DESIGN SPEED: N/A					
ADT:	5,610 (2021)	IH-45 SBFR over Sims Bayou			
ADT:	84,600 (2021)	US-290 over Cypress Rosehill			
ADT:	194,700 (2021)	US-59 over US 90A & UPRR			
ADT:	18,800 (2021)	FM 2234 over Clear Creek			

	FED. RD. DIST. NO.	PROJECT NO.		SHEET NO.
	6	BPM 638209001		1
	STATE	STATE DIST.	COUNTY	
	TEXAS	12	HARRIS, ETC	
	CONT.	SECT.	JOB	HIGHWAY NO.
	6382	09	001	US 290, ETC

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

INDEX OF SHEETS
SEE SHEET 2

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT
BRIDGE PREVENTATIVE MAINTENANCE PROJECT

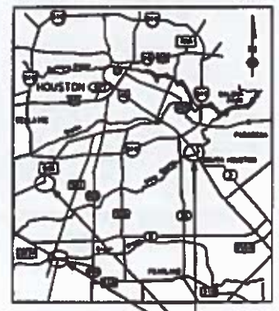
PROJECT NO. BPM 638209001
CONTROL NO. 6382-09-001
HARRIS COUNTY

NET LENGTH OF BPM 6382-09-001 = ROADWAY= 0.000 FT = 0.000 MILES
BRIDGE= 3332.000 FT = 0.631 MILES
TOTAL = 3332.000 FT = 0.631 MILES

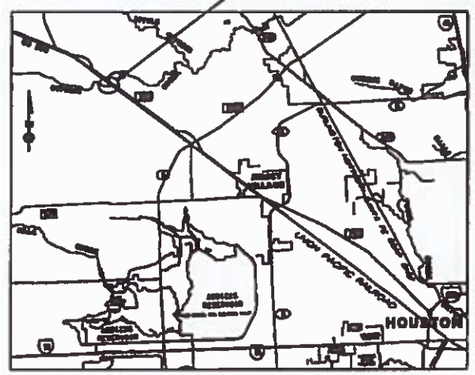
LIMITS: VARIOUS HWYS IN HARRIS & FT. BEND COUNTY

SEALED EXPANSION JOINT (SEJ) & BEARING PAD REPLACEMENT, AND MISCELLANEOUS WORK

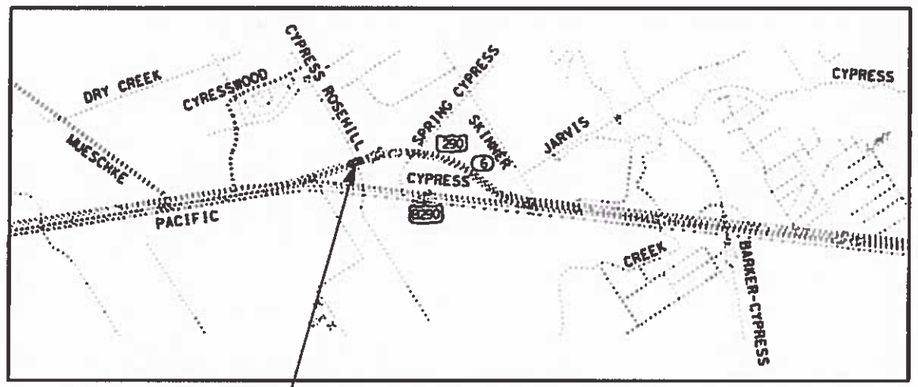
VICINITY MAP



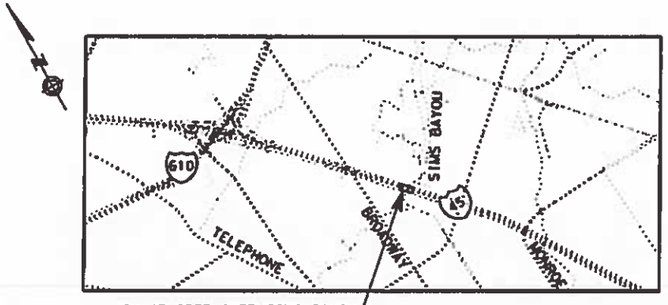
PROJECT LOCATIONS



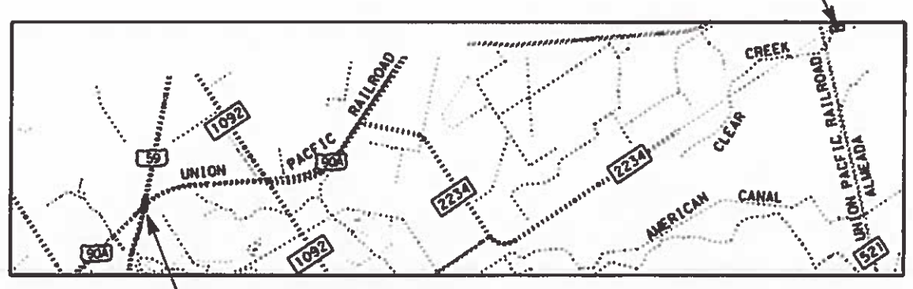
VICINITY MAP



US-290 OVER CYPRESS ROSEHILL
NBI= 12-102-0050-06-148



IH-45 SBFR OVER SIMS BAYOU
NBI= 12-102-0500-03-294



US-59/IH-69 OVER US 90A & UPRR
NBI= 12-080-0027-12-323

FM 2234 OVER CLEAR CREEK
NBI= 12-080-2105-01-004

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

PROJECT LOCATION MAPS
NOT TO SCALE

EXCEPTIONS : NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING: 08/17/2021

Mark Bellamy, P.E.
AREA ENGINEER

APPROVED FOR LETTING: 9-28-2021

Melody I. Galland, P.E.
DIRECTOR OF MAINTENANCE

COUNTY HARRIS, ETC PROJ. NO. BPM 638209001
HWY. NO. US 290, ETC LETTING DATE
DATE ACCEPTED

H:\WCMO\Region\Maintenance Projects\BPM\BPM 6382-09-001\Plan Set\1_General\BPM_TITLE SHEET.dgn

GENERAL

TRAFFIC CONTROL PLANS

BRIDGE REPAIRS

US 290 OVER CYPRESS ROSEHILL RD

IH-45 SBFR OVER SIMS BAYOU

US 59 / US 69 OVER US 90 A & UPRR

FM 2234 OVER CLEAR CREEK

TRAFFIC CONTROL STANDARDS

STANDARDS / DETAILS

SW3P

STATE OF TEXAS
DEDRICK D. KNIGHTEN
103612
LICENSED
PROFESSIONAL ENGINEER

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

Dedrick D. Knighten, P.E. DATE: 9/2/2021

TEXAS DEPARTMENT OF TRANSPORTATION

US - 290 ETC
INDEX OF SHEETS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		2
STATE	STATE DIST. NO.	COUNTY	
TEXAS	HOU	HARRIS,ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290,ETC

General Notes:

General:

This is a Routine Maintenance Site Specific Contract.

This is a 60 working day project.

The majority of the work proposed on this project is based on recommendations from the Bridge Inspection Reports. These reports are available upon request through the Area Office.

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

Hamoon Bahrami, P.E. at **Hamoon Bahrami@txdot.gov**
Brett McLeod, P.E. at **Brett.McLeod@txdot.gov**

Contractor questions will be accepted through email, phone, and in person by the above individuals. Contractor questions will be reviewed by the Area Engineer or Assistant Area Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following address:

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

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

The Contractor will begin call out work within the required time for each work order. Work orders are expected to be completed per the contract plans within the number of days allowed for each work order. All call out work orders will have a begin date and number of working days. The Contractor will begin work within 48 hours of notification for routine call outs, unless otherwise approved by the Engineer. Work will be completed within the required number of working days. The Contractor will begin work within 4 hours of notification for emergency call outs and complete within 48 hours, unless otherwise approved by the Engineer. Failure to begin work within the required time and proceed to completion within the required time will result in the assessment of liquidated damages.

If fixed features require, the governing slopes shown may vary between the limits shown and to the extent determined by the Engineer.

Notify the Engineer immediately if discrepancies are discovered in the horizontal control or the benchmark data.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved, except for roadway illumination, electrical, and traffic signal items.

The cost for materials, labor, and incidentals to provide for traffic across the roadway and for ingress and egress to private property in accordance with Section 7.2.4 of the standard specifications is subsidiary to the various bid items. Restore access roadways to their original condition upon completing construction.

Stencil the National Bridge Inventory (NBI) number on each existing bridge shown on these plans. The NBI number is shown above the title block for each bridge layout.

Clearly mark or highlight on the shop drawings, the items being furnished for this project. Submit required shop drawings in accordance with the shop drawing distribution list shown in the note for Item 5 for review and distribution.

Tolls incurred by the Contractor are incidental to the various bid items.

Procure permits and licenses, which are to be issued by the City, County, or Municipal Utility District.

General: Site Management

Do not mix or store materials, or store or repair equipment, on top of concrete pavement or bridge decks unless authorized by the Engineer. Permission will be granted to store materials on surfaces if no damage or discoloration will result.

Personal vehicles of employees are not permitted to park within the right of way, including sections closed to public traffic. Employees may park on the right of way at the Contractor's office, equipment, and materials storage yard sites.

Assume ownership of debris and dispose of at an approved location. Do not dispose of debris on private property unless approved in writing by the District Engineer.

Control the dust caused by construction operations. For sweeping the base material in preparation for laying asphalt and for sweeping the finished concrete pavement, use one of the following types of sweepers or approved equal:

Tricycle Type	**Truck Type - 4 Wheel**
Wayne Series 900	M-B Cruiser II
Elgin White Wing	Wayne Model 945
Elgin Pelican	Mobile TE-3
	Mobile TE-4
	Murphy 4042

General: Traffic Control and Construction

When design details are not shown on the plans, provide signs and arrows conforming to the latest "Standard Highway Sign Designs for Texas" manual.

General: Utilities

Consider the locations of underground utilities depicted in the plans as approximate and employ responsible care to avoid damaging utility facilities. Depending upon scope and magnitude of planned construction activities, advanced field confirmation by the utility owner or operator may be prudent. Where possible, protect and preserve permanent signs, markers, and designations of underground facilities.

If the Contractor damages or causes damage (breaks, leaks, nicks, dents, gouges, etc.) to the utility, contact the utility facility owner or operator immediately.

Be aware that an operational Computerized Transportation Management System (CTMS) exists within the limits of this project and that the system must remain operational throughout construction. If the Contractor damages or causes damage to this system, repair such damage within 8 hours of occurrence at no cost to the Department. In the event of system damage, notify the Director of Traffic Management Systems at 713-881-3283 within one hour of occurrence. Failure of the Contractor to repair damage to the main fiber optic cable and CCTV cable trunk lines, which convey all corridor information to TranStar, will result in the Contractor being billed for the full cost of emergency repairs.

At least 72 hours before starting work, make arrangements for locating existing Department-owned above ground and underground fiber optic, communications, power, illumination, and traffic signal cabling and conduit. Do this by calling the Department's Houston District Traffic Signal Operations Office at 713-802-5662, or by e-mailing the Department's Houston District Traffic Signal Operations Office at **locaterquest@txdot.gov**, to schedule marking of underground lines on the ground. Use caution if working in these areas to avoid damaging or interfering with existing facilities.

Notify the Engineer at least 48 hours before constructing junction boxes at storm drain and utility intersections.

Install or remove poles and luminaires located near overhead or underground electrical lines using established industry and utility safety practices. Consult the appropriate utility company before beginning such work.

If overhead or underground power lines need to be de-energized, contact the electrical service provider to perform this work. Costs associated with de-energizing the power lines or other protective measures required are at no expense to the Department.

If working near power lines, comply with the appropriate sections of Texas State Law and Federal Regulations relating to the type of work involved.

Perform electrical work in conformance with the National Electrical Code (NEC) and Department's standard sheets.

Before beginning any underground work, notify the City of Houston's Chief Inspector, Public Works and Engineering, to establish the locations of any existing electrical systems for lighting facilities within the limits of this project.

Item 5: Control of Work

Before contract letting, cross-section data for this project will be available to the prospective bidders in PDF format on the Department's Houston District website located at:

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/Houston%20District/Construction%20Projects/

The cross-section data provided above is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the data with the appropriate plans, specifications, and estimates for the projects.

Submit shop drawings electronically for the fabrication of items as documented in Table 1 or Table 2 below. Information and requirements for electronic submittals can be viewed in the "Guide to Electronic Shop Drawing Submittal" which can be accessed through the following web link, ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/e_submit_guide.pdf. References to 11 in. x 17 in. sheets in individual specifications for structural items imply electronic CAD sheets.

Table 1
2014 Construction Specification Required Shop/Working Drawing Submittals - TxDOT Generated Plans

Spec Item No.'s	Product	Submittal Required	Approval Required (Y/N)	Contractor/ Fabricator P.E. Seal Required	Reviewing Party	Shop or Working Drawing (Note 1)
7.16.1& 2	Construction Load Analyses	Y	Y	Y	B	WD
400	Excavation and Backfill for Structures (cofferdams)	Y	N	Y	A	WD
403	Temporary Special Shoring	Y	N	Y	C	WD
420	Formwork/Falsework	Y	N	Y	A	WD
423	Retaining Walls, (calcs req'd.)	Y	Y	Y	C	SD
425	Optional Design Calculations (Prstrs Bms)	Y	Y	Y	B	SD
425	Prestr Concr Sheet Piling	Y	Y	N	B	SD
425	Prestr Concr Beams	Y	Y	N	B	SD
425	Prestr Concr Bent	Y	Y	N	B	SD
426	Post Tension Details	Y	Y	N	B	SD
434	Elastomeric Bearing Pads (All)	Y	Y	N	B	SD
441	Bridge Protective Assembly	Y	Y	N	B	SD
441	Misc Steel (various steel assemblies)	Y	Y	N	B	SD
441	Steel Pedestals (bridge raising)	Y	Y	N	B	SD
441	Steel Bearings	Y	Y	N	B	SD
441	Steel Bent	Y	Y	N	B	SD
441	Steel Diaphragms	Y	Y	N	B	SD
441	Steel Finger Joint	Y	Y	N	B	SD
441	Steel Plate Girder	Y	Y	N	B	SD
441	Steel Tub-Girders	Y	Y	N	B	SD

441	Erection Plans, including Falsework	Y	N	Y	A	WD
449	Sign Structure Anchor Bolts	Y	Y	N	T	SD
450	Railing	Y	Y	N	A	SD
462	Concrete Box Culvert	Y	Y	N	C	SD
462	Concrete Box Culvert (Alternate Designs Only,calcs reqd.)	Y	Y	Y	B	SD
464	Reinforced Concrete Pipe (Jack and Bore only; ONLY when requested)	Y	Y	Y	A	SD
465	Pre-cast Junction Boxes, Grates, and Inlets	Y	Y	N	A	SD
465	Pre-cast Junction Boxes, Grates, and Inlets (Alternate Designs Only, calcs req'd.)	Y	Y	Y	B	SD
466	Pre-cast Headwalls and Wingwalls	Y	Y	N	A	SD
467	Pre-cast Safety End Treatments	Y	Y	N	A	SD
495	Raising Existing Structure (calcs reqd.)	Y	Y	Y	B	SD
610	Roadway Illumination Supports (Non-Standard only, calcs reqd.)	Y	Y	Y	BRG	SD
613	High Mast Illumination Poles (Non-standard only, calcs reqd.)	Y	Y	Y	BRG	SD
627	Treated Timber Poles	Y	Y	N	T	SD
644	Special Non-Standard Supports (Bridge Mounts, Barrier Mounts, Etc.)	Y	Y	Y	T	SD
647	Large Roadside Sign Supports	Y	Y	Y	T	SD
650	Cantilever Sign Structure Supports - Alternate Design Calcs.	Y	Y	Y	T	SD
650	Sign Structures	Y	Y	N	T	SD
680	Installation of Highway Traffic Signals	Y	Y	N	T	SD
682	Vehicle and Pedestrian Signal Heads	Y	Y	N	T	SD
684	Traffic Signal Cables	Y	Y	N	T	SD
685	Roadside Flashing Beacon Assemblies	Y	Y	N	T	SD
686	Traffic Signal Pole Assemblies (Steel) (Non-Standard only)	Y	Y	Y	T	SD
687	Pedestal Pole Assemblies	Y	Y	N	T	SD
688	Detectors	Y	Y	N	A	SD
784	Repairing Steel Bridge Members	Y	Y	Y	B	WD
SS	Prestr Concr Crown Span	Y	Y	N	B	SD
SS	Sound Barrier Walls	Y	Y	Y	A	SD
SS	Camera Poles	Y	Y	Y	TMS	SD
SS	Pedestrian Bridge (Calcs req'd.)	Y	Y	Y	B	SD
SS	Screw-In Type Anchor Foundations	Y	Y	N	T	SD
SS	Fiber Optic/Communication Cable	Y	Y	N	TMS	SD
SS	Spread Spectrum Radios for Signals	Y	Y	N	T	SD
SS	VIVDS System for Signals	Y	Y	N	T	SD
SS	CTMS Equipment	Y	Y	N	TMS	SD

Notes:

1. Document flow for Working Drawings differs from Shop Drawings in that Working Drawings must be submitted to the Engineer rather than the Engineer of Record and they are for the information of the Engineer only; an approval stamp and distribution to all project offices is not required.

Key to Reviewing Party

A - Area Office

Area Office	Email Address
Brazoria Area Office	HOU-BRZAShpDrwgs@txdot.gov
Fort Bend Area Office	HOU-FBAShpDrwgs@txdot.gov
Galveston Area Office	HOU-GALVAShpDrwgs@txdot.gov
Montgomery Area Office	HOU-MONTAShpDrwgs@txdot.gov
North Harris Area Office	HOU-NHAShpDrwgs@txdot.gov
Southeast Area Office	HOU-SEHAShpDrwgs@txdot.gov
Traffic Systems Construction Office	HOU-TSCShpDrwgs@txdot.gov
West/Central Harris Area Office	HOU-WWCHAOShpDrwgs@txdot.gov

B - Houston Bridge Engineer

Bridge Design (Houston TxDOT)	HOU-BrgShpDrwgs@txdot.gov

BRG - Austin Bridge Division

Bridge Design (Austin TxDOT)	BRG_ShopPlanReview@txdot.gov

C - Construction Office

Construction	HOU-ConstrShpDrwgs@txdot.gov
Laboratory	HOU-LabShpDrwgs@txdot.gov

T - Traffic Engineer

Traffic Operations	HOU-TrfShpDrwgs@txdot.gov

TMS – Traffic Management System

Computerized Traffic Management Systems (CTMS)	HOU-CTMSShpDrwgs@txdot.gov

Item 7: Legal Relations and Responsibilities

Do not initiate activities in a Project Specific Location (PSL), associated with a U.S. Army Corps of Engineers (USACE) permit area, that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include those pertaining to, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined here means materials are delivered to or from the PSL. The permit area includes the waters of the U.S. or associated wetlands affected by activities associated with this project. Special restrictions may be required for such work. Assume responsibility for consultations with the USACE regarding activities, including PSLs that have not been previously evaluated by the USACE. Provide the Department with a copy of consultations or approvals from the USACE before initiating activities.

The Contractor may proceed with activities in PSLs that do not affect a USACE permit area if a self-determination has been made that the PSL is non-jurisdictional or if proper USACE clearances have been obtained in jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. The Contractor is solely responsible for documenting any determinations that their activities do not affect a USACE permit area. Maintain copies of their determinations for review by the Department or any regulatory agency.

Document and coordinate with the USACE, if required, before hauling any excavation from or hauling any embankment to a USACE permit area by either 1 or 2 below:

1. **Restricted Use of Materials for the Previously Evaluated Permit Areas.** Document both the Project Specific Locations (PSL) and their authorization. Maintain copies for review by the Department or any regulatory agency. When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:
   a. Suitable excavation of required material in the areas shown on the plans and cross sections as specified in the Item, "Excavation" is used for permanent or temporary fill (under the Item, "Embankment") within a USACE permit area.
   b. Suitable embankment (under the Item, "Embankment") from within the USACE permit area is used as fill within a USACE evaluated area.
   c. Unsuitable excavation or excess excavation, "Waste" (under the Item, "Excavation"), that is disposed of at a location approved within a USACE evaluated area.

2. **Contractor Materials from Areas Other than Previously Evaluated Areas.** Provide the Department with a copy of USACE coordination or approvals before initiating any activities for an area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to, haul roads, equipment staging areas, borrow and disposal sites:
   a. The Item, "Embankment" used for temporary or permanent fill within a USACE permit area.
   b. Unsuitable excavation or excess excavation, "Waste" (under the Item, "Excavation"), that is disposed of outside a USACE evaluated area.

This project does not require a U.S. Army Corps of Engineers (USACE) Section 404 Permit before letting, but if a permit is needed during construction, assume responsibility for preparing the permit application. Submit the permit application to the Department's District Environmental Section for approval. Once the permit application is approved, the Department will submit it to the USACE. Assume responsibility for the requested revisions, in coordination with the Department's District Environmental Section.

The nesting / breeding season for migratory birds is February 15 through September 30.

Take measures to prevent the building of nests on any structures or trees within the project limits throughout the duration of the construction if work / removal will be performed during the nesting / breeding season. This can be accomplished by application of bird repellent gel, netting by hand every 3 to 4 days, or any other non-threatening method approved by the Houston District Environmental Section. Obtain this approval well in advance of the planned use. Contact the Houston District Environmental Section at 713-802-5244. The cost of this work is subsidiary to the various bid items.

No significant traffic generator events have been identified.

Item 8: Prosecution and Progress

The Department will not adjust the number of days for the project and milestones, if any, due to differences in opinion regarding any assumptions made in the preparation of the schedule or for errors, omissions, or discrepancies found in the time determination schedule.

Working days will be computed and charged based on a 7- day workweek in accordance with Section 8.3.1.*3* with nighttime work in accordance with Section 8.3.1.3.

The Lane Closure Assessment Fee are shown in the table below. These fees apply to the Contractor for closures or obstructions that overlap into restricted hour traffic for each hour or portion thereof, per lane, regardless of the length of lane closure or obstruction. For Restricted Hours subject to Lane Assessment Fee refer to the Item, "Barricades, Signs, and Traffic Handling."

Lane Assessment Fees

Location	ADT (2021)	Lane Closure Fee (phpl)
US 290 over Cypress Rosehill Rd	84,600	$2,000
US 59/69 over US 90 A	194,700	$4,500
IH 45 SBFR over Sims Bayou	5,810	$200
FM 2234 over Clear Creek	18,800	$400

Item 423: Retaining Walls

Approved Concrete Block Retaining Wall Systems are listed at the website below or from the Department's home page>Business>Bridge>Retaining Walls>Approved Concrete Block Retaining Wall Systems:

http://www.txdot.gov/business/resources/approved-systems/retaining-system.html

Item 500: Mobilization

This contract consists of one (1) lump sum (LS) Mobilization.

Item 502: Barricades, Signs, and Traffic Handling

Use a traffic control plan for handling traffic through the various phases of construction. Follow the phasing sequence unless otherwise agreed upon by the Area Engineer and the Project Manager. Ensure this plan conforms to the latest "Texas Manual on Uniform Traffic Control Devices" and the latest Barricade and Construction (BC) Standard Sheets. The latest versions of Work Zone Standard Sheets WZ (BTS-1) and WZ (BTS-2) are the traffic control plan for the signal installations.

Submit changes to the traffic control plan to the Area Engineer. Provide a layout showing the construction phasing, signs, striping, and signalizations for changes to the original traffic control plan.

Furnish and maintain the barricades and warning signs, including the necessary temporary and portable traffic control devices, during the various phases of construction. Place and construct these barricades and warning signs in accordance with the latest "Texas Manual on Uniform Traffic Control Devices" for typical construction layouts.

Cover work zone signs when work related to the signs is not in progress, or when any hazard related to the signs no longer exists.

Keep the delineation devices, signs, and pavement markings clean. This work is subsidiary to the Item, "Barricades, Signs, and Traffic Handling."

Erect temporary signs when exit ramps are closed or moved to new locations during construction.

Before detouring traffic onto the mainlane shoulders, remove dirt, debris, vegetation, and other deleterious material from the surface of the shoulders. Appropriately sign the detour in an approved manner. This work is subsidiary to the various bid items.

Coordinate and schedule the work with the appropriate Metro representative if requiring access to the High Occupancy Vehicle lanes.

Cover or remove the permanent signs and construction signs that are incorrect or that do not apply to the current situation for a particular phase.

Replace the overhead signs, informational signs, and exit signs to be removed, with temporary signs providing the correct information to the traveling public. Size the replacement signs and include them in the traffic control plan.

Do not mount signs on drums or barricades, except those listed in the latest Barricades and Construction standard sheets.

Use traffic cones for daytime work only. Replace the cones with plastic drums during nighttime hours.

Place positive barriers to protect drop-off conditions greater than 2 ft. within the clear zone that remain overnight.

All lane closures are considered subsidiary to the various bid items.

Do not reduce the existing number of lanes open to traffic except as shown on the following time schedule:

One Lane Closures (Frontage Roads*)

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday	9:00 AM – 3:00 PM	9:00 PM – 5:00 AM	5:00 AM – 9:00 AM 3:00 PM – 9:00 PM
Tuesday	9:00 AM – 3:00 PM	9:00 PM – 5:00 AM	5:00 AM – 9:00 AM 3:00 PM – 9:00 PM
Wednesday	9:00 AM – 3:00 PM	9:00 PM – 5:00 AM	5:00 AM – 9:00 AM 3:00 PM – 9:00 PM
Thursday	9:00 AM – 3:00 PM	9:00 PM – 5:00 AM	5:00 AM – 9:00 AM 3:00 PM – 9:00 PM
Friday	9:00 AM – 3:00 PM	9:00 PM – 5:00 AM	5:00 AM – 9:00 AM 3:00 PM – 9:00 PM
Saturday	5:00 AM – 5:00 PM	5:00 PM – 5:00 AM	N/A
Sunday	5:00 AM – 5:00 PM	5:00 PM – 5:00 AM	N/A

*Includes closure of U-turns.

One or More Lane Closures (Mainlanes)**

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Tuesday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Wednesday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Thursday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Friday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Saturday	5:00 AM – 5:00 PM	5:00 PM – 5:00 AM	N/A
Sunday	5:00 AM – 5:00 PM	5:00 PM – 5:00 AM	N/A

**Unless otherwise approved by the Area Engineer, a minimum of two (2) main lanes must remain open at all times except when total closures of mainlanes are permitted.

Total Closures (Ramps)

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Tuesday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Wednesday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Thursday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Friday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Saturday	5:00 AM – 5:00 PM	5:00 PM – 5:00 AM	N/A
Sunday	5:00 AM – 5:00 PM	5:00 PM – 5:00 AM	N/A

Total Closures (HOV)

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday	Not Permitted	9:00 PM – 4:00 AM	4:00 AM – 9:00 PM
Tuesday	Not Permitted	9:00 PM – 4:00 AM	4:00 AM – 9:00 PM
Wednesday	Not Permitted	9:00 PM – 4:00 AM	4:00 AM – 9:00 PM
Thursday	Not Permitted	9:00 PM – 4:00 AM	4:00 AM – 9:00 PM
Friday	Not Permitted	9:00 PM – 4:00 AM	4:00 AM – 9:00 PM
Saturday	5:00 AM – 5:00 PM	5:00 PM – 5:00 AM	N/A
Sunday	5:00 AM – 5:00 PM	5:00 PM – 5:00 AM	N/A

Total Closures (Mainlanes*)

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Tuesday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Wednesday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Thursday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Friday	Not Permitted	9:00 PM – 5:00 AM	5:00 AM – 9:00 PM
Saturday	5:00 AM – 5:00 PM	5:00 PM – 5:00 AM	N/A
Sunday	5:00 AM – 5:00 PM	5:00 PM – 5:00 AM	N/A

*Unless otherwise approved by the Area Engineer, total closures of mainlanes are only permitted for bridge jacking/bearing pad replacement operation and bridge joint replacement operation.

The above times are approved for the traffic control conditions listed. The Area Engineer may approve other closure times if traffic counts warrant. The Area Engineer may reduce the above times for special events.

Law enforcement assistance will be required for this project and is expected to be required for major traffic control changes and lane closures. Coordinate with local law enforcement and arrange for law enforcement as directed or agreed by the Engineer. Before payment will be made, complete the "Daily Report on Law Enforcement Force Account Work" (Form 318), provided by the Department and submit daily invoices that agree with this form for any day during the month in which approved services were provided.

Provide full-time, off-duty, uniformed, certified peace officers, as part of traffic control operations. The peace officers must be able to show proof of certification by the Texas

Commission on Law Enforcement Officers Standards. The cost of the officers is paid for on a force account basis.

A minimum of 7 days in advance of any total closure, notify the Houston District Public Information Office of which roadways, ramps, intersections, or lanes will be closed, the dates they will remain closed, and when they will be opened again to traffic.

A minimum of 7 days in advance of any total closure, place a portable changeable message (PCM) sign at the location of each total closure which informs the traveling public of the details of the closure. Alternately, if the Traffic Control Plan provides a positive barrier at the location, a non-trailer mounted static message board sign behind the positive barrier may be used in place of a PCM.

All work and materials associated with portable changeable message signs and truck mounted attenuators will be paid for directly under Item 6001, "Portable Changeable Message Sign" and Item 6185, "Truck Mounted Attenuator (TMA)," respectively.

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

All work and materials furnished with this item are subsidiary to the pertinent bid items except:

- Portable changeable message boards payable under Item 6001
- Truck mounted attenuators payable under Item 6185
- Law enforcement payable under force account

Item 506: Temporary Erosion, Sedimentation and Environmental Controls

The use of hay bales is not permitted as Storm Water Pollution Prevention Plan (SWP3) measures.

The Storm Water Pollution Prevention Plan (SWP3) consists of temporary erosion control measures needed and provided for under this Item. The disturbed area is less than one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7. Since the disturbed area is less than 5 acres, a "Notice of Intent" (NOI) is not required.

Use appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction staging area. Remove and dispose of materials in compliance with State and Federal laws.

Before starting construction, review with the Engineer the SWP3 used for temporary erosion control as outlined on the plans. Before construction, place the temporary erosion and sedimentation control features as shown on the SWP3.

After completing earthwork operations, restore and reseed the disturbed areas in accordance with the Department's specifications for permanent or temporary erosion control.

Implement temporary and permanent erosion control measures to comply with the National Pollution Discharge Elimination System (NPDES) general permit under the Clean Water Act.

Before starting grading operations and during the project duration, place the temporary or permanent erosion control measures to prevent sediment from leaving the right of way.

Item 4002: Elastomeric Bearing Pads

Provide bridge jacking plans signed and sealed by a professional engineer to raise the bridge for bearing pad replacement.

For each bridge, salvage two (2) of the existing bearing pads that have been removed and provide to TxDOT for future testing.

Bridge must remain completely closed to traffic during bridge jacking and bearing pad replacement operation and bridge joint replacement operation. See notes under Item 502 for allowable total closure times.

Item 6185: Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

A shadow vehicle with Truck Mounted Attenuators (TMAs) or Trailer Attenuators (TAs) is required as shown on the appropriate Traffic Control Plan (TCP) sheets. TMAs/TAs must meet the requirements of the Compliant Work Zone Traffic Control Device List.

Level 3 Compliant TMAs/TAs are required for this project.

In addition to the shadow vehicles with TMAs/TAs that are specified as being required on the TCP layout sheets for this project, provide additional shadow vehicles with TMAs/TAs as shown on the TCP Standard sheets. The Contractor is responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs/TAs needed on the project.

Estimate & Quantity Sheet

Texas Department of Transportation

CONTROLLING PROJECT ID 6382-09-001 **DISTRICT** Houston **COUNTY** Harris
HIGHWAY US0290

				CONTROL SECTION JOB	6382-09-001	TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00177095		
				COUNTY	Harris		
				HIGHWAY	US0290		
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	423-6004	RETAINING WALL (CONC BLOCK)	SF	200.000		200.000	
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF	135.000		135.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	4.000		4.000	
	438-6001	CLEANING AND SEALING EXISTING JOINTS	LF	87.000		87.000	
	481-6002	PIPE (PVC) (SDR - 35) (6 IN)	LF	10.000		10.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3.000		3.000	
	776-6006	REPAIR (T201 W/ STEEL PIPE RAIL - C201)	LF	10.000		10.000	
	776-6033	REPAIR TY (T4 (S) RAIL)	LF	25.000		25.000	
	778-6011	CONCRETE RAIL REPAIR (TYPE 501)	LF	3.000		3.000	
	785-6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	58.000		58.000	
	4002-6001	REPLACE ELASTOMERIC BEARING PADS	EA	101.000		101.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	60.000		60.000	
	6185-6002	TMA (STATIONARY)	DAY	60.000		60.000	

US 290 OVER CYPRESS ROSEHILL RD		
429	785	4002
6005	6011	6001
CONC STR REPAIR (DECK REP) (FULL DEPTH))	BRIDGE JOINT REPLACEMENT (SEJ)	REPLACE ELASTOMERIC BEARING PADS
SF	LF	EA
135	58	28

IH 69/US 59 OVER US 90A & UPRR				
423	481	776	778	4002
6004	6002	6033	6011	6001
RETAINING WALL (CONC BLOCK)	PIPE PVC (SDR-35)	REPAIR TY (T4(S)RAIL)	CONCRETE RAIL REPAIR	REPLACE ELASTOMERIC BEARING PADS
SF	LF	LF	LF	EA
200	10	25	3	46

FM 2234 OVER CLEAR CREEK
4002
6001
REPLACE ELASTOMERIC BEARING PADS
EA
13

IH 45 SBFR OVER SIMS BAYOU			
429	438	776	4002
6007	6001	6006	6001
CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEANING AND SEALING EXISTING JOINTS	REPAIR (T201 W/STEEL PIPE RAIL-C201)	REPLACE ELASTOMERIC BEARING PADS
SF	LF	LF	EA
4	87	10	14

SUMMARY OF QUANTITIES

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		5
STATE	DIST.	COUNTY	
TEXAS	12	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

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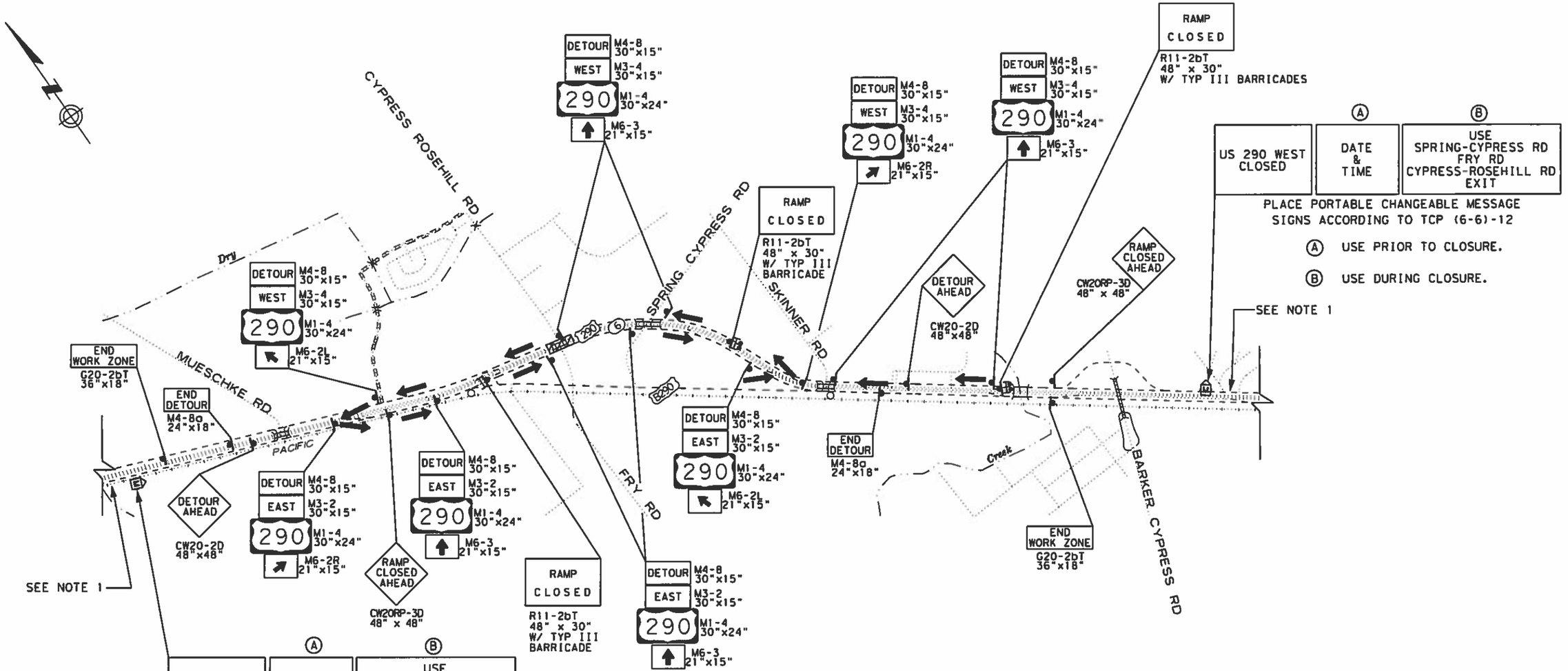

PLACE PORTABLE CHANGEABLE MESSAGE SIGNS ACCORDING TO TCP (6-6)-12

Ⓐ USE PRIOR TO CLOSURE.

Ⓑ USE DURING CLOSURE.

LEGEND

- WORK ZONE
- TYPE III BARRICADE
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- DIRECTIONAL ARROW

NOTES:

1. SEE TCP STANDARD TCP (6-6)-12 "TRAFFIC CONTROL PLAN FREEWAY CLOSURE FOR TRAFFIC CONTROL INFORMATION.
2. SEE TCP STANDARD TCP (6-2)-12 "TRAFFIC CONTROL PLAN WORK AREA NEAR RAMP TCP FOR TRAFFIC CONTROL INFORMATION.
3. SEE TCP STANDARD TCP (2-6)-18 "TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTIPLANE CONVENTIONAL ROADS TCP "FOR TRAFFIC CONTROL INFORMATION.
4. COORDINATE WITH METRO IF NEEDED, HOV LANES ARE CLOSED DURING CONSTRUCTION

THIS TRAFFIC CONTROL PLAN IS FOR USE ON WEEKENDS ONLY (9:00PM FRIDAY TO 5:00AM THE FOLLOWING MONDAY)

STATE OF TEXAS
DEDRICK D. KNIGHTEN
103612
LICENSED
PROFESSIONAL ENGINEER

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9/2 , 2021

Dedrick D. Knighten P.E.

US 290 OVER CYPRESS ROSEHILL RD DETOUR PLAN

SHEET 1 OF 2

Texas Department of Transportation

SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		6
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

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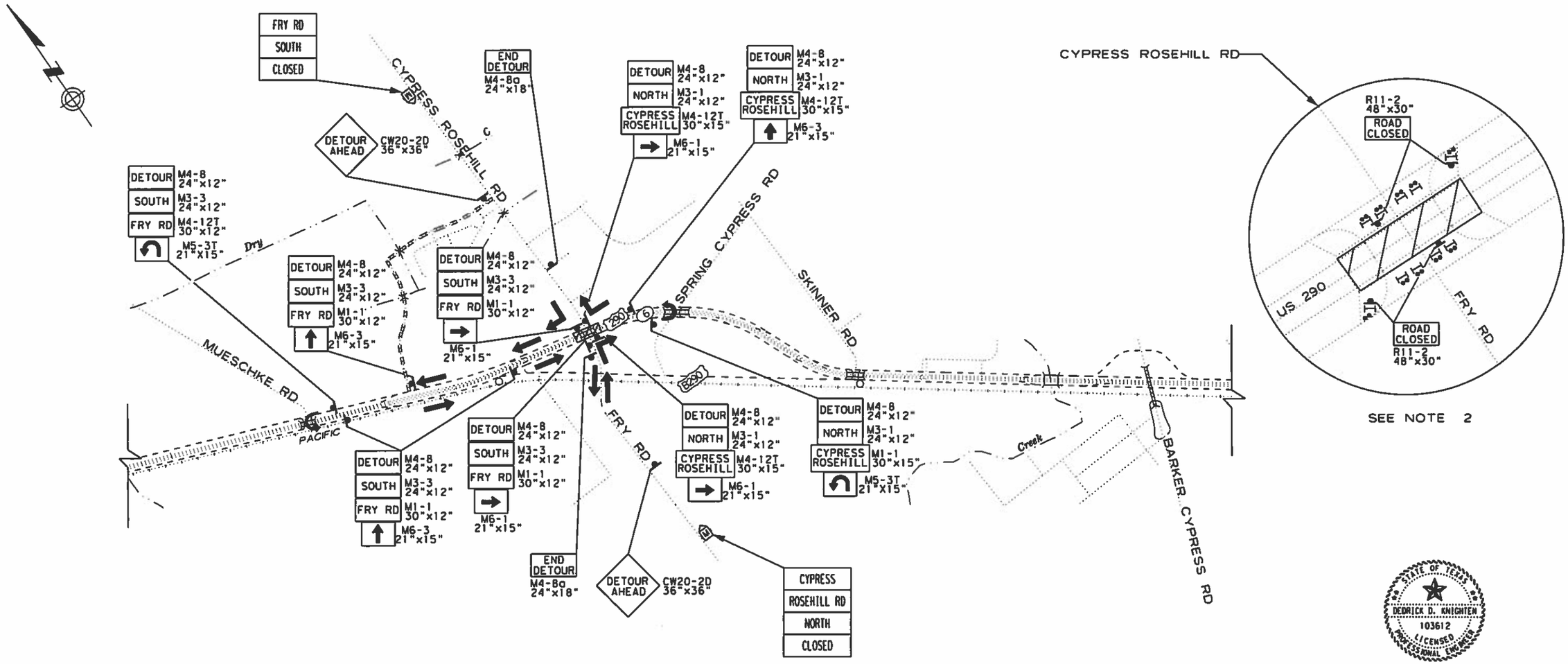

LEGEND

- WORK ZONE
- TYPE III BARRICADE
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- DIRECTIONAL ARROW
- TRAFFIC DRUM

NOTES:

1. SEE TCP STANDARD TCP (2-4)-18 "TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTIPLANE CONVENTIONAL ROADS FOR TRAFFIC CONTROL INFORMATION.
2. PLACE TYPE III BARRICADES WITH DRUMS AT WORK ZONE INTERSECTIONS FOR THE NORTHBOUND AND SOUTHBOUND APPROACH FOR THE INTERSECTION AND U-TURNS WHEN PERFORMING WORK OVER THE ROADWAY.

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US 290 OVER CYPRESS ROSEHILL RD DETOUR PLAN

SHEET 2 OF 2

Texas Department of Transportation

 SCALE N. T. S.

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		7
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

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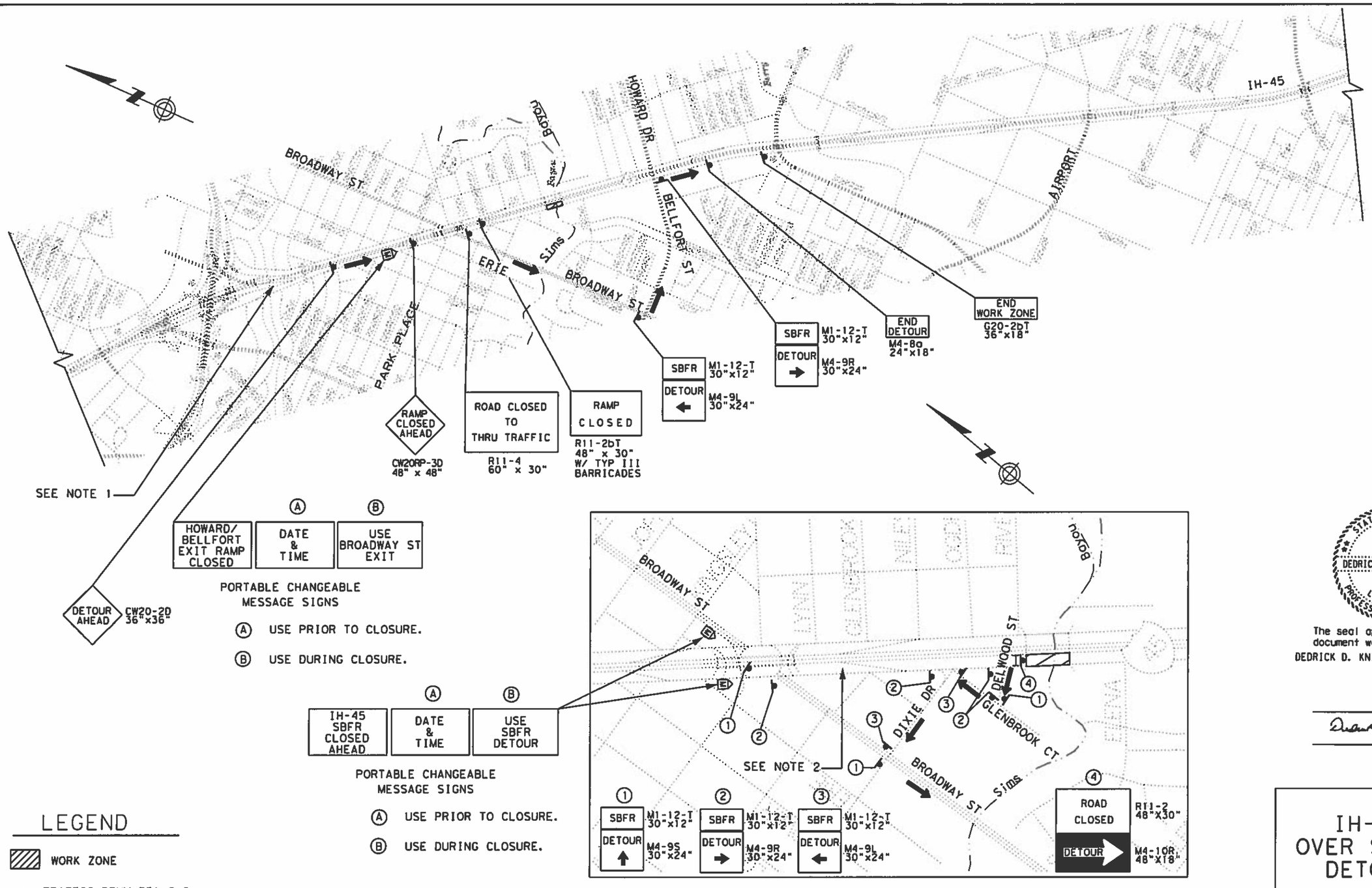

LEGEND

- WORK ZONE
- TRAFFIC DRUM 35' C-C
- TYPE III BARRICADE
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- DIRECTIONAL ARROW

NOTE:

1. SEE TCP (6-3b) OF STANDARD TCP (6-3)-12 FOR CLOSURE OF IH-45 SOUTHBOUND EXIT RAMP TO HOWARD/BELLFORT.
2. SEE TCP (2-6)-18 FOR LEFT LANE CLOSURE OF IH-45 SBFR.

