

INDEX OF SHEETS

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SEE SHEET 2 FOR INDEX OF SHEETS

TDLR INSPECTION NOT REQUIRED

STATE OF TEXAS  
TEXAS DEPARTMENT OF TRANSPORTATION

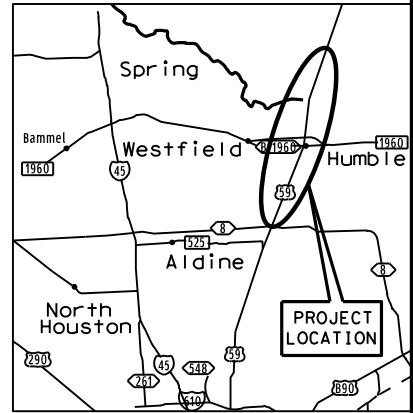
PLANS OF PROPOSED  
STATE HIGHWAY IMPROVEMENT

PROJECT NO. C177-7-118, ETC.  
CONTROL CSJ 0177-07-118, ETC.

IH 69  
HARRIS COUNTY, ETC.

FOR THE CONSTRUCTION OF MISCELLANEOUS WORK  
CONSISTING OF REMOVING AND REPLACING PAVEMENT MARKINGS

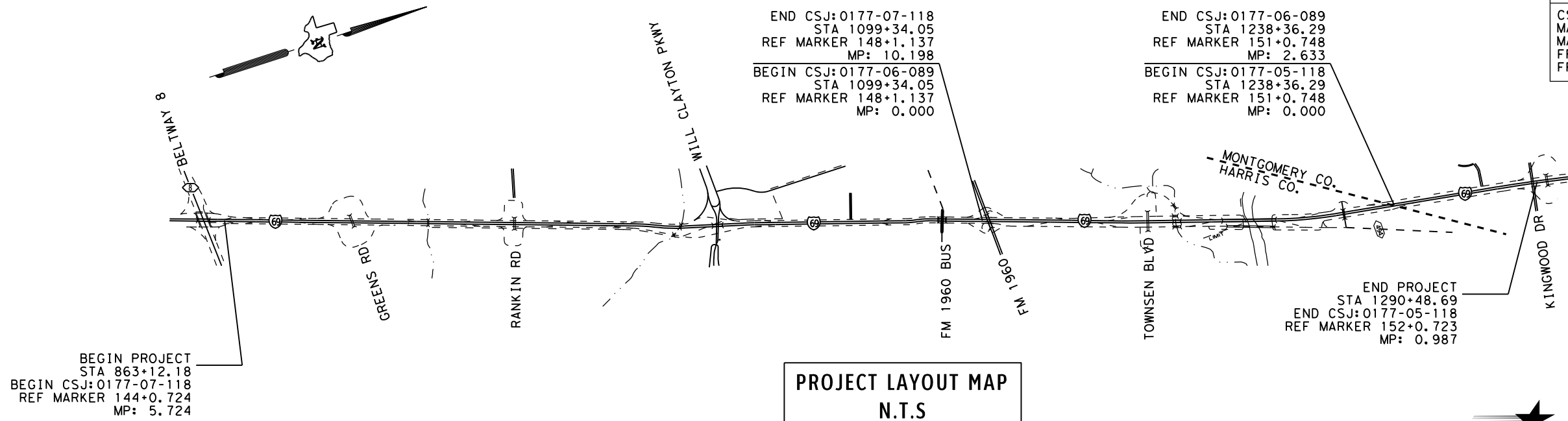
FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.
6	TEXAS	C 177-7-118, ETC	IH 69
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.
HOU	HARRIS	0177 07	118, ETC
			JOB NO.
			1
			SHEET NO.
			1



CSJ	LIMITS	STATION	LENGTH
0177-07-118	FROM SL 8 EAST TO FM 1960	863+12.18 - 1099+34.05	23,621.87 FT 4.474 MI
0177-06-089	FROM FM 1960 TO MONTGOMERY COUNTY LINE	1099+34.05 - 1238+36.29	13,902.24 FT 2.633 MI
0177-05-118	FROM HARRIS COUNTY LINE TO KINGWOOD DR	1238+36.29 - 1290+48.69	5,212.40 FT 0.987 MI
TOTAL			42,736.51 FT 8.094 MI

ADT		
CSJ 0177-07-118		
MAINLANES (2022)		159,300
MAINLANES (2042)		309,200
FRONTAGE ROADS (2022)		29,500
FRONTAGE ROADS (2042)		40,900
CSJ 0177-06-089		
MAINLANES (2022)		125,300
MAINLANES (2042)		243,200
FRONTAGE ROADS (2022)		33,000
FRONTAGE ROADS (2042)		45,700
CSJ 0177-05-118		
MAINLANES (2022)		121,900
MAINLANES (2042)		236,600
FRONTAGE ROADS (2022)		28,000
FRONTAGE ROADS (2042)		38,800

DESIGN SPEED	
MAINLANES	= 60 MPH
FRONTAGE ROADS	= 45 MPH
FUNCTIONAL CLASSIFICATION	
MAINLANES	= 1
FRONTAGE ROADS	= 5



PROJECT LAYOUT MAP  
N.T.S

RAILROAD CROSSINGS: NONE  
EXCEPTIONS: NONE  
EQUATIONS: NONE

TEXAS DEPARTMENT OF TRANSPORTATION  
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SUBMITTED FOR LETTING 09/22/2022  
For DISTRICT TRAFFIC ENGINEER

APPROVED FOR LETTING 9/29/2022  
DocuSigned by: James Koch, P.E.  
For DISTRICT ENGINEER

COUNTY HARRIS, ETC PROJ. NO. C 177-7-118, ETC  
HWY. NO. IH 69 LETTING DATE DECEMBER 2022  
DATE ACCEPTED

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION  
NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS,  
SHALL GOVERN ON THIS PROJECT: REQUIRED LABOR PROVISIONS FOR  
STATE PROJECT: SP 000-008

INDEX OF SHEETS

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SHEET NO DESCRIPTION

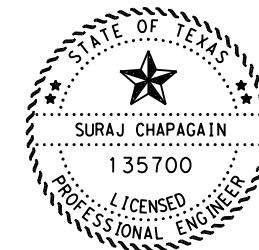
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THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE (\*) HAVE BEEN SELECTED BY ME, OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.



*Suraj Chapagain, P.E.*

08/22/2022

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INDEX OF SHEETS

SHEET 1 OF 1

ORIGINAL DRAWING DATE:	MAY, 2022	STATE DISTRICT REGION	HOU 6	PROJECT NO.		SHEET	2
DATE:		COUNTY	HARRIS	CONTROL	0177	SECTION	07
FILE:		JOB	118, etc	HIGHWAY	IH 69		

DATE: \$DATE\$  
FILE: \$FILE\$

**General Notes:**

**General:**

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

Mr. Dock S. Gee, P.E., Traffic Construction Supervisor  
[Dock.Gee@txdot.gov](mailto:Dock.Gee@txdot.gov)

Mr. Gaurang S. Pandit, P.E., Design Supervisor  
[Gaurang.Pandit@txdot.gov](mailto:Gaurang.Pandit@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.

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.

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.

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

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

**General: Site Management**

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**

Wayne Series 900  
Elgin White Wing  
Elgin Pelican

**Truck Type - 4 Wheel**

M-B Cruiser II  
Wayne Model 945  
Mobile TE-3  
Mobile TE-4  
Murphy 4042

**General: Traffic Control and Construction**

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

**General: Utilities**

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

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Control: 0177-07-118, etc.

lines, which convey all corridor information to TranStar, will result in the Contractor being billed for the full cost of emergency repairs.

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

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

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

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

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 7: Legal Relations and Responsibilities

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.

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

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

Highway: IH 69

Control: 0177-07-118, etc.

In addition to lane closures, cease work 3 days before the predicted hurricane landfall on or near the roadway that adversely impacts the flow of traffic and reduces the capacity of the highway during an evacuation. Vehicles of the Contractor, subcontractors, or material suppliers will not be allowed to enter or exit the traffic stream, including those for the purpose of material hauling and delivery, and mobilization or demobilization of equipment. When directed, this prohibition will include a reasonable time period for the evacuees to return to their point of origin.

No significant traffic generator events have been identified.

#### Item 8: Prosecution and Progress

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

Working days will be computed and charged based on a five-day workweek in accordance with Section 8.3.1.6.

A working day will be charged Monday through Friday, excluding national holidays, regardless of weather conditions or material availability. Nighttime work that extends past midnight will be charged to the following day. Work on national holidays will not be permitted without written permission of the Engineer. If work requiring an Inspector to be present is performed on a national holiday, and weather and other conditions permit the performance of work for 7 hours between 10:00 p.m. and 5:00 a.m., a working day will be charged.

Allowable work times are as follows:

Sunday 10:00 P.M. – Monday 5:00 AM  
Monday 10:00 P.M. – Tuesday 5:00 AM  
Tuesday 10:00 P.M. – Wednesday 5:00 AM  
Wednesday 10:00 P.M. – Thursday 5:00 AM  
Thursday 10:00 P.M. – Friday 5:00 AM

The Lane Closure Assessment Fee is \$ 842.00 for IH 69 mainlanes and \$ 749.00 for IH 69 frontage roads. 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." The time increment for the Lane Closure Assessment fee for this project is one hour.

#### Item 502: Barricades, Signs, and Traffic Handling

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**One, Two and Full Lane Closures (Roadway/Ramp/Direct Connector)**

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday	N/A	12:00 AM – 5:00 AM 10:00 PM-11:59 PM	5:00 AM-10:00 PM
Tuesday	N/A	12:00 AM – 5:00 AM 10:00 PM-11:59 PM	5:00 AM-10:00 PM
Wednesday	N/A	12:00 AM – 5:00 AM 10:00 PM-11:59 PM	5:00 AM-10:00 PM
Thursday	N/A	12:00 AM – 5:00 AM 10:00 PM-11:59 PM	5:00 AM-10:00 PM
Friday	N/A	12:00 AM – 5:00 AM	5:00 AM-11:59 PM
Saturday	N/A	N/A	N/A
Sunday	N/A	10:00 PM – 11:59 PM	12:00 AM-10:00 PM

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

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

Provide full-time, off-duty, uniformed, certified peace officers, as part of traffic control operations. The peace officers must be able to show proof of certification by the Texas Commission on Law Enforcement Officers Standards. The cost of the officers is paid for on a force account basis.

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

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

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These

enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

**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.

**Item 644: Small Roadside Sign Assemblies**

Sign locations shown on the plans are approximate. Before placing them, obtain approval of and then stake the exact locations for these signs.

Use the Texas Universal Triangular Slip Base with the concrete foundation for small ground mounted signs, unless otherwise shown in the plans.

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

Assume ownership of the removed existing signs.

Locations of the relocated signs are approximate. Before placing them, obtain approval of and then stake the exact locations for these signs.

Replace existing signs that become damaged during relocation at no expense to the Department.

**Item 666: Reflectorized Pavement Markings**

**Item 668: Prefabricated Pavement Markings**

**Item 6020: Multipolymer Pavement Markings (MPM) with Warranty**

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.

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.

**County:** Harris, etc.

**Sheet 7**

**Highway:** IH 69

**Control:** 0177-07-118, etc.

**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.

A total of one (1) shadow vehicle with a TMA/TA is required for the work with the exception of Pavement Marking Operations. 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.

A total of three (3) shadow vehicles with a TMA/TA are required for Pavement Marking Operations. 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.

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 0177-07-118

DISTRICT Houston  
HIGHWAY IH 69

COUNTY Harris, Montgomery

CONTROL SECTION JOB				0177-05-118		0177-06-089		0177-07-118		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00125499		A00125498		A00125497			
COUNTY				Montgomery		Harris		Harris			
HIGHWAY				IH 69		IH 69		IH 69			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	500-6001	MOBILIZATION	LS					1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	1.000		2.000		3.000		6.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA					3.000		3.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA	57.000		311.000		347.000		715.000	
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA			456.000		635.000		1,091.000	
	658-6027	INSTL DEL ASSM (D-SY)SZ (BRF)CTB (BI)	EA	65.000		40.000				105.000	
	666-6212	REFL PAV MRK TY II (Y) 12" (SLD)	LF	325.000		385.000		2,359.000		3,069.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	20.000		38.000		77.000		135.000	
	668-6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA	6.000		12.000		29.000		47.000	
	668-6080	PREFAB PAV MRK TY C (W) (UTURN ARROW)	EA	4.000		4.000		14.000		22.000	
	668-6084	PREFAB PAV MRK TY C (W) (NUMBER)	EA	1.000		4.000		8.000		13.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	24.000		43.000		84.000		151.000	
	668-6115	PREFAB PAV MRK TY C (MULTI) (SHIELD)	EA			2.000		20.000		22.000	
	672-6006	REFL PAV MRKR TY I-A	EA			83.000		133.000		216.000	
	672-6008	REFL PAV MRKR TY I-R	EA	28.000		140.000		224.000		392.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	1,195.000		3,081.000		5,269.000		9,545.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	43,873.000		148,194.000		243,239.000		435,306.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	6,980.000		16,863.000		28,078.000		51,921.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF	2,457.000		7,174.000		15,622.000		25,253.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	787.000		811.000		3,213.000		4,811.000	
	677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	19.000		32.000		62.000		113.000	
	677-6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA	6.000		12.000		27.000		45.000	
	677-6011	ELIM EXT PAV MRK & MRKS (NUMBER)	EA	1.000		4.000		8.000		13.000	
	677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	23.000		37.000		68.000		128.000	
	677-6022	ELIM EXT PAV MRK & MRKS (SHEILD)	EA			2.000		20.000		22.000	
	677-6036	ELIM EXT PAV MRK & MRKS (UTURN ARROW)	EA	4.000		4.000		14.000		22.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	52,293.000		147,495.000		242,527.000		442,315.000	
	678-6004	PAV SURF PREP FOR MRK (8")	LF	6,980.000		16,863.000		28,078.000		51,921.000	
	678-6006	PAV SURF PREP FOR MRK (12")	LF	1,847.000		8,334.000		14,818.000		24,999.000	
	678-6008	PAV SURF PREP FOR MRK (24")	LF	1,255.000		479.000		3,498.000		5,232.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	19.000		38.000		75.000		132.000	
	678-6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA	6.000		12.000		29.000		47.000	
	678-6012	PAV SURF PREP FOR MRK (UTURN ARR)	EA	4.000		4.000		14.000		22.000	
	678-6015	PAV SURF PREP FOR MRK (NUMBER)	EA	1.000		4.000		8.000		13.000	
	678-6016	PAV SURF PREP FOR MRK (WORD)	EA	23.000		43.000		82.000		148.000	
	678-6025	PAV SURF PREP FOR MRKS (SHIELD)	EA			2.000		20.000		22.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	12.000		34.000		63.000		109.000	





# Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0177-07-118

DISTRICT Houston  
HIGHWAY IH 69

COUNTY Harris, Montgomery

CONTROL SECTION JOB				0177-05-118		0177-06-089		0177-07-118		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00125499		A00125498		A00125497			
COUNTY				Montgomery		Harris		Harris			
HIGHWAY				IH 69		IH 69		IH 69			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	6020-6004	MLTPLY PV MK W/WTY (W) (6") (SLD)	LF	11,567.000		35,350.000		56,233.000		103,150.000	
	6020-6005	MLTPLY PV MK W/WTY (W) (6") (BRK)	LF	14,200.000		37,610.000		63,060.000		114,870.000	
	6020-6006	MLTPLY PV MK W/WTY (W) (6") (DOT)	LF	348.000		592.000		1,634.000		2,574.000	
	6020-6007	MLTPLY PV MK W/WTY (W) (8") (SLD)	LF	6,980.000		15,217.000		25,421.000		47,618.000	
	6020-6008	MLTPLY PV MK W/WTY (W) (12") (SLD)	LF	1,129.000		5,512.000		7,476.000		14,117.000	
	6020-6009	MLTPLY PV MK W/WTY (W) (12") (LNDP)	LF	393.000		1,229.000		3,437.000		5,059.000	
	6020-6010	MLTPLY PV MK W/WTY (W) (24") (SLD)	LF	1,255.000		479.000		3,498.000		5,232.000	
	6020-6014	MLTPLY PV MK W/WTY (Y) (6") (SLD)	LF	11,978.000		36,333.000		58,540.000		106,851.000	
	6020-6017	MLTPLY PV MK W/WTY (Y) (8") (SLD)	LF			1,646.000		2,657.000		4,303.000	
	6020-6019	MLTPLY PV MK W/WTY (Y) (12") (SLD)	LF			1,208.000		1,546.000		2,754.000	
	6020-6022	MLTPLY PV MK W/WTY (BLK) (6") (BRK)	LF	14,200.000		37,610.000		63,060.000		114,870.000	
	6185-6002	TMA (STATIONARY)	DAY	12.000		34.000		63.000		109.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	8.000		23.000		42.000		73.000	
	08	CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS					1.000		1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS					1.000		1.000	
		CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS					1.000		1.000	


## SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES

LAYOUT SHEET NO.	ITEM NO.		658	658	658	666	668	668	668	668	668	668
	DESC. CODE		6013	6026	6027	6212	6077	6078	6080	6084	6085	6115
	STATION LIMITS		INSTL DEL ASSM (D-SW)SZ (BRF)CTB	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	INSTL DEL ASSM (D-SY)SZ (BRF)CTB (BI)	REFL PAV MRK TY II (Y)12" (SLD)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (DBL ARROW)	PREFAB PAV MRK TY C (W) (UTURN ARROW)	PREFAB PAV MRK TY C (W) (NUMBER)	PREFAB PAV MRK TY C (W) (WORD)	PREFAB PAV MRK TY C (MULTI) (SHIELD)
	FROM	TO	EA	EA	EA	LF	EA	EA	EA	EA	EA	EA
1	B.O.P	872+00		21								
2	872+00	884+00	4	30			6			1		
3	884+00	896+00	18	30			2			1	8	10
4	896+00	908+00	30	30			1	4	4		6	
5	908+00	920+00	14	30			7			1	6	10
6	920+00	932+00	12	36			2				2	
7	932+00	944+00	2	30						1		
8	944+00	956+00	29	30				4	4		3	
9	956+00	968+00	16	30							1	
10	968+00	980+00		30						1		
11	980+00	992+00		30			7				7	
12	992+00	1004+00	14	31			3			1	3	
13	1004+00	1016+00	28	37			2				2	
14	1016+00	1028+00	24	36			7	5	4	1	11	
15	1028+00	1040+00	16	30								
16	1040+00	1052+00	16	30			1				1	
17	1052+00	1064+00	13	30			3				3	
18	1064+00	1076+00	44	47						1		
19	1076+00	1088+00	39	39			4				6	
20	1088+00	1099+34.05	28	28			12	4	2		5	
37	GREENS ROAD					552	4	4			4	
38	RANKIN ROAD					545	4	4			4	
39	WILL CLAYTON PARKWAY					900	4	4			4	
40	FM 1960 BUSINEES					362	8				8	
<b>SUBTOTAL CSJ: 0177-07-118</b>			<b>347</b>	<b>635</b>	<b>0</b>	<b>2,359</b>	<b>77</b>	<b>29</b>	<b>14</b>	<b>8</b>	<b>84</b>	<b>20</b>
20	1099+34.05	1100+00	2	2							1	
21	1100+00	1112+00	23	53			8	2	4		12	
22	1112+00	1124+00	32	46			3			1	3	
23	1124+00	1136+00	15	30								
24	1136+00	1148+00	15	30			2	2			2	
25	1148+00	1160+00	21	30			2				2	
26	1160+00	1172+00	51	84			1			1	1	
27	1172+00	1184+00	30	59			4	3		1	4	
28	1184+00	1196+00	60	60								
29	1196+00	1208+00	44	28	2		3	3			3	2
30	1208+00	1220+00	15		15		2				2	
31	1220+00	1232+00	3	23	15		4	1			4	
32	1232+00	1238+36.29		5	8		1	1		1	1	
41	FM 1960			6		385	8				8	
<b>SUBTOTAL CSJ: 0177-06-089</b>			<b>311</b>	<b>456</b>	<b>40</b>	<b>385</b>	<b>38</b>	<b>12</b>	<b>4</b>	<b>4</b>	<b>43</b>	<b>2</b>
32	1238+36.29	1244+00			7					1		
33	1244+00	1256+00	9		15							
34	1256+00	1268+00	3		15		1				1	
35	1268+00	1280+00	19		15		1				1	
36	1280+00	E.O.P	26		13		10	6	4		14	
42	KINGWOOD DRIVE					325	8				8	
<b>SUBTOTAL CSJ: 0177-05-118</b>			<b>57</b>	<b>0</b>	<b>65</b>	<b>325</b>	<b>20</b>	<b>6</b>	<b>4</b>	<b>1</b>	<b>24</b>	<b>0</b>
<b>PROJECT TOTALS</b>			<b>715</b>	<b>1,091</b>	<b>105</b>	<b>3,069</b>	<b>135</b>	<b>47</b>	<b>22</b>	<b>13</b>	<b>151</b>	<b>22</b>

**NOTE:**  
REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

**SUMMARY OF  
PERMANENT  
PAVEMENT MARKING  
QUANTITIES**

SHEET 1 OF 4



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CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC		9

DATE:  
FILE:


## SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES

LAYOUT SHEET NO.	ITEM NO.		672	672	672	677	677	677	677	677	677	677	677	677	
	DESC. CODE		6006	6008	6010	6002	6003	6005	6007	6008	6009	6011	6012	6022	6036
	STATION LIMITS		REFL PAV MRKR TY I-A	REFL PAV MRKR TY I-R	REFL PAV MRKR TY II-C-R	ELIM EXT PAV MRK & MRKS (6")	ELIM EXT PAV MRK & MRKS (8")	ELIM EXT PAV MRK & MRKS (12")	ELIM EXT PAV MRK & MRKS (24")	ELIM EXT PAV MRK & MRKS (ARROW)	ELIM EXT PAV MRK & MRKS (DBL ARROW)	ELIM EXT PAV MRK & MRKS (NUMBER)	ELIM EXT PAV MRK & MRKS (WORD)	ELIM EXT PAV MRK & MRKS (SHEILD)	ELIM EXT PAV MRK & MRKS (UTURN ARROW)
	FROM	TO	EA	EA	EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
1	B.O.P	872+00	16	28	139	9,921	1,274	179							
2	872+00	884+00		14	321	11,120	2,050	1,192	403	6		1			
3	884+00	896+00	25	14	338	11,681	1,563	1,075	100	1		1	7	10	
4	896+00	908+00			321	11,160	446	1,332	99		4		5		4
5	908+00	920+00		14	298	13,123	2,058	877	202	7		1	6	10	
6	920+00	932+00		14	262	13,362	706	525							
7	932+00	944+00		28	288	12,964	2,188		150			1			
8	944+00	956+00			188	11,800	395	304	78		4		3		4
9	956+00	968+00			182	12,000	40						1		
10	968+00	980+00	13	28	286	12,812	2,557	206	160			1			
11	980+00	992+00	22	14	318	11,800	1,525	1,155	154	3			3		
12	992+00	1004+00	14	14	285	11,719	815	932	115	3		1	3		
13	1004+00	1016+00			290	12,548	1,310	538		2			2		
14	1016+00	1028+00	20	14	292	12,051	3,156	1,105	155	5	3	1	9		4
15	1028+00	1040+00		14	165	12,368	376								
16	1040+00	1052+00			163	11,311	130								
17	1052+00	1064+00			284	11,535	2,014	475		1					
18	1064+00	1076+00	21	28	198	13,947	1,605	269	104			1			
19	1076+00	1088+00	2		233	12,909	560	498	8	2			4		
20	1088+00	1099+34.05			234	10,530	907	866	145	12	4		5		2
37	GREENS ROAD				43	588	479	988	399	4	4		4		
38	RANKIN ROAD				29	378	442	935	158	4	4		4		
39	WILL CLAYTON PARKWAY				48	676	776	1,291	214	4	4		4		
40	FM 1960 BUSINES				64	936	706	881	569	8			8		
<b>SUBTOTAL CSJ: 0177-07-118</b>			<b>133</b>	<b>224</b>	<b>5,269</b>	<b>243,239</b>	<b>28,078</b>	<b>15,622</b>	<b>3,213</b>	<b>62</b>	<b>27</b>	<b>8</b>	<b>68</b>	<b>20</b>	<b>14</b>
20	1099+34.05	1100+00			14	744		12					1		
21	1100+00	1112+00			267	10,620	2,330	97	124	8	2		12		4
22	1112+00	1124+00	20	14	275	13,834	2,135	227	167			1			
23	1124+00	1136+00	3	14	236	13,066	784	340							
24	1136+00	1148+00			231	12,380	452	254	22	2	2		2		
25	1148+00	1160+00			288	11,649	1,761	594		2			2		
26	1160+00	1172+00		42	230	18,239	1,684	204	84			1			
27	1172+00	1184+00		42	311	15,092	2,378	808	118	3	3	1	3		
28	1184+00	1196+00			227	11,260		586							
29	1196+00	1208+00	7		248	11,283	694	535		3	3		3	2	
30	1208+00	1220+00	41		285	10,960	2,053	1,259		1			1		
31	1220+00	1232+00		14	295	11,200	794	1,462		4	1		4		
32	1232+00	1238+36.29		14	128	7,125	572			1	1	1	1		
41	FM 1960		12		47	742	1,226	796	296	8			8		
<b>SUBTOTAL CSJ: 0177-06-089</b>			<b>83</b>	<b>140</b>	<b>3,081</b>	<b>148,194</b>	<b>16,863</b>	<b>7,174</b>	<b>811</b>	<b>32</b>	<b>12</b>	<b>4</b>	<b>37</b>	<b>2</b>	<b>4</b>
32	1238+36.29	1244+00		28	139	5,875	1,100	229				1			
33	1244+00	1256+00			219	11,208	632	130							
34	1256+00	1268+00			236	9,666	854	470	27						
35	1268+00	1280+00			282	9,545	1,854	444		1			1		
36	1280+00	E.O.P			258	6,668	1,884	735	142	10	6		14		4
42	KINGWOOD DRIVE				61	911	656	449	618	8			8		
<b>SUBTOTAL CSJ: 0177-05-118</b>			<b>0</b>	<b>28</b>	<b>1,195</b>	<b>43,873</b>	<b>6,980</b>	<b>2,457</b>	<b>787</b>	<b>19</b>	<b>6</b>	<b>1</b>	<b>23</b>	<b>0</b>	<b>4</b>
<b>PROJECT TOTALS</b>			<b>216</b>	<b>392</b>	<b>9,545</b>	<b>435,306</b>	<b>51,921</b>	<b>25,253</b>	<b>4,811</b>	<b>113</b>	<b>45</b>	<b>13</b>	<b>128</b>	<b>22</b>	<b>22</b>

NOTE:  
REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

SUMMARY OF  
PERMANENT  
PAVEMENT MARKING  
QUANTITIES

SHEET 2 OF 4



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CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC		10

DATE:  
FILE:


## SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES

LAYOUT SHEET NO.	ITEM NO.		678	678	678	678	678	678	678	678	678	
	DESC. CODE		6002	6004	6006	6008	6009	6010	6012	6015	6016	6025
	STATION LIMITS		PAV SURF PREP FOR MRK (6")	PAV SURF PREP FOR MRK (8")	PAV SURF PREP FOR MRK (12")	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (ARROW)	PAV SURF PREP FOR MRK (DBL ARROW)	PAV SURF PREP FOR MRK (UTURN ARR)	PAV SURF PREP FOR MRK (NUMBER)	PAV SURF PREP FOR MRK (WORD)	PAV SURF PREP FOR MRKS (SHIELD)
	FROM	TO	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
1	B.O.P	872+00	9,921	1,274	179							
2	872+00	884+00	11,120	2,050	1,712		6			1		
3	884+00	896+00	11,645	1,563	1,150	24	2			1	8	10
4	896+00	908+00	11,097	446	957	273	1	4	4		6	
5	908+00	920+00	13,123	2,058	1,109		7			1	6	10
6	920+00	932+00	13,302	706	600							
7	932+00	944+00	13,018	2,188	514					1		
8	944+00	956+00	11,800	395		246		4	4		3	
9	956+00	968+00	12,000	40							1	
10	968+00	980+00	12,812	2,557	921					1		
11	980+00	992+00	11,500	1,525	1,455		7				7	
12	992+00	1004+00	11,719	815	1,034		3			1	3	
13	1004+00	1016+00	12,548	1,310	538		2				2	
14	1016+00	1028+00	12,051	3,156	898	282	7	5	4	1	11	
15	1028+00	1040+00	12,368	376								
16	1040+00	1052+00	11,237	130			1				1	
17	1052+00	1064+00	11,443	2,014	200		3				3	
18	1064+00	1076+00	13,953	1,605	384					1		
19	1076+00	1088+00	12,762	560	521		4				6	
20	1088+00	1099+34.05	10,530	907	288	433	12	4	2		5	
37	GREENS ROAD		588	479	552	603	4	4			4	
38	RANKIN ROAD		378	442	545	356	4	4			4	
39	WILL CLAYTON PARKWAY		676	776	900	424	4	4			4	
40	FM 1960 BUSINEES		936	706	362	857	8				8	
<b>SUBTOTAL CSJ: 0177-07-118</b>			<b>242,527</b>	<b>28,078</b>	<b>14,818</b>	<b>3,498</b>	<b>75</b>	<b>29</b>	<b>14</b>	<b>8</b>	<b>82</b>	<b>20</b>
20	1099+34.05	1100+00	744	0	12						1	
21	1100+00	1112+00	10,620	2,330	97	124	8	2	4		12	
22	1112+00	1124+00	13,675	1,135	413		3			1	3	
23	1124+00	1136+00	13,066	784	340							
24	1136+00	1148+00	12,240	452	326	22	2	2			2	
25	1148+00	1160+00	11,649	1,761	614		2				2	
26	1160+00	1172+00	18,239	1,684	312		1			1	1	
27	1172+00	1184+00	15,052	2,378	988	37	4	3		1	4	
28	1184+00	1196+00	11,260	0	586							
29	1196+00	1208+00	11,123	694	616		3	3			3	2
30	1208+00	1220+00	10,960	2,053	1,259		2				2	
31	1220+00	1232+00	11,080	794	1,807		4	1			4	
32	1232+00	1238+36.29	7,045	572	169		1	1		1	1	
41	FM 1960		742	1,226	796	296	8				8	
<b>SUBTOTAL CSJ: 0177-06-089</b>			<b>147,495</b>	<b>16,863</b>	<b>8,334</b>	<b>479</b>	<b>38</b>	<b>12</b>	<b>4</b>	<b>4</b>	<b>43</b>	<b>2</b>
32	1238+36.29	1244+00	6,295	1,100	229					1		
33	1244+00	1256+00	12,108	632	130							
34	1256+00	1268+00	11,956	854	470	27						
35	1268+00	1280+00	11,785	1,854	444		1				1	
36	1280+00	E.O.P	9,168	1,884	249	388	10	6	4		14	
42	KINGWOOD DRIVE		981	656	325	840	8				8	
<b>SUBTOTAL CSJ: 0177-05-118</b>			<b>52,293</b>	<b>6,980</b>	<b>1,847</b>	<b>1,255</b>	<b>19</b>	<b>6</b>	<b>4</b>	<b>1</b>	<b>23</b>	
<b>PROJECT TOTALS</b>			<b>442,315</b>	<b>51,921</b>	<b>24,999</b>	<b>5,232</b>	<b>132</b>	<b>47</b>	<b>22</b>	<b>13</b>	<b>148</b>	<b>22</b>

**NOTE:**  
REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

**SUMMARY OF  
PERMANENT  
PAVEMENT MARKING  
QUANTITIES**

SHEET 3 OF 4



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CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC		11

DATE:  
FILE:


## SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES

LAYOUT SHEET NO.	ITEM NO.		6020	6020	6020	6020	6020	6020	6020	6020	6020	6020	
	DESC. CODE		6004	6005	6006	6007	6008	6009	6010	6014	6017	6019	6022
	STATION LIMITS		MLTPLY PV MK W/WTY (W) (6") (SLD)	MLTPLY PV MK W/WTY (W) (6") (BRK)	MLTPLY PV MK W/WTY (W) (6") (DOT)	MLTPLY PV MK W/WTY (W) (8") (SLD)	MLTPLY PV MK W/WTY (W) (12") (SLD)	MLTPLY PV MK W/WTY (W) (12") (LNDRP)	MLTPLY PV MK W/WTY (W) (24") (SLD)	MLTPLY PV MK W/WTY (Y) (6") (SLD)	MLTPLY PV MK W/WTY (Y) (8") (SLD)	MLTPLY PV MK W/WTY (Y) (12") (SLD)	MLTPLY PV MK W/WTY (BLK) (6") (BRK)
	FROM	TO	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	
1	B.O.P	872+00	2,816	1,930		944				3,245	330	179	1930
2	872+00	884+00	2,480	3,120		2,050	1,634	78		2,400			3120
3	884+00	896+00	2,537	3,090	144	1,050	75	786	24	2,784	513	289	3090
4	896+00	908+00	2,560	3,040	57	446	78	879	273	2,400			3040
5	908+00	920+00	2,987	3,490		2,058	980	129		3,156			3490
6	920+00	932+00	2,504	3,930		706	600			2,938			3930
7	932+00	944+00	2,740	3,610	54	2,188	514			3,004			3610
8	944+00	956+00	2,560	3,420		395			246	2,400			3420
9	956+00	968+00	2,400	3,600		40				2,400			3600
10	968+00	980+00	2,643	3,440		2,296	715			3,289	261	206	3440
11	980+00	992+00	2,400	3,200	300	1,098	1,034	276		2,400	427	145	3200
12	992+00	1004+00	2,761	3,180		534	267	537		2,598	281	230	3180
13	1004+00	1016+00	2,851	3,340		1,310	271	267		3,017			3340
14	1016+00	1028+00	3,230	2,700		2,762	661		282	3,421	394	237	2700
15	1028+00	1040+00	3,086	2,950		376				3,382			2950
16	1040+00	1052+00	2,400	3,000	66	130				2,771			3000
17	1052+00	1064+00	2,502	3,040	228	2,014	200			2,633			3040
18	1064+00	1076+00	3,987	2,780	6	1,188	130			4,400	417	254	2780
19	1076+00	1088+00	3,209	2,900	153	526	317	198		3,600	34	6	2900
20	1088+00	1099+34.05	2,468	2,880		907		288	433	2,302			2,880
37	GREENS ROAD		384	50	104	479			603				50
38	RANKIN ROAD		80	100	98	442			356				100
39	WILL CLAYTON PARKWAY		80	190	216	776			424				190
40	FM 1960 BUSINEES		568	80	208	706			857				80
<b>SUBTOTAL CSJ: 0177-07-118</b>			<b>56,233</b>	<b>63,060</b>	<b>1,634</b>	<b>25,421</b>	<b>7,476</b>	<b>3,437</b>	<b>3,498</b>	<b>58,540</b>	<b>2,657</b>	<b>1,546</b>	<b>63,060</b>
20	1099+34.05	1100+00	132	240				12		132			240
21	1100+00	1112+00	2,440	2,890		2,330	97		124	2,400			2,890
22	1112+00	1124+00	3,295	3,300	261	1,728	215			3,519	407	198	3,300
23	1124+00	1136+00	2,612	3,700		732	290			3,054	52	50	3,700
24	1136+00	1148+00	2,400	3,720		452	254	72	22	2,400			3,720
25	1148+00	1160+00	2,559	3,240	69	1,761	614			2,541			3,240
26	1160+00	1172+00	5,978	3,020		1,684	312			6,221			3,020
27	1172+00	1184+00	4,432	2,940		2,378	856	132	37	4,740			2,940
28	1184+00	1196+00	2,400	3,230			286	300		2,400			3,230
29	1196+00	1208+00	2,400	3,160		558	246	249		2,403	136	121	3,160
30	1208+00	1220+00	2,560	3,000		1,278	378	267		2,400	775	614	3,000
31	1220+00	1232+00	2,400	3,140		794	1,648	159		2,400			3,140
32	1232+00	1238+36.29	1,582	1,870		572	130	39		1,723			1,870
41	FM 1960		160	160	262	950	186		296		276	225	160
<b>SUBTOTAL CSJ: 0177-06-089</b>			<b>35,350</b>	<b>37,610</b>	<b>592</b>	<b>15,217</b>	<b>5,512</b>	<b>1,229</b>	<b>479</b>	<b>36,333</b>	<b>1,646</b>	<b>1,208</b>	<b>37,610</b>
32	1238+36.29	1244+00	1,360	1,680		1,100	229			1,575			1,680
33	1244+00	1256+00	2,400	3,600	108	632	130			2,400			3,600
34	1256+00	1268+00	2,554	3,350		854	470		27	2,702			3,350
35	1268+00	1280+00	2,488	3,000		1,854	300	144		3,297			3,000
36	1280+00	E.O.P	2,164	2,500		1,884		249	388	2,004			2,500
42	KINGWOOD DRIVE		601	70	240	656			840				70
<b>SUBTOTAL CSJ: 0177-05-118</b>			<b>11,567</b>	<b>14,200</b>	<b>348</b>	<b>6,980</b>	<b>1,129</b>	<b>393</b>	<b>1,255</b>	<b>11,978</b>	<b>0</b>	<b>0</b>	<b>14,200</b>
<b>PROJECT TOTALS</b>			<b>103,150</b>	<b>114,870</b>	<b>2,574</b>	<b>47,618</b>	<b>14,117</b>	<b>5,059</b>	<b>5,232</b>	<b>106,851</b>	<b>4,303</b>	<b>2,754</b>	<b>114,870</b>

**NOTE:**  
REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

**SUMMARY OF  
PERMANENT  
PAVEMENT MARKING  
QUANTITIES**

SHEET 4 OF 4



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CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC		12

DATE:  
FILE:

PLAN SHEET NO.	SIGN SHEET NO.	SIGN TYPE	SIGN TEXT	SIGN DIMENSIONS	ALUMINUM TYPE A		PLYWOOD TYPE A	
					X		X	
4	1	W9-1L	PROPOSED	36X36	X		X	
				36X36	X		X	
				36X36	X		X	
10	1	W9-1L		36X36				
				36X36				
				36X36				
12	1	W9-1L		36X36				
				36X36				
				36X36				
SUB TOTAL CSJ 0177-07-118					3		3	
PROJECT TOTAL								

644-INS SM RD SN SUP & AM

636

6001	6002	6004	6005	6007	6009	6012	6027	6028	6030	6031	6033	6034	6036	6042	6064	6065	6090	6001	6007
TY 10BWG (1) SA (P)	TY 10BWG (1) SA (P-BM)	TY 10BWG (1) SA (T)	TY 10BWG (1) SA (T-2EXT)	TY 10BWG (1) SA (U)	TY 10BWG (1) SB (P)	TY 10BWG (1) SB (T)	TY S80 (1) SA (P)	TY S80 (1) SA (P-BM)	TY S80 (1) SA (T)	TY S80 (1) SA (T-2EXT)	TY S80 (1) SA (U)	TY S80 (1) SA (U-1EXT)	TY S80 (1) SA (U-BM)	TY S80 (1) SB (T)	IN BRIDGE MNT CLR SGN ASSM (TY N)	IN BRIDGE MNT CLR SGN ASSM (TY S)	(RAIL)(130MPH)(U MOUNT)	ALUM SIGNS (TY A)	REPLACE EXT ALUM SIGNS (TY A)

Sign support shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.

**ALUMINUM SIGN BLANKS (TYPE A)**

Square Ft.	Min. Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

**SUMMARY OF SMALL SIGNS**

© TxDOT 2022 SHEET 1 OF 1

STATE DISTRICT	FEDERAL REGION	PROJECT NO.	SHEET	
HOU	6	C 177-7-118, etc.	13	
COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
HARRIS, etc.	0177	07	118	IH 69

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DATE: DATE TIME  
 FILE: DOCUMENT NAME

**BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:**

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

**WORKER SAFETY NOTES:**


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

**COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES**

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

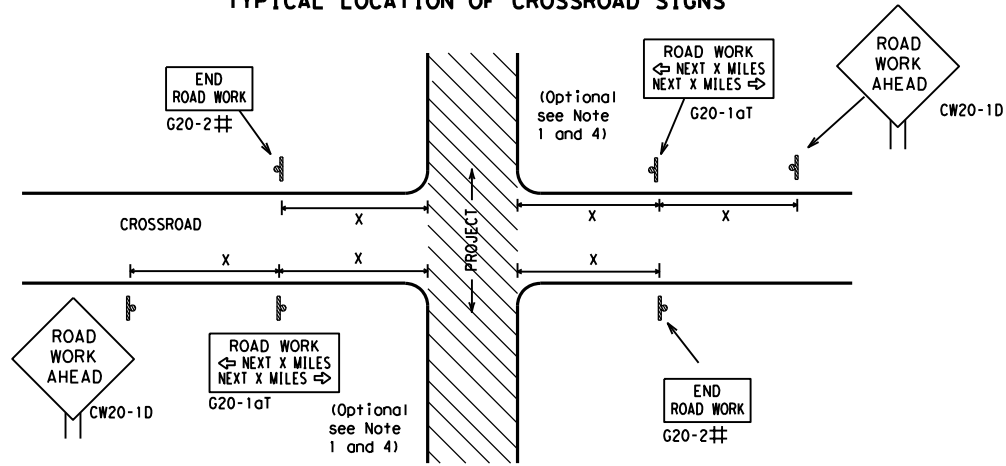
<b>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT</b> <a href="http://www.txdot.gov">http://www.txdot.gov</a>
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD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

SHEET 1 OF 12

 Texas Department of Transportation		Traffic Safety Division Standard	
<b>BARRICADE AND CONSTRUCTION          GENERAL NOTES          AND REQUIREMENTS</b>			
<b>BC (1) - 21</b>			
FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	DW: TxDOT
© TxDOT November 2002	CONT	SECT	JOB
	0177	07	118, etc.
4-03 7-13			IH 69
9-07 8-14	DIST	COUNTY	SHEET NO.
5-10 5-21	HOU	Harris, etc.	14

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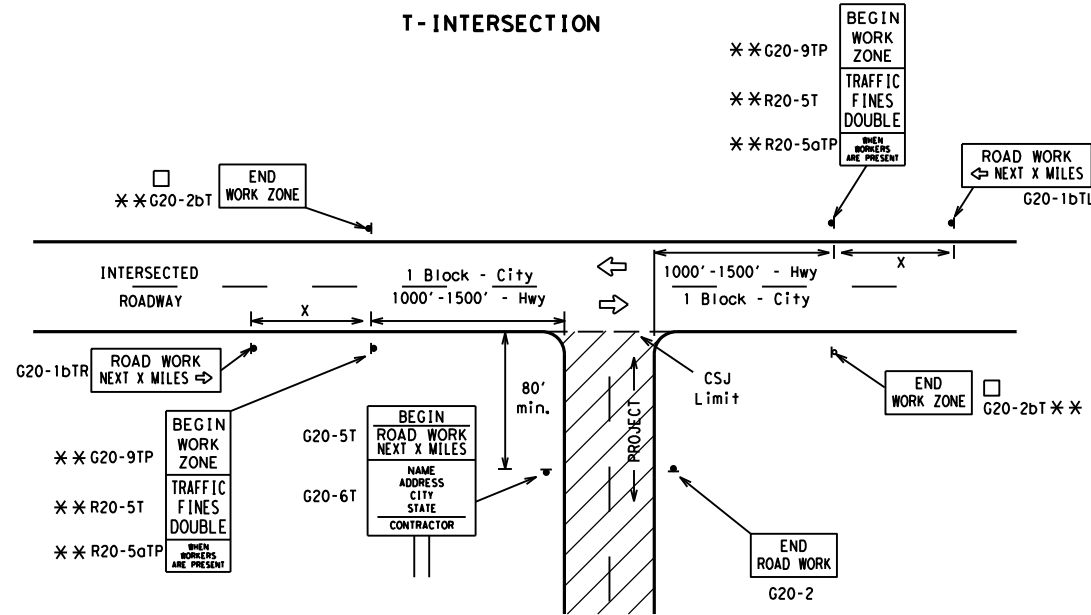
**TYPICAL LOCATION OF CROSSROAD SIGNS**



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

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

**T-INTERSECTION**



**CSJ LIMITS AT T-INTERSECTION**

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

**TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING<sup>1,5,6</sup>**

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 <sup>4</sup>	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 <sup>2</sup>
			65	700 <sup>2</sup>
			70	800 <sup>2</sup>
			75	900 <sup>2</sup>
			80	1000 <sup>2</sup>
			*	* <sup>3</sup>

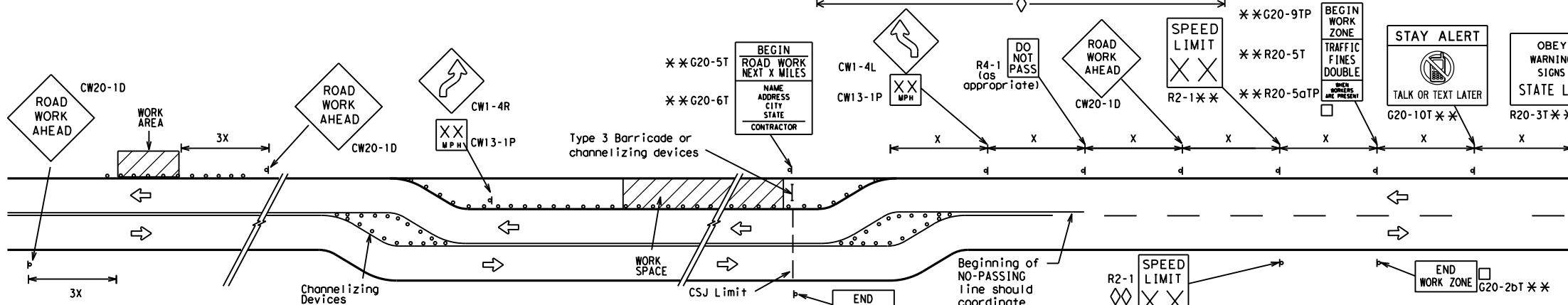
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

**GENERAL NOTES**

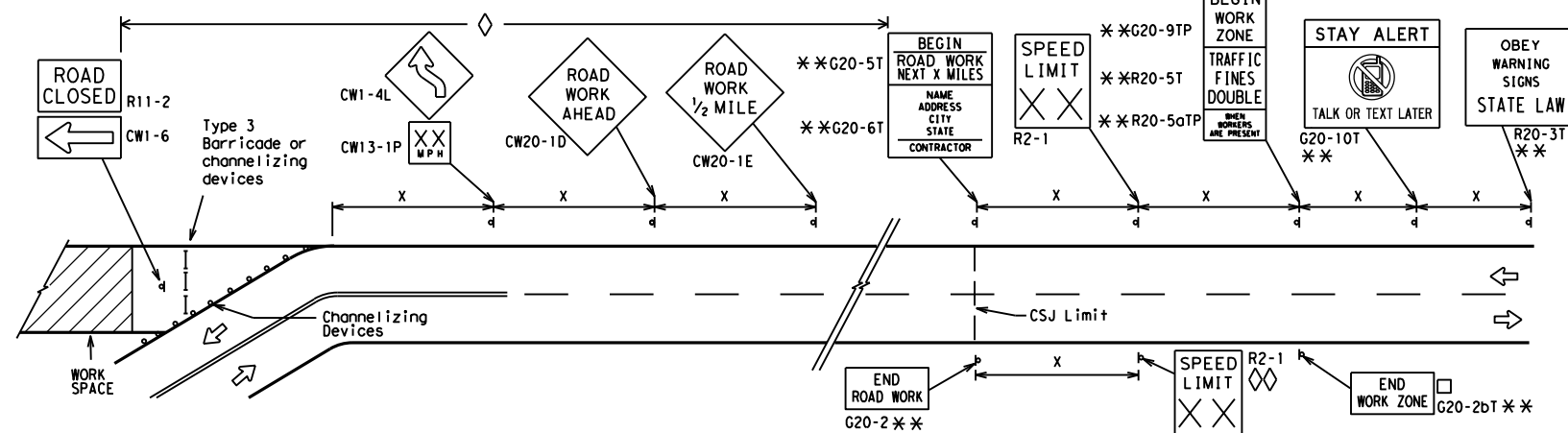
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may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

**WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS**

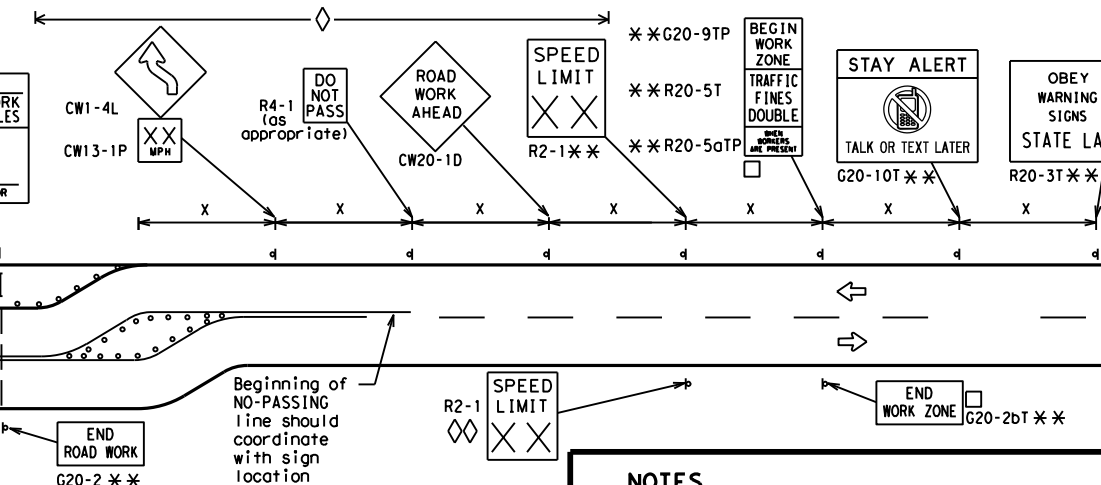


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



**SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS**



**NOTES**

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "x" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
- CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
- Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
- Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12



**BARRICADE AND CONSTRUCTION PROJECT LIMIT**

**BC(2)-21**

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	HOU	Harris, etc.	15	

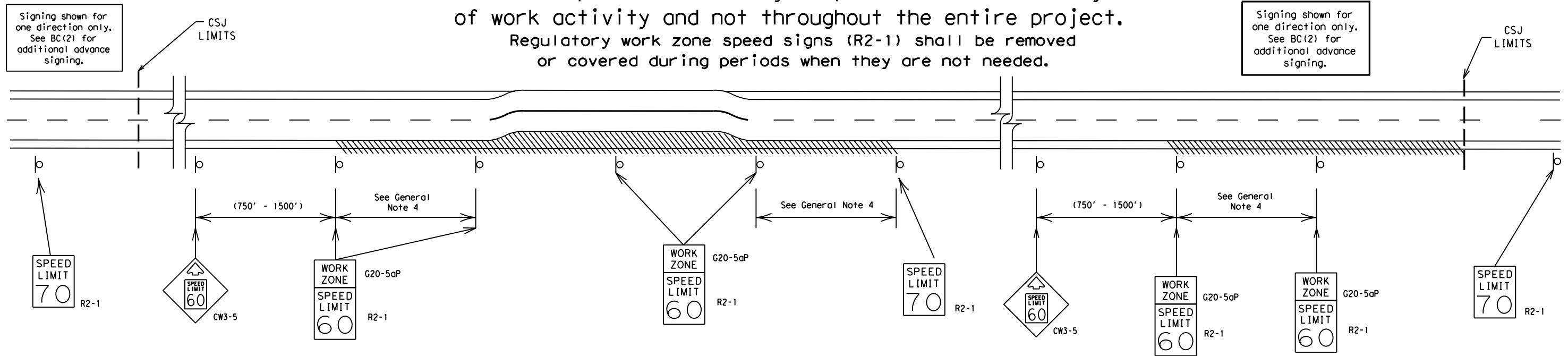
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# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

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

### SHORT TERM WORK ZONE SPEED LIMITS

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

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

## GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- 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
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- 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.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
  - Law enforcement.
  - Flagger stationed next to sign.
  - Portable changeable message sign (PCMS).
  - Low-power (drone) radar transmitter.
  - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- 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.

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SHEET 3 OF 12



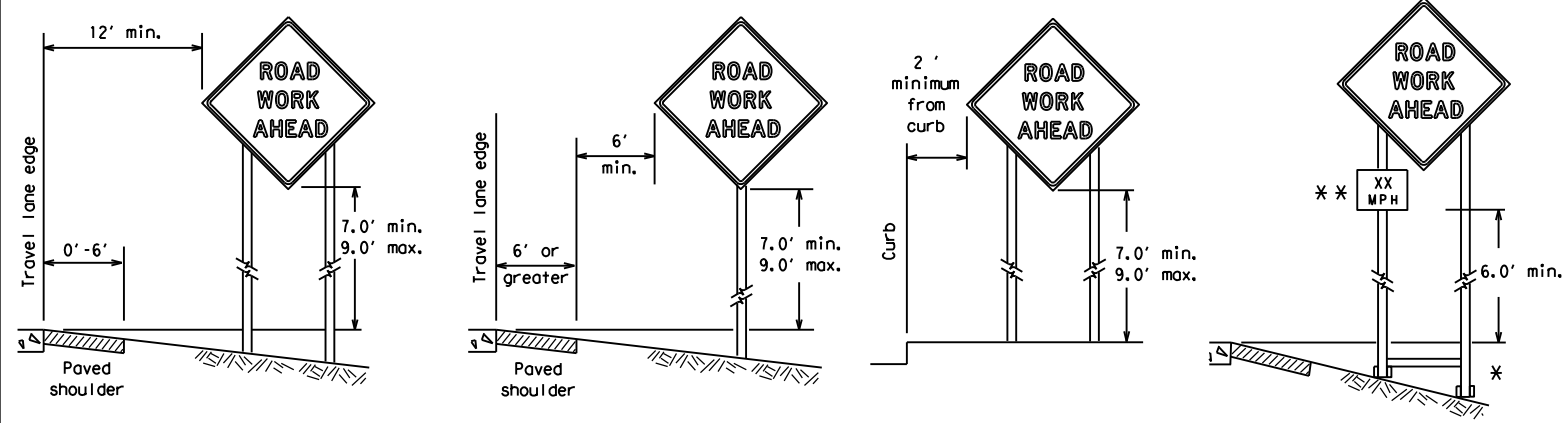
## BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 21

FILE:	bc-21.dgn	DW:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0177	07	118, etc.	IH 69				
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	HOU	Harris, etc.	16					

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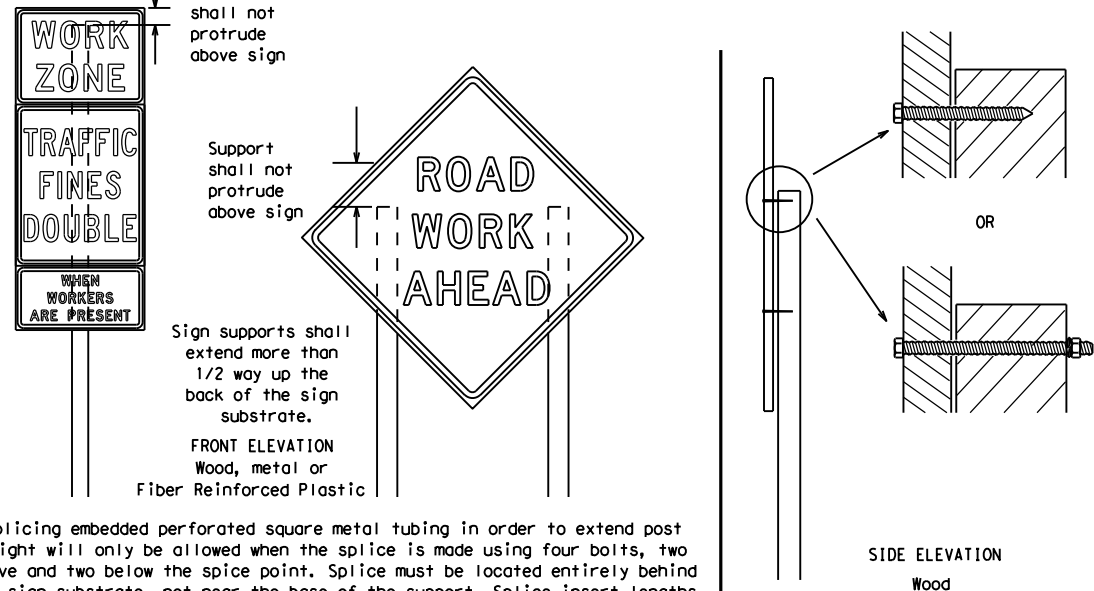
**TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS**



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

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

**ATTACHMENT FOR SIGN SUPPORTS**



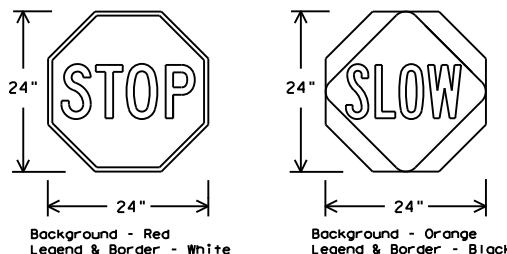
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

**STOP/SLOW PADDLES**

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



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B <sub>FL</sub> OR C <sub>FL</sub> SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

**CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS**

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

**GENERAL NOTES FOR WORK ZONE SIGNS**

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

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

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

**SIGN MOUNTING HEIGHT**

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

**SIZE OF SIGNS**

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

**SIGN SUBSTRATES**

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

**REFLECTIVE SHEETING**

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



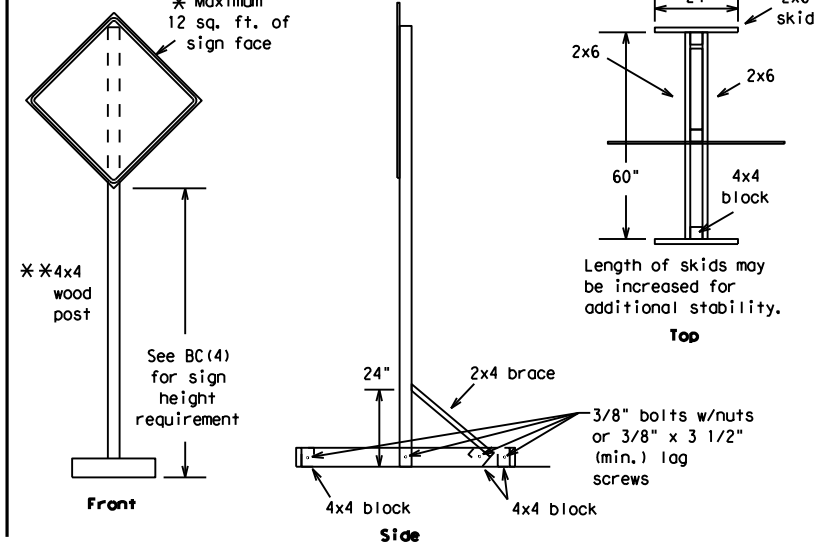
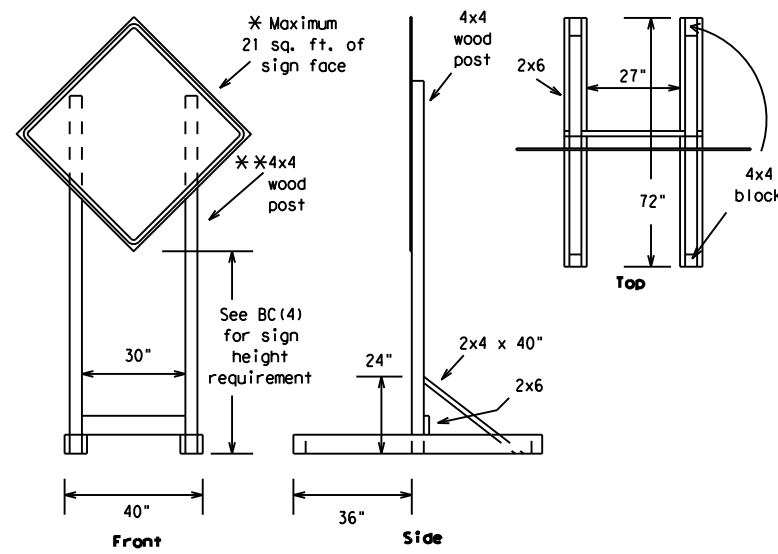
**BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES**

**BC (4) - 21**

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REVISIONS		0177	07	118, etc.	IH 69				
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	HOU	Harris, etc.	17					

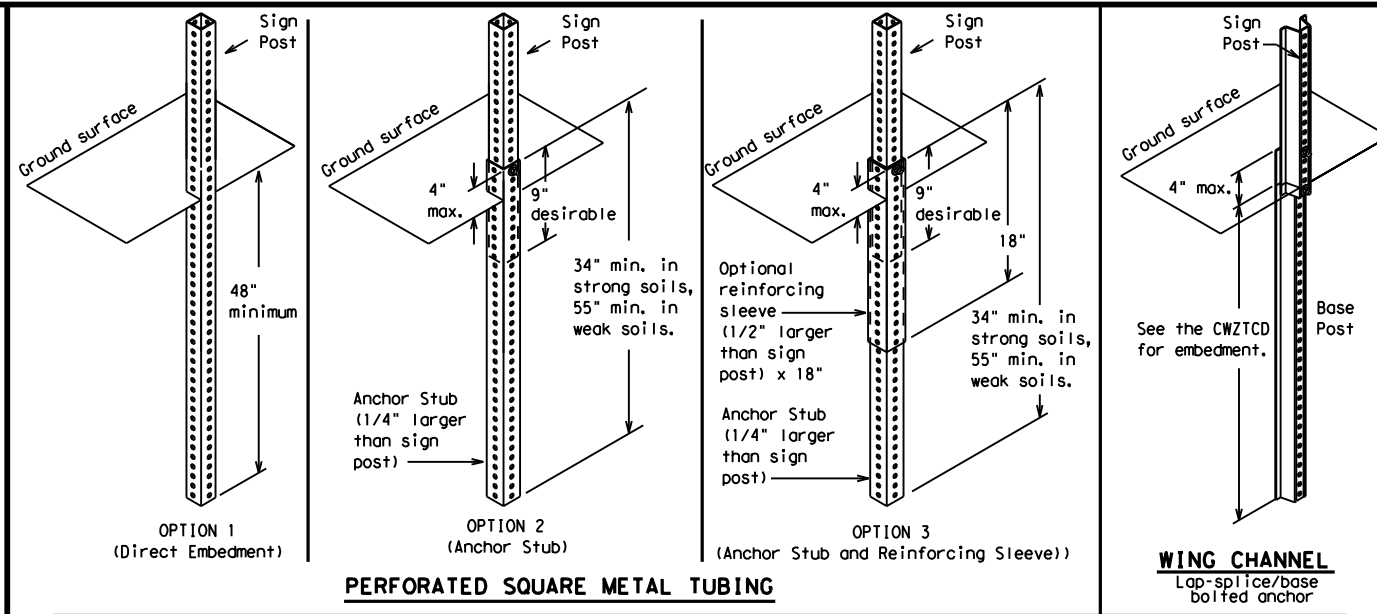
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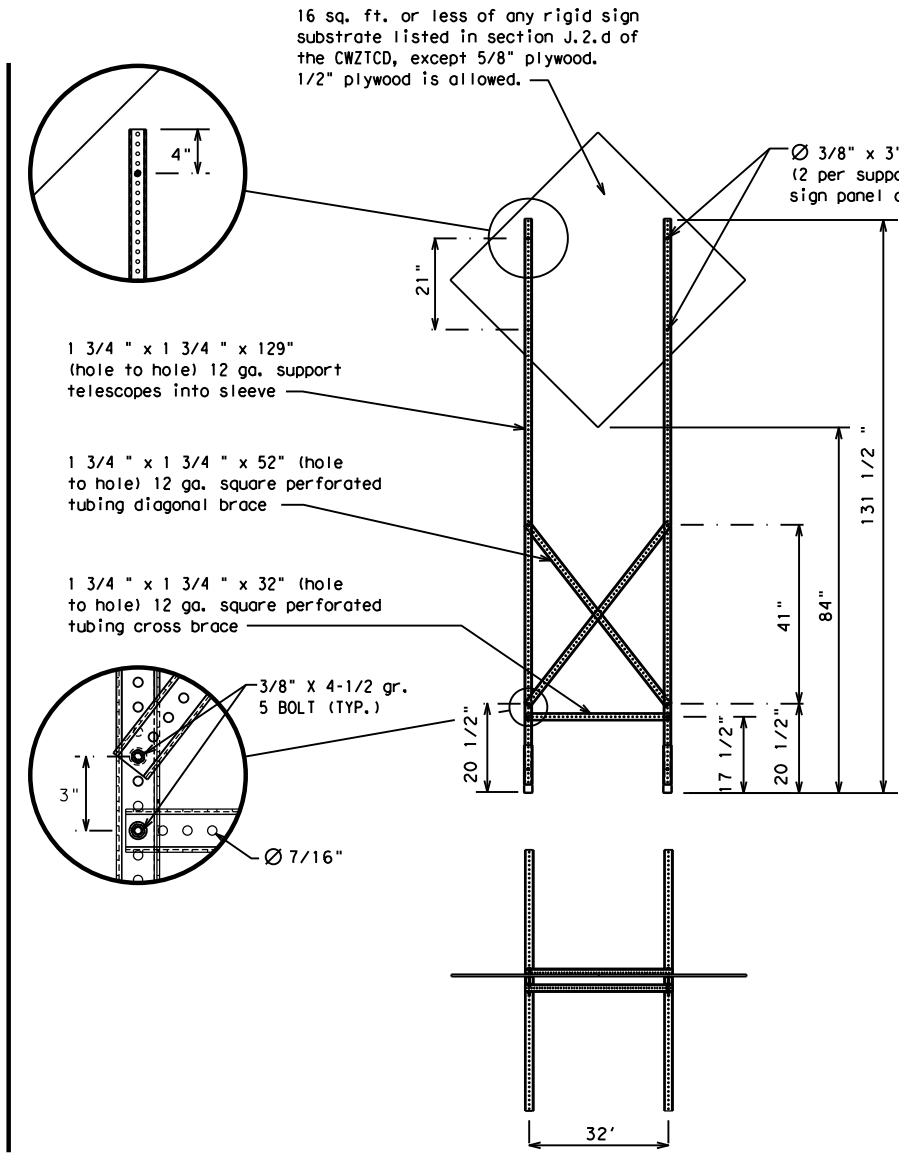
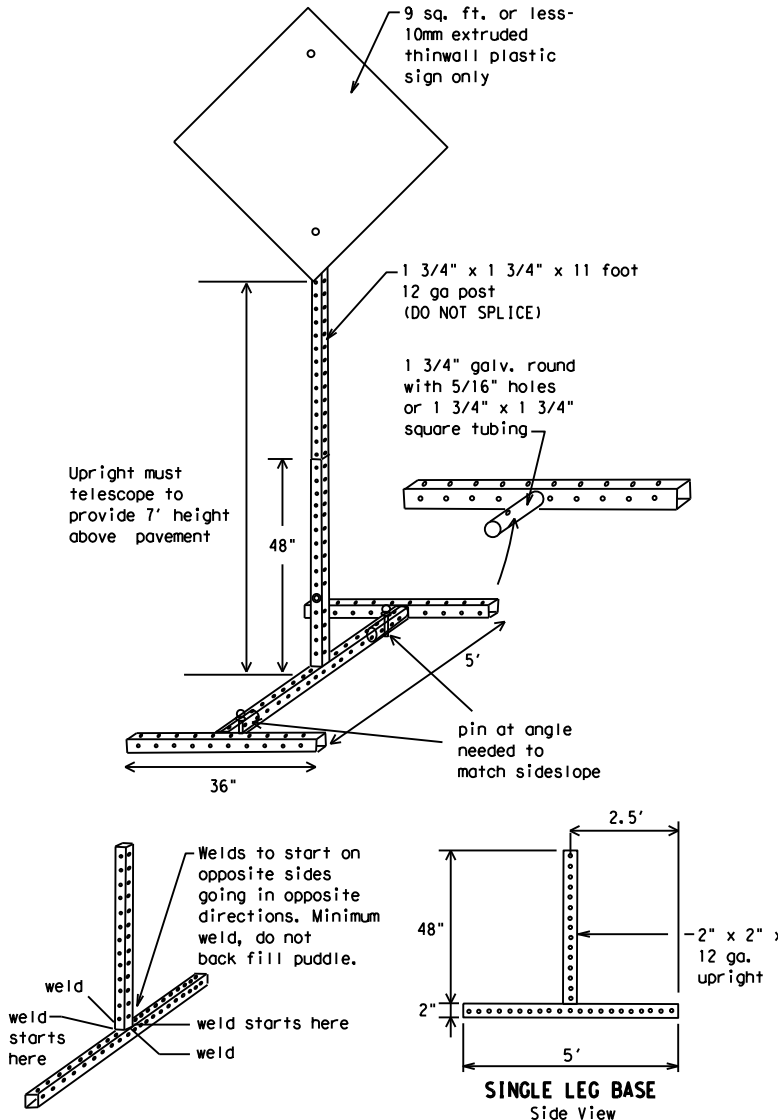
### SKID MOUNTED WOOD SIGN SUPPORTS

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



### GROUND MOUNTED SIGN SUPPORTS

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



### SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

### WEDGE ANCHORS

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

### OTHER DESIGNS

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

### GENERAL NOTES

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

- \* See BC(4) for definition of "Work Duration."
- \*\* Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
- See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



## BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

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REVISIONS		0177	07	118, etc.	IH 69				
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DATE: DATE TIME  
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

## PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- 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.
- 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.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- 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.
- 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.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- 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.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- 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.
- 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.
- Each line of text should be centered on the message board rather than left or right justified.
- 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.

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## 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
XXXXXXXX TO XXXXXX
US XXX TO FM XXXX

### Warning List

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

### \*\* Advance Notice List

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

\*\* See Application Guidelines Note 6.

WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canal	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	HWY	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

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

## APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- 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.
- 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

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- 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

- 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.
- 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.
- 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.
- 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.

SHEET 6 OF 12



# BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

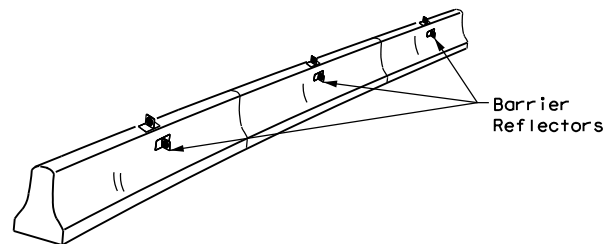
BC (6) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177 07	118, etc.	IH 69	
9-07 8-14	DIST	COUNTY	SHEET NO.	
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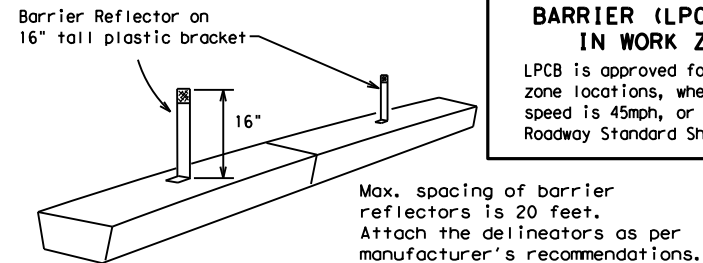
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



**CONCRETE TRAFFIC BARRIER (CTB)**

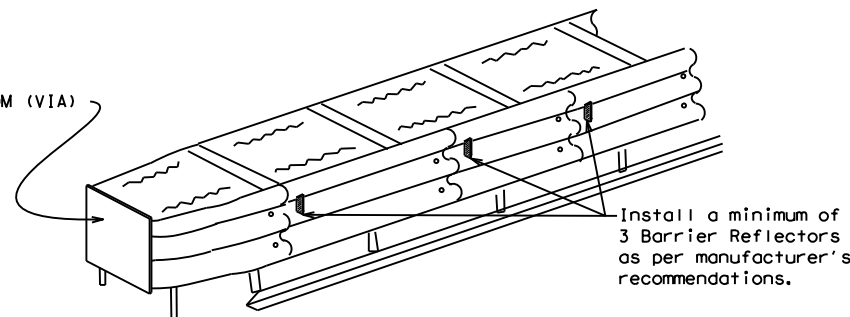
- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector.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



**LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES**

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

**LOW PROFILE CONCRETE BARRIER (LPCB)**



**DELINEATION OF END TREATMENTS**

**END TREATMENTS FOR CTB'S USED IN WORK ZONES**

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

**BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS**

**WARNING LIGHTS**

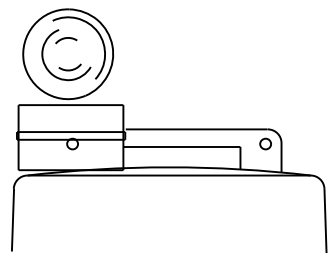
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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<sub>FL</sub> or C<sub>FL</sub> Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- 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".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- 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.
- 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.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

**WARNING LIGHTS MOUNTED ON PLASTIC DRUMS**

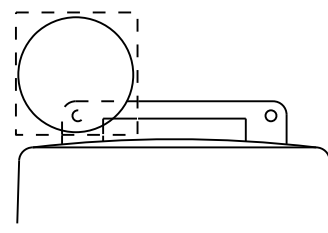
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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.
- 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.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- 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**

- 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.
- 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.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- 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.
- 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.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



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

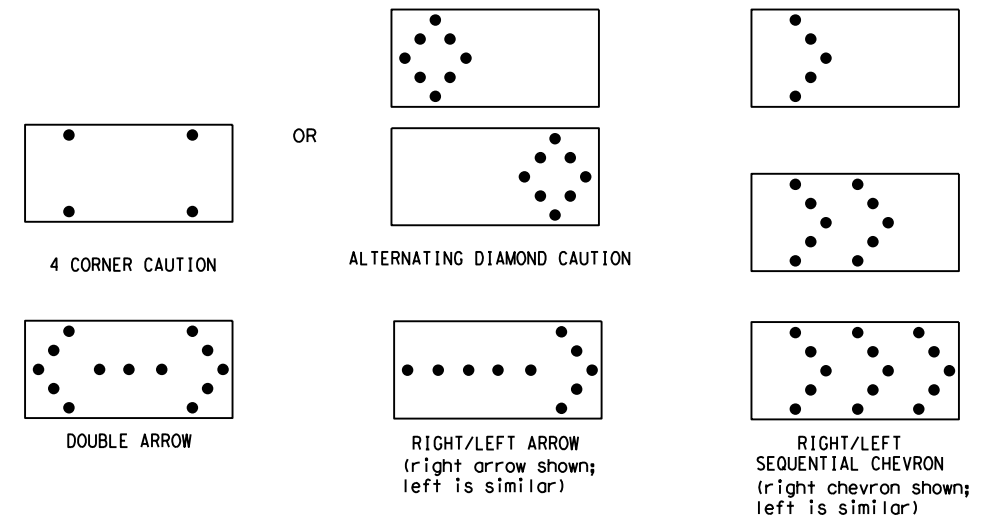


Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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 FILE: DOCUMENT NAME

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.

- 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.
- 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.
- 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.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- 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.
- 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.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- 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.
- 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**

SHEET 7 OF 12

**TRUCK-MOUNTED ATTENUATORS**

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- 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.
- 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.



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

**BC (7) -21**

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	OW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	1H 69
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	HOU	Harris, etc.	20	

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**GENERAL NOTES**

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- 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.
- 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.
- 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).
- 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.
- 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:

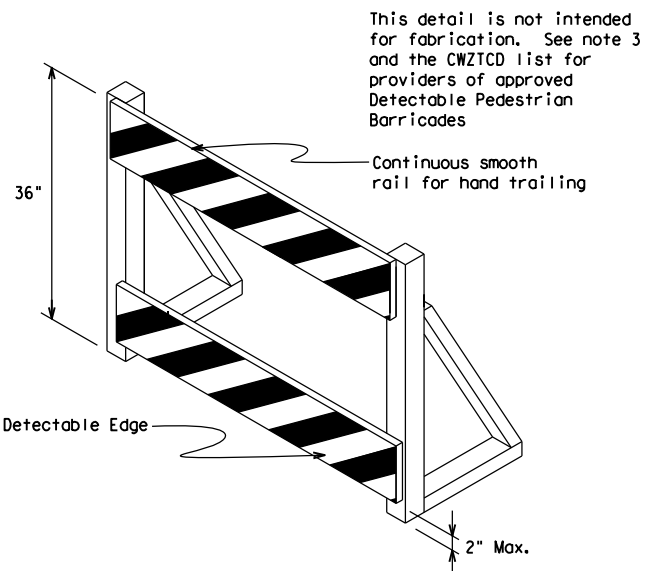
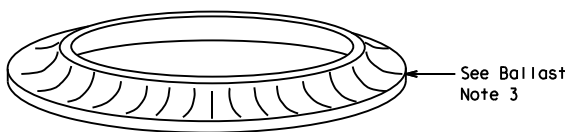
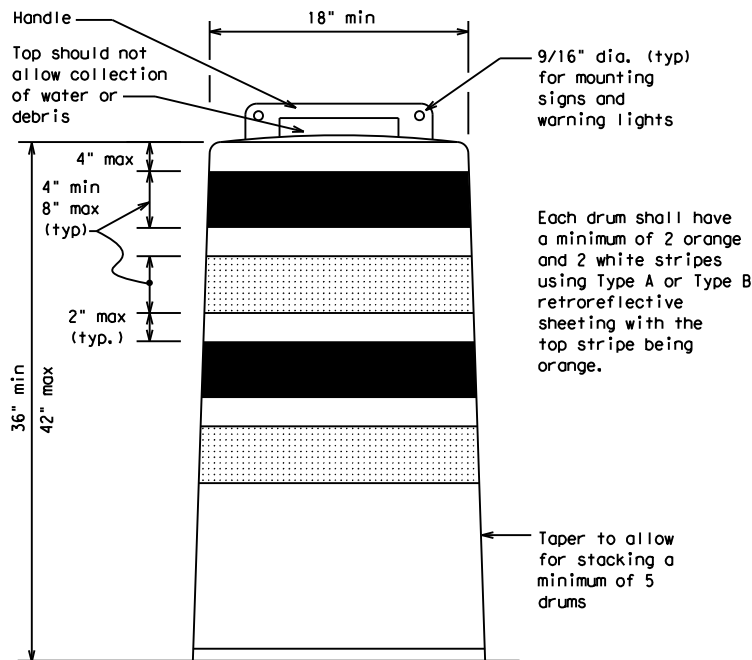
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- 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.
- 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.
- 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.
- 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.
- 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.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

**RETROREFLECTIVE SHEETING**

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

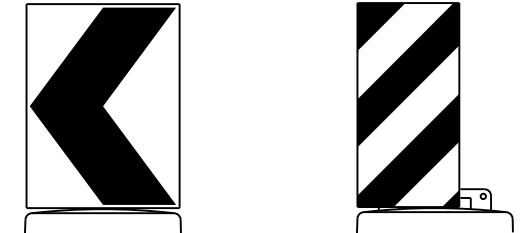
**BALLAST**

- 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.
- 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.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- 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.
- 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.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.



**DETECTABLE PEDESTRIAN BARRICADES**

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



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

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

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

**SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS**

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B<sub>FL</sub> or Type C<sub>FL</sub> Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- 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.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- 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.
- 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.

SHEET 8 OF 12



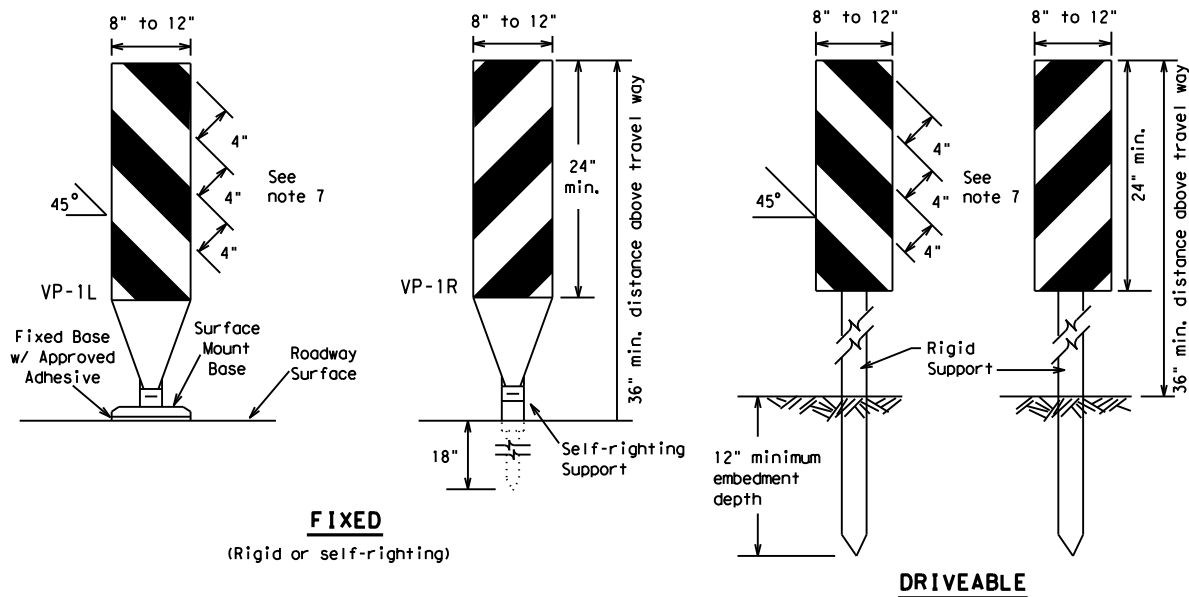
**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (8) - 21**

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REVISIONS		0177	07	118, etc.				IH	69
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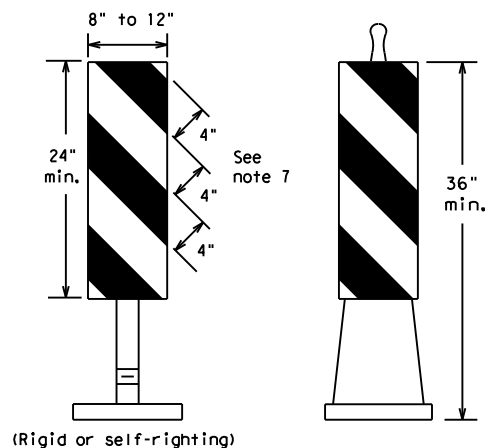
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**FIXED**  
(Rigid or self-righting)

**DRIVEABLE**

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

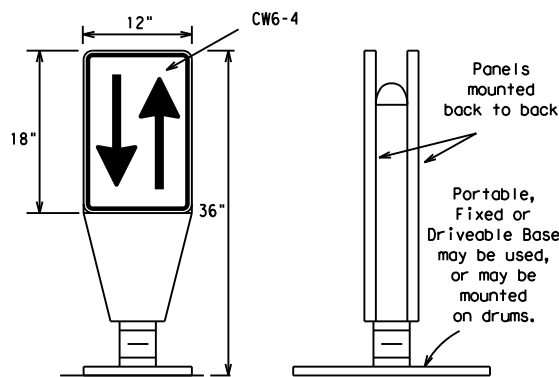


(Rigid or self-righting)

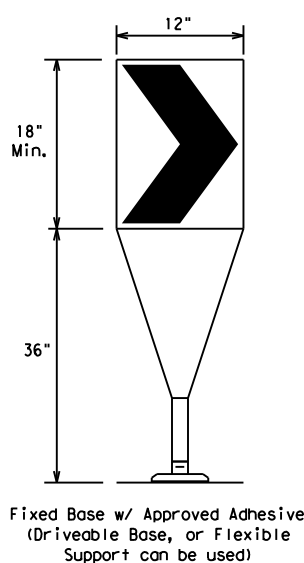
**PORTABLE**

**VERTICAL PANELS (VPs)**

- 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.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B<sub>FL</sub> or Type C<sub>FL</sub> conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

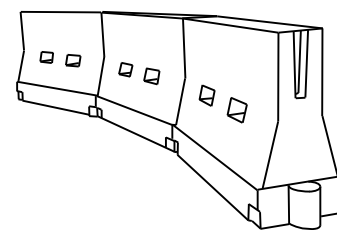


**OPPOSING TRAFFIC LANE DIVIDERS (OTLD)**



- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- 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.
- 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.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B<sub>FL</sub> or Type C<sub>FL</sub> conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- 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**



**LONGITUDINAL CHANNELIZING DEVICES (LCD)**

- 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.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

**WATER BALLASTED SYSTEMS USED AS BARRIERS**

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
- 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.
- 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.
- 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.
- 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**

**GENERAL NOTES**

- 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).
- 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.
- 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).
- 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.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- 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.
- 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.

Posted Speed	Formula	Minimum Desirable Taper Lengths * *			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS <sup>2</sup> / 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



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (9) - 21**

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0177	07	118, etc.		IH 69			
9-07	8-14	DIST	COUNTY		SHEET NO.				
7-13	5-21	HOU	Harris, etc.		22				

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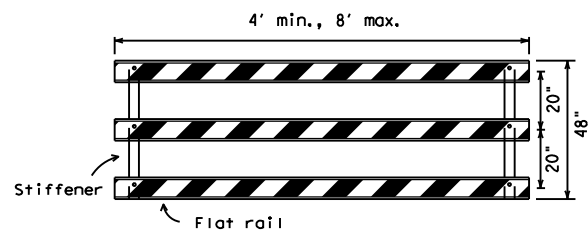
**TYPE 3 BARRICADES**

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

Barricades shall NOT be used as a sign support.



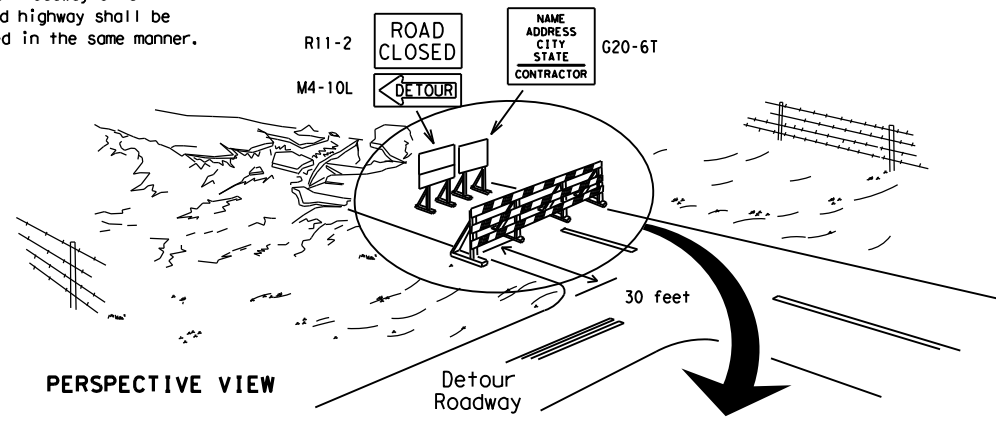
**TYPICAL STRIPING DETAIL FOR BARRICADE RAIL**



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

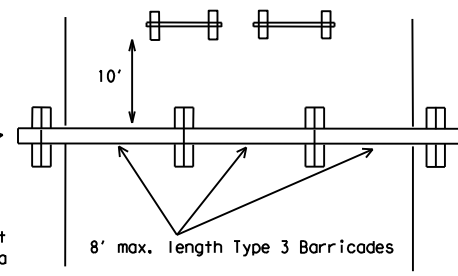
**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**

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



PERSPECTIVE VIEW

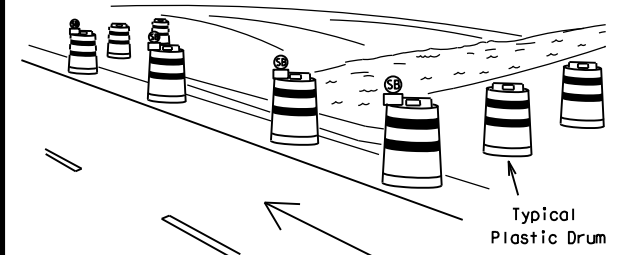
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



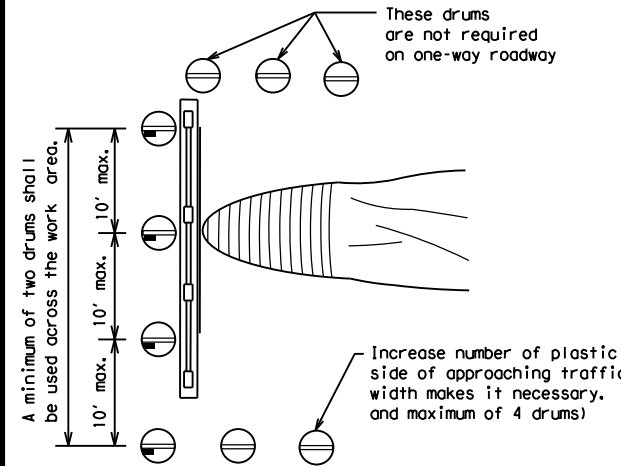
PLAN VIEW

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

**TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION**



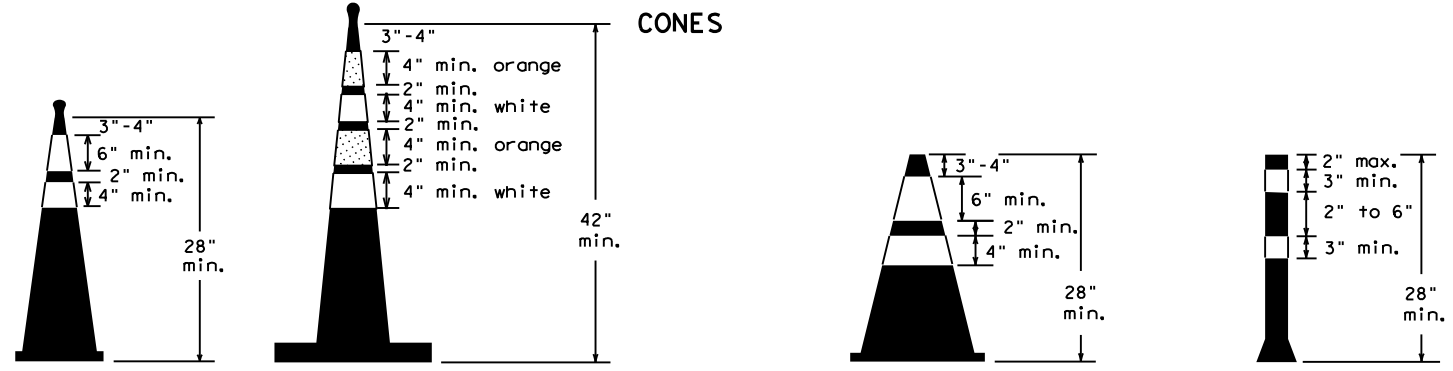
PERSPECTIVE VIEW



PLAN VIEW

**CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS**

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



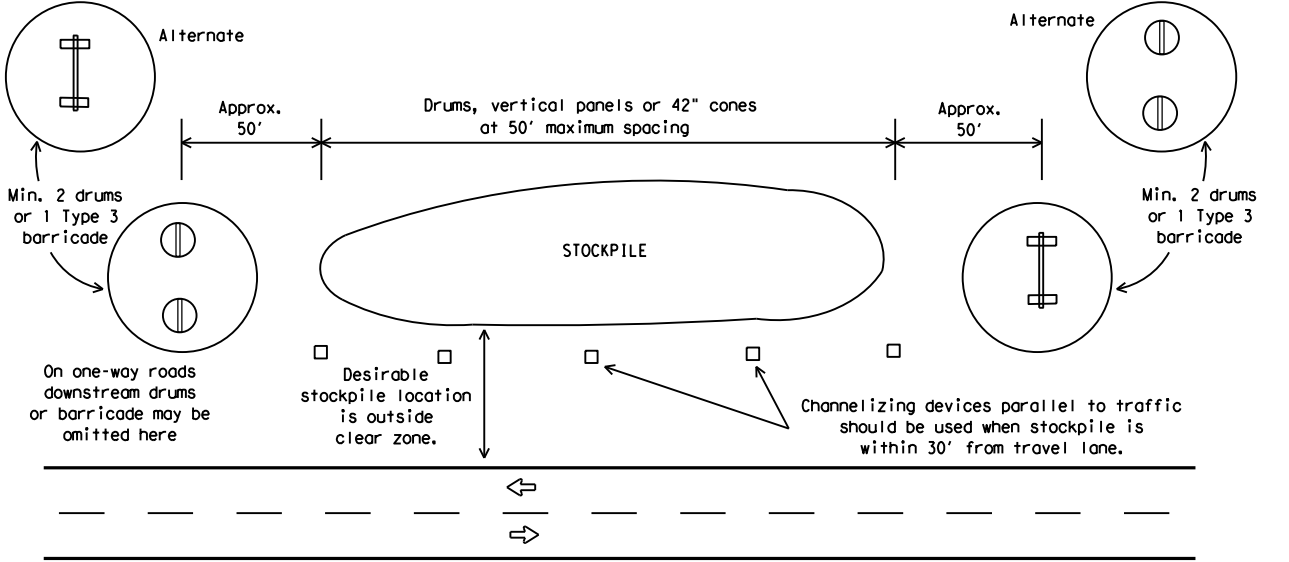
Two-Piece cones

One-Piece cones

Tubular Marker

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

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



**TRAFFIC CONTROL FOR MATERIAL STOCKPILES**



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (10) - 21**

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
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REVISIONS	0177	07	118, etc.	IH 69
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	HOU	Harris, etc.	23	

DATE: DATE TIME  
FILE: DOCUMENT NAME



## WORK ZONE PAVEMENT MARKINGS

### GENERAL

- 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.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- 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).
- 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.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

### RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- 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

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

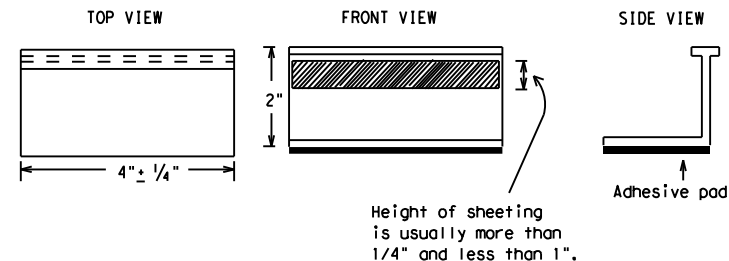
### MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- 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.
- 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.
- 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

- 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.
- 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.
- 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".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- 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.
- 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**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- 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.
  - 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.
  - 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.
- Small design variances may be noted between tab manufacturers.
- 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

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- 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).

SHEET 11 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

**BC(11)-21**

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS		0177 07 118, etc. IH 69		
2-98 9-07 5-21	DIST	COUNTY	SHEET NO.	
1-02 7-13	HOU	Harris, etc.	24	
11-02 8-14				

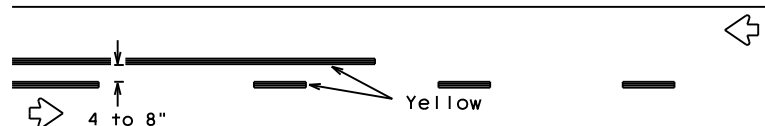
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## PAVEMENT MARKING PATTERNS

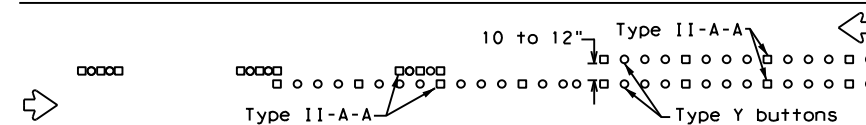


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

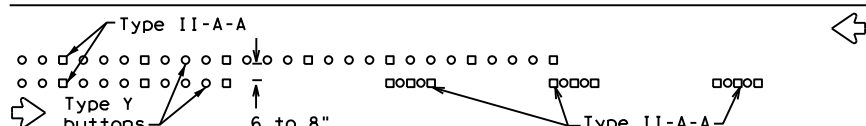


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.



RAISED PAVEMENT MARKERS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN B

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



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



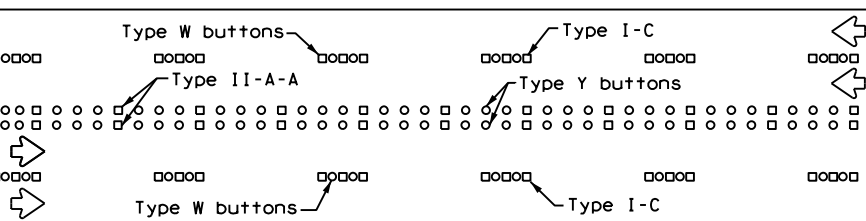
RAISED PAVEMENT MARKERS

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



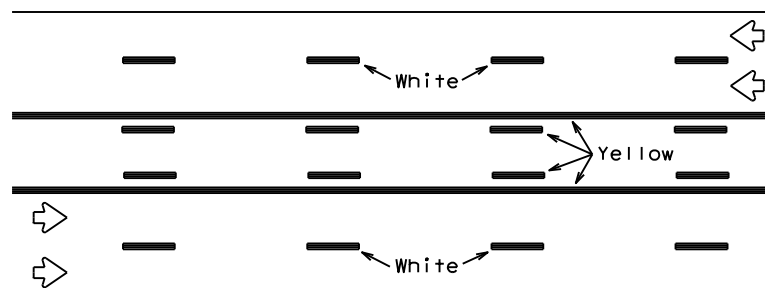
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



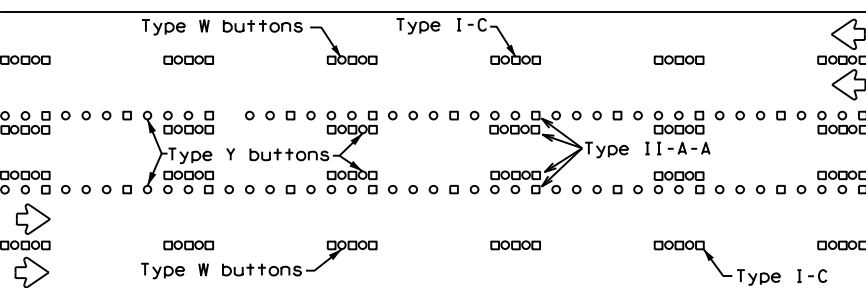
RAISED PAVEMENT MARKERS

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



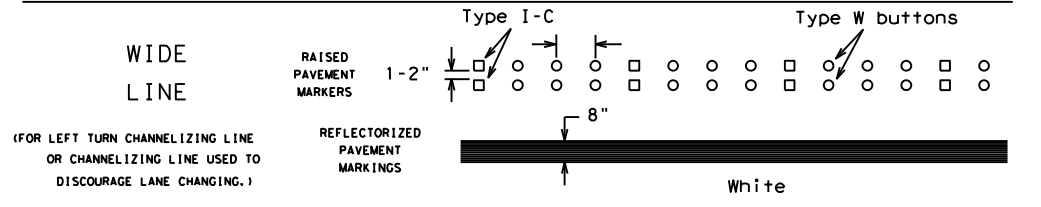
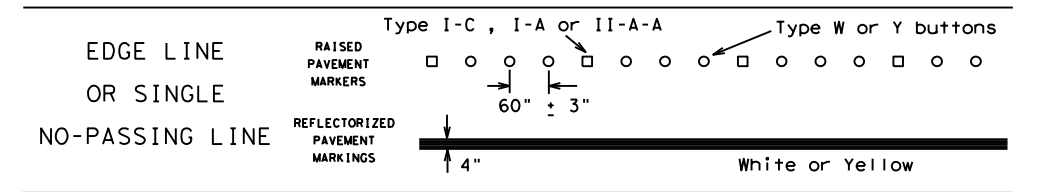
RAISED PAVEMENT MARKERS

## TWO-WAY LEFT TURN LANE

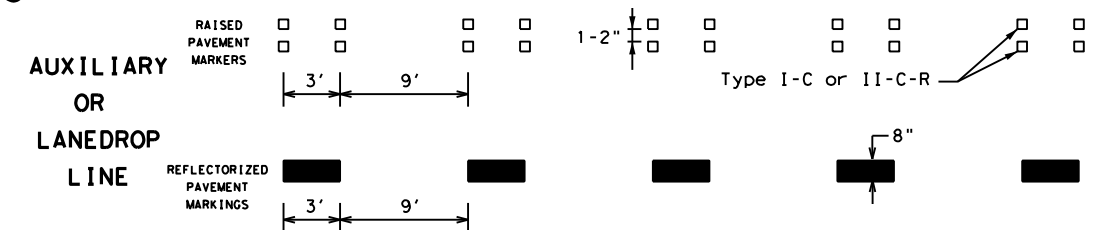
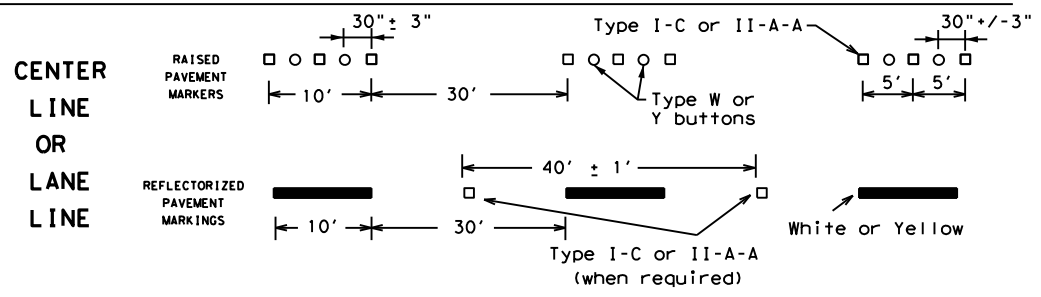
## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



### SOLID LINES

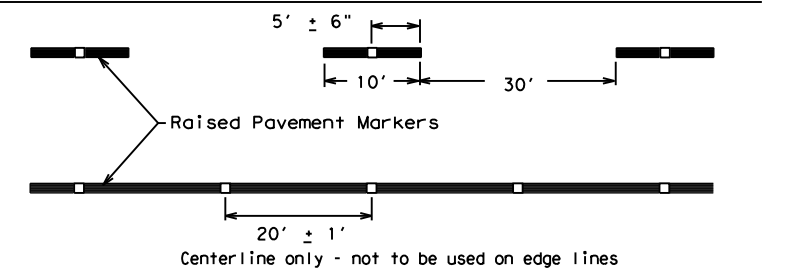


### BROKEN LINES



### 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.



SHEET 12 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
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REVISIONS	0177	07	118, etc.	IH 69
1-97 9-07 5-21	DIST	COUNTY	SHEET NO.	
2-98 7-13	HOU	Harris, etc.	25	
11-02 8-14				

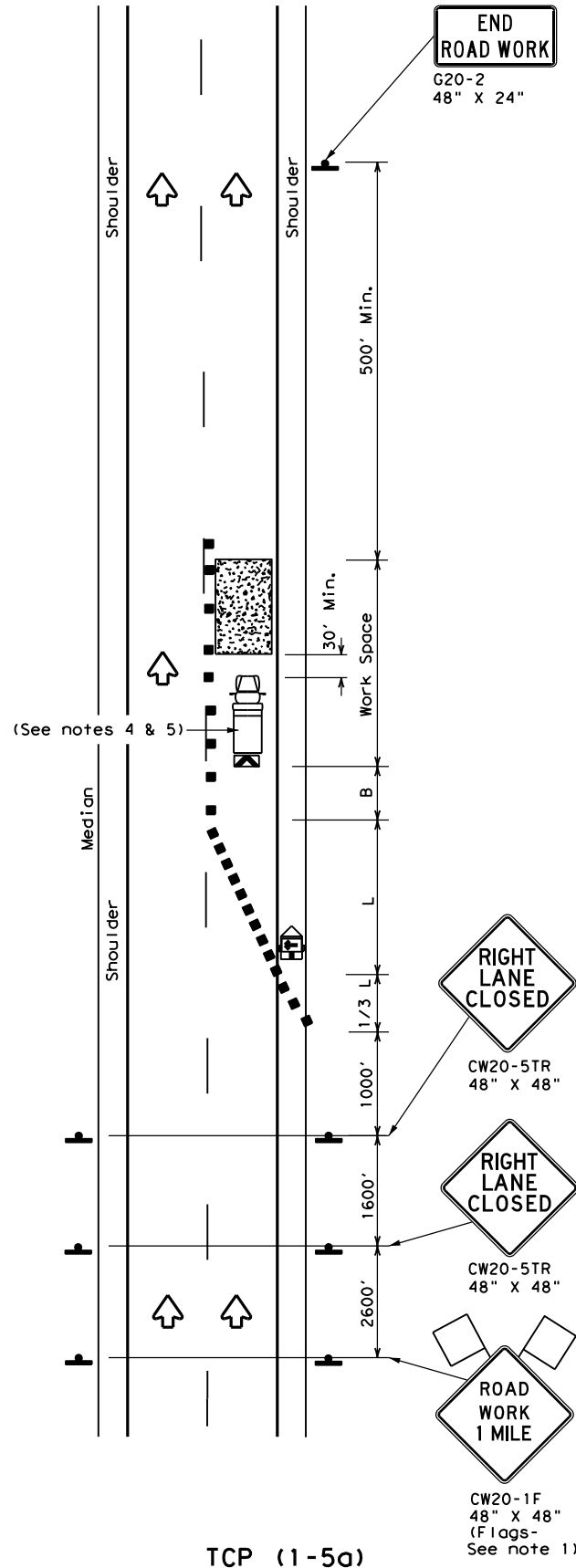
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

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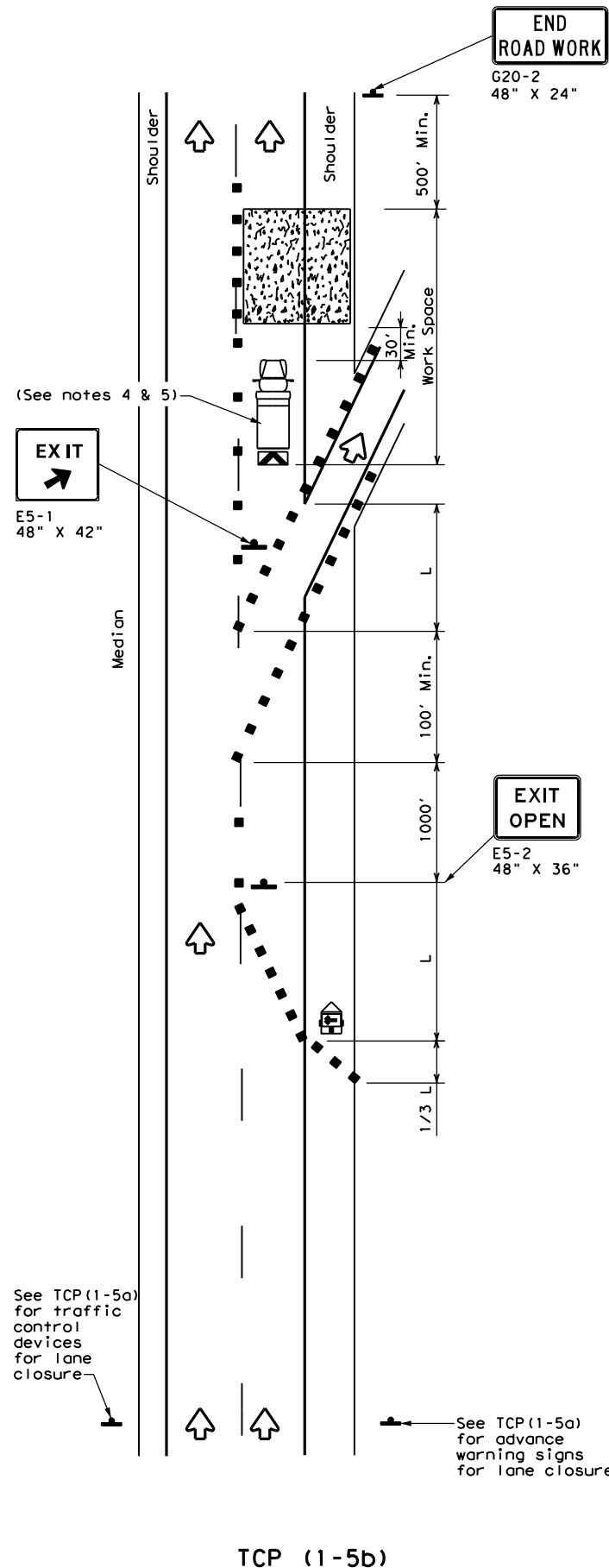
DATE: DATE TIME  
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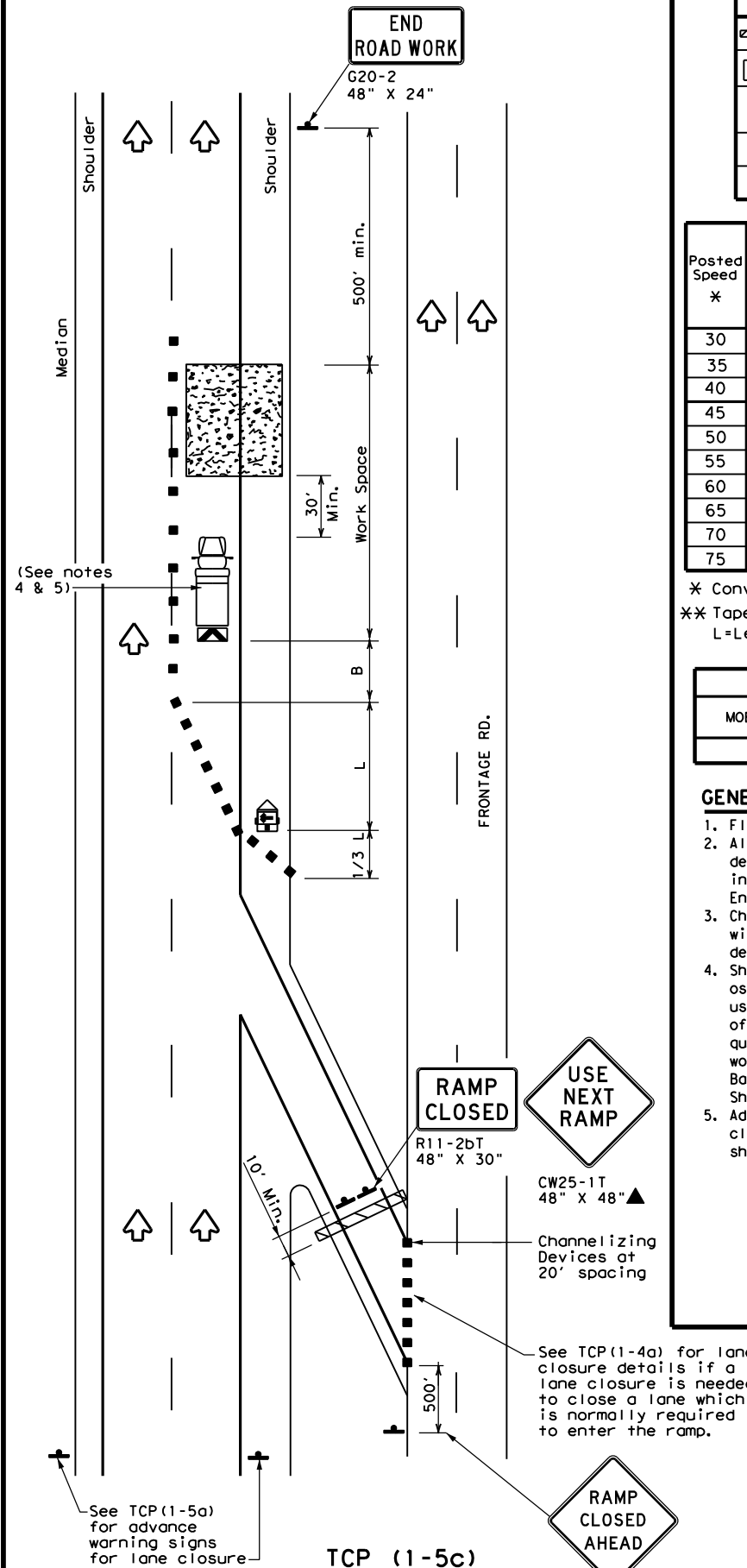
DATE: DATE TIME  
FILE: DOCUMENT NAME



TCP (1-5a)  
**ONE LANE CLOSURE**



TCP (1-5b)  
**LANE CLOSURE NEAR EXIT RAMP**



TCP (1-5c)  
**LANE CLOSURE NEAR ENTRANCE RAMP**

LEGEND			
	Type 3 Barricade		Channelizing Devices
	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 **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
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**
- Flags attached to signs where shown, are REQUIRED.
  - 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.
  - 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.
  - 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.
  - 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

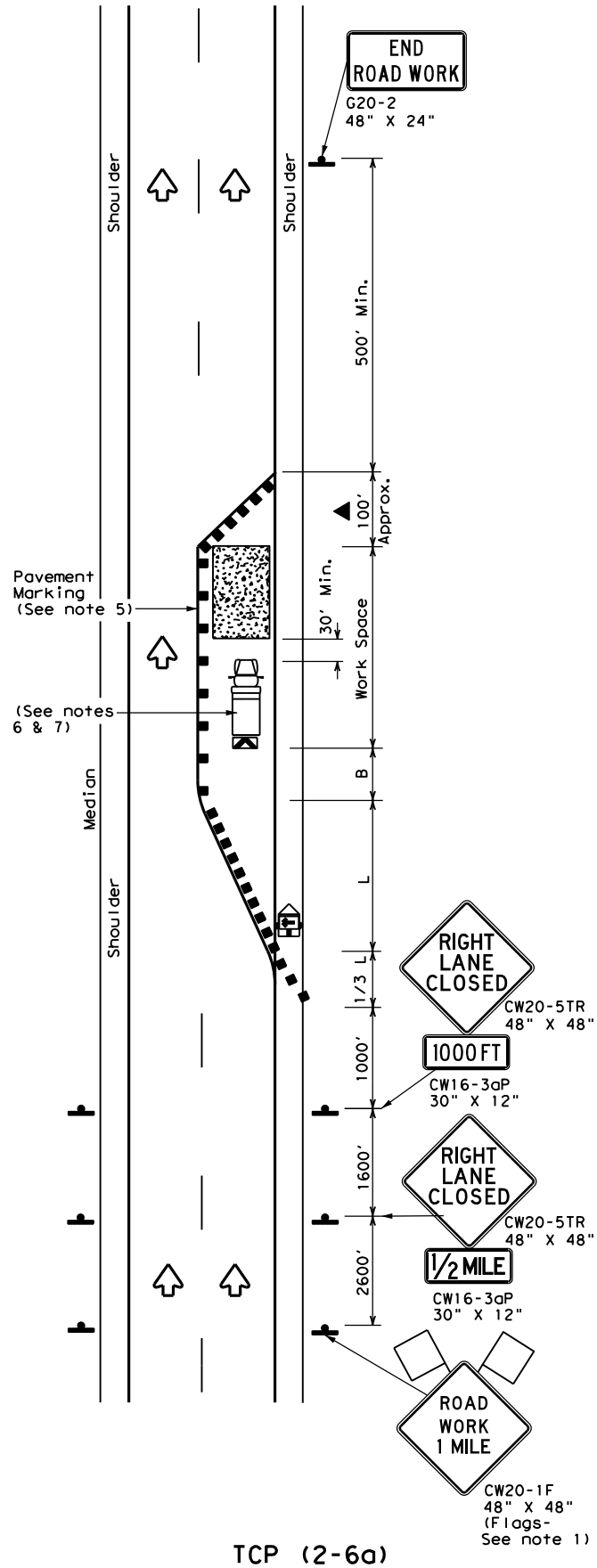
## TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

### TCP (1-5) - 18

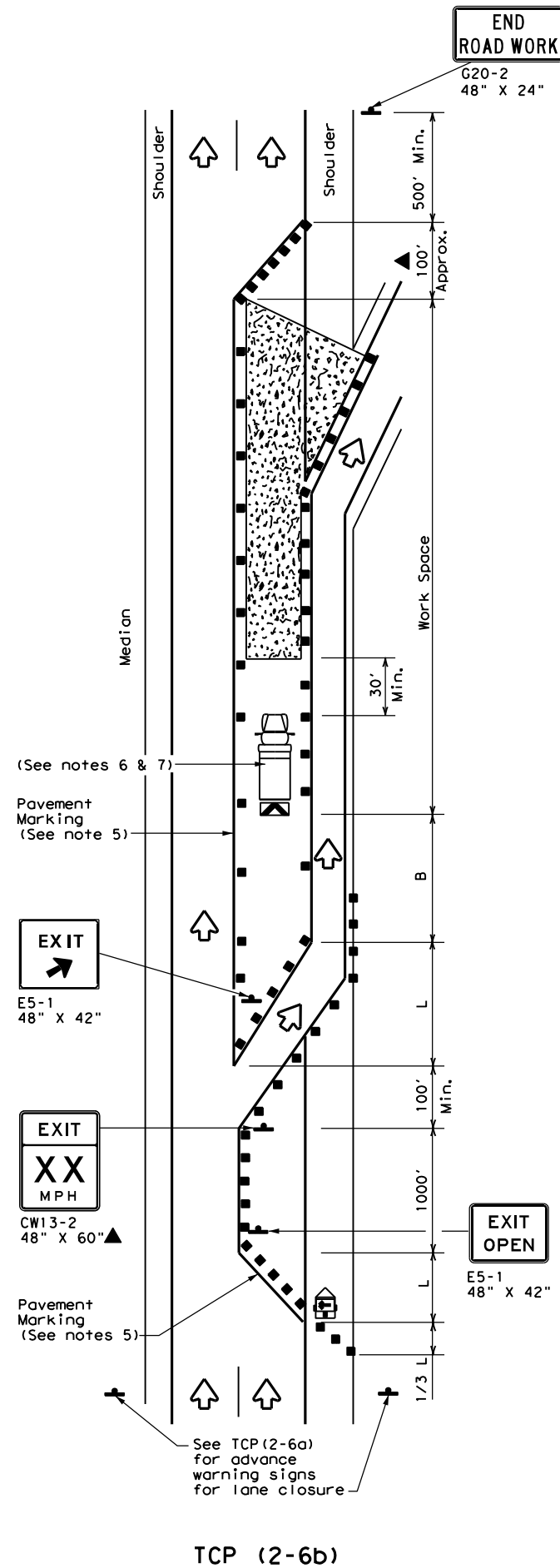
FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
2-18	REVISIONS	0177 07	118, etc.	IH 69
	DIST	COUNTY	SHEET NO.	
	HOU	Harris, etc.	26	

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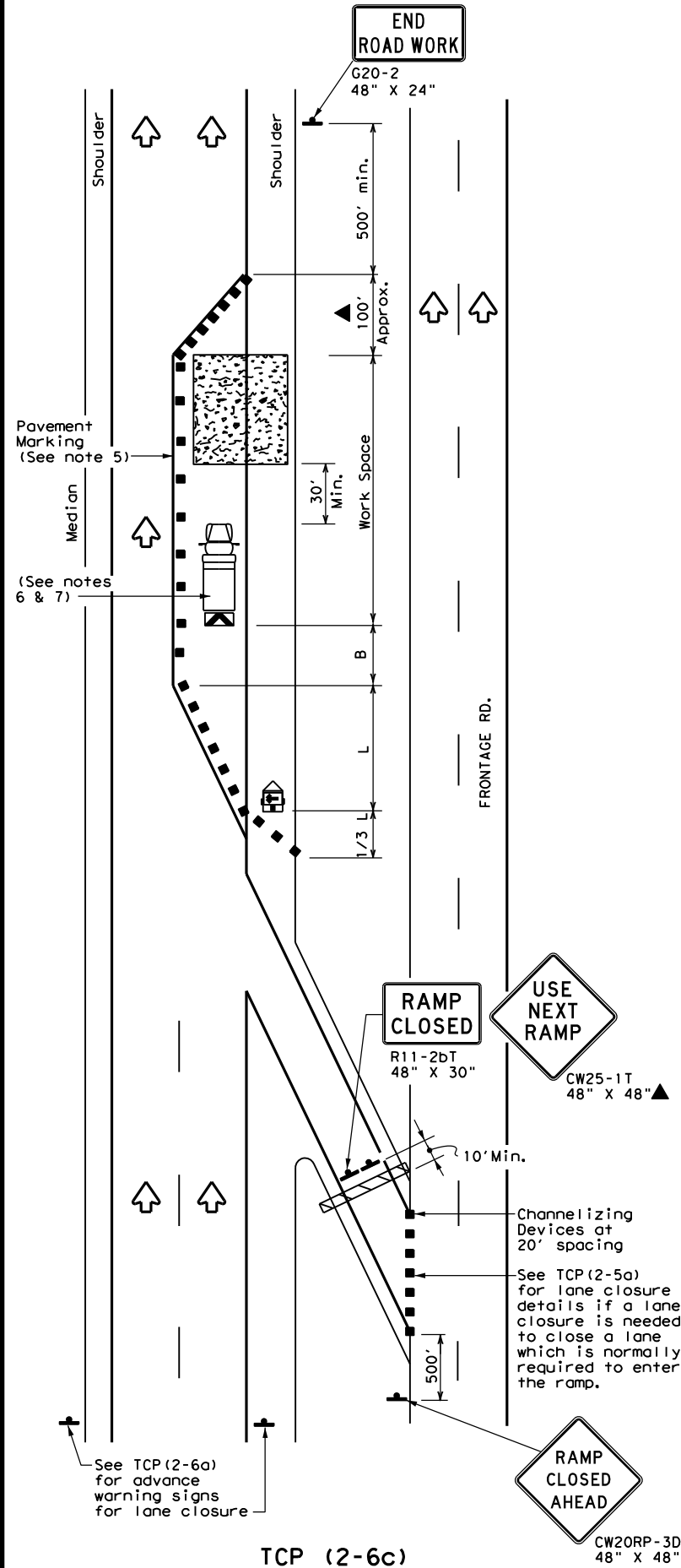
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TCP (2-6a)  
**ONE LANE CLOSURE**



TCP (2-6b)  
**LANE CLOSURE NEAR EXIT RAMP**



TCP (2-6c)  
**LANE CLOSURE NEAR ENTRANCE RAMP**

LEGEND			
	Type 3 Barricade		Channelizing Devices
	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 **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
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**
- Flags attached to signs where shown, are REQUIRED.
  - 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.
  - 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.
  - Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on every other channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
  - The placement of pavement markings may be omitted on intermediate-term stationary work zones with the approval of the Engineer.
  - 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.
  - 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.

**Traffic Operations Division Standard**

## TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

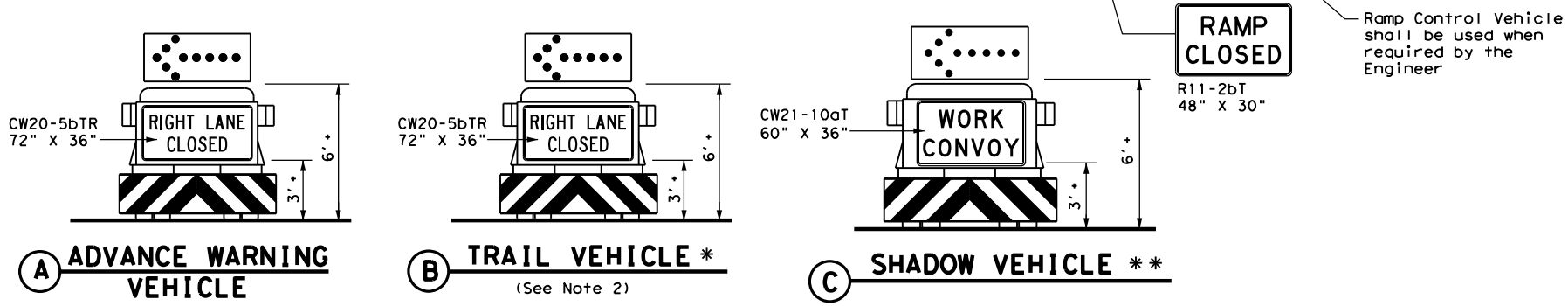
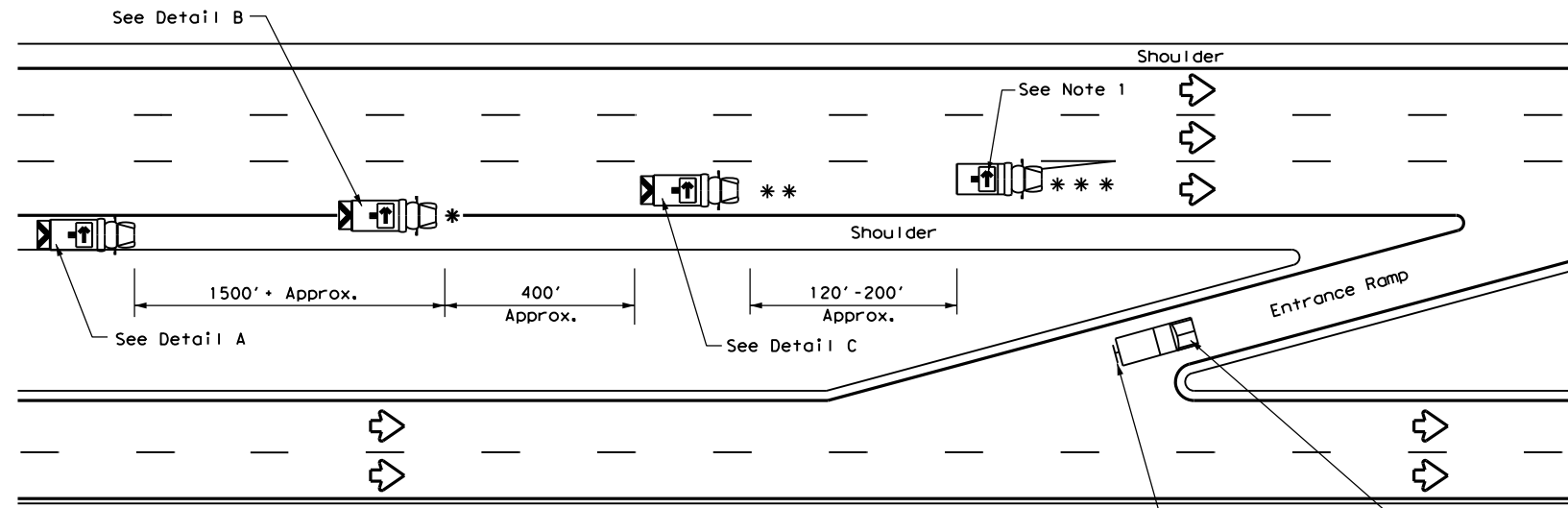
### TCP (2-6) - 18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT	REVISIONS	CONT	SECT	JOB
2-94 4-98	0177 07	118, etc.		1H 69
8-95 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	HOU	Harris, etc.		27

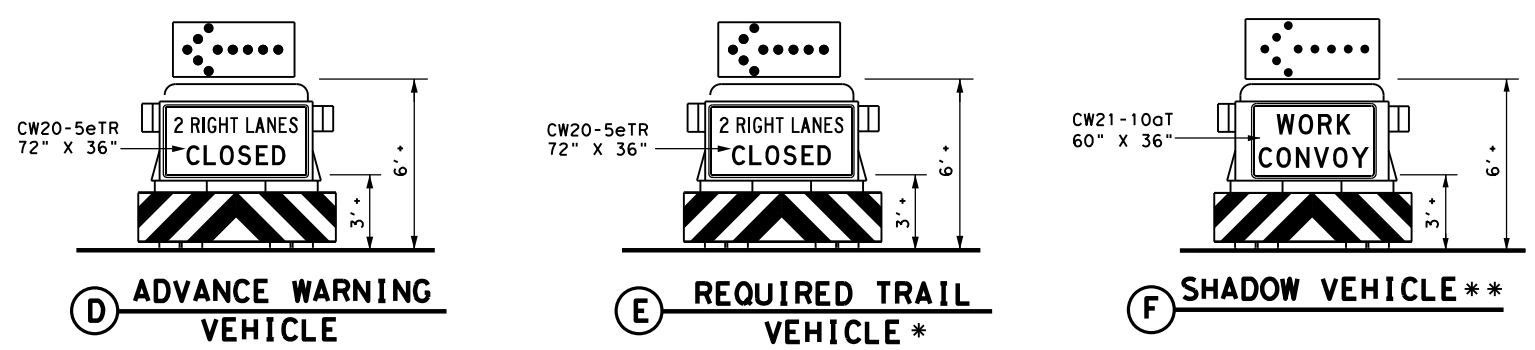
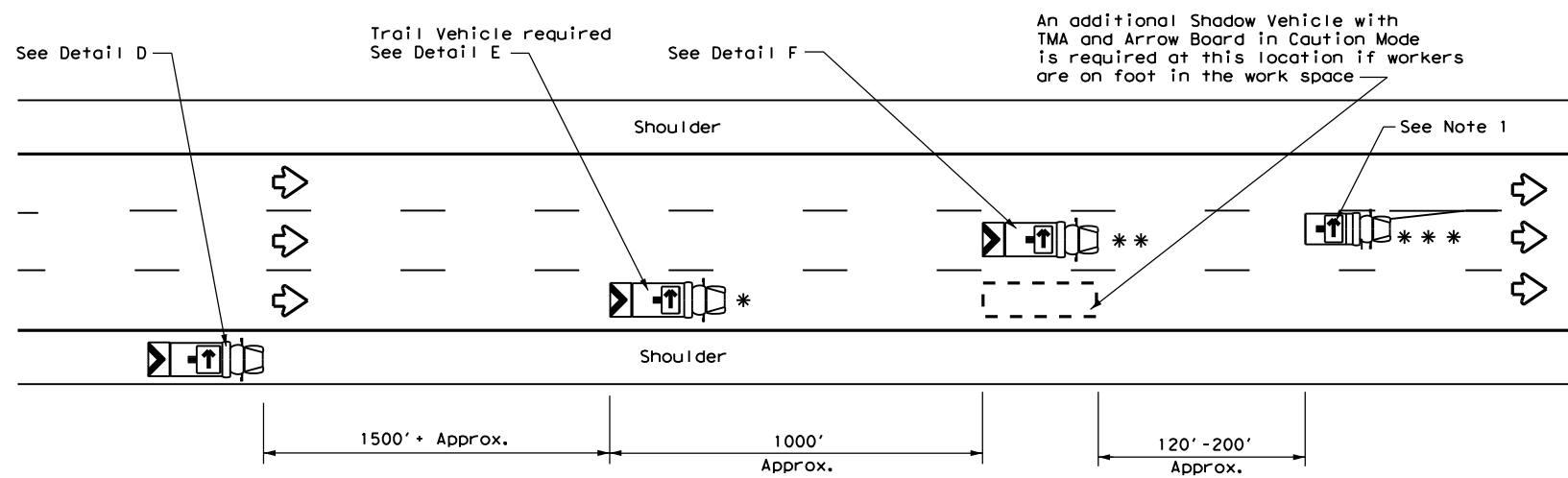
166

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DATE: DATE TIME  
 FILE: DOCUMENT NAME



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



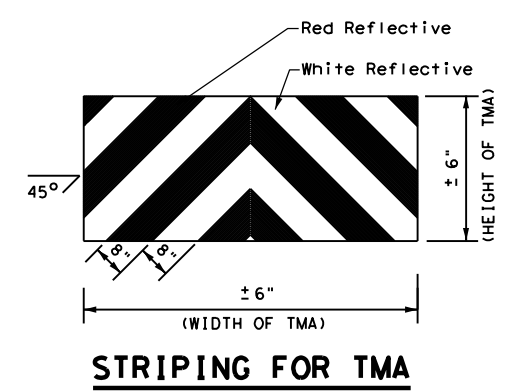
**INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)**

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
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**GENERAL NOTES**

- 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.
- 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.
- 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.
- The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
- Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
- Each vehicle shall have two-way radio communication capability.
- When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
- 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.
- Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
- 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.
- Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
- 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.
- Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
- 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

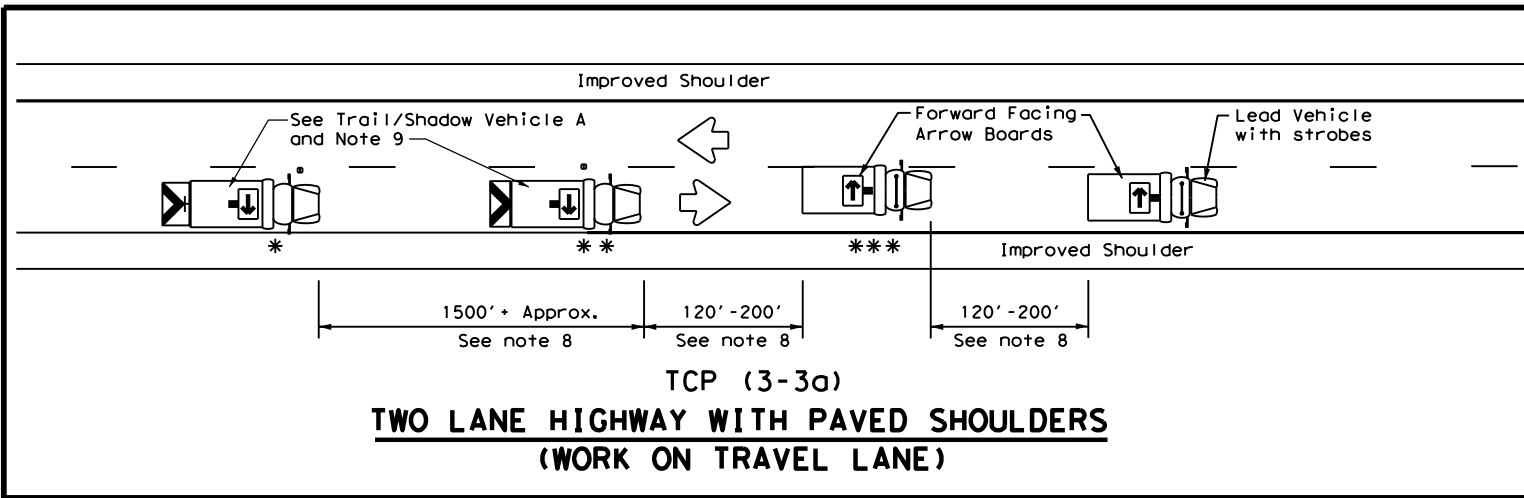
TCP(3-2)-13

FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS		0177 07	118, etc.	IH 69
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 7-13	HOU	Harris, etc.	28	
1-97				

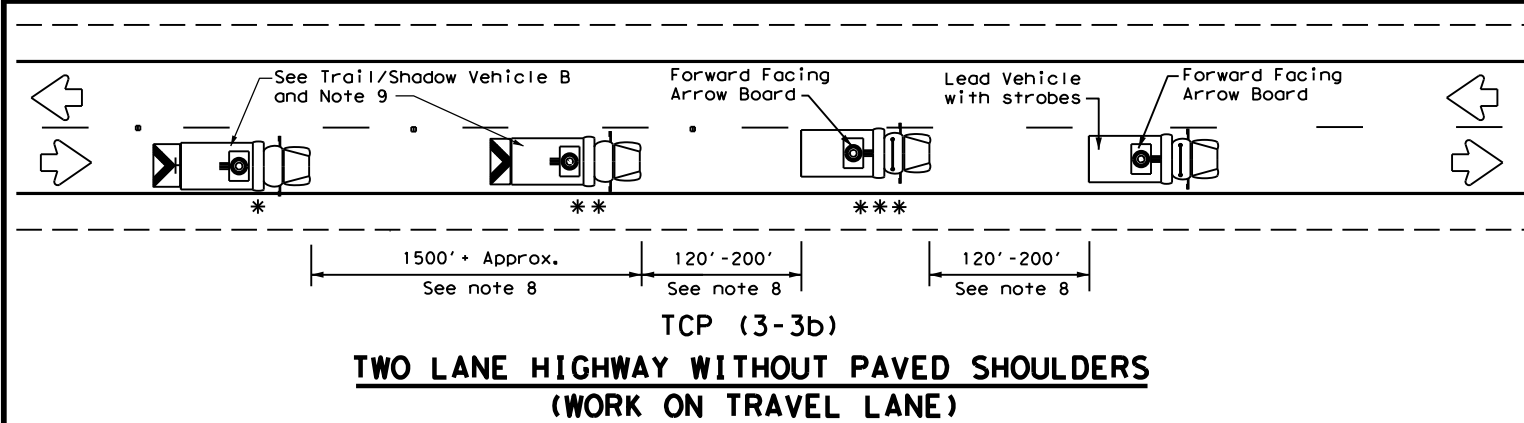
176

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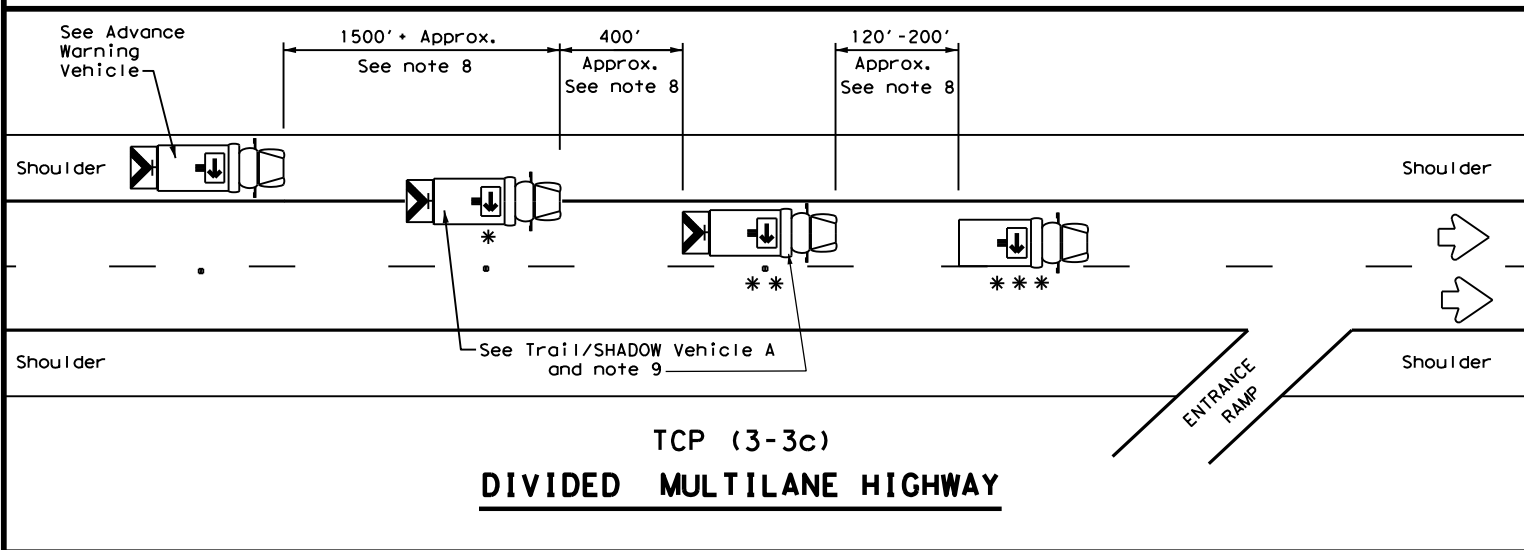
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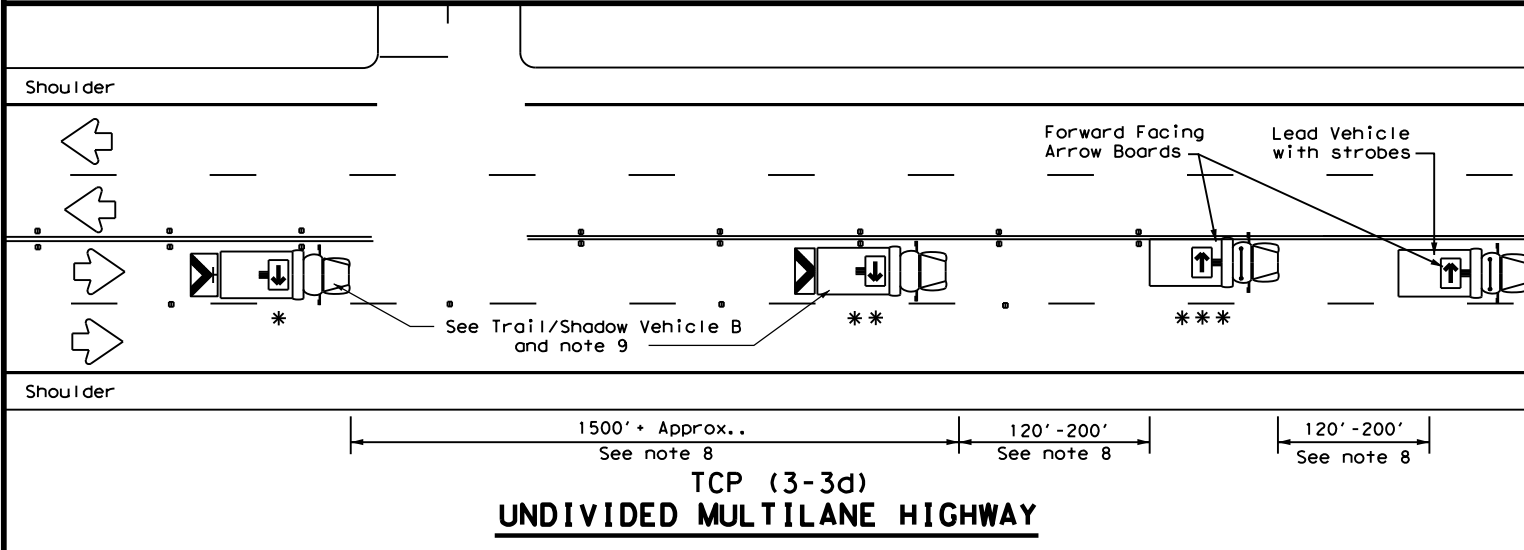
**TCP (3-3a)**  
**TWO LANE HIGHWAY WITH PAVED SHOULDERS**  
**(WORK ON TRAVEL LANE)**



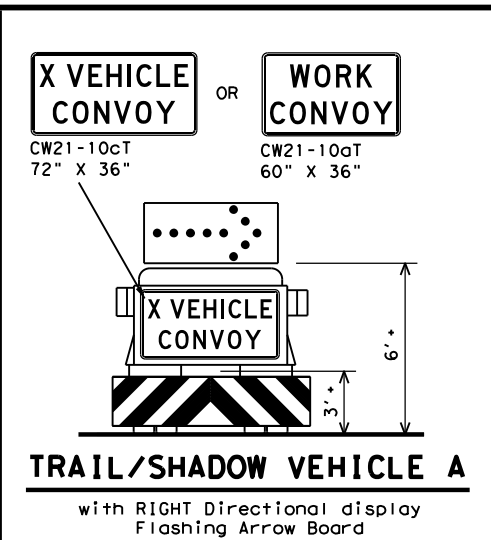
**TCP (3-3b)**  
**TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS**  
**(WORK ON TRAVEL LANE)**



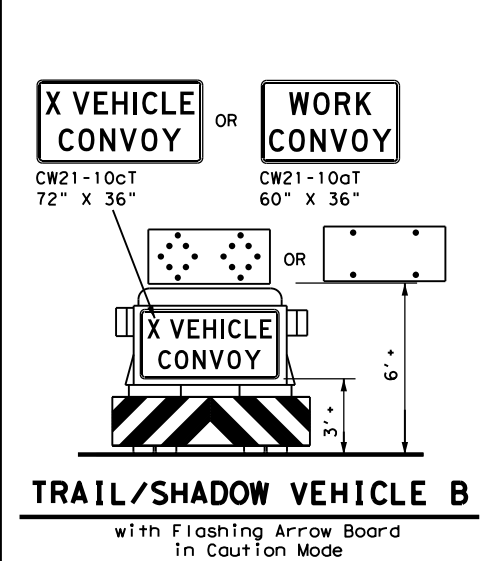
**TCP (3-3c)**  
**DIVIDED MULTILANE HIGHWAY**



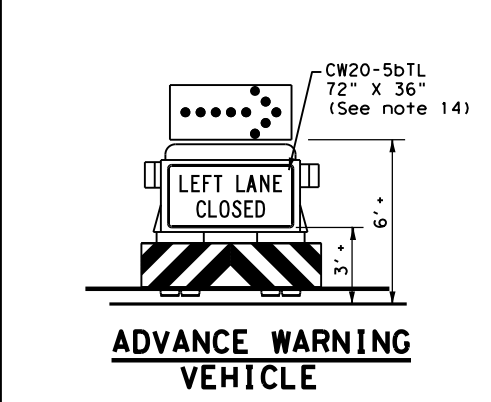
**TCP (3-3d)**  
**UNDIVIDED MULTILANE HIGHWAY**



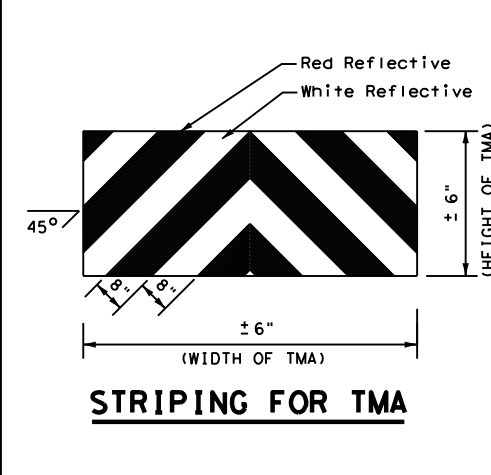
**TRAIL/SHADOW VEHICLE A**  
 with RIGHT Directional display  
 Flashing Arrow Board



**TRAIL/SHADOW VEHICLE B**  
 with Flashing Arrow Board  
 in Caution Mode



**ADVANCE WARNING VEHICLE**



**STRIPING FOR TMA**

LEGEND		
* Trail Vehicle	ARROW BOARD DISPLAY	
** Shadow Vehicle		
*** Work Vehicle		RIGHT Directional
		LEFT Directional
		Double Arrow
		CAUTION (Alternating Diamond or 4 Corner Flash)

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

**GENERAL NOTES**

- TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
- 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.
- The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
- Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
- Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
- Each vehicle shall have two-way radio communication capability.
- When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
- Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the 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 and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
- X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
- For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or 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 may 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.
- A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
- For divided highways with three or four lanes in each direction, use TCP(3-2).
- Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
- The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
- On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

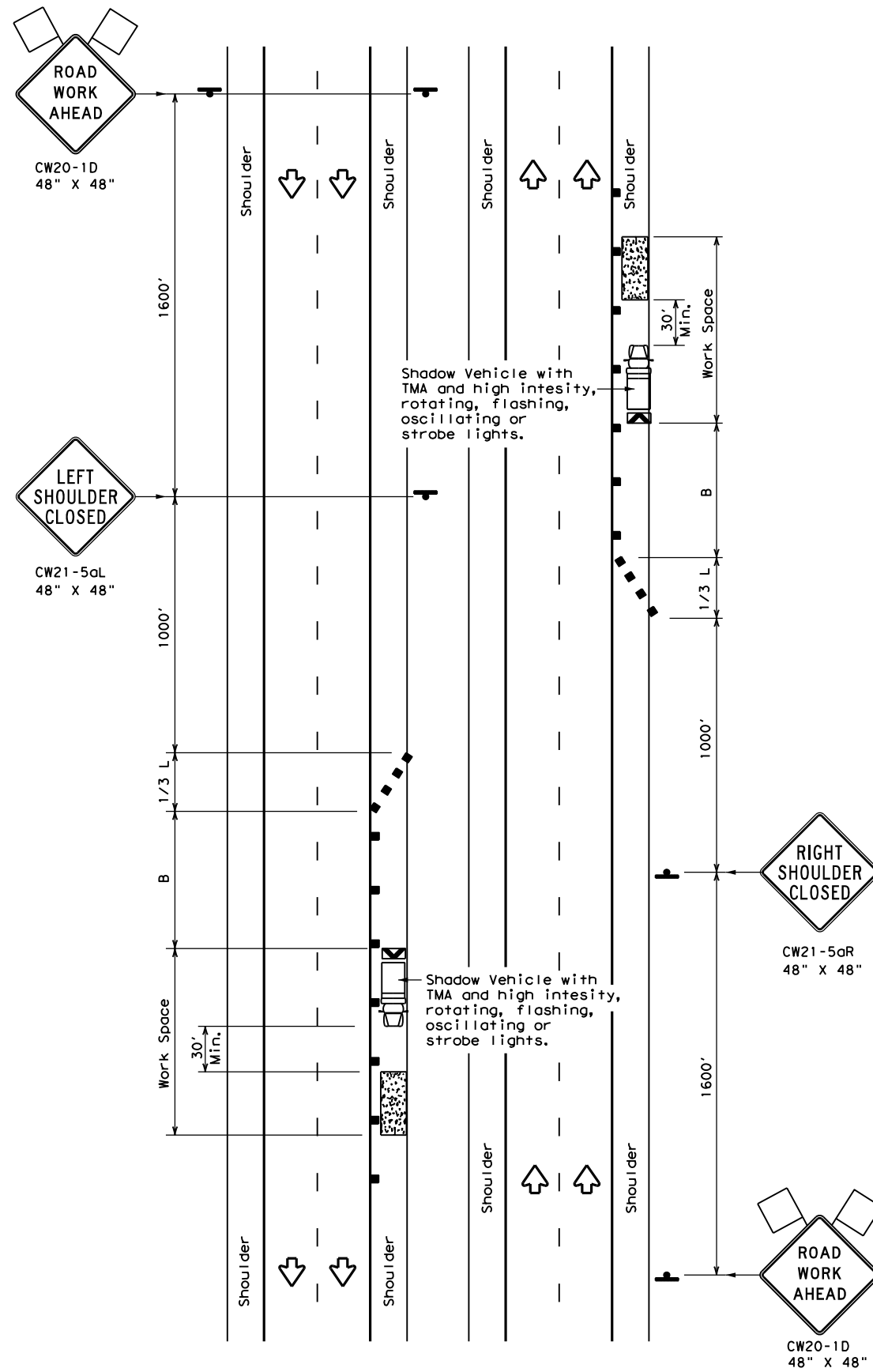
Texas Department of Transportation  
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN**  
**MOBILE OPERATIONS**  
**RAISED PAVEMENT**  
**MARKER INSTALLATION/REMOVAL**  
**TCP (3-3) - 14**

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 7-13	HOU	Harris, etc.	29	
1-97 7-14				

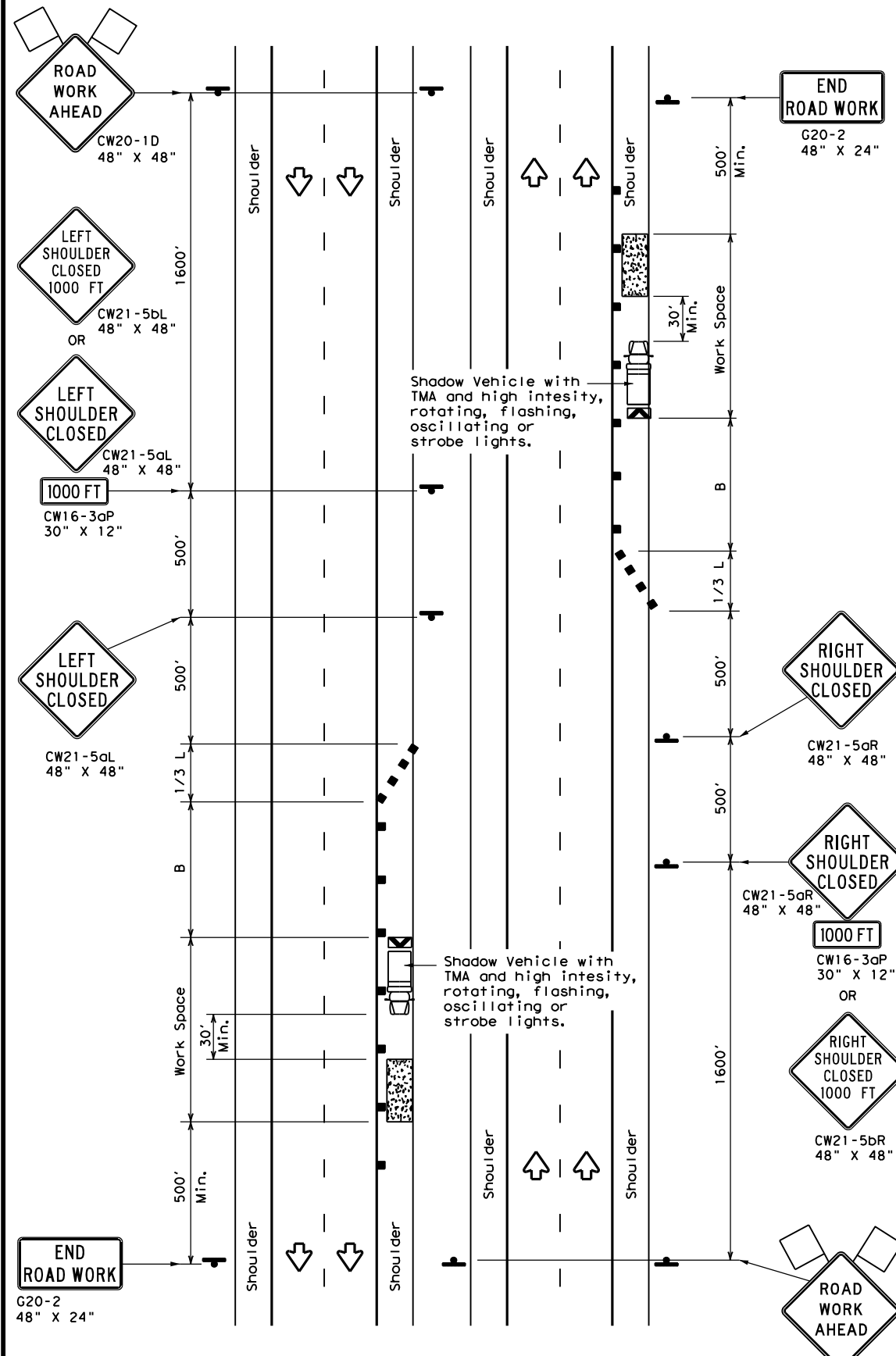
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DATE: DATE TIME  
FILE: DOCUMENT NAME



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		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
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	L = WS	550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65	L = WS	650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75	L = WS	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 affecting 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.



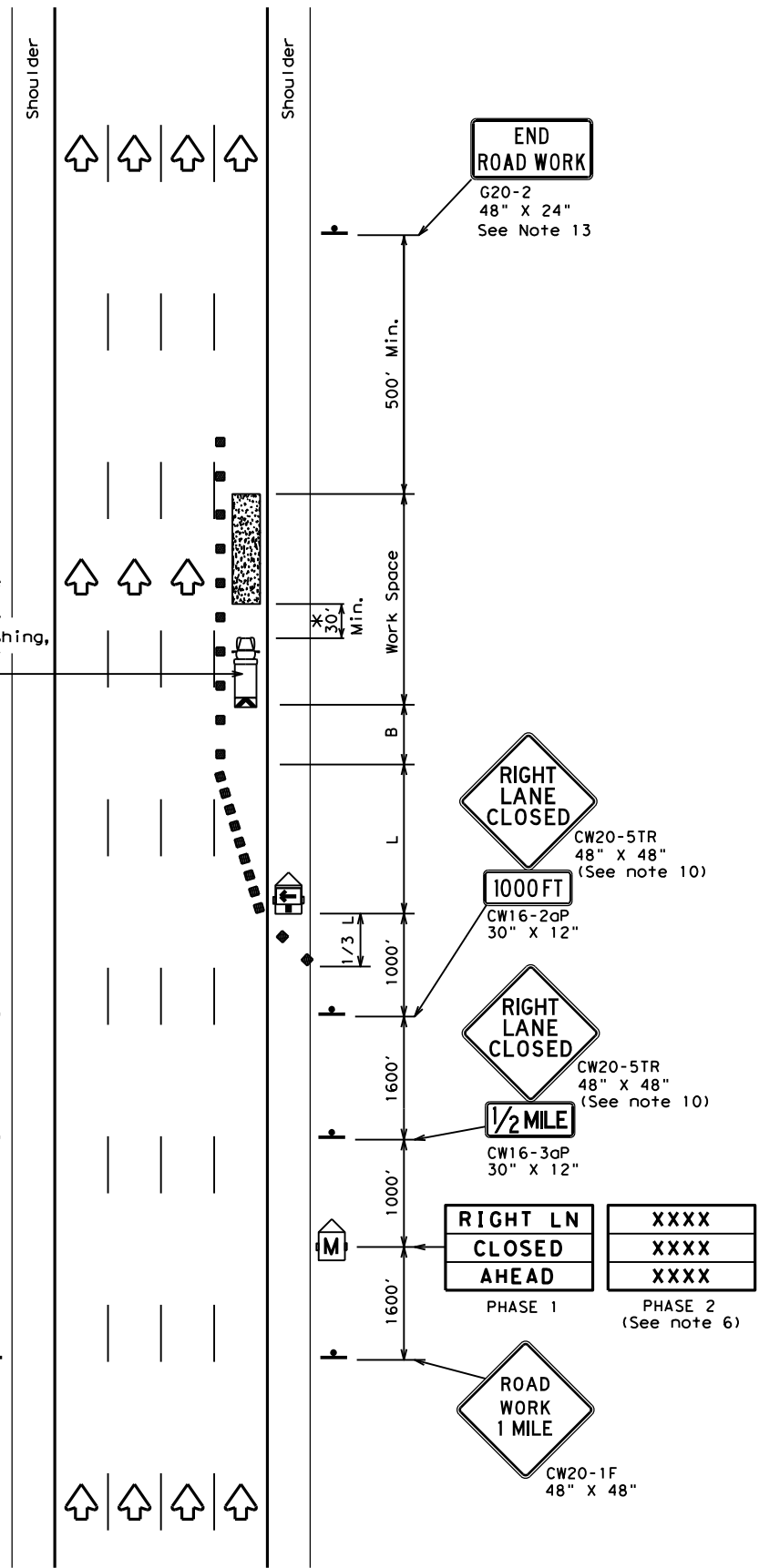
**TRAFFIC CONTROL PLAN  
 SHOULDER WORK FOR  
 FREEWAYS / EXPRESSWAYS**

**TCP (5-1) - 18**

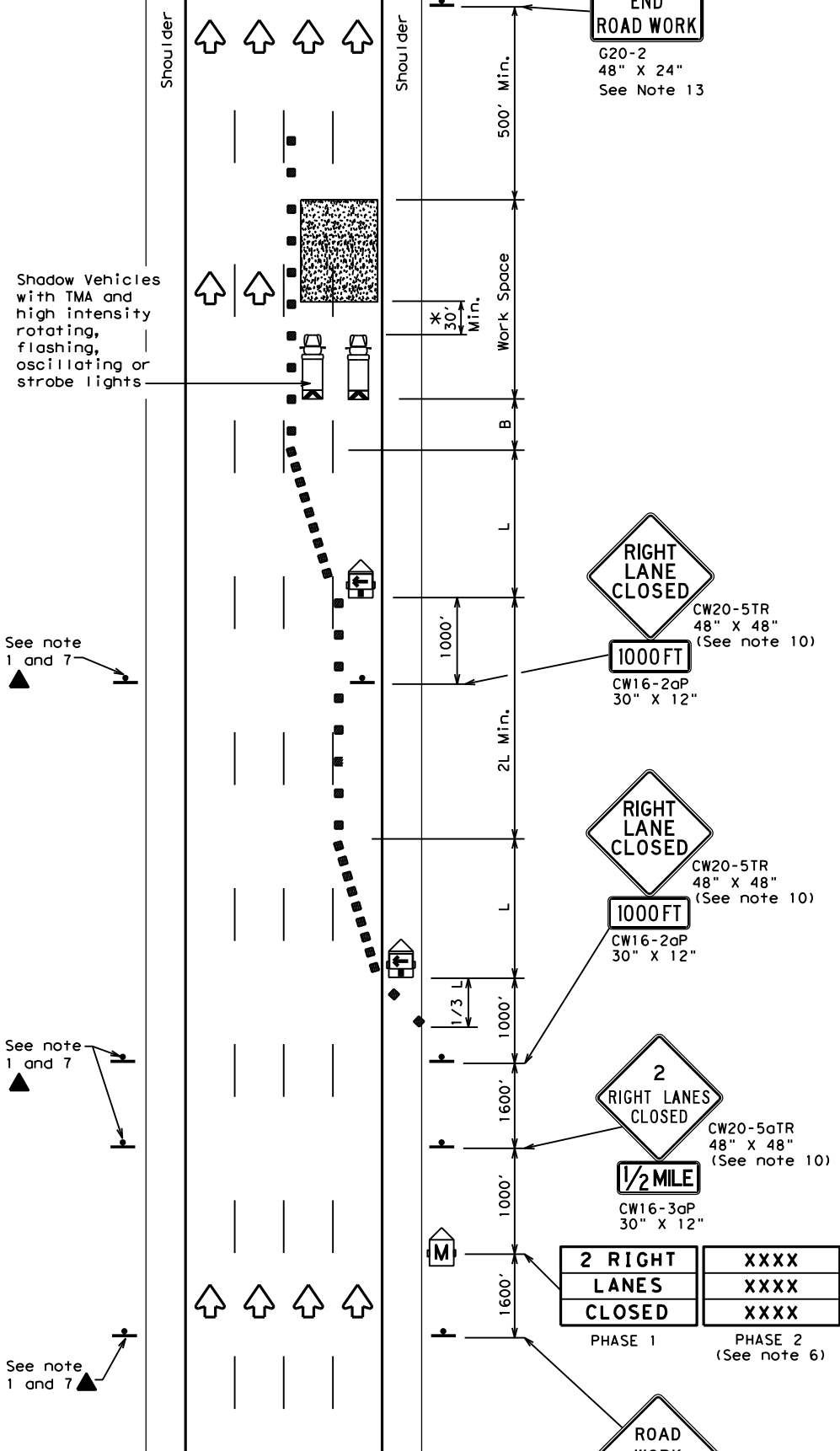
FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
2-18	DIST	COUNTY	SHEET NO.	
	HOU	Harris, etc.		30

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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		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

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

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

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

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- 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.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- 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.
- 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.
- Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
- 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.
- Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- 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.
- 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.
- 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.
- 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.



**TRAFFIC CONTROL PLAN  
FREEWAY LANE CLOSURES**

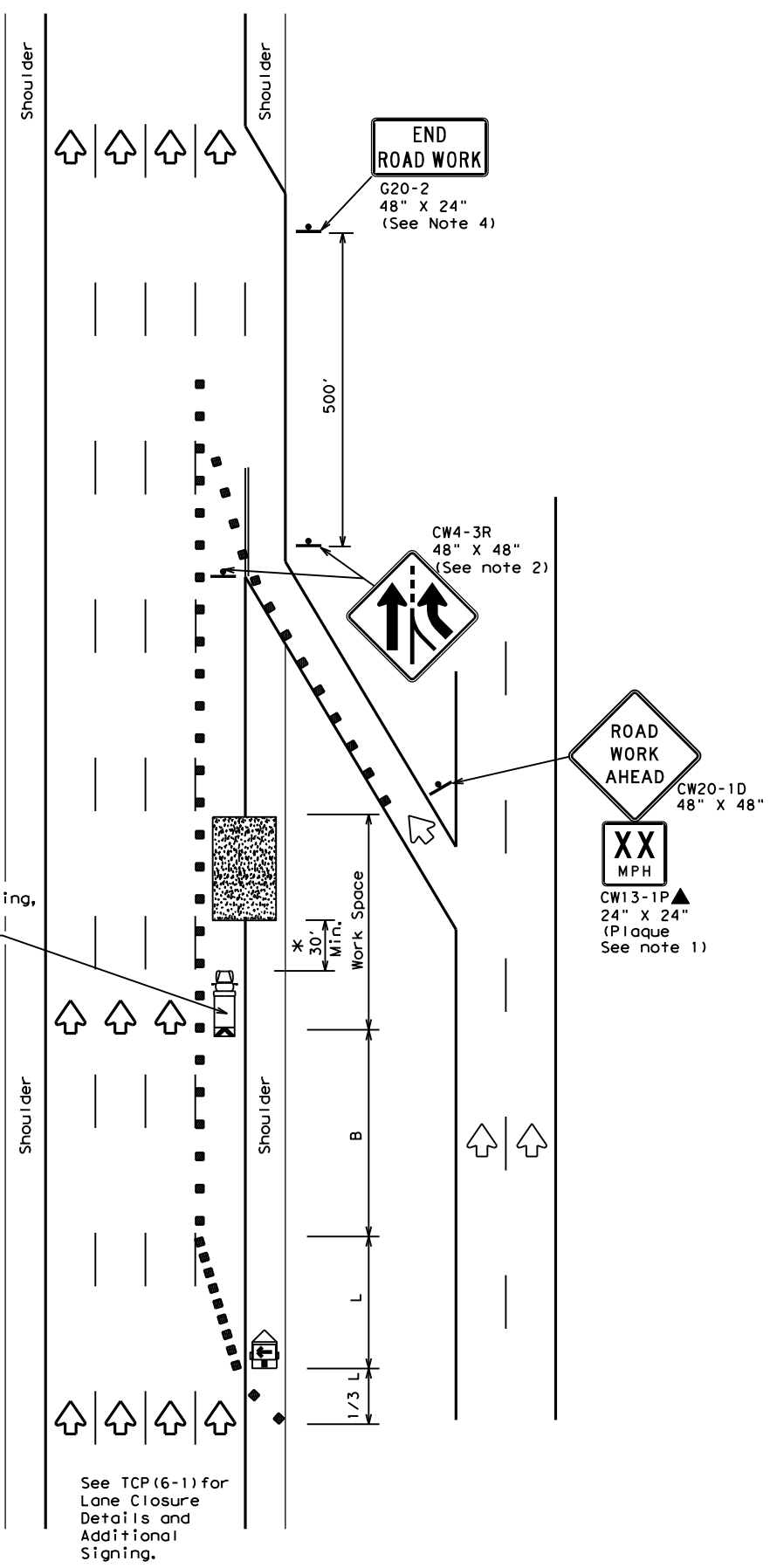
**TCP (6-1) - 12**

FILE:	tcp6-1.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY				
8-12	REVISIONS	0177	07	118, etc.	IH 69				
	DIST	COUNTY		SHEET NO.					
	HOU	Harris, etc.		31					

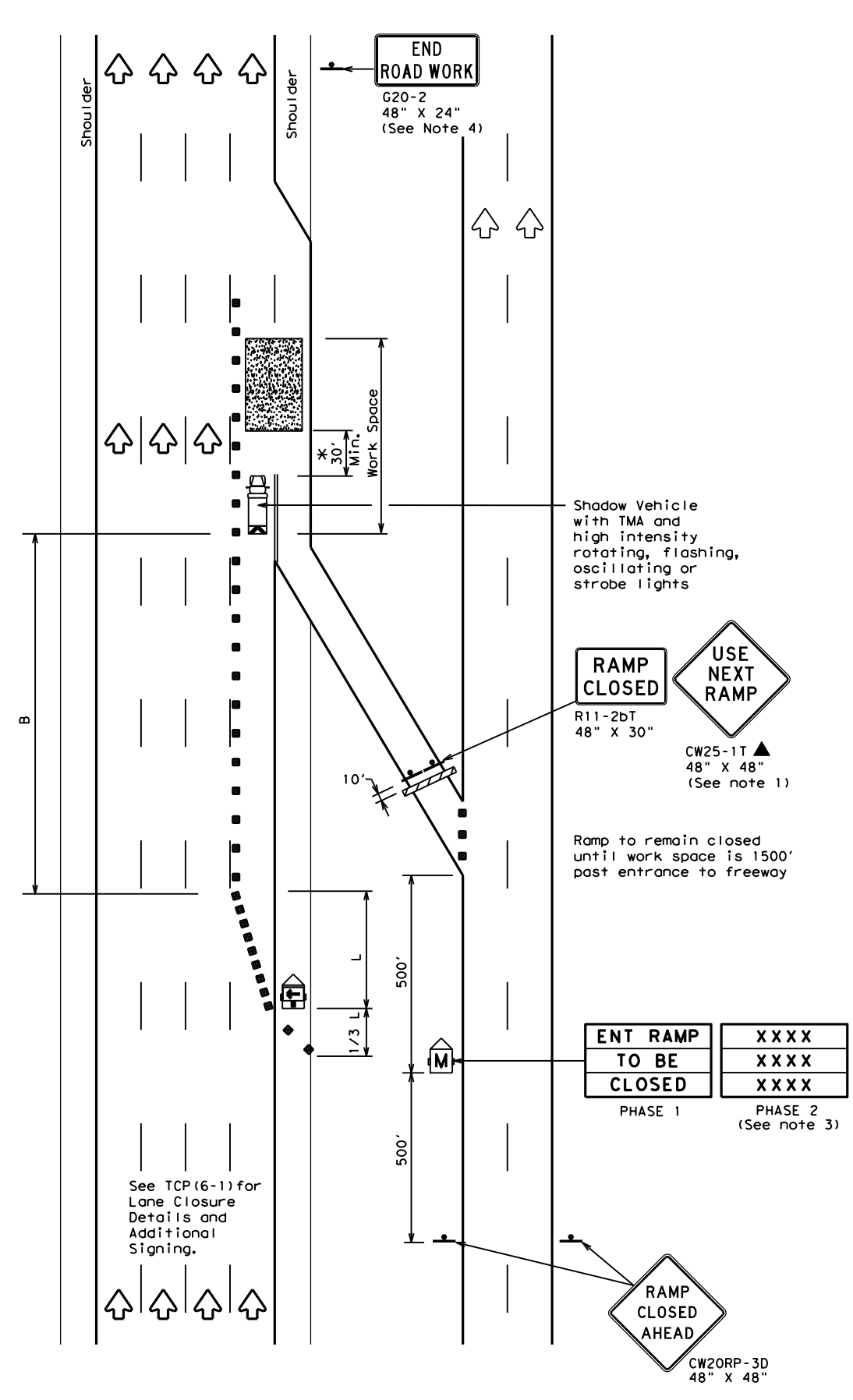


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DATE: DATE TIME  
FILE: DOCUMENT NAME



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		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

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

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

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

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainline can be seen from both roadways.
- See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
- 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.



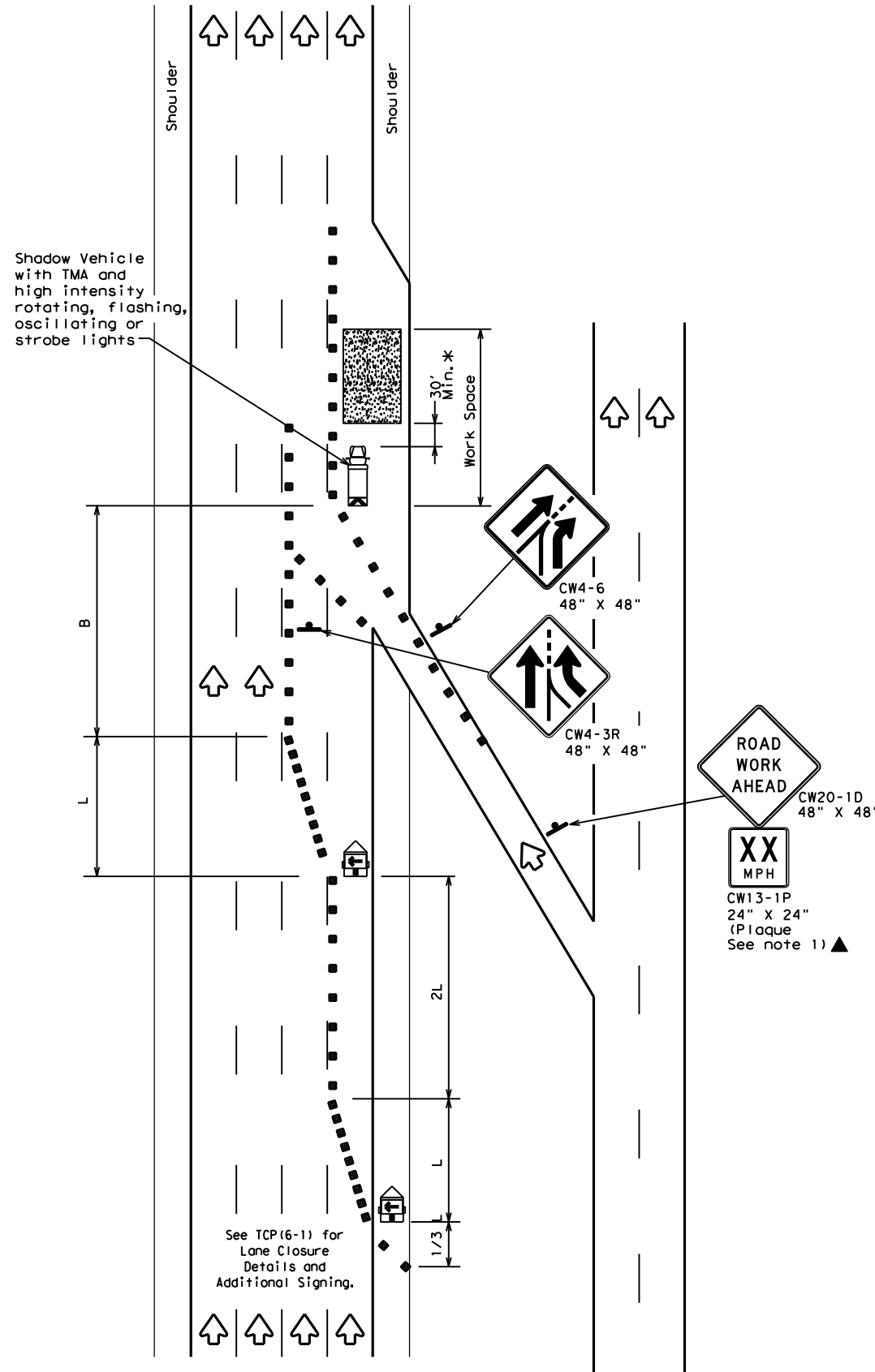
**TRAFFIC CONTROL PLAN**  
**WORK AREA NEAR RAMP**

**TCP (6-2) - 12**

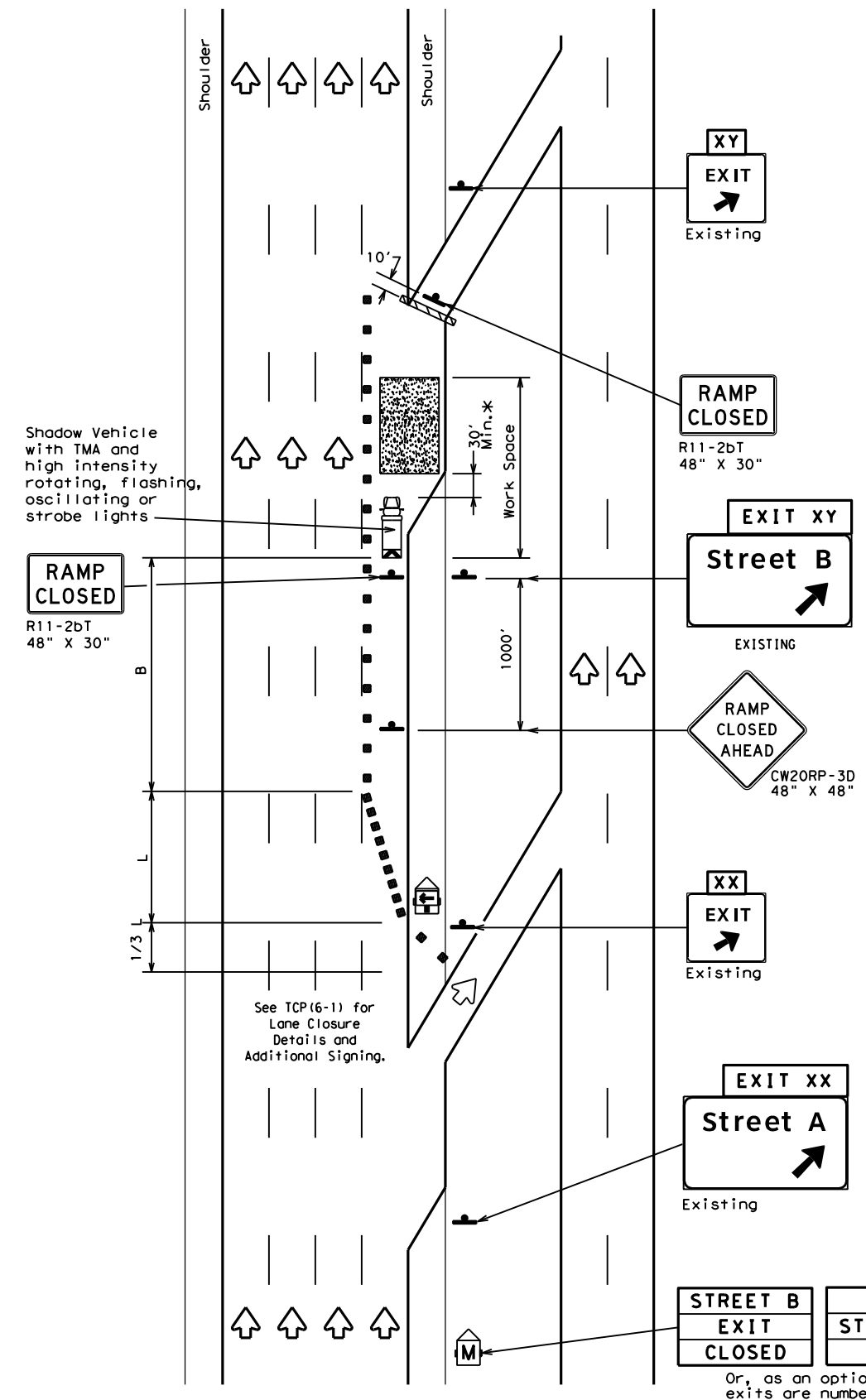
FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
1-97 8-98	DIST	COUNTY	SHEET NO.	
4-98 8-12	HOU	Harris, etc.	32	

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DATE: DATE TIME  
FILE: DOCUMENT NAME



TCP (6-3a)  
**ENTRANCE RAMP OPEN**



TCP (6-3b)  
**EXIT RAMP CLOSED**  
**TRAFFIC EXITS PRIOR TO CLOSED RAMP**

STREET B  
EXIT  
CLOSED

USE  
STREET A  
EXIT

EXIT XY  
CLOSED

USE  
EXIT XX

Or, as an option when exits are numbered

Place 1 mile (approx.) in advance of Street A exit.

LEGEND			
	Type 3 Barricade		Channelizing Devices
	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" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L = WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES:  
1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.

\*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

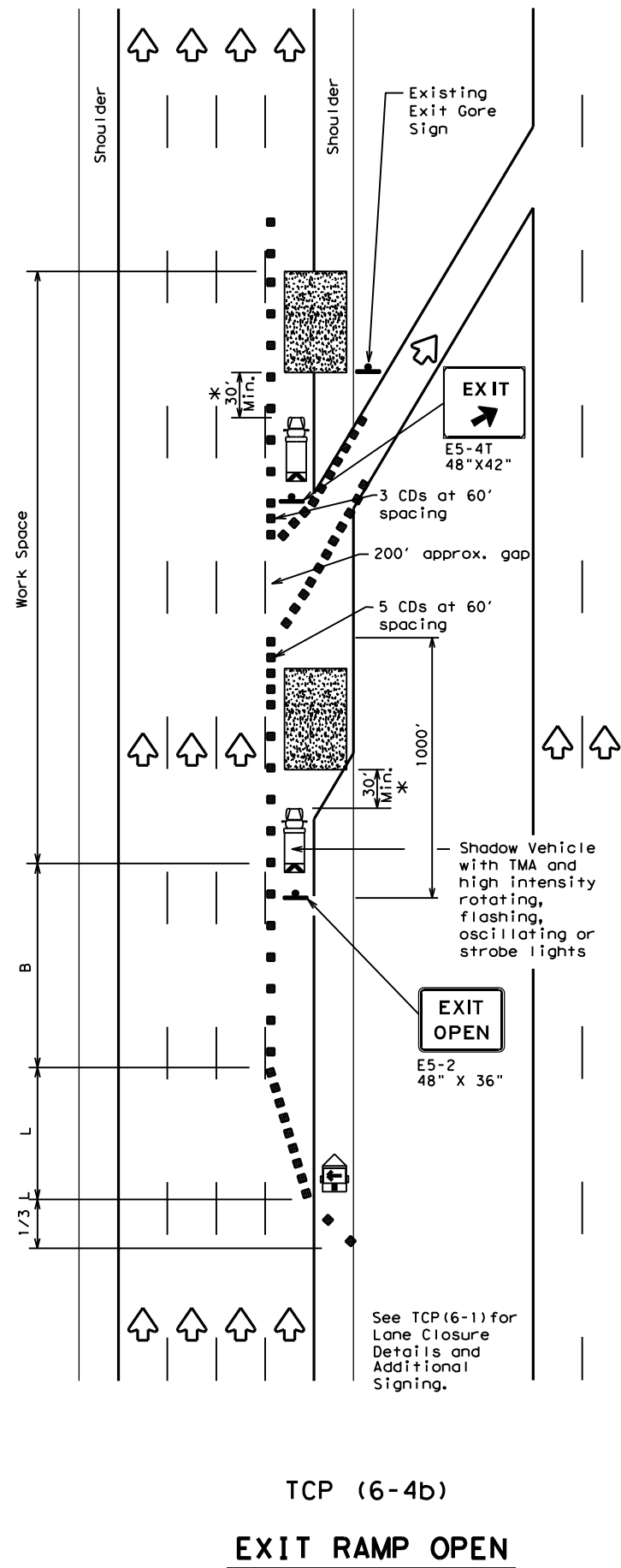
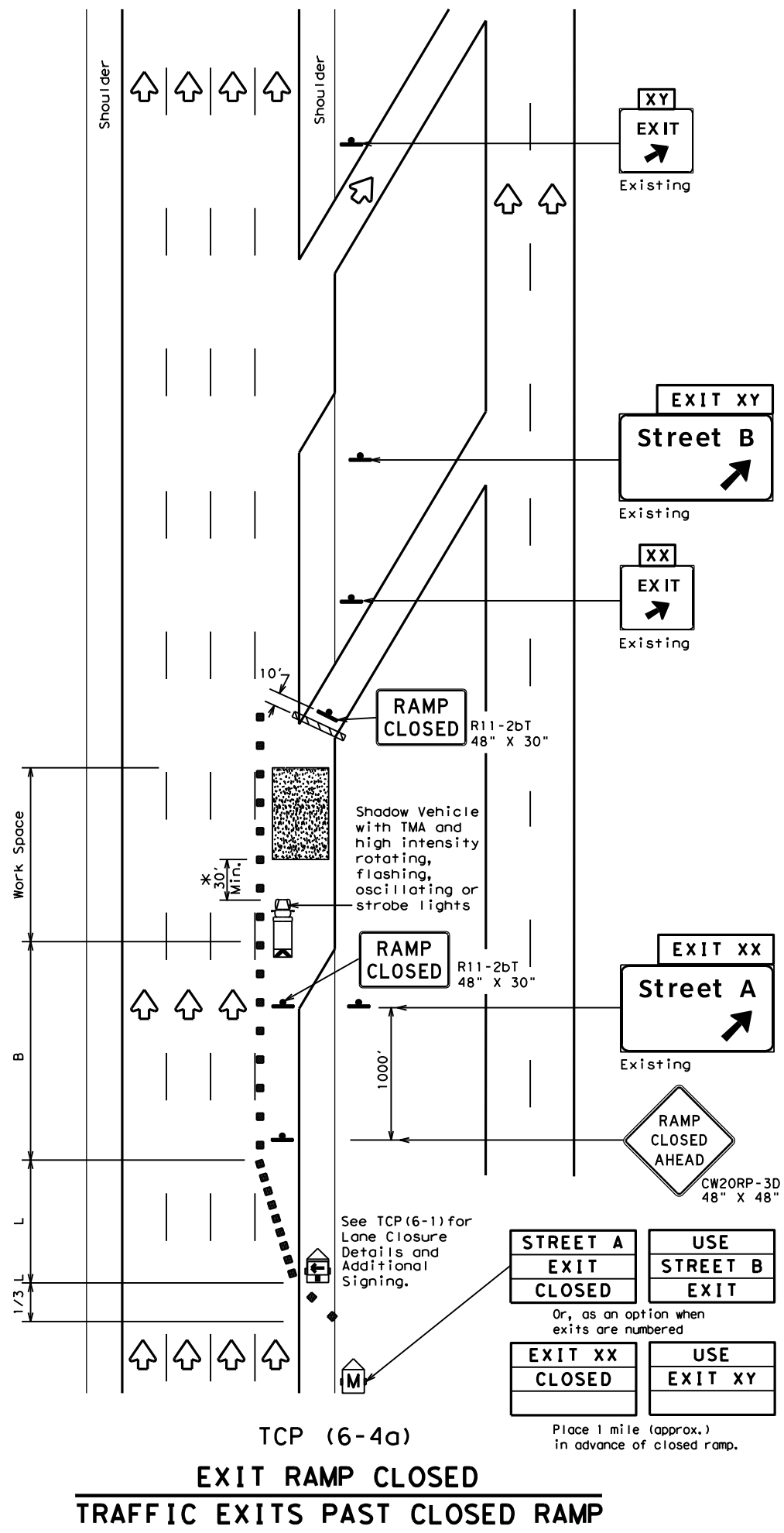
**TRAFFIC CONTROL PLAN  
WORK AREA BEYOND RAMP**

**TCP (6-3) - 12**

FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
1-97 8-98	DIST	COUNTY	SHEET NO.	
4-98 8-12	HOU	Harris, etc.	33	

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FILE: DOCUMENT NAME



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

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

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

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- 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

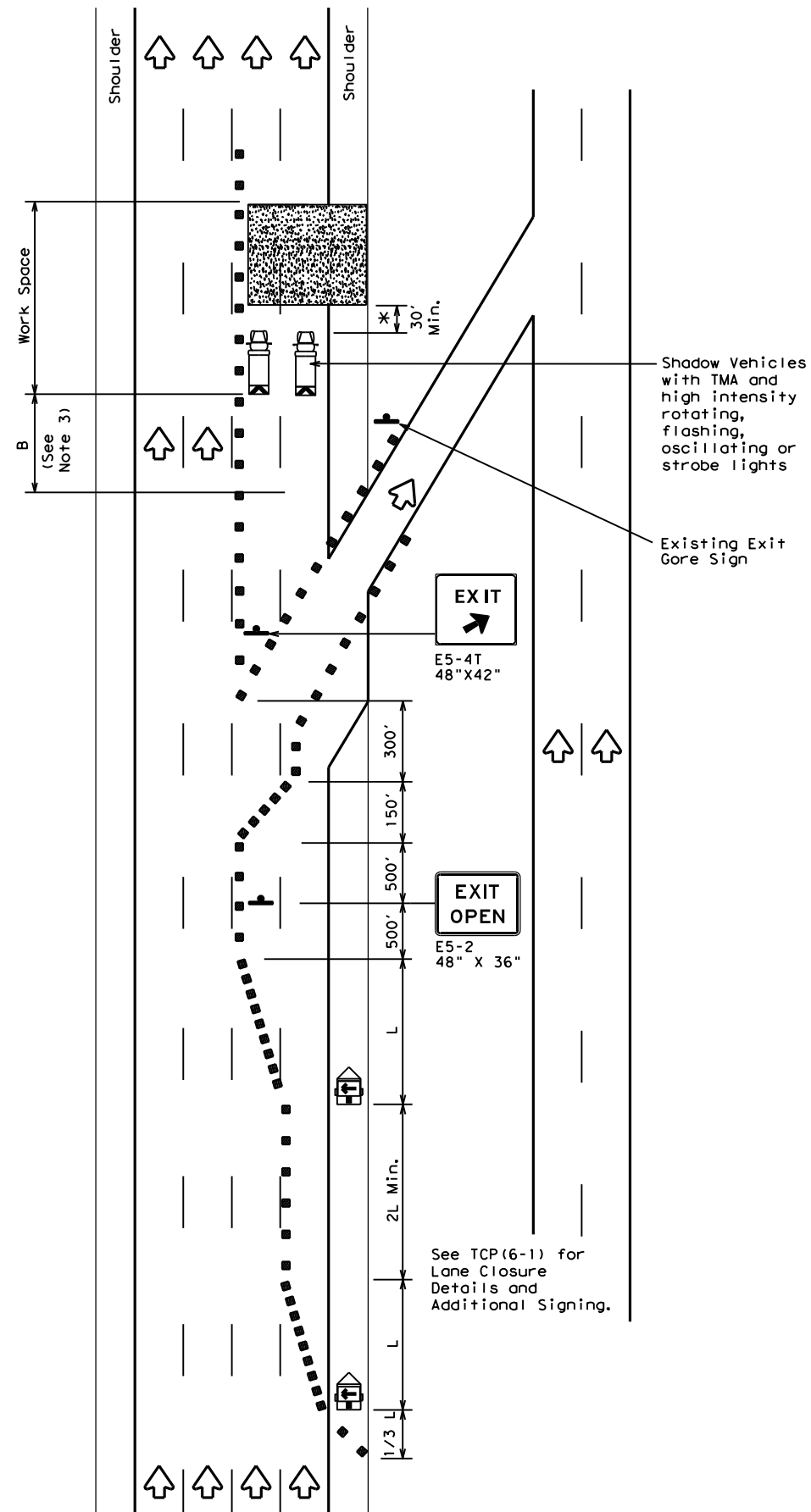
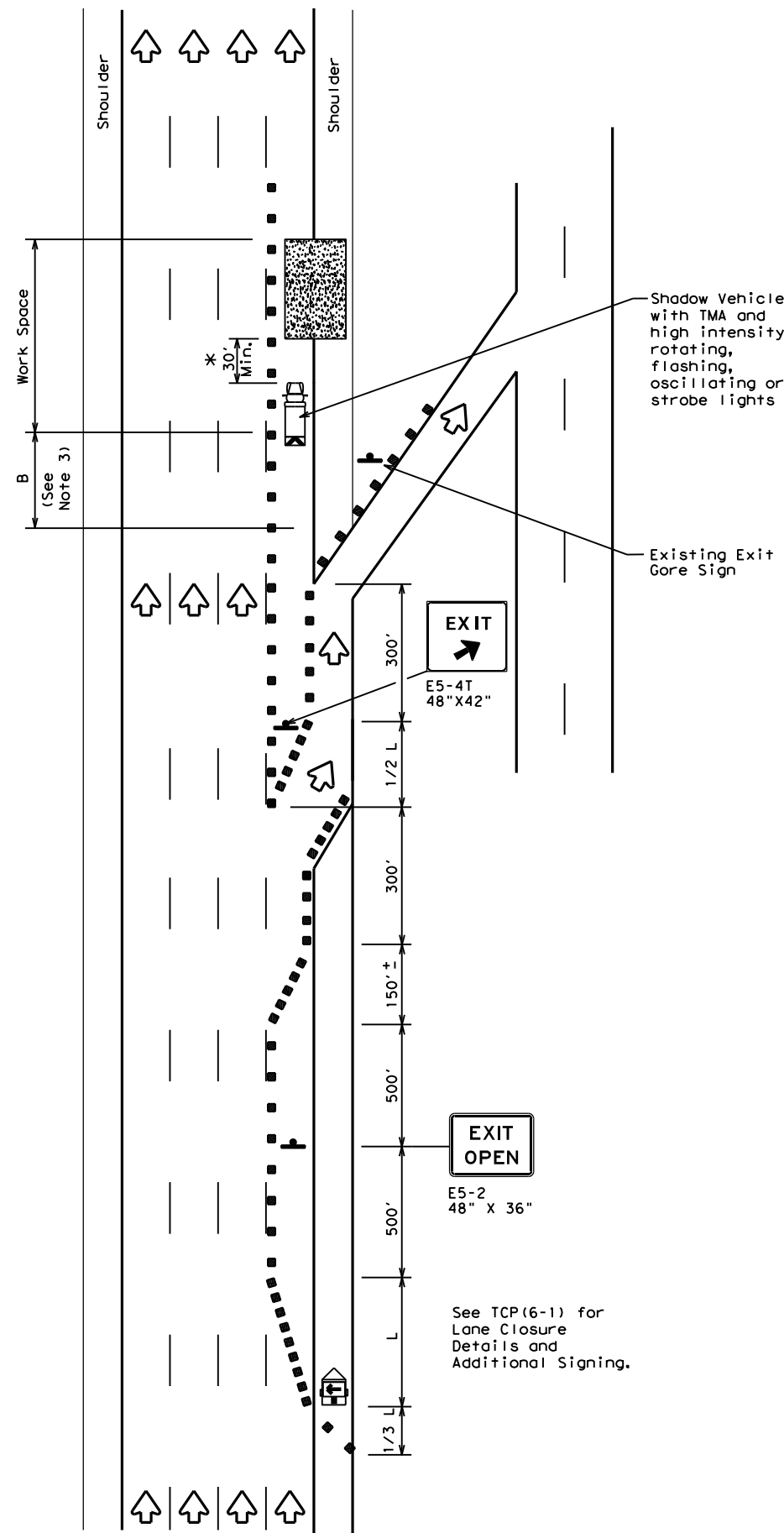
**TRAFFIC CONTROL PLAN**  
**WORK AREA AT EXIT RAMP**

**TCP (6-4) - 12**

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
1-97 8-98	DIST	COUNTY	SHEET NO.	
4-98 8-12	HOU	Harris, etc.	34	

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FILE: DOCUMENT NAME



LEGEND			
	Type 3 Barricade		Channelizing Devices
	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" * * *			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L = WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

### GENERAL NOTES

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

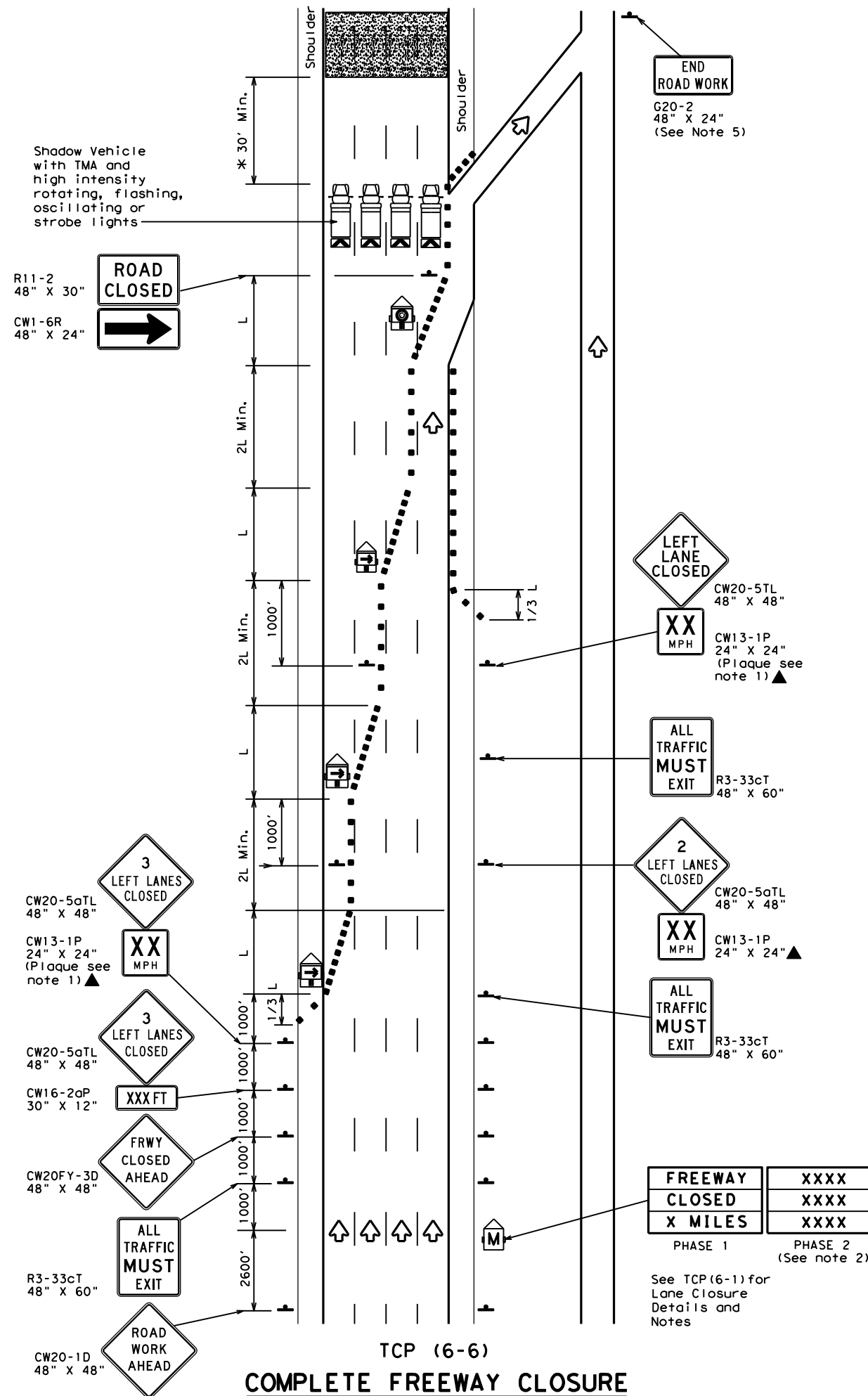
## TRAFFIC CONTROL PLAN WORK AREA BEYOND EXIT RAMP

### TCP (6-5) - 12

FILE:	tcp6-5.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CR:	TxDOT
©TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0177	07	118, etc.	IH 69				
1-97	8-98	DIST	COUNTY		SHEET NO.				
4-98	8-12	HOU	Harris, etc.		35				

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DATE: DATE TIME  
FILE: DOCUMENT NAME



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

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

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

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

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- 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.
- 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.
- Entrance ramps located from the advance warning area to the exit ramp should be closed whenever possible.
- 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.



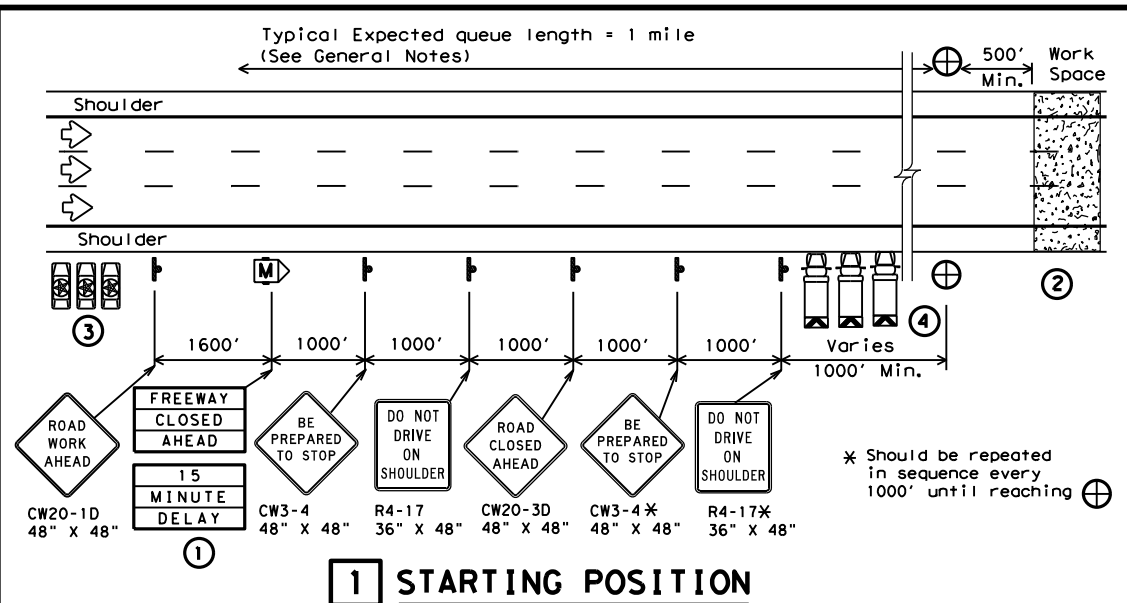
**TRAFFIC CONTROL PLAN  
FREEWAY CLOSURE**

**TCP (6-6) - 12**

FILE: tcp6-6.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
1-97 8-98	DIST	COUNTY	SHEET NO.	
4-98 8-12	HOU	Harris, etc.	36	

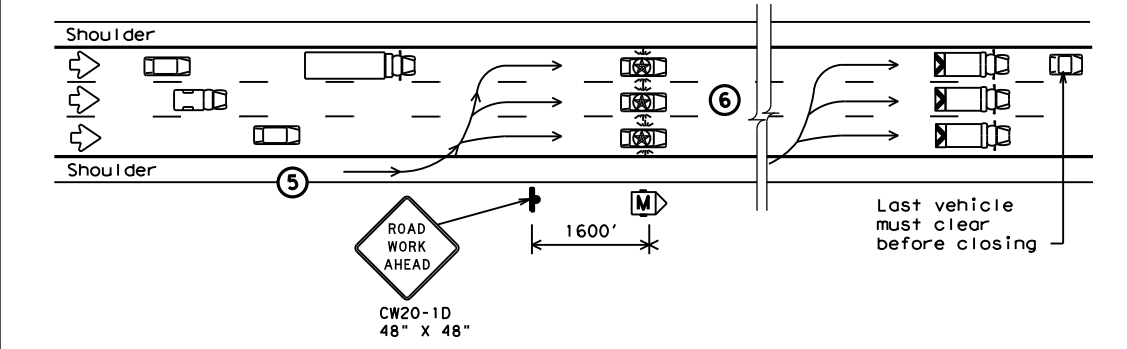
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: DATE TIME  
FILE: DOCUMENT NAME



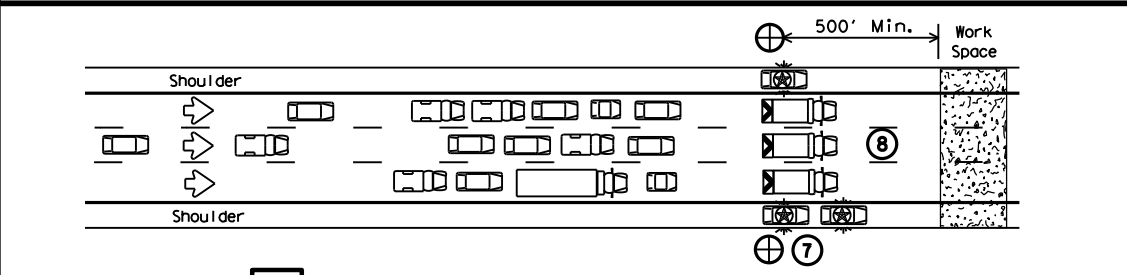
### 1 STARTING POSITION

- 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.
- 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.
- 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.
- 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.



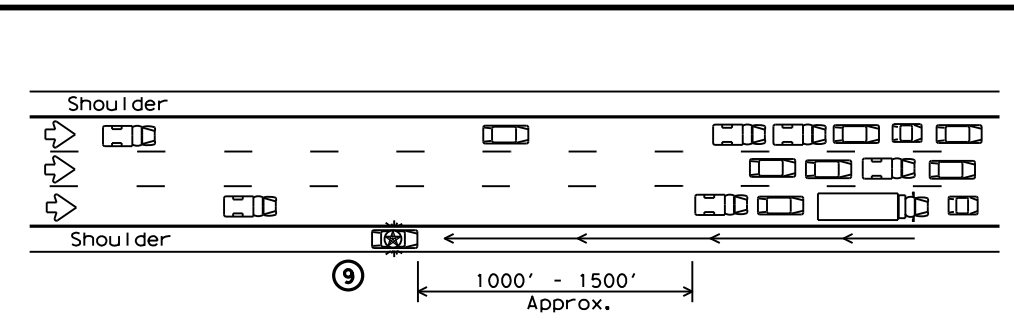
### 2 REDUCING SPEED OPERATION

- Starting position of the LEOVs should be in advance of the most distant warning signs.
- 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.



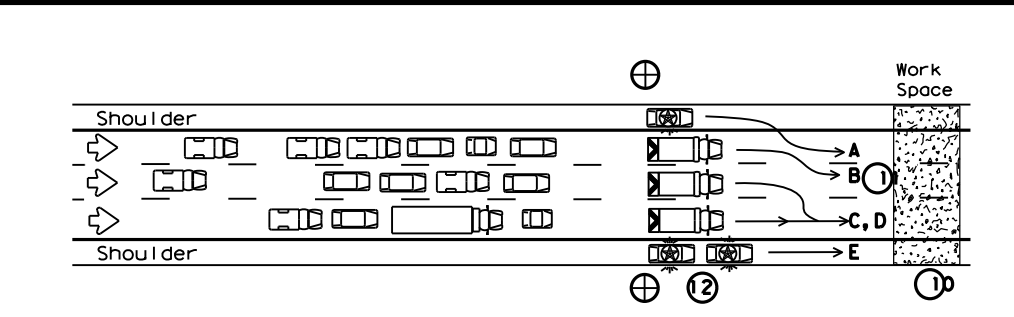
### 3 ALL TRAFFIC STOPPED AT CP

- 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.
- 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

- 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

- All equipment, materials, personnel, and other items should be removed from the roadway and maintain an adequate clear zone.
- 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.
- The LEOV or LEOVs on the right shoulder may remain on the shoulder until satisfied that traffic is moving satisfactorily before merging or proceeding.
- 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

- 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.
- 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.
- 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).
- The roadway closure should be during off-peak hours, as shown in the plans, or as directed by the Engineer.
- 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.
- 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.
- 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

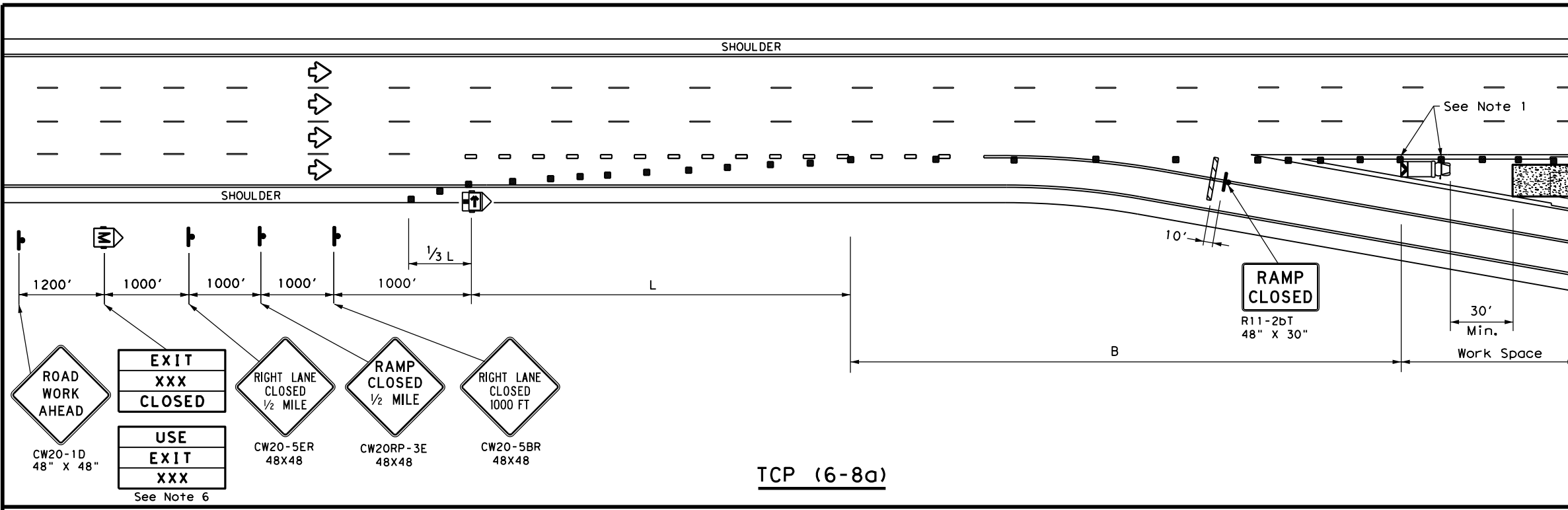
## TRAFFIC CONTROL PLAN SHORT DURATION FREEWAY CLOSURE SEQUENCE

### TCP (6-7) - 12

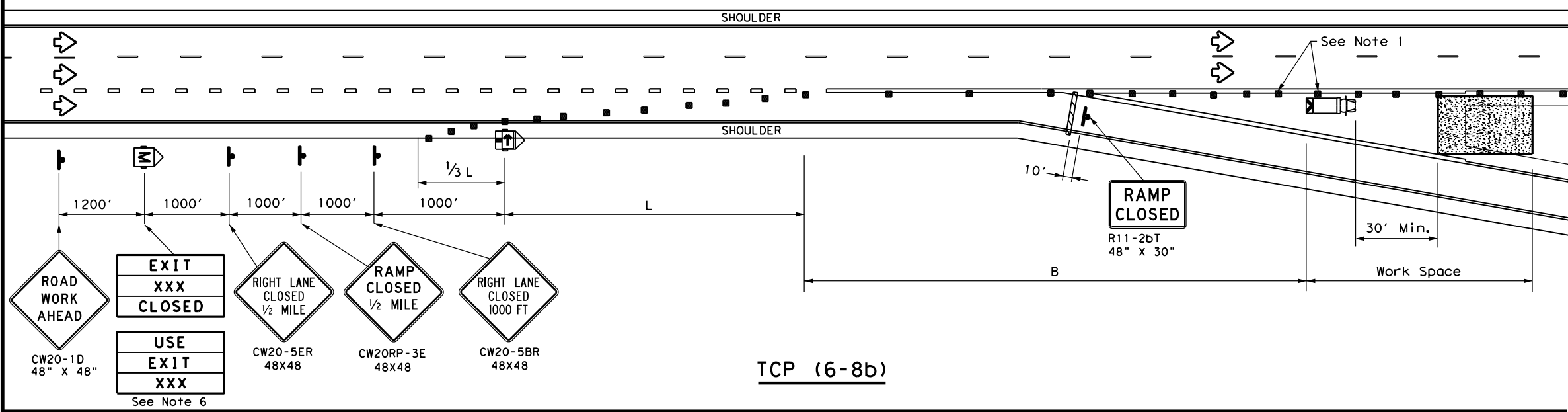
FILE: tcp6-7.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
1-97 8-12	DIST	COUNTY	SHEET NO.	
4-98	HOU	Harris, etc.	37	

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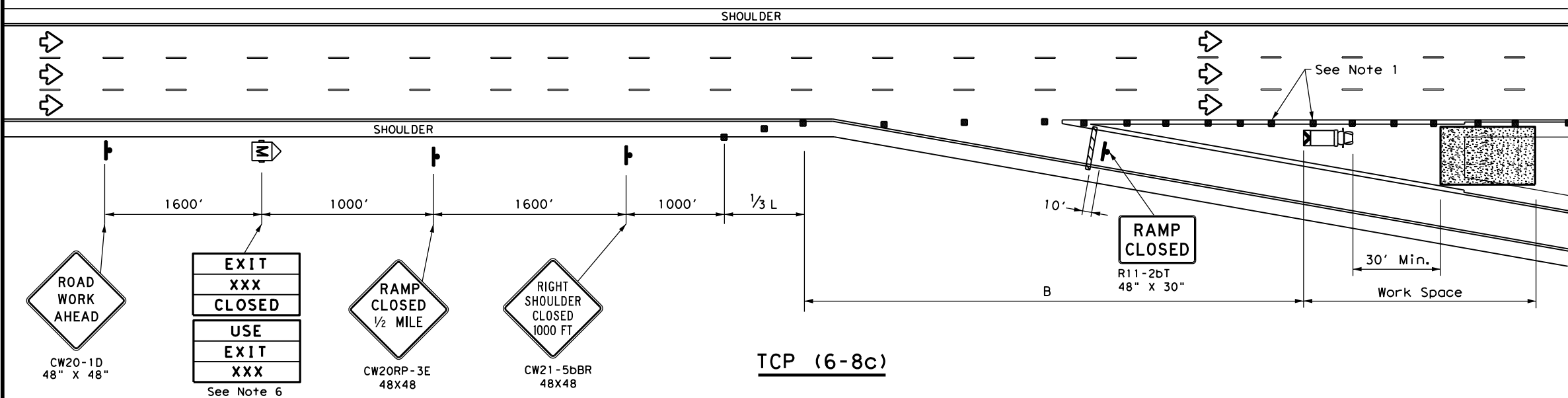
DATE: DATE TIME  
FILE: DOCUMENT NAME



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

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

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

- GENERAL NOTES**
- Place channelizing devices in the gore at 20' spacing.
  - See the Standard Highway Sign Design for Texas (SHSD) for sign details.
  - 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.
  - 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.
  - Truck mounted attenuator is required.
  - The PCMS may be omitted if replaced with a "RAMP CLOSED" AHEAD (CW20RP-3D) Sign.
  - Roadway ADT should be greater than 10,000.

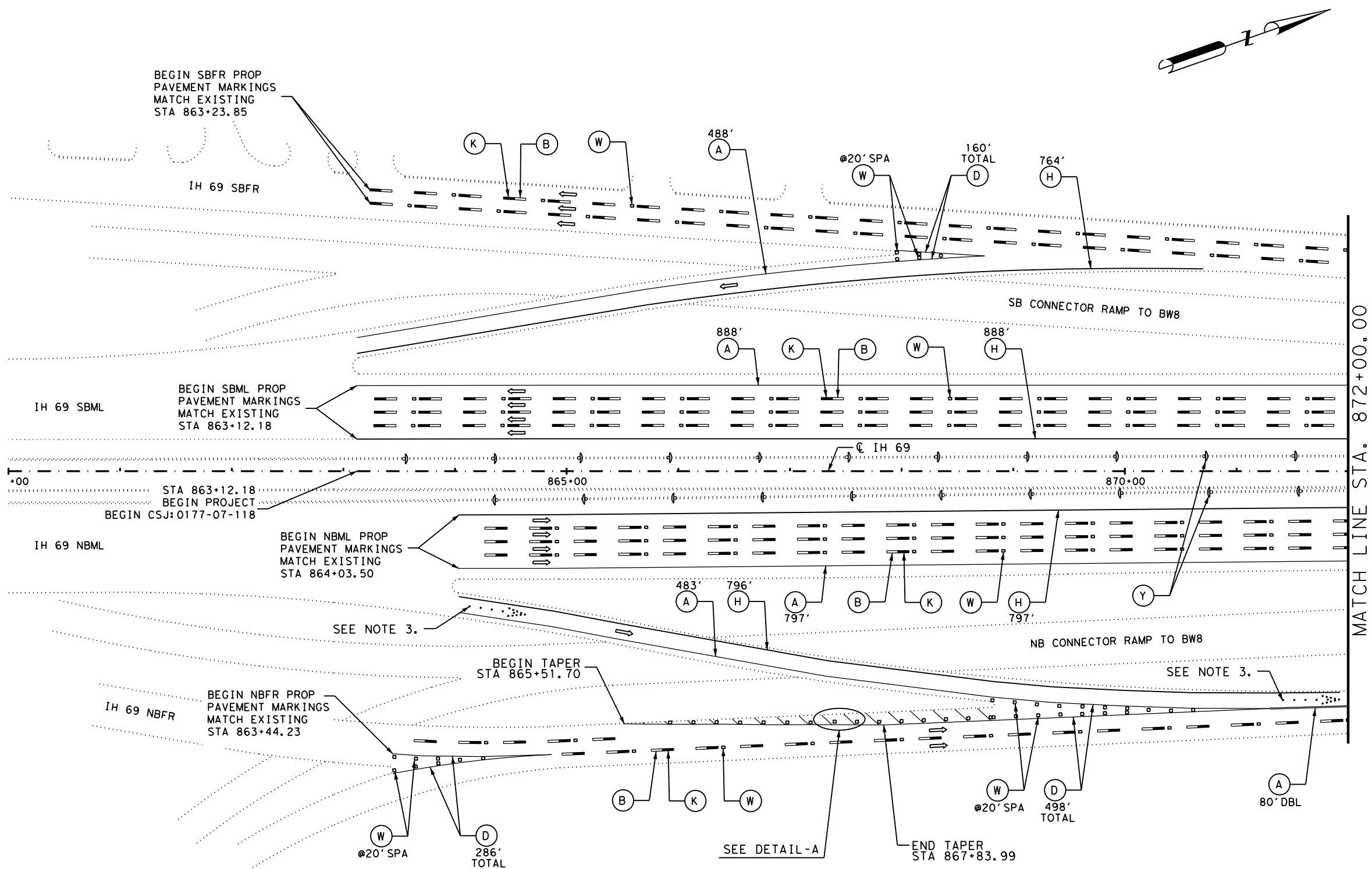
Texas Department of Transportation  
Traffic Operations Division Standard

**WORK IN EXIT GORE FOR ADT GREATER THAN 10,000**

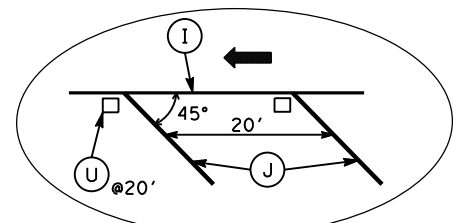
**TCP (6-8) - 14**

FILE: tcp6-8.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
DIST	COUNTY		SHEET NO.	
HOU	Harris, etc.		38	

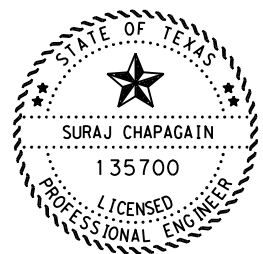
DATE: \$DATE\$ \$TIME\$ FILE: \$FILES\$



- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



DETAIL "A"



Suraj Chapagain, P.E.  
9/2/2022

**IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT**

SHEET 1 OF 42



CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		39

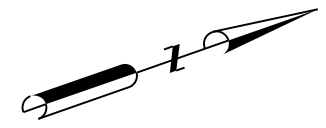
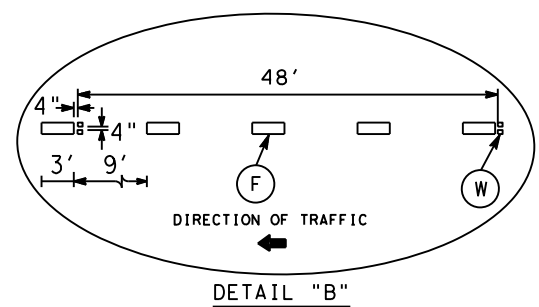
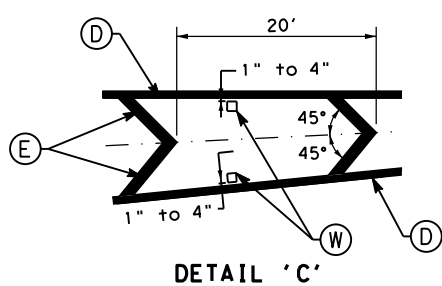
SCALE: 1" = 100'

**LEGEND:**

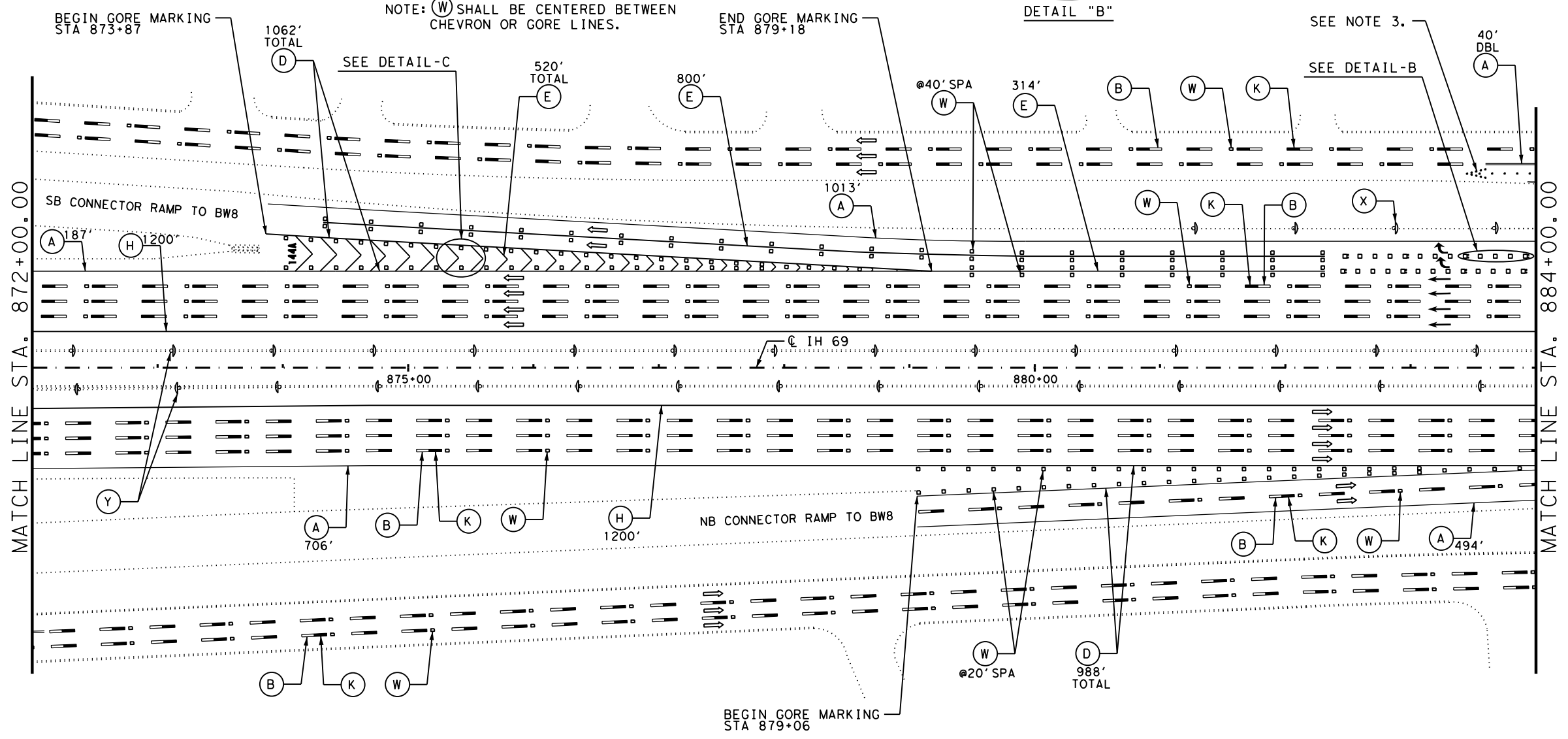
(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



DATE: \$DATE\$ \$TIME\$ FILE: \$FILES\$

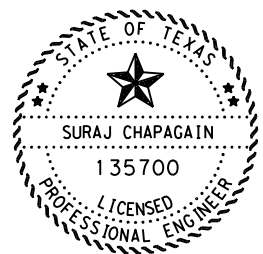


- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



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IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

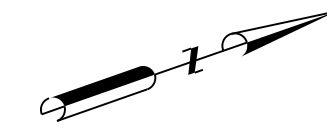
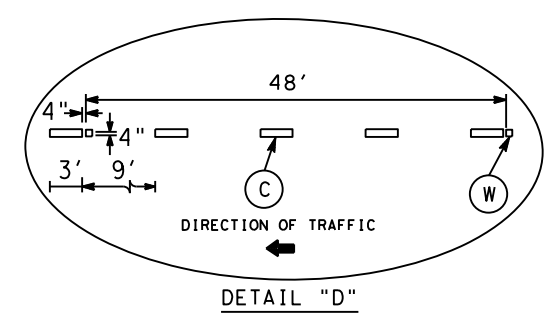
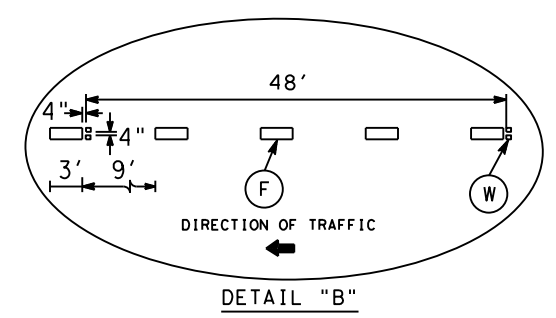
SHEET 2 OF 42



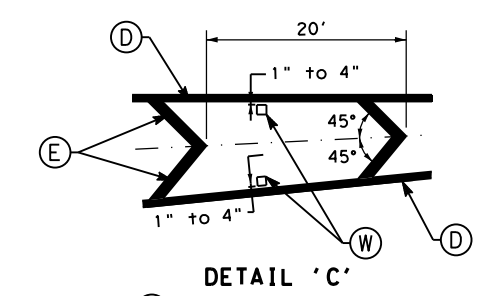
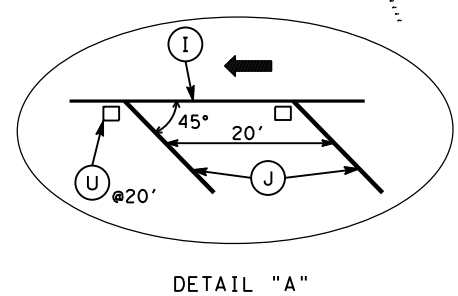
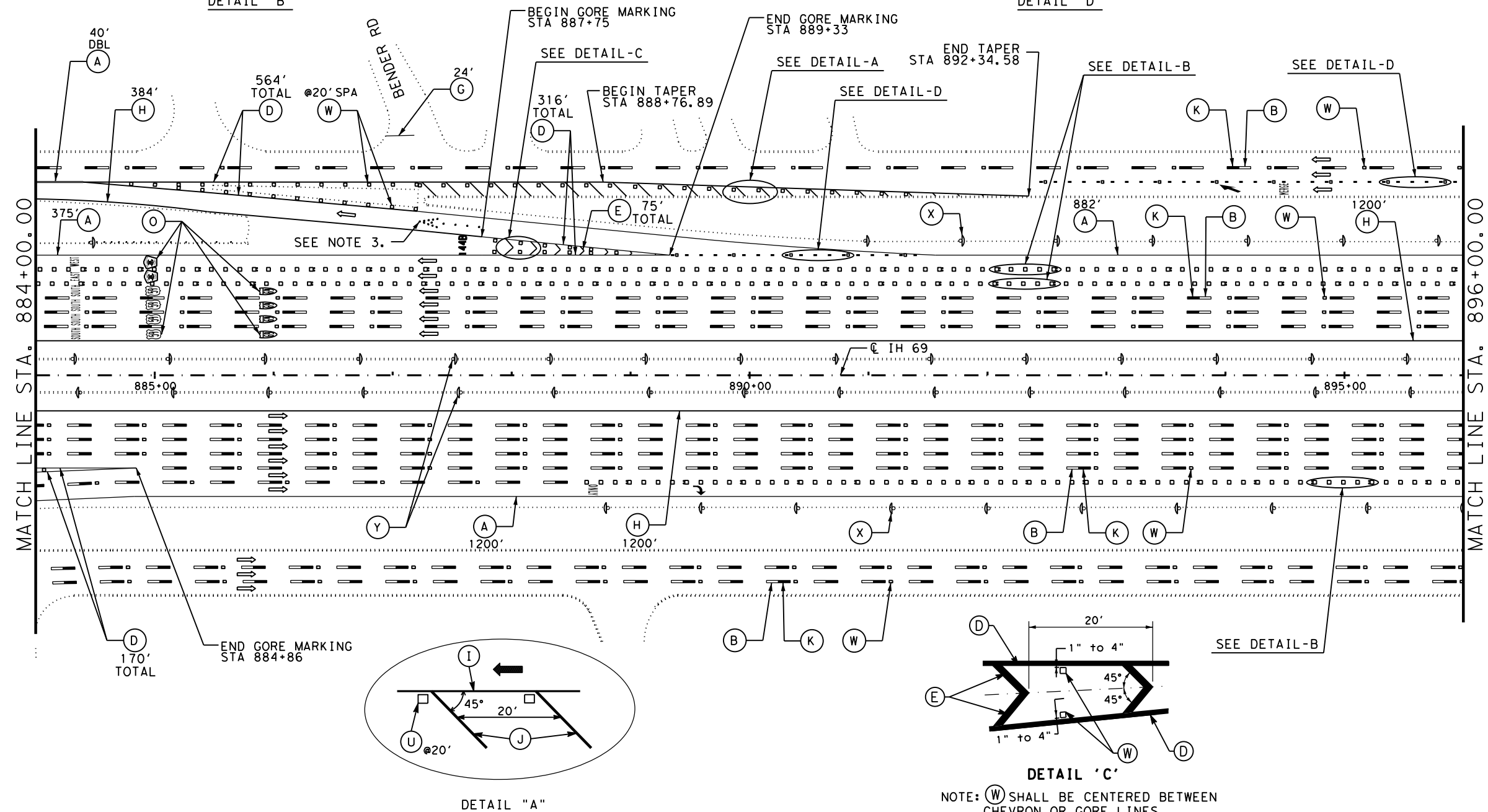
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		40

SCALE: 1" = 100'

DATE: \$DATE\$ \$TIME\$ FILE: \$FILES\$



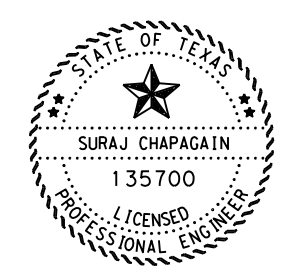
- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**NOTE:** (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



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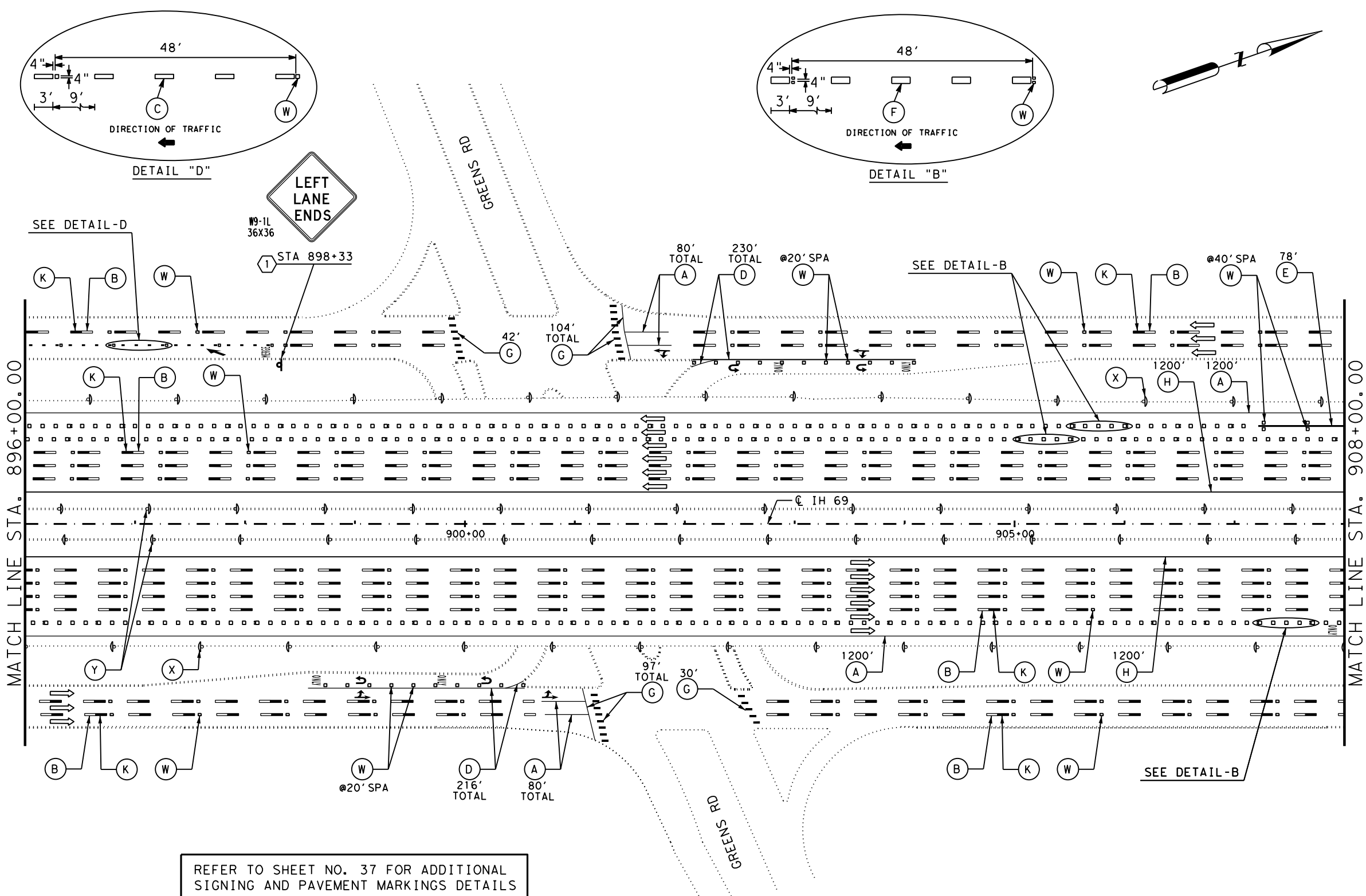
**IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT**

SHEET 3 OF 42

		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY		SHEET NO.
		HOU	HARRIS, ETC.		41

SCALE: 1" = 100'

DATE: \$DATE\$ \$TIME\$  
 FILE: \$FILES\$

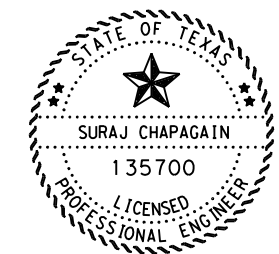


- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

REFER TO SHEET NO. 37 FOR ADDITIONAL SIGNING AND PAVEMENT MARKINGS DETAILS

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T-) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



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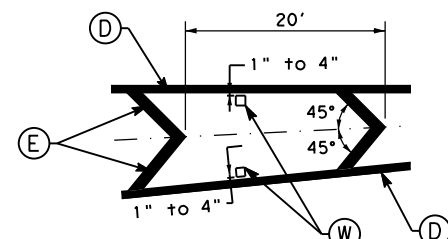
IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 4 OF 42

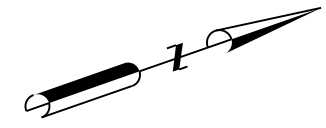
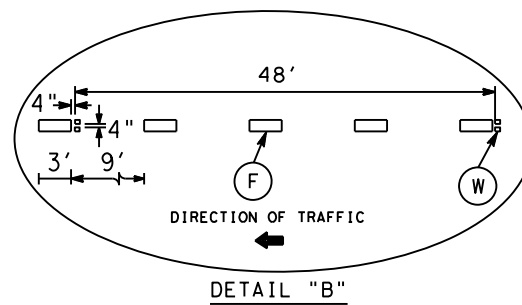
		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY		SHEET NO.
		HOU	HARRIS, ETC.		42

SCALE: 1" = 100'

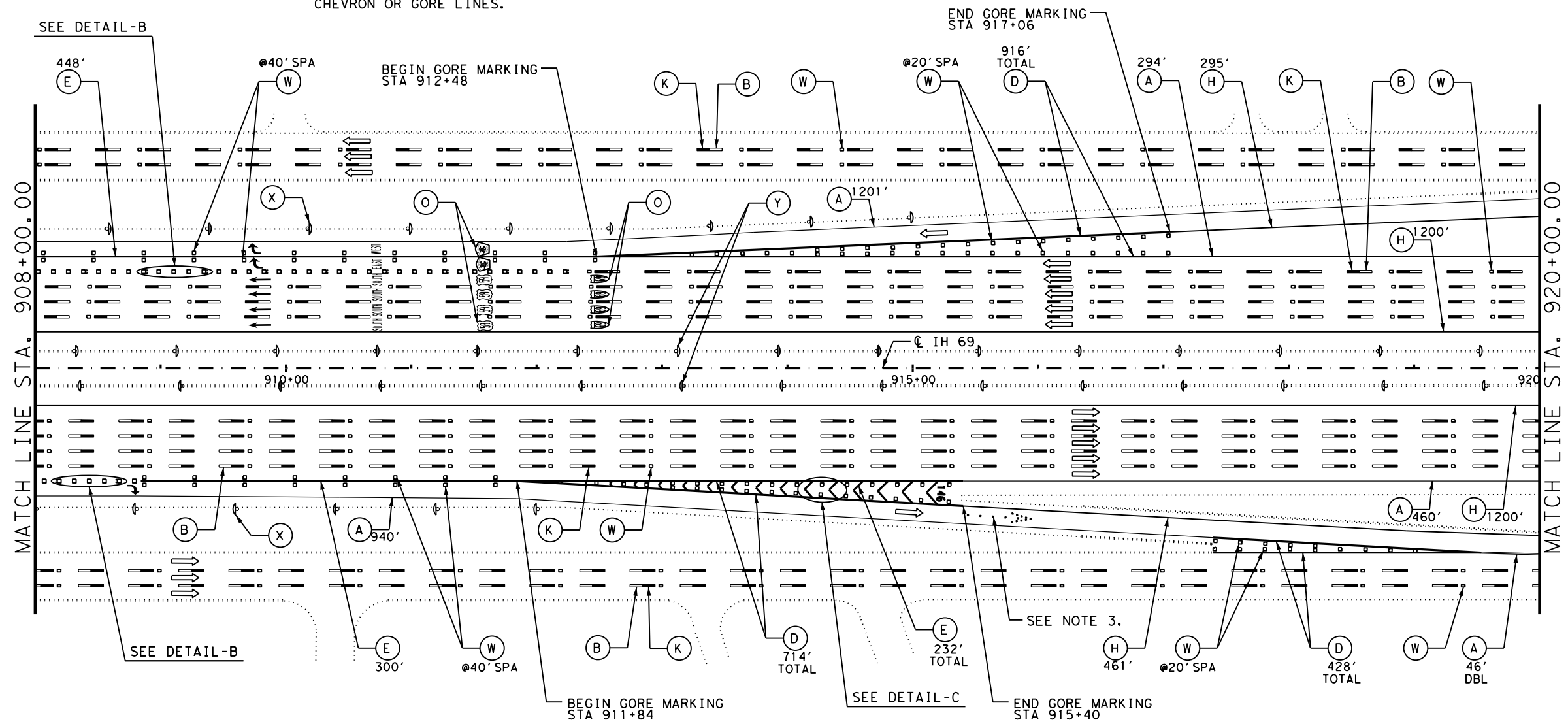
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NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.

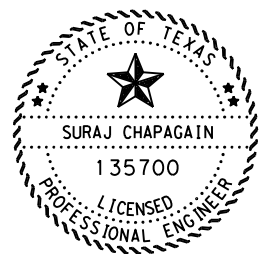


- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



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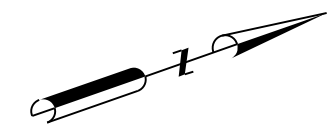
IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

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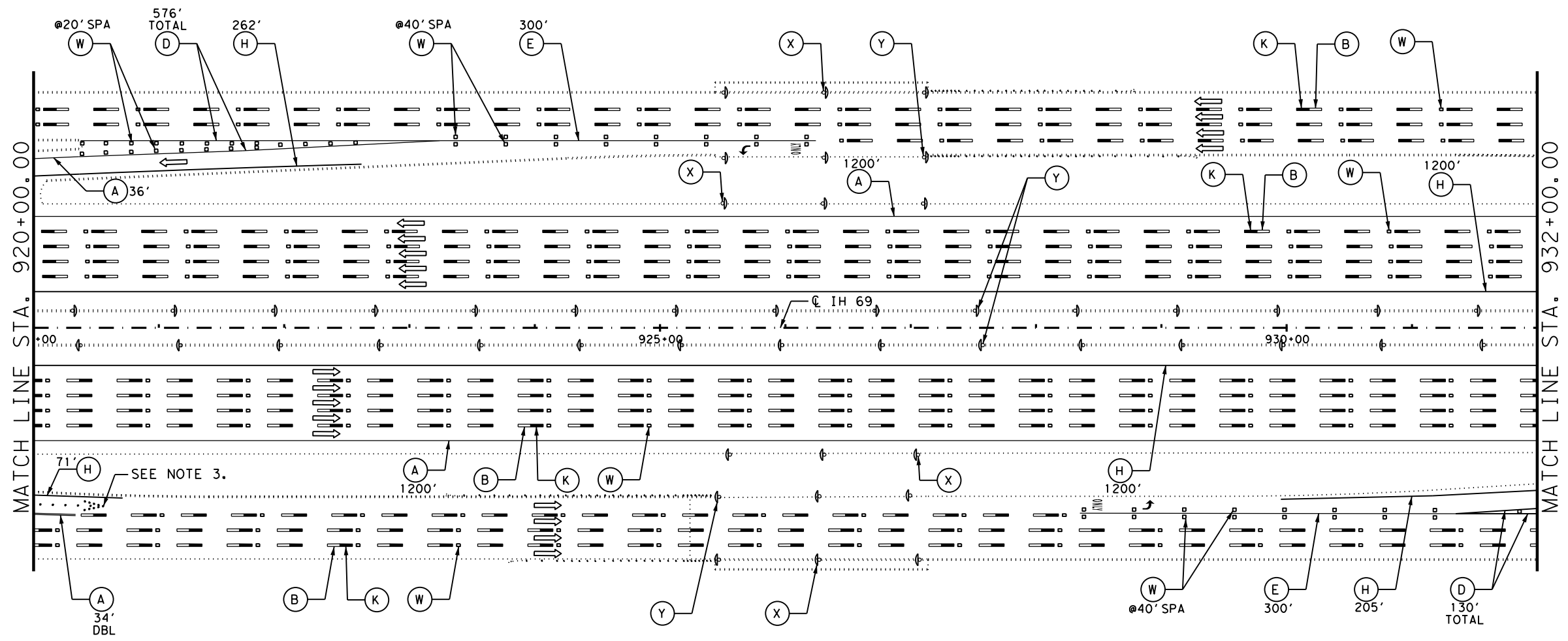
		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY		SHEET NO.
		HOU	HARRIS, ETC.		43

SCALE: 1" : 100'

Cks  
Dns  
Cks  
Dns

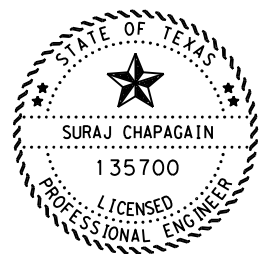


- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	⇨ 4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ 1 PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨ 2 PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨ 3 PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨ 4 PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨ 5 PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



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SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 6 OF 42

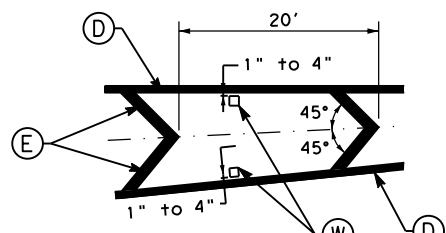


CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		44

SCALE: 1" = 100'

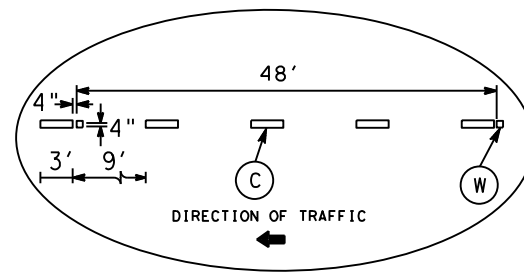
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DATE: \$DATE\$ \$TIME\$ FILE: \$FILE\$

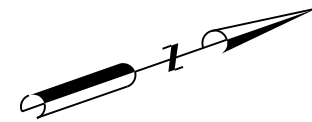


**DETAIL 'C'**

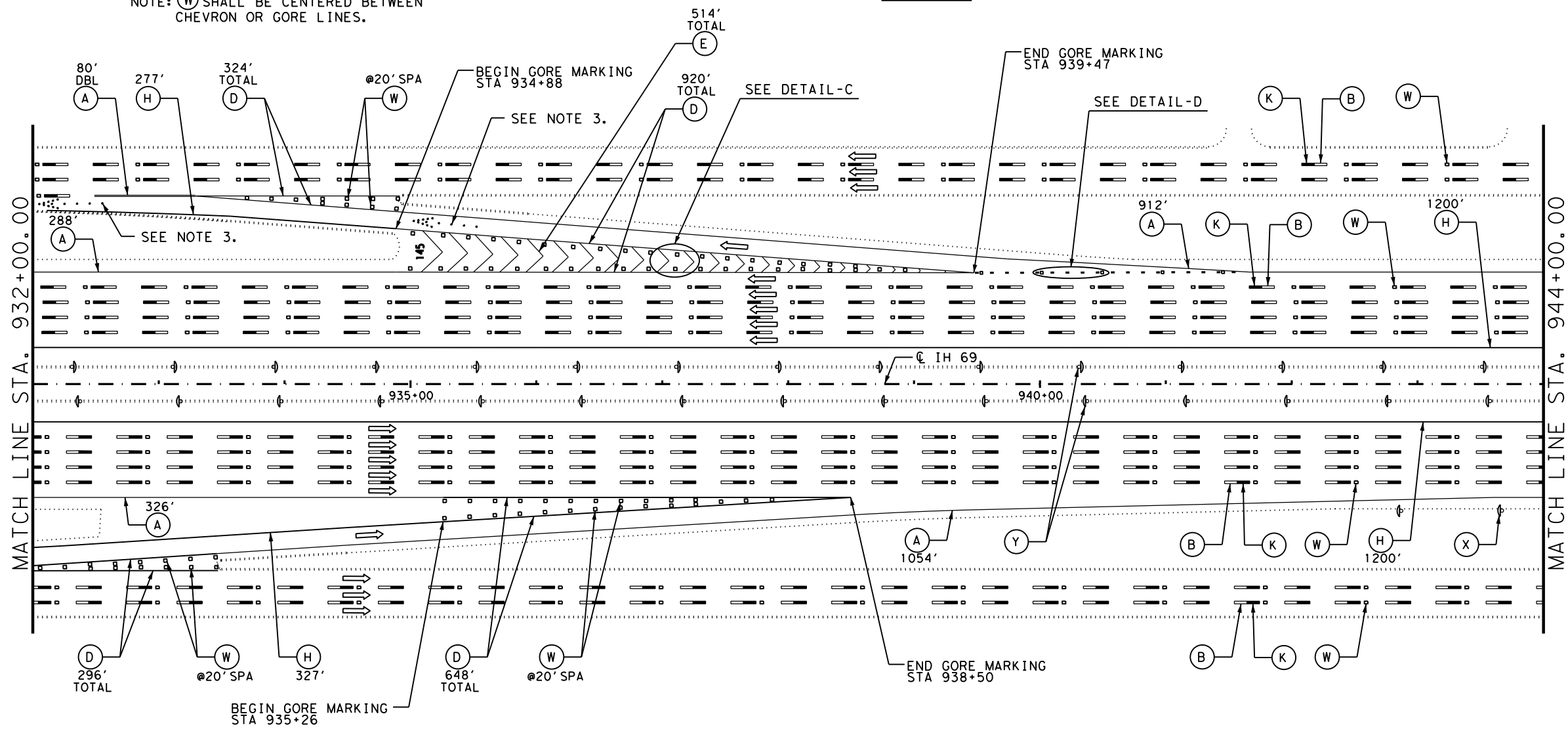
NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.



**DETAIL 'D'**

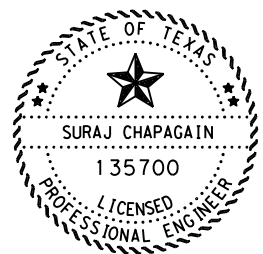


- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



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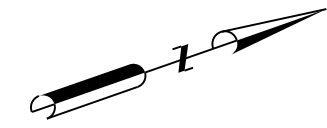
**IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT**

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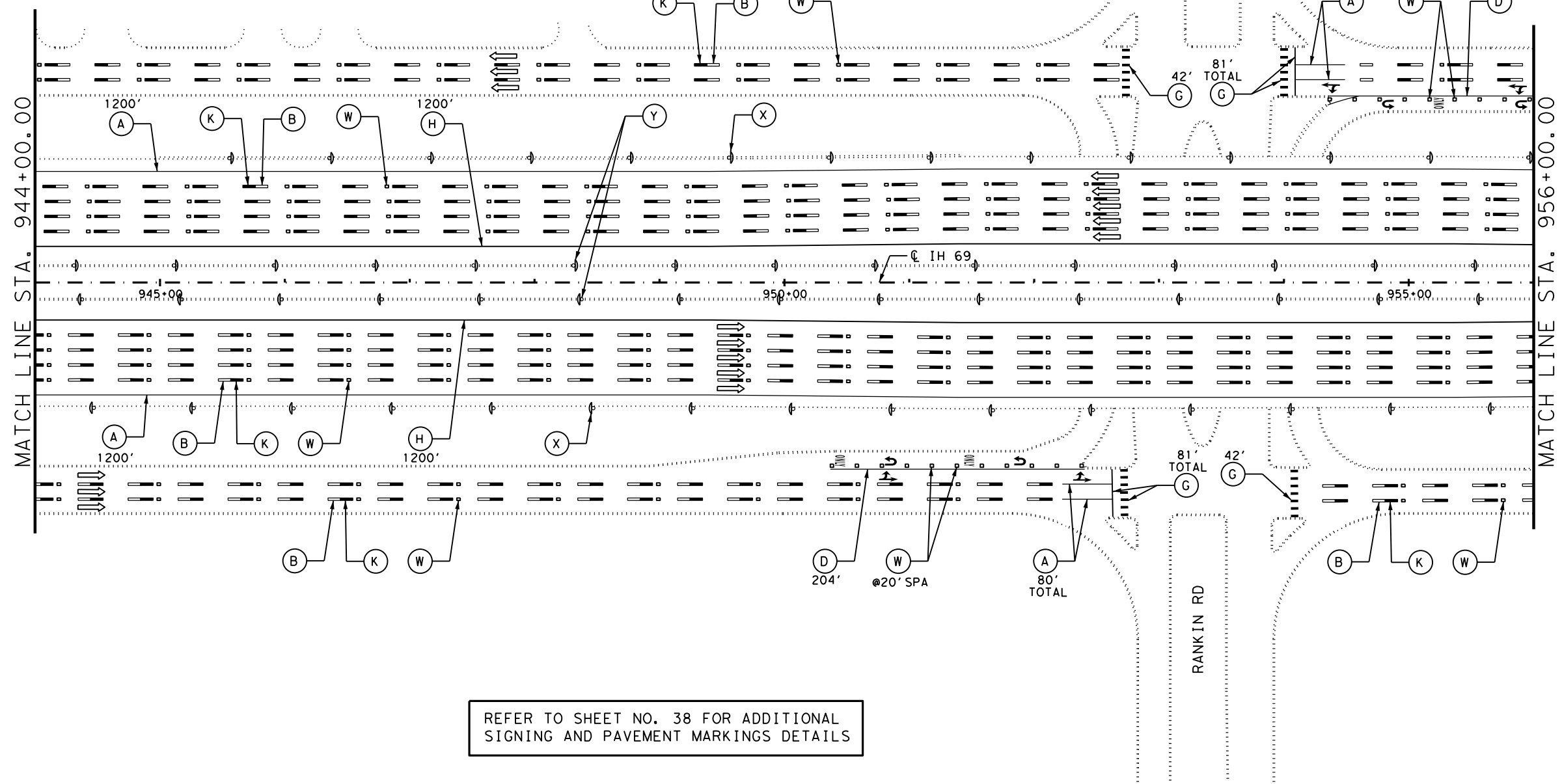
		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY		SHEET NO.
		HOU	HARRIS, ETC.		45

SCALE: 1" : 100'

Ck:   
 Dh:   
 Ck:   
 Dh:



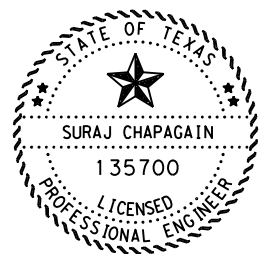
- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



REFER TO SHEET NO. 38 FOR ADDITIONAL SIGNING AND PAVEMENT MARKINGS DETAILS

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRKR TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRKR TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRKR TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRKR TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRKR TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRKR TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRKR TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRKR TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ MERGE ONLY
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



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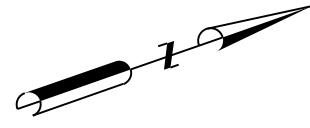


CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		46

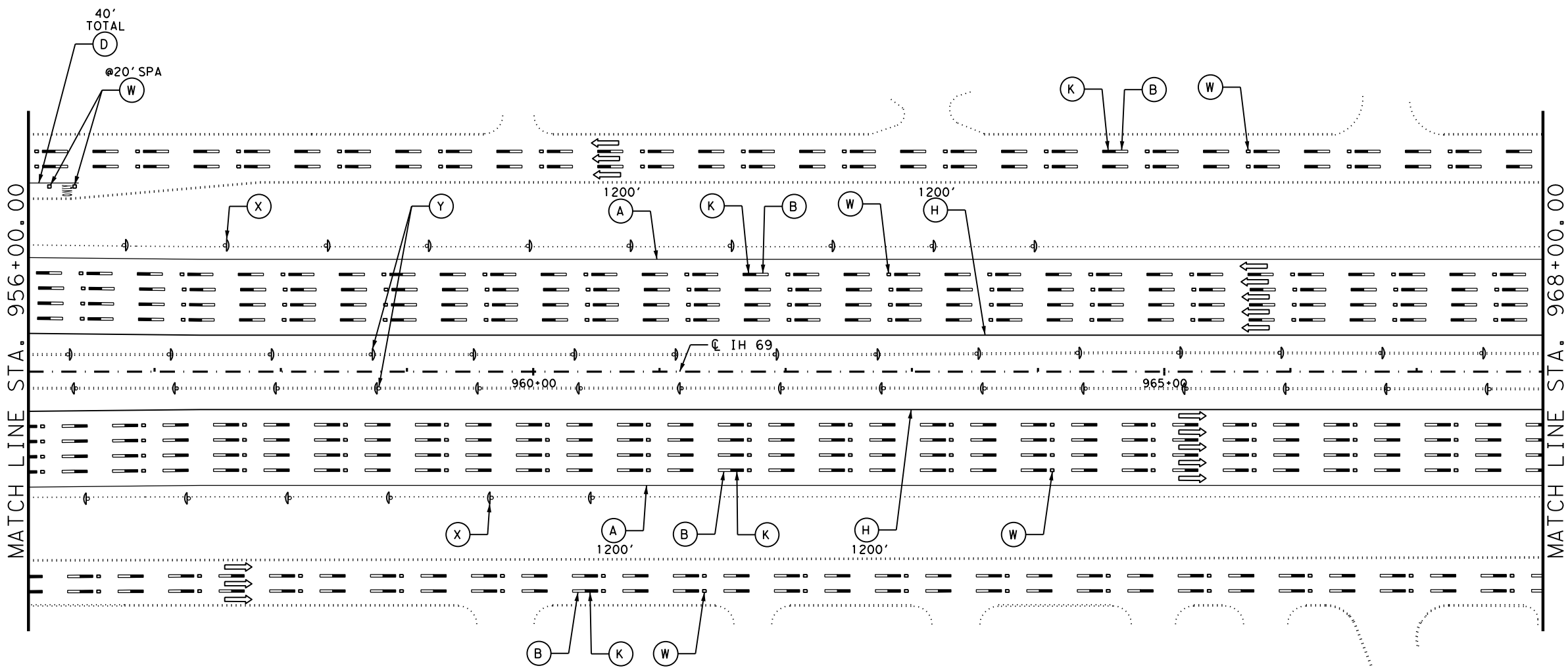
SCALE: 1" = 100'

DATE: \$DATE\$ \$TIME\$  
 FILE: \$FILES\$

C&G  
D&R  
C&G  
D&R



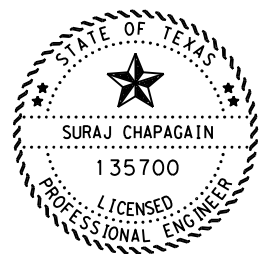
- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		

DATE: \$DATE\$  
FILE: \$FILE\$



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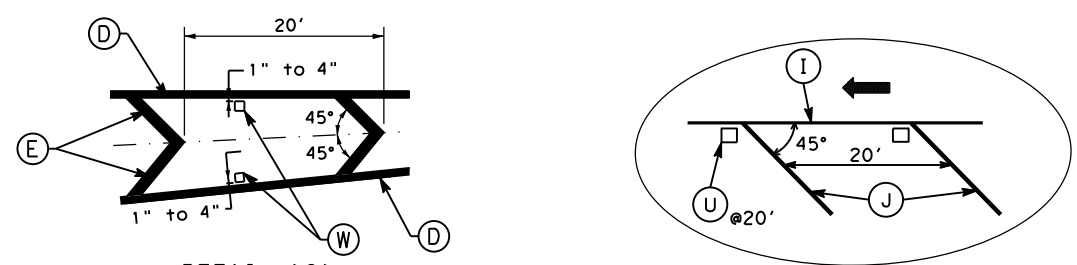


CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		47

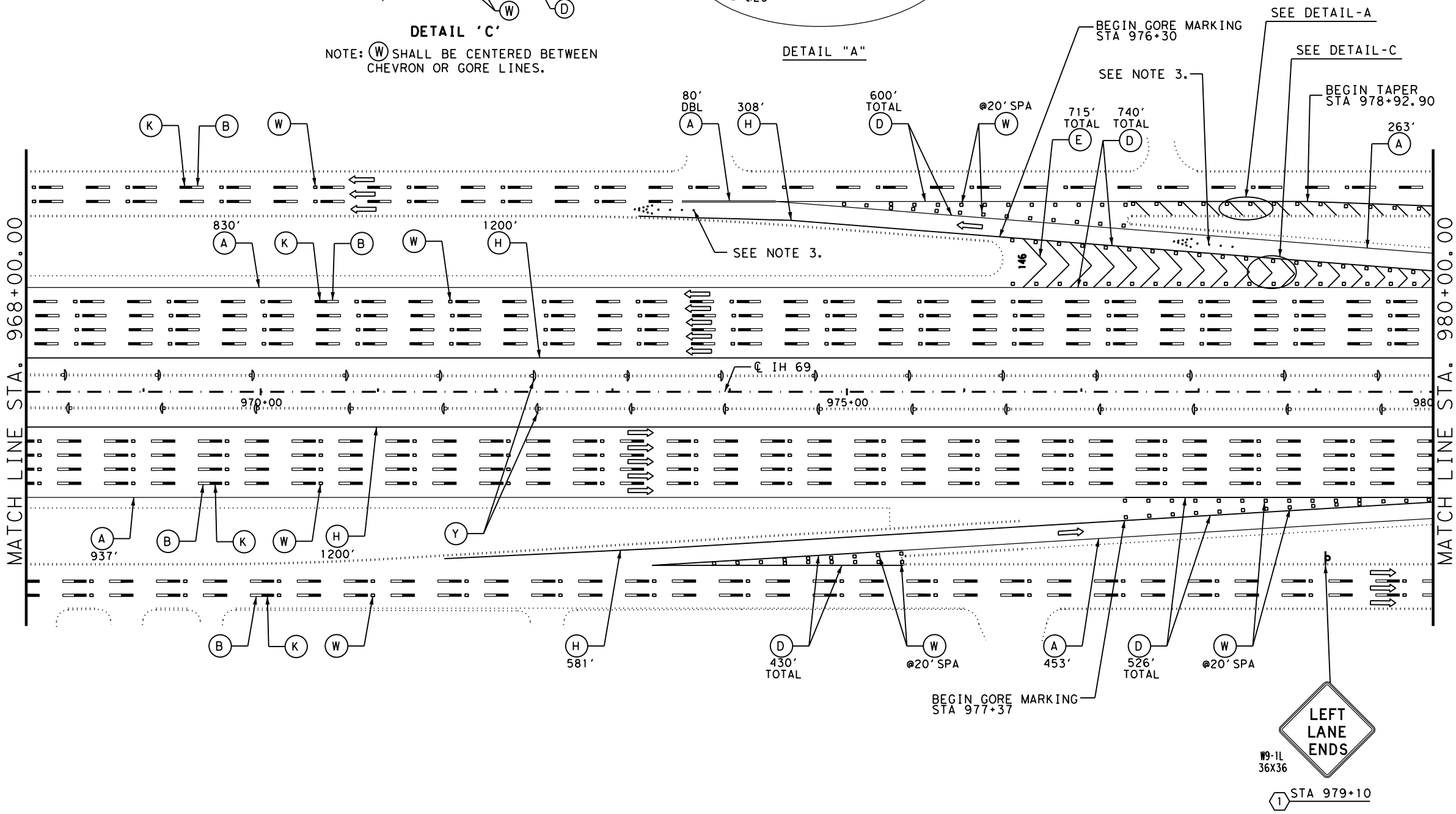
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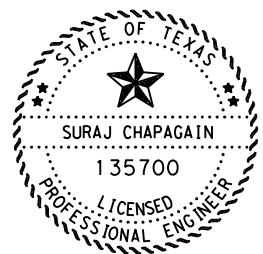
NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.



- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T-) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



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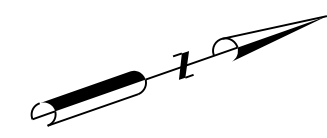
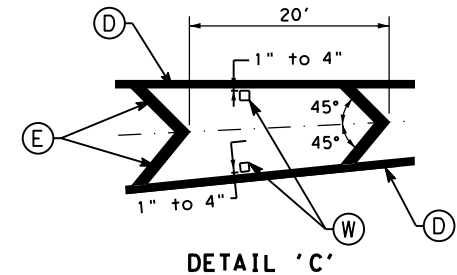
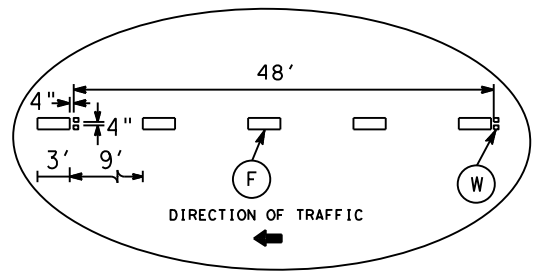
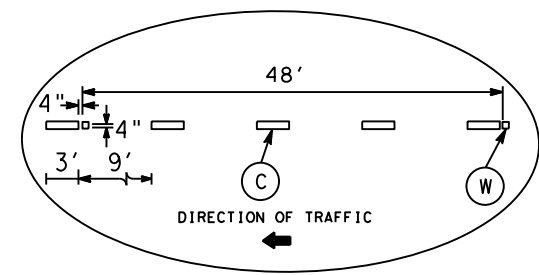
SHEET 10 OF 42



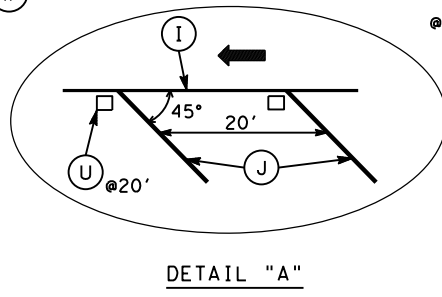
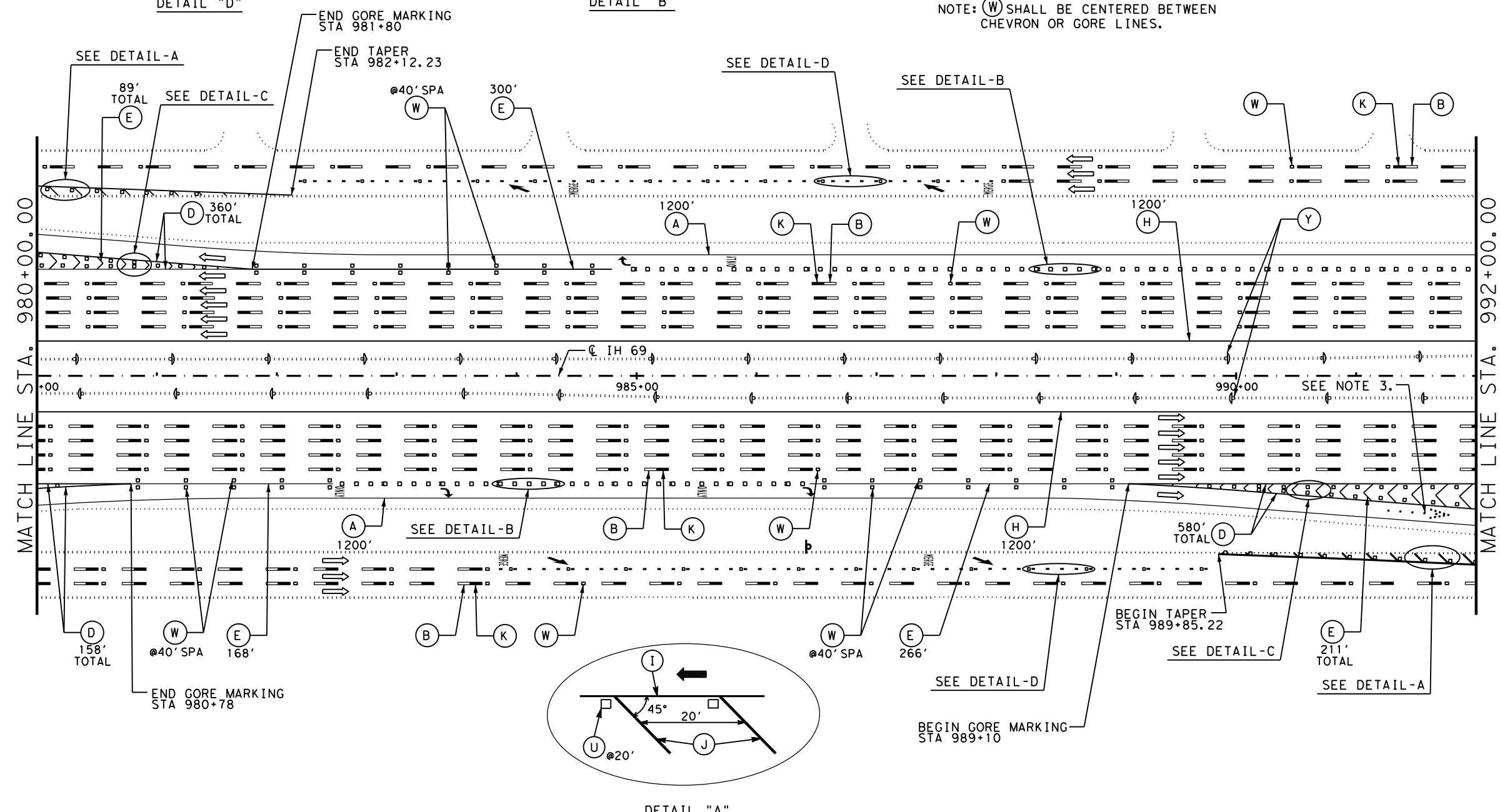
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		48

SCALE: 1" : 100'

DATE: \$DATE\$ \$TIME\$  
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 Cks: \_\_\_\_\_  
 Dns: \_\_\_\_\_

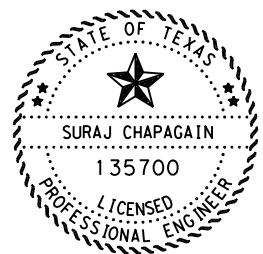


- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



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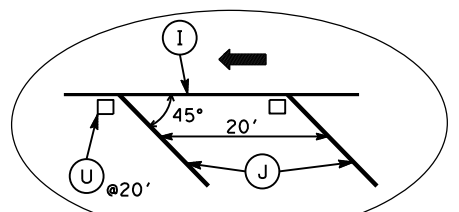
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		49

SCALE: 1" = 100'

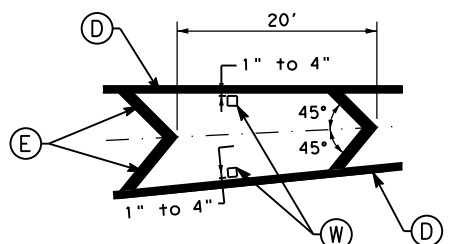
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1 STA 992+87

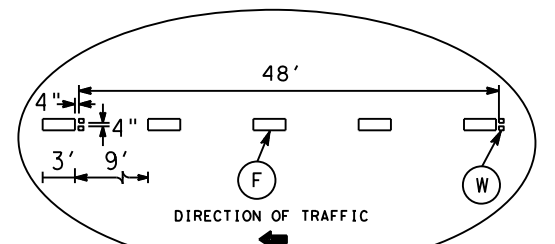


DETAIL "A"

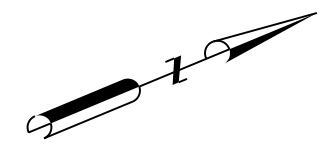


DETAIL 'C'

NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.

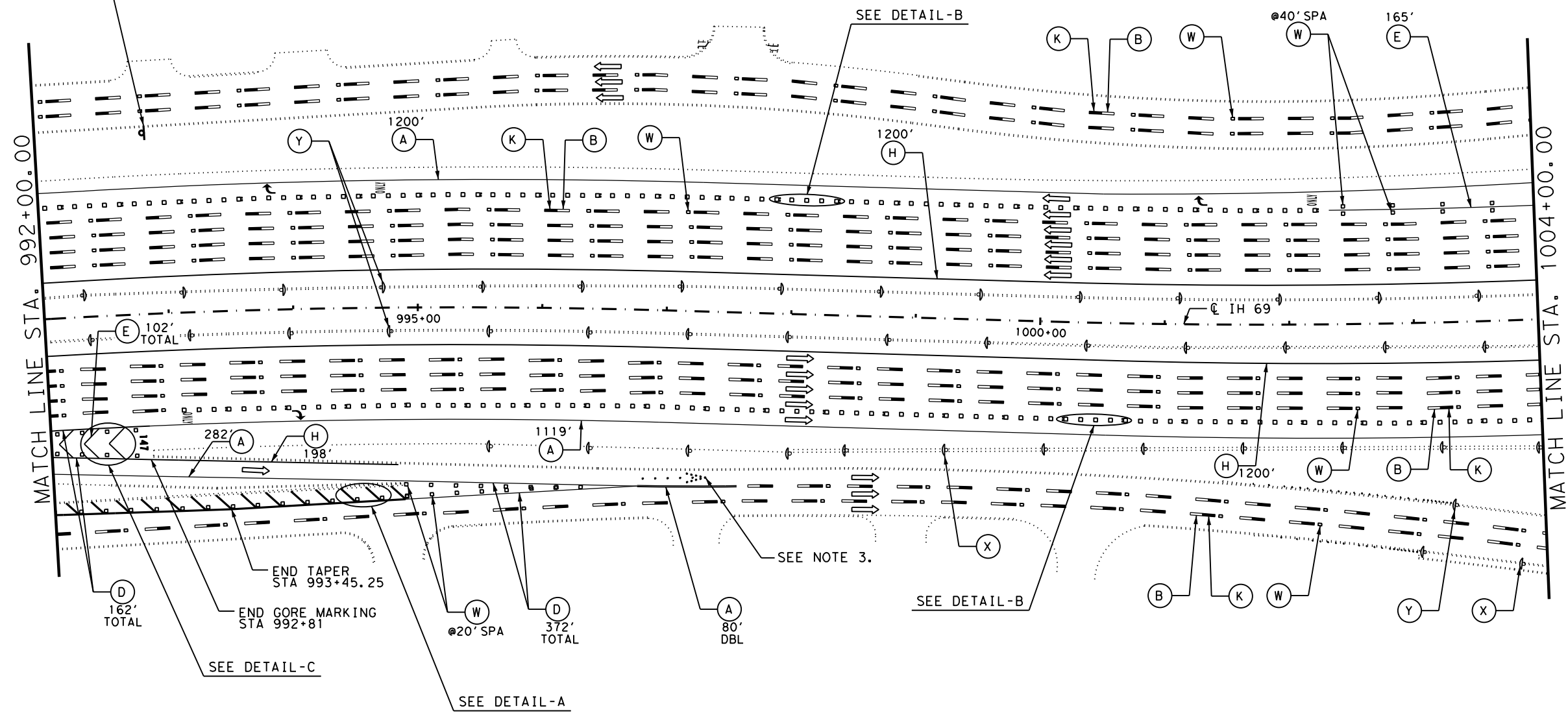


DETAIL "B"



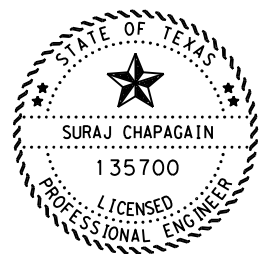
NOTE:

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LEGEND:

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.

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IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

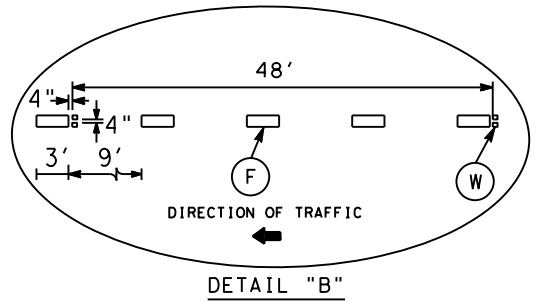
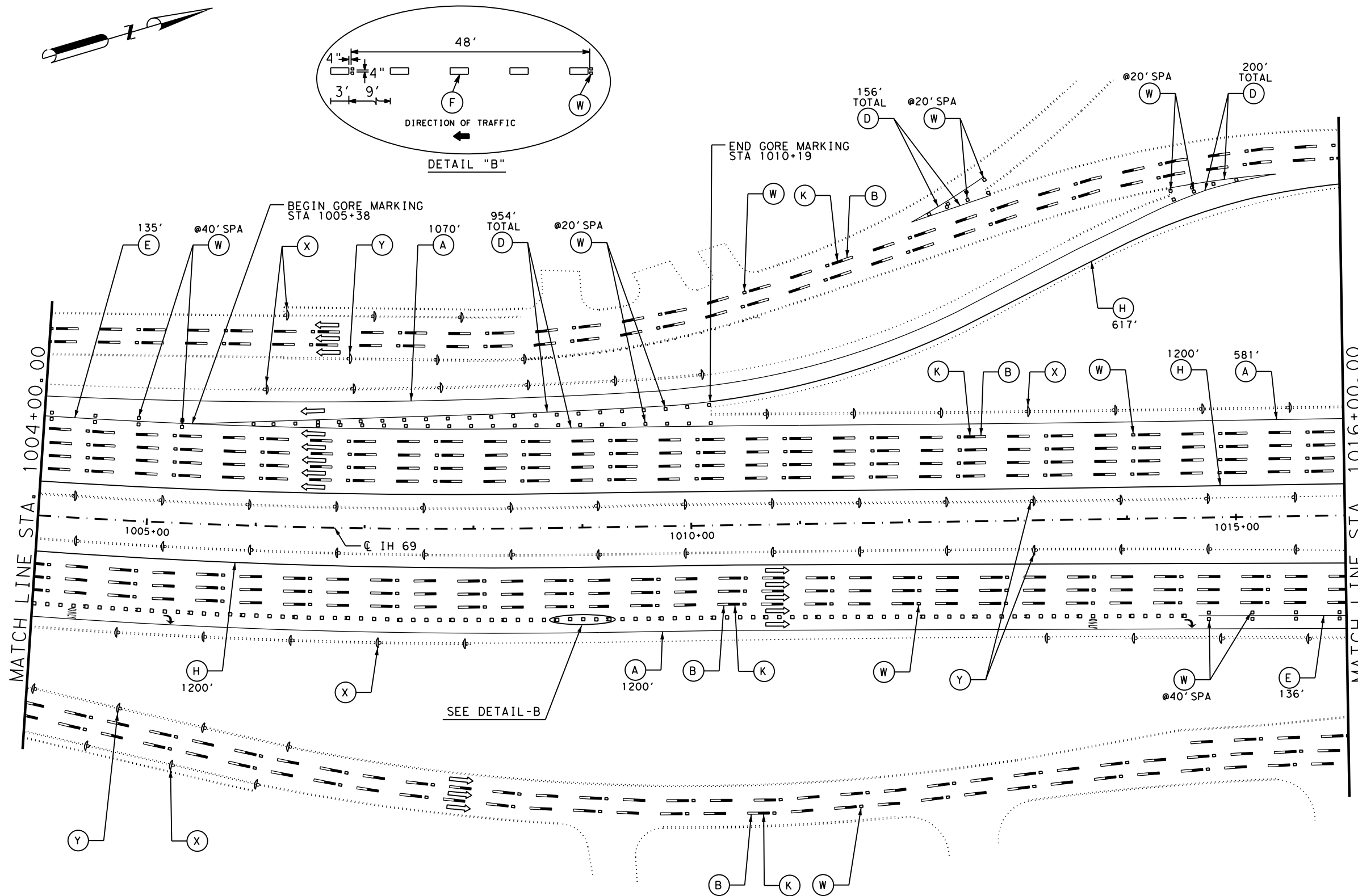
SHEET 12 OF 42



CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		50

SCALE: 1" : 100'

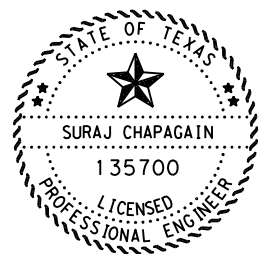
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- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



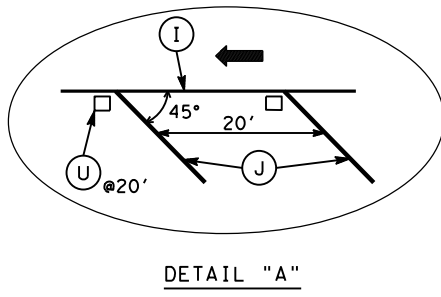
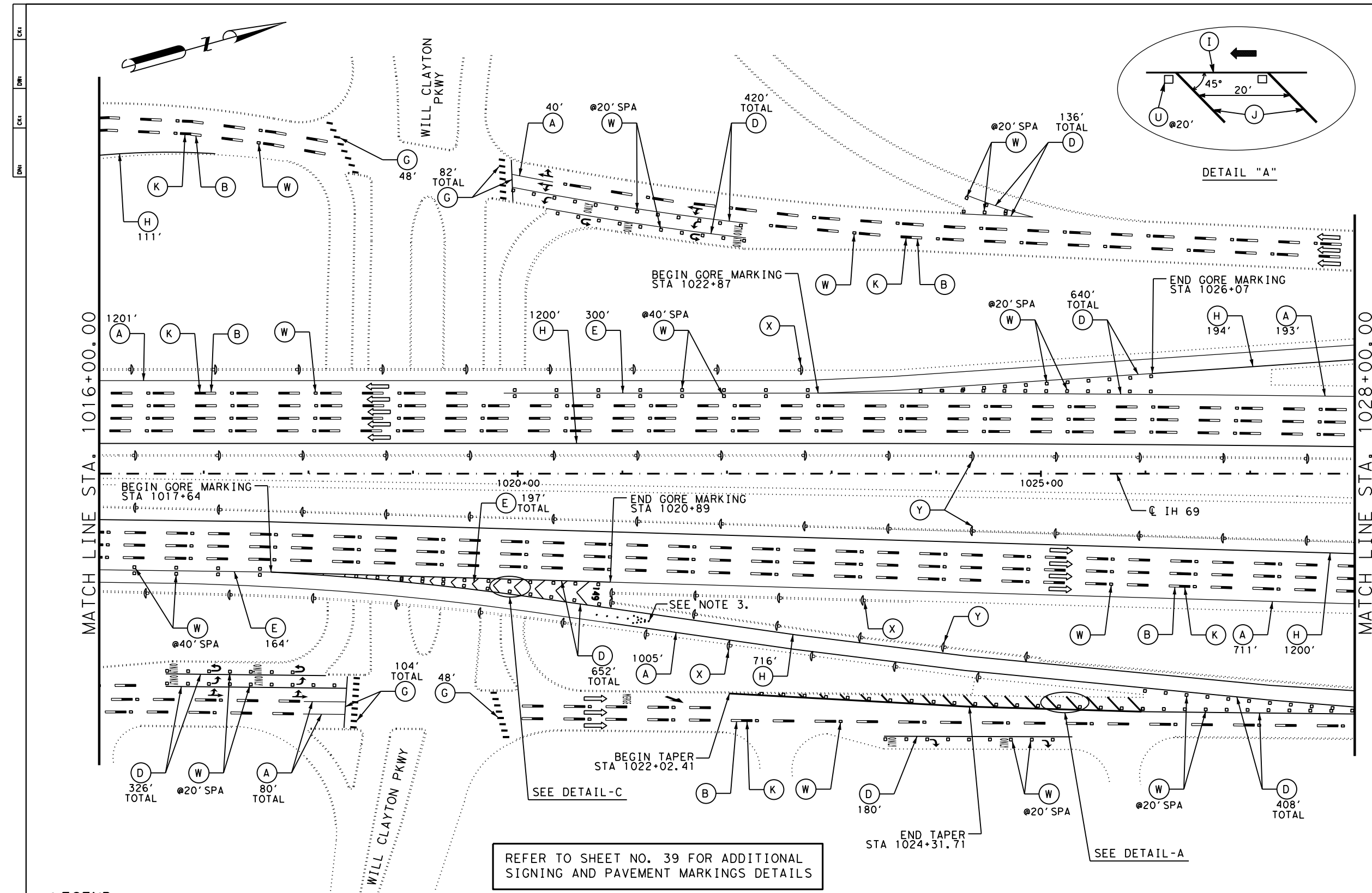
Suraj Chapagain, P.E.  
9/2/2022

**IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT**

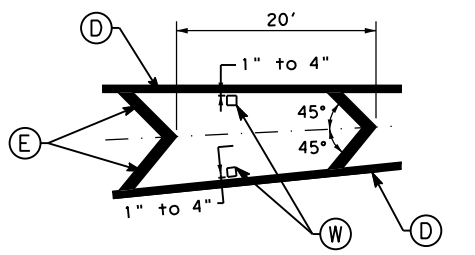
SHEET 13 OF 42

		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY	SHEET NO.	
		HOU	HARRIS, ETC.	51	

SCALE: 1" : 100'



- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

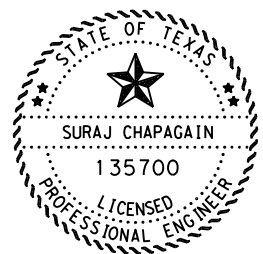


NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.

REFER TO SHEET NO. 39 FOR ADDITIONAL SIGNING AND PAVEMENT MARKINGS DETAILS

**LEGEND:**

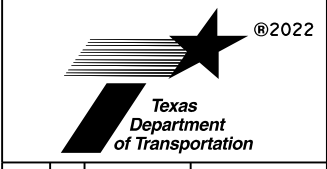
- |   |   |  |   |
|---|---|--|---|
| (A) MLTPLY PV MK W/WTY (W) (6") (SLD)   | (J) MLTPLY PV MK W/WTY (Y) (12") (SLD)      | (W) REFL PAV MRKR TY II-C-R                          | ⇨ DIRECTION OF TRAFFIC                  |
| (B) MLTPLY PV MK W/WTY (W) (6") (BRK)   | (K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)     | (X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA     | 4 PREFAB PAV MRK TY C (W) (NUMBER)      |
| (C) MLTPLY PV MK W/WTY (W) (6") (DOT)   | (M) PREFAB PAV MRK TY C (W) (36") (YLD TRI) | (Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA     | ↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)   |
| (D) MLTPLY PV MK W/WTY (W) (8") (SLD)   | (N) PREFAB PAV MRK TY C (W) (RR XING)       | (Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA | ⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)   |
| (E) MLTPLY PV MK W/WTY (W) (12") (SLD)  | (O) PREFAB PAV MRK TY C (MULTI) (SHIELD)    | (-) PROPOSED SMALL SIGN                              | ⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)  |
| (F) MLTPLY PV MK W/WTY (W) (12") (LNDP) | (P) REFL PAV MRKR TY II (Y) 12" (SLD)       | (T) RELOCATE SM RD SN SUP & AM                       | ⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW) |
| (G) MLTPLY PV MK W/WTY (W) (24") (SLD)  | (T) REFL PAV MRKR TY I-R                    | (X-) REMOVE SM RD SN SUP & AM                        | ⇄ PREFAB PAV MRK TY C (W) (WORD)        |
| (H) MLTPLY PV MK W/WTY (Y) (6") (SLD)   | (U) REFL PAV MRKR TY I-A                    |  |   |
| (I) MLTPLY PV MK W/WTY (Y) (8") (SLD)   | (V) REFL PAV MRKR TY II-A-A                 |  |   |



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MARKING LAYOUT

SHEET 14 OF 42

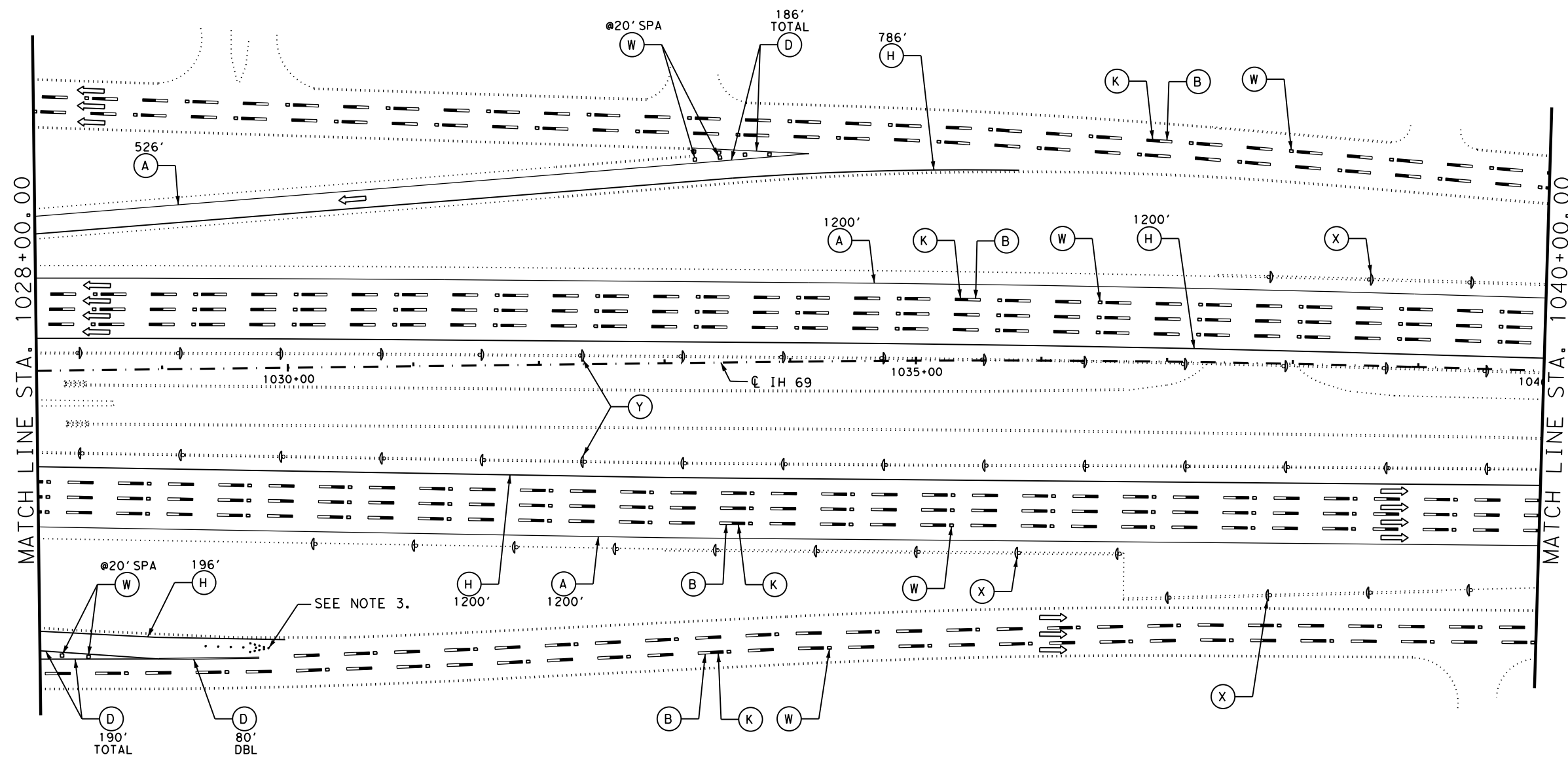


CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		52

SCALE: 1" = 100'

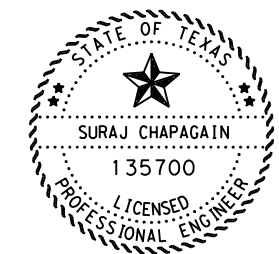
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DATE: \$DATE\$ \$TIME\$ FILE: \$FILES\$



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
9/2/2022

**IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT**

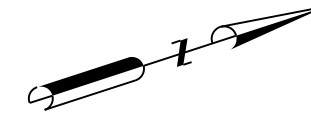
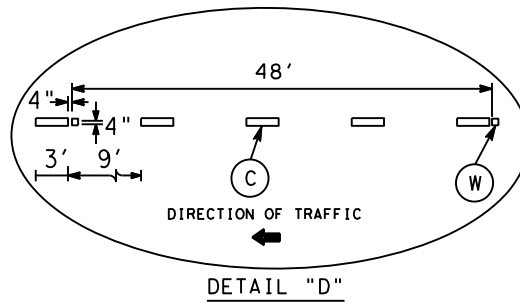
SHEET 15 OF 42

@2022

CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		53

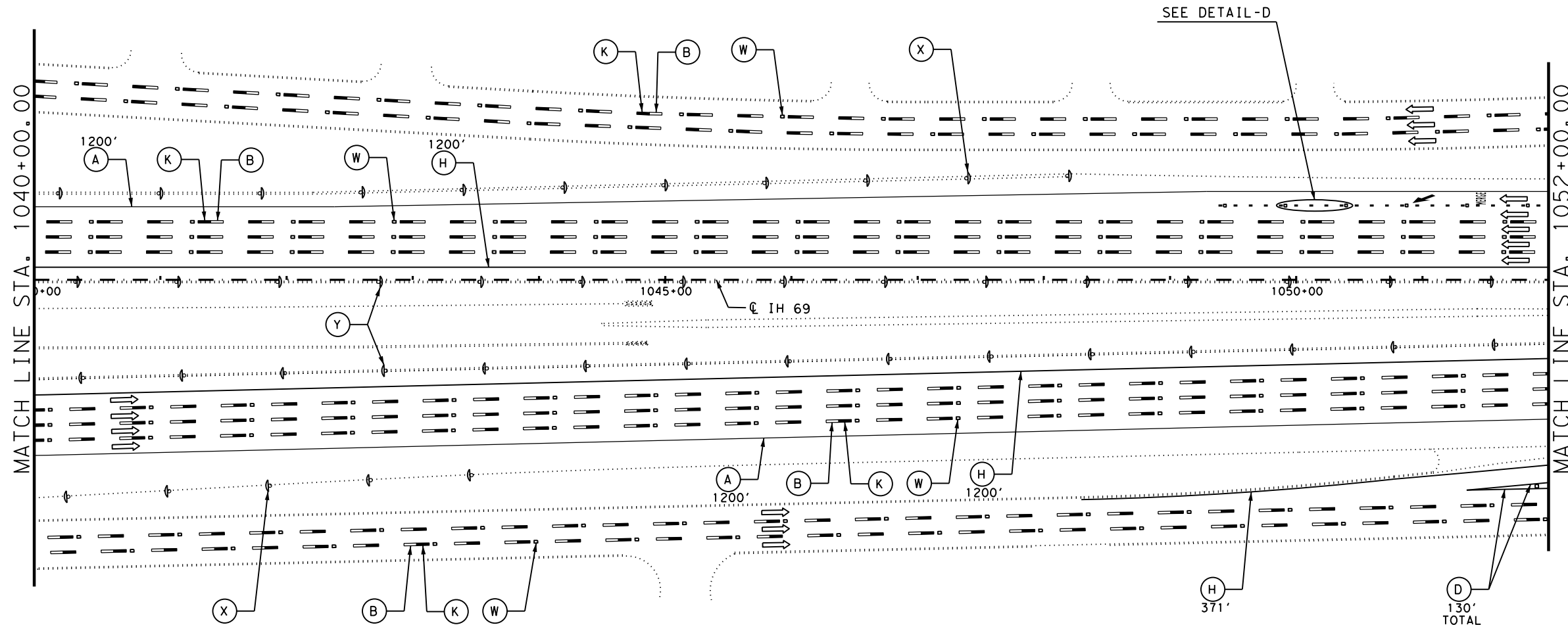
SCALE: 1" = 100'

Cks  
Dnr  
Cks  
Dnr



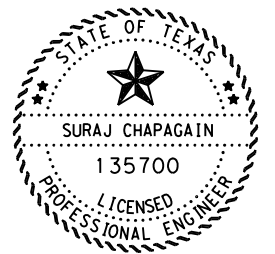
NOTE:

1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



LEGEND:

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T-) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
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IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

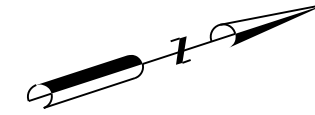
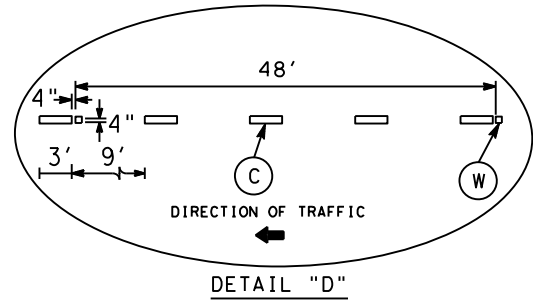
SHEET 16 OF 42

		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY		SHEET NO.
		HOU	HARRIS, ETC.		54

SCALE: 1" : 100'

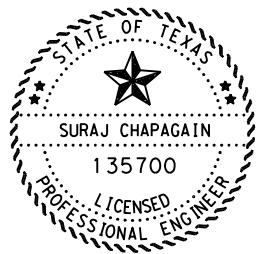
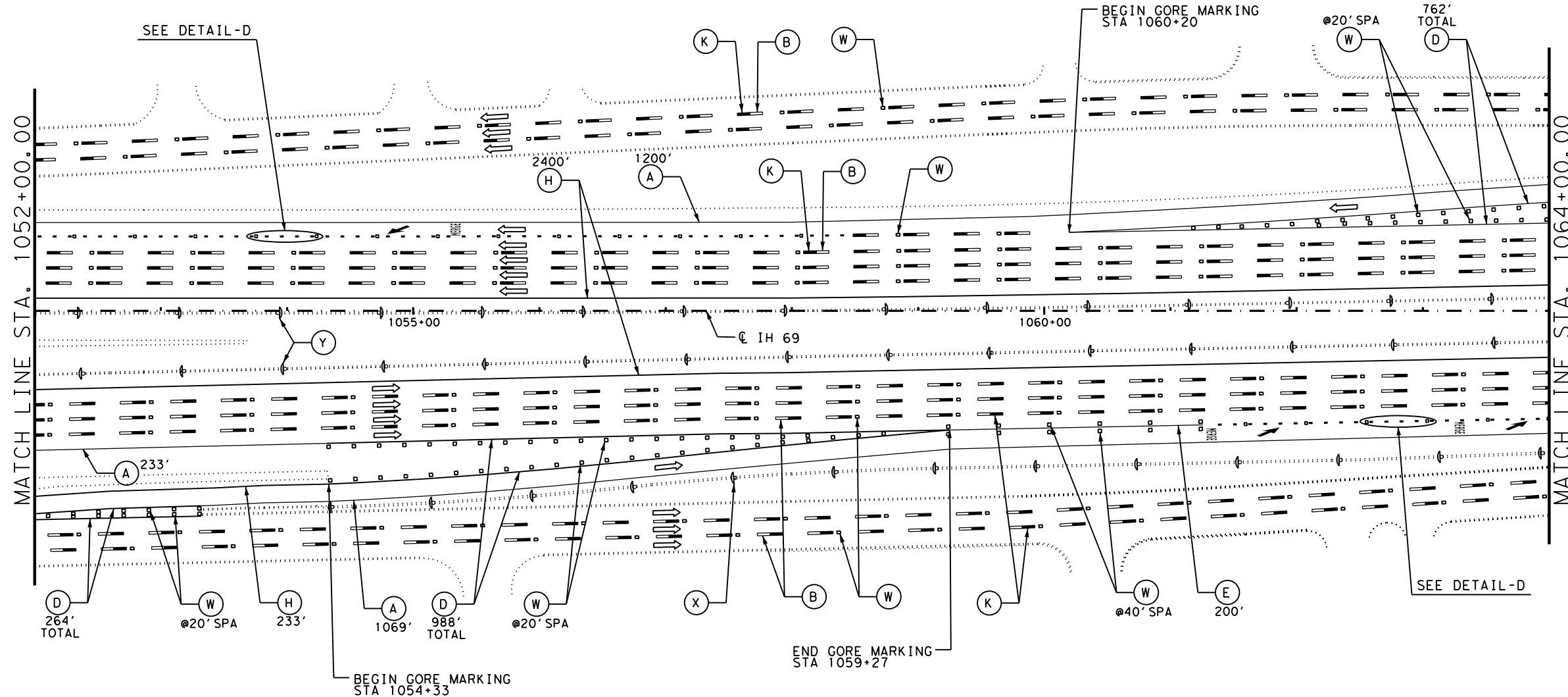
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C&G  
D&R  
C&G  
D&R



NOTE:

1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



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9/2/2022

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SIGNING & PAVEMENT  
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LEGEND:

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		

DATE: \$DATE\$  
FILE: \$FILE\$

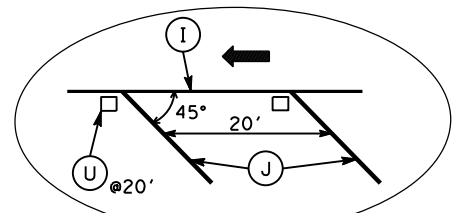
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@2022  

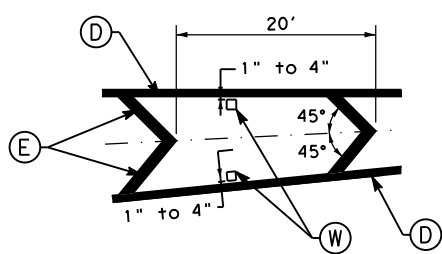
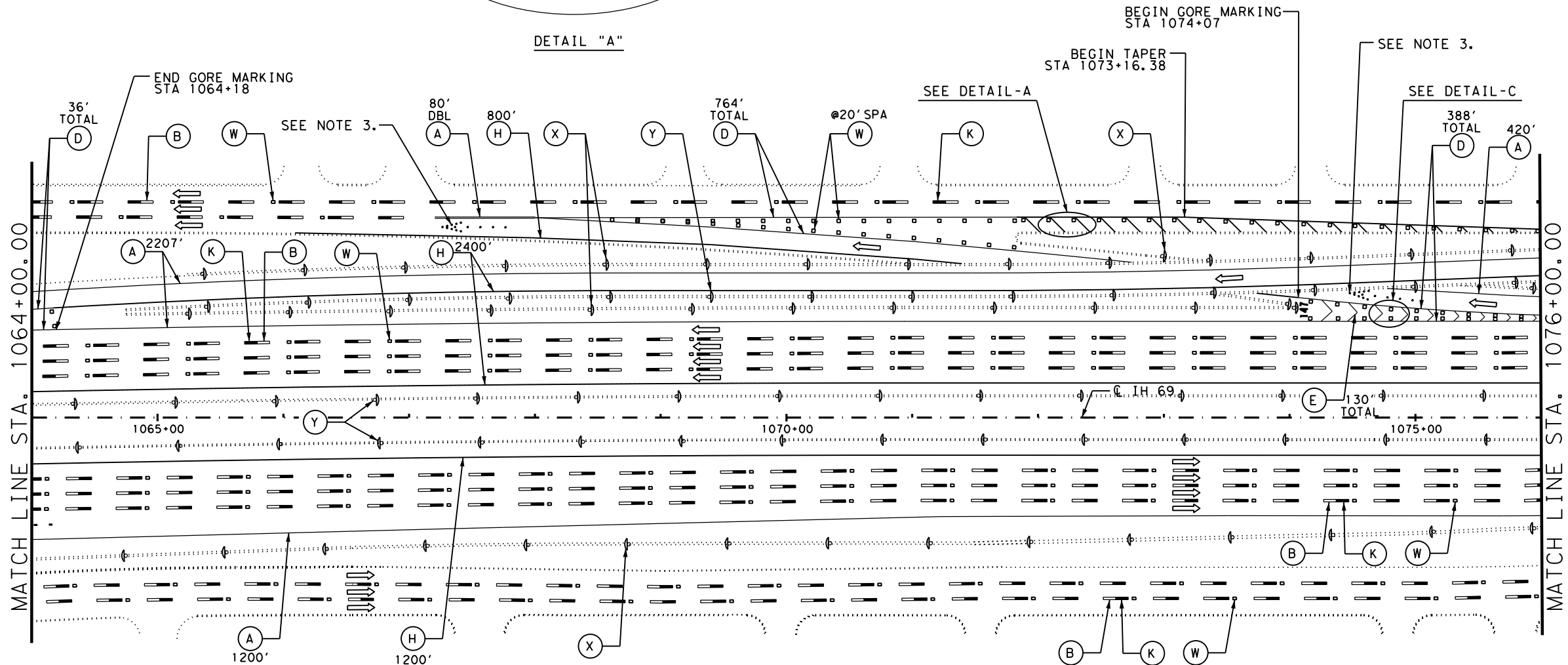
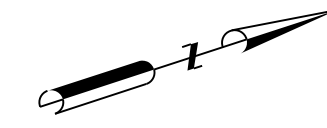
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		55



DATE: \$DATE\$ \$TIME\$ FILE: \$FILE\$



DETAIL "A"



DETAIL 'C'

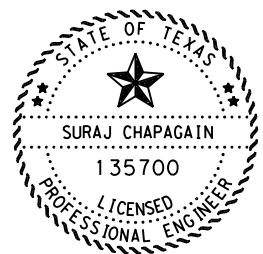
NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.

NOTE:

1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

LEGEND:

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↙ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
9/20/2022

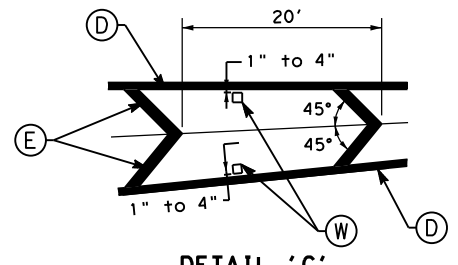
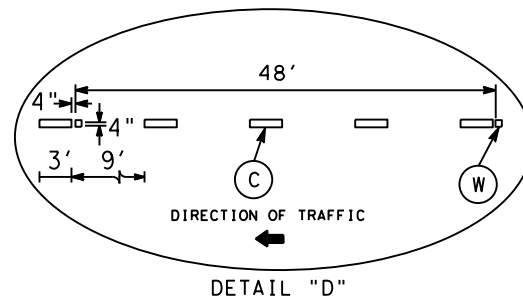
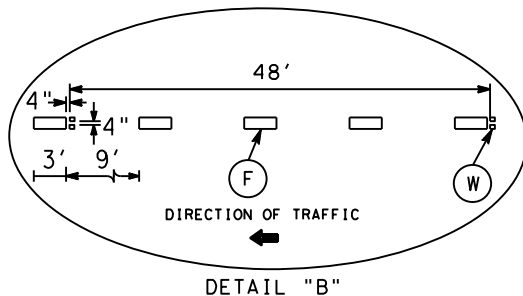
IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 18 OF 42

		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY	SHEET NO.	
		HOU	HARRIS, ETC.	56	

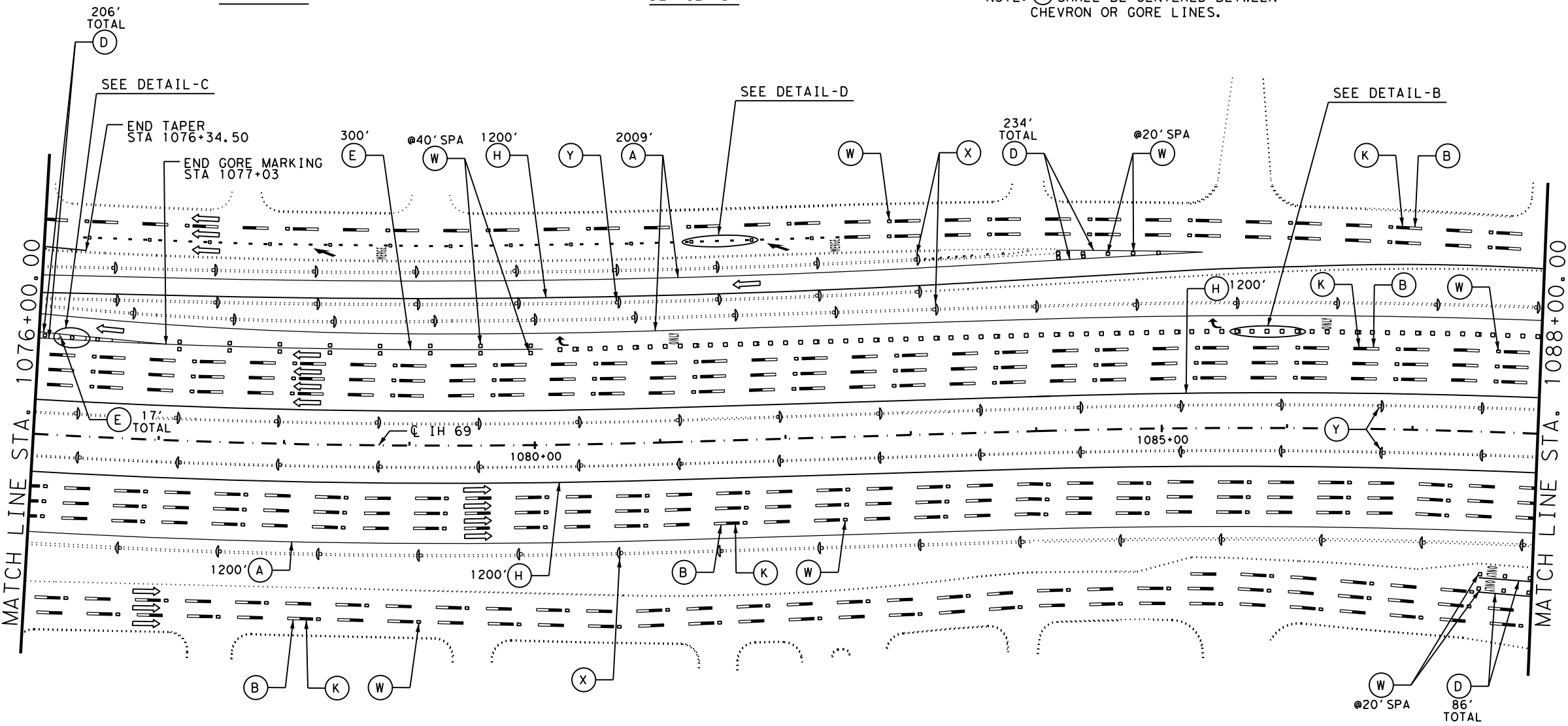
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 Cks: [ ]  
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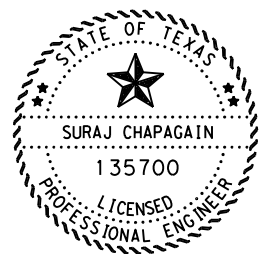
NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.

- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
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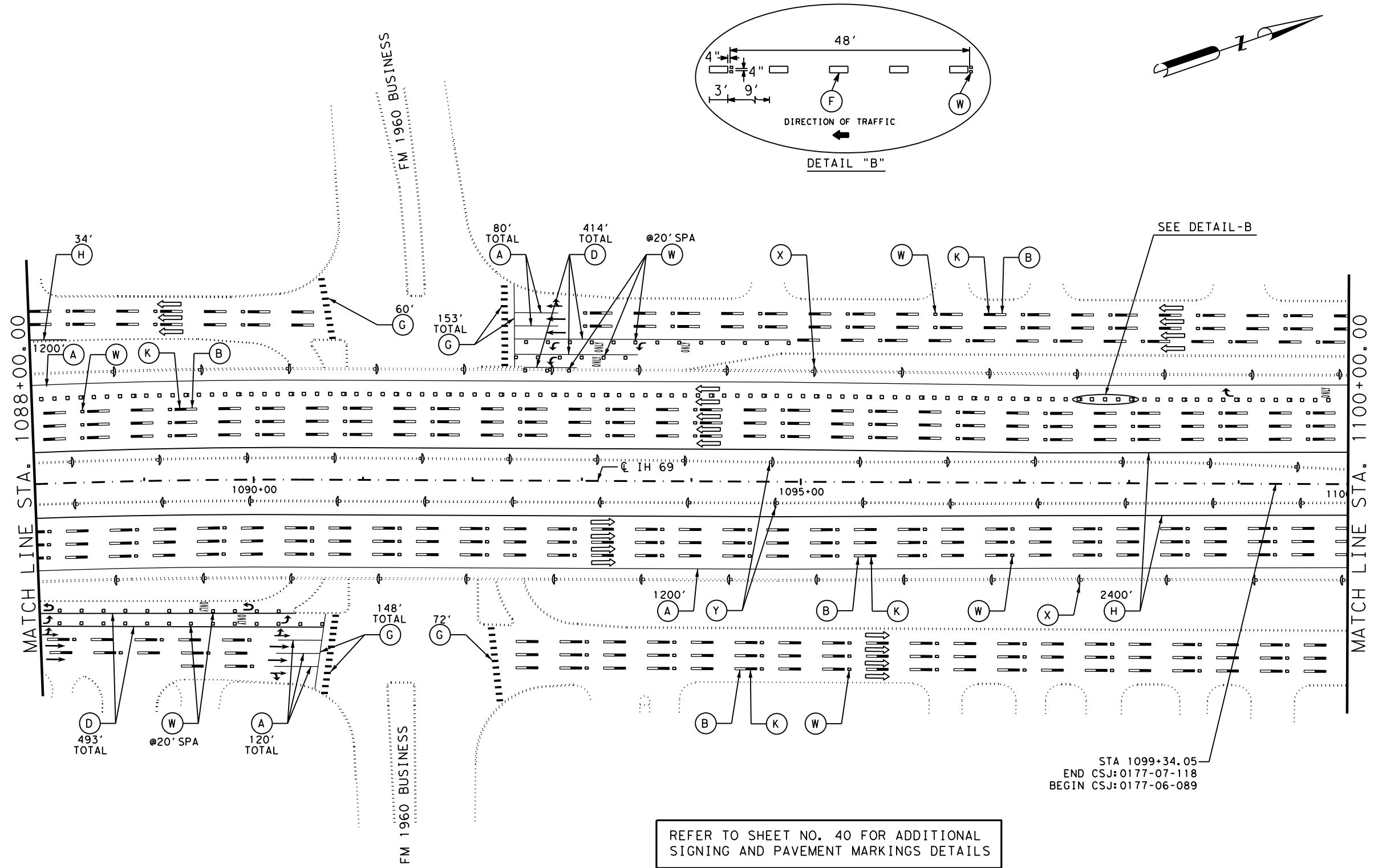
IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 19 OF 42

		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY	SHEET NO.	
		HOU	HARRIS, ETC.	57	

SCALE: 1" : 100'

DATE: \$DATE\$ \$TIME\$ FILE: \$FILES\$



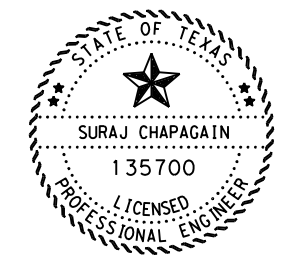
- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

STA 1099+34.05  
 END CSJ:0177-07-118  
 BEGIN CSJ:0177-06-089

REFER TO SHEET NO. 40 FOR ADDITIONAL SIGNING AND PAVEMENT MARKINGS DETAILS

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↘ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(Q) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
 9/2/2022

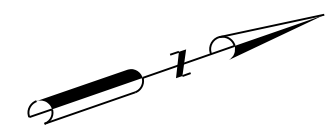
IH 69  
 SIGNING & PAVEMENT  
 MARKING LAYOUT

SHEET 20 OF 42

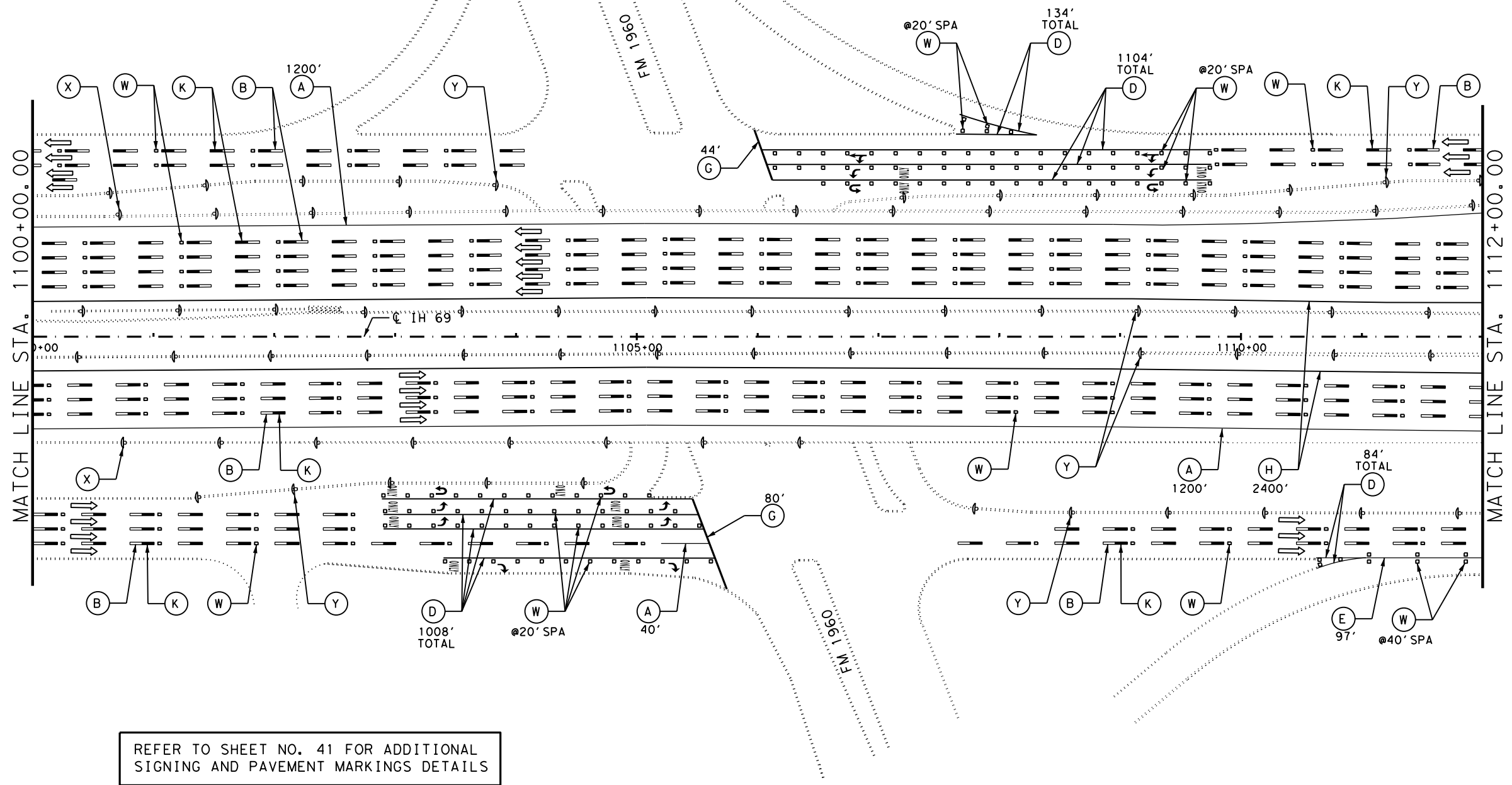
		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY	SHEET NO.	
		HOU	HARRIS, ETC.	58	

SCALE: 1" = 100'

C&G  
D&R  
C&G  
D&R



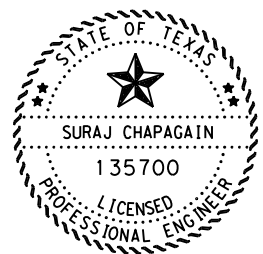
- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



REFER TO SHEET NO. 41 FOR ADDITIONAL SIGNING AND PAVEMENT MARKINGS DETAILS

**LEGEND:**

- |   |   |  |   |
|---|---|--|---|
| (A) MLTPLY PV MK W/WTY (W) (6") (SLD)   | (J) MLTPLY PV MK W/WTY (Y) (12") (SLD)      | (W) REFL PAV MRKR TY II-C-R                          | ⇨ DIRECTION OF TRAFFIC                  |
| (B) MLTPLY PV MK W/WTY (W) (6") (BRK)   | (K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)     | (X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA     | 4 PREFAB PAV MRK TY C (W) (NUMBER)      |
| (C) MLTPLY PV MK W/WTY (W) (6") (DOT)   | (M) PREFAB PAV MRK TY C (W) (36") (YLD TRI) | (Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA     | ↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)   |
| (D) MLTPLY PV MK W/WTY (W) (8") (SLD)   | (N) PREFAB PAV MRK TY C (W) (RR XING)       | (Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA | ⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)   |
| (E) MLTPLY PV MK W/WTY (W) (12") (SLD)  | (O) PREFAB PAV MRK TY C (MULTI) (SHIELD)    | (-) PROPOSED SMALL SIGN                              | ⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)  |
| (F) MLTPLY PV MK W/WTY (W) (12") (LNDP) | (P) REFL PAV MRKR TY II (Y) 12" (SLD)       | (T) RELOCATE SM RD SN SUP & AM                       | ⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW) |
| (G) MLTPLY PV MK W/WTY (W) (24") (SLD)  | (T) REFL PAV MRKR TY I-R                    | (X-) REMOVE SM RD SN SUP & AM                        | ⇄ MERGE ONLY                            |
| (H) MLTPLY PV MK W/WTY (Y) (6") (SLD)   | (U) REFL PAV MRKR TY I-A                    |  |   |
| (I) MLTPLY PV MK W/WTY (Y) (8") (SLD)   | (V) REFL PAV MRKR TY II-A-A                 |  |   |

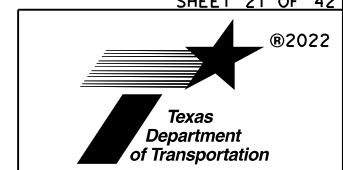


Suraj Chapagain, P.E.

9/2/2022

IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 21 OF 42

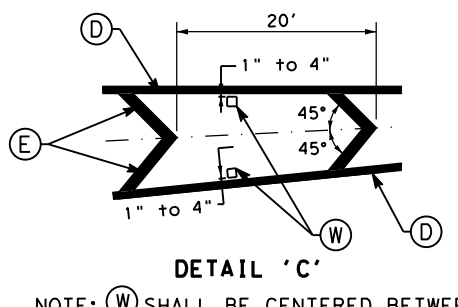
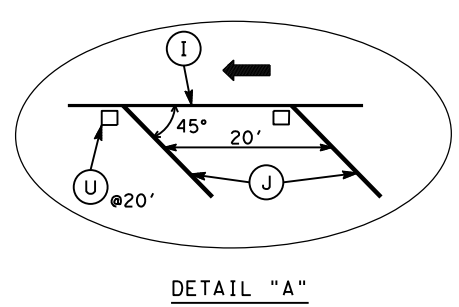
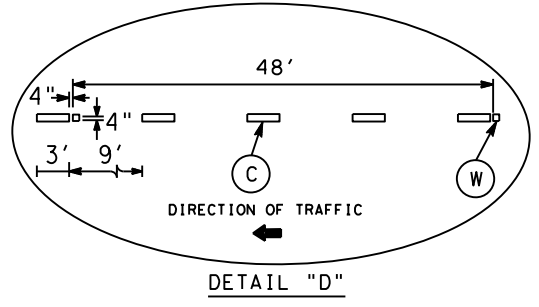
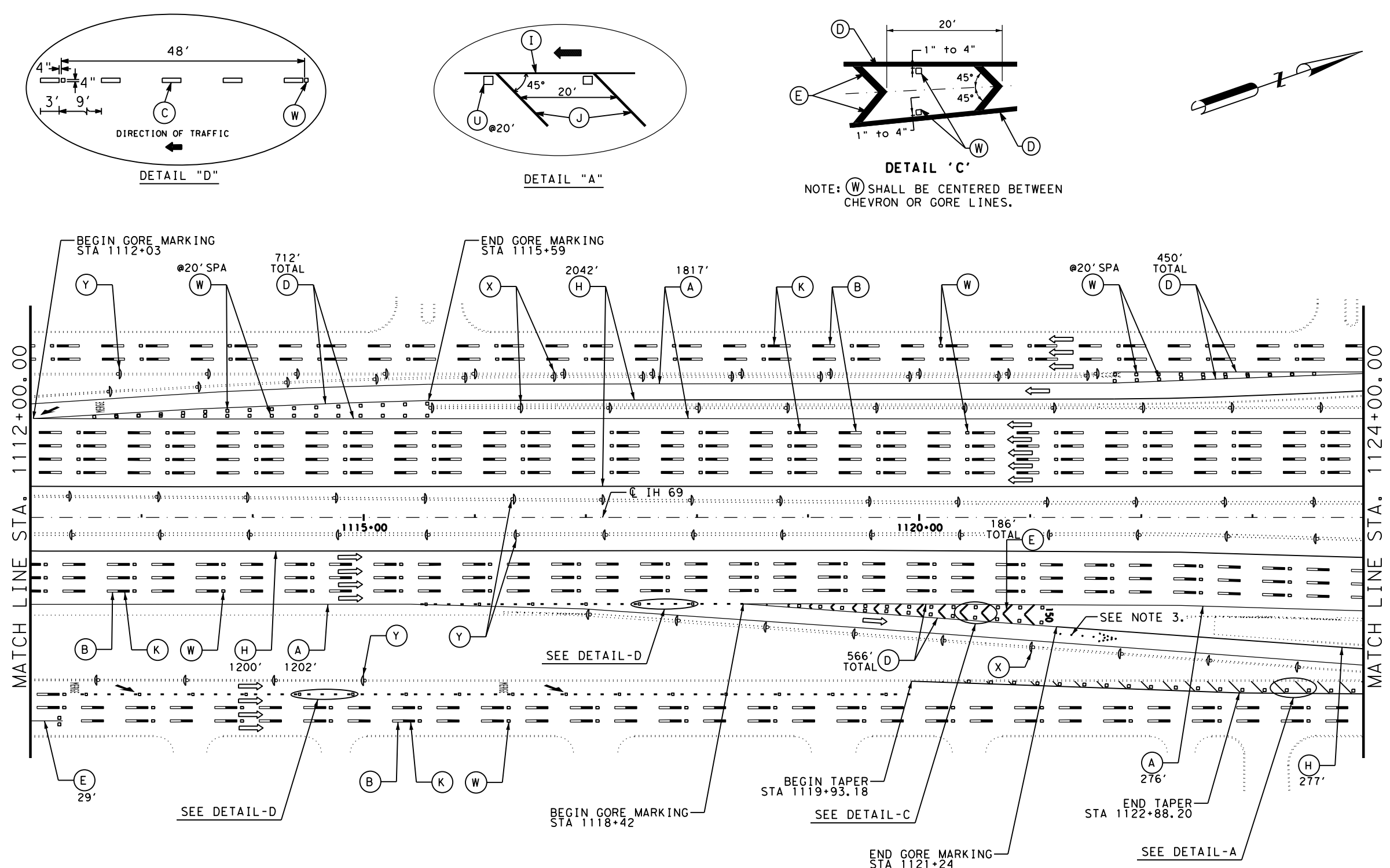


CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		59

SCALE: 1" = 100'

DATE: \$DATE\$  
FILE: \$FILES\$

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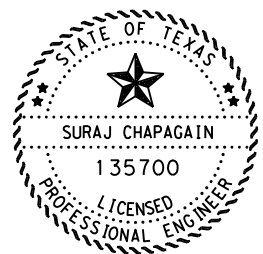


NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.

- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
9/20/2022

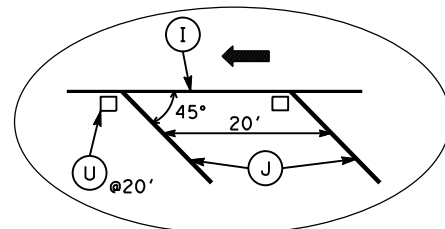
IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 22 OF 42

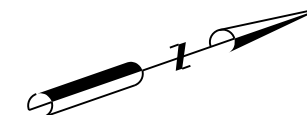
		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY		SHEET NO.
		HOU	HARRIS, ETC.		60

SCALE: 1" : 100'

DATE: \$DATE\$ \$TIME\$  
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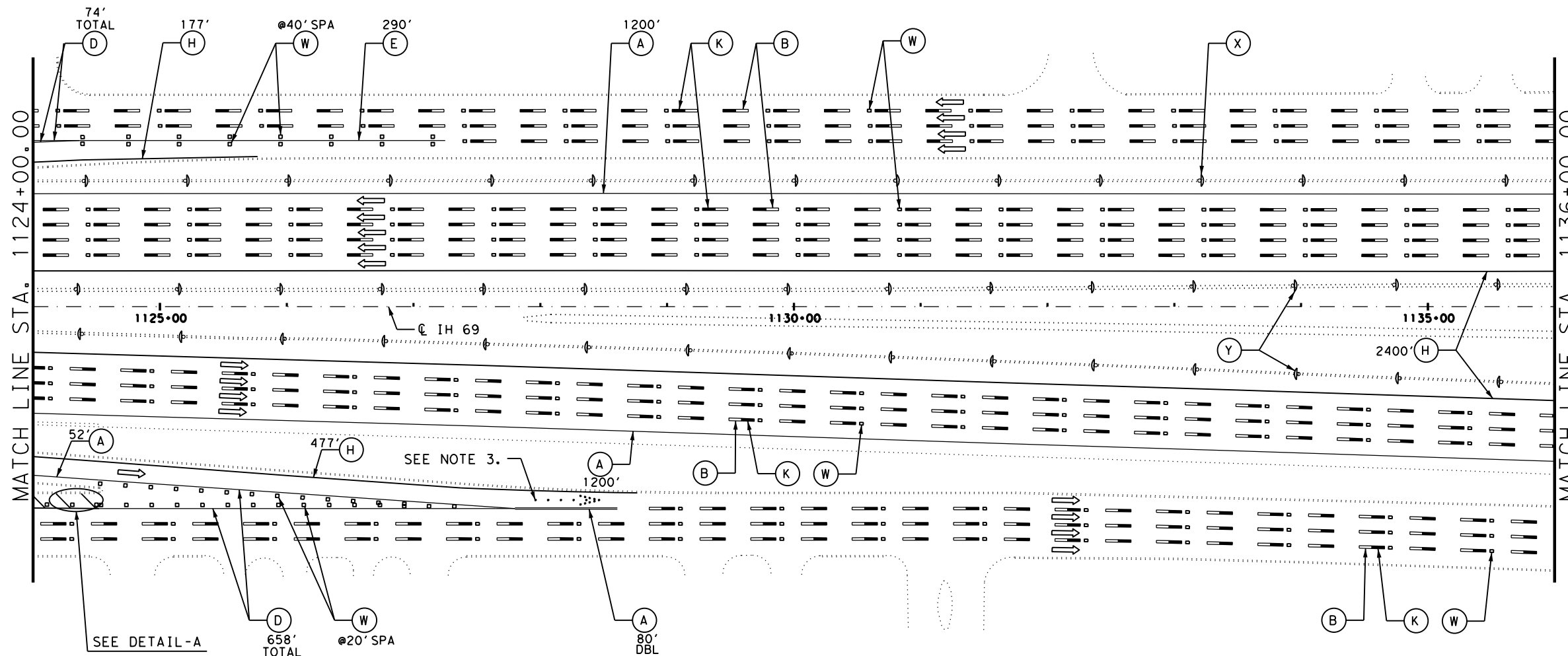


DETAIL "A"



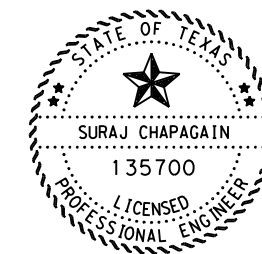
NOTE:

1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



LEGEND:

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
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IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

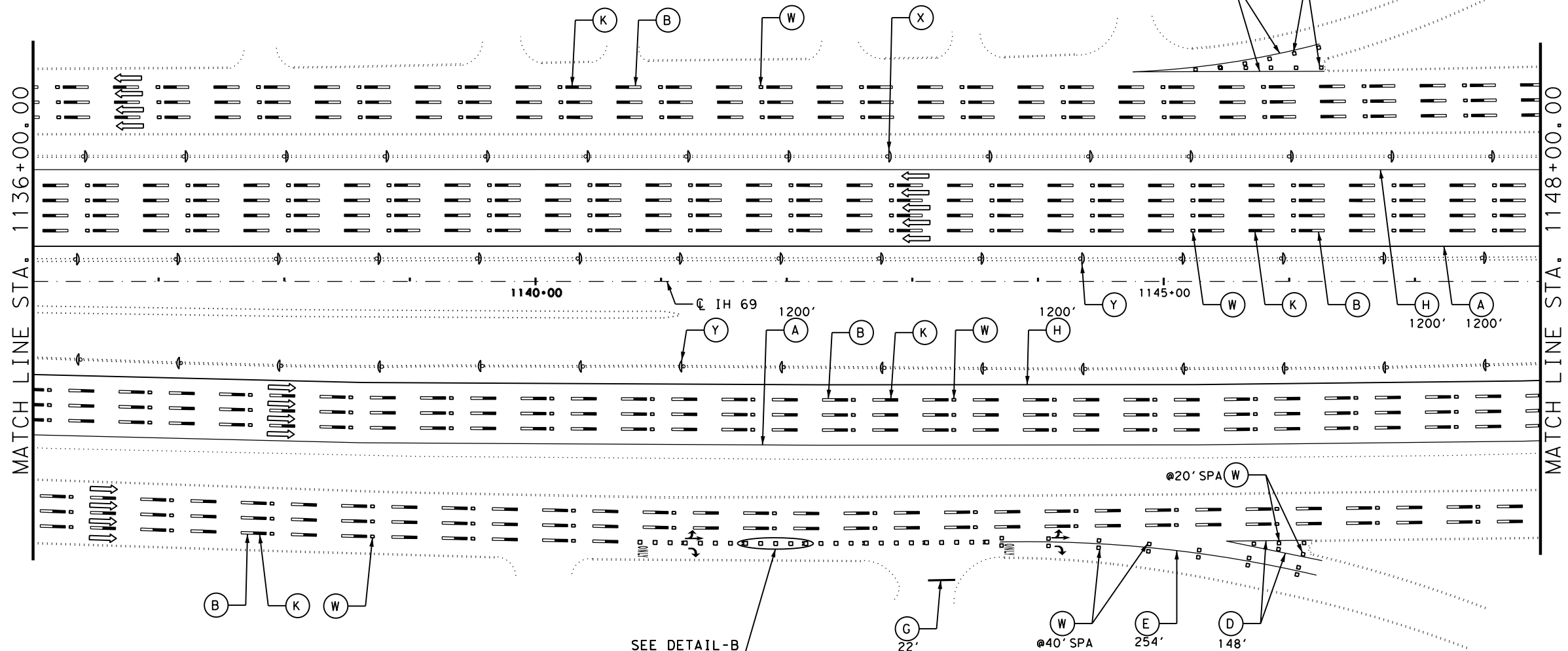
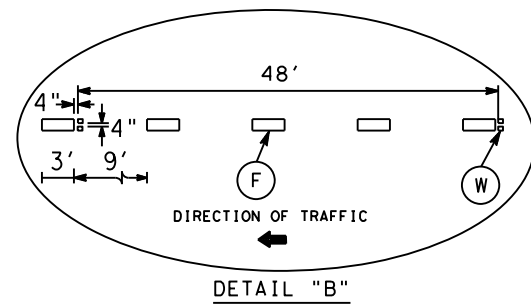
SHEET 23 OF 42

@2022

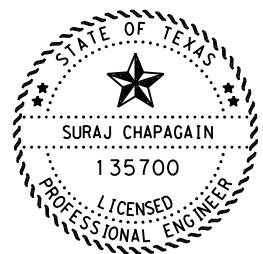
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		61

SCALE: 1" : 100'

DATE: \$DATE\$ \$TIME\$ FILE: \$FILES\$



- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



Suraj Chapagain, P.E.  
9/2/2022

IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 24 OF 42

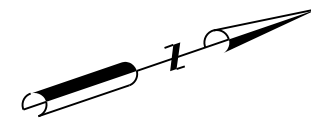
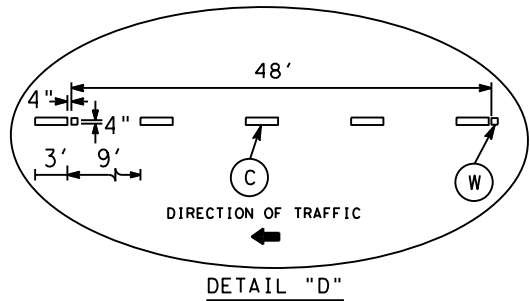
LEGEND:

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X) REMOVE SM RD SN SUP & AM	⇄ MERGE ONLY PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		

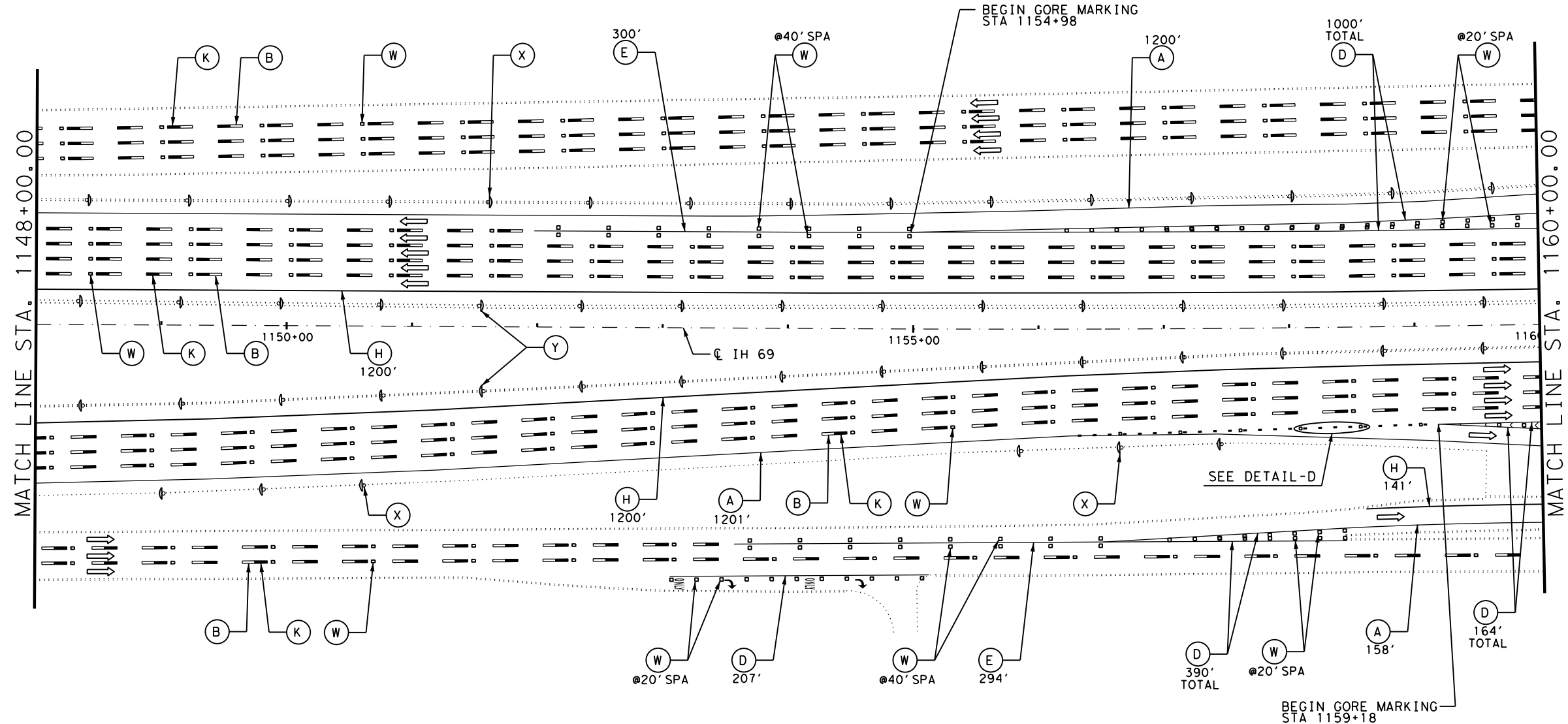
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@2022  
 CONT SECT JOB HIGHWAY  
 0177 07 118, ETC. IH 69  
 DIST COUNTY SHEET NO.  
 HOU HARRIS, ETC. 62

C&G  
 D&R  
 C&G  
 D&R

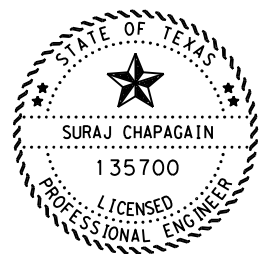


- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	⇨ 4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
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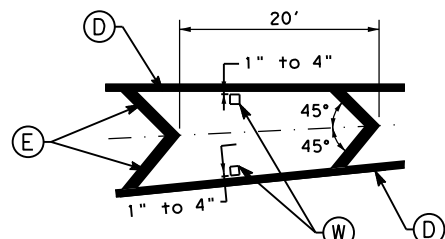
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		63

SCALE: 1" = 100'

DATE: \$DATE\$  
 FILE: \$FILE\$

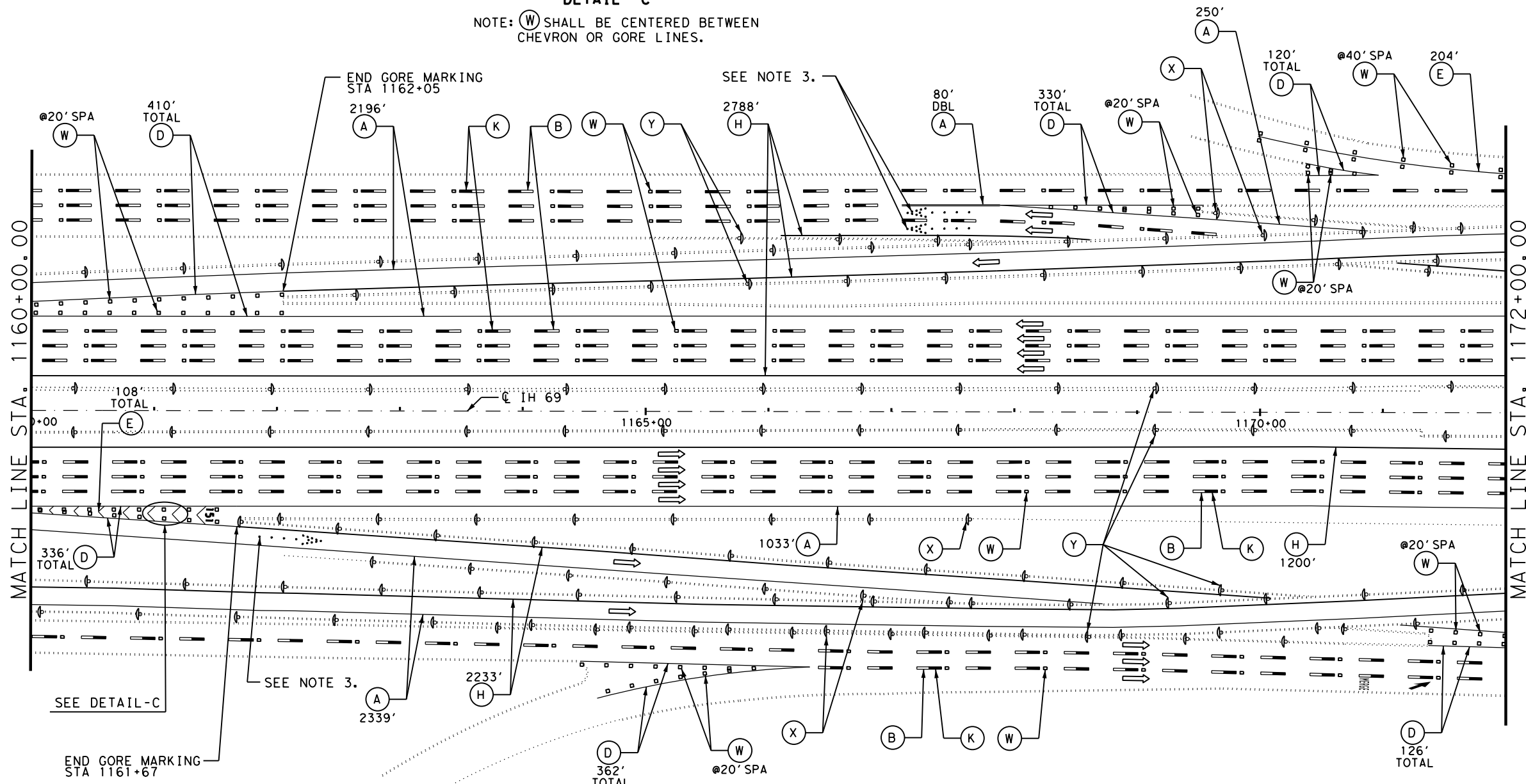
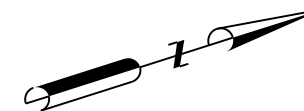


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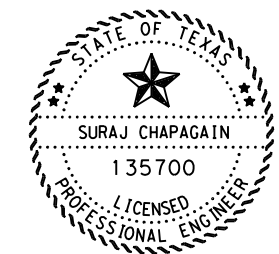


DETAIL 'C'

NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.



- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
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  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



Suraj Chapagain, P.E.  
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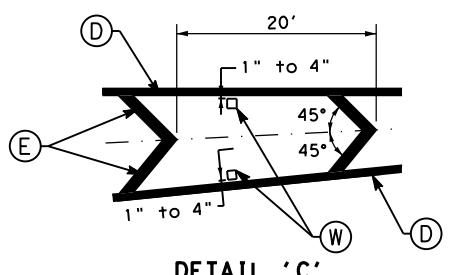
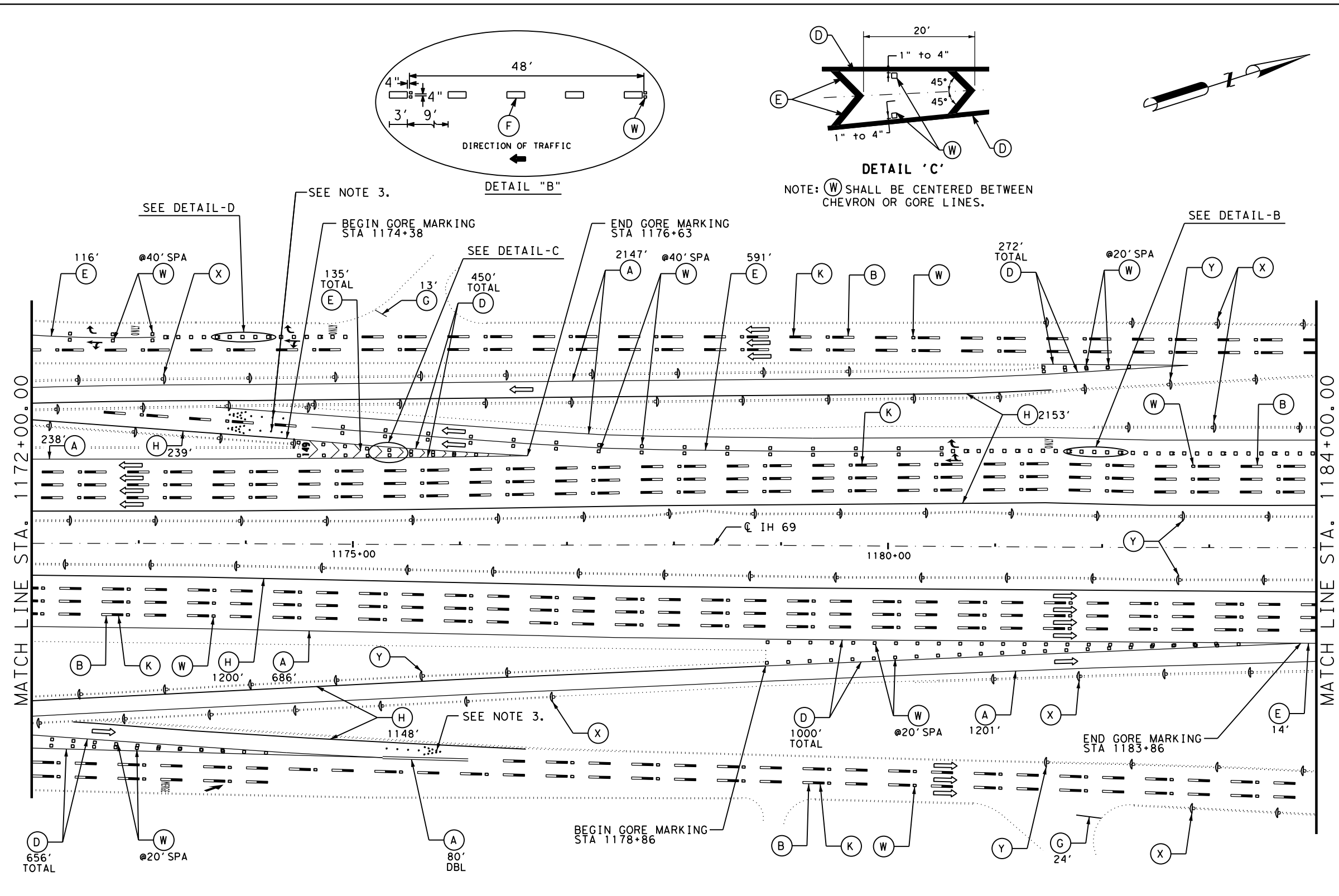
		@2022	
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		64

LEGEND:

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		

SCALE: 1" : 100'

DATE: \$DATE\$ \$TIME\$  
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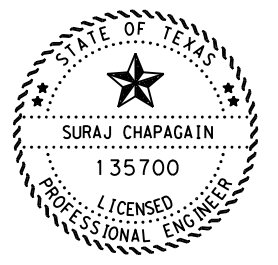


NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.

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**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
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Suraj Chapagain, P.E.  
9/20/2022

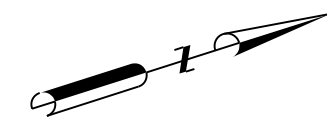
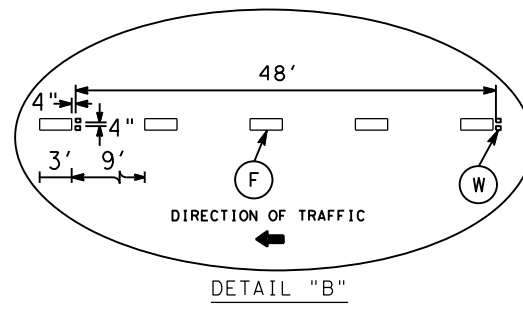
IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 27 OF 42

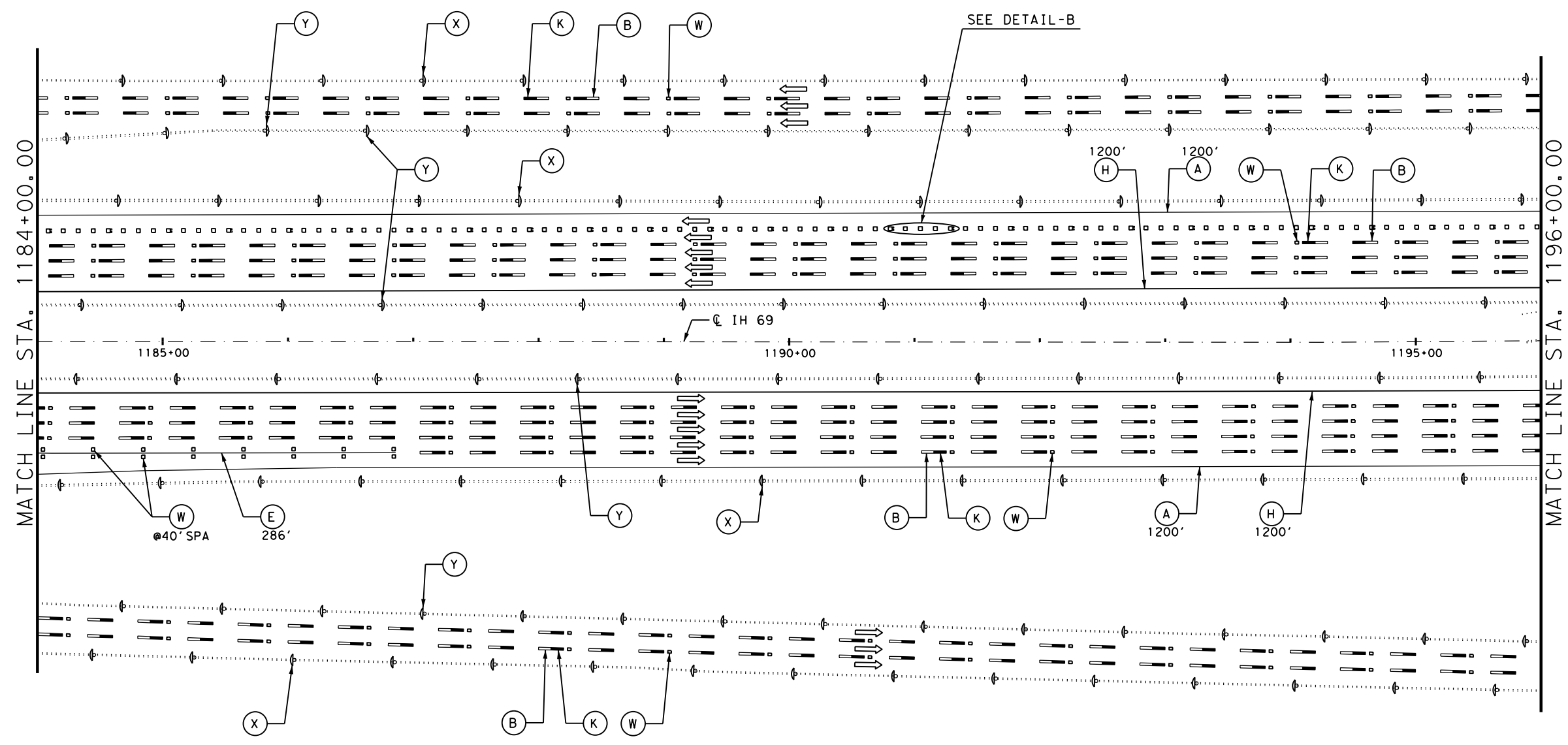
		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY	SHEET NO.	
		HOU	HARRIS, ETC.	65	

SCALE: 1" : 100'

C&G  
 D&R  
 C&G  
 D&R

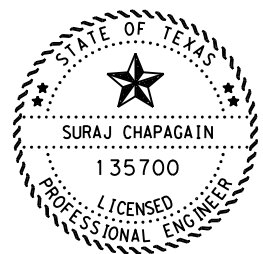


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  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

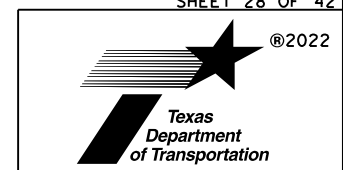
(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



*Suraj Chapagain, P.E.*  
9/2/2022

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SHEET 28 OF 42

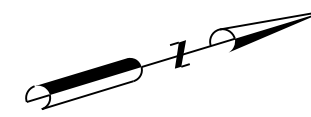
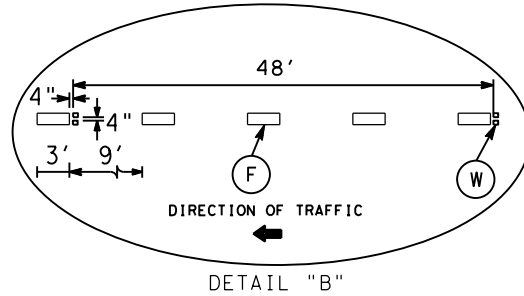
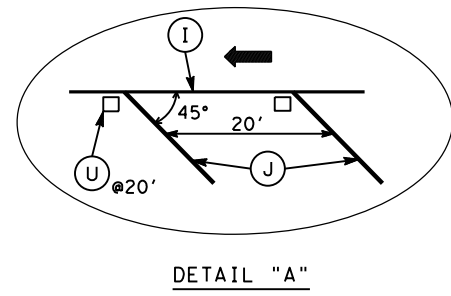


CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		66

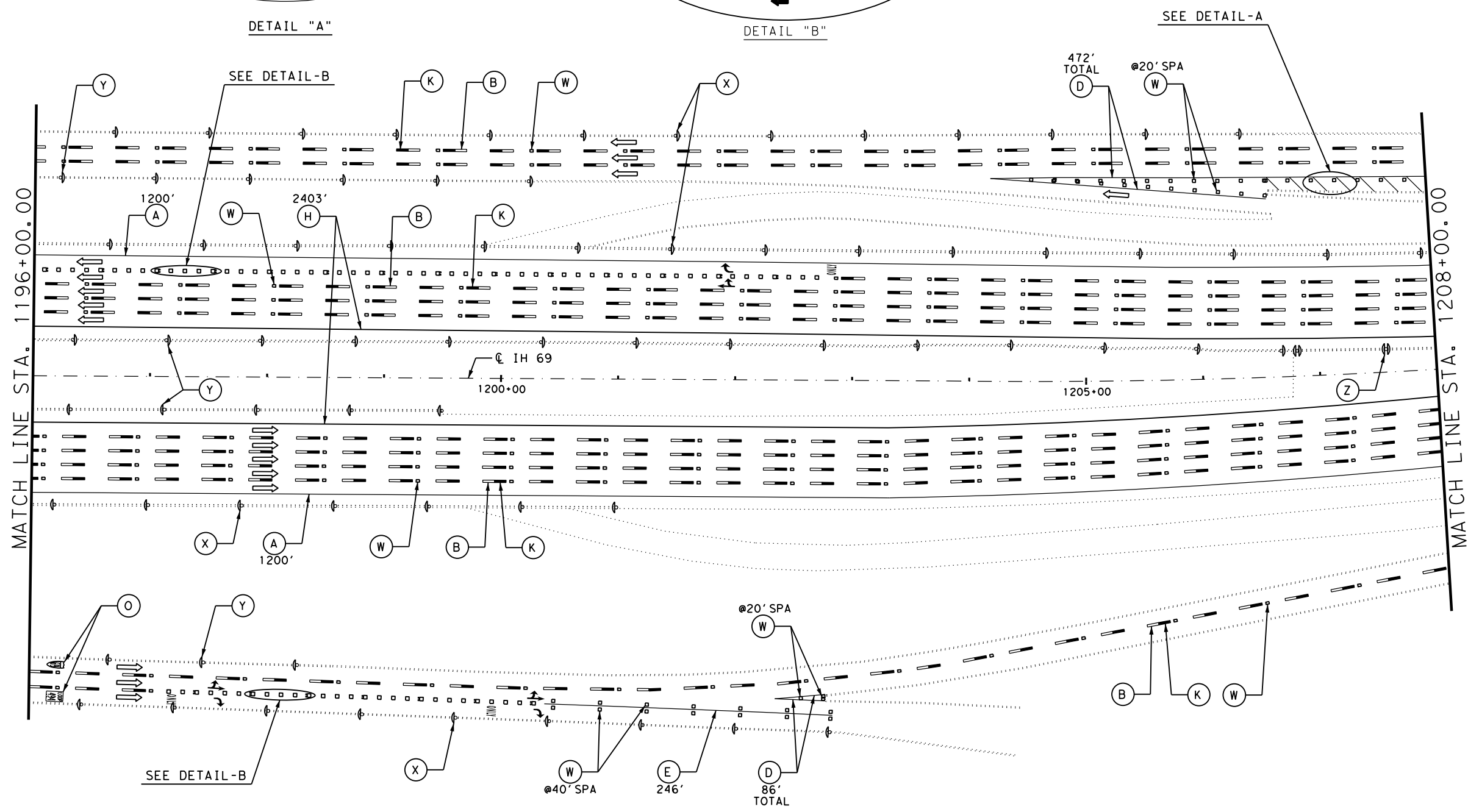
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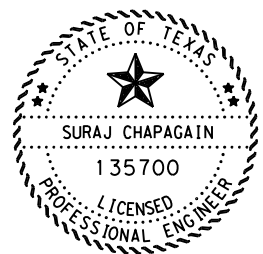


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**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



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9/2/2022

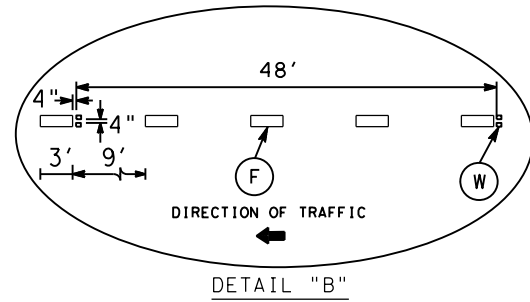
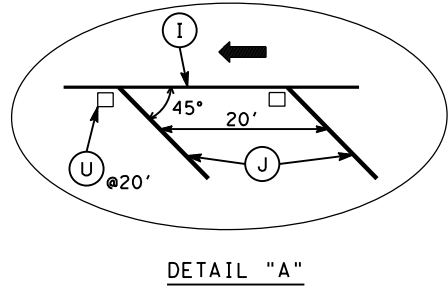
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SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 29 OF 42

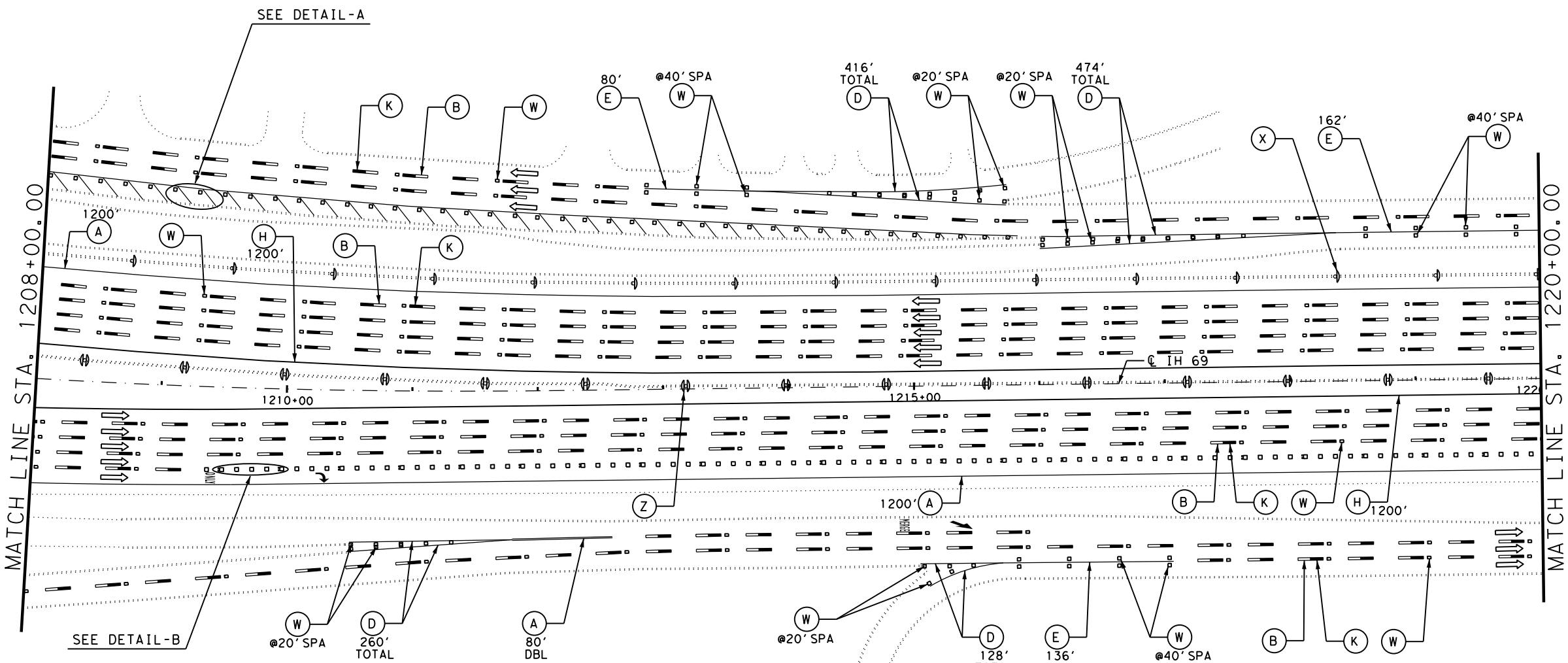
		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY		SHEET NO.
		HOU	HARRIS, ETC.		67

SCALE: 1" = 100'

DATE: \$DATE\$ \$TIME\$  
 FILE: \$FILES\$  
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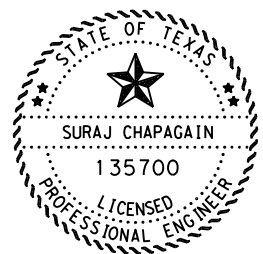


- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
9/2/2022

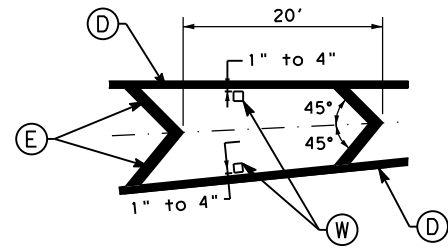
IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 30 OF 42

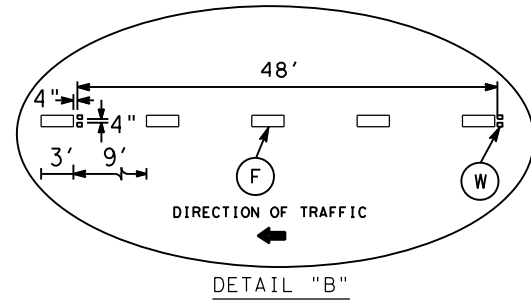
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		68

SCALE: 1" : 100'

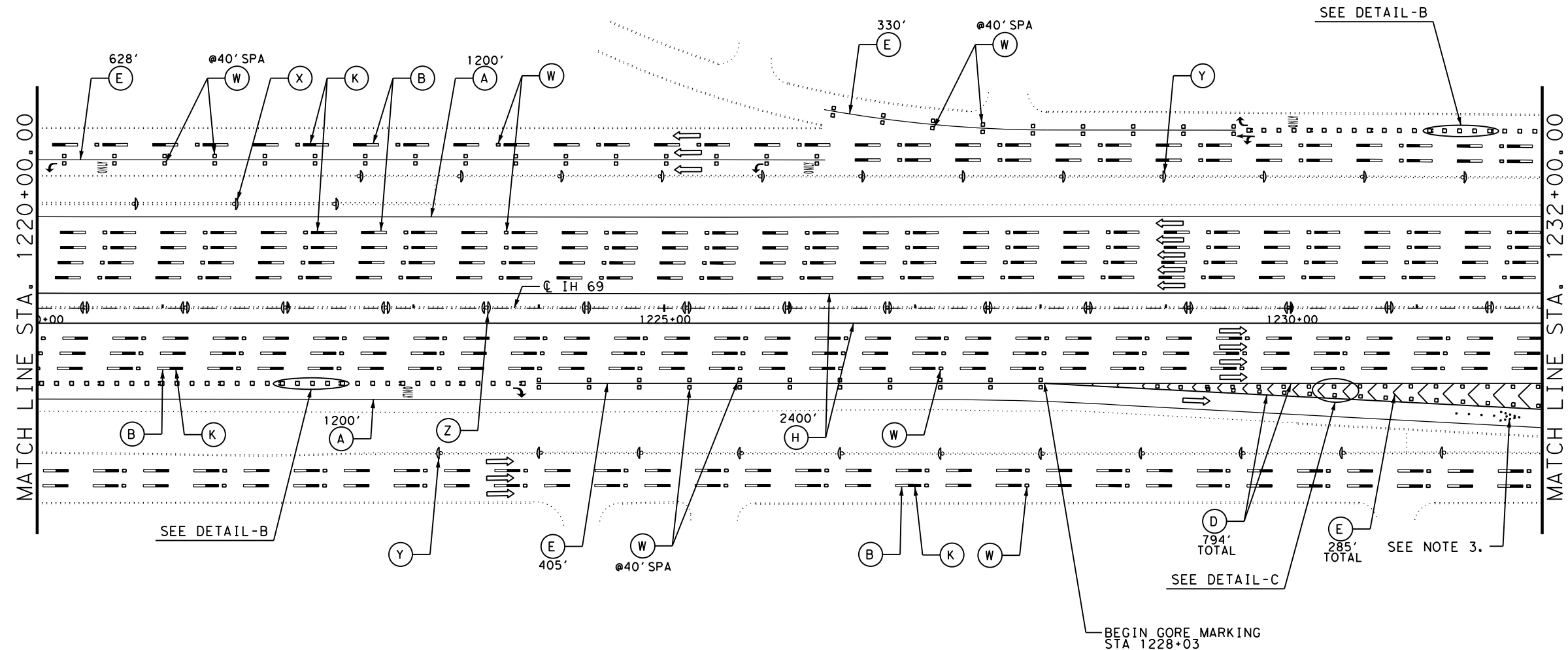
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**DETAIL 'C'**  
 NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.

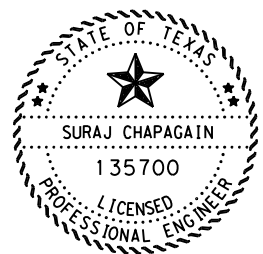


- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T-) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
 9/20/2022

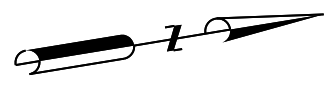
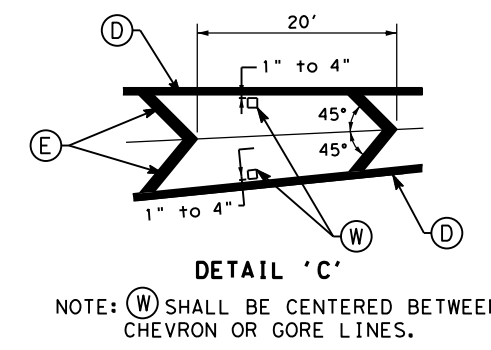
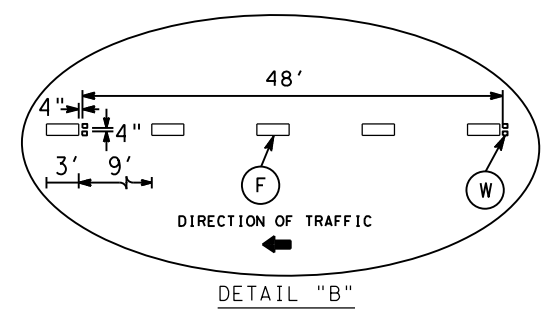
**IH 69  
 SIGNING & PAVEMENT  
 MARKING LAYOUT**

SHEET 31 OF 42

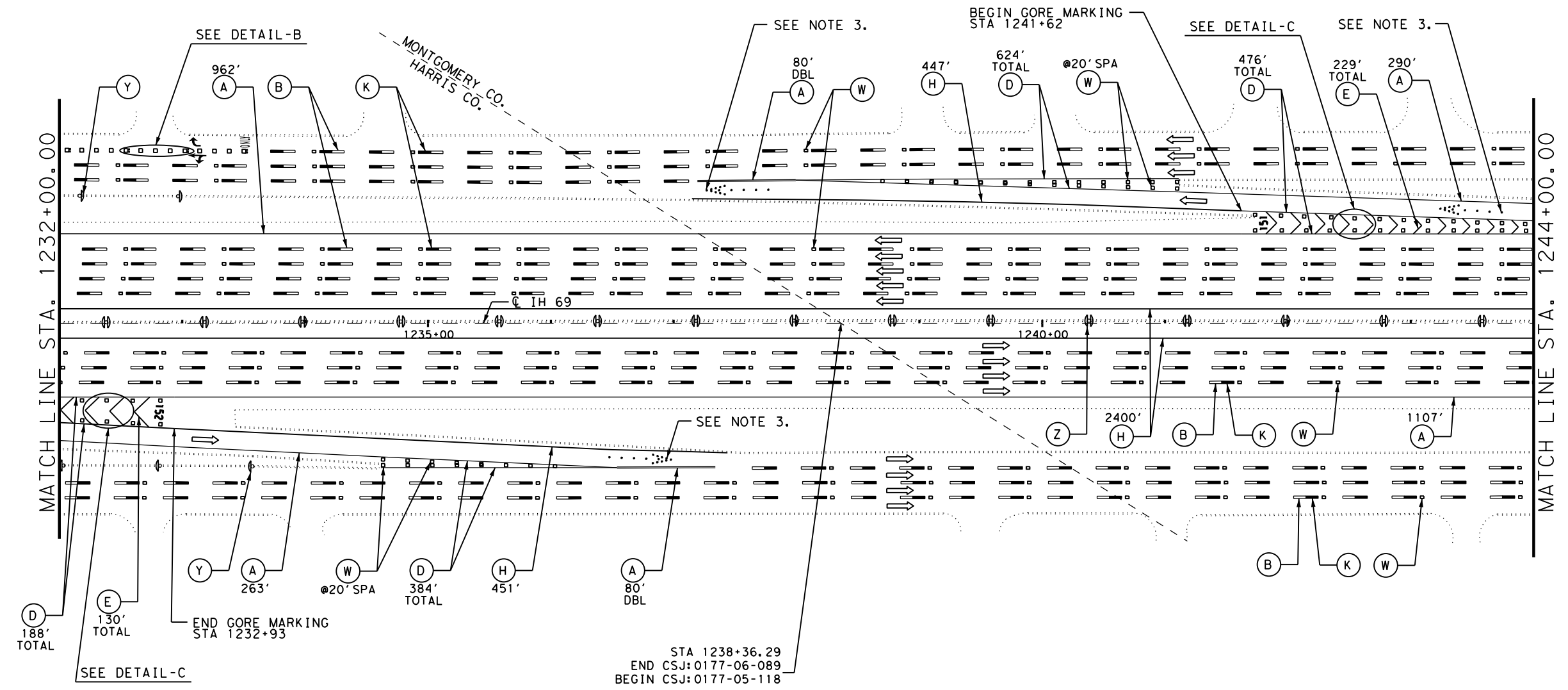
		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY		SHEET NO.
		HOU	HARRIS, ETC.		69

SCALE: 1" = 100'

DATE: \$DATE\$ \$TIME\$  
 FILE: \$FILES\$



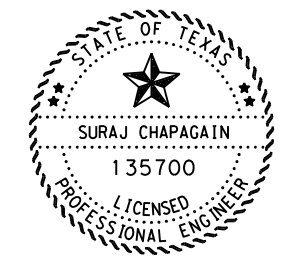
- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



STA 1238+36.29  
 END CSJ: 0177-06-089  
 BEGIN CSJ: 0177-05-118

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T-) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
 9/20/2022

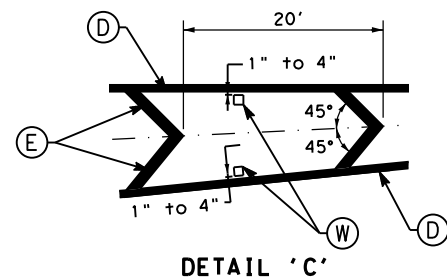
IH 69  
 SIGNING & PAVEMENT  
 MARKING LAYOUT

SHEET 32 OF 42

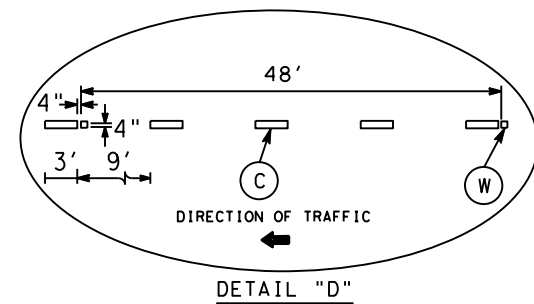
		CONT 0177 DIST HOU	SECT 07 COUNTY HARRIS, ETC.	JOB 118, ETC. SHEET NO. 70	HIGHWAY IH 69
		DATE: 09/20/2022		SHEET NO. 70	YEAR: 2022

SCALE: 1" = 100'

DATE: \$DATE\$ \$TIME\$  
 FILE: \$FILES\$

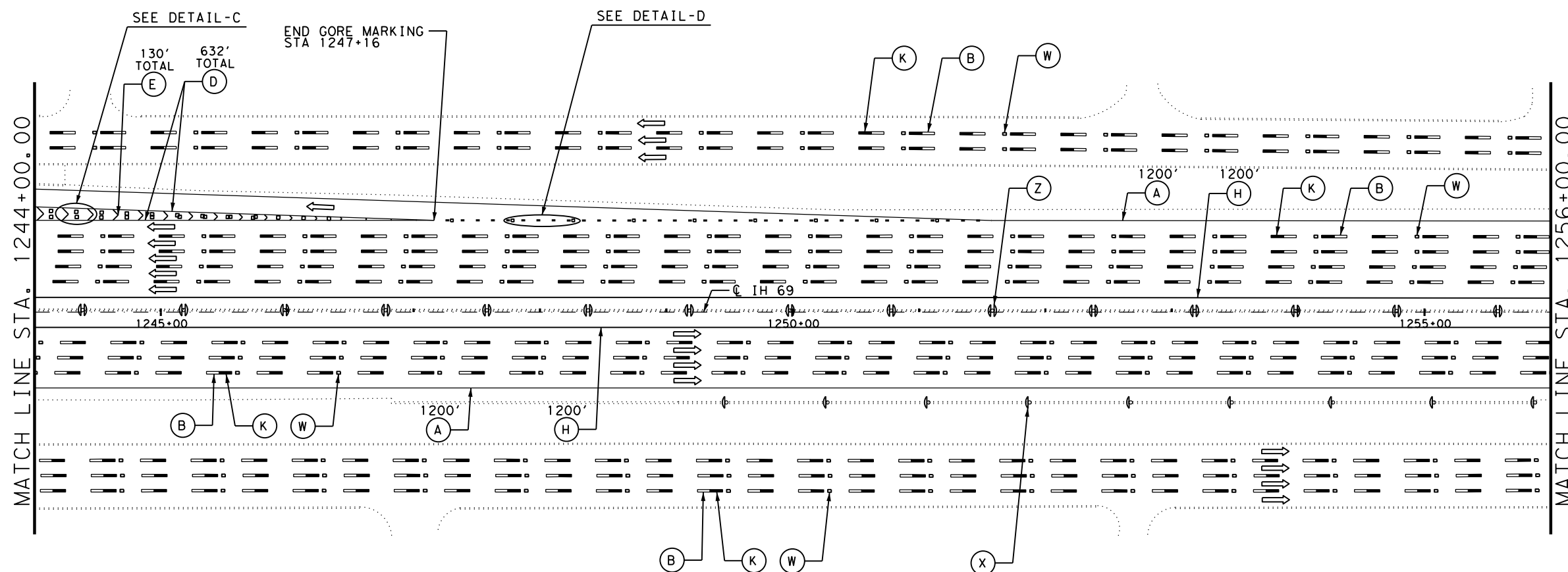


NOTE: (W) SHALL BE CENTERED BETWEEN CHEVRON OR GORE LINES.



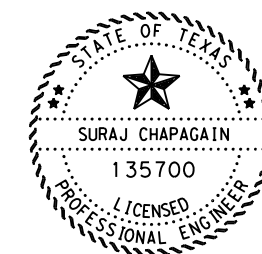
NOTE:

1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
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3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



LEGEND:

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.

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IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 33 OF 42

CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		71

SCALE: 1" = 100'

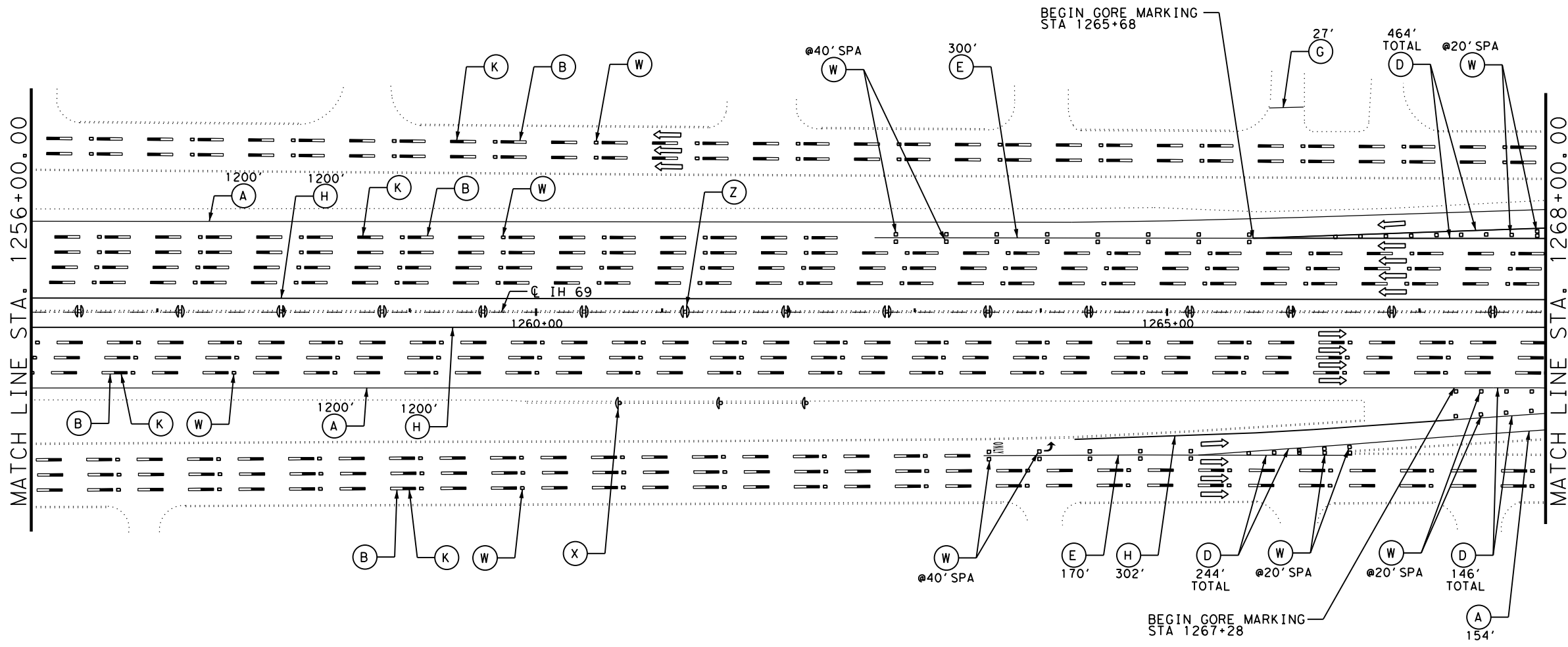


Cks  
Dnr  
Cks  
Dnr



NOTE:

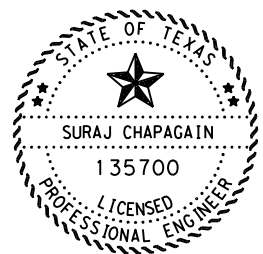
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LEGEND:

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		

DATE: \$DATE\$  
FILE: \$FILES\$



Suraj Chapagain, P.E.  
9/2/2022

IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

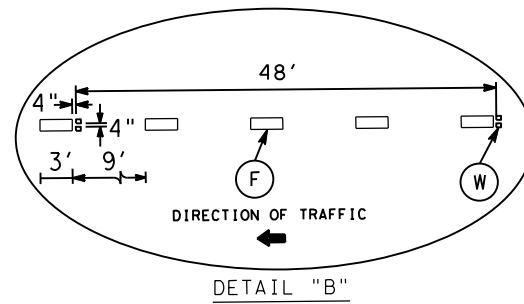
SHEET 34 OF 42



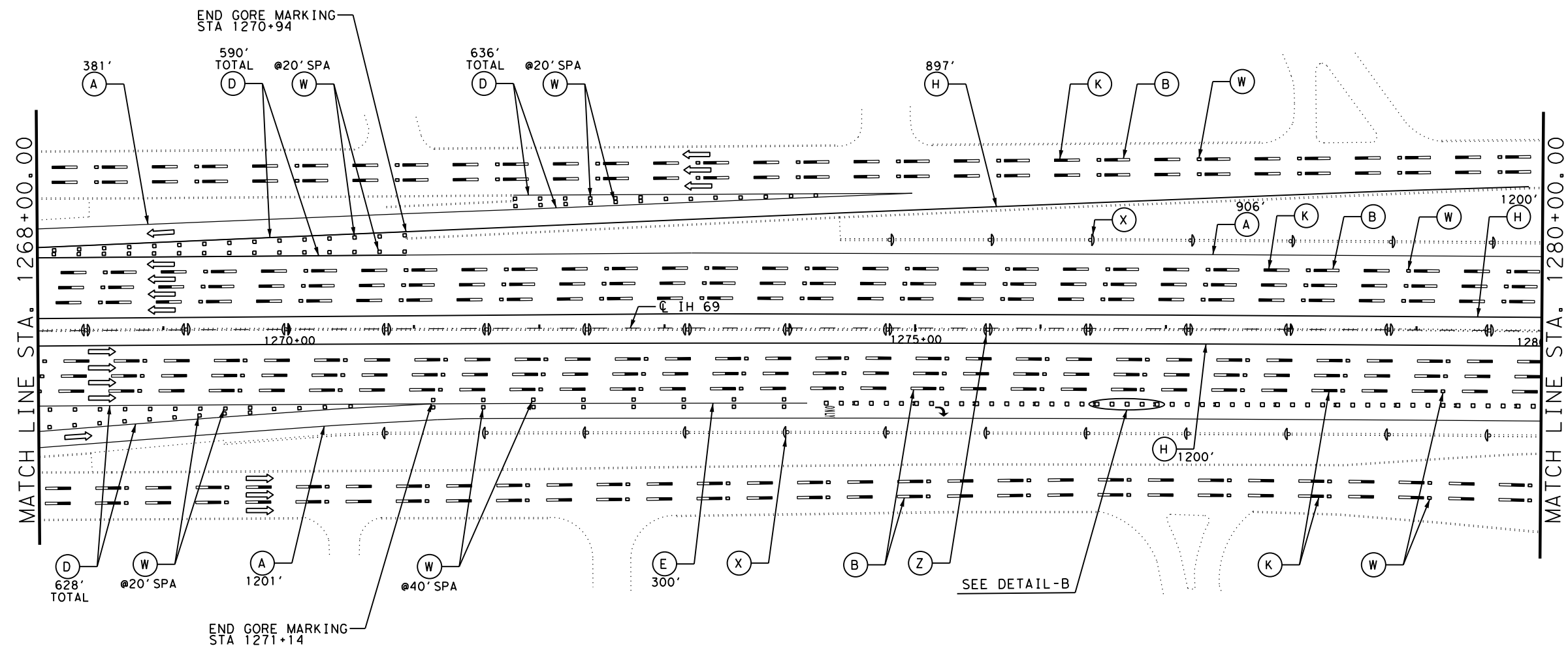
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		72

SCALE: 1" = 100'

DATE: \$DATE\$ \$TIME\$ FILE: \$FILE\$

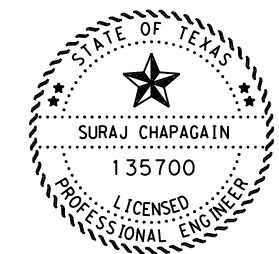


- NOTE:**
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**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
9/2/2022

IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

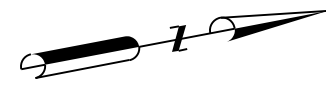
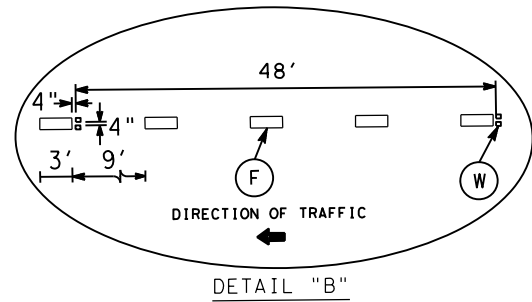
SHEET 35 OF 42

@2022

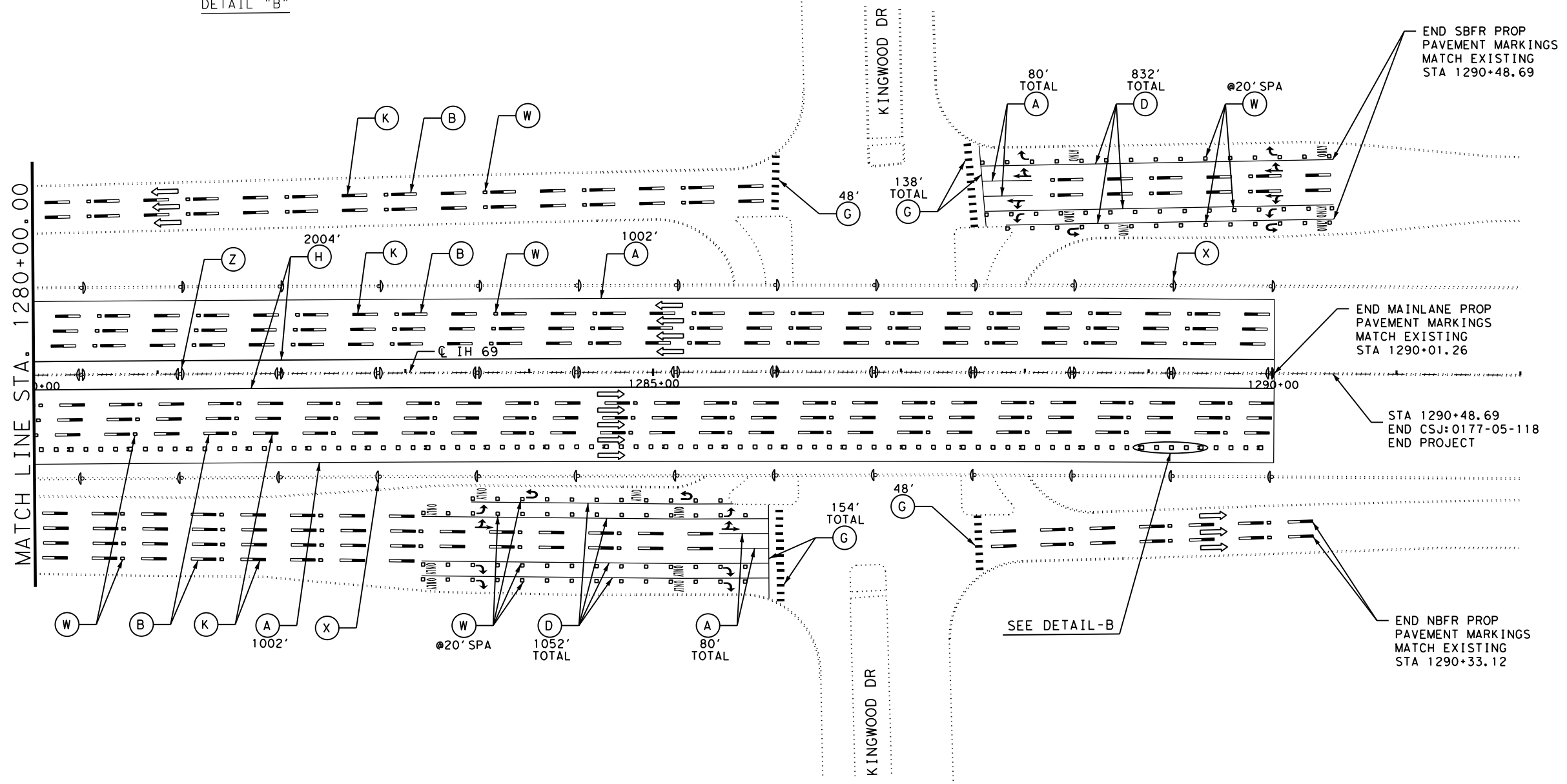
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		73

SCALE: 1" = 100'

DATE: \$DATE\$ \$TIME\$  
 FILE: \$FILE\$

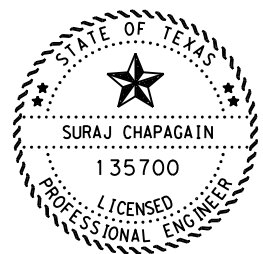


- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	⇨ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇨⇨ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇨⇨⇨ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRKR TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X) REMOVE SM RD SN SUP & AM	⇨⇨⇨⇨⇨ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



SURAJ CHAPAGAIN, P.E.  
9/2/2022

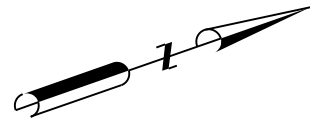
IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT

SHEET 36 OF 42

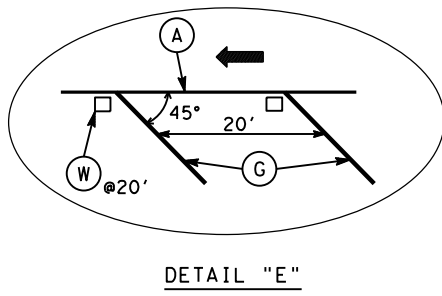
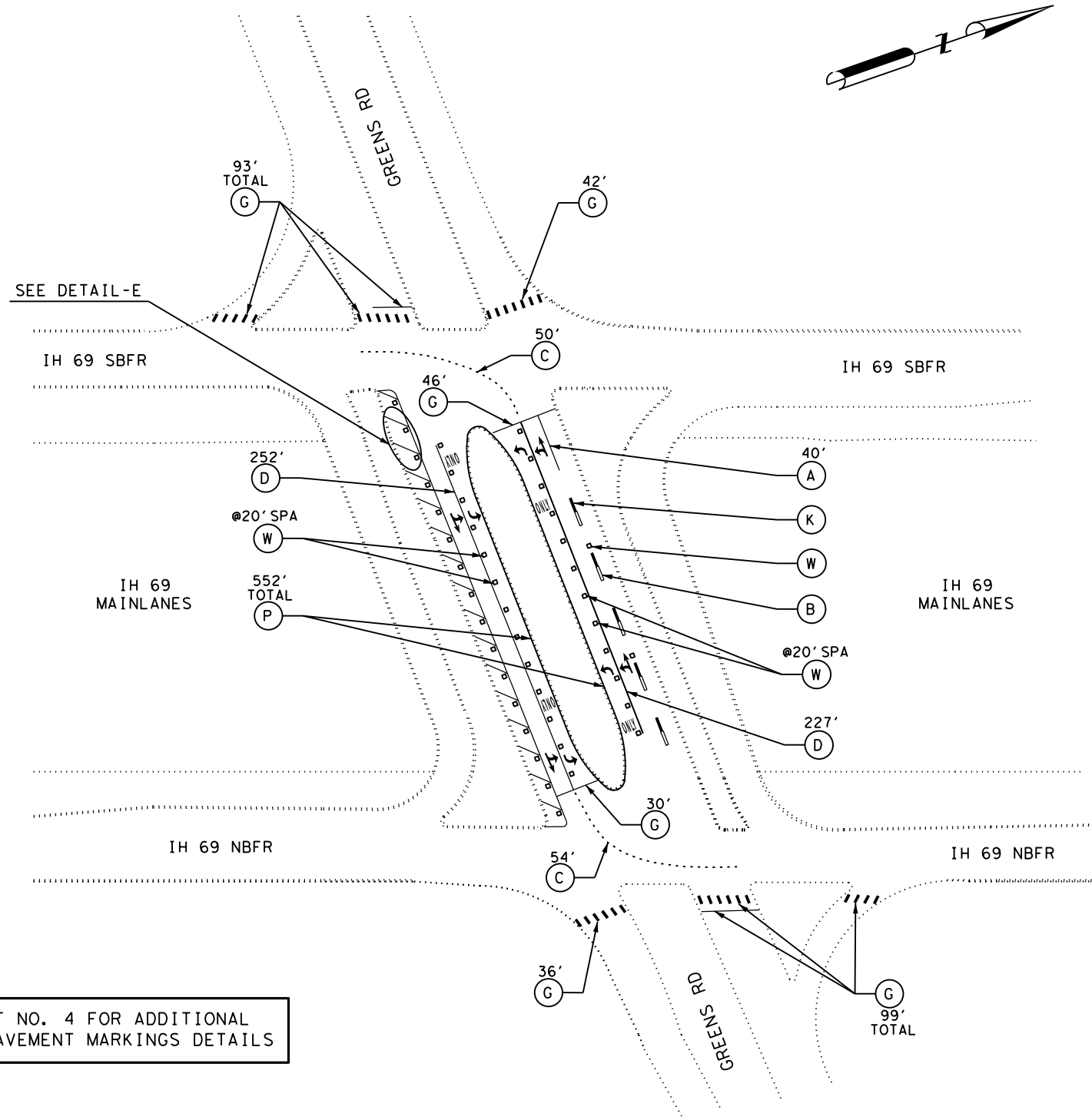
		CONT	SECT	JOB	HIGHWAY
		0177	07	118, ETC.	IH 69
		DIST	COUNTY	SHEET NO.	
		HOU	HARRIS, ETC.	74	

SCALE: 1" = 100'

Cks  
Dnr  
Cks  
Dnr



- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

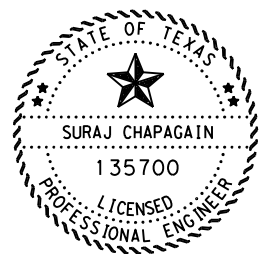


REFER TO SHEET NO. 4 FOR ADDITIONAL SIGNING AND PAVEMENT MARKINGS DETAILS

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		

DATE: \$DATE\$  
FILE: \$FILE\$



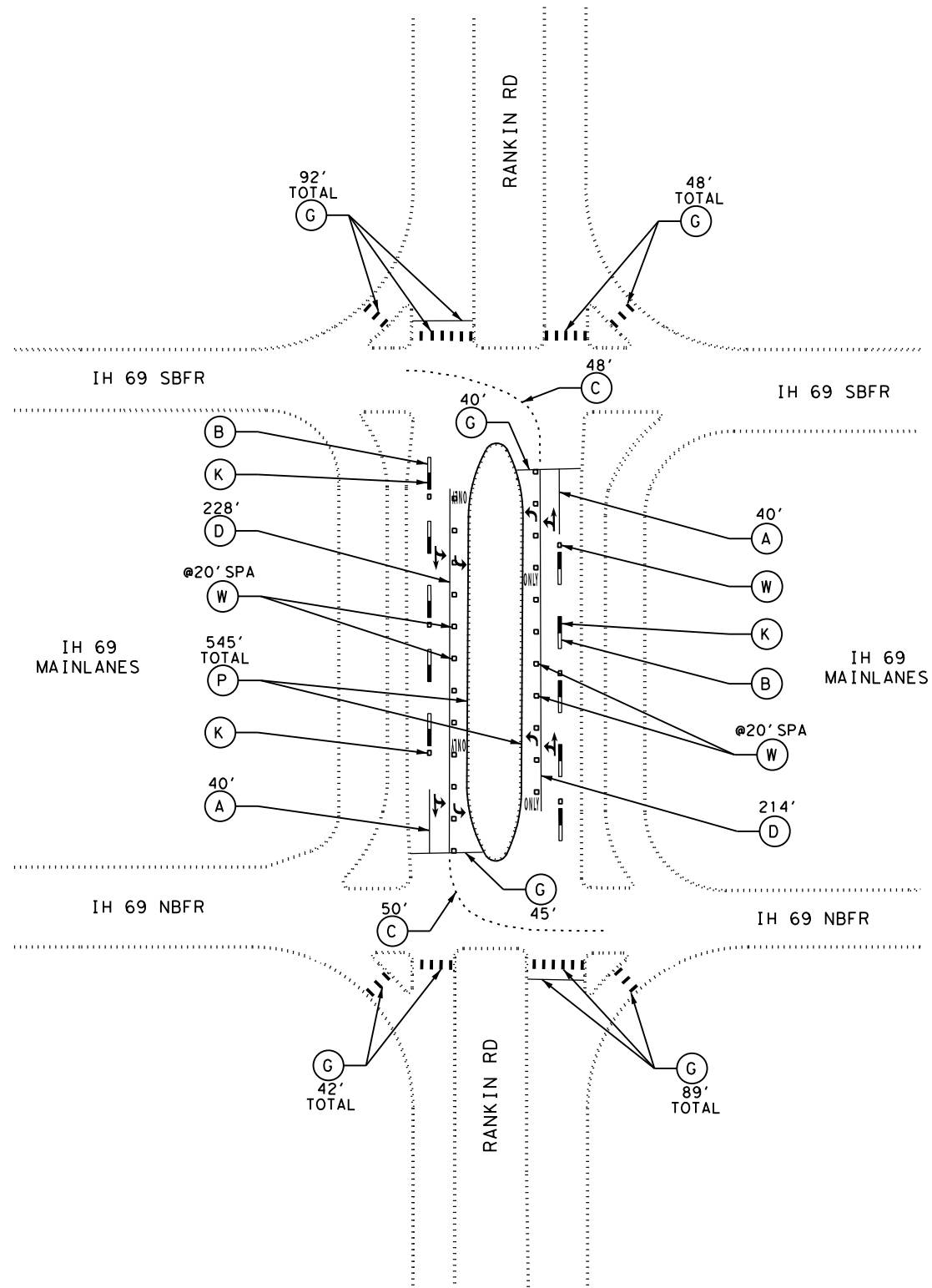
Suraj Chapagain, P.E.  
9/2/2022

IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT  
(GREENS RD)  
SHEET 37 OF 42

		@2022	
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		75

SCALE: 1" = 100'

Ck1  
 Dk1  
 Ck2  
 Dk2

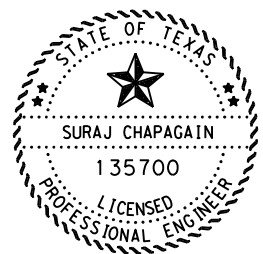


REFER TO SHEET NO. 8 FOR ADDITIONAL SIGNING AND PAVEMENT MARKINGS DETAILS

- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
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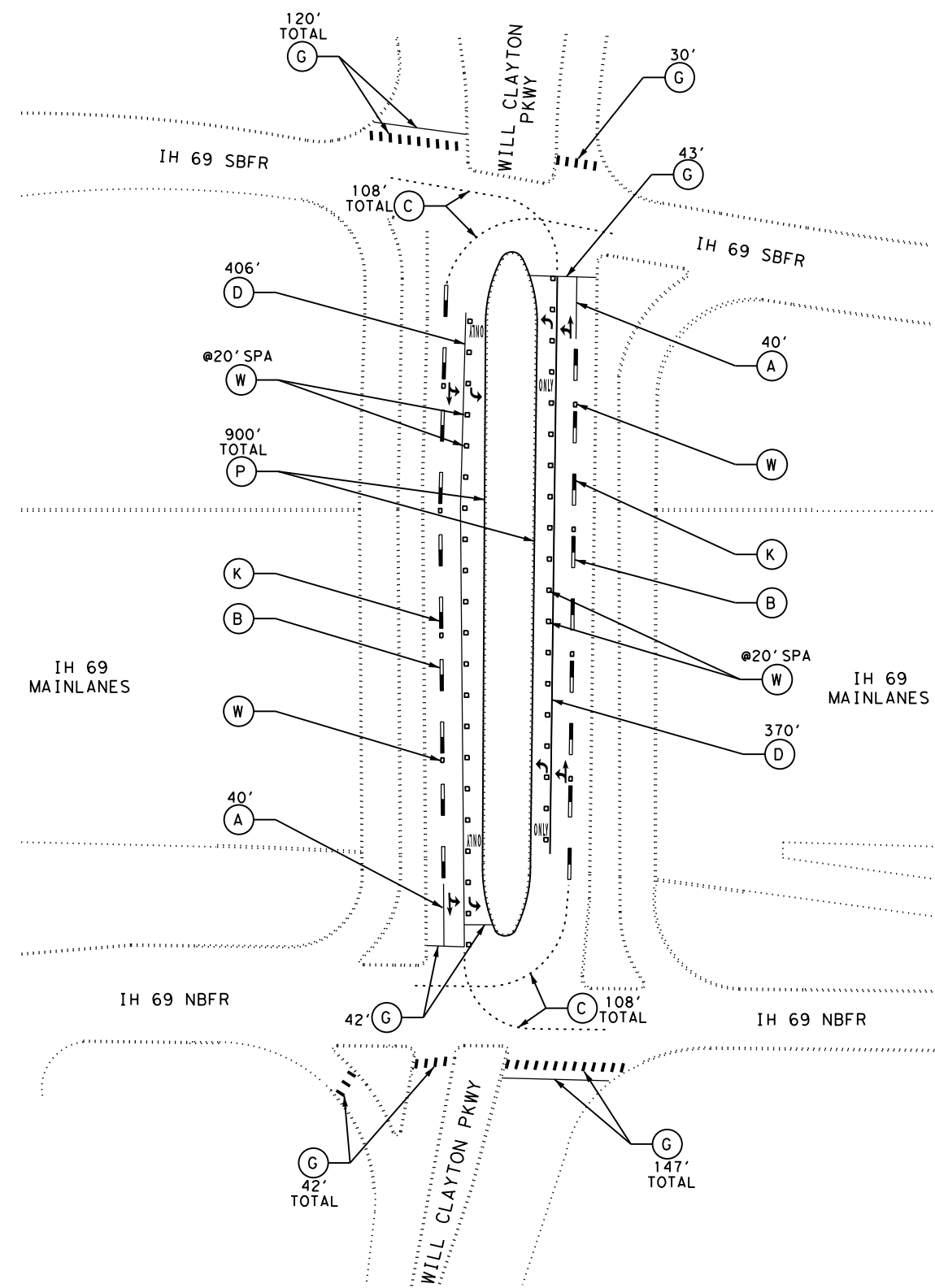
IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT  
(RANKIN RD)  
SHEET 38 OF 42

DATE: \$DATE\$		\$TIME\$	
FILE: \$FILES\$			
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		76

SCALE: 1" = 100'

DATE: \$DATE\$  
 FILE: \$FILES\$

Cks  
Dht  
Cks  
Dht



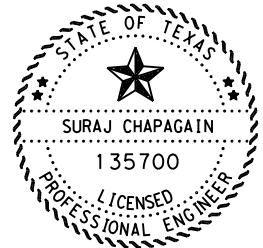
REFER TO SHEET NO. 14 FOR ADDITIONAL SIGNING AND PAVEMENT MARKINGS DETAILS

NOTE:

1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

LEGEND:

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T-) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
9/2/2022

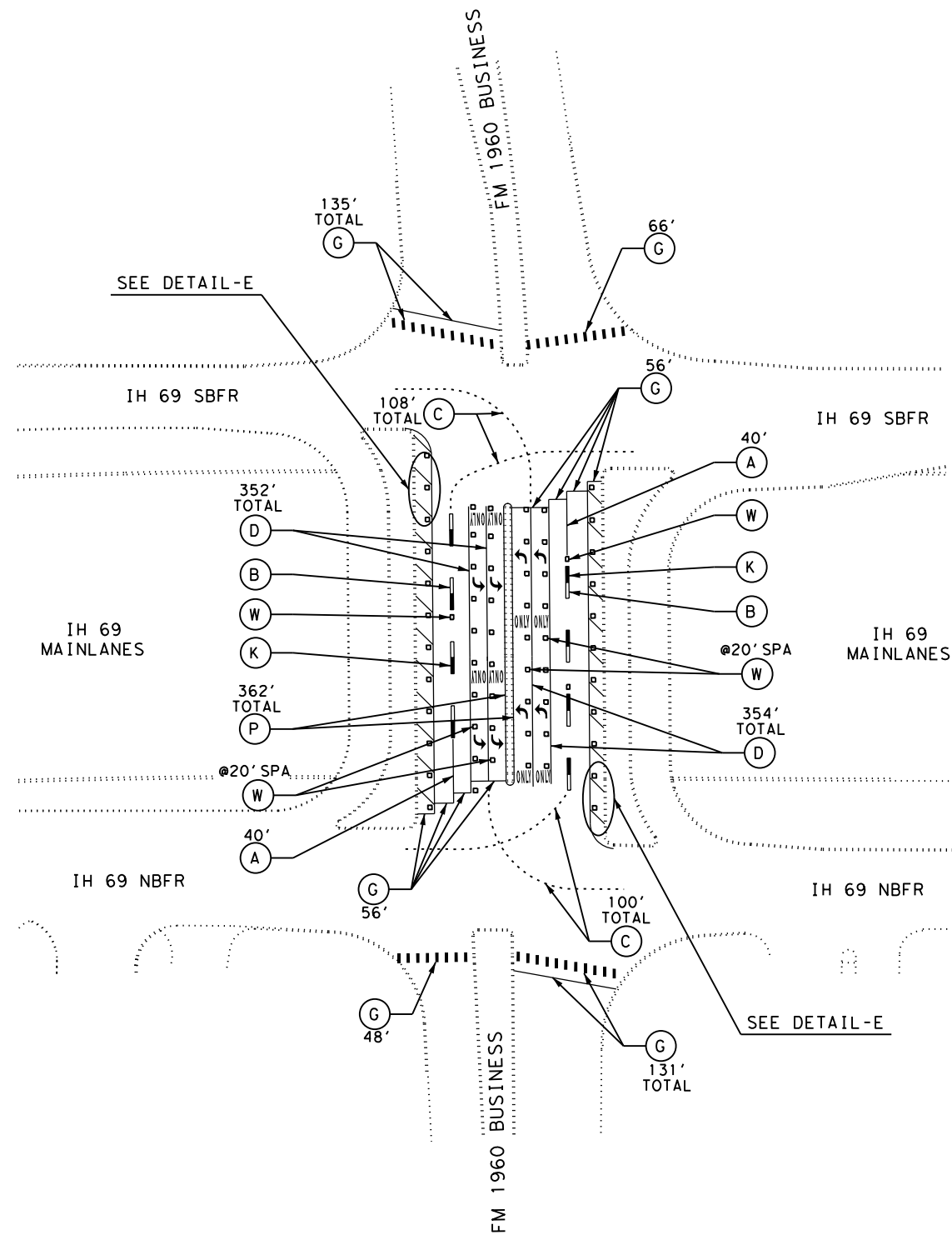
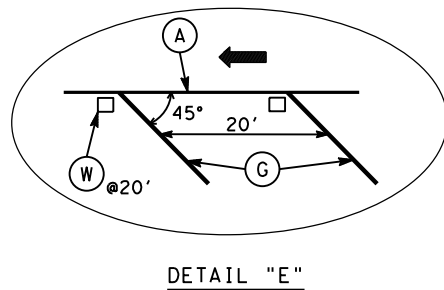
IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT  
(WILL CLAYTON PKWY)  
SHEET 39 OF 42

DATE: \$DATE\$		\$TIME\$	
FILE: \$FILES\$			
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		77

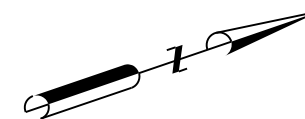
SCALE: 1" = 100'

DATE: \$DATE\$  
FILE: \$FILES\$

DATE: \$DATE\$ \$TIME\$ FILE: \$FILE\$



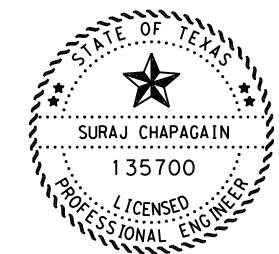
REFER TO SHEET NO. 20 FOR ADDITIONAL SIGNING AND PAVEMENT MARKINGS DETAILS



- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



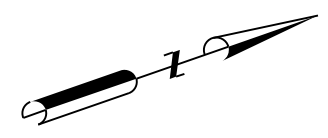
Suraj Chapagain, P.E.  
9/2/2022

IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT  
(FM 1960 BUSINESS)  
SHEET 40 OF 42

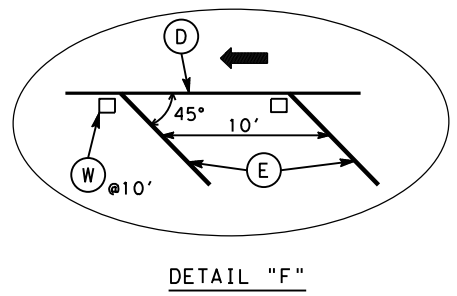
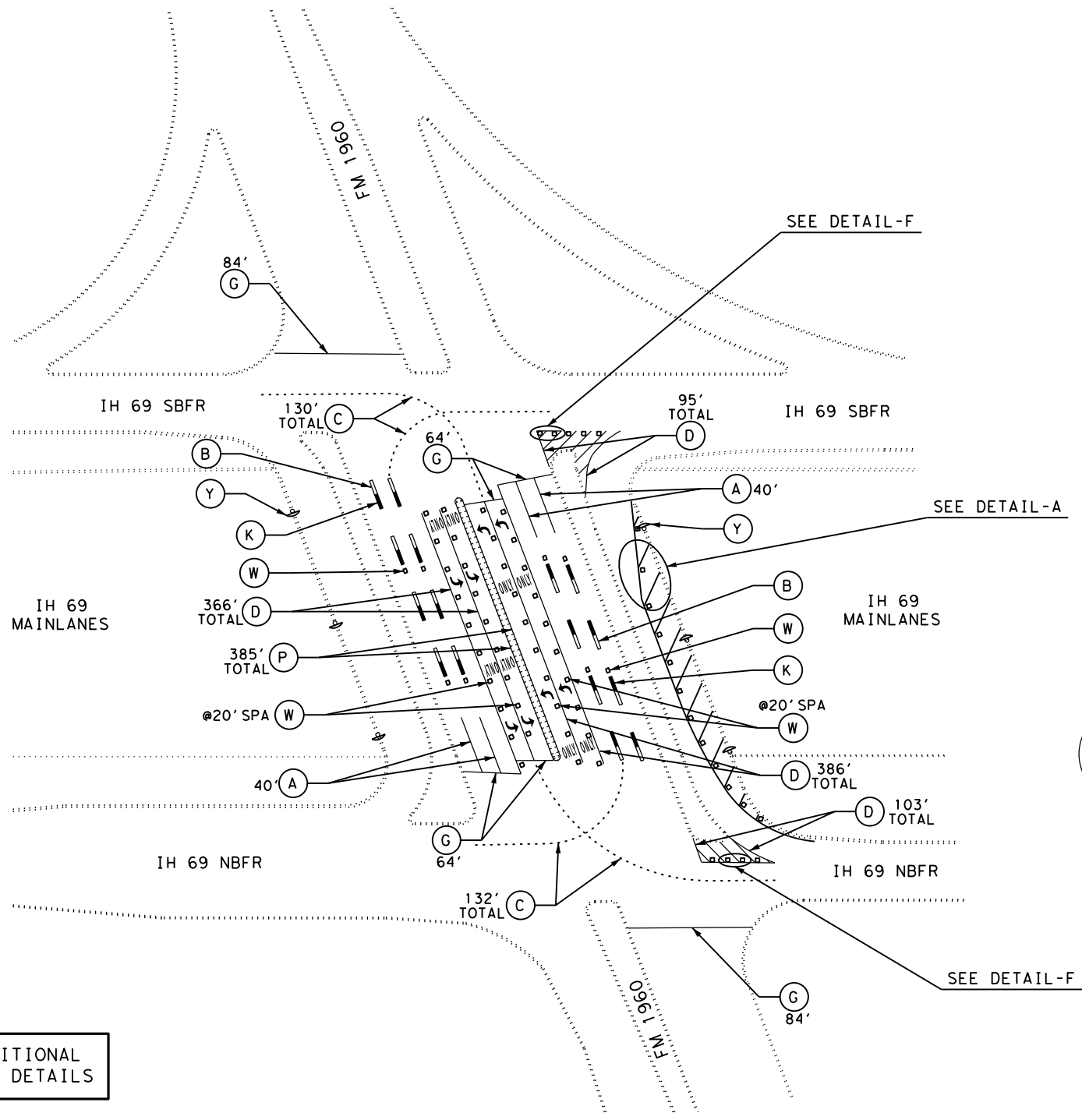
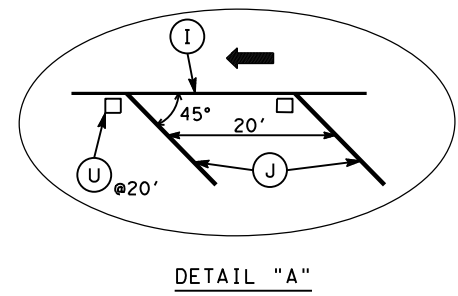
		@2022	
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		78

SCALE: 1" = 100'

C&G  
D&R  
C&G  
D&R



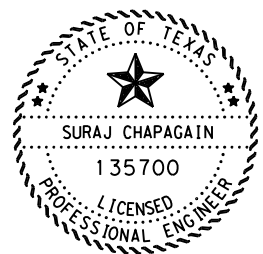
- NOTE:**
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



REFER TO SHEET NO. 21 FOR ADDITIONAL SIGNING AND PAVEMENT MARKINGS DETAILS

**LEGEND:**

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDRP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		



Suraj Chapagain, P.E.  
9/2/2022

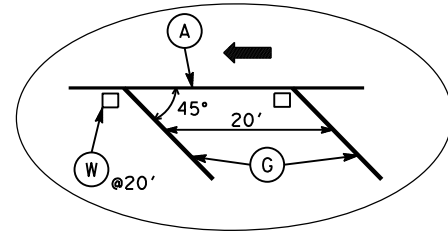
IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT  
(FM 1960)  
SHEET 41 OF 42

DATE: \$DATE\$		\$TIME\$	
FILE: \$FILES\$			
CONT	SECT	JOB	HIGHWAY
0177	07	118, ETC.	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS, ETC.		79

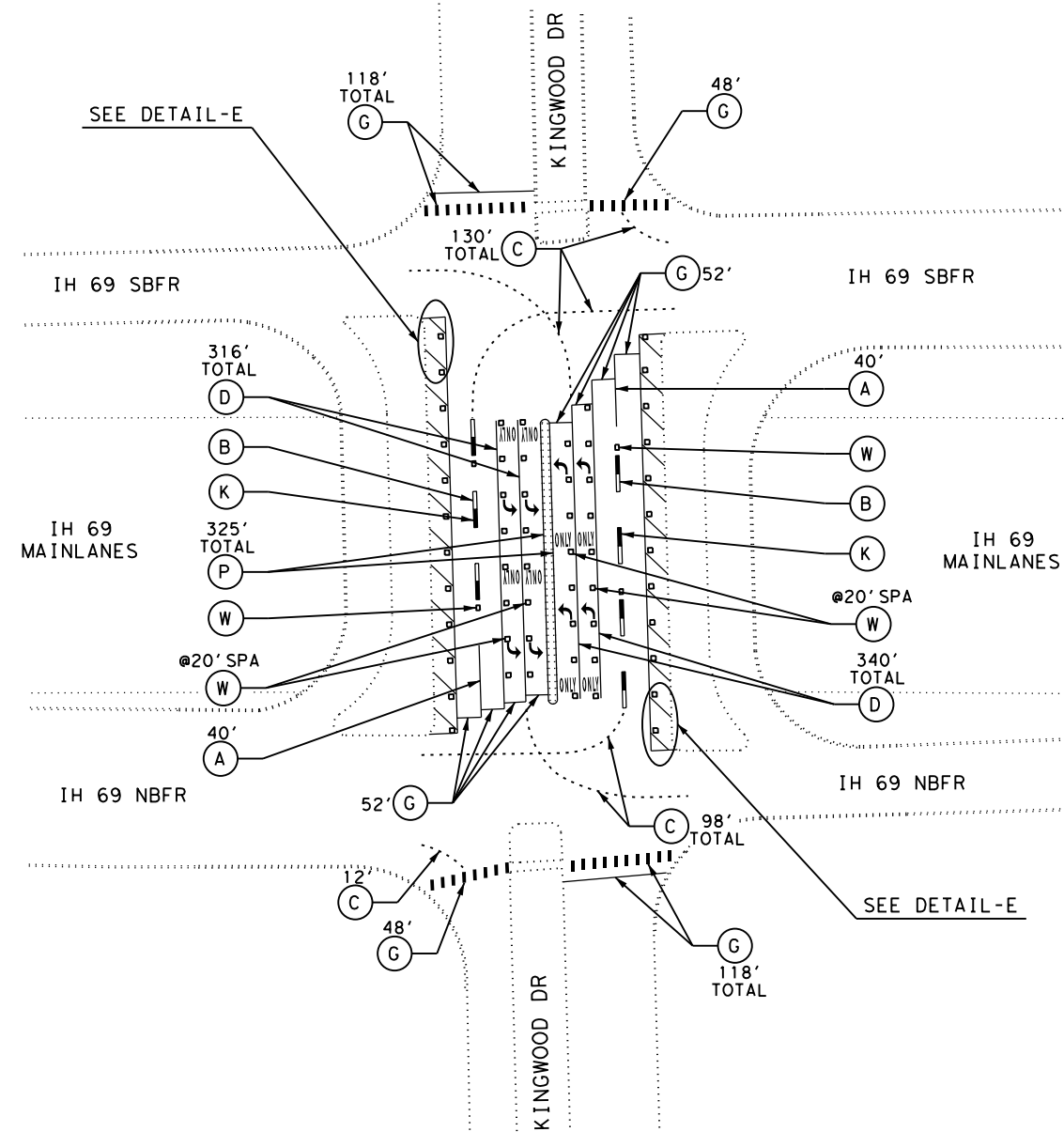
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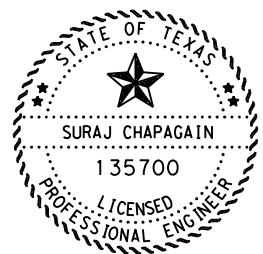
DETAIL "E"



REFER TO SHEET NO. 36 FOR ADDITIONAL SIGNING AND PAVEMENT MARKINGS DETAILS



- NOTE:
1. RESTRIPE BY REMOVING EXISTING PAVEMENT MARKINGS THEN REPLACE WITH PROPOSED PAVEMENT MARKINGS. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS.
  2. REFER TO "SUMMARY OF PERMANENT PAVEMENT MARKING QUANTITIES" SHEET FOR THE REMOVAL QUANTITIES OF EXISTING PAVEMENT MARKINGS.
  3. REFER TO STANDARD SHEET FPM(1)-12 FOR WRONG WAY ARROW DETAIL.
  4. REMOVAL OF RAISED PAVEMENT MARKERS WILL NOT BE PAID FOR DIRECTLY AND WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.



Suraj Chapagain, P.E.  
9/2/2022

IH 69  
SIGNING & PAVEMENT  
MARKING LAYOUT  
(KINGWOOD DR)  
SHEET 42 OF 42

LEGEND:

(A) MLTPLY PV MK W/WTY (W) (6") (SLD)	(J) MLTPLY PV MK W/WTY (Y) (12") (SLD)	(W) REFL PAV MRKR TY II-C-R	⇨ DIRECTION OF TRAFFIC
(B) MLTPLY PV MK W/WTY (W) (6") (BRK)	(K) MLTPLY PV MK W/WTY (BLK) (6") (BRK)	(X) INSTAL DEL ASSM (D-SW) SZ(BRF)CTB AT 80' SPA	4 PREFAB PAV MRK TY C (W) (NUMBER)
(C) MLTPLY PV MK W/WTY (W) (6") (DOT)	(M) PREFAB PAV MRK TY C (W) (36") (YLD TRI)	(Y) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB AT 80' SPA	↑ / ↓ PREFAB PAV MRK TY C (W) (ARROW)
(D) MLTPLY PV MK W/WTY (W) (8") (SLD)	(N) PREFAB PAV MRK TY C (W) (RR XING)	(Z) INSTAL DEL ASSM (D-SY) SZ(BRF)CTB(BI) AT 80' SPA	⇄ PREFAB PAV MRK TY C (W) (DBL ARROW)
(E) MLTPLY PV MK W/WTY (W) (12") (SLD)	(O) PREFAB PAV MRK TY C (MULTI) (SHIELD)	(-) PROPOSED SMALL SIGN	⇄ PREFAB PAV MRK TY C (W) (U-LT ARROW)
(F) MLTPLY PV MK W/WTY (W) (12") (LNDP)	(P) REFL PAV MRK TY II (Y) 12" (SLD)	(T) RELOCATE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (UTURN ARROW)
(G) MLTPLY PV MK W/WTY (W) (24") (SLD)	(T) REFL PAV MRKR TY I-R	(X-) REMOVE SM RD SN SUP & AM	⇄ PREFAB PAV MRK TY C (W) (WORD)
(H) MLTPLY PV MK W/WTY (Y) (6") (SLD)	(U) REFL PAV MRKR TY I-A		
(I) MLTPLY PV MK W/WTY (Y) (8") (SLD)	(V) REFL PAV MRKR TY II-A-A		

SCALE: 1" = 100'

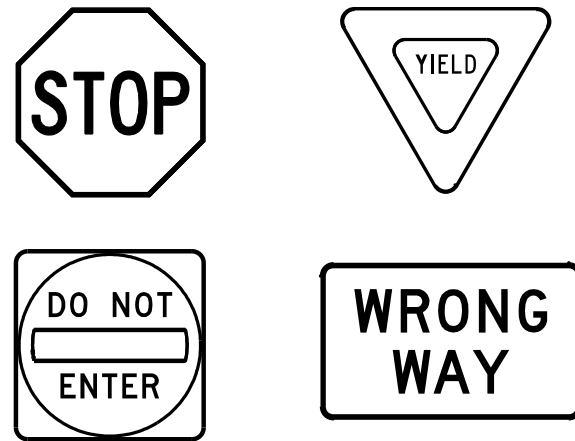
©2022  
 CONT: 0177  
 SECT: 07  
 JOB: 118, ETC.  
 HIGHWAY: IH 69  
 DIST: HOU  
 COUNTY: HARRIS, ETC.  
 SHEET NO.: 80

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DATE: DATE TIME  
 FILE: DOCUMENT NAME

### REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



#### REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

### REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

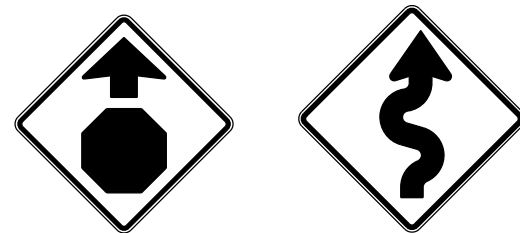
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



#### TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

### REQUIREMENTS FOR WARNING SIGNS



#### TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B <sub>FL</sub> OR C <sub>FL</sub> SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

### REQUIREMENTS FOR SCHOOL SIGNS



#### TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B <sub>FL</sub> OR C <sub>FL</sub> SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

### GENERAL NOTES

- Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
- Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
- Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
- Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
- White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
- Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
- Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
- Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website:  
<http://www.txdot.gov/>

		<i>Traffic Operations Division Standard</i>	
<h2>TYPICAL SIGN REQUIREMENTS</h2>			
<h3>TSR(4) - 13</h3>			
FILE:	tsr4-13.dgn	DN:	TxDOT
© TxDOT	October 2003	CK:	TxDOT
REVISIONS		DW:	TxDOT
12-03	7-13	CR:	TxDOT
9-08		CON:	SECT
		JOB	HIGHWAY
		0177 07 118, etc.	IH 69
		DIST	COUNTY
		HOU	Harris, etc.
			SHEET NO.
			81

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## SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

### Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))  
 TWT = Thin-Walled Tubing (see SMD(TWT))  
 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))  
 S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

### Number of Posts (1 or 2)

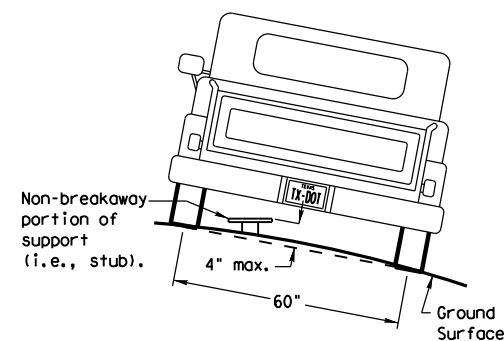
### Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))  
 UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))  
 WS = Wedge Anchor Steel - (see SMD(TWT))  
 WP = Wedge Anchor Plastic (see SMD(TWT))  
 SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))  
 SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

### Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))  
 T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))  
 U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))  
 IF REQUIRED  
 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))  
 BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))  
 WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))  
 EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

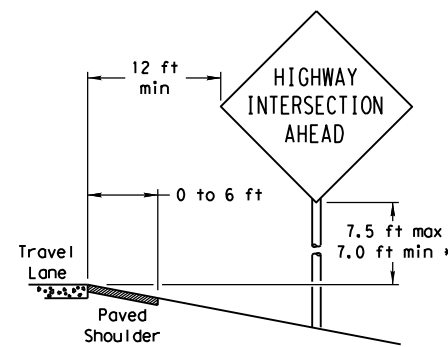
## REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

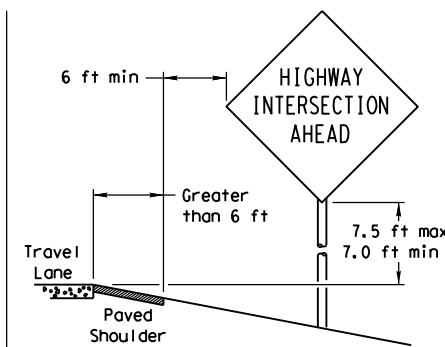
## SIGN LOCATION

### PAVED SHOULDERS



#### LESS THAN 6 FT. WIDE

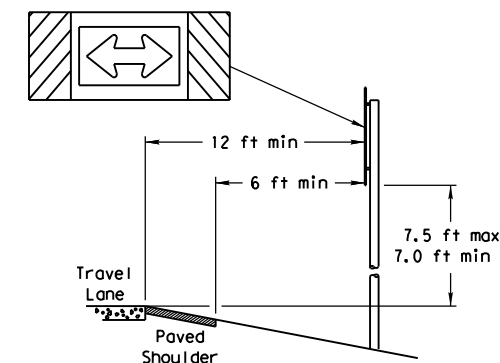
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



#### GREATER THAN 6 FT. WIDE

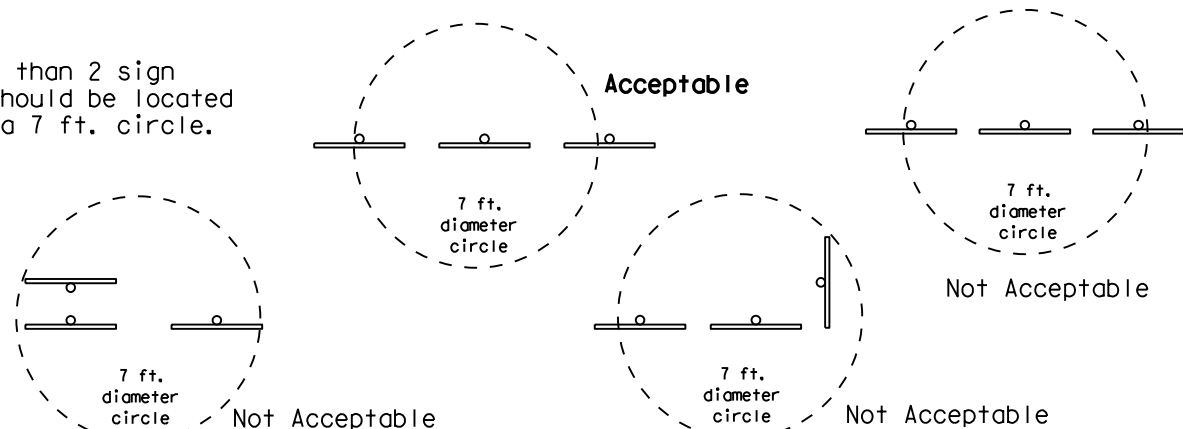
When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

### T-INTERSECTION

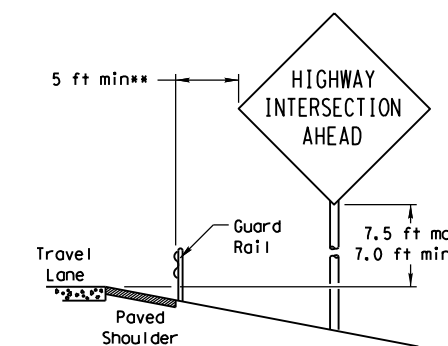


When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

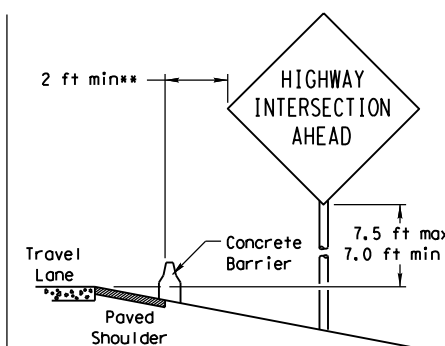
No more than 2 sign posts should be located within a 7 ft. circle.



### BEHIND BARRIER



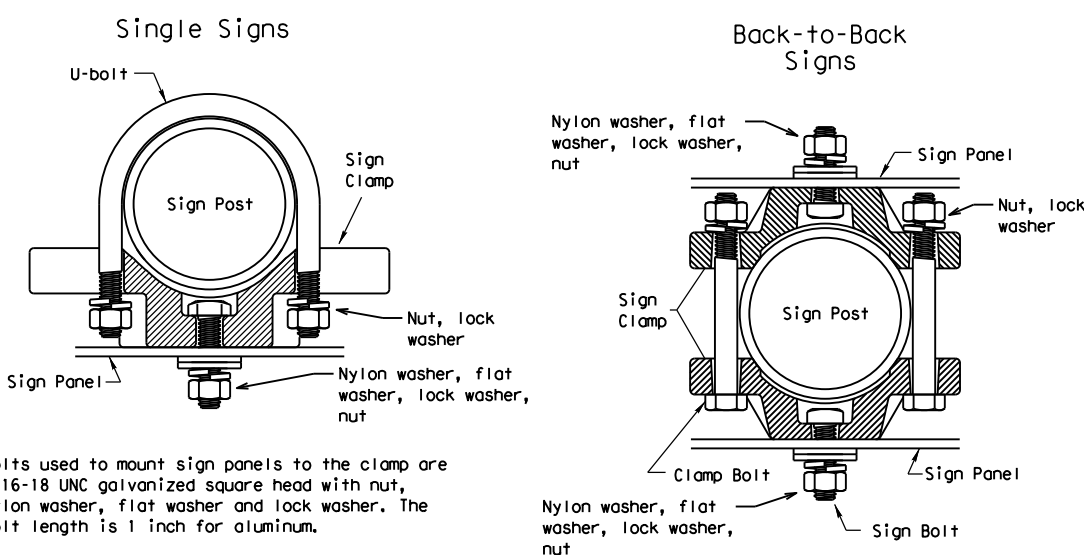
#### BEHIND GUARDRAIL



#### BEHIND CONCRETE BARRIER

\*\*Sign clearance based on distance required for proper guard rail or concrete barrier performance.

## TYPICAL SIGN ATTACHMENT DETAIL



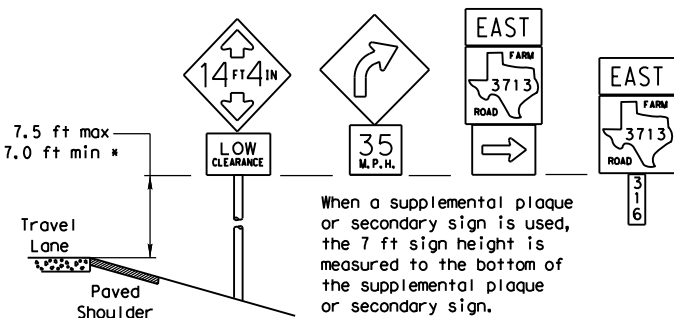
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

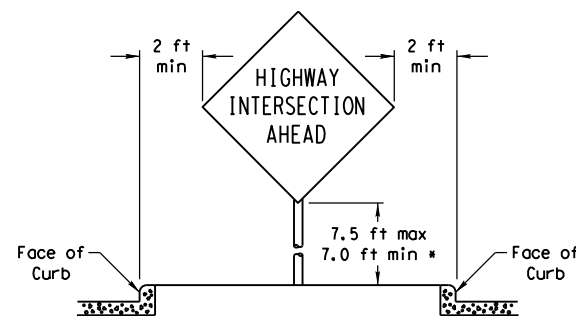
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

### SIGNS WITH PLAQUES

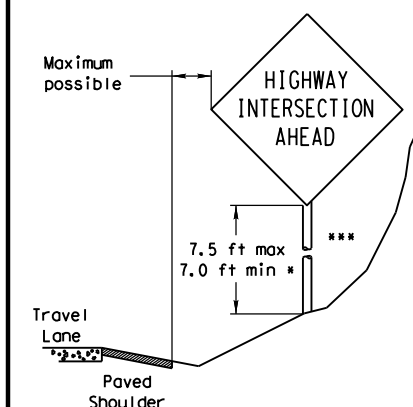


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

### CURB & GUTTER OR RAISED ISLAND



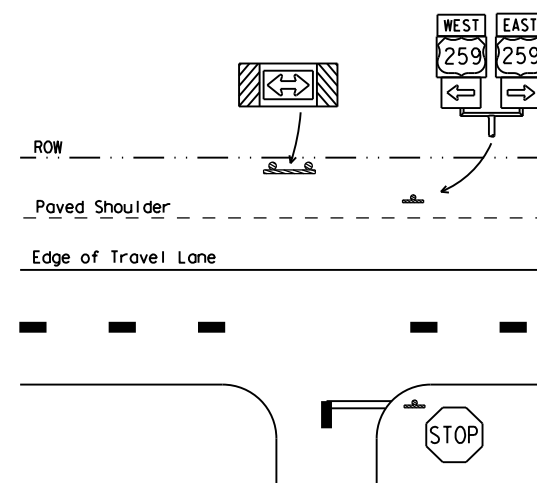
### RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

\*\*\* Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.



\* Signs shall be mounted using the following condition that results in the greatest sign elevation:

- (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
- (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:  
<http://www.txdot.gov/publications/traffic.htm>

Texas Department of Transportation  
 Traffic Operations Division

## SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

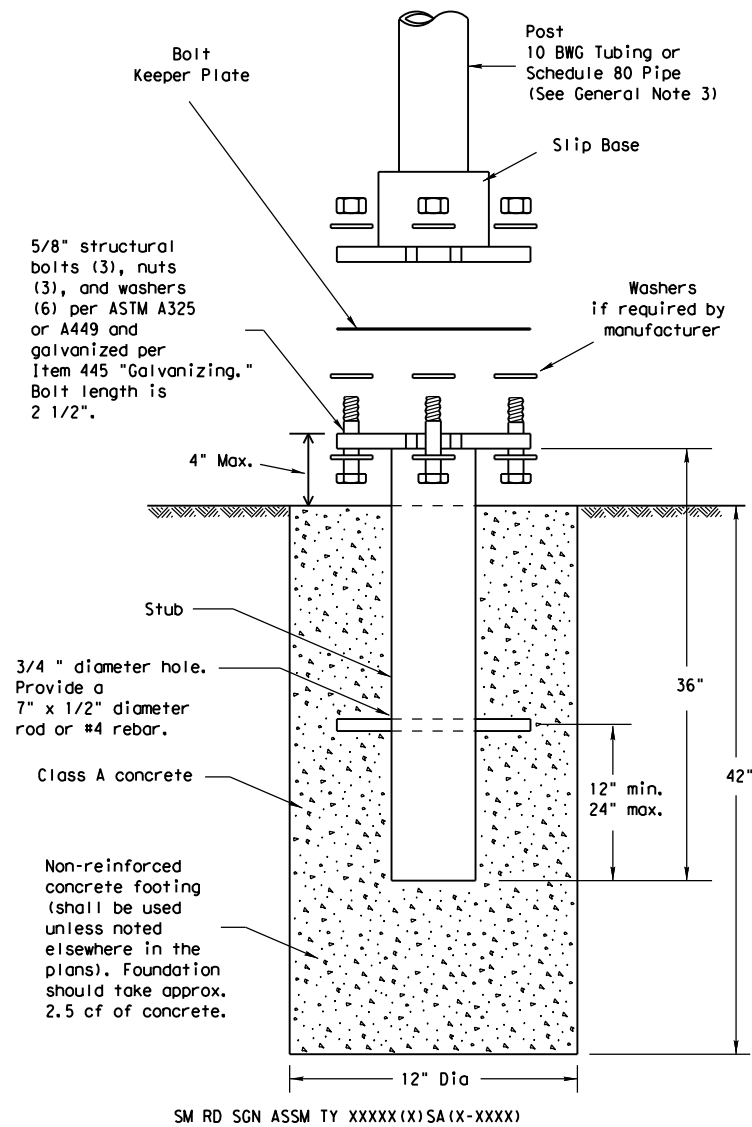
SMD(GEN)-08

© TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB
		0177	07	118, etc.
		DIST	COUNTY	IH 69
		HOU	Harris, etc.	82

DATE: \$DATES\$ \$TIME\$  
 FILE: \$FILES\$

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## TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



### NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. [http://www.txdot.gov/business/producer\\_list.htm](http://www.txdot.gov/business/producer_list.htm) The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

### GENERAL NOTES:

- Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
- Material used as post with this system shall conform to the following specifications:
  - 10 BWG Tubing (2.875" outside diameter)
    - 0.134" nominal wall thickness
    - Seamless or electric-resistance welded steel tubing or pipe
    - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
    - Other steels may be used if they meet the following:
      - 55,000 PSI minimum yield strength
      - 70,000 PSI minimum tensile strength
      - 20% minimum elongation in 2"
    - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
    - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
    - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
  - Schedule 80 Pipe (2.875" outside diameter)
    - 0.276" nominal wall thickness
    - Steel tubing per ASTM A500 Gr C
    - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
      - 46,000 PSI minimum yield strength
      - 62,000 PSI minimum tensile strength
      - 21% minimum elongation in 2"
    - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
    - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
    - Galvanization per ASTM A123
- See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: <http://www.txdot.gov/publications/traffic.htm>
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

### ASSEMBLY PROCEDURE

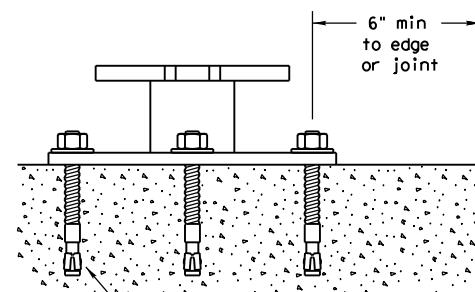
#### Foundation

- Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
- The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
- Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
- Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
- The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

#### Support

- Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
- Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

### CONCRETE ANCHOR



5/8" diameter Concrete Anchor - 8 places (embed a minimum of 5 1/2" and torque to min. of 50 ft-lbs). Anchor may be expansion or adhesive type.

SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxyes and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

DATE: \$DATE\$  
FILE: \$FILE\$

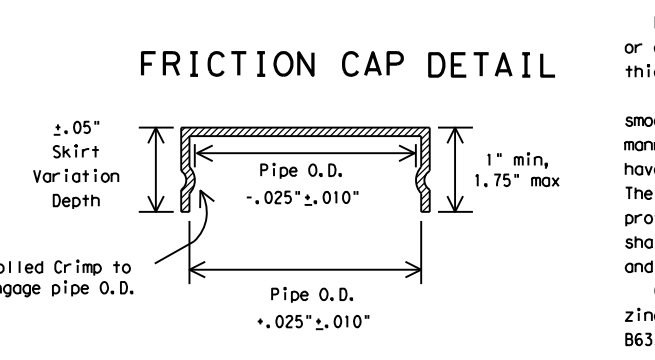
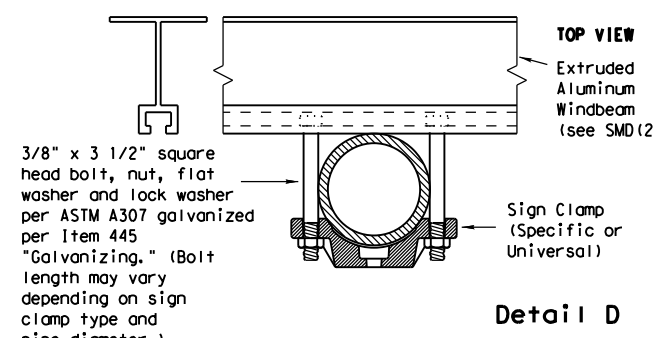
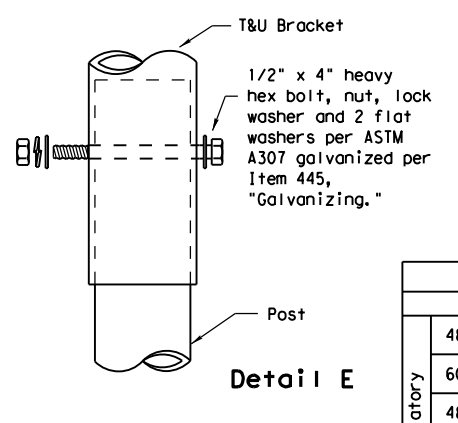
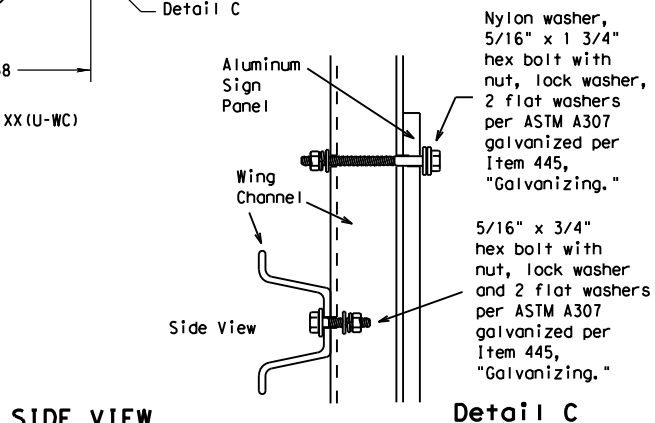
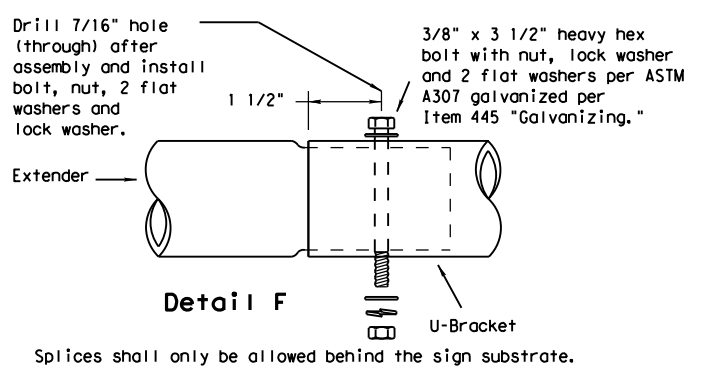
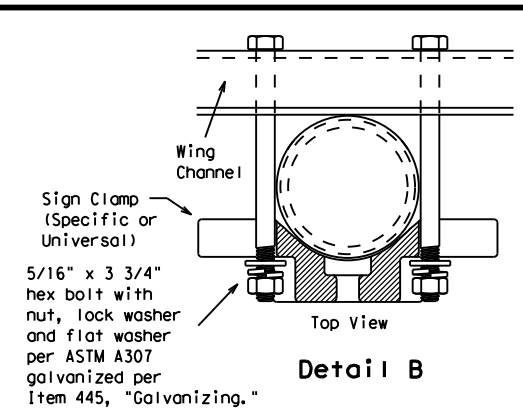
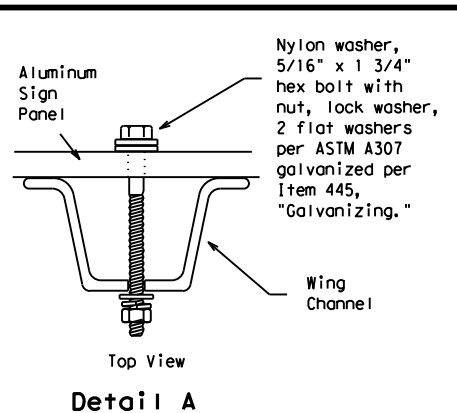
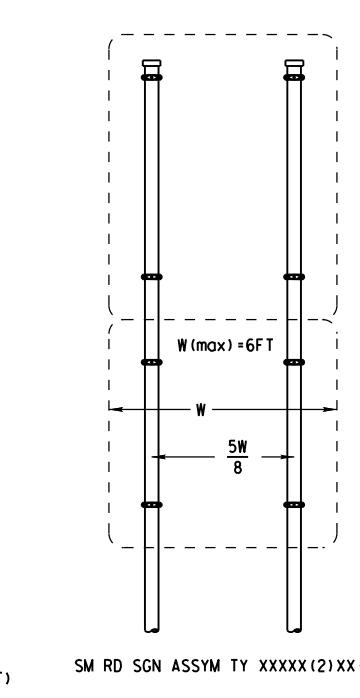
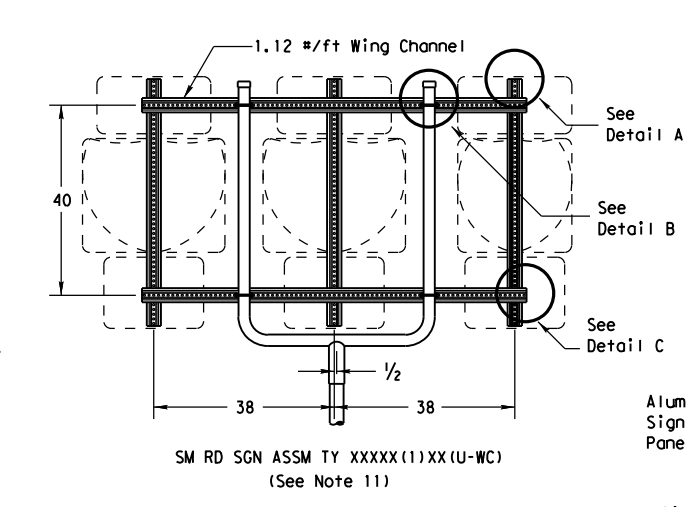
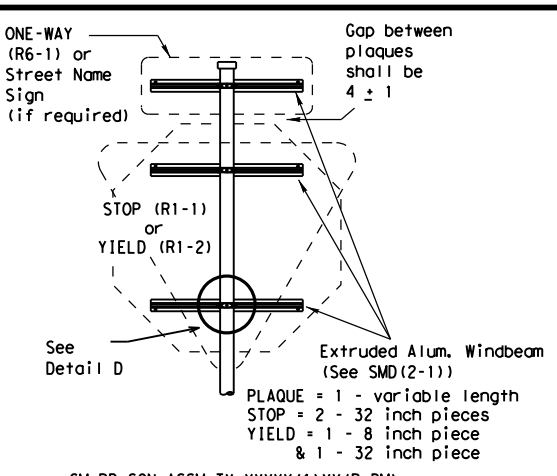
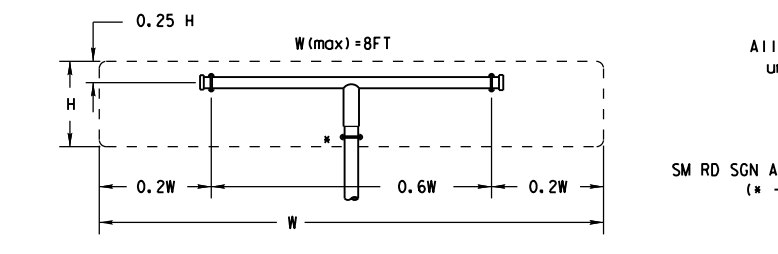
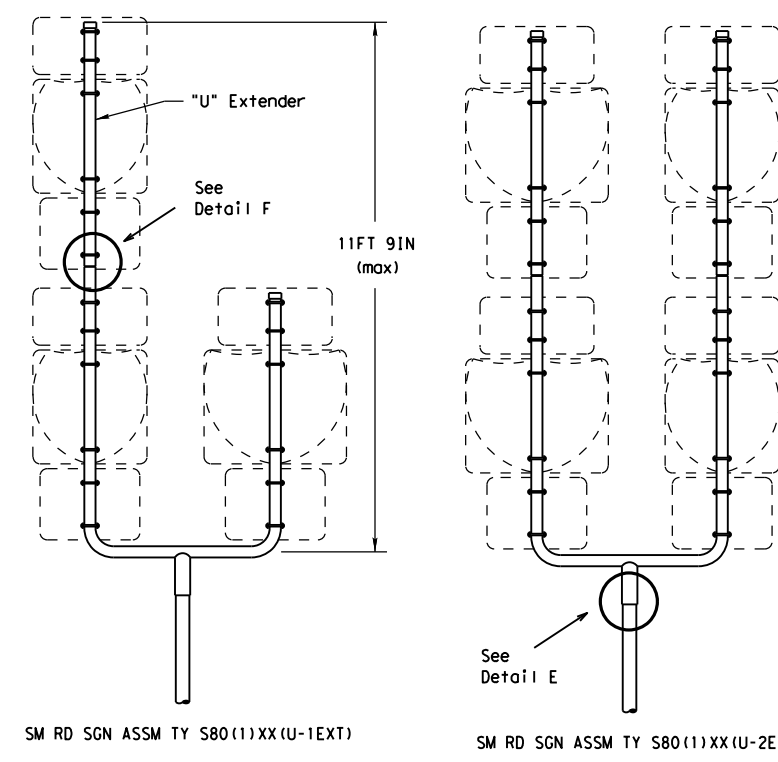
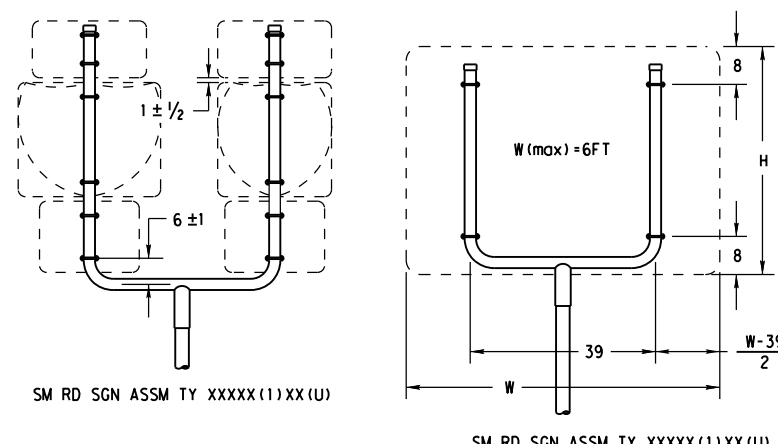
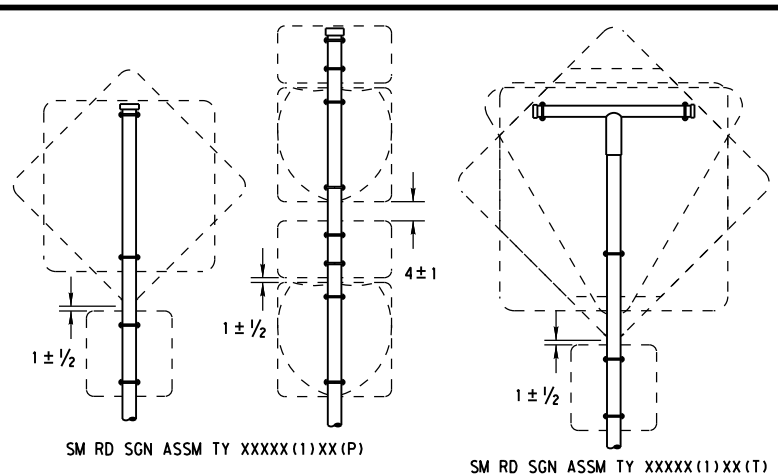
Texas Department of Transportation  
Traffic Operations Division

## SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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		DIST	COUNTY		SHEET NO.
		HOU	Harris, etc.		83

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All dimensions are in english unless detailed otherwise.

Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes. The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture. Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1. SIGN SUPPORT # OF POSTS MAX. SIGN AREA  

10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT		
SIGN DESCRIPTION	SUPPORT	
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
Warning	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)	
Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)	



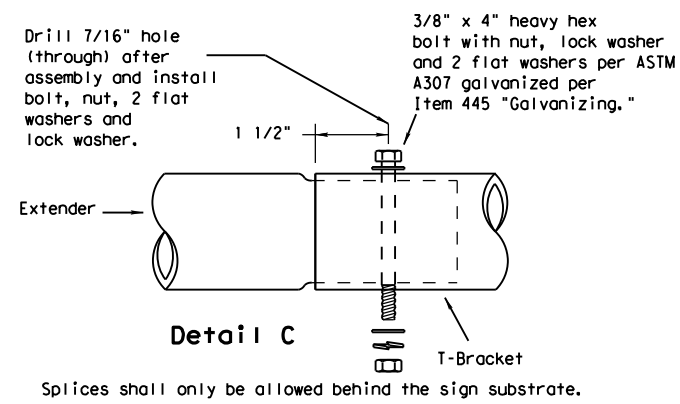
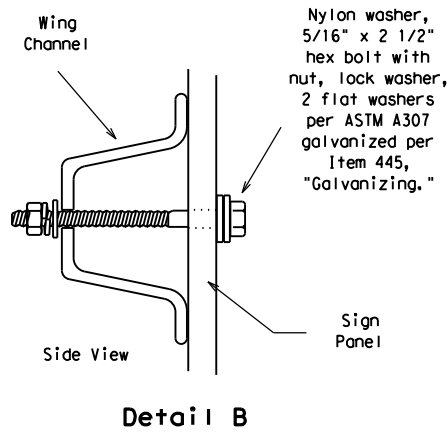
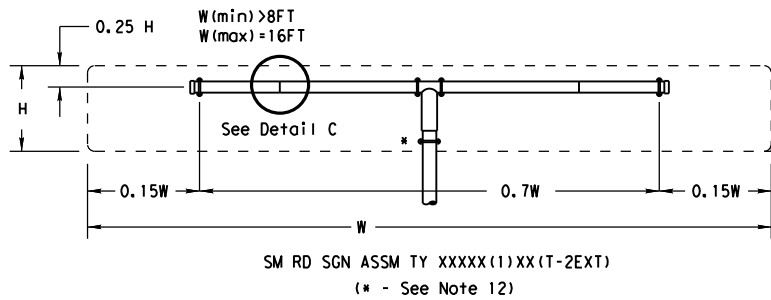
SIGN MOUNTING DETAILS  
SMALL ROADSIDE SIGNS  
TRIANGULAR SLIPBASE SYSTEM  
SMD(SLIP-2)-08

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		DIST	COUNTY		SHEET NO.
		HOU	Harris, etc.		84

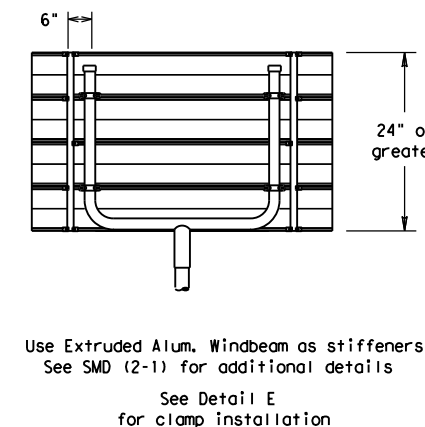
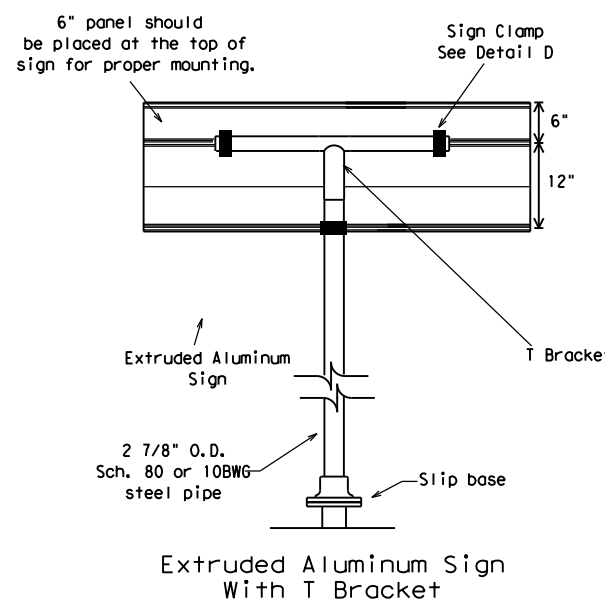
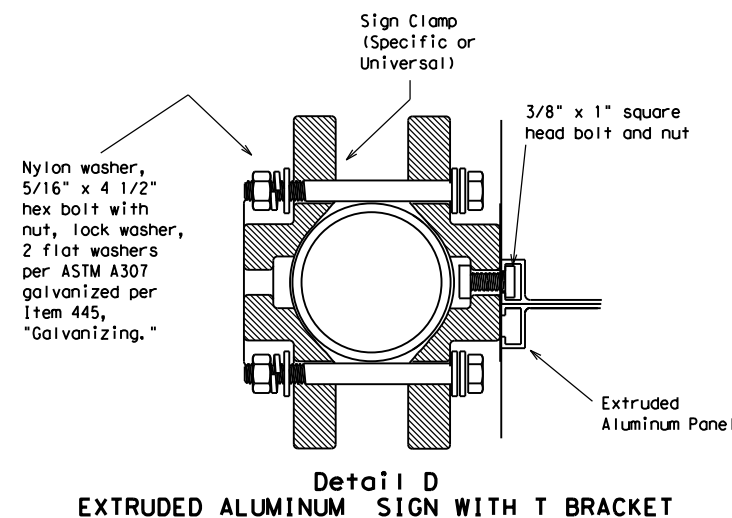
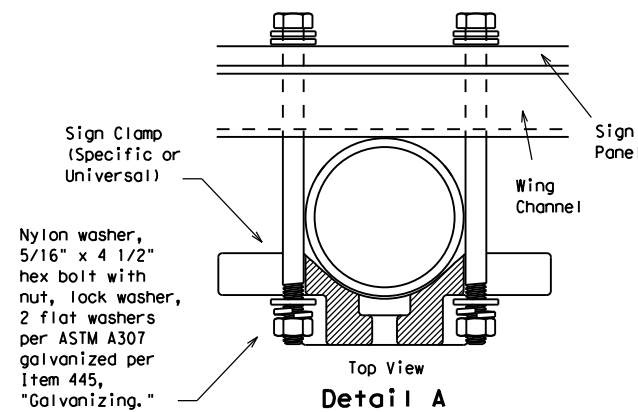
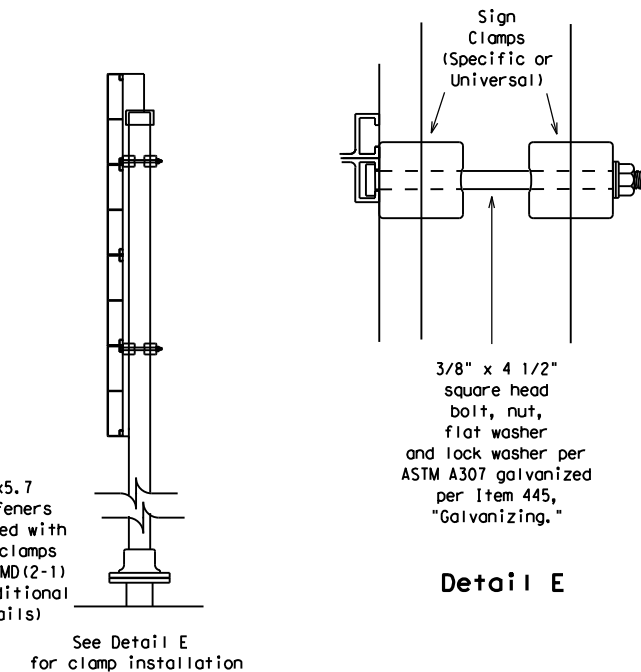
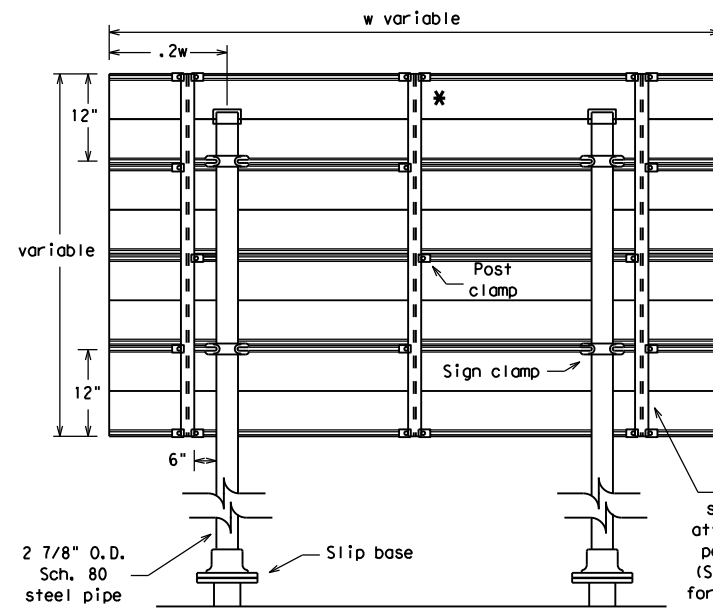
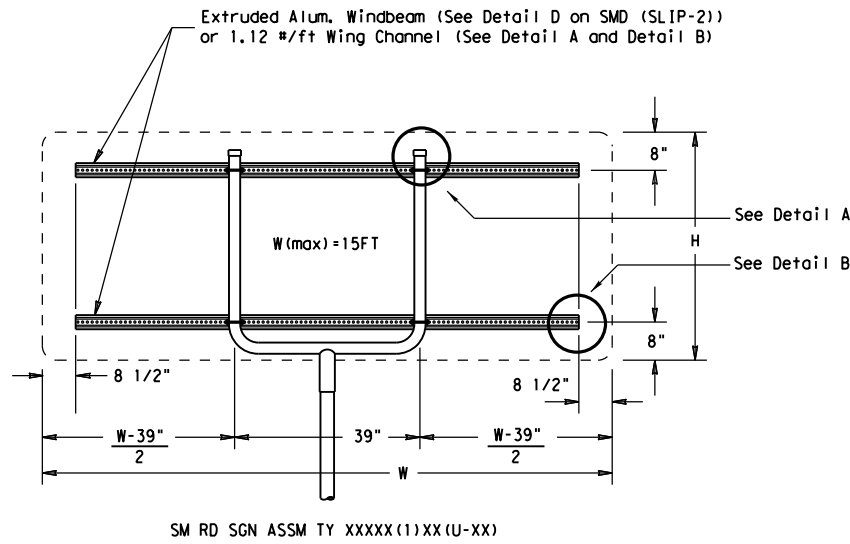
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- GENERAL NOTES:**
- | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
|--------------|------------|----------------|
| 10 BWG       | 1          | 16 SF          |
| 10 BWG       | 2          | 32 SF          |
| Sch 80       | 1          | 32 SF          |
| Sch 80       | 2          | 64 SF          |
  - The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
  - Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
  - Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
  - Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
  - For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
  - When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
  - Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
  - Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
  - Sign blanks shall be the sizes and shapes shown on the plans.
  - Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
  - Post open ends shall be fitted with Friction Caps.



REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
Warning	48x60-inch signs	TY S80(1)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation  
 Traffic Operations Division  
**SIGN MOUNTING DETAILS**  
**SMALL ROADSIDE SIGNS**  
**TRIANGULAR SLIPBASE SYSTEM**  
**SMD(SLIP-3)-08**

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		DIST	COUNTY	IH 69
		HOU	Harris, etc.	SHEET NO. 85

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REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS				DELINEATORS				D & OM DESCRIPTIVE CODES			
DEVICE	SIZE 1	SIZE 2	SIZE 3	SIZE 4	DEVICE	SINGLE	DOUBLE	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 BRFL = 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	
SHEETING: Yellow, White or Red Type B or C reflective sheeting				SHEETING: Yellow, White or Red Type B or C Reflective Sheeting						INSTL OM ASSM (OM-XX) (XXXX)XXX (XX)	
NOTE: 1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (fix). 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.				POST TYPE: WC, YFLX, WFLX, GND						TYPE OF OBJECT MARKER 1, 2, 3, or 4 NUMBER OF REFLECTORS OR DIRECTION X = 3-Size 2 reflector unit (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									
DEVICE	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	
SHEETING: Yellow-Type B or C Sheeting (FL), Yellow - Type B or C Sheeting, Alternating acrylic black and retroreflective yellow - Type B <sub>FL</sub> or C <sub>FL</sub> Sheeting, Red -Type B <sub>FL</sub> or C <sub>FL</sub> Sheeting									
POST TYPE: TWT, WC, WFLX, TWT									
MOUNT TYPE: WAS, WAP, GND, GND, GND, SRF, WAS, WAP, WAS, WAP									

BARRIER REFLECTORS (BRF)			CHEVRONS				ONE DIRECTION LARGE ARROW		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.
DEVICE	GF1	GF2	CTB	W1-8				W1-6	
SHEETING: Yellow, White, Red			SIZE (W x L): 18"x 24" (Conventional), 24"x 30" (Conventional Oversize), 30"x 36" (Expressway), 36" x 48" (Freeway)				SIZE (W x L): 48" x 24" (Conventional), 60" x 30" (Expressway & Freeway)		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
NOTE: 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.			MOUNTING HEIGHT: 4'-0" or 7'-0", 7'-0" Only				MOUNTING HEIGHT: 7'-0"		
NOTE: 1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.			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).						

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Texas Department of Transportation  
 Traffic Safety Division Standard

### DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

## D & OM(1)-20

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REVISIONS	0177	07	118, etc.	IH 69
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4-10 7-20	HOU	Harris, etc.	86	

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POST TYPE AND SUPPORT FOUNDATION DETAILS				TYPE OF BARRIER MOUNTS	
WING CHANNEL (WC)	FLEXIBLE POSTS (YFLX, WFLX)		WEDGE ANCHOR SYSTEMS		GUARD FENCE ATTACHMENT
GND	GND	SRF	WAS	WAP	GF 1
	EMBEDDED		SURFACE MOUNT	STEEL	PLASTIC
<b>NOTES</b> 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.	<b>NOTES</b> 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.		<b>NOTE</b> 1. Install per manufacturer's recommendations.		

**CONCRETE TRAFFIC BARRIER (CTB)**

**GENERAL NOTES**

- Place delineators on a section of roadway at a consistent distance from the edge of pavement.
- Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
- 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.
- Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
- Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
- 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.

Texas Department of Transportation  
 Traffic Safety Division Standard

**DELINEATOR & OBJECT MARKER INSTALLATION**  
**D & OM(2)-20**

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10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	HOU	Harris, etc.	87	

20B

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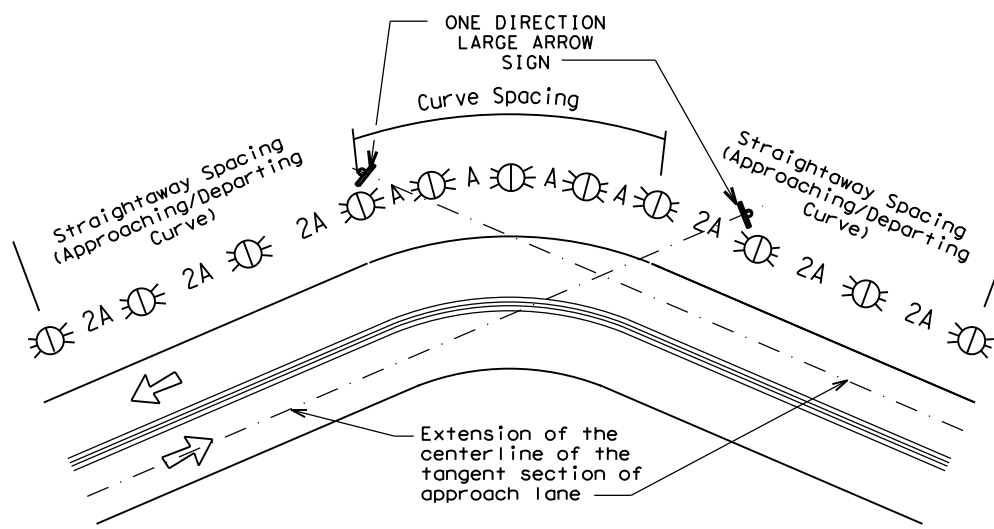


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### MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

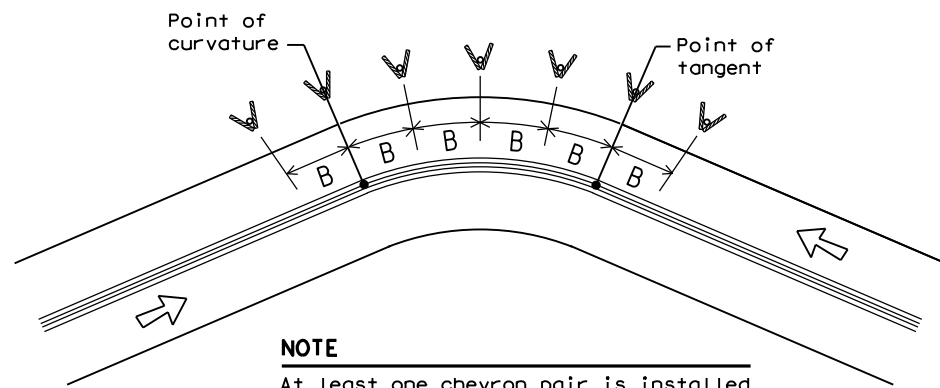
### SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



**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**

- 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.
- Barrier reflectors may be used to replace required delineators.
- Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation  
Traffic Safety Division Standard

## DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

### D & OM(3)-20

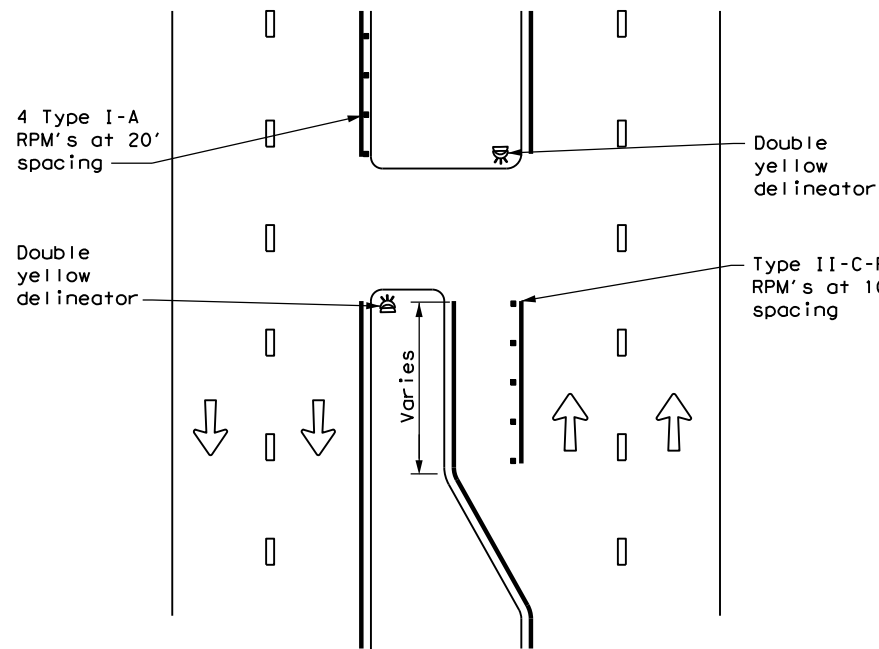
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3-15 8-15	DIST	COUNTY	SHEET NO.	
8-15 7-20	HOU	Harris, etc.	88	

DATE: DATE TIME  
FILE: DOCUMENT NAME

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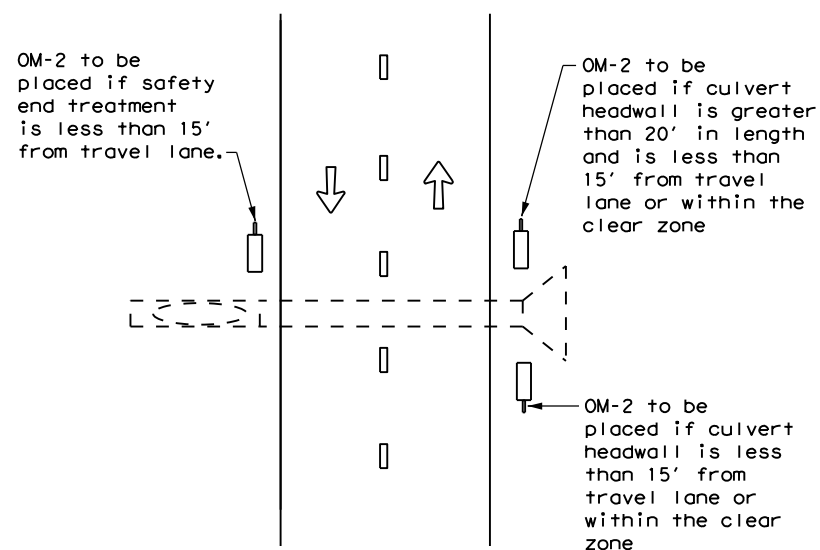
DATE: DATE TIME  
FILE: DOCUMENT NAME

**CROSSOVERS**



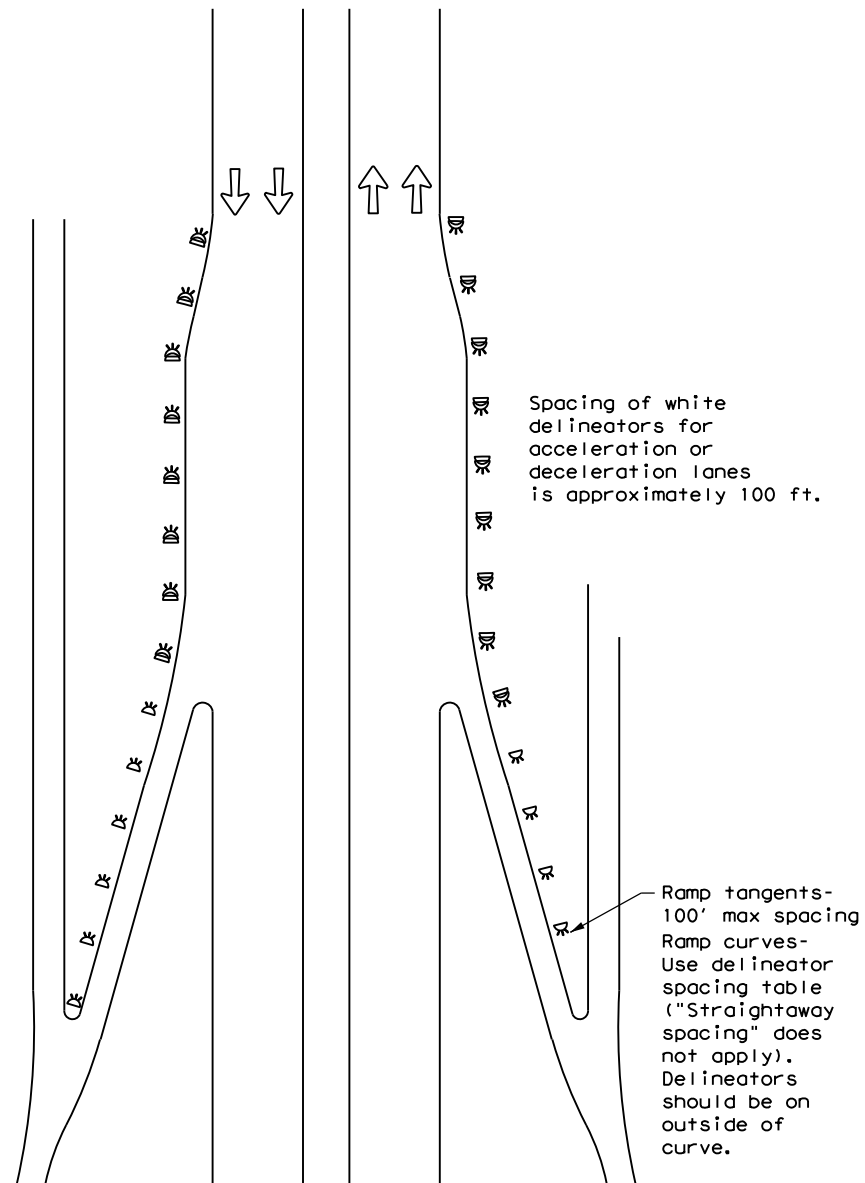
**DETAIL 1**

**FOR CULVERTS WITHOUT MBGF**



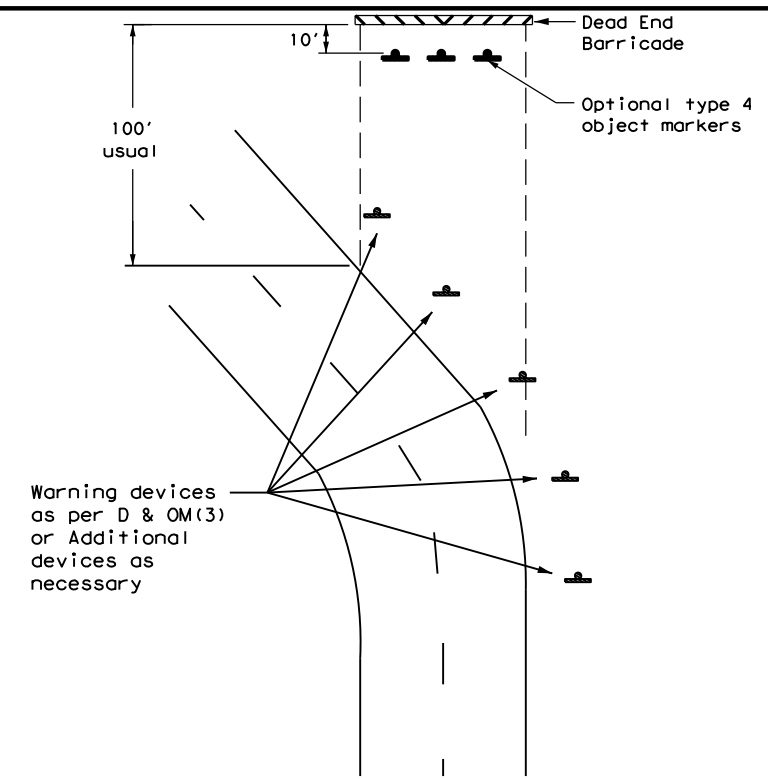
**DETAIL 2**

**FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES**



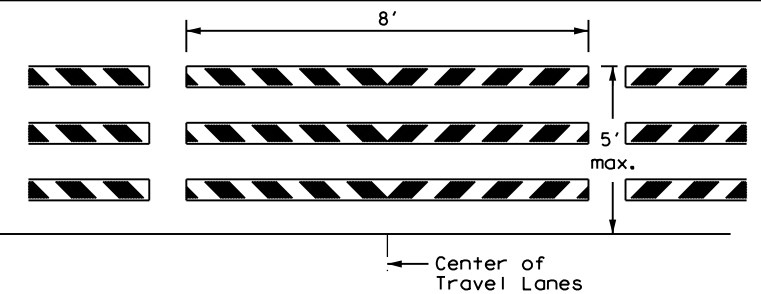
**DETAIL 3**

**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



**DELINEATOR & OBJECT MARKER PLACEMENT DETAILS**

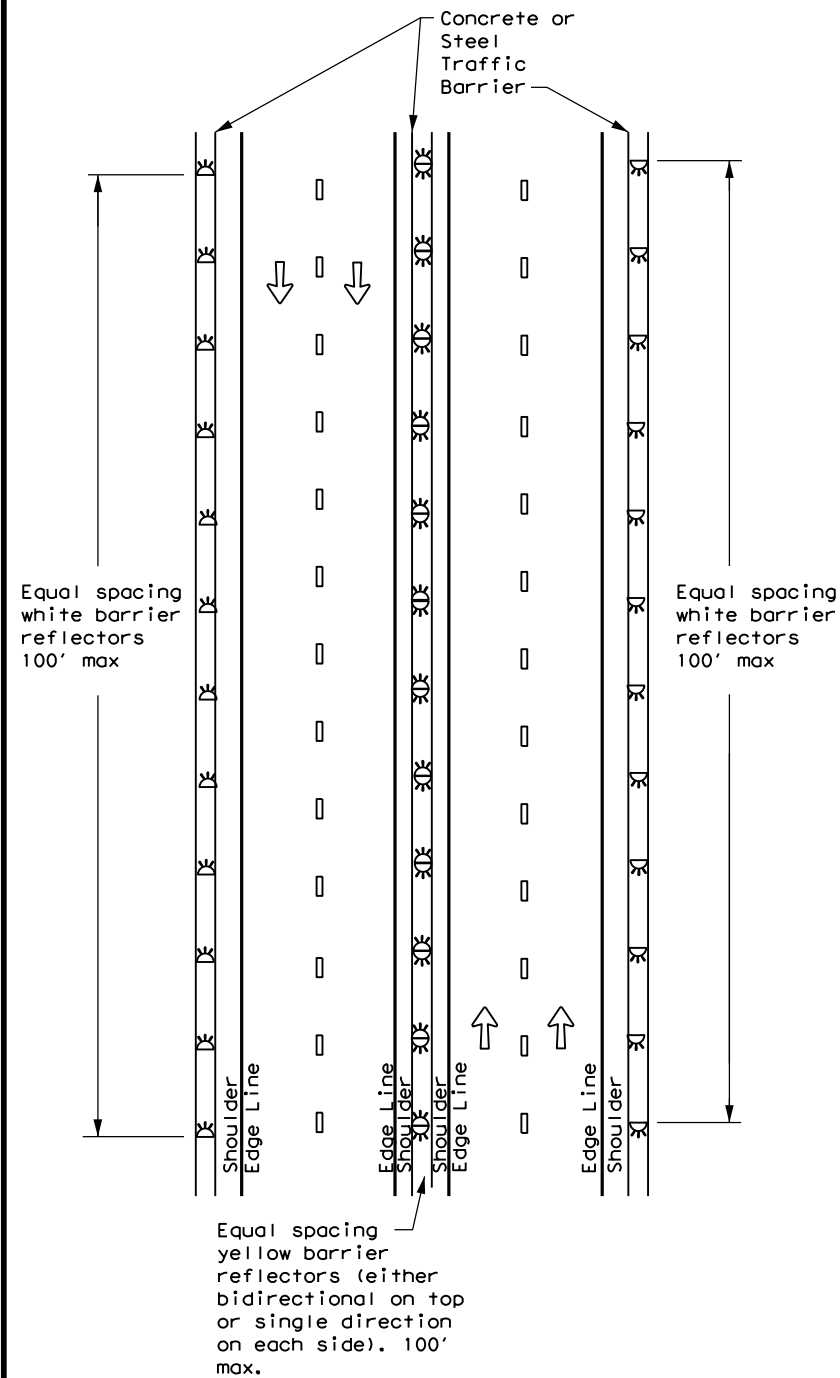
**D & OM(4) - 20**

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CR: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
3-15	DIST	COUNTY	SHEET NO.	
7-20	HOU	Harris, etc.	89	

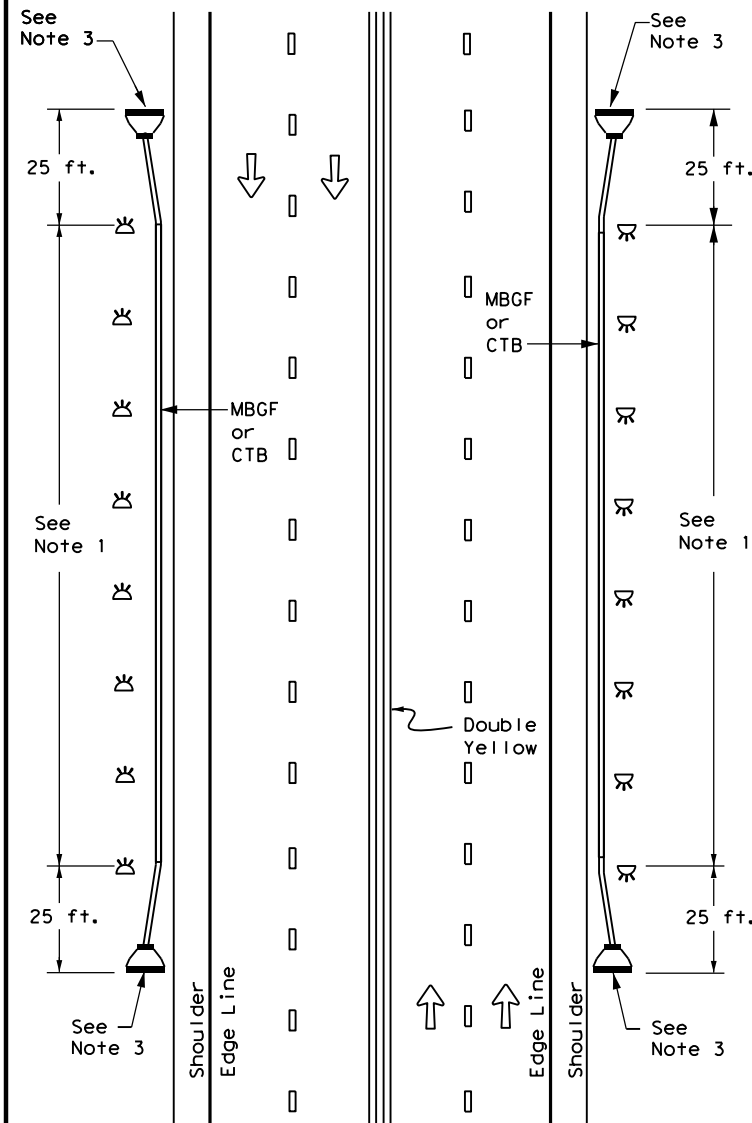
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DATE: DATE TIME  
FILE: DOCUMENT NAME

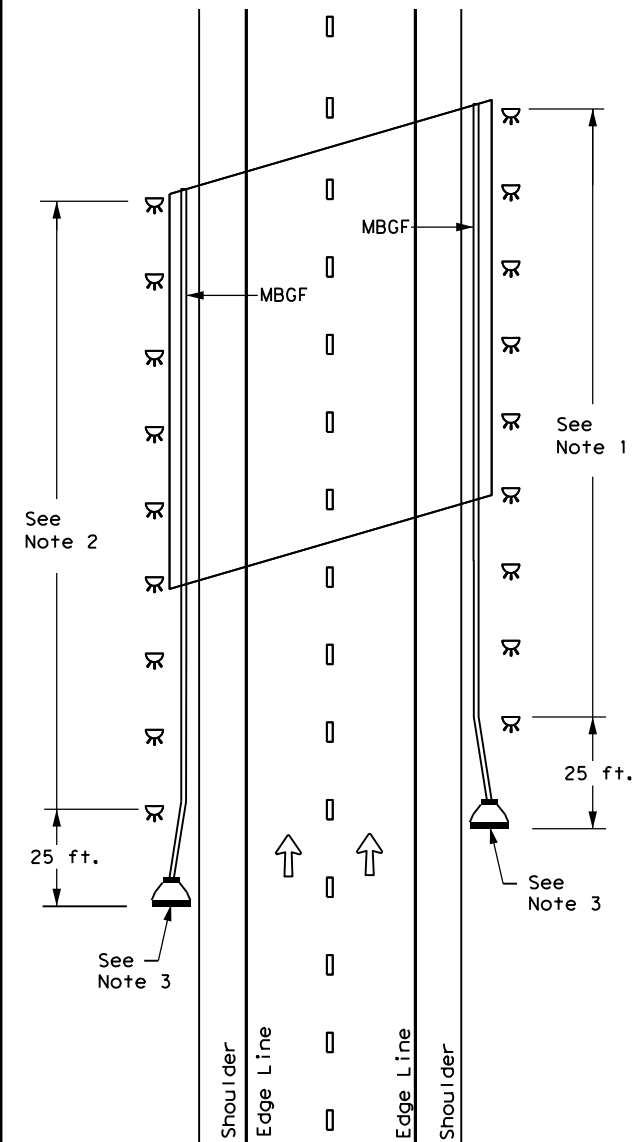
### CONTINUOUS CONCRETE OR STEEL BARRIER



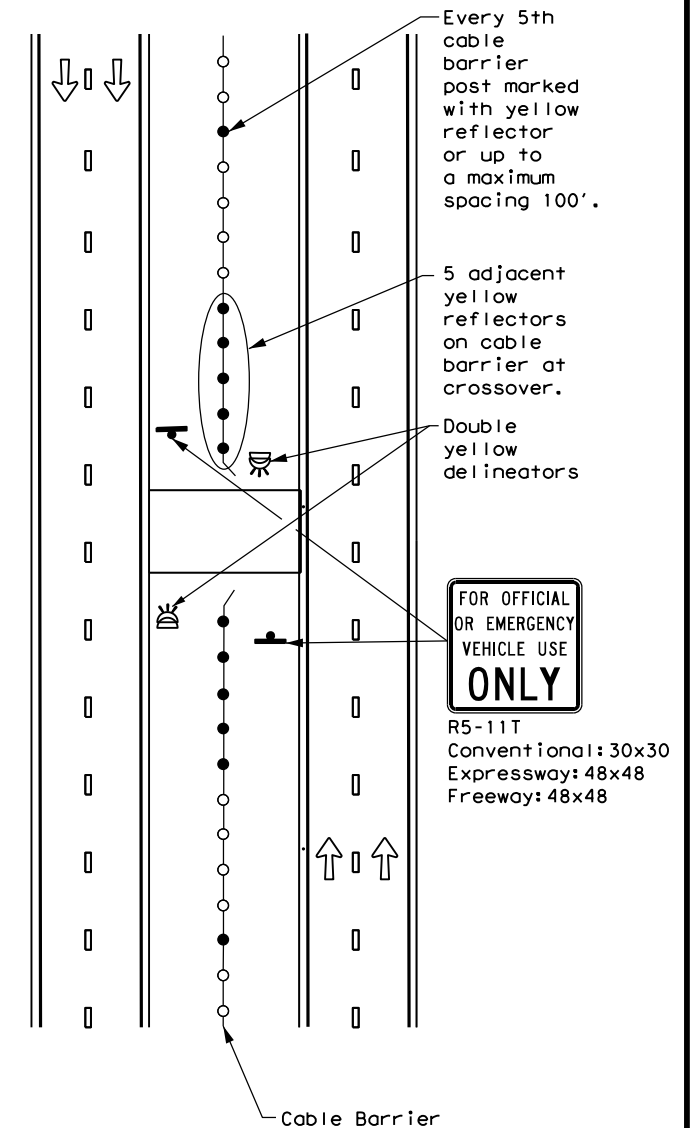
### MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



### 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 Continuous 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

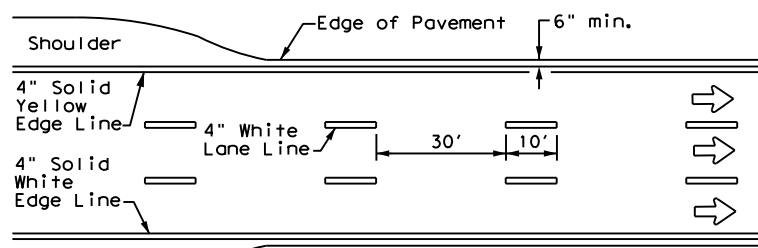
Texas Department of Transportation Traffic Safety Division Standard

## DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

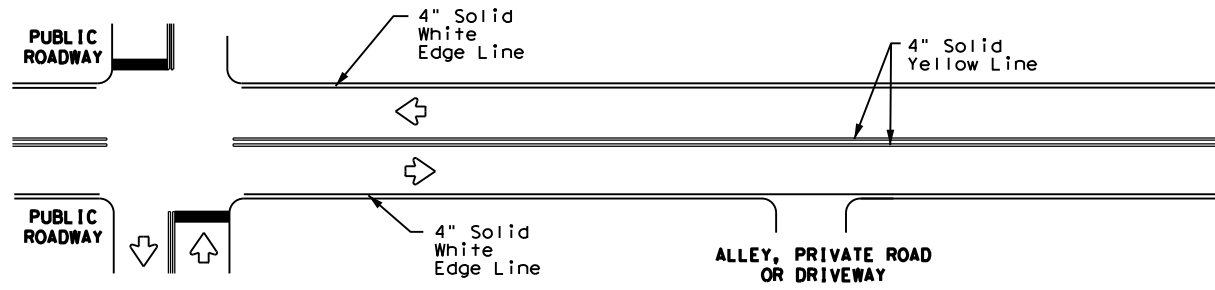
### D & OM(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177 07	118, etc.	IH 69	
7-20	DIST	COUNTY	SHEET NO.	
	HOU	Harris, etc.	90	

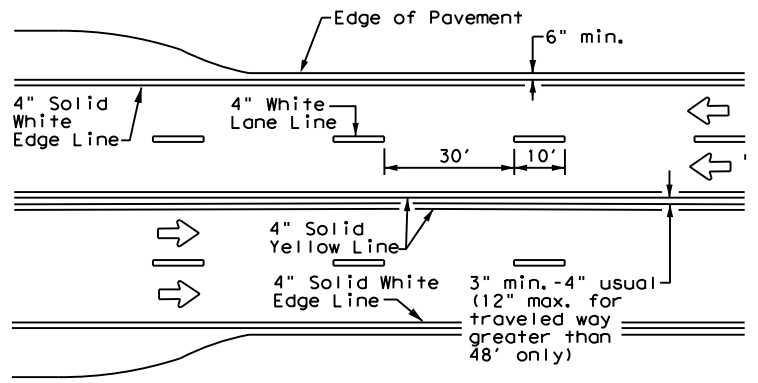
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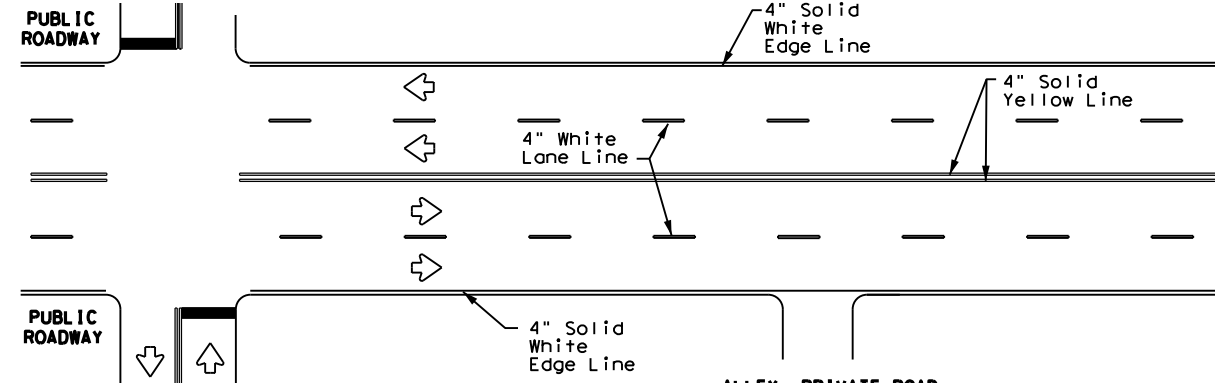
**EDGE LINE AND LANE LINES  
ONE-WAY ROADWAY  
WITH OR WITHOUT SHOULDERS**



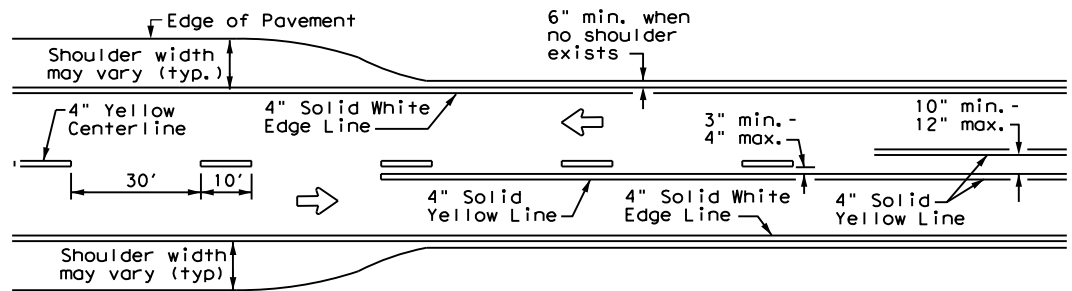
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT  
MARKINGS THROUGH INTERSECTIONS**



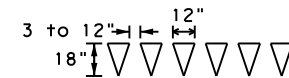
**CENTERLINE AND LANE LINES  
FOUR LANE TWO-WAY ROADWAY  
WITH OR WITHOUT SHOULDERS**



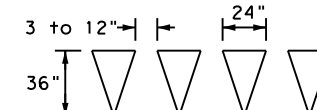
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT  
MARKINGS THROUGH INTERSECTIONS**



**TWO LANE TWO-WAY ROADWAY  
WITH OR WITHOUT SHOULDERS**

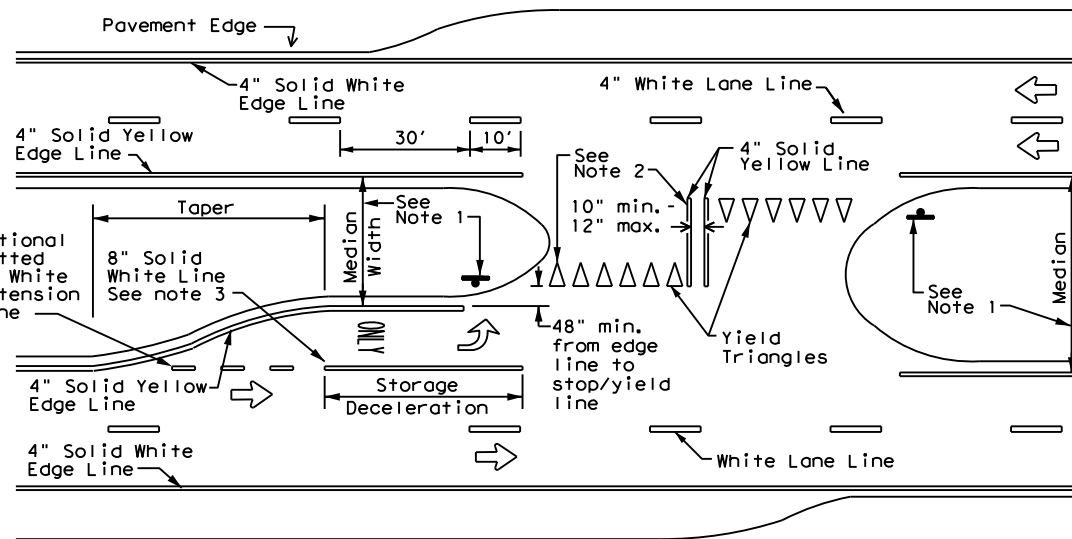


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

**YIELD LINES**



**FOUR LANE DIVIDED ROADWAY CROSSOVERS**

**NOTE:**

- Irrespective of shoulder, use 6 in width lines (edge lines).
- Use 4 in. width lines (edge and lane lines) when lane width is 10 ft. or less; and 6 in. width lines when lane width is greater than 10 ft.

**NOTES**

- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
- Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield triangles shall only be used with yield signs.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

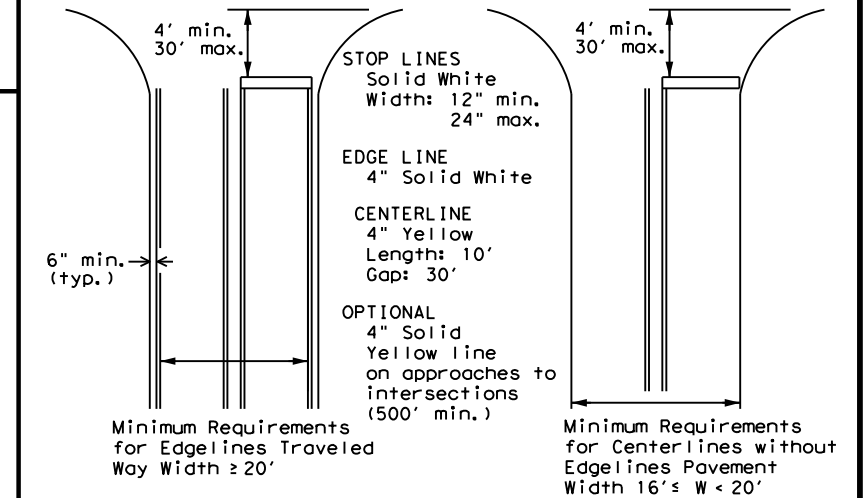
**GENERAL NOTES**

- Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
- The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

**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.



**GUIDE FOR PLACEMENT OF STOP LINES,  
EDGE LINE & CENTERLINE**

Based on Traveled Way and Pavement Widths for Undivided Highways



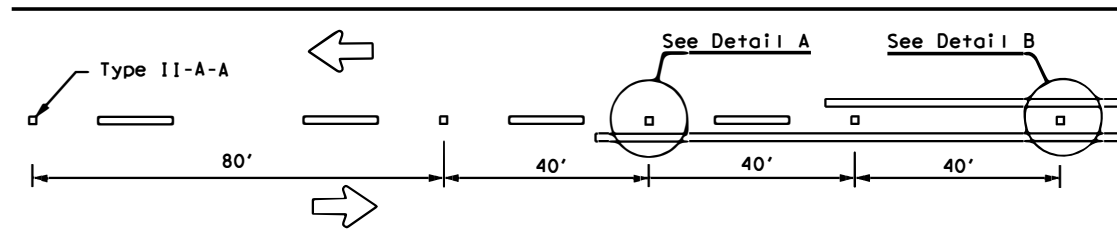
**TYPICAL STANDARD  
PAVEMENT MARKINGS**

PM-20

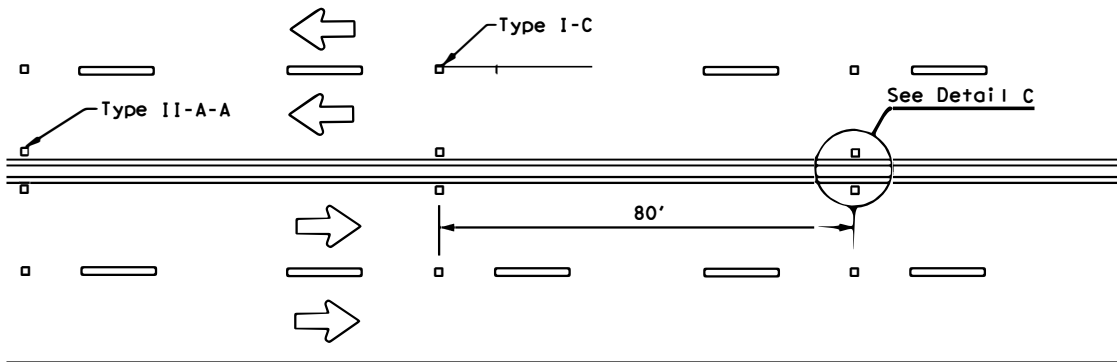
© TxDOT NOVEMBER 1978		DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS		CONT	SECT	JOB	HIGHWAY
8-95	2-12	0177	07	118, etc.	IH 69
5-00	8-16				
8-00	7-20				
3-03					
		DIST	COUNTY	SHEET NO.	
		HOU	Harris, etc.	91	

# REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

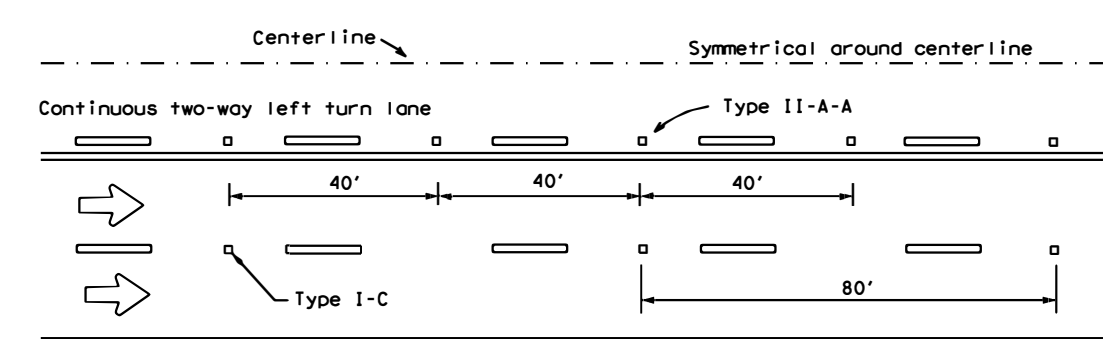
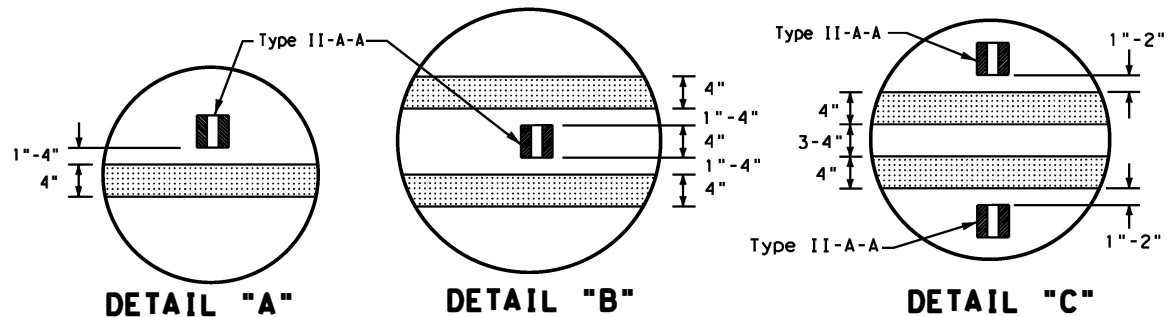
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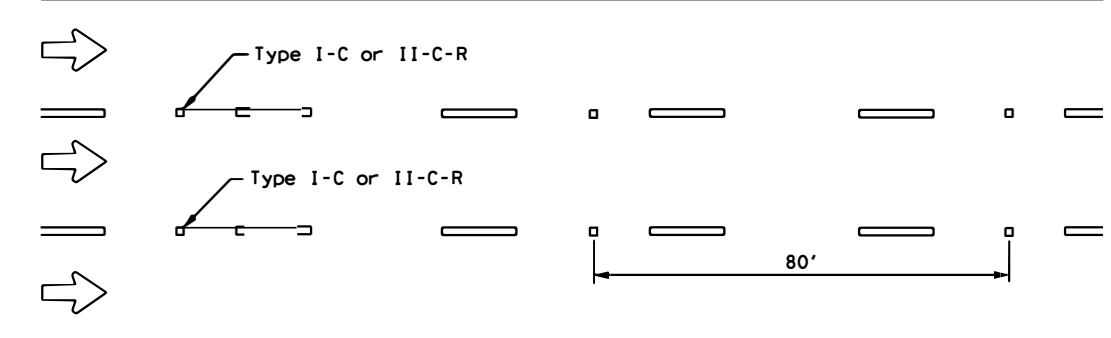
**CENTERLINE FOR ALL TWO LANE ROADWAYS**



**CENTERLINE & LANE LINES  
FOR FOUR LANE TWO-WAY HIGHWAYS**



**CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE**

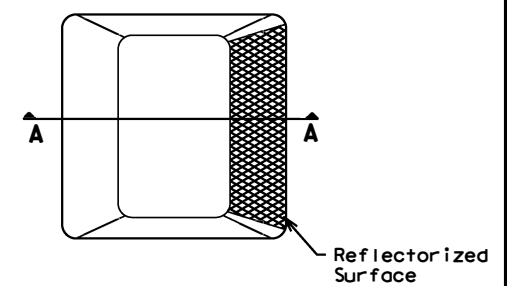


**LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)**

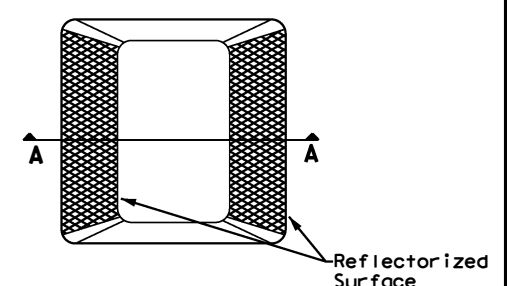
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

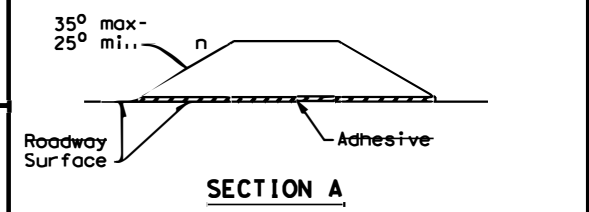
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



**Type I (Top View)**



**Type II (Top View)**



**RAISED PAVEMENT MARKERS**

**GENERAL NOTES**

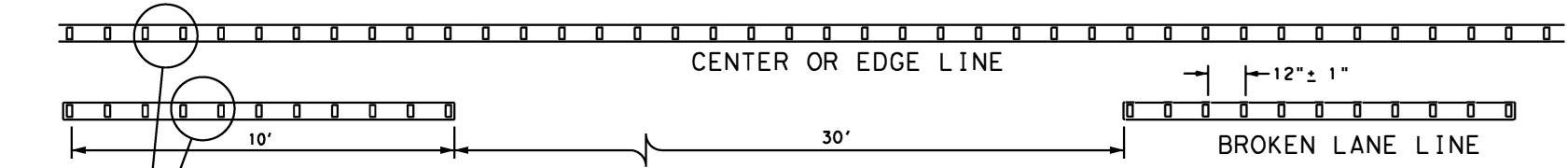
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.



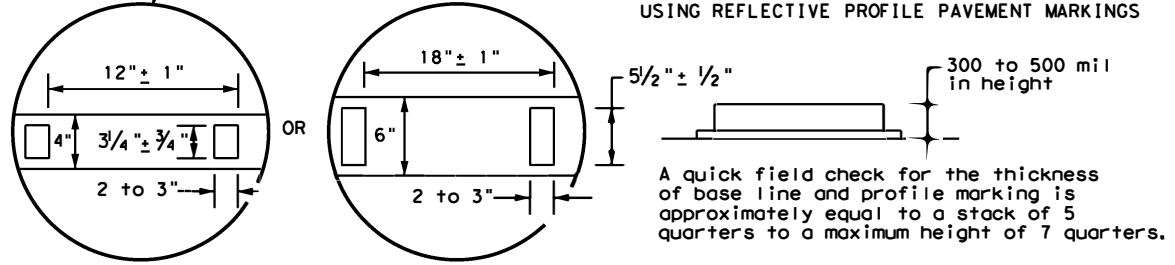
## POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2) - 20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
4-92 2-10 REVISIONS	0177 07	118, etc.	IH 69	
5-00 2-12	DIST	COUNTY	SHEET NO.	
8-00 6-20	HOU	Harris, etc.	92	

DATE: DATE TIME  
FILE: DOCUMENT NAME

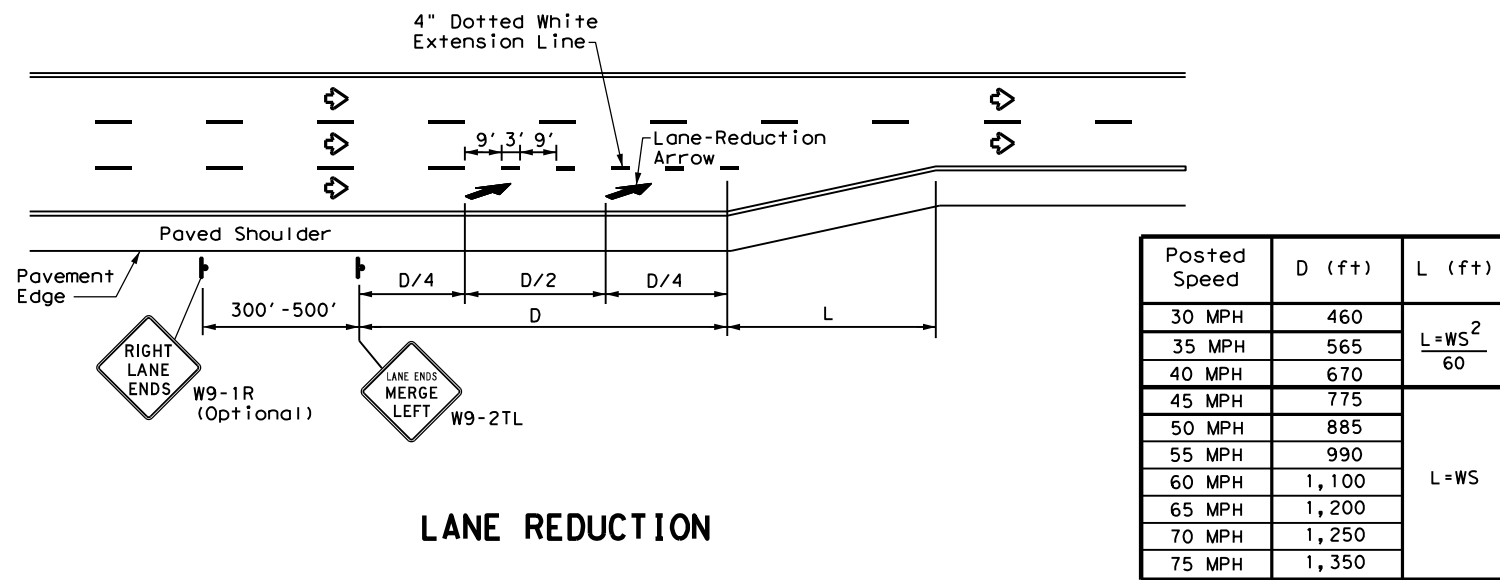


**REFLECTORIZED PROFILE  
PATTERN DETAIL  
USING REFLECTIVE PROFILE PAVEMENT MARKINGS**



**NOTE**  
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

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Posted Speed	D (ft)	L (ft)
30 MPH	460	$L = \frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	L = WS
45 MPH	775	
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

**NOTES**

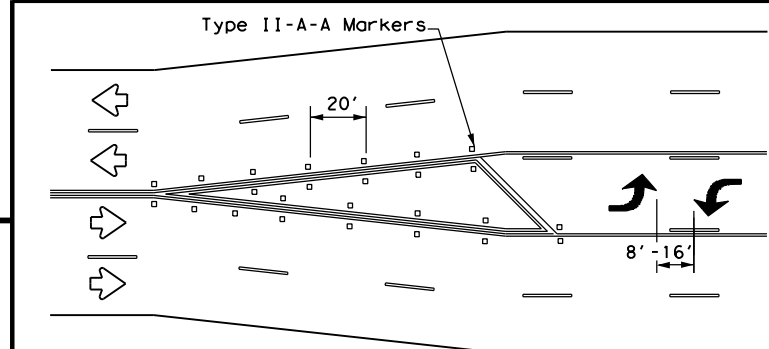
- Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
- On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
- Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
- For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

**GENERAL NOTES**

- Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
- When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
- Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

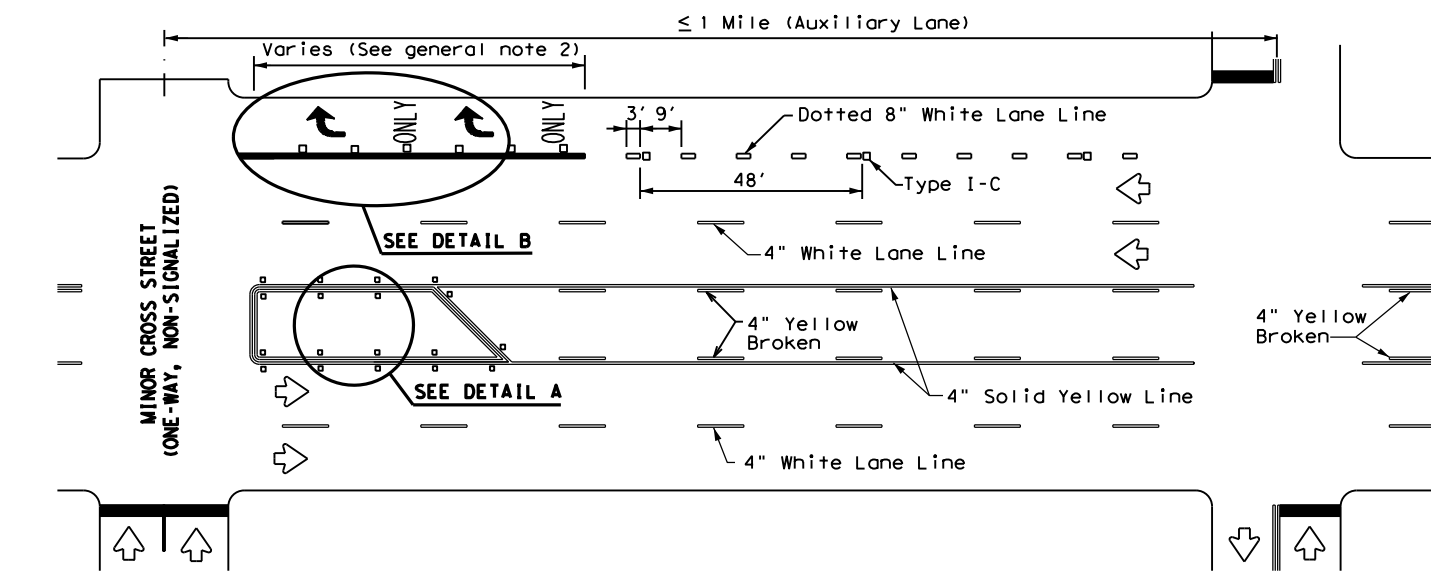
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

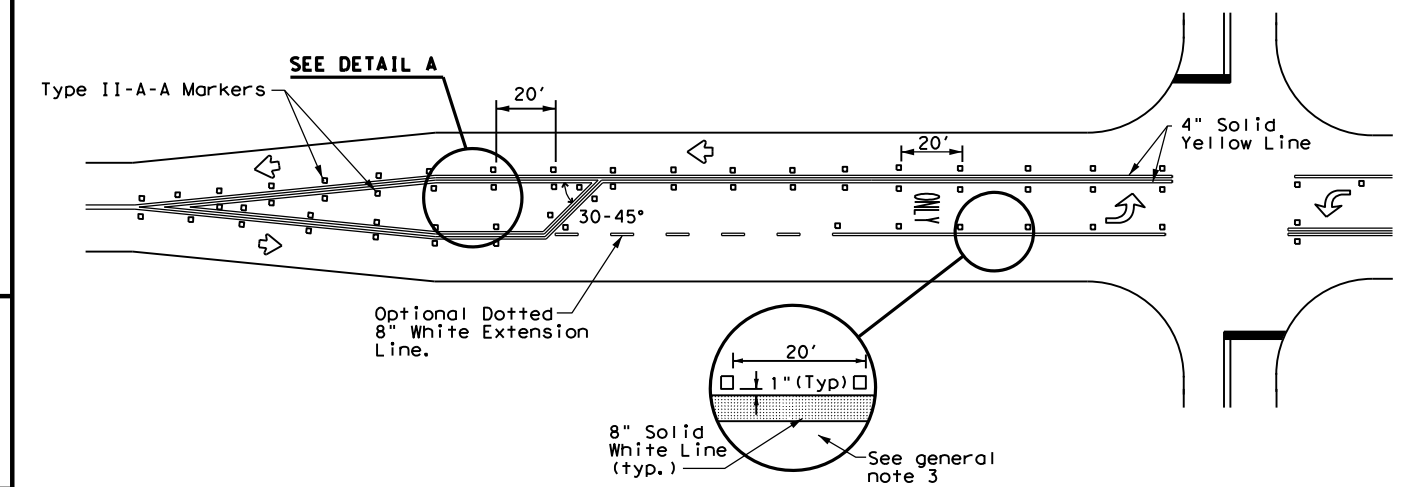


A two-way left-turn (TWLTL) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

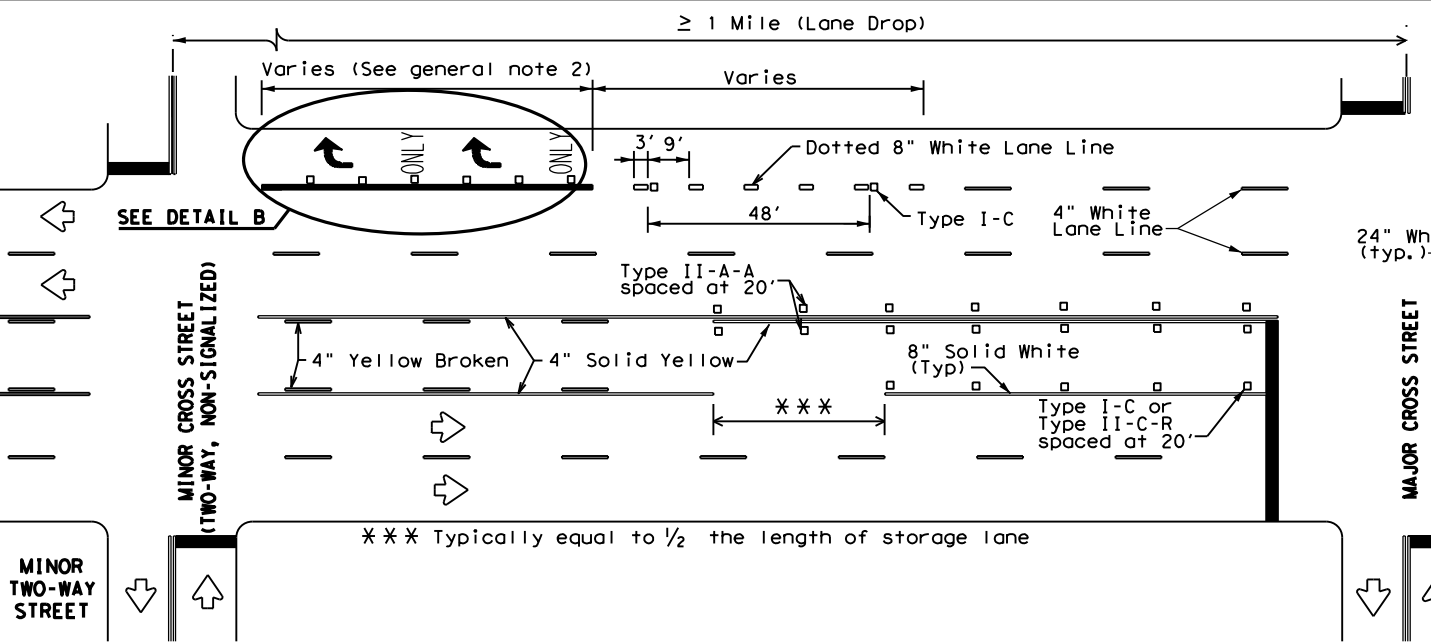
**TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY**



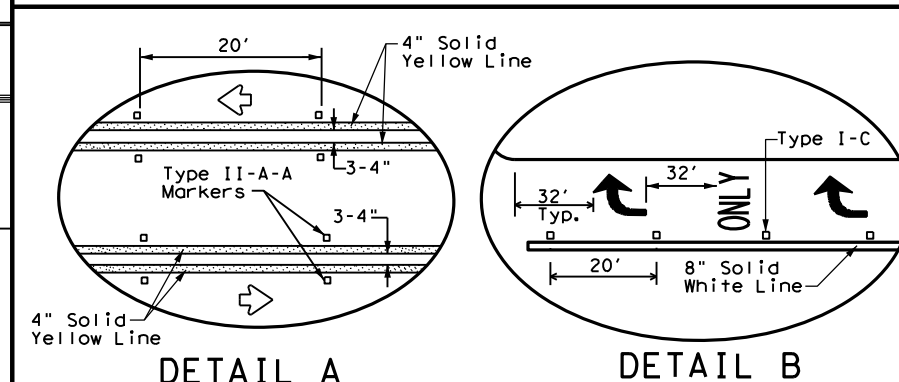
**TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE**



**TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS**



**TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP**



DETAIL A

DETAIL B

Texas Department of Transportation  
Traffic Safety Division Standard

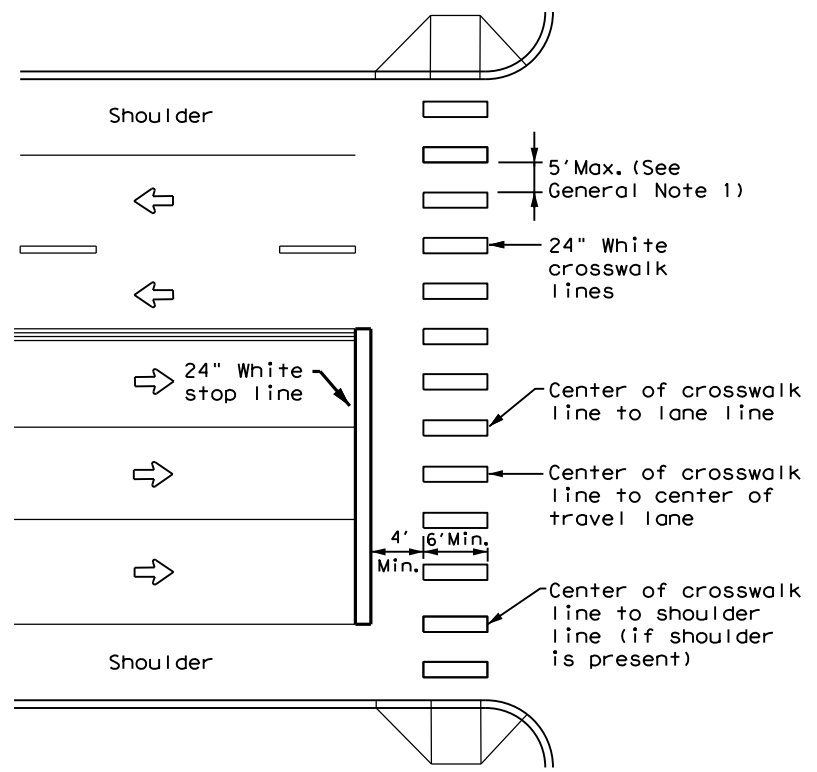
**TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3) - 20**

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
5-00 2-10	DIST	COUNTY	SHEET NO.	
8-00 2-12	DST	Harris, etc.	93	
3-03 6-20				

DATE: DATE TIME  
FILE: DOCUMENT NAME

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DATE: DATE TIME  
FILE: DOCUMENT NAME



**HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH**

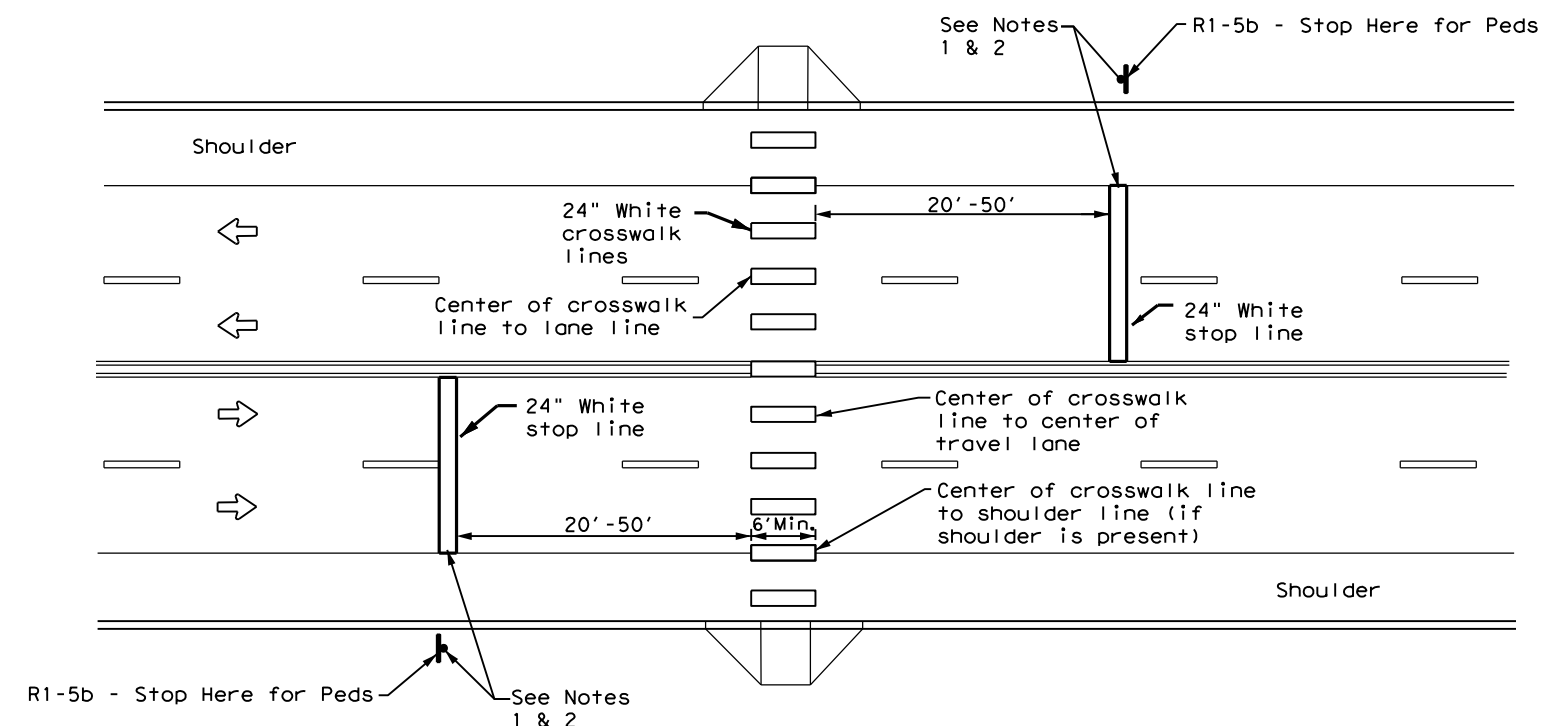
**GENERAL NOTES**

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

**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.



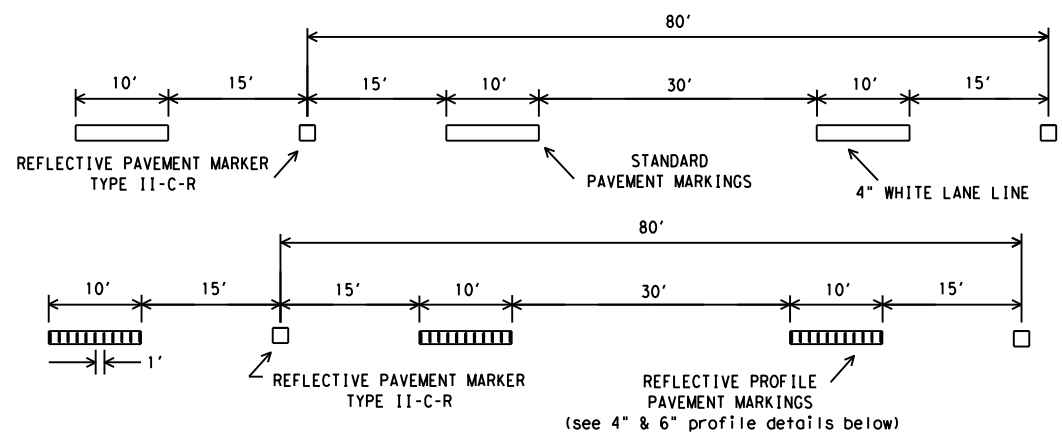
**UNSIGNALIZED MID BLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK**

**NOTES:**

1. Use stop bars with "Stop Here for Pedestrians" signs at unsignalized mid block crosswalks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

<p><b>CROSSWALK PAVEMENT MARKINGS</b></p> <p><b>PM(4) - 22</b></p>			
FILE: pm4-22.dgn	DN:	CK:	DW:
© TxDOT June 2020	CONT	SECT	JOB
3-22 REVISIONS	0177 07	118, etc.	IH 69
DIST	COUNTY	SHEET NO.	
HOU	Harris, etc.	94	

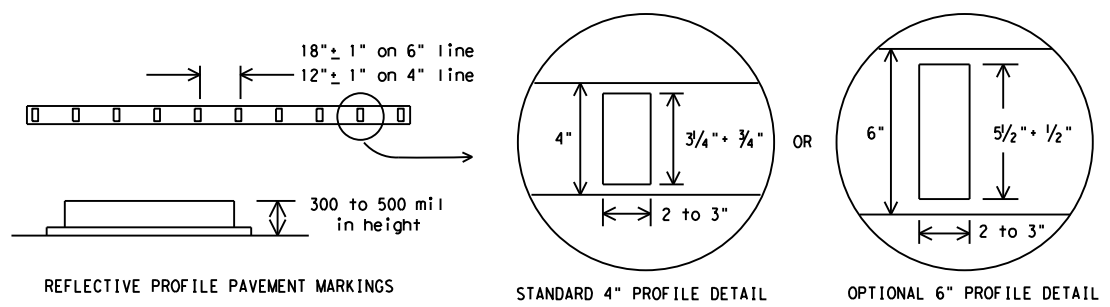
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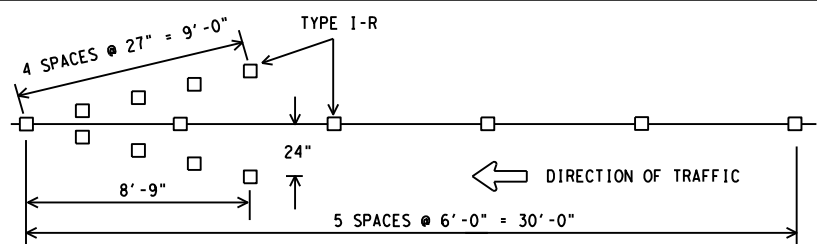
PAVEMENT MARKERS (REFL) TYPE II-C-R SHALL BE SPACED ON 80' CENTERS WITH THE CLEAR FACE TOWARD NORMAL TRAFFIC AND THE RED FACE TOWARD WRONG WAY TRAFFIC.

TRAFFIC LANE LINES PAVEMENT MARKING DETAILS

EDGE LINES 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.

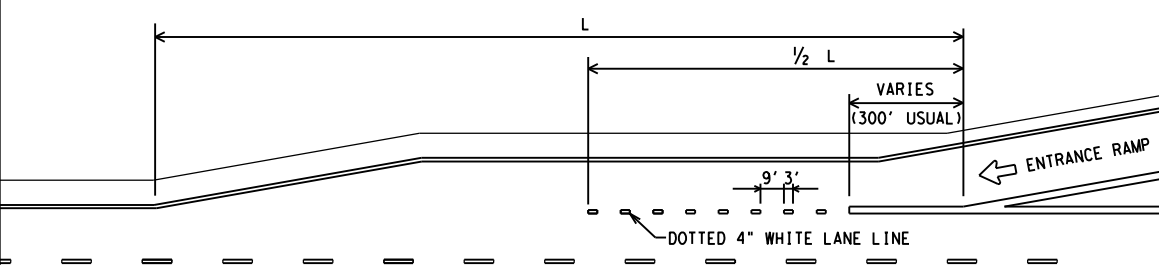


EDGE LINE PAVEMENT MARKINGS

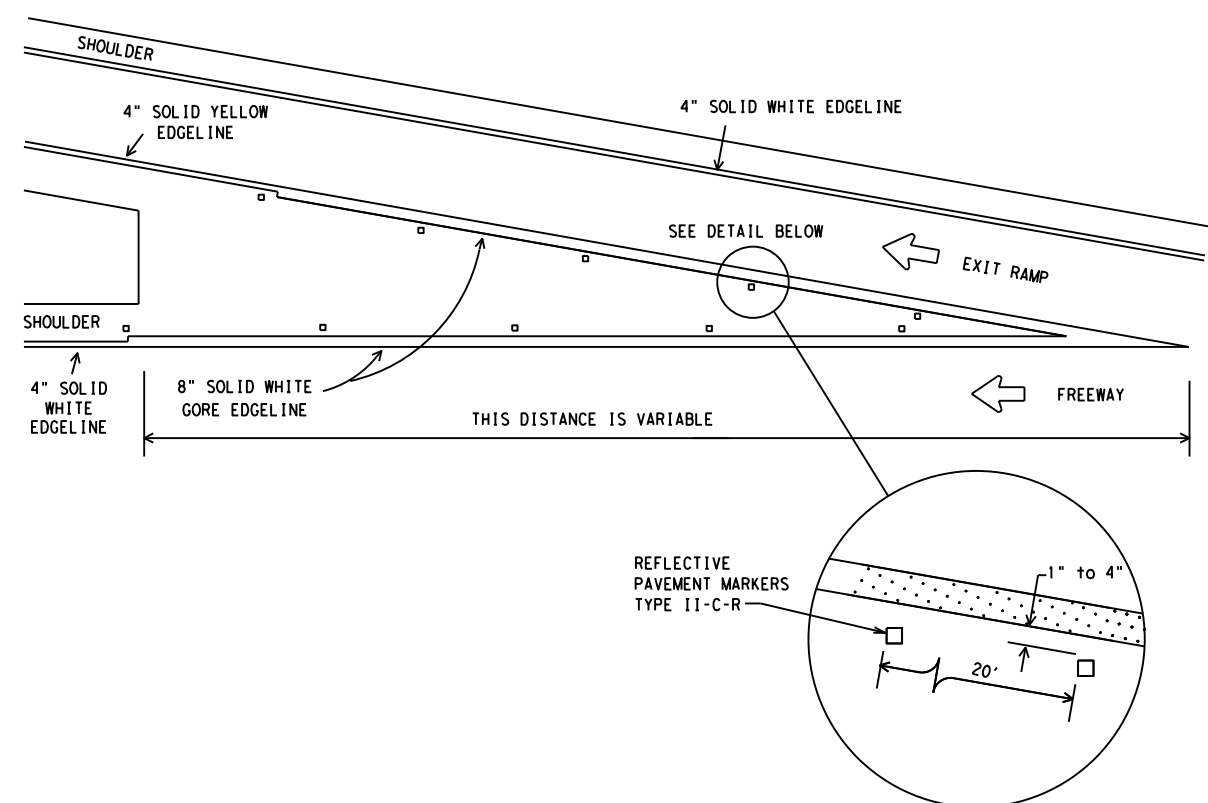


ALL RAISED MARKERS IN THE WRONG WAY ARROW SHALL BE TYPE I-R REFLECTORIZED PAVEMENT MARKERS WITH THE REFLECTORIZED SURFACE FACING THE WRONG WAY TRAFFIC. TYPE II-C-R SHALL NOT BE USED. REFLECTORIZED WRONG WAY ARROWS, NOT TO EXCEED TWO, MAY BE PLACED ON EXIT RAMP. LOCATION OF THE ARROWS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

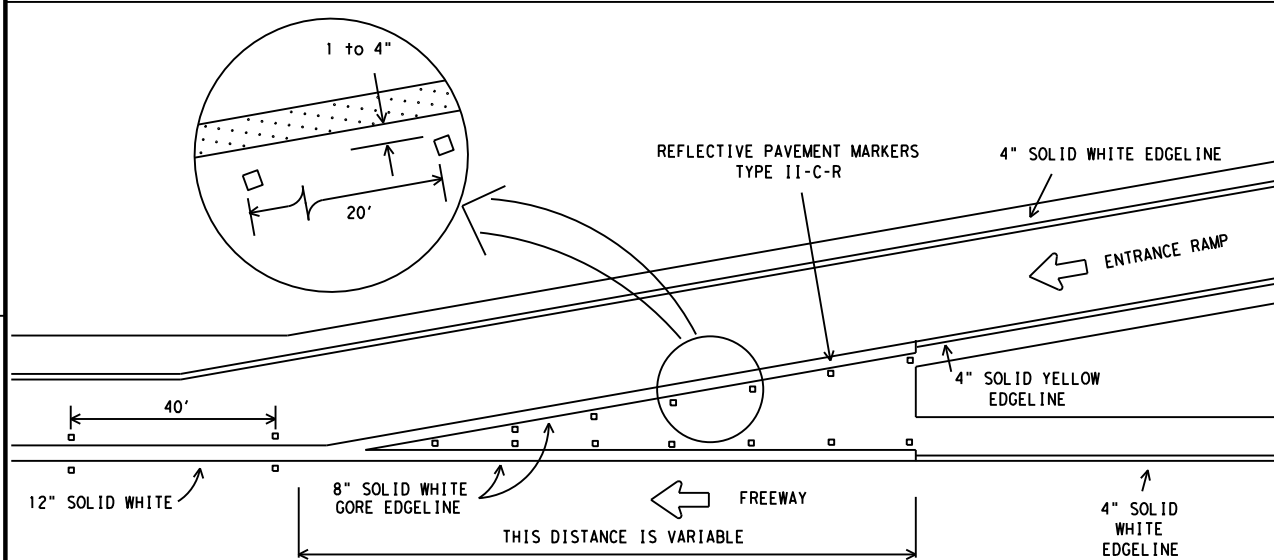
WRONG WAY ARROW DETAIL



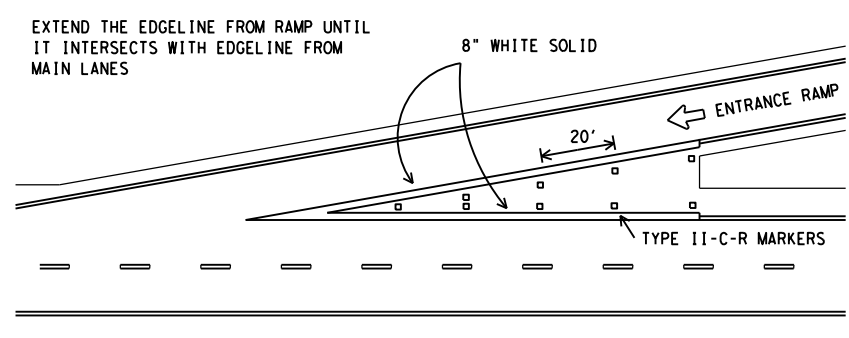
PARALLEL ACCELERATION LANE



TYPICAL EXIT RAMP GORE MARKING



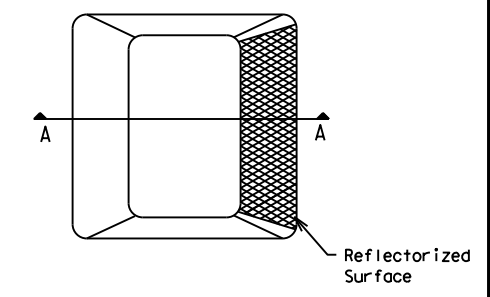
TYPICAL ENTRANCE RAMP GORE MARKING



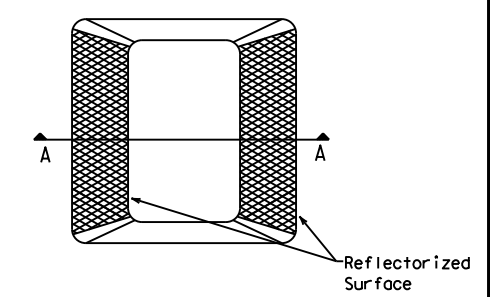
TAPERED ACCELERATION LANE

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

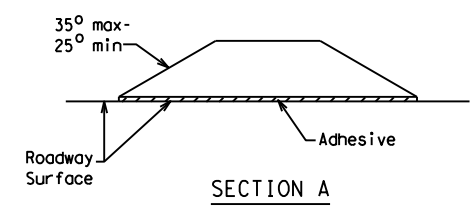
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation  
Traffic Operations Division

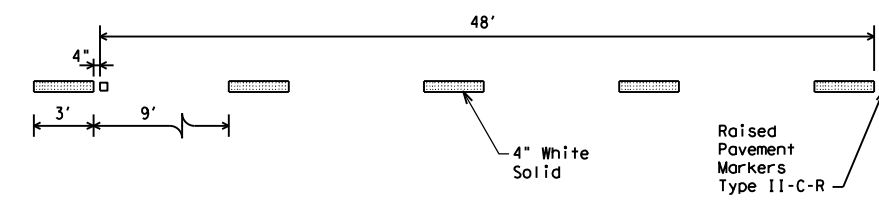
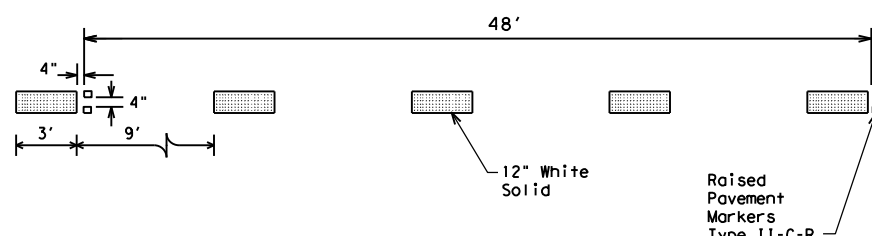
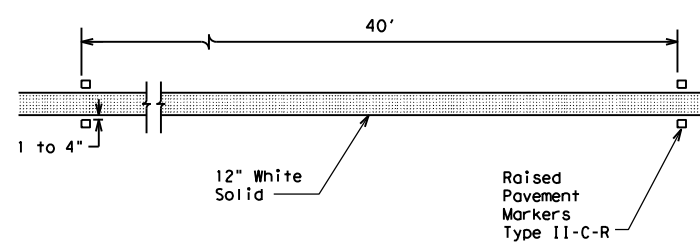
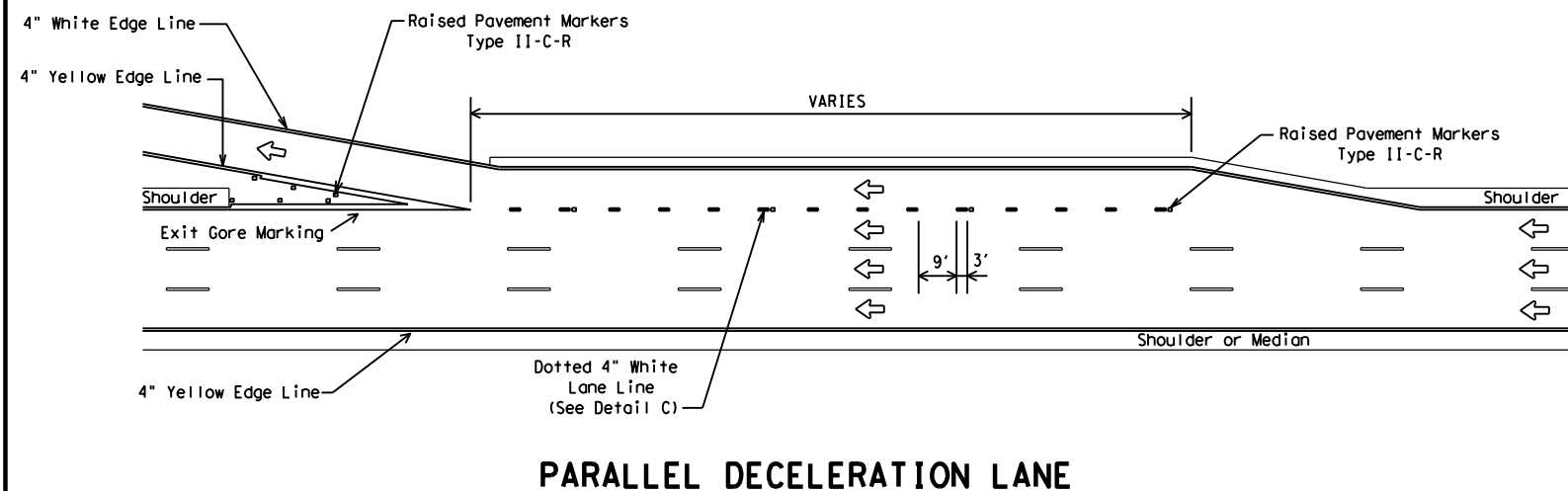
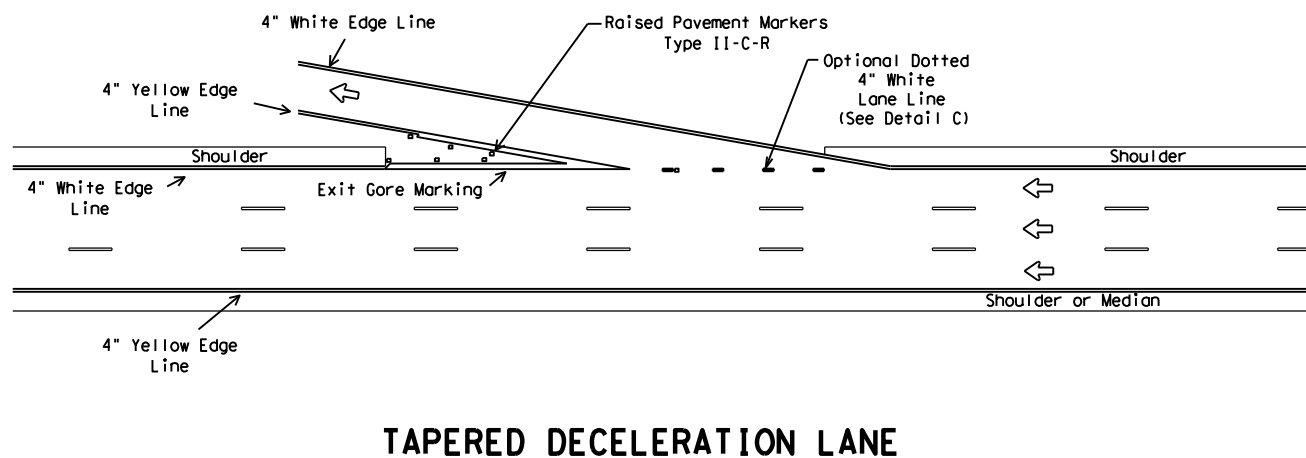
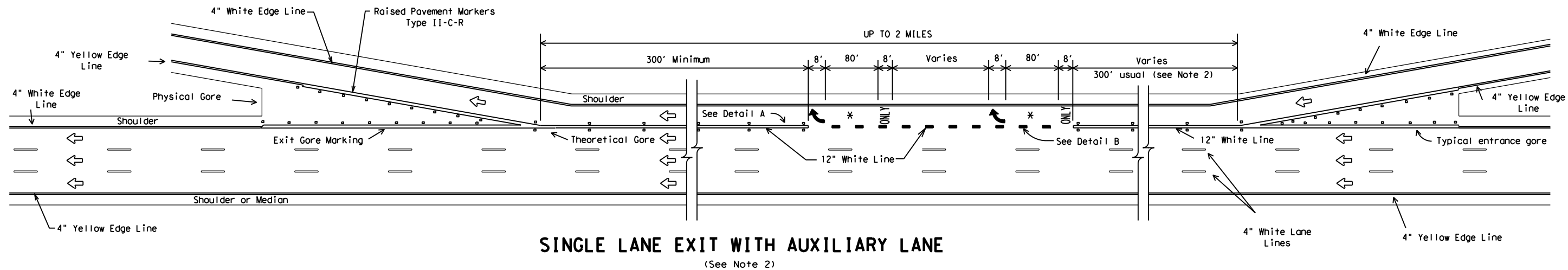
TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS  
FPM(1)-12

© TxDOT May 1974		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISONS		CONT	SECT	JOB	HIGHWAY
4-92	2-10	0177	07	118, etc.	IH 69
5-00	2-12	DIST		COUNTY	SHEET NO.
8-00		HOU		Harris, etc.	95
2-08					



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DATE: \$DATE\$  
 \$TIME\$  
 FILE: \$FILES\$



**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

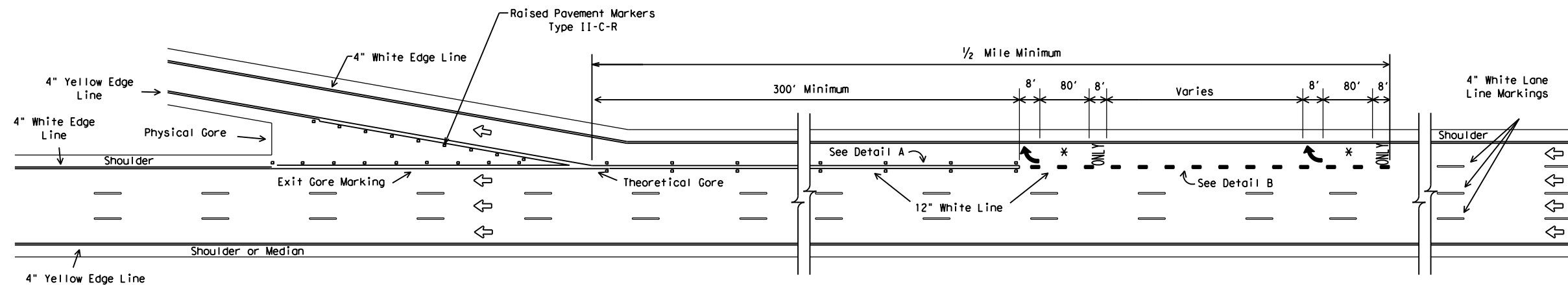
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



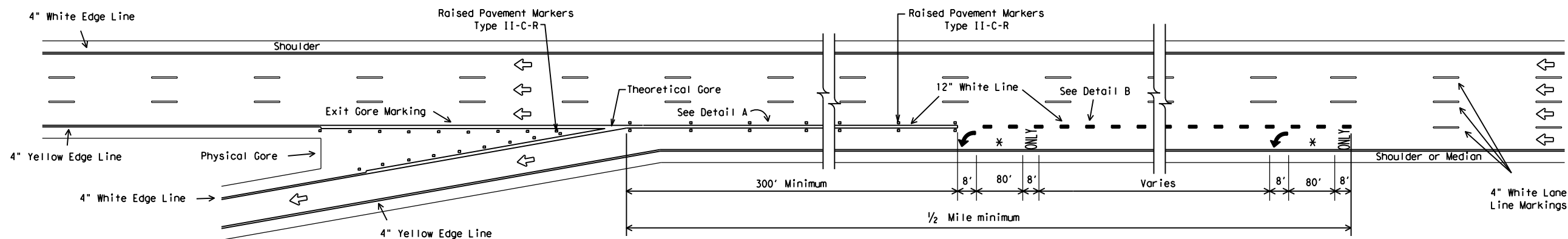
**TYPICAL STANDARD  
 FREEWAY PAVEMENT MARKINGS  
 ENTRANCE AND EXIT RAMP  
 FPM(2)-12**

© TxDOT February 1977		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS		CONT	SECT	JOB	HIGHWAY
4-92	2-10	0177	07	118, etc.	IH 69
8-95	2-12	DIST		COUNTY	SHEET NO.
5-00		HOU		Harris, etc.	96
8-00					

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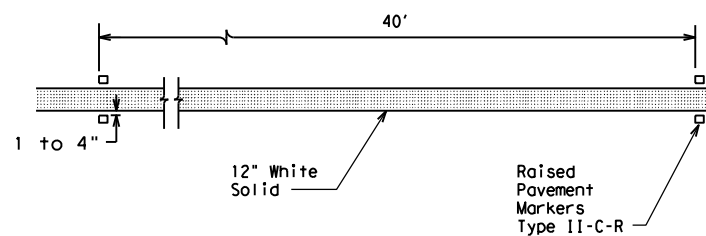


**SINGLE LANE EXIT - LANE DROP OR EXIT ONLY**

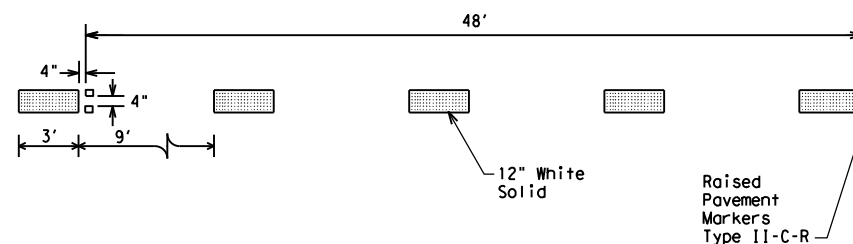


**SINGLE LANE EXIT - LANE DROP OR EXIT ONLY (LEFTHAND)**

LEGEND	
←	Denotes direction of traffic.
↩	Pavement marking arrows (white)
✱	Arrow markings are optional, however "ONLY" is required if arrow is used



**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.

**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.

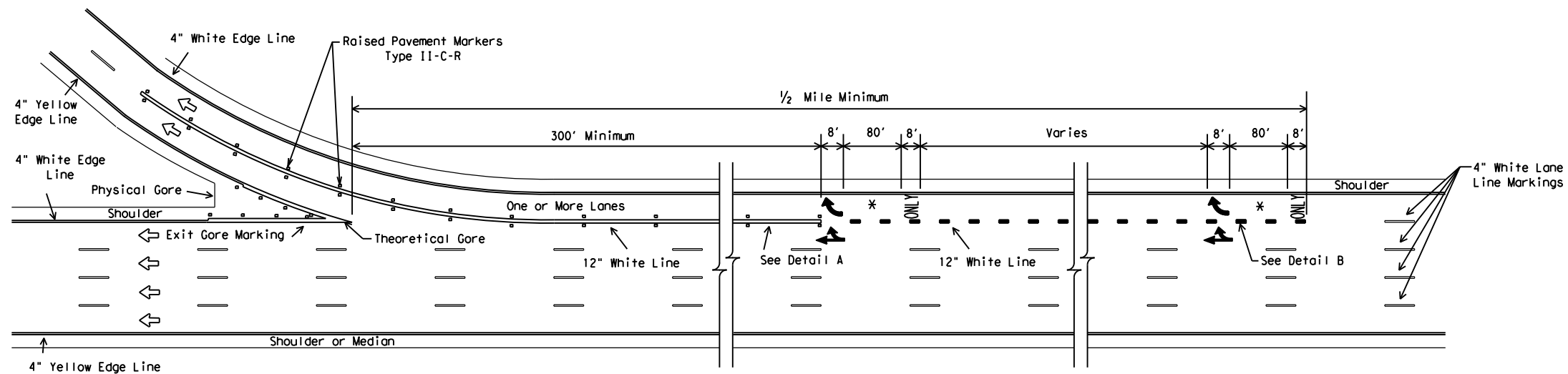
Texas Department of Transportation  
Traffic Operations Division

**TYPICAL STANDARD  
FREEWAY PAVEMENT MARKINGS  
LANE DROP (EXIT ONLY) EXIT RAMPS  
FPM(3) - 12**

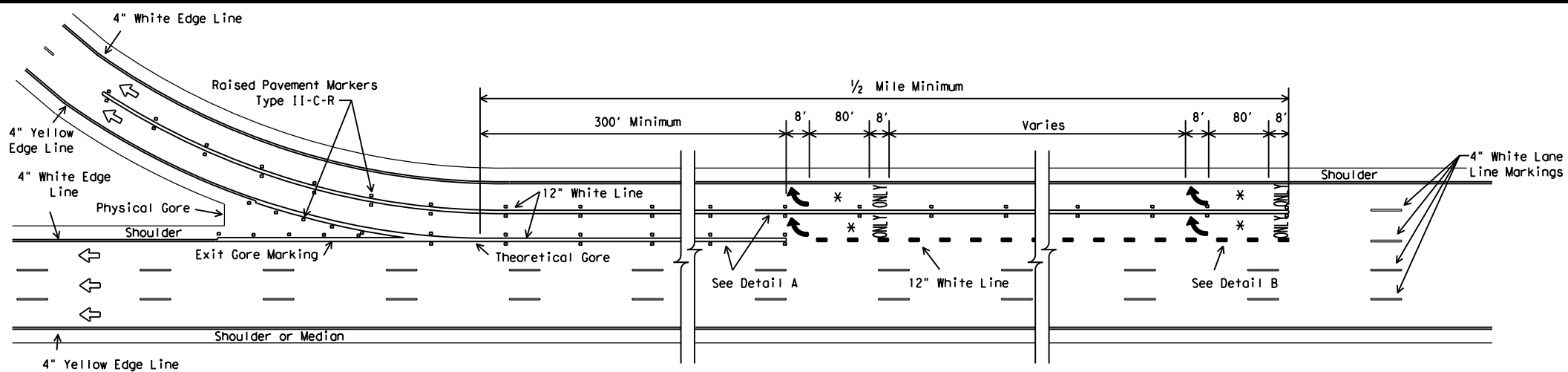
REVISIONS		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
NO.	DATE	CONTRACT	SECTION	JOB	HIGHWAY
5-00		0177	07	118, etc.	IH 69
8-00					
2-10					
2-12					
		HOU		Harris, etc.	97

DATE: \$DATES \$TIME\$  
 FILE: \$FILES\$

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**MULTIPLE LANE EXIT - EXIT ONLY WITH OPTION LANE**

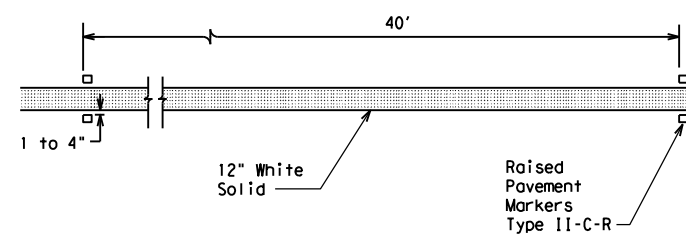


**MULTIPLE LANE EXIT ONLY**

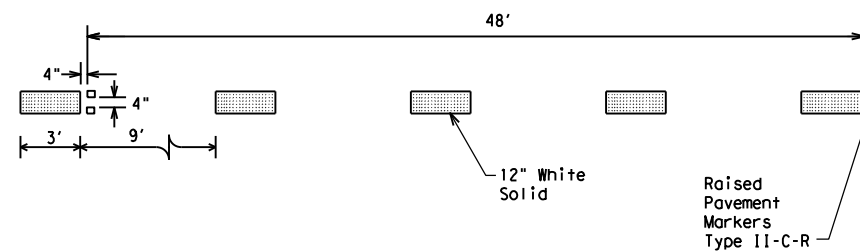
LEGEND	
	Denotes direction of traffic
	Pavement marking arrow (white)
	Optional Pavement Marking Arrows (white)
	Arrow markings are optional, however "ONLY" is required if arrow is used

**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**

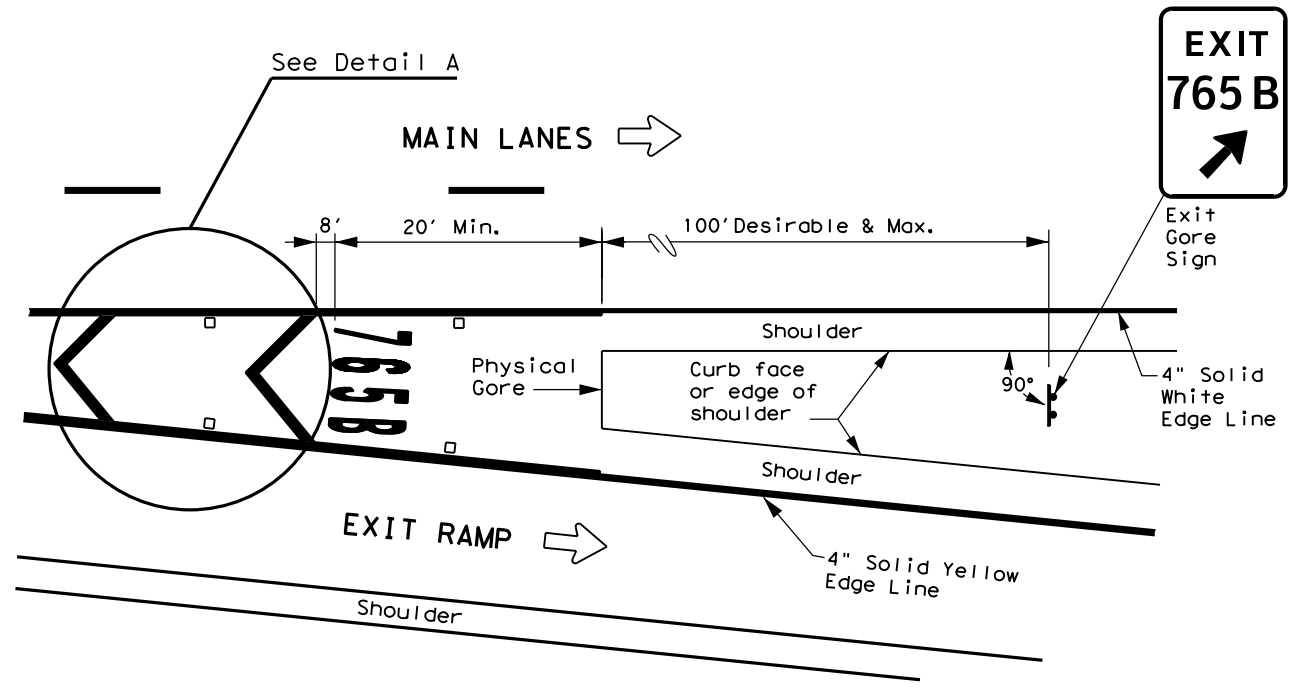
© TxDOT April 1992	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
5-00	0177	07	118, etc.	IH 69
8-00				
2-10	DIST		COUNTY	SHEET NO.
2-12	HOU		Harris, etc.	98

DATE: \$DATE\$ \$TIME\$  
FILE: \$FILES\$

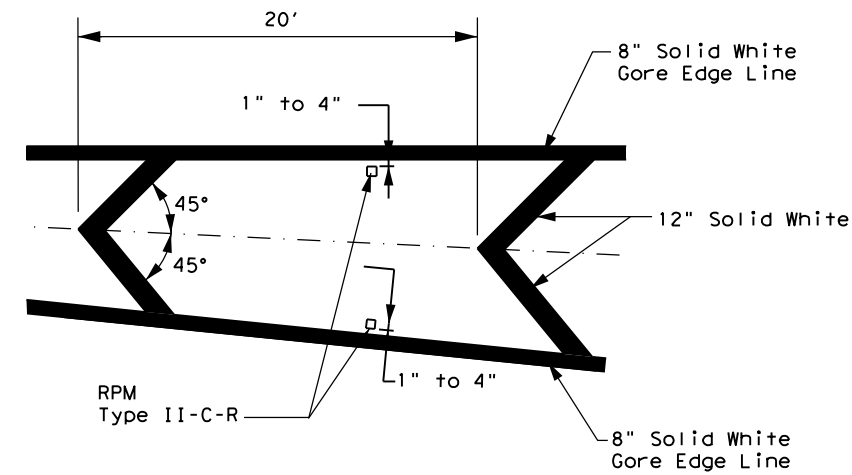
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**EXIT NUMBER PAVEMENT MARKING NOTES**

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**

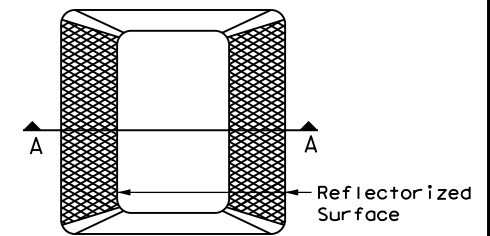
1. Raised pavement markers shall be centered between chevron or gore lines.
2. For more information, see ReflectORIZED Raised Pavement Marker Detail.

**DETAIL A**

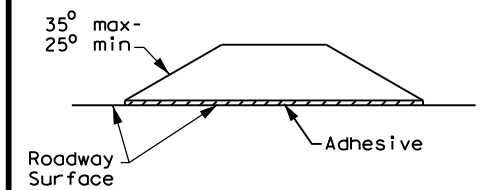
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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**

**REFLECTORIZED RAISED PAVEMENT MARKER (RPM)**



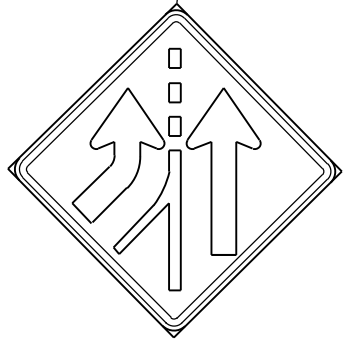
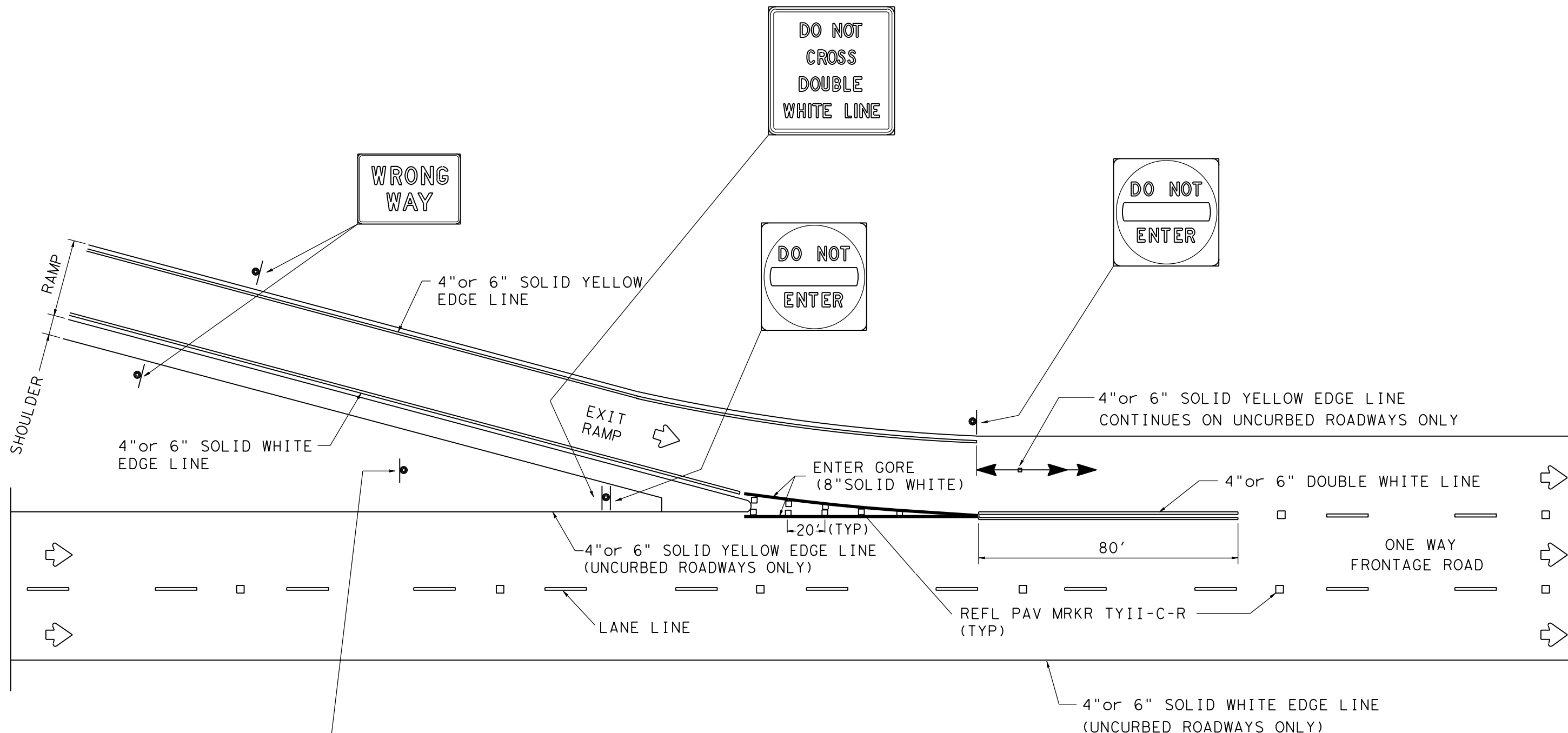
**EXIT GORE PAVEMENT MARKINGS**

**FPM(5) - 19**

FILE: fpm(5)-19.dgn	DN:	CK:	DW:	CK:
© TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0177	07	118, etc.	IH 69
DIST	COUNTY		SHEET NO.	
HOU	Harris, etc.		99	

**MARKINGS WITHOUT EXIT NUMBER**

DATE: DATE TIME  
FILE: DOCUMENT NAME



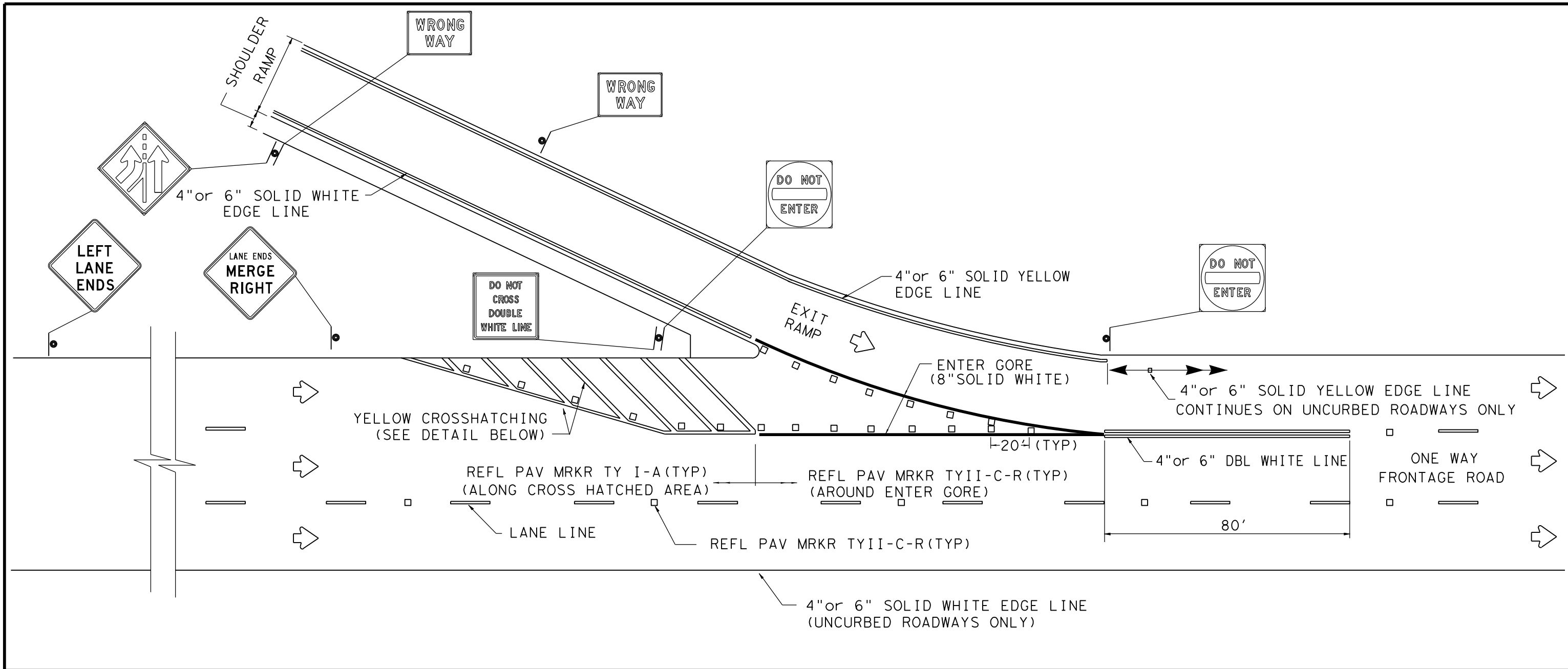
DRAWING SCALE: NONE

Texas Department of Transportation  
Houston District

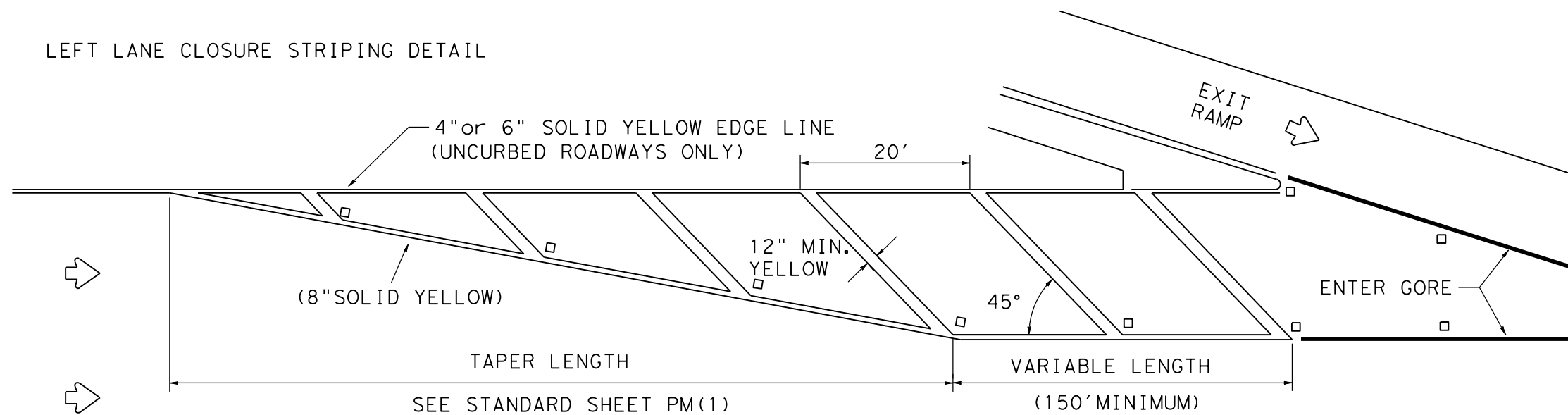
SIGNING AND PAVEMENT  
MARKING DETAILS  
EXIT RAMPS-FRONTAGE ROAD

ER-FR(1)-09

FILE:	DN:	CK:	DW:	CK:
© TxDOT 1998	DIST	FED REG	COUNTY	SHEET
REVISIONS FEB., 2008 DEC., 2009	HOU	6	Harris, etc.	100
	CONTROL	SECT	JOB	HIGHWAY
	0177	07	118, etc.	IH 69



LEFT LANE CLOSURE STRIPING DETAIL



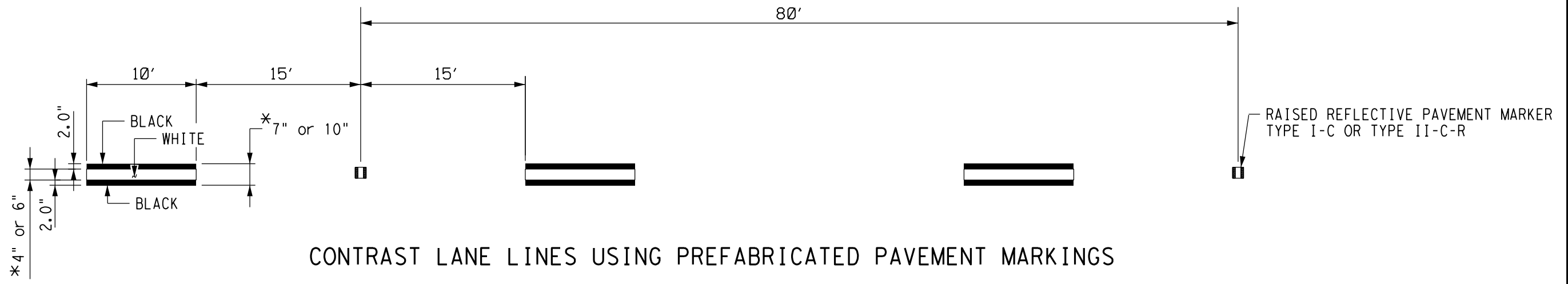
DRAWING SCALE: NONE



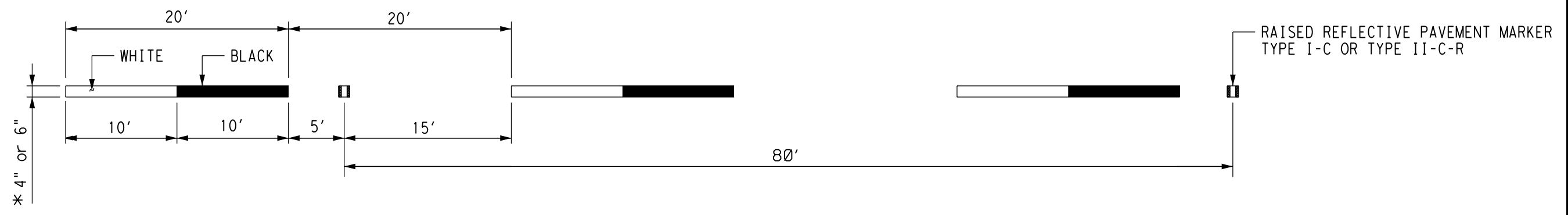
**SIGNING AND PAVEMENT MARKING DETAILS  
EXIT RAMPS-FRONTAGE ROAD**

**ER-FR(2)-09**

FILE:	DN:	CK:	DW:	CK:
© TxDOT 1998	DIST	FED REG	COUNTY	SHEET
REVISIONS FEB., 2008 DEC., 2009	HOU	6	Harris, etc.	101
	CONTROL	SECT	JOB	HIGHWAY
	0177	07	118, etc.	IH 69



➔ DIRECTION OF TRAFFIC

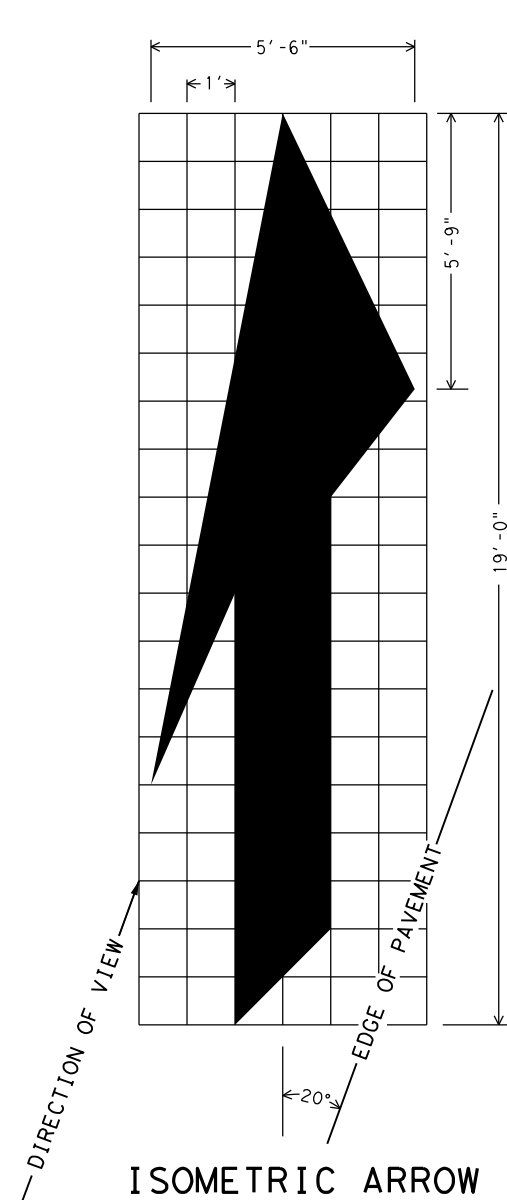
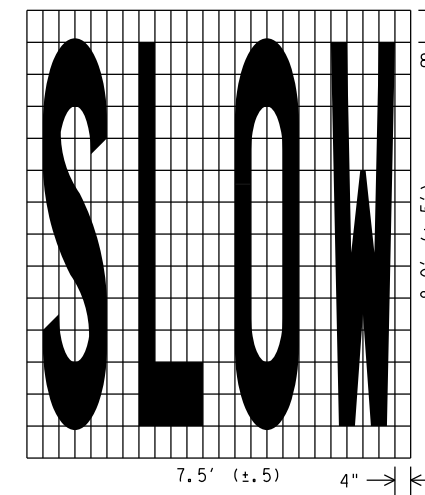
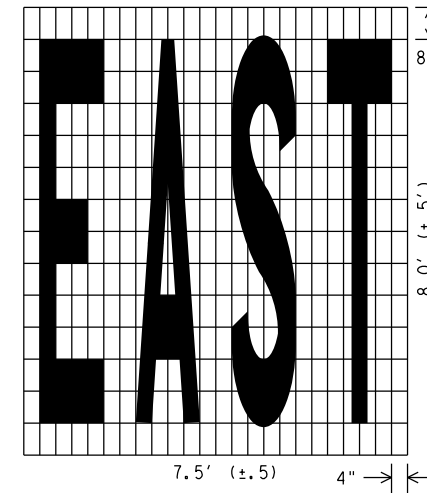
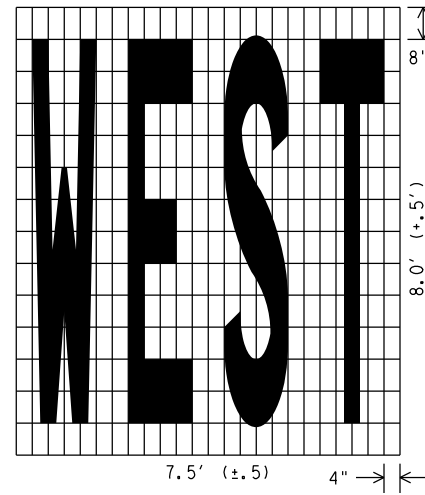
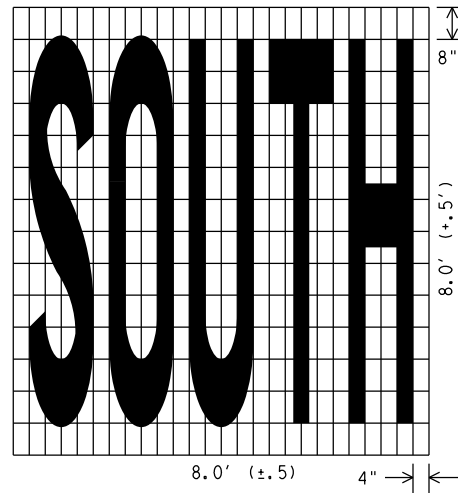
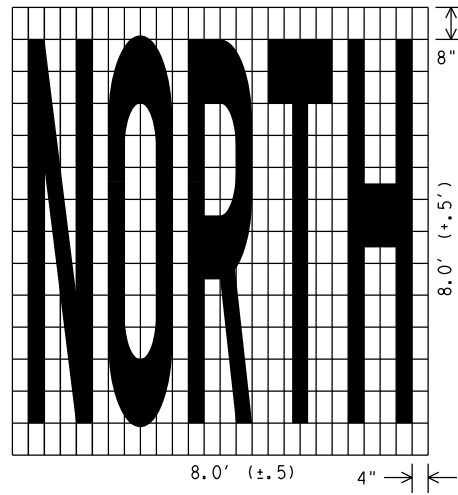


\* AS SHOWN ON THE PLANS.

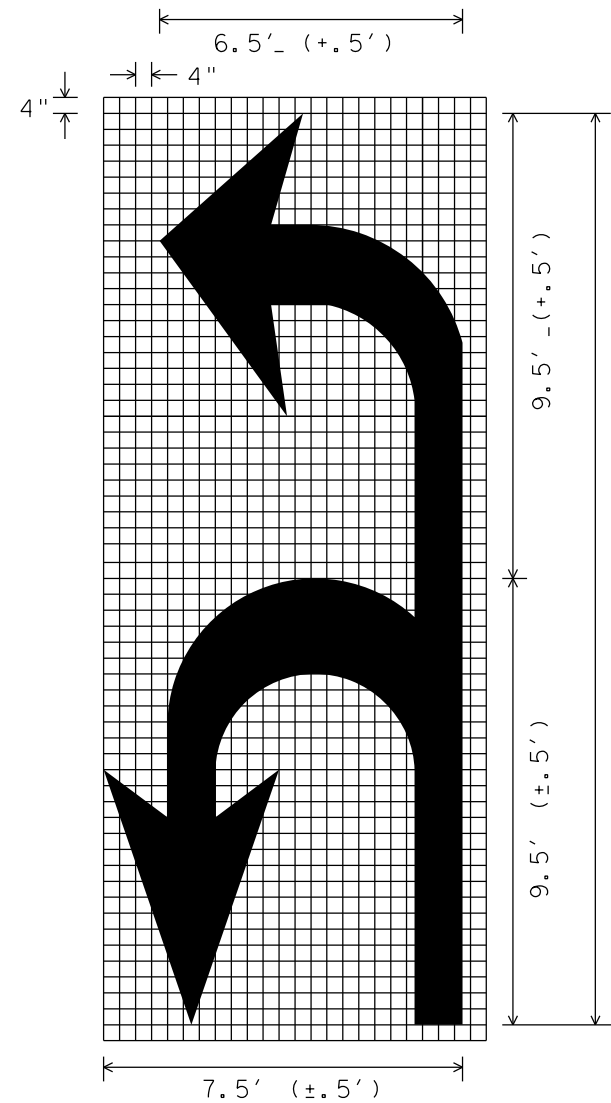
PAVEMENT MARKINGS  
(CONTRAST LANE LINES)

PM (CLL) - 14

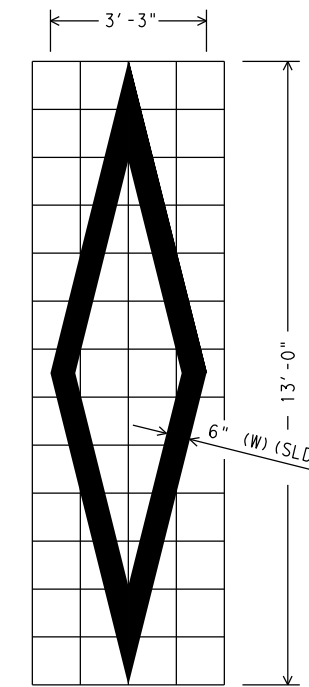
FILE:	DN:	CK:	DW:	CK:
© TxDOT 2003	DIST	FED REG	COUNTY	SHEET
REVISIONS	HOU	6	Harris, etc.	102
01-19-08	CONTROL	SECT	JOB	HIGHWAY
10-2019 '9" to 10"	0177	07	118, etc.	IH 69



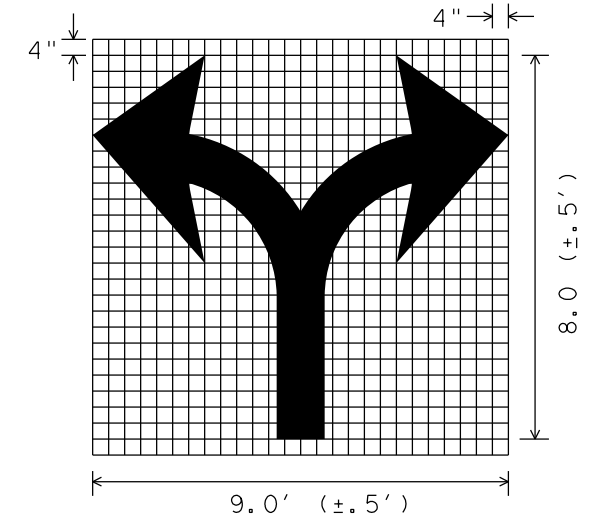
**ISOMETRIC ARROW**  
 12 INCH GRID  
 AREA = 42 SQ. FT.  
 RIGHT LANE DROP ARROW  
 (FOR LEFT LANE, USE MIRROR IMAGE)



**U-L ARROW**



**DIAMOND SYMBOL**



SCALE 1/4" = 1'

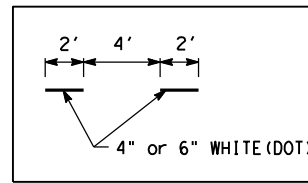
**Texas Department of Transportation**  
 Houston District

**PAVEMENT MARKINGS  
 (WORDS, ARROWS & SYMBOLS)**

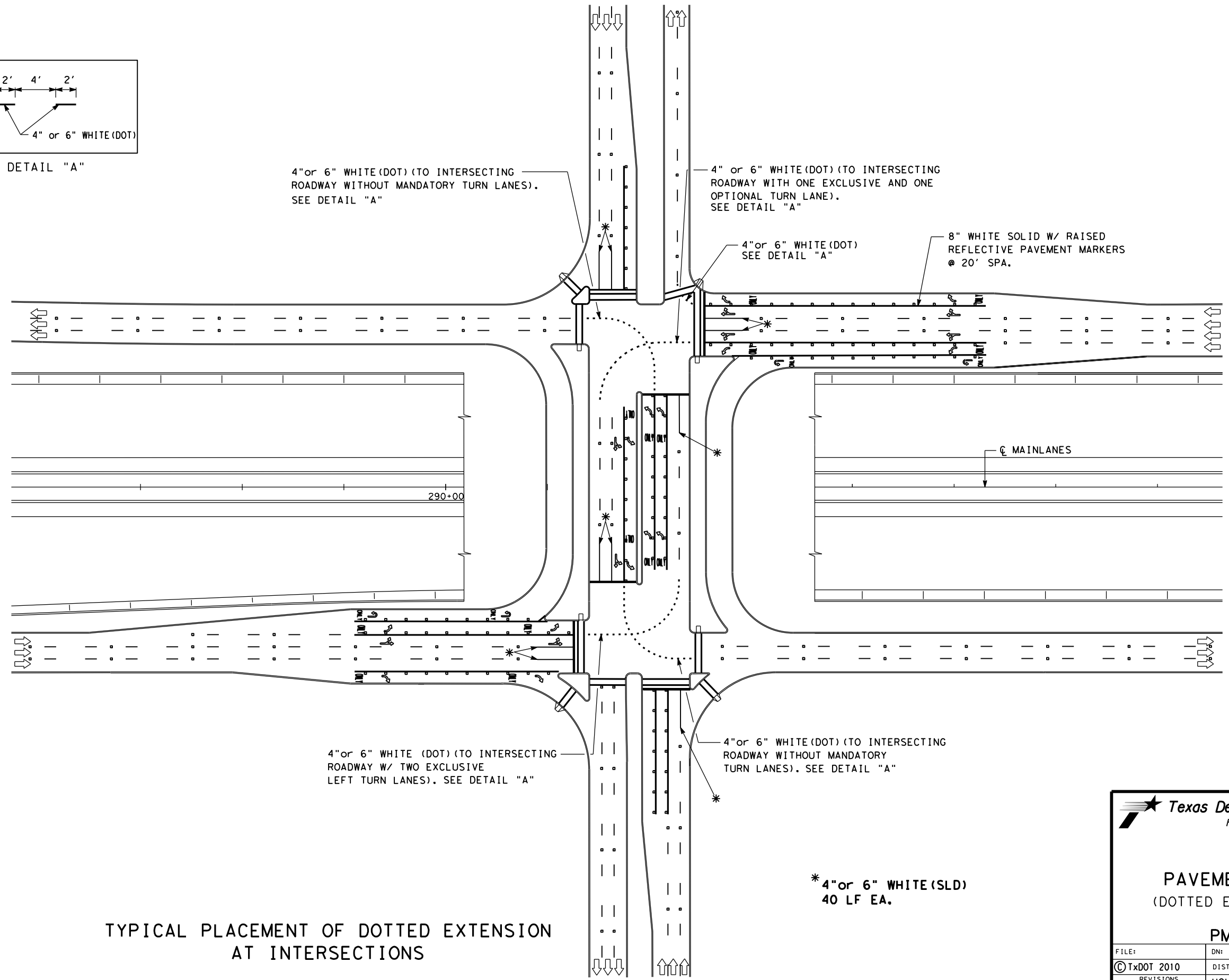
**PM(WAS) -07**

FILE:	DN:	CK:	DW:	CK:
©TxDOT 2007	DIST	FED REG	COUNTY	SHEET
REVISIONS 03-19-07	HOU	6	Harris, etc.	103
	CONTROL	SECT	JOB	HIGHWAY
	0177	07	118, etc.	IH 69





DETAIL "A"



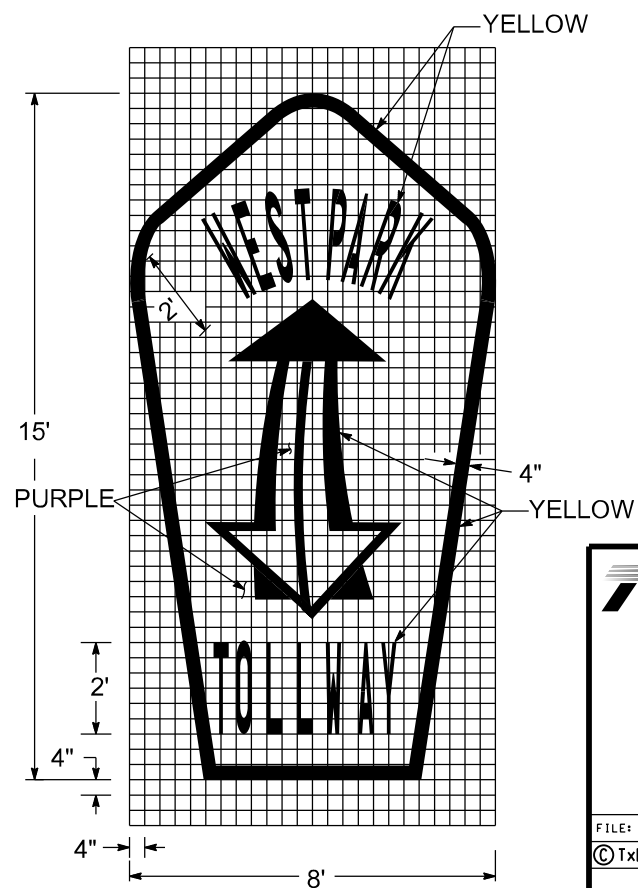
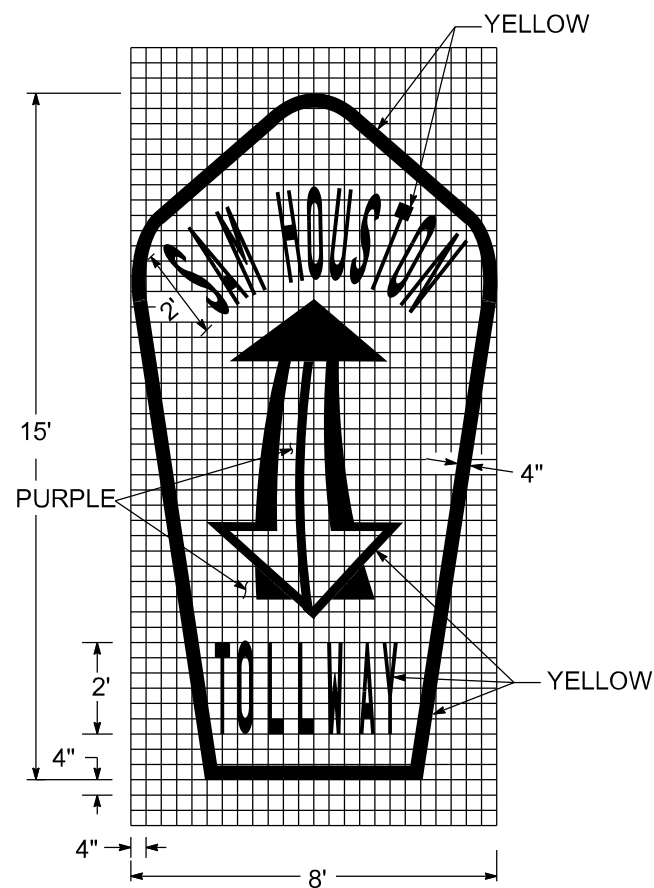
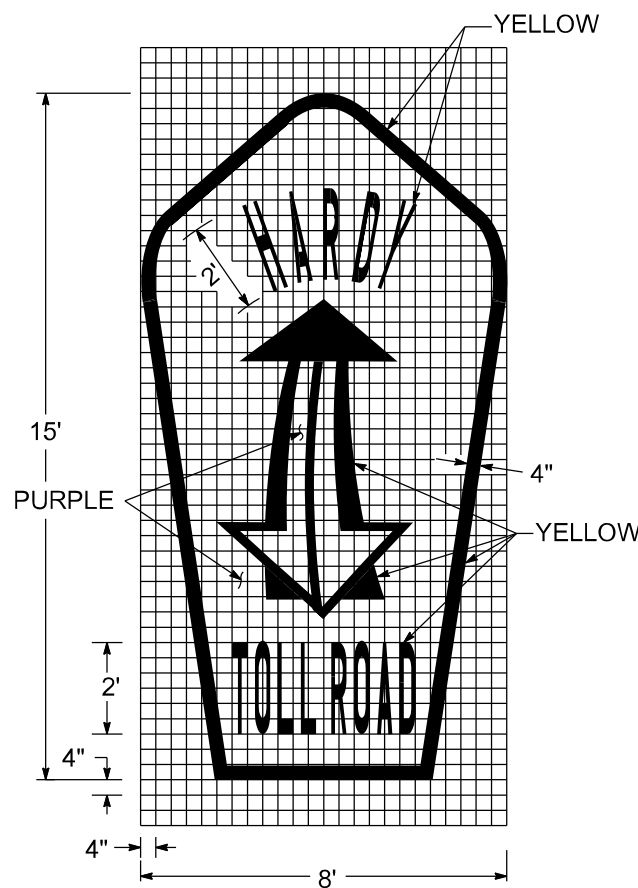
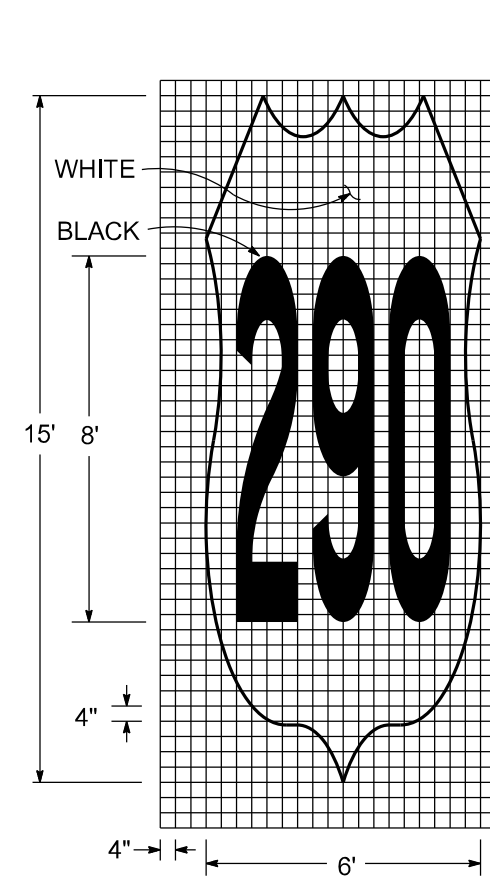
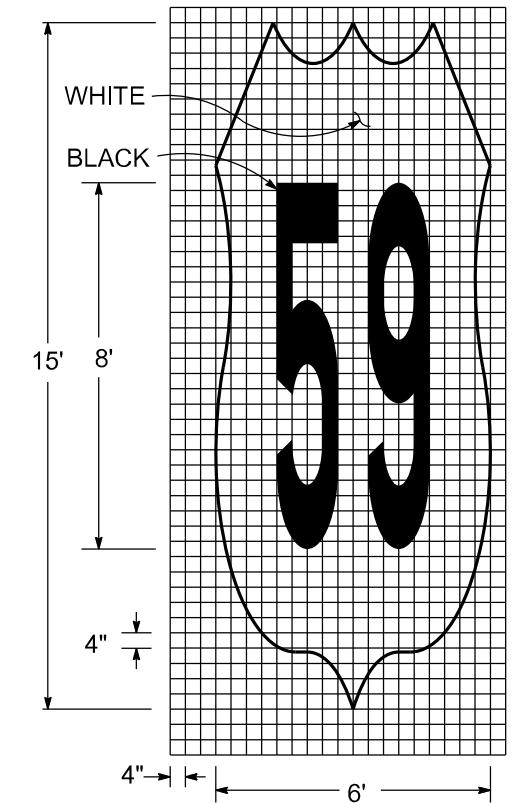
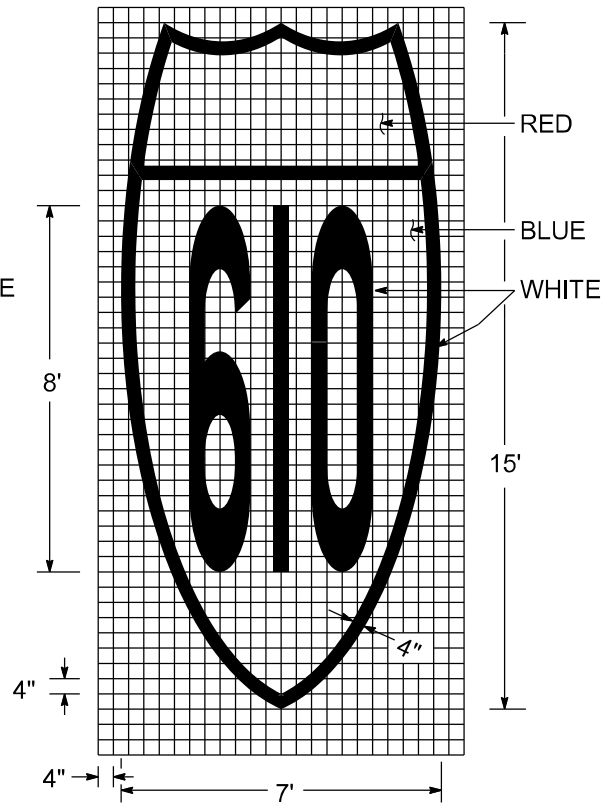
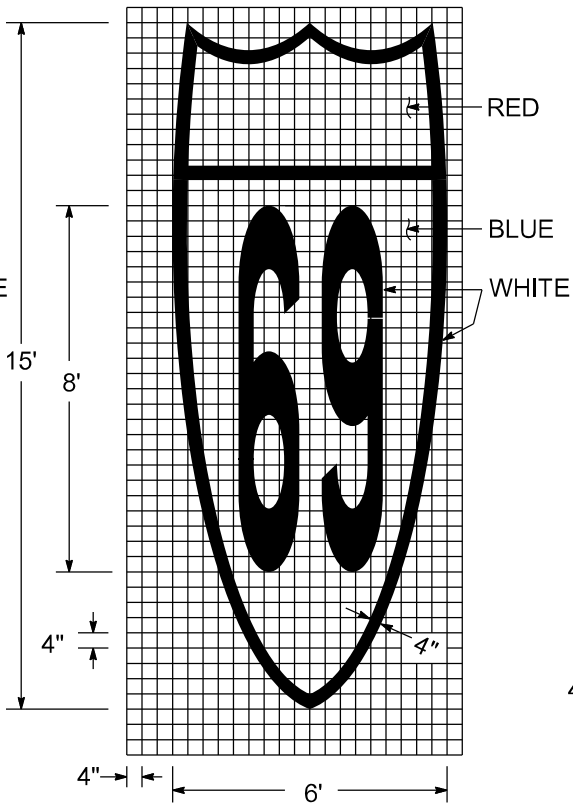
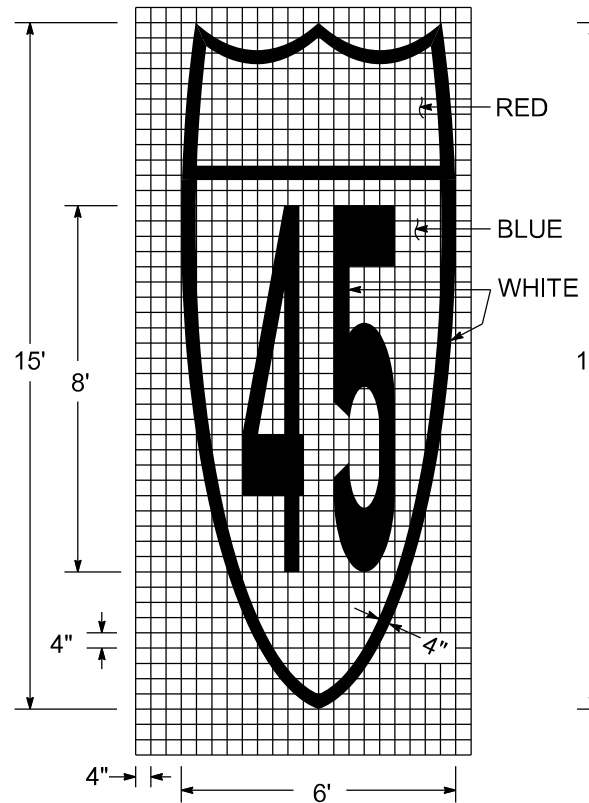
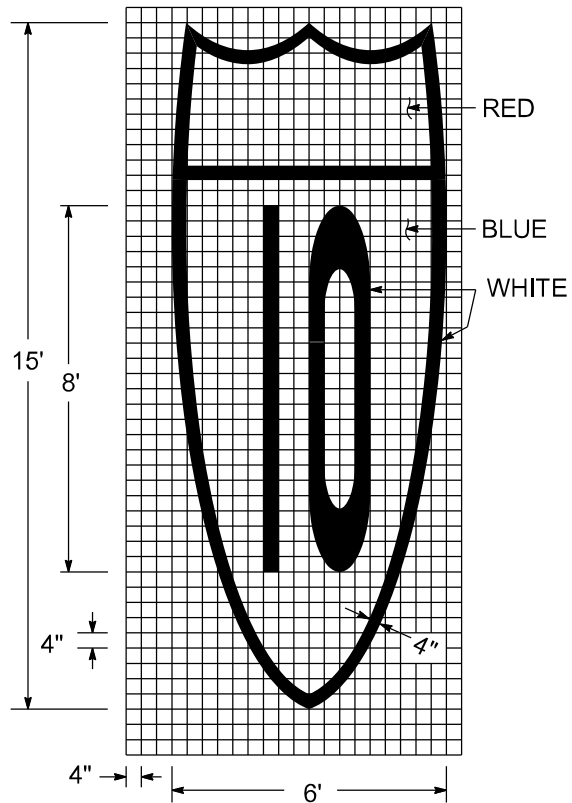
TYPICAL PLACEMENT OF DOTTED EXTENSION AT INTERSECTIONS



PAVEMENT MARKINGS  
(DOTTED EXTENSION DETAILS)

PM(DOT) - 11

FILE:	DN:	CK:	DW:	CK:
© TxDOT 2010	DIST	FED REG	COUNTY	SHEET
REVISIONS	HOU	6	Harris, etc.	104
4/2010	CONTROL	SECT	JOBSECT	HIGHWAY
4/2011	0177	07	118, etc.	IH 69



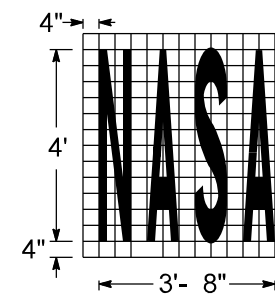
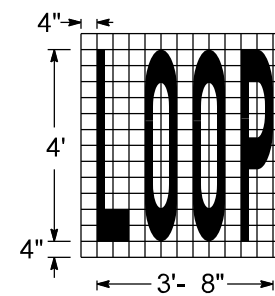
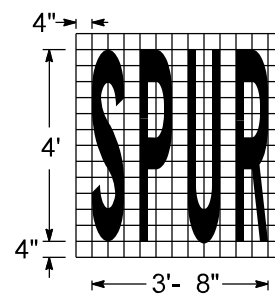
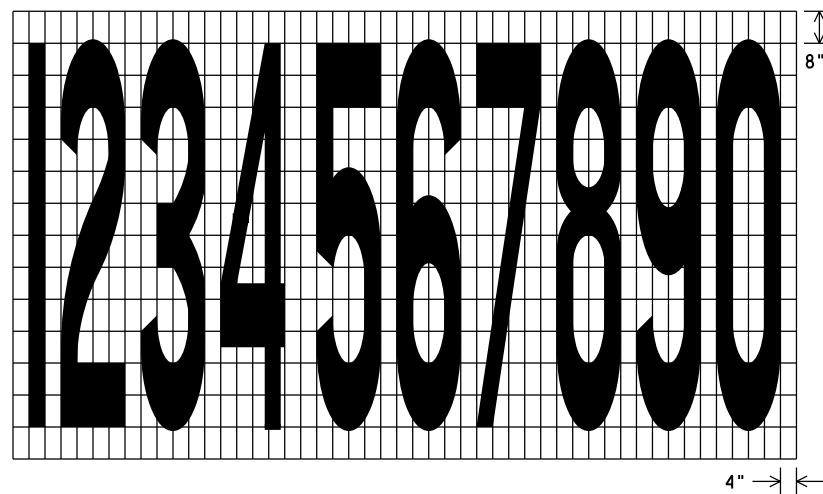
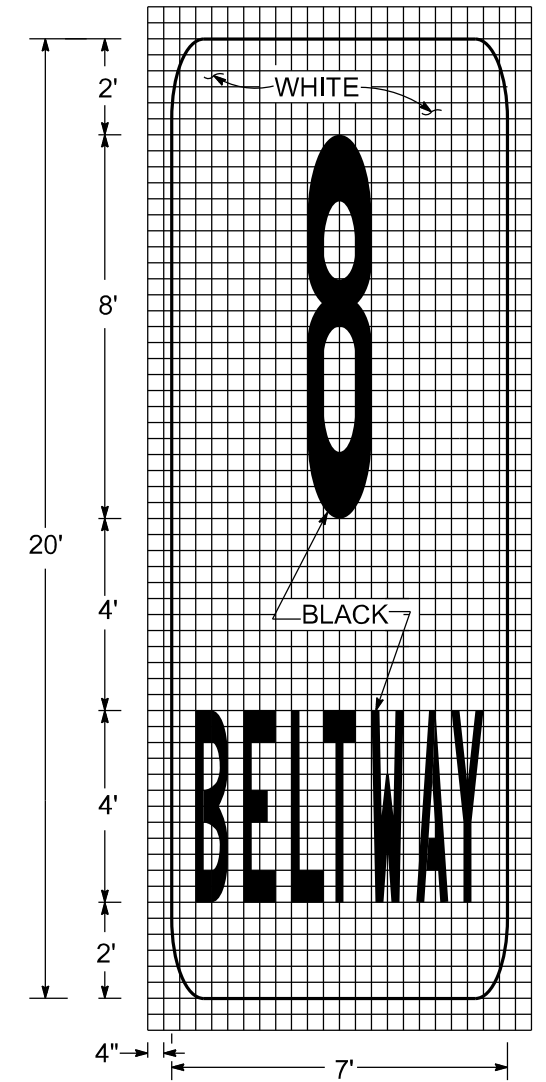
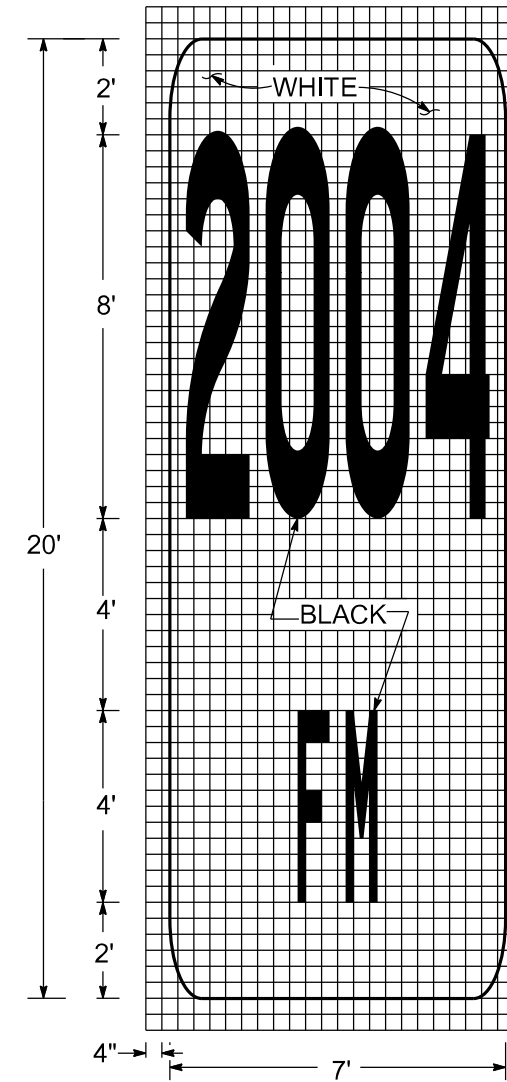
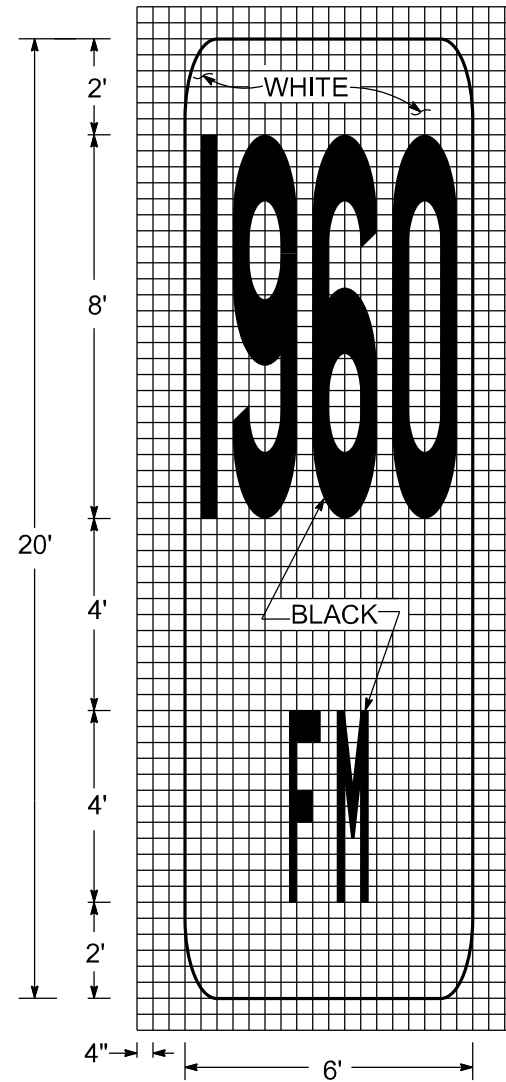
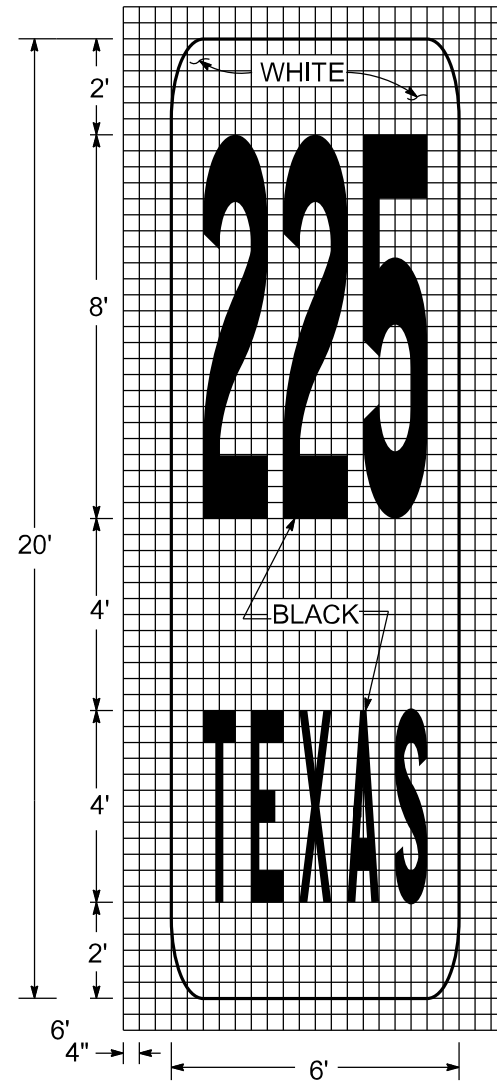
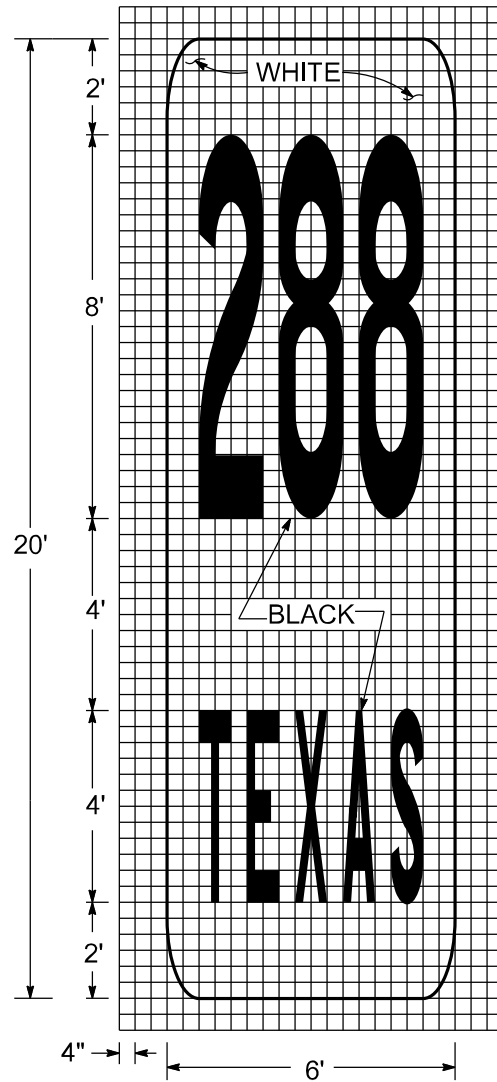
Texas Department of Transportation  
Houston District

PAVEMENT MARKING  
(SHIELD)

PM(SHIELD-1) - 17

FILE:	DN:	CK:	DW:	CK:
© TxDOT 2004	DIST	FED REG	COUNTY	SHEET
REVISIONS 07-12-17 07-30-17	HOU	6	Harris, etc.	105
	CONTROL	SECT	JOB	HIGHWAY
	0177	07	118, etc.	IH 69

SCALE 1/4" = 1'



**Texas Department of Transportation**  
Houston District


**PAVEMENT MARKING (SHIELD)**

**PM(SHIELD-2) - 17**

FILE:	DN:	CK:	DW:	CK:
© TxDOT 2004	DIST	FED REG	COUNTY	SHEET
REVISIONS 07-12-17 07-30-17	HOU	6	Harris, etc.	106
	CONTROL	SECT	JOB	HIGHWAY
	0177	07	118, etc.	IH 69

<p><b>I. STORMWATER POLLUTION PREVENTION</b></p> <p>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.</p> <p>No Additional Comments</p>	<p><b>III. CULTURAL RESOURCES</b></p> <p>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.</p> <p>No Additional Comments</p>	<p><b>VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES</b></p> <p>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.</p> <p>No Additional Comments</p>
<p><b>II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS</b></p> <p>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.</p> <p><input checked="" type="checkbox"/> No United States Army Corps (USACE) Permit Required</p> <p><input type="checkbox"/> 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."</p> <p><input type="checkbox"/> 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."</p> <p><input type="checkbox"/> 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.</p> <p><input type="checkbox"/> 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.</p> <p>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.</p> <p><input checked="" type="checkbox"/> No United States Coast Guard (USCG) Coordination Required</p> <p><input type="checkbox"/> United States Coast Guard (USCG) Permit</p> <p><input type="checkbox"/> United States Coast Guard (USCG) Exemption</p> <p>No Additional Comments</p>	<p><b>IV. VEGETATION RESOURCES</b></p> <p>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.</p> <p>No Additional Comments</p> <p><b>V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS</b></p> <p>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.</p> <p>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)</p> <p>No Additional Comments</p> <p>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.</p>	<p><b>VII. OTHER ENVIRONMENTAL ISSUES</b></p> <p>Comments:</p>

DATE: May 11, 2022  
FILE:

				TxDOT Houston District	
<p><b>ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS</b></p> <p><b>EPIC</b></p>					
FILE:	EPIC Sheet.dgn	DN:	CK:	DW:	CK:
© TxDOT:	March 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS		0177	07	118,etc.	IH 69
UPDATED section V, text and added definition (10/17)		DIST	COUNTY		SHEET NO.
ADDED USCG and USACE notes in Section VII (04/18)		HOU	Harris,etc.		107