FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	F 2021(836)		1
STATE	STATE DIST. NO.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0271	15	097	IH 610

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT
PROJECT NO. F 2021(836)
CSJ 0271-15-097

NET LENGTH OF PROJECT = 6,400 FT = 1.212 MILES — ROADWAY 1335.47 FT = 0.253 MILE; BRIDGE 5064.53 FT = 0.959 MILE

HARRIS COUNTY
IH 610

LIMITS: AT HOUSTON SHIP CHANNEL BRIDGE

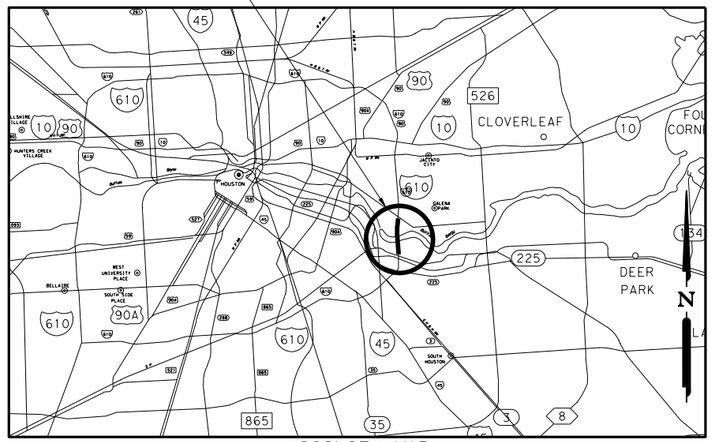
FOR STEEL BRIDGE MEMBER PAINTING

EXSITING NBI#: 12-102-0-0271-15-377

INDEX OF SHEETS

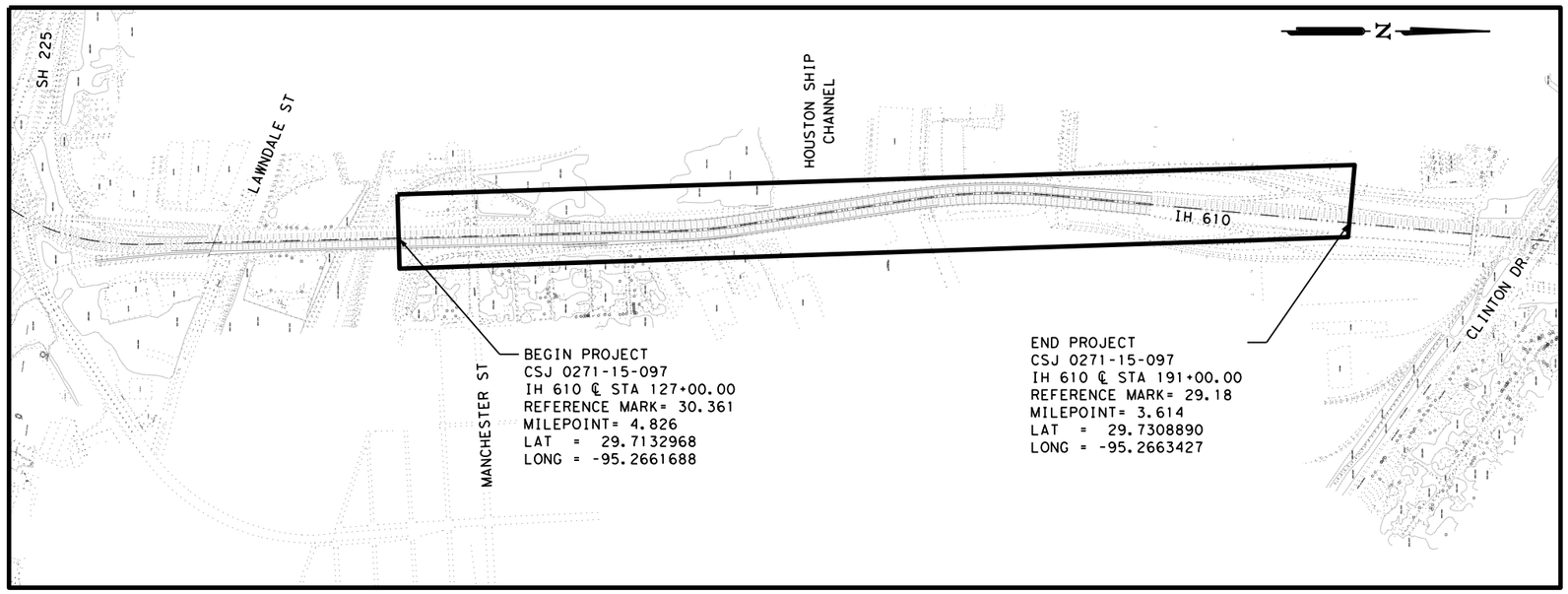
SEE SHEET 2 FOR INDEX OF SHEETS

PROJECT LOCATION



VICINITY MAP
N. T. S.

ADT (2021) = 197,000
ADT (2041) = 254,100
DESIGN SPEED : 55 MPH



LAYOUT MAP
N. T. S

EXCEPTIONS : NONE
EQUATIONS : YES
RR CROSSINGS : YES

NOTES:

SEE TRAFFIC CONTROL PLANS FOR BARRICADES AND WARNING SIGNS.

ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE. ALL DISTANCES AND COORDINATES SHOWN ARE SURFACE AND MAY BE CONVERTED TO A GRID BY DIVIDING BY A COMBINED SCALE FACTOR OF 1.00013.

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND THE SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT:
REQUIRED CONTRACT PROVISIONS, FEDERAL AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 2012).

COUNTY HARRIS PROJ. NO. F 2021(836)
HWY. NO. IH 610 LETTING DATE AUGUST 2021
DATE ACCEPTED _____.

DATE: 5/21/2021
pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\1. General\097GT.dgn

Texas Department of Transportation

SUBMITTED FOR LETTING: 05/21 20 21

Alan J. Wang, P.E.
SUPERVISING DESIGN ENGINEER

APPROVED FOR LETTING: 6/2/2021 20____

DocuSigned by:
James W. Koch , P.E.
FOR DISTRICT ENGINEER
6A2ACFA465C24C...

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	CSJ:0271-15-003
	CSJ:0271-15-005
	CSJ:0271-15-007

***	
***	

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED
PROFESSIONAL ENGINEER

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

Jessica Lynn Kephart, P.E. 06/18/2021

JESSICA KEPHART, P.E. DATE

Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE INDEX OF SHEET

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STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 6/18/2021
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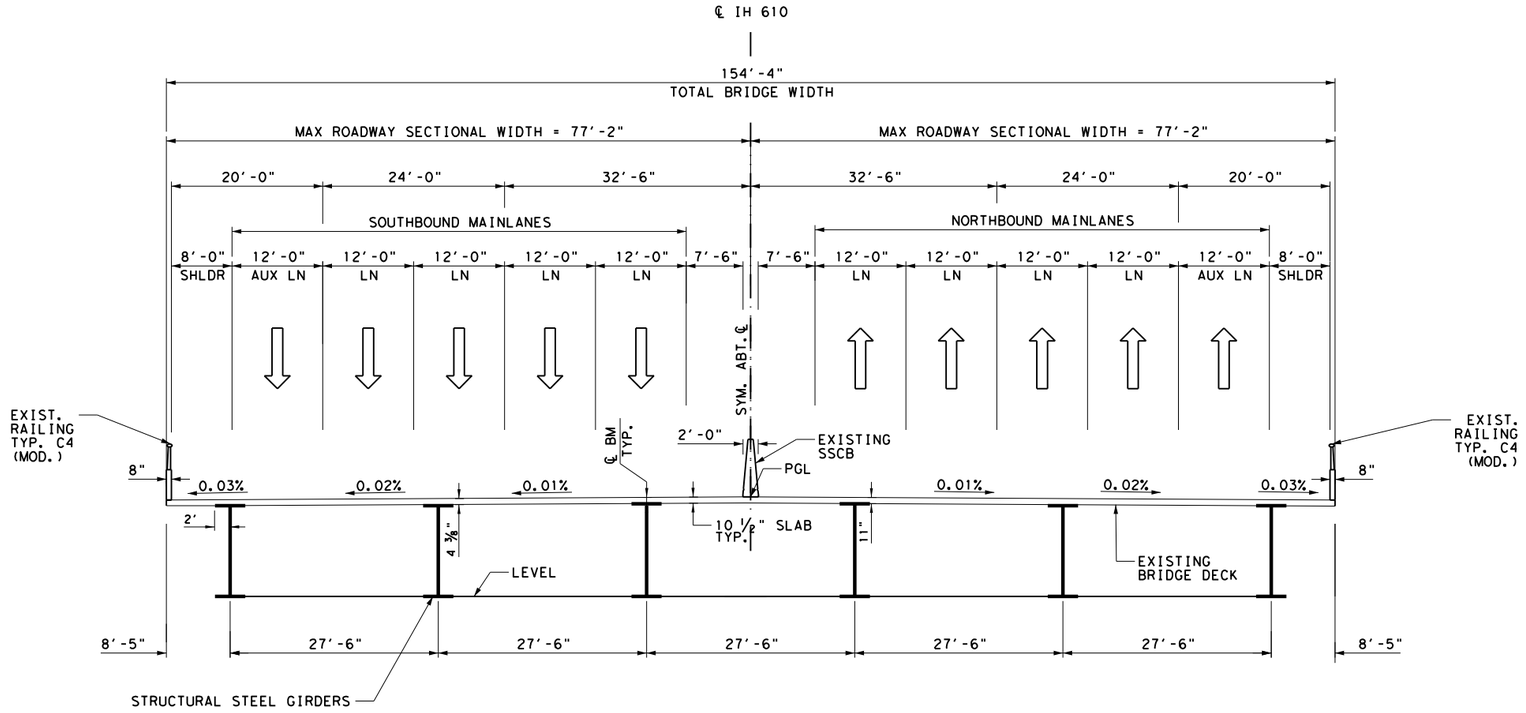

BRIDGE TYPICAL SECTION

BENT 45 AT STA 149+72.67
BENT 50 AT STA 162+06.53

NOTE:
SEE AS BUILT PLAN
CSJ: 0271-15-007
FOR MORE DETAIL INFORMATION

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.
05/21/2021

The seal appearing on this document was authorized by Jessica Lynn Kephart, P.E. 133487
Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act.

Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE TYPICAL SECTION

N.T.S.

SHEET 1 OF 1

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6	F 2021(836)	3

STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271150971\4 - Design\Plan Set\1. General\097GXT*TYPICAL.dgn

General Notes:

General:

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

Melody Galland, P.E., Area Engineer – Email: Melody.Galland@txdot.gov
David Lazaro, P.E., Assistant Area Engineer – Email: David.Lazaro@txdot.gov

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

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

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

TWIC Cards required at Bent 50 to access Port of Houston area. Comply with the following Security Laws and Regulations, etc.:

(a) Contractor shall comply with (and cause its employees, Subcontractors, agents and other workforce to comply with) all applicable federal, state, local and Port of Houston Authority security rules and regulations and all applicable training and licensing requirements, including without limitation, the facility access regulations set from time to time by the Port of Houston Authority, all applicable rules and regulations of the Transportation Worker Identification Credential ("TWIC") Program, and all requirements pertaining to the protection of "Sensitive Security Information" as set forth in 49 CFR 1520.

(b) Contractor shall ensure that all of its employees, Subcontractors and other persons needing unescorted access to secured areas of Port of Houston Authority facilities have obtained and have in their possession valid TWIC when the TWIC Program is in force at Port of Houston Authority's facilities. Contractor has the responsibility of ascertaining when such program is in force and causing itself, its employees, agents, Subcontractors and all others under its supervision or control to know and understand all TWIC regulations and comply with them. Contractor understands that Port of Houston Authority shall not have any duty whatsoever to provide TWIC escorts for Contractor, its employees, agents, Subcontractors and any others under its supervision or control.

(c) The Port of Houston Authority is not responsible for the cost of compliance for such rules, regulations and requirements. Contractor is required to obtain and be aware of all such rules, regulations and requirements, and represents to Port of Houston Authority that it is in compliance with these requirements.

(d) Contractor shall be fully liable for all damages, and for any fee fines and penalties assessed against the Port of Houston Authority (including without limitation, damages, fees, fines, and penalties as a consequence of the issuance of a notice violation, warning or other communication from the United

States Coast Guard or other Governmental Authority) by reason of Contractor's (or its workforce's) failure to comply with any and all such rules, regulations and requirements. Contractor assumes full responsibility for such violation, warning or other communication and shall immediately notify the Port of Houston Authority in writing of Contractor's receipt of such notice, warning or other communication.

(e) Contractor assumes full responsibility for compliance by all persons under its control with the TWIC Program, and for assuring that such persons timely obtain a TWIC and have a non-revoked TWIC in their possession at all times while in secured or restricted areas of the Port of Houston Authority's facilities, all in accordance with applicable regulations.

(f) Contractor shall notify the Coast Guard and the Port of Houston immediately in writing if any employee's, agent's or Subcontractor's TWIC is revoked, lost, damaged or stolen.

(g) Contractor shall sign such confidentiality agreements (and cause its employees, Subcontractors, agents and other workforce to do the same) as and when requested by the Port of Houston Authority with respect to information considered confidential and/or proprietary by the Authority.

(h) Contractor shall cause itself, its employees, Subcontractors, agents, and all others working under its control or supervision to know, understand and comply at all times with Port of Houston Authority's Credentialing Policy and Procedures as in effect from time to time.

(i) Prior to any employee or agent Contractor (or any other person authorized by Contractor) beginning work upon Port of Houston Authority property, Contractor shall obtain, and comply with, current Port of Houston Authority Credentialing Policy and Procedures. All personnel under the control of the Contractor, including Subcontractors, who will enter upon Port of Houston Authority property during the performance of the Work, shall be badged, and shall prominently display such badge, while on Port of Houston Authority property.

(j) IN ADDITION TO AND WITHOUT LIMITING ANY OTHER INDEMNITIES GIVEN BY THE CONTRACTOR UNDER THIS CONTRACT, CONTRACTOR SHALL DEFEND AND HOLD THE PORT OF HOUSTON AUTHORITY INDEMNITIES HARMLESS FROM ANY FAILURE OF CONTRACTOR, CONTRACTOR'S DIRECTORS, OFFICERS, EMPLOYEES, AGENTS, SUBCONTRACTORS, OR ANY OTHER PERSONS UNDER ITS CONTROL, SUPERVISION OR DIRECTION, TO OBSERVE ALL APPLICABLE TRANSPORTATION WORKER IDENTIFICATION CREDENTIAL (TWIC) LAWS AND REGULATIONS, OTHER SECURITY LAWS AND REGULATIONS, INCLUDING THOSE PERTAINING TO SENSITIVE SECURITY INFORMATION OR OTHER SECURITY INFORMATION DEEMED CONFIDENTIAL BY THE PORT OF HOUSTON AUTHORITY, AND ALL ACCESS REQUIREMENTS SET BY THE PORT OF HOUSTON AUTHORITY OR OTHER AUTHORITIES, AS WELL AS ALL OTHER REQUIREMENTS OF THIS CONTRACT, AND CONTRACTOR SHALL FULL REIMBURSE PORT OF HOUSTON AUTHORITY INDEMNITEES AND MAKE THEM WHOLE ON ACCOUNT OF ANY DAMAGES, FINES, FEES OR PENALTIES ON ACCOUNT OF SUCH FAILURE.

Coordinate with the Area Office for work performed over the Houston Ship Channel. Provide a schedule showing when work will be performed over the Houston Ship Channel to the United States Coast Guard representative, Sarah K Rousseau, *Email –sarah.k.rousseau@uscg.mil*.

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

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

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

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

If a foundation is to be placed where a riprap surface or an asphalt concrete surface presently exists, use caution in breaking out the existing surface for placement. Break out no greater area than is required to place the foundation. After placing the foundation, wrap the periphery with 0.5 in. pre-molded mastic expansion joint. Then replace the remaining portion of the broken out surface with Class A or Class C concrete or cold mix asphalt concrete to the exact slope, pattern, and thickness of the existing riprap or asphalt. Payment for breaking out the existing surface, wrapping the foundation, and replacing the surface is subsidiary to the various bid items.

The lengths of the posts for ground mounted signs and the tower legs for the overhead sign supports are approximate. Verify the lengths before ordering these materials to meet the existing field conditions and to conform to the minimum sign mounting heights shown in the plans.

Furnish aluminum Type A signs instead of plywood signs for signs shown on the Summary of Small Signs sheet.

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.

General: Roadway Illumination and Electrical

Coordinate with U.S. Coast Guard Waterways Management and Facilities Division Houston-Galveston Sector prior to turning off any navigation lights on bridge.

For roadway illumination and electrical items, use materials from pre-qualified producers as shown on the Construction Division (CST) of the Department's material producers list. Check the latest link on the Department's website for this list. The category/item is "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials found on this list.

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

The Contractor may make the electrical grounding connections and permissible splices using the thermal fusion process, Cadweld, ThermOweld, or approved equal, instead of bolted connections and splices.

The Area Engineer will arrange with the Contractor, an inspection of the completed electrical systems for the highway lighting systems before final acceptance for compliance with plans and specifications. The inspection will be made with personnel from the electrical section of the Department's District Transportation Operations Office. The city's electrical division personnel will also inspect lighting systems within the city limits. Portions of the work found to be deficient during this inspection will not be accepted.

General: Site Management

Mark stations every 100 ft. and maintain the markings for the project duration. Remove the station markings at the completion of the project. This work is subsidiary to the various bid items.

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.

If fences cross construction easements shown on the plans and work is required beyond the fences, remove and replace the fences as directed. This work and the materials are subsidiary to the various bid items.

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

General: Utilities

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

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

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

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

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

Item 5: Control of Work

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
Southeast Area Office	HOU-SEHAShpDrwgs@txdot.gov
Traffic Systems Construction Office	HOU-TSCShpDrwgs@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

Item 7: Legal Relations and Responsibilities

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

USACE regarding activities, including PSLs that have not been previously evaluated by the USACE. Provide the Department with a copy of consultations or approvals from the USACE before initiating activities.

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

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

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

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

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

Maintain the roadway slope stability. Maintaining slope stability is subsidiary to the various bid items.

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.

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

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

Provide a virus-free computer disk or other acceptable electronic media containing the Primavera construction schedule.

The Lane Closure Assessment Fee is $ *4,500*. This fee applies to the Contractor for closures or obstructions that overlap into restricted hour traffic for each hour or portion thereof, per lane, regardless of the length of lane closure or obstruction. For Restricted Hours subject to Lane Assessment Fee refer to the Item, "Barricades, Signs, and Traffic Handling."

Milestone 1

This milestone is for the bridge railing and deck repair on the Northbound side of the Houston Ship Channel Bridge.

Time charges for Milestone 1 commence with the beginning of the first Northbound full closure, or placement of the Phase 1 Traffic Control Plan.

Milestone 1 ends with the completion of the second Northbound full closure, and all Northbound lanes are open to traffic. The allowable number of days for milestone 1 is *144* working days.

The Contractor will receive a credit in the amount of $ 2,700 per day for early completion of Milestone 1. The maximum number of days for computing the incentive credit is 14 days. The maximum total amount of incentive is $ 37,800.

The Contractor will incur a disincentive in the amount of $2,700 per day charged when work on Milestone 1 extends beyond the 144 working days allowed for Milestone 1.

The tabulation below specifies the maximum allowable time for the project milestone, schedule of disincentives, and credit for early completion:

M.S. No.	Allowable No. of Working Days	Begin Milestone	End Milestone	Disincentives/Credit for Early Completion (per working day)	Maximum Allowable No. of Working Days for Early Completion	Maximum Credit Allowable for Early Completion
1	144	1st Full NB Closure	All NB lanes open to traffic	$2,700.00	14	$37,800.00

Milestone 2

This milestone is for the bridge railing and deck repair on the Southbound side of the Houston Ship Channel Bridge.

Time charges for Milestone 2 commence with the beginning of the first Southbound full closure, or placement of the Phase 2 Traffic Control Plan.

Milestone 2 ends with the completion of the second Southbound full closure, and all Southbound lanes are open to traffic. The allowable number of days for milestone 2 is *72* working days.

The Contractor will receive a credit in the amount of $ 25,000 per day for early completion of Milestone 2. The maximum number of days for computing the incentive credit is 14 days. The maximum total amount of incentive is $ 350,000.

The Contractor will incur a disincentive in the amount of $25,000 per day charged when work on Milestone 2 extends beyond the 72 working days allowed for Milestone 2.

The tabulation below specifies the maximum allowable time for the project milestone, schedule of disincentives, and credit for early completion:

M.S. No.	Allowable No. of Working Days	Begin Milestone	End Milestone	Disincentives/Credit for Early Completion (per working day)	Maximum Allowable No. of Working Days for Early Completion	Maximum Credit Allowable for Early Completion
1	72	1st Full SB Closure	All SB lanes open to traffic	$25,000.00	14	$350,000.00

After the project is substantially complete, when both Phase 1 & Phase 2 are complete, the liquidated damages become those based on contract administration costs.

Item 104: Removing Concrete

Removing concrete curb is paid as a separate bid item if the existing pavement on which it rests is not removed at the same time.

Items 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.

The approach pavement is paid for under the Item, "Concrete Pavement."

Item 420: Concrete Substructures

Unless otherwise noted, use Class C concrete with an ordinary surface finish for signal, lighting, or sign structure foundations.

Item 421: Hydraulic Cement Concrete

Entrained air is required in all slip formed concrete (bridge rail, concrete traffic barrier, pavement, etc.), but is not required for other structural concrete. Adjust the dosage of air entraining agent for low air content as directed or allowed by the Engineer. If entrained air is provided where not required, do not exceed the manufacturer's recommended dosage.

Item 429: Concrete Structure Repair

A minimum of two weeks prior to overhang repair work, coordinate with the Bridge Construction and Maintenance Division (BRG C&M) for the inspection of any bridge overhang repair work. Bridge inspector services can be requested by emailing BRG-FO-STL@txdot.gov.

Item 442: Metal for Structures

Use temperature zone 1 for Charpy V-Notch (CVN) testing.

Prestressed concrete panels will not be allowed on steel structures.

Item 502: Barricades, Signs, and Traffic Handling

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

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

Furnish and maintain the barricades and warning signs, including the necessary temporary and portable traffic control devices, during the various phases of construction. Place and construct these barricades and warning

signs in accordance with the latest "Texas Manual on Uniform Traffic Control Devices" for typical construction layouts.

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

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

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

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

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

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

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

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

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

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

One Lane Closure

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

Full Closure (Roadway / Ramps / Direct Connector)

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday	NONE	12:00 AM – 5:00 AM	5:00 AM – 11:59 PM
Tuesday	NONE	NONE	12:00 AM – 11:59 PM
Wednesday	NONE	NONE	12:00 AM – 11:59 PM
Thursday	NONE	NONE	12:00 AM – 11:59 PM
Friday	NONE	9:00 PM – 11:59 PM	12:00 AM – 9:00 PM
Saturday	5:00 AM – 7:00 PM	7:00 PM – 11:59PM 12:00 AM – 5:00 AM	NONE
Sunday	5:00 AM – 7:00 PM	7:00 PM – 11:59PM 12:00 AM – 5:00 AM	NONE

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 14 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.

Item 506: Temporary Erosion, Sedimentation and Environmental Controls

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

The Storm Water Pollution Prevention Plan (SWP3) consists of temporary erosion control measures needed and provided for under this Item. The disturbed area is less than one acre and use of erosion control measures is not

anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7. Since the disturbed area is less than 5 acres, a "Notice of Intent" (NOI) is not required.

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

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

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

Item 512: Portable Traffic Barrier

Transport Low Profile Concrete Barriers (LPCB) used for traffic handling from the Department's stockpile located on the north side of IH 610 at Long Drive.

Where required by the Engineer, provide anchor pins for Type 2 Low Profile Concrete Barriers (LPCB) as shown on the current LPCB standard. Anchor pins are subsidiary to the Low Profile Concrete Barrier.

Transport Standard Height Portable Traffic Barriers (including J-J Hook and Safety Shape) used for traffic handling from the Department's stockpile located on the south side of IH 610 at Cedar Crest Blvd. (located across IH 610 from Long Drive).

Use only the J-J Hook type connection between barriers.

After completing the project, return Low Profile Concrete Barriers (LPCB) used for traffic handling, to the Department's stockpile located on the north side of IH 610 at Long Drive. After completing the project, return the associated LPCB connecting hardware to the area office or as directed.

After completing the project, return Standard Height Portable Traffic Barriers (including J-J Hook and Single Slope) used for traffic handling, to the Department's stockpile located on the south side of at IH 610 at Cedar Crest Blvd. (located across IH 610 from Long Drive). After completing the project, return the associated Single Slope barrier connecting hardware to the area office or as directed.

After completing the project, Standard Height Safety Shape Portable Traffic Barriers used for traffic handling and the associated connecting hardware will become the property of the Contractor.

If placing the portable traffic barrier on pre-stressed concrete box beams with exposed reinforcing steel, protect the reinforcing steel by supporting the portable traffic barrier on 4 in. by 4 in. timbers. Place the timbers transversely and space them on 4 ft. centers. The cost of the labor and materials to perform this work are subsidiary to the Item, "Portable Traffic Barrier."

Item 545: Crash Cushion Attenuators

After completing the project, return remaining unused crash cushion attenuators units to the Area Office Maintenance yard or as directed, at no cost to the Department.

A MASH compliant crash cushion attenuator is required for every temporary and permanent installation.

Item 618: Conduit
Item 620: Electrical Conductors
Item 628: Electrical Services

If the specifications for electrical items require UL-listed products, this means UL-listed or CSA-listed.

Item 618: Conduit

When backfilling bore pits, ensure that the conduit is not damaged during installation or due to settling backfill material. Compact select backfill in 3 equal lifts to the bottom of the conduit; or if using sand, place it 2 in. above the conduit. Ensure backfill density is equal to that of the existing soil. Prevent material from entering the conduit.

Construct bore pits a minimum of 5 ft. from the edge of the base or pavement. Close the bore pit holes overnight.

Unless otherwise shown on the plans, install underground conduit a minimum of 24 in. deep. Install the conduit in accordance with the latest National Electrical Code (NEC) and applicable Department standard sheets. Place conduit under driveways or roadways a minimum of 24 in. below the pavement surface.

If using casing to place bored conduit, the casing is subsidiary to the conduit.

If placing the conduit under existing pavement to reach the service poles, bore the conduit in place and extend it a minimum distance of 5 ft. beyond the edge of shoulder or the back of curb.

Where PVC, duct cable, and HDPE conduit 1 in. and larger is allowed and installed per Department standards, provide a PVC elbow in place of the galvanized rigid metal elbow required by the Electrical Details standards. Ensure the PVC elbow is of the same schedule rating as the conduit to which it is connected. Use only a flat, high tensile strength polyester fiber pull tape to pull conductors through the PVC conduit system.

Remove conductor and conduit to be abandoned to 1 ft. below the ground level. This work is subsidiary to the various bid items.

Do not use cast iron junction boxes in concrete traffic barriers and single slope traffic barriers. Use polymer concrete junction boxes in place of the cast iron junction boxes shown on standard sheets CTBI (3), CTBI (4), and SSCB (4). Mount the junction boxes flush (+ 0 in., - 1/2 in.) with the concrete surface of the concrete barrier.

Use materials from pre-qualified producers as shown on the Department's Construction Division (CST) material producers list. Check the latest links on the Department's website for the list. The category is "Roadway Illumination and Electrical Supplies." The polymer concrete barrier box is subsidiary to Item 618, "Conduit."

Item 620: Electrical Conductors

Test each wire of each cable or conductor after installation. Incomplete circuits or damage to the wire or the cable are cause for immediate rejection of the entire cable being tested. Remove and replace the entire cable at no expense to the Department. Also test the replacement cable after installation.

When pulling cables or conductors through the conduit, do not exceed the manufacturer's recommended pulling tensions. Lubricate the cables or conductors with a lubricant recommended by the cable manufacturer.

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holders as shown on the Department's Construction Division (CST) material producers list. Check the latest link on the Department's website for this list. The category is "Roadway Illumination and Electrical Supplies." The fuse holder is shown on the list under Items 610 and 620. Provide 10 Amp time delay fuses.

Ensure that circuits test clear of faults, grounds, and open circuits.

Split bolt connectors are allowed only for splices on the grounding conductors.

For Roadside Flashing Beacon Assemblies (Item 685) and Pedestal Pole Assemblies (Item 687) within the project, provide single-pole breakaway disconnects as shown on the Construction Division (CST) material producers list. Check the latest link on the Department's website for this list. The category is "Roadway Illumination and Electrical Supplies." The fuse holder is shown on the list under Item 685. For underground (hot) conductors, install a breakaway connector with a dummy fuse (slug). Provide dummy fuse (slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).

For electrical licensing and electrical certification requirements for this project, see Item 7 of the Standard Specifications and any applicable special provisions to Item 7.

Item 628: Electrical Services

Verify and coordinate the electrical service location with the engineering section of the appropriate utility district or company.

Identify the electrical service pole with an address number assigned by the Utility Service Provider. Provide 2-in. numerals visible from the highway. Provide numbers cut out aluminum figures nailed to wood poles or painted figures on steel poles or service cabinets.

Item 662: Work Zone Pavement Markings

At the end of each workday, mark roadways that remain open to traffic during construction operations with standard pavement markings, in accordance with the latest "Texas Manual on Uniform Traffic Control Devices."

Using raised markers for removable work zone pavement markings on final concrete surfaces is optional.

For transition lane lines and detour lane lines, use raised pavement markers as shown for solid lines on the latest Barricade and Construction standard sheet for "Work Zone Pavement Marking Details."

Item 662: Work Zone Pavement Markings
Item 668: Prefabricated Pavement Markings
Item 6019: Longitudinal Prefabricated Pavement Markings (PPM) with Warranty
Item 6038: Multipolymer Pavement Markings (MPM)

Use Type III glass beads for thermoplastic and multipolymer pavement markings.

Use a 0.100 in. (100 mil) thickness for thermoplastic pavement markings, measured to the top of the thermoplastic, not including the exposed glass beads.

Use a 0.022 in. (22 mil) thickness for multipolymer pavement markings, measured to the top of the multipolymer, not including the exposed glass beads.

For roadways with asphalt surfaces to be striped with work zone or permanent thermoplastic markings, the Contractor has the option to apply paint and beads markings for a maximum 30-day period until placing the thermoplastic markings, or until starting the succeeding phase of work on the striped area. Maintain the paint and beads markings, at no expense to the Department, until placing the thermoplastic markings or starting the succeeding phase of work on the striped area. The work zone markings, whether paint and beads or thermoplastic, are paid under the Item, "Work Zone Pavement Markings" and the markings are paid for only once for the given phase of construction.

If using paint and bead markings as described above, purchase the traffic paint from the open market.

If the Type II markings become dirty and require cleaning by washing, brushing, compressed air, or other approved methods before applying the Type I thermoplastic markings, this additional cleaning is subsidiary to the Item, "Reflectorized Pavement Markings."

Establish the alignment and layout for work zone striping and permanent striping.

Stripe all roadways before opening them to traffic.

Place pavement markings under these items in accordance with details shown on the plans, the latest "Texas Manual on Uniform Traffic Control Devices," or as directed.

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

Item 672: Raised Pavement Markers

If other operations are complete on the project and if the curing time period is not yet elapsed, the contract time will be suspended until the curing is done.

Before placing the raised pavement markers on concrete pavement, blast clean the surface using an abrasive-blasting medium. This work is subsidiary to the Item, "Raised Pavement Markers."

Provide epoxy adhesive that is machine-mixed or nozzle-mixed and dispensed. Equip the machine or nozzle with a mechanism to ensure positive mix measurement control.

Item 677: Eliminating Existing Pavement Markings and Markers

Remove existing pavement markings on concrete or asphalt surfaces by flail milling or as directed.

Item 678: Pavement Surface Preparation for Markings

Do not blast clean asphalt concrete pavement. Clean asphalt concrete pavement as required under the applicable specifications or as directed.

On new concrete pavement or on existing concrete pavement when placing a new stripe on a new location, remove the curing compounds and contamination from the pavement surface by flail milling or as directed. In addition, air-blast the surface with compressed air just before placing the new stripe.

On existing concrete pavement when placing a new stripe on an existing location, after removing the existing stripe under the Item, "Eliminating Existing Pavement Markings and Markers," air-blast the surface with compressed air just before placing the new stripe.

Do not clean concrete pavement by grinding.

Item 738: Cleaning and Sweeping Highways

Mow areas of existing vegetation, collect and dispose of litter, and sweep the roadway within the project limits according to the following chart for the duration of the project or as directed. This work is paid for under their respective bid items.

Roadside Mowing	Litter Removal	Debris Removal	Cleaning and Sweeping Highways
0 cycles	*0* cycles	*0* cycles	*10* cycles

Item 778: Concrete Rail Repair (In-Kind)

Provide a signed and sealed plan for deck and rail repair locations for approval by the Engineer prior to work.

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 0271-15-097 **DISTRICT** Houston **COUNTY** Harris
HIGHWAY IH 610

		CATEGORY OF WORK		Roadway		Barricades		Mobilization		Bridge NBI: 121020027115377		Force Account		TOTAL EST.	TOTAL FINAL
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF							320.000				320.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF							2,040.000				2,040.000	
	429-6018	CONC STR REP (REMOVE AND REPL BM END)	CY							48.700				48.700	
	431-6002	PNEUMATICALLY PLACED CONC (REPAIR)	CF							60.000				60.000	
	438-6009	CLEANING EXISTING JOINTS	LF							620.000				620.000	
	446-6013	CLEAN & PAINT EXIST STR (SYSTEM III-A)	LS							1.000				1.000	
	500-6001	MOBILIZATION	LS					1.000						1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO			10.000								10.000	
	512-6013	PORT CTB (DES SOURCE)(SGL SLP)(TY 1)	LF	2,280.000										2,280.000	
	512-6021	PORT CTB (DES SOURCE)(LOW PROF)(TY 1)	LF	220.000										220.000	
	512-6022	PORT CTB (DES SOURCE)(LOW PROF)(TY 2)	LF	40.000										40.000	
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF	1,980.000										1,980.000	
	512-6037	PORT CTB (STKPL)(SGL SLP)(TY 1)	LF	2,280.000										2,280.000	
	512-6045	PORT CTB (STKPL)(LOW PROF)(TY 1)	LF	220.000										220.000	
	512-6046	PORT CTB (STKPL)(LOW PROF)(TY 2)	LF	40.000										40.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	1.000										1.000	
	545-6004	CRASH CUSH ATTEN (STKPL)	EA	4.000										4.000	
	545-6007	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	EA	1.000										1.000	
	545-6010	CRASH CUSH ATTEN (INSTL)(L)(W)(TL3)	EA	3.000										3.000	
	550-6003	CHAIN LINK FENCE (REMOVE)	LF							140.000				140.000	
	550-6008	CHAIN LINK FENCE (INSTALL) (8')	LF							3,818.000				3,818.000	
	617-6001	TEMP RD IL (RD IL ASM)	EA	6.000										6.000	
	618-6070	CONDT (RM) (2")	LF	100.000										100.000	
	620-6007	ELEC CONDR (NO.8) BARE	LF	120.000										120.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF	240.000										240.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	8,217.000										8,217.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	341.000										341.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	1.000										1.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	1.000										1.000	
	668-6115	PREFAB PAV MRK TY C (MULTI) (SHIELD)	EA	1.000										1.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	171.000										171.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	8,792.000										8,792.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	1,938.000										1,938.000	
	677-6004	ELIM EXT PAV MRK & MRKS (10")	LF	690.000										690.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF	205.000										205.000	
	677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	1.000										1.000	
	677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	1.000										1.000	
	677-6022	ELIM EXT PAV MRK & MRKS (SHEILD)	EA	1.000										1.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	8,792.000										8,792.000	
	678-6004	PAV SURF PREP FOR MRK (8")	LF	1,938.000										1,938.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0271-15-097 **DISTRICT** Houston **COUNTY** Harris
HIGHWAY IH 610

CATEGORY OF WORK				Roadway		Barricades		Mobilization		Bridge NBI: 121020027115377		Force Account		TOTAL EST.	TOTAL FINAL
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	678-6005	PAV SURF PREP FOR MRK (10")	LF	690.000										690.000	
	678-6006	PAV SURF PREP FOR MRK (12")	LF	205.000										205.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	1.000										1.000	
	678-6016	PAV SURF PREP FOR MRK (WORD)	EA	1.000										1.000	
	678-6025	PAV SURF PREP FOR MRKS (SHIELD)	EA	1.000										1.000	
	738-6001	CLEANING / SWEEPING (CENTER MEDIAN)	CYC	10.000										10.000	
	738-6003	CLEANING / SWEEPING (OUTSIDE MAIN LANE)	CYC	10.000										10.000	
	778-6001	CONCRETE RAIL REPAIR (IN-KIND)	LF							140.000				140.000	
	4187-6001	REMOV & REPL TAR WITH STRUCTURAL GROUT	EA							1.000				1.000	
	5087-6001	BIRD DETERRENT	LF							41.000				41.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	1,800.000										1,800.000	
	6019-6006	PREFB PV MK W/WNTY TY B (W)(6")(SLD)	LF	3,155.000										3,155.000	
	6019-6007	PREFB PV MK W/WNTY TY B(W)6"(BRK)CNTST	LF	690.000										690.000	
	6038-6004	MULTIPOLYMER PAV MRK (W)(6")(SLD)	LF	5,575.000										5,575.000	
	6038-6006	MULTIPOLYMER PAV MRK (W)(6")(DOT)	LF	62.000										62.000	
	6038-6007	MULTIPOLYMER PAV MRK (W)(8")(SLD)	LF	1,938.000										1,938.000	
	6038-6012	MULTIPOLYMER PAV MRK (W)(12")(LNDP)	LF	205.000										205.000	
	6185-6002	TMA (STATIONARY)	DAY	128.000										128.000	
	18	RAILROAD FLAGGING: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)										1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)										1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)										1.000		1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)										1.000		1.000	

TRAFFIC CONTROL QUANTITIES											
502	512							545			
6001	6013	6021	6022	6025	6037	6045	6046	6003	6004	6007	6010
BARRICADES, SIGNS AND TRAFFIC HANDLING	PORT CTB (DES SORCE) (SGL SLOPE)(TY1)	PORT CTB (DES SOURCE)(LOW PROF)(TY 1)	PORT CTB (DES SOURCE)(LOW PROF)(TY 2)	PORT CTB (MOVE)(SGL SLOPE)(TY 1)	PORT CTB (STKPL)(SGL) SLOPE (TY1)	PORT CTB (STKPL)(LOW PROF)(TY 1)	PORT CTB (STKPL)(LOW PROF)(TY 2)	CRASH CUSH ATTEN (MOVE& RESET)	CRASH CUSH ATTEN (STKPL)	CRASH CUSH ATTEN (INSTL) (L)(N)(TL3)	CRASH CUSH ATTEN (INSTL) (L)(W)(TL3)
MO	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA
10	2280	220	40	1980	2280	220	40	1	4	1	3

TRAFFIC CONTROL QUANTITIES			
662		6001	6185
6063	6095	6001	6002
WK ZN PAV MRK REMOV (W)4"(SLD)	WK ZN PAV MRK REMOV (Y)4"(SLD)	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)
LF	LF	DAY	DAY
8217	341	1800	128

MAINTENANCE QUANTITIES	
738	
6001	6003
CLEANING / SWEEPING (CENTER MEDIAN)	CLEANING /SWEEPING (OUTSIDE MAIN LANE)
CYC	CYC
10	10

Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE SUMMARY OF TCP AND MAINTENANCE QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		6
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

LIGHTING QUANITITIES			
618	620		617
6070	6007	6008	6001
CONDUIT RM (2")	ELEC COND (NO.8) BARE	ELEC COND (NO.8) INSULATED	TEMP RD IL (RD IL ASM)
LF	LF	LF	EA
100	120	240	6

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
SUMMARY LIGHTING QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		7
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES

LAYOUT SHEET NO.	STATION FROM	STATION TO	658-INSTL DEL ASSM (6013) (D-SW) SZ (BRF) CTB	658-INSTL DEL ASSM (6027) (D-SY) SZ (BRF) CTB (BI)	668-PREFAB PAV MRK (6077) TY C (W) (ARROW)	668-PREFAB PAV MRK (6078) TY C (W) (DBL ARROW)	668-PREFAB PAV MRK (6084) TY C (W) (NUMBER)	668-PREFAB PAV MRK (6085) TY C (W) (WORD)	668-PREFAB PAV MRK (6115) TY C (MULTI) (SHIELD)	672 (6010) REFL PAV MRKR TY II-C-R	677 ELIM EXT PAV MRK & MRKS 6002 (6")	6003 (8")	6004 (10")	6005 (12")	6007 (24")	6008 (ARROW)	6009 (DBL ARROW)	6012 (WORD)	6022 (SHIELD)	6028 (RUMBLE STRIP)
			EA	EA	EA	EA	EA	EA	EA	EA	LF	LF	LF	LF	LF	EA	EA	EA	EA	LF
CSJ: 0271-15-097 IH 610																				
1	127+00	139+00	-	-	1	-	-	1	1	92							-			-
2	139+00	151+00	-	-	-	-	-	-	-	35				-	-	-	-	-	-	-
3	151+00	163+00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
4	163+00	175+00	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
5	175+00	187+00	-	-	-	-	-	-	-	39				-	-	-	-	-	-	-
6	187+00	199+00	-	-	-	-	-	-	-	5								-	-	
TOTAL			-	-	1	-	-	1	1	171	-	-	-	-	-	-	-	-	-	-

LAYOUT SHEET NO.	STATION FROM	STATION TO	678-PAVT SURF PREPARATION FOR MARKINGS (6002) 6"	(6004) 8"	(6005) 10"	(6006) 12"	(6009) (ARROW)	(6010) (DBL ARROW)	(6015) (NUMBER)	(6016) (WORD)	(6025) (SHIELD)	6019 (6006) PREFAB PV MK W/WNTY TY B(W) (6")(SLD)	(6007) * PREFAB PV MK W/WNTY TY B(W) 6"(BRK)CNTST	6038-MULTIPOLYMER PAV MRK (6004) (W)(6") (SLD)	(6005) (W)(6") (BRK)	(6006) (W)(6") (DOT)	(6007) (W)(8") (SLD)	(6011) (W)(12") (SLD)	(6012) (W)(12") (LNDP)	(6017) (Y)(6") (SLD)	6056 (6001) PREFORMED IN-LANE (TRANS) RUMBLE STRIP
			LF	LF	LF	LF	EA	EA	EA	EA	EA	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF
CSJ: 0271-15-097 IH 610																					
1	127+00	139+00	2960	1078	75	205	1	-	-	1	1	1200	75	1760	-	-	1078	-	205	-	-
2	139+00	151+00	2562	320	275	-	-	-	-	-	-	700	275	1800	-	62	320	-	-	-	-
3	151+00	163+00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	163+00	175+00	2030	-	-	-	-	-	-	-	-	1015	-	1015	-	-	-	-	-	-	-
5	175+00	187+00	840	540	240	-	-	-	-	-	-	240	240	600	-	-	540	-	-	-	-
6	187+00	199+00	400	-	100	-	-			-	-	-	100	400		-	-		-	-	
TOTAL			8792	1938	690	205	1	-	-	1	1	3155	690	5575	-	62	1938	-	205	-	-

* CNTST W/ 2" BLACK ON EACH SIDE (10" TOTAL WIDTH)

Texas Department of Transportation

SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES

SHEET 1 OF 1

STATE	FEDERAL	PROJECT NO.		SHEET
DISTRICT	REGION			8
HOU	6			HIGHWAY
COUNTY	CONTROL	SECTION	JOB	NO.
HARRIS	0271	15	097	IH 610

Beginning of Project

- Place (7) Portable Changeable Message Signs (PCMS) at locations shown in "IH 610 Ship Channel Bridge Northbound Total Closure Portable Changeable Message Signing (WKND Only)" sheet 14 days in advance of implementing Phase 1 TCP. PCMS will provide advance notification to public to expect lane closures and delays. Location and message may be determined by the Field Engineer.
- Submit request for weight restriction with the Texas Department of Motor Vehicles for the work zone.
- Place (4) PCMS at Northbound and Southbound locations shown in "Advance Warning Signs" Sheets 7 days in advance of beginning construction activities. PCMS will provide advance notification to public of overweight load restrictions throughout work zone. PCMS will remain in place throughout all phases of construction. Location and message may be determined by the Field Engineer.
- Utilize dynamic message signs (DMS) as shown in "IH 610 Ship Channel Bridge Northbound Total Closure Dynamic Message Sign (WKND Only)" sheet 14 days in advance of implementing Phase 1 TCP. DMS will provide advance notification to public to expect lane closures and delays. Exact wording of advance notification messages to be determined by the Field Engineer.
- Mobilize equipment, materials, labor, etc. to contractor work zone.
- Place "Bent 45 Lower Level" and "Bent 50 Lower Level" TCP as needed.
- Begin work on concrete spalling and steel sand-blasting & repainting areas.

Phase 1

- Install project signs as shown on the "Advance Warning Signs" sheets.
- Install SWP3 devices.
- Clean finger joint bladders.
- Perform weekend IH 610 Total Northbound Closure to perform traffic switch to Phase 1 TCP per "IH 610 Phase 1 Traffic Control Plan" sheets.
- Perform repairs to Northbound deck/rail repair areas.
- Perform clean-up on work area.
- Place (8) Portable Changeable Message Sign (PCMS) at locations shown in "IH 610 Ship Channel Bridge Southbound Total Closure Portable Changeable Message Signing (WKND Only)" and "IH 610 Ship Channel Bridge Northbound Total Closure Portable Changeable Message Signing (WKND Only)" sheets 14 days in advance of Southbound and Northbound Total Closures. PCMS will provide advance notification to public to expect lane closures and delays. Location and message may be determined by the Field Engineer.
- Utilize dynamic message signs (DMS) as shown in "IH 610 Ship Channel Bridge Southbound Total Closure Dynamic Message Sign (WKND Only)" sheets and in "IH 610 Ship Channel Bridge Northbound Total Closure Dynamic Message Sign (WKND Only)" 14 days in advance of Northbound and Southbound Closure. DMS will provide advance notification to public to expect lane closures and delays. Exact wording of advance notification messages to be determined by the Field Engineer.

Phase 2

- Perform weekend IH 610 Southbound and Northbound Total Closures to perform traffic switch form Phase 1 TCP to Phase 2 TCP per "IH 610 Phase 2 Traffic Control Plan" sheets.
- Perform repairs to Southbound deck/rail repair areas.
- Perform clean-up on work area.
- Place (1) Portable Changeable Message Sign (PCMS) at locations shown in "IH 610 Ship Channel Bridge Southbound Total Closure Portable Changeable Message Signing (WKND Only)" 14 days in advance of Southbound Closure. PCMS will provide advance notification to public to expect lane closures and delays. Location and message may be determined by the Field Engineer.
- Utilize dynamic message signs (DMS) as shown in "IH 610 Ship Channel Bridge Southbound Total Closure Dynamic Message Sign (WKND Only)" sheets 14 days in advance of Northbound Closure. DMS will provide advance notification to public to expect lane closures and delays. Exact wording of advance notification messages to be determined by the Field Engineer.
- Perform clean-up on work area.
- Perform weekend IH 610 Southbound Total Closure to remove Phase 2 TCP.

End of Project

- Remove "Bent 45 Lower Level" and "Bent 50 Lower Level" TCP.
- Remove all traffic control devices, advanced warning signs, and SW3P devices.
- Submit request to remove weight restriction with the Texas Department of Motor Vehicles for the work zone.

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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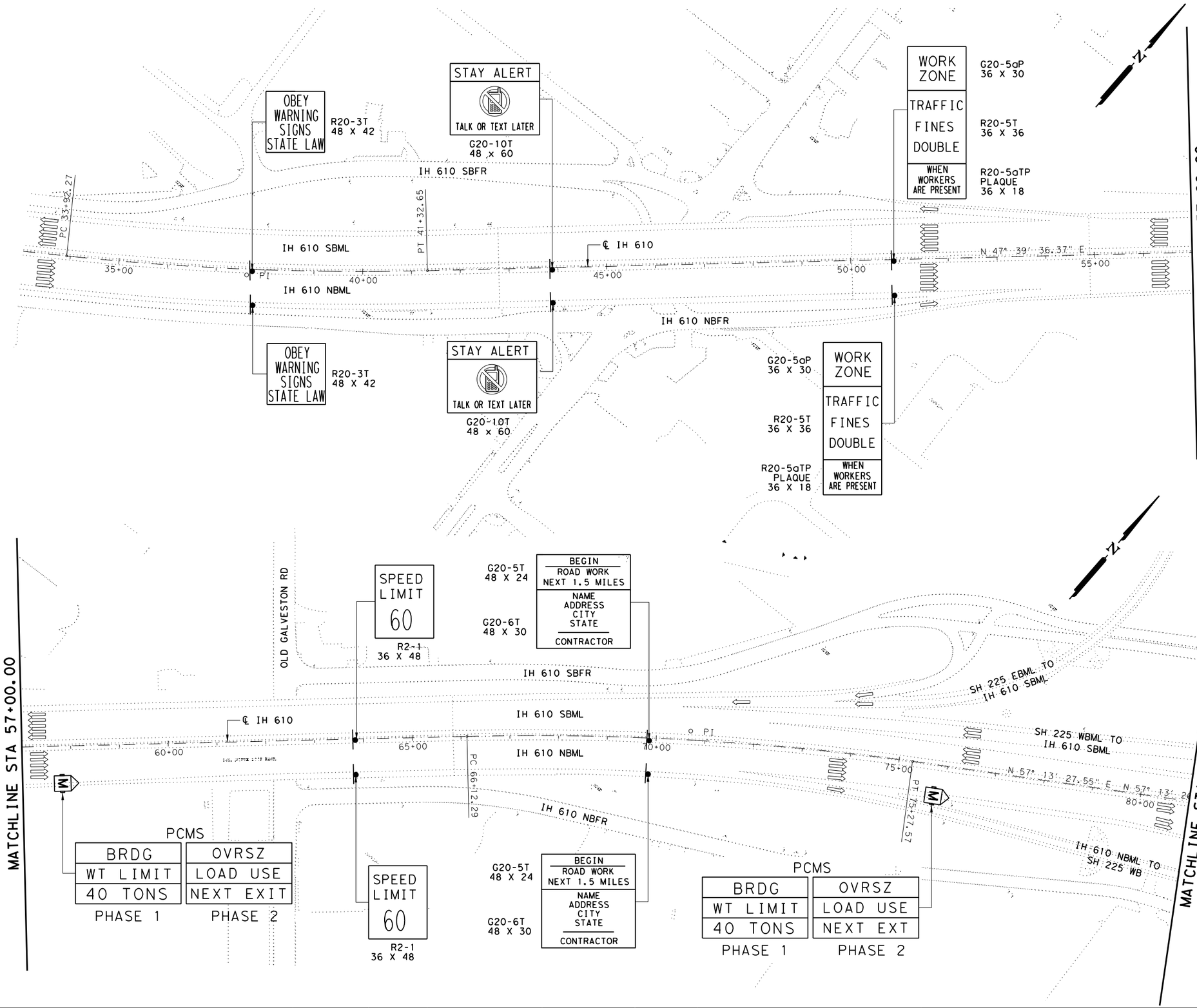
IH 610 SHIP CHANNEL BRIDGE TRAFFIC CONTROL PLAN PHASING NARRATIVE

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		9
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



NOTES:

1. FOR ALIGNMENT INFORMATION SEE SHEETS 106-122.
2. COVER EXISTING CONFLICTING SIGNS AS DIRECTED
3. EXACT SIGN LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS TO BE DETERMINED BY ENGINEER.

LEGEND

- SIGN
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TY III BARRICADE
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
ADVANCE WARNING SIGNS

BEGIN TO
℄ IH 610 TO STA 81+00.00

SCALE: 1" = 200' HORZ

SHEET 1 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		10
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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NOTES:

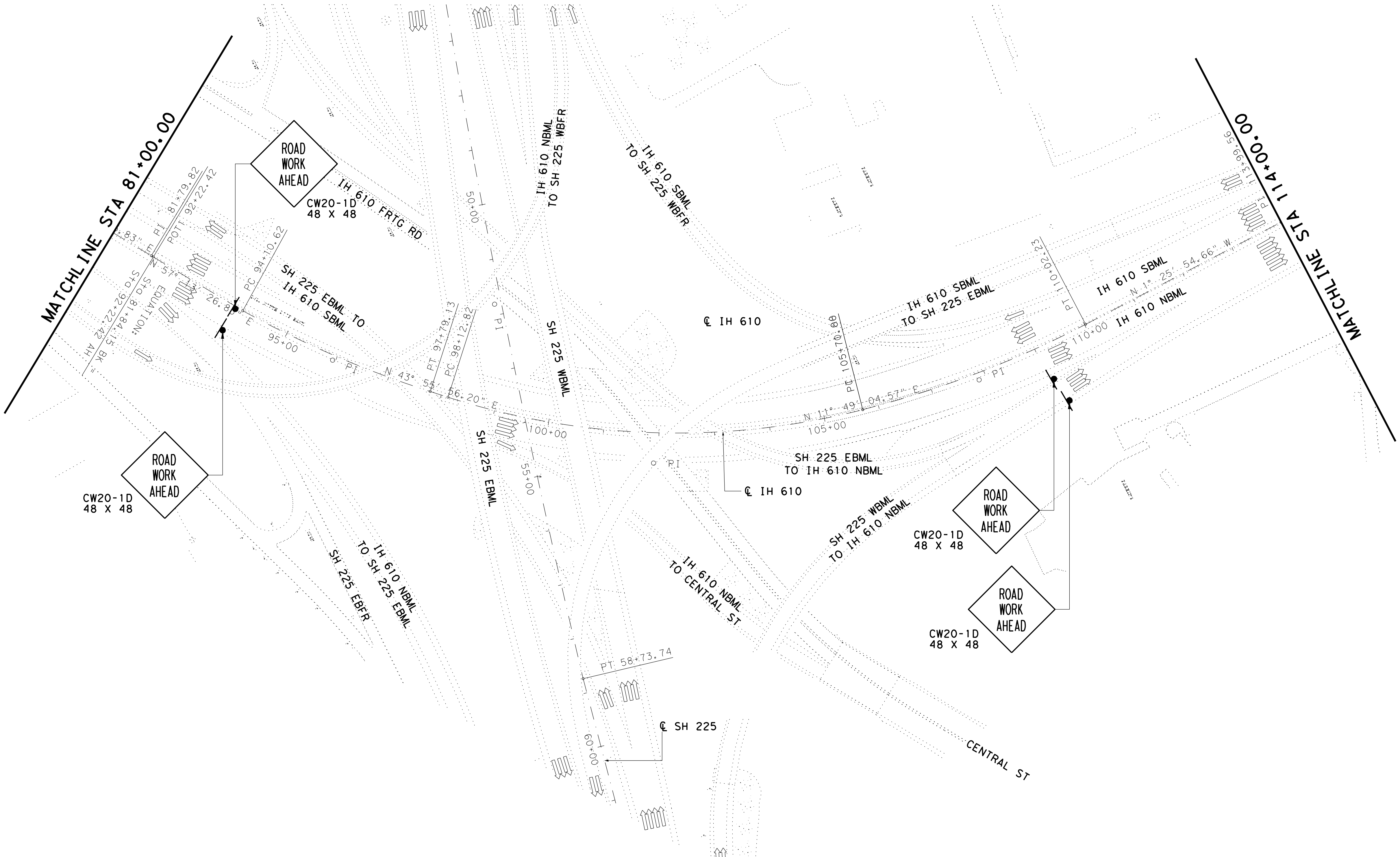
1. FOR ALIGNMENT INFORMATION SEE SHEETS 106-122.
2. COVER EXISTING CONFLICTING SIGNS AS DIRECTED
3. EXACT SIGN LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS TO BE DETERMINED BY ENGINEER.

LEGEND

	SIGN
	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	TY III BARRICADE
	CHANNELIZING DEVICES
	EXIST TRAFFIC LANE
	OPEN TO TRAFFIC LANE

NOTES:

STATION EQUATION AS SHOWN.



Jessica Lynn Kephart, P.E.

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STATE OF TEXAS — JESSICA LYNN KEPHART — 133487 — LICENSED PROFESSIONAL ENGINEER

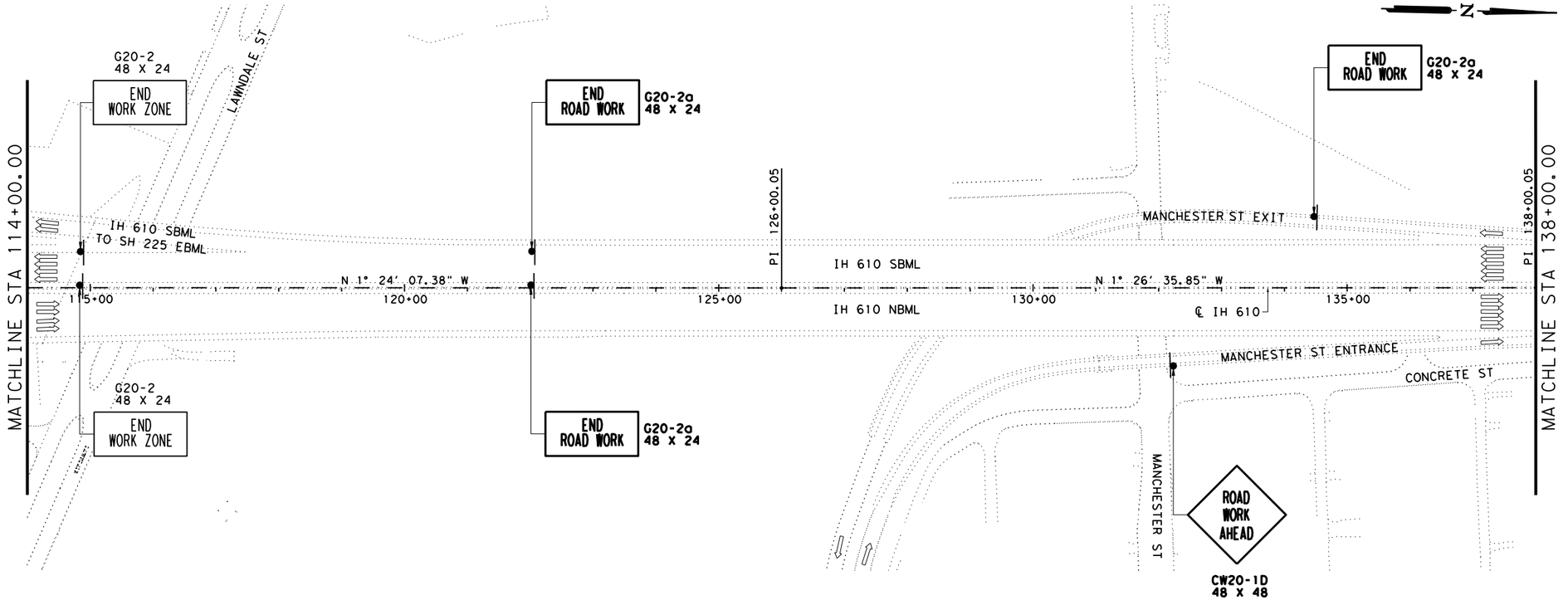
Texas Department of Transportation

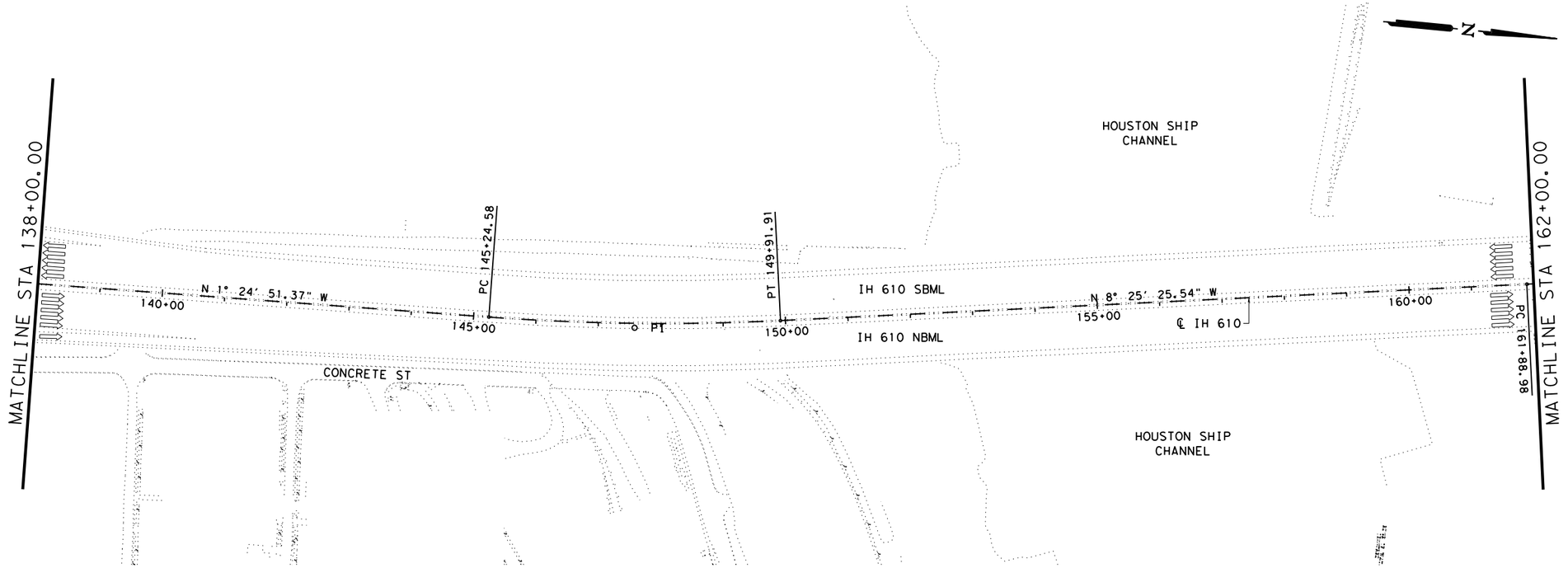
IH 610 SHIP CHANNEL BRIDGE ADVANCE WARNING SIGNS

IH 610 ℄ STA 81+00 TO STA 114+00

SCALE: 1" = 200' HORZ

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		11
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610





NOTES:

1. FOR ALIGNMENT INFORMATION SEE SHEETS 106-122.
2. COVER EXISTING CONFLICTING SIGNS AS DIRECTED
3. EXACT SIGN LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS TO BE DETERMINED BY ENGINEER.

LEGEND

- SIGN
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TY III BARRICADE
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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Texas Department of Transportation

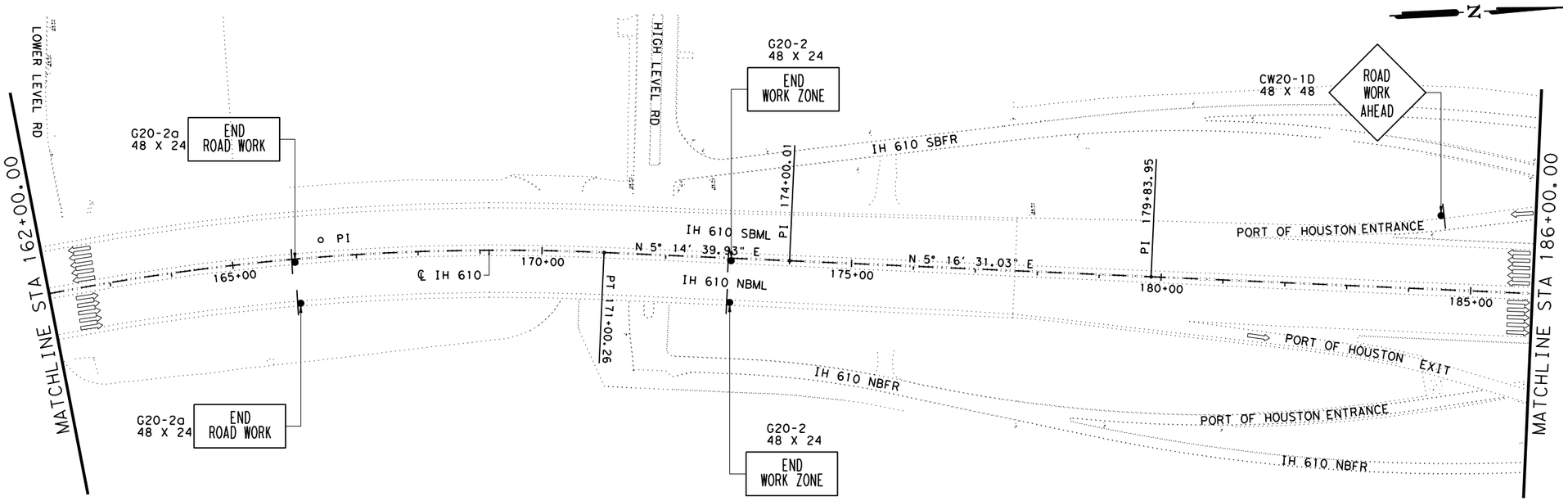
IH 610
SHIP CHANNEL BRIDGE
ADVANCE WARNING SIGNS

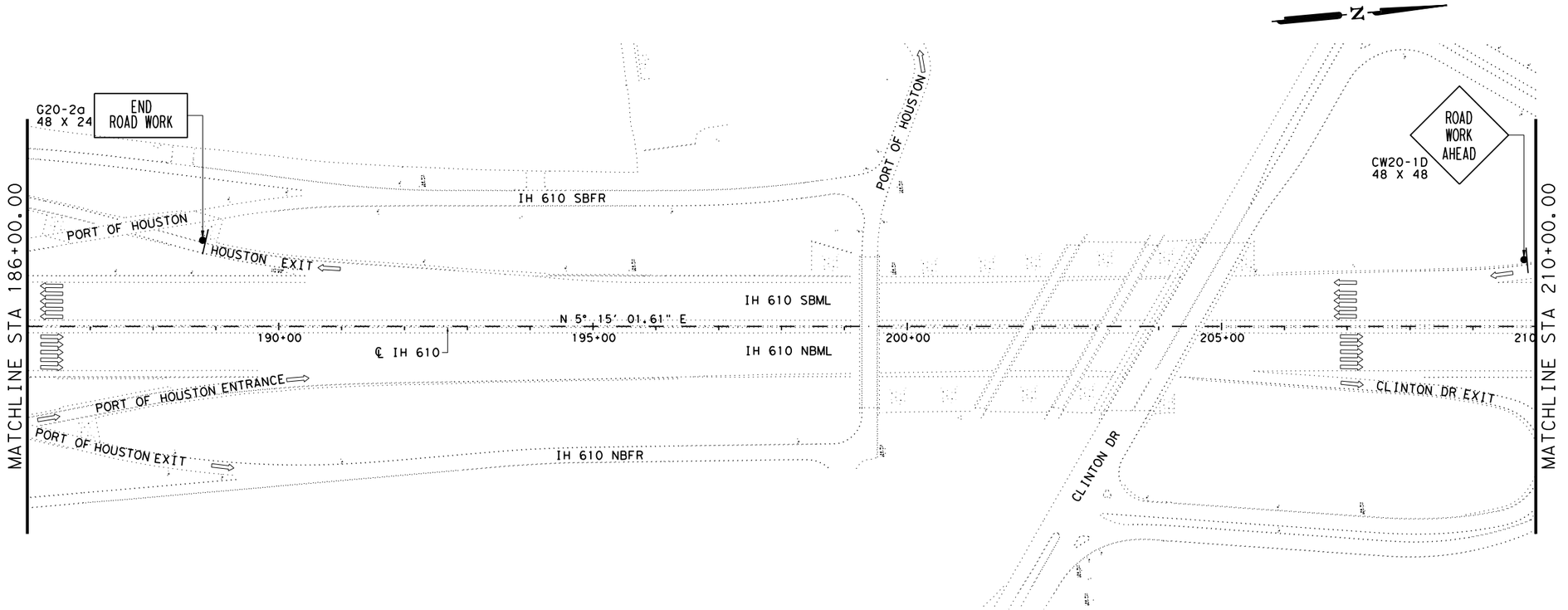
IH 610 ℄ STA 114+00
TO STA 162+00

SCALE: 1" = 200' HORZ

SHEET 3 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		12
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610





NOTES:

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2. COVER EXISTING CONFLICTING SIGNS AS DIRECTED
3. EXACT SIGN LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS TO BE DETERMINED BY ENGINEER.

LEGEND

- SIGN
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TY III BARRICADE
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

STATE OF TEXAS
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Jessica Lynn Kephart, P.E.

05/21/2021

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Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE ADVANCE WARNING SIGNS

IH 610 ℄ STA 162+00 TO STA 210+00

SCALE: 1" = 200' HORZ

SHEET 4 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		13
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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PCMS

BRDG	OVRSZ
WT LIMIT	LOAD USE
40 TONS	NEXT EXT
PHASE 1	PHASE 2

MATCHLINE STA 210+00.00

END ROAD WORK
G20-2a
48 X 24

CLINTON DR EXIT

PC 211+01.89

℄ IH 610

IH 610 SBML

IH 610 NBML

215+00

220+00
PI

225+00

230+00

CLINTON DR ENTRANCE

MISSISSIPPI ST

ROAD WORK AHEAD
CW20-1D
48 X 48

PT 228+52.22

℄ IH 610

ROAD WORK AHEAD
CW20-1D
48 X 48

G20-5T
48 X 24

G20-6T
48 X 30

BEGIN
ROAD WORK
NEXT 2 MILES

NAME
ADDRESS
CITY
STATE

CONTRACTOR

TURNING BASIN DR

MATCHLINE STA 234+00.00

G20-5T
48 X 24

G20-6T
48 X 30

BEGIN
ROAD WORK
NEXT 2 MILES

NAME
ADDRESS
CITY
STATE

CONTRACTOR

N

G20-5aP
36 X 30

WORK ZONE

TRAFFIC FINES DOUBLE

R20-5T
36 X 36

R20-5aTP PLAQUE
36 X 18

WHEN WORKERS ARE PRESENT

STAY ALERT

TALK OR TEXT LATER

G20-10T

N

SPEED LIMIT
60

R2-1
36 X 48

PCMS

BRDG	OVRSZ
WT LIMIT	LOAD USE
40 TONS	NEXT EXT
PHASE 1	PHASE 2

TURNING BASIN DR
TO IH 610 SBML

MATCHLINE STA 234+00.00

℄ IH 610

IH 610 SBML

N 3° 27' 22.45" W

235+00

240+00

245+00

250+00

255+00

IH 610 NBML

TURNING BASIN DR

MATCHLINE STA 258+00.00

TURNING BASIN DR
TO IH 610 NBML

SPEED LIMIT
60

R2-1
36 X 48

G20-5aP
36 X 30

WORK ZONE

TRAFFIC FINES DOUBLE

R20-5T
36 X 36

R20-5aTP PLAQUE
36 X 18

WHEN WORKERS ARE PRESENT

STAY ALERT

TALK OR TEXT LATER

G20-10T

NOTES:

1. FOR ALIGNMENT INFORMATION SEE SHEETS 106-122.
2. COVER EXISTING CONFLICTING SIGNS AS DIRECTED
3. EXACT SIGN LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS TO BE DETERMINED BY ENGINEER.

LEGEND

- SIGN
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TY III BARRICADE
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
ADVANCE WARNING SIGNS

IH 610 ℄ STA 210+00
TO STA 258+00

SCALE: 1" = 200' HORZ

SHEET 5 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		14
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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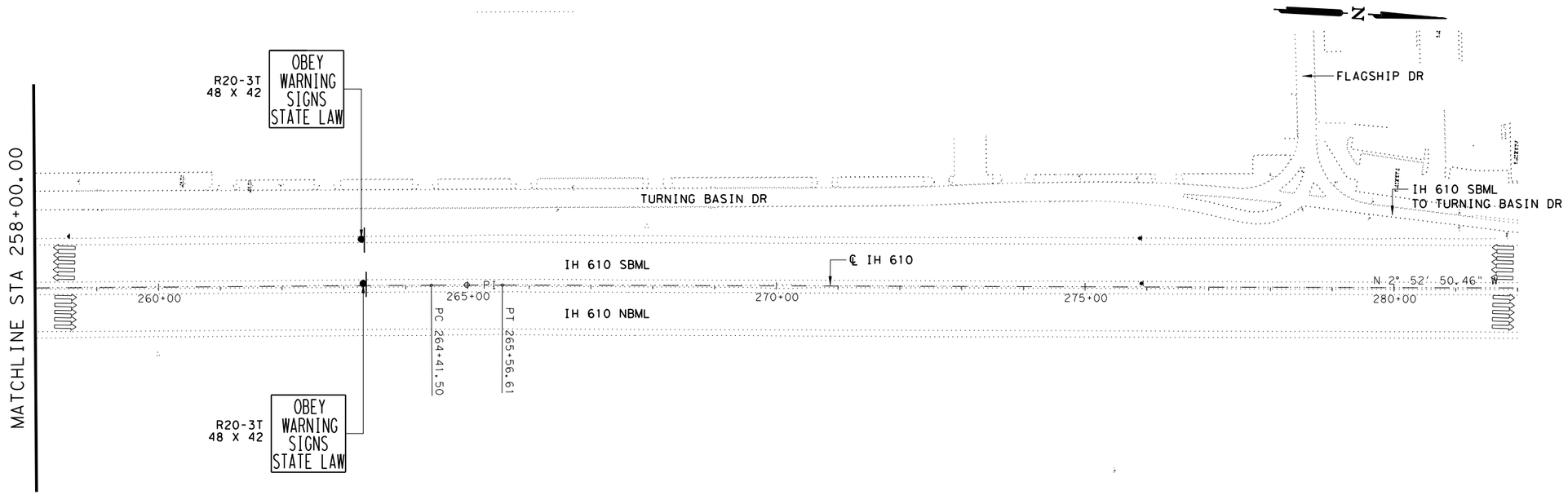

NOTES:

1. FOR ALIGNMENT INFORMATION SEE SHEETS 106-122.
2. COVER EXISTING CONFLICTING SIGNS AS DIRECTED
3. EXACT SIGN LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS TO BE DETERMINED BY ENGINEER.

LEGEND

- SIGN
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TY III BARRICADE
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED
PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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Texas Department of Transportation

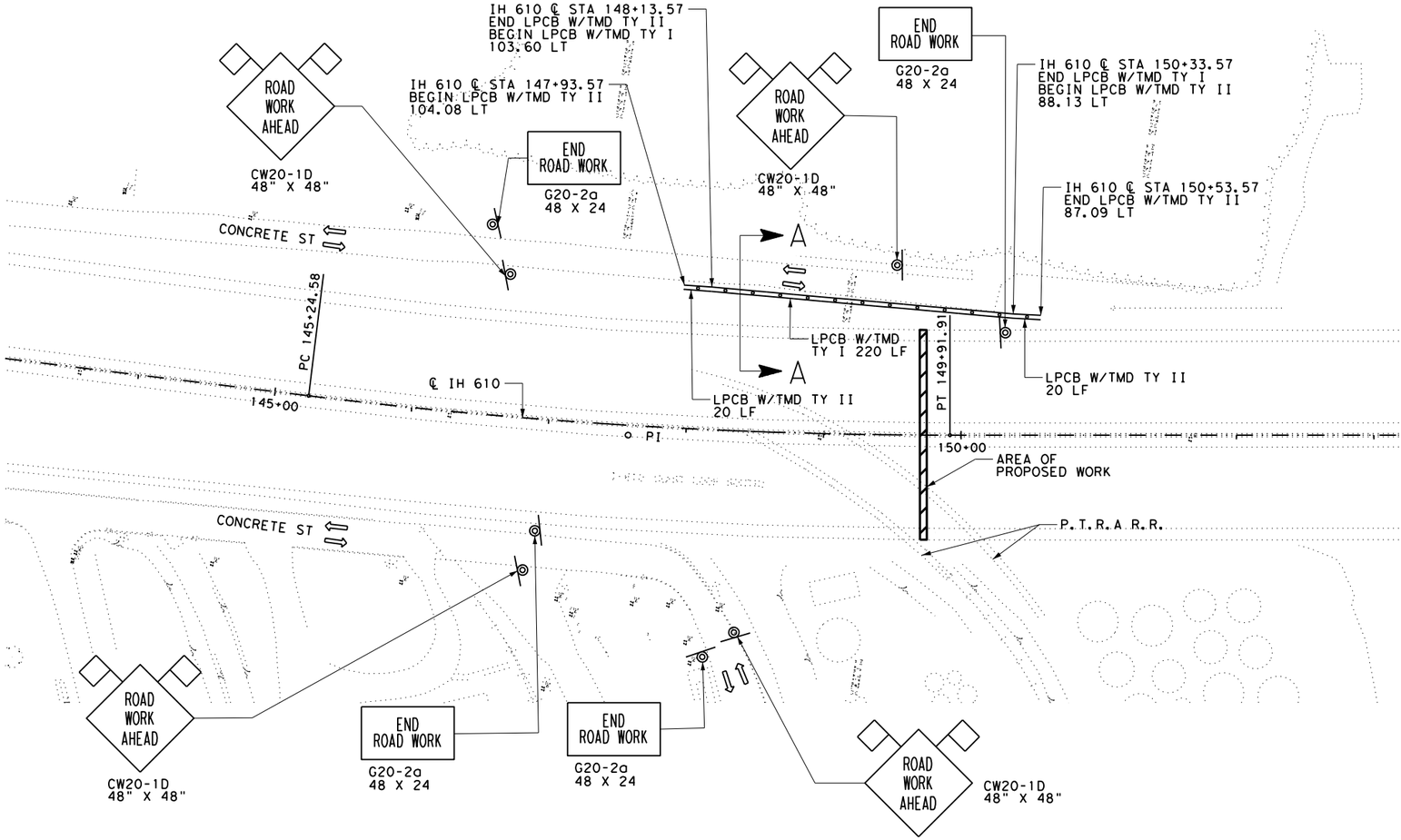
IH 610
SHIP CHANNEL BRIDGE
ADVANCE WARNING SIGNS

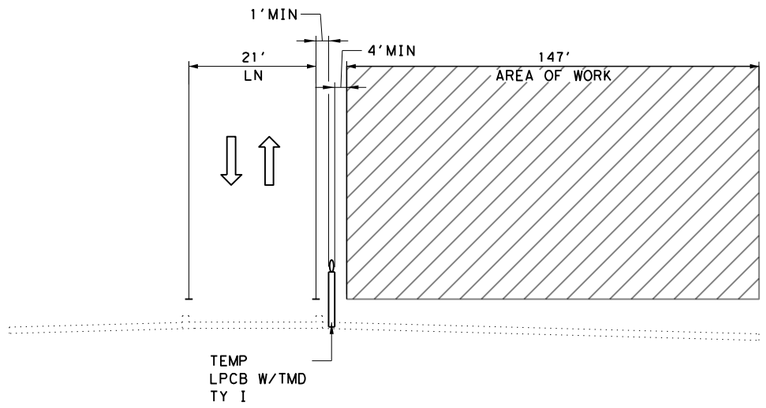
IH 610 ℄ STA 258+00
TO END PROJECT

SCALE: 1" = 200' HORZ

SHEET 6 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		15
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610





SECTION A-A
NTS

LEGEND

- SIGN
- TY III BARRICADE
- TEMPORARY LPCB W/TMD
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES) — 4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

1. FOR ALIGNMENT INFORMATION SEE SHEETS 106-122.
2. COVER EXISTING CONFLICTING SIGNS AS DIRECTED
3. EXACT SIGN LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS TO BE DETERMINED BY ENGINEER.

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021
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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TCP

BENT 45 LOWER LEVEL

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		16
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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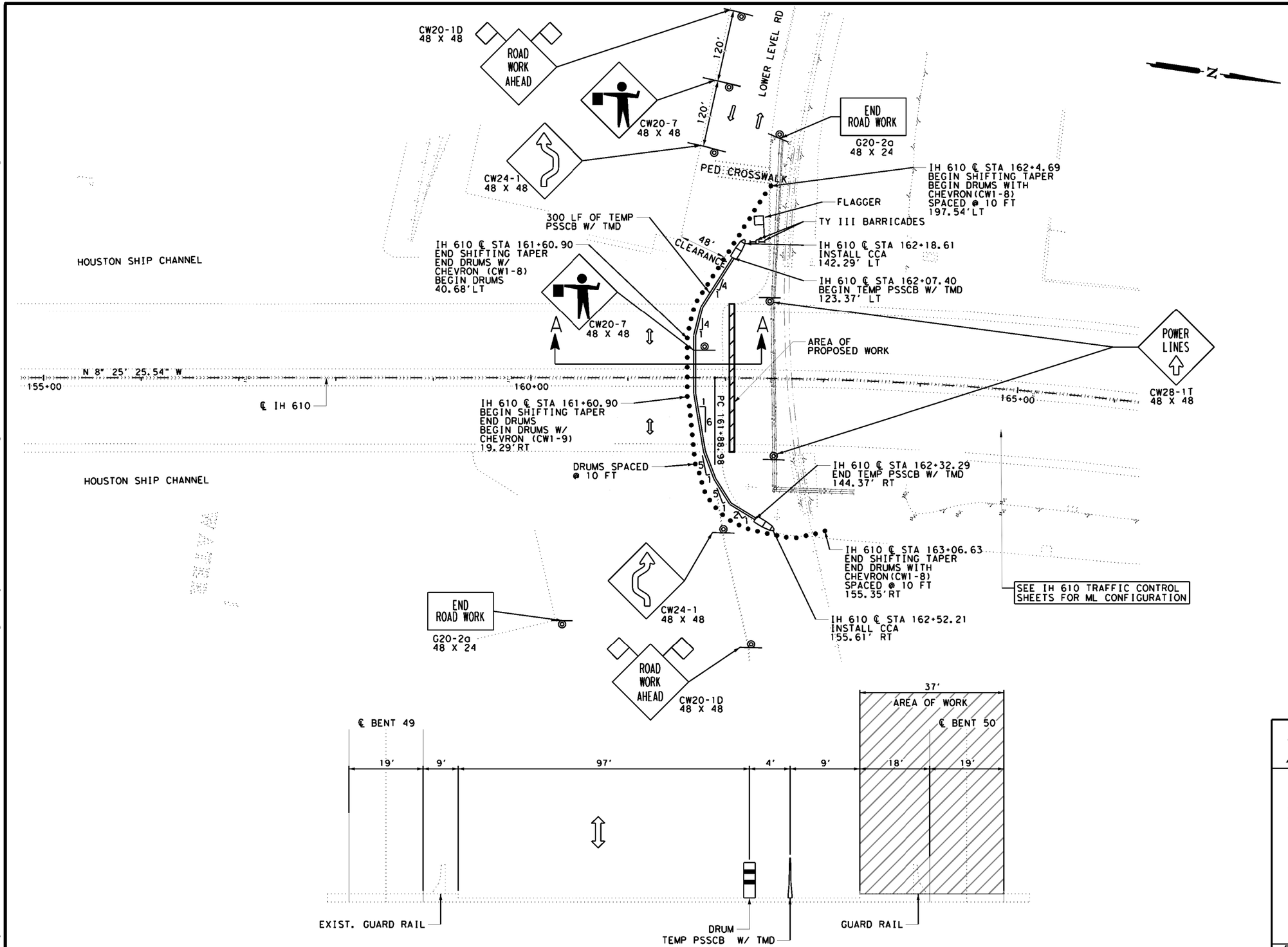

SECTION A-A
NTS

LEGEND

- SIGN
- TY III BARRICADE
- TEMPORARY LPCB W/TMD
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

1. FOR ALIGNMENT INFORMATION SEE SHEETS 106-122.
2. COVER EXISTING CONFLICTING SIGNS AS DIRECTED
3. EXACT SIGN LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS TO BE DETERMINED BY ENGINEER.

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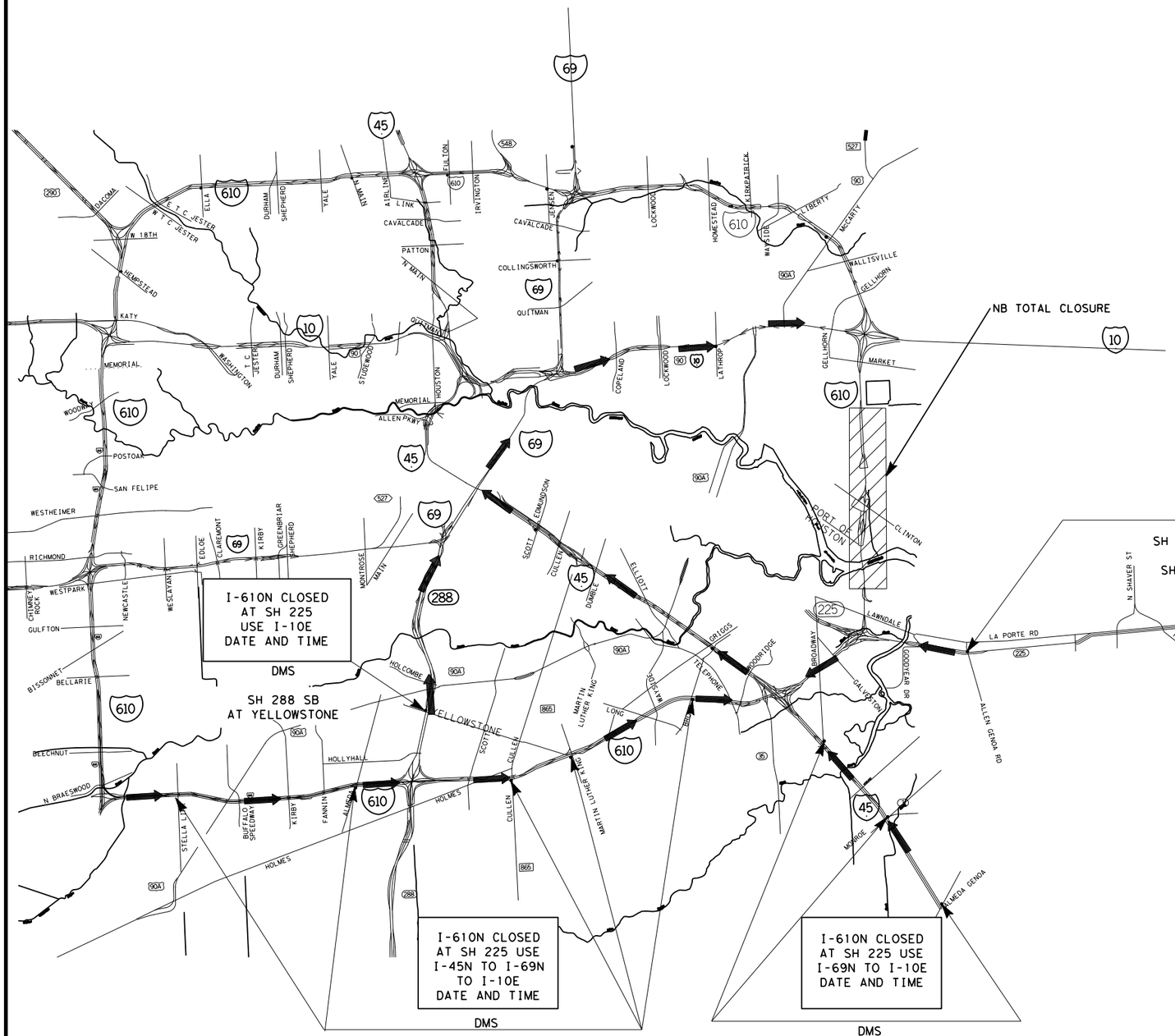
Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TCP

BENT 50 LOWER LEVEL

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		17
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



NOTES:

1. SEE TRAFFIC CONTROL PLANS FOR IH 610 NORTHBOUND HOUSTON SHIP CHANNEL BRIDGE, CONN SH 225 EB TO IH 610 NB, AND CONN SH 225 WB TO IH 610 NB FOR ADDITIONAL PCMS & SIGNS.

2. ALL MESSAGE SIGN WORDING MAY BE CHANGED WITH APPROVAL BY THE ENGINEER.

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LICENSED
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Bonnie Tai

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Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE NORTHBOUND TOTAL CLOSURE DETOUR LAYOUT DYNAMIC MESSAGE SIGNING (WKND ONLY)

SCALE: N.T.S.

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		18
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

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NOTES:

1. THE TRAVELING PUBLIC IS TO BE NOTIFIED TWO (2) WEEKS IN ADVANCE OF TOTAL FREEWAY CLOSURE. EXACT WORDING OF ADVANCE NOTIFICATION MESSAGES TO BE DETERMINED BY THE ENGINEER

2. SEE TRAFFIC CONTROL PLANS FOR IH 610 NORTHBOUND HOUSTON SHIP CHANNEL BRIDGE, CONN SH 225 EB TO IH 610 NB, AND CONN SH 225 WB TO IH 610 NB FOR ADDITIONAL PCMS & SIGNS.

N

NB TOTAL CLOSURE

DETOUR NORTH
INTERSTATE 610

M4-8 30 X 15
M3-1 30 X 15
M1-1 30 X 24
M6-2L 21 X 15

DETOUR NORTH
INTERSTATE 610

M4-8 30 X 15
M3-1 30 X 15
M1-1 30 X 24
M6-2R 21 X 15

I-610N CLOSED AT SH 225	USE I-610S TO I-45N

PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

I-610N CLOSED AT SH 225	USE I-45N

PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

I-610N CLOSED	USE 288N I-69N TO I-10E

PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

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Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE NORTHBOUND TOTAL CLOSURE DETOUR LAYOUT PORTABLE CHANGEABLE MESSAGE SIGNING (WKND ONLY)

SCALE: N.T.S.

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		19
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

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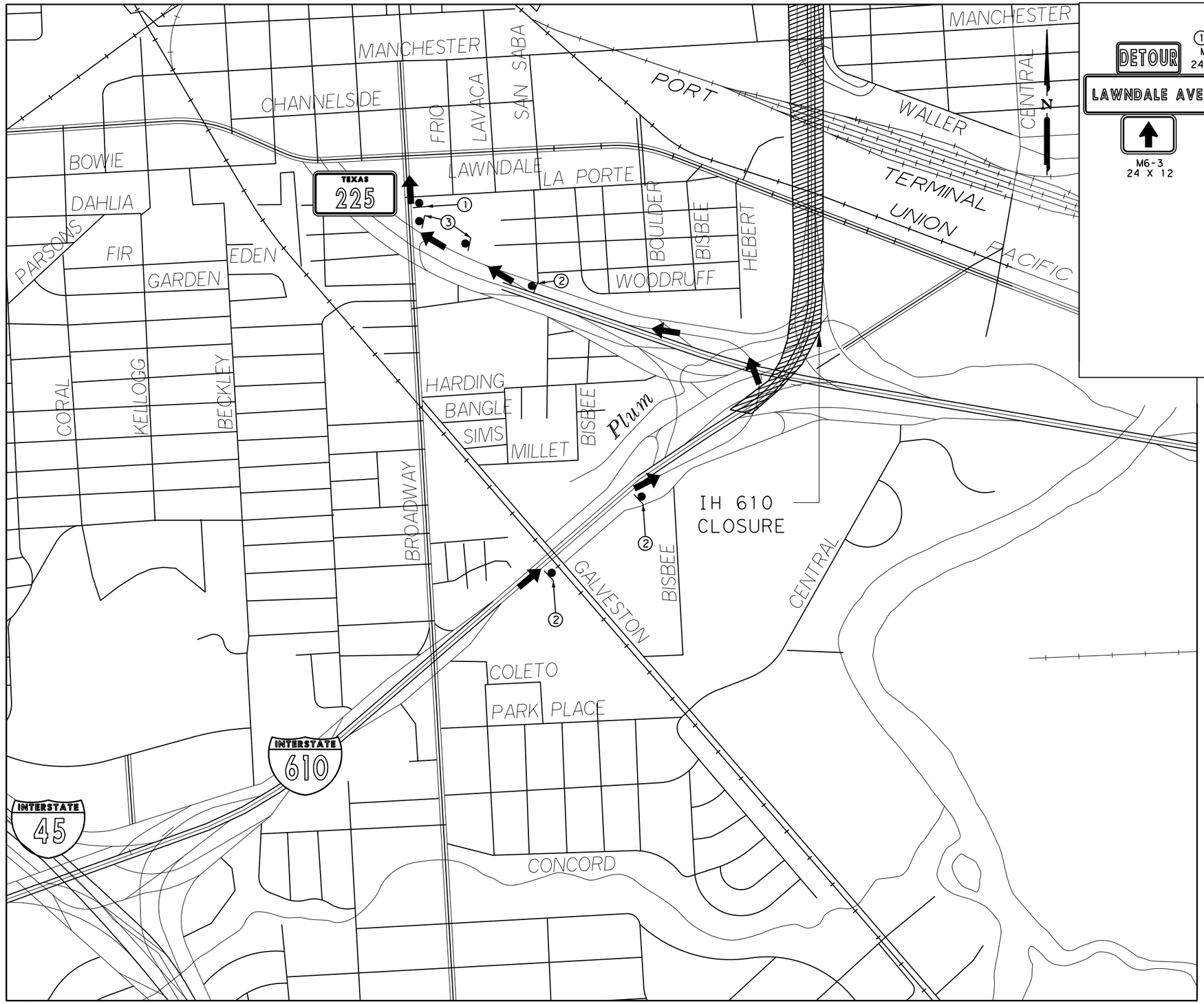

SIGN LEGEND

①	DETOUR	M4-8	24 X 12
	LAWNDALE AVE	CW16-8P	54 X 12
	M6-3		24 X 12
②	DETOUR	M4-8	30 X 15
	LAWNDALE AVE	CW16-8P	54 X 12
	M6-2R		24 X 12
③	DETOUR	M4-8	24 X 12
	LAWNDALE AVE	CW16-8P	54 X 12
	M6-1R		24 X 12

NOTE:

1. ADDITIONAL DETOUR INFORMATION AVAILABLE ON IH 610 SHIP CHANNEL BRIDGE NORTHBOUND TOTAL CLOSURE PORTABLE CHANGEABLE MESSAGE SIGN (WKND ONLY)
2. CITY OF HOUSTON DETOUR ROUTES WERE APPROVED ON FEBRUARY 15, 2021. CONTRACTOR TO SUBMIT MOBILITY PERMIT APPLICATION. VERIFY ROUTE CONDITIONS AND COORDINATE WITH ENGINEER AND THE CITY OF HOUSTON PRIOR TO IMPLEMENTING DETOURS.

STATE OF TEXAS
BONNIE TAI
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LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610 LAWNDALE AVE EXIT RAMP CLOSURE DETOUR (WKND ONLY)

SCALE: N.T.S.

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		20
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

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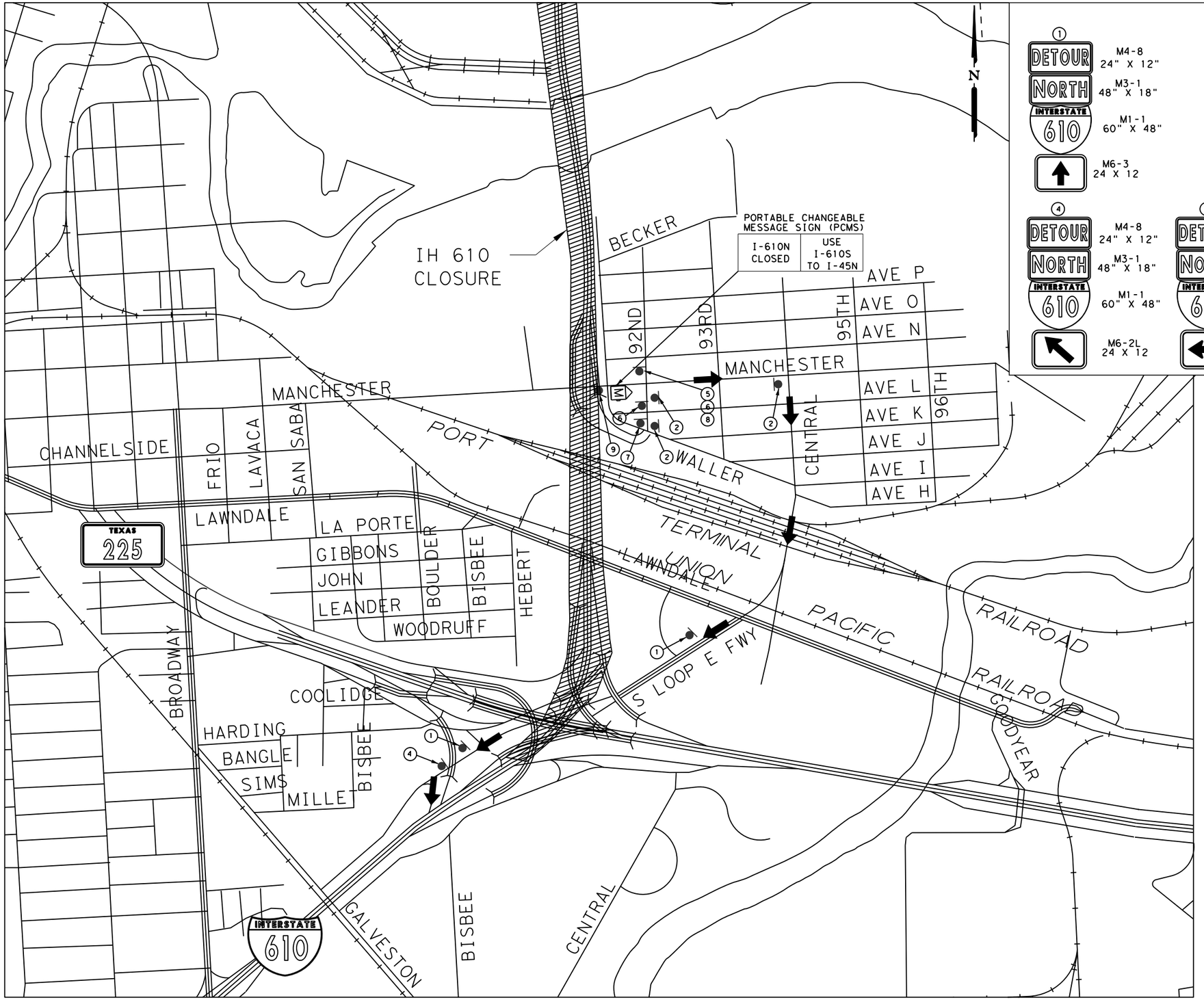

SIGN LEGEND

1. DETOUR / NORTH / INTERSTATE 610 — M4-8 24" X 12", M3-1 48" X 18", M1-1 60" X 48"; M6-3 24 X 12
2. DETOUR / NORTH / INTERSTATE 610 — M4-8 24" X 12", M3-1 48" X 18", M1-1 60" X 48"; M6-1R 24 X 12
3. DETOUR / NORTH / INTERSTATE 610 — M4-8 24" X 12", M3-1 48" X 18", M1-1 60" X 48"; M6-2R 24 X 12
4. DETOUR / NORTH / INTERSTATE 610 — M4-8 24" X 12", M3-1 48" X 18", M1-1 60" X 48"; M6-2L 24 X 12
5. DETOUR / NORTH / INTERSTATE 610 — M4-8 24" X 12", M3-1 48" X 18", M1-1 60" X 48"; M6-1L 24 X 12
6. RAMP CLOSED AHEAD — CW2ORP-3D 48" X 48"
7. RAMP CLOSED — R11-2bT 48" X 30"
8. ROAD CLOSED TO THRU TRAFFIC — R11-4 60" X 30"
9. ROAD WORK AHEAD — CW20-1D 48" X 48"

NOTE:
1. ADDITIONAL DETOUR INFORMATION AVAILABLE ON IH 610 SHIP CHANNEL BRIDGE NORTHBOUND TOTAL CLOSURE PORTABLE CHANGEABLE MESSAGE SIGN (WKND ONLY)
2. CITY OF HOUSTON DETOUR ROUTES WERE APPROVED ON FEBRUARY 15, 2021. CONTRACTOR TO SUBMIT MOBILITY PERMIT APPLICATION. VERIFY ROUTE CONDITIONS AND COORDINATE WITH ENGINEER AND THE CITY OF HOUSTON PRIOR TO IMPLEMENTING DETOURS.

STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

Bonnie Tai
05/21/2021

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Texas Department of Transportation

IH 610 MANCHESTER DR ENTRANCE RAMP CLOSURE DETOUR EASTBOUND (WKND ONLY)

SCALE: N.T.S.

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		21
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE:5/21/2021
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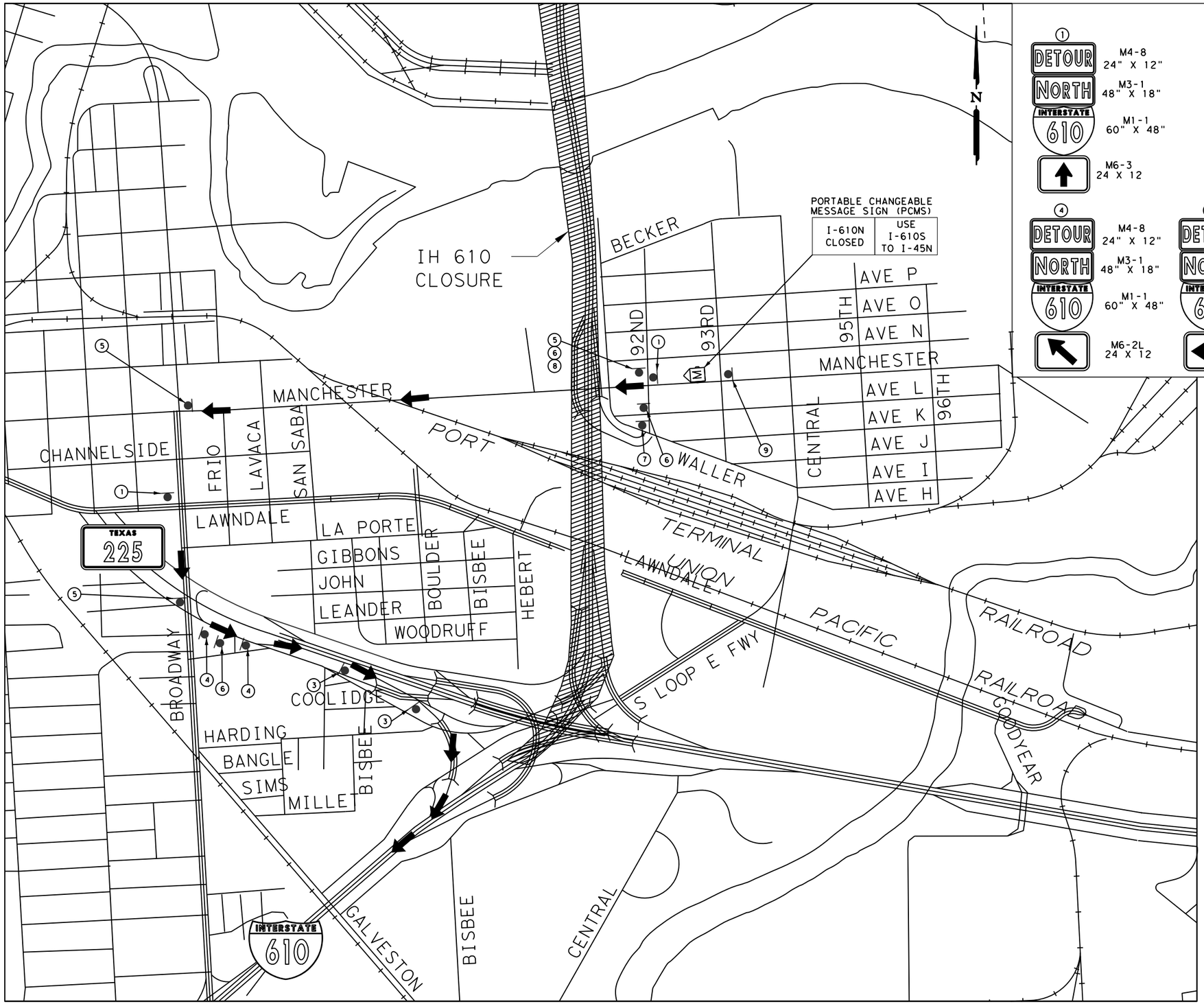

SIGN LEGEND

1	DETOUR / NORTH / INTERSTATE 610	M4-8 24" X 12"; M3-1 48" X 18"; M1-1 60" X 48"; M6-3 24 X 12
2	DETOUR / NORTH / INTERSTATE 610	M4-8 24" X 12"; M3-1 48" X 18"; M1-1 60" X 48"; M6-1R 24 X 12
3	DETOUR / NORTH / INTERSTATE 610	M4-8 24" X 12"; M3-1 48" X 18"; M1-1 60" X 48"; M6-2R 24 X 12
4	DETOUR / NORTH / INTERSTATE 610	M4-8 24" X 12"; M3-1 48" X 18"; M1-1 60" X 48"; M6-2L 24 X 12
5	DETOUR / NORTH / INTERSTATE 610	M4-8 24" X 12"; M3-1 48" X 18"; M1-1 60" X 48"; M6-1L 24 X 12
6	RAMP CLOSED AHEAD	CW20RP-3D 48" X 48"
7	RAMP CLOSED	R11-2bT 48" X 30"
8	ROAD CLOSED TO THRU TRAFFIC	R11-4 60" X 30"
9	ROAD WORK AHEAD	CW20-1D 48" X 48"

NOTE:
1. ADDITIONAL DETOUR INFORMATION AVAILABLE ON IH 610 SHIP CHANNEL BRIDGE NORTHBOUND TOTAL CLOSURE PORTABLE CHANGEABLE MESSAGE SIGN (WKND ONLY)
2. CITY OF HOUSTON DETOUR ROUTES WERE APPROVED ON FEBRUARY 15, 2021. CONTRACTOR TO SUBMIT MOBILITY PERMIT APPLICATION. VERIFY ROUTE CONDITIONS AND COORDINATE WITH ENGINEER AND THE CITY OF HOUSTON PRIOR TO IMPLEMENTING DETOURS.

STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021
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Texas Department of Transportation

IH 610 MANCHESTER DR ENTRANCE RAMP CLOSURE DETOUR WESTBOUND (WKND ONLY)

SCALE: N.T.S.

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		22
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE:5/21/2021
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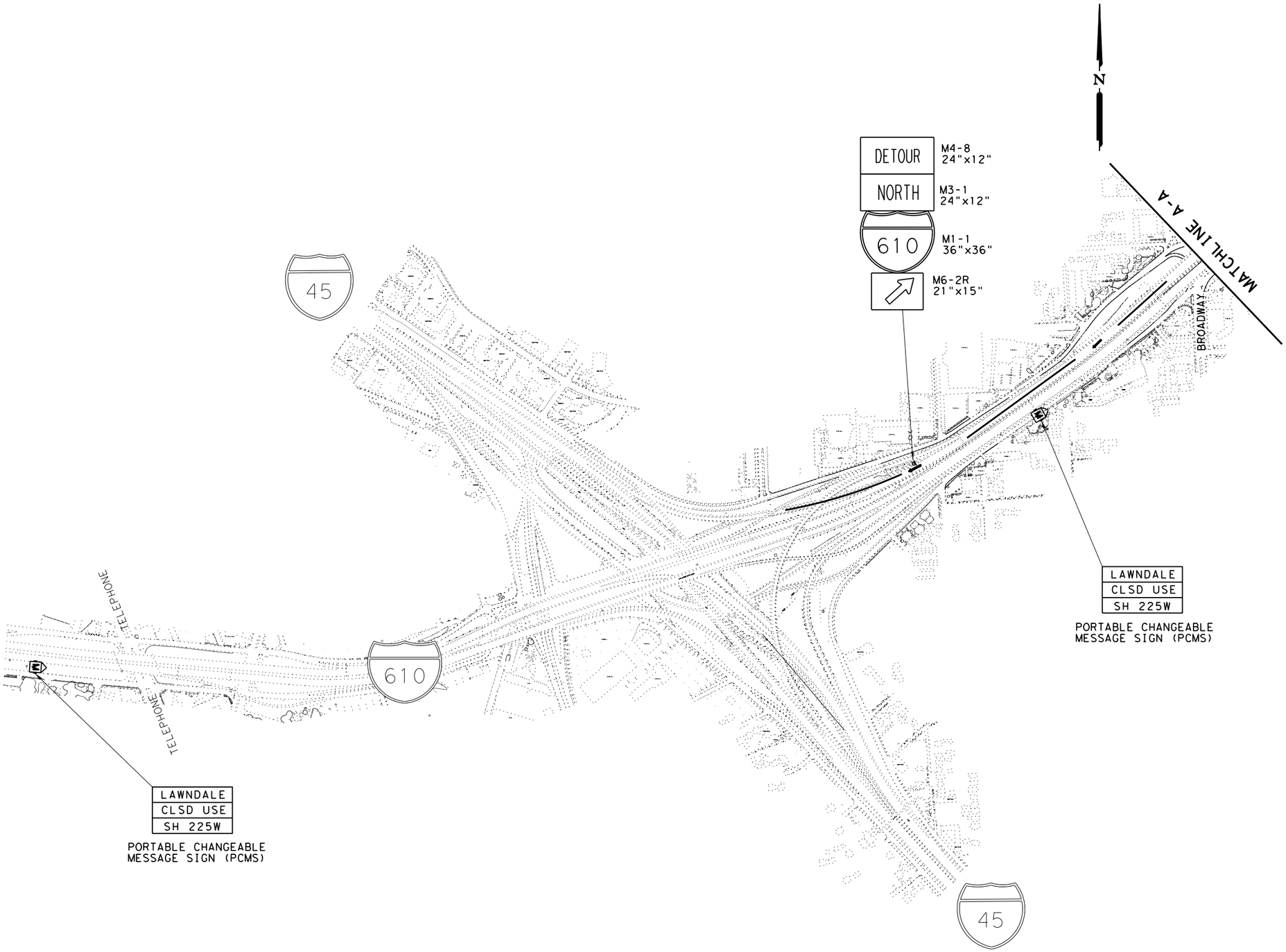

LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TY III BARRICADE

STATE OF TEXAS
BONNIE TAI
125946
LICENSED
PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610 NORTHBOUND AT SH 225 DETOUR TRAFFIC CONTROL (WKND ONLY)

SCALE: N.T.S.

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		23
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

NOTES:

1. ALL MESSAGE SIGN WORDING MAY BE CHANGED BY THE ENGINEER.

2. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

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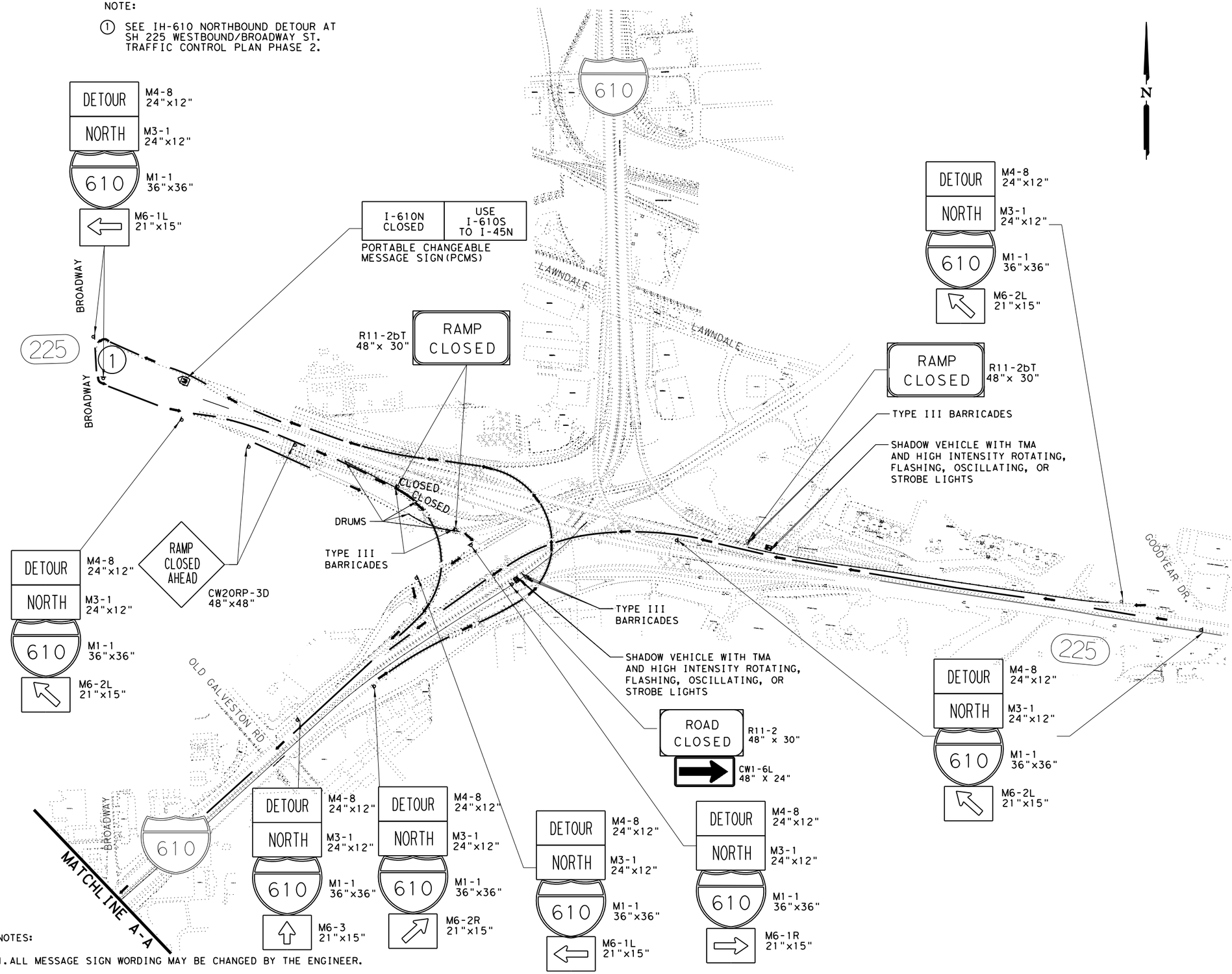
NOTE:

(1) SEE IH-610 NORTHBOUND DETOUR AT SH 225 WESTBOUND/BROADWAY ST. TRAFFIC CONTROL PLAN PHASE 2.



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TY III BARRICADE

N

NOTES:

1. ALL MESSAGE SIGN WORDING MAY BE CHANGED BY THE ENGINEER.

2. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

STATE OF TEXAS
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Texas Department of Transportation

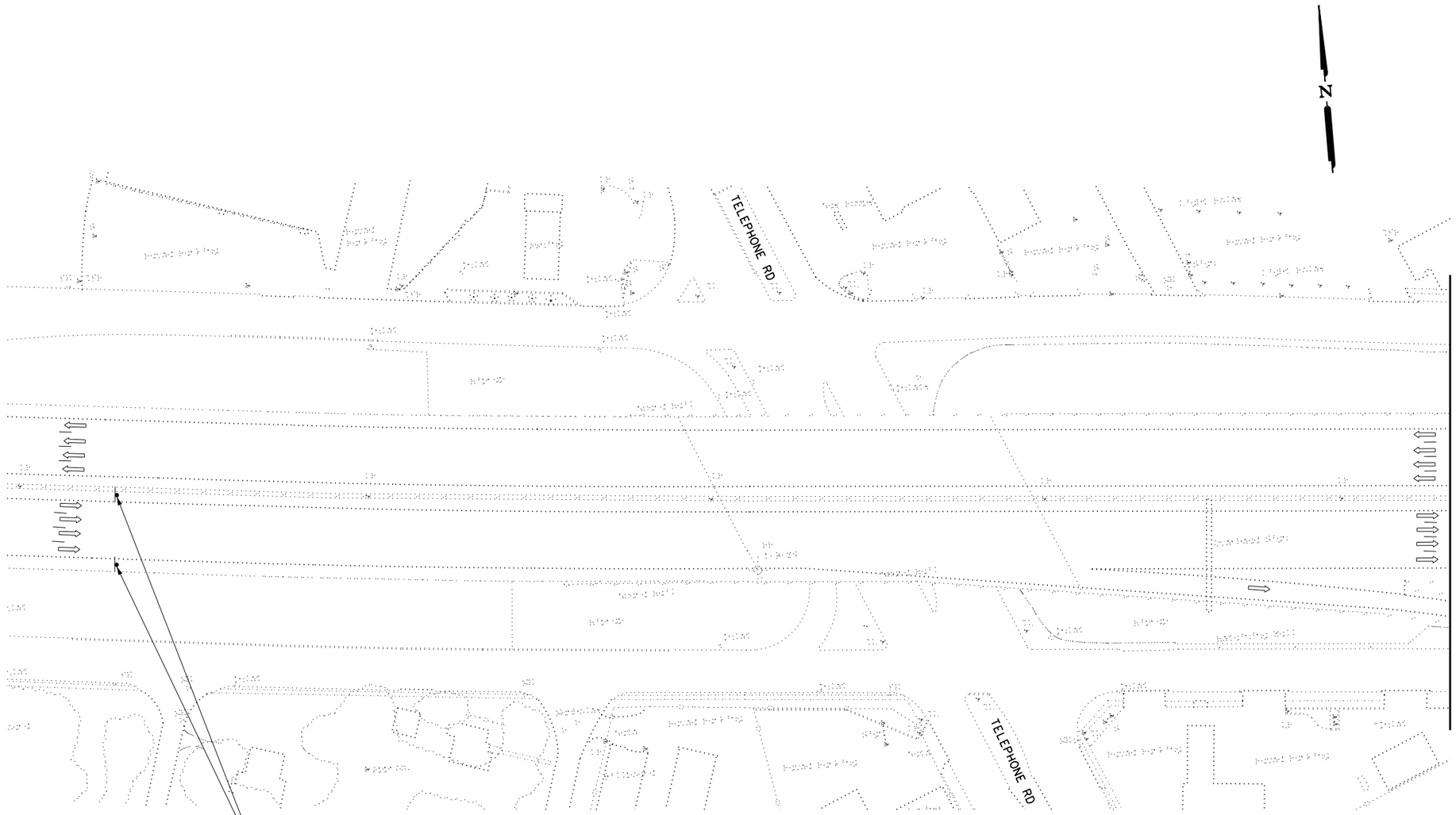
IH 610 NORTHBOUND AT SH 225 DETOUR TRAFFIC CONTROL (WKND ONLY)

SCALE: N.T.S.

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		24
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271150971\V4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\R225det.dgn



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

1. PLACE TY III BARRICADES ACROSS ALL CLOSED LANES AT 2 LOCATIONS BETWEEN IH-10 AND THE PORT OF HOUSTON AS DIRECTED BY THE ENGINEER OR THE ENGINEER'S REPRESENTATIVE.

2. TOTAL FREEWAY CLOSURE. USE TxDOT STANDARD SHEET "TRAFFIC CONTROL PLAN FREEWAY CLOSURE" TCP (6-6)-12.

3. ONE OR TWO LANE CLOSURE. SEE TxDOT STANDARD "TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURE" TCP (6-1)-12 FOR MORE INFORMATION.

4. PLACE 1 WEEK IN ADVANCE OF CLOSURE. LOCATION SHOWN IS APPROXIMATE, EXACT LOCATION TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

5. ALL MESSAGE SIGN WORDING MAY BE CHANGED BY THE ENGINEER.

6. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
NORTHBOUND (WKND ONLY)

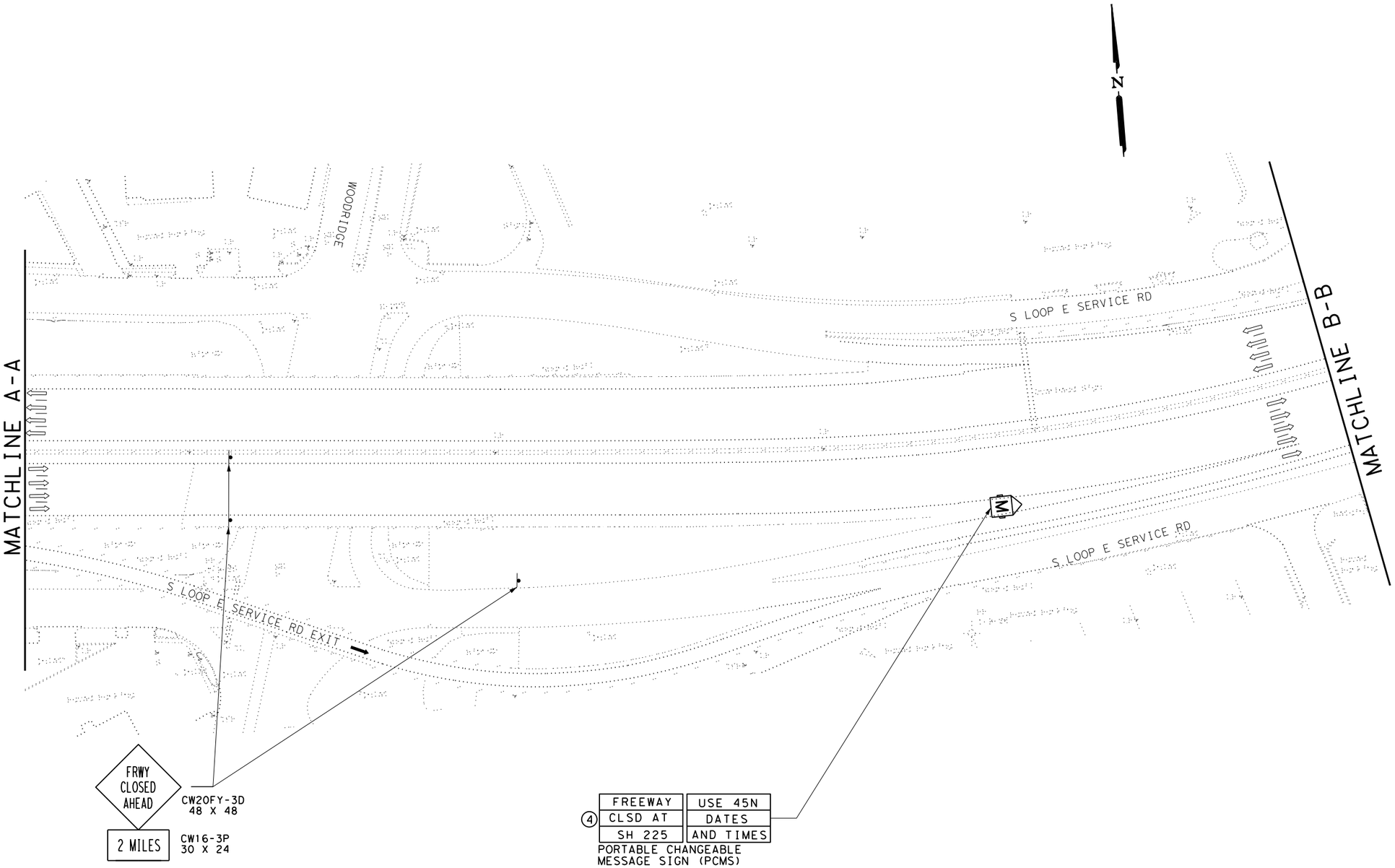
℄ IH 610 BEGIN
TO MATCHLINE A-A

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 1 OF 11

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		25
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\RNBTCP*01.dgn



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
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IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
NORTHBOUND (WKND ONLY)

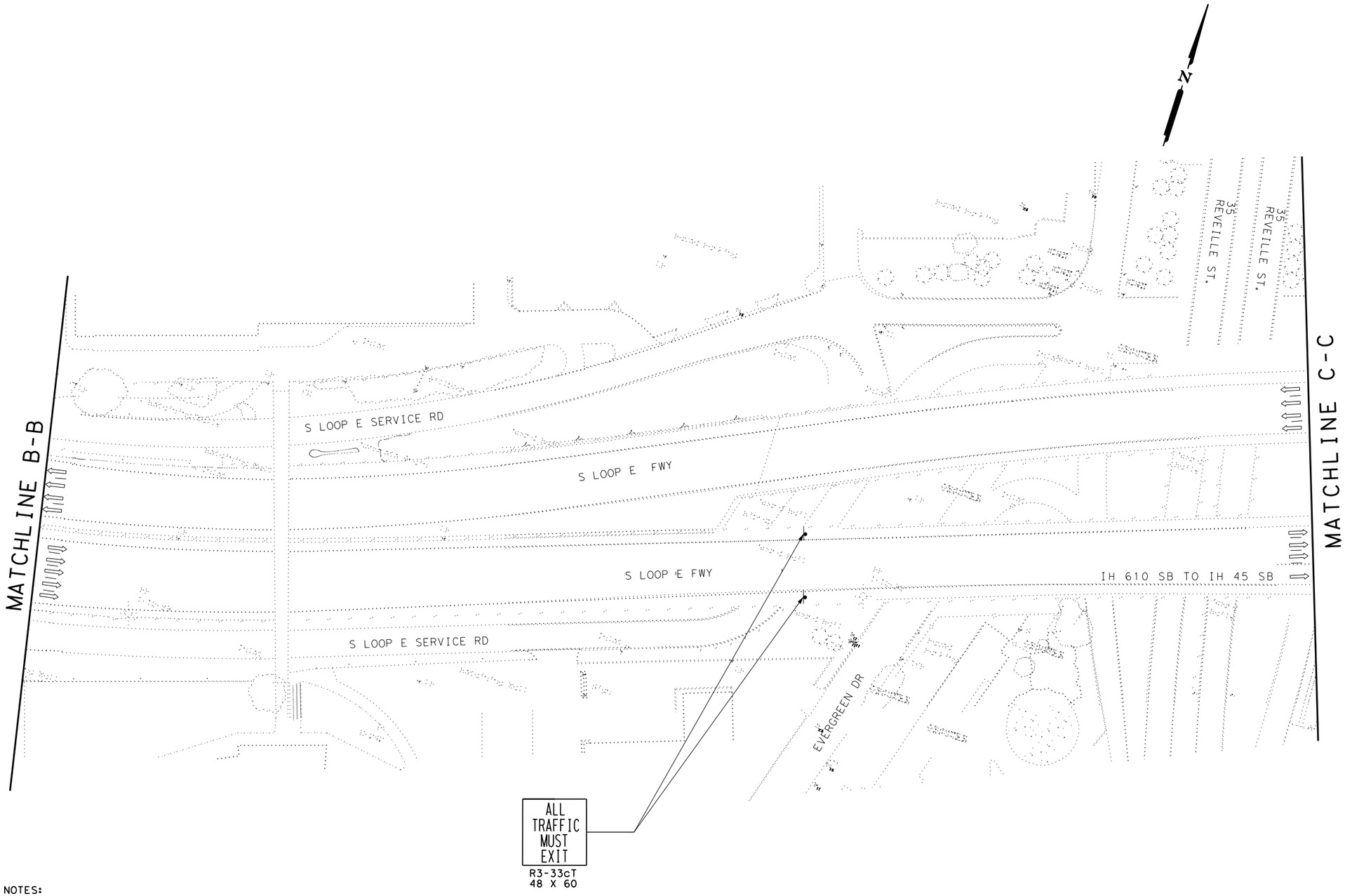
℄ IH 610 MATCHLINE
A-A MATCHLINE B-B

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 2 OF 11

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		26
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271150971\4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\RNBTCP*02.dgn



LEGEND

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- CHANNELIZING DEVICES
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- OPEN TO TRAFFIC LANE
- SIGN
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IH 610 SHIP CHANNEL BRIDGE TRAFFIC CONTROL TOTAL CLOSURE NORTHBOUND (WKND ONLY)

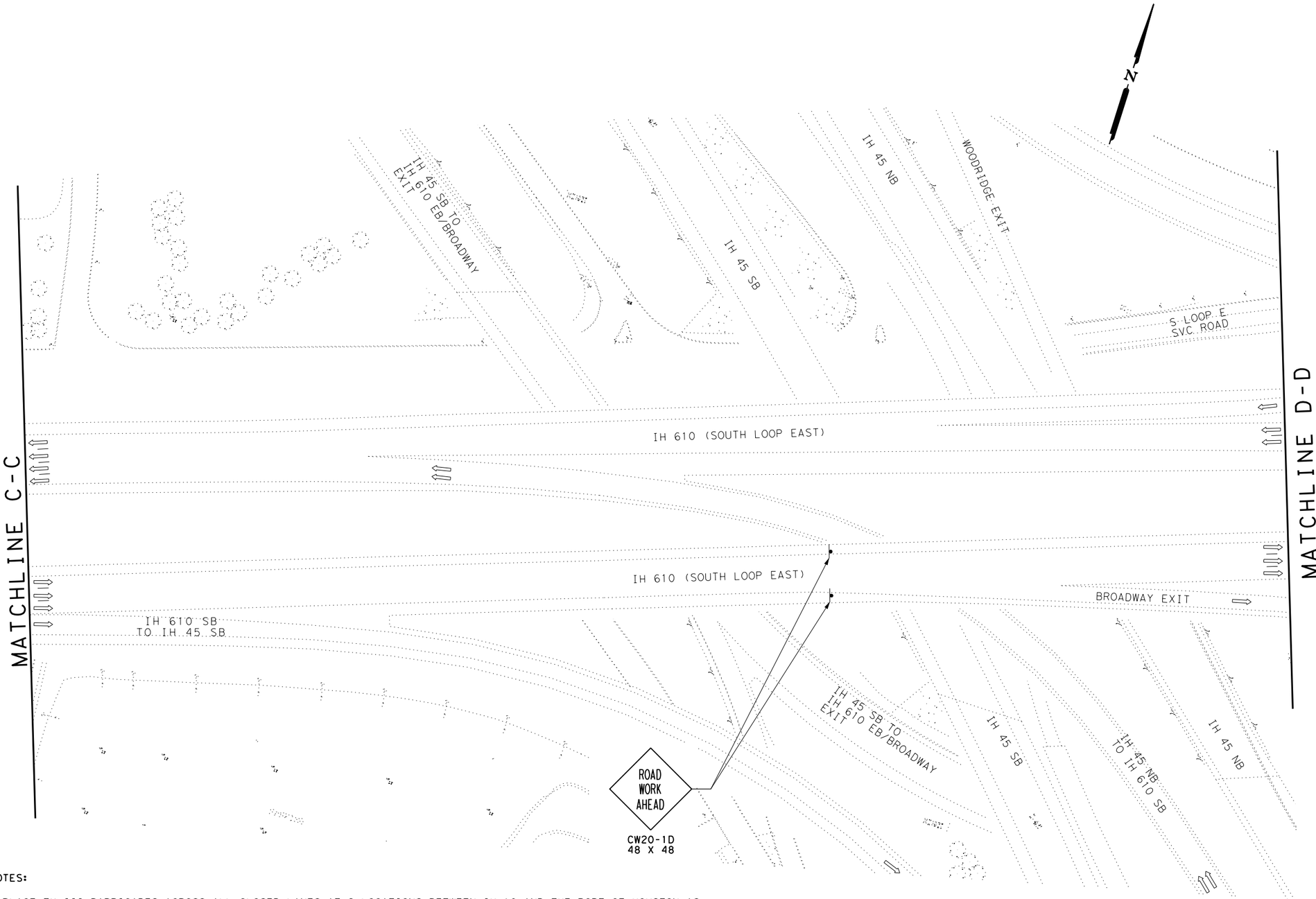
℄ IH 610 MATCHLINE
B-B MATCHLINE C-C

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 3 OF 11

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		27
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271150971\4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\RNBTCP*03.dgn



LEGEND

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- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
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IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
NORTHBOUND (WKND ONLY)

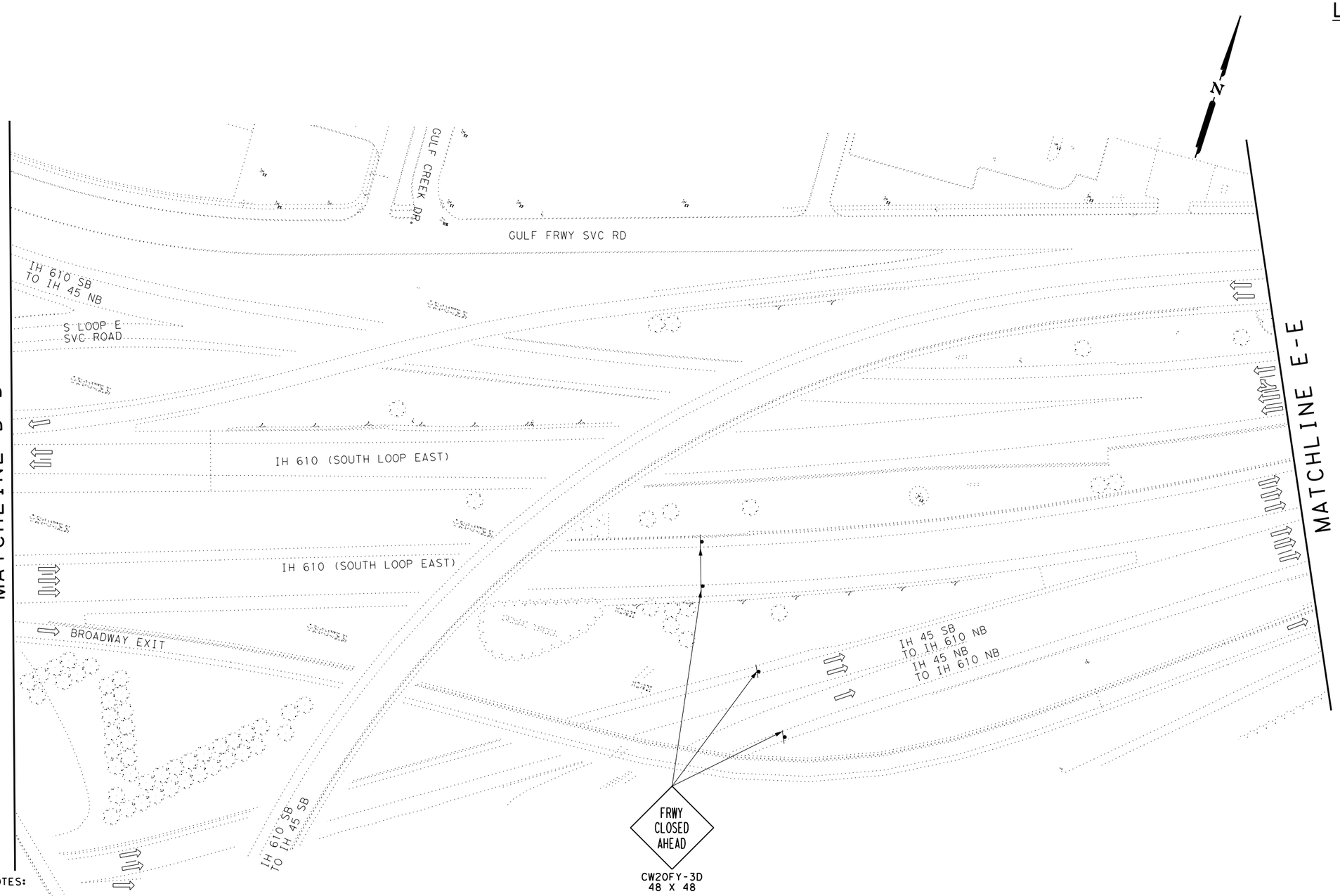
℄ IH 610 MATCHLINE
C-C MATCHLINE D-D

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 4 OF 11

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		28
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\RNBTCP*04.dgn



LEGEND

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- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
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- TRAILER MOUNTED FLASHING ARROW BOARD
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IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
NORTHBOUND (WKND ONLY)

℄ IH 610 MATCHLINE D-D TO MATCHLINE E-E

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 5 OF 11

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		29
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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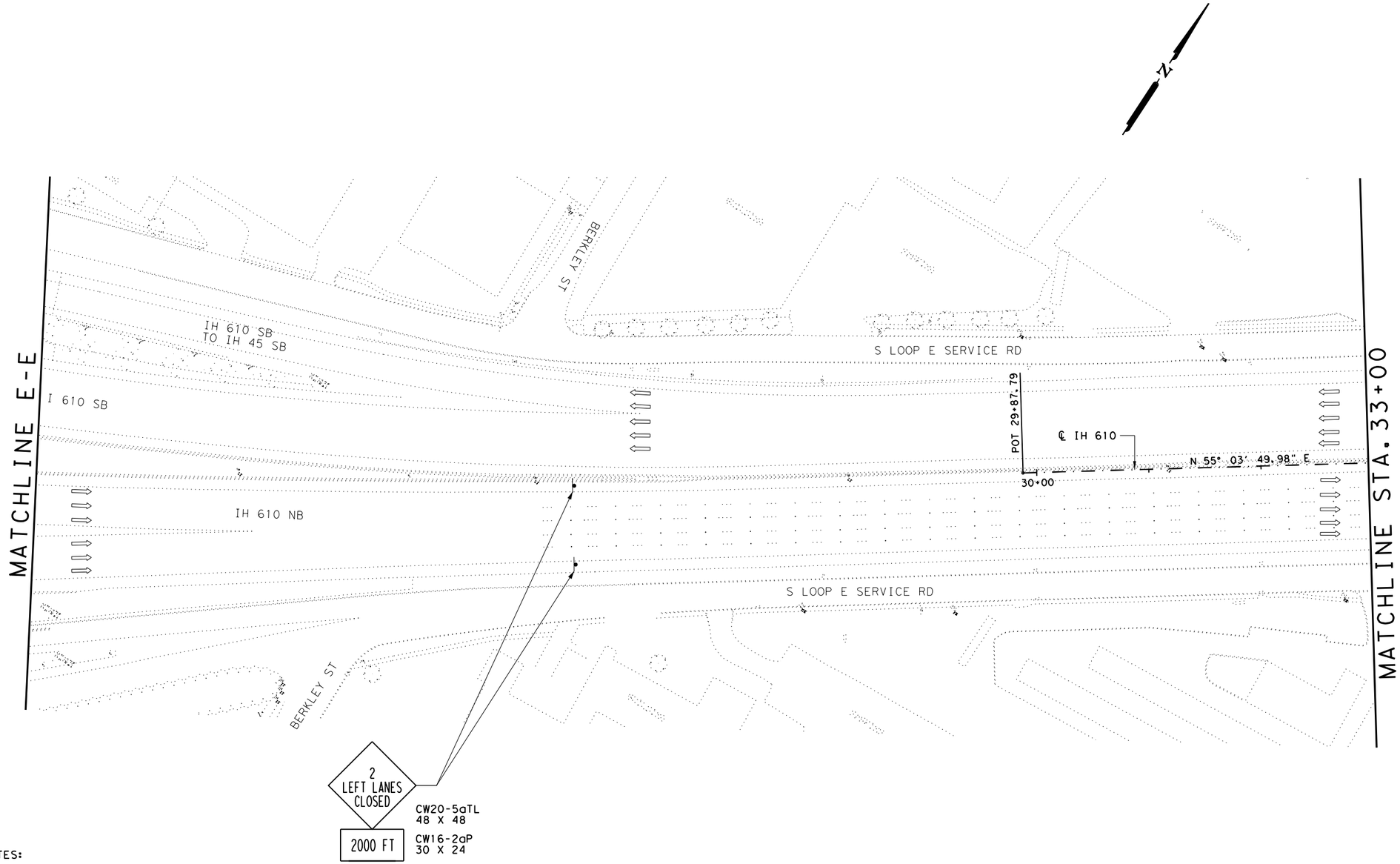
LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE



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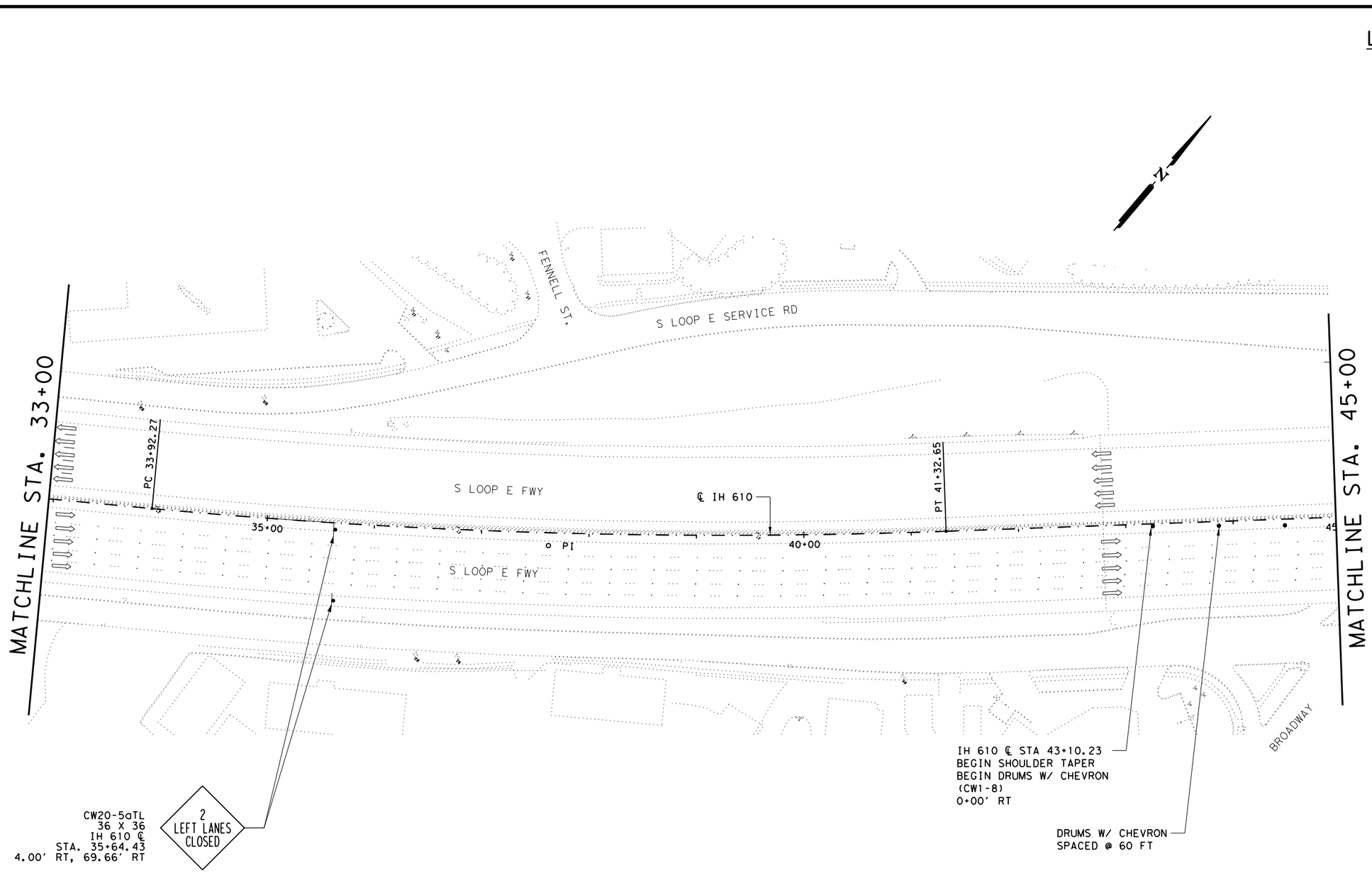
IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
NORTHBOUND (WKND ONLY)

℄ IH 610 MATCHLINE E-E
TO STA 33+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 6 OF 11

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		30
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

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IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
NORTHBOUND (WKND ONLY)

℄ IH 610 STA 33+00.00
TO STA 45+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

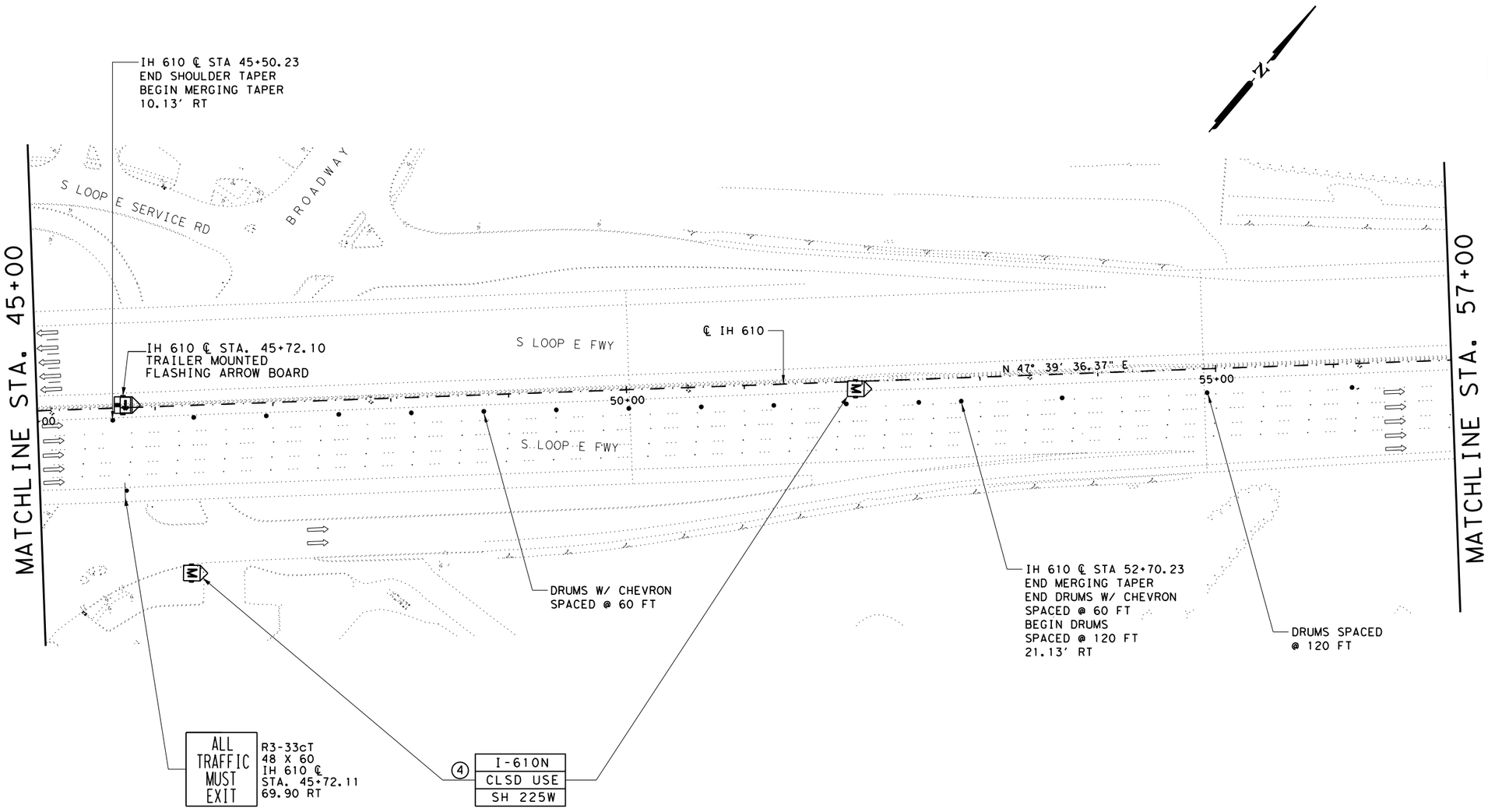
SHEET 7 OF 11

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		31
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\RNBTCP*07.dgn

LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE



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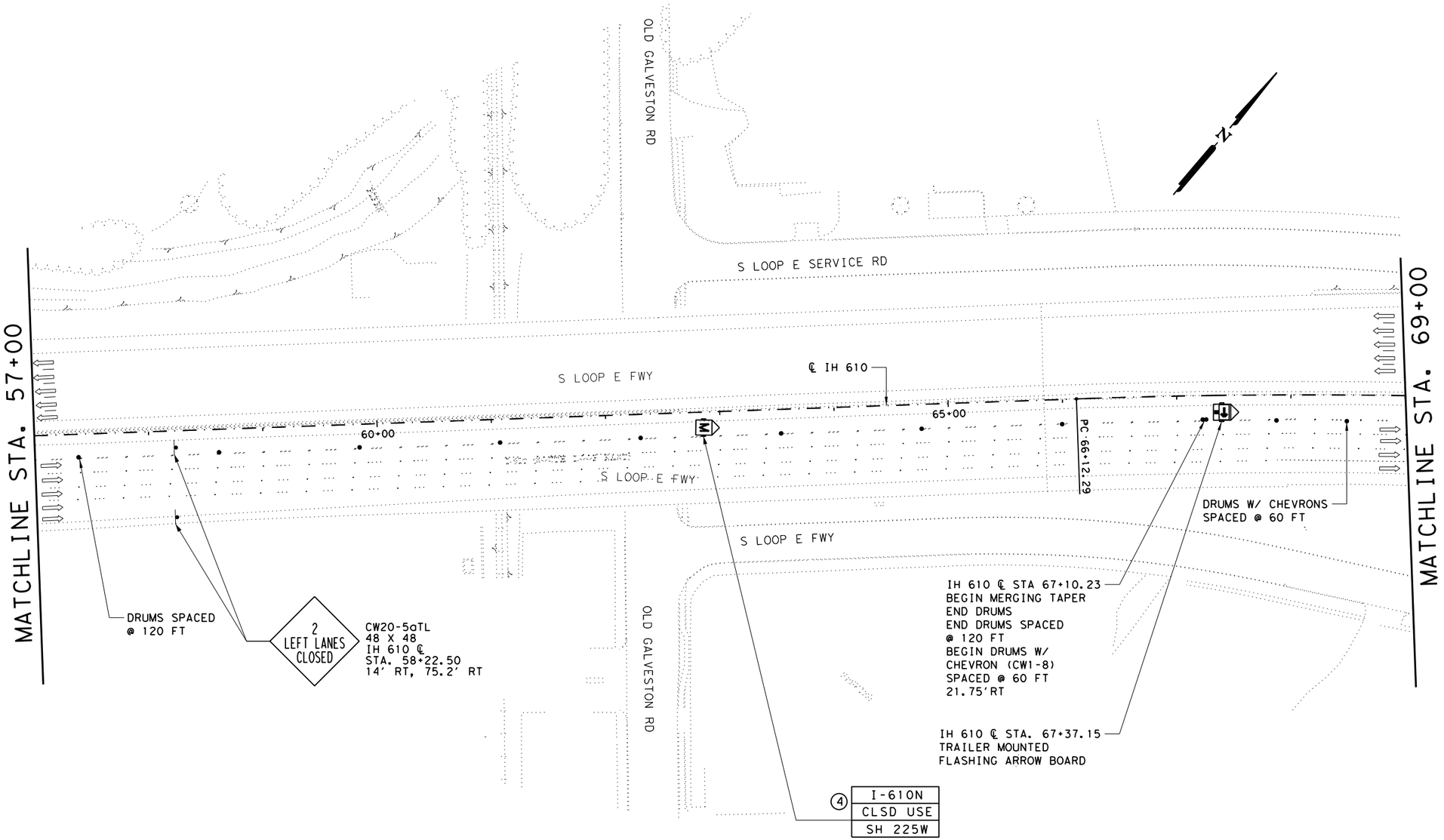
IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
NORTHBOUND (WKND ONLY)

℄ IH 610 STA 45+00.00
TO STA 57+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 8 OF 11

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		32
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
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IH 610 SHIP CHANNEL BRIDGE TRAFFIC CONTROL TOTAL CLOSURE NORTHBOUND (WKND ONLY)

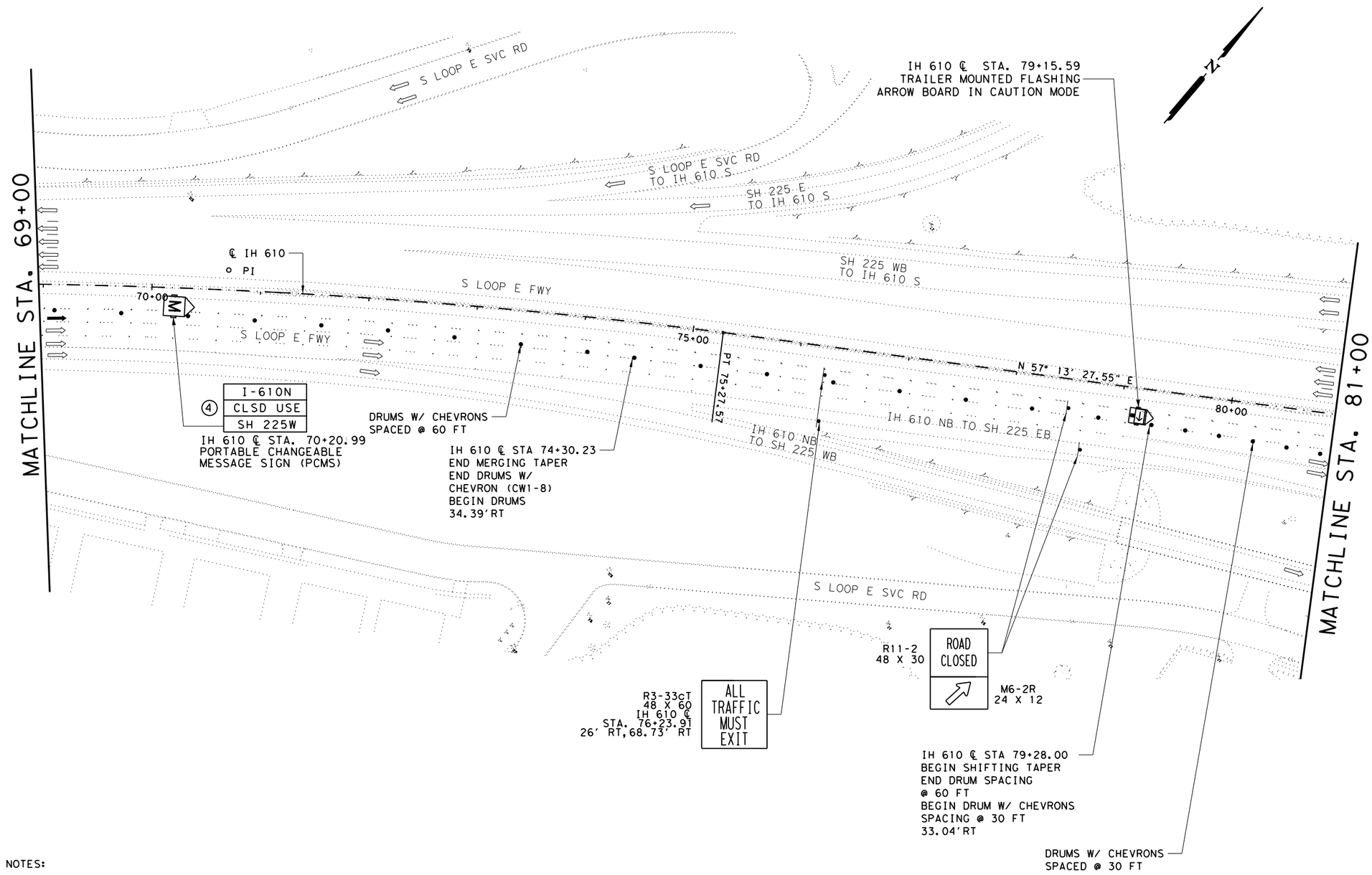
℄ IH 610 STA 57+00.00 TO STA 69+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 9 OF 11

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		33
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\RNBTCP*09.dgn



LEGEND

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- CHANNELIZING DEVICES
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- OPEN TO TRAFFIC LANE
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Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
NORTHBOUND (WKND ONLY)

℄ IH 610 STA 69+00.00
TO STA 81+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

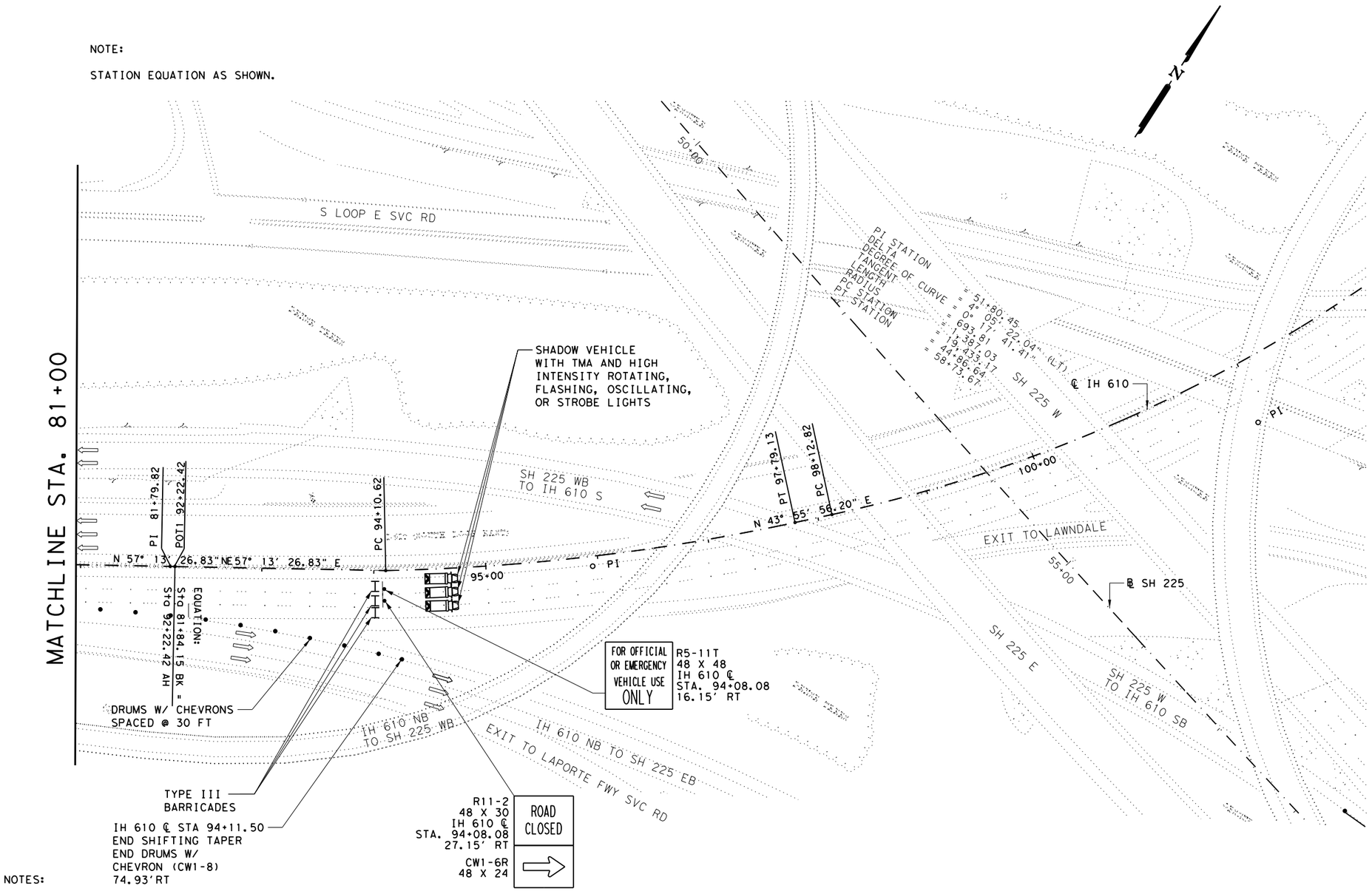
SHEET 10 OF 11

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		34
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097X4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\RNBTCP*10.dgn

NOTE:

STATION EQUATION AS SHOWN.