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2021
P.E.

IH-45 SBFR OVER SIMS BAYOU DETOUR PLAN

SHEET 1 OF 1

Texas Department of Transportation

SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		8
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

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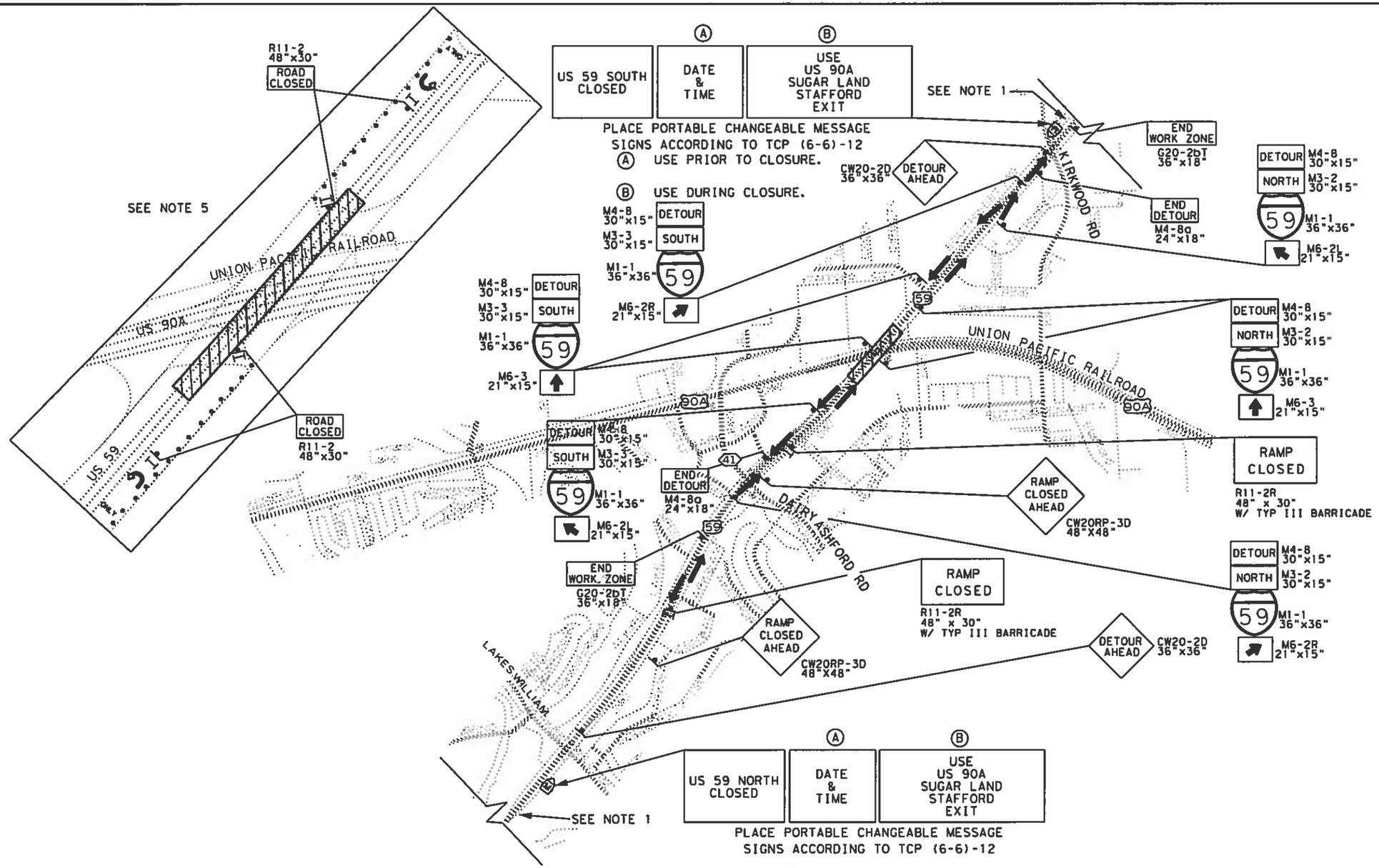

LEGEND

- WORK ZONE
- TRAFFIC DRUM 35' C-C
- TYPE III BARRICADE
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TRAILER MOUNTED FLASHING ARROW BOARD
- DIRECTIONAL ARROW

NOTES:

1. SEE TCP STANDARD TCP (6-6)-12 "TRAFFIC CONTROL PLAN FREEWAY CLOSURE FOR TRAFFIC CONTROL INFORMATION.
2. SEE TCP STANDARD TCP (6-2)-12 "TRAFFIC CONTROL PLAN WORK AREA NEAR RAMP FOR TRAFFIC CONTROL INFORMATION.
3. SEE TCP STANDARD TCP (2-6)-18 "TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTIPLANE CONVENTIONAL ROADS FOR TRAFFIC CONTROL INFORMATION.
4. COORDINATE WITH METRO IF NEEDED, HOV LANES ARE CLOSED DURING CONSTRUCTION
5. PLACE TYPE III BARRICADES WITH DRUMS AND CLOSE THE U-TURN WHEN PERFORMING WORK OVER THE ROADWAY.

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DEDRICK D. KNIGHTEN
103612
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US 59/IH 69 OVER US 90 A DETOUR PLAN

SHEET 1 OF 1

Texas Department of Transportation

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FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		9
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

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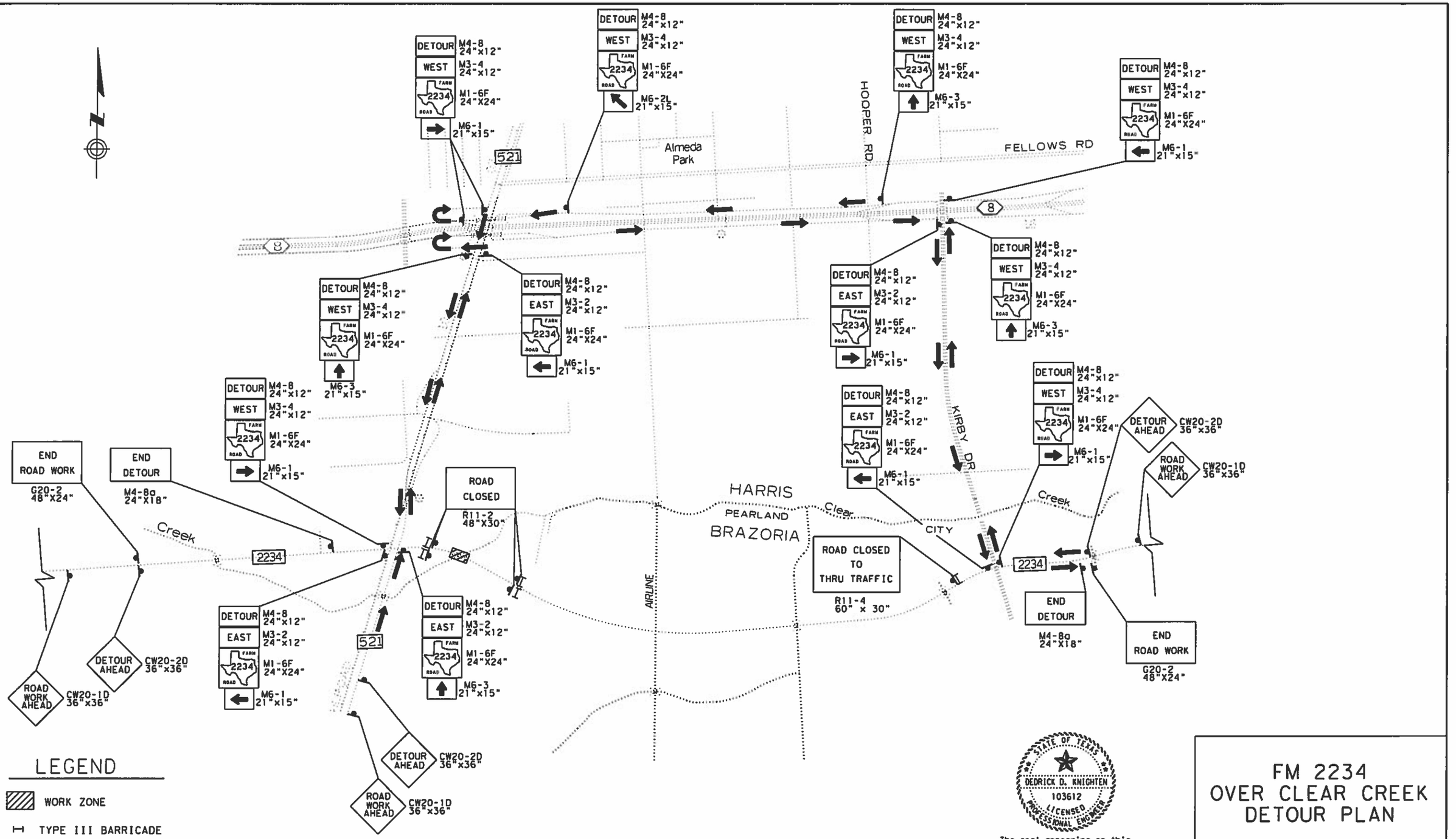

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FM 2234 OVER CLEAR CREEK DETOUR PLAN

SHEET 1 OF 1

Texas Department of Transportation

SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		10
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

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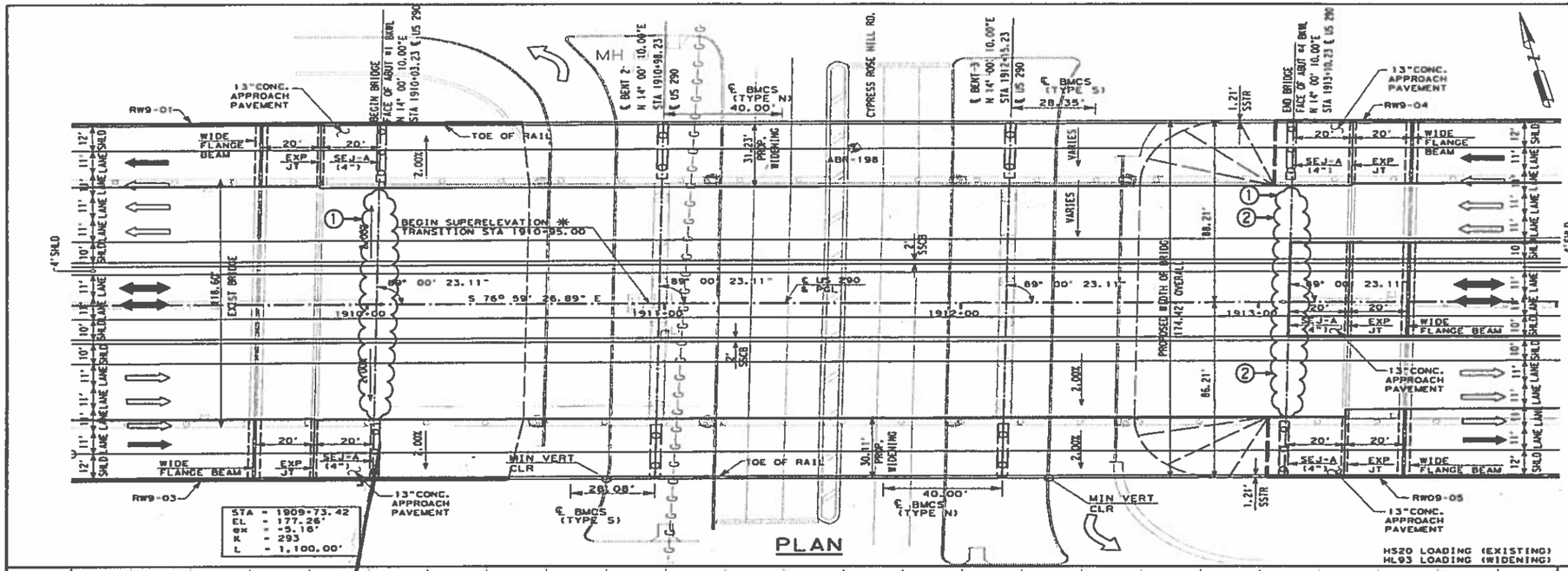


NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN THE HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN AND/OR SUPERELEVATION.
3. THE EXISTING BRIDGE DIMENSIONS SHOWN WERE TAKEN FROM THE ORIGINAL BRIDGE PLAN DRAWINGS. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO BEGINING WORK AND ORDERING MATERIAL.
4. THE VERTICAL GRADES SHOWN ON THE ELEVATION VIEW, TAKEN FROM THE ORIGINAL BRIDGE PLANS, ARE AT THE EXISTING PGL.
5. FOR BORINGS SEE "SOIL BORING DATA" SHEETS. BORING STATION & OFFSET BASED ON ℄ US 290 ML.
6. FOR BENCHMARKS, HORIZONTAL AND VERTICAL CONTROL, SEE "CONTROL SHEETS".
7. EXISTING UTILITIES TO BE RELOCATED OR ABANDONED ARE NOTED. THE CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES BEFORE BEGINING CONSTRUCTION OR ORDERING MATERIAL.

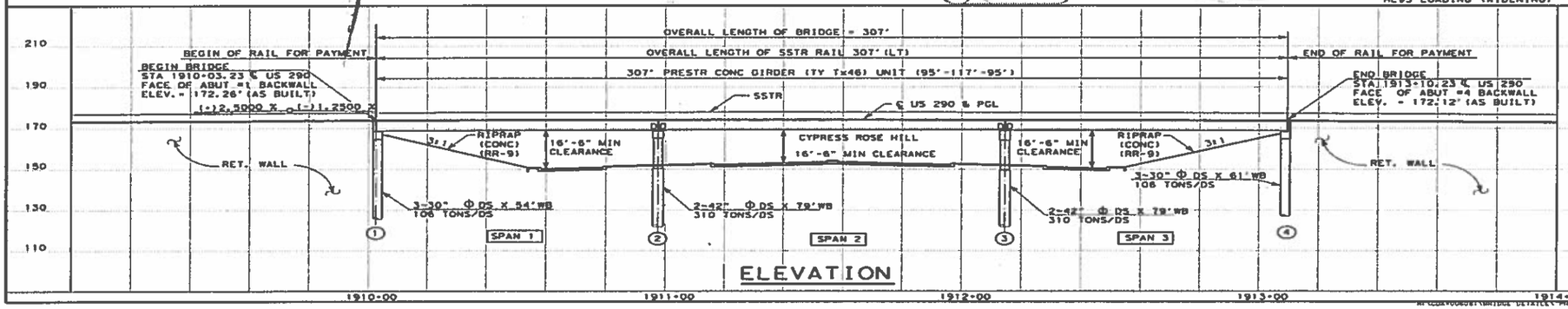
NBI# 12-102-0050-06-148

8. BEAM END "D" DENOTES DOWELS IN BENT CAP. BLANK DENOTES NO DOWEL.

* SEE SHEET 2 OF 2 FOR TYPICALS CYPRESS ROSE HILL RD. OVERPASS.

DESIGN SPEED: 60 MPH
ADT (ML): 76,600 (2013)
105,000 (2033)
FUNCTIONAL CLASS: URBAN FREEWAY
NBI# 12-102-0-0050-08-148

The seal appearing on this document was authorized by King Yuen, P.E. 86432,
on 7-10-13
King Yuen, P.E.
Signed



Texas Department of Transportation

US 290
BRIDGE LAYOUT
CYPRESS ROSE HILL OVERPASS
WB MAINLANES

20 0 20 40 (H)
20 0 20 40 (V)

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			994
STATE	DIST.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0050	06	081	US 290

DESCRIPTION OF WORK

*① REPLACE ALL BEARING PADS AT ABUTMENT 1 AND ABUTMENT 4 EXCEPT FOR THE WIDENING SECTION.

WORK TO BE PAID UNDER ITEM 4002-6001 "REP ELASTOMERIC BEARING PADS".

② REPLACE DAMAGED BRIDGE JOINT (SEJ). SEE BRIDGE JOINT REPLACEMENT SHEET FOR DETAILS.

WORK TO BE PAID UNDER ITEM 0785-6011 "BRIDGE JOINT REPLACEMENT (SEJ)".

NOTES:

1. SEE SHEET "BRIDGE JACKING LOADS" FOR BRIDGE JACKING INFORMATION.

*2. 28 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS GpB(MOD). PAD FABRICATION TO CONFORM TO CURRENT TXDOT STANDARD IGEB.

LIMITS OF REPAIR ARE APPROXIMATE AND FOR CONTRACTOR'S INFORMATION ONLY.

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9/2 2021
Dedrick D. Knighten P.E.

US 290 OVER
CYPRESS ROSEHILL RD
BRIDGE REPAIR LAYOUT

SHEET 1 OF 4

NBI# 12-102-0-0050-06-148

Texas Department of Transportation

 SCALE N. T. S.

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			11
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

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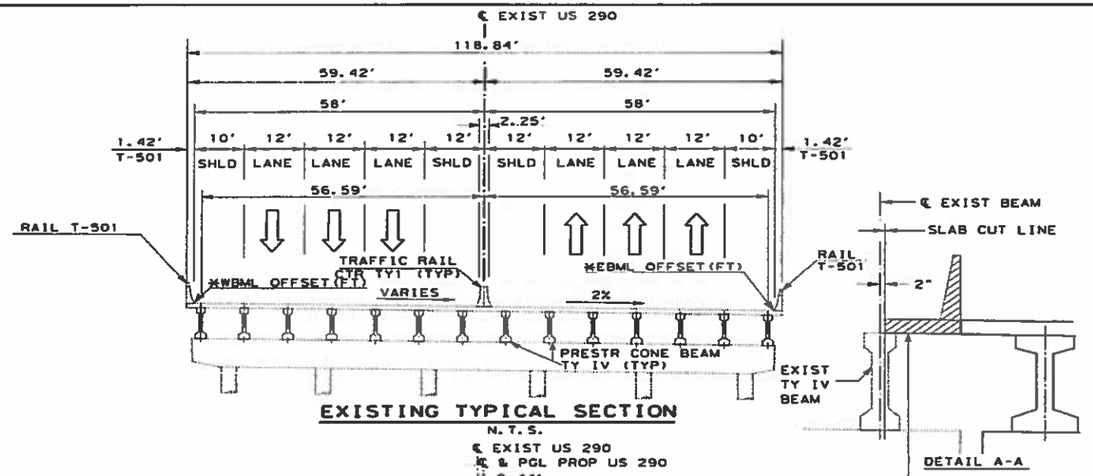
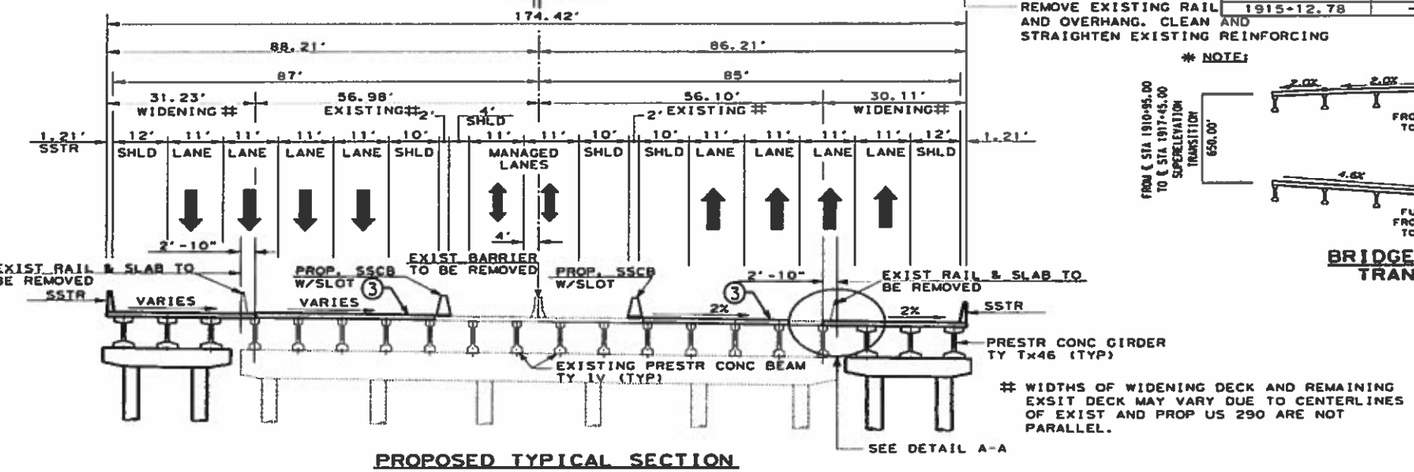


EXISTING TYPICAL SECTION

N. T. S.



PROPOSED TYPICAL SECTION

N. T. S.

REMOVE EXISTING RAIL AND OVERHANG. CLEAN AND STRAIGHTEN EXISTING REINFORCING

* NOTE:

BRIDGE SUPERELEVATION TRANSITION LAYOUT

WIDTHS OF WIDENING DECK AND REMAINING EXSIT DECK MAY VARY DUE TO CENTERLINES OF EXIST AND PROP US 290 ARE NOT PARALLEL.

US290 CYPRESS ROSEHILL RD. BRIDGE *WBML NORTHSIDE EXISTING T-501 TOE		
CENTER LINE STATION	OFFSET (FT.)	SURVEY ELEVATION (FT.)
1908+03.26	-58.41	169.52
1908+27.90	-58.47	169.79
1908+53.39	-58.45	170.05
1908+78.33	-58.38	170.29
1909+03.12	-58.40	170.53
1909+28.50	-58.30	170.72
1909+44.43	-58.26	170.81
1909+78.22	-58.37	171.18
1910+04.02	-58.39	171.19
1910+09.13	-58.35	171.23
1910+34.43	-58.36	171.35
1910+59.36	-58.43	171.48
1910+84.44	-58.24	171.55
1911+00.91	-58.34	171.64
1911+35.33	-58.37	171.87
1911+59.87	-58.31	171.98
1911+85.48	-58.25	172.14
1912+10.34	-58.36	172.26
1912+35.74	-58.31	172.32
1912+60.97	-58.26	172.37
1912+88.62	-58.31	172.37
1913+11.88	-58.07	172.43
1913+37.18	-58.19	172.46
1913+62.19	-58.15	172.45
1913+87.14	-58.26	172.33
1914+11.99	-58.18	172.24
1914+37.29	-58.09	172.20
1914+61.85	-58.00	172.11
1914+87.17	-57.98	172.02
1915+12.78	-57.90	171.88

US290 CYPRESS ROSEHILL RD. BRIDGE *EBML SOUTHSIDE EXISTING T-501 TOE		
CENTER LINE STATION	OFFSET (FT.)	SURVEY ELEVATION (FT.)
1908+00.92	57.49	169.44
1908+26.41	57.42	169.68
1908+51.39	57.46	169.93
1908+76.97	57.38	170.21
1909+01.77	57.46	170.55
1909+26.83	57.39	170.75
1909+52.07	57.38	170.93
1909+76.46	57.37	171.11
1910+01.87	57.37	171.16
1910+27.36	57.37	171.39
1910+52.85	57.40	171.50
1910+77.77	57.38	171.56
1911+02.57	57.36	171.60
1911+25.82	57.33	171.64
1911+52.72	57.36	171.65
1911+78.40	57.34	171.69
1912+03.17	57.43	171.63
1912+28.25	57.52	171.59
1912+53.83	57.43	171.51
1912+78.60	57.52	171.40
1913+03.85	57.61	171.21
1913+09.60	57.62	171.13
1913+35.28	57.63	171.12
1913+60.22	57.62	170.77
1913+85.21	57.76	170.59
1914+09.91	57.79	170.40
1914+35.56	57.84	170.13
1914+60.36	57.91	169.92
1914+85.44	57.83	169.57
1915+10.48	57.82	169.25

Texas Department of Transportation

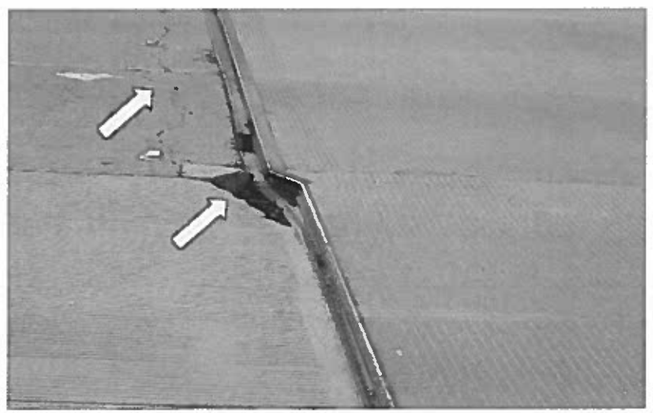
US 290

BRIDGE LAYOUT
CYPRESS ROSE HILL
OVERPASS
WB MAINLANES

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			175
STATE	STATE DIST.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0050	06	081	US 290

H:\WCHAO\Design\Maintenance Projects\BPM\BPM 6382-09-001\Plan Set\7. BRIDGE\US 290 AT CYPRESS ROSEHILL\BL02\US 290 WB.DGN



③ REPLACE DAMAGED BRIDGE JOINT (SEJ) WESTBOUND MAINLANES BETWEEN MANAGED LANES AND WIDENING SECTION.

③ REPLACE DAMAGED BRIDGE JOINT (SEJ) EASTBOUND MAINLANES BETWEEN MANAGED LANES AND WIDENING SECTION.

US 290 OVER
CYPRESS ROSEHILL RD
BRIDGE REPAIR LAYOUT

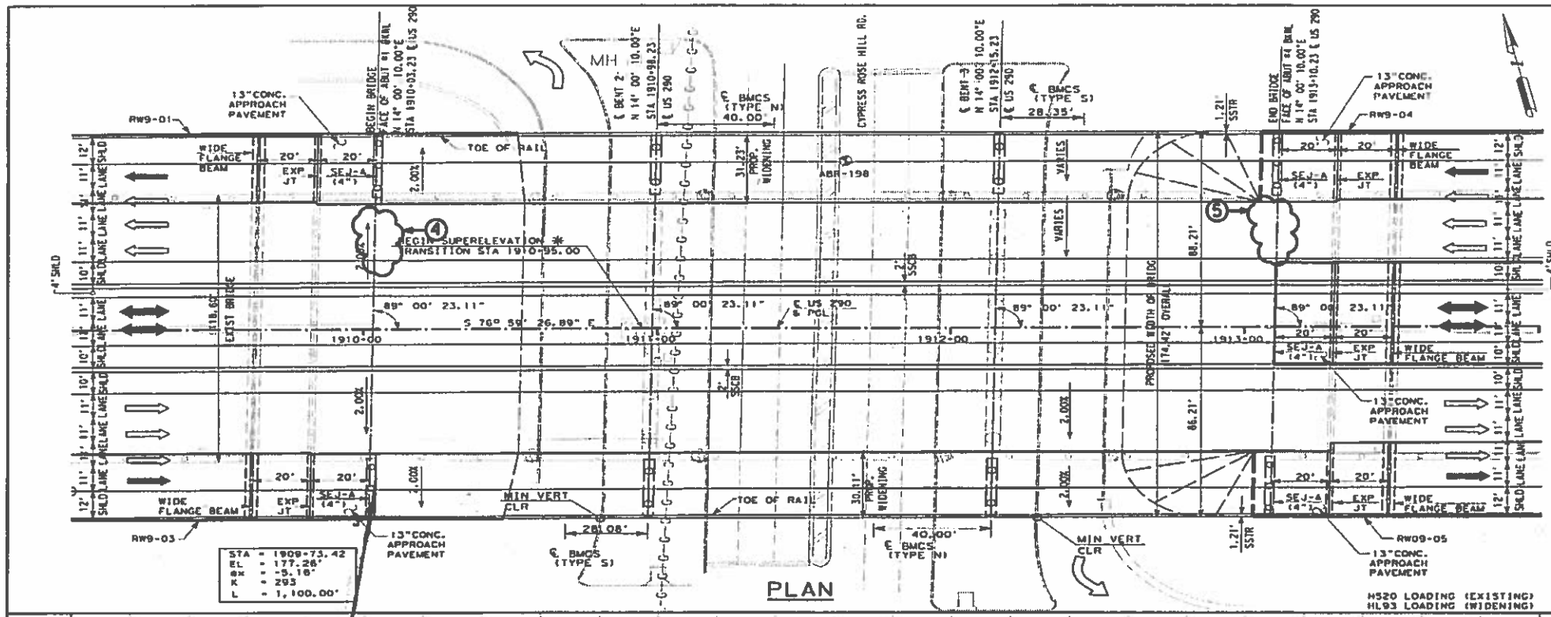
SHEET 2 OF 4

NBI# 12-102-0-0050-06-148

Texas Department of Transportation

SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		12
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC



NOTES:

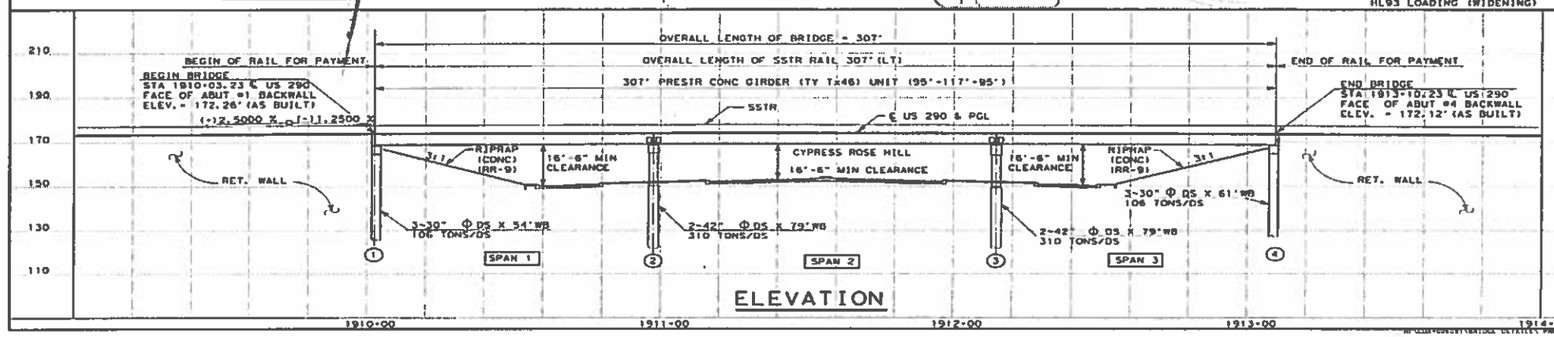
1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN THE HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN AND/OR SUPERELEVATION.
3. THE EXISTING BRIDGE DIMENSIONS SHOWN WERE TAKEN FROM THE ORIGINAL BRIDGE PLAN DRAWINGS. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO BEGINING WORK AND ORDERING MATERIAL.
4. THE VERTICAL GRADES SHOWN ON THE ELEVATION VIEW, TAKEN FROM THE ORIGINAL BRIDGE PLANS, ARE AT THE EXISTING PGL.
5. FOR BORINGS SEE "SOIL BORING DATA" SHEETS. BORING STATION & OFFSET BASED ON ℄ US 290 WB.
6. FOR BENCHMARKS, HORIZONTAL AND VERTICAL CONTROL, SEE "CONTROL SHEETS".
7. EXISTING UTILITIES TO BE RELOCATED OR ABANDONED ARE NOTED. THE CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES BEFORE BEGINING CONSTRUCTION OR ORDERING MATERIAL. NBI# 12-102-0050-06-148
8. BEAM END "D" DENOTES DOWELS IN BENT CAP. BLANK DENOTES NO DOWEL.

* SEE SHEET 2 OF 2 FOR TYPICALS CYPRESS ROSE HILL RD. OVERPASS.

DESIGN SPEED: 60 MPH
AOT (WB): 76,600 (2013)
105,000 (2033)
FUNCTIONAL CLASS: URBAN FREEWAY
NBI# 12-102-0-0050-06-148

STATE OF TEXAS — XING YUAN — 86432 — LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Xing Yuan, P.E. 86432,
on 7-10-13
Xing Yuan, P.E.



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Texas Department of Transportation

US 290
BRIDGE LAYOUT
CYPRESS ROSE HILL
OVERPASS
WB MAINLANES

0 20 40 (H)
0 20 40 (V)

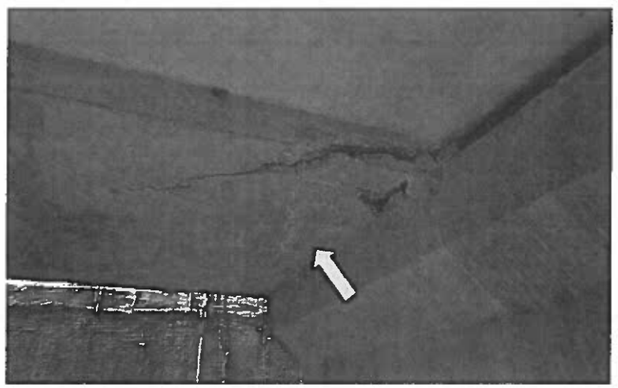
SHEET 1 OF 2

SEC NO.	DIV. NO.	PROJECT NO.	SHEET NO.
6			984
STATE	DIST.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0030	06	081	US 290

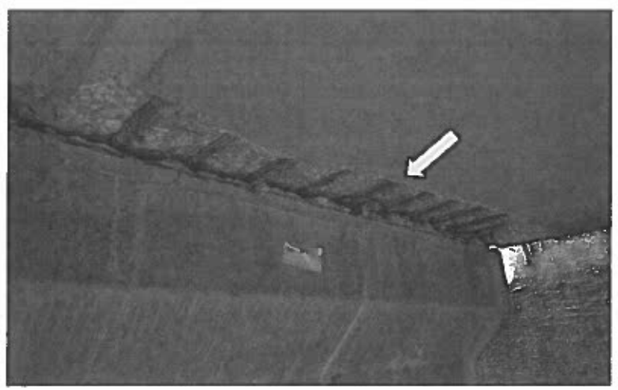
STATE OF TEXAS — DEDRICK D. KNIGHTEN — 103612 — LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by DEDRICK D. KNIGHTEN, P.E. 103612

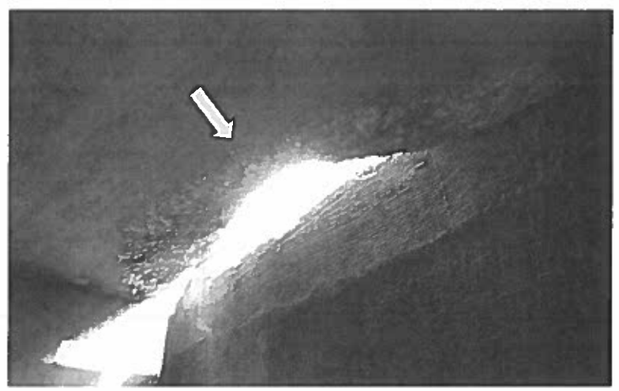
9/2
2021
Dedrick D. Knighten, P.E.



④ DELAMINATION IN THE DECK SOFFIT LEFT OF BEAM 3.



④ DEEP SPALL WITH EXPOSED REBAR IN DECK SOFFIT RIGHT OF BEAM 3.



⑤ DEEP SPALL WITH EXPOSED REBAR IN DECK SOFFIT ALONG BEAM 1.

US 290 OVER CYPRESS ROSEHILL RD BRIDGE REPAIR LAYOUT

SHEET 3 OF 4

NBI# 12-102-0-0050-06-148

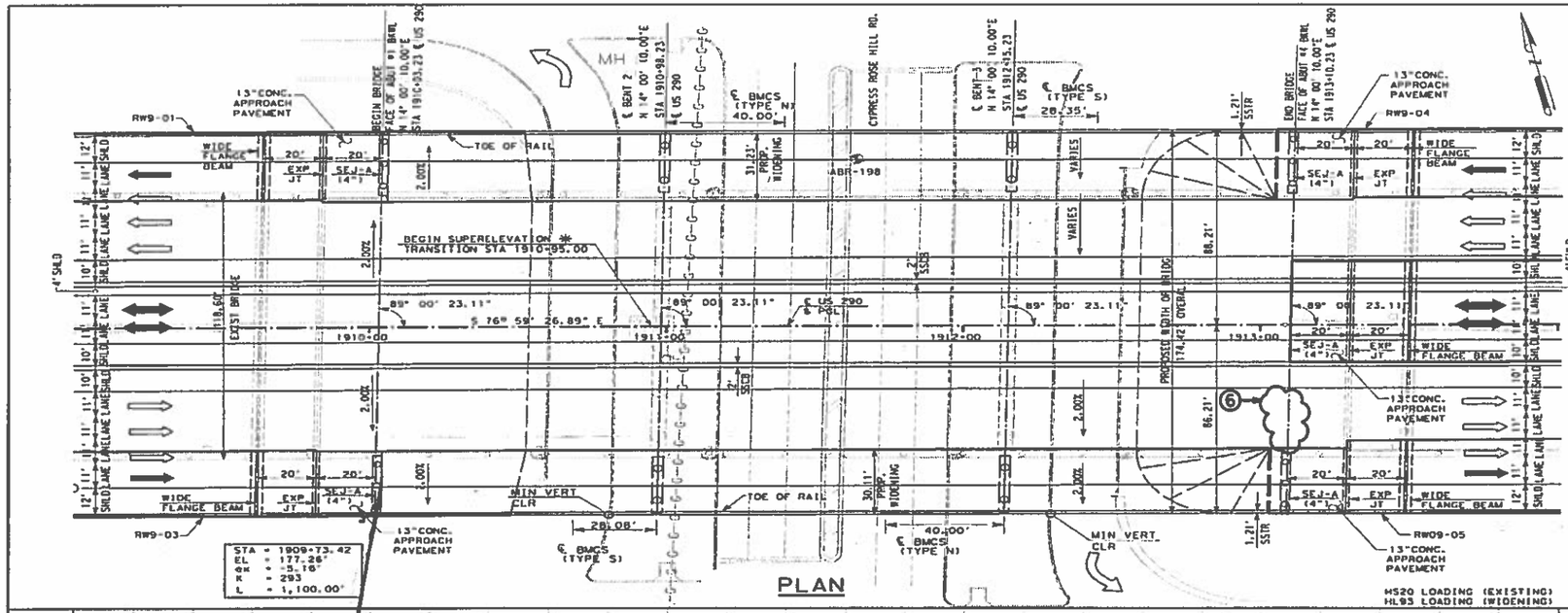
Texas Department of Transportation

© 2021 SCALE N. T. S.

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		13
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC: PROJECT/BPM638209001/
FILE: 45S8-BL.DGN



NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN THE HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN AND/OR SUPERELEVATION.
3. THE EXISTING BRIDGE DIMENSIONS SHOWN WERE TAKEN FROM THE ORIGINAL BRIDGE PLAN DRAWINGS. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO BEGINING WORK AND ORDERING MATERIAL.
4. THE VERTICAL GRADES SHOWN ON THE ELEVATION VIEW, TAKEN FROM THE ORIGINAL BRIDGE PLANS, ARE AT THE EXISTING PGL.
5. FOR BORINGS SEE "SOIL BORING DATA" SHEETS. BORING STATION & OFFSET BASED ON ℄ US 290 ML.
6. FOR BENCHMARKS, HORIZONTAL AND VERTICAL CONTROL, SEE "CONTROL SHEETS".
7. EXISTING UTILITIES TO BE RELOCATED OR ABANDONED ARE NOTED. THE CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES BEFORE BEGINING CONSTRUCTION OR ORDERING MATERIAL. NBI# 12-102-0050-06-148
8. BEAM END "B" DENOTES DOWELS IN BENT CAP. BLANK DENOTES NO DOWEL.

* SEE SHEET 2 OF 2 FOR TYPICALS CYPRESS ROSE HILL RD. OVERPASS.

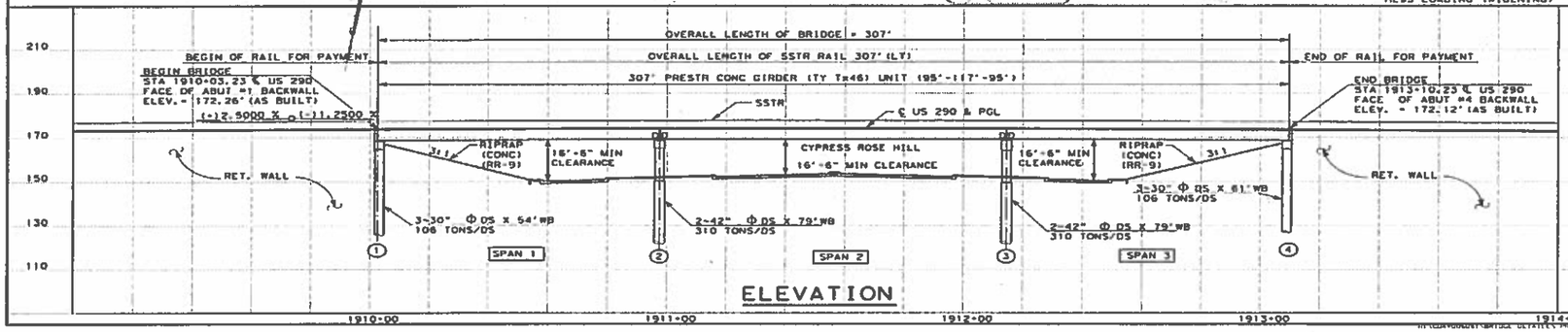
DESIGN SPEED: 60 MPH
ADT (ML): 76,600 (2013)
105,000 (2033)
FUNCTIONAL CLASS: URBAN FREEWAY
NBI# 12-102-0-0050-06-148

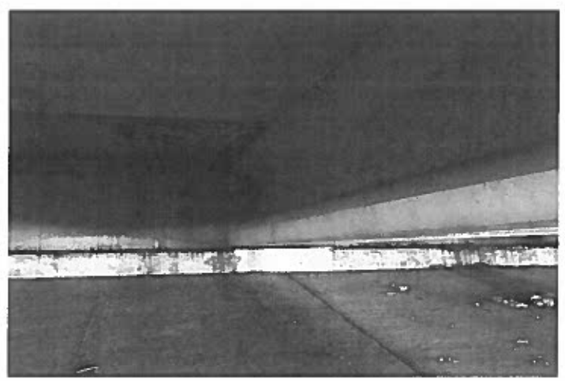
THE STATE OF TEXAS · BING YUEN · 86432 · LICENSED PROFESSIONAL ENGINEER

This seal appearing on this document was authorized by Bing Yuen, P.E. 86432.

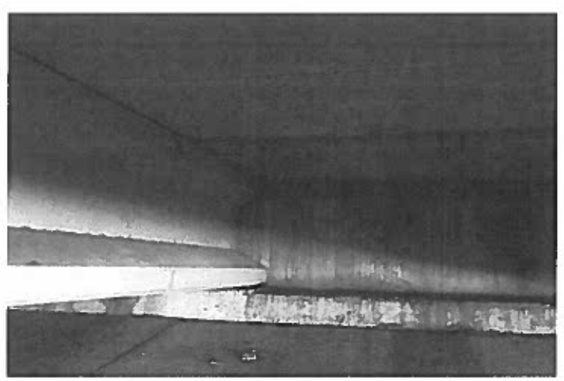
on 7-10, 13

Bing Yuen, P.E.
Signed





⑥ DELAMINATION IN THE DECK SOFFIT LEFT OF BEAM 12.



⑥ DELAMINATION IN THE DECK SOFFIT RIGHT OF BEAM 12.

Texas Department of Transportation

US 290
BRIDGE LAYOUT
CYPRESS ROSE HILL OVERPASS
WB MAINLANES

0 20 40 (H)
0 20 40 (V)

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			994
STATE	DIST.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0050	06	081	US 290

THE STATE OF TEXAS · DEDRICK D. KNIGHTEN · 103612 · LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by DEDRICK D. KNIGHTEN, P.E. 103612

9/2, 2021

Dedrick D. Knighten, P.E.

US 290 OVER CYPRESS ROSEHILL RD BRIDGE REPAIR LAYOUT

SHEET 4 OF 4

NBI# 12-102-0-0050-06-148

Texas Department of Transportation

SCALE N. T. S.

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		14
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 45 50 51 52 53 55 56 57 58 59 60 61 62 63

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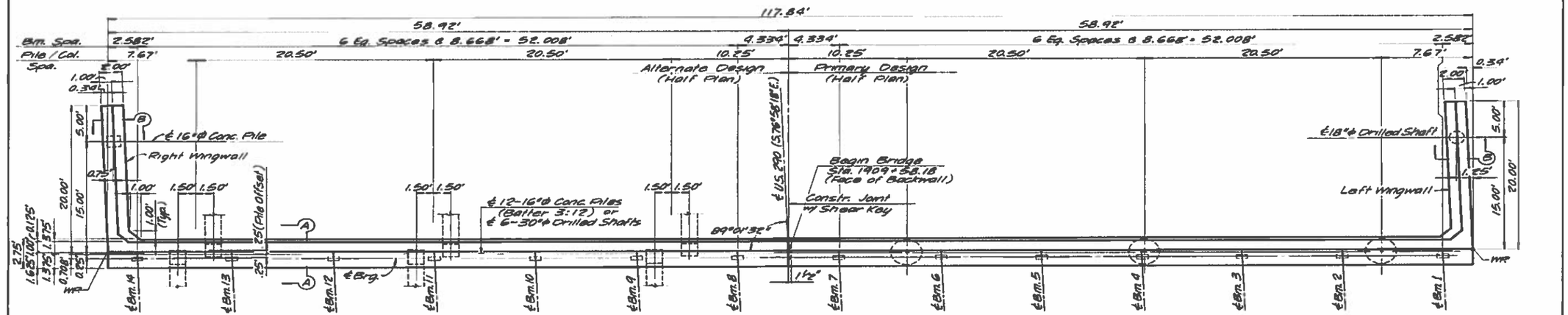
FILE: 455B-BL.DGN



BEARING SEAT ELEVATIONS

	Bm. 1	Bm. 2	Bm. 3	Bm. 4	Bm. 5	Bm. 6	Bm. 7	Bm. 8	Bm. 9	Bm. 10	Bm. 11	Bm. 12	Bm. 13	Bm. 14
Abut. 1	167.604	167.783	167.963	168.142	168.322	168.501	168.681	168.680	168.499	168.318	168.137	167.956	167.775	167.593

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

ABUTMENT 1
US 290 AT CYPRESS ROSEHILL RD.

