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DESIGN	FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
GRAPHICS	6	RMC 6382-11-001		1
CHECKED	STATE	STATE DIST.	COUNTY	
CHECKED	TEXAS	12	HARRIS, ETC.	
CHECKED	CONT.	SECT.	JOB	HIGHWAY NO.
	6382	11	001	US 290, ETC.

STATE OF TEXAS

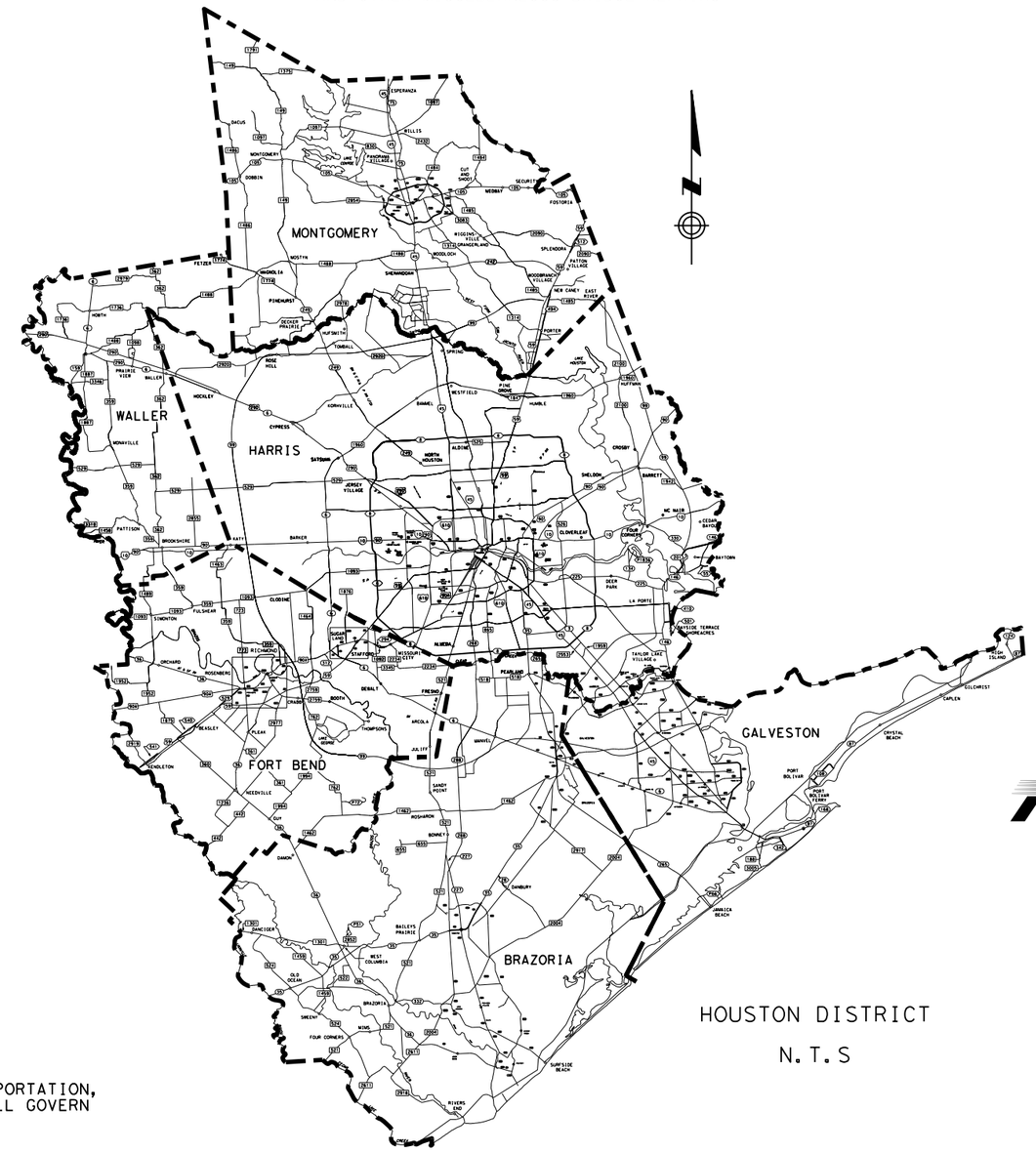
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED

STATE HIGHWAY IMPROVEMENT

STATE ROUTINE MAINTENANCE PROJECT
RMC 6382-11-001

LIMITS: VARIOUS LOCATIONS IN THE HOUSTON DISTRICT
FOR THE REPLACEMENT OF EXISTING BEARING PADS, SEJ REPLACEMENT
AND OTHER MISCELLANEOUS BRIDGE REPAIRS



HOUSTON DISTRICT

N. T. S

COUNTY VARIOUS PROJ. NO. RMC 6382-11-001
HWY. NO. VARIOUS LETTING DATE _____
DATE ACCEPTED _____

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

Texas Department of Transportation

SUBMITTED FOR LETTING: August 20, 2021

for: AREA ENGINEER

APPROVED FOR LETTING: 9-28-2021

DIRECTOR OF MAINTENANCE

DATE: 08/17/2021
FILE: H:\WCHAO\Design\Maintenance Projects\RMC\6382-11-001\Plan Set\1. General\GT01.dgn

STATE OF TEXAS
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

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

Steve Van, P.E. 08/19/2021

STEVE VAN, P.E. DATE

TEXAS DEPARTMENT OF TRANSPORTATION

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TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290,ETC.

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SHEET NO.				DESCRIPTION
				ROADWAY STANDARDS (CONT)
94	-	96	*	WIDE FLANGE PAVEMENT TERMINALS; WFPT (HOU DIST)
97	-	98	*	SINGLE SLOPE CONCRETE BARRIER PRECAST BARRIER (TYPE 1); SSCB (2)-10
99			*	CONCRETE PAVING DETAILS JOINT SEALS; JS-14
				VII. RAILROAD
100				RAILROAD SCOPE OF WORK
101	-	102		RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS
				VIII. ENVIRONMENTAL
103				TXDOT STORM WATER POLLUTION PREVENTION PLANS; SWP3 (HOU DIST)

SHEET NO.	DESCRIPTION

STATE OF TEXAS
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

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TEXAS DEPARTMENT OF TRANSPORTATION

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CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290,ETC.

General Notes:

General:

This is a Routine Maintenance Non Site Specific Contract.

This is a **53** 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.

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 48 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 **locaterequest@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 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 8.3.3.1.

The maximum number of days the time charges on this contract may be suspended due to contractor mobilization, and material fabrication/accumulation or processing delays is **60** days. The Engineer and the Contractor may mutually agree, in writing, to decrease this maximum number of days.

The Lane Closure Assessment Fees 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 502, "Barricades, Signs, and Traffic Handling".

Lane Assessment Fees

Location	ADT (2021)	Lane Closure Fee (phpl)
US 290 at Spring Cypress Rd (Mainlanes)	75,100	$1,500
US 290 at Spring Cypress Rd (Frontage Roads)	23,600	$500
SH 105 at BNSF RR	9,800	$200

Item 361: Repair of Concrete Pavement

For full depth repair, remove only the quantity of pavement replaceable during the daily allowable work schedule.

Remove loose sub-base material and replace it with concrete. Use a bondbreaker, such as a polyethylene sheet, at the interface between the replaced sub-base material and the new concrete pavement.

Supply polyethylene fabric on the job site sufficient to cover the area of repair.

Do not place concrete if impending weather may result in rainfall or low temperatures that may impair the quality of the finished work.

Repair portions of the concrete pavement surfaces that are damaged while in a plastic state before those areas receive permanent pavement markings and open to traffic. Perform repairs that are structurally equivalent to and cosmetically uniform with adjacent undamaged areas. Do not repair by grouting onto the surface.

Ready mix concrete will be permitted if the equipment and construction methods can produce the desired results. Hand finishing will be permitted.

Perform saw cutting as shown on the plans in accordance with Section 360.4.10, "Sawing Joints." This saw cutting is subsidiary to this bid Item.

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.

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.

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

One Lane Closures (US 290 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

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
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 (US 290 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 (US 290 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
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 (US 290 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 (US 290 Mainlanes & SH 105)*

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 US 290 mainlanes & SH 105 are only permitted for bridge jacking/bearing pad 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.

Use Uneven Lane Signs (CW 8-11) during resurfacing operations for elevation differences between adjacent lanes of greater than 1 in.

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

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

Item 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 512: Portable Traffic Barrier

Temporarily move section of SSCB precast barrier with pinned placement. Move back SSCB and install pinned placement once the work is completed.

Item 4002: Elastomeric Bearing Pads

Provide bridge jacking plans signed and sealed by a professional engineer to raise the bridge for bearing pad replacement. Required jacking loads are provided by the Department in the plans.

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

CONTROLLING PROJECT ID 6382-11-001

DISTRICT Houston
HIGHWAY US 290, ETC.

COUNTY Harris, etc.

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**6382-11-001**			
		PROJECT ID		**A00177099**			
		COUNTY		**Harris**			
		HIGHWAY		**US0290**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	361-6051	FULL-DPTH REP(BR APPROACH SLAB)(9"-13")	SY	33.000		33.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	28.000		28.000	
	438-6001	CLEANING AND SEALING EXISTING JOINTS	LF	430.000		430.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		2.000	
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF	240.000		240.000	
	785-6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	285.000		285.000	
	4002-6001	REPLACE ELASTOMERIC BEARING PADS	EA	38.000		38.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	60.000		60.000	
	6185-6002	TMA (STATIONARY)	DAY	53.000		53.000	
	08	EROSION CONTROL MAINTENANCE (NON-PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY (NON-PART)	LS	1.000		1.000	
		LAW ENFORCEMENT	LS	1.000		1.000	

SUMMARY OF QUANTITIES

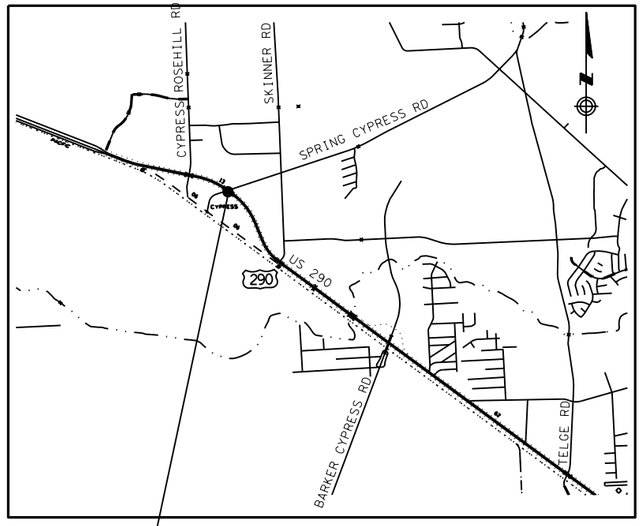
ITEM		361	429	438	512	785	4002
DESC. CODE		6051	6007	6001	6025	6011	6001
ROADWAY	NBI #	FULL-DPTH REP (BR APPROACH SLAB)(9"-13")	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEANING AND SEALING EXISTING JOINTS	PORT CTB (MOVE) (SGL SLP)(TY 1)	BRIDGE JOINT REPLACEMENT (SEJ)	REPLACE ELASTOMERIC BEARING PADS
		SY	SF	LF	LF	LF	EA
US 290 & SPRING CYPRESS DR	12-102-0050-06-149	33.00	28.00	430.00	240.00	285.00	16.00
SH 105 & BNSF RR	12-170-0338-07-129	0.00	0.00	0.00	0.00	0.00	22.00
TOTAL		33.00	28.00	430.00	240.00	285.00	38.00

FILE: H:\WCHAO\Design\MAINTENANCE Projects\RMC\RMC 6382-11-001\PLAN SET\1. General\GQ01.dgn

SUMMARY OF QUANTITIES

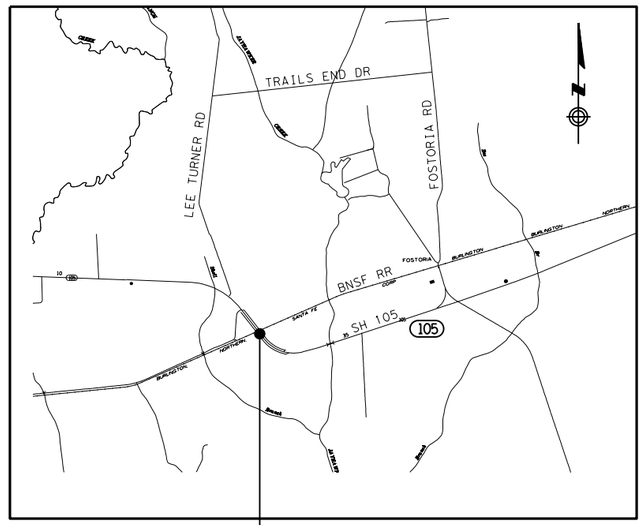
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			6
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

LOCATION 1



PROJECT
CSJ 6382-11-001
US 290 AT SPRING CYPRESS RD
NBI# 12-102-0050-06-149

LOCATION 2



PROJECT
CSJ 6382-11-001
SH 105 AT BNSF RR
NBI# 12-170-0338-07-129

LOCATIONS			
LOCATION #	NBI #	FACILITY CARRIED	FEATURE CROSSED
1	12-102-0050-06-149	US 290	SPRING CYPRESS RD
2	12-170-0338-07-129	SH 105	BNSF RR
3	AS DIRECTED BY THE ENGINEER		

TEXAS DEPARTMENT OF TRANSPORTATION

BRIDGE LOCATIONS LIST

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			7
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

DATE: 08/18/2021
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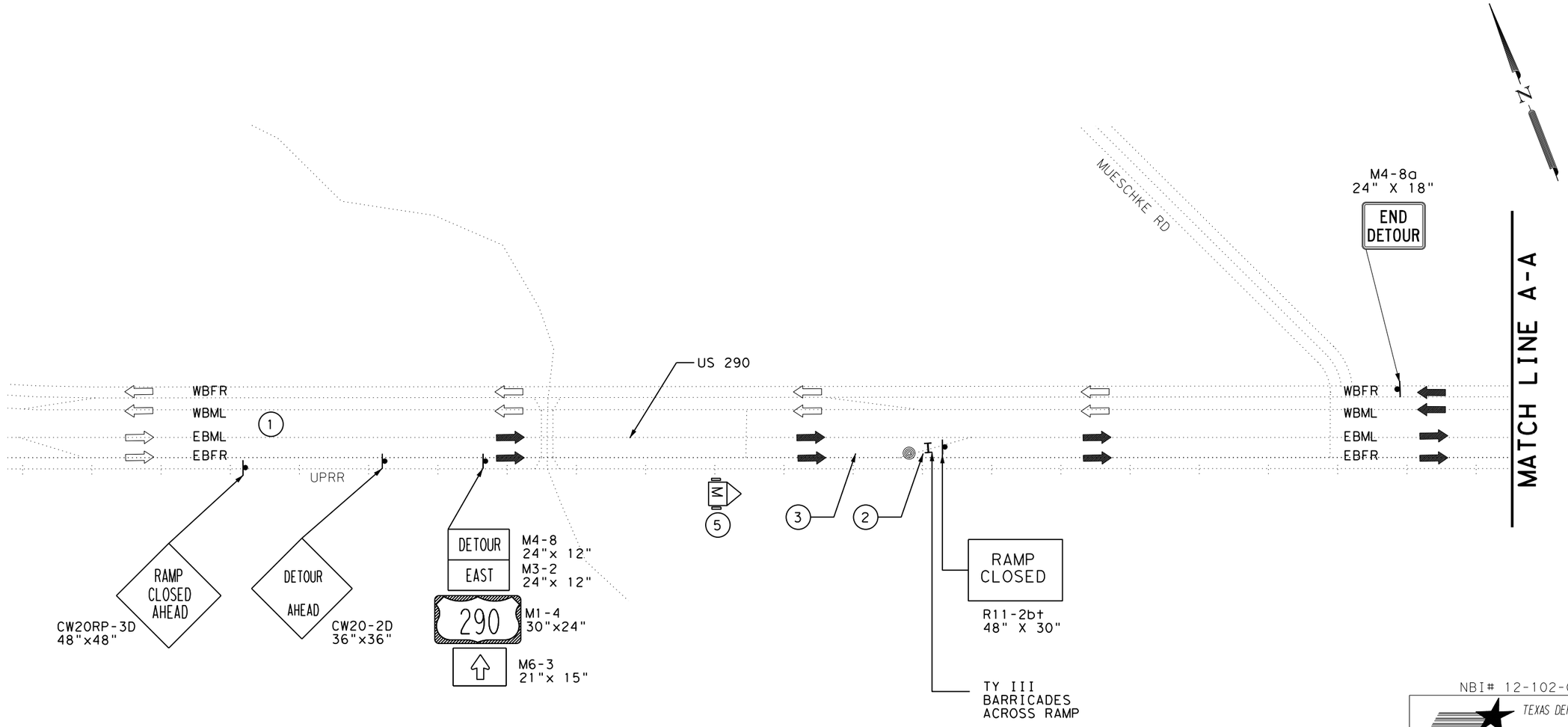

PORTABLE CHANGEABLE MESSAGE BOARD

5	ENT RAMP TO BE CLOSED	DATE & TIME	ENT RAMP CLOSED AHEAD	STAY ON FRNTG ROAD
	A	A	B	B

A TO BE USED PRIOR TO CLOSURE

B TO BE USED DURING CLOSURE

NOTES:

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

STATE OF TEXAS
STEVE VAN
137551
LICENSED
PROFESSIONAL ENGINEER

Steve Van, P.E.

08/19/2021

NBI# 12-102-0050-06-149

TEXAS DEPARTMENT OF TRANSPORTATION

US 290 OVERPASS AT SPRING CYPRESS RD

DETOUR PLAN

N.T.S. SHEET 1 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			8
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

DATE: 07/28/2021
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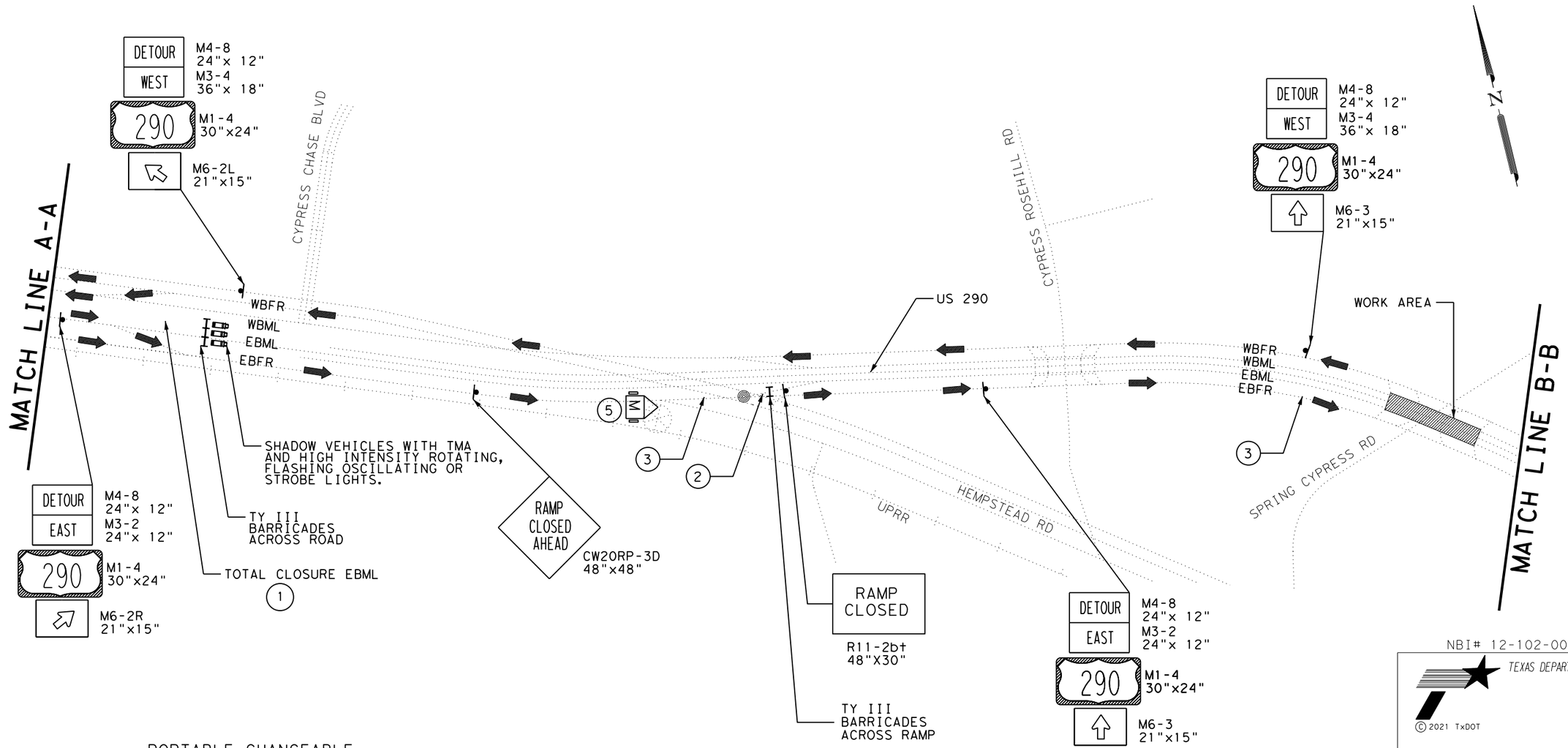

PORTABLE CHANGEABLE MESSAGE BOARD

5				
	ENT RAMP TO BE CLOSED	DATE & TIME	ENT RAMP CLOSED AHEAD	STAY ON FRNTG ROAD
	A	A	B	B

A TO BE USED PRIOR TO CLOSURE

B TO BE USED DURING CLOSURE

NOTES:

1. SEE TCP STANDARD TCP (6-6)-12 "TRAFFIC CONTROL PLAN FREEWAY CLOSURE TCP" FOR DETAILED TRAFFIC CONTROL INFORMATION.
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4. COORDINATE WITH METRO IF NEEDED, HOV LANES ARE CLOSED DURING CONSTRUCTION

STATE OF TEXAS
STEVE VAN
137551
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Steve Van, P.E.

08/19/2021

NBI# 12-102-0050-06-149

TEXAS DEPARTMENT OF TRANSPORTATION

US 290 OVERPASS AT SPRING CYPRESS RD

DETOUR PLAN

N. T. S. SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		9

STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

DATE: 07/28/2021
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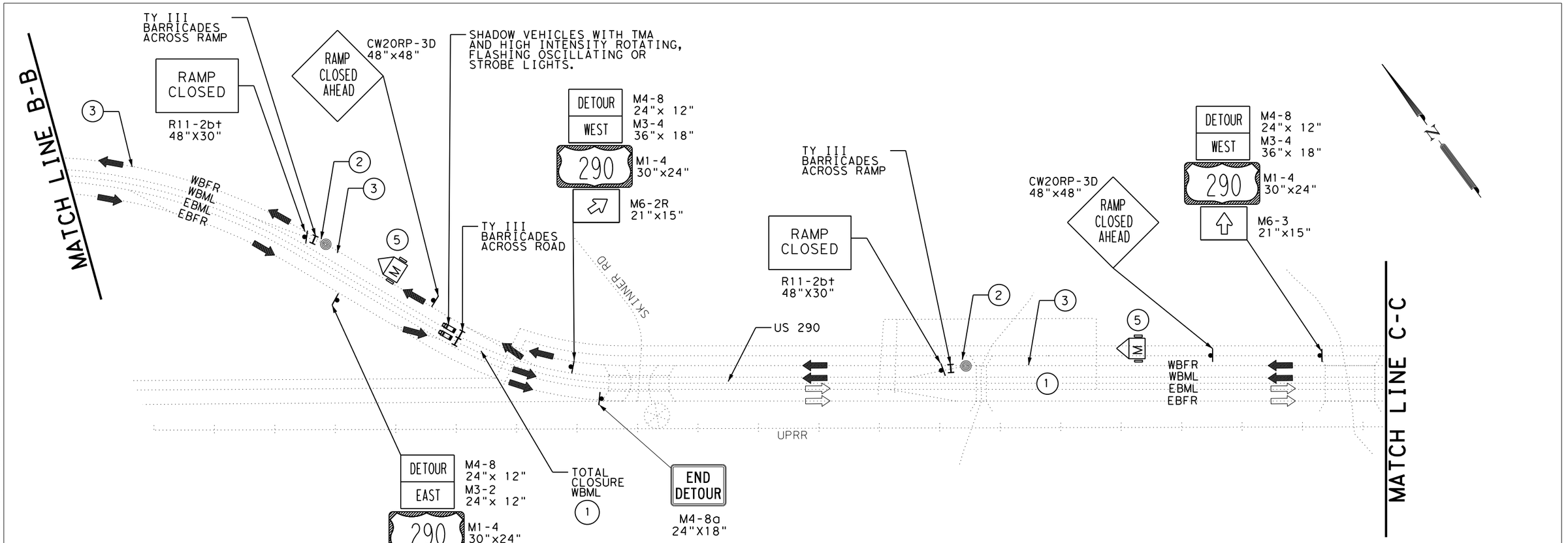

PORTABLE CHANGEABLE MESSAGE BOARD

(5)				
	ENT RAMP TO BE CLOSED	DATE & TIME	ENT RAMP CLOSED AHEAD	STAY ON FRNTG ROAD
	(A)	(A)	(B)	(B)

(A) TO BE USED PRIOR TO CLOSURE

(B) TO BE USED DURING CLOSURE

NOTES:

(1) SEE TCP STANDARD TCP (6-6)-12 "TRAFFIC CONTROL PLAN FREEWAY CLOSURE TCP" FOR DETAILED TRAFFIC CONTROL INFORMATION.

(2) SEE TCP STANDARD TCP (6-2)-12 "TRAFFIC CONTROL PLAN WORK AREA NEAR RAMP TCP" FOR DETAILED TRAFFIC CONTROL INFORMATION.

(3) SEE TCP STANDARD TCP (2-4)-18 "TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTIPLANE CONVENTIONAL ROADS TCP" FOR DETAILED TRAFFIC CONTROL INFORMATION.

(4) COORDINATE WITH METRO IF NEEDED, HOV LANES ARE CLOSED DURING CONSTRUCTION

STATE OF TEXAS
STEVE VAN
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Steve Van, P.E.

08/19/2021

NBI# 12-102-0050-06-149

TEXAS DEPARTMENT OF TRANSPORTATION

US 290 OVERPASS AT SPRING CYPRESS RD

DETOUR PLAN

N. T. S.

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		10

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

DATE: 07/28/2021
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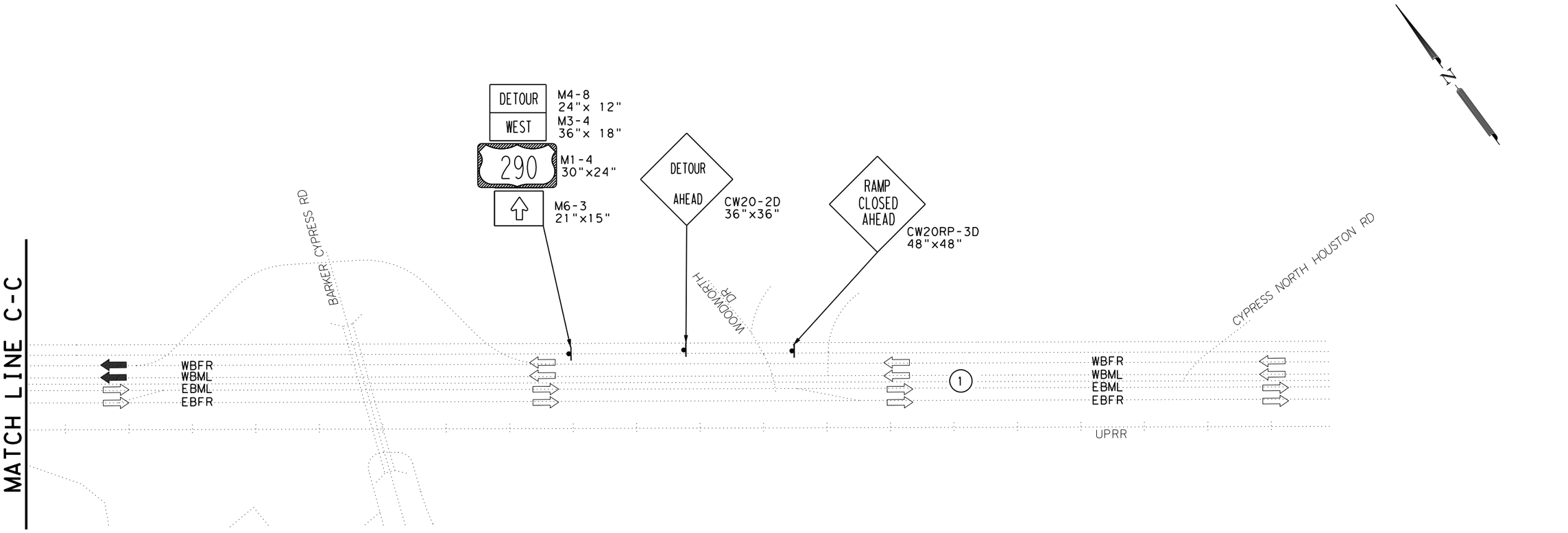

PORTABLE CHANGEABLE MESSAGE BOARD

4	ENT RAMP TO BE CLOSED	DATE & TIME	ENT RAMP CLOSED AHEAD	STAY ON FRNTG ROAD
	(A)	(A)	(B)	(B)

(A) TO BE USED PRIOR TO CLOSURE

(B) TO BE USED DURING CLOSURE

NOTES:

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

STATE OF TEXAS
STEVE VAN
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Steve Van, P.E.

08/19/2021

NBI# 12-102-0050-06-149

TEXAS DEPARTMENT OF TRANSPORTATION

US 290 OVERPASS AT SPRING CYPRESS RD

DETOUR PLAN

N.T.S.

SHEET 4 OF 4

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

DATE:07/28/2021
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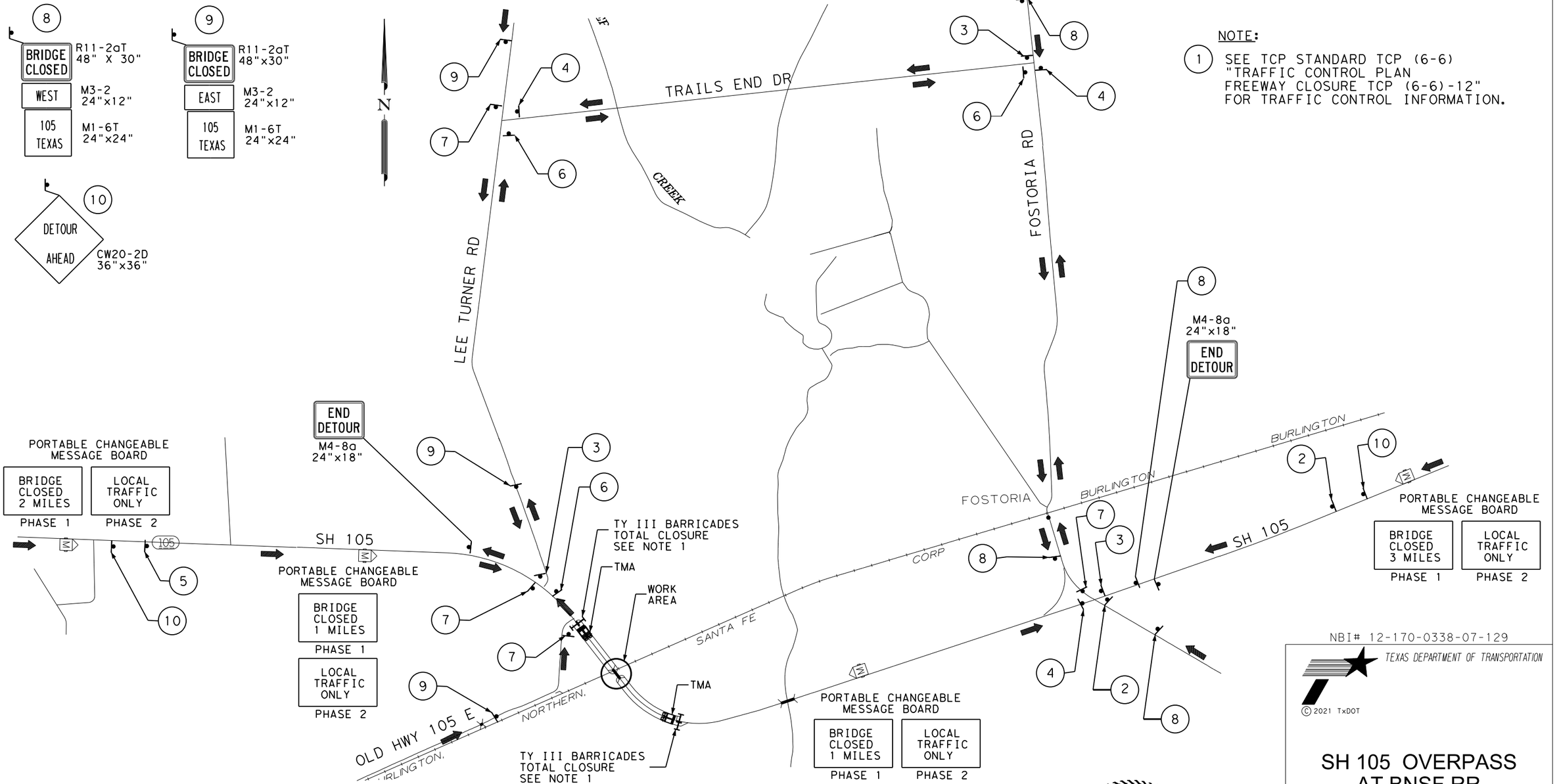

NOTE:

1. SEE TCP STANDARD TCP (6-6) "TRAFFIC CONTROL PLAN FREEWAY CLOSURE TCP (6-6)-12" FOR TRAFFIC CONTROL INFORMATION.

NBI# 12-170-0338-07-129

TEXAS DEPARTMENT OF TRANSPORTATION

SH 105 OVERPASS AT BNSF RR

DETOUR PLAN

STATE OF TEXAS
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

Stan Van, P.E.

08/19/2021

N. T. S.

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		12

STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

DATE:08/19/2021
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DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

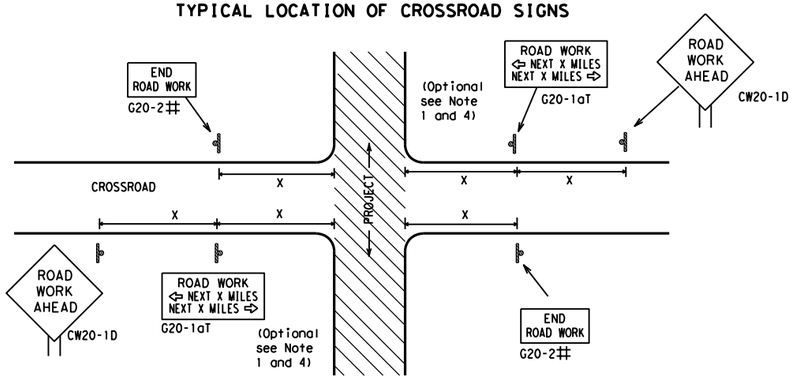
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	11	001	US 290, ETC.
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	HOU	HARRIS, ETC.		13
5-10 5-21				

DATE:
FILE:

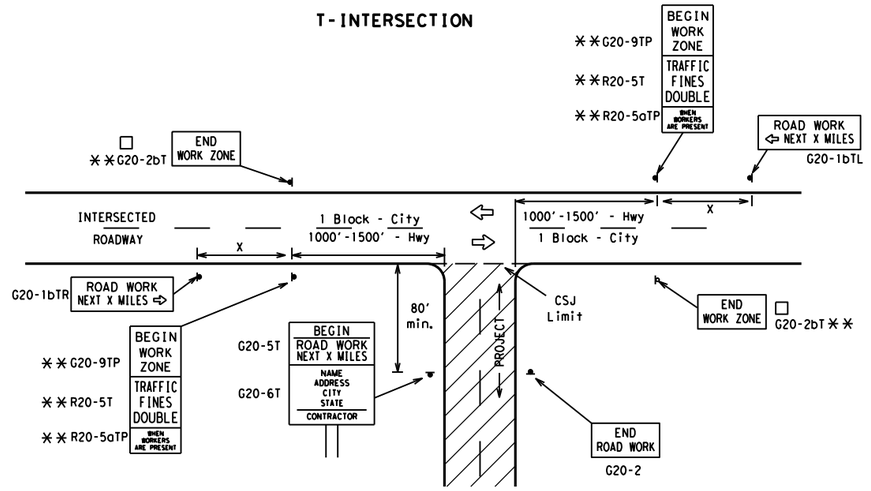
TYPICAL LOCATION OF CROSSROAD SIGNS



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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

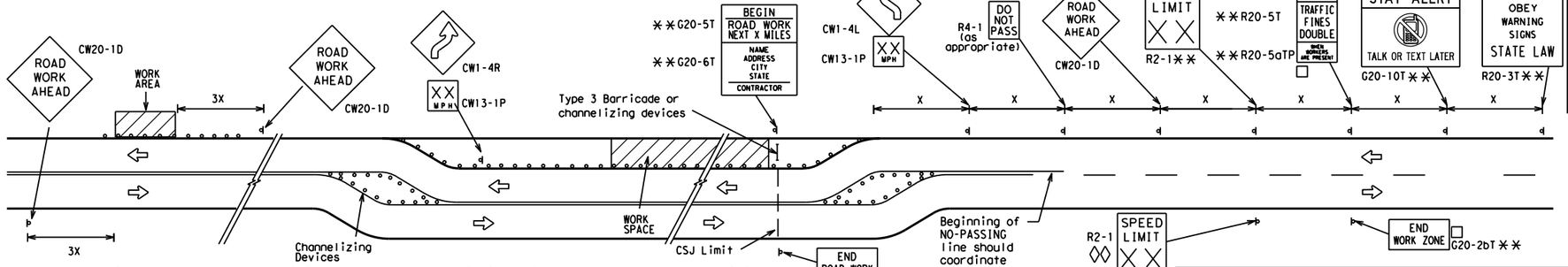
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

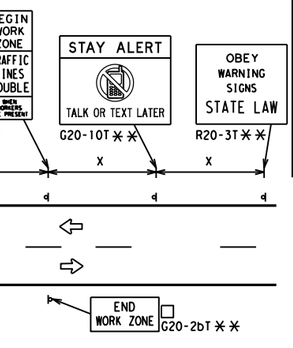
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

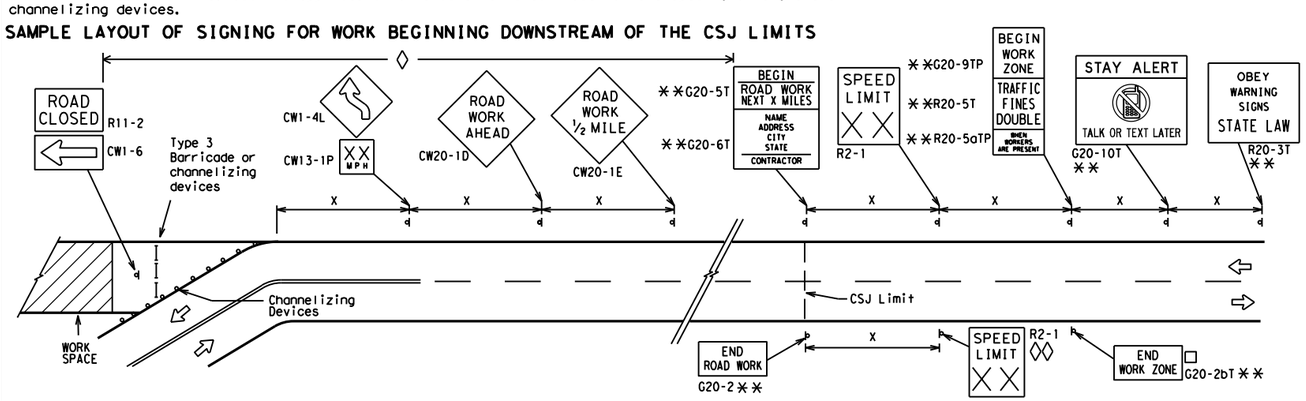


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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



NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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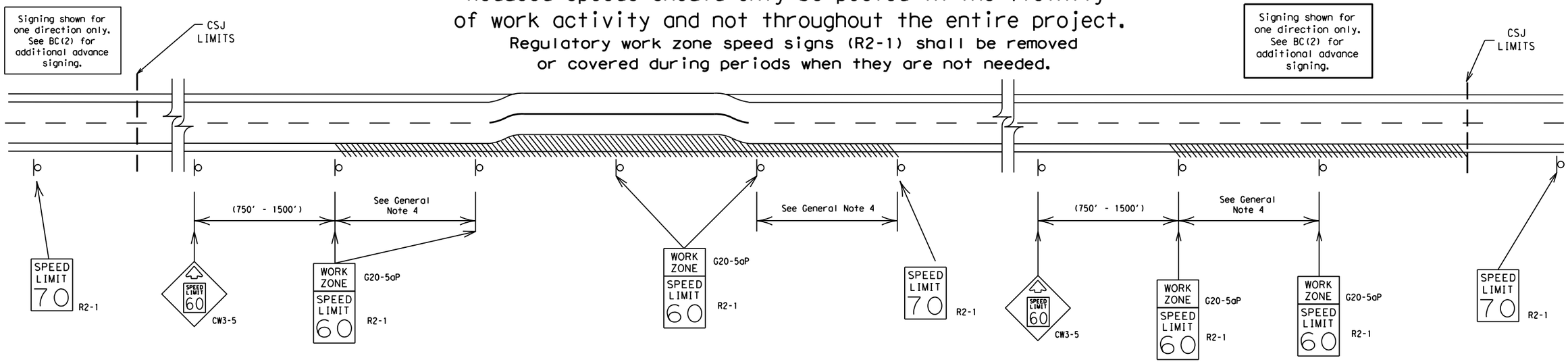
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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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	HOU	HARRIS, ETC.		15

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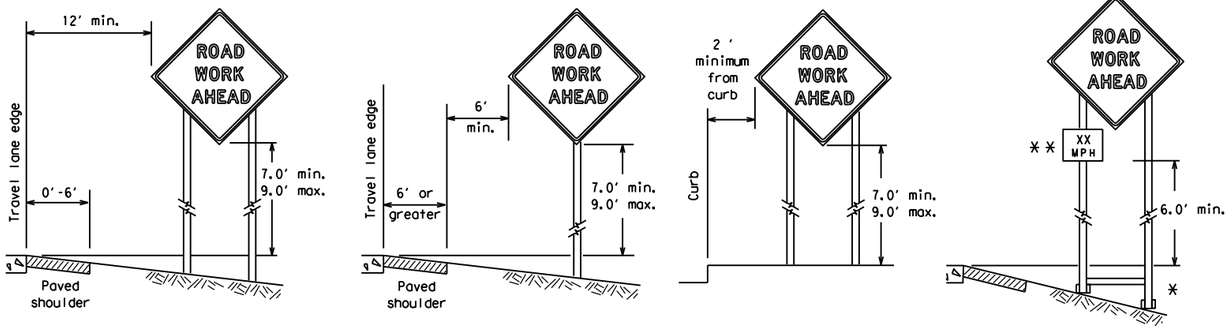
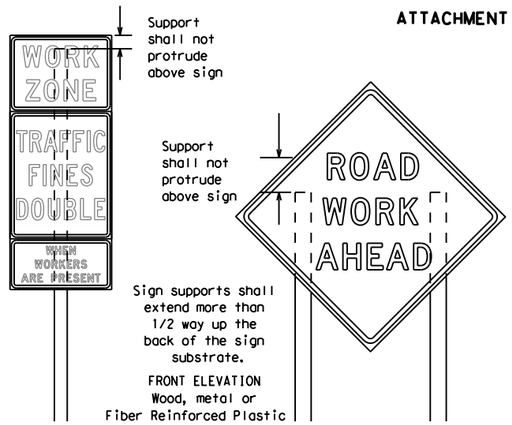
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

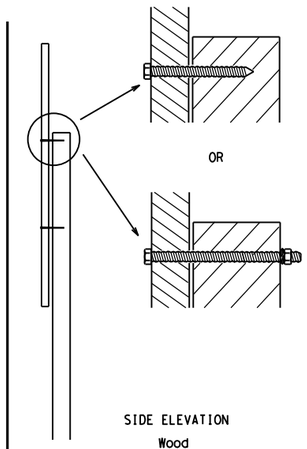


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





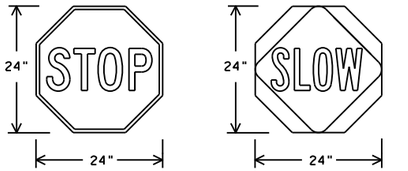
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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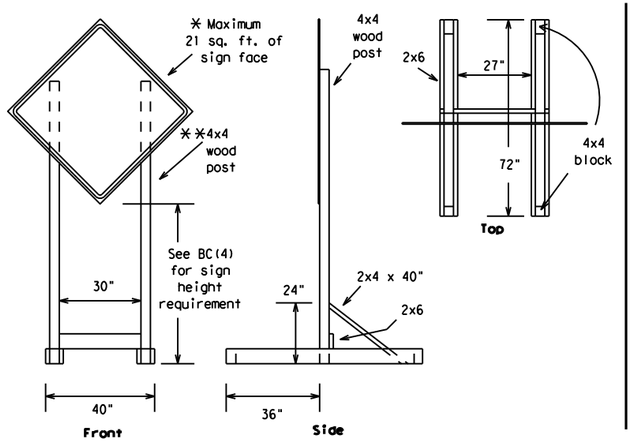
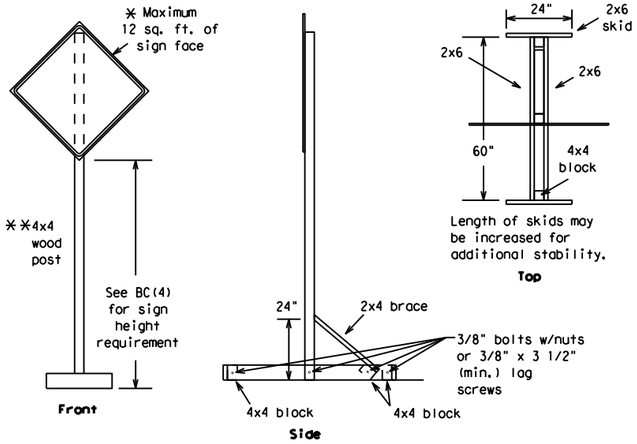
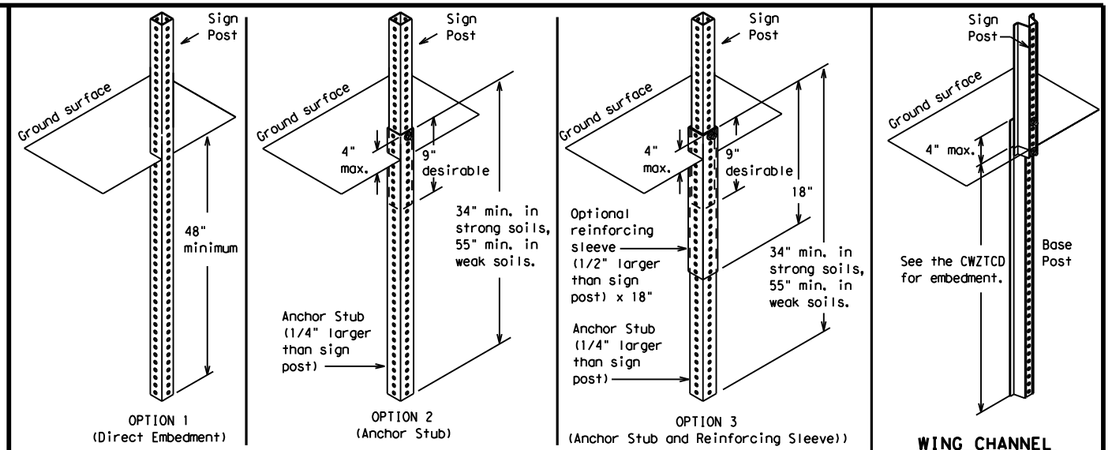




SKID MOUNTED WOOD SIGN SUPPORTS

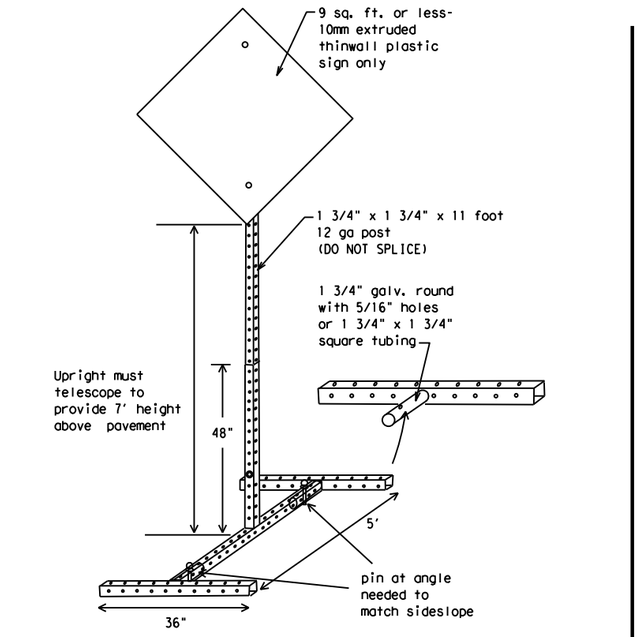
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

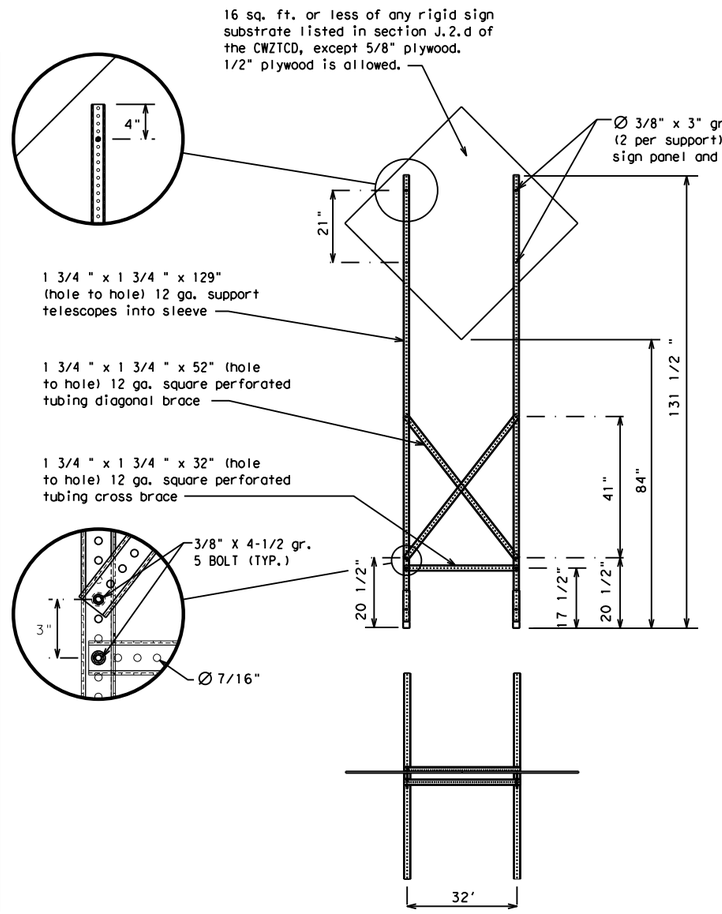


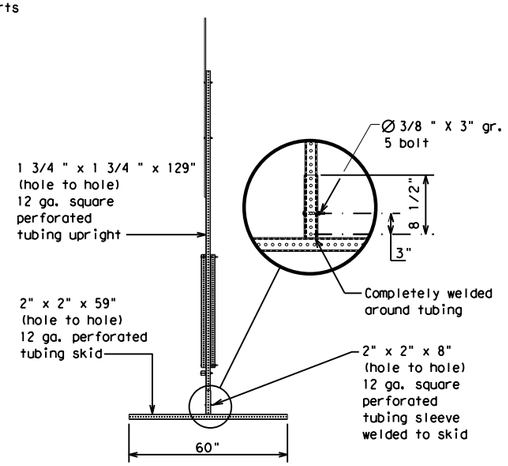
PERFORATED SQUARE METAL TUBING

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.

SHEET 5 OF 12

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
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)

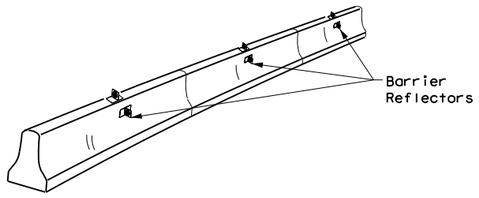
BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		6382	11	001	US 290, ETC.
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		HOU	HARRIS, ETC.		18

100

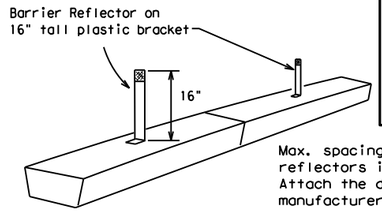
DATE:
FILE:

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



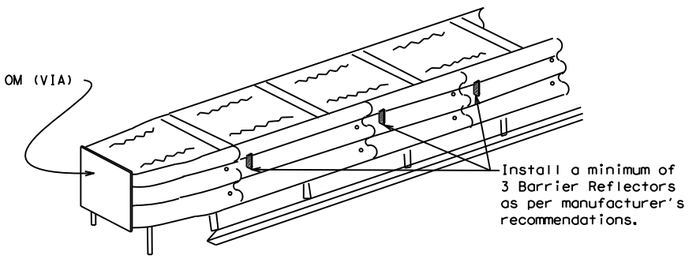
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

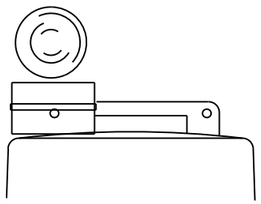
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

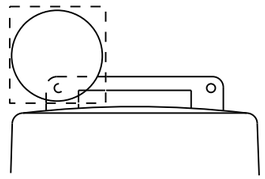
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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

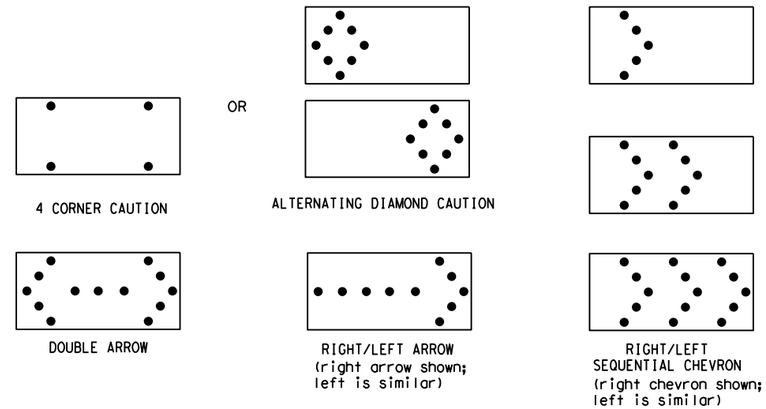
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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	6382	11	001	US 290, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS, ETC.		19

101

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:

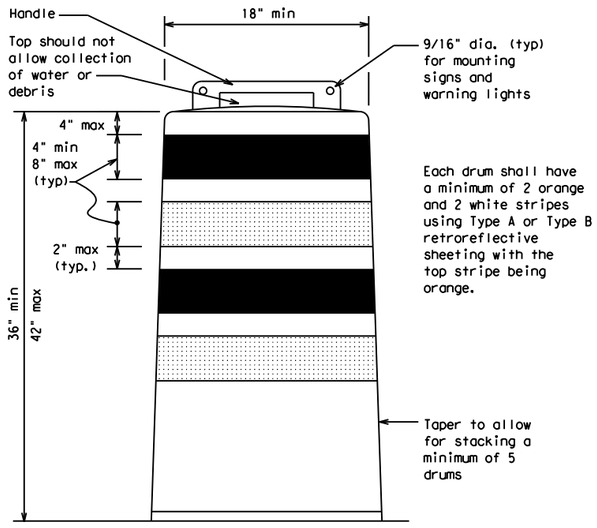
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

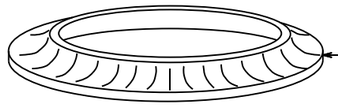
RETROREFLECTIVE SHEETING

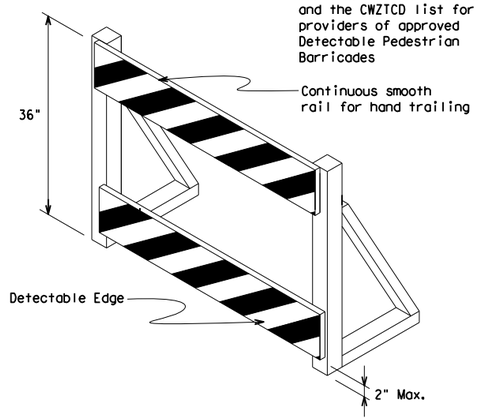
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

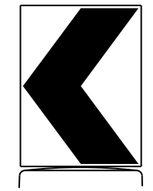




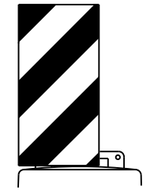


DETECTABLE PEDESTRIAN BARRICADES

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

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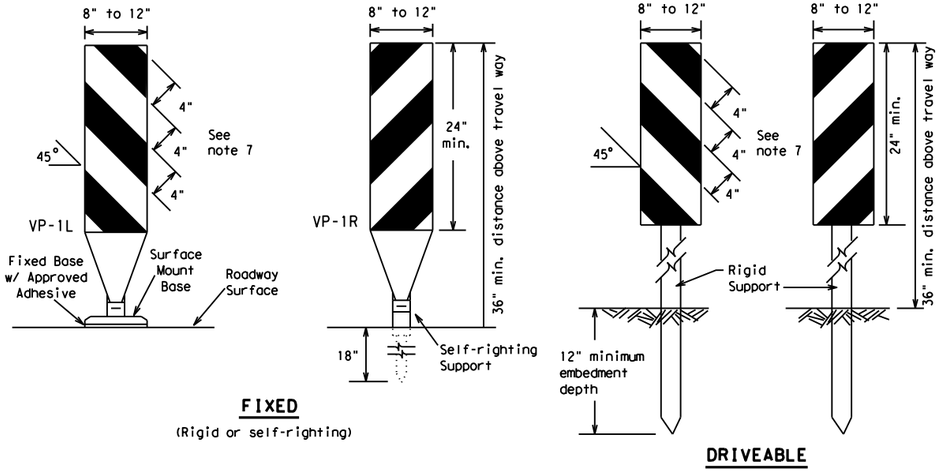
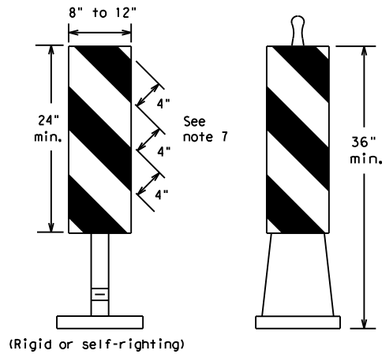


FIXED
(Rigid or self-righting)

DRIVEABLE

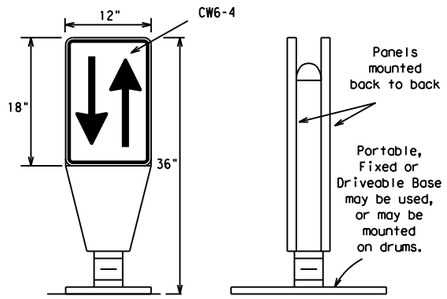


(Rigid or self-righting)

PORTABLE

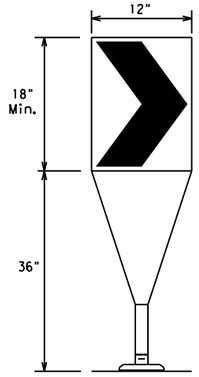
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



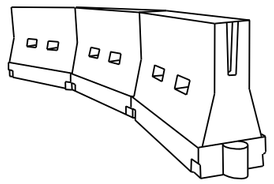
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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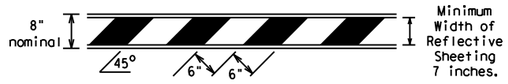
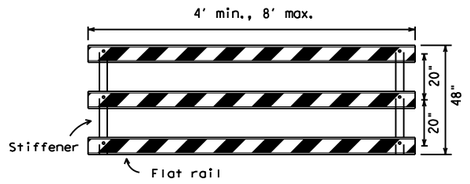
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



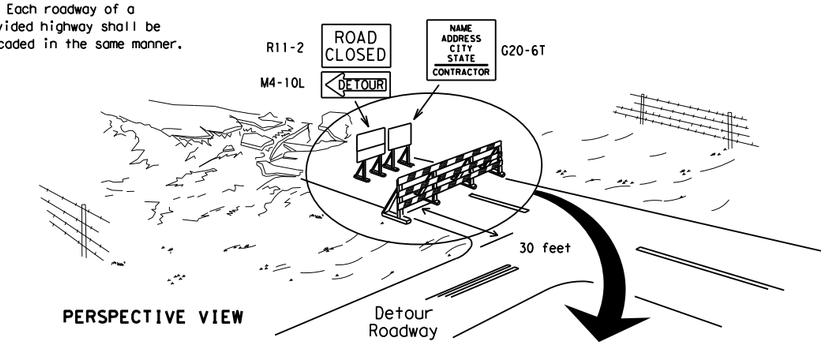
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

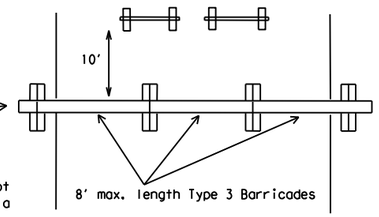
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

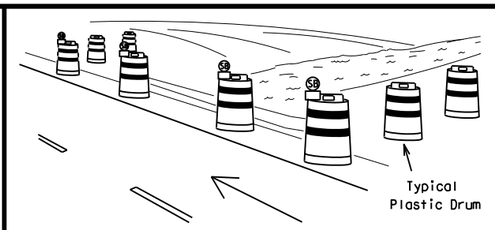
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

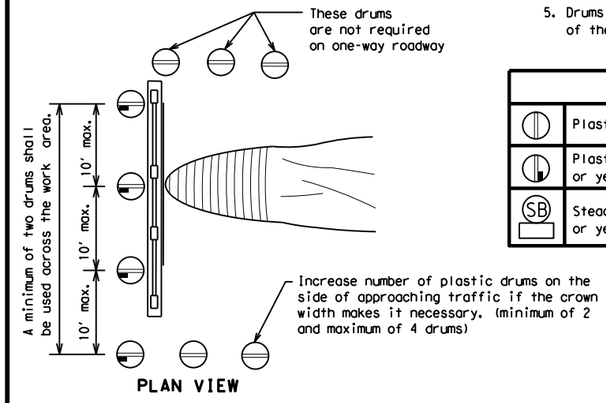
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

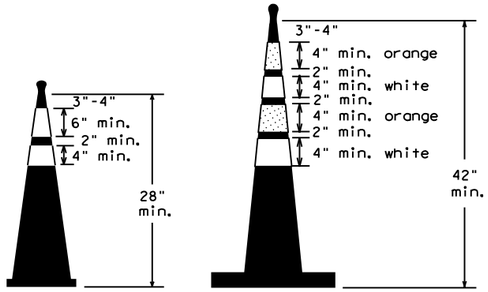
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

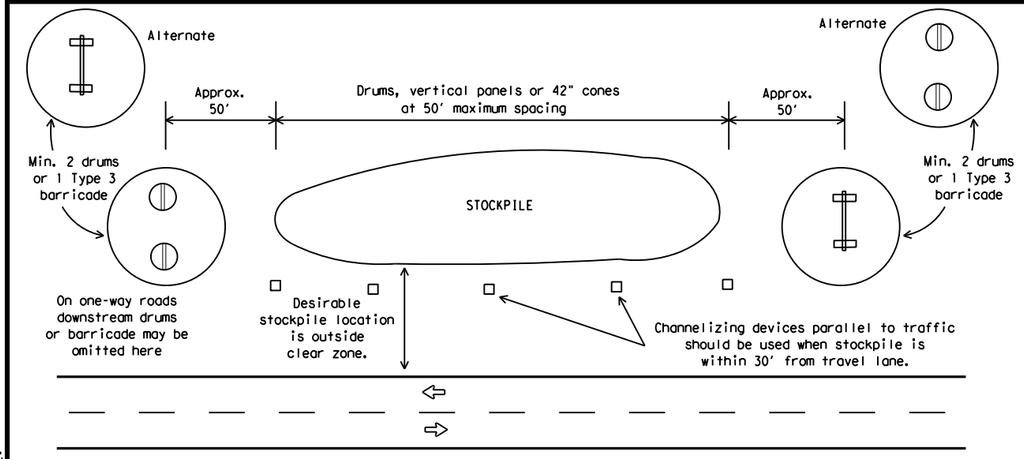
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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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.