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

1. PLACE TY III BARRICADES ACROSS ALL CLOSED LANES AT 2 LOCATIONS BETWEEN IH-10 AND THE PORT OF HOUSTON AS DIRECTED BY THE ENGINEER OR THE ENGINEER'S REPRESENTATIVE.

2. TOTAL FREEWAY CLOSURE. USE TxDOT STANDARD SHEET "TRAFFIC CONTROL PLAN FREEWAY CLOSURE" TCP (6-6)-12.

3. ONE OR TWO LANE CLOSURE. SEE TxDOT STANDARD "TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURE" TCP (6-1)-12 FOR MORE INFORMATION.

4. PLACE 1 WEEK IN ADVANCE OF CLOSURE. LOCATION SHOWN IS APPROXIMATE, EXACT LOCATION TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

5. ALL MESSAGE SIGN WORDING MAY BE CHANGED BY THE ENGINEER.

6. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

STATE OF TEXAS
BONNIE TAI
125946
LICENSED
PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE TRAFFIC CONTROL TOTAL CLOSURE NORTHBOUND (WKND ONLY)

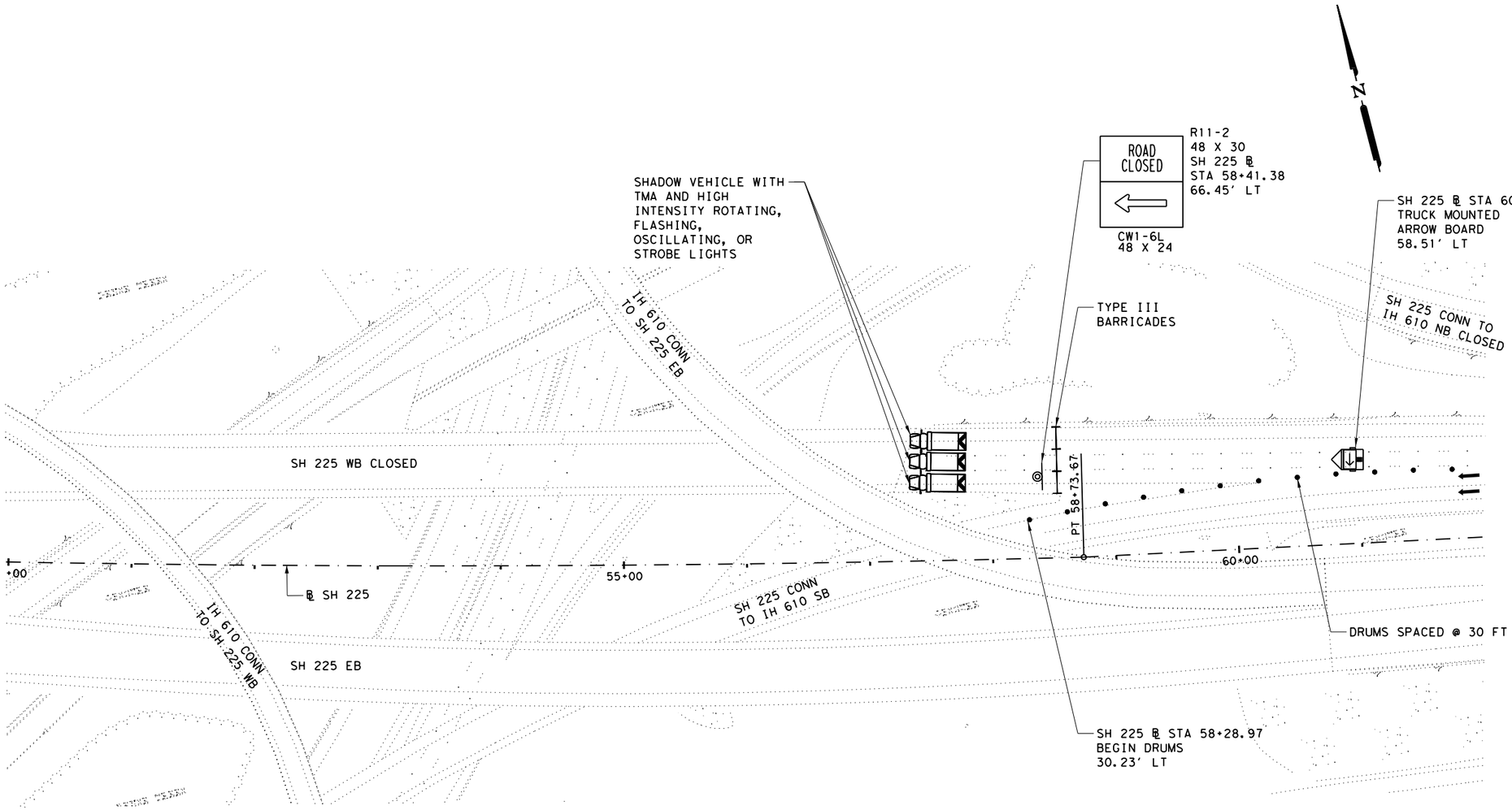
℄ IH 610 STA 81+00.00 TO END

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 11 OF 11

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		35
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271150971\4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\RNBTCP*11.dgn



LEGEND

- SIGN
- SHADOW VEHICLE WITH TMA
- TY III BARRICADE
- TRAILER MOUNTED FLASHING ARROW BOARD
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES) — 4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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5. ALL MESSAGE SIGN WORDING MAY BE CHANGED BY THE ENGINEER.

6. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

Texas Department of Transportation

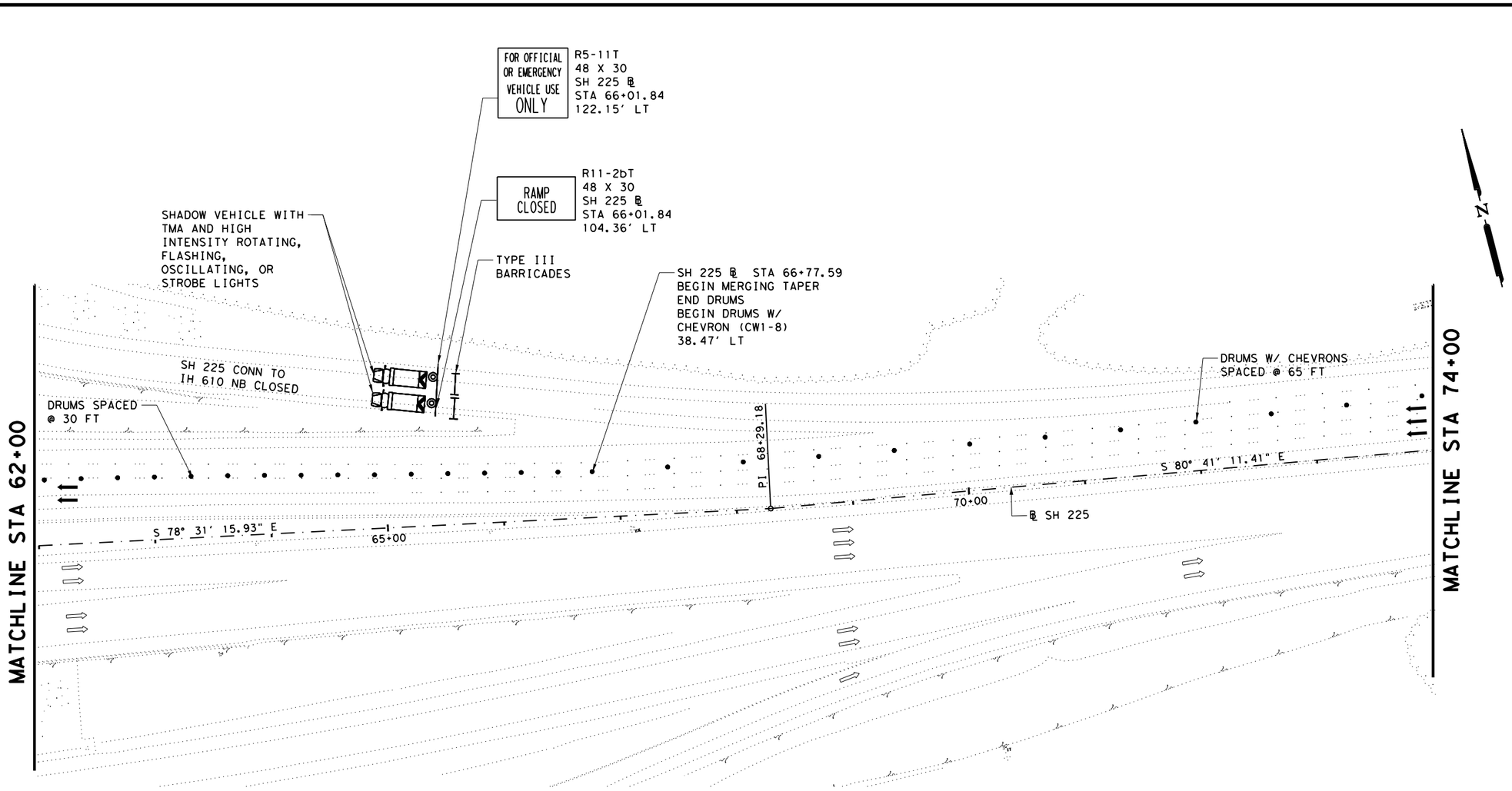
SH 225 WESTBOUND AT IH 610 TRAFFIC CONTROL NORTHBOUND CLOSURE (WKND ONLY)

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 1 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		36
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE:5/21/2021
DW:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271\15097\V4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\225 WB\ML 225 WB TCP SHT1.dgn



LEGEND

- SIGN
- SHADOW VEHICLE WITH TMA
- TY III BARRICADE
- TRAILER MOUNTED FLASHING ARROW BOARD
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES) — 4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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Texas Department of Transportation

SH 225 WESTBOUND AT IH 610 TRAFFIC CONTROL NORTHBOUND CLOSURE (WKND ONLY)

℄ SH 225 STA 62+00.00
TO STA 74+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 2 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		37
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

NOTES:

1. PLACE TY III BARRICADES ACROSS ALL CLOSED LANES AT 2 LOCATIONS BETWEEN IH-10 AND THE PORT OF HOUSTON AS DIRECTED BY THE ENGINEER OR THE ENGINEER'S REPRESENTATIVE.

2. TOTAL FREEWAY CLOSURE. USE TxDOT STANDARD SHEET "TRAFFIC CONTROL PLAN FREEWAY CLOSURE" TCP (6-6)-12.

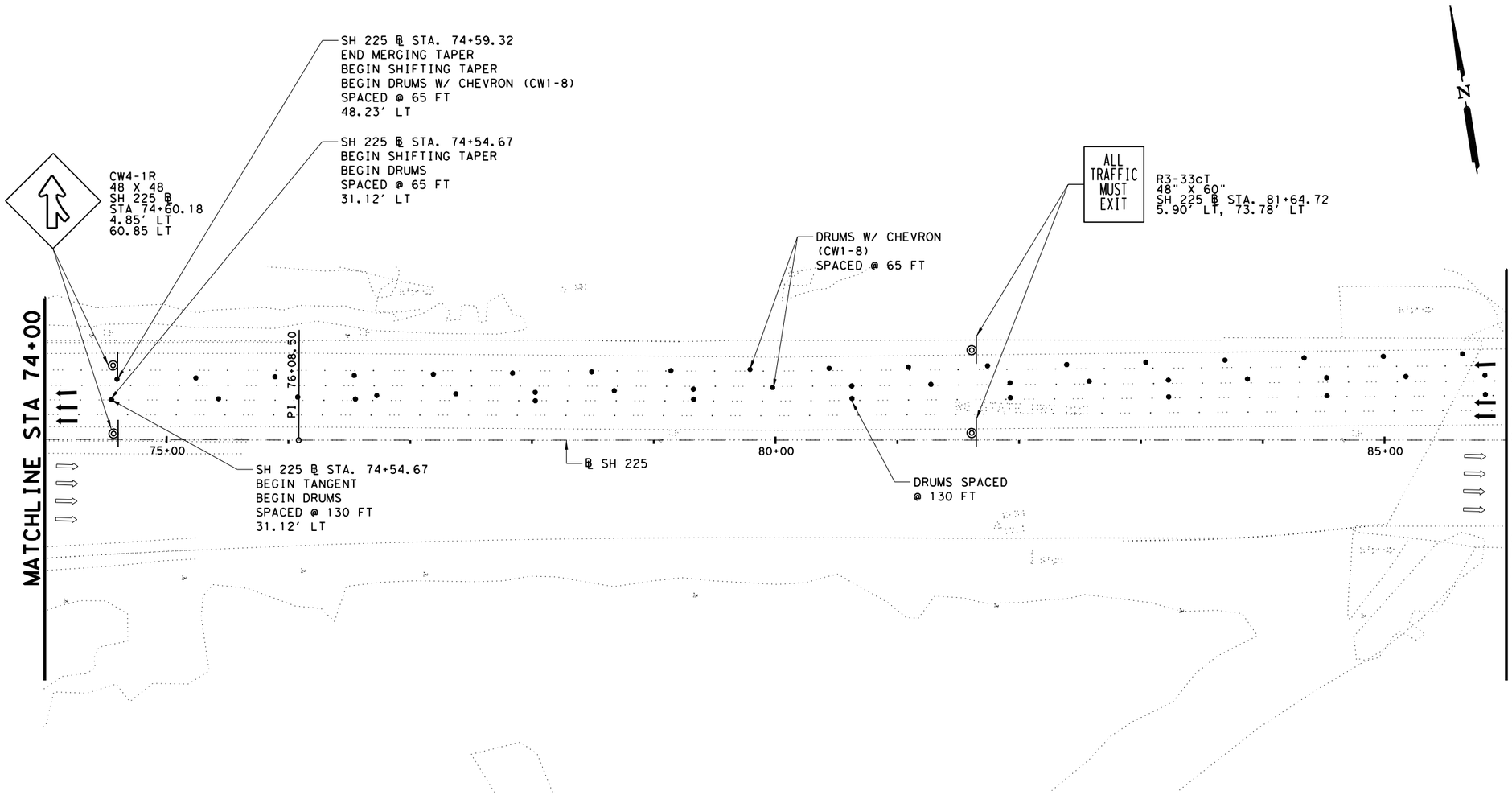
3. ONE OR TWO LANE CLOSURE. SEE TxDOT STANDARD "TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURE" TCP (6-1)-12 FOR MORE INFORMATION.

4. PLACE 1 WEEK IN ADVANCE OF CLOSURE. LOCATION SHOWN IS APPROXIMATE, EXACT LOCATION TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

5. ALL MESSAGE SIGN WORDING MAY BE CHANGED BY THE ENGINEER.

6. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271\15097\V4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\225 WB\ML 225 WB TCP SHT2



LEGEND

- SIGN
- SHADOW VEHICLE WITH TMA
- TY III BARRICADE
- TRAILER MOUNTED FLASHING ARROW BOARD
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES) — 4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021
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Texas Department of Transportation

SH 225 WESTBOUND AT IH 610 TRAFFIC CONTROL NORTHBOUND CLOSURE (WKND ONLY)

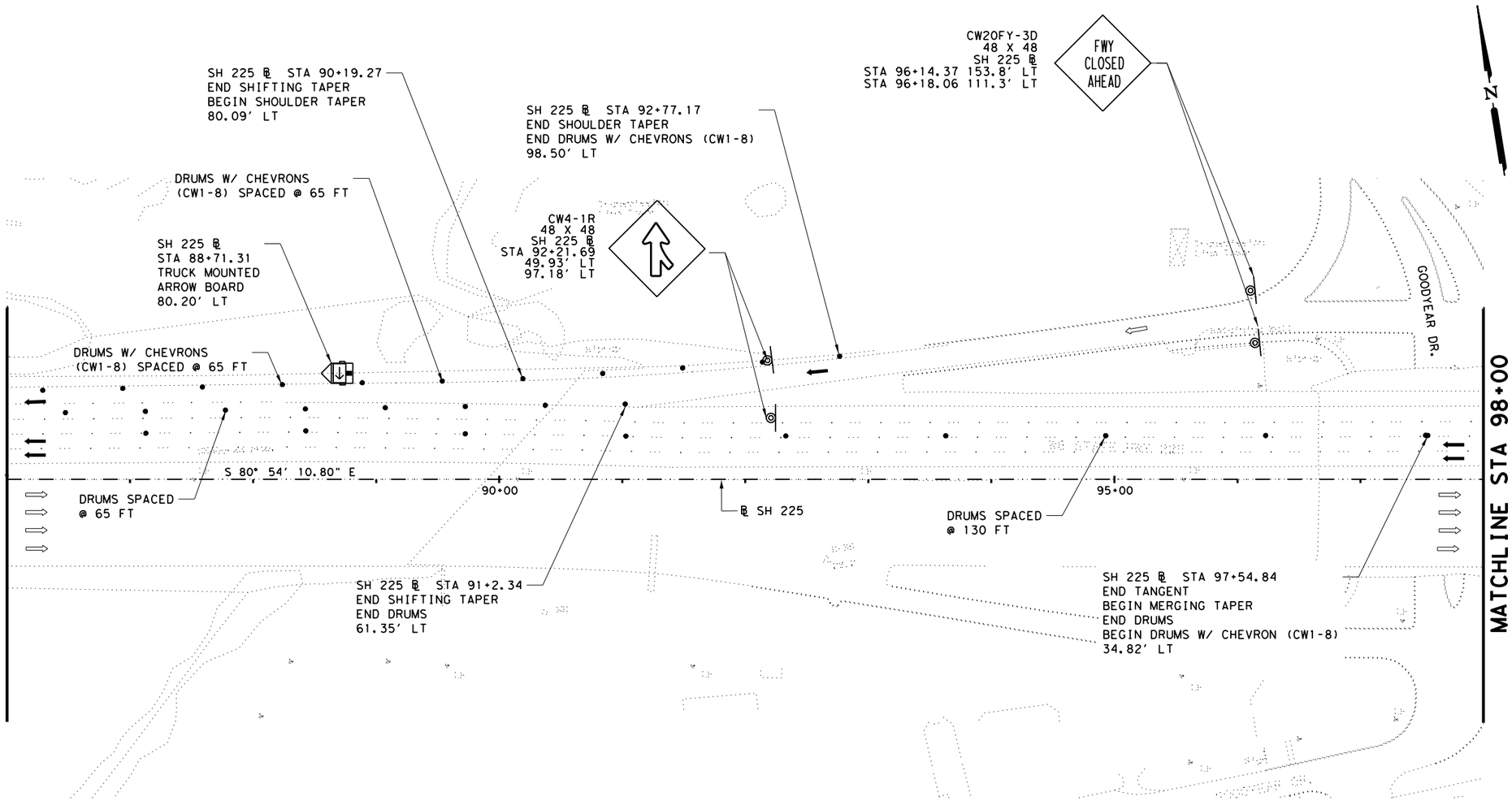
℄ SH 225 STA 74+00.00 TO STA 86+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 3 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		38
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271115097\4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\225 WB\ML 225 WB TCP SHT3



LEGEND

- SIGN
- SHADOW VEHICLE WITH TMA
- TY III BARRICADE
- TRAILER MOUNTED FLASHING ARROW BOARD
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES) — 4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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Texas Department of Transportation

SH 225 WESTBOUND AT IH 610 TRAFFIC CONTROL NORTHBOUND CLOSURE (WKND ONLY)

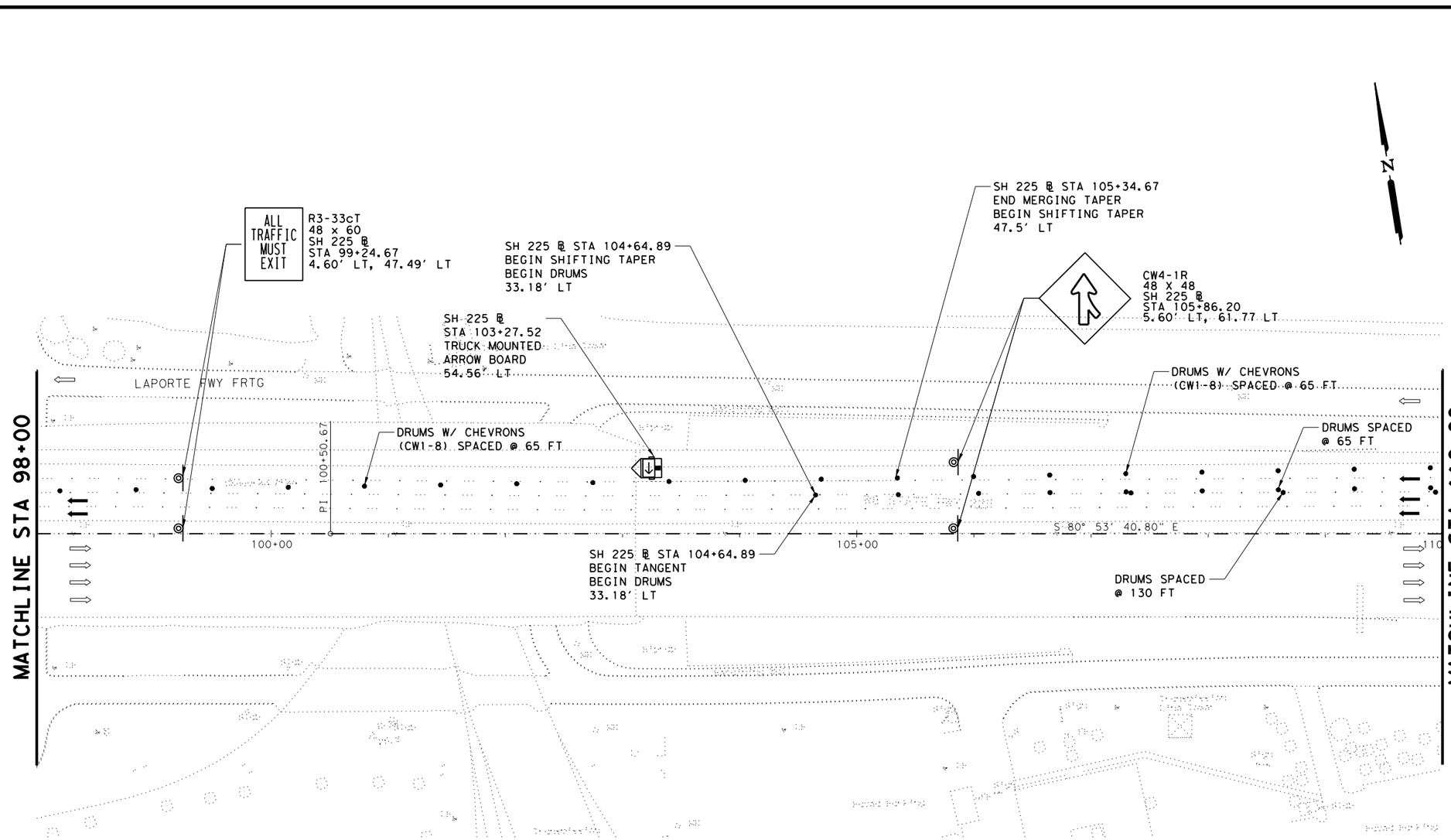
℄ SH 225 STA 86+00.00
TO STA 98+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 4 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		39
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271150971\4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\225 WB\ML 225 WB TCP SHT4



LEGEND

- SIGN
- SHADOW VEHICLE WITH TMA
- TY III BARRICADE
- TRAILER MOUNTED FLASHING ARROW BOARD
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES) — 4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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Texas Department of Transportation

SH 225 WESTBOUND AT IH 610 TRAFFIC CONTROL NORTHBOUND CLOSURE (WKND ONLY)

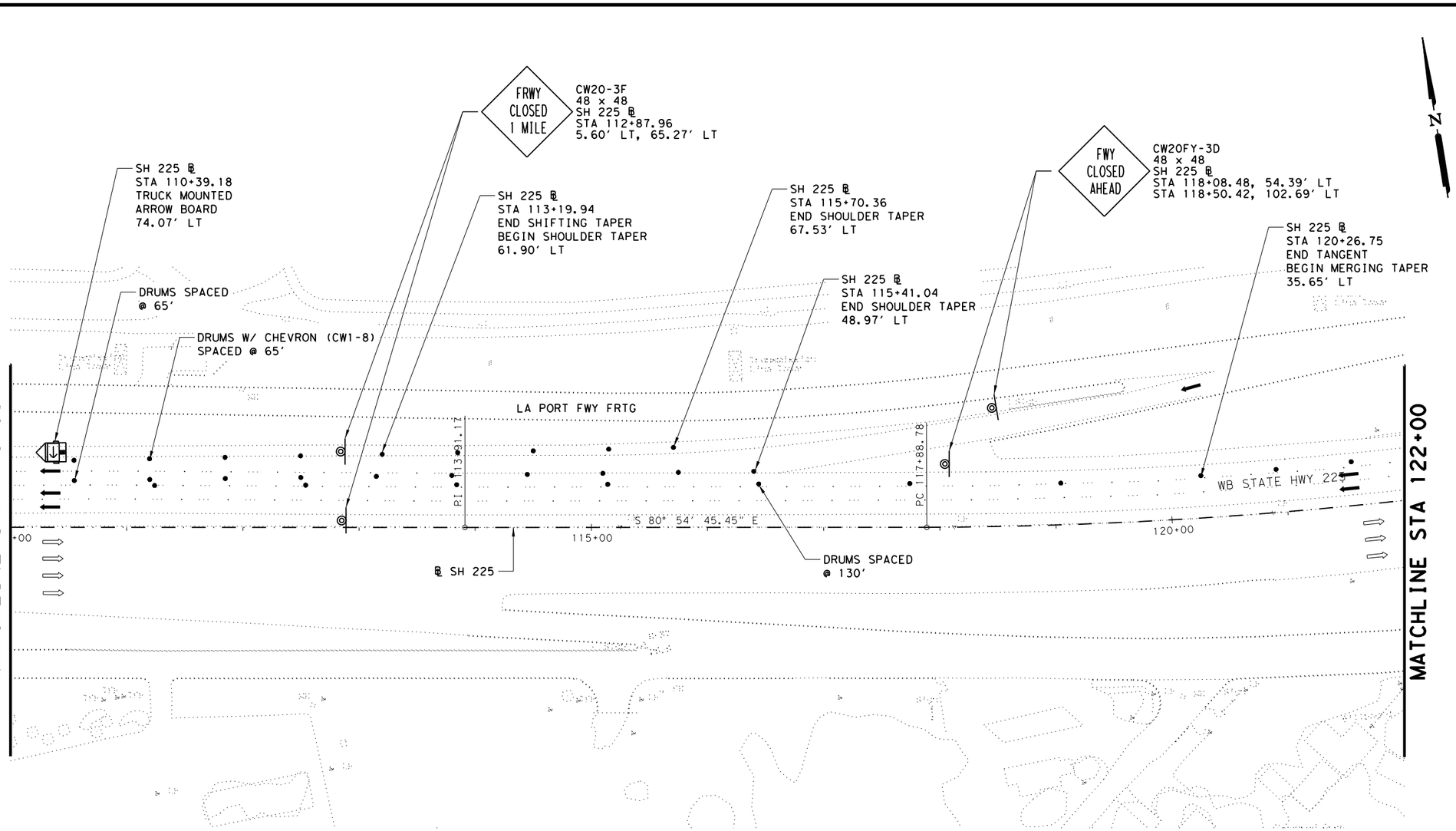
℄ SH 225 STA 98+00.00
TO STA 110+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 5 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		40
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\225 WB\ML 225 WB TCP SHT5



LEGEND

- SIGN
- SHADOW VEHICLE WITH TMA
- TY III BARRICADE
- TRAILER MOUNTED FLASHING ARROW BOARD
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES) — 4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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Texas Department of Transportation

SH 225 WESTBOUND AT IH 610 TRAFFIC CONTROL NORTHBOUND CLOSURE (WKND ONLY)

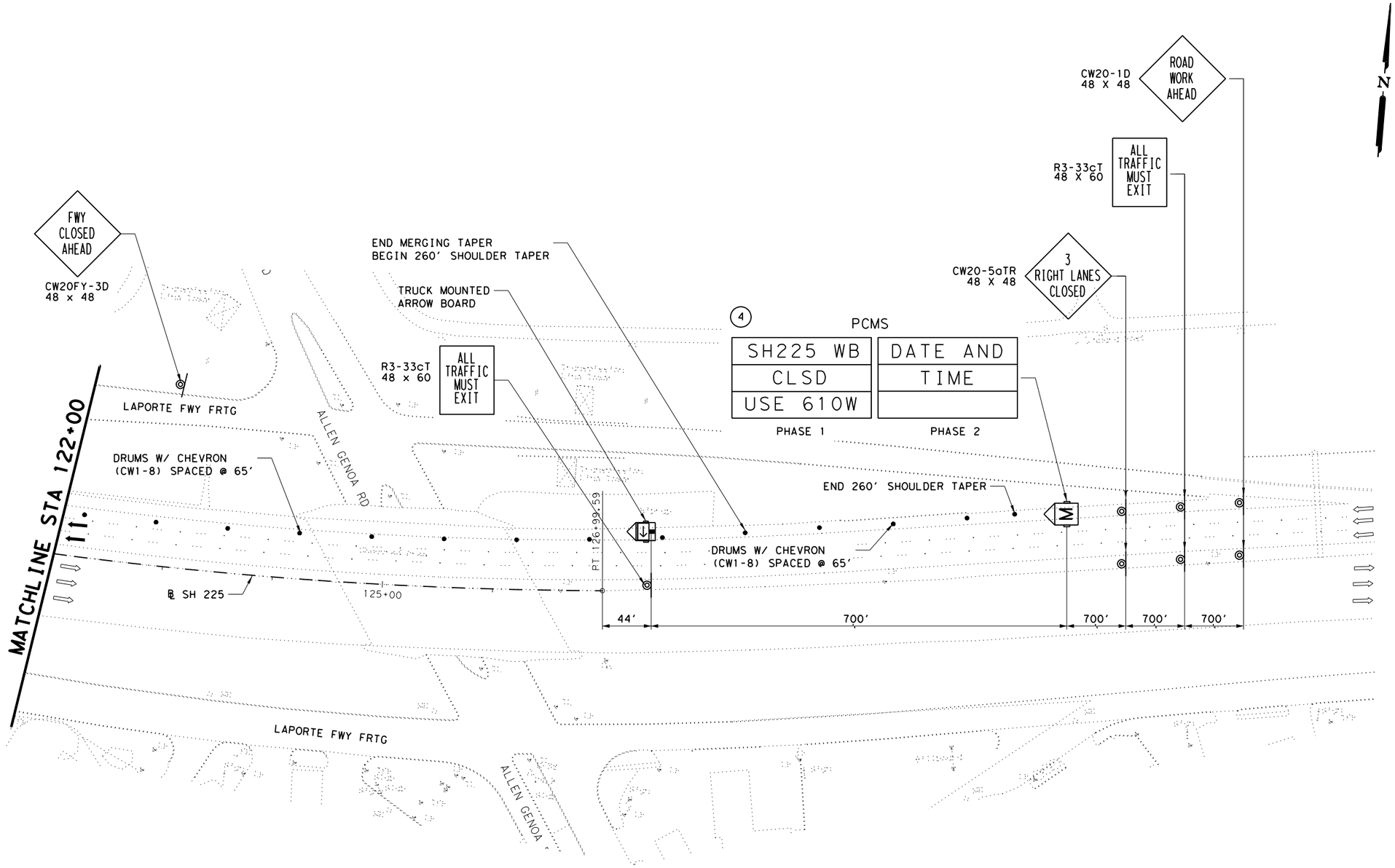
℄ SH 225 STA 110+00.00
TO STA 122+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 6 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		41
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\225 WB\ML 225 WB TCP SHT6



LEGEND

- SIGN
- SHADOW VEHICLE WITH TMA
- TY III BARRICADE
- TRAILER MOUNTED FLASHING ARROW BOARD
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES) — 4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

STATE OF TEXAS
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05/21/2021

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Texas Department of Transportation

SH 225 WESTBOUND AT IH 610 TRAFFIC CONTROL NORTHBOUND CLOSURE (WKND ONLY)

℄ SH 225 STA 122+00.00 TO END

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 7 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		42
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271\15097\V4 - Design\Plan Set\2. TCP\NB TOTAL CLOSURE TCP\225 WB\ML 225 WB TCP SHT7

610S
CLOSED AT
PORT OF HOUSTON
USE 45S
DATE & TIME

DMS

IH 610 NL EB @ ELLA
IH 610 NL EB @ N MAIN
IH 610 WL NB @ HEMPSTEAD

610S
CLOSED AT
PORT OF HOUSTON
DATE & TIME

DMS

IH 610 NL EB @ FULTON
IH 610 NL EB @ JENSEN

610S
CLOSED AT
PORT OF HOUSTON
USE 69 S TO 45 S
DATE & TIME

DMS

US 59 (EASTEX) SB
@ WILL CLAYTON
US 59 (EASTEX) SB
@ E. MT HOUSTON

US 59 (EASTEX) SB
@ CROSSTIMBERS
US 59 (EASTEX) SB
@ COLLINGSWORTH

610S
CLOSED AT
PORT OF HOUSTON
USE 10W TO 69S
DATE & TIME

DMS

IH 610 NL EB
@ KIRPATRICK

610S
CLOSED AT
PORT OF HOUSTON
USE 610N TO 69S
DATE AND TIME

DMS

I-10 EAST EASTBOUND
AT LATHROP

610S
CLOSED AT
PORT OF HOUSTON
USE 10W TO 69S
DATE AND TIME

DMS

I-610 EAST LOOP SOUTHBOUND
AT MCCARTY

610S
CLOSED AT
PORT OF HOUSTON
USE 69S TO 45S
DATE AND TIME

DMS

I-10 EAST WESTBOUND
AT JOHN RALSTON

I-10 EAST WESTBOUND
AT SHELDON

IH 10 WB @ WASHINGTON
IH 10 WB @ STUDEMONT

610S
CLOSED AT
PORT OF HOUSTON
USE 45S
DATE & TIME

DMS

610S
CLOSED AT
PORT OF HOUSTON
USE 10 W TO 69S
DATE AND TIME

DMS

I-610 EL SOUTHBOUND
AT TURNING BASIN

I-610 EL NORTHBOUND
AT TURNING BASIN

SB TOTAL CLOSURE

N

NOTES:

1. THE TRAVELING PUBLIC IS TO BE NOTIFIED TWO (2) WEEKS IN ADVANCE OF TOTAL FREEWAY CLOSURE. EXACT WORDING OF ADVANCE NOTIFICATION MESSAGES TO BE DETERMINED BY THE FIELD ENGINEER.

2. SEE TRAFFIC CONTROL PLANS FOR IH 610 SOUTHBOUND HOUSTON SHIP CHANNEL BRIDGE, CONN IH 10 EB TO IH 610 SB, AND CONN IH 10 WB AND US 90 WB TO IH 610 SB FOR ADDITIONAL PCMS'S AND SIGNS.

STATE OF TEXAS
JESSICA LYNN KEPHART
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LICENSED
PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
SOUTHBOUND TOTAL
CLOSURE DETOUR LAYOUT
DYNAMIC MESSAGE
SIGNING (WKND ONLY)

SCALE: N.T.S.

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		43
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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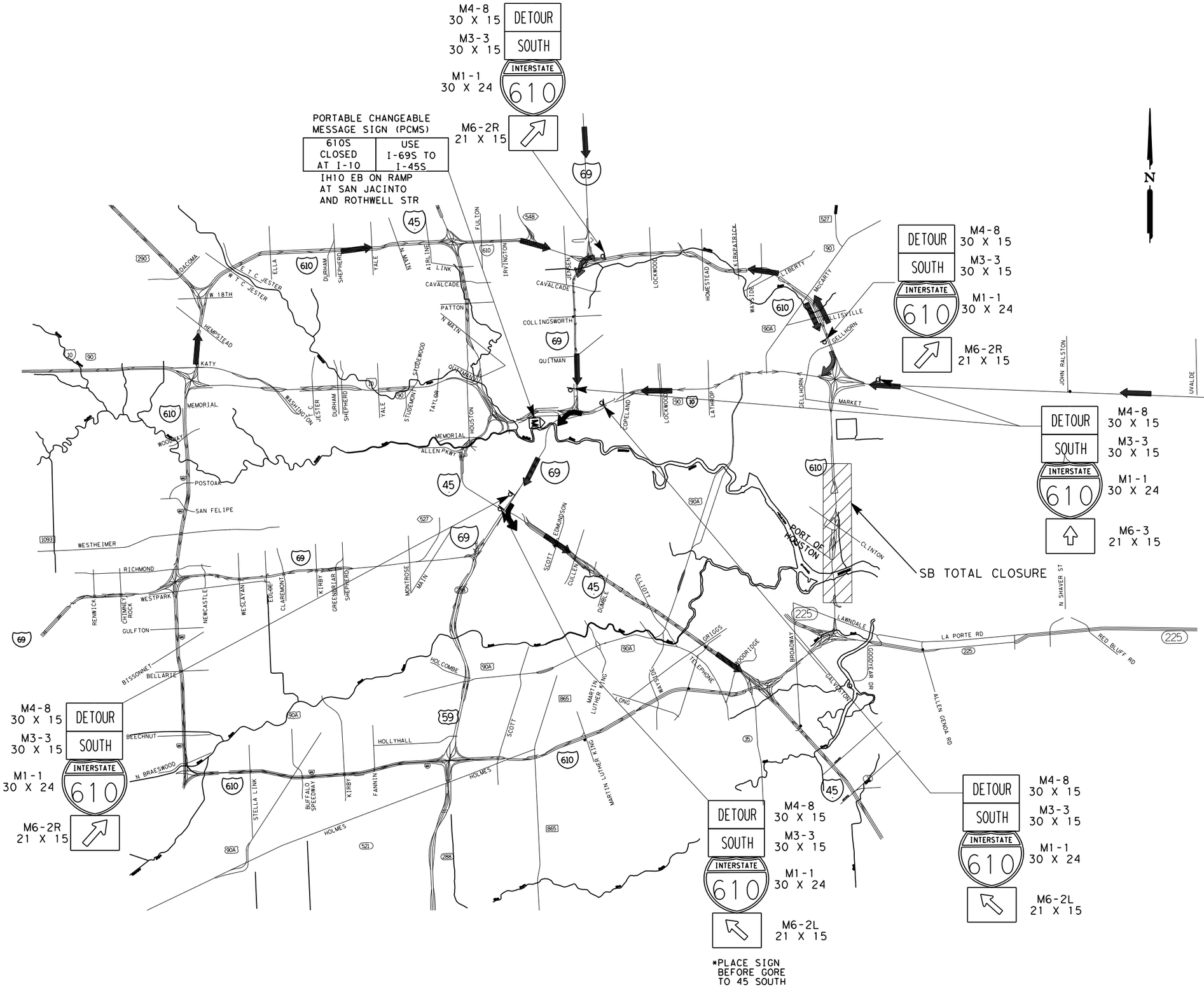

NOTES:

1. THE TRAVELING PUBLIC IS TO BE NOTIFIED TWO (2) WEEKS IN ADVANCE OF TOTAL FREEWAY CLOSURE. EXACT WORDING OF ADVANCE NOTIFICATION MESSAGES TO BE DETERMINED BY THE FIELD ENGINEER.
2. SEE TRAFFIC CONTROL PLANS FOR IH 610 SOUTHBOUND HOUSTON SHIP CHANNEL BRIDGE, CONN IH 10 EB TO IH 610 SB, AND CONN IH 10 WB AND US 90 WB TO IH 610 SB FOR ADDITIONAL PCMS'S AND SIGNS.

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED
PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE SOUTHBOUND TOTAL CLOSURE DETOUR LAYOUT PORTABLE CHANGEABLE MESSAGE SIGNING (WKND ONLY)

SCALE: N.T.S.

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		44
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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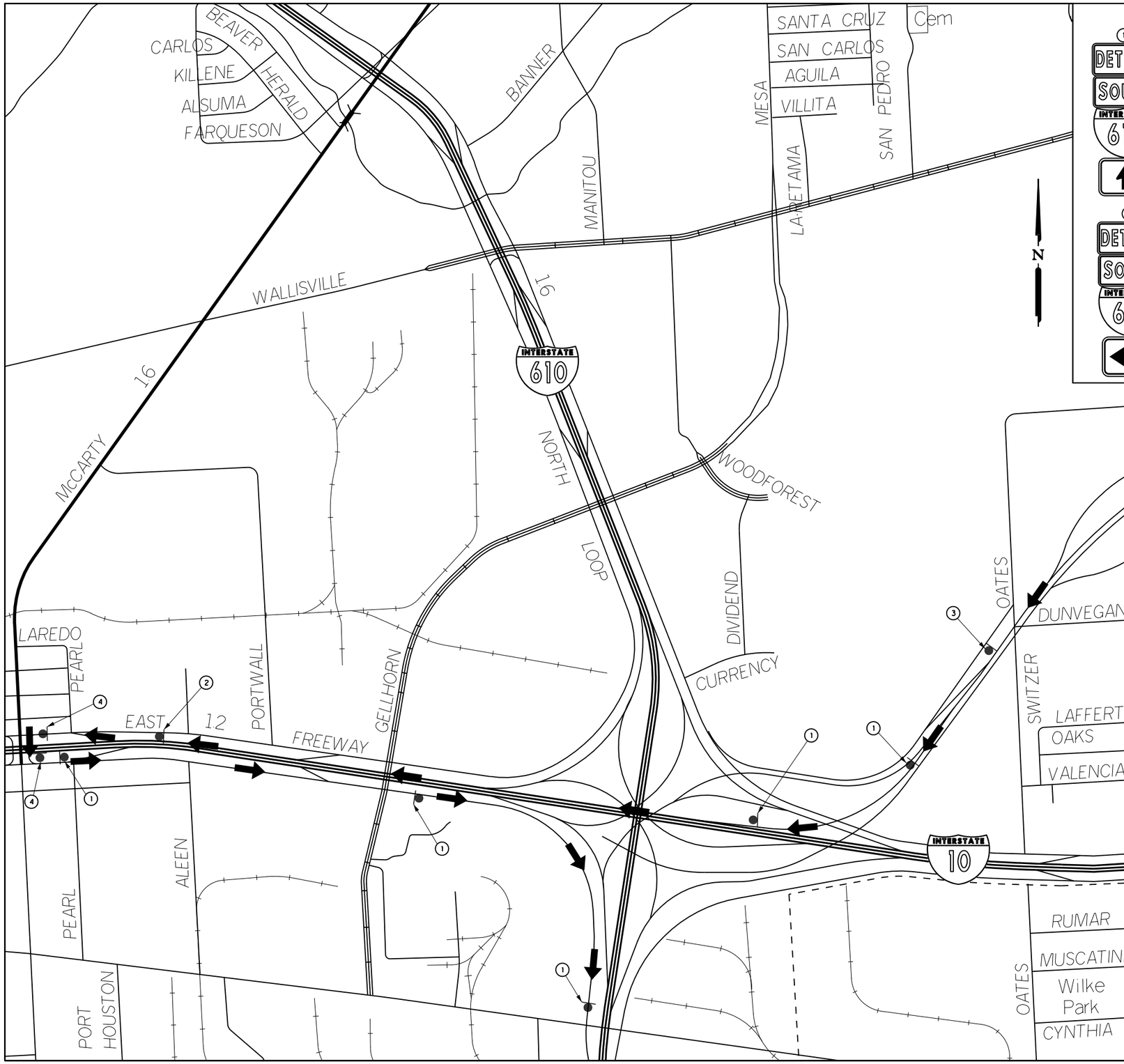

SIGN LEGEND

1
DETOUR M4-8 24" X 12"
SOUTH M3-3 48" X 18"
INTERSTATE 610 M1-1 60" X 48"
M6-3 24 X 12

2
DETOUR M4-8 24" X 12"
SOUTH M3-3 48" X 18"
INTERSTATE 610 M1-1 60" X 48"
M6-2R 24 X 12

3
DETOUR M4-8 24" X 12"
SOUTH M3-3 48" X 18"
INTERSTATE 610 M1-1 60" X 48"
M6-2L 24 X 12

4
DETOUR M4-8 24" X 12"
SOUTH M3-3 48" X 18"
INTERSTATE 610 M1-1 60" X 48"
M6-1L 24 X 12

5
RAMP CLOSED AHEAD
CW20RP-3D 48" X 48"

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610 SOUTHBOUND AT US 90 WB CONNECTOR DETOUR

SCALE: N.T.S.

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		45
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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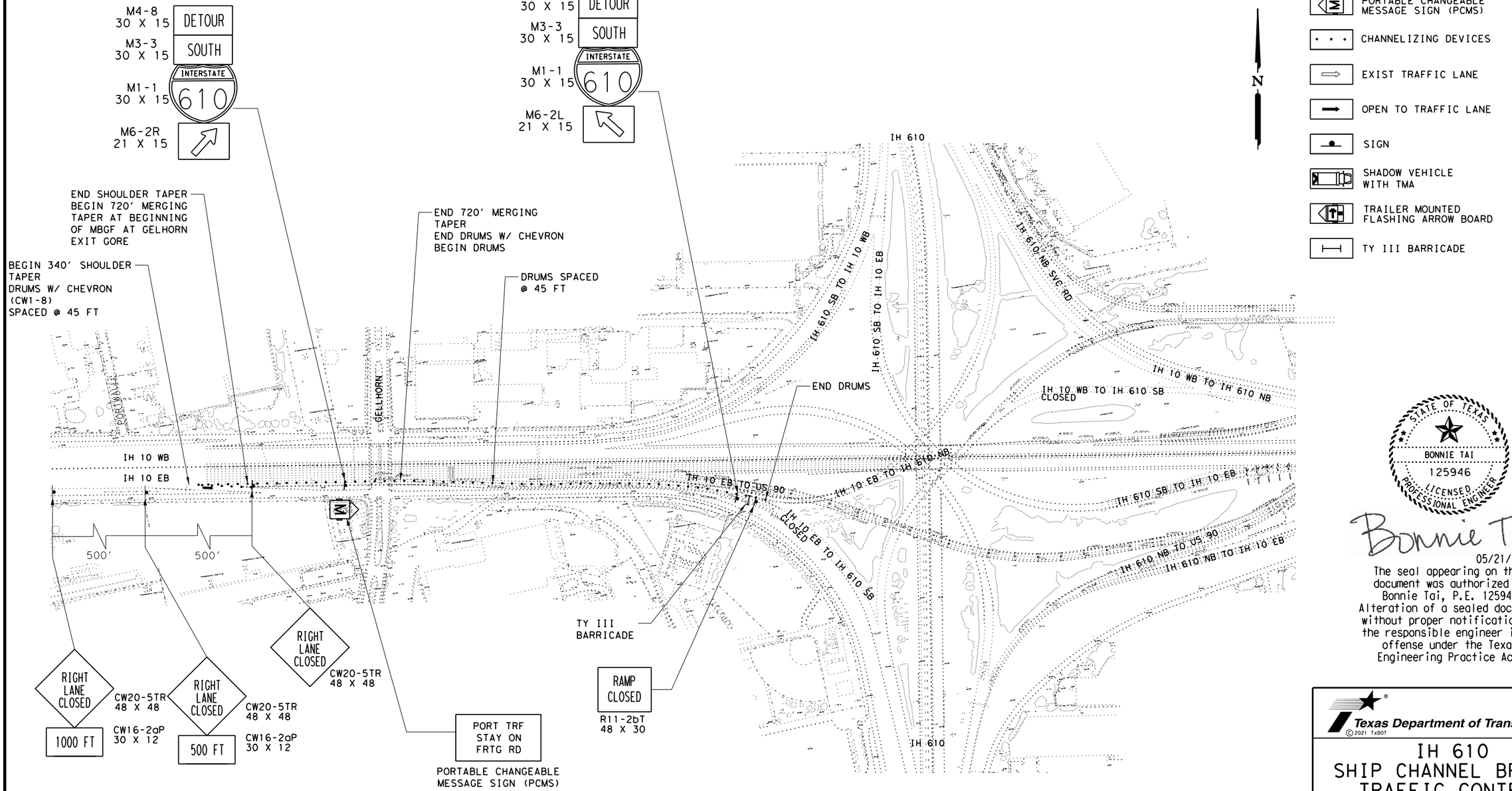

LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

1. PLACE TY III BARRICADES ACROSS ALL CLOSED LANES AT 2 LOCATIONS BETWEEN IH-10 AND THE PORT OF HOUSTON AS DIRECTED BY THE ENGINEER OR THE ENGINEER'S REPRESENTATIVE.
2. TOTAL FREEWAY CLOSURE. USE TxDOT STANDARD SHEET "TRAFFIC CONTROL PLAN FREEWAY CLOSURE" TCP (6-6)-12.
3. ONE OR TWO LANE CLOSURE. SEE TxDOT STANDARD "TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURE" TCP (6-1)-12 FOR MORE INFORMATION.
4. PLACE 1 WEEK IN ADVANCE OF CLOSURE. LOCATION SHOWN IS APPROXIMATE, EXACT LOCATION TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
5. ALL MESSAGE SIGN WORDING MAY BE CHANGED BY THE ENGINEER.
6. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

PLACE PCMS AT THE FOLLOWING LOCATIONS:

IH 10 EB FRTG
BEFORE MCCARTY ON-RAMP

I-610S CLOSED	PORT TRF STAY ON FRTG RD

PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

IH 10 EB MAINLANES
AT MCCARTY ON-RAMP

I-610S CLOSED	PORT TRF EXIT GELLHORN

PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

STATE OF TEXAS
BONNIE TAI
125946
LICENSED
PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

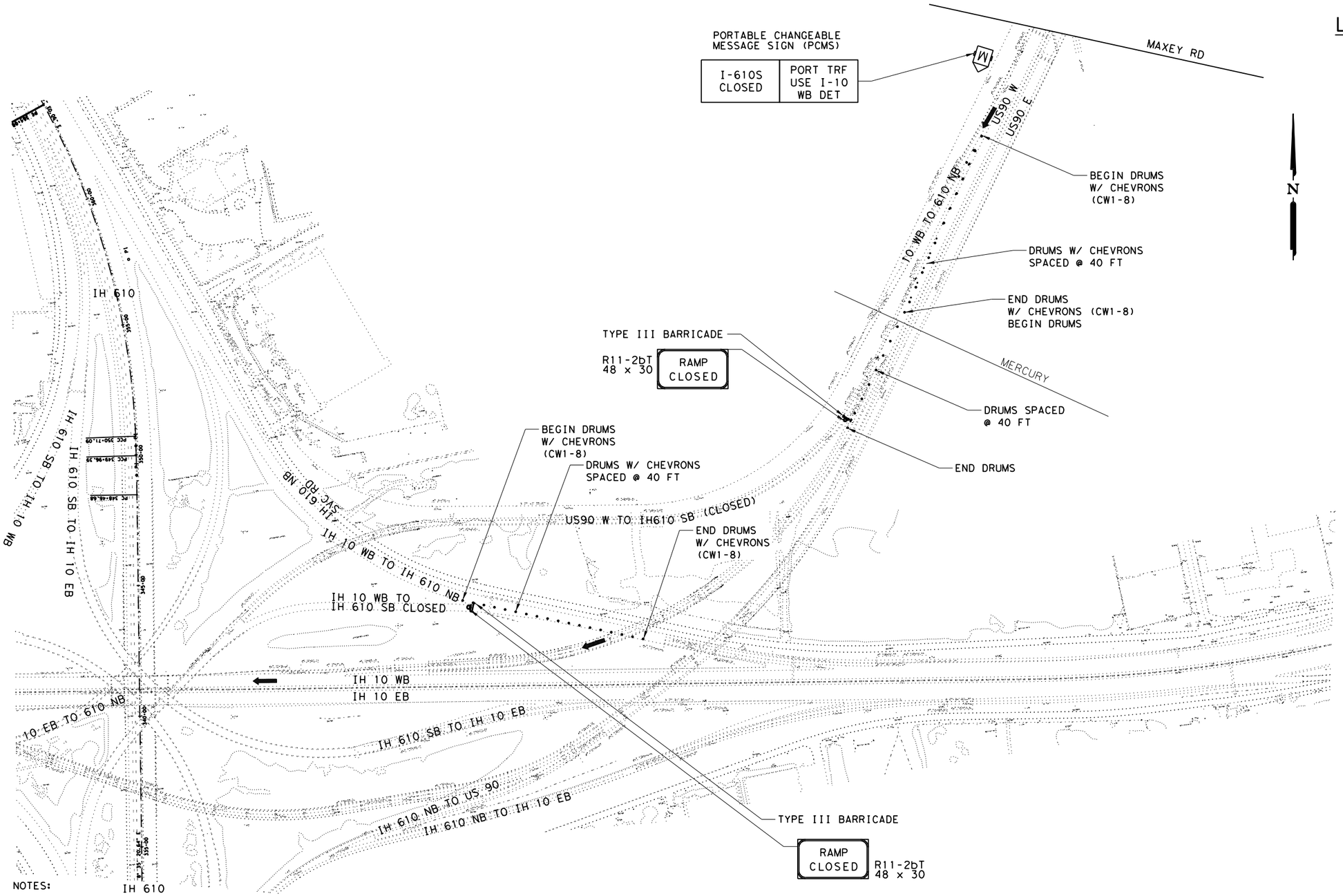
IH 610 SHIP CHANNEL BRIDGE TRAFFIC CONTROL TOTAL CLOSURE SOUTHBOUND (WKND ONLY) CONN IH 10 EB TO IH 610 SB

SCALE: N.T.S.

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		46
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097X4 - Design\Plan Set\2. TCP\SB TOTAL CLOSURE TCP\Revised Detours\10EBdet.dgn



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

N

NOTES:

1. PLACE TY III BARRICADES ACROSS ALL CLOSED LANES AT 2 LOCATIONS BETWEEN IH-10 AND THE PORT OF HOUSTON AS DIRECTED BY THE ENGINEER OR THE ENGINEER'S REPRESENTATIVE.

2. TOTAL FREEWAY CLOSURE. USE TxDOT STANDARD SHEET "TRAFFIC CONTROL PLAN FREEWAY CLOSURE" TCP (6-6)-12.

3. ONE OR TWO LANE CLOSURE. SEE TxDOT STANDARD "TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURE" TCP (6-1)-12 FOR MORE INFORMATION.

4. PLACE 1 WEEK IN ADVANCE OF CLOSURE. LOCATION SHOWN IS APPROXIMATE, EXACT LOCATION TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

5. ALL MESSAGE SIGN WORDING MAY BE CHANGED BY THE ENGINEER.

6. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

PLACE PCMS AT FOLLOWING LOCATIONS:

IH 10 WB MAINLANES AT MERCURY DRIVE

I-610S CLOSED	PORT TRF UTURN AT MCCARTY

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

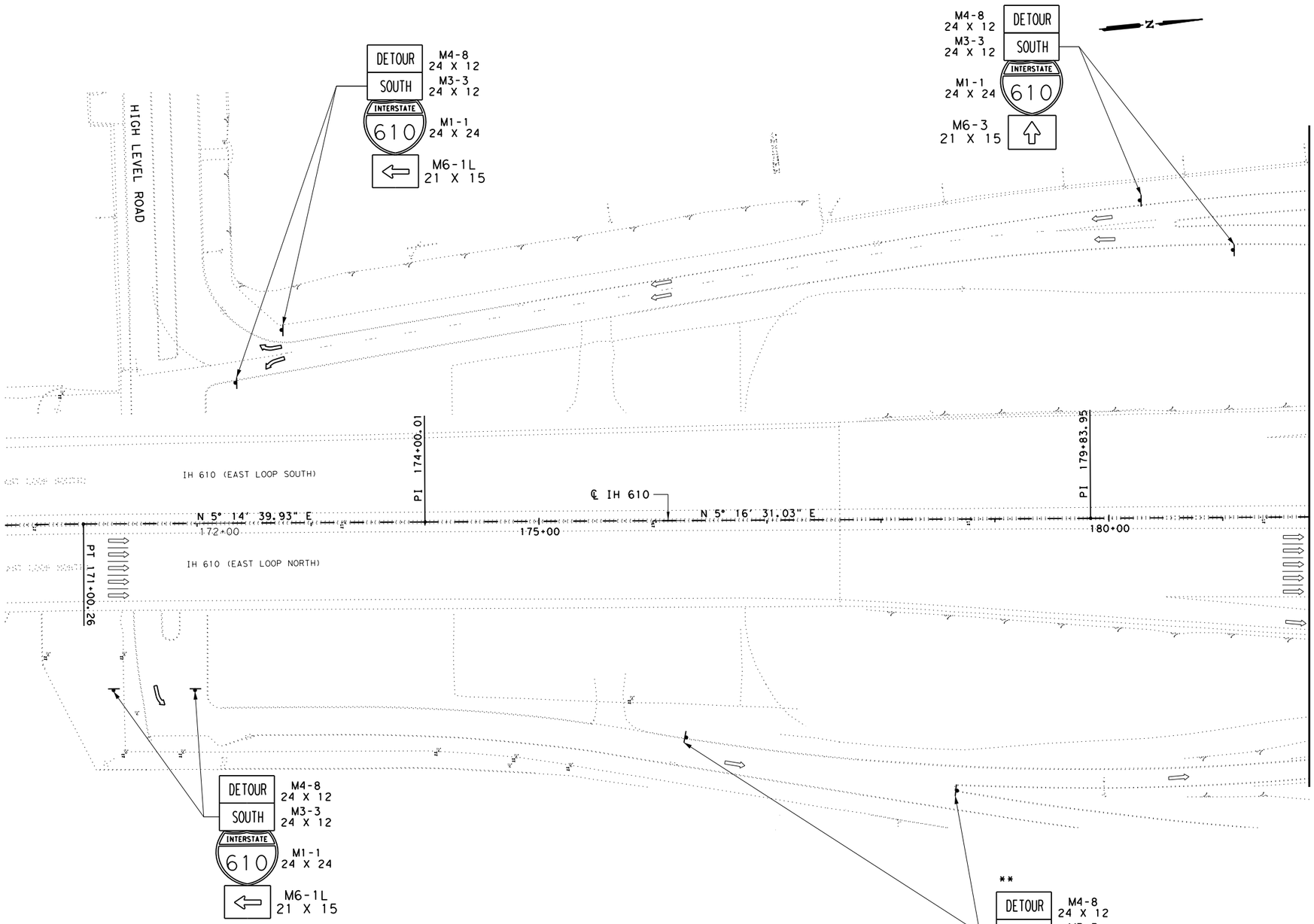
IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)
CONN IH 10 WB
AND US 90 WB

SCALE: N.T.S.

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		47
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\SB TOTAL CLOSURE TCP\Revised Detours\WB*det.dgn



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

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** PLACE DETOUR SIGN DIRECTLY IN FRONT OF EXISTING 610 SOUTH SIGN. COVER EXISTING 610 SOUTH SIGN IF DETOUR SIGN DOES NOT BLOCK IT FROM VIEW.

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE TRAFFIC CONTROL TOTAL CLOSURE SOUTHBOUND (WKND ONLY)

℄ IH 610 BEGIN TO STA 182+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 1 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		48
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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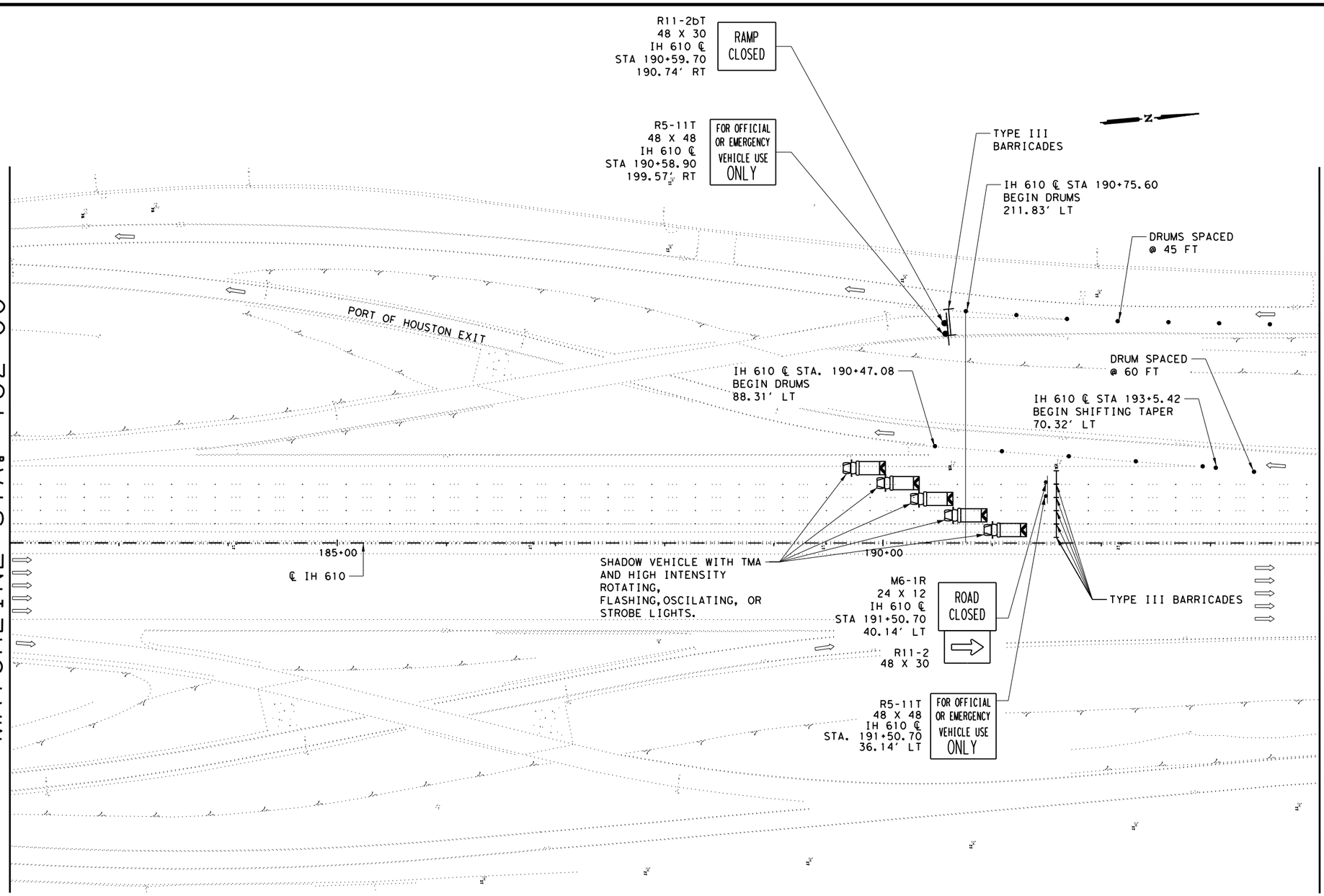

LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

STATE OF TEXAS
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NOTES:

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2. TOTAL FREEWAY CLOSURE. USE TxDOT STANDARD SHEET "TRAFFIC CONTROL PLAN FREEWAY CLOSURE" TCP (6-6)-12.

3. ONE OR TWO LANE CLOSURE. SEE TxDOT STANDARD "TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURE" TCP (6-1)-12 FOR MORE INFORMATION.

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5. ALL MESSAGE SIGN WORDING MAY BE CHANGED BY THE ENGINEER.

6. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

℄ IH 610 STA 182+00.00
TO STA 194+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 2 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		49
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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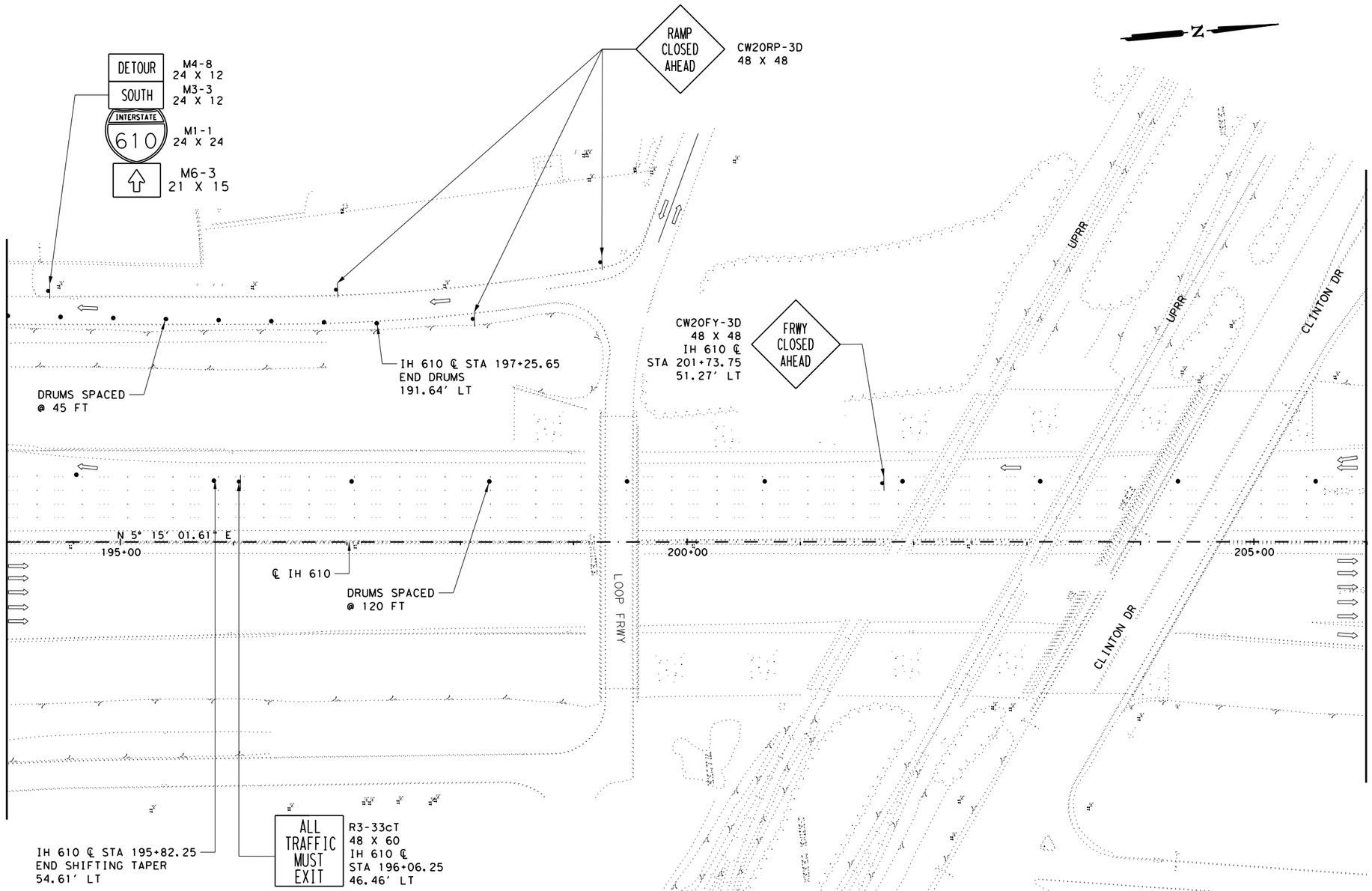

LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

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STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

℄ IH 610 STA 194+00.00
TO STA 206+00.00

SCALE: 1" = 100′ HORZ
1" = 10′ VERT

SHEET 3 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		50
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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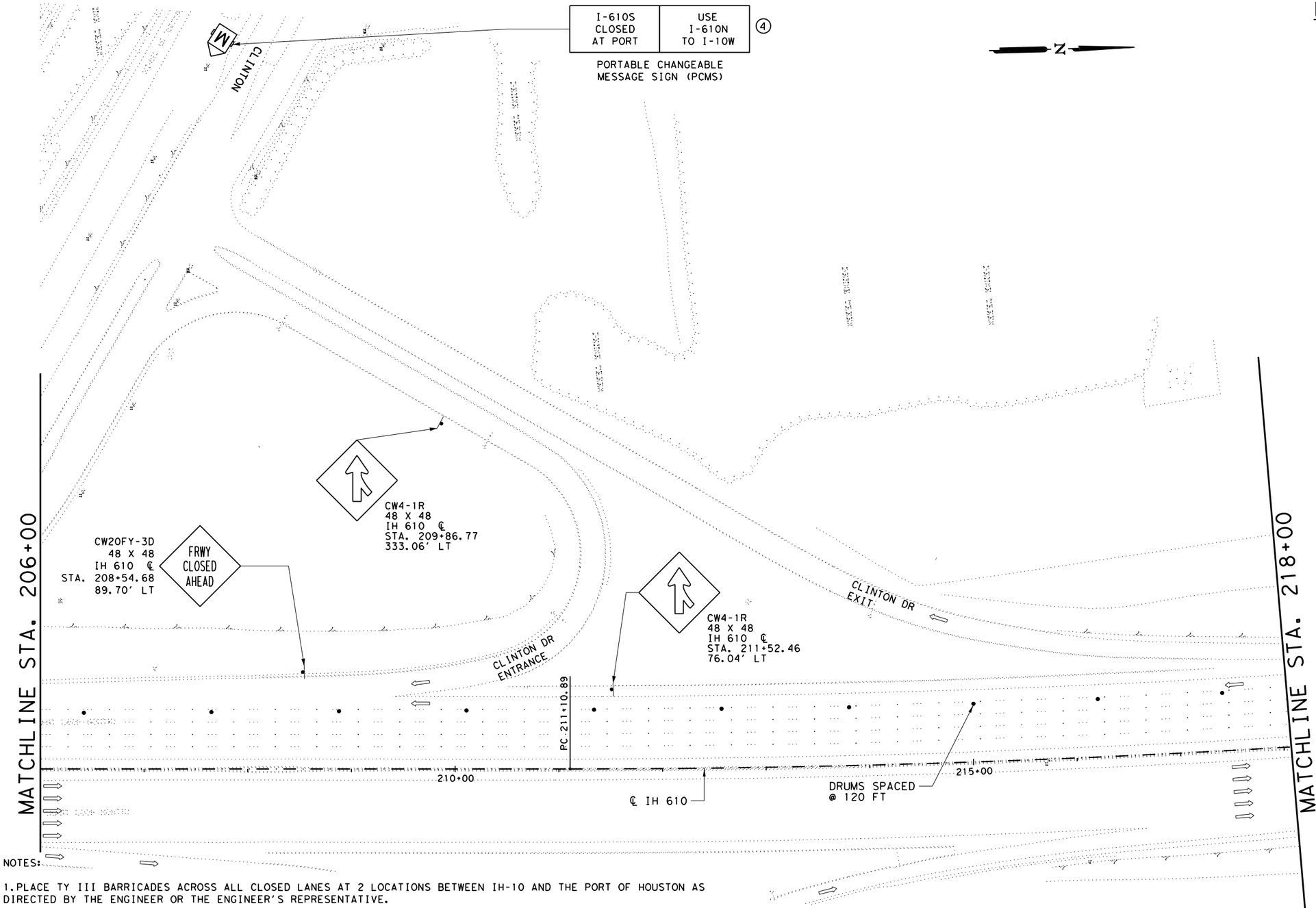

LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

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STATE OF TEXAS
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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

℄ IH 610 STA 206+00.00
TO STA 218+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 4 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		51
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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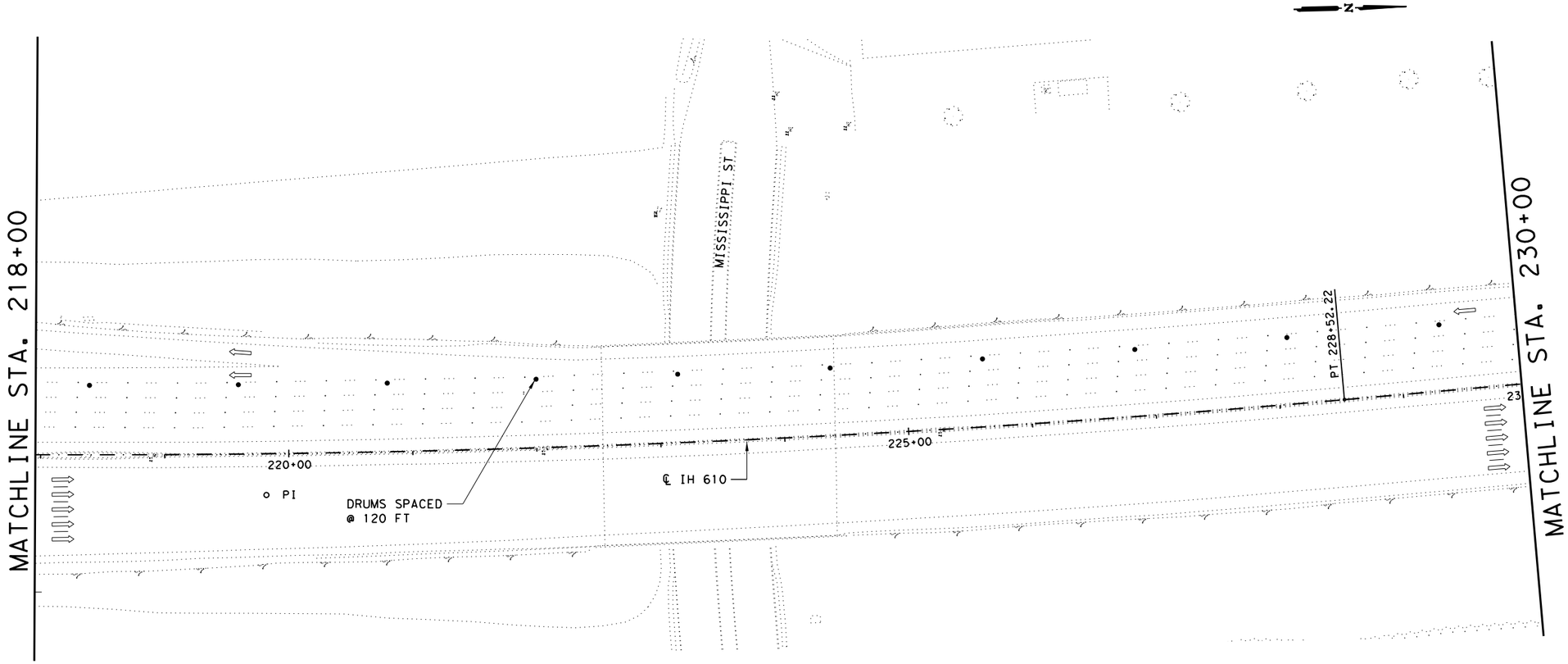

LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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NOTES:

1. PLACE TY III BARRICADES ACROSS ALL CLOSED LANES AT 2 LOCATIONS BETWEEN IH-10 AND THE PORT OF HOUSTON AS DIRECTED BY THE ENGINEER OR THE ENGINEER'S REPRESENTATIVE.

2. TOTAL FREEWAY CLOSURE. USE TxDOT STANDARD SHEET "TRAFFIC CONTROL PLAN FREEWAY CLOSURE" TCP (6-6)-12.

3. ONE OR TWO LANE CLOSURE. SEE TxDOT STANDARD "TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURE" TCP (6-1)-12 FOR MORE INFORMATION.

4. PLACE 1 WEEK IN ADVANCE OF CLOSURE. LOCATION SHOWN IS APPROXIMATE, EXACT LOCATION TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

5. ALL MESSAGE SIGN WORDING MAY BE CHANGED BY THE ENGINEER.

6. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

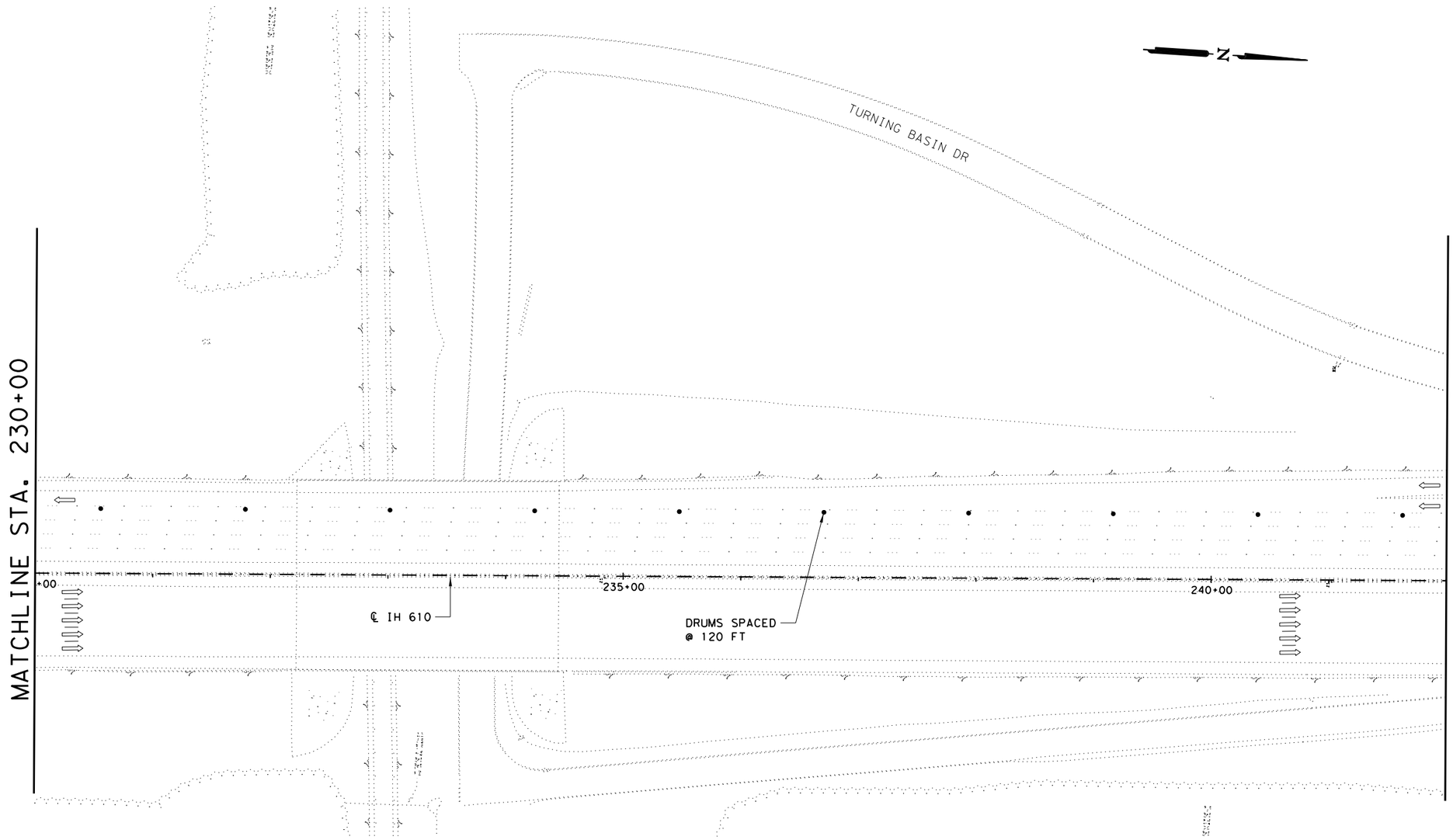
℄ IH 610 STA 218+00.00
TO STA 230+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 5 OF 21

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		52
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\SB TOTAL CLOSURE TCP\Rsbtcp*05.dgn



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

1. PLACE TY III BARRICADES ACROSS ALL CLOSED LANES AT 2 LOCATIONS BETWEEN IH-10 AND THE PORT OF HOUSTON AS DIRECTED BY THE ENGINEER OR THE ENGINEER'S REPRESENTATIVE.

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6. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

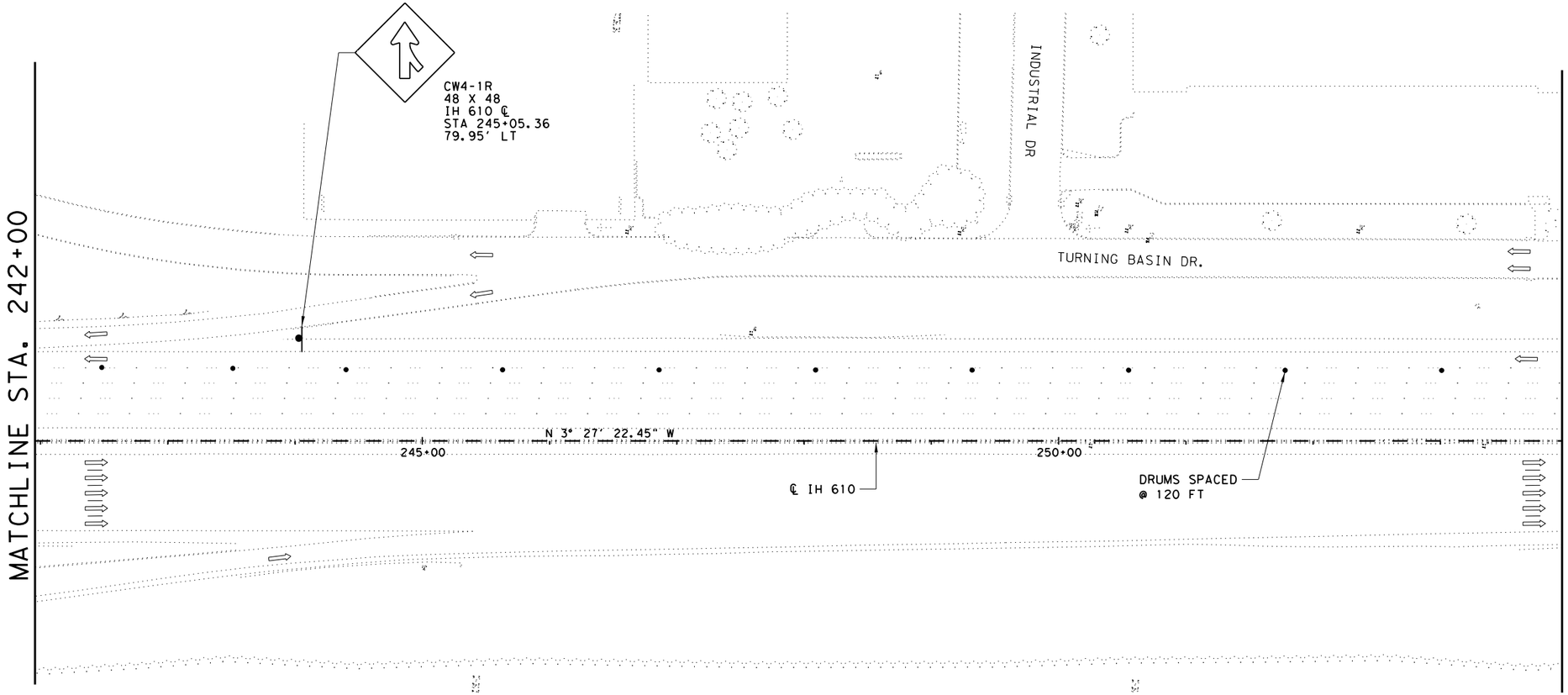
℄ IH 610 STA 230+00.00
TO STA 242+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 6 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		53
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271150974 - Design\Plan Set\2. TCP\SB TOTAL CLOSURE TCP\Rsbtcp*06.dgn



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

1. PLACE TY III BARRICADES ACROSS ALL CLOSED LANES AT 2 LOCATIONS BETWEEN IH-10 AND THE PORT OF HOUSTON AS DIRECTED BY THE ENGINEER OR THE ENGINEER'S REPRESENTATIVE.

2. TOTAL FREEWAY CLOSURE. USE TxDOT STANDARD SHEET "TRAFFIC CONTROL PLAN FREEWAY CLOSURE" TCP (6-6)-12.

3. ONE OR TWO LANE CLOSURE. SEE TxDOT STANDARD "TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURE" TCP (6-1)-12 FOR MORE INFORMATION.

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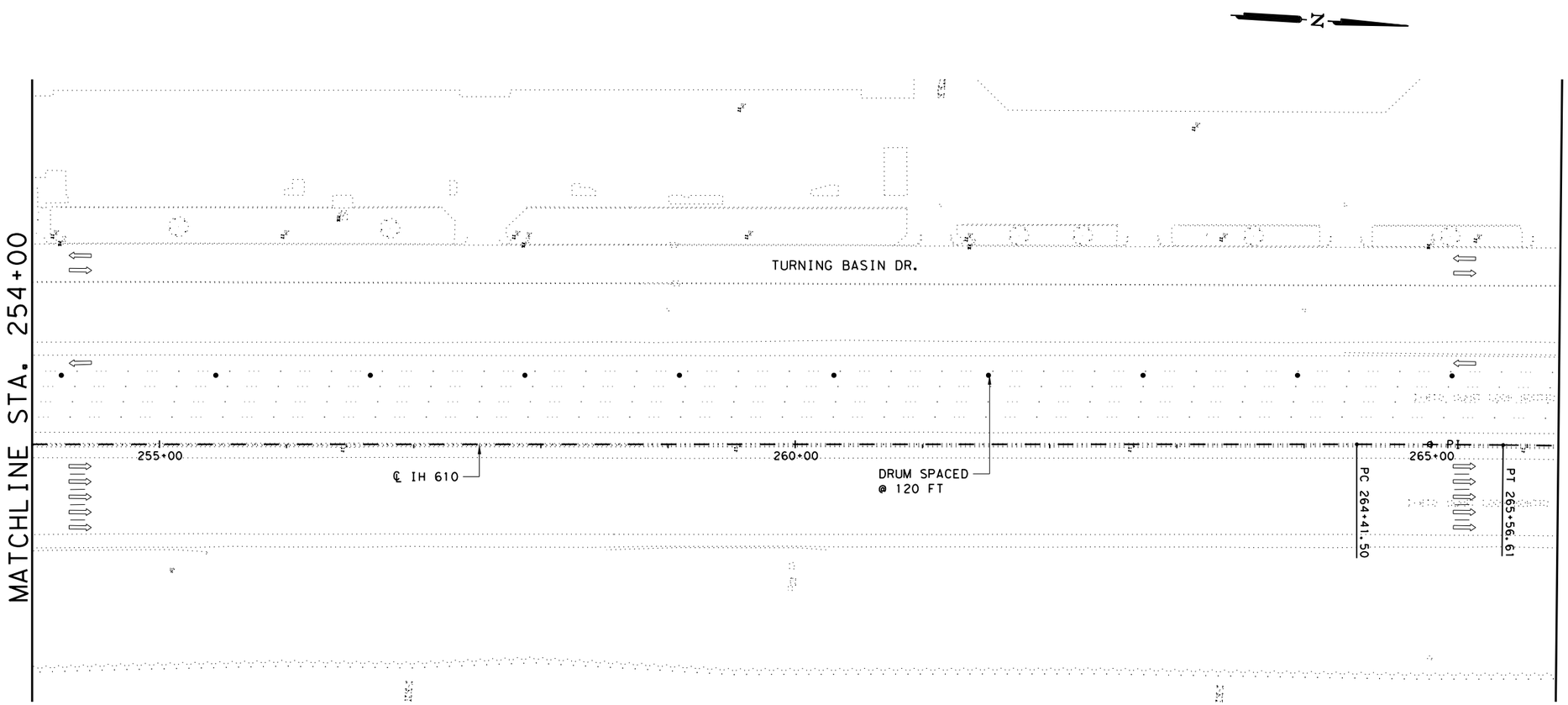
IH 610 SHIP CHANNEL BRIDGE TRAFFIC CONTROL TOTAL CLOSURE SOUTHBOUND (WKND ONLY)

℄ IH 610 STA 242+00.00 TO STA 254+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 7 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		54
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

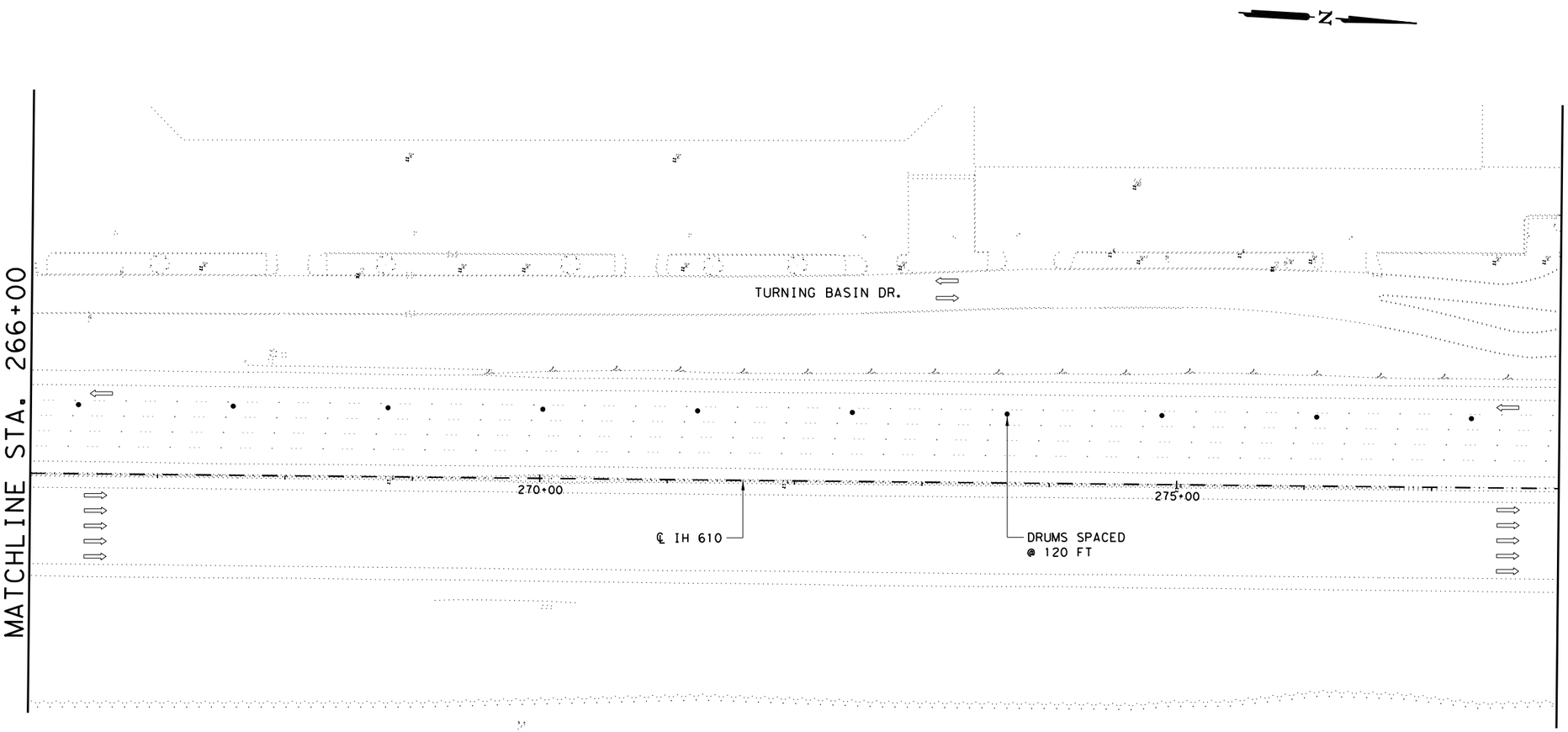
℄ IH 610 STA 254+00.00
TO STA 266+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 8 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		55
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\SB TOTAL CLOSURE TCP\Rsbtcp*08.dgn



LEGEND

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- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
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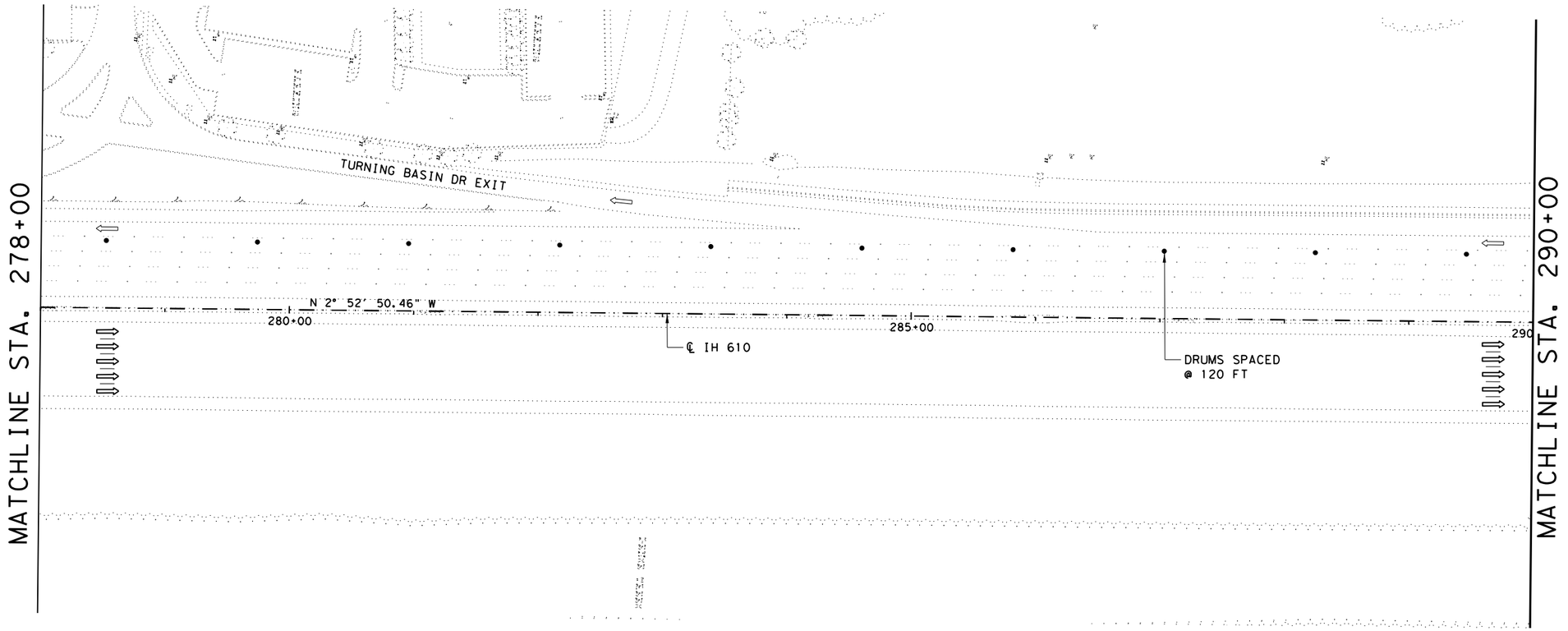
IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

℄ IH 610 STA 266+00.00
TO STA 278+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 9 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		56
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



LEGEND

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- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
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IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

℄ IH 610 STA 278+00.00
TO STA 290+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 10 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		57
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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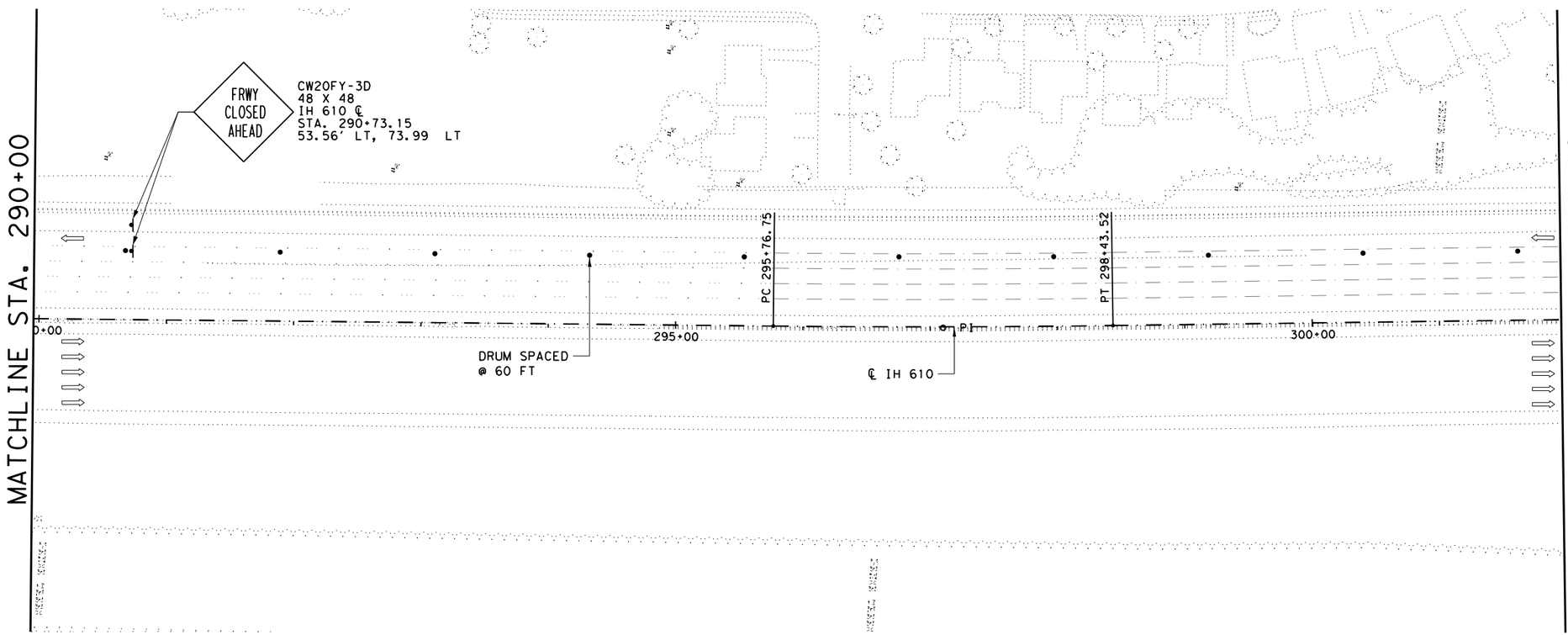

LEGEND

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- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
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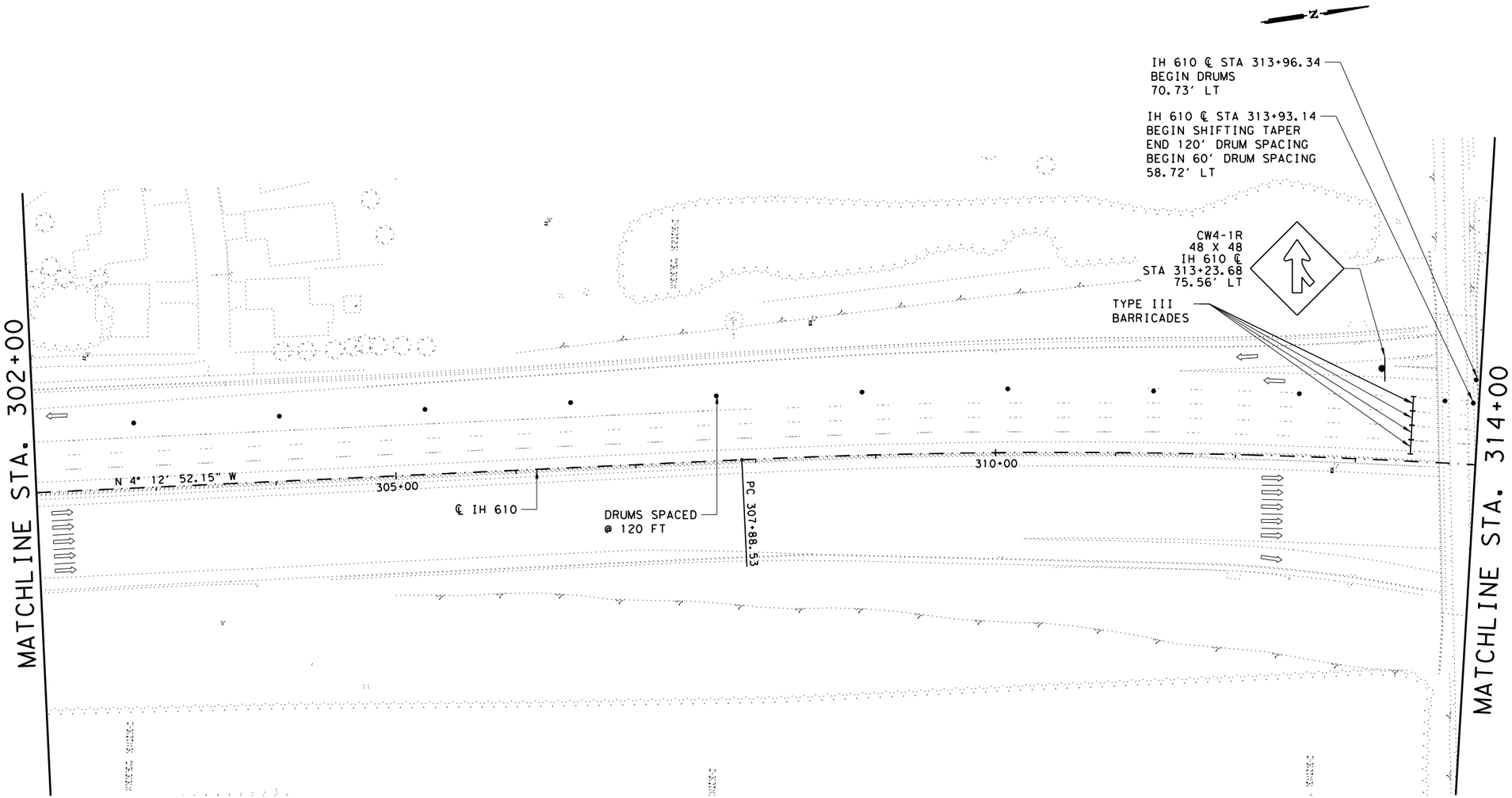
IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

℄ IH 610 STA 290+00.00
TO STA 302+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 11 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		58
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



LEGEND

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- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
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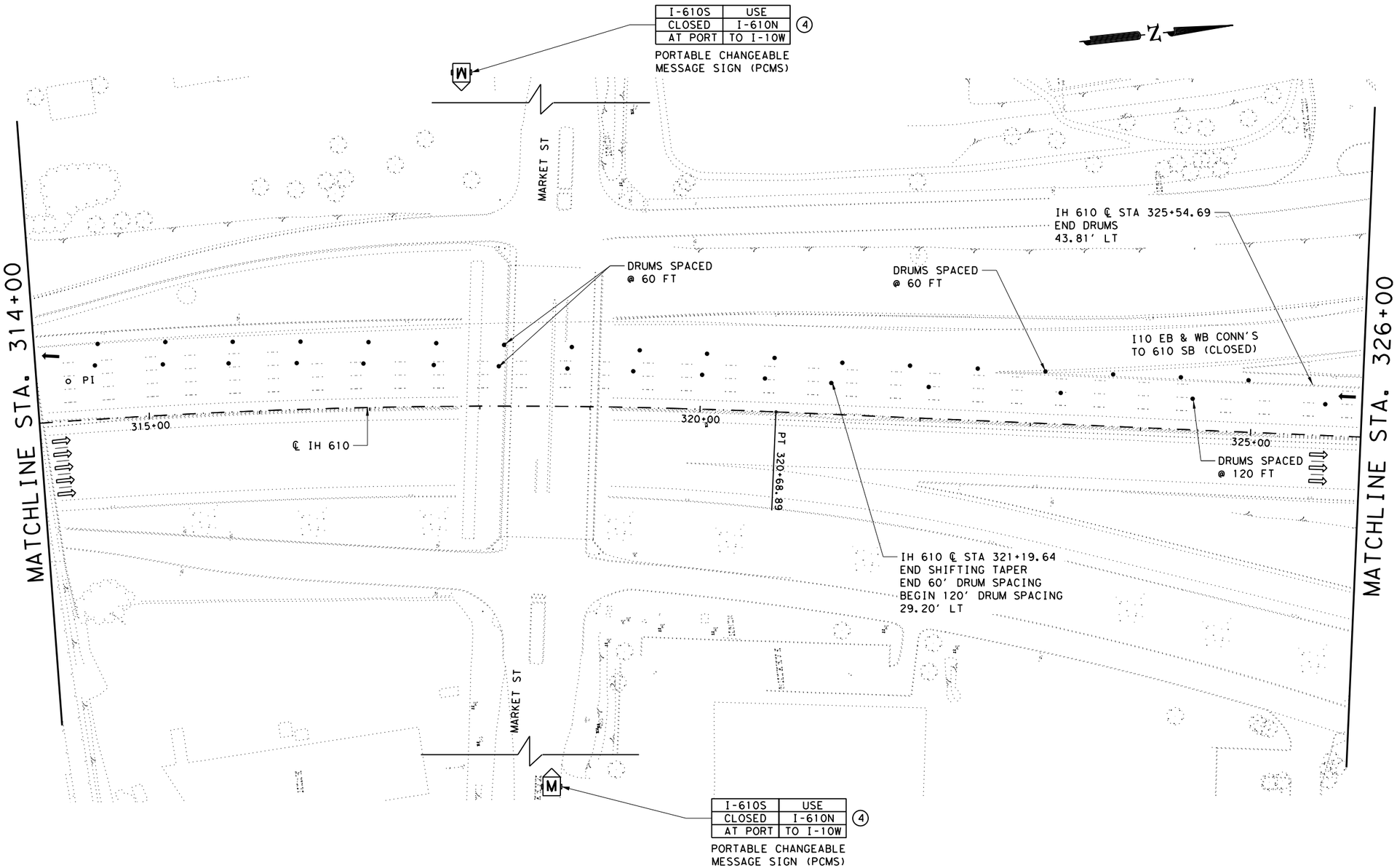
IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

℄ IH 610 STA 302+00.00
TO STA 314+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 12 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		59
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



LEGEND

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- CHANNELIZING DEVICES
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- OPEN TO TRAFFIC LANE
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IH 610 SHIP CHANNEL BRIDGE TRAFFIC CONTROL TOTAL CLOSURE SOUTHBOUND (WKND ONLY)

℄ IH 610 STA 314+00.00 TO STA 326+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 13 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		60
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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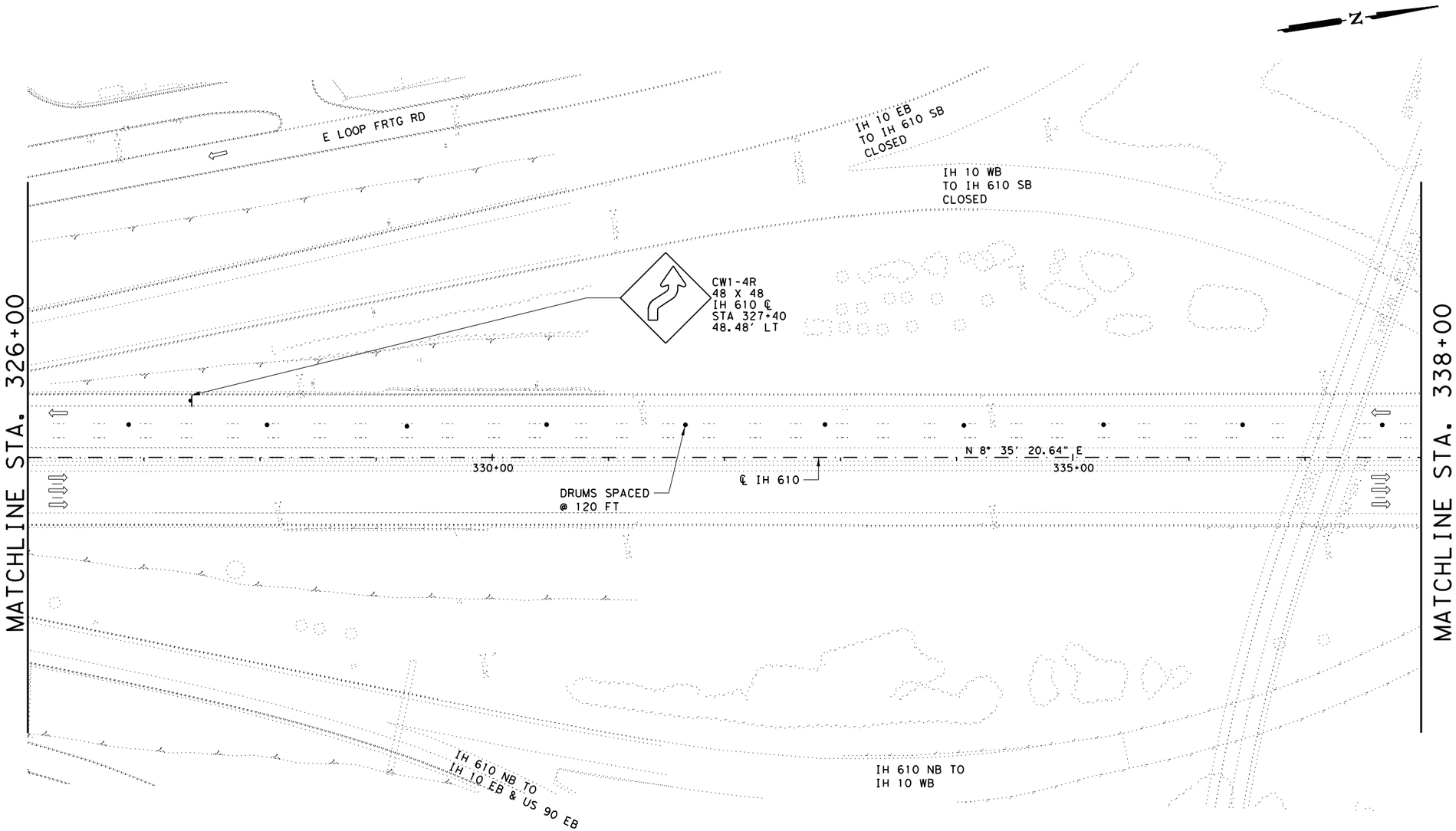

LEGEND

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- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
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IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

℄ IH 610 STA 326+00.00
TO STA 338+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 14 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		61
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

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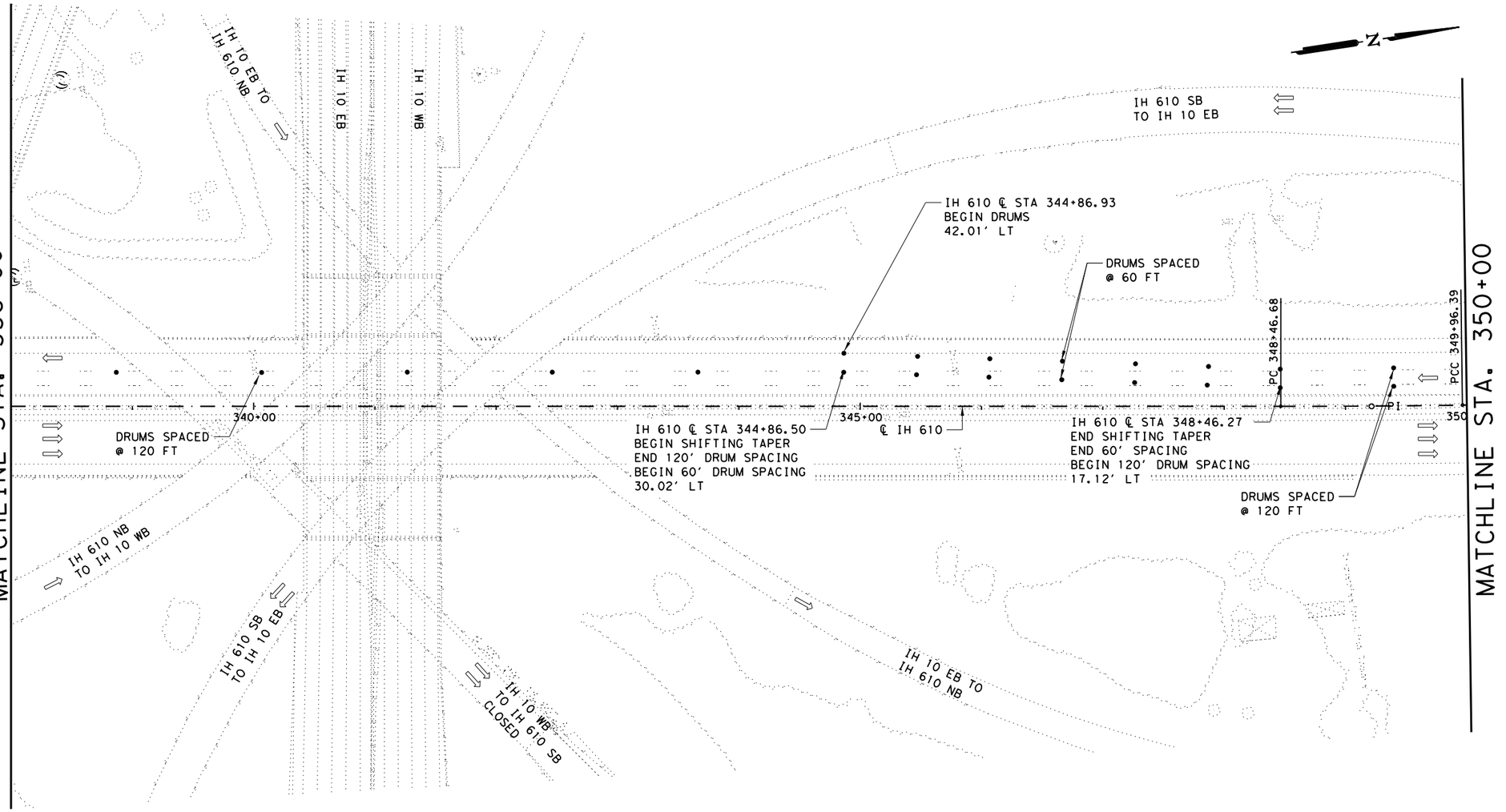

LEGEND

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TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

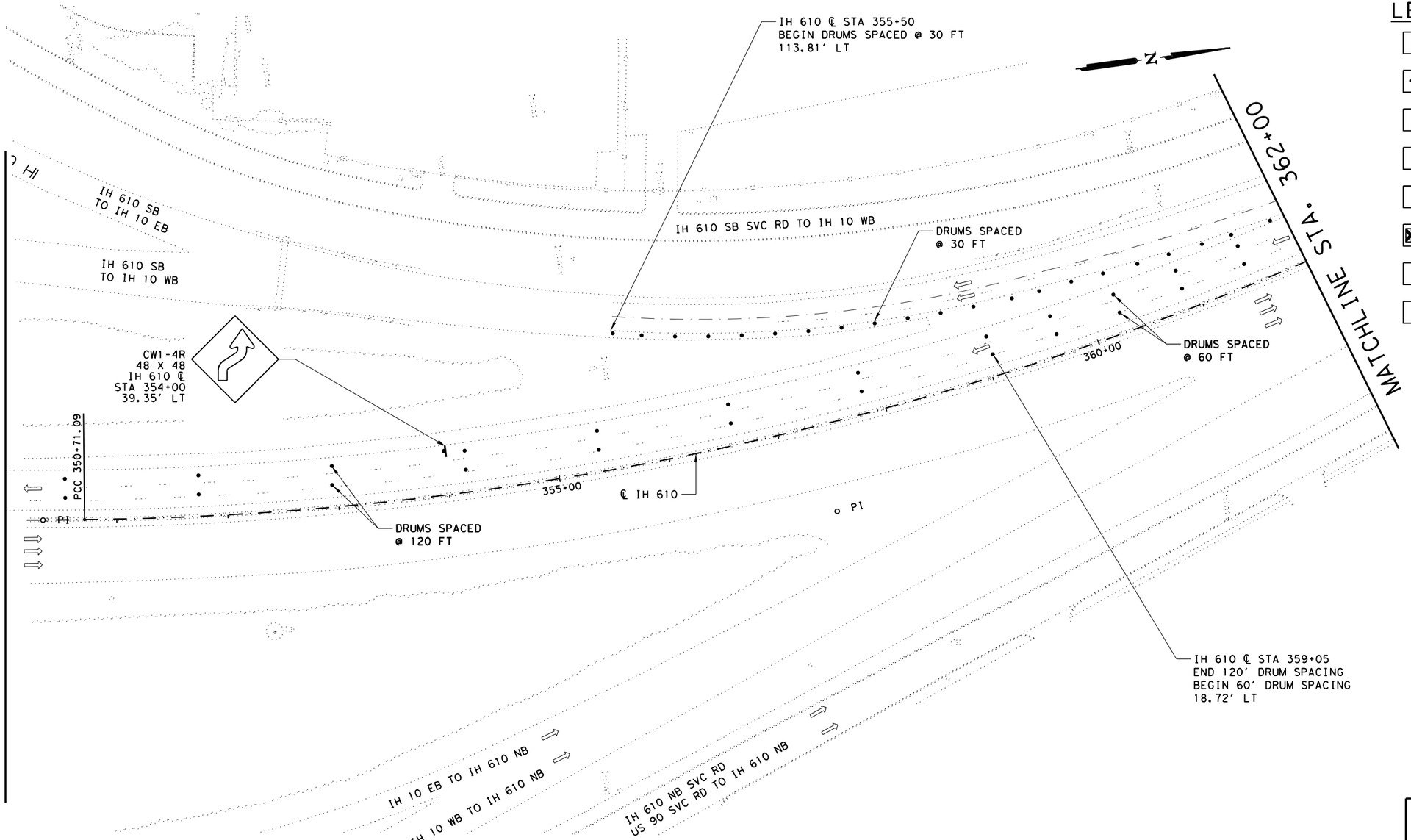
℄ IH 610 STA 338+00.00
TO STA 350+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 15 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		62
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\SB TOTAL CLOSURE TCP\Rsbtcp*15.dgn



LEGEND

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NOTES:

1. PLACE TY III BARRICADES ACROSS ALL CLOSED LANES AT 2 LOCATIONS BETWEEN IH-10 AND THE PORT OF HOUSTON AS DIRECTED BY THE ENGINEER OR THE ENGINEER'S REPRESENTATIVE.

2. TOTAL FREEWAY CLOSURE. USE TxDOT STANDARD SHEET "TRAFFIC CONTROL PLAN FREEWAY CLOSURE" TCP (6-6)-12.

3. ONE OR TWO LANE CLOSURE. SEE TxDOT STANDARD "TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURE" TCP (6-1)-12 FOR MORE INFORMATION.

4. PLACE 1 WEEK IN ADVANCE OF CLOSURE. LOCATION SHOWN IS APPROXIMATE, EXACT LOCATION TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

5. ALL MESSAGE SIGN WORDING MAY BE CHANGED BY THE ENGINEER.

6. PRIOR TO TOTAL CLOSURE, COORDINATE WITH LOCAL GOVERNMENT EMERGENCY RESPONDERS, AREA ENGINEER, AND PORT AUTHORITY. MAINTAIN EMERGENCY THROUGH ACCESS.

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

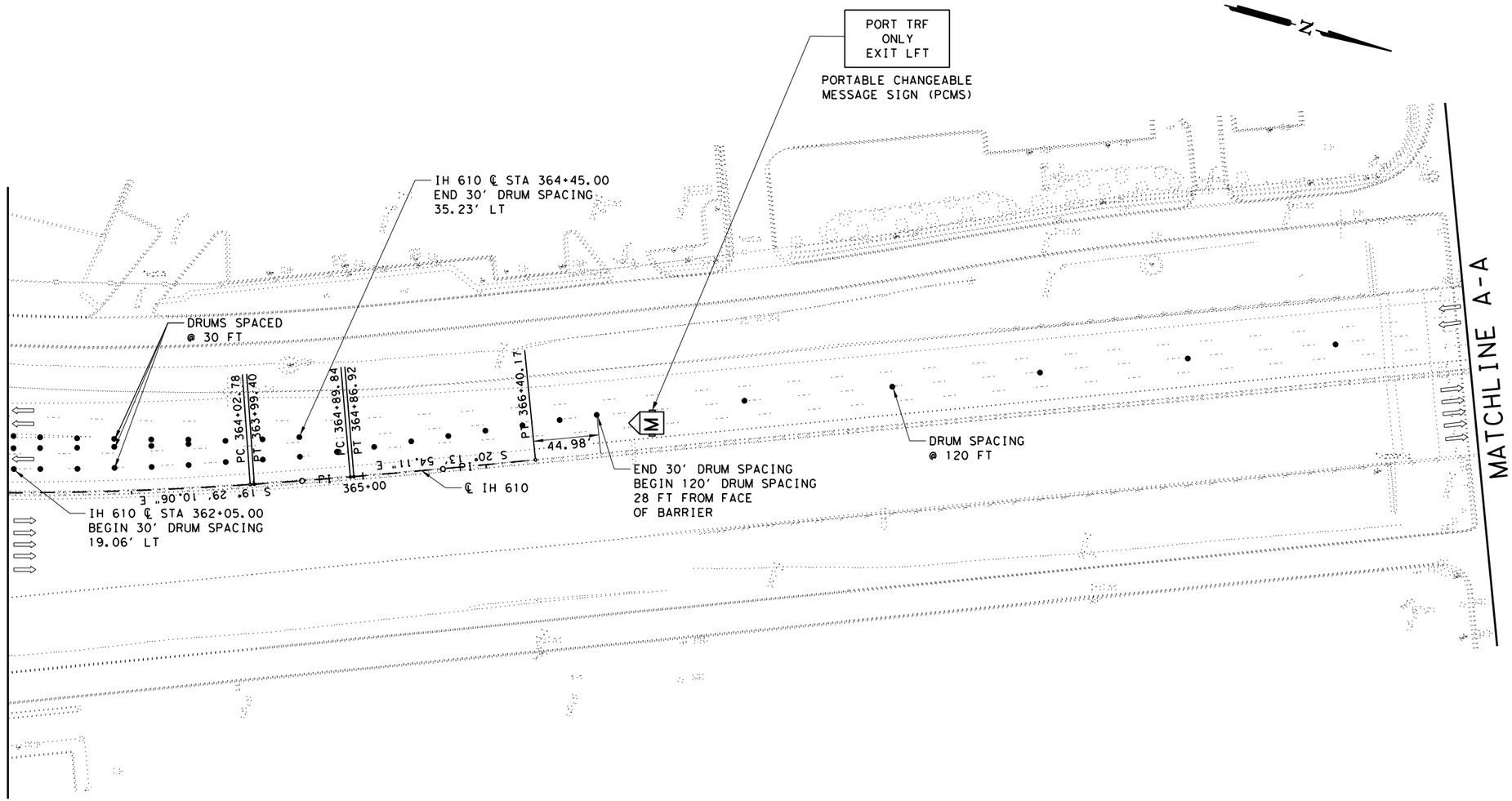
℄ IH 610 STA 350+00.00
TO STA 362+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 16 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		63
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\SB TOTAL CLOSURE TCP\Rsbtcp*16.dgn



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

1. PLACE TY III BARRICADES ACROSS ALL CLOSED LANES AT 2 LOCATIONS BETWEEN IH-10 AND THE PORT OF HOUSTON AS DIRECTED BY THE ENGINEER OR THE ENGINEER'S REPRESENTATIVE.

2. TOTAL FREEWAY CLOSURE. USE TxDOT STANDARD SHEET "TRAFFIC CONTROL PLAN FREEWAY CLOSURE" TCP (6-6)-12.

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STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

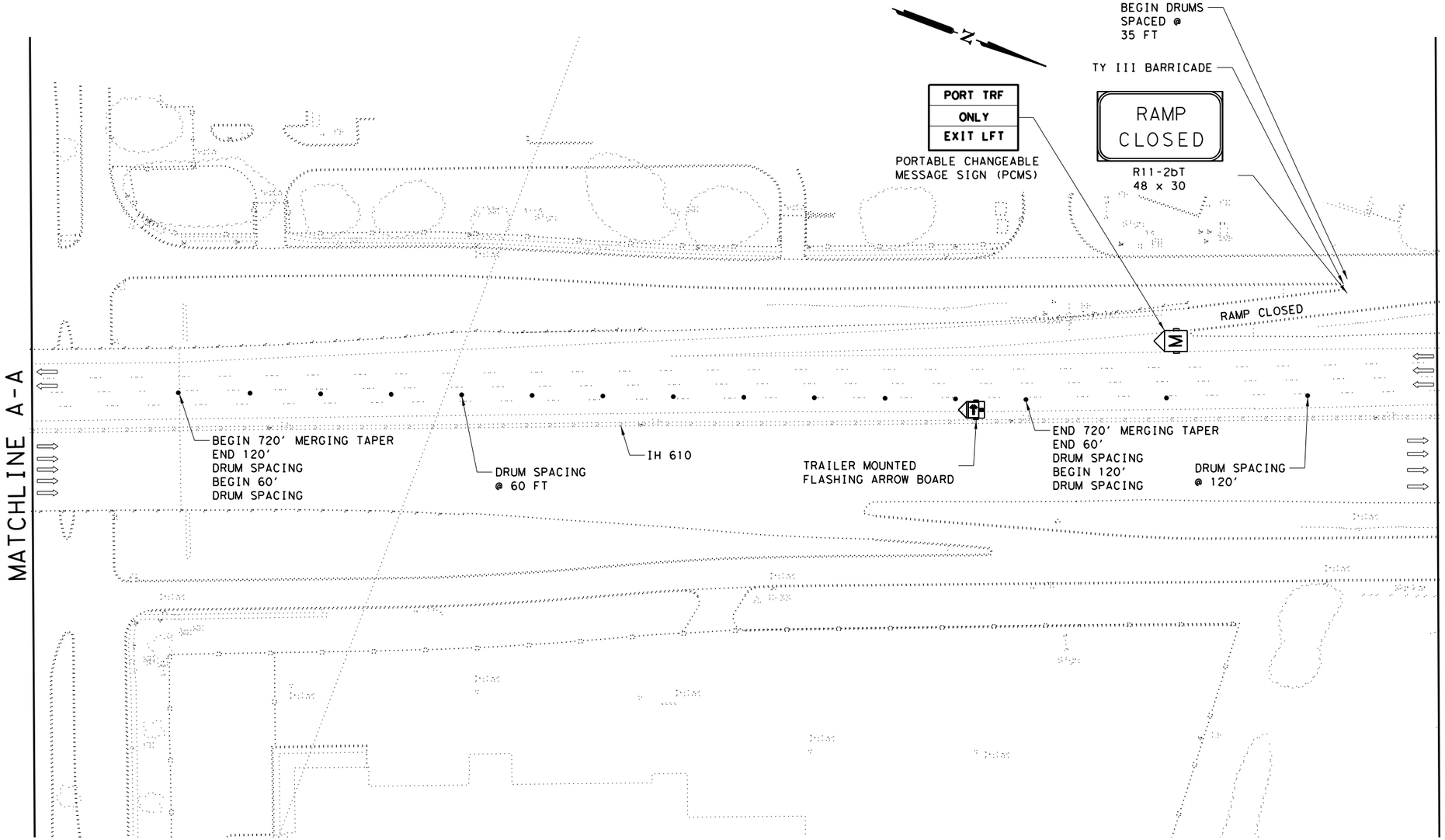
IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

℄ IH 610 STA 362+00.00
TO MATCHLINE A-A

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 17 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		64
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

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IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

℄ IH 610 MATCHLINE
A-A TO MATCHLINE B-B

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 18 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		65
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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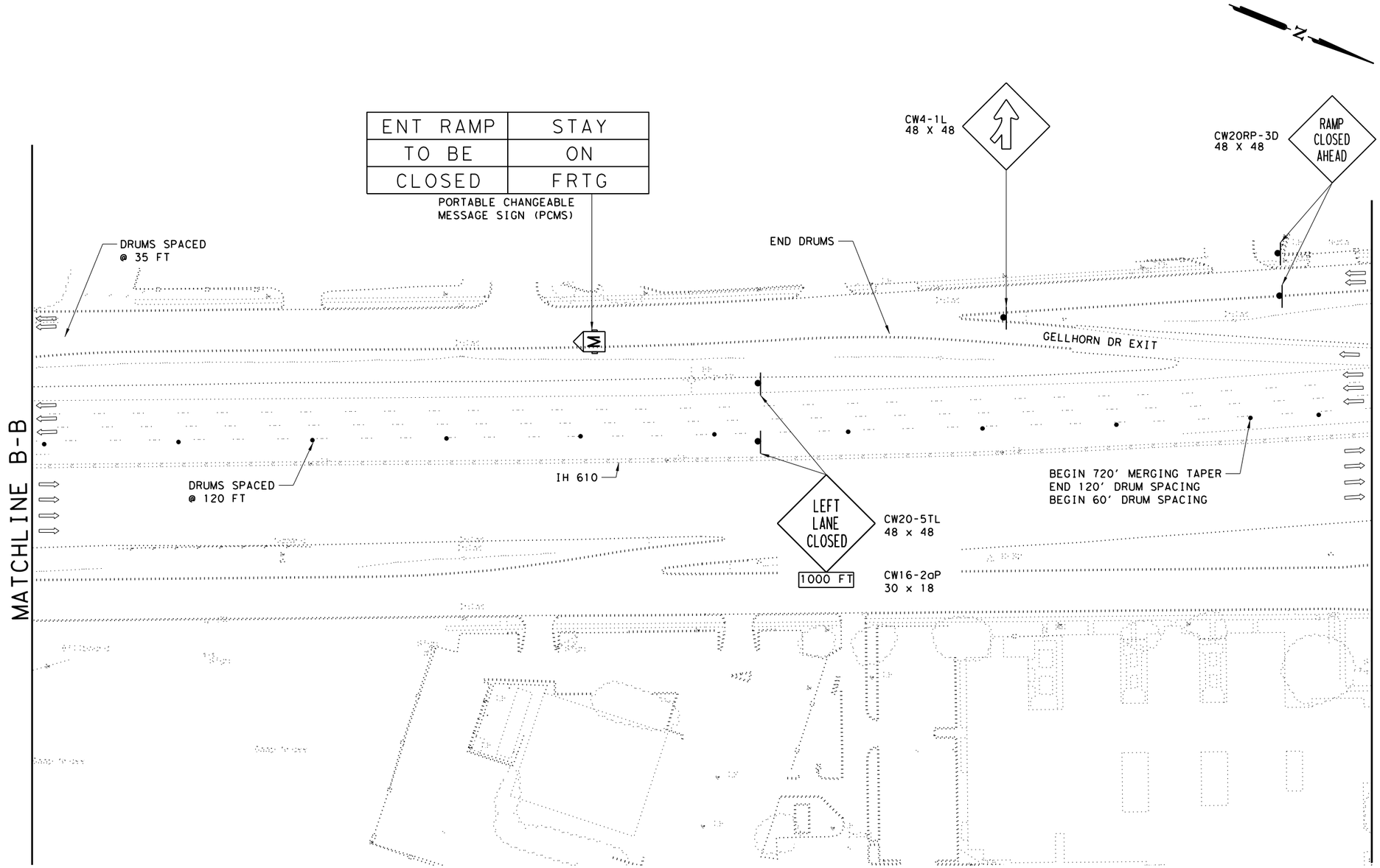

LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

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Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE TRAFFIC CONTROL TOTAL CLOSURE SOUTHBOUND (WKND ONLY)

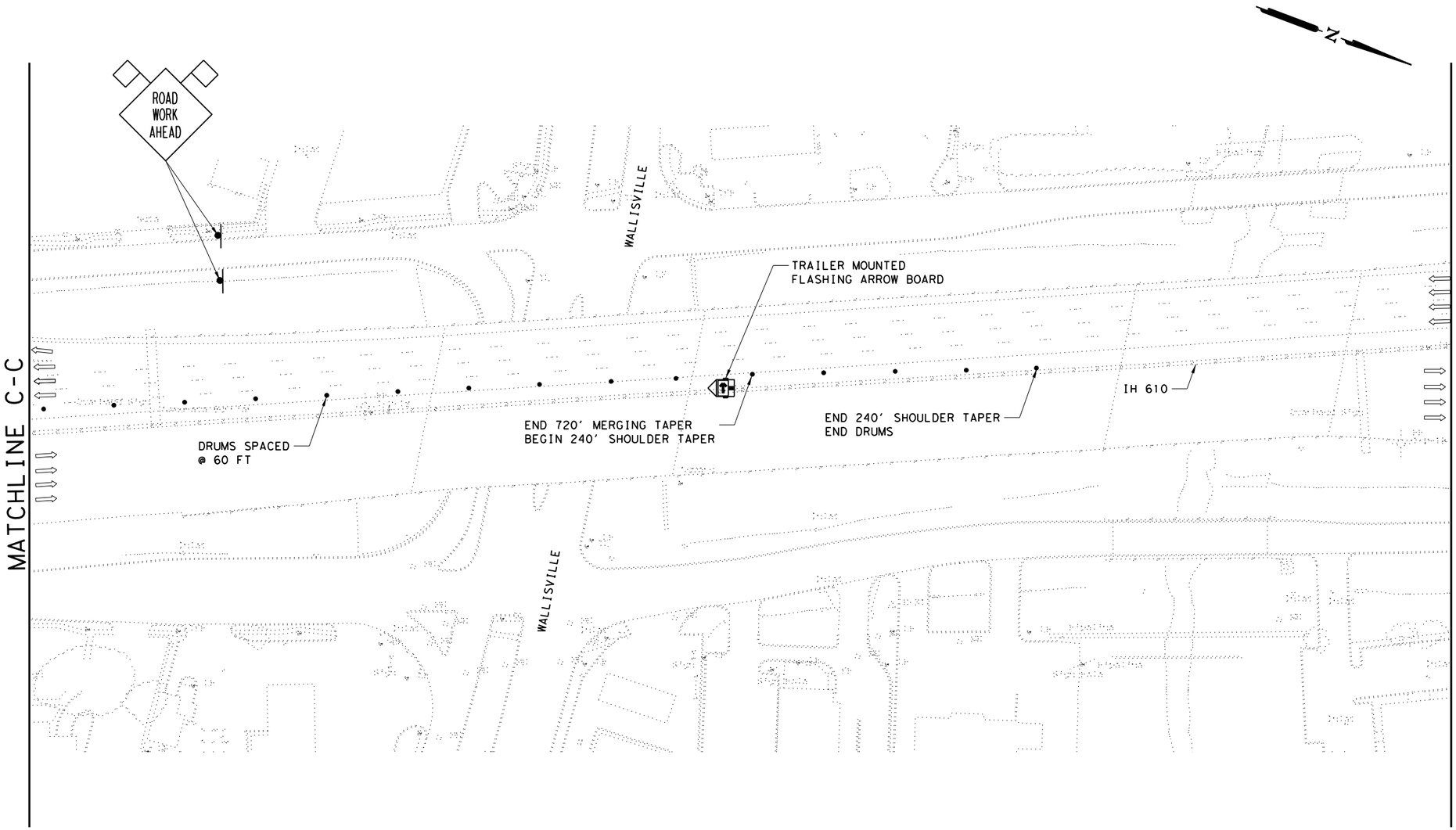
℄ IH 610 MATCHLINE
B-B TO MATCHLINE C-C

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 19 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		66
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\2. TCP\SB TOTAL CLOSURE TCP\Rsbtcp*19.dgn



LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

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IH 610 SHIP CHANNEL BRIDGE TRAFFIC CONTROL TOTAL CLOSURE SOUTHBOUND (WKND ONLY)

℄ IH 610 MATCHLINE C-C TO MATCHLINE D-D

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 20 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		67
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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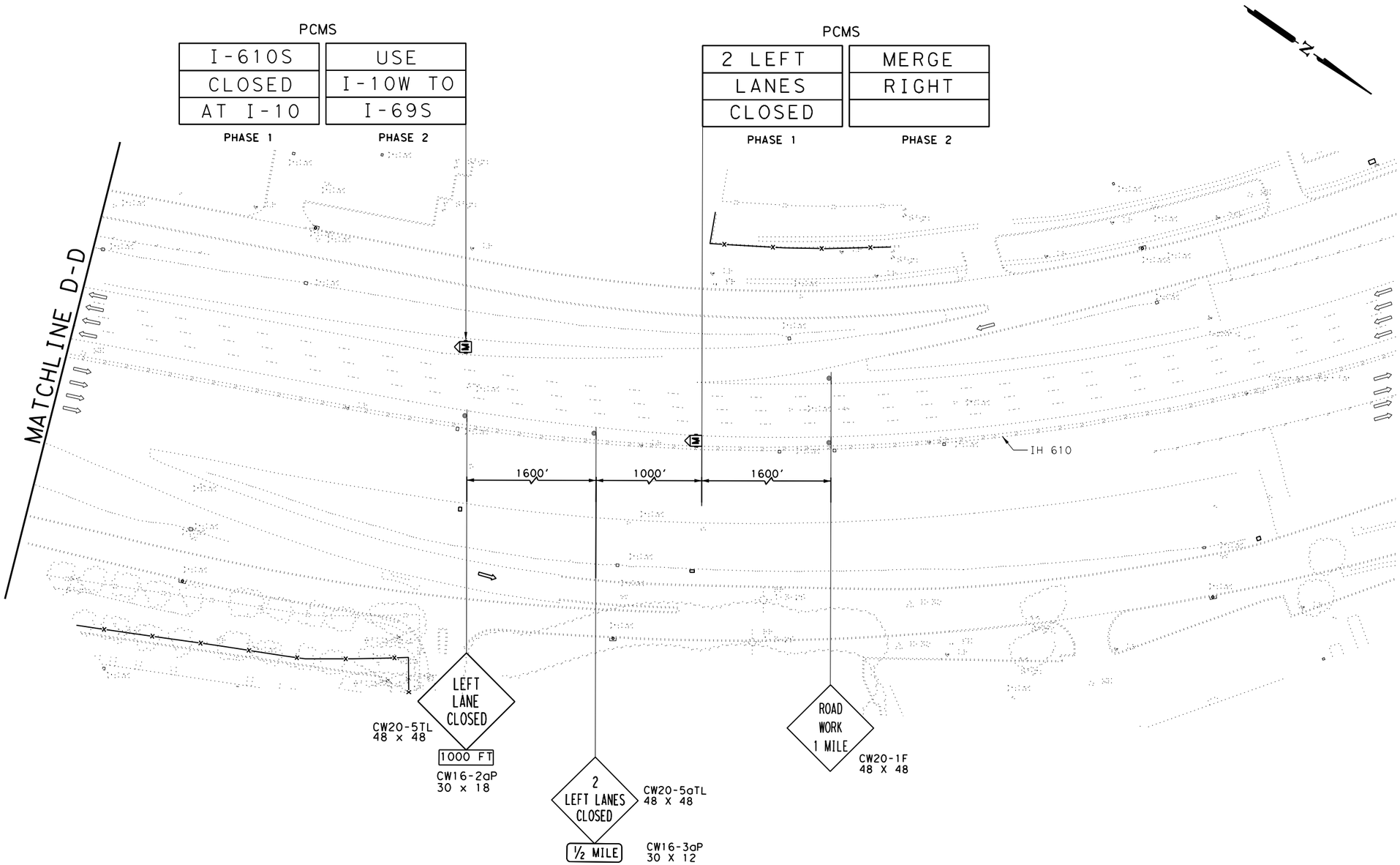

LEGEND

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- SIGN
- SHADOW VEHICLE WITH TMA
- TRAILER MOUNTED FLASHING ARROW BOARD
- TY III BARRICADE

NOTES:

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IH 610
SHIP CHANNEL BRIDGE
TRAFFIC CONTROL
TOTAL CLOSURE
SOUTHBOUND (WKND ONLY)

℄ IH 610 MATCHLINE D-D TO END

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 21 OF 21

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		68
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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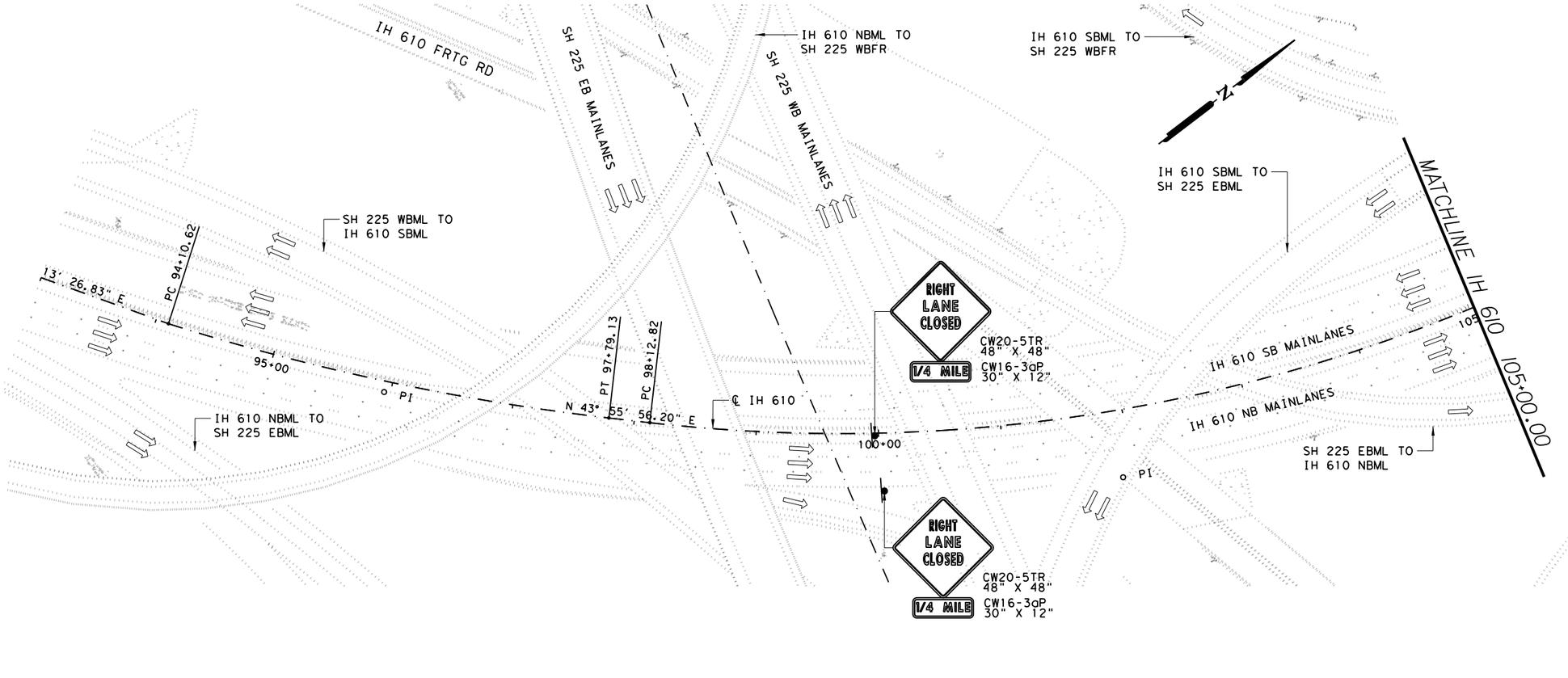

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- TO REMAIN IN PLACE FROM PREVIOUS PHASE
- TRAILER MOUNTED FLASHING ARROW BOARD

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES) — 4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

1. FOR ALIGNMENT INFORMATION SEE SHEETS 126-142.
2. EXISTING SIGNAGE (SEE OTHER PLANS).

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED
PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 1

BEGIN TO
℄ IH 610 STA 105+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 1 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		69
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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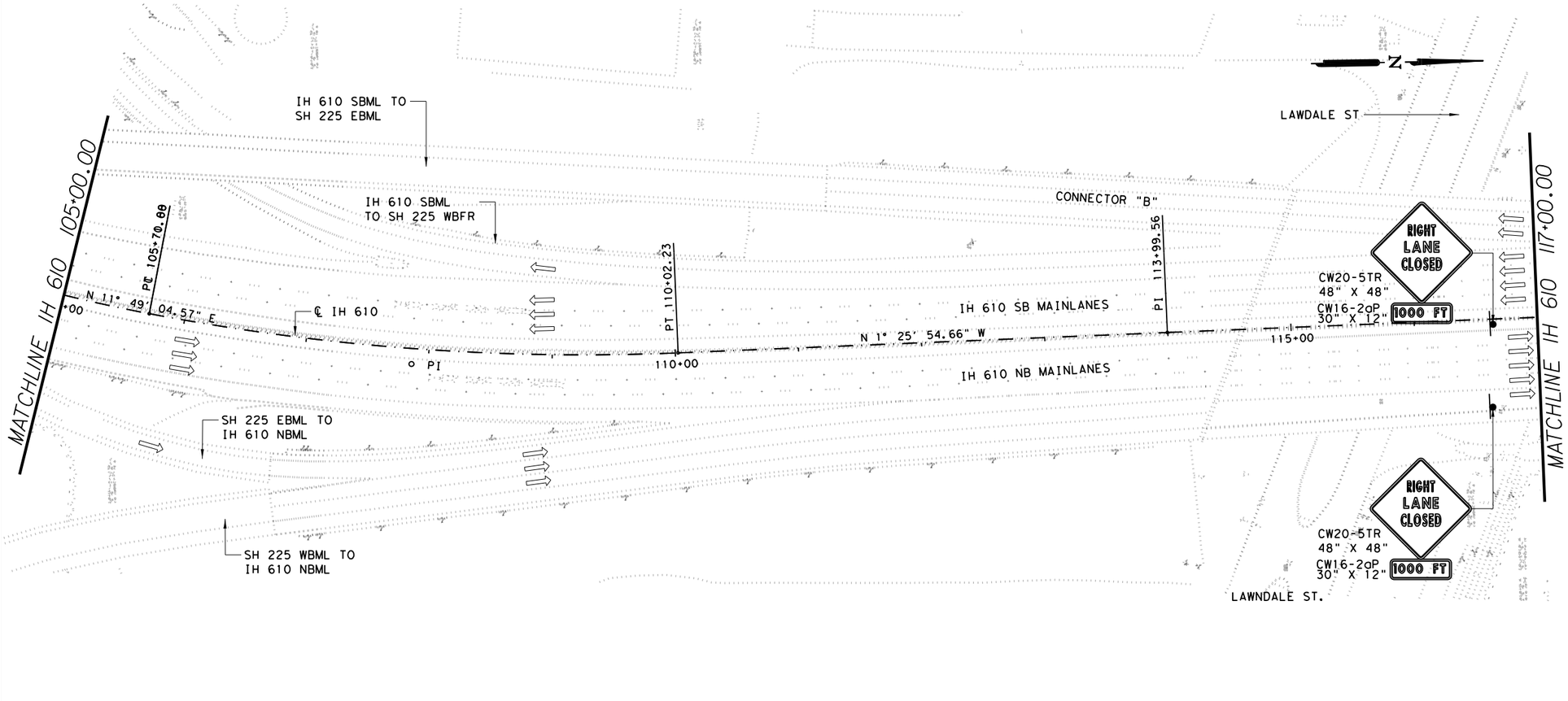

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- * TO REMAIN IN PLACE FROM PREVIOUS PHASE
- TRAILER MOUNTED FLASHING ARROW BOARD

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

1. FOR ALIGNMENT INFORMATION SEE SHEETS 126-142.
2. EXISTING SIGNAGE (SEE OTHER PLANS).

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021
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Texas Department of Transportation

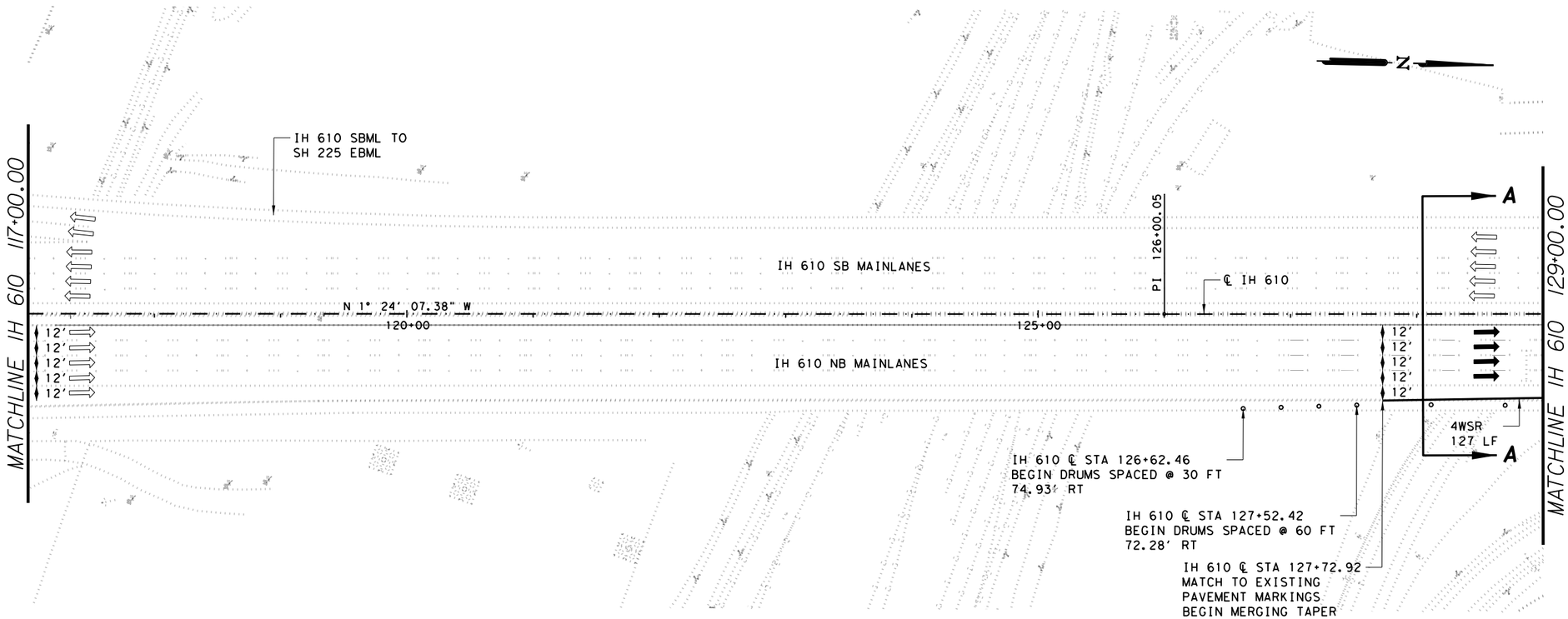
IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 1

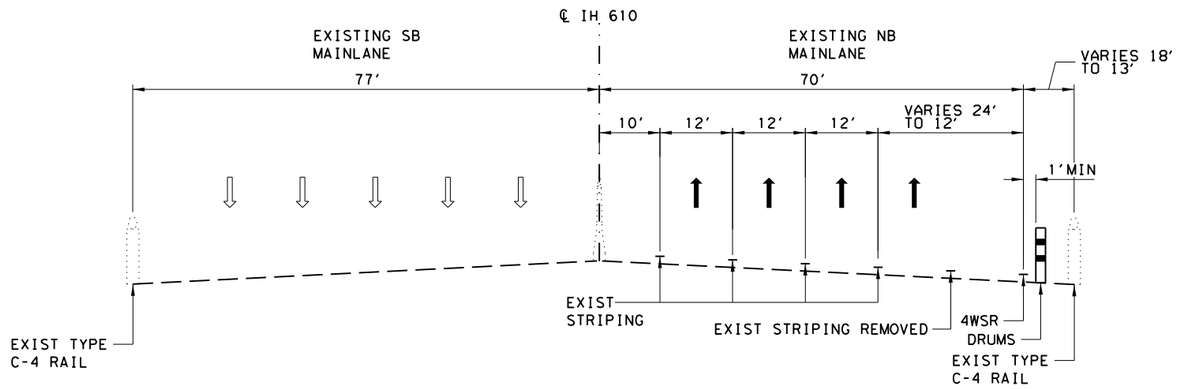
℄ IH 610 STA 105+00.00
TO STA 117+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 2 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		70
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610





SECTION A-A
N.T.S

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- * TO REMAIN IN PLACE FROM PREVIOUS PHASE
- TRAILER MOUNTED FLASHING ARROW BOARD

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

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IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 1

℄ IH 610 STA 117+00.00
TO STA 129+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 3 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		71
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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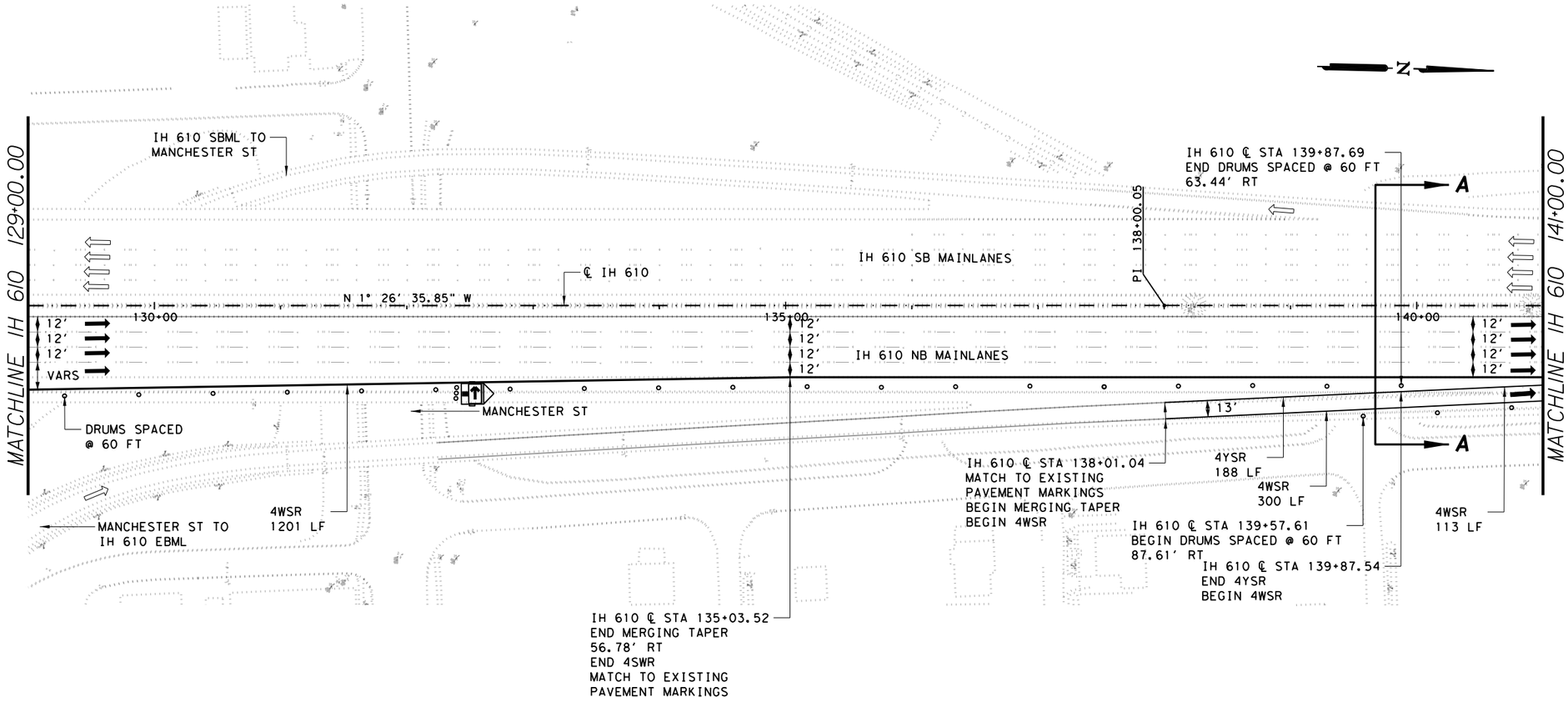

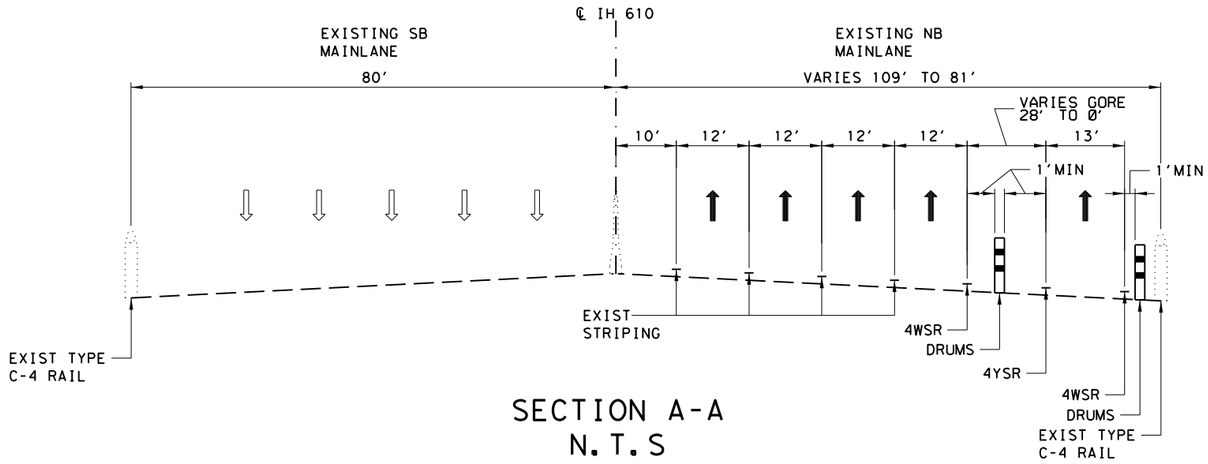

SECTION A-A
N.T.S

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- * TO REMAIN IN PLACE FROM PREVIOUS PHASE
- TRAILER MOUNTED FLASHING ARROW BOARD

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

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STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

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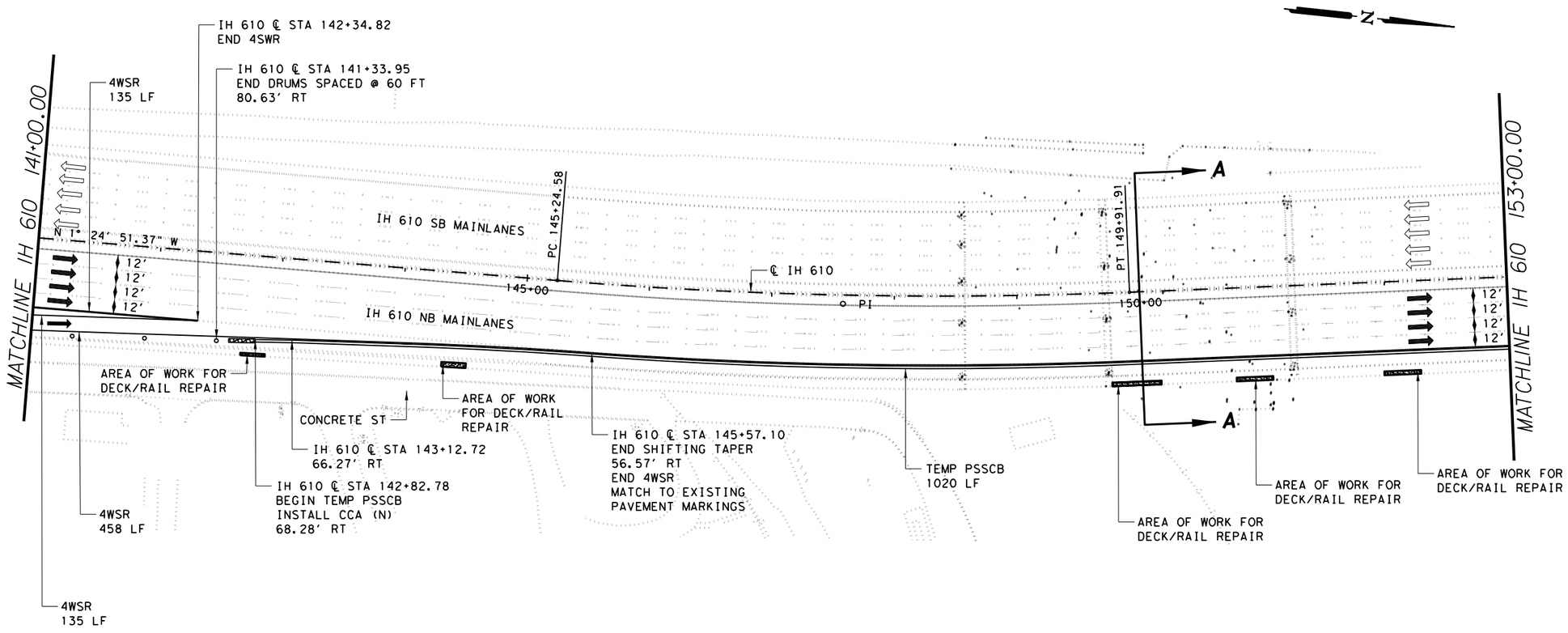
IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 1

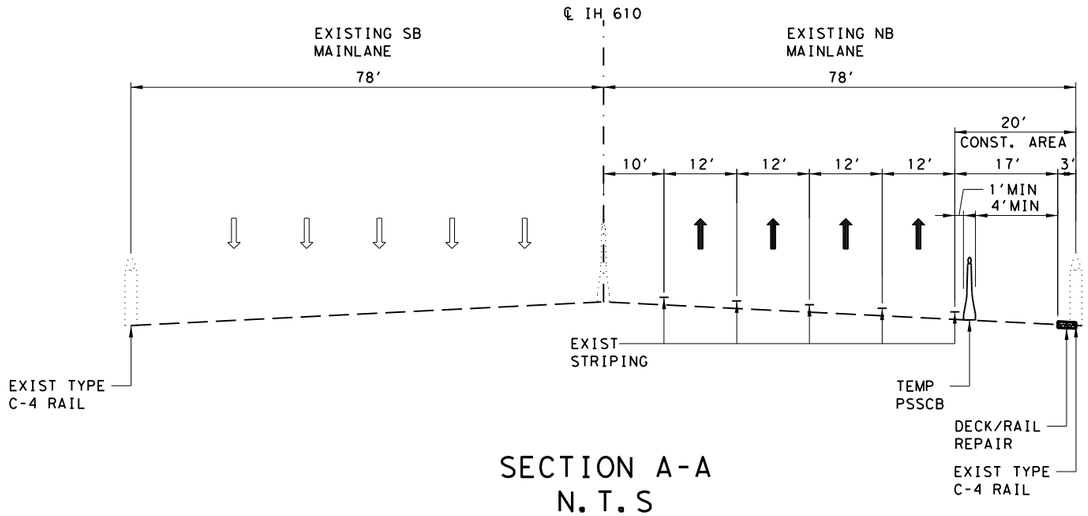
℄ IH 610 STA 129+00.00
TO STA 141+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 4 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		72
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610





SECTION A-A
N.T.S

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- * TO REMAIN IN PLACE FROM PREVIOUS PHASE
- TRAILER MOUNTED FLASHING ARROW BOARD

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

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IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 1

℄ IH 610 STA 141+00.00
TO STA 153+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 5 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		73
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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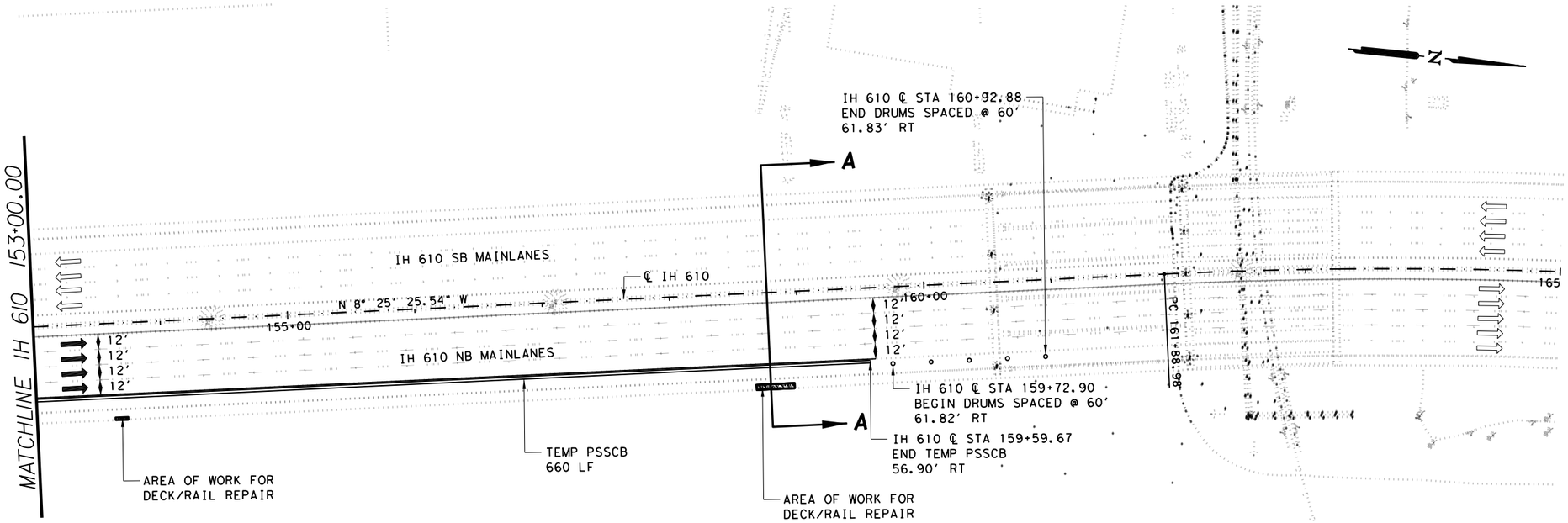

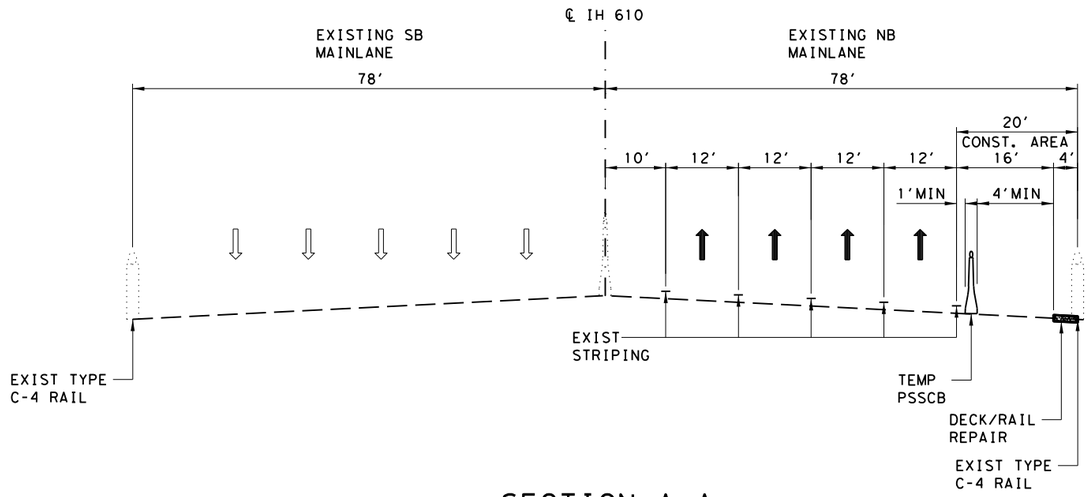

SECTION A-A
N.T.S

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- * TO REMAIN IN PLACE FROM PREVIOUS PHASE
- TRAILER MOUNTED FLASHING ARROW BOARD

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

1. FOR ALIGNMENT INFORMATION SEE SHEETS 126-142.
2. EXISTING SIGNAGE (SEE OTHER PLANS).

STATE OF TEXAS
JESSICA LYNN KEPHART
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LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

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Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 1

℄ IH 610 STA 153+00.00
TO END

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 6 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		74
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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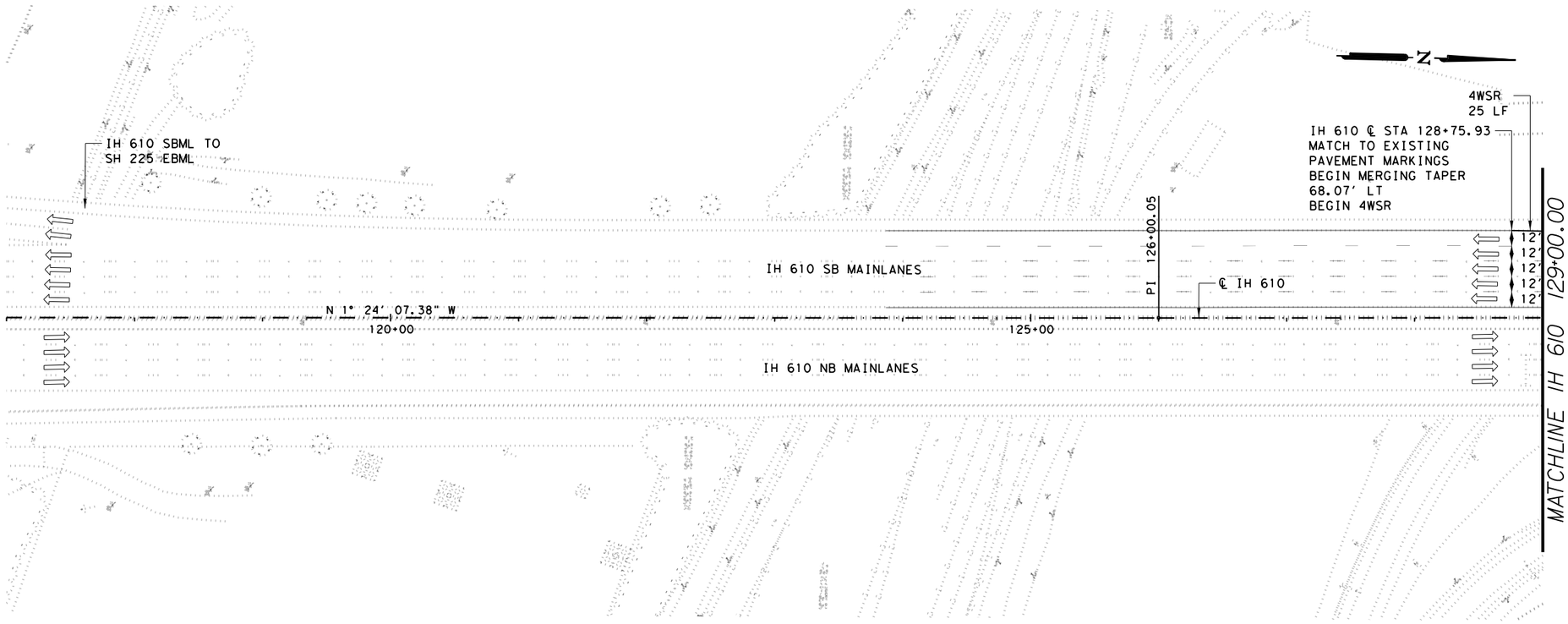

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- * TO REMAIN IN PLACE FROM PREVIOUS PHASE
- TRAILER MOUNTED FLASHING ARROW BOARD

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES) — 4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

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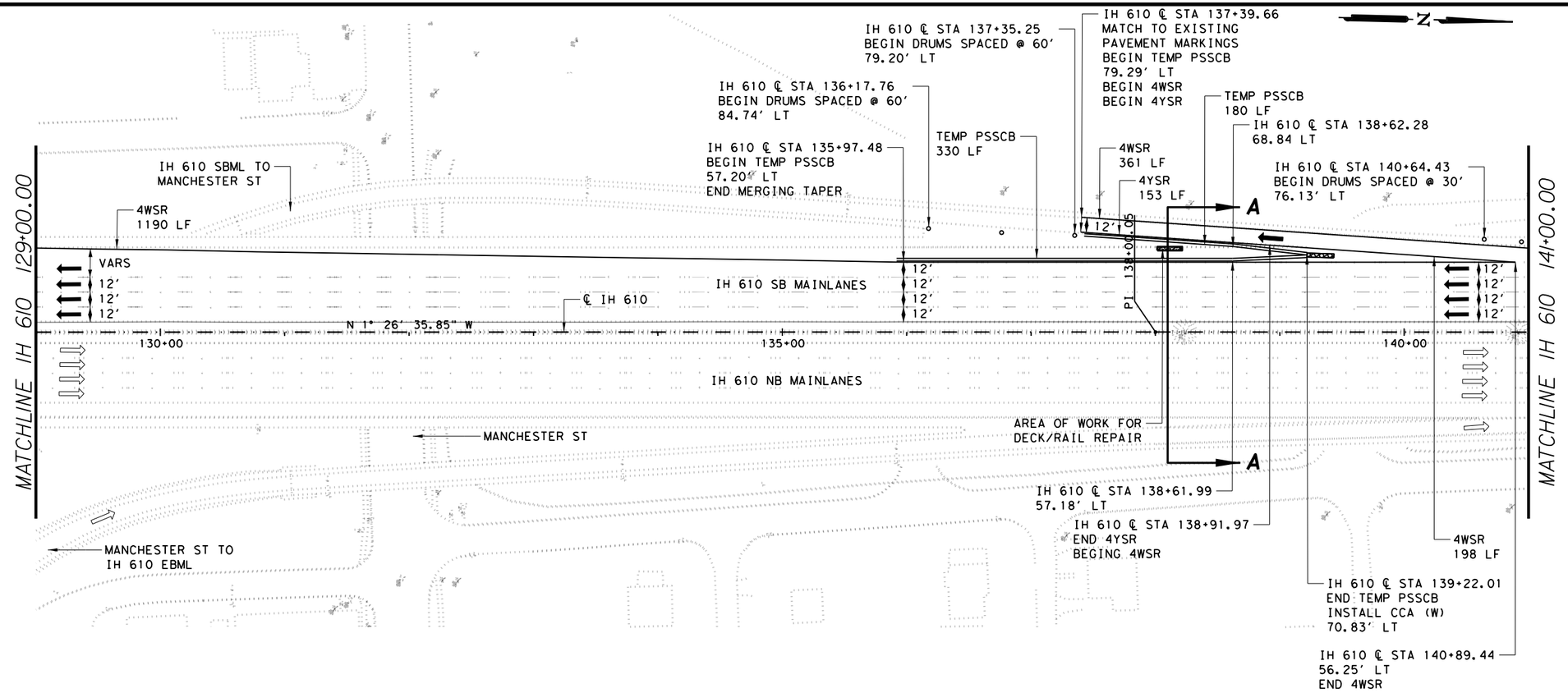
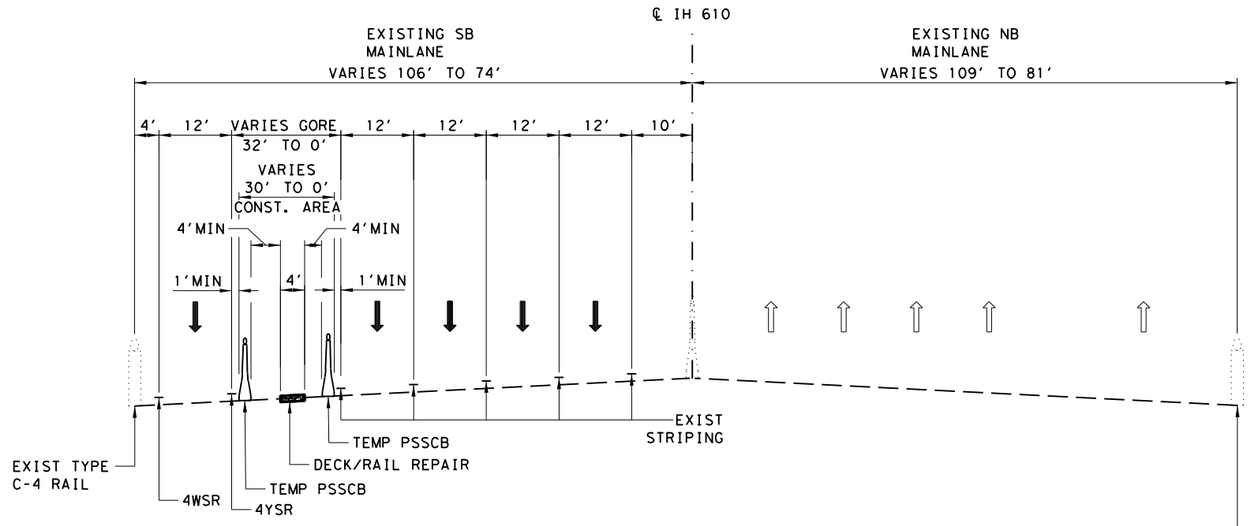
IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 2

BEGIN TO
℄ IH 610 TO STA 129+00.00
SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 1 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		75
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610





SECTION A-A
N.T.S

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
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CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

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IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 2

℄ IH 610 STA 129+00.00
TO STA 141+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 2 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		76
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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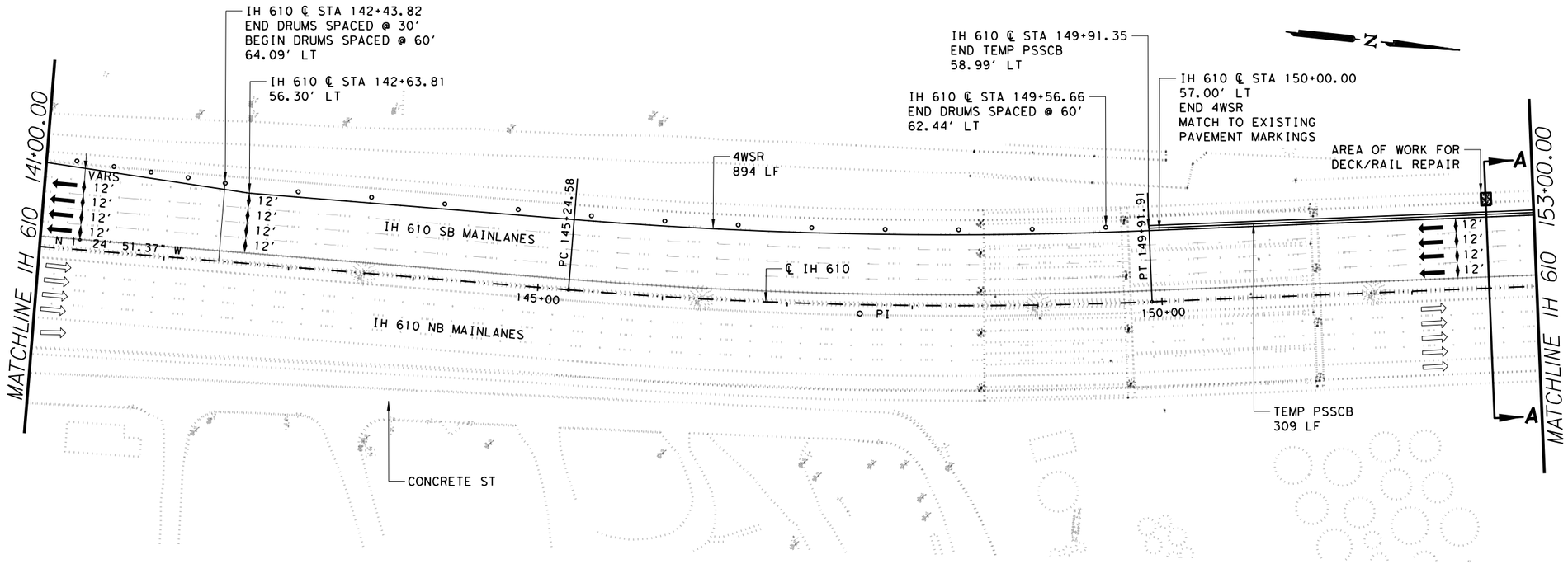

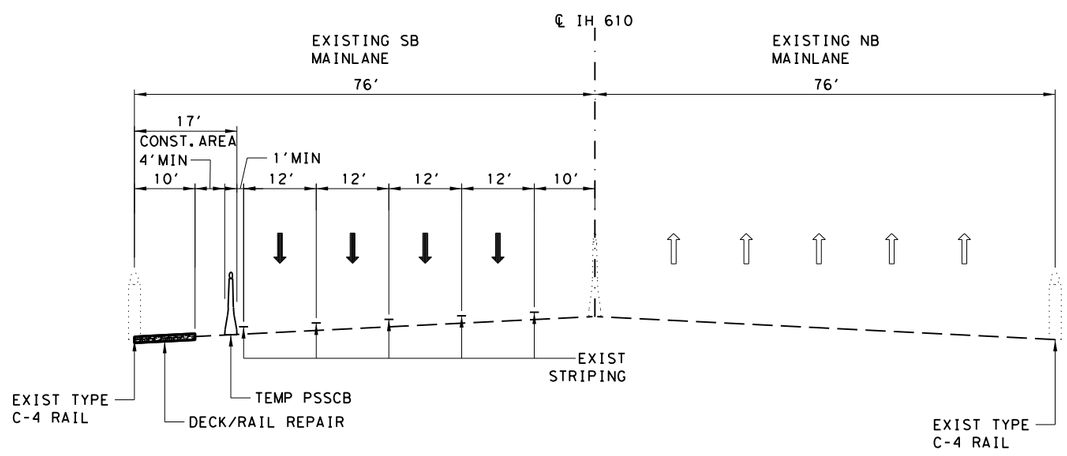

SECTION A-A
N.T.S

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
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CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

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2. EXISTING SIGNAGE (SEE OTHER PLANS).

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IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 2

℄ IH 610 STA 141+00.00
TO STA 153+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 3 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		77
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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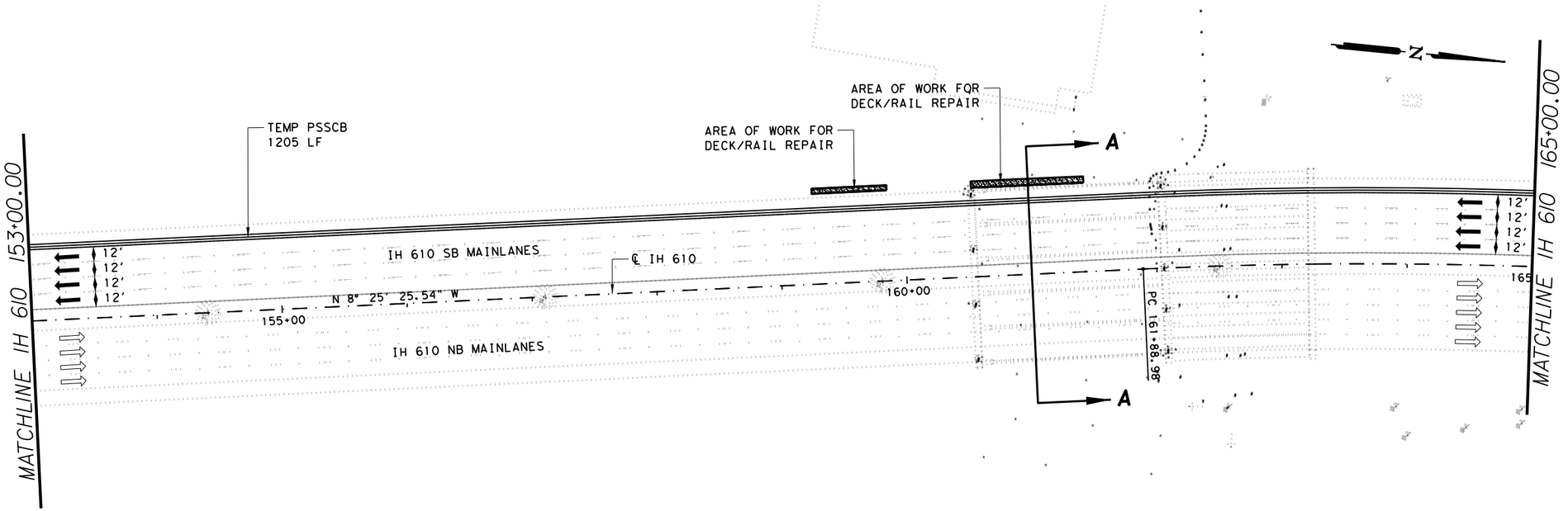

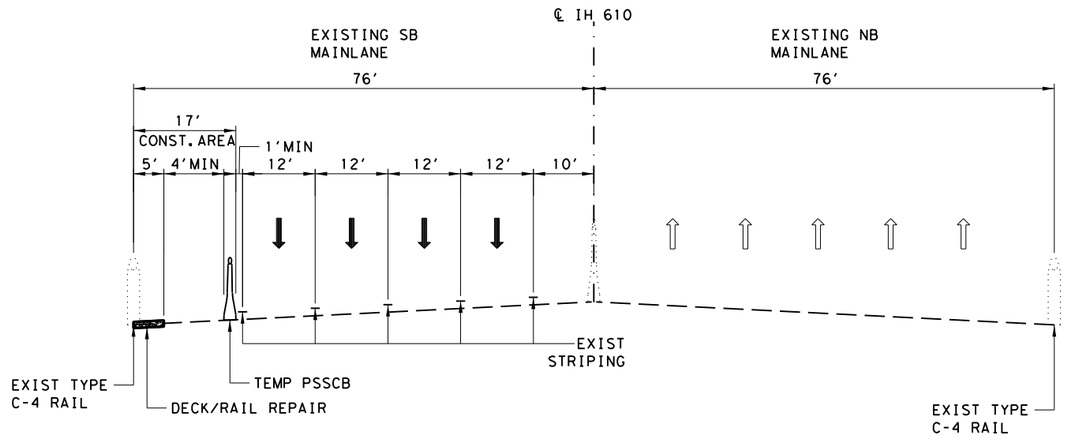

SECTION A-A
N.T.S

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
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CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE
4YSNR

NOTES:

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2. EXISTING SIGNAGE (SEE OTHER PLANS).

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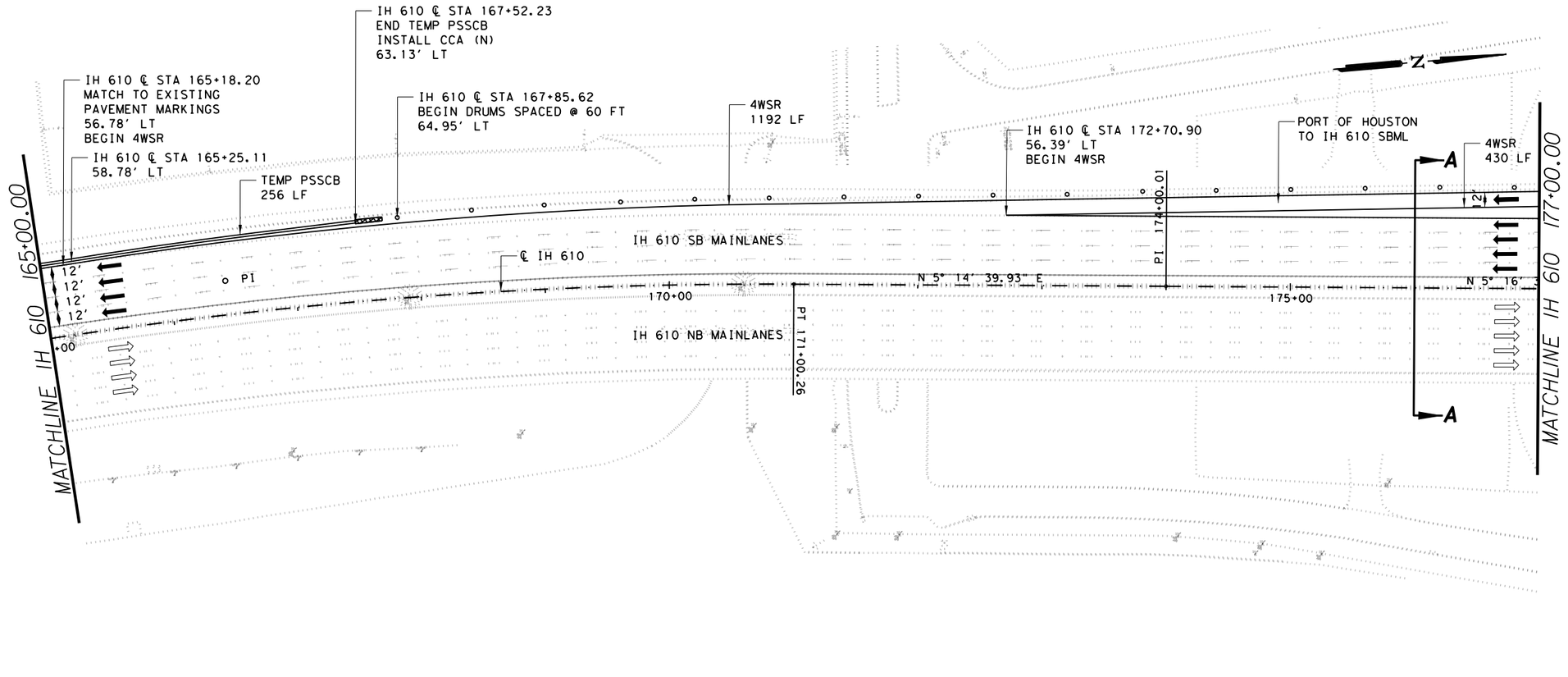
IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 2

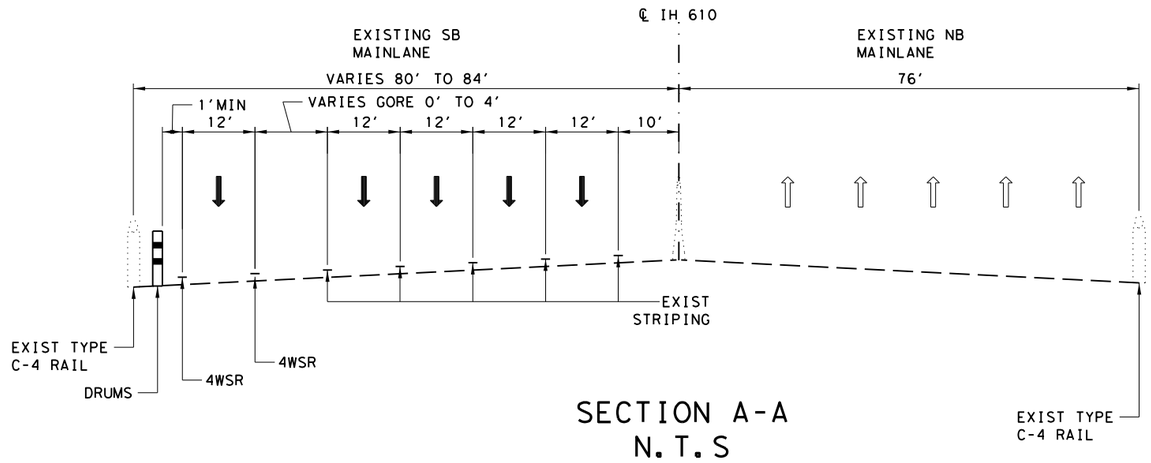
℄ IH 610 STA 153+00.00
TO STA 165+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 4 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		78
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610





SECTION A-A
N.T.S

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- * TO REMAIN IN PLACE FROM PREVIOUS PHASE
- TRAILER MOUNTED FLASHING ARROW BOARD

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

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2. EXISTING SIGNAGE (SEE OTHER PLANS).

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IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 2

℄ IH 610 STA 165+00.00
TO STA 177+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 5 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		79
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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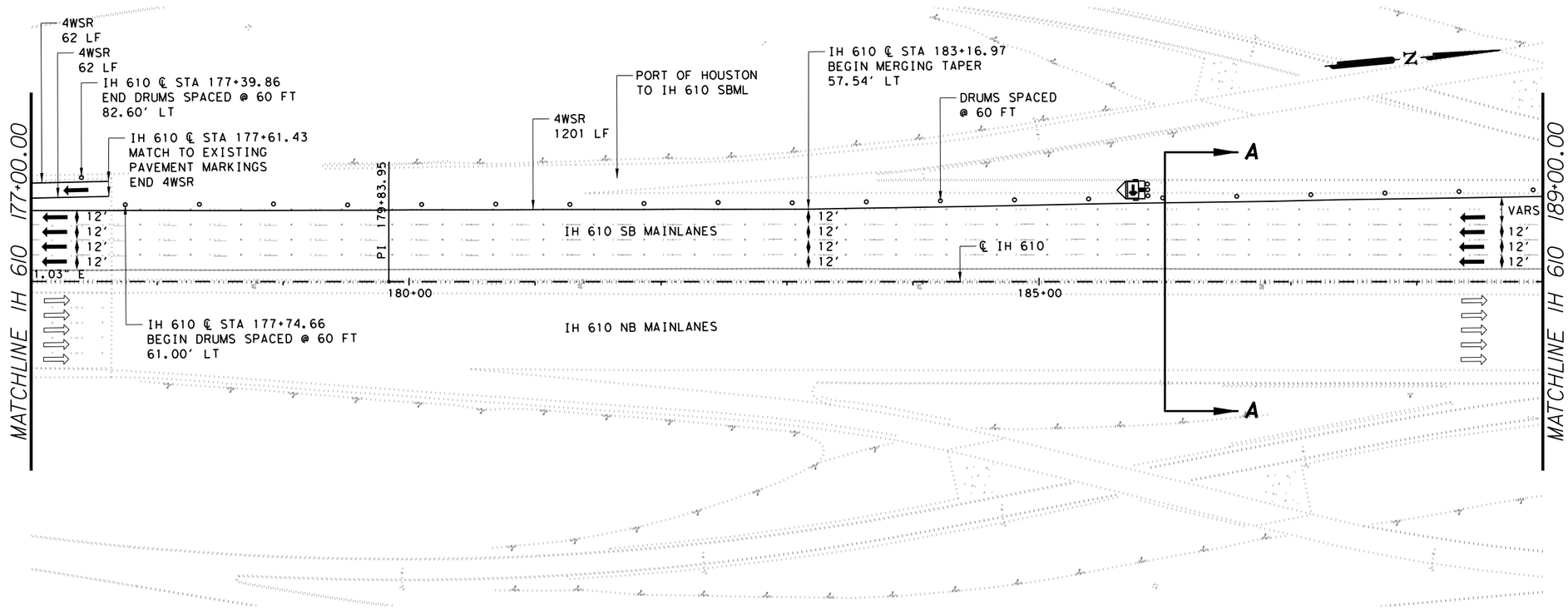

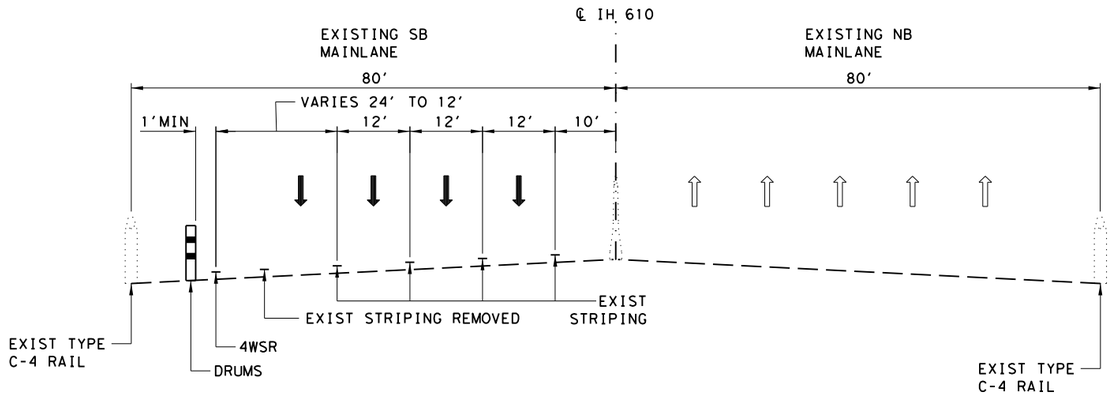

SECTION A-A
N.T.S

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
- * TO REMAIN IN PLACE FROM PREVIOUS PHASE
- TRAILER MOUNTED FLASHING ARROW BOARD

CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

1. FOR ALIGNMENT INFORMATION SEE SHEETS 126-142.
2. EXISTING SIGNAGE (SEE OTHER PLANS).

STATE OF TEXAS
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IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 2

℄ IH 610 STA 177+00.00
TO STA 189+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 6 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		80
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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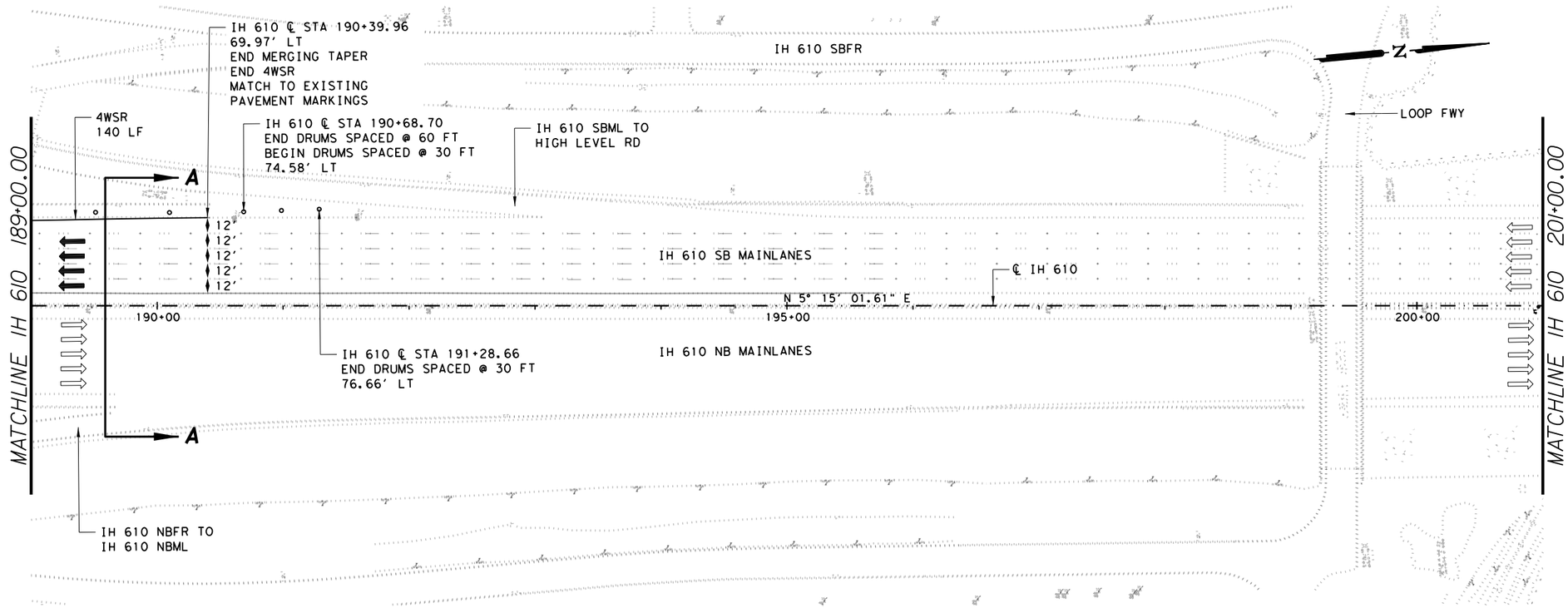

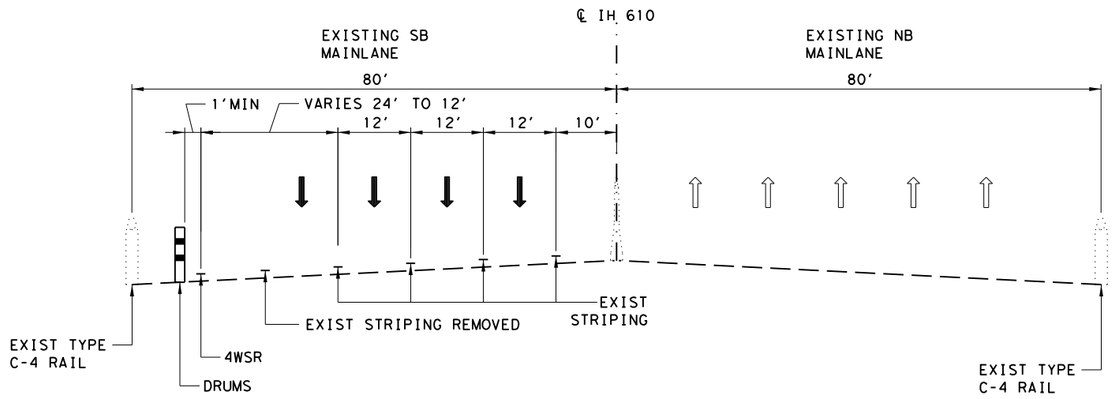

SECTION A-A
N.T.S

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
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CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
4YSNR
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE

NOTES:

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2. EXISTING SIGNAGE (SEE OTHER PLANS).

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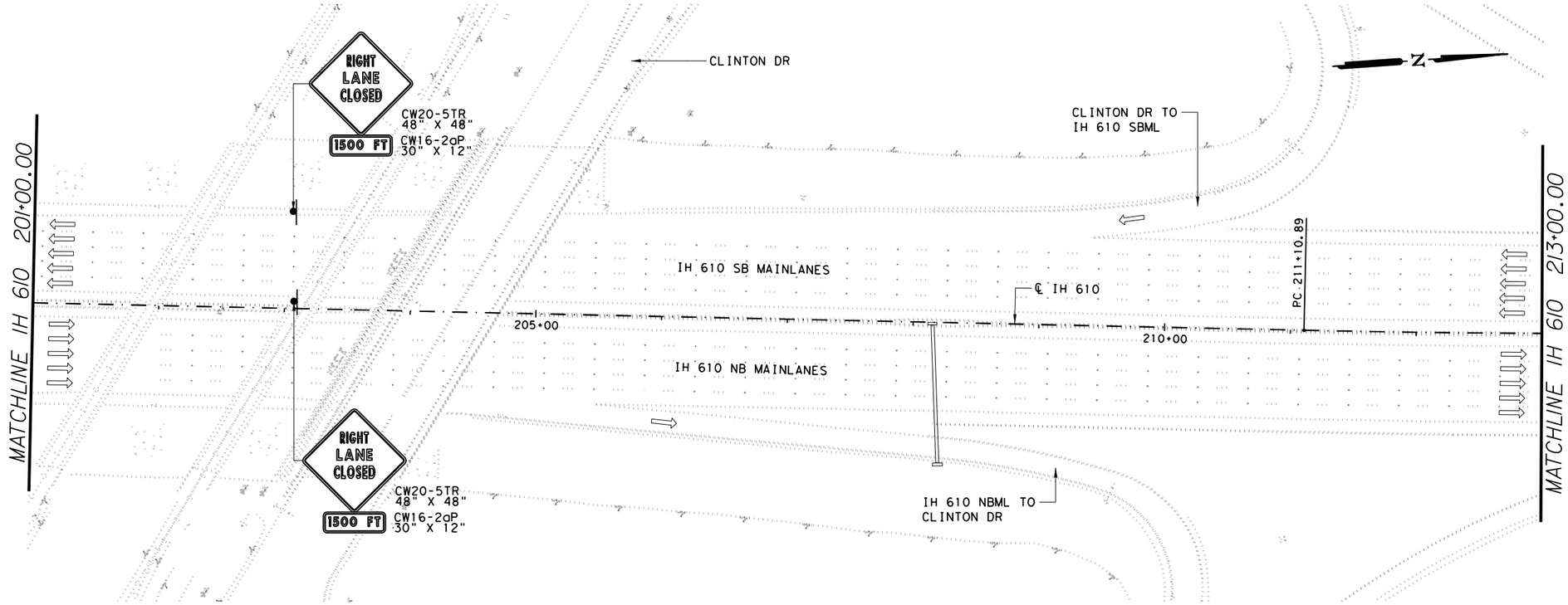
IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 2

℄ IH 610 STA 189+00.00
TO STA 201+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 7 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		81
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
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CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
SOLID/BROKEN
REMOVABLE/NON-REMOVABLE
4YSNR

NOTES:

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IH 610
SHIP CHANNEL BRIDGE
TCP
PHASE 2

℄ IH 610 STA 201+00.00
TO STA 213+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 8 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		82
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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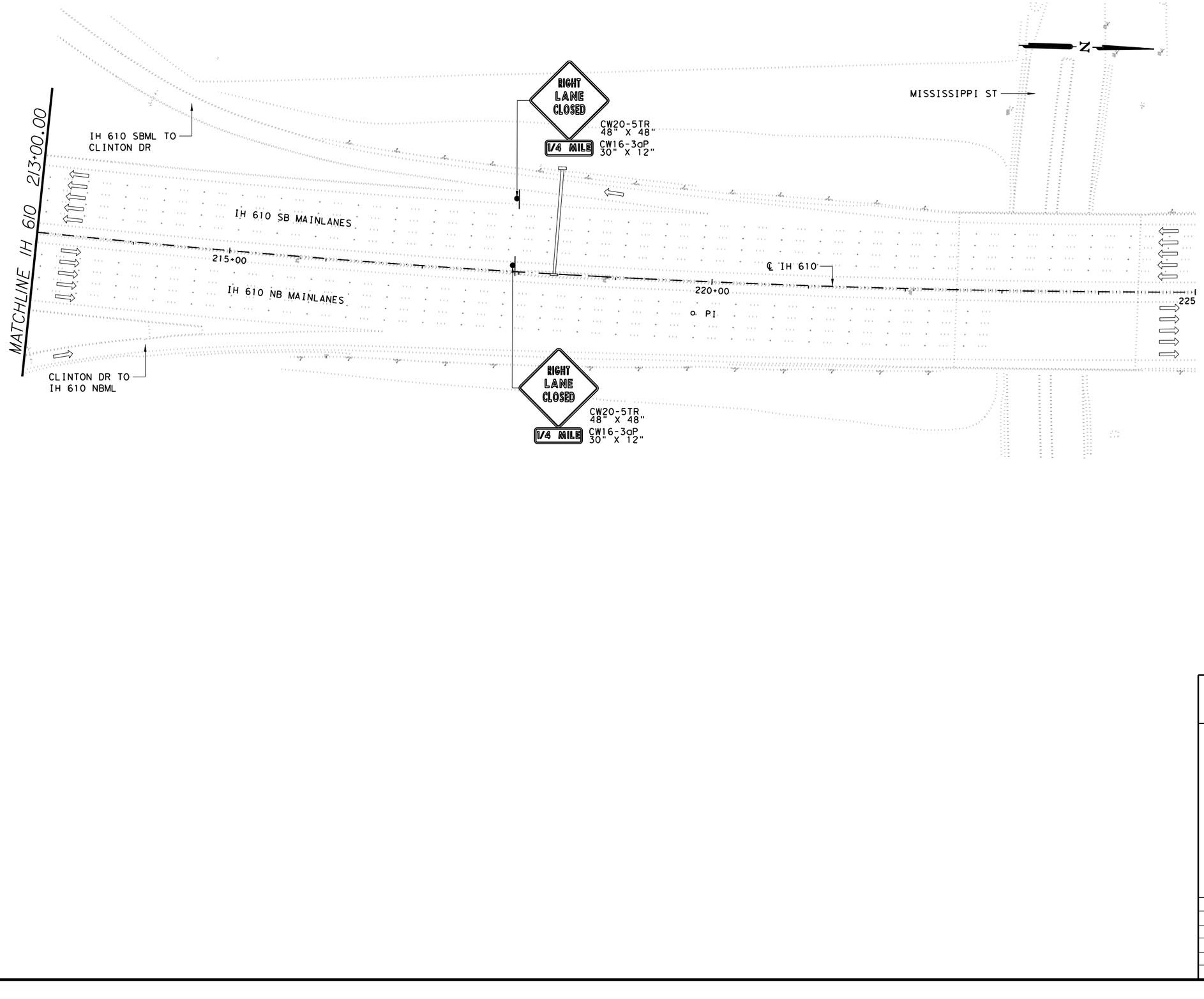

LEGEND

- SIGN
- LANE DROP
- TY III BARRICADE
- TEMPORARY PSSCB
- CHANNELIZING DEVICES
- EXIST TRAFFIC LANE
- OPEN TO TRAFFIC LANE
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CONSTR PAVEMENT MARKINGS
WHITE/YELLOW
WIDTH (INCHES)
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NOTES:

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IH 610
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TCP
PHASE 2

℄ IH 610 STA 213+00.00
TO END

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 9 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		83
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

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. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

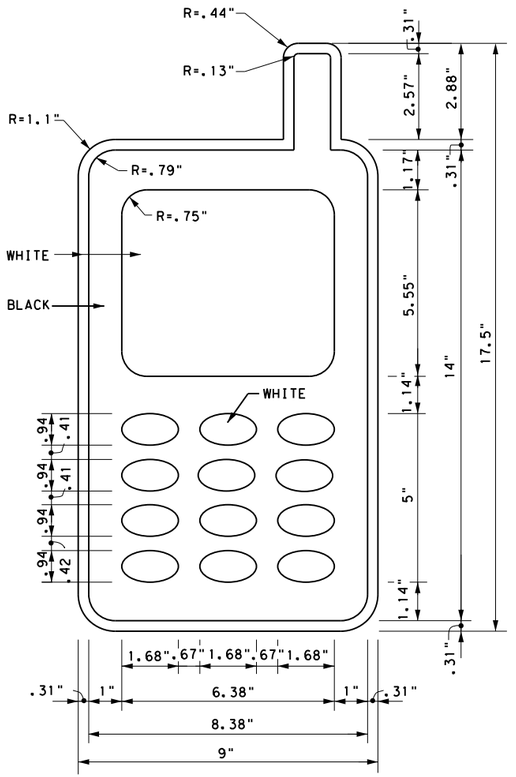
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

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 APPAREL 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.



3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

SIGN DETAIL (G20-10T)

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
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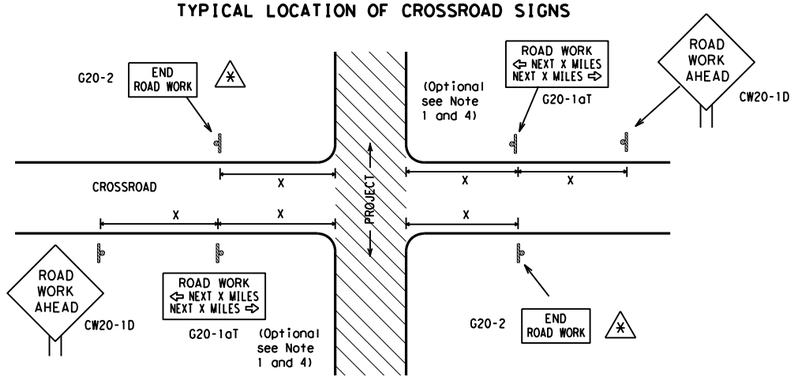
DATE: 01/10/2019 8:49 AM
FILE: BC(1)-14

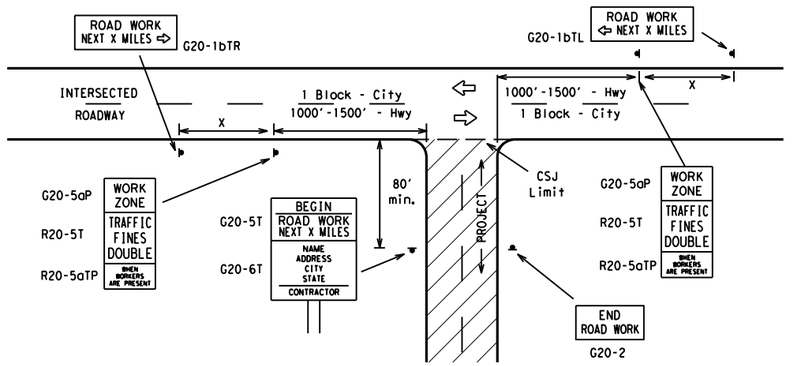
TYPICAL LOCATION OF CROSSROAD SIGNS



✱ 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. 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]

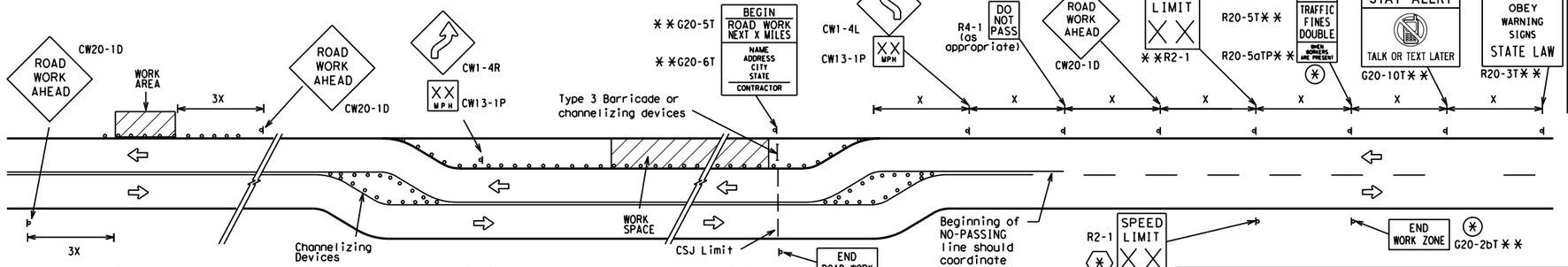
✱ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

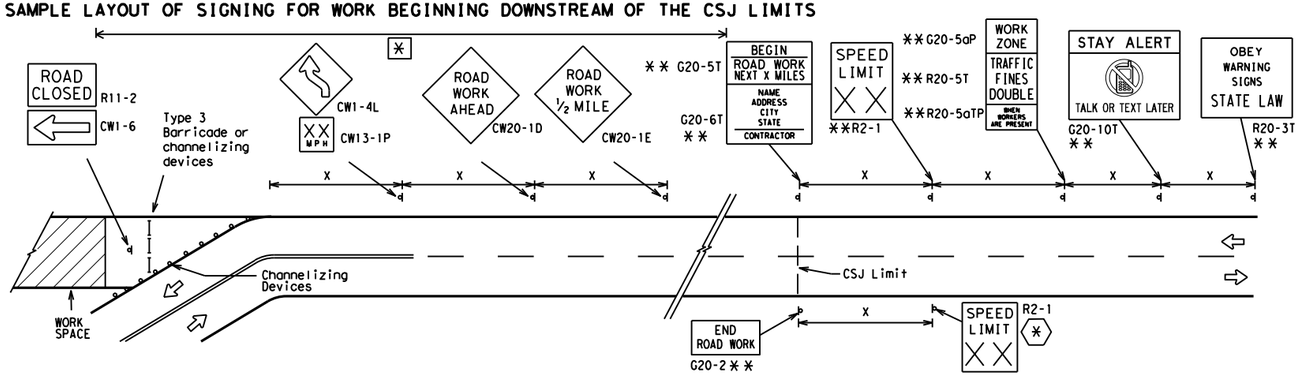
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

✱✱ Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

[✱] 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 Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0271	15	097	IH 610
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7-13	HOU	HARRIS		92

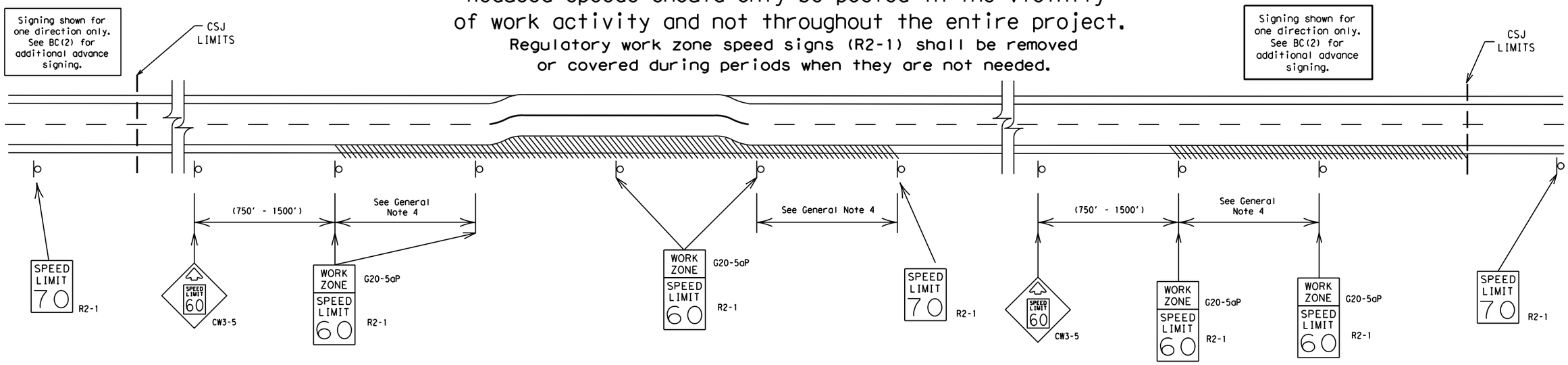
DATE: 01/10/2019 9:00 AM
FILE: BC(2)-14

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 travelled 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 Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

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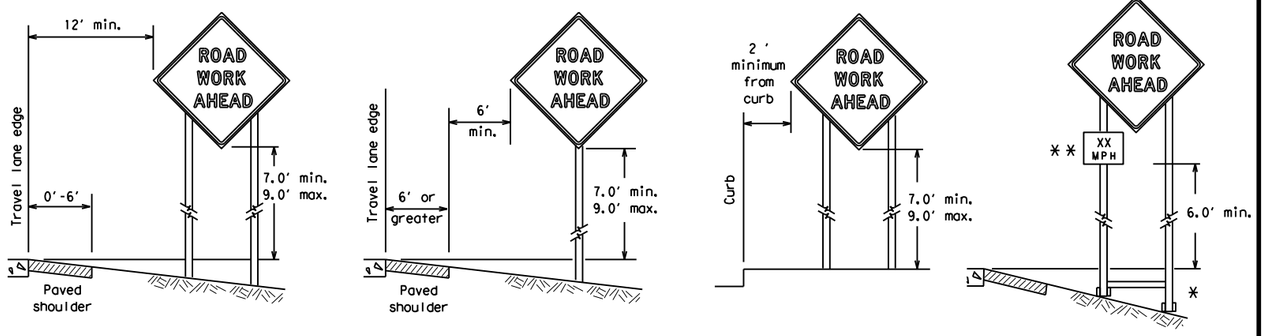
	HOU	HARRIS		93

DATE: 01/10/2019 9:15 AM
FILE: BC(3)-14

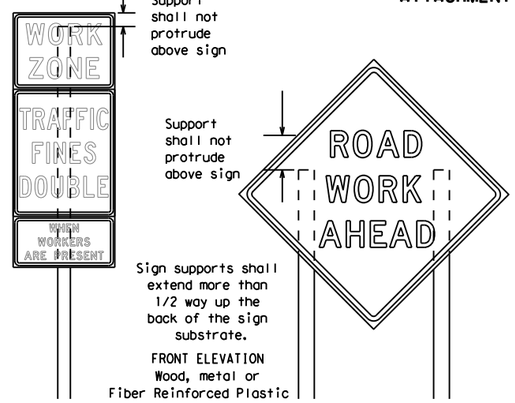
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

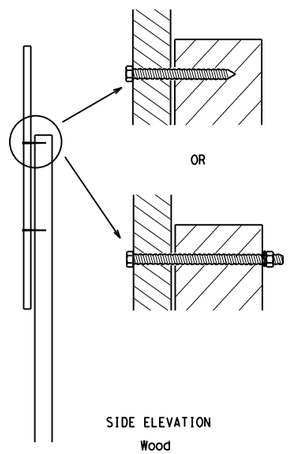


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





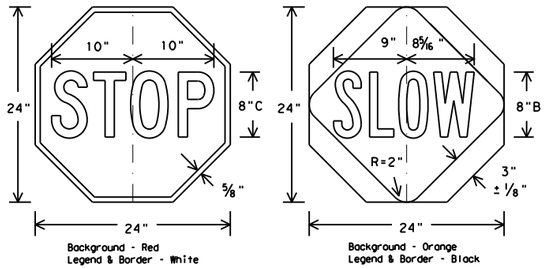
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
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.



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, 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.
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 sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards 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). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 9-07 8-14 7-13	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		94

DATE: 01/10/2019 9:30 AM
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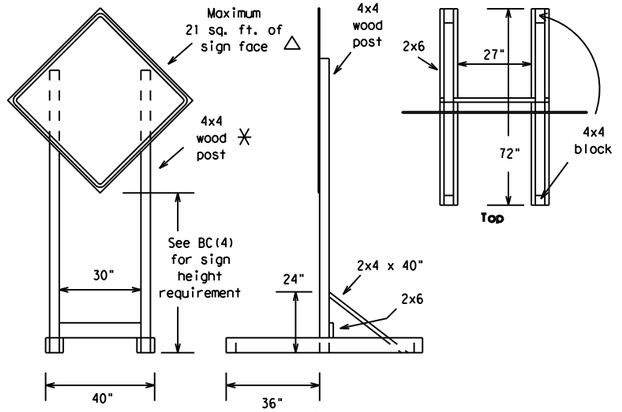
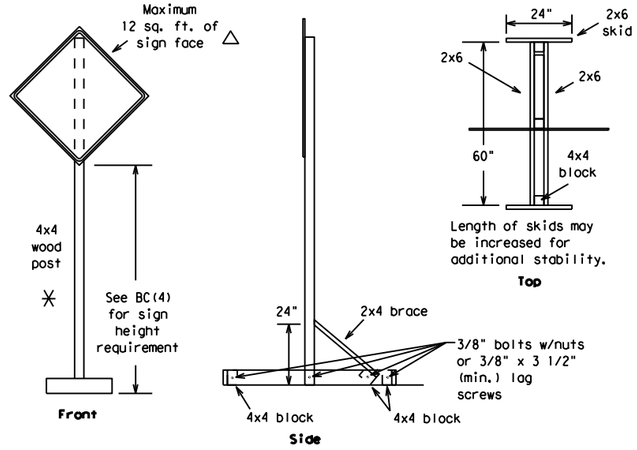
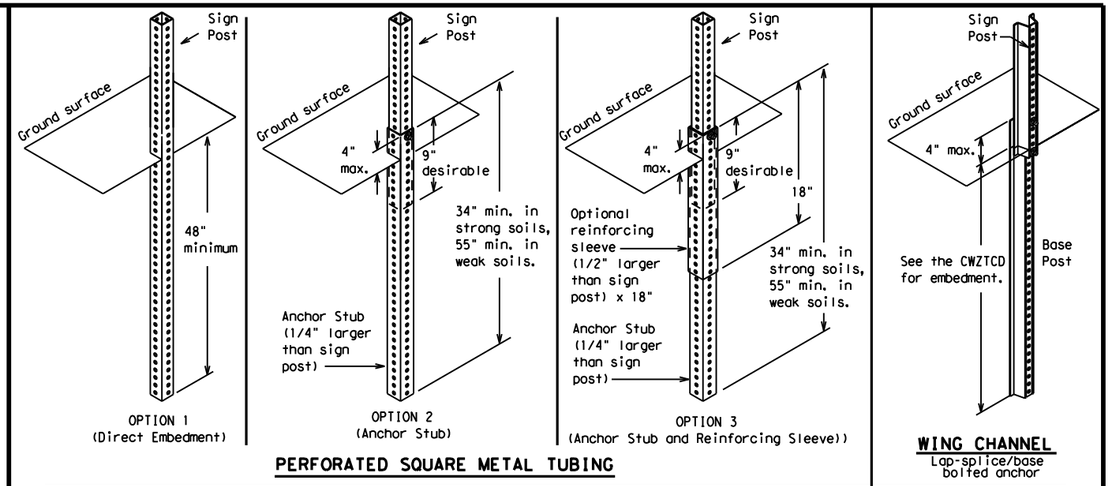




SKID MOUNTED WOOD SIGN SUPPORTS

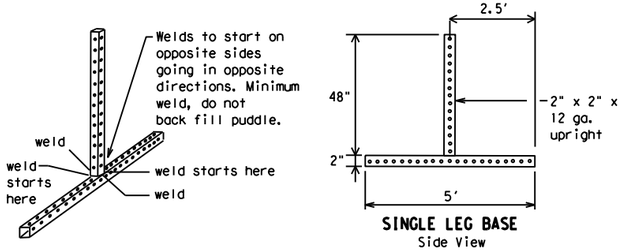
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □



PERFORATED SQUARE METAL TUBING

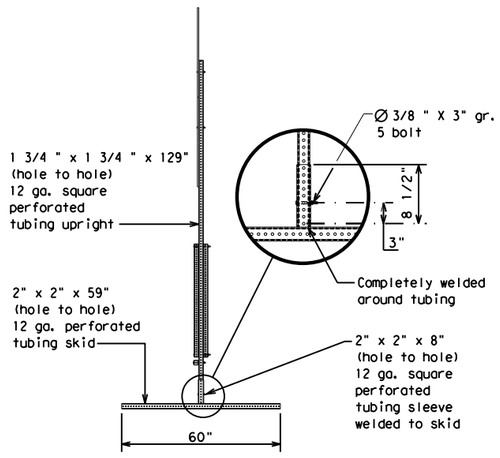
GROUND MOUNTED SIGN SUPPORTS

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.



Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND 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.

Texas Department of Transportation — Traffic Operations Division Standard

SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	HOU	HARRIS		95

DATE: 01/10/2019 9:50 AM
FILE: BC(5)-14

WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** 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 Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

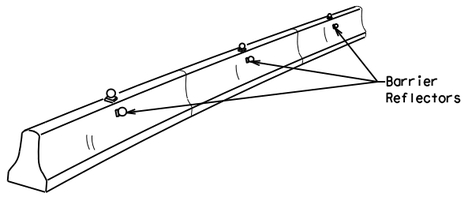
BC(6)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	HOU	HARRIS		96

100

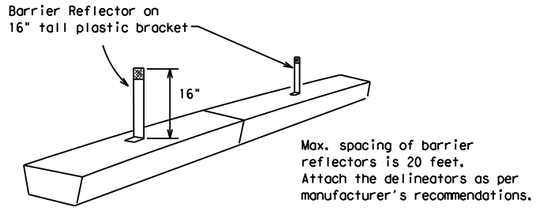
DATE: 01/10/2019 10:00 AM
FILE: BC(6)-14

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.

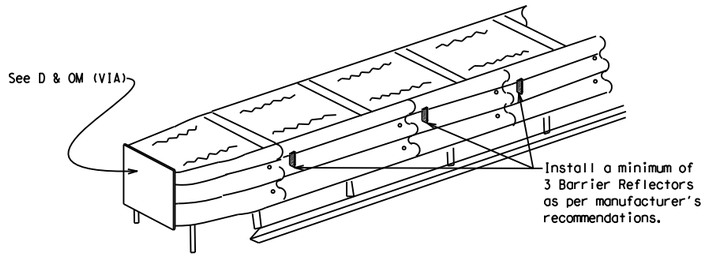


CONCRETE TRAFFIC BARRIER (CTB)

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.



LOW PROFILE CONCRETE BARRIER (LPCB)

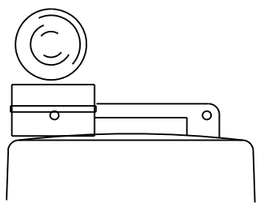


DELINEATION OF END TREATMENTS

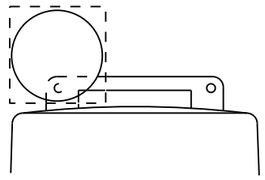
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

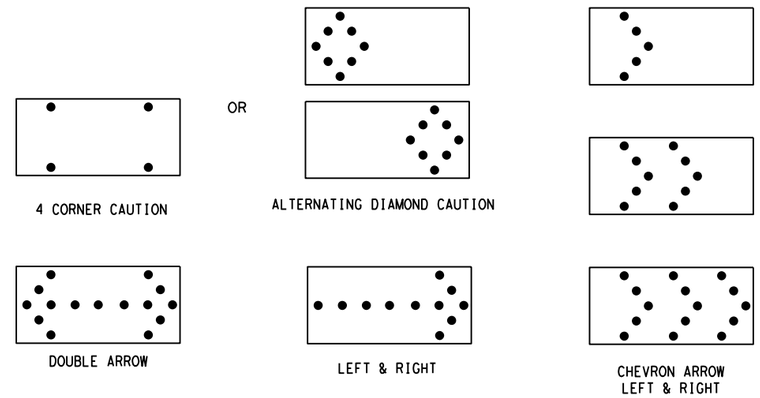
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	HOU	HARRIS		97

101

DATE: 01/10/2019 10:10 AM
FILE: BC(7)-14

DATE: 01/10/2019 10:20 AM
FILE: BC(8)-14

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:

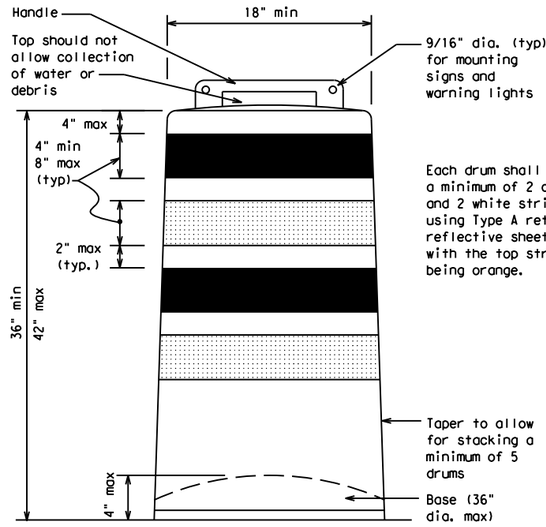
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

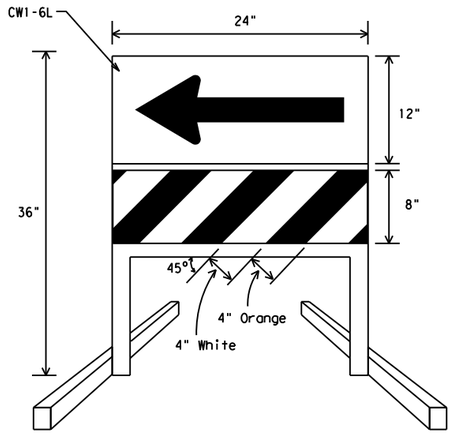
RETROREFLECTIVE SHEETING

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 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

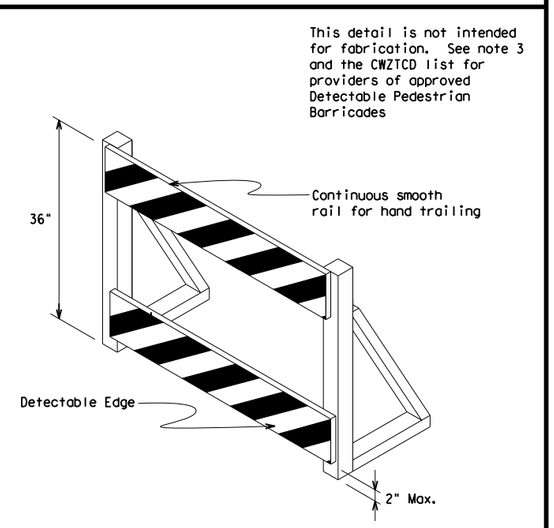
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other 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.





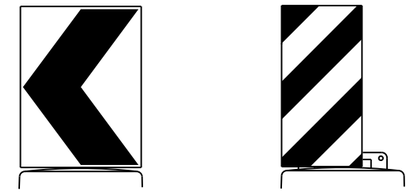
DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.



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.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
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 for Buildings and Facilities (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 may use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



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

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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A 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 Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

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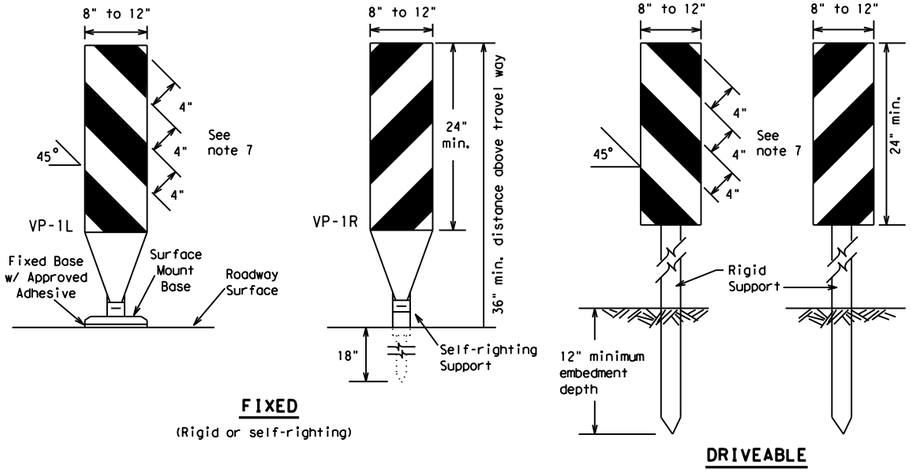
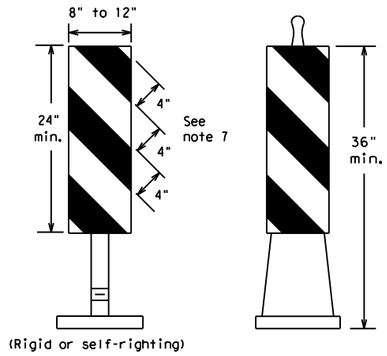
9-07 8-14	HOU	HARRIS		98



FIXED
(Rigid or self-righting)

DRIVEABLE

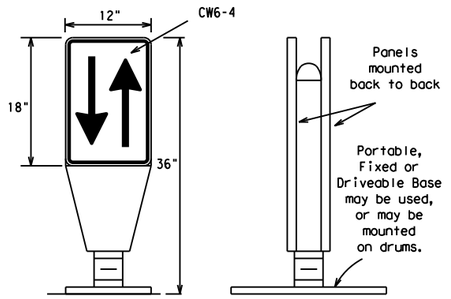


(Rigid or self-righting)

PORTABLE

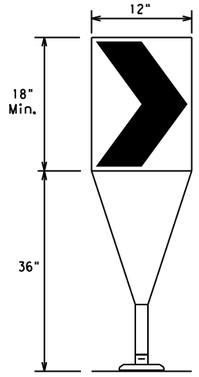
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of 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 conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



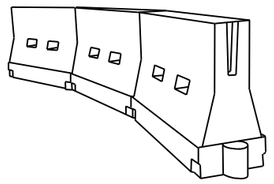
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed 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 NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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	HOU	HARRIS		99

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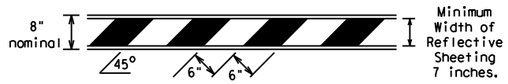
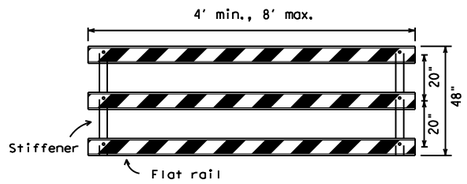
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



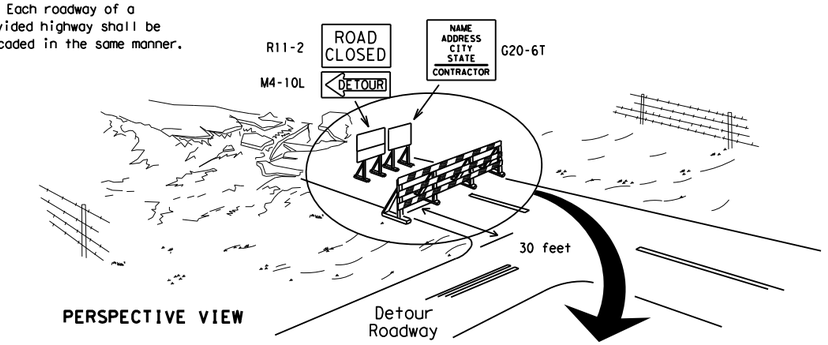
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

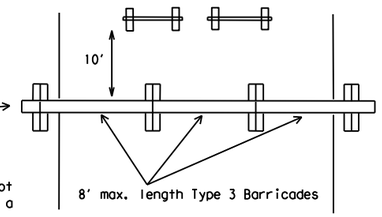
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

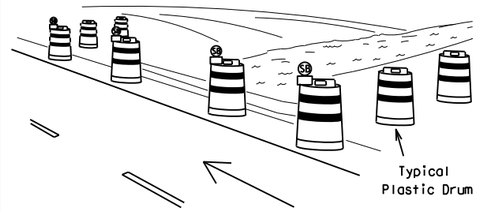
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

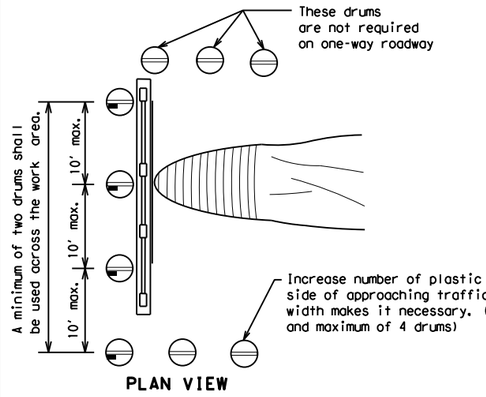
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

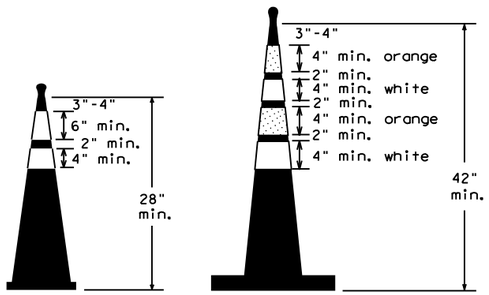
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

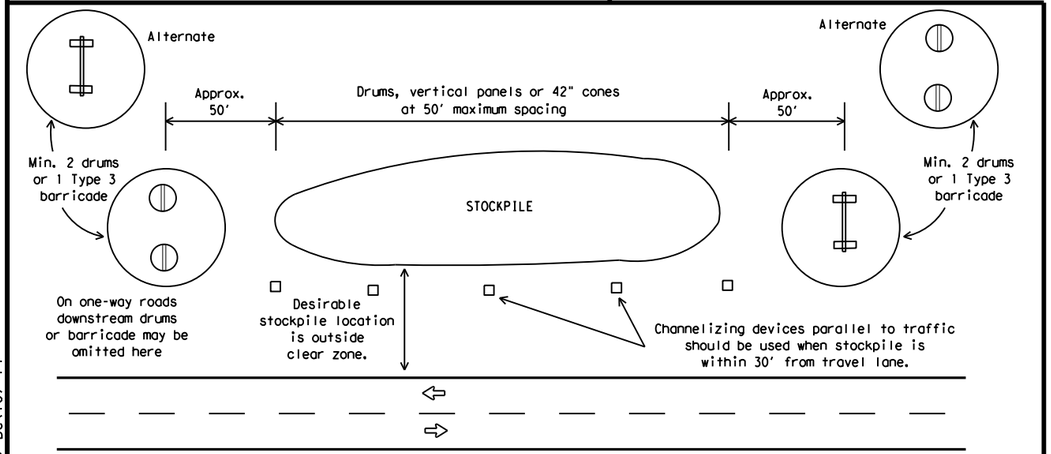


Two-Piece cones | One-Piece cones | Tubular Marker

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

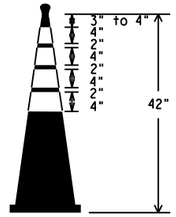
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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 used at night 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.
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

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

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7-13	HOU	HARRIS		100

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

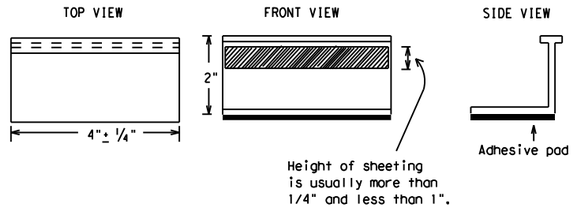
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
2-98 9-07	DIST	COUNTY		SHEET NO.
1-02 7-13	HOU	HARRIS		101
11-02 8-14				

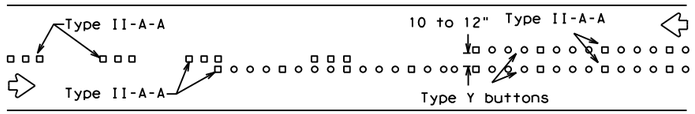
105

DATE: 01/10/2019 10:45 AM
FILE: BC(11)-14

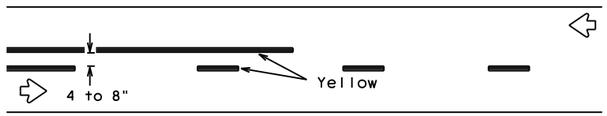
DATE: 01/10/2019 11:00 AM
FILE: BC(12)-14

PAVEMENT MARKING PATTERNS

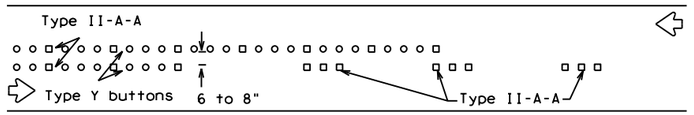
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



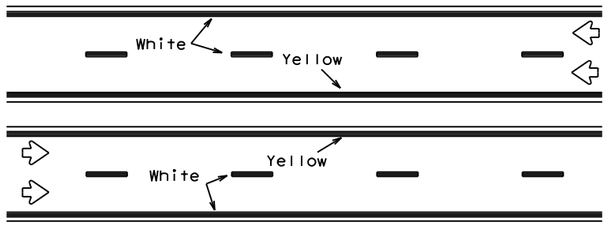
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



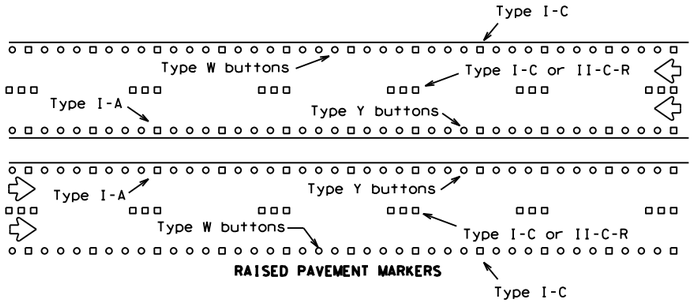
RAISED PAVEMENT MARKERS - PATTERN B

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



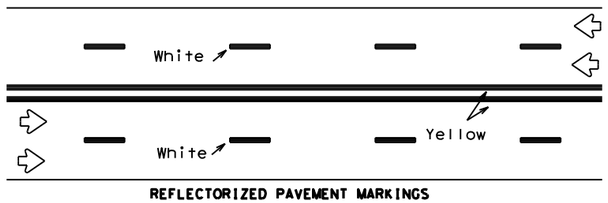
REFLECTORIZED PAVEMENT MARKINGS



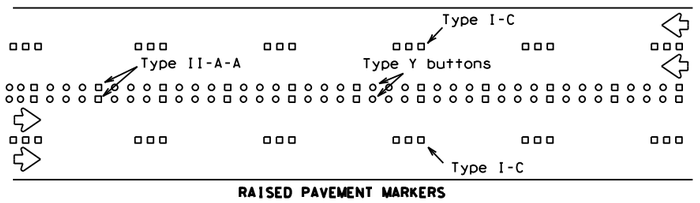
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



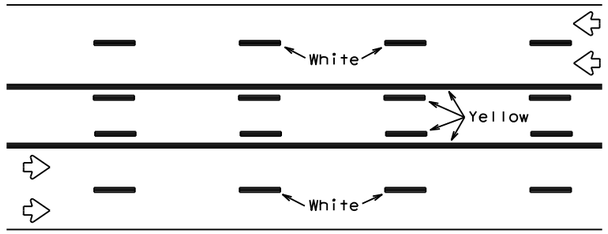
REFLECTORIZED PAVEMENT MARKINGS



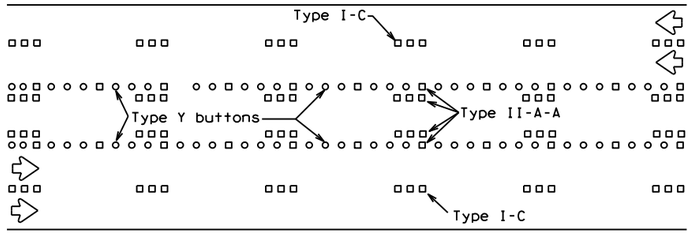
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

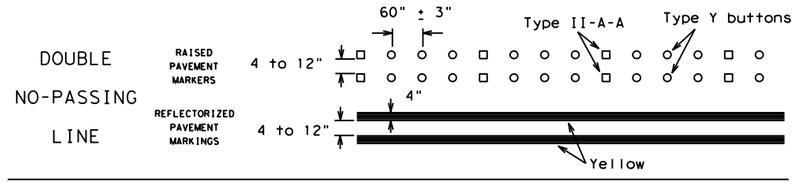
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

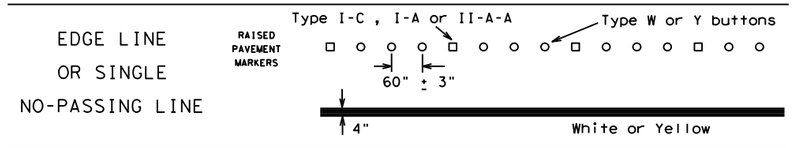
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

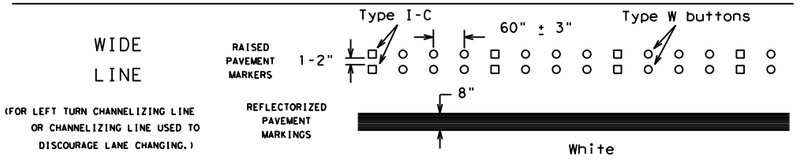


EDGE LINE OR SINGLE NO-PASSING LINE



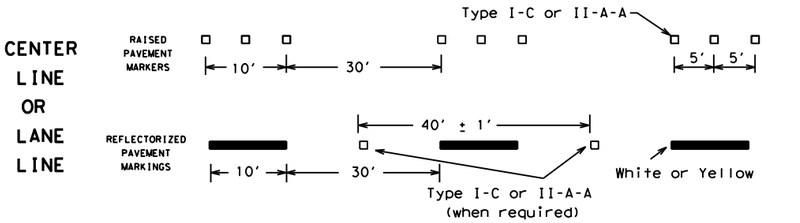
WIDE LINE

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

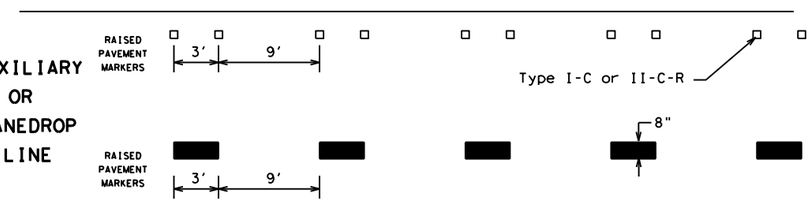


BROKEN LINES

CENTER LINE OR LANE LINE

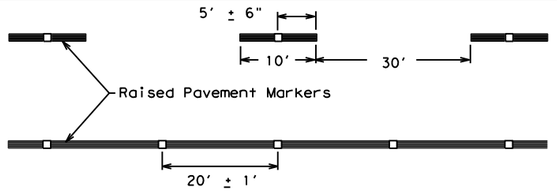


AUXILIARY OR LANEDROP LINE



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 Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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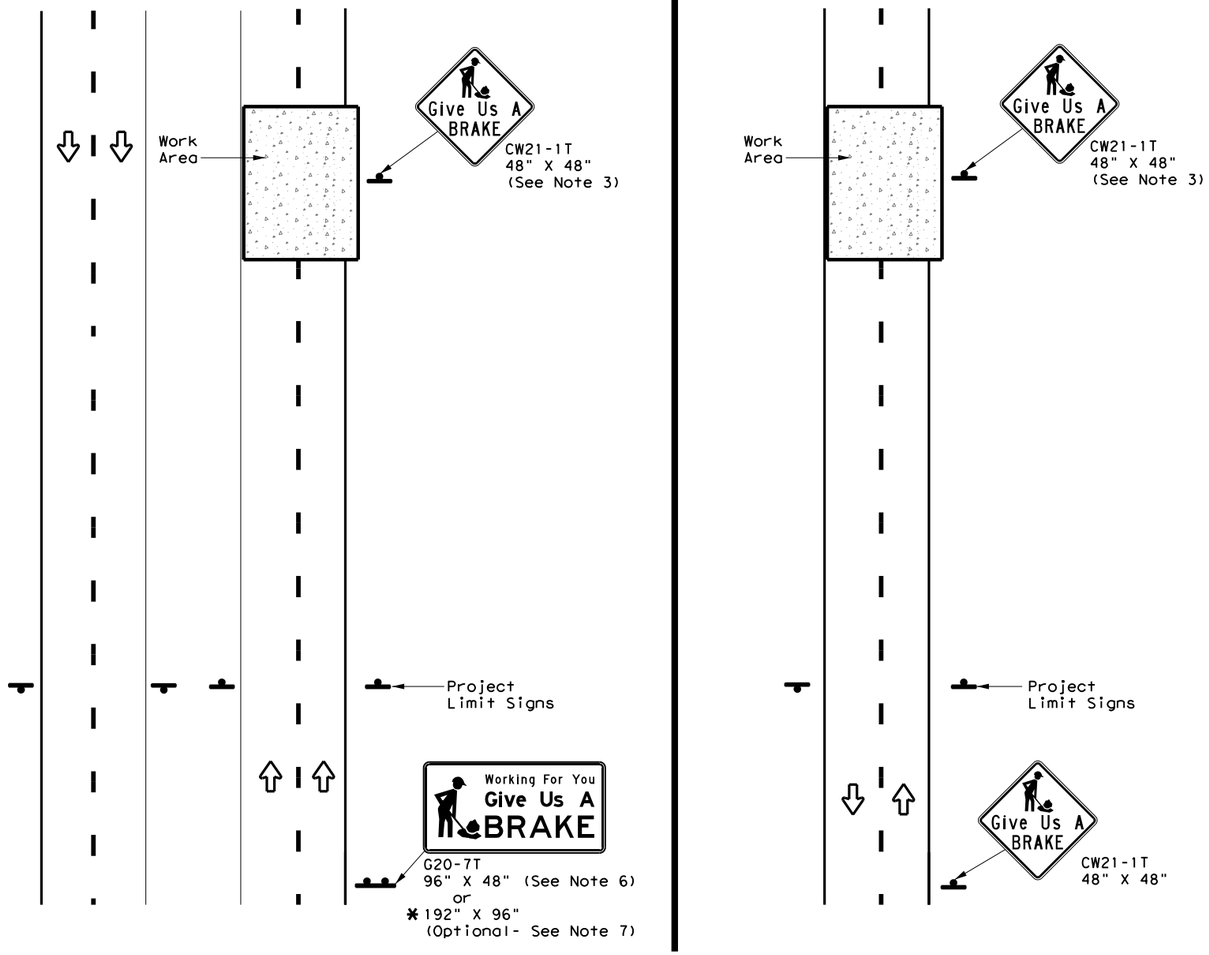
1-97 9-07	DIST	COUNTY		SHEET NO.
2-98 7-13	HOU	HARRIS		102
11-02 8-14				



DIVIDED HIGHWAY

UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

DATE: 5/18/2021 $TIME$
FILE: $FILE$

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
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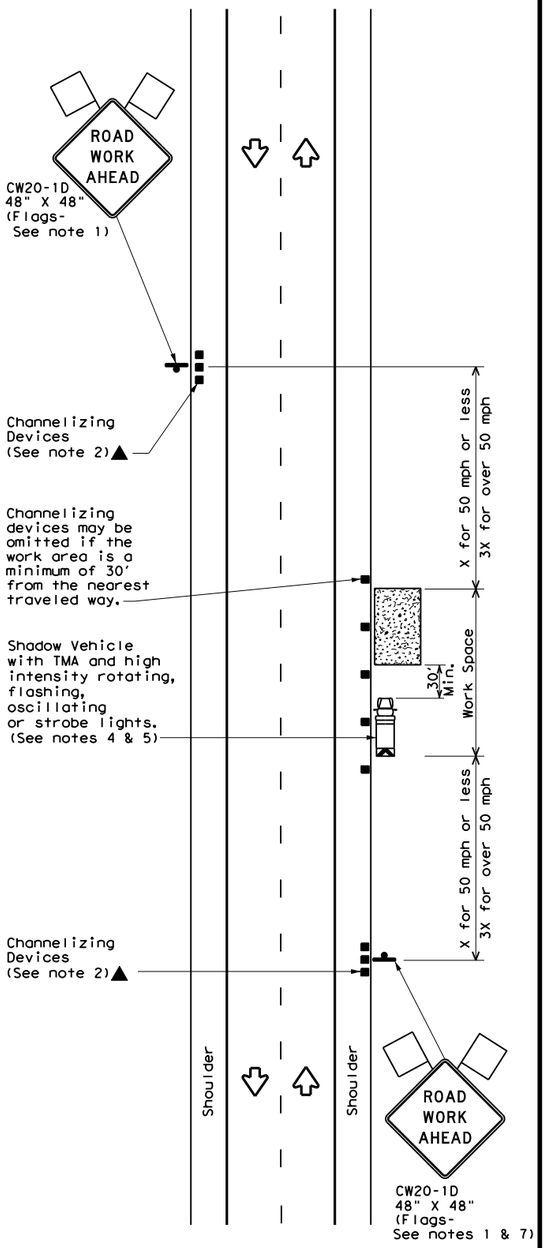
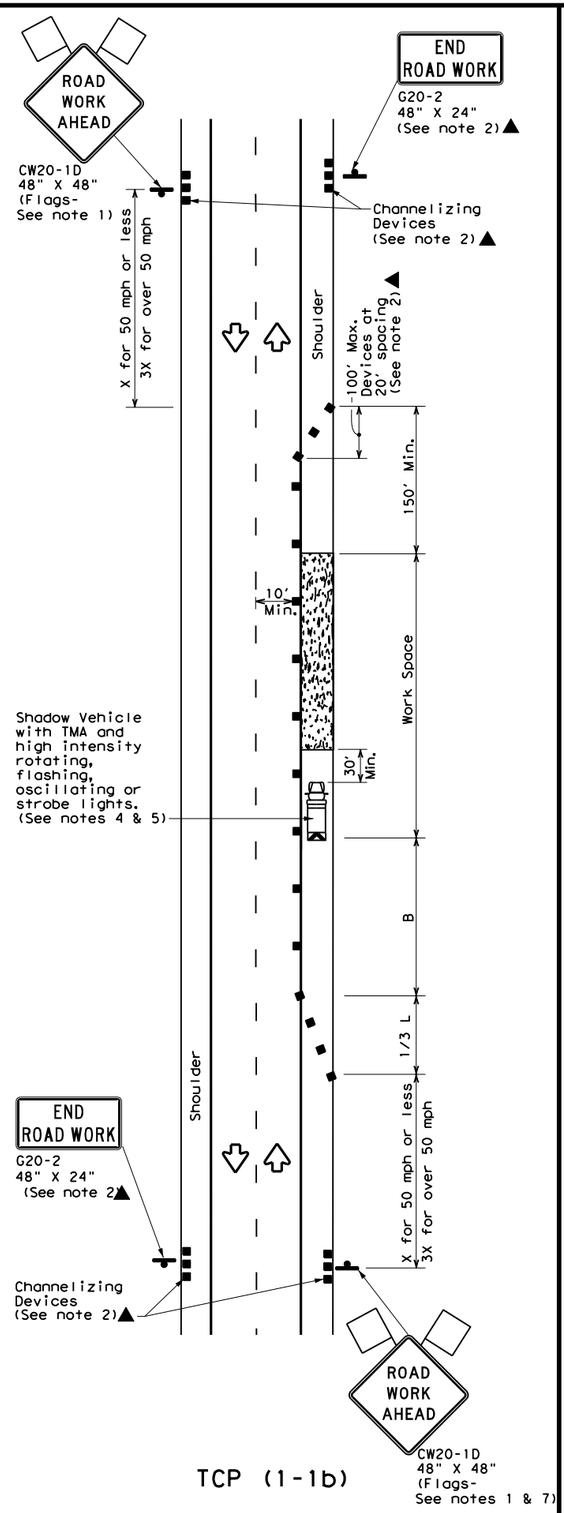
6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	HOU	HARRIS		103



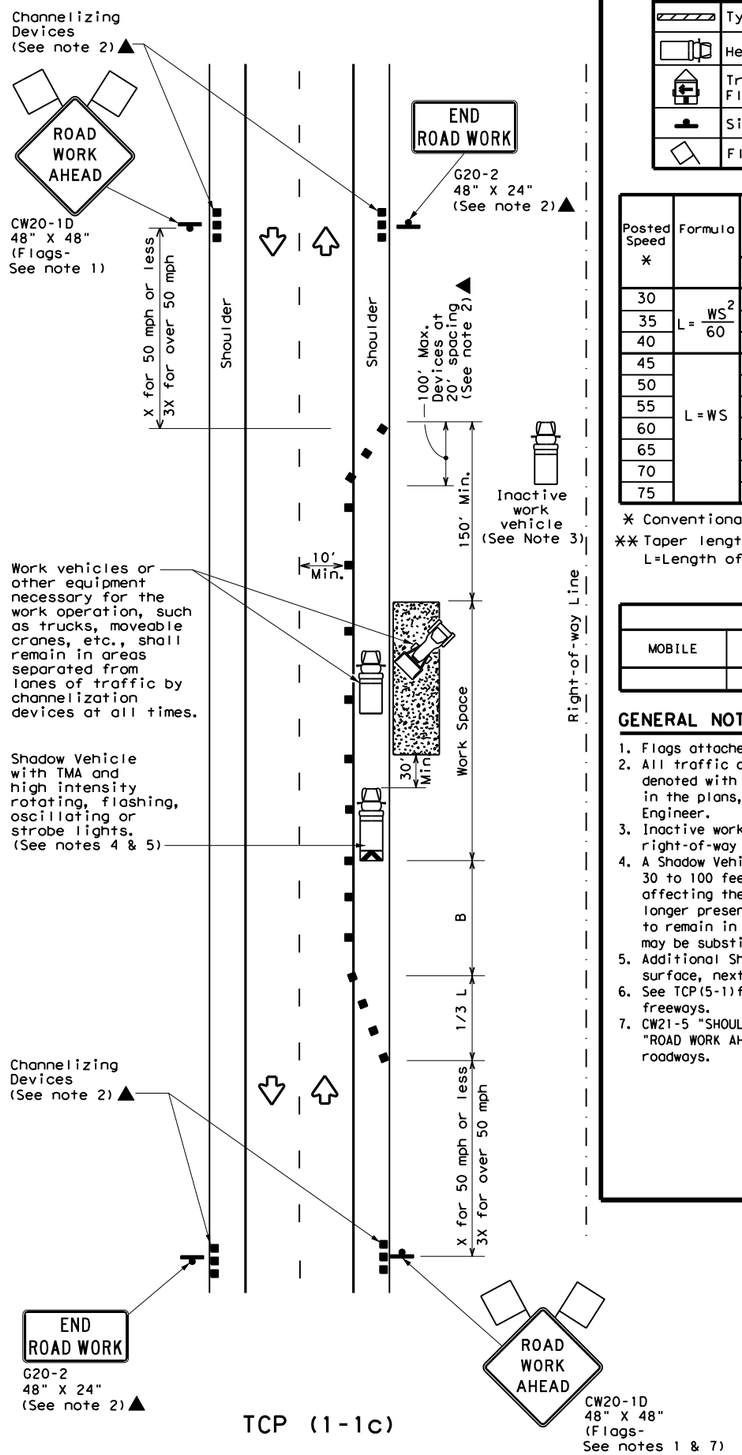
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	HOU	HARRIS		104
1-97 2-18				

DATE: 01/07/2019 2:14 PM
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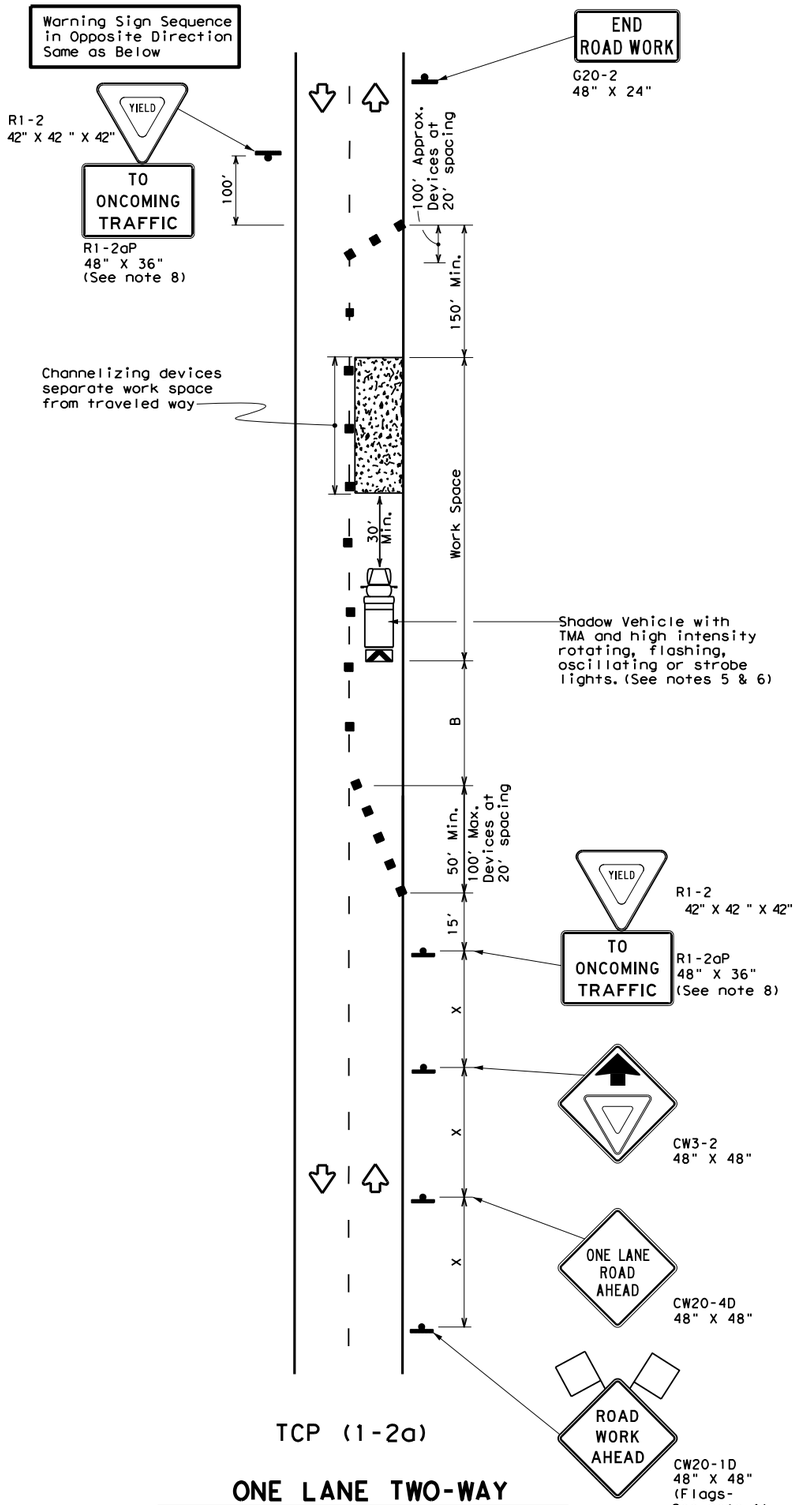
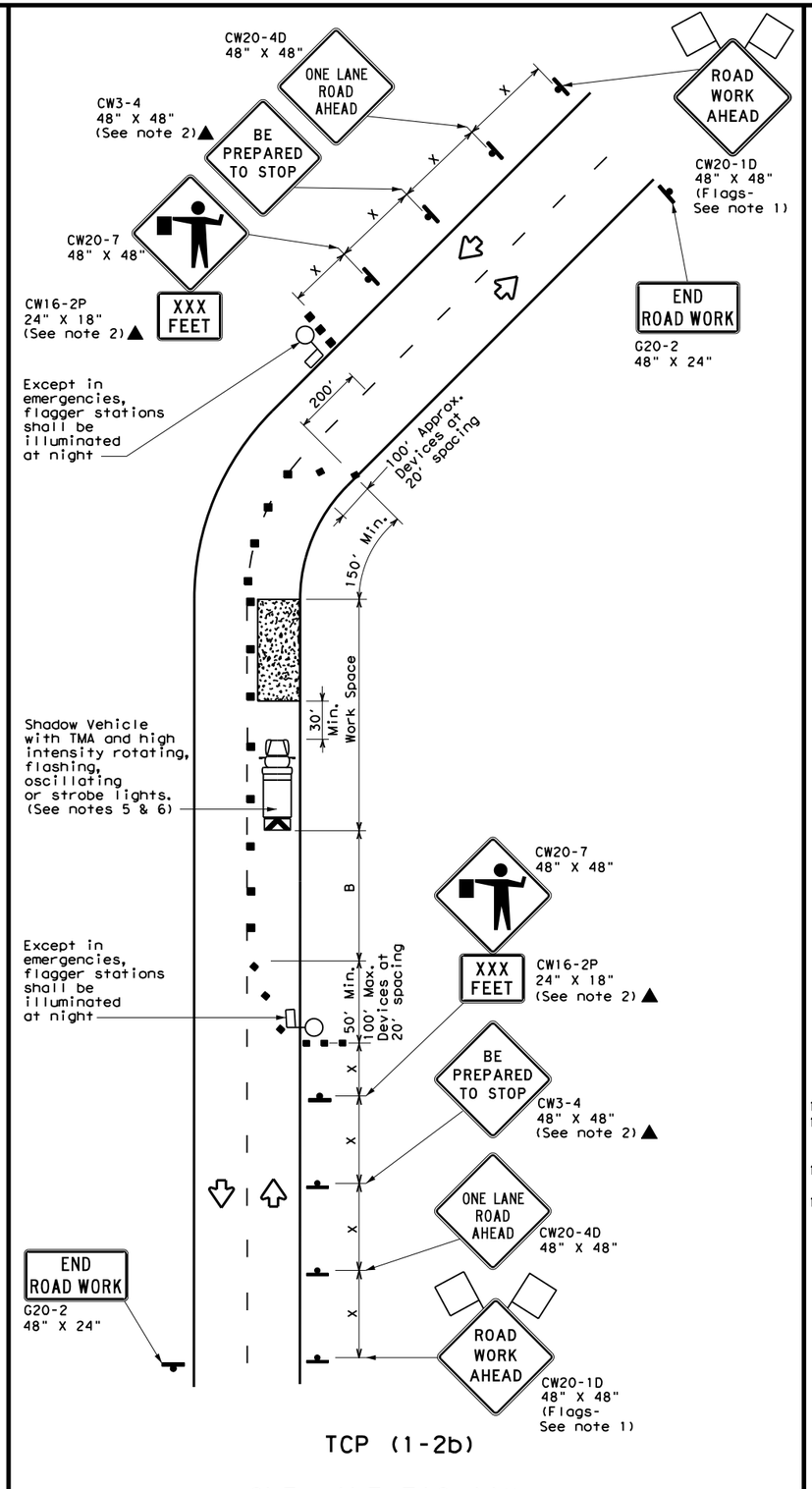
DATE: 5/18/2021 $TIME$
FILE: $FILE$



TCP (1-2a)

ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
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 off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

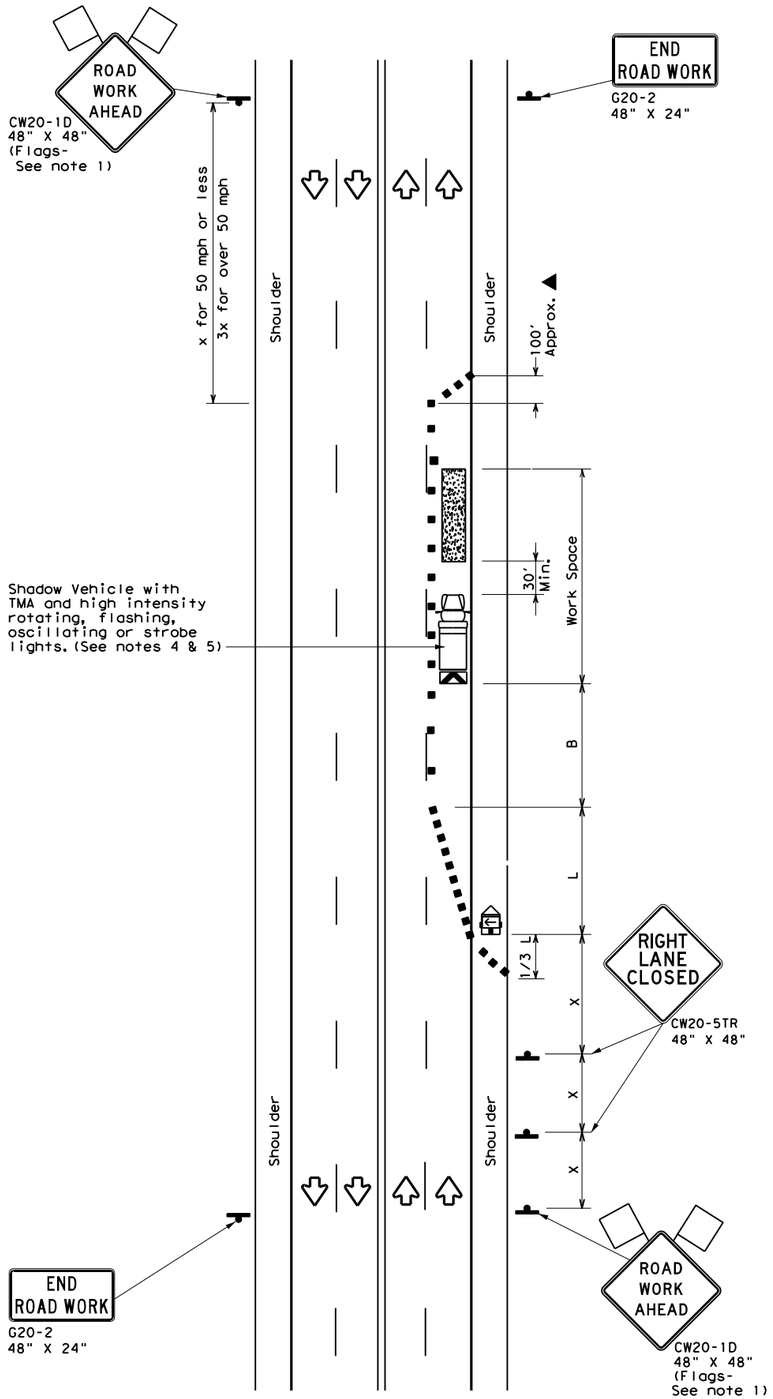
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

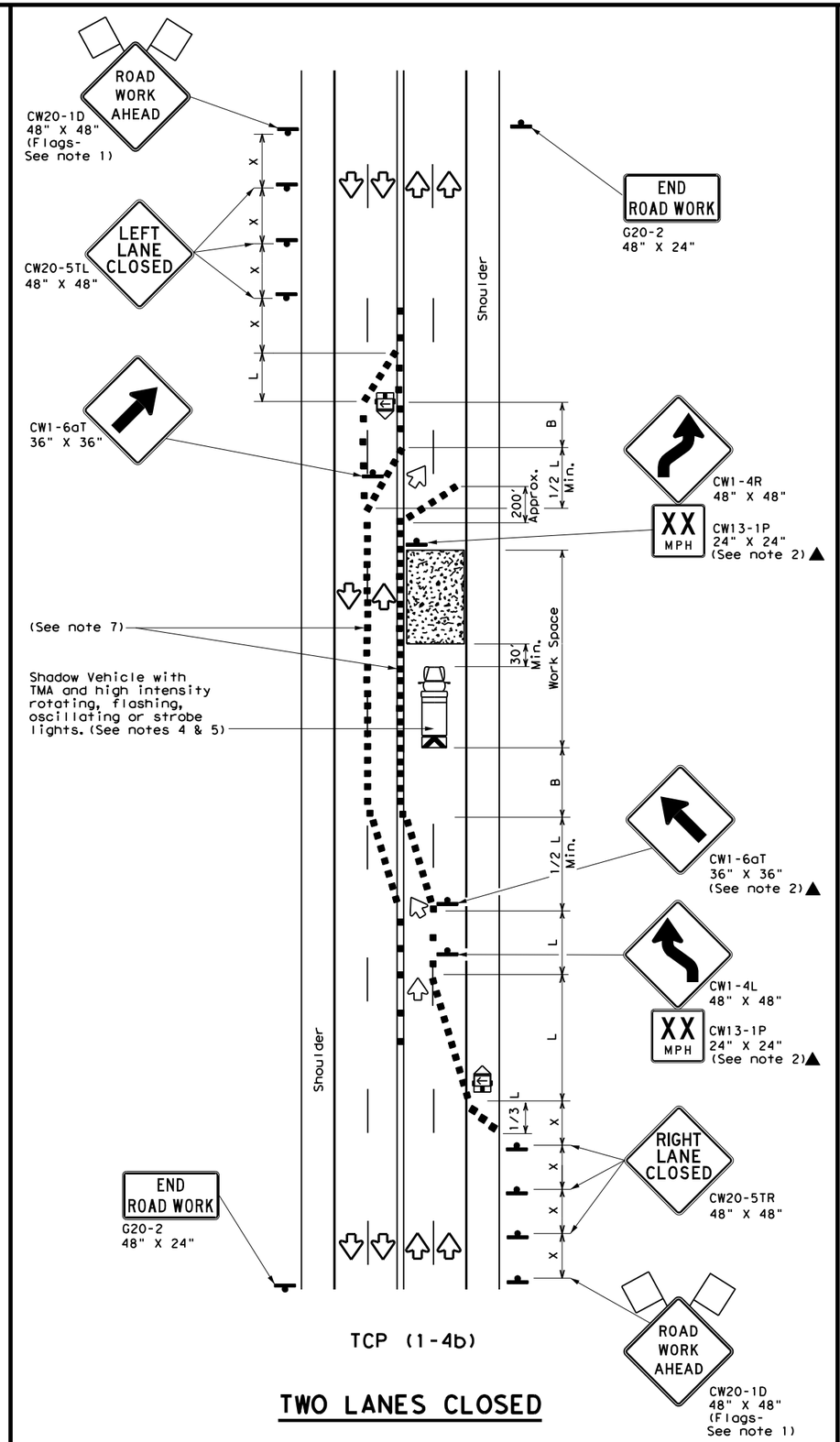
TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
4-90 4-98	DIST	COUNTY		SHEET NO.
2-94 2-12	HOU	HARRIS		105
1-97 2-18				



TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

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 CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

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 where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. 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 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

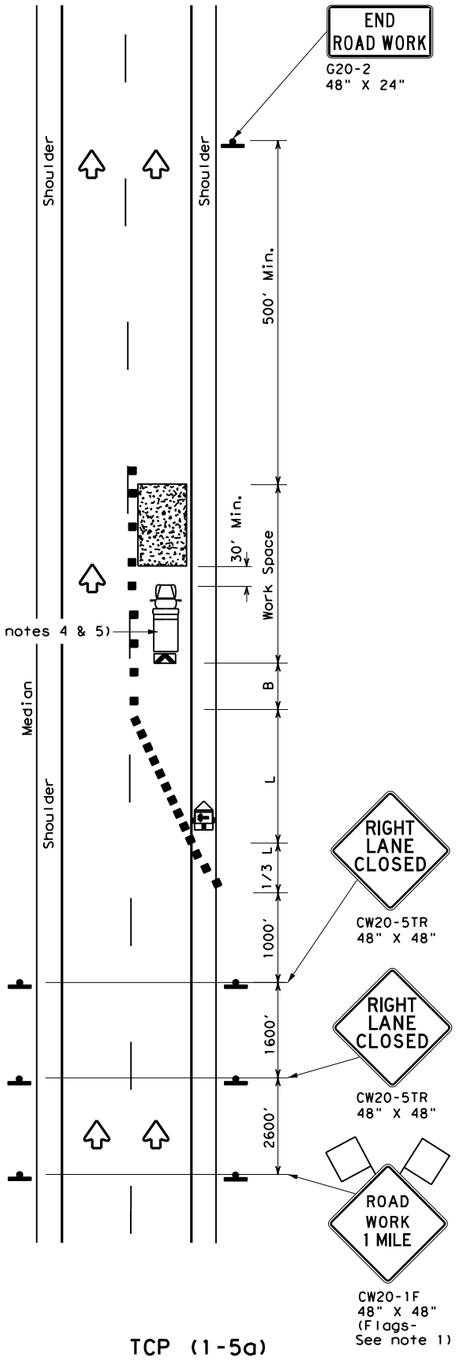
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

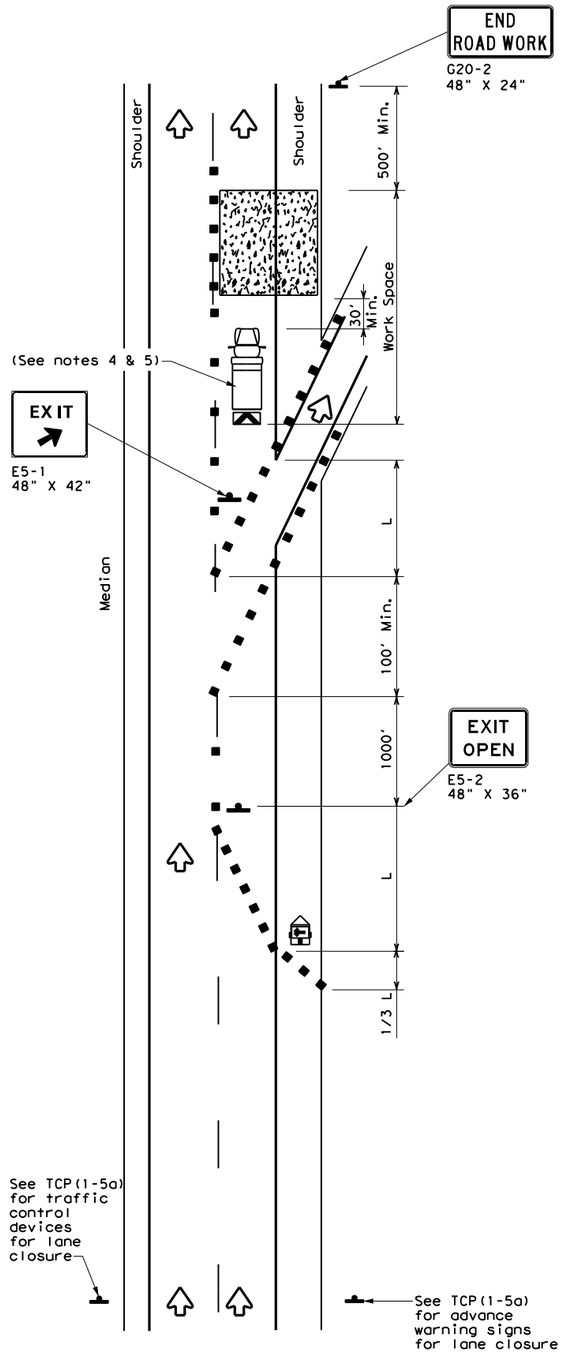
FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	HOU	HARRIS		106
1-97 2-18				

DATE: 5/18/2021 $TIME$
FILE: $FILE$



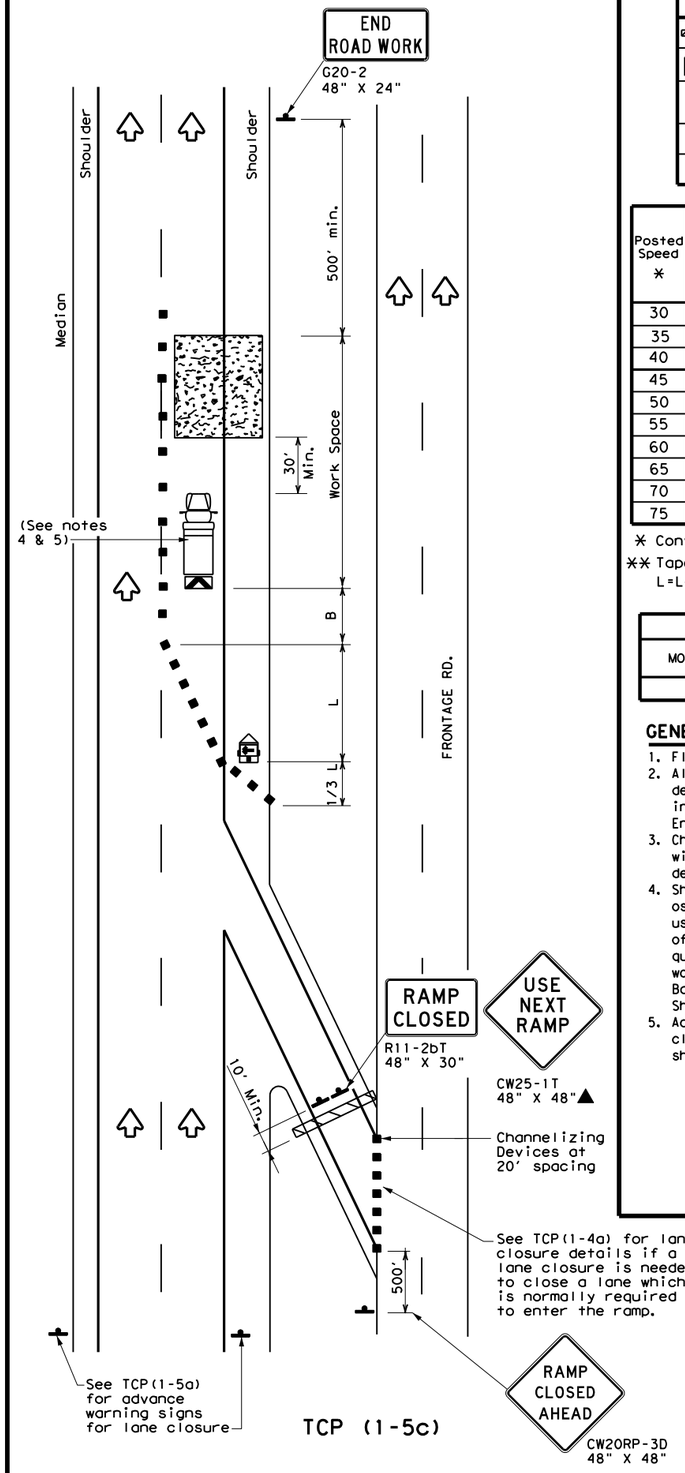
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		107

DATE: 5/18/2021 $TIME$
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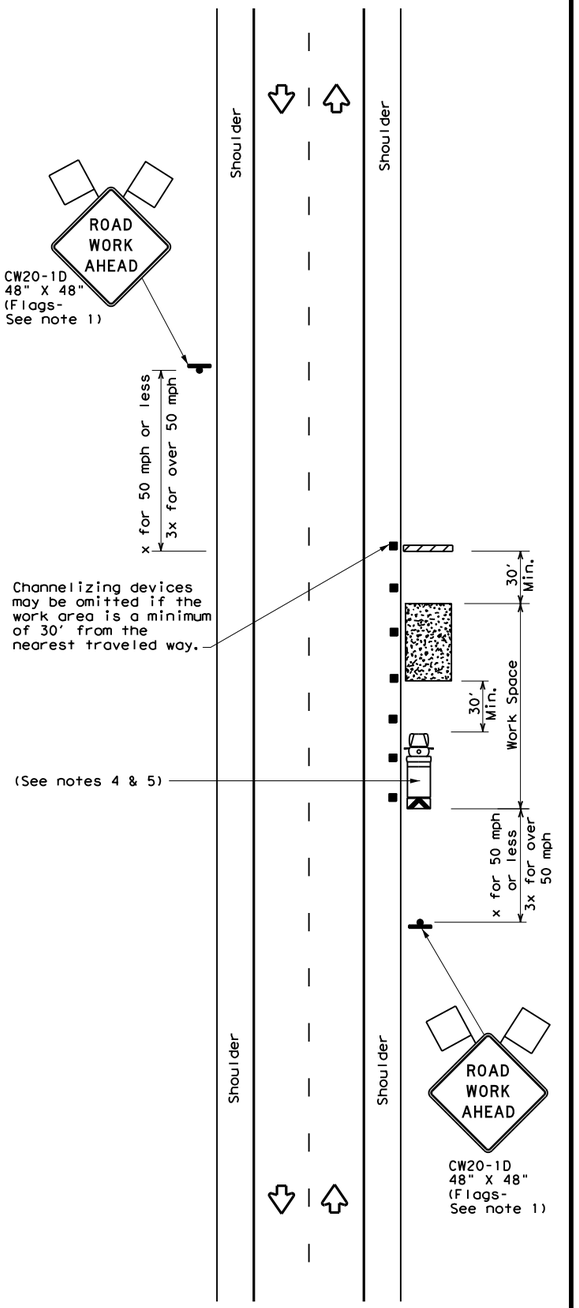
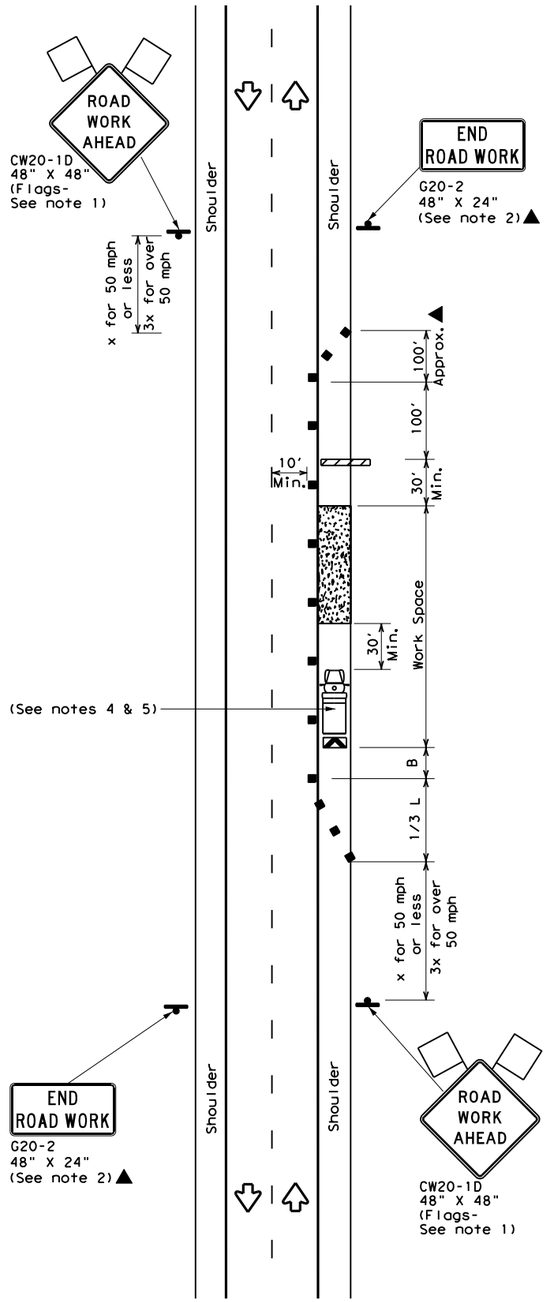


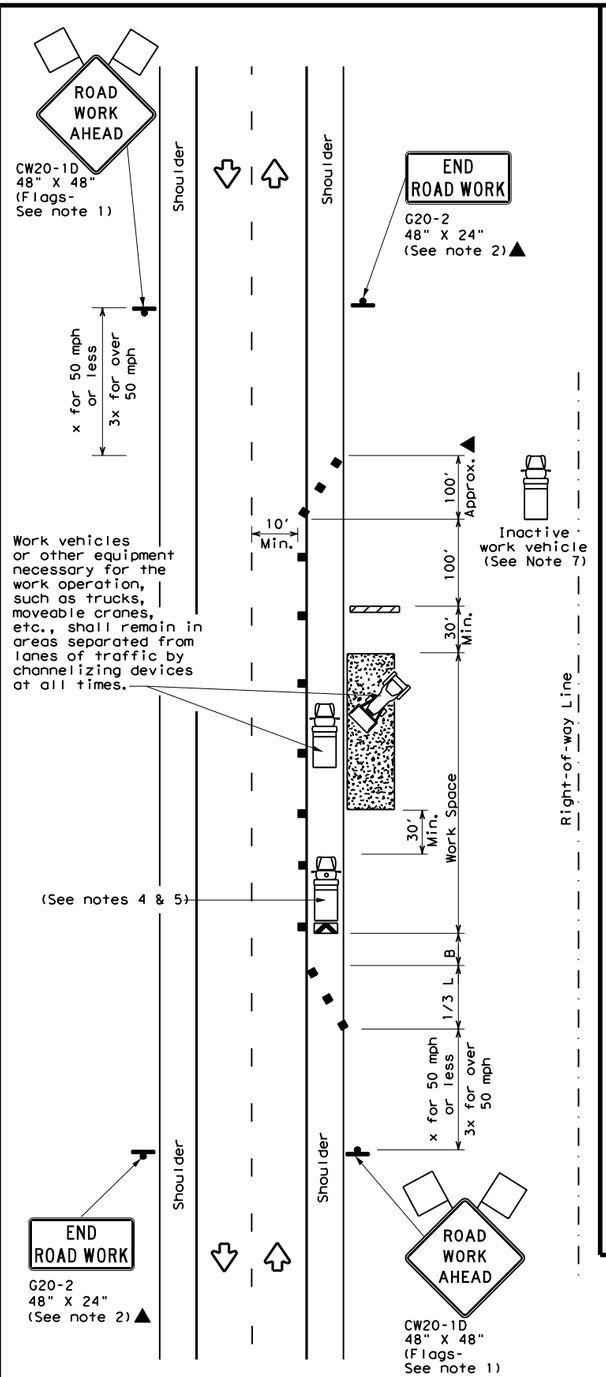
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

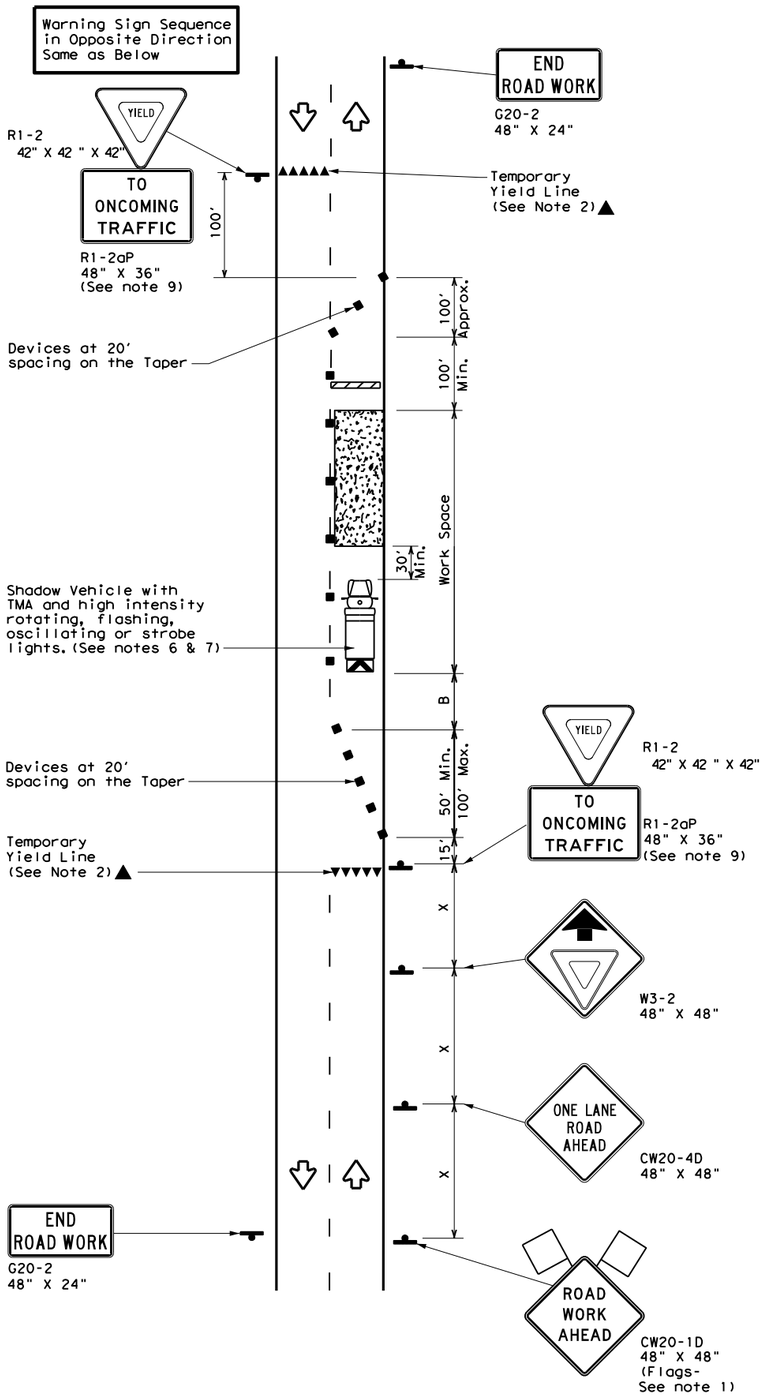
TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	HOU	HARRIS		108
1-97 2-18				

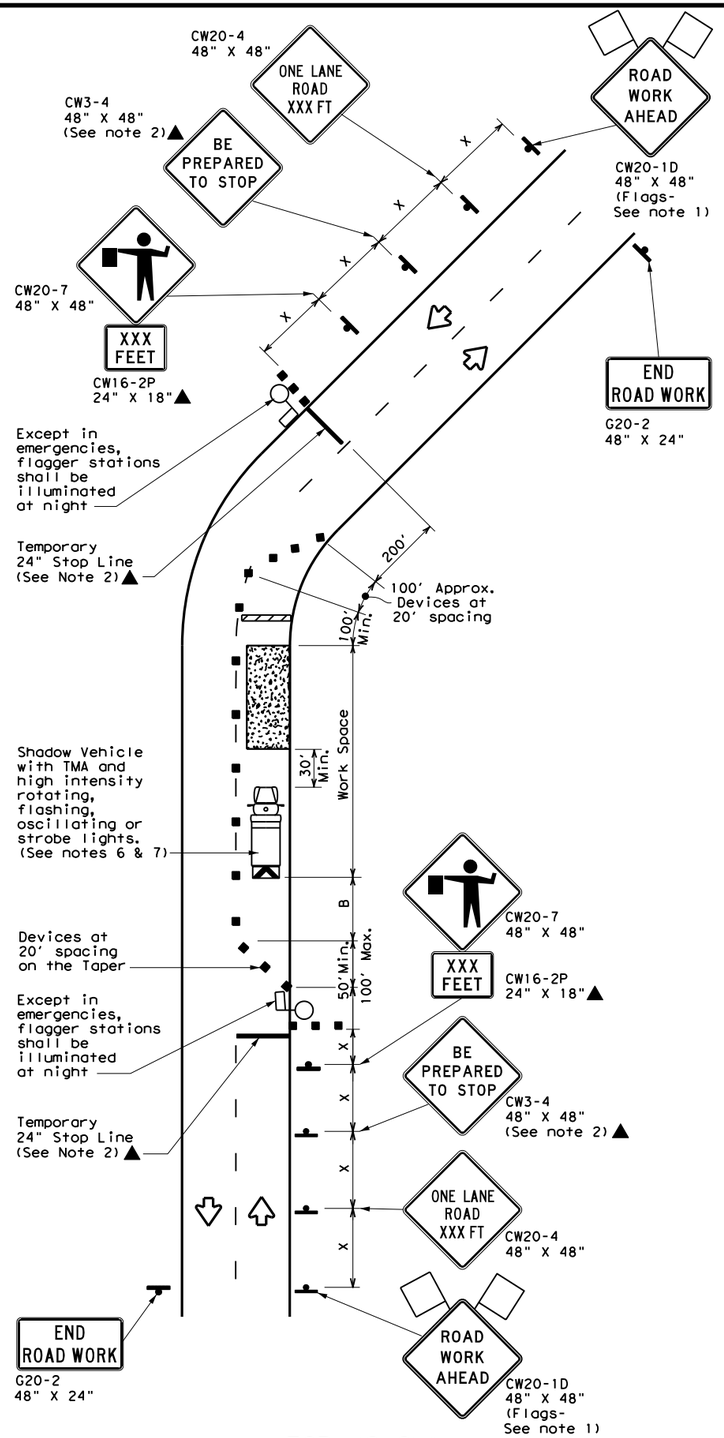
161

DATE: 5/18/2021 $TIME$
FILE: $FILE$

DATE: 5/18/2021 $TIME$
FILE: $FILE$



TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0271	15	097	IH 610
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	HOU	HARRIS		109

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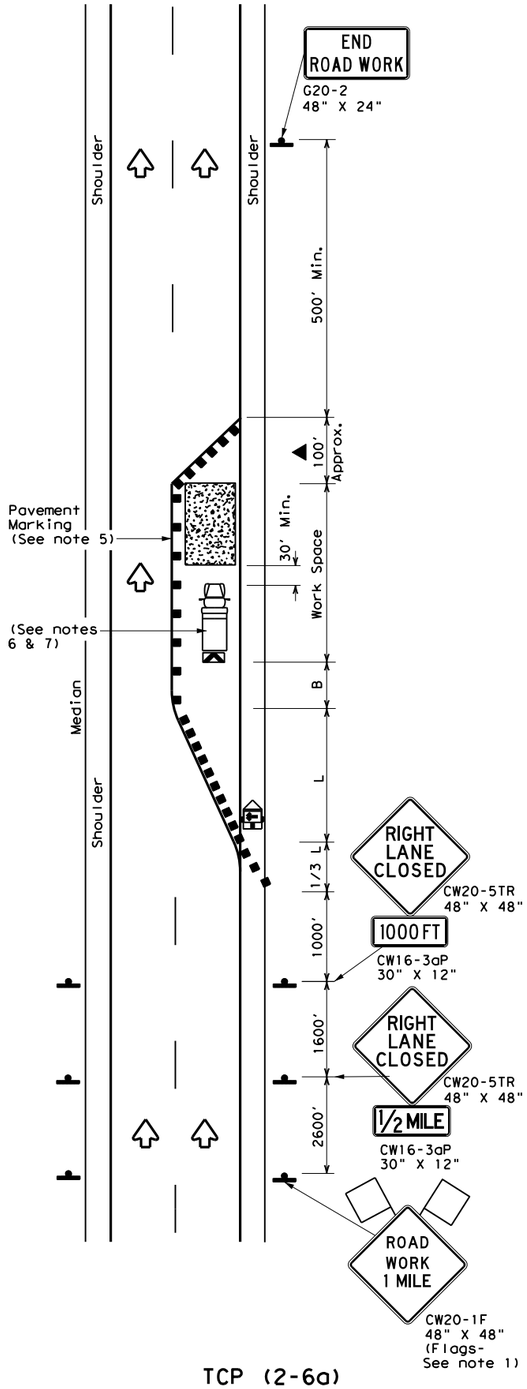
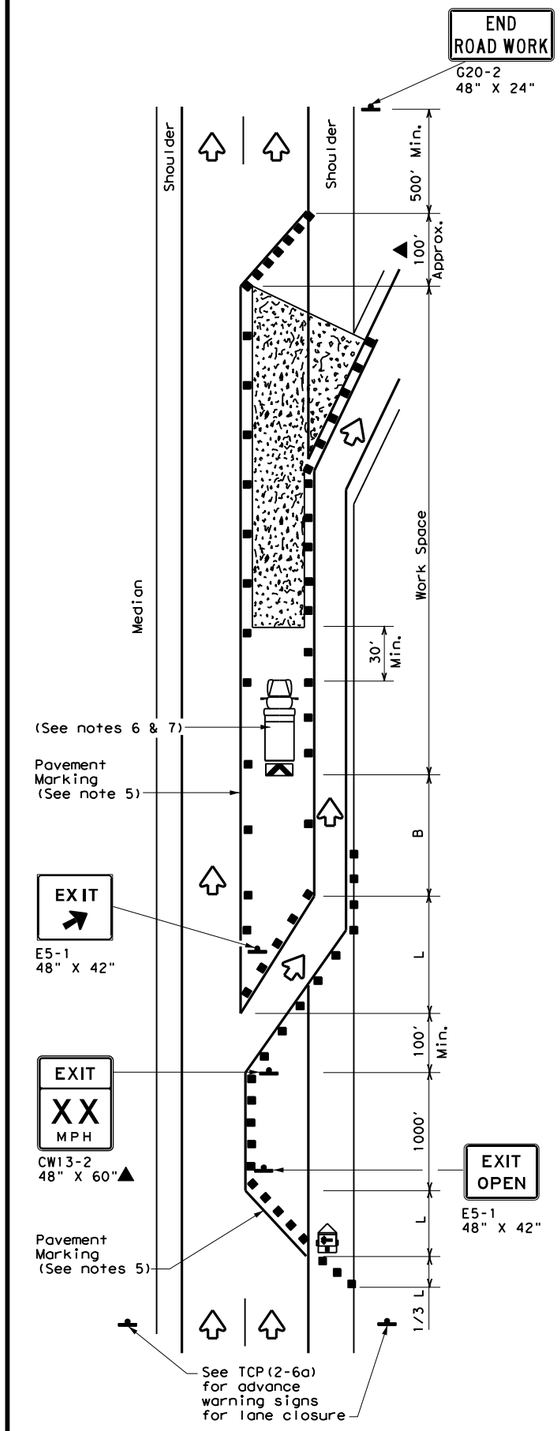
DATE: 5/18/2021 $TIME$
FILE: $FILE$



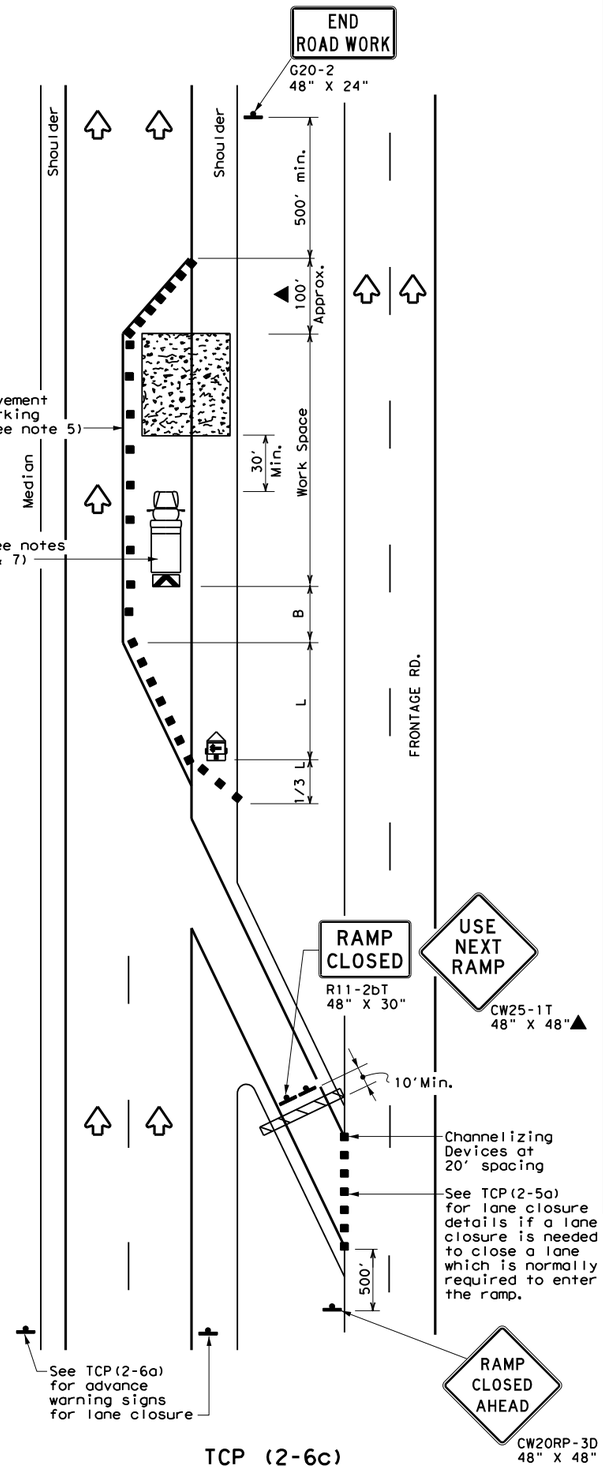
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

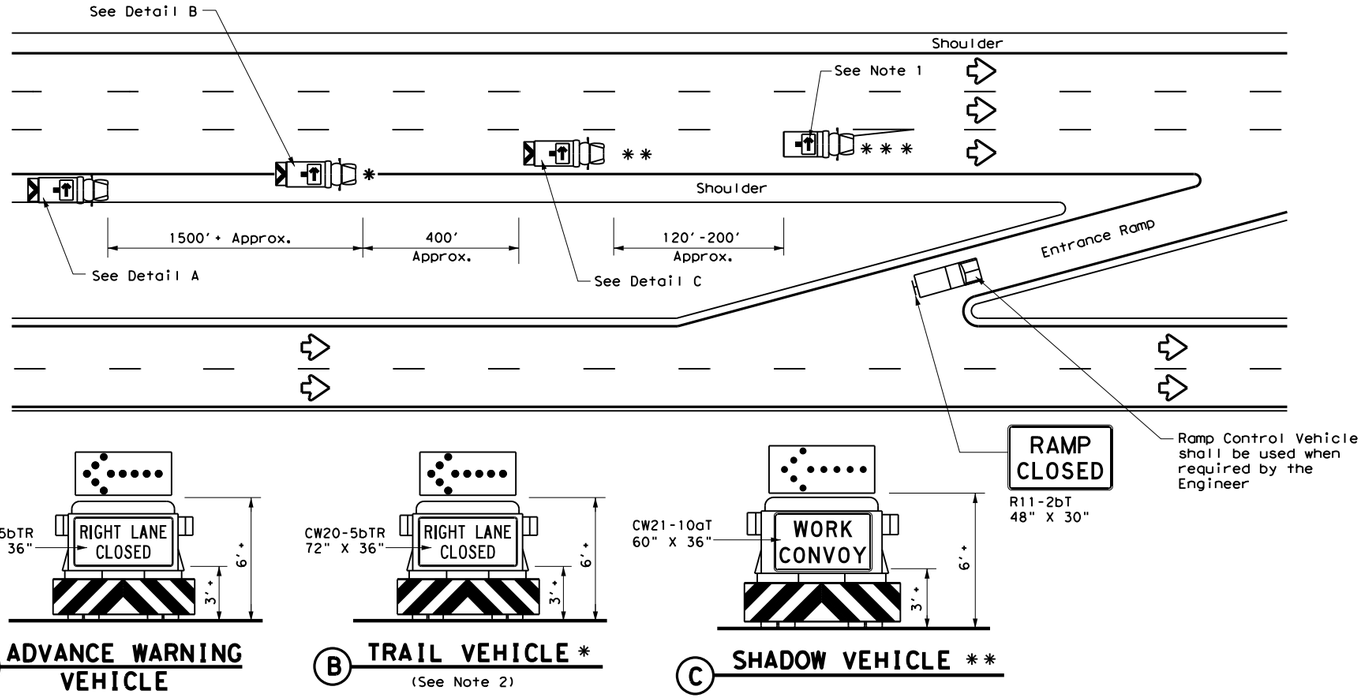
Texas Department of Transportation

Traffic Operations Division Standard

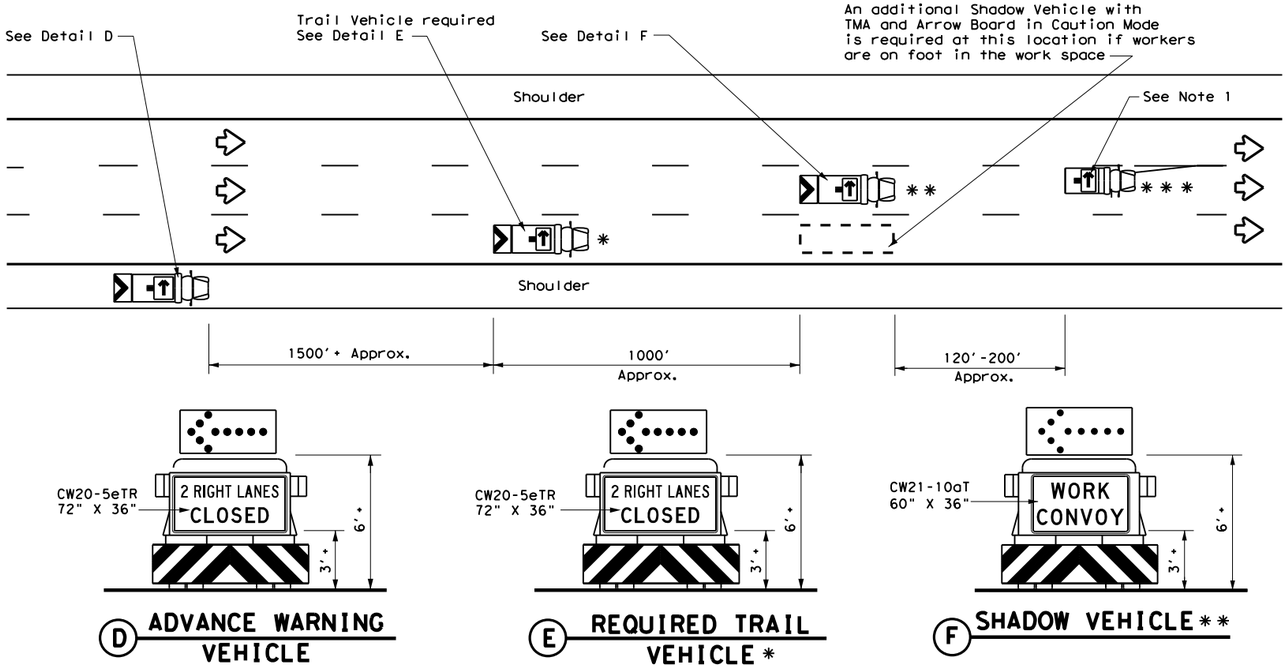
TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		110



RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



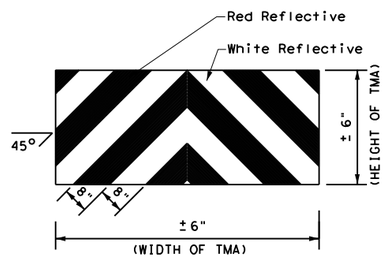
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

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

GENERAL NOTES

1. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board, must be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

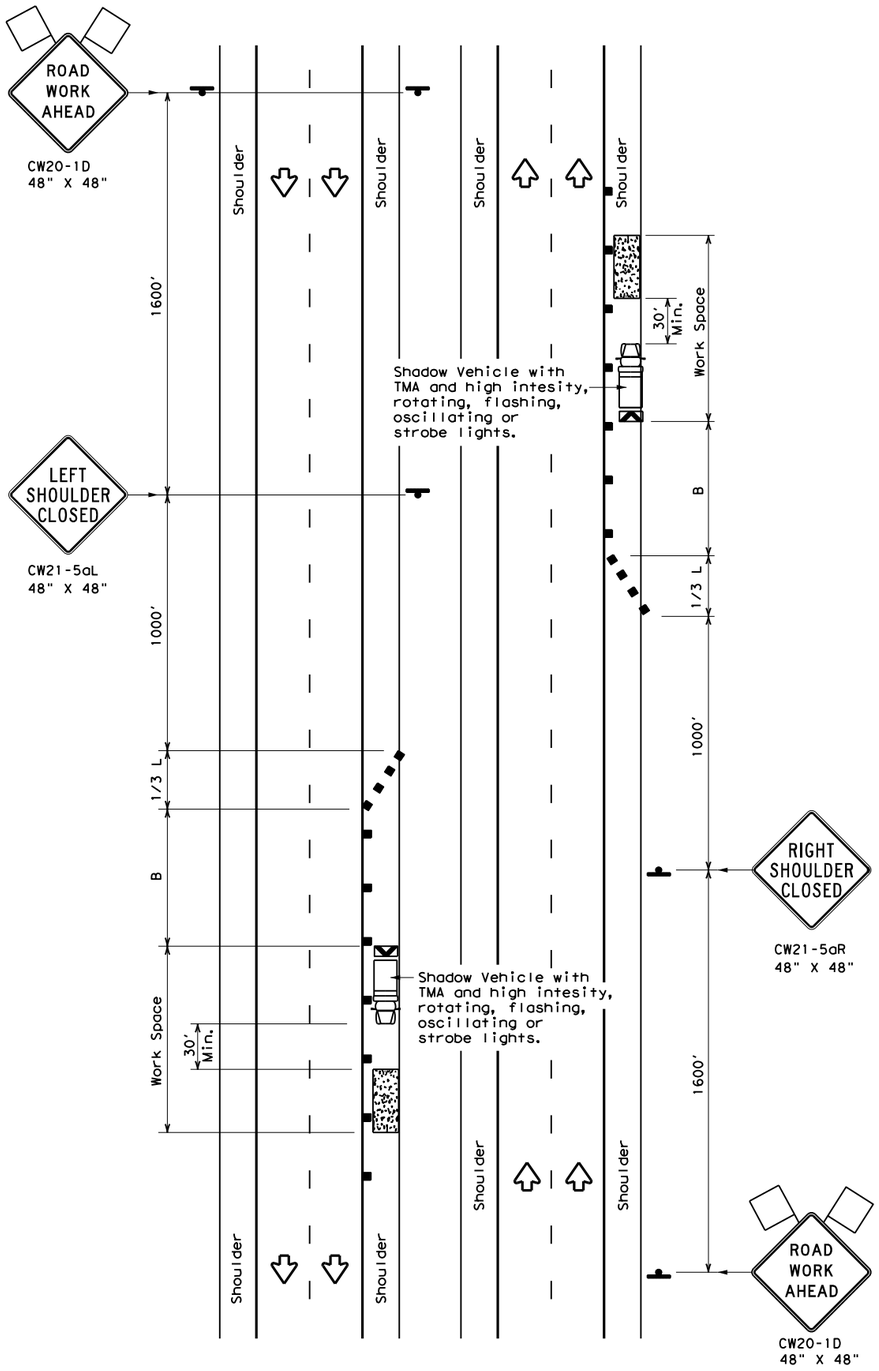
TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	HOU	HARRIS		111
1-97				

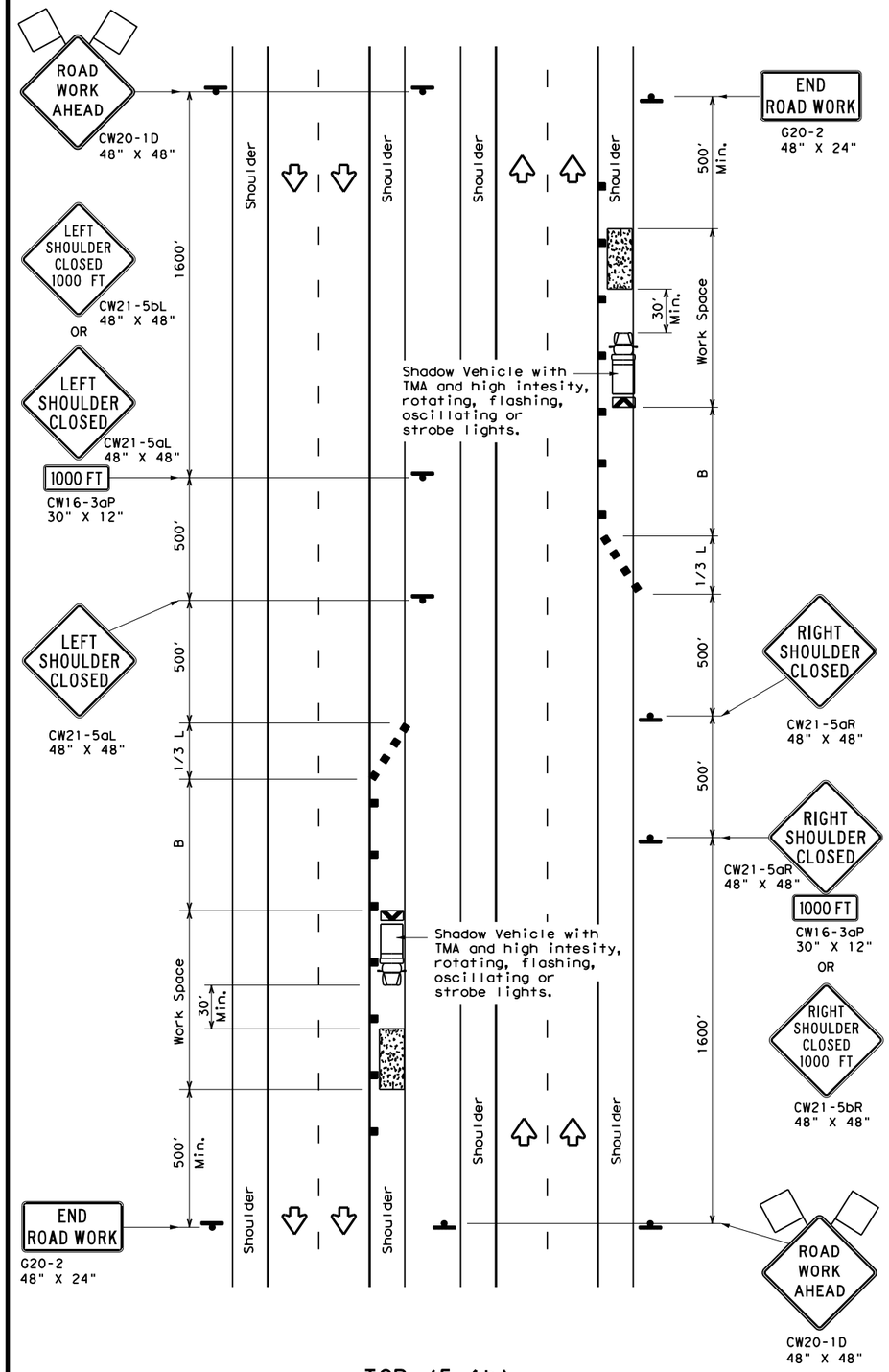
176

DATE: 5/18/2021 $TIME$
FILE: $FILE$



TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

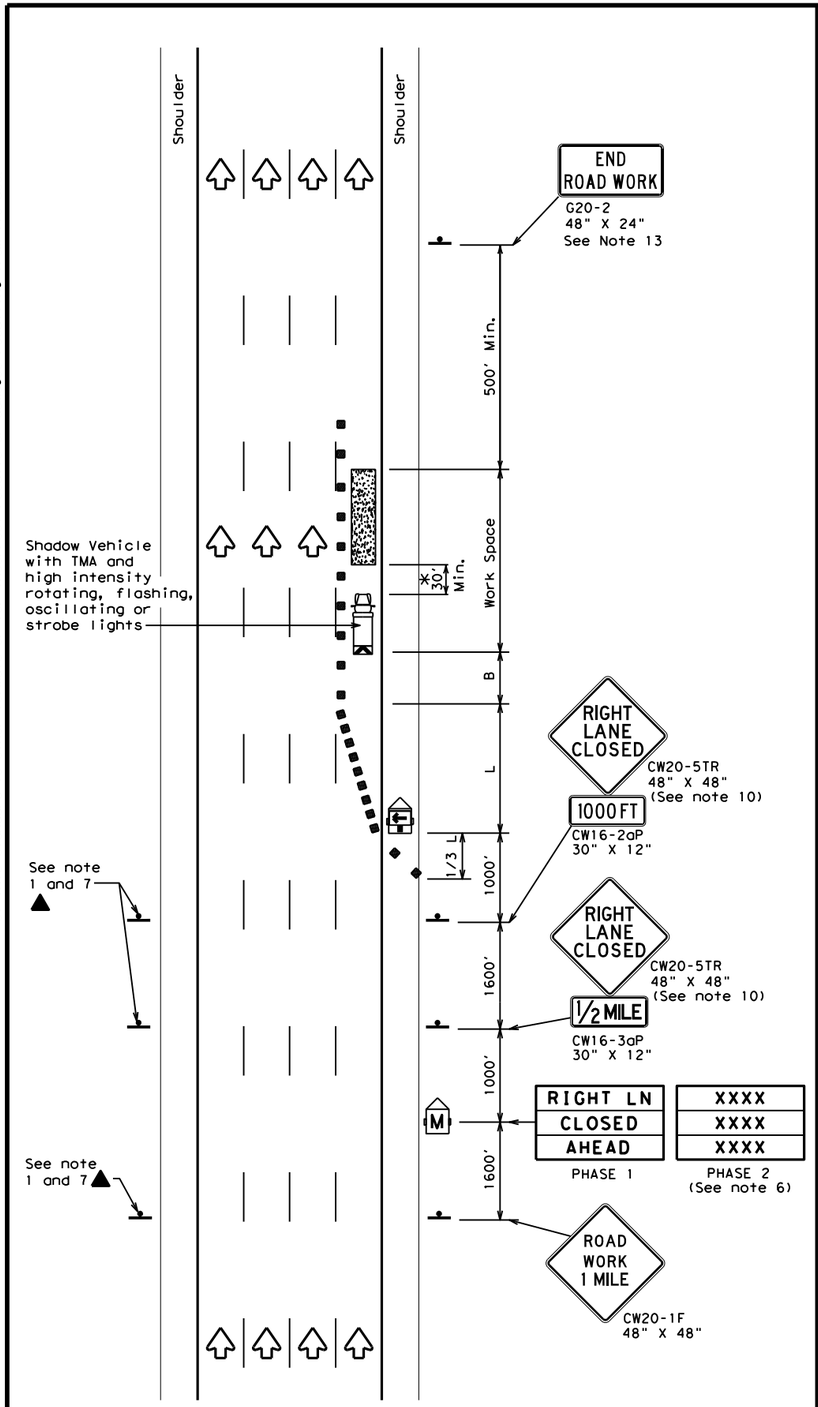
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

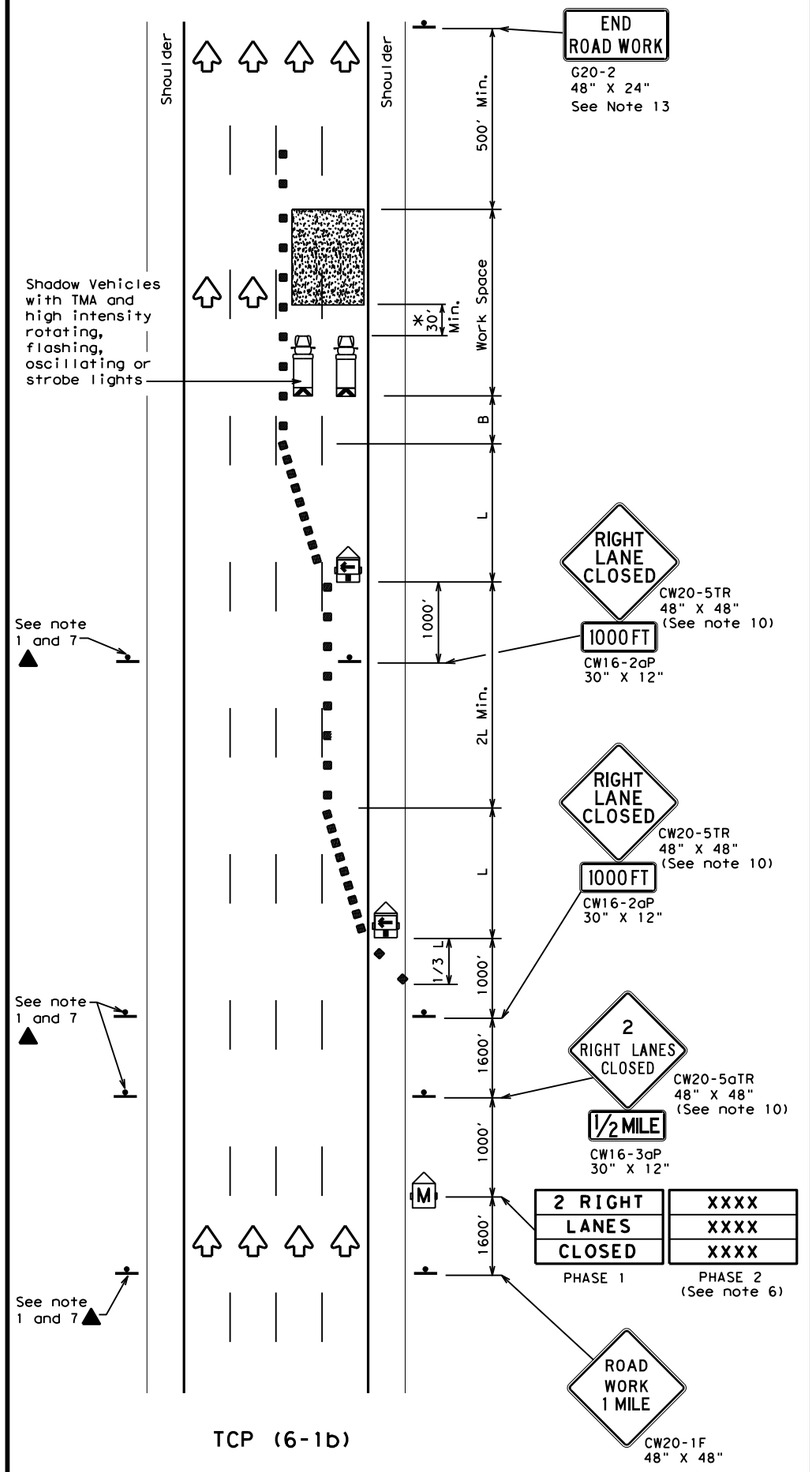
FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		112

DATE: 5/18/2021 $TIME$
FILE: $FILE$



TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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

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

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

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

GENERAL NOTES

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

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

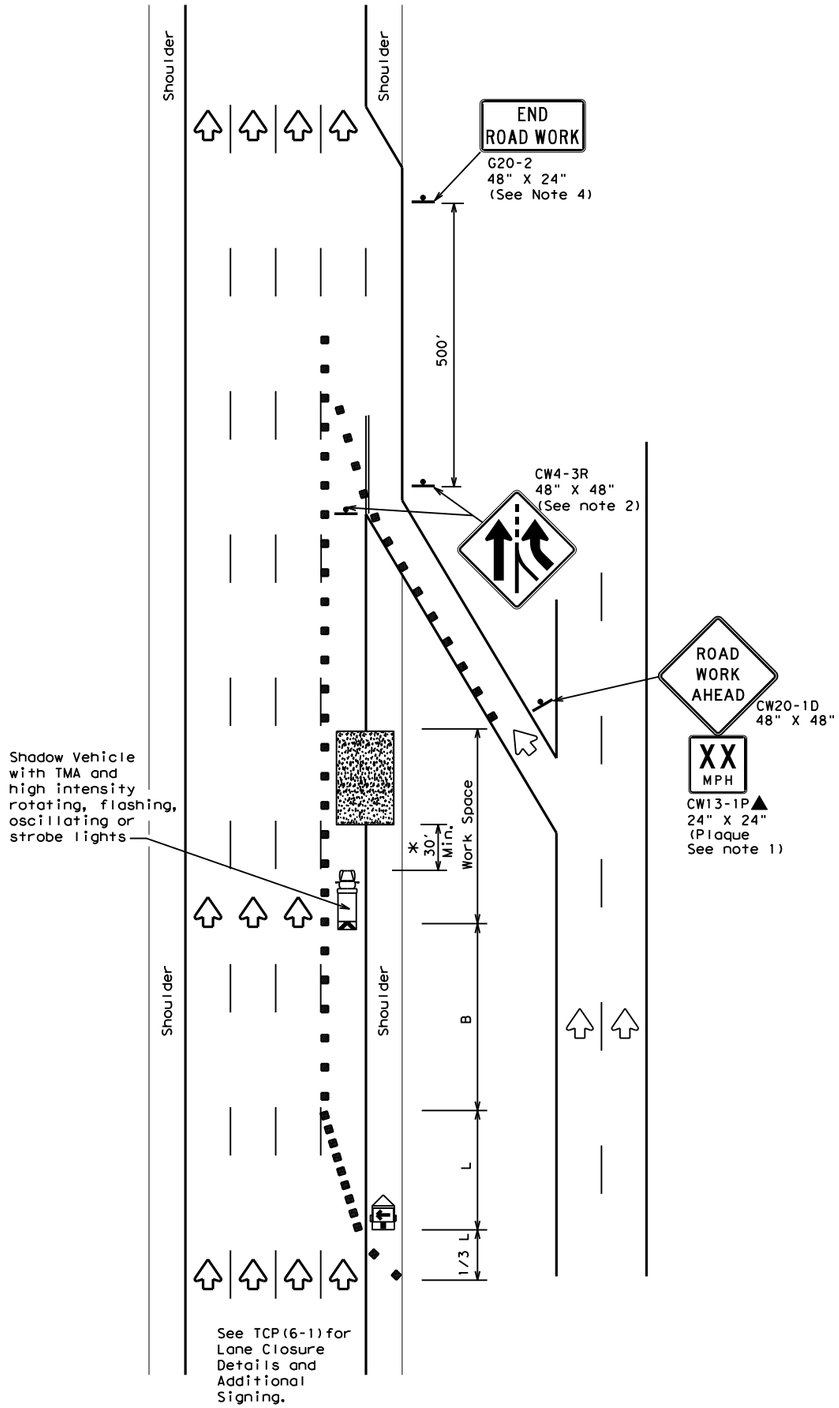
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

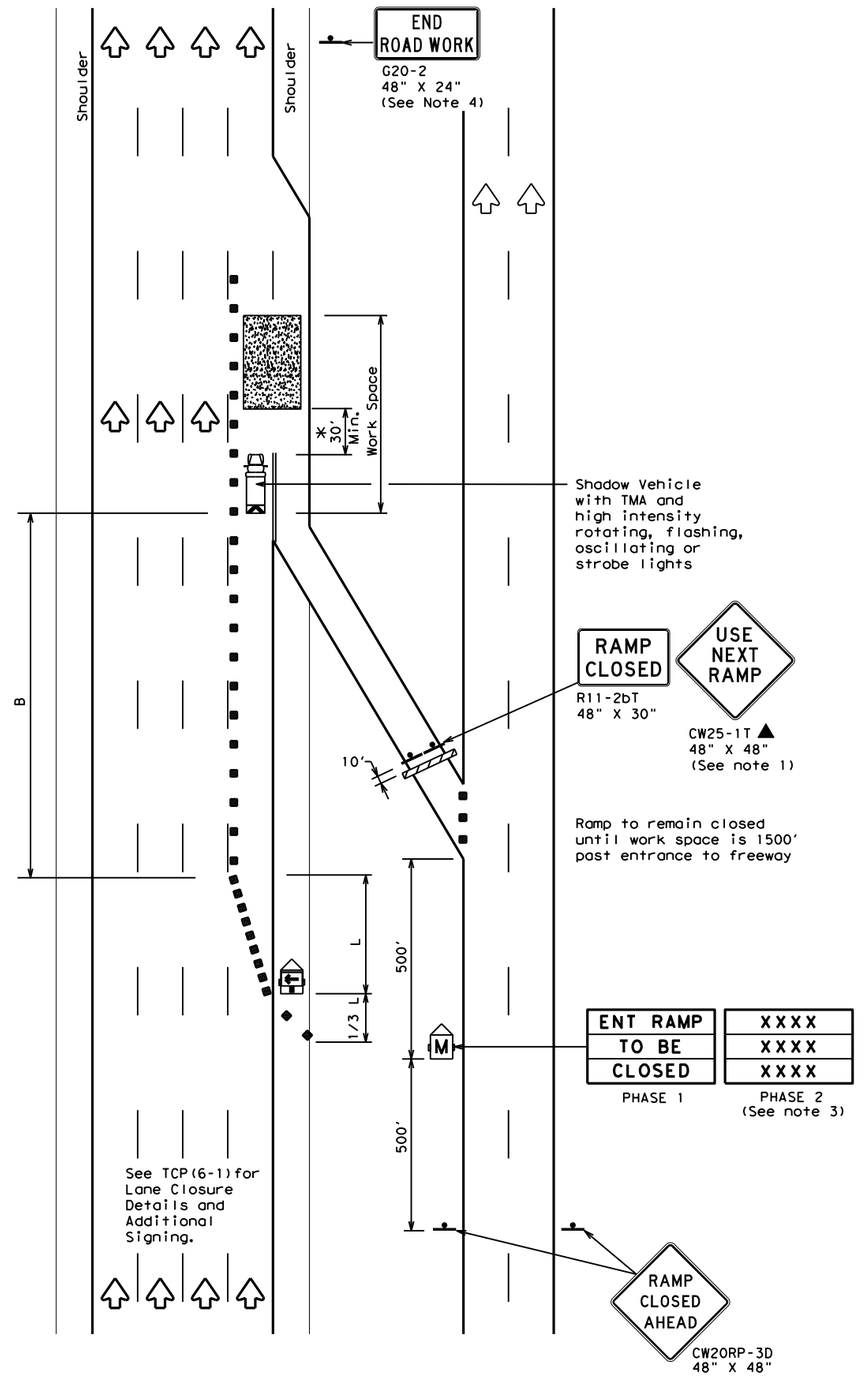
FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
8-12	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		113

DATE: 5/18/2021 $TIME$
FILE: $FILE$



TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

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

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

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

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

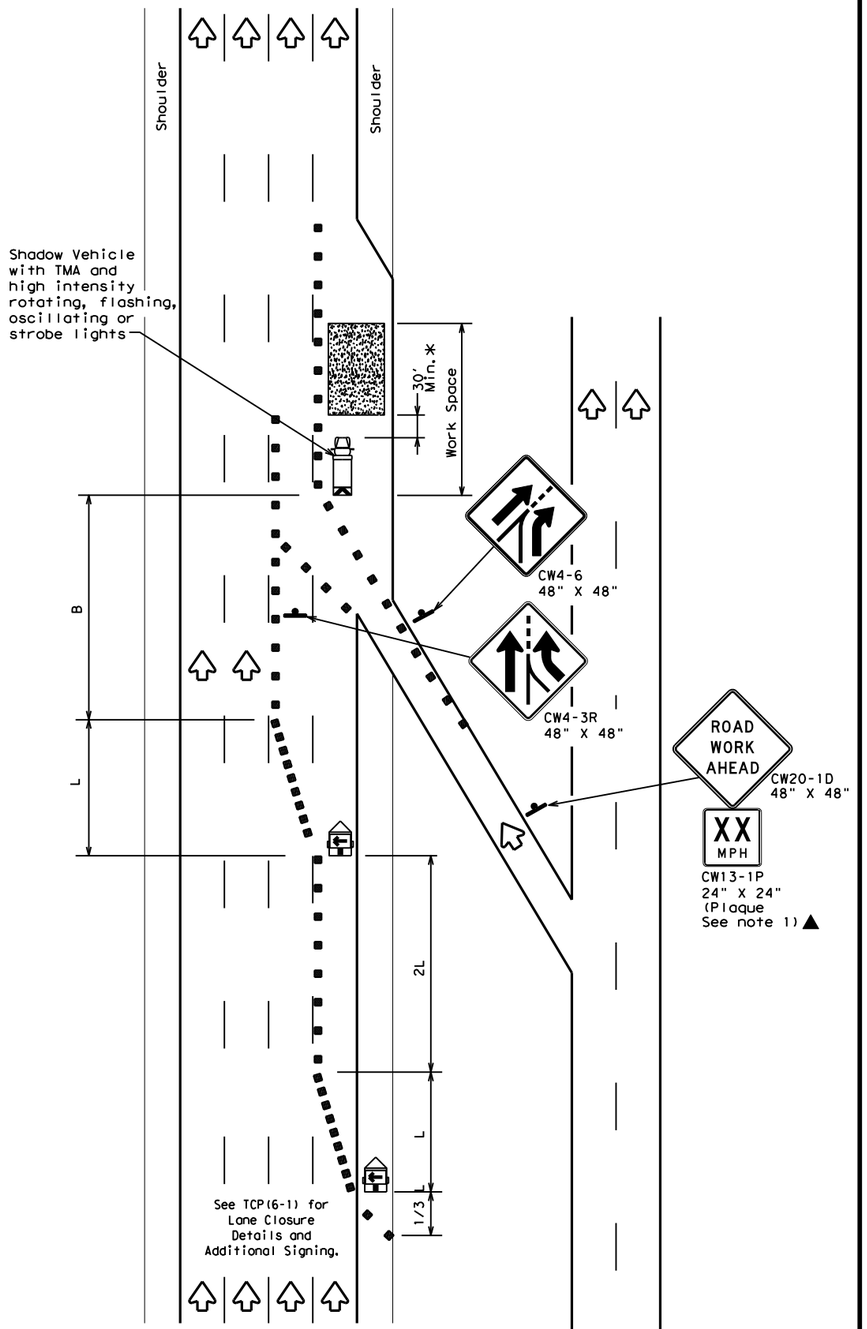
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

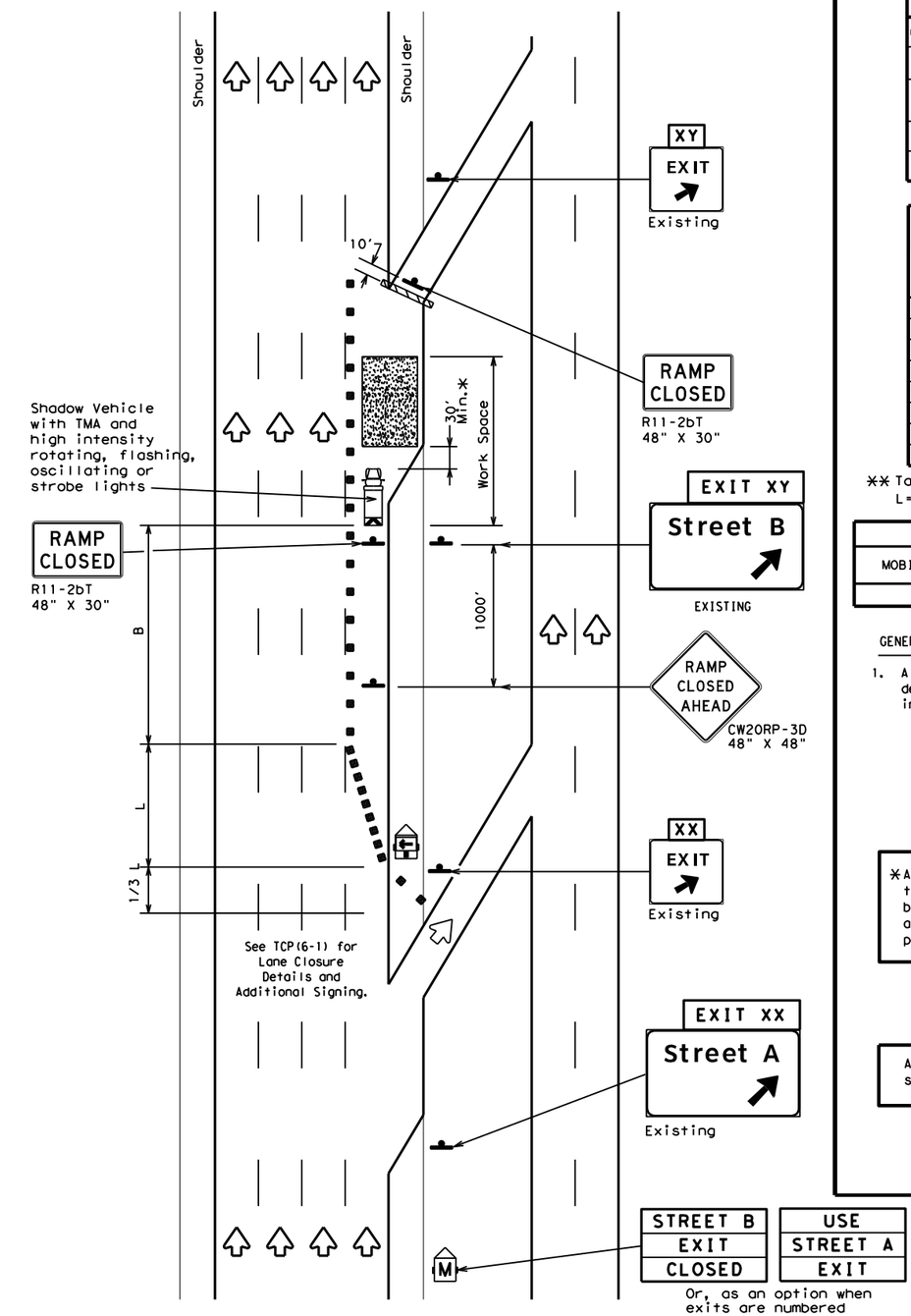
FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	HARRIS		114

DATE: 5/18/2021 $TIME$
FILE: $FILE$



TCP (6-3a)

ENTRANCE RAMP OPEN



STREET B	USE
EXIT	STREET A
CLOSED	EXIT

Or, as an option when exits are numbered

EXIT XY	USE
CLOSED	EXIT XX

Place 1 mile (approx.) in advance of Street A exit.

TCP (6-3b)

EXIT RAMP CLOSED
TRAFFIC EXITS PRIOR TO CLOSED RAMP

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

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

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

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

GENERAL NOTES:

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.

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

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

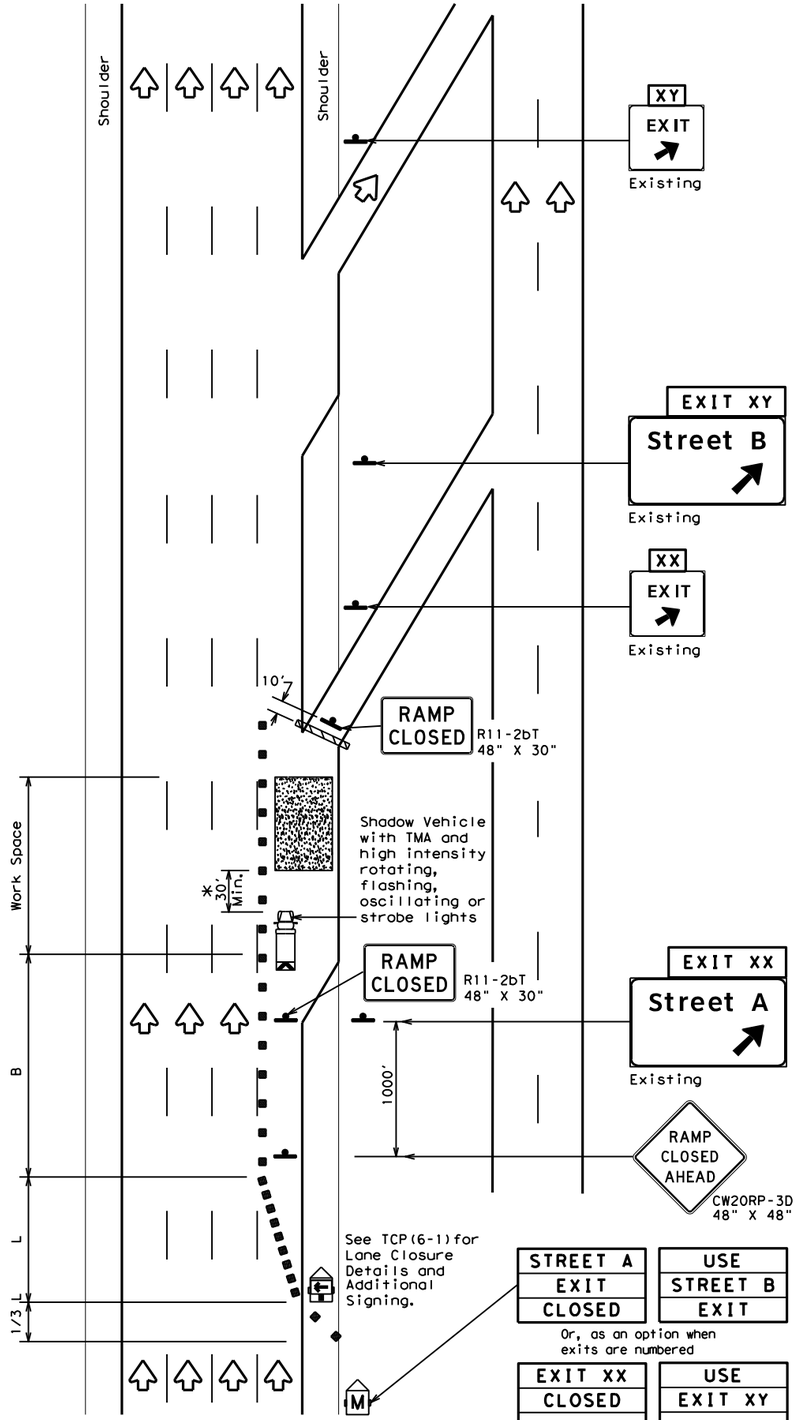
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

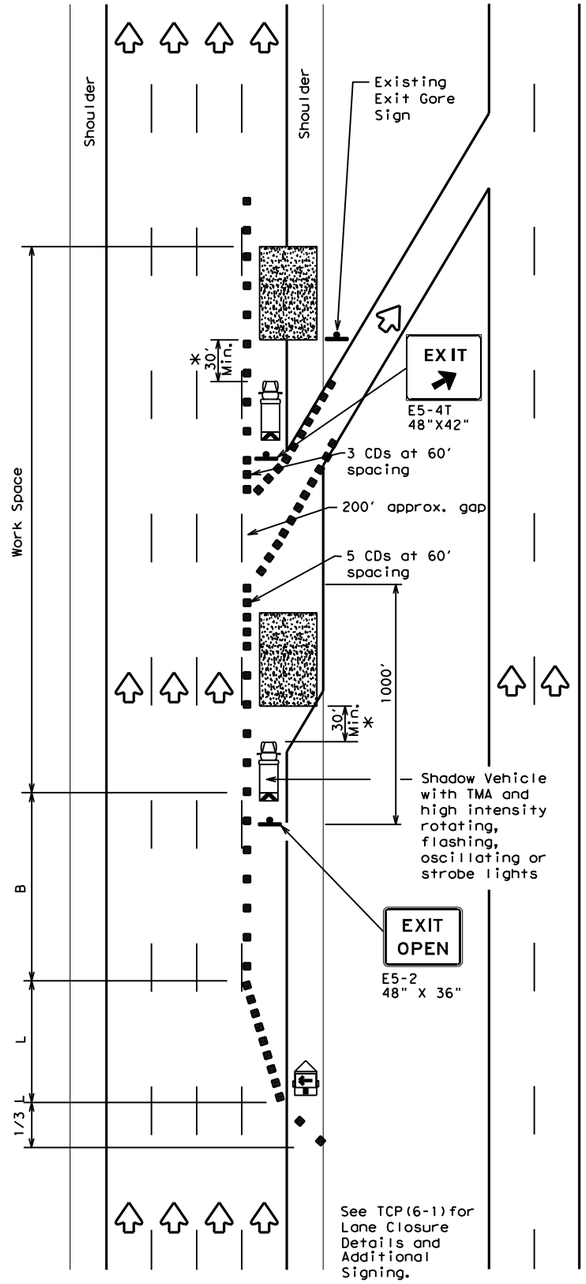
FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	HARRIS		115

DATE: 5/18/2021 $TIME$
FILE: $FILE$



TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

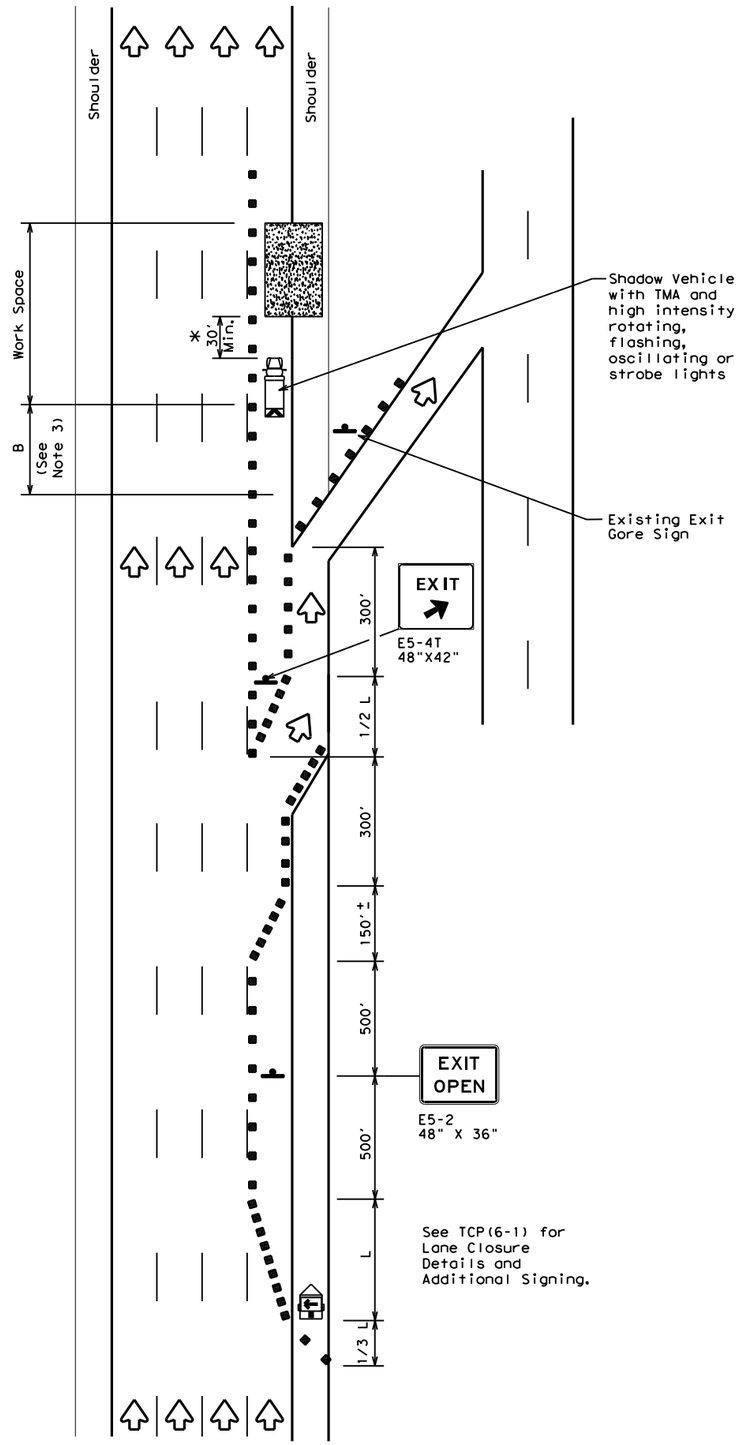
TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	HARRIS		116

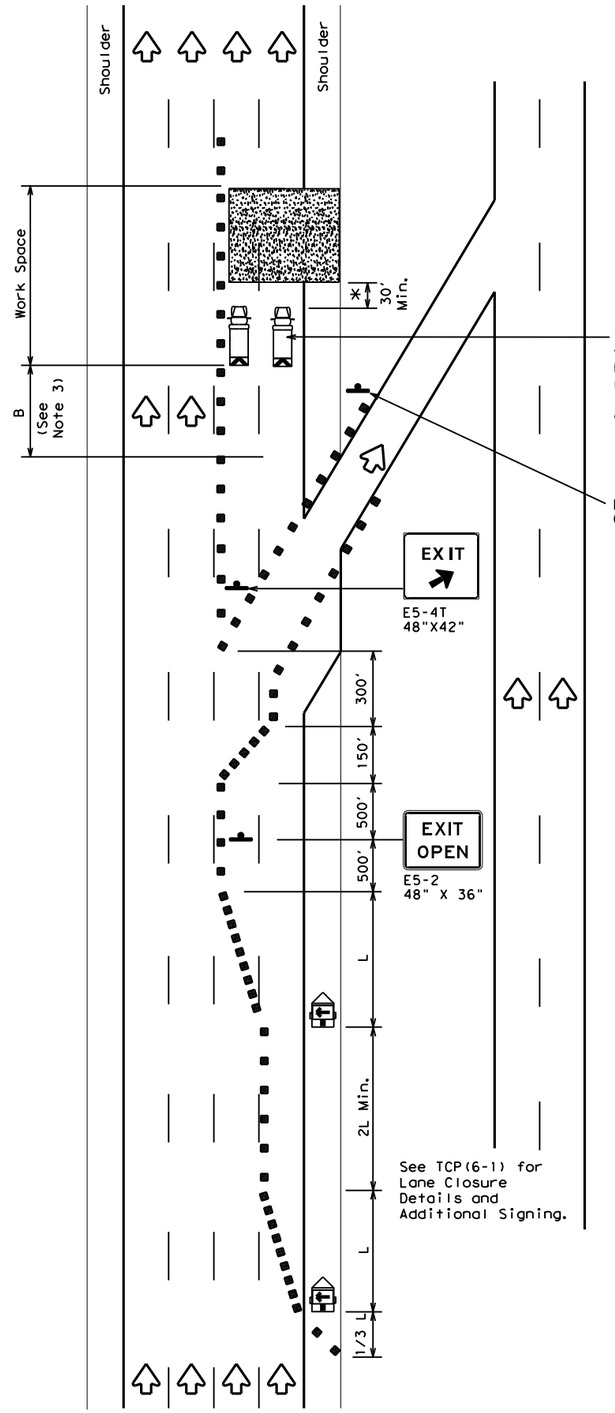
DATE: 5/18/2021 $TIME$
FILE: $FILE$

DATE: 5/18/2021 $TIME$
FILE: $FILE$



TCP (6-5a)

EXIT RAMP OPEN



TCP (6-5b)

EXIT RAMP OPEN
TWO LANE CLOSURE WITHIN 1500' PAST EXIT RAMP

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

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

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC standards for sign details.
3. If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing the ramp.

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

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

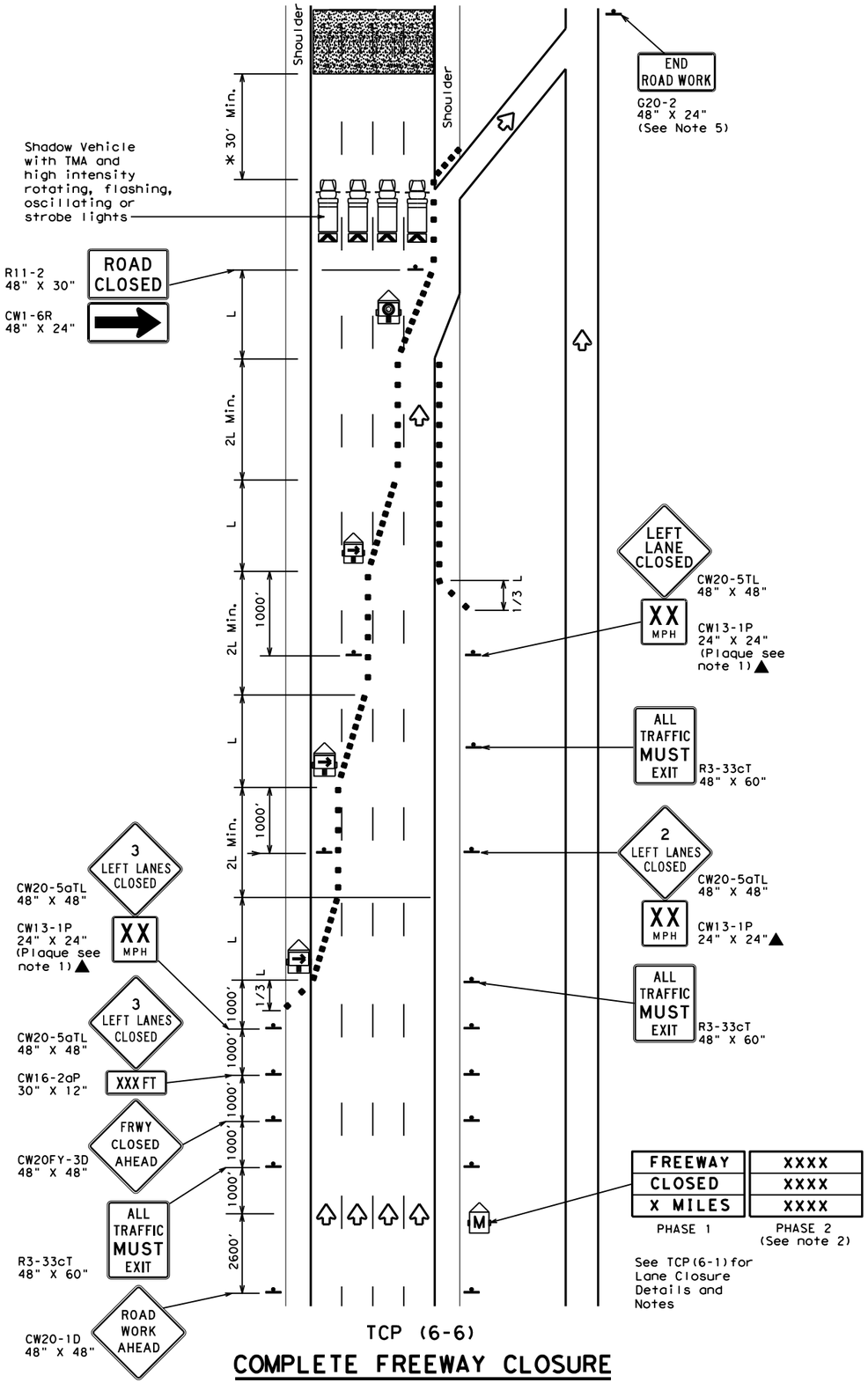
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND EXIT RAMP

TCP(6-5)-12

FILE: tcp6-5.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	HARRIS		117

DATE: 5/18/2021 $TIME$
FILE: $FILE$



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

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

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

GENERAL NOTES

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

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

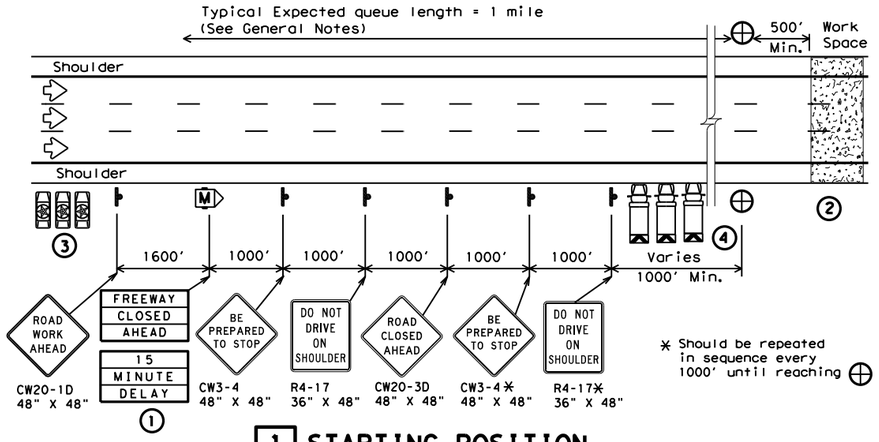
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY CLOSURE

TCP(6-6)-12

FILE: tcp6-6.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	HARRIS		118



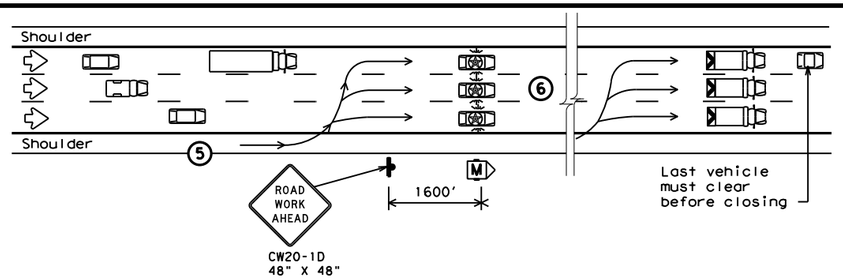
1 STARTING POSITION

(1) Traffic control devices should be installed or located near their intended position prior to beginning temporary roadway closure sequence. Duplicate signs should be erected on the median side of the roadway when median width permits. Warning signs should not be placed on the paved shoulders that will be used by the WARNING LEOV, or where movement of the LEOVs or barrier vehicles will be impeded.

(2) Prior to beginning the roadway closure sequence, all equipment, materials, personnel, and other items necessary to complete the work should be gathered near the work area. Entrance ramps located in the area where a queue is expected to build should be closed.

(3) There should be one LEOV for every lane to be controlled, plus a minimum of one to warn traffic approaching a queue. An additional lead law enforcement officer is desirable to remain with the Engineer's or Contractor's point of contact (POC) during the operation in order to improve communication with all LEOVs involved.

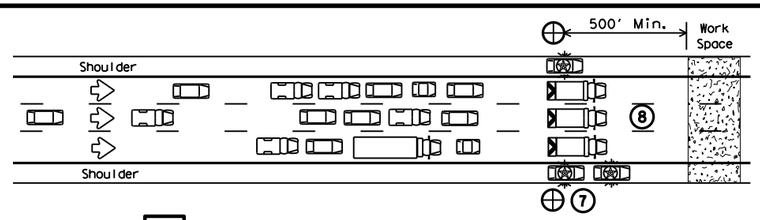
(4) One barrier vehicle with a Truck Mounted Attenuator and amber or blue and amber high intensity flashing/oscillating/strobe lighting shall be used for each lane to be closed.



2 REDUCING SPEED OPERATION

(5) Starting position of the LEOVs should be in advance of the most distant warning signs.

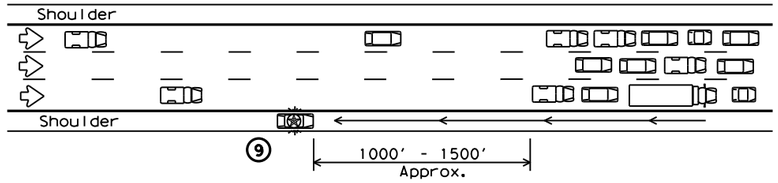
(6) Once the LEOVs have achieved an abreast blocking formation while traveling toward the CP, emergency lights and headlights should be turned "ON". The LEOVs should maintain formation, not allow traffic to pass, and begin to decelerate. The LEOVs should continue to decelerate, giving the barrier vehicles opportunity to be staged upstream of the work space after traffic has cleared. The LEOVs should then continue to decelerate slowly until bringing traffic to a stop near the barrier vehicles.



3 ALL TRAFFIC STOPPED AT CP

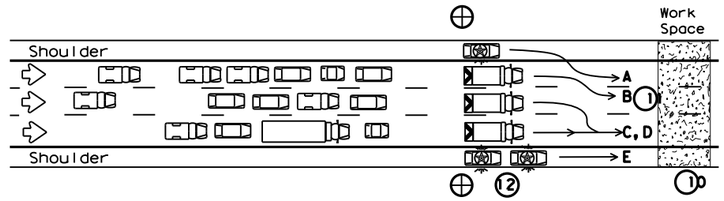
(7) Once traffic is stopped the LEOVs should park on the shoulders with emergency lighting "ON" in order to provide law enforcement presence at the closure and keep shoulders blocked ahead of the work space. They should stay in radio contact with the WARNING LEOV.

(8) The barrier vehicles should be parked, one in each lane, the parking brake set, with the high visibility flashing/oscillating/strobe lighting "ON," and the transmission in gear.



4 WARNING THE TRAFFIC QUEUE

(9) The WARNING LEOV should proceed to the right shoulder of the roadway, with emergency lights on approximately 1000' in advance of the traffic queue (stopped traffic) as the queue develops. When determined that limited sight distance situations (crest of hills, sharp roadway curvature, etc.) may occur to motorists approaching the queue, the WARNING LEOV may proceed 1/4 mile or more in advance of the queue.



5 RELEASING STOPPED TRAFFIC

(10) All equipment, materials, personnel, and other items should be removed from the roadway and maintain an adequate clear zone.

(11) When the roadway is clear for traffic, the LEOV should proceed forward from the left shoulder followed by the barrier vehicles, from left to right, as shown alphabetically in the plan view.

(12) The LEOV or LEOVs on the right shoulder may remain on the shoulder until satisfied that traffic is moving satisfactorily before merging or proceeding.

(13) LEOVs and barrier vehicles should re-group at their respective starting positions if necessary.

LEGEND			
■ ■	Channelizing Devices	⊕	Control Position (CP)
(M)	Portable Changeable Message Sign (PCMS)		Barrier Vehicle with Truck Mounted Attenuator
	Law Enforcement Officer's Vehicle(LEOV)		Traffic Flow

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

GENERAL NOTES

1. All traffic control devices shall conform with the latest edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Additional guidelines for traffic control devices may be found in the TMUTCD. Signs conflicting with the roadway closure sequence should be completely removed or covered. Additional traffic control devices may be required for closure of access roads, cross streets, exit and entrance ramps as directed by the Engineer.

2. Law enforcement officers and all workers involved should review and understand all procedures before the roadway closure sequence begins. Pre-work meetings may be held for this purpose. Local emergency services and media should have advance notification of roadway closure, expected dates and approximate times of closures.

3. Law enforcement officers shall be in uniform and have jurisdiction in the locale of the work area. An additional WARNING Law Enforcement Officer's Vehicle (LEOV) may be used on the median side of the roadway where median shoulder width permits (See sequence #9).

4. The roadway closure should be during off-peak hours, as shown in the plans, or as directed by the Engineer.

5. Work should be limited to approximately 15 minutes maximum duration unless otherwise directed by the Engineer based on existing roadway conditions. If the work is not complete within 15 minutes, or if the end of the traffic queue extends past the most distant advance warning signs, the work area should be cleared of all equipment, materials, personnel, and other items, and the roadway reopened. When the queue has dissipated and the traffic flow appears normal the roadway closure sequence may be repeated.

6. For traffic volumes greater than 1000 Passenger Cars Per Hour Per Lane (PCPHPL), or for roadway closures that exceed 15 minutes, see details elsewhere in the plan.

7. If traffic queues beyond the advance warning signs during one road closure sequence, the advance warning should be extended prior to repeating the road closure sequence. When possible, PCMS signs should be located in advance of the last available exit prior to the closure to allow motorists the choice of an alternate route.

THIS PLAN IS INTENDED TO BE USED AT LOCATIONS/TIMES WHEN TRAFFIC VOLUMES ARE LESS THAN 1000 PASSENGER CARS PER HOUR PER LANE.

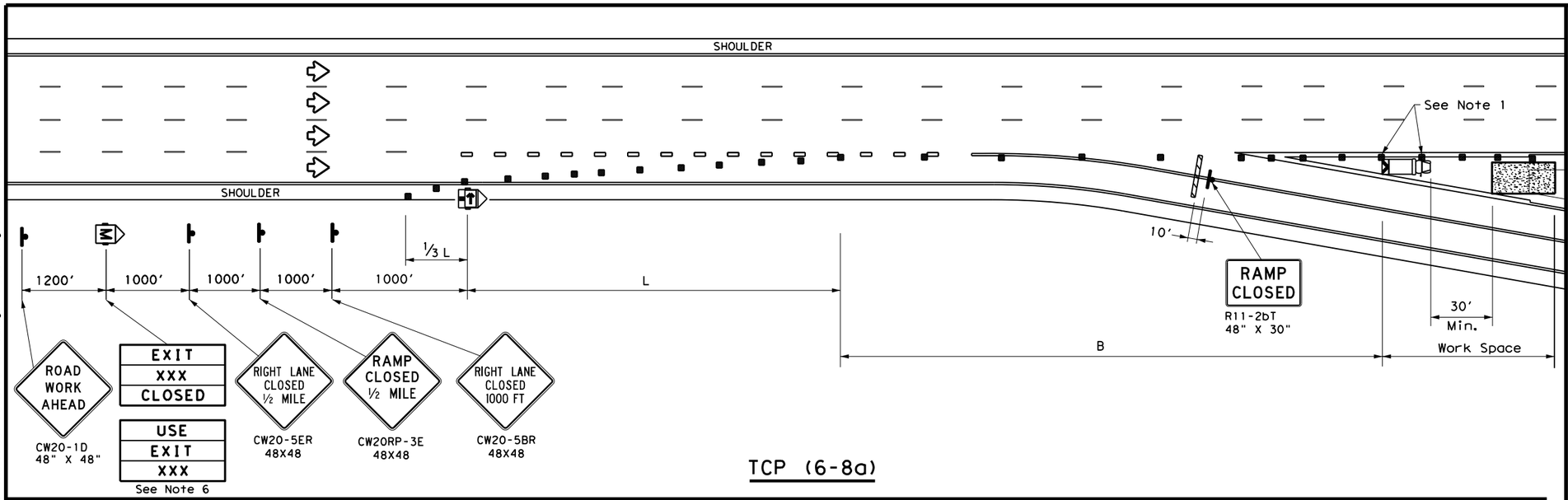
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHORT DURATION FREEWAY CLOSURE SEQUENCE

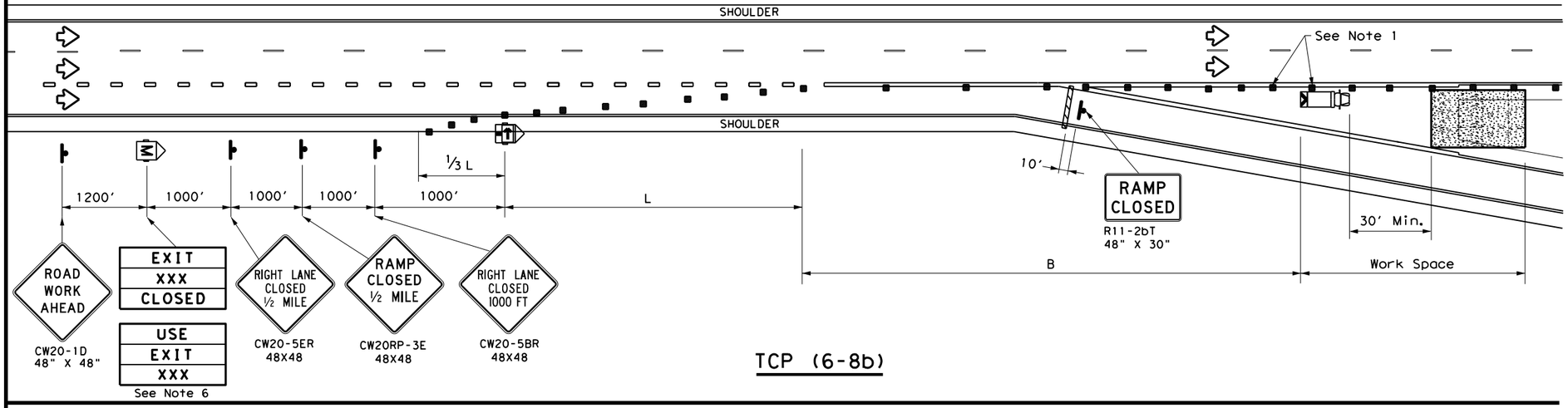
TCP(6-7)-12

FILE: tcp6-7.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
1-97 8-12	DIST	COUNTY		SHEET NO.
4-98	HOU	HARRIS		119

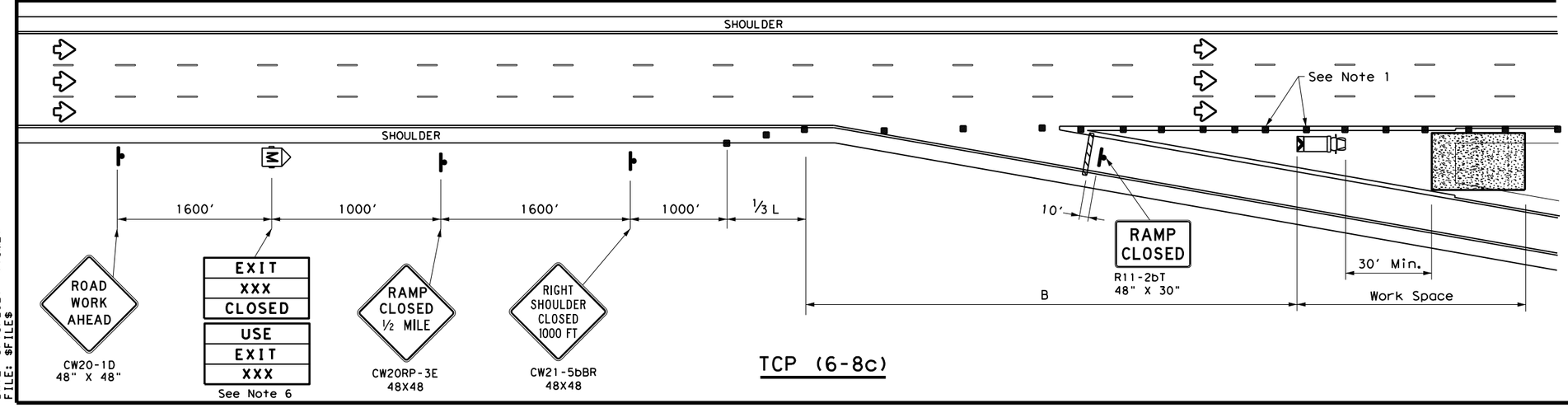
DATE: 5/18/2021 $TIME$
FILE: $FILE$



TCP (6-8a)



TCP (6-8b)



TCP (6-8c)

LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		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. Place channelizing devices in the gore at 20' spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) for traffic control details.
5. Truck mounted attenuator is required.
6. The PCMS may be omitted if replaced with a "RAMP CLOSED" AHEAD (CW20RP-3D) Sign.
7. Roadway ADT should be greater than 10,000.

Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

FILE: tcp6-8.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
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	HOU	HARRIS		120

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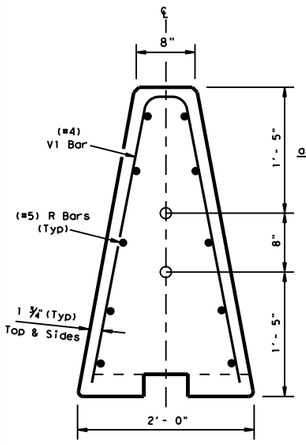
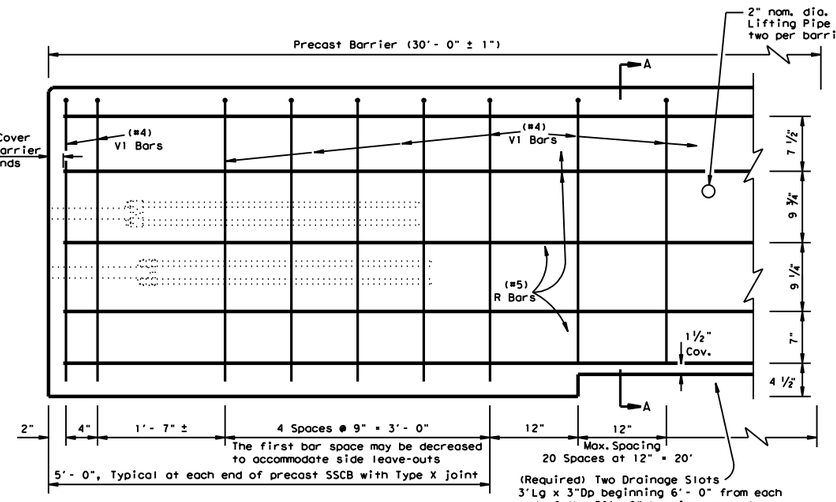


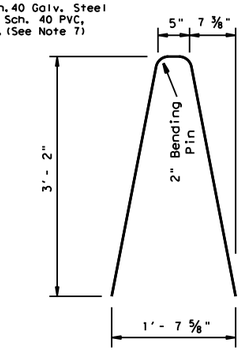
End View
Precast Barrier

Pipe locations for Joint Type X connection



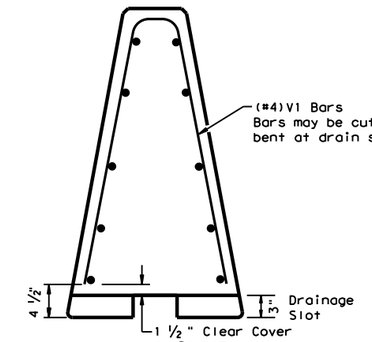
Reinforcement for Precast (SSCB)
Single Slope Concrete Barrier (Type 1)

Showing reinforcement for Joint Connection (Type X)



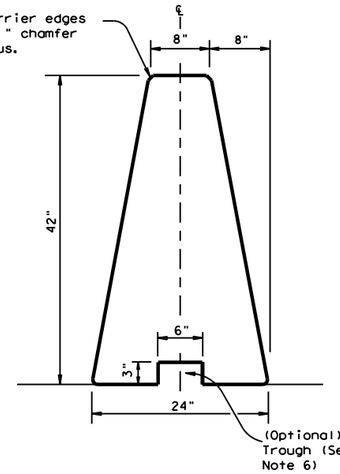
V1 Bar
#4 Rebar

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



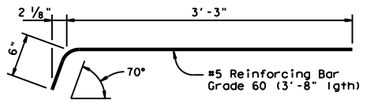
Section A-A
Steel Placement at (Required) Drainage Slots

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



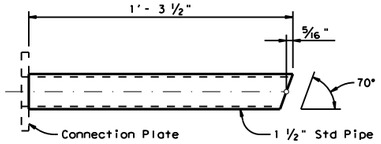
Single Slope Concrete Traffic Barrier

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



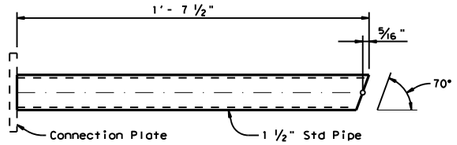
DEFORMED BAR ANCHOR DETAILS

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



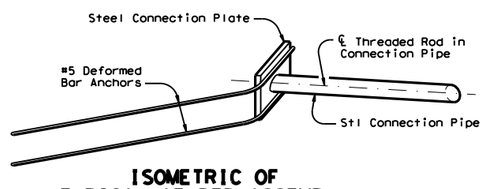
UPPER CONNECTION PIPE DETAILS

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



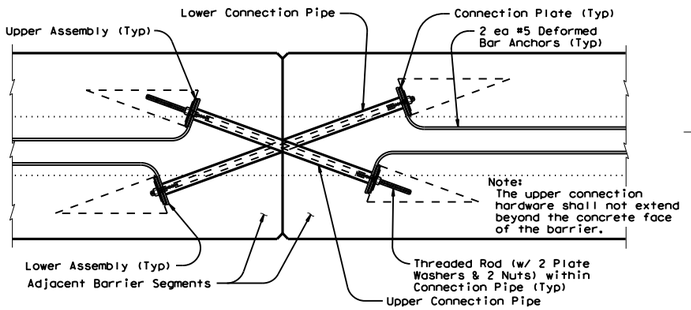
LOWER CONNECTION PIPE DETAILS

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



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

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



TYPE X JOINT INSTALLATION DETAIL

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

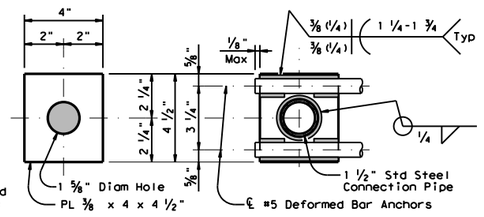
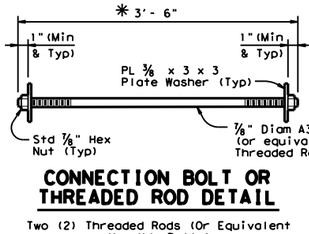


PLATE DIMENSIONS **WELDING DETAILS**

CONNECTION PLATE DETAILS

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



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

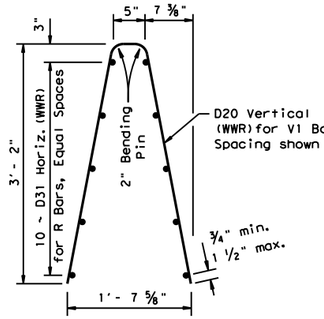
CONNECTION BOLT OR THREADED ROD DETAIL

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

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

General Notes

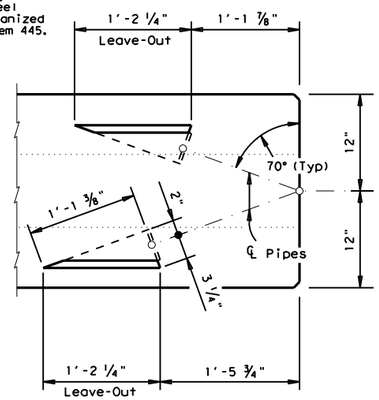
1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾" chamfer or a tooled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



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

(WWR) General Notes

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



BARRIER PLAN AT JOINT

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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	HOU	HARRIS		121

DATE: 5/18/2021
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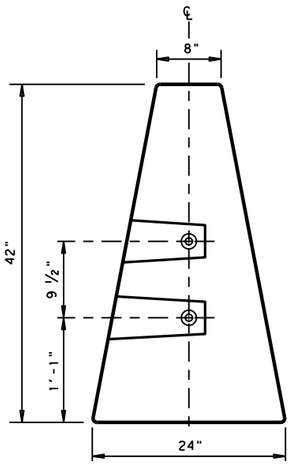
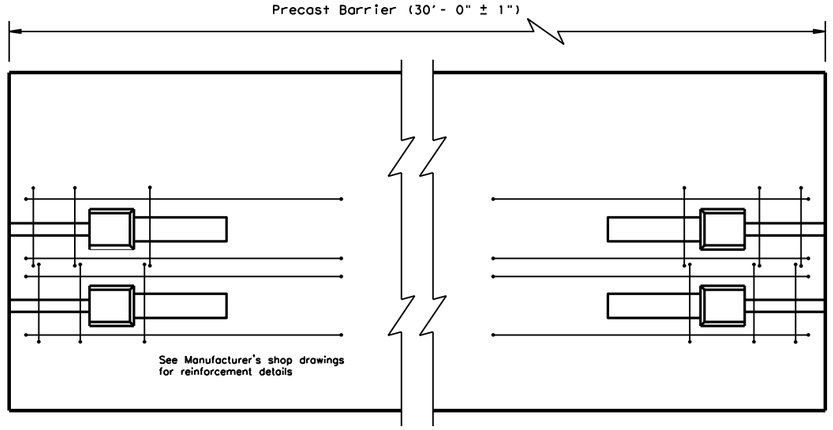
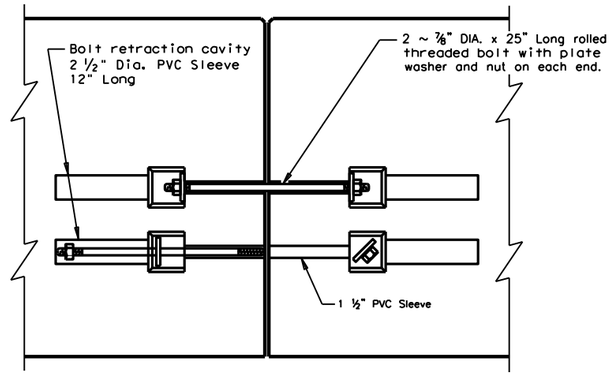


END VIEW
"QUICK-BOLT" POCKET LOCATIONS

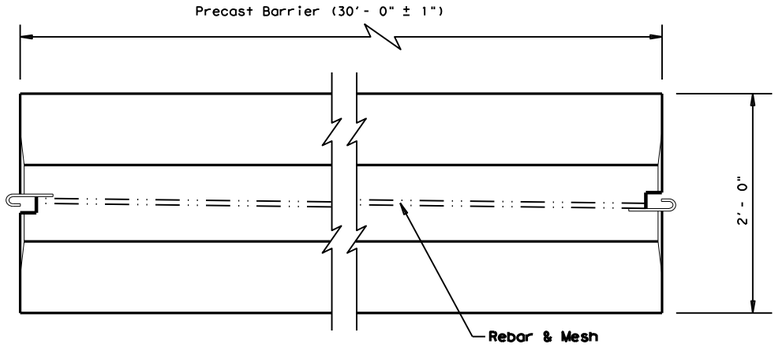


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details

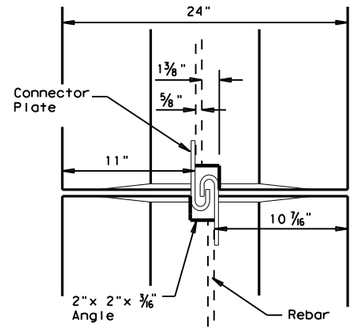


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

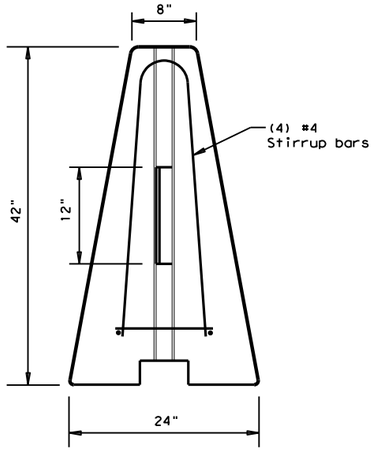
Joint Connection (Type Q)



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



VIEW FROM ABOVE
J-J HOOK CONNECTION



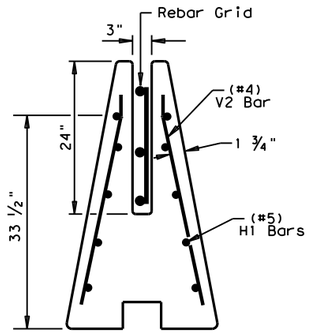
END VIEW

Proprietary Joint Connections (SSCB)

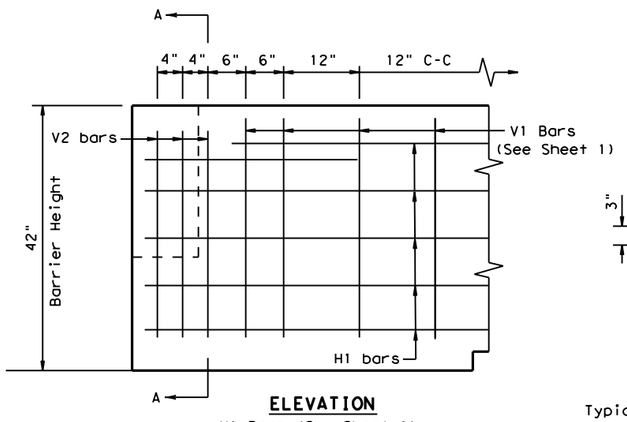
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

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

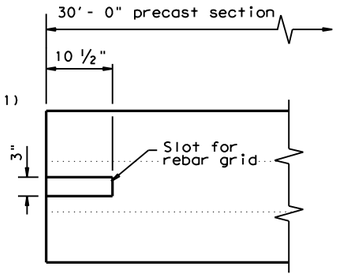
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



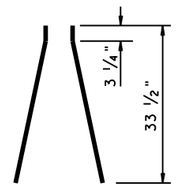
SECTION A-A
Showing (Type R) Rebar Grid



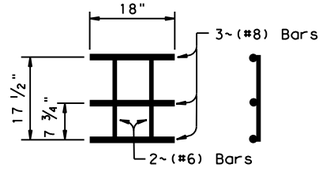
ELEVATION
V1 Bars (See Sheet 1)



TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



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



WELDED REBAR GRID

Joint Connection (Type R)

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
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	HOU	HARRIS		122

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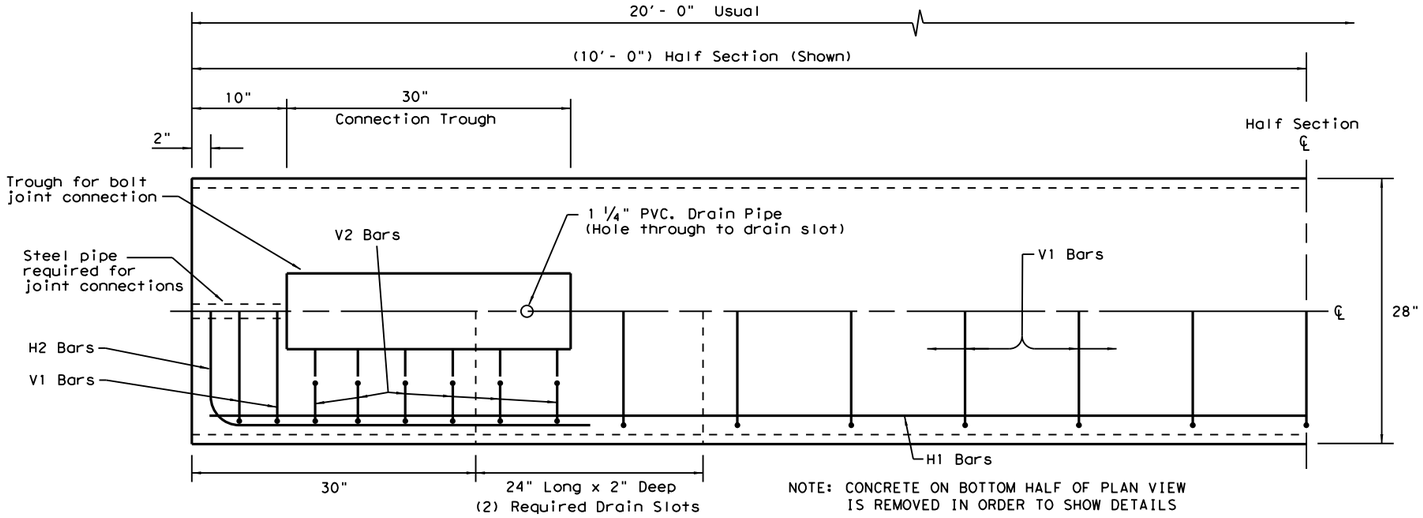
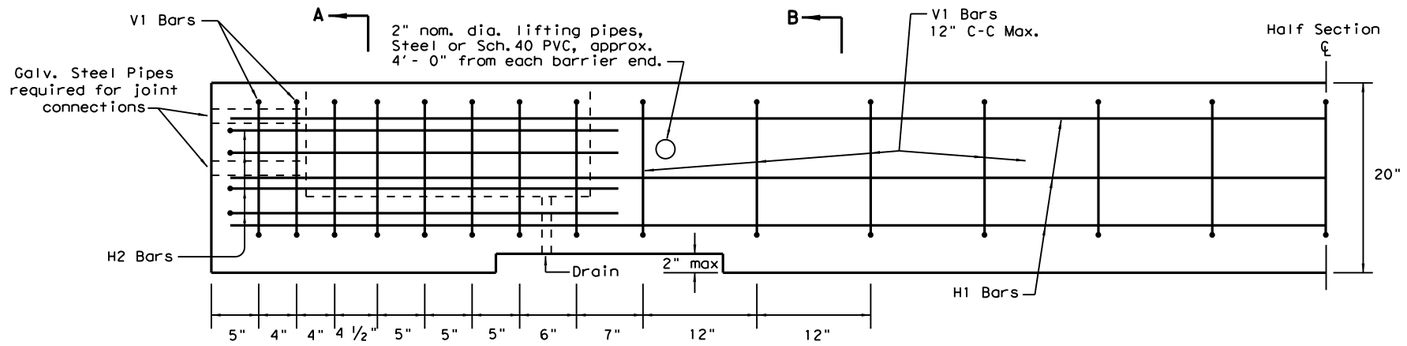
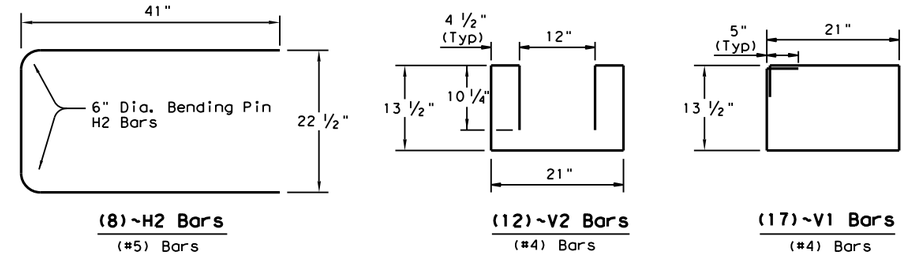


PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



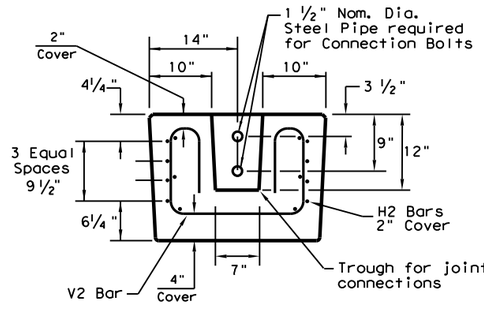
(8)~H2 Bars (#5) Bars

(12)~V2 Bars (#4) Bars

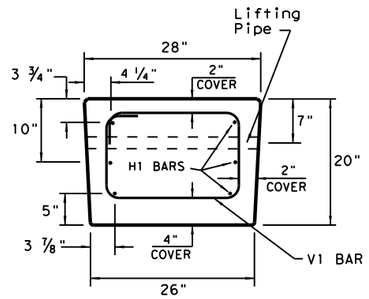
(17)~V1 Bars (#4) Bars

REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



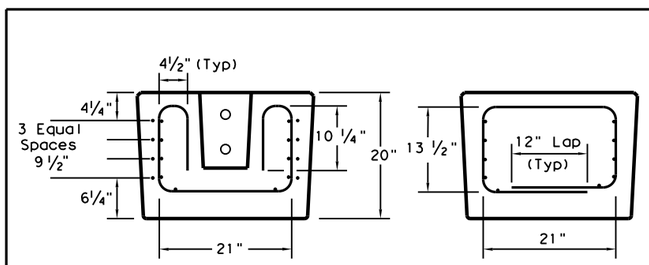
SECTION B-B

GENERAL NOTES

1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have ¾" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts." and is considered subsidiary.
7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445, "Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000



SECTION A-A SECTION B-B

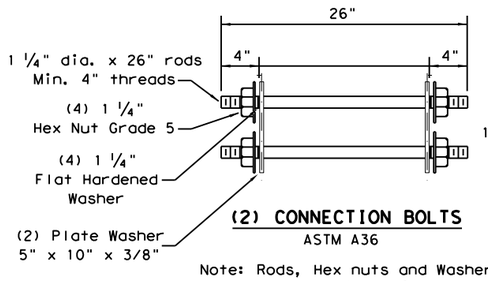
(WWR) GENERAL NOTES

1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

8 ~ (D31) Horizontal Wires (Equally spaced)
10 ~ (D20) Horizontal Wires (Equally spaced)
29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)

WELDED WIRE REINFORCEMENT (WWR)- OPTIONAL REINFORCING



(2) CONNECTION BOLTS
ASTM A36

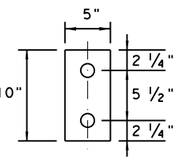


PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
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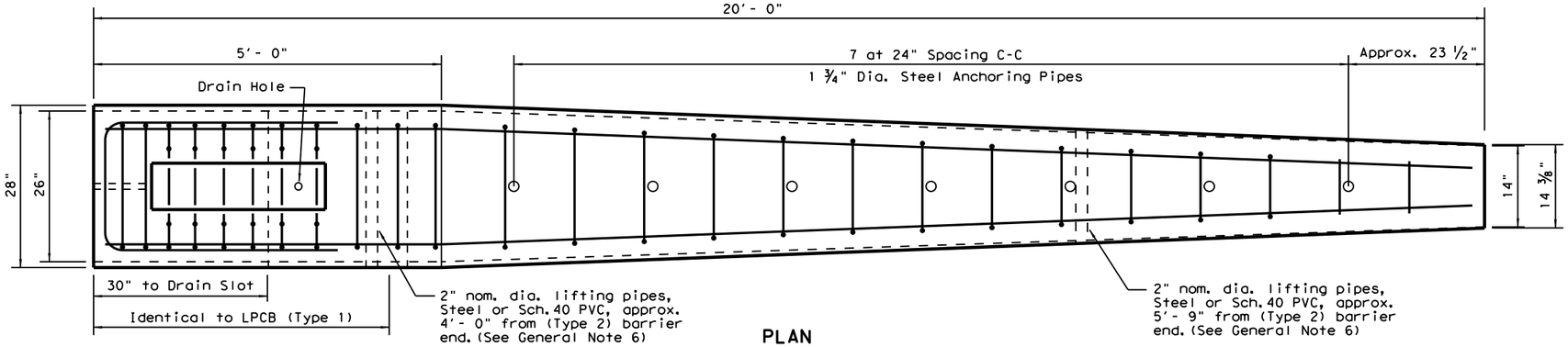
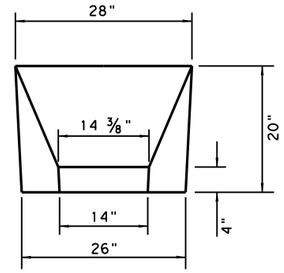
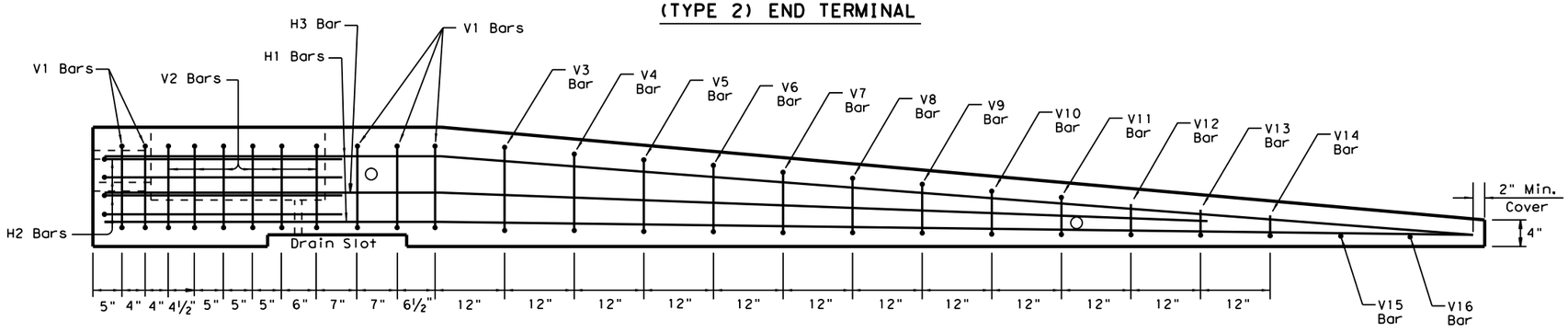


PLAN
(TYPE 2) END TERMINAL



APPROACH VIEW

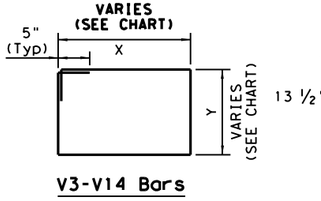


ELEVATION
(TYPE 2) END TERMINAL

Note:
Anchoring pipes not shown in Elevation View

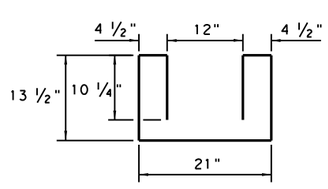
TYPE 2 - NOTES

1. Welded wire reinforcment (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment. The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.

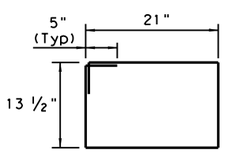


V3-V14 Bars

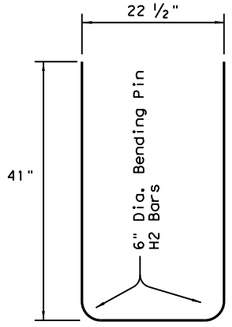
BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 ¼	14 ½
V4 BAR	19 ½	13 ½
V5 BAR	18 ½	12 ¼
V6 BAR	17 ½	11 ¼
V7 BAR	17	10 ¼
V8 BAR	16 ¼	9
V9 BAR	15 ½	8
V10 BAR	14 ½	7
V11 BAR	13 ¾	6



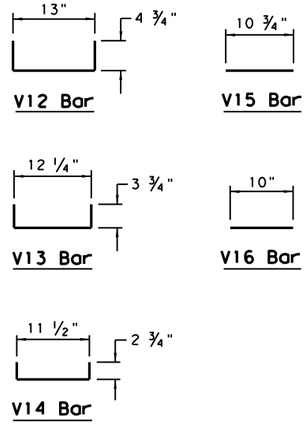
(6)~V2 Bars



(5)~V1 Bars

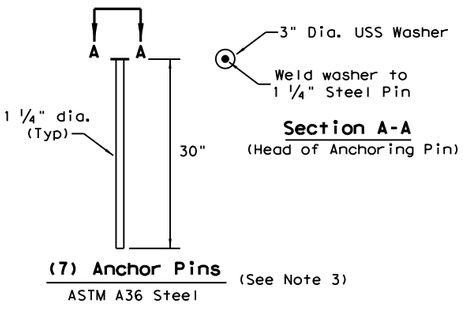


(4)~H2 Bars
(#5) Bars



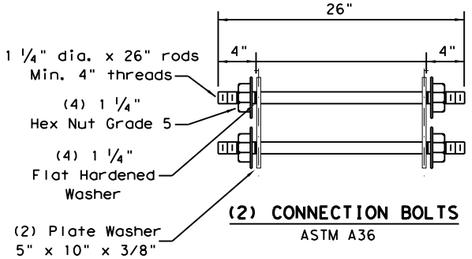
Note: All V Bars are (#4)

REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL



(7) Anchor Pins
ASTM A36 Steel
(See Note 3)

Section A-A
(Head of Anchoring Pin)



(2) CONNECTION BOLTS
ASTM A36

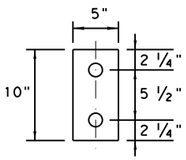
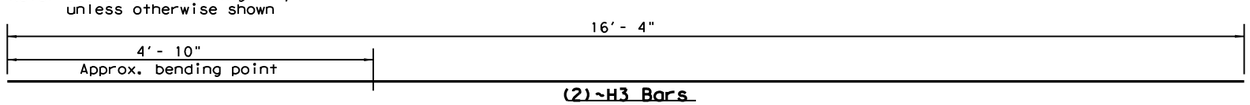


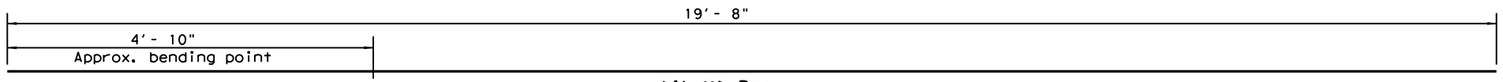
PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

Note: Use 2" Dia. Bending Pin, unless otherwise shown



(2)~H3 Bars
(#5) Bar



Note: Bends on H1 and H3 bars are slight and do not require formal bends.

(4)~H1 Bars
(#5) Bar

FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

Texas Department of Transportation

Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
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	HOU	HARRIS		124

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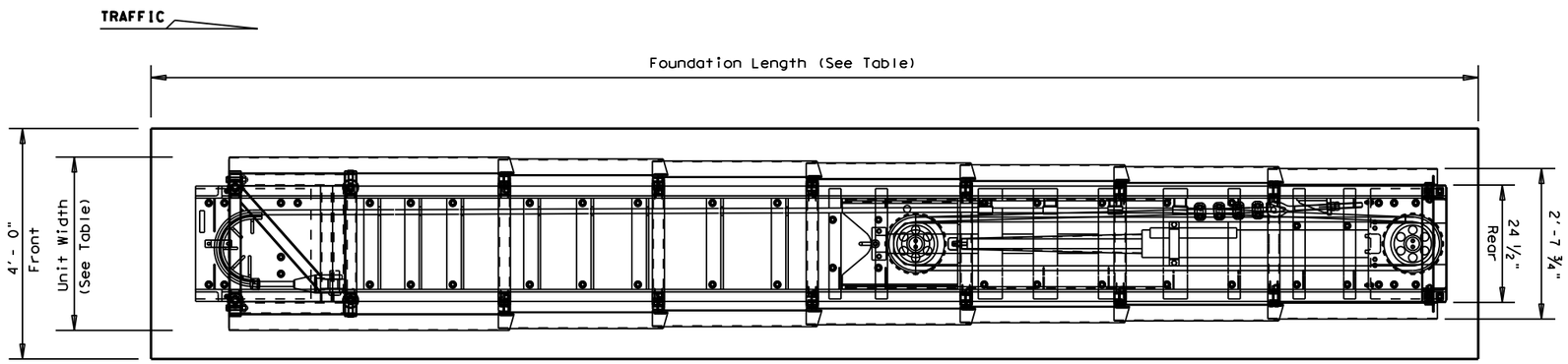
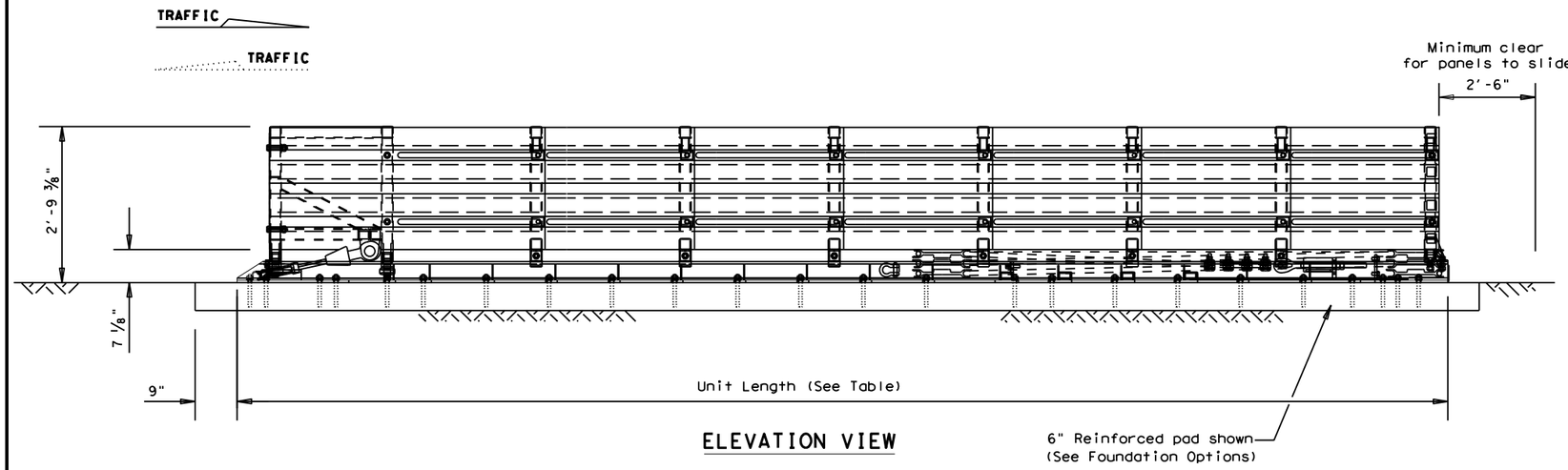


PLAN VIEW



ELEVATION VIEW

MODEL	TEST LEVEL	UNIT LENGTH (approx.)	UNIT WIDTH	FOUNDATION LENGTH	OBSTACLE WIDTH
SCI70GM	TL-2	13'-6"	2'-10 ⅝"	15'- 6 ¼"	**24"to 36"**
SCI100GM	TL-3	21'-6"	3'-1 ½"	23'- 0"	**24"to 36"**

System and pad lengths vary depending on backup type.

FOUNDATION OPTIONS
6" Reinforced Concrete (5 ½" Anchor Embedment)
8" Unreinforced Concrete (5 ½" Anchor Embedment)
3" Min. Asphalt over 3" Min. Concrete (16 ½" Anchor Embed.)
6" Asphalt over 6" Compact Subbase (16 ½" Anchor Embed.)
8" Minimum Asphalt (16 ½" Anchor Embedment)

For steel placement in concrete foundations, see manufacturer's product manual.

TRANSITION OPTIONS
Concrete Vertical Wall
Concrete Traffic Barriers
Guardrail (W-Beam)
Guardrail (Thrie-Beam)

Transition types are shown elsewhere on the plans (i.e. Attenuator location details or in the general notes).

For bi-directional transition panel and end shoe details, see manufacturer's product manual.

GENERAL NOTES

1. For specific information regarding installation and technical guidance of the system, contact: Work Area Protection, Corp. at (800) 327-4417, or (630) 377-9100.
2. For bi-directional traffic, appropriate transition panels will be required.
3. Additional details for the transition option and foundation option will be shown on the manufacturer's shop drawings furnished to the Engineer.
4. Concrete shall be class "S" with a minimum compressive strength of 4,000 psi.
5. Maximum permissible cross-slope is 8%.
6. The installation area should be free from curbs, elevated objects, or depressions.
7. The SCI100GM & SCI70GM systems should be approximately parallel with the barrier or ℄ of merging barriers.

For attachment and transitions to other shapes, barriers, railings and bi-directional traffic flows are available.

(See manufacturer's product manual)

NOTE: Side Panels can travel 30" beyond the last terminal brace at the rear of the cushion. All objects that may interfere with this motion can affect performance of and may cause undue damage to the crash cushion.

LOW MAINTENANCE

Texas Department of Transportation

Design Division Standard

WORK AREA PROTECTION CORP (SMART-NARROW)

SMTC(N)-16

FILE: smtcn16.dgn	DN: TxDOT	CK: KM	DW: BD/VP	CK: VP
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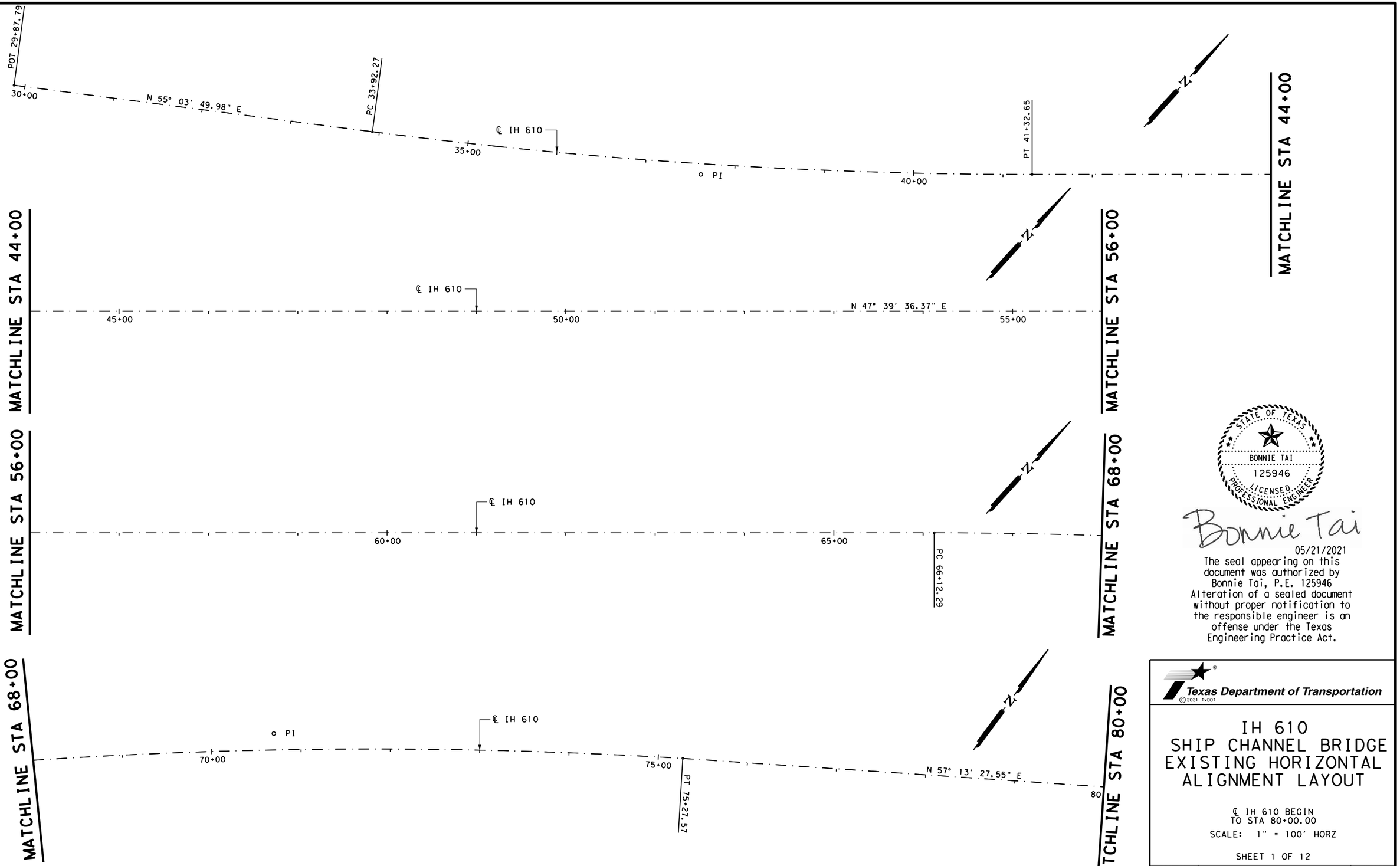

NOTE:

1. THIS IS A BEST FIT ALIGNMENT BASED ON AS BUILT PLAN FOR INFORMATION ONLY. (CSJ: 0912-70-094)

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT LAYOUT

℄ IH 610 BEGIN TO STA 80+00.00

SCALE: 1" = 100' HORZ

SHEET 1 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		126
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CONT	SECT	JOB	HIGHWAY
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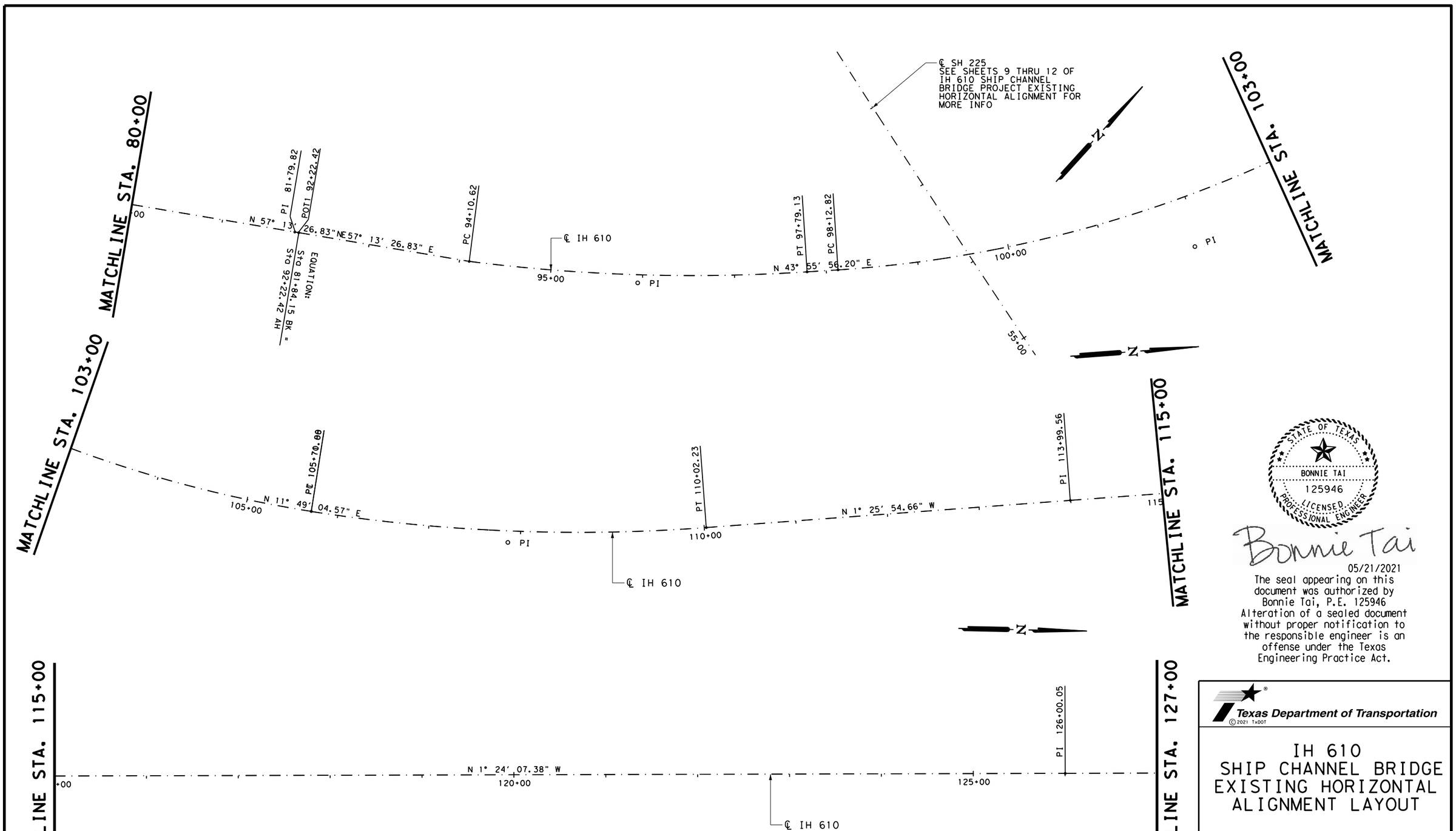

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IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT LAYOUT

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SCALE: 1" = 100' HORZ

SHEET 2 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
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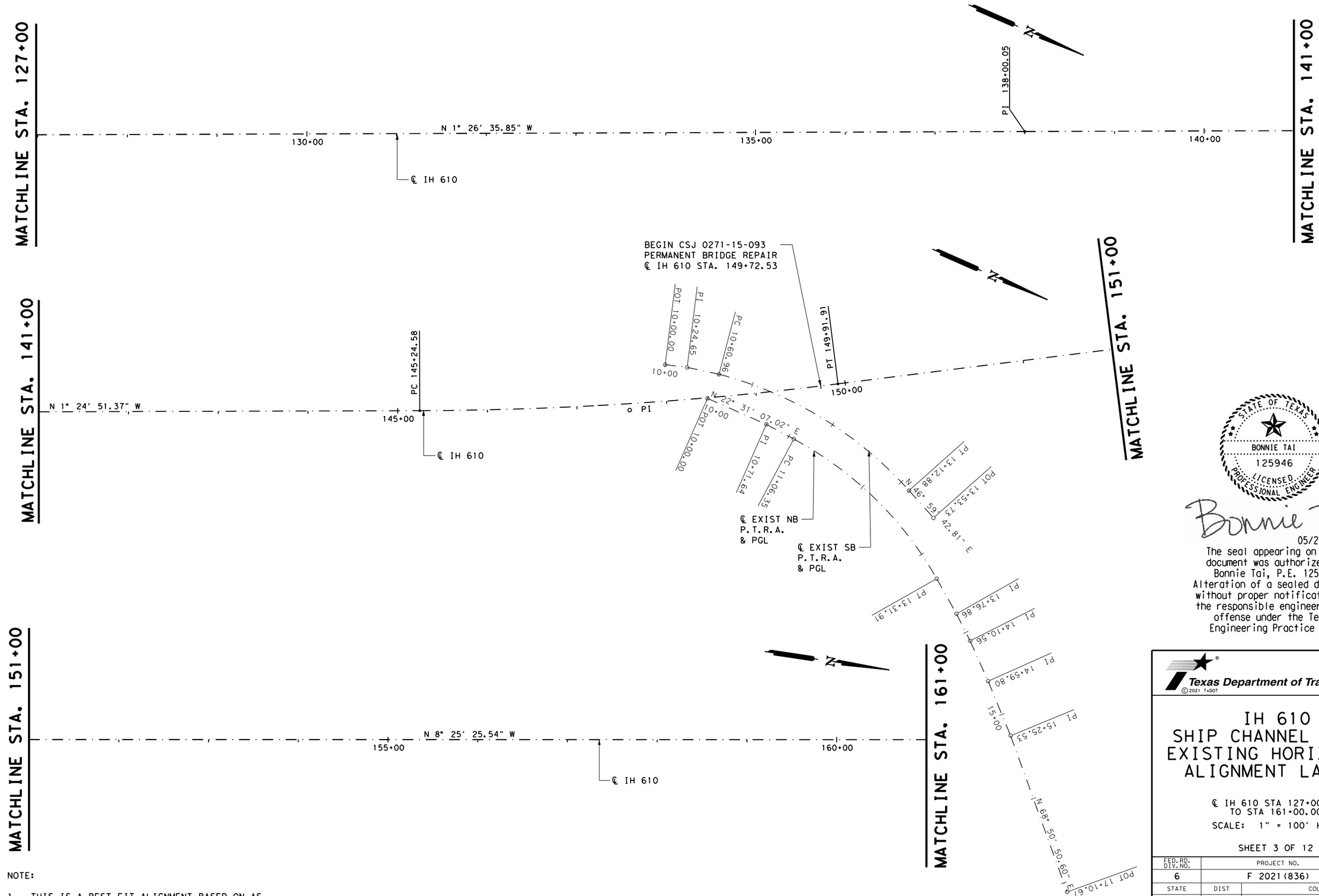

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IH 610
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EXISTING HORIZONTAL ALIGNMENT LAYOUT

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SCALE: 1" = 100' HORZ

SHEET 3 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
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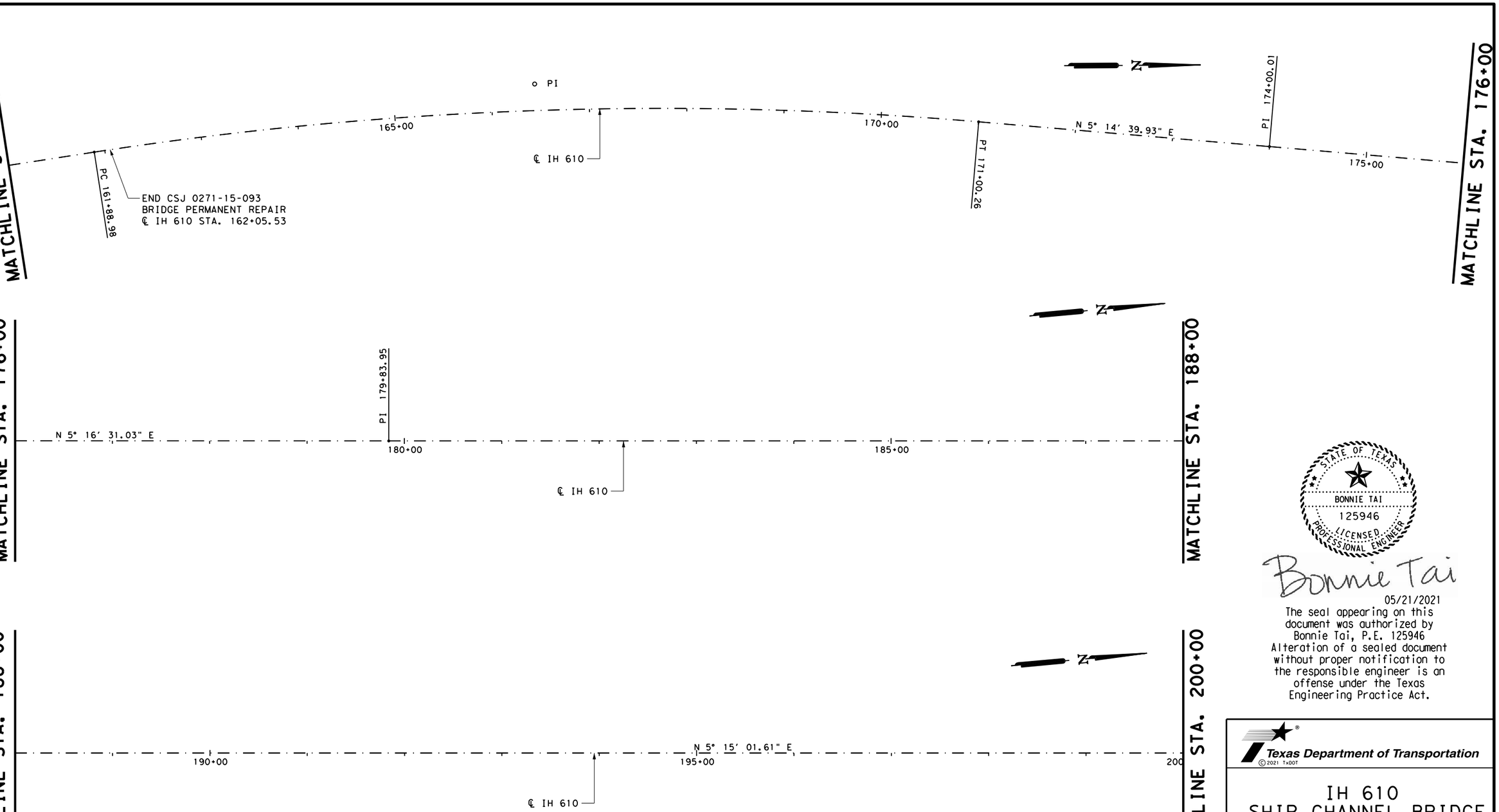

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IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT LAYOUT

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TO STA 200+00.00

SCALE: 1" = 100' HORZ

SHEET 4 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
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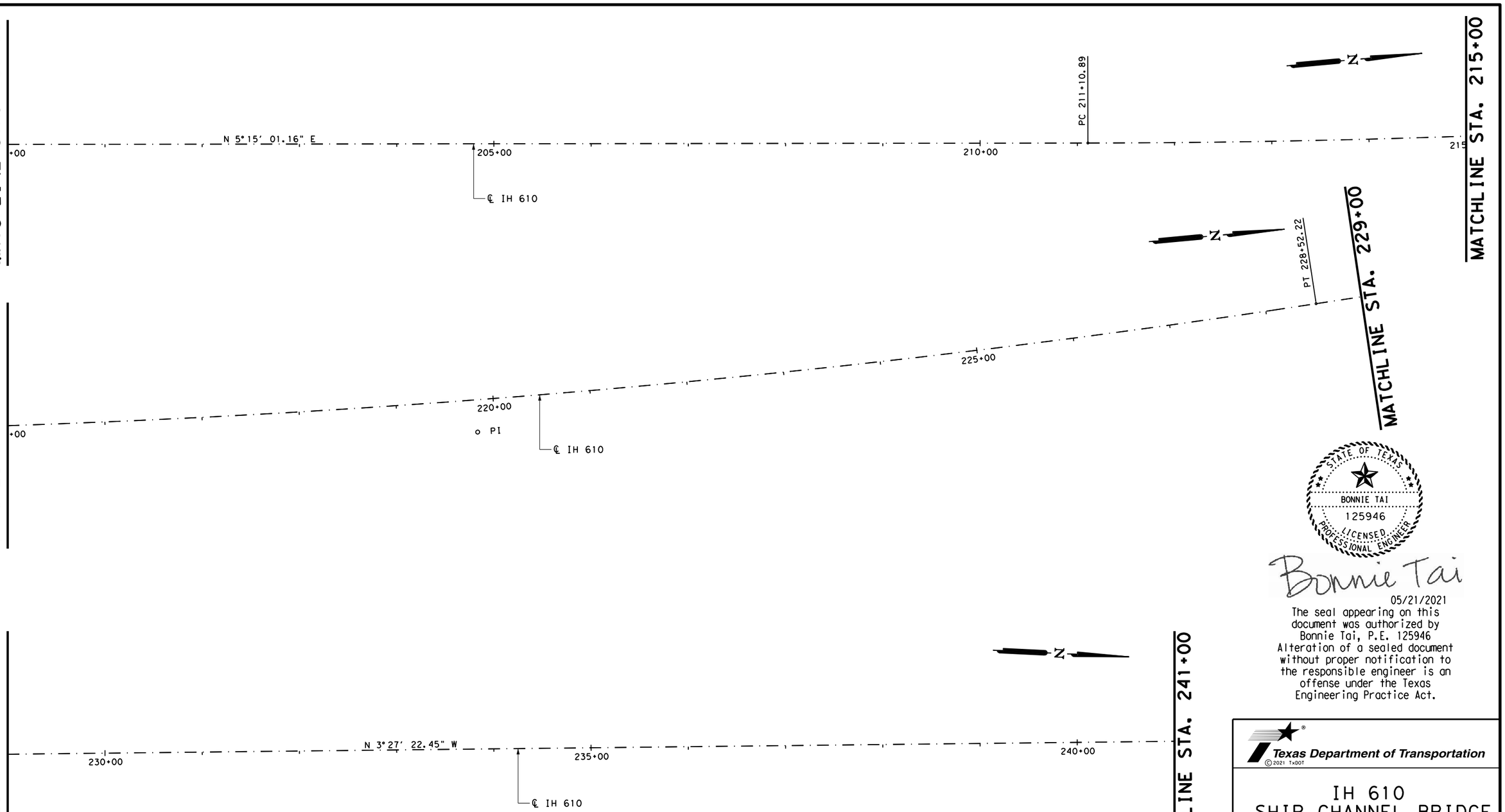

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IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT LAYOUT

℄ IH 610 STA 200+00.00
TO STA 241+00.00

SCALE: 1" = 100' HORZ

SHEET 5 OF 12

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STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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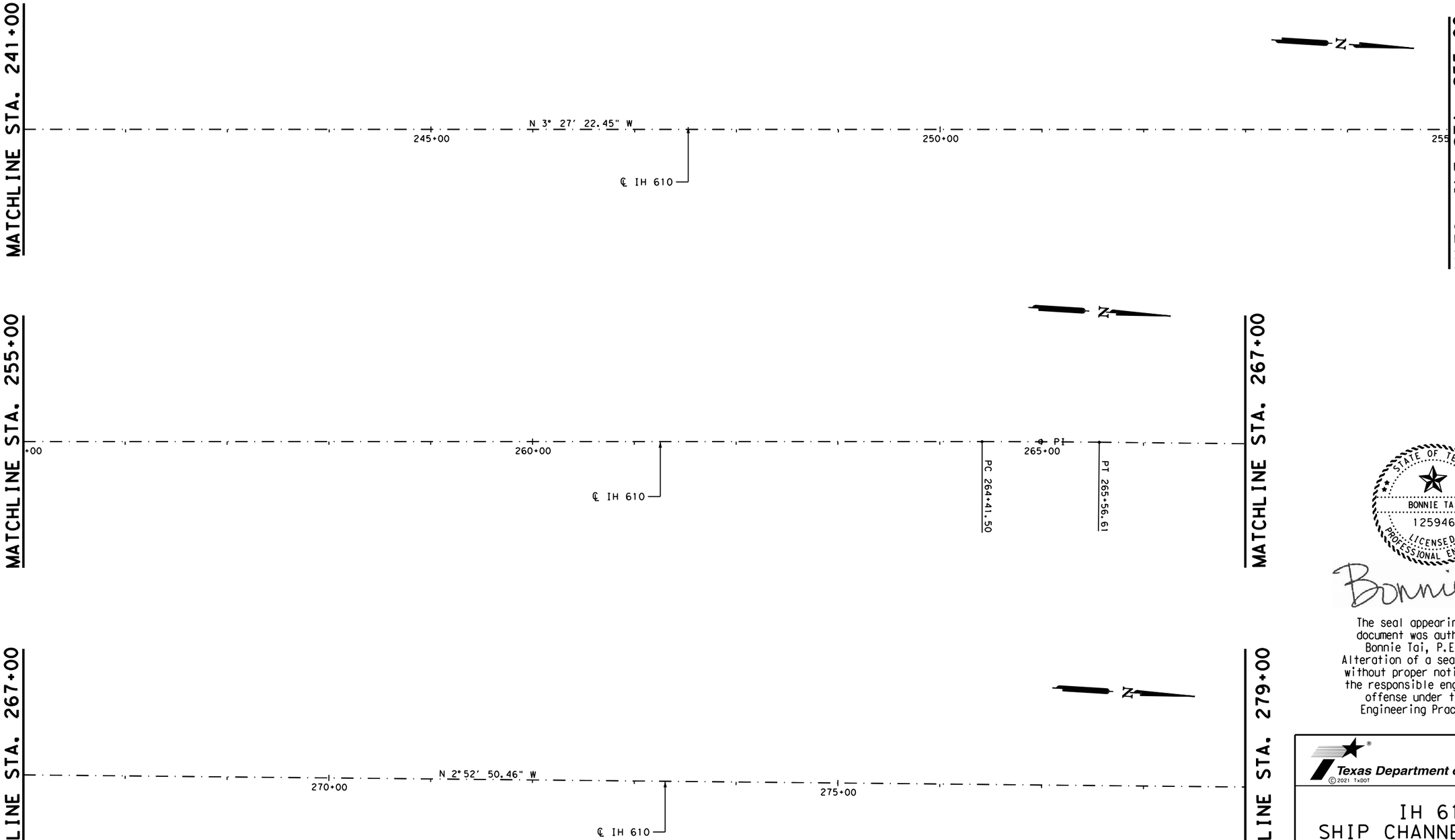

NOTE:

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STATE OF TEXAS
BONNIE TAI
125946
LICENSED
PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

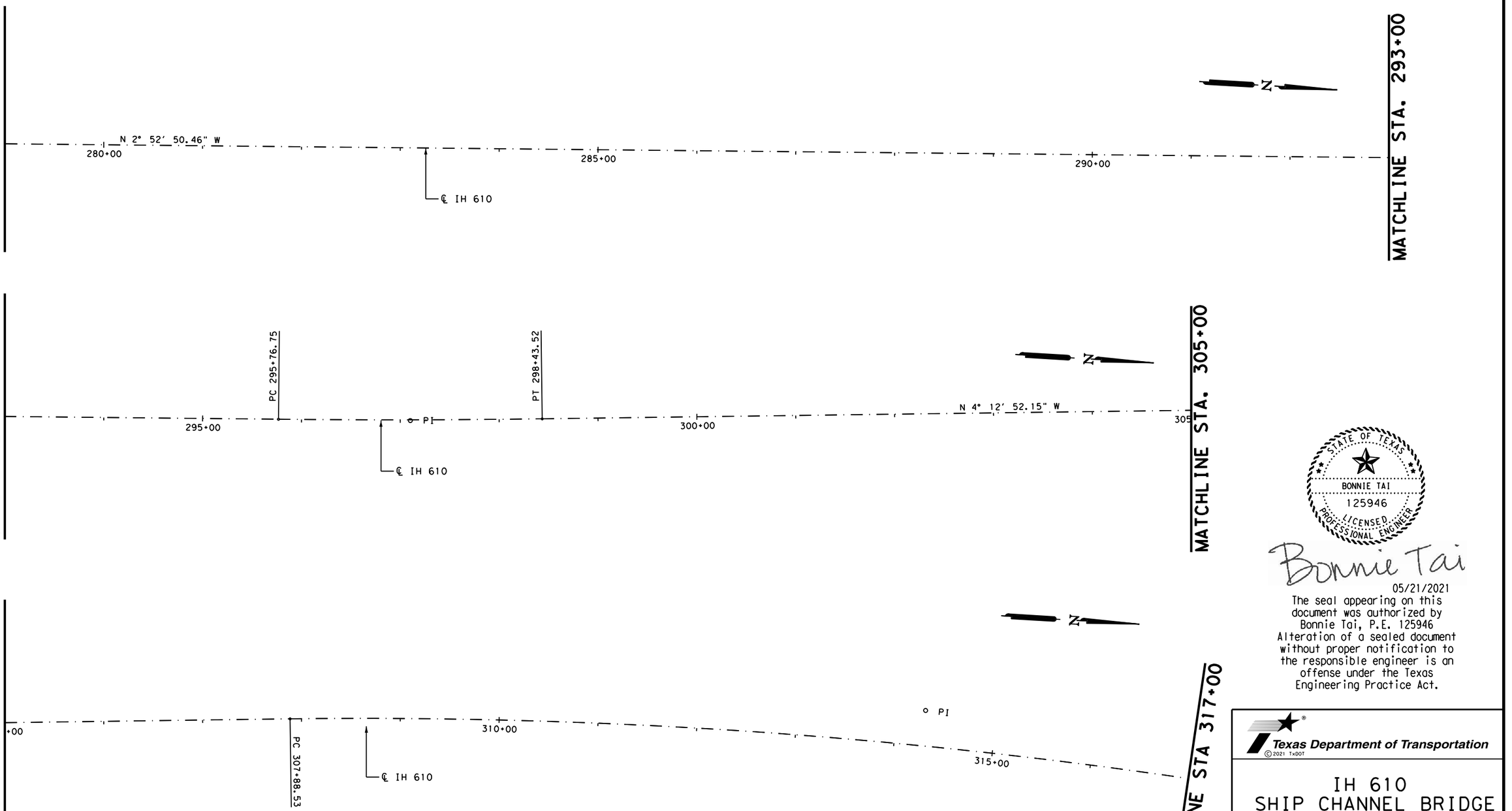
IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT LAYOUT

℄ IH 610 STA 241+00.00
TO STA 279+00.00

SCALE: 1" = 100' HORZ

SHEET 6 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		131
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



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IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT LAYOUT

℄ IH 610 STA 279+00.00
TO STA 317+00.00

SCALE: 1" = 100' HORZ

SHEET 7 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		132
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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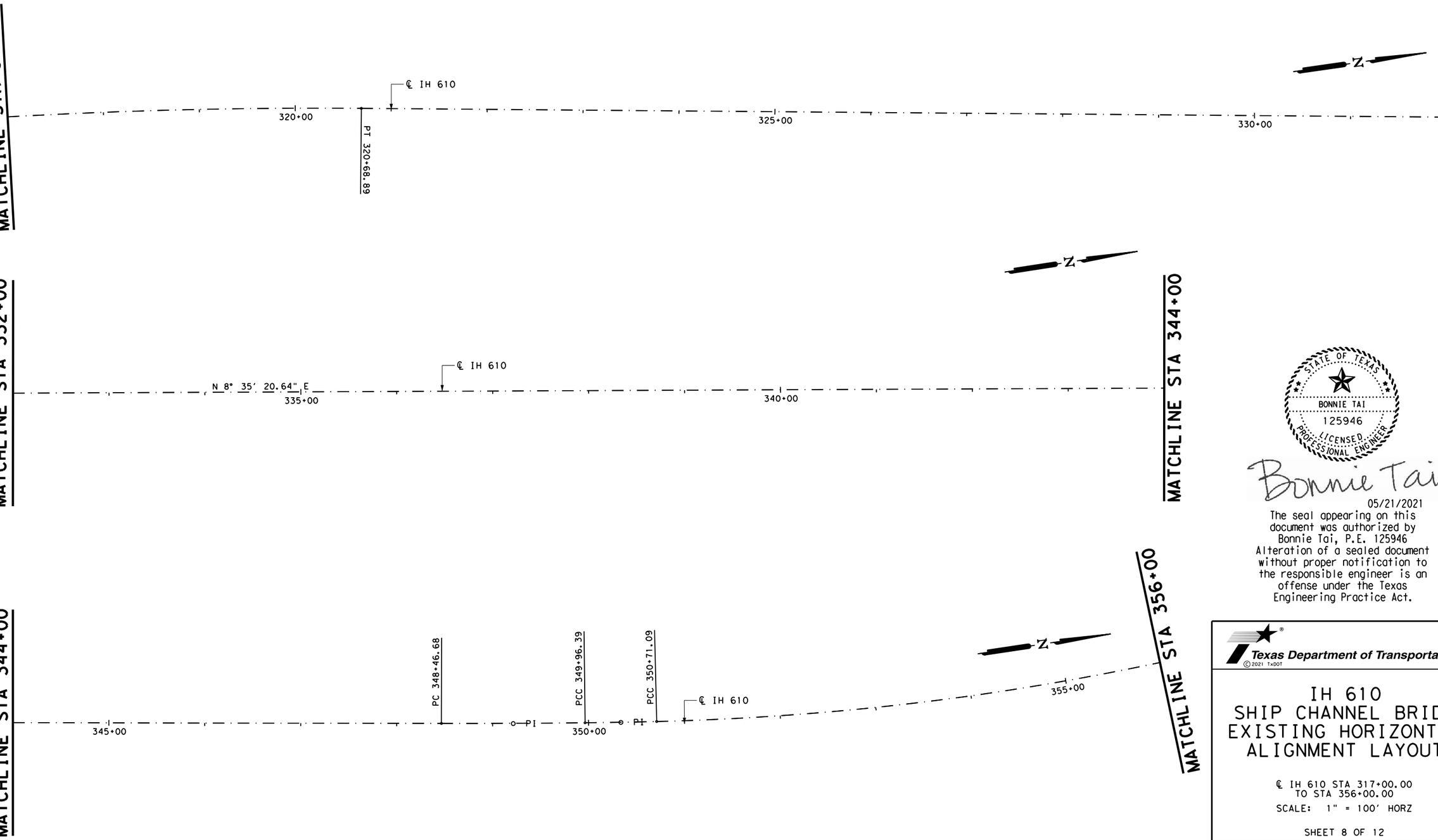

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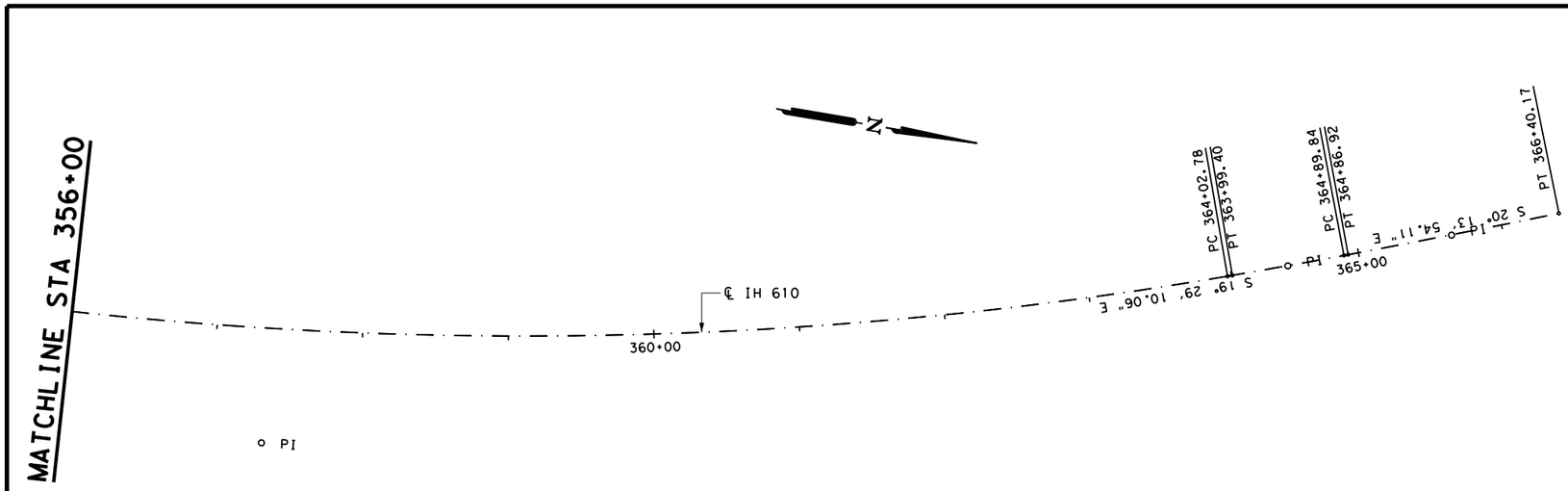
IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT LAYOUT

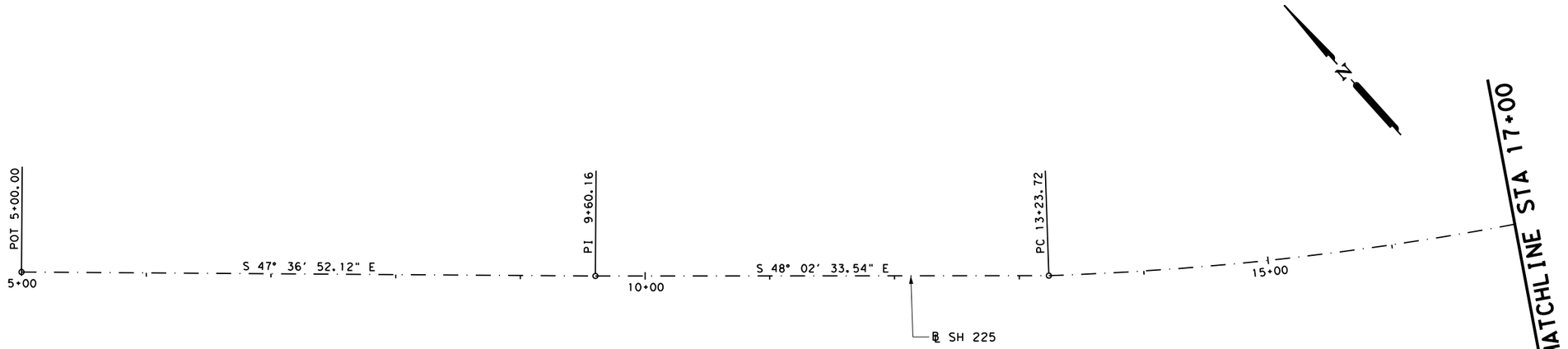
℄ IH 610 STA 317+00.00
TO STA 356+00.00

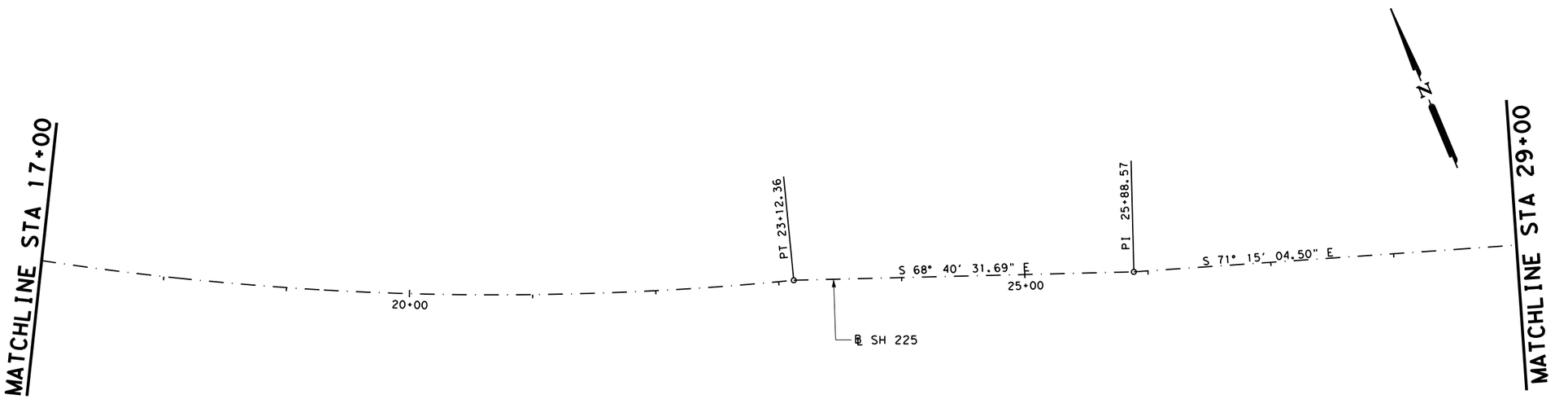
SCALE: 1" = 100' HORZ

SHEET 8 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		133
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610







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IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT LAYOUT

℄ IH 610 STA 356+00.00
TO END
℄ SH 225 BEGIN
TO STA 29+00.00
SCALE: 1" = 100' HORZ

SHEET 9 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		134
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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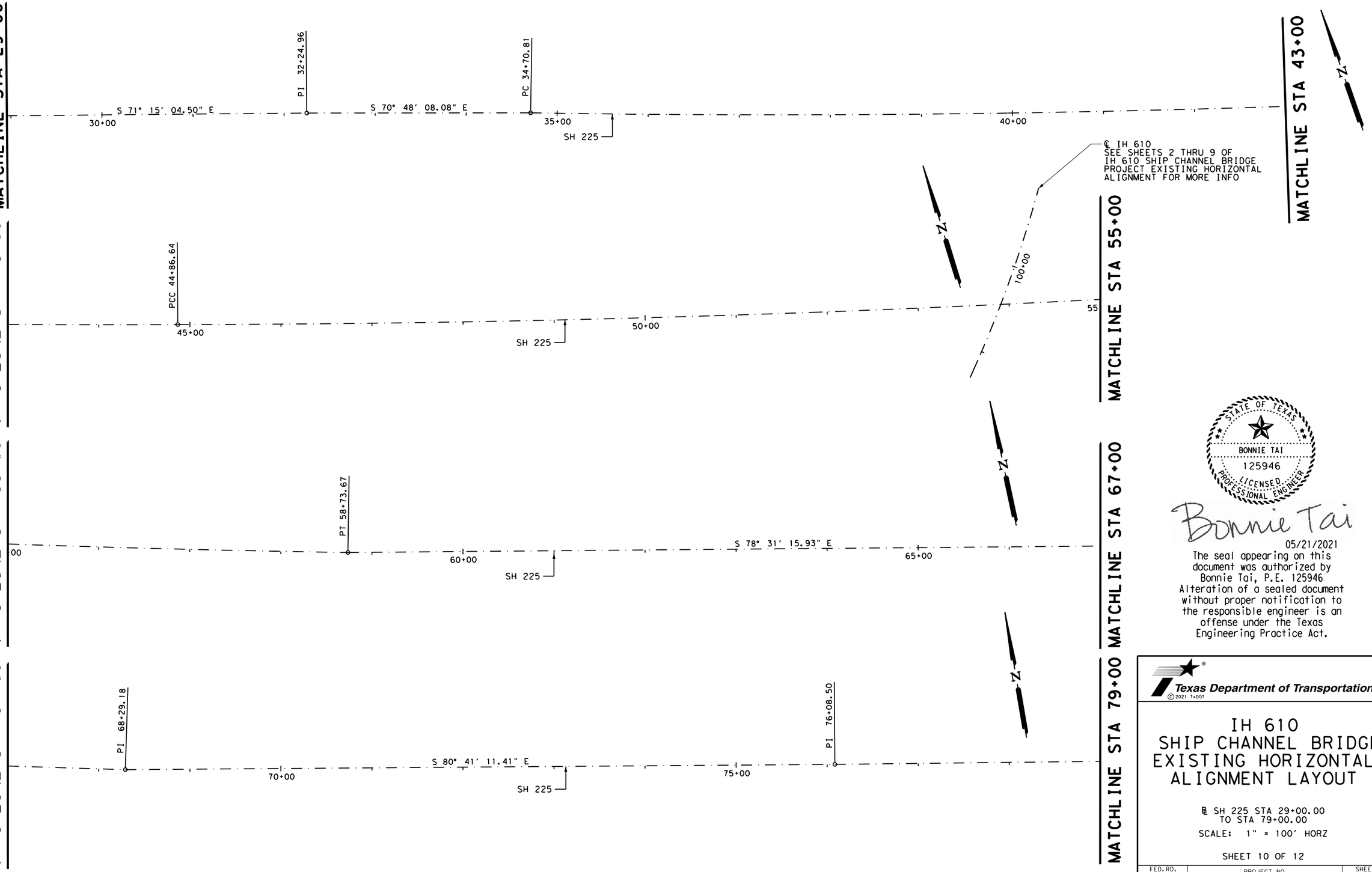

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IH 610
SHIP CHANNEL BRIDGE
EXISTING HORIZONTAL ALIGNMENT LAYOUT

℄ SH 225 STA 29+00.00
TO STA 79+00.00

SCALE: 1" = 100' HORZ

SHEET 10 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		135
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
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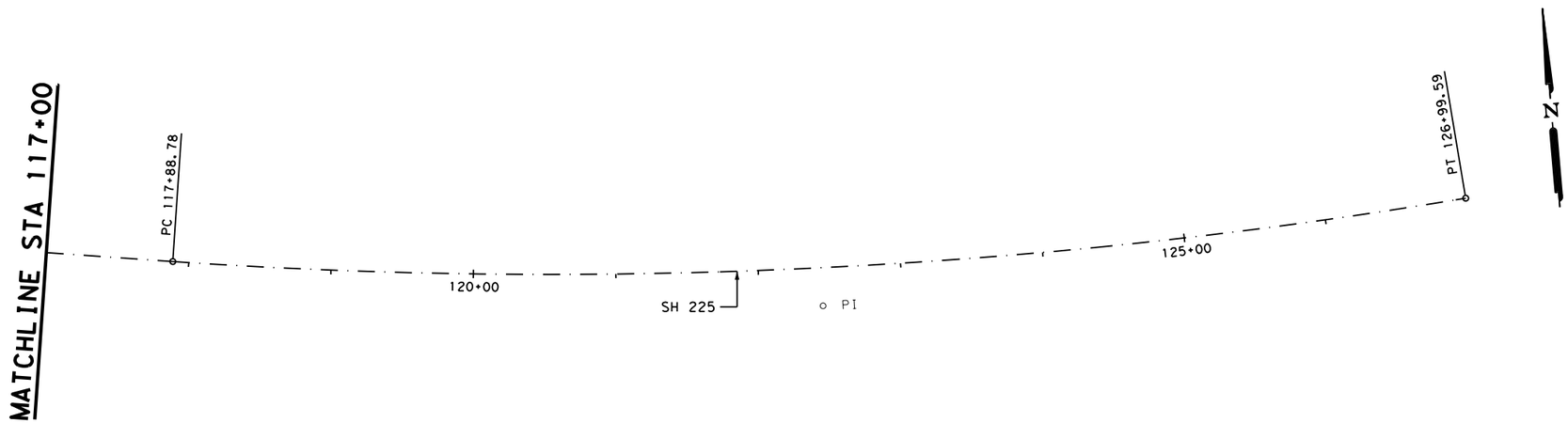
IH 610
SHIP CHANNEL BRIDGE
EXISTING HORIZONTAL ALIGNMENT LAYOUT

℄ SH 225 STA 79+00.00
TO STA 117+00.00

SCALE: 1" = 100' HORZ

SHEET 11 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		136
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



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IH 610
SHIP CHANNEL BRIDGE
EXISTING HORIZONTAL ALIGNMENT LAYOUT

℄ SH 225 STA 117+00.00
TO END

SCALE: 1" = 100' HORZ

SHEET 12 OF 12

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		137
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\3. Roadway\IH 610 Horz Align Layout 12.dgn

℄ IH 610

Beginning chain CL_610 description

Point 82 X 3,149,050.9845 Y 13,822,539.7663 Sta 29+87.970

Course from 82 to PC CL_6101 N 52° 40′ 13.05" E Dist 1,143.7977

Equation: Sta 41+31.768 (BK) = Sta 33+92.450 (AH) — End Region 1 / Begin Region 2

Curve Data

Curve CL_6101					
P.I. Station	37+63.155	X	3,149,686.4746	Y	13,822,983.6862
Delta =	7° 24′ 13.61" (RT)				
Degree =	1° 00′ 00.00"				
Tangent =	370.7050				
Length =	740.3781				
Radius =	5,729.5780				
External =	11.9798				
Long Chord =	739.8630				
Mid. Ord. =	11.9548				
P.C. Station	33+92.450	X	3,149,960.4857	Y	13,823,233.3661
P.T. Station	41+32.829	X	3,149,382.5739	Y	13,822,771.3972
C.C.		X	3,146,101.4581	Y	13,827,468.4540
Back =	S 47° 39′ 36.37" W				
Ahead =	S 55° 03′ 49.98" W				
Chord Bear =	S 51° 21′ 43.17" W				

Course from PT CL_6101 to PC CL_6102 N 48° 30′ 38.07" E Dist 3,218.3140

Equation: Sta 73+51.143 (BK) = Sta 66+12.469 (AH) — End Region 2 / Begin Region 3

Curve Data

Curve CL_6102					
P.I. Station	70+71.086	X	3,152,132.3347	Y	13,825,212.3630
Delta =	9° 09′ 10.19" (RT)				
Degree =	1° 00′ 00.00"				
Tangent =	458.6172				
Length =	915.2831				
Radius =	5,729.5780				
External =	18.3254				
Long Chord =	914.3102				
Mid. Ord. =	18.2670				
P.C. Station	66+12.469	X	3,151,793.3422	Y	13,824,903.4717
P.T. Station	75+27.752	X	3,152,516.1460	Y	13,825,463.3983
C.C.		X	3,155,652.3698	Y	13,820,668.3839
Back =	N 47° 39′ 36.37" E				
Ahead =	N 56° 48′ 46.56" E				
Chord Bear =	N 52° 14′ 11.46" E				

Course from PT CL_6102 to 83 N 57° 13′ 27.55" E Dist 652.2468

Point 83 X 3,153,064.5528 Y 13,825,816.4930 Sta 81+79.999

Course from 83 to 06 N 57° 13′ 26.84" E Dist 4.1514

Equation: Sta 81+84.150 (BK) = Sta 92+22.420 (AH) — End Region 3 / Begin Region 4

Point 06 X 3,153,068.0433 Y 13,825,818.7404 Sta 92+22.420

Course from 06 to 84 N 57° 13′ 26.84" E Dist 0.1800

Point 84 X 3,153,068.1946 Y 13,825,818.8378 Sta 92+22.600

Course from 84 to PC CL_6103 N 57° 13′ 26.83" E Dist 188.2031

NOTE:

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(CSJ: 0912-70-094)

℄ IH 610 CONTINUE

Curve Data

Curve CL_6103					
P.I. Station	95+95.624	X	3,153,377.7054	Y	13,826,026.9099
Delta =	11° 00′ 00.05" (LT)				
Degree =	2° 59′ 06.14"				
Tangent =	184.8205				
Length =	368.5050				
Radius =	1,919.4320				
External =	8.8776				
Long Chord =	367.9393				
Mid. Ord. =	8.8367				
P.C. Station	94+10.803	X	3,153,226.4347	Y	13,825,920.7224
P.T. Station	97+79.308	X	3,153,505.9353	Y	13,826,160.0103
C.C.		X	3,152,123.6365	Y	13,827,491.7269
Back =	N 54° 55′ 56.25" E				
Ahead =	N 43° 55′ 56.20" E				
Chord Bear =	N 49° 25′ 56.22" E				

Course from PT CL_6103 to PC CL_6104 N 43° 55′ 56.20" E Dist 33.6877

Curve Data

Curve CL_6104					
P.I. Station	102+02.275	X	3,153,799.3932	Y	13,826,464.6145
Delta =	32° 06′ 51.63" (LT)				
Degree =	4° 14′ 10.81"				
Tangent =	389.2795				
Length =	758.0687				
Radius =	1,352.4841				
External =	54.9077				
Long Chord =	748.1844				
Mid. Ord. =	52.7656				
P.C. Station	98+12.996	X	3,153,529.3081	Y	13,826,184.2709
P.T. Station	105+71.064	X	3,153,879.1186	Y	13,826,845.6426
C.C.		X	3,152,555.3027	Y	13,827,122.6347
Back =	N 43° 55′ 56.20" E				
Ahead =	N 11° 49′ 04.57" E				
Chord Bear =	N 27° 52′ 30.38" E				

Course from PT CL_6104 to PC CL_6105 N 11° 49′ 04.20" E Dist 0.1165

Curve Data

Curve CL_6105					
P.I. Station	107+87.761	X	3,153,923.4986	Y	13,827,057.7462
Delta =	13° 14′ 59.23" (LT)				
Degree =	3° 04′ 21.24"				
Tangent =	216.5802				
Length =	431.2284				
Radius =	1,864.7523				
External =	12.5351				
Long Chord =	430.2681				
Mid. Ord. =	12.4514				
P.C. Station	105+71.181	X	3,153,879.1425	Y	13,826,845.7567
P.T. Station	110+02.409	X	3,153,918.0868	Y	13,827,274.2588
C.C.		X	3,152,053.9168	Y	13,827,227.6625
Back =	N 11° 49′ 04.57" E				
Ahead =	N 1° 25′ 54.66" W				
Chord Bear =	N 5° 11′ 34.95" E				

Course from PT CL_6105 to 85 N 1° 25′ 54.66" W Dist 397.3275

Point 85 X 3,153,908.1584 Y 13,827,671.4622 Sta 113+99.737

Course from 85 to 86 N 1° 24′ 07.38" W Dist 1,200.4963

Point 86 X 3,153,878.7847 Y 13,828,871.5991 Sta 126+00.233

Course from 86 to 87 N 1° 26′ 35.85" W Dist 1,199.9994

Point 87 X 3,153,848.5597 Y 13,830,071.2178 Sta 138+00.233

Course from 87 to PC CL_6106 N 1° 24′ 51.37" W Dist 724.5250

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IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		138
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

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℄ IH 610 CONTINUE

Curve Data

Curve CL_6106

P.I. Station	147+58.716	X	3,153,824.9032	Y	13,831,029.4095
Delta =	7° 00′ 34.17" (LT)				
Degree =	1° 29′ 59.60"				
Tangent =	233.9588				
Length =	467.3339				
Radius =	3,820.0000				
External =	7.1578				
Long Chord =	467.0425				
Mid. Ord. =	7.1444				
P.C. Station	145+24.757	X	3,153,830.6776	Y	13,830,795.5220
P.T. Station	149+92.091	X	3,153,790.6299	Y	13,831,260.8443
C.C.		X	3,150,011.8413	Y	13,830,701.2400
Back = N	1° 24′ 51.37" W				
Ahead = N	8° 25′ 25.54" W				
Chord Bear = N	4° 55′ 08.45" W				

Course from PT CL_6106 to PC CL_6107 N 8° 25′ 25.54" W Dist 1,197.0673

Curve Data

Curve CL_6107

P.I. Station	166+46.972	X	3,153,548.2010	Y	13,832,897.8712
Delta =	13° 40′ 05.47" (RT)				
Degree =	1° 29′ 59.60"				
Tangent =	457.8130				
Length =	911.2796				
Radius =	3,820.0000				
External =	27.3358				
Long Chord =	909.1203				
Mid. Ord. =	27.1416				
P.C. Station	161+89.159	X	3,153,615.2675	Y	13,832,444.9973
P.T. Station	171+00.438	X	3,153,590.0473	Y	13,833,353.7677
C.C.		X	3,157,394.0561	Y	13,833,004.6016
Back = N	8° 25′ 25.54" W				
Ahead = N	5° 14′ 39.93" E				
Chord Bear = N	1° 35′ 22.80" W				

Course from PT CL_6107 to 88 N 5° 14′ 39.93" E Dist 299.7510

Point 88 X 3,153,617.4460 Y 13,833,652.2639 Sta 174+00.189

Course from 88 to 89 N 5° 16′ 31.03" E Dist 583.9365

Point 89 X 3,153,671.1337 Y 13,834,233.7271 Sta 179+84.126

Course from 89 to PC CL_6108 N 5° 15′ 01.61" E Dist 3,126.9414

Curve Data

Curve CL_6108

P.I. Station	219+83.415	X	3,154,037.1062	Y	13,838,216.2359
Delta =	8° 42′ 24.06" (LT)				
Degree =	0° 30′ 00.00"				
Tangent =	872.3476				
Length =	1,741.3366				
Radius =	11,459.1559				
External =	33.1565				
Long Chord =	1,739.6616				
Mid. Ord. =	33.0608				
P.C. Station	211+11.067	X	3,153,957.2782	Y	13,837,347.5485
P.T. Station	228+52.404	X	3,153,984.5158	Y	13,839,086.9968
C.C.		X	3,142,546.2025	Y	13,838,396.1689
Back = N	5° 15′ 01.61" E				
Ahead = N	3° 27′ 22.45" W				
Chord Bear = N	0° 53′ 49.58" E				

Course from PT CL_6108 to PC CL_6109 N 3° 27′ 22.45" W Dist 3,589.2727

NOTE:

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(CSJ: 0912-70-094)

℄ IH 610 CONTINUE

Curve Data

Curve CL_6109

P.I. Station	264+99.232	X	3,153,764.6627	Y	13,842,727.1920
Delta =	0° 34′ 31.98" (RT)				
Degree =	0° 30′ 00.00"				
Tangent =	57.5556				
Length =	115.1102				
Radius =	11,459.1559				
External =	0.1445				
Long Chord =	115.1097				
Mid. Ord. =	0.1445				
P.C. Station	264+41.676	X	3,153,768.1325	Y	13,842,669.7411
P.T. Station	265+56.787	X	3,153,761.7702	Y	13,842,784.6748
C.C.		X	3,165,206.4458	Y	13,843,360.5691
Back = N	3° 27′ 22.45" W				
Ahead = N	2° 52′ 50.46" W				
Chord Bear = N	3° 10′ 06.46" W				

Course from PT CL_6109 to PC CL_61010 N 2° 52′ 50.46" W Dist 3,020.1483

Curve Data

Curve CL_61010

P.I. Station	297+10.321	X	3,153,603.2854	Y	13,845,934.2244
Delta =	1° 20′ 01.68" (LT)				
Degree =	0° 30′ 00.00"				
Tangent =	133.3862				
Length =	266.7603				
Radius =	11,459.1559				
External =	0.7763				
Long Chord =	266.7543				
Mid. Ord. =	0.7762				
P.C. Station	295+76.935	X	3,153,609.9888	Y	13,845,801.0068
P.T. Station	298+43.695	X	3,153,593.4828	Y	13,846,067.2498
C.C.		X	3,142,165.3132	Y	13,845,225.1125
Back = N	2° 52′ 50.46" W				
Ahead = N	4° 12′ 52.15" W				
Chord Bear = N	3° 32′ 51.31" W				

Course from PT CL_61010 to PC CL_61011 N 4° 12′ 52.15" W Dist 945.0179

Curve Data

Curve CL_61011

P.I. Station	314+31.568	X	3,153,476.7894	Y	13,847,650.8290
Delta =	12° 48′ 12.79" (RT)				
Degree =	1° 00′ 00.00"				
Tangent =	642.8550				
Length =	1,280.3553				
Radius =	5,729.5780				
External =	35.9512				
Long Chord =	1,277.6929				
Mid. Ord. =	35.7270				
P.C. Station	307+88.713	X	3,153,524.0331	Y	13,847,009.7123
P.T. Station	320+69.068	X	3,153,572.7977	Y	13,848,286.4743
C.C.		X	3,159,238.1178	Y	13,847,430.7810
Back = N	4° 12′ 52.15" W				
Ahead = N	8° 35′ 20.64" E				
Chord Bear = N	2° 11′ 14.25" E				

Course from PT CL_61011 to PC CL_61012 N 8° 35′ 20.64" E Dist 2,777.7898

Curve Data

Curve CL_61012

P.I. Station	349+21.714	X	3,153,998.8308	Y	13,851,107.1273
Delta =	0° 44′ 52.72" (LT)				
Degree =	0° 29′ 58.63"				
Tangent =	74.8558				
Length =	149.7095				
Radius =	11,467.8838				
External =	0.2443				
Long Chord =	149.7084				
Mid. Ord. =	0.2443				
P.C. Station	348+46.858	X	3,153,987.6513	Y	13,851,033.1110
P.T. Station	349+96.568	X	3,154,009.0431	Y	13,851,181.2832
C.C.		X	3,142,648.3811	Y	13,852,745.8012
Back = N	8° 35′ 20.64" E				
Ahead = N	7° 50′ 27.92" E				
Chord Bear = N	8° 12′ 54.28" E				

STATE OF TEXAS
BONNIE TAI
125946
LICENSED
PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT DATA

SHEET 2 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		139
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\3. Roadway\IH 610 Horiz Align Data 02.dgn

℄ IH 610 CONTINUE

Curve Data

Curve CL_61013					
P.I. Station	350+33.919	X	3,154,014.1388	Y	13,851,218.2857
Delta =	0° 44′ 58.03" (LT)				
Degree =	1° 00′ 11.71"				
Tangent =	37.3517				
Length =	74.7024				
Radius =	5,711.0064				
External =	0.1221				
Long Chord =	74.7019				
Mid. Ord. =	0.1221				
P.C. Station	349+96.568	X	3,154,009.0431	Y	13,851,181.2832
P.T. Station	350+71.270	X	3,154,018.7502	Y	13,851,255.3517
C.C.		X	3,148,351.4331	Y	13,851,960.4132
Back = N	7° 50′ 27.92" E				
Ahead = N	7° 05′ 29.89" E				
Chord Bear = N	7° 27′ 58.91" E				

Curve Data

Curve CL_61014					
P.I. Station	357+47.595	X	3,154,102.2469	Y	13,851,926.5023
Delta =	26° 34′ 39.96" (LT)				
Degree =	2° 00′ 03.15"				
Tangent =	676.3246				
Length =	1,328.3071				
Radius =	2,863.5360				
External =	78.7851				
Long Chord =	1,316.4299				
Mid. Ord. =	76.6755				
P.C. Station	350+71.270	X	3,154,018.7502	Y	13,851,255.3517
P.T. Station	363+99.577	X	3,153,876.6395	Y	13,852,564.0886
C.C.		X	3,151,177.1203	Y	13,851,608.8741
Back = N	7° 05′ 29.89" E				
Ahead = N	19° 29′ 10.07" W				
Chord Bear = N	6° 11′ 50.09" W				

Course from PT CL_61014 to PC CL_61015 S 19° 29′ 10.06" E Dist 3.3869

Curve Data

Curve CL_61015					
P.I. Station	364+45.031	X	3,153,863.7367	Y	13,852,600.5530
Delta =	0° 44′ 44.06" (LT)				
Degree =	0° 53′ 10.28"				
Tangent =	42.0668				
Length =	84.1324				
Radius =	6,465.4097				
External =	0.1369				
Long Chord =	84.1318				
Mid. Ord. =	0.1368				
P.C. Station	364+02.964	X	3,153,877.7693	Y	13,852,560.8957
P.T. Station	364+87.096	X	3,153,849.1892	Y	13,852,640.0243
C.C.		X	3,147,782.6835	Y	13,850,404.1730
Back = N	19° 29′ 10.07" W				
Ahead = N	20° 13′ 54.13" W				
Chord Bear = N	19° 51′ 32.10" W				

Course from PT CL_61015 to PC CL_61016 S 20° 13′ 54.11" E Dist 2.9258

Curve Data

Curve CL_61016					
P.I. Station	365+65.186	X	3,153,824.0110	Y	13,852,707.7321
Delta =	0° 45′ 03.25" (LT)				
Degree =	0° 29′ 58.27"				
Tangent =	75.1635				
Length =	150.3248				
Radius =	11,470.1645				
External =	0.2463				
Long Chord =	150.3238				
Mid. Ord. =	0.2463				
P.C. Station	364+90.022	X	3,153,850.2010	Y	13,852,637.2791
P.T. Station	366+40.347	X	3,153,796.8999	Y	13,852,777.8359
C.C.		X	3,143,098.8623	Y	13,848,640.6067
Back = N	20° 23′ 31.10" W				
Ahead = N	21° 08′ 34.35" W				
Chord Bear = N	20° 46′ 02.72" W				

==========

Ending chain CL_610 description

NOTE:

1. THIS IS A BEST FIT ALIGNMENT BASED ON AS BUILT PLAN FOR INFORMATION ONLY.
(CSJ: 0912-70-094)

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT DATA

SHEET 3 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		140
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\3. Roadway\IH 610 Horiz Align Data 03.dgn

℄ SH 225

```
<*       1   Describe Chain CL_225

Chain CL_225 contains:
 75 76 CUR CL_2251 77 78 CUR CL_2252 CUR CL_2253 79 80 81 82 CUR CL_2254

Beginning chain CL_225 description
================================================================================

Point 75              X   3,149,223.8964 Y  13,828,265.9288 Sta      5+00.000

Course from 75 to 76 S 47° 36′ 52.12" E Dist 460.1597

Point 76              X   3,149,563.7821 Y  13,827,955.7279 Sta      9+60.160

Course from 76 to PC CL_2251 S 48° 02′ 33.54" E Dist 363.5590

                                    Curve Data
                                   *----------*
Curve CL_2251
P.I.  Station           18+24.779  X      3,150,217.6427  Y     13,827,390.1907
Delta       =       22° 55′ 39.30" (LT)
Degree      =        2° 19′ 08.17"
Tangent     =             501.0600
Length      =             988.7117
Radius      =           2,470.7797
External    =              50.2942
Long Chord  =             982.1281
Mid. Ord.   =              49.2908
P.C.  Station           13+23.719  X      3,149,834.1401  Y     13,827,712.6606
P.T.  Station           23+12.430  X      3,150,696.4716  Y     13,827,242.5967
C.C.                               X      3,151,424.2734  Y     13,829,603.7525
Back        = S  49° 56′ 27.76" E
Ahead       = S  72° 52′ 07.06" E
Chord Bear  = S  61° 24′ 17.41" E

Course from PT CL_2251 to 77 S 68° 40′ 31.69" E Dist 276.2024

Point 77              X   3,150,953.7639 Y  13,827,142.1557 Sta     25+88.633

Course from 77 to 78 S 71° 15′ 04.50" E Dist 636.3961

Point 78              X   3,151,556.3910 Y  13,826,937.6060 Sta     32+25.029

Course from 78 to PC CL_2252 S 70° 48′ 08.08" E Dist 245.8446

                                    Curve Data
                                   *----------*
Curve CL_2252
P.I.  Station           39+78.948  X      3,152,265.4362  Y     13,826,681.4565
Delta       =        3° 29′ 28.48" (LT)
Degree      =        0° 20′ 37.26"
Tangent     =             508.0750
Length      =           1,015.8355
Radius      =          16,671.1602
External    =              7.7403
Long Chord  =           1,015.6784
Mid. Ord.   =              7.7367
P.C.  Station           34+70.873  X      3,151,788.5640  Y     13,826,856.7650
P.T.  Station           44+86.709  X      3,152,752.0990  Y     13,826,535.5130
C.C.                               X      3,157,540.8564  Y     13,842,504.0879
Back        = S  69° 48′ 55.75" E
Ahead       = S  73° 18′ 24.23" E
Chord Bear  = S  71° 33′ 39.99" E
```

NOTE:

1. THIS IS A BEST FIT ALIGNMENT BASED ON AS BUILT PLAN FOR INFORMATION ONLY.
(CSJ: 0912-70-094)

℄ SH 225 CONTINUE

```
                                    Curve Data
                                   *----------*
Curve CL_2253
P.I.  Station           51+80.519  X      3,153,415.8502  Y     13,826,333.5045
Delta       =        4° 05′ 22.04" (LT)
Degree      =        0° 17′ 41.41"
Tangent     =             693.8105
Length      =           1,387.0319
Radius      =          19,433.1717
External    =              12.3814
Long Chord  =           1,386.7375
Mid. Ord.   =              12.3735
P.C.  Station           44+86.709  X      3,152,752.0990  Y     13,826,535.5130
P.T.  Station           58+73.741  X      3,154,092.3174  Y     13,826,179.3451
C.C.                               X      3,158,410.2216  Y     13,845,126.7424
Back        = S  73° 04′ 21.74" E
Ahead       = S  77° 09′ 43.78" E
Chord Bear  = S  75° 07′ 02.76" E

Course from PT CL_2253 to 79 S 78° 31′ 15.93" E Dist 955.5049

Point 79              X   3,155,028.7103 Y  13,825,989.1927 Sta     68+29.246

Course from 79 to 80 S 80° 41′ 11.41" E Dist 779.3291

Point 80              X   3,155,797.7660 Y  13,825,863.0690 Sta     76+08.575

Course from 80 to 81 S 80° 54′ 10.80" E Dist 2,442.1663

Point 81              X   3,158,209.2150 Y  13,825,476.9470 Sta    100+50.741

Course from 81 to 82 S 72° 13′ 05.46" W Dist 9,617.7033

                                                          End   Region 1
Equation: Sta 196+68.444 (BK) = Sta 29+87.970 (AH)        ----------------
                                                          Begin Region 2

Point 82              X   3,149,050.9845 Y  13,822,539.7663 Sta     29+87.970

Course from 82 to PC CL_2254 N 76° 14′ 36.97" E Dist 11,195.5932

                                                          End   Region 2
Equation: Sta 141+83.563 (BK) = Sta 117+88.846 (AH)       ----------------
                                                          Begin Region 3

                                    Curve Data
                                   *----------*
Curve CL_2254
P.I.  Station          122+46.358  X      3,160,377.4435  Y     13,825,131.2454
Delta       =       13° 24′ 35.42" (LT)
Degree      =        1° 28′ 20.08"
Tangent     =             457.5120
Length      =             910.8434
Radius      =           3,891.7304
External    =              26.8003
Long Chord  =             908.7659
Mid. Ord.   =              26.6170
P.C.  Station          117+88.846  X      3,159,925.4380  Y     13,825,202.0150
P.T.  Station          126+99.690  X      3,160,833.5380  Y     13,825,167.2320
C.C.                               X      3,160,527.4252  Y     13,829,046.9048
Back        = S  81° 06′ 05.58" E
Ahead       = N  85° 29′ 19.00" E
Chord Bear  = S  87° 48′ 23.29" E

================================================================================
Ending chain CL_225 description


<*          Save bc_225 SUB ℄ None ℄

File BC_225 is saved
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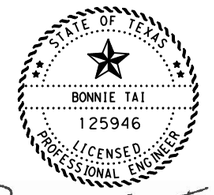

Bonnie Tai

05/21/2021

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Texas Department of Transportation

IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT DATA

SHEET 4 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		141
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

℄ SB RAILROAD

```
Chain RR_01 contains:
 RR1 RR2 RR3 CUR CRR1 RR4 RR5 RR6 RR7 RR8 RR9

Beginning chain RR_01 description
================================================================================

Point RR1              X   3,153,810.0095 Y  13,831,115.9010 Sta      10+00.000

Course from RR1 to RR2 N 22° 31′ 07.02" E Dist 71.6420

Point RR2              X   3,153,837.4472 Y  13,831,182.0807 Sta      10+71.642

Course from RR2 to RR3 N 26° 56′ 08.15" E Dist 34.7075

Point RR3              X   3,153,853.1694 Y  13,831,213.0231 Sta      11+06.350

                                  Curve Data
                                 *----------*
Curve CRR1
P.I.  Station            12+22.216  X      3,153,905.6557  Y      13,831,316.3202
Delta          =      32° 18′ 32.83" (RT)
Degree         =      14° 19′ 26.20"
Tangent        =            115.8668
Length         =            225.5602
Radius         =            400.0000
External       =             16.4434
Long Chord     =            222.5835
Mid. Ord.      =             15.7941
P.C.  Station            11+06.350  X      3,153,853.1694  Y      13,831,213.0231
P.T.  Station            13+31.910  X      3,154,005.2269  Y      13,831,375.5713
C.C.                                X      3,154,209.7759  Y      13,831,031.8276
Back         = N  26° 56′ 08.15" E
Ahead        = N  59° 14′ 40.98" E
Chord Bear   = N  43° 05′ 24.57" E

Point RR4              X   3,154,005.2269 Y  13,831,375.5713 Sta      13+31.910

Course from RR4 to RR5 N 59° 14′ 40.98" E Dist 44.9510

Point RR5              X   3,154,043.8560 Y  13,831,398.5580 Sta      13+76.861

Course from RR5 to RR6 N 62° 02′ 00.35" E Dist 33.6982

Point RR6              X   3,154,073.6190 Y  13,831,414.3610 Sta      14+10.559

Course from RR6 to RR7 N 64° 41′ 44.90" E Dist 49.2363

Point RR7              X   3,154,118.1311 Y  13,831,435.4058 Sta      14+59.795

Course from RR7 to RR8 N 66° 19′ 41.08" E Dist 65.7392

Point RR8              X   3,154,178.3390 Y  13,831,461.8000 Sta      15+25.535

Course from RR8 to RR9 N 68° 50′ 50.60" E Dist 185.1306

Point RR9              X   3,154,350.9960 Y  13,831,528.6050 Sta      17+10.665

================================================================================
Ending chain RR_01 description
```

℄ NB RAILROAD

```
<*       2   Describe Chain RR_02

Chain RR_02 contains:
 RR20 RR21 RR22 CUR CRR2 RR24 RR25

Beginning chain RR_02 description
================================================================================

Point RR20             X   3,153,773.4514 Y  13,831,067.9185 Sta      10+00.000

Course from RR20 to RR21 N 5° 49′ 32.19" E Dist 24.6532

Point RR21             X   3,153,775.9537 Y  13,831,092.4444 Sta      10+24.653

Course from RR21 to RR22 N 10° 54′ 11.82" E Dist 36.3115

Point RR22             X   3,153,782.8221 Y  13,831,128.1004 Sta      10+60.965

                                  Curve Data
                                 *----------*
Curve CRR2
P.I.  Station            11+90.651  X      3,153,812.9406  Y      13,831,254.2405
Delta          =      33° 33′ 58.07" (RT)
Degree         =      13° 19′ 28.56"
Tangent        =            129.6860
Length         =            251.9110
Radius         =            430.0000
External       =             19.1308
Long Chord     =            248.3240
Mid. Ord.      =             18.3159
P.C.  Station            10+60.965  X      3,153,782.8221  Y      13,831,128.1004
P.T.  Station            13+12.876  X      3,153,907.7796  Y      13,831,342.6940
C.C.                                X      3,154,201.0651  Y      13,831,028.2364
Back         = N  13° 25′ 44.74" E
Ahead        = N  46° 59′ 42.82" E
Chord Bear   = N  30° 12′ 43.78" E

Point RR24             X   3,153,907.7796 Y  13,831,342.6940 Sta      13+12.876

Course from RR24 to RR25 N 46° 59′ 42.81" E Dist 40.8580

Point RR25             X   3,153,937.6589 Y  13,831,370.5616 Sta      13+53.734

================================================================================
Ending chain RR_02 description
```

STATE OF TEXAS
BONNIE TAI
125946
LICENSED
PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

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NOTE:

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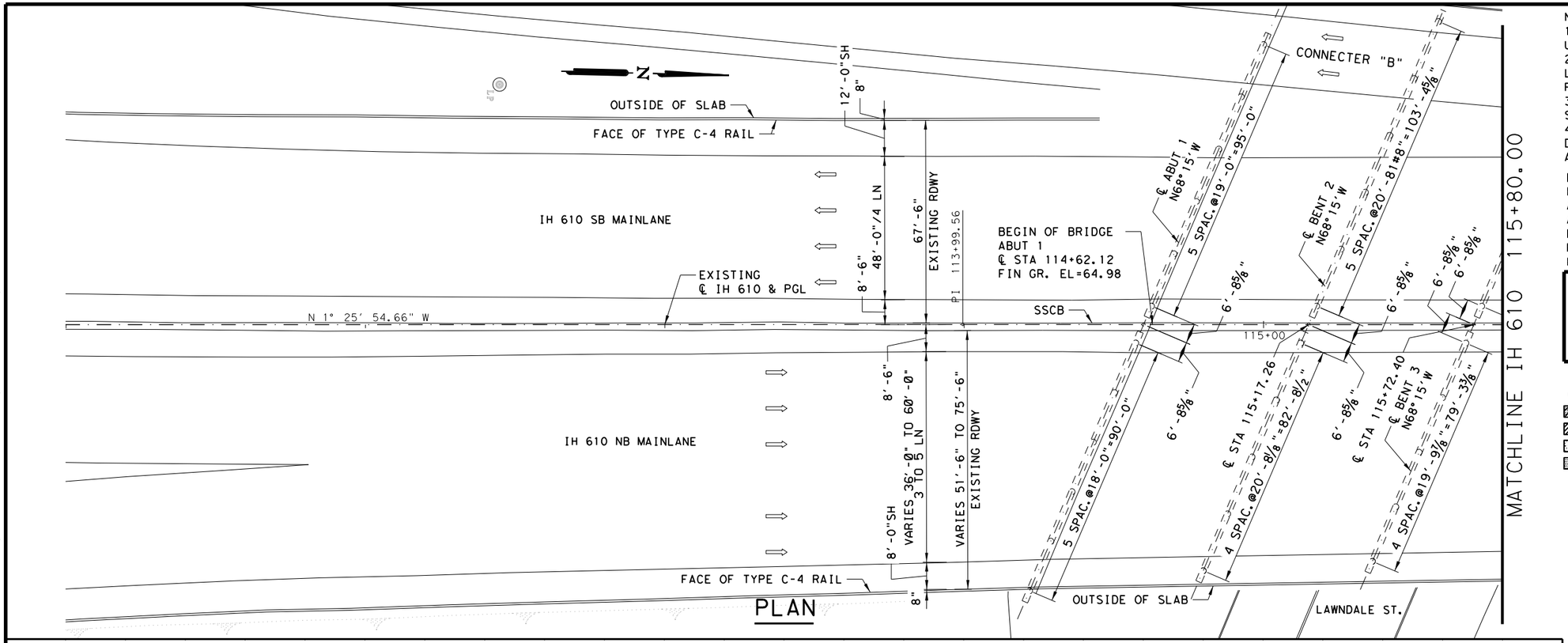
(CSJ: 0912-70-094)

Texas Department of Transportation

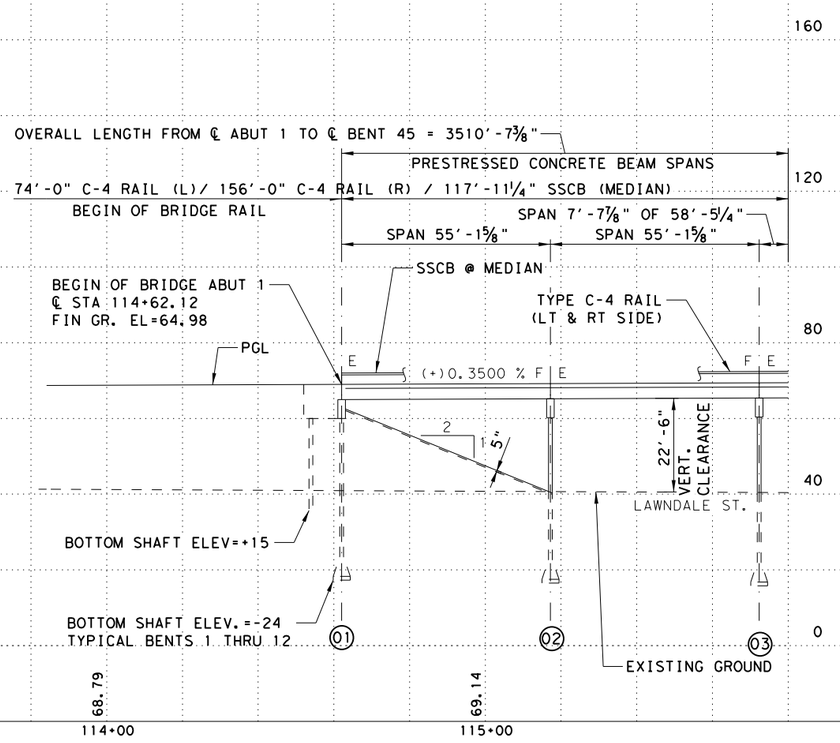
IH 610 SHIP CHANNEL BRIDGE EXISTING HORIZONTAL ALIGNMENT DATA

SHEET 5 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		142
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



PLAN



ELEVATION

NOTES:
1. STATIONS ARE TAKEN ALONG ℄ IH 610, UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ANY EXISTING UTILITIES PRIOR TO STARTING WORK.
3. SEE AS BUILT PLANS FOR HISTORICAL SOIL BORING INFORMATION.
4. PROVIDE A SIGNED AND SEALED PLAN FOR DECK AND RAIL REPAIR LOCATIONS FOR APPROVAL BY THE ENGINEER PRIOR TO WORK.

DESIGN DATA:

FUNCTIONAL CLASS:	URBAN FREEWAY
ADT (2021):	197,000
ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

THESE DETAILS WERE REDRAWN PER "AS-BUILT PLANS". APPROXIMATE LOCATIONS OF THE WORK TO BE DETERMINED BY THE AREA OFFICE. LOCATIONS OF WORK NOT TO SCALE. CONTRACTOR TO FIELD VERIFY ALL INFORMATION PRIOR TO ANY CONSTRUCTION.

LEGEND AND SYMBOLS

- EXISTING DIRECTION OF TRAFFIC
- DECK & RAIL REPAIR LOCATION
- SPALLING REPAIR LOCATIONS
- STEEL PAINTING LOCATIONS
- SPALLING REPAIR ON FACE OF BEAM ENDS
- "E" - DENOTES EXPANSION
- "F" - DENOTES FIXED
- "℄" - CENTER LINE
- "SH" - SHOULDER
- "PGL" - PROFILE GRADE LINE

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai
07/02/2021

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Texas Department of Transportation

BRIDGE LAYOUT
IH 610
SHIP CHANNEL BRIDGE

℄ IH 610 BEGIN BRIDGE TO STA 115+80.00

SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 1 OF 17

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		143
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
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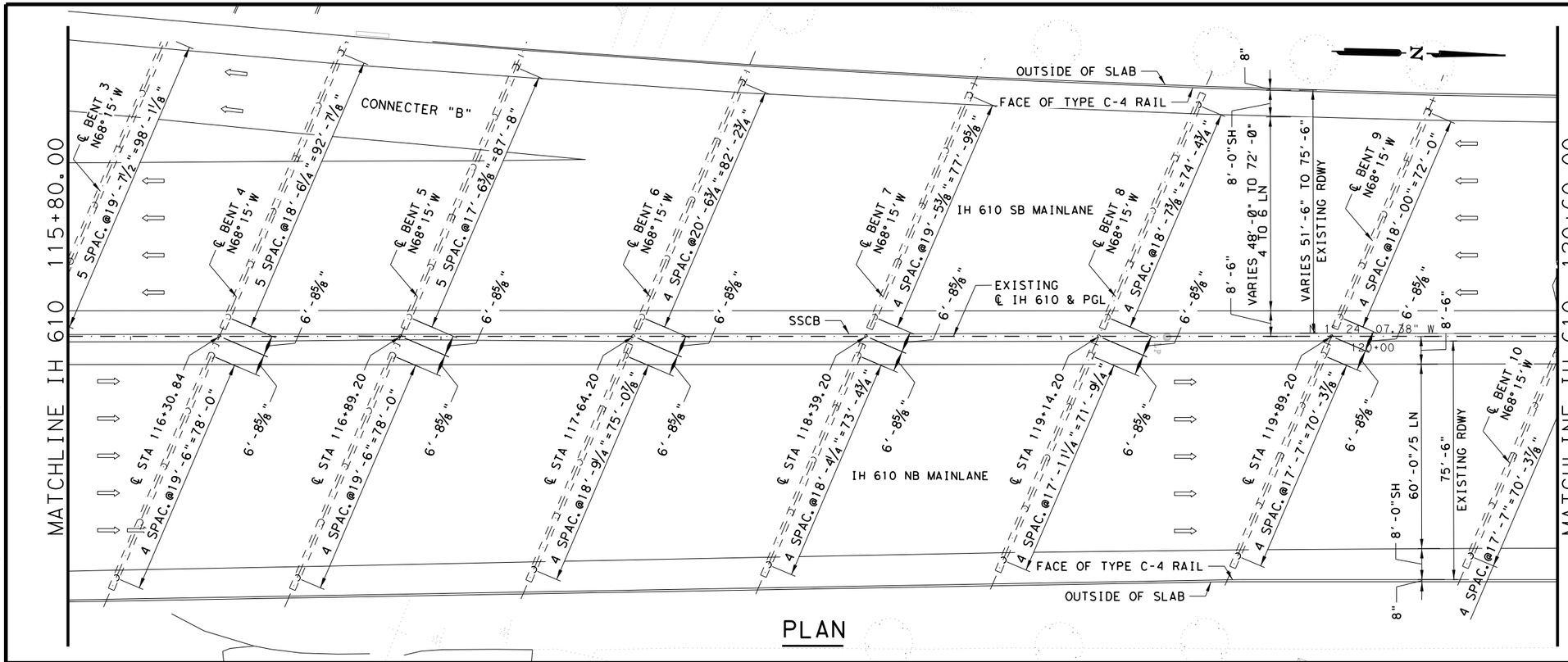
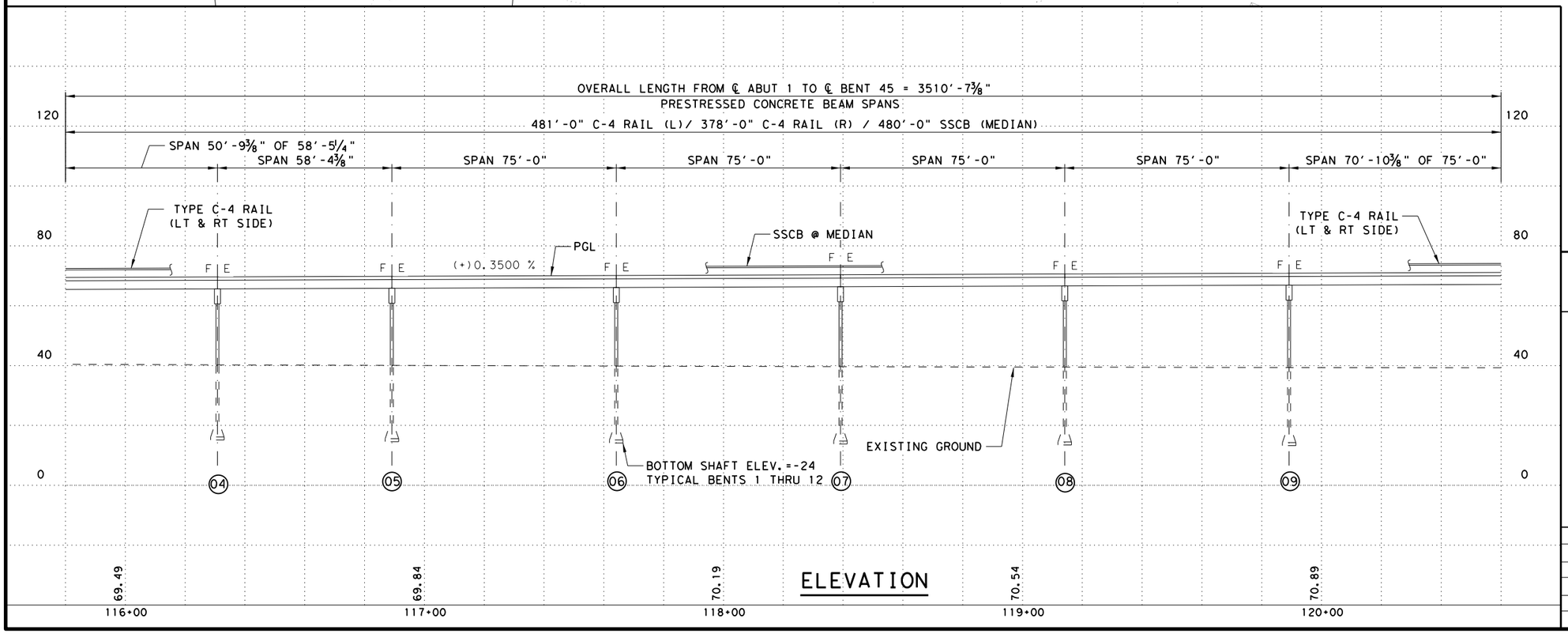


PLAN



ELEVATION

NOTES:
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4. PROVIDE A SIGNED AND SEALED PLAN FOR DECK AND RAIL REPAIR LOCATIONS FOR APPROVAL BY THE ENGINEER PRIOR TO WORK.

DESIGN DATA:

FUNCTIONAL CLASS:	URBAN FREEWAY
ADT (2021):	197,000
ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

THESE DETAILS WERE REDRAWN PER "AS-BUILT PLANS". APPROXIMATE LOCATIONS OF THE WORK TO BE DETERMINED BY THE AREA OFFICE. LOCATIONS OF WORK NOT TO SCALE. CONTRACTOR TO FIELD VERIFY ALL INFORMATION PRIOR TO ANY CONSTRUCTION.

LEGEND AND SYMBOLS

- EXISTING DIRECTION OF TRAFFIC
- DECK & RAIL REPAIR LOCATION
- SPALLING REPAIR LOCATIONS
- STEEL PAINTING LOCATIONS
- SPALLING REPAIR ON FACE OF BEAM ENDS
- "E" - DENOTES EXPANSION
- "F" - DENOTES FIXED
- "℄" - CENTER LINE
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07/02/2021

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Texas Department of Transportation

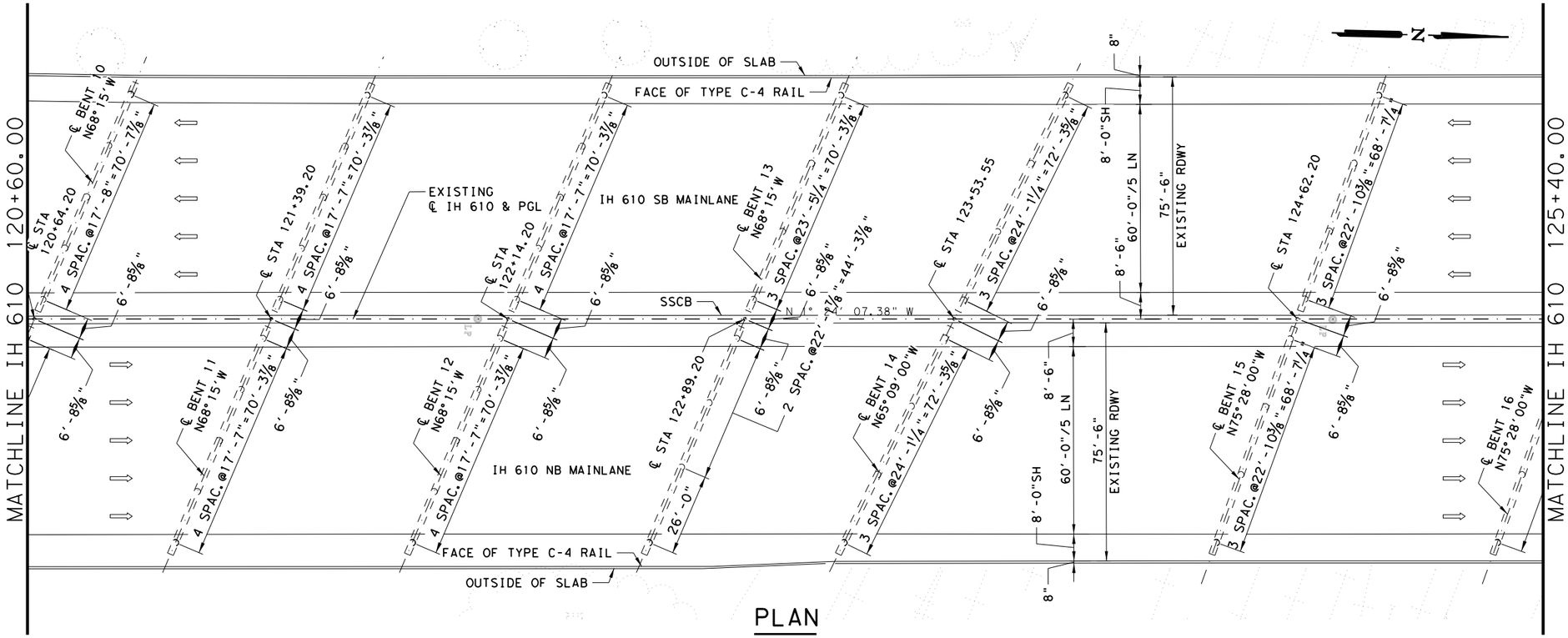
BRIDGE LAYOUT
IH 610
SHIP CHANNEL BRIDGE

℄ IH 610 STA 115+80.00
TO STA 120+60.00

SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 2 OF 17

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		144
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



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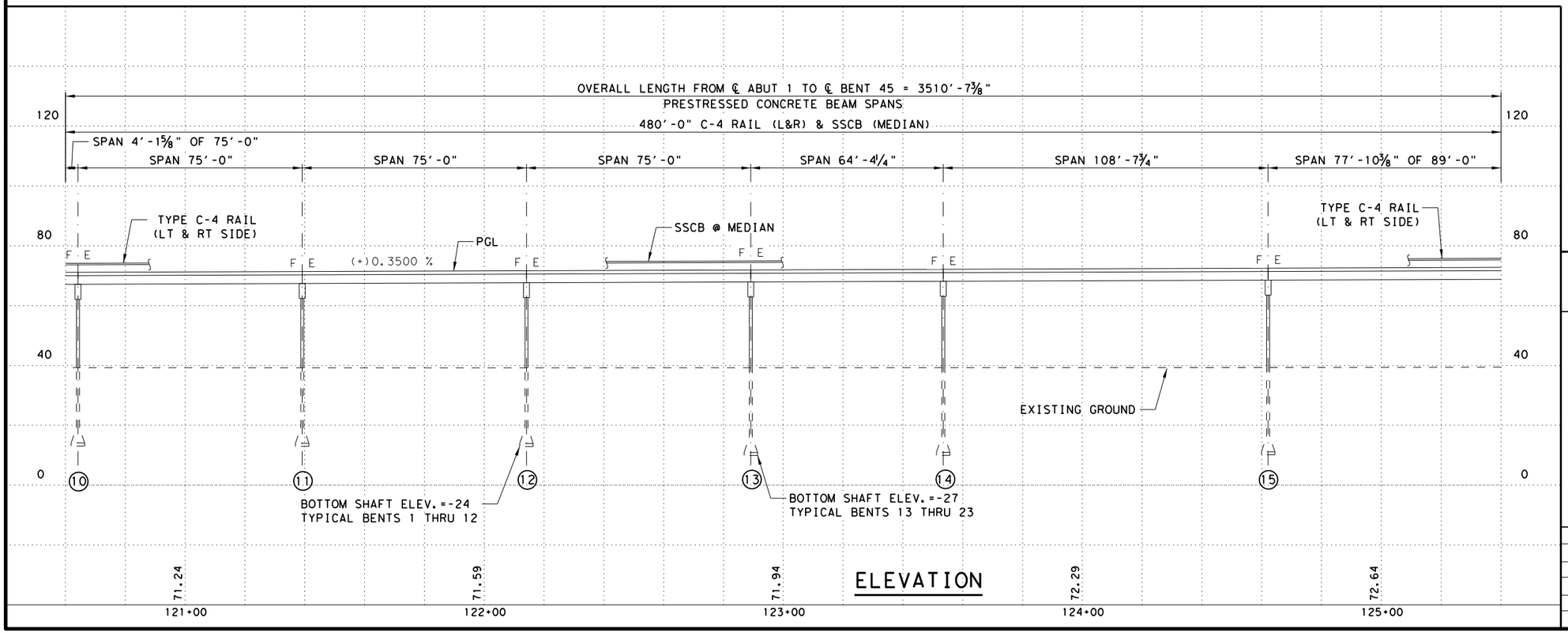

ELEVATION

NOTES:
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3. SEE AS BUILT PLANS FOR HISTORICAL SOIL BORING INFORMATION.
4. PROVIDE A SIGNED AND SEALED PLAN FOR DECK AND RAIL REPAIR LOCATIONS FOR APPROVAL BY THE ENGINEER PRIOR TO WORK.

DESIGN DATA:

FUNCTIONAL CLASS:	URBAN FREEWAY
ADT (2021):	197,000
ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

THESE DETAILS WERE REDRAWN PER "AS-BUILT PLANS". APPROXIMATE LOCATIONS OF THE WORK TO BE DETERMINED BY THE AREA OFFICE. LOCATIONS OF WORK NOT TO SCALE. CONTRACTOR TO FIELD VERIFY ALL INFORMATION PRIOR TO ANY CONSTRUCTION.

LEGEND AND SYMBOLS

- EXISTING DIRECTION OF TRAFFIC
- DECK & RAIL REPAIR LOCATION
- SPALLING REPAIR LOCATIONS
- STEEL PAINTING LOCATIONS
- SPALLING REPAIR ON FACE OF BEAM ENDS
- "E" - DENOTES EXPANSION
- "F" - DENOTES FIXED
- "℄" - CENTER LINE
- "SH" - SHOULDER
- "PGL" - PROFILE GRADE LINE

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai
07/02/2021

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Texas Department of Transportation

BRIDGE LAYOUT
IH 610
SHIP CHANNEL BRIDGE

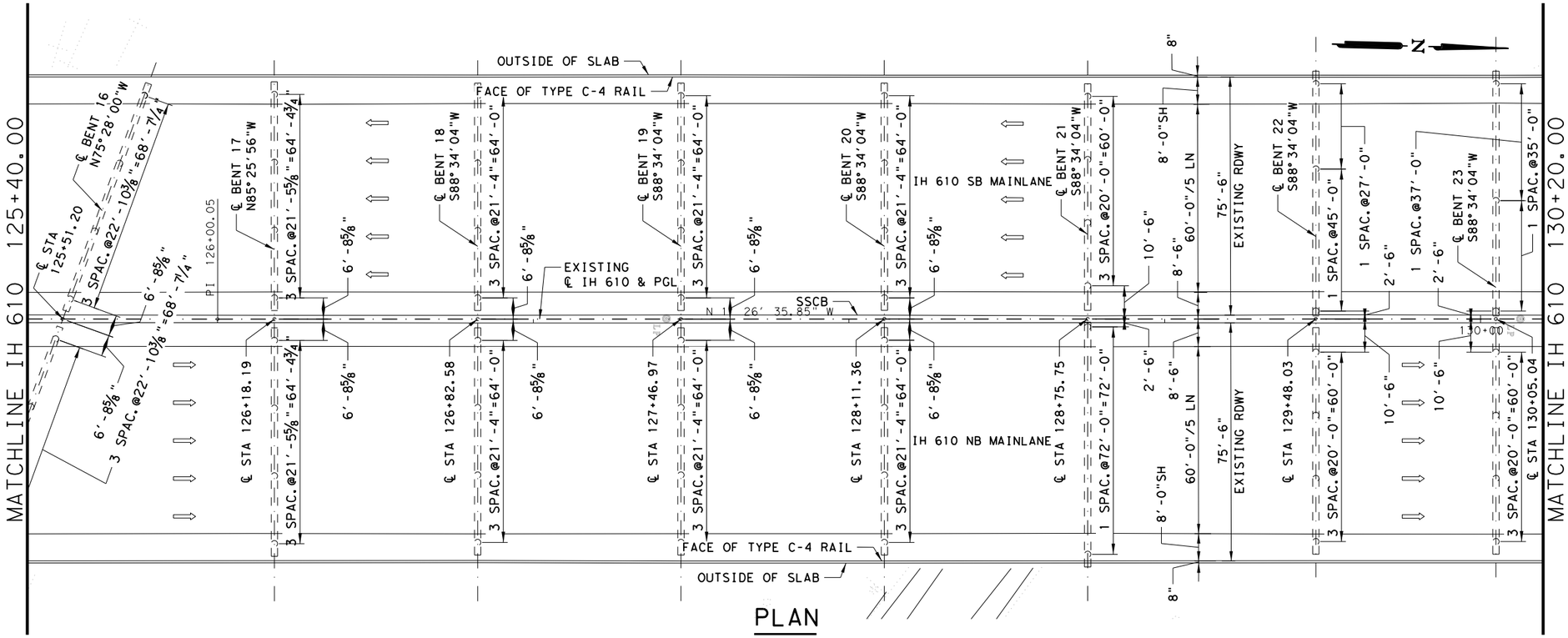
℄ IH 610 STA 120+60.00
TO STA 125+40.00

SCALE: 1" = 40' HORZ
1" = 40' VERT

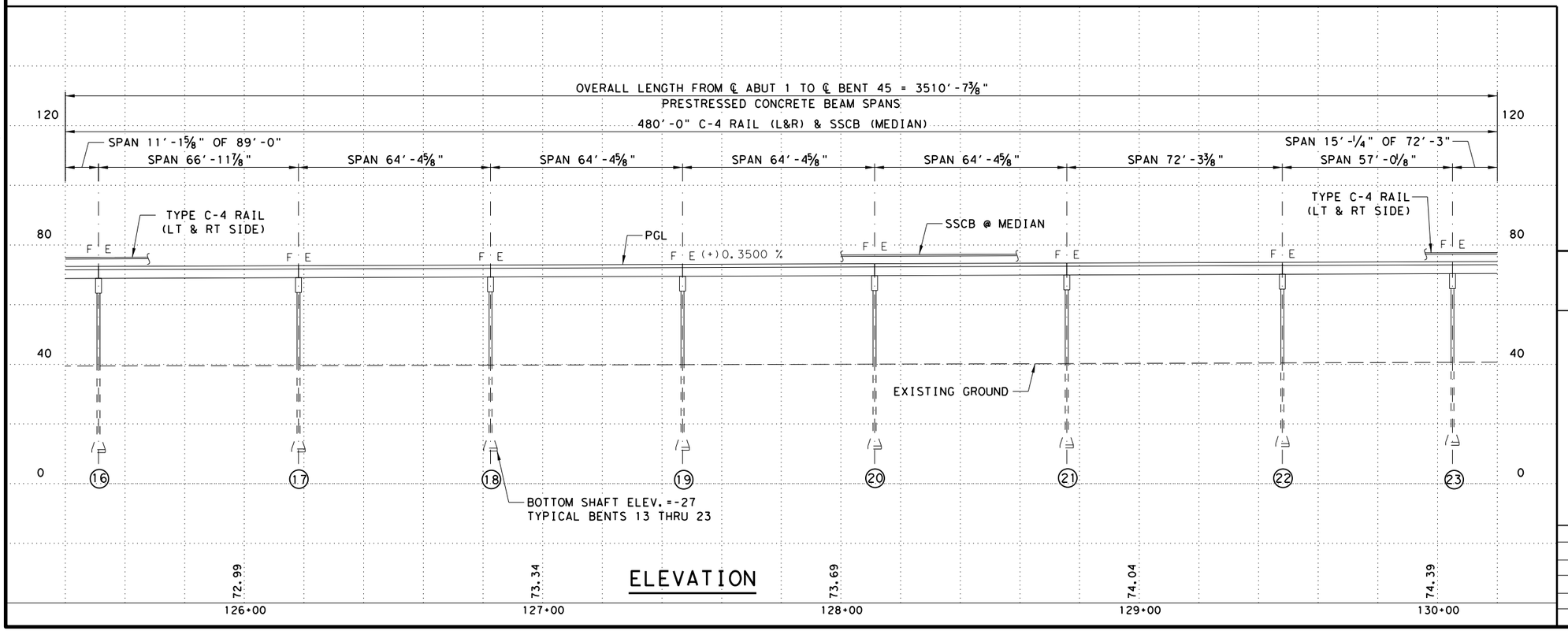
SHEET 3 OF 17

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		145
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\7. Bridge\097BL*03.dgn



PLAN



ELEVATION

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DESIGN DATA:

FUNCTIONAL CLASS:	URBAN FREEWAY
ADT (2021):	197,000
ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

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LEGEND AND SYMBOLS

- EXISTING DIRECTION OF TRAFFIC
- DECK & RAIL REPAIR LOCATION
- SPALLING REPAIR LOCATIONS
- STEEL PAINTING LOCATIONS
- SPALLING REPAIR ON FACE OF BEAM ENDS
- "E" - DENOTES EXPANSION
- "F" - DENOTES FIXED
- "℄" - CENTER LINE
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STATE OF TEXAS
BONNIE TAI
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Bonnie Tai
07/02/2021

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Texas Department of Transportation

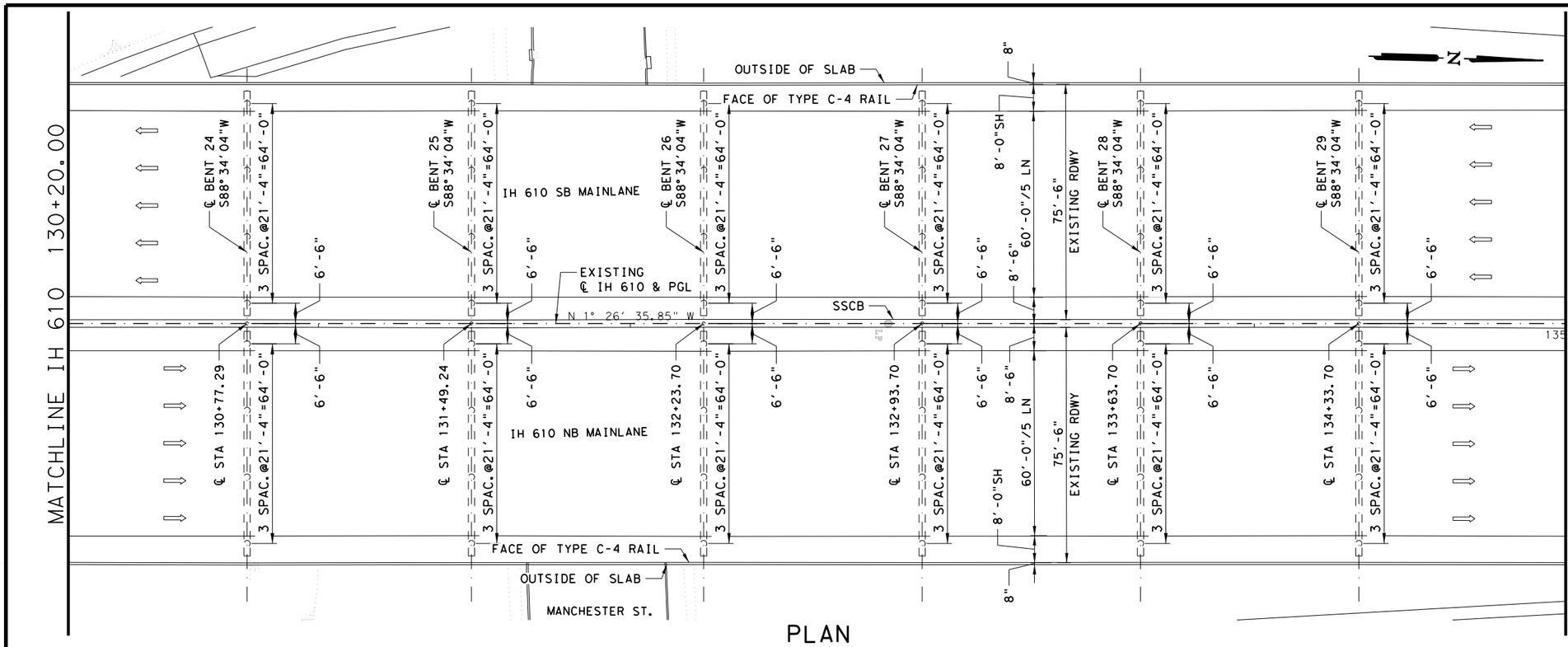
BRIDGE LAYOUT
IH 610
SHIP CHANNEL BRIDGE

℄ IH 610 STA 125+40.00
TO STA 130+20.00

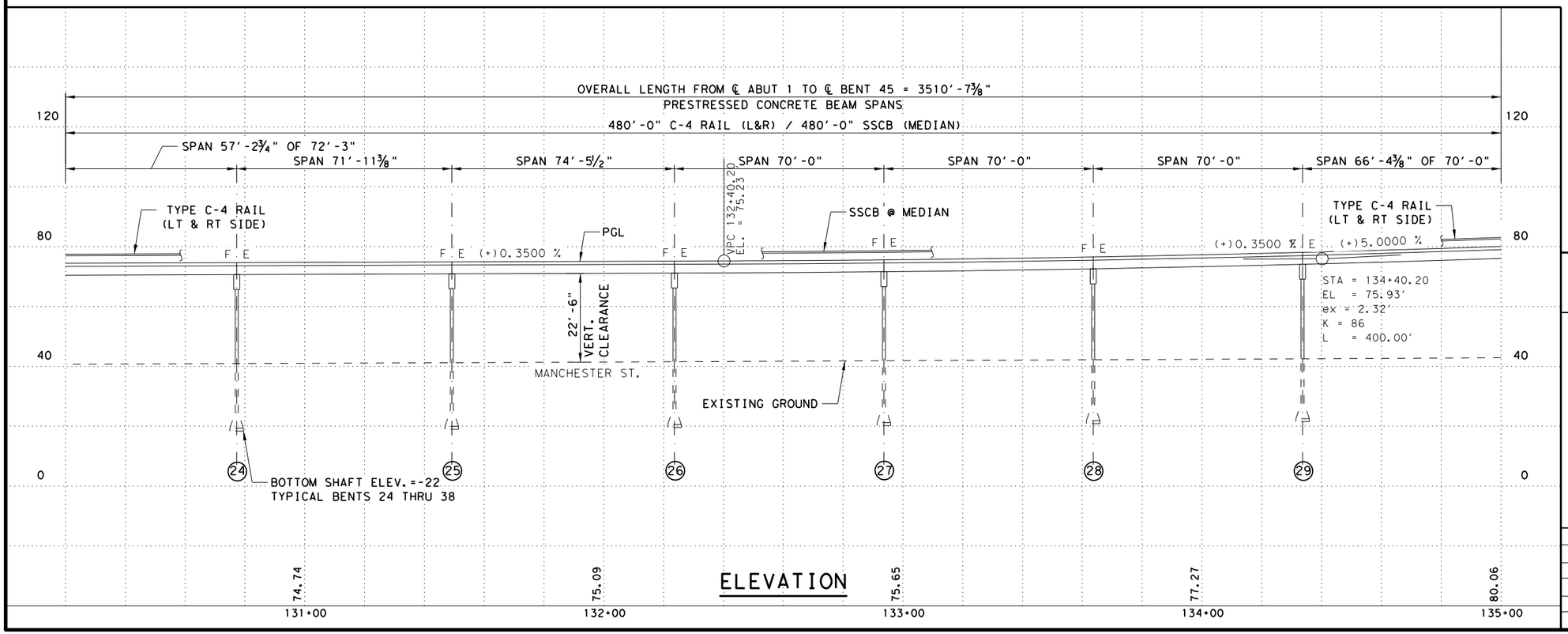
SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 4 OF 17

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		146
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



PLAN



ELEVATION

NOTES:
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DESIGN DATA:

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ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

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LEGEND AND SYMBOLS

- EXISTING DIRECTION OF TRAFFIC
- DECK & RAIL REPAIR LOCATION
- SPALLING REPAIR LOCATIONS
- STEEL PAINTING LOCATIONS
- SPALLING REPAIR ON FACE OF BEAM ENDS
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STATE OF TEXAS
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Texas Department of Transportation

BRIDGE LAYOUT IH 610 SHIP CHANNEL BRIDGE

℄ IH 610 STA 130+20.00 TO STA 135+00.00

SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 5 OF 17

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		147
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
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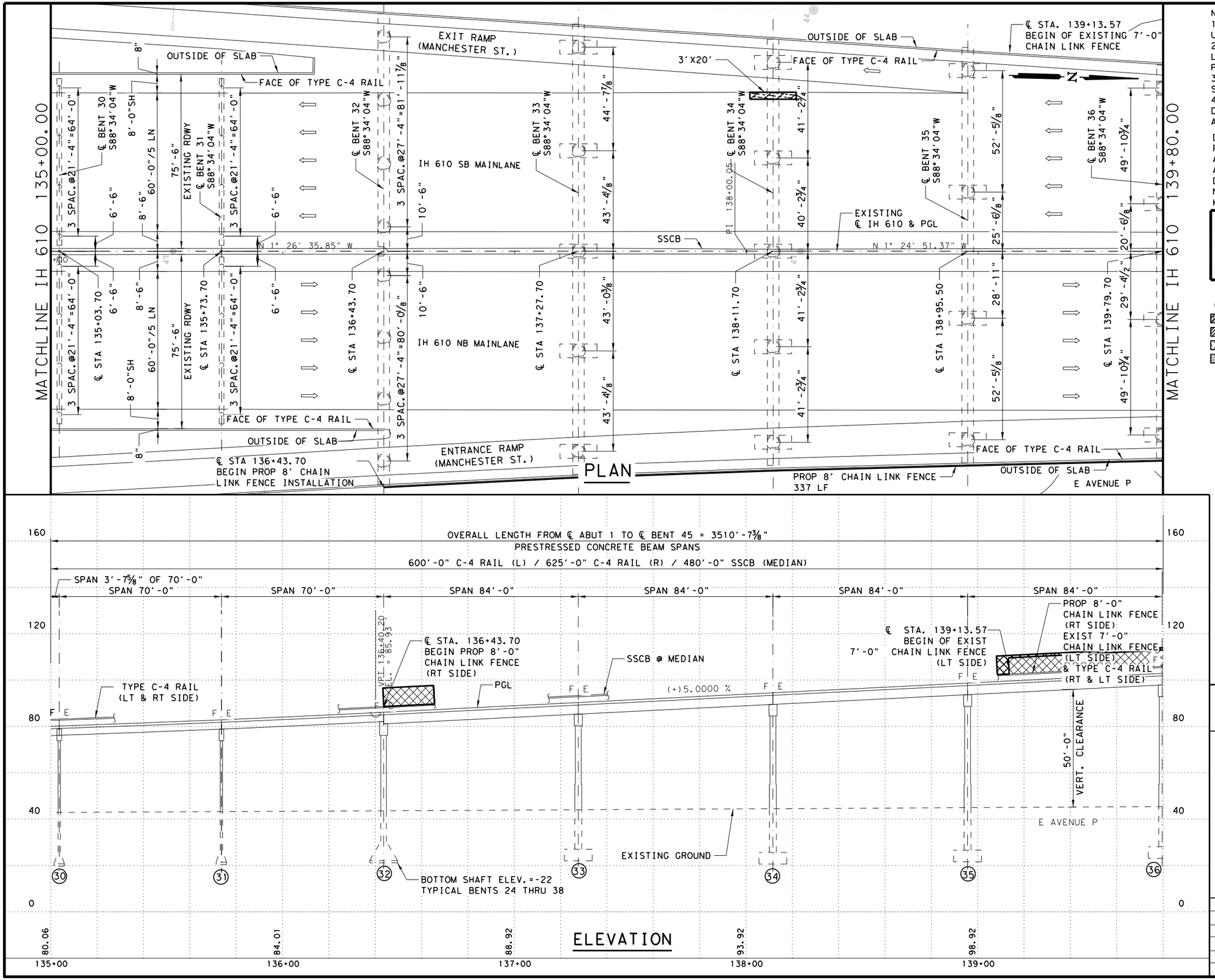

NOTES:
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ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

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BRIDGE LAYOUT IH 610 SHIP CHANNEL BRIDGE

℄ IH 610 STA 135+00.00 TO STA 139+80.00

SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 6 OF 17

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		148
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
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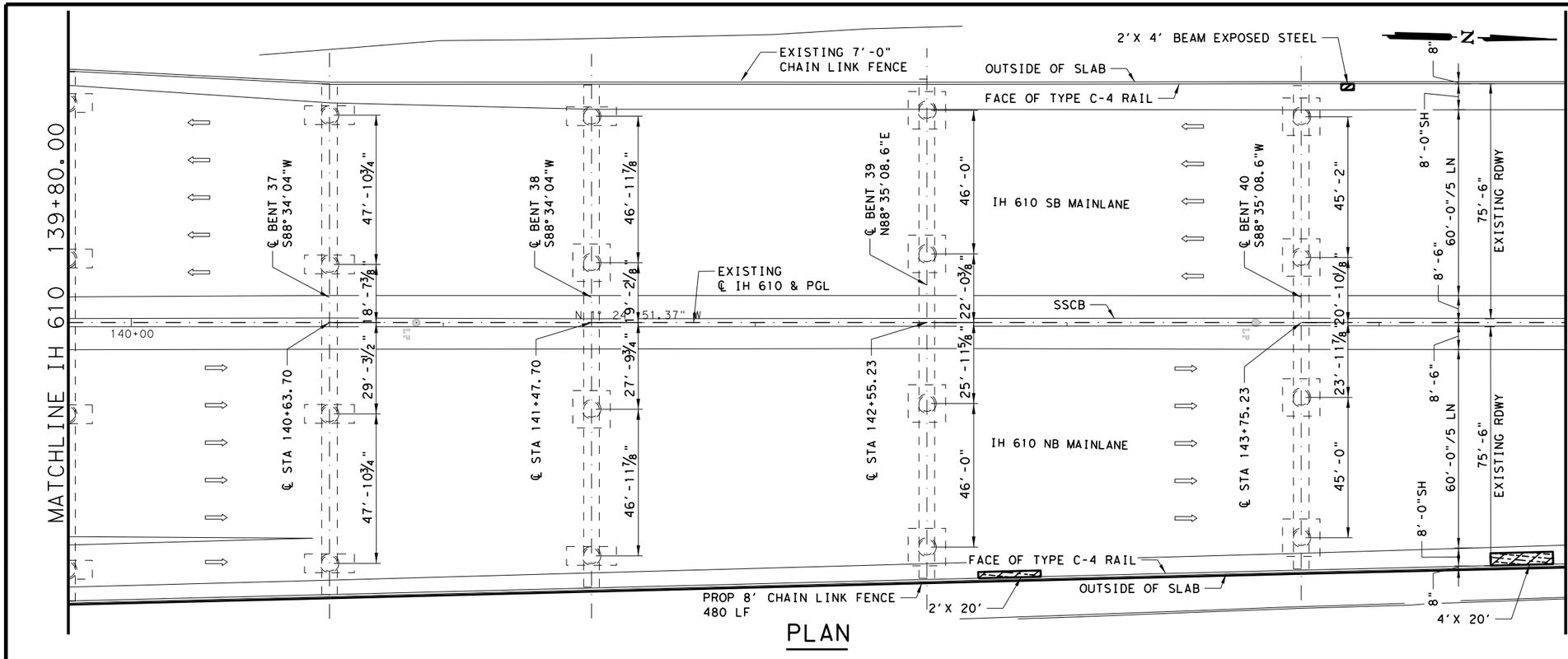
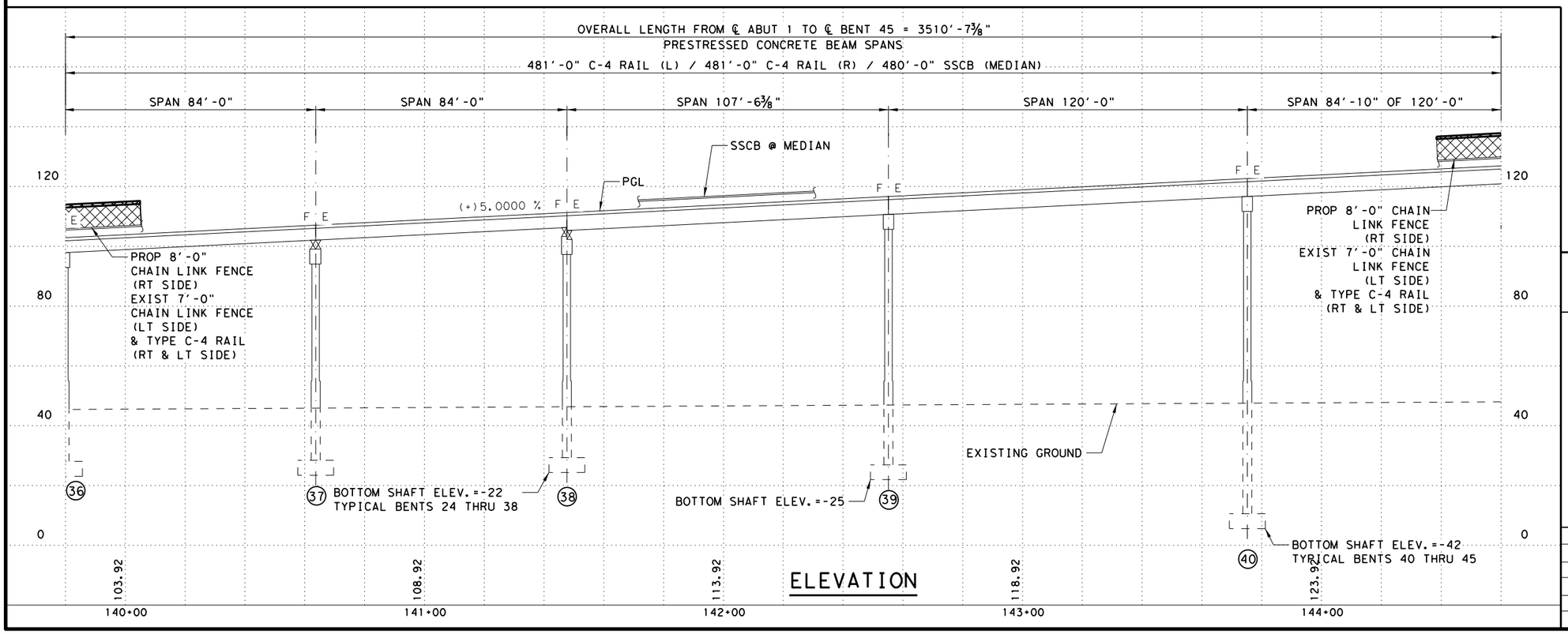


PLAN



ELEVATION

NOTES:
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DESIGN DATA:

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ADT (2021):	197,000
ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

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LEGEND AND SYMBOLS

- EXISTING DIRECTION OF TRAFFIC
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Texas Department of Transportation

BRIDGE LAYOUT
IH 610
SHIP CHANNEL BRIDGE

℄ IH 610 STA 139+80.00
TO STA 144+60.00

SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 7 OF 17

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		149
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
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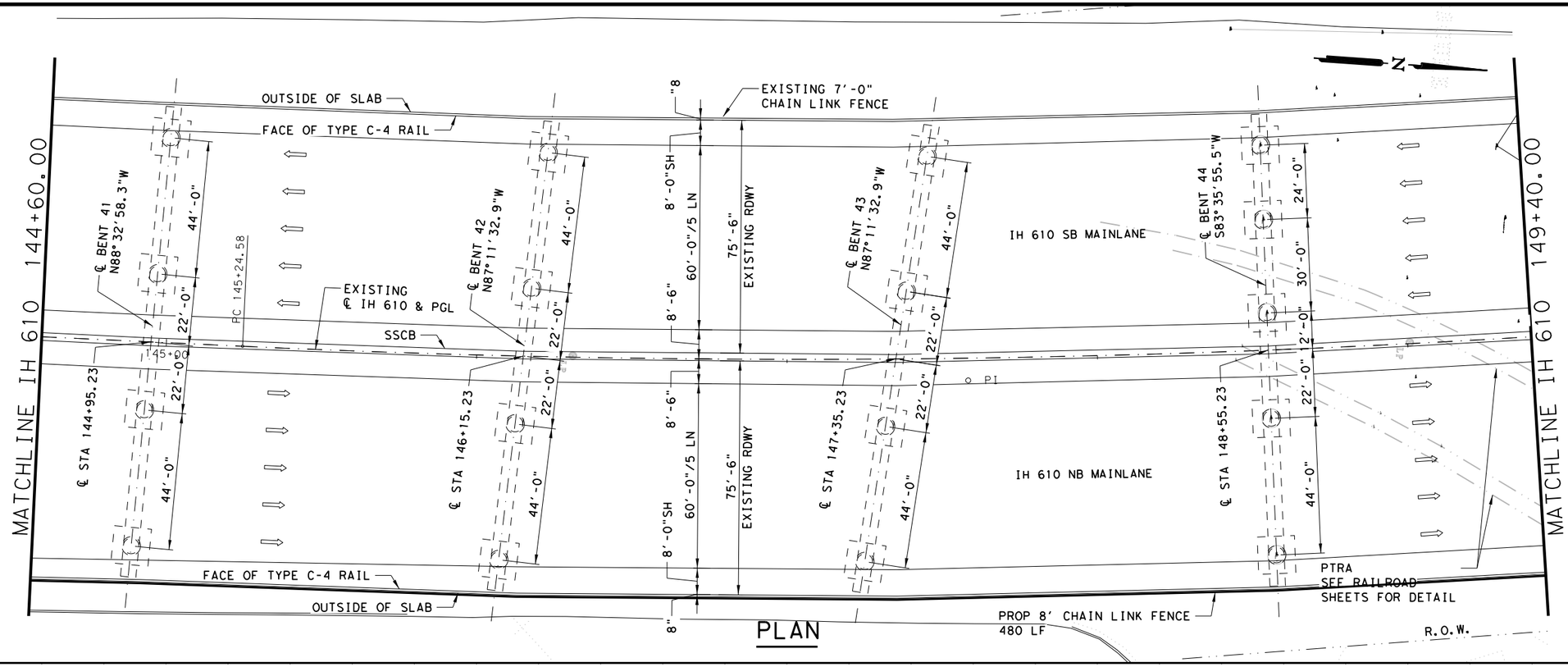

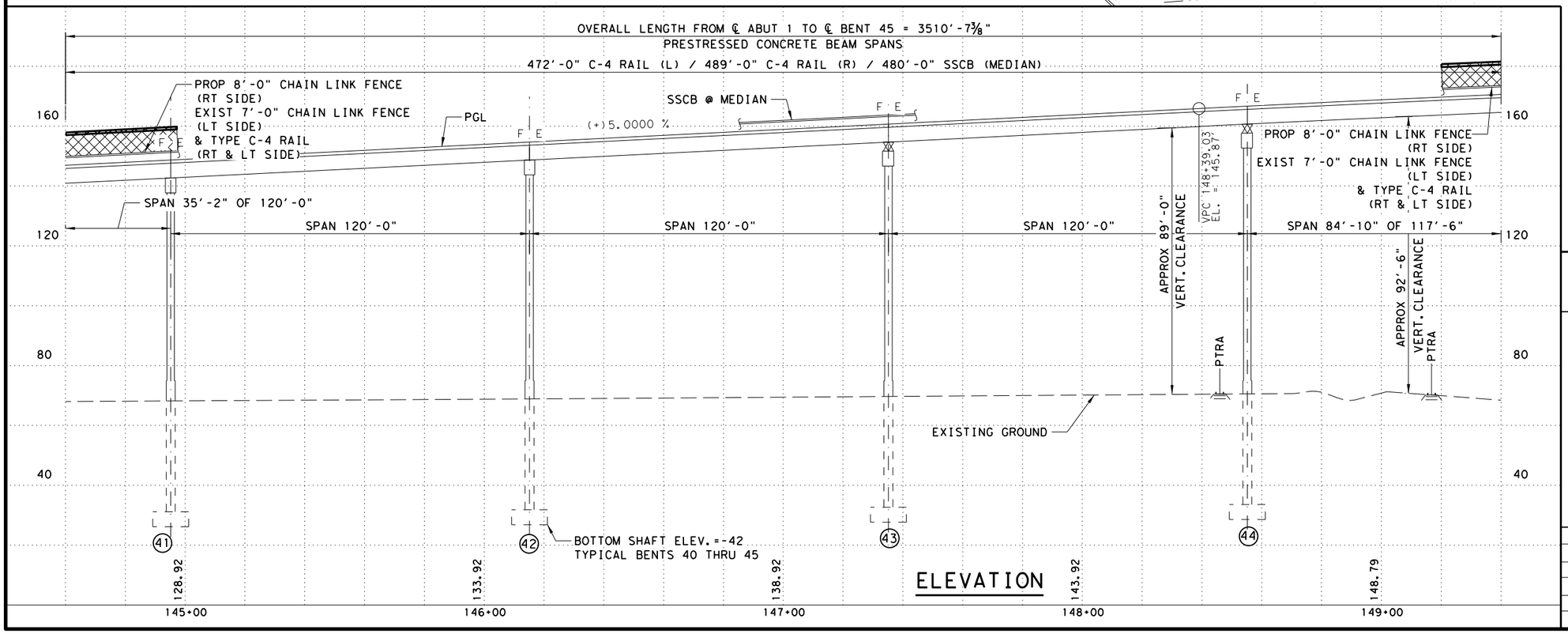

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DESIGN DATA:

FUNCTIONAL CLASS:	URBAN FREEWAY
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ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

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LEGEND AND SYMBOLS

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STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai
07/02/2021

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Texas Department of Transportation

BRIDGE LAYOUT
IH 610
SHIP CHANNEL BRIDGE

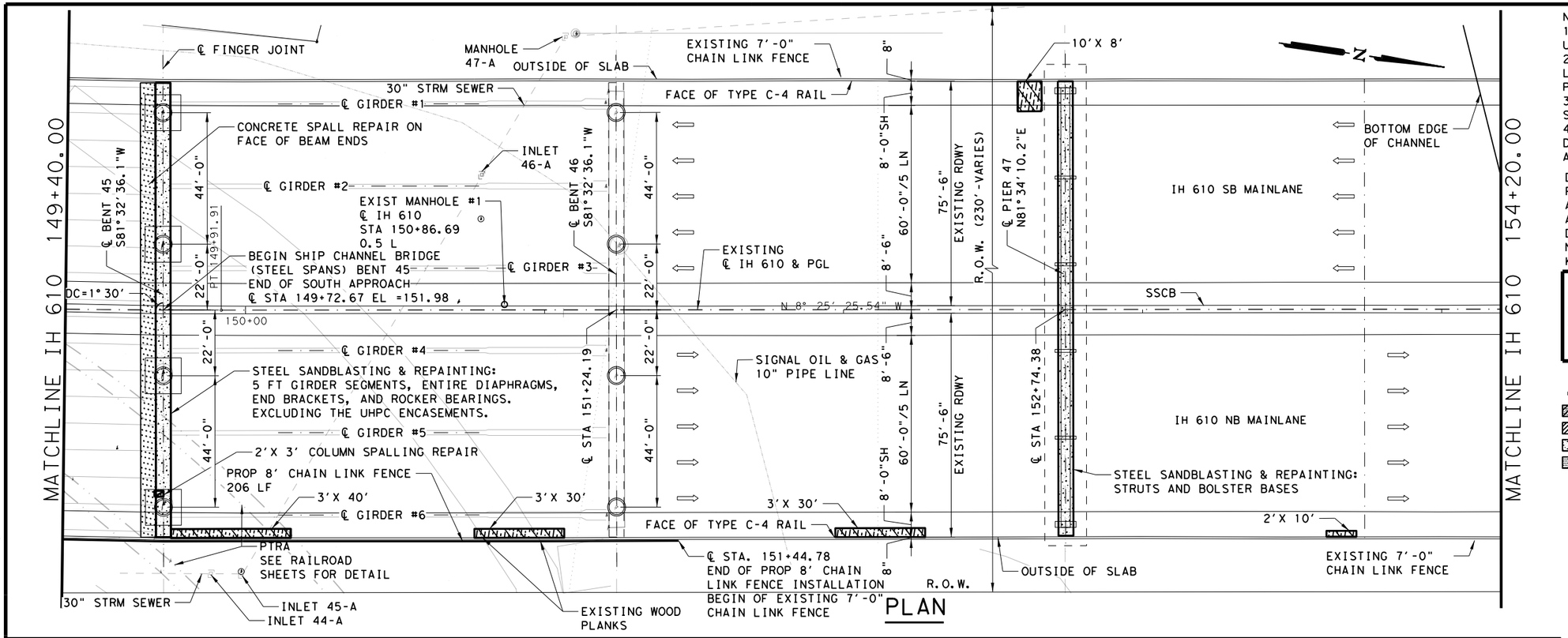
℄ IH 610 STA 144+60.00
TO STA 149+40.00

SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 8 OF 17

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		150
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\7. Bridge\097BL*08.dgn



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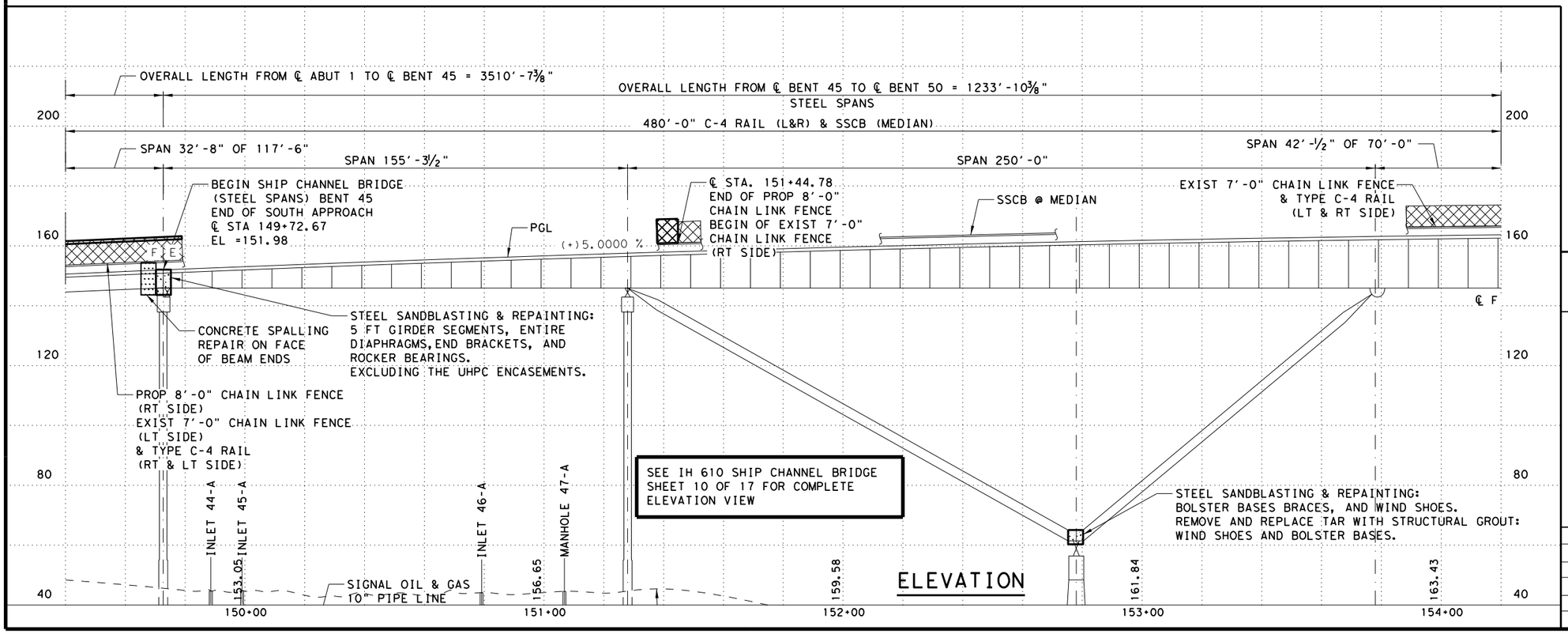

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LICENSED PROFESSIONAL ENGINEER

Bonnie Tai
07/02/2021

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Texas Department of Transportation

BRIDGE LAYOUT IH 610 SHIP CHANNEL BRIDGE

℄ IH 610 STA 149+40.00 TO STA 154+20.00

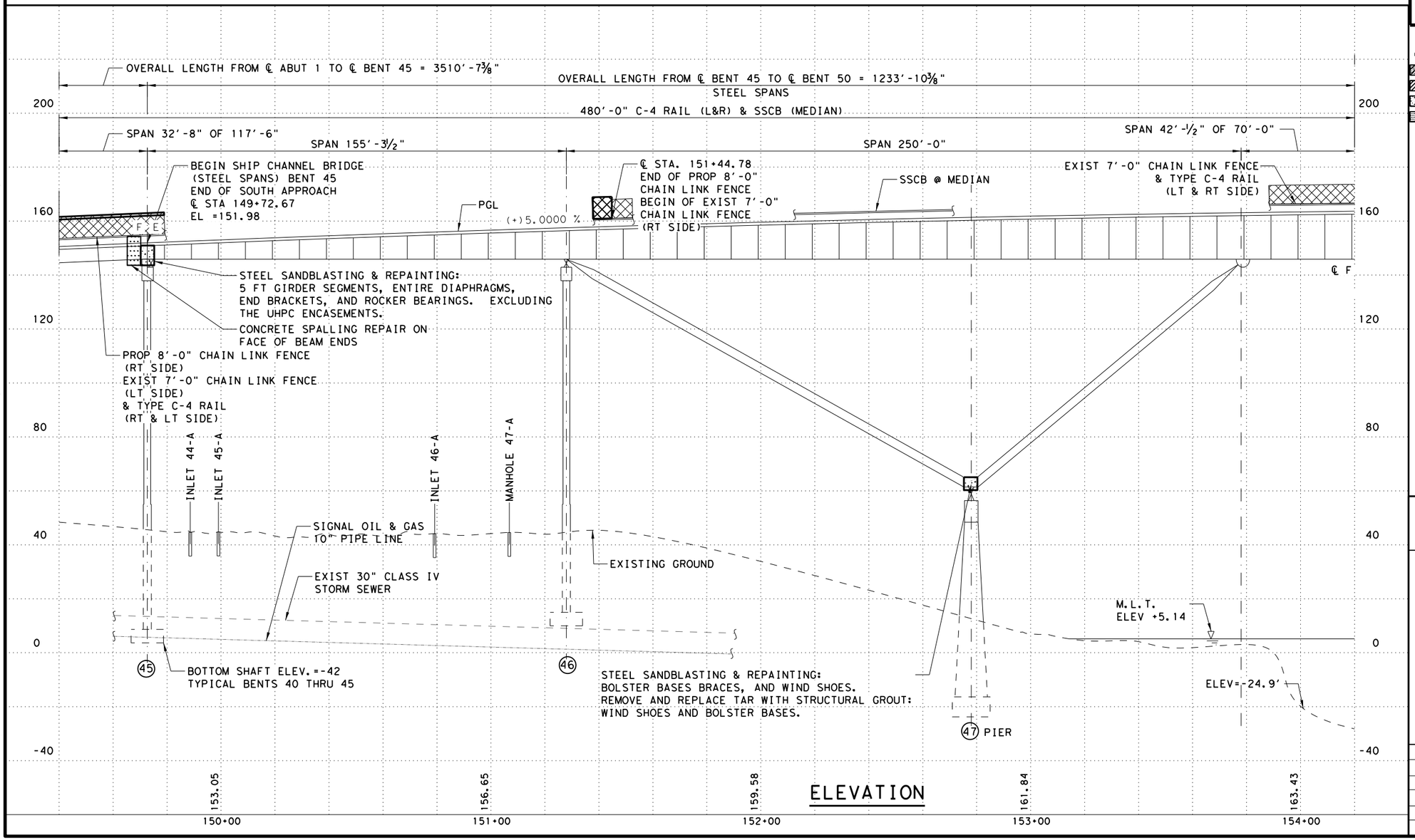
SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 9 OF 17

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		151
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\7. Bridge\097BL*09.dgn

SEE IH 610 SHIP CHANNEL BRIDGE SHEET 9 OF 17 FOR COMPLETE PLAN VIEW



ELEVATION

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DESIGN DATA:

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NBI#:	12-102-0-027115-377
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LEGEND AND SYMBOLS

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BRIDGE LAYOUT
IH 610
SHIP CHANNEL BRIDGE

℄ IH 610 STA 149+40.00
TO STA 154+20.00

SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 10 OF 17

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		152
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
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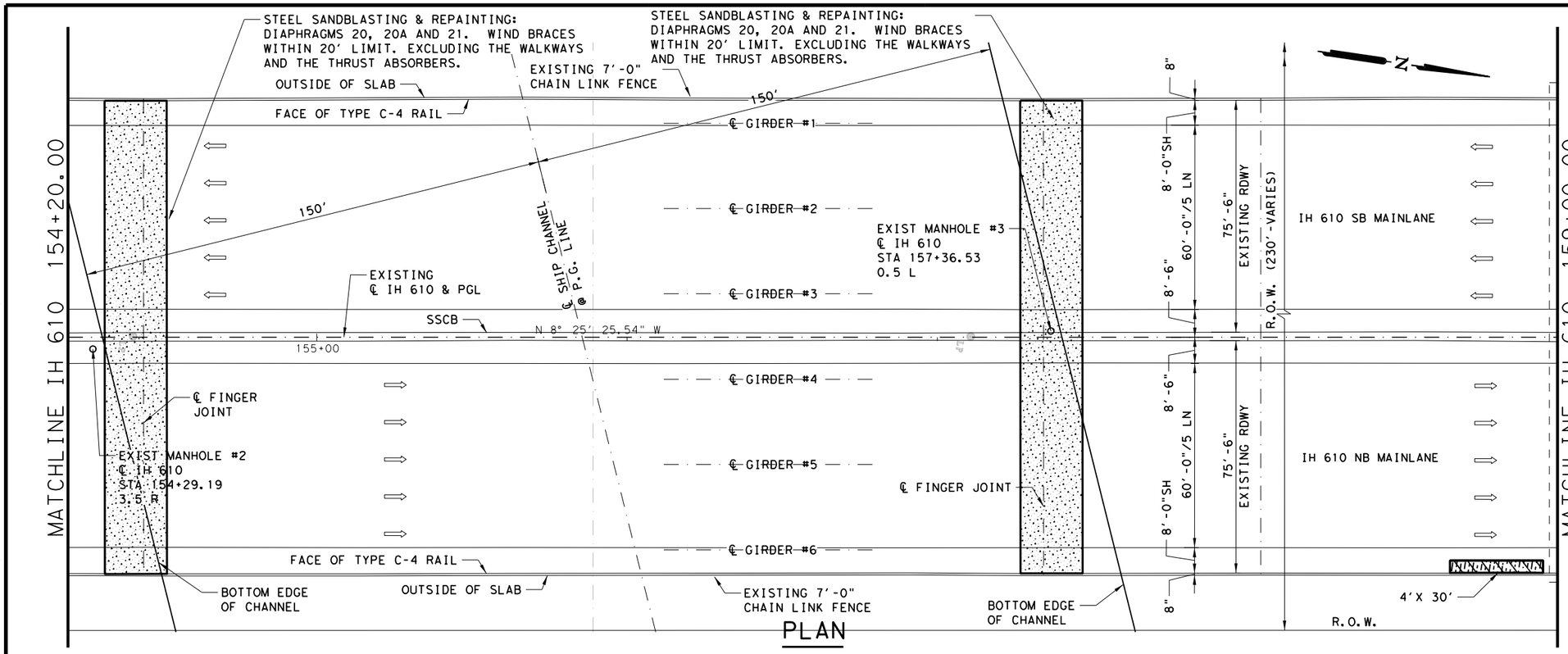
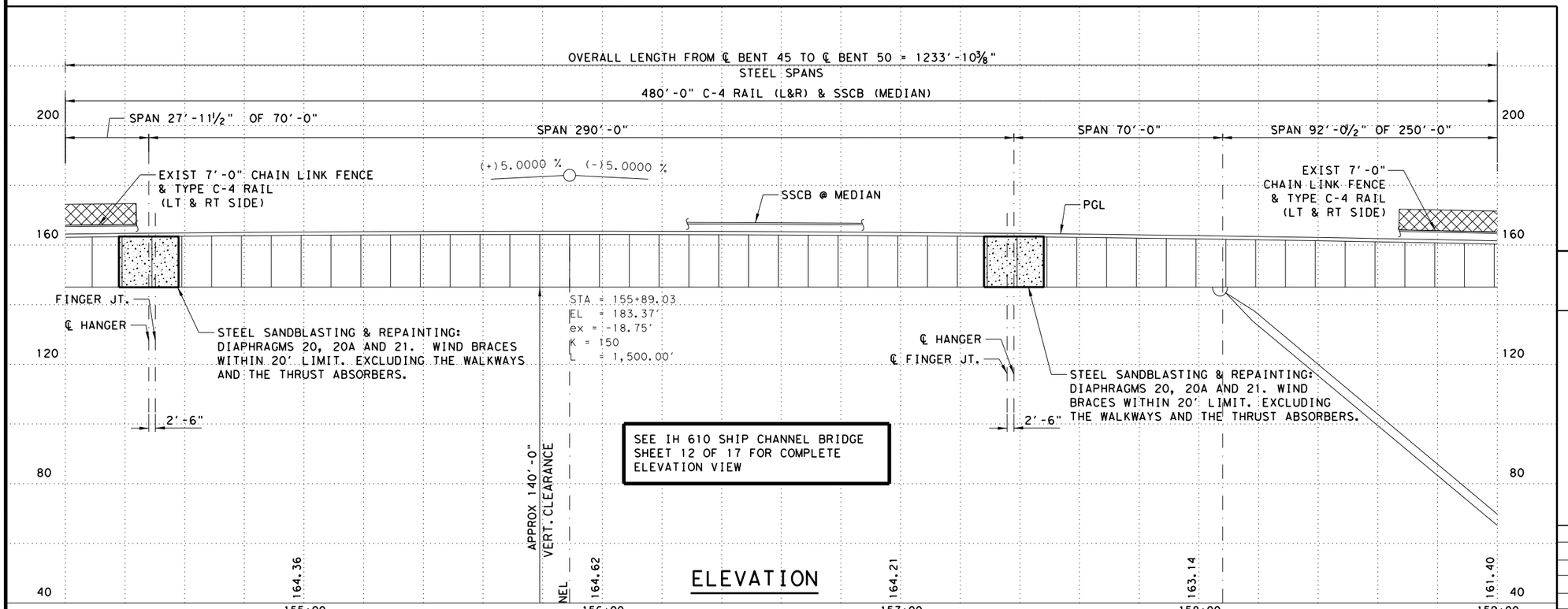


PLAN



SEE IH 610 SHIP CHANNEL BRIDGE SHEET 12 OF 17 FOR COMPLETE ELEVATION VIEW

ELEVATION

NOTES:
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DESIGN DATA:

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ADT (2041):	254,100
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NBI#:	12-102-0-027115-377
KEY MAP:	535C

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- EXISTING DIRECTION OF TRAFFIC
- DECK & RAIL REPAIR LOCATION
- SPALLING REPAIR LOCATIONS
- STEEL PAINTING LOCATIONS
- SPALLING REPAIR ON FACE OF BEAM ENDS
- "E" - DENOTES EXPANSION
- "F" - DENOTES FIXED
- "℄" - CENTER LINE
- "SH" - SHOULDER
- "PGL" - PROFILE GRADE LINE

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai
07/02/2021

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Texas Department of Transportation

BRIDGE LAYOUT IH 610 SHIP CHANNEL BRIDGE

℄ IH 610 STA 154+20.00 TO STA 159+00.00

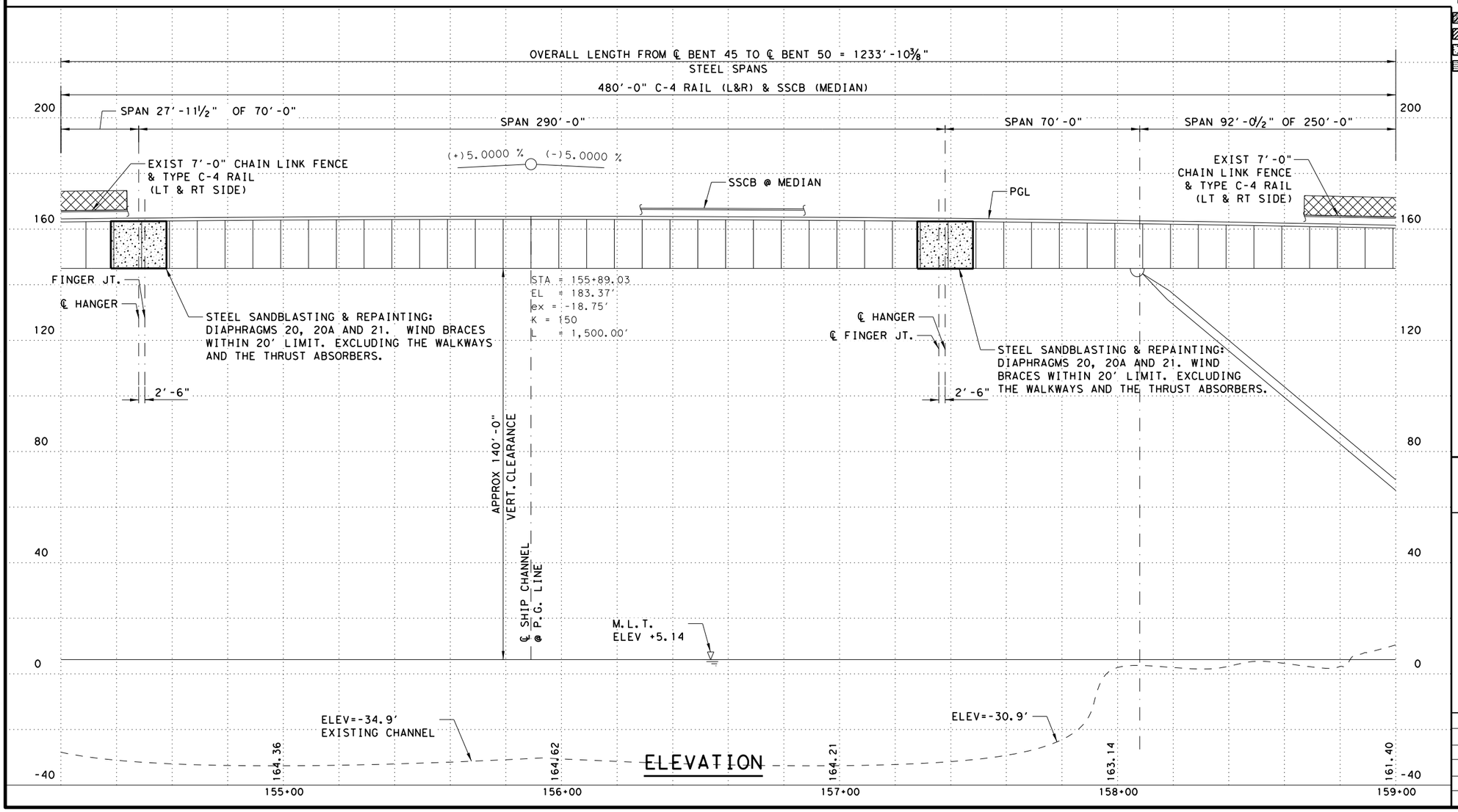
SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 11 OF 17

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		153
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271150971\4 - Design\Plan Set\7. Bridge\097BL*11.dgn

SEE IH 610 SHIP CHANNEL BRIDGE SHEET 11 OF 17 FOR COMPLETE PLAN VIEW



NOTES:
1. STATIONS ARE TAKEN ALONG ℄ IH 610, UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ANY EXISTING UTILITIES PRIOR TO STARTING WORK.
3. SEE AS BUILT PLANS FOR HISTORICAL SOIL BORING INFORMATION.
4. PROVIDE A SIGNED AND SEALED PLAN FOR DECK AND RAIL REPAIR LOCATIONS FOR APPROVAL BY THE ENGINEER PRIOR TO WORK.

DESIGN DATA:

FUNCTIONAL CLASS:	URBAN FREEWAY
ADT (2021):	197,000
ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

THESE DETAILS WERE REDRAWN PER "AS-BUILT PLANS". APPROXIMATE LOCATIONS OF THE WORK TO BE DETERMINED BY THE AREA OFFICE. LOCATIONS OF WORK NOT TO SCALE. CONTRACTOR TO FIELD VERIFY ALL INFORMATION PRIOR TO ANY CONSTRUCTION.

LEGEND AND SYMBOLS

- ⇨ EXISTING DIRECTION OF TRAFFIC
- DECK & RAIL REPAIR LOCATION
- SPALLING REPAIR LOCATIONS
- STEEL PAINTING LOCATIONS
- SPALLING REPAIR ON FACE OF BEAM ENDS
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STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai
07/02/2021

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Texas Department of Transportation

BRIDGE LAYOUT
IH 610
SHIP CHANNEL BRIDGE

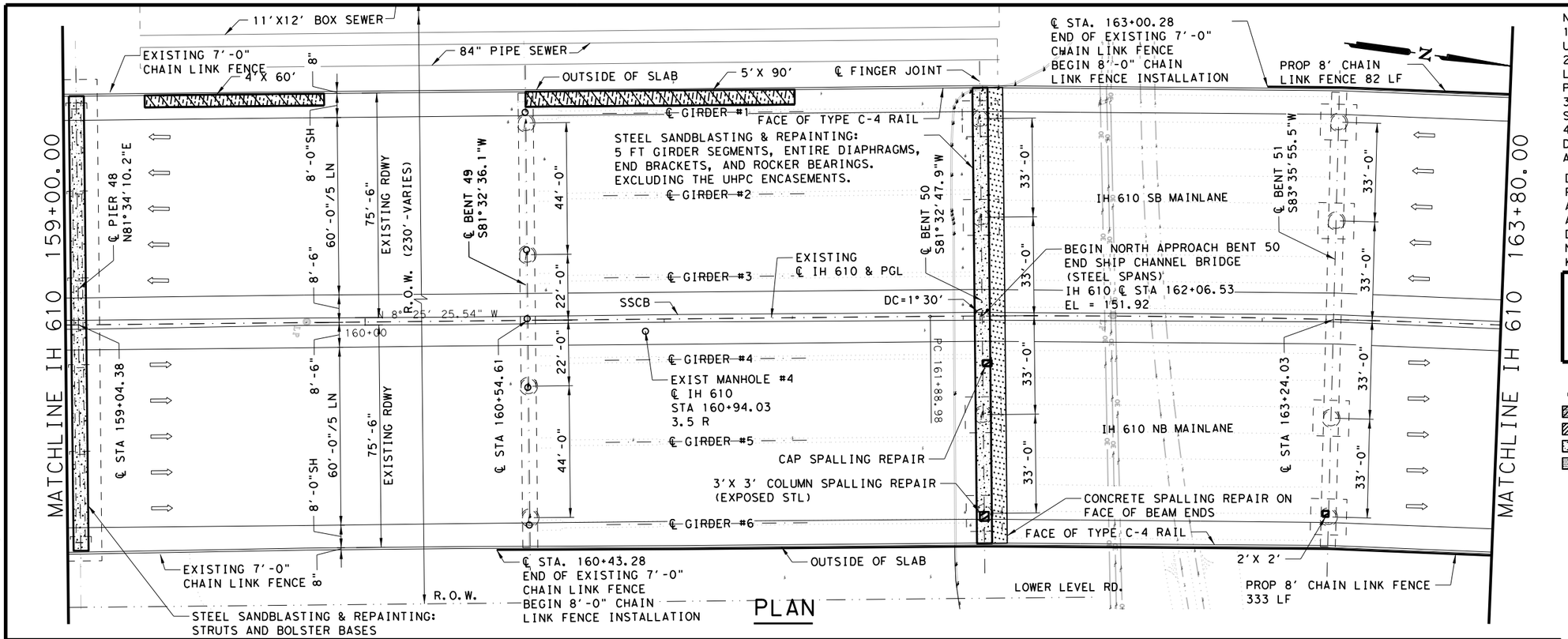
℄ IH 610 STA 154+20.00
TO STA 159+00.00

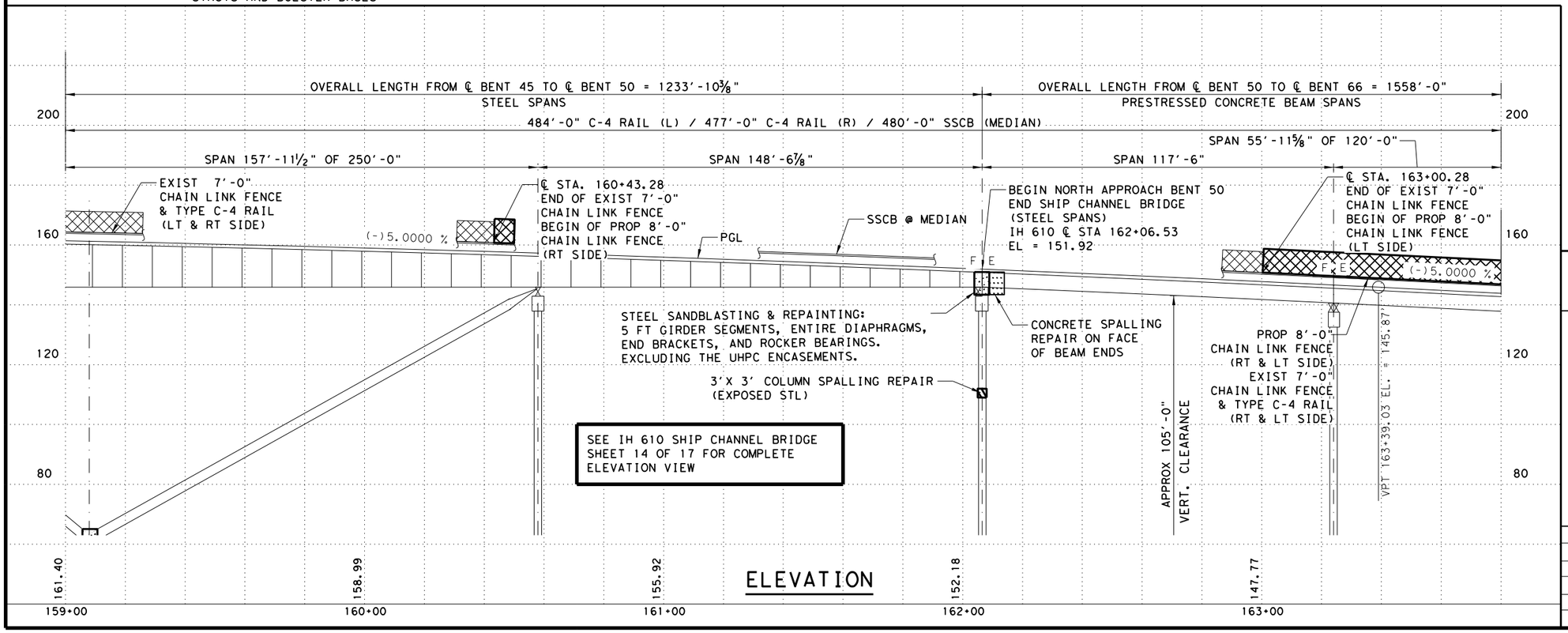
SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 12 OF 17

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		154
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\7. Bridge\097BL*12.dgn





NOTES:
1. STATIONS ARE TAKEN ALONG ℄ IH 610, UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ANY EXISTING UTILITIES PRIOR TO STARTING WORK.
3. SEE AS BUILT PLANS FOR HISTORICAL SOIL BORING INFORMATION.
4. PROVIDE A SIGNED AND SEALED PLAN FOR DECK AND RAIL REPAIR LOCATIONS FOR APPROVAL BY THE ENGINEER PRIOR TO WORK.

DESIGN DATA:

FUNCTIONAL CLASS:	URBAN FREEWAY
ADT (2021):	197,000
ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

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LEGEND AND SYMBOLS

- EXISTING DIRECTION OF TRAFFIC
- DECK & RAIL REPAIR LOCATION
- SPALLING REPAIR LOCATIONS
- STEEL PAINTING LOCATIONS
- SPALLING REPAIR ON FACE OF BEAM ENDS

"E" - DENOTES EXPANSION
"F" - DENOTES FIXED
"℄" - CENTER LINE
"SH" - SHOULDER
"PGL" - PROFILE GRADE LINE

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai
07/02/2021

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Texas Department of Transportation

BRIDGE LAYOUT
IH 610
SHIP CHANNEL BRIDGE

℄ IH 610 STA 159+00.00
TO STA 163+80.00

SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 13 OF 17

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		155
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
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SEE IH 610 SHIP CHANNEL BRIDGE SHEET 13 OF 17 FOR COMPLETE PLAN VIEW

NOTES:
1. STATIONS ARE TAKEN ALONG ℄ IH 610, UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ANY EXISTING UTILITIES PRIOR TO STARTING WORK.
3. SEE AS BUILT PLANS FOR HISTORICAL SOIL BORING INFORMATION.
4. PROVIDE A SIGNED AND SEALED PLAN FOR DECK AND RAIL REPAIR LOCATIONS FOR APPROVAL BY THE ENGINEER PRIOR TO WORK.

DESIGN DATA:
FUNCTIONAL CLASS: URBAN FREEWAY
ADT (2021): 197,000
ADT (2041): 254,100
DESIGN SPEED: 55 MPH
NBI#: 12-102-0-027115-377
KEY MAP: 535C

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LEGEND AND SYMBOLS
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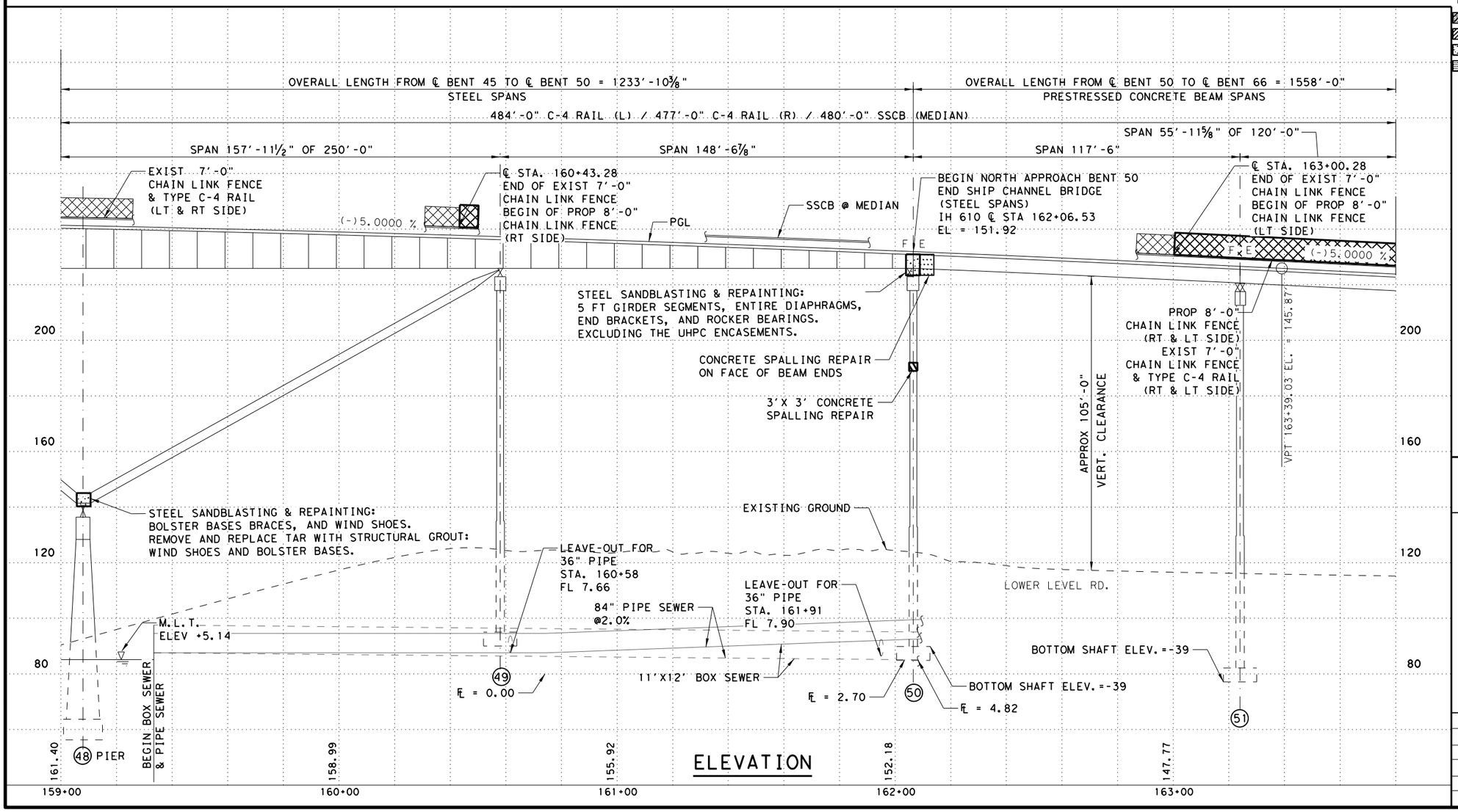
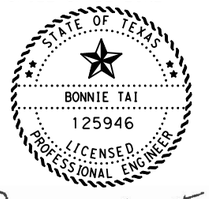
- "℄" - CENTER LINE
- "SH" - SHOULDER
- "PGL" - PROFILE GRADE LINE



ELEVATION



Bonnie Tai
07/02/2021
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Texas Department of Transportation

BRIDGE LAYOUT
IH 610
SHIP CHANNEL BRIDGE

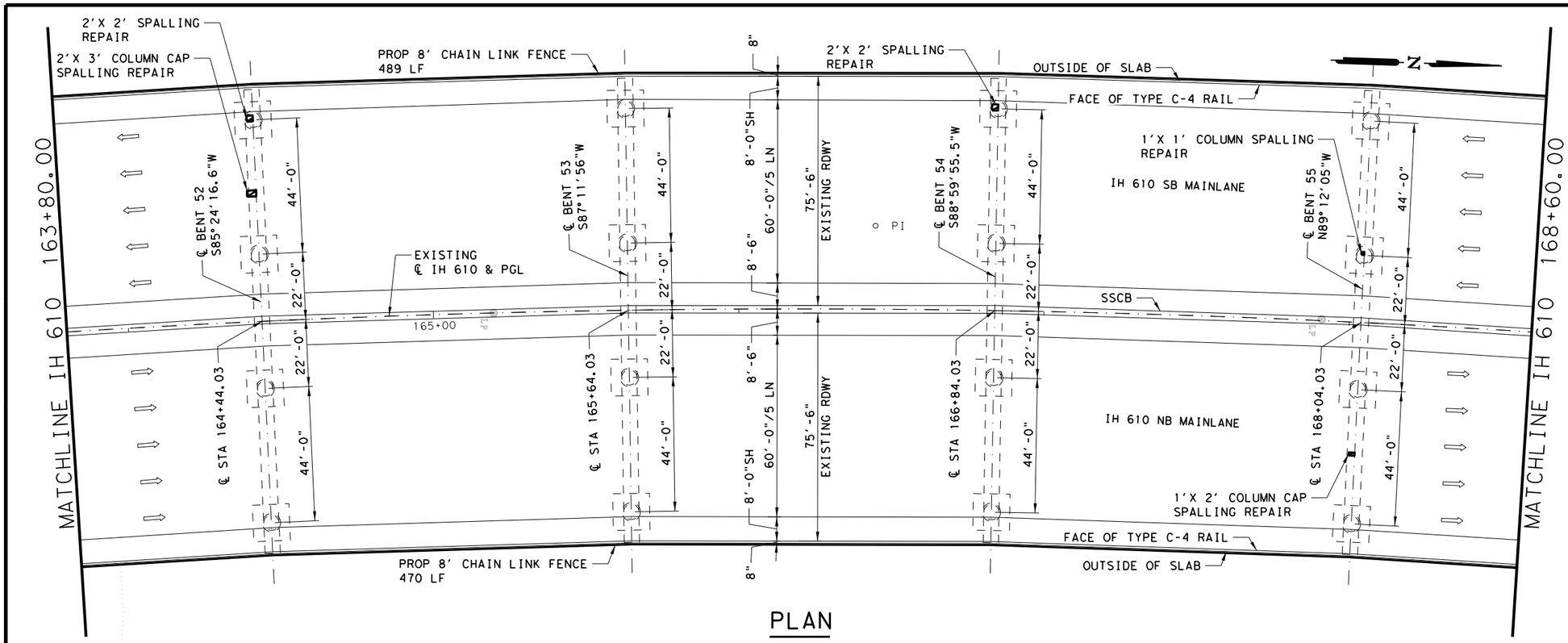
℄ IH 610 STA 159+00.00
TO STA 163+80.00

SCALE: 1" = 40' HORZ
1" = 40' VERT

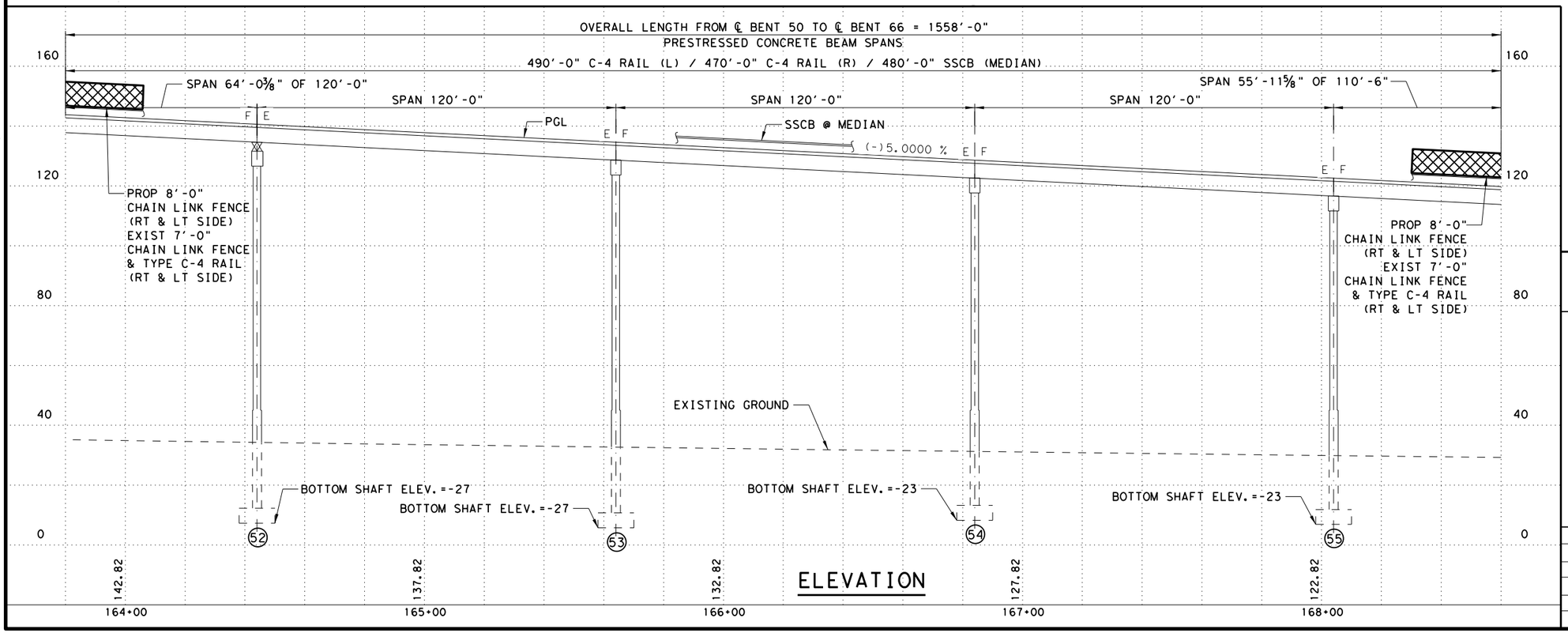
SHEET 14 OF 17

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		156
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\7. Bridge\097BL*14.dgn



PLAN



ELEVATION

NOTES:
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DESIGN DATA:

FUNCTIONAL CLASS:	URBAN FREEWAY
ADT (2021):	197,000
ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

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LEGEND AND SYMBOLS

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- STEEL PAINTING LOCATIONS
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- "PGL" - PROFILE GRADE LINE

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai
07/02/2021

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Texas Department of Transportation

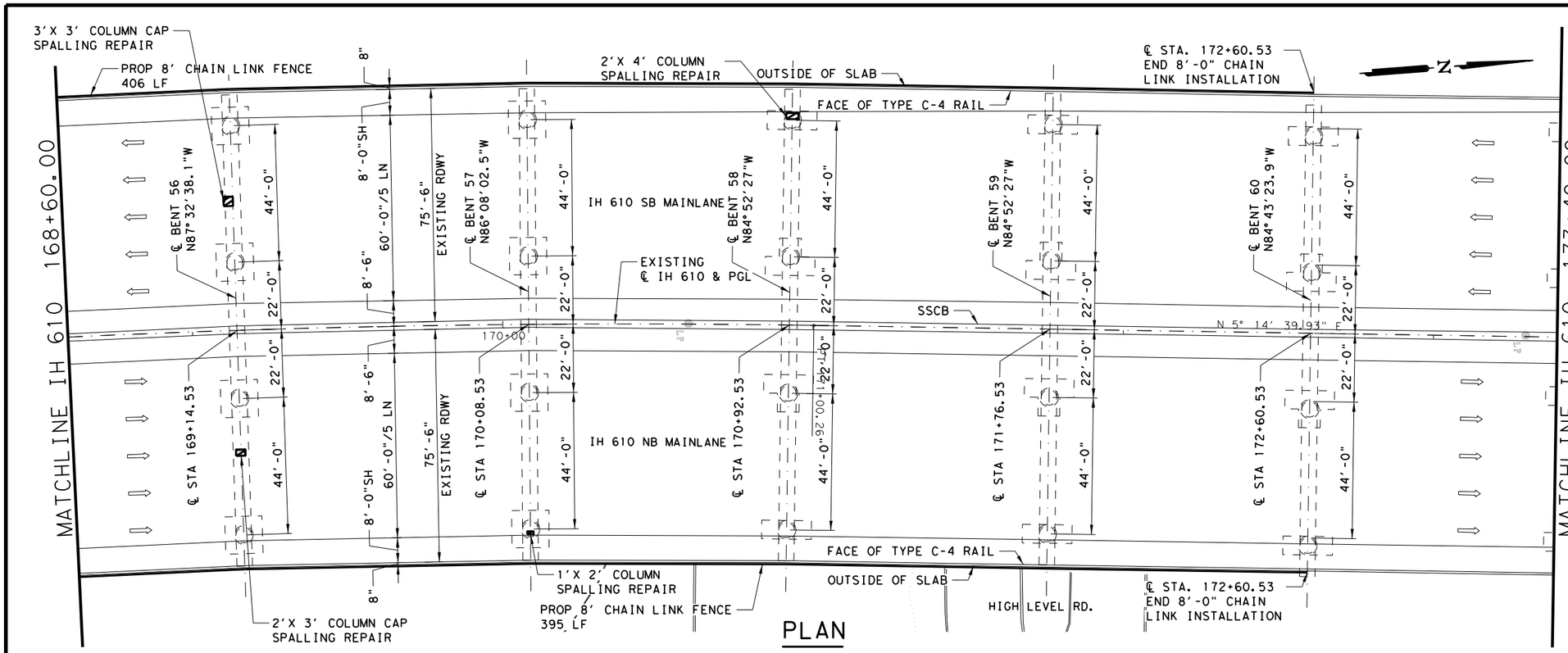
BRIDGE LAYOUT IH 610 SHIP CHANNEL BRIDGE

℄ IH 610 STA 163+80.00 TO STA 168+60.00

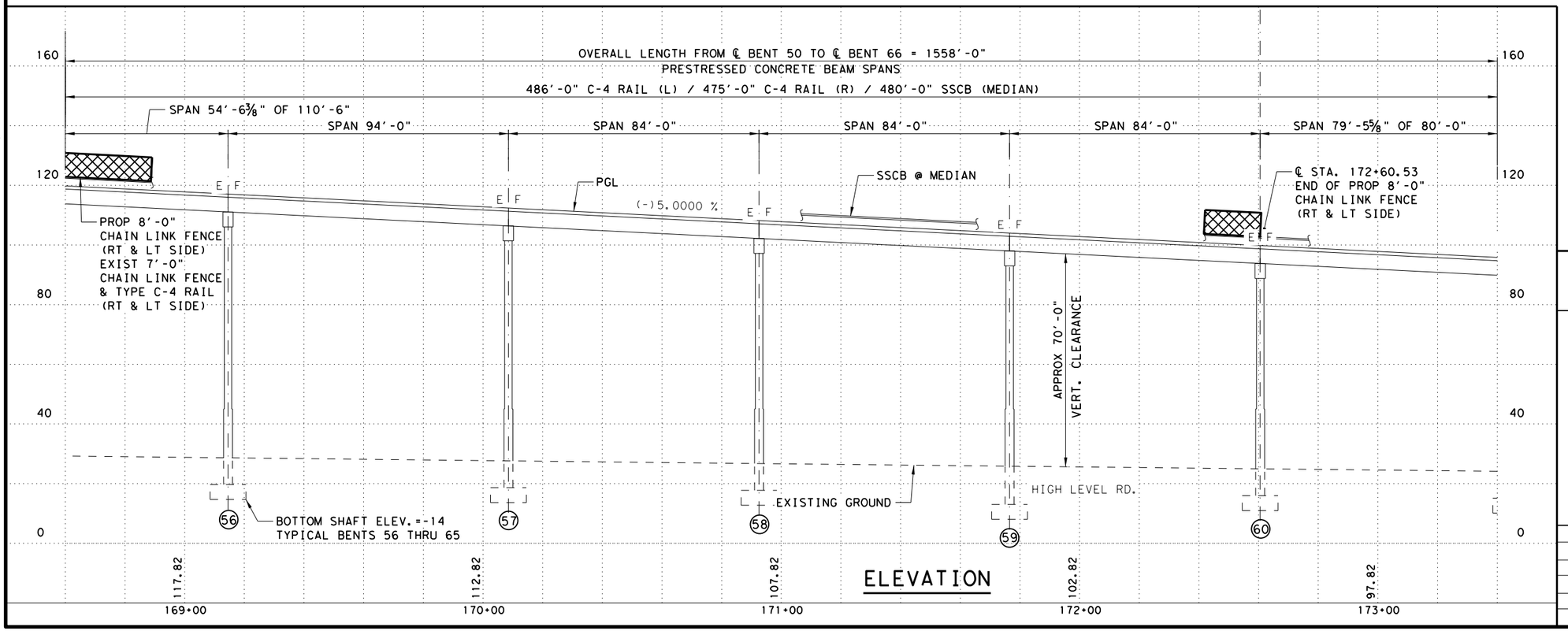
SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 15 OF 17

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		157
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



PLAN



ELEVATION

NOTES:
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DESIGN DATA:

FUNCTIONAL CLASS:	URBAN FREEWAY
ADT (2021):	197,000
ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

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LEGEND AND SYMBOLS

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- DECK & RAIL REPAIR LOCATION
- SPALLING REPAIR LOCATIONS
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- SPALLING REPAIR ON FACE OF BEAM ENDS

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"℄" - CENTER LINE
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STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai
07/02/2021

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Texas Department of Transportation

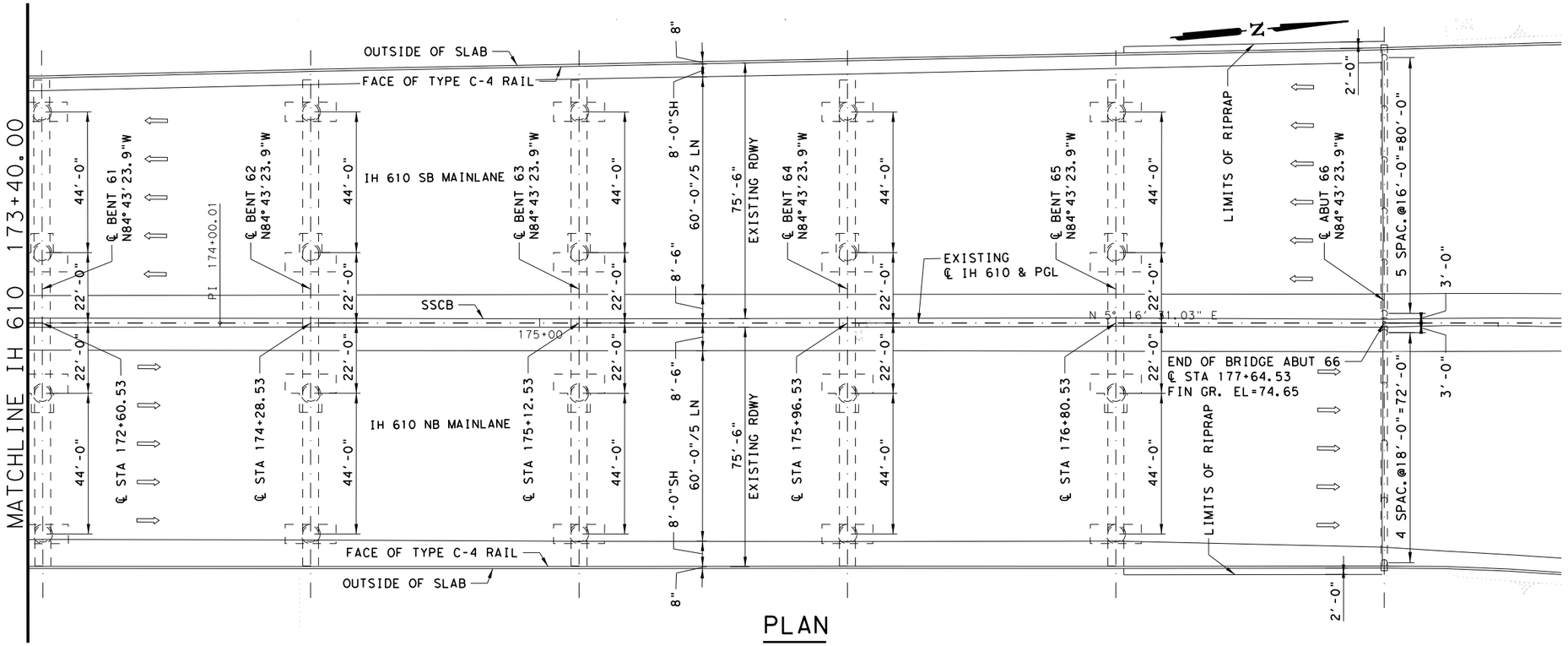
BRIDGE LAYOUT IH 610 SHIP CHANNEL BRIDGE

℄ IH 610 STA 168+60.00 TO STA 173+40.00

SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 16 OF 17

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		158
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



PLAN

NOTES:
1. STATIONS ARE TAKEN ALONG ℄ IH 610, UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ANY EXISTING UTILITIES PRIOR TO STARTING WORK.
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DESIGN DATA:

FUNCTIONAL CLASS:	URBAN FREEWAY
ADT (2021):	197,000
ADT (2041):	254,100
DESIGN SPEED:	55 MPH
NBI#:	12-102-0-027115-377
KEY MAP:	535C

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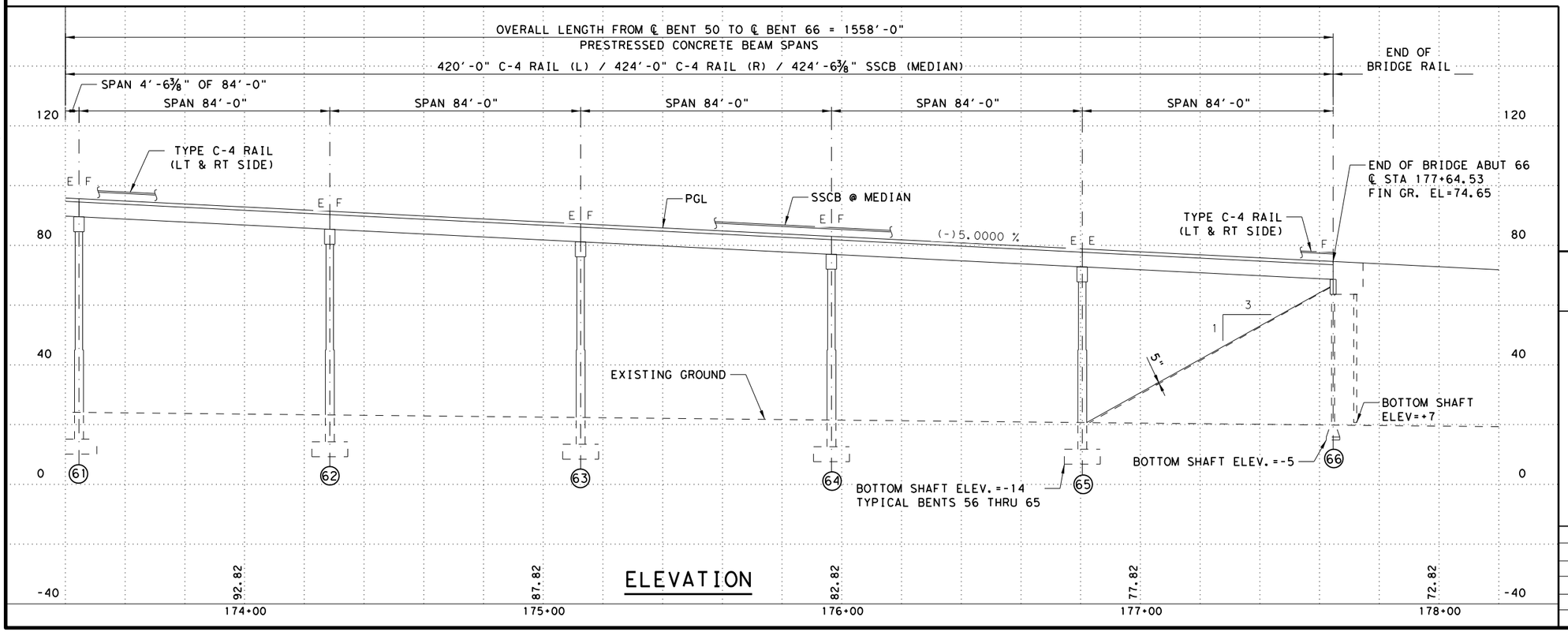

ELEVATION

STATE OF TEXAS
BONNIE TAI
125946
LICENSED PROFESSIONAL ENGINEER

Bonnie Tai
07/02/2021

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Texas Department of Transportation

BRIDGE LAYOUT
IH 610
SHIP CHANNEL BRIDGE

℄ IH 610 STA 173+40.00
TO END BRIDGE

SCALE: 1" = 40' HORZ
1" = 40' VERT

SHEET 17 OF 17

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		159
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 7/2/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\7. Bridge\097BL*17.dgn

ITEM NO.	429-6005	429-6007	429-6018	431-6002	438-6009	446-6013	550-6003	550-6008	778-6001	4187-6001	5087-6001
ITEM	CONC STR REPAIR(DECK REP (FULL DEPTH))	CONC STR REPAIR (VERTICAL & OVERHEAD)	CONC STR REP (REMOVE AND REPL BM END)	PNEUMATICALLY PLACED CONC (REPAIR)	CLEANING EXISTING JOINTS	CLEAN & PAINT EXIST STR (SYSTEM III-A)	CHAIN LINK FENCE (REMOVE)	CHAIN LINK FENCE (INSTALL) (8')	CONCRETE RAIL REPAIR (IN KIND)	REMOVE & REPLACE TAR W/ STR GROUT	BIRD DETERRENT
UNIT	SF	SF	CY	CF	LF	LS	LF	LF	LF	LS	LF
QUANTITY	320	2,040	48.7	60.0	620	1	140	3,818	140	1	41

7/2/2021
H:\Bridge\Graphic Files\0271-15-097 Ship Channel Repainting\Ship Channel Steel Clean April 2021.dgn

SHEET 1 OF 1

STATE OF TEXAS
BLAKE A. HUNTSMAN
136815
LICENSED PROFESSIONAL ENGINEER

Blake A. Huntsman P.E.

07.02.2021

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Texas Department of Transportation

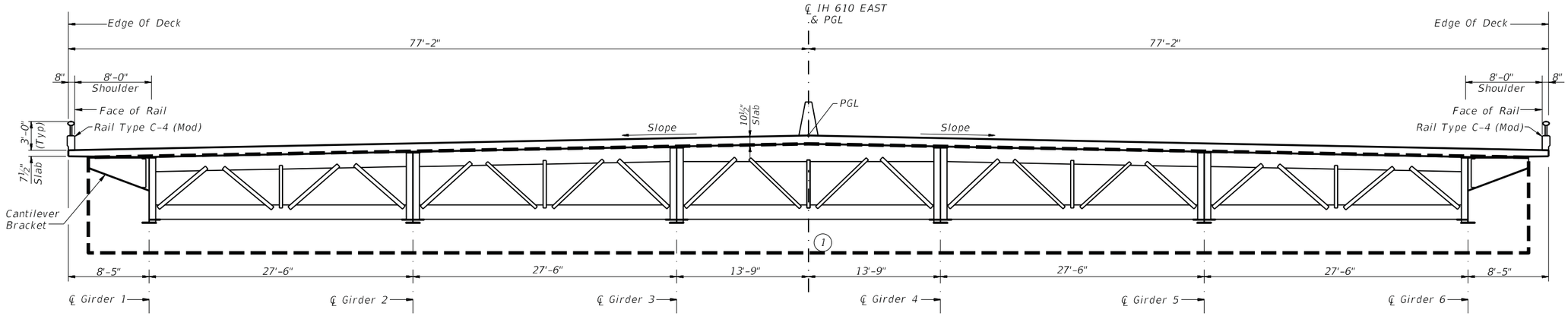
Houston District (Bridge)

BRIDGE E&Q SHEETS

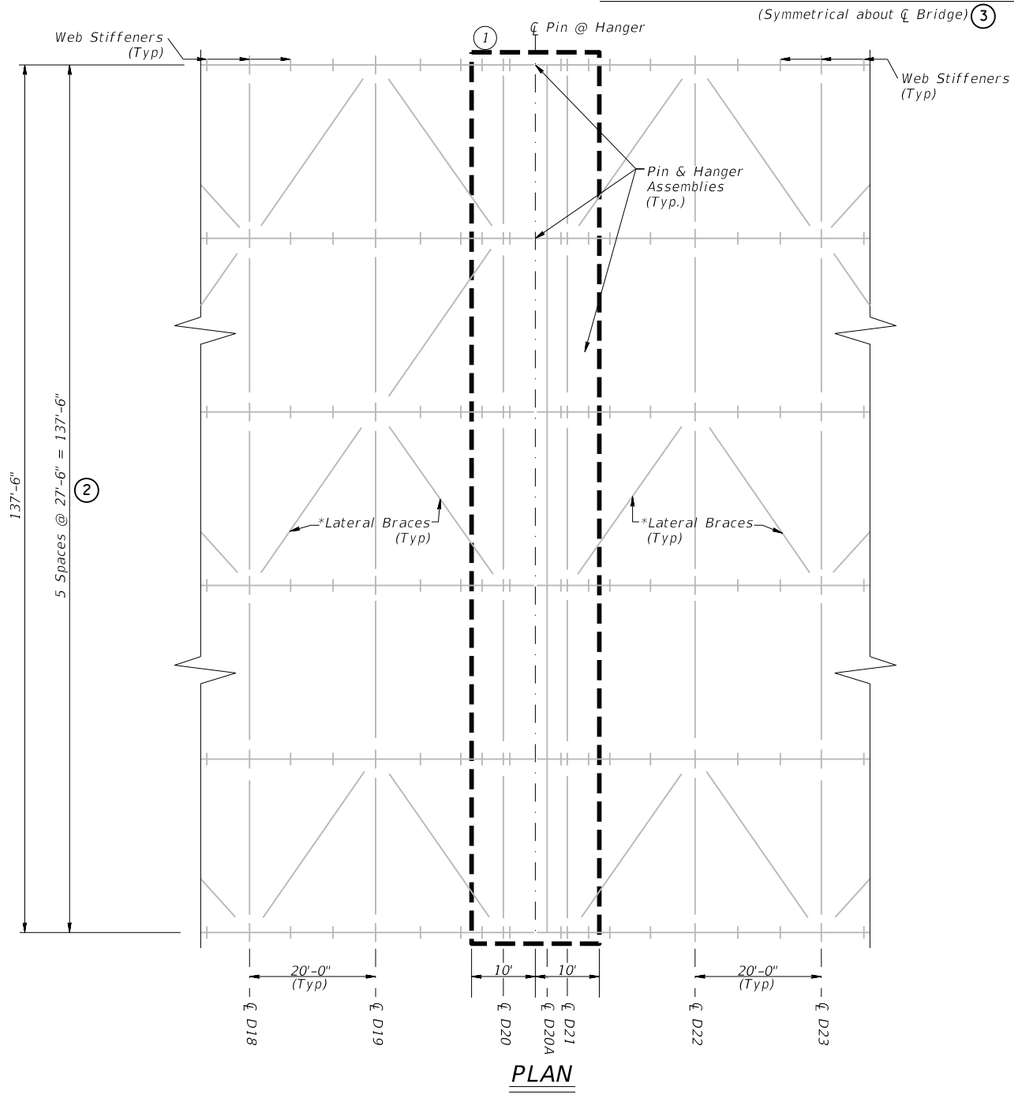
IH 610 EAST

AT SHIP CHANNEL BRIDGE

FILE:	DN: BH	CK: TF	DW: BH	CK: TF
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		160



TYPICAL SECTION @ DIAPHRAGMS 20 & 21



PLAN

Notes:

1. Clean and paint the steel with System III-A, in accordance with Item 446, at the specified areas on the girders, pins, hangers, lateral braces, diaphragms, cantilever brackets, stiffeners and gusset plates, etc. This area includes all surfaces within small gaps behind the hanger plates but excludes the walkways, concrete elements, UHPC plates, and the thrust absorber. Remove safety cables in these areas.

   Notify the Engineer for field inspection after the completion of abrasive blasting and prior to the application of each coat.

   Non-recyclable abrasive meeting SSPC AB-1 may be used in lieu of the recyclable abrasive specified in Item 446.

   Cleaning steel surfaces, removing existing paint, and touch-up painting in the field with System III-A are paid under Item 446-6013, Clean & Paint Exist Str (System III-A).

2. See as-builts for additional dimensions of girders, pins, hangers, diaphragms, stiffeners and gusset plates, etc.

3. 2 sets of 6 Pin and Hanger assemblies are located symmetrically about the center of the Bridge. See as-builts for further clarification.

4. See Note 2 on sheet 163 for additional area of repainting of the bottom surfaces of the bottom flanges.

STATE OF TEXAS
BLAKE A. HUNTSMAN
136815
LICENSED
PROFESSIONAL ENGINEER

Blake A. Huntsman P.E.

05.21.2021

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Texas Department of Transportation

Houston District (Bridge)

STEEL CLEANING DETAILS
IH 610 EAST
AT SHIP CHANNEL BRIDGE

FILE:	DN: BH	CK: TF	DW: BH	CK: TF
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		161

5/21/2021
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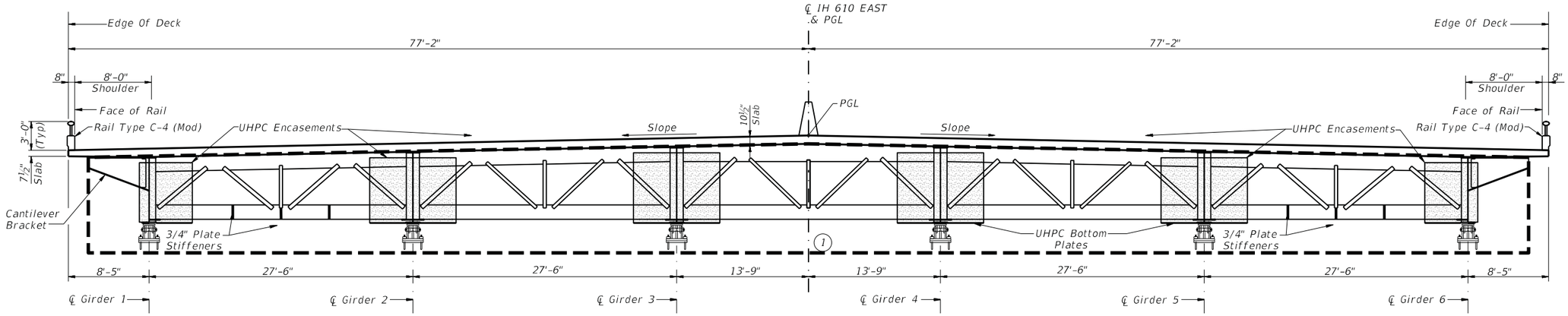
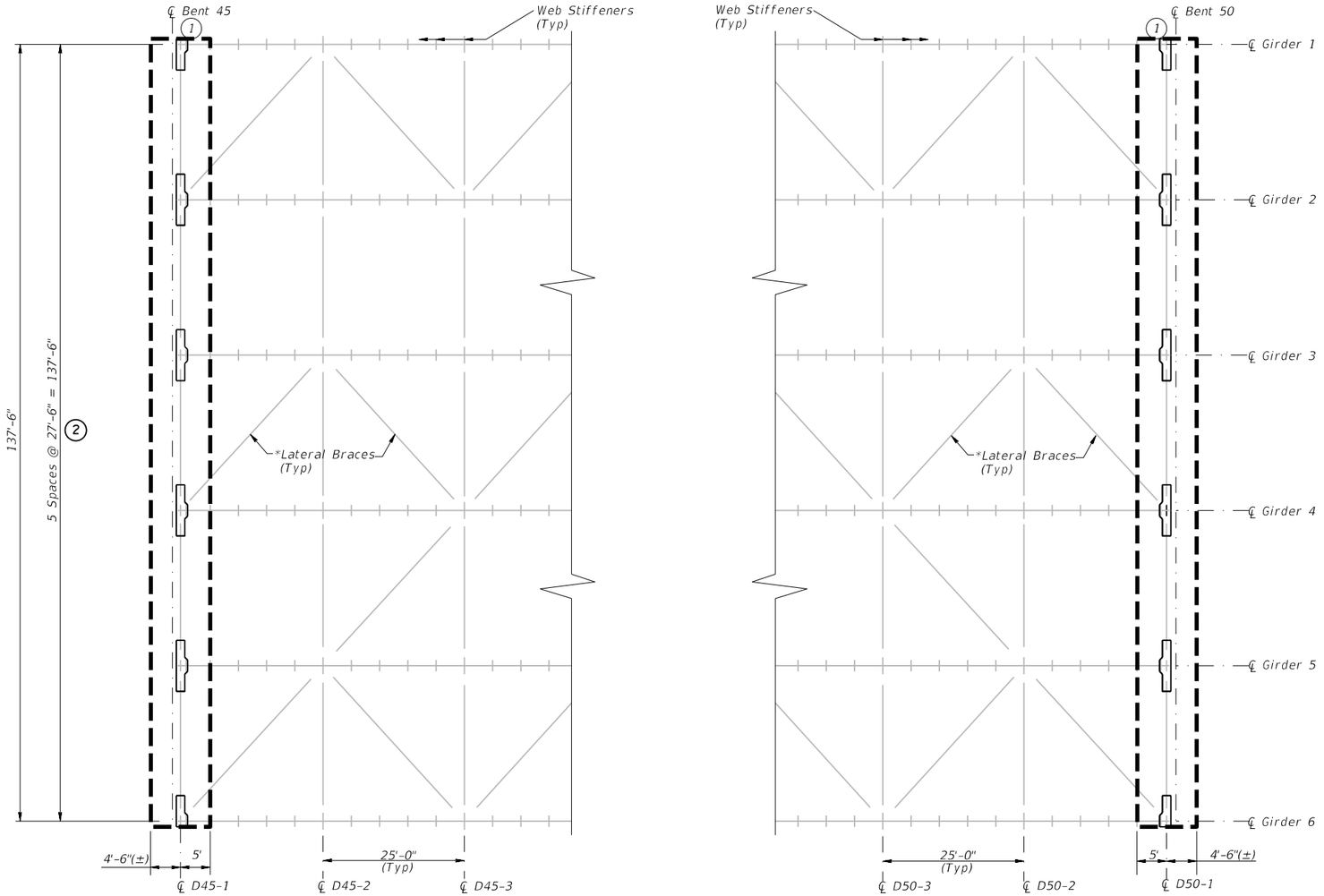


TYPICAL SECTION @ BENT 45 & BENT 50 LOOKING NORTH

(Girder Depths Vary From 5.6'(±) to 6.7'(±))



PLAN @ BENT 45

PLAN @ BENT 50

* Verified lateral brace locations

Notes:

1. Clean and paint the steel with System III-A, in accordance with Item 446, at the specified areas on the girders, diaphragms, lateral braces, end brackets, stiffeners and rocker bearings, etc. This area includes all surfaces within small gaps behind the hanger plates but excludes the walkways, concrete elements, UHPC plates, and the thrust absorber. Remove safety cables in these areas.

   Notify the Engineer for field inspection after the completion of abrasive blasting and prior to the application of each coat.

   Non-recyclable abrasive meeting SSPC AB-1 may be used in lieu of the recyclable abrasive specified in Item 446.

   Cleaning steel surfaces, removing existing paint, and touch-up painting in the field with System III-A are paid under Item 446-6013, Clean & Paint Exist Str (System III-A).

2. See as-builts for additional dimensions of girders, hangers, diaphragms, lateral braces, end brackets, stiffeners, and rocker bearings, etc.

STATE OF TEXAS
BLAKE A. HUNTSMAN
136815
LICENSED PROFESSIONAL ENGINEER

Blake A. Huntsman P.E.

05.21.2021

Texas Department of Transportation

Houston District (Bridge)

STEEL CLEANING DETAILS
IH 610 EAST
AT SHIP CHANNEL BRIDGE

FILE:	DN: BH	CK: TF	DW: BH	CK: TF
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		162

5/21/2021
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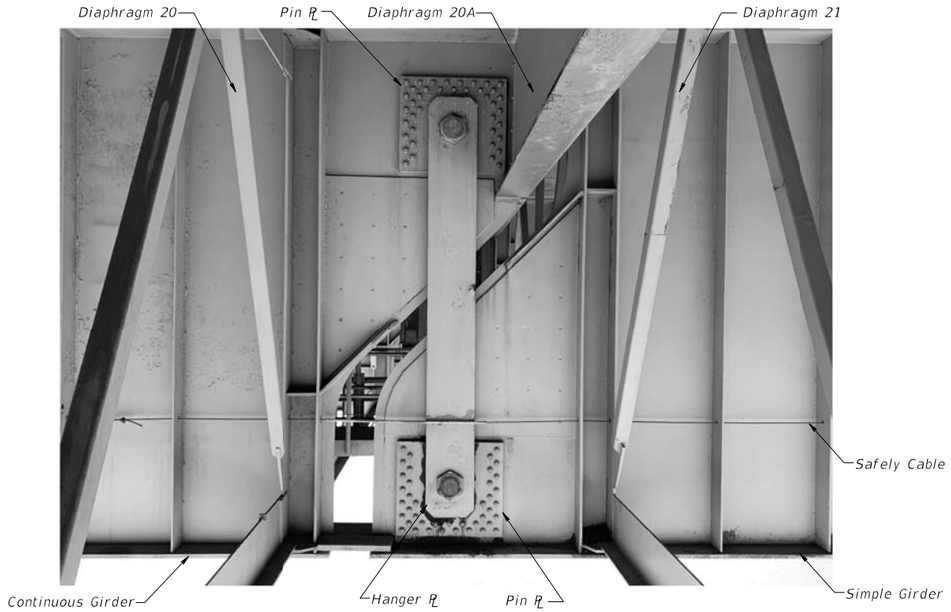
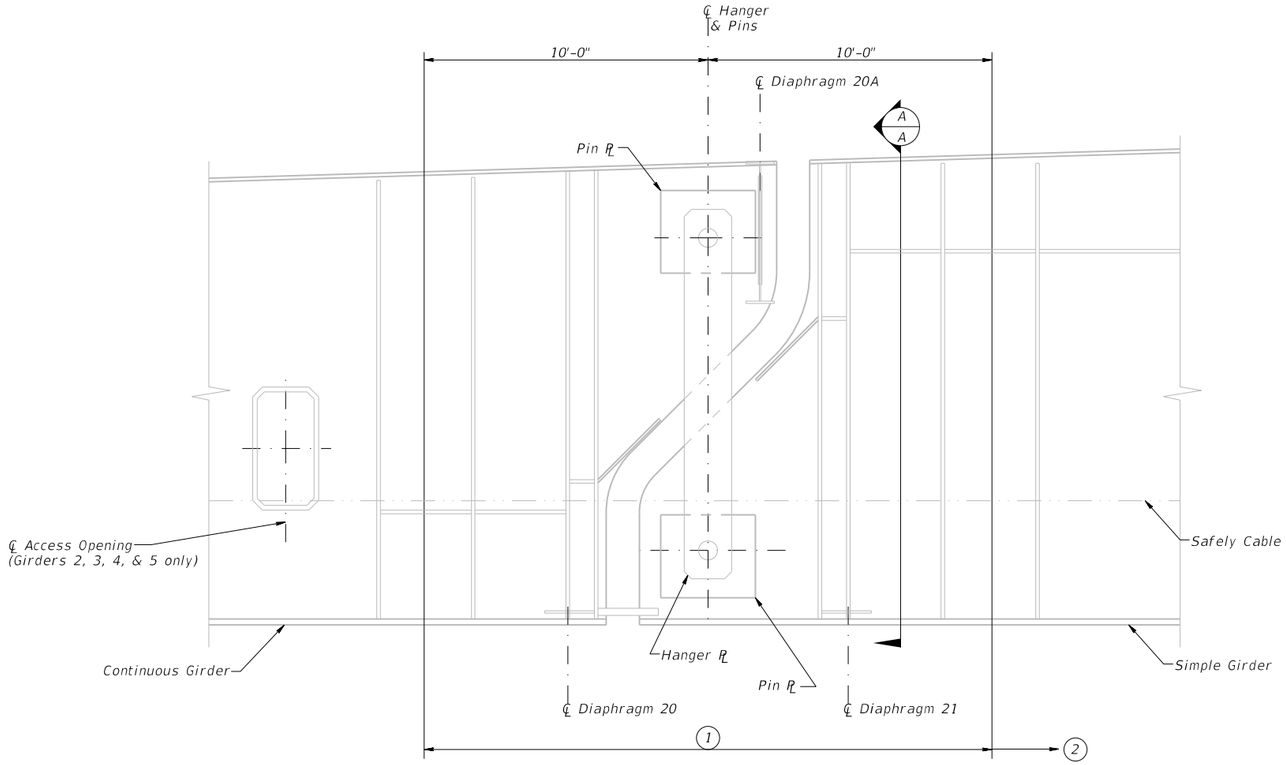


PHOTO OF TYPICAL PIN & HANGER ASSEMBLY



PAINT REMOVAL LIMITS AT PIN & HANGER ASSEMBLIES

(Symmetrical about ℄ Bridge)

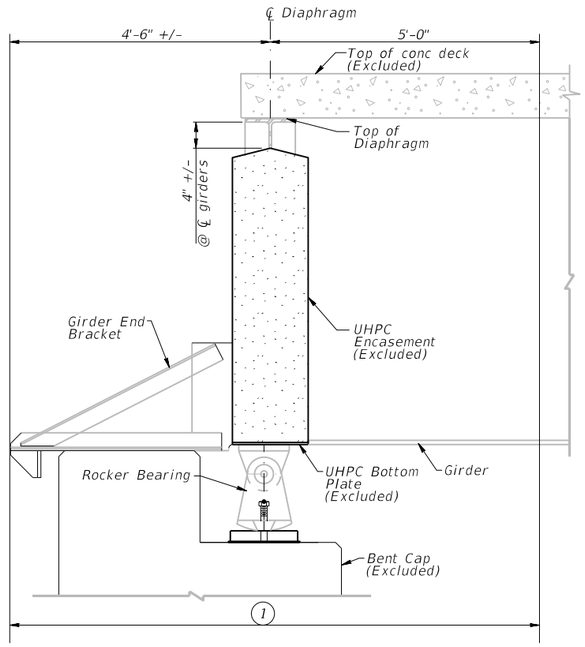
(1) Clean and paint the steel with System III-A, in accordance with Item 446, at the specified areas on the girders, pins, hangers, lateral braces, diaphragms, stiffeners, end brackets, rocker bearings, and gusset plates, etc. This area includes all surfaces within small gaps behind the hanger plates but excludes the walkways, concrete elements, UHPC plates, and the thrust absorber. Remove safety cables in these areas.

Notify the Engineer for field inspection after the completion of abrasive blasting and prior to the application of each coat.

Non-recyclable abrasive meeting SSPC AB-1 may be used in lieu of the recyclable abrasive specified in Item 446.

Cleaning steel surfaces, removing existing paint, and touch-up painting in the field with System III-A are paid under Item 446-6013, Clean & Paint Exist Str (System III-A).

(2) Repaint bottom surfaces of the bottom flanges on the south side of the north hanger as directed by the engineer. An additional total of 120 SF of cleaning and painting with System III-A is subsidiary to item 446-6013.



PAINT REMOVAL LIMITS AT BENT 45 AND 50

Looking East or West - (Symmetrical about ℄ Bridge)

STATE OF TEXAS
BLAKE A. HUNTSMAN
136815
LICENSED PROFESSIONAL ENGINEER

Blake A. Huntsman P.E.

05.21.2021

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Houston District (Bridge)

STEEL CLEANING DETAILS
IH 610 EAST
AT SHIP CHANNEL BRIDGE

FILE:	DN: BH	CK: TF	DW: BH	CK: TF
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		163

5/21/2021
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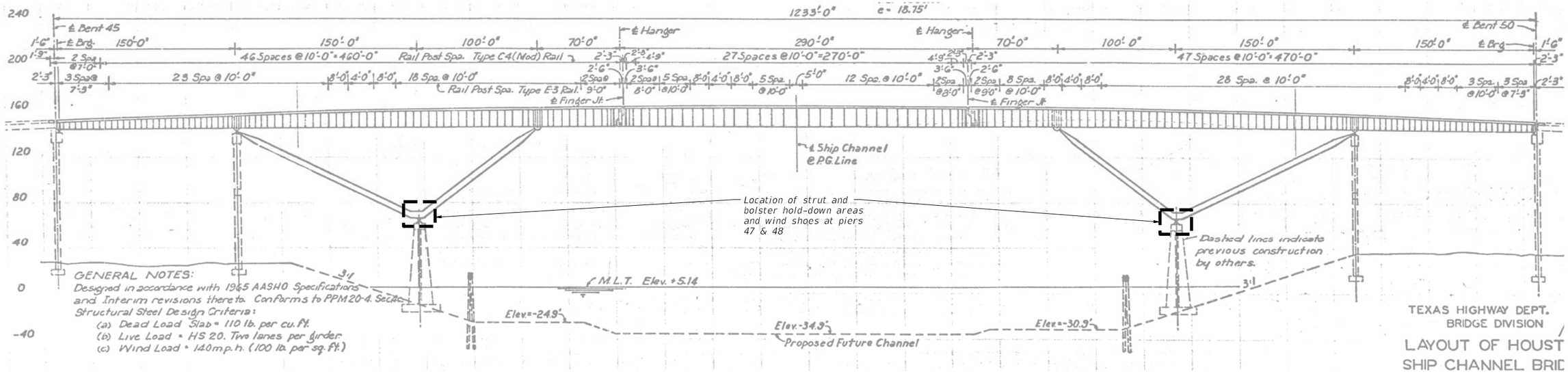
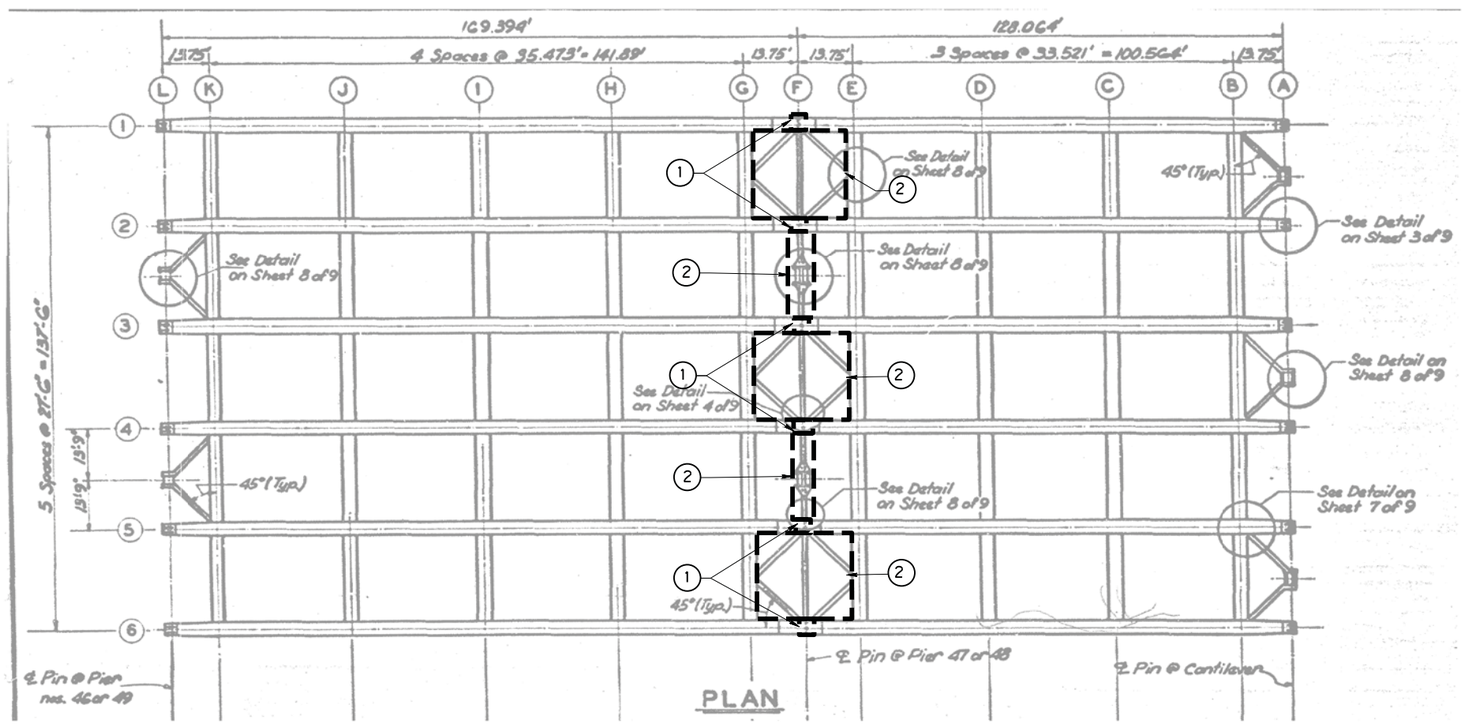


SHIP CHANNEL BRIDGE LAYOUT



PLAN VIEW OF STRUT AND BOLSTER

Notes:

1. Sandblast, repaint steel, and replace existing tar with structural grout at bolster hold-down areas. Refer to sheet 5 of 6 for details and specifications.
2. Sandblast, repaint steel, and replace existing tar with structural grout at lateral/ diagonal braces and wind shoes. Refer to sheet 6 of 6 for details and specifications.

NOTE:
All details on this plan sheet are from the original 1973 Ship Channel Bridge as-builts and have been modified with project specific notes. Please see as-builts for additional dimensions.

SHEET 4 OF 6

STATE OF TEXAS
BLAKE A. HUNTSMAN
136815
LICENSED PROFESSIONAL ENGINEER

Blake A. Huntsman P.E.

05.21.2021

Texas Department of Transportation
Houston District (Bridge)

STEEL CLEANING DETAILS
IH 610 EAST
AT SHIP CHANNEL BRIDGE

FILE:	DN: BH	CK: TF	DW: BH	CK: TF
©TxDOT	CONT.	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		164

5/21/2021
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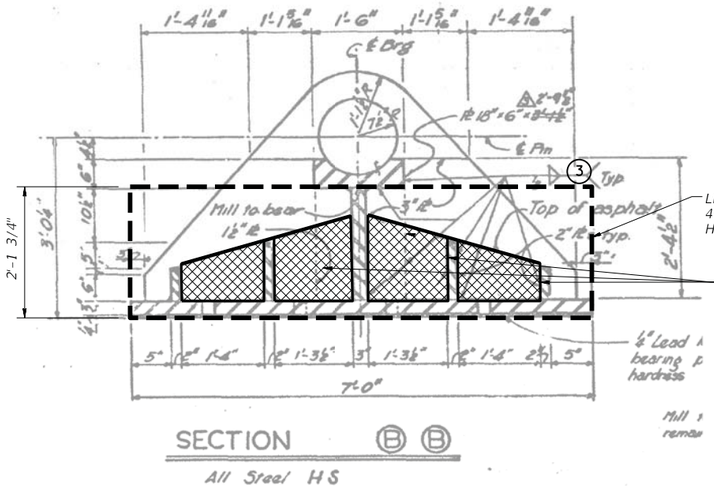
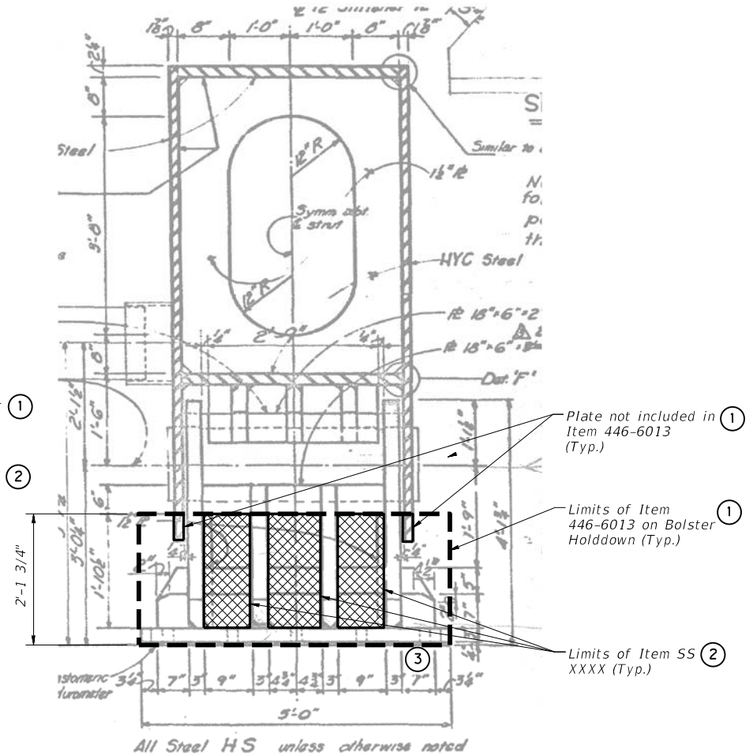
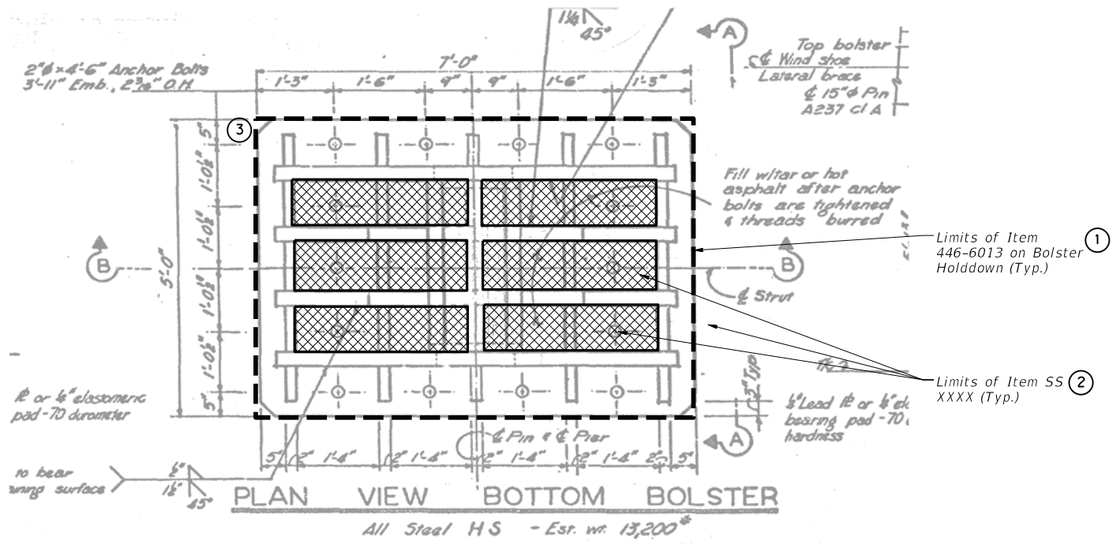




HOLD-DOWN BOLSTER DETAIL - ELEVATION VIEW



HOLD-DOWN BOLSTER - PLAN VIEW

PHOTO OF HOLD-DOWN BOLSTER - TYPICAL

Notes:

(1) *Use sandblasting to abrasively and thoroughly remove rust & existing paints on all accessible areas of the hold-down bolsters. Follow TxDOT Standard Spec. Item 446-6013 with approved safety and lead abatement procedures. Prior to sandblasting remove all debris accumulated within the hold-down bolster area.*

Notify the Engineer after the completion of sandblasting for field inspection. After the approval of the Engineer, proceed to repaint all the newly exposed bare steel areas by applying System III-A paint in accordance with TxDOT Standard Spec. 446.

Cleaning steel surfaces, removing existing paint, and touch-up painting at the field with System III-A are paid under Item 446-6013, Clean & Paint Exist Str (System III-A). Efforts related to lead abatement will be paid with the Force Account "Lead Abatement".

(2) *Remove all accessible tar shown in hatched areas and replace with structural grout at bolster hold-down areas in accordance with TxDOT Special Spec. Item 4187-6001. After completion of tar removal, sandblast and repaint perimeter steel in accordance with all requirements of note 1 prior to installing grout. Slope top of grout to match slope between tops of existing stiffeners.*

(3) *Tar on steel inside the limits of item 446-6013 but outside the limits of the hatched area shall be cleaned but not replaced with grout.*

NOTE:
All details on this plan sheet are from the original 1973 Ship Channel Bridge as-builts and have been modified with project specific notes. Please see as-builts for additional dimensions.

STATE OF TEXAS
BLAKE A. HUNTSMAN
136815
LICENSED PROFESSIONAL ENGINEER

Blake A. Huntsman P.E.
05.21.2021

Texas Department of Transportation ®2018

Houston District (Bridge)

STEEL CLEANING DETAILS
IH 610 EAST
AT SHIP CHANNEL BRIDGE

FILE:	DN: BH	CK: TF	DW: BH	CK: TF
©TxDOT	CONT.	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
	DIST.	COUNTY		SHEET NO.
	HOU	HARRIS		165

5/21/2021
H:\Bridge\Graphic Files\0271-15-097 Ship Channel Repainting\Ship Channel Steel Clean April 2021.dgn

PHOTO OF BOTTTOM OF WINDSHOE
(TYP.)

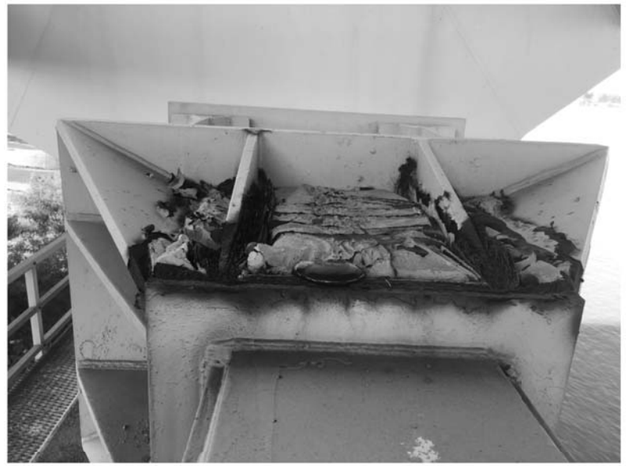
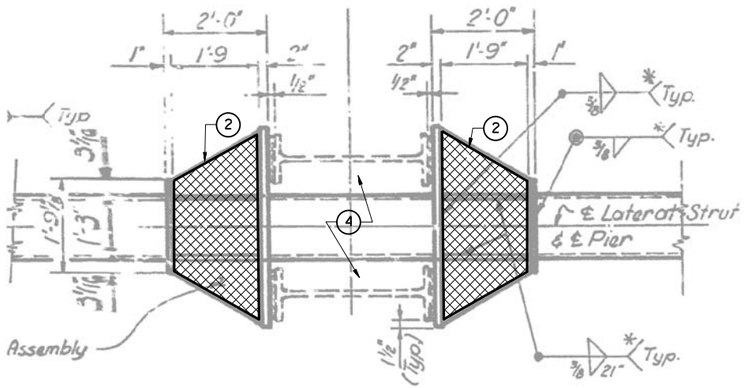
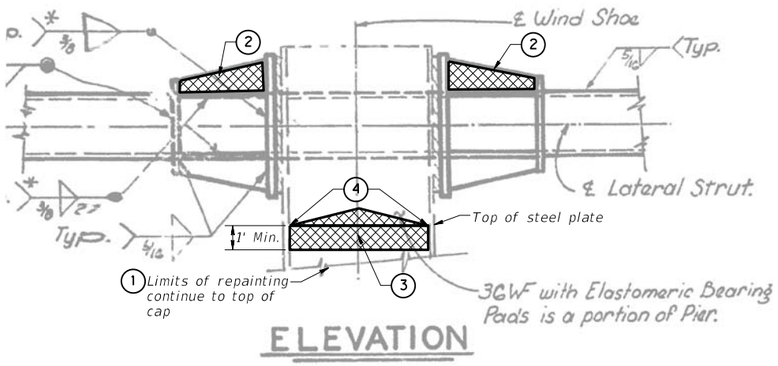


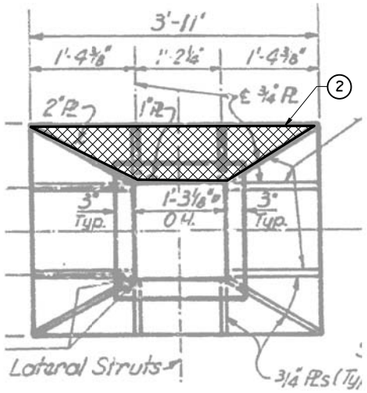
PHOTO OF TOP OF WINDSHOE
(TYP.)



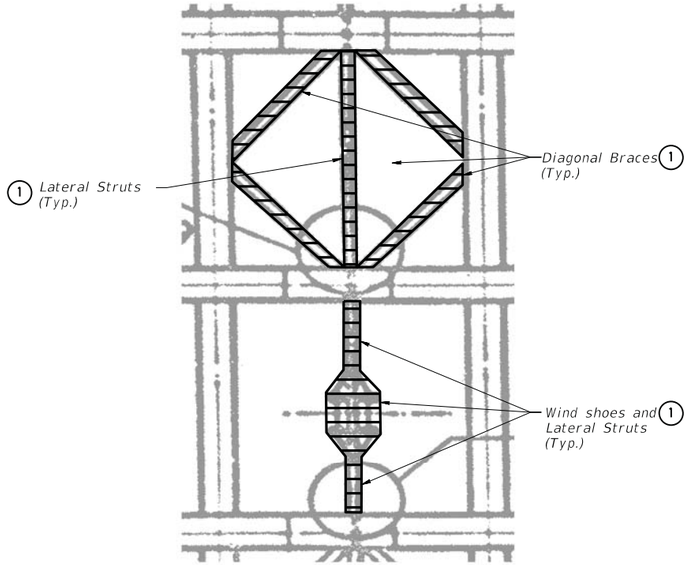
PLAN



ELEVATION



SIDE ELEVATION
(Showing Typ. Shoe Assembly)



PAINT LIMITS OF WINDSHOES AND BRACES
(TYP.)

Notes:

1. Use sandblasting to abrasively and thoroughly remove rust & existing paints on all accessible areas of lateral struts, diagonal braces, and wind shoes. Follow TxDOT Standard Spec. Item 446-6013 with approved safety and lead abatement procedures. Prior to sandblasting remove all debris accumulated within the wind shoes.

   Notify the Engineer after the completion of sandblasting for field inspection. After the approval of the Engineer, proceed to repaint all the newly exposed bare steel areas by applying System III-A paint in accordance with TxDOT Standard Spec. 446.

   Cleaning steel surfaces, removing existing paint, and touch-up painting at the field with System III-A are paid under Item 446-6013, Clean & Paint Exist Str (System III-A). Efforts related to lead abatement will be paid with the Force Account "Lead Abatement".

2. Remove existing tar and replace with structural grout between stiffeners at top of wind shoe in accordance with TxDOT Special Spec. Item 4187-6001. After completion of tar removal, sandblast and repaint perimeter steel in accordance with all requirements of note 1 prior to installing grout. Slope top of grout to match slope of tops of existing stiffeners. Install structural grout at all wind shoes including locations where no existing tar is present. Tar on steel inside the limits of item 446-6013 but outside the limits of the hatched areas shall be cleaned but not replaced with grout.

3. Remove existing tar and replace with structural grout at bottom of wind shoe in accordance with TxDOT Special Spec. Item 4187-6001. Remove a minimum of 1' of existing tar. Remove additional tar until perimeter steel shows no signs of corrosion. After completion of tar removal, sandblast and repaint perimeter steel in accordance with all requirements of note 1 prior to installing grout. Install additional grout above existing level of tar with 1:4 slope for drainage. Tar on steel inside the limits of item 446-6013 but outside the limits of the hatched areas shall be cleaned but not replaced with grout.

4. Install bird deterrent system in accordance with TxDOT Special Spec. Item 5087-6001 at lower portion of wind shoe on outside perimeter and top portion of windshoe between W36 and lateral strut.

NOTE:
All details on this plan sheet are from the original 1973 Ship Channel Bridge as-builts and have been modified with project specific notes. Please see as-builts for additional dimensions.

STRUT AND BOLSTER WIND SHOES

STATE OF TEXAS
BLAKE A. HUNTSMAN
136815
LICENSED PROFESSIONAL ENGINEER

Blake A. Huntsman P.E.

05.21.2021

Texas Department of Transportation

Houston District (Bridge)

STEEL CLEANING DETAILS
IH 610 EAST
AT SHIP CHANNEL BRIDGE

FILE:	DN: BH	CK: TF	DW: BH	CK: TF
©TxDOT	CONT.	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
	DIST.	COUNTY		SHEET NO.
	HOU	HARRIS		166

5/21/2021
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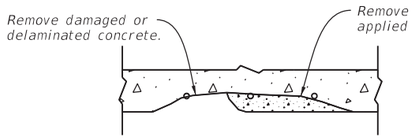
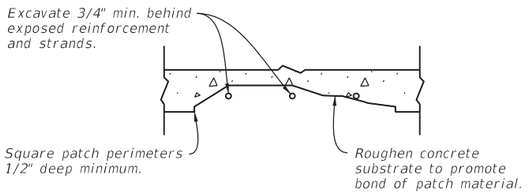
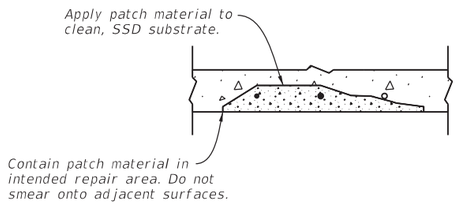


DAMAGED CONDITION



EXCAVATION & PREPARATION



PATCHING

CONCRETE REPAIR DETAILS

Refer to the TxDOT Concrete Repair Manual for additional guidance.

CONCRETE REPAIR NOTES:

1) Verify extent of damage and repairs in the prescence of the Engineer prior to proceeding. Immediately notify Engineer if any discrepancies are noted between the plans and actual conditions.

2) Submit detailed repair procedures, including proposed proprietary materials, for approval prior to commencing work.

3) Perform all work in accordance with Item 429, "Concrete Structure Repair," and the TxDOT Concrete Repair Manual, available from the Department website. A copy of the TxDOT Concrete Repair Manual must be available onsite during all concrete repair operations.

4) Remove delaminated, loose, and unsound concrete where indicated on the plans. Remove any previously applied repair material. Use only hand tools or power-driven chipping hammers (15 lb. class max) to remove concrete and to excavate behind reinforcing bars.

5) Bend, but do not remove, damaged steel reinforcement to ensure there will be 1" minimum concrete cover in the patch area.

6) Remove rust, oil, and other contaminants from concrete and reinforcing steel surfaces by abrasive blast cleaning. Just prior to patching blast the repair area using a high-pressure air compressor equipped with filters to remove oil.

7) Pre-bagged repair material:

   - For overhang repairs, provide SikaQuick VOH, MasterEmaco S488 CI, or other approved Type C Vertical and Overhead repair material per DMS-4655 "Concrete Repair Materials," and listed on the Material Producer List.

   - For rail, column, and other miscellaneous repairs, provide an approved Type A, C, or D concrete repair material per DMS-4655 "Concrete Repair Materials," and listed on the Material Producer List.

   - Follow all manufacturer recommendations for surface prep, mixing, application, lift thickness, curing, and other requirements.

8) Obtain a Saturated Surface-Dry (SSD) substrate just prior to patching using a high-pressure water blast for a brief period (1 minute minimum) or other approved method. Surface may be damp but must be free of standing water.

9) If using a trowel-applied material, apply a bond coat consisting of a thin layer of non-extended repair mortar scrubbed into the substrate. Apply repair material while scrub coat is still wet. Do not exceed the maximum lift depth permitted by the manufacturer. Prepare the surface prior to applying subsequent lifts in accordance with the Manufacturer's recommendations.

10) Moist cure the patch material for a minimum of 48 hours using wet mats, water spray, ponding, or other method approved by Engineer, and in accordance with Manufacturer's recommendations.

GENERAL NOTES

Perform all concrete repair work in accordance with Item 429, "Concrete Structure Repair," and appropriate sections of the TxDOT Concrete Repair Manual.

Follow all manufacturer specifications and recommendations for the repair materials selected.

Payment for repairs is per Item 429, "Concrete Structure Repair."

Contact TxDOT Bridge Division to coordinate inspection of repairs a minimum of 2 weeks prior to beginning the work. Bridge Division inspectors can be reached by email at: BRG-FO-STL@txdot.gov.

STATE OF TEXAS
SETH D. COLE
131778
LICENSED
PROFESSIONAL ENGINEER

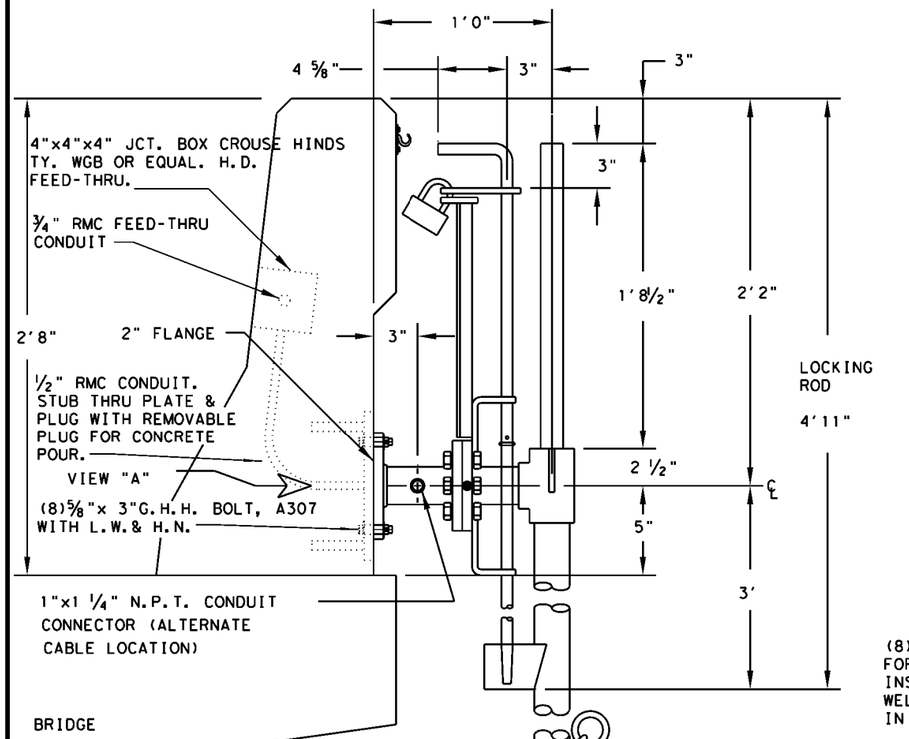
02/01/2021

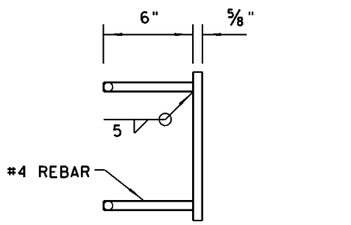
Texas Department of Transportation | Bridge Division

CONCRETE REPAIR DETAILS

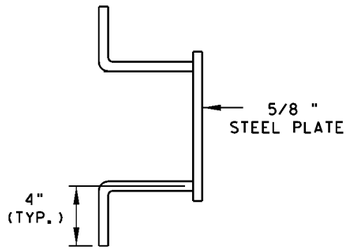
FILE: concreterepair.dgn	DN: SDC	CK: JDB	DW: SDC	CK: JDB
©TxDOT JANUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		167

DATE:
FILE: T:\BRG_FOP\CM\Staff\SDZIEKAN\Repair Details 2018\ODA\Culverts



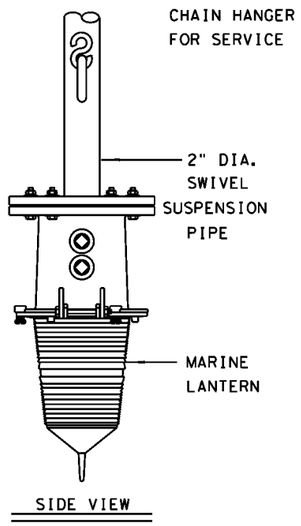


SIDE VIEW



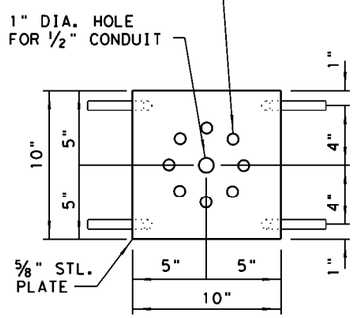
TOP VIEW

FLANGE MOUNTING PLATE DETAILS

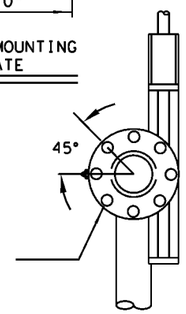


SIDE VIEW

(8)- 11/16 "DIA. HOLES ON 5" B.C. FOR 5/8"DIA. BOLTS. BOLTS TO BE INSERTED FROM BACK AND TACK WELDED PRIOR TO CASTING IN RAIL.

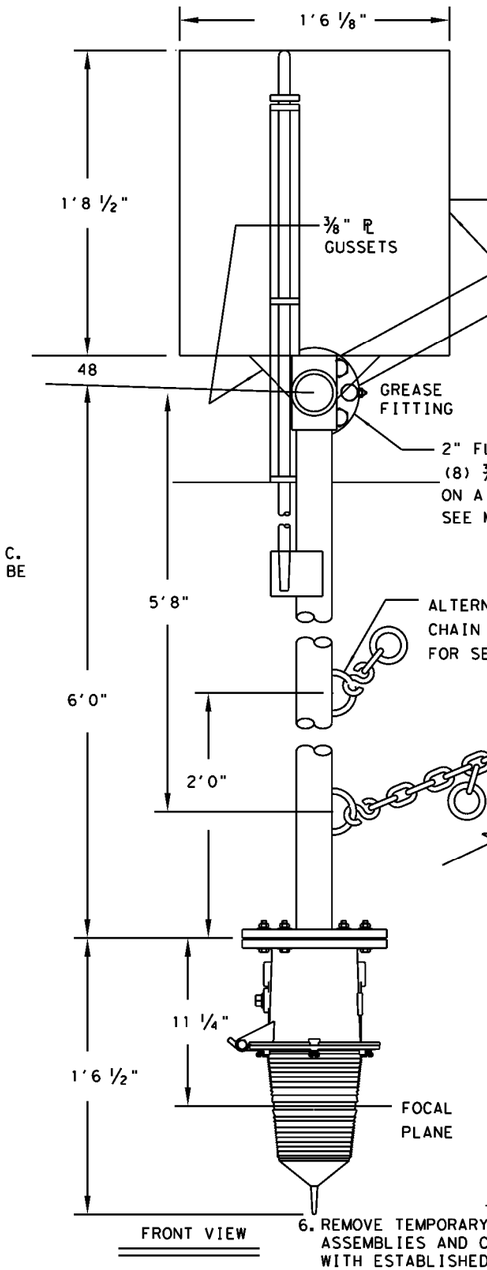


FLANGE MOUNTING PLATE

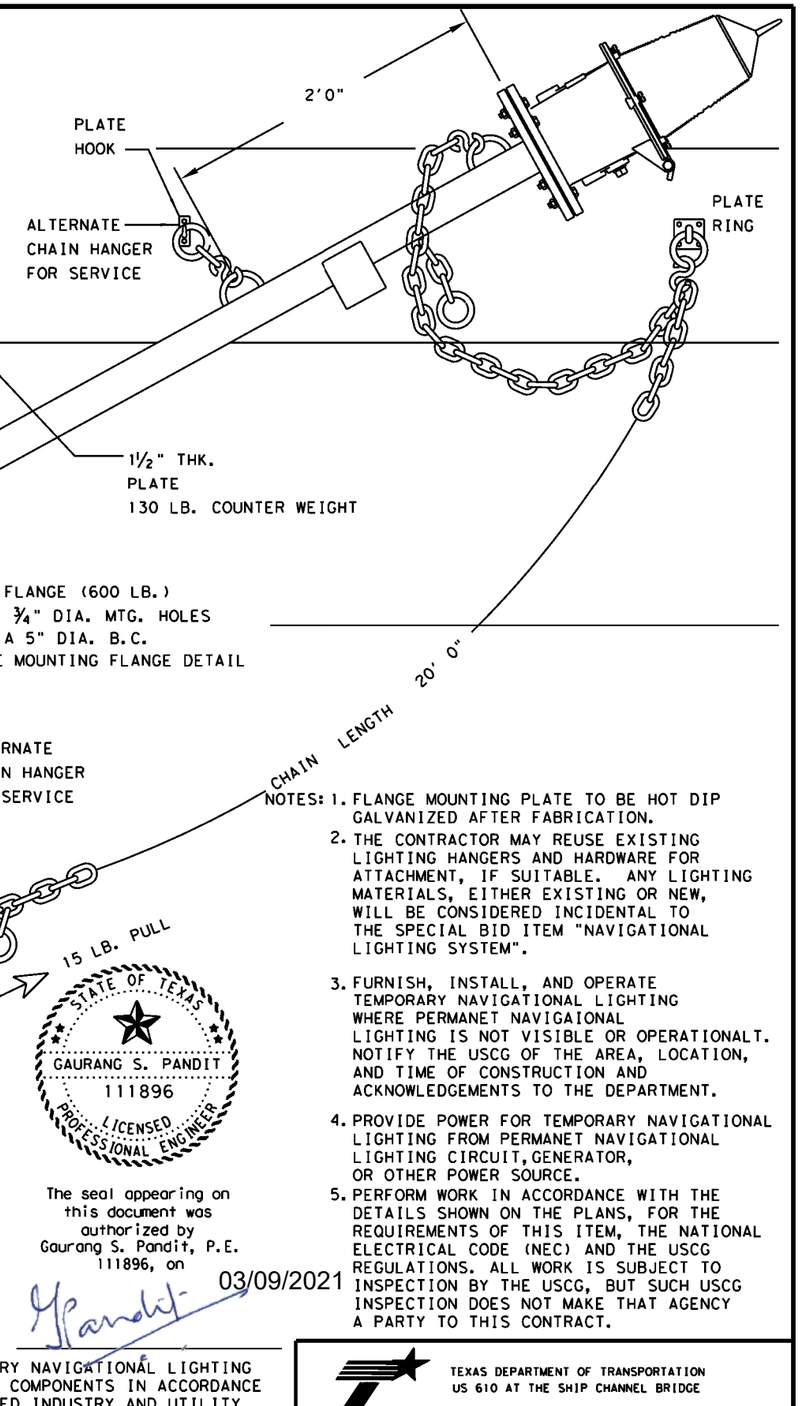


VIEW "A" MOUNTING FLANGE DETAIL

2" FLANGE 600 LB.



FRONT VIEW



NOTES:

1. FLANGE MOUNTING PLATE TO BE HOT DIP GALVANIZED AFTER FABRICATION.
2. THE CONTRACTOR MAY REUSE EXISTING LIGHTING HANGERS AND HARDWARE FOR ATTACHMENT, IF SUITABLE. ANY LIGHTING MATERIALS, EITHER EXISTING OR NEW, WILL BE CONSIDERED INCIDENTAL TO THE SPECIAL BID ITEM "NAVIGATIONAL LIGHTING SYSTEM".
3. FURNISH, INSTALL, AND OPERATE TEMPORARY NAVIGATIONAL LIGHTING WHERE PERMANET NAVIGAIONAL LIGHTING IS NOT VISIBLE OR OPERATIONALT. NOTIFY THE USCG OF THE AREA, LOCATION, AND TIME OF CONSTRUCTION AND ACKNOWLEDGEMENTS TO THE DEPARTMENT.
4. PROVIDE POWER FOR TEMPORARY NAVIGATIONAL LIGHTING FROM PERMANET NAVIGATIONAL LIGHTING CIRCUIT, GENERATOR, OR OTHER POWER SOURCE.
5. PERFORM WORK IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS, FOR THE REQUIREMENTS OF THIS ITEM, THE NATIONAL ELECTRICAL CODE (NEC) AND THE USCG REGULATIONS. ALL WORK IS SUBJECT TO INSPECTION BY THE USCG, BUT SUCH USCG INSPECTION DOES NOT MAKE THAT AGENCY A PARTY TO THIS CONTRACT.
6. REMOVE TEMPORARY NAVIGATIONAL LIGHTING ASSEMBLIES AND COMPONENTS IN ACCORDANCE WITH ESTABLISHED INDUSTRY AND UTILITY SAFETY PRACTICES. DISCONNECT AND REMOVE CONDUCTORS FROM ABANDONED CIRCUITS UNLESS DIRECTED OTHERWISE OR AS SHOWN ON PLANS. REMOVE EXPOSED ABANDONED CONDUIT AND DUCTS UNLESS DIRECTED OTHERWISE OR AS SHOWN ON PLANS. ACCEPT OWNERSHIP OF UNSALVAGEABLE MATERIALS, UNLESS DIRECTED OTHERWISE OR SHOWN ON PLANS, AND DISPOSED OF IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS.

STATE OF TEXAS
GAURANG S. PANDIT
111896
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Gaurang S. Pandit, P.E. 111896, on 03/09/2021

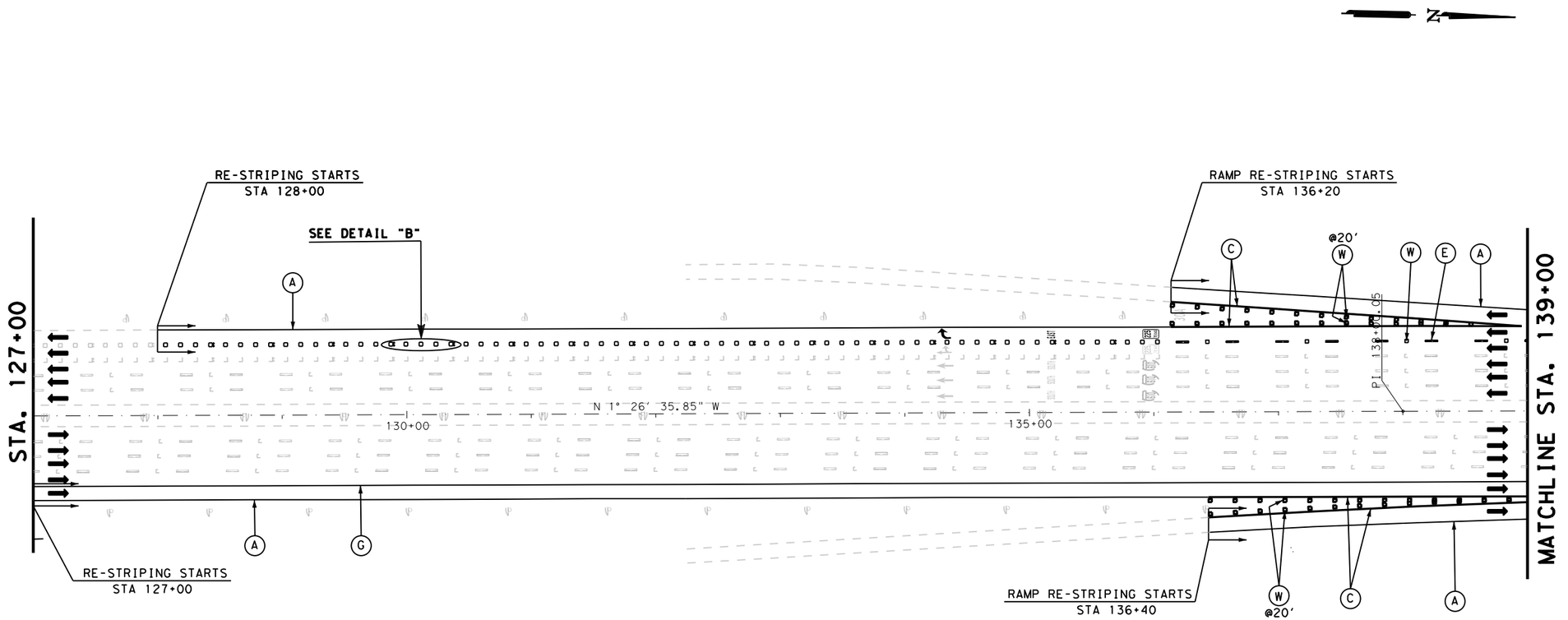
TEXAS DEPARTMENT OF TRANSPORTATION
US 610 AT THE SHIP CHANNEL BRIDGE

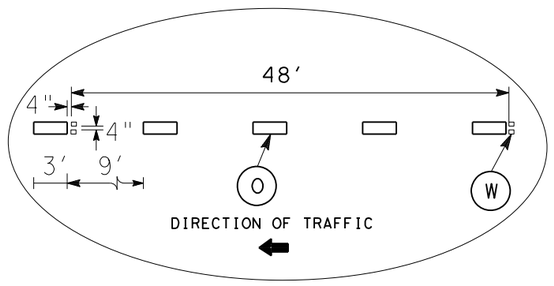
NAVIGATION LIGHT DETAILS

NOT TO SCALE — SHEET 1 OF 1

DN: RT III	DRAWING	DATE	FED. RD. DIV. NO.	STATE	PROJECT NO.				HIGHWAY NO.
CK DN: MM	ORIGINAL	OCT 00							
DW: RT III			6	TEXAS					SH 146
CK DN: MM			STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.	
			HOU	HARRIS	0271	15	097	196	

swivel.dgn





DETAIL "B"

LEGEND:

- (A) MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (B) MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (C) MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (D) MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (E) PREFAB PV MK W/WNTY TY B(W)(6")(BRK)CNST
- (F) MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (G) PREFAB PV MK W/WNTY TY B(W)(6")(SLD)
- (K) MULTIPOLYMER PAV MRK (W)(6")(DOT)
- (O) MULTIPOLYMER PAV MRK (W)(12")(LNDP)
- (W) REFL PAV MRKR TY II-C-R
- (S) INSTL DEL ASSM (D-SW)SZ(BRF)CTB
- (U) INSTL DEL ASSM (D-SY)SZ(BRF)CTB (BI)
- ← DIRECTION OF TRAVEL
- 17A PREFAB PAV MRK TY C (W)(NUMBER)
- PREFAB PAV MRK TY C (W)(ARROW)
- PREFAB PAV MRK TY C (W)(DBL ARROW)
- MERGE ONLY PREFAB PAV MRK TY C (W)(WORD)
- 225 TEXAS 610 PREFAB PAV MRK TY C (MULTI)(SHIELD)

STATE OF TEXAS
GAURANG S. PANDIT
111896
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Gaurang S. Pandit, P.E. 111896, on 05/21/2021.

Texas Department of Transportation

IH 610 PAVEMENT MARKING PLAN

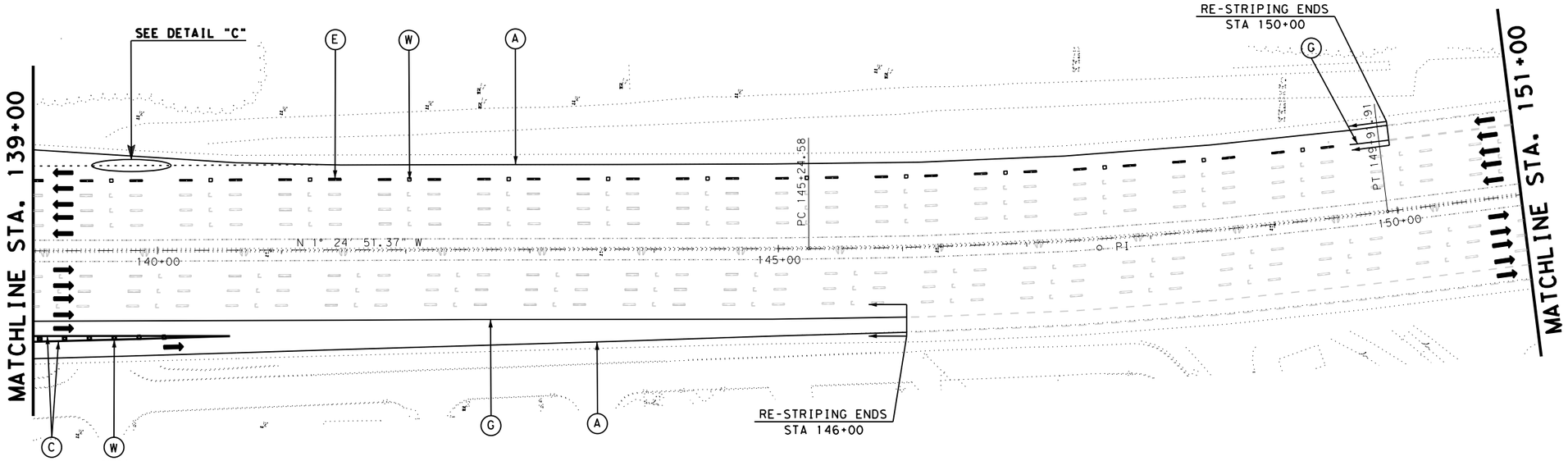
℄ IH 610 STA 127+00.00
TO STA 139+00.00

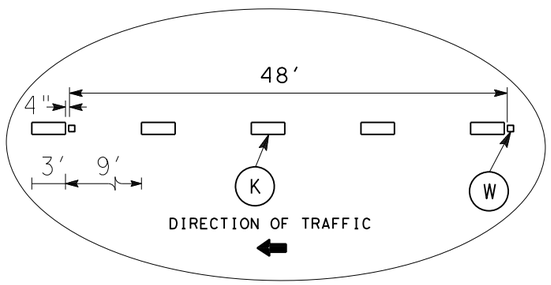
SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 1 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			203
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE:$DATE$
$FILEL$





DETAIL "C"

LEGEND:

- (A) MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (B) MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (C) MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (D) MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (E) PREFAB PV MK W/WNTY TY B(W)(6")(BRK)CNST
- (F) MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (G) PREFAB PV MK W/WNTY TY B(W)(6")(SLD)
- (K) MULTIPOLYMER PAV MRK (W)(6")(DOT)
- (O) MULTIPOLYMER PAV MRK (W)(12")(LNDP)
- (W) REFL PAV MRKR TY II-C-R
- (S) INSTL DEL ASSM (D-SW)SZ(BRF)CTB
- (U) INSTL DEL ASSM (D-SY)SZ(BRF)CTB (BI)
- ← DIRECTION OF TRAVEL
- 17A PREFAB PAV MRK TY C (W)(NUMBER)
- PREFAB PAV MRK TY C (W)(ARROW)
- PREFAB PAV MRK TY C (W)(DBL ARROW)
- MERGE ONLY PREFAB PAV MRK TY C (W)(WORD)
- 225 TEXAS 610 PREFAB PAV MRK TY C (MULTI)(SHIELD)

DATE:$DATE$
$FILE$

STATE OF TEXAS
GAURANG S. PANDIT
111896
REGISTERED PROFESSIONAL ENGINEER

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Texas Department of Transportation

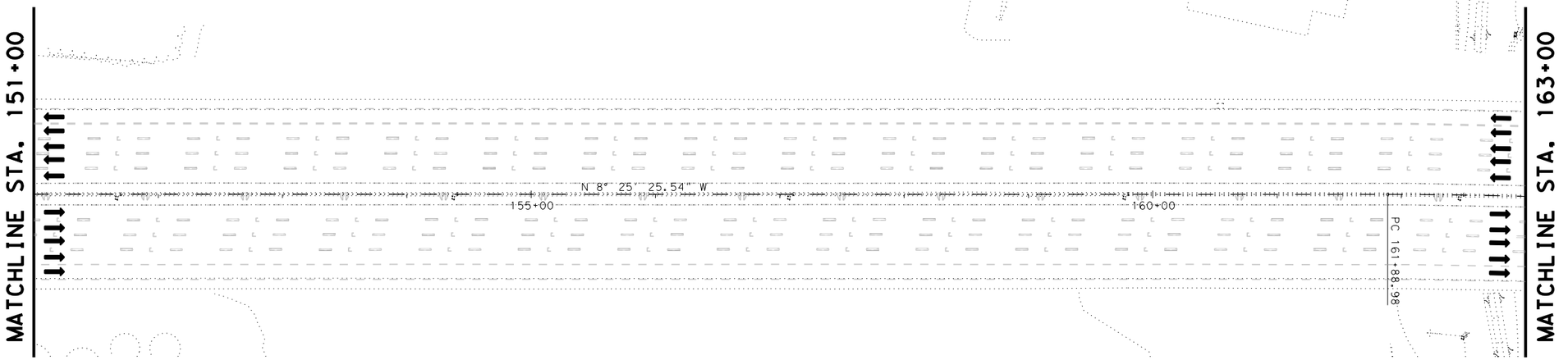
IH 610 PAVEMENT MARKING PLAN

℄ IH 610 STA 139+00.00
TO STA 151+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 2 OF 6

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			204
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



N

LEGEND:

- (A) MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (B) MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (C) MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (D) MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (E) PREFAB PV MK W/WNTY TY B(W)(6")(BRK)CNST
- (F) MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (G) PREFAB PV MK W/WNTY TY B(W)(6")(SLD)
- (K) MULTIPOLYMER PAV MRK (W)(6")(DOT)
- (O) MULTIPOLYMER PAV MRK (W)(12")(LNDP)
- (W) REFL PAV MRKR TY II-C-R
- (S) INSTL DEL ASSM (D-SW)SZ(BRF)CTB
- (U) INSTL DEL ASSM (D-SY)SZ(BRF)CTB (BI)
- DIRECTION OF TRAVEL
- 17A PREFAB PAV MRK TY C (W)(NUMBER)
- PREFAB PAV MRK TY C (W)(ARROW)
- PREFAB PAV MRK TY C (W)(DBL ARROW)
- MERGE ONLY PREFAB PAV MRK TY C (W)(WORD)
- 225 TEXAS 610 PREFAB PAV MRK TY C (MULTI)(SHIELD)

DATE:$DATE$
$FILEL$

STATE OF TEXAS
GAURANG S. PANDIT
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05/21/2021

Texas Department of Transportation

IH 610 PAVEMENT MARKING PLAN

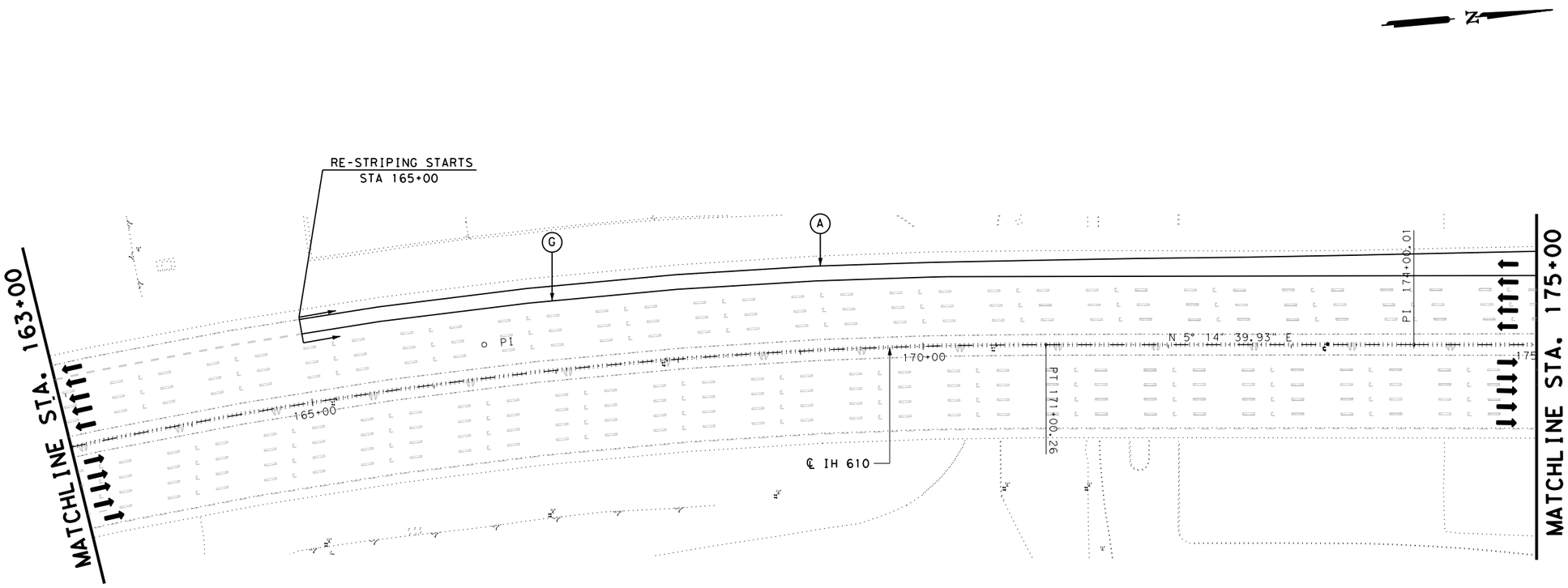
℄ IH 610 STA 151+00.00
TO STA 163+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 3 OF 6

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		205

STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



LEGEND:

- (A) MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (B) MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (C) MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (D) MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (E) PREFAB PV MK W/WNTY TY B(W)(6")(BRK)CNST
- (F) MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (G) PREFAB PV MK W/WNTY TY B(W)(6")(SLD)
- (K) MULTIPOLYMER PAV MRK (W)(6")(DOT)
- (O) MULTIPOLYMER PAV MRK (W)(12")(LNDP)
- (W) REFL PAV MRKR TY II-C-R
- (S) INSTL DEL ASSM (D-SW)SZ(BRF)CTB
- (U) INSTL DEL ASSM (D-SY)SZ(BRF)CTB (BI)
- ← DIRECTION OF TRAVEL
- 17A PREFAB PAV MRK TY C (W)(NUMBER)
- PREFAB PAV MRK TY C (W)(ARROW)
- PREFAB PAV MRK TY C (W)(DBL ARROW)
- MERGE ONLY PREFAB PAV MRK TY C (W)(WORD)
- 225 TEXAS 610 PREFAB PAV MRK TY C (MULTI)(SHIELD)

Texas Department of Transportation

IH 610
PAVEMENT MARKING PLAN

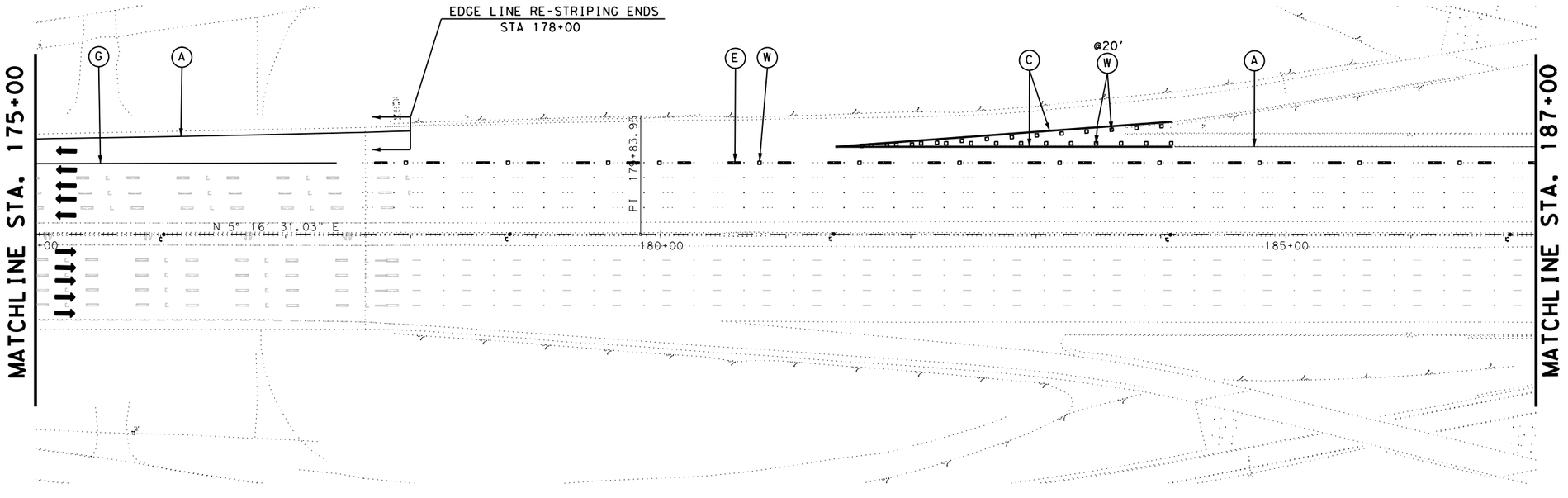
℄ IH 610 STA 163+00.00
TO STA 175+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 4 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			206
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE:$DATE$
$FILEL$



LEGEND:

- (A) MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (B) MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (C) MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (D) MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (E) PREFAB PV MK W/WNTY TY B(W)(6")(BRK)CNST
- (F) MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (G) PREFAB PV MK W/WNTY TY B(W)(6")(SLD)
- (K) MULTIPOLYMER PAV MRK (W)(6")(DOT)
- (O) MULTIPOLYMER PAV MRK (W)(12")(LNDP)
- (W) REFL PAV MRKR TY II-C-R
- (S) INSTL DEL ASSM (D-SW)SZ(BRF)CTB
- (U) INSTL DEL ASSM (D-SY)SZ(BRF)CTB (BI)
- ← DIRECTION OF TRAVEL
- 17A PREFAB PAV MRK TY C (W)(NUMBER)
- PREFAB PAV MRK TY C (W)(ARROW)
- PREFAB PAV MRK TY C (W)(DBL ARROW)
- MERGE ONLY PREFAB PAV MRK TY C (W)(WORD)
- 225 TEXAS 610 PREFAB PAV MRK TY C (MULTI)(SHIELD)

DATE:$DATE$
$FILEL$

STATE OF TEXAS
GAURANG S. PANDIT
111896
REGISTERED PROFESSIONAL ENGINEER

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Texas Department of Transportation

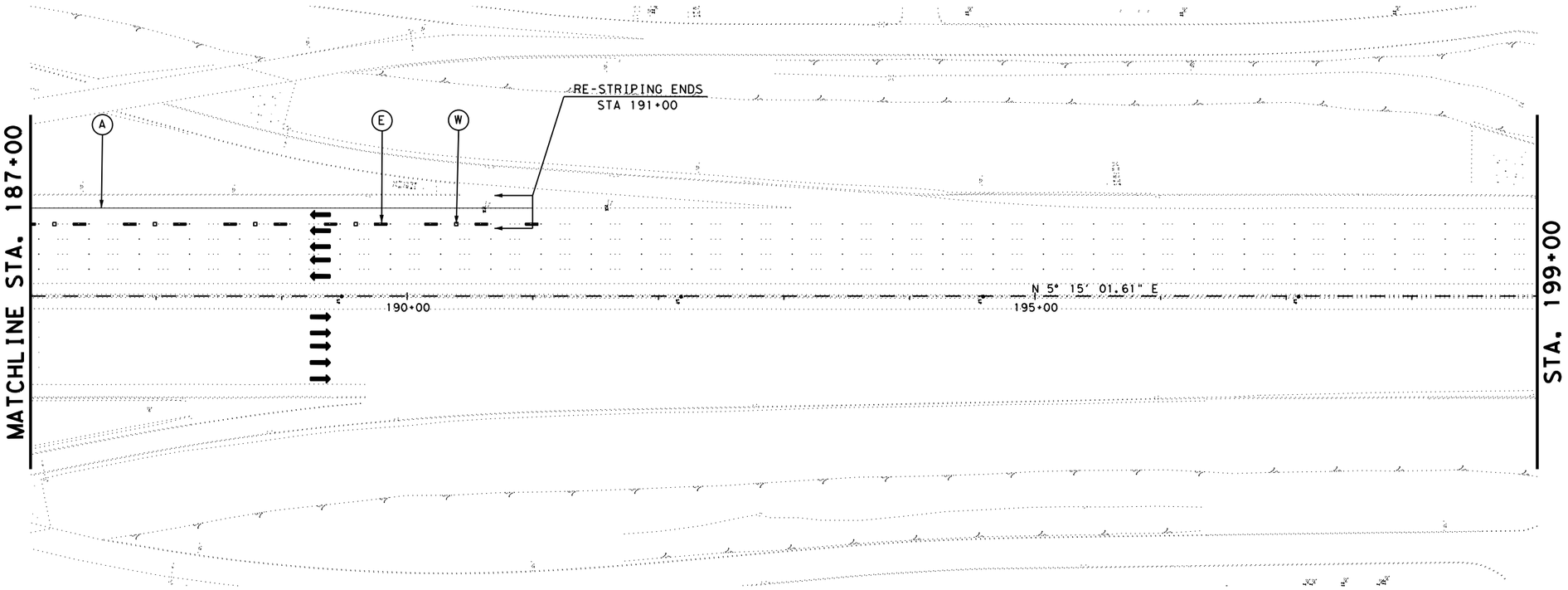
IH 610
PAVEMENT MARKING PLAN

℄ IH 610 STA 175+00.00
TO STA 187+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 5 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			207
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



LEGEND:

- (A) MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (B) MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (C) MULTIPOLYMER PAV MRK (W)(8")(SLD)
- (D) MULTIPOLYMER PAV MRK (W)(12")(SLD)
- (E) PREFAB PV MK W/WNTY TY B(W)(6")(BRK)CNST
- (F) MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (G) PREFAB PV MK W/WNTY TY B(W)(6")(SLD)
- (K) MULTIPOLYMER PAV MRK (W)(6")(DOT)
- (O) MULTIPOLYMER PAV MRK (W)(12")(LNDP)
- (W) REFL PAV MRKR TY II-C-R
- (S) INSTL DEL ASSM (D-SW)SZ(BRF)CTB
- (U) INSTL DEL ASSM (D-SY)SZ(BRF)CTB (BI)
- ← DIRECTION OF TRAVEL
- 17A PREFAB PAV MRK TY C (W)(NUMBER)
- PREFAB PAV MRK TY C (W)(ARROW)
- PREFAB PAV MRK TY C (W)(DBL ARROW)
- MERGE ONLY PREFAB PAV MRK TY C (W)(WORD)
- 225 TEXAS 610 PREFAB PAV MRK TY C (MULTI)(SHIELD)

DATE:$DATE$
$FILEL$

STATE OF TEXAS
GAURANG S. PANDIT
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Texas Department of Transportation

IH 610 PAVEMENT MARKING PLAN

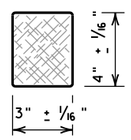
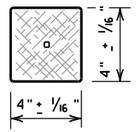
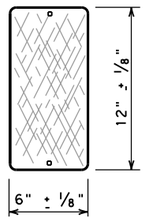
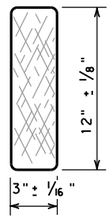
℄ IH 610 STA 187+00.00
TO STA 199+00.00

SCALE: 1" = 100' HORZ
1" = 10' VERT

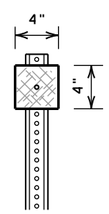
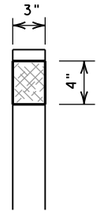
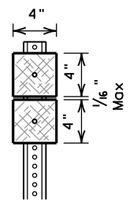
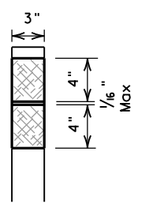
SHEET 6 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			208
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

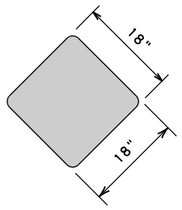
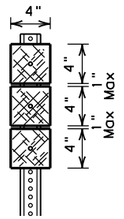
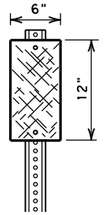
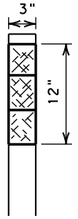
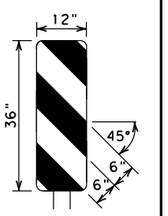
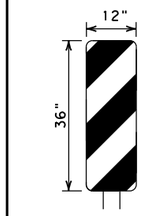
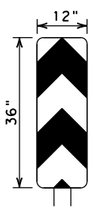
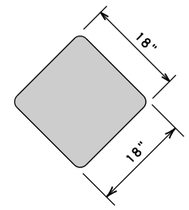
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

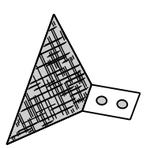
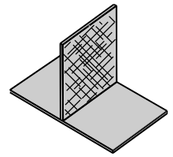
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

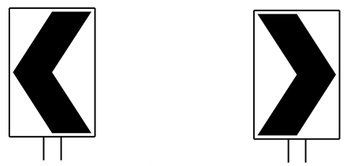
	GF1	GF2	CTB
DEVICE			

1. Barrier reflectors shall meet the requirements of DMS 8600.
2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.

SHEETING: Yellow, White, Red

NOTE
1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.

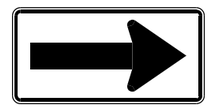
CHEVRONS

DEVICE:  W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE:  W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dam1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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20A

DATE:
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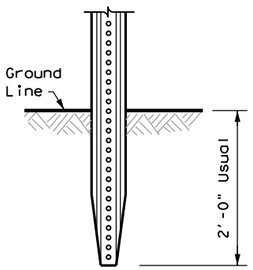
POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

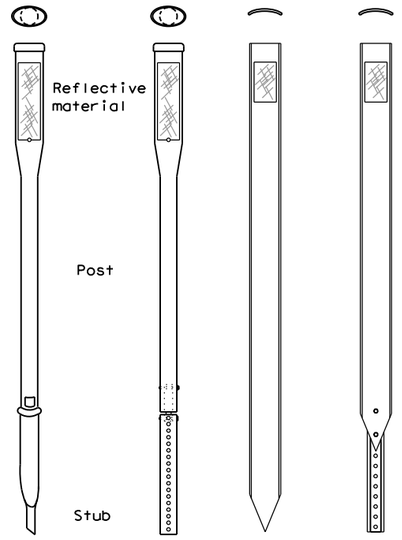


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

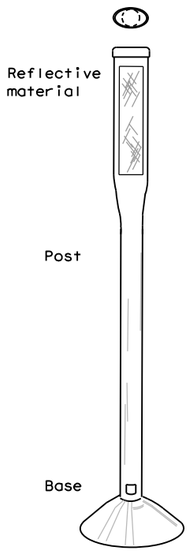
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



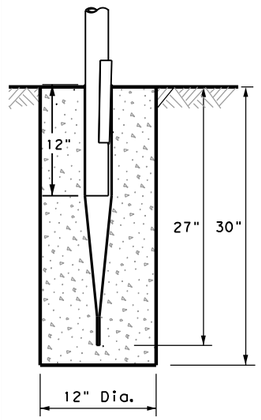
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

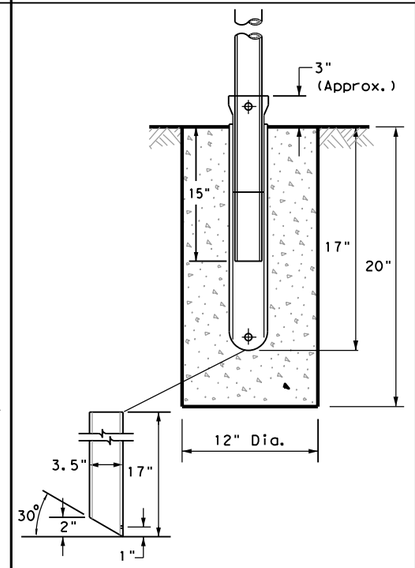
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

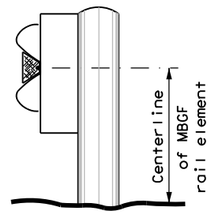
NOTE

1. Install per manufacturer's recommendations.

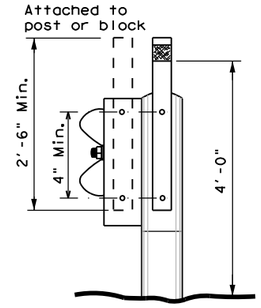
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

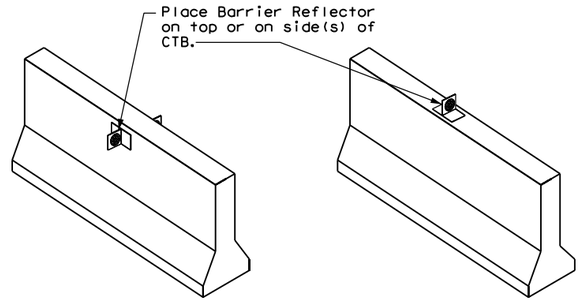
GF1



GF2



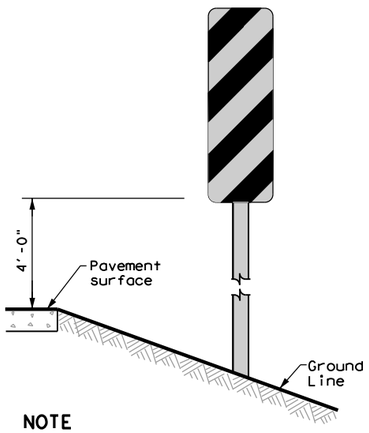
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

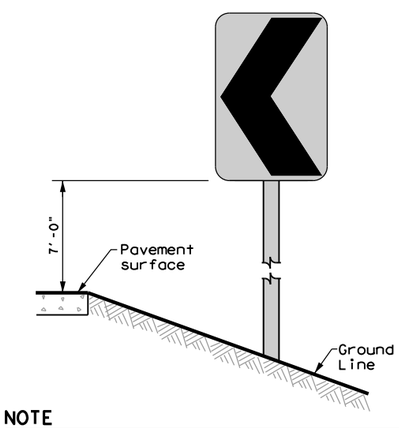
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

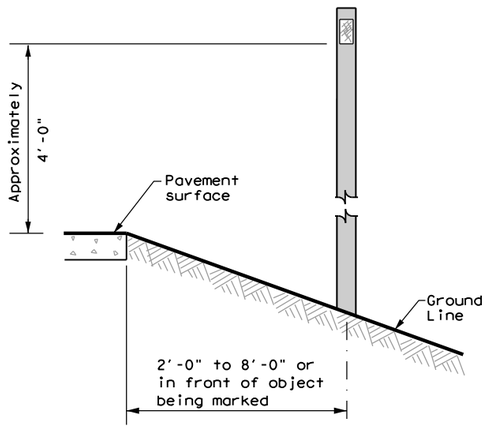
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

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DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

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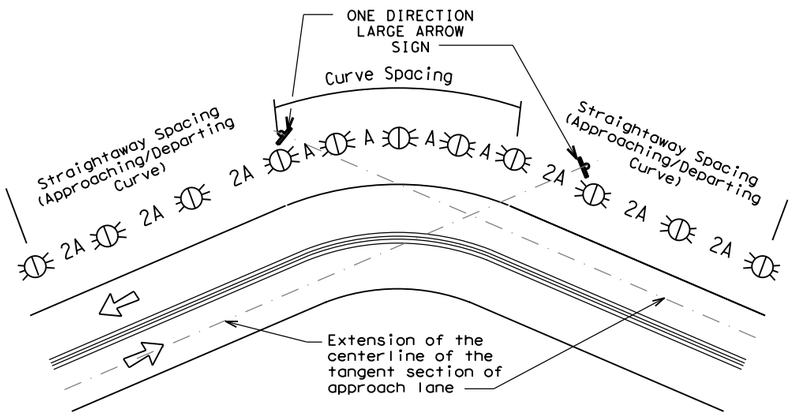
MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

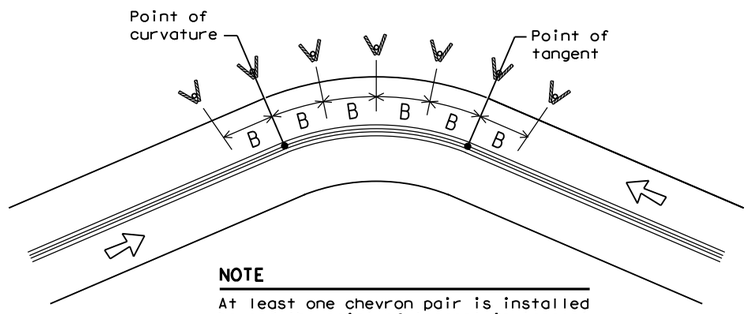
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

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DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

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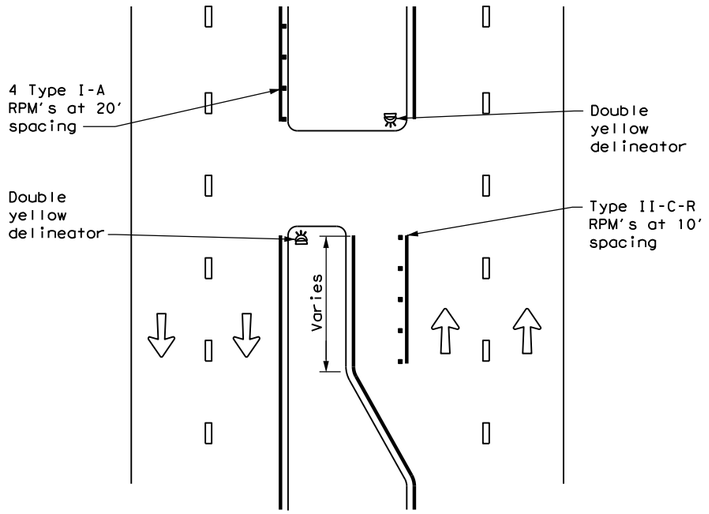
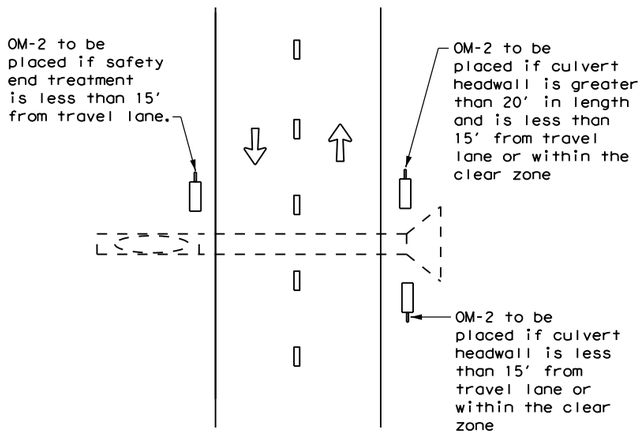
CROSSOVERS



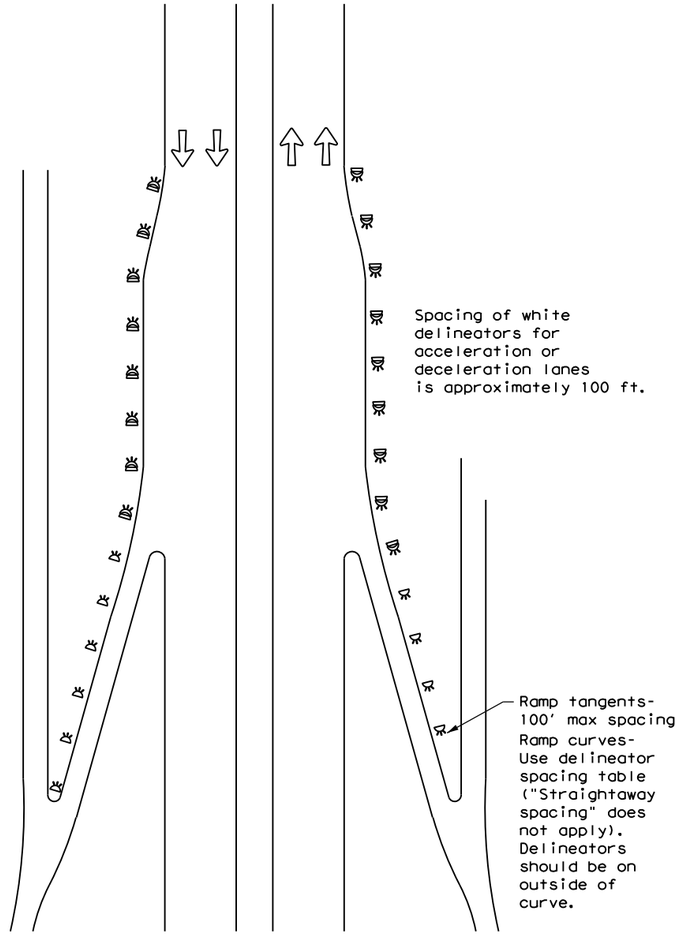
DETAIL 1

FOR CULVERTS WITHOUT MBGF



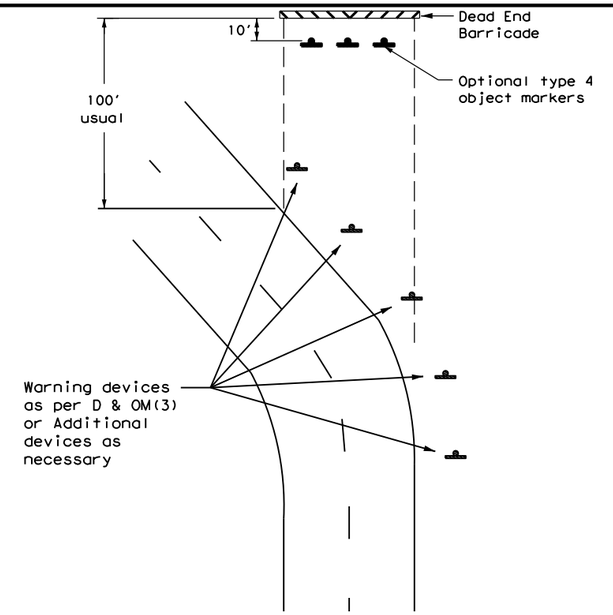
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



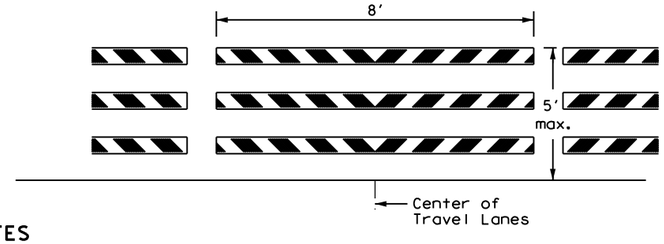
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

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DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

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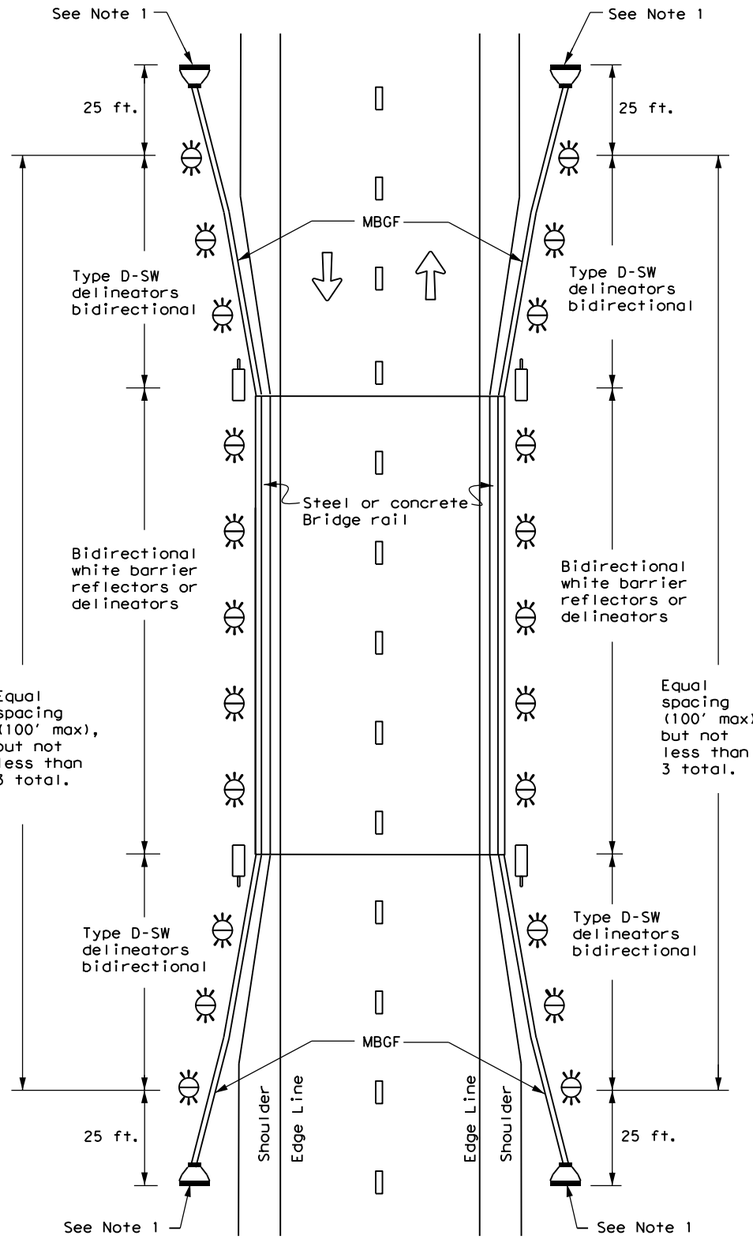
20D

DATE:
FILE:

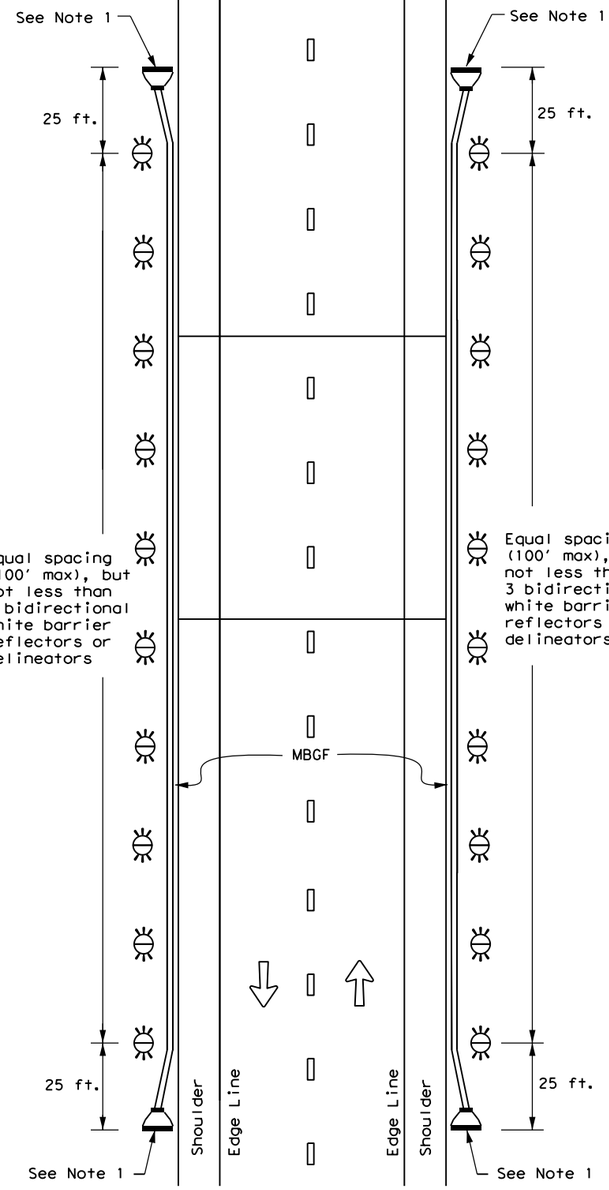
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

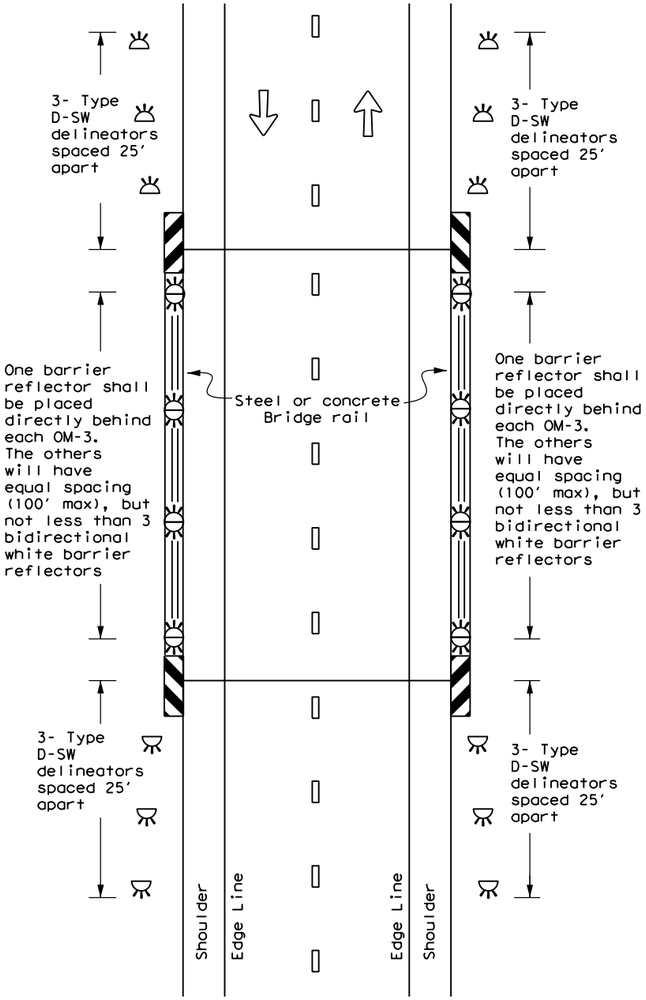
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

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DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

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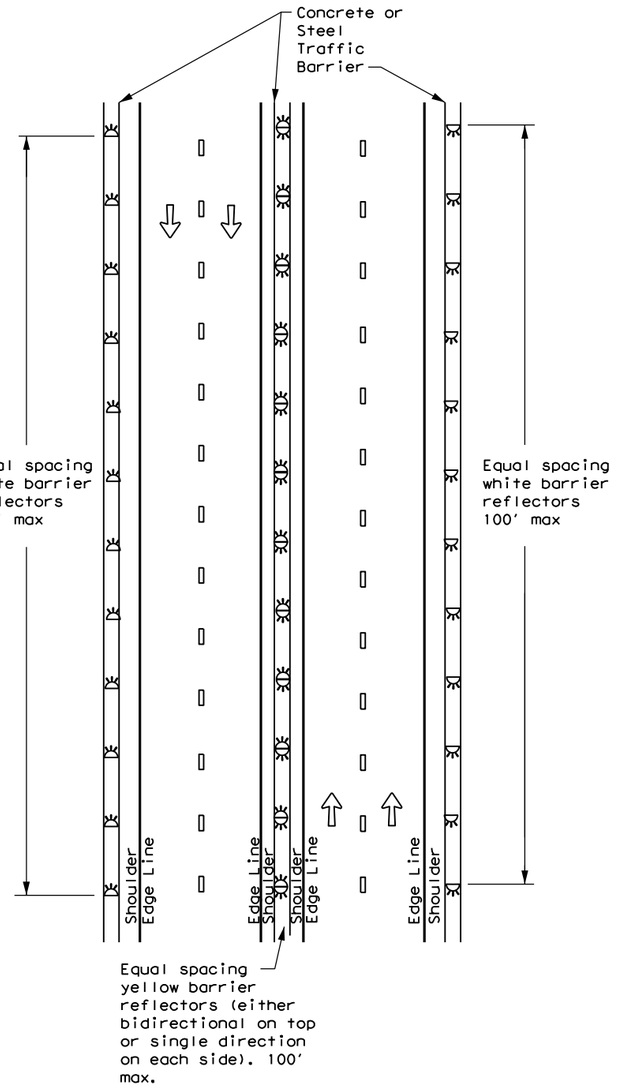
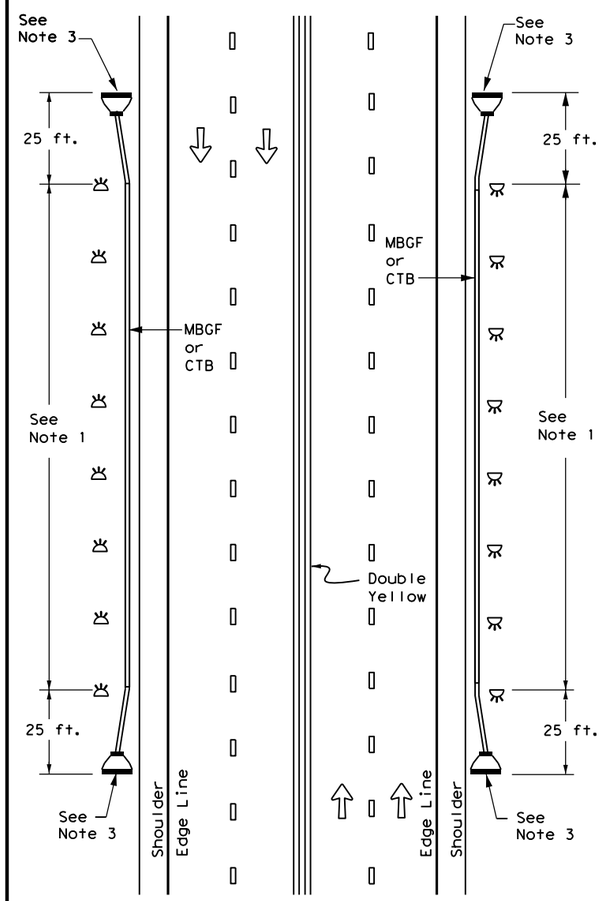
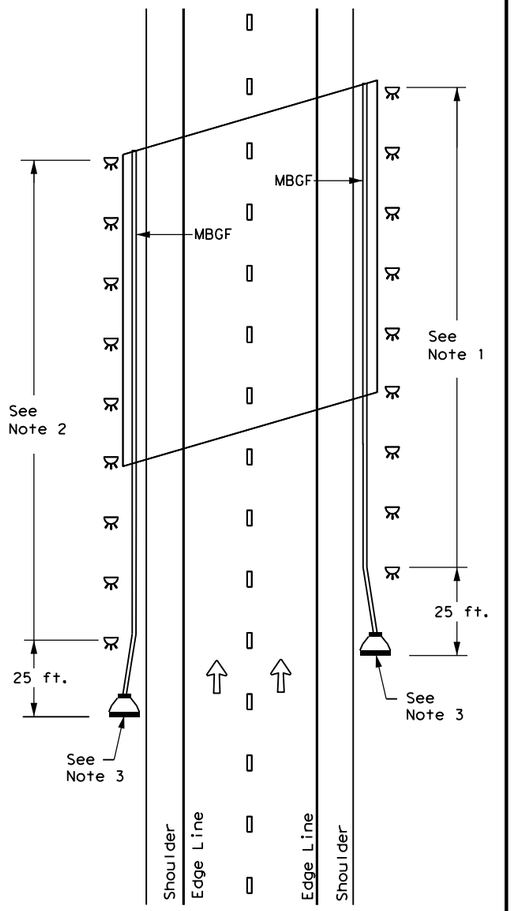
CONTINUOUS CONCRETE OR STEEL BARRIER



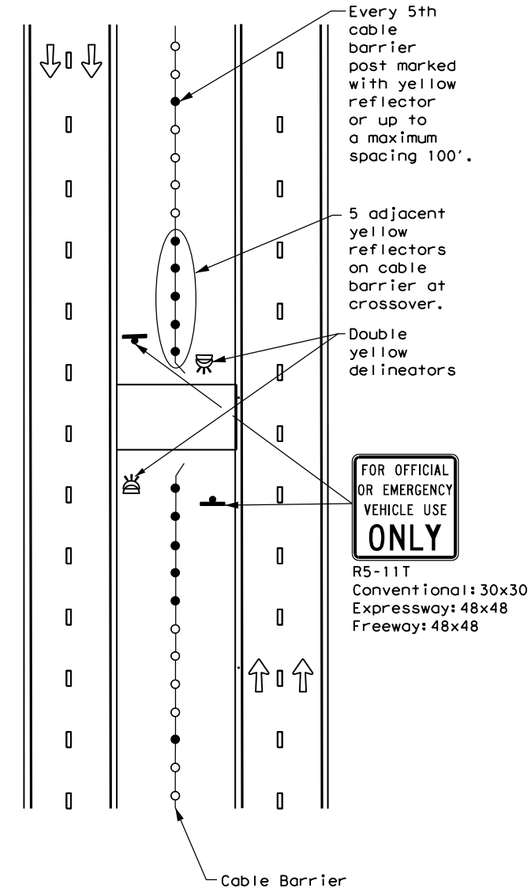
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

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DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

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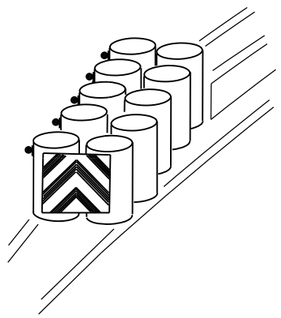
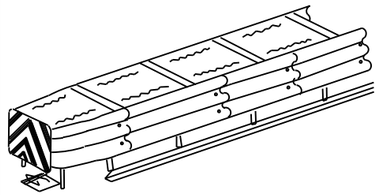
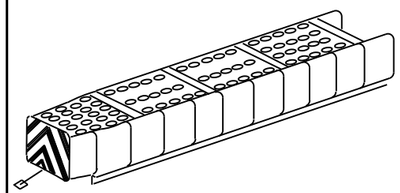
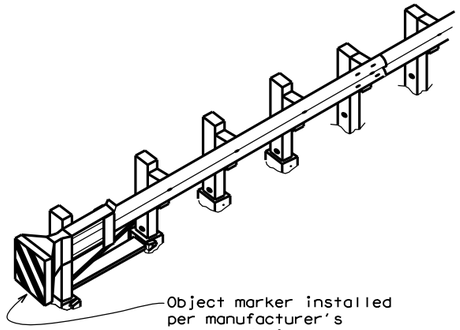
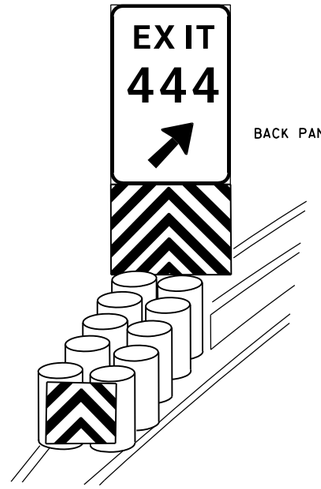




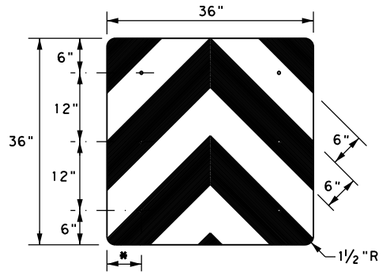


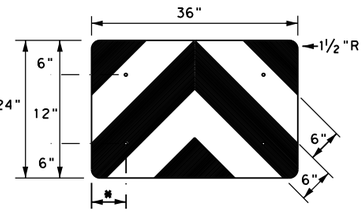


Object marker installed per manufacturer's recommendations.

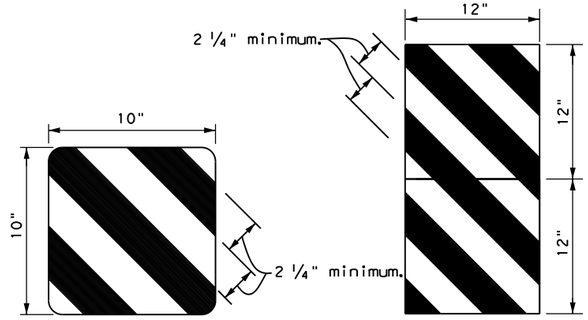


BACK PANEL (OPTIONAL)

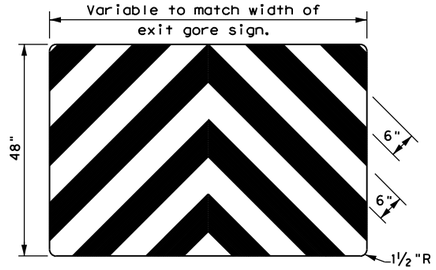


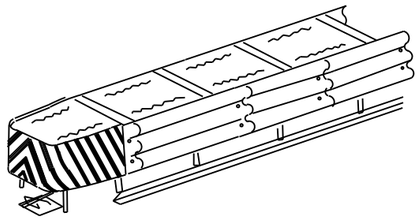


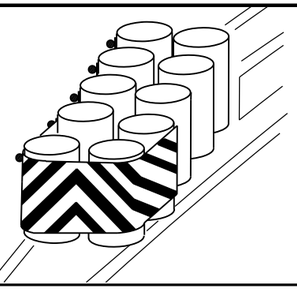
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

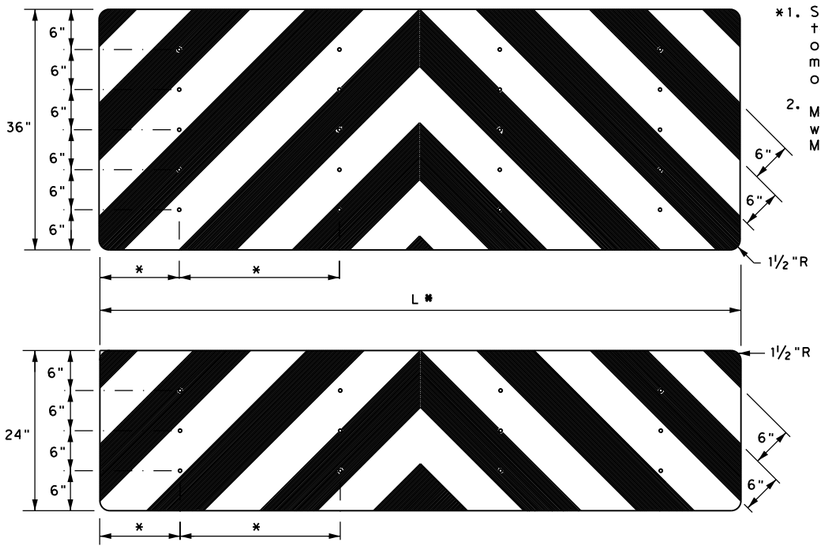


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

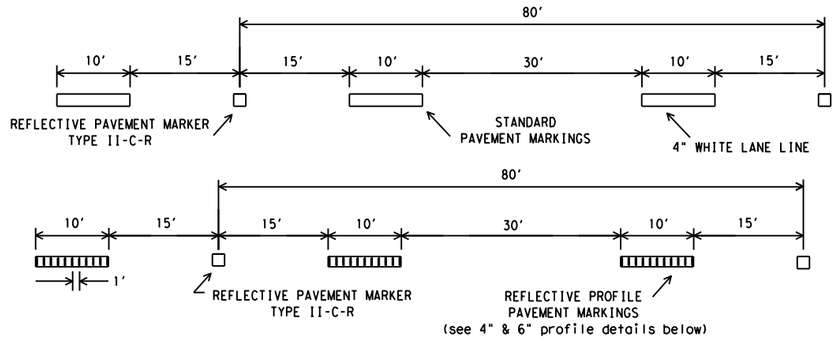
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	HOU	HARRIS		215
4-98 7-20				

20G

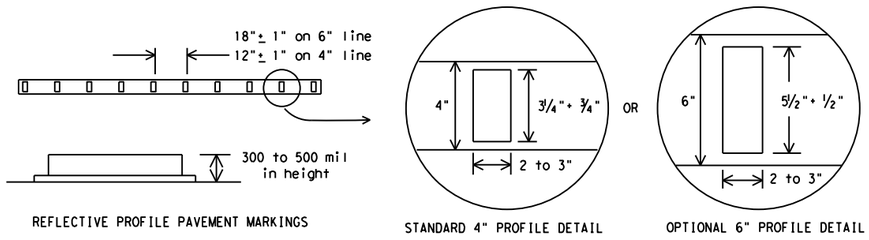
DATE:
FILE:



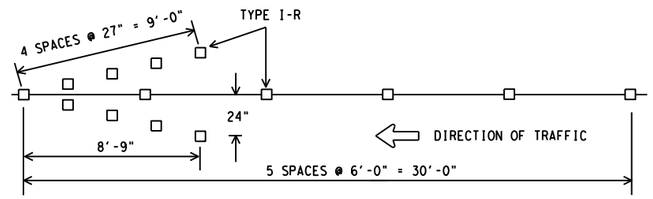
PAVEMENT MARKERS (REFL) TYPE II-C-R SHALL BE SPACED ON 80' CENTERS WITH THE CLEAR FACE TOWARD NORMAL TRAFFIC AND THE RED FACE TOWARD WRONG WAY TRAFFIC.

TRAFFIC LANE LINES PAVEMENT MARKING DETAILS

EDGELINES SHOULD TYPICALLY BE 4" WIDE AND THE MATERIALS SHALL BE AS SPECIFIED IN THE PLANS.
IF RAISED PROFILE PAVEMENT MARKINGS ARE USED SEE DETAILS BELOW.



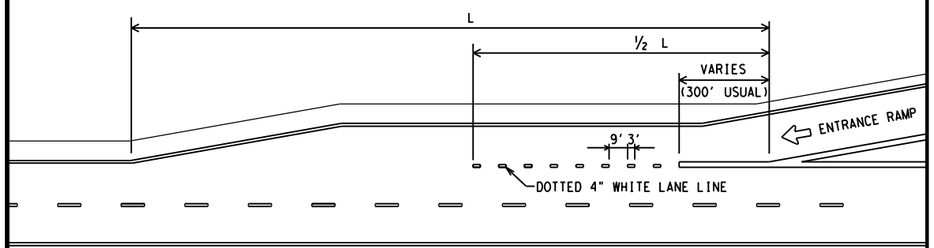
EDGELINE PAVEMENT MARKINGS



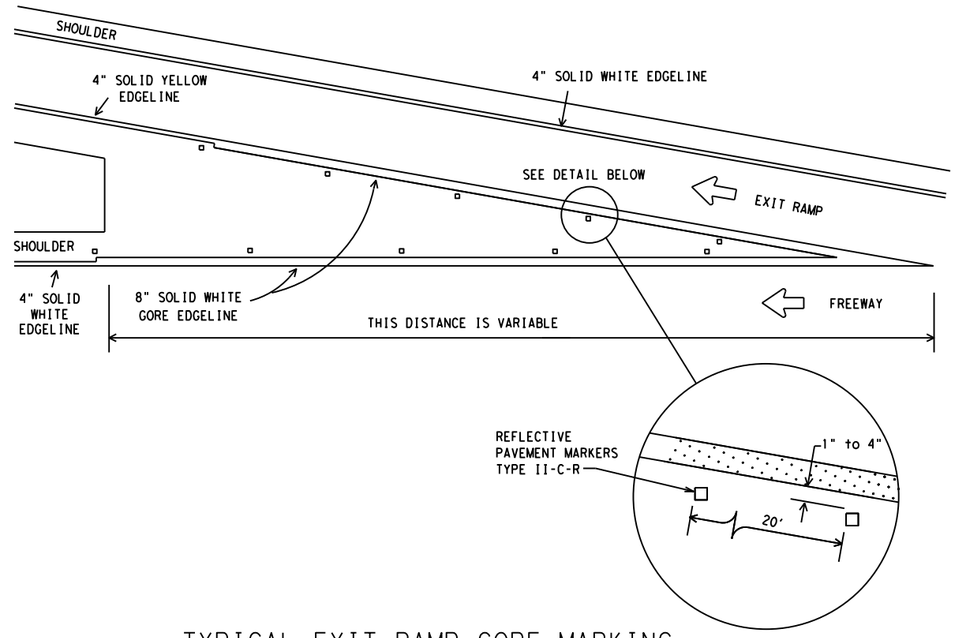
ALL RAISED MARKERS IN THE WRONG WAY ARROW SHALL BE TYPE I-R REFLECTORIZED PAVEMENT MARKERS WITH THE REFLECTORIZED SURFACE FACING THE WRONG WAY TRAFFIC. TYPE II-C-R SHALL NOT BE USED.

REFLECTORIZED WRONG WAY ARROWS, NOT TO EXCEED TWO, MAY BE PLACED ON EXIT RAMPS.
LOCATION OF THE ARROWS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

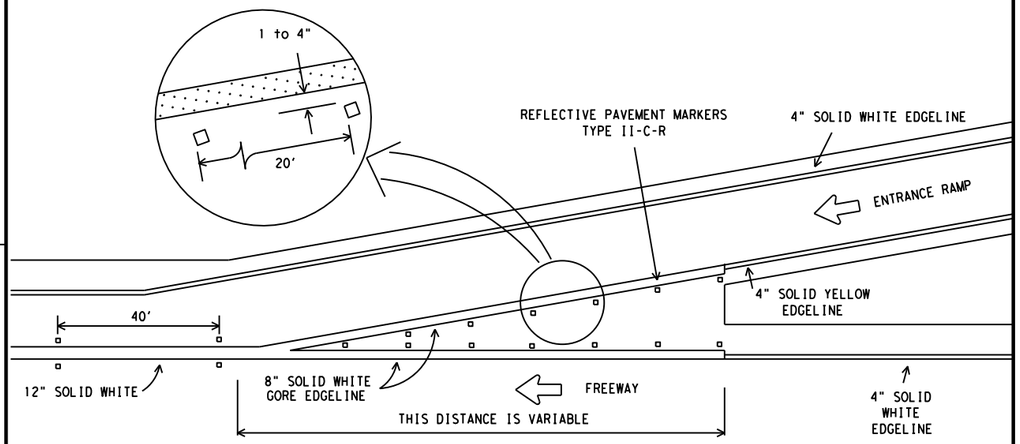
WRONG WAY ARROW DETAIL



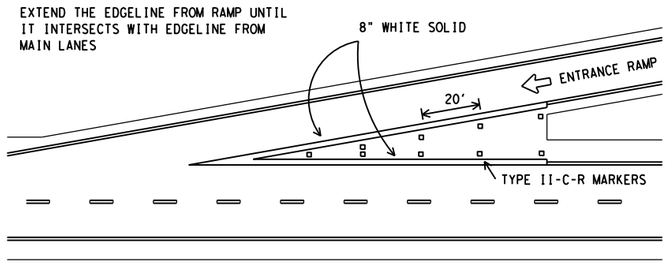
PARALLEL ACCELERATION LANE



TYPICAL EXIT RAMP GORE MARKING



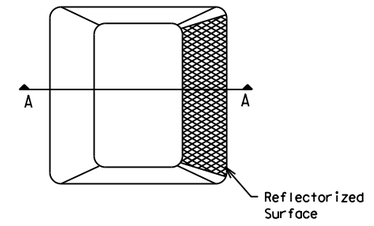
TYPICAL ENTRANCE RAMP GORE MARKING



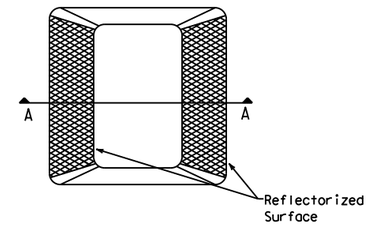
TAPERED ACCELERATION LANE

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

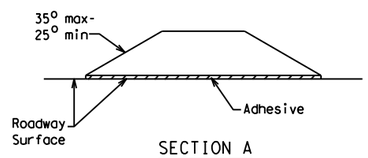
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

FPM(1)-12

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

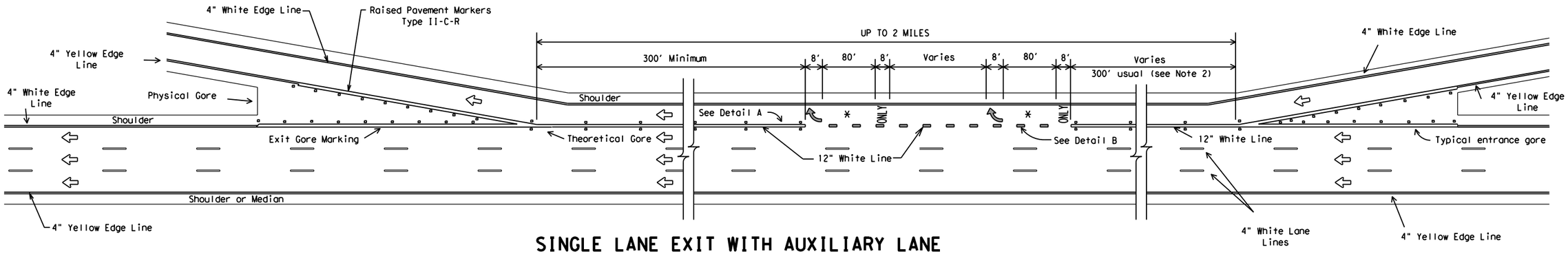
REVISIONS
4-92 2-10
5-00 2-12
8-00
2-08

CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610
DIST	COUNTY		SHEET NO.
HOU	HARRIS		216

23A

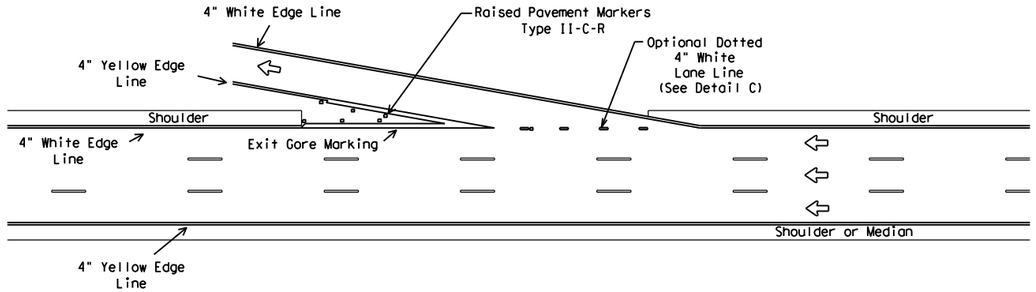
DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

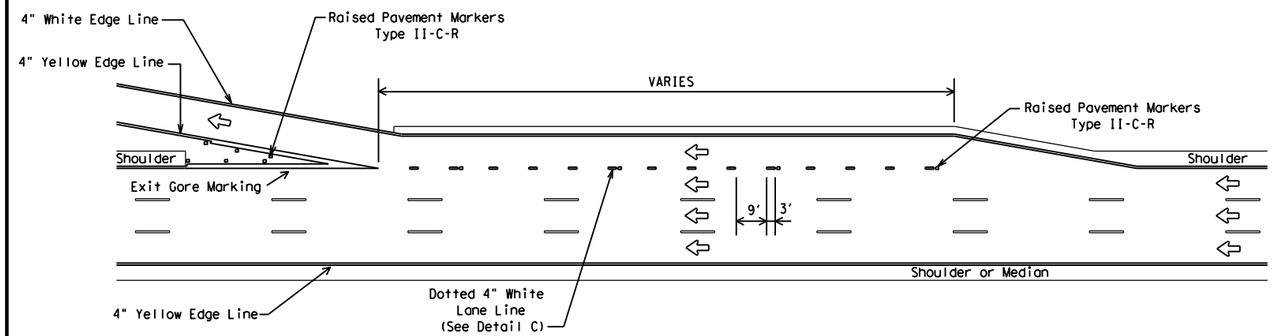


SINGLE LANE EXIT WITH AUXILIARY LANE

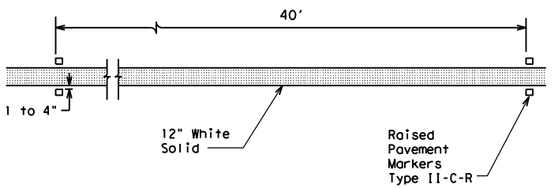
(See Note 2)



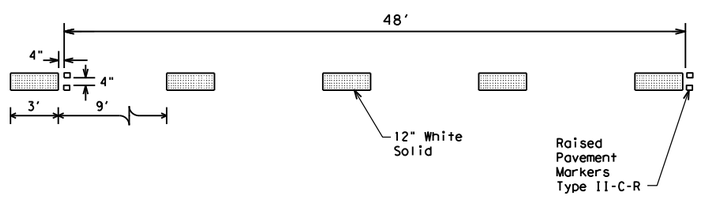
TAPERED DECELERATION LANE



PARALLEL DECELERATION LANE

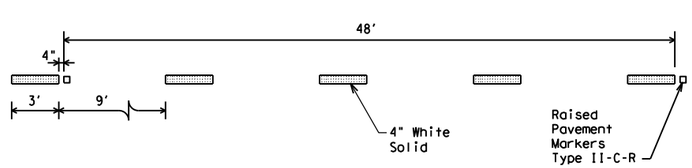


DETAIL A



DETAIL B

Wide (12") Dotted Lane Line (See Note 3)



DETAIL C

Normal (4") Dotted Lane Line (See Note 4)

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") Dotted Lane Line (See Detail B) is used to separate a through lane from a lane drop at normal exit ramp and from an auxiliary lane between an entrance and exit ramp.
4. Normal (4") Dotted Lane Line (See Detail C) is used at parallel acceleration and deceleration lanes.

LEGEND	
⇦	Denotes direction of traffic.
↱	Pavement marking arrows (white)
✳	Arrow markings are optional, however "ONLY" is required if arrow is used

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS ENTRANCE AND EXIT RAMPS

FPM(2)-12

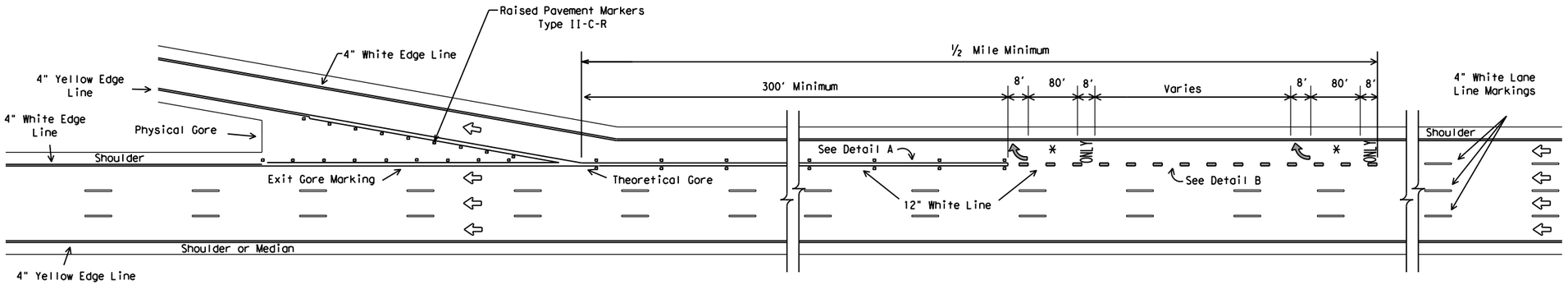
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
4-92 2-10
8-95 2-12
5-00
8-00

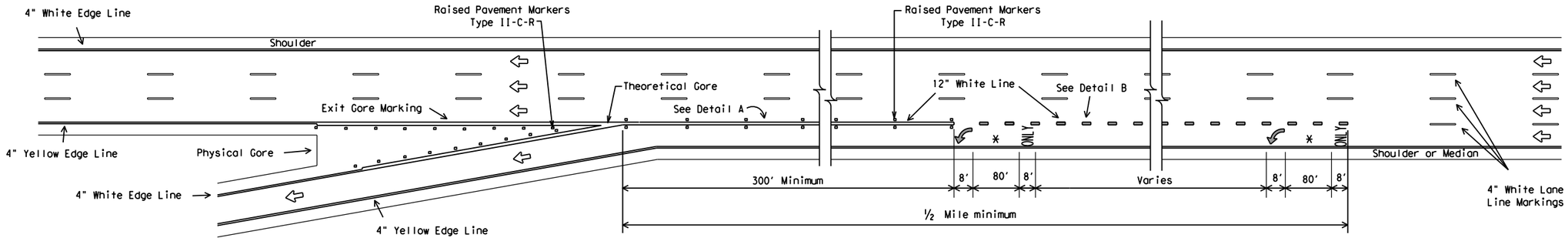
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610
DIST	COUNTY		SHEET NO.
HOU	HARRIS		217

DATE:
FILE:

23B



SINGLE LANE EXIT - LANE DROP OR EXIT ONLY

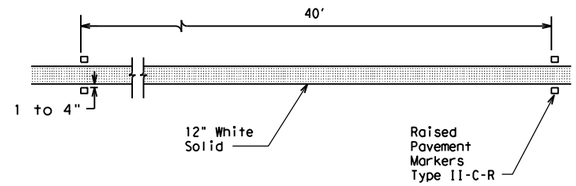


SINGLE LANE EXIT - LANE DROP OR EXIT ONLY (LEFTHAND)

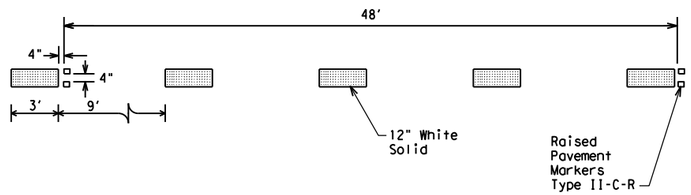
LEGEND	
⇦	Denotes direction of traffic.
↱	Pavement marking arrows (white)
*	Arrow markings are optional, however "ONLY" is required if arrow is used

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") Dotted Lane Line (See Detail B) is used to separate a through lane from a lane drop at normal exit ramp and from an auxiliary lane between an entrance and exit ramp.



DETAIL A



DETAIL B

Wide (12") Dotted Lane Line (See Note 3)

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS LANE DROP (EXIT ONLY) EXIT RAMPS

FPM(3)-12

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

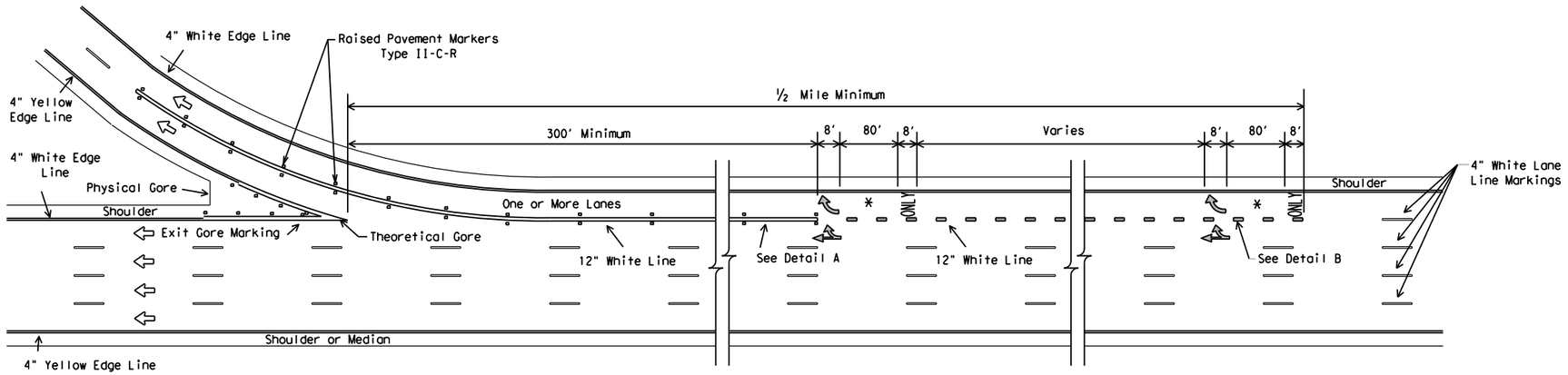
REVISIONS
5-00
8-00
2-10
2-12

CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

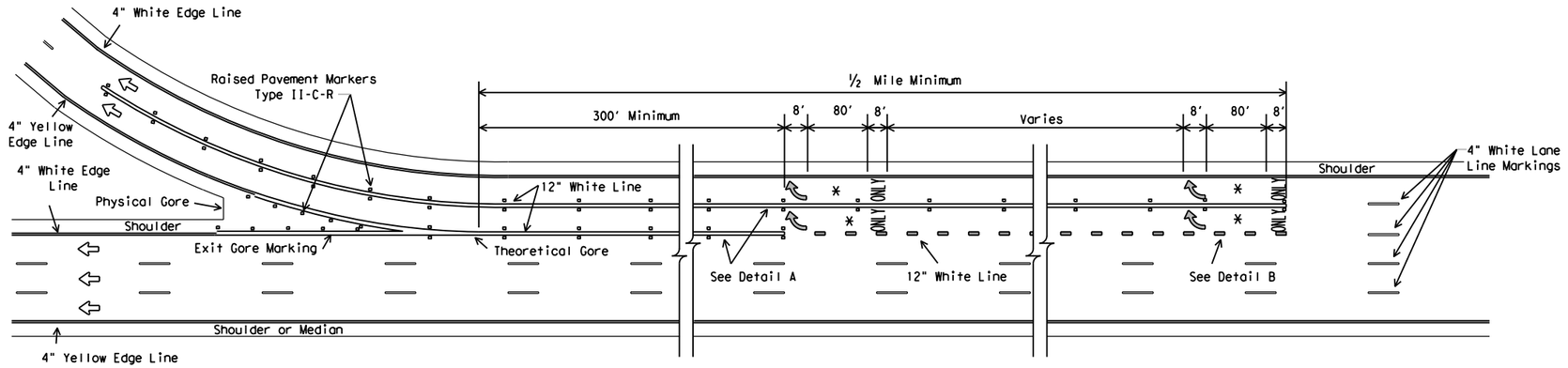
DIST	COUNTY	SHEET NO.
HOU	HARRIS	218

23C

DATE:
FILE:



MULTIPLE LANE EXIT - EXIT ONLY WITH OPTION LANE

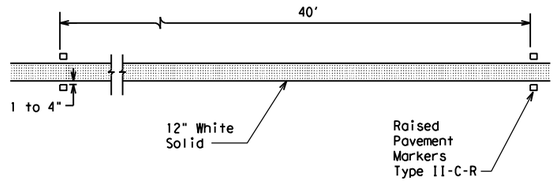


MULTIPLE LANE EXIT ONLY

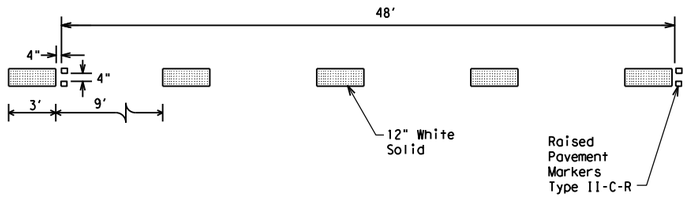
LEGEND	
⇦	Denotes direction of traffic
	Pavement marking arrow (white)
	Optional Pavement Marking Arrows (white)
✳	Arrow markings are optional, however "ONLY" is required if arrow is used

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") Dotted Lane Line (See Detail B) is used to separate a through lane from a lane drop at normal exit ramp and from an auxiliary lane between an entrance and exit ramp.



DETAIL A



DETAIL B

Wide (12") Dotted Lane Line (See Note 3)

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS LANE DROP (EXIT ONLY) DETAILS

FPM(4)-12

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
5-00
8-00
2-10
2-12

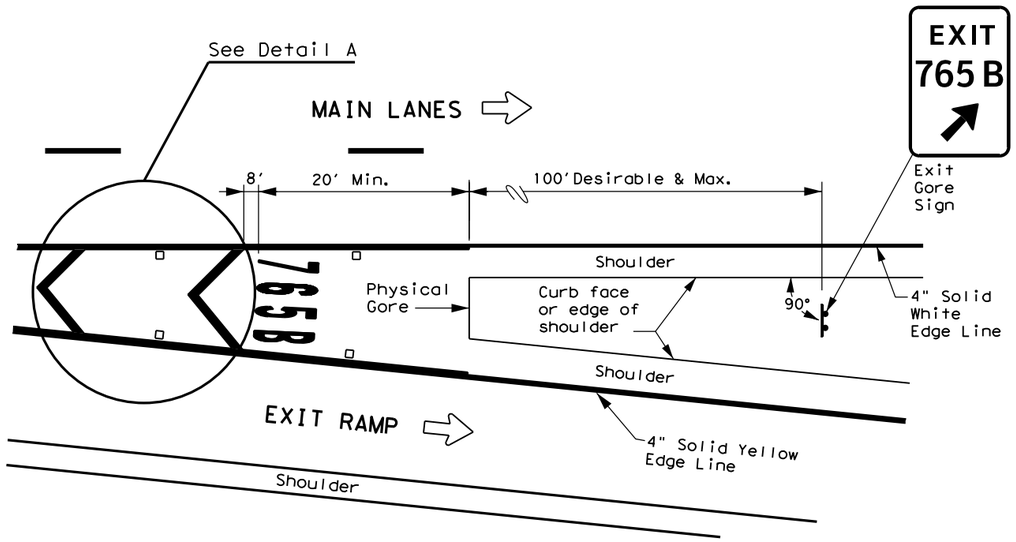
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610
DIST	COUNTY		SHEET NO.
HOU	HARRIS		219

DATE:
FILE:

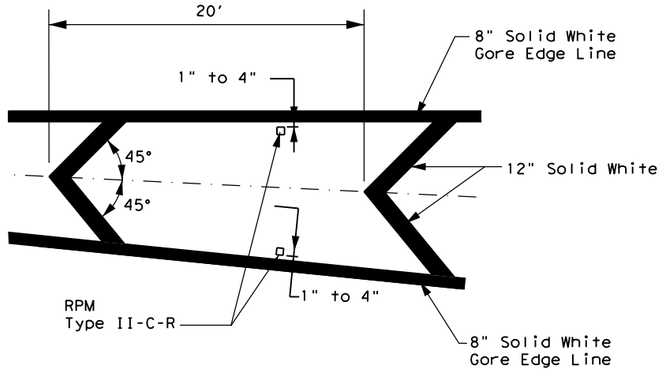
DATE:
FILE:

EXIT NUMBER PAVEMENT MARKING NOTES

1. Minimum 8 foot white markings should be used, unless otherwise noted.
2. Spacing between letters and numbers should be approximately 4 inches.
3. Pavement markings are to be located as specified elsewhere in the plans.
4. All pavement marking materials shall meet the required Departmental Material Specifications or as specified in these plans.
5. Numbers and Letters details can be found in the Standard Highway Design for Texas (SHSD) Chapter 12 at http://www.txdot.gov



MARKINGS WITH EXIT NUMBER



NOTES

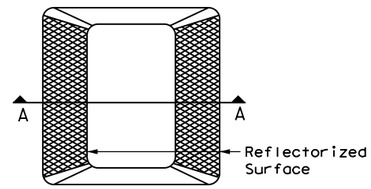
1. Raised pavement markers shall be centered between chevron or gore lines.
2. For more information, see Reflectorized Raised Pavement Marker Detail.

DETAIL A

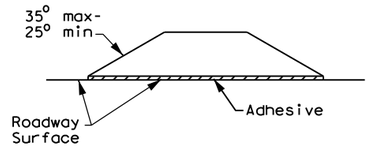
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

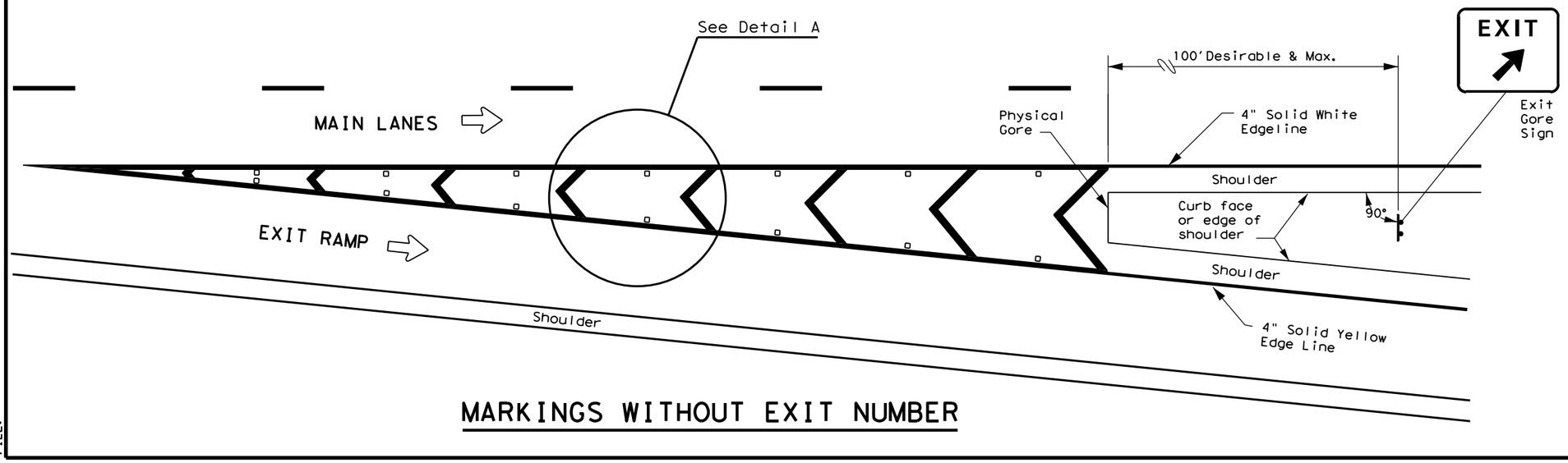
LEGEND	
⇦	Traffic flow
▫	Reflectorized Raised Markers (RPM) Type II-C-R



Type II (Top View)



SECTION A



MARKINGS WITHOUT EXIT NUMBER

REFLECTORIZED RAISED PAVEMENT MARKER (RPM)

Texas Department of Transportation

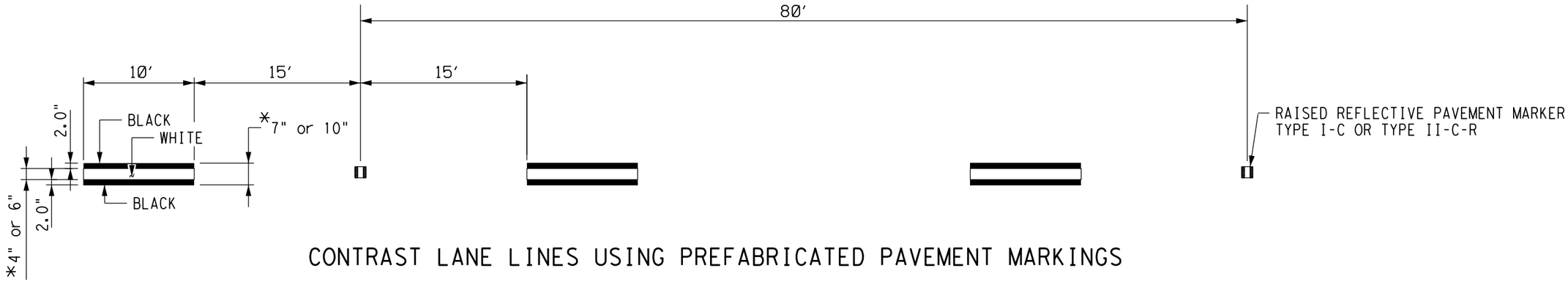
Traffic Safety Division Standard

EXIT GORE PAVEMENT MARKINGS

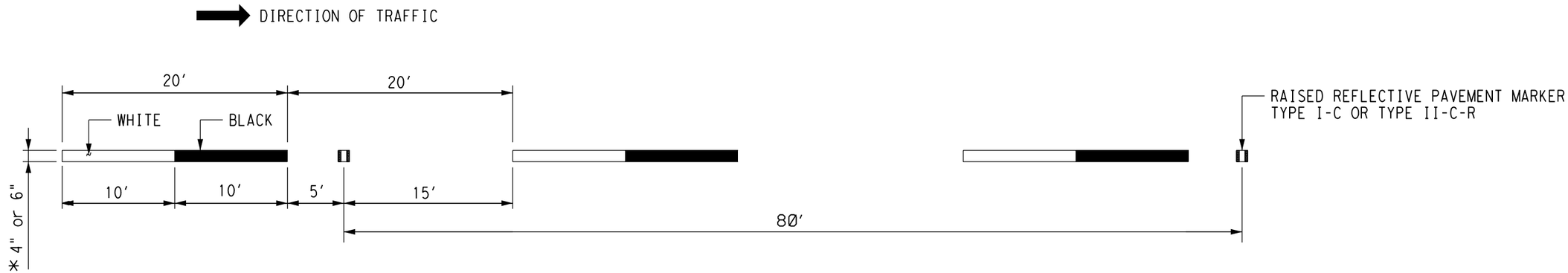
FPM(5)-19

FILE: fpm(5)-19.dgn	DN:	CK:	DW:	CK:
© TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		220

23F



CONTRAST LANE LINES USING PREFABRICATED PAVEMENT MARKINGS



CONTRAST LANE LINES USING LIQUID APPLICATIONS
(MULTIPOLYMER, THERMOPLASTIC, ETC.)

✳ AS SHOWN ON THE PLANS.

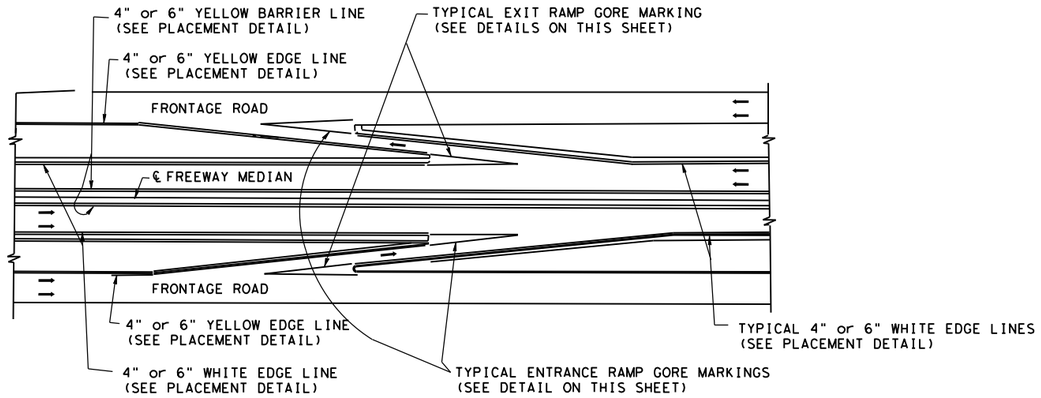
Texas Department of Transportation
Houston District

PAVEMENT MARKINGS
(CONTRAST LANE LINES)

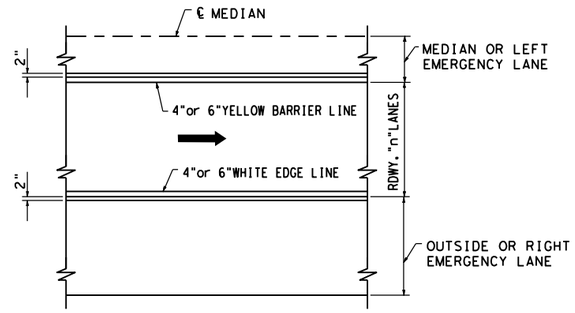
PM(CLL)-14

FILE:	DN:	CK:	DW:	CK:	
© TxDOT 2003	DIST	FED REG	PROJECT NO.		SHEET
REVISIONS 01-10-06 02-12-08 10-2019 9" to 10"	HOU	6			221
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0271	15	097	IH 610

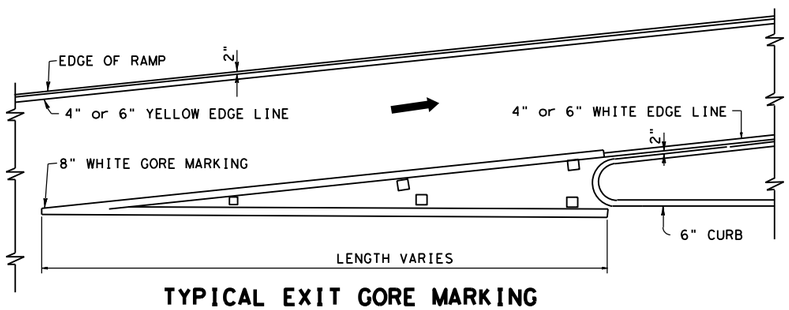
STD N-30



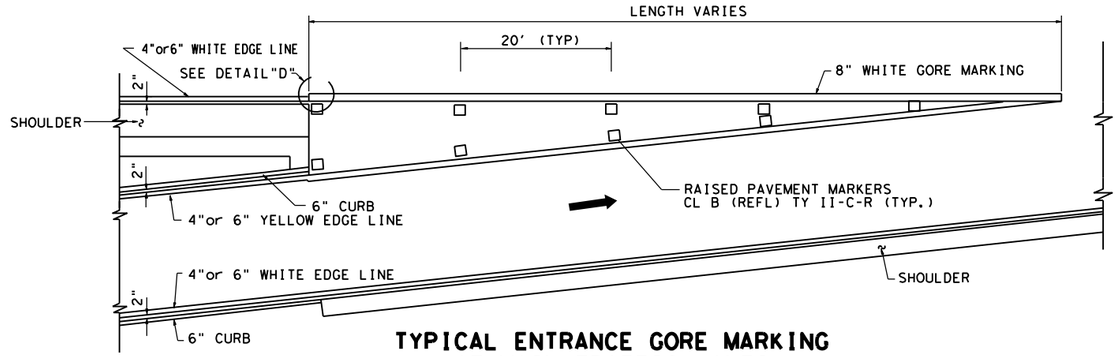
TYPICAL LAYOUT



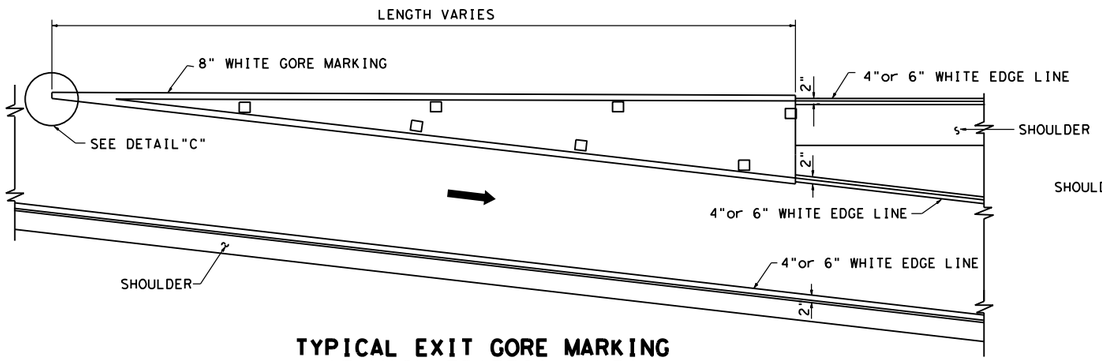
TYPICAL PLACEMENT FOR BARRIER AND EDGE LINES



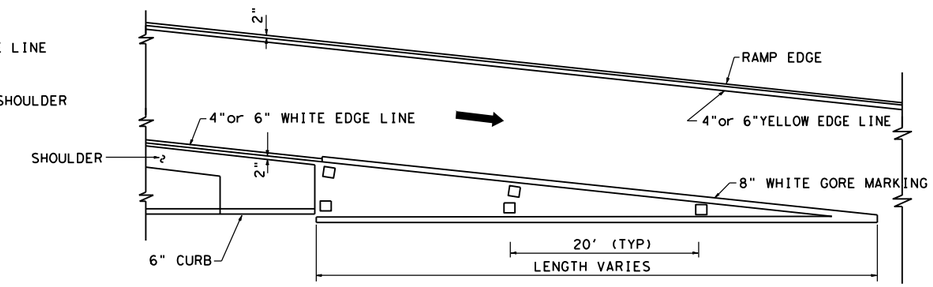
TYPICAL EXIT GORE MARKING AT FRONTAGE ROAD



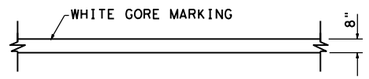
TYPICAL ENTRANCE GORE MARKING AT MAIN TRAFFIC LANES



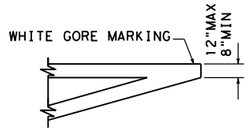
TYPICAL EXIT GORE MARKING AT MAIN TRAFFIC LANES



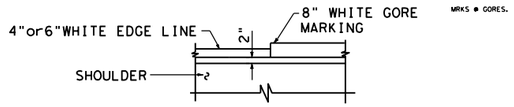
TYPICAL ENTRANCE GORE MARKING AT FRONTAGE ROAD



DETAIL "A"



DETAIL "C"



DETAIL "D "

MRKS • GORES.

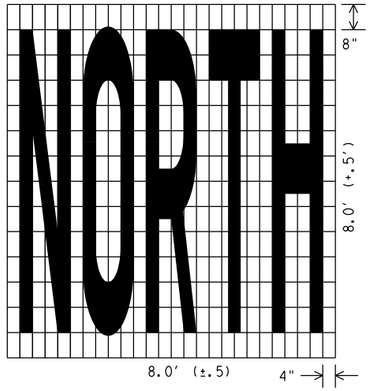
Texas Department of Transportation
Houston District

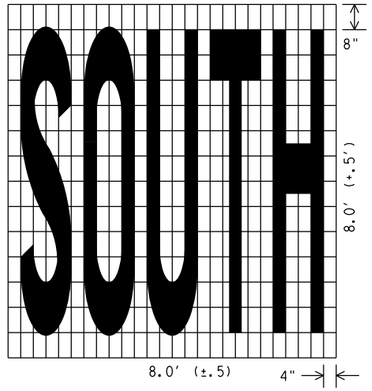
PAVEMENT MARKINGS
(RAMP AND GORE DETAILS)

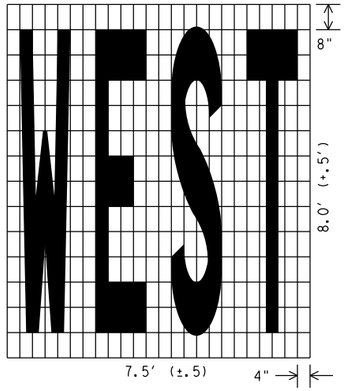
PM(R&G)-10

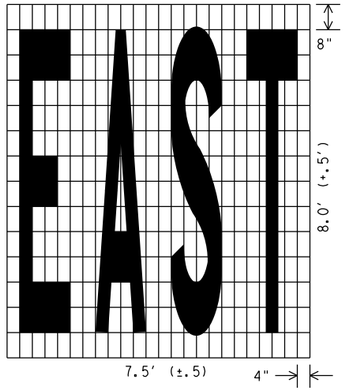
FILE:	DN:	CK:	DW:	CK:
© TxDOT 2010	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS 4/2010	HOU	6		222
	COUNTY	CONTROL	SECT JOB	HIGHWAY
	HARRIS	0271	15 097	IH 610

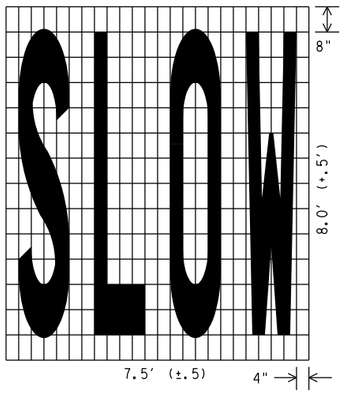
STD N-5

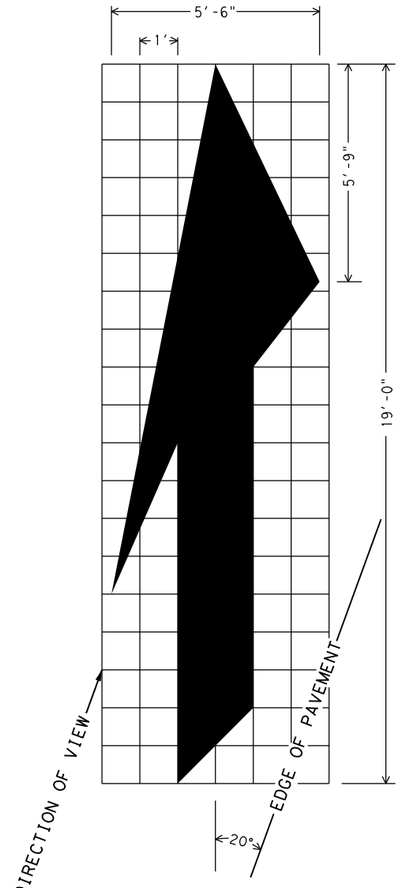






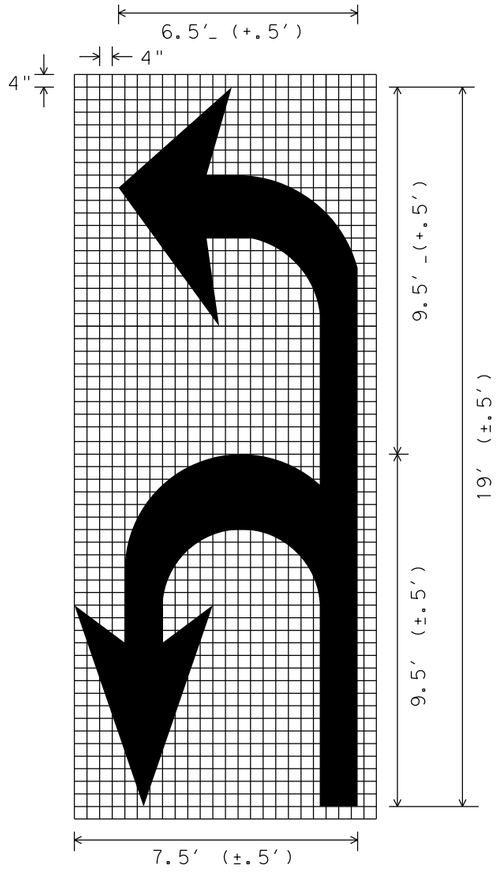




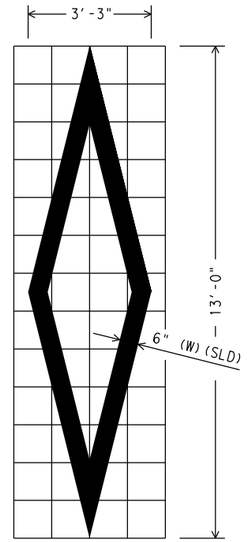


ISOMETRIC ARROW

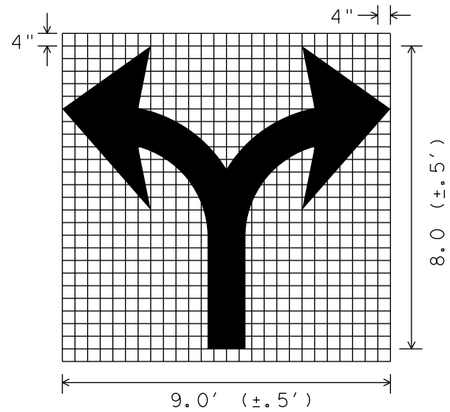
12 INCH GRID
AREA = 42 SQ. FT.
RIGHT LANE DROP ARROW
(FOR LEFT LANE, USE MIRROR IMAGE)



U-L ARROW



DIAMOND SYMBOL



SCALE 1/4" = 1′

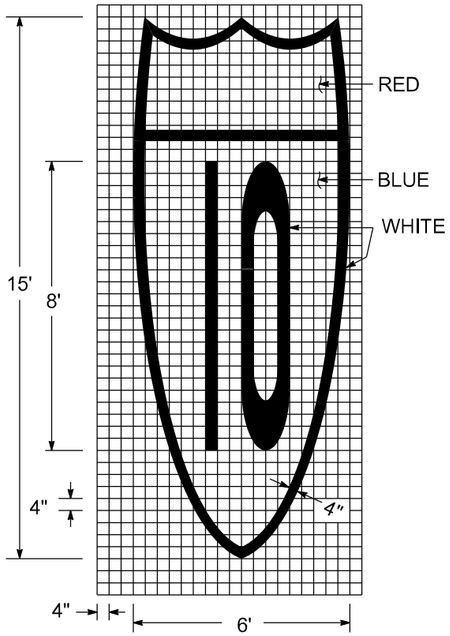
Texas Department of Transportation
Houston District

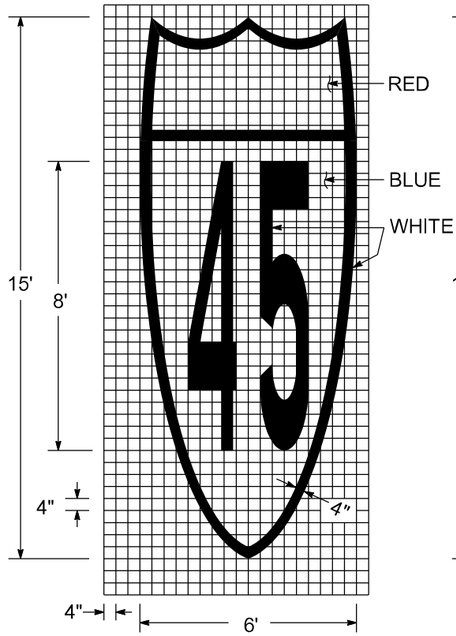
PAVEMENT MARKINGS (WORDS, ARROWS & SYMBOLS)

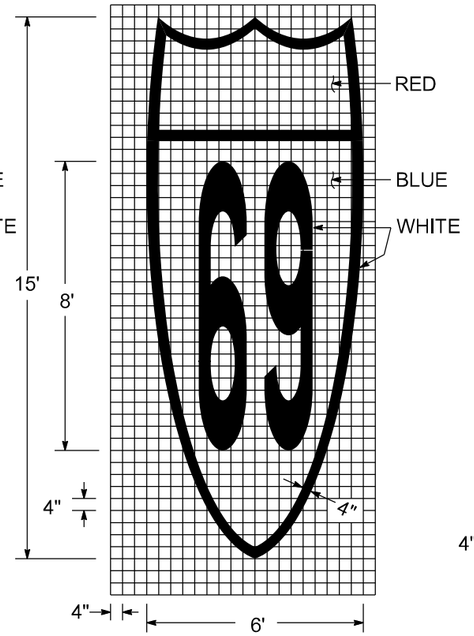
PM(WAS)-07

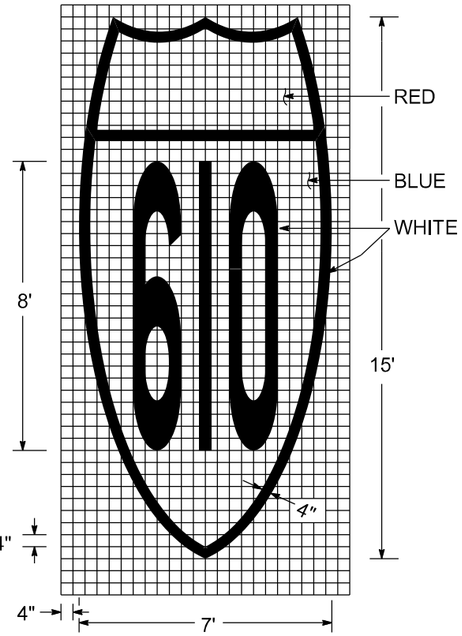
FILE:	DN:	CK:	DW:	CK:
© TxDOT 2007	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS 03-19-07	HOU	6		223
	COUNTY	CONTROL	SECT JOB	HIGHWAY
	HARRIS	0271	15 097	IH 610

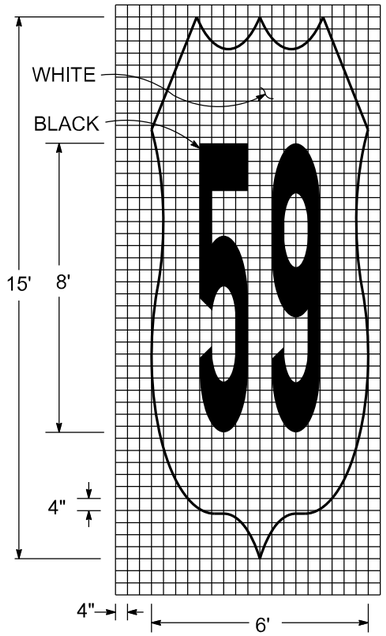
STD-N31

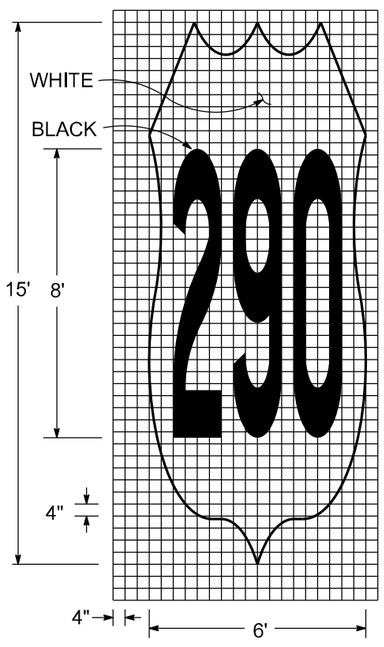


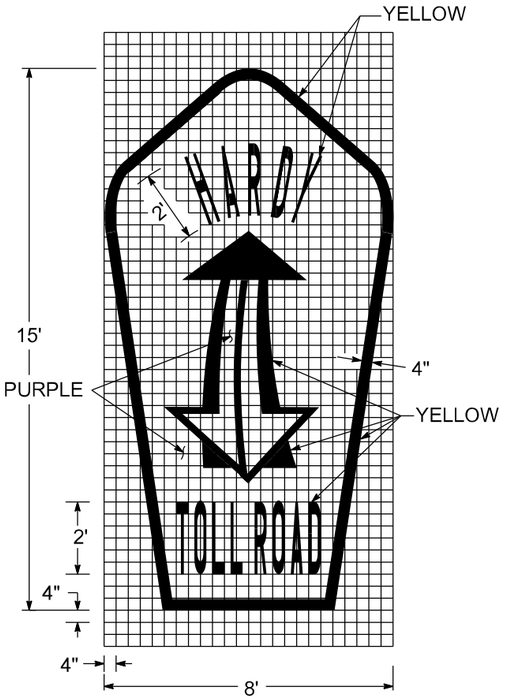


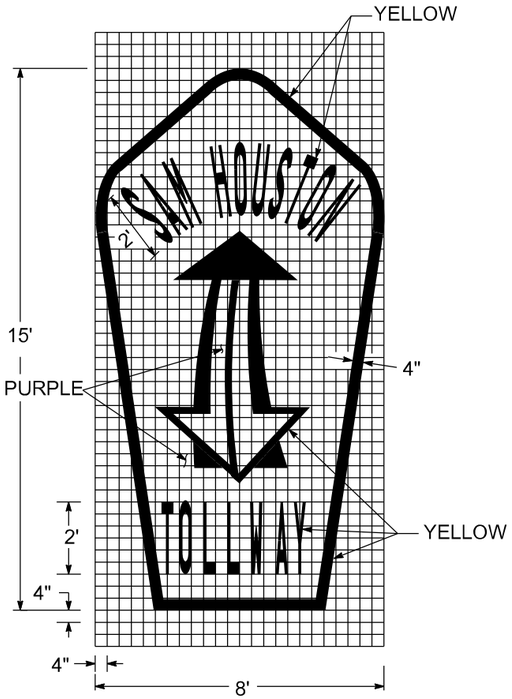


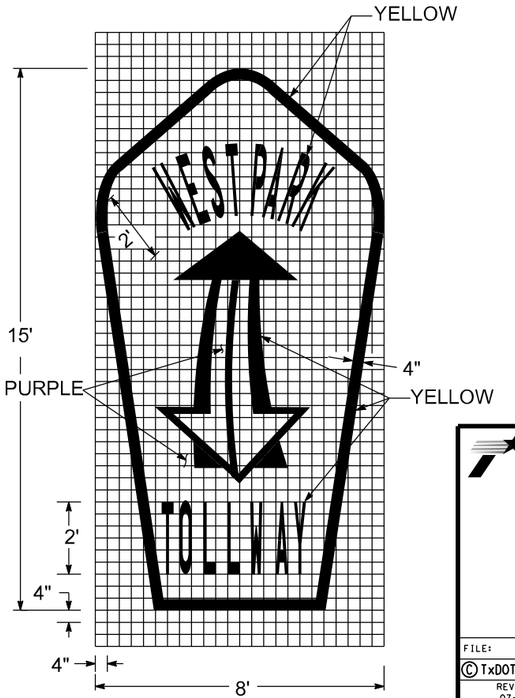












Texas Department of Transportation
Houston District

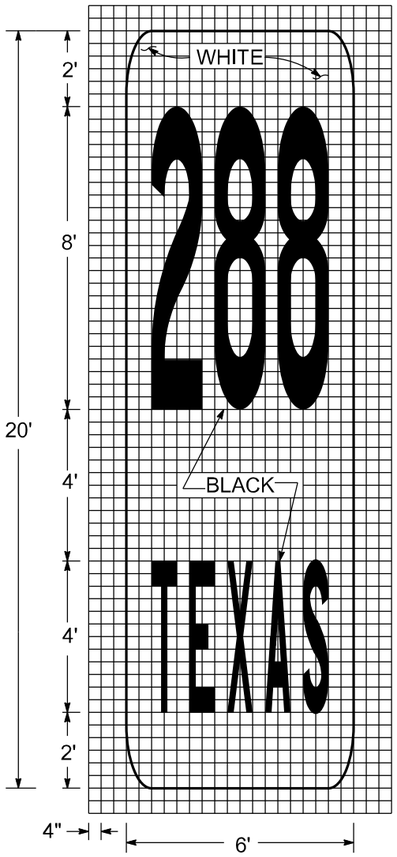
PAVEMENT MARKING (SHIELD)

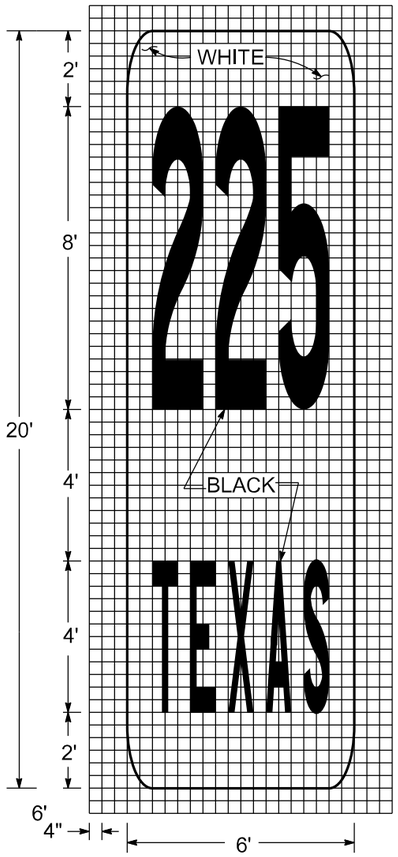
PM(SHIELD-1)-17

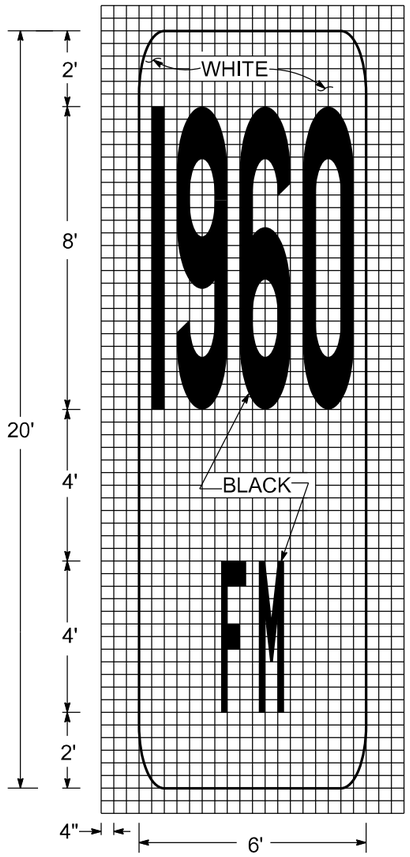
FILE:	DN:	CK:	DW:	CK:
©TxDOT 2004	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS 07-12-17 07-30-17	HOU	6		224
COUNTY	CONTROL	SECT	JOB	HIGHWAY
HARRIS	0271	15	097	IH 610

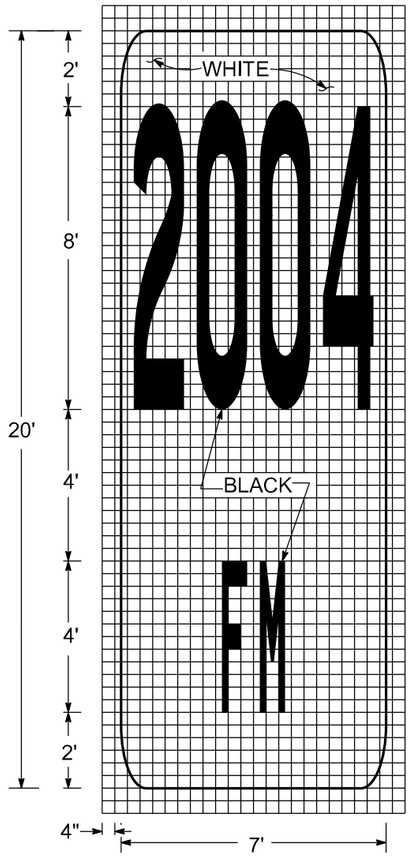
SCALE 1/4" = 1'

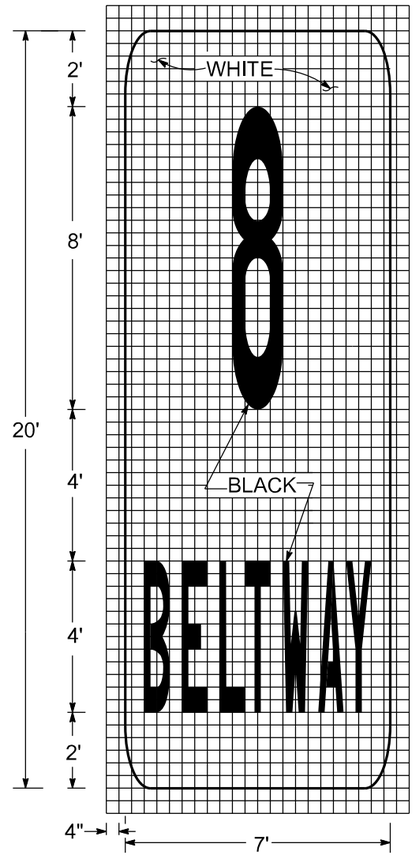
STD-N32

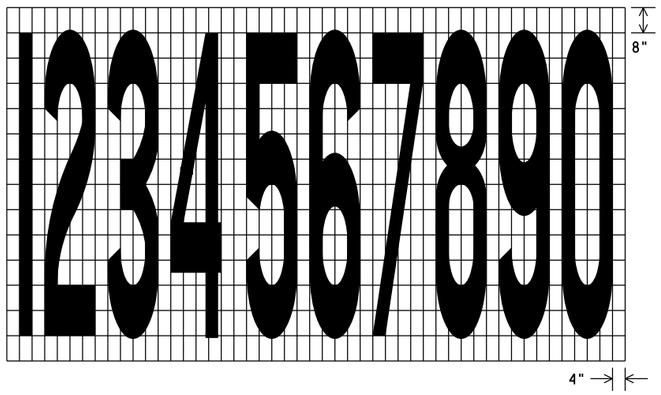


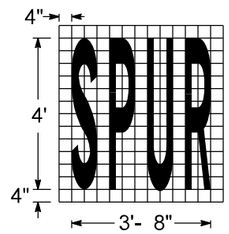


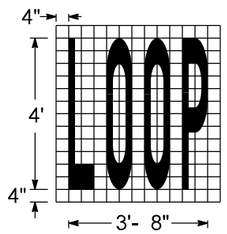


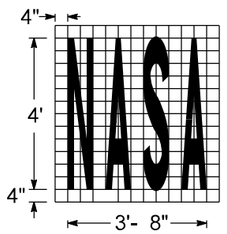












Texas Department of Transportation
Houston District

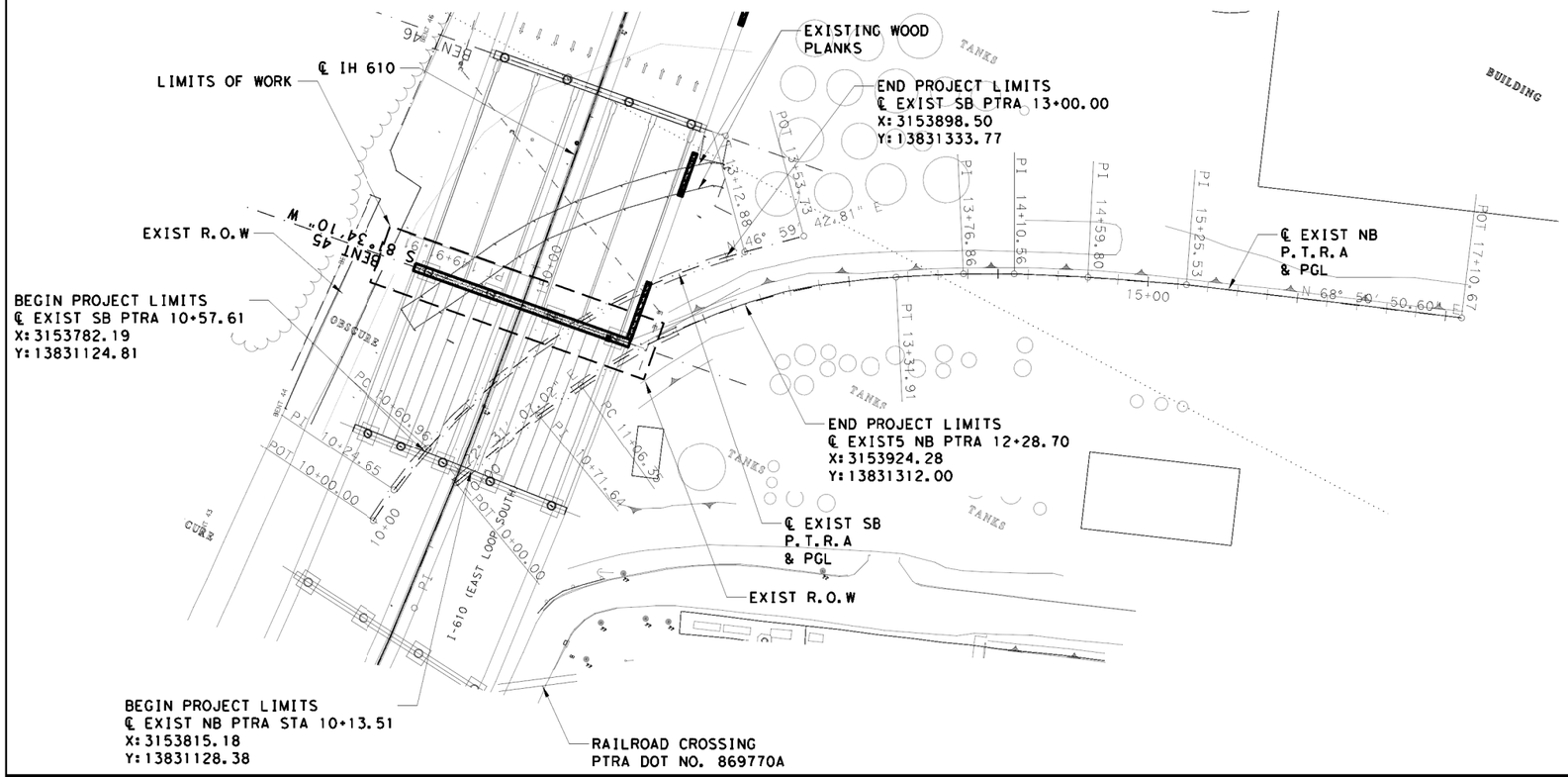
PAVEMENT MARKING (SHIELD)

PM(SHIELD-2)-17

FILE:	DN:	CK:	DW:	CK:
© TxDOT 2004	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS 07-12-17 07-30-17	HOU	6		225

COUNTY	CONTROL	SECT	JOB	HIGHWAY
HARRIS	0271	15	097	IH 610

STD-N33



NOTES:

1. DATA FROM SURVEY AND GOOGLE EARTH WAS USED TO CREATE THE PROFILES. FOR INFORMATION ONLY.

STATE OF TEXAS
BONNIE TAI
125946
LICENSED
PROFESSIONAL ENGINEER

Bonnie Tai

05/21/2021

The seal appearing on this document was authorized by Bonnie Tai, P.E. 125946
Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act.

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE @ PORT TERMINAL RR ASSOC.
EXIST PTRA TRACK PLAN & PROFILE

SCALE: 1" = 100' HORZ
1" = 10' VERT

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2021(836)		230
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 5/21/2021
pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\10. Miscellaneous\Railroad\097RRPP*01.dgn

DATE:
FILE:

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

DOT #: NEAR 869770A
Crossing Type: HIGHWAY OVERPASS
RR Company Owning Track at Crossing: PORT TERMINAL RAILROAD ASSOCIATION (PTRA)
Operating RR Company at Track: PTRA
RR MP: 0.000
RR Subdivision: CONTANDA TERMINALS
City: HOUSTON
County: HARRIS
CSJ at this Crossing: 0271-15-097
Highway/Roadway name crossing the railroad: IH 610
# of regularly scheduled trains per day at this crossing: 2
# of switching movements per day at this crossing: 2
% of estimated contract cost of work within railroad ROW: 20%

Scope of Work at this Crossing to Be Performed by State Contractor:
IH 610 SHIP CHANNEL BRIDGE REPAIR ABOVE/NEAR DOT 869770A

Scope of Work at this Crossing to Be Performed by Railroad Company:
FLAGGING IS TO BE PERFORMED BY THE RAILROAD COMPANY.

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

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 60

On this project, night or weekend flagging is:

☒ Expected
☐ Not Expected

Flagging services will be provided by:

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

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

Contact Information for Flagging:

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

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

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

☒ OTHERS PTRA - DARRELL HIMEL
EMAIL: DHIMEL@PTRA.COM
OFFICE: (713)393-6512 MOBILE: (713)408-2653

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☒ Not Required

☐ Required: Contact Information for Construction Inspection:

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

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

☐ Required
☒ Not Required

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

V. RAILROAD INSURANCE REQUIREMENTS

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

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

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

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

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

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

On this project, an ROE agreement is:

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

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

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

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

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

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☐ Not Required
☒ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

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

IX. EMERGENCY NOTIFICATION

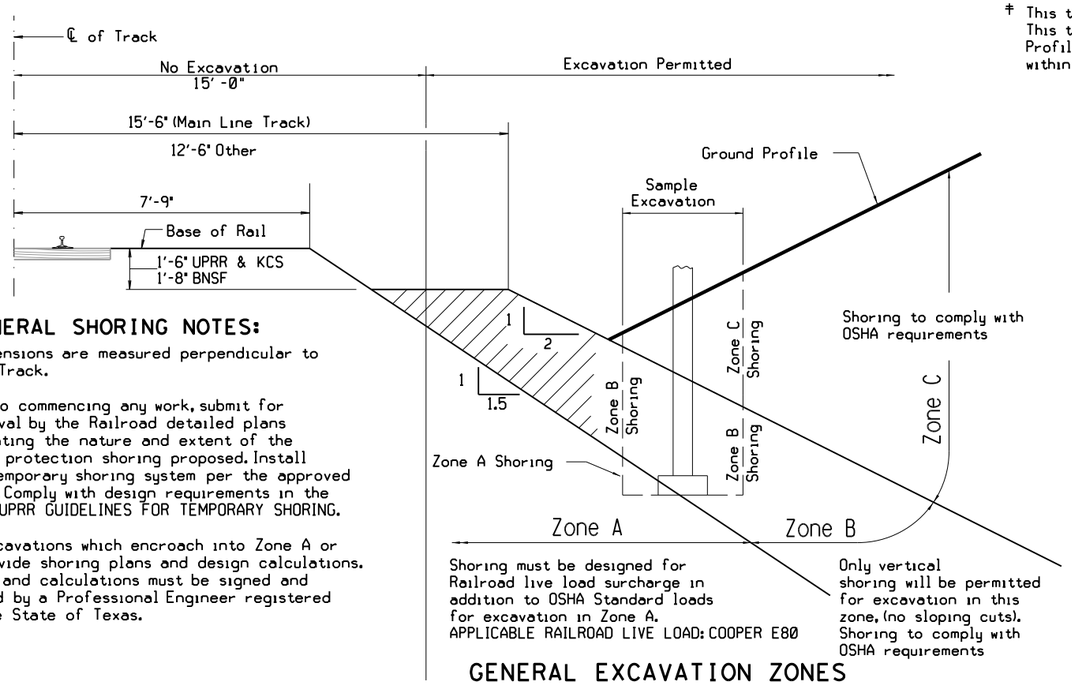
In Case of Railroad Emergency
Call PORT TERMINAL RAILROAD ASSOCIATION
Railroad Emergency Line at 713-393-6509
Location: DOT NO. 869770A
RR Milepost 0.000 CONTANDA TERMINALS Subdivision

EXHIBIT "A"

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
3/2020	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		231



GENERAL EXCAVATION ZONES

GENERAL SHORING NOTES:

1. All dimensions are measured perpendicular to ℄ of Track.
2. Prior to commencing any work, submit for approval by the Railroad detailed plans indicating the nature and extent of the track protection shoring proposed. Install the temporary shoring system per the approved plans. Comply with design requirements in the BNSF/UPRR GUIDELINES FOR TEMPORARY SHORING.
3. For excavations which encroach into Zone A or B, provide shoring plans and design calculations. Plans and calculations must be signed and sealed by a Professional Engineer registered in the State of Texas.

GENERAL SHORING REQUIREMENTS ‡

RAILROAD GENERAL NOTES:

1. Railroad review and approval of shoring, erection, demolition, and falsework is required. Allow a minimum of four weeks for the review and approval of each submittal.
2. The proposed grade separation project shall not increase the quantity and/or characteristics of the flow in the Railroad's ditches and/or drainage structures. In the rare event that a grade separation project will increase the quantity and/or characteristics of flow in such elements, such a design must be reviewed and approved by the Railroad.
3. Verify the elevation of the existing top-of-rail profile before beginning construction. Bring all discrepancies to the attention of the Railroad prior to construction.
4. Submit a proposed method of erosion and sediment control for approval by the Railroad.
5. Design and construct all shoring systems that impact the Railroad's operations and/or support the Railroad's embankment per current Railroad Guidelines for Temporary Shoring.
6. Comply with Railroad Demolition Guidelines for all demolitions within the Railroad's right of way and/or demolition that may impact the Railroad's tracks or operations.
7. Design erection methods over the Railroad's right of way to cause no interruption to the Railroad's operation, enabling the track(s) to remain open to traffic per the Railroad's requirements. Coordinate construction work windows with the Railroad's Designated Representative.
8. Design all construction phasing that may impact the Railroad operations to cause no interruption to the Railroad's operations, enabling the track(s) to remain open to traffic per the Railroad's requirements. Coordinate construction work windows with the Railroad's Designated Representative.
9. Comply with minimum construction clearances for falsework outlined in the Railroad's Guidelines.
10. Verify all permanent clearances before project closing.
11. For Railroad coordination please refer to Sheets 2 and 3 and the TxDOT Standard Specifications.

For shoring/excavations in Zone A or B, TxDOT requires a predesigned and approved shoring design in the PS&E. If this is the case no Contractor submittal is required.

‡ This table is primarily required for overpass projects. This table is not required for underpass projects if the provided Plan and Profile sheets indicate this information at a minimum of every 100 ft and within bounds including 1500 ft before and after the limits of trackwork.

TABLE OF TOP OF RAIL PROFILE ‡

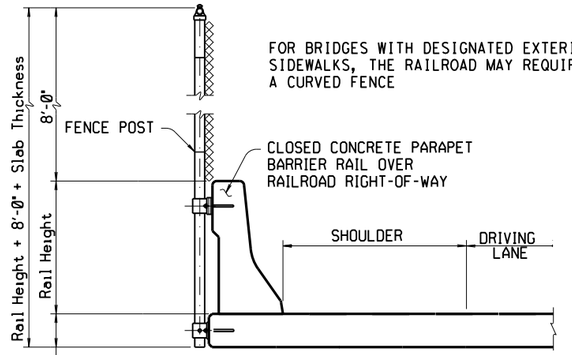
(STATIONS INCREASE WITH MILEPOST INCREASE)

	MAIN LINE			
	ALIGNMENT: LEFT RAIL 100' STATIONS	ELEVATION	ALIGNMENT: RIGHT RAIL 100' STATIONS	ELEVATION
1000' PRIOR TO PROJECT				
WITHIN PROJECT	10+00	20.05'	10+00	21.62'
	11+00	19.57'	11+00	20.30'
	12+00	18.57'	12+00	20.97'
	13+00	16.70'	13+00	20.64'
	13+53.73	16.65'	14+00	20.04'
			15+00	20.02'
			16+00	20.01'
			17+00	20.00'
			17+10.67	20.00'
1000' AFTER PROJECT	⬓		⬓	

⬓ ± EXISTING TRACK STA. 10+00
= ± CONSTRUCTION STA. XX+XX

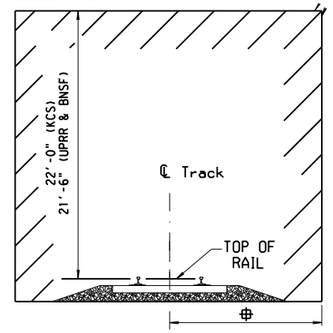
FOR THE FOLLOWING INFORMATION PLEASE REFER TO THE PLAN AND ELEVATION DRAWINGS OF THE BRIDGE PLANS. THE PLAN AND ELEVATION DRAWINGS SHALL SHOW ALL REQUIRED INFORMATION PER BNSF/UPRR GUIDELINES FOR RAILROAD GRADE SEPARATION PROJECT PLAN NO. 711100 SHEET 2.

1. Centerline of bridge and/or centerline of project.
2. Track layout and limits of Railroad right of way with respect to centerline of main lines.
3. Future tracks, access roadways and existing tracks as main line, siding, spur, etc.
4. Point of minumum vertical clearance and distance, Measured perpendicular, from the centerline of nearest track.
5. Horizontal clearance at right angle from centerline of nearest existing or future track to the face of obstruction such as substructure above grade.
6. Horizontal clearance at right angle from centerline of nearest existing or future track to the face of nearest foundation below grade.
7. Horizontal spacing at right angle between centerlines of existing and/or future tracks.
8. Limits of shoring and minimum distance at right angle from centerline of nearest track.
9. All existing facilities and utilities and their proposed relocation, if required.
10. Toe of riprap or earth slope and/or limits of retaining wall.
11. Existing and proposed contours. (not required if the existing groundlines or drainage characteristics in Railroad ROW will not be altered).
12. Railroad Milepost and direction of increasing Milepost.
13. Direction of flow for all drainage systems within project limits.
14. Limits of barrier rail and fence with respect to centerline of track.
15. Depth of foundation below bottom of tie. (for footings only)
16. Top and bottom of pier protection wall elevation relative to top of rail elevation.
17. Controlling dimensions of drainage ditches and/or drainage structures.
18. Top of rail elevations for all tracks.
19. Minimum permanent vertical clearance above top of high rail to the lowest point under the bridge.
20. Existing and proposed groundline & roadway profile.
21. Type of riprap slope paving.
22. Location of deck drains.
23. Total width of superstructure.
24. Width of shoulder and/or sidewalk.



TYPICAL FENCE ON BARRIER DETAIL

ONLY REQUIRED ON OVERPASSES IF SHOWN ON BRIDGE LAYOUT. (AREAS WITH PEDESTRIANS ON BRIDGE, RAIL YARDS, OR HISTORY OF VANDALISM)



MINIMUM CONSTRUCTION CLEARANCE ENVELOPE

(NORMAL TO RAILROAD)
15'-0" (UPRR), (BNSF) and 14'-0" (KCS)

GENERAL NOTES:

Design and Construction for Railroad Projects shall be in accordance with the AREMA Manual for Railway Engineering and BNSF/UPRR Guidelines for Railroad Grade Separation Projects or Kansas City Southern Guidelines for the Design and Construction of Overpasses and Underpasses, or DART Light Rail Project Design Criteria Manual, and the TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges AS APPLICABLE TO THE RAILROAD COMPANY INVOLVED.

See BNSF/UPRR Guidelines for Grade Seperation Projects Plan No. 711100 and TxDOT Railroad Fence Details Sheet for additional information. A curved top fence extending 8'-0" above top of sidewalk is acceptable only where there is a traffic rail between roadway and sidewalk.

See Kansas City Southern Guidelines for the Design and Construction of Overpasses and Underpasses for corresponding BNSF/UPRR sheets referenced.

SHEET 1 OF 3

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.

05/21/2021

The seal appearing on this document was authorized by Jessica Lynn Kephart, P.E. 133487
Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act.

EXHIBIT "A"

RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION.dgn

Texas Department of Transportation — Rail Division

RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		232

DATE:5/21/2021
FILE:$FILE$

DATE:$DATE$
FILE:$FILE$

DATE:5/21/2021
pw:\\txdot.projectwiseonline.com:TXDOT\Documents\12 - HOU\Design Projects\027115097\14 - Design\Plan Set\10. Miscellaneous\Railroad\RR Req for Bridge Projects.dgn

PART 1 - GENERAL

1.01 DESCRIPTION

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

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

1.02 REQUEST FOR INFORMATION / CLARIFICATION

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

1.03 PLANS / SPECIFICATIONS

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

PART 2 - UTILITIES AND FIBER OPTIC

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

PART 3 - CONSTRUCTION

3.01 GENERAL

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

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

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

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

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

3.02 RAILROAD OPERATIONS

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

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

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

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

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

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

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

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

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.18 for railroad flagging requirements.

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

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

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

3.04 INSURANCE

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

3.05 RAILROAD SAFETY ORIENTATION

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

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

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

3.06 COOPERATION

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

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

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

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

3.08 APPROVAL OF REDUCED CLEARANCES

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

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

C. Do not commence work involving an approved infringement until receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED
PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.
05/21/2021
The seal appearing on this document was authorized by Jessica Lynn Kephart, P.E. 133487

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EXHIBIT "A"

Texas Department of Transportation — Rail Division

RAILROAD REQUIREMENTS FOR FOR BRIDGE CONSTRUCTION

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© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		233

DATE:
FILE: RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION.dgn

3.09 CONSTRUCTION AND AS-BUILT SUBMITTALS

A. Provide TxDOT submittals for construction materials and procedures as outlined below and indicated in TxDOT Standard Specifications. A summary of most TxDOT submittal requirements can be found at: www.dot.state.tx.us/publications/bridge/items reviewed.pdf

B. The tables below provide the Railroad's minimum submittal requirements for the construction items noted. Submittal requirements are in addition to those specified elsewhere in these bid documents. The review times indicated below represent the total time, including the Railroad's required four (4) weeks.

C. TxDOT will forward relevant submittals to the Railroad Manager of Industry and Public Projects unless otherwise directed by the Railroad. TxDOT and the Engineer of Record will review and include comments prior to forwarding to the Railroad. Submit items in Table 1 for both railroad overpass and underpass projects, as applicable. Submit items in Table 2 for railroad underpass projects only.

TABLE 1 - RAILROAD SUBMITTAL REQUIREMENTS FOR OVERPASS & UNDERPASS PROJECTS

ITEM	DESCRIPTION	SETS	REVIEW TIME
1	Shoring design and details	6	6 weeks
2	Falsework design and details	6	6 weeks
3	Drainage design provisions	6	6 weeks
4	Erection diagrams and sequence	6	6 weeks
5	Demolition diagram and sequence	6	6 weeks

TABLE 2 - RAILROAD SUBMITTAL REQUIREMENTS FOR UNDERPASS PROJECTS

ITEM	DESCRIPTION	SETS	NOTES	REVIEW TIME
1	Shop drawings	6	Steel and Concrete members	6 weeks
2	Bearings	6	For all structures	6 weeks
3	Concrete Mix Designs	6	For all structures	6 weeks
4	Rebar & Strand certifications	6	For superstructure only	6 weeks
5	28 day concrete strength	6	For superstructure only	6 weeks
6	Waterproofing material certifications and installation procedure	6	Waterproofing & protective boards	6 weeks
7	Structural steel certifications	6	All fracture critical members & other members requiring improved notch toughness	6 weeks
8	Fabrication and Test reports	6	All fracture critical members & other members requiring improved notch toughness	6 weeks
9	Welding Procedures and Welder Certification	6	AWS requirements	6 weeks
10	Foundation Construction Reports or Notes	6	Pile driving, drilled shaft construction, bearing pressure test reports for spread footings	6 weeks
11	Compaction testing reports for backfill at abutments	6	Must meet 95% maximum dry density, Modified Procter ASTM D1557	6 weeks

D. TxDOT shall submit As-Built Records to the Railroad when TxDOT has processed the final project plans. These records shall consist of the following items:

Overpass Projects

1. Electronic files of all structure design drawings with as constructed modifications shown, in Microstation J or Acrobat .PDF format.
2. Hard copies of all structure design drawings with as constructed modifications shown.

Underpass Projects

1. Electronic files of all structure design drawings with as constructed modifications shown, in Microstation J or Acrobat .PDF format.
2. Hard copies of all structure design drawings with as constructed modifications shown.
3. Final approved copies of shop drawings for concrete and steel members.
4. Foundation Construction Reports
5. Compaction testing reports for backfill at abutments

3.10 APPROVAL OF DETAILS

Submit details of the construction affecting Railroad's tracks and property not already included in the Contract Plans to the Railroad Designated Representative through TxDOT for the Railroad's review and written approval before such work is undertaken. Allow a total six (6) weeks for review and approval of these submittals, which includes the Railroad's four (4) week review time.

3.11 MAINTENANCE OF RAILROAD FACILITIES

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

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

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

3.12 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

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

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

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

3.13 RAILROAD REPRESENTATIVES

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

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

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

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

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

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

3.14 WALKWAYS REQUIRED

Maintain along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than twelve feet (12') from centerline of track. Remove any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours before the close of each work day. Construct walkways with railings over open excavation areas when in close proximity of track. Do not violate allowable clearances of these railings to centerline of track: 8' - 6" horizontally for tangent track or 9' - 6" horizontally for curved track.

3.15 COMMUNICATIONS AND SIGNAL LINES

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

3.16 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.17 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

UPRR 1-800-336-9193
7:00 AM to 9:00 PM CST Monday-Friday except holidays,
staffed 24 hrs/day for emergencies
48 hrs notice required

BNSF 1-800-533-2891
24 hour number
5 working days notice required

KCS 1-800-344-8377
Texas One Call, a 24 hour number
48 hrs notice required, excluding weekends and holidays

If a telecommunications system is buried anywhere on or near Railroad's property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor-assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of ¼ inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.18 RAILROAD FLAGGING

Per the RIGHT OF ENTRY agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor work and at least 30 working days in advance of any Contractor work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.19 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the Right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED
PROFESSIONAL ENGINEER

Jessica Lynn Kephart, P.E.
05/21/2021

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Texas Department of Transportation — Rail Division

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REVISIONS March 2020	0271	15	097	IH 610
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I. STORMWATER POLLUTION PREVENTION

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit is required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506. Refer to Storm Water Pollution Prevention Plan (SWP3) Houston District standard plan.

No Additional Comments

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS

United States Army Corps of Engineers (USACE) Permit is required for filling, dredging, excavating or other work in water bodies, rivers, creeks, streams, wetlands or wet areas. The Contractor must adhere to all of the terms and general conditions associated with the following permit(s). If additional work not represented in the plans is required, contact the Engineer immediately.

☒ No United States Army Corps (USACE) Permit Required

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Nationwide Permit (NWP) without a Pre-Construction Notification (PCN). Project specific permit was not issued by USACE, therefore is not in the plan set. The USACE general conditions are in the “General Notes."

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Nationwide Permit (NWP) with a Pre-Construction Notification (PCN). The project specific permit issued by the United States Army Corps of Engineers (USACE) is included in the plan set. The USACE general conditions are in the “General Notes."

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Individual Permit (IP). The project specific permit issued by the United States Army Corps of Engineers (USACE) is included in the plan set.

☐ Work would be authorized by the United States Army Corps of Engineers (USACE) permit. The project specific permit issued by the USACE will be provided to the contractor.

United States Coast Guard (USCG) Permit is required for projects that involve the construction or modification (including changes to lighting) of a bridge or causeway across a water body determined to be navigable by the United States Coast Guard (USCG) under Section 9 of the Rivers and Harbors Act. If additional work not represented in the plans is required, contact the Engineer immediately.

☐ No United States Coast Guard (USCG) Coordination Required

☐ United States Coast Guard (USCG) Permit

☐ United States Coast Guard (USCG) Exemption

Additional Comments

No work is authorized within the confines of the Houston Ship Channel

Prior to construction, coordination with the US. Coast Guard Waterway Management Division is required. Please coordinate with Ryan Gilbert (LTJG) at Ryan.A.Gilbert@uscg.mil or Sarah K Rousseau at sarah.k.rousseau@uscg.mil or (281) 464-4736

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the area and contact the Engineer immediately.

No Additional Comments

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Refer to TxDOT Standard Specifications in order to comply with requirements for invasive species, beneficial landscaping and tree/brush removal.

No Additional Comments

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS

If any of the listed species below are observed, cease work in the area, do not disturb species or habitat and contact the Engineer immediately.

The work may not remove active nests (from bridges, structures, or vegetation adjacent to the roadway, etc.) during nesting season (February 15 to October 1). If removal of structures or vegetation is necessary during the nesting season, the Contractor shall conduct a bird survey no more than 3 days in advance of the clearing/demolish start date. All bird surveys shall be conducted by a Field Biologist and adhere to the guidance document “Avoiding Migratory Birds and Handling Potential Violations” found in the TxDOT Environmental Compliance Toolkits at the time of the survey. (See below for Field Biologist and Ornithologist qualifications)

No Additional Comments

Field Biologist, Ornithologist – a field biologist is defined as an individual qualified to perform field investigations, presence/absence surveys and habitat surveys for protected avian species or species of concern. A mandatory bachelor’s degree in biology or a related science is required. At a minimum, the Field Biologist, Ornithologist, shall have completed and reported a minimum of three presence/absence and habitat surveys for protected avian species in the past five years. A minimum of three projects must have been conducted in Texas. Surveys shall have been performed for documentation of species in accordance with a protocol approved by USFWS or TPWD, or following generally accepted methodologies.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

Refer to TxDOT Standard Specifications in the event potentially contaminated materials are observed, such as dead or distressed vegetation, trash disposal areas, drums, canisters, barrels, leaching or seepage of substances, unusual smells or odors, or stained soil, cease work in the area and contact the Engineer immediately.

No Additional Comments

VII. OTHER ENVIRONMENTAL ISSUES

Comments:

DATE: Jan 06, 2021
FILE:

Version 2.1

Texas Department of Transportation

TxDOT Houston District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: EPIC Sheet.dgn	DN:	CK:	DW:	CK:
© TxDOT: March 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	I-610
UPDATED section V. text and added definition (10/17) ADDED USCG and USACE notes in Section VII (04/18)	DIST	COUNTY		SHEET NO.
	12	Harris		235

SITE DESCRIPTION

PROJECT LIMITS: HARRIS COUNTY
IH 610 AT HOUSTON SHIP CHANNEL BRIDGE

PROJECT DESCRIPTION: PERMANENT BRIDGE REPAIRS

MAJOR SOIL DISTURBING ACTIVITIES: N/A

TOTAL PROJECT AREA: 22.383 AC

TOTAL AREA TO BE DISTURBED: .344 AC

WEIGHTED RUNOFF COEFFICIENT: (AFTER CONSTRUCTION): RUNOFF COEFFICIENT WILL REMAIN THE SAME

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: N/A

NAME OF RECEIVING WATERS: HOUSTON SHIP CHANNEL
NO. 1006 FROM TCEQ WEBSITE
WATER SURFACE QUALITY VIEWER MAP.

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

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

OTHER:

STRUCTURAL PRACTICES:

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

OTHER:

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

1) INSTALL SWP3 MEASURES
2) REPAIR EXISTING BRIDGES
3) REMOVE SWP3 MEASURES

STORM WATER MANAGEMENT: USE EXISTING DRAINAGE WITH BMPs.

OTHER EROSION AND SEDIMENT CONTROLS:

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

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

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

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

SANITARY WASTE: NOT APPLICABLE.

OFFSITE VEHICLE TRACKING:

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

OTHER:

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

STATE OF TEXAS
JESSICA LYNN KEPHART
133487
LICENSED PROFESSIONAL ENGINEER

XX/XX/20XX
The seal appearing on this document was authorized by Jessica Lynn Kephart, P.E. 133487
Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act.

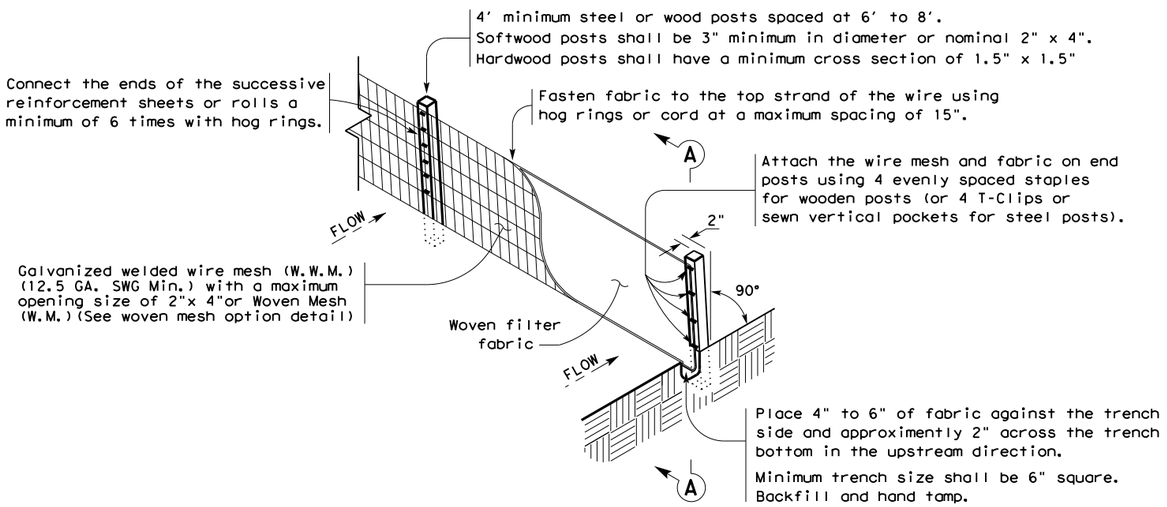
Texas Department of Transportation
Houston District

TxDOT STORM WATER POLLUTION PREVENTION PLAN

SWP3

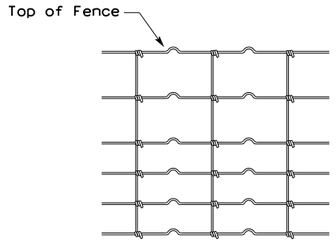
FILE: STDG1.DGN	DN: TxDot	CK: TxDot	DW: TxDot	CK: TxDot
©TxDOT JANUARY 2007	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS	HOU	6		236
9/2010 INSPECTION NOTE 9/2013 INSPECTION NOTE 11/2013 SWP TO SWP3 05/2015 2014 SPECS	COUNTY		CONTROL / SECT / JOB	HIGHWAY
	HARRIS		0271 / 15 / 097	IH 610

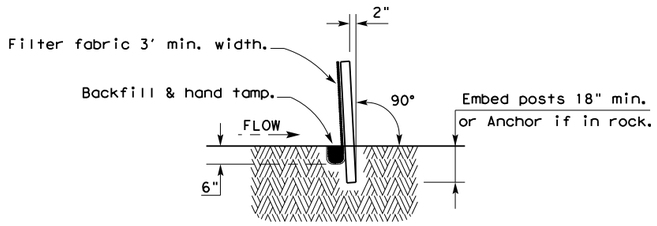
STD G-1



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

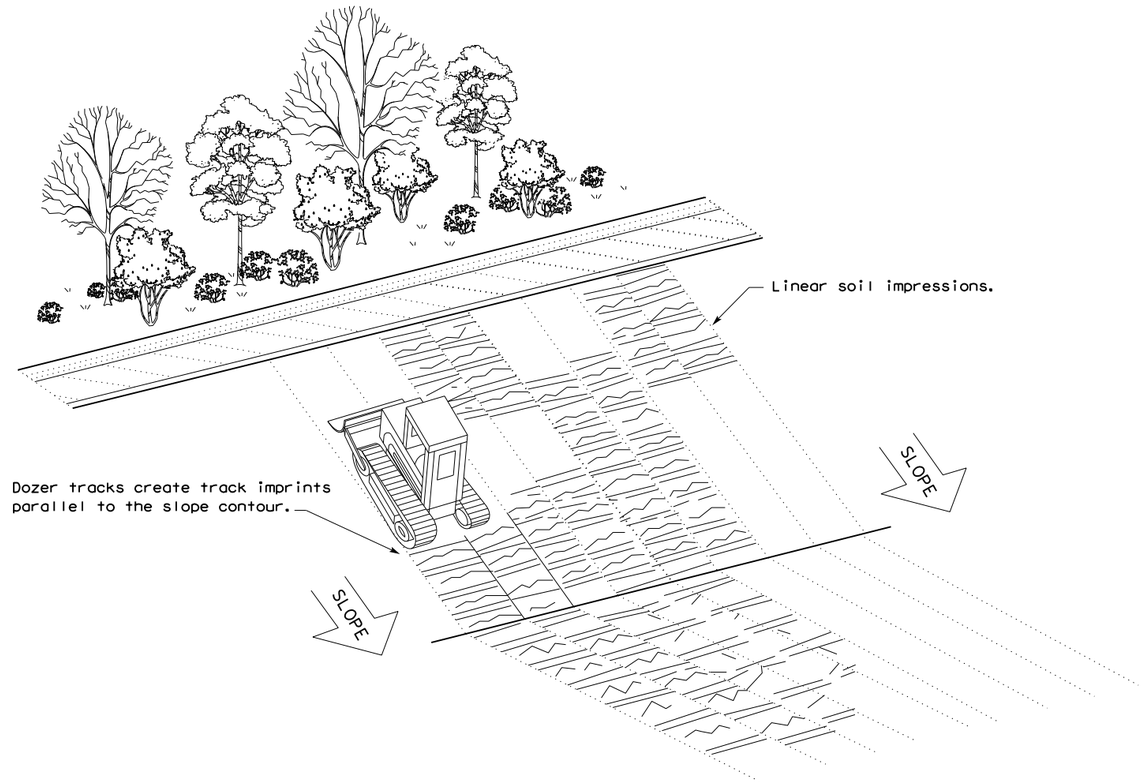
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

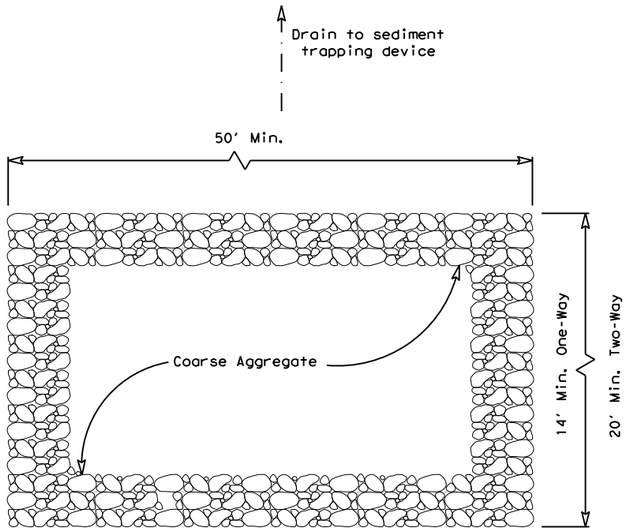
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

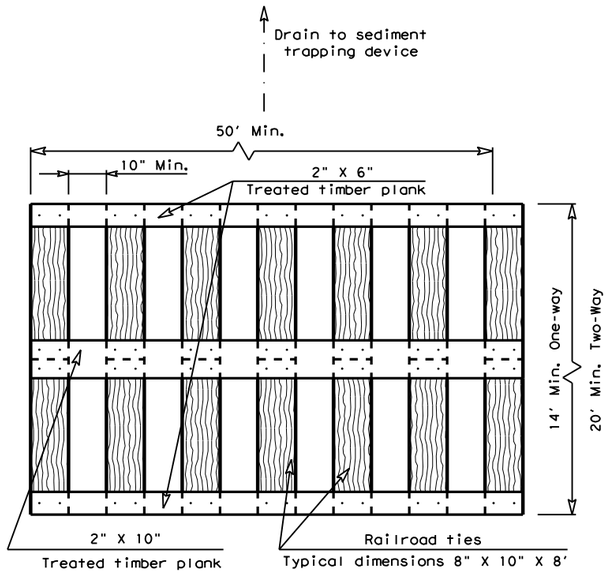
EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0271	15	097		IH 610		
	DIST	COUNTY					SHEET NO.
	HOU	HARRIS					237

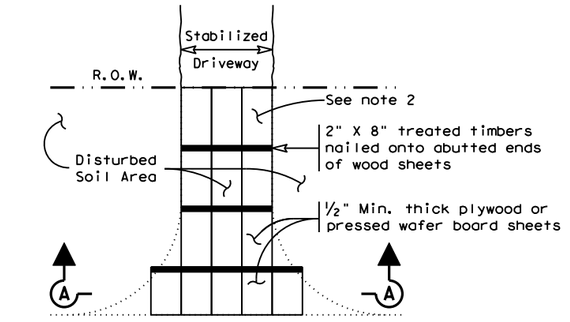
DATE:3/12/2021
FILE:$FILE$



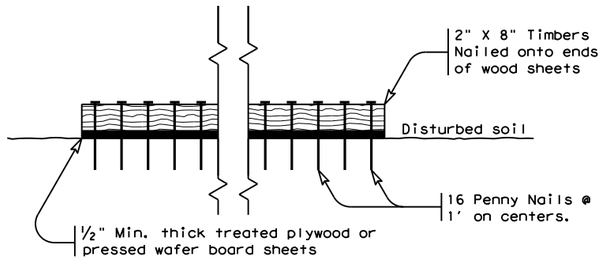
PLAN VIEW



PLAN VIEW



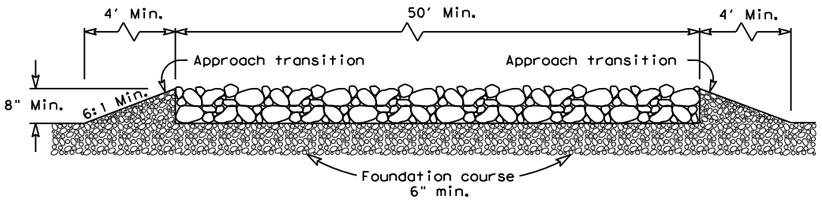
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

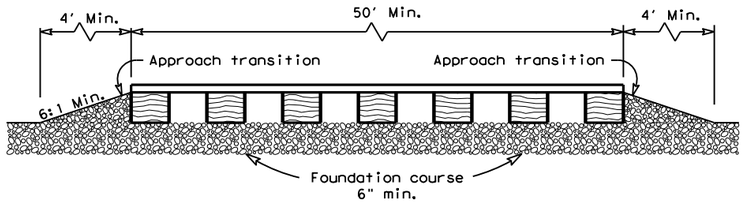
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

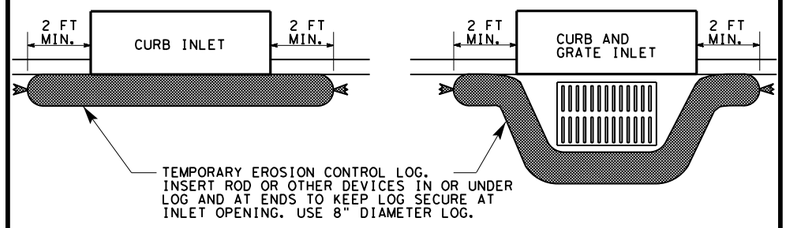
EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0271	15	097	IH 610
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		238

DATE: 3/12/2021
FILE: $FILE$

CURB INLETS
8" DIAMETER LOGS

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



MATERIAL REQUIREMENTS

FILL:

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

DO NOT USE MATERIAL WHICH PROHIBITS WATER INFILTRATION.

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

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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

Sediment traps should be placed in the following locations:
1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way

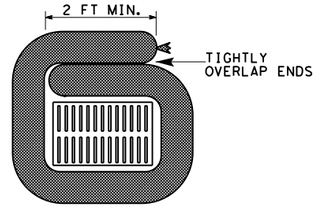
The trap should be cleaned when the capacity has been reduced by 1/2 or the sediment has accumulated to a depth of 1', whichever is less.

REQUIRED ITEMS:

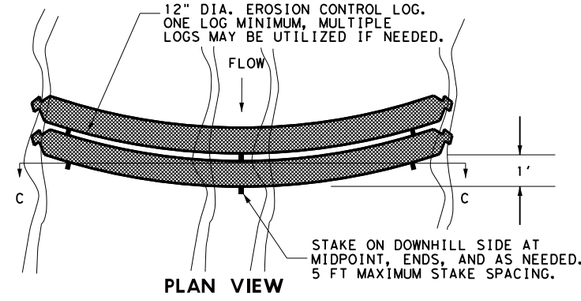
- ITEM 506-6040 BIODEG EROSN CONT LOGS (INSTL) (8") LF
- ITEM 506-6041 BIODEG EROSN CONT LOGS (INSTL) (12") LF
- ITEM 506-6043 BIODEG EROSN CONT LOGS (REMOVE) LF

DROP INLETS AND OTHER LOCATIONS
12" DIAMETER LOGS

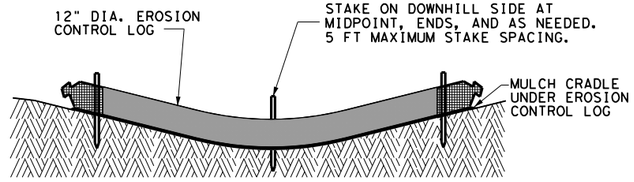
ITEM 506-6041 BIODEG EROSN CONT LOGS (INSTL)(12")



DROP INLETS

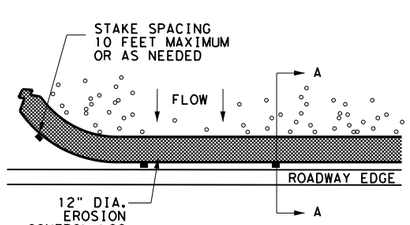


PLAN VIEW



SECTION C-C

DRAINAGE SWALE OR DITCH



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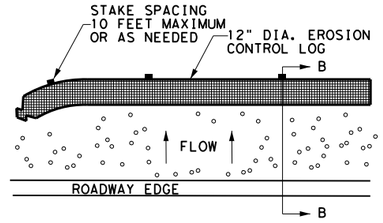
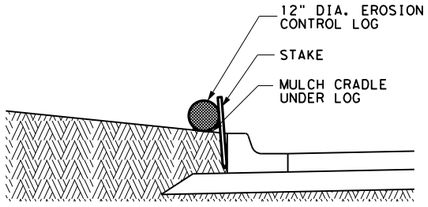
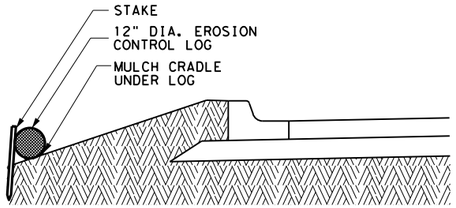


PLAN VIEW



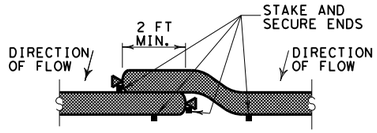
SECTION A-A

SLOPE TO ROADWAY EDGE

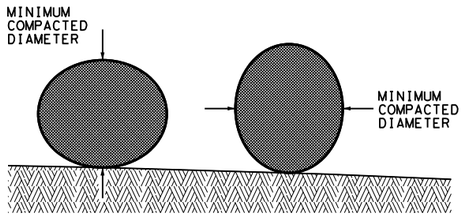


SECTION B-B

SLOPE AWAY FROM ROADWAY EDGE



END OF LOG OVERLAP



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation
Houston District

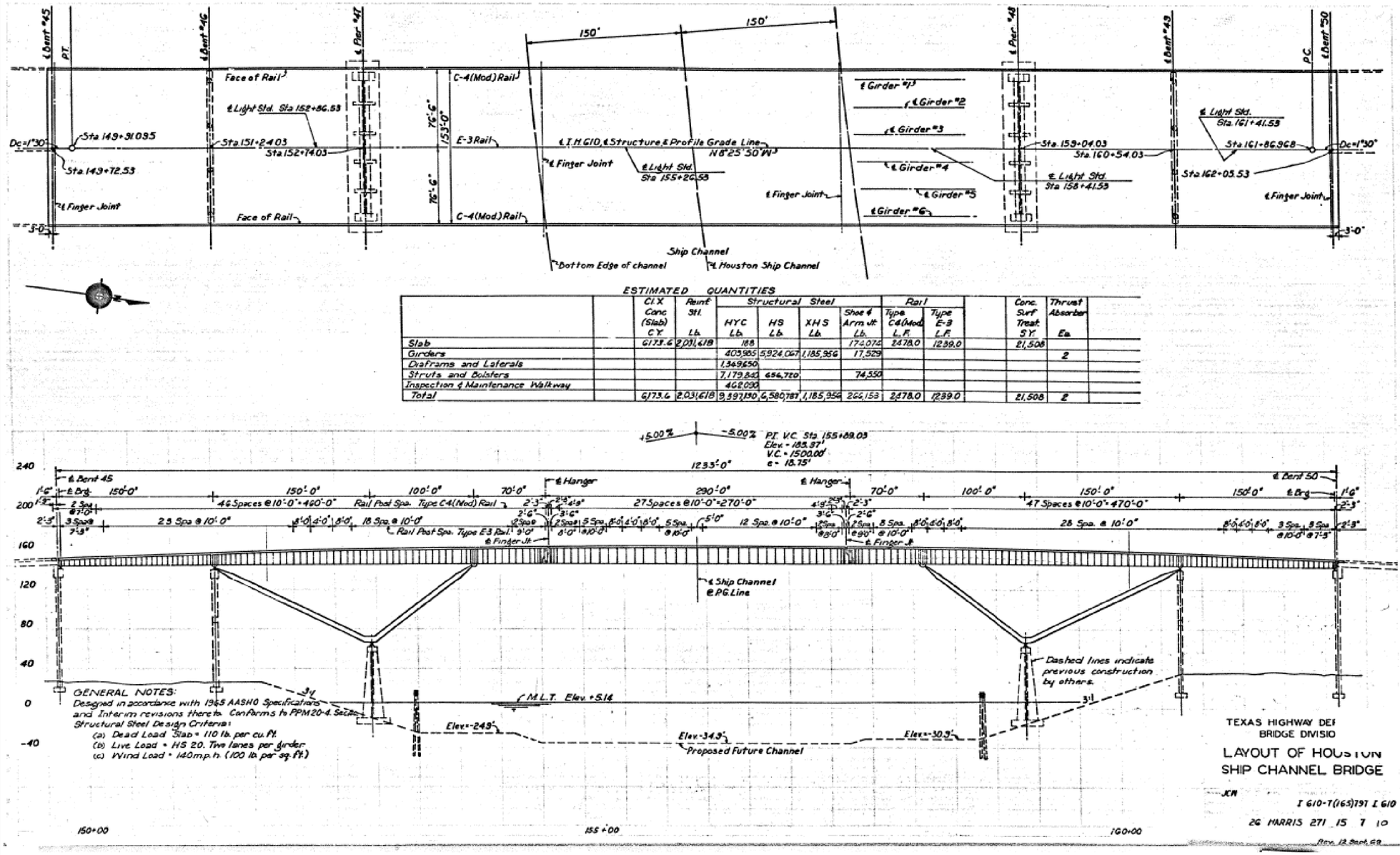
EROSION CONTROL LOG

ECL-12

FILE: STDG4a.DGN	DN: TxDot	CK: TxDot	DW: TxDot	CK: TxDot			
© TxDOT 2014	DISTRICT	FED REG	PROJECT NUMBER				SHEET
REVISIONS 3/15 MINOR CORRECTIONS	HOU	6					239
	COUNTY			CONTROL	SECT	JOB	HIGHWAY
	HARRIS			0271	15	097	IH 610

DATE: 3/12/2021
FILE: $FILE$

STD G-4A



ESTIMATED QUANTITIES

		Cl X Conc (Slab) C.Y.	Reinf Stl. Lb.	Structural Steel HYC Lb.	HS Lb.	XHS Lb.	Shoe & Arm Wt. Lb.	Rail Type C4(Mod) L.F.	Rail Type E-3 L.F.		Conc. Surf. Treat. S.Y.	Thrust Absorber Ea.
Slab		6173.6	2,031,618	188			174,074	2478.0	1239.0		21,508	
Girders				405,965	5,924,067	1,185,956	17,529					2
Diaframs and Laterals				1,369,650								
Struts and Bolsters				7,179,840	656,720		74,550					
Inspection & Maintenance Walkway				462,090								
Total		6173.6	2,031,618	9,597,190	6,580,787	1,185,956	266,153	2478.0	1239.0		21,508	2

GENERAL NOTES:
Designed in accordance with 1965 AASHO Specifications and Interim revisions thereto. Conforms to PPM 20-4, Section Structural Steel Design Criteria:
(a) Dead Load Slab = 110 lb. per cu. ft.
(b) Live Load = HS 20. Two lanes per girder.
(c) Wind Load = 140 m.p.h. (100 lb. per sq. ft.)

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION
LAYOUT OF HOUSTON SHIP CHANNEL BRIDGE
JCN
I 610-7(163)791 I 610
26 HARRIS 271 15 7 10
Rev. 12 Sept. 69

FOR CONTRACTOR'S INFORMATION ONLY

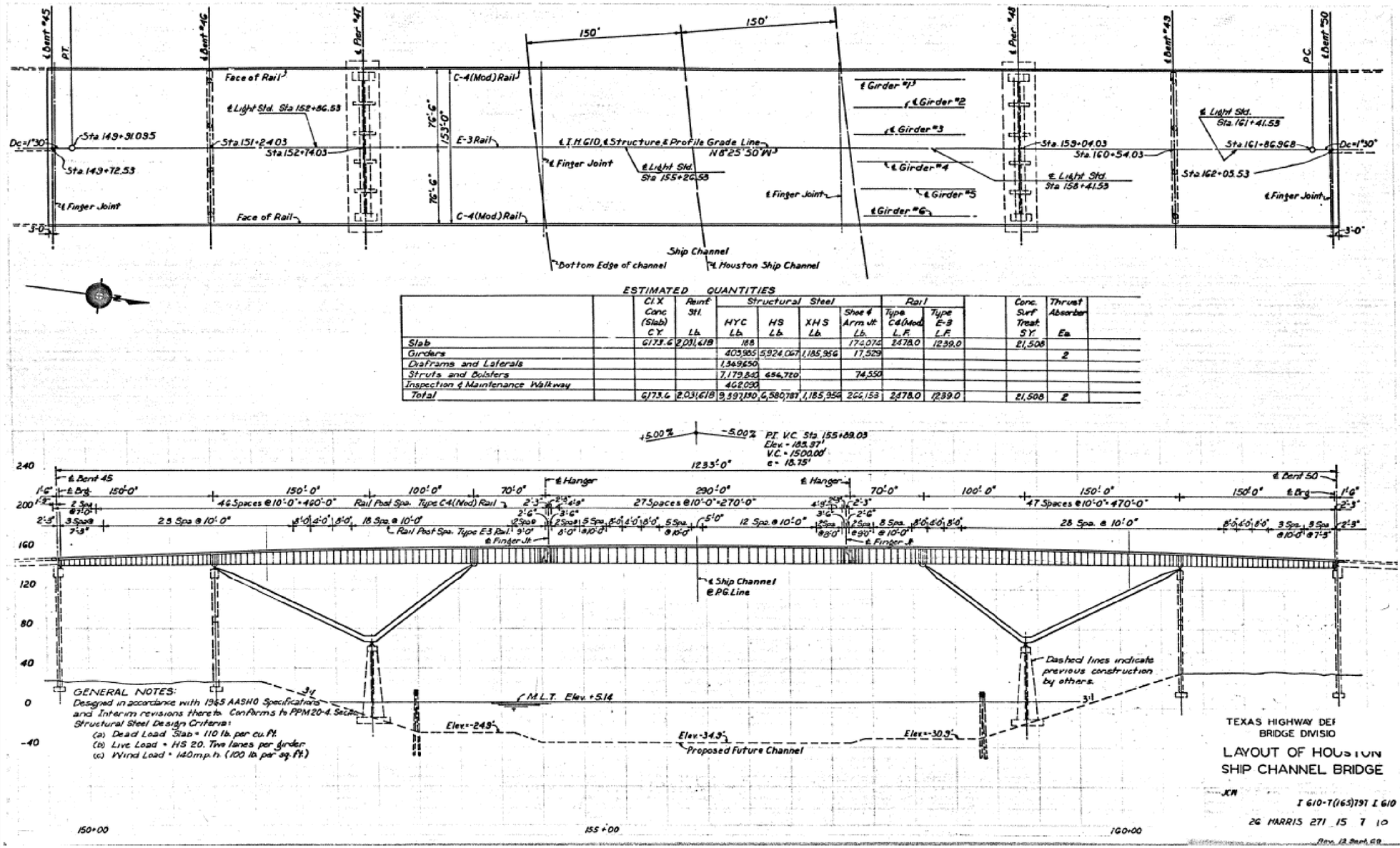
Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 1 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			240
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 3/10/2021
pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271\5097\4 - Design\Plan Set\1. General\097ASB.dgn



ESTIMATED QUANTITIES

		Cl X Conc (Slab) C.Y.	Reinf Stl. Lb.	Structural Steel HYC Lb.	HS Lb.	XHS Lb.	Shoe & Arm Wt. Lb.	Rail Type Cd(Mod) L.F.	Type E-3 L.F.		Conc. Surf. Treat. S.Y.	Thrust Absorber Ea.
Slab		6173.6	2,031,618	188			174,074	2478.0	1239.0		21,508	
Girders				405,965	5,924,067	1,185,956	17,529					2
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Inspection & Maintenance Walkway				462,090								
Total		6173.6	2,031,618	9,597,190	6,580,787	1,185,956	266,153	2478.0	1239.0		21,508	2

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Structural Steel Design Criteria:
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(b) Live Load = HS 20. Two lanes per girder.
(c) Wind Load = 140 m.p.h. (100 lb. per sq. ft.)

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION
LAYOUT OF HOUSTON SHIP CHANNEL BRIDGE
JCN
I 610-7(163)791 I 610
26 HARRIS 271 15 7 10
Rev. 12 Sept. 69

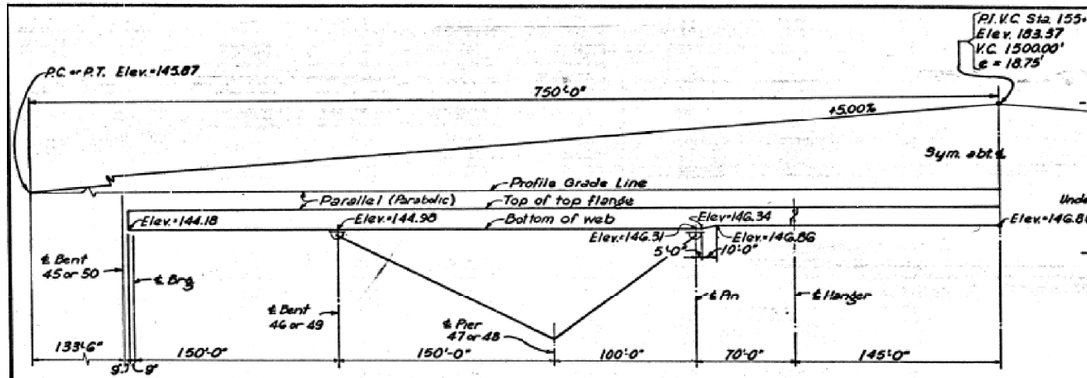
FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

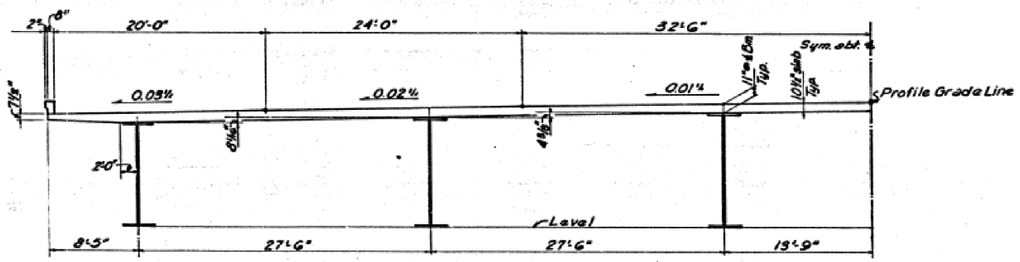
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 2 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			241
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



HALF ELEVATION



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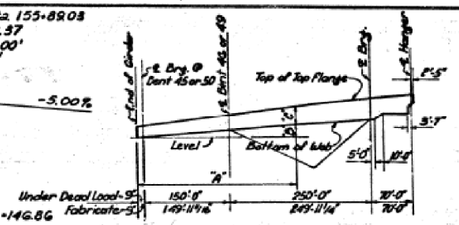
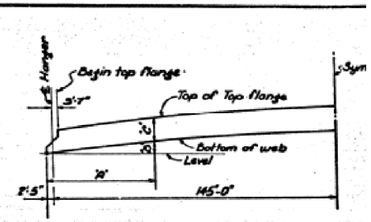


BLOCKING DIAGRAM FOR CONTINUOUS UNIT



BLOCKING DIAGRAM FOR SIMPLE SPAN

"A"	"B"	"C"	"A"	"B"	"C"
0	0	5.71'	245'-9"	1.54'	12.48'
9"	0	5.74'	250'-9"	1.56'	12.58'
5'-9"	.04'	5.92'	255'-9"	1.59'	12.67'
10'-9"	.09'	6.10'	260'-9"	1.61'	12.76'
15'-9"	.09'	6.27'	265'-9"	1.63'	12.86'
20'-9"	.12'	6.44'	270'-9"	1.65'	12.94'
25'-9"	.14'	6.62'	275'-9"	1.68'	13.03'
30'-9"	.17'	6.78'	280'-9"	1.70'	13.12'
35'-9"	.20'	6.95'	285'-9"	1.72'	13.20'
40'-9"	.22'	7.12'	290'-9"	1.74'	13.28'
45'-9"	.24'	7.28'	295'-9"	1.75'	13.37'
50'-9"	.27'	7.44'	300'-9"	1.77'	13.44'
55'-9"	.27'	7.61'	305'-9"	1.80'	13.52'
60'-9"	.30'	7.76'	310'-9"	1.80'	13.60'
65'-9"	.33'	7.91'	315'-9"	1.83'	13.67'
70'-9"	.34'	8.08'	320'-9"	1.84'	13.76'
75'-9"	.36'	8.23'	325'-9"	1.85'	13.82'
80'-9"	.38'	8.38'	330'-9"	1.87'	13.88'
85'-9"	.40'	8.54'	335'-9"	1.89'	13.95'
90'-9"	.42'	8.68'	340'-9"	1.90'	14.02'
95'-9"	.45'	8.83'	345'-9"	1.92'	14.08'
100'-9"	.46'	8.98'	350'-9"	1.94'	14.14'
105'-9"	.49'	9.11'	355'-9"	1.95'	14.21'
110'-9"	.51'	9.26'	360'-9"	1.97'	14.26'
115'-9"	.54'	9.41'	365'-9"	2.00'	14.32'
120'-9"	.57'	9.54'	370'-9"	2.00'	14.38'
125'-9"	.61'	9.68'	375'-9"	2.03'	14.43'
130'-9"	.63'	9.82'	380'-9"	2.06'	14.48'
135'-9"	.68'	9.95'	385'-9"	2.07'	14.54'
140'-9"	.71'	10.06'	390'-9"	2.10'	14.58'
145'-9"	.75'	10.21'	395'-9"	2.13'	14.63'
150'-8½"	.80'	10.34'	400'-7½"	2.15'	14.68'
155'-9"	.85'	10.47'	405'-9"	2.19'	14.72'
160'-9"	.89'	10.60'	410'-9"	2.45'	14.53'
165'-9"	.93'	10.72'	415'-9"	2.72'	14.34'
170'-9"	.98'	10.84'	420'-9"	2.74'	14.40'
175'-9"	1.06'	10.97'	425'-9"	2.74'	14.47'
180'-9"	1.07'	11.08'	430'-9"	2.77'	14.53'
185'-9"	1.10'	11.20'	435'-9"	2.78'	14.59'
190'-9"	1.14'	11.33'	440'-9"	2.80'	14.65'
195'-9"	1.19'	11.45'	445'-9"	2.83'	14.71'
200'-9"	1.23'	11.56'	450'-9"	2.86'	14.78'
205'-9"	1.27'	11.68'	455'-9"	2.89'	14.82'
210'-9"	1.30'	11.79'	460'-9"	2.91'	14.87'
215'-9"	1.35'	11.87'	465'-9"	2.94'	14.92'
220'-9"	1.37'	11.93'	467'-2"	2.95'	14.93'
225'-9"	1.41'	12.03'	473'-2"	2.98'	14.99'
230'-9"	1.46'	12.13'			
235'-9"	1.46'	12.28'			
240'-9"	1.51'	12.38'			

Note: Values for "A" and "B" are for all Girders. Values for "C" are for outside Fascia Girders (Nos 1 & 6) and shall be increased by .07' for interior Girders (Nos. 2 & 5) and by 1.04' for median Girders (Nos 3 & 4).

All values shown are for the unstressed girder and include the effect of the vertical curve and the dead load of girder, diaphragms and slab.

The values for the continuous unit include the longitudinal lengthening caused by the horizontal component of the dead load reaction at the channel strut.

"A"	"B"	"C"	
0	0	0	Begin
6'-0"	.03'	15.00'	Begin
7'-5"	.04'	15.02'	
18'-5"	.08'	15.06'	
17'-5"	.12'	15.11'	
22'-5"	.16'	15.15'	
27'-5"	.20'	15.19'	
32'-5"	.24'	15.23'	
37'-5"	.27'	15.27'	
42'-5"	.31'	15.30'	
47'-5"	.34'	15.34'	
52'-5"	.37'	15.37'	
57'-5"	.40'	15.40'	
62'-5"	.43'	15.43'	
67'-5"	.46'	15.46'	
72'-5"	.49'	15.48'	
77'-5"	.51'	15.51'	
82'-5"	.54'	15.53'	
87'-5"	.56'	15.55'	
92'-5"	.58'	15.57'	
97'-5"	.59'	15.59'	
102'-5"	.61'	15.60'	
107'-5"	.63'	15.62'	
112'-5"	.64'	15.63'	
117'-5"	.65'	15.64'	
122'-5"	.66'	15.65'	
127'-5"	.67'	15.66'	
132'-5"	.68'	15.66'	
137'-5"	.68'	15.67'	
142'-5"	.68'	15.67'	
147'-5"	.68'	15.67'	

-End bolt flange
-End top flange (Add "B" + "C" for ordinate to top of top flange)

Sheet 1.

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

GIRDER DETAILS

2

SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE: Feb. 1969	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT
REVISIONS	2G	6	I 610-7(163)75
	COUNTY		CONTROL SECTION JOB
	HARRIS		271 15

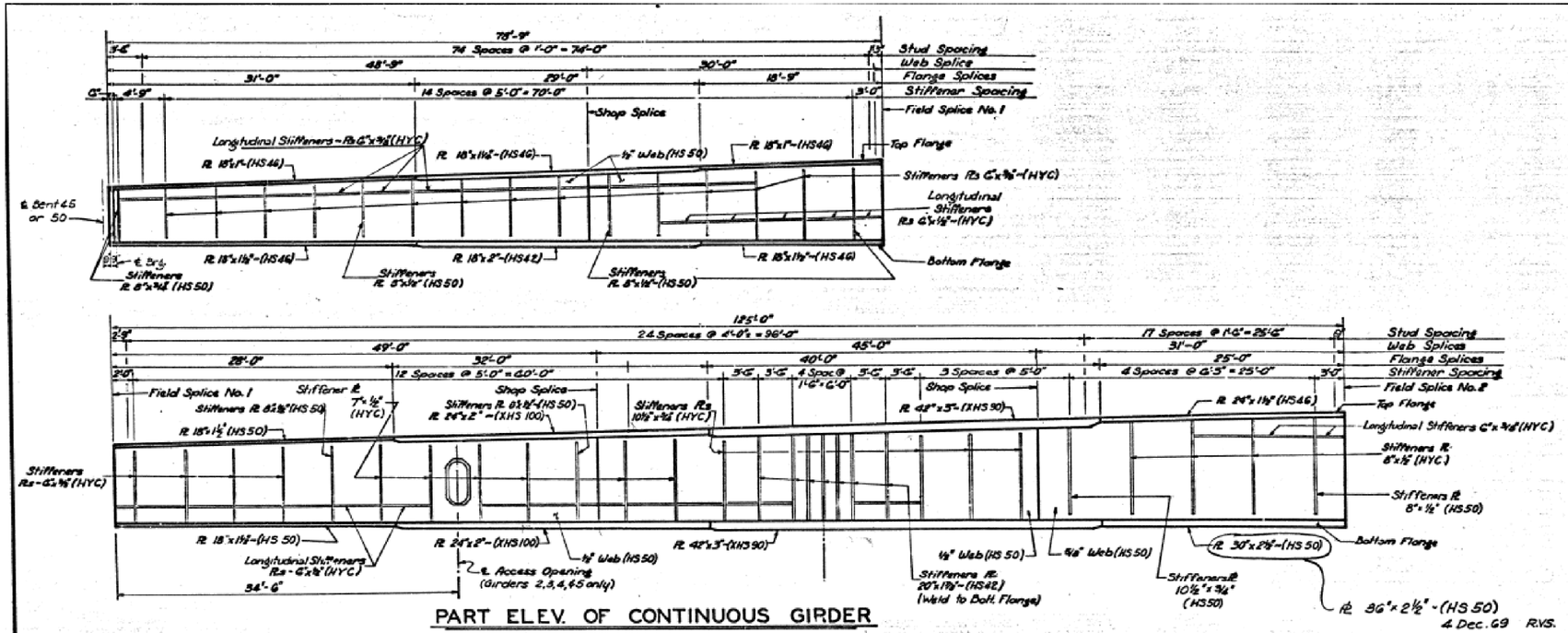
FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 3 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			242
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



PART ELEV. OF CONTINUOUS GIRDER

HS-20 LOADING

Sheet

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

GIRDER DETAILS

HOUSTON SHIP CHANNEL BRIDG

ORIGINAL DRAWING DATE: JAN. 1969	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT
REVISIONS	26	6	I 610-7(163)?
Rev. 4 Dec 69 R.V.S.	COUNTY		CONTROL SECTION JOB
	HARRIS		271 15

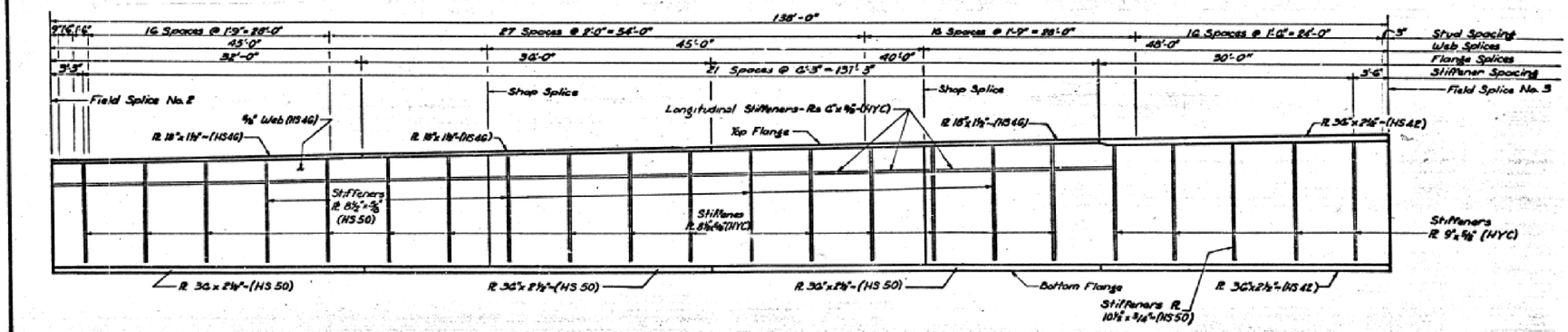
FOR CONTRACTOR'S INFORMATION ONLY

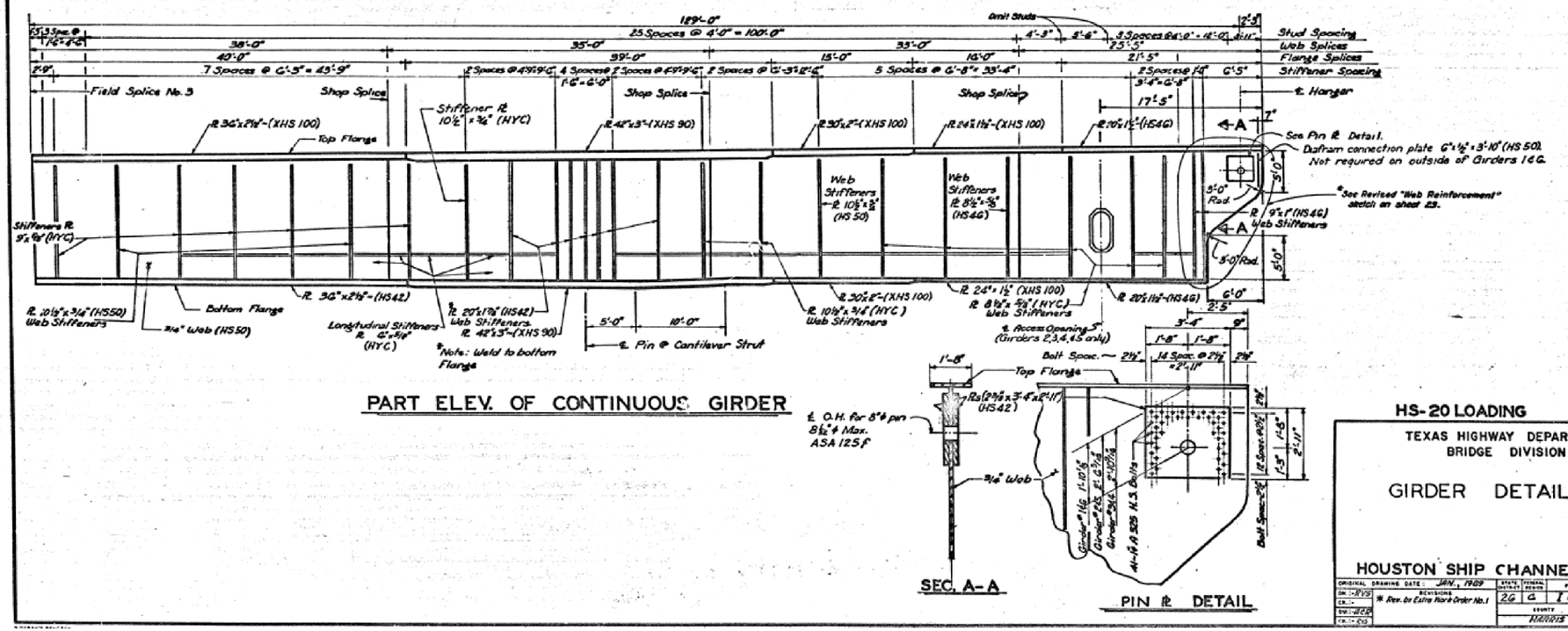
Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 4 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			243
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610





PART ELEV. OF CONTINUOUS GIRDER

HS-20 LOADING Sheet 3

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

GIRDER DETAILS

HOUSTON SHIP CHANNEL BRID

ORIGINAL DRAWING DATE: JAN., 1969	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT
REVISIONS * Rev. to Extra Work Order No. 1	2G	6	I 610-7(165)
	COUNTY	CONTROL	SECTION
	HARRIS	0271	15

FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 5 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			244
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 3/10/2021
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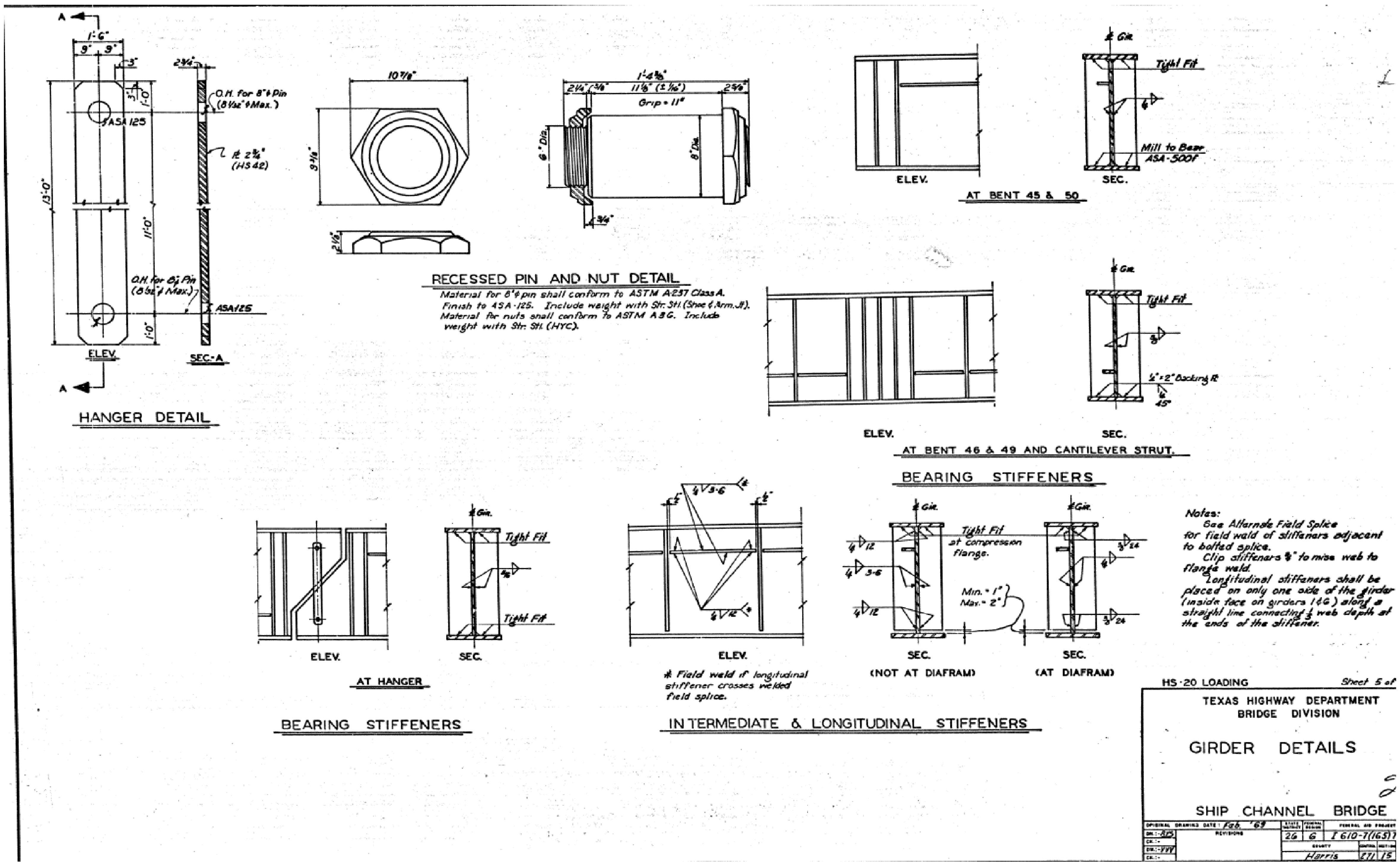

FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation
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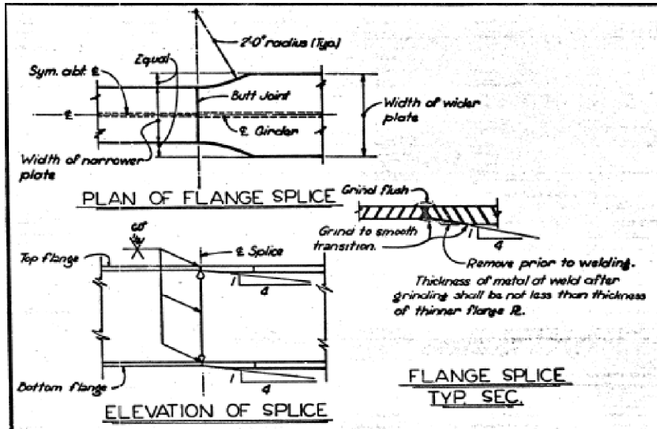
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 6 OF 44

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		245

STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 3/10/2021
pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\0271150974 - Design\Plan Set\1. General\097ASB.dgn



WELDED SPLICE DETAIL

Note: These details shall be used in conjunction with Item 441 of Tex. Hwy. Dept. Std. Specs. and special provisions thereto.

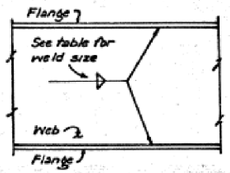
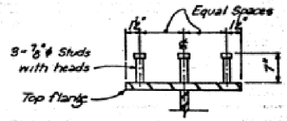


TABLE OF WELD SIZES	
Flange thickness	Min. Weld
Over ¾" to 1½"	5/16"
Over 1½" to 2½"	3/8"
Over 2½" to 6"	½"

FLANGE TO WEB WELD

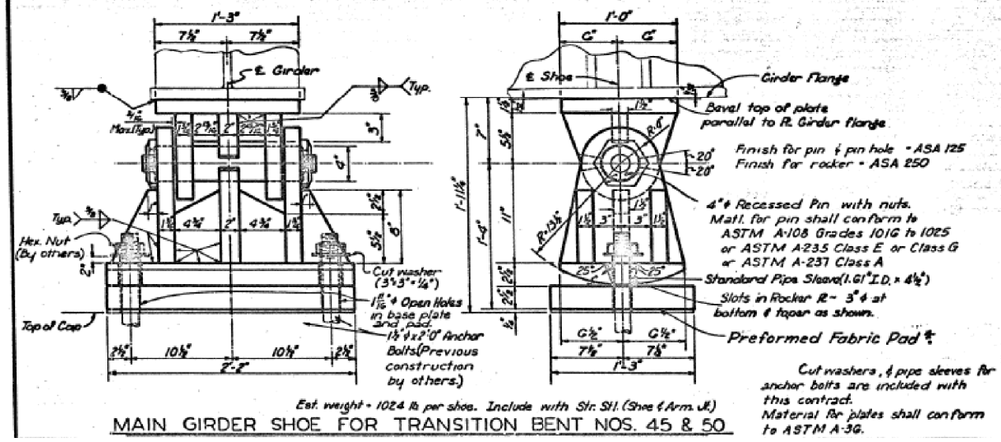
If the automatic submerged arc process is used, either the fillet weld shown or a full penetration bevel groove weld may be used.



STUD DETAIL

Studs shall be electric arc end welded to the flange with complete fusion.

Include weight with Str. Stl. (H.S.)



MAIN GIRDER SHOE FOR TRANSITION BENT NOS. 45 & 50

*Note: Each shoe shall be placed on a preformed fabric pad ⅛" (±1/32) consisting of 8 oz. duck and high quality natural rubber in 16 (±2) plies. Pads shall be subsidiary to the various bid items.

HS-20 LOADING — Sheet 6

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

GIRDER DETAILS

SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE: Mar. 69	STATE	FEDERAL AID PROJECT
REVISIONS	2C. G	I 610-7(165)
Rev. 12 Sept 69	COUNTY	CONTROL SECT. JOB
	Harris	271 15

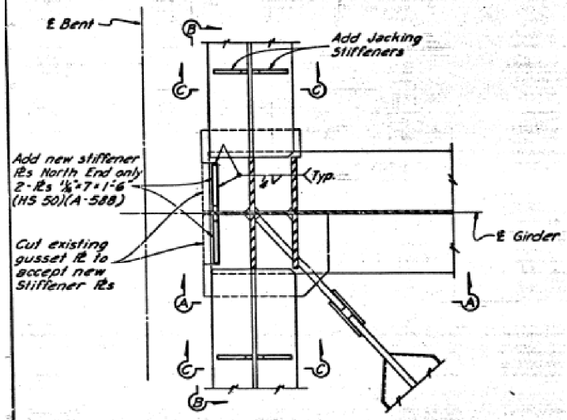
FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

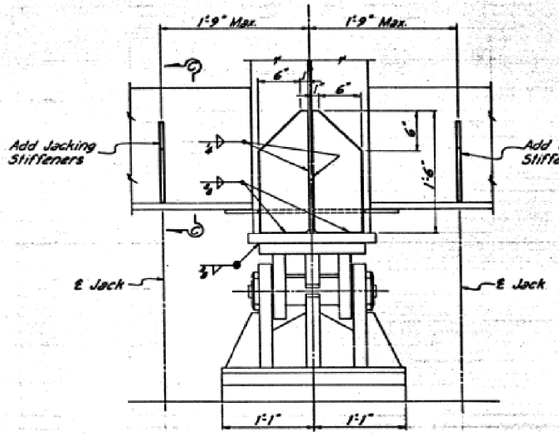
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 7 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			246
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

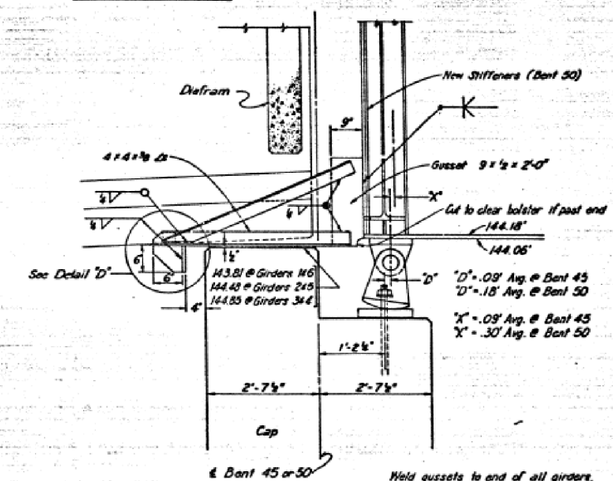


TYPICAL PLAN



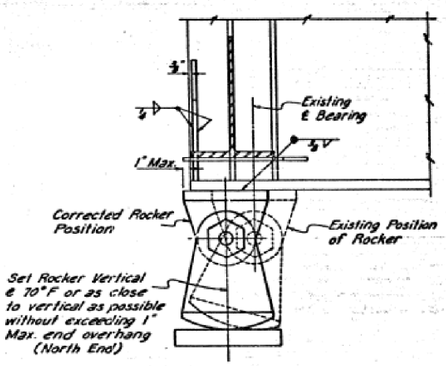
VIEW B-B

Install @ each Girder:

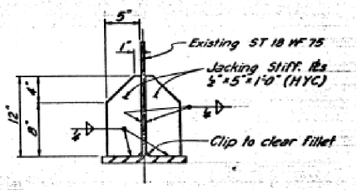


Weld gussets to end of all girders, then weld angle and stop assemblies to gussets so that stop opening is 4". (Thus the stops will engage the backwall when the finger joint is full open)

Gusset Wt	31 lbs
Angle and Stop Assembly	205 lbs
Total per girder	236 lbs



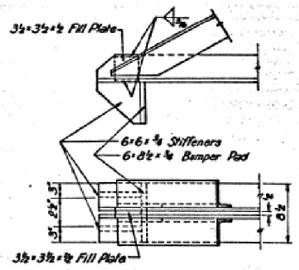
SECTION A-A



SECTION C-C

Note:
D.L. Reaction to each Rocker Shoe =135,000 Lbs.

DETAIL "D"



Sketch to Accompany Extra Work Order No. 5

TEXAS HIGHWAY DEPARTMENT
HOUSTON URBAN PROJECT

CORRECTION OF END ROCKI BEARING DETAILS 2

HOUSTON SHIP CHANNEL BRIDGE

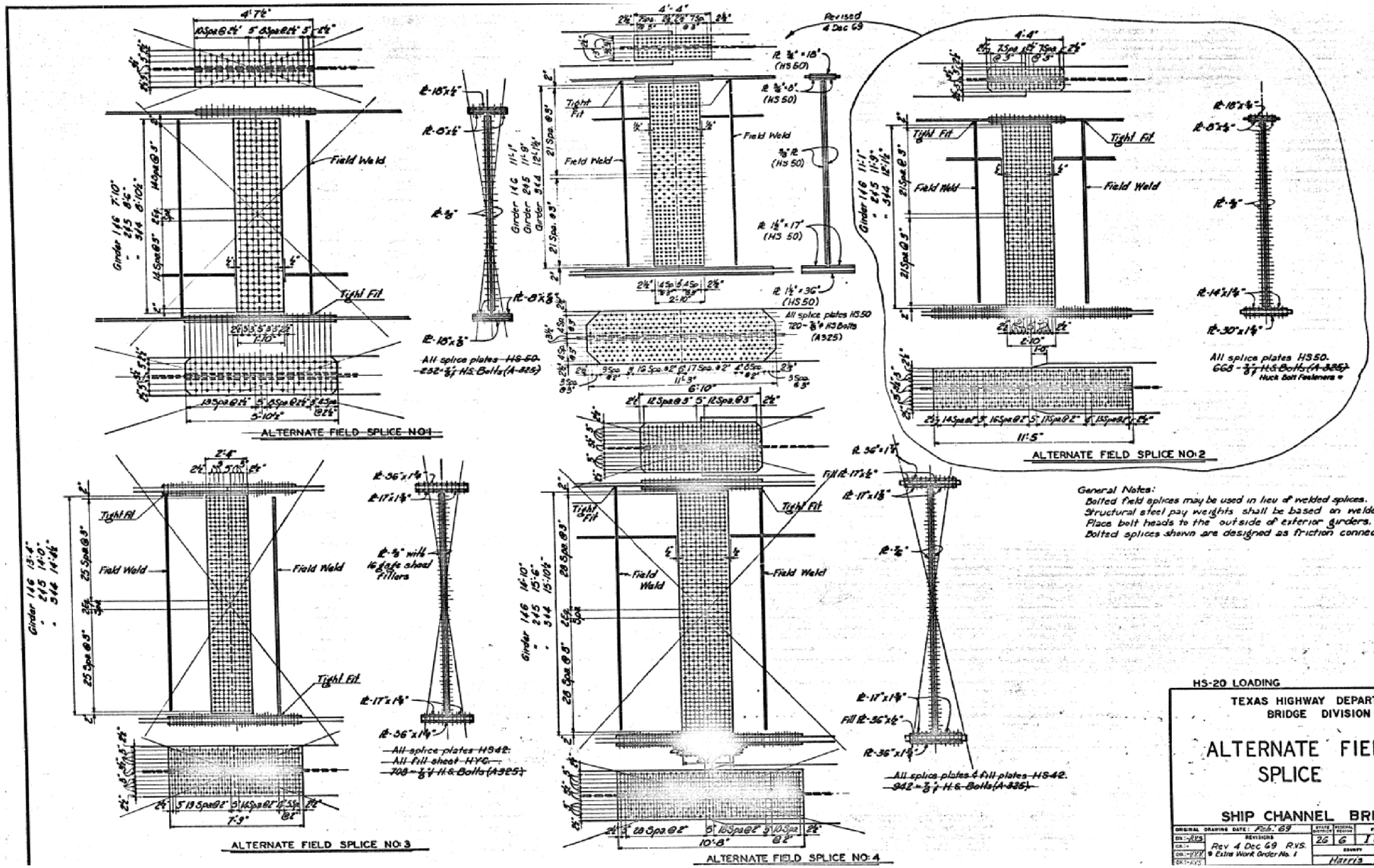
DN	E.J.S.	DRAWING	DATE	FED.RD. DIV.NO.	STATE	FEDERAL PROJECT NO.
CK. DN	S.L.T.		JULY 1973	6	TEXAS	I-610-7(165)7
DW	C.J.M.	Rev Aug 1973	600	STATE DIST.NO.	COUNTY	CONT. SECT.
CK. DW				12	HARRIS	271 15
TR						

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 8 OF 44

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			247
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



General Notes:
Bolted field splices may be used in lieu of welded splices.
Structural steel pay weights shall be based on welded splices.
Place bolt heads to the outside of exterior girders.
Bolted splices shown are designed as friction connections.

HS-20 LOADING

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

ALTERNATE FIELD SPLICE

SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE: Feb. 69	STATE DIST.	REGIONAL DIVISION	FEDERAL AID PROJECT
REVISIONS	26	6	1 610-7(163)
Rev 4 Dec 69 R.V.S. Extra Work Order No. 1	COUNTY		VOUCHER SHEET NO.
	Harris		271 15

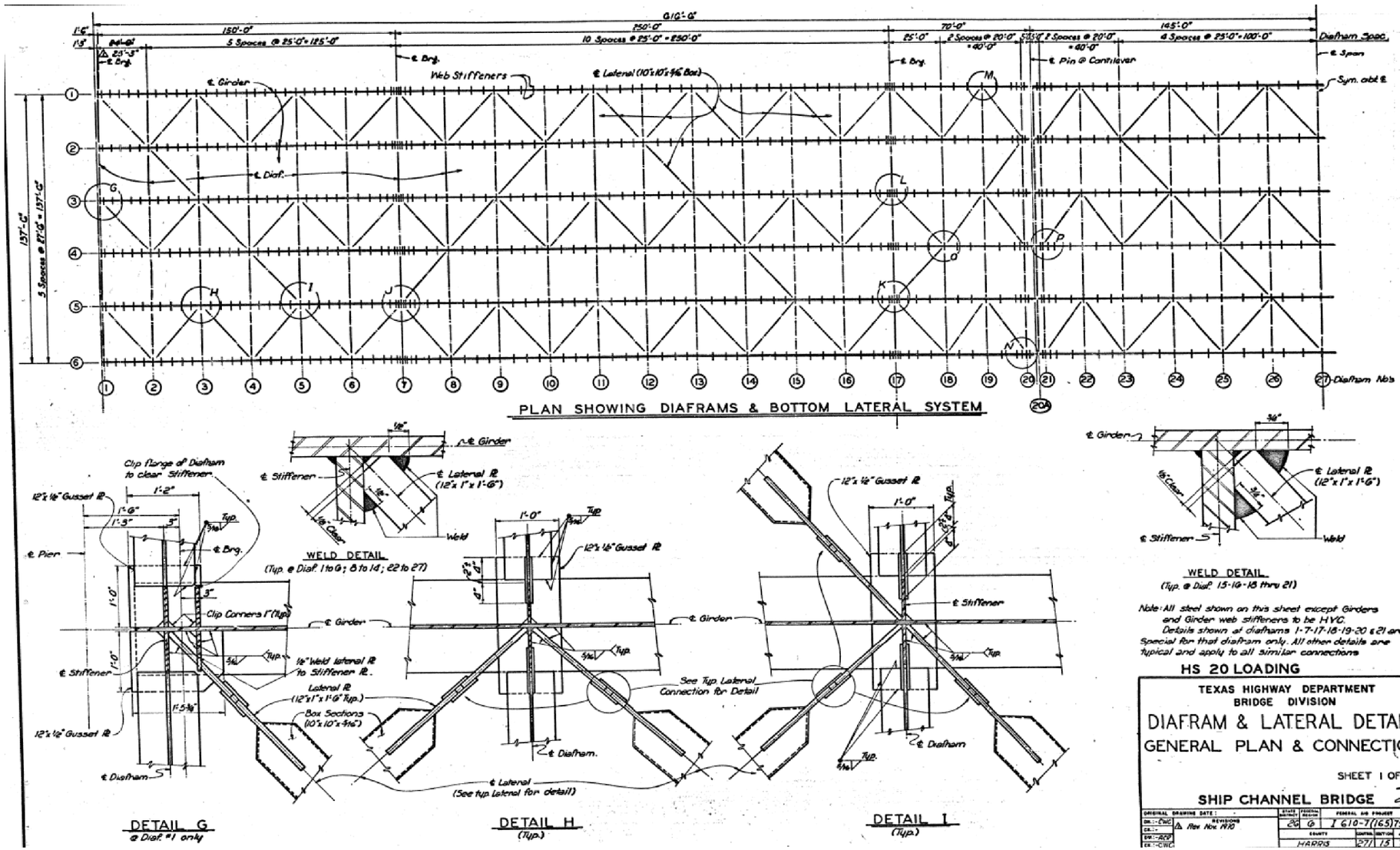
FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 9 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			248
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



Note: All steel shown on this sheet except Girders and Girder web stiffeners to be HVC. Details shown at diafhams 1-7-17-18-19-20 & 21 are Special for that diafram only. All other details are typical and apply to all similar connections

HS 20 LOADING

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

DIAFRAM & LATERAL DETAILS
GENERAL PLAN & CONNECTION

SHEET 1 OF 8

SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE:	REVISIONS	STATE DISTRICT	REGION	FEDERAL AID PROJECT #	SHEET #
DR.:-CWC		26	6	I 610-7(165)797	2
CK.:-	Rev. Nos. #10	COUNTY		CONTROL SECT/JOB	JOB #
DW.:-ACP		HARRIS		271 15 7	
CK.:-CWC					

FOR CONTRACTOR'S INFORMATION ONLY

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 10 OF 44

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		249

STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 3/10/2021
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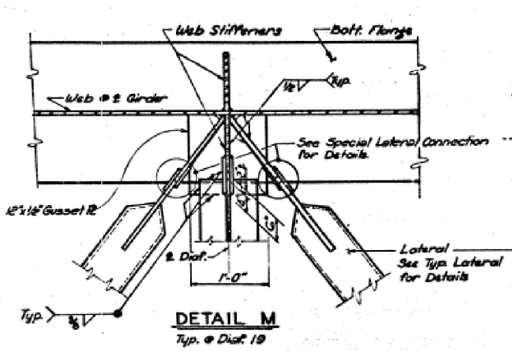
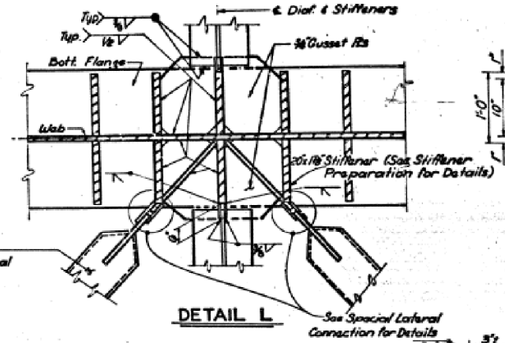


DETAIL M

Typ. @ Diaf. 19



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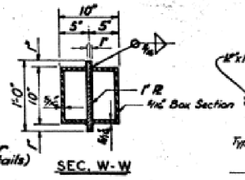
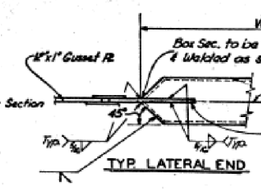


SEC. W-W

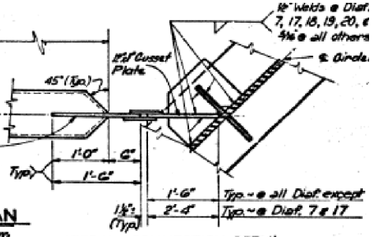


TYP. LATERAL END

PART PLAN

Note: Lateral may be fabricated from a 10"x10"x⅝" Structural tube, or may be fabricated from plate stock. All steel to be HYC.

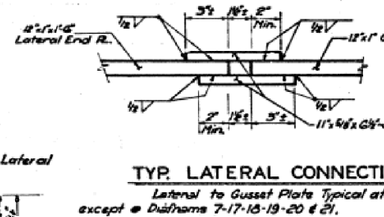
Field erection bolts may be used with the welded connection, if used the bolts shall remain in place. Nut and bolt heads to be tack welded to splice plates. If erection bolts are to be used they shall be shown on the shop plans.



LATERAL CONNECTION DETAIL

(Showing Lateral End Pl & Gusset Pl Dimension)

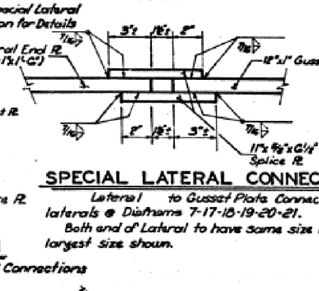
Note: Alternate high strength bolted connec may be submitted by the Contractor to th Engineer for approval. Quantities for pa will be based on the welded connection



TYP. LATERAL CONNECTION

Lateral to Gusset Plate Typical at all Connections except @ Diaframs 7-17-18-19-20 & 21.

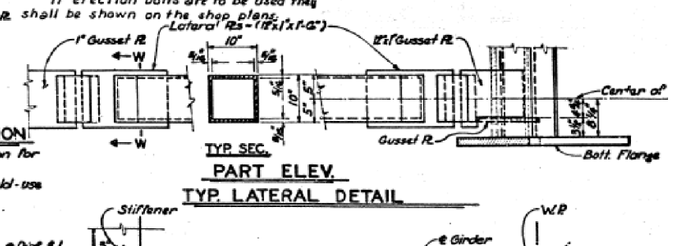
Alternate field and shop welding on ends of lateral for ease in erecting.



SPECIAL LATERAL CONNECTION

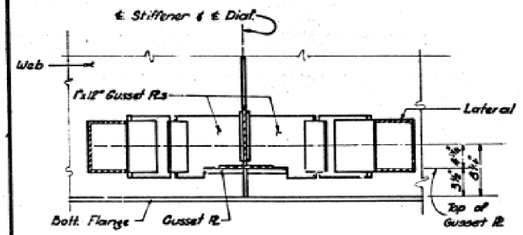
Lateral to Gusset Plate Connection for laterals @ Diaframs 7-17-18-19-20-21.

Both end of Lateral to have same size weld-use largest size shown.

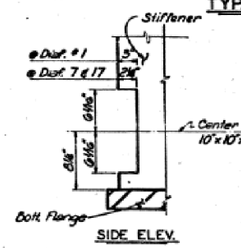


TYP. SEC.

PART ELEV.

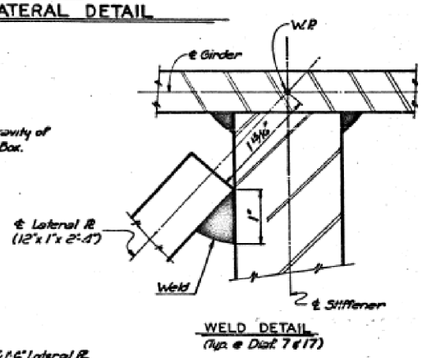


TYP. LATERAL CONNECTION ELEV.



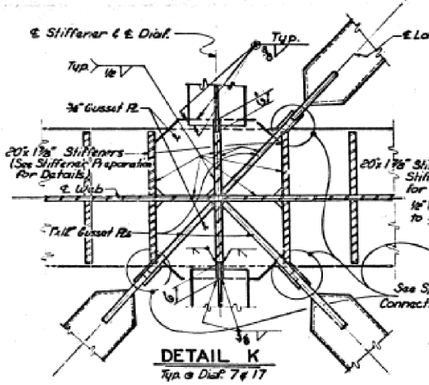
SIDE ELEV.

TYP. LATERAL DETAIL



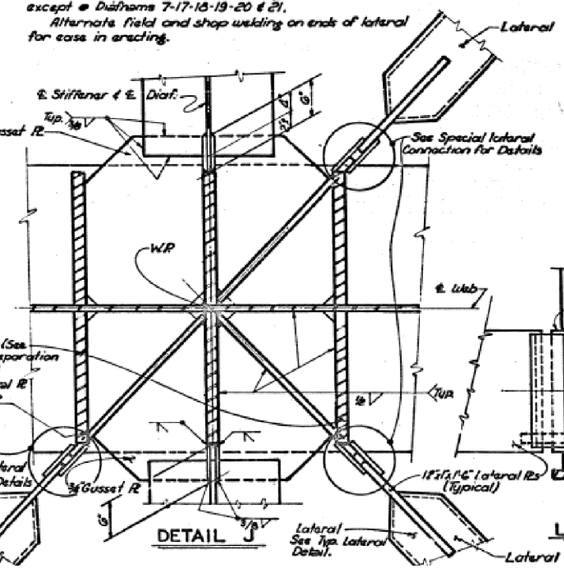
WELD DETAIL

(Typ. @ Diaf. 7 & 17)

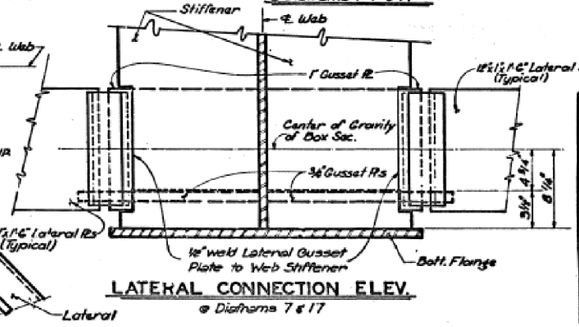


DETAIL K

Typ. @ Diaf. 7 & 17



DETAIL J



LATERAL CONNECTION ELEV.

@ Diaframs 7 & 17

STIFFENER PREPARATION

@ Diaframs 1-7 & 17

HS 20 LOADING

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

DIAFRAM & LATERAL DETA

SHEET 2 C

SHIP CHANNEL BRIDGE C

ORIGINAL DRAWING DATE: Feb: 1929	STATE PROJECT	FEDERAL REGION	FEDERAL AID PROJECT
REVISIONS	2G	G	I 610-7(165)1
Rev. 18 Sept 69	COUNTY		CONTROL SECTION
	HARRIS		271 15

DN: CWC
CK:
DW: JCP
CK:

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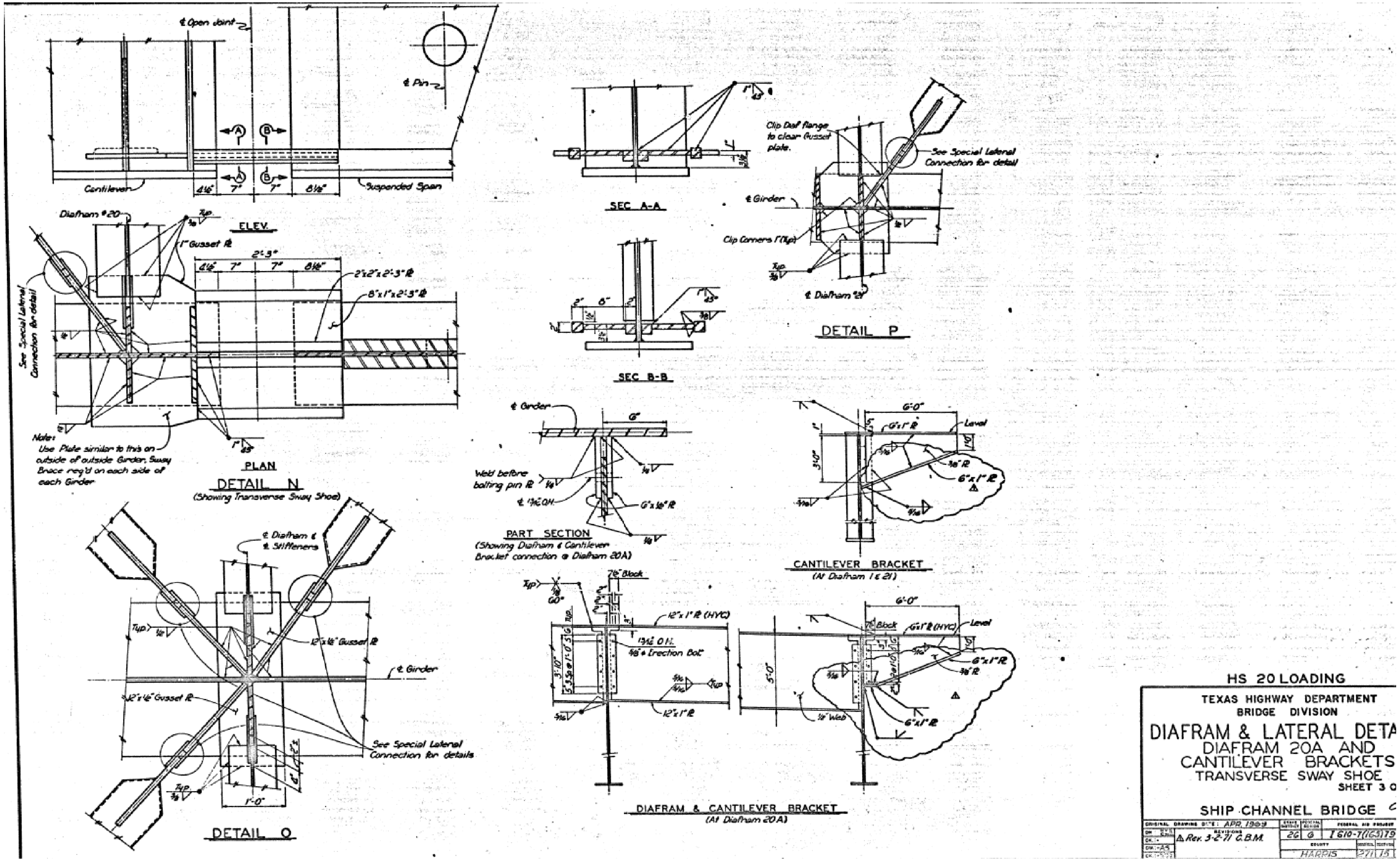
Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 11 OF 44

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			250
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 3/10/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\1. General\097ASB.dgn



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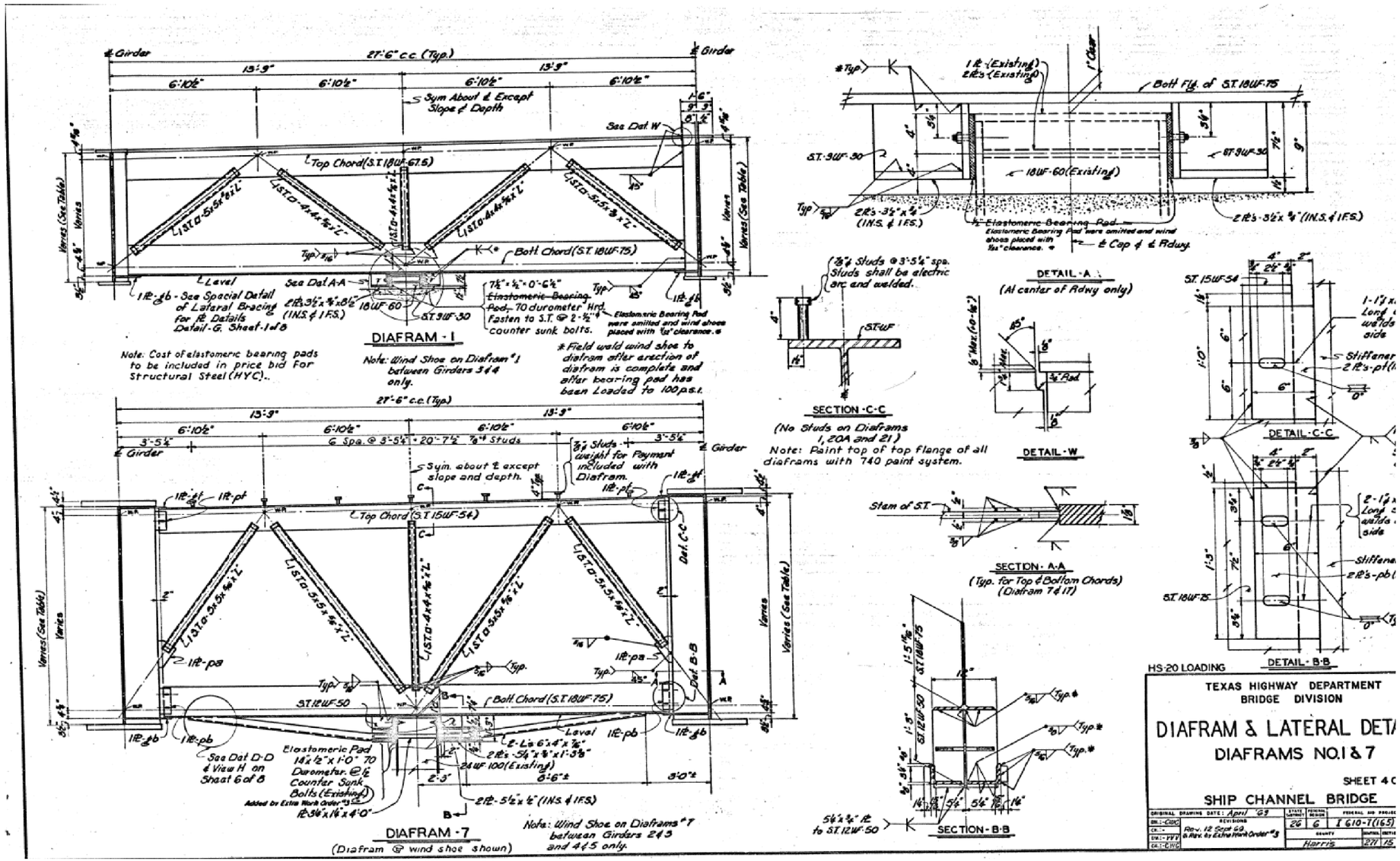
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 12 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			251
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

DIAFRAM & LATERAL DET
DIAFRAMS NO. 1 & 7

SHEET 4 C

SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE: April '69	STATE HIGHWAY	FEDERAL REGION	FEDERAL AID PROJECT
REVISIONS	26	6	I 610-T(165)
Rev. 12 Sand 69 & Rev. to Extra Work Order "3"	COUNTY		
	Harris		271 15

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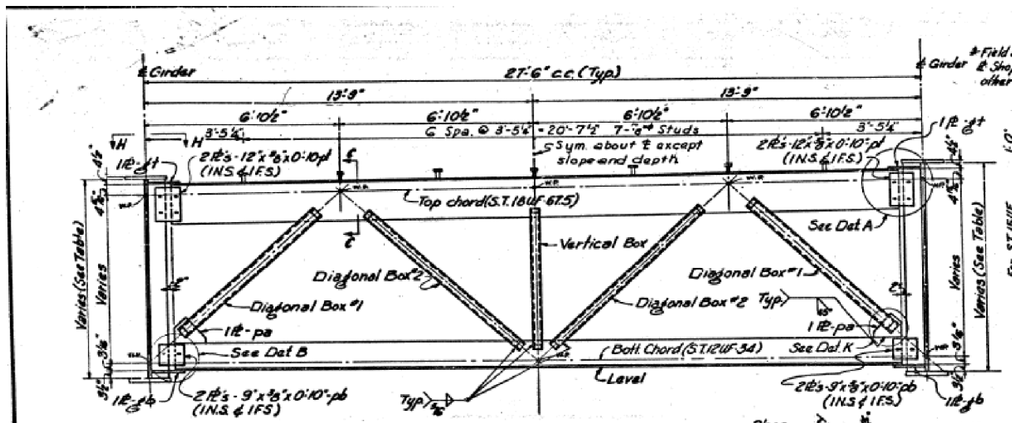
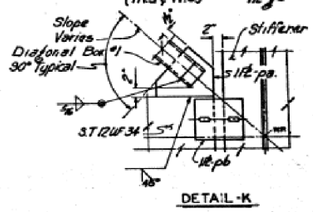
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 13 OF 44

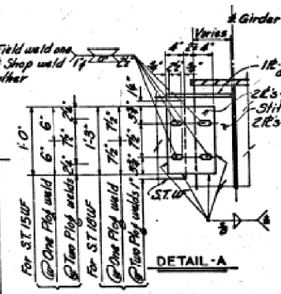
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			252
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



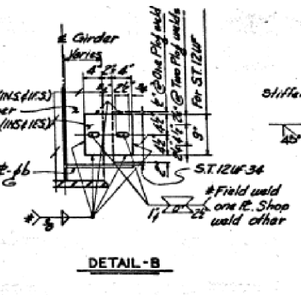
DIAFRAMS - 2 THRU. 5



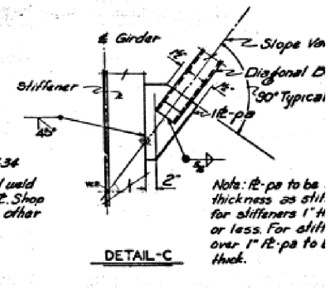
DETAIL-K



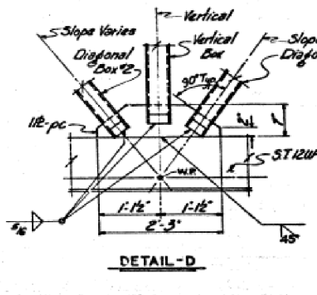
DETAIL-A



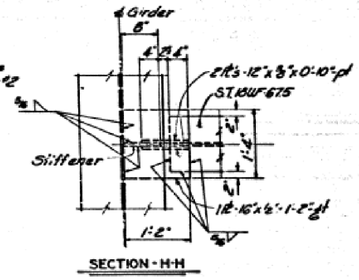
DETAIL-B



DETAIL-C



DETAIL-D



SECTION-H-H

General Notes:

For Dimensions, Welds and Plate sizes shown see Table on Sheet 8 of 8.

Welding of Connecting Plates for diafram shall be alternated between shop and f to facilitate erection of diaframs, see Section F-F on Sheet 7 of 8.

See Sheet 4 of 8 for Detail C-C.

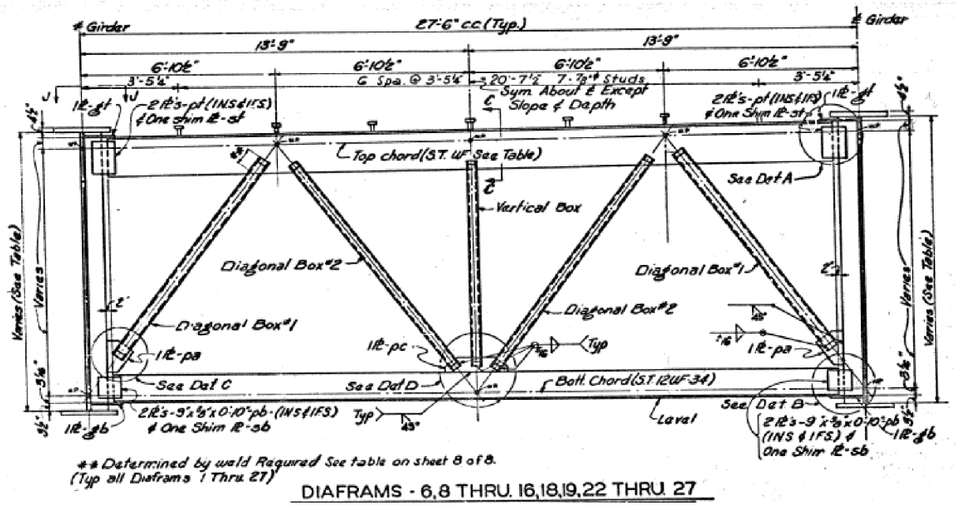
See Sheets 1 Thru 3 for details of Plate ℄b.

All steel for diaframs and lateral brac to be H.Y.C. unless shown otherwise.

Shim ℄'s shall not exceed ⅝" in thickn Not more than one shim ℄ may be pla on any one side of connection. Increas the weld size shown by the thickness of shim ℄ used at connection. Shim ℄ shall be same size as contact A of Splice. See Table for size of Shims.

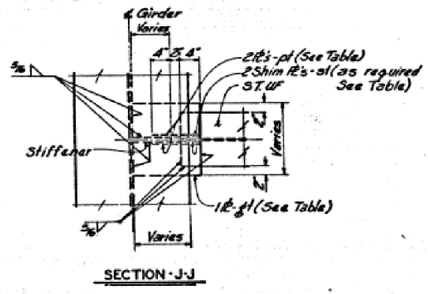
See sheet 8 of 8 For other general r

HS-20 LOADING



** Determined by weld Required See table on sheet 8 of 8.
(Typ. all Diaframs 1 Thru 27)

DIAFRAMS - 6,8 THRU. 16,18,19,22 THRU. 27



SECTION-J-J

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

DIAFRAM & LATERAL DETA

TYPICAL DIAFRAMS

SHEET 5 O

SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE April '69	REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT
DR.-CHK.	Rev. 12 Sept 69.	26	6	I 610-7(165)I
CK.-		COUNTY		
DW.-CHK.		HARRIS		

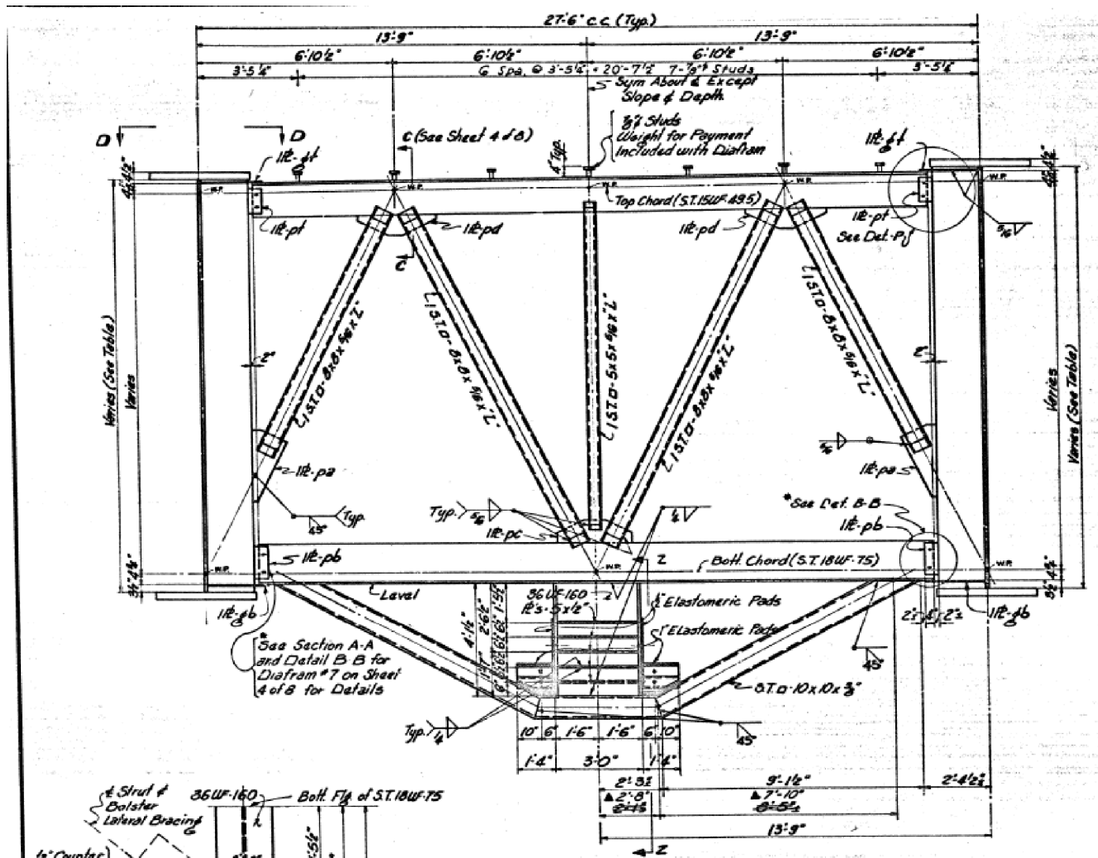
Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 14 OF 44

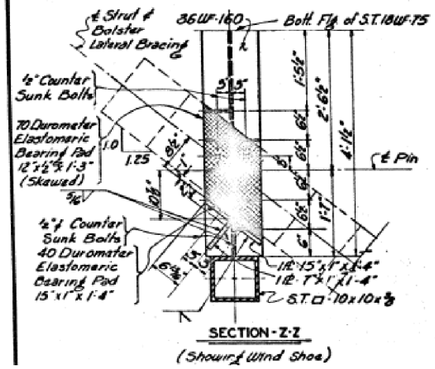
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			253
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

FOR CONTRACTOR'S INFORMATION ONLY

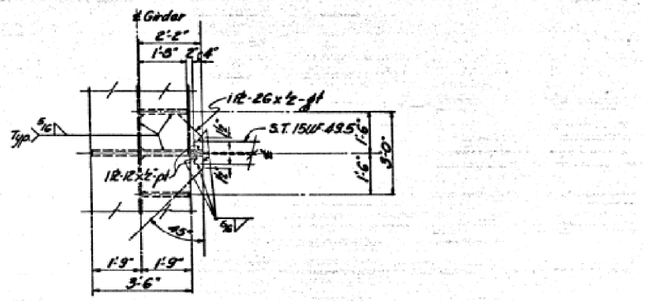


DIAFRAM 17 *
(@ Wind Shoe)

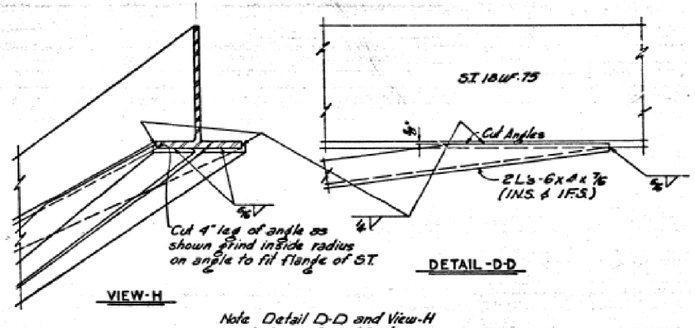
Note: Wind Shoes to be on Diaframs between Girders 1 and 2; 3 and 4; 5 and 6 only.
See notes on sheet 8 of 9 of Strut and Bolster details for pre-loading of wind shoes.
Cost of Elastomeric Bearing Pads to be included in price bid for Structural Steel (H.Y.C.).



SECTION-Z-Z
(Shown @ Wind Shoe)



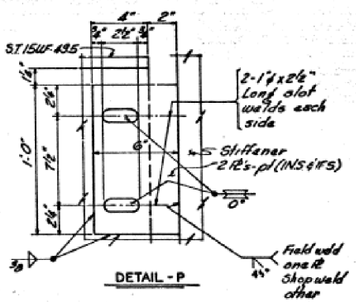
SECTION-D-D



DETAIL-D-D

VIEW-H

Note Detail D-D and View-H apply to Diafram #7 shown on Sheet 4 of 8.



DETAIL-P

* Rev. by Extra Work Order
▲ Rev. April, 71

HS-20 LOADING

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

DIAFRAM & LATERAL DETA
DIAFRAM NO. 17

SHEET 60

SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE: April '69	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT
REVISIONS	26	6	I 610-7(163)
Rev. 12 Sept 69.	COUNTY		CONTROL SECTION
	Harris		271 15

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 15 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			254
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

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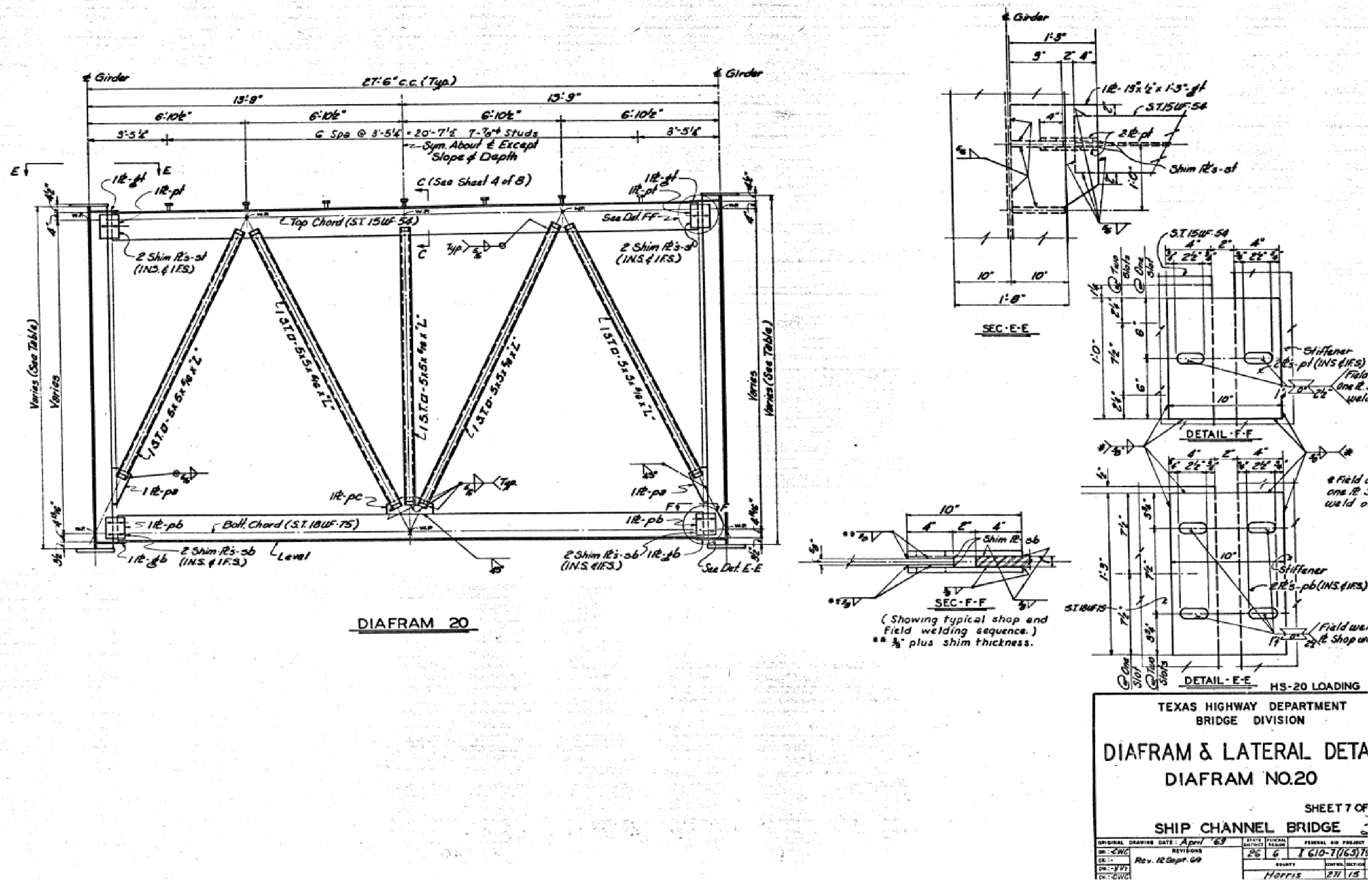

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IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 16 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			255
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

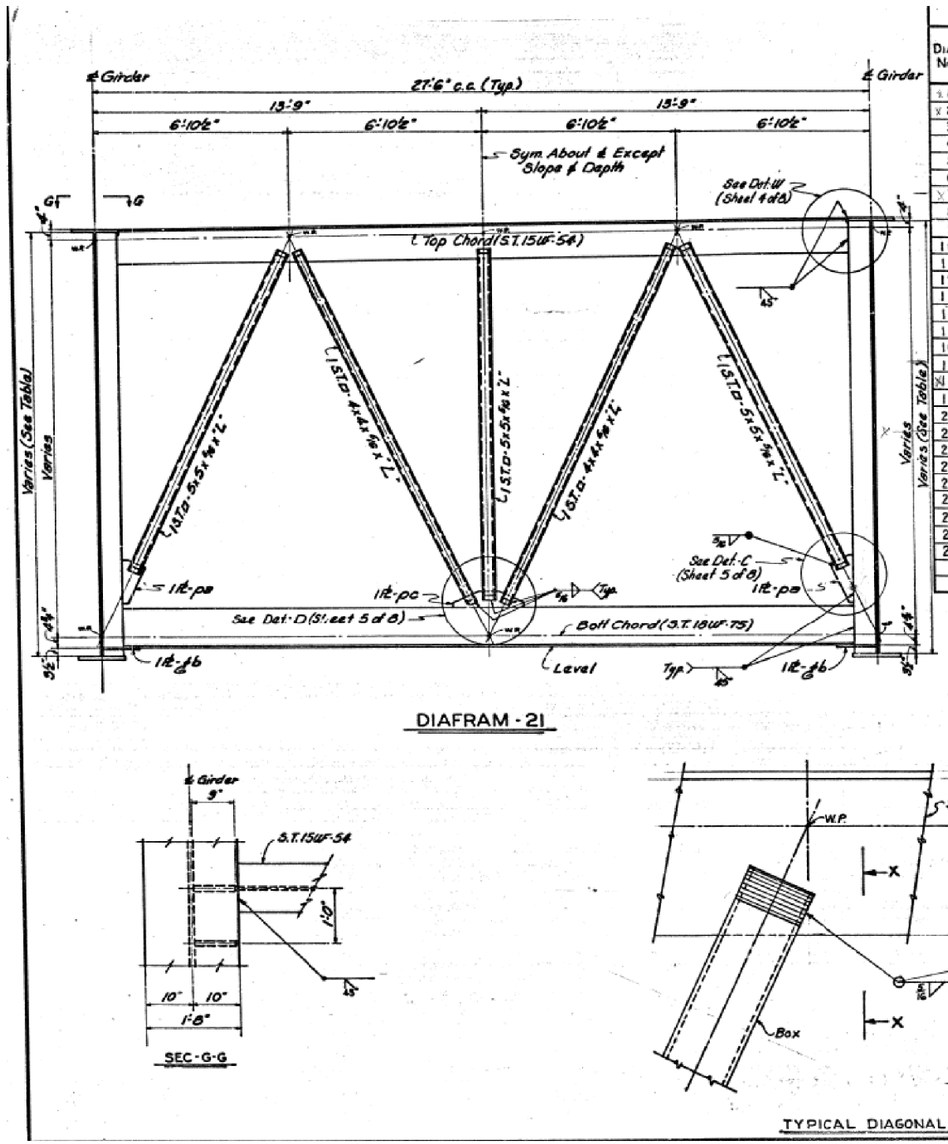


TABLE OF DIAFRAM CONTROL DIMENSIONS AND MEMBER SIZES

Dia. No.	Web Stiff. Size	Web Depth @ Girder 1 or 6	2 or 5	3 or 4	Top Chord Size Or S.T.	No Of Plus Rivs Ea. PL pt	Size Of Conn. Plates PL gt	PL pt	Shim st	PL pd	Bottom Chord Size Or S.T.	No Of Rivs Welds Ea. PL pb	Size Of Conn. Plates PL gb	PL pb	Shim sb	PL pc	PL pa	Diagonal Box *1 Size Box	Length & Size Of Weld	Diagonal Box *2 Size Box	Length & Size Of Weld	Vertica Size Box
X 1	8"×⅜	5.66'	6.33'	6.69'	18WF75	~	~	~	~	~	18WF75	~	12"×½×1'-2"	~	~	~	~	5"×5"×⅜"	~	4"×4"×5/16"	~	4"×4"×5/16"
X 2	8"×½	6.54'	7.21'	7.57'	"	4	16"×½×1'-2"	10"×½×1'-8"	~	~	12WF34	2	12"×½×1'-2"	5"×⅜×0'-10"	~	~	7"×⅜	"	"	"	"	"
3	8"×½	7.34'	8.01'	8.37'	"	4	"	"	~	~	"	2	"	"	~	~	"	"	"	"	"	"
4	8"×½	8.15'	8.82'	9.18'	"	4	"	"	~	~	"	2	"	"	~	~	"	"	"	"	"	"
5	8"×½	8.90'	9.57'	9.93'	"	4	"	"	~	~	"	2	"	"	~	~	"	"	"	"	"	"
6	8"×½	9.51'	10.18'	10.54'	"	4	"	"	~	~	"	2	"	"	~	7"×⅜×2'-5"	9"×½	"	"	"	"	"
X 7	20"×⅜	10.09'	10.76'	11.12'	15WF54	1	26"×½×0'-8"	6"×½×1'-0"	~	~	18WF75	2	20"×½×1'-0"	6"×½×1'-5"	~	~	17"×⅜	5"×5"×⅜"	26"of 5/16	5"×5"×⅜"	26"of 5/16	"
8	10½"×¾	10.72'	11.39'	11.75'	"	2	16"×½×1'-4½"	10"×½×1'-0"	3/16"	~	12WF34	2	12"×½×1'-4½"	5"×⅜×0'-10"	⅜ & 5/16"	7"×⅜×2'-5"	9"×⅜	"	"	4"×4"×5/16"	24"of 5/16	"
9	8"×½	11.41'	12.08'	12.44'	"	2	14"×½×1'-2"	10"×½×1'-0"	~	~	"	2	12"×½×1'-2"	~	~	~	9"×½	"	"	"	"	"
10	8½"×⅜	11.95'	12.62'	12.98'	"	2	14"×½×1'-2½"	~	~	~	"	2	12"×½×1'-2½"	~	⅜"	~	9"×⅜	"	"	"	"	5"×5"×⅜"
11	8½"×⅜	12.45'	13.12'	13.48'	"	2	"	"	~	~	"	2	"	"	⅜"	~	"	"	"	"	"	"
12	8½"×⅜	12.90'	13.57'	13.93'	"	2	"	"	~	~	"	2	"	"	⅜"	~	"	"	"	"	"	"
13	8½"×⅜	13.31'	13.98'	14.34'	"	2	"	"	~	~	"	2	"	"	⅜"	~	"	"	"	"	"	"
14	10½"×⅜	13.61'	14.28'	14.64'	"	2	14"×½×1'-4½"	~	~	~	"	2	12"×½×1'-4½"	~	⅜ & 5/16"	~	9"×⅜	"	"	"	"	"
15	10½"×¾	13.93'	14.60'	14.96'	"	2	"	"	~	~	"	2	"	"	⅜ & 5/16"	~	"	"	"	"	"	"
16	10½"×¾	14.22'	14.89'	15.25'	"	2	"	"	5/16"	~	"	2	"	"	⅜ & 5/16"	~	"	"	"	"	"	"
17	20"×⅝	14.43'	15.10'	15.46'	15WF49.5	2	26"×½×1'-10"	6"×½×1'-0"	~	5"×½×0'-8"	18WF75	2	26"×½×1'-10"	6"×½×1'-5"	~	5"×½×2'-7"	18"×½	8"×8"×½"	50"of 5/16	8"×8"×½"	50"of 5/16	"
X 18	10½"×¾	14.30'	14.97'	15.33'	"	4	14"×½×1'-4½"	10"×½×1'-0"	2@⅜"	~	12WF34	4	12"×½×1'-4½"	5"×⅜×0'-10"	⅜ & 5/16"	7"×⅜×2'-5"	9"×⅜	5"×5"×⅜"	26"of 5/16	4"×4"×5/16"	24"of 5/16	"
19	8½"×⅜	14.58'	15.25'	15.61'	"	4	14"×½×1'-2½"	~	⅜"	~	12WF34	4	12"×½×1'-2½"	~	⅜"	~	9"×⅜	"	"	"	"	"
20	9"×1'	14.84'	15.51'	15.87'	15WF54	2	14"×½×1'-3"	10"×½×1'-0"	⅜ & 5/16"	~	18WF75	4	15"×1'-3"	15"×½×0'-10"	2@⅜"	7"×⅜×2'-3"	9"×1'	"	~	5"×5"×⅜"	26"of 5/16	"
20A	~				~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
21	9"×1'	14.93'	15.60'	15.96'	15WF54	~	~	~	~	~	18WF75	~	15"×1'-3"	~	~	7"×⅜×2'-5"	9"×1'	5"×5"×⅜"	26"of 5/16	4"×4"×5/16"	24"of 5/16	5"×5"×⅜"
22	9"×⅝	15.06'	15.73'	16.05'	15WF49.5	4	16"×½×1'-5"	10"×½×1'-0"	⅜"	~	12WF34	4	12"×½×1'-3"	5"×⅜×0'-10"	⅜"	5"×½×2'-3"	9"×⅜	"	"	"	"	"
23	9"×⅝	15.17'	15.84'	16.20'	"	4	"	"	⅜"	~	"	4	"	"	⅜"	"	9"×⅜	"	"	"	"	"
24	9"×⅝	15.27'	15.94'	16.30'	"	4	"	"	⅜"	~	"	4	"	"	⅜"	"	9"×⅜	"	"	"	"	"
25	10½"×¾	15.34'	16.01'	16.37'	"	4	14"×½×1'-4½"	"	2@⅜"	~	"	4	12"×½×1'-4½"	"	⅜"	"	9"×⅜	"	"	"	"	"
26	10½"×¾	15.40'	16.07'	16.43'	"	4	"	"	2@⅜"	~	"	4	"	"	⅜"	"	9"×⅜	"	"	"	"	"
27	10½"×¾	15.42'	16.09'	16.45'	"	4	"	"	2@⅜"	~	"	4	"	"	⅜"	"	9"×⅜	"	"	"	"	"

General Notes:

Back up bars to be used with all bevel Full penetration butt welds. Thick of bars to be ⅝", Width of bar to be ½" larg than the weld size.

Field erection bolts may be used u the welded connections, if used the bolts shall remain in place. Nuts and bolt heads be tack welded to connected material. If erection bolts are to be used they shall shown on the shop plans.

Alternate high strength bolted connec may be submitted by the contractor to t Engineer for approval. Quantities for p -ment will be based on the welded connect shown.

See sheet 5 of 8 for other general notes.

ESTIMATED QUANTITIES

Diaframs La

Structural Steel "HYC" 1,058,200# 29

H-S-20 LOADING

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

DIAFRAM & LATERAL DETAI

TABLE OF VARIABLE DIMENSI AND DIAFRAM NO:21

SHEET 8 OF

SHIP CHANNEL BRIDGE

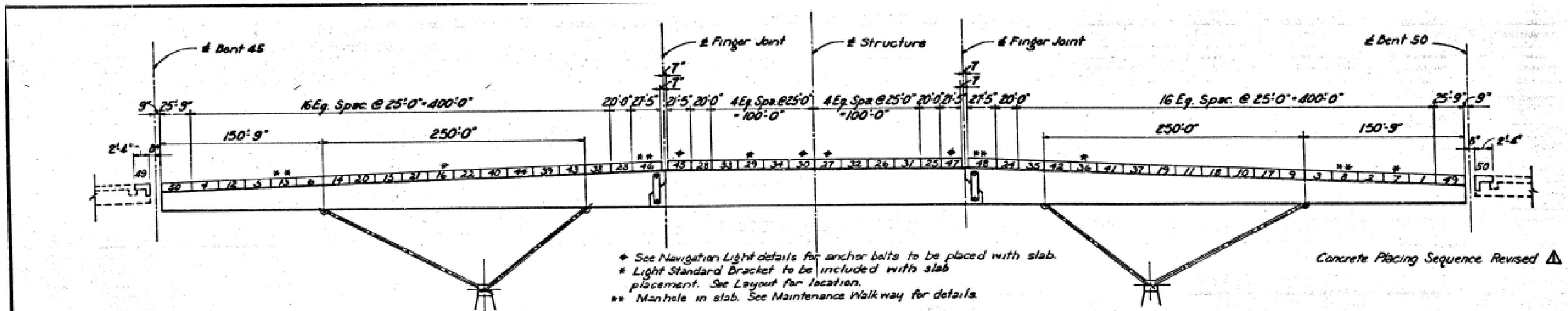
ORIGINAL DRAWING DATE: April '69	STATE DISTRICT	STATE REGION	FEDERAL AID PROJECT
REVISIONS	EG	6	I 610-7(165)179
Rev 12 Sept 69	COUNTY		CONTROL SECTION JOB
	Harris		271 15

FOR CONTRACTOR'S INFORMATION ONLY

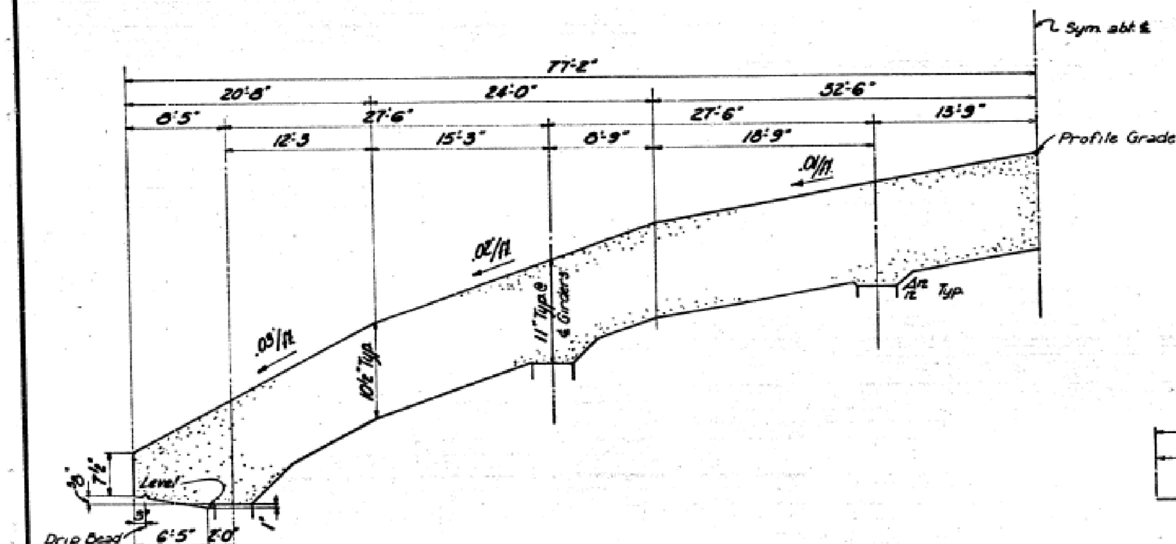
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 17 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			256
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

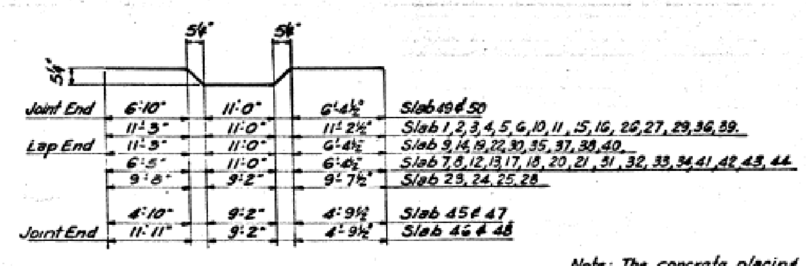


CONCRETE PLACING SEQUENCE

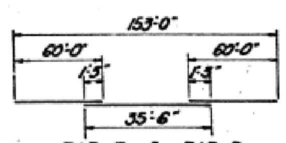


HALF TRANSVERSE SECTION (SHOWING DIM.)

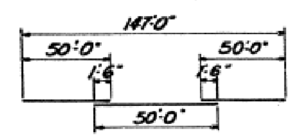
Typ. for Plate Girder Slab.



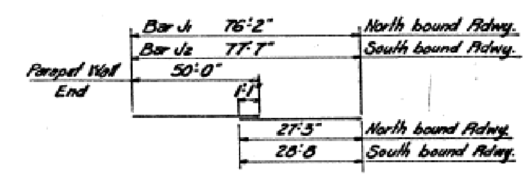
BARS C



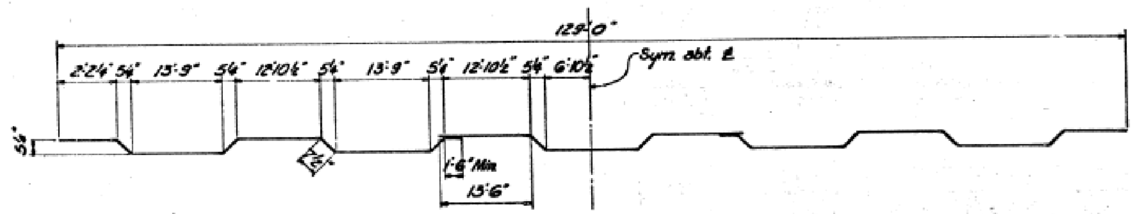
BAR B & BAR D



BAR H



BAR J1 & BAR J2



BAR F

Note: The concrete placing sequence shown was determined by considering the following.

1. Girder deflection caused by slab weight. Composite action where applicable.
2. No over stress on girder or shoes.
3. Bar laps in adjoining placements.
4. Comply with Special Provision to Item 420. (420___018) Paragraph 6, page 11.
5. Place slabs with finger joints last.

Any deviation from this sequence shall be submitted to the Bridge Division for review and approval prior to approval of girder shop drawings.

Include unfinished approach slabs with placement no: 49 and 5

Place slab reinforcing bars in alphabetical order.

See Parapet Wall Details, Railing (Type E-3), and Conduit Details for additional reinforcement, anchor bolts & pls, and conduit hanger inserts to be placed in slab.

Design stress for reinforcing steel = 20,000 psi. Dimensions relating to reinforcing steel are to centers of bars unless shown otherwise. Design stress for concrete = 1200 psi. Chamfer corners ¾".

HS 20 LOADING — Sheet 1 o

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

SLAB DETAILS

SHIP CHANNEL BRIDGE

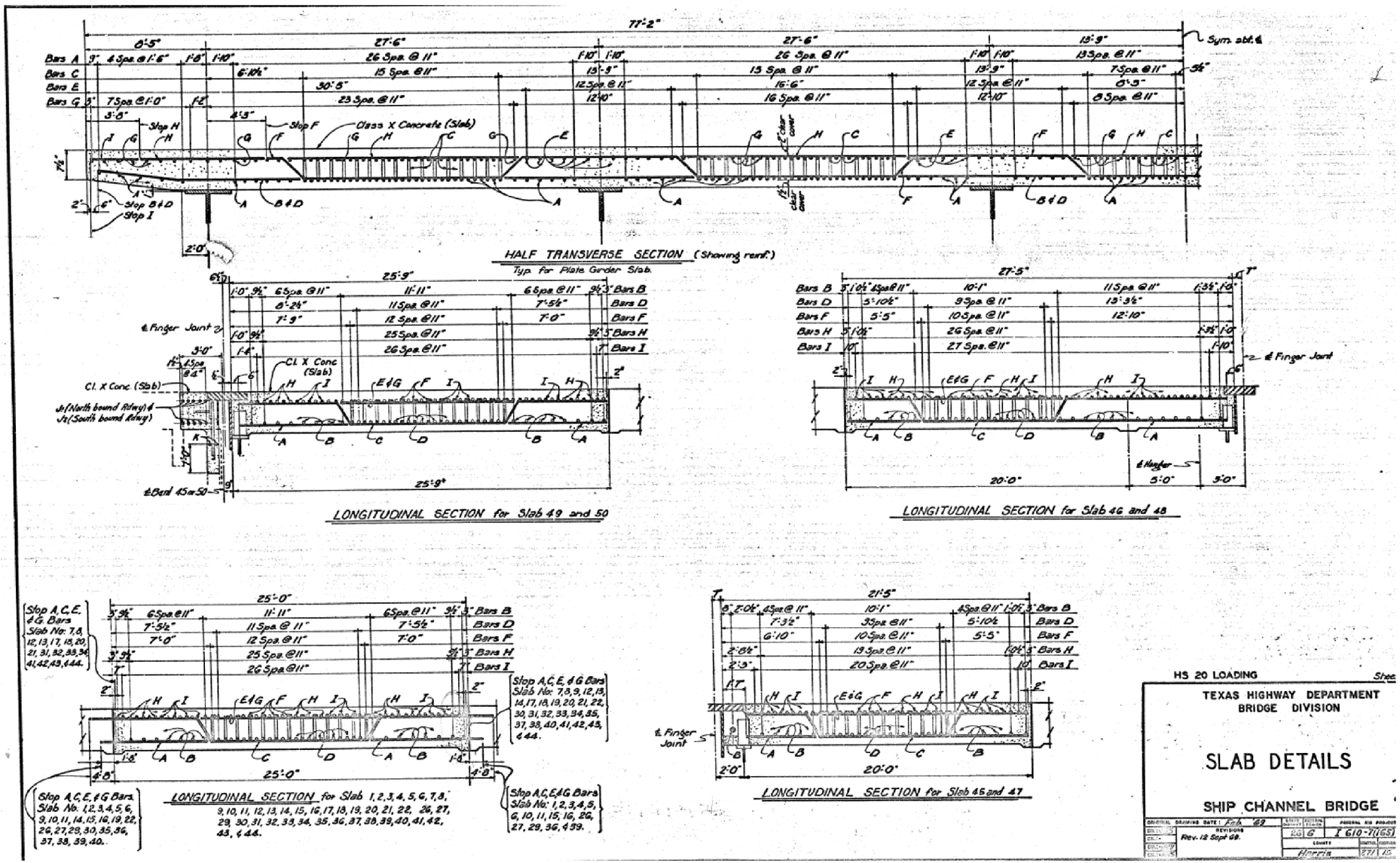
Original drawing date: Feb. '69
Revisions: Rev. 12 Sept 69; Rev. March 1972
Harris — 271 15 7

FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			257
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



HS 20 LOADING

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

SLAB DETAILS

SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE: Feb 69
REVISIONS
Rev. 12 Sept 69.

FEDERAL AID PROJECT	
6	I 610-7(165)
COUNTY	CONTROL SECTION JOB
Harris	0271 15

*****FOR CONTRACTOR'S INFORMATION ONLY*****

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 19 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			258
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

BILL OF REINFORCING STEEL & ESTIMATED QUANTITIES

TYPICAL FOR SLAB 49 or 50

Bars	No:	Size	Length	Weight
A	145	#6	25'-1"	5467
B	16	#6	155'-6"	3737
C	80	#7	25'-6"	4170
D	12	#6	155'-6"	2803
E	52	#7	25'-1"	2066
F	13	#7	135'-2"	3592
G	115	#7	25'-1"	5896
H	28	#7	150'-0"	8585
I	54	#8	15'-0"	2162
J1	10	#5	77'-3"	806
J2	10	#5	78'-8"	821
K	32	#5	6'-11"	231

Reinforcing Steel	Lb.	40,936
Class 'X' Conc. (Slab)	C.Y.	142.4
Struct Stl (Shoe & Arm. H)	Lb.	36,674
Railing (Ty C4) Mod.	L.F.	59.0
Railing (TyE)	L.F.	29.5
Conc. Surf. Treat	S.Y.	512

TYPICAL FOR SLAB 7, 8, 12, 13.
17, 18, 20, 21, 31, 32, 33, 34, 41, 42, 43, & 44.

Bars	No:	Size	Length	Weight
A	145	#6	24'-8"	5373
B	16	#6	155'-6"	3737
C	80	#7	25'-1"	4101
D	12	#6	155'-6"	2803
E	52	#7	24'-8"	2622
F	13	#7	135'-2"	3592
G	115	#7	24'-8"	5799
H	28	#7	150'-0"	8585
I	54	#8	15'-0"	2162

Reinforcing Steel	Lb.	38,774
Class 'X' Conc. (Slab)	C.Y.	125.0
Railing (Ty C4) Mod.	L.F.	50.0
Railing (Ty E)	L.F.	25.0
Conc. Surf. Treat	S.Y.	434
Str. Stl. (HYC)	Lb.	47 **

TYPICAL FOR SLAB 1, 2, 3, 4, 5, 6, 10.
11, 15, 16, 26, 27, 29, 36, & 39.

Bars	No:	Size	Length	Weight
A	145	#6	26'-4"	6170
B	16	#6	155'-6"	3737
C	80	#7	34'-9"	5682
D	12	#6	155'-6"	2803
E	52	#7	34'-4"	3649
F	13	#7	135'-2"	3592
G	115	#7	34'-4"	8070
H	28	#7	150'-0"	8685
I	54	#8	15'-0"	2162

Reinforcing Steel	Lb.	44,450
Class 'X' Conc. (Slab)	C.Y.	125.0
Railing (Ty C4) Mod.	L.F.	50.0
Railing (Ty E)	L.F.	25.0
Conc. Surf. Treat	S.Y.	434
Str. Stl. (HYC)	Lb.	47 ***

TYPICAL FOR SLAB 9, 14, 19, 22.
30, 35, 37, 38, & 40.

Bars	No:	Size	Length	Weight
A	145	#6	26'-6"	5771
B	16	#6	155'-6"	3737
C	80	#7	29'-11"	4893
D	12	#6	155'-6"	2803
E	52	#7	29'-6"	3135
F	13	#7	135'-2"	3592
G	115	#7	29'-6"	6934
H	28	#7	150'-0"	8585
I	54	#8	15'-0"	2162

Reinforcing Steel	Lb.	41,612
Class 'X' Conc. (Slab)	C.Y.	125.0
Railing (Ty C4) Mod.	L.F.	50.0
Railing (Ty E)	L.F.	25.0
Conc. Surf. Treat	S.Y.	434

TYPICAL FOR SLAB 23, 24, 25 & 28

Bars	No:	Size	Length	Weight
A	145	#6	23'-2"	5081
B	12	#6	155'-6"	2803
C	80	#7	29'-9"	4865
D	10	#6	155'-6"	2336
E	52	#7	29'-4"	3117
F	11	#7	135'-2"	3039
G	115	#7	29'-4"	6894
H	22	#7	150'-0"	6745
I	42	#8	15'-0"	1682

Reinforcing Steel	Lb.	36,562
Class 'X' Conc. (Slab)	C.Y.	100.1
Railing (Ty C4) Mod.	L.F.	40.0
Railing (Ty E)	L.F.	20.0
Conc. Surf. Treat	S.Y.	347

TYPICAL FOR SLAB 45 or 47

Bars	No:	Size	Length	Weight
A	145	#6	19'-8"	4284
B	12	#6	155'-6"	2803
C	80	#7	20'-7"	3284
D	10	#6	155'-6"	2336
E	52	#7	19'-8"	2091
F	11	#7	135'-2"	3039
G	115	#7	19'-8"	4624
H	21	#7	150'-0"	6439
I	42	#8	15'-0"	1682

Reinforcing Steel	Lb.	30,582
Class 'X' Conc. (Slab)	C.Y.	107.2
Railing (Ty C4) Mod.	L.F.	44.0
Railing (Ty E)	L.F.	22.0
Conc. Surf. Treat	S.Y.	382
Struct Stl (Shoe & Arm. H)	Lb.	26,872

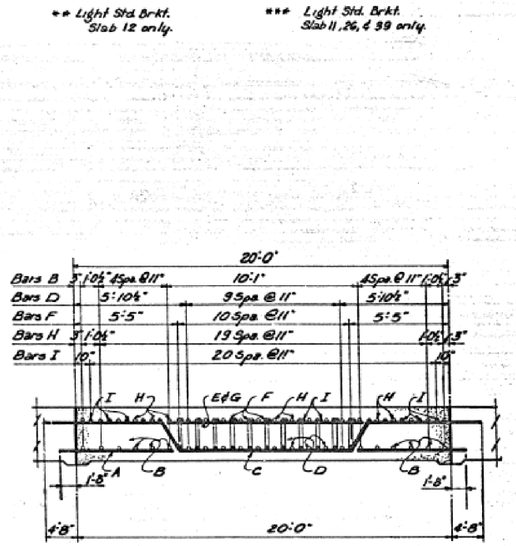
TYPICAL FOR SLAB 46

Bars	No:	Size	Length	W
A	145	#6	26'-9"	
B	19	#6	155'-6"	
C	80	#7	27'-2"	
D	10	#6	155'-6"	
E	52	#7	26'-9"	
F	11	#7	135'-2"	
G	115	#7	26'-9"	
H	29	#7	150'-0"	
I	56	#8	15'-0"	

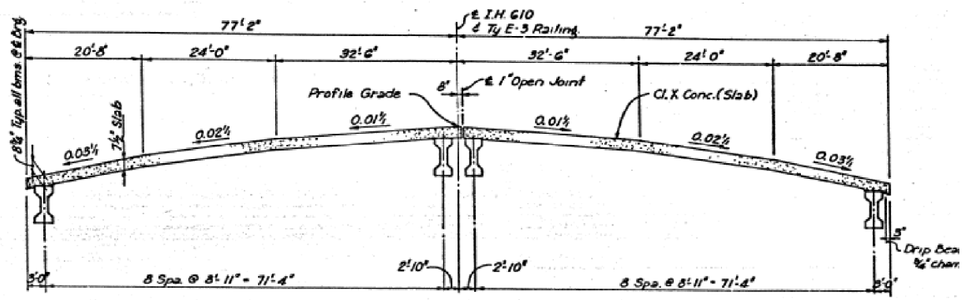
Reinforcing Steel	Lb.	4
Class 'X' Conc. (Slab)	C.Y.	
Railing (Ty C4) Mod.	L.F.	
Railing (Ty E)	L.F.	
Conc. Surf. Treat	S.Y.	
Struct Stl (Shoe & Arm. H)	Lb.	

** Light Std. Brkt. Slab 12 only.

*** Light Std. Brkt. Slab 11, 26, & 39 only.

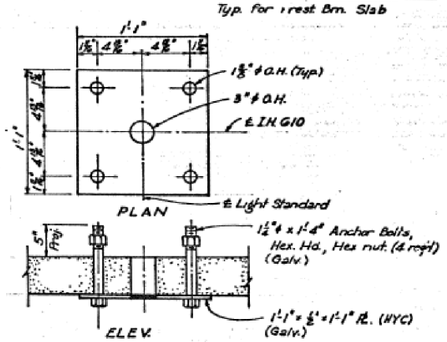


LONGITUDINAL SECTION for Slab 23, 24, 25, & 28



TRANSVERSE SECTION

Typ. for Prest Brn. Slab



LIGHT STANDARD BRACKET

Est. weight = 47 lb. per brkt. Include with Str. Stl. (HYC)

HS 20 LOADING

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

SLAB DETAILS

SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE: Feb '69	STATE DISTRICT	FEDERAL ROAD DESIGN	FEDERAL AID PROJECT
REVISIONS	20	6	I 610-7(165)75
Rev. 12 Sept 69. Rev. 30 Sept. 69	COUNTY		SHEET NO. / SHEETS
	Harris		271 / 75

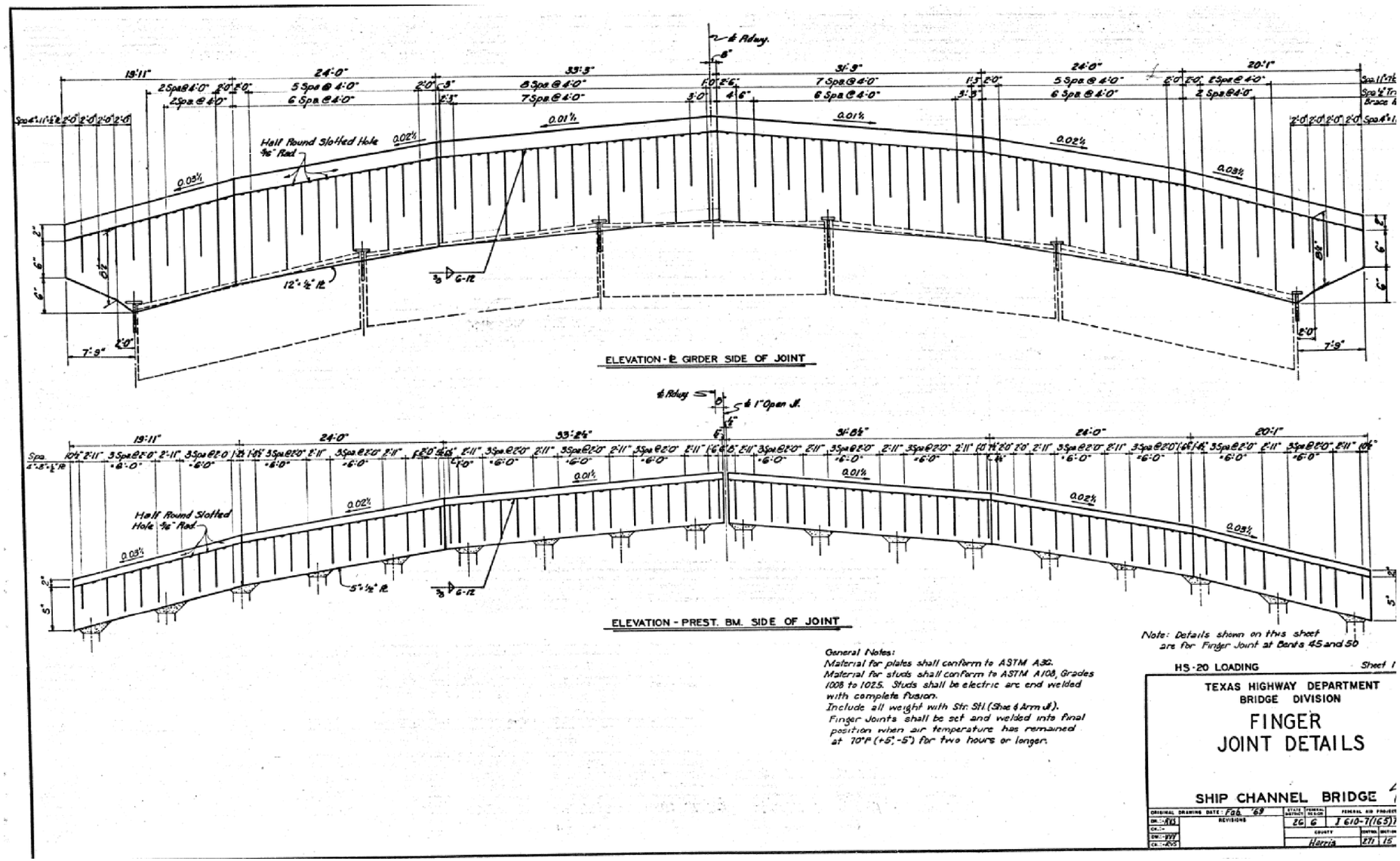
FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 20 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			259
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



General Notes:
Material for plates shall conform to ASTM A36.
Material for studs shall conform to ASTM A108, Grades 1008 to 1025. Studs shall be electric arc end welded with complete fusion.
Include all weight with Stir Stl (Shoe & Arm Jt).
Finger Joints shall be set and welded into final position when air temperature has remained at 70°F (+5°-5°) for two hours or longer.

Note: Details shown on this sheet are for Finger Joint at Bents 45 and 50

HS-20 LOADING — Sheet 1

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

FINGER JOINT DETAILS

SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE: Feb. '69	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT
REVISIONS	26	6	I 610-7(165)1
	COUNTY		CONTROL	SECTION
	Harris		271	15

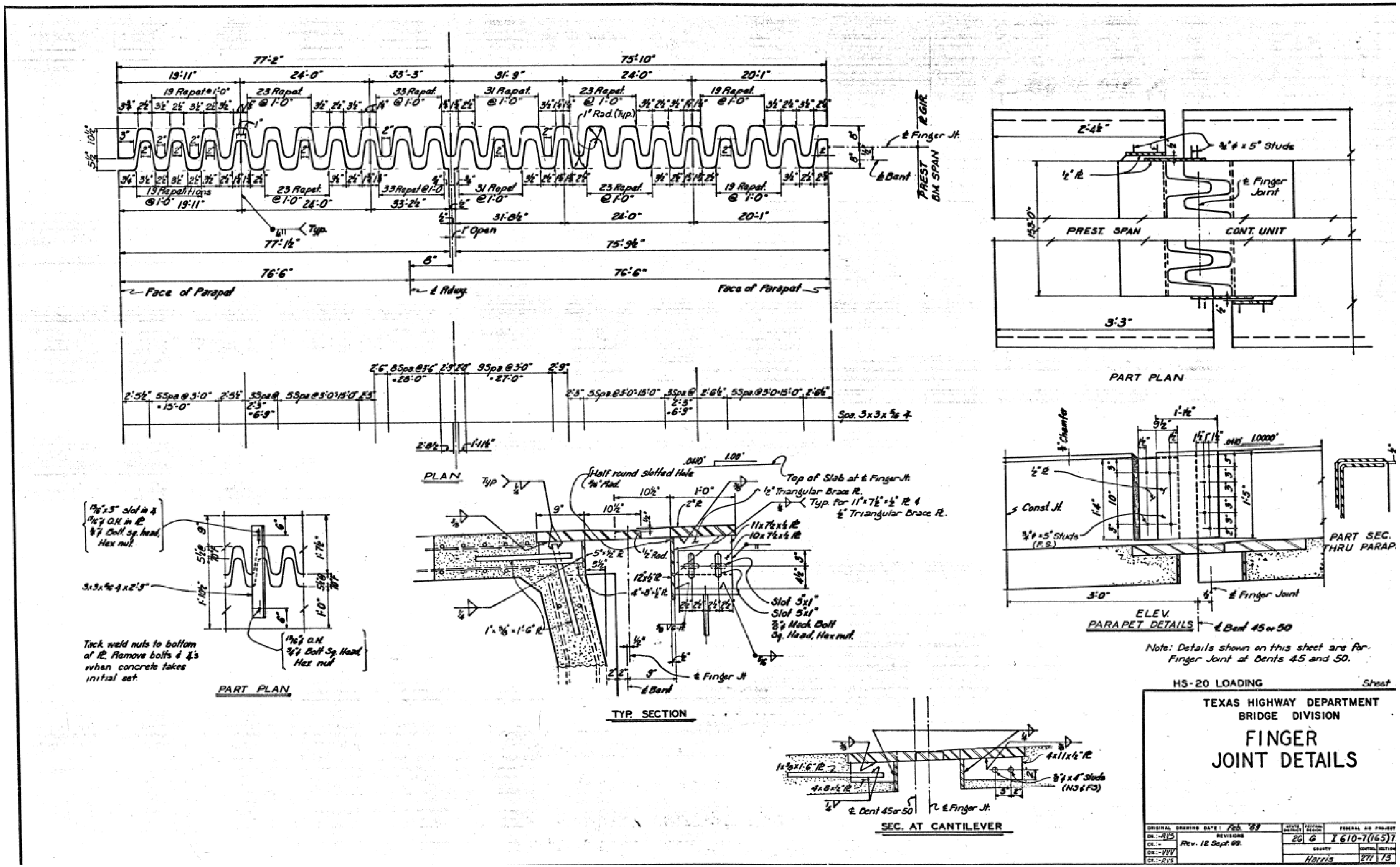
FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 21 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			260
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

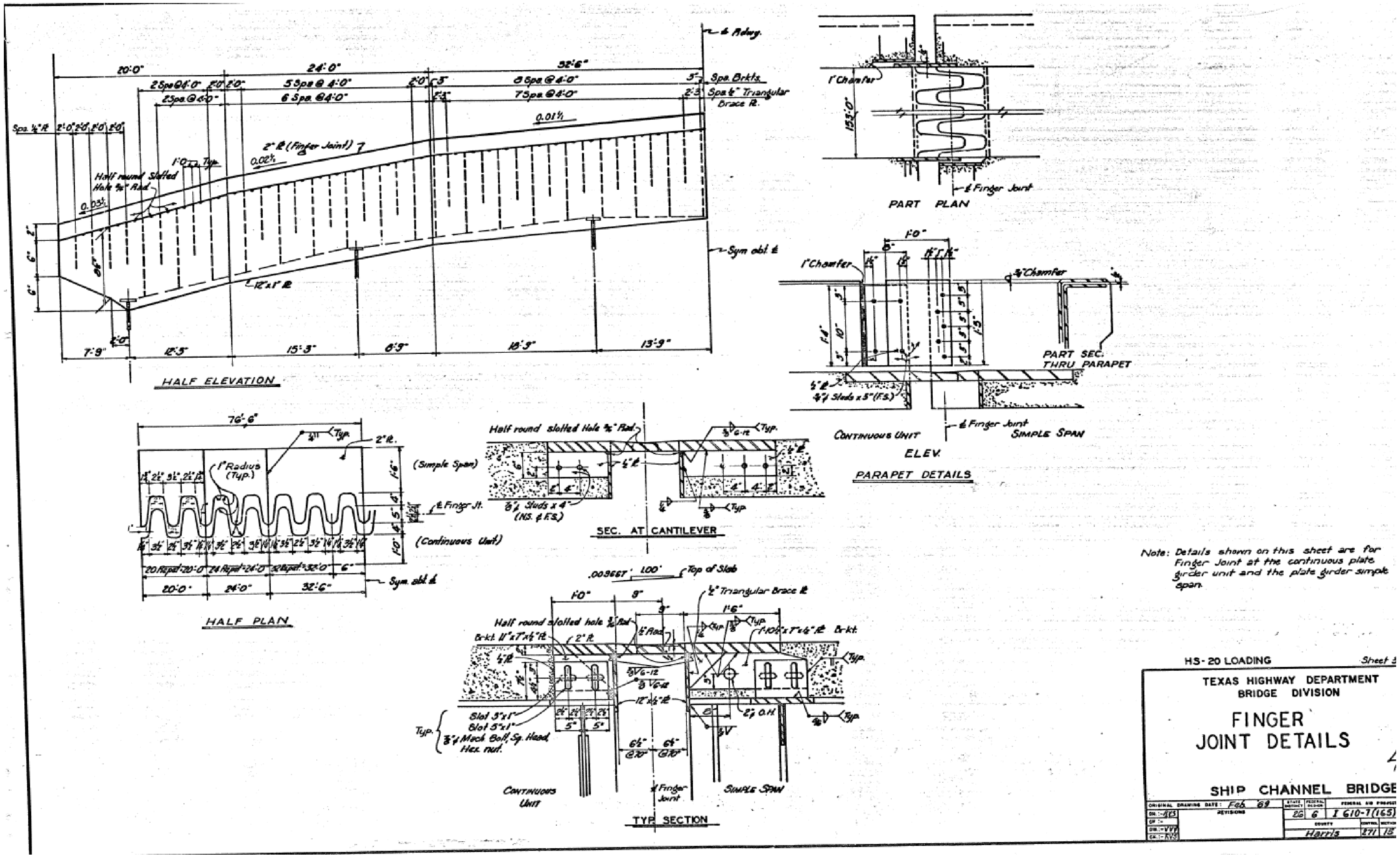
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 22 OF 44

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		261

STATE	DIST	COUNTY
TEXAS	HOU	HARRIS

CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation
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IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 23 OF 44

FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
6				262
STATE	DIST	COUNTY		
TEXAS	HOU	HARRIS		
CONT	SECT	JOB	HIGHWAY	
0271	15	097	IH 610	

DATE: 3/10/2021
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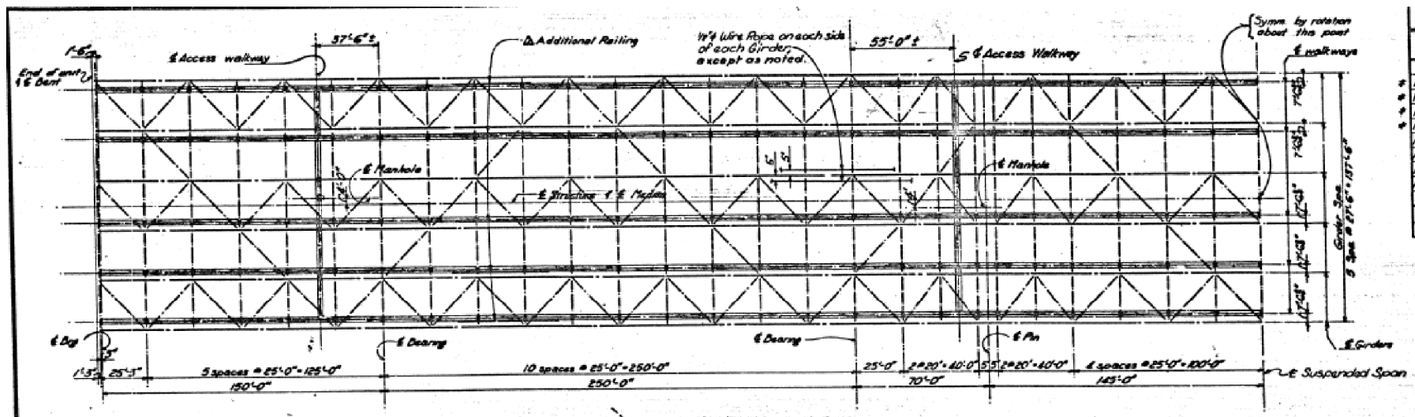


HALF PLAN WALKWAYS

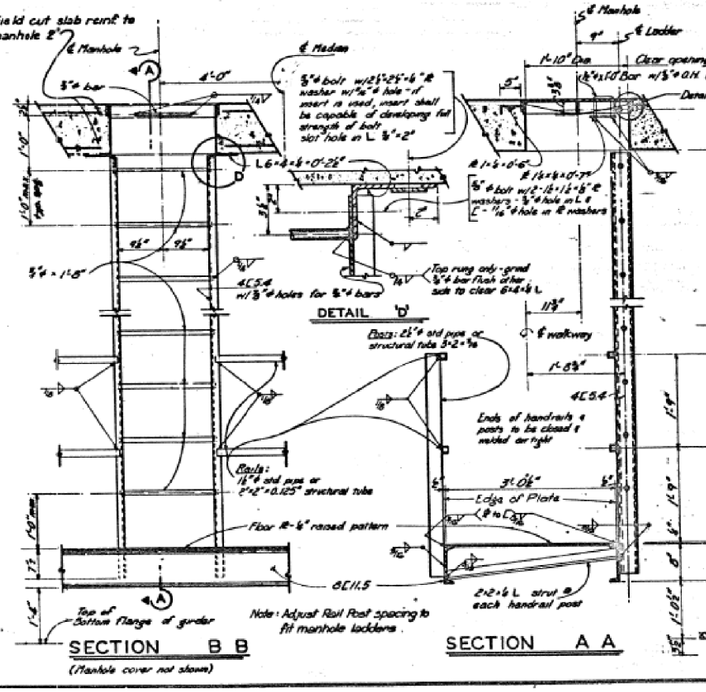
TABLE OF ESTIMATED QUANTITIES

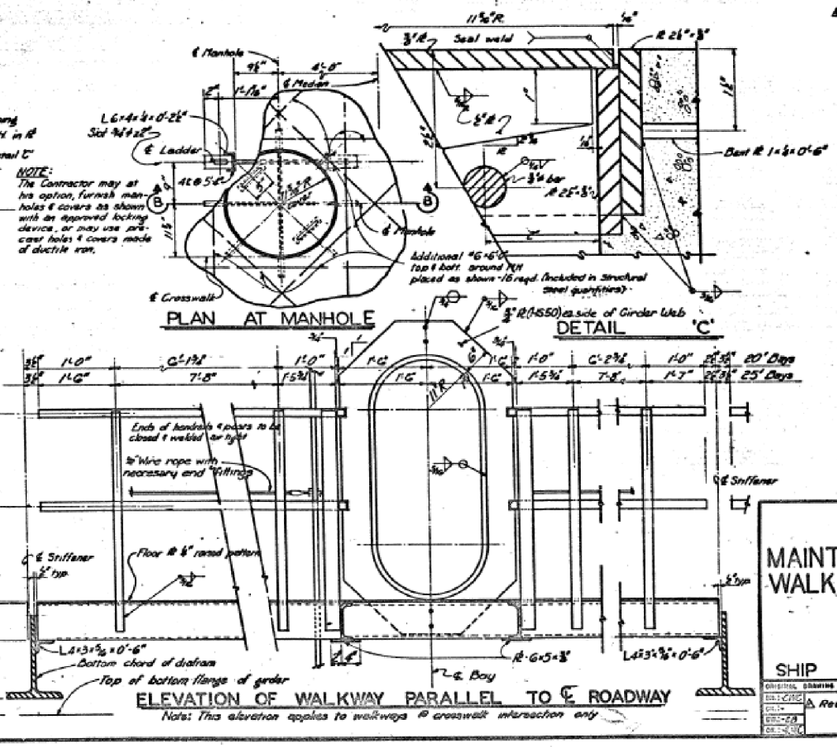
	℄ Rail Tube	Rail ℄ Pipe	HYC Walkway	HYC ℄ Lad.	Wire Rope
	Lb.	Lb.	Lb.	Lb.	L.F.
1-25'-3" Bay (10 Req'd)	242	229	1489	–	50.5
1-25'-0" Bay (190 Req'd)	240	227	1475	–	50.0
1-20'-0" Bay (30 Req'd)	187	177	1179	–	40.0
1-10'-0" Bay (10 Req'd)	147	145	577	–	4.0
1-25'-0" Bay w/crosswalk (8 Req'd)	711	680	3000	–	42.0
1-20'-0" Bay w/crosswalk (6 Req'd)	657	630	2730	–	32.0
1-25'-0 Bay w/manhole (2 Req'd)	678	647	3000	390	42.0
1-20'-0 Bay w/manhole (2 Req'd)	624	600	2730	450	32.0
			HYC		Wire Rope
Total			458,752		11,985

*For Contractor's information only.
Payment will be based on Pipe Rail quantities.
Wire rope to be ⅜" dia. 6 x 42 Galvanized iron filler rope or approved equal.
No direct payment will be made for th wire rope. 3356 Lbs. have been added Structural Steel 'HYC' for pay purp

△℄ Approx. quantity for additional railing.
Final quantity for payment shall be 4,067.0 L.F. – Item 442 Spl., Str. Stl (HYC) (Mana Safety chains with clasps are considered inciden to the item.

Note: Field cut slab reinf. to clear manhole 8"





TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION
MAINTENANCE & INSPECTIO
WALKWAY DETAILS
SHEET 1 OF 2
SHIP CHANNEL BRIDGE 4

ORIGINAL DRAWING DATE: 10-68		FEDERAL AID PROJECT
REVISIONS	DISTRICT	
△ Rev. Sept. 29, 1972	25 G	T 610-7(16)179
	COUNTY	SHEET NO.
	Harris	271 15

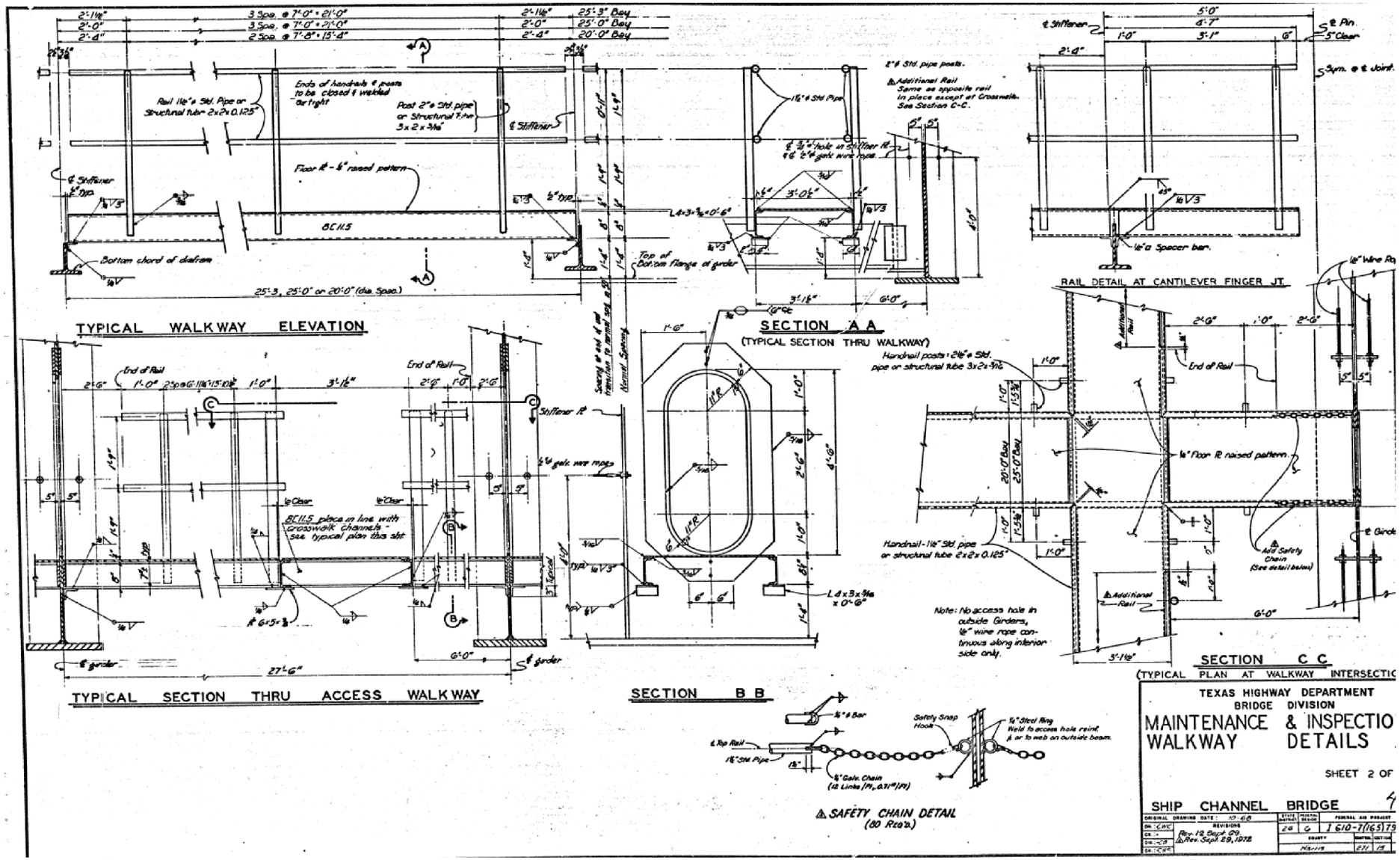
FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 24 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			263
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

MAINTENANCE & INSPECTIO
WALKWAY DETAILS

SHEET 2 OF

SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE: 10-68	REVISIONS	STATE DISTRICT	FEDERAL AID PROJECT
DR: CWC	Rev. 12 Sept. 69. Rev. Sept. 29, 1972	66	I 610-7(165)79
CK: -		COUNTY	CONTROL SECTION
SHK: CB		Harris	271 19
QA: CWC			

FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 25 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			264
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 3/10/2021
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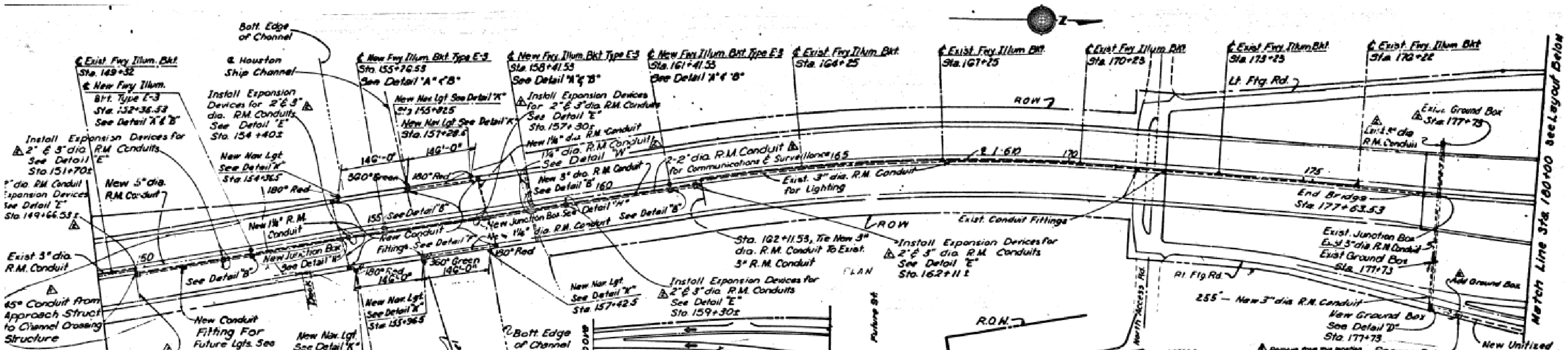

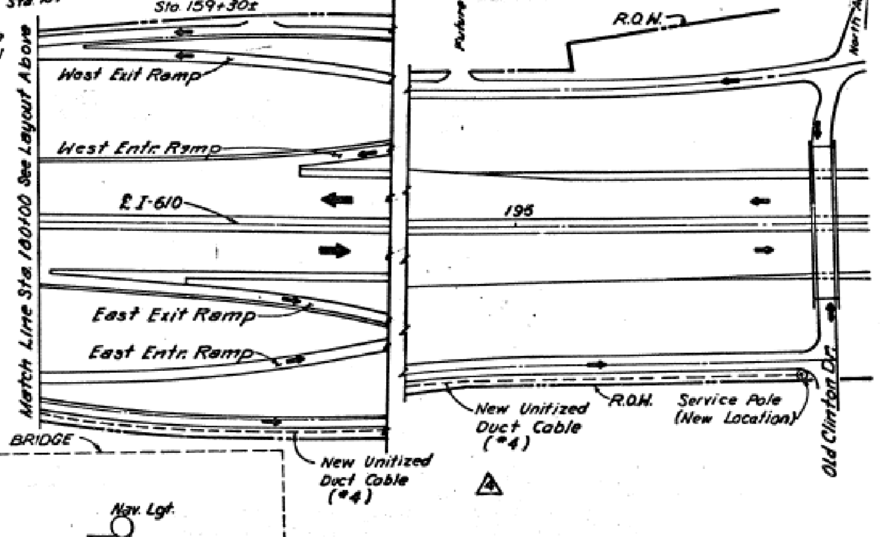

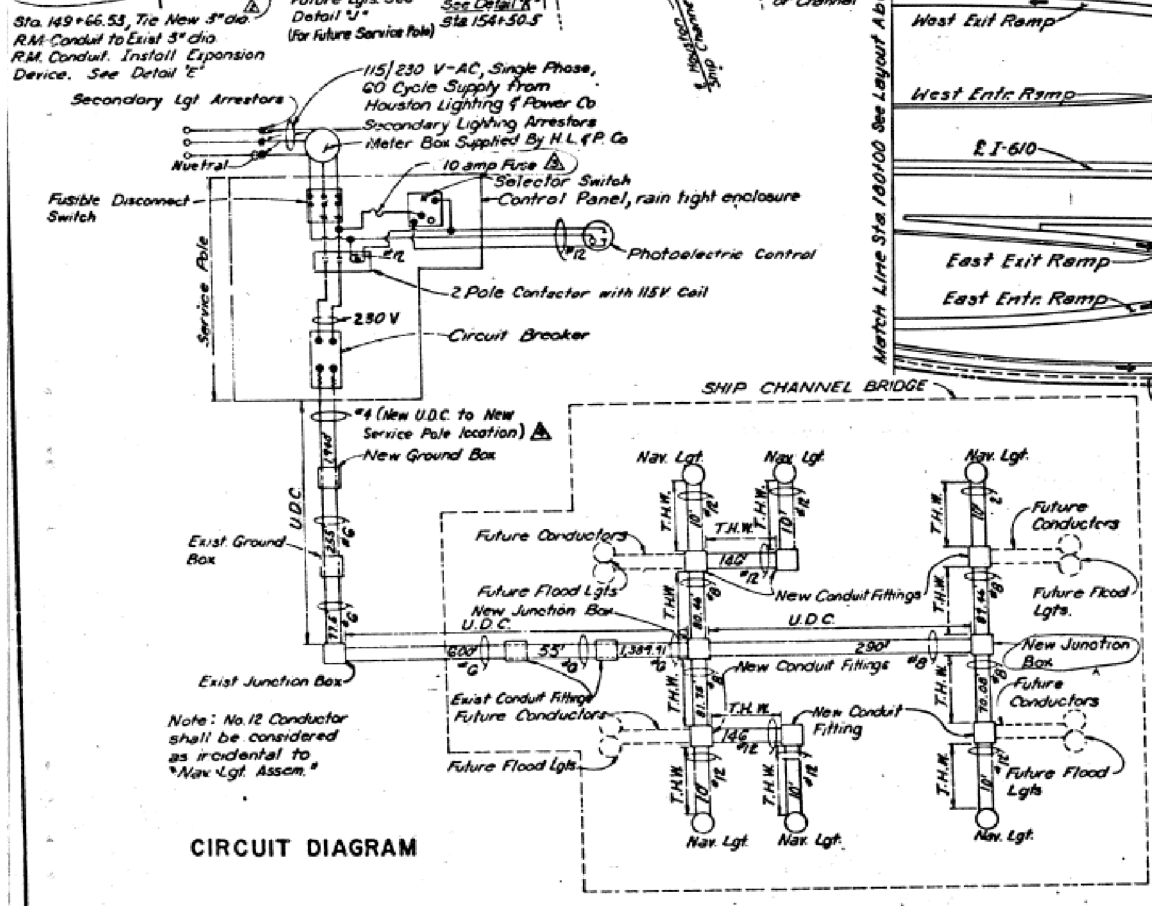

CIRCUIT DIAGRAM

NOTES:

△ Remove from this location and replace at "New Location" near Old Clinton Drive.

EACH GREEN NAVIGATION LIGHT SHALL EACH SHOW THROUGH A HORIZONTAL ARC OF 360°. THEY SHALL BE SECURELY MOUNTED JUST BELOW THE OUTERMOST EDGE OF THE BRIDGE STRUCTURE, AS SHOWN IN THE DETAILS, SO AS TO BE VISIBLE FROM AN APPROACHING VESSEL. GREEN NAVIGATION LIGHTS SHALL BE PERKO #1011, OR WALLACE & TIERNAN 200MM TYPE 231-1010, OR EQUAL, CAST BRONZE, EMERY FINISHED, WATERTIGHT, WITH MEDIUM SCREW SOCKET.

EACH RED NAVIGATION LIGHT SHALL SHOW THROUGH A HORIZONTAL ARC OF 180° AND SHALL BE SECURELY MOUNTED JUST BELOW THE OUTERMOST EDGE OF THE BRIDGE STRUCTURE, AS SHOWN IN THE DETAILS, TO SHOW 90° ON EITHER SIDE OF A LINE PARALLEL TO THE AXIS OF THE CHANNEL SO AS TO BE VISIBLE FROM AN APPROACHING VESSEL. RED NAVIGATION LIGHTS SHALL BE PERKO #1010, OR WALLACE & TIERNAN 200MM TYPE 231-1011, OR EQUAL, CAST BRONZE, EMERY FINISHED, WATERTIGHT, WITH MEDIUM SCREW SOCKET.

NAVIGATION LIGHTS SHALL BE FURNISHED WITH DOUBLE SOCKETS. DOUBLE SOCKETS TO BE FURNISHED WITH RELAYS. RELAYS SHALL BE ADVANCE, NO. PG2C, OR EQUAL 12VA WITH 15 AMP CONTACTS.

△

ALL PARTS OF THE NAVIGATION LIGHT MOUNTING ASSEMBLY INCLUDING NUTS, BOLTS, FLANGES, ETC. SHALL BE GALVANIZED AFTER FABRICATION EXCEPT AS OTHERWISE NOTED.

PAD LOCKS SHALL BE CORBIN NO. 909, BRASS, OR SARGENT NO. 735HS OR EQUAL. ALL PADLOCKS SHALL BE KEYED ALIKE.

ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE, NEMA STANDARDS AND APPLICABLE LOCAL ORDINANCES.

ELECTRICAL SYSTEM SHALL BE GROUNDED AND BONDING JUMPERS SHALL BE INSTALLED AT ALL EXPANSION JOINTS. GROUNDING SHALL BE CONSIDERED AS INCIDENTAL.

NAVIGATION LIGHT SUPPORT BRACKETS SHALL BE CONSIDERED AS A PART OF "NAVIGATION LIGHT ASSEMBLY".

FREEWAY ILLUMINATION CONDUIT SYSTEM AS SHOWN IS TO BE FURNISHED ON THIS PROJECT. FREEWAY ILLUMINATION STANDARDS, LUMINAIRES, CONDUCTORS, COMMUNICATIONS △ & SURVEILLANCE SYSTEMS, ETC. TO BE FURNISHED ON A FUTURE CONTRACT.

THE COST OF THE JUNCTION BOXES, CONDULETS, HUB, AND ALL MISCELLANEOUS ITEMS FOR A COMPLETE CONDUIT SYSTEM SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONDT (RIGID METAL)(3 IN).

CONDUIT FITTINGS SHALL BE CROUSE-HINDS SERIES 8 CONDULETS, OR APPLETON FORM 35 UNILETS.

△ FUSE SHALL BE OPEN TYPE, ATTACHED TO BACK OF PANEL FOR ACCESS AND MAINTENANCE

ESTIMATED QUANTITIES			AS BUILT
ITEM	UNIT	QUANTITY	QUANTITY
Duct Cable (1 in) (8-2 Insul)	L.F.	290	290.00
* Duct Cable (1 in) (6-2 Insul)	L.F.	2400	2,377.41
Duct Cable (1¼ in) (4-2 Insul)	L.F.	2,065	△ 1,940.00
Elec Condr (No 8 AWG Insul) THW	L.F.	640	643.50
Condt (Rigid Metal) (1¼ in)	L.F.	845	△ 959.64
Condt (Rigid Metal) (3in)	L.F.	1360	1,504.50
Condt (Rigid Metal) (2in)	L.F.	2570	△ 2,570.60
Ground Box	Ea.	1	△ 1
Service Pole	Ea.	1	1
Nav Lgt Assem	Ea.	6	6
2" Cond. Surveillance			1,287.30
2" Cond. Communications			1,285.30

* Contractor placed 1¼" Duct Cable at his convenience paid for as 1".

△ Rev. Sept. 72
△ Rev. Apr. 72

TEXAS HIGHWAY DEPARTMENT
HOUSTON URBAN PROJECT
EAST LOOP FREEWAY

COMMUNICATION, FWY. ILLUM. & NAV. LGTS. CONDUIT LAYOUT & WIRING DIAGRAM 481

SHIP CHANNEL BRIDGE

ORIGINAL July 1969 · Rev. 12 Sept. 69 · Rev. 30 Sept. 69 · Rev. Oct. 70 · TEXAS · I-610-7(165)797 · 12 · Harris · 271 · 15 · 7

FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation
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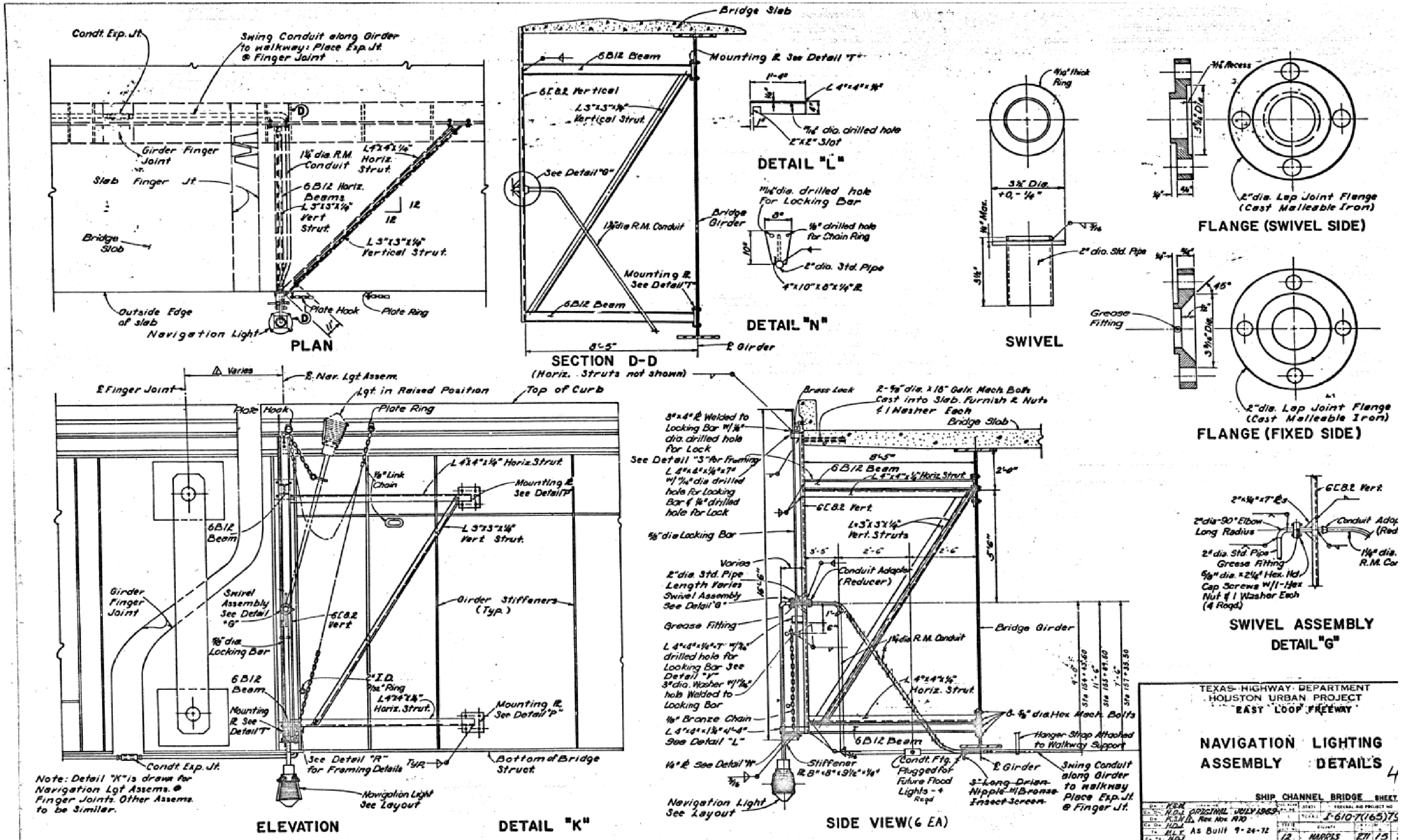
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 26 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			265
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 3/10/2021



Texas Department of Transportation

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IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 27 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			266
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

FOR CONTRACTOR'S INFORMATION ONLY

DATE: 3/10/2021
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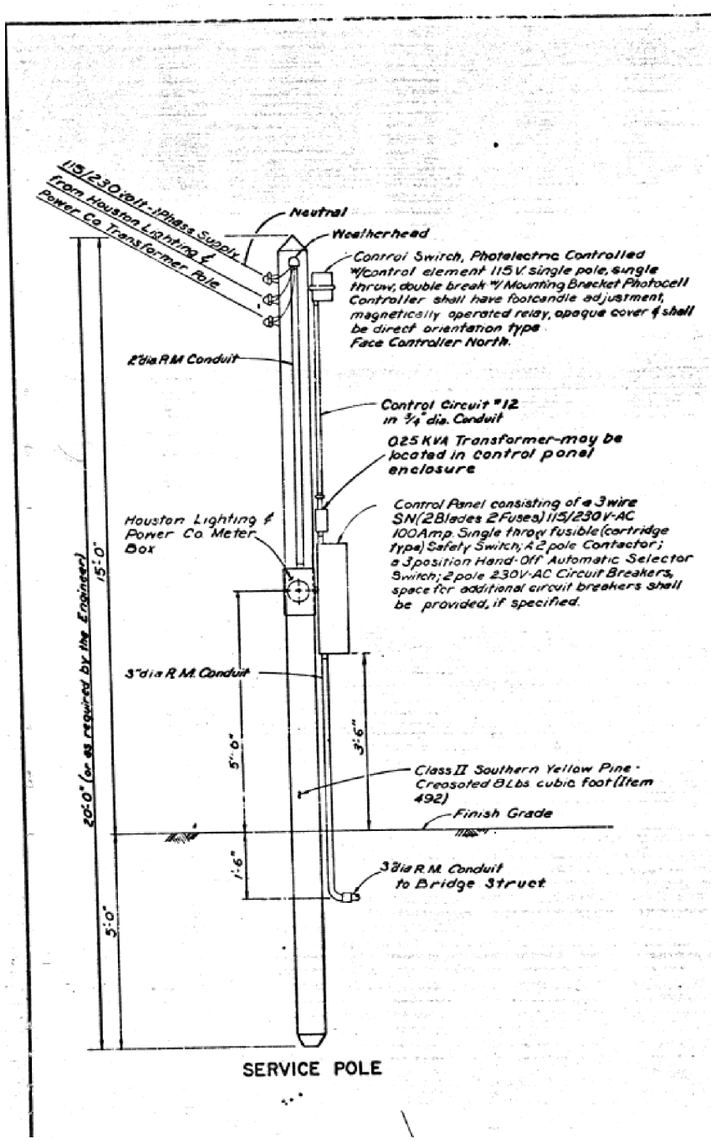


SERVICE POLE

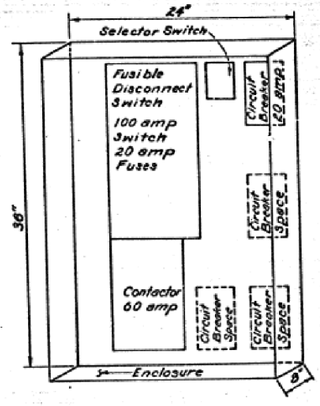
Notes:

Each part of the Service Pole shall be firmly attached to the pole.

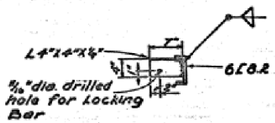
Provide a hasp & lock on the Control Panel Enclosure. Contractor shall provide the Engineer with three copies of the key.

Size of Control Panel Enclosure & arrangement of components subject to revision to suit components that are furnished.

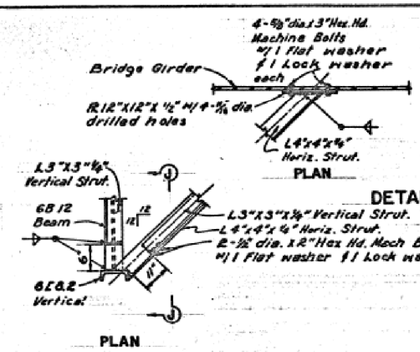
Control Panel Enclosure shall be 14 ga. galvanized sheet metal & shall be NEMA 12. Enclosure shall have one door vertically hinged to body with a continuous hinge, and gasketed with cellular neoprene. Enclosure shall be galvanized after manufacture.

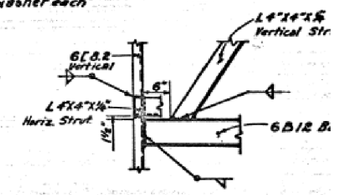


CONTROL PANEL



DETAIL "V"





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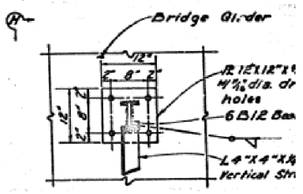

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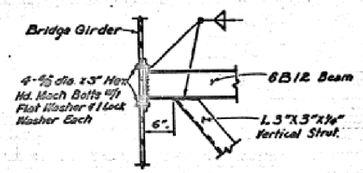


SECTION H-H

TEXAS HIGHWAY DEPARTMENT
HOUSTON URBAN PROJECT
EAST LOOP FREEWAY

SERVICE POLE & NAVIGATION L

MISC. BRACKET DETAIL

	ORIGINAL	JULY 1969	6	TEXAS	F-610-7(165)7
			STATE DIST. NO. 12	COUNTY HARRIS	SHEET 8 of 271

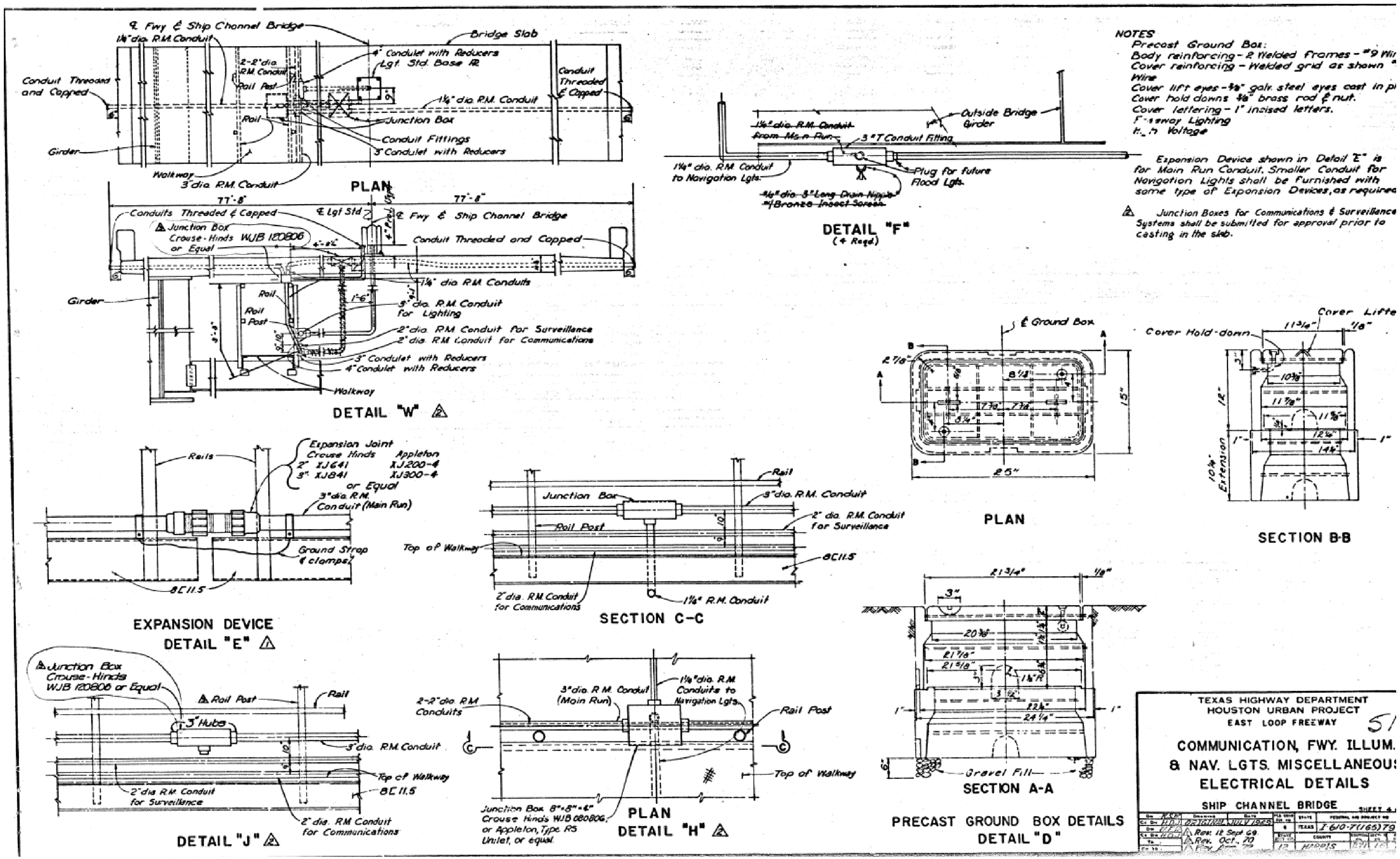
FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 28 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			267
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



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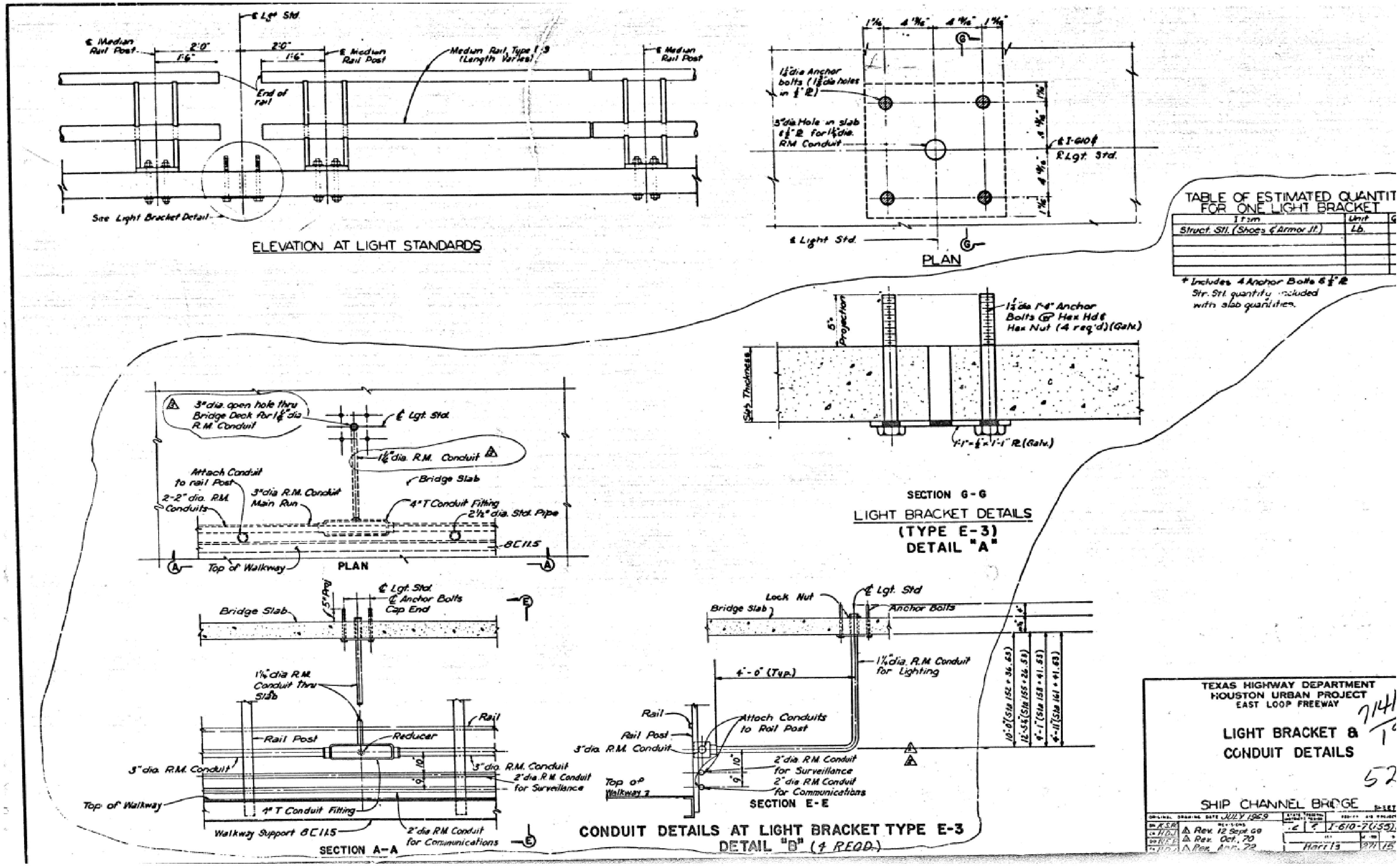
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 29 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			268
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



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IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 30 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			269
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

TABLE OF ESTIMATED QUANTITIES

Description	Uncl. Str. Excav	Cem. Stab. BkPl.	Drilled Shafts 54"φ	18"φ	30"φ	36"φ	42"φ	48"φ	Bell Footings	Class C Concrete Abut.	Bents	Slabs	Prestressed Conc. Beams Type C	Size 54	Size 72	Riprap Class A Conc.	Reinf. Steel	Structural Steel Shoe & Arm. Jt	Girder HYC	Girder LA	Railing Type E3	Type C4	Conc. Surface Treatment
	C.Y.	C.Y.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	C.Y.	C.Y.	C.Y.	C.Y.	L.F.	L.F.	L.F.	C.Y.	Lb.	Lb.	Lb.	Lb.	L.F.	L.F.	S.Y.
Abutment No. 1	202	167		83	1062				15	96.1						177	12,773	1,261					7
Interior Bents	1945					6730	7646	11,728	2375		11,501.6						1,802,001	68,457					
3-Floor Beam Bents			129					386	63		121.8						21,765		65,220	77,557			
Prestr. Conc. Bm. Spans												14,793.5	40,656.85	14,590.11	17,341.40		3,374,410	110,087			350758	7006.95	63,705
12 Lighting Brackets																	324	540					
Totals	2147	167	129	83	1062	6730	7646	12,114	2453	96.1	11,623.4	14,793.5	40,656.85	14,590.11	17,341.40	177	5,317,279	180,345	65,220	77,557	350758	7006.95	63,705

TABLE OF BENT VARIABLES (ABUT. 1 THRU BENT 16)

Item	Abut. #1 L&R Abut.	Abut. #1 L&R Wing	2L	2R	3L	3R	4L	4R	5L	5R	6L	6R	7L	7R	8L	8R	9L	9R	10L	10R	11L	11R	12L	12R	13L	13R	14L	14R	15L	15R	16L	16R
Dia. of Drilled Shaft	2'-6"	1'-6"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0	3'-0"	3'-0	3'-6"	3'-6	3'-6"	3'-6"	4'-0"	4'-0"	3'-6"	3'-6"
X=Length of Dr. Sh.	81'-5"	41'-5"	58'-9"	58'-2"	59'	58'	58'-9"	57'	59'	58'-3"	59'-6"	59'-1"	59'-6"	58'-6"	59'-3"	59'-6"	59'-6"	59'-6"	59'-6"	59'-6"	59'-6"	59'-6"	60'	59'-6"	63'	63'	63'-6"	63'-6"	66'-6"	65'-9"	63'	63'
Dia. of Bell Footing	5'-6"		8'-0"	7'-6"	8'-0"	7'-6"	7'-6"	7'-6"	8'-0"	8'-0"	9'-0"	8'-6"	8'-6"	8'-6"	8'-6"	8'-6"	8'-6"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	9'-0"	9'-0"	10'-[illegible]	10'-6"	11'-0"	11'-0"	9'-6"	9'-6"
Footing Pressure (T/□')	2.14		2.67	2.94	2.61	2.94	2.91	2.96	2.71	2.84	2.69	2.74	2.92	2.71	2.83	2.68	2.71	2.97	2.99	2.93	2.95	2.93	2.95	2.93	2.85	2.77	2.81	2.85	2.82	2.91	2.77	2.95
Number of Columns	1L-6R	2	6	5	6	5	6	5	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4

TABLE OF BENT VARIABLES (BENT 17 THRU BENT 32)

Item	17L	17R	18L	18R	19L	19R	20L	20R	21L	21R	22L	22R	23L	23R	24L	24R	25L	25R	26L	26R	27L	27R	28L	28R	29L	29R	30L	30R	31L	31R	32L	32R
Dia. of Drilled Shaft	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	4'-6"	4'-0"	3'-6'	4'-0"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	4'-0"	4'-0"
X= Length of Dr. Sh.	63'-6"	63'-6"	64'-6"	63'-6"	64'-6"	64'	64'-6"	64'-6"	63'-6"	64'-6"	64'-3"	64'-3"	63'-6"	65	59	59'-6"	58'-6"	60'-6"	58'-6"	59'	59'	60'-6"	60'-6"	60'-6"	59'-6"	59'-6"	60'-6"	60'-6"	60'-6"	60'-6"	61'-2"	61'-2"
Dia. of Bell Footing	8'-6"	9'-0"	8'-6"	8'-6"	8'-6"	8'-6"	8'-6"	8'-6"	8'-3"	11'-3"	9'-3"	8'-3"	9'-3"	8'-3"	8'-3"	8'-3"	8'-3"	8'-3"	8'-3"	8'-3"	8'-3"	9'-0"	8'-3"	8'-0"	8'-3"	8'-0"	8'-3"	8'-0"	8'-3"	8'-0"	10'-3"	10'-3"
Footing Pressure (T/□')	2.83	2.82	2.93	2.97	2.98	2.86	2.99	3.08	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Number of Columns	4	4	4	4	4	4	4	4	4	2	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

TABLE OF BENT VARIABLES (BENT 33 THRU BENT 45)

Item	33 Exterior Column	33 Interior Column	34 Exterior Column	34 Interior Column	35 Exterior Column	35 Interior Column	36 Exterior Column	36 Interior Column	37 Exterior Column	37 Interior Column	38 Exterior Column	38 Interior Column	39 Exterior Column	39 Interior Column	40 Exterior Column	40 Interior Column	41 Exterior Column	41 Interior Column	42 Exterior Column	42 Interior Column	43 Exterior Column	43 Interior Column	44 Exterior Col. 1&5	44 Interior Col. 2	44 Int. Cols 3&4
Type of Footing	A	A	A	A	A	A	A	A	A	A	A	B	C	C	C	C	C	C	C	C	C	C	B	B	C
X=Length of Dr. Sh.	56'-9"	56'-9"	56'-9"	56'-9"	56'-10"	56'-10"	56'-4"	*~~56'-4"~~	55'-10"	55'-10"	54'-9"	54'-9"	58'-0"	57'-9"	74'-6"	75'-0"	74'-6"	73'-6"	72'-0"	72'-0"	68'-5"	68'-5"	66'-5"	64'-11"	65'-5"
Dia. of Bell Footing	11'-3"	9'-9"	8'-3"	9'-9"	8'-9"	10'-9"	9'-0"	10'-9"	9'-0"	10'-9"	10'-6"	10'-0"	8'-9"	10'-3"	8'-9"	10'-3"	8'-9"	10'-3"	8'-9"	10'-3"	8'-9"	10'-3"	10'-3"	10'-3"	10'-3"
Footing Pressure (T/□')	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Number of Columns	2	3	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2

* 55'-9"

Item	Bent Number 45 Exterior Column	Bent Number 45 Interior Column
Type of Footing	C	C
X=Length of Dr. Sh.	~~63'-875~~ 64.883	~~63'-475~~ 64.122
Dia. of Bell Footing	9'-0"	10'-0"
Footing Pressure T/□'	3.50	3.50
Number of Columns	2	2

See Sheet 129 for adjustment in footing elevations.

Note: Dia. of Bell Footing and Footing Pressure Changed for Bents 21 thru 45.

Rev. Jan. 20, 1970

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

LAYOUT

SOUTH APPROACH TO
SHIP CHANNEL BRIDGE

STRUCTURE NO 377 SHEET 8 OF 8 SHEETS
DEC 1967
I-610-7(163)797 68
DHU
12 HARRIS 271 15 5 IH 610

FOR CONTRACTOR'S INFORMATION ONLY

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		270

STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

TABLE OF ESTIMATED QUANTITIES — NORTH APPROACH

Description	Uncl. Str. Excav.	Cem. Slab Bkfl.	Drilled Shafts							Bell Figs.	Class "C" Concrete			Prestr. Conc. Bms.			Riprap Cl. "A" Conc	Reinf. Steel	Structural Steel		Railing		Conc. Surf. Trtmt			
			18"	30"	36"	42"	48"				Abut.	Bents	Slabs	Type C	Size 54"	Size 72"			Shoes & Arm. Jt		Type T3	Type C4				
	C.Y.	C.Y.	L.F.	L.F.	L.F.	L.F.	L.F.			C.Y.	C.Y.	C.Y.	C.Y.	L.F.	L.F.	L.F.	C.Y.	Lb.	Lb		L.F.	L.F.	S.Y.			
Abutment No. 66	186	127	118	781			10,847			22.8	86.1						230	16,212	1,340							
Interior Bents	2,641									1,606.7		9,597.8						1,482,102	66,767							
Prestr. Conc. Brm. Spans													6,581.2		15,478.53	14,393.45		1,398,687	23,148		1,549.45	3,113.5	27,539			
Lighting Brackets																		136	225							
Totals	2,827	127	118	781			10,847			1,629.5	86.1	9,597.8	6,581.2		15,478.53	14,393.45	230	2,877,138	91,480		1,549.45	3,113.5	27,539			

TABLE OF BENT VARIABLES (BENT 50 THRU BENT 61)

Item	BENT NUMBER																									
	50		51		52		53		54		55		56		57		58		59		60		61			
	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column		
Type of Footing	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	B	A	B	A	B	A	B		
X=Length of Dr. Shaft	51'-2"	51'-2"	51'-2"	51'-2"	60'-4"	60'-4"	59'-4"	59'-4"	55'-3"	55'-8"	55'-3"	55'-3"	45'-8"	45'-8"	43'-1"	43'-1"	44'-7"	44'-7"	44'-7"	44'-7"	44'-7"	44'-7"	45'-7"	45'-7"		
Diameter of Bell Ftg.	9'-6"ϕ	11'-0"ϕ	9'-6"ϕ	11'-0"ϕ	9'-6"ϕ	11'-0"ϕ	9'-6"ϕ	11'-0"ϕ	9'-6"ϕ	11'-0"ϕ	9'-6"ϕ	11'-0"ϕ	9'-0"ϕ	11'-0"ϕ	8'-6"ϕ	10'-0"ϕ	9'-6"ϕ	11'-0"ϕ	11'-0"ϕ	10'-0"ϕ	11'-0"ϕ	10'-0"ϕ	11'-0"ϕ	10'-0"ϕ		
Footing Pressure (T/ft²)	2.8	2.7	2.7	2.7	2.9	3.0	2.9	3.0	2.9	3.0	2.9	3.0	2.5	2.5	2.6	2.8	2.9	2.7	2.9	3.0	2.9	3.0	2.8	2.9		
Number of Columns	2	3	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		

TABLE OF BENT VARIABLES (BENT 62 THRU BENT 66)

Item	BENT NUMBER									
	62		63		64		65		Abutment 66	
	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Abut.	Wing
Type of Footing	A	B	A	B	A	B	A	B	——	——
X=Length of Dr. Shaft	45'-7"	45'-7"	45'-7"	45'-7"	45'-7"	45'-7"	45'-7"	45'-7"	71'-0"	59'-0"
Diameter of Bell Ftg.	11'-0"ϕ	10'-0"ϕ	11'-0"ϕ	10'-0"ϕ	11'-0"ϕ	10'-0"ϕ	10'-6"ϕ	10'-0"ϕ	6'-6"ϕ	——
Footing Pressure (T/ft²)	2.8	2.9	2.7	2.9	2.7	2.9	2.8	2.9	2.7	——
Number of Columns	2	2	2	2	2	2	2	2	11	2

SHEET 5 OF 5

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

ESTIMATE SUMMARY
LAYOUT

NORTH APPROACH TO
SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE:		STATE DISTRICT	GENERAL REGION	FEDERAL AID PROJECT	SHEET
DR.:-	REVISIONS	12	6	I-610-7(184)798	33
CK.:-		COUNTY	CONTROL SECTION JOB		HIGHWAY
DR.:-		Harris	271 15 6		I-610
CK.:-					

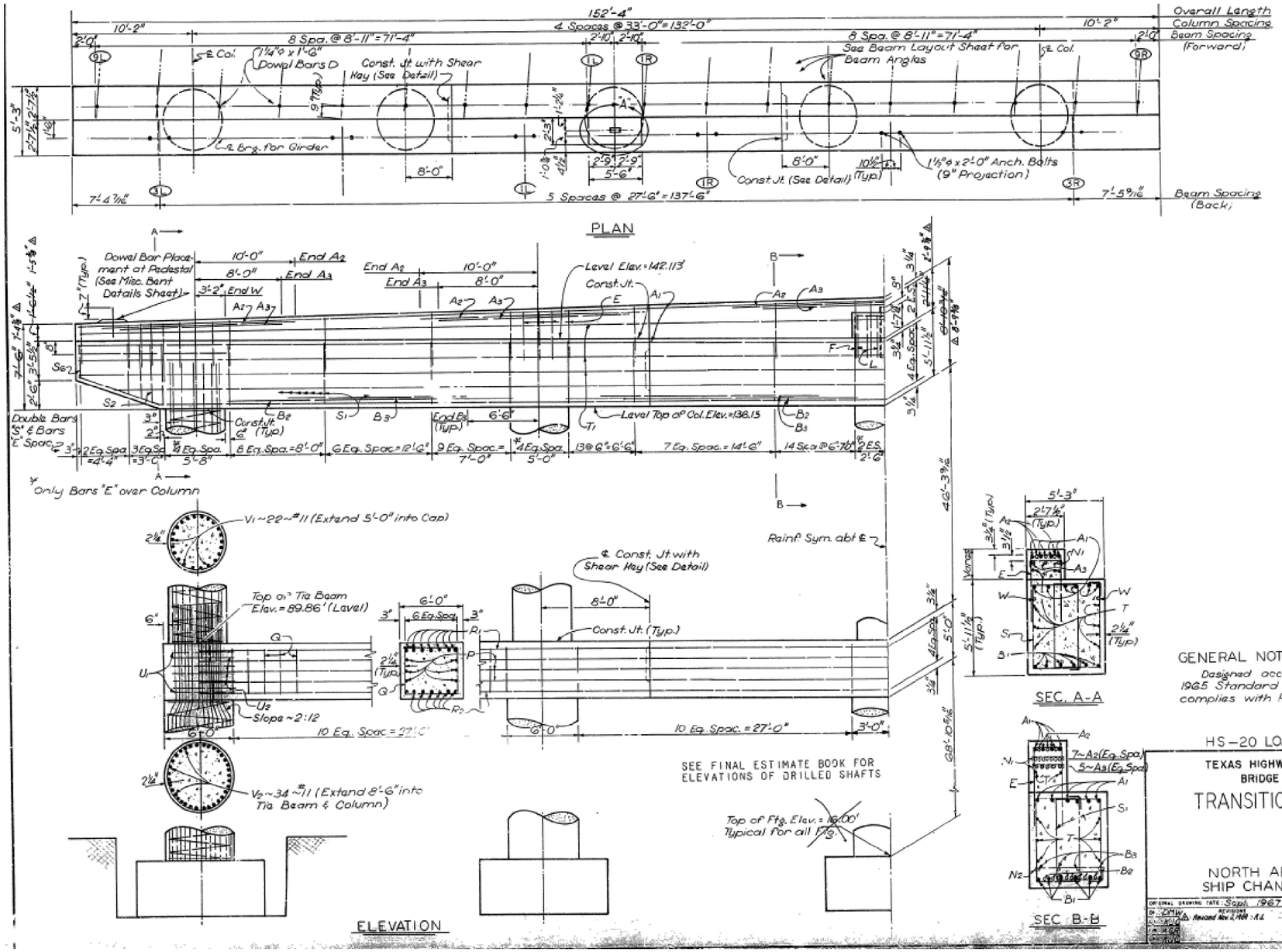
FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 32 OF 44

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			271
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

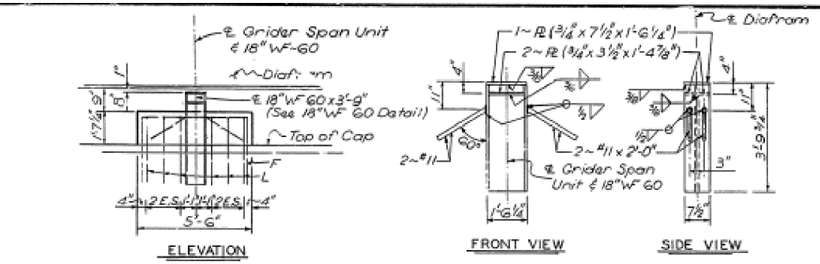
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 33 OF 44

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		272

STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

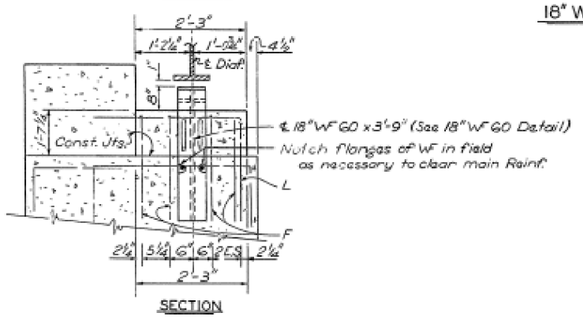
DATE: 3/10/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\1. General\097ASB.dgn



ELEVATION

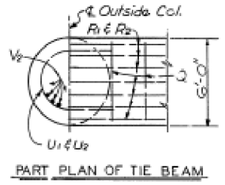
FRONT VIEW SIDE VIEW

18" WF~60 DETAIL

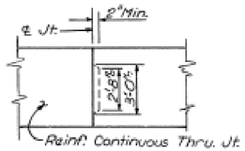


SECTION

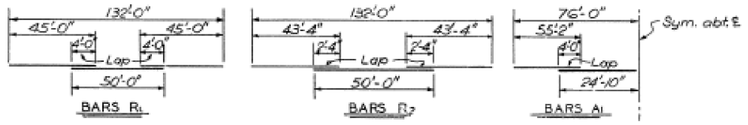
DETAIL "A" OF WIND SHOE

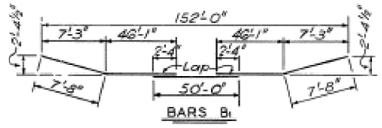


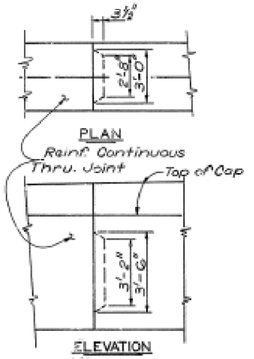
PART PLAN OF TIE BEAM



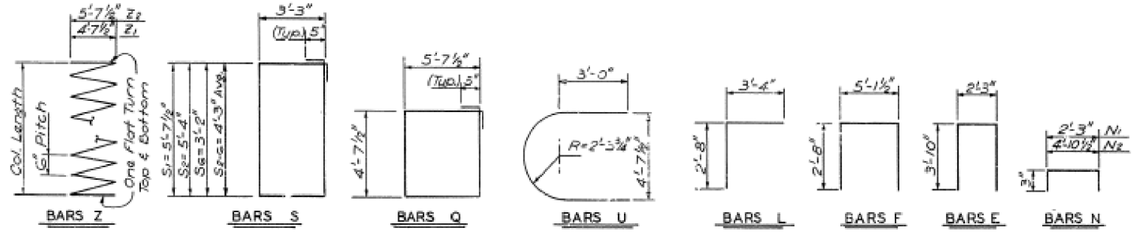
CONST. JT. DETAIL
(For Tie Beam)







CONSTRUCTION JT. DETAIL
(For Bent Cap)



BAR DETAILS

BILL OF REINFORCING STEEL				
Bars	No.	Size	Length	Weight
A1	10	*#11	@120'-0"	2,501
A2	36	*#11	120'-0"	3,825
A3	21	*#11	16'-0"	1,785
B1	6	*#11	@157'-6"	5,021
B2	32	*#11	28'-0"	4,760
B3	16	*#11	20'-0"	1,700
E	145	*5	9'-11"	1,500
F	4	#6	10'-6"	63
L	6	#6	6'-0"	54
N1	48	#5	2'-9"	138
N2	24	#5	5'-5"	136
S1	240	*#5	18'-7"	4,652
S2~6	20	*#5	15'-10"	330
T1	4	#5	@[illegible]'-5"	644
T2	2	#5	@149'-6"	312
U1	4	#11	13'-3"	282
U2	10	#6	13'-3"	199
Q	44	#5	21'-4"	979
R1	7	*#11	@140'-0"	5,207
R2	7	*#11	@136'-8"	5,083
P	6	#5	@135'-8"	848
W	4	#5	13'-2"	55
V1	110	*#11	51'-8"	30,196
V2	170	*#11	@80'-10"	73,009
Z1	5	#3	@375'-5"	2585
Z2	5	#3	@435'-1"	4578
D	18	1 1/4"ϕ	1'-6"	113
5~Type "C" Footing Reinf.				14,265
Total				170,820

*Grade 60 Reinf. Steel

@Includes 2~20 Dia. Laps.
@Includes 2~35 Dia. Laps.
#Includes 1~30 Dia. Laps.

TABLE OF ESTIMATED QUANTITIES FOR BENT #50		
Item	Unit	Quantity
Reinf. Steel	Lbs	170,820
Class "C" Concrete	C.Y.	997.5
Structural Steel	Lbs.	399
Uncl. Struct Excav.	C.Y.	220

SEE FINAL ESTIMATE BOOK FOR ELEVATIONS OF DRILLED SHAFTS

HS-20 LOADING SHEET 2 OF 2

TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

TRANSITION BENT #50

NORTH APPROACH TO
SHIP CHANNEL BRIDGE

ORIGINAL DRAWING DATE: Sept 1987	STATE	FEDERAL AID NO.	FEDERAL AID PROJECT	SHEET
REVISIONS	12	G	I-610-7(164)798	36
	COUNTY			
	Harris	271	15	3

FOR CONTRACTOR'S INFORMATION ONLY

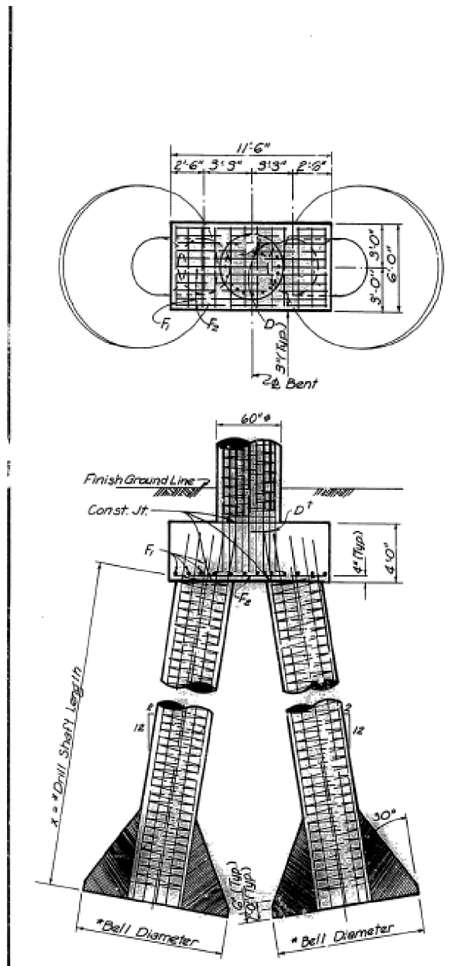
Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

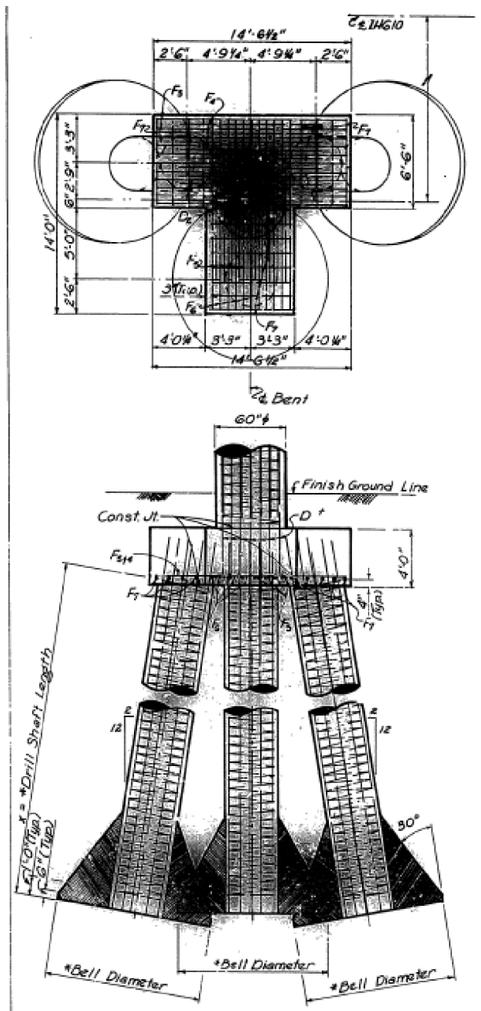
SHEET 34 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			273
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

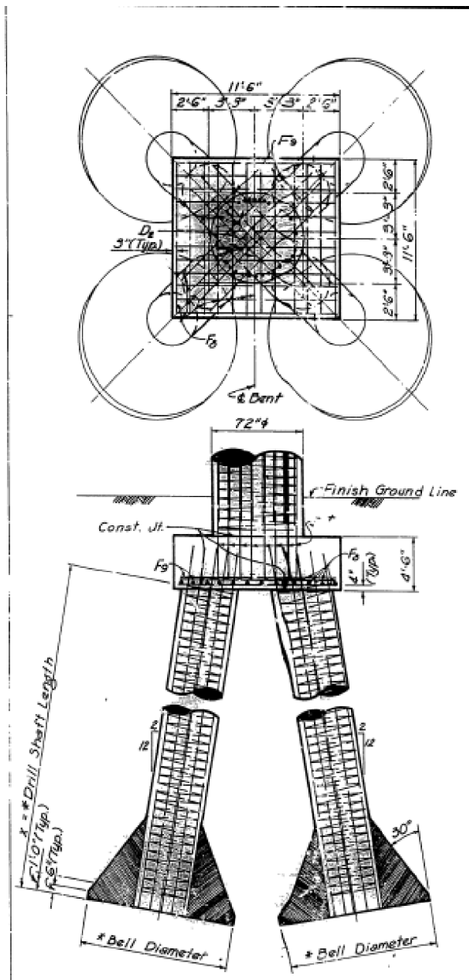
DATE: 3/10/2021
DW: \\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOU\Design Projects\027115097\4 - Design\Plan Set\1. General\097ASB.dgn



TYPE A FOOTING



TYPE B FOOTING



TYPE C FOOTING

#BILL OF REINFORCING STEEL AND ESTIMATED QUANTITIES

TYPE A FOOTING

Bar	No.	Size	Length	Weight
F1	12	#11	5'-0"	967
F2	11	#11	11'-3"	657
D2	22	#11	8'-0"	935
Reinforcing Steel			Lbs.	1959
Class C Conc.			C.Y.	10.2

▲TYPE B FOOTING

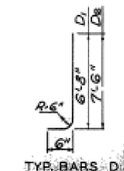
Bar	No.	Size	Length	Weight
F9	11	#11	14'-0"	876
F4	10	#11	10'-6"	558
F5	10	#11	10'-0"	531
F6	11	#11	13'-6"	789
F7	16	#11	6'-5"	532
D2	22	#11	8'-0"	935
Reinforcing Steel			Lbs.	4163
Class C Conc.			C.Y.	21.2

TYPE C FOOTING

Bar	No.	Size	Length	Weight
F8	24	#9	11'-0"	893
F9	8	#11	12'-0"	510
D2	34	#11	8'-0"	1445
Reinforcing Steel			Lbs	2853
Class C Conc			C.Y.	22.0

NOTES & EXPLANATION OF SYMBOLS:
All Drill Shafts shown are 4'-0"ϕ with #18~#10 vertical bars extending 3'-2" min. into footing and #3 spiral @6" pitch with one flat turn top and bottom.

* See Layout for Bell Dia. & Drill Shaft Length.
# Tables are for one footing.
† D2 extends 3'-2" into Col.
▲ Add 12 D2 Bars per Footing for 72"ϕ Cols. - Bent #58 (Total Reinf. Steel per Footing 4675 lbs.)
● Included in price bid for Drilled Shafts.



TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

FOOTING DETAILS

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NORTH APPROACH TO
SHIP CHANNEL BRIDGE

DRAWING DATE	STATE	FEDERAL AID PROJECT
July 1967	12 6	F-610-7(164)798
REVISIONS: ▲ Rev. Sept. 23, 1969	COUNTY	

FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

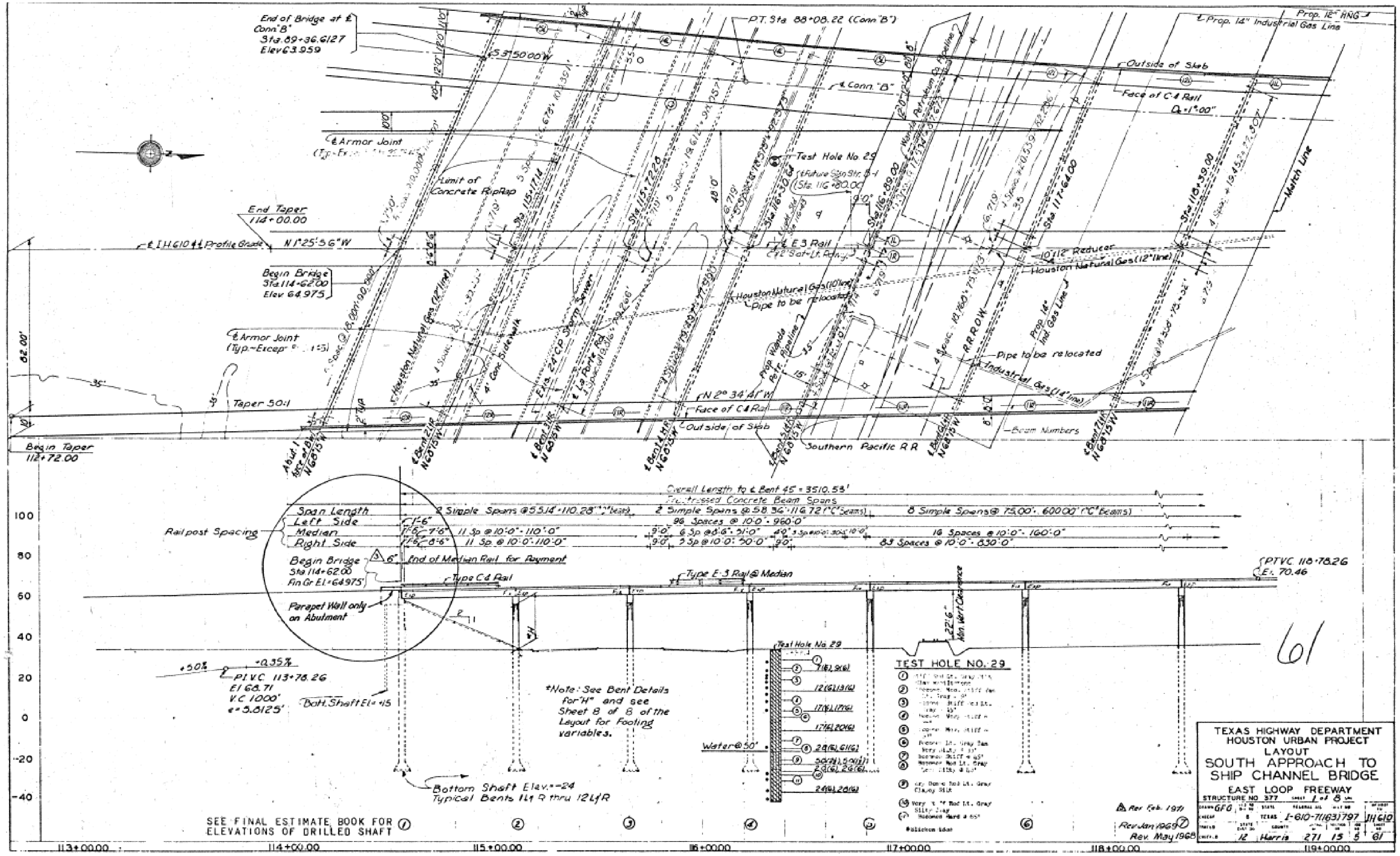
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 35 OF 44

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		274

STATE	DIST	COUNTY
TEXAS	HOU	HARRIS

CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



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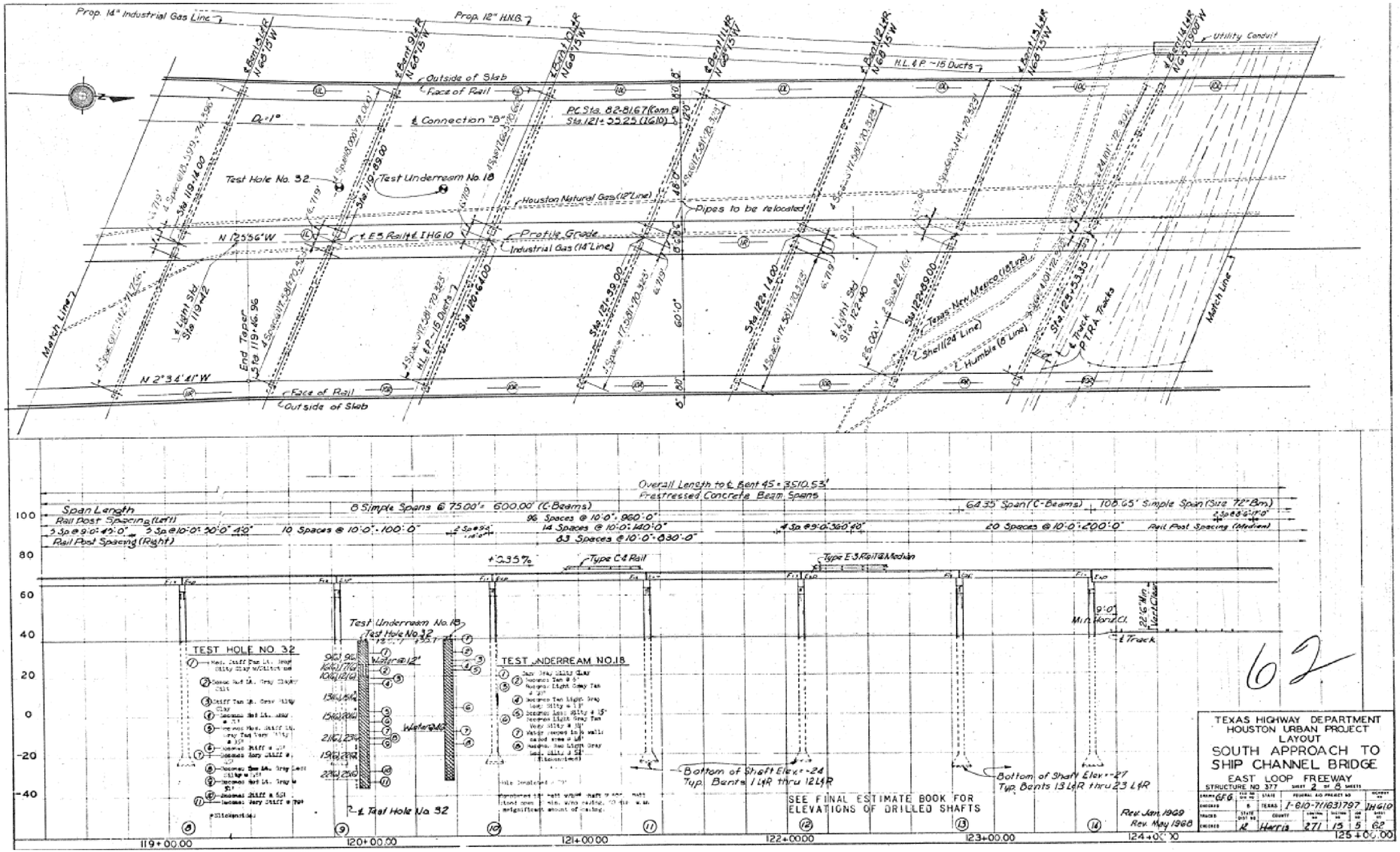
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 36 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			275
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



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TEXAS HIGHWAY DEPARTMENT
HOUSTON URBAN PROJECT
LAYOUT
SOUTH APPROACH TO
SHIP CHANNEL BRIDGE
EAST LOOP FREEWAY
STRUCTURE NO. 377 SHEET 2 OF 8 SHEETS

DRAWN	GFG	CHK'D		STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHECKED	R	TEXAS	F-610-7(163)797	IHG10		
TRACED		STATE DIST. NO.	COUNTY	SHEET NO.		
CHECKED	R Harris	271	15	5	62	

FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 37 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			276
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 3/10/2021
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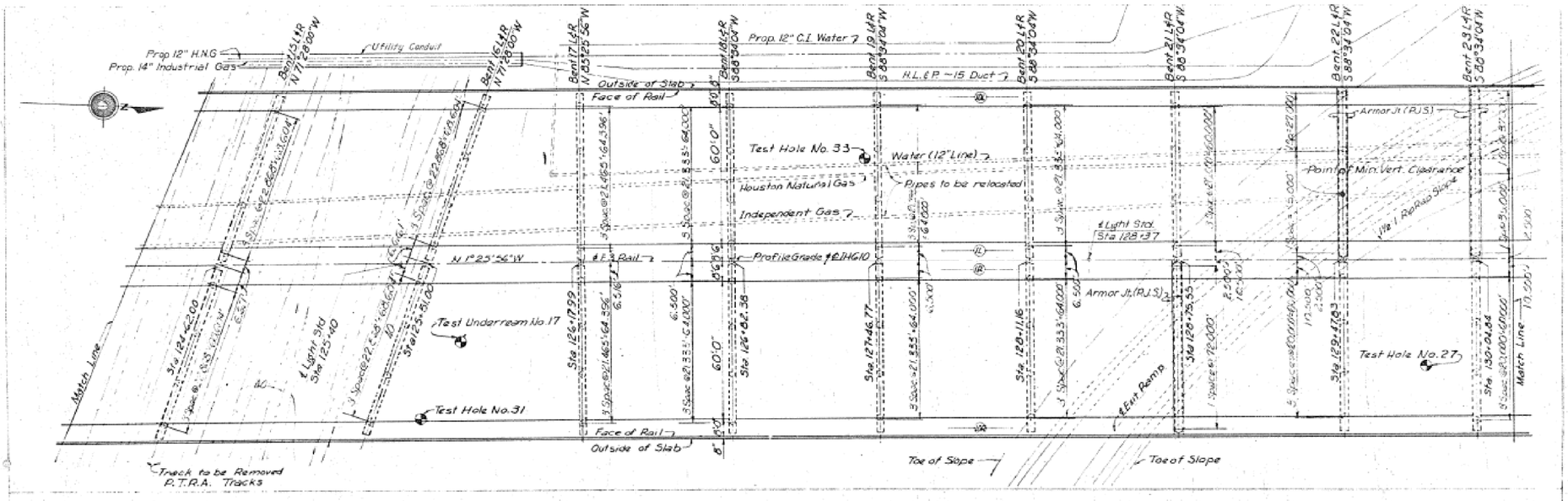


FOR CONTRACTOR'S INFORMATION ONLY

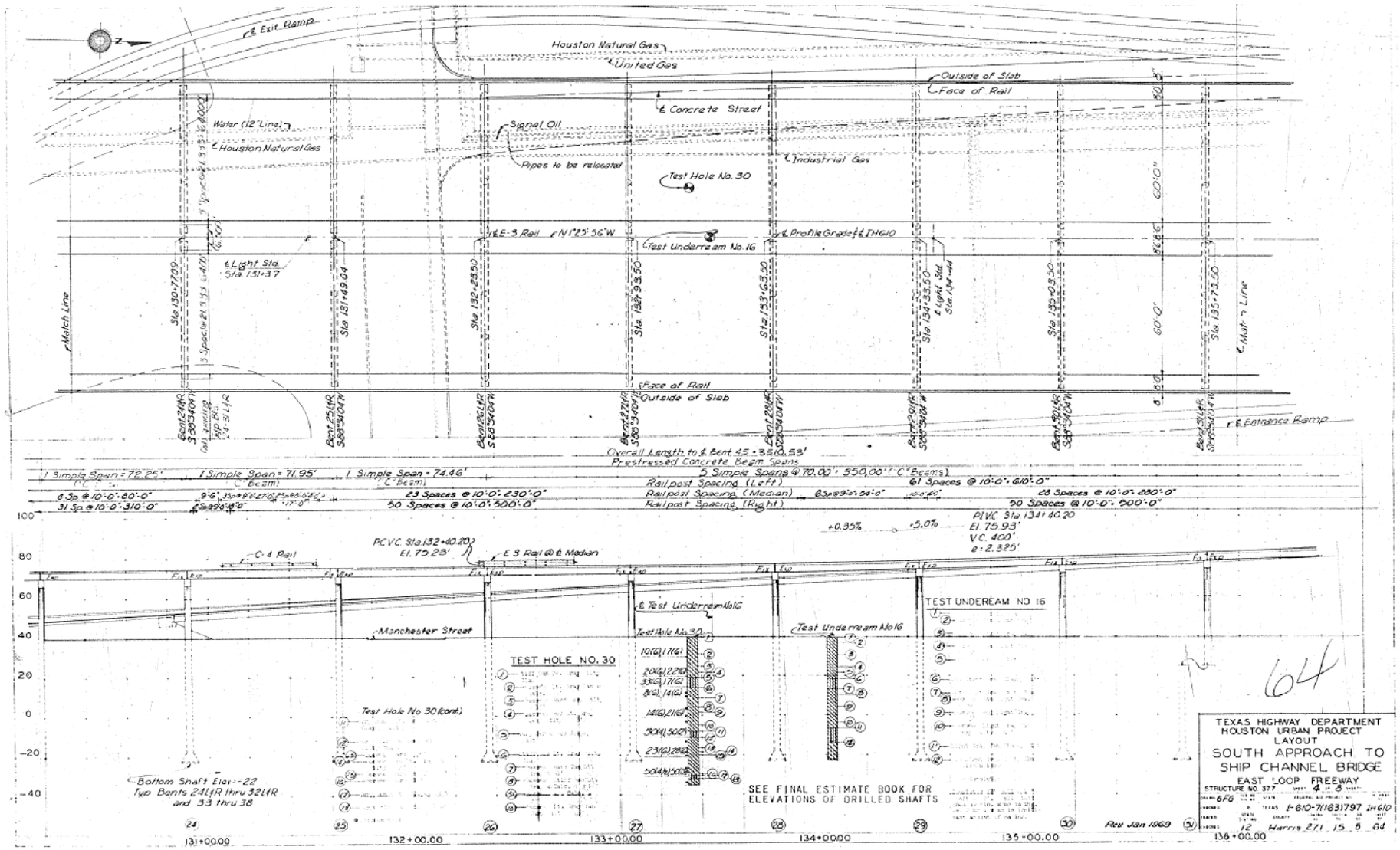
TEXAS HIGHWAY DEPARTMENT
HOUSTON URBAN PROJECT
LAYOUT
SOUTH APPROACH TO SHIP CHANNEL BRIDGE
EAST LOOP FREEWAY
STRUCTURE NO. 377 SHEET 3 OF 8 SHEETS
GFG I-610-7(16)31797 IHG10
12 Harris 271 15 5 63

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 38 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			277
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



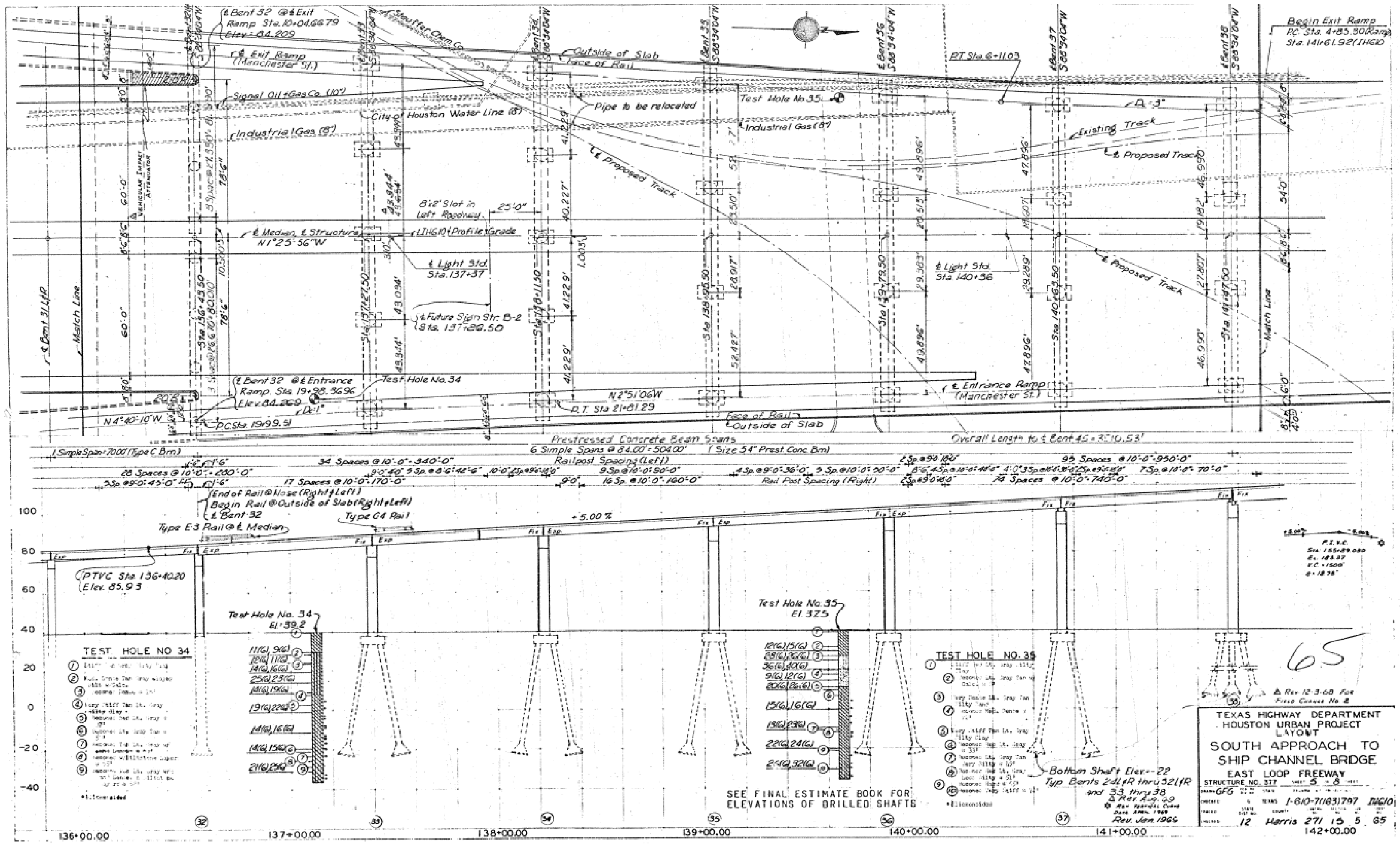
FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 39 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			278
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



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SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 40 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			279
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 3/10/2021
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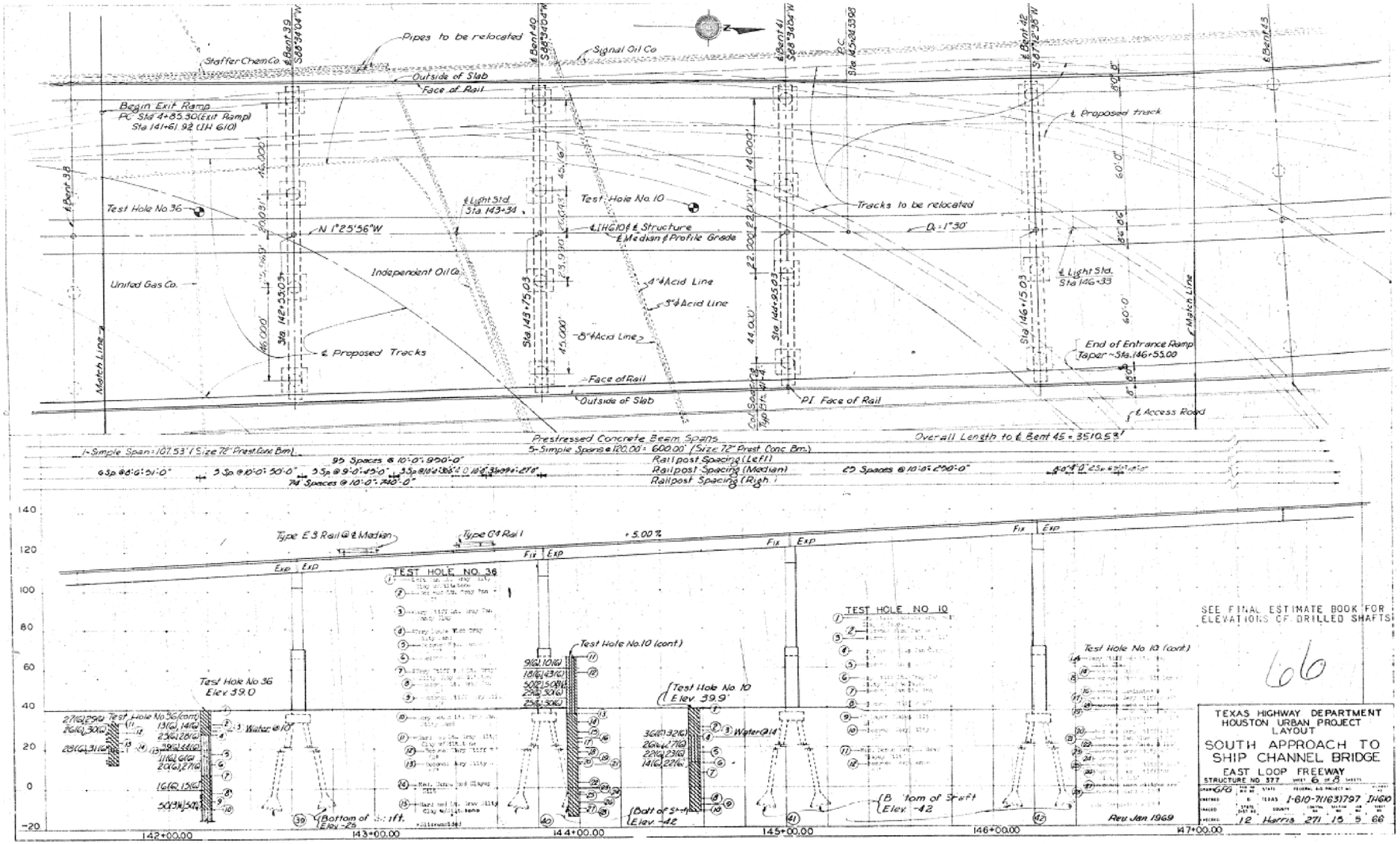

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TEXAS HIGHWAY DEPARTMENT
HOUSTON URBAN PROJECT
LAYOUT
SOUTH APPROACH TO SHIP CHANNEL BRIDGE
EAST LOOP FREEWAY
STRUCTURE NO. 377 SHEET 6 OF 8 SHEETS

CHKD.	STATE	COUNTY	CONT.	SECT.	JOB	HIGHWAY
	TEXAS	I-610-7(163)797 IH610				
TRACED	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	SHEET NO.
CHECKED	12	Harris	271	15	5	66

Rev. Jan 1969

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IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 41 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			280
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 3/10/2021
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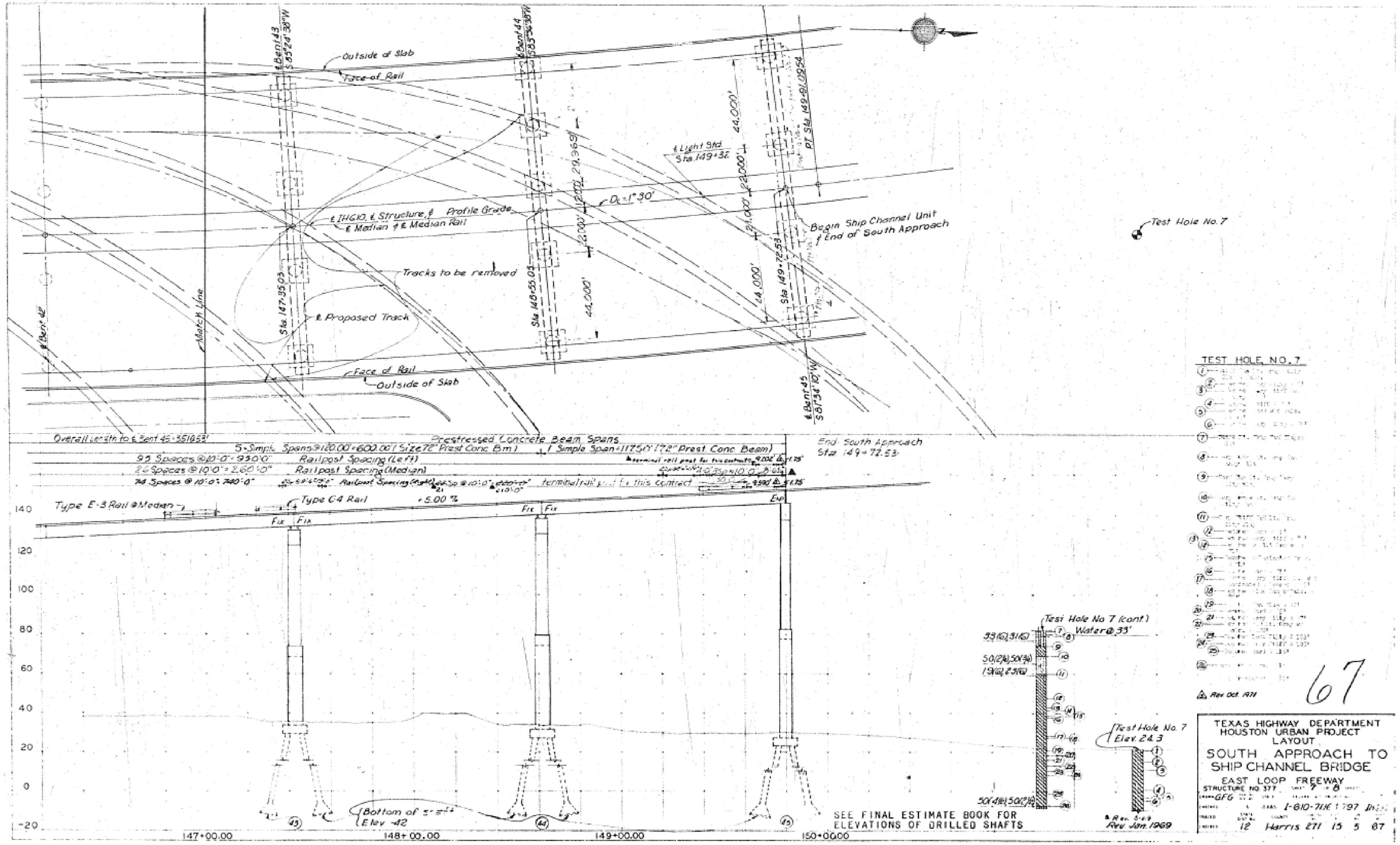

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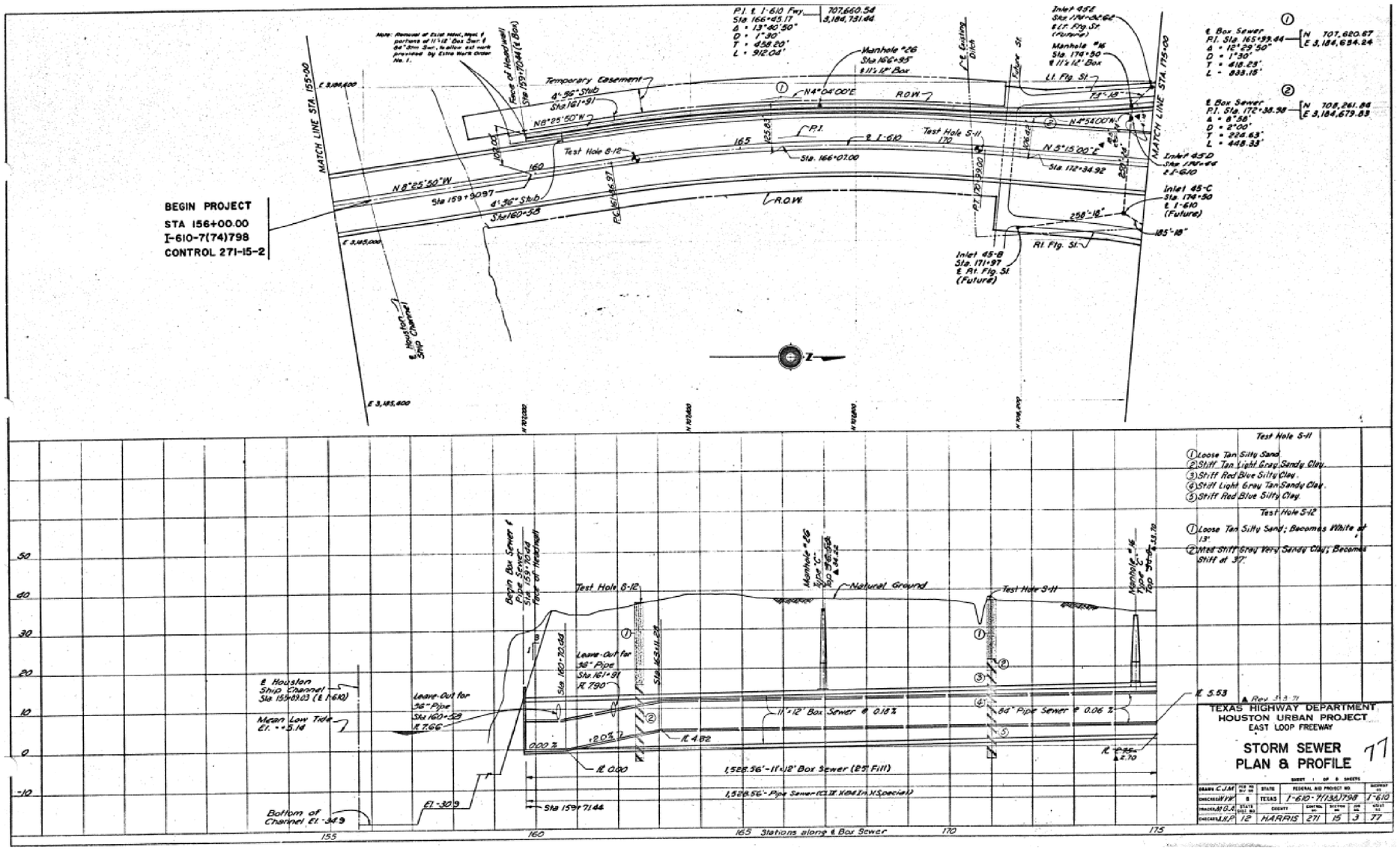
IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 42 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			281
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



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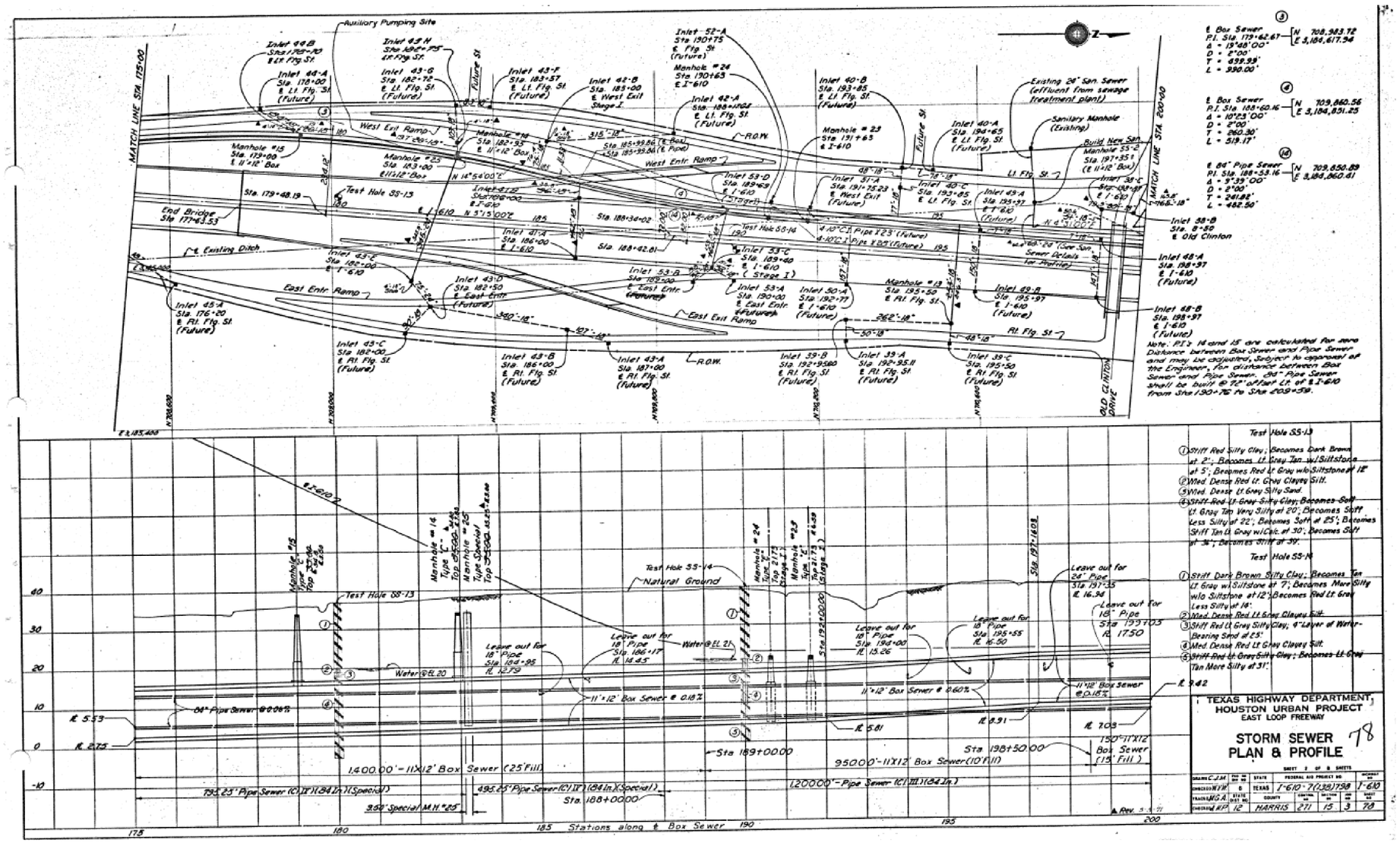
Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 43 OF 44

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		282

STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610



FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

IH 610
SHIP CHANNEL BRIDGE
AS BUILT PLAN SET

SHEET 44 OF 44

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			283
STATE	DIST	COUNTY	
TEXAS	HOU	HARRIS	
CONT	SECT	JOB	HIGHWAY
0271	15	097	IH 610

DATE: 3/10/2021
pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\12 - HOUDesign Projects\027115097\4 - Design\Plan Set\1. General\097ASB.dgn