00145

FOR CONTRACTOR'S INFORMATION ONLY.

US 290 OVER CYPRESS ROSEHILL RD

ABUTMENT 1

SHEET 1 OF 1

STR. 12-102-0-0050-06-148

Texas Department of Transportation

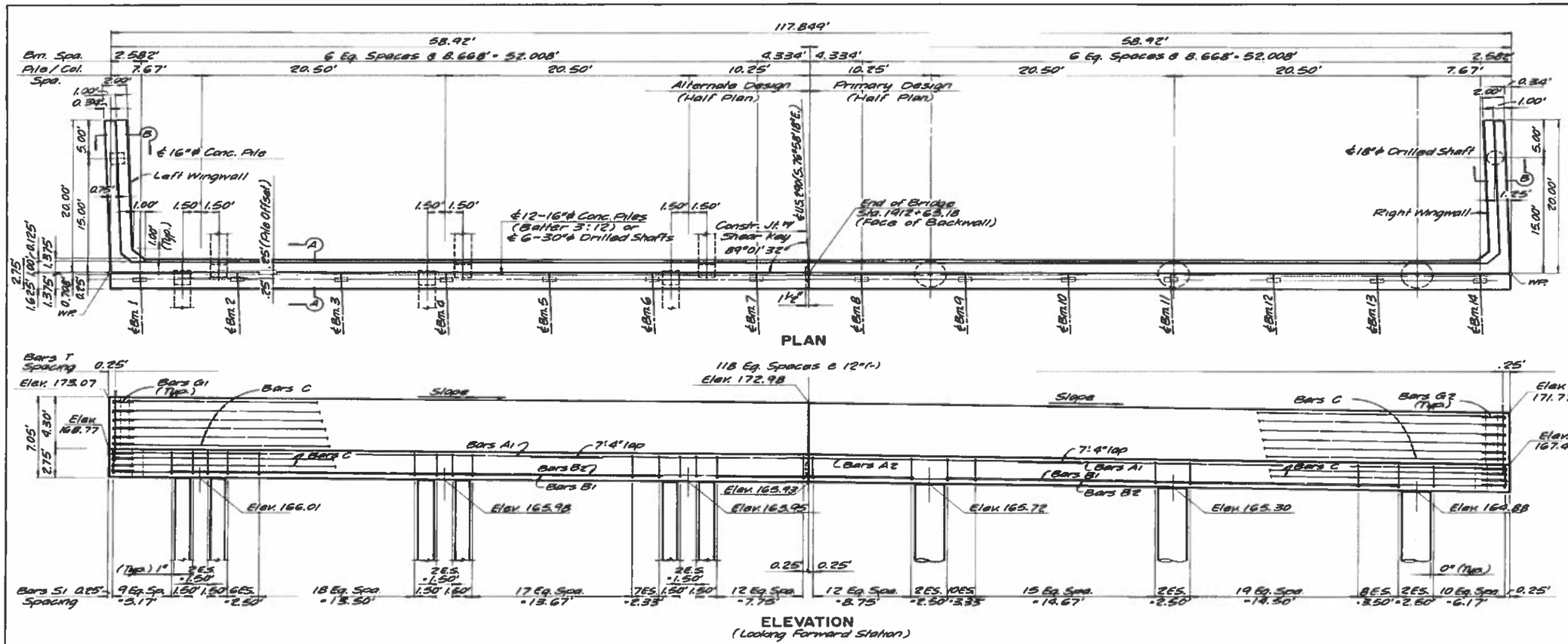
SCALE N. T. S.

FED. NO. DIV. NO.	PROJECT NO.	SHEET NO.
6	BPM 638209001	15

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

H:\WCHAO\Design\Maintenance Projects\BPM?BPM PROJECTS\BPM 6382-09-001\Plan Set\7. BRIDGE\US 290 AT CYPRESS ROSEHILL\BA02 US 290 WB.DGN



BEARING SEAT ELEVATIONS

	Bm. 1	Bm. 2	Bm. 3	Bm. 4	Bm. 5	Bm. 6	Bm. 7	Bm. 8	Bm. 9	Bm. 10	Bm. 11	Bm. 12	Bm. 13	Bm. 14
Abut. 4	168.853	168.840	168.826	168.813	168.801	168.788	168.776	168.681	168.507	168.322	168.102	167.962	167.783	167.609

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

ABUTMENT 4
US 290 AT CYPRESS ROSEHILL RD.

00146

DESIGNED	DRAWN	CHECKED	DATE
ORIGINAL			APRIL '08

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
6	TEXAS	NH-F 535(22)	1020

STATE DIST. NO.	COUNTY	CONT	SECT	JOB	SHEET NO.
12	HARRIS	6382	09	033	133

FOR CONTRACTOR'S INFORMATION ONLY.

US 290 OVER CYPRESS ROSEHILL RD

ABUTMENT 4

SHEET 1 OF 1

STR. 12-102-0-0050-06-148

SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		16
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

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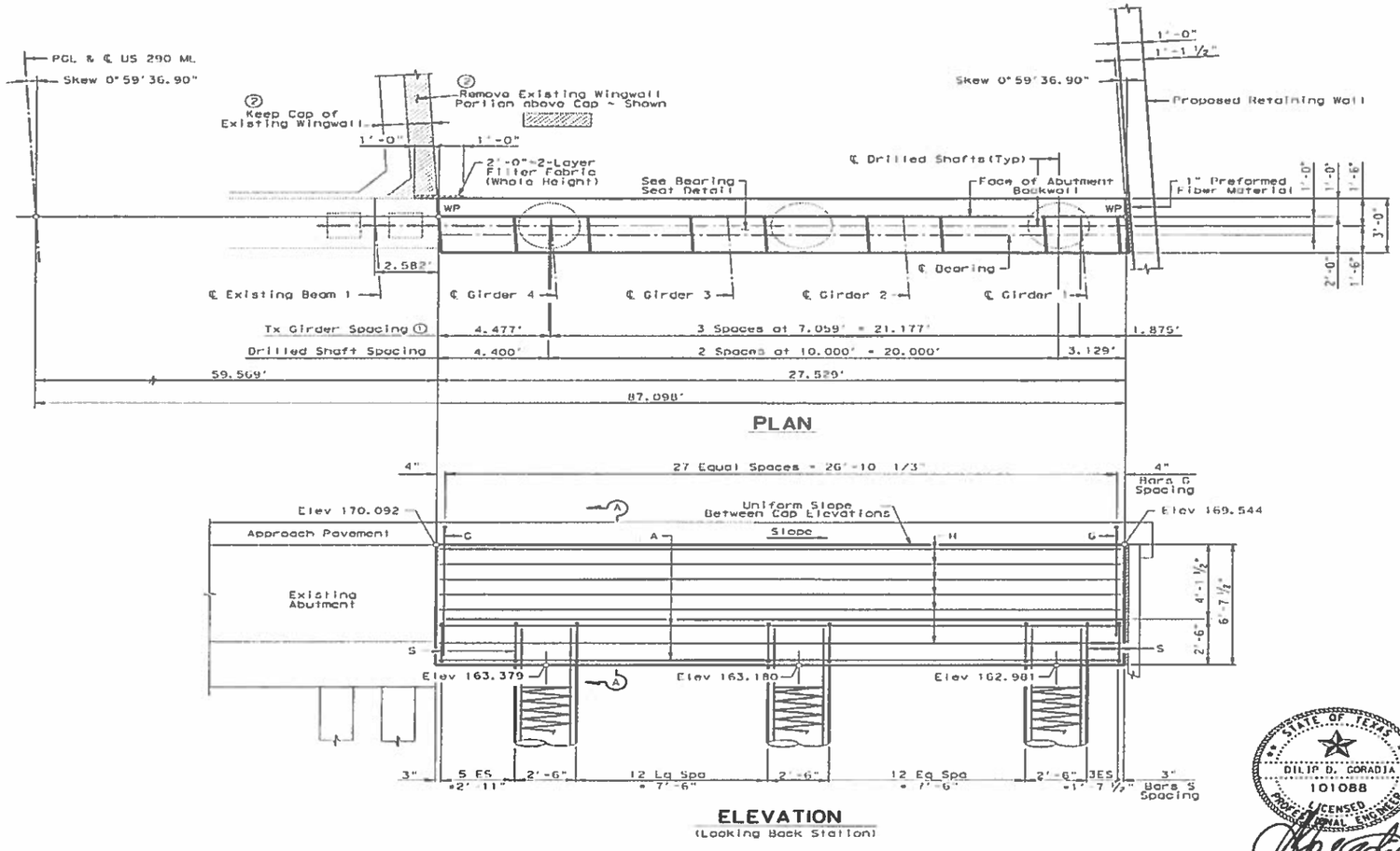

IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ALL DIMENSIONS AND ELEVATIONS IN THE FIELD PRIOR TO ORDERING MATERIALS.

① See Framing Plan for Girder Angles.

② See Demolition Plan for Details.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Class "C" concrete strength is f'c = 3,600 psi.

All reinforcing steel shall be Grade 60.

HS20 Loading (Existing)
HL93 Loading (Widening)

Sheet 1 of 2

STATE OF TEXAS
DILIP D. GORADIA
101088
LICENSED PROFESSIONAL ENGINEER

06.05.2013

Texas Department of Transportation
Houston District (Bridge)
US 290

ABUTMENT 1

US 290 WB MAINLANES
CYPRESS ROSEHILL OVERPASS
WIDENING

FILE: 290WBCyprRdAbut1.dgn	DN: DJG	CK: TJ	DW: DJJ	CK: DDG
© TxDOT APRIL 2013	DISTRICT	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
REVISIONS	HOUSTON	6		17B

COUNTY	CONTROL	SECT	JOB	HIGHWAY
HARRIS	0050	06	081	US 290

FOR CONTRACTOR'S INFORMATION ONLY.

US 290 OVER
CYPRESS ROSEHILL RD

SEJ-S(1)

SHEET 1 OF 1

STR. 12-102-0-0050-06-148

Texas Department of Transportation

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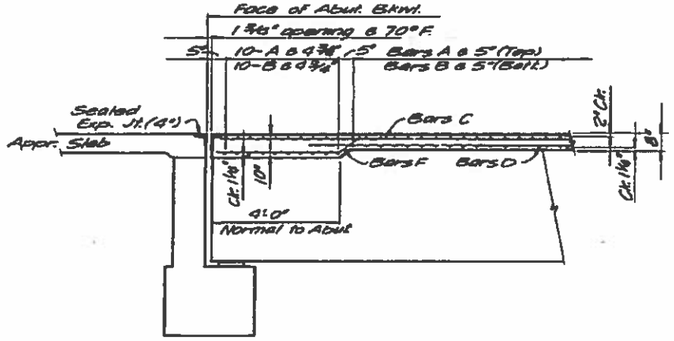
FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	BPM 638209001	17

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

H:\Bridge\US 290\SEG 9-CA3\290 WBML Cypress Rosehill Overpass Widening\Bridge\290WBCyprRdAbut1.dgn 5/2013

H:\WCHAO\Design\Maintenance Projects\BPM\BPM PROJECTS\BPM 6382-09-001\Plan Set\7.BRIDGE\US 290 AT CYPRESS ROSEHILL\SEJ-S(1) US 290 WB.DGN



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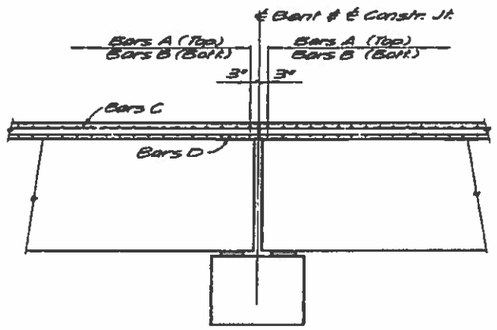

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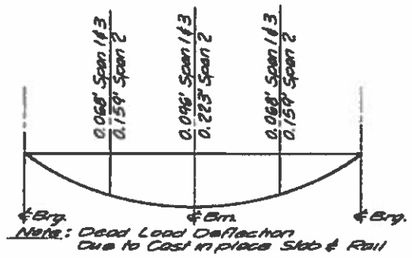


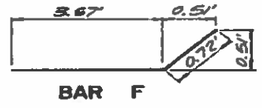
Note: Dead Load Deflection Due to Cast in place Slab & Rail

DEAD LOAD DEFLECTION DIAGRAM

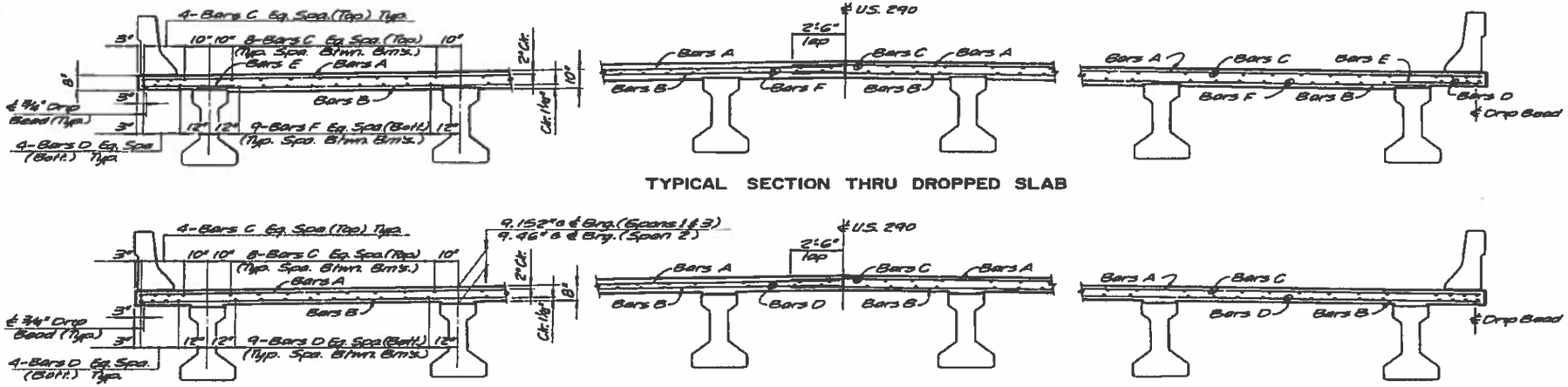
TABLE OF REINFORCING STEEL

Bar	No.	Size	Length	Weight
A1	736	#5	69.10	31,758
A2	736	#5	61.76	28,402
B1	216	#5	64.10	14,115
B2	20	#5	59.83	1238
B3	118	#5	61.78	26,113
B4	20	#5	59.08	1285
C	112	#5	343.92	36,671
D1	117	#5	307.42	37,576
D2	8	#5	307.75	2568
E	40	#5	9.99	187
F	234	#5	8.39	1071
			Total lb's.	263,592

Includes 5-1.25' laps (All laps)
Includes 696-2.17' lap (All laps)
All Reinforcing Steel shall be Grade 60.



BAR F



TYPICAL SECTION THRU DROPPED SLAB

TYPICAL SECTION THRU NORMAL SLAB

ESTIMATED QUANTITIES

Item	Unit	Quantity
Reinf. Conc. Slab	S.F.	36,687
Conc. Surf. Treat	S.Y.	3,492.7

@ Reinforcing Steel Quantity is for Contractor's information only.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

SLAB DETAILS
US 290 AT CYPRESS ROSEHILL RD.

00154

FOR CONTRACTOR'S INFORMATION ONLY.

US 290 OVER CYPRESS ROSEHILL RD

SLAB DETAILS

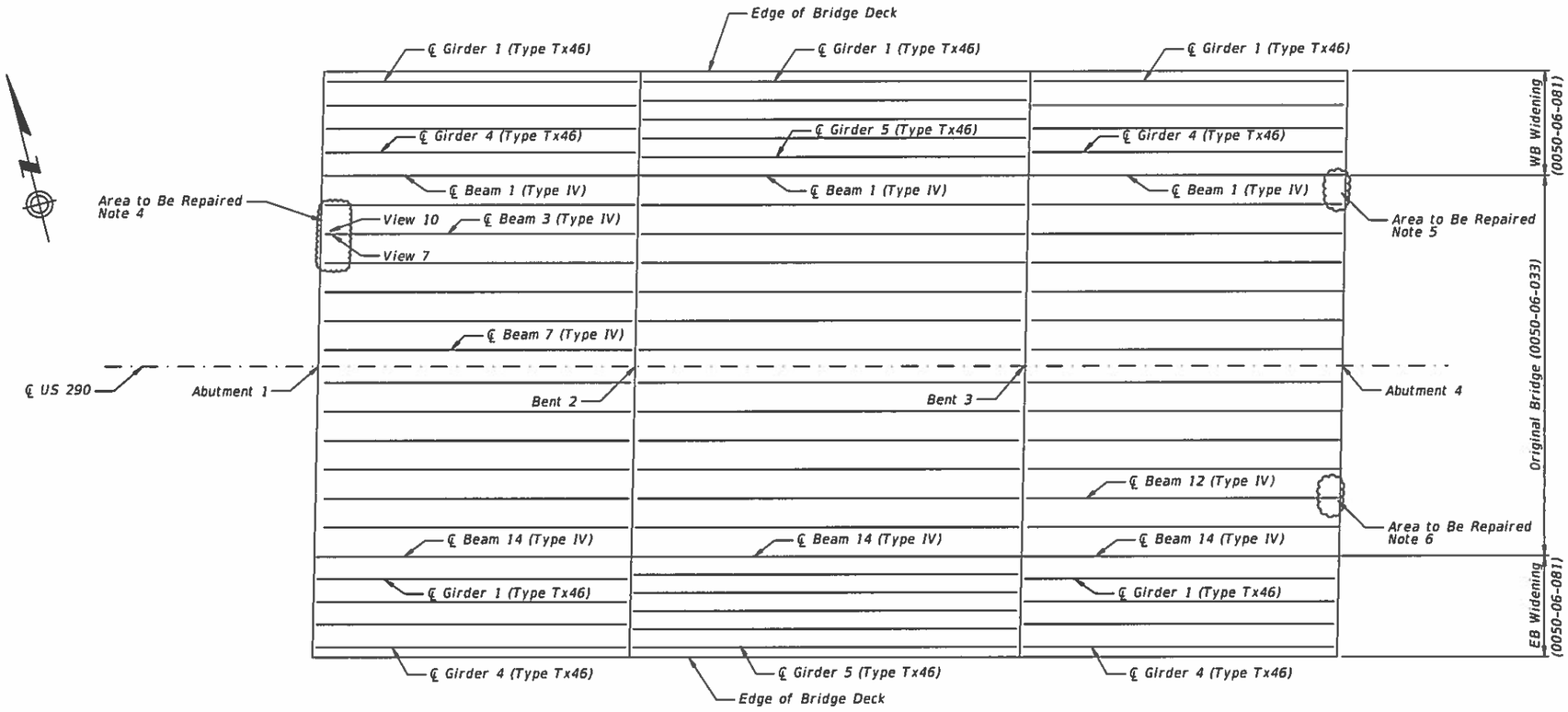
SHEET 1 OF 1

STR. 12-102-0-0050-06-148

Texas Department of Transportation

SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		18
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC



BRIDGE PLAN

See Bridge Repair Layout sheets for note callouts designating repair locations as well as photos of damaged areas to be repaired.

Full depth deck repairs may overlap with SEJ replacements shown elsewhere in these plans. Reinforcing details shown on full depth deck repair sheets control.

HS20 LOADING (EXISTING)

STATE OF TEXAS
MICHAEL E. CARLSON
111317
LICENSED
PROFESSIONAL ENGINEER

Michael E Carlson, PE

07/22/2021

Texas Department of Transportation

Houston District (Bridge)

FULL DECK REPAIR THICKEND SLAB

NBI: 12-102-0050-06-148

US 290 CYPRESS ROSEHILL RD OVERPASS

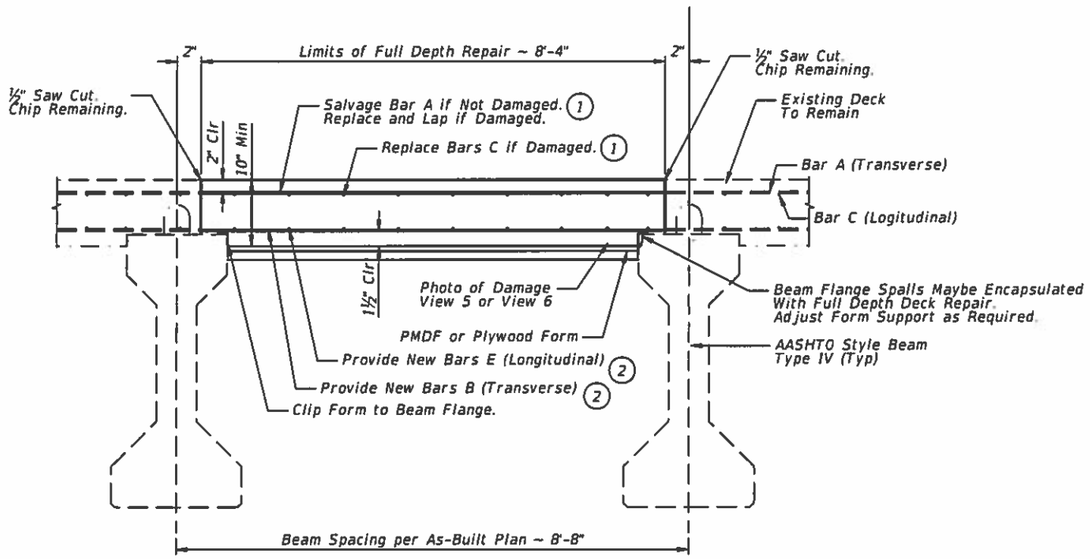
BPM 6382-09-001

FILE: Full Thickened Deck.dgn	DN: NEC	CK: SV	DW: NEC	CK: SV
©TxDOT 7/22/2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		19

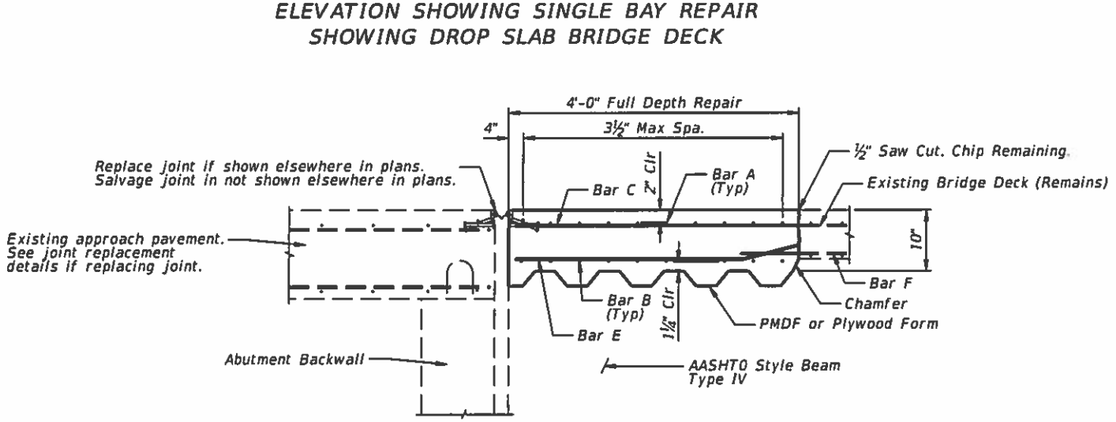
7/22/2021
C:\Users\mcarlso\Desktop\Bridge Damage\US 290 Cypress Rosehill\Full Thickened Deck.dgn

TABLE OF ESTIMATED QUANTITES (THIS SHEET)			
ITEM	DESCRIPTION	UNITS	QUANTITY
429-6005	CONC STR REPAIR (DECK REP (FULL DEPTH))	SF	67
429-6006	CONC STR REPR (RAPID DECK REP(FULL DPT))	SF	-

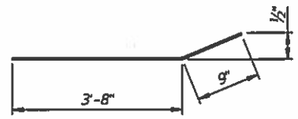
CONCRETE CLASS			
Approx. Req. Curing Time	Type	Reference	Billing
4 Hrs	Type B - Ultra Rapid	DMS 4655	429-6006
8 Hrs	Type A - Rapid	DMS 4655	429-6006
24 Hrs	Class "K" Conc.	Item 421	429-6005
72+ Hrs	Class "S" Conc.	Item 421	429-6005



ELEVATION SHOWING SINGLE BAY REPAIR
SHOWING DROP SLAB BRIDGE DECK



SECTION SHOWING REPAIR
SHOWING DROP SLAB BRIDGE DECK



BAR E
Matches Bar F

REINFORCING BAR TABLE			
Bar	Size	Max Spac.	Lap
A	#5	3½"	2'-0"
B	#5	3½"	N/A
C	#5	9"	N/A
E	#5	9"	1'-7"

Reinf Steel is Approx. 3lbs/sf Per Layer.

GENERAL NOTES

See Sheet 3 of 3.

MATERIAL NOTES

See Sheet 3 of 3.

(1) See Reinforcing Bar Table For Bar Sizes and Laps to Provide if Bars Cannot Be Salvaged.

(2) See Reinforcing Bar Table For Bar Sizes. Bars B Shall Extend Across Repair.

(3) Chip to Remove Deck Material Using Maximum 16lb Hammer. Do Not Damage Beam Top Flange. Remove Enough Deck Material to Provide For 6"+ Ledge on Beam Flange.

See Bridge Repair Layout sheets for note callouts designating repair locations as well as photos of damaged areas to be repaired.

Full depth deck repairs may overlap with SEJ replacements shown elsewhere in these plans. Reinforcing details shown on full depth deck repair sheets control.

STATE OF TEXAS
MICHAEL E. CARLSON
111317
LICENSED
PROFESSIONAL ENGINEER

07/22/2021

HS20 LOADING (EXISTING) SHEET 2 OF 3

Texas Department of Transportation — Houston District (Bridge)

FULL DECK REPAIR THICKEND SLAB

NBI: 12-102-0050-06-148

US 290 CYPRESS ROSEHILL RD OVERPASS

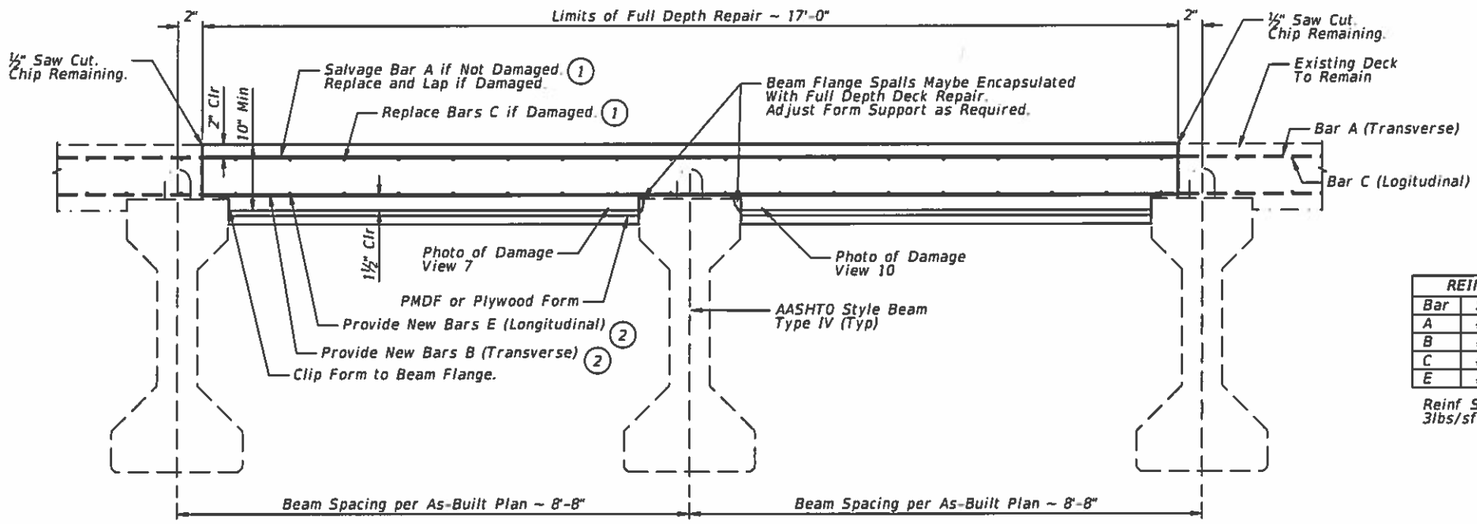
BPM 6382-09-001

FILE: Full Thickened Deck.dgn	DN: MEC	CK: SV	DW: MEC	CK: SV
©TxDOT 7/22/2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		20

7/22/2021
C:\Users\vmcarlso\Desktop\Bridge Damage\US 290 Cypress Rosehill\Full Thickened Deck.dgn

TABLE OF ESTIMATED QUANTITES (THIS SHEET)			
ITEM	DESCRIPTION	UNITS	QUANTITY
429-6005	CONC STR REPAIR (DECK REP (FULL DEPTH))	SF	68
429-6006	CONC STR REPR (RAPID DECK REP(FULL DPT))	SF	-

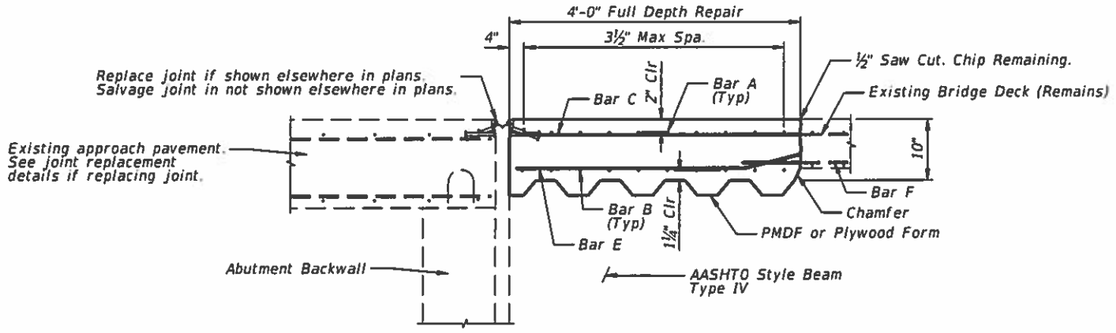
CONCRETE CLASS			
Approx. Req. Curing Time	Type	Reference	Billing
4 Hrs	Type B - Ultra Rapid	DMS 4655	429-6006
8 Hrs	Type A - Rapid	DMS 4655	429-6006
24 Hrs	Class "K" Conc.	Item 421	429-6005
72+ Hrs	Class "S" Conc.	Item 421	429-6005



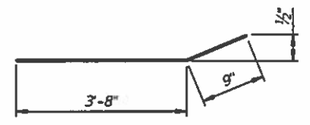
ELEVATION SHOWING TWO BAY REPAIR
SHOWING DROP SLAB BRIDGE DECK

REINFORCING BAR TABLE			
Bar	Size	Max Spac.	Lap
A	#5	3½"	2'-0"
B	#5	3½"	N/A
C	#5	9"	N/A
E	#5	9"	1'-7"

Reinf Steel is Approx. 3lbs/sf Per Layer.



SECTION SHOWING REPAIR
SHOWING DROP SLAB BRIDGE DECK



BAR E
Matches Bar F

GENERAL NOTES

Designed According to AASHTO LRFD Specifications.

Reinforcing Steel Quantities are for Contractor Information Only.

These Details Only Pertain to Full Deck Repairs Assuming Panel Damage Has Occured.

Salvage Reinforcing Steel That is Not Damaged. Do Not Cut if Possible. Replace Reinforcing Steel if Damaged. Provide Laps per Table.

Refer to TxDOT "Concrete Repair Manual" Chapter 3, Section 4, for Approved Removal and Repair Options.

Do Not Reuse Prestressing Strands From Broken Panels

Use PMDF or Plywood Forms. PMDF Shall Remain in Place Other Forms and Support Structures Shall Be Removed After the Repair has Gained Required Strength. Drilling Into Prestressed Beam Bottom Flange or Webs is Not Permitted.

Refer to DMS 4655 and the TxDOT MPL for more information on approved repair materials.

Use Slower Curing Material When Time Permits.

MATERIAL NOTES

All Reinforcing Shall be Grade 60.

Concrete Strength f'c = 4,000 psi

Concrete Strength Shall Reach 3,600 psi Prior to Opening To Traffic.

(1) See Reinforcing Bar Table For Bar Sizes and Laps to Provide if Bars Cannot Be Salvaged.

(2) See Reinforcing Bar Table For Bar Sizes. Bars B Shall Extend Across Repair.

(3) Chip to Remove Deck Material Using Maximum 16lb Hammer. Do Not Damage Beam Top Flange. Remove Enough Deck Material to Provide For 6"+ Ledge on Beam Flange.

See Bridge Repair Layout sheets for note callouts designating repair locations as well as photos of damaged areas to be repaired.

Full depth deck repairs may overlap with SEJ replacements shown elsewhere in these plans. Reinforcing details shown on full depth deck repair sheets control.

STATE OF TEXAS
MICHAEL E. CARLSON
111317
LICENSED
PROFESSIONAL ENGINEER

Mic E Carl, PE

07/22/2021

HS20 LOADING (EXISTING)

Texas Department of Transportation — Houston District (Bridge)

FULL DECK REPAIR THICKEND SLAB

NBI: 12-102-0050-06-148

US 290 CYPRESS ROSEHILL RD OVERPASS

BPM 6382-09-001

FILE: Full Thickened Deck.dgn	DN: NEC	CK: SV	DW: NEC	CK: SV
©TxDOT 7/22/2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		21

7/22/2021
C:\Users\mcarlso\Desktop\Bridge Damage\US 290 Cypress Rosehill\Full Thickened Deck.dgn

STRUCTURE	NO. BEAMS	STATION	JACKING LOAD
NBI# 12-102-0-0050-06-148	(1)		TON/BEAM
CYPRESS ROSE HILL OVERPASS	14	Sta. 1910+03.23 (AHEAD)	91
	14	Sta. 1913+10.23 (BACK)	91

(1) Refer to Existing Bridge Layout Sheets for number of bearing pads to be replaced.

1. All work shall be performed as per special specification 4002 "Replace Elastomeric Bearing Pads"

2. Fabricate and install Bearing Pads in accordance with Item 434 Bridge Bearings, Fabrication for new bearing pads shall meet current TxDOT IGEB Standard Sheets. New bearing pads shall match the original bearing pad dimension and thickness. Develop a bearing layout to identify location and orientation of all bearings. New Bearing pads must be beveled to accomodate beam slope. Refer to asbuilt plans for additional information
The work performed and materials furnished under this item will be paid as per Item 4002 "Replace Elastomeric Bearing Pads".

3. Raising structures for removing and replacing bearings is in accordance with Item 495, "Raising Existing Structures". Submit any temporary shoring plan and raising plan signed and sealed by a licensed professional engineer for approval prior to the beginning of the work. The beam's ends at any bent should not be raised more than an additional height needed for inserting new bearing pad. Also, additional measures may be needed to prevent any damage in the superstructure and substructure.
Inform the engineer for fixed conditions at any repair location.
Raising structures and all work related to temporary shoring including engineering design shall be subsidiary to Item 4002 "Replace Elastomeric Bearing Pads".

4. Shore towers used to support the various bridge members during repair procedures will be certified. The contractor will supply the engineer with copies of the certifications prior to placement of the shore towers. Submit shoring tower capacity and working drawings before installation.

5. Contractor shall remove and re-attach any existing electrical conduit and drain pipes system. The work performed will be incidental to Item 4002.

6. All other work performed and materials furnished per the plans will be considered subsidiary to Item 4002.

7. No traffic is allowed on the bridge during the time of the operation.

STATE OF TEXAS
DENNIS A JOHNSON
93566
LICENSED PROFESSIONAL ENGINEER

Dennis A Johnson
07/28/2021

Texas Department of Transportation | Houston District (Bridge)

BRIDGE JACKING LOADS

CYPRESS ROSEHILL OVERPASS

FILE: 148_JackingLoads-.dgn	DW: AL	CK: DJ	DW: AL	CK: DJ
©TxDOT 7/28/2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	11	001	US290,ETC
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS,ETC		22

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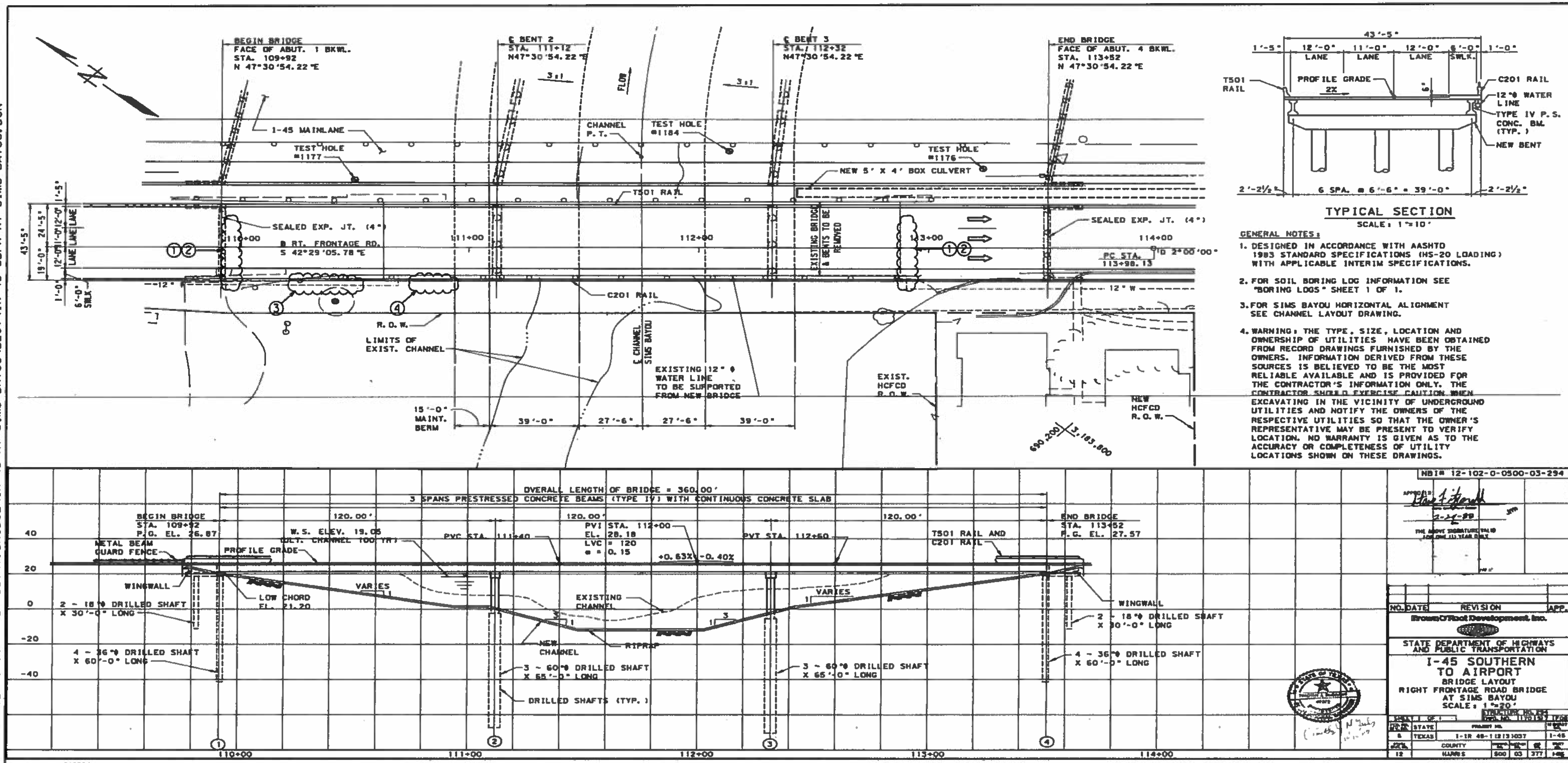
BEGIN BRIDGE
FACE OF ABUT. 1 BKWL.
STA. 109+92
N 47°30'54.22"E
℄ BENT 2
STA. 111+12
N47°30'54.22"E
℄ BENT 3
STA. 112+32
N47°30'54.22"E
END BRIDGE
FACE OF ABUT. 4 BKWL.
STA. 113+52
N 47°30'54.22"E
I-45 MAINLANE
TEST HOLE #1177
CHANNEL P.T.
TEST HOLE #1184
TEST HOLE #1176
NEW 5' X 4' BOX CULVERT
T501 RAIL
SEALED EXP. JT. (4")
RT. FRONTAGE RD.
S 42°29'05.78"E
EXISTING BRIDGE & BENTS TO BE REMOVED
PC STA. 113+98.13
D 2°00'00"
C201 RAIL
R.O.W.
LIMITS OF EXIST. CHANNEL
℄ CHANNEL SIMS BAYOU
EXISTING 12" Ø WATER LINE TO BE SUPPORTED FROM NEW BRIDGE
EXIST. HCFCD R.O.W.
NEW HCFCD R.O.W.
15'-0" MAINT. BERM
39'-0"
27'-6"
27'-6"
39'-0"
TYPICAL SECTION
SCALE: 1"=10'
43'-5"
12'-0" LANE
11'-0" LANE
12'-0" LANE
6'-0" SWLK.
PROFILE GRADE
2%
12"Ø WATER LINE
TYPE IV P.S. CONC. BM. (TYP.)
NEW BENT
6 SPA. @ 6'-6" = 39'-0"
GENERAL NOTES:
1. DESIGNED IN ACCORDANCE WITH AASHTO 1983 STANDARD SPECIFICATIONS (HS-20 LOADING) WITH APPLICABLE INTERIM SPECIFICATIONS.
2. FOR SOIL BORING LOG INFORMATION SEE "BORING LOGS" SHEET 1 OF 1.
3. FOR SIMS BAYOU HORIZONTAL ALIGNMENT SEE CHANNEL LAYOUT DRAWING.
4. WARNING: THE TYPE, SIZE, LOCATION AND OWNERSHIP OF UTILITIES HAVE BEEN OBTAINED FROM RECORD DRAWINGS FURNISHED BY THE OWNERS. INFORMATION DERIVED FROM THESE SOURCES IS BELIEVED TO BE THE MOST RELIABLE AVAILABLE AND IS PROVIDED FOR THE CONTRACTOR'S INFORMATION ONLY. THE CONTRACTOR SHOULD EXERCISE CAUTION WHEN EXCAVATING IN THE VICINITY OF UNDERGROUND UTILITIES AND NOTIFY THE OWNERS OF THE RESPECTIVE UTILITIES SO THAT THE OWNER'S REPRESENTATIVE MAY BE PRESENT TO VERIFY LOCATION. NO WARRANTY IS GIVEN AS TO THE ACCURACY OR COMPLETENESS OF UTILITY LOCATIONS SHOWN ON THESE DRAWINGS.
OVERALL LENGTH OF BRIDGE = 360.00'
3 SPANS PRESTRESSED CONCRETE BEAMS (TYPE IV) WITH CONTINUOUS CONCRETE SLAB
120.00'
120.00'
120.00'
BEGIN BRIDGE
STA. 109+92
P.G. EL. 26.87
W.S. ELEV. 19.05
DSGN. CHANNEL (100 YR)
PVC STA. 111+40
PVI STA. 112+00
EL. 28.18
LVC = 120
e = 0.15
PVT STA. 112+60
+0.63% -0.40%
END BRIDGE
STA. 113+52
P.G. EL. 27.57
T501 RAIL AND C201 RAIL
METAL BEAM GUARD FENCE
PROFILE GRADE
WINGWALL
LOW CHORD EL. 21.20
VARIES
EXISTING CHANNEL
NEW CHANNEL
RIPRAP
2 - 18"Ø DRILLED SHAFT X 30'-0" LONG
4 - 36"Ø DRILLED SHAFT X 60'-0" LONG
3 - 60"Ø DRILLED SHAFT X 65'-0" LONG
DRILLED SHAFTS (TYP.)
110+00
111+00
112+00
113+00
114+00
NBI# 12-102-0-0500-03-294
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
I-45 SOUTHERN TO AIRPORT
BRIDGE LAYOUT
RIGHT FRONTAGE ROAD BRIDGE AT SIMS BAYOU
SCALE: 1"=20'

DESCRIPTION OF WORK

*① REPLACE ALL BEARING PADS AT ABUT 1 AND ABUT 4 FOR SBFR.

WORK TO BE PAID UNDER ITEM 4002-6001 "REP ELASTOMERIC BEARING PADS".

② CLEAN AND RESEAL DECK JOINTS OVER ABUTMENTS.

WORK TO BE PAID UNDER ITEM 438-6001 "CLEANING AND SEALING EXISTING JOINTS".

③ REPLACE DAMANGED STEEL PIPE RAIL OF SOUTHWEST BRIDGE RAIL OVER NORTHWEST SPAN.

WORK TO BE PAID UNDER ITEM 0776-6006 "REPAIR (T201 W/ STEEL PIPE RAIL-C201)".

④ REPAIR 2'x 2' SPALLING WITH EXPOSED STEEL OF SOUTHWEST DECK OVERHANG OF SPAN 1.

WORK TO BE PAID UNDER ITEM 0429-6007 "CON STR REPAIR (VERTICAL & OVERHEAD)".

NOTES:

1. SEE SHEET "BRIDGE JACKING LOADS" FOR BRIDGE JACKING INFORMATION.

* 2. 14 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS GpB(MOD). PAD FABRICATION TO CONFORM TO CURRENT TXDOT STANDARD IGEB.

3. CONTRACTOR SHALL REPLACE RAIL ACCORDING TO STANDARD SHEET #

LIMITS OF REPAIR ARE APPROXIMATE AND FOR CONTRACTOR'S INFORMATION ONLY.

STATE OF TEXAS — DEDRICK D. KNIGHTEN — 103612 — LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by DEDRICK D. KNIGHTEN, P.E. 103612

8/2 2021

[signature] P.E.

IH-45 SBFR OVER SIMS BAYOU BRIDGE REPAIR LAYOUT

SHEET 1 OF 1

NBI# 12-102-0500-03-294

Texas Department of Transportation

 SCALE N.T.S.