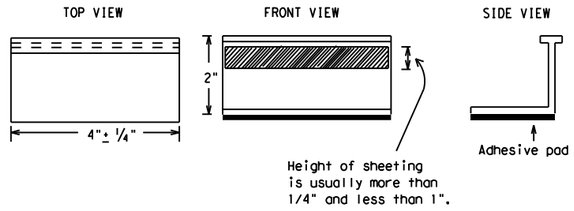
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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).

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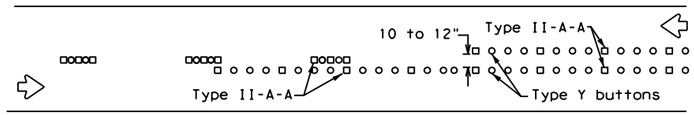
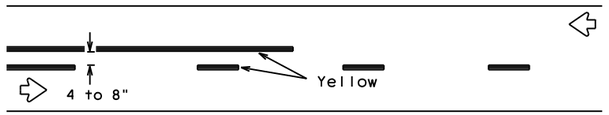
PAVEMENT MARKING PATTERNS

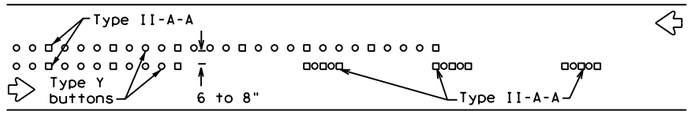
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



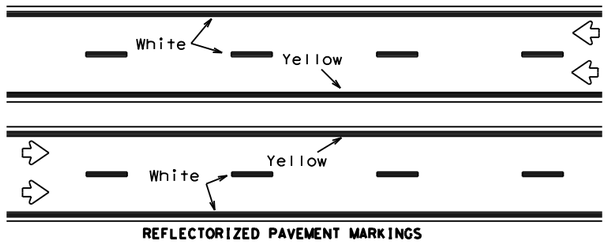
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



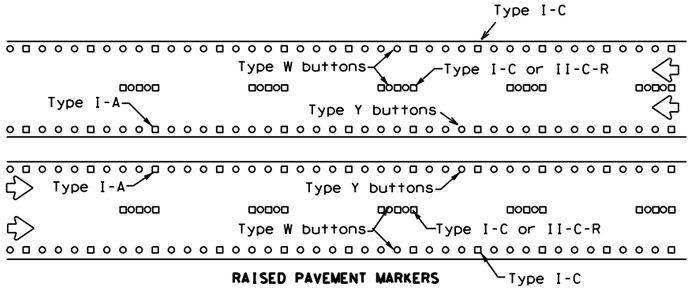
RAISED PAVEMENT MARKERS - PATTERN B

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



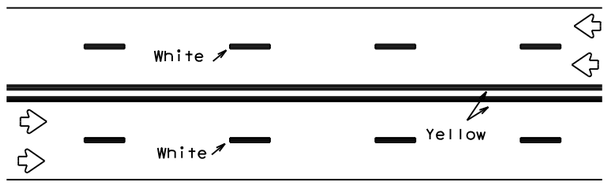
REFLECTORIZED PAVEMENT MARKINGS



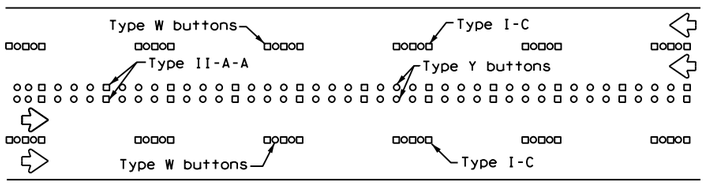
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



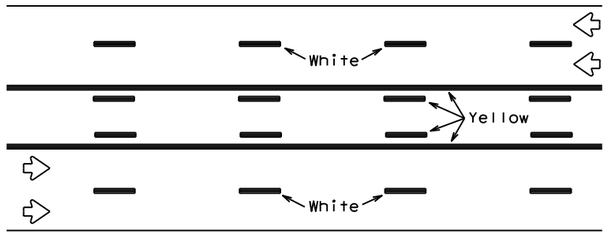
REFLECTORIZED PAVEMENT MARKINGS



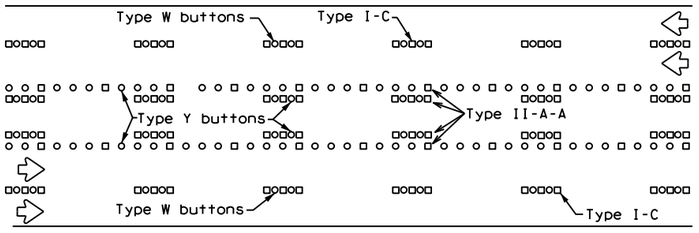
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

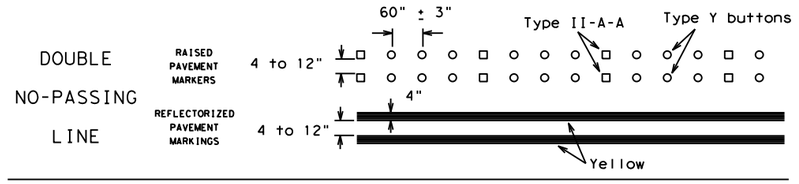
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

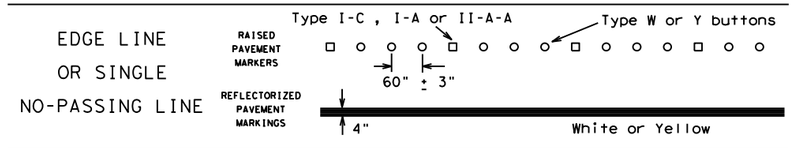
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

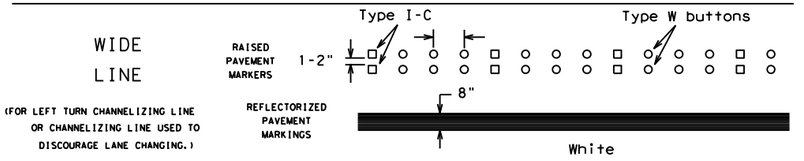


EDGE LINE OR SINGLE NO-PASSING LINE



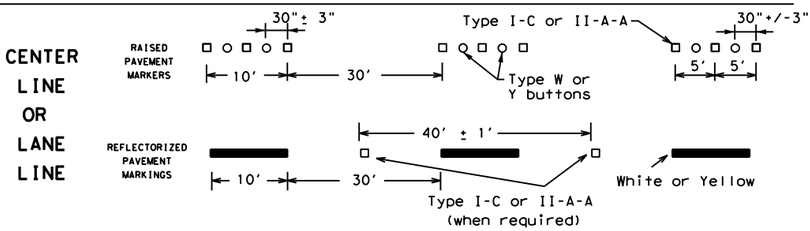
WIDE LINE

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

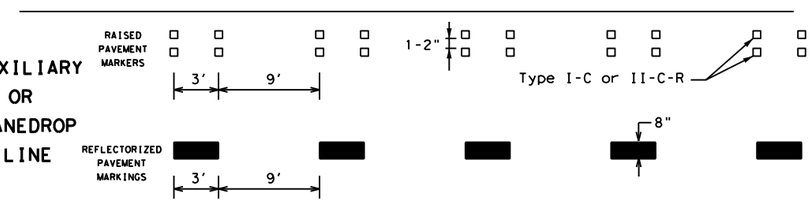


BROKEN LINES

CENTER LINE OR LANE LINE

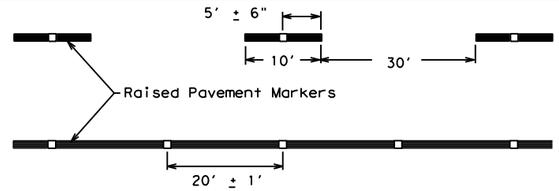


AUXILIARY OR LANEDROP LINE



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."

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

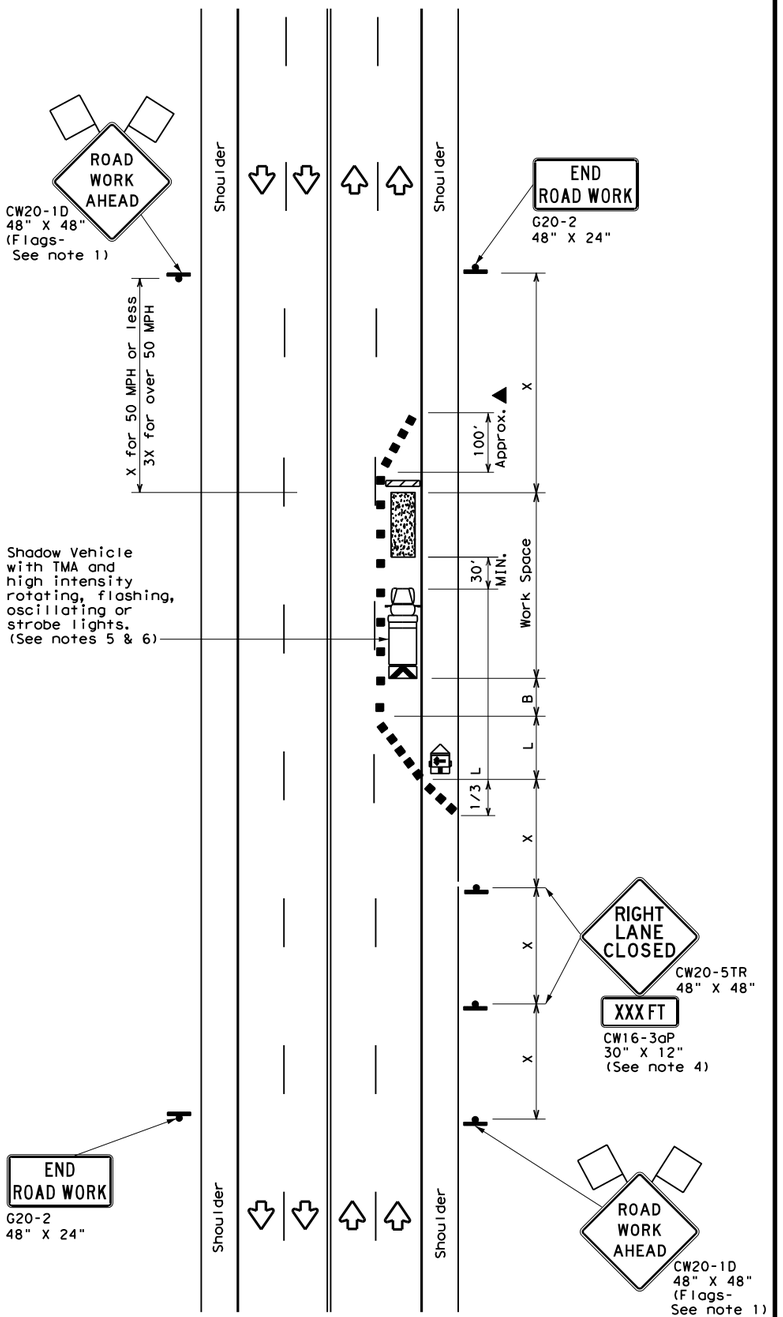
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

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	11	001	US 290, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS, ETC.		24

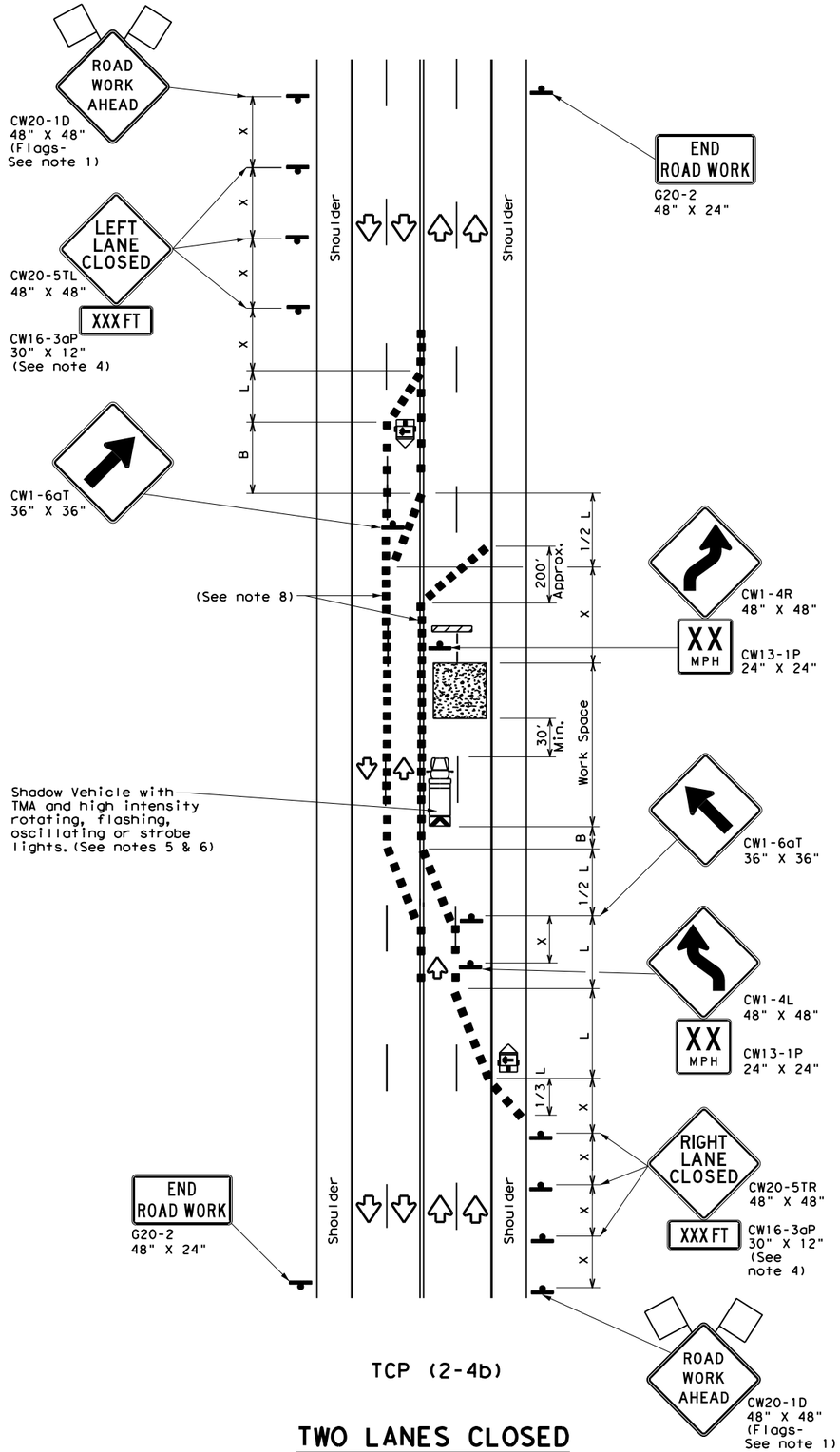
106

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

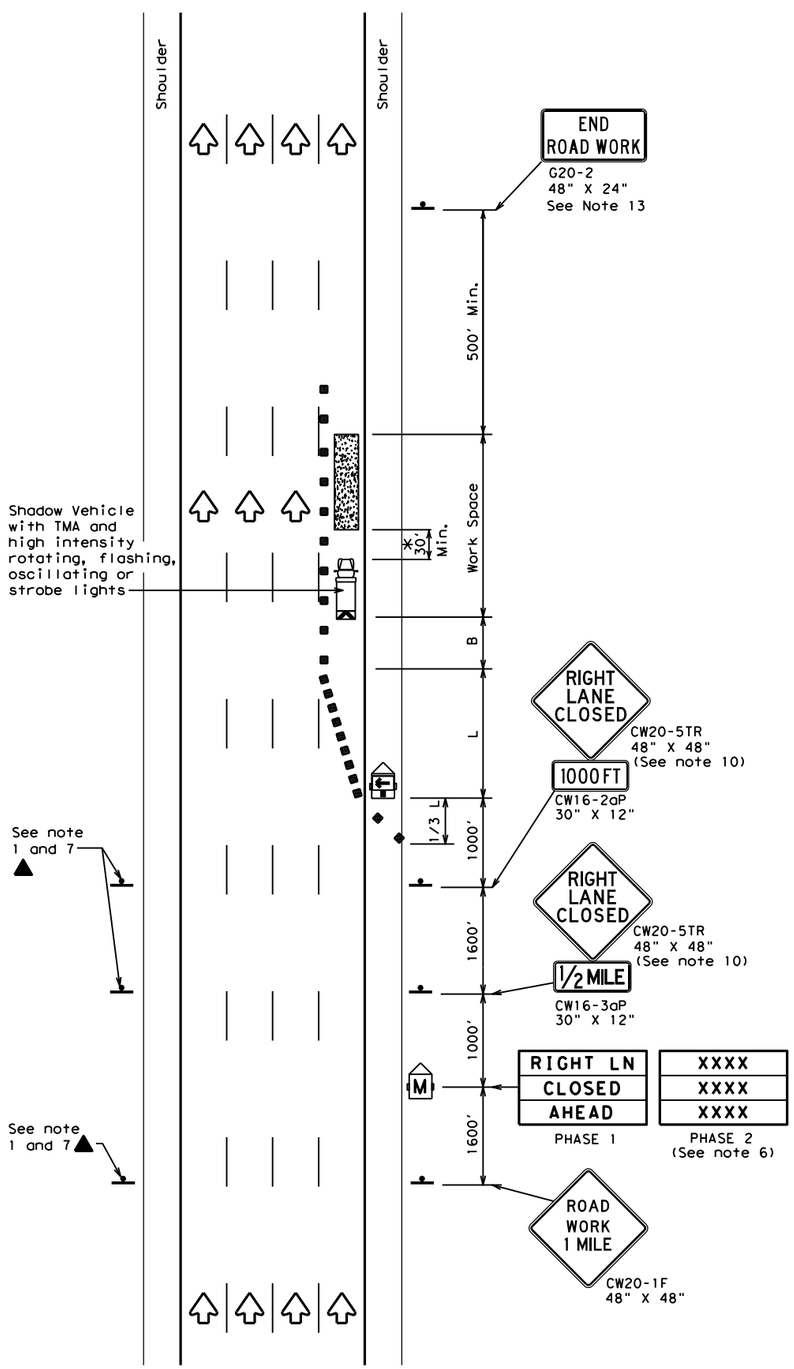
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

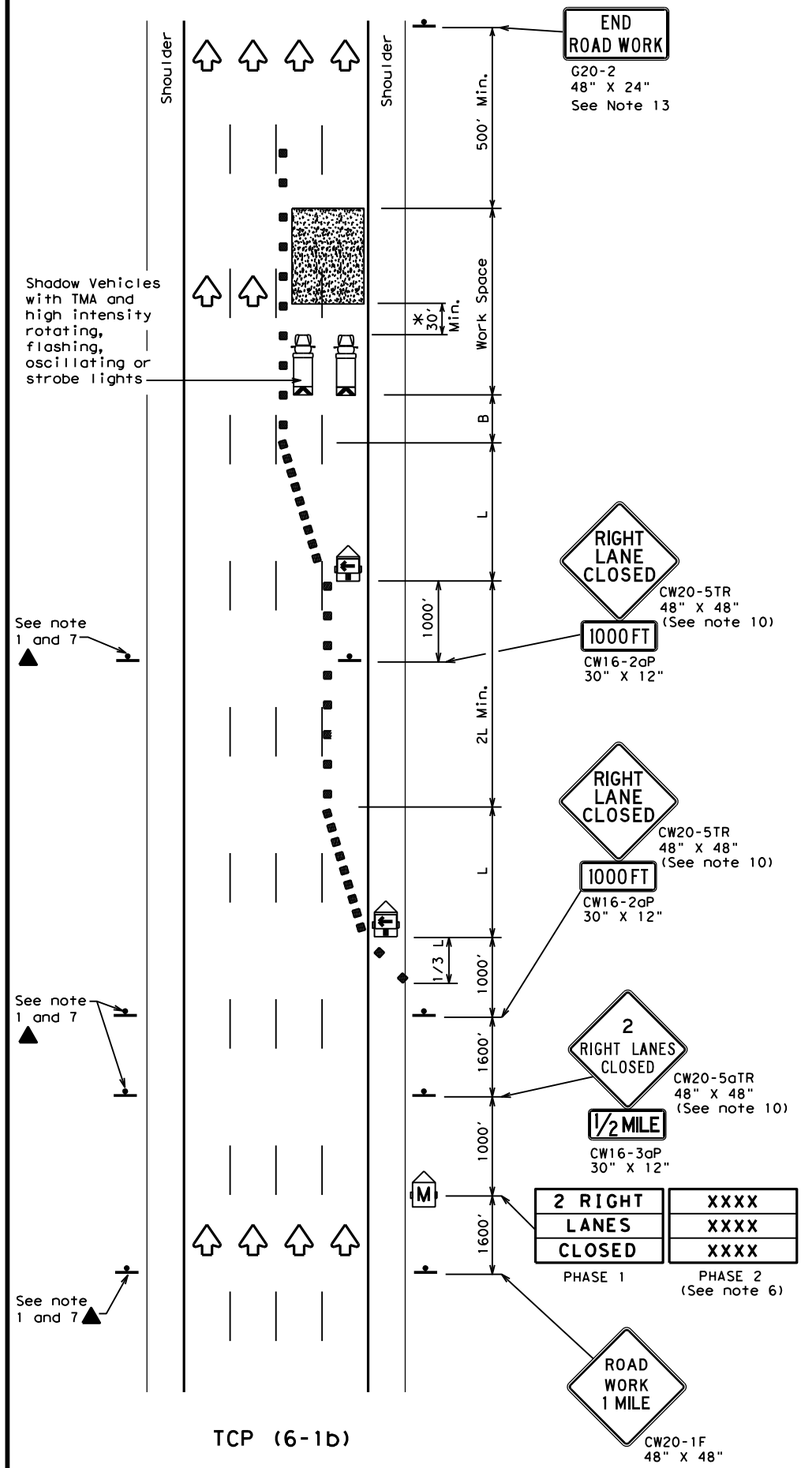
FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	6382	11	001	US 290, ETC.
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	HOU	HARRIS, ETC.		25

DATE:
FILE:



TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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

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

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

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

GENERAL NOTES

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

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

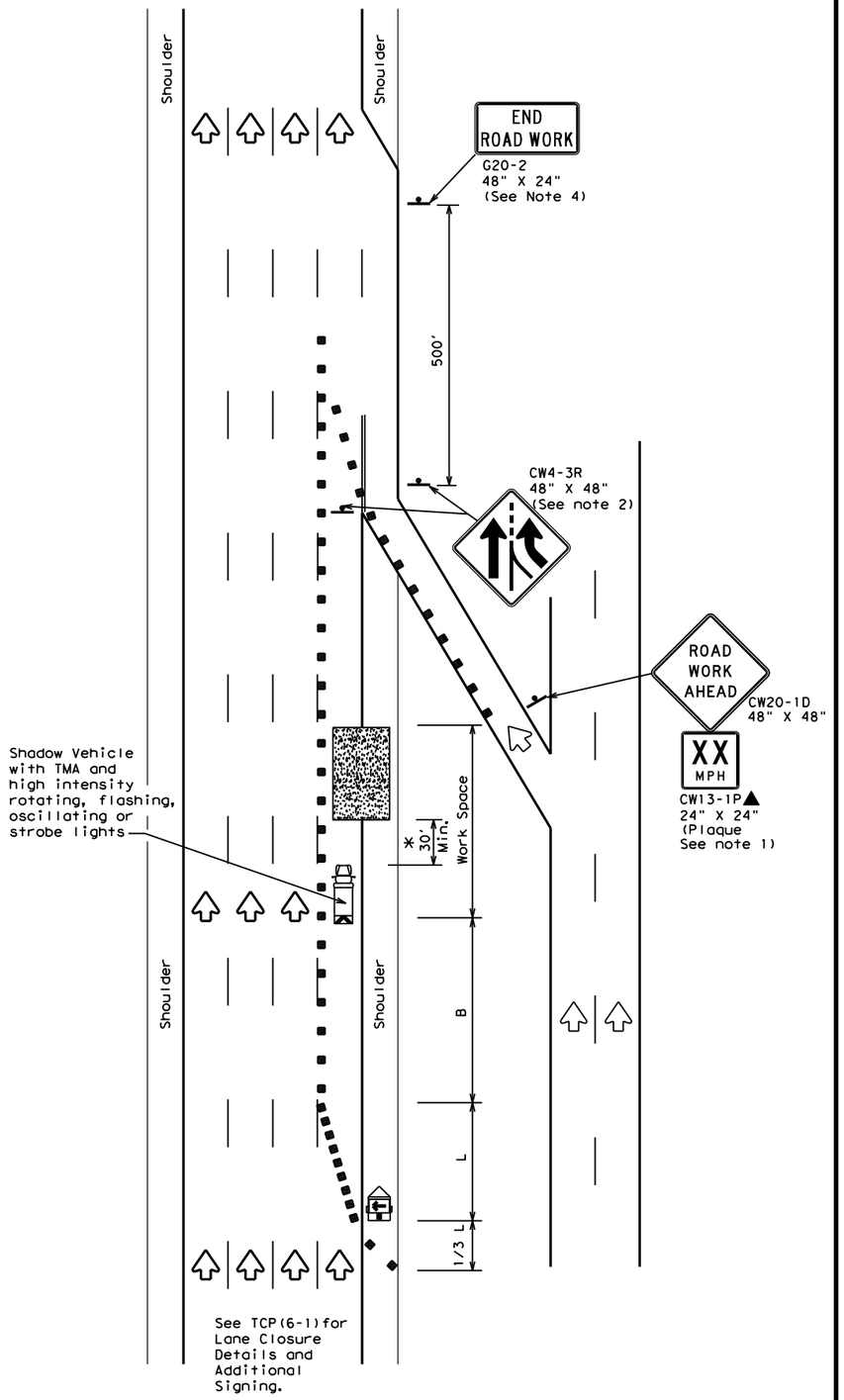
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

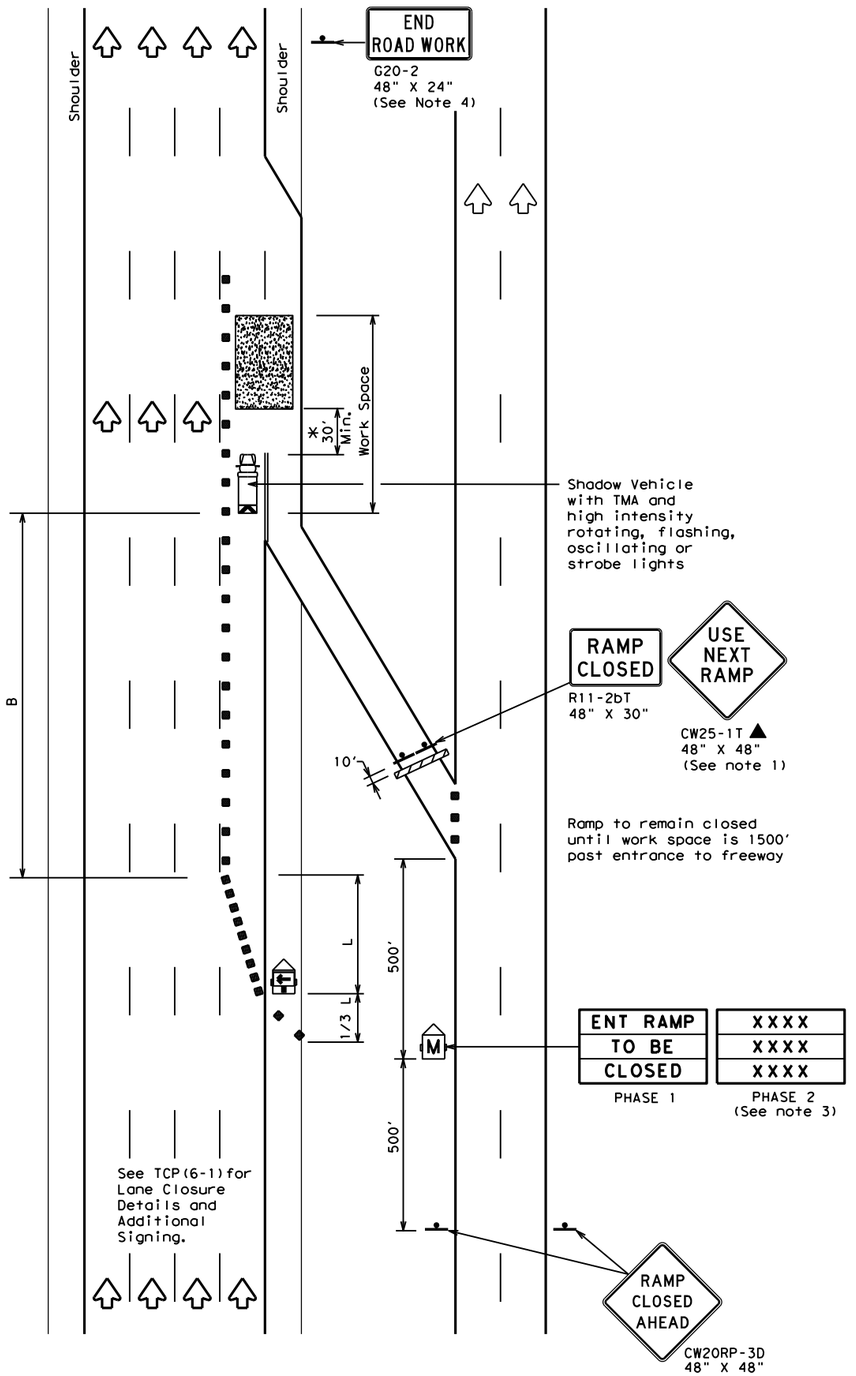
FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	6382	11	001	US 290, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS, ETC.		26

DATE:
FILE:



TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			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. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	11	001	US 290, ETC.
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	HARRIS, ETC.		27

202

DATE:
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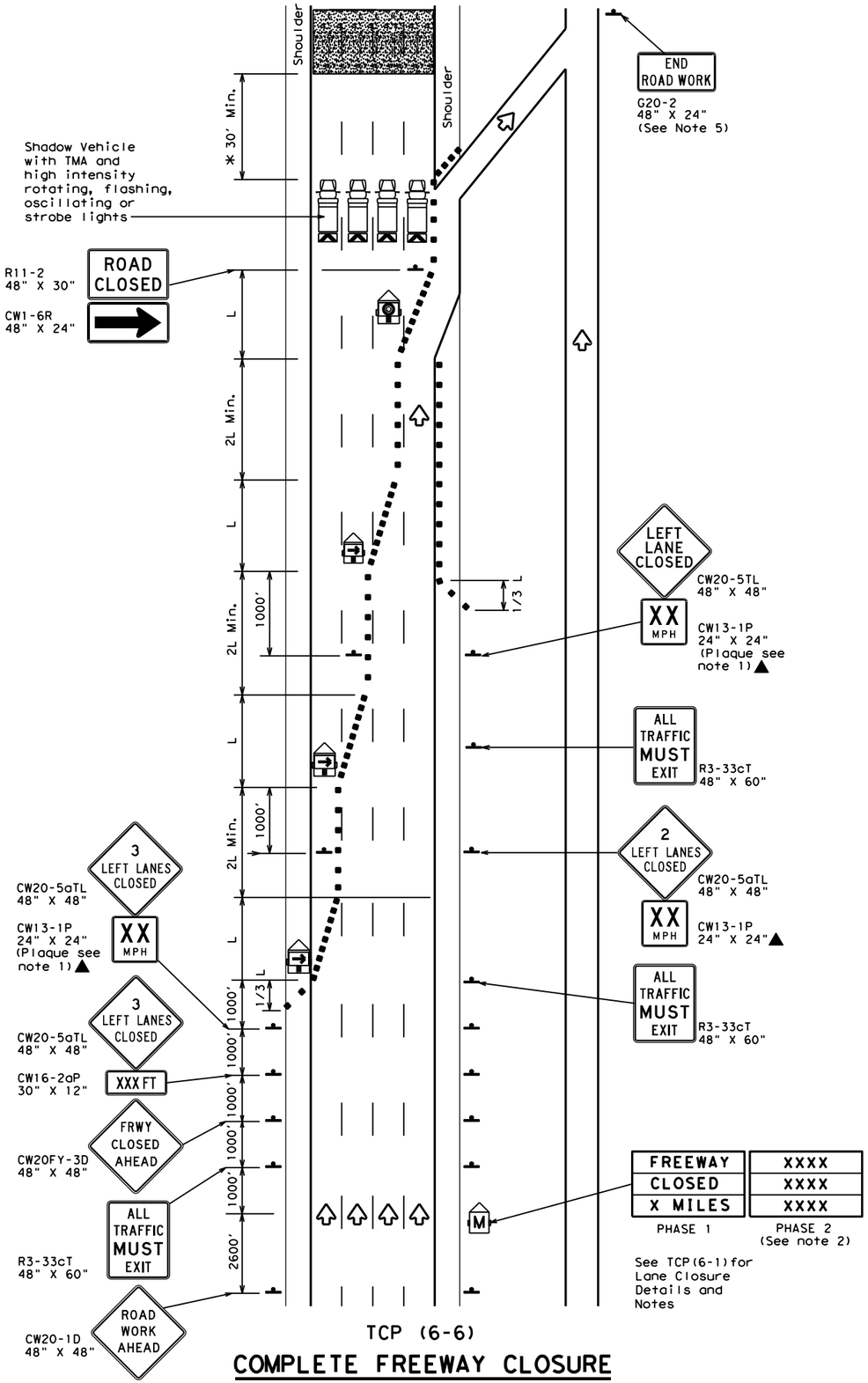


TCP (6-6)

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.

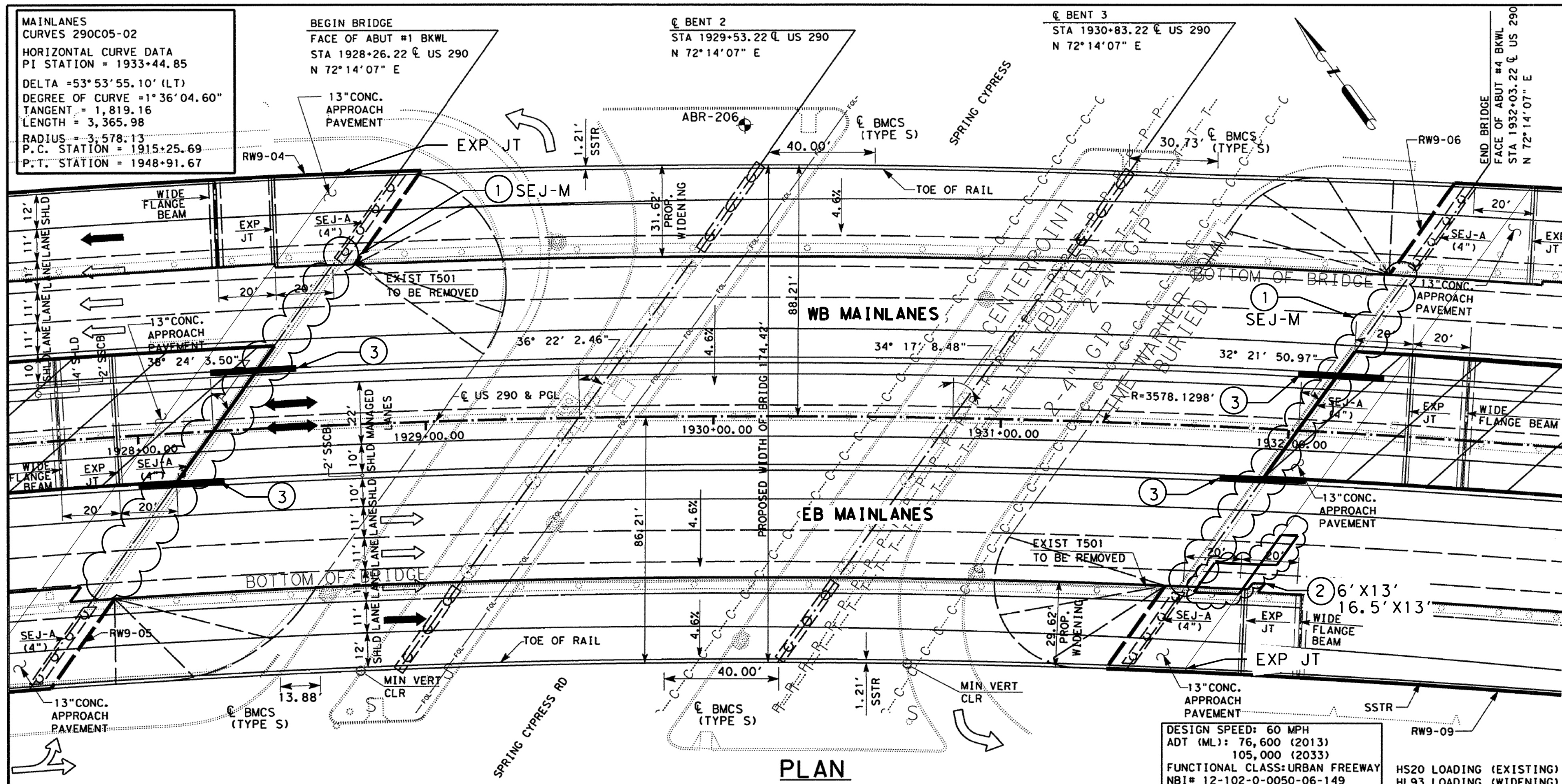
Texas Department of Transportation
Traffic Operations Division Standard

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	6382	11	001	US 290, ETC.
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	HARRIS, ETC.		28

206



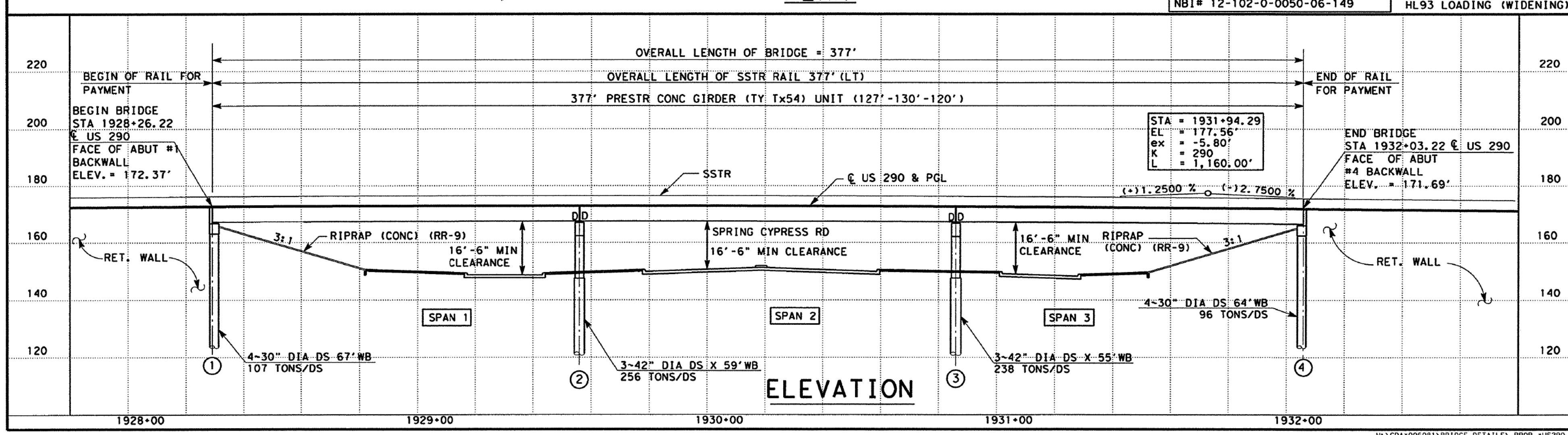
NOTES:

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

STATE OF TEXAS
KING YUEN
86432
LICENSED PROFESSIONAL ENGINEER

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

King Yuen, P.E.
Signed



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US 290
BRIDGE LAYOUT
SPRING CYPRESS RD
OVERPASS
WB MAINLANES

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			1034
STATE	STATE DIST.NO.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0050	06	081	US 290

H:\CDA+006081\BRIDGE DETAILE\ PROP.+US290 OVERPASS-PROP.SPRING CYPRESS WBML.DGN REV. 07/10/2013

NOTES

*1. EXACT DIMENSIONS OF REPAIR TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO REPAIR.

**2. 16 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN "PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS)" "GpB-2". THE NEW PADS SHOULD BE FABRICATED TO CONFORM TO TXDOT STANDARD "IBEB" AND MATCH ORIGINAL HEIGHTS AND SLOPES.

3. SEE SHEET "US 290 OVERPASS AT SPRING CYPRESS RD BRIDGE JACKING LOADS" FOR DETAILED JACKING LOADS INFORMATION

STATE OF TEXAS
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

Steve Van, P.E.
08/19/2021

NBI # 12-102-0050-06-149

DESCRIPTION OF WORK

*① REPLACE 147.4' SEJ JOINT AT ABUT 1 FROM OUTSIDE OF MIDDLE LANE 2 ON WB MAINLANES TO OUTSIDE LANE 2 ON EB MAINLANES.

REPLACE 136.8' SEJ JOINT AT ABUT 4 FROM OUTSIDE LANE 2 ON WB MAINLANES TO OUTSIDE OF MIDDLE LANE 2 ON EB MAINLANES.

REPLACE EXISTING JOINTS WITH SEJ-M AND MATCH EXISTING SEJ-A AT WIDENING SECTION IF POSSIBLE. SEE "BRIDGE JOINT REPLACEMENT DETAILS" SHEETS FOR MORE INFORMATION.

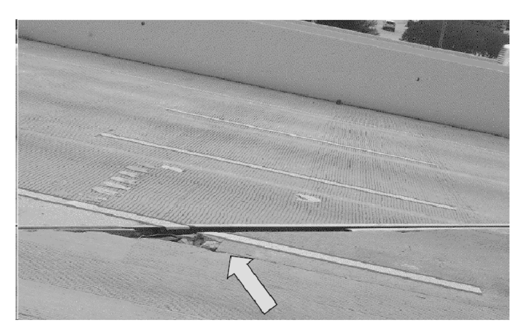
WORK TO BE PAID UNDER ITEM:
785-6011 "BRIDGE JOINT REPLACEMENT (SEJ)".

*② PERFORM FULL DEPTH REPAIR FOR 6'X13'& 16.5'X13' (FULL WIDTH OF THE LANE) ON EB MAINLANES AT SOUTH APPROACH SLAB.

WORK TO BE PAID UNDER ITEM: 0361-6051 FULL-DPTH REP(BR APPROACH SLAB)(9"-13")"

③ TEMPORARILY MOVE A 30 FT SECTION OF SSCB PRECAST BARRIER WITH PINNED PLACEMENT AT ABUT 1 & ABUT 4. MOVE BACK SSCB AND INSTALL PINNED PLACEMENT ONCE THE WORK IS COMPLETED.

WORK TO BE PAID UNDER ITEMS:
512 6025 "PORT CTB (MOVE)(SGL SLP)(TY 1)".



① DAMAGED SEJ JOINT AT ABUT 1 (LOOKING SOUTH)

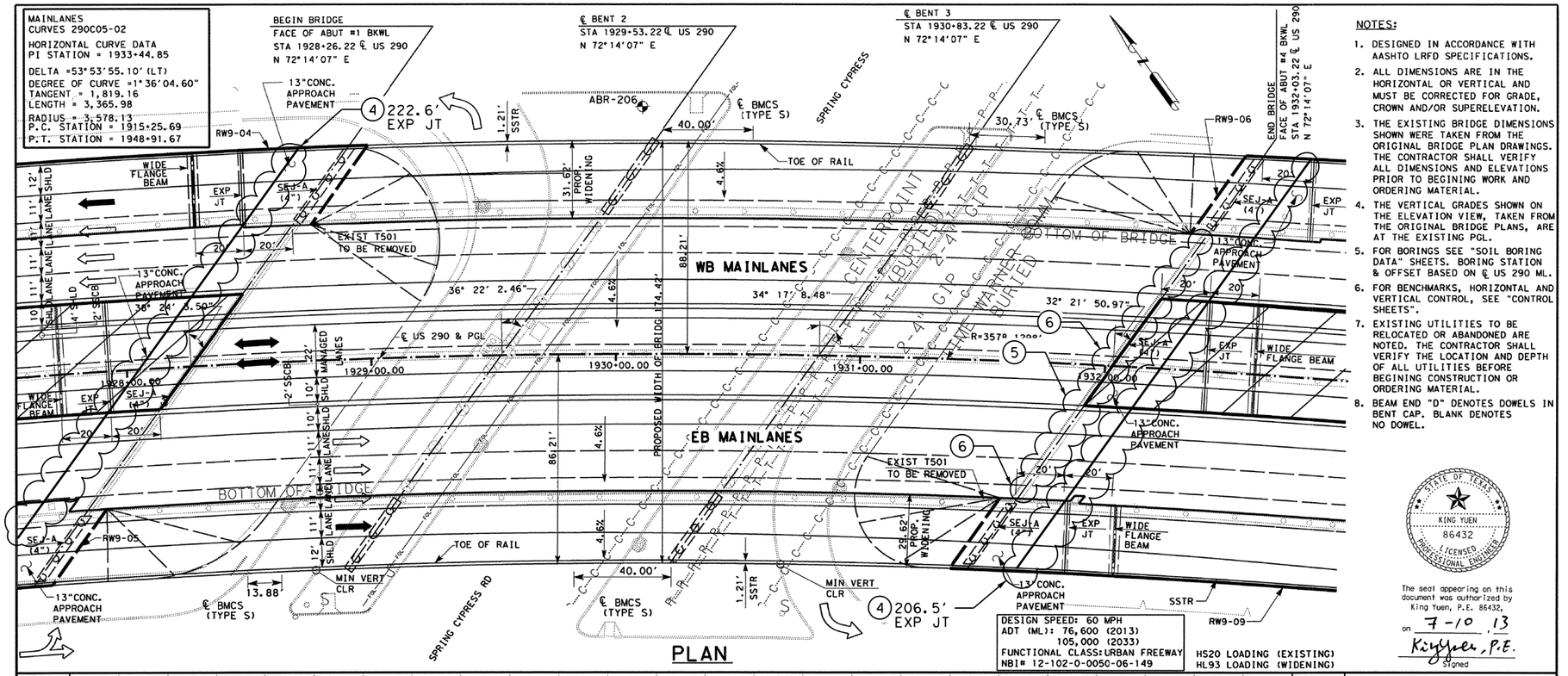
① DAMAGED SEJ JOINT AT ABUT 4 (LOOKING NORTH)

US 290 OVERPASS AT SPRING CYPRESS RD

BRIDGE REPAIR LAYOUT

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			29
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

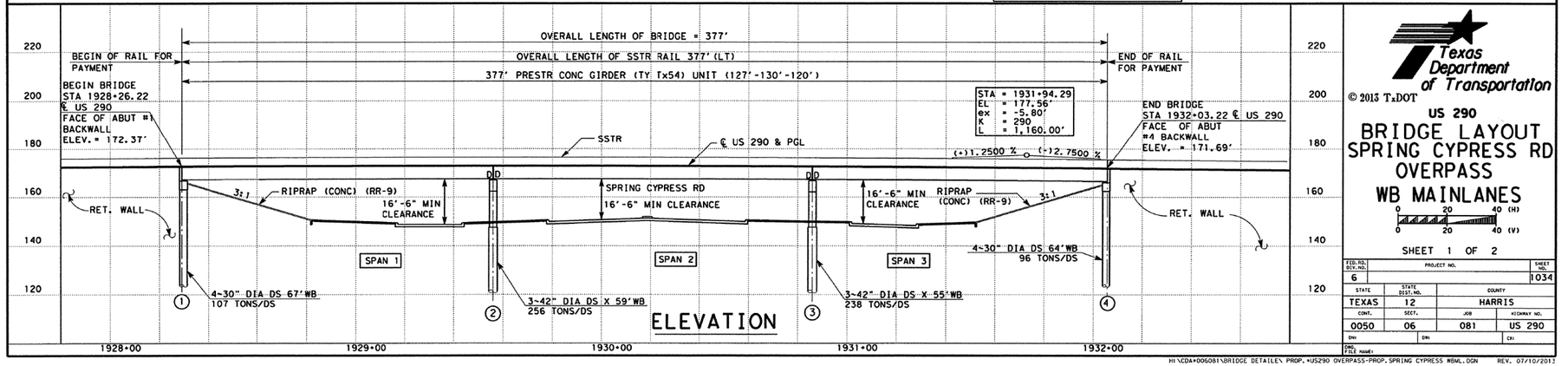


NOTES:

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

DESIGN SPEED: 60 MPH
ADT (ML): 76,600 (2013)
105,000 (2033)
FUNCTIONAL CLASS: URBAN FREEWAY
NBI# 12-102-0-0050-06-149

HS20 LOADING (EXISTING)
HL93 LOADING (WIDENING)



Texas Department of Transportation

US 290
BRIDGE LAYOUT
SPRING CYPRESS RD
OVERPASS
WB MAINLANES

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

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			1034
STATE	STATE DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0050	06	081	US 290

DW: DW: CK:
DW: FILE NAME:

H:\CDA*006081\BRIDGE DETAILS\ PROP. *US290 OVERPASS-PROP. SPRING CYPRESS WBML.DGN REV. 07/10/2013

NOTES

*1. EXACT DIMENSIONS OF REPAIR TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO REPAIR.

**2. 16 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN "PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS)" "GpB-2". THE NEW PADS SHOULD BE FABRICATED TO CONFORM TO TXDOT STANDARD "IBEB" AND MATCH ORIGINAL HEIGHTS AND SLOPES.

3. SEE SHEET "US 290 OVERPASS AT SPRING CYPRESS RD BRIDGE JACKING LOADS" FOR DETAILED JACKING LOADS INFORMATION

STATE OF TEXAS
KING YUEN
86432
LICENSED PROFESSIONAL ENGINEER

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

Kingyen, P.E.
Signed

STATE OF TEXAS
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

Steve Van, P.E.

08/19/2021

NBI # 12-102-0050-06-149

US 290 OVERPASS AT SPRING CYPRESS RD

BRIDGE REPAIR LAYOUT

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			30
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

DESCRIPTION OF WORK

*④ CLEAN AND RESEAL EXISTING APPROACH SLAB AT EXPANSION JOINTS. SEE "CONCRETE PAVING DETAILS JOINT SEALS; JS-14" STANDARD FOR MORE INFORMATION.

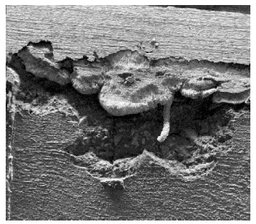
WORK TO BE PAID UNDER ITEMS:
438-6001 "CLEANING AND SEALING EXISTING JOINTS"

**⑤ REPLACE ALL BEARING PADS AT ABUTMENT 4, EXCEPT WIDENING PORTION OF WB & EB MAINLANES (SEE NOTE 2 & 3)

WORK TO BE PAID UNDER ITEM:
4002-6001 "REPLACE ELASTOMERIC BEARING PADS"

*⑥ 30"X18"X1" MODERATE SPALL AT ABUT 4 RIGHT OF BEAM 7.
24"X48"X4" DEEP SPALL WITH EXPOSED REBAR AT ABUT 4 BEHIND BEAM 8.
48"X48"X5" DEEP SPALL WITH EXPOSED REBAR AT ABUT 4 RIGHT OF BEAM 16.

WORK TO BE PAID UNDER ITEMS:
429-6007 "CONC STR REPAIR (VERTICAL & OVERHEAD)"



30"X18"X1" MODERATE SPALL AT ABUT 4 RIGHT OF BEAM 7

24"X48"X4" DEEP SPALL WITH EXPOSED REBAR AT ABUT 4 BEHIND BEAM 8.

48"X48"X5" DEEP SPALL WITH EXPOSED REBAR AT ABUT 4 RIGHT OF BEAM 16.

DATE: 07/26/2021
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STRUCTURE	NO. BEAMS	STATION	JACKING LOAD
NBI# 12-102-0050-06-149	(1) (2)		TON/BEAM
WB & EB MAINLANES SPRING CYPRESS RD OVERPASS	16	Sta.1932+03.22 (BACK)	102

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

(2) It may require the lifting of additional beams from the existing structure.

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 IBEB 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.

Dennis A Johnson

08/02/2021

Texas Department of Transportation

Houston District (Bridge)

BRIDGE JACKING LOADS

WB & EB MAINLANES SPRING CYPRESS RD OVERPASS

FILE: 149_JackingLoads-.dgn	DN: AL	CK: DJ	DW: AL	CK: DJ
©TxDOT 8/2/2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	11	001	US 290,ETC
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS,ETC		31

DATE: 7/30/2021 12:01:25 PM
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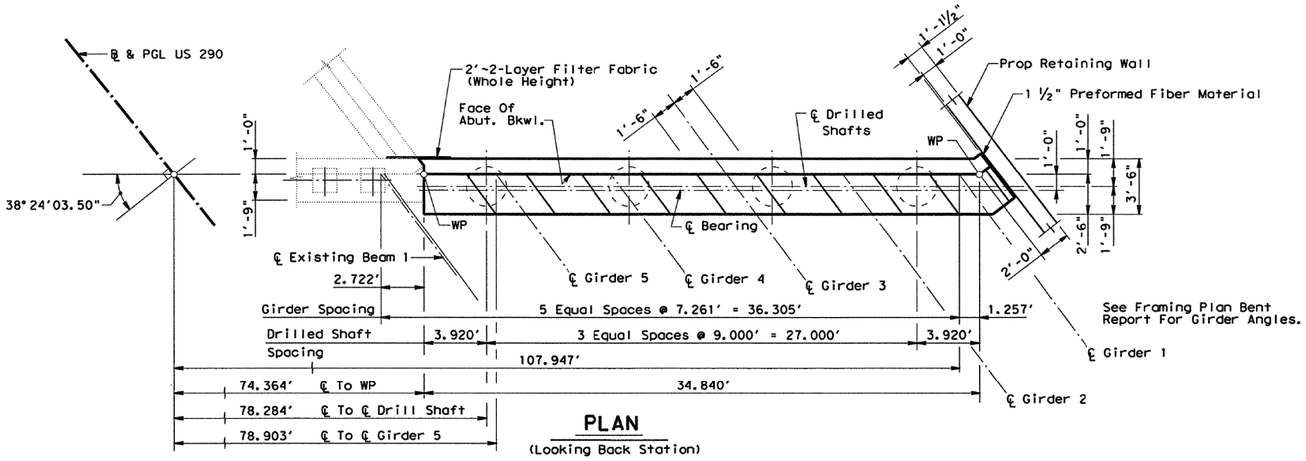
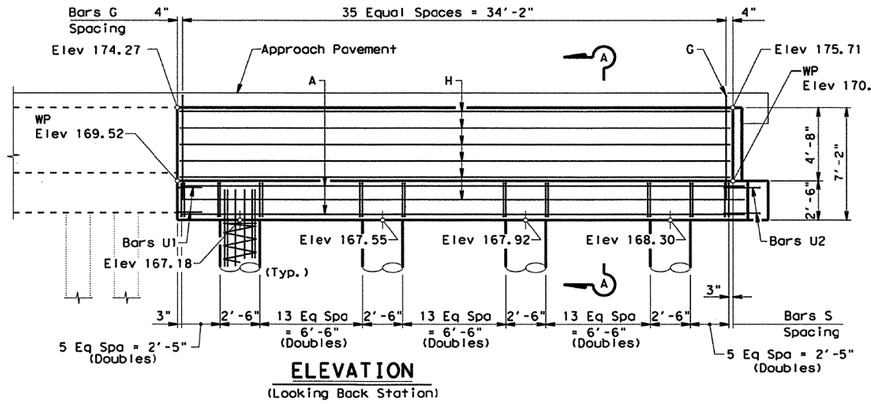


PLAN
(Looking Back Station)



ELEVATION
(Looking Back Station)

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

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 1 OF 2

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED PROFESSIONAL ENGINEER
6/5/13

Texas Department of Transportation
Houston District (Bridge)
US 290

ABUTMENT 1

US 290 WB MAINLANES
SPRING CYPRESS RD OVERPASS
WIDENING

FILE: SprCyRd_Abut1_WB.dgn	DN: FSTS	CK: YL	DW: ST	CK: FSTS
©TxDOT APRIL 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1038
	COUNTY		CONTROL SECT JOB	HIGHWAY
	HARRIS		0050 06 081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290
WB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

ABUTMENT 1

(AS-BUILT PLAN)

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			32
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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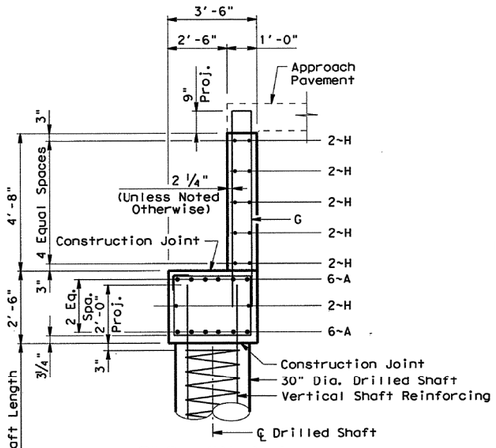

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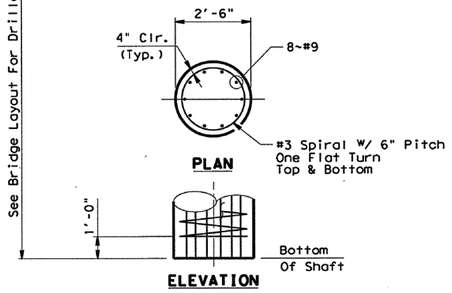
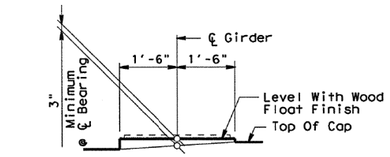
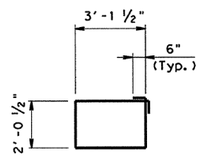


30" DIAMETER DRILLED SHAFT



BEARING SEAT DETAIL

(Bearing Surface Shall Be Clean Of All Loose Material Before Placing Bearing Pad)



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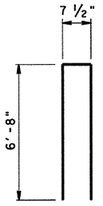

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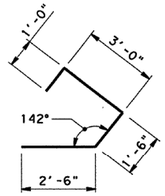

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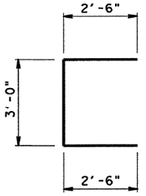

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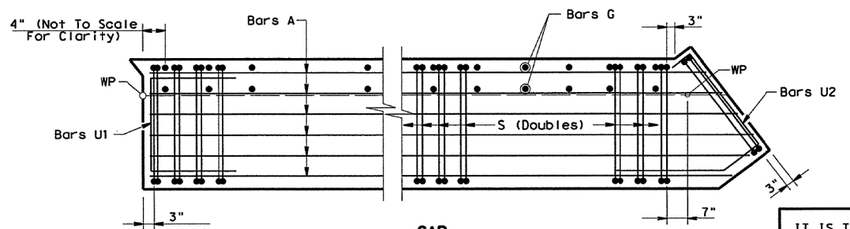


CAP

CORNER DETAILS

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

TABLE OF ESTIMATED QUANTITIES

	BAR	NO.	SIZE	LENGTH	WEIGHT
**	A	12	#11	36'-0"	2,293
	G	36	#5	13'-11 1/2"	525
**	H	12	#6	36'7"	659
	S	110	#5	11'-4"	1,302
	U1	2	#6	8'-0"	25
	U2	2	#6	8'-0"	25
*	Reinforcing Steel			LD	4,829
	Cl C Conc For Ext Str (Abut)			CY	17.9

* Reinforcing Steel Quantities Are For Contractor's Information Only.

** Average Length

GENERAL NOTES:

Designed According To AASHTO LRFD Specifications.

Class "C" Concrete Strength f'c = 3,600 psi.

All Cap Reinforcing Steel Shall Be Grade 60.

