FHWA TEXAS DIVISION	MAINTENANCE PROJECT NO.		SHEET NO.
	RMC 646735001		1
STATE	DISTRICT	COUNTY	
TEXAS	ATL	BOWIE ETC.	
CONTROL	SECTION	JOB	HIGHWAY NO.
6467	35	001	US 59 ETC.

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
HIGHWAY ROUTINE MAINTENANCE CONTRACT

TYPE OF WORK:

GUIDE AND CALLOUT SIGN INSTALLATION

PROJECT NO. : RMC 6467-35-001

HIGHWAY : US 59

LIMITS OF WORK : DISTRICT WIDE

SEE SHEET 2
FOR INDEX OF SHEETS

SEE SHEETS 3 THRU 11
FOR LOCATION MAPS

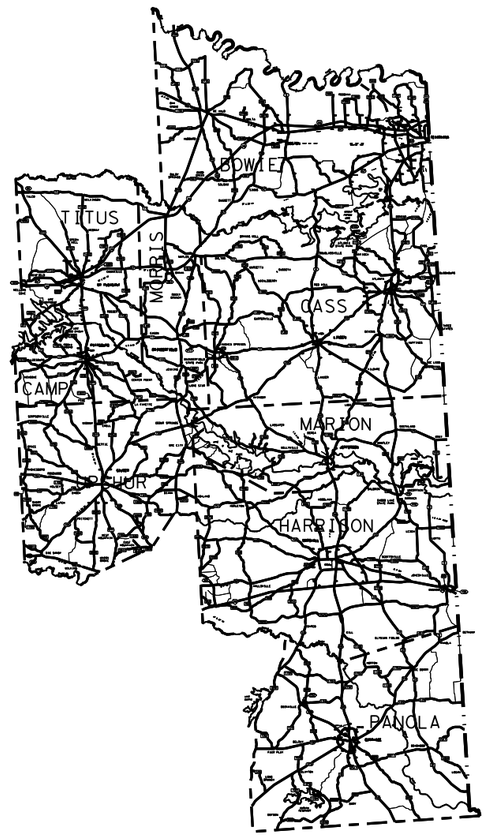
THE CONSTRUCTION WORK WAS PERFORMED IN SUBSTANTIAL COMPLIANCE WITH THE CONTRACT.

_____ _____
DATE

THE CONTRACTOR SHALL MAKE HIS OWN INVESTIGATIONS AND ARRANGEMENTS FOR DELIVERY OF MATERIALS.

WARNING SIGNS

CONSTRUCTION SIGNS AND BARRICADE PLACEMENTS SHALL BE IN ACCORDANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, AS SHOWN ON THE BC STANDARDS AND AS SPECIFIED HEREIN OR AS DIRECTED.



ATLANTA DISTRICT MAP

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS COMPLETED & ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

CONTRACTOR ADDRESS: _____

LIST OF APPROVED FIELD CHANGES:

SUBMITTED FOR LETTING: 05/03/2024

Christina N. Trawler, P.E.
DIRECTOR OF TRANSPORTATION OPERATIONS

RECOMMENDED FOR LETTING: 5/7/2024

DocuSigned by:
Jason Dupree, P.E.
E5D4989260134 1C...
DIRECTOR OF MAINTENANCE

APPROVED FOR LETTING: 5/7/2024

DocuSigned by:
Rebecca L Wells, P.E.
23686C08B28F4A0...
DISTRICT ENGINEER

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COUNTY BOWIE, ETC. PROJ NO CCSJ 646735001
HWY US 59, ETC. LETTING DATE JULY, 2024
DATE ACCEPTED _____

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS INCLUDED IN THE CONTRACT SHALL GOVERN ON THIS PROJECT.

EXCEPTIONS: N/A
EQUATIONS: N/A
RAILROAD CROSSINGS: N/A

INDEX OF SHEETS

STATE OF TEXAS
KENNETH S. BURNS
142417
LICENSED
PROFESSIONAL ENGINEER

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

Kenneth S. Burns, P.E.

5/3/2024
DATE

INDEX OF SHEETS

 Texas Department of Transportation

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OKLAHOMA

MC CURTAIN COUNTY

ARKANSAS

LITTLE RIVER COUNTY

RED RIVER COUNTY

MORRIS CO

BOWIE CO

CASS CO

MILLER COUNTY ARKANSAS

BOWIE COUNTY TEXAS

DE KALB

NEW BOSTON

WHALEY

HOOKS

VICTORY CITY

LEARY

NASH

WAKE VILLAGE

TEXARKANA

OLD BOSTON

REDWATER

SIMMS

BASSETT

MAUD

CORLEY

WRIGHT PATMAN LAKE

CASS COUNTY

BOWIE COUNTY

"INSET"

TEXARKANA AREA

LOCATION MAP

Texas Department of Transportation

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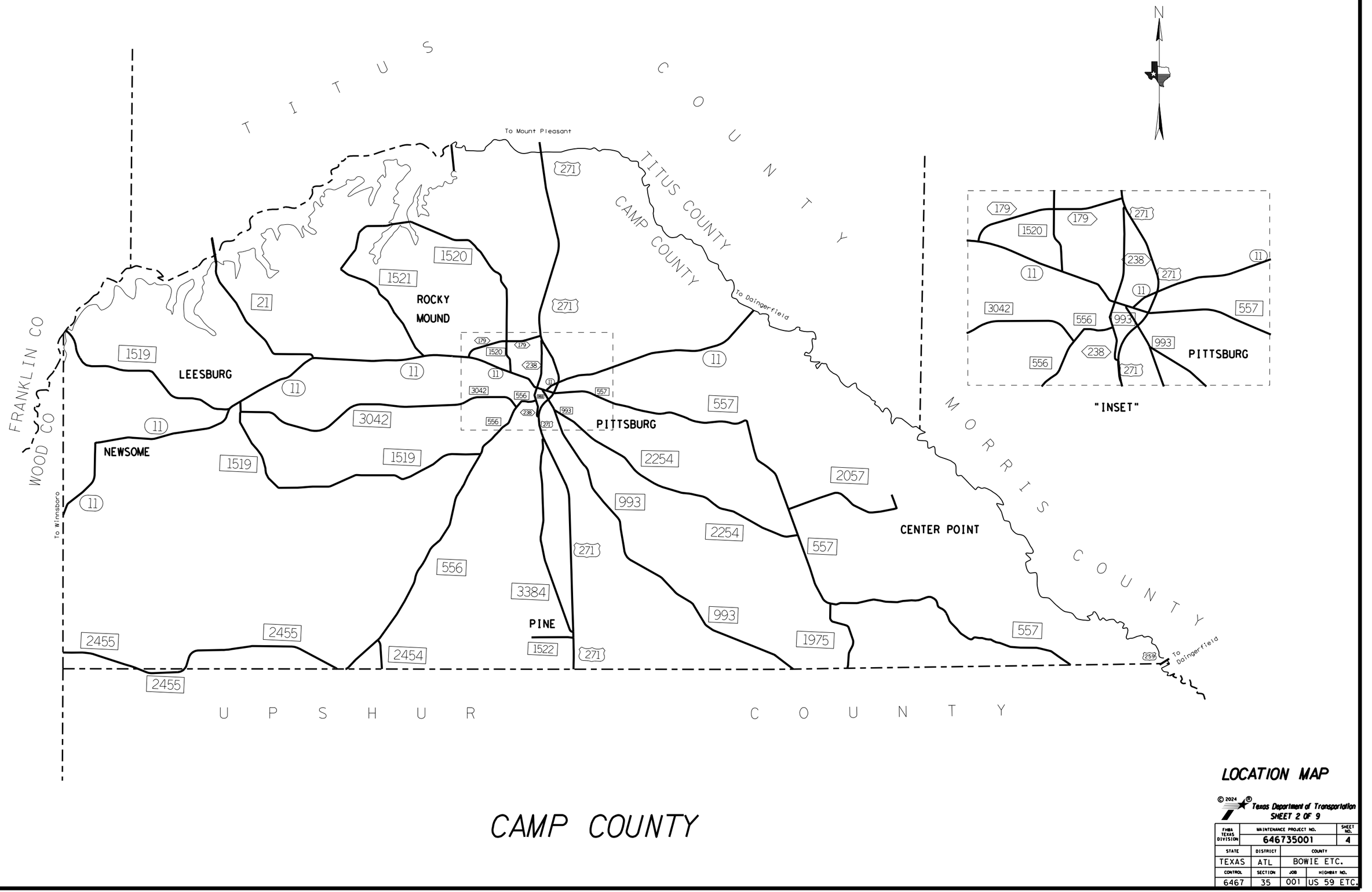

CAMP COUNTY

LOCATION MAP

Texas Department of Transportation
SHEET 2 OF 9

FHWA TEXAS DIVISION	MAINTENANCE PROJECT NO.		SHEET NO.
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STATE	DISTRICT	COUNTY	
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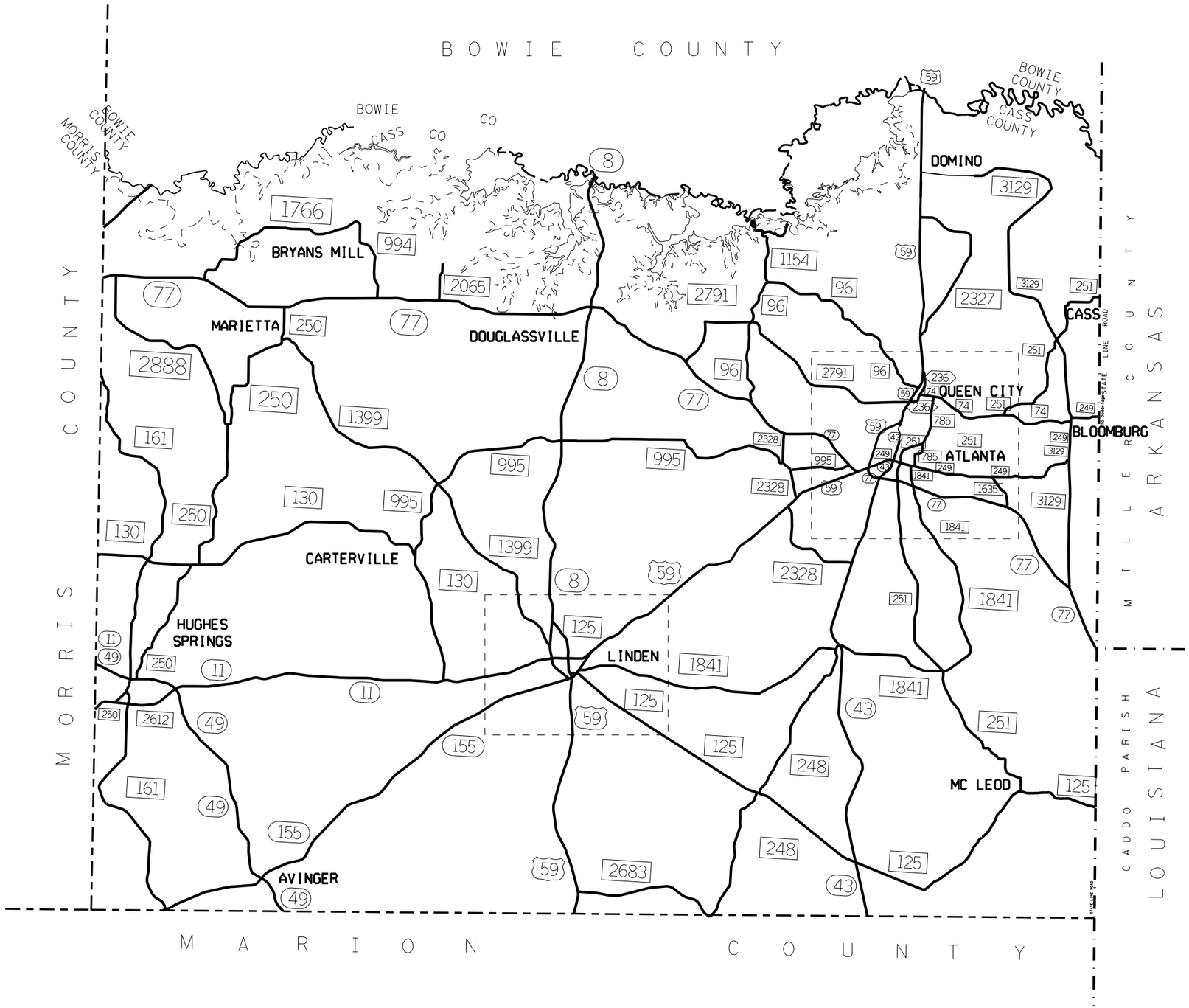

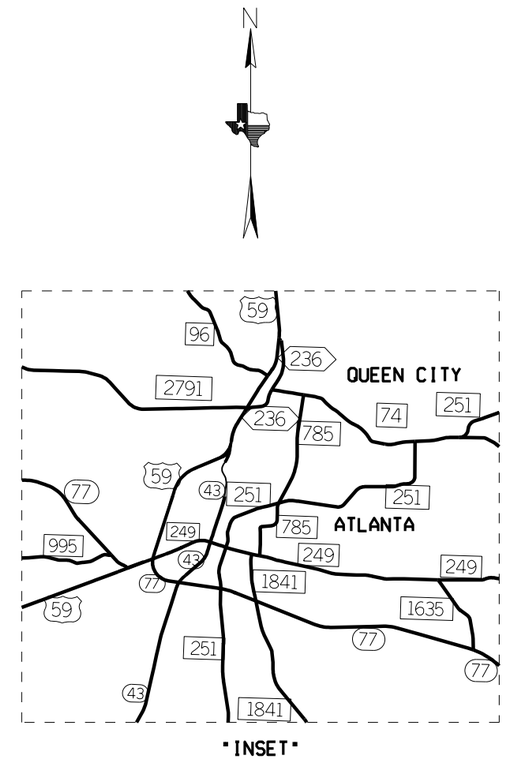

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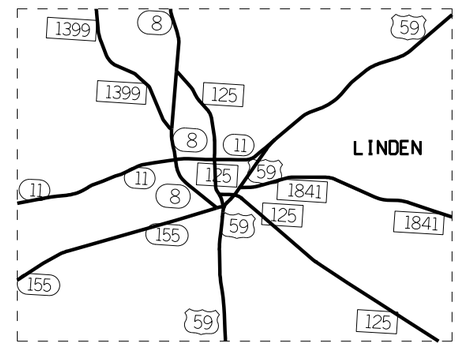

"INSET"

CASS COUNTY

LOCATION MAP

Texas Department of Transportation

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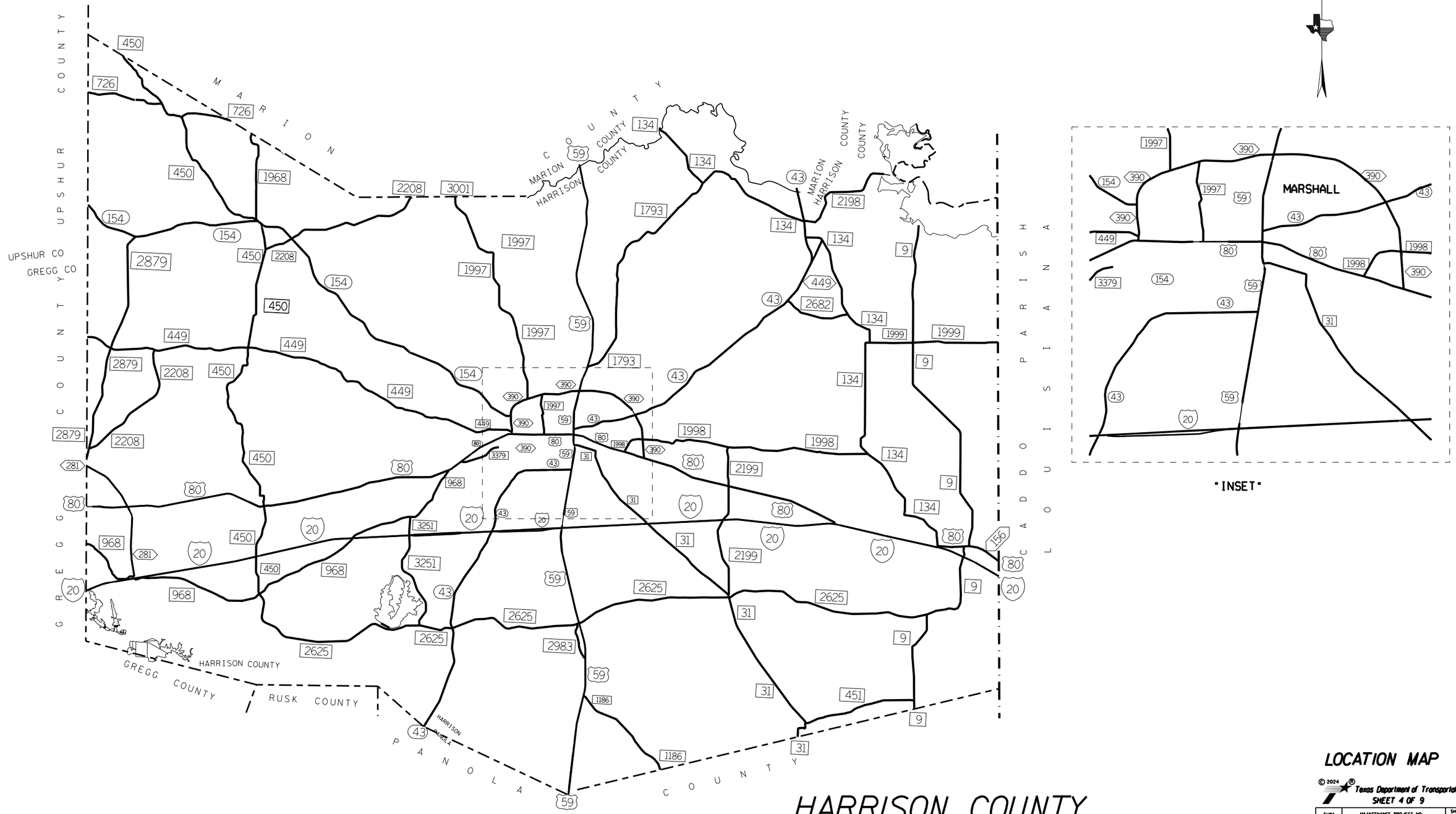

HARRISON COUNTY

LOCATION MAP

Texas Department of Transportation

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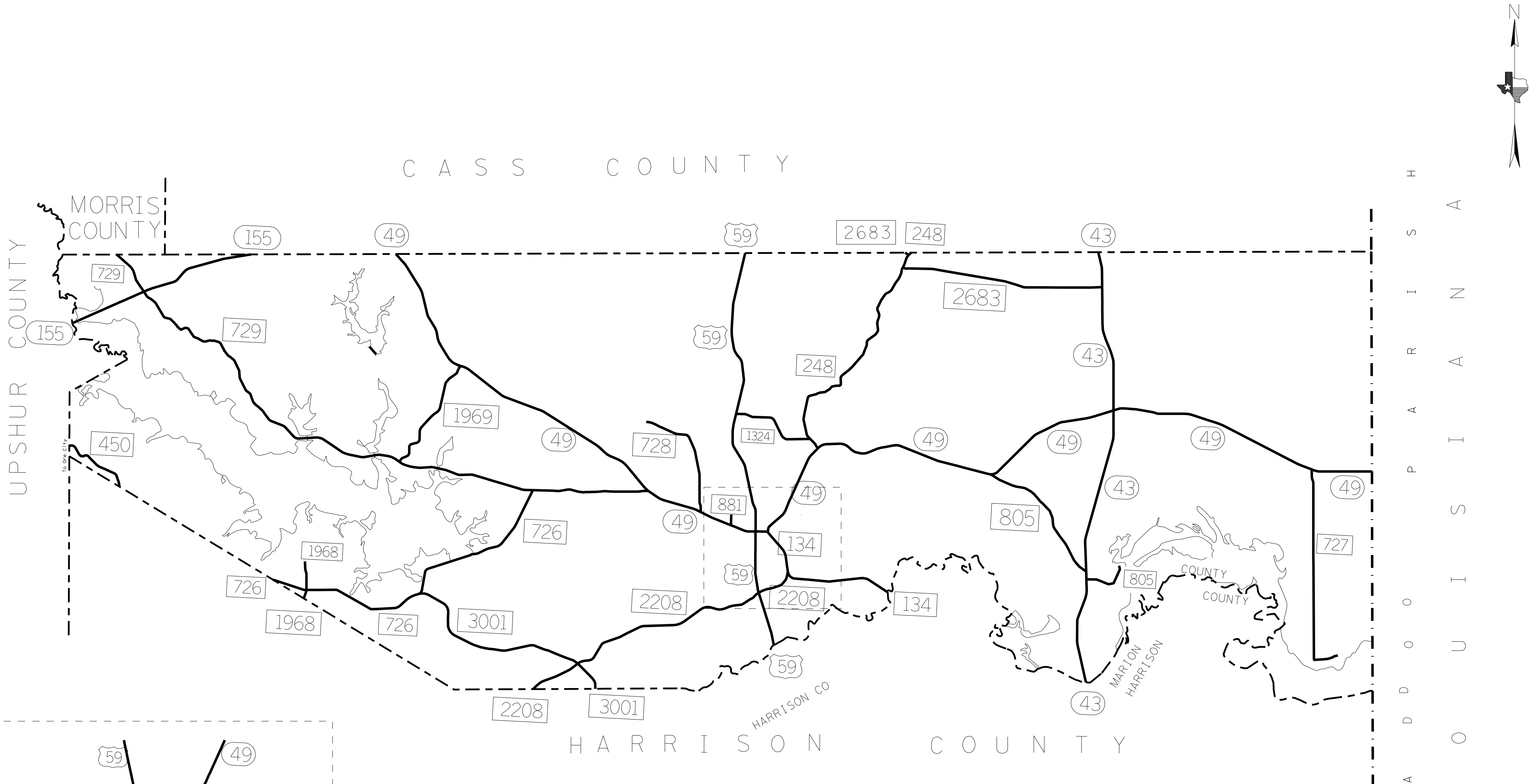

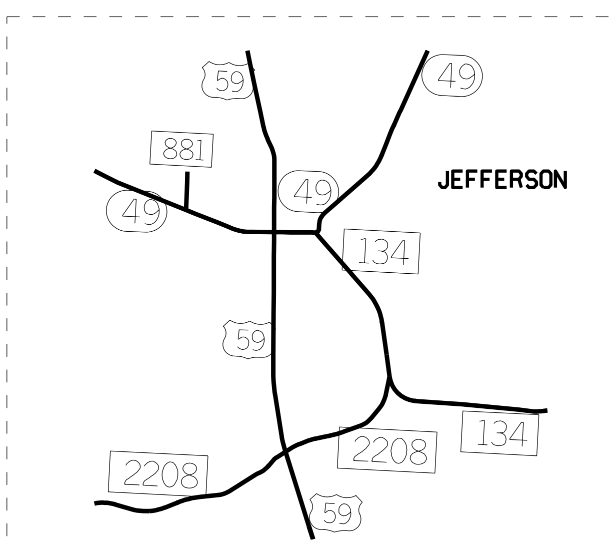

"INSET"