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		23
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

H:\WCHAO\Design\Maintenance Projects\BPM\BPM 6382-09-001\Plan Set\7.BRIDGE\IH 45 AT SIMS BAYOU\BL01\IH-45 SBFR AT SIMS BAYOU.DGN

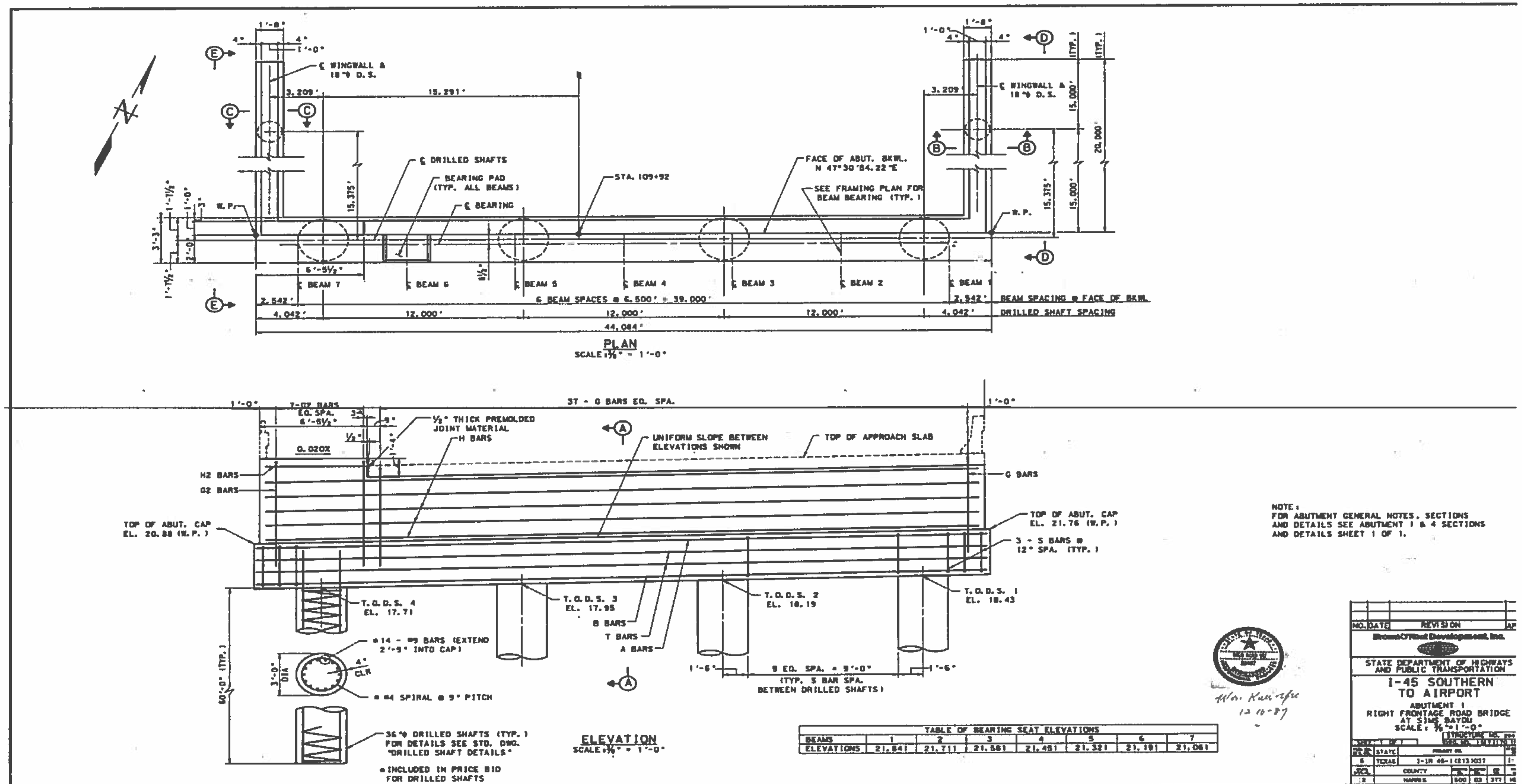

TABLE OF BEARING SEAT ELEVATIONS

BEAMS	1	2	3	4	5	6	7
ELEVATIONS	21.841	21.711	21.581	21.451	21.321	21.191	21.061

FOR CONTRACTOR'S INFORMATION ONLY.

IH-45 SBFR OVER SIMS BAYOU

ABUTMENT 1

SHEET 1 OF 1

STR. 12-102-0500-03-294

Texas Department of Transportation

SCALE N.T.S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		24
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

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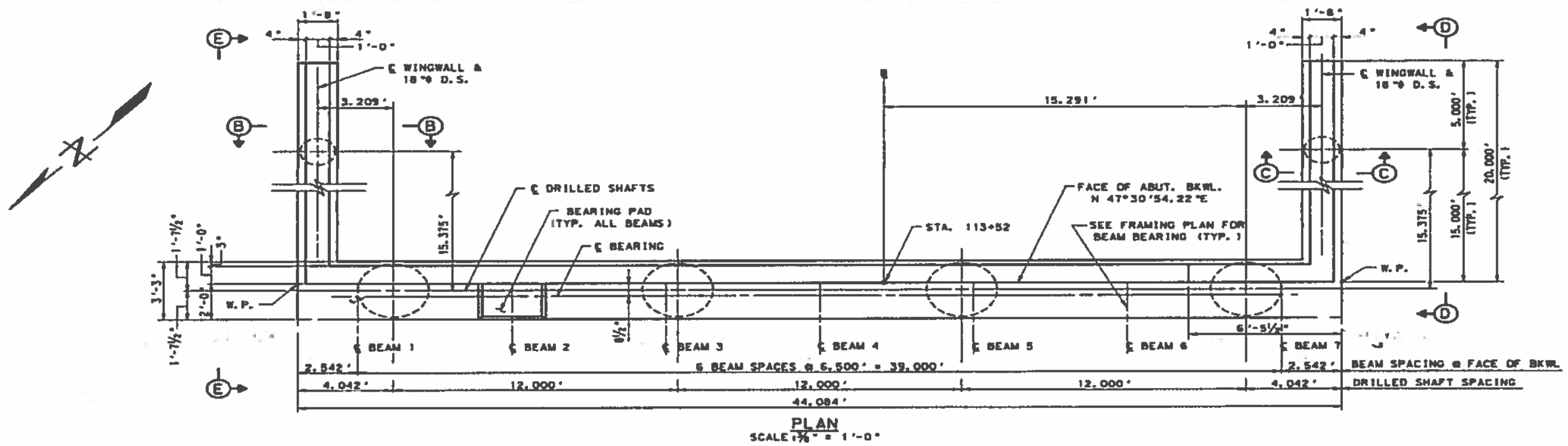

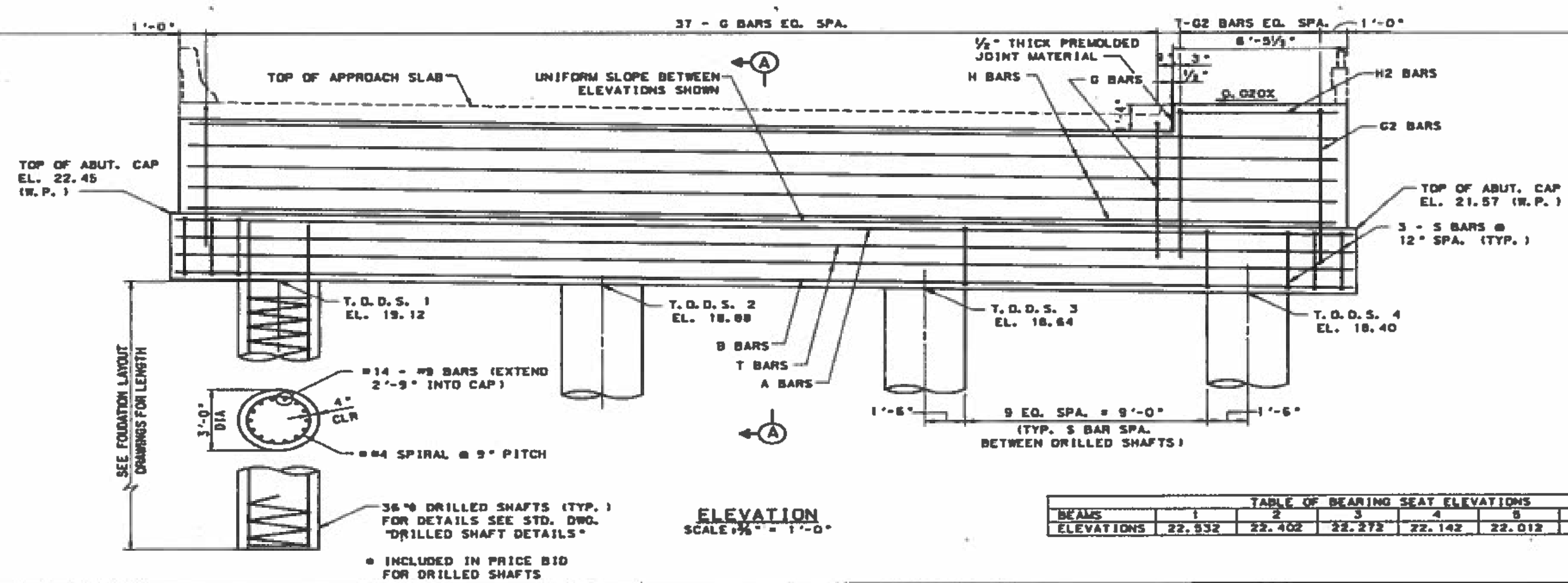

TABLE OF BEARING SEAT ELEVATIONS							
BEAMS	1	2	3	4	5	6	7
ELEVATIONS	22.532	22.402	22.272	22.142	22.012	21.882	21.752

NOTE:
FOR ABUTMENT GENERAL NOTES, SECTIONS AND DETAILS SEE ABUTMENT 1 & 4 SECTIONS AND DETAILS SHEET 1 OF 1.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
I-45 SOUTHERN TO AIRPORT
ABUTMENT 4
RIGHT FRONTAGE ROAD BRIDGE AT SIMS BAYOU
SCALE: ⅜" = 1'-0"

FOR CONTRACTOR'S INFORMATION ONLY.

IH-45 SBFR OVER SIMS BAYOU

ABUTMENT 4
SHEET 1 OF 1

STR. 12-102-0500-03-294
Texas Department of Transportation

SCALE N.T.S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		25
STATE	DIST.	COUNTY	
TEXAS	HOU	VARIOUS	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

FILE: 455B-BL.DGN
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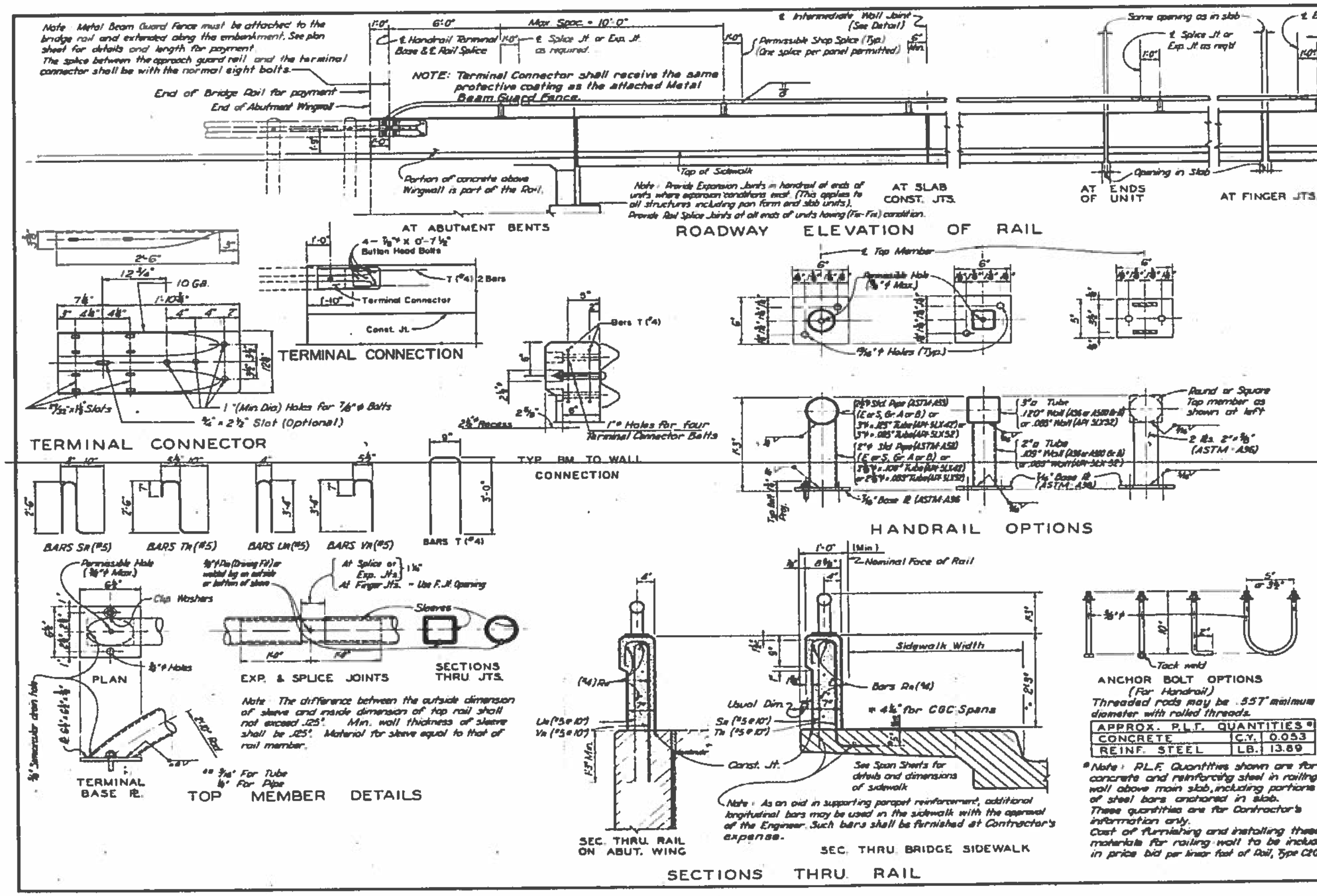

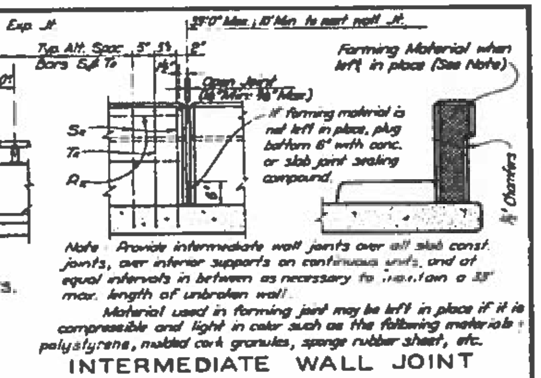

GENERAL NOTES:

Designed in accordance with AASHTO 1977 Standard and current Interim Specifications.

All parapet concrete and reinforcing, including that embeded in the slab or wingwalls, the terminal connector and the connection to the deep beam guard rail are considered part of Type C201 Railing for payment.

Concrete for railing wall shall be Class "C". Chamfer all exposed corners ¾" unless otherwise shown.

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

The face of concrete railing shall be vertical unless otherwise shown in plans. Handrail posts shall be perpendicular to top of concrete. Grout may be used under base plates if necessary.

Whichever of the various handrail options is selected for use shall be used throughout the entire project.

Handrail sections shall be made continuous over not less than two posts nor more than four (except at Abutments).

For railing not requiring shop drawings, erection drawings showing panel lengths, rail post spacing and anchor bolt setting shall be submitted to the Resident Engineer for approval. If railing requires shop and erection drawings, these drawings shall be submitted to the Bridge Engineer for approval. Shop drawings may be submitted as 11" X 18" prints provided they are clearly legible.

Exposed edges of handrail and handrail posts shall be rounded or chamfered to approximately 1/16" by grinding.

RAILS ON HORIZONTAL CURVES

	Rad. to Face of Rail	Max. Chord Lgth.	Construction or Fabrication
Railing Wall	Over 3200'	33'-0"	Construct wall to the required radius or in chords shown. ◊
	Over 2000'-3200'	20'-0"	
	Over 300'-2000'	10'-0"	
	Thru 300'	0	Construct wall to the required radius ◊
Handrail	Over 2800'	29'-0"	Furnish in straight rail panels ◊
	Over 1400'-2800'	14'-6"	Bent chord sections or fabricate to the required radius
	Over 700'-1400'	7'-3"	
	Thru 700'	0	Fabricate to the required radius

◊ Shop drawings will not be required.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

COMBINATION RAIL TYPE C201

PREPARED BY AND FOR THE USE OF TEXAS SDHPT.

DEC. 1980 — Rev. 2-84 (Gen. Notes)

FOR CONTRACTOR'S INFORMATION ONLY.

ACC: PROJECT/BPM631848001/ FILE: 455B-BL.DGN

IH-45 SBFR OVER SIMS BAYOU

COMBINATION RAIL TYPE C201

SHEET 1 OF 1

STR. 12-102-0500-03-294

Texas Department of Transportation

 SCALE N.T.S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		26
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

STRUCTURE	NO. BEAMS	STATION	JACKING LOAD
NBI# 12-102-0500-03-294	(1)		TON/BEAM
IH45 SBFR AT SIMS BAYOU	7	Sta. 109+92 (AHEAD)	94
	7	Sta. 113+52 (BACK)	94

(1) Refer to Existing Bridge Layout Sheets for number of bearing pads to be replaced.

1. All work shall be performed as per special specification 4002 "Replace Elastomeric Bearing Pads"

2. Fabricate and install Bearing Pads in accordance with Item 434 Bridge Bearings, Fabrication for new bearing pads shall meet current TxDOT IGEB Standard Sheets. New bearing pads shall match the original bearing pad dimension and thickness. Develop a bearing layout to identify location and orientation of all bearings. New Bearing pads must be beveled to accomodate beam slope. Refer to asbuilt plans for additional information
The work performed and materials furnished under this item will be paid as per Item 4002 "Replace Elastomeric Bearing Pads".

3. Raising structures for removing and replacing bearings is in accordance with Item 495, "Raising Existing Structures". Submit any temporary shoring plan and raising plan signed and sealed by a licensed professional engineer for approval prior to the beginning of the work. The beam's ends at any bent should not be raised more than an additional height needed for inserting new bearing pad. Also, additional measures may be needed to prevent any damage in the superstructure and substructure.
Inform the engineer for fixed conditions at any repair location.
Raising structures and all work related to temporary shoring including engineering design shall be subsidiary to Item 4002 "Replace Elastomeric Bearing Pads".

4. Shore towers used to support the various bridge members during repair procedures will be certified. The contractor will supply the engineer with copies of the certifications prior to placement of the shore towers. Submit shoring tower capacity and working drawings before installation.

5. Contractor shall remove and re-attach any existing electrical conduit and drain pipes system. The work performed will be incidental to Item 4002.

6. All other work performed and materials furnished per the plans will be considered subsidiary to Item 4002.

7. No traffic is allowed on the bridge during the time of the operation.

STATE OF TEXAS
DENNIS A JOHNSON
95166
LICENSED
PROFESSIONAL ENGINEER

Dennis A Johnson

07/28/2021

Texas Department of Transportation | Houston District (Bridge)

BRIDGE JACKING LOADS

IH45 SBFR AT SIMS BAYOU

FILE: 294_JackingLoads-.dgn	DN: AL	CK: DJ	DW: AL	CK: DJ
©TxDOT 7/28/2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6366	86	001	IH45
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		27

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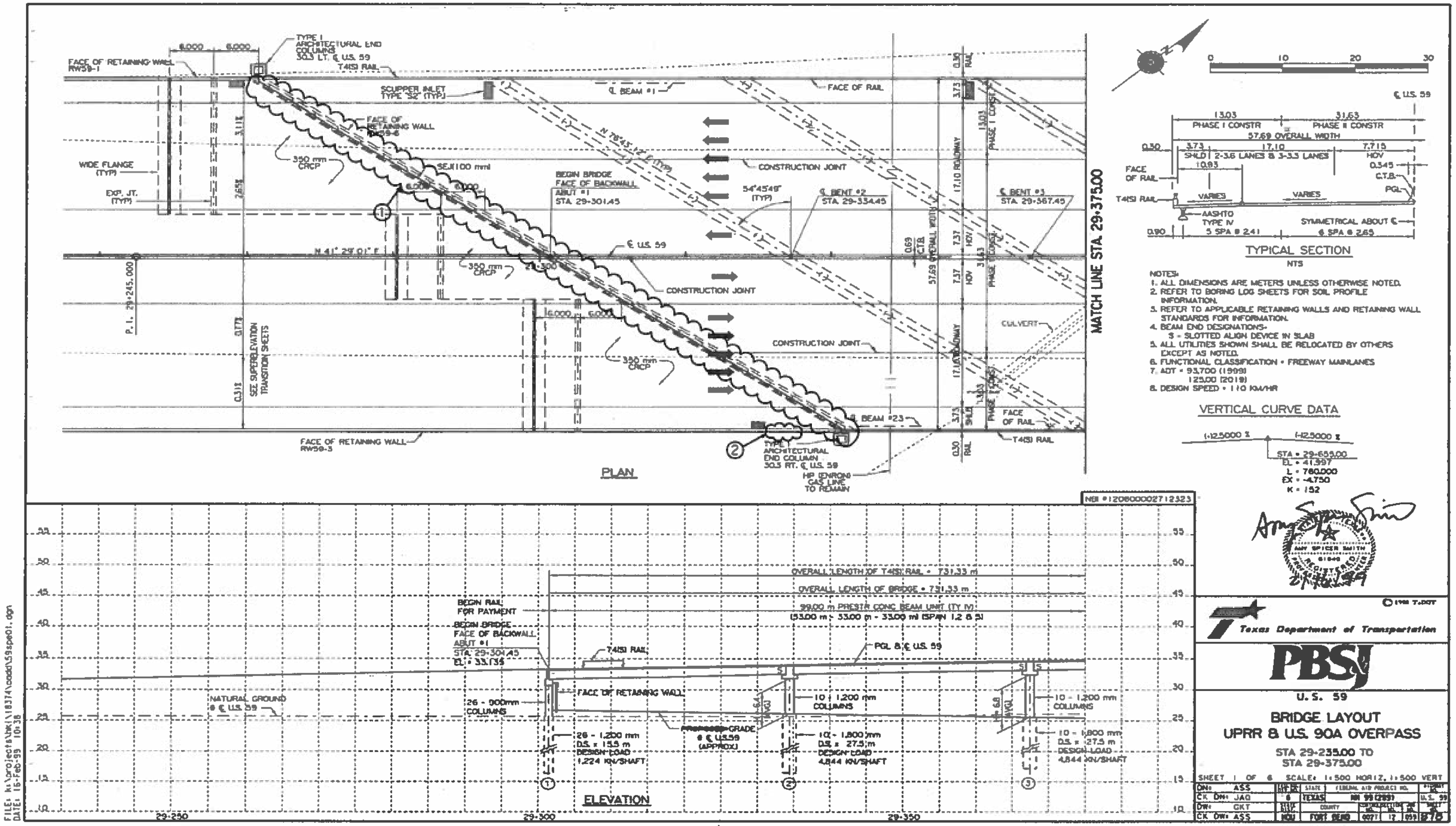

DESCRIPTION OF WORK

*① REPLACE ALL BEARING PADS AT ABUTMENT 1.

WORK TO BE PAID UNDER ITEM 4002-6001 "REP ELASTOMERIC BEARING PADS".

② REPAIR 3 LF OF DAMAGED CONC RAIL.

WORK TO BE PAID UNDER ITEM 778-6011 "CONC RAIL REPAIR TYPE 501".

NOTES:

1. SEE SHEET "BRIDGE JACKING LOADS" FOR BRIDGE JACKING INFORMATION.

* 2. 23 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS GpB(MOD). PAD FABRICATION TO CONFORM TO CURRENT TXDOT STANDARD IGEB.

LIMITS OF REPAIR ARE APPROXIMATE AND FOR CONTRACTOR'S INFORMATION ONLY.

STATE OF TEXAS
DEDRICK D. KNIGHTEN
103612
LICENSED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by DEDRICK D. KNIGHTEN, P.E. 103612

8/2 2021

P.E.

US 59/IH 69 OVER US 90A & UPRR BRIDGE REPAIR LAYOUT

SHEET 1 OF 3

NBI# 12-080-0027-12-323

Texas Department of Transportation

 SCALE N.T.S.

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	BPM 638209001	28

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

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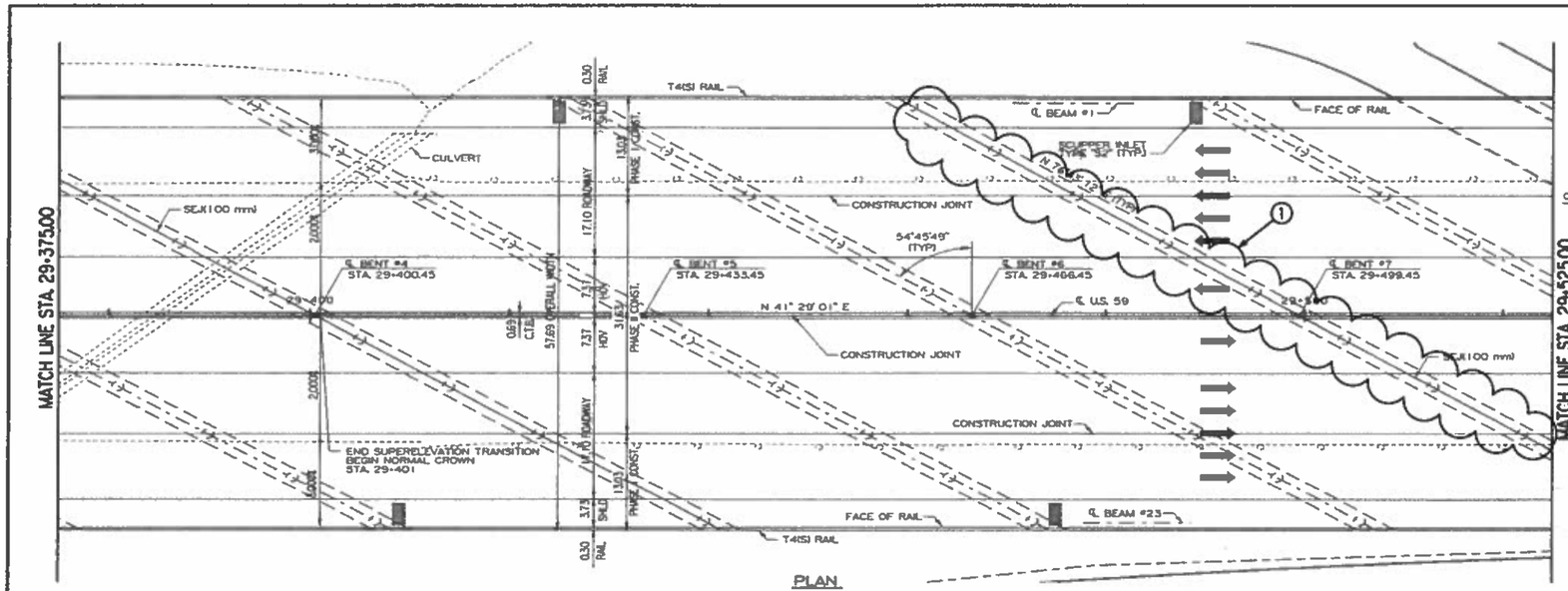
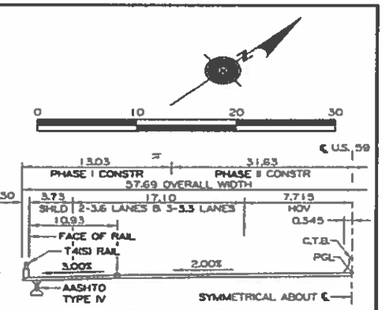




TYPICAL SECTION

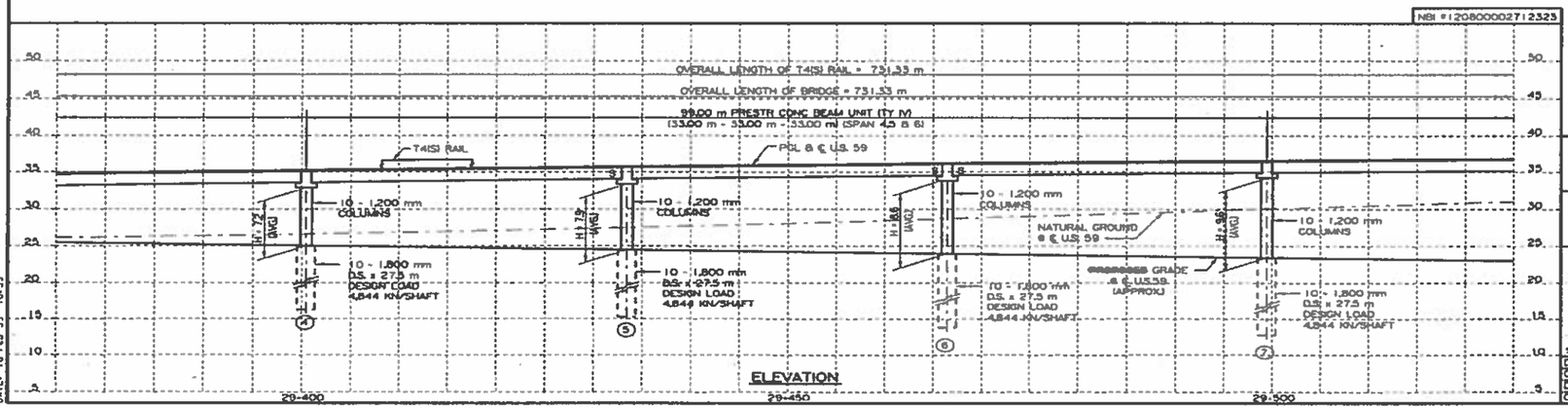
NTS

NOTES:
1. ALL DIMENSIONS ARE METERS UNLESS OTHERWISE NOTED.
2. REFER TO BORING LOG SHEETS FOR SOIL PROFILE INFORMATION.
3. REFER TO APPLICABLE RETAINING WALLS AND RETAINING WALL STANDARDS FOR INFORMATION.
4. BEAM END DESIGNATIONS-
   S - SLOTTED ALIGN DEVICE IN SLAB
5. ALL UTILITIES SHOWN SHALL BE RELOCATED BY OTHERS EXCEPT AS NOTED.
6. FUNCTIONAL CLASSIFICATION = FREEWAY MAINLANES
7. ADT = 93,700 (1999)
   125,00 (2019)
8. DESIGN SPEED = 110 KM/HR

VERTICAL CURVE DATA

(-12.5000 % (-12.5000 %

STA = 29+633.00
EL = 41.957
L = 760.000
EX = 4.750
K = 152



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DATE: 16-Feb-99 10:39

Texas Department of Transportation

PBSJ

U. S. 59

BRIDGE LAYOUT
UPRR & U.S. 90A OVERPASS
STA 29+375.00 TO
STA 29+525.00

SHEET 2 OF 6 SCALE: 1"=500' HORIZ, 1"=500' VERT

DN: ASS	DIST. SEC.	STATE	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CK DN: JAO	6	TEXAS	BRM 99(289)		U.S. 59
DW: GKT	DIST.	COUNTY	CONTROL NO.	SUB NO.	SHEET NO.
CK DW: ASS	HOU	FORT BEND	0027	12 (999)	879

DESCRIPTION OF WORK

*① REPLACE ALL BEARING PADS AT BENT 7 FORWARD.

WORK TO BE PAID UNDER ITEM 4002-6001 "REP ELASTOMERIC BEARING PADS".

NOTES:

1. SEE SHEET "BRIDGE JACKING LOADS" FOR BRIDGE JACKING INFORMATION.

*2. 23 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS GpB(MOD). PAD FABRICATION TO CONFORM TO CURRENT TXDOT STANDARD IGEB.

LIMITS OF REPAIR ARE APPROXIMATE AND FOR CONTRACTOR'S INFORMATION ONLY.

STATE OF TEXAS
DEDRICK D. KNIGHTEN
103612
LICENSED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by DEDRICK D. KNIGHTEN, P.E. 103612

9/2 2021

Dedrick D. Knighten P.E.

US 59/IH 69 OVER US 90A & UPRR BRIDGE REPAIR LAYOUT

SHEET 2 OF 3

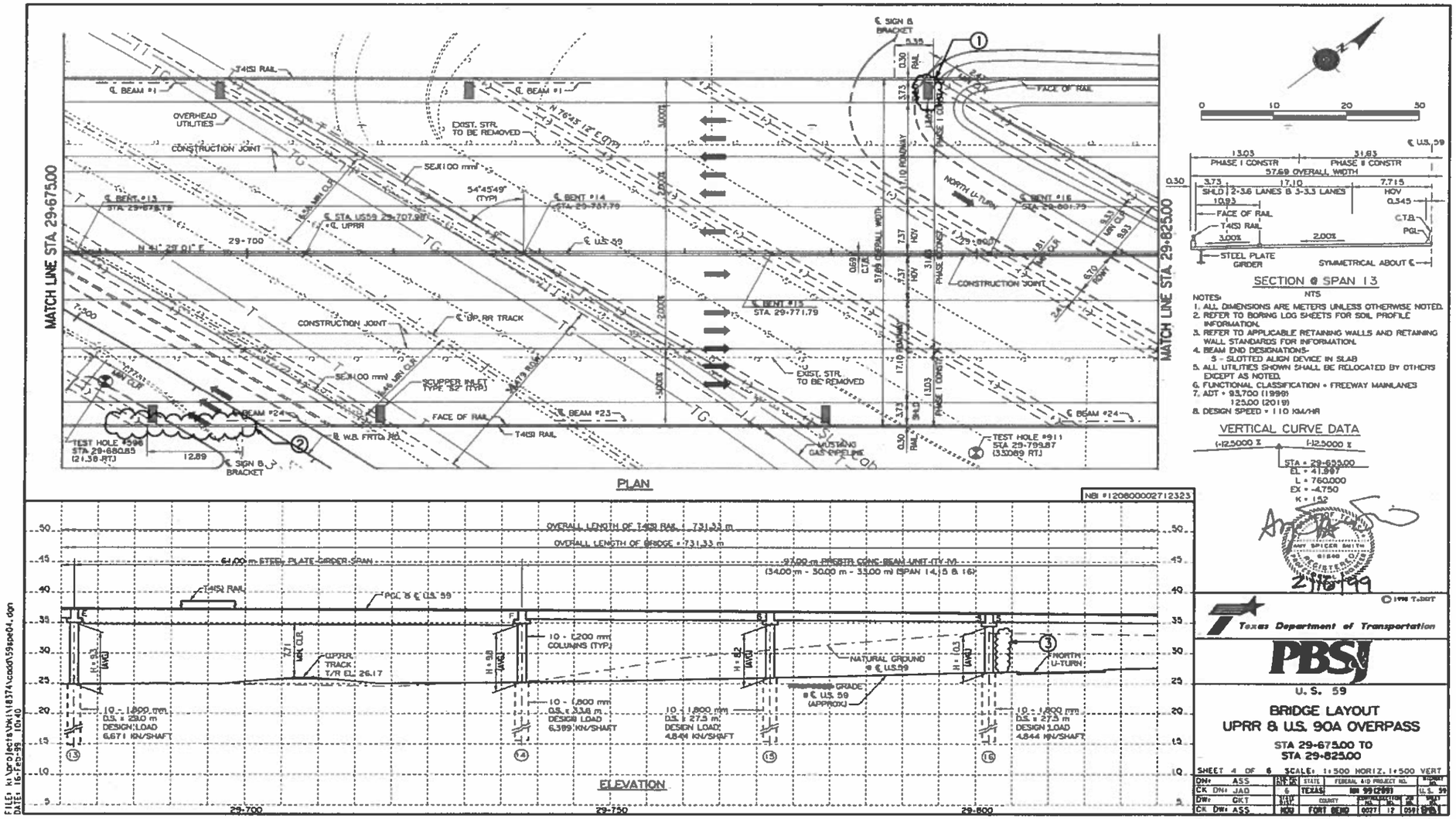
NBI# 12-080-0027-12-323

Texas Department of Transportation

 SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		29
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

H:\WCHAO\Design\Maintenance Projects\BPM\BPM 6382-09-001\Plan Set\7. BRIDGE\US59 at US90A & UPRR \IH69US59_BL2.DGN



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DESCRIPTION OF WORK

① REPLACE 10 LF OF DAMAGED DECK DRAIN PIPE.

WORK TO BE PAID UNDER ITEM 481-6002 "PIPE PVC (SDR-35)".

② REPAIR 25 LF OF DAMAGED RAIL.

WORK TO BE PAID UNDER ITEM 776-6033 "REPAIR TY (T4 (S) RAIL)".

③ REPAIR 200 SF OF DAMAGED RETAINING WALL.

WORK TO BE PAID UNDER ITEM 423-6004 "RETAINING WALL (CONC) BLOCK)".

LIMITS OF REPAIR ARE APPROXIMATE AND FOR CONTRACTOR'S INFORMATION ONLY.

STATE OF TEXAS
DEDRICK D. KNIGHTEN
103612
LICENSED
PROFESSIONAL ENGINEER

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9/2 2021

Dedrick D. Knighten, P.E.

US 59/IH 69 OVER US 90A & UPRR BRIDGE REPAIR LAYOUT

SHEET 3 OF 3

NBI# 12-080-0027-12-323

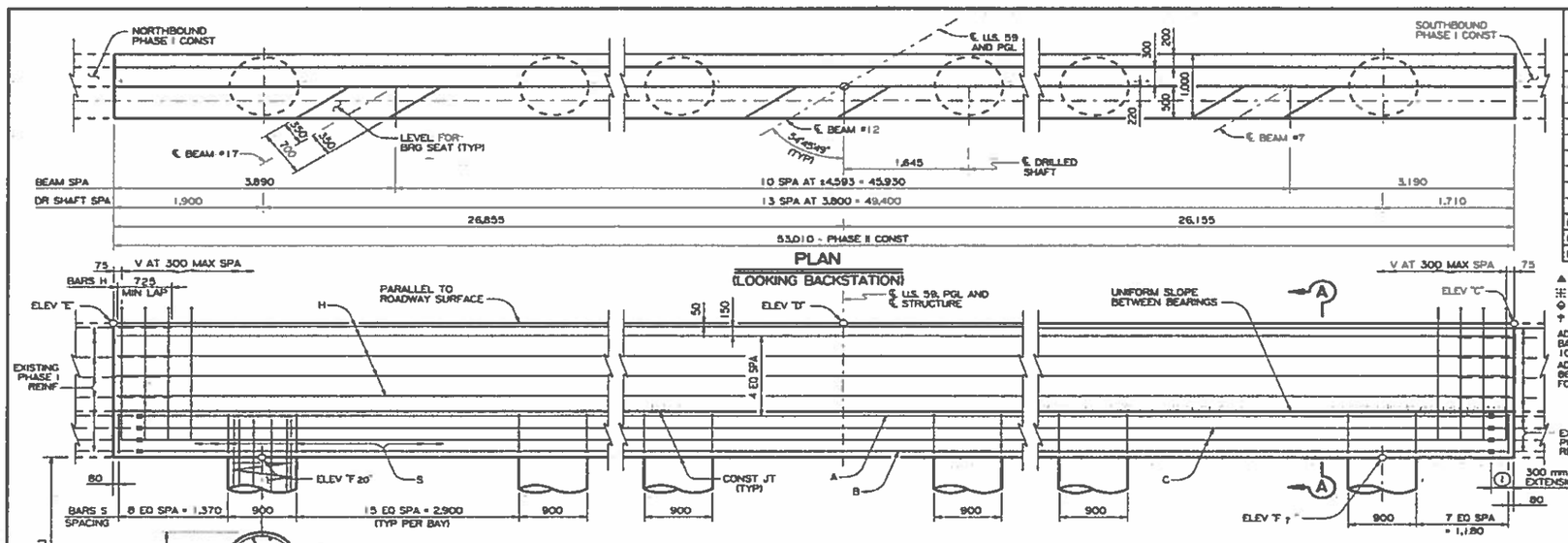
Texas Department of Transportation

SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	BPM 638209001	30

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC

CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC



ESTIMATED QUANTITIES
FOR H = 7,500 (AVG)

BAR	NO.	SIZE	LENGTH	MASS
A	4	#11	▲62,070	1,963
B	4	#9	‡56,850	1,151
C	4	#6	◇54,250	485
H	10	#5	†54,360	844
S	225	#4	3,170	709
V	177	#5	4,344	1,193
X	140	#9	8,150	5,773
Y	140	#9	2,600	1,842
Z	14	#4	86,909	1,210
REINFORCING STEEL			Kg	15,170
CLASS "C" CONCRETE (ABUT)			m^3	128.8
DRILLED SHAFTS (1,200)			m	217

▲ INCLUDES 3 - 3,220 mm MIN LAP
‡ INCLUDES 3 - 1,480 mm MIN LAP
◇ INCLUDES 2 - 920 mm MIN LAP
† INCLUDES 2 - 725 mm MIN LAP

ADJUST SPIRAL Z LENGTH BY 1,093 mm AND BARS X LENGTH BY 100 mm FOR EACH 100 mm VARIATION IN "H" VALUE.
ADJUST REINFORCING STEEL TOTAL BY 86.1 kg AND CONCRETE TOTAL BY 0.09 m^3 FOR EACH 100 mm VARIATION IN "H" VALUE.

GENERAL NOTES:
DESIGNED ACCORDING TO CURRENT AASHTO STANDARD AND INTERIM SPECIFICATIONS.
CALCULATED FOUNDATION LOADS - CAP DRILLED SHAFTS = 1,224 kN/DR SHAFT
SEE SEJ STANDARD SHEET FOR DETAILS AND LENGTH OF SEJ TO BE PLACED WITH ABUTMENT.
SEE RETAINING WALL DETAILS FOR COPING TO BE ATTACHED TO ABUTMENT.
ALL DIMENSIONS ARE IN MILLIMETERS [mm] UNLESS OTHERWISE SHOWN.

MS18 LOADING

© 1998 TxDOT

Texas Department of Transportation

PBSJ

U. S. 59

ABUTMENT NO. 1

PHASE II - SOUTHBOUND AND NORTHBOUND U.S. 59
UPRR & U.S. 90A OVERPASS

DN:	BEV	CK: DW:	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
CK: DW:	ASS		TEXAS	NH 99 (239)				U.S. 59
DW:	GKT		DIST.	COUNTY				SHEET NO.
CK: DW:	JAQ		HOU	FORT BEND	0027	12	050	24

TABLE OF ELEVATIONS

C	D	E	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20
31.906	32.791	33.107	29.803	29.932	30.061	30.189	30.318	30.446	30.575	30.863	30.708	30.753	30.798	30.842	30.887	30.932

FOR CONTRACTOR'S INFORMATION ONLY.

US 59/IH 69 OVER US 90A & UPRR

ABUTMENT NO. 1

SHEET 1 OF 1

NBI# 12-080-0027-12-323

Texas Department of Transportation

© 2021 SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		31
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

LEVELS DISPLAYED
ACC: PROJECT/BPM638209001/
FILE: IH69US59 03.DGN

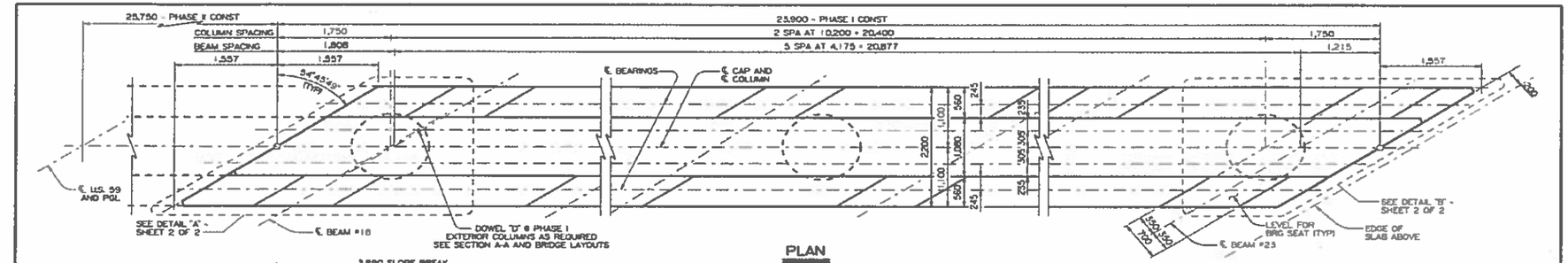


TABLE OF ELEVATIONS

BENT	ELEVATION (m)								
	E	F	G	O	P	Q	Y	Z	AA
2	33.691	33.715	33.686	31.587	31.675	31.850	24.952	24.580	24.852
3	34.266	34.279	34.206	32.178	32.229	32.192	25.166	25.100	24.812
4	34.809	34.814	34.707	32.716	32.751	32.696	25.012	25.049	25.153
5	35.280	35.278	35.136	33.185	33.201	33.118	24.986	25.172	25.401
6	35.681	35.672	35.495	33.583	33.581	33.480	24.963	25.138	25.301
7	36.009	35.994	35.781	33.908	33.888	33.770	24.562	24.482	24.544
8	36.253	36.232	35.985	34.149	34.112	33.978	23.497	23.533	23.589
9	36.452	36.425	36.139	34.345	34.289	34.135	22.130	22.120	22.111
11	36.603	36.562	36.219	34.497	34.403	34.232	20.490	20.496	20.502
15	35.987	35.918	35.411	33.829	33.578	33.483	25.850	25.850	25.850
16	35.686	35.609	35.071	33.564	33.322	33.098	22.491	22.113	21.735
17	35.287	35.203	34.629	33.152	32.952	32.660	22.623	22.509	22.395
18	34.816	34.725	34.117	32.677	32.480	32.150	23.585	23.700	23.460
19	34.272	34.175	33.532	32.130	31.890	31.508	23.513	23.648	24.575
20	33.658	33.555	32.874	31.511	31.260	30.814	23.478	23.630	24.681
21	32.973	32.863	32.146	30.822	30.554	30.189	25.405	25.242	24.487
22	32.215	32.098	31.347	30.061	29.775	29.393	25.207	24.587	24.125

⚠2 5/21/01 REVISED ELEVATIONS
⚠1 4/17/01 REVISED ELEVATIONS

DESIGNED ACCORDING TO CURRENT AASHTO STANDARD AND INTERIM SPECIFICATIONS.
CALCULATED FOUNDATION LOADS -
TOP OF DRILLED SHAFTS = 4,844 kN / DR SHAFT
ALL REINFORCING SHALL BE GRADE 420.
CLASS "F" CONCRETE WITH COARSE AGGR. GRADE NO. 5
f'c = 28MPa
ALL DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE SHOWN.

MS18 LOADING

Texas Department of Transportation

PBS&J

U. S. 59
INTERIOR BENT
NOS. 2-9, 11 & 15-22
PHASE I - NORTHBOUND U.S. 59
UPRR & U.S. 90A OVERPASS

SHEET 1 OF 2

DW:	BEV	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.		SHEET NO.
CK: DW:	ASS	6	TEXAS	NBH 9912(289)		N. S. 04
DW:	CKT	STATE DIST.	COUNTY	CONTROL	SECT.	JOB	SHEET NO.
CK: DW:	JAQ	HOU	FORT BEND	0027	12	004	901

MARY SPICER SMITH 61840 REGISTERED PROFESSIONAL ENGINEER STATE OF TEXAS
6/4/01

FOR CONTRACTOR'S INFORMATION ONLY.

US 59/IH 69 OVER US 90A & UPRR

BENT 6 NB

SHEET 1 OF 1

NBI# 12-080-0027-12-323

Texas Department of Transportation

SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		32
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64

ACC: PROJECT/BPM638209001/
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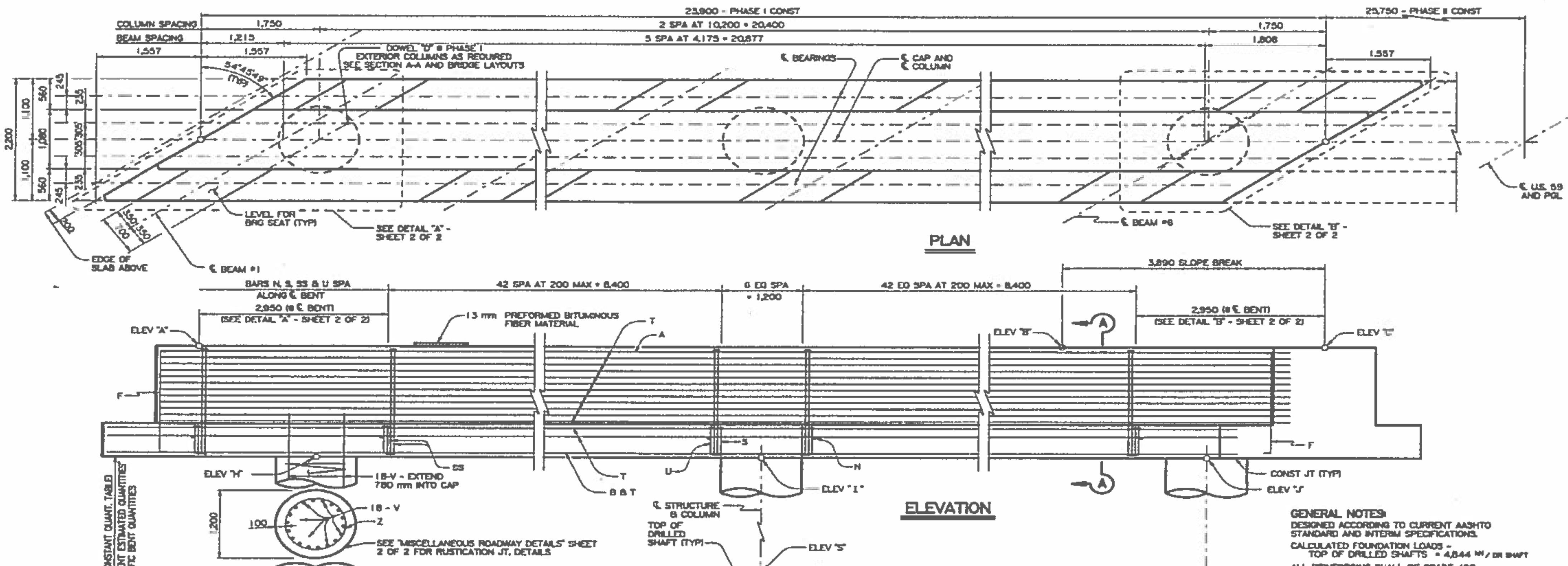


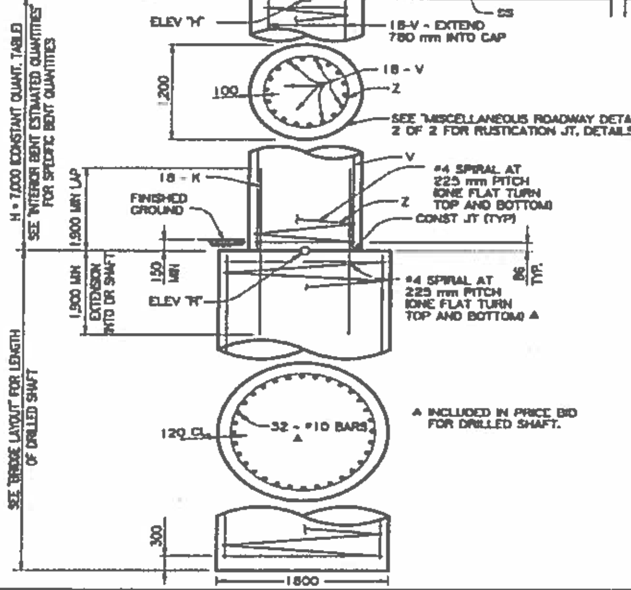


TABLE OF ELEVATIONS

BENT	ELEVATION (m) A	B	C	H	I	J	R	S	T
2	31.874	32.820	32.739	29.919	30.298	30.665	23.940	24.471	24.911
3	32.855	33.359	33.468	30.697	31.055	31.399	24.038	24.599	25.151
4	33.354	34.015	34.114	31.392	31.729	32.050	25.447	25.384	25.306
5	33.982	34.589	34.681	31.896	32.316	32.620	25.282	25.142	25.007
6	34.500	35.083	35.169	32.531	32.828	33.111	24.818	24.489	24.413
7	34.980	35.509	35.587	32.988	33.268	33.532	23.855	23.886	23.918
8	35.329	35.842	35.914	33.354	33.615	33.862	23.229	23.265	23.301
9	35.867	36.144	36.209	33.689	33.932	34.160	22.202	22.192	22.183
11	36.039	36.458	36.512	34.056	34.269	34.467	20.448	20.454	20.459
15	36.028	36.281	36.304	34.088	34.146	34.304	24.554	25.524	25.850 ⚠
16	35.845	36.068	36.085	33.840	33.958	34.097	25.262	24.904	24.526
17	35.577	35.765	35.776	33.573	33.669	33.751	23.468	23.354	23.240
18	35.238	35.381	35.394	33.232	33.309	33.372	24.425	23.601	23.480
19	34.828	34.944	34.941	32.816	32.877	32.922	24.542	23.659	23.541
20	34.344	34.427	34.416	32.331	32.373	32.401	25.664	23.656	23.519
21	33.790	33.837	33.820	31.774	31.796	31.807	25.349	23.759	23.654
22	33.165	33.176	33.161	31.146	31.152	31.142	25.105	23.633	24.738

ELEV "T"

GENERAL NOTES:
DESIGNED ACCORDING TO CURRENT AASHTO STANDARD AND INTERIM SPECIFICATIONS.
CALCULATED FOUNDATION LOADS - TOP OF DRILLED SHAFTS = 4,844 kN / DR SHAFT
ALL REINFORCING SHALL BE GRADE 420.
CLASS "F" CONCRETE WITH COARSE AGGR. GRADE NO. 5
f'c = 28MPa
ALL DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE SHOWN.
MS18 LOADING

⚠ 4/17/01 REVISED ELEVATIONS

4/26/01

Texas Department of Transportation
PBSJ

U.S. 59
INTERIOR BENT
NOS. 2-9, 11 & 15-22
PHASE I - SOUTHBOUND U.S. 59
UPRR & U.S. 90A OVERPASS
SHEET 1 OF 2

DN: BEV	FED RD DIV NO. 6	STATE TEXAS	FEDERAL AID PROJECT NO. NH 99(289)		HIGHWAY NO. U.S. 59
CK DN: ASS					
DW: GKT	DIST HOU	COUNTY FORT BEND			SHEET NO. 899
CK DW: JAG					

FOR CONTRACTOR'S INFORMATION ONLY.

US 59/IH 69 OVER
US 90A & UPRR

BENT 6 SB

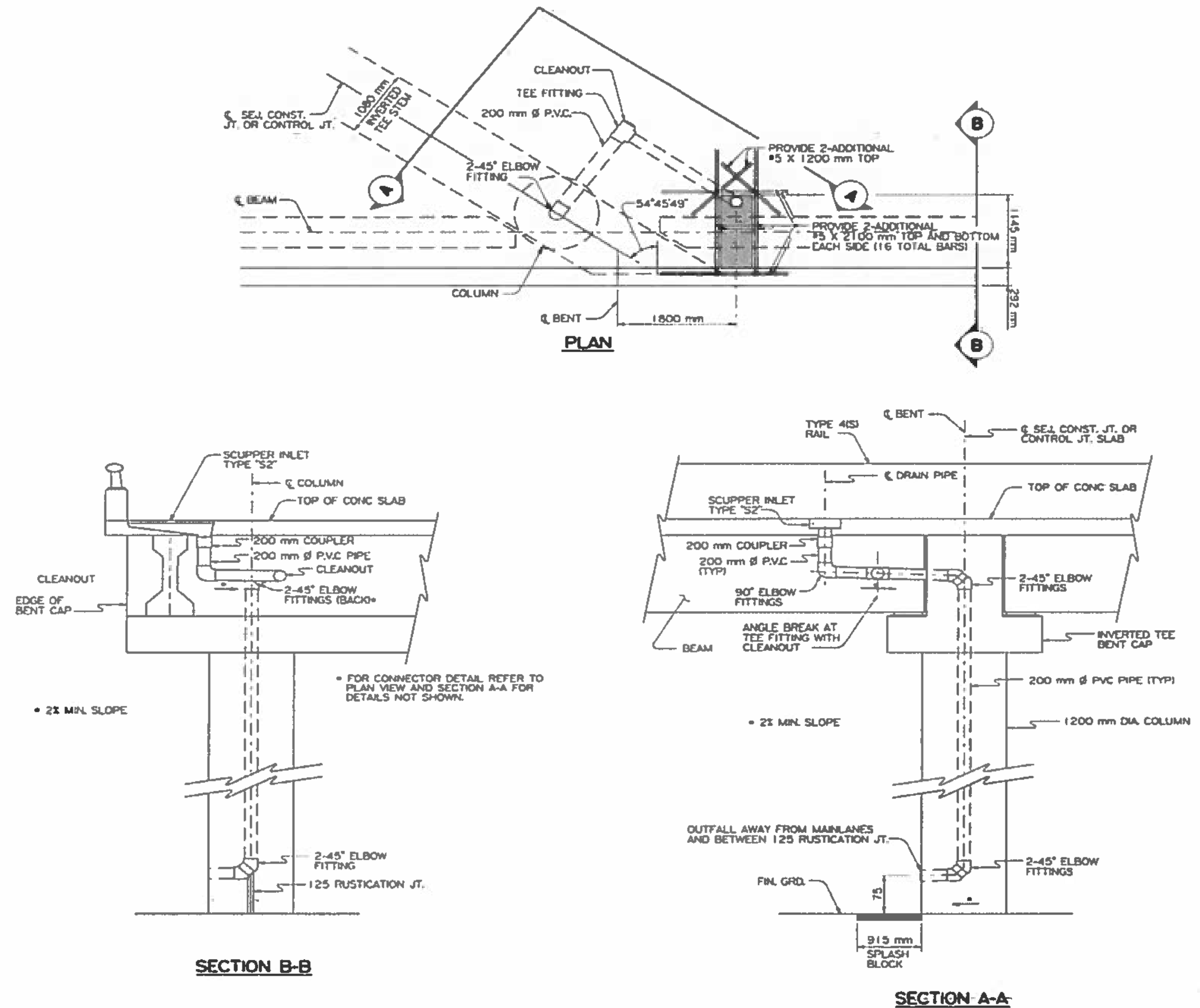
SHEET 1 OF 1

NBI# 12-080-0027-12-323

Texas Department of Transportation

SCALE N.T.S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		33
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC



GENERAL NOTES:

1. WHEN PLACING CONCRETE CARE SHALL BE TAKEN TO PREVENT HONEYCOMBING OR AIR POCKETS AROUND OR BENEATH THE SCUPPER INLET CASTING.
2. SLAB FORM SHALL BE ADEQUATELY BRACED TO SUPPORT THE DEAD WEIGHT OF THE CASTING. SLAB REINFORCING BARS SHALL BE DEFLECTED TO CLEAR THE CASTING BY 25 mm. WHEN BENDING IS NOT POSSIBLE, REINFORCING BARS MAY BE STOPPED OR CUT TO CLEAR CASTING.
3. PAYMENT FOR ADDITIONAL SLAB REINFORCING IS CONSIDERED SUBSIDIARY TO THE BID ITEM "REINFORCED CONCRETE SLAB".
4. SCUPPER INLET TYPE S2 SHALL BE PAID UNDER THE BID ITEM 465 "MANHOLES AND INLETS"
5. 200 mm DIAMETER PVC PIPE AND INCIDENTIAL ITEMS SHALL BE PAID UNDER THE BID ITEM 481 "PVC PIPE FOR BRIDGE DRAINS"

Texas Department of Transportation

PBSJ

SCUPPER INLET TYPE "S2"
(FOR DIRECT TRAFFIC)

SHEET 2 OF 2 SCALE: NONE

DN: RHS	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.					HIGHWAY NO.
CK DN: ASS	6	TEXAS	[illegible] 59(209)					U.S. 59
DW: CKT	STATE DIST.	COUNTY		CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
CK DW: ASS	HOU	FORT BEND		0027	12	059		7[illegible]4

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FILE: IH69US59 03.DGN

FOR CONTRACTOR'S INFORMATION ONLY.

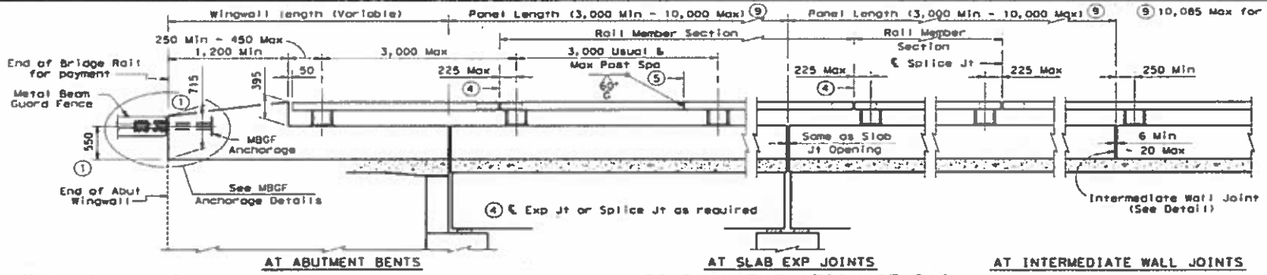
US 59 /IH 69 OVER
US 90A & UPRR

SCUPPER INLET
TYPE "S2"
SHEET 1 OF 1
NBI# 12-080-0027-12-323

Texas Department of Transportation

SCALE N.T.S.

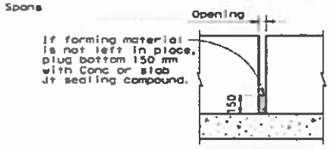
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		34
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC



ROADWAY ELEVATION OF RAIL

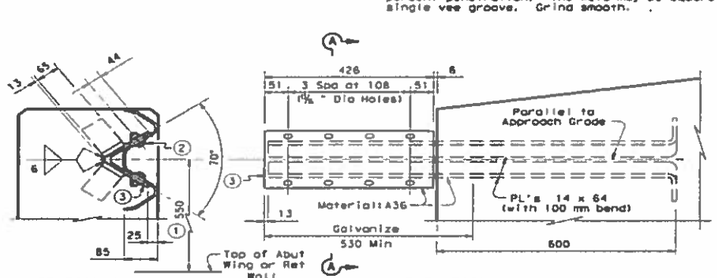
NOTE: Metal Beam Guard Fence must be attached to the Abutment Wing and extended along the embankment unless shown otherwise on the plans. See Plan Sheet for details and length for payment.

⑤ One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove, or single vee groove. Grind smooth.



INTERMEDIATE WALL JOINT DETAIL

Note: Provide intermediate wall joints over all slab construction joints, over interior supports on continuous units, and at equal intervals in between as necessary to maintain a 10,000 mm maximum length of unbroken wall. Material used in forming joint may be left in place if it is compressible and light in color such as the following materials: polystyrene, molded cork granules, sponge rubber sheet, etc.



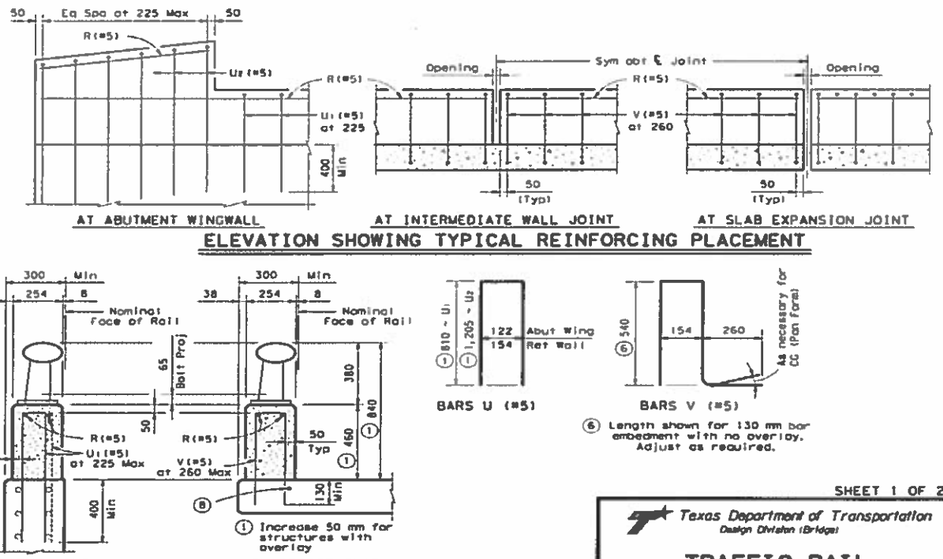
SECTION A-A

ELEVATION

⑦ 8 - ⅝" Dia Hex Head Bolts with 5 x 50 x 100 mm PL Washers

③ L 152 x 152 x 7.9 bent to 70°, or 2 PL's 8 x 152 welded to 70°.

METAL BEAM GUARD FENCE ANCHORAGE DETAILS



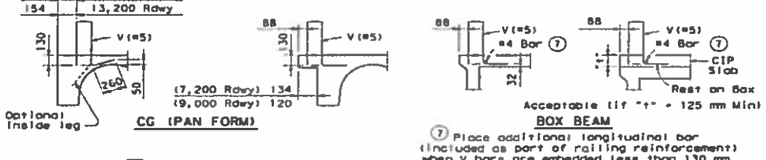
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

⑧ Top longitudinal slab bar may be adjusted laterally 75 mm ± to tie reinforcing.

① Increase 50 mm for structures with overlay

SECTIONS THRU RAIL

⑥ Length shown for 130 mm bar embedment with no overlay. Adjust as required.



⑦ Place additional longitudinal bar (included as part of railing reinforcement) when V bars are embedded less than 130 mm.

Note: This railing should not be placed on an elevated sidewalk, (Design speed 64 km/h or less). When used as a separator barrier, anchorage to the slab must be with the standard Bars V at 260 mm. If the railing fails over a PCP with dimension "t" being equal to or greater than 98 mm then Bars V at 200 mm spacing with an additional longitudinal #4 Bar may be placed in CIP Slab as shown.

TYPICAL REINFORCEMENT PLACEMENT DETAILS

SHEET 1 OF 2

Texas Department of Transportation
Design Division (Bridge)

TRAFFIC RAIL (STEEL)

TYPE T4(S) (M)

FILE: rlstd013.dgn	DN: JJP	CK: RLR	DW: DRC	CK: LDS	ck: BS69M
©TxDOT January 1996	DIST	FED RDS	FEDERAL AID PROJECT		SHEET
REVISIONS	HOU	6	JH 99 (269)		DBG
	COUNTY		CONTROL	SECT	JOB
	HARRIS, ETC		6382	09	001

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LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 49 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC: PROJECT/BPM638480001/
FILE: IH69US59 03.DGN

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FOR CONTRACTOR'S INFORMATION ONLY.

US 59 /IH 69 OVER US 90A & UPRR

TRAFFIC RAIL

SHEET 1 OF 1

NBI# 12-080-0027-12-323

Texas Department of Transportation

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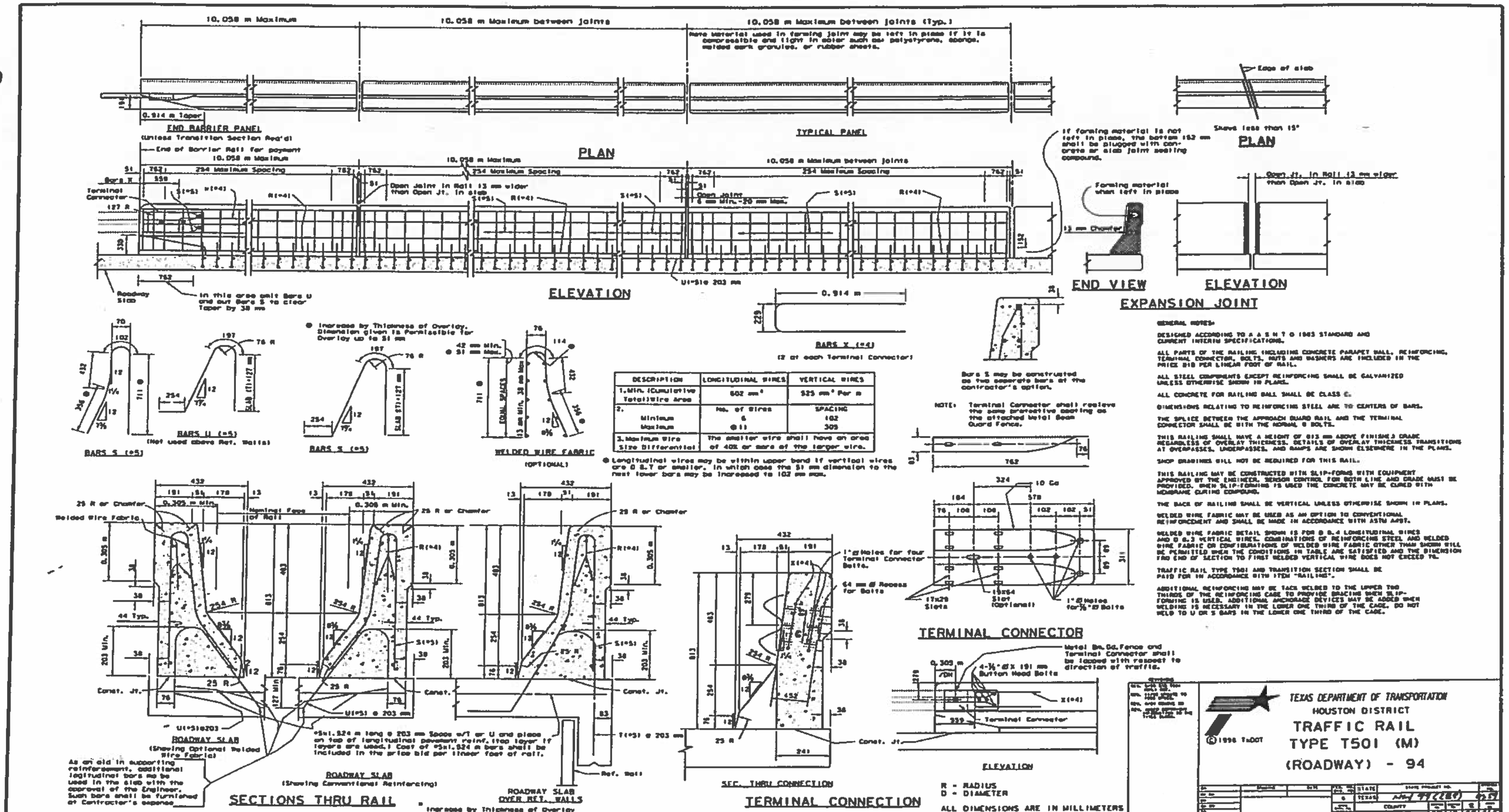
FED. NO. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		35
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC



ACC: PROJECT/BPM631848001/
FILE: IH69US59 03.DGN

FOR CONTRACTOR'S INFORMATION ONLY.

US 59 /IH 69 OVER US 90A & UPRR

TRAFFIC RAIL TYPE T501 (M)

SHEET 1 OF 1

NBI# 12-080-0027-12-323

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SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		36
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

STRUCTURE	NO. BEAMS	STATION	JACKING LOAD
NBI# 12-102-2105-01-004	(1)		TON/BEAM
FM 2234 AT CLEAR CREEK	13	Sta. 11+54.00 (BACK)	48

(1) Refer to Existing Bridge Layout Sheets for number of bearing pads to be replaced.

1. All work shall be performed as per special specification 4002 "Replace Elastomeric Bearing Pads"

2. Fabricate and install Bearing Pads in accordance with Item 434 Bridge Bearings, Fabrication for new bearing pads shall meet current TxDOT IGEB Standard Sheets. New bearing pads shall match the original bearing pad dimension and thickness. Develop a bearing layout to identify location and orientation of all bearings. New Bearing pads must be beveled to accomodate beam slope. Refer to asbuilt plans for additional information
The work performed and materials furnished under this item will be paid as per Item 4002 "Replace Elastomeric Bearing Pads".

3. Raising structures for removing and replacing bearings is in accordance with Item 495, "Raising Existing Structures". Submit any temporary shoring plan and raising plan signed and sealed by a licensed professional engineer for approval prior to the beginning of the work. The beam's ends at any bent should not be raised more than an additional height needed for inserting new bearing pad. Also, additional measures may be needed to prevent any damage in the superstructure and substructure. Inform the engineer for fixed conditions at any repair location. Raising structures and all work related to temporary shoring including engineering design shall be subsidiary to Item 4002 "Replace Elastomeric Bearing Pads".

4. Shore towers used to support the various bridge members during repair procedures will be certified. The contractor will supply the engineer with copies of the certifications prior to placement of the shore towers. Submit shoring tower capacity and working drawings before installation.

5. Contractor shall remove and re-attach any existing electrical conduit and drain pipes system. The work performed will be incidental to Item 4002.

6. All other work performed and materials furnished per the plans will be considered subsidiary to Item 4002.

7. No traffic is allowed on the bridge during the time of the operation.

STATE OF TEXAS
DENNIS A JOHNSON
95566
LICENSED PROFESSIONAL ENGINEER

Dennis A Johnson
08/12/2021

Texas Department of Transportation | Houston District (Bridge)

BRIDGE JACKING LOADS

FM 2234 AT CLEAR CREEK

FILE 4_JackingLoads.dgn	DN: AL	CK: DJ	DW: AL	CK: DJ
©TxDOT 8/12/2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	FM 2234
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		37

DATE: 7/28/2021 10:36:56 AM
FILE: H:\Bridge\DJohnson\RHC Projects\6382-09-001-Bearing pad replacement\4_JackingLoads.dgn

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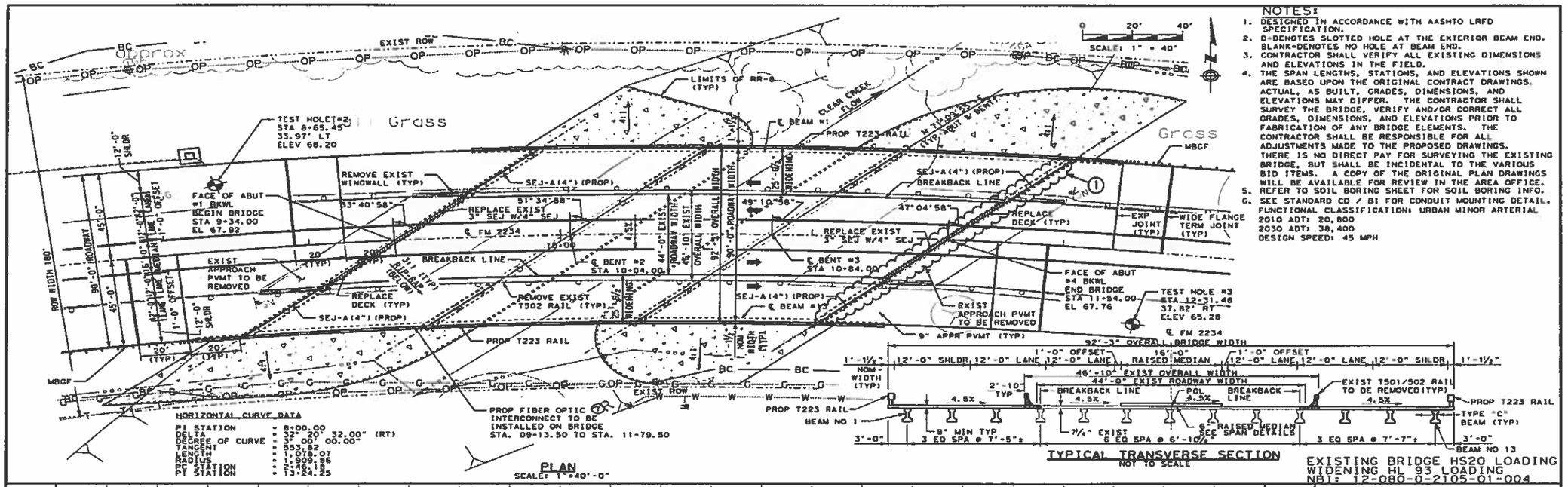
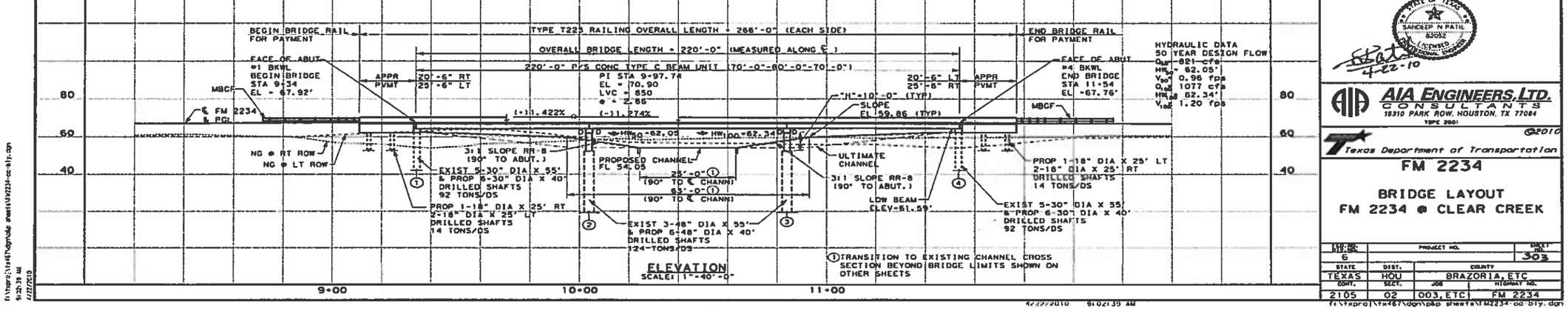


NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATION.
2. D=DENOTES SLOTTED HOLE AT THE EXTERIOR BEAM END. BLANK=DENOTES NO HOLE AT BEAM END.
3. CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND ELEVATIONS IN THE FIELD.
4. THE SPAN LENGTHS, STATIONS, AND ELEVATIONS SHOWN ARE BASED UPON THE ORIGINAL CONTRACT DRAWINGS. ACTUAL, AS BUILT, GRADES, DIMENSIONS, AND ELEVATIONS MAY DIFFER. THE CONTRACTOR SHALL SURVEY THE BRIDGE, VERIFY AND/OR CORRECT ALL GRADES, DIMENSIONS, AND ELEVATIONS PRIOR TO FABRICATION OF ANY BRIDGE ELEMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ADJUSTMENTS MADE TO THE PROPOSED DRAWINGS. THERE IS NO DIRECT PAY FOR SURVEYING THE EXISTING BRIDGE, BUT SHALL BE INCIDENTAL TO THE VARIOUS BID ITEMS. A COPY OF THE ORIGINAL PLAN DRAWINGS WILL BE AVAILABLE FOR REVIEW IN THE AREA OFFICE.
5. REFER TO SOIL BORING SHEET FOR SOIL BORING INFO.
6. SEE STANDARD CD / BI FOR CONDUIT MOUNTING DETAIL.

FUNCTIONAL CLASSIFICATION: URBAN MINOR ARTERIAL
2010 ADT: 20,800
2030 ADT: 38,400
DESIGN SPEED: 45 MPH

EXISTING BRIDGE HS20 LOADING
WIDENING HL 93 LOADING
NBI: 12-080-0-2105-01-004



① TRANSITION TO EXISTING CHANNEL CROSS SECTION BEYOND BRIDGE LIMITS SHOWN ON OTHER SHEETS

SANDEEP N PATIL 83032 LICENSED PROFESSIONAL ENGINEER
4-22-10

AIA ENGINEERS, LTD.
CONSULTANTS
10310 PARK ROW, HOUSTON, TX 77084
TBPE 2001

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Texas Department of Transportation

FM 2234

BRIDGE LAYOUT
FM 2234 @ CLEAR CREEK

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			303
STATE	DIST.	COUNTY	
TEXAS	HOU	BRAZORIA, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
2105	02	003, ETC	FM 2234

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4/22/2010 9:02:39 AM

DESCRIPTION OF WORK

*① REPLACE ALL BEARING PADS AT ABUT 4.

WORK TO BE PAID UNDER ITEM 4002-6001 "REP ELASTOMERIC BEARING PADS".

NOTES:

1. SEE SHEET "BRIDGE JACKING LOADS" FOR BRIDGE JACKING INFORMATION.

* 2. 13 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS GpB(MOD). PAD FABRICATION TO CONFORM TO CURRENT TXDOT STANDARD IGEB.

LIMITS OF REPAIR ARE APPROXIMATE AND FOR CONTRACTOR'S INFORMATION ONLY.

STATE OF TEXAS DEDRICK D. KNIGHTEN 103612 LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by DEDRICK D. KNIGHTEN, P.E. 103612

8/2 2021

David D. Knighten P.E.

FM 2234 OVER CLEAR CREEK BRIDGE REPAIR LAYOUT

SHEET 1 OF 1

NBI# 12-080-2105-01-004

Texas Department of Transportation

 SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		38
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

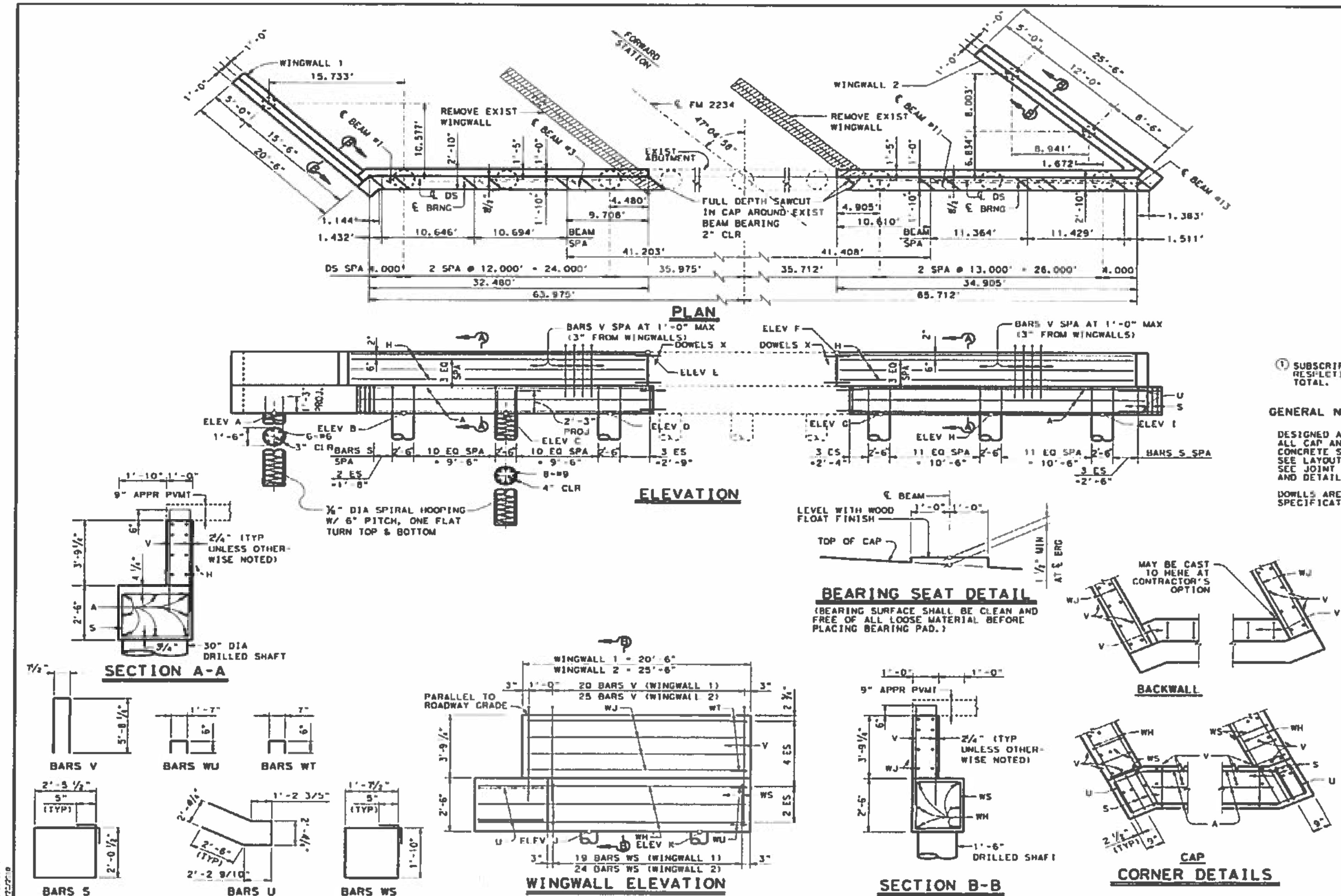

TABLE OF ESTIMATED QUANTITIES ①				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	16	#11	35'- 2" *	2,989
S	65	# 4	9 '- 10"	427
U	4	# 6	10'-9 3/5"	65
V	116	# 5	12'- 0"	1,452
H	16	# 5	35'- 2"	587
WH1	6	# 9	22'- 2"	452
WH2	6	# 9	27'-3 3/5"	557
WJ1	8	# 5	20'- 0"	167
WJ2	8	# 5	25'- 0"	209
WS	43	# 4	7'- 9"	223
WT	4	# 4	1'- 7"	5
WU	4	# 4	2'- 7"	7
X	16	# 5	3'- 0"	50
REINFORCING STEEL			LB	7,190
CLASS "C" CONCRETE			CY	41.6

* AVERAGE LENGTH

TABLE OF ELEVATIONS					
A	B	C	D	E	F
62.51'	62.40'	62.07'	61.74'	67.89'	66.15'
G	H	I	J	K	
59.76'	59.40'	58.98'	58.87'	58.67'	

① SUBSCRIPTS 1 AND 2 REPRESENT WINGWALL 1 AND 2 RESPECTIVELY. QUANTITIES SHOWN ARE PER ABUTMENT TOTAL.

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
ALL CAP AND WALL REINFORCING SHALL BE GRADE 60.
CONCRETE STRENGTH F'C = 3,600 PSI.
SEE LAYOUT FOR FOUNDATION SIZE AND LENGTH.
SEE JOINT REPLACEMENT DETAILS FOR JOINT DETAILS AND DETAILS NOT SHOWN.

DOWELS ARE INSTALLED USING 100% EPOXY PER SPECIFICATION ITEM 420.

HL93 LOADING

AIA ENGINEERS, LTD. CONSULTANTS

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FM 2234

ABUTMENT NO. 4
FM 2234 @ CLEAR CREEK

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			307
STATE	DIST.	COUNTY	
TEXAS	HOU	BRAZORIA, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
2105	02	003, ETC	FM 2234

LEVELS DISPLAYED	ACC: PROJECT/BPM631848001/	FILE: 455B-BL.DGN

FOR CONTRACTOR'S INFORMATION ONLY.

FM 2234 OVER CLEAR CREEK

ABUTMENT 4

SHEET 1 OF 1

STR. 12-102-2105-01-004

Texas Department of Transportation

SCALE N. T. S.

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 638209001		39
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	09	001	US 290, ETC

STRUCTURE	NO. BEAMS	STATION	JACKING LOAD
NBI# 12-080-0027-12-323	(1)		TON/BEAM
IH 69 AT US90A & UPRR	23	Sta. 29+301.45 (AHEAD)	97
	23	Sta. 29+499.45(FWD)	97

(1) Refer to Existing Bridge Layout Sheets for number of bearing pads to be replaced.

1. All work shall be performed as per special specification 4002 "Replace Elastomeric Bearing Pads"

2. Fabricate and install Bearing Pads in accordance with Item 434 Bridge Bearings, Fabrication for new bearing pads shall meet current TxDOT IGEB Standard Sheets. New bearing pads shall match the original bearing pad dimension and thickness. Develop a bearing layout to identify location and orientation of all bearings. New Bearing pads must be beveled to accomodate beam slope. Refer to asbuilt plans for additional information
The work performed and materials furnished under this item will be paid as per Item 4002 "Replace Elastomeric Bearing Pads".

3. Raising structures for removing and replacing bearings is in accordance with Item 495, "Raising Existing Structures". Submit any temporary shoring plan and raising plan signed and sealed by a licensed professional engineer for approval prior to the beginning of the work. The beam's ends at any bent should not be raised more than an additional height needed for inserting new bearing pad. Also, additional measures may be needed to prevent any damage in the superstructure and substructure.
Inform the engineer for fixed conditions at any repair location.
Raising structures and all work related to temporary shoring including engineering design shall be subsidiary to Item 4002 "Replace Elastomeric Bearing Pads".

4. Shore towers used to support the various bridge members during repair procedures will be certified. The contractor will supply the engineer with copies of the certifications prior to placement of the shore towers. Submit shoring tower capacity and working drawings before installation.

5. Contractor shall remove and re-attach any existing electrical conduit and drain pipes system. The work performed will be incidental to Item 4002.

6. All other work performed and materials furnished per the plans will be considered subsidiary to Item 4002.

7. No traffic is allowed on the bridge during the time of the operation.

STATE OF TEXAS
DENNIS A JOHNSON
93066
LICENSED
PROFESSIONAL ENGINEER

Dennis A Johnson
08/12/2021

Texas Department of Transportation | Houston District (Bridge)

BRIDGE JACKING LOADS

IH69/US59 AT US90A & UPRR

FILE: 323_JackingLoads-.dgn	DN: AL	CK: DJ	DW: AL	CK: DJ
©TxDOT 8/12/2021 REVISIONS	CONT	SECT	JOB	HIGHWAY
	6382	09	001	IH69/US59
	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		40

DATE: 7/28/2021 8:25:26 AM
FILE: H:\Bridge\Johnson\RMC-Projects\6382-09-001-Bearing pad replacement\323_JackingLoads-.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

WORKER SAFETY NOTES:

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

SHEET 1 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

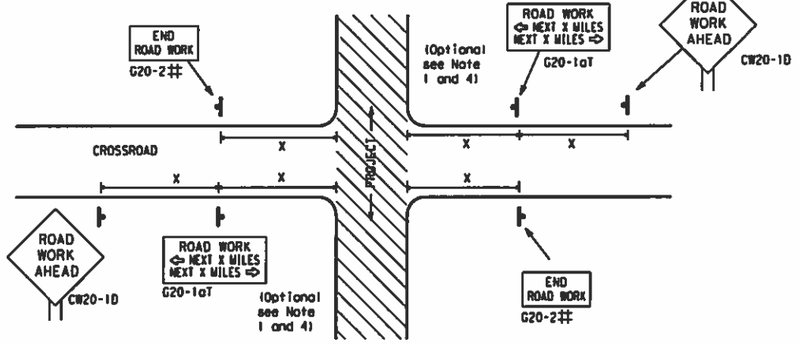
BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	6382	09	001	US 290, ETC
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS, ETC		41

DATE:
FILE:

DATE:
FILE:

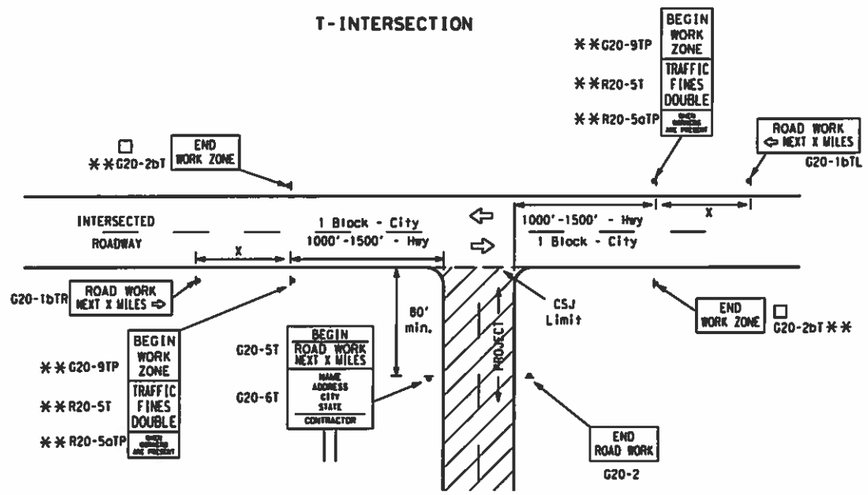
TYPICAL LOCATION OF CROSSROAD SIGNS



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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

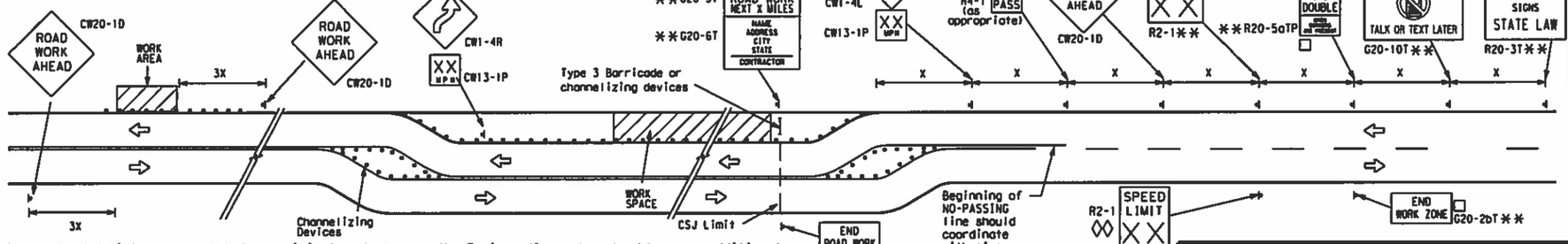
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

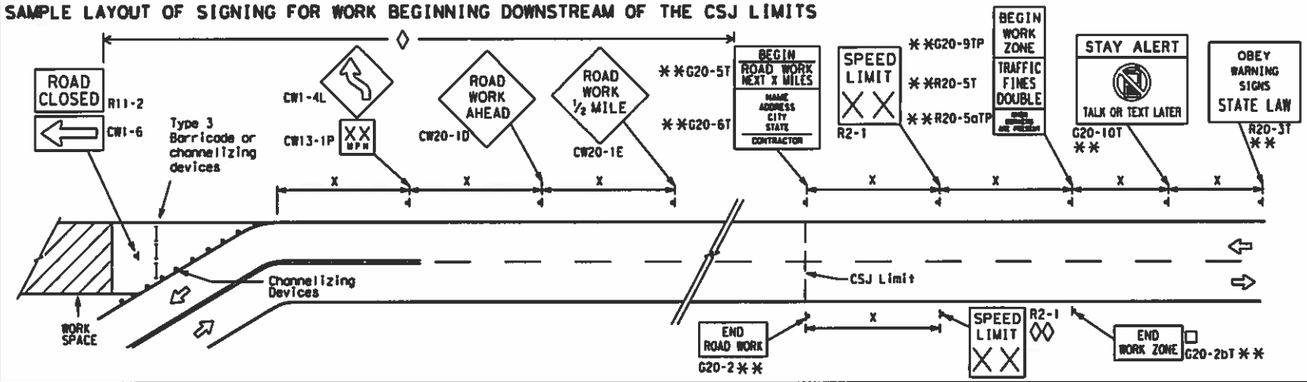
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
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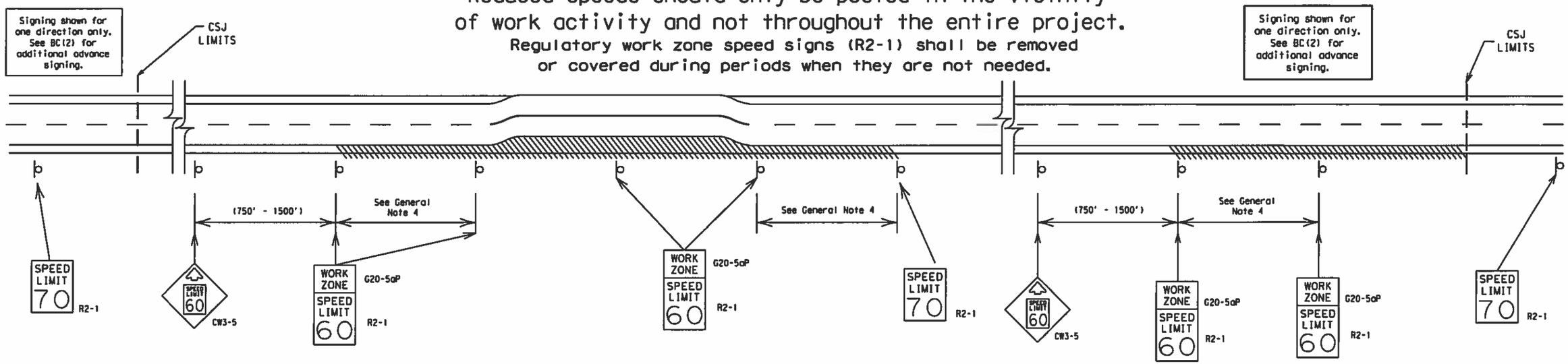
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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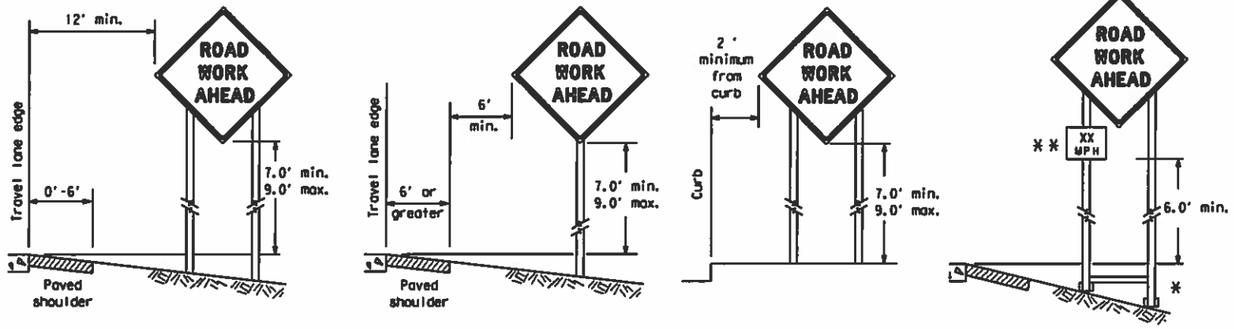
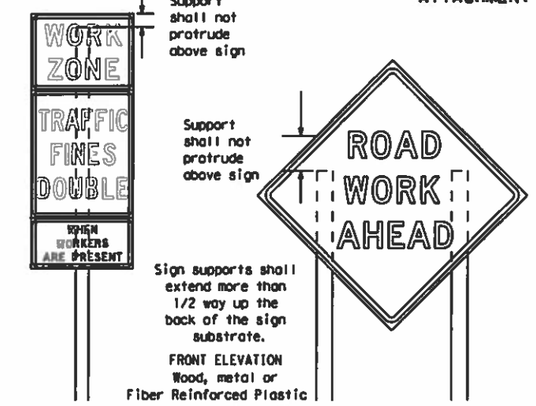
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



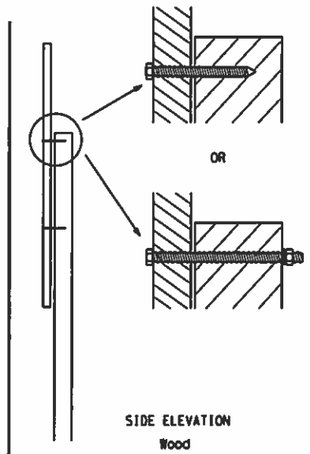
* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the 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.

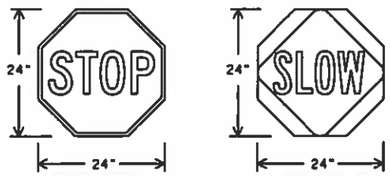


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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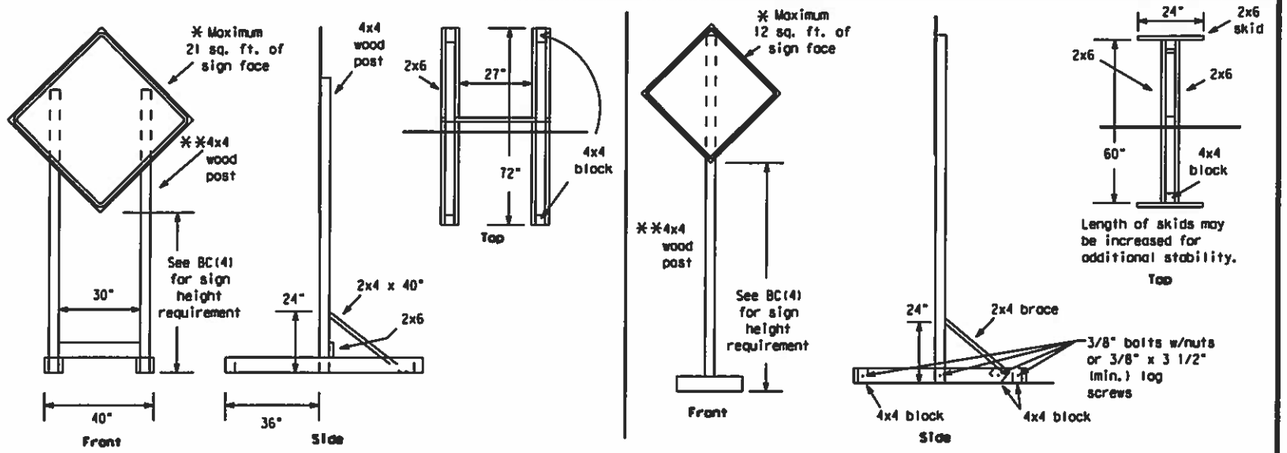
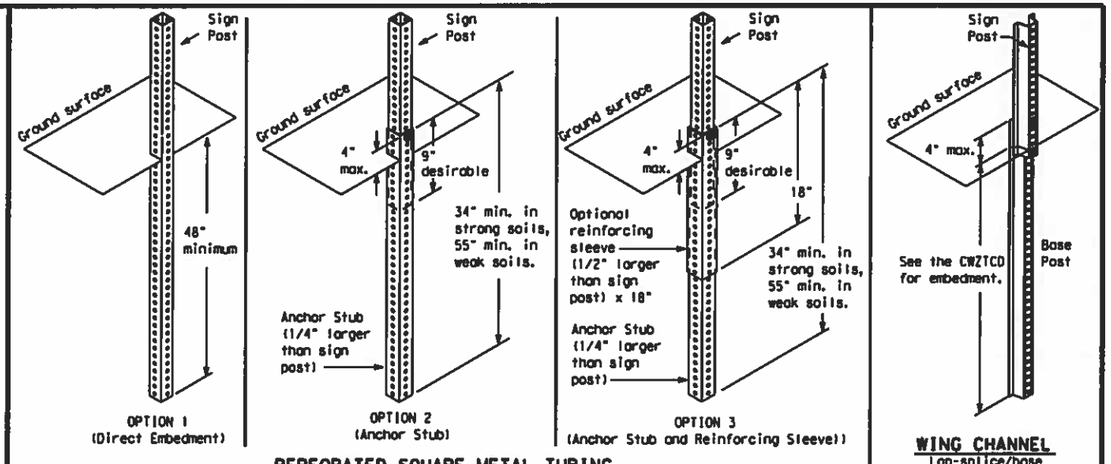


SKID MOUNTED WOOD SIGN SUPPORTS

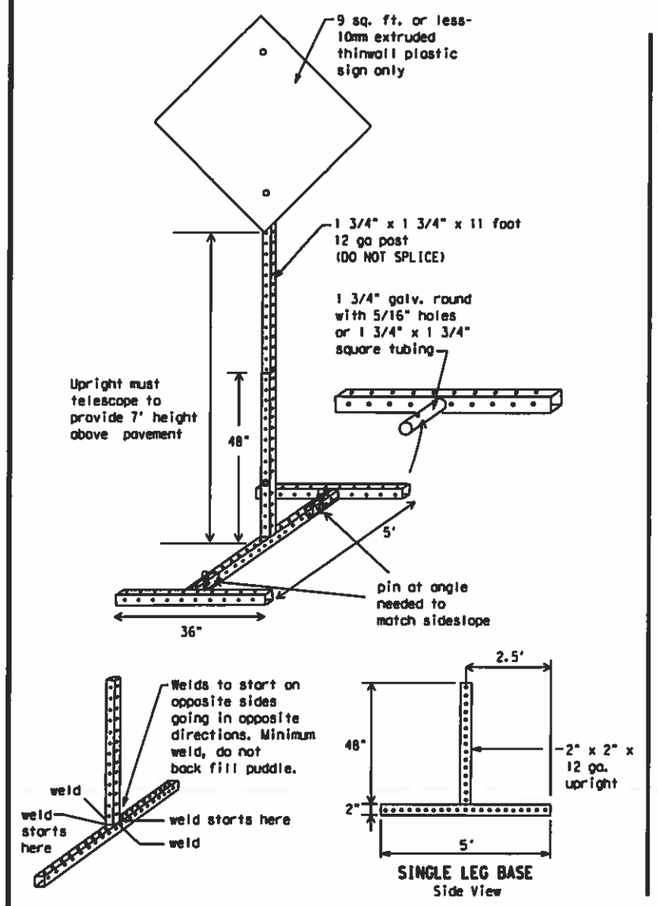
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

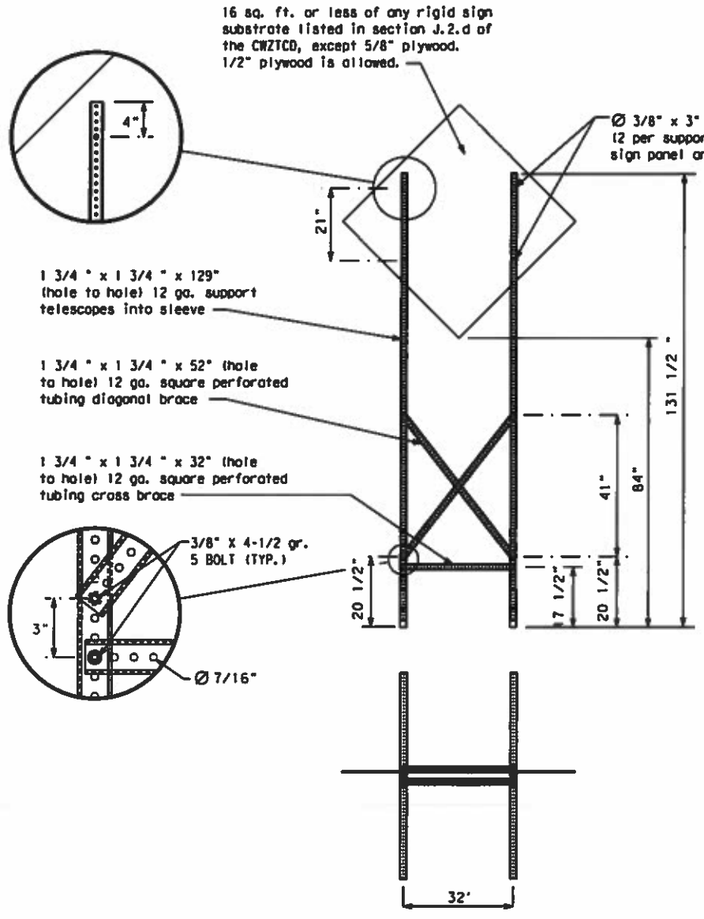


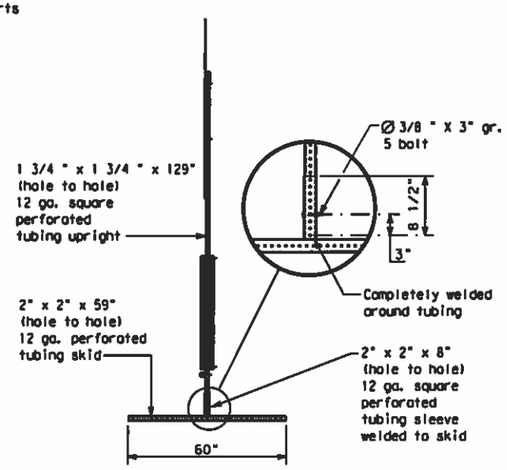
PERFORATED SQUARE METAL TUBING

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

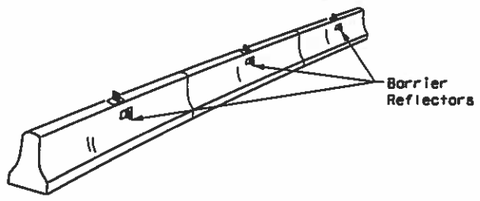
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

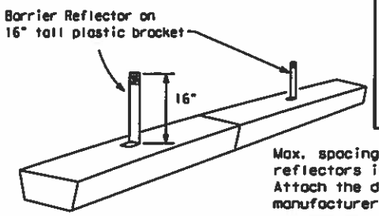
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS,ETC		46

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



CONCRETE TRAFFIC BARRIER (CTB)

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

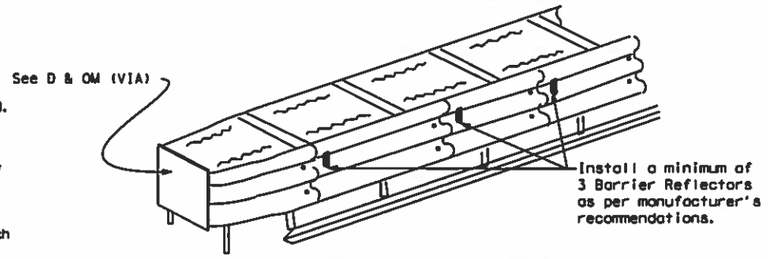


Max. spacing of barrier reflectors is 20 feet.
Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

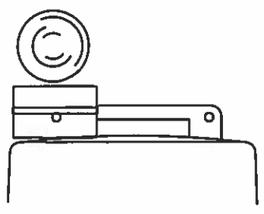


DELINEATION OF END TREATMENTS

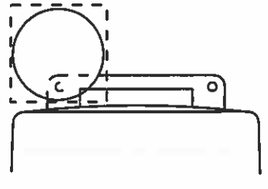
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

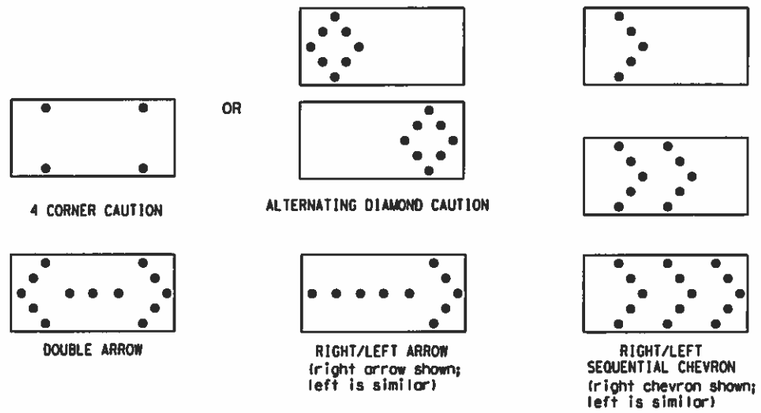
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6302	08	001	US 290, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS, ETC		47

DATE:
FILE:

DATE:
FILE:

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

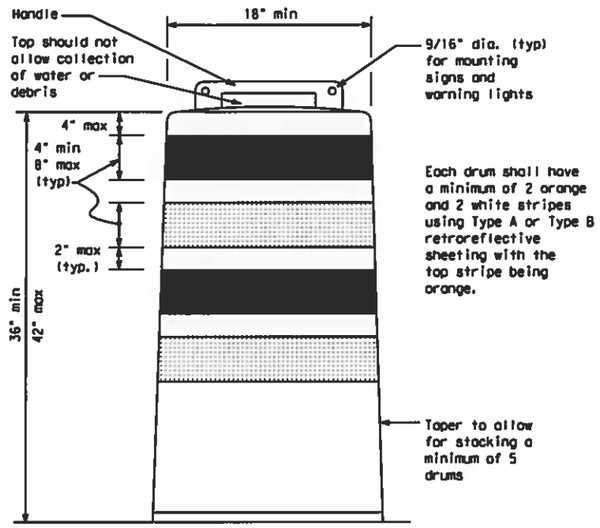
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

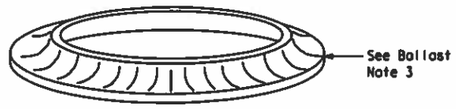
RETROREFLECTIVE SHEETING

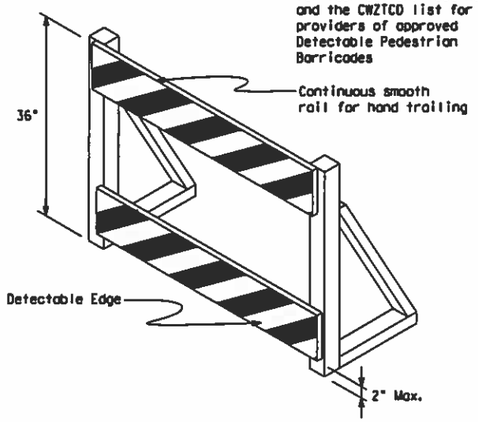
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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



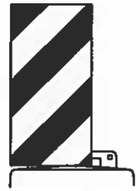




DETECTABLE PEDESTRIAN BARRICADES

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

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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

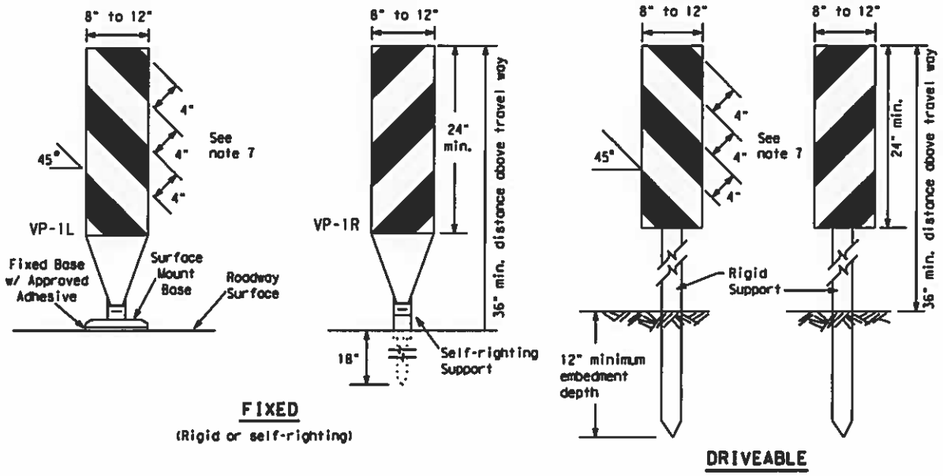
Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

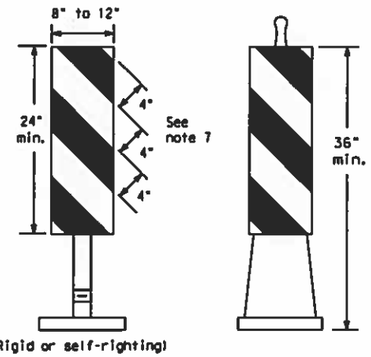
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290, ETC
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	HOU	HARRIS		48
7-13				

102



FIXED
(Rigid or self-righting)

DRIVEABLE

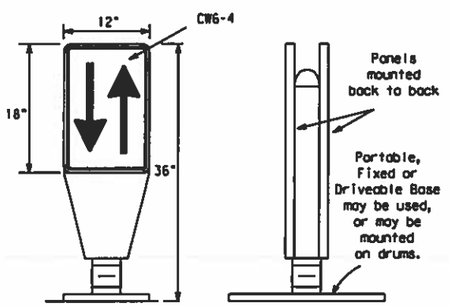


(Rigid or self-righting)

PORTABLE

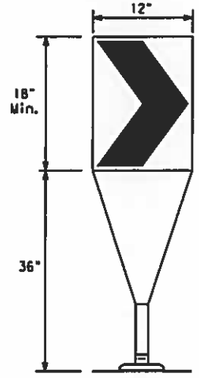
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



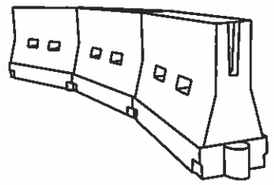
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290, ETC
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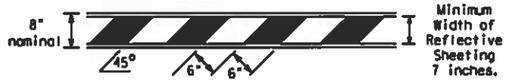
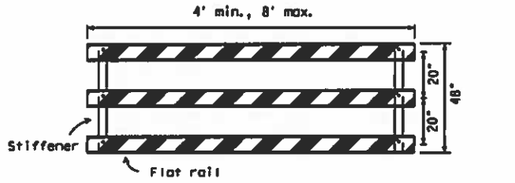
TYPE 3 BARRICADES

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.



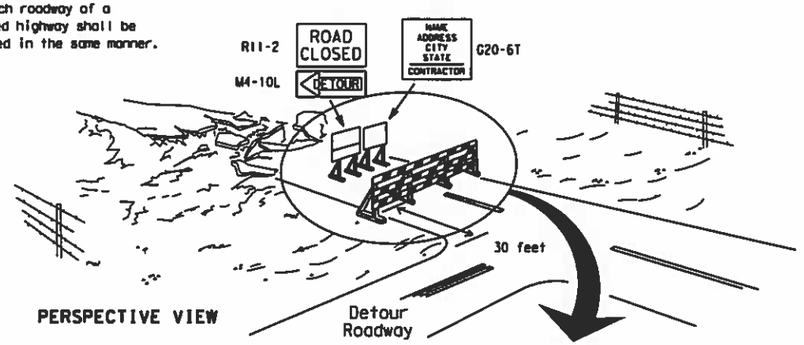
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

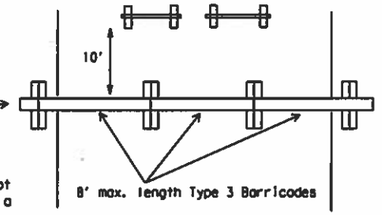
Each roadway of a divided highway shall be barricaded in the same manner.



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.

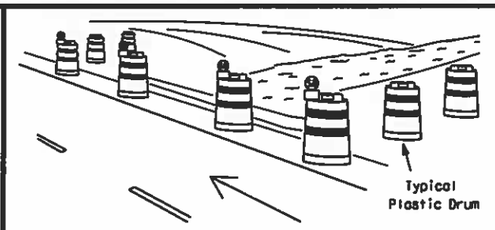
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

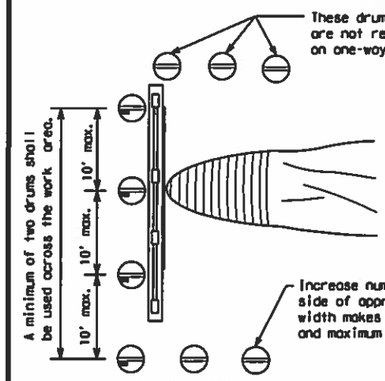
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

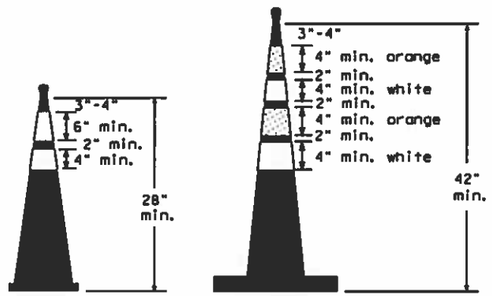
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



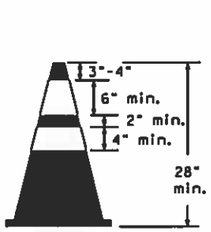
PLAN VIEW

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

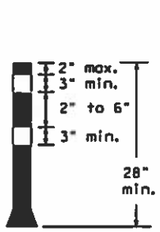
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

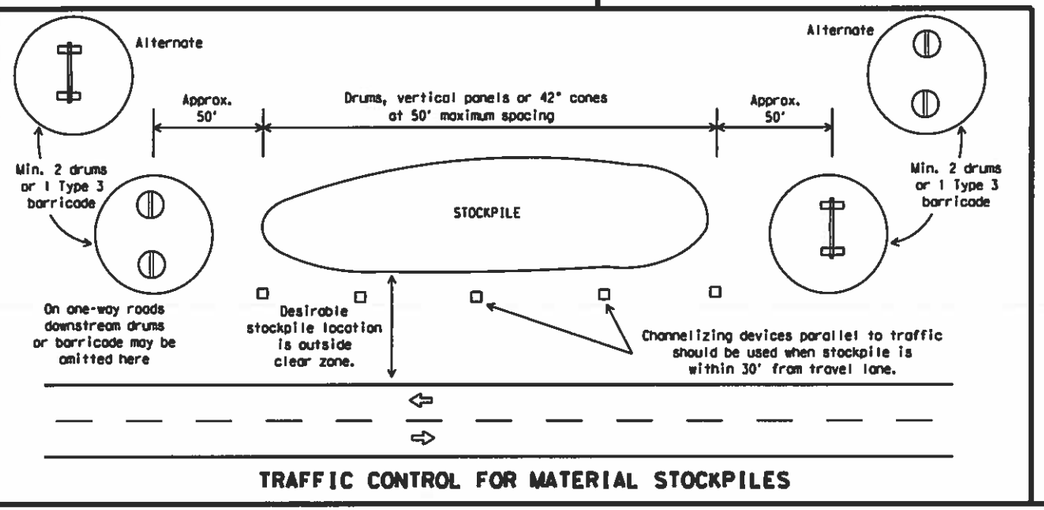


Tubular Marker

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

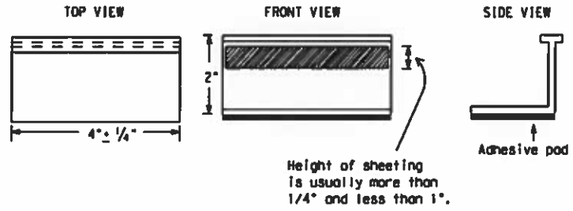
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
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11-02 8-14				

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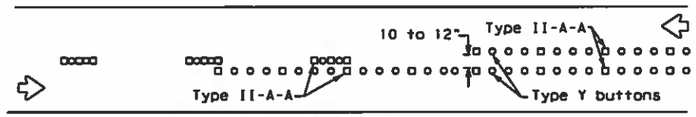
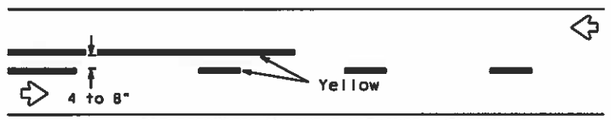
PAVEMENT MARKING PATTERNS

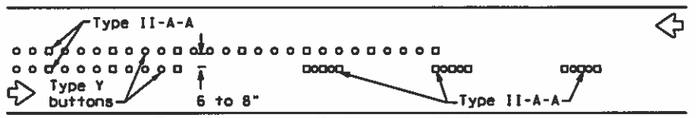
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



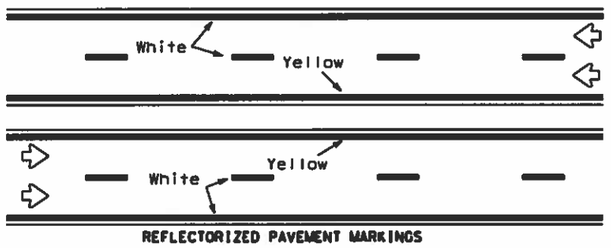
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



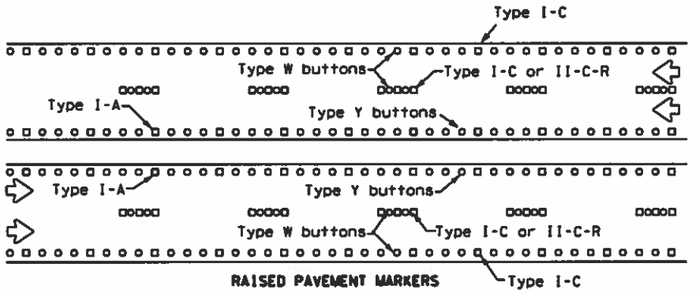
RAISED PAVEMENT MARKERS - PATTERN B

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

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



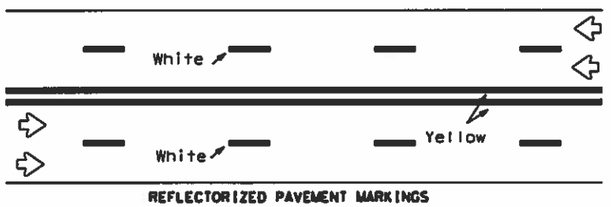
REFLECTORIZED PAVEMENT MARKINGS



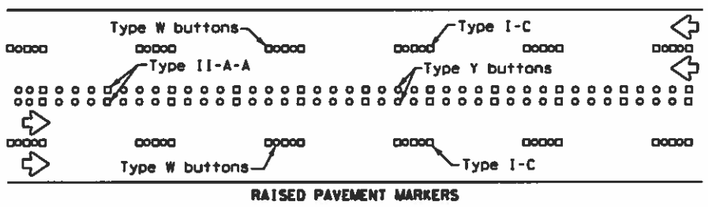
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



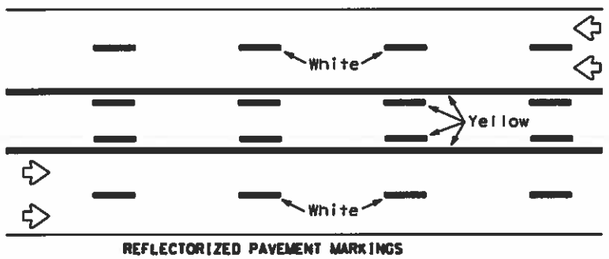
REFLECTORIZED PAVEMENT MARKINGS



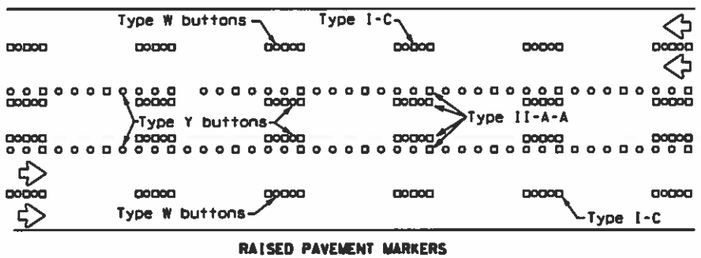
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

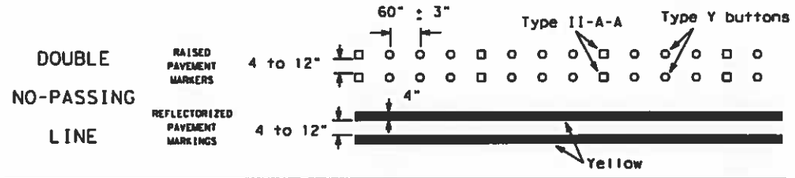
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

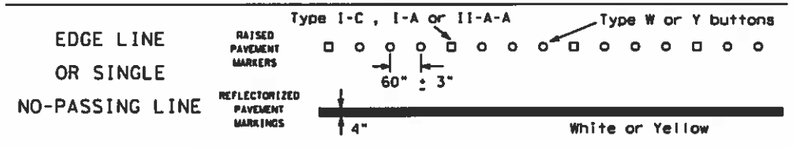
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

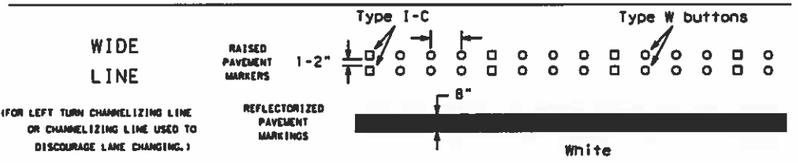


EDGE LINE OR SINGLE NO-PASSING LINE



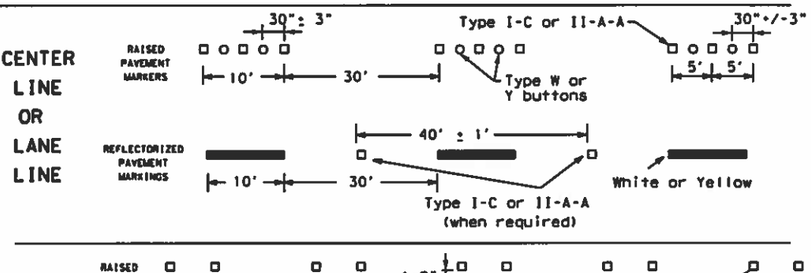
WIDE LINE

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

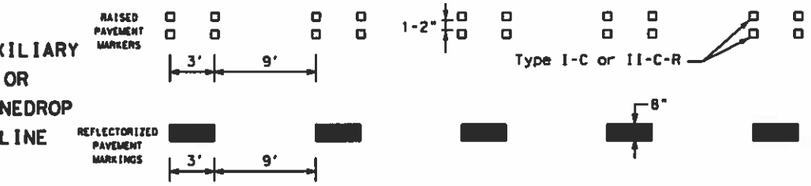


BROKEN LINES

CENTER LINE OR LANE LINE

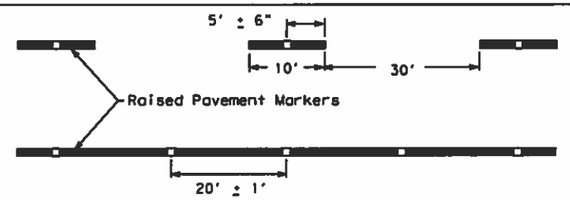


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

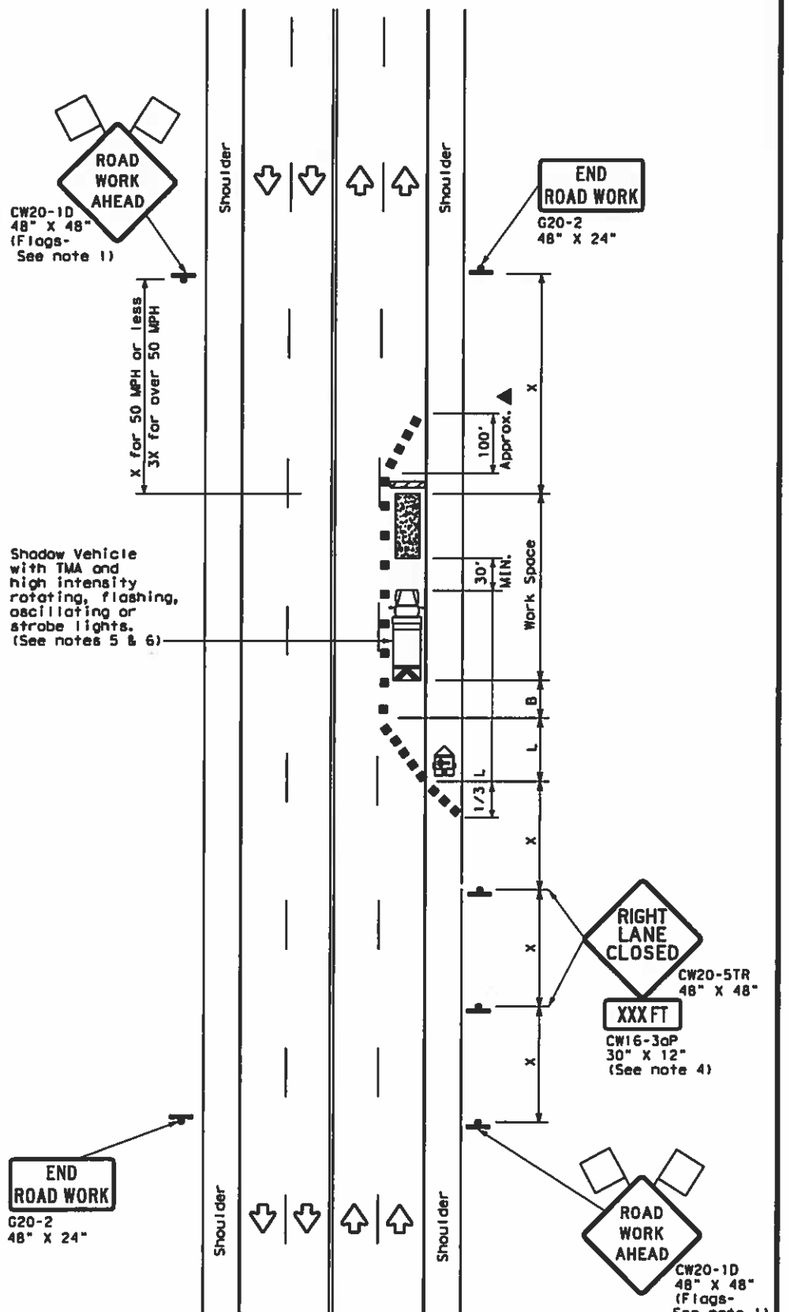
BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	6382	09	001	US 290, ETC
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS, ETC		12

106

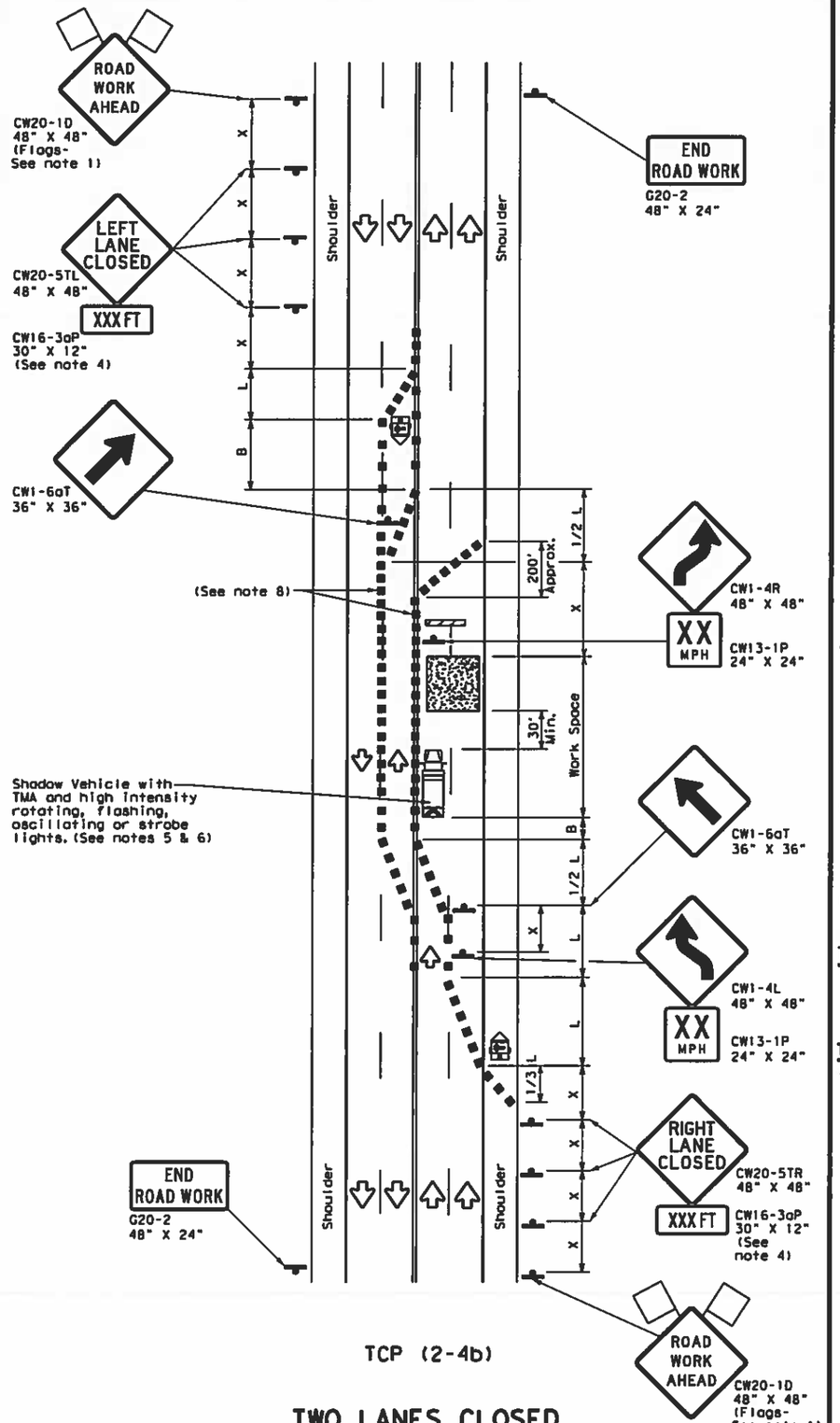
DATE:
FILE:

DATE:
FILE:



TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

7. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED"signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-4b)

8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation

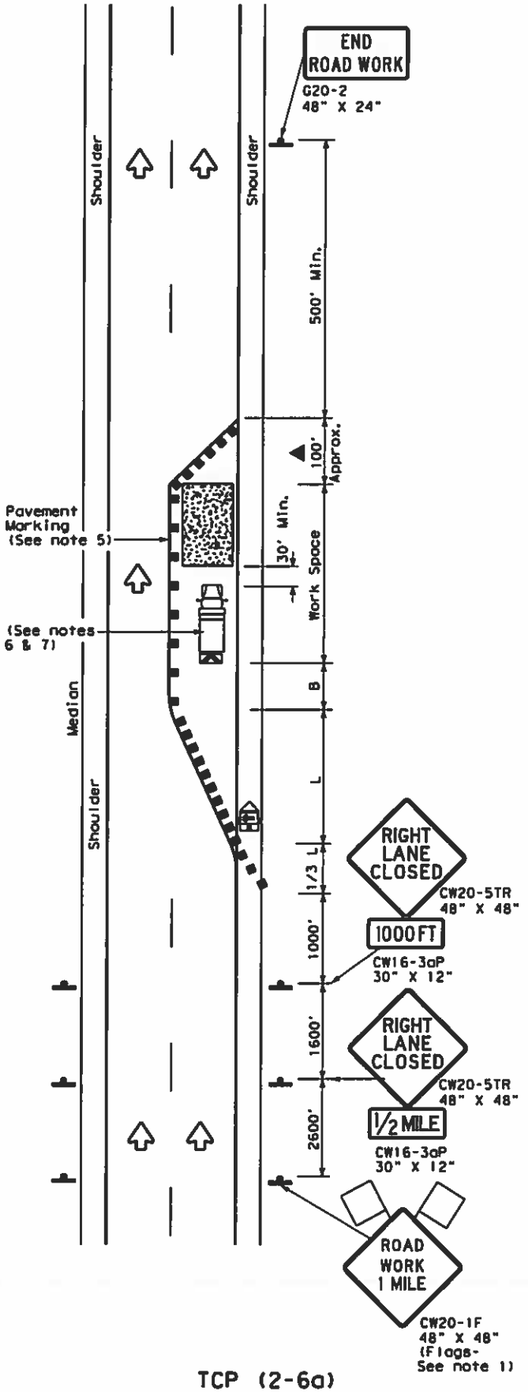
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

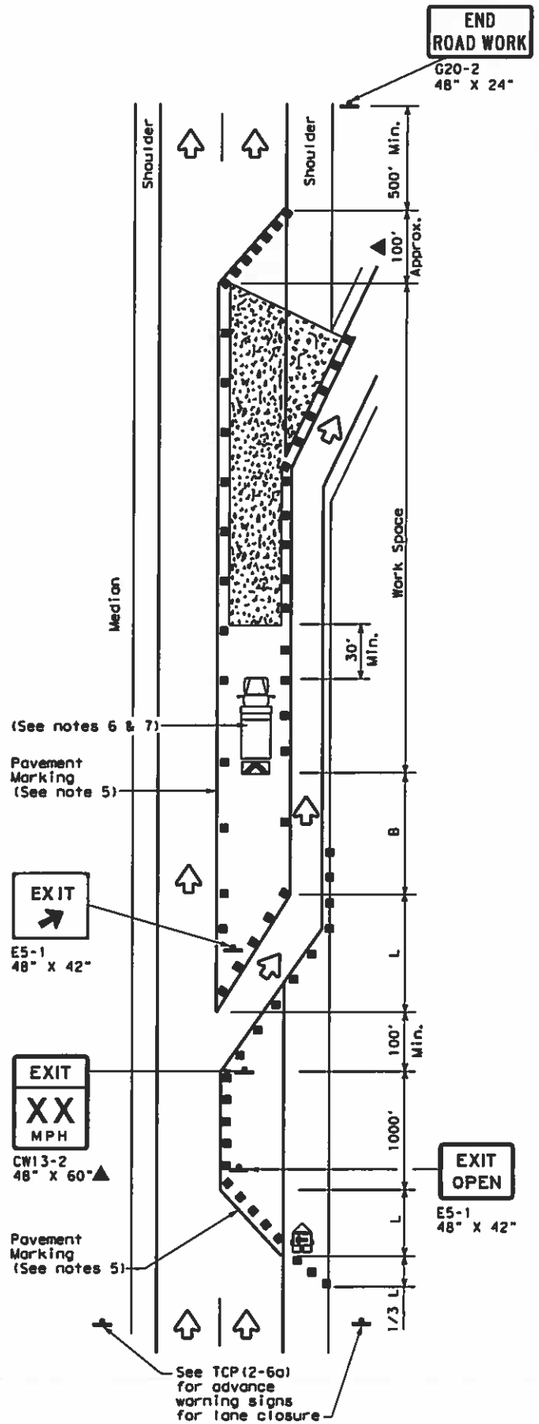
FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	6382	09	001	US 290, ETC
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	HOU	HARRIS, ETC		53

DATE:
FILE:



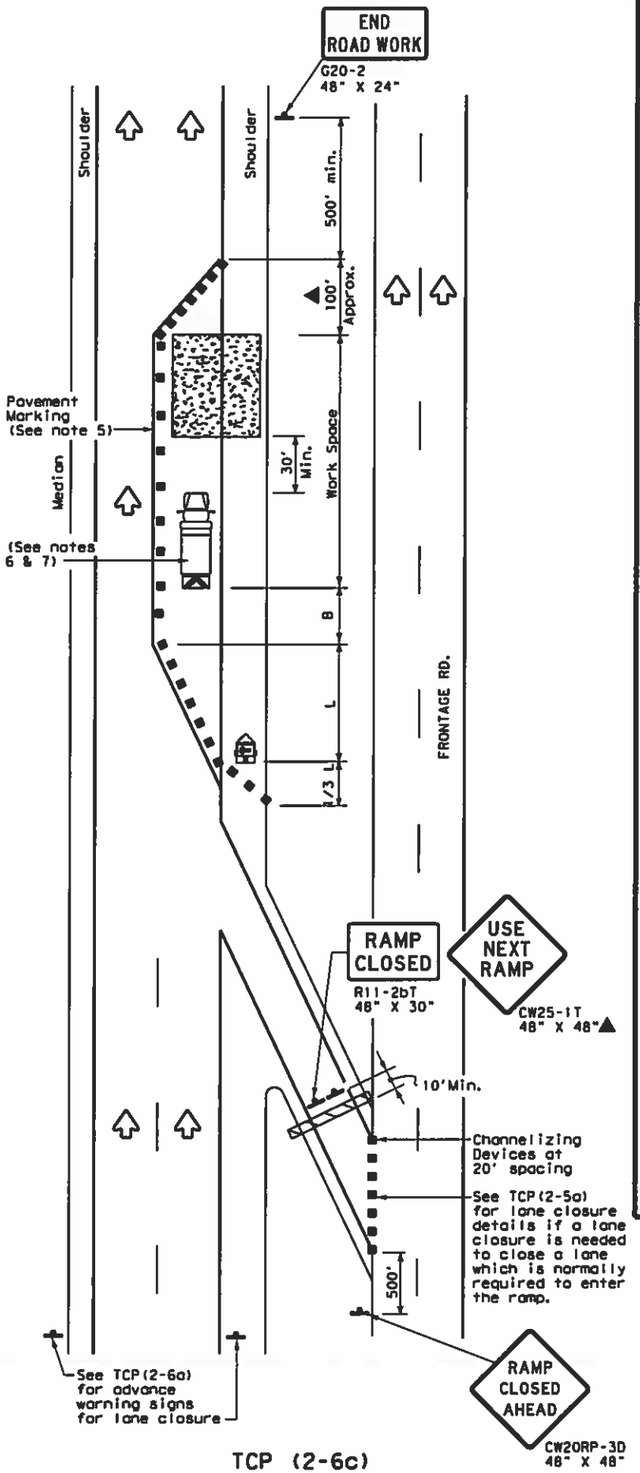
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

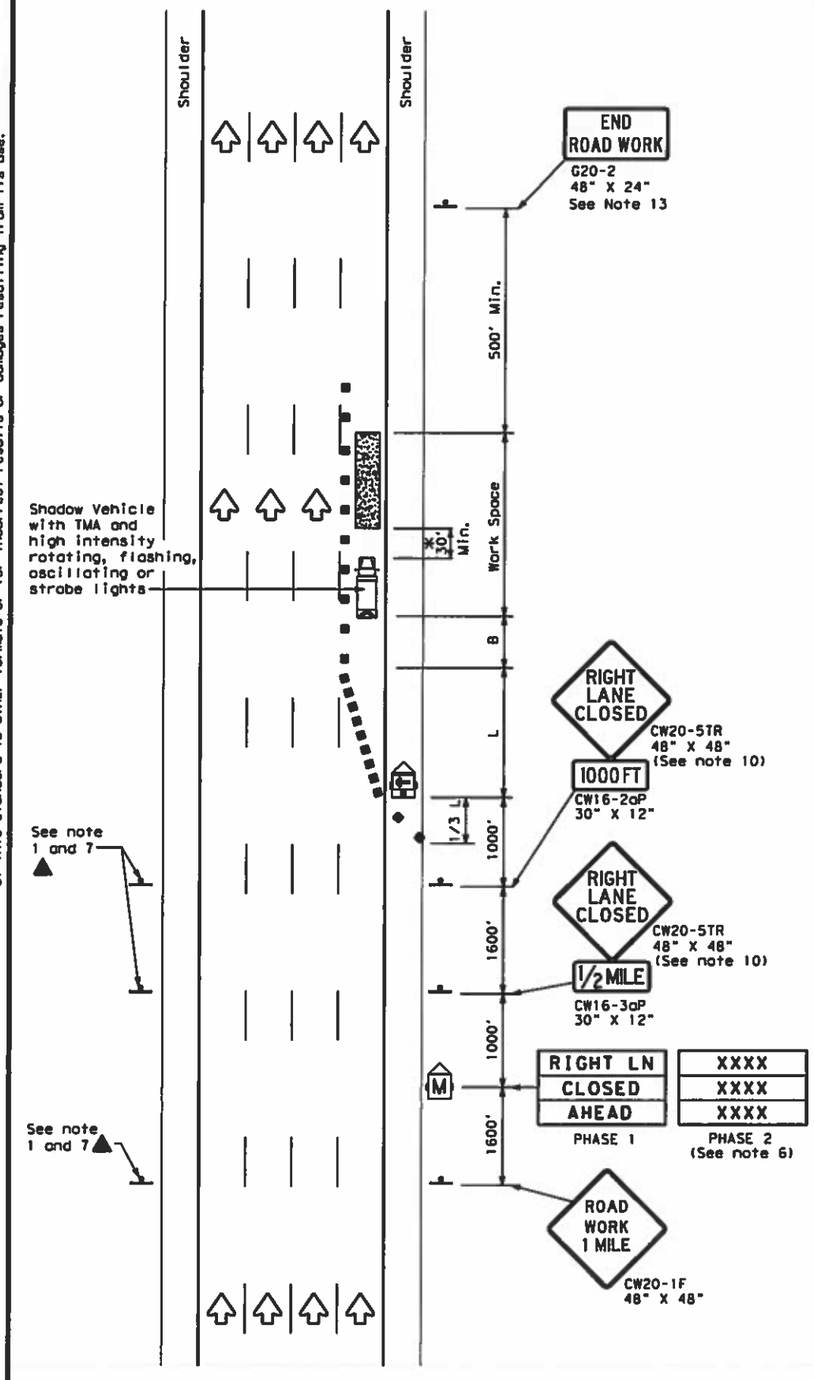
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

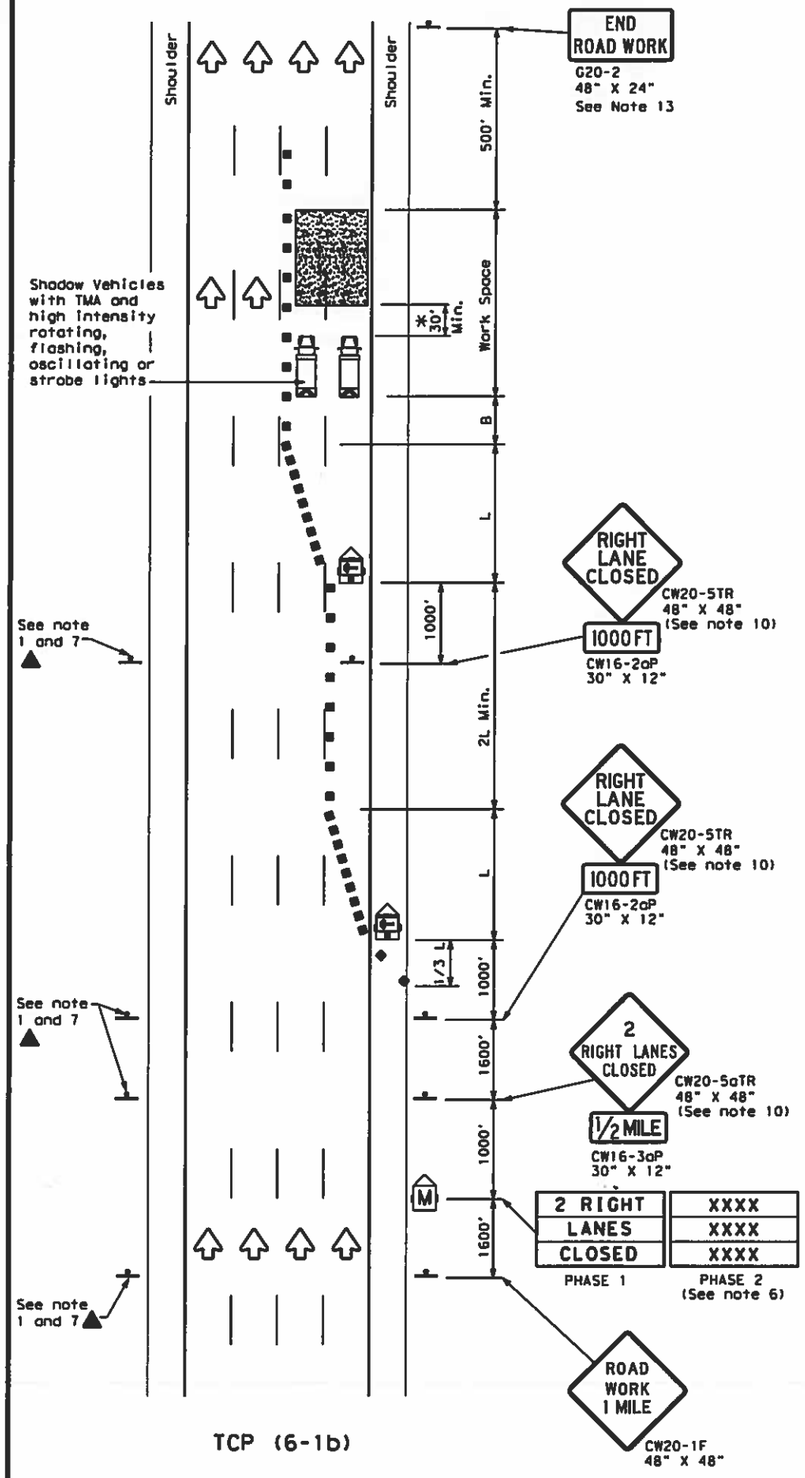
TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	DIST	COUNTY		SHEET NO.
		HARRIS, ETC		54



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

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

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

GENERAL NOTES

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

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

Texas Department of Transportation
Traffic Operations Division Standard

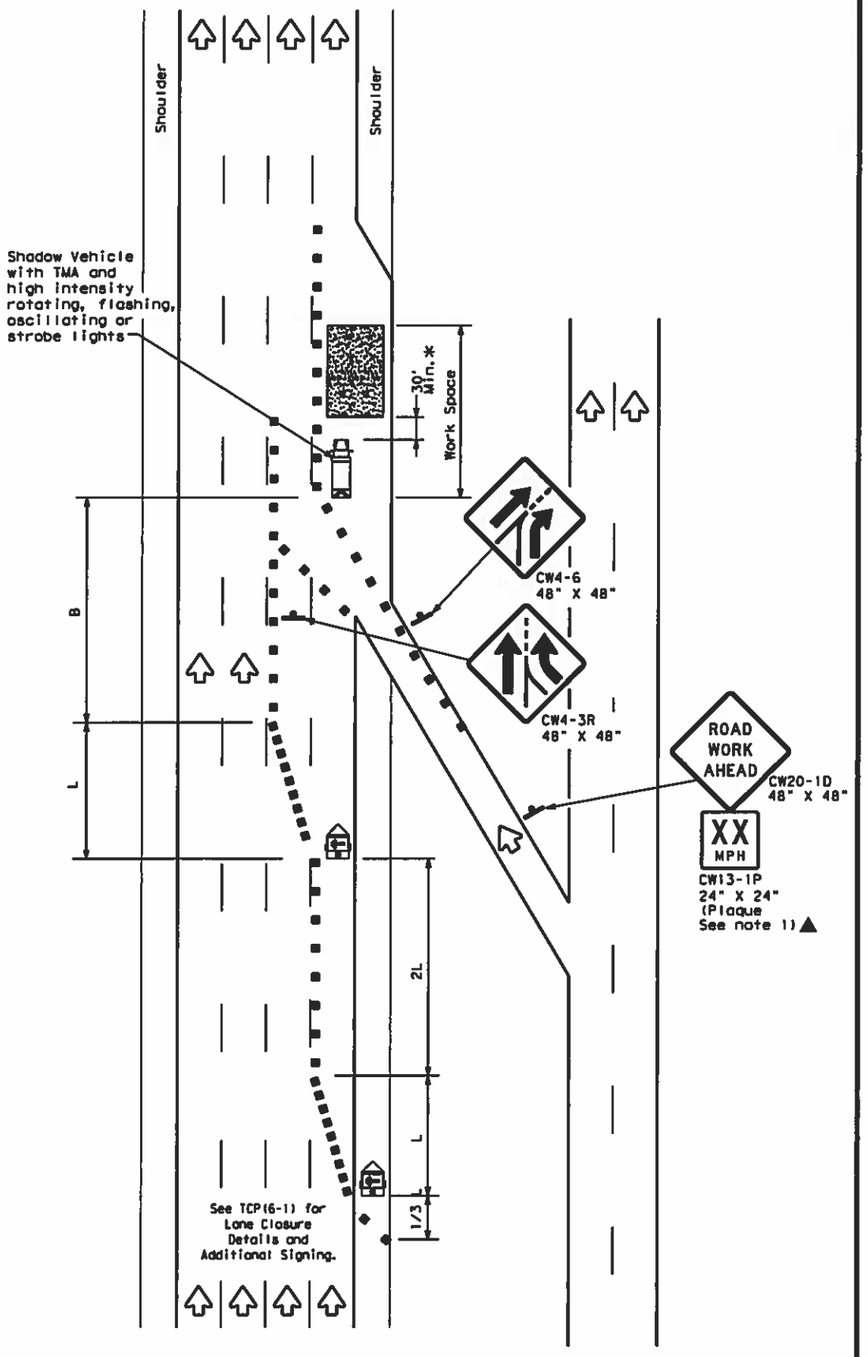
TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY	
REVISIONS 8-12	6382	09	001	US 290,ETC	
	DIST	COUNTY		SHEET NO.	
	CONT	HARRIS,ETC		55	

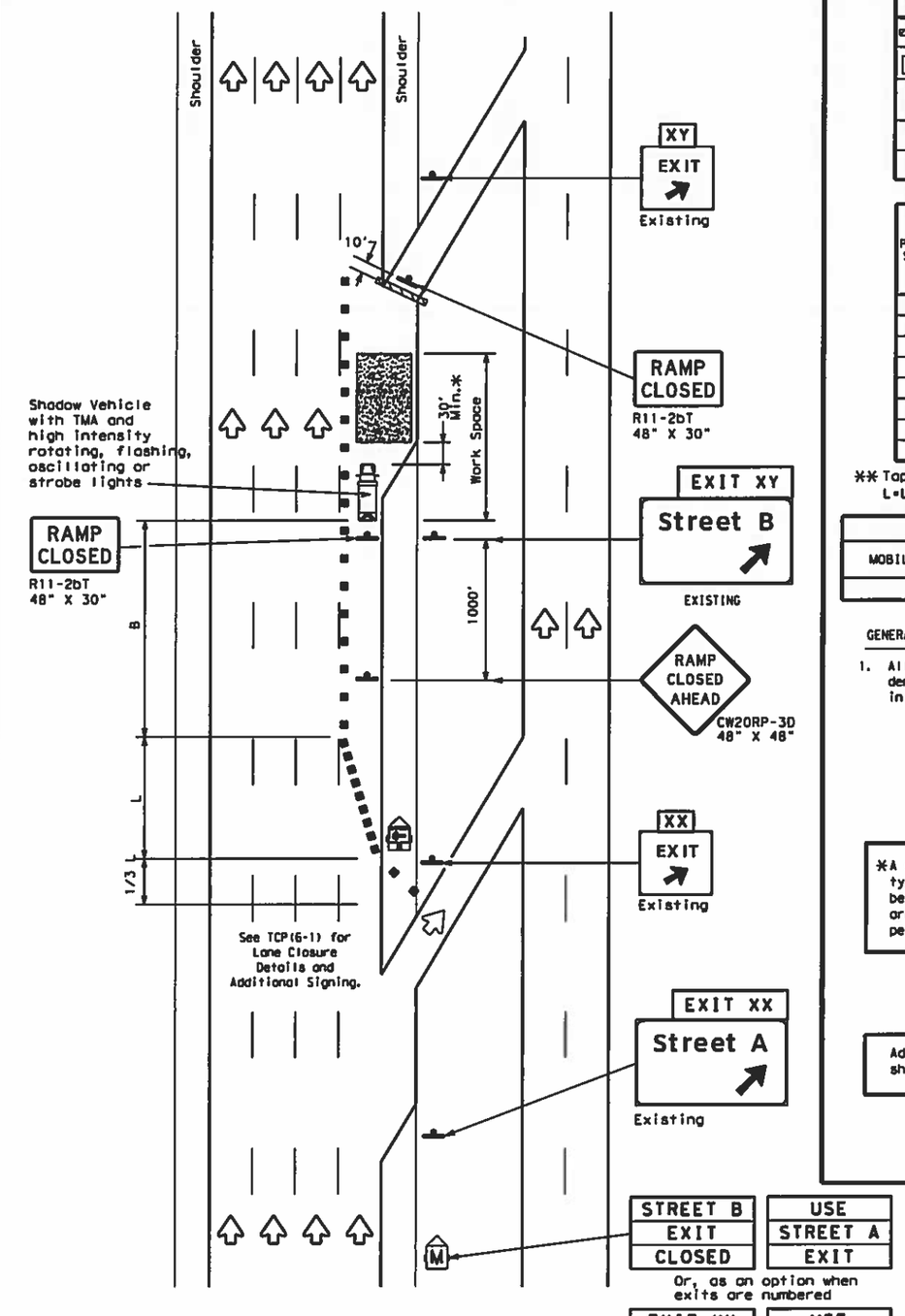
DATE:
FILE:

DATE:
FILE:



TCP (6-3a)

ENTRANCE RAMP OPEN



TCP (6-3b)

EXIT RAMP CLOSED

TRAFFIC EXITS PRIOR TO CLOSED RAMP

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 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.

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

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

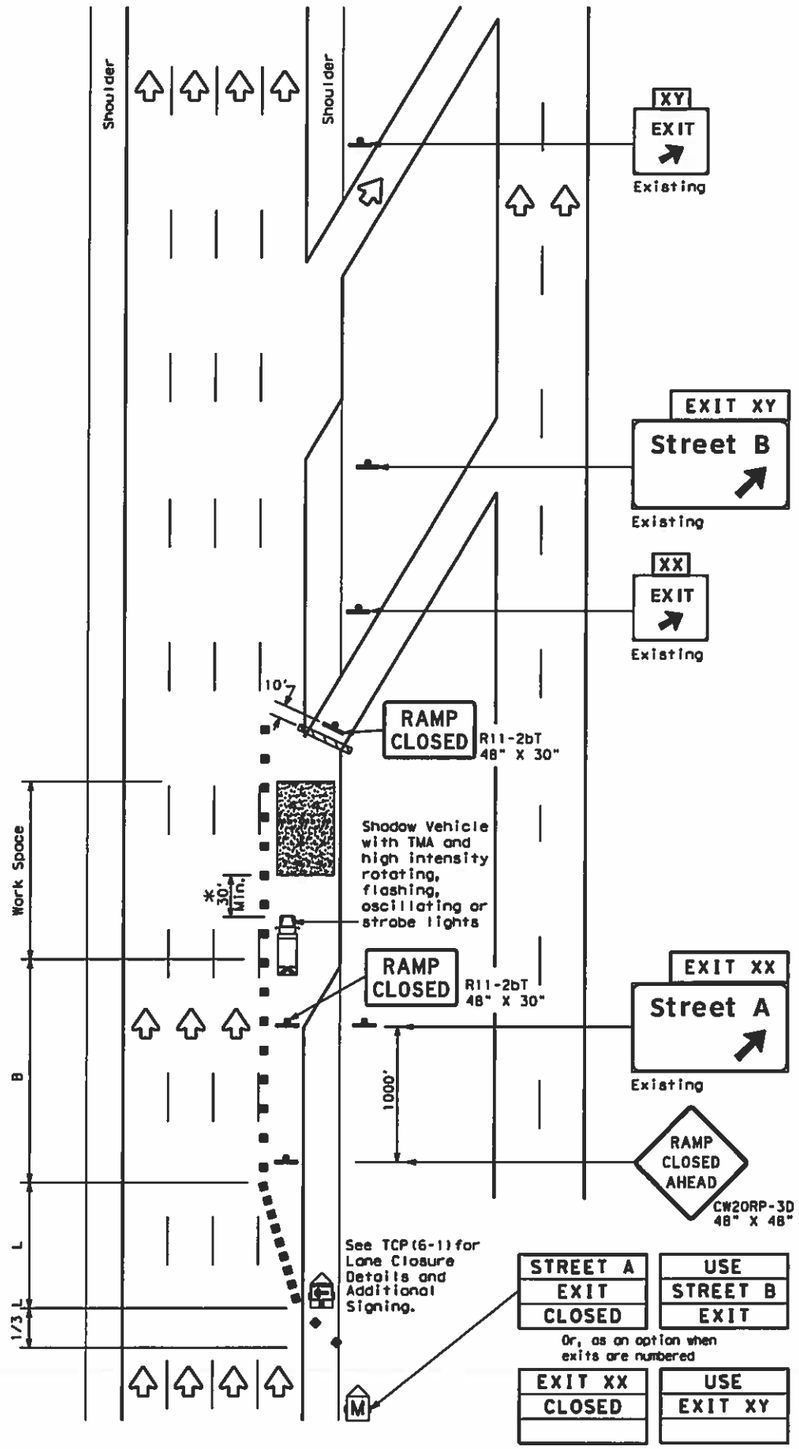
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

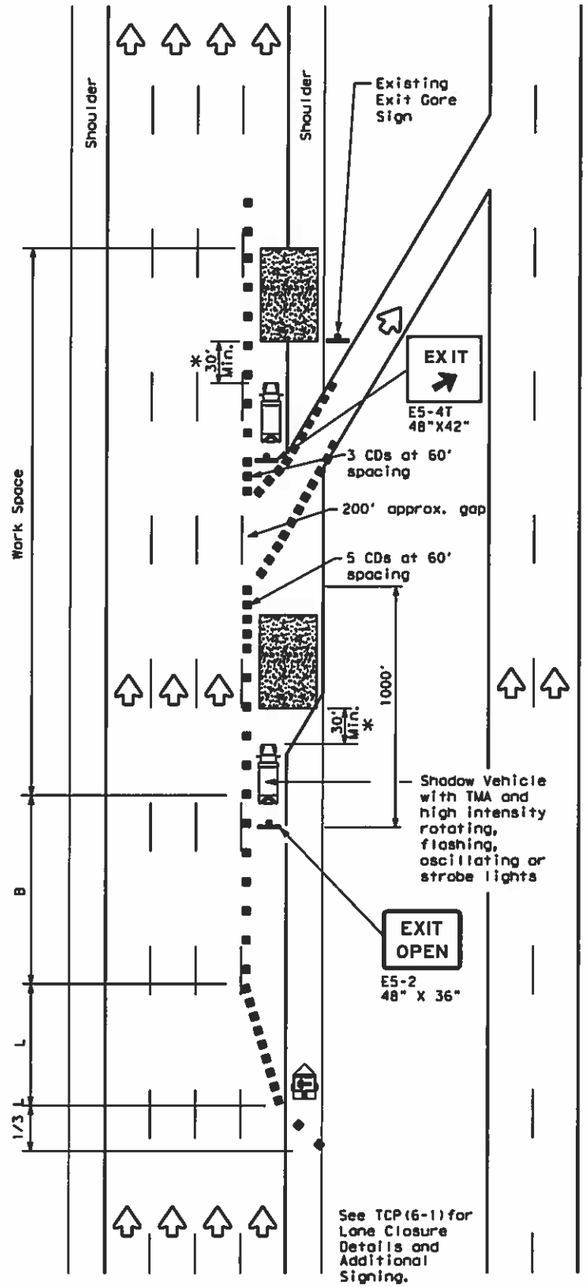
FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290, ETC
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	HARRIS, ETC		56

DATE:
FILE:



TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS				US 290, ETC
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12		HARRIS, ETC		57

DATE:
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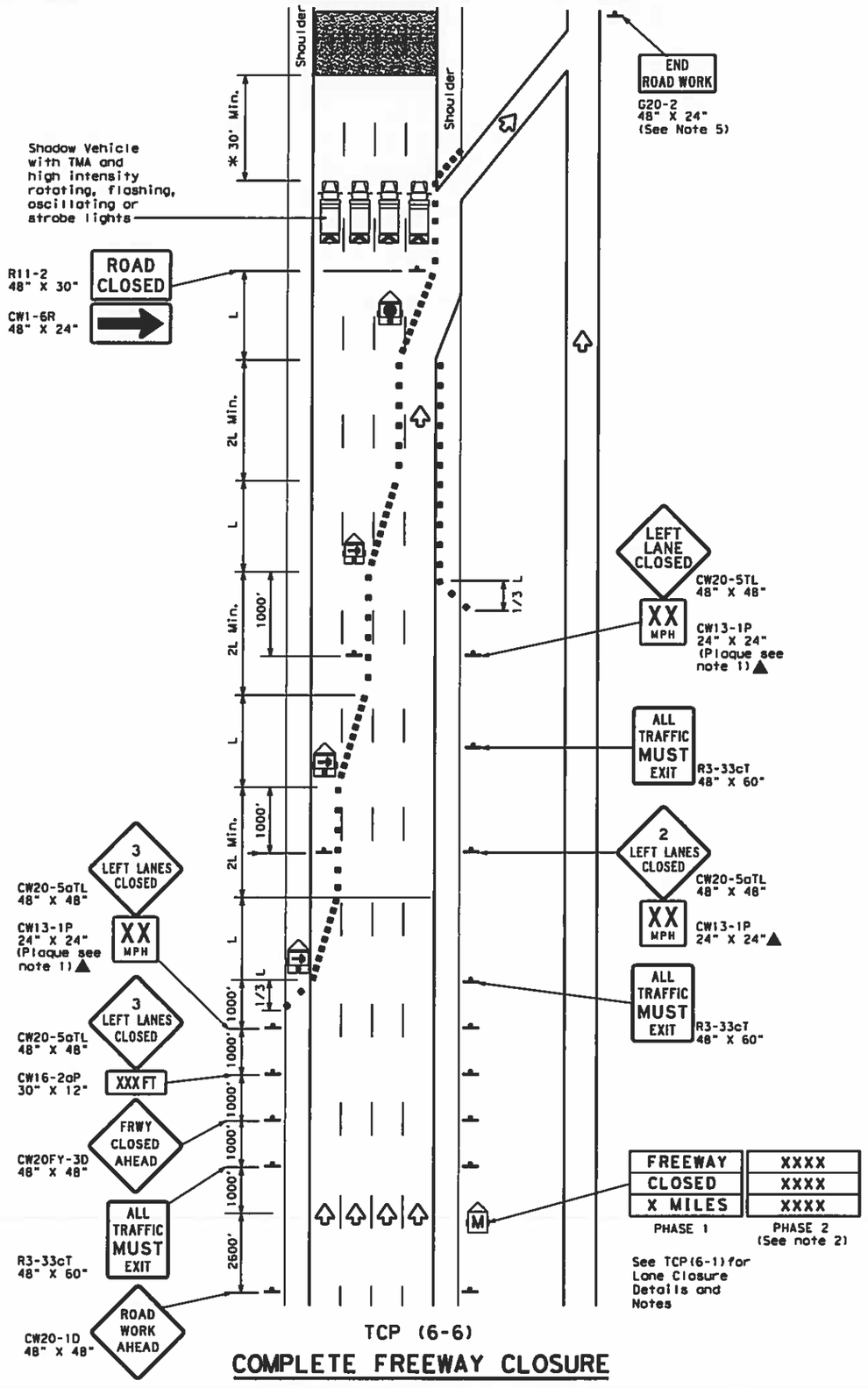


TCP (6-6)

COMPLETE FREEWAY 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)
	Flashing Arrow Board in Caution Mode		Traffic Flow
	Sign		

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. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE RIGHT," recommended speed, delay, exit information, or other specific warnings.
3. Where queuing is anticipated beyond signing shown, additional PCMS signs, other warning signs, devices or Law Enforcement Officers should be available to warn approaching high speed traffic of the end of the queue, as directed by the Engineer.
4. Entrance ramps located from the advance warning area to the exit ramp should be closed whenever possible.
5. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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

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

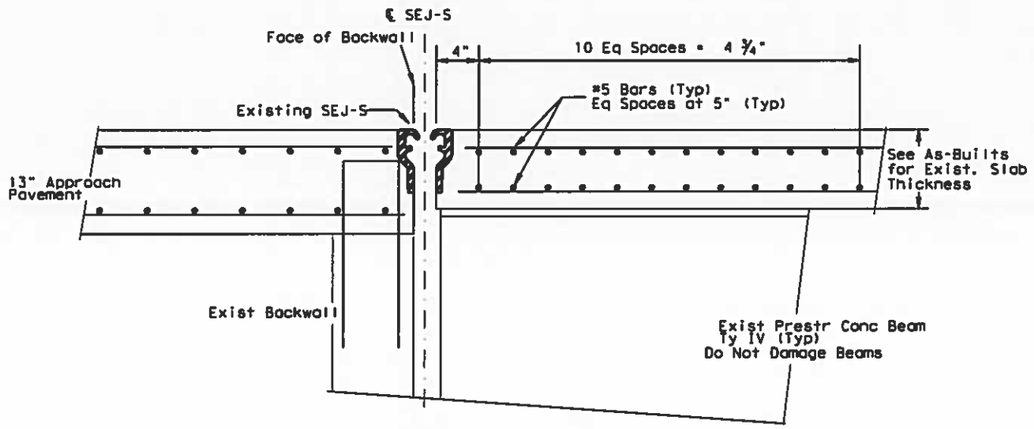
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
FREEWAY CLOSURE

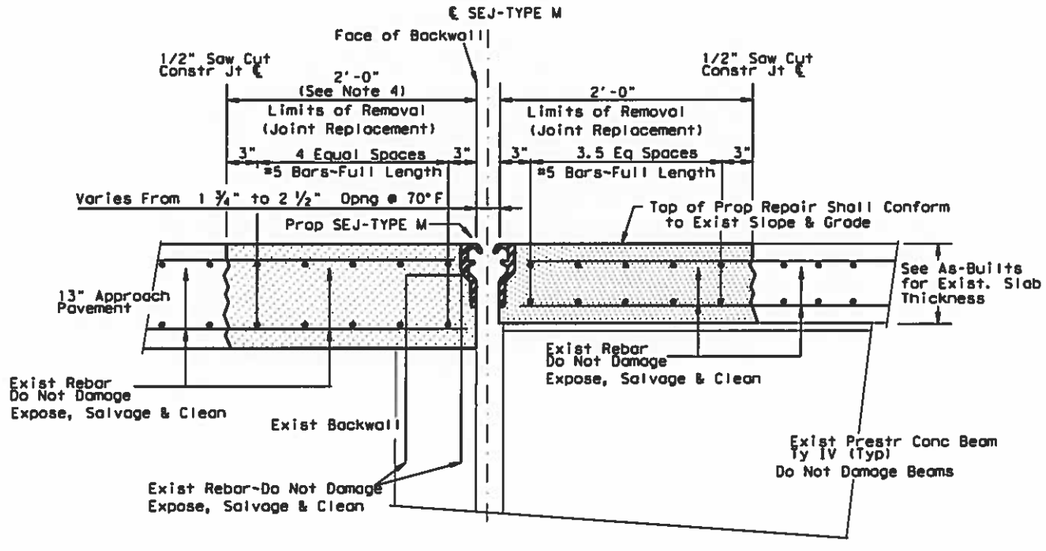
TCP(6-6)-12

FILE: tcp6-6.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 8-98 4-98 8-12	6382	09	001	US 290, ETC
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS, ETC		56

206



EXISTING SECTION @ ABUT 1 & 4



PROPOSED SECTION @ ABUT 1 & 4

NOTES:

1. ALL WORK RELATED TO BRIDGE JOINT REPLACEMENT SHOWN ON THIS DETAIL IS SUBSIDIARY TO ITEM 785-6011, "BRIDGE JOINT REPLACEMENT (SEJ)" UNLESS OTHERWISE NOTED.
2. FOR BRIDGE DECK REPAIR, USE A CLASS "K" CONCRETE OR AS APPROVED BY THE ENGINEER. ACHIEVE 3,000 PSI COMPRESSIVE STRENGTH PRIOR TO REOPENING TO TRAFFIC.
3. PERFORM CONCRETE REPAIR IN ACCORDANCE WITH ITEM 429, "CONCRETE STRUCTURE REPAIR," AND THE CONCRETE REPAIR MANUAL.
4. EXACT DIMENSIONS OF REPAIR TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO REPAIR AND PROPOSED SEJ-TYPE M SHOULD MATCH EXISTING SEJ-A.
5. SOME OF THE REPAIRS SHOWN ON THIS SHEET WILL OVERLAP WITH THE FULL DEPTH REPAIRS AS PER STATED ON NOTE 4 AND 5 OF THE FULL DECK REPAIR THICKEND SLAB SHEETS. THOSE DETAILS WILL CONTROL IN THSES AREAS.

STATE OF TEXAS
DEDRICK D. KNIGHTEN
103612
LICENSED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by DEDRICK D. KNIGHTEN, P.E. 103612

9/2 2021

Dedrick D. Knighten P.E.

Not To Scale SHEET 1 OF 1

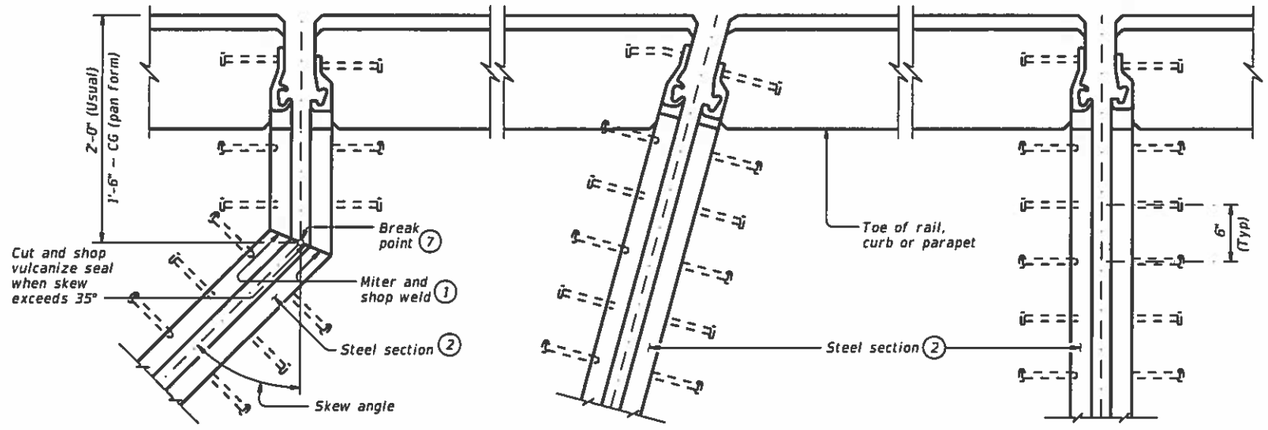
 Texas Department of Transportation

US 290 OVER ROSEHILL RD

BRIDGE JOINT REPLACEMENT DETAILS

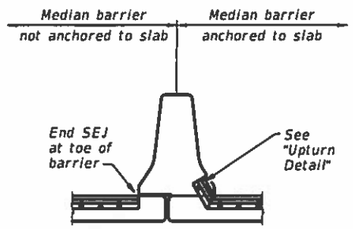
STATE	DIST.	PROJECT NO.			SHEET NO.
TEXAS	HOU	BMP 638209001			59
COUNTY	FED. RD. DIV. NO.	CONT.	SECT.	JOB	HIGHWAY NO.
HARRIS, ETC	6	6382	09	001	US 290, ETC

DATE:
FILE:

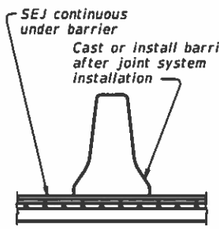


SHOWING SKEWS WITH SLAB BREAKBACKS | SHOWING SKEWS WITHOUT SLAB BREAKBACKS | SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

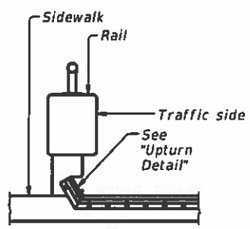
PLANS OF END CONDITIONS



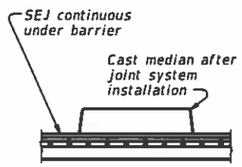
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



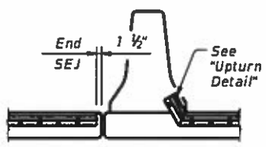
AT MEDIAN BARRIER



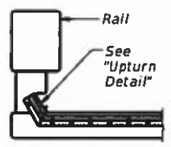
AT SIDEWALK BEHIND BRIDGE RAIL



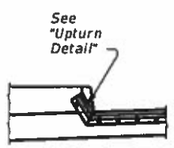
AT RAISED MEDIAN



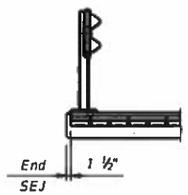
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

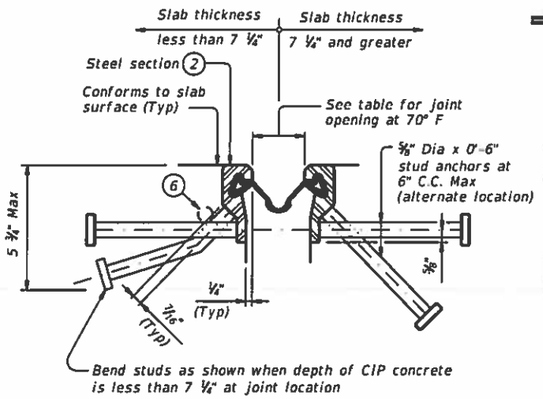


AT SIDEWALK

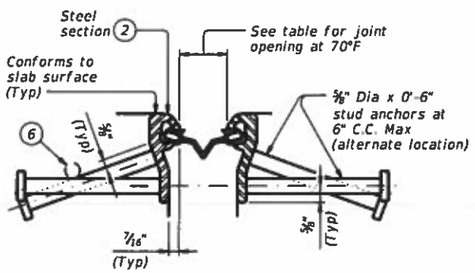


AT STEEL POST BRIDGE RAIL

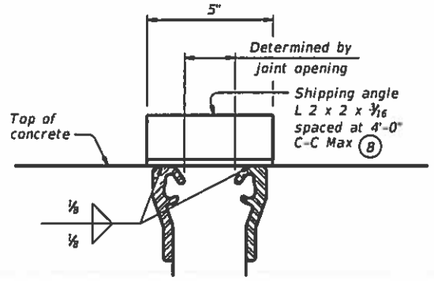
TYPICAL SECTIONS (5)



SECTION THRU WATSON BOWMAN ACME (SE-400 OR SE-500) JOINTS



SECTION THRU D.S. BROWN (A2R-400 OR A2R-XTRA) JOINTS



SHOWING D.S. BROWN (Ty SSCM2)
(All joints are similar.) (Studs are not shown for clarity.)

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION (2)	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening (3)	Seal Type	Joint Opening (3)
D.S. Brown	Type SSCM2	A2R-400	1 ¾"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 ¾"	SE-500	2"

REDUCED LONGITUDINAL MOVEMENT RANGE

SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.

For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

(1) Remove all burrs which will be in contact with seal prior to making splice.

(2) Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.

(3) These openings are also the recommended minimum installation openings.

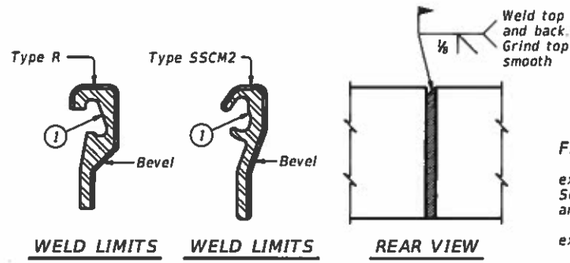
(4) Reduce for sidewalk or parapet heights less than 6".

(5) Other conditions affecting the joint profile should be noted elsewhere.

(6) Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.

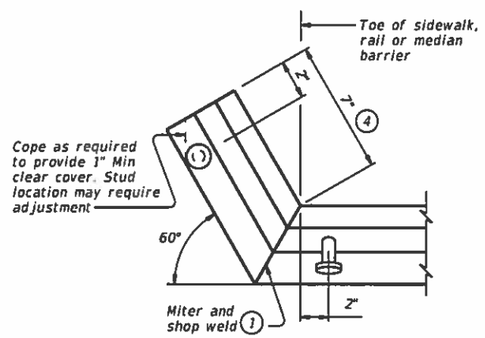
(7) See Span details for location of break point.

(8) Align shipping angle perpendicular to joint.



WELD LIMITS | WELD LIMITS | REAR VIEW

FIELD SPLICE DETAIL



UPTURN DETAIL

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for sealed expansion joint.

Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section with System II or IV primer in accordance with Item 446, "Feild Cleaning and Painting Steel", unless required to galvanize when shown in the plans. Provide galvanizing in accordance with Item 445, "Galvanizing". Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Item 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of sealed expansion joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure the sealed expansion joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for sealed expansion joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

GENERAL NOTES:

Provide sealed expansion joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-M is 6 ½".

Texas Department of Transportation

Bridge Division Standard

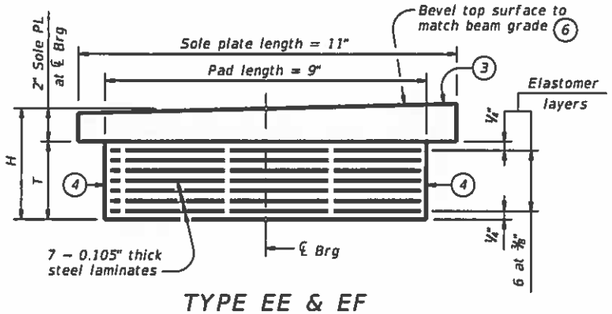
SEALED EXPANSION JOINT
TYPE M
WITHOUT OVERLAY

SEJ-M

FILE: sejmste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290,ETC
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS,ETC		60

DATE:
FILE:

1. Applicable to EE bearings only.
2. Min DL can be reduced by the ratio of (actual exp length/max exp length).
3. Locate "Bearing Type" identification here.
4. Locate permanent mark here.
5. Min Bearing Seat width, normal to girder, is "S" + 8".
6. See span details for beam grade (slope) at bearing locations.

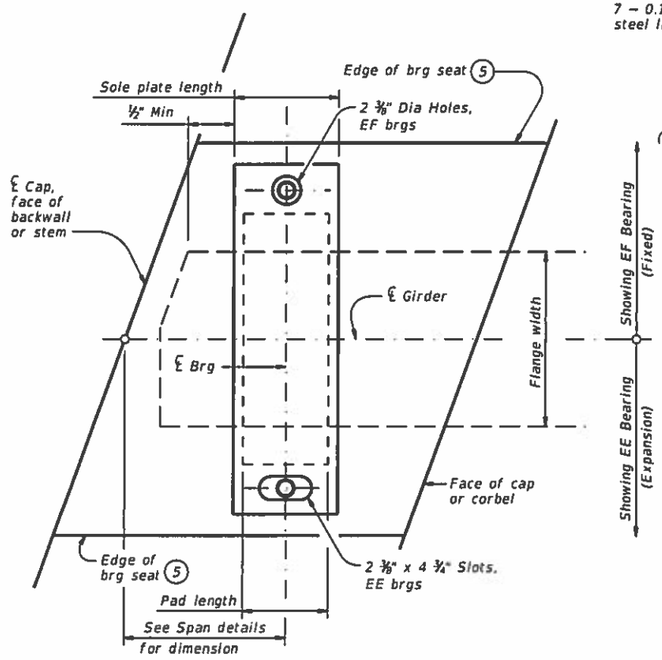


TYPE EE & EF LAMINATED ELASTOMERIC BEARING DETAIL

(50 Durometer) (Vulcanize sole plate to elastomer)

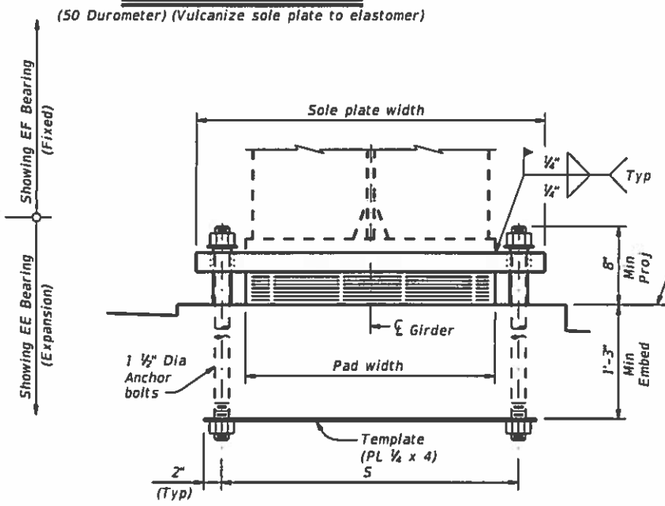
TABLE OF END BEARING DESIGNS

Bearing Type	Neoprene Pad		Sole Plate		H	S	T	Flange Width		Reactions (Unfactored)			Max Expansion Length (1)
	Width	Length	Width	Length				Min	Max	(1)(2) Min DL	Max DL	Max Total	
	in	in	in	in	in	in	in	in	in	kip	kip	kip	ft
EE1 or EF1	15	9	25.5	11	5.5	20.0	3.49	10	15	59	115	144	250
EE2 or EF2	18	9	28.5	11	5.5	23.0	3.49	10	18	71	148	185	250
EE3 or EF3	21	9	31.5	11	5.5	26.0	3.49	11	21	83	181	226	250
EE4 or EF4	24	9	34.5	11	5.5	29.0	3.49	14	24	95	215	269	250
EE5 or EF5	27	9	37.5	11	5.5	32.0	3.49	17	27	106	249	312	250
EE6 or EF6	30	9	40.5	11	5.5	35.0	3.49	20	30	118	284	355	250
EE7 or EF7	32	9	42.5	11	5.5	37.0	3.49	22	32	126	307	384	250
EE8 or EF8	34	9	44.5	11	5.5	39.0	3.49	24	34	134	331	414	250
EE9 or EF9	36	9	46.5	11	5.5	41.0	3.49	26	36	142	355	443	250

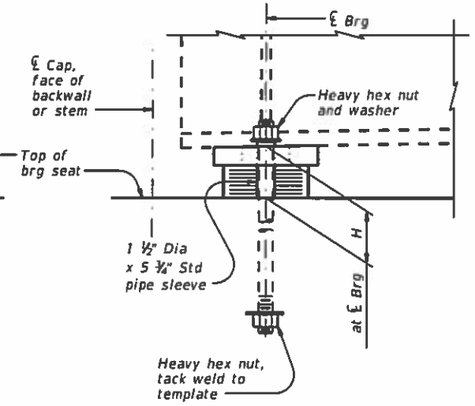


PLAN

Pipe sleeves, washers and nuts not shown for clarity



FRONT ELEVATION



SIDE ELEVATION

END FIXED (EF) AND EXPANSION (EE) BEARINGS

Paid for at unit price bid for "Elastomeric Bearing" as per Item 434.

MATERIAL NOTES:

Provide anchor bolts conforming to ASTM F1554 Grade 105 or ASTM A193 Grade B7. Provide nuts conforming to ASTM A563 Grade DH, heavy hex or A194 Grade 2H, heavy hex. Provide washers conforming to ASTM F436. Provide pipe sleeves conforming to the requirements of ASTM A53 Grade B or A 500 Grade B. Hot-dip galvanize all anchor bolts (exposed end plus 6" Min), nuts not embedded in concrete, and pipe sleeves as per Item 445, "Galvanizing".

For painted bridges, provide steel for sole plates conforming to ASTM A36 or A588. For unpainted (weathering) bridges, provide steel for sole plates conforming to ASTM A588.

GENERAL NOTES:

The bearings shown on this standard are intended for use with continuous and simple span rolled beams and plate girders. None of the bearings shown are designed to resist uplift.

See span details for bearing type and location.

The bearing fabricator is required to develop a bearing layout which identifies location and orientation of all bearings. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.

Submit shop drawings for approval. Dimension sole plates to the nearest 1/16" based on required thickness at centerline of bearing and slope of the girder in the finished structure. Thickness tolerance variation from the shop drawings is 1/16" +/-, except the variation from a plane parallel to the theoretical top surface can not exceed 1/16" total.

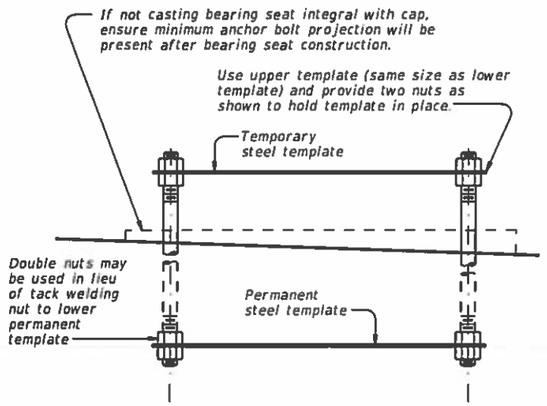
Install anchor bolt nuts finger-tight or loosely snug.

(7) Form hole with either plastic duct meeting the requirements of Item 426.2.2 or galvanized corrugated metal post-tensioning duct. Do not use PVC or other smooth plastic or steel duct. Do not drill hole.

(8) Fill void with a pre-qualified grout conforming to DMS-4675 and capable of 4,000 psi compressive strength. Void may also be filled with epoxy grout using Type VIII epoxy conforming to DMS-6100. Clean holes before filling.

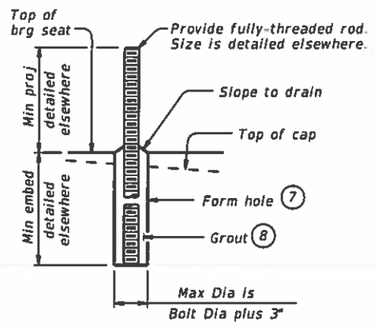
All bearings on this standard require wood float bearing seat surfaces that are clean and free of all loose material before placement of bearings.

These bearings are not intended for use with bridges over 100 ft wide. The anchor bolts are not designed to restrain temperature-induced lateral movement.



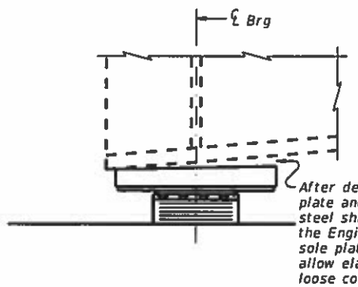
ANCHOR BOLT SETTING DETAIL

Applies to all bearings on this standard. Verify and correct, if necessary, anchor bolt location immediately after concrete placement, before initial set.



OPTIONAL ANCHOR BOLT SETTING DETAIL

Applies to all bearings on this standard.



GIRDER TO SOLE PLATE WELD DETAIL

Applies to all end bearings on this standard. Small gaps between girders and sole plates are anticipated under steel dead load only.

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING DETAILS
STEEL GIRDERS AND BEAMS

SGEB

FILE: sgebstel-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290,ETC
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS,ETC		61

DATE:
FILE:

(2) Min DL can be reduced by the ratio of (actual exp length/max exp length).

(3) Locate "Bearing Type" identification here.

(4) Locate permanent mark here.

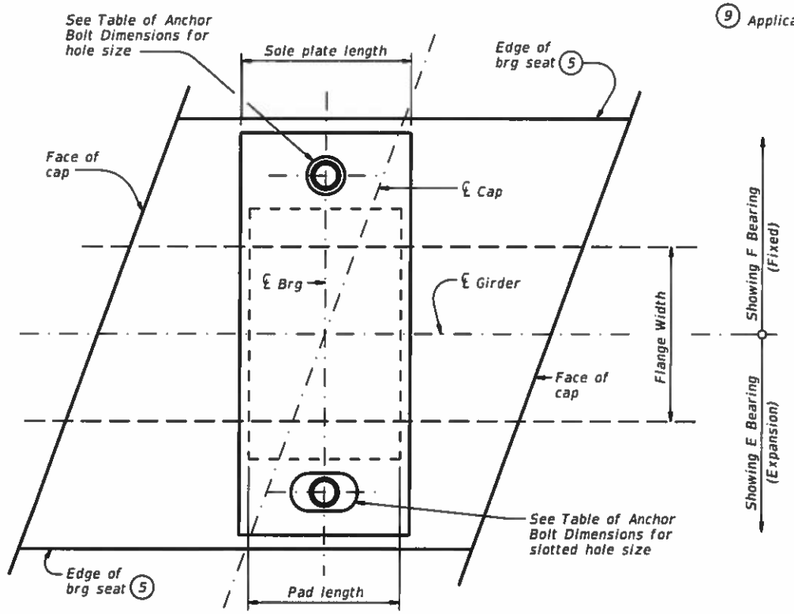
(5) Min Bearing Seat width, normal to girder, is "S" + 8".

(6) See span details for beam grade (slope) at bearing locations.

(9) Applicable to E bearings only.

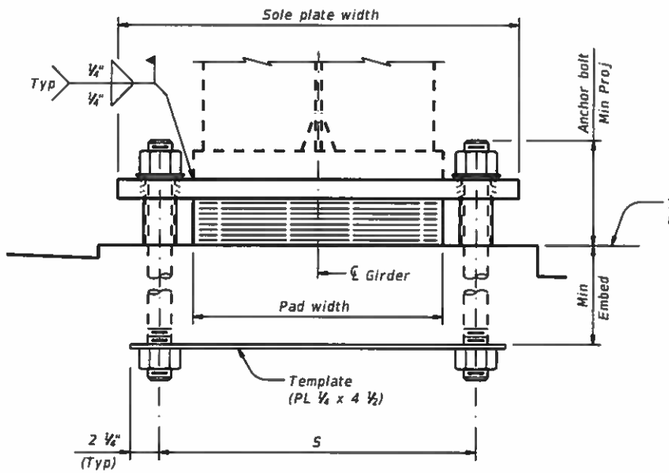
TABLE OF INTERIOR BEARING DESIGNS

Bearing Type	Neoprene Pad		Sole Plate		H	S	T	Flange Width		Reactions (Unfactored)			Max Expansion Length (9)
	Width	Length	Width	Length				Min	Max	(9)(2) Min DL	Max DL	Max Total	
	in	in	in	in	in	in	in	in	in	kip	kip	kip	ft
E1 or F1	15	10	27.0	12	5.1	20.5	3.09	10	15	66	180	225	206
E2 or F2	18	10	30.0	12	5.1	23.5	3.09	10	18	79	216	270	206
E3 or F3	21	10	33.0	12	5.1	26.5	3.09	11	21	92	252	315	206
E4 or F4	24	14	38.5	16	6.4	30.5	4.45	12	24	147	403	504	321
E5 or F5	27	14	41.5	16	6.4	33.5	4.45	15	27	165	454	567	321
E6 or F6	30	14	44.5	16	6.4	36.5	4.45	18	30	184	504	630	321
E7 or F7	32	16	48.0	18	6.9	39.0	4.93	19	32	224	614	768	355
E8 or F8	34	16	50.0	18	6.9	41.0	4.93	21	34	238	653	816	355
E9 or F9	36	16	52.0	18	6.9	43.0	4.93	23	36	252	691	864	355

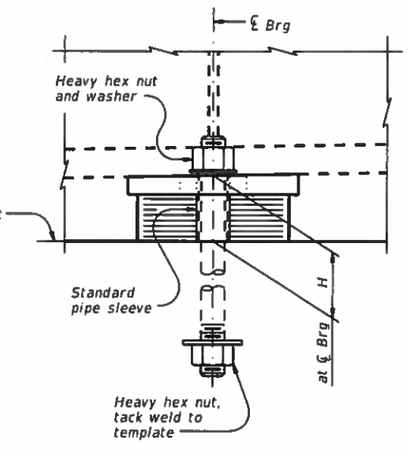


PLAN

Pipe sleeves, washers and nuts not shown for clarity



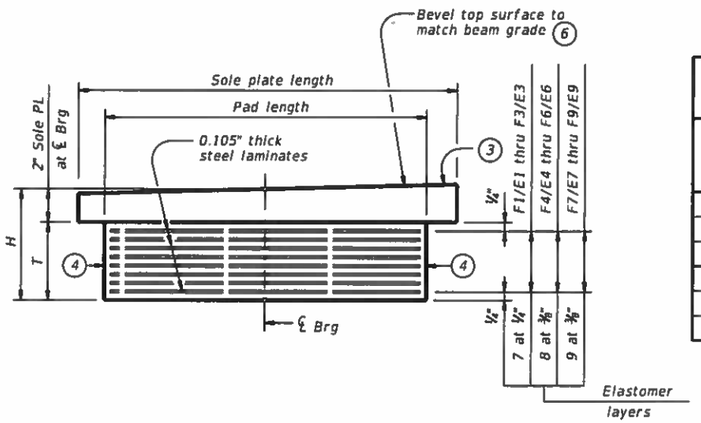
FRONT ELEVATION



SIDE ELEVATION

INTERIOR FIXED (F) AND EXPANSION (E) BEARINGS

Paid for at unit price bid for "Elastomeric Bearing" as per Item 434.



TYPE E & F LAMINATED ELASTOMERIC BEARING DETAIL

(50 Durometer) (Vulcanize sole plate to elastomer)

TABLE OF ANCHOR BOLT DIMENSIONS FOR TYPE E AND F BEARINGS

Bearing Type	Anchor Bolt Dia	Pipe Sleeve Size (Dia x Length)	Sole Plate Hole Size	Anchor Bolt	
				Embed	Proj
F1 thru F3	1 ¾"	2" x 5 ⅜"	2 ¾" Dia	1'- 6"	8"
F4 thru F6	2 ¼"	2 ½" x 6 ⅝"	3 ¼" Dia	2'- 0"	9 ½"
F7 thru F9	2 ½"	3" x 7 ¼"	3 ⅞" Dia	2'- 1"	10 ½"
E1 thru E3	1 ¾"	2" x 5 ⅜"	2 ¾" x 4 ½"	1'- 6"	8"
E4 thru E6	2 ¼"	2 ½" x 6 ⅝"	3 ¼" x 6 ¼"	2'- 0"	9 ½"
E7 thru E9	2 ½"	3" x 7 ¼"	3 ⅞" x 7"	2'- 1"	10 ½"

SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING DETAILS

STEEL GIRDERS AND BEAMS

SGEB

FILE: sgebste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290,ETC
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS,ETC		62

DATE:
FILE:

(3) Locate "Bearing Type" identification here.

(4) Locate permanent mark here.

(5) Min bearing seat width, normal to girder, is "S" + 8".

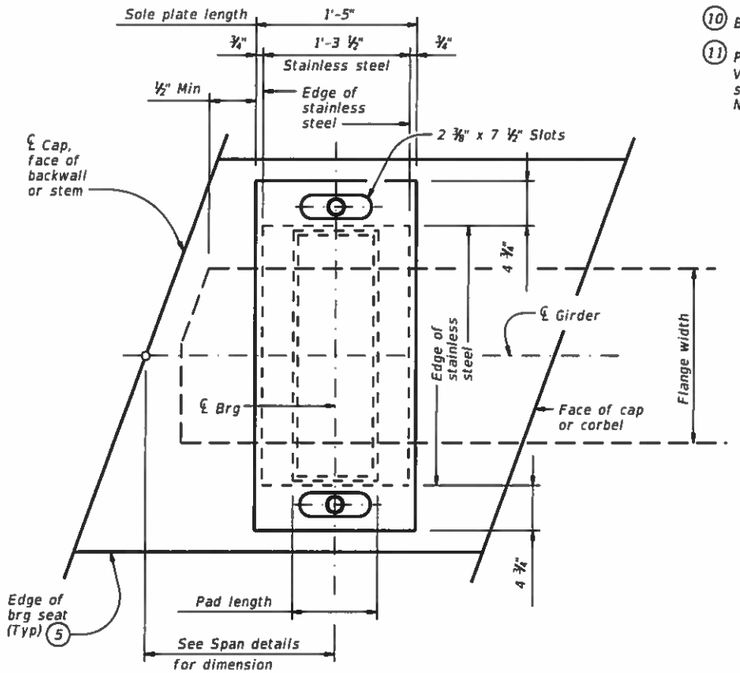
(6) See span details for beam grade (slope) at bearing locations.

(10) Bond PTFE to ½" plate with an approved adhesive.

(11) Provide steel for ½" plate conforming to ASTM A36. Vulcanize plate to elastomer. Paint plate (in the shop) with System II in accordance with Item 446. No paint is permitted in recess or on PTFE.

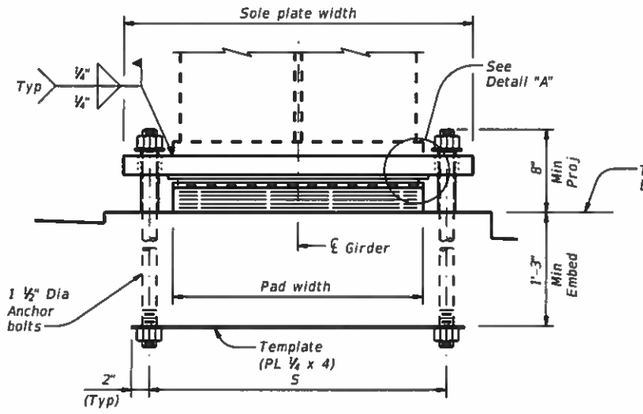
TABLE OF END SLIDING BEARING DESIGNS

Bearing Type	Neoprene Pad		Sole Plate		H	S	T	Flange Width		Reactions (Unfactored)		Max Expansion Length
	Width	Length	Width	Length				Min	Max	Max DL	Max Total	
	in	in	in	in	in	in	in	in	in	kip	kip	ft
ES1	15	9	25.5	17	5.5	20.0	2.65	10	15	108	203	500
ES2	18	9	28.5	17	5.5	23.0	2.65	10	18	130	243	500
ES3	21	9	31.5	17	5.5	26.0	2.65	11	21	151	284	500
ES4	24	9	34.5	17	5.5	29.0	2.65	14	24	173	324	500
ES5	27	9	37.5	17	5.5	32.0	2.65	17	27	194	365	500
ES6	30	9	40.5	17	5.5	35.0	2.65	20	30	216	405	500
ES7	32	9	42.5	17	5.5	37.0	2.65	22	32	230	432	500
ES8	34	9	44.5	17	5.5	39.0	2.65	24	34	245	459	500
ES9	36	9	46.5	17	5.5	41.0	2.65	26	36	259	486	500

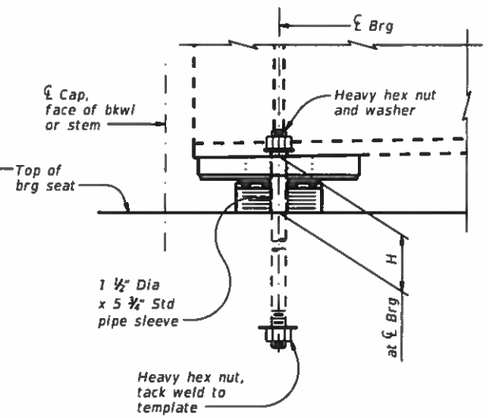


PLAN

Pipe sleeves, washers and nuts not shown for clarity



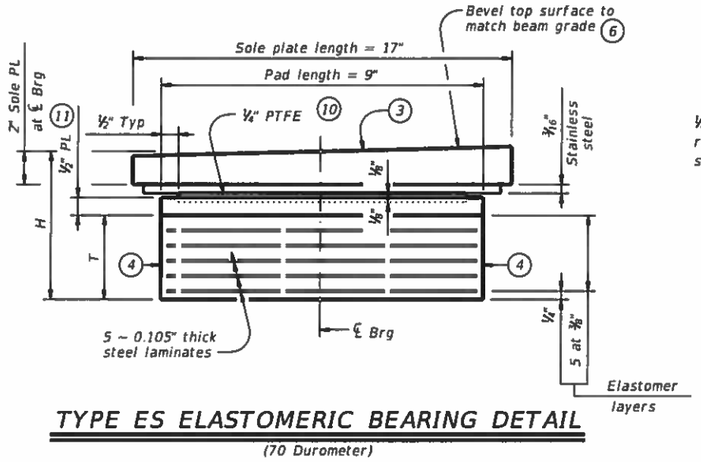
FRONT ELEVATION



SIDE ELEVATION

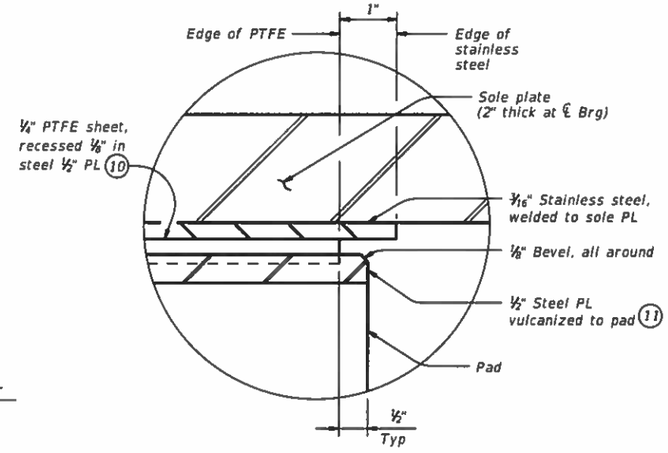
END SLIDING (ES) EXPANSION BEARINGS

Paid for at unit price bid for "Sliding Elastomeric Bearing" as per Item 434.



TYPE ES ELASTOMERIC BEARING DETAIL

(70 Durometer)



DETAIL "A"

SHEET 3 OF 3

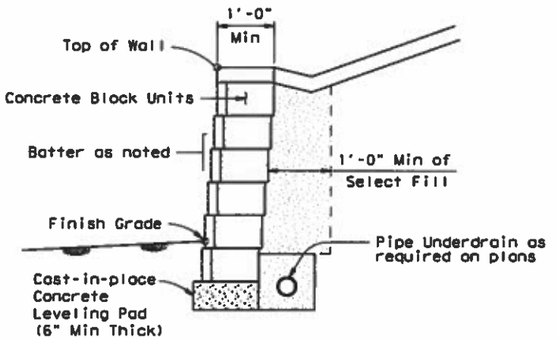
Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING DETAILS
STEEL GIRDERS AND BEAMS

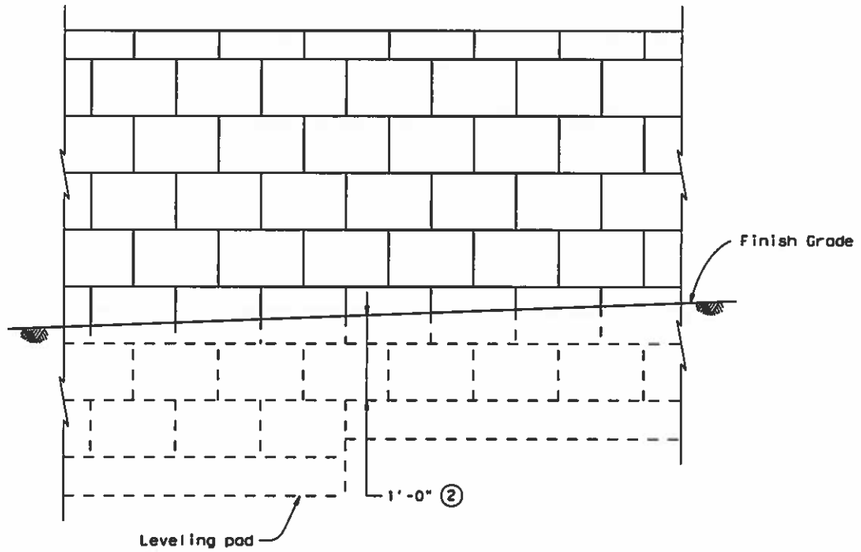
SGEB

FILE: sgebste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	09	001	US 290,ETC
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS,ETC		43

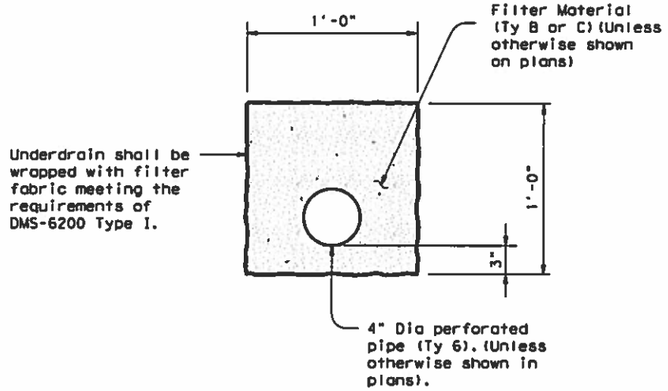


SECTION

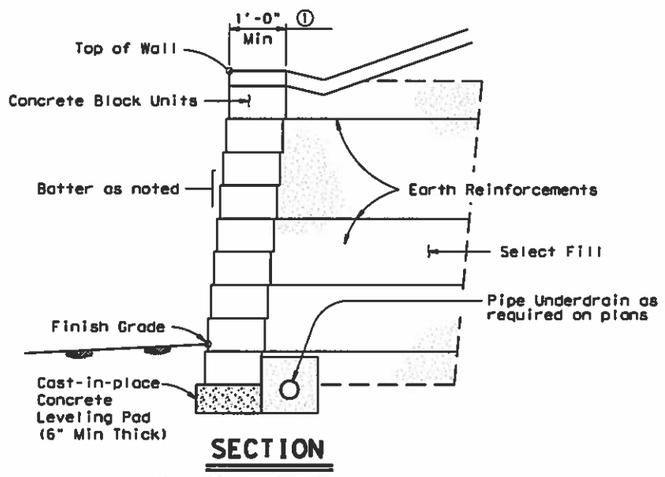
(No Earth Reinforcements)



TYPICAL ELEVATION



UNDERDRAIN DETAIL



SECTION

(With Earth Reinforcements)

① For systems utilizing continuous structural pins passing thru a minimum of 3 block layers, the minimum block depth shall be 8". The maximum vertical spacing of primary reinforcement on these systems shall be 24", and intermediate reinforcement will not be required.

② Unless noted elsewhere in the plans, 1'-0" minimum cover shall be provided from the top of leveling pad to finish grade.

③ For walls which are designated as landscape walls and are less than 6' tall, the following modifications to the design criteria will be allowed:

Factor of safety in sliding > 1.2.
Factor of safety in overturning > 1.5.
Connection strength factor of safety of 1.0 at ¾" strain.
Minimum earth reinforcement length of 4'.

The above modified criteria does not apply to walls over 6' tall regardless of designation.

EARTH REINFORCEMENTS:

Walls may be constructed without earth reinforcements if all stability criteria are met with the blocks alone. If all stability criteria are not satisfied, earth reinforcements shall be provided.

The long term design strength (LTDS) of earth reinforcement shall be calculated in accordance with current AASHTO Standard and Interim Specifications.

Soil-geogrid pullout coefficient values shall be determined in accordance with Geosynthetics Research Institute (GRI) Method GG-5, "Guidelines for Evaluating Geogrid Pullout".

For the combination of concrete block and geogrid chosen, connection strength data shall be provided. The allowable connection load shall be limited to the connection strength developed at ¾" displacement, divided by a 1.5 safety factor. ③

For internal stability calculations, the failure plane will be assumed to originate at the back of the concrete blocks.

The factor of safety against pullout of the earth reinforcements shall be determined from test data evaluated at ¾" strain.

The maximum vertical spacing of primary earth reinforcement layers shall be 40 inches. ①

The minimum length of primary earth reinforcements shall be 8 feet, measured from the front of the blocks. ③

A layer of intermediate reinforcement shall be provided between primary reinforcements when the spacing between primary layers exceeds twice the horizontal depth of the concrete block unit. Intermediate reinforcement shall have a minimum length of 4 feet, and shall provide local stability for the concrete block units. ①

STABILITY CRITERIA:

Factor of safety in sliding along the base of the structure shall be greater than or equal to 1.5. ③

Factor of safety in overturning shall be greater than or equal to 2.0. ③

The base pressure resultant shall fall within the middle third of the retaining wall.

DESIGN PARAMETERS:

Structure shall be based on the following design parameters:

Random Backfill: Unit weight = 120 pcf.
(Embankment or Existing Soils) ø = 30° c = 0 psf
Select Backfill: Unit weight = 120 pcf
ø = 34° c = 0 psf

GENERAL NOTES:

Sections and Typical Elevation shown are for informational purposes only. Specific geometry is to be determined based on wall layouts and other plan information.

Unless otherwise shown in the plans, wall batter shall be a maximum of 3" per foot. Blocks shall be placed horizontally, and a positive means of obtaining batter such as pins, keyways, or concrete lips shall be provided.

Texas Department of Transportation

Bridge Division Standard

CONCRETE BLOCK RETAINING WALL

RW(CB)

FILE: rwstde02.dgn	DN: TxDOT	CK: TxDOT	DW: GHO	CK: NPM	
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY	
REVISIONS	6382	09	001	US 290, ETC	
	DIST	COUNTY		SHEET NO.	
	HOU	HARRIS, ETC		64	

DATE:
FILE:

SITE DESCRIPTION

PROJECT LIMITS: US 290 OVER CYPRESS ROSE HILL RD, IH 45 OVER SIMS BAYOU, US 59/ US 69 OVER US 90A & UPRR, FM 2234 OVER CLEAR CREEK

PROJECT DESCRIPTION: SEALED EXPANSION JOINT (SEJ) & BEARING PAD REPLACEMENT, AND MISCELLANEOUS WORK

MAJOR SOIL DISTURBING ACTIVITIES: N/A

TOTAL PROJECT AREA: 0.1 AC

TOTAL AREA TO BE DISTURBED: 0.1 AC

WEIGHTED RUNOFF COEFFICIENT: (AFTER CONSTRUCTION): SAME AS BEFORE CONSTRUCTION

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: EXISTING CONDITION OF SOIL AND VEGETATION COVER IS FAIR. CONSIST MOSTLY OF ST. AUGUSTINE GRASS, DIRT, AND GRAVEL.

NAME OF RECEIVING WATERS: SIMS BAYOU AND CLEAR CREEK

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- ___ TEMPORARY SEEDING
- ___ PERMANENT PLANTING, SODDING, OR SEEDING
- ___ MULCHING
- ___ SOIL RETENTION BLANKET
- ___ BUFFER ZONES
- ___ PRESERVATION OF NATURAL RESOURCES

OTHER: N/A

STRUCTURAL PRACTICES:

- X SILT FENCES
- ___ HAY BALES
- ___ ROCK BERMS
- ___ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- ___ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- ___ DIVERSION DIKE AND SWALE COMBINATIONS
- ___ PIPE SLOPE DRAINS
- ___ PAVED FLUMES
- ___ ROCK BEDDING AT CONSTRUCTION EXIT
- ___ TIMBER MATTING AT CONSTRUCTION EXIT
- ___ CHANNEL LINERS
- ___ SEDIMENT TRAPS
- ___ SEDIMENT BASINS
- ___ STORM INLET SEDIMENT TRAP
- ___ STONE OUTLET STRUCTURES
- ___ CURBS AND GUTTERS
- ___ STORM SEWERS
- ___ VELOCITY CONTROL DEVICES
- X EROSION CONTROL LOGS

OTHER: ___

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES: N/A

((Provide narrative of construction sequencing))

STORM WATER MANAGEMENT: STORM WATER DRAINAGE WILL BE PROVIDED BY AN EXISTING STORM SEWER.

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: All erosion and sediment controls will be maintained in good working order. If a repair is necessary it will be done at the earliest date possible, but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. The area adjacent to creeks and drainageways shall have priority followed by devices protecting storm sewer inlets.

INSPECTION: All inspections will be performed by a TxDOT inspector per one of the options below as directed by the Area Engineer
1. At least every 7 calendar days
2. At least every 14 days or after 0.5 inches or more of rainfall
An inspection and maintenance report should be made for each inspection. Based on the inspection results, the controls shall be revised according to the inspection report.

WASTE MATERIALS: The dumpster used to store all waste material will meet all state and local city solid waste management regulations. All trash and construction debris will be deposited in the dumpster. The dumpster will be emptied as necessary or as required by local regulation and the trash will be hauled to a local dump. No construction waste material will be buried on site.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): In the event of a spill which may be considered hazardous, the Houston District Safety Office shall be contacted immediately at 713-802-5962.

SANITARY WASTE: N/A

OFFSITE VEHICLE TRACKING:

- ___ HAUL ROADS DAMPENED FOR DUST CONTROL
- ___ LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- ___ EXCESS DIRT ON ROAD REMOVED DAILY
- ___ STABILIZED CONSTRUCTION ENTRANCE

OTHER: ___

REMARKS: Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the sediment that may enter receiving waterways. Disposal areas shall not be located in any waterway, waterbody or streambed. Construction staging areas and vehicle maintenance areas shall be constructed by the contractor in a manner which minimizes the runoff of all pollutants. All waterways shall be cleared as soon as practical of temporary embankments, temporary bridges, matting, falsework, piling, debris, and other obstructions placed during construction operations that are not part of the finished work.

STATE OF TEXAS
DEDRICK D. KNIGHTEN
103612
LICENSED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by DEDRICK D. KNIGHTEN, P.E. 103612

7/2 2021

Dedrick D. Knighten, P.E.

Texas Department of Transportation
Houston District

TxDOT STORM WATER POLLUTION PREVENTION PLAN

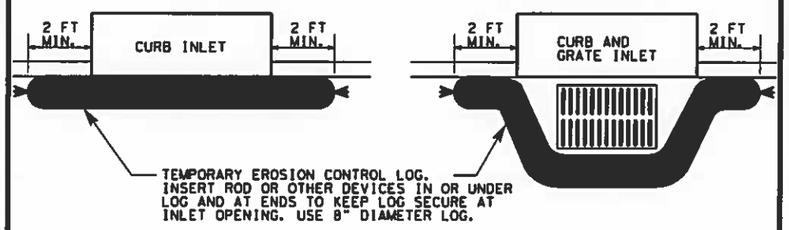
SWP3

FILE: STDG1.DGN	DW: TxDot	CK: TxDot	DW: TxDot	CK: TxDot
©TxDOT JANUARY 2007	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS	HOU	6	BPM 638209001	65
9/2010 INSPECTION NOTE 9/2013 INSPECTION NOTE 11/2013 SWP TO SWP3 05/2013 2014 SPECS	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS, ETC	6382	09	001	US 290,ETC

STD G-1

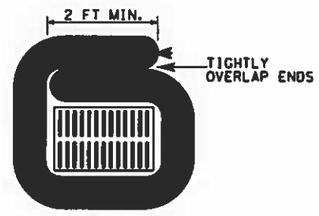
CURB INLETS
8" DIAMETER LOGS

ITEM 506-6040 BIODEG EROSN CONT LOGS (INSTL) (8")

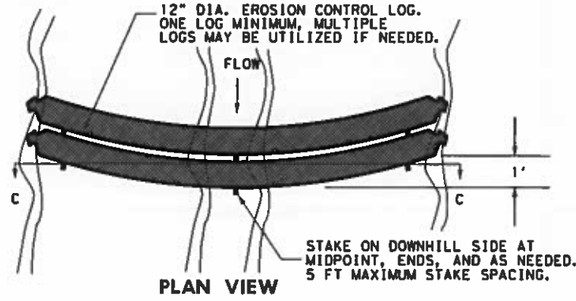


DROP INLETS AND OTHER LOCATIONS
12" DIAMETER LOGS

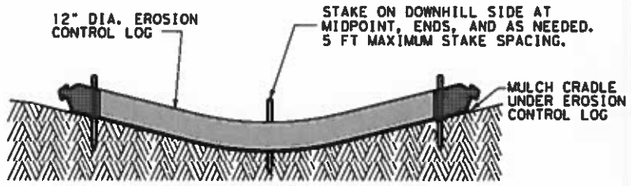
ITEM 506-6041 BIODEG EROSN CONT LOGS (INSTL)(12")



DROP INLETS

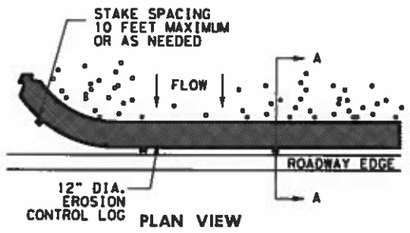


PLAN VIEW

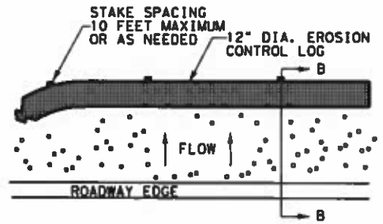


SECTION C-C

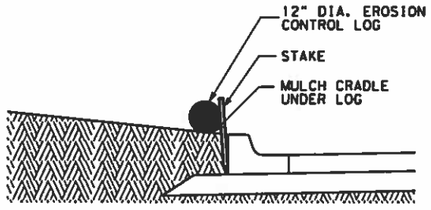
DRAINAGE SWALE OR DITCH



PLAN VIEW

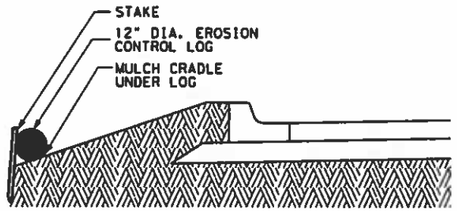


PLAN VIEW



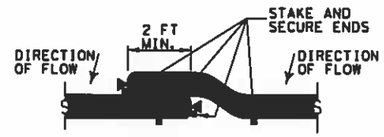
SECTION A-A

SLOPE TO ROADWAY EDGE



SECTION B-B

SLOPE AWAY FROM ROADWAY EDGE



END OF LOG OVERLAP

MATERIAL REQUIREMENTS

FILL:

Use 100% shredded mulch or other non-compost biodegradable material as fill for logs. No compost or fines.

DO NOT USE MATERIAL WHICH PROHIBITS WATER INFILTRATION.

LOG MESH:

Use mesh with 1/4" openings or larger. Mesh must allow water infiltration but also hold fill material in place.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

A sediment trap (erosion control log) may be used to filter sediment out of runoff draining from an unstabilized area.

Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

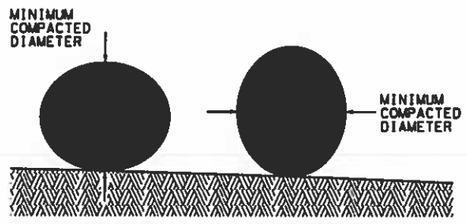
Sediment traps should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way

The trap should be cleaned when the capacity has been reduced by 1/2 or the sediment has accumulated to a depth of 1', whichever is less.

REQUIRED ITEMS:

- ITEM 506-6040 BIODEG EROSN CONT LOGS (INSTL) (8") LF
- ITEM 506-6041 BIODEG EROSN CONT LOGS (INSTL) (12") LF
- ITEM 506-6043 BIODEG EROSN CONT LOGS (REMOVE) LF



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

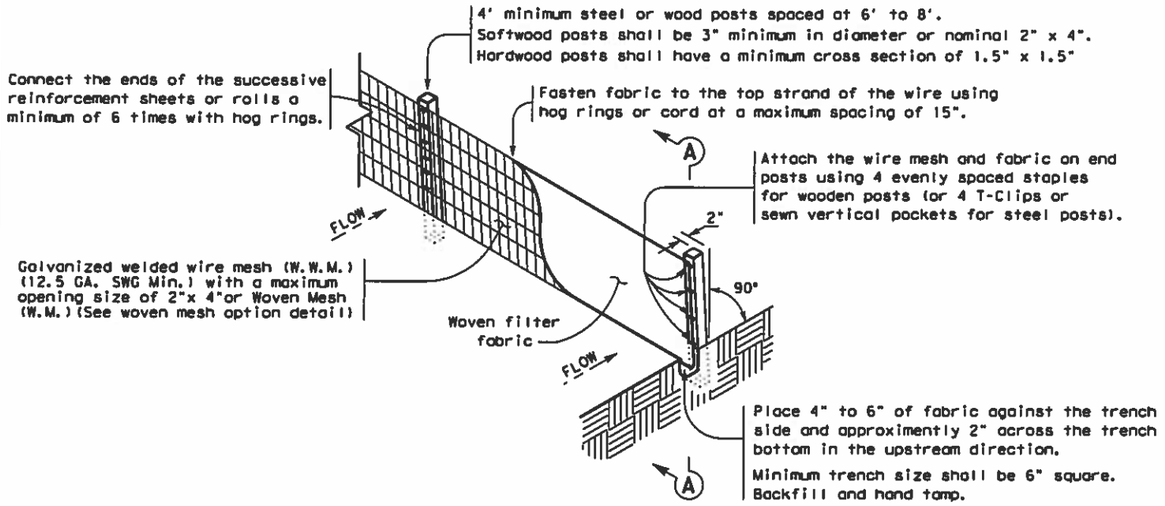
Texas Department of Transportation
Houston District

EROSION CONTROL LOG

ECL-12

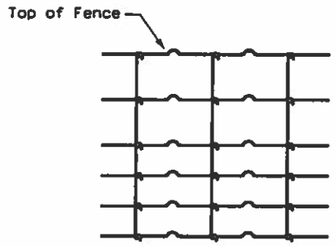
FILE: STDG4a.DGN	DW: TxDot	CK: TxDot	DW: TxDot	CK: TxDot			
©TxDOT 2014	DISTRICT	FED.RTE.	PROJECT NUMBER				SHEET
REVISIONS 3/15 MINOR CORRECTIONS	HOU	6	BPM 638209001				66
	COUNTY		CONTROL	SECT	JOB	HIGHWAY	
	HARRIS		6382	09	001	US 290,ETC	

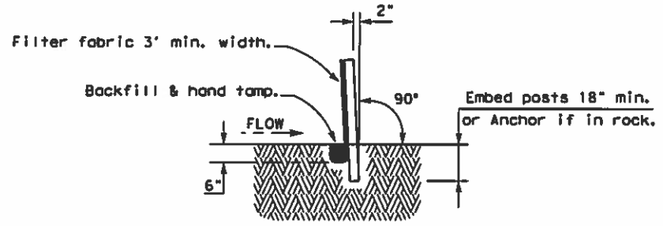
STD G-4A



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

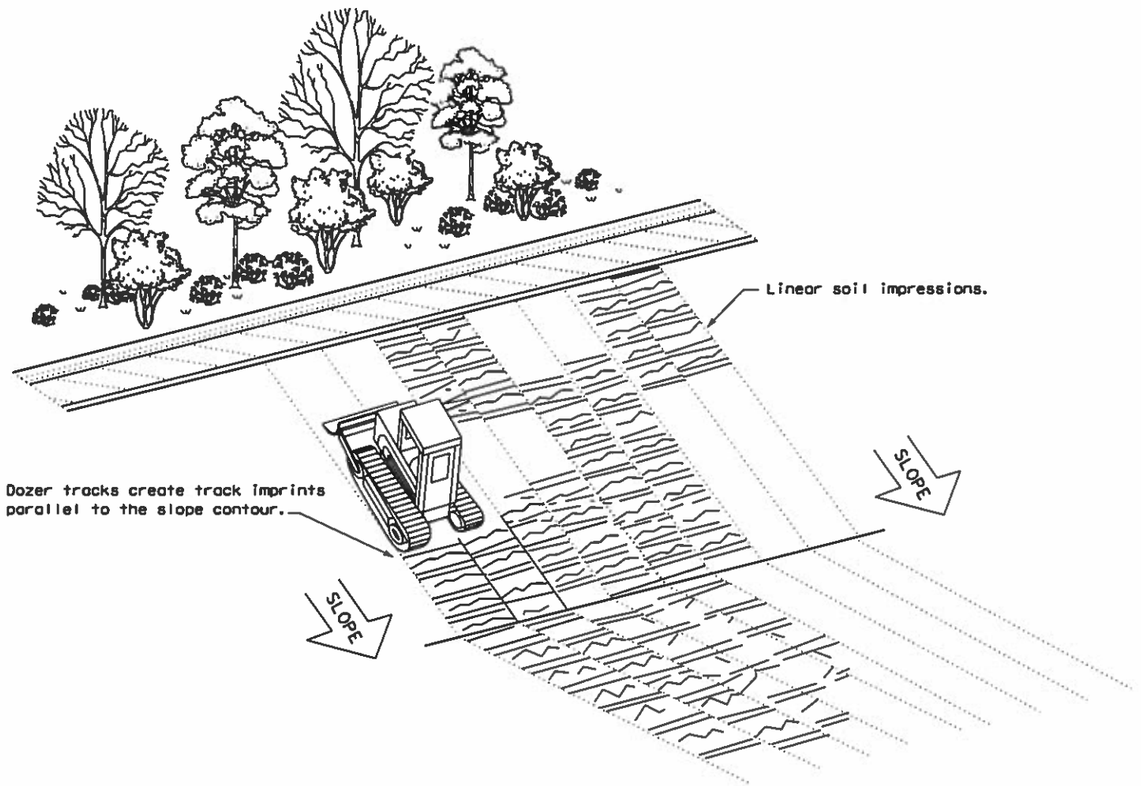
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	6382	09	001	US 290, ETC	
	DIST	COUNTY		SHEET NO.	
	HOU	HARRIS, ETC		67	

DATE
FILE