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 2 OF 2

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED PROFESSIONAL ENGINEER
4/26/2013

Texas Department of Transportation
Houston District (Bridge)
US 290

ABUTMENT 1

US 290 WB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_Abut1_WB.dgn	DN: FSTS	CK: YL	DW: ST	CK: FSTS
© TxDOT APRIL 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1029
	COUNTY		CONTROL SECT JOB	HIGHWAY
	HARRIS		0050 09 081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290
WB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

ABUTMENT 1

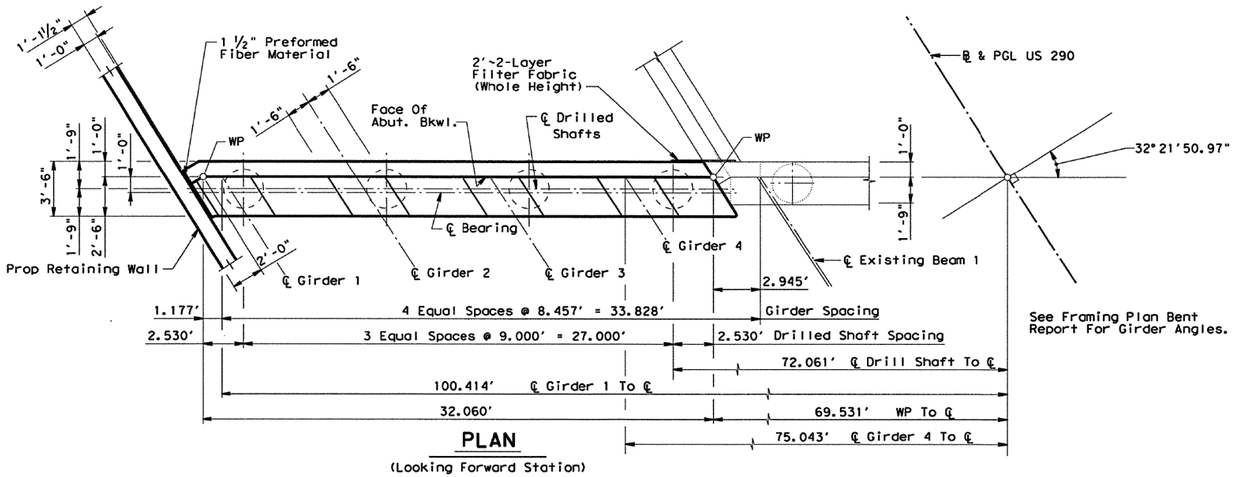
(AS-BUILT PLAN)

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		33

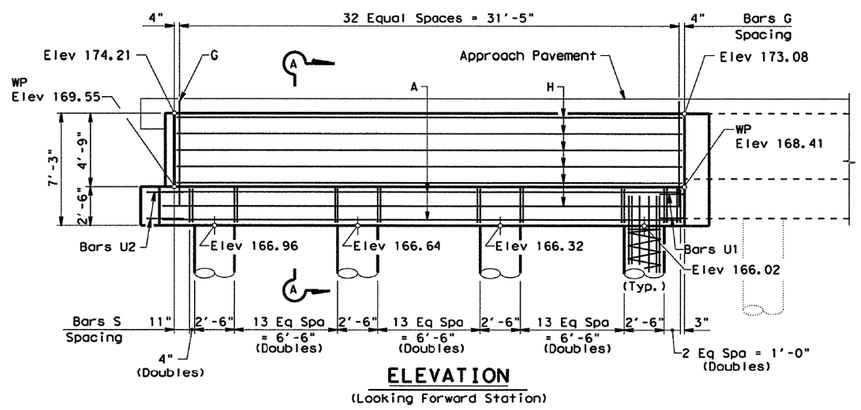
STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



PLAN

(Looking Forward Station)



ELEVATION

(Looking Forward Station)

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

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 1 OF 2

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
PROFESSIONAL LICENSED ENGINEER

6/5/13

Texas Department of Transportation
Houston District (Bridge)
US 290

ABUTMENT 4

US 290 WB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_Abut4_WB.dgn	DN: FSTS	CK: YL	DW: ST	CK: FSTS
©TxDOT APRIL 2013	DISTRICT	FED RD	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1040
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0050	06	081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290
WB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

ABUTMENT 4

(AS-BUILT PLAN)

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			34
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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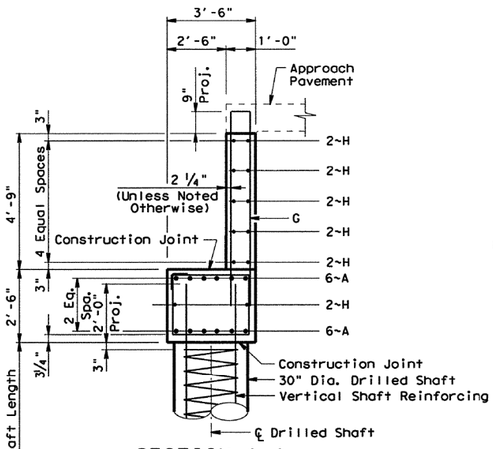

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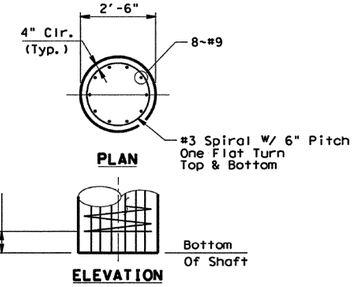
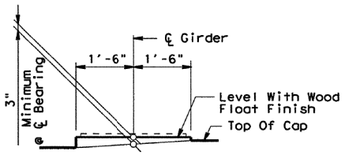
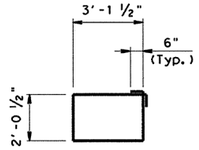


30" DIAMETER DRILLED SHAFT



BEARING SEAT DETAIL

(Bearing Surface Shall Be Clean Of All Loose Material Before Placing Bearing Pad)



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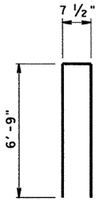

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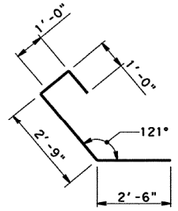

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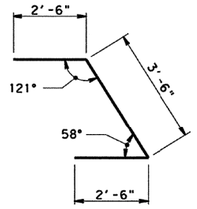
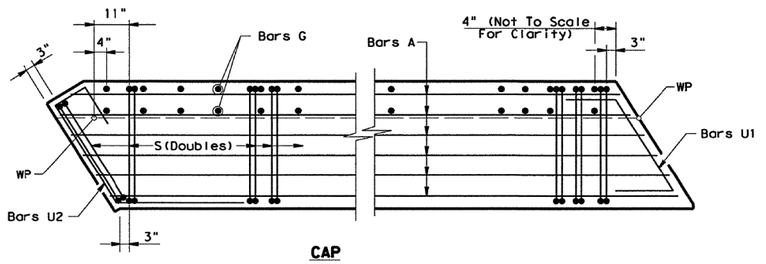


BARS U1



CAP

CORNER DETAILS

TABLE OF ESTIMATED QUANTITIES					
BAR	NO.	SIZE	LENGTH	WEIGHT	
A	12	#11	32'-6"	2,071	**
G	32	#5	14'-2"	472	
H	12	#6	32'-3"	582	**
S	98	#5	11'-4"	1,160	
U1	2	#6	8'-6"	26	
U2	2	#6	7'-3"	22	
Reinforcing Steel			Lb	4,333	*
Cl C Conc For Ext Str (Abut)			CY	16.5	

* Reinforcing Steel Quantities Are For Contractor's Information Only.

** Average Length

GENERAL NOTES:

Designed According To AASHTO LRFD Specifications.

Class "C" Concrete Strength f'c = 3,600 psi.

All Cap Reinforcing Steel Shall Be Grade 60.

Chamfer All Exposed Edges 3/4".

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

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED PROFESSIONAL ENGINEER
6/5/13

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 2 OF 2

Texas Department of Transportation
Houston District (Bridge)
US 290

ABUTMENT 4

US 290 WB MAINLANES
SPRING CYPRESS RD OVERPASS
WIDENING

FILE: SprCyRd_Abut4_WB.dgn	DWN FSTS	CK: YL	DW: ST	CK: FSTS
©TxDOT APRIL 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		104
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0050	09	071	US 290

CONTRACTOR'S INFORMATION ONLY

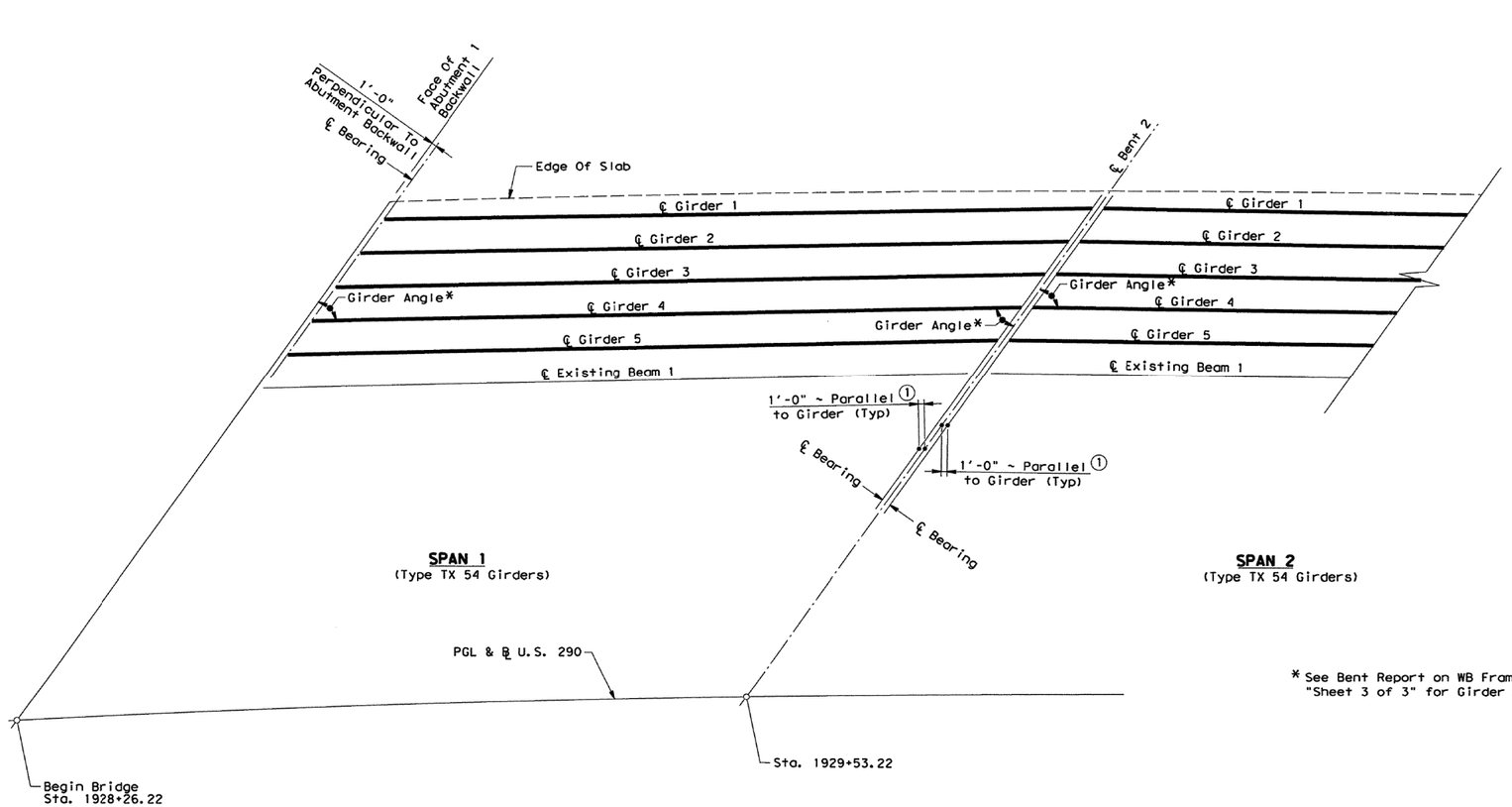
US 290
WB MAINLANES
SPRING CYPRESS RD
OVERPASS WIDENING

ABUTMENT 4

(AS-BUILT PLAN)

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			35
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



* See Bent Report on WB Framing Plan "Sheet 3 of 3" for Girder Angle.

NOTES:
① See Standard IGEB For Orientation Of Dimension.

TABLE OF ESTIMATED QUANTITIES				
ITEM	UNIT	QUANTITY		
		SPAN 1	SPAN 2	SPAN 3
Prestressed Concrete Girder (TX54)	LF	621.21	641.05	473.68

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED
PROFESSIONAL ENGINEER
4/26/2013

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 1 OF 3

Texas Department of Transportation
Houston District (Bridge)
US 290

FRAMING PLAN

US 290 WB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_Framing.dgn	DN:	CK:	DW: ST	CK:
©TxDOT MARCH 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1044
	COUNTY		CONTROL SECT JOB	HIGHWAY
	HARRIS		0050 06 081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290 WB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

FRAMING PLAN

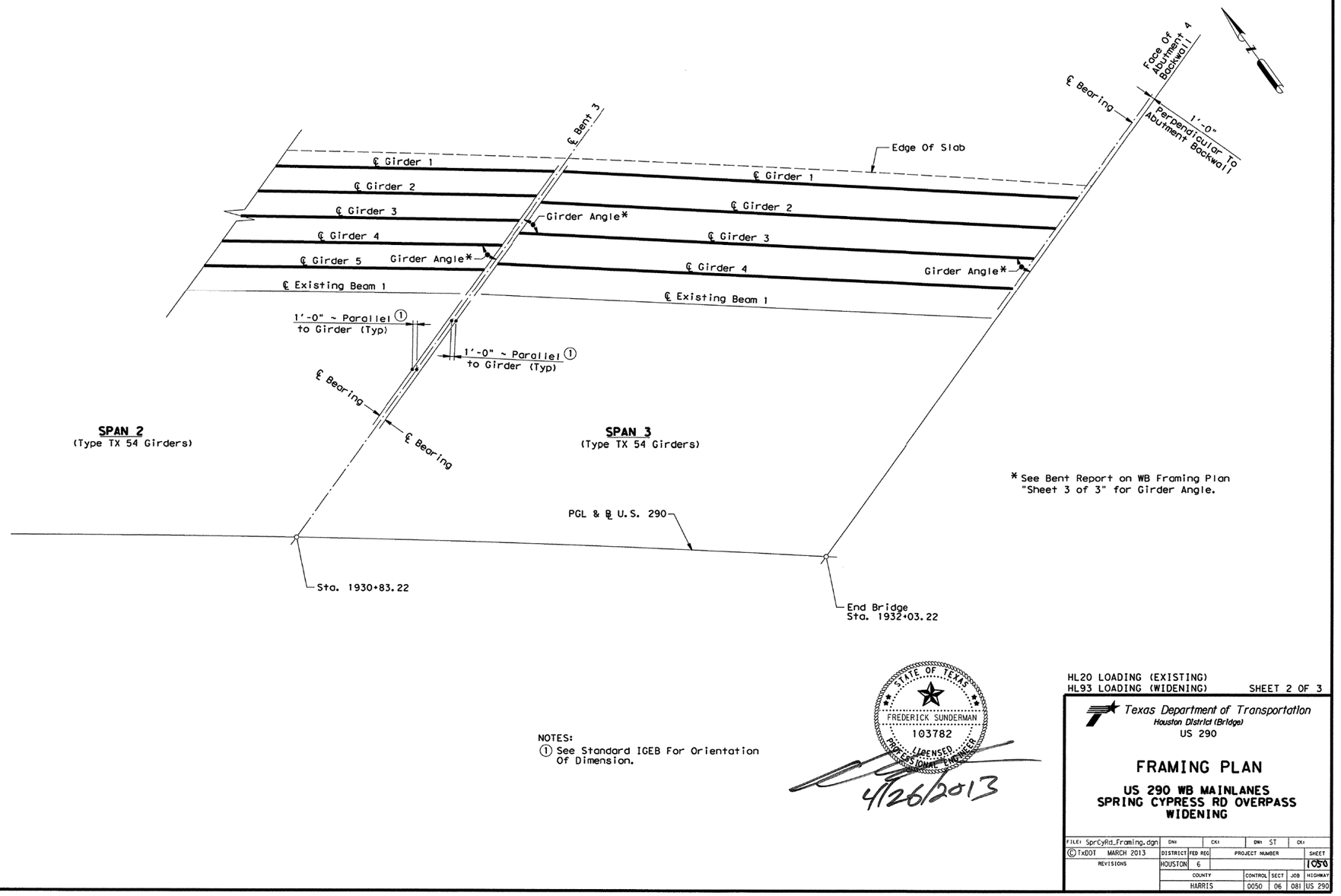
(AS-BUILT PLAN)

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		36

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



NOTES:
① See Standard IGEB For Orientation Of Dimension.

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
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4/26/2013

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 2 OF 3

Texas Department of Transportation
Houston District (Bridge)
US 290

FRAMING PLAN

US 290 WB MAINLANES
SPRING CYPRESS RD OVERPASS
WIDENING

FILE: SprCyRd_Framing.dgn	DN:	CK:	DW: ST	CK:	
© TxDOT MARCH 2013	DISTRICT	FED REG	PROJECT NUMBER		SHEET
REVISIONS	HOUSTON	6			050
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0050	06	081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290
WB MAINLANES
SPRING CYPRESS RD
OVERPASS WIDENING

FRAMING PLAN

(AS-BUILT PLAN)

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		37
STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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h:\bridge\us 290\seg 9-cad\290 WBML Spring Cypress Rd Overpass Widening\SprCyRd_slab_WB.dgn

STROY

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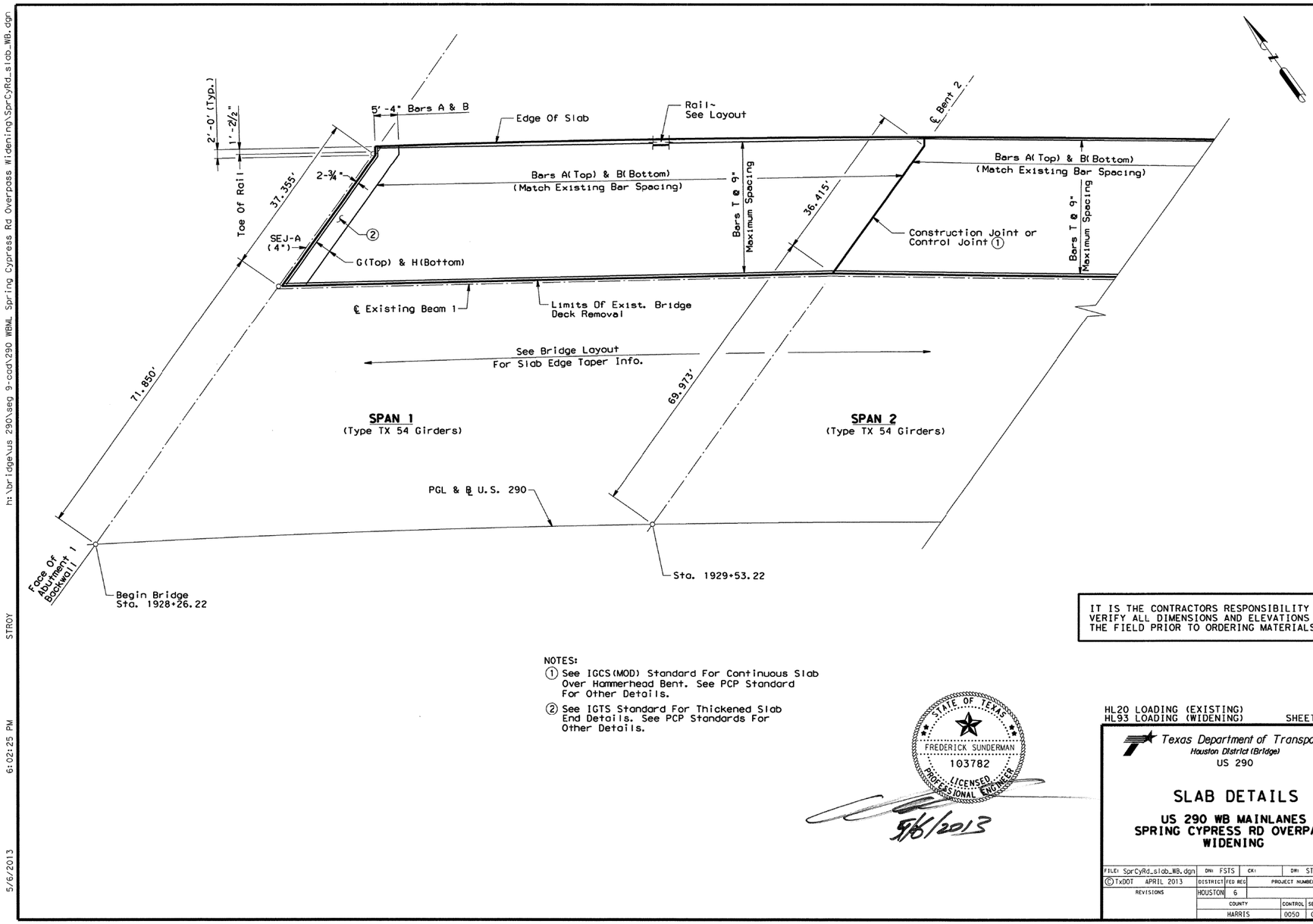


IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ALL DIMENSIONS AND ELEVATIONS IN THE FIELD PRIOR TO ORDERING MATERIALS.

NOTES:

① See IGCS(MOD) Standard For Continuous Slab Over Hammerhead Bent. See PCP Standard For Other Details.

② See IGTS Standard For Thickened Slab End Details. See PCP Standards For Other Details.

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED PROFESSIONAL ENGINEER
5/6/2013

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 1 OF 4

Texas Department of Transportation
Houston District (Bridge)
US 290

SLAB DETAILS

US 290 WB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_slab_WB.dgn	DN: FSTS	CK:	DW: ST	CK: FSTS
©TxDOT APRIL 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1053
	COUNTY		CONTROL SECT JOB	HIGHWAY
	HARRIS		0050 06 081	US 290

CONTRACTOR'S INFORMATION ONLY

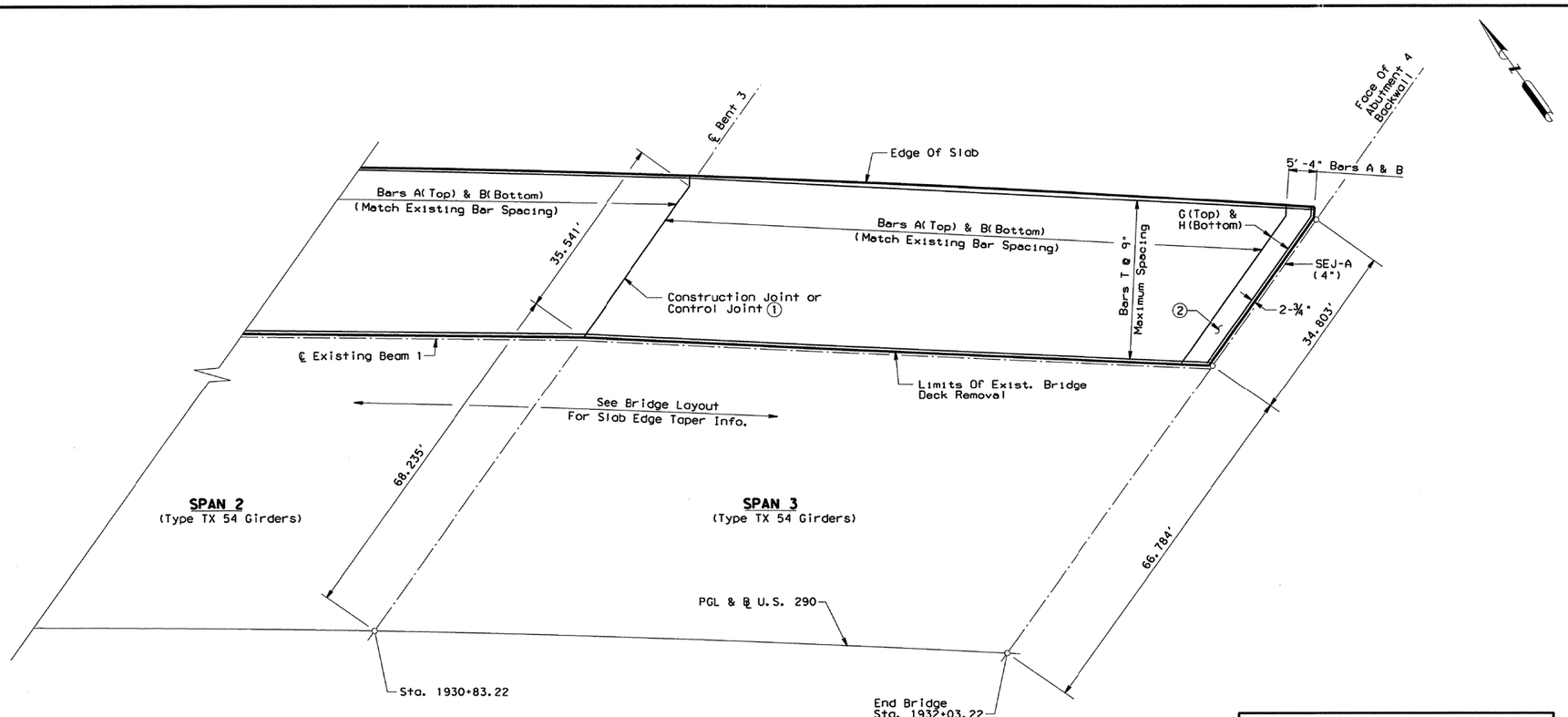
US 290
WB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

SLAB DETAILS

(AS-BUILT PLAN)

SHEET 1 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			38
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



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

NOTES:

(1) See IGCS(MOD) Standard For Continuous Slab Over Hammerhead Bent. See PCP Standard For Other Details.

(2) See IGTS Standard For Thickened Slab End Details. See PCP Standards For Other Details.

STATE OF TEXAS
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103782
LICENSED PROFESSIONAL ENGINEER
5/6/2013

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 2 OF 4

Texas Department of Transportation
Houston District (Bridge)
US 290

SLAB DETAILS

US 290 WB MAINLANES
SPRING CYPRESS RD OVERPASS
WIDENING

FILE: SprCyRd_slab_WB.dgn	DN: FSTS	CK:	DW: ST	CK: FSTS
©TxDOT APRIL 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1054

COUNTY	CONTROL	SECT	JOB	HIGHWAY
HARRIS	0050	06	08	US 290

CONTRACTOR'S INFORMATION ONLY

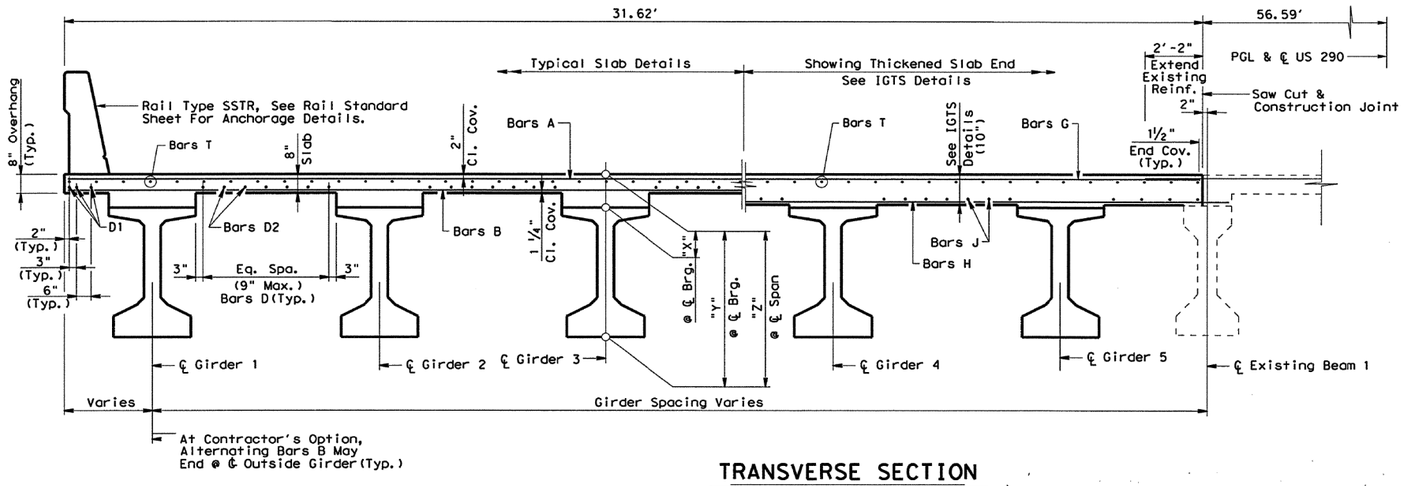
US 290
WB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

SLAB DETAILS

(AS-BUILT PLAN)

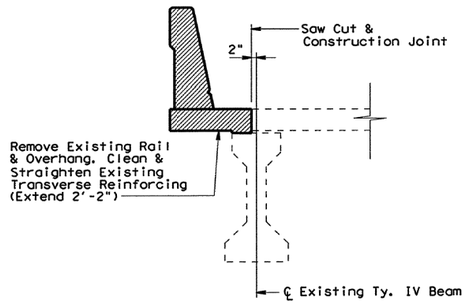
SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			39
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

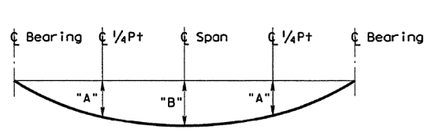


TRANSVERSE SECTION

(Spans 1 & 2)
(Unit 1)



REMOVAL DETAIL



DEAD LOAD DEFLECTION DIAGRAM

Note: Dead Load Deflection Due To Panels, CIP Slab, And Rail Concrete.

SPAN NO.	GIRDER NO.	"A" (Feet)	"B" (Feet)
1	1	0.136	0.190
1	2	0.134	0.188
1	3	0.134	0.188
1	4	0.137	0.192
1	5	0.136	0.192
2	1	0.155	0.217
2	2	0.151	0.212
2	3	0.151	0.211
2	4	0.150	0.211
2	5	0.150	0.210

TABLE OF SECTION DEPTHS

SPAN NO.	GIRDER NO.	"X" @ ℄ BRNG.	"Y" @ ℄ BRNG.	"Z" @ ℄ SPAN
1	1	11"	5'-4"	9 ⅞"
	2	11"	5'-4"	9 ¾"
	3	11"	5'-4"	9 ¾"
	4	11"	5'-4"	10 ⅛"
	5	11"	5'-4"	10"
2	1	10"	5'-5"	10 ⅛"
	2	10"	5'-5"	9 ⅞"
	3	10"	5'-5"	9 ⅝"
	4	10"	5'-5"	9 ⅝"
	5	10"	5'-5"	9 ½"

TABLE OF ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
SPAN 1	Cl S Conc For Ext Str (Slab)	SF	4019
	Sealed Expansion Joint (4 In) (SEJ-A)	LF	41
SPAN 2	Cl S Conc For Ext Str (Slab)	SF	4123

Reinforcing Steel Weight Is Calculated Using An Approximate Factor Of 6.10 Lbs/SF.

BAR TABLE

Bar	Size
A	#5
B	#5
D	#5
G	#5
H	#5
J	#5
M	#5
T	#4

GENERAL NOTES:

Designed According To AASHTO LRFD Specifications.

All Dimensions Are Horizontal Dimensions At Top Of Girder.

See PCP Or PMDF Standards For Details And Quantity Adjustments.

See IGMS Standard For Miscellaneous Details.

All Reinforcing Shall Be Grade 60.

Concrete Strength f'c = 4,000 psi.

Bar Laps, Where Required, Shall Be As Follows:
Uncoated ~ #4 = 1'-9"
#5 = 2'-2"

See Railing Details For Rail Anchorage In Slab.

PCPS are not allowed in the bay between the new girders and the existing beams

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 3 OF 4

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
PROFESSIONAL ENGINEER
LICENSED
4/26/2013

Texas Department of Transportation
Houston District (Bridge)
US 290

SLAB DETAILS

US 290 WB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_slab_WB.dgn	DN: FSTS	CK:	DW: ST	CK: FSTS
© TxDOT APRIL 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		40SS
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0050	06	081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290
WB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

SLAB DETAILS

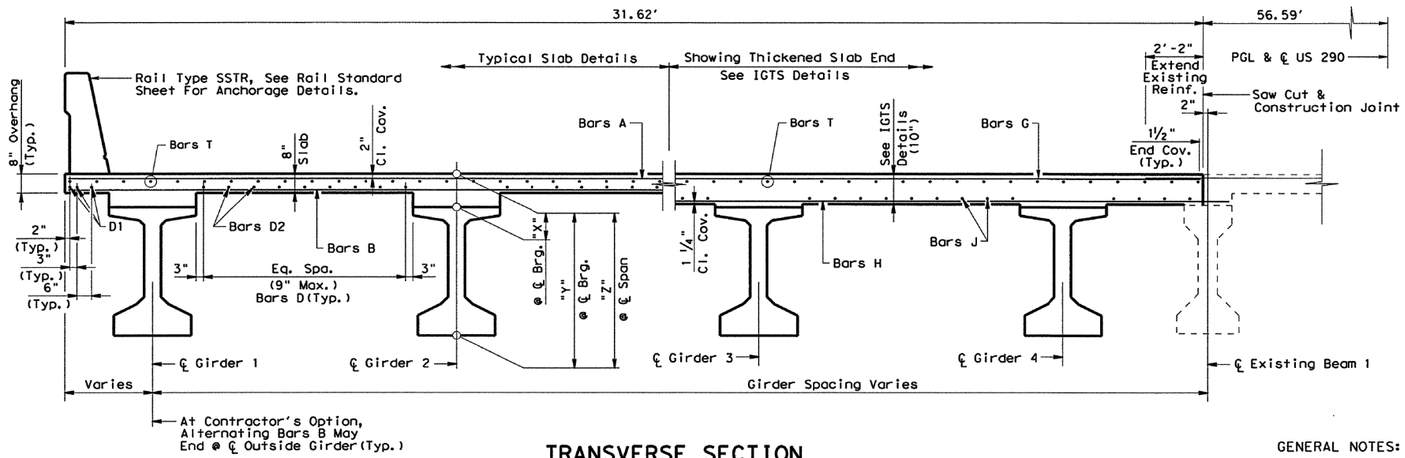
(AS-BUILT PLAN)

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		40

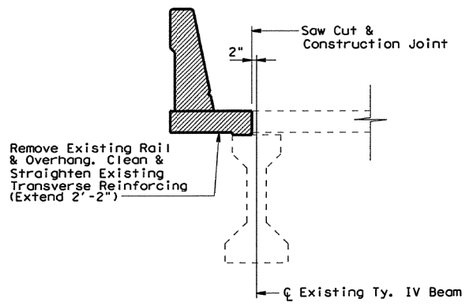
STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



TRANSVERSE SECTION

(Span 3)
(Unit 1)



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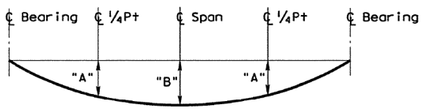

DEAD LOAD DEFLECTION DIAGRAM

Note: Dead Load Deflection Due To Panels, CIP Slab, And Rail Concrete.

SPAN NO.	GIRDER NO.	"A" (Feet)	"B" (Feet)
3	1	0.121	0.169
3	2	0.132	0.185
3	3	0.133	0.187
3	4	0.135	0.190

TABLE OF SECTION DEPTHS

SPAN NO.	GIRDER NO.	"X" @ ℄ BRNG.	"Y" @ ℄ BRNG.	"Z" @ ℄ SPAN
3	1	11"	5'-5"	9 ½"
	2	11"	5'-5"	9 ⅝"
	3	11"	5'-5"	9 ¾"
	4	11"	5'-5"	10 ⅛"

TABLE OF ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
SPAN 3	Cl S Conc For Ext Str (Slab)	SF	3802
	Sealed Expansion Joint (4 In) (SEJ-A)	LF	39

Reinforcing Steel Weight Is Calculated Using An Approximate Factor Of 6.10 Lbs/SF.

BAR TABLE

Bar	Size
A	#5
B	#5
D	#5
G	#5
H	#5
J	#5
M	#5
T	#4

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
PROFESSIONAL ENGINEER
4/26/2013

GENERAL NOTES:

Designed According To AASHTO LRFD Specifications.

All Dimensions Are Horizontal Dimensions At Top Of Girder.

See PCP Or PMDF Standards For Details And Quantity Adjustments.

See IGMS Standard For Miscellaneous Details.

All Reinforcing Shall Be Grade 60.

Concrete Strength f'c = 4,000 psi.

Bar Laps, Where Required, Shall Be As Follows:
Uncoated ~ #4 = 1'-9"
#5 = 2'-2"

See Railing Details For Rail Anchorage In Slab.

PCPS are not allowed in the bay between the new girders and the existing beams

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 4 OF 4

Texas Department of Transportation
Houston District (Bridge)
US 290

SLAB DETAILS

US 290 WB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_slab_WB.dgn	DN: FSTS	CK:	DW: ST	CK: FSTS
©TxDOT APRIL 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1056
	COUNTY		CONTROL SECT JOB	HIGHWAY
	HARRIS		0050 06 081	US 290

US 290 WB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

SLAB DETAILS

(AS-BUILT PLAN)

SHEET 4 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			41
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

CONTRACTOR'S INFORMATION ONLY

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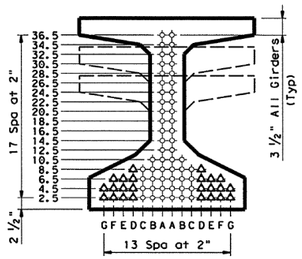
DESIGNED GIRDERS (DEPRESSED STRANDS)

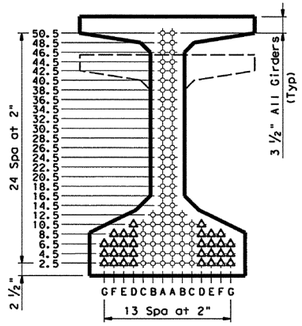
STRUCTURE	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS: NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" @ ℄ (in)	"e" END (in)	DEPRESSED NO.	DEPRESSED TO (in)	CONCRETE: RELEASE STRGTH (1) f'ci (ksi)	CONCRETE: MINIMUM 28 DAY COMP STRGTH f'c (ksi)
US 290 WBML	1	1-3	Tx54		54	1/2	270	18.12	11.90	8	50.5	5.068	6.159
SPRING CYPRESS	1	4,5	Tx54		50	1/2	270	18.37	11.65	8	50.5	4.673	6.083
RD OVERPASS	2	1-3	Tx54		58	1/2	270	17.77	10.87	10	50.5	5.222	6.682
WIDENING	2	4,5	Tx54		54	1/2	270	18.12	11.90	8	50.5	5.080	6.428
	3	1,4	Tx54		52	1/2	270	18.24	11.78	8	50.5	4.851	5.687
	3	2,3	Tx54		54	1/2	270	18.12	11.90	8	50.5	5.049	6.002

OPTIONAL DESIGN

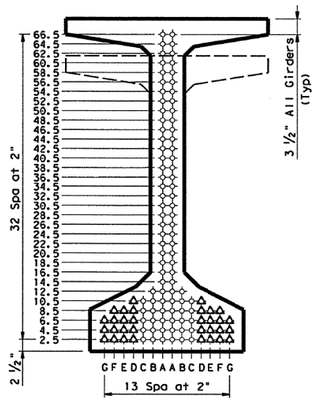
DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (ft-kips)	LIVE LOAD DISTRIBUTION FACTOR (2) Moment	Shear
4.078	-3.795	7084	0.483	0.752
4.036	-3.660	6816	0.483	0.752
4.334	-4.020	7466	0.483	0.736
4.229	-3.828	7107	0.481	0.736
3.843	-3.684	7126	0.569	0.851
3.956	-3.795	7294	0.569	0.851



TYPE Tx28, Tx34 & Tx40 (3)



TYPE Tx46 & Tx54 (3)



TYPE Tx62 & Tx70 (3)

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Specifications.

All concrete must be Class H. Provide Class H(HPC) if shown elsewhere in plans. All reinforcing bars must be Grade 60.

When shown on this sheet, the Fabricator has the option of furnishing either the designed depressed strand girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a registered Professional Engineer.

Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.

Prestress losses for the designed girders have been calculated for a relative humidity of 75 percent. Optional designs must likewise conform.

For depressed strand designed girders, strands must be located as low as possible on the 2" grid system unless a Non-Standard Strand Pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.

Strands for the designed girder must be low relaxation strands pretensioned to 75 percent of fpu each.

Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

All beams designed using a compressive design release strength factor = 0.65. Release strengths shown may NOT be further reduced using 5197 criteria in optional designs.

(1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

(2) Portion of full HL93.

(3) Full-length debonded strands are only permitted in strand positions marked Δ. Double wrap full-length debonded strands in outermost position of each row. Full-length debonding must comply with Item 426.4.F.4.

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED
PROFESSIONAL ENGINEER
4/26/2013

Texas Department of Transportation
Bridge Division

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)

IGND

FILE:	igndstel.dgn	DN: FSTS	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT	June 2007	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS		HOU			10S2
02/09: General Notes.		COUNTY		CONTROL	SECT	JOB	HIGHWAY
10/09: General Notes.		HARRIS		6050	06	081	US 290
12/10: Rel Strgth & LLDF.							

CONTRACTOR'S INFORMATION ONLY

US 290
WB MAINLANES
SPRING CYPRESS RD
OVERPASS WIDENING

PRESTRESSED CONCRETE
I-GIRDER DESIGNS
(NON-STANDARD SPANS)
IGND

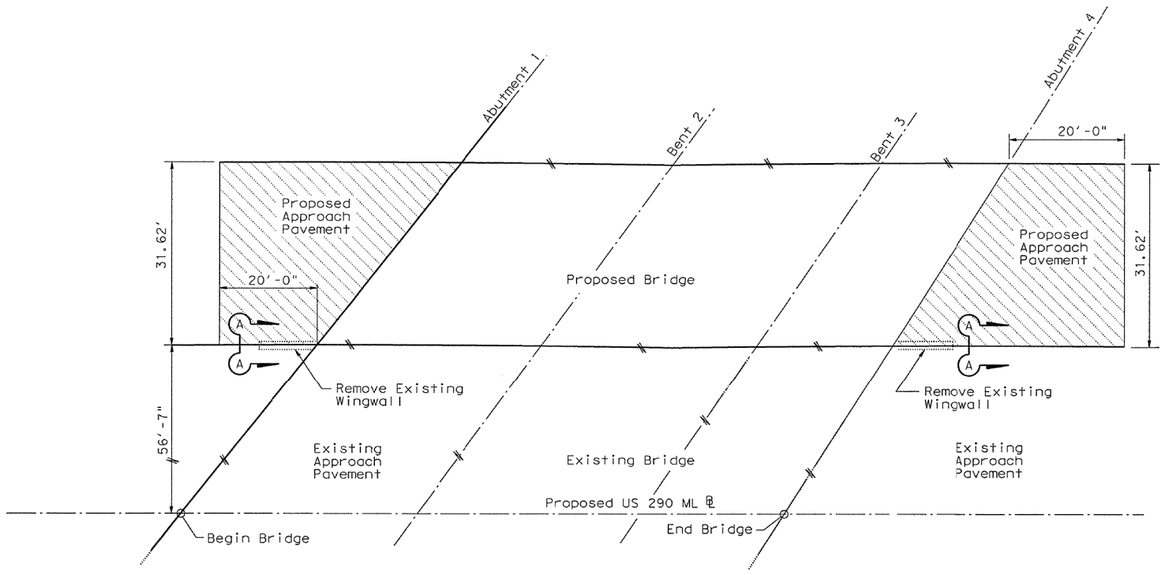
(AS-BUILT PLAN)

SHEET 1 OF 1

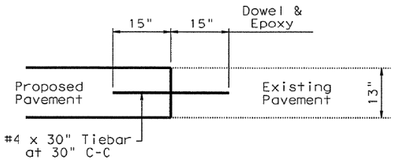
FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		42

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



APPROACH PAVEMENT WIDENING PLAN



LONGITUDINAL JOINT SECTION A-A

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

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED
PROFESSIONAL ENGINEER
4/26/2013

Texas Department of Transportation
Houston District (Bridge)

US 290

APPROACH PAVEMENT MODIFICATION PLAN

US 290 WB MAINLANES
SPRING CYPRESS RD OVERPASS
WIDENING

FILE: approach.dgn	DN: FSTS	CK: YL	DW: ST	CK: FSTS
© TxDOT MARCH 2013	DISTRICT	FED REC	PROJECT NO.	SHEET
REVISIONS	HOUSTON	6		1046
	COUNTY		CONTROL SECT JOB	HIGHWAY
	HARRIS		0050 08 081	US290

CONTRACTOR'S INFORMATION ONLY

US 290
WB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

APPROACH PAVEMENT MODIFICATION PLAN

(AS-BUILT PLAN)

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		43

STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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H:\bridge\us 290\seq 9-cad\290 WBML Spring Cypress Rd Overpass Widening\SprCyRd•approach•WB.dgn

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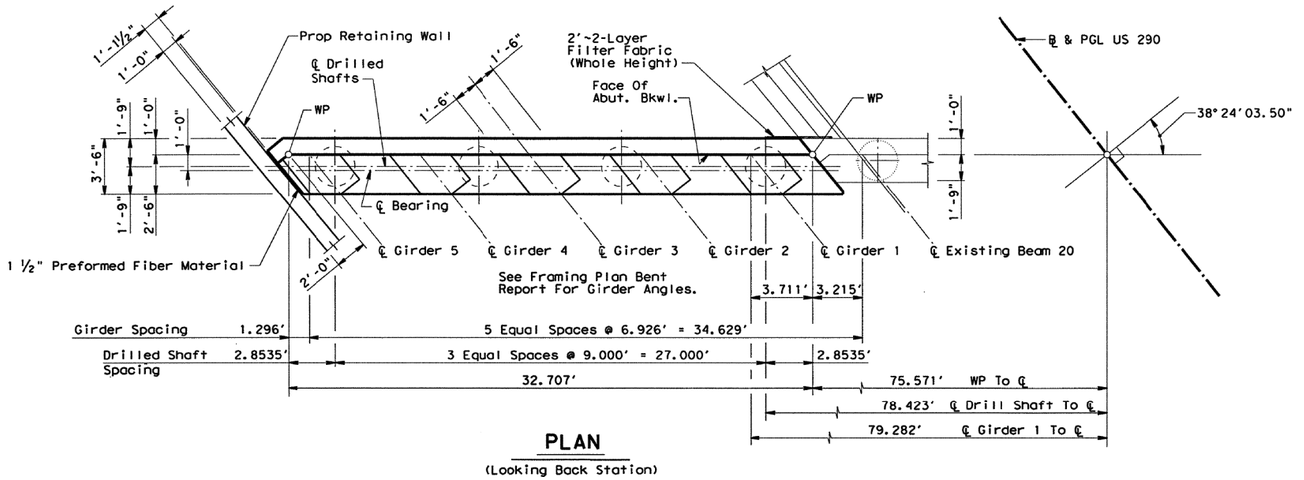
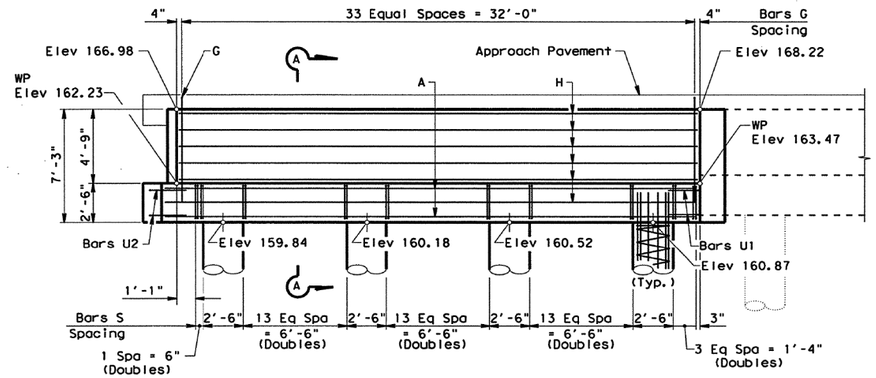


PLAN

(Looking Back Station)



ELEVATION

(Looking Back Station)

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

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 1 OF 2

Texas Department of Transportation
Houston District (Bridge)
US 290

ABUTMENT 1

US 290 EB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_Abut1_EB.dgn	DWN FSTS	CK: YL	DW: ST	CK: FSTS
© TxDOT APRIL 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1061
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0050	06	081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290
EB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

ABUTMENT 1

(AS-BUILT PLAN)

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			44
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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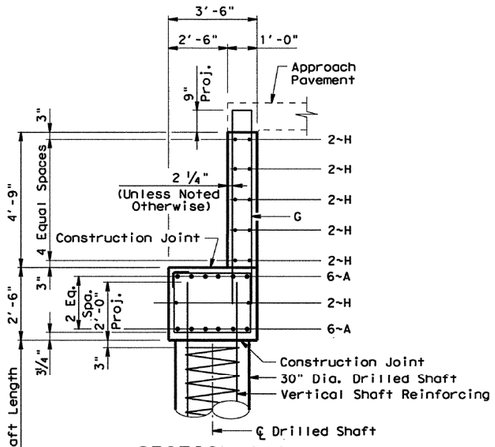
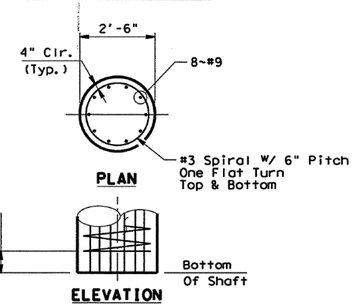
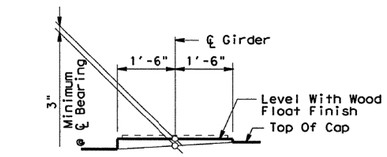
6/5/2013



SECTION A-A

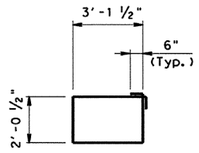


30" DIAMETER DRILLED SHAFT



BEARING SEAT DETAIL

(Bearing Surface Shall Be Clean Of All Loose Material Before Placing Bearing Pad)



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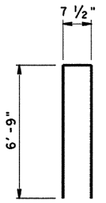

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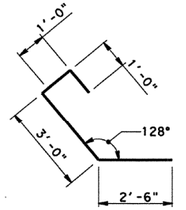

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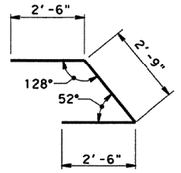

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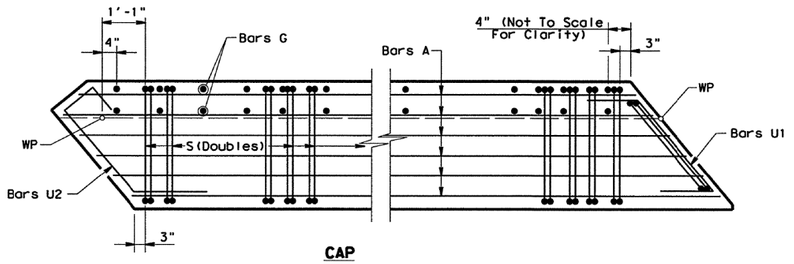


CAP

CORNER DETAILS

TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
** A	12	#11	33'-4"	2,124
G	33	#5	14'-2"	487
** H	12	#6	33'-0"	595
S	96	#5	11'-4"	1,136
U1	2	#6	7'-9"	24
U2	2	#6	7'-6"	23
* Reinforcing Steel			Lb	4,389
Cl C Conc For Ext Str (Abut)			CY	16.8

* Reinforcing Steel Quantities Are For Contractor's Information Only.

** Average Length

GENERAL NOTES:

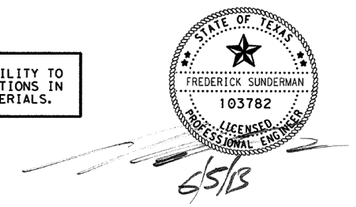
Designed According To AASHTO LRFD Specifications.

Class "C" Concrete Strength f'c = 3,600 psi.

All Cap Reinforcing Steel Shall Be Grade 60.

Chamfer All Exposed Edges 3/4".

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



HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 2 OF 2

Texas Department of Transportation
Houston District (Bridge)
US 290

ABUTMENT 1

US 290 EB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_Abut1_EB.dgn	DN: FSTS	CK: YL	DW: ST	CK: FSTS
© TxDOT APRIL 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1062
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0050	09	081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290 EB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

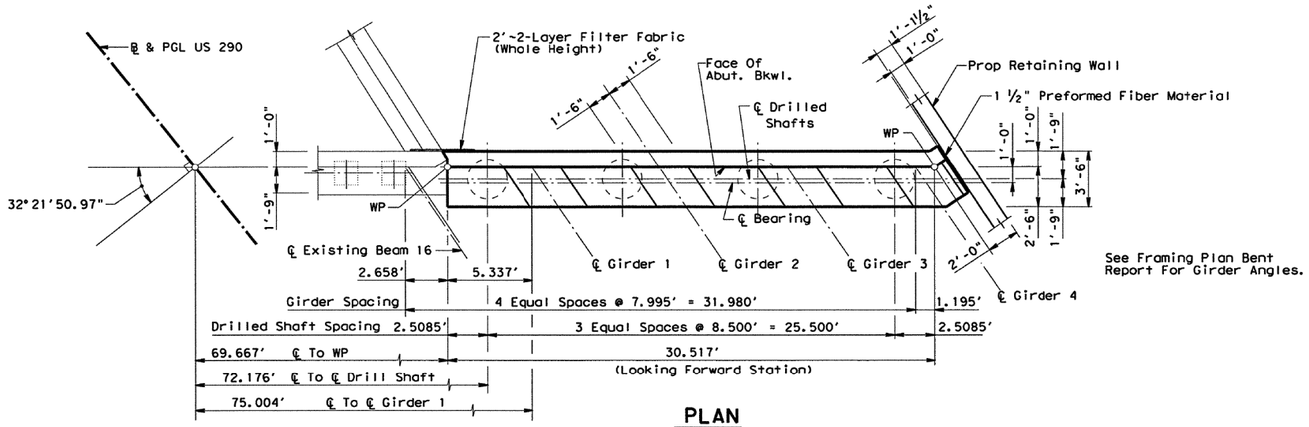
ABUTMENT 1

(AS-BUILT PLAN)

SHEET 2 OF 2

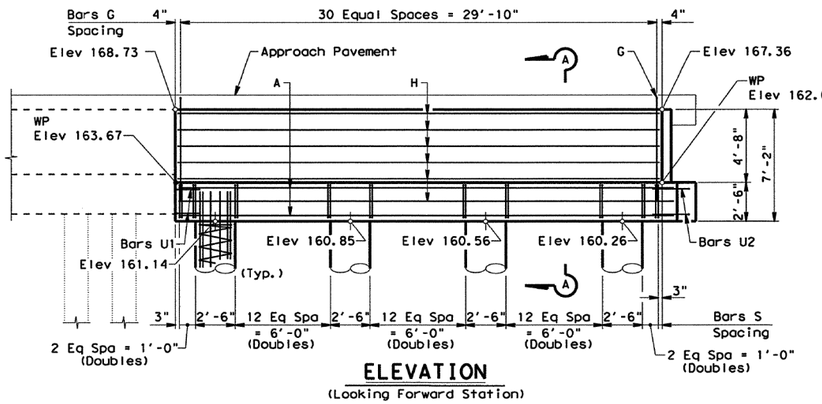
FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		45

STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



See Framing Plan Bent Report For Girder Angles.

PLAN



ELEVATION
(Looking Forward Station)

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

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 1 OF 2

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED
PROFESSIONAL ENGINEER
6/5/13

Texas Department of Transportation
Houston District (Bridge)
US 290

ABUTMENT 4

US 290 EB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_Abut4_EB.dgn	DW: FSTS	CK: YL	DW: ST	CK: FSTS
©TxDOT APRIL 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		063
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0050	06	081	US 290

CONTRACTOR'S INFORMATION ONLY

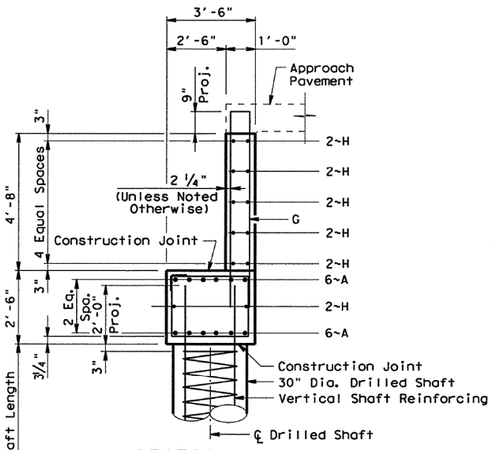
US 290 EB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

ABUTMENT 4

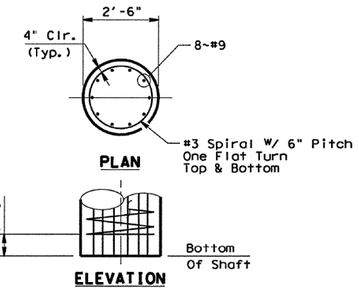
(AS-BUILT PLAN)

SHEET 1 OF 2

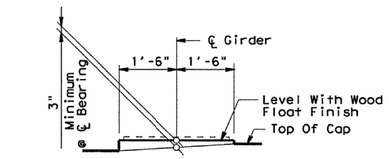
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			46
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



SECTION A-A

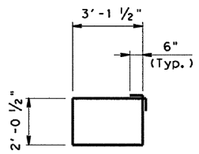


30" DIAMETER DRILLED SHAFT



BEARING SEAT DETAIL

(Bearing Surface Shall Be Clean Of All Loose Material Before Placing Bearing Pad)



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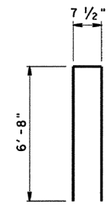

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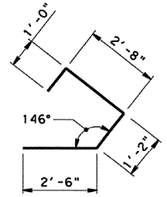

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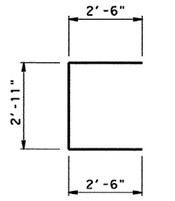

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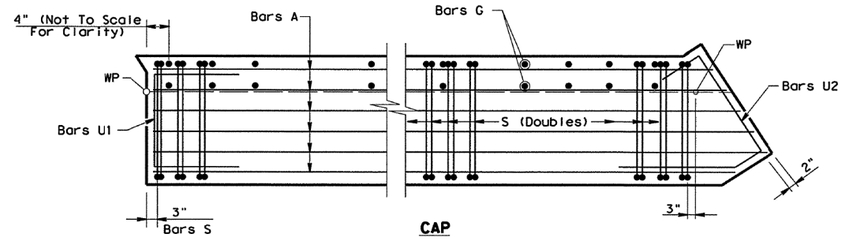

CAP

CORNER DETAILS

TABLE OF ESTIMATED QUANTITIES					
	BAR	NO.	SIZE	LENGTH	WEIGHT
**	A	12	#11	32'-5"	2,002
	G	32	#5	13'-11 1/2"	467
**	H	12	#6	32'-2"	578
	S	90	#5	11'-4"	1,065
	U1	2	#6	7'-11"	24
	U2	2	#6	7'-3"	22
*	Reinforcing Steel			Lb	4,158
	Cl C Conc For Ext Str (Abut)			CY	16.1

* Reinforcing Steel Quantities Are For Contractor's Information Only.

** Average Length

GENERAL NOTES:

Designed According To AASHTO LRFD Specifications.

Class "C" Concrete Strength f'c = 3,600 psi.

All Cap Reinforcing Steel Shall Be Grade 60.

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

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 2 OF 2

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
PROFESSIONAL ENGINEER
4/26/2013

Texas Department of Transportation
Houston District (Bridge)
US 290

ABUTMENT 4

US 290 EB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_Abut4_EB.dgn	DN: FSTS	CK: YL	DW: ST	CK: FSTS
© TxDOT APRIL 2013	DISTRICT	FED RD	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1064
	COUNTY		CONTROL SECT JOB	HIGHWAY
	HARRIS		0050 09 081	US 290

US 290
EB MAINLANES
SPRING CYPRESS RD
OVERPASS WIDENING

ABUTMENT 4

(AS-BUILT PLAN)

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		47

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

CONTRACTOR'S INFORMATION ONLY

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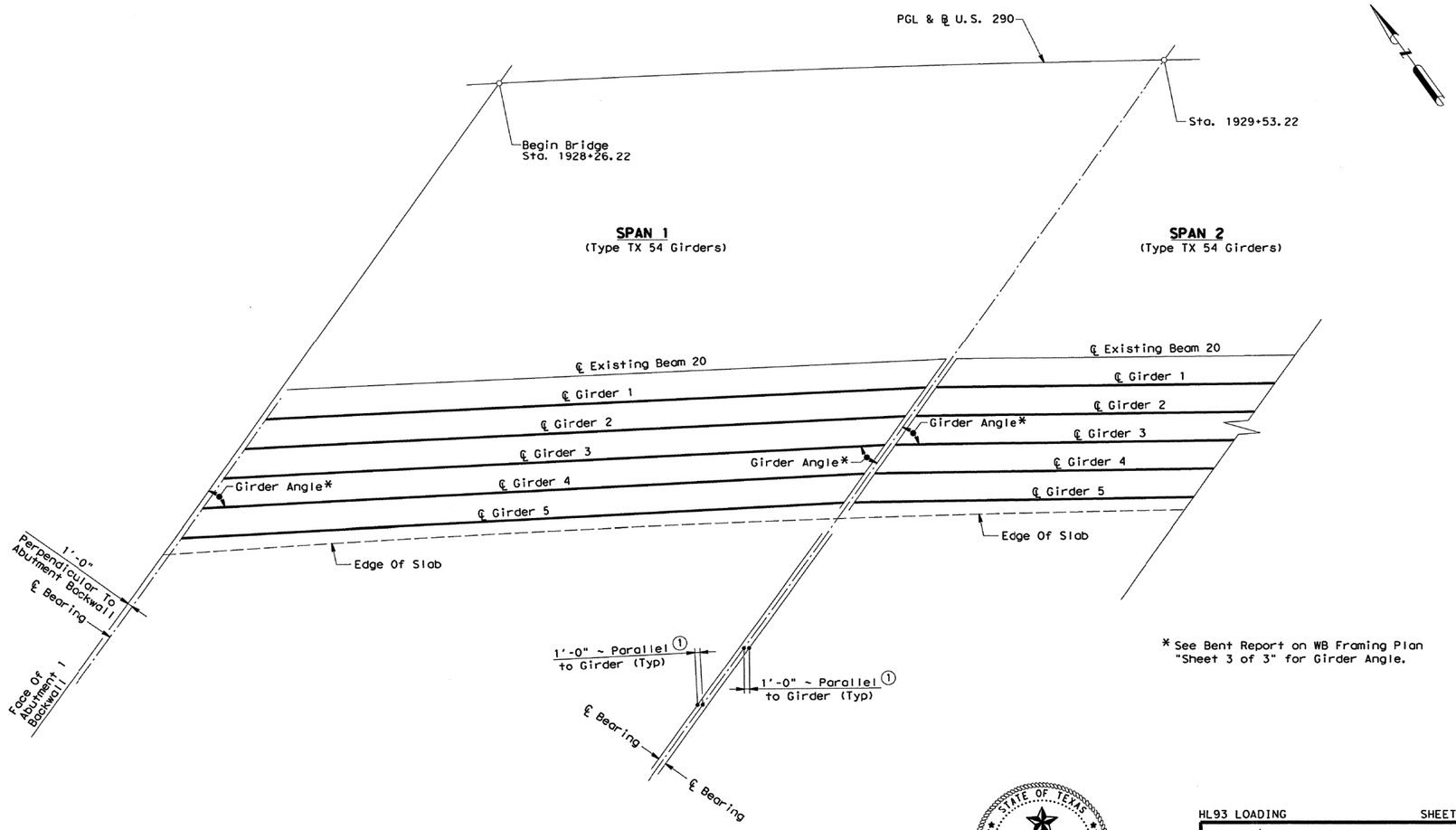
4/26/2013



* See Bent Report on WB Framing Plan "Sheet 3 of 3" for Girder Angle.

