FOR INDEX OF SHEETS SEE SHEET 2

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
ROUTINE MAINTENANCE CONTRACT

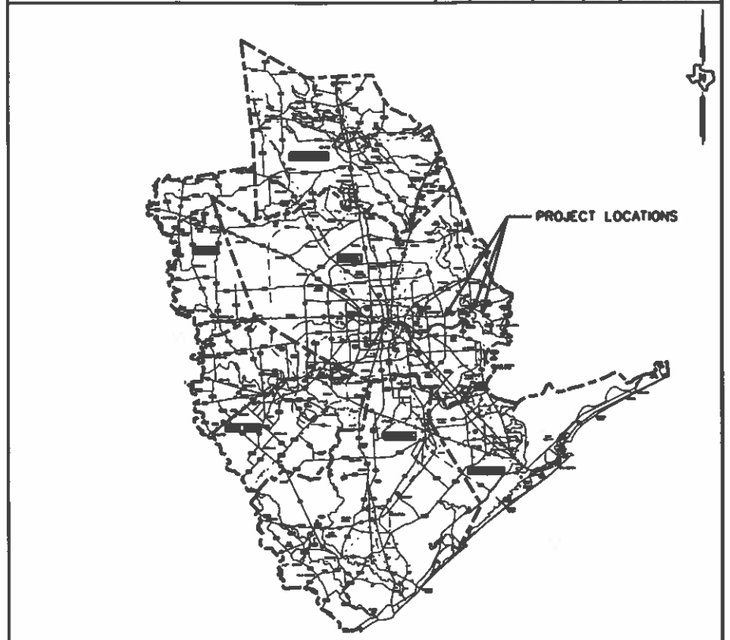
BPM 6433-62-001
SPUR 330, ETC.

VARIOUS BRIDGE REPAIRS
HARRIS COUNTY

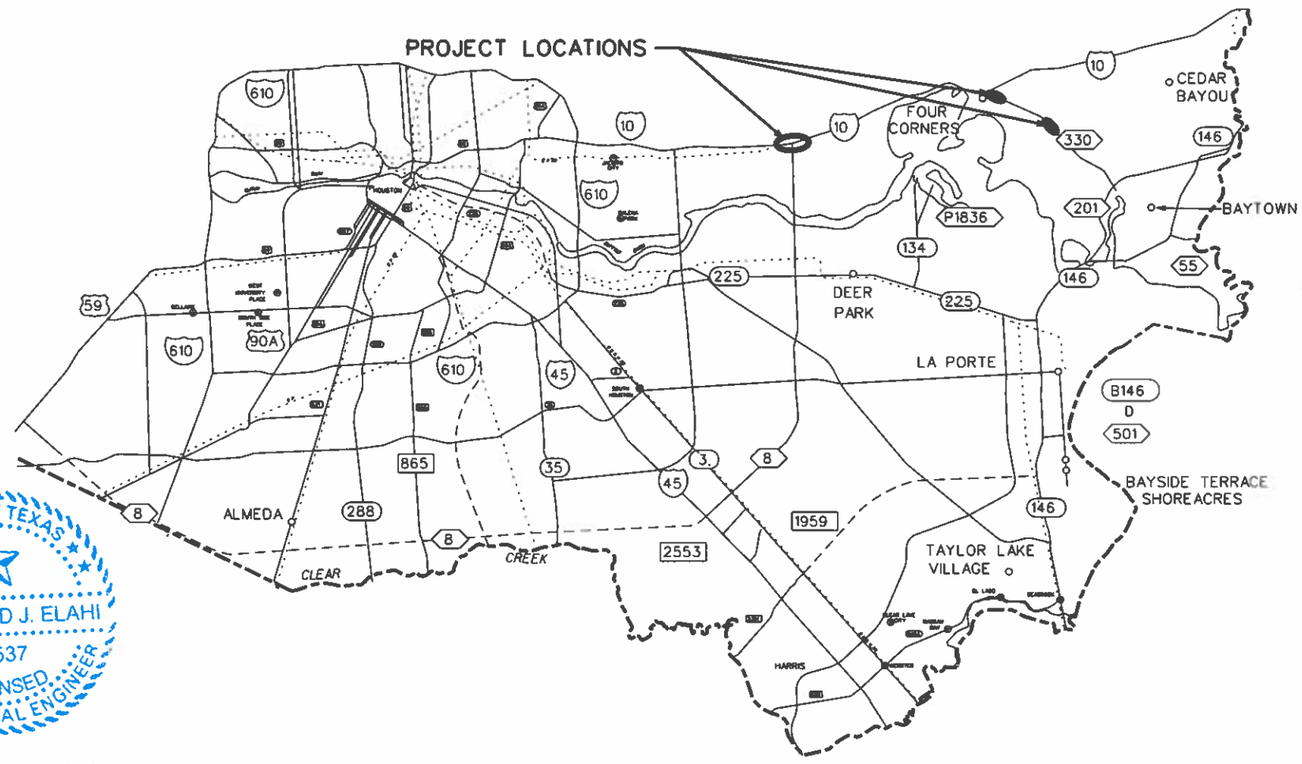
LIMITS: BW8 NB - IH10 WB CONNECTOR
BW8 SB - IH10 EB CONNECTOR
SPUR 330 WBFR AT SPRING GULLY
SPUR 330 EBML AT UPRR, WADE RD, BAKER RD

DESIGN SPEED & ADT		
MAINLANES.....65 MPH		
FRONTAGE ROADS.....45 MPH		
	2023	2043
SPUR 330,ETC.	51,500	75,500

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		1
STATE	STATE DIST. NO.	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330, ETC.



VICINITY MAP



STATE OF TEXAS
MUHAMMAD J. ELAHI
98537
LICENSED
PROFESSIONAL ENGINEER

Muhammad J. Elahi, PE 02/09/2023
DATE

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

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING 02/09/ 2023
Muhammad J. Elahi
AREA ENGINEER
2/28/2023

APPROVED FOR LETTING _____ 2023
DocuSigned by:
Melody I. Galland
DIRECTOR OF MAINTENANCE

COUNTY HARRIS PROJ. NO. BPM 6433-62-001
HWY. NO. SPUR 330,ETC. LETTING DATE APRIL 2023
CONTRACTOR NAME
CONTRACT BEGIN DATE
WORK COMPLETED DATE
DATE OF ACCEPTANCE

FILE: H:\Repos\Projects\Jacobs\Work Authorization\Set 1\DGN\BPM 6433-62-001_Title Sheet.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

HARRIS

BPM 6433-62-001

- The standard sheets specifically identified above have been selected by me or under my responsible supervision as being applicable to this project."

Citlali Tapia, P.E.
CITLALI TAPIA

2/1/2023
DATE

Texas Department of Transportation

SPUR 330,ETC.
VARIOUS BRIDGE REPAIRS

INDEX OF SHEETS

FILE:	DN: JS	CK: CT	DW: JS	CK: CT
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330,ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		2

2/1/2023
$FILE$

County: Harris **Control:** BPM 6433-62-001

Highway: Spur 330, etc.

General:

Supervision:

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

Jamal Elahi, P.E.
Area Engineer
Jamal.Elahi@txdot.gov
TxDOT Southeast Harris Area Office
702 FM 1959
Houston Texas 77034
(281) 464-5501

Vanessa M. Bosques, P.E.
Assistant Area Engineer
Vanessa.Bosques@txdot.gov
TxDOT Southeast Harris Area Office
702 FM 1959
Houston Texas 77034
(281) 464-5503

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

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

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

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

This project will be managed by, and requests for payment addressed to:

Raciel (Ray) Castillo Jr., Maintenance Supervisor
TxDOT Southeast Harris Area Office
Southeast Harris Maintenance
702 FM 1959
Houston, Texas 77034
(281) 464-5540

Sheet 3

County: Harris **Control:** BPM 6433-62-001

Highway: Spur 330, etc.

This is a Bridge Preventive Maintenance Site Specific Contract.

Work contained by these plans is time sensitive. Contractor ***shall*** complete all work included in plans ***no later than August 31, 2023***.

Contractor ***shall*** order and obtain material required for all work included in plans to allow for completing work no later than the ***August 31, 2023 deadline***.

Contractor shall be responsible for determining and implementing necessary precautions for catching all debris when performing work over any body of water. Cost associated with measures taken is incidental to various bid items.

Sequence of work shall be as follows, unless otherwise directed or approved by the Engineer:

1. NBI 12-102-0508-07-198 Spur 330 WBFR at Spring Gully
2. NBI 12-102-0508-07-306 Spur 330 EBML at UPRR Wade Rd Baker Rd
3. NBI 12-102-0508-01-449 BW 8 NB to IH 10 WB DC
4. NBI 12-102-0508-01-450 BW 8 SB to IH 10 EB DC

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

Schedule construction operations such that preparing individual items of work follows in close sequence to constructing storm drains in order to provide as little inconvenience as practical to the businesses and residents along the project.

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.

At least 72 hours before starting work, make arrangements for locating existing Department-owned above ground and underground fiber optic, communications, power, illumination, and traffic signal cabling and conduit. Do this by calling the Department's Houston District Traffic Signal Operations Office at 713-802-5662, or by e-mailing the Department's Houston District Traffic Signal Operations Office at HOU-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.

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.

Item 5: Control of Work

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

During staging and construction operations, equipment is not allowed in the Waters of the United States.

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.

Secure approval for the locations of field offices, material storage sites, material disposal sites, plants, borrow pits, etc. in writing before use to ensure that the proposed location is not within Jurisdictional Waters of the United States (wetlands).

Do not store any material in Waters of the United States inside the right of way without written approval.

Before construction operations begin, provide a drawing of the location of proposed temporary access roads, haul roads, or temporary fill used during construction operations to ensure that they are not within Jurisdictional Waters of the United States.

If the Contractor elects to use an area not permitted and determined to be within Jurisdictional Waters of the United States during the prosecution of the work, the Contractor will hold the Department harmless for delays caused by procuring the necessary permits from the United States Army Corps of Engineers.

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

Conduct any tree removal outside of the migratory bird nesting season. If this is not possible due to scheduling, then exercise caution to remove only those trees with no active nests. Do not destroy nests on structures or in trees within the project limits during the nesting / breeding season.

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.

This project is on a hurricane evacuation route. Provide at the pre-construction meeting a written plan outlining procedures to suspend work, secure the job site, and safely handle traffic through and across the project in the event of a hurricane evacuation.

During the hurricane season (June 1 through November 30), do not close any travel lanes except when the Contractor can demonstrate that he/she can provide labor, equipment, material, a work plan, and quality of work to satisfactorily return all lanes to an open, all-weather travel surface within 3 days of receiving written or verbal notice but no later than 3 days before the predicted hurricane landfall. Construction of temporary lanes to an all-weather surface will be paid for in accordance with Article 9.7, “Payment for Extra Work and Force Account Method.”

In addition to lane closures, cease work 3 days before the predicted hurricane landfall on or near the roadway that adversely impacts the flow of traffic and reduces the capacity of the highway during an evacuation. Vehicles of the Contractor, subcontractors, or material suppliers will not be allowed to enter or exit the traffic stream, including those for the purpose of material hauling

and delivery, and mobilization or demobilization of equipment. When directed, this prohibition will include a reasonable time period for the evacuees to return to their point of origin.

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.

For NBI 12-102-0508-01-449 and NBI 12-102-0508-01-450, working days will be computed and charged based on a 3-day weekend only workweek in accordance with Section 8.3.1.6.(Other). Working days will be charged Friday through Monday, excluding national holidays, regardless of weather conditions or material availability, as determined by the Engineer, for a continuous period as shown in Item 502.

For NBI 12-102-0508-07-198 and NBI 12-102-0508-07-306 working days will be computed and charged based on a *seven-day* workweek in accordance with Section 8.3.1.6.(Other) with nighttime work in accordance with Section 8.3.3.1. Working days will be charged Monday through Sunday, excluding national holidays, regardless of weather conditions or material availability, as determined by the Engineer, for a continuous period as shown in Item 502.

The Lane Closure Assessment Fee for each roadway is stated below. This fee applies to the Contractor for closures or obstructions that overlap into restricted hour traffic for each hour or portion therefore, per lane, regardless of the length of lane closure or obstruction. For Restricted Hours subject to Lane Assessment Fee refer to the Item, “Barricades, Signs, and Traffic Handling.” The time increment for the Lane Closure Assessment fee for this project is one hour.

Lane Closure Assessment Fee Table

Roadway	Lane Assessment Fee
BW 8	$ 500
SP 330	$ 1,000
SP 330 Frontage Road	$ 200

Items 360, 420, and 421: All Concrete Items

For the Department’s concrete cylinder split samples, transport the test cylinders to the Houston District Laboratory located at 7600 Washington Avenue in Houston, or to the appropriate Area Laboratory, when applicable. Transporting the test cylinders is subsidiary to the various bid items.

County: Harris **Control:** BPM 6433-62-001

Highway: Spur 330, etc.

Item 361: Repair of Concrete Pavement

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

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

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 Call-Out Mobilization for preventative work.

Item 502: Barricades, Signs, and Traffic Handling

Traffic Control and all lane closures under this project will be subsidiary to the various bid Items.

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

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

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

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

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

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

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.

County: Harris **Control:** BPM 6433-62-001

Highway: Spur 330, etc.

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.

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

One Lane and Two Lane Closure
NBI 12-102-0508-07-306

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday Through Friday	9:00 AM – 3:00 PM	8:00 PM – 5:00 AM	5:00 AM – 9:00 AM 3:00 PM – 8:00 PM

Full Closure
NBI 12-102-0508-07-306
NBI 12-102-0508-01-449
NBI 12-102-0508-450

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday Through Friday	NOT PERMITTED	8:00 PM – 5:00 AM	5:00 AM – 8:00 PM
Saturday Through Sunday	5:00 AM – 12:00 PM	12:00 PM – 5:00 AM	N/A

County: Harris **Control:** BPM 6433-62-001

Highway: Spur 330, etc.

Full Closure
NBI 12-102-0508-07-198

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday Through Friday	No Restrictions	No Restrictions	N/A
Saturday Through Sunday	No Restrictions	No Restrictions	N/A

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.

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.

County: Harris **Control:** BPM 6433-62-001

Highway: Spur 330, etc.

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

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

Item 506: Temporary Erosion, Sedimentation and Environmental Controls

During construction, Contractor shall be responsible for implementing measures to prevent the spill of materials into nearby water bodies. All work and materials associated with spill prevention will be subsidiary to the item of work being performed.

Item 785: Bridge Joint Repair or Replacement

Contractor shall verify actual joint conditions and bridge configuration prior to beginning work. The conditions and configurations of existing joints may be different than what is shown.

Saw cut concrete to remove existing portions of steel joints. Contractor shall remove concrete with caution and in strict conformance with Specification Item 429.

The portion of the steel rail that extends into the concrete barrier or curb may be left in place if intact. Expose, clean and salvage existing steel reinforcement.

Concrete replacement material will be Class "K" concrete as approved by the engineer. Concrete shall achieve 3.600 PSI compressive strength prior to reopening to traffic.

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 6433-62-001 **DISTRICT** Houston **COUNTY** Harris
HIGHWAY IH0010

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**6433-62-001**			
		PROJECT ID		**A00193682**			
		COUNTY		**Harris**			
		HIGHWAY		**IH0010**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	401-6001	FLOWABLE BACKFILL	CY	1.000		1.000	
	429-6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF	2.000		2.000	
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF	107.000		107.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	41.000		41.000	
	438-6001	CLEANING AND SEALING EXISTING JOINTS	LF	126.000		126.000	
	500-6033	MOBILIZATION (CALLOUT)	EA	4.000		4.000	
	776-6053	REPLACE (STEEL RAIL)	LF	26.000		26.000	
	785-6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	160.000		160.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	146.000		146.000	
	6185-6002	TMA (STATIONARY)	DAY	62.000		62.000	

12-102-0508-01-449 (BW 8 NB - IH 10 WB)			
ITEM	DESCRIPTION	UNIT	QUANTITY
0401 6001	FLOWABLE BACKFILL	CY	1
0438 6001	CLEANING AND SEALING EXISTING JOINTS	LF	22
0785 6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	60
0500 6033	MOBILIZATION (CALLOUT)	EA	1

12-102-0508-01-450 (BW 8 SB - IH 10 EB)			
ITEM	DESCRIPTION	UNIT	QUANTITY
0776 6053	REPLACE (STEEL RAIL)	LF	26
0785 6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	100
0500 6033	MOBILIZATION (CALLOUT)	EA	1

12-102-0508-07-198 (SPUR 330 WBFR AT SPRING GULLY)			
ITEM	DESCRIPTION	UNIT	QUANTITY
0429 6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF	2
0429 6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF	7
0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	41
0438 6001	CLEANING AND SEALING EXISTING JOINTS	LF	33
0500 6033	MOBILIZATION (CALLOUT)	EA	1

12-102-0508-07-306 (SPUR 330 EBML AT UPRR, WADE RD, BAKER RD)			
ITEM	DESCRIPTION	UNIT	QUANTITY
0429 6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF	100
0438 6001	CLEANING AND SEALING EXISTING JOINTS	LF	71
0500 6033	MOBILIZATION (CALLOUT)	EA	1

ITEM	DESCRIPTION	UNIT	QUANTITY
6001 6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	146
6185 6002	TMA (STATIONARY)	DAY	62

Texas Department of Transportation

SPUR 330, ETC.
VARIOUS BRIDGE REPAIRS

SUMMARY OF QUANTITIES

FILE:	DN: JS	CK: CT	DW: JS	CK: CT
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		5

2/1/2023
$FILES

LEGEND			
	TYPE 3 BARRICADE		BARRELS 60' C-C
	HEAVY WORK VEHICLE		TRAFFIC FLOW
	TRAILER MOUNTED FLASHING ARROW BOARD	M	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	SIGN	**	7 DAYS AHEAD
*	DAY OF REPAIR		

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\TCP\TCP198Sheet1.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

2/9/2023

STATE OF TEXAS
YEE-CHENG CHANG
96492
LICENSED
PROFESSIONAL ENGINEER

Eddy Chang

TRAFFIC CONTROL
SP330 NB TO IH10 EB

Texas Department of Transportation

FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		6
STATE	DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330,ETC.

LEGEND			
	TYPE 3 BARRICADE		BARRELS 60' C-C
	HEAVY WORK VEHICLE		TRAFFIC FLOW
	TRAILER MOUNTED FLASHING ARROW BOARD	M	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	SIGN	**	7 DAYS AHEAD
*	DAY OF REPAIR		

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\TCP\TCP198Sheet2.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

2/9/2023

STATE OF TEXAS
YEE-CHENG CHANG
96492
LICENSED
PROFESSIONAL ENGINEER

Eddy Chang

TRAFFIC CONTROL
SP330 NB TO IHIO EB

Texas Department of Transportation

FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		7
STATE	DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330,ETC.

LEGEND			
	TYPE 3 BARRICADE	○	BARRELS 60' C-C
	HEAVY WORK VEHICLE	⇨	TRAFFIC FLOW
	TRAILER MOUNTED FLASHING ARROW BOARD	M	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	SIGN	**	7 DAYS AHEAD
*	DAY OF REPAIR		

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\TCP\TCP198Sheet3.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

2/9/2023

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PROFESSIONAL ENGINEER

Eddy Chang

TRAFFIC CONTROL
SP330 NB TO IHIO EB

Texas Department of Transportation

FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		8
STATE	DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330,ETC.

DECKER DR

SP 330

N MARKET LOOP

TY3 BARRICADE

MYRTLE DR

RAMP CLOSED

DATE CLOSED

TY3 BARRICADE

MOSSEY OAK DR

RAMP CLOSED

R11-2bT
48" X 30"

USE ENTRANCE RAMP
W BAKER ST

MATCH LINE A-A

N

2/9/2023

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Eddy Chang

LEGEND			
	TYPE 3 BARRICADE	○	BARRELS 60' C-C
	HEAVY WORK VEHICLE	⇨	TRAFFIC FLOW
	TRAILER MOUNTED FLASHING ARROW BOARD	M	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	SIGN	**	7 DAYS AHEAD
*	DAY OF REPAIR		

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\TCP\TCP306Sheet1.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

TRAFFIC CONTROL
SP330 SB

Texas Department of Transportation

FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		9
STATE	DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330,ETC.

2/9/2023

STATE OF TEXAS
YEE-CHENG CHANG
96492
LICENSED
PROFESSIONAL ENGINEER

Eddy Chang

LEGEND			
	TYPE 3 BARRICADE	○	BARRELS 60' C-C
	HEAVY WORK VEHICLE	⇨	TRAFFIC FLOW
	TRAILER MOUNTED FLASHING ARROW BOARD	M	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	SIGN	**	7 DAYS AHEAD
*	DAY OF REPAIR		

TRAFFIC CONTROL
SP330 SB

Texas Department of Transportation

FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		10
STATE	DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330,ETC.

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\TCP\TCP306Sheet2.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

TY3 BARRICADE

RAMP
CLOSED

DATE
CLOSED

RAMP
CLOSED

R11-2bT
48" X 30"

USE
ENTRANCE
RAMP

W BAKER
ST

TY3 BARRICADE

TY3 BARRICADE

TY3 BARRICADE

WADE RD

N

2/9/2023

STATE OF TEXAS
YEE-CHENG CHANG
96492
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PROFESSIONAL ENGINEER

Eddy Chang

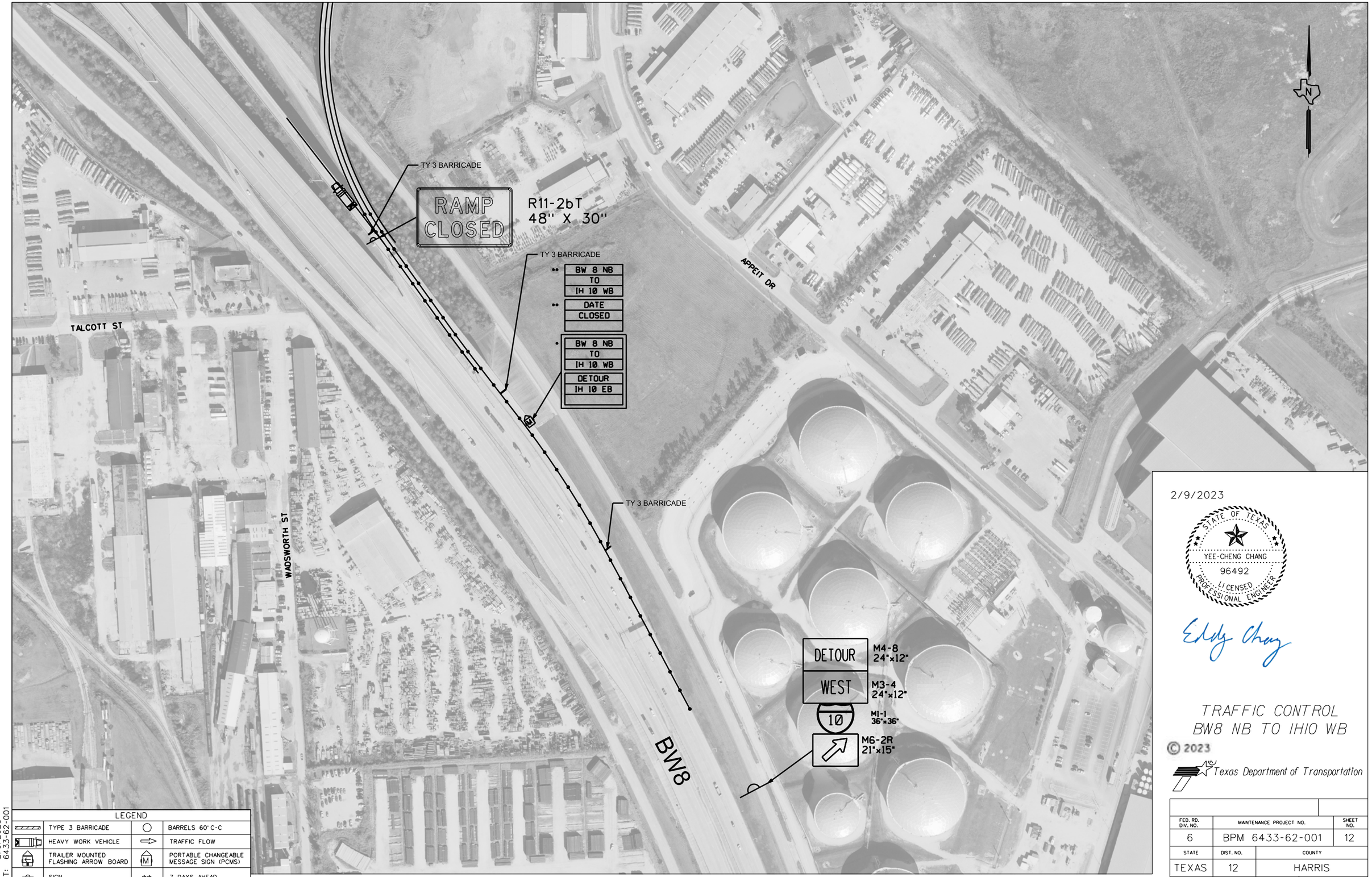
LEGEND			
	TYPE 3 BARRICADE	○	BARRELS 60' C-C
	HEAVY WORK VEHICLE	⇨	TRAFFIC FLOW
	TRAILER MOUNTED FLASHING ARROW BOARD	M	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	SIGN	**	7 DAYS AHEAD
*	DAY OF REPAIR		

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\TCP\TCP306Sheet3.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

TRAFFIC CONTROL
SP330 SB

Texas Department of Transportation

FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		11
STATE	DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330,ETC.



LEGEND			
	TYPE 3 BARRICADE	○	BARRELS 60' C-C
	HEAVY WORK VEHICLE	⇨	TRAFFIC FLOW
	TRAILER MOUNTED FLASHING ARROW BOARD	M	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	SIGN	**	7 DAYS AHEAD
*	DAY OF REPAIR		

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\TCP\TCP449Sheet1.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

2/9/2023

STATE OF TEXAS
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96492
LICENSED
PROFESSIONAL ENGINEER

Eddy Chang

TRAFFIC CONTROL
BW8 NB TO IH10 WB

Texas Department of Transportation

FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		12
STATE	DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330,ETC.

LEGEND			
	TYPE 3 BARRICADE	○	BARRELS 60' C-C
	HEAVY WORK VEHICLE	⇨	TRAFFIC FLOW
	TRAILER MOUNTED FLASHING ARROW BOARD	(M)	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	SIGN	**	7 DAYS AHEAD
*	DAY OF REPAIR		

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\TCP\TCP449Sheet2.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

2/9/2023

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96492
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Eddy Chang

TRAFFIC CONTROL
BW8 NB TO IH10 WB

Texas Department of Transportation

FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		13
STATE	DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330,ETC.

LEGEND			
	TYPE 3 BARRICADE		BARRELS 60' C-C
	HEAVY WORK VEHICLE		TRAFFIC FLOW
	TRAILER MOUNTED FLASHING ARROW BOARD	M	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	SIGN	**	7 DAYS AHEAD
*	DAY OF REPAIR		

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\TCP\TCP449Sheet3.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

2/9/2023

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TRAFFIC CONTROL
BW8 NB TO IH10 WB

Texas Department of Transportation

FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		14
STATE	DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330,ETC.

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\TCP\TCP450Sheet1.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

LEGEND			
	TYPE 3 BARRICADE	○	BARRELS 60' C-C
	HEAVY WORK VEHICLE	⇨	TRAFFIC FLOW
C	TRAILER MOUNTED FLASHING ARROW BOARD	M	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	SIGN	**	7 DAYS AHEAD
*	DAY OF REPAIR		

2/9/2023

STATE OF TEXAS
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96492
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PROFESSIONAL ENGINEER

Eddy Chang

TRAFFIC CONTROL
BW8 SB TO IH10 EB

Texas Department of Transportation

FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		15
STATE	DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330,ETC.

LEGEND			
	TYPE 3 BARRICADE	○	BARRELS 60' C-C
	HEAVY WORK VEHICLE	⇨	TRAFFIC FLOW
	TRAILER MOUNTED FLASHING ARROW BOARD	M	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	SIGN	**	7 DAYS AHEAD
*	DAY OF REPAIR		

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\TCP\TCP450Sheet2.dgn
DATE: 2/9/2023
PROJECT: 6433-62-001

2/9/2023

STATE OF TEXAS
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TRAFFIC CONTROL
BW8 SB TO IH10 EB

Texas Department of Transportation

FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.		SHEET NO.
6	BPM 6433-62-001		16
STATE	DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT	SECT.	JOB	HIGHWAY NO.
6433	62	001	SPUR 330,ETC.

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

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\Standards\Traffic\BC-21_1.DGN
DATE: 2/21/2023
PROJECT: 6433-62-001

Texas Department of Transportation

Traffic Safety Division Standard

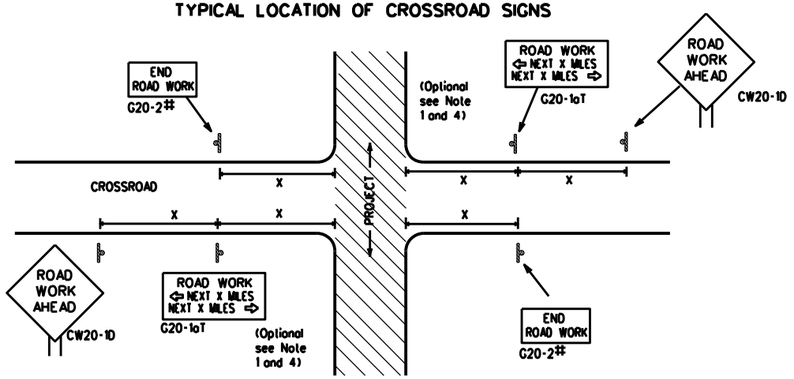
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330,ETC.
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	12	HARRIS		17
5-10 5-21				

95

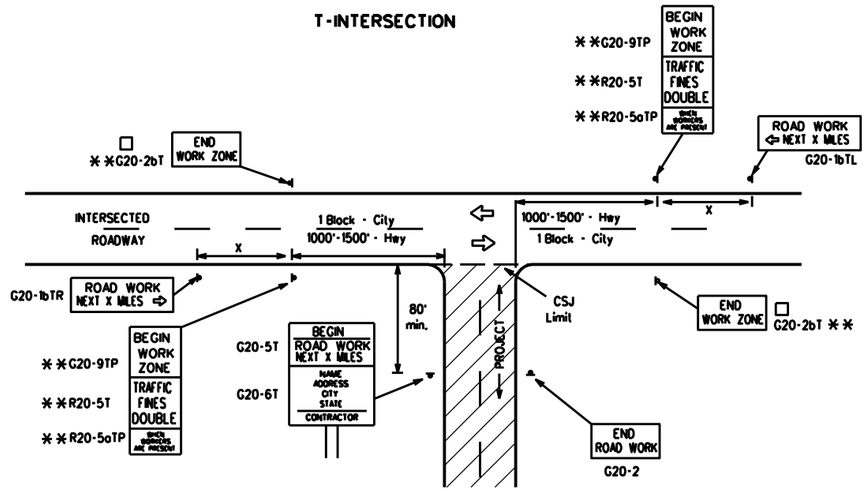
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

1.5.6

SIZE

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

SPACING

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

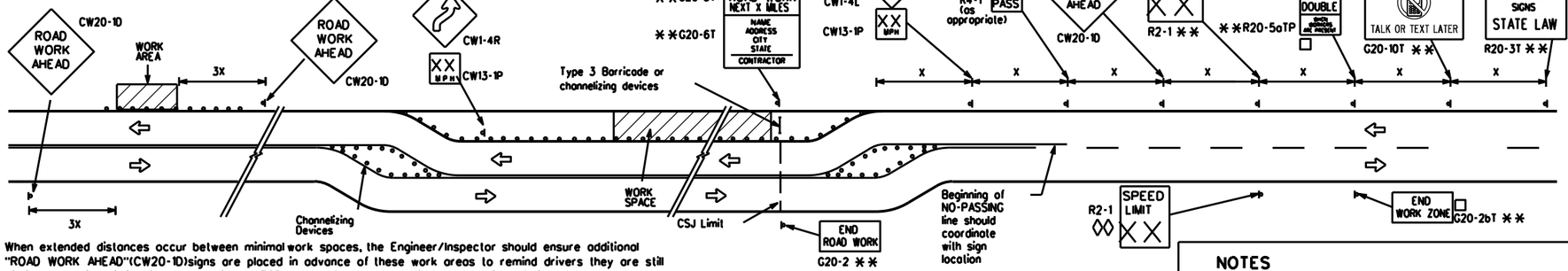
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

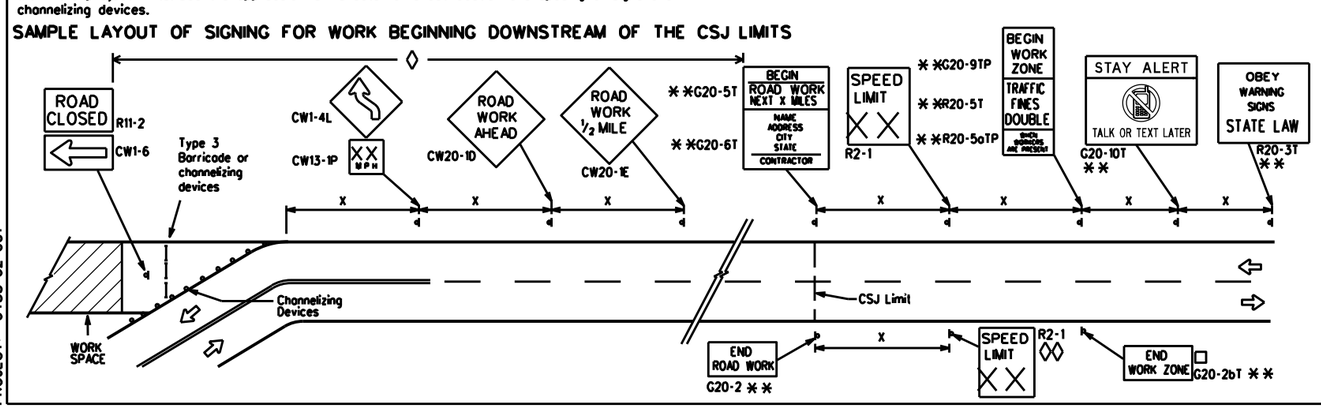
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

NOTES

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

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

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

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

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

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

SHEET 2 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	12	HARRIS		18

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FILE:
DATE: 2/2/2023
PROJECT: 6433-62-001
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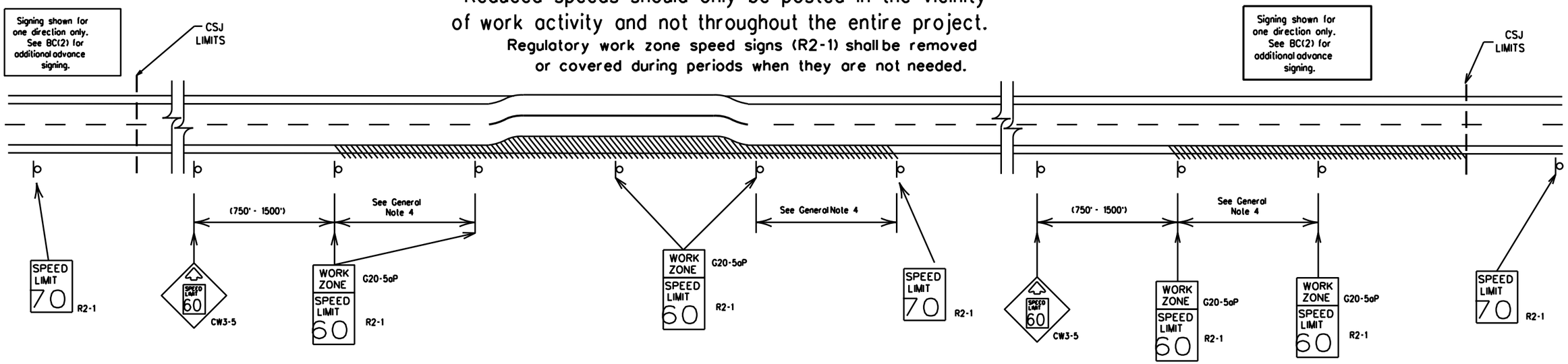
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	12	HARRIS		19

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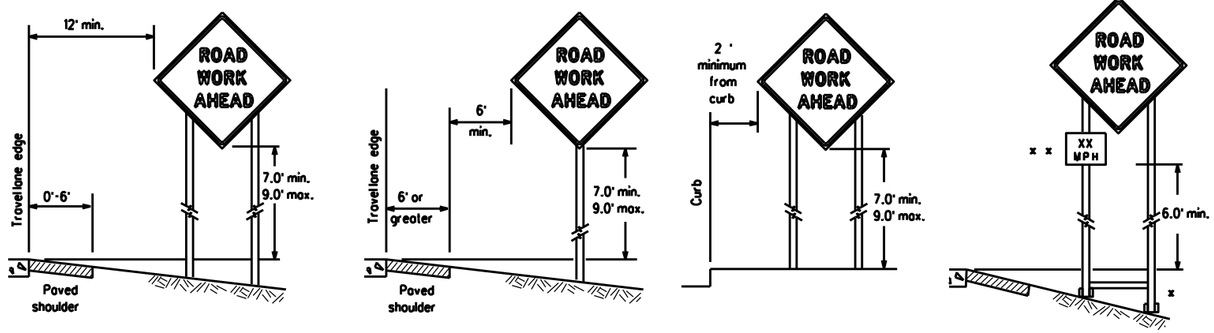
DATE: 2/27/2023
PROJECT: 6433-62-001

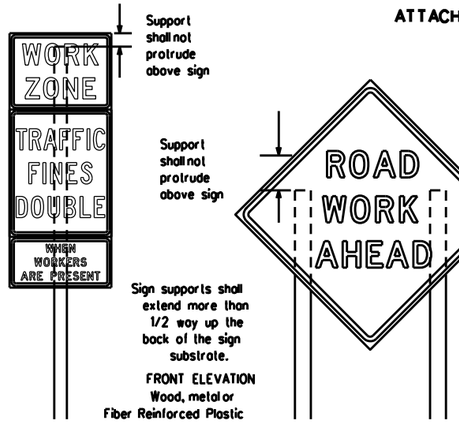
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

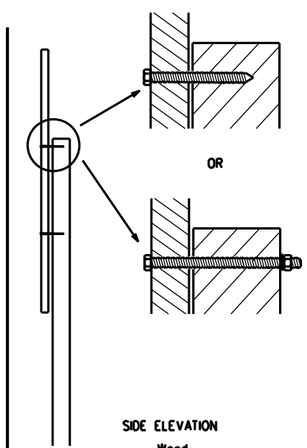


x When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





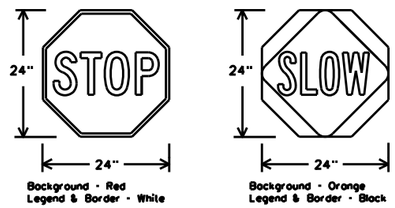
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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 lightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	6433	62	001	SPUR 330,ETC.
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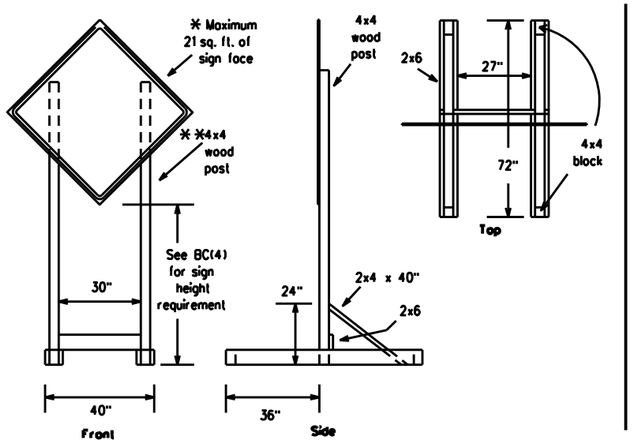
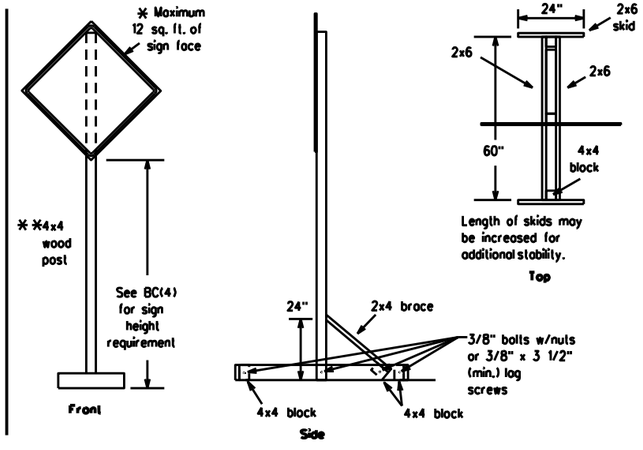
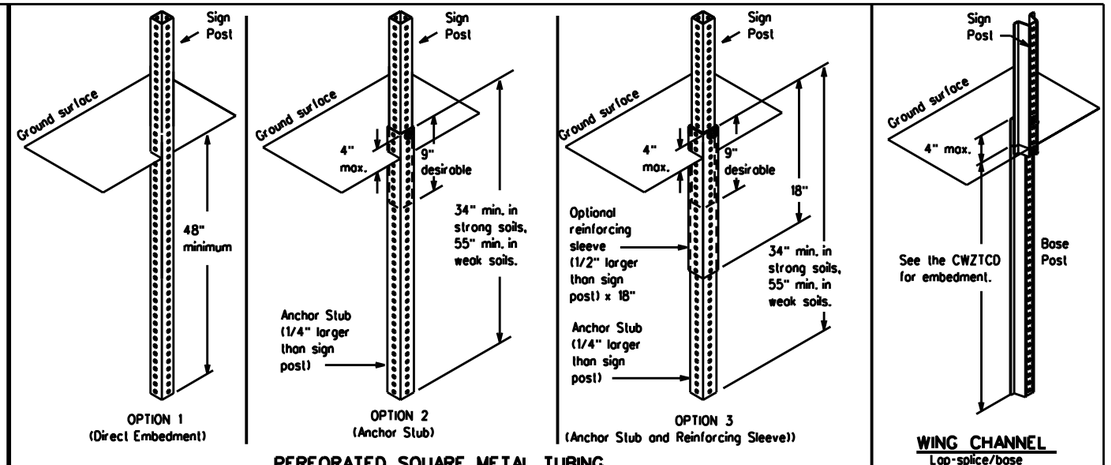




SKID MOUNTED WOOD SIGN SUPPORTS

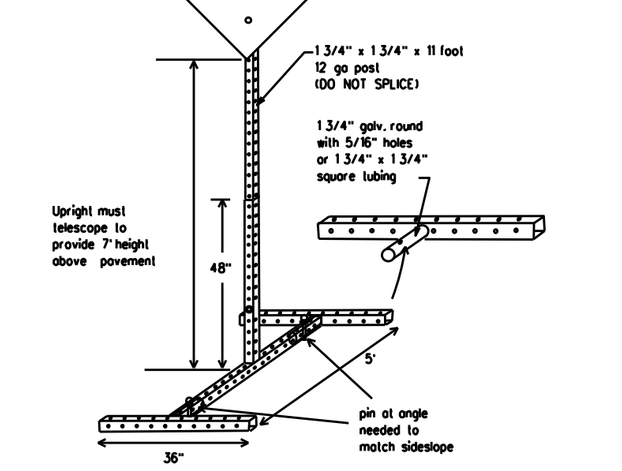
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

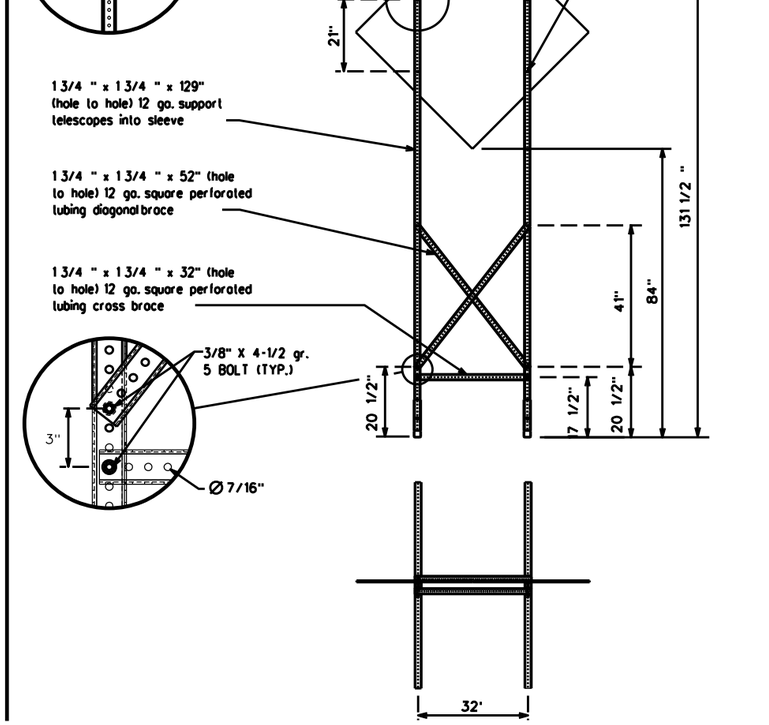


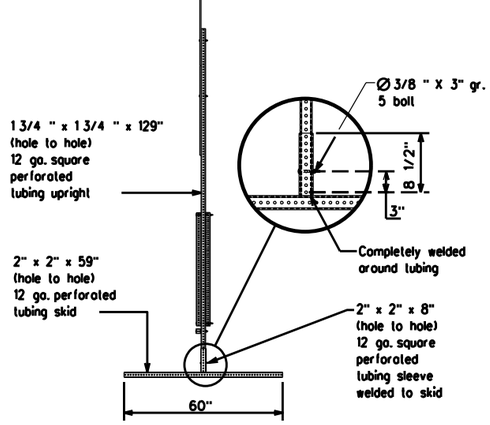
PERFORATED SQUARE METAL TUBING

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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DATE: 2/2/2023
PROJECT: 6433-62-001

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

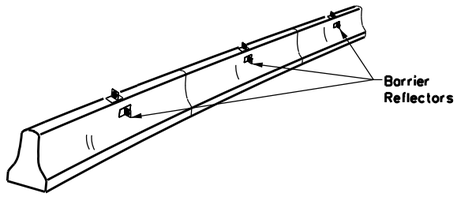
BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	12	HARRIS		22

100

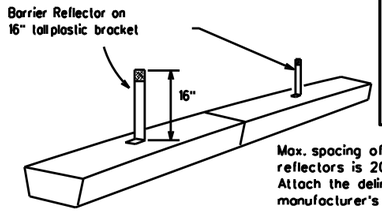
FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\Standards\Traffic\BC-21_7.DGN
DATE: 2/22/2023
PROJECT: 6433-62-001

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.

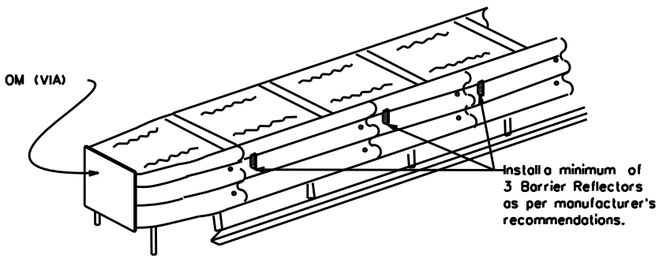


Max. spacing of barrier reflectors is 20 feet.
Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) 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.

LOW PROFILE CONCRETE BARRIER (LPCB)

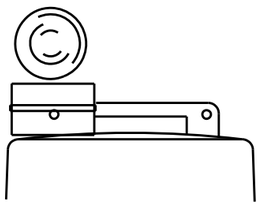


DELINEATION OF END TREATMENTS

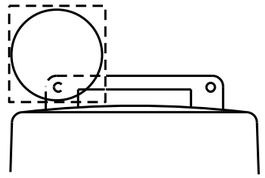
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B or C $_{FL}$ 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

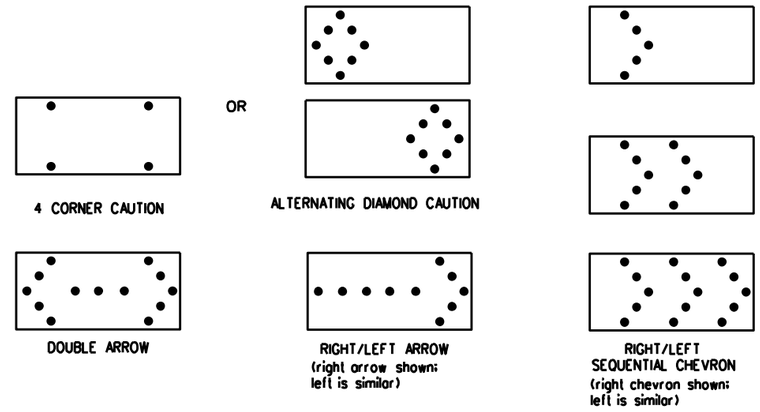
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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 travellane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

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

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

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

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



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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	12	HARRIS		23

FILE: H:\Repair Projects\Jacobs\Work Authorization\Set 1\Standards\Traffic\BC-21_8.DGN
DATE: 2/2/2023
PROJECT: 6433-62-001

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

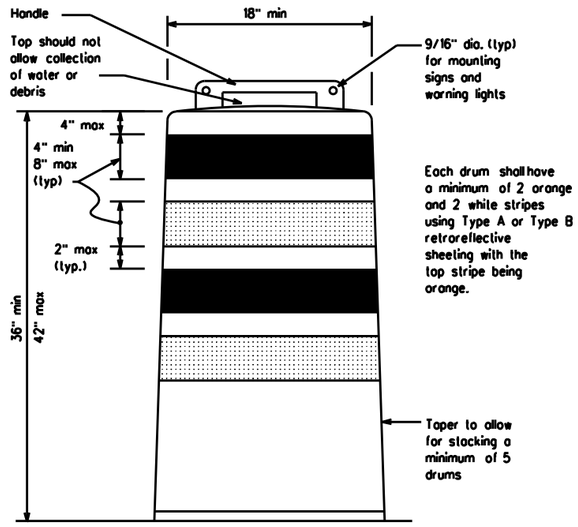
1. Plastic drums shall be a two-piece design: the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

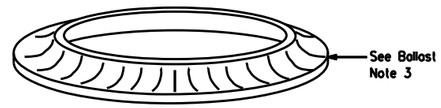
RETROREFLECTIVE SHEETING

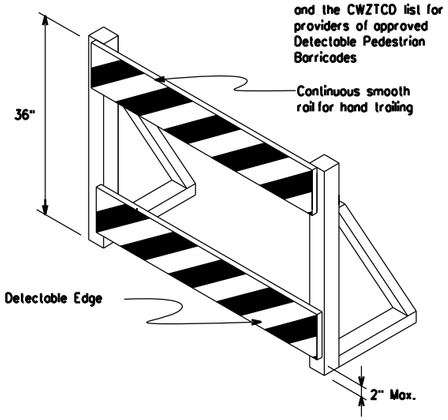
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

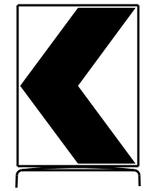




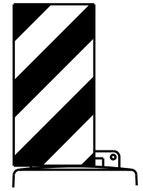


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330,ETC.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	12	HARRIS		24
7-13				

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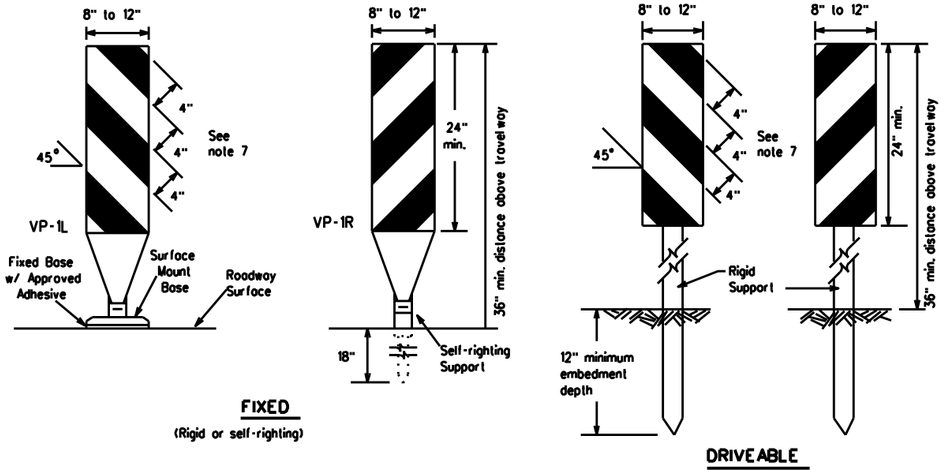
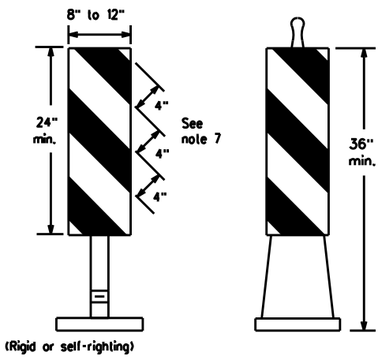
DATE: 2/27/2023
PROJECT: 6433-62-001



FIXED
(Rigid or self-righting)

DRIVEABLE

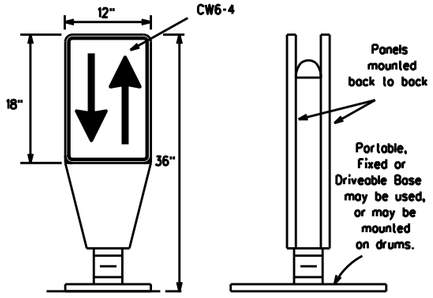


(Rigid or self-righting)

PORTABLE

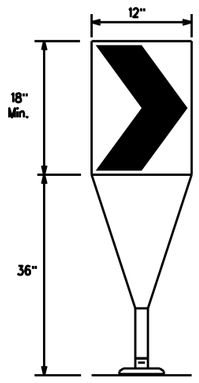
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



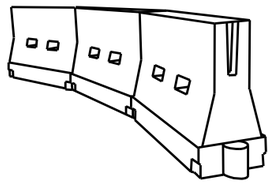
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	12	HARRIS		25

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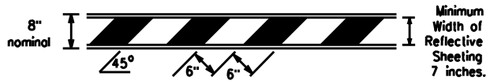
DATE: 2/21/2023
PROJECT: 6433-62-001

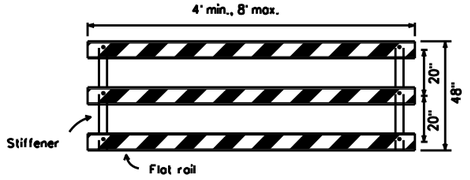
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



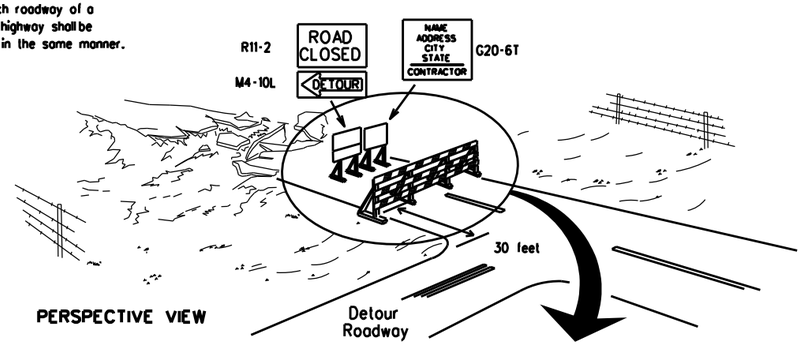
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

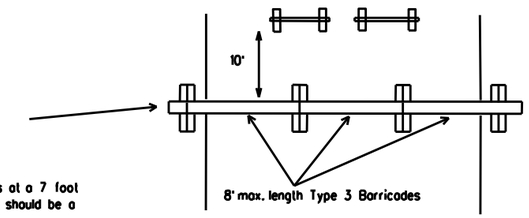
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

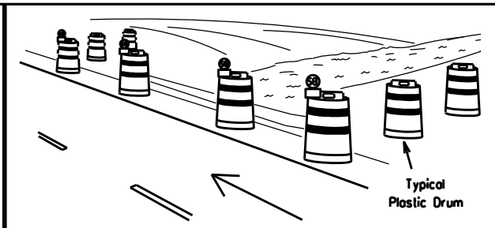
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

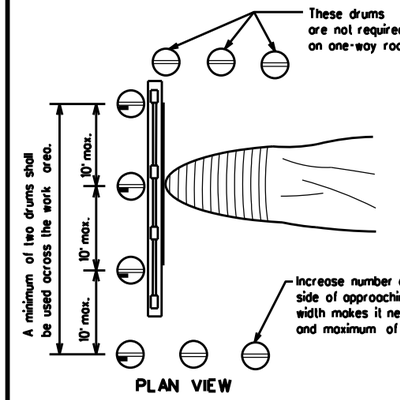
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

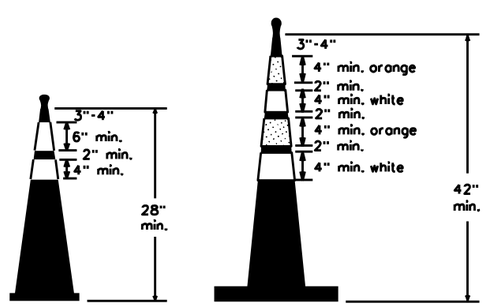
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



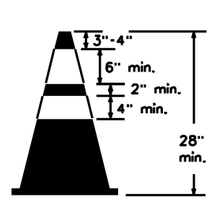
PLAN VIEW

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

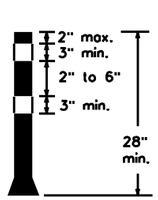
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

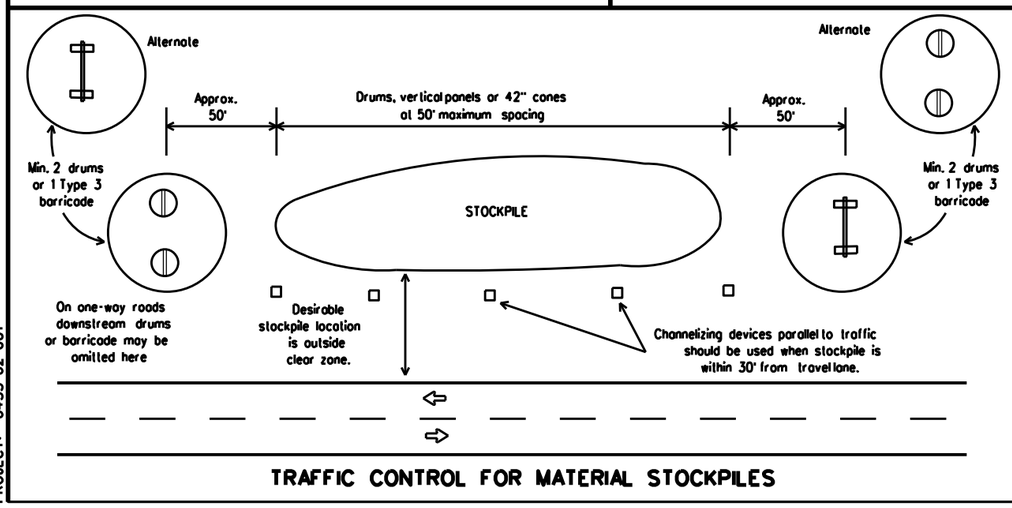


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	6433	62	001	SPUR 330,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	12	HARRIS		26

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DATE: 2/27/2023
PROJECT: 6433-62-001

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

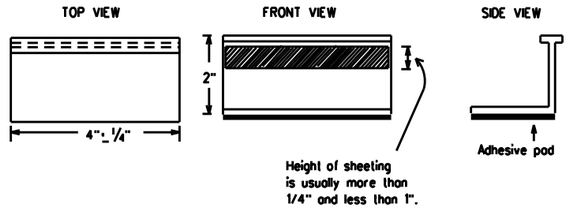
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	6433	62	001	SPUR 330,ETC.
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	12	HARRIS		27
11-02 8-14				

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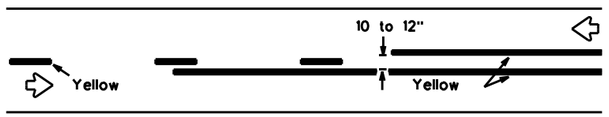
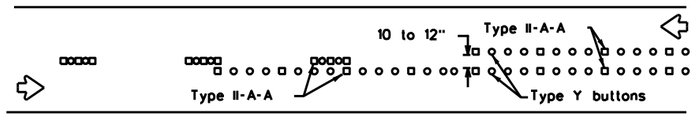
DATE: 2/2/2023
PROJECT: 6433-62-001

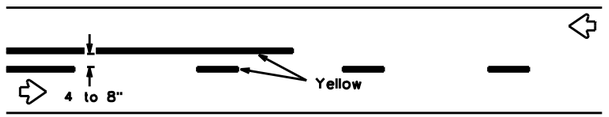
PAVEMENT MARKING PATTERNS



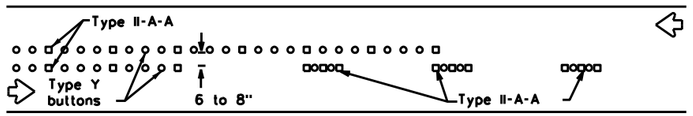
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



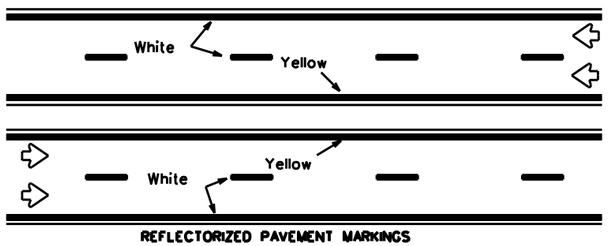
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



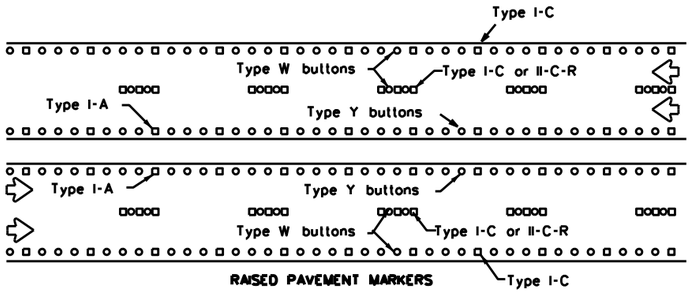
RAISED PAVEMENT MARKERS - PATTERN B

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

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



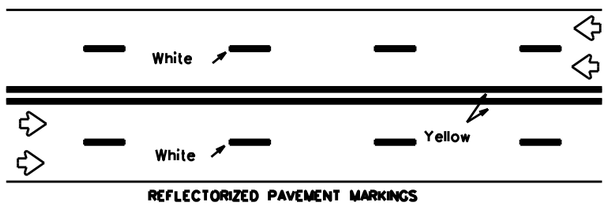
REFLECTORIZED PAVEMENT MARKINGS



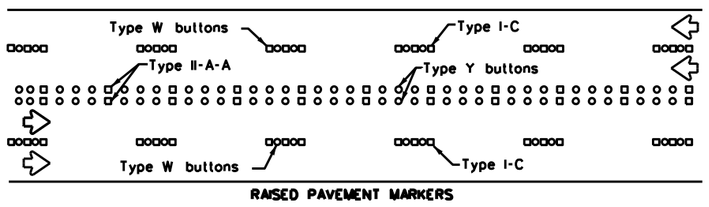
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



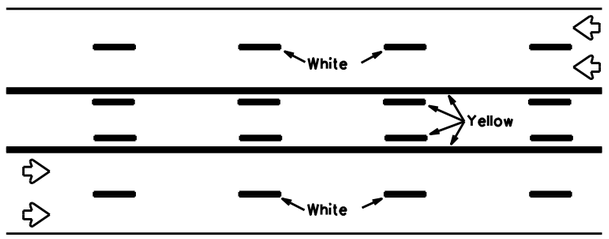
REFLECTORIZED PAVEMENT MARKINGS



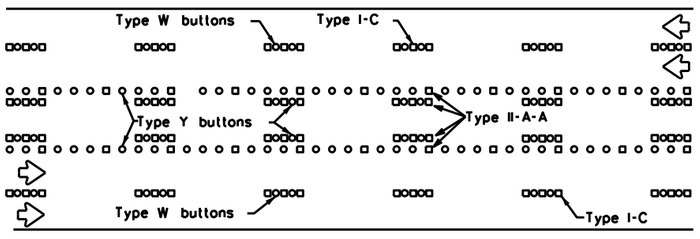
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

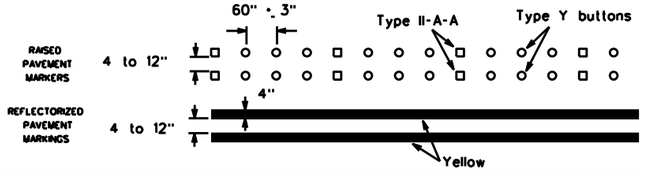
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

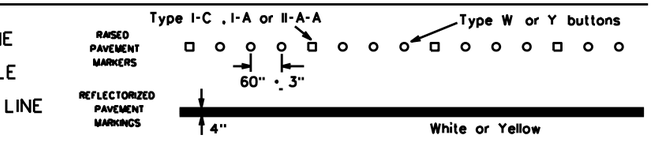
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

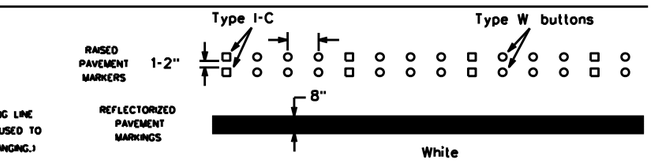


EDGE LINE OR SINGLE NO-PASSING LINE



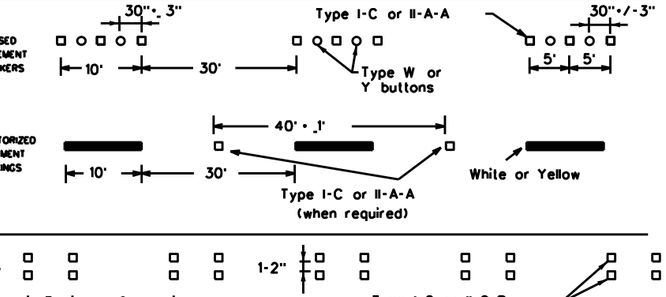
WIDE LINE

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

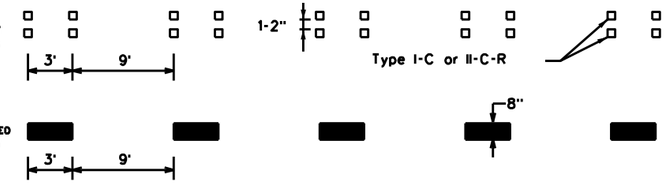


BROKEN LINES

CENTER LINE OR LANE LINE

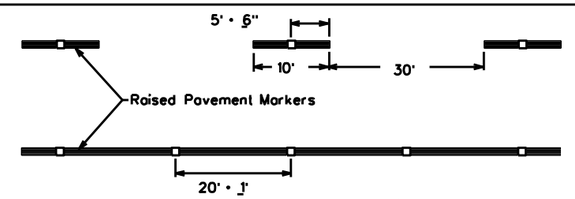


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

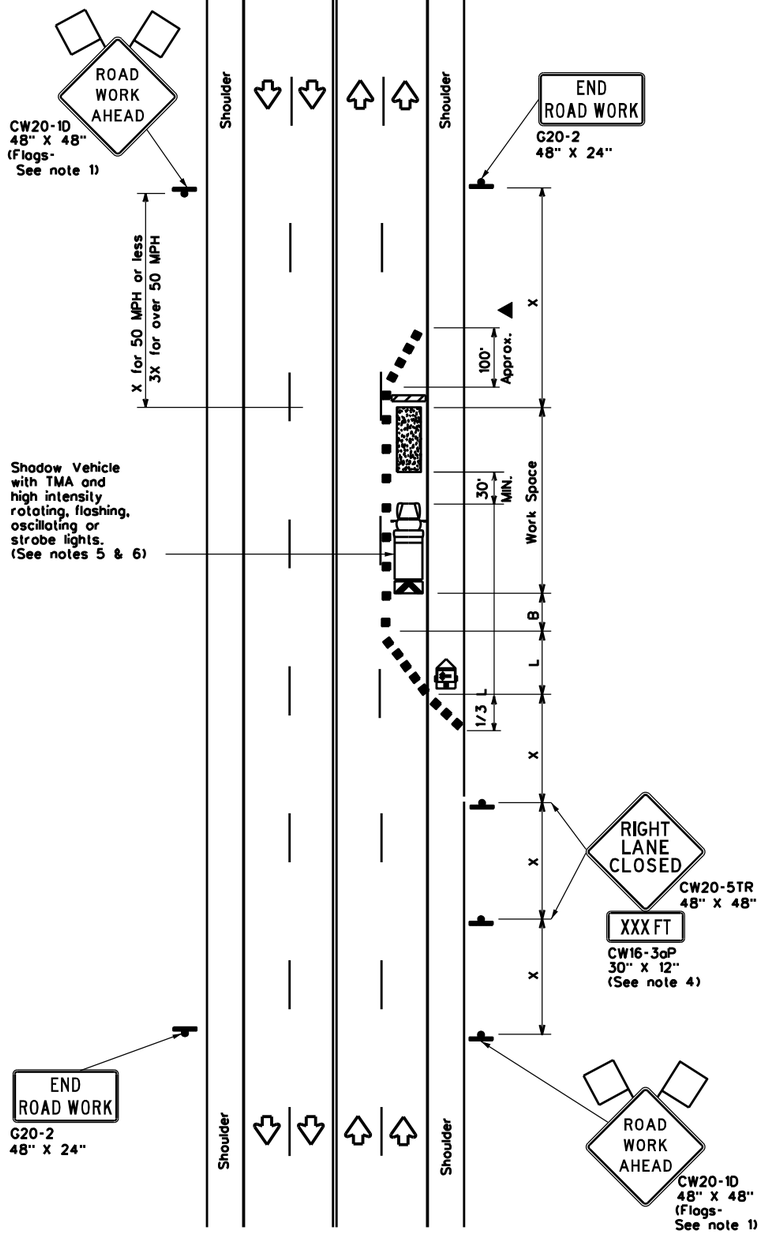
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	6433	62	001	SPUR 330,ETC.
	DIST	COUNTY		SHEET NO.
	12	HARRIS		28

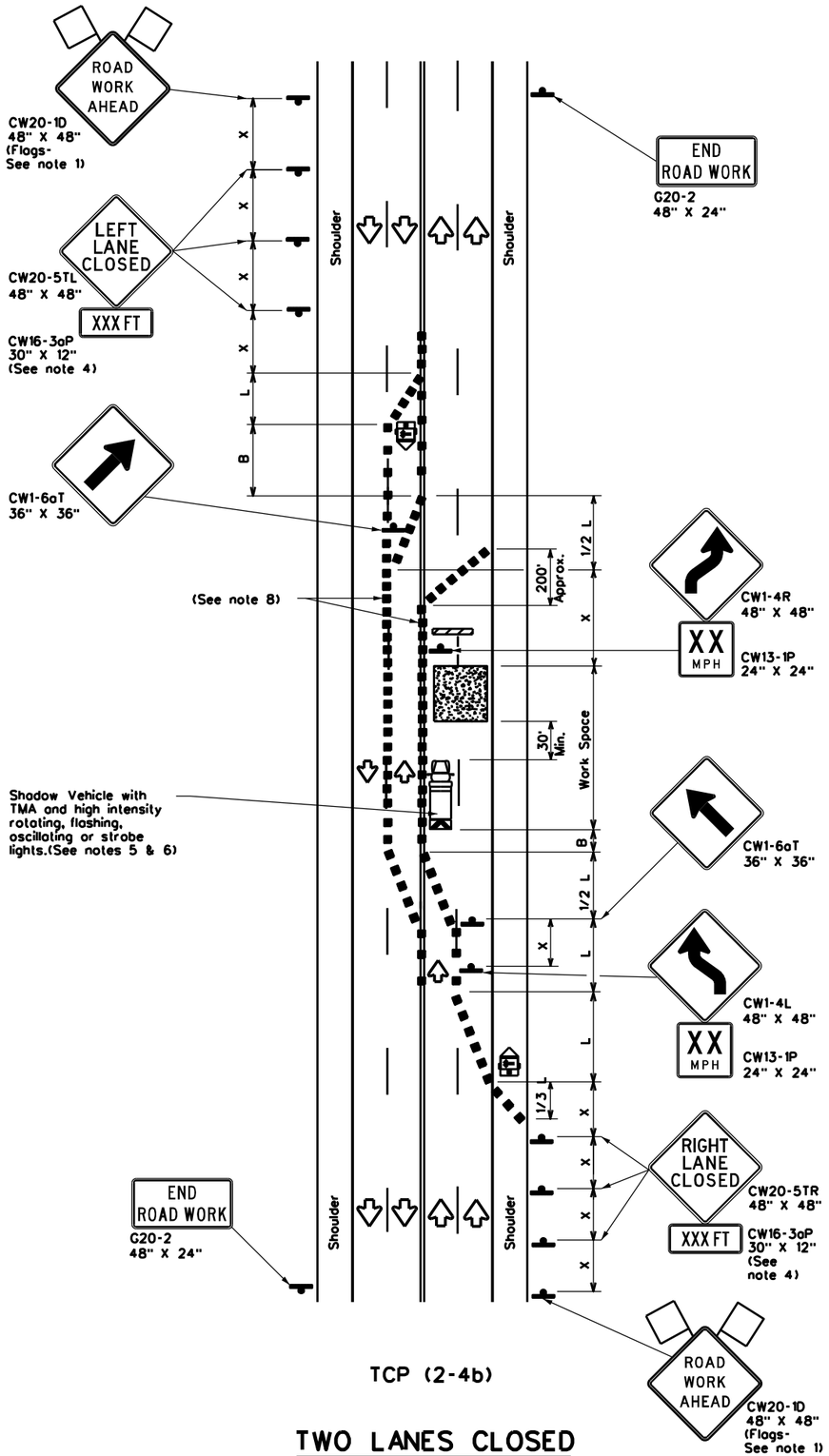
106

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 lighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

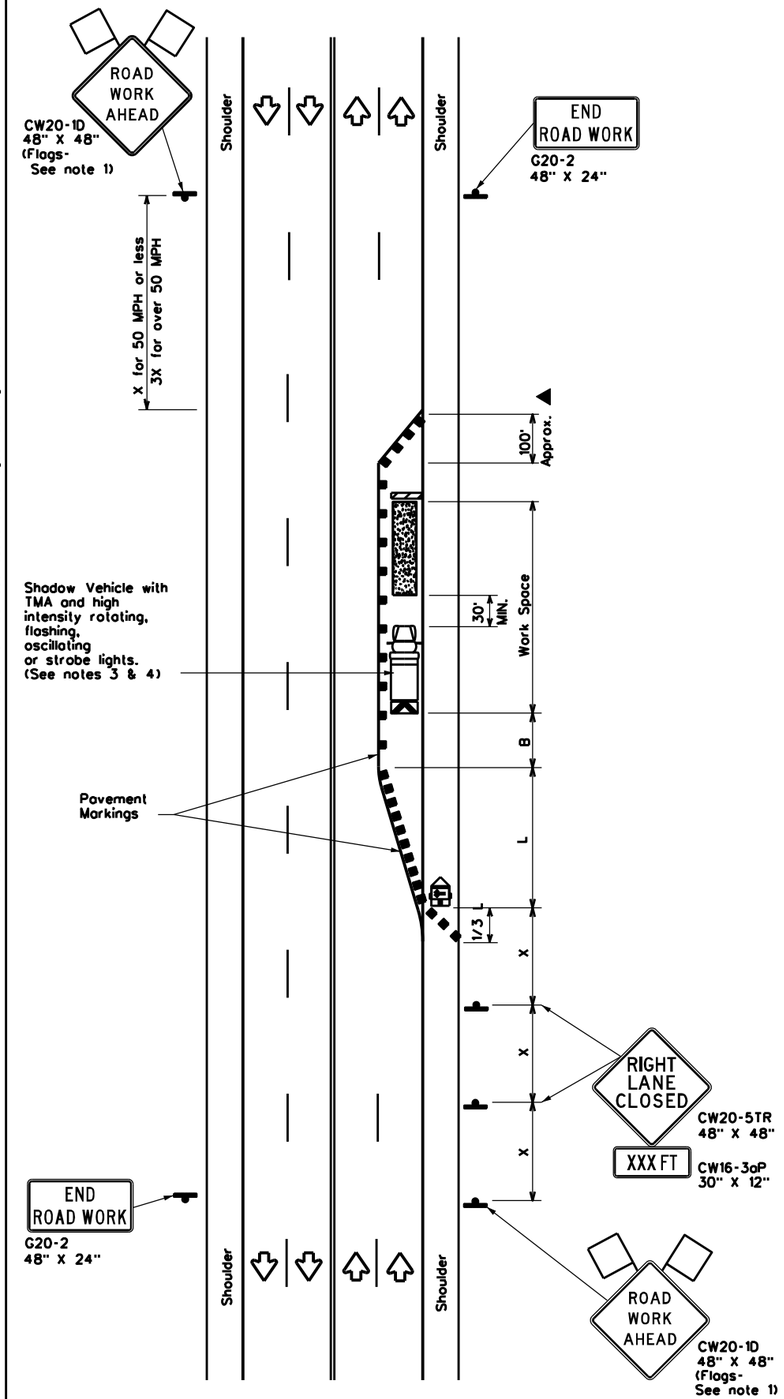
TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	6433	62	001	SPUR 330,ETC.
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	HOU	HARRIS		29

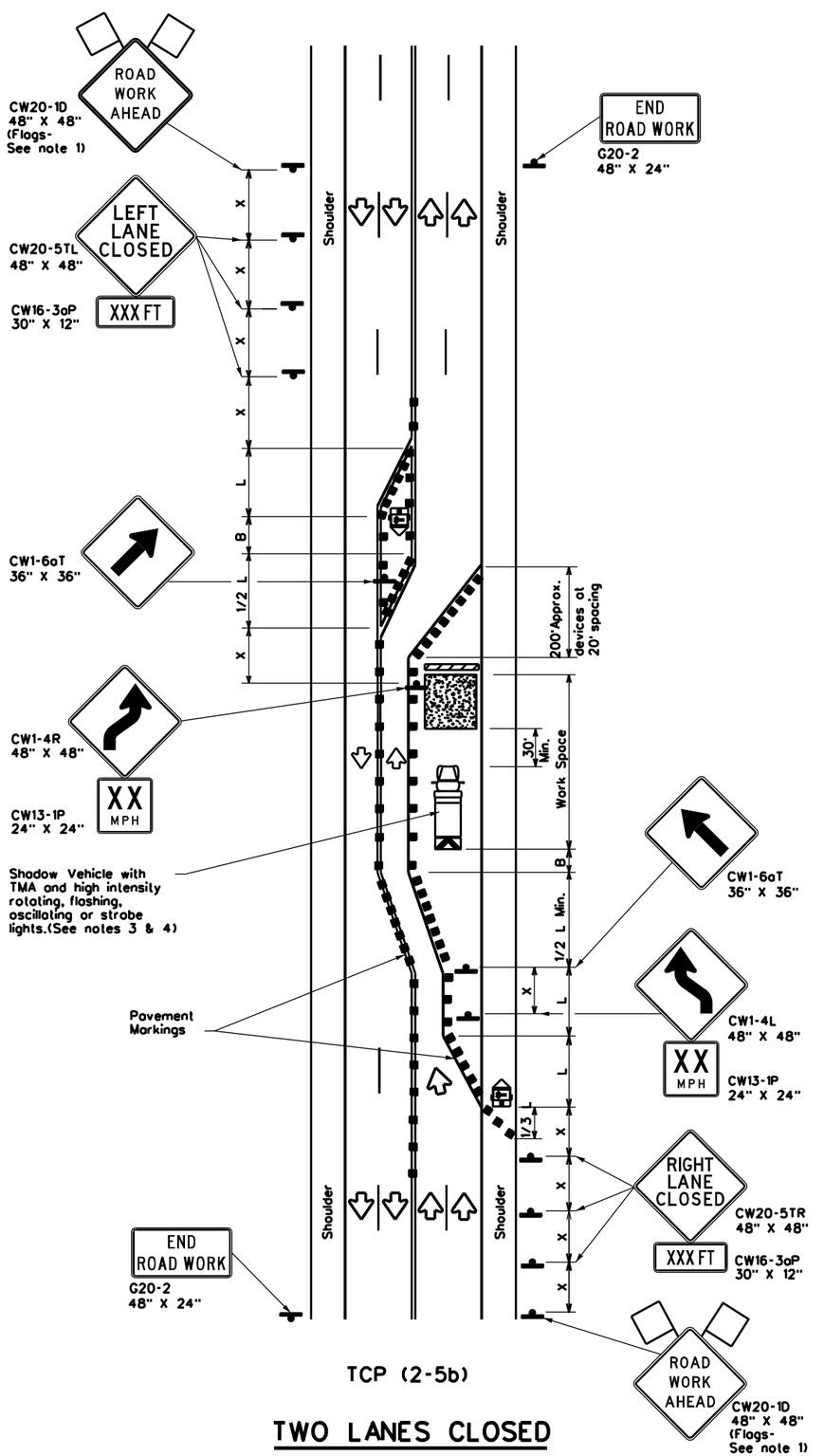
16.4

DATE:
FILE:



TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew 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.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation

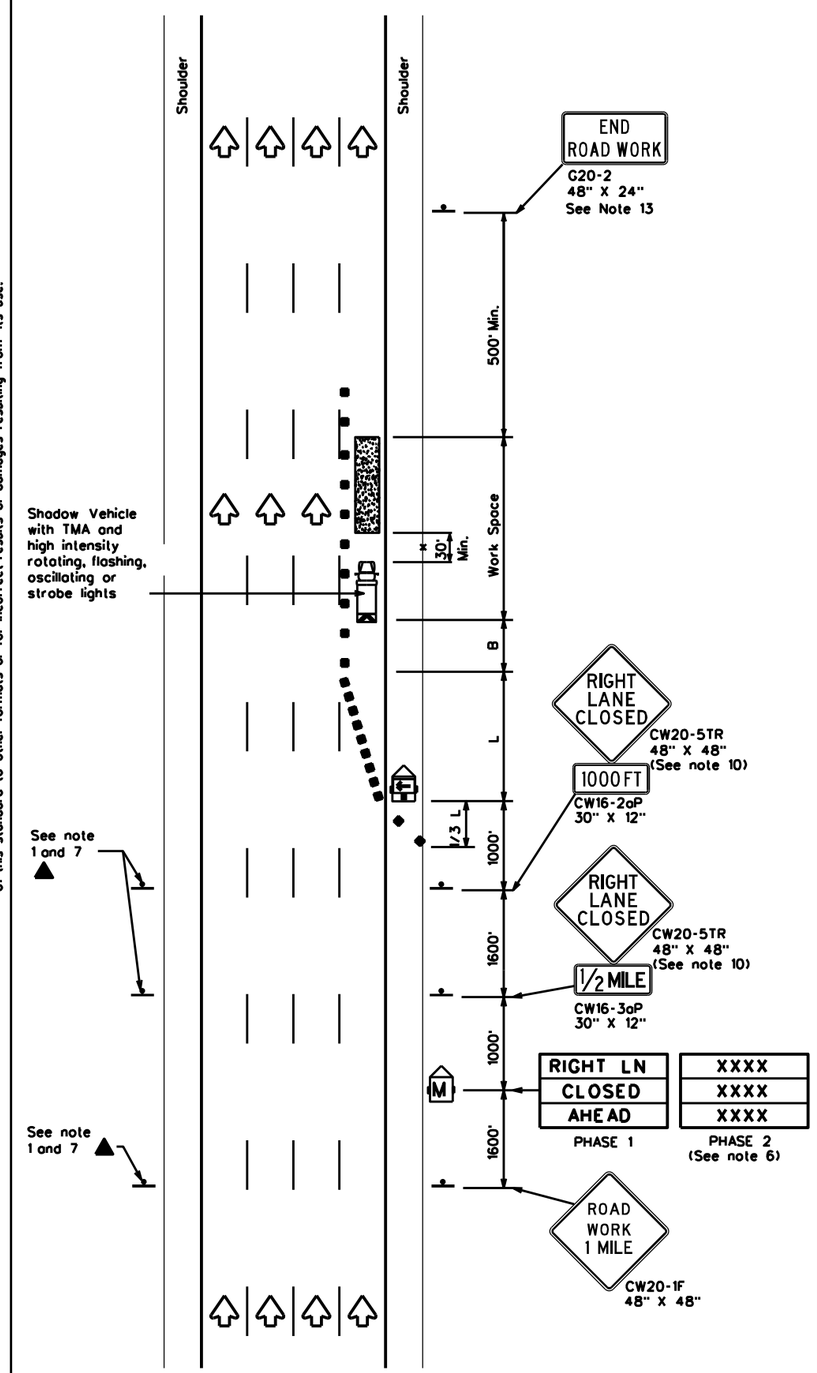
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

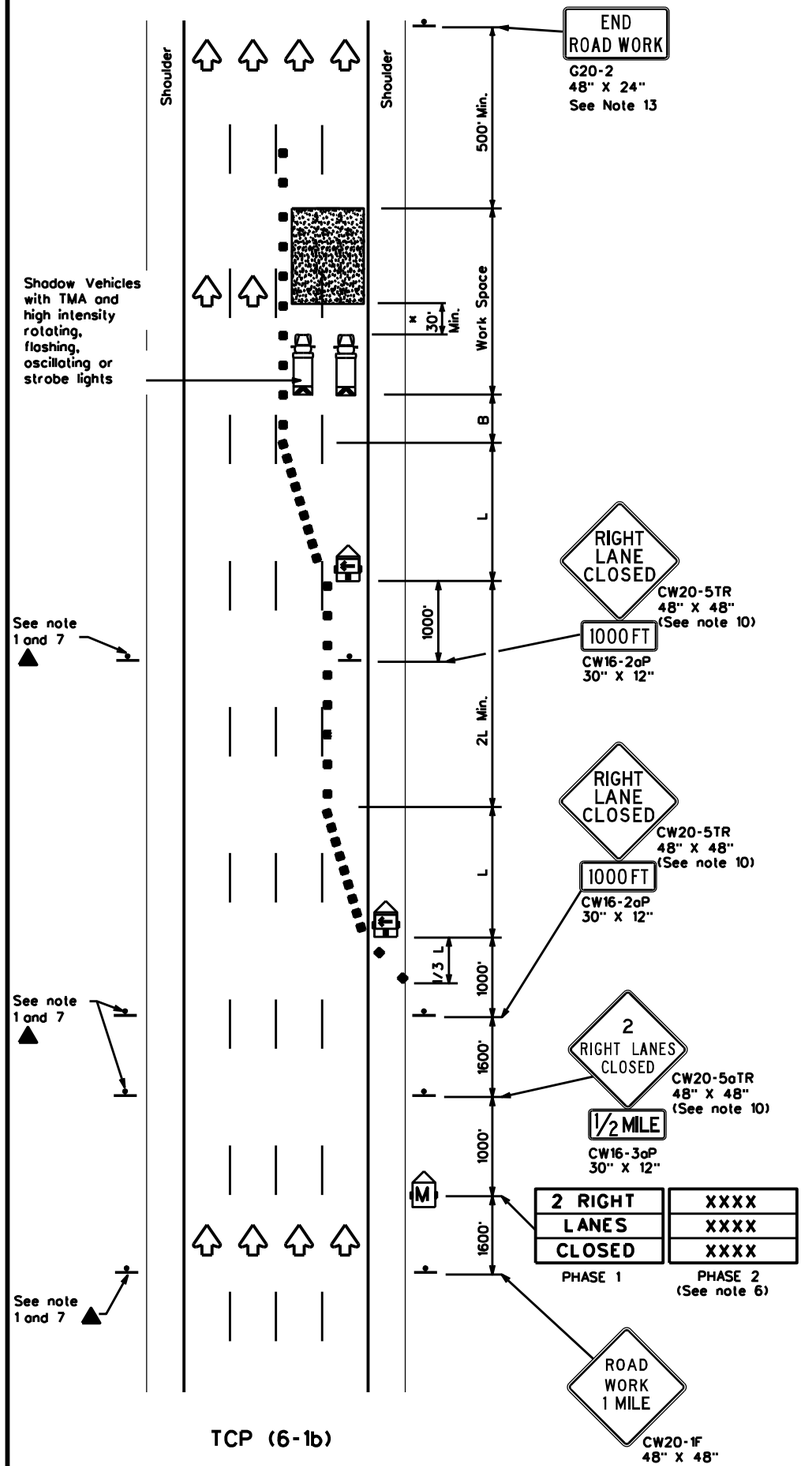
FILE: tcp2-5-18.dgn	ON:		CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB		HIGHWAY
REVISIONS	6433	62	001		SPUR 330,ETC.
8-95 2-12	DIST		COUNTY		SHEET NO.
1-97 3-03	HOU		HARRIS		30
4-98 2-18					

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 7' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a ploque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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

Texas Department of Transportation
Traffic Operations Division Standard

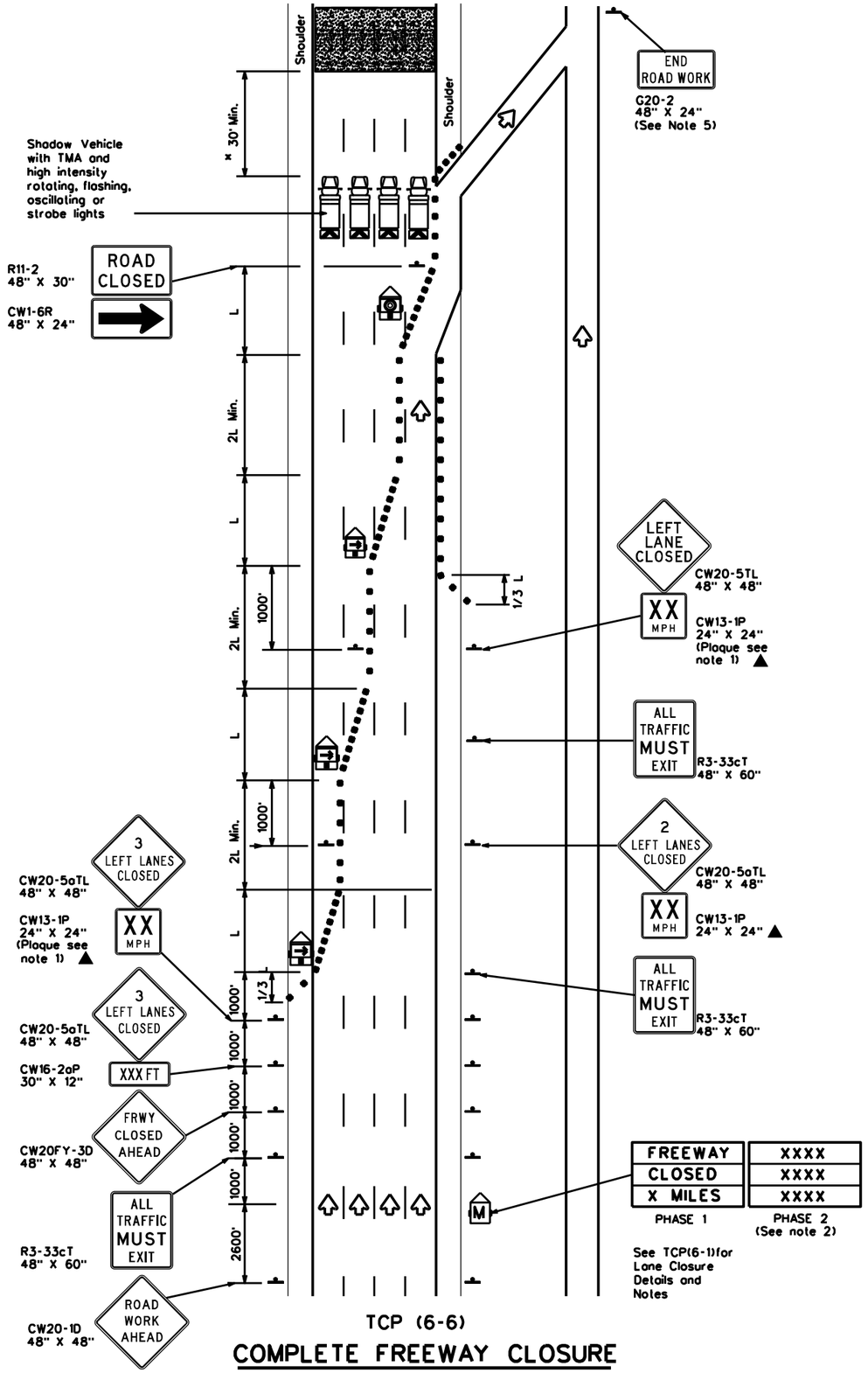
TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	6433	62	001	SPUR 330,ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		31

201

DATE:
FILE:



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" ××			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. 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.

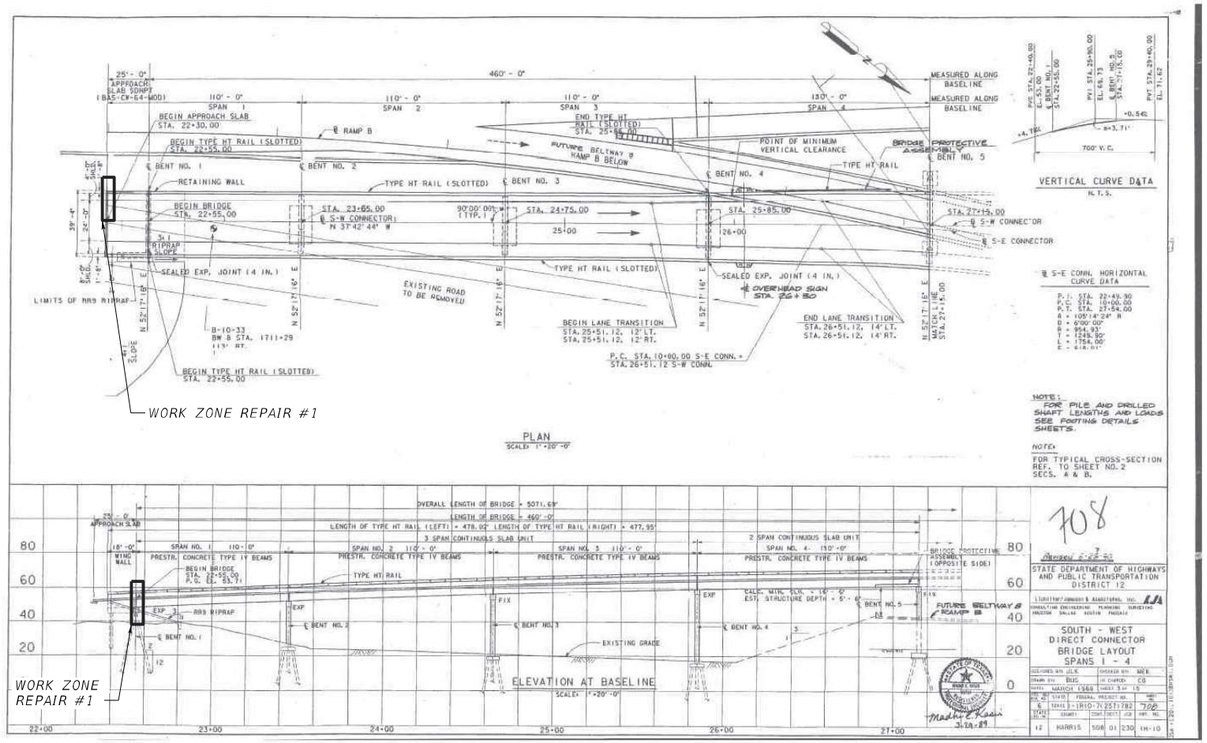
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
FREEWAY CLOSURE

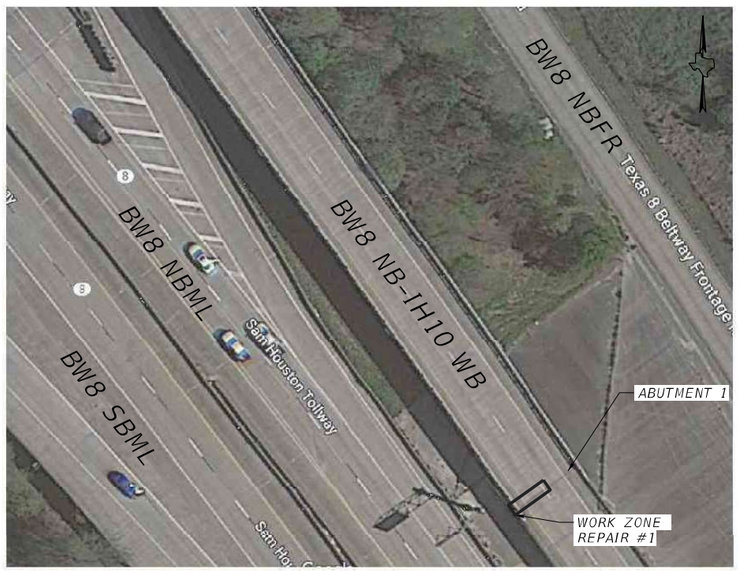
TCP(6-6)-12

FILE: tcp6-6.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330,ETC.
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	HARRIS		32

206



BRIDGE LAYOUT- PLAN & ELEVATION VIEW



BRIDGE LOCATION- PLAN VIEW

① *REPAIR EXISTING VOID AT ABUTMENT.*

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED PROFESSIONAL ENGINEER
12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

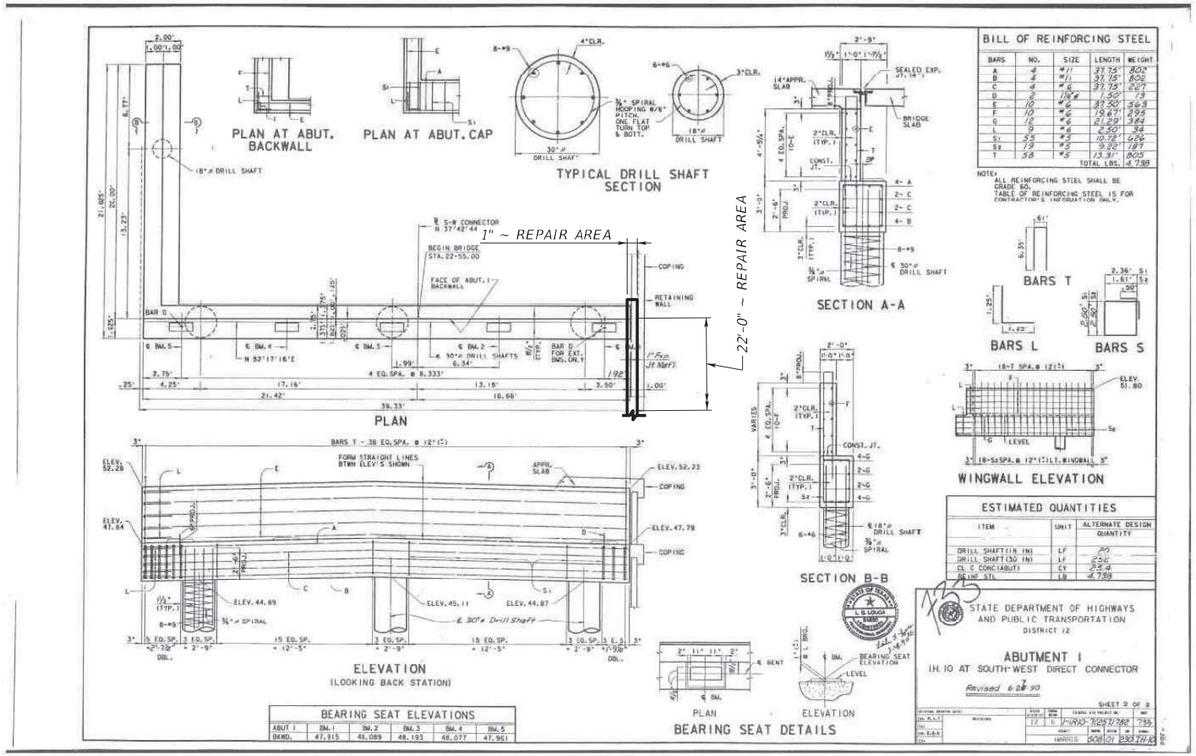
Texas Department of Transportation — Bridge Division

BW8 NB-IH10 WB

BRIDGE REPAIR DETAILS
ABUTMENT REPAIR LOCATIONS

NBI# 12-102-0508-01-449

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		33



BEARING SEAT ELEVATIONS						
ABUT 1	BM.1	BM.2	BM.3	BM.4	BM.5	
(BKWD.)	47.815	46.089	46.193	46.077	47.961	

BILL OF REINFORCING STEEL				
BARS	NO.	SIZE	LENGTH	WEIGHT
A	4	#11	37'-5"	809
B	4	#11	37'-5"	802
C	4	#6	37'-5"	269
D	2	#4	1'-6"	13
E	10	#6	31'-5"	363
F	10	#6	19'-6"	295
G	12	#6	21'-8"	364
L	9	#6	4'-5"	54
S1	53	#5	10'-7"	292
S2	13	#5	9'-5"	187
T	58	#5	13'-9"	805
			TOTAL LBS.	4,738

NOTE: ALL REINFORCING STEEL SHALL BE GRADE 60.
TABLE OF REINFORCING STEEL IS FOR CONTRACTOR'S INFORMATION ONLY.

ESTIMATED QUANTITIES		
ITEM	UNIT	ALTERNATE DESIGN QUANTITY
DRILL SHAFT (18 IN)	LF	20
DRILL SHAFT (30 IN)	LF	252
CL C CONC (ABUT)	CY	223.8
REINF STL	LB	41,738

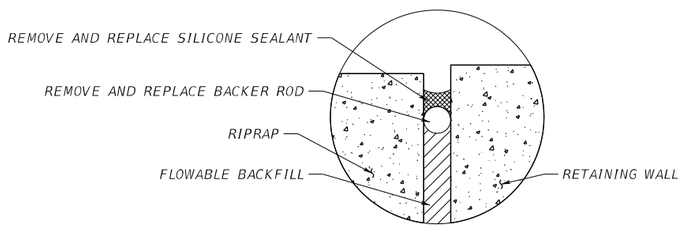
ABUTMENT 1- PLAN & ELEVATION VIEW

EXISTING VOID AT ABUTMENT 1 PHOTO- 12/07/2020

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QUANTITY
0401-6001	FLOWABLE BACKFILL	CY	0.07
0438-6001	CLEANING AND SEALING EXISTING JOINTS	LF	22

CONSTRUCTION NOTES: REPAIR

1. CLEAN JOINT OPENING OF ALL EXISTING EXPANSION MATERIALS/DEVICES, DIRT, AND ALL OTHER DELETARIOUS MATERIALS IN ACCORDANCE WITH ITEM 438, "CLEANING AND SEALING JOINTS". CLEAN JOINT OUT FULL DEPTH OF THE JOINT.
2. OBTAIN APPROVAL OF THE CLEANED JOINT.
3. USE PREQUALIFIED FLOWABLE BACKFILL TO FILL THE VOID UP TO 1" BELOW THE TOP OF RIPRAP.
4. PLACE BACKER ROD INTO JOINT OPENING 1" BELOW THE TOP OF RIPRAP.
5. SEAL THE JOINT OPENING WITH A CLASS 7 JOINT SEALANT.
6. ALL WORK RELATED TO CLEANING AND SEALING OF JOINT IS INCLUDED IN THE UNIT PRICE FOR ITEM 438-6001 AND EVERYTHING ELSE IS INCLUDED IN THE UNIT PRICE FOR ITEM 401-6001 "FLOWABLE BACKFILL".



JOINT REPAIR

MATERIAL NOTES:

FLOWABLE FILL TO MEET THE REQUIREMENTS OF ITEM 401 "FLOWABLE BACKFILL", IT MAY BE EITHER AN EXCAVATABLE OR NON-EXCAVATABLE MIX DESIGN.

ALTERNATIVELY, THE CONTRACTOR MAY USE A POLYURETHANE FOAM FILL MEETING THE REQUIREMENTS OF SS 3061. TO FILL VOIDS, CARE SHALL BE TAKEN TO NOT DAMAGE EXISTING RIPRAP AND RETAINING WALL BY APPLYING EXCESSIVE PRESSURE.

USE CLASS 7 JOINT SEALANT IN ACCORDANCE WITH DMS-6310, "JOINT SEALANT AND FILLERS."

GENERAL NOTES:

MEASUREMENTS SHOWN ON REPAIR DETAILS ARE APPROXIMATE. ADJUST AS REQUIRED.

CONTRACTOR WILL ADJUST RATE OF PLACEMENT TO ASSURE THAT EXISTING RETAINING WALL AND RIPRAP WILL NOT BE DAMAGED BY BLOW OUT. ANY DAMAGE WILL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

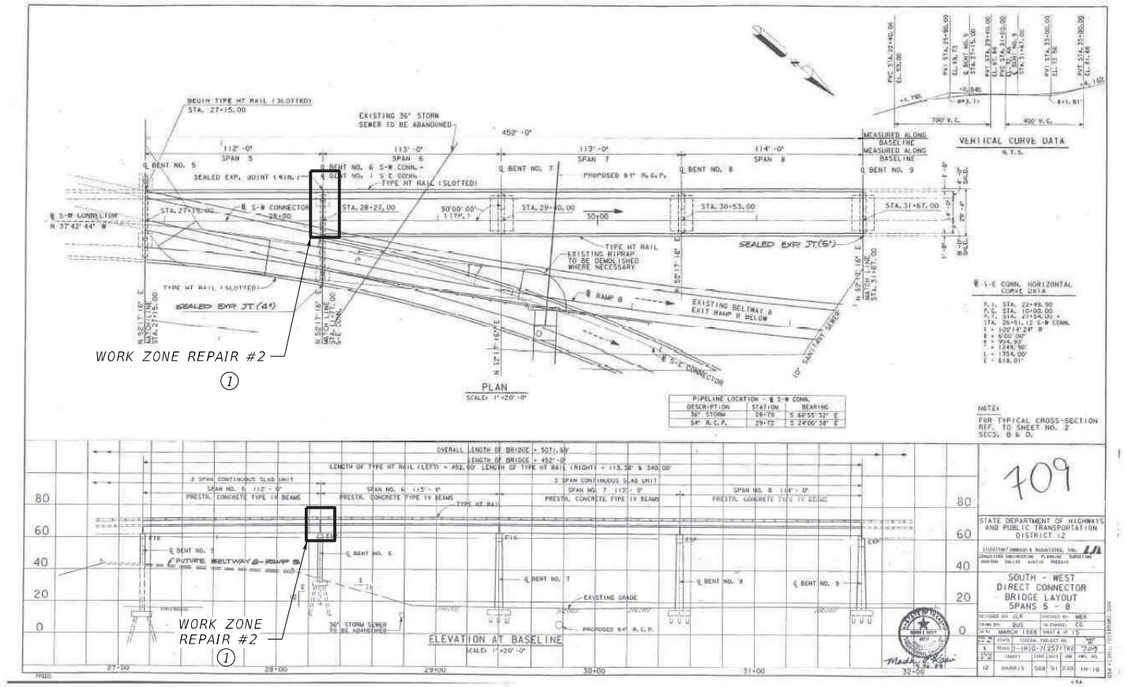
Texas Department of Transportation — Bridge Division

BW8 NB-IH10 WB

BRIDGE REPAIR DETAILS
WORK ZONE REPAIR #1
ABUTMENT REPAIR LOCATIONS

NBI# 12-102-0508-01-449

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		34



BRIDGE LAYOUT- PLAN & ELEVATION VIEW

BRIDGE LOCATION- PLAN VIEW

EXISTING JOINT AT BENT 6 PHOTO- 9/28/2022

WORK ZONE REPAIR #2

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
0785-6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	30

(1) REPLACE EXISTING JOINT WITH SEJ-M (4") FOR LENGTH OF JOINT. SEE PARTIAL DEPTH AT BRIDGE SLAB WITH THICKENED SLAB END DETAIL ON JOINT REPAIR DETAILS SHEET.

STATE OF TEXAS
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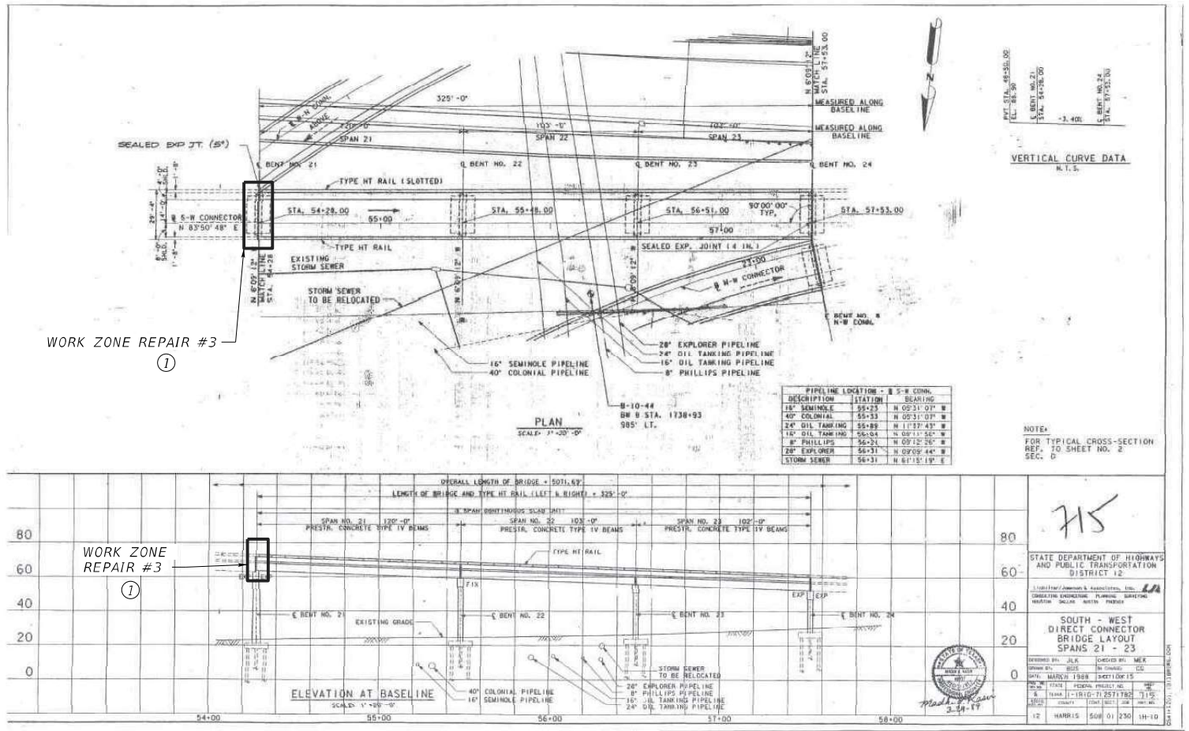
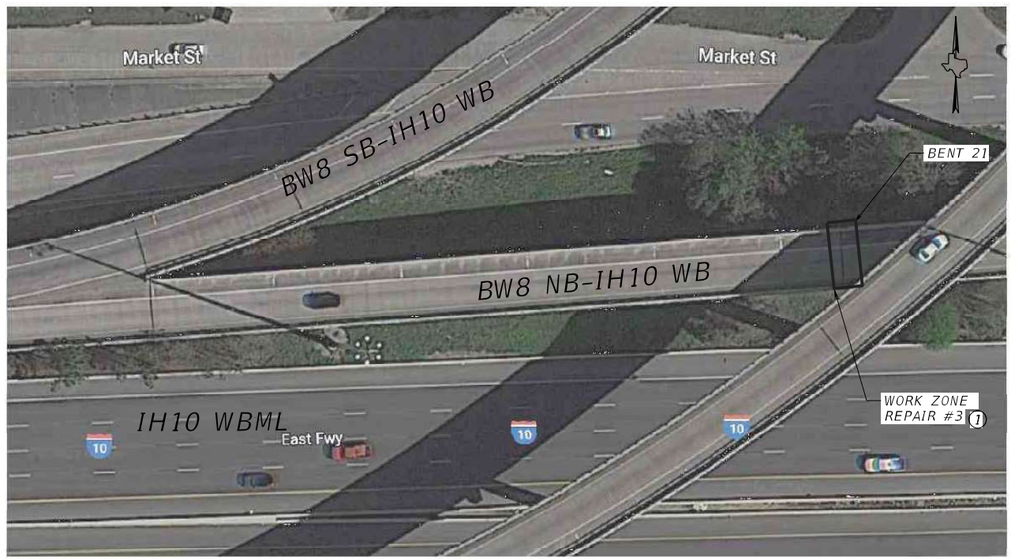
BRIDGE REPAIR DETAILS
JOINT REPAIR LOCATIONS

NBI# 12-102-0508-01-449

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		35



BRIDGE LAYOUT - PLAN & ELEVATION VIEW



BRIDGE LOCATION - PLAN VIEW

EXISTING JOINT AT BENT 21 PHOTO - 9/28/2022

WORK ZONE REPAIR #3

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
0785-6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	30

1 REPLACE EXISTING JOINT WITH SEJ-M (4") FOR LENGTH OF JOINT. SEE PARTIAL DEPTH AT BRIDGE SLAB WITH THICKENED SLAB END AND FULL DEPTH AT BRIDGE SLAB WITH STEEL GIRDER DETAILS ON JOINT REPAIR DETAILS SHEET.

STATE OF TEXAS
DELYNN HENRY
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PROFESSIONAL ENGINEER

12/21/2022

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Texas Department of Transportation

Bridge Division

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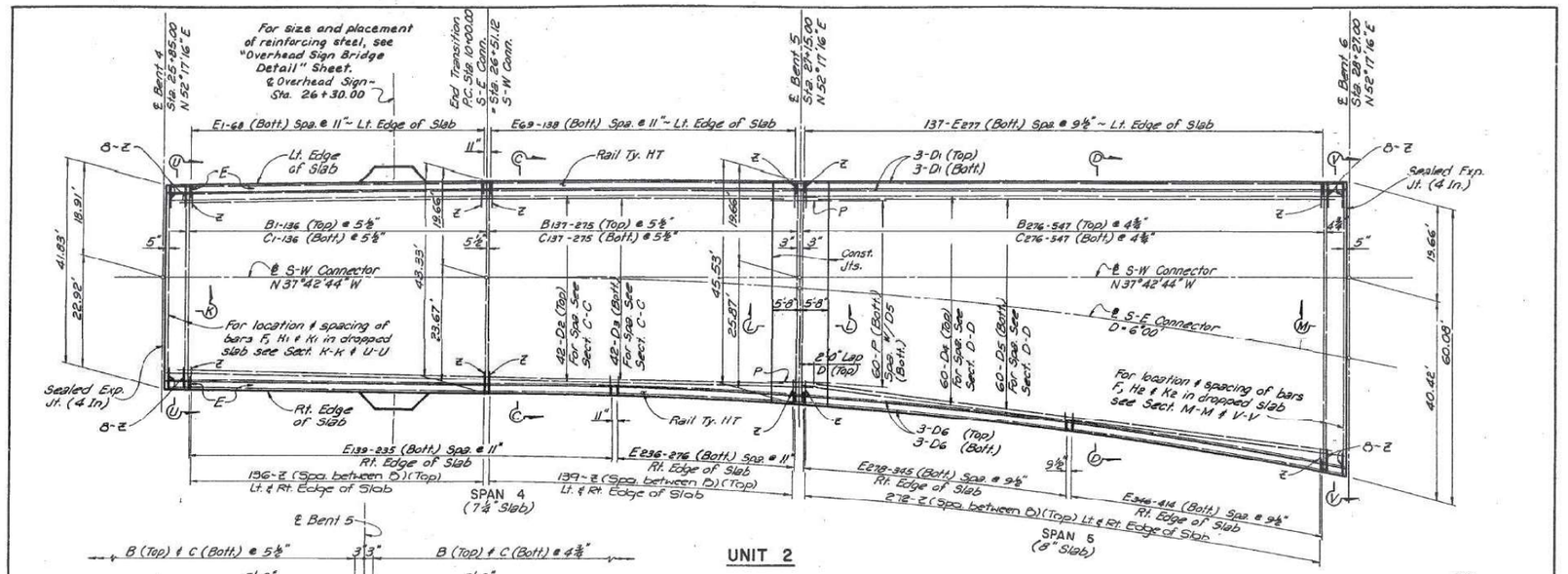
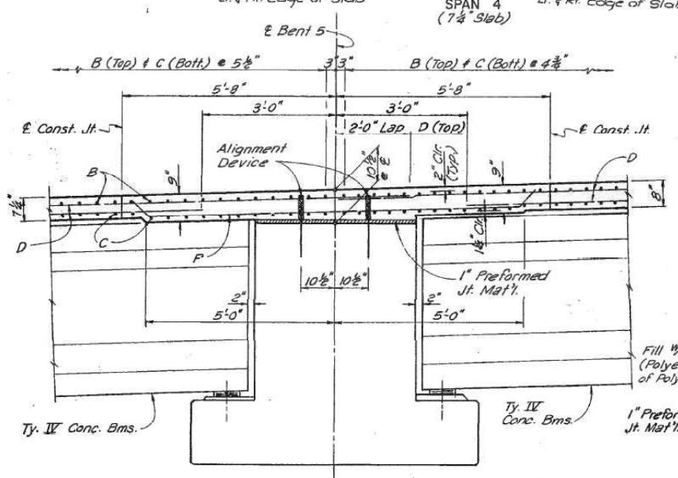
BRIDGE REPAIR DETAILS
JOINT REPAIR LOCATIONS

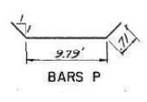
NBI# 12-102-0508-01-449

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		36





UNIT 2



Note: Care shall be taken to secure the alignment device during placement of the conc. slab.

* Includes 4 ~ 1.25' Laps
† Includes 2 ~ 1.25' Laps
# Includes 1 ~ 1.25' Laps

TABLE OF REINFORCING STEEL
UNIT 2

Bar	No.	Size	Length	Weight
B1-136	1 Eq.	#5	41.50'-43.00'	5993
B137-275	1 Eq.	#5	43.00'-45.20'	6393
B276-547	1 Eq.	#5	45.20'-59.75'	14,887
C1-136	1 Eq.	#5	41.50'-43.00'	5993
C137-275	1 Eq.	#5	43.00'-45.20'	6393
C276-547	1 Eq.	#5	45.20'-59.75'	14,887
D1	6	#5	246.67'	1544
D2	42	#5	134.75'	5935
D3	42	#5	125.75'	5509
D4	60	#5	119.41'	7134
D5	60	#5	108.25'	6674
D6	6	#5	247.00'	1546
E1-68	1 Eq.	#5	3.50'-3.87'	385
E69-138	1 Eq.	#5	3.87'-3.50'	269
E139-235	1 Eq.	#5	3.50'-2.58'	308
E236-276	1 Eq.	#5	2.58'-3.50'	130
E277	137	#5	3.50'	500
E278-345	1 Eq.	#5	3.50'-1.79'	188
E346-416	1 Eq.	#5	1.79'-3.50'	190
F	102	#5	4.63'	471
H1	8	#5	41.50'	346
H2	9	#5	61.00'	573
K1	8	#5	41.50'	346
K2	9	#5	61.00'	573
P	60	#5	11.21'	702
Z	1126	#5	4.25'	4991
			Total Lbs.	92,818

Notes:
Reinf. stl. to be grade 60.
Reinf. stl. quantity is for Contractor's information only.

B. L. TANNOUR 80044 REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
3/28/90
B L Tannour P.E.

ESTIMATED QUANTITIES

Item	Unit	Quantity
Paint Conc. Slab	SF	11,923
Conc. Surf. Treat	SY	1221

NOTE: The use of PCP's shall not be permitted between Beams 1 & 2 or Beams 4 & 5.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
I.H. 10 - BELTWAY 8 INTERCHANGE

781

SLAB DETAILS
SOUTH - WEST DIRECT CONNECTOR

Revised 6-~~26~~-90 27-90

SHEET 2 OF 14

DN: CJM	CK:	DW: CJM	CK: TSU	TR:	CK: TR:	DATE: SEPT. 1989	FED. RD. DIV. NO. 6	STATE: TEXAS	FEDERAL PROJECT NO.: I-IRIO-7(267)782	HIGHWAY NO.: SUR 8
							STATE DIST. NO. 12	COUNTY: HARRIS	CONT. 508	SECT. 01	JOB 230	SHEET NO. 781

FOR CONTRACTORS INFORMATION ONLY
The seal appearing on this sheet covers only the repair details, not the original design.

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER
12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

BW8 NB-IH10 WB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-449

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		37

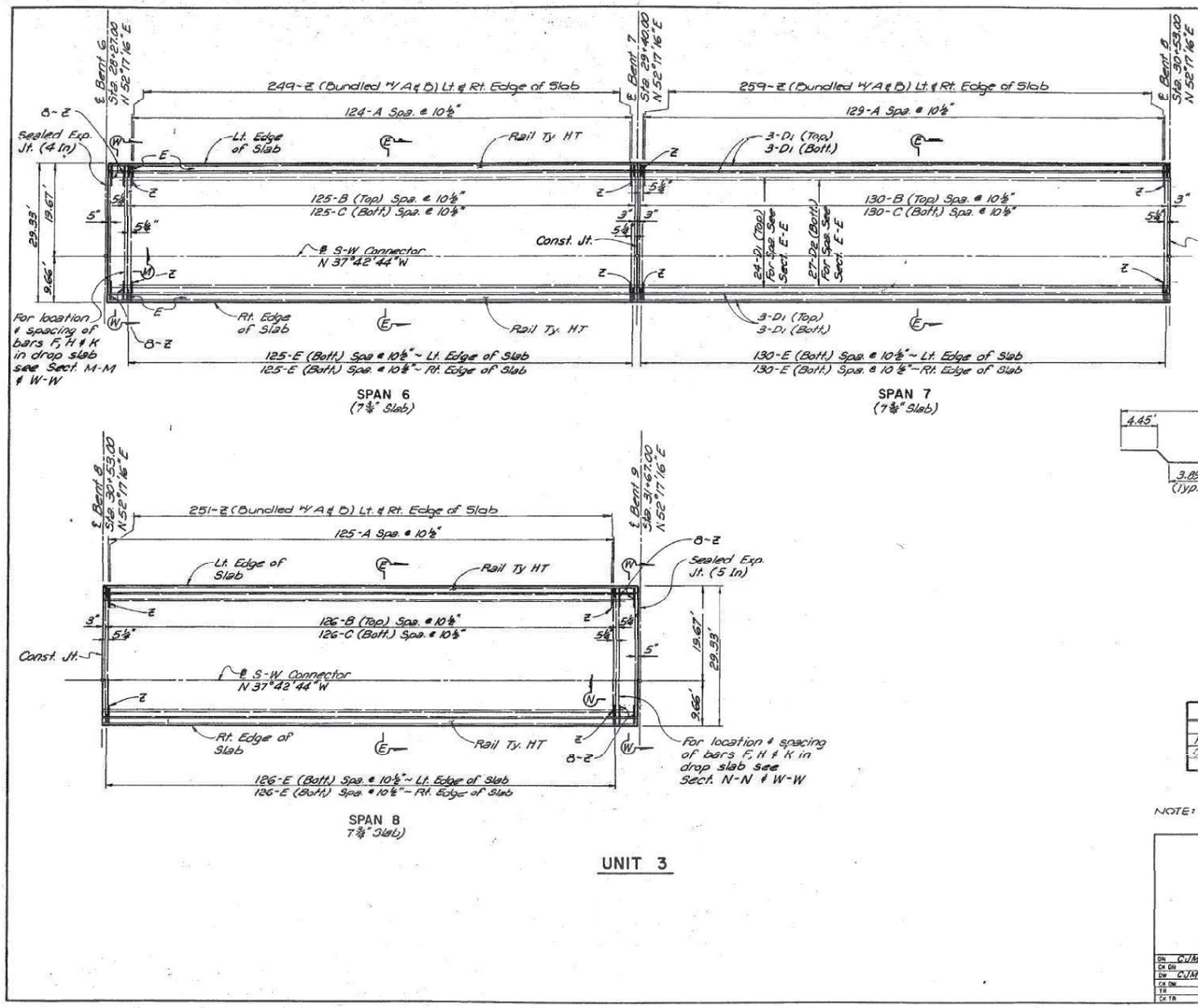
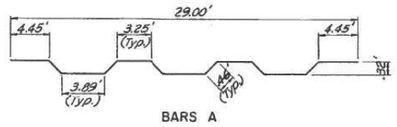


TABLE OF REINFORCING STEEL				
UNIT 3				
Bar	No.	Size	Length	Weight
A	378	#5	29.83'	11,761
B	381	#5	29.00'	11,523
C	381	#5	29.00'	11,524
* D1	36	#5	345.92'	12,999
* D2	27	#5	341.25'	9610
E	762	#5	3.50'	2782
F	54	#5	1.43'	250
H	18	#5	29.00'	544
K	18	#5	29.00'	544
E	1650	#5	4.26'	6571
		Total Lbs.		68,399

* Includes 5 ~ 1.25' Laps.

Notes:
Reinf. stl. to be grade 60.
Reinf. stl. quantity is for Contractors information only.



BARS A

BARS F

ESTIMATED QUANTITIES		
Item	Unit	Quantity
Reinf. Conc. Slab	SF	9967.2
Conc. Surf. Treat	SY	981.6

Revised 6-27-90

F-82

NOTE: The use of PCP's shall not be permitted.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
I.H. 10 - BELTWAY 8 INTERCHANGE

SLAB DETAILS
SOUTH - WEST DIRECT CONNECTOR

SHEET 3 OF 14

DN: CJM	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK: GN	ORIGINAL	SEPT. 1989	6	TEXAS	I-IRIO-7(267)782	BW 8
DW: CJM			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK: DW			12	HARRIS	908 01 890	782
TR						
CK: TR						

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STATE OF TEXAS
DELYNN HENRY
107399
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PROFESSIONAL ENGINEER
12/21/2022

NO.	DATE	REVISION	APPROV.

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818 TOWN & COUNTRY BLVD,
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Texas Department of Transportation
Bridge Division

BW8 NB-IH10 WB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-449

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		38

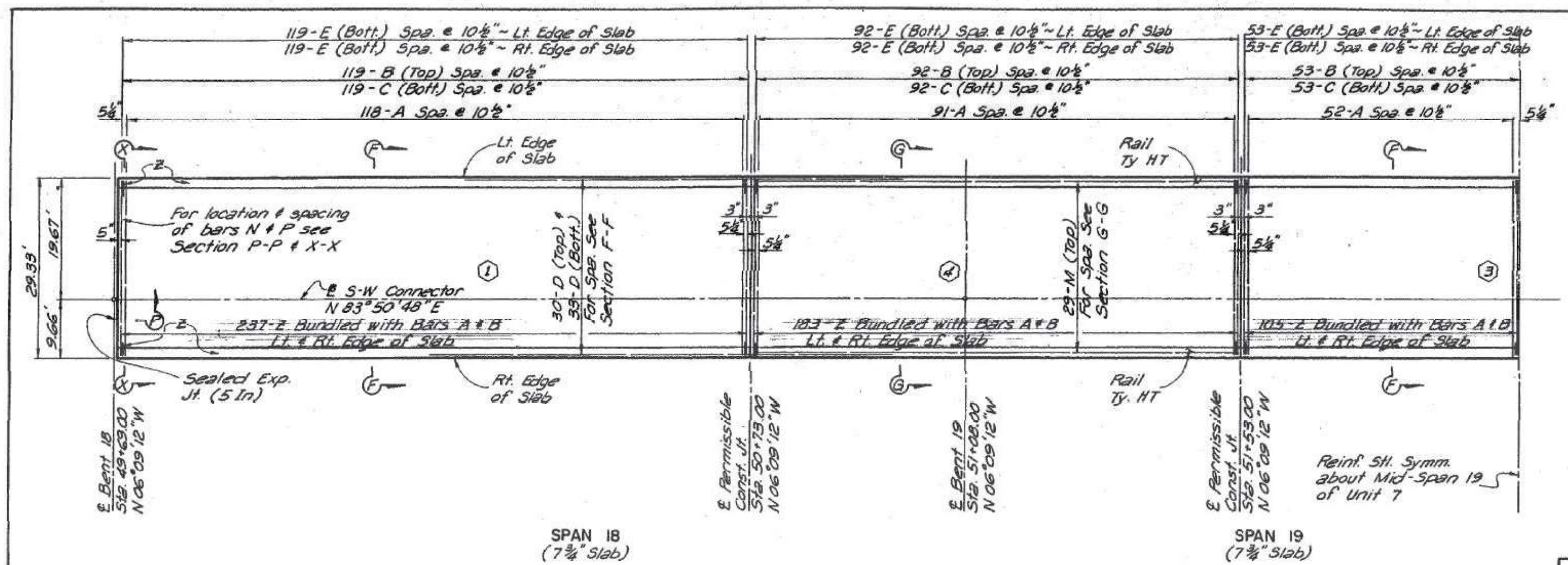
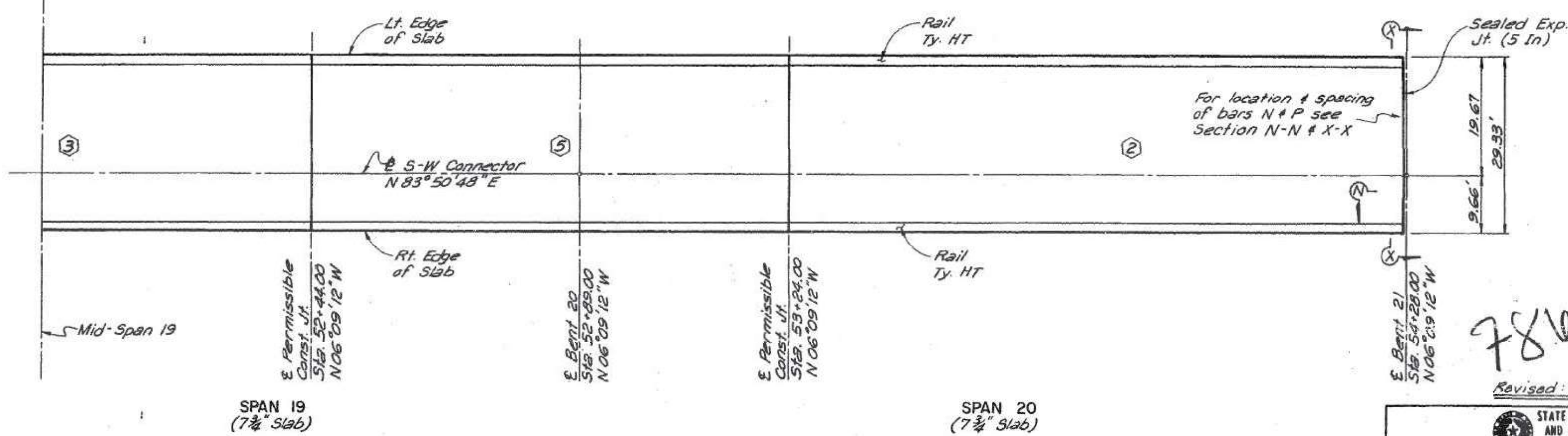


TABLE OF REINFORCING STEEL				
UNIT 7				
Bar	No.	Size	Length	Weight
A	522	#5	29.83'	16,241
B	527	#5	29.00'	15,940
C	527	#5	29.00'	15,940
* D	63	#5	467.42'	30,714
E	1054	#5	3.50'	3848
M	58	#5	79.67'	4820
N	54	#5	2.29'	129
P	12	#5	6.12'	77
Z	2100	#5	4.25'	9309
			Total Lbs.	97018

* Includes 7-1.25' Laps.

Notes:
Reinf. stl. to be grade 60.
Reinf. stl. quantity is for Contractor's information only.

ESTIMATED QUANTITIES		
Item	Unit	Quantity
Reinf. Conc. Slab	SF	13,497.6
Conc. Surf. Treat	SY	1325.3



UNIT 7

3/28/90
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78

Revised: 6-27-90

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
I.H. 10 - BELTWAY 8 INTERCHANGE

SLAB DETAILS

SOUTH - WEST DIRECT CONNECTOR

SHEET 7 OF 14

DN	CJM	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			
CK DN	TSU	ORIGINAL	OCT. 1989	6	TEXAS	I-IR10-7(257)782			
DW	CJM			STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB
CK DW	TSU			12	HARRIS		508	01	280
TR									
CK TR									

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STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER
Delynn Henry 12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD, SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation
Bridge Division

BW8 NB-IH10 WB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-449

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		39

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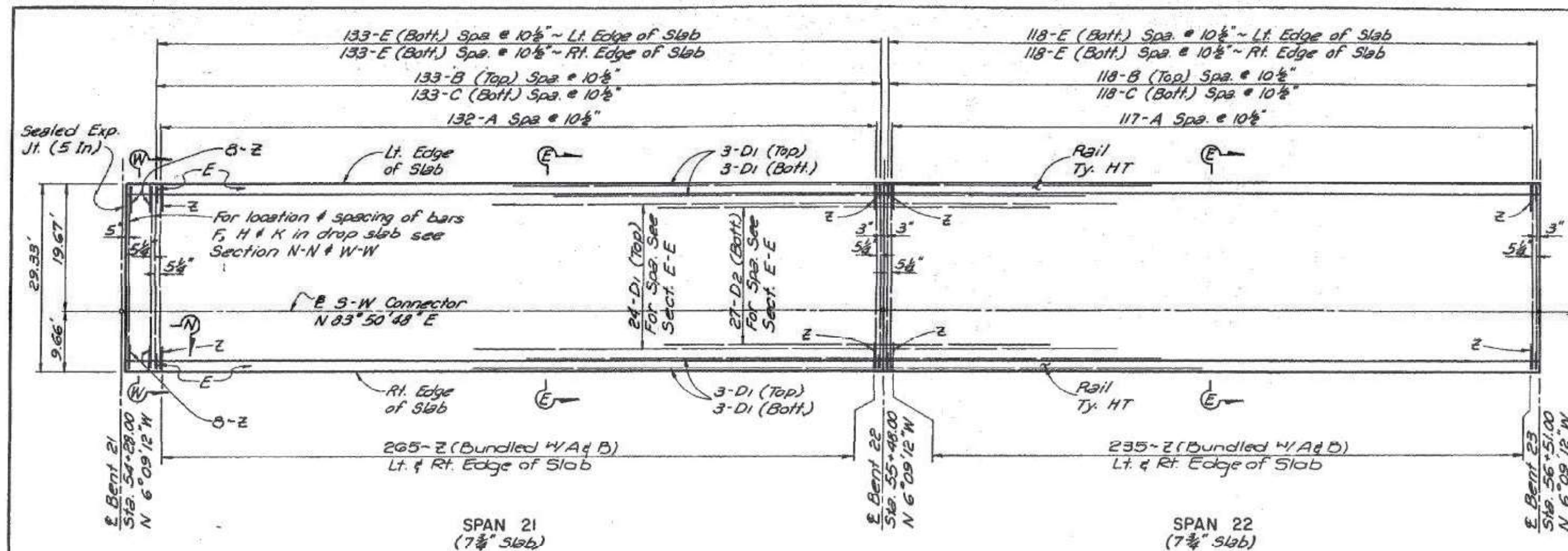

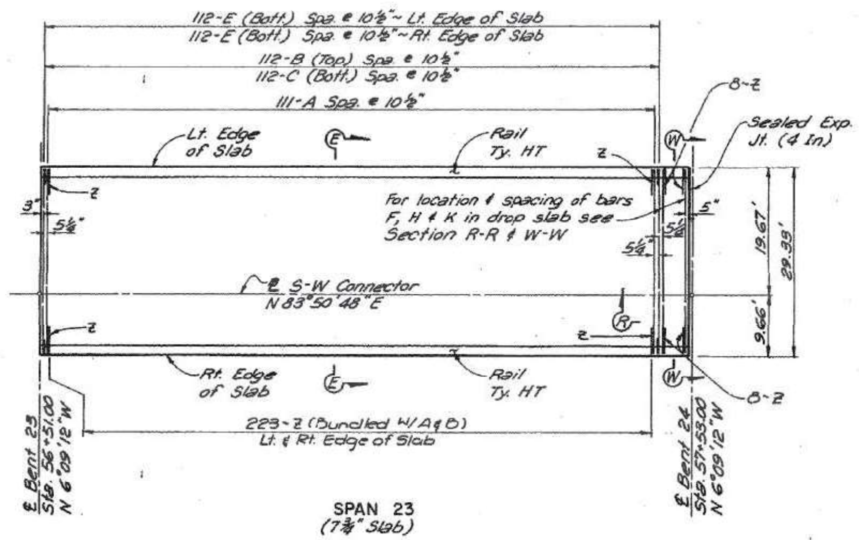

UNIT 8

TABLE OF REINFORCING STEEL

UNIT 8

Bar	No.	Size	Length	Weight
A	360	#5	29.83'	11,201
B	363	#5	29.00'	10,980
C	363	#5	29.00'	10,980
* D1	36	#5	330.52'	12,125
* D2	27	#5	326.25'	9,188
E	726	#5	3.50'	2,650
F	54	#5	4.43'	250
H	18	#5	29.00'	544
K	18	#5	29.00'	544
Z	1478	#5	4.25'	6,552
			Total Lbs.	65314

* Includes Five ~ 1.25' Laps.

Notes:
Reinf. stl. to be grade 60.
Reinf. stl. quantity is for Contractor's information only.

ESTIMATED QUANTITIES

Item	Unit	Quantity
Reinf Conc Slab	SF	9,527.3
Conc Surf Treat	SY	938.3

STATE OF TEXAS B. I. TANNOUS 50044 REGISTERED PROFESSIONAL ENGINEER

3/28/90 B. I. Tannous

787

NOTE: The use of PCP shall not be permitted.
Revised: 6-27-90

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
I.H. 10 - BELTWAY 8 INTERCHANGE

SLAB DETAILS

SOUTH - WEST DIRECT CONNECTOR

SHEET 8 OF 14

DN	CJM	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK DN	TSU	ORIGINAL	OCT. 1989	6	TEXAS	I-IR10-7(257)782	BW 8
DW	CJM			STATE DIST. NO.	COUNTY	CONT. / SECT. / JOB	SHEET NO.
CK DW	TSU			12	HARRIS	508 / 01 / 230	787
TR							
CK TR							

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STATE OF TEXAS DELYNN HENRY 107399 LICENSED PROFESSIONAL ENGINEER
Delynn Henry 12/21/2022

NO.	DATE	REVISION	APPROV.

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818 TOWN & COUNTRY BLVD, SUIT 500, HOUSTON TX 77024
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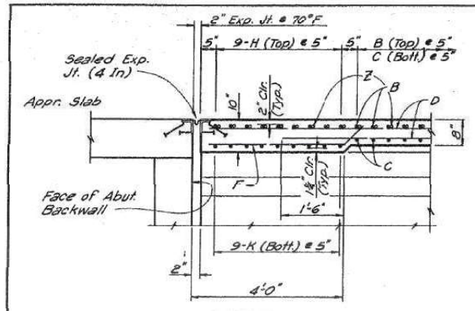
Texas Department of Transportation — Bridge Division

BW8 NB-IH10 WB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-449

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST		COUNTY	SHEET NO.
	HOU		HARRIS	40



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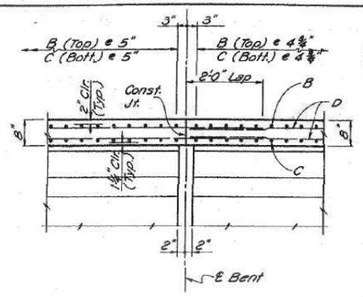

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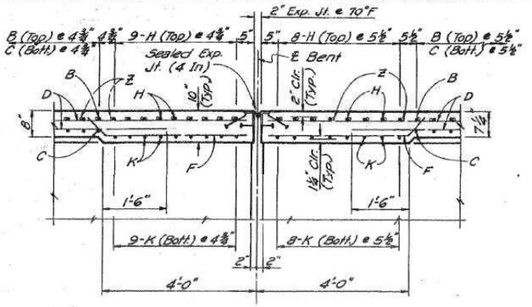

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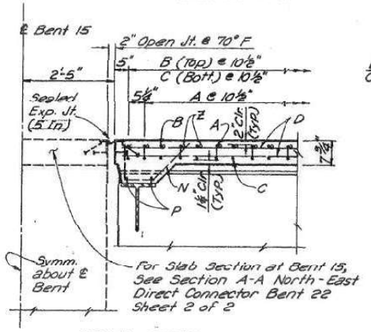

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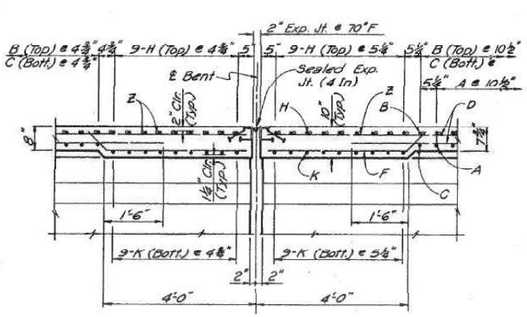

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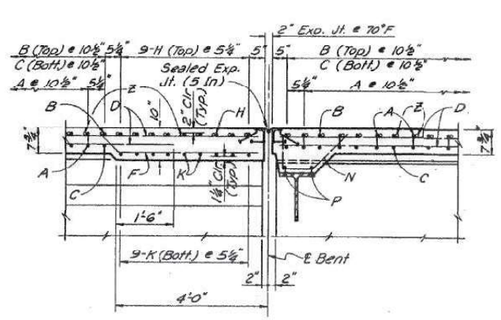

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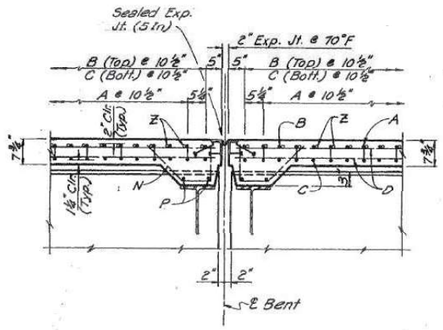

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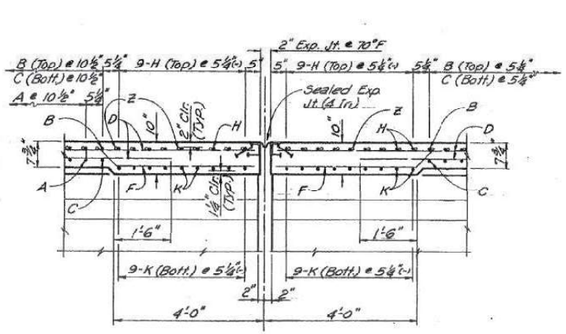

SECTION R-R

STATE OF TEXAS
B. L. TANNOUS
90044
REGISTERED
PROFESSIONAL ENGINEER

B. L. Tannous, P.E.
3/28/90

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STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
I.H. 10 - BELTWAY 8 INTERCHANGE

SLAB DETAILS

SOUTH - WEST DIRECT CONNECTOR

SHEET 12 OF 14

DN	C.J.M.	DRAWING	DATE
CK DW	T.S.U.	ORIGINAL	OCT. 1989
DW	C.J.M.		
CK DW	T.S.U.		
TA			
CK TR			

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			HIGHWAY NO.
6	TEXAS	I-IRIO-7(257)782			BW 8
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	SHEET NO.
12	HARRIS	5456	01	230	792

FOR CONTRACTORS INFORMATION ONLY
The seal appearing on this sheet covers only the repair details, not the original design.

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

Delynn Henry
12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation

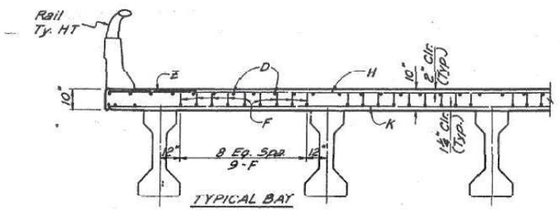
Bridge Division

BW8 NB-IH10 WB

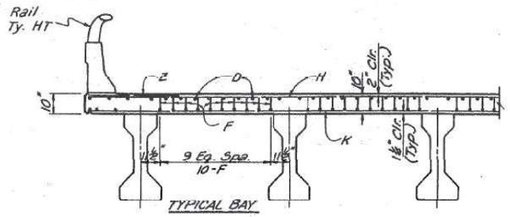
BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-449

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		41



PARTIAL SECTION S-S



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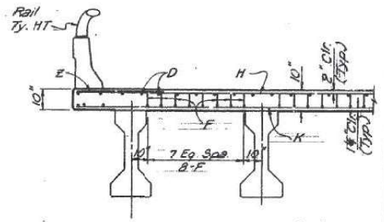

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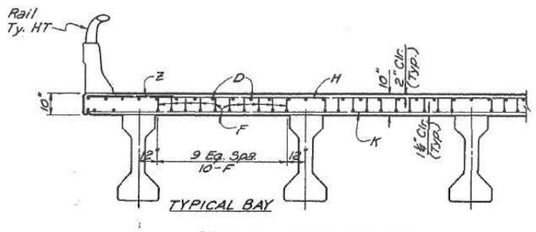

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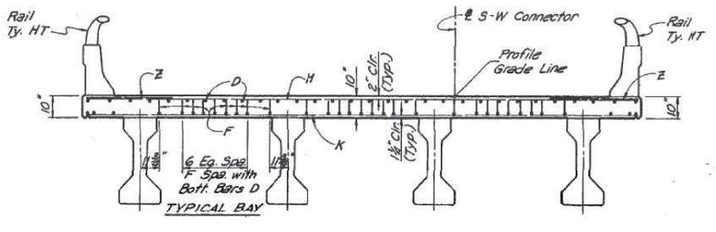
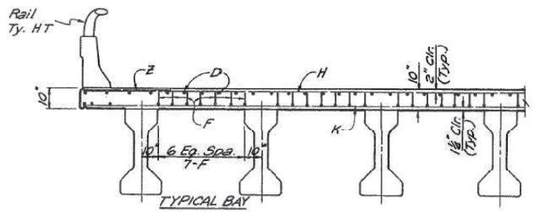
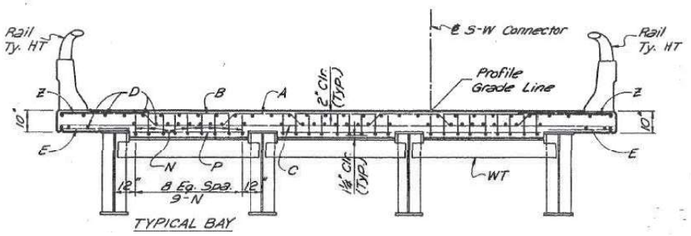


SECTION W-W



PARTIAL SECTION U-U



SECTION X-X

Revised: 6-30-90

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12
IH. 10 - BELTWAY 8 INTERCHANGE

SLAB DETAILS

SOUTH - WEST DIRECT CONNECTOR

SHEET 13 OF 14

ORIGINAL DRAWING DATE: OCT. 1989	STATE	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DR.: CJM	12	6	I-IRIO-7(257)782	793
CK.: TSU	COUNTY	CONTROL	SECTION	JOB	HIGHWAY
DR.: CJM	HARRIS	508	01	250	BW 8
CK.: TSU					

REVISIONS

FOR CONTRACTORS INFORMATION ONLY
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STATE OF TEXAS
DELYNN HENRY
107390
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

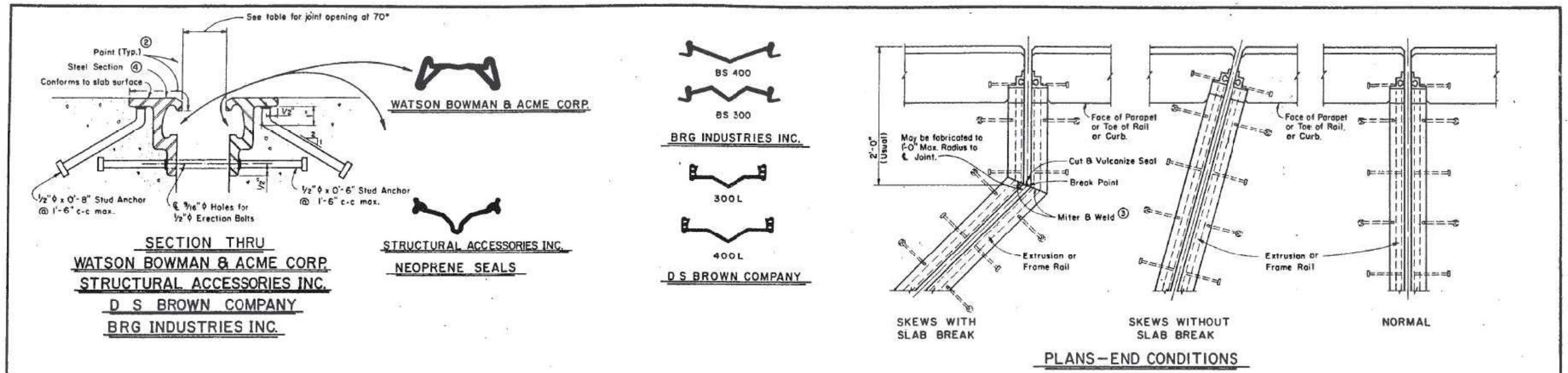
Texas Department of Transportation — Bridge Division

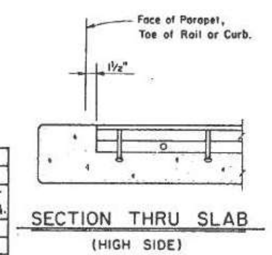
BW8 NB-IH10 WB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-449

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		42





MANUFACTURER	STEEL SECTION ④	NEOPRENE STRIP SEAL 3" JOINT Seal Type	3" JOINT Joint Opening	4" JOINT Seal Type	4" JOINT Joint Opening	5" JOINT SEAL TYPE	5" JOINT JOINT OPN'G.
Watson Bowman & Acme Corp.	Type M Extrusion	S 300	1.75	S 400	1.75	—	—
Structural Accessories Inc.	Type SC11 Extrusion	40 SS	1.75	50 SS	1.75	—	—
D S Brown	Frame Rail SSCM	300L	1.75	400L	1.75	BS500	3.00
BRG Industries Inc.	Type W *	BS 300	1.75	BS 400	1.75	—	—

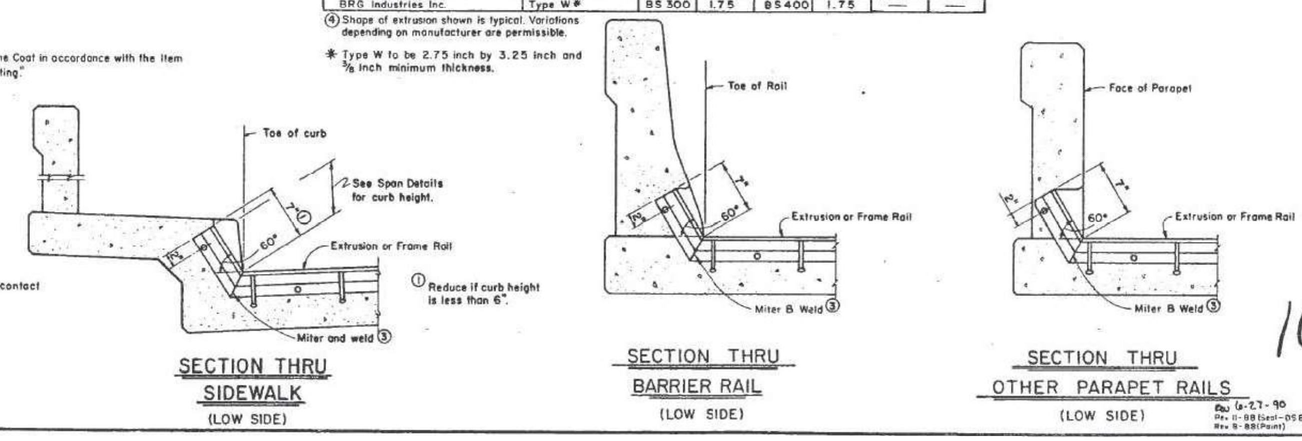
④ Shape of extrusion shown is typical. Variations depending on manufacturer are permissible.

* 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".



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.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

SEALED EXPANSION JOINT DETAILS

WITHOUT OVERLAY

(MOD.) DISTRICT 12 SEJ-S(1)

1012

MARCH 1983 — 12 — HARRIS

FOR CONTRACTORS INFORMATION ONLY
The seal appearing on this sheet covers only the repair details, not the original design.

STATE OF TEXAS — DELYNN HENRY — 107399 — LICENSED PROFESSIONAL ENGINEER

Delynn Henry 12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD, SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

BW8 NB-IH10 WB

BRIDGE REPAIR DETAILS
AS-BUILTS
NBI# 12-102-0508-01-449

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT 6433	SECT 62	JOB 001	HIGHWAY SPUR 330, ETC.
REVISIONS	DIST HOU	COUNTY HARRIS		SHEET NO. 43

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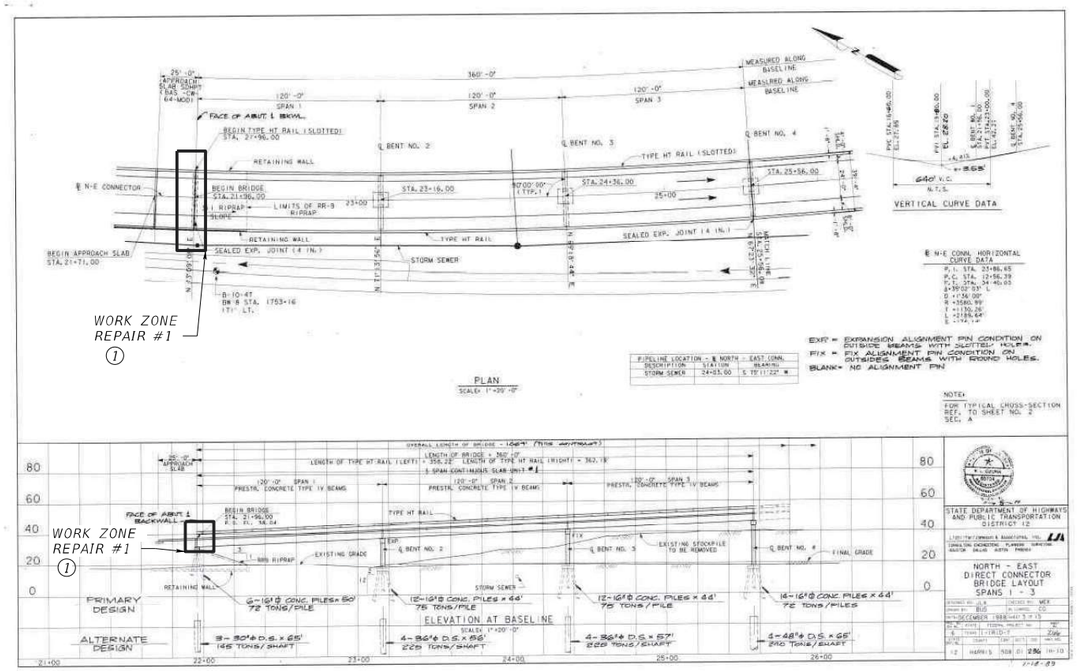
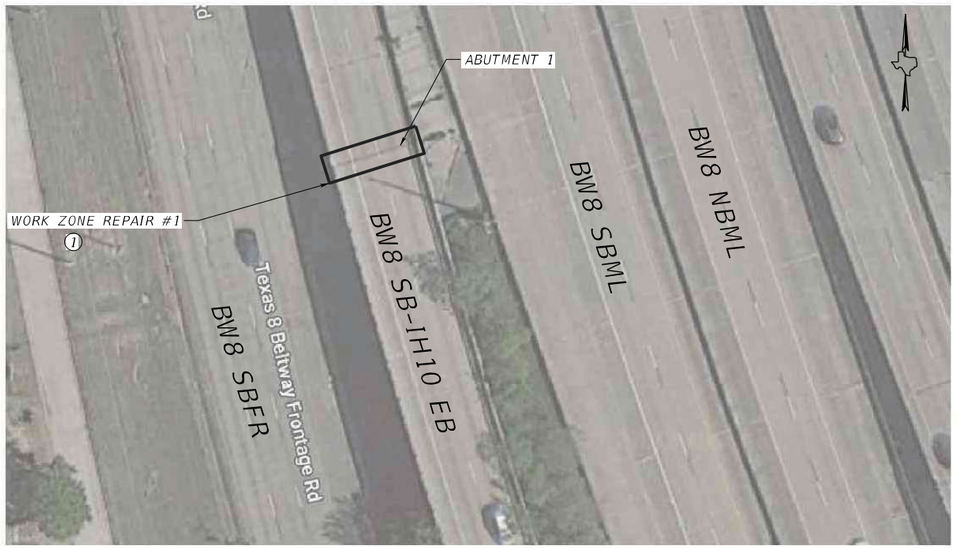


BRIDGE LAYOUT - PLAN & ELEVATION VIEW



BRIDGE LOCATION - PLAN VIEW

EXISTING JOINT AT ABUTMENT 1 PHOTO - 9/28/2022

WORK ZONE REPAIR #1

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
0785-6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	40

1 REPLACE EXISTING JOINT WITH SEJ-M (4") FOR LENGTH OF JOINT. SEE PARTIAL DEPTH AT BRIDGE SLAB WITH THICKENED SLAB END DETAIL AND PARTIAL DEPTH AT ABUTMENT DETAIL ON JOINT REPAIR DETAILS SHEET.

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

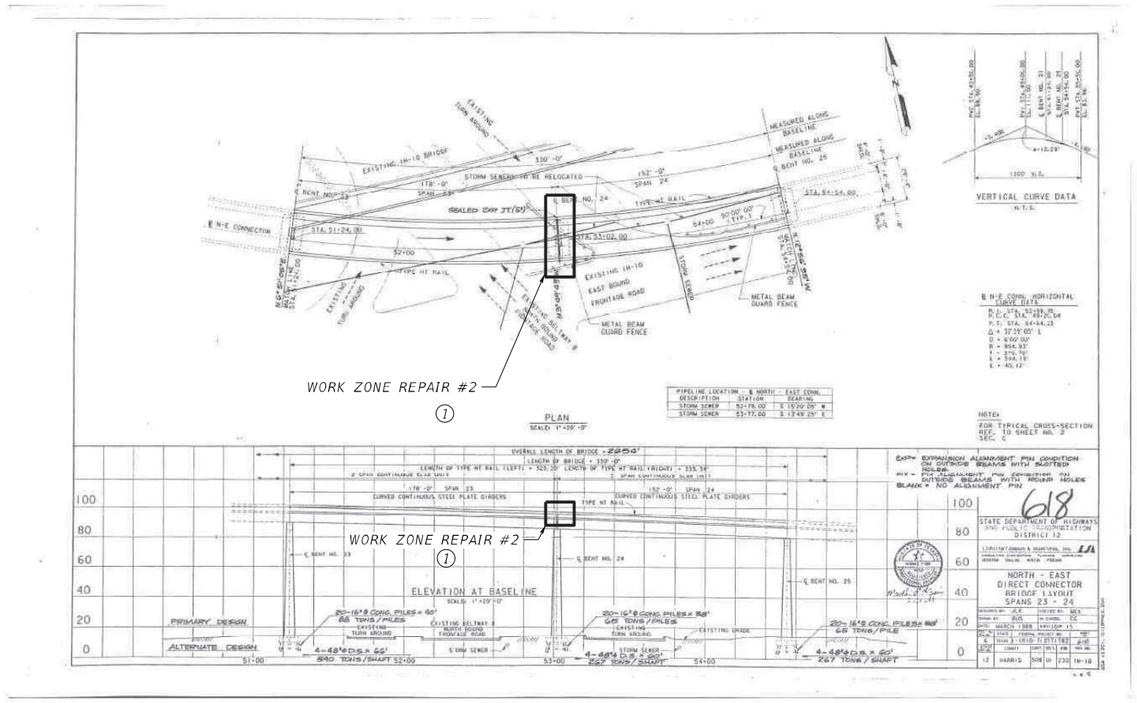
Texas Department of Transportation — Bridge Division

BW8 SB-IH10 EB

BRIDGE REPAIR DETAILS
JOINT REPAIR LOCATIONS

NBI# 12-102-0508-01-450

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		44



BRIDGE LAYOUT - PLAN & ELEVATION VIEW

BRIDGE LOCATION - PLAN VIEW

EXISTING JOINT AT BENT 24 PHOTO - 9/28/2022

WORK ZONE REPAIR #2

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
0785-6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	30

1 REPLACE EXISTING JOINT WITH SEJ-M (4") FOR LENGTH OF JOINT. SEE FULL DEPTH AT BRIDGE SLAB WITH STEEL GIRDER DETAIL ON JOINT REPAIR DETAILS SHEET.

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

BW8 SB-IH10 EB

BRIDGE REPAIR DETAILS
JOINT REPAIR LOCATIONS

NBI# 12-102-0508-01-450

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		45

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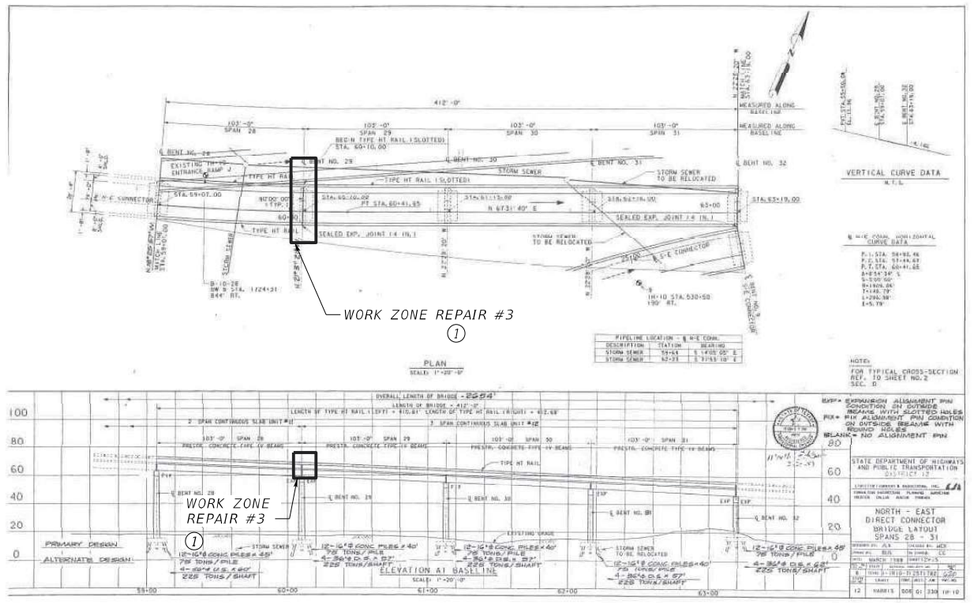


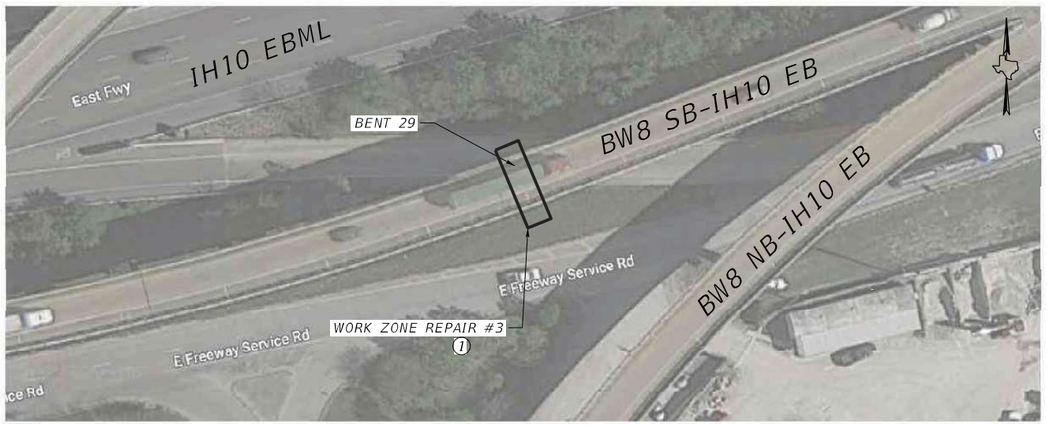
BRIDGE LAYOUT - PLAN & ELEVATION VIEW

EXISTING JOINT AT BENT 29 PHOTO - 9/28/2022

WORK ZONE REPAIR #3

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QUANTITY
0785-6011	BRIDGE JOINT REPLACEMENT (SEJ)	LF	30

1. REPLACE EXISTING JOINT WITH SEJ-M (4") FOR LENGTH OF JOINT. SEE PARTIAL DEPTH AT BRIDGE SLAB WITH THICKENED SLAB END DETAIL ON JOINT REPAIR DETAILS SHEET.



BRIDGE LOCATION - PLAN VIEW

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

BW8 SB-IH10 EB

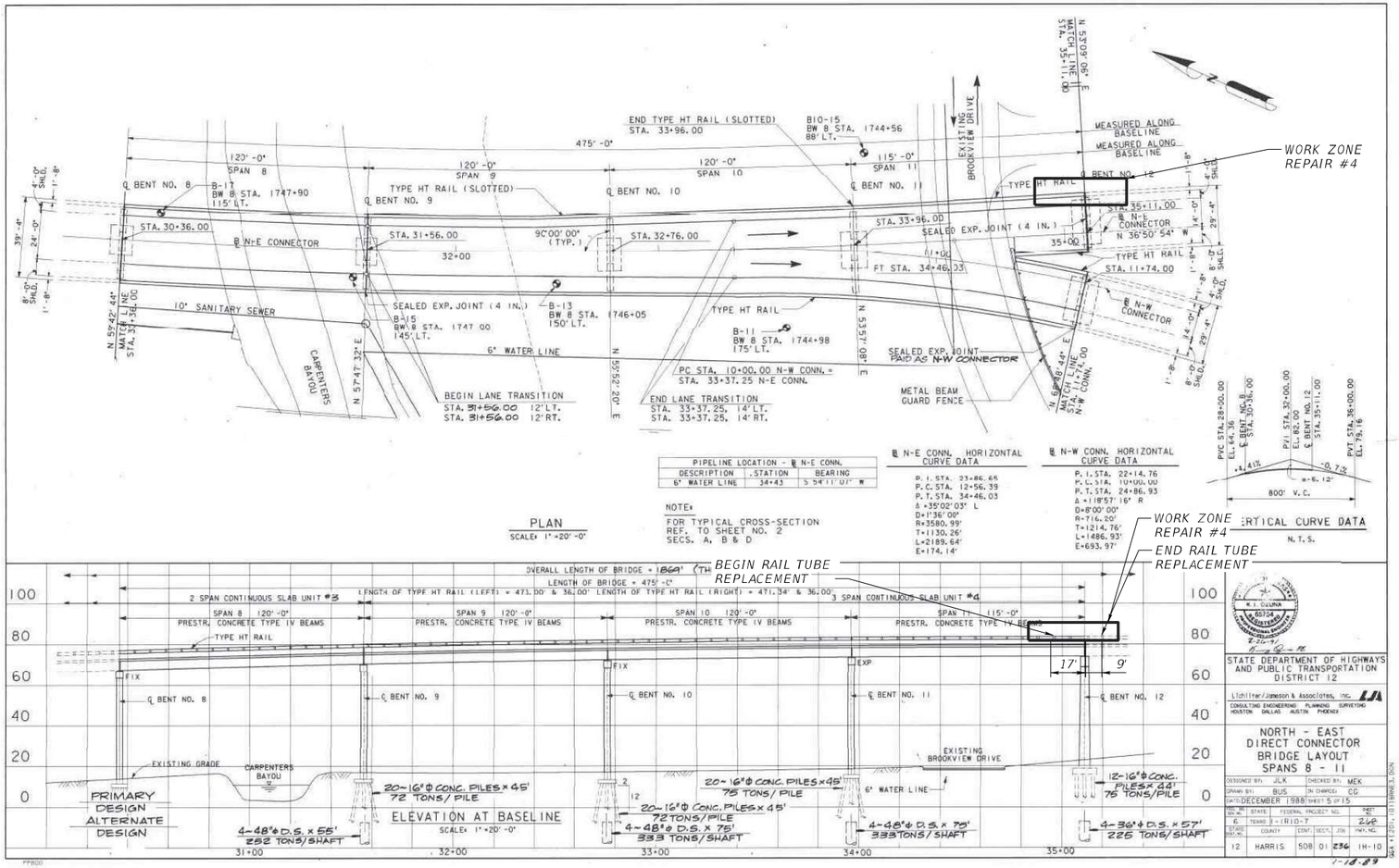
BRIDGE REPAIR DETAILS
JOINT REPAIR LOCATIONS

NBI# 12-102-0508-01-450

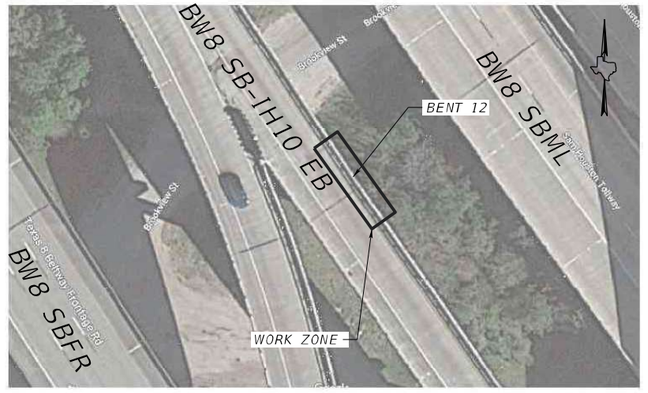
FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		46

ESTIMATED QUANTITIES

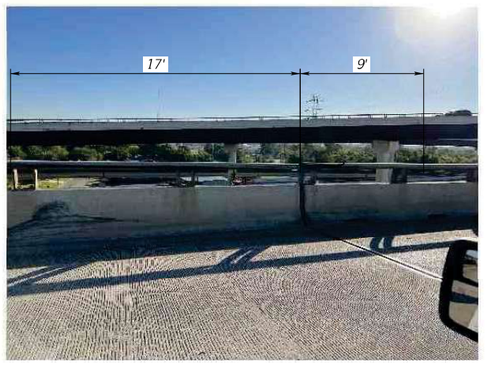
ITEM	DESCRIPTION	UNIT	QUANTITY
0776-6053	REPLACE (STEEL RAIL)	LF	26.0



BRIDGE LAYOUT - PLAN & ELEVATION VIEW



BRIDGE LOCATION- PLAN VIEW



EXISTING RAIL (TYPE T80HT) AT BENT 12 PHOTO - 9/28/2022

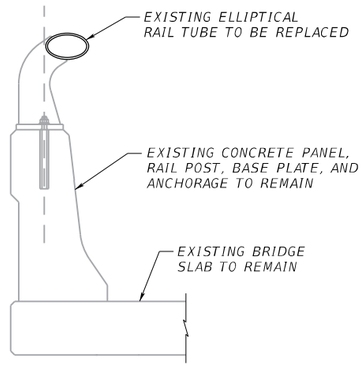
WORK ZONE REPAIR #4

GENERAL NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS PRIOR TO COMMENCING WORK.
2. SEE TYPE T80HT STANDARD FOR DETAILS NOT SHOWN.
3. SUBMIT SHOP DRAWINGS OF RAILING TO THE ENGINEER FOR APPROVAL. INCLUDE DETAILS FOR CONNECTION OF THE PROPOSED RAIL TO EXISTING RAIL.
4. REPAIR DAMAGED CONCRETE AS PER ITEM 429 AND THE TXDOT CONCRETE REPAIR MANUAL.
5. IF ANCHORS ARE DAMAGED, THE CONTRACTOR WILL SUBMIT A REPAIR DETAIL FOR APPROVAL. NEW ANCHORS WILL BE A TYPE III EPOXY AS PER DMS 6100. THIS WORK WILL BE CONSIDERED SUBSIDIARY.

CONSTRUCTION NOTES:

1. CUT EXISTING ELLIPTICAL TUBE TO LIMITS SHOWN.
2. CUT WELDS BETWEEN ELLIPTICAL TUBE AND RAIL POST.
3. BUTT WELD NEW ELLIPTICAL TUBE TO EXISTING TUBE.
4. INSERT SLEEVE MENBER INTO THE NEW TUBE AT SPLICE POINT. WELD NEW TUBE ONTO RAIL POSTS.



RAIL REPAIR DETAIL #4

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER
12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD, SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

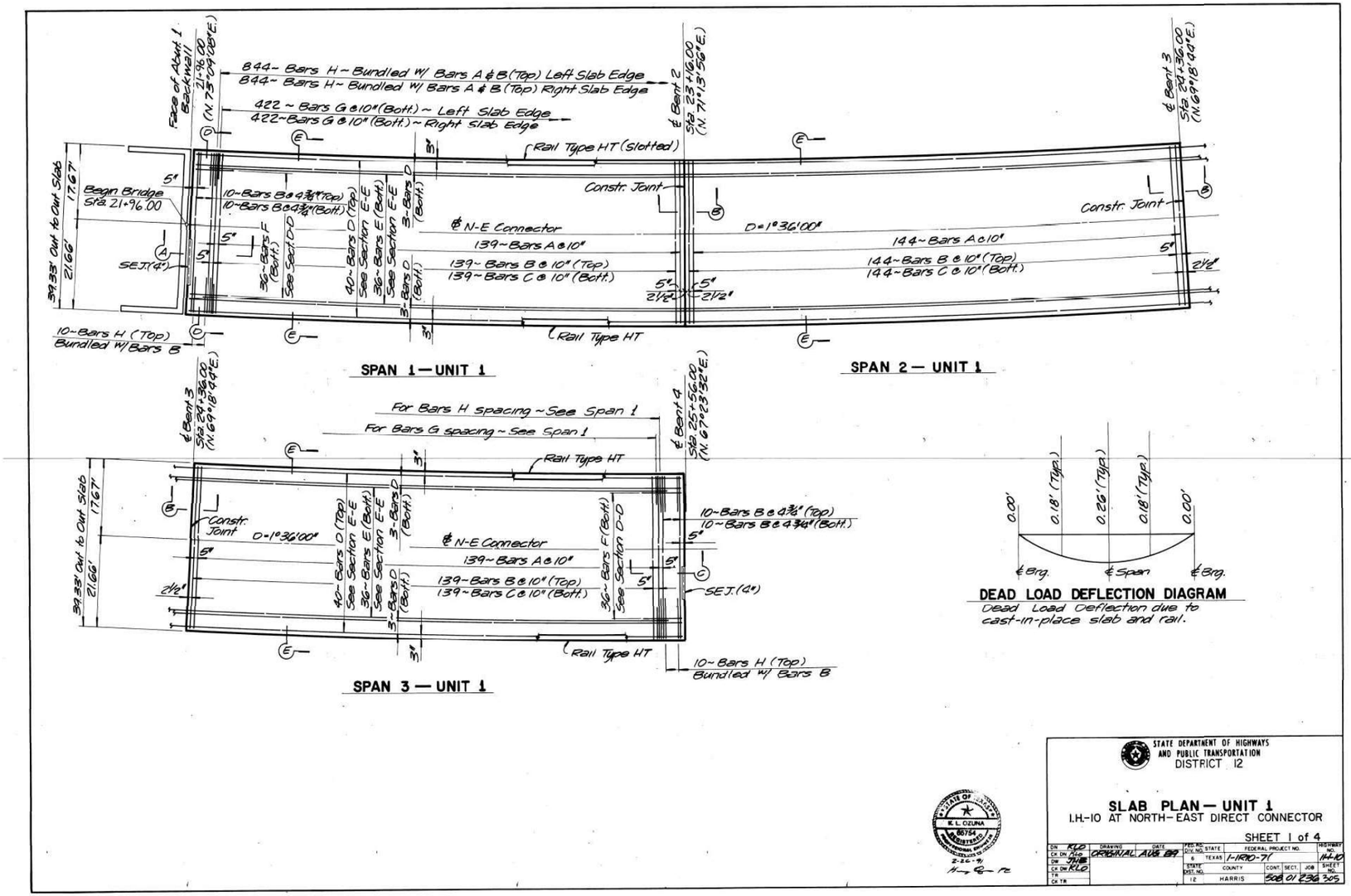
Texas Department of Transportation — Bridge Division

BW8 SB-IH10 EB

BRIDGE REPAIR DETAILS
RAIL REPAIR DETAILS

NBI# 12-102-0508-01-450

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		47



DEAD LOAD DEFLECTION DIAGRAM

Dead Load Deflection due to cast-in-place slab and rail.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

SLAB PLAN — UNIT 1

I.H.-10 AT NORTH-EAST DIRECT CONNECTOR

SHEET 1 of 4

DN	CK	DW	CK	DRAWING	DATE
KLO	JLO	JHB	KLO	ORIGINAL	AUG 89

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
6	TEXAS	I-10-3-71	IH-10

STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	SHEET NO.
12	HARRIS	508	01	236	305

K. L. OZUNA 66754 REGISTERED PROFESSIONAL ENGINEER
2-26-91

FOR CONTRACTORS INFORMATION ONLY
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STATE OF TEXAS
DELYNN HENRY
107399
LICENSED PROFESSIONAL ENGINEER

Delynn Henry

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

BW8 SB-IH10 EB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-450

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		48

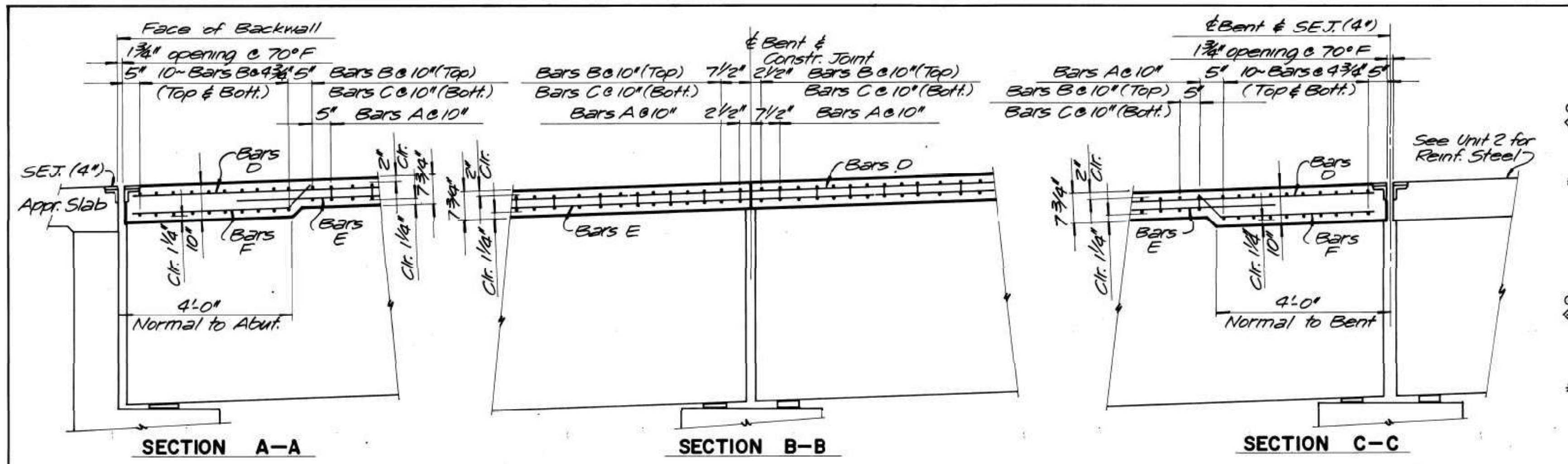
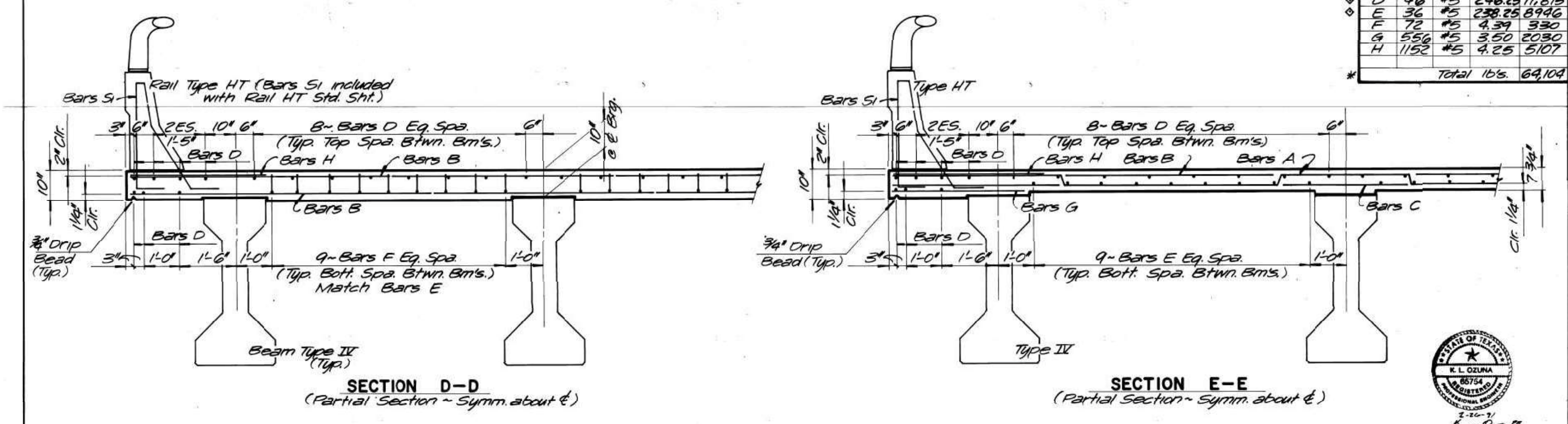
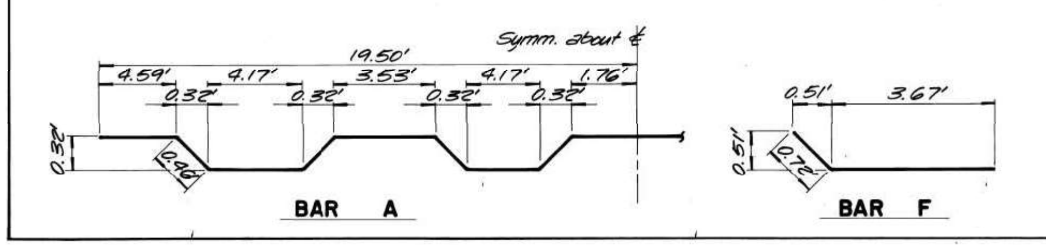


Table of Reinforcing Stl. Unit 1					
	Bar	No.	Size	Length	Weight
	A	422	#5	40.12	17,659
	B	462	#5	39.00	18,793
	C	422	#5	39.00	17,166
⊙	D	46	#5	367.17	17,616
◇	E	36	#5	358.25	13,452
	F	72	#5	4.39	330
	G	844	#5	3.50	3081
	H	1728	#5	4.25	7660
*				Total lb's.	95,757

Table of Reinforcing Stl. Unit 2					
	Bar	No.	Size	Length	Weight
	A	422	#5	40.12	17,659
	B	462	#5	39.00	18,793
	C	422	#5	39.00	17,166
⊙	D	46	#5	367.17	17,616
◇	E	36	#5	358.25	13,452
	F	72	#5	4.39	330
	G	844	#5	3.50	3081
	H	1728	#5	4.25	7660
*				Total lb's.	95,757

Table of Reinforcing Stl. Unit 3					
	Bar	No.	Size	Length	Weight
	A	278	#5	40.12	11,633
	B	318	#5	39.00	12,935
	C	278	#5	39.00	11,308
◇	D	46	#5	246.25	11,815
◇	E	36	#5	238.25	8946
	F	72	#5	4.39	330
	G	556	#5	3.50	2030
	H	1152	#5	4.25	5107
*				Total lb's.	64,104





Estimated Quantities				
Item	Unit	Quantities		
		Unit 1	Unit 2	Unit 3
Reinf. Conc. Slab	SF.	14,160	14,160	9439
Conc. Surf. Treat.	SY.	1440	1440	960

* Reinforcing Steel Quantities are for Contractor's information only
◇ Includes 5 ~ 1.25' laps (Alternate laps)
⊙ Includes 6 ~ 1.25' laps (Alternate laps)

K. L. OZUNA 65754 REGISTERED PROFESSIONAL ENGINEER
2-26-91

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

SLAB DETAILS - UNITS 1, 2 & 3
I.H.-10 AT NORTH-EAST DIRECT CONNECTOR

SHEET 4 of 4

DN	KLO	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			HIGHWAY NO.
CK DN	KLO	ORIGINAL	AUG. 89	6	TEXAS	I-IR10-71			IH-10
DW	JHB			STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	SHEET NO.
CK DW	KLO			12	HARRIS		508	01	236	308
TR									
CK TR									

FOR CONTRACTORS INFORMATION ONLY
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STATE OF TEXAS
DELYNN HENRY
107399
LICENSED PROFESSIONAL ENGINEER
Delynn Henry
12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation
Bridge Division

BW8 SB-IH10 EB

BRIDGE REPAIR DETAILS
AS-BUILTS
NBI# 12-102-0508-01-450

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST		COUNTY	SHEET NO.
	HOU		HARRIS	49

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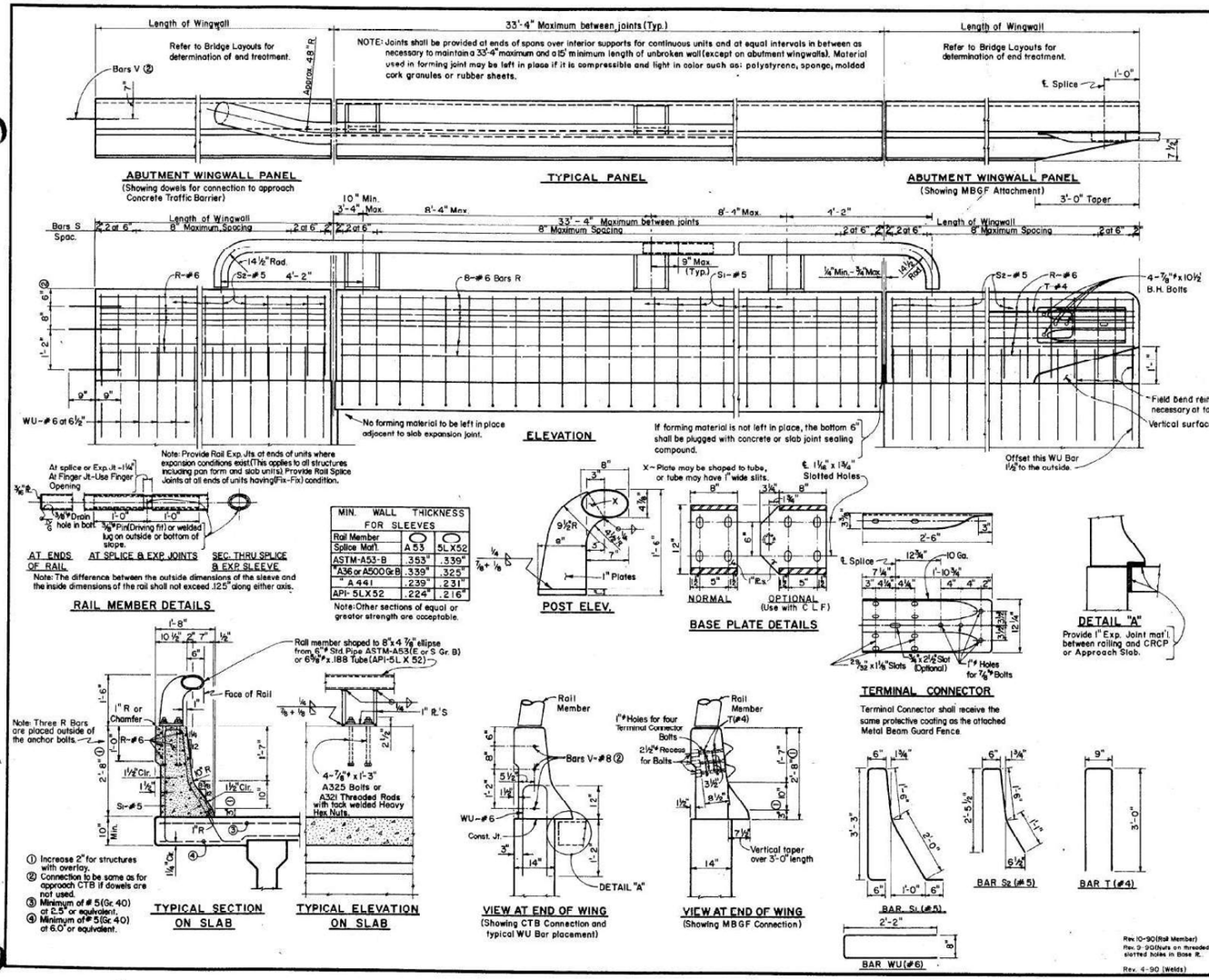

GENERAL NOTES:

This rail has been successfully evaluated by a full scale impact test conducted with an 80,000 lb. van-type truck impacting at 14.5 degrees and 48.4 mph. Test documentation may be found in Research Report 416-1, "Concrete Safety Shape With Metal Rail On Top To Redirect 80,000 lb. Trucks," Texas Transportation Institute, December 1984.

All parts of the railing including steel railing, concrete parapet wall, reinforcing, terminal connector, bolts, nuts, and washers are included in the price bid per linear foot of Type HT Rail.

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

All concrete for railing shall be Class "C".

All reinforcing steel shall be Grade 60. Welded Wire Fabric will not be permitted in this rail.

Dimensions relating to reinforcing steel are to centers of bars except as shown.

The back of railing shall be vertical unless otherwise shown in plans.

Metal Beam Guard Fence or Concrete Traffic Barrier is usually attached to the abutment wingwall panel. See plan sheet for details. The splice between the approach guard fence and the terminal connector shall be with the normal eight bolts. The dowel connection to the approach traffic barrier shall be grouted the same as other barrier joints.

The Heavy Truck Rail may also terminate on the structure if safety considerations so allow, in which case it will have normal traffic railing such as T501 adjacent to the ends. See Bridge Layouts for limits.

Shop drawings will not be required for this rail, however, erection drawings showing panel lengths, rail post spacing, and anchor bolt setting shall be submitted to the Resident Engineer for approval.

This railing may be constructed with slip-forms with equipment approved by the Engineer. Sensor control for both line and grade must be provided. When slip-forming is used, the concrete may be cured with membrane curing compound.

Additional reinforcing may be tack welded to the upper two-thirds of the reinforcing cage to provide bracing when slip-forming is used. Additional anchorage devices may be added when welding is necessary in the lower one-third of the cage. Do not weld to U or S bars in the lower one-third of the cage.

Panel lengths of tube members shall be attached continuously to a minimum of three posts.

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STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

HEAVY TRUCK BARRIER RAIL

TYPE HT

ORIGINAL DRAWING DATE OCT. 1985	STATE	FEDERAL AID NUMBER	FEDERAL AID PROJECT ID	SHEET
REVISIONS	12	6	I-TRIO-7( ) etc. 479	
DR.:-JJP Rev. 1-86 (Rail member at wings)	DISTRICT	COUNTY	CONTROL	JOB
CK.:- 5-87 (Back Dim.)	HARRIS		508 01	236 IH 10
DW.:-EDS Rev. 9-87 (Sec. on Slab)				
CK.:- Rev. 1-90 (Bars #8) 3-90 (Bar WU)				

DELYNN HENRY
107399
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

BW8 SB-IH10 EB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-450

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		50

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BRIDGE DIVISION

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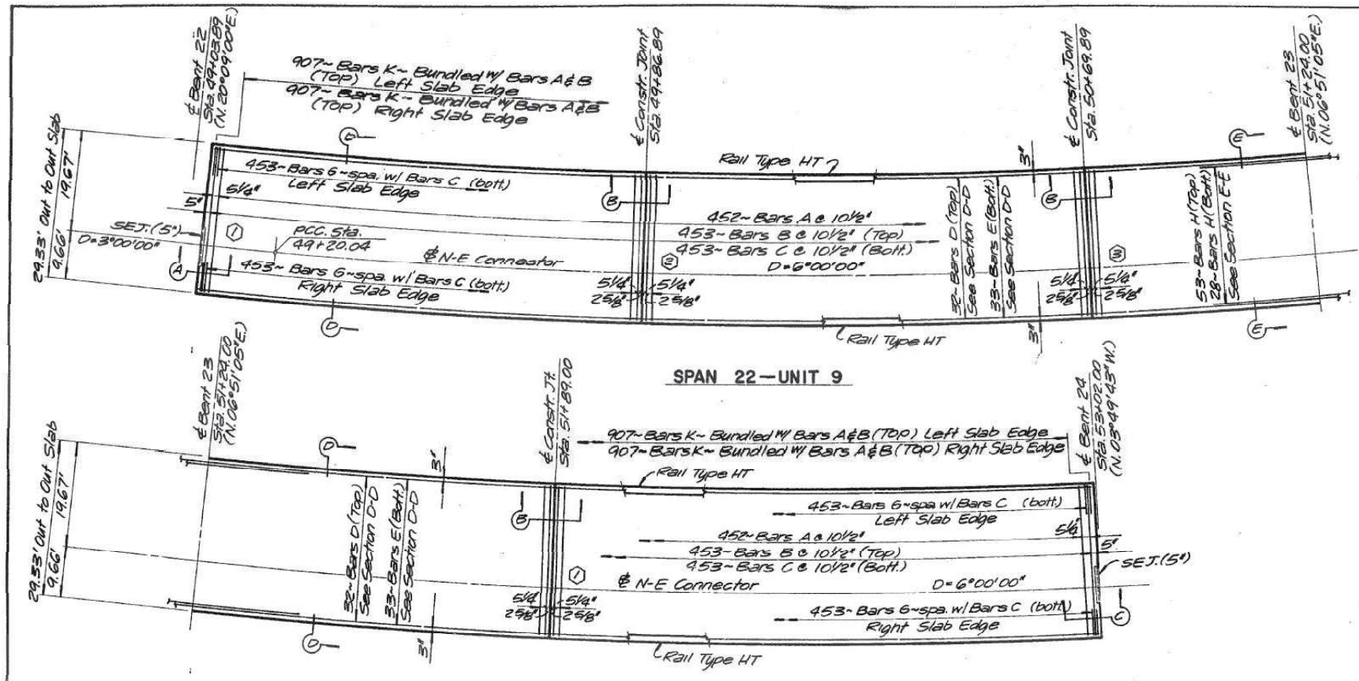
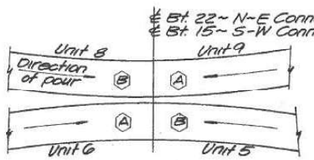


℄ Bt. 22~ N-E Connector
℄ Bt. 15~ S-W Connector



Slabs for each unit shall be poured in the direction of the arrows.
If continuous placement is used the slab shall be poured at a rate of 40 L.F. of deck per hour, in the direction shown.
Ⓐ Unit 9 (N-E Conn.) and Unit 6 (S-W Conn.) shall be poured first.
Ⓑ Unit 8 (N-E Conn.) and Unit 5 (S-W. Conn.) shall be poured second.

Note:
① Indicates pouring sequence

Rev. 6-27-90

673

K. L. OLIVINA 85754 3-2-90

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

SLAB PLAN—UNIT 9
I.H.-10 AT NORTH-EAST DIRECT CONNECTOR

SHEET 2 of 5

DN: KLO	DRAWING	DATE
CK: DW: JAB	ORIGINAL	AUG. 89
CK: DW: KLO		
CK: TR:		

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
6	TEXAS	I-IH10-7(257)782	N-P
STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
12	HARRIS	6433 62 001	673

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STATE OF TEXAS
DELYNN HENRY
107399
LICENSED PROFESSIONAL ENGINEER

Delynn Henry

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
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SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

BW8 SB-IH10 EB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-450

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
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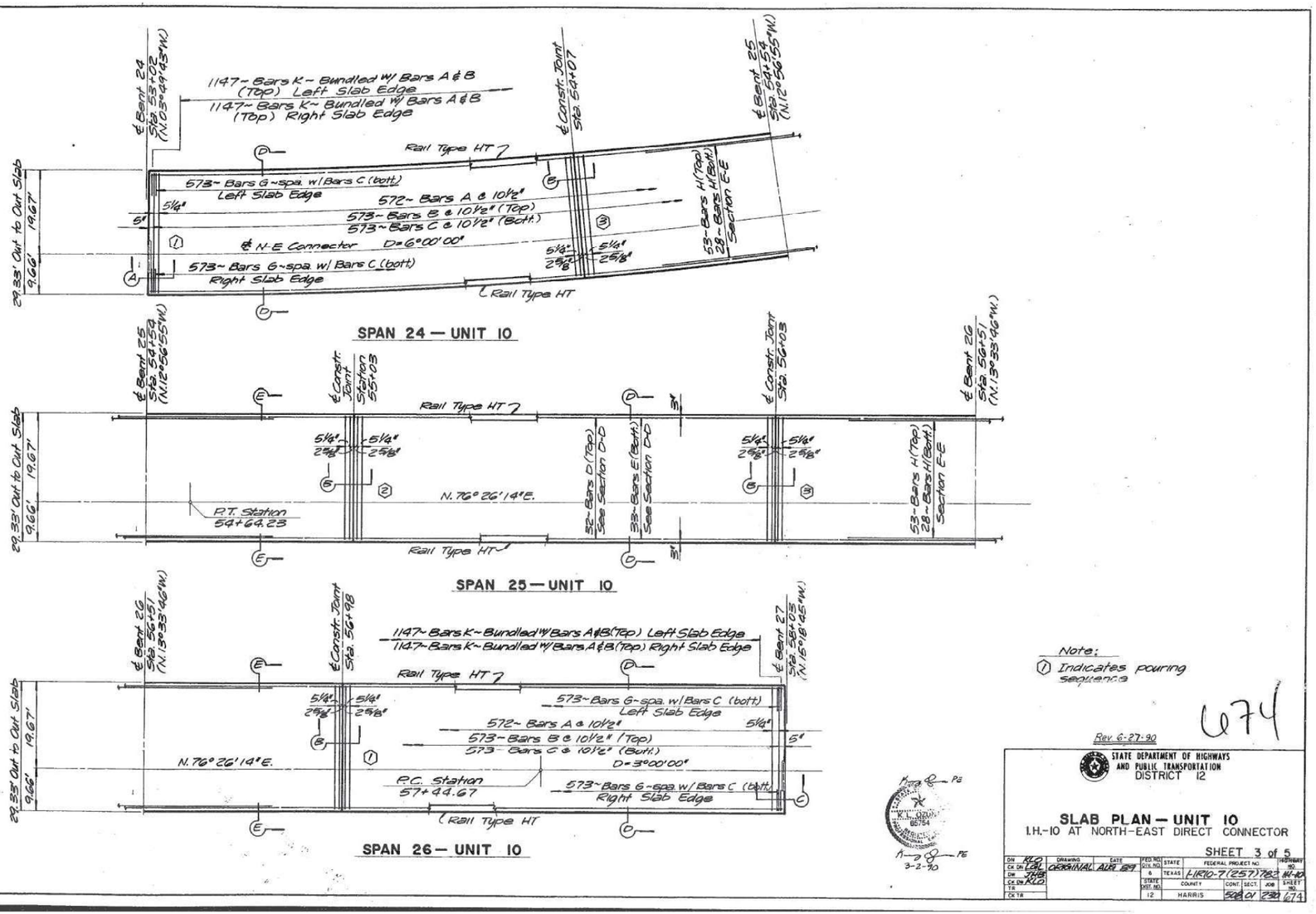

Note:
(1) Indicates pouring sequence

674

Rev. 6-27-90

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

SLAB PLAN — UNIT 10
I.H.-10 AT NORTH-EAST DIRECT CONNECTOR

SHEET 3 of 5

DN: KLD	DRAWING	DATE	FED. RO. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
CK. DN: LRL	ORIGINAL	AUG '89	6	TEXAS	I-(IH)10-7(257)783	IH-10
DW: JHB			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK. DN: KLD			12	HARRIS	508 01 238	674
TR:						
CK. TR:						

3-2-90

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DELYNN HENRY
107399
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PROFESSIONAL ENGINEER

Delynn Henry

12/21/2022

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SUIT 500, HOUSTON TX 77024
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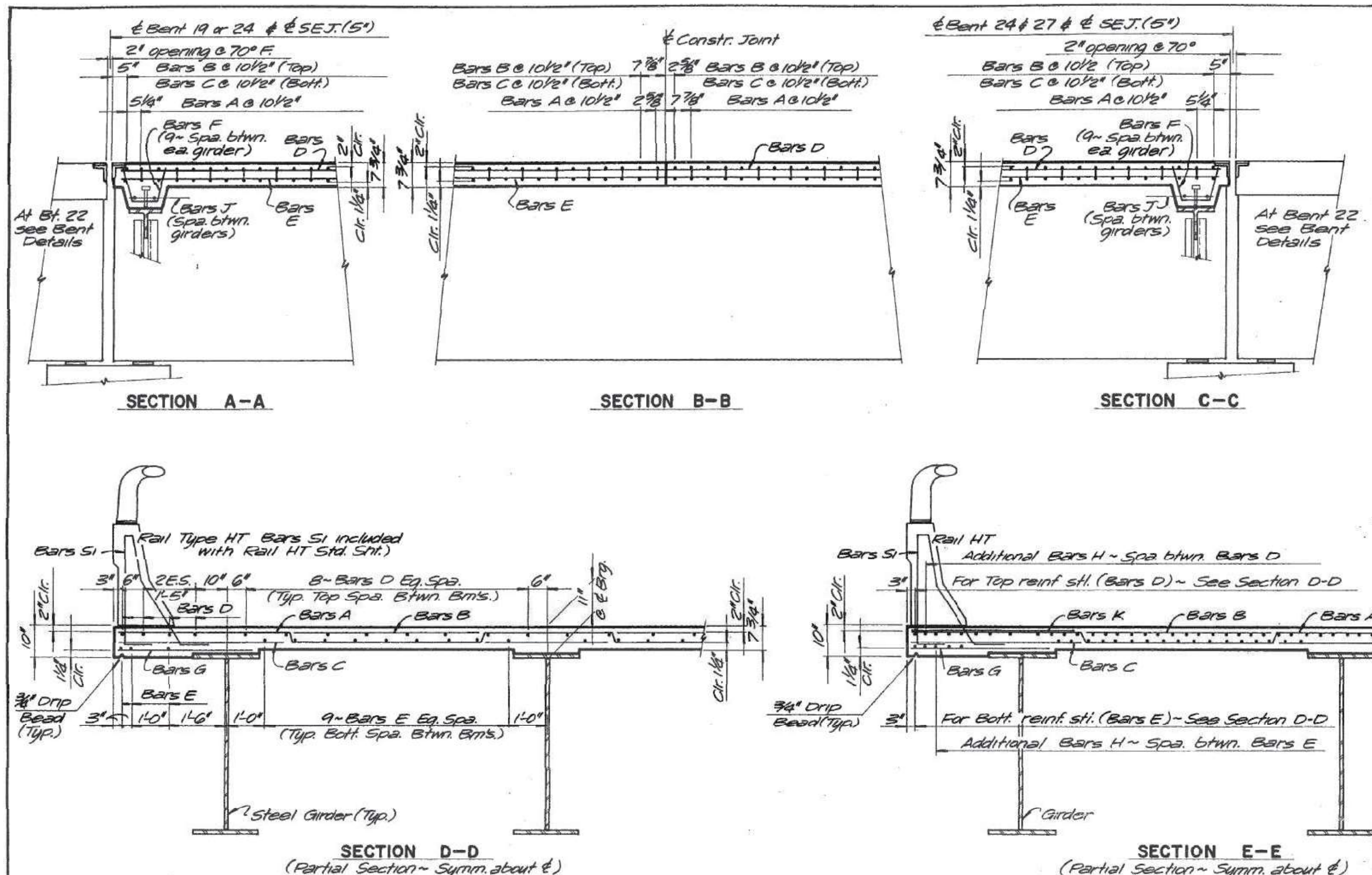
Texas Department of Transportation — Bridge Division

BW8 SB-IH10 EB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-450

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		52

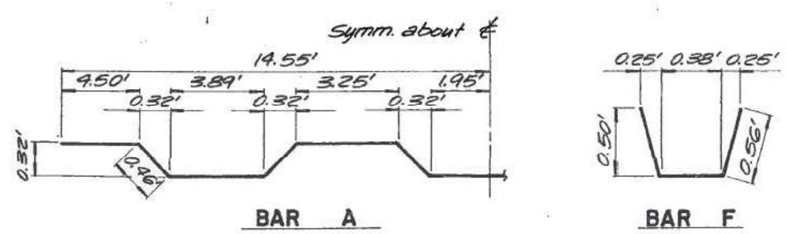


All Reinforcing Steel shall be Grade 60
The use of Precast Concrete Panels are *not* permitted.

Table of Reinforcing Stl. Unit 8					
	Bar	No.	Size	Length	Weight
	A	689	#5	29.94	21,516
	B	690	#5	29.00	20,870
	C	690	#5	29.00	20,870
⊙	D	32	#5	615.31	20,537
⊙	E	33	#5	615.31	21,178
	F	54	#5	1.50	84
	G	1380	#5	3.50	5038
	H	162	#6	60.00	14,599
	J	12	#5	6.44	81
	K	2764	#5	4.25	12,973
*				Total lb's	137,746

Table of Reinforcing Stl. Unit 9					
	Bar	No.	Size	Length	Weight
	A	452	#5	29.94	14,115
	B	453	#5	29.00	13,702
	C	453	#5	29.00	13,702
⊡	D	32	#5	403.53	13,468
⊡	E	33	#5	403.53	13,889
	F	54	#5	1.50	84
	G	906	#5	3.50	3307
	H	81	#6	60.00	7300
	J	12	#5	4.95	62
	K	1814	#5	4.25	8041
*				Total lb's.	87670

Table of Reinforcing Stl. Unit 10					
	Bar.	No.	Size	Length	Weight
	A	572	#5	29.94	17,862
	B	573	#5	29.00	17,332
	C	573	#5	29.00	17,332
▽	D	32	#5	510.67	17,044
▽	E	33	#5	510.67	17,577
	F	54	#5	1.50	84
	G	1146	#5	3.50	4183
	H	162	#6	60.00	14,599
	J	12	#5	5.95	74
	K	2294	#5	4.25	10,767
*				Total lb's.	116,854



Estimated Quantities				
Item	Unit	Quantities		
		Unit 8	Unit 9	Unit 10
Reinf. Conc. Slab	SF.	17,675	11,611	14,694
Conc. Surf. Treat	SY.	1740	1193	1447

* Reinforcing Steel Quantities are for Contractor's information only.
⊡ Includes 6 ~ 1.25' laps (Alternate laps)
▽ Includes 8 ~ 1.25' laps (Alternate laps)
⊙ Includes 10 ~ 1.25' laps (Alternate laps)

K.L. OZUNA 65754 REGISTERED PROFESSIONAL ENGINEER
PE 3-2-90

Rev. 6-27-90

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

676

SLAB DETAILS - UNITS 8, 9 & 10
I.H.-10 AT NORTH-EAST DIRECT CONNECTOR

SHEET 5 of 5

DN	KLO	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			HIGHWAY NO.
CK DN	TGL	ORIGINAL	AUG. 89	6	TEXAS	I-IR10-7(257) 782			IH-10
DW	JHB			STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	SHEET NO.
CK DN	KLO			12	HARRIS		508	01	230	676
TR									
CK TR									

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DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER
Delynn Henry
12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation
Bridge Division

BW8 SB-IH10 EB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-450

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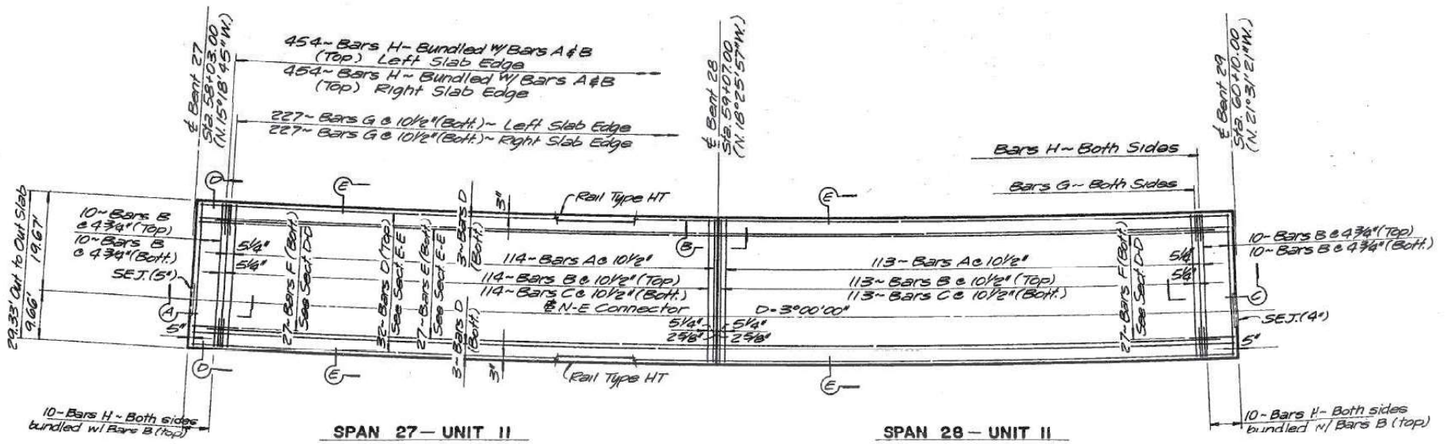

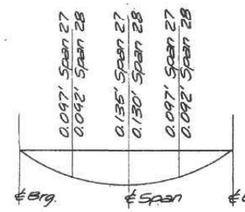

DEAD LOAD DEFLECTION DIAGRAM

Dead Load Deflection due to cast-in-place slab and rail.

677

Rev. 6-27-90

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

SLAB PLAN — UNIT II
I.H.-10 AT NORTH-EAST DIRECT CONNECTOR

SHEET 1 of 3

DN: KLO	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
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DW: KLO			STATE DIST. NO.	COUNTY	CONT. SECT. JOB	SHEET NO.
CK: DW: KLO			12	HARRIS	6336 01 230	077
TR:						
CK: TR:						

K. L. OBUNA 65754 REGISTERED PROFESSIONAL ENGINEER
3-2-90

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Texas Department of Transportation — Bridge Division

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BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-450

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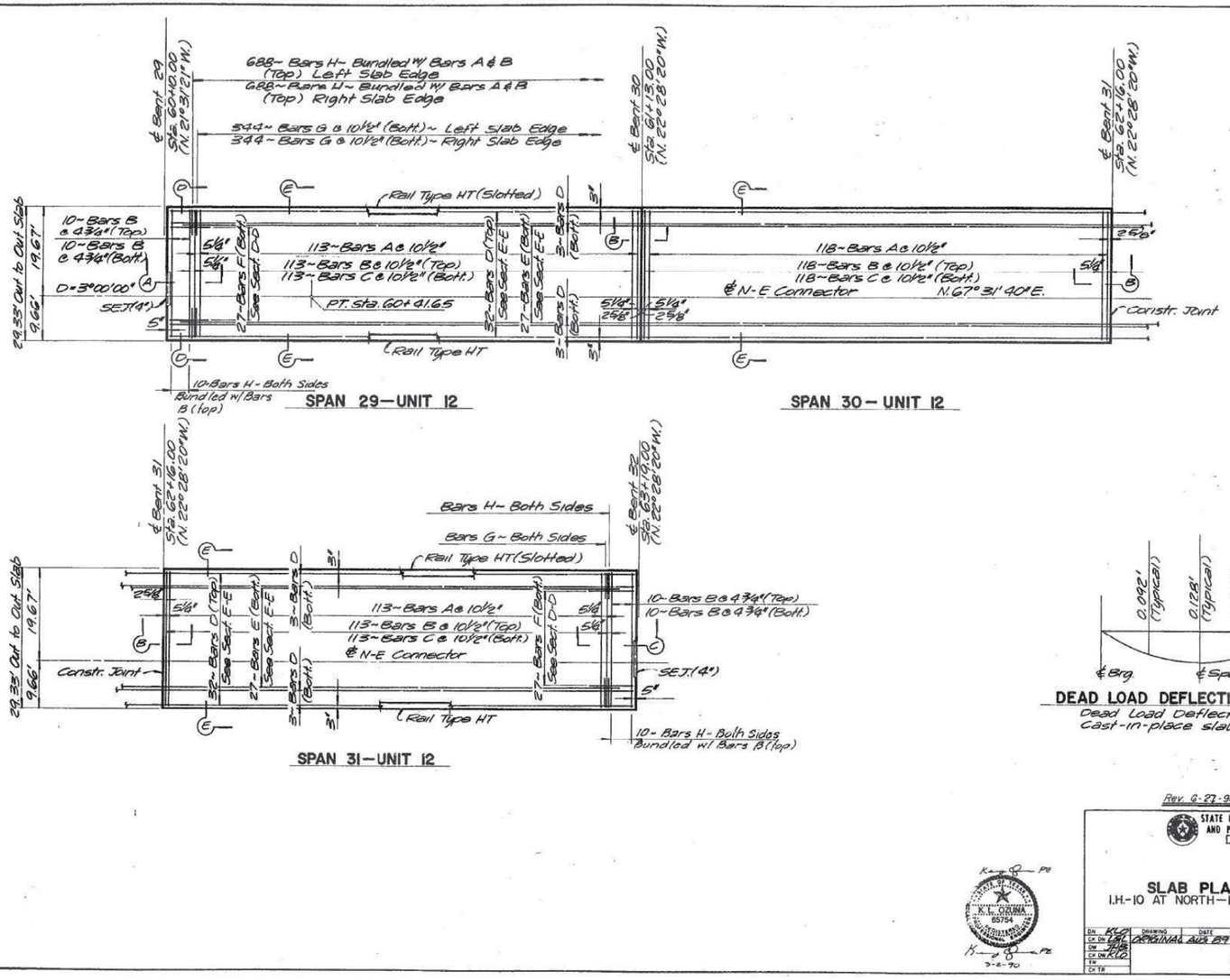

Rev. 6-27-90

678

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

SLAB PLAN—UNIT 12
I.H.-10 AT NORTH—EAST DIRECT CONNECTOR

SHEET 2 of 3

DN: KLO	DRAWING	DATE
CK: DW:	ORIGINAL	AUG '89
CK: DW: KLO		
CK: TR:		

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
6	TEXAS	I-IRIO-7(257) 782	IH-10
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	SHEET NO.
12	HARRIS	5081	01	230	678

K. L. OLIVA 65754 LICENSED PROFESSIONAL ENGINEER
K. L. Oliva P.E.
9-6-90

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DELYNN HENRY
107399
LICENSED PROFESSIONAL ENGINEER
Delynn Henry
12/21/2022

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Texas Department of Transportation — Bridge Division

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BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-450

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	DIST	COUNTY		SHEET NO.
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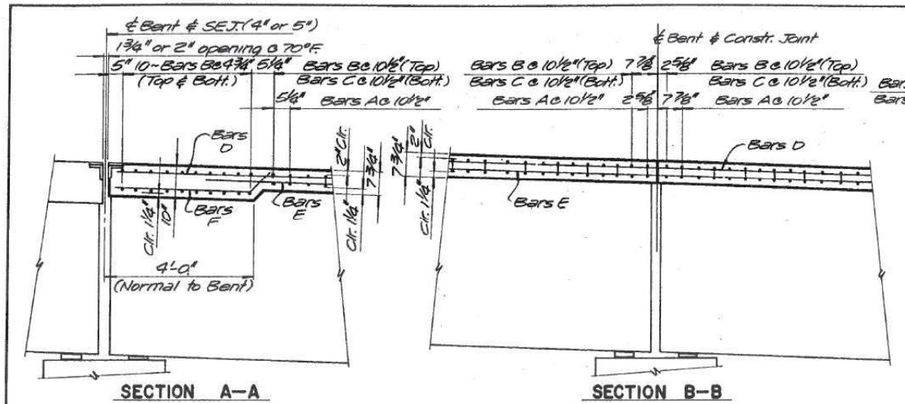
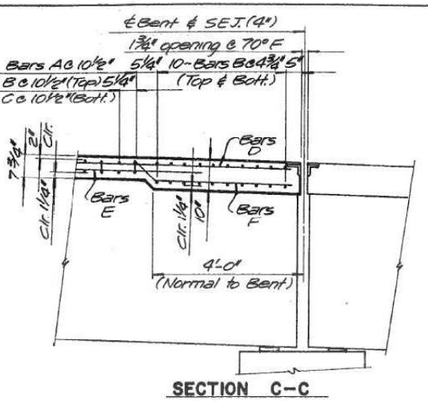


SECTION A–A

SECTION B–B



SECTION C–C

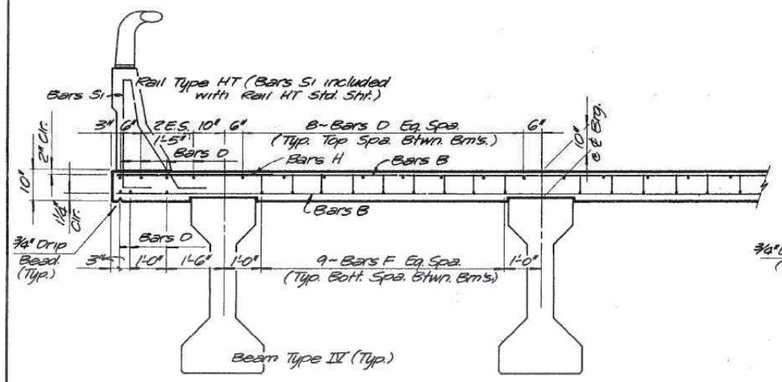
Table of Reinforcing Sh. Unit 11

Bar	No.	Size	Length	Weight
A	227	#5	29.94	7089
B	227	#5	29.00	6866
C	227	#5	29.00	6866
D	38	#5	210.42	8340
E	27	#5	205.35	5780
F	54	#5	4.39	247
G	454	#5	3.50	1657
H	948	#5	4.25	4202
*			Total lbs.	41047

Table of Reinforcing Sh. Unit 12

Bar	No.	Size	Length	Weight
A	344	#5	29.94	10,742
B	344	#5	29.00	10,405
C	344	#5	29.00	10,405
D	38	#5	314.92	12,482
E	27	#5	309.75	8723
F	54	#5	4.39	247
G	688	#5	3.57	2572
H	1416	#5	4.25	6277
*			Total lbs.	61,793

All Reinforcing Steel shall be Grade 60.



SECTION D–D
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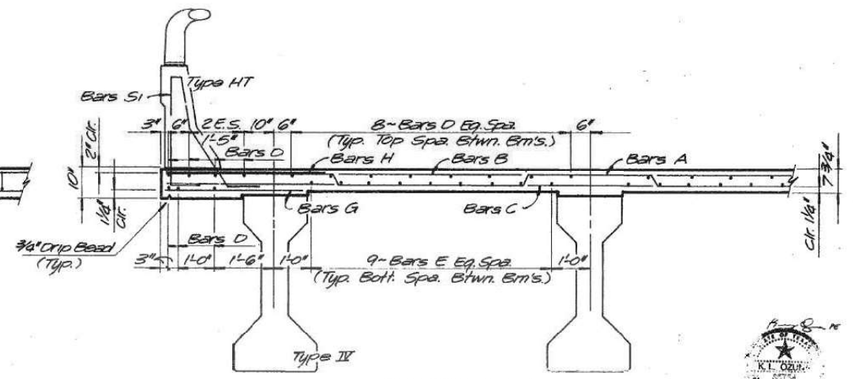

SECTION E–E
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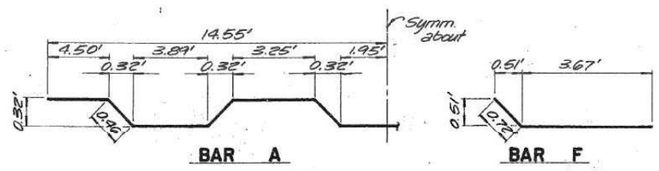

BAR A BAR F

Estimated Quantities

Item	Unit	Quantities Unit 11	Quantities Unit 12
Reinf. Conc. Slab	SF.	6071	9063
Conc. Surf. Treat	SY.	598	893

* Reinforcing Steel Quantities are for Contractor's information only.
⊙ Includes 3~1.25' laps (Alternate laps)
⊡ Includes 5~1.25' laps (Alternate laps)
TP3 use of Precast Concrete Panels are not permitted.

Rev. 6-25-90 (23)

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

679

SLAB DETAILS—UNITS 11 & 12
I.H.-10 AT NORTH-EAST DIRECT CONNECTOR

SHEET 3 of 3

ON	KLO
CK CH	GAL
DR	JHB
CK DR	KLO
TR	
CK TR	

DRAWING: ORIGINAL AUG 89

FED. ROAD DIV. NO.	STATE	FEDERAL PROJECT NO.	HIGHWAY NO.
6	TEXAS	I-610-7(657)782	IH-10
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	SHEET NO.
12	HARRIS	6433	62	001	679

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STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER
12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

BW8 SB-IH10 EB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-450

FILE:	DN:	CK:	DW:	CK:
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REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		56

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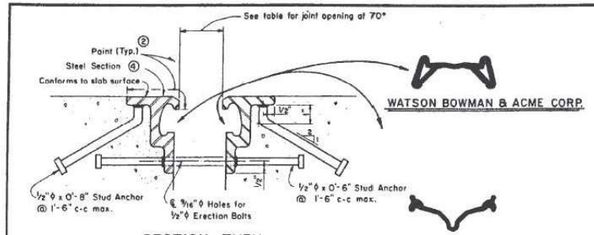
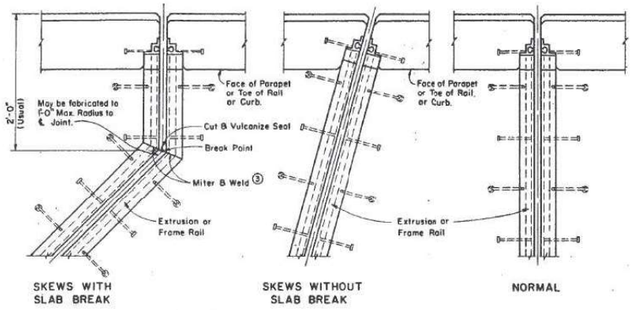


SECTION THRU
WATSON BOWMAN & ACME CORP.
STRUCTURAL ACCESSORIES INC.
D S BROWN COMPANY
BRG INDUSTRIES INC.

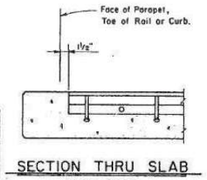


PLANS–END CONDITIONS

MANUFACTURER	STEEL SECTION④	NEOPRENE STRIP SEAL 3" JOINT Seal Type	3" JOINT Joint Opening	4" JOINT Seal Type	4" JOINT Joint Opening	5" JOINT SEAL TYPE	5" JOINT JOINT OPNG.
Watson Bowman & Acme Corp.	Type M Extrusion	S300	1.75	S400	1.75	—	—
Structural Accessories Inc.	Type SC11 Extrusion	400S	1.75	500S	1.75	—	—
D S Brown	Frame Rail SSCM	300L	1.75	400L	1.75	85500	3.00
BRG Industries Inc.	Type W*	BS300	1.75	BS400	1.75	—	—

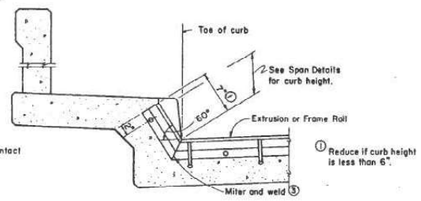
④ Shape of extrusion shown is typical. Variations depending on manufacturer are permissible.

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



SECTION THRU SLAB
(HIGH SIDE)

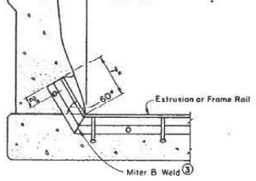
② Clean and paint with Prime Coat in accordance with the item "Cleaning, Paint, and Painting."



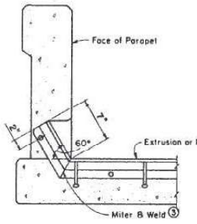
③ Remove all burrs which will be in contact with seal prior to making splice.

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. 6-27-96
Rev. 11-88 (Seal-DS Brown)
Rev. 5-88 (Paint)

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 diaphrams. Cost of temporary bracing is to be included in the price bid for Sealed Exp. Jt.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

SEALED EXPANSION JOINT DETAILS

WITHOUT OVERLAY

10 12

(MOD.) DISTRICT 12 SEJ-S(I)

ORIGINAL DRAWING DATE: MARCH 1983	REVISIONS	STATE	FEDERAL AID PROJECT	SHEET
DN: THD		12	6 I-IH10-7(257)782	1012
CK: THD	Rev. 8-84 Rev. I-87 (SCII)			
DW: DRG	Rev. 10-85 Rev. I-6-88 (Stud Spc.)	COUNTY	CONTROL SECT. JOB	HIGHWAY
CK: JCW	Rev. 11-89 Rev. 3-88 (Add BRG Industries Inc.)	HARRIS	6201 233H-10	

FOR CONTRACTORS INFORMATION ONLY
The seal appearing on this sheet covers only the repair details, not the original design.

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

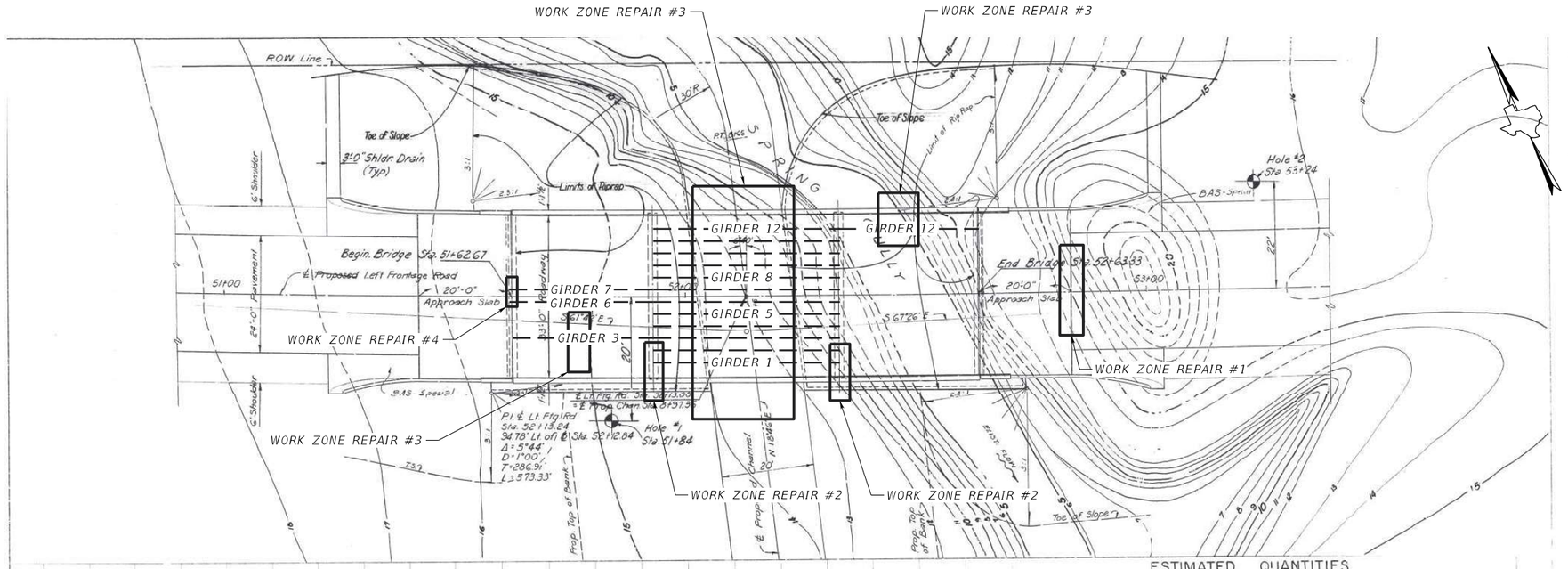
Texas Department of Transportation — Bridge Division

BW8 SB-IH10 EB

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-01-450

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		57



LEGEND FOR TEST HOLES

Letter	Symbol	Classification
S		Sands, little or no fines
SM		Silty sands, sand-silt mixtures
SC		Clayey sands, sand-clay mixtures
CL		Sandy clays, silty clays, lean clays
CH		Inorganic clays of high plasticity, fat clays
		Calcareous nodules
BS		Sandstone

ESTIMATED QUANTITIES

DECRIPTION	UNCL STR EXC (BRIDGE) CY	16" CONC PILING LF	CLASS A CONC PAN GIRDERS CY	CLASS A CONC BENTS CY	REINF STEEL LB	PARAPET RAILING TYPE T2 LF	RIP RAP CONC (CLASS B) CY
2-Abutment Bents	16	224		14.4	2,070	26.0	
2-Interior Bents		360		12.0	1,726		
2-30.333' Conc Slab & Girder Spans			83.4		19,956	121.4	
1-40.000' Conc Slab & Girder Span			67.8		14,018	80.0	
TOTALS	16	584	151.2	26.4	37,770	227.4	109

BRIDGE LAYOUT - PLAN & ELEVATION VIEW

STATE OF TEXAS
DELYNN HENRY
107398
LICENSED PROFESSIONAL ENGINEER

Delynn Henry

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation

Bridge Division

SPUR 330 WBFR AT SPRING GULLY

BRIDGE REPAIR DETAILS SPALLING REPAIR LOCATIONS

NBI# 12-102-0508-07-198

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		58

CHECKED C.W. | TEXAS | C-508-7-4 | SP330
DRAWN L.M. | FED. RD. DIST. NO. | PROJECT NO. | SHEET NO.
QUANTITIES | STATE DIST. NO. | COUNTY | CONTROL | SECT. NO. | JOB NO. | SHEET NO.
12 | HARRIS | 508 | 7 | 4 | 21

BRIDGE LOCATION - PLAN VIEW

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

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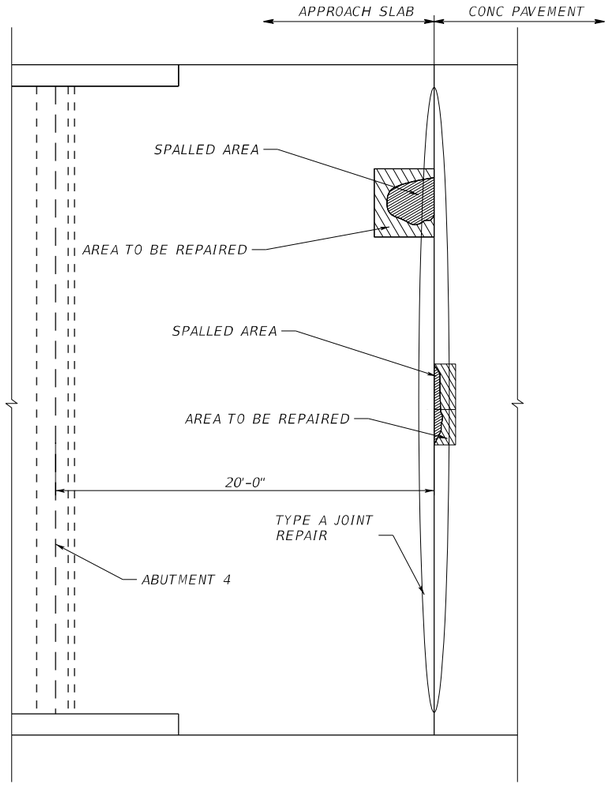
Texas Department of Transportation — Bridge Division

SPUR 330 WBFR AT SPRING GULLY

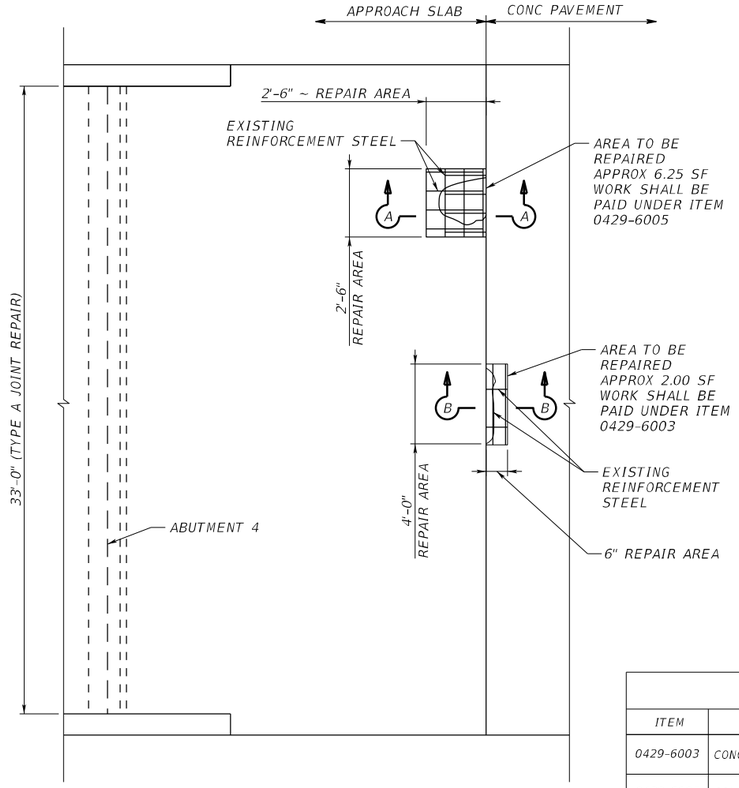
BRIDGE REPAIR DETAILS
SPALLING REPAIR LOCATIONS

NBI# 12-102-0508-07-198

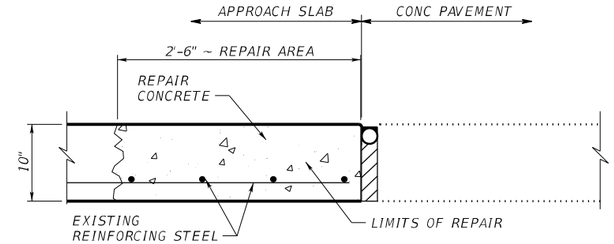
FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		59



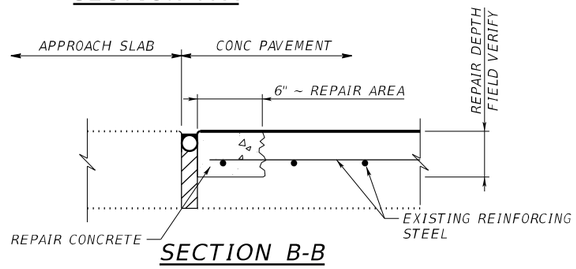
EAST APPROACH SLAB REPAIR OVERVIEW



EAST APPROACH SLAB REPAIR DETAILS



SECTION A-A



SECTION B-B

CONSTRUCTION NOTES: SPALLS REPAIR

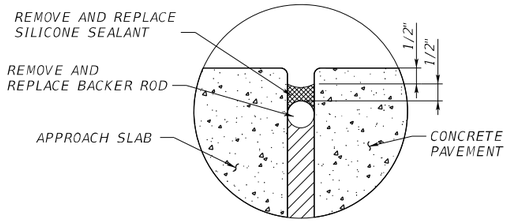
1. SAW-CUT REPAIR PERIMETER 1/2" DEEP TO ELIMINATE FEATHERED EDGES. REPAIR MATERIAL SHOULD BE APPLIED IN DEPTHS NO LESS THAN 1/2". DO NOT CUT THE EXISTING REINFORCING STEEL.
2. REMOVE DAMAGED CONCRETE USING A HAMMER (15 LB MAX) AND ENSURE THAT THE REMAINING DECK IS SOUND. PROVIDE A UNIFORMLY ROUGH SURFACE WITH A CHIPPED APPEARANCE (1/4" MINIMUM SURFACE PROFILE OR ICRI CONCRETE SURFACE PROFILE 9).
3. ENSURE A MINIMUM CLEARANCE OF 3/4" BELOW EXISTING LAYER OF STEEL.
4. USE ABRASIVE BLASTING TO REMOVE RUST FROM EXPOSED STEEL SURFACES.
5. PRIOR TO APPLYING MATERIAL WATER BLAST CONCRETE SURFACE TO PROVIDE A SSD CONDITION.
6. THE SURFACE SHOULD BE DAMP WITH NO STANDING WATER PRIOR TO APPLYING REPAIR MATERIAL.
7. USE CLASS K CONCRETE REPAIR MATERIAL AND PLACE IT ONTO THE PREPARED SURFACES.
8. ALL REPAIR SHALL BE DONE IN ACCORDANCE TO ITEM 429 "CONCRETE STRUCTURE REPAIR" AND THE TXDOT "CONCRETE REPAIR MANUAL".

MATERIAL NOTES:

USE CLASS K CONCRETE WITH MINIMUM CONCRETE STRENGTH OF 3,600 PSI AT 24 HOURS. OTHER CONCRETE CRITERIA MAY BE REQUIRED AS DIRECTED BY THE ENGINEER. A MIX DESIGN SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL AND TESTING OF THE CONCRETE SHALL BE DONE PRIOR TO BEGINNING WORK.

GENERAL NOTES:

MEASUREMENTS AND LOCATION SHOWN ON REPAIR DETAILS ARE APPROXIMATE. CONTRACTOR TO VERIFY EXACT LOCATION OF REPAIR AND ADJUST AS REQUIRED.



TYPE A JOINT REPAIR DETAIL

TYPE A JOINT REPAIR NOTES:

1. REMOVE EXISTING SILICONE SEALANT AND BACKER ROD.
2. CLEAN GAP AND CONCRETE SURFACE, MAKE SURE THE CONCRETE SURFACE IS FREE OF ANY DEBRIS.
3. INSTALL BACKER ROD AND SILICONE SEALANT IN ACCORDANCE WITH DETAIL "TYPE A JOINT DETAIL" ON SHEET CS-MD AND IN ACCORDANCE WITH ITEM 438 "CLEANING AND SEALING JOINTS.
4. EXTEND SEALANT UP INTO CURB 3" ON LOWER SIDE OF THE DECK.
5. ALL WORK SHOWN IN THE "TYPE A JOINT REPAIR DETAIL" IS INCLUDED IN THE UNIT PRICE FOR ITEM 438-6001 AND ALL RELATED WORK SHALL BE CONSIDERED SUBSIDIARY.

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
0429-6003	CONC STR REPAIR (DECK REP (PART DEPTH))	SF	2
0429-6005	CONC STR REPAIR (DECK REP (FULL DEPTH))	SF	6.25
0438-6001	CLEANING AND SEALING EXISTING JOINTS	LF	33

EAST APPROACH RELIEF JOINT PHOTO - 10/13/2020

WORK ZONE REPAIR #1

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

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818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

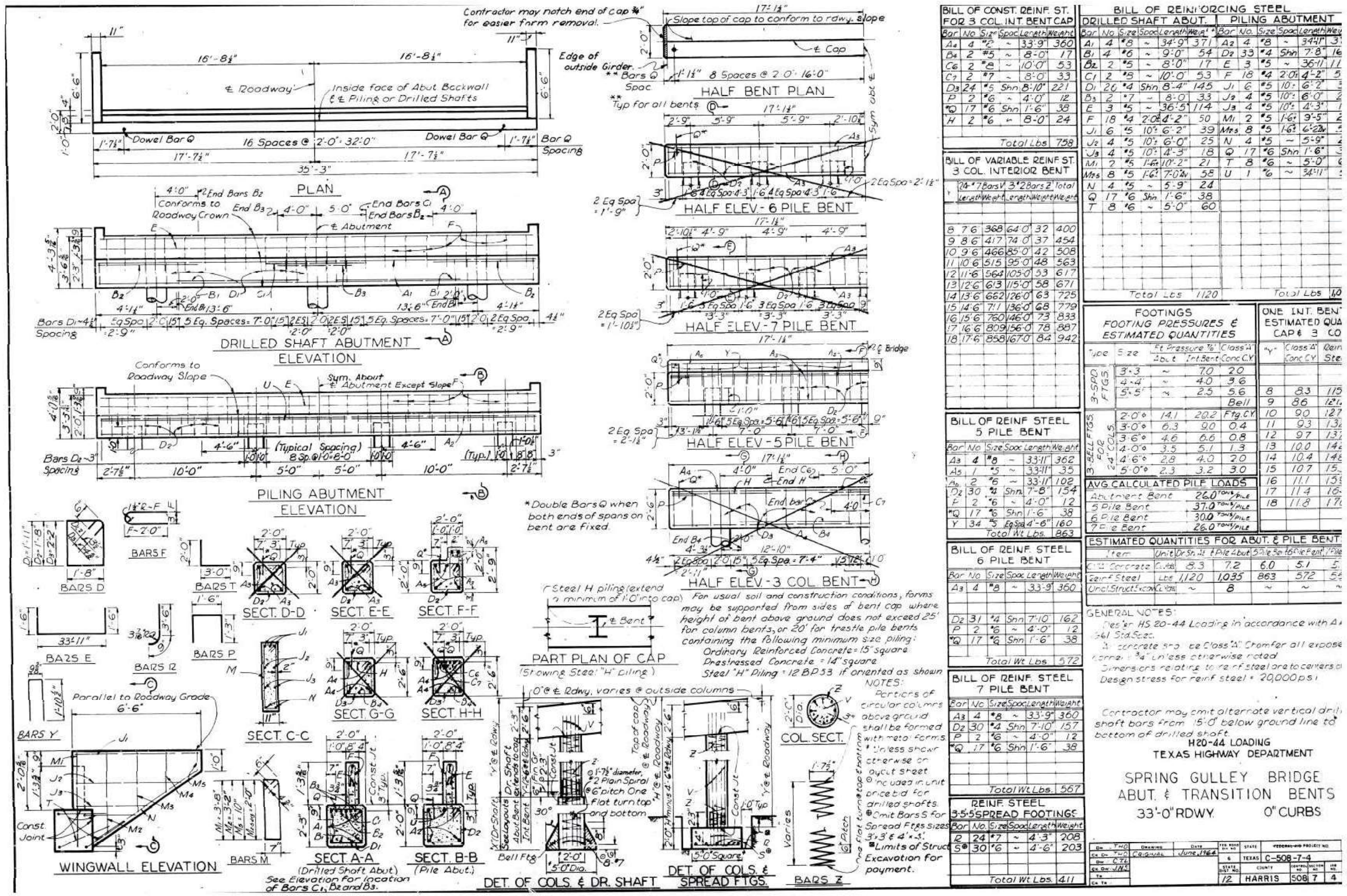
SPUR 330 WBFR AT SPRING GULLY

BRIDGE REPAIR DETAILS WORK ZONE REPAIR #1

APPROACH SLAB REPAIR

NBI# 12-102-0508-07-198

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		60



BENT 2 & 3 DETAILS

CONCRETE BENT CAP 2
PHOTO - 10/13/2020

WORK ZONE REPAIR #2
BENT 3 SIMILAR

STATE OF TEXAS
DELYNN HENRY
107399
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PROFESSIONAL ENGINEER

Delynn Henry 12/21/2022

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Texas Department of Transportation — Bridge Division

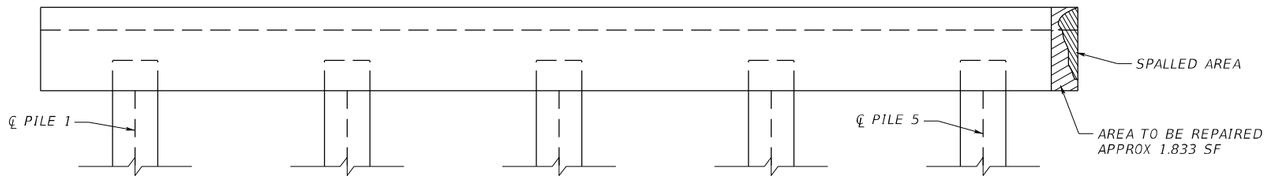
SPUR 330 WBFR AT SPRING GULLY

BRIDGE REPAIR DETAILS
WORK ZONE REPAIR #2
BENT 2 & 3 REPAIR
NBI# 12-102-0508-07-198

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST		COUNTY	SHEET NO.
	HOU		HARRIS	61

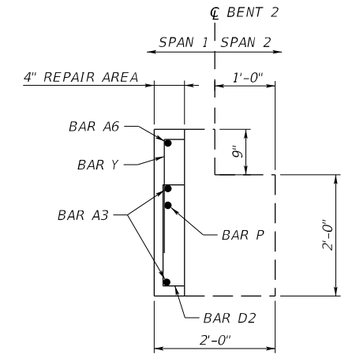
ESTIMATED QUANTITIES			
ITEM	DESCRIPTION (1)	UNIT	QUANTITY
0429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	3.67

(1) CONSISTS OF REPAIR QUANTITIES FOR BENT CAPS 2 & 3

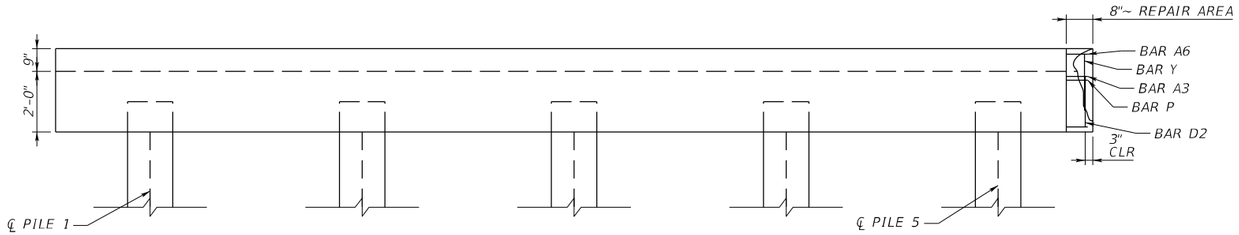


BENT 2 ~ WEST FACE REPAIR OVERVIEW

ELEVATION
BENT 3 SIMILAR



CAP SECTION



BENT 2 ~ WEST FACE REPAIR DETAILS

ELEVATION
BENT 3 SIMILAR

CONSTRUCTION NOTES: REMOVAL & SURFACE PREP

1. REMOVE ANY DAMAGED OR LOOSE CONCRETE WITH HAND TOOLS OR POWER DRIVEN CHIPPING HAMMER (15 LB CLASS MAX).
2. SAW CUT REPAIR PERIMETER 1/2" DEEP TO ELIMINATE FEATHERED EDGES. REPAIR MATERIAL SHOULD BE APPLIED IN DEPTHS NO LESS THAN 1/2". DO NOT CUT THE EXISTING REINFORCING STEEL.
3. DO NOT OVER-CUT THE CORNERS OF THE REPAIR AREA. WHEN PRACTICAL, UNDER-CUT THE REPAIR PERIMETER AT AN APPROXIMATE ANGLE OF 30 DEGREES.
4. IF MORE THAN HALF THE PERIMETER OF ANY MILD REINFORCEMENT IS EXPOSED OR IF THE EXPOSED BAR EXHIBITS SIGNIFICANT CORROSION, REMOVE THE CONCRETE FROM AROUND THE ENTIRE BAR. PROVIDE 3/4" CLEARANCE BETWEEN THE REINFORCING STEEL AND EXISTING CONCRETE.
5. USE ABRASIVE BLASTING TO REMOVE RUST FROM EXPOSED STEEL SURFACES.
6. ROUGHEN THE SUBSTRATE TO ENSURE THE REPAIR MATERIAL WILL BOND TO THE EXISTING CONCRETE. AIM FOR MINIMUM SURFACE ROUGHNESS PROFILE OF 1/8" OR CSP (CONCRETE SURFACE PROFILE) 6 PER ICRI.
7. PRIOR TO APPLYING REPAIR MATERIAL WATER BLAST CONCRETE SURFACE TO PROVIDE A SSD CONDITION.
8. THE SURFACE SHOULD BE DAMP WITH NO STANDING WATER PRIOR TO APPLYING REPAIR MATERIAL.
9. ALL REPAIR PREPARATIONS SHALL BE DONE IN ACCORDANCE TO ITEM 429 "CONCRETE STRUCTURE REPAIR" AND THE TXDOT CONCRETE REPAIR MANUAL.

CONCTRUCTION NOTES: REPAIR

1. USE PROPRIETARY, BAGGED CONCRETE REPAIR MATERIAL (EXTENDED) MEETING THE REQUIREMENTS OF DMS-4655, "CONCRETE REPAIR MATERIALS".
2. REPAIR MATERIALS SHALL BE STORED PER THE MANUFACTURER'S DIRECTIONS. PACKAGED MATERIALS EXPOSED TO THE ENVIRONMENT OR EXHIBITING SIGNS OF PACKAGING WEAR SHOULD NOT BE USED.
3. RETAIN MANUFACTURER'S LOT TAGS WITH PACKAGED DATE AND SHELF LIFE FOR INSPECTION PRIOR TO PRODUCT USE.
4. APPLY THE MATERIAL USING A TROWEL. DO NOT EXCEED A LIFT OF 2" OR THE MAXIMUM PERMITTED BY THE REPAIR MATERIAL SUPPLIER, WHICHEVER IS LESS.
5. ROUGHEN THE SURFACE OF MATERIALS THAT WILL RECEIVE SUBSEQUENT LIFTS AND ENSURE THE SUBSTRATE IS CLEAN AND SATURATED SURFACE DRY PRIOR TO PLACING ADDITIONAL REPAIR MATERIAL.
6. ALL REPAIRS SHALL BE DONE IN ACCORDANCE TO ITEM 429 "CONCRETE STRUCTURE REPAIR" AND THE TXDOT CONCRETE REPAIR MANUAL.

GENERAL NOTES:

MEASUREMENTS SHOWN ON REPAIR DETAILS ARE APPROXIMATE. ADJUST AS REQUIRED.

MATERIAL NOTES:

USE ONLY PREAPPROVED MATERIALS MEETING THE REQUIREMENTS OF DMS-4655 "CONCRETE REPAIR MATERIALS". REFER TO THE "CONCRETE REPAIR MATERIALS" MPL FOR A LIST OF PREQUALIFIED MATERIALS. REPAIR CONCRETE SHALL BE CLASS K WITH MINIMUM COMPRESSIVE STRENGTH OF 3,600 PSI AT 24 HOURS.

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

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FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

SPUR 330 WBFR AT SPRING GULLY

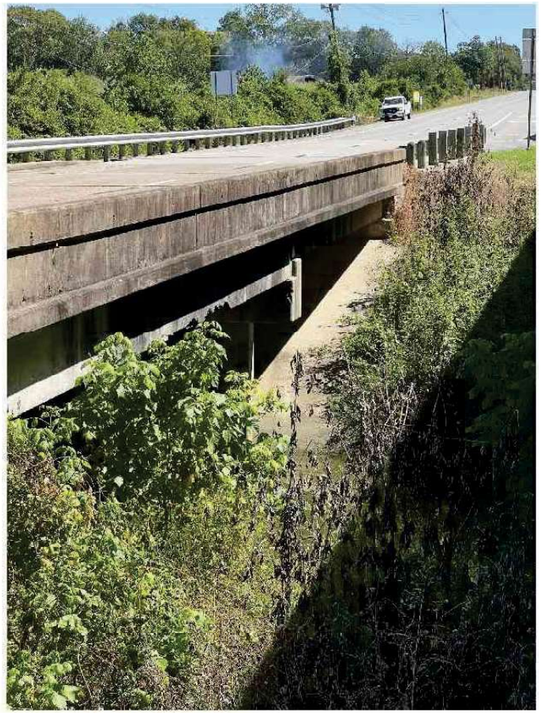
BRIDGE REPAIR DETAILS
WORK ZONE REPAIR #2
BENT 2 & 3 REPAIR

NBI# 12-102-0508-07-198

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		62

SPAN 1 - PAN GIRDER 3 (FROM SOUTH)

WORK ZONE REPAIR #3
OTHER GIRDERS SIMILAR



SPAN 2 - PAN GIRDER 1 (FROM SOUTH)

WORK ZONE REPAIR #3
OTHER GIRDERS SIMILAR

STATE OF TEXAS
DELYNN HENRY
107399
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PROFESSIONAL ENGINEER

12/21/2022

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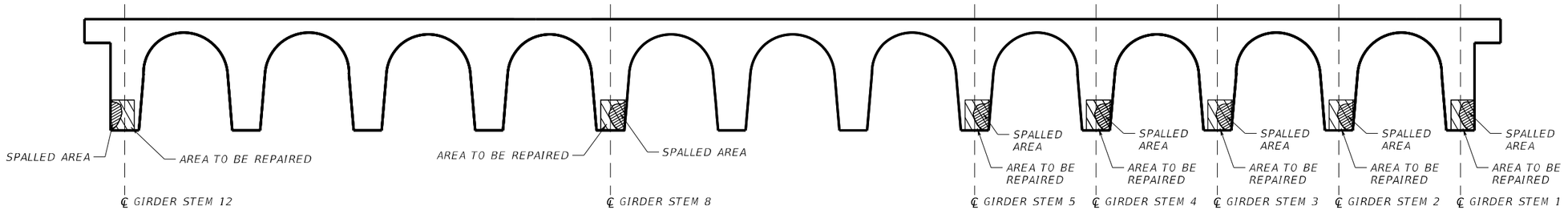
Texas Department of Transportation — Bridge Division

SPUR 330 WBFR AT SPRING GULLY

BRIDGE REPAIR DETAILS
WORK ZONE REPAIR #3
PAN GIRDER REPAIR

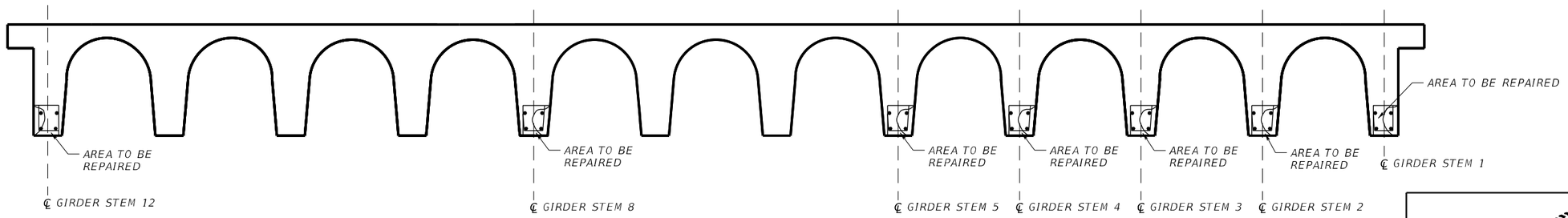
NBI# 12-102-0508-07-198

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		63



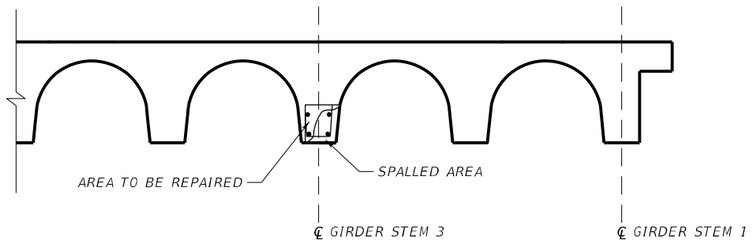
SPAN 2 TRANSVERSE SECTION REPAIR OVERVIEW

FROM WEST



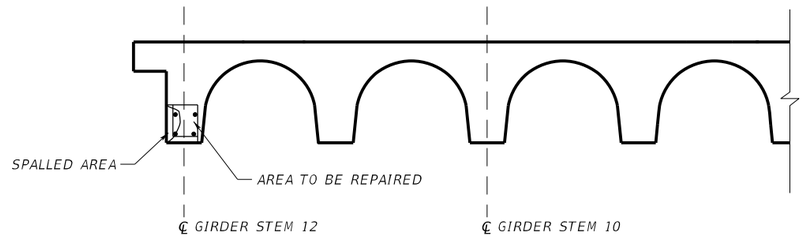
SPAN 2 TRANSVERSE SECTION REPAIR DETAILS

FROM WEST



SPAN 1 HALF TRANSVERSE SECTION

FROM WEST



SPAN 3 HALF TRANSVERSE SECTION

FROM WEST

LOCATION AND LIMITS FOR REPAIR ARE APPROXIMATE.
CONTRACTOR TO REPORT LOCATIONS OF SPALLS AND SECTION LOSS PERCENTAGES AT RESPECTIVE SPALLED AREAS TO TXDOT PRIOR TO PERFORMING REPAIR.

ESTIMATED QUANTITIES

ITEM	DESCRIPTION (1)	UNIT	QUANTITY
0429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	33.75

(1) INCLUDES QUANTITIES FOR SPAN 1 ~ GIRDER 3, SPAN 2 ~ GIRDERS 1-5, 8, 12 AND SPAN 3 - GIRDER 12.

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

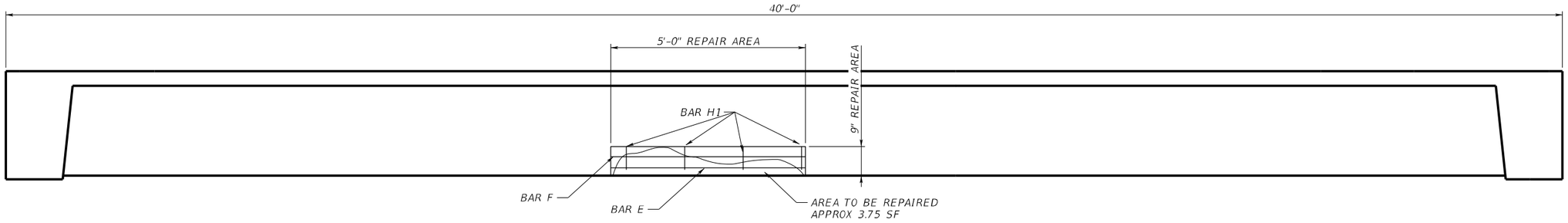
Texas Department of Transportation — Bridge Division

SPUR 330 WBFR AT SPRING GULLY

BRIDGE REPAIR DETAILS
WORK ZONE REPAIR #3
PAN GIRDER REPAIR

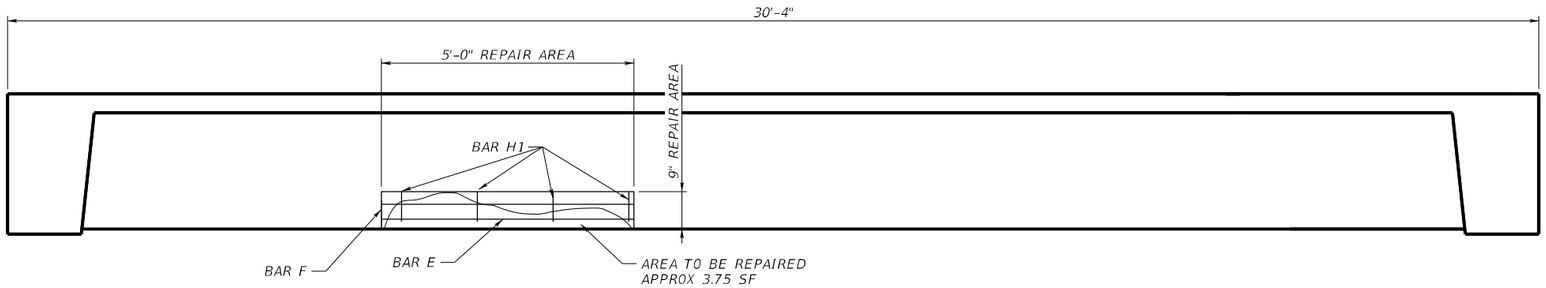
NBI# 12-102-0508-07-198

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		64



SPAN 2 GIRDER 1 ~ SOUTH FACE REPAIR DETAILS

ELEVATION (SIMILAR FOR ALL SPAN 2 GIRDERS TO BE REPAIRED)



SPAN 1 GIRDER 3 ~ SOUTH FACE REPAIR DETAILS

ELEVATION (SIMILAR FOR ALL SPAN 1 & SPAN 3 GIRDERS TO BE REPAIRED)

LOCATION AND LIMITS FOR REPAIR ARE APPROXIMATE.
CONTRACTOR TO REPORT LOCATIONS OF SPALLS AND SECTION LOSS PERCENTAGES AT RESPECTIVE SPALLED AREAS TO TXDOT PRIOR TO PERFORMING REPAIR.

CONSTRUCTION NOTES: REMOVAL & SURFACE PREP

1. REMOVE ANY DAMAGED OR LOOSE CONCRETE WITH HAND TOOLS OR POWER DRIVEN CHIPPING HAMMER (15 LB CLASS MAX).
2. SAW CUT REPAIR PERIMETER 1/2" DEEP TO ELIMINATE FEATHERED EDGES. REPAIR MATERIAL SHOULD BE APPLIED IN DEPTHS NO LESS THAN 1/2". DO NOT CUT THE EXISTING REINFORCING STEEL.
3. DO NOT OVER-CUT THE CORNERS OF THE REPAIR AREA. WHEN PRACTICAL, UNDER-CUT THE REPAIR PERIMETER AT AN APPROXIMATE ANGLE OF 30 DEGREES.
4. IF MORE THAN HALF THE PERIMETER OF ANY MILD REINFORCEMENT IS EXPOSED OR IF THE EXPOSED BAR EXHIBITS SIGNIFICANT CORROSION, REMOVE THE CONCRETE FROM AROUND THE ENTIRE BAR. PROVIDE 3/4" CLEARANCE BETWEEN THE REINFORCING STEEL AND EXISTING CONCRETE.
5. USE ABRASIVE BLASTING TO REMOVE RUST FROM EXPOSED STEEL SURFACES.
6. ROUGHEN THE SUBSTRATE TO ENSURE THE REPAIR MATERIAL WILL BOND TO THE EXISTING CONCRETE. AIM FOR MINIMUM SURFACE ROUGHNESS PROFILE OF 1/8" OR CSP (CONCRETE SURFACE PROFILE) 6 PER ICRI.
7. PRIOR TO APPLYING REPAIR MATERIAL WATER BLAST CONCRETE SURFACE TO PROVIDE A SSD CONDITION.
8. THE SURFACE SHOULD BE DAMP WITH NO STANDING WATER PRIOR TO APPLYING REPAIR MATERIAL.
9. ALL REPAIR PREPARATIONS SHALL BE DONE IN ACCORDANCE TO ITEM 429 "CONCRETE STRUCTURE REPAIR" AND THE TXDOT CONCRETE REPAIR MANUAL.

CONSTRUCTION NOTES: REPAIR

1. USE PROPRIETARY, BAGGED CONCRETE REPAIR MATERIAL (EXTENDED) MEETING THE REQUIREMENTS OF DMS-4655, "CONCRETE REPAIR MATERIALS".
2. REPAIR MATERIALS SHALL BE STORED PER THE MANUFACTURER'S DIRECTIONS. PACKAGED MATERIALS EXPOSED TO THE ENVIRONMENT OR EXHIBITING SIGNS OF PACKAGING WEAR SHOULD NOT BE USED.
3. RETAIN MANUFACTURER'S LOT TAGS WITH PACKAGED DATE AND SHELF LIFE FOR INSPECTION PRIOR TO PRODUCT USE.
4. APPLY THE MATERIAL USING A TROWEL. DO NOT EXCEED A LIFT OF 2" OR THE MAXIMUM PERMITTED BY THE REPAIR MATERIAL SUPPLIER, WHICHEVER IS LESS.
5. ROUGHEN THE SURFACE OF MATERIALS THAT WILL RECEIVE SUBSEQUENT LIFTS AND ENSURE THE SUBSTRATE IS CLEAN AND SATURATED SURFACE DRY PRIOR TO PLACING ADDITIONAL REPAIR MATERIAL.
6. ALL REPAIRS SHALL BE DONE IN ACCORDANCE TO ITEM 429 "CONCRETE STRUCTURE REPAIR" AND THE TXDOT CONCRETE REPAIR MANUAL.

GENERAL NOTES

MEASUREMENTS AND LOCATION SHOWN ON REPAIR DETAILS ARE APPROXIMATE.
CONTRACTOR TO VERIFY EXACT LOCATION OF REPAIR AND ADJUST AS REQUIRED.

MATERIAL NOTES

USE ONLY PREAPPROVED MATERIALS MEETING THE REQUIREMENTS OF DMS-4655 "CONCRETE REPAIR MATERIALS".
REFER TO THE "CONCRETE REPAIR MATERIALS" MPL FOR A LIST OF PREQUALIFIED MATERIALS.
REPAIR CONCRETE SHALL BE CLASS K WITH MINIMUM COMPRESSIVE STRENGTH OF 3,600 PSI AT 24 HOURS.

STATE OF TEXAS
DELYNN HENRY
107390
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

SPUR 330 WBFR AT SPRING GULLY

BRIDGE REPAIR DETAILS
WORK ZONE REPAIR #3
PAN GIRDER REPAIR

NBI# 12-102-0508-07-198

FILE:	DN:		CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY	
REVISIONS	6433	62	001	SPUR 330, ETC.	
	DIST	COUNTY		SHEET NO.	
	HOU	HARRIS		65	

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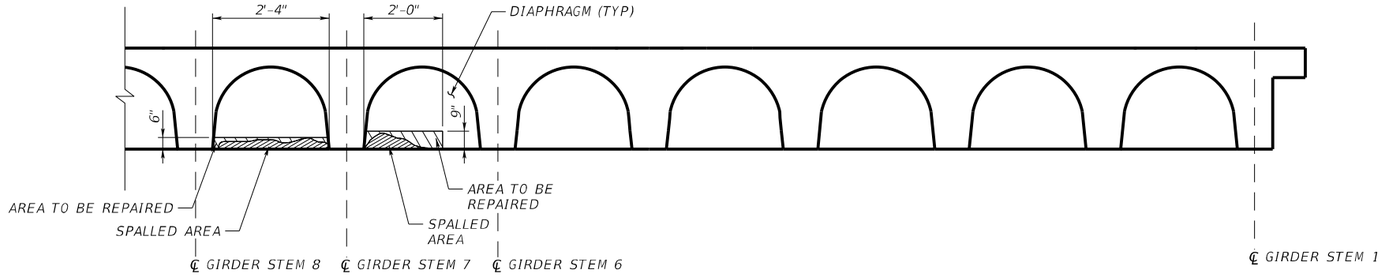
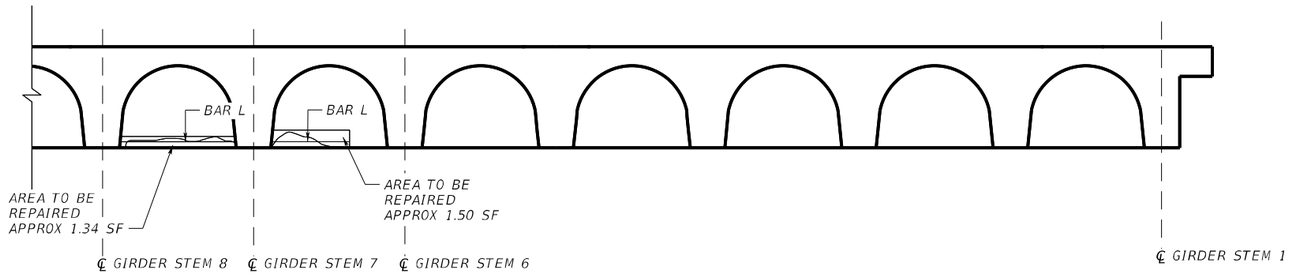


SPAN 1 HALF TRANSVERSE SECTION REPAIR OVERVIEW

FROM WEST

SPAN 1 ~ BAYS 6 & 7

WORK ZONE REPAIR #4



SPAN 1 HALF TRANSVERSE SECTION REPAIR DETAILS

FROM WEST

ESTIMATED QUANTITIES

ITEM	DESCRIPTION (1)	UNIT	QUANTITY
0429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	2.84

(1) INCLUDES QUANTITIES FOR SPAN 1 ~ BAY 6 & 7.

CONSTRUCTION NOTES: REMOVAL & SURFACE PREP

1. REMOVE ANY DAMAGED OR LOOSE CONCRETE WITH HAND TOOLS OR POWER DRIVEN CHIPPING HAMMER (15 LB CLASS MAX).
2. SAW CUT REPAIR PERIMETER 1/2" DEEP TO ELIMINATE FEATHERED EDGES. REPAIR MATERIAL SHOULD BE APPLIED IN DEPTHS NO LESS THAN 1/2". DO NOT CUT THE EXISTING REINFORCING STEEL.
3. DO NOT OVER-CUT THE CORNERS OF THE REPAIR AREA. WHEN PRACTICAL, UNDER-CUT THE REPAIR PERIMETER AT AN APPROXIMATE ANGLE OF 30 DEGREES.
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7. PRIOR TO APPLYING REPAIR MATERIAL WATER BLAST CONCRETE SURFACE TO PROVIDE A SSD CONDITION.
8. THE SURFACE SHOULD BE DAMP WITH NO STANDING WATER PRIOR TO APPLYING REPAIR MATERIAL.
9. ALL REPAIR PREPARATIONS SHALL BE DONE IN ACCORDANCE TO ITEM 429 "CONCRETE STRUCTURE REPAIR" AND THE TXDOT CONCRETE REPAIR MANUAL.

CONSTRUCTION NOTES: REPAIR

1. USE PROPRIETARY, BAGGED CONCRETE REPAIR MATERIAL (EXTENDED) MEETING THE REQUIREMENTS OF DMS-4655, "CONCRETE REPAIR MATERIALS".
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GENERAL NOTES

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CONTRACTOR TO VERIFY EXACT LOCATION OF REPAIR AND ADJUST AS REQUIRED.

MATERIAL NOTES

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REPAIR CONCRETE SHALL BE CLASS K WITH MINIMUM COMPRESSIVE STRENGTH OF 3,600 PSI AT 24 HOURS.

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

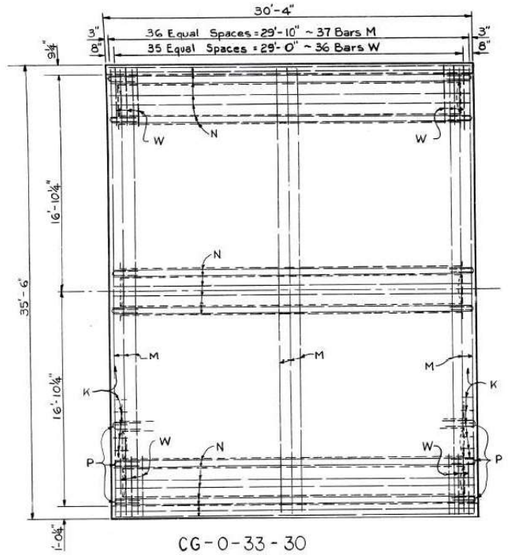
Texas Department of Transportation
Bridge Division

SPUR 330 WBFR AT SPRING GULLY

BRIDGE REPAIR DETAILS
WORK ZONE REPAIR #4
DIAPHRAGM REPAIR

NBI# 12-102-0508-07-198

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		66



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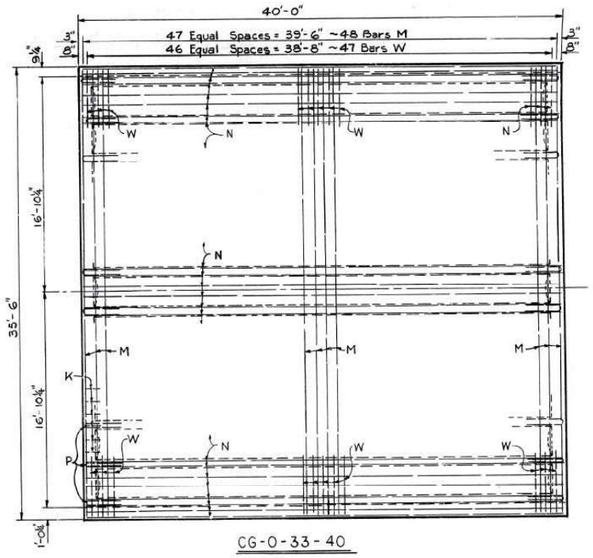

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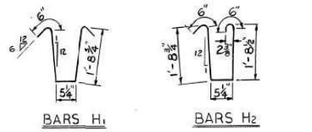
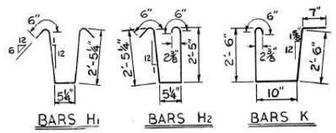
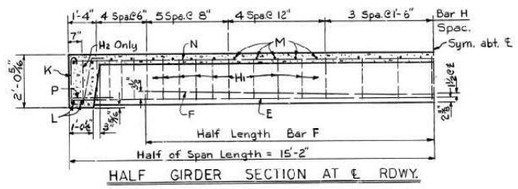


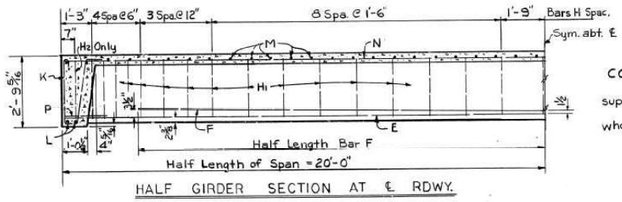
BAR BENDING FOR 30' SPAN



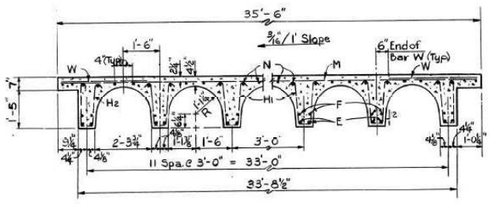
BAR BENDING FOR 40' SPAN



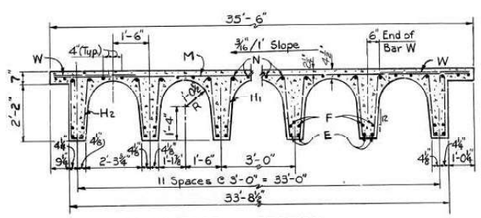
HALF GIRDER SECTION AT ℄ RDWY.



HALF GIRDER SECTION AT ℄ RDWY.



TRANSVERSE SECTION



TRANSVERSE SECTION

GENERAL NOTES:
For General Notes See Sheet 2 Of 2

CONSTRUCTION NOTES:
Contractor must provide adequate means of supporting outside forms during placement of concrete. Forms may be supported from bent caps only when specified on bent details.

TEXAS HIGHWAY DEPARTMENT

30'-4" & 40'-0" CONCRETE SLAB AND GIRDER SPANS
33'-0" RDWY. 0" CURBS
SPRING GULLY BRIDGE
LEFT FRONTAGE ROAD

Dn. THD	Ck. Dn. THD	Dw. GED	Ck. Dn. GK	Tr.	Ck. Tr.	DRAWING Dist. 12	DATE Oct. 1964	FED. ROAD DIV. NO. 6	STATE Texas	PROJECT NO. C-508-7-4	SHEET NO. 22
								STATE DIST. NO. 12	COUNTY HARRIS	CONTROL NO. 508	SECTION NO. 7	JOB NO. 4	HIGH. NO. SP330

SHEET 1 OF 2

FOR CONTRACTORS INFORMATION ONLY
The seal appearing on this sheet covers only the repair details, not the original design.

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

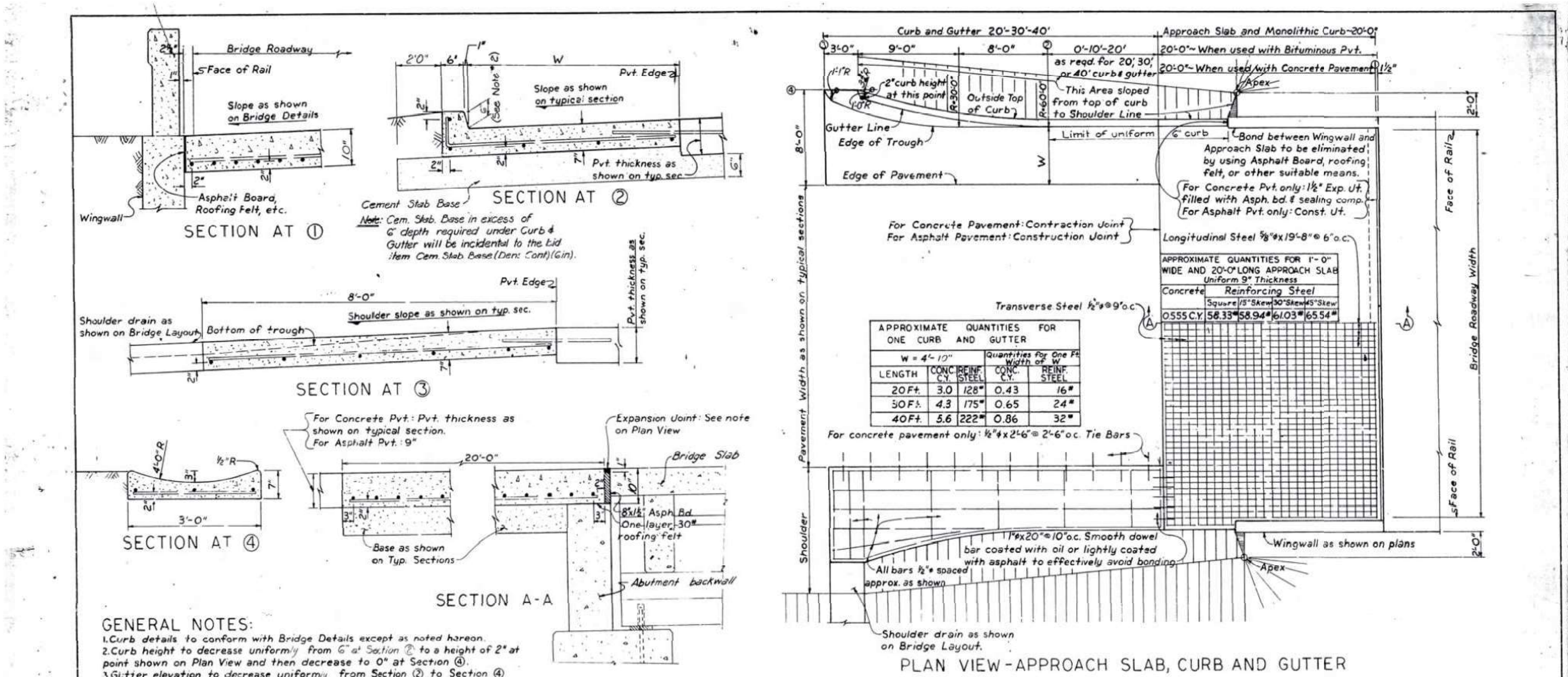
Texas Department of Transportation — Bridge Division

SPUR 330 WBFR AT SPRING GULLY

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-07-198

FILE:	DN:		CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY	
REVISIONS	6433	62	001	SPUR 330, ETC.	
	DIST	COUNTY		SHEET NO.	
	HOU	HARRIS		67	



PLAN VIEW - APPROACH SLAB, CURB AND GUTTER

APPROXIMATE QUANTITIES FOR 1'-0" WIDE AND 20'-0" LONG APPROACH SLAB Uniform 9" Thickness				
Concrete	Reinforcing Steel			
	Square	15° Skew	30° Skew	45° Skew
0.555 C.Y.	58.33#	58.94#	61.03#	65.54#

APPROXIMATE QUANTITIES FOR ONE CURB AND GUTTER				
W = 4'-10"			Quantities for One Ft. Width of W	
LENGTH	CONC. C.Y.	REINF. STEEL	CONC. C.Y.	REINF. STEEL
20 Ft.	3.0	128#	0.43	16#
30 Ft.	4.3	175#	0.65	24#
40 Ft.	5.6	222#	0.86	32#

GENERAL NOTES:

1. Curb details to conform with Bridge Details except as noted hereon.
2. Curb height to decrease uniformly from 6" at Section ② to a height of 2" at point shown on Plan View and then decrease to 0" at Section ④.
3. Gutter elevation to decrease uniformly from Section ② to Section ④ and gutter depression to be formed along lines shown.
4. Approach slab crown to vary as required to transition from bridge crown to roadway crown.
5. For skewed bridges, approach slab will be skewed as per bridge. Curbs shall be constructed and attached in the same manner as for square bridges.
6. For Asphalt roadways, the approach slab shall be finished as required for bridge floor and monolithic curb shall be finished as specified for adjacent curb and gutter.
7. Payment for the approach slab, monolithic curb, and curb and gutter shall be made at the unit price bid for "Class A Concrete (Approach Slab)" and "Reinforcing Steel". Payment for expansion joints, dowels and any excavation required for the approach slab shall be included in the unit price bid for "Class A Concrete (Approach Slab)".

APPROXIMATE QUANTITIES FOR ONE APPROACH SLAB AND TWO CURB AND GUTTERS W=4'-10" (UNIFORM 9" SLAB)

BRIDGE ROADWAY WIDTH (Ft.)	CURB & GUTTER LENGTH (Ft.)	CONCRETE C.Y.	REINFORCING STEEL SQUARE LBS.	15° SKEW LBS.	30° SKEW LBS.	45° SKEW LBS.
26	20	21.3	1,806	1,822	1,877	1,995
	30	23.9	1,900	1,916	1,971	2,089
	40	26.5	1,994	2,104	2,159	2,277
33	20	25.2	2,215	2,235	2,305	2,455
	30	27.8	2,309	2,329	2,399	2,549
	40	30.4	2,403	2,423	2,493	2,643
35	20	26.3	2,332	2,354	2,427	2,586
	30	28.9	2,416	2,438	2,511	2,670
	40	31.5	2,510	2,532	2,605	2,764

TEXAS HIGHWAY DEPARTMENT

BRIDGE APPROACH SLAB, CURB AND GUTTER
RESTRICTED WIDTH
FOR USE WITH ASPHALT AND CONCRETE PAVEMENTS
SQUARE OR SKEW
BAS- SPECIAL
1 OF 2

Dn. C.W. Ck. Dn. E.S. Ck. Dn. C.W. Dist 12 Sept. 1964 6 TEXAS C-508-7-4 28 12 Harris 508 7 4 SP 330

FOR CONTRACTORS INFORMATION ONLY
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STATE OF TEXAS
DELYNN HENRY
107399
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PROFESSIONAL ENGINEER
Delynn Henry
12/21/2022

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818 TOWN & COUNTRY BLVD, SUIT 500, HOUSTON TX 77024
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Texas Department of Transportation
Bridge Division

SPUR 330 WBFR AT SPRING GULLY

BRIDGE REPAIR DETAILS
AS-BUILTS
NBI# 12-102-0508-07-198

FILE: DN: CK: DW: CK:
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CONT	SECT	JOB	HIGHWAY
6433	62	001	SPUR 330, ETC.
DIST		COUNTY	SHEET NO.
HOU		HARRIS	68

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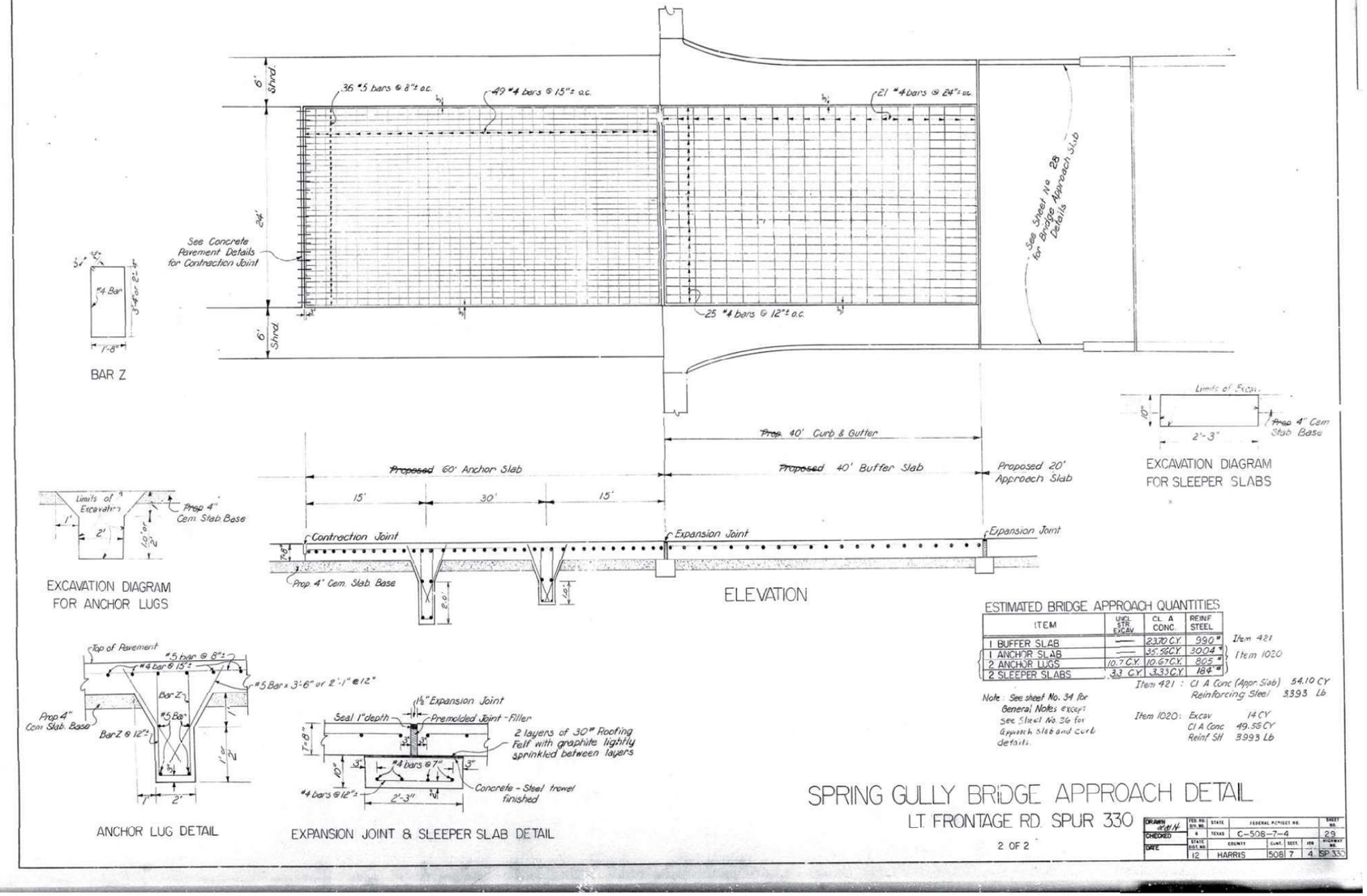

ESTIMATED BRIDGE APPROACH QUANTITIES

ITEM	UNCL. STR. EXCAV.	CL. A CONC.	REINF. STEEL	
1 BUFFER SLAB	—	23.70 C.Y.	990 #	Item 421
1 ANCHOR SLAB	—	35.56 C.Y.	3004 #	Item 1020
2 ANCHOR LUGS	10.7 C.Y.	10.67 C.Y.	805 #	
2 SLEEPER SLABS	3.3 C.Y.	3.33 C.Y.	184 #	

Item 421 : Cl A Conc (Appr Slab) 54.10 CY
Reinforcing Steel 3393 Lb

Item 1020: Excav 14 CY
Cl A Conc 49.56 CY
Reinf St 3993 Lb

Note: See sheet No. 34 for General Notes Except see Sheet No. 36 for Approach Slab and curb details.

SPRING GULLY BRIDGE APPROACH DETAIL

LT FRONTAGE RD. SPUR 330

2 OF 2

DRAWN	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
CHECKED	6	TEXAS	C-508-7-4	29
DATE	STATE DIST. NO.	COUNTY	CONT. SECT. JOB	HIGHWAY NO.
	12	HARRIS	508 7 4	SP 330

FOR CONTRACTORS INFORMATION ONLY
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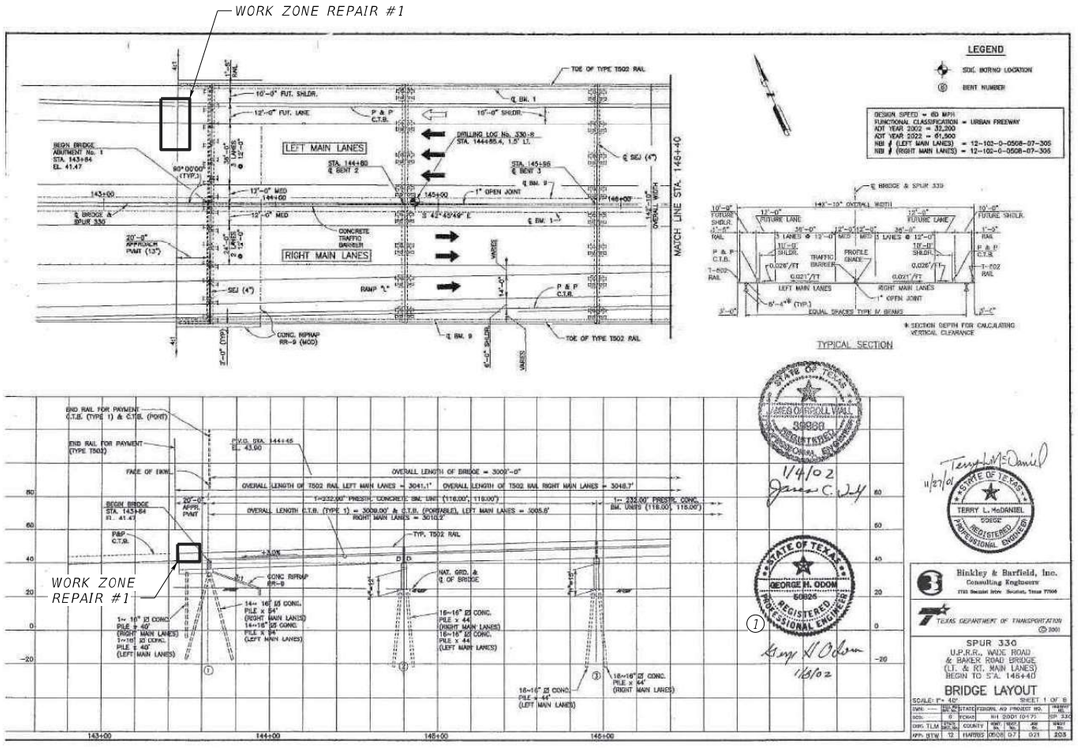
Texas Department of Transportation — Bridge Division

SPUR 330 WBFR AT SPRING GULLY

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0508-07-198

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		69



BRIDGE LAYOUT- PLAN & ELEVATION VIEW

BRIDGE LOCATION - PLAN VIEW

EXISTING NW APPROACH SLAB PHOTO - 10/13/2020

WORK ZONE REPAIR #1

STATE OF TEXAS
DELYNN HENRY
107399
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12/21/2022

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818 TOWN & COUNTRY BLVD,
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FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

SPUR 330 EB ML AT UPRR, WADE RD, BAKER RD BRIDGE REPAIR DETAILS APPROACH SLAB REPAIR

NBI# 12-102-0-0508-07-306

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
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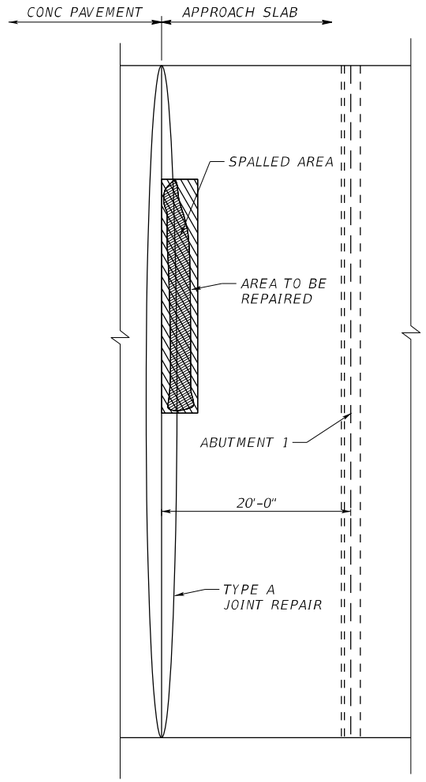
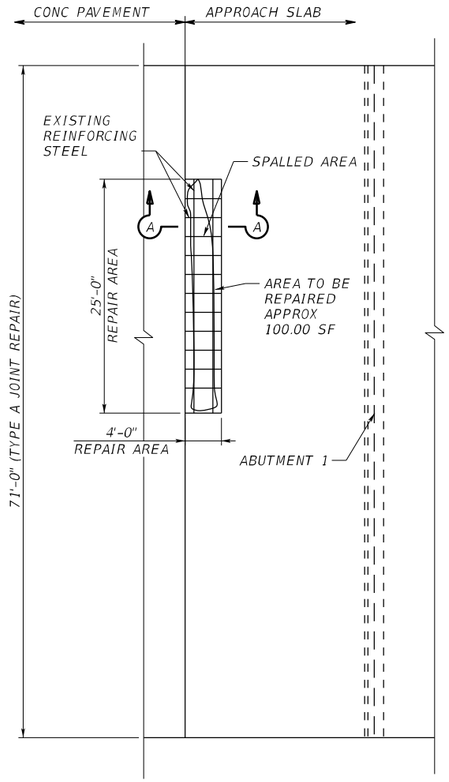
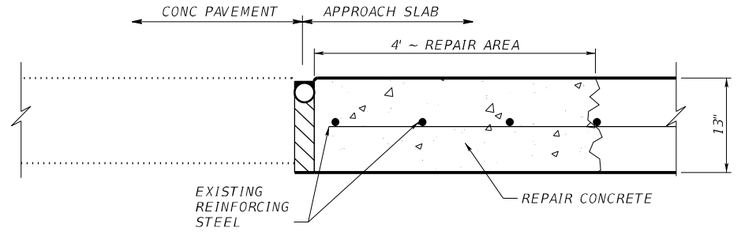


WEST APPROACH SLAB REPAIR OVERVIEW



WEST APPROACH SLAB REPAIR DETAILS



SECTION A-A

CONSTRUCTION NOTES: SPALLS REPAIR

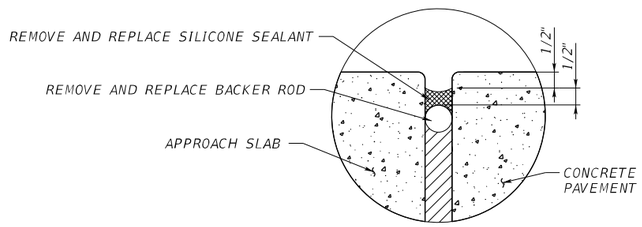
1. SAW-CUT REPAIR PERIMETER 1/2" DEEP TO ELIMINATE FEATHERES EDGES. REPAIR MATERIAL SHOULD BE APPLIED IN DEPTHS NO LESS THAN 1/2". DO NOT CUT THE EXISTING REINFORCING STEEL.
2. REMOVE DAMAGED CONCRETE USING A HAMMER (15 LB MAX) AND ENSURE THAT THE REMAINING DECK IS SOUND. PROVIDE A UNIFORMLY ROUGH SURFACE WITH A CHIPPED APPEARANCE (1/4" MINIMUM SURFACE PROFILE OR ICRI CONCRETE SURFACE PROFILE 9).
3. ENSURE A MINIMUM CLEARANCE OF 3/4" BELOW EXISTING LAYER OF STEEL.
4. USE ABRASIVE BLASTING TO REMOVE RUST FROM EXPOSED STEEL SURFACES.
5. PRIOR TO APPLYING MATERIAL WATER BLAST CONCRETE SURFACE TO PROVIDE A SSD CONDITION.
6. THE SURFACE SHOULD BE DAMP WITH NO STANDING WATER PRIOR TO APPLYING REPAIR MATERIAL.
7. USE CLASS K CONCRETE REPAIR MATERIAL AND PLACE IT ONTO THE PREPARED SURFACES.
8. ALL REPAIR SHALL BE DONE IN ACCORDANCE TO ITEM 429 "CONCRETE STRUCTURE REPAIR" AND THE TXDOT "CONCRETE REPAIR MANUAL".

MATERIAL NOTES:

USE CLASS K CONCRETE WITH MINIMUM CONCRETE STRENGTH OF 3,600 PSI AT 24 HOURS. OTHER CONCRETE CRITERIA MAY BE REQUIRED AS DIRECTED BY THE ENGINEER. A MIX DESIGN SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL AND TESTING OF THE CONCRETE SHALL BE DONE PRIOR TO BEGINNING WORK.

GENERAL NOTES:

MEASUREMENTS AND LOCATION SHOWN ON REPAIR DETAILS ARE APPROXIMATE. CONTRACTOR TO VERIFY EXACT LOCATION OF REPAIR AND ADJUST AS REQUIRED.



TYPE A JOINT REPAIR DETAIL

TYPE A JOINT REPAIR NOTES:

1. REMOVE EXISTING SILICONE SEALANT AND BACKER ROD.
2. CLEAN GAP AND CONCRETE SURFACE, MAKE SURE THE CONCRETE SURFACE IS FREE OF ANY DEBRIS.
3. INSTALL BACKER ROD AND SILICONE SEALANT IN ACCORDANCE WITH DETAIL "TYPE A JOINT DETAIL" ON SHEET CS-MD AND IN ACCORDANCE WITH ITEM 438 CLEANING AND SEALING JOINTS.
4. EXTEND SEALANT UP INTO RAIL OR CURB 3" ON LOW SIDE OR SIDES OF THE DECK.
5. ALL WORK SHOWN IN THE "TYPE A JOINT REPAIR DETAIL" IS INCLUDED IN THE UNIT PRICE FOR ITEM 438-6001 AND ALL RELATED WORK SHALL BE CONSIDERED SUBSIDIARY.

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
0429-6005	CONC STR REPAIR (DECK REP (FULL DEPTH))	SF	100.00
0438-6001	CLEANING AND SEALING EXISTING JOINTS	LF	71

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/22/2022

NO.	DATE	REVISION	APPROV.

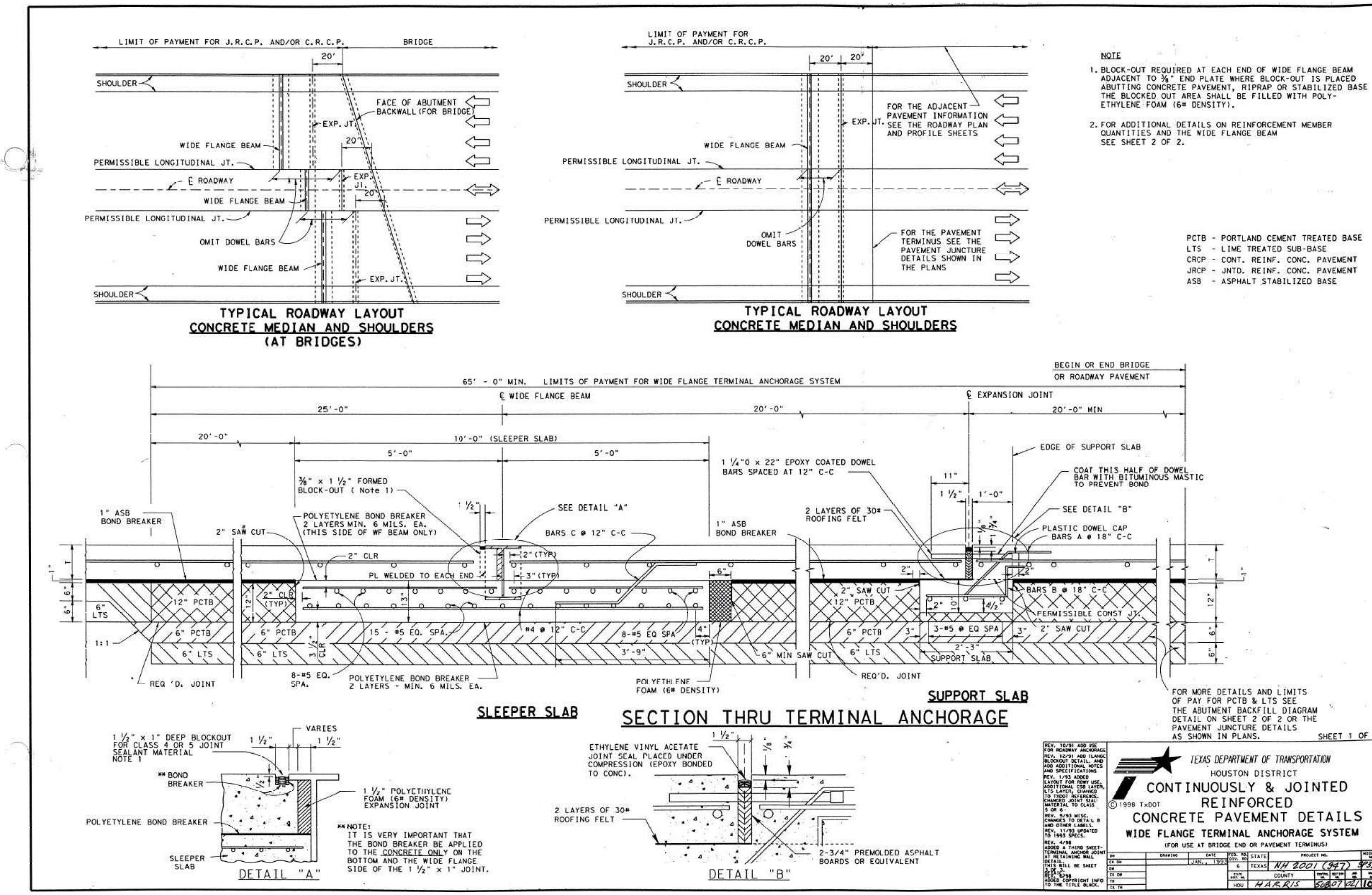
Jacobs
818 TOWN & COUNTRY BLVD,
SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

SPUR 330 EB ML AT UPRR, WADE RD, BAKER RD BRIDGE REPAIR DETAILS WORK ZONE REPAIR #1 APPROACH SLAB REPAIR

NBI# 12-102-0508-07-306

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		71


NOTE
1. BLOCK-OUT REQUIRED AT EACH END OF WIDE FLANGE BEAM ADJACENT TO 3/8" END PLATE WHERE BLOCK-OUT IS PLACED ABUTTING CONCRETE PAVEMENT, RIPRAP OR STABILIZED BASE THE BLOCKED OUT AREA SHALL BE FILLED WITH POLY-ETHYLENE FOAM (6# DENSITY).
2. FOR ADDITIONAL DETAILS ON REINFORCEMENT MEMBER QUANTITIES AND THE WIDE FLANGE BEAM SEE SHEET 2 OF 2.
PCTB - PORTLAND CEMENT TREATED BASE
LTS - LIME TREATED SUB-BASE
CRCP - CONT. REINF. CONC. PAVEMENT
JRCP - JNTD. REINF. CONC. PAVEMENT
ASB - ASPHALT STABILIZED BASE
TYPICAL ROADWAY LAYOUT
CONCRETE MEDIAN AND SHOULDERS
(AT BRIDGES)
TYPICAL ROADWAY LAYOUT
CONCRETE MEDIAN AND SHOULDERS
LIMIT OF PAYMENT FOR J.R.C.P. AND/OR C.R.C.P.
BRIDGE
SHOULDER
FACE OF ABUTMENT BACKWALL (FOR BRIDGE)
EXP. JT.
WIDE FLANGE BEAM
PERMISSIBLE LONGITUDINAL JT.
℄ ROADWAY
OMIT DOWEL BARS
FOR THE ADJACENT PAVEMENT INFORMATION SEE THE ROADWAY PLAN AND PROFILE SHEETS
FOR THE PAVEMENT TERMINUS SEE THE PAVEMENT JUNCTURE DETAILS SHOWN IN THE PLANS
BEGIN OR END BRIDGE OR ROADWAY PAVEMENT
65' - 0" MIN. LIMITS OF PAYMENT FOR WIDE FLANGE TERMINAL ANCHORAGE SYSTEM
℄ WIDE FLANGE BEAM
℄ EXPANSION JOINT
10'-0" (SLEEPER SLAB)
EDGE OF SUPPORT SLAB
1 1/4"⌀ x 22" EPOXY COATED DOWEL BARS SPACED AT 12" C-C
COAT THIS HALF OF DOWEL BAR WITH BITUMINOUS MASTIC TO PREVENT BOND
3/8" x 1 1/2" FORMED BLOCK-OUT (Note 1)
POLYETYLENE BOND BREAKER 2 LAYERS MIN. 6 MILS. EA. (THIS SIDE OF WF BEAM ONLY)
SEE DETAIL "A"
SEE DETAIL "B"
BARS C @ 12" C-C
2 LAYERS OF 30# ROOFING FELT
PLASTIC DOWEL CAP
BARS A @ 18" C-C
BARS B @ 18" C-C
PERMISSIBLE CONST JT.
1" ASB BOND BREAKER
2" SAW CUT
PL WELDED TO EACH END
REQ'D. JOINT
POLYETHYLENE BOND BREAKER 2 LAYERS - MIN. 6 MILS. EA.
POLYETHLENE FOAM (6# DENSITY)
SUPPORT SLAB
SLEEPER SLAB
SECTION THRU TERMINAL ANCHORAGE
FOR MORE DETAILS AND LIMITS OF PAY FOR PCTB & LTS SEE THE ABUTMENT BACKFILL DIAGRAM DETAIL ON SHEET 2 OF 2 OR THE PAVEMENT JUNCTURE DETAILS AS SHOWN IN PLANS.
SHEET 1 OF 2
1 1/2" x 1" DEEP BLOCKOUT FOR CLASS 4 OR 5 JOINT SEALANT MATERIAL NOTE 1
** BOND BREAKER
1 1/2" POLYETHYLENE FOAM (6# DENSITY) EXPANSION JOINT
POLYETYLENE BOND BREAKER
SLEEPER SLAB
** NOTE: IT IS VERY IMPORTANT THAT THE BOND BREAKER BE APPLIED TO THE CONCRETE ONLY ON THE BOTTOM AND THE WIDE FLANGE SIDE OF THE 1 1/2" x 1" JOINT.
DETAIL "A"
ETHYLENE VINYL ACETATE JOINT SEAL PLACED UNDER COMPRESSION (EPOXY BONDED TO CONC).
2 LAYERS OF 30# ROOFING FELT
2-3/4" PREMOLDED ASPHALT BOARDS OR EQUIVALENT
DETAIL "B"
TEXAS DEPARTMENT OF TRANSPORTATION
HOUSTON DISTRICT
CONTINUOUSLY & JOINTED REINFORCED CONCRETE PAVEMENT DETAILS
WIDE FLANGE TERMINAL ANCHORAGE SYSTEM
(FOR USE AT BRIDGE END OR PAVEMENT TERMINUS)
©1998 TxDOT
HARRIS

FOR CONTRACTORS INFORMATION ONLY
The seal appearing on this sheet covers only the repair details, not the original design.

STATE OF TEXAS
DELYNN HENRY
107399
LICENSED
PROFESSIONAL ENGINEER

12/21/2022

NO.	DATE	REVISION	APPROV.

Jacobs
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SUIT 500, HOUSTON TX 77024
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

SPUR 330 EB ML AT UPRR, WADE RD, BAKER RD

BRIDGE REPAIR DETAILS AS-BUILTS

NBI# 12-102-0-0508-07-306

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST		COUNTY	SHEET NO.
	HOU		HARRIS	72

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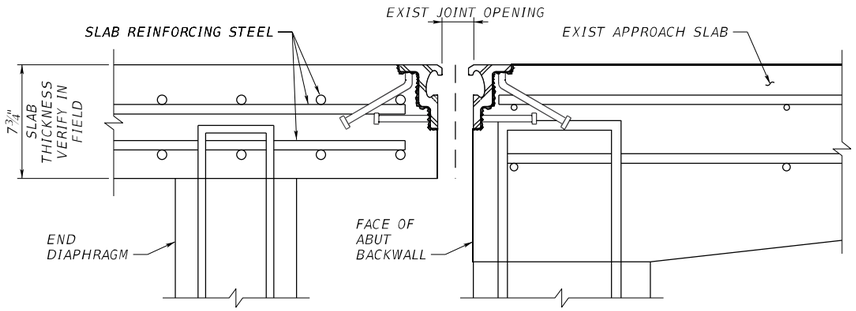


BRIDGE SLAB WITH END DIAPHRAGM

ABUTMENT BACKWALL WITH APPROACH SLAB

SECTION THRU EXISTING EXPANSION JOINT

NOTES:

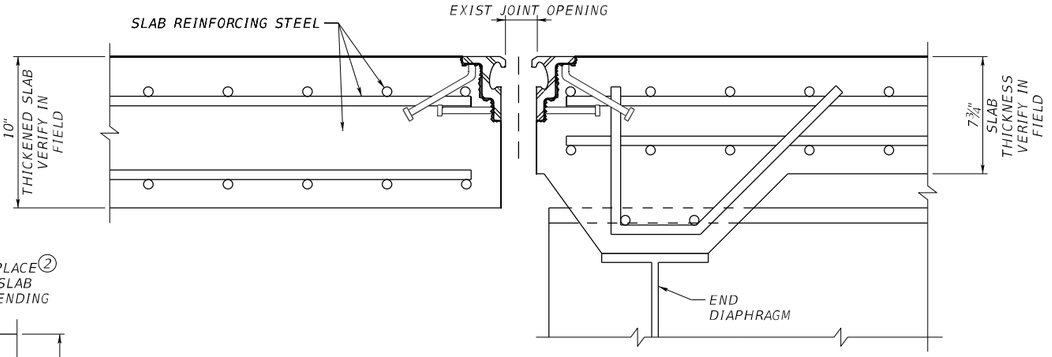
1. BREAK BACK CONCRETE TO MINIMUM LENGTH SHOWN OR AS DIRECTED BY THE ENGINEER. WHEN REINFORCING STEEL IS NOT EXISTING AS SHOWN, THE BREAKBACK MAY BE REQUIRED TO BE LONGER TO ACCOMMODATE THE ADDITIONAL REINFORCING STEEL.
2. SALVAGE EXISTING REINFORCING STEEL WHERE POSSIBLE. ALL EXISTING STEEL SHALL BE CLEANED AND PROTECTED IN PLACE WHEN STEEL SHOWN IS NOT PRESENT IN THE REPAIR AREA. ADDITIONAL STEEL SHALL BE PLACED AS SHOWN AND SHALL BE #5 UNLESS OTHERWISE NOTED. REPLACE STEEL WHEN NOT SALVAGEABLE. TRIM EXISTING REINFORCING STEEL AS NEEDED TO MAINTAIN END COVER.
3. REPAIR CONCRETE SHALL BE CLASS K WITH MINIMUM COMPRESSIVE STRENGTH OF 3,600 PSI AT 24 HOURS AND PRIOR TO REOPENING BRIDGE TO TRAFFIC. OTHER CONCRETE STRENGTH CRITERIA MAY BE REQUIRED AS DIRECTED BY THE ENGINEER. A MIX DESIGN SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL AND TESTING OF THE CONCRETE SHALL BE DONE PRIOR TO BEGINNING WORK.
4. WHERE EXISTING JOINT WIDTH NEEDS TO BE REDUCED AND 2" END COVER CANNOT BE ACHIEVED FROM EXISTING LONGITUDINAL REINFORCING, ADD BARS U.

CONSTRUCTION NOTES:

1. REMOVE EXISTING CONCRETE (ON BRIDGE DECK AND APPROACH SLAB) TO THE EXTENT SHOWN. THE REMOVAL LINES SHOULD BE PERPENDICULAR TO THE CENTERLINE OF THE BRIDGE.
2. REPLACE DAMAGED OR MISSING REINFORCING. DRILL AND DOWEL REINFORCING TO EXISTING CONCRETE PER MANUFACTURERS SPECIFICATIONS.
3. CONCRETE SHALL BE PLACED PER ITEM 429 CONCRETE STRUCTURE REPAIR AND THE TXDOT CONCRETE REPAIR MANUAL.
4. ALL WORK SHOWN ON THIS SHEET IS INCLUDED IN THE UNIT PRICES PAID FOR BY ITEM 0785 BRIDGE JOINT REPLACEMENT AND ALL RELATED WORK SHALL BE CONSIDERED SUBSIDIARY.

GENERAL NOTES:

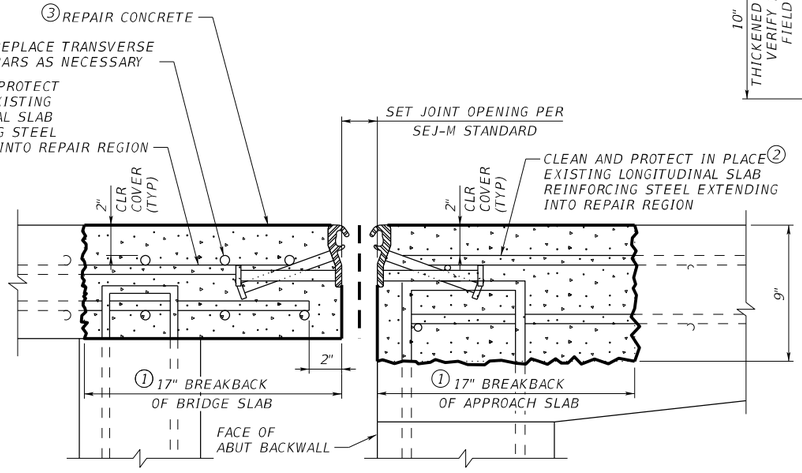
1. SEE SEJ-M STANDARD FOR DETAILS NOT SHOWN.
2. CONTRACTOR SHALL VERIFY ACTUAL JOINT CONDITION AND BRIDGE CONFIGURATION PRIOR TO BEGINNING WORK.
3. PROVIDE GRADE 60 REINFORCING STEEL.



BRIDGE SLAB WITH THICKENED SLAB END

BRIDGE SLAB AT STEEL GIRDER

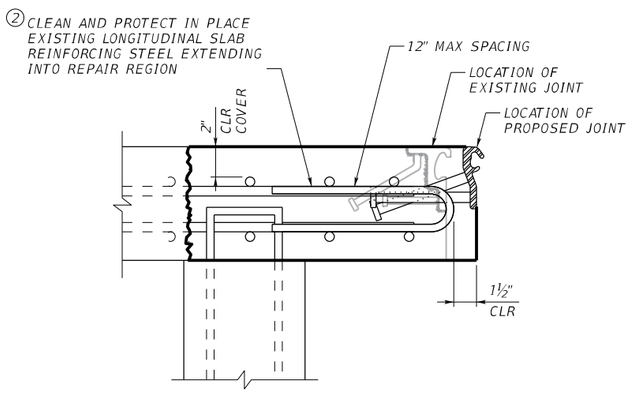
SECTION THRU EXISTING EXPANSION JOINT



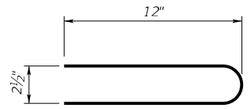
FULL DEPTH AT BRIDGE SLAB WITH END DIAPHRAGM

PARTIAL DEPTH AT ABUTMENT

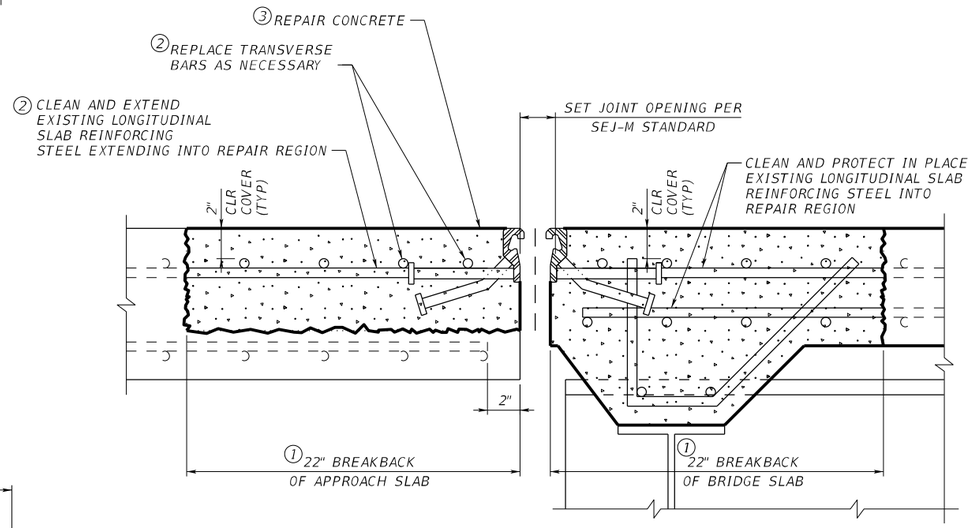
SECTION THRU JOINT REPLACEMENT



ADDITIONAL STEEL ④



BARS U (#4)



PARTIAL DEPTH AT BRIDGE SLAB WITH THICKENED SLAB END

FULL DEPTH AT BRIDGE SLAB WITH STEEL GIRDER

SECTION THRU JOINT REPLACEMENT

STATE OF TEXAS
DELYNN HENRY
LICENSED
PROFESSIONAL ENGINEER
107399

12/21/2022

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Jacobs
818 TOWN & COUNTRY BLVD,
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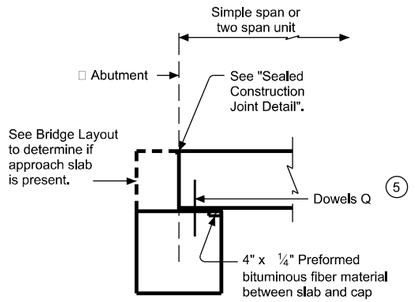
FIRM REGISTRATION F-2966

Texas Department of Transportation — Bridge Division

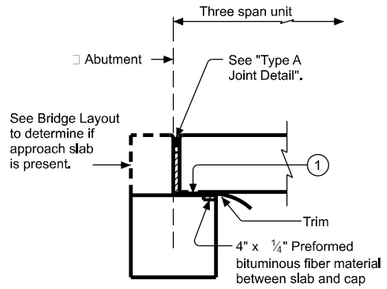
JOINT REPAIR DETAILS
VARIOUS BRIDGES

FILE:	DN:	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		73

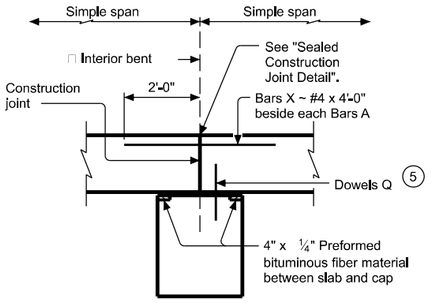
DATE:
FILE:



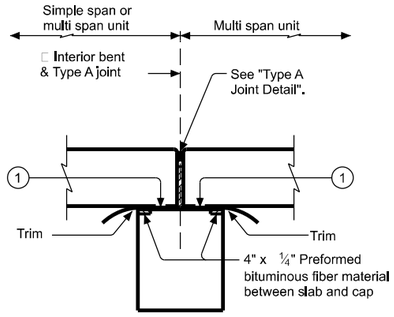
FIXED ABUTMENT



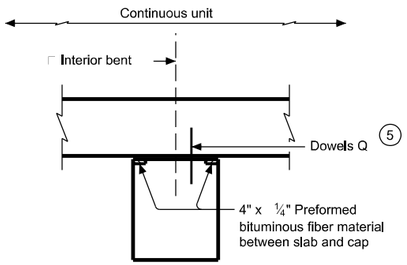
EXPANSION ABUTMENT 9



FIXED INTERIOR BENT WITH SIMPLE SPANS 8

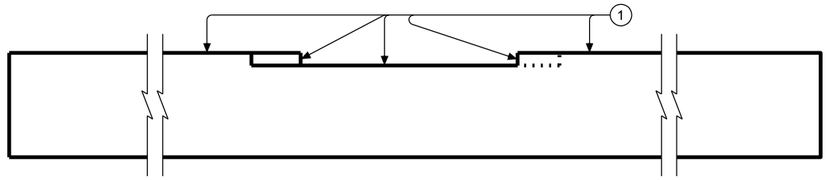


EXPANSION INTERIOR BENT 9



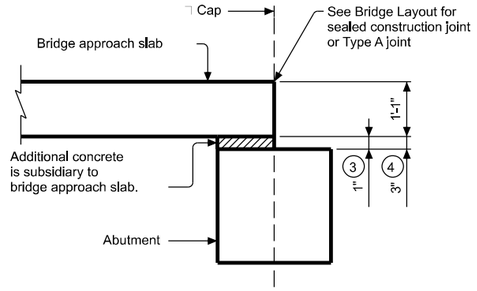
FIXED INTERIOR BENT WITH CONTINUOUS UNIT

ELEVATION AT FIXED OR EXPANSION BENTS 10

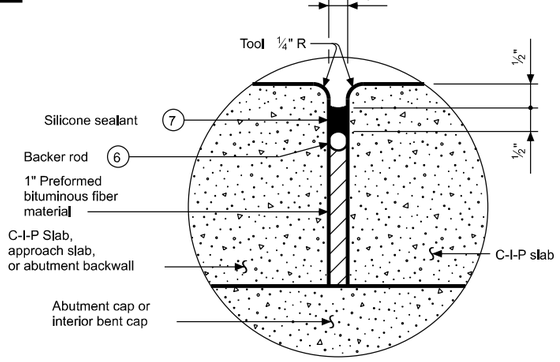


ELEVATION OF CAP

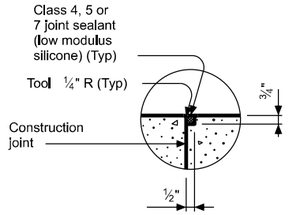
(Showing skewed conditions, non-skewed is similar.)



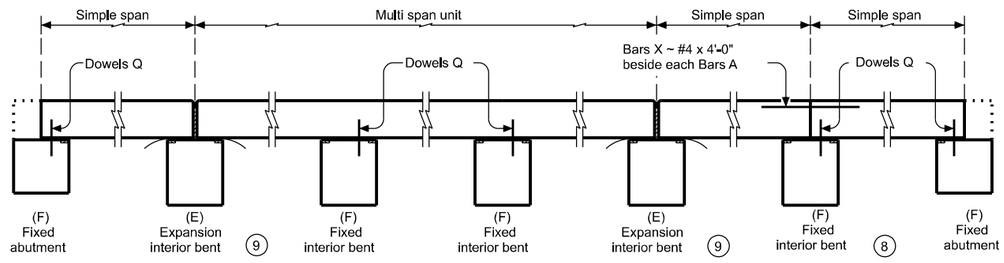
MODIFIED BRIDGE APPROACH SLAB 2



TYPE A JOINT DETAIL 10

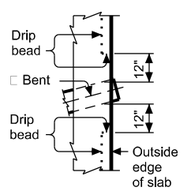


SEALED CONSTRUCTION JOINT DETAIL

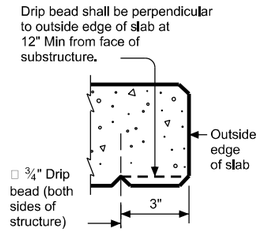


EXAMPLE OF FIXED AND EXPANSION BENTS 10

Showing C-I-P slab span with a 16" slab thickness.



PLAN



SECTION

DRIP BEAD DETAILS

ADJUSTMENT IN REINFORCING STEEL QUANTITIES

Rdwy Width	Fixed Condition 8		Expansion Condition 9	
	Add Bars X		Deduct Dowel Q	
	Add 2.67 lb/bar		Ded 2.25 lb/bar	
Ft	No.	Weight	No.	Weight
24	30	+80	5	-11
28	34	+91	5	-11
30	36	+96	5	-11
38	44	+118	5	-11
44	50	+134	5	-11

Note: The above quantities are for the fixed or expansion condition over one bent and are for information only.

1. Smooth trowel finish. Oil top of cap with 60 grade oil and apply heavy coat of powdered graphite. Press down one layer of 30# roofing felt.
2. See Bridge Layout to determine if approach slab is present.
3. Use with 14" slab thickness.
4. Use with 16" slab thickness.
5. See Abutment or Bent details for location of Dowels Q.
6. 1 ¼" backer road must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
7. Class 7 silicone sealant that conforms to DMS 6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.
8. Bars X required only when 2 simple spans are used together over a fixed interior bent. The use of 3 consecutive simple spans are not recommended nor supported by this standard.
9. Omit Dowels Q from expansion bents.
10. Recommended location of Type A joints are at the ends of 3 span units, ends of 2 span units supported by an interior bent, and no farther than 2 simple spans from an abutment.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Specifications.

Seal slab construction joints at bent locations with Class 4, 5, or 7 joint sealant (low modulus silicone.) See "Sealed Construction Joint Detail.

See Bridge Layout for joint type and location. Provide sealed construction joints or Type A joints.

Payment for Type A joints will be as per item 454, "Bridge Expansion Joints,"

Sealed construction joints are subsidiary to the span.

This standard does not support the use of transition bents.

HL93 LOADING

Texas Department of Transportation

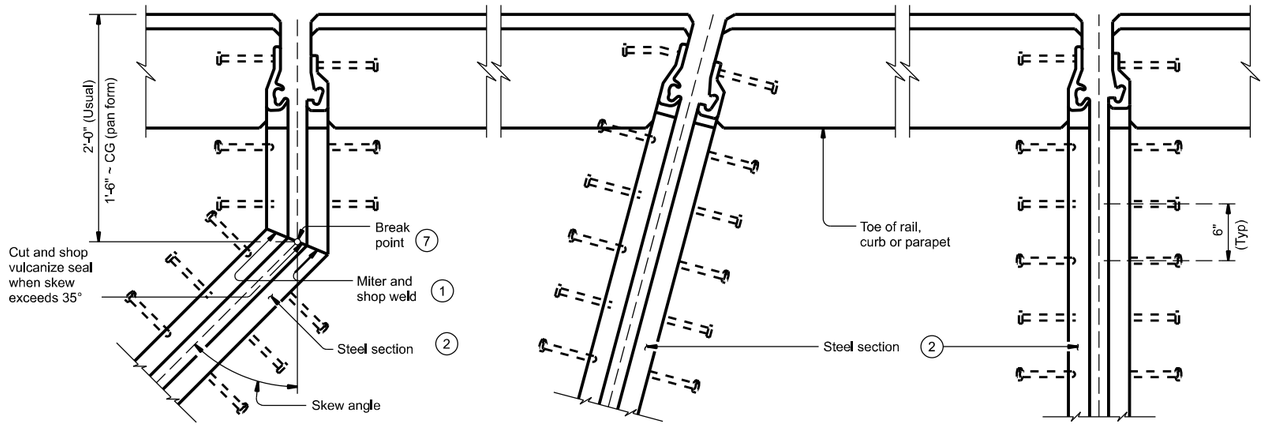
Bridge Division Standard

MISC DETAILS FOR C-I-P CONC SLAB SPANS

CS-MD

FILE: mcs01ste-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT July 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		74

DATE:
FILE:

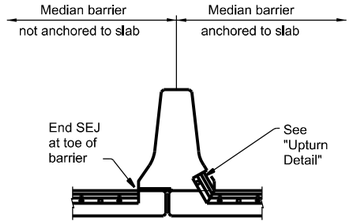


SHOWING SKEWS WITH SLAB BREAKBACKS

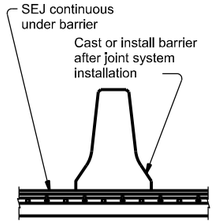
SHOWING SKEWS WITHOUT SLAB BREAKBACKS

SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

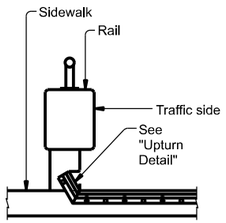
PLANS OF END CONDITIONS



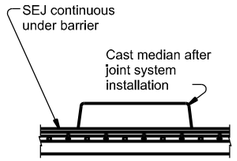
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



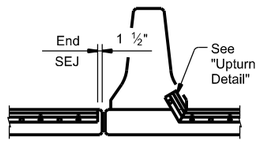
AT MEDIAN BARRIER



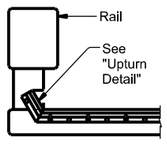
AT SIDEWALK BEHIND BRIDGE RAIL



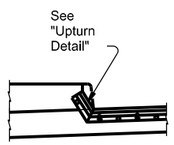
AT RAISED MEDIAN



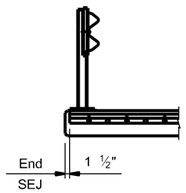
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

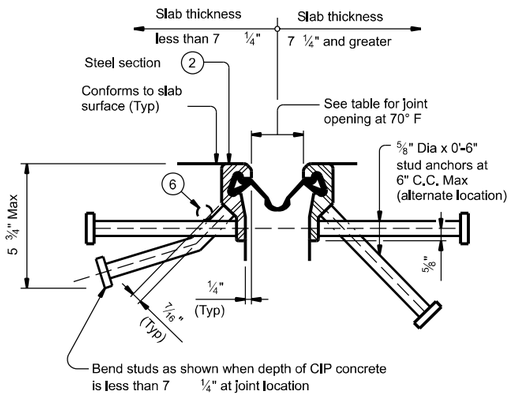


AT SIDEWALK

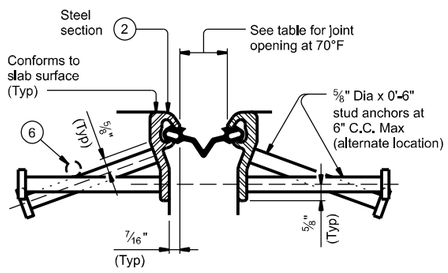


AT STEEL POST BRIDGE RAIL

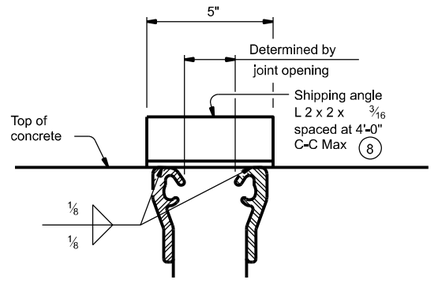
TYPICAL SECTIONS (5)



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



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



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

SHIPPING ANGLE

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

TABLE OF SEALED EXPANSION JOINT INFORMATION

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

REDUCED LONGITUDINAL MOVEMENT RANGE

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

DESIGN NOTES:

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

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

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

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

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

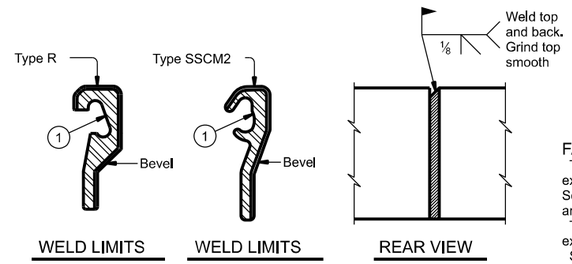
(4) Reduce for sidewalk or parapet heights less than 6".

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

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

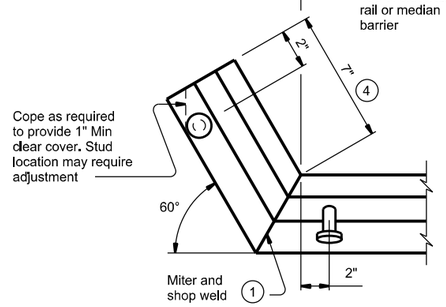
(7) See Span details for location of break point.

(8) Align shipping angle perpendicular to joint.



WELD LIMITS WELD LIMITS REAR VIEW

FIELD SPLICE DETAIL



UPTURN DETAIL

FABRICATION NOTES:

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

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

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

Weld studs in accordance with AWS D1.1.

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

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

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

CONSTRUCTION NOTES:

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

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

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

GENERAL NOTES:

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

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

Texas Department of Transportation

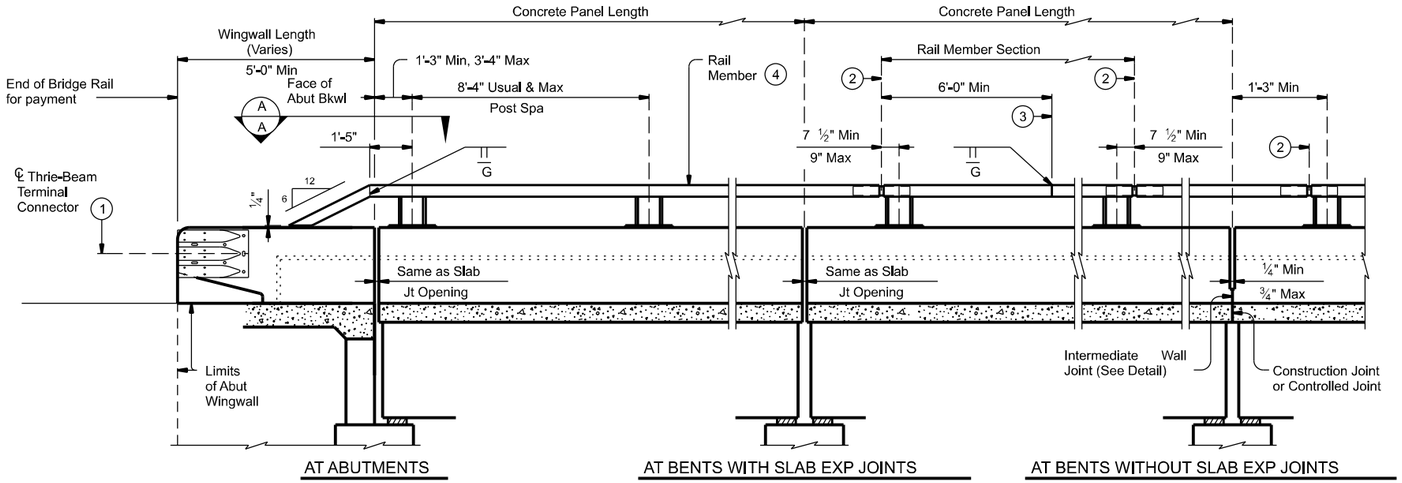
Bridge Division Standard

SEALED EXPANSION JOINT
TYPE M
WITHOUT OVERLAY

SEJ-M

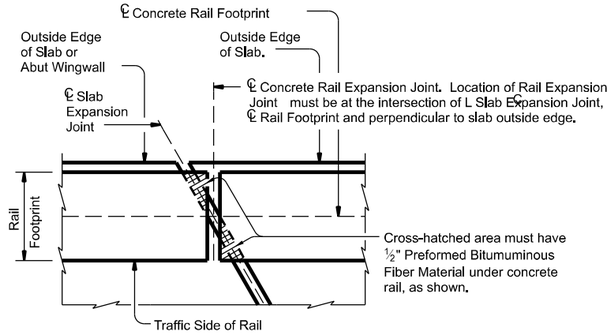
FILE: sejmste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		75

DATE:
FILE:



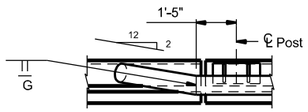
ROADWAY ELEVATION OF RAIL

(Rail Member showing Elliptical Tube Option, Rectangular Tube Option similar).



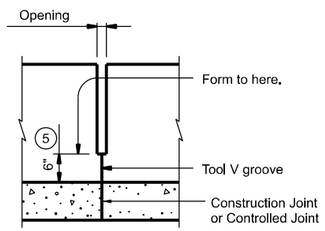
PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.



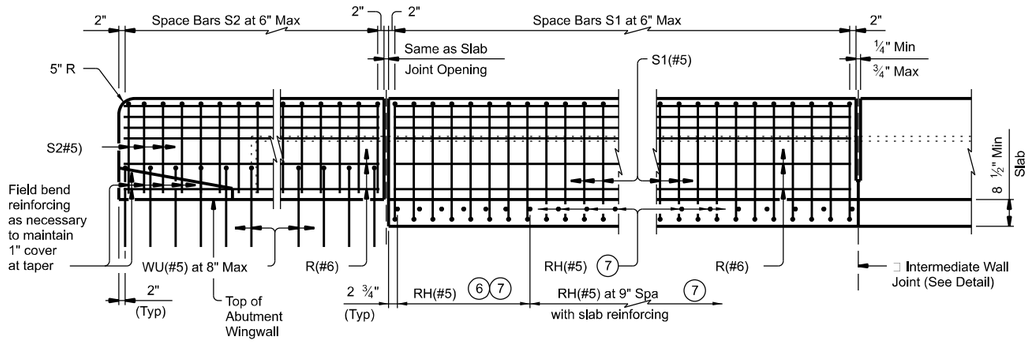
VIEW A-A

(Showing Rail Member turn-down)
(Rail Member showing Elliptical Tube Option, Rectangular Tube Option similar).

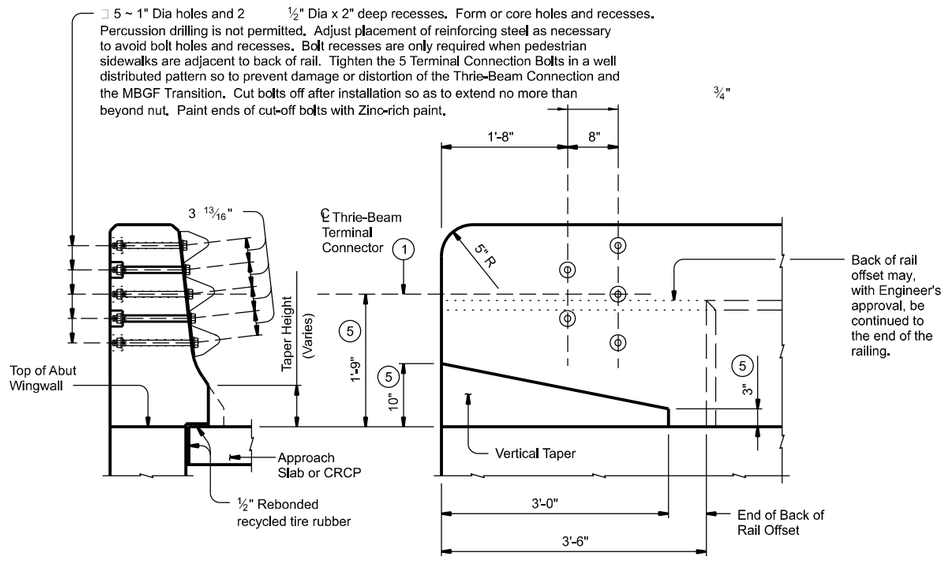


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



TERMINAL CONNECTION DETAILS

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge unless otherwise shown in the plans.
2. ℄ Exp Jt or Splice Jt as required.
3. One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove, double vee groove, or single groove. Grind smooth.
4. Unless directed otherwise by the Engineer, the Fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.
5. Increase 2" for structures with Overlay.
6. RH(#5) at 7" Spacing = 3'-6" with thickened slab end reinforcing.
7. Bars RH(#5) are part of rail reinforcing and are included in unit price bid for railing. Bars RH(#5) are in addition to slab overhang reinforcement shown elsewhere. Extend bars RH(#5) 2'-0" Min past □ of beam/girder. Space and bundle with adjacent slab bars G(#4) and bars A(#4). Match slab bar cover. (Typ)

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T80HT

FILE: rlstd015-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		76

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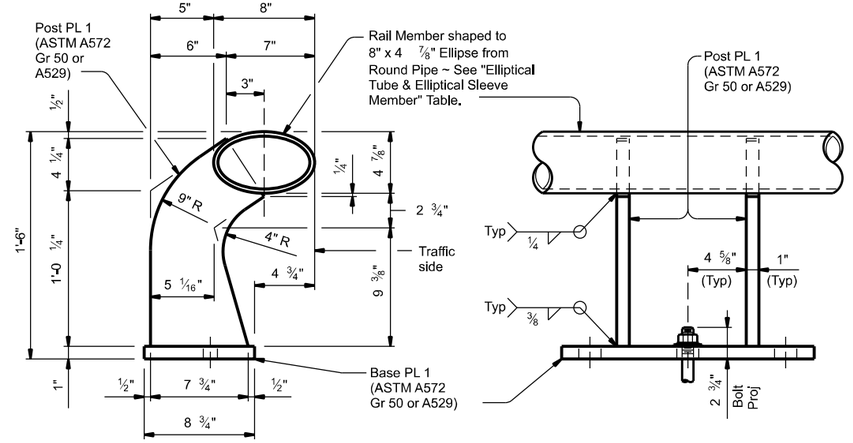
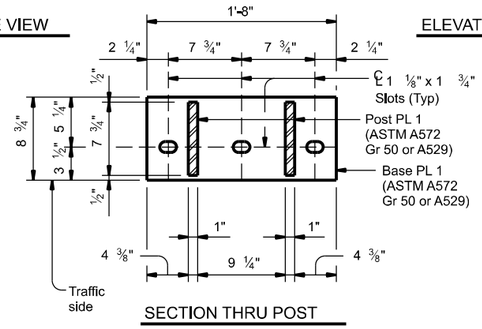
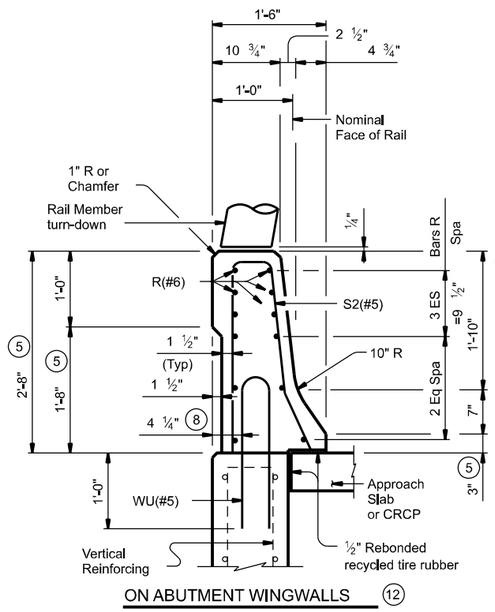
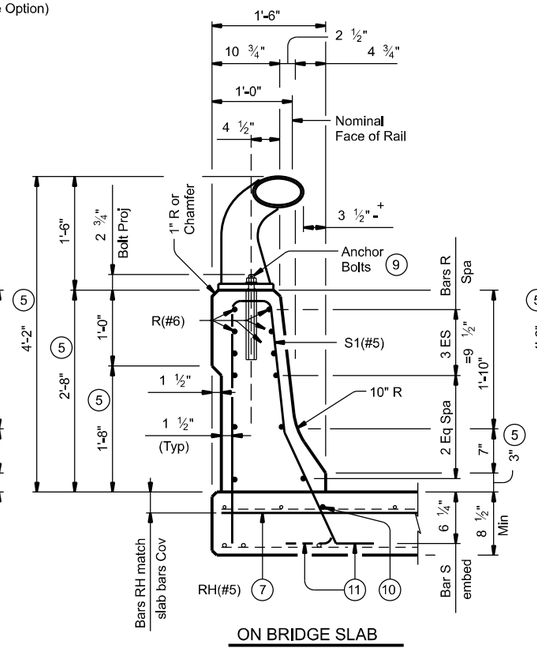




ELLIPTICAL TUBE WITH RAIL POST AND ANCHORAGE DETAILS

(Showing Elliptical Tube Option)

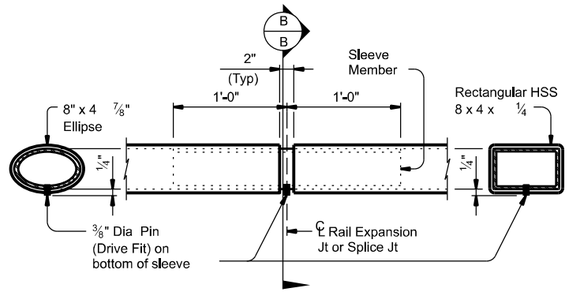




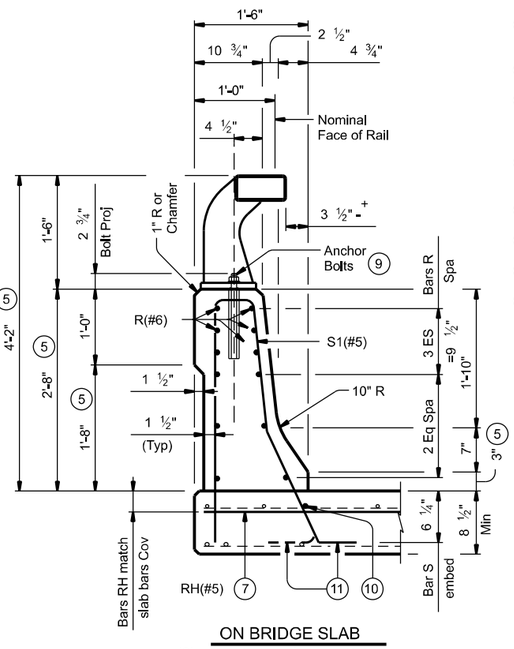
SECTIONS THRU RAIL (4)(12)

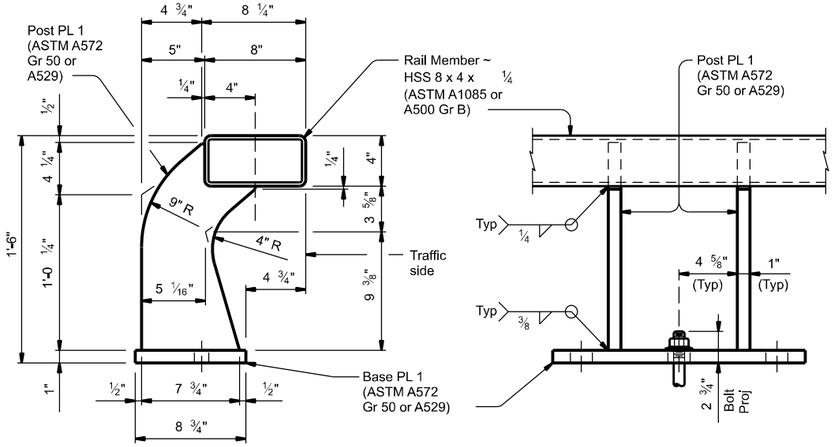
ELLIPTICAL TUBE & ELLIPTICAL SLEEVE MEMBER		
8" x 4 7/8" Ellipse	Elliptical Sleeve Member	
Material	Material	Thickness
6" Dia Std Pipe ASTM A53 E or S Gr B)	ASTM A53 Gr B	0.353"
	ASTM A36 or A500 Gr B	0.339"
	API-5LX52	0.224"
6 5/8" O.D. Pipe x 0.188" API-5LX52	ASTM A53 Gr B	0.339"
	ASTM A36 or A500 Gr B	0.325"
	API-5LX52	0.188"

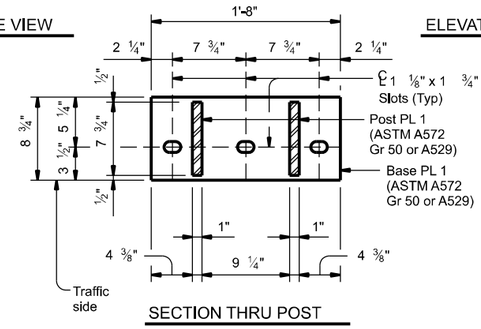
Notes: Other sections of equal or greater strength are acceptable for elliptical sleeves. The major and minor diameters of the rail member may vary +/- 0.1875" from plan dimension. However, the difference between the outside diameters of the elliptical sleeve and the inside diameters of the rail member cannot exceed 0.25 inches.



TUBE SPLICE DETAIL (4)







RECTANGULAR TUBE WITH RAIL POST AND ANCHORAGE DETAILS (4)

(Showing Rectangular Tube Option)

(4) Unless directed otherwise by the Engineer, the Fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.

(5) Increase 2" for structures with Overlay.

(7) Bars RH(#5) are part of rail reinforcing and are included in unit price bid for railing. Bars RH(#5) are in addition to slab overhang reinforcement shown elsewhere. Extend bars RH(#5) 2'-0" Min past ℄ of beam/girder. Space and bundle with adjacent slab bars G(#4) and bars A(#4). Match slab bar cover. (Typ)

(8) 5 1/4" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall.

(9) See "Material Notes" for Anchor Bolt information.

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

(11) Bar may be bent or adjusted as shown.

(12) Mounting this rail to retaining walls requires additional details not covered by this standard.

SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T80HT

FILE: rlstd015-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
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REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		77

DATE:
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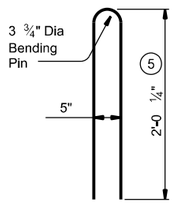
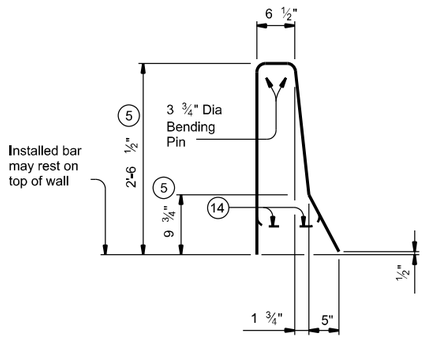
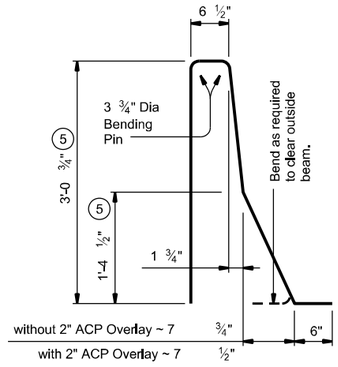


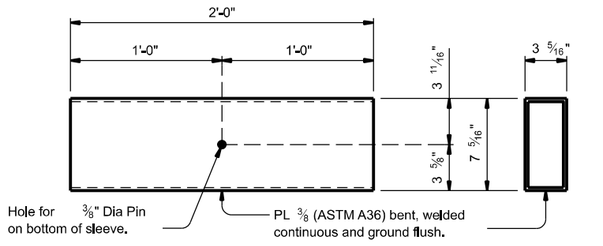
BARS WU (#5)



BARS S2 (#5)



BARS S1 (#5)



RECTANGULAR TUBE SLEEVE MEMBER DETAIL

(See Tube Splice Detail)

(4) Unless directed otherwise by the Engineer, the Fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.

(5) Increase 2" for structures with Overlay.

(7) Bars RH(#5) are part of rail reinforcing and are included in unit price bid for railing. Bars RH(#5) are in addition to slab overhang reinforcement shown elsewhere. Extend bars RH(#5) 2'-0" Min past □ of beam/girder. Space and bundle with adjacent slab bars G(#4) and bars A(#4). Match slab bar cover. (Typ)

(9) See "Material Notes" for Anchor Bolt information.

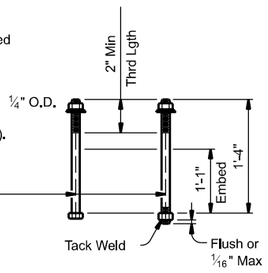
(13) See "Elevation Showing Typical Reinforcing Placement" for spacing RH(#5) bars.

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

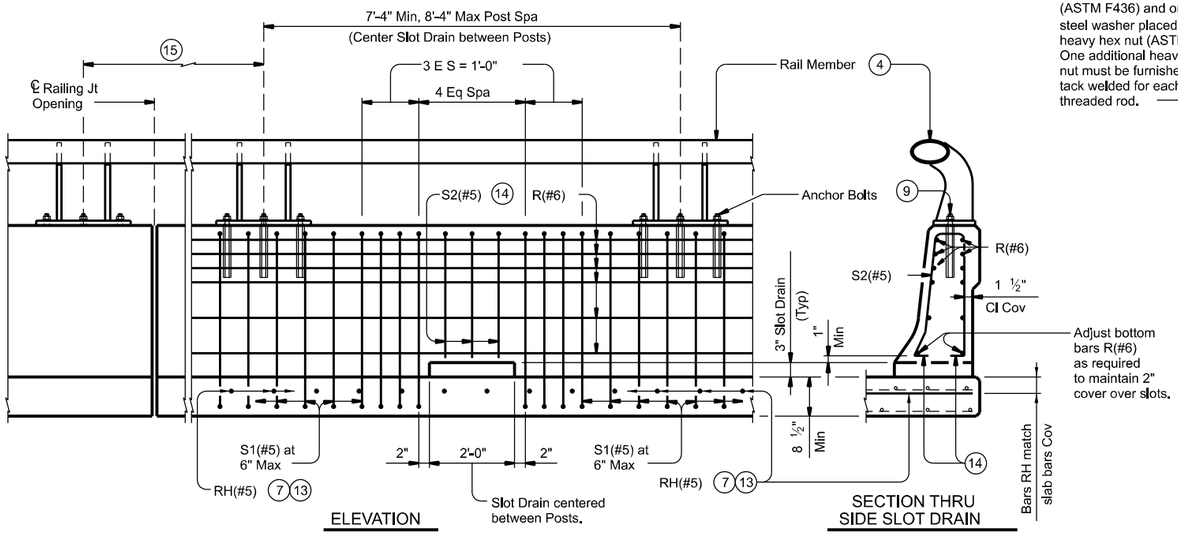
(15) Slots are not allowed in areas where there is a joint in the concrete panel between rail posts.

(16) Shop drawings for approval are required for tubular steel sections.

□ ⅞" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ASTM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one 2 steel washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod.



CAST-IN-PLACE ANCHOR BOLT OPTIONS (9)



OPTIONAL SIDE SLOT DRAIN DETAILS

Note: Center Side Slot Drains between rail posts within the limits shown. Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots are not permitted.

RAIL DATA FOR HORIZONTAL CURVES

	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
Rail Members	Over 2800'	29'-0"	Straight rail sections
	Over 1400' thru 2800'	14'-6"	To required radius or to chords shown (16)
	Over 700' thru 1400'	7'-3"	
	Thru 700'	Zero	To required radius (16)

CONSTRUCTION NOTES:

This rail may be slipformed if approved by the Engineer when adhesive anchor bolts are used. At the Contractor's option anchor bolts may be cast with the parapet. See "Material Notes". Slipforming parapet is not allowed if anchor bolts are cast with parapet wall.

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

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

Rail parapet must be plumb unless otherwise approved. Steel posts must be square to the top of parapet. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist.

Panel lengths of tube members must be attached continuously to a minimum of three posts.

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

Chamfer all exposed concrete corners.

MATERIAL NOTES:

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

Anchor bolts must be ⅞" Dia ASTM A193 Gr B7 fully threaded rods with heavy hex nuts, one hardened steel washer (ASTM F436), and one (2 ¼" O.D.) steel washer each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 10 ½". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 22 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

Optional cast-in-place anchor bolts must be ⅞" Dia ASTM F3125 Gr A325 or A449 bolts (or A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one heavy hex nut and one hardened steel washer (ASTM F436) plus one (2 ¼" O.D.) steel washer at each bolt. Nuts must conform to ASTM A563 requirements.

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

Provide Grade 60 reinforcing steel.

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

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars S1, S2 and WU unless noted otherwise.

Provide bar laps, where required, as follows: Uncoated or galvanized ~ #6 = 2'-5"
Epoxy coated ~ #6 = 3'-7"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-5 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

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

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

The T80HT Rail may terminate on the structure if safety considerations so allow. In this case, there must be a custom section, detailed elsewhere in the plans, transitioning between this and a normal traffic railing such as T551. See Bridge Layout for limits.

Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting to the Engineer for approval.

Average weight of railing with no overlay: 447 plf total
415 plf (Conc)
32 plf (Steel).

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

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T80HT

FILE: tlstd015-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
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REVISIONS	6433	62	001	SPUR 330, ETC.
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		78