MARION COUNTY

LOCATION MAP

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SHEET 5 OF 9

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TEXAS	ATL	BOWIE ETC.	
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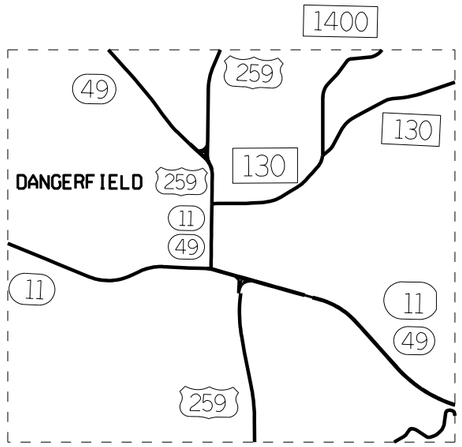

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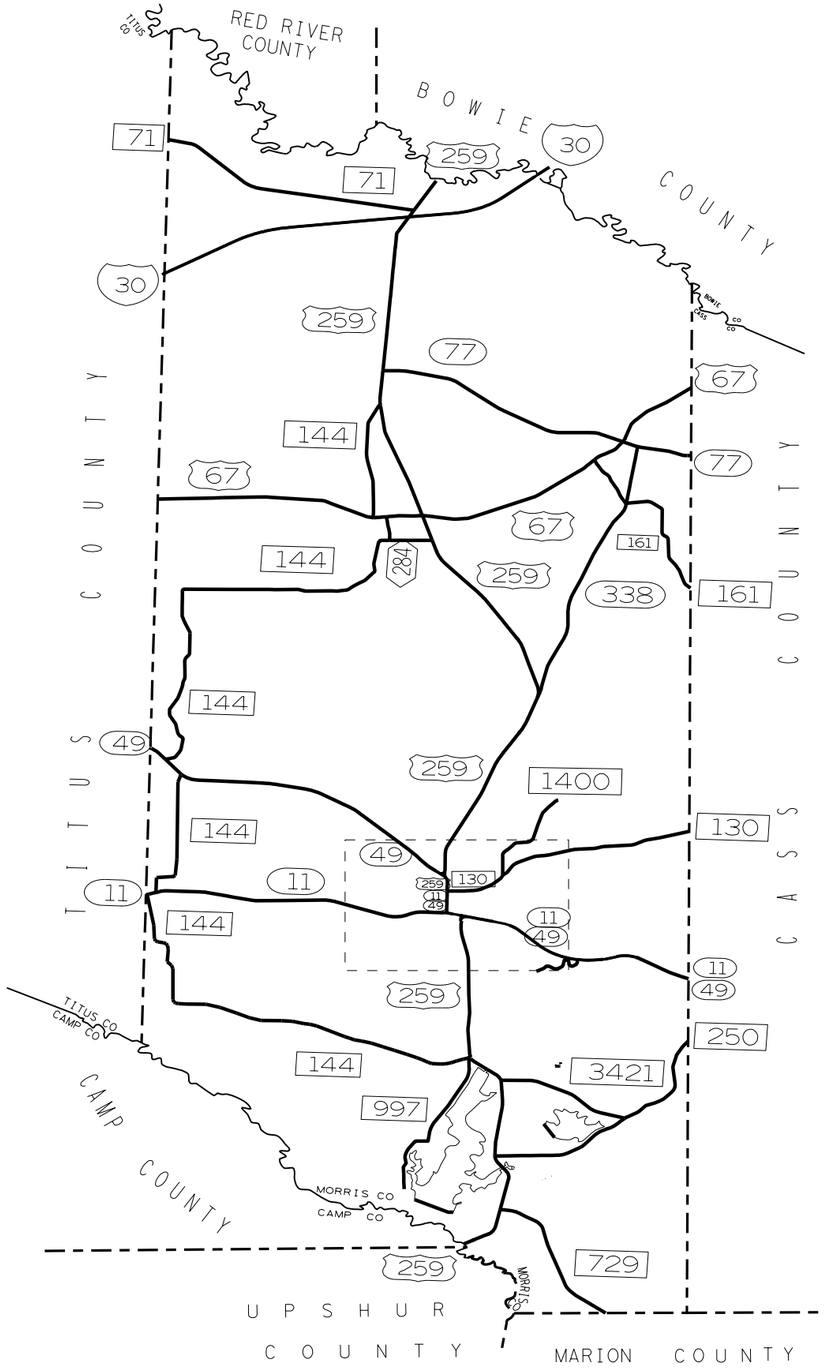

MORRIS COUNTY

LOCATION MAP

 Texas Department of Transportation

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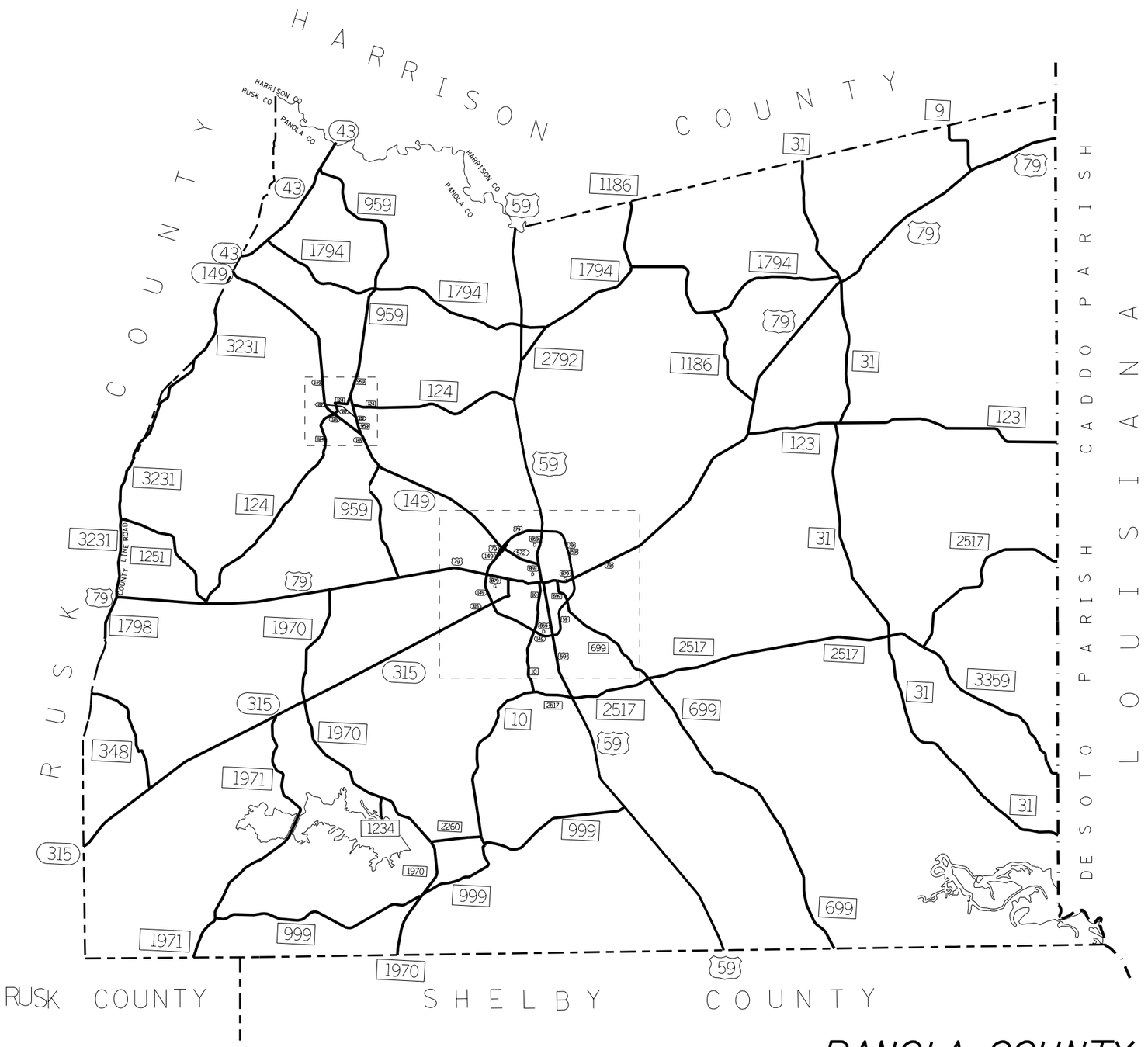

PANOLA COUNTY

LOCATION MAP

Texas Department of Transportation

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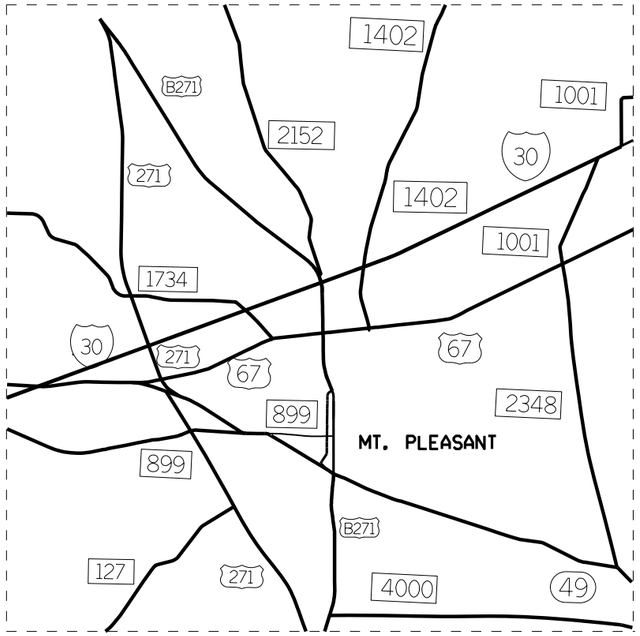

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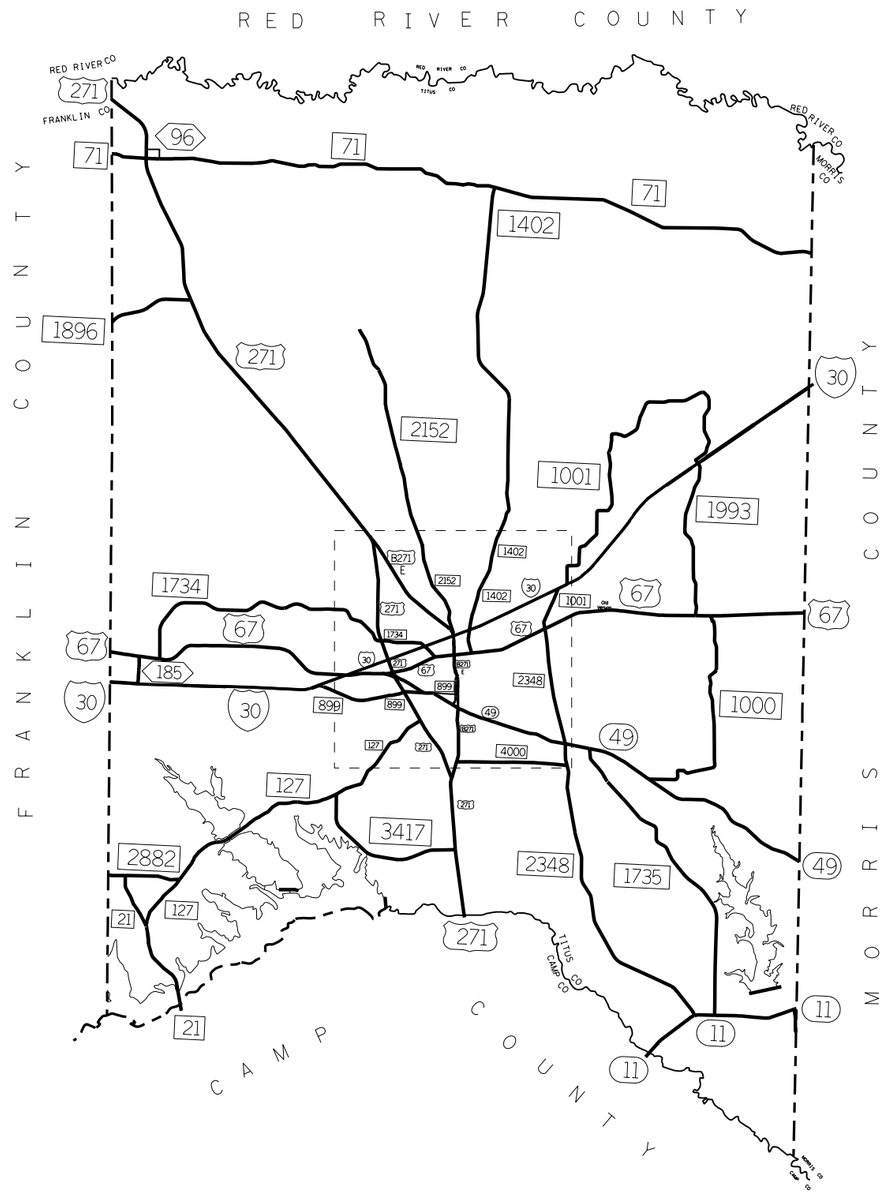

TITUS COUNTY

Texas Department of Transportation

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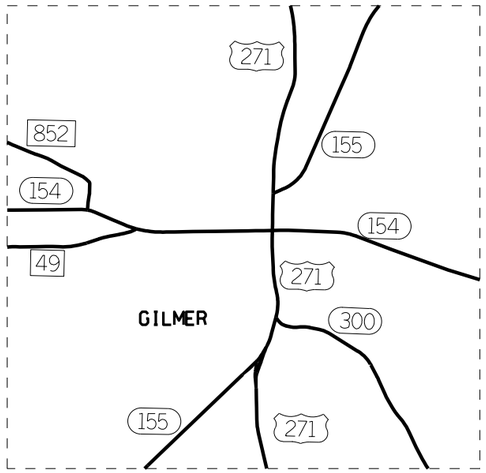

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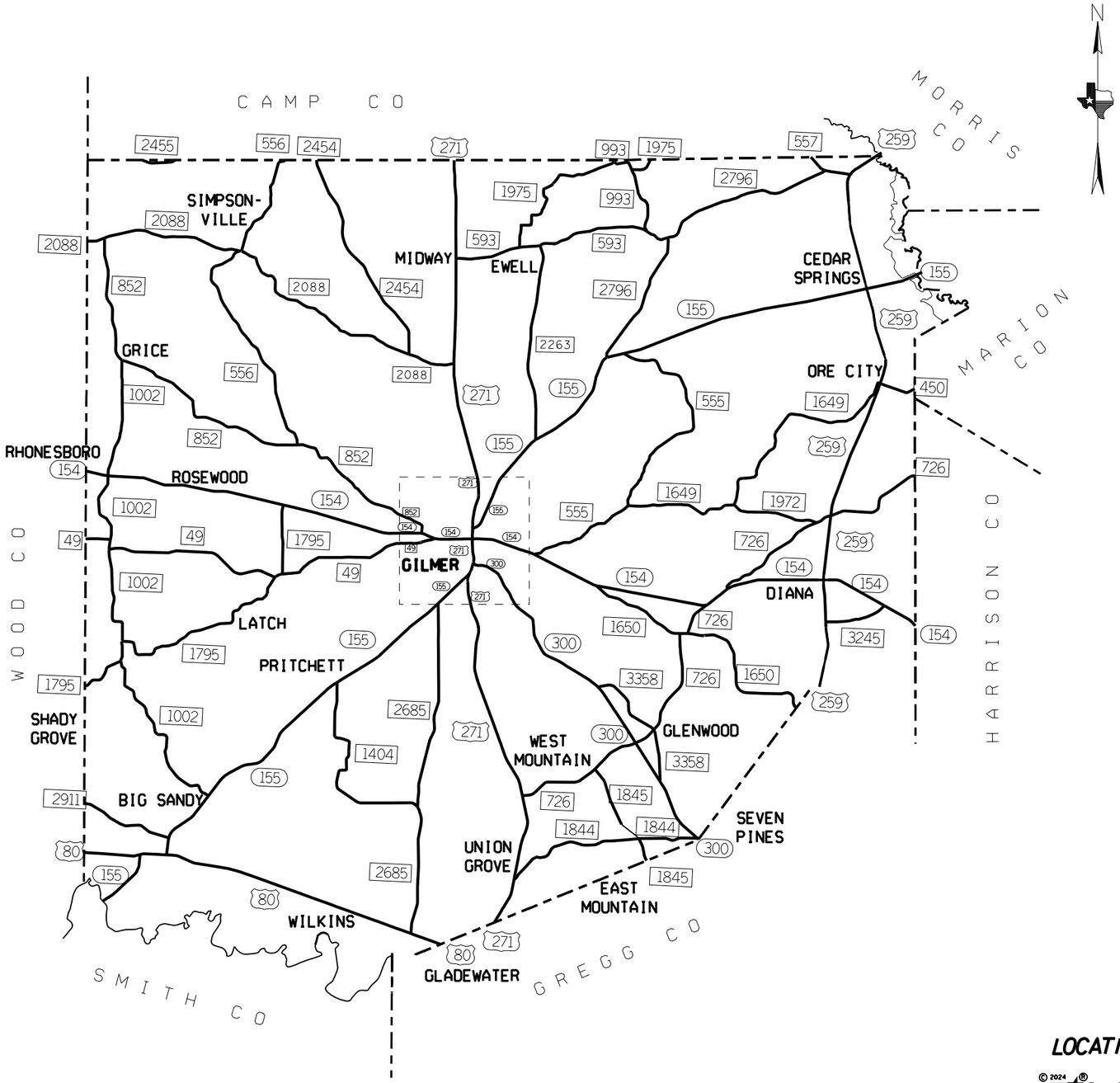

UPSHUR COUNTY

LOCATION MAP

 Texas Department of Transportation

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GENERAL NOTES:

General:
Contractor questions on this project are to be emailed to the following individuals:

Christina Trowler, P.E.
Director of Operations - Atlanta
Christina.Trowler@txdot.gov

Kenneth Burns, P.E.
Traffic Engineer - Atlanta
Kenneth.Burns@txdot.gov

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

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

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

Questions regarding the plans and/or the project after the contract has been awarded should be referred to the Managing Engineer.

Christina Trowler, P.E.
Director of Operations - Atlanta
701 East Main
Atlanta, TX. 75551
(903) 799-1480

Catalog numbers or trade names of any manufacturer for any part of the installation shown on these plans, are for the purpose of identification only. Furnish manufacturer's materials that are of equal quality and comply with the specifications for this project.

Plans are required for this project. Each contract awarded by the Department stands on its own and as such, is separate from other contracts. A Contractor awarded multiple contracts must be capable and sufficiently staffed to concurrently process any or all contracts.

Notify the Engineer or his representative by 8:15 a.m. on any day when working in the District.

Clean up and remove all loose material resulting from contract operations each day before work is suspended for that day.

Project Number: RMC 646735001 **Sheet 12**

County: Bowie, etc. **Control:** 6467-35-001

Highway: US0059, etc.

Repair all pavement damaged by the Contractor's forces during construction. Such repair is to be considered incidental to the various bid items in the project and must be approved by engineer.

Various locations in the Atlanta District, which consist of the following nine counties: Bowie, Camp, Cass, Harrison, Marion, Morris, Panola, Titus and Upshur.

All work, materials, and services not expressly called for in the specification or not shown on the plans, which may be necessary for the complete and proper construction, will be performed, furnished, and installed by the Contractor. These items will not be paid for directly but will be considered subsidiary to the various bid items.

Item 4: Scope of Work

Callout sign installation will consist of the installation and removal of large and small signs

Contractor will be notified on an "as needed" basis, meaning the Contractor may be called to work on a damaged sign and upon completion of that work leave, if no other work is available at that time. Work must begin within (5) calendar days after notification.

Thirty (30) days lead time will be allowed for manufacturing of materials from issuance of work order. Contractor will be required to install the new sign within (5) days for a total of (35) days per work order. The Engineer or their representative will be copied via email upon the order for the manufacturer of the materials. If for any reason the manufacturers are unable to provide the materials required in this time frame the Contractor must provide documentation from the manufacturers for the delay. Failure to provide documentation and date of the order will result in liquidated damages in accordance with Article 8.6. All shop drawings and material specifications for each individual sign will be submitted to the Engineer or their representative.

Contractor will be instructed before beginning work on what items of work will be performed for each individual sign. Upon instructions from the Engineer or their representative at to the items of work for each individual sign, the Contractor must document via email to the Engineer or their representative that all necessary sign hardware been ordered within (5) days of receiving instruction for each individual sign.

D-Series signs to be done in this contract will have the following dimensions:

SIGN TYPE	SIZE
D3-1G	18" X 60" or 18" X 96"
D3-1G	24" X 60" or 24" x 96"

Actual sign description legends will be provided by the Engineer after letting.

Contractor will verify the elevation difference between edge of travel lane and bottom of sign. Positioning of the sign will be twelve (12) feet from the edge of the sign to the edge of the travel lane where shoulders are less than six (6) feet wide, or six (6) feet from edge of shoulders equal to or greater than six (6) feet wide.

All signs will be mounted 7 feet high from the bottom of the sign to the travel lane. Elevation requirements must be adhered to -0" + 6" maximum differential.

Sign panels will be required to have edge molding as detailed in the edge molding standard sheet. Indent the border ½" to allow for the edge molding. Edge molding will be subsidiary to this item. Sign clamps will be installed for the large callout signs prior to the installation of the edge molding for ease of installation and to avoid having to remove edge molding out in the field for stiffener installation.

All signs, mounts and miscellaneous hardware from this project will become the property of the Contractor and be disposed of outside the state right of way.

Item 5: Control of the Work

Contact all utility companies for the exact location of underground utilities before boring, trenching or any other work that might interfere with or damage existing utilities.

Repair any damage caused to utilities by Contractor operations at own expense and restore service in a timely manner.

Attention is directed to the fact that the work on any project will not be accepted until all components have been shown to be fully operational.

Item 6: Control of Materials

When requesting payments for material on hand, contractor's material storage facility will be within the Atlanta District.

Attention is directed to the pre-qualified products, on the internet at https://www.txdot.gov/business/resources/materials/producer-list.html

Item 8: Prosecution and Progress

A five-day work week will be used to determine time charges in accordance with Section 8.3.1.1, "Five-Day Workweek".

Attention is directed to the fact that work on the roadway will not begin until thirty (30) minutes after sunrise and will end on the roadway by thirty (30) minutes before sunset or as directed by the Engineer.

Project Number: RMC 646735001 **Sheet 12**

County: Bowie, etc. **Control:** 6467-35-001

Highway: US0059, etc.

The Engineer will specify the number of working days and months of barricades, signs and traffic handling granted for each Work Order based on a percentage of the dollar amount of the Work Order verses the total dollar amount of the Contract.

In accordance with Article 8.6 "Failure to Complete Work on Time," liquidated damages will be charged for failure to complete each Work Order in the specified number of days. The amount assessed per day for liquidated damages will be 1% of the estimated cost of the Work Order, but not to be less than $50 per day and not to exceed $200 per day.

Unless otherwise directed, prosecute the work continuously to completion of the contract.