NOTES:
① See Standard IGEB For Orientation Of Dimension.

TABLE OF ESTIMATED QUANTITIES				
ITEM	UNIT	QUANTITY		
		SPAN 1	SPAN 2	SPAN 3
Prestressed Concrete Girder (TX54)	LF	640.04	654.41	482.22

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED
PROFESSIONAL ENGINEER
4/26/2013

HL93 LOADING

SHEET 1 OF 3

Texas Department of Transportation
Houston District (Bridge)
US 290

FRAMING PLAN

**US 290 EB MAINLANES
SPRING CYPRESS RD OVERPASS
WIDENING**

FILE: SprCyRd_Framing.dgn	DN:	CK:	DW: ST	CK:
©TxDOT MARCH 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1072
	COUNTY		CONTROL SECT JOB	HIGHWAY
	HARRIS		0050 06 081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290
EB MAINLANES
SPRING CYPRESS RD
OVERPASS WIDENING

FRAMING PLAN

(AS-BUILT PLAN)

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		48

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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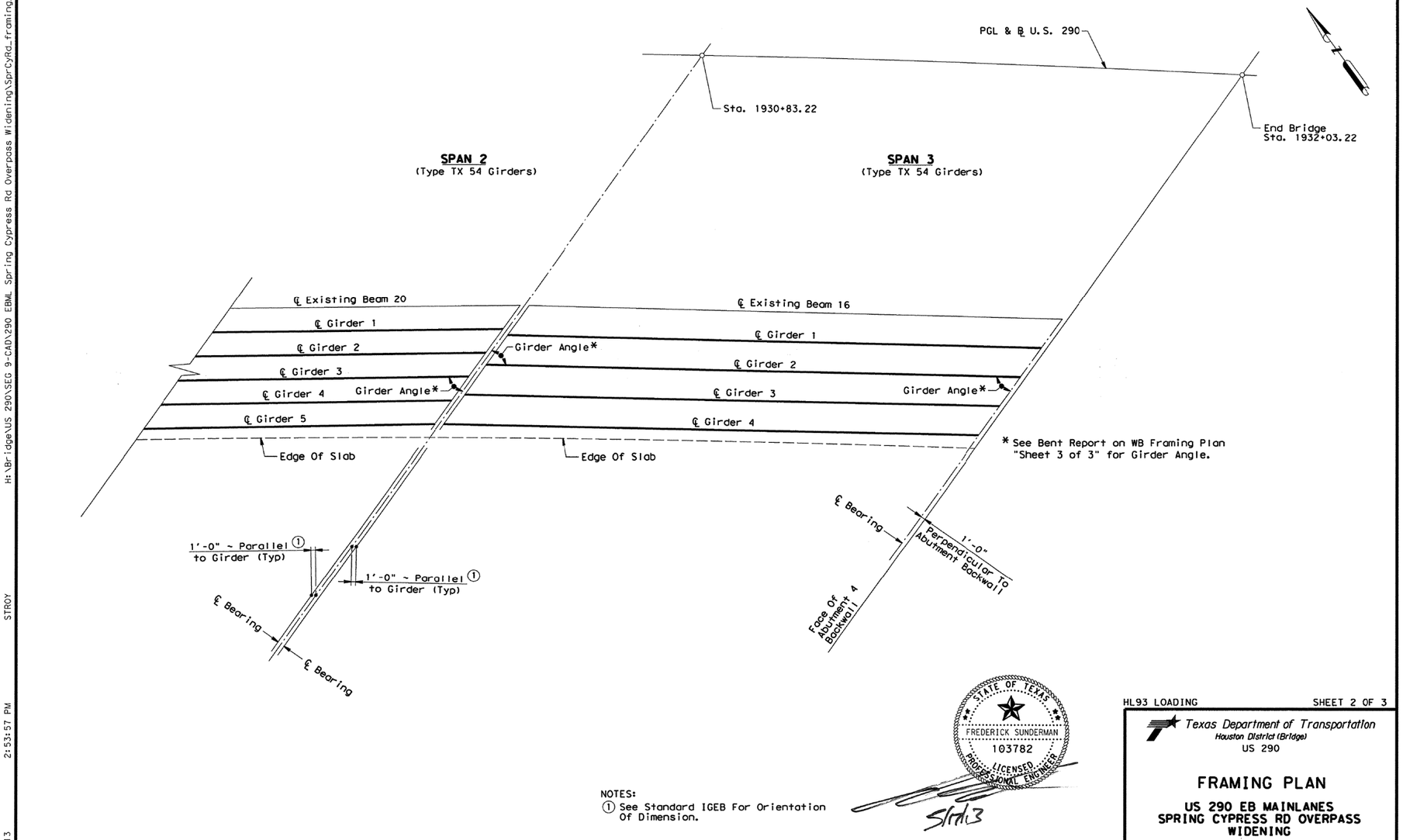
5/17/2013



NOTES:
① See Standard IGEB For Orientation Of Dimension.

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED
PROFESSIONAL ENGINEER

HL93 LOADING SHEET 2 OF 3

Texas Department of Transportation
Houston District (Bridge)
US 290

FRAMING PLAN

US 290 EB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_framing.dgn	DN:	CK:	DW: ST	CK:	
© TxDOT MARCH 2013	DISTRICT	FED RD	PROJECT NUMBER		SHEET
REVISIONS	HOUSTON	6			1073
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0050	06	081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290
EB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

FRAMING PLAN

(AS-BUILT PLAN)

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			49
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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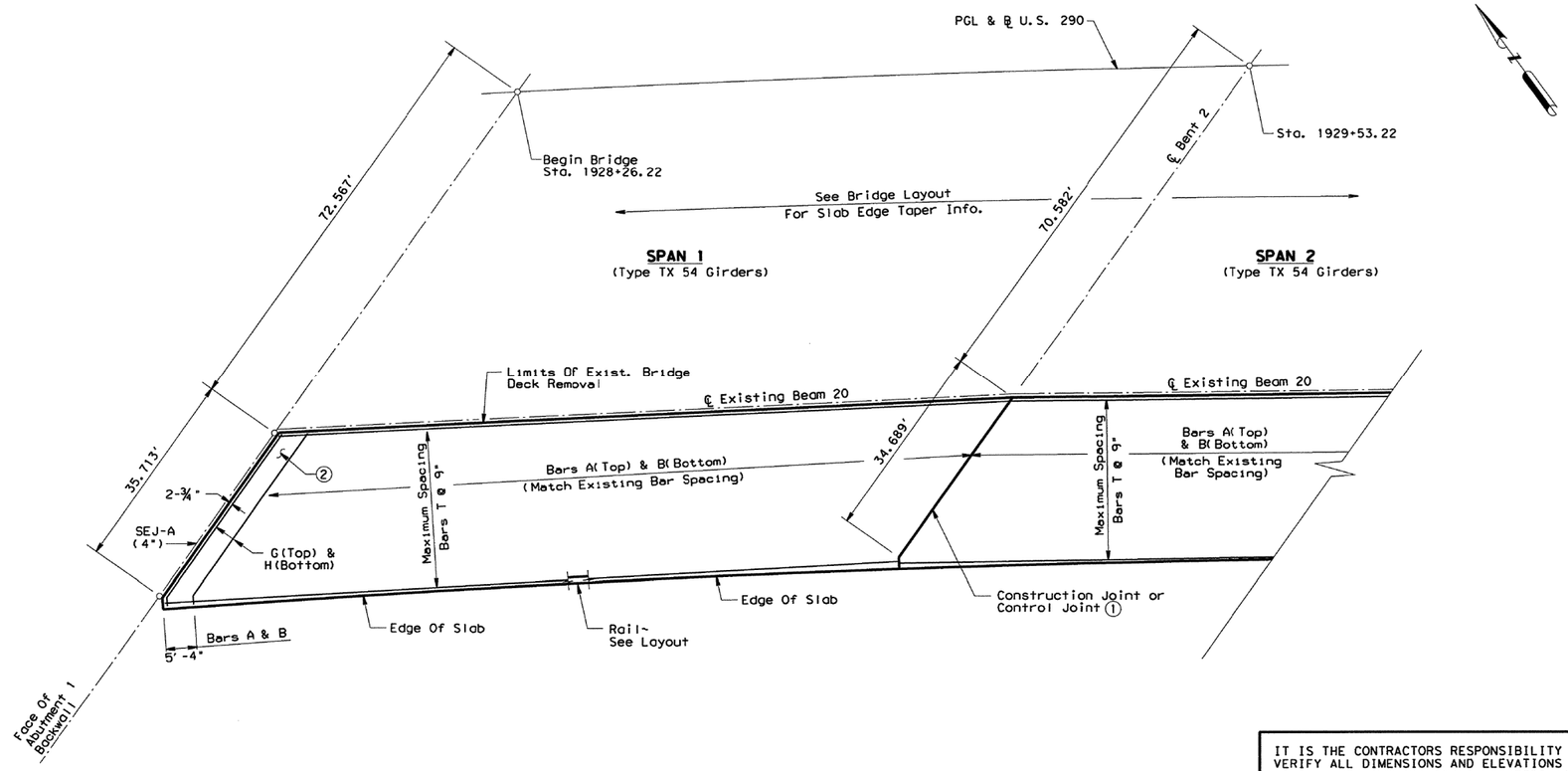
5/6/2013



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

NOTES:

(1) See IGCS(MOD) Standard For Continuous Slab Over Hammerhead Bent. See PCP Standard For Other Details.

(2) See IGTS Standard For Thickened Slab End Details. See PCP Standards For Other Details.

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED
PROFESSIONAL ENGINEER

5/6/13

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 1 OF 4

Texas Department of Transportation
Houston District (Bridge)
US 290

SLAB DETAILS

US 290 EB MAINLANES
SPRING CYPRESS RD OVERPASS
WIDENING

FILE: SprCyRd_slab_EB.dgn	DN:	CK:	DW: ST	CK:	
© TxDOT MARCH 2013	DISTRICT	FED REG	PROJECT NUMBER		SHEET
REVISIONS	HOUSTON	6			1076
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0050	06	081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290
EB MAINLANES
SPRING CYPRESS RD
OVERPASS WIDENING

SLAB DETAILS

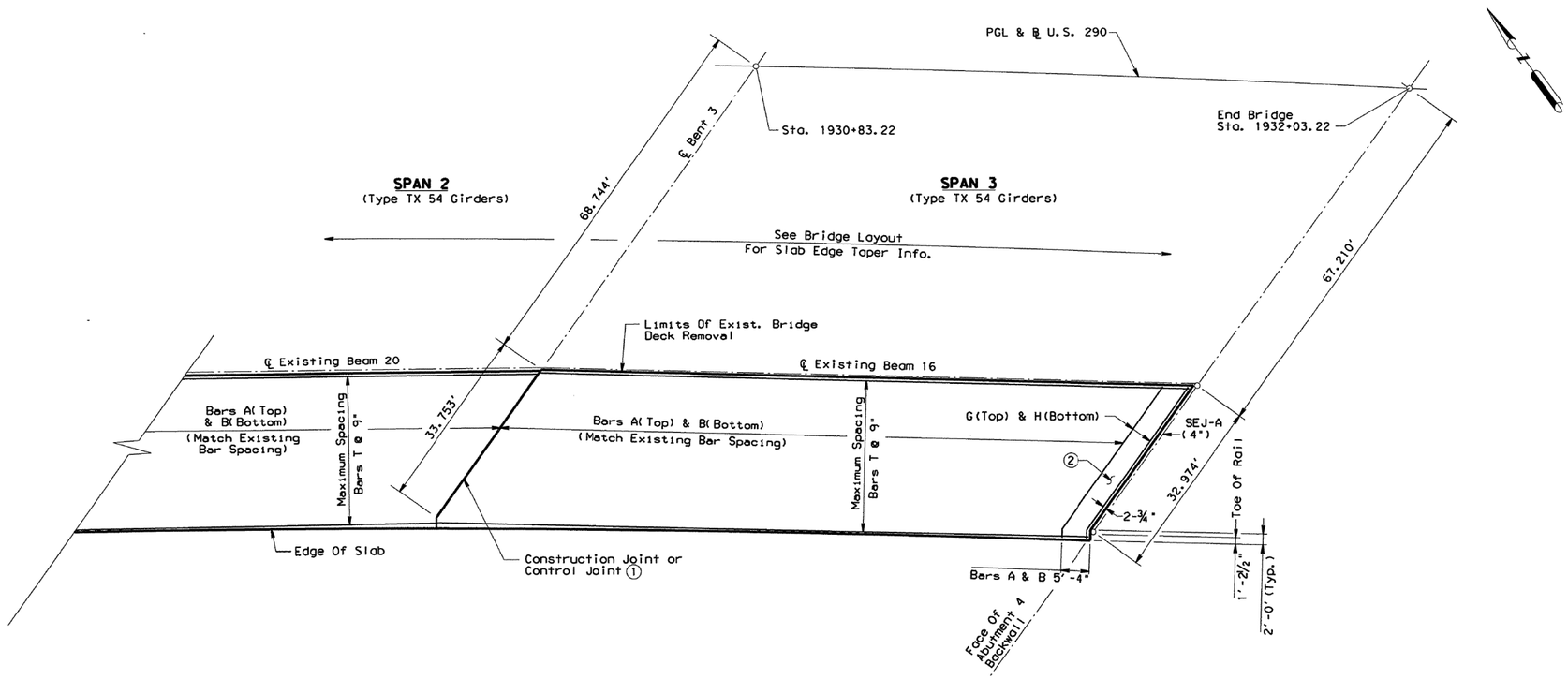
(AS-BUILT PLAN)

SHEET 1 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		50

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



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

NOTES:

1. See IGCS(MOD) Standard For Continuous Slab Over Hammerhead Bent. See PCP Standard For Other Details.
2. See IGTS Standard For Thickened Slab End Details. See PCP Standards For Other Details.

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED
PROFESSIONAL ENGINEER
5/6/2013

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 2 OF 4

Texas Department of Transportation
Houston District (Bridge)
US 290

SLAB DETAILS

US 290 EB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_slab_EB.dgn	DN:	CK:	DW: ST	CK:	
© TxDOT MARCH 2013	DISTRICT	FED REG	PROJECT NUMBER		SHEET
REVISIONS	HOUSTON	6			1977
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0050	06	081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290
EB MAINLANES
SPRING CYPRESS RD
OVERPASS WIDENING

SLAB DETAILS

(AS-BUILT PLAN)

SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			51
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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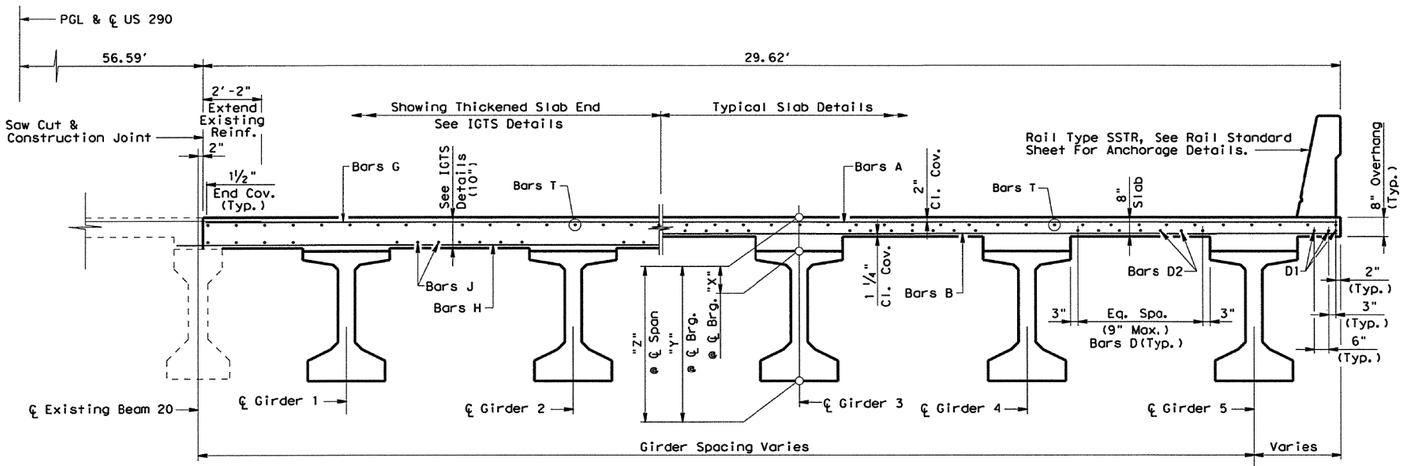
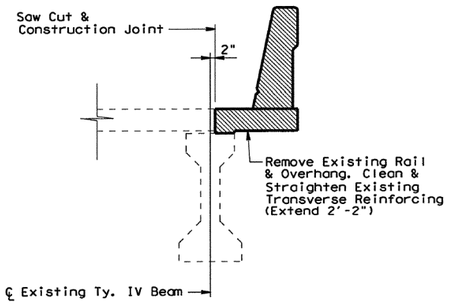
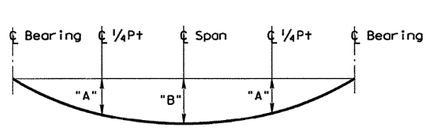


TRANSVERSE SECTION

(Spans 1 & 2)
(Unit 1)



REMOVAL DETAIL



DEAD LOAD DEFLECTION DIAGRAM

Note: Dead Load Deflection Due To Panels, CIP Slab, And Rail Concrete.

SPAN NO.	GIRDER NO.	"A" (Feet)	"B" (Feet)
1	1	0.144	0.202
1	2	0.142	0.199
1	3	0.139	0.195
1	4	0.139	0.196
1	5	0.131	0.183
2	1	0.152	0.213
2	2	0.154	0.216
2	3	0.153	0.214
2	4	0.152	0.213
2	5	0.146	0.205

TABLE OF SECTION DEPTHS

SPAN NO.	GIRDER NO.	"X" @ ℄ BRNG.	"Y" @ ℄ BRNG.	"Z" @ ℄ SPAN
1	1	11 ½"	5'-5 ½"	10 ¼"
	2	11 ½"	5'-5 ½"	10"
	3	11 ½"	5'-5 ½"	9 ½"
	4	11 ½"	5'-5 ½"	9 ½"
	5	11 ½"	5'-5 ½"	9 ⅜"
2	1	10 ¾"	5'-4 ¾"	9 ⅝"
	2	10 ¾"	5'-4 ¾"	9 ⅞"
	3	10 ¾"	5'-4 ¾"	9 ⅝"
	4	10 ¾"	5'-4 ¾"	9 ½"
	5	10 ¾"	5'-4 ¾"	9 ⅝"

TABLE OF ESTIMATED QUANTITIES

ITEM		UNIT	QUANTITY
SPAN 1	Cl S Conc For Ext Str (Slab)	SF	3759
	Sealed Expansion Joint (4 In) (SEJ-A)	LF	39
SPAN 2	Cl S Conc For Ext Str (Slab)	SF	3839

Reinforcing Steel Weight Is Calculated Using An Approximate Factor Of 6.10 Lbs/SF.

BAR TABLE

Bar	Size
A	#5
B	#5
D	#5
G	#5
H	#5
J	#5
M	#5
T	#4

GENERAL NOTES:

Designed According To AASHTO LRFD Specifications.

All Dimensions Are Horizontal Dimensions At Top Of Girder.

See PCP Or PMDF Standards For Details And Quantity Adjustments.

See IGMS Standard For Miscellaneous Details.

All Reinforcing Shall Be Grade 60.

Concrete Strength f'c = 4,000 psi.

Bar Laps, Where Required, Shall Be As Follows:
Uncoated ~ #4 = 1'-9"
#5 = 2'-2"

See Railing Details For Rail Anchorage In Slab.

PCPS are not allowed in the bay between the new girders and the existing beams

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 3 OF 4

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED PROFESSIONAL ENGINEER
4/26/2013

Texas Department of Transportation
Houston District (Bridge)
US 290

SLAB DETAILS

US 290 EB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_slab_EB.dgn	DN: FSTS	CK:	DW: ST	CK: FSTS
© TxDOT MARCH 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		52
	COUNTY		CONTROL SECT	JOB HIGHWAY
	HARRIS		0050 06	031 US 290

CONTRACTOR'S INFORMATION ONLY

US 290
EB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

SLAB DETAILS

(AS-BUILT PLAN)

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		52
STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.
CONT.	SECT.	JOB / HIGHWAY NO.
6382	11	001 / US 290, ETC.

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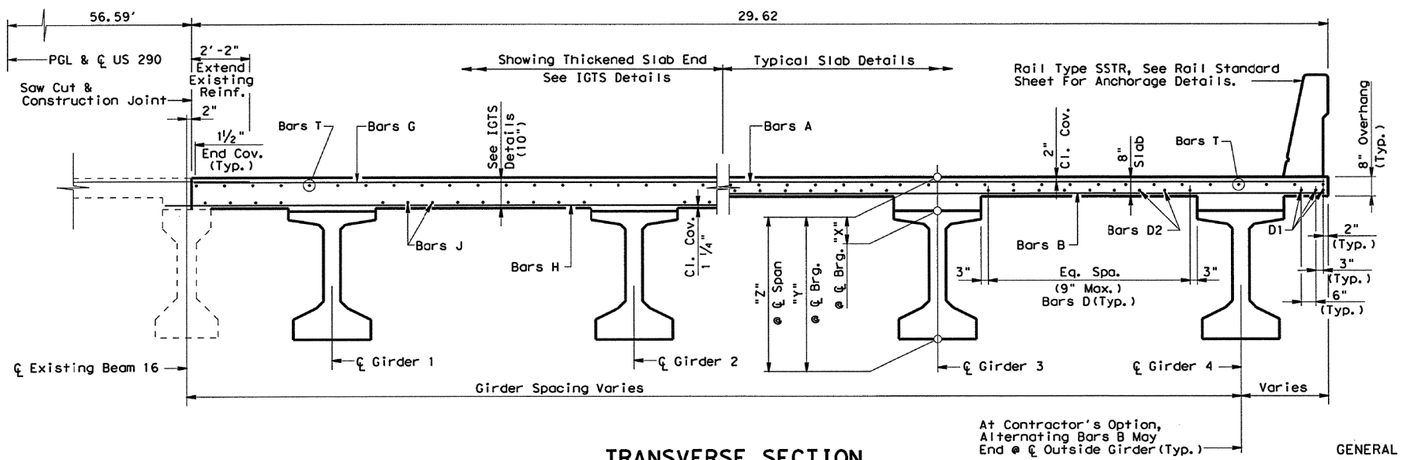
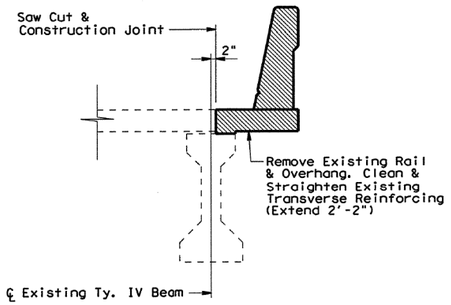
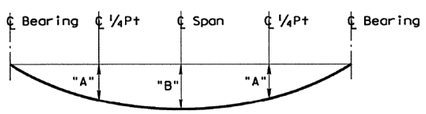


TRANSVERSE SECTION

(Span 3)
(Unit 1)



REMOVAL DETAIL



DEAD LOAD DEFLECTION DIAGRAM

Note: Dead Load Deflection Due To Panels, CIP Slab, And Rail Concrete.

SPAN NO.	GIRDER NO.	"A" (Feet)	"B" (Feet)
3	1	0.133	0.186
3	2	0.131	0.183
3	3	0.132	0.185
3	4	0.117	0.164

TABLE OF ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
SPAN 3	CI S Conc For Ext Str (Slab)	SF	3545
	Sealed Expansion Joint (4 in) (SEJ-A)	LF	36

Reinforcing Steel Weight Is Calculated Using An Approximate Factor Of 6.10 Lbs/SF.

TABLE OF SECTION DEPTHS

SPAN NO.	GIRDER NO.	"X" @ ℄ BRNG.	"Y" @ ℄ BRNG.	"Z" @ ℄ SPAN
3	1	10"	5'-4"	9 ⅞"
	2	10"	5'-4"	9 ⅜"
	3	10"	5'-4"	9 ⅝"
	4	10"	5'-4"	9 ¾"

BAR TABLE

Bar	Size
A	#5
B	#5
D	#5
G	#5
H	#5
J	#5
M	#5
T	#4

GENERAL NOTES:

Designed According To AASHTO LRFD Specifications.

All Dimensions Are Horizontal Dimensions At Top Of Girder.

See PCP Or PMDF Standards For Details And Quantity Adjustments.

See IGMS Standard For Miscellaneous Details.

All Reinforcing Shall Be Grade 60.

Concrete Strength f'c = 4,000 psi.

Bar Laps, Where Required, Shall Be As Follows:
Uncoated ~ #4 = 1'-9"
#5 = 2'-2"

See Railing Details For Rail Anchorage In Slab.

PCPS are not allowed in the bay between the new girders and the existing beams

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

SHEET 4 OF 4

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED PROFESSIONAL ENGINEER
4/26/2013

Texas Department of Transportation
Houston District (Bridge)
US 290

SLAB DETAILS

US 290 EB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

FILE: SprCyRd_slab_EB.dgn	DN: FSTS	CK:	DW: ST	CK: FSTS
©TxDOT MARCH 2013	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS	HOUSTON	6		1079
	COUNTY		CONTROL SECT	JOB HIGHWAY
	HARRIS		0050 06	081 US 290

CONTRACTOR'S INFORMATION ONLY

US 290
EB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

SLAB DETAILS

(AS-BUILT PLAN)

SHEET 4 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		53

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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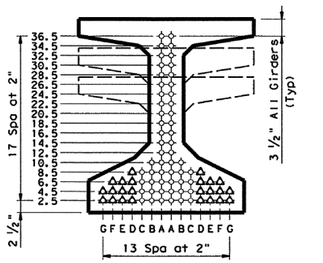
DESIGNED GIRDERS (DEPRESSED STRANDS)

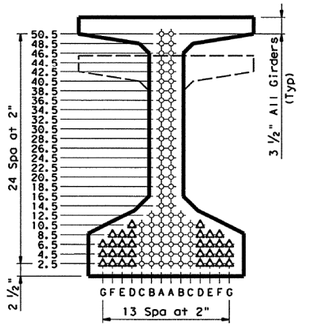
STRUCTURE	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS: NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" @ END (in)	"e" @ END (in)	DEPRESSED NO.	DEPRESSED TO (in)	CONCRETE: RELEASE STRGTH (1) f'ci (ksi)	CONCRETE: MINIMUM 28 DAY COMP STRGTH f'c (ksi)
US 290 EBML	1	1,2	Tx54		50	1/2	270	18.37	11.65	8	50.5	4.682	6.286
SPRING CYPRESS	1	3,4	Tx54		56	1/2	270	17.94	10.80	10	50.5	5.037	6.328
RD OVERPASS	1	5	Tx54		54	1/2	270	18.12	11.90	8	50.5	5.080	6.126
WIDENING	2	1	Tx54		52	1/2	270	18.24	11.78	8	50.5	4.890	6.512
	2	2	Tx54		54	1/2	270	18.12	11.90	8	50.5	5.089	6.553
	2	3,4	Tx54		58	1/2	270	17.77	10.87	10	50.5	5.231	6.700
	2	5	Tx54		56	1/2	270	17.94	10.80	10	50.5	5.047	6.560
	3	1	Tx54		48	1/2	270	18.51	11.51	8	50.5	4.460	5.946
	3	2,3	Tx54		52	1/2	270	18.24	11.78	8	50.5	4.858	6.014
	3	4	Tx54		50	1/2	270	18.37	11.65	8	50.5	4.660	5.649

OPTIONAL DESIGN

STRUCTURE	DESIGN LOAD COMP STRESS (TOP @) (SERVICE I) fct (ksi)	DESIGN LOAD TENSILE STRESS (BOTT @) (SERVICE III) fcb (ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (ft-kips)	LIVE LOAD DISTRIBUTION FACTOR (2): Moment	LIVE LOAD DISTRIBUTION FACTOR (2): Shear
US 290 EBML	4.124	-3.675	6690	0.436	0.683
SPRING CYPRESS	4.211	-3.898	7273	0.480	0.683
RD OVERPASS	4.157	-3.838	7183	0.480	0.683
WIDENING	4.259	-3.800	6932	0.439	0.684
	4.285	-3.820	6961	0.439	0.684
	4.350	-3.980	7277	0.439	0.684
	4.315	-3.938	7212	0.438	0.684
	3.882	-3.552	6621	0.491	0.737
	3.930	-3.687	6891	0.490	0.737
	3.816	-3.566	6710	0.490	0.738



TYPE Tx28, Tx34 & Tx40 (3)



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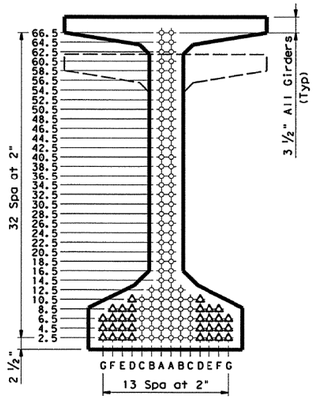

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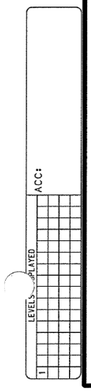

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Specifications.

All concrete must be Class H. Provide Class H(HPC) if shown elsewhere in plans. All reinforcing bars must be Grade 60.

When shown on this sheet, the Fabricator has the option of furnishing either the designed depressed strand girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a registered Professional Engineer.

Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.

Prestress losses for the designed girders have been calculated for a relative humidity of 75 percent. Optional designs must likewise conform.

For depressed strand designed girders, strands must be located as low as possible on the 2" grid system unless a Non-Standard Strand Pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.

Strands for the designed girder must be low relaxation strands pretensioned to 75 percent of fpu each.

Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

All beams designed using a compressive design release strength factor = 0.65. Release strengths shown may NOT be further reduced using 5197 criteria in optional designs.

(1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

(2) Portion of full HL93.

(3) Full-length debonded strands are only permitted in strand positions marked Δ. Double wrap full-length debonded strands in outermost position of each row. Full-length debonding must comply with Item 426.4.F.4.

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED
PROFESSIONAL ENGINEER
4/26/2013

Texas Department of Transportation
Bridge Division

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)

IGND

FILE: igndstel.dgn	DN: FSTS	CK: TxDOT	DW: ST	CK: TxDOT
©TxDOT June 2007	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS 02/09: General Notes. 10/09: General Notes. 12/10: Rel Strgth & LLDF.	HOU			1075
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS	6050	06	081	US 290

CONTRACTOR'S INFORMATION ONLY

US 290 EB MAINLANES SPRING CYPRESS RD OVERPASS WIDENING

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS) IGND

(AS-BUILT PLAN)

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			54
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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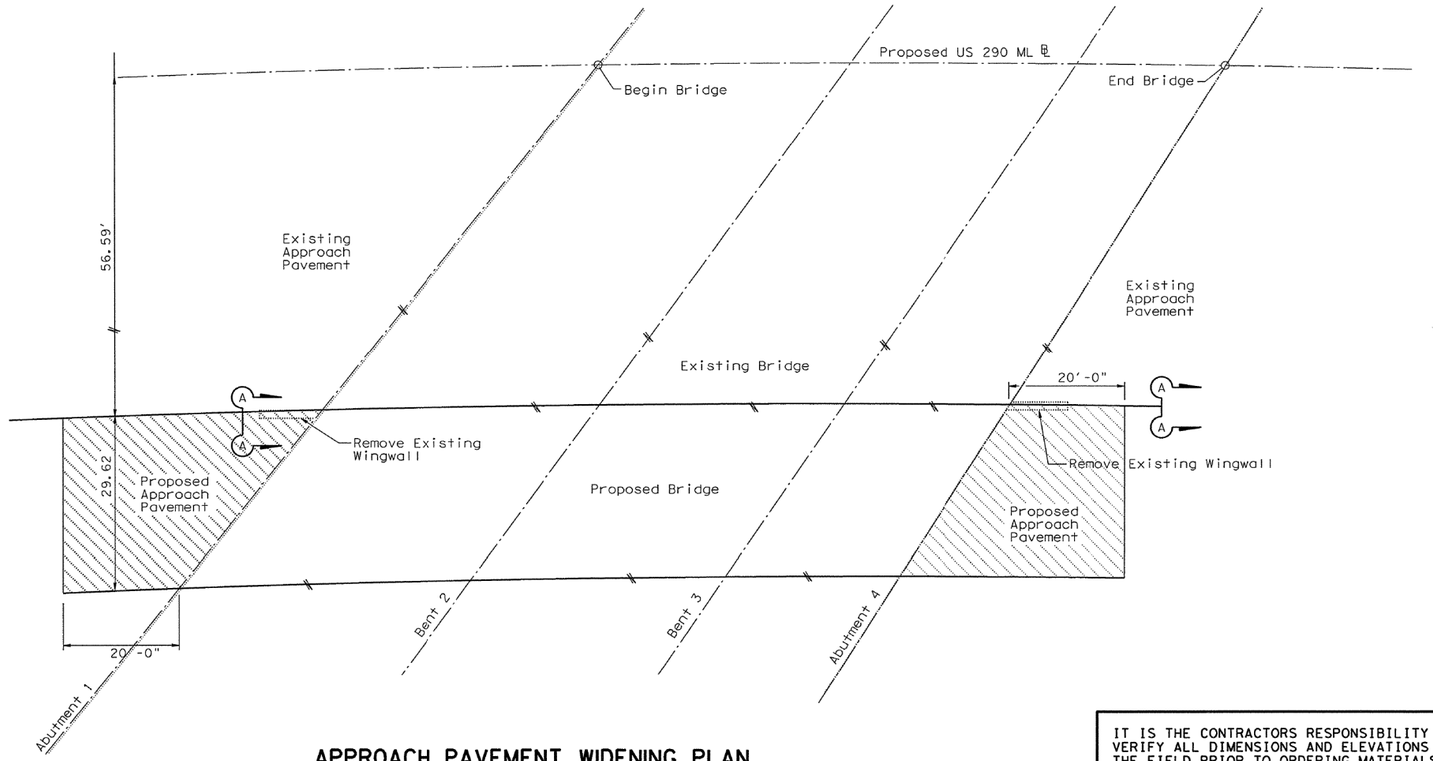
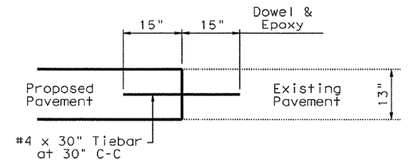


APPROACH PAVEMENT WIDENING PLAN



LONGITUDINAL JOINT SECTION A-A

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

STATE OF TEXAS
FREDERICK SUNDERMAN
103782
LICENSED PROFESSIONAL ENGINEER
4/26/2013

HL20 LOADING (EXISTING)
HL93 LOADING (WIDENING)

Texas Department of Transportation
Houston District (Bridge)

US 290

APPROACH PAVEMENT MODIFICATION PLAN

US 290 EB MAINLANES
SPRING CYPRESS RD OVERPASS
WIDENING

FILE: approach.dgn	DN: YL	CK: MEC	DW: BJJ	CK: YL
© TxDOT APRIL 2013	DISTRICT	FED REG	PROJECT NO.	SHEET
REVISIONS	HOUSTON	6		1069
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS	0050	08	081	US290

CONTRACTOR'S INFORMATION ONLY

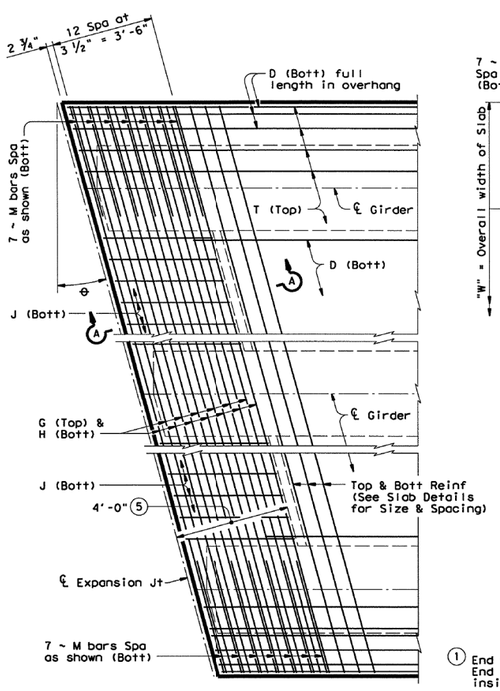
US 290
EB MAINLANES
SPRING CYPRESS RD OVERPASS WIDENING

APPROACH PAVEMENT MODIFICATION PLAN

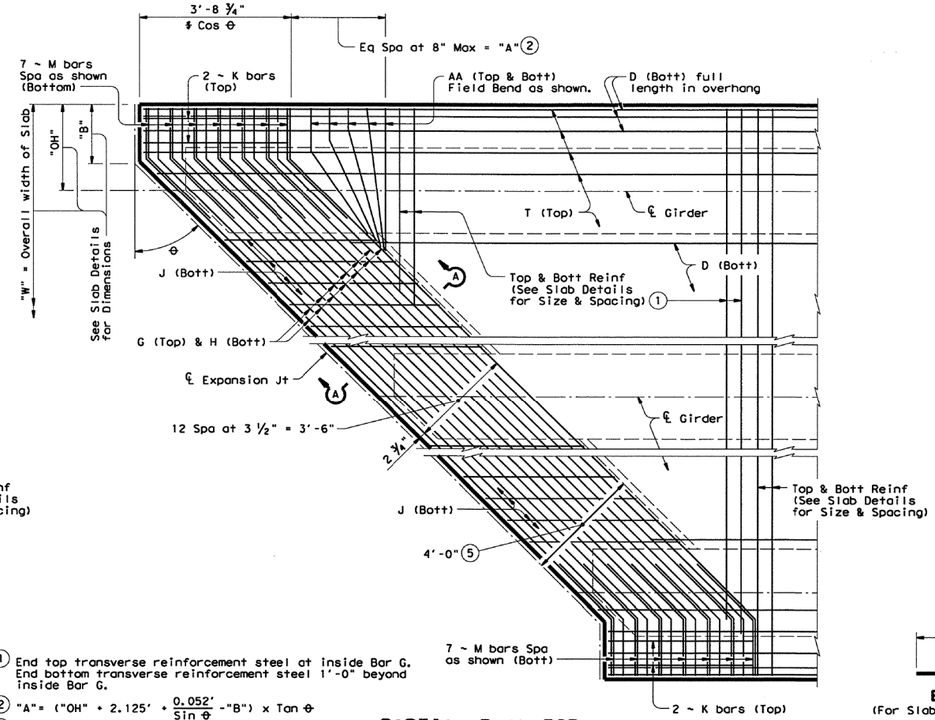
(AS-BUILT PLAN)

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			55
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

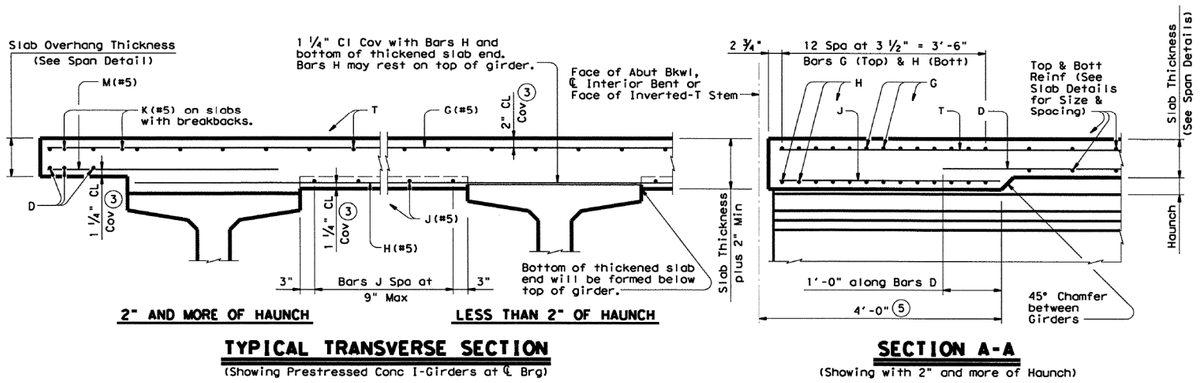


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



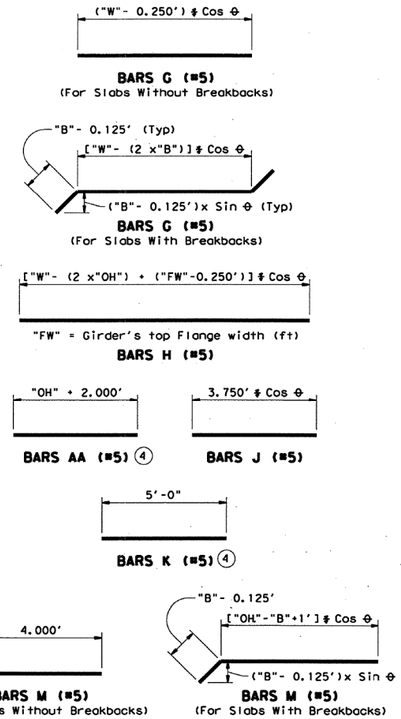
PARTIAL PLAN FOR SLABS WITH BREAKBACK

1. End top transverse reinforcement steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.
2. "A" = ("OH" + 2.125' + $\frac{0.052'}{\sin \Theta}$ - "B") x Tan Θ
3. Clear Cover will be as shown unless otherwise shown on Span Details.
4. Only required on slabs with breakbacks.
5. Thickened Slab End dimensioned perpendicular to Face of Bkwl, Centerline Interior Bent or Face of Inverted-T Stem.



TYPICAL TRANSVERSE SECTION
(Showing Prestressed Conc I-Girders at ℄ Brg)

SECTION A-A
(Showing with 2" and more of Haunch)



GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.
These details are restricted to Prestressed Concrete I-Girder Spans.
These details are to be used in conjunction with the Span Details and Standard PCP (if prestressed concrete panels are used).
All reinforcing bars must be Grade 60 steel.
If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J and M must be epoxy coated.
Bar laps, where required, will be as follows:

Uncoated ~ #4	1'-5"
~ #5	1'-9"
Epoxy Coated ~ #4	2'-1"
~ #5	2'-7"

HL93 LOADING

Texas Department of Transportation
Bridge Division

THICKENED SLAB END DETAILS
PRESTRESSED CONCRETE I-GIRDER SPANS

IGTS

FILE: igtsste1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT June 2007	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	HOU			129
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS	0050	06	081	US290

CONTRACTOR'S INFORMATION ONLY

THICKNED SLAB END DETAILS PRESTRESSED CONCRETE I-GIRDER SPANS

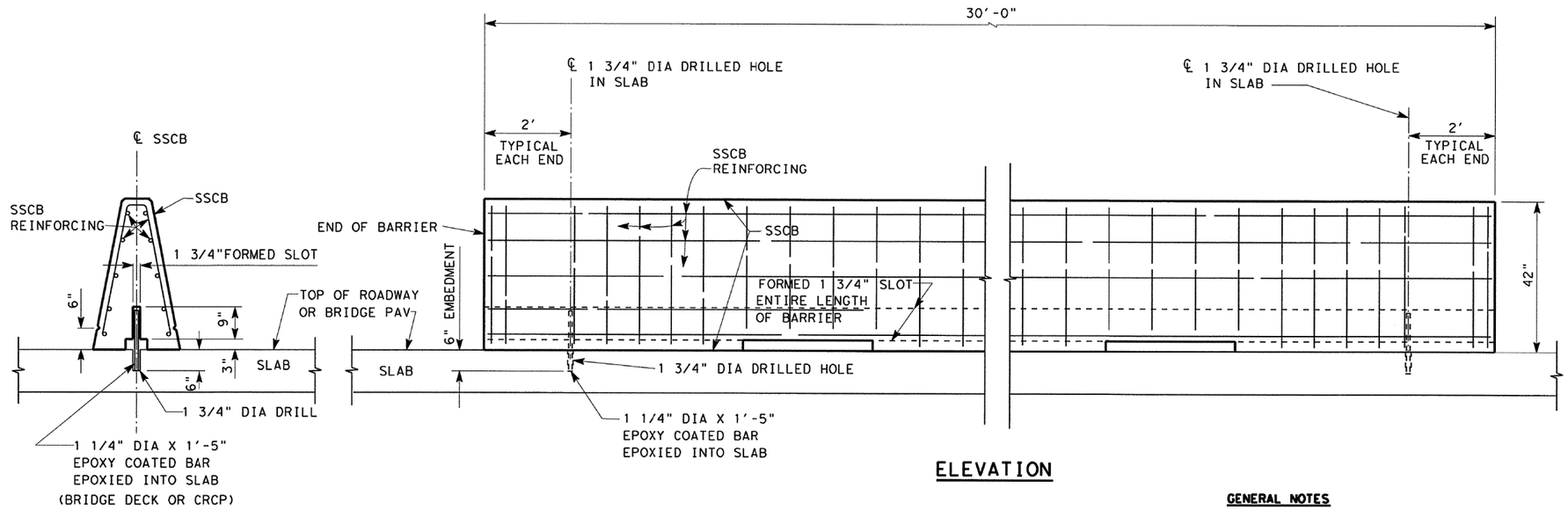
IGTS

(AS-BUILT PLAN)

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			56
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

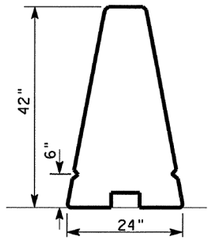
H:\WCHAO\Design\Maintenance Projects\RMC\RMC 6382-11-001\Plan Set\3. Roadway\Standard\IGTS.dgn



SECTION

ELEVATION

PRECAST SSCB PINNED
(WITH OPTIONAL CONDUIT TROUGH SHOWN)



TYPICAL SECTION

GENERAL NOTES

1. These details provide a method of laterally restraining precast concrete barrier to limit deflections under normally expected passenger vehicle impacts. These details are intended for use on both sides of managed lanes.
2. See SSCB(2) standard sheets for reinforcement requirements, J-J Hook connection, and drainage slot.
3. The forming of slots in the barrier, drilling of holes in bridge deck or pavement, fabrication and materials for the 1 ¼in. pins, installation of pins, J-J hook connections,and any repair to the barrier shall be considered as subsidiary to the barrier bid items.
4. Any damage to the barrier and travel surface will be repaired as directed by the Engineer in accordance with Item 429, "Concrete Structure Repair."
5. Weight of barrier is approx. 700 lbs per foot.

STATE OF TEXAS
KING YUEN
86432
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by King Yuen, P.E. 86432,
on 8-9, 13
King Yuen, P.E.
Signed

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1) PINNED PLACEMENT
SSCB(5)-10 (MOD)

FILE: sscb510.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	6	081	US290
	DIST	COUNTY		SHEET NO.
	12	HARRIS		544B

DATE:
FILE:

CONTRACTOR'S INFORMATION ONLY

SINGLE SLOPE CONCRETE BARRIER PRECAST BARRIER (TYPE 1) PINNED PLACEMENT

SSCB(5)-10 (MOD)

(AS-BUILT PLAN)

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			57
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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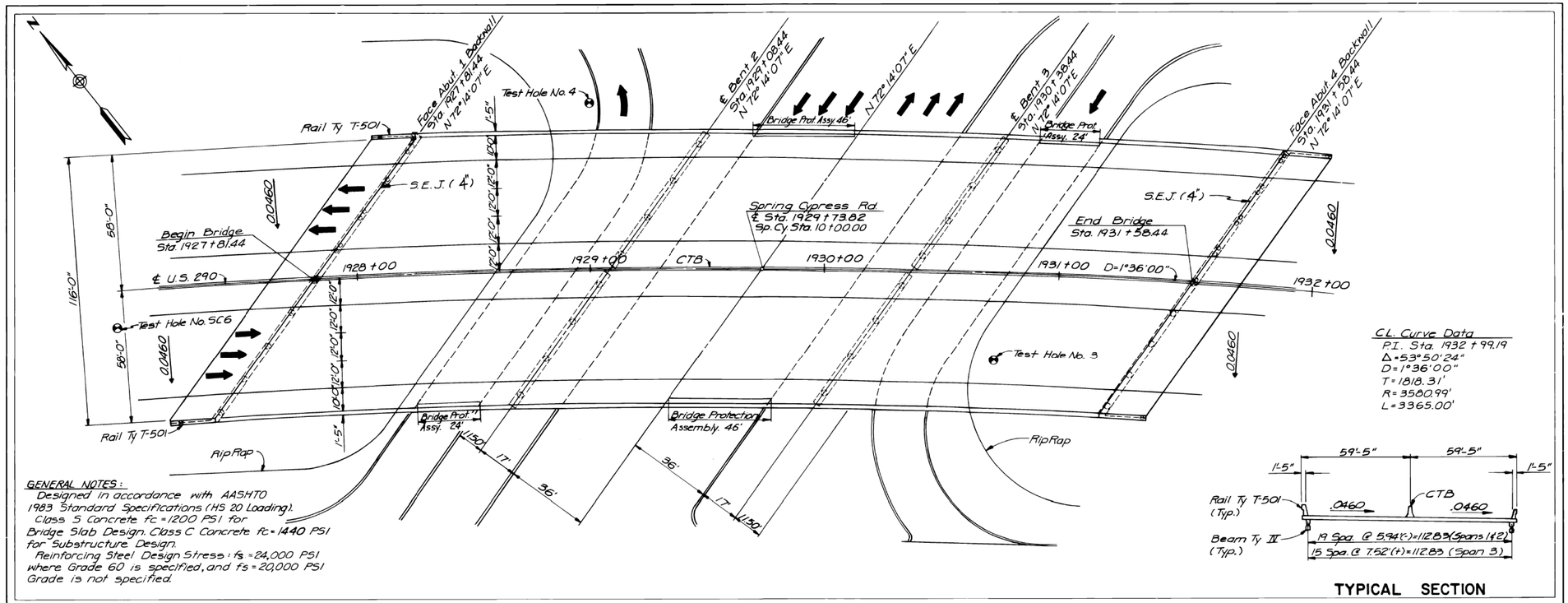

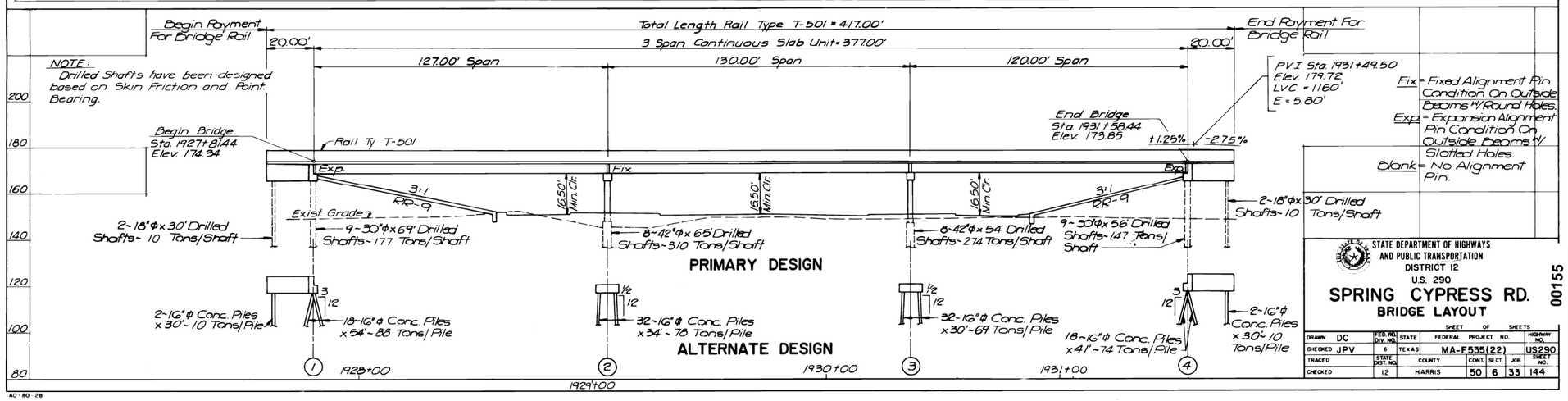

AD-80-28

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290
SPRING CYPRESS RD.
BRIDGE LAYOUT
00155

DRAWN	DC	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CHECKED	JPV	6	TEXAS	MA-F535(22)	US290
TRACED		STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CHECKED		12	HARRIS	50 6 33	144

SHEET OF SHEETS

CONTRACTOR'S INFORMATION ONLY

US 290 MAINLANES SPRING CYPRESS RD OVERPASS

BRIDGE LAYOUT

(AS-BUILT PLAN)

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		58

STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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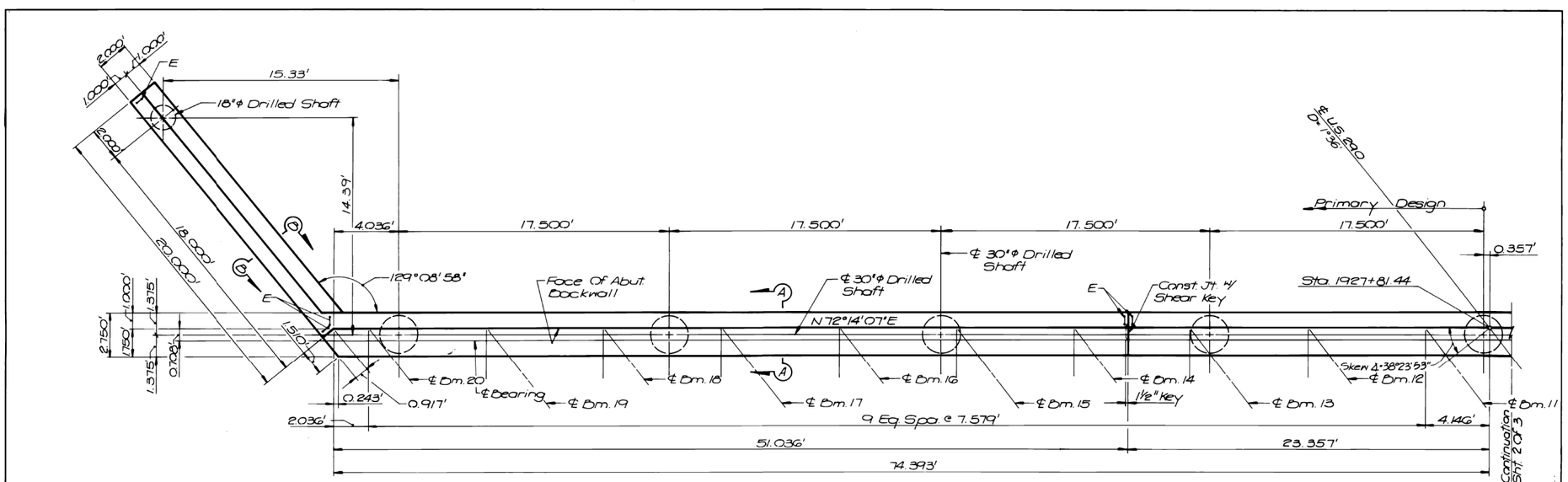
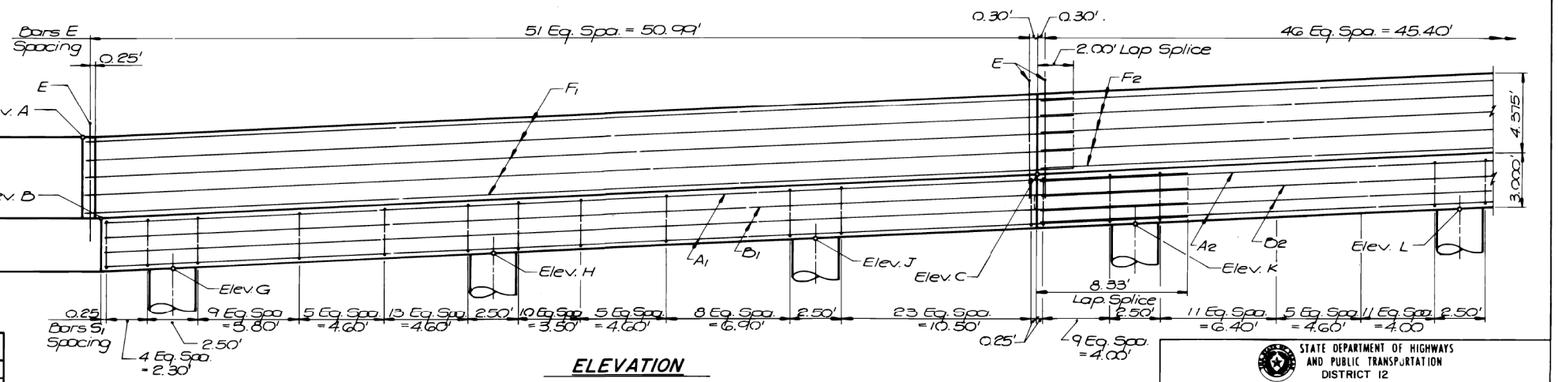


PLAN
(Looking Down Station)



ELEVATION

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY	
		PRIMARY	ALTERNATE
Cl. "C" Conc. (Abut.)	C.Y.	85.0	85.0
Cem. Stab. Bkfl.	C.Y.	216.5	216.5
Reinf. Steel #	LB.	19,246	19,268

For Contractor's Information Only. No Direct Payment.

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	BM. 15	BM. 16	BM. 17	BM. 18	BM. 19	BM. 20
171.70'	171.40'	171.11'	170.82'	170.52'	170.23'	169.93'	169.64'	169.34'	169.04'	168.74'	168.45'	168.15'	167.85'	167.55'	167.25'	166.95'	166.65'	166.34'	166.04'

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

ABUTMENT 1
SPRING CYPRESS RD.

SHEET 1 OF 3

DN JPV	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK DN	ORIGINAL	JUNE, 1988	6	TEXAS	MA-F535 (22)	US 290
DW DRG			STATE DIST. NO.	COUNTY	CONT. SEC'T. JOB	SHEET NO.
CK DW JPV			12	HARRIS	080 06 033	147
TR						
CK TR						

00158

CONTRACTOR'S INFORMATION ONLY

US 290 MAINLANES SPRING CYPRESS RD OVERPASS

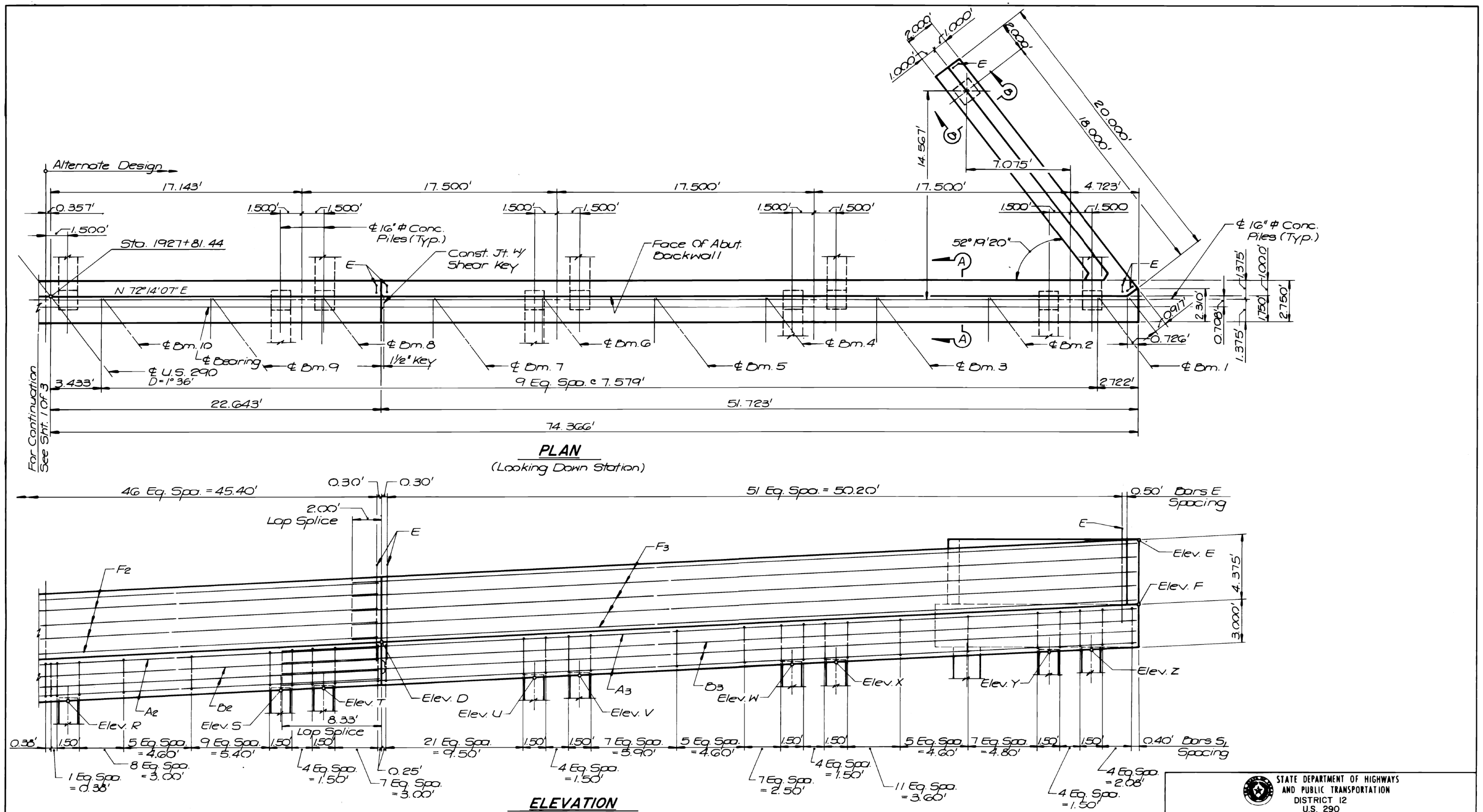
ABUTMENT 1

(AS-BUILT PLAN)

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		59

STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



ABUTMENT ELEVATIONS

	ELEV. A	ELEV. B	ELEV. C	ELEV. D	ELEV. E	ELEV. F	ELEV. G	ELEV. H	ELEV. J	ELEV. K	ELEV. L	ELEV. M	ELEV. N	ELEV. P	ELEV. Q	ELEV. R	ELEV. S	ELEV. T	ELEV. U	ELEV. V	ELEV. W	ELEV. X	ELEV. Y	ELEV. Z	ELEV. AA	ELEV. BB
PRIMARY DESIGN	170.21'	165.85'	167.86'	169.67'	176.08'	171.70'	163.03'	163.71'	164.40'	165.09'	165.78'	166.47'	167.16'	167.85'	168.52'	—	—	—	—	—	—	—	—	—	170.03'	176.00'
ALTERNATE DESIGN	170.21'	165.85'	167.86'	169.67'	176.08'	171.70'	162.95'	163.07'	163.64'	163.76'	164.38'	164.45'	165.02'	165.14'	165.71'	165.83'	166.40'	166.52'	167.09'	167.21'	167.78'	167.90'	168.47'	168.59'	170.03'	176.00'

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

ABUTMENT 1

SPRING CYPRESS RD.

SHEET 2 OF 3

DN JPV · CK DN · DW DRG · CK DW JPV · DRAWING ORIGINAL · DATE JUNE, 1988 · FED. RD. DIV. NO. 6 · STATE TEXAS · FEDERAL PROJECT NO. MA-F535 (22) · HIGHWAY NO. US 290 · STATE DIST. NO. 12 · COUNTY HARRIS · CONT. 050 · SECT. 06 · JOB 033 · SHEET NO. 148

00159

CONTRACTOR'S INFORMATION ONLY

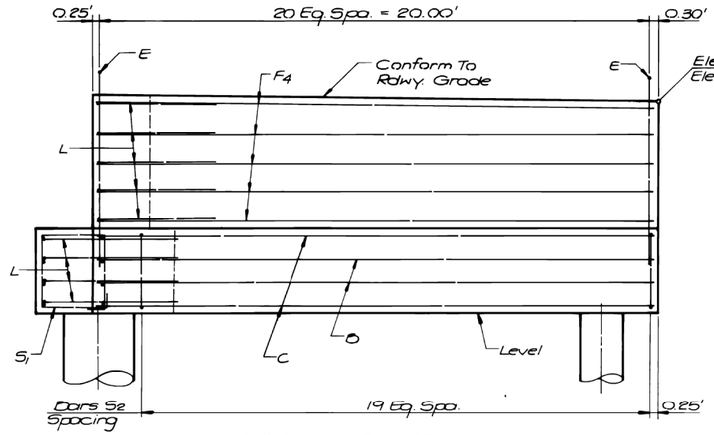
US 290 MAINLANES
SPRING CYPRESS RD
OVERPASS

ABUTMENT 1

(AS-BUILT PLAN)

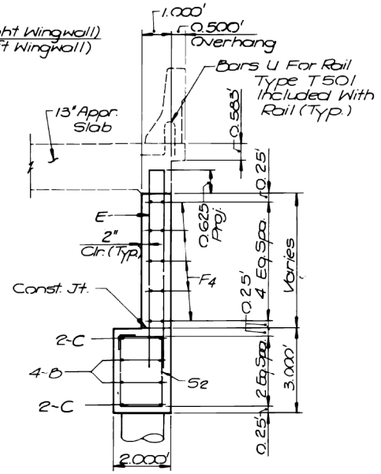
SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			60
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

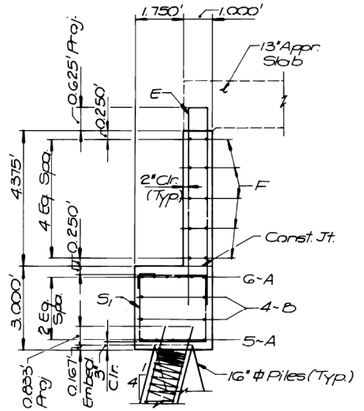


WINGWALL ELEVATION *

NOTE: Wingwalls Are Defined As Right Or Left When Looking Up Station



SECTION B-B



SECTION A-A

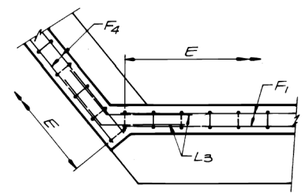
BILL OF REINF. STEEL

BARS	NO.	SIZE	LENGTH	WEIGHT
A1	11	#11	59.00'	3,448
A2	11	#11	45.75'	2,674
A3	11	#11	60.00'	3,507
B1	4	#6	59.00'	354
B2	4	#6	45.75'	275
B3	4	#6	60.00'	360
B4	4	#6	19.50'	117
B5	4	#6	18.50'	111
C1	4	#8	19.50'	208
C2	4	#8	18.50'	198
D	2	1½" ϕ	1.50'	13
E	193	#5	13.11'	2,639
F1	10	#5	55.25'	555
F2	10	#5	45.75'	477
F3	10	#5	52.75'	550
F4	20	#5	19.75'	412
L1	4	#6	8.00'	48
L2	4	#6	10.00'	60
L3	10	#5	5.00'	52
L4	4	#6	6.00'	36
L5	5	#5	5.00'	26
L6	4	#6	6.00'	36
L7	5	#5	5.00'	26
* S1	238	#5	10.78'	2,676
* S2	40	#5	9.30'	388
TOTAL IN POUNDS				19,896

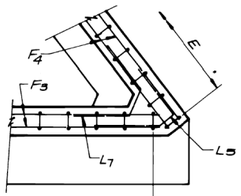
* Grade 60

ADDITIONAL REINF. STEEL
(ALTERNATE DESIGN)

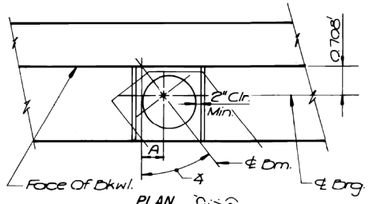
BARS	NO.	SIZE	LENGTH	WEIGHT
* S1	2	#5	10.78'	22
TOTAL IN POUNDS				22



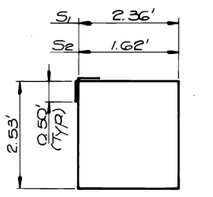
PLAN AT BACKWALL



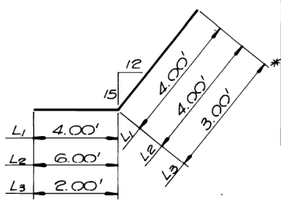
PLAN AT BACKWALL



PLAN



BARS S1 & S2

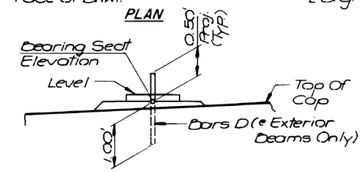


BARS L1, L2, & L3

PLAN AT ABUT. CAP

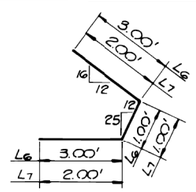
PLAN AT ABUT. CAP

CORNER DETAILS

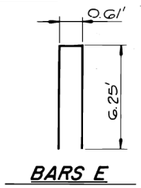


ELEVATION

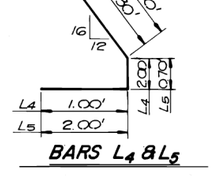
BEARING SEAT DETAILS



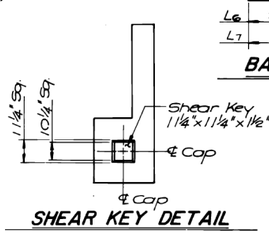
BARS L6 & L7



BARS E



BARS L4 & L5



SHEAR KEY DETAIL

BEARING SEAT OFFSETS

OFFSET	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	BM. 15	BM. 16	BM. 17	BM. 18	BM. 19	BM. 20
"A"	6 5/16	6 3/8	6 3/8	6 3/8	6 3/8	6 1/16	6 1/16	6 1/16	6 1/2	6 1/2	6 1/2	6 1/2	6 9/16	6 9/16	6 9/16	6 9/16	6 5/8	6 5/8	6 5/8	6 11/16

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

ABUTMENT 1 DETAILS

SPRING CYPRESS RD.

SHEET 3 OF 3

DN: JPV	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK: DN	ORIGINAL	JUNE, 1988	6	TEXAS	MA - F535 (22)	US 290
DW: DRG			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK: DW: JPV			12	HARRIS	080 06 033	149
TR:						
CK: TR:						

00160

CONTRACTOR'S INFORMATION ONLY

US 290 MAINLANES
SPRING CYPRESS RD
OVERPASS

ABUTMENT 1

(AS-BUILT PLAN)

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		61

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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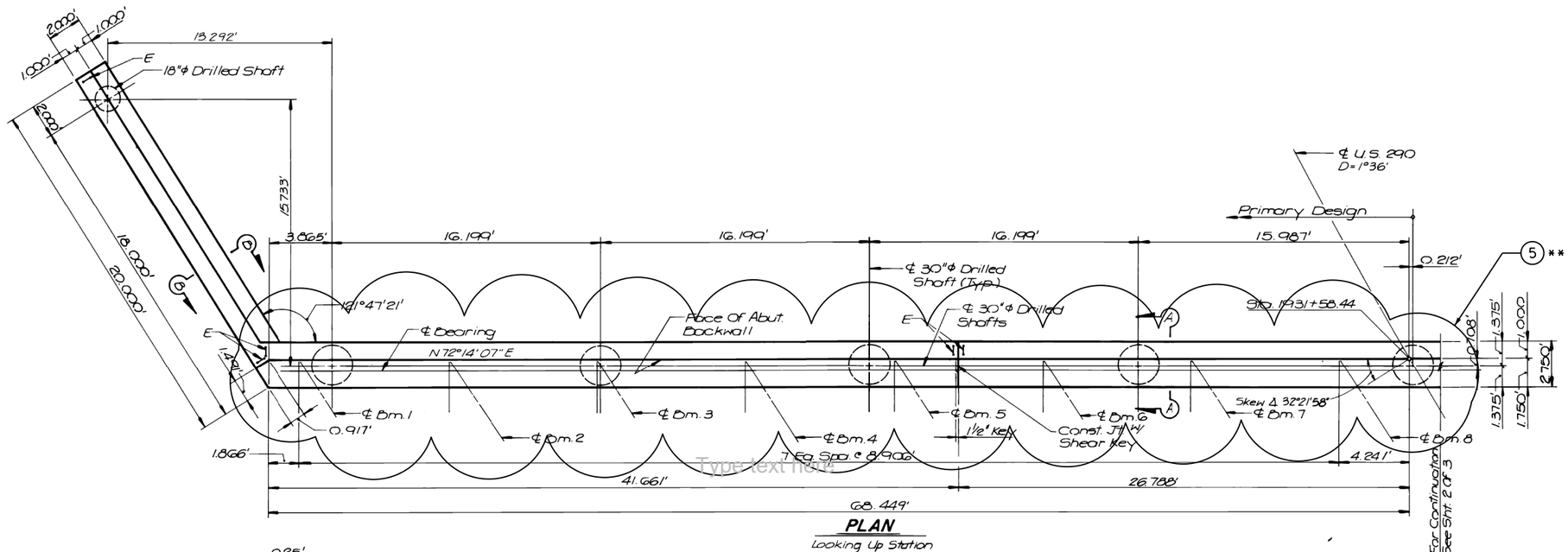
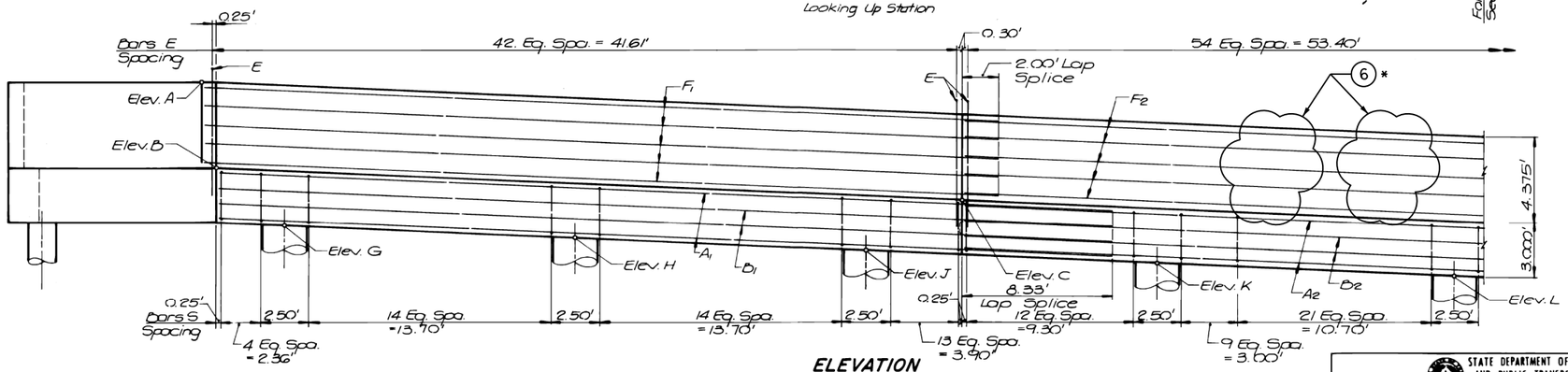


PLAN
Looking Up Station



ELEVATION

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY PRIMARY	QUANTITY ALTERNATE
Cl. "C" Conc. (Abut.)	C.Y.	80.0	80.0
Cem. Stab. Bkfl.	L.F.	204.4	204.4
Reinf. Steel *	LB	16,882	16,994

*Reinforcing Steel quantities are for contractor's information only. No direct payment.

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	BM. 15	BM. 16
170.68	170.37	170.06	169.76	169.45	169.14	168.83	168.52	168.22	167.91	167.60	167.29	166.98	166.66	166.35	166.04

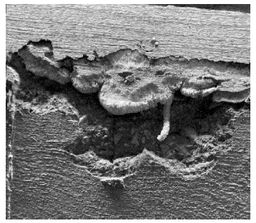
** ⑤ REPLACE 16 BEARING PADS AT ABUTMENT 4, EXCEPT WIDENING PORTION OF WB & EB MAINLANES

* ⑥ 30"X18"X1" MODERATE SPALL AT ABUT 4 RIGHT OF BEAM 7.
24"X48"X4" DEEP SPALL WITH EXPOSED REBAR AT ABUT 4 BEHIND BEAM 8.
48"X48"X5" DEEP SPALL WITH EXPOSED REBAR AT ABUT 4 RIGHT OF BEAM 16.

* EXACT DIMENSIONS OF REPAIR TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO REPAIR.

** 16 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN "PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS)" "GpB-2". THE NEW PADS SHOULD BE FABRICATED TO CONFORM TO TXDOT STANDARD "IBEB" AND MATCH ORIGINAL HEIGHTS AND SLOPES.

⑥ *



30"X18"X1" MODERATE SPALL AT ABUT 4 RIGHT OF BEAM 7

⑥ *

24"X48"X4" DEEP SPALL WITH EXPOSED REBAR AT ABUT 4 BEHIND BEAM 8.

STATE OF TEXAS
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

Steve Van, P.E.

08/19/2021

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

ABUTMENT 4

SPRING CYPRESS RD.

SHEET 1 OF 3

DN: JPV	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK DN:	ORIGINAL	JUNE, 1988	6	TEXAS	MA-F535(22)	US290
DW: DRG			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK DW: JPV			12	HARRIS	050 06 033	150
TR:						
CK TR:						

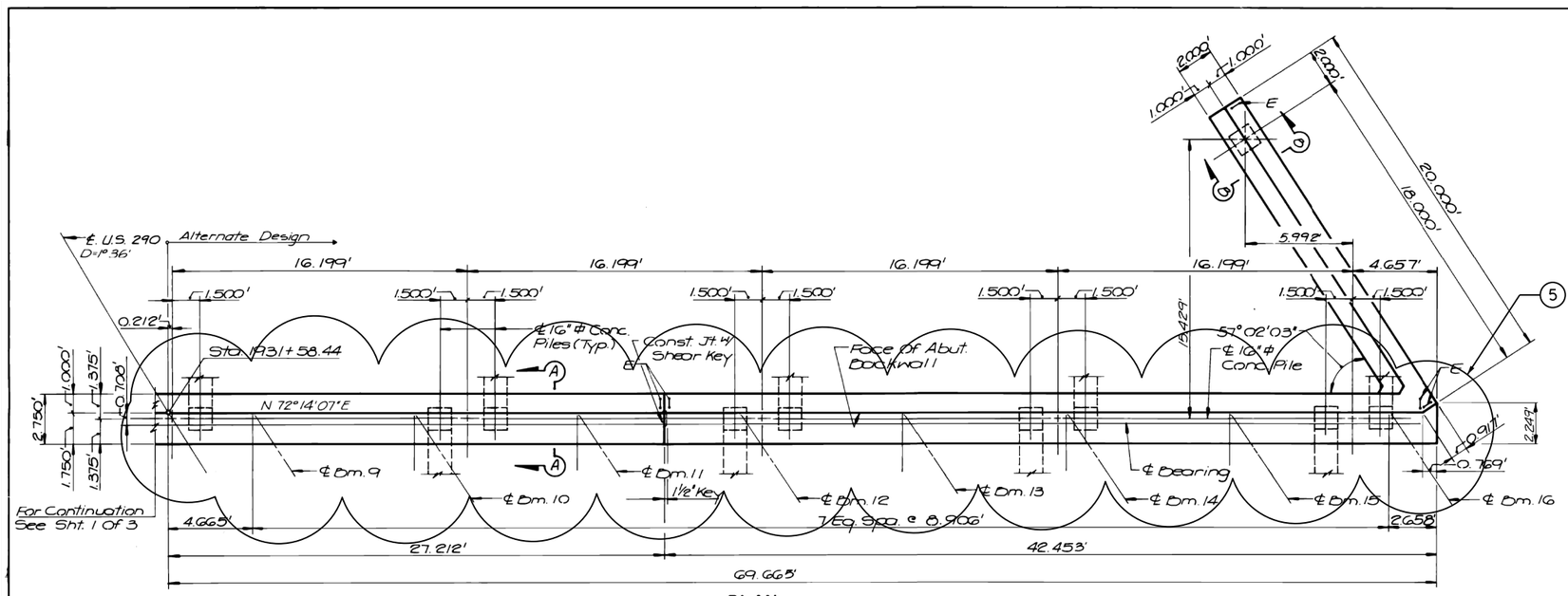
00161

US 290 MAINLANES SPRING CYPRESS RD OVERPASS

ABUTMENT 4

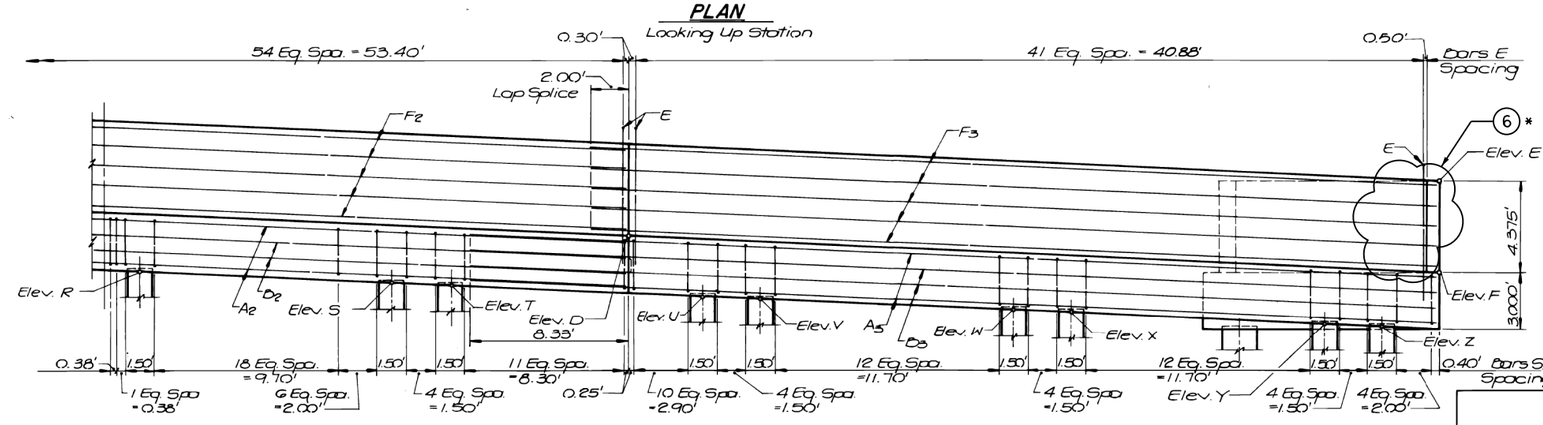
SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			62
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



PLAN

Looking Up Station



ELEVATION

ABUTMENT ELEVATIONS

	ELEV. A	ELEV. B	ELEV. C	ELEV. D	ELEV. E	ELEV. F	ELEV. G	ELEV. H	ELEV. J	ELEV. K	ELEV. L	ELEV. M	ELEV. N	ELEV. P	ELEV. Q	ELEV. R	ELEV. S	ELEV. T	ELEV. U	ELEV. V	ELEV. W	ELEV. X	ELEV. Y	ELEV. Z	ELEV AA	ELEV. BB
PRIMARY DESIGN	175.03	170.66	169.21	167.34	170.24	165.86	167.52	166.92	166.40	165.84	165.28	164.71	164.15	163.58	163.02	—	—	—	—	—	—	—	—	—	170.11	174.90
ALTERNATE DESIGN	175.03	170.66	169.21	167.34	170.24	165.86	167.57	167.47	166.97	166.87	166.45	166.35	165.89	165.79	166.33	165.23	164.76	164.66	164.20	164.10	163.63	163.53	163.07	162.97	170.11	174.90

** ⑤ REPLACE 16 BEARING PADS AT ABUTMENT 4, EXCEPT WIDENING PORTION OF WB & EB MAINLANES

* ⑥ 30"X18"X1" MODERATE SPALL AT ABUT 4 RIGHT OF BEAM 7.
24"X48"X4" DEEP SPALL WITH EXPOSED REBAR AT ABUT 4 BEHIND BEAM 8.
48"X48"X5" DEEP SPALL WITH EXPOSED REBAR AT ABUT 4 RIGHT OF BEAM 16.

* EXACT DIMENSIONS OF REPAIR TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO REPAIR.

** 16 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN "PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS)" "GpB-2". THE NEW PADS SHOULD BE FABRICATED TO CONFORM TO TXDOT STANDARD "IBEB" AND MATCH ORIGINAL HEIGHTS AND SLOPES.

⑥ *

48"X48"X5" DEEP SPALL WITH EXPOSED REBAR AT ABUT 4 RIGHT OF BEAM 16.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

ABUTMENT 4

SPRING CYPRESS RD.

SHEET 2 OF 3

DN JPV	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK DR	ORIGINAL	JUNE, 1988	6	TEXAS	MA-F535(22)	US 290
DW DRG			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK DW JPV			12	HARRIS	050 06 033	151
TR						
CK TR						

00162

STATE OF TEXAS
STEVE VAN
137551
LICENSED
PROFESSIONAL ENGINEER

Steve Van, P.E.

08/19/2021

US 290 MAINLANES SPRING CYPRESS RD OVERPASS

ABUTMENT 4

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		63

STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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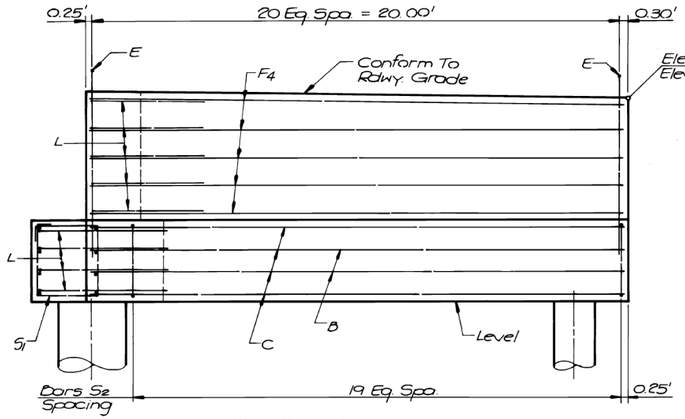
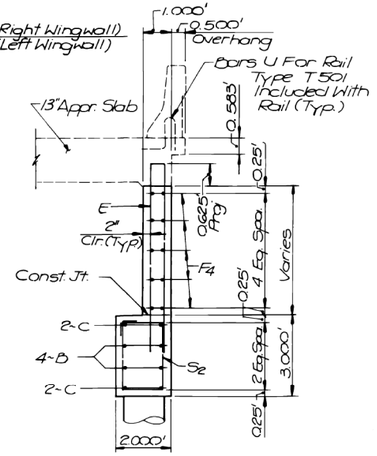
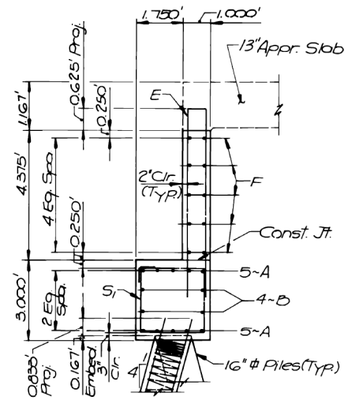


WINGWALL ELEVATION *

NOTE: Wingwalls Are Defined As Right Or Left When Looking Up Station



SECTION B-B



SECTION A-A

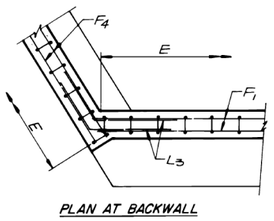
BILL OF REINF. STEEL

BARS	NO.	SIZE	LENGTH	WEIGHT
A1	10	#11	50.00'	2,651
A2	10	#11	53.75'	2,856
A3	10	#11	50.67'	2,692
B1	4	#6	50.00'	300
B2	4	#6	55.75'	323
B3	4	#6	50.67'	304
B4	4	#6	19.50'	117
B5	4	#6	18.50'	111
C1	4	#8	19.50'	208
C2	4	#8	18.50'	166
D	2	1¼"ϕ	1.50'	13
E	182	#5	13.11'	2,489
F1	10	#5	43.00'	449
F2	10	#5	53.75'	561
F3	10	#5	44.20'	461
F4	20	#5	19.75'	412
L1	4	#6	8.00'	48
L2	4	#6	10.00'	60
L3	10	#5	5.00'	52
L4	4	#6	6.00'	36
L5	5	#5	5.00'	26
L6	4	#6	6.00'	36
L7	5	#5	5.00'	26
+ S1	186	#5	10.78'	2,091
+ S2	40	#5	9.30'	388
TOTAL IN POUNDS				16,882

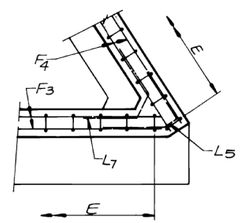
*Grade 60

ADDITIONAL REINF. STEEL
(ALTERNATE DESIGN)

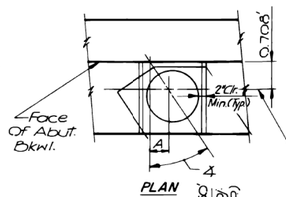
BARS	NO.	SIZE	LENGTH	WEIGHT
+ S1	10	#5	10.78'	112
TOTAL IN POUNDS				112



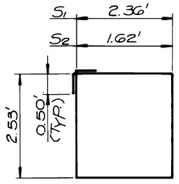
PLAN AT BACKWALL



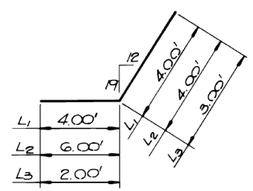
PLAN AT BACKWALL



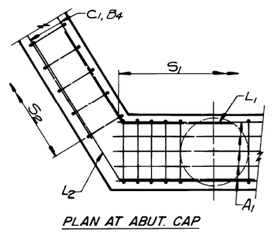
PLAN



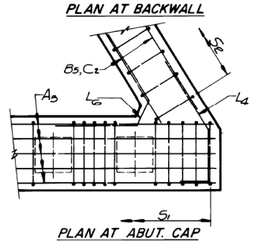
BARS S1 & S2



BARS L1, L2, & L3

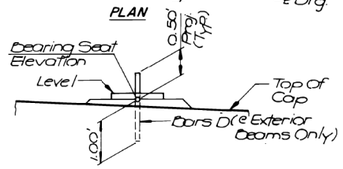


PLAN AT ABUT. CAP



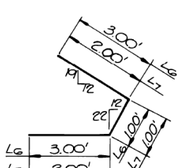
PLAN AT ABUT. CAP

CORNER DETAILS

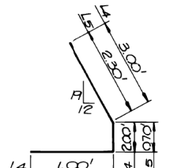


ELEVATION

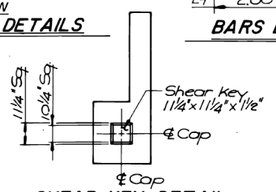
BEARING SEAT DETAILS



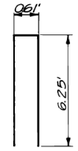
BARS L6 & L7



BARS L4 & L5



SHEAR KEY DETAIL



BARS E

BEARING SEAT OFFSETS

OFFSET	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	BM. 15	BM. 16
"A"	5 7/16"	5 1/2"	5 1/2"	5 1/2"	5 7/16"	5 7/16"	5 7/16"	5 7/16"	5 5/8"	5 5/8"	5 5/8"	5 5/8"	5 7/16"	5 7/16"	5 7/16"	5 7/16"

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

ABUTMENT 4 DETAILS
SPRING CYPRESS RD.

SHEET 3 OF 3

DN JPV	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK DN	ORIGINAL	JULY, 1988	6	TEXAS	MA-F535(02)	US290
DW DRG			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK DW JPV			12	HARRIS	050 06 033	152
TR						
CK TR						

00163

CONTRACTOR'S INFORMATION ONLY

US 290 MAINLANES SPRING CYPRESS RD OVERPASS

ABUTMENT 4

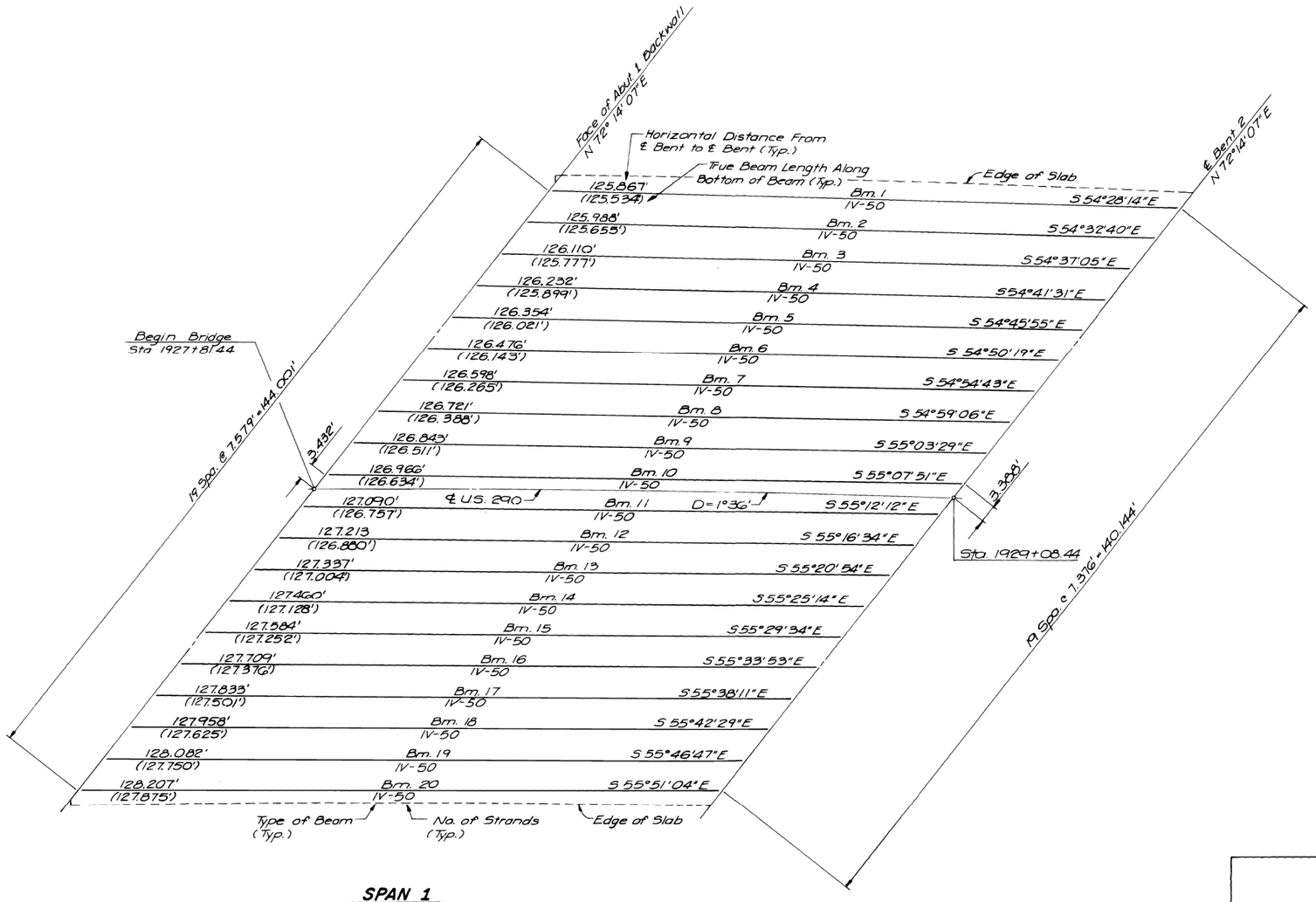
(AS-BUILT PLAN)

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		64

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



SPAN 1

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

BEAM LAYOUT

SPRING CYPRESS RD.

SHEET 1 OF 3

DN JPV	DRAWING	DATE	FED.RD. DIV.NO.	STATE	FEDERAL PROJECT NO.				HIGHWAY NO.
CK DN	ORIGINAL	APR.1988	6	TEXAS	MA-F535(22)				US290
DW DC			STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	SHEET NO.
CK DW JPV			12	HARRIS		050	06	033	156
TR									
CK TR									

00167

CONTRACTOR'S INFORMATION ONLY

US 290 MAINLANES SPRING CYPRESS RD OVERPASS

FRAMING PLAN

(AS-BUILT PLAN)

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			65
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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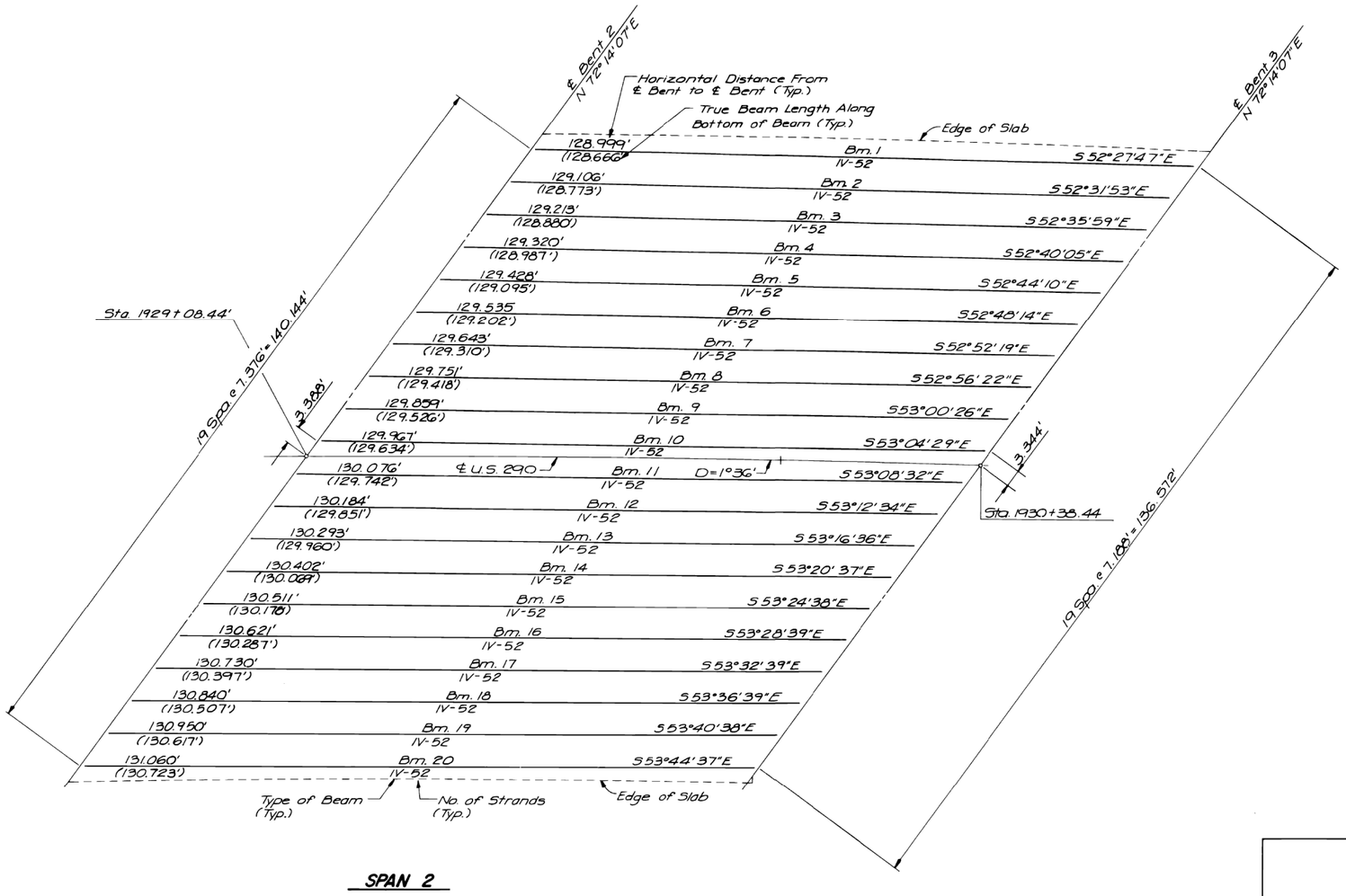

SPAN 2

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

BEAM LAYOUT
SPRING CYPRESS RD.

SHEET 2 OF 3

DN JPV	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK DN	ORIGINAL	APR. 1988	6	TEXAS	MA-F535(22)	US290
DW DC			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK DW JPV			12	HARRIS	050 06 033	157
TR						
CK TR						

00168

CONTRACTOR'S INFORMATION ONLY

US 290 MAINLANES
SPRING CYPRESS RD
OVERPASS

FRAMING PLAN

(AS-BUILT PLAN)

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			66
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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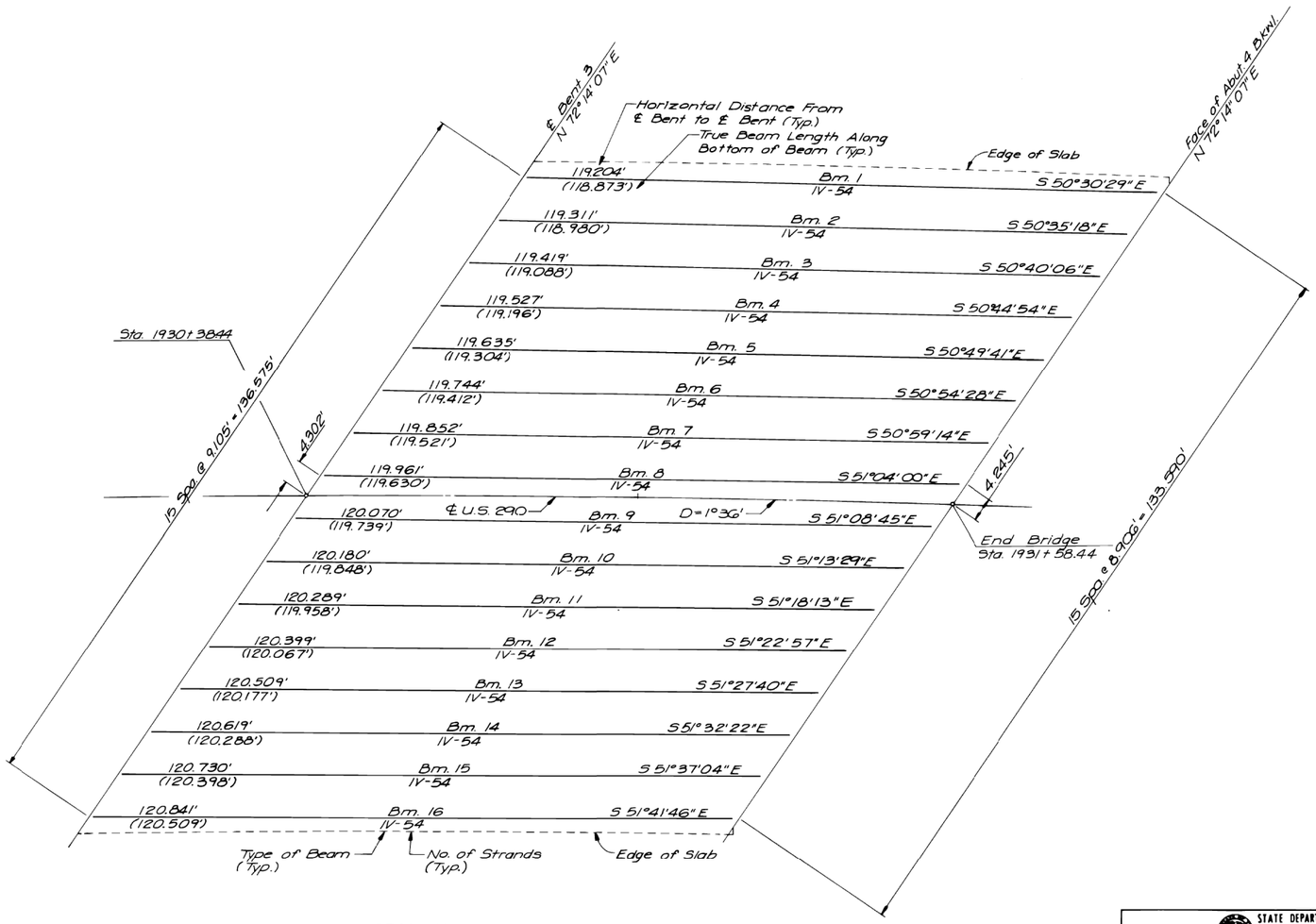

SPAN 3

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

BEAM LAYOUT
SPRING CYPRESS RD.

SHEET 3 OF 3

DN JPV	DRAWING	DATE	FED.RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK DN	ORIGINAL	APR.,1988	6	TEXAS	MA-F535(22)	US290
DW DC			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK DW JPV			12	HARRIS	050 06 033	158
TR						
CK TR						

00169

CONTRACTOR'S INFORMATION ONLY

US 290 MAINLANES SPRING CYPRESS RD OVERPASS

FRAMING PLAN

(AS-BUILT PLAN)

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			67
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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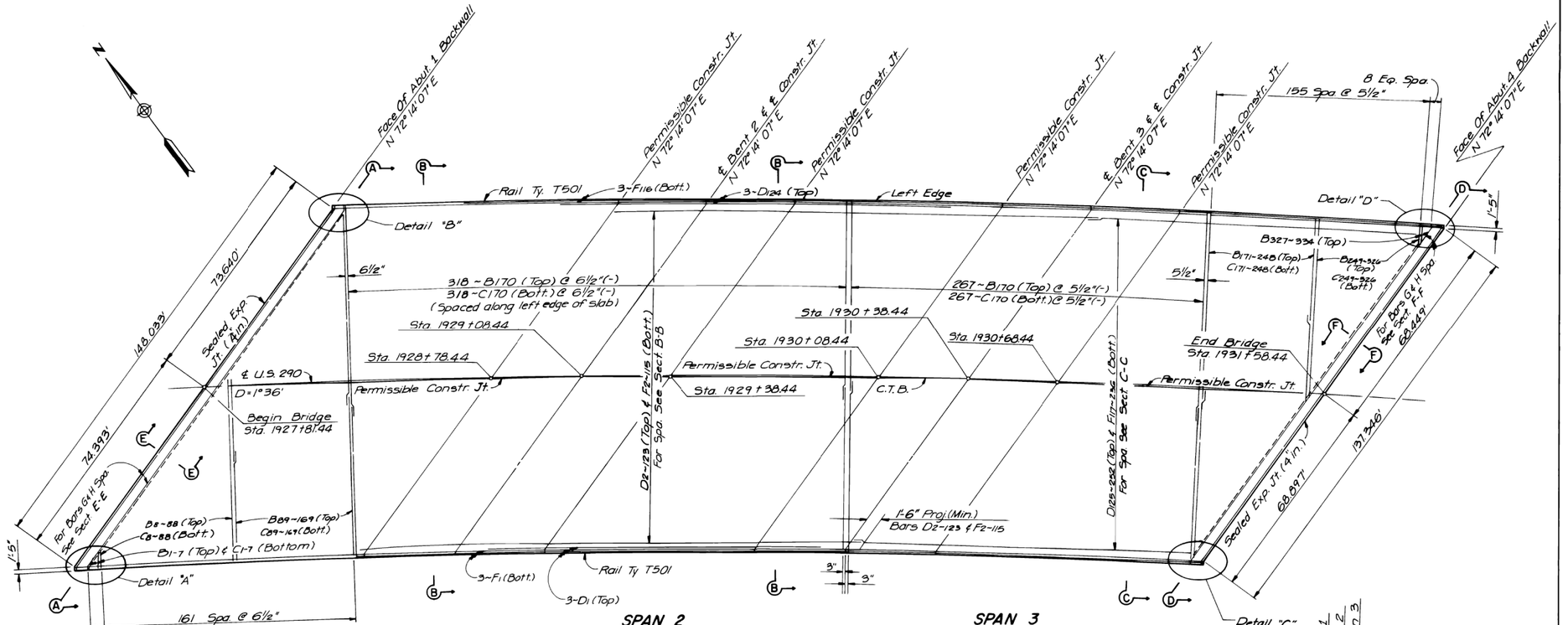
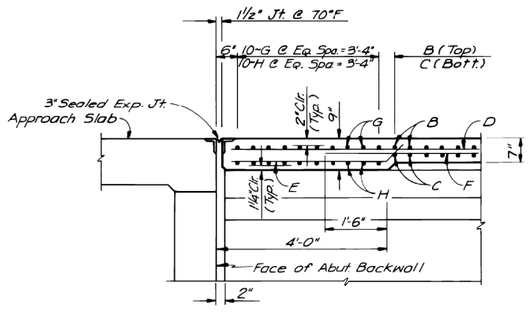
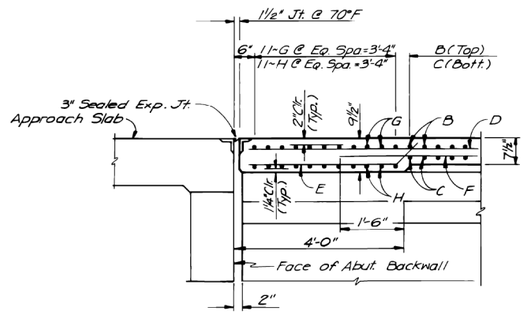




SECTION E-E



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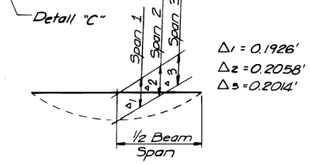

DEAD LOAD DEFLECTION DIAGRAM

NOTE: Deflections shown are due to the weight of cast-in-place concrete and rail only.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

SLAB DETAILS

SPRING CYPRESS RD.

SHEET 1 OF 4

DN JPV	DRAWING	DATE
CK DN	ORIGINAL	MAY 1988
DW DC		
CK DW JPV		
TR		
CK TR		

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
6	TEXAS	MA-F535(22)	US290

STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	SHEET NO.
12	HARRIS	050	06	033	159

00170

US 290 MAINLANES SPRING CYPRESS RD OVERPASS

SLAB DETAILS

(AS-BUILT PLAN)

SHEET 1 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			68
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

CONTRACTOR'S INFORMATION ONLY

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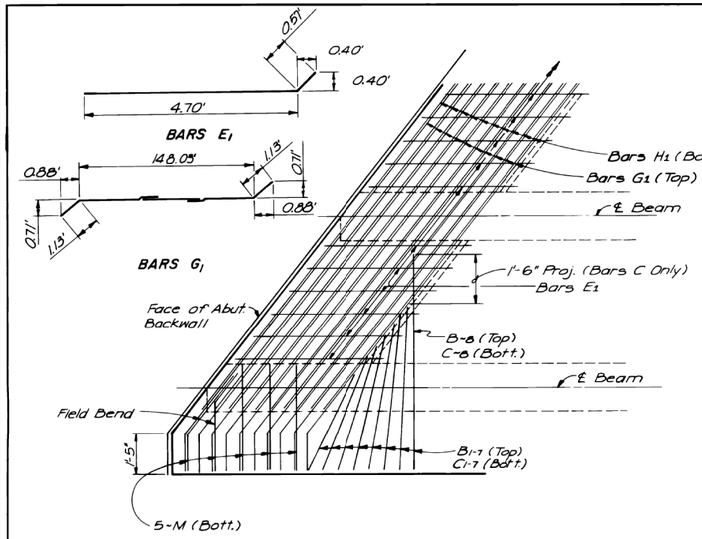
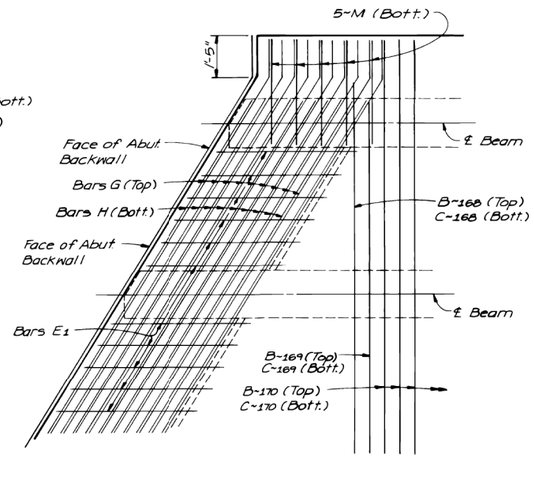


DETAIL "A"

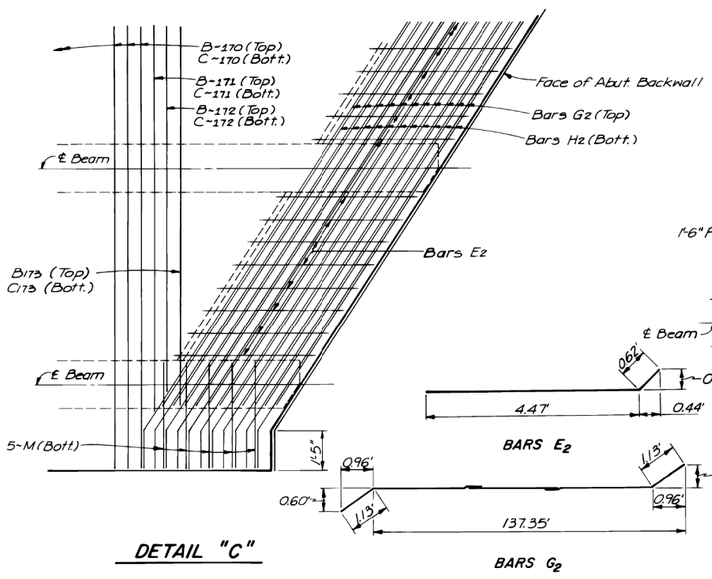


NOTE: Bars D Are Not Shown In Details A, B, C and D

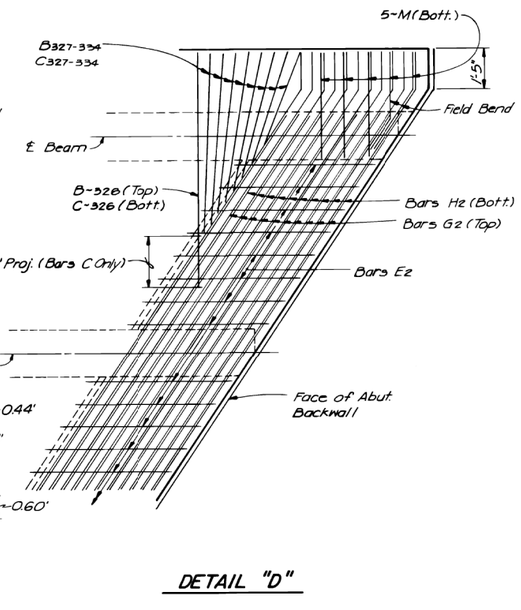
DETAIL "B"

B1 = 3.70'	4.70' Avg.	
B7 = 5.70'		
B8 = 6.00'	33.00' Avg.	
B88 = 60.00'		
B89 = 62.22'	90.10' Avg.	
B169 = 117.80'		
B171 = 118.00'	90.04' Avg.	
B248 = 62.07'		
B249 = 60.00'	33.33' Avg.	
B326 = 6.65'		
B327 = 6.30'	4.85' Avg.	
B334 = 3.40'		

C1 = 3.70'	4.70' Avg.	
C7 = 5.70'		
C6 = 7.50'	33.75' Avg.	
C86 = 60.00'		
C89 = 63.72'	91.16' Avg.	
C168 = 118.60'		
C173 = 118.10'	90.84' Avg.	
C248 = 63.57'		
C251 = 60.00'	34.08' Avg.	
C326 = 8.15'		
C327 = 6.30'	4.85' Avg.	
C334 = 3.40'		
D2 = 266.20'	264.00' Avg.	
D123 = 261.80'		
D125 = 123.43'	122.61' Avg.	
D252 = 121.79'		
F2 = 262.45'	260.25' Avg.	
F115 = 258.05'		
F117 = 119.68'	117.82' Avg.	
F237 = 115.95'		



DETAIL "C"



DETAIL "D"

BILL OF REINF. STEEL

	BARS	NO.	SIZE	LENGTH	WEIGHT
	B1-7	7	#5	4.70' Avg.	34
	B8-88	81	#5	33.00' Avg.	2788
+	B89-169	81	#5	90.10' Avg.	7612
+	B170	585	#5	120.00'	73,219
+	B171-248	78	#5	90.04' Avg.	7325
	B249-326	78	#5	33.33' Avg.	2712
	B327-334	8	#5	4.85' Avg.	40
	C1-7	7	#5	4.70' Avg.	34
	C8-86	79	#5	33.75' Avg.	2781
+	C87	1	#5	62.22'	65
+	C88	1	#5	62.92'	66
+	C89-168	80	#5	91.16' Avg.	7606
+	C169	1	#5	117.80'	123
+	C170	585	#5	120.00'	73,219
+	C171	1	#5	118.00'	123
+	C172	1	#5	117.30'	122
+	C173-248	76	#5	90.84' Avg.	7201
+	C249	1	#5	62.92'	66
+	C250	1	#5	62.22'	65
	C251-326	76	#5	34.08' Avg.	2701
	C327-334	8	#5	4.85' Avg.	40
≠	D1	3	#5	389.76'	1220
≠	D2-123	122	#5	264.0' Avg.	3359
≠	D124	3	#5	383.84'	1201
≠	D125-252	128	#5	122.61' Avg.	16369
	E1	114	#5	5.27'	627
	E2	120	#5	5.09'	637
≠	F1	3	#5	389.76'	1220
≠	F2-115	114	#5	260.25' Avg.	30,944
≠	F116	3	#5	383.84'	1201
≠	F117-237	120	#5	117.82' Avg.	14,746
≠	G1	10	#5	153.13'	1597
≠	G2	11	#5	142.45'	1634
≠	H1	10	#5	148.67'	1551
≠	H2	11	#5	138.00'	1583
	M	20	#5	3.70'	77
	Total In Pounds				265,908

+ Includes one 1'-5" splice
≠ Includes two 1'-5" splices
≠ Includes four 1'-5" splices
≠ Includes six 1'-5" splices

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Reinf. Conc. Slab	S.F.	44,805
Reinf. Stl.▲	LB	265,908
Conc. Surf. Treat.	S.Y.	4,978

▲ For Contractor's Information Only. No Direct Payment.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

SLAB DETAILS

SPRING CYPRESS RD.

SHEET 2 OF 4

DW JPV	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				HIGHWAY NO.
CK DN	ORIGINAL	JUNE 1988	6	TEXAS	MA-F535(22)				US290
DW DC			STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	SHEET NO.
CK DW JPV			12	HARRIS		050	06	033	160
TR									
CK TR									

00171

US 290 MAINLANES SPRING CYPRESS RD OVERPASS

SLAB DETAILS

(AS-BUILT PLAN)

SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			69
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

CONTRACTOR'S INFORMATION ONLY

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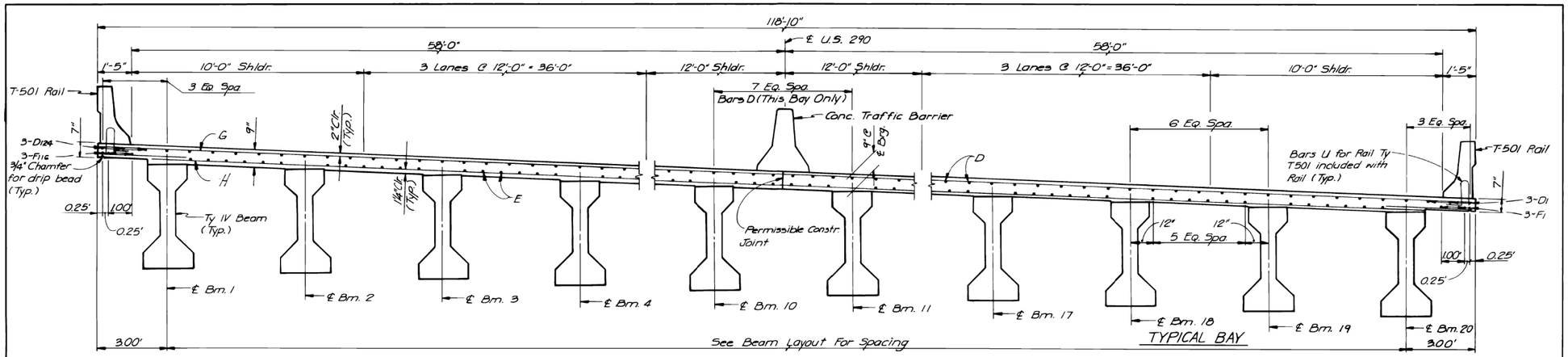
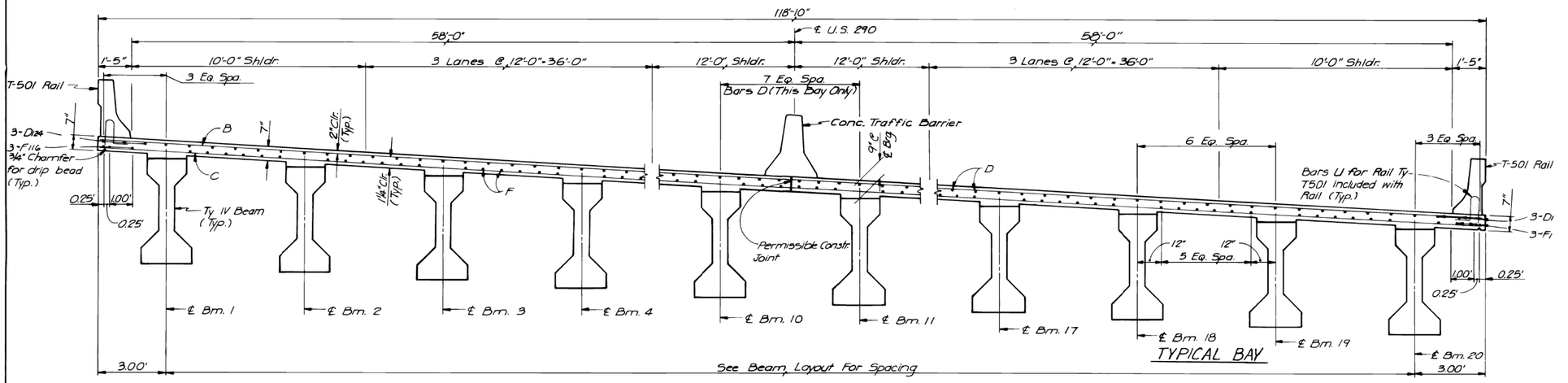


SECTION A-A



SECTION B-B

Rev 1/12/89

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

SLAB DETAILS

SPRING CYPRESS RD.

SHEET 3 OF 4

DN JPV	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK DN	ORIGINAL	MAY, 1988	6	TEXAS	MA-F535(22)	US290
DW DC			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK DW			12	HARRIS	050 06 033	161
TR						
CK TR						

00172

CONTRACTOR'S INFORMATION ONLY

US 290 MAINLANES
SPRING CYPRESS RD
OVERPASS

SLAB DETAILS

(AS-BUILT PLAN)

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		70

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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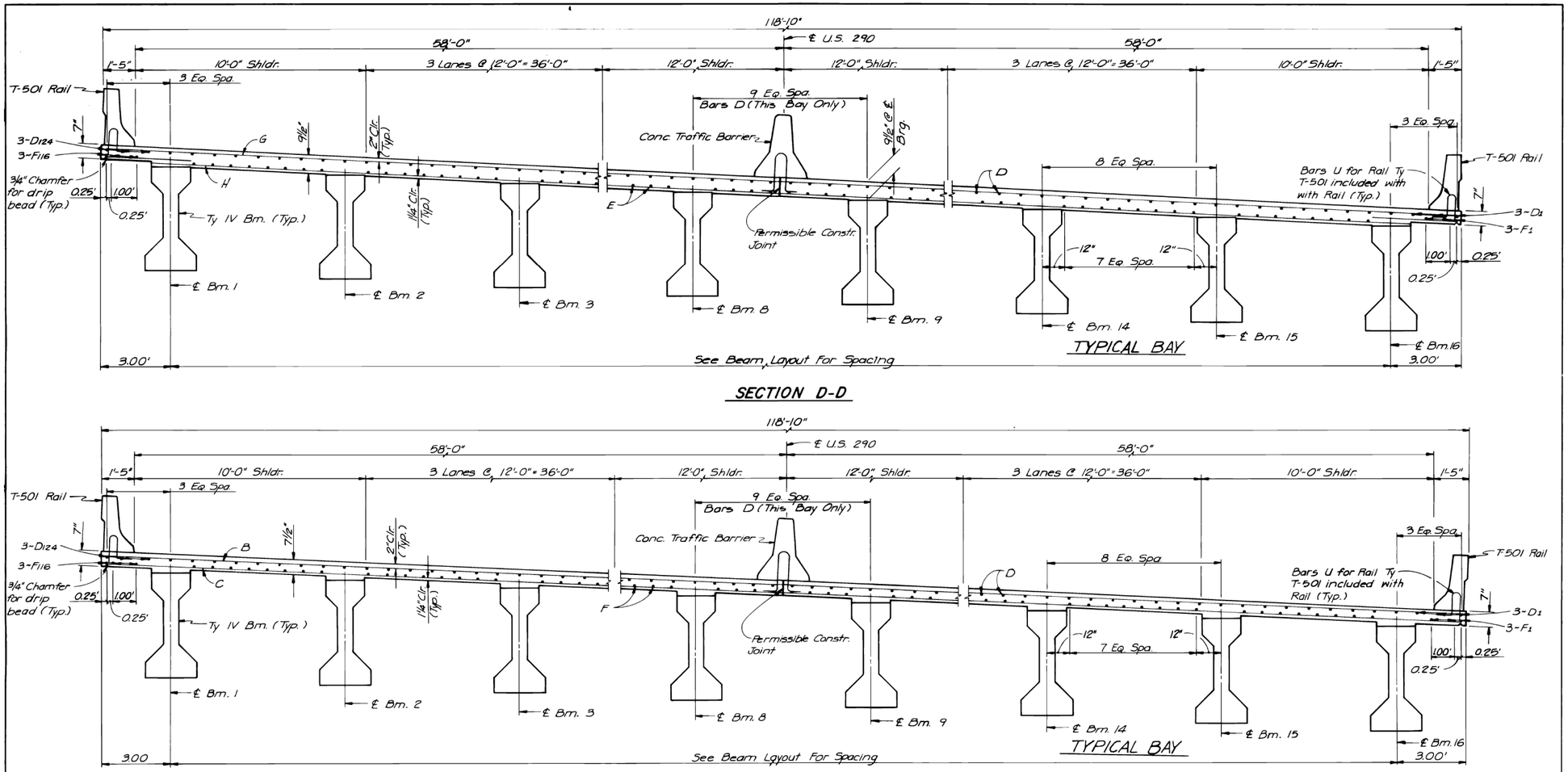

SECTION D-D

SECTION C-C

Rev 1/12/89

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
U.S. 290

SLAB DETAILS

SPRING CYPRESS RD.

SHEET 4 OF 4

DN JPV	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				HIGHWAY NO.
CK DN	ORIGINAL	MAY, 1988	6	TEXAS	MA-F535 (22)				US290
DW DC			STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	SHEET NO.
CK DW			12	HARRIS		050	06	033	162
TR									
CK TR									

00173

CONTRACTOR'S INFORMATION ONLY

US 290 MAINLANES SPRING CYPRESS RD OVERPASS

SLAB DETAILS

(AS-BUILT PLAN)

SHEET 4 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			71
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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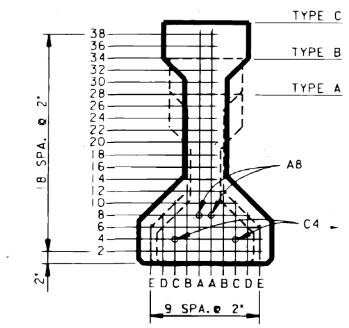
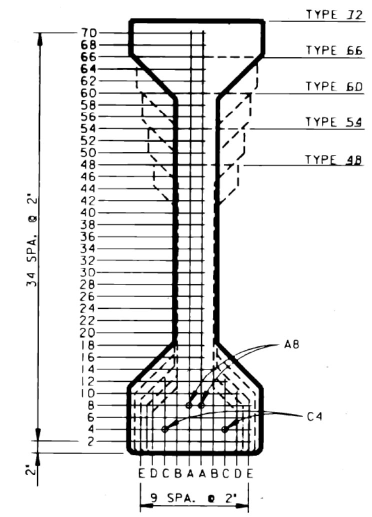
DESIGNED BEAMS (DEPRESSED STRANDS) / OPTIONAL DESIGN

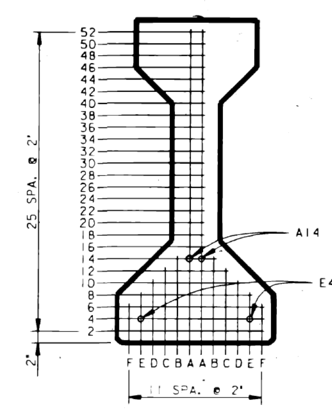
STRUCTURE	SPAN	BEAM NO.	* BEAM TYPE	NON-STD. STRAND PATTERN	PRESTRESSING STRANDS: TOTAL NO.	TOTAL SIZE	TOTAL STRGTH.	"e" ℄ In.	"e" END In.	DEPRESSED NO.	DEPRESSED TO	CONCRETE: RELEASE STRGTH f'ci (psi)	CONCRETE: MINIMUM 28 DAY COMP. STRGTH. f'c (psi)	OPTIONAL DESIGN: DN. LOAD COMP. STRESS (TOP ℄) fct (psi)	OPTIONAL DESIGN: DN. LOAD TENSILE STRESS (BOTT. ℄) fcb (psi)	OPTIONAL DESIGN: REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (Ft. Kips)
U.S. 290 @ SPRING CYPRESS ROAD	1	20	IV	—	50	1/2	270K	19.47	11.07	10	A-52	5517	7938	4286	4244	6519
	2	20	IV	—	52	1/2	270K	19.29	11.21	10	A-52	5771	8421	4495	4432	6771
	3	16	IV	—	54	1/2	270K	19.12	11.34	10	A-52	5975	7867	4259	4390	7060



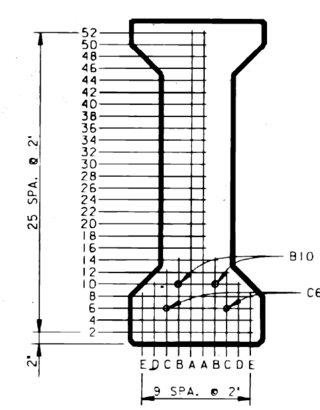
TYPES A, B, & C BMS.



TYPES 48, 54, 60, 66, & 72 BMS.



AASHTO TYPE IV BM.



TYPE 54 (MCD) BM.

MINIMUM NUMBER OF 1/2" STRANDS

TYPE	A	B	C	48	54	* 5M	60	66	72	IV
NO.	6	8	10	8	10	18	14	16	18	18

* 5M DENOTES TYPE 54 (MOD) BEAM.

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF BEAM

GENERAL NOTES:

DESIGNED IN ACCORDANCE WITH CURRENT A. A. S. H. T. O. SPECIFICATIONS.

ALL CONCRETE SHALL BE CLASS H.

WHEN SHOWN ON THIS SHEET, THE FABRICATOR HAS THE OPTION OF FURNISHING EITHER THE DESIGNED DEPRESSED STRAND BEAM OR AN APPROVED OPTIONAL ©BEAM DESIGN. LOW RELAXATION STRANDS SHALL• BE USED.

PRESTRESSED LOSSES FOR THE DESIGNED BEAMS HAVE BEEN CALCULATED ACCORDING TO THE A. A. S. H. T. O. 1975 INTERIM SPECIFICATIONS FOR A RELATIVE HUMIDITY OF •75%. OPTIONAL DESIGNS SHALL LIKEWISE CONFORM.

CERTAIN BEAMS WITH DEPRESSED STRANDS ARE SUBJECT TO CRACKING IN THE END OF THE BEAM. WHEN SUCH CRACKS OCCUR, ALL SUBSEQUENT BEAMS OF THE SAME TYPE AND STRAND PATTERN SHALL HAVE STRANDS WRAPPED IN THE FOLLOWING MANNER:

1. ALTERNATE ROWS OF DEPRESSED STRANDS SHALL BE WRAPPED FOR 2 FEET FROM EACH END OF THE BEAM.
2. ONE HALF OF THE STRAIGHT STRANDS, AS NEARLY AS POSSIBLE, SHALL BE WRAPPED FOR 4 FEET FROM EACH END OF THE BEAM.
3. THE WRAPPING PATTERN SHALL BE SYMMETRICAL ABOUT THE VERTICAL AXIS OF THE BEAM FOR BOTH DEPRESSED AND STRAIGHT STRANDS.
4. STRANDS SHALL BE WRAPPED SO THAT THE CENTERS OF GRAVITY OF THE DEPRESSED STRANDS AND THE STRAIGHT STRANDS WILL REMAIN WITHIN 1 INCH OF THEIR ORIGINAL LOCATION.
5. STRANDS SHALL BE TIGHTLY WRAPPED WITH PLASTIC TUBING. BOTH ENDS AND THE SEAM OF THE TUBE SHALL BE SEALED WITH WATERPROOF TAPE.
6. REVISED SHOP DRAWINGS WILL NOT BE REQUIRED, BUT WRAPPING PATTERNS, AND THE BEAMS AFFECTED, SHALL APPEAR ON THE AS-BUILT DRAWINGS.

FOR DEPRESSED STRAND DESIGNED BEAMS, STRANDS SHALL BE LOCATED AS LOW AS POSSIBLE ON THE 2" GRID SYSTEM SHOWN HEREON UNLESS A NON-STANDARD STRAND PATTERN IS INDICATED. FILL ROW "2", THEN ROW "4", THEN ROW "6", ETC., BEGINNING EACH ROW IN THE "A" POSITION AND WORKING OUTWARD UNTIL THE REQUIRED NUMBER OF STRANDS IS REACHED. ALL STRANDS IN THE "A" POSITION SHALL BE DEPRESSED, MAINTAINING THE 2" SPACING SO THAT THE UPPER TWO STRANDS ARE IN THE POSITION SHOWN IN THE TABLE AT THE BEAM ENDS.

INITIAL PRETENSION FOR 1/2"ø 270 K STRANDS. =•31.0 K

DESIGN SHOWN BASED ON INITIAL PRETENSION OF •31.0 K.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

PRESTRESSED CONCRETE BEAMS

(NON-STANDARD SPANS)

Gp NS

00174

(MOD.) (LOW RLX)

ORIGINAL DRAWING DATE: OCT. 1976

DN.: D-I
CK.: D-I
DW.: TJ
TR.:

REVISIONS
© 3-79
• 6-88

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT •	SHEET
12	6	MA-F535 (22)	163

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
HARRIS	050	06	033	US290

A.S. 0542 (355100) BRIDGE1.CEL (GPNS) .DGN

CONTRACTOR'S INFORMATION ONLY

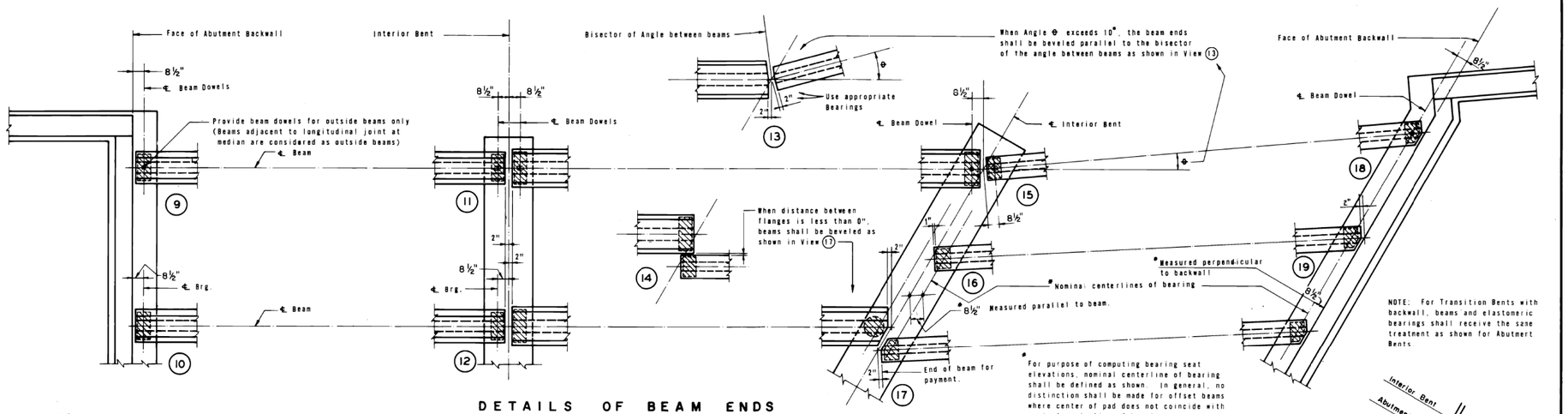
US 290 MAINLANES
SPRING CYPRESS RD
OVERPASS

PRESTRESSED
CONCRETE BEAMS
(NON-STANDARD SPANS)
Gp NS

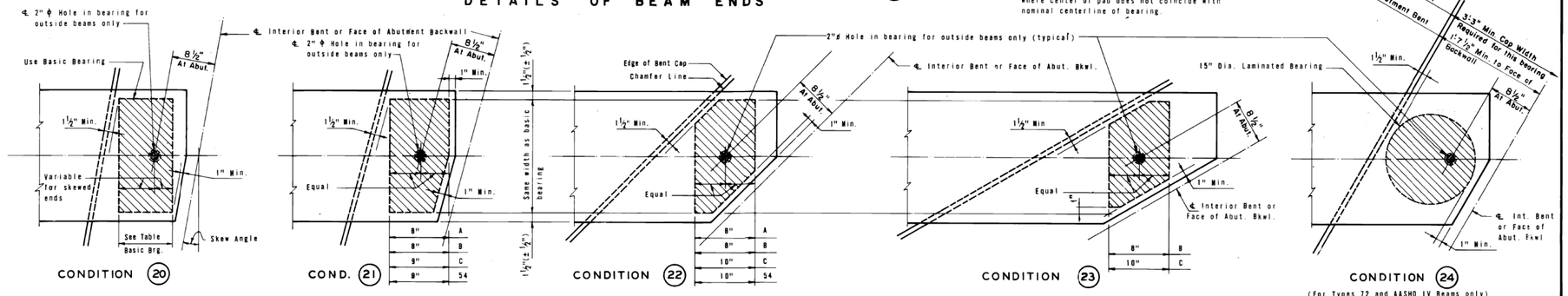
(AS-BUILT PLAN)

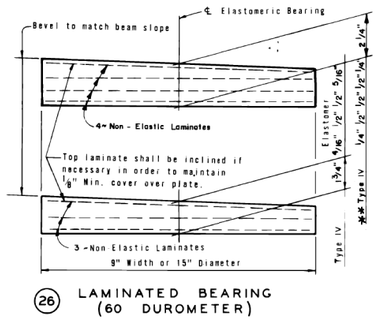
SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			72
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



DETAILS OF BEAM ENDS





(26) LAMINATED BEARING (60 DUROMETER)

NOTE: Basic Bearings are to be used for square beam ends and for moderately skewed beam ends as covered in Condition (20). Holes in bearings for square beams shall be centered on pad.

DETAILS OF ELASTOMERIC BEARINGS

BASIC BEARINGS			
BM. TYPE	SIZE. THICKNESS "t" & DESCRIPTION		
A	8" X 14" X ¾"	PLAIN	
B	8" X 16" X ¾"	PLAIN	
C	9" X 19" X 1"	PLAIN	
54	9" X 14" X 1½"	LAMINATED	
72	9" X 20" X 1¾"	LAMINATED	
△ *IV	9" X 22" X 1¾"	LAMINATED	
△ **IV	15" DIAMETER x 2¼"	LAMINATED	

*BENTS 2 & 3
**ABUTMENT 1 & 4 & BENT 3

BEARINGS FOR BEVELED BEAM ENDS					
BM. TYPE	CONDITION (20)	CONDITION (21)	CONDITION (22)	CONDITION (23)	CONDITION (24)
A	0° THRU 20°	20° THRU 30°	OVER 30°	NOT APPLICABLE	NOT APPLICABLE
B	0° THRU 15°	15° THRU 30°	30° THRU 55°	OVER 55°	NOT APPLICABLE
C	0° THRU 10°	10° THRU 20°	20° THRU 50°	OVER 50°	NOT APPLICABLE
54	0° THRU 10°	10° THRU 25°	OVER 25°	NOT APPLICABLE	NOT APPLICABLE
72	0° THRU 10°	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	OVER 10°
IV	0° THRU 8°	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	OVER 8°
IV	0° THRU 8°	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	OVER 8°

Skew angle of Bm. end

GENERAL NOTES:

Beams shall be seated on elastomeric bearings of the dimensions shown.

Bearings shall be furnished with their thickness varying in one direction depending on the slope of the erected beam.

Constant thickness bearings may be used for moderate beam slopes if the variation is within the allowable dimensional tolerances given in the specifications.

Cost of furnishing and installing elastomeric bearing shall be included in unit price bid for "Prestressed Concrete Beams"

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

PRESTRESSED CONCRETE BEAMS
BEAM ENDS & BEARINGS

Gp B-2

(MOD.) FOR U.S. 290 AT SPRING CYPRESS RD.

ORIGINAL DRAWING DATE JUNE 1985	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DN - HJD	12		MA-F535 (22)	164
CK - THD △ 6-30	COUNTY	SHEET	SECTION	JOB	HIGHWAY
DW - RNS	HARRIS	050	06	033	US 290
CK - THD					

REVISIONS

00175

CONTRACTOR'S INFORMATION ONLY

US 290 MAINLANES
SPRING CYPRESS RD
OVERPASS

PRESTRESSED
CONCRETE BEAMS
(BEAM ENDS & BEARINGS)
Gp B-2

(AS-BUILT PLAN)

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			73
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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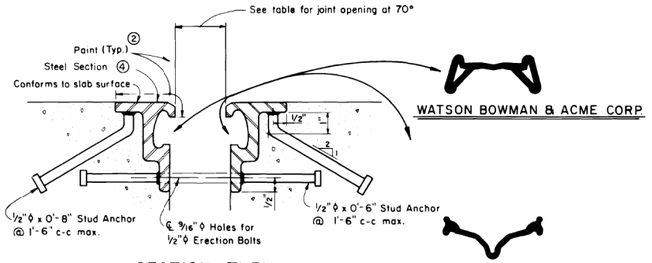
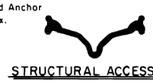


SECTION THRU
WATSON BOWMAN & ACME CORP.
STRUCTURAL ACCESSORIES INC.
D S BROWN COMPANY
BRG INDUSTRIES INC.

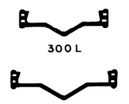
WATSON BOWMAN & ACME CORP.



STRUCTURAL ACCESSORIES INC.
NEOPRENE SEALS

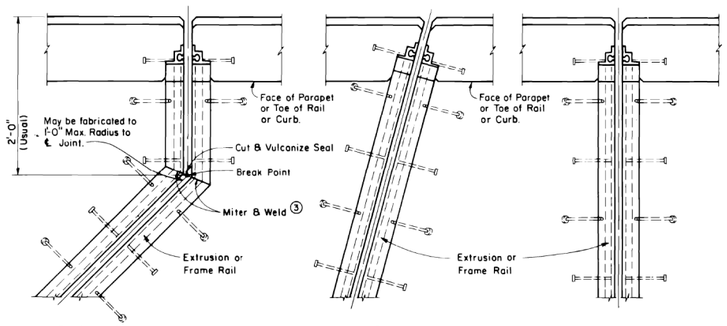
BS 400
BS 300

BRG INDUSTRIES INC.



300 L
400 L

D S BROWN COMPANY



SKEWS WITH SLAB BREAK | SKEWS WITHOUT SLAB BREAK | NORMAL

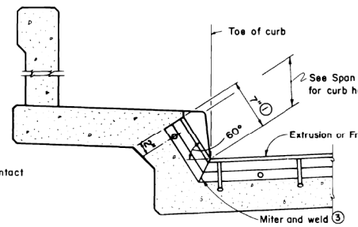
PLANS – END CONDITIONS

MANUFACTURER	STEEL SECTION④	NEOPRENE STRIP SEAL			
		3" JOINT		4" JOINT	
		Seal Type	Joint Opening	Seal Type	Joint Opening
Watson Bowman & Acme Corp.	Type M Extrusion	S 300	1.75	S 400	1.75
Structural Accessories Inc.	Type SCII Extrusion	40 SS	1.75	50 SS	1.75
D S Brown	Frame Rail SSCM	300 L	1.75	400 L	1.75
BRG Industries Inc.	Type W*	BS 300	1.75	BS 400	1.75

④ Shape of extrusion shown is typical. Variations depending on manufacturer are permissible.

* Type W to be 2.75 inch by 3.25 inch and ⅜ inch minimum thickness.

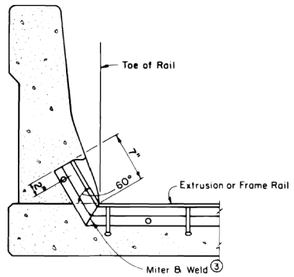
② Clean and paint with Prime Coat in accordance with the Item "Cleaning, Paint, and Painting"



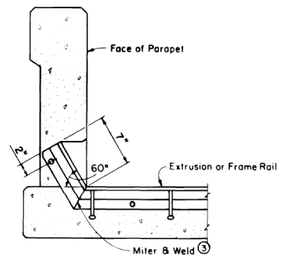
③ Remove all burrs which will be in contact with seal prior to making splice.

① Reduce if curb height is less than 6".

SECTION THRU SIDEWALK
(LOW SIDE)

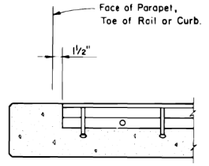


SECTION THRU BARRIER RAIL
(LOW SIDE)



SECTION THRU OTHER PARAPET RAILS
(LOW SIDE)

Rev. 11-88 (Seal-DS Brown)
Rev. 8-88 (Paint)



SECTION THRU SLAB
(HIGH SIDE)

GENERAL NOTES:

Sealed Exp. Jts. shall be provided in the size and at all locations shown on plans.

Shop fabrication will be required at all intersections of cross slope and at break points.

Steel sections shall be shipped in convenient lengths not to exceed 24'-0" and butt welded in the field.

At splices, a continuous ground smooth weld shall be provided except on all surfaces in locking contact with seal which shall have no burrs.

Corresponding sections of Sealed Exp. Jts. shall be temporarily shop assembled, checked for fit, and match marked for shipment.

Erection holes, if required, shall be punched so as to line up when Sealed Exp. Jts. are in their final position. Erection bolts, if used, shall be cut off flush with extrusion promptly after the concrete in the latter of the two placements has taken initial set.

Stud anchors shall be electric arc end-welded with complete fusion.

The neoprene seal shall be continuous and included in the price bid for Sealed Exp. Jt.

The Contractor shall arrange for securing the Sealed Exp. Jt. in position, and placing to the proper grade and alignment by welding braces to adjacent slab steel, to prestressed beam stirrups, or to anchors cast in concrete diaframs. Cost of temporary bracing is to be included in the price bid for Sealed Exp. Jt.

Replaced 2/9/89

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

SEALED EXPANSION JOINT DETAILS
WITHOUT OVERLAY

SEJ-S(1)

ORIGINAL DRAWING DATE MARCH 1983	REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #	SHEET
DN -	Rev. 8-84 Rev. 10 85 Rev. 11-85 Rev. 10 86	12	6	AA-F 535(22)	188
CK -	Rev 1-87 (SCII) Rev 1-88 (Stud Spa) Rev 3-88 (Add BRG Industries Inc.)	COUNTY	CONTROL	SECT.	JOB	HIGHWAY
DW - DRG		HARRIS	50	6	3	US 290
CK - JCW						

00200

CONTRACTOR'S INFORMATION ONLY

US 290 MAINLANES SPRING CYPRESS RD OVERPASS

SEALED EXPANSION JOINT DETAILS (WITHOUT OVERLAY) SEJ-S(1)

(AS-BUILT PLAN)

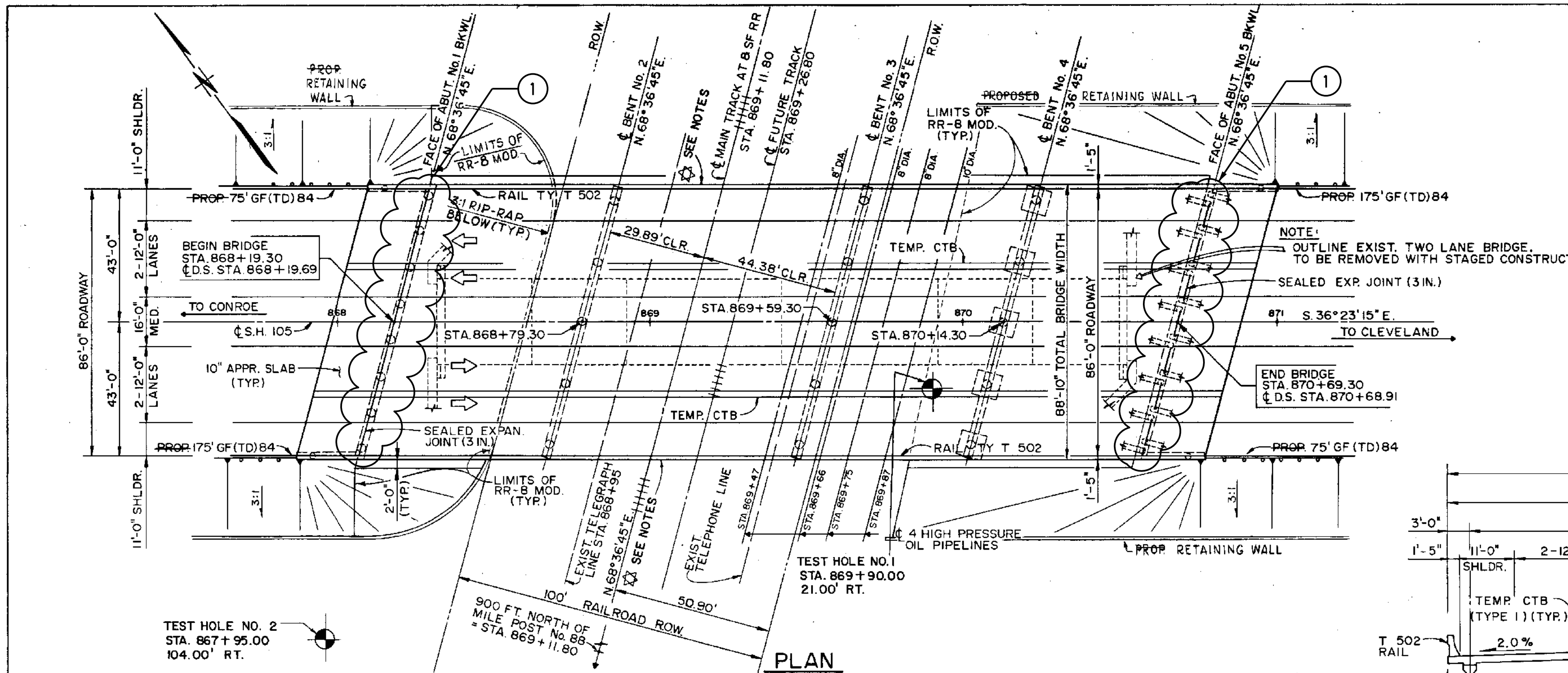
SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		74

STATE	DIST.	COUNTY
TEXAS	HOU	HARRIS, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

H:\WCHAO\Design\Maintenance Projects\RMC\RMC 6382-11-001\Plan Set\3. Roadway\12-102-0-0050-06-149\SEJ S.dgn



NOTES:

DESIGNED IN ACCORDANCE WITH A.A.S.H.T.O 1989 STANDARD SPECS AND REVISIONS THERETO — HS 20.

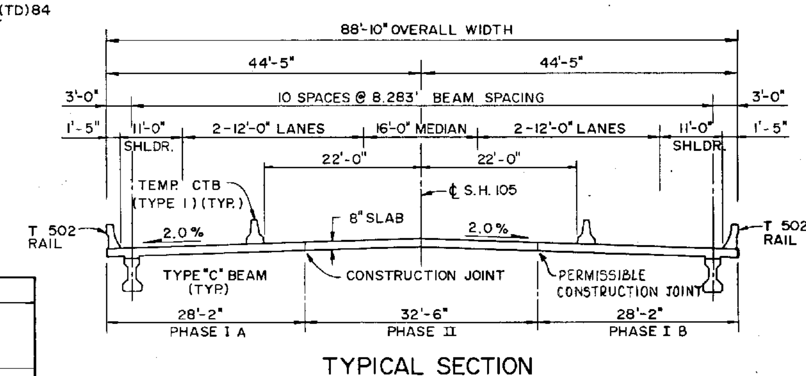
CLASS 'S' CONCRETE FC = 1200 PSI FOR BRIDGE SLAB DESIGN AND CLASS 'C' CONCRETE FC = 1440 PSI FOR SUBSTRUCTURE DESIGN.

REINFORCING STEEL DESIGN FS = 24000 PSI WHERE GRADE 60 IS SPECIFIED AND FS = 20000 PSI WHERE IS NOT SPECIFIED.

✡ WATER BARRIERS SHALL BE PLACED AT SPAN 2 ONLY.

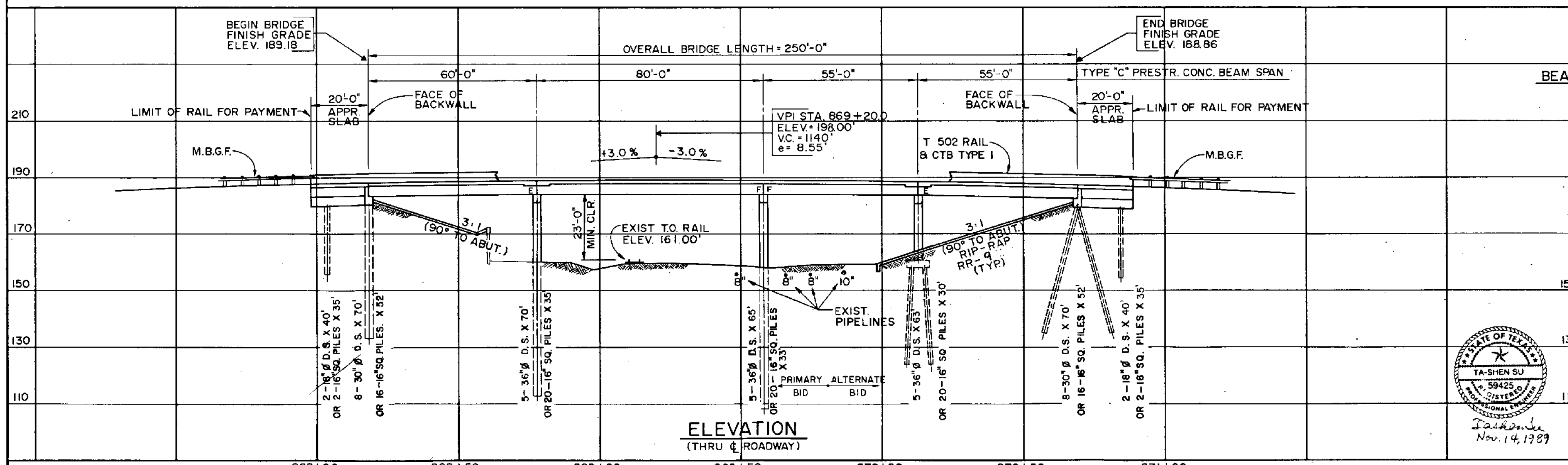
(*) EXIST. BRIDGE SPECS:

TYPE — CONC. SLAB W/GIRDERS & I-BEAMS
LENGTH — 220' (6 SPANS 30'-30'-50'-50'-30'-30')
WIDTH — 27'-6"



ESTIMATED QUANTITIES

ITEM / BID	CLASS C CONCRETE ABUT. C.Y.	CLASS C CONCRETE BENT C.Y.	PRESTRESS. CONC. BEAM TYPE C L.F.	REINFORCED CONC. SLAB S.F.	CONCRETE SURFACE TREATMENT S.Y.	RAIL TYPE T 502 L.F.	RAIL TYPE CTB I L.F.	SEALED EXPANSION JOINT (3 IN.) L.F.	RIPRAP (CONC.) CLASS B C.Y.	REMOVE OLD STRUCT. (LARGE) EA.	SLURRY DISPL. DRILLED SHAFT 18 IN. L.F.	SLURRY DISPL. DRILLED SHAFT 30 IN. L.F.	SLURRY DISPL. DRILLED SHAFT 36 IN. L.F.	CONCRETE PILE (16 IN. SQ.) L.F.	STRUCT. EXCAVATION C.Y.	CEMENT STABILIZED BACKFILL C.Y.	RIPRAP (CONC.) TYPE N C.Y.		
PRIMARY	88.0	153.6	2735.5	22208	2389	580	580	180.4		1	160	1120	990	—	—		—		
ALTERNATE	88.0	247.5	2735.5	22208	2389	580	580	180.4		1	—	—	—	3764	250.8		8.4		



BEAM END CONDITIONS:
E = DENOTES SLOTTED HOLES AT BEAM END.
F = DENOTES ROUND HOLES AT BEAM END.
BLANK = NO HOLES

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

BRIDGE LAYOUT
AT & SF RR OVERPASS

SHEET 1 OF 2 SHEETS

DRAWN D. Bell	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CHECKED T SU	6	TEXAS	FR 1032 (13)	SH 105
TRACED	STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CHECKED	12	MONTGOMERY, ETC.	0338 07 018	31

TA-SHEN SU 59425
Nov. 14, 1989

DESCRIPTION OF WORK

**① REPLACE 11 BEARING PADS AT ABUTMENT 1 AND 11 BEARING PADS AT ABUTMENT 5 (SEE NOTE 1 & 2)

WORK TO BE PAID UNDER ITEM: 4002-6001 "REPLACE ELASTOMERIC BEARING PADS"

STATE OF TEXAS
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

Steve Van, P.E.
08/19/2021

NBI # 12-170-0338-07-129

SH 105 OVERPASS AT BNSF RR

BRIDGE REPAIR LAYOUT

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			75
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

NOTES

**1. 22 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN "PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS)" "GpB-2". THE NEW PADS SHOULD BE FABRICATED TO CONFORM TO TXDOT STANDARD "IBEB" AND MATCH ORIGINAL HEIGHTS AND SLOPES.

2. SEE SHEET "SH 105 OVERPASS AT BNSF RR BRIDGE JACKING LOADS" FOR DETAILED JACKING LOADS INFORMATION.

3. DO NOT PLACE MATERIALS AND OPERATE EQUIPMENTS WITHIN RAILROAD RIGHT OF WAY.

STRUCTURE	No BEAMS (1)	JACKING LOAD
		TON/BEAM
SH 105 OVER BNSF RR (SPAN 1)	11	27
SH 105 OVER BNSF RR (SPAN 4)	11	25

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

NOTES:

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 TxDOT IBEB Standard Sheet Provided. New bearing pads shall fabricated to the new TxDOT IBEB dimensions however match original bearing pad thickness.
   Develop a bearing layout to identify location and orientation of all bearings.
   New Bearing pads must be beveled to accomodate beam slope.
   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 to the engineer for fixed conditions at any repair location.
   Raising structures and all work related to temporary shoring including engineering desing 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.

8. Avoid cutting Dowel Bars. Place new bearing pads adjacent to Dowel bars.

STATE OF TEXAS
AN YAN
114660
LICENSED PROFESSIONAL ENGINEER

An Yan, P.E.
07/26/2021

Texas Department of Transportation | Houston District (Bridge)

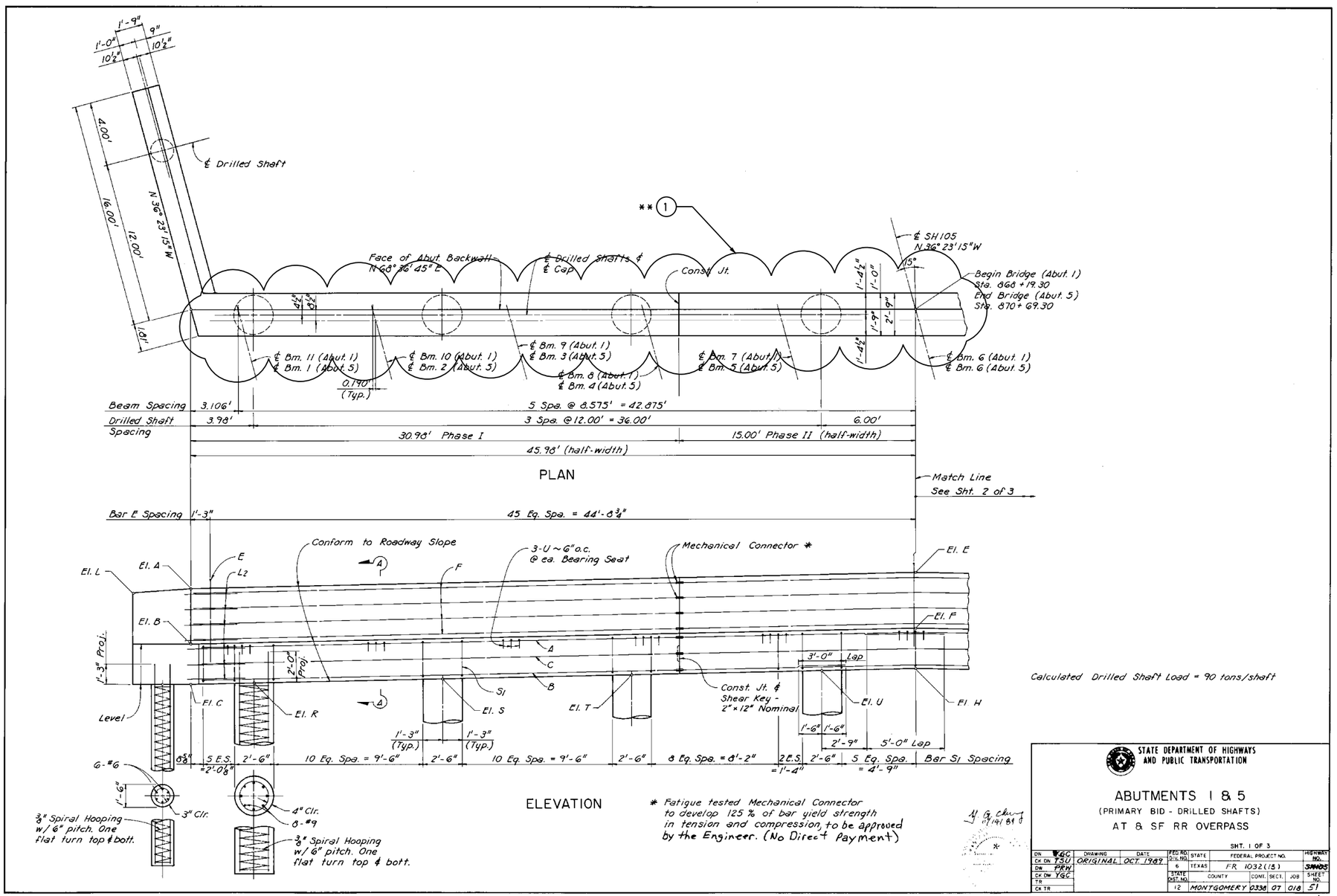
SH 105
OVERPASS AT BNSF RR
NBI: 12-170-0338-07-129

BRIDGE JACKING LOADS

RMC: 6382-11-001

FILE: SH105_JackLoads.dgn	DN: AY	CK: MEC	DW: AY	CK: MEC
©TxDOT 7/26/2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	11	001	US 290, ETC
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS, ETC		76

7/26/2021
H:\Bridge\Mike's Team\Repairs Other\2021-06 Bearing Pad Replacements\Bearing Replacements - An Yan\6382-11-001 SH 105 BNSF RR\SH105_JackLoads.dgn



Calculated Drilled Shaft Load = 90 tons/shaft

① REPALCE 11 BEARING PADS AT ABUTMENT 1 AND 11 BEARING PADS AT ABUTMENT 5

** 22 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN "PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS)" "GpB-2". THE NEW PADS SHOULD BE FABRICATED TO CONFORM TO TXDOT STANDARD "IBEB" AND MATCH ORIGINAL HEIGHTS AND SLOPES.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ABUTMENTS 1 & 5

(PRIMARY BID - DRILLED SHAFTS)

AT & SF RR OVERPASS

SHT. 1 OF 3

DN TGC	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			HIGHWAY NO.
CK. DN. TSU	ORIGINAL	OCT. 1987	6	TEXAS	FR 1032(15)			SHARES
DW. PRN			STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	SHEET NO.
CK DW TGC			12	MONTGOMERY		0338	07	018	51
TR								
CK TR								

4

STATE OF TEXAS
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

Steve Van, P.E.

08/19/2021

SH 105 OVERPASS AT BNSF RR

ABUTMENT 1 & 5

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		77

STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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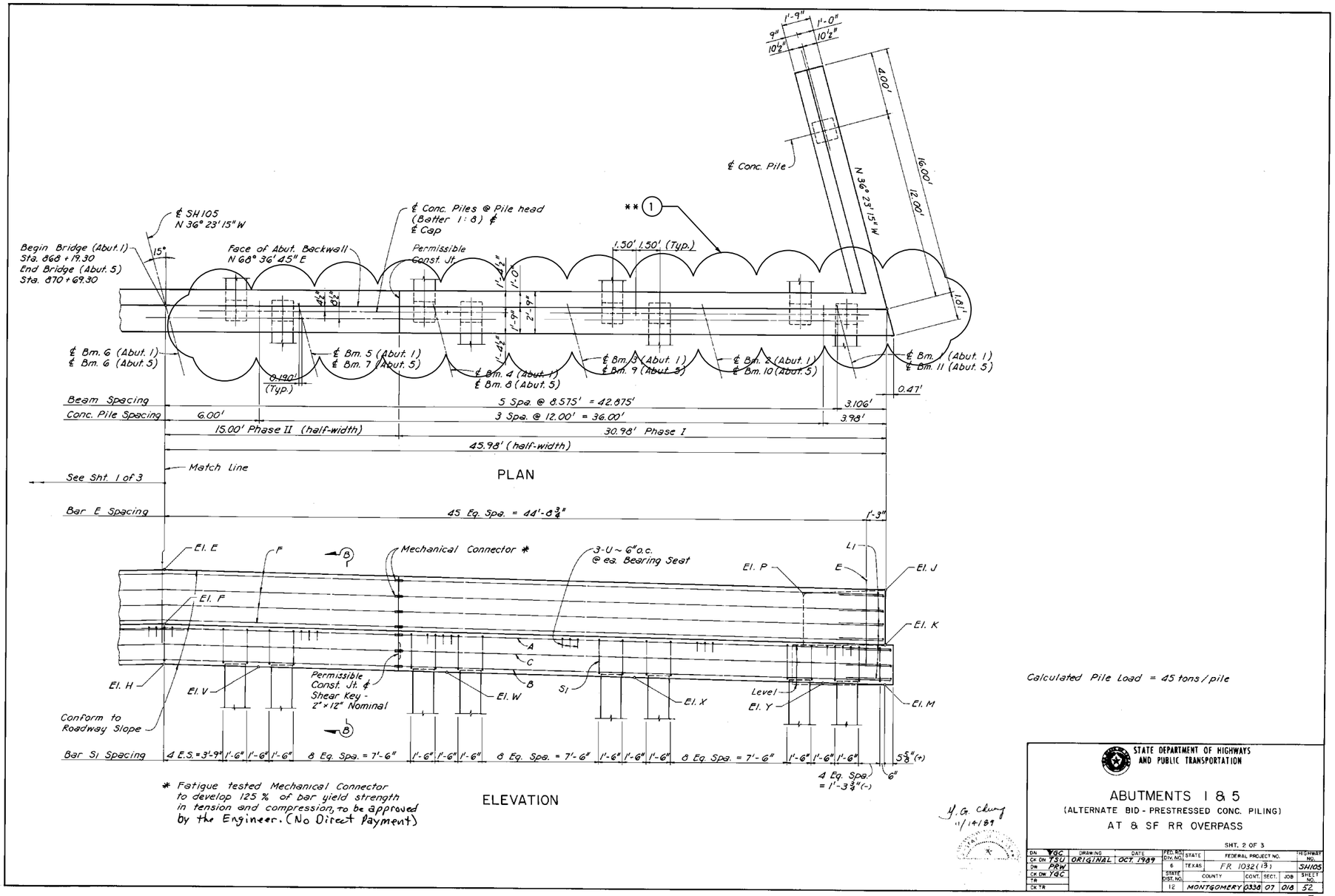

Calculated Pile Load = 45 tons / pile

Y. G. Chung
11/14/89

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ABUTMENTS 1 & 5

(ALTERNATE BID - PRESTRESSED CONC. PILING)

AT & SF RR OVERPASS

SHT. 2 OF 3

DN YGC	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK DN TSU	ORIGINAL	OCT. 1989	6	TEXAS	FR 1032(13)	SH105
DN PRW			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK DW YGC			12	MONTGOMERY	0338 07 018	52
TR						5
CK TR						

① REPALCE 11 BEARING PADS AT ABUTMENT 1 AND 11 BEARING PADS AT ABUTMENT 5

** 22 ELASTOMERIC BEARING PADS TO BE REPLACED WITH NEW PADS AS PER DETAILS GIVEN IN "PRESTRESSED CONCRETE BEAMS (BEAM ENDS AND BEARINGS)" "GpB-2". THE NEW PADS SHOULD BE FABRICATED TO CONFORM TO TXDOT STANDARD "IBEB" AND MATCH ORIGINAL HEIGHTS AND SLOPES.

STATE OF TEXAS
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

Steve Van, P.E.

08/19/2021

SH 105 OVERPASS AT BNSF RR

ABUTMENT 1 & 5

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			78
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

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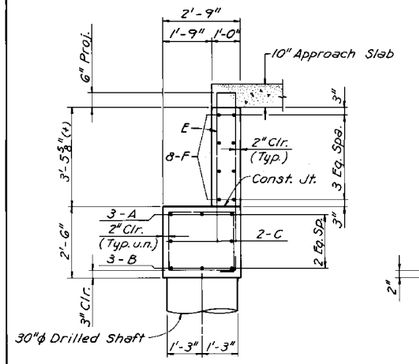

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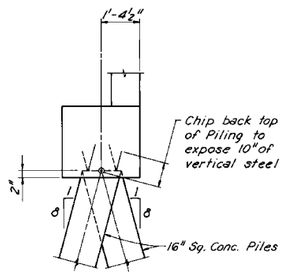

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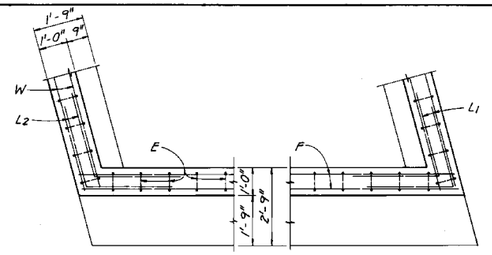
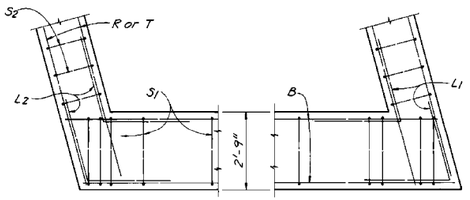
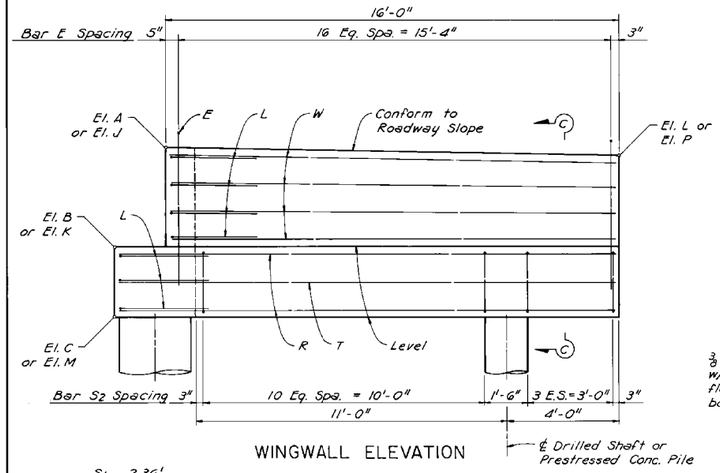


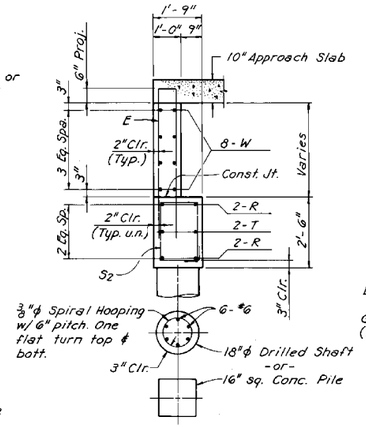
WINGWALL & ABUTMENT BACKWALL



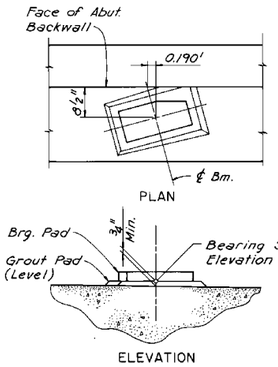
WINGWALL CAP & ABUTMENT CAP



WINGWALL ELEVATION

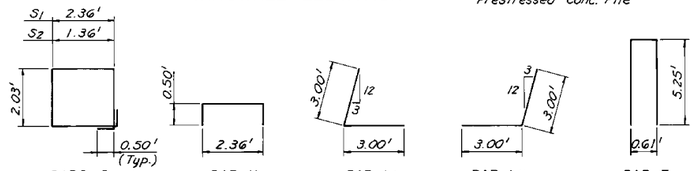


SECTION C-C



ELEVATION

BEARING SEAT DETAILS



BARS S BAR U BAR L1 BAR L2 BAR E

At Wingwall :
Calculated Drilled Shaft Load = 15 tons/shaft
Calculated Pile Load = 15 tons/pile

BILL OF REINFORCING STEEL				
Bar	No.	Size	Length	Weight
A	3	#11	91.66'	1461
B	3	#11	91.66'	1461
C	2	#5	91.75'	191
E	125	#5	11.11'	1448
F	9	#5	91.75'	766
L1	14	#5	6.00'	88
L2	14	#5	6.00'	88
R	3	#9	17.13'	466
S1	89	#5	9.78'	908
S2	30	#5	7.78'	243
T	4	#5	17.13'	71
U	33	#5	3.36'	116
W	16	#5	15.50'	259
Total (Lbs.) *				7566

* Incidental item. For Contractor's information only.

Use Grade 60 Reinforcing Steel.

ESTIMATED QUANTITIES				
Item		Unit	Abut. 1	Abut. 5
Reinforcing Steel *		Lbs.	7566	7566
Class C Concrete		C.Y.	44	44
Primary Bid	30"ϕ Drilled Shaft	L.F.	560	560
	18"ϕ Drilled Shaft	L.F.	80	80
Alternate Bid	16" Sq. Concrete Pile	L.F.	902	902

BEARING SEAT ELEVATIONS						
Location	Beam 1	Beam 2	Beam 3	Beam 4	Beam 5	Beam 6
Abut. 1	184.160	184.319	184.474	184.628	184.783	184.937
Abut. 5	183.701	183.865	184.069	184.253	184.436	184.619

Location	Beam 7	Beam 8	Beam 9	Beam 10	Beam 11
Abut. 1	184.759	184.582	184.404	184.226	184.047
Abut. 5	184.471	184.322	184.173	184.024	183.874

TABLE OF ELEVATIONS						
Location	A	B	C	E	F	H
Abut. 1	187.40	183.93	181.43	188.35	184.88	182.38
Abut. 5	187.05	183.58	181.08	188.03	184.56	182.06
Location	J	K	L	M	P	R
Abut. 1	187.52	184.05	187.29	181.55	187.44	181.51
Abut. 5	187.23	183.76	186.90	181.26	187.11	181.16
Location	S	T	U	V	W	X
Abut. 1	181.76	182.01	182.26	182.27	182.06	181.84
Abut. 5	181.42	181.68	181.93	181.96	181.75	181.54
Location	Y					
Abut. 1	181.62					
Abut. 5	181.33					

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ABUTMENTS 1 & 5

AT & SF RR OVERPASS

SHT. 3 OF 3

DN: YGC	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK DN: TJU	ORIGINAL	OCT. 1989	6	TEXAS	FR 1032(13)	SH105
DW: PRW			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK DW: YGC			12	MONTGOMERY	0338 07 018	53
CK TR:						

CONTRACTOR'S INFORMATION ONLY

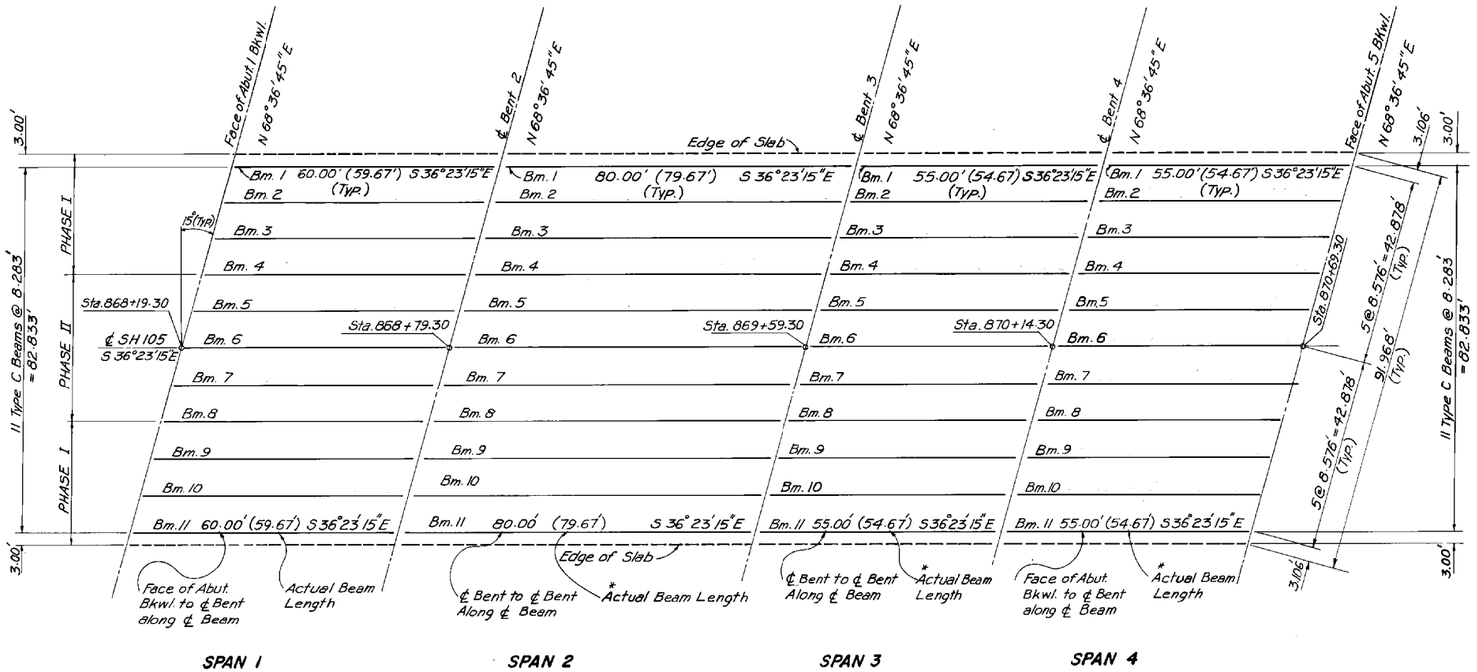
SH 105 OVERPASS AT BNSF RR

ABUTMENT 1 & 5

(AS-BUILT PLAN)

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			79
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



NOTES:

1. * Actual Beam Length is Measured Along Bottom of Beam with Beam Ends Set 2" From Face of Abutment Backwall or ℄ of Bent Lines.
2. Estimated Prestressed Concrete Beam – Type C 2735.5 L.F.
3. Beam End Conditions: See Bridge Layout.

Nov. 14, 1989

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

FRAMING PLAN

AT & SF RR OVERPASS

DN T SU	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			HIGHWAY NO.
CK DN G C	ORIGINAL	OCT., 1989	6	TEXAS	FR 1032(13)			SH105
DW KNK			STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	SHEET NO.
CK DW T SU			12	MONTGOMERY	0338	07	018	56
CK TR								

9

CONTRACTOR'S INFORMATION ONLY

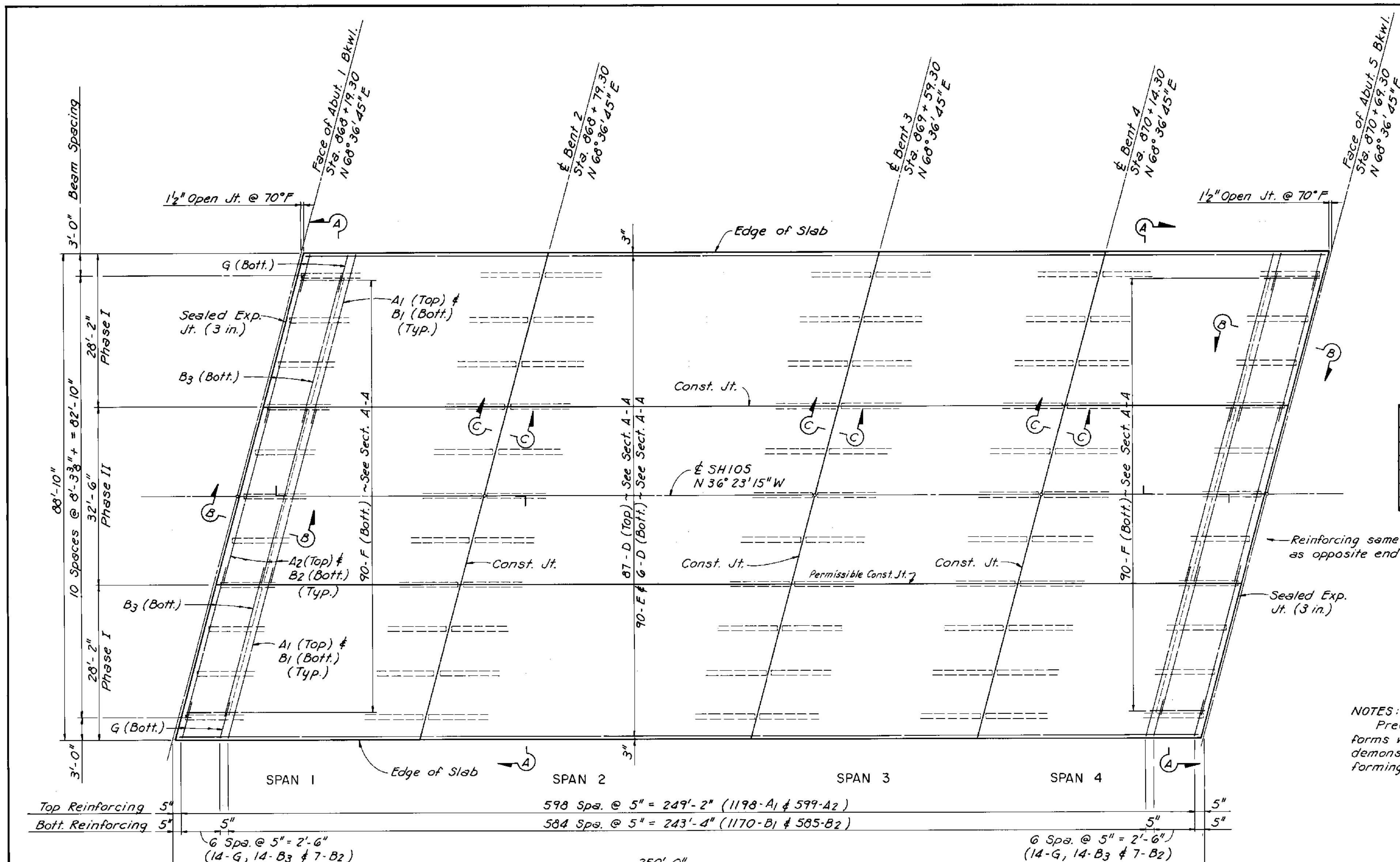
SH 105 OVERPASS AT BNSF RR

FRAMING PLAN

(AS-BUILT PLAN)

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			80
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



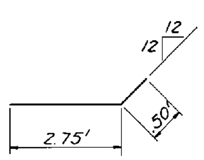
PLAN

BILL OF REINFORCING STEEL					
	Bar	No.	Size	Length	Weight
	A1	1198	#5	31.06'	38,810
	A2	599	#5	33.62'	21,004
	B1	1170	#5	31.06'	37,903
	B2	599	#5	33.62'	21,004
	B3	28	#5	28.83'	842
†	D	93	#5	257.50'	24,977
†	E	90	#5	254.67'	23,906
	F	180	#5	3.25'	610
	G	28	#5	5.00'	146
	Total (lbs.) *				169,202

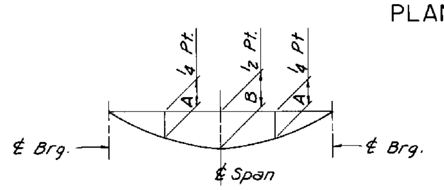
† Includes 4 - 2'-0" laps.
* Incidental item. For Contractor's information only.

ESTIMATED QUANTITIES		
Item	Unit	Quantity
Reinforced Conc. Slab	S.F.	22,208
Conc. Surface Treatment	S.Y.	2,389
Sealed Exp. Jt. (3 in.)	L.F.	180.4
Class S Conc. (Slab) *	C.Y.	551.6

NOTES:
Precast concrete panels and permanent metal deck forms will not be permitted unless the Contractor can demonstrate to the Engineer's satisfaction that these forming methods can be used.



BAR F



DEAD LOAD DEFLECTION DIAGRAM
Deflections shown are due to cast in place concrete and rail only.

SPAN	"A"	"B"
1	0.031'	0.044'
2	0.102'	0.143'
3	0.022'	0.031'
4	0.022'	0.031'

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

SLAB DETAILS
AT & SF RR OVERPASS

SHT. 1 OF 2

DN TSU	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				HIGHWAY NO.
CK DN YGC	ORIGINAL	OCT. 1989	6	TEXAS	FR 1032 (13)				SH105
DW PRW			STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	SHEET NO.
CK DW TSU			12	MONTGOMERY		0338	07	018	57
TR									
CK TR									

10

CONTRACTOR'S INFORMATION ONLY

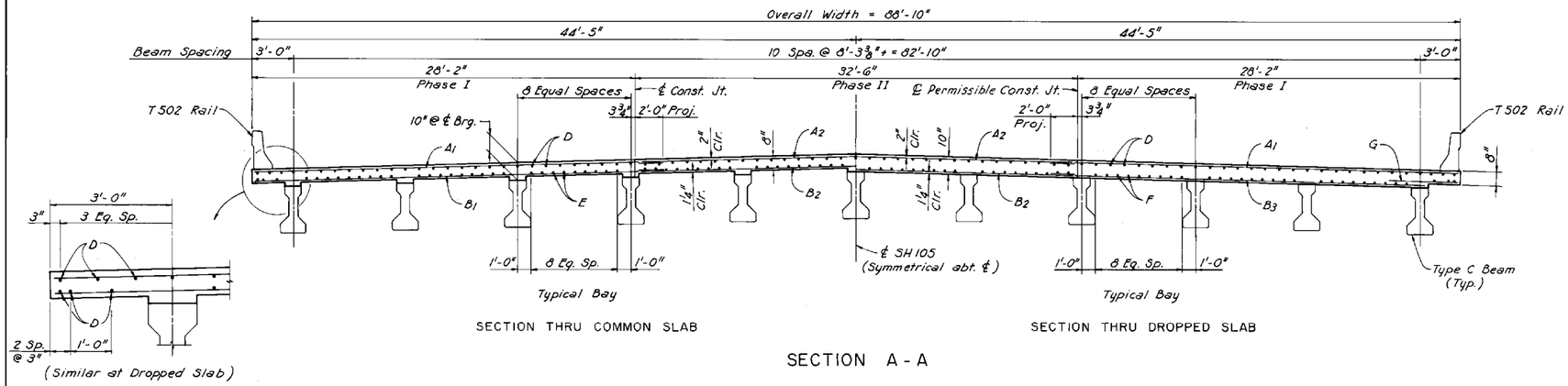
SH 105 OVERPASS AT BNSF RR

SLAB DETAILS

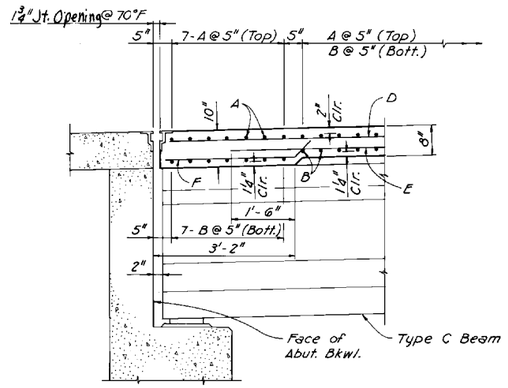
(AS-BUILT PLAN)

SHEET 1 OF 2

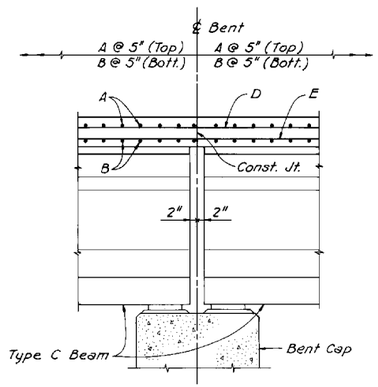
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			81
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



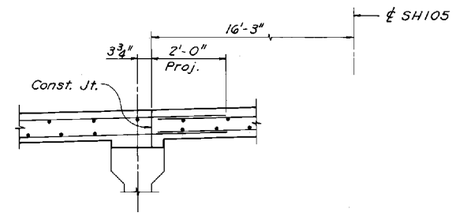
SECTION A - A



SECTION B - B
At Abutments



SECTION C - C
At Interior Bents



CONSTRUCTION JOINT
Joint in Common Slab shown (Similar at Dropped slab)

Jan. 14, 1999

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

SLAB DETAILS

AT & SF RR OVERPASS

SHT. 2 OF 2

DN TSU	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				HIGHWAY NO.
CK DN YGC	ORIGINAL	OCT. 1999	6	TEXAS	FR 1032(13)				SH105
DW PRW			STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	SHEET NO.
CK DN TSU			12	MONTGOMERY		0338	07	018	58
TR									
CK TR									

11

CONTRACTOR'S INFORMATION ONLY

SH 105 OVERPASS AT BNSF RR

SLAB DETAILS

(AS-BUILT PLAN)

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		82

STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

H:\WCHAO\Design\Maintenance Projects\RMC\RMC 6382-11-001\Plan Set\3. Roadway\12-170-0-0338-07-129\Slab02.dgn

DESIGNED BEAMS (DEPRESSED STRANDS)

STRUCTURE	SPAN	BEAM NO.	* BEAM TYPE	NON-STD. STRAND PAT-TERN	PRESTRESSING STRANDS TOTAL NO.	TOTAL SIZE	TOTAL STRGTH.	TOTAL "e" @ ℄ in.	"e" END in.	DEPRESSED NO.	DEPRESSED TO	CONCRETE RELEASE STRGTH f'ci (psi)	CONCRETE MINIMUM 28 DAY COMP. STRGTH. f'c (psi)
AT & SF RR	1	All	C		40	1/2	270	11.99	6.99	10	A-30	6040	6710
AT & SF RR	2	All	C		20	1/2	270	14.09	10.49	4	A-22	4000	5000
AT & SF RR	3 & 4	All	C		16	1/2	270	14.34	11.34	4	A-16	4000	5000

OPTIONAL DESIGN

DN. LOAD COMP. STRESS (TOP ℄) fot (psi)	DN. LOAD TENSILE STRESS (BOTT. ℄) fcb (psi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (Ft. Kips)
3707	3965	3788
2096	2399	2452
1762	2058	2124

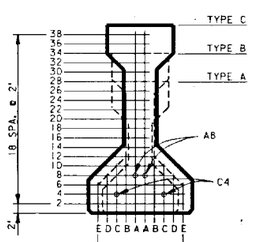
MINIMUM NUMBER OF 1/2" STRANDS

TYPE	A	B	C	48	54	*5W	60	66	72	IV
NO.	6	8	10	8	10	18	14	16	18	18

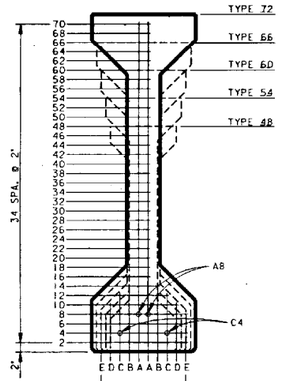
* 5W DENOTES TYPE 54 (MOD) BEAM.

NON-STANDARD STRAND PATTERNS

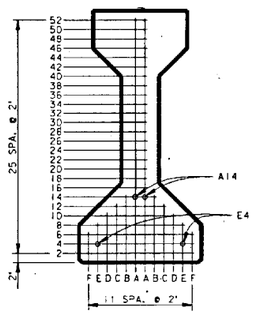
PATTERN	STRAND ARRANGEMENT AT ℄ OF BEAM



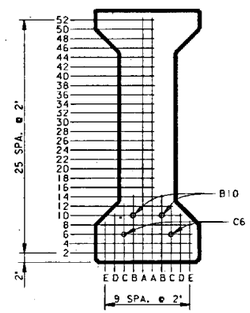
TYPES A, B, & C BMS.



TYPES 48, 54, 60, 66, & 72 BMS.



AASHTO TYPE IV BM.



TYPE 54 (MOD) BM.

GENERAL NOTES:

DESIGNED IN ACCORDANCE WITH CURRENT A. A. S. H. T. O. SPECIFICATIONS.

ALL CONCRETE SHALL BE CLASS H.

WHEN SHOWN ON THIS SHEET, THE FABRICATOR HAS THE OPTION OF FURNISHING EITHER THE DESIGNED DEPRESSED STRAND BEAM OR AN APPROVED OPTIONAL ©BEAM DESIGN. LOW RELAXATION STRANDS SHALL BE USED. A REDUCTION OF NO MORE THAN 4 STRANDS WILL BE PERMITTED IN OPTIONAL DESIGNS FOR BEAMS 120' OR LONGER.△

PRESTRESSED LOSSES FOR THE DESIGNED BEAMS HAVE BEEN CALCULATED ACCORDING TO THE A. A. S. H. T. O. 1975 INTERIM SPECIFICATIONS FOR A RELATIVE HUMIDITY OF 75%. OPTIONAL DESIGNS SHALL LIKEWISE CONFORM.

CERTAIN BEAMS WITH DEPRESSED STRANDS ARE SUBJECT TO CRACKING IN THE END OF THE BEAM. WHEN SUCH CRACKS OCCUR, ALL SUBSEQUENT BEAMS OF THE SAME TYPE AND STRAND PATTERN SHALL HAVE STRANDS WRAPPED IN THE FOLLOWING MANNER:

1. ALTERNATE ROWS OF DEPRESSED STRANDS SHALL BE WRAPPED FOR 2 FEET FROM EACH END OF THE BEAM.
2. ONE HALF OF THE STRAIGHT STRANDS, AS NEARLY AS POSSIBLE, SHALL BE WRAPPED FOR 4 FEET FROM EACH END OF THE BEAM.
3. THE WRAPPING PATTERN SHALL BE SYMMETRICAL ABOUT THE VERTICAL AXIS OF THE BEAM FOR BOTH DEPRESSED AND STRAIGHT STRANDS.
4. STRANDS SHALL BE WRAPPED SO THAT THE CENTERS OF GRAVITY OF THE DEPRESSED STRANDS AND THE STRAIGHT STRANDS WILL REMAIN WITHIN 1 INCH OF THEIR ORIGINAL LOCATION.
5. STRANDS SHALL BE TIGHTLY WRAPPED WITH PLASTIC TUBING. BOTH ENDS AND THE SEAM OF THE TUBE SHALL BE SEALED WITH WATERPROOF TAPE.
6. REVISED SHOP DRAWINGS WILL NOT BE REQUIRED, BUT WRAPPING PATTERNS, AND THE BEAMS AFFECTED, SHALL APPEAR ON THE AS-BUILT DRAWINGS.

FOR DEPRESSED STRAND DESIGNED BEAMS, STRANDS SHALL BE LOCATED AS LOW AS POSSIBLE ON THE 2" GRID SYSTEM SHOWN HEREON UNLESS A NON-STANDARD STRAND PATTERN IS INDICATED. FILL ROW "2", THEN ROW "4", THEN ROW "6", ETC., BEGINNING EACH ROW IN THE "A" POSITION AND WORKING OUTWARD UNTIL THE REQUIRED NUMBER OF STRANDS IS REACHED. ALL STRANDS IN THE "A" POSITION SHALL BE DEPRESSED, MAINTAINING THE 2" SPACING SO THAT THE UPPER TWO STRANDS ARE IN THE POSITION SHOWN IN THE TABLE AT THE BEAM ENDS.

INITIAL PRETENSION FOR 1/2"ø 270 K STRANDS. 31.0 K *

DESIGN SHOWN BASED ON INITIAL PRETENSION OF 31.0 K.

* CHANGED TO REQUIRE LOW RELAXATION STRANDS.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

PRESTRESSED CONCRETE BEAMS

(NON-STANDARD SPANS)

Gp NS

(MOD.) (LOW LAX)

DES. & DET. DRAWN BY DATE: OCT. 1976

REVISIONS

STATE	FEDERAL AID PROJECT NO.	SHEET
12	FR 1032(13)	59

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
MONTGOMERY, ETC.	0338	07	018	SH 105

CONTRACTOR'S INFORMATION ONLY

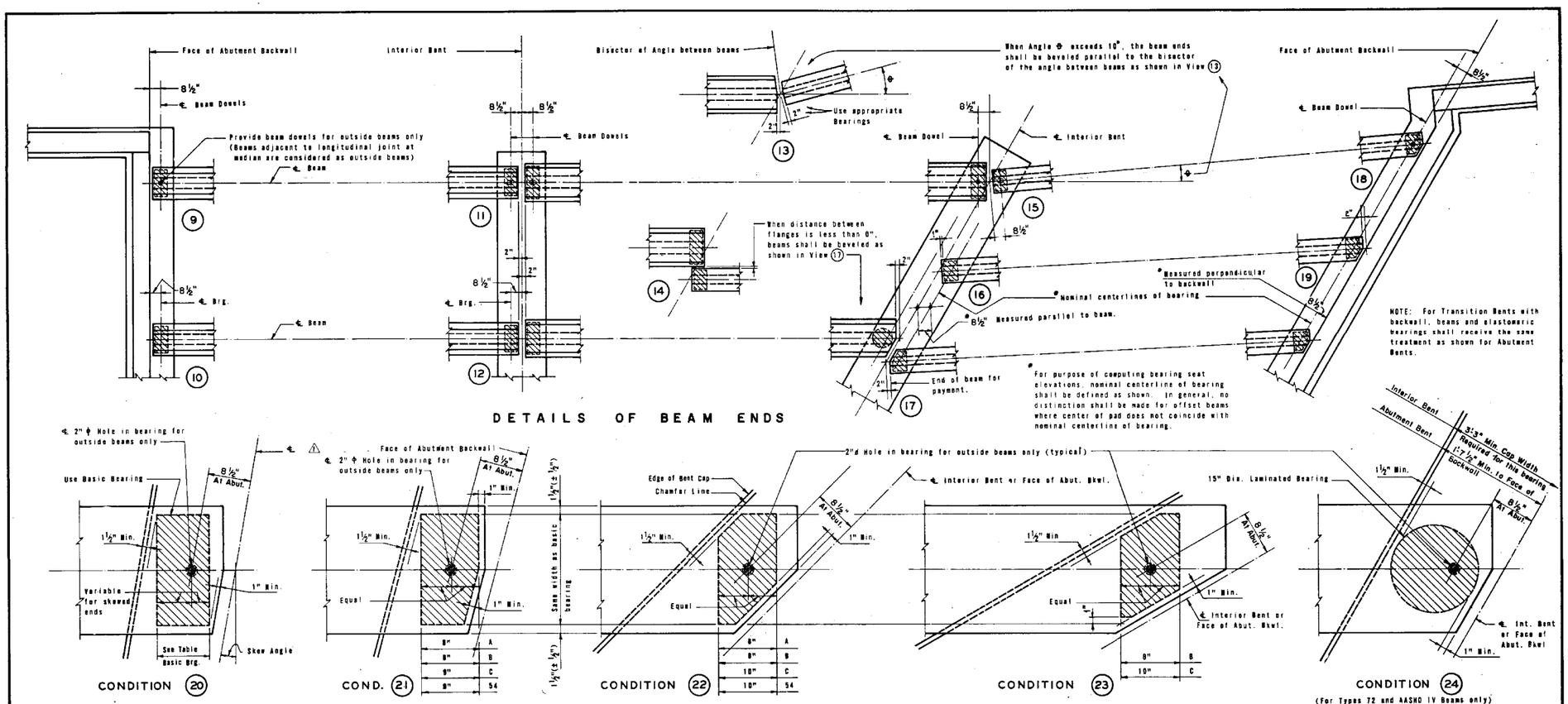
SH 105 OVERPASS AT BNSF RR

PRESTRESSED CONCRETE BEAMS (NON-STANDARD SPANS) Gp NS

(AS-BUILT PLAN)

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			83
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



BASIC BEARINGS			
BM. TYPE	SIZE. THICKNESS "t" & DESCRIPTION		
A	8" X 14" X 3/4"	PLAIN	
B	8" X 16" X 3/4"	PLAIN	
~~C~~	~~9" X 19" X 1"~~	~~PLAIN~~	
54	9" X 14" X 1½"	LAMINATED	
72	9" X 20" X 1 3/4"	LAMINATED	
IV	9" X 22" X 1 3/4"	LAMINATED	
⚠ C	9" X 19" X 1"	LAMINATED	

BEARINGS FOR BEVELED BEAM ENDS					
BM. TYPE	CONDITION (20)	CONDITION (21)	CONDITION (22)	CONDITION (23)	CONDITION (24)
A	0° THRU 20°	20° THRU 30°	OVER 30°	NOT APPLICABLE	NOT APPLICABLE
B	0° THRU 15°	15° THRU 30°	30° THRU 55°	OVER 55°	NOT APPLICABLE
~~C~~	~~0° THRU 10°~~	10° THRU 20°	20° THRU 50°	OVER 50°	NOT APPLICABLE
54	0° THRU 10°	10° THRU 25°	OVER 25°	NOT APPLICABLE	NOT APPLICABLE
72	0° THRU 10°	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	OVER 10°
IV	0° THRU 8°	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	OVER 8°
C	0° THRU 15°				

GENERAL NOTES:

Beams shall be seated on elastomeric bearings of the dimensions shown.

Bearings shall be furnished with their thickness varying in one direction depending on the slope of the erected beam.

Constant thickness bearings may be used for moderate beam slopes if the variation is within the allowable dimensional tolerances given in the specifications.

Cost of furnishing and installing elastomeric bearing shall be included in unit price bid for "Prestressed Concrete Beams"

⚠ REV. 11-9-89 CHANGED BEARING PAD

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

PRESTRESSED CONCRETE BEAMS
BEAM ENDS & BEARINGS

Gp B-2 (MOD)

ORIGINAL DRAWING DATE: JUNE 1985	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DR.:-HJD	12	6	FR 1032(13)	61
CK.:-THD	COUNTY	SECTION	SECT NO.	JOB NUMBER
⚠ 11-9-89	MONTGOMERY, etc.	0338	07	018 SH 105
DR.:-RNS				
CK.:-THD				etc.

14

SH 105 OVERPASS
AT BNSF RR

PRESTRESSED
CONCRETE BEAMS
(BEAM ENDS & BEARINGS)
Gp B-2 (MOD)

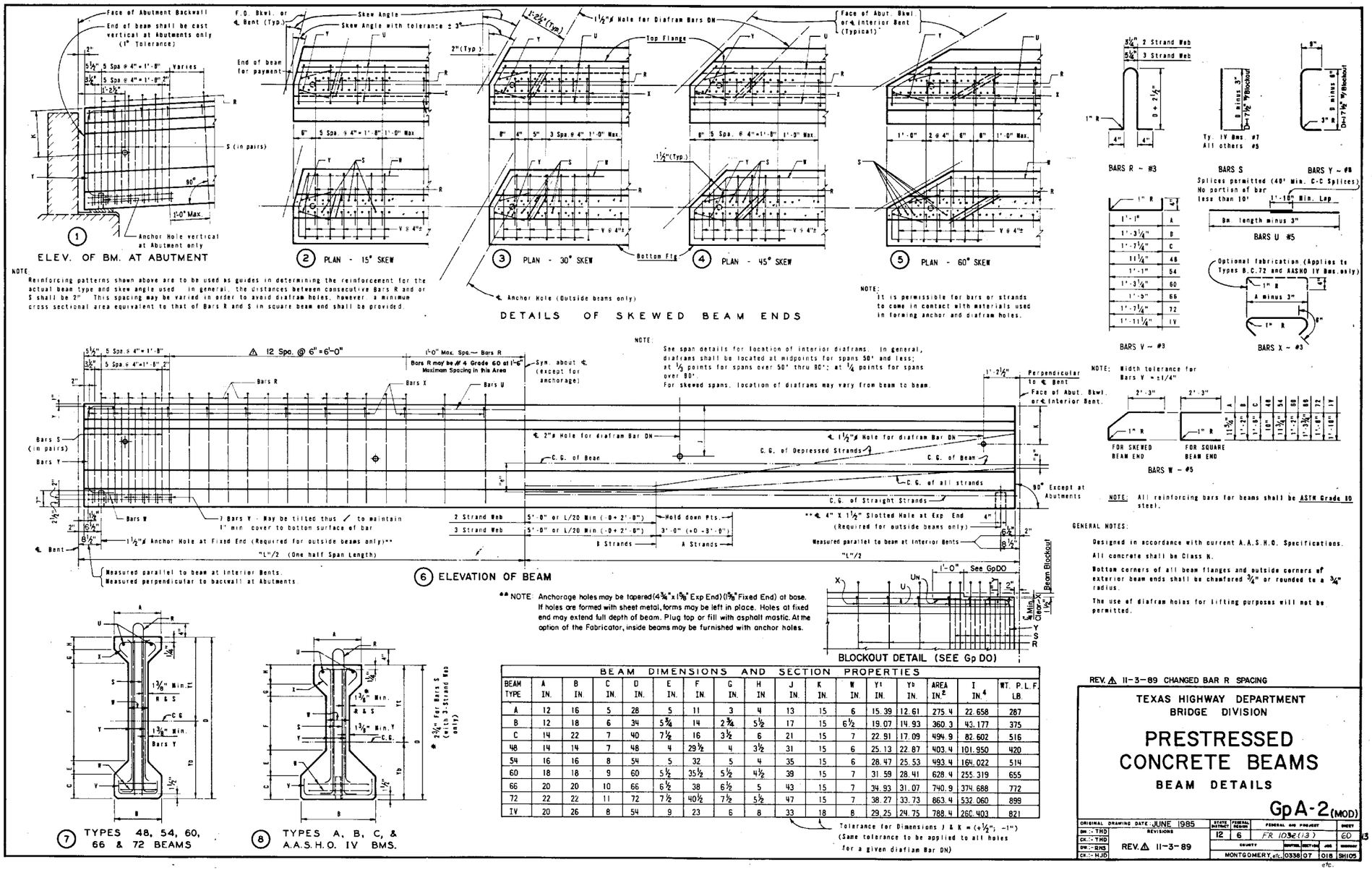
(AS-BUILT PLAN)

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			84
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

CONTRACTOR'S INFORMATION ONLY

H:\WCHAO\Design\Maintenance Projects\RMC\RMC 6382-11-001\Plan Set\3. Roadway\12-170-0-0338-07-129\GpA-2.dgn



BEAM DIMENSIONS AND SECTION PROPERTIES

BEAM TYPE	A IN.	B IN.	C IN.	D IN.	E IN.	F IN.	G IN.	H IN.	J IN.	K IN.	W IN.	Y¹ IN.	Yb IN.	AREA IN.²	I IN.⁴	WT. P.L.F. LB.
A	12	16	5	28	5	11	3	4	13	15	6	15.39	12.61	275.4	22.658	287
B	12	18	6	34	5¾	14	2¾	5½	17	15	6½	19.07	14.93	360.3	43.177	375
C	14	22	7	40	7½	16	3½	6	21	15	7	22.91	17.09	494.9	82.602	516
48	14	14	7	48	4	29½	4	3½	31	15	6	25.13	22.87	403.4	101.950	420
54	16	16	8	54	5	32	5	4	35	15	6	28.47	25.53	493.4	164.022	514
60	18	18	9	60	5½	35½	5½	4½	39	15	7	31.59	28.41	628.4	255.319	655
66	20	20	10	66	6½	38	6½	5	43	15	7	34.93	31.07	740.9	374.688	772
72	22	22	11	72	7½	40½	7½	5½	47	15	7	38.27	33.73	863.4	532.060	899
IV	20	26	8	54	9	23	6	8	33	18	8	29.25	24.75	788.4	260.403	821

Tolerance for Dimensions J & K = (+½"; -1")
(Same tolerance to be applied to all holes for a given diafram Bar DN)

REV. ⚠ 11-3-89 CHANGED BAR R SPACING

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

PRESTRESSED CONCRETE BEAMS
BEAM DETAILS

GpA-2(MOD)

ORIGINAL DRAWING DATE: JUNE 1985		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DN:- THD	REVISIONS	12	6	FR 1032(13)	60
CK:- THD		COUNTY		CONTROL	SECTION	JOB	HIGHWAY
DW:- RNS	REV. ⚠ 11-3-89	MONTGOMERY, etc.		0338	07	018	SH105
CK:- HJD							

CONTRACTOR'S INFORMATION ONLY

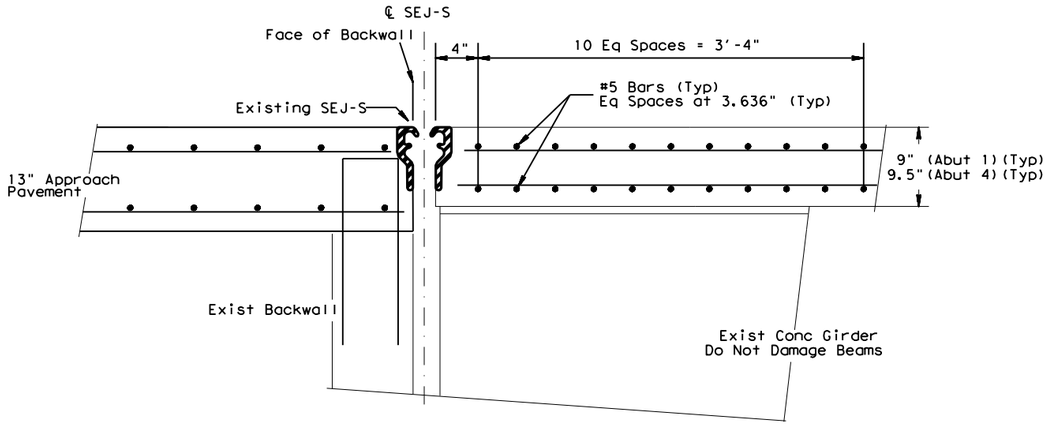
SH 105 OVERPASS AT BNSF RR

PRESTRESSED CONCRETE BEAMS (BEAM DETAILS) GpA-2 (MOD)

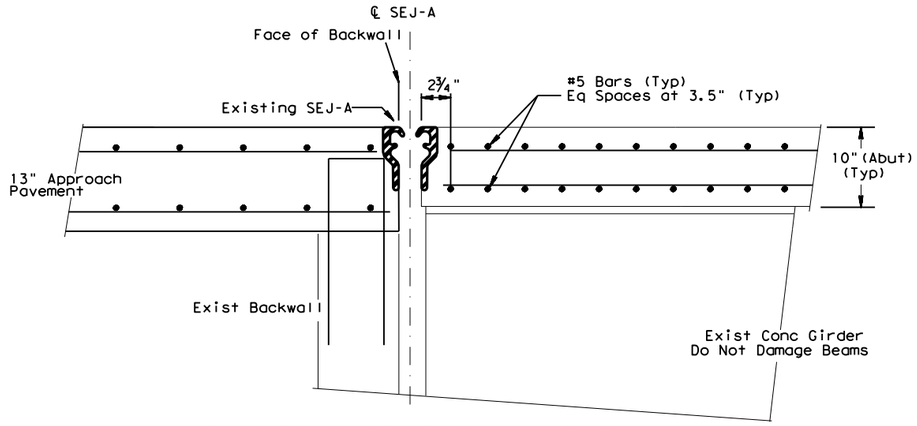
(AS-BUILT PLAN)

SHEET 1 OF 1

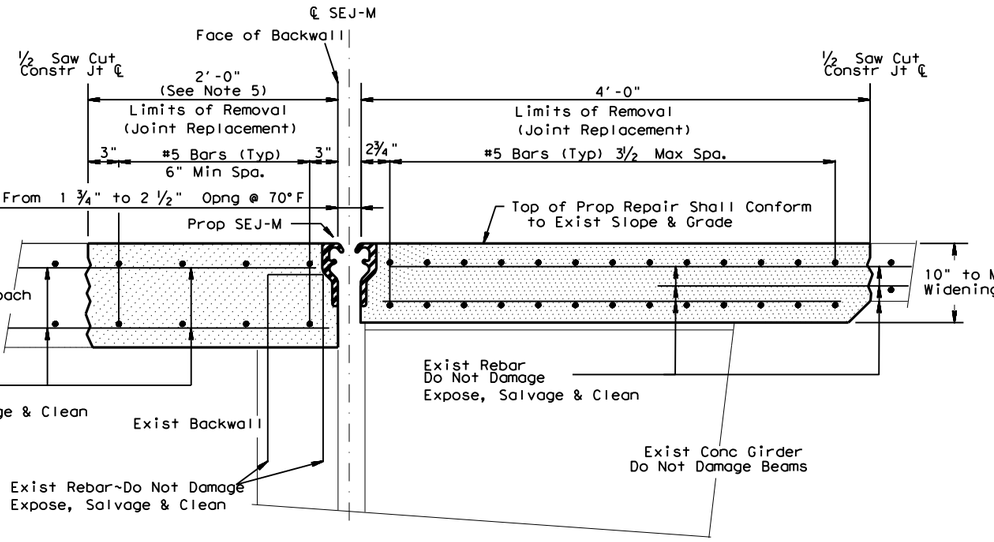
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			85
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



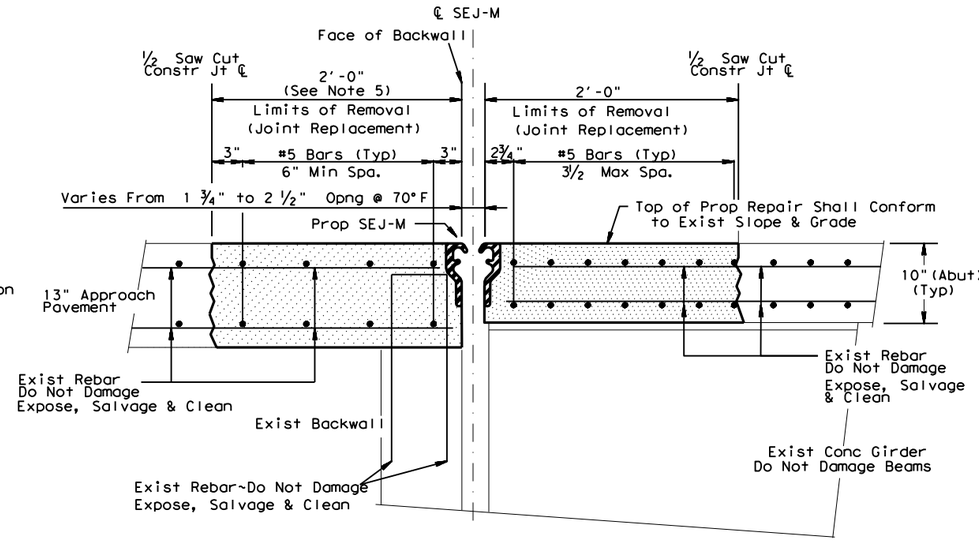
EXISTING SECTION @ ABUT 1 & 4
CONCRETE GIRDER SECTION
(ORIGINAL SECTION)



EXISTING SECTION @ ABUT 1 & 4
CONCRETE GIRDER SECTION
(WIDENING SECTION)



PROPOSED SECTION @ ABUT 1 & 4
CONCRETE GIRDER SECTION
(ORIGINAL SECTION)



PROPOSED SECTION @ ABUT 1 & 4
CONCRETE GIRDER SECTION
(WIDENING SECTION)

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. SEE SHEETS "SEALED EXPANSION JOINT TYPE M WITHOUT OVERLAY" FOR JOINT DETAILS TO MATCH EXISTING JOINT TYPE-A IF POSSIBLE.
5. EXACT DIMENSIONS OF REPAIR TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO REPAIR THE TRANSVERSE CRACKS THAT APPEAR NEXT TO ABUTMENT JOINTS. THE ESTIMATE OF WIDTH IS 2' FOR WBML NORTH APPROACH SLAB AT ABUT 1&4, 3' FOR EBML SOUTH APPROACH SLAB AT ABUT 1, 3.5' FOR EBML SOUTH APPROACH SLAB AT ABUT 4, AND 2' FOR HOV SECTION AT ABUT 1&4.

Steve Van, P.E.

08/19/2021

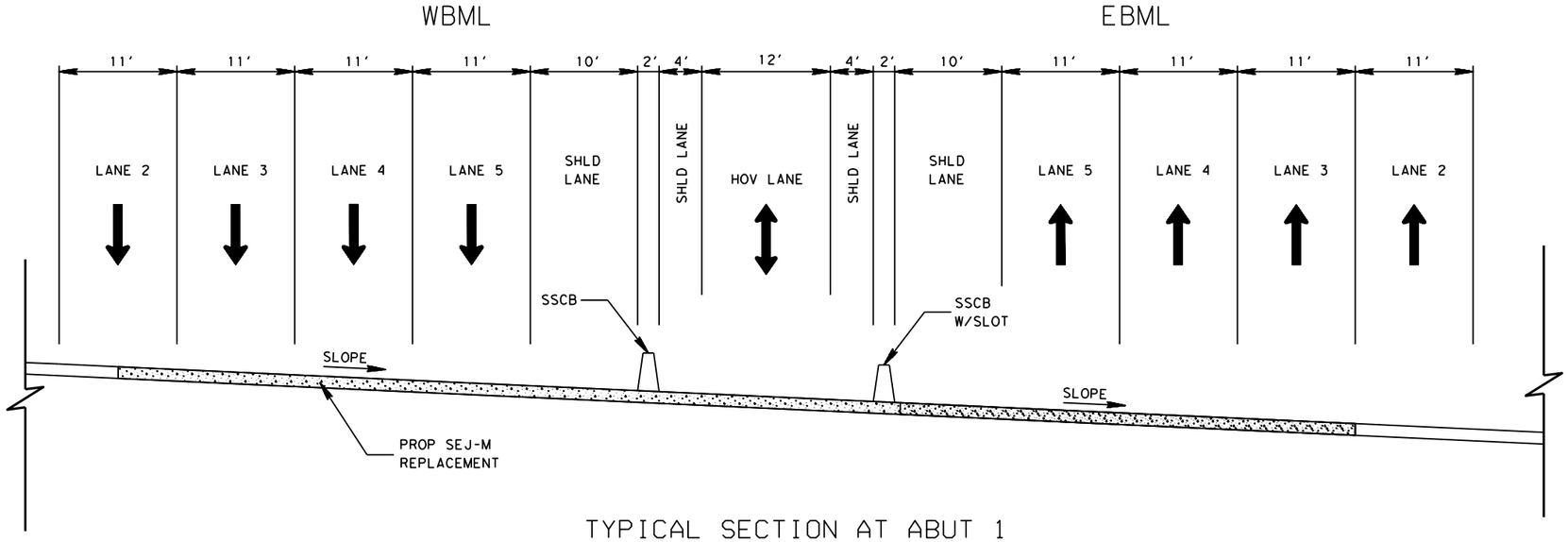
Not To Scale SHEET 1 OF 2

 Texas Department of Transportation

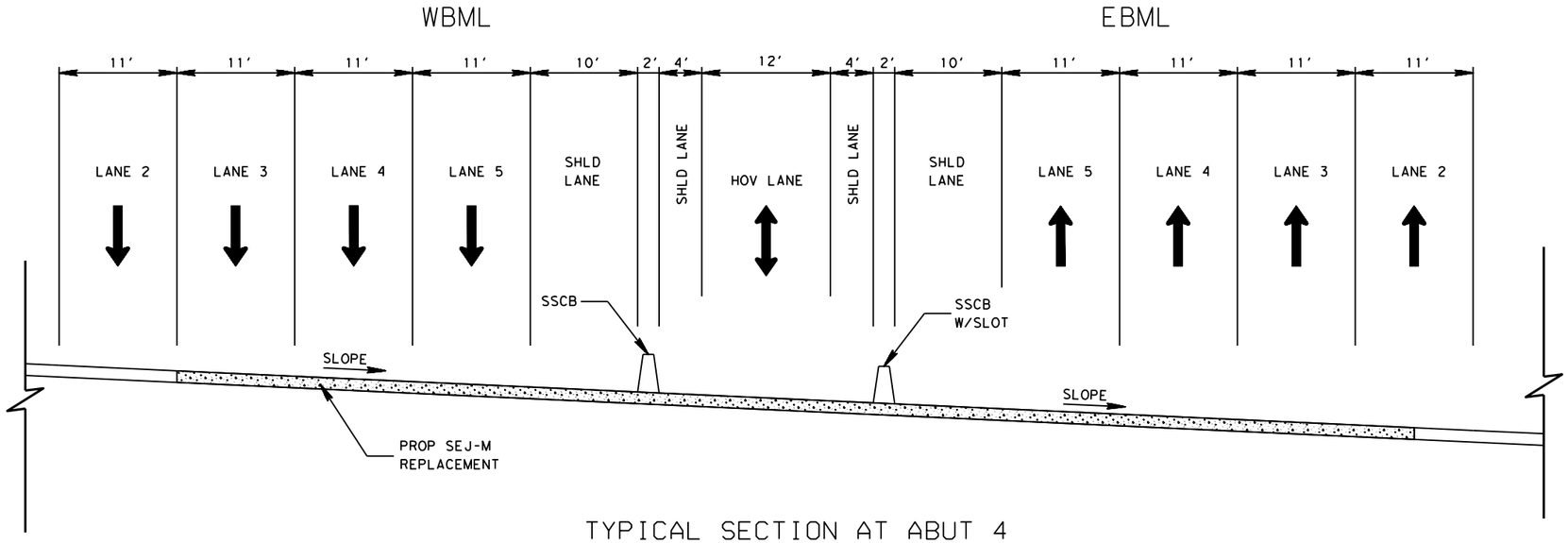
US 290

BRIDGE JOINT REPLACEMENT DETAILS

STATE	DIST.	PROJECT NO.			SHEET NO.
TEXAS	HOU				86
COUNTY	FED. RD. DIV. NO.	CONT.	SECT.	JOB	HIGHWAY NO.
HARRIS, ETC.	6	6382	11	001	US 290, ETC.



TYPICAL SECTION AT ABUT 1



TYPICAL SECTION AT ABUT 4

LEGEND:

PROPOSED SEJ-M REPLACEMENT

NOTE:

1. EXACT DIMENSIONS OF REPAIR TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO REPAIR.

STATE OF TEXAS
STEVE VAN
137551
REGISTERED PROFESSIONAL ENGINEER

Steve Van, P.E.
08/19/2021

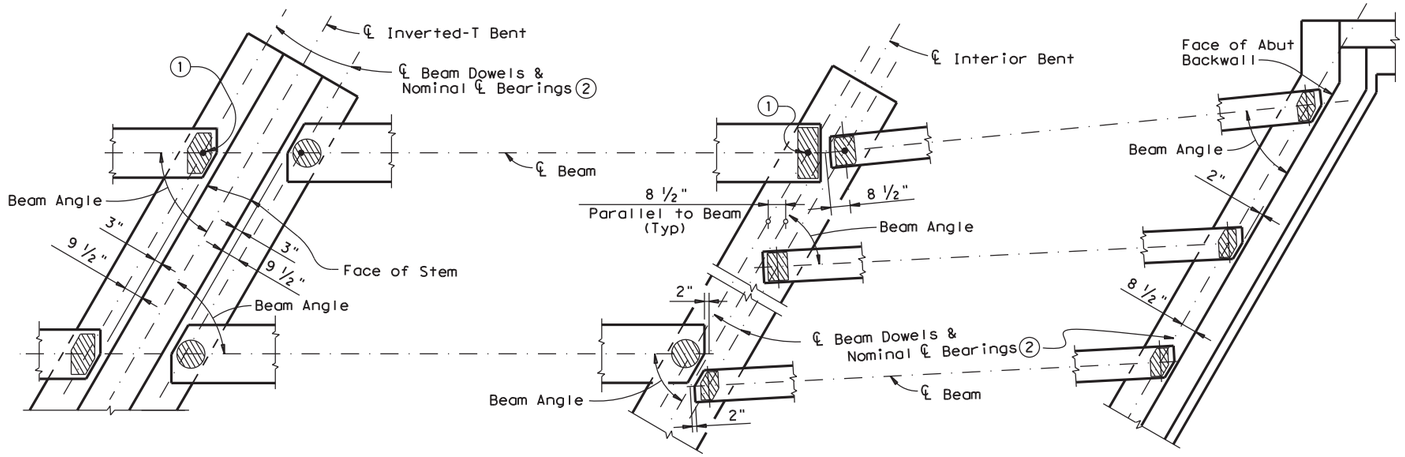
Not To Scale SHEET 2 OF 2

US 290

BRIDGE JOINT REPLACEMENT DETAILS

STATE	DIST.	PROJECT NO.			SHEET NO.
TEXAS	HOU				87
COUNTY	FED. RD. DIV. NO.	CONT.	SECT.	JOB	HIGHWAY NO.
HARRIS, ETC.	6	6382	11	001	US 290, ETC.

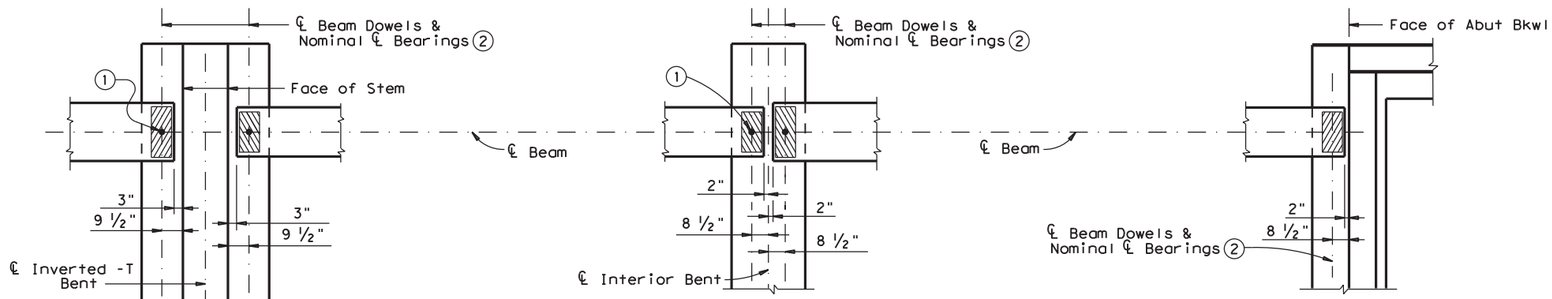
LEVELS DISPLAYED
ACC:
1



AT INVERTED-T BENT WITH SKEW

AT CONVENTIONAL INTERIOR BENT WITH SKEW

AT ABUTMENT WITH SKEW (3)



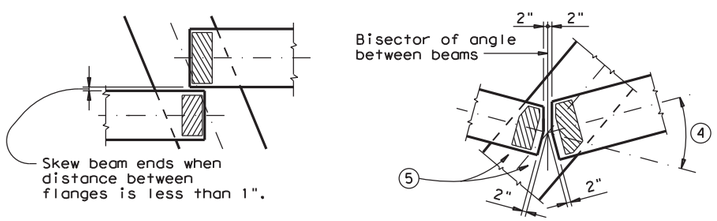
AT INVERTED-T BENT

AT CONVENTIONAL INTERIOR BENT

AT ABUTMENT

BEAM END DETAILS

1. Dowel at doweled beam end [labeled (D) on Bridge Layout]. Required for outside beams only or as shown on substructure details.
2. For purposes of computing Bearing Seat Elevations, nominal centerline of bearing shall be defined as shown. The actual center of bearing pad may vary from this line.
3. For Transition Bents with backwall, beams and elastomeric bearings shall receive the same treatment as shown for Abutments.
4. When angle exceeds 0°, one or both beam ends shall be clipped to maintain the clearance between beam ends as shown in view.
5. See Elastomeric Bearing Data Table for Bearing size. Corner clips in Table not applicable for this situation. Table reflects beam conflicts of this type on radial bents only.



BEAM CONFLICT DETAILS

GENERAL NOTES:

These details accommodate skew angles up to 60°.
Shop drawings for approval are required.
A bearing layout which identifies location and orientation of all bearings shall be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.
Cost of furnishing and installing elastomeric bearings shall be included in unit price bid for "Prestressed Concrete Beams".

HL93 LOADING

STATE OF TEXAS
MICHAEL E. CARLSON
111317
LICENSED PROFESSIONAL ENGINEER

Michael E Carlson, PE
07/26/2021

Texas Department of Transportation
Bridge Division

ELASTOMERIC BEARING AND BEAM END DETAILS

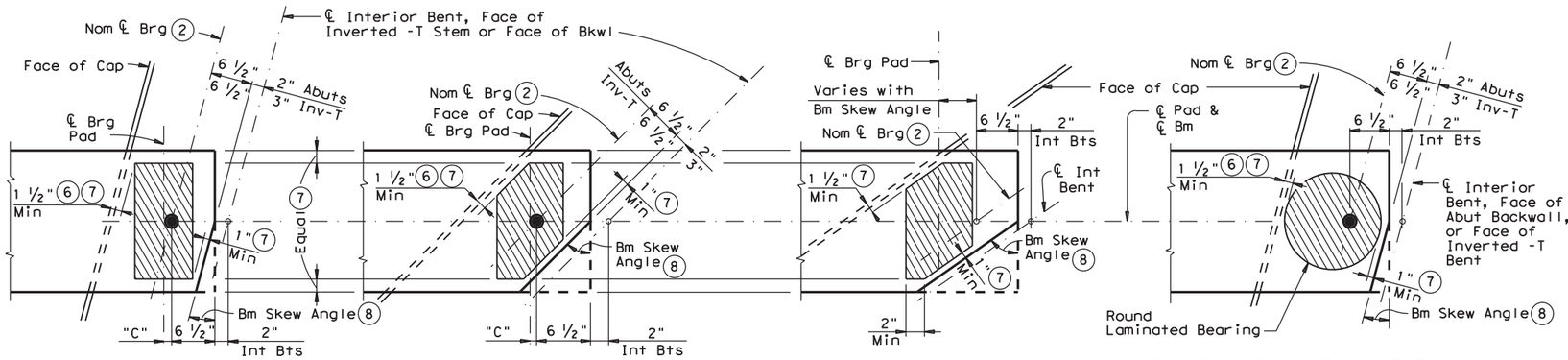
PRESTR CONCRETE I-BEAMS

RMC: 6382-11-001

IBEB

FILE: ibebstel.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2005	DISTRICT	PROJECT		SHEET
REVISIONS	HOU			88
Rev. 4-05: Taper Tolerance and Shop Drawings	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS, ETC	6382	11	001	US 290, ETC

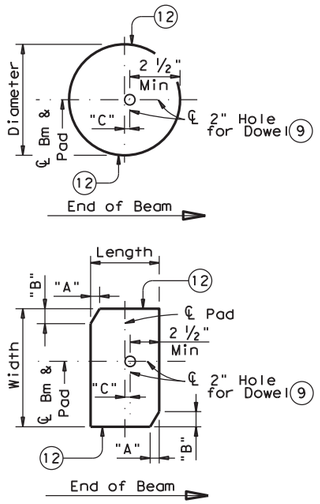
LEVELS DISPLAYED
ACC:
1



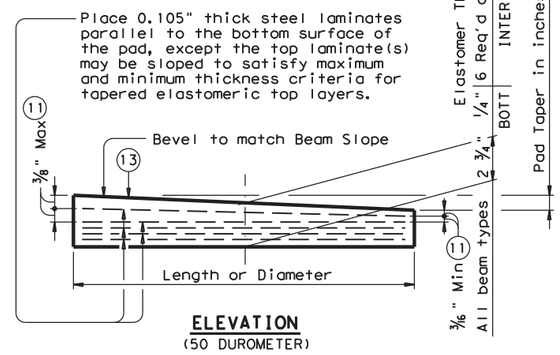
SKEWED BMS ENDS AT CONV INT BENTS

ROUND BEARINGS FOR SKEWED TYPE IV & VI BEAMS ONLY

ELASTOMERIC BEARING PLACEMENT DIAGRAMS



PLANS (10)



ELEVATION
(50 DUROMETER)

LAMINATED ELASTOMERIC BEARING DETAILS (14)

(2) For purposes of computing Bearing Seat Elevations, nominal centerline of bearing shall be defined as shown. The actual center of bearing pad may vary from this line.

(6) 3" for Inverted -T.

(7) Factors controlling laminated bearing placement if no dowel is present. Place ℄ Pad as near Nominal ℄ Brg as possible between limits shown.

(8) Complement of Beam Angle except at some conflicting beams.

(9) Provide 2" Dia Hole (always on beam end side of centerline pad) only at locations required. See substructure details for location. The Dowel offset "C" dimension may be 0" when the bridge is square.

(10) See Elastomeric Bearing Data Table for dimensions.

(11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(12) Locate Permanent Mark here.

(13) BEARING TYPE shall be indicated on all pads. For tapered pads, BEARING TYPE shall be located on the high side. The Fabricator shall include the value of "N" (amount of taper in 1/8" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for 1/8" taper)
N=2, (for 1/4" taper)
(etc.)
Fabricated pad top surface slope shall not vary from plan beam slope by more than $\left(\frac{0.0625"}{\text{Length or Dia}}\right)$ IN/IN.

(14) The use of Polyisoprene (natural rubber), for the manufacture of bearing pads, is not permitted.

(15) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.

(16) Interpolate "C" values for angles not shown between 30° & 40°, 40° & 50°, 50° & 60°.

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (15)

Beam Type	Abutments	Int Bents	Inv-T Bents
	Face of Bkwl to Face of Cap	Overall Cap Width	Corbel Width
A, B, & C	1'-4 ½"	2'-9"	1'-8"
IV	1'-7 ½"	3'-3"	1'-10"
VI	1'-10 ½"	3'-9"	2'-0"

ELASTOMERIC BEARING DATA TABLE

Bent Type	Beam Type	Brg Type (13)	Beam End Skew Angle Range	Pad Size Lgth x Width	Pad Clip Dimensions "A"	Pad Clip Dimensions "B"	"C" (9)
AT ABUTMENTS, INVERTED - T & TRANSITION BENTS WITH BACKWALLS	A	A-1-"N"	0° thru 15°	7" x 12"	—	—	—
	A	A-2-"N"	15° + thru 45°	7" x 12"	1 ¼"	1 ¼"	¾"
	A	A-3-"N"	45° + thru 60°	7" x 12"	1 ½"	2"	1"
	B	B-1-"N"	0° thru 15°	7" x 14"	—	—	—
	B	B-2-"N"	15° + thru 45°	7" x 14"	2 ¼"	2 ¼"	¾"
	B	B-3-"N"	45° + thru 60°	7" x 14"	3 ¾"	2 ¼"	1"
	C	C-1-"N"	0° thru 15°	7" x 16"	—	—	—
	C	C-2-"N"	15° + thru 45°	7" x 16"	3 ¼"	3 ¼"	¾"
	C	C-3-"N"	45° + thru 60°	8" x 16"	6"	4"	1"
	IV	IV-1-"N"	0° thru 15°	7" x 22"	—	—	1"
	IV	IV-2-"N"	15° + thru 29°	7" x 22"	2 ½"	4 ½"	1"
	IV	IV-3-"N"	30° (16)	15" Dia	—	—	2 ⅜"
	IV	IV-4-"N"	40° (16)	15" Dia	—	—	2 ⅝"
	IV	IV-5-"N"	50° (16)	15" Dia	—	—	3 ⅛"
	IV	IV-6-"N"	60° (16)	15" Dia	—	—	4"
	VI	VI-1-"N"	0° thru 15°	9" x 24"	—	—	2"
	VI	VI-2-"N"	15° + thru 29°	9" x 24"	3 ¼"	5 ½"	2"
	VI	VI-3-"N"	30° (16)	17" Dia	—	—	3 ¾"
	VI	VI-4-"N"	40° (16)	17" Dia	—	—	4"
	VI	VI-5-"N"	50° (16)	17" Dia	—	—	5 ½"
	VI	VI-6-"N"	60° (16)	17" Dia	—	—	6"
AT CONVENTIONAL INTERIOR BENTS Sq Bm Ends	A	A-4-"N"	Not Applicable	7" x 12"	—	—	—
	B	B-4-"N"	Not Applicable	7" x 14"	—	—	—
	C	C-4-"N"	Not Applicable	7" x 16"	—	—	—
	IV	IV-7-"N"	Not Applicable	7" x 22"	—	—	—
	VI	VI-7-"N"	Not Applicable	9" x 24"	—	—	—
AT CONVENTIONAL INTERIOR BENTS Skewed Bm Ends	A	A-5-"N"	0° thru 15°	7" x 12"	—	—	—
	A	A-6-"N"	15° + thru 60°	7" x 12"	1"	1"	—
	B	B-5-"N"	0° thru 15°	7" x 14"	—	—	—
	B	B-6-"N"	15° + thru 45°	7" x 14"	1 ¾"	1 ¾"	—
	B	B-7-"N"	45° + thru 60°	7" x 14"	2 ¾"	1 ¾"	—
	C	C-5-"N"	0° thru 15°	7" x 16"	—	—	½"
	C	C-6-"N"	15° + thru 45°	7" x 16"	2 ¾"	2 ¾"	—
	C	C-7-"N"	45° + thru 60°	7" x 16"	4 ½"	2 ¾"	—
	IV	IV-8-"N"	0° thru 15°	7" x 22"	—	—	1"
	IV	IV-9-"N"	15° + thru 29°	7" x 22"	1 ¼"	2"	—
	IV	IV-10-"N"	29° + thru 60°	15" Dia	—	—	—
	VI	VI-8-"N"	0° thru 15°	9" x 24"	1"	3 ¾"	1 ½"
	VI	VI-9-"N"	15° + thru 29°	9" x 24"	1"	2"	—
	VI	VI-10-"N"	29° + thru 60°	17" Dia	—	—	—

HL93 LOADING

STATE OF TEXAS
MICHAEL E. CARLSON
111317
LICENSED PROFESSIONAL ENGINEER

Michael E Carlson, PE
07/26/2021

Texas Department of Transportation
Bridge Division

ELASTOMERIC BEARING AND BEAM END DETAILS

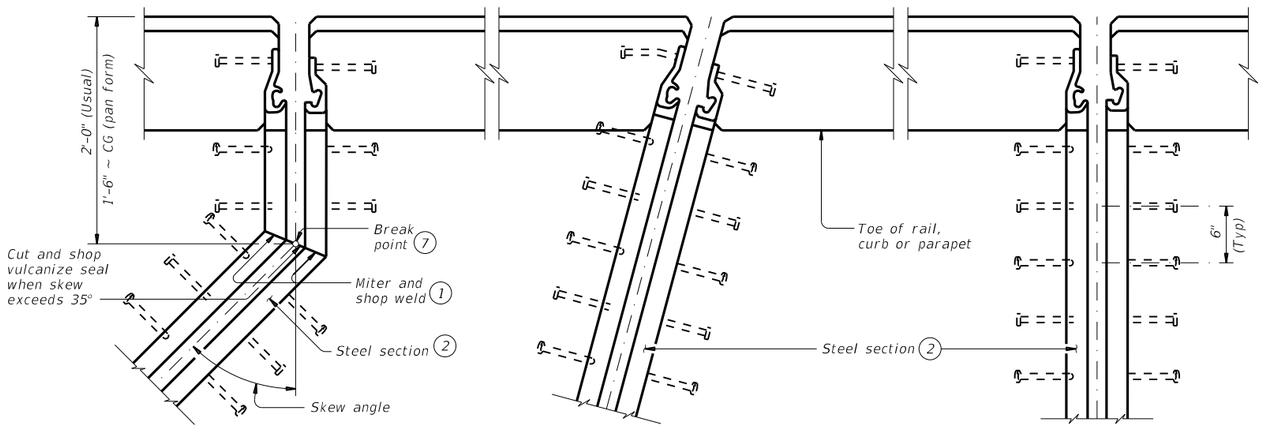
PRESTR CONCRETE I-BEAMS

RMC: 6382-11-001

IBEB

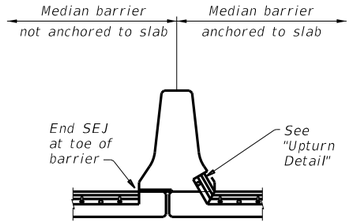
FILE: ibebstel.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2005	DISTRICT	PROJECT		SHEET
REVISIONS Rev. 4-05: Taper Tolerance and Shop Drawings	HOU			89
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS, ETC	6382	11	001	US 290, ETC

DATE:
FILE:

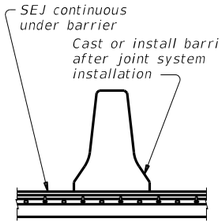


SHOWING SKEWS WITH SLAB BREAKBACKS | SHOWING SKEWS WITHOUT SLAB BREAKBACKS | SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

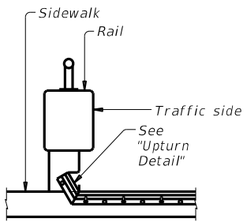
PLANS OF END CONDITIONS



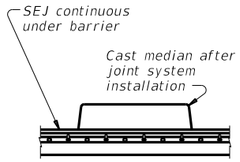
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



AT MEDIAN BARRIER



AT SIDEWALK BEHIND BRIDGE RAIL



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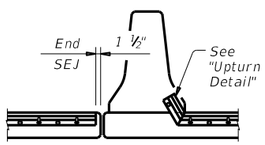
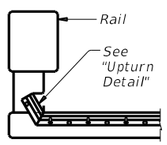
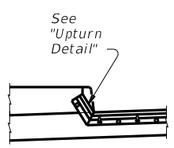


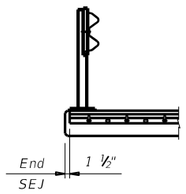
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

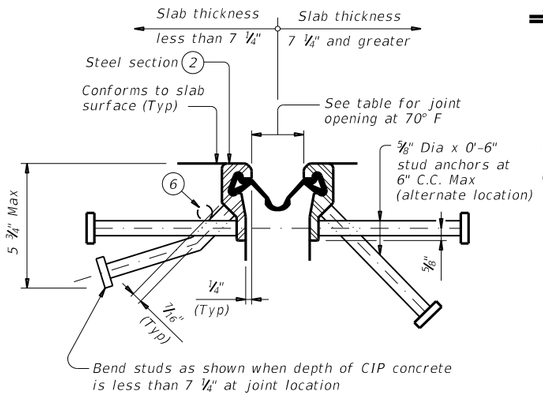


AT SIDEWALK

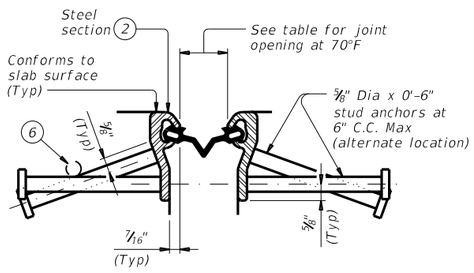


AT STEEL POST BRIDGE RAIL

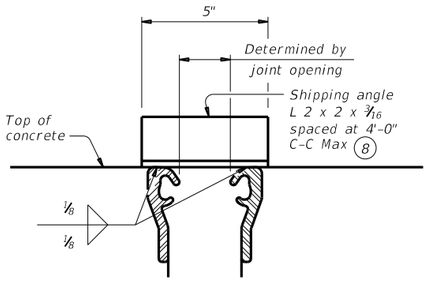
TYPICAL SECTIONS (5)



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.

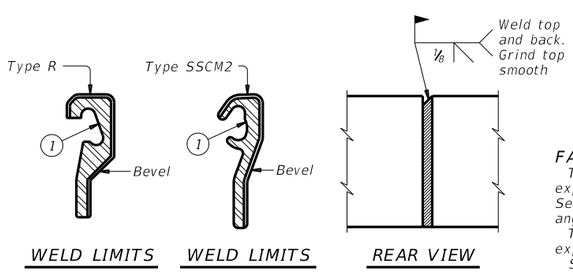
(4) Reduce for sidewalk or parapet heights less than 6".

(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

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.

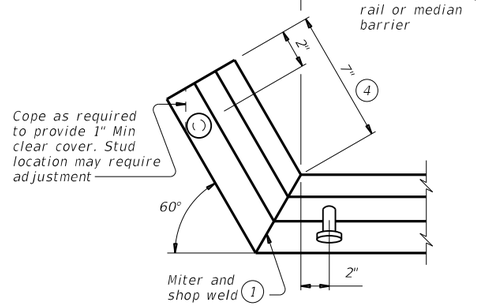
Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

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".



UPTURN DETAIL

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	11	001	US 290, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS, ETC.		90

H:\WCHAO\Design\Maintenance Projects\RMC\RMC 6382-11-001\Plan Set\3. Roadway\Standard\SEJ-A01.dgn

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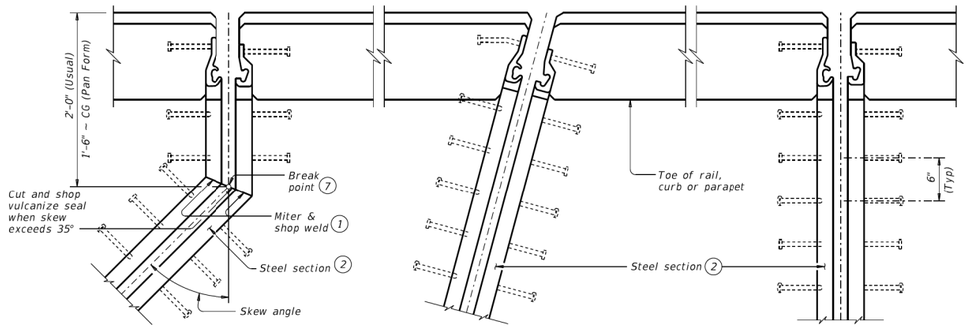


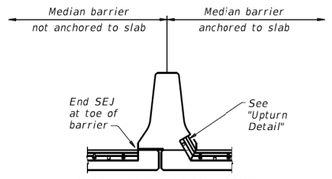
SHOWING SKEWS WITH SLAB BREAKBACKS

SHOWING SKEWS WITHOUT SLAB BREAKBACKS

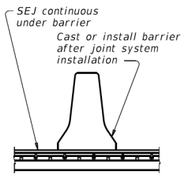
SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

PLANS OF END CONDITIONS

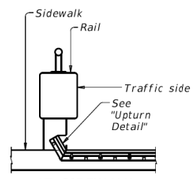
Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.
Shown with upturns



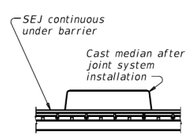
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



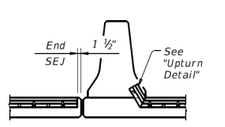
AT MEDIAN BARRIER



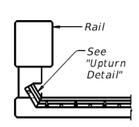
AT SIDEWALK BEHIND BRIDGE RAIL



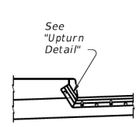
AT RAISED MEDIAN



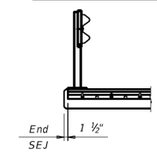
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL



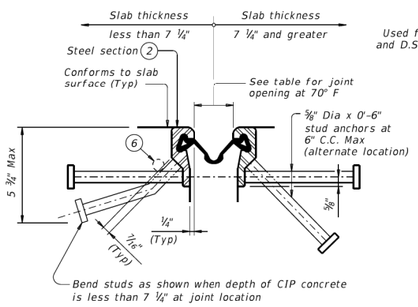
AT SIDEWALK



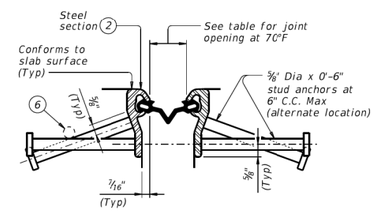
AT STEEL POST BRIDGE RAIL

TYPICAL SECTIONS (5)

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.



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



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

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"
Watson Bowman Acme	As Shown	SPS-400	2"	N/A	N/A
R.J. Watson	As Shown	SF-400	2 ½"	N/A	N/A

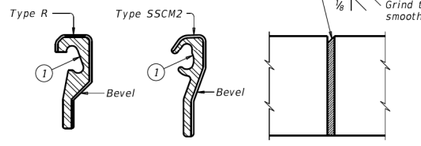
REDUCED LONGITUDINAL MOVEMENT RANGE

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.

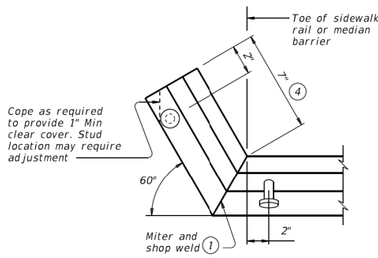
For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).



WELD LIMITS | WELD LIMITS | REAR VIEW

FIELD SPLICE DETAIL

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.



UPTURN DETAIL

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.

(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.

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of Sealed Expansion Joints, 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 portions of steel sections not in contact with concrete with the primer specified for System II paint.

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-A is 6 ½".

CONTRACTOR'S INFORMATION ONLY

SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

SEALED EXPANSION JOINT
TYPE A
WITHOUT OVERLAY

SEJ-A

FILE: sejaste1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
01-16: Addition of strip seal type, dimension armor plate, Joint Seal splice note.	DIST	COUNTY		SHEET NO.

STATE OF TEXAS
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

Steve Van, P.E.

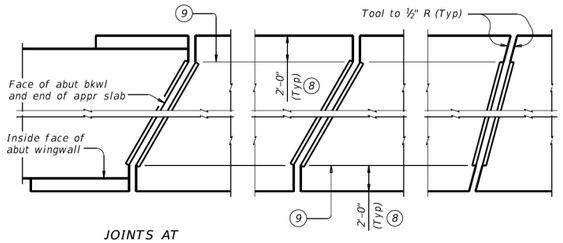
08/19/2021

SEALED EXPANSION JOINT TYPE A WITHOUT OVERLAY

SEJ-A

SHEET 1 OF 2

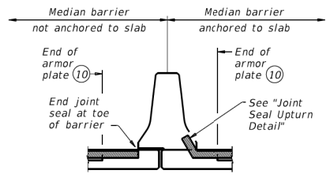
FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			91
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.



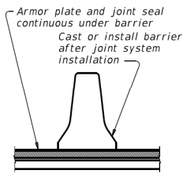
JOINTS AT ABUTMENTS | SKEWS OVER 15° | SKEWS THRU 15°

PLANS OF ARMOR PLATES

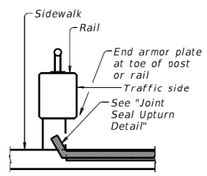
Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems



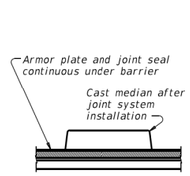
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



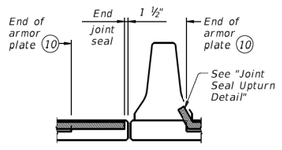
AT MEDIAN BARRIER



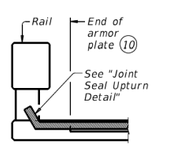
AT SIDEWALK BEHIND BRIDGE RAIL



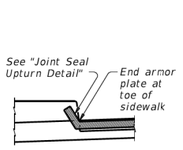
AT RAISED MEDIAN



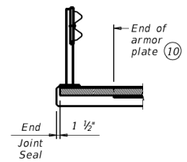
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL



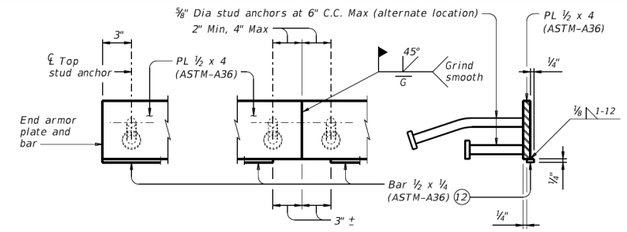
AT SIDEWALK



AT STEEL POST BRIDGE RAIL

TYPICAL SECTIONS OF ARMOR PLATES & SEALS (5)

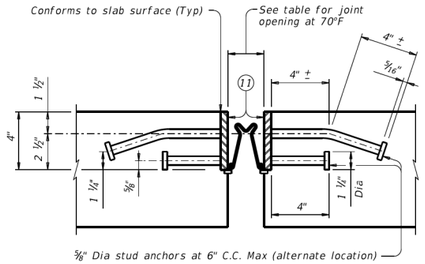
Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems



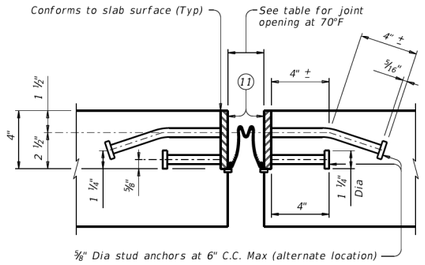
END VIEW | FIELD SPLICE (Studs not shown for clarity) | SECTION

ELEVATION OF ARMOR PLATE

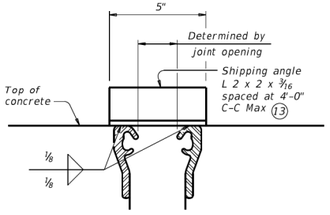
Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems



SECTION THRU R J WATSON (SF-400) JOINT



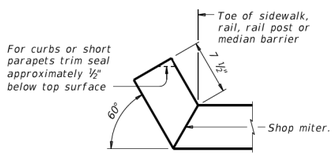
SECTION THRU WATSON BOWMAN ACME (SPS-400) JOINT



SHOWING D.S. BROWN (Ty SSCM2)
All joints similar

SHIPPING ANGLE

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



JOINT SEAL UPTURN DETAIL

Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems. Upturn seal only. Terminate armor plates as shown in "Plans of Armor Plates" and "Typical Sections of Armor Plates & Seals."

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

(8) Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.

(9) At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.

(10) See "Plans of Armor Plates".

(11) Coat with Manufacturer's supplied epoxy primer above bar before installing sealant.

(12) In lieu of bar, use ¾", 16 gauge, stainless steel strap. Attach to armor plate with a fastener for attaching steel to steel base material, such as Hilti X-EGN or X-S13.

(13) Align shipping angle perpendicular to joint.

CONSTRUCTION NOTE FOR R.J. WATSON (SF-400) AND WATSON BOWMAN ACME (SPS-400) JOINTS:
Splice and install seal in accordance with the Manufacturer's directions and with the adhesive provided by the Manufacturer. Splice in joint seal may be performed in the field.

Texas Department of Transportation | Bridge Division Standard

SEALED EXPANSION JOINT TYPE A WITHOUT OVERLAY

SEJ-A

FILE: sejaste1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
01-16: Addition of strip seal type, dimension armor plate. Joint Seal splice note.	DIST	COUNTY		SHEET NO.

DATE:
FILE:

H:\WCHAO\Design\Maintenance Projects\RMC\RMC 6382-11-001\Plan Set\3. Roadway\Standard\SEJ-A02.dgn

STATE OF TEXAS
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

Steve Van, P.E.

08/19/2021

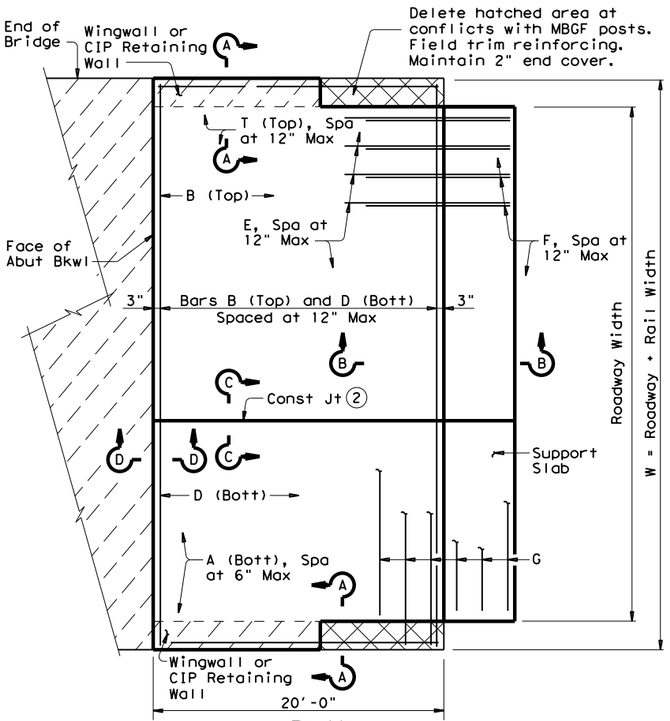
SEALED EXPANSION JOINT TYPE A WITHOUT OVERLAY

SEJ-A

SHEET 2 OF 2

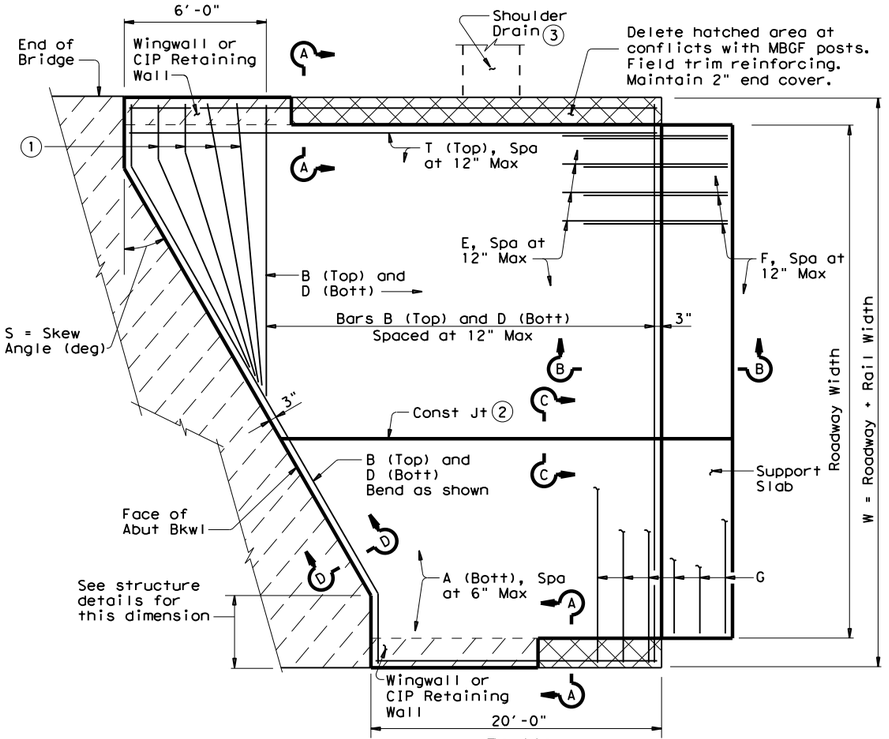
FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			92
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6382	11	001	US 290, ETC.

CONTRACTOR'S INFORMATION ONLY



PLAN

(Showing Non-Skewed Approach Slab)



PLAN

(Showing Skewed Approach Slab)

BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
E	#5
F	#5
G	#5
T	#5

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab
= 18.4 Lbs/LF of Support Slab

Area of Appr Slab = $20W + 0.5W^2 \tan S$ (SF)
(Support Slab not included)

W = Width of Approach Slab (ft)

S = Skew Angle (deg)

(1) Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.

(2) Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.

(3) See details elsewhere in plans for shoulder drain location and details.

(4) For Contractor's information only.

(5) On portion of support slab that supports the concrete pavement, adjust top surface elevation, if required, to accommodate concrete pavement thickness. Smooth trowel finish. Oil top of support slab with 60 grade oil and apply heavy coat of powdered graphite. Press down one layer of 30# roofing felt.

(6) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

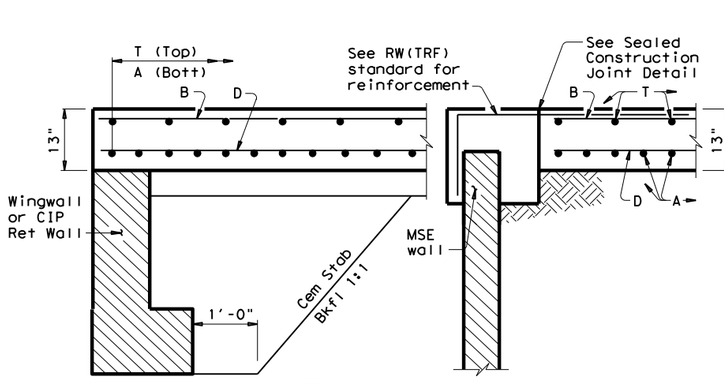
(7) See details elsewhere in plans for required cross-slope.

(8) Place in accordance with Item 438.

(9) Backer rod shall be 25% larger than joint opening and shall be compatible with the sealant.

GENERAL NOTES:

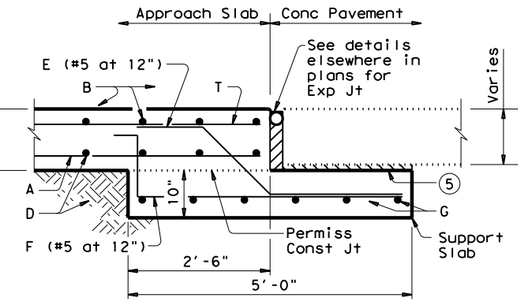
1. Construct approach slab in accordance with Item 422.
2. Concrete shall be Class "S" with a minimum compressive strength of 4,000 psi.
3. All reinforcing steel shall be Grade 60.
4. Construct the subgrade or subbase from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.
5. Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.
6. Cure for 4 days using water or membrane curing per Item 422.
7. Sealant, backer rod and preformed bituminous fiber material is subsidiary to approach slab concrete.



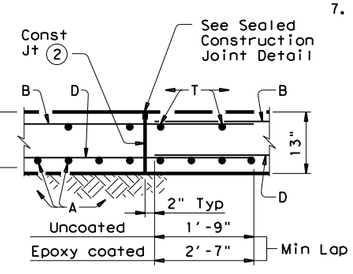
SHOWING WINGWALL OR CIP RETAINING WALL

SHOWING MSE WALL

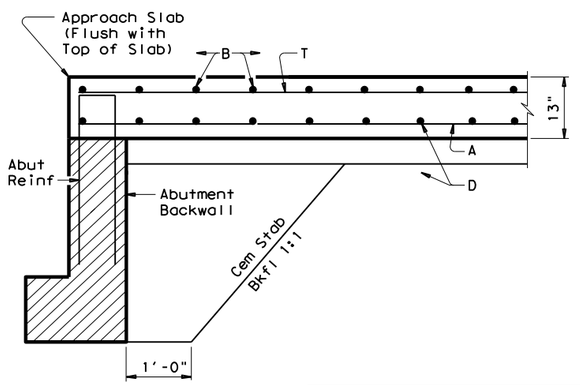
SECTION A-A



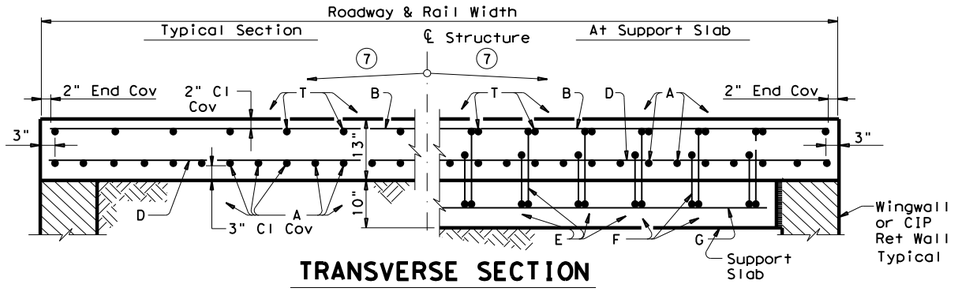
SECTION B-B



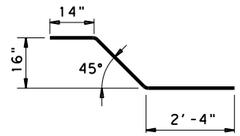
SECTION C-C (6)



SECTION D-D



TRANSVERSE SECTION



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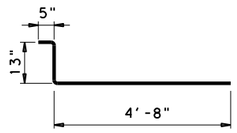

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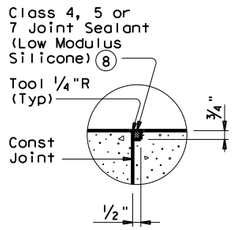


SEALED CONSTRUCTION JOINT DETAIL

Texas Department of Transportation
Houston District

BRIDGE APPROACH SLAB

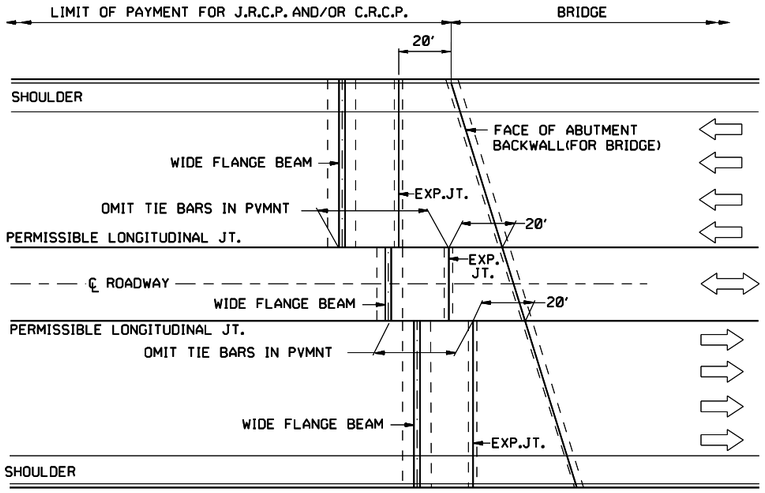
CONCRETE PAVEMENT

BAS-C

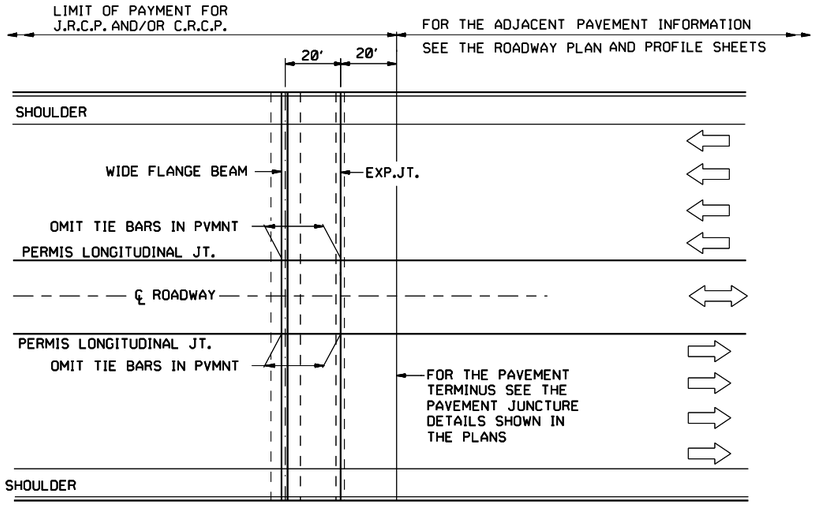
FILE: STDB10B.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2009	DISTRICT	PROJECT NO.		SHEET
REVISIONS 4/20/2015 updated to 2014 standard	HOU			93
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS, ETC.	6382	11	001	US 290, ETC.

STDB10B

LEVELS DISPLAYED
PATH:
1



TYPICAL ROADWAY LAYOUT CONCRETE MEDIAN AND SHOULDERS (AT BRIDGES)

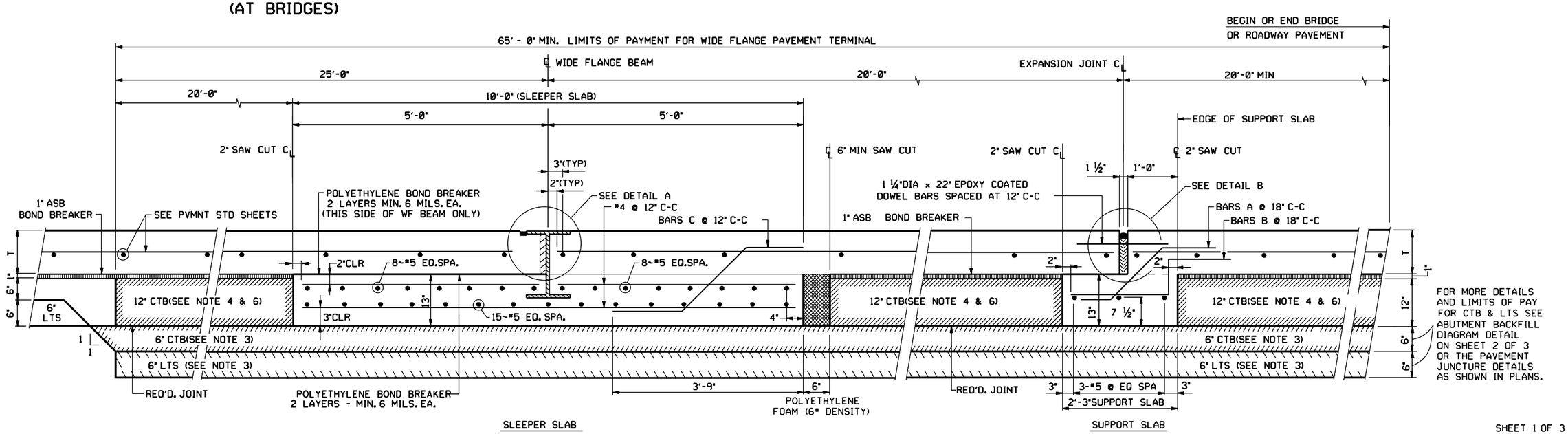


TYPICAL ROADWAY LAYOUT CONCRETE MEDIAN AND SHOULDERS

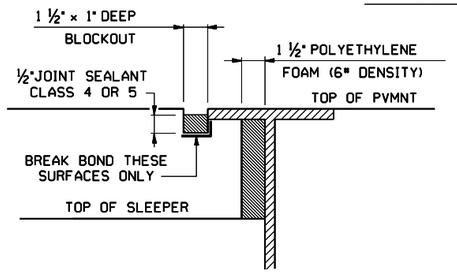
NOTES

1. BLOCK-OUT REQUIRED AT EACH END OF WIDE FLANGE BEAM ADJACENT TO ⅜ INCH END PLATE WHERE BLOCK-OUT IS PLACED ABUTTING CONCRETE PAVEMENT, RIPRAP OR STABILIZED BASE. THE BLOCKED OUT AREA WILL BE FILLED WITH POLYETHYLENE FOAM (6 POUND DENSITY). SEE SHEET 3 OF 3 FOR BLOCK-OUT DETAIL.
2. FOR ADDITIONAL DETAILS ON REINFORCEMENT MEMBER QUANTITIES AND THE WIDE FLANGE BEAM SEE SHEET 2 OF 3.
3. REPLACE 6 INCH LIME TREATMENT AND 6 INCH CEMENT TREATMENT WITH CEMENT STABILIZED BACK-FILL AT STRUCTURES WITH CEMENT STABILIZED BACKFILL EMBANKMENT. SEE "CEMENT STABILIZED BACKFILL EMBANKMENT" STANDARD SHEET FOR DETAILS.
4. 12 INCH CEMENT STABILIZED BACKFILL MAY BE SUBSTITUTED FOR 12 INCH CTB, AT CONTRACTOR'S OPTION, ON APPLICABLE STRUCTURES WITH CEMENT STABILIZED BACKFILL EMBANKMENT.

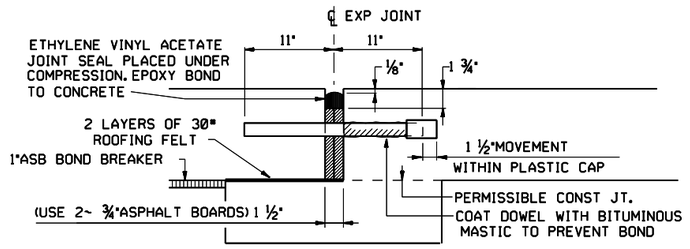
CTB - CEMENT TREATED BASE
LTS - LIME TREATED SUBGRADE
CRCP - CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
JRCP - JOINTED REINFORCED CONCRETE PAVEMENT
ASB - ASPHALT STABILIZED BASE
T - PAVEMENT THICKNESS



TYPICAL SECTION THRU TERMINAL ANCHORAGE @ SLEEPER SLAB & SUPPORT SLAB



DETAIL A



DETAIL B

SHEET 1 OF 3

Texas Department of Transportation
Houston District

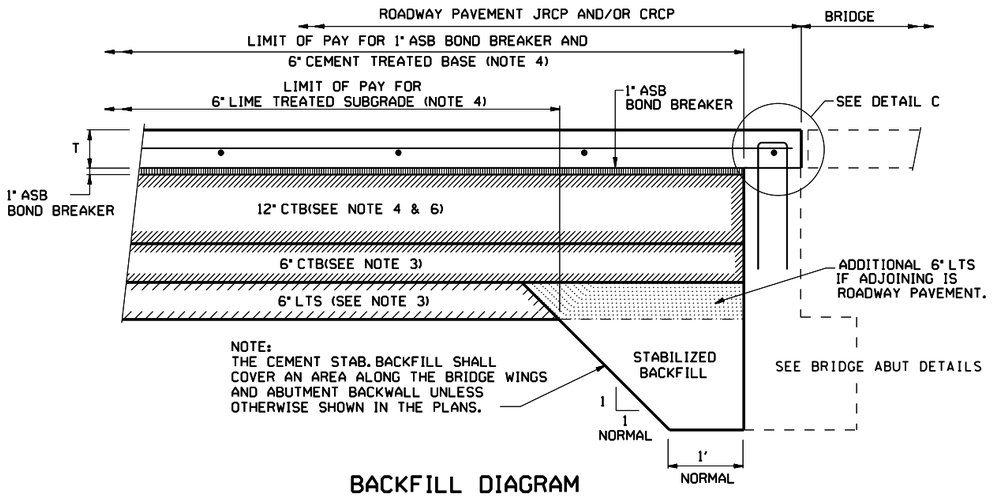
WIDE FLANGE PAVEMENT TERMINALS

FOR CONTINUOUSLY & JOINTED REINFORCED CONCRETE PAVEMENT DETAILS
(FOR USE AT BRIDGE END OR PAVEMENT TERMINUS)

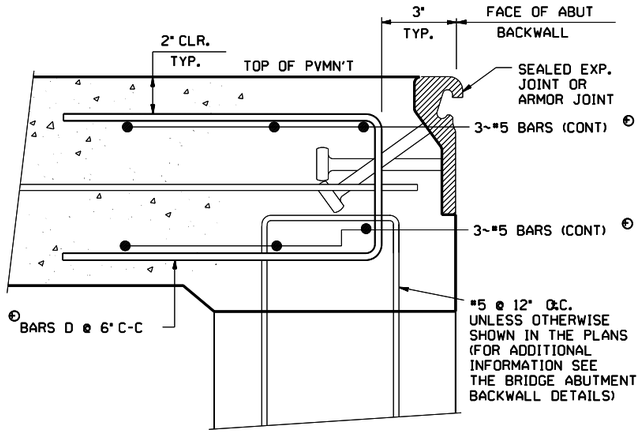
WFPT

FILE: STDB-3.DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT 2014	DISTRICT	FED REG	PROJECT NO.	SHEET
REVISIONS 02/15 2014 SPECS	HOU	6		94
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS, ETC.		6382	11	001	US 290, ETC.

STDB-3



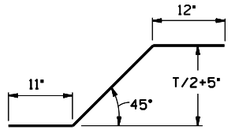
BACKFILL DIAGRAM



DETAIL C

(SHOWING ADDITIONAL REINFORCEMENT FOR ROADWAY PAVEMENT WITH SEALED EXPANSION JOINTS OR ARMOR JOINTS AT ABUTMENTS.)

⊕ THE ADDITIONAL STEEL REQUIRED BY THE ABOVE DETAIL "C" SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED INCIDENTAL TO THE ITEM, "CONCRETE PAVEMENT".



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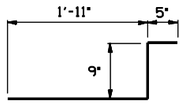
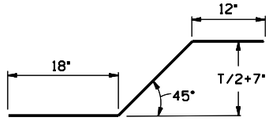
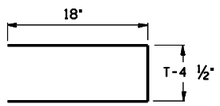


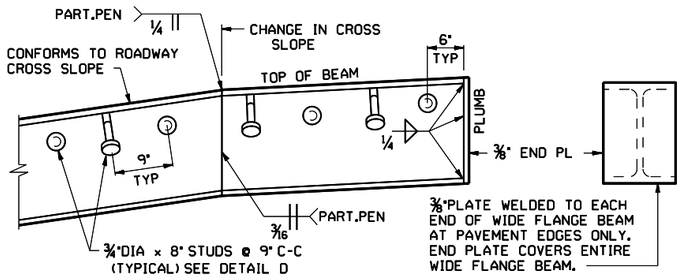
BARS B (#4)



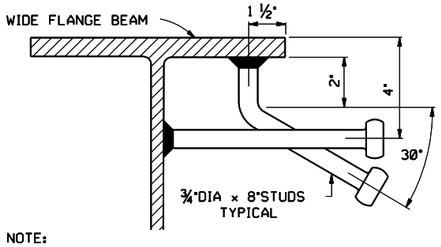
BARS C (#4)



BARS D (#5)



WIDE FLANGE DETAIL



NOTE:
STUDS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION. ANY STUD WHICH IS DISLODGED IN SHIPPING OR CAN BE DISLODGED BY HAMMER SHALL BE REPLACED.

DETAIL D

NOTES: (CONT)

5. THIS STANDARD WILL BE USED WITH SPECIAL SPECIFICATION "CONCRETE PAVEMENT TERMINALS" THIS ITEM WILL BE MEASURED BY THE LINEAR FOOT OF WIDE FLANGE BEAM COMPLETE IN PLACE.

   WIDE FLANGE BEAM, SUPPORT SLAB, SLEEPER SLAB, 12 INCHES OF CEMENT TREATED BASE, POLYETHYLENE BONDBREAKER AND ANY EXCAVATION NECESSARY WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO SPECIAL SPECIFICATION ITEM, "CONCRETE PAVEMENT WIDE FLANGE TERMINALS".

7. POLYETHYLENE FOAM (6 POUND DENSITY), SAW CUTS, EXPANSION JOINTS, EPOXY COATED DOWEL AND EXPANSION JOINT MATERIALS WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED INCIDENTAL TO THE ITEM 360.

8. THE CONCRETE PAVEMENT, 1 INCH ASB BONDBREAKER, 6 INCH PORTLAND CEMENT TREATED BASE AND 6 INCH LIME TREATED SUBGRADE WILL BE PAID FOR UNDER THE APPROPRIATE BID ITEMS.

9. SHEAR CUTTING OF DOWEL BARS IS PROHIBITED.

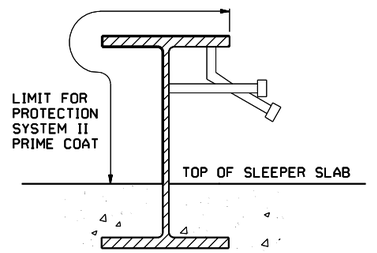
10. EPOXY COATING OF DOWEL BARS PER SPECIFICATION ITEM 440.

11. CEMENT STABILIZED BACKFILL IS REQUIRED AT ALL ABUTMENTS.

CTB - CEMENT TREATED BASE
LTS - LIME TREATED SUBGRADE
CRCP - CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
JRCP - JOINTED REINFORCED CONCRETE PAVEMENT
ASB - ASPHALT STABILIZED BASE
T - PAVEMENT THICKNESS

TABLE OF BEAM SIZES

PAVEMENT THICKNESS	WIDE FLANGE BEAM DESIGNATION
8"-9 ½"	W14 X 68
10"-11 ½"	W16 X 89
12"-13"	W18 X 97
14" & 15"	W21 X111



WIDE FLANGE PAINTING DETAIL

SEE "TABLE OF BEAM SIZES"

ESTIMATED QUANTITIES (FOR CONTRACTOR'S INFORMATION ONLY)

	ITEM	PAVEMENT THICKNESS				
		8" THRU 10"	10 ½" THRU 12"	12 ½" THRU 13"	14"	15"
SLEEPER SLAB	CONCRETE	0.40 CY/LF	0.40 CY/LF	0.40 CY/LF	0.40 CY/LF	0.40 CY/LF
	REINFORCING STEEL	49.1 LBS/LF	49.3 LBS/LF	49.6 LBS/LF	49.7 LBS/LF	49.8 LBS/LF
SUPPORT SLAB	CONCRETE	0.09 CY/LF	0.09 CY/LF	0.09 CY/LF	0.09 CY/LF	0.09 CY/LF
	REINFORCING STEEL	6.3 LBS/LF	6.4 LBS/LF	6.5 LBS/LF	6.6 LBS/LF	6.6 LBS/LF
	12" CEMENT TREATED BASE	1.95 CY/LF (BASED ON JOINTS BEING NORMAL TO THE PAVEMENT CENTERLINE)				

Texas Department of Transportation
Houston District

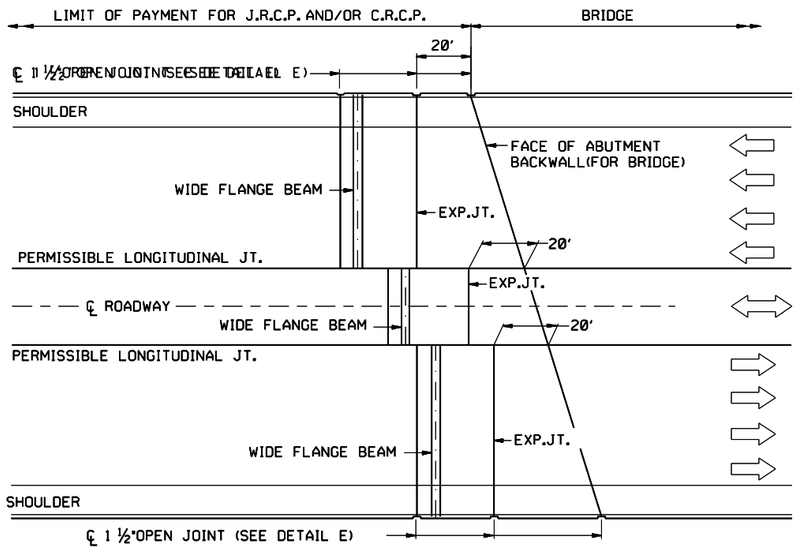
WIDE FLANGE PAVEMENT TERMINALS

FOR CONTINUOUSLY & JOINTED REINFORCED CONCRETE PAVEMENT DETAILS
(FOR USE AT BRIDGE END OR PAVEMENT TERMINUS)

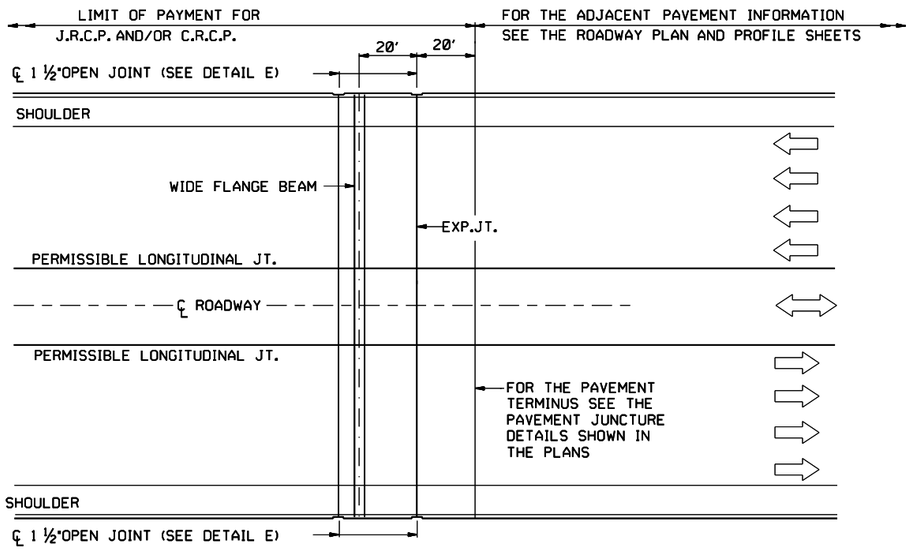
WFPT

FILE: STDB-3.DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT 2014	DISTRICT	FED REG	PROJECT NO.	SHEET
REVISIONS 02/15 2014 SPECS	HOU	6		95
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS, ETC.	6382	11	001	US 290 ETC.

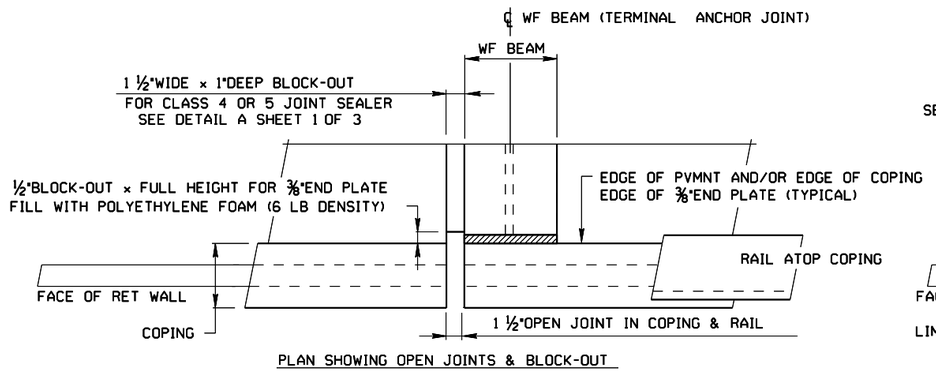
STDB-3



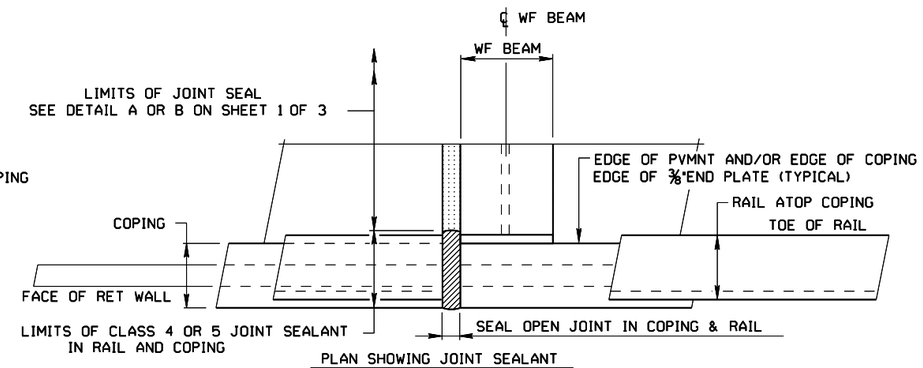
PLAN
SHOWING OPEN JOINT LAYOUT



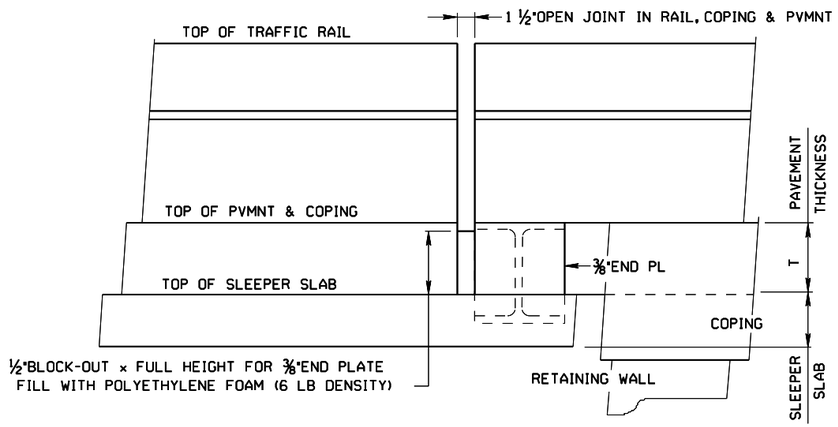
PLAN
SHOWING OPEN JOINT LAYOUT



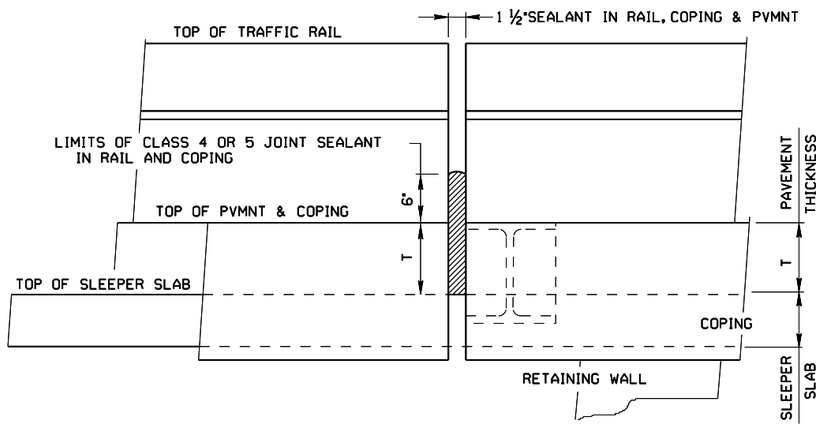
PLAN SHOWING OPEN JOINTS & BLOCK-OUT



PLAN SHOWING JOINT SEALANT



ELEVATION SHOWING OPEN JOINTS & BLOCK-OUT



ELEVATION SHOWING JOINT SEALANT

DETAIL E

SHOWN @ WIDE FLANGE ~ ALL OTHER JOINTS SIMILAR

SHEET 3 OF 3

Texas Department of Transportation
Houston District

WIDE FLANGE PAVEMENT TERMINALS

FOR CONTINUOUSLY & JOINTED REINFORCED CONCRETE PAVEMENT DETAILS
(FOR USE AT RETAINING WALLS)

WFPT

FILE: STDB-3.DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TXDOT 2014	DISTRICT	FED REG	PROJECT NO.	SHEET
REVISIONS 02/15 2014 SPECS	HOU	6		96
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	HARRIS, ETC.		6382 11 001	US 290, ETC.

STDB-3

DATE:
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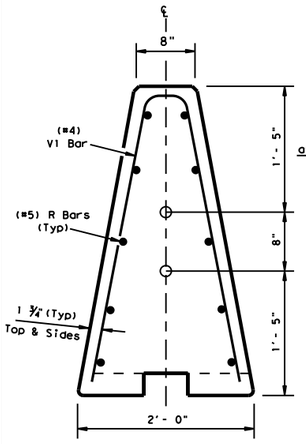
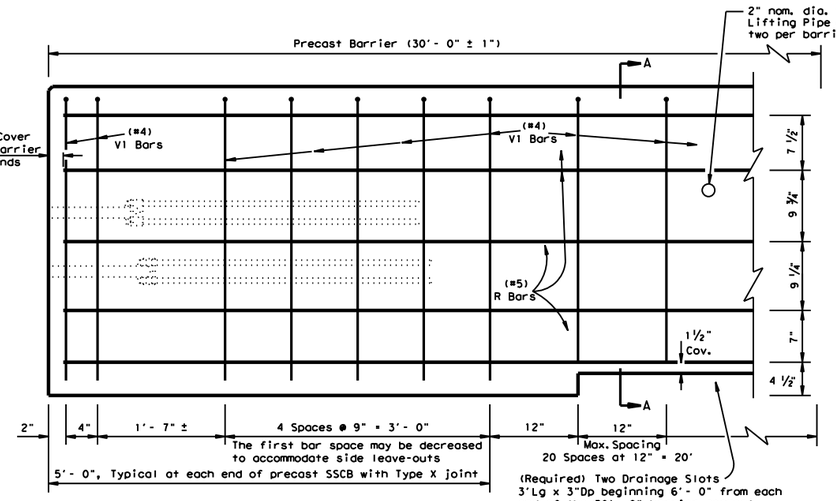


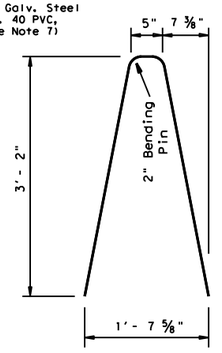
End View
Precast Barrier

Pipe locations for Joint Type X connection



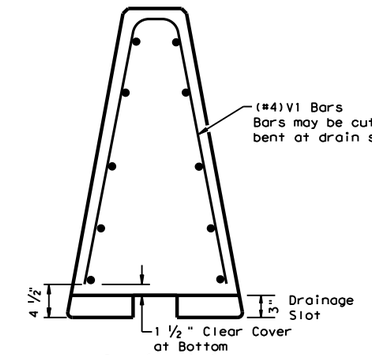
Reinforcement for Precast (SSCB)
Single Slope Concrete Barrier (Type 1)

Showing reinforcement for Joint Connection (Type X)



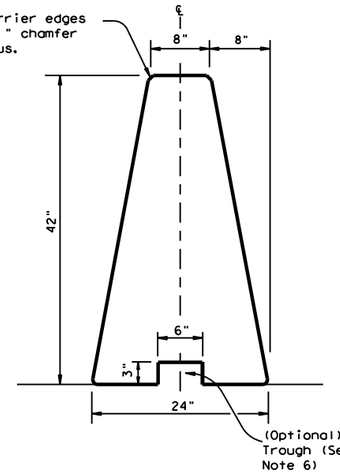
V1 Bar
#4 Rebar

Note:
V1 Bars above the drainage slots may bent to accomadate 1 ½" clear cover as directed by the Engineer.



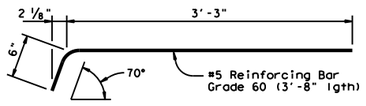
Section A-A
Steel Placement at (Required) Drainage Slots

All precast barrier edges shall have a ¾" chamfer or tooled radius.



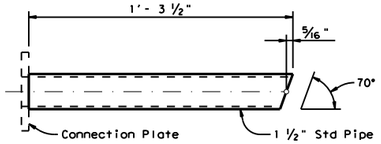
Single Slope Concrete Traffic Barrier

Precast SSCB barrier may be connected to cast-in-place SSBC. The joint connection "Types" may be used in the cast-in-place barrier, to match the precast barrier connection.



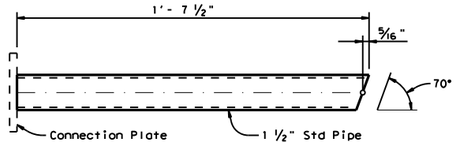
DEFORMED BAR ANCHOR DETAILS

Two (2) Bars required per assembly.
Eight (8) required per Joint.



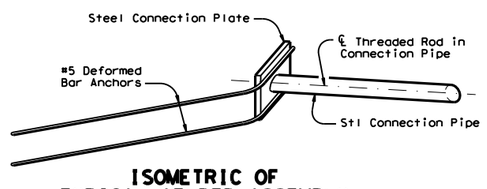
UPPER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Upper Assembly.
Two (2) required per Joint.



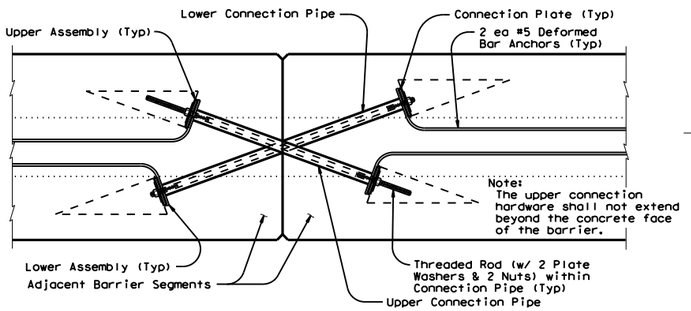
LOWER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Lower Assembly.
Two (2) required per Joint.



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

Four (4) [2 Upper & 2 Lower] Assemblies required per Joint.



TYPE X JOINT INSTALLATION DETAIL

Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.

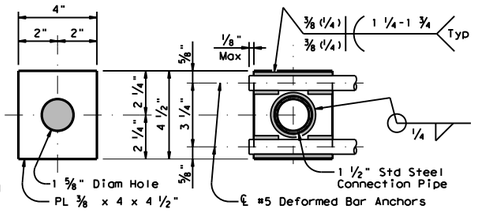
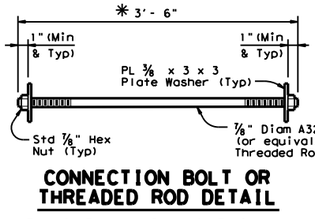


PLATE DIMENSIONS **WELDING DETAILS**

CONNECTION PLATE DETAILS

One (1) Plate required per assembly.
Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.



* The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.

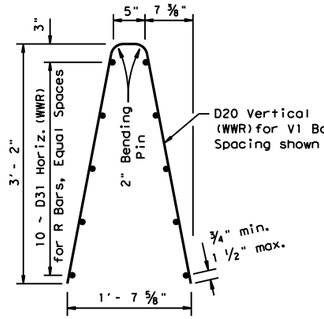
CONNECTION BOLT OR THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts)
(w/ Two (2) PL ⅜ x 3 x 3 Plate Washers & Two (2) Std Hex Nuts)
required per Joint.

Weight of one precast 30 ft. (SSCB) segment = Approx. 10.5 Tons or 717 lbs per ft.

General Notes

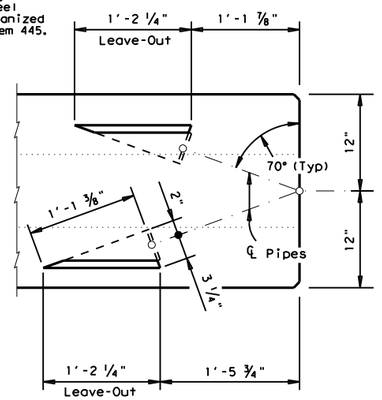
1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾" chamfer or a tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items.
9. All steel assemblies shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."



Welded Wire Reinforcement (WWR) Option for Bars R and V1

(WWR) General Notes

1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".



BARRIER PLAN AT JOINT

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	11	001	US 290, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS, ETC.		97

DATE:
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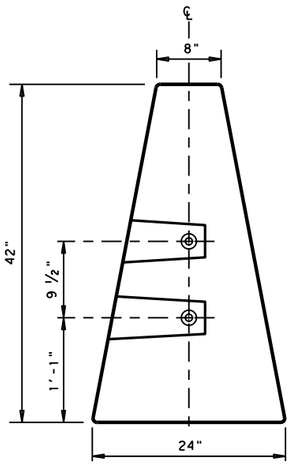
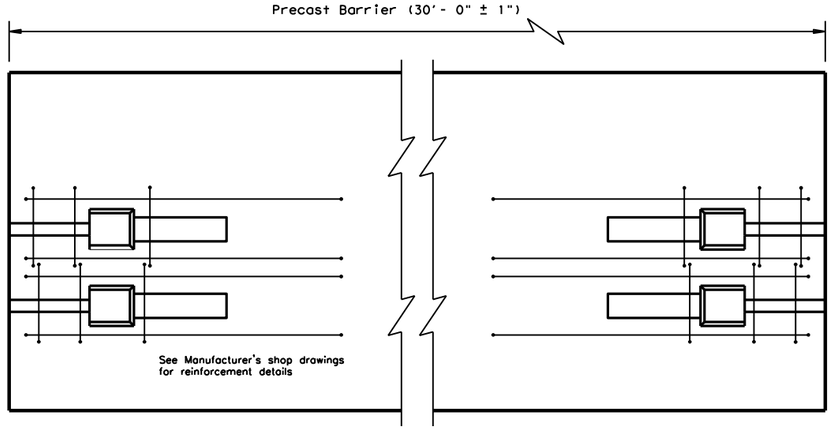
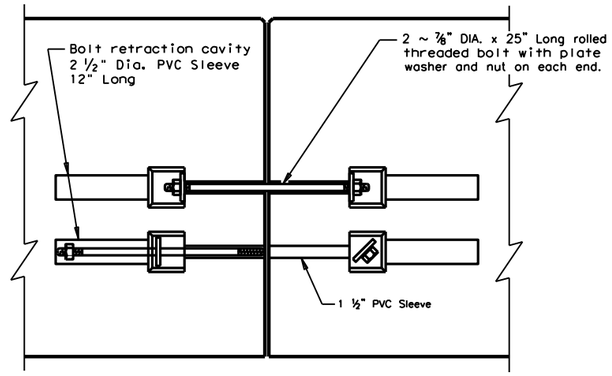


END VIEW
"QUICK-BOLT" POCKET LOCATIONS



ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details



ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

Joint Connection (Type Q)

TOP VIEW
PRECAST (SSCB) WITH J-J HOOKS
See Manufacturer's shop drawing for additional details

VIEW FROM ABOVE
J-J HOOK CONNECTION

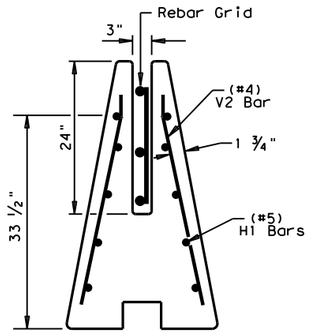
END VIEW

Proprietary Joint Connections (SSCB)

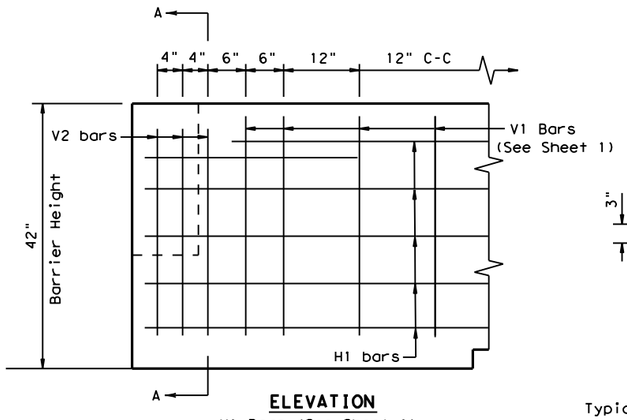
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexar Concrete, (210)497-3773

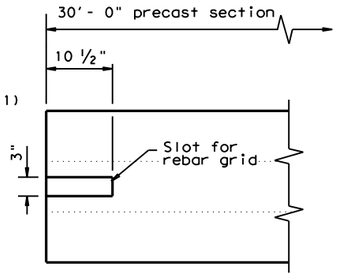
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



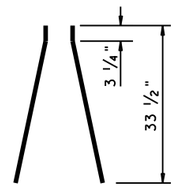
SECTION A-A
Showing (Type R) Rebar Grid



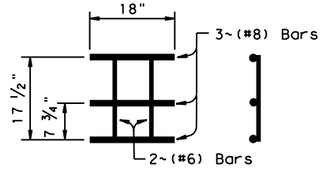
ELEVATION
V1 Bars (See Sheet 1)



TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



(#4) V2 BARS
6 ~ two piece bars per barrier segment



WELDED REBAR GRID

Joint Connection (Type R)

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)

SSCB(2)-10

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REVISIONS	6382	11	001	US 290, ETC.
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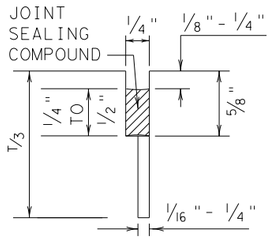
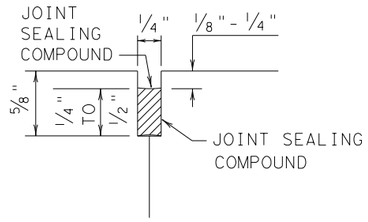
	HOU	HARRIS, ETC.		98

DATE:
FILE:

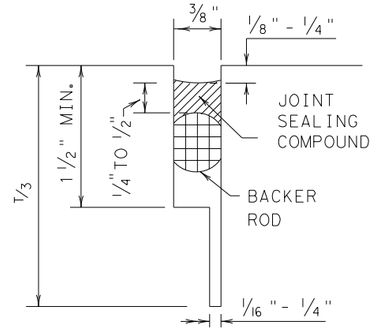
METHOD B: JOINT SEALING COMPOUND



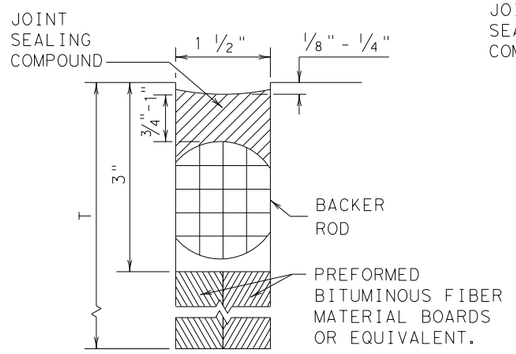
LONGITUDINAL SAWED CONTRACTION JOINT



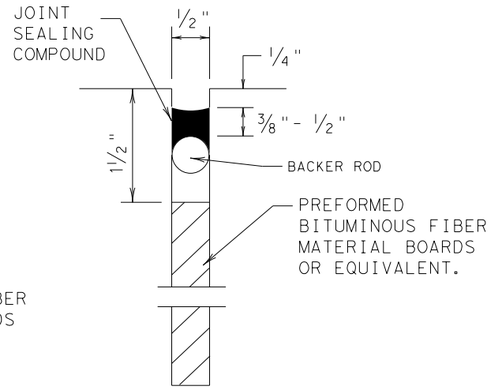
LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT

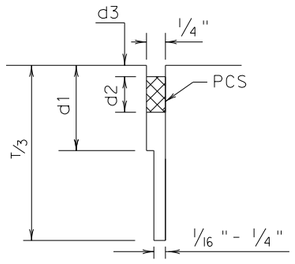


TRANSVERSE FORMED EXPANSION JOINT

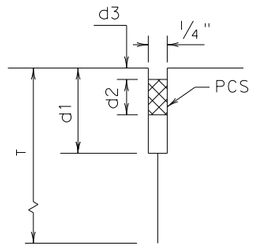


FORMED ISOLATION JOINT

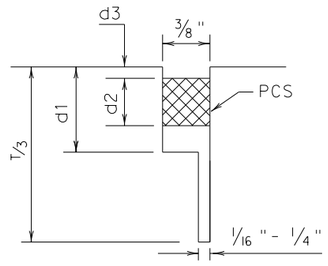
METHOD A: PREFORMED COMPRESSION SEALS (PCS)(DMS-6310 CLASS 6)



LONGITUDINAL SAWED CONTRACTION JOINT



LONGITUDINAL CONSTRUCTION JOINT



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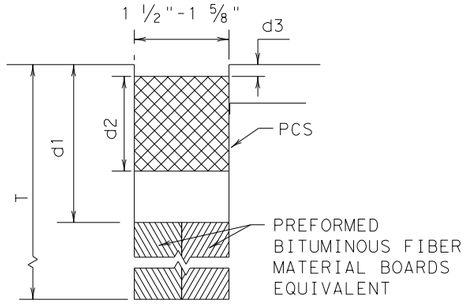

TRANSVERSE FORMED EXPANSION JOINT

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

CONCRETE PAVING DETAILS

JOINT SEALS

JS-14

FILE: js14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	6382	11	001	US 290, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS, ETC.		99

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 966504U
Crossing Type: HIGHWAY BRIDGE OVER RAILROAD
RR Company Owning Track at Crossing: BNSF RAILWAY (BNSF)
Operating RR Company at Track: BNSF
RR MP: 88.200
RR Subdivision: CONROE
City: CONROE
County: MONTGOMERY
RMC at this Crossing: 6382-11-001
Highway/Roadway name crossing the railroad: SH 105
# of regularly scheduled trains per day at this crossing: 8
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: N/A

Scope of Work at this Crossing to Be Performed by State Contractor:

1. REPLACE BEARING PADS AT ABUT 1 & 5 IMMEDIATELY ADJACENT TO BNSF R.O.W.

Scope of Work at this Crossing to Be Performed by Railroad Company:

N/A

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

N/A

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: N/A

On this project, night or weekend flagging is:

☐ Expected
☒ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices
☐ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30 day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

☐ UPRR - UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging

☐ BNSF - BNSF.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging

☐ KCS - KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
- Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☒ Not Required

☐ Required: Contact Information for Construction Inspection:

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

☐ Required
☒ Not Required

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Railroad reference number shall be provided by TxDOT CST or DO.

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several Railroad Companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000 combined single limit
Railroad Protective Liability	
☒ Not Required	
☐ Non - Bridge Projects	$2,000,000 / $6,000,000
☐ Bridge Projects	$5,000,000 / $10,000,000
☐ Other	$4,000,000 / $6,000,000

VI. CONTRACTOR'S RIGHT OF ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

☒ Not Required
☐ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
☐ Required: Contractor to obtain (see Item 5, Article 8.4)
With the following railroad companies: _____

To view previously approved ROE Agreement templates agreed upon between the State and Railroad, see:

http://www.txdot.gov/inside-txdot/division/rail/samples.html

Approved ROE Agreement templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed ROE agreement between the Contractor and the Railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☒ Not Required
☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call BNSF Railway (BNSF)
Railroad Emergency Line at 800-832-5452 Opt. 1
Location: DOT 966504U
RR Milepost: 88.200
Subdivision: Conroe

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:	
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS	6382	11	001	US 290, ETC.	
3/2020	DIST	COUNTY		SHEET NO.	
	HOU	HARRIS, ETC.		100	

DATE:
FILE:

PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.

B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.

C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.

D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.

E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.

G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.

B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.

B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.

D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."

B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR)and 14'-0" (KCS) horizontal from centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

A. Maintain minimum track clearances during construction as specified in Section 3.07.

B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	6382	11	001	US 290, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS, ETC.		101

DATE:
FILE:

3.09 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
   1. Pre-construction meetings.
   2. Pile driving/drilling of caissons or drilled shafts.
   3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
   4. Erection of precast concrete or steel bridge superstructure.
   5. Placement of waterproofing (prior to placing ballast on bridge deck).
   6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.

D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

   UPRR 1-800-336-9193
   7:00 AM to 9:00 PM CST Monday-Friday except holidays,
   staffed 24 hrs/day for emergencies
   48 hrs notice required

   BNSF 1-800-533-2891
   24 hour number
   5 working days notice required

   KCS 1-800-344-8377
   Texas One Call, a 24 hour number
   48 hrs notice required, excluding weekends and holidays

   If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4 inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.16 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	6382	11	001	US 290, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS, ETC.		102

DATE:
FILE:

SITE DESCRIPTION

PROJECT LIMITS: VARIOUS LOCATIONS IN THE HOUSTON DISTRICT

PROJECT DESCRIPTION: FOR THE REPLACEMENT OF EXISTING BEARING PADS, SEJ REPLACEMENT AND OTHER MISCELLANEOUS BRIDGE REPAIRS

MAJOR SOIL DISTURBING ACTIVITIES: N/A

TOTAL PROJECT AREA: 2.17 AC

TOTAL AREA TO BE DISTURBED: 0.00 AC

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

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
N/A

NAME OF RECEIVING WATERS:
N/A

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: N/A

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

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

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 calender 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
X LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
X 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
STEVE VAN
137551
LICENSED PROFESSIONAL ENGINEER

Steve Van, P.E.
08/19/2021

Texas Department of Transportation
Houston District

TxDOT STORM WATER POLLUTION PREVENTION PLAN

SWP3

FILE: STDG1.DGN	DN: TxDot	CK: TxDot	DW: TxDot	CK: TxDot
©TxDOT JANUARY 2007	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS REV. 9/2010 INSPECTION NOTE REV. 9/2013 INSPECTION NOTE REV. 11/2013 SW3P TO SWP3	HOUSTON	6		103
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS, ETC.	6382	11	001	US 290, ETC.

STD G-1