Supply an adequate size crew experienced in the type of work described within these specifications and capable of performing the work in a safe and timely manner. Furnish all equipment, tools, and machinery for the proper prosecution of the work. Equipment, tools, and machinery will be on the work site in good operating condition and have all manufacturers' safety features in proper working condition prior to beginning work and remain in place during the prosecution of the work. All equipment, tools, and machinery will be capable of maintaining a continuous work schedule for the satisfactory completion of the project.

Verbally notify the Engineer 24 hours in advance of starting work.

Verbally notify the Engineer or his representative by 8:15 a.m. on any day which work is originally planned and which the Contractor will not be working, for whatever reason.

Provide proper equipment and labor to complete the initial list prior to leaving. All other work will be on an as needed basis. In order to complete the work in a timely manner, plan the operations according to the list. Prior to beginning work, submit a schedule based on the list of highways so that inspection arrangements can be made.

Unless otherwise approved, work will not begin before daylight and all operations will stop in sufficient time to have signs removed from the road before dark.

Provide progress schedules meeting the requirements of Section 8.5 in 2014 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges.

Item 9: Measurement and Payment

For all pay items, a daily email shall be sent to the inspector with the item number, quantity, and location description. Failure to send required information will result in nonpayment of the items for the month.

Item 416: Drilled Shaft Foundations

Foundation locations will be staked by the Contractor. The Engineer will be given a minimum of 3 days advance notice to ensure placement is in the proposed design location. Chamfer or tool exposed edges or joints of concrete as directed.

Item 502: Barricades, Signs & Traffic Handling

This contract is for non-site-specific callout work. In accordance with Article 502.4.1.6 "Contracts with Callout Work and Work Orders" this item will not be paid for separately but considered subsidiary to the contract bid items.

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.

Install temporary rumble strips in accordance with WZ(RS)-16 wherever short duration or short-term stationary lane closures are in place and workers are present.

The Contractor's particular attention is directed to the requirements of Item 7, "Legal Relations and Responsibilities", of the standard specifications. In addition to these requirements, the following provisions will also govern on this contract.

There may be ongoing contracts on several of the roadways included in this contract. Coordinate work with these projects and consult with the Engineer when developing sequence of work.

The Traffic Control Plan for this contract consists of the installation and maintenance of warning signs and or other traffic control devices shown in the plans, specification data which may be included in the general notes, applicable provisions of the Texas Manual on Uniform Traffic Control Devices (TMUTCD), traffic control plan sheets included in the plans, standard BC sheets and Item 502 of the standard specifications.

The Contractor's responsible person (CRP) will be responsible for ensuring that the signs and traffic control devices are in place and functioning properly in accordance with Article 502.2 of the Standard Specifications.

The CRP will inspect and ensure any deficiencies are corrected each and every day throughout the duration of this contract. Notify the Engineer in writing of the name, address, and telephone number of this employee or these employees.

Attention is directed to the traffic control plan sheets when shown in the plans for handling traffic through the work area. The signing arrangement and spacing shown may be varied as necessary to fit field conditions; however, any proposed changes in the traffic control plan must be approved by the Engineer prior to implementation.

The method of handling traffic will conform to that set forth in the plans and as directed. Restrict the movement of equipment across traffic lanes to an absolute minimum.

Project Number: RMC 646735001 **Sheet 12**

County: Bowie, etc. **Control:** 6467-35-001

Highway: US0059, etc.

All warning signs will be (48 inches x 48 inches) black on orange, factory made and in satisfactory condition.

Strobe lights or flashing lights and back up horns (when applicable and/or as directed by the Engineer) will be installed on all motorized equipment and will be in operation during the time that the equipment is working on or near the road surface.

A Type B flashing arrow panel will be required on this project when a lane of traffic is to be closed for any duration of time.

Attention is directed to the fact that anytime equipment encroaches into a travel lane as shown on WZ BTS and TCP standards shown in this project, the Contractor will be required to have at least one shadow vehicle with a truck mounted attenuator as directed.

Notify inspector prior to any planned lane closures. Lane closures must be entered in the HCR (Highway Condition Report) 48 hours prior to beginning work.

All flaggers will be properly attired, orange, or fluorescent type III vests and white hard hats are required. Proper flagging procedures must be demonstrated by all workers in accordance with the "Texas Manual on Uniform Traffic Control Device." A list of all qualified flaggers will be furnished by the Contractor before beginning work. This list will be updated as flaggers become qualified.

Provide flaggers at the ends of work areas and at all other points of conflict with roadway machinery and roadway traffic when and as directed.

No equipment will be left within 30 feet of the travel way. Equipment and/or obstructions within 30 feet of the travel way will be removed or clearly marked by warning lights and barricades, as directed.

Maintain access to abutting property at all times using approved materials and methods. Work required to maintain ingress and egress within the limits of this project will not be paid for directly but is subsidiary to the pertinent bid items. Provide for traffic safety and for the ingress and egress to public and private property in work areas at all times during the construction of this project.

Place construction fencing a minimum of 4 feet high around bore pits open over night for pedestrian safety. Use appropriate post to install fencing around open pits, do not use equipment as part of post or fencing system.

The existing number of lanes open to traffic will not be reduced except that lane closures will be required on high-speed roadways for all short term/short duration work that requires a vehicle to be in the roadway or as directed.

In urban areas and high-speed areas the contractor will be required to set up full lane closures when working at intersections as directed by the Engineer.

Item 506: Temporary Erosion, Sedimentation, and Environmental Controls

Provide and install additional erosion or water pollution control measures deemed necessary by the Engineer as prescribed by this item and in accordance with the appropriate specification. Payment for erosion control measures for which applicable pay items are not included in the Contract shall be made in accordance with Article 9.4, "Payment for Extra Work".

Item 636: Signs

Ensure the location and details of the fabrication, assembly and erection of the aluminum signs are in accordance with the details shown on the plans.

Ensure the Contractor's working drawings, for extruded aluminum signs, conform to the details shown on the plans.

Transport signs in such a manner as to not damage the high intensity reflective sheeting. Carry signs in a standing position within a divider rack assembly.

Ensure new sign panels have edge molding as detailed in the edge molding standard sheet. Edge molding will be subsidiary to this item. Install sign clamps on the sign before the installation of the edge molding.

When a sign has been damaged or has been determined by the Engineer to be replaced. The Engineer will furnish the Contactor a sign detail layout with the dimensions of each individual sign to be replaced drawn on the SignCAD program. The Engineer will also provide a copy of the SignCAD file for each individual sign in pdf format.

New sign installation will also be required for this project where the large sign can be installed on two triangular slip base supports. Contractor will be required to install the sign under this item.

Contractor will provide all lane, ramp, and shoulder closures necessary for sign installations.

Type A signs will be as directed by Engineer. Type A may consist of Guide, Route Marker, Regulatory or Warning signs and will be made of flat aluminum.

Item 644: Small Roadside Sign Assemblies

D-Series signs will be made of extruded aluminum.

Existing sign assemblies will be removed after the proposed sign is installed. Contractor will leave existing sign in place while proposed sign goes up. The existing sign will be removed immediately after the proposed sign is installed.

For this project, the standard triangular slip base two bolt casting will be used. This casting must be furnished from an approved manufacturer.

Project Number: RMC 646735001 **Sheet 12**

County: Bowie, etc. **Control:** 6467-35-001

Highway: US0059, etc.

Erect the proposed signs an appropriate distance from adjacent signs in accordance with the Texas MUTCD, as directed and as shown on the plans.

Verify the elevation difference between the edge of the travel lane and bottom of the sign.

For this project some of the sign installations will include chevron signs which are two separate signs mounted back-to-back on the same post as detailed in standard D&M (3)-15B.

Item 647: Large Roadside Sign Supports and Assemblies

The Contractor may have to remove and or relocate an existing sign structure as directed.

All signs, mounts and miscellaneous hardware from this project will become the property of the Contractor and be disposed of outside the state right of way.

The removal of the supports and foundations will be as directed, some situations may only require the removal of the sign panel to replace with a new panel and re-use all existing sign supports. The new panel will be paid for under Item 636.

Four (4) – W6X9 (20 ft. lengths) I – Beams will be required for this project in order to install signs as needed.

Four (4) – W8X18 (20 ft. lengths) I – Beams will be required for this project in order to install signs as needed.

Item 690: Maintenance of Traffic Signals

Signs on mast arms at signalized intersections will be replaced under this item. Contractor will not be asked to perform work on individual signs at intersections, but multiple intersections in close proximity to make efficient use of TXDOT and Contractor's time and resources.

Provide all signs and mounting hardware to accomplish this work. Mounting hardware will not be paid for separately but will be subsidiary to this item. All removed sign components will become the property of the Contractor.

Item 752: Tree and Brush Removal

Contractor will be called upon to do tree trimming and brush removal for existing signs. TXDOT will send the Contractor a work order with a list of signs and the footage to be cut for each sign. Each sign to have brush trimmed and removed will have a minimum of 25 feet to be trimmed. This work will take place on conventional roadways, US, SH, SS, and FM roadways. No tree trimming work will take place on Interstate Highways. All signs to be trimmed will be small roadside assemblies and not large I-beam signs. Contractor will not be required to trim both sides of highway at the same location. Sites are specifically associated to a single sign as directed.

On conventional roadways, all sign locations will be trimmed to a vertical height of 20 ft. above natural ground and horizontally from the edge of sign farthest from the road to 10 ft. out.

On conventional roadways, all limb vegetation within the 20' vertical dimension and within the horizontal dimension at the sign, will be removed from the sign to 25' minimum upstream from the sign. A minimum measurement of 25' will be paid for at all locations.

Chippers will be permitted so that limbs may be chipped for disposal. All chippers must be approved prior to use. Wood chips can be disposed of on the right of way provided they are spread and left in a neat appearance and as approved. Wood chips are not to be disposed of in developed areas or in front of houses

All limbs that are not chipped must be disposed of off State property according to State and Federal regulations.

Complete tree trimming operations on each specific sign before beginning operations on another sign. Complete work on each roadway before beginning operations on another roadway unless otherwise approved. All limbs, etc., cut by trimming operations must be chipped or removed from the right-of-way prior to the end of the same working day.

Item 6001: Portable Changeable Message Sign

Locations of the message boards will be approved by the Engineer or their representative prior to setting out. Messages will be provided by the Engineer and paid by the number of days used displaying messages for each

Item 6043: Large Road Signs

New signs will not be required when a sign assembly has been damaged or needs to be relocated, and the sign can be reused. Items 636 will govern new or replaced sign materials.

The intent of this item is to make repairs to sings that have useable foundations, legs, and signs. Minor repairs to bolt keepers, fuse plates, or sign adjustments may be required to maintain sign suitability.

Item 6044: Small Road Signs

New signs will not be required when a sign assembly has been damaged or needs to be relocated, and the sign can be reused. Items 636 will govern new or replaced sign materials.

The intent of this item is to make repairs to signs that have useable foundations, legs, and signs. Minor repairs to bolt keepers, fuse plates, or sign adjustments may be required to maintain sign suitability.

The primary use of this Item will be to make repairs to Exit Ramp Signs on Interstates that do not classify as a large sign. Repairs will be made under this Item to maintain the sign, and if the Engineer decides to replace payment will be made under the appropriate bid items.

Project Number: RMC 646735001 **Sheet 12**

County: Bowie, etc. **Control:** 6467-35-001

Highway: US0059, etc.

Item 6185: Truck Mounted Attenuator

The number of TMA's required will be determined by the type of work and applicable TCP. The Contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMA's needed for the project.

ESTIMATE SUMMARY

EST.	FINAL.	EST.	FINAL.	EST.	FINAL.	EST.	FINAL.	EST.	FINAL.	ALT	ITEM CODE ITEM NO.	ITEM CODE DESC. CODE	ITEM CODE SP NO.	DESCRIPTION	UNIT	TOTAL EST.	TOTAL FINAL
											0416	6016		DRILL SHAFT (SIGN MTS)(12 IN)	LF	25.00	
											0416	6018		DRILL SHAFT (SIGN MTS)(24 IN)	LF	192.00	
											0500	6033		MOBILIZATION(CALLOUT)	EA	15.00	
											0636	6001	001	ALUMINUM SIGNS (TY A)	SF	20.00	
											0636	6002	001	ALUMINUM SIGNS (TY G)	SF	1800.00	
											0636	6003	001	ALUMINUM SIGNS (TY O)	SF	600.00	
											0636	6007	001	REPLACE EXISTING ALUMINUM SIGNS (TY A)	SF	100.00	
											0636	6008	001	REPLACE EXISTING ALUMINUM SIGNS (TY G)	SF	3000.00	
											0636	6009	001	REPLACE EXISTING ALUMINUM SIGNS (TY O)	SF	2700.00	
											0644	6001		IN SM RD SN SUP&AM TY 10BWG(1)SA(P)	EA	2.00	
											0644	6004		IN SM RD SN SUP&AM TY 10BWG(1)SA(T)	EA	5.00	
											0644	6006		IN SM RD SN SUP&AM TY 10BWG(1)SA(T-EXAL)	EA	2.00	
											0644	6027		IN SM RD SN SUP&AM TY S80(1)SA(P)	EA	4.00	
											0644	6030		IN SM RD SN SUP&AM TY S80(1)SA(T)	EA	2.00	
											0644	6032		IN SM RD SN SUP&AM TY S80(1)SA(T-EXAL)	EA	3.00	
											0644	6051		IN SM RD SN SUP&AM TY S80(2)SA(P-EXAL)	EA	35.00	
											0644	6060		IN SM RD SN SUP&AM TY TWT(1)WS(P)	EA	2.00	
											0644	6067		IN SM RD SN SUP&AM (INST SIGN ONLY)	EA	2.00	
											0644	6077		REMOVE BRDG MTN CLEARANCE SIGN ASSM	EA	5.00	
											0647	6001		INSTALL LRSS (STRUCT STEEL)	LB	11000.00	
											0647	6002		RELOCATE LRSA	EA	4.00	
											0647	6003		REMOVE LRSA	EA	25.00	
											0650	6203		RELOCATE EXISTING OVERHD SIGN SUP	EA	1.00	
											0650	6204		REMOVE OVERHD SIGN SUP	EA	2.00	
											0690	6027		REMOVAL OF SIGNAL RELATED SIGNS	EA	10.00	
											0690	6028		REPLACE OF SIGNAL RELATED SIGNS	EA	80.00	
											0690	6029		INSTALL OF SIGNAL RELATED SIGNS	EA	15.00	
											0752	6022		TREE TRIMMING AND BRUSH REMOVAL	LF	1500.00	
											6043	6001		REPAIR LG RDSD SIGN SUPT & ASSEMBLIES	EA	18.00	
											6044	6001		REPAIR SM RDSD SIGN SUPP & ASSEM	EA	20.00	
											6044	6004		REPAIR LG RDSD SIGN SUPP & ASSEM	EA	10.00	
											6001	6001		PORTABE CHANGEABLE MESSAGE SIGN	DAY	30.00	
											6185	6002	002	TMA (STATIONARY)	DAY	60.00	

ESTIMATE & QUANTITY SHEET

ESTIMATE AND QUANTITY

FHWA TEXAS DIVISION	MAINTENANCE PROJECT NO.	SHEET NO.
	646735001	13

STATE	DISTRICT	COUNTY	
TEXAS	ATL	BOWIE, ETC.	
CONTROL	SECTION	JOB	HIGHWAY NO.
6467	35	001	US 59, ETC.

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	6467	35	001	US 59 ETC.
	DIST	COUNTY		SHEET NO.
	ATL	BOWIE ETC.		14

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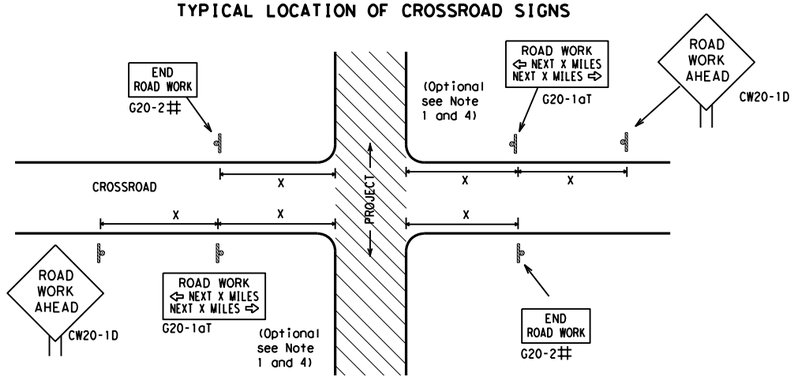
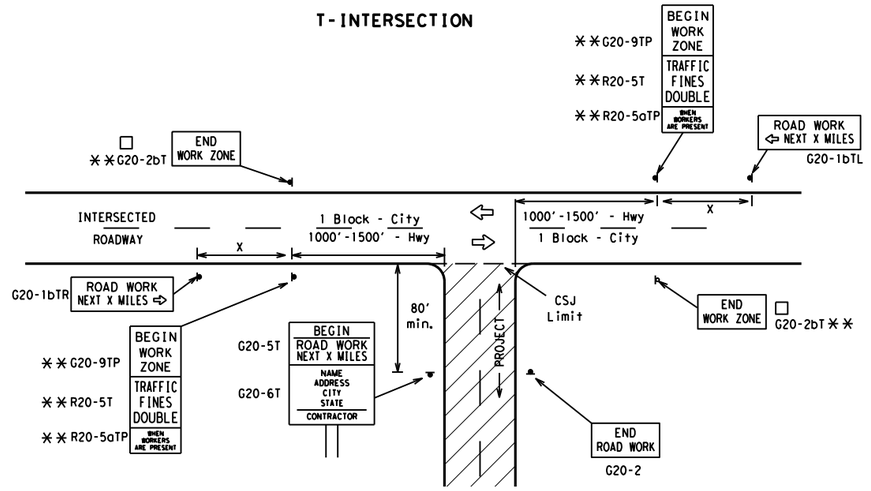
TYPICAL LOCATION OF CROSSROAD SIGNS



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[1,5,6]

SIZE

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

SPACING

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

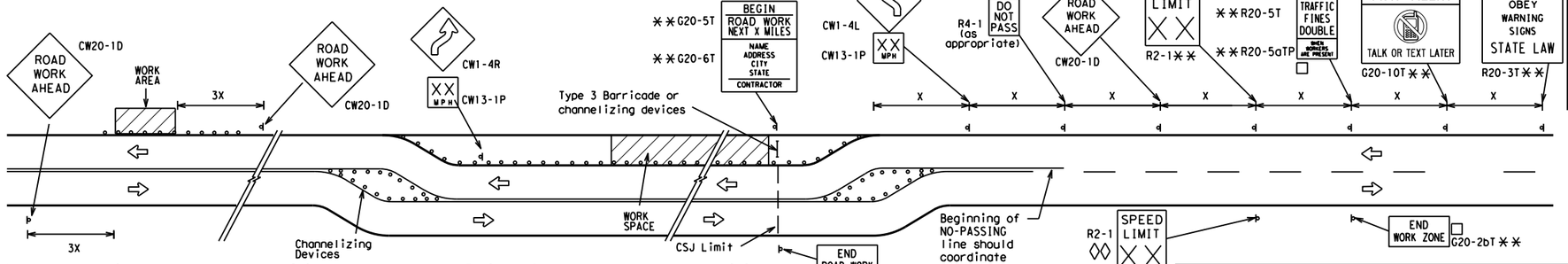
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

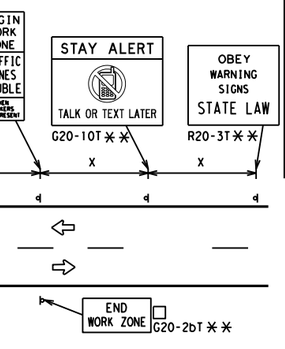
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

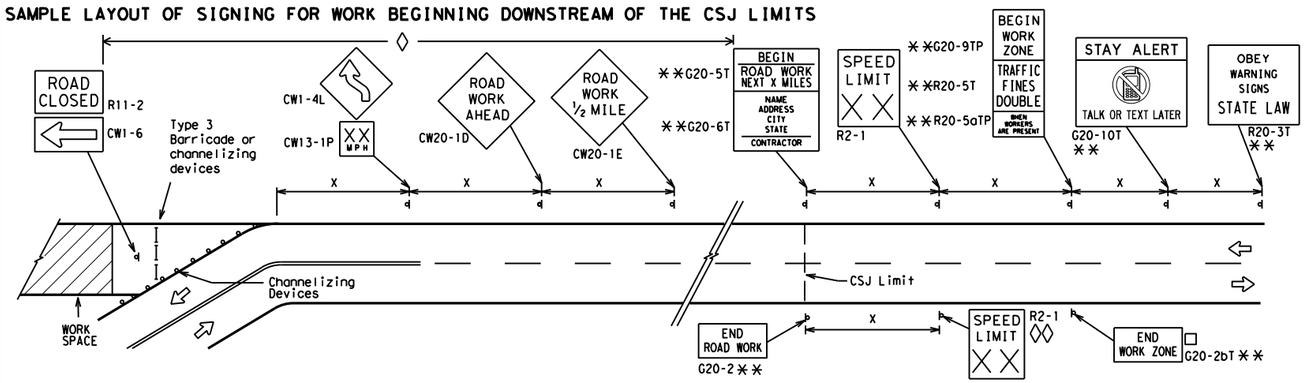


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ATL	BOWIE ETC.		15

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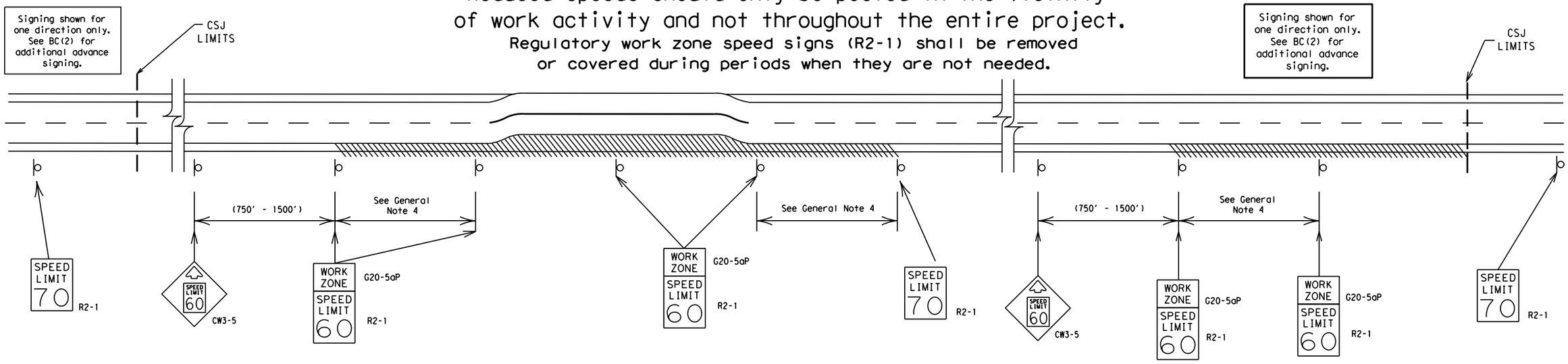
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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:

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	6467	35	001	US 59 ETC.
	DIST	COUNTY		SHEET NO.
	ATL	BOWIE ETC.		16

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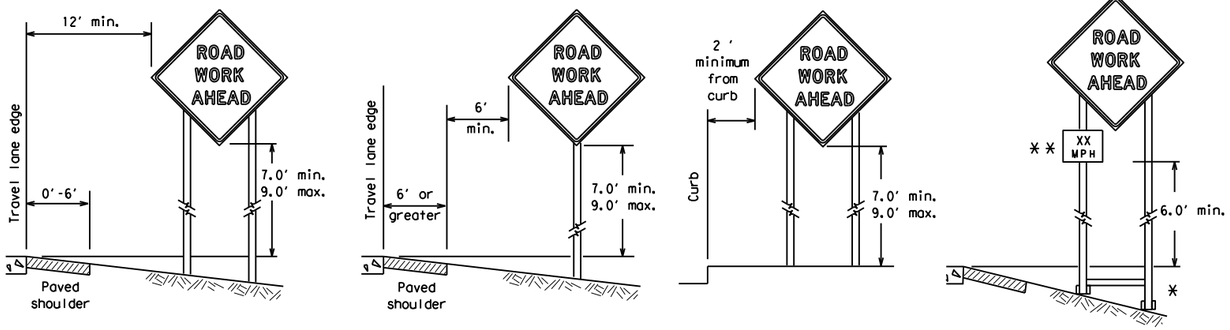
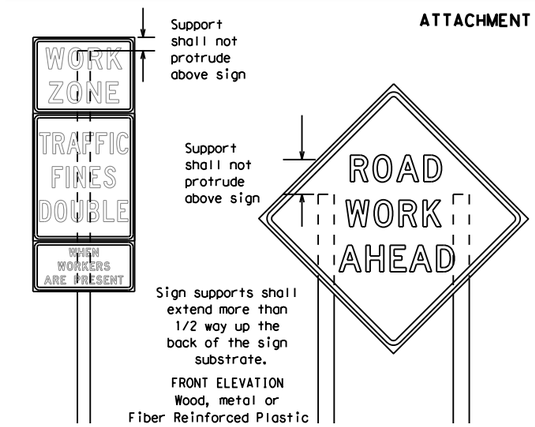
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

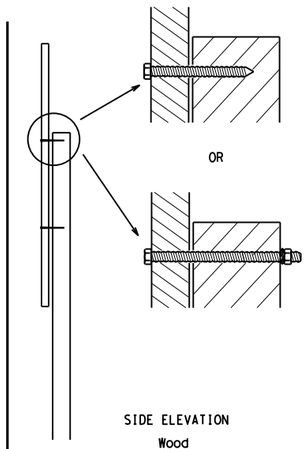


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





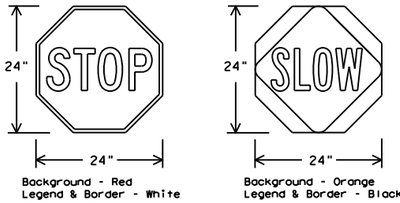
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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 spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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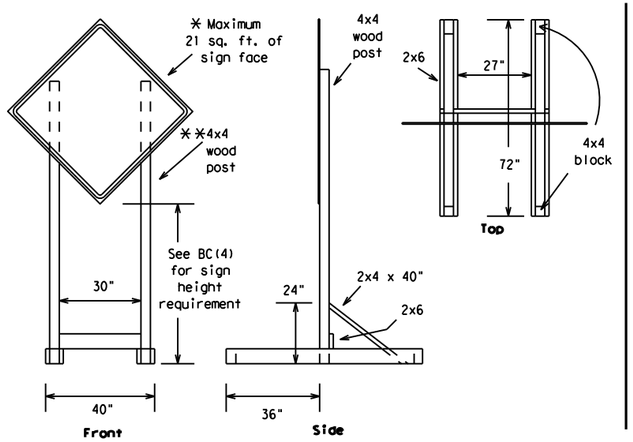
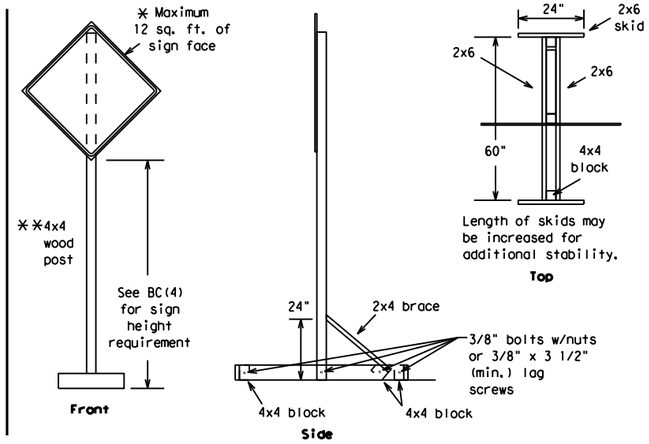
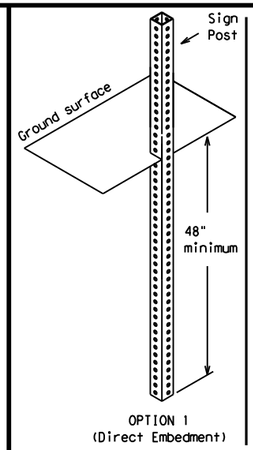
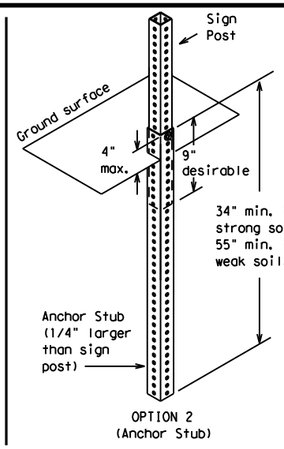


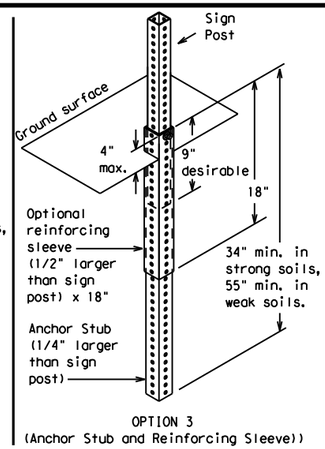


SKID MOUNTED WOOD SIGN SUPPORTS

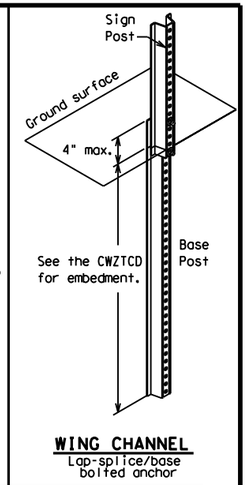
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







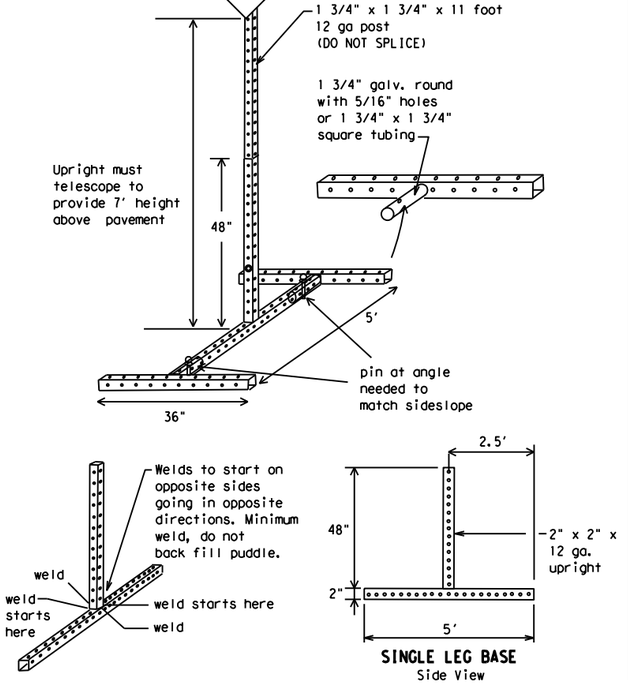
PERFORATED SQUARE METAL TUBING

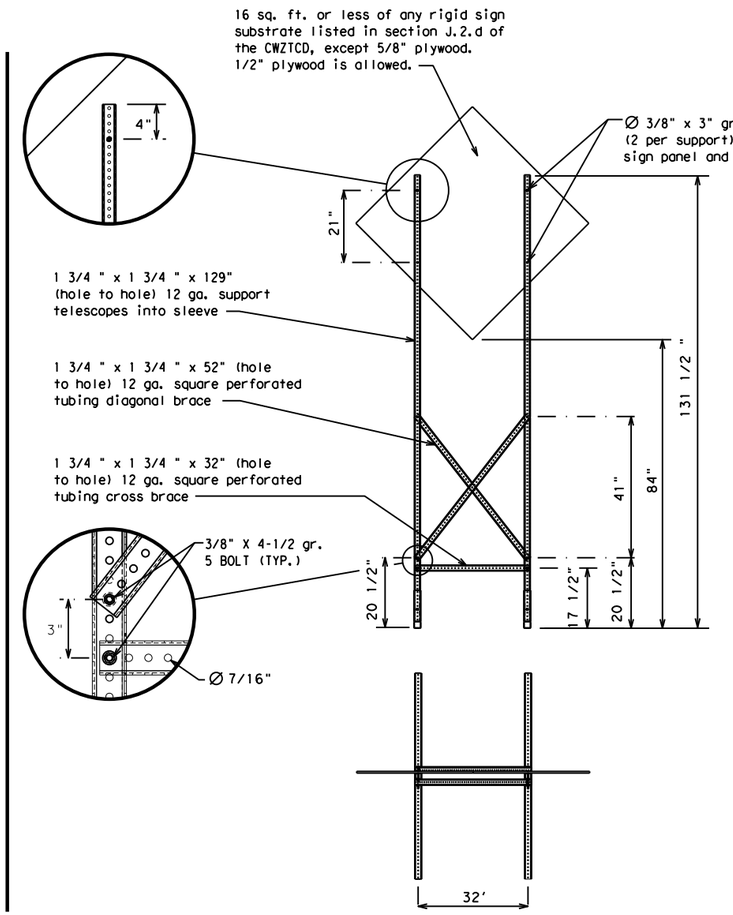


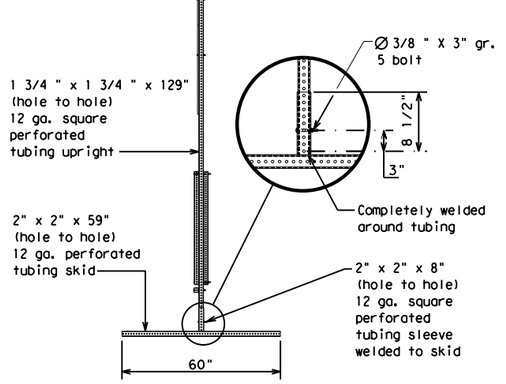
WING CHANNEL
Lap-splice/base bolted anchor

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.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ATL	BOWIE ETC.		18

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
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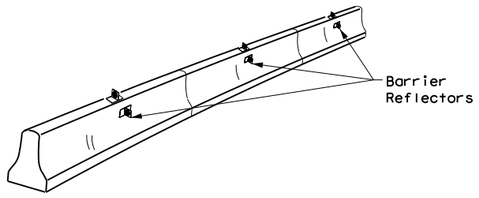
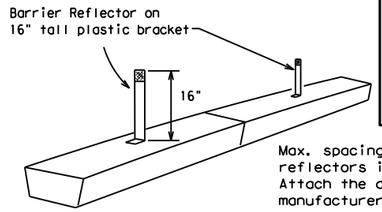
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

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

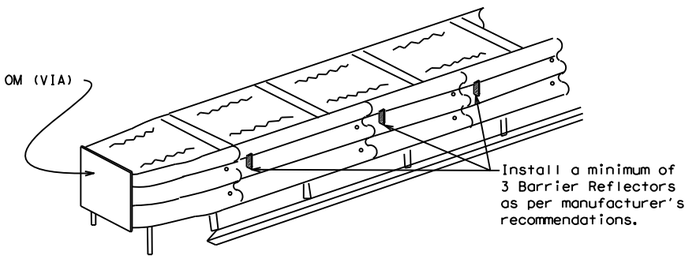


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

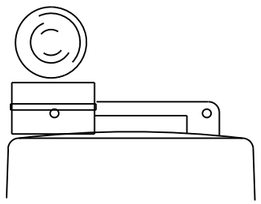


DELINEATION OF END TREATMENTS

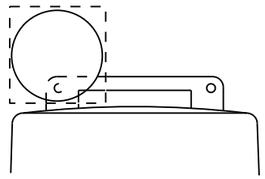
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

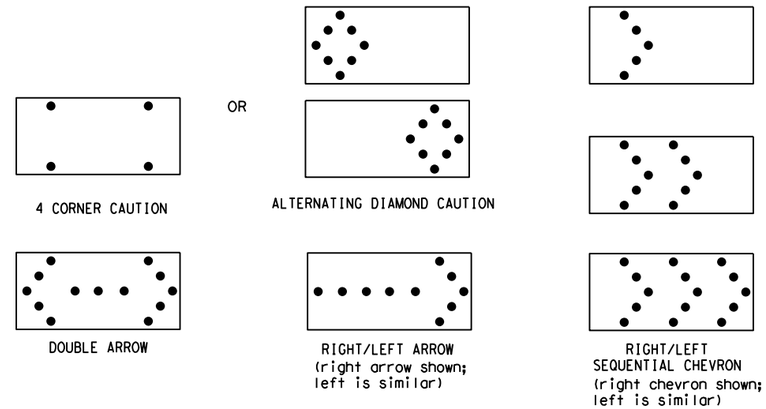
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
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7-13 5-21	ATL	BOWIE ETC.		20

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

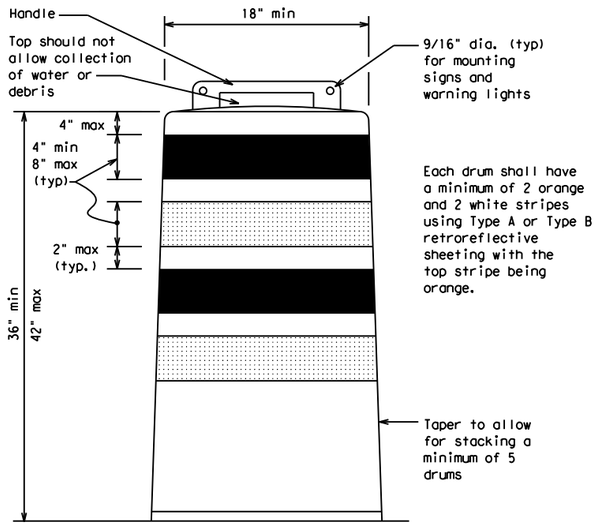
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

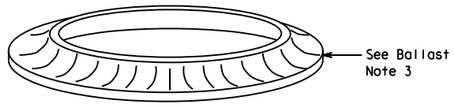
RETROREFLECTIVE SHEETING

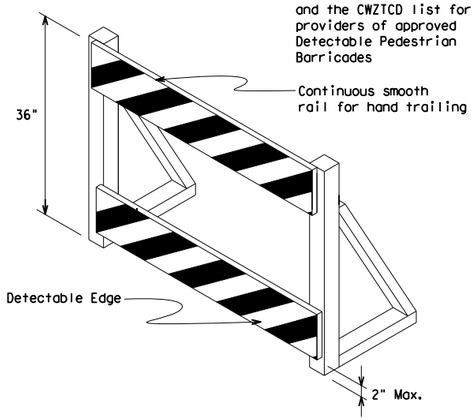
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

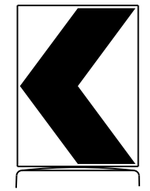




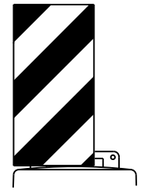


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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REVISIONS	6467	35	001	US 59 ETC.
4-03 8-14	DIST	COUNTY		SHEET NO.
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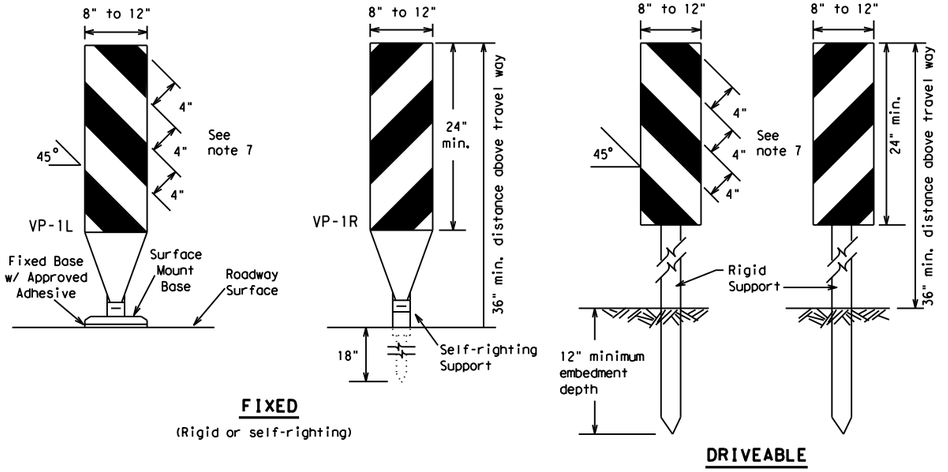
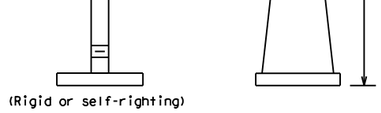


FIXED
(Rigid or self-righting)

DRIVEABLE

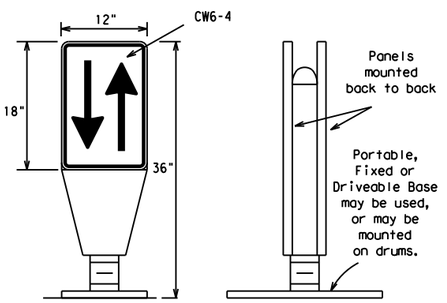


(Rigid or self-righting)

PORTABLE

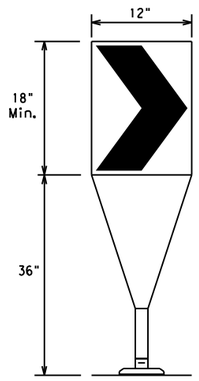
VERTICAL PANELS (VPs)

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



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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



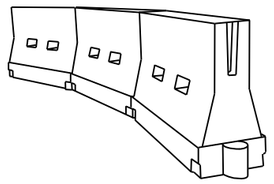
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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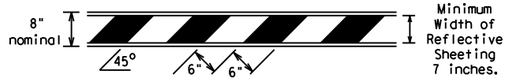
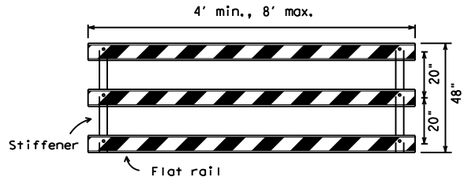
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



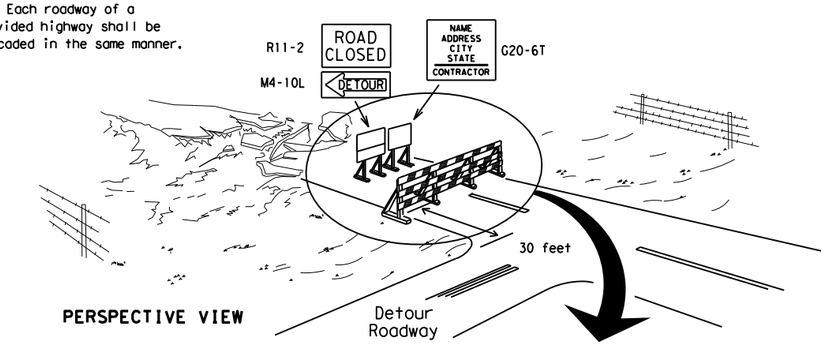
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

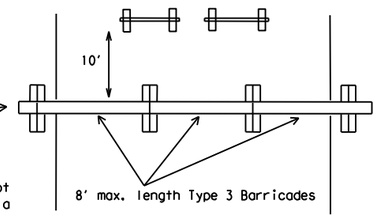
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

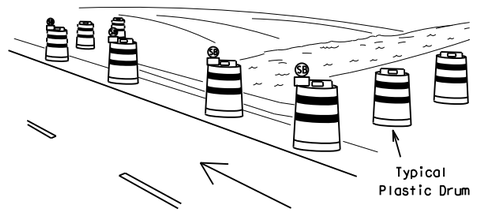
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

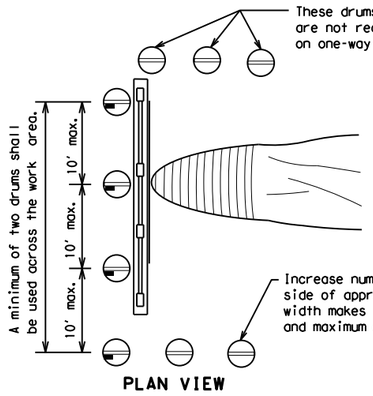
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

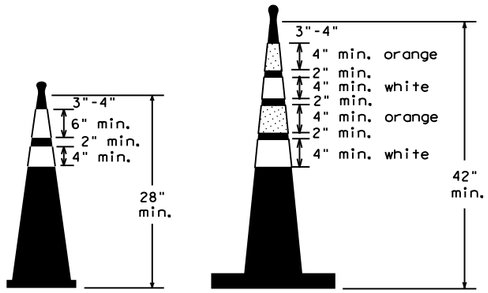
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

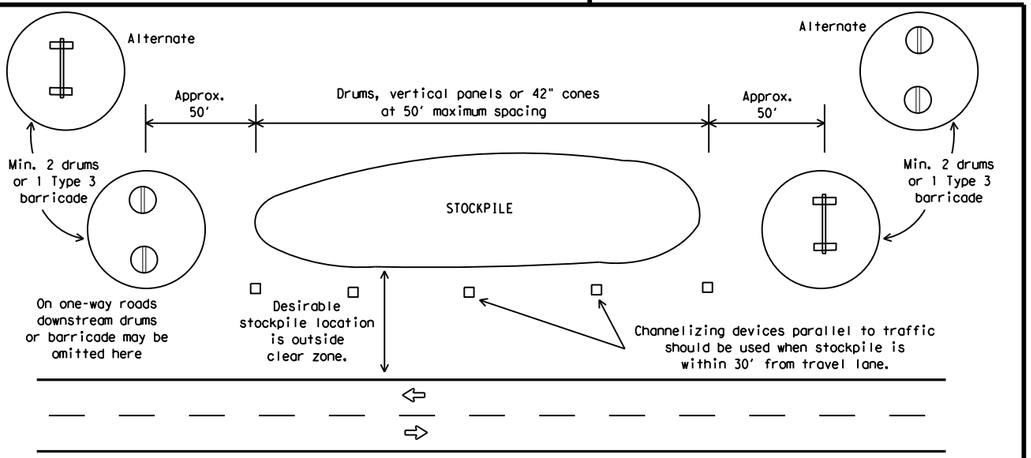
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

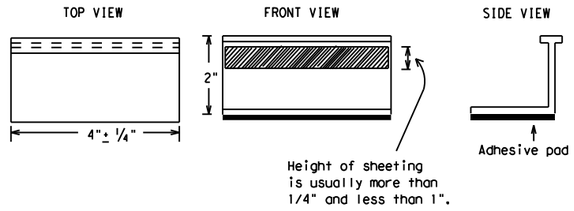
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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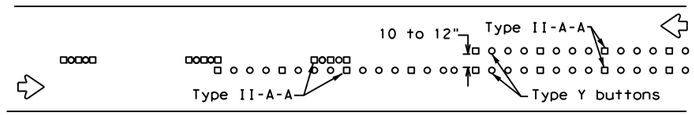
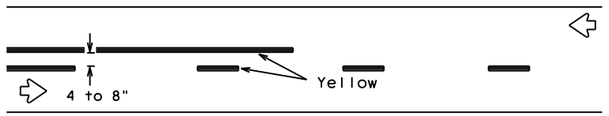
PAVEMENT MARKING PATTERNS

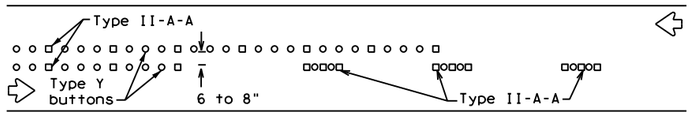
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



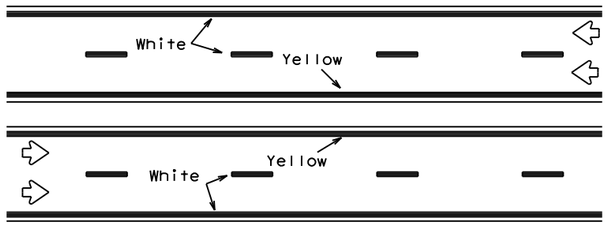
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



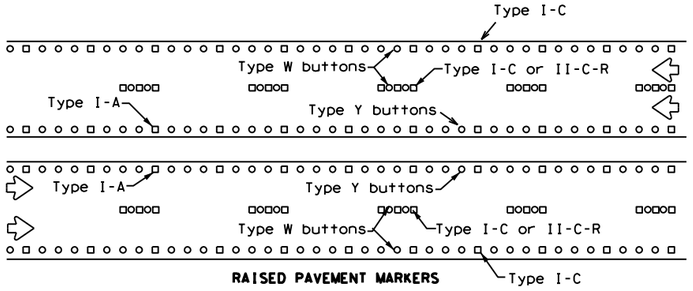
RAISED PAVEMENT MARKERS - PATTERN B

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

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



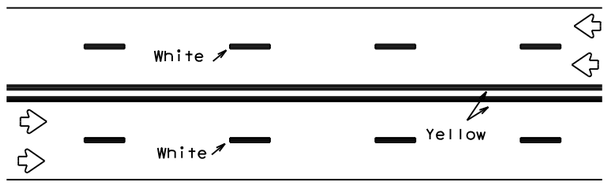
REFLECTORIZED PAVEMENT MARKINGS



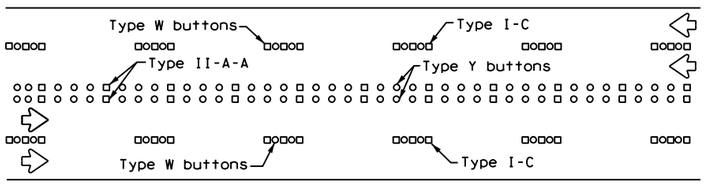
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



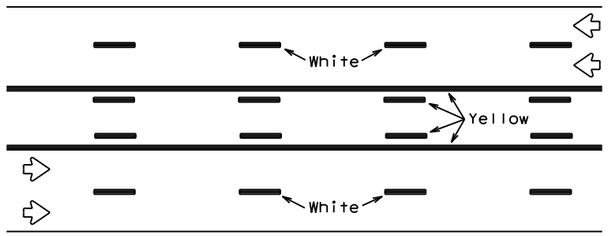
REFLECTORIZED PAVEMENT MARKINGS



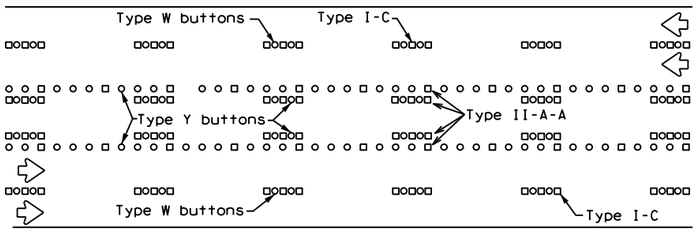
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

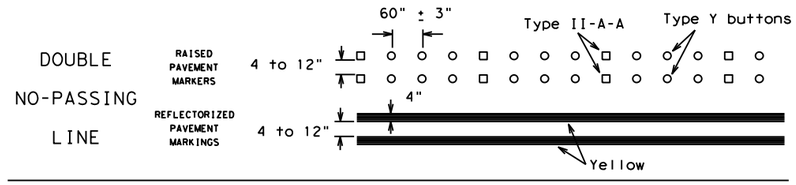
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

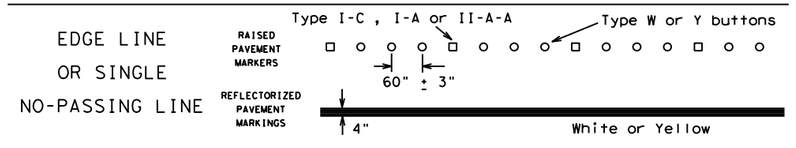
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

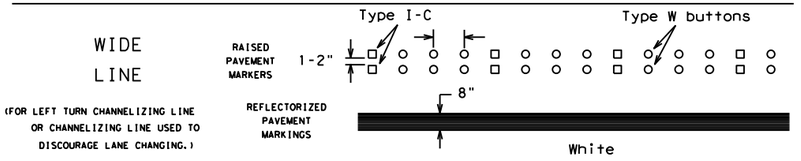


EDGE LINE OR SINGLE NO-PASSING LINE



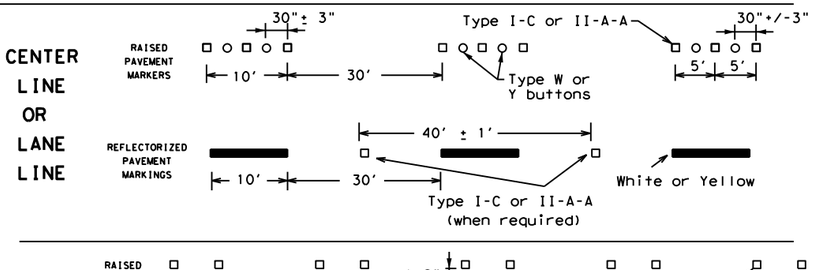
WIDE LINE

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

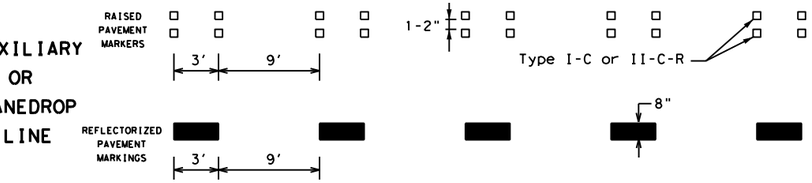


BROKEN LINES

CENTER LINE OR LANE LINE

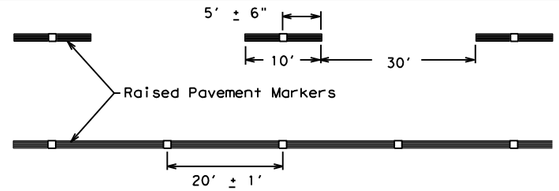


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	6467	35	001	US 59 ETC.
	DIST	COUNTY		SHEET NO.
	ATL	BOWIE ETC.		25

106

DATE: 4/22/2024 2:26:35 PM
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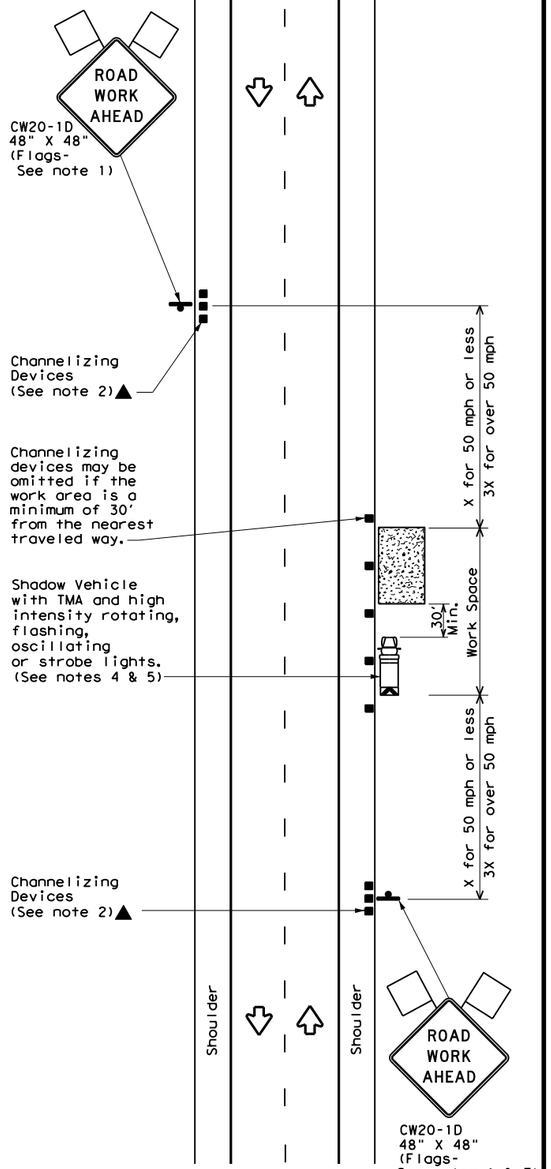
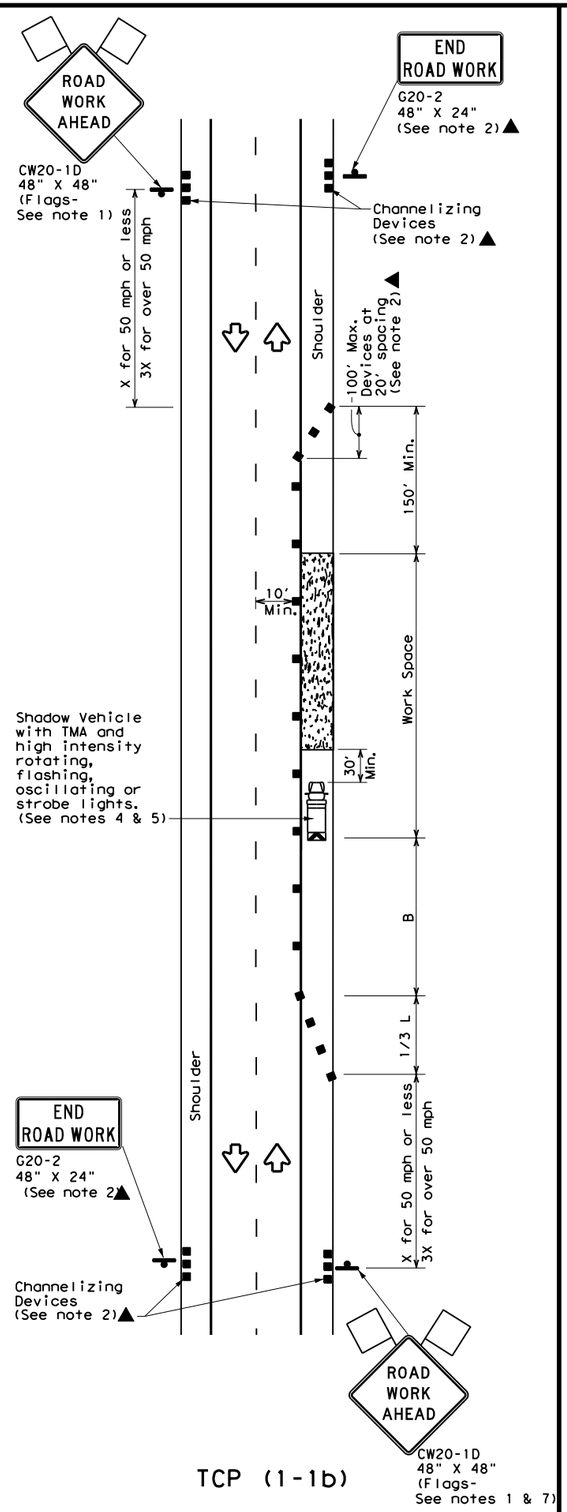


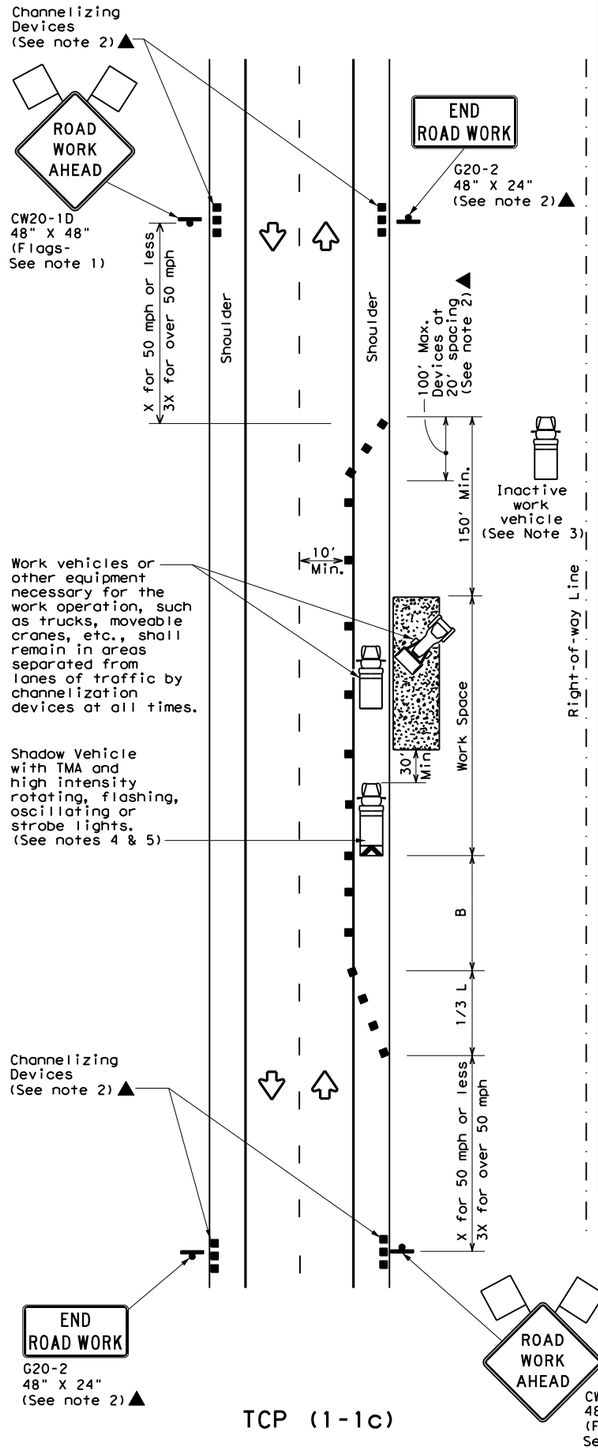
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

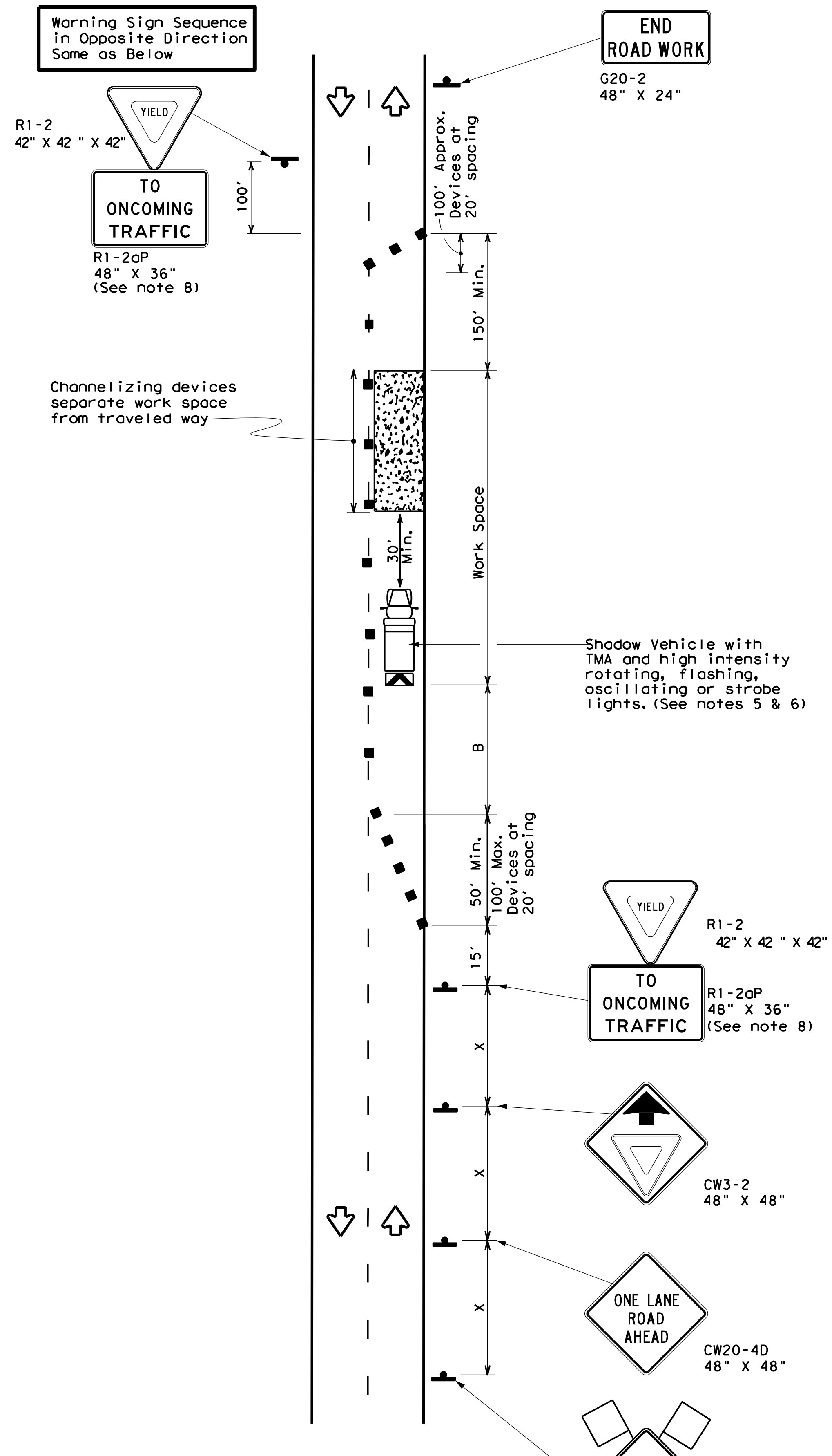
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

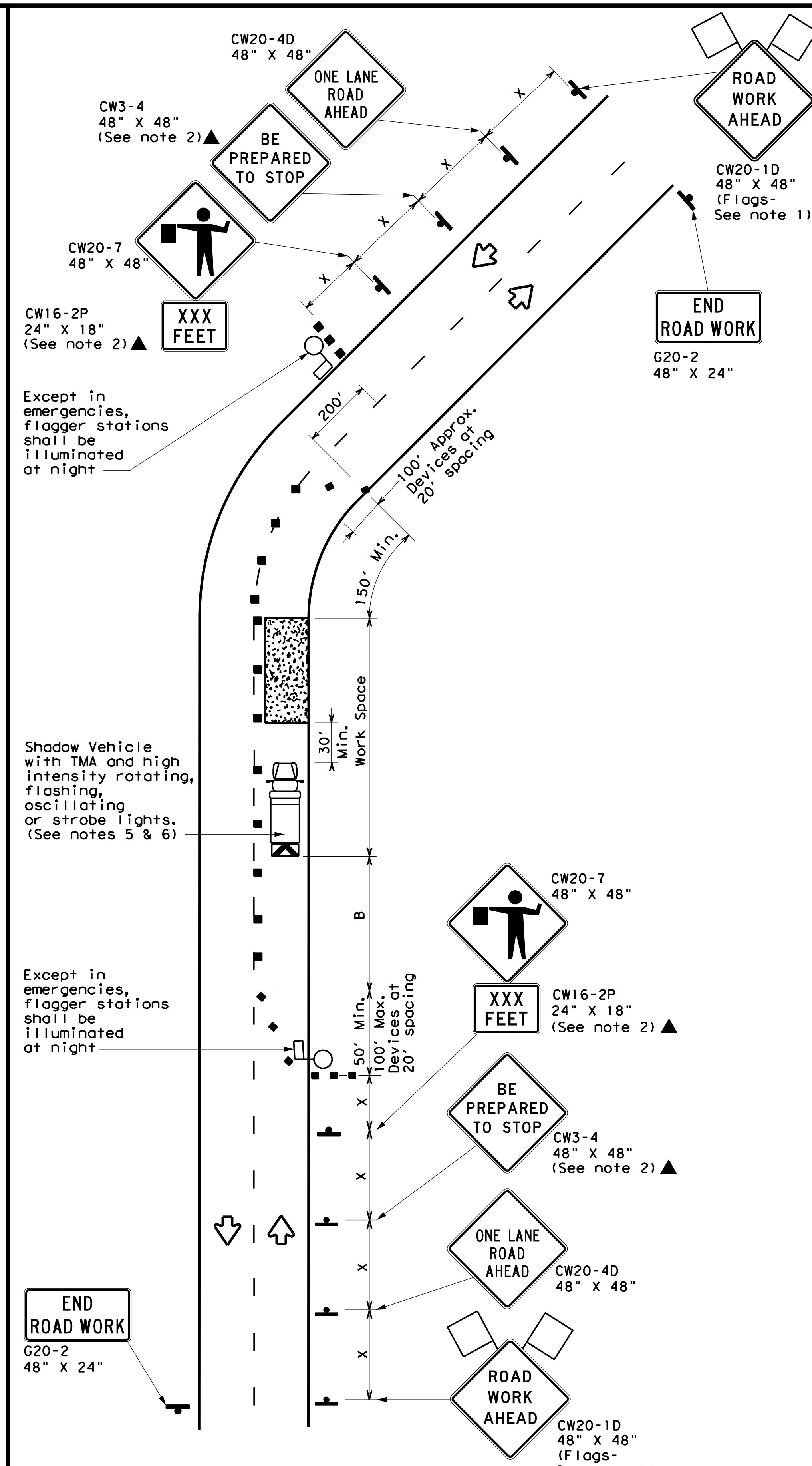
FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98	6467	35	001	US 59 ETC.
8-95 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	ATL	BOWIE ETC.		26



TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

LEGEND

▭	Type 3 Barricade	▪▪	Channelizing Devices
▭	Heavy Work Vehicle	▲	Truck Mounted Attenuator (TMA)
▭	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
▬	Sign	⇦	Traffic Flow
◇	Flag	○	Flagger

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT 6467	SECT 35	JOB 001	HIGHWAY US 59 ETC.
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	DIST ATL	COUNTY BOWIE ETC.		SHEET NO. 27

DATE: 4/22/2024 2:28:02 PM
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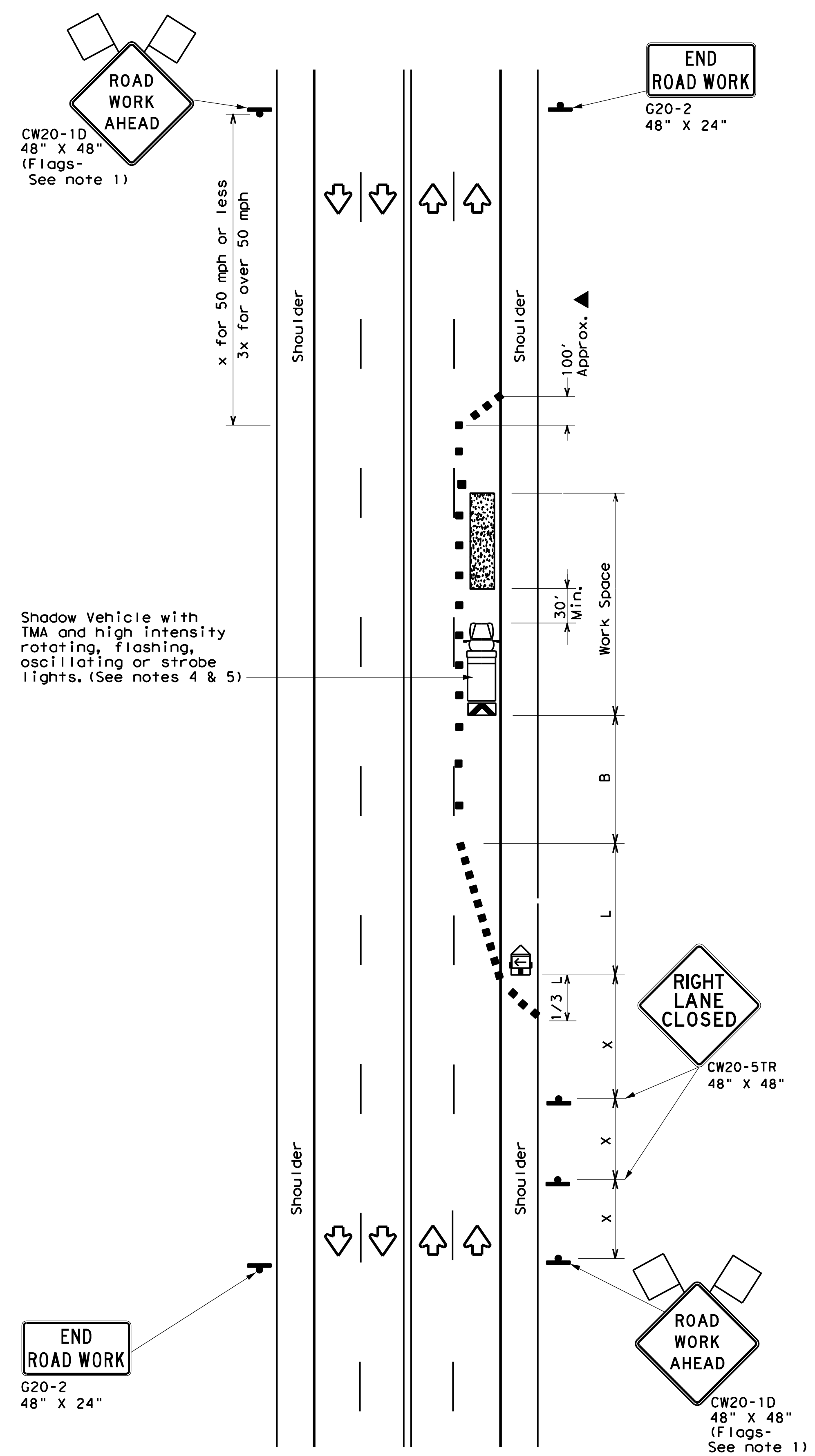
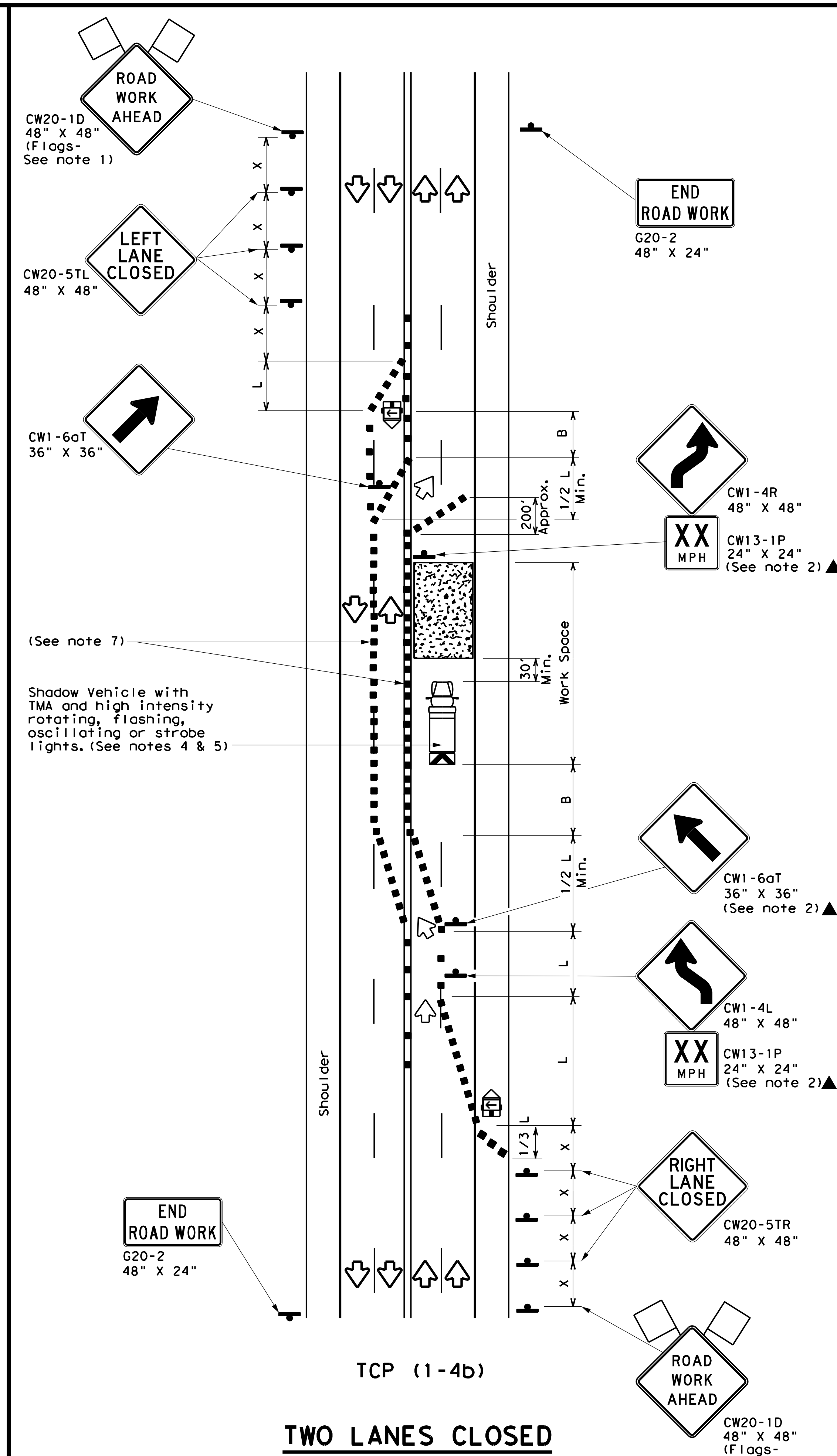


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

LEGEND

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

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	6467	35	001	US 59 ETC.
	DIST		COUNTY	SHEET NO.
	ATL		BOWIE ETC.	28

154

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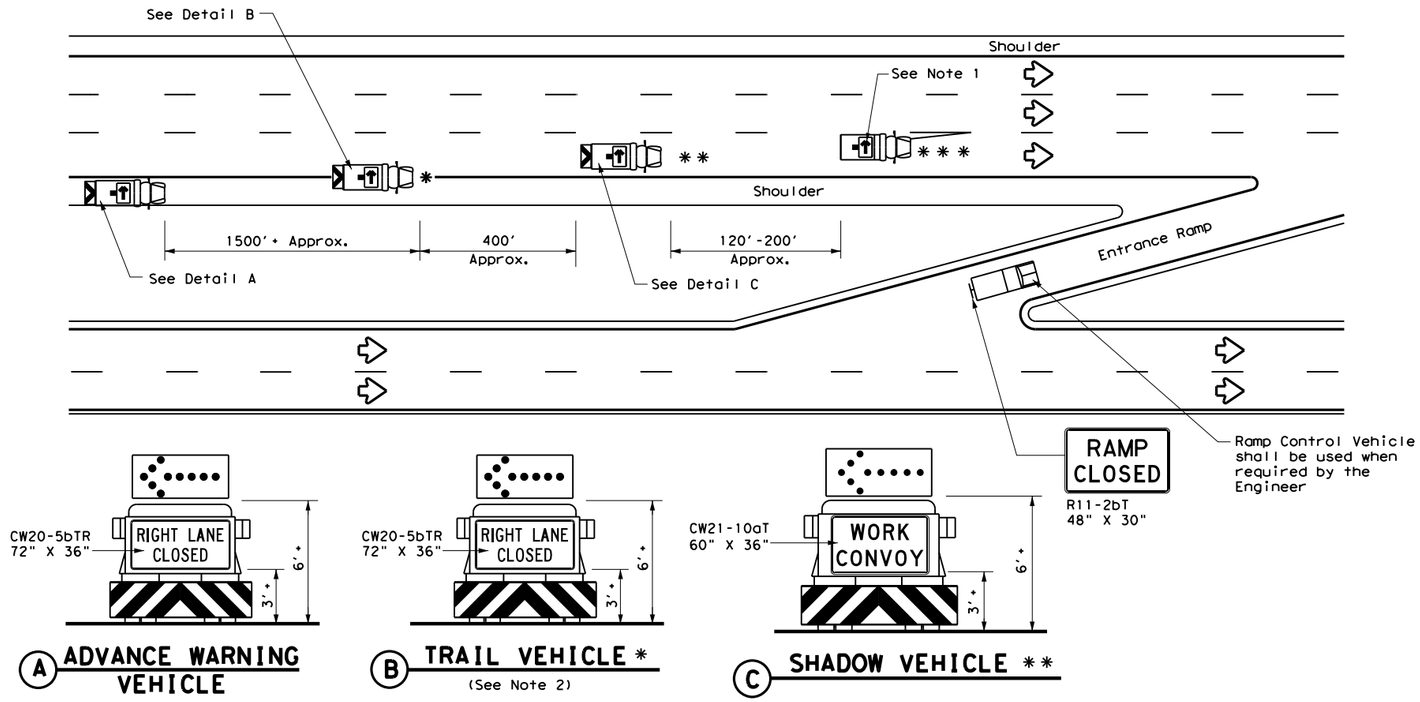
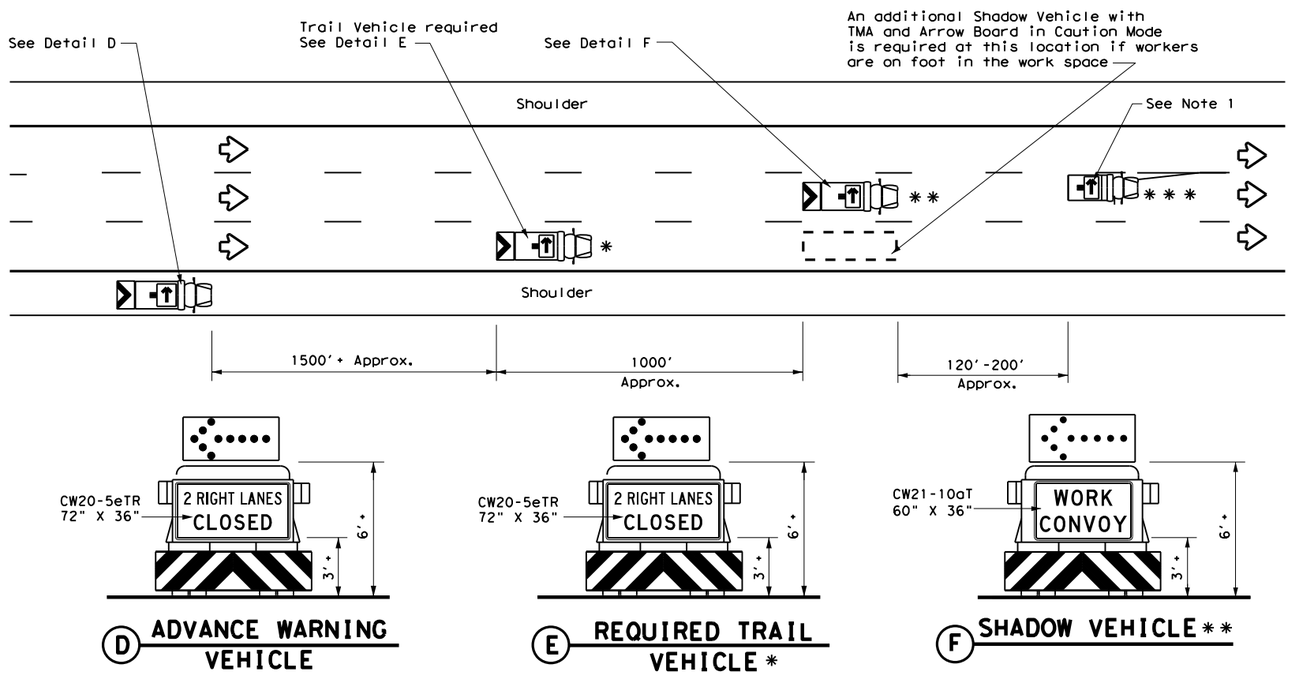


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



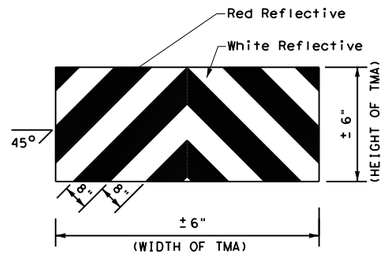
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	6467	35	001	US 59 ETC.
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	ATL	BOWIE ETC.		29

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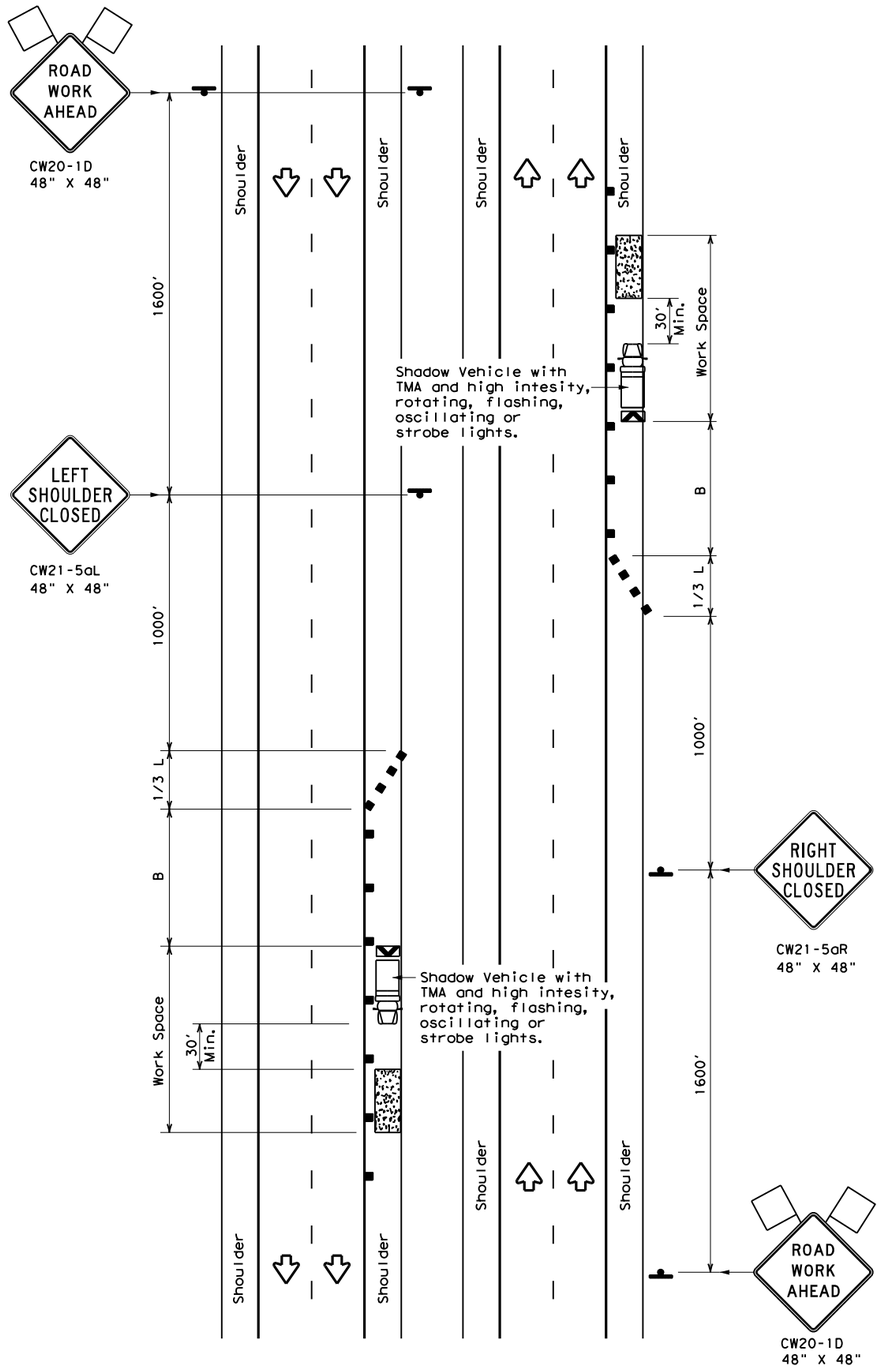
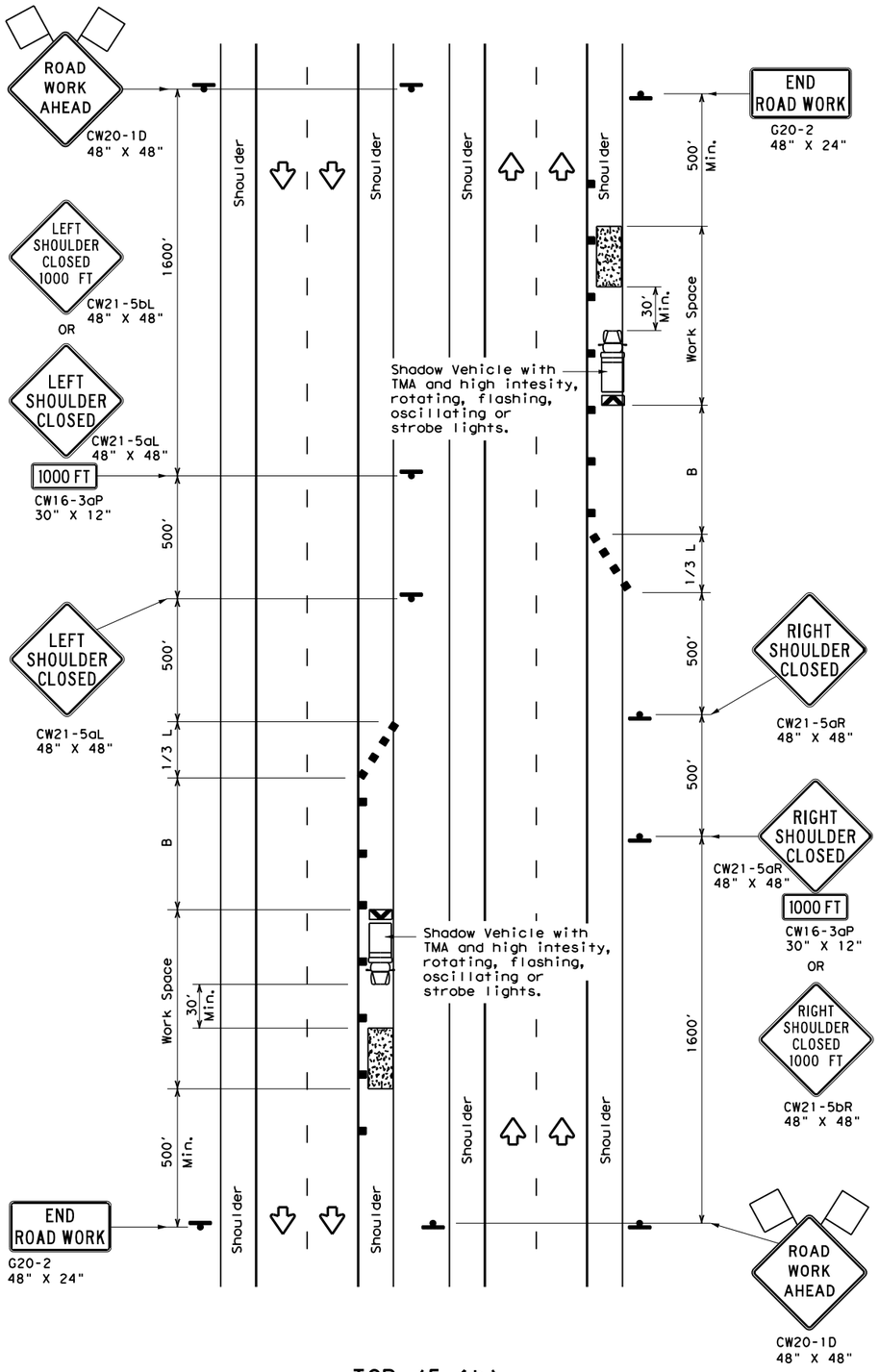


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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

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

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	ATL	BOWIE ETC.		30

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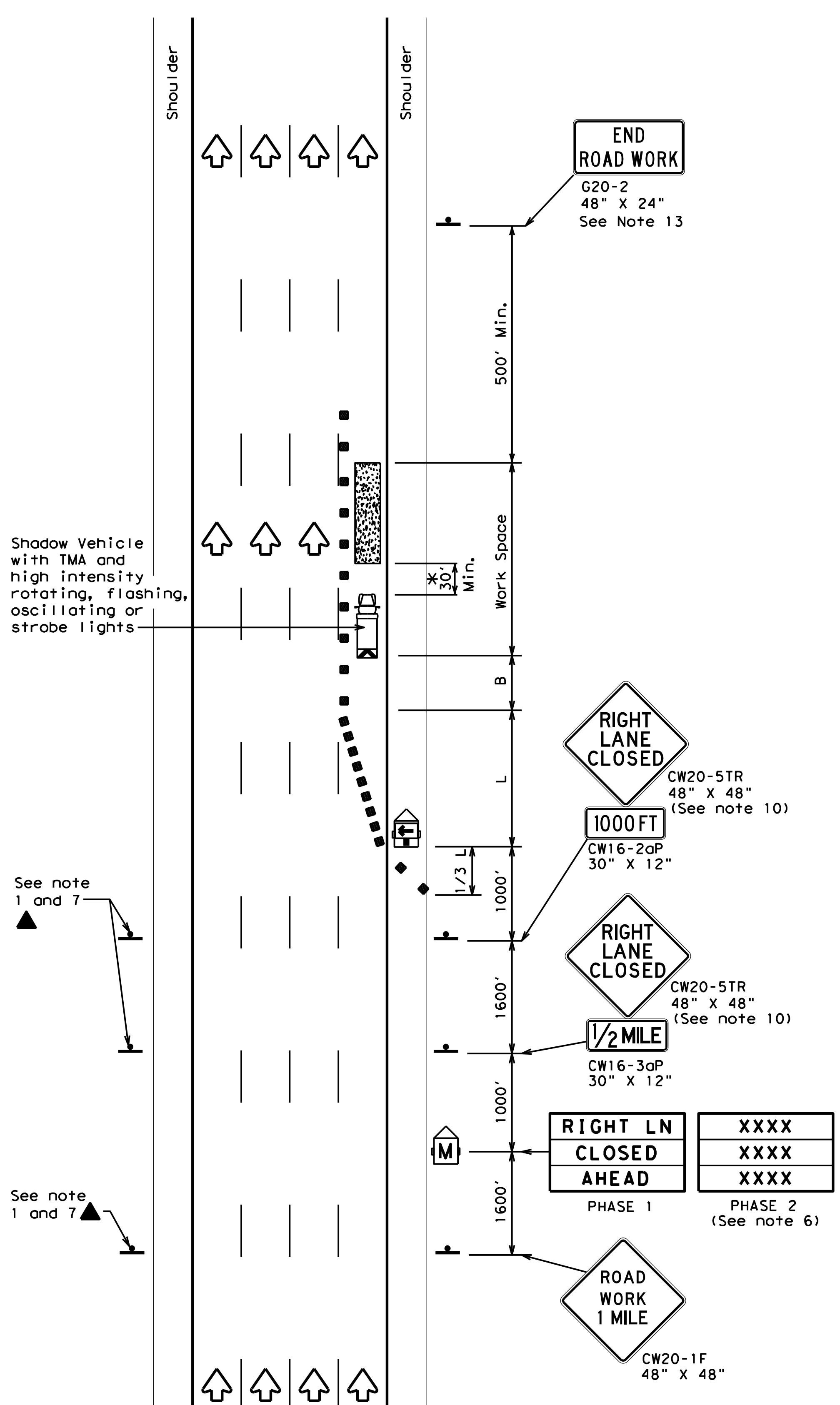
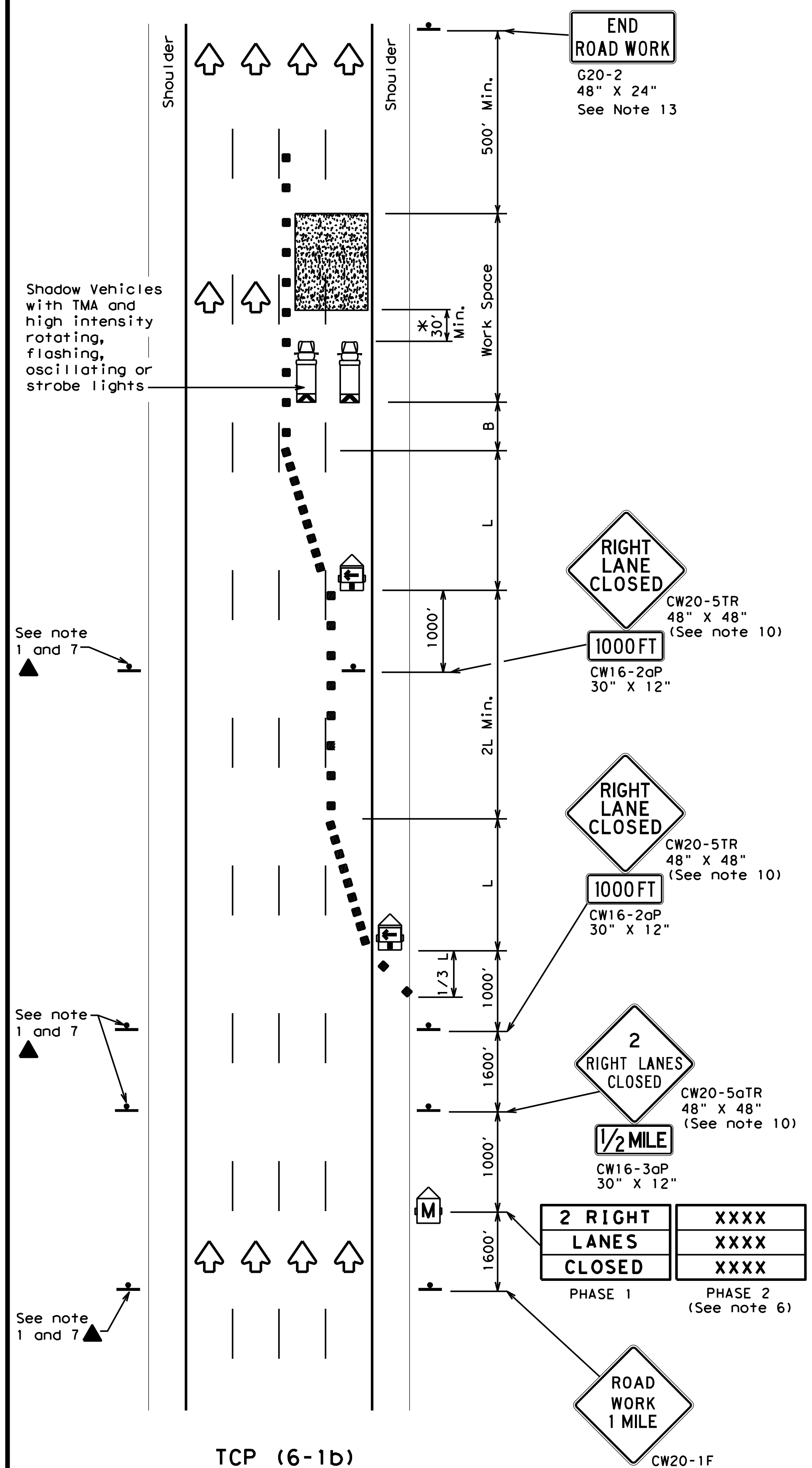


TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

LEGEND

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT 6467	SECT 35	JOB 001	HIGHWAY US 59 ETC.
REVISIONS 8-12	DIST ATL		COUNTY BOWIE ETC.	SHEET NO. 31

201

DATE: 4/22/2024 2:44:42 PM
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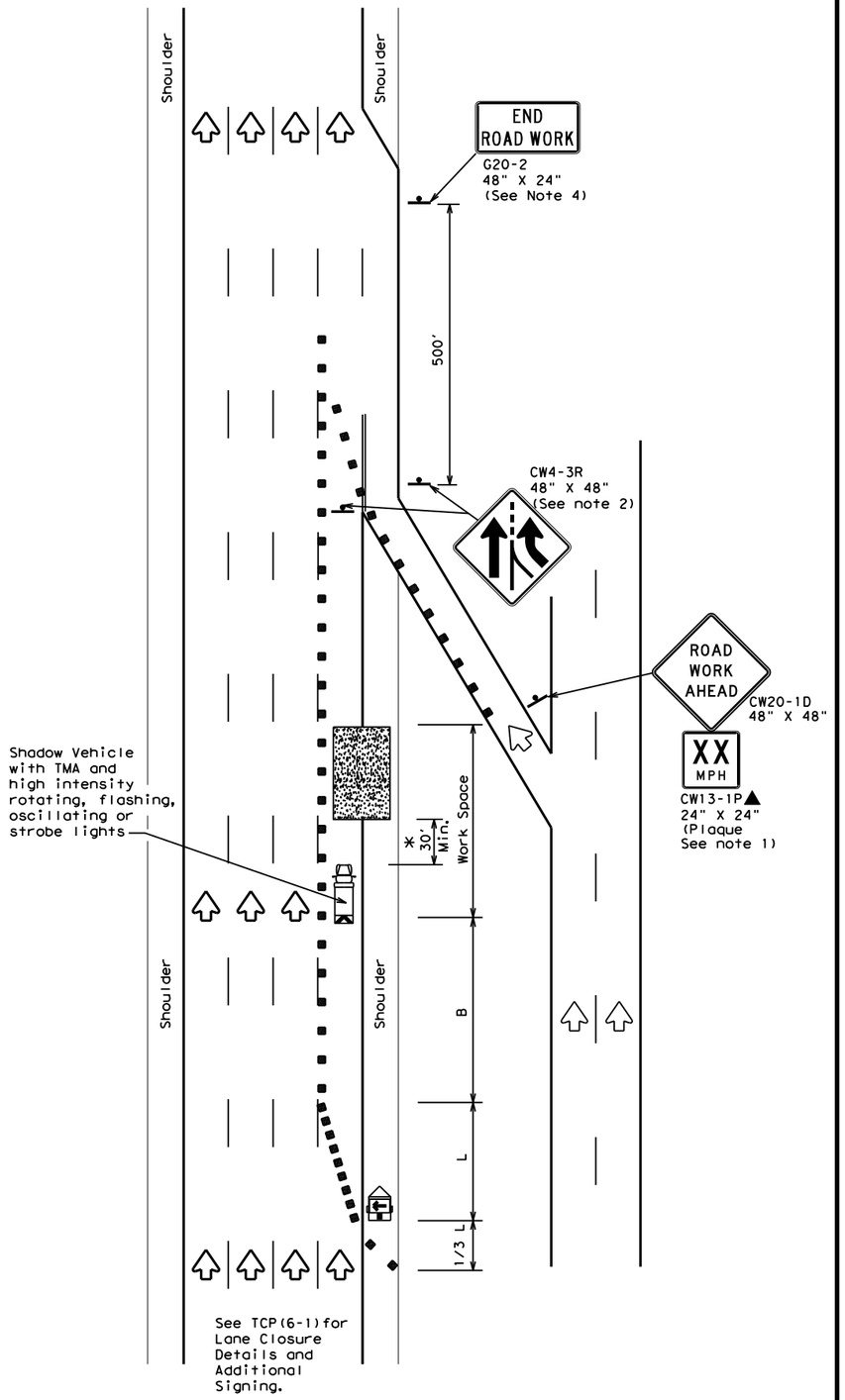
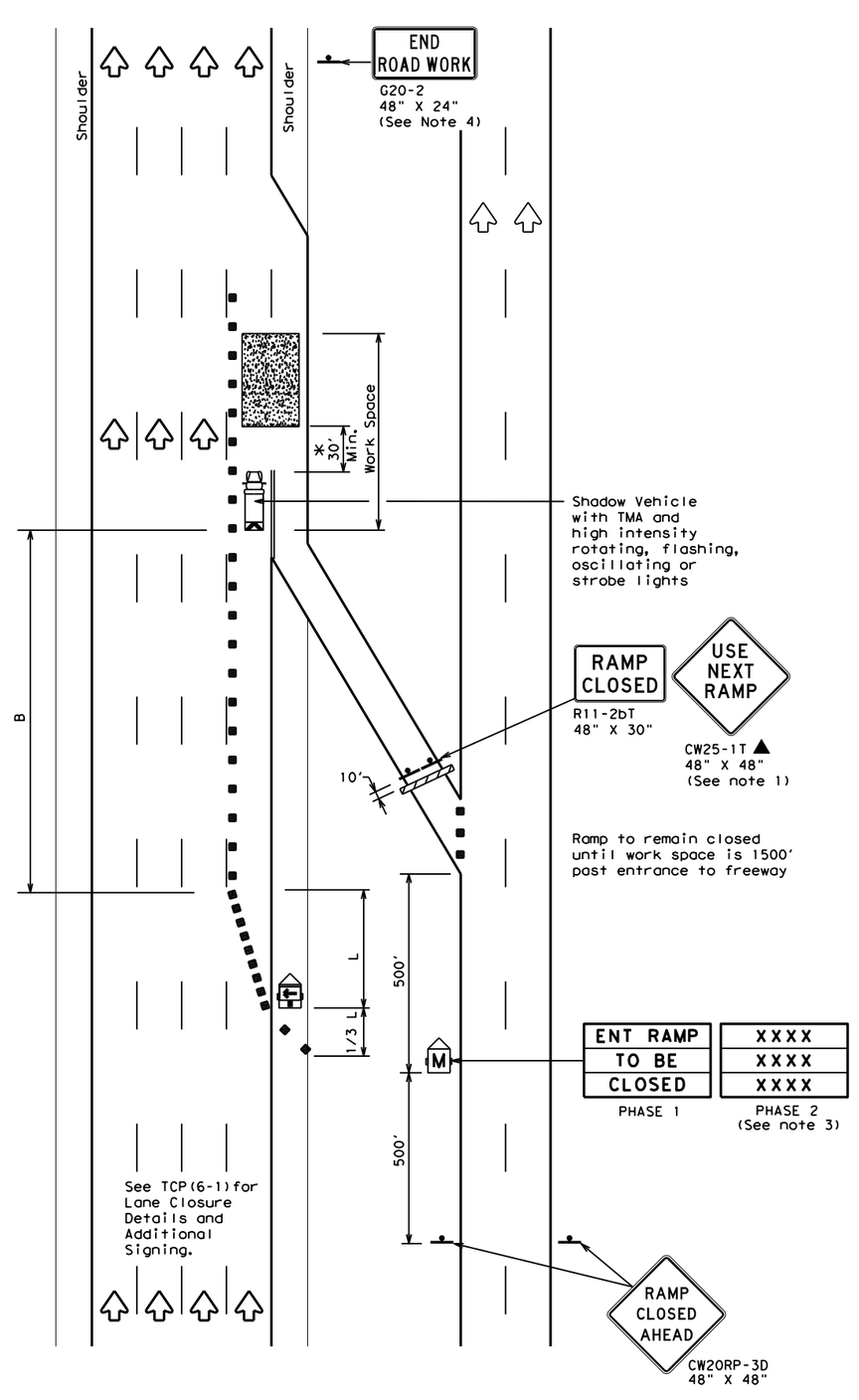


TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	ATL	BOWIE ETC.		32

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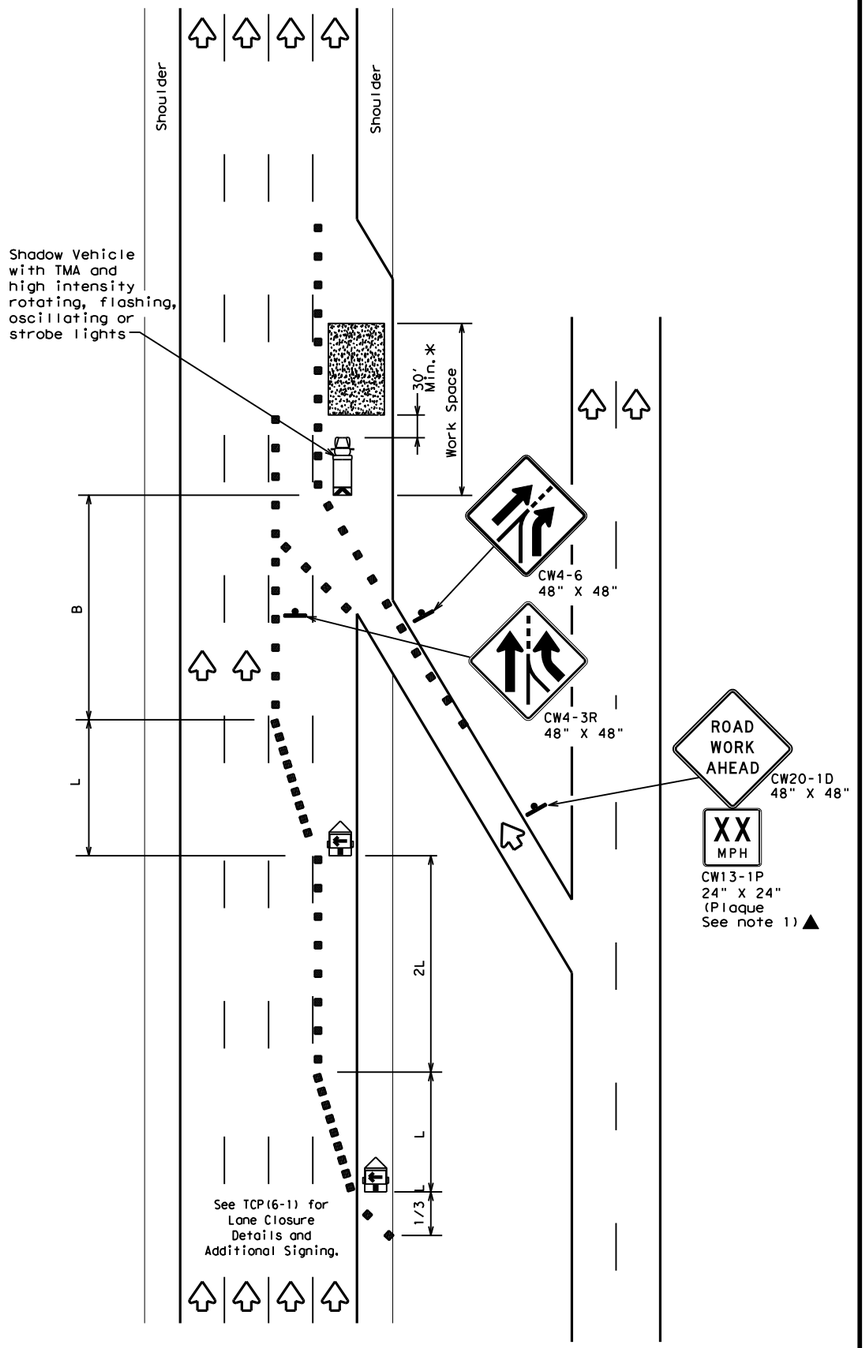
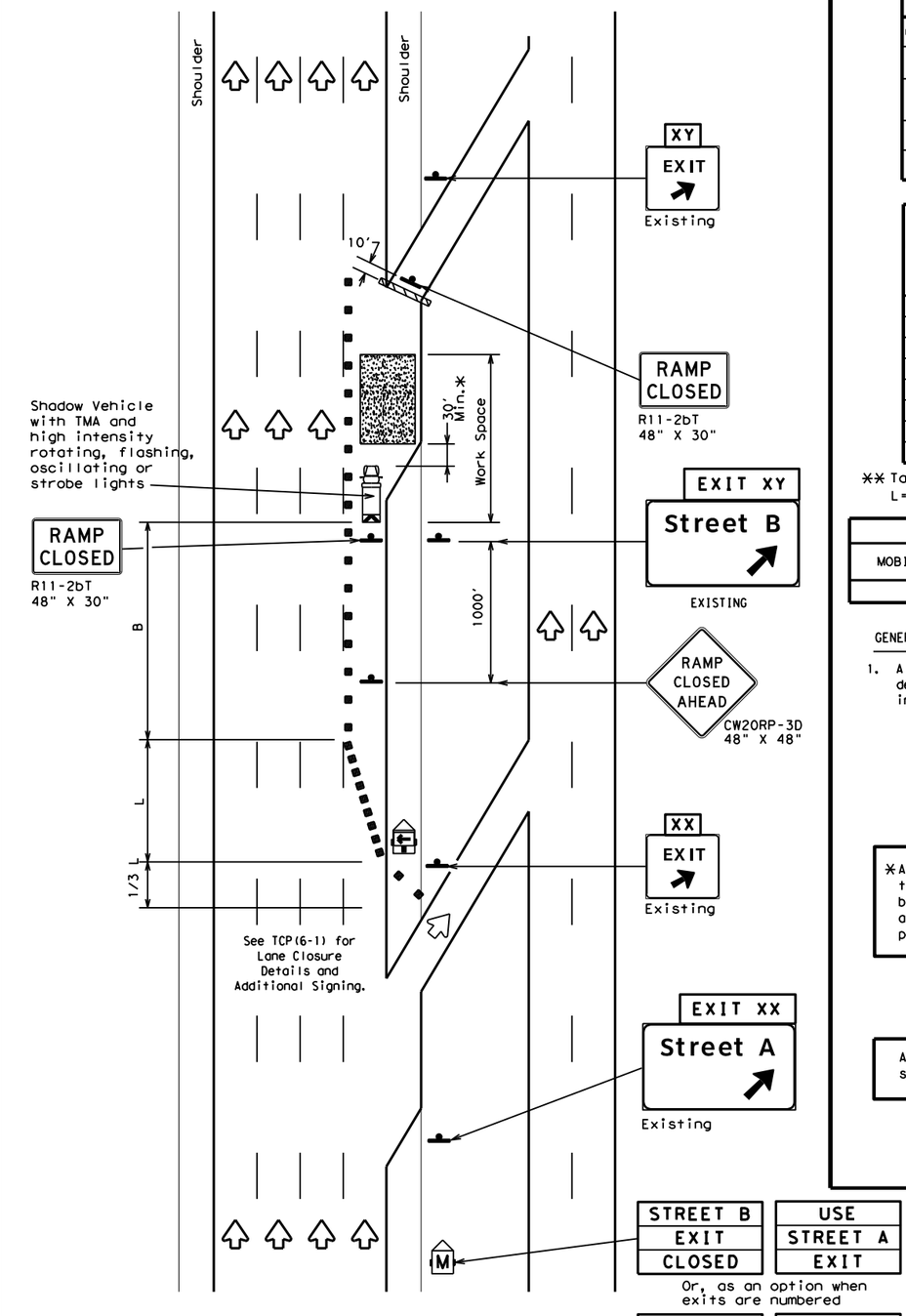


TCP (6-3a)

ENTRANCE RAMP OPEN



STREET B	USE
EXIT	STREET A
CLOSED	EXIT

Or, as an option when exits are numbered

EXIT XY	USE
CLOSED	EXIT XX

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

TCP (6-3b)

EXIT RAMP CLOSED
TRAFFIC EXITS PRIOR TO CLOSED RAMP

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

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

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

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

GENERAL NOTES:

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

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©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	ATL	BOWIE ETC.		33

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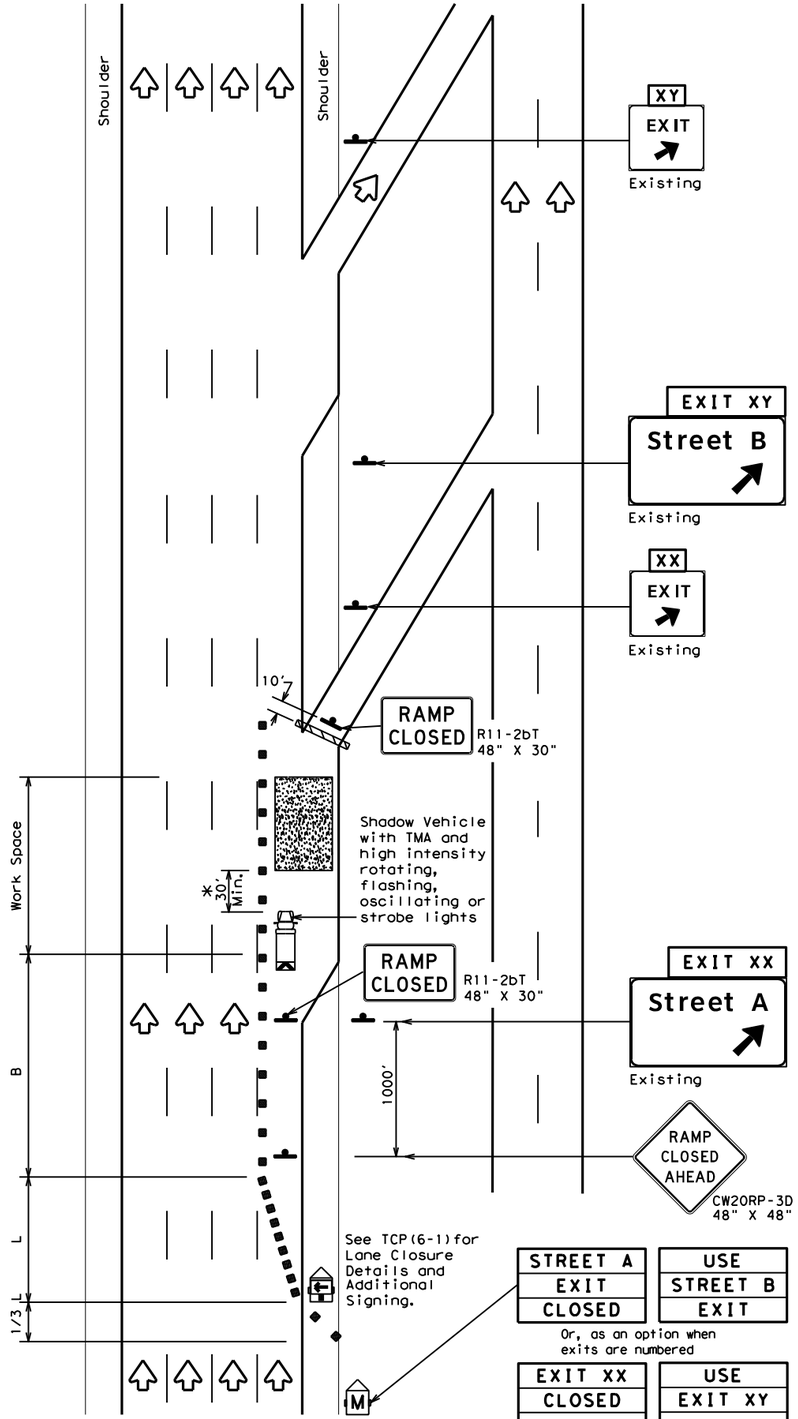
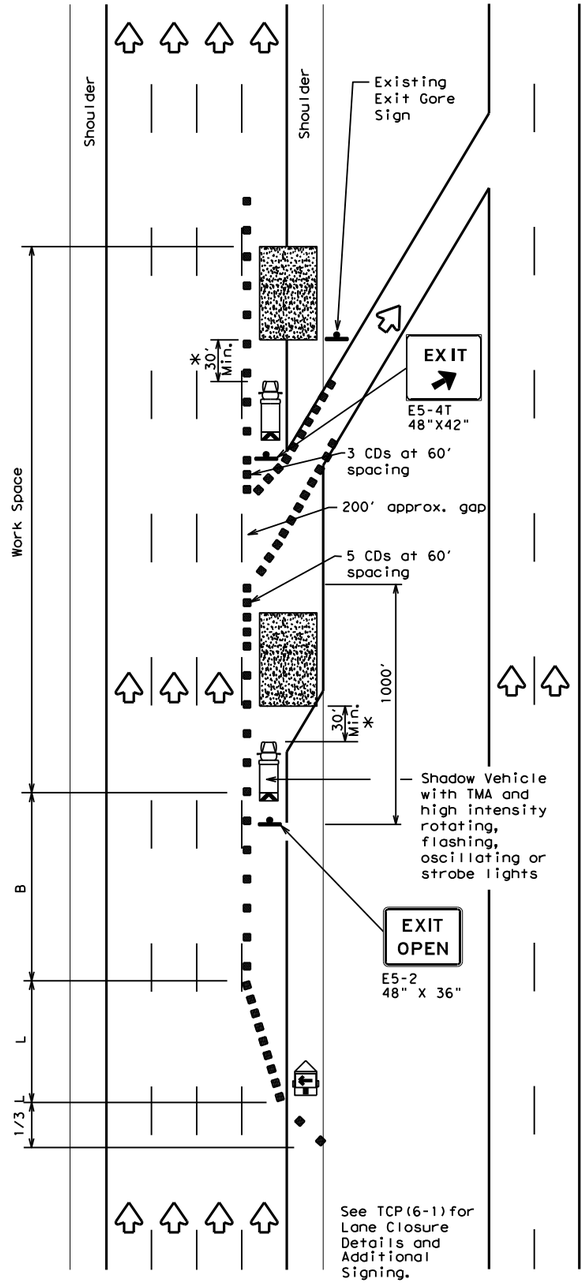


TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	ATL	BOWIE ETC.		34

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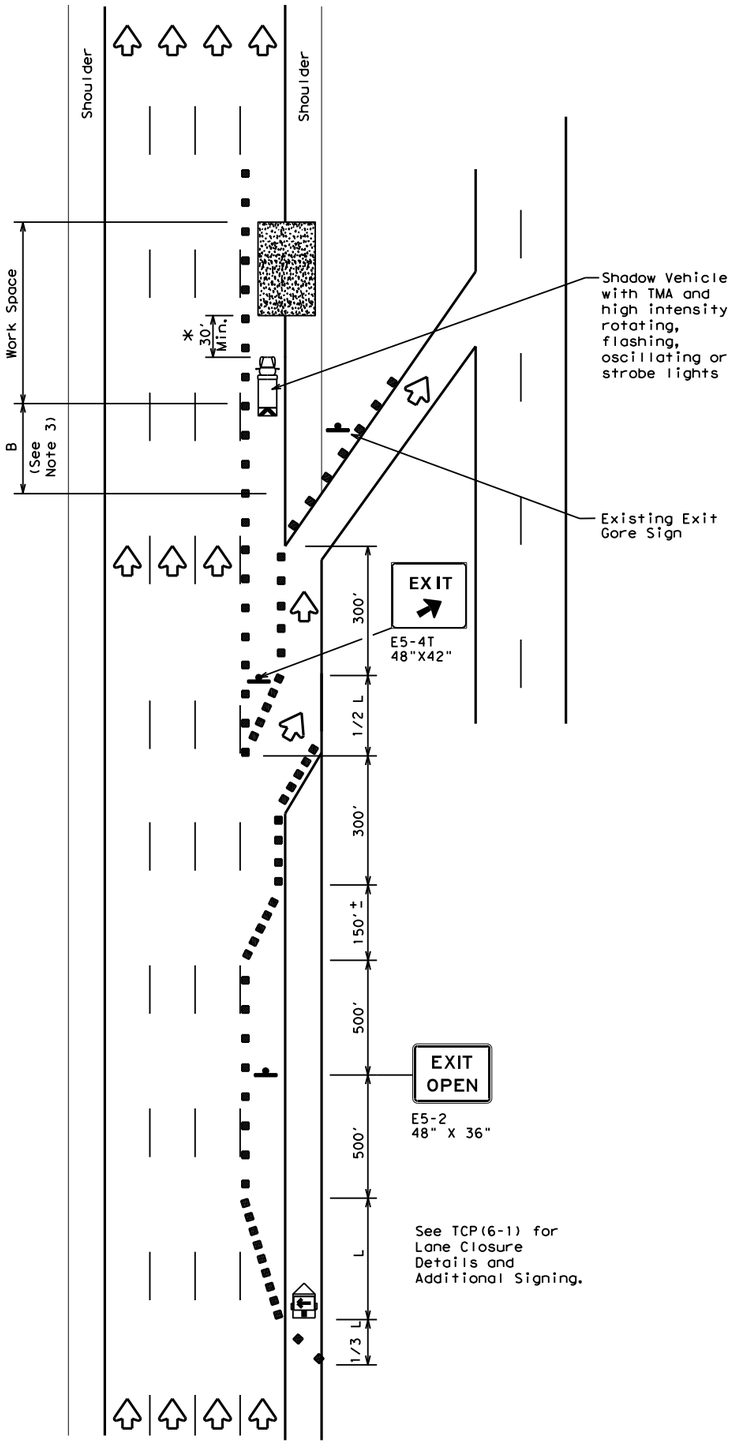
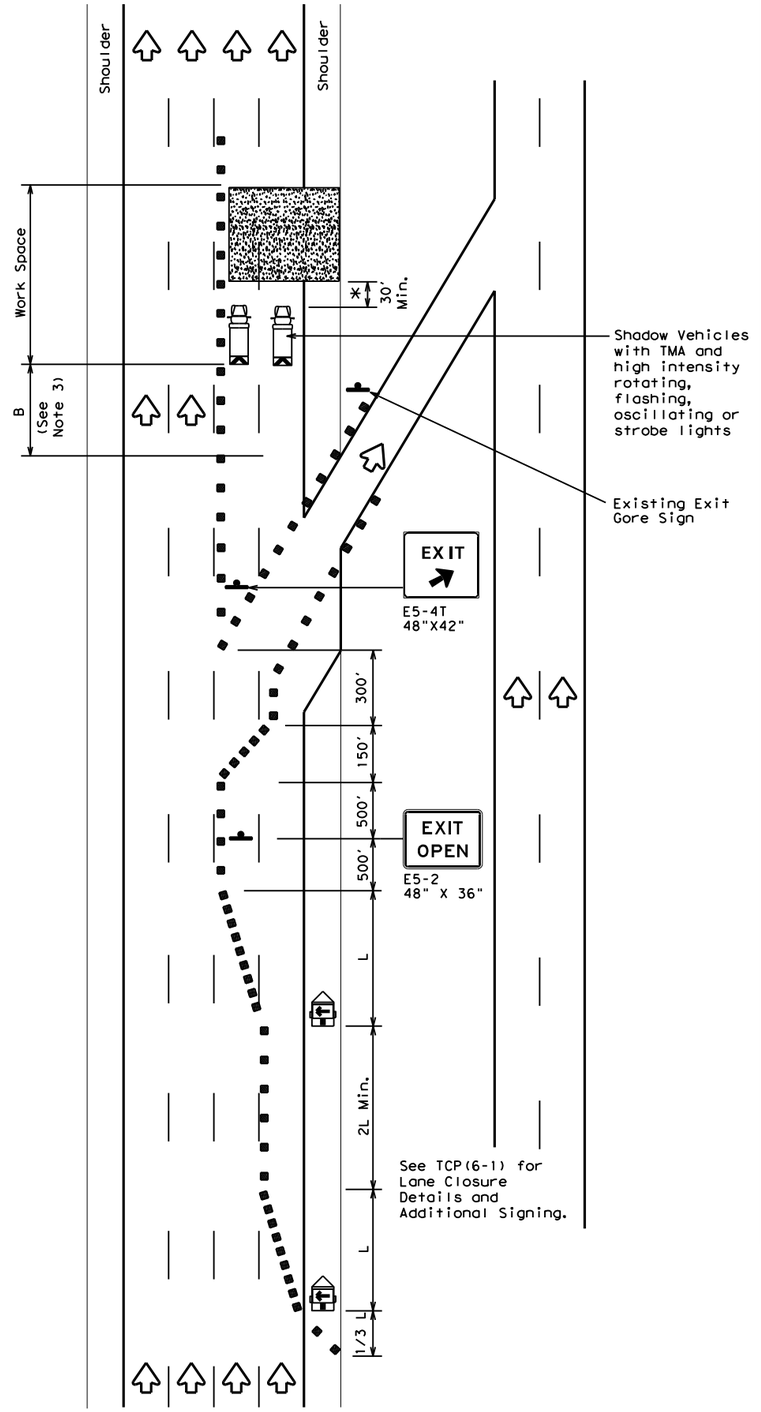


TCP (6-5a)

EXIT RAMP OPEN



TCP (6-5b)

EXIT RAMP OPEN
TWO LANE CLOSURE WITHIN 1500' PAST EXIT RAMP

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC standards for sign details.
3. If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing the ramp.

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND EXIT RAMP

TCP(6-5)-12

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©TxDOT Feburary 1998	CONT	SECT	JOB	HIGHWAY
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1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	ATL	BOWIE ETC.		35

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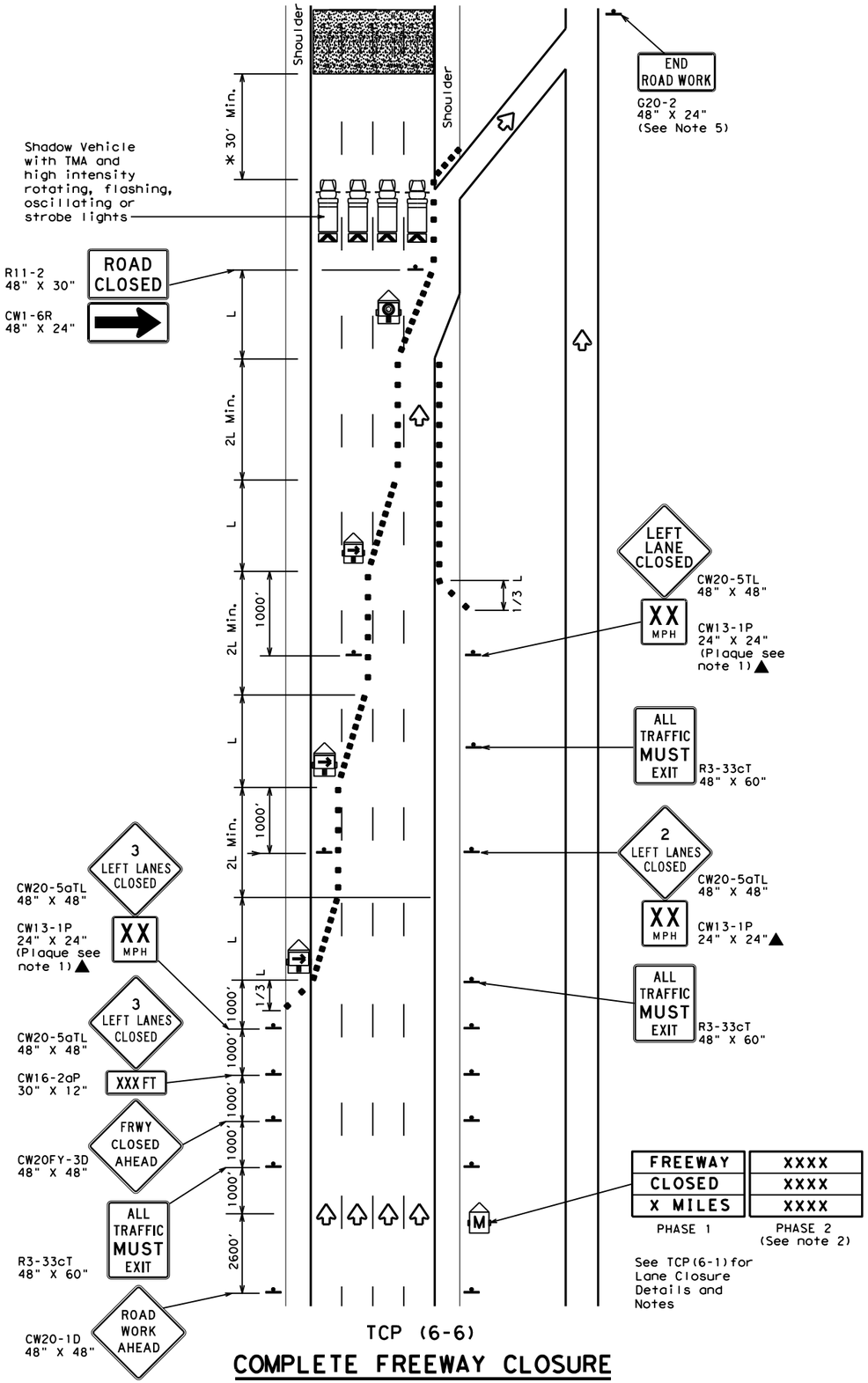

TCP (6-6)

COMPLETE FREEWAY CLOSURE

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

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

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

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY CLOSURE

TCP(6-6)-12

FILE: tcp6-6.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	ATL	BOWIE ETC.		36

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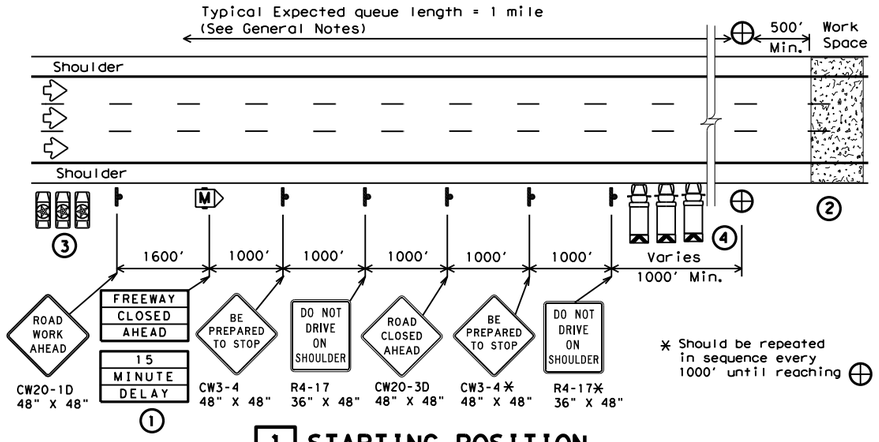


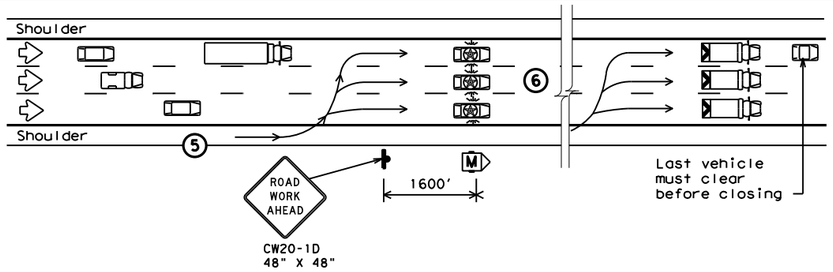
1 STARTING POSITION

① Traffic control devices should be installed or located near their intended position prior to beginning temporary roadway closure sequence. Duplicate signs should be erected on the median side of the roadway when median width permits. Warning signs should not be placed on the paved shoulders that will be used by the WARNING LEOV, or where movement of the LEOVs or barrier vehicles will be impeded.

② Prior to beginning the roadway closure sequence, all equipment, materials, personnel, and other items necessary to complete the work should be gathered near the work area. Entrance ramps located in the area where a queue is expected to build should be closed.

③ There should be one LEOV for every lane to be controlled, plus a minimum of one to warn traffic approaching a queue. An additional lead law enforcement officer is desirable to remain with the Engineer's or Contractor's point of contact (POC) during the operation in order to improve communication with all LEOVs involved.

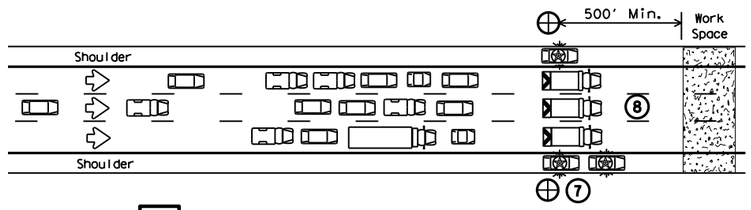
④ One barrier vehicle with a Truck Mounted Attenuator and amber or blue and amber high intensity flashing/oscillating/strobe lighting shall be used for each lane to be closed.



2 REDUCING SPEED OPERATION

⑤ Starting position of the LEOVs should be in advance of the most distant warning signs.

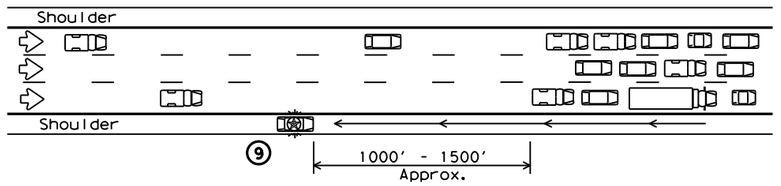
⑥ Once the LEOVs have achieved an abreast blocking formation while traveling toward the CP, emergency lights and headlights should be turned "ON". The LEOVs should maintain formation, not allow traffic to pass, and begin to decelerate. The LEOVs should continue to decelerate, giving the barrier vehicles opportunity to be staged upstream of the work space after traffic has cleared. The LEOVs should then continue to decelerate slowly until bringing traffic to a stop near the barrier vehicles.



3 ALL TRAFFIC STOPPED AT CP

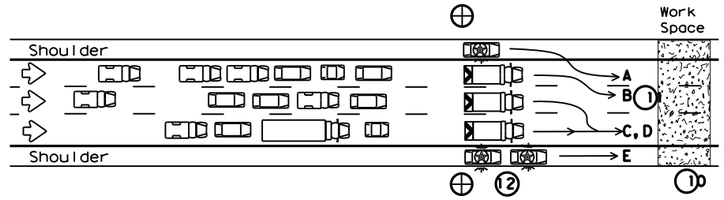
⑦ Once traffic is stopped the LEOVs should park on the shoulders with emergency lighting "ON" in order to provide law enforcement presence at the closure and keep shoulders blocked ahead of the work space. They should stay in radio contact with the WARNING LEOV.

⑧ The barrier vehicles should be parked, one in each lane, the parking brake set, with the high visibility flashing/oscillating/strobe lighting "ON," and the transmission in gear.



4 WARNING THE TRAFFIC QUEUE

⑨ The WARNING LEOV should proceed to the right shoulder of the roadway, with emergency lights on approximately 1000' in advance of the traffic queue (stopped traffic) as the queue develops. When determined that limited sight distance situations (crest of hills, sharp roadway curvature, etc.) may occur to motorists approaching the queue, the WARNING LEOV may proceed ¼ mile or more in advance of the queue.



5 RELEASING STOPPED TRAFFIC

⑩ All equipment, materials, personnel, and other items should be removed from the roadway and maintain an adequate clear zone.

⑪ When the roadway is clear for traffic, the LEOV should proceed forward from the left shoulder followed by the barrier vehicles, from left to right, as shown alphabetically in the plan view.

⑫ The LEOV or LEOVs on the right shoulder may remain on the shoulder until satisfied that traffic is moving satisfactorily before merging or proceeding.

⑬ LEOVs and barrier vehicles should re-group at their respective starting positions if necessary.

LEGEND			
■ ■	Channelizing Devices	⊕	Control Position (CP)
(M)	Portable Changeable Message Sign (PCMS)		Barrier Vehicle with Truck Mounted Attenuator
	Law Enforcement Officer's Vehicle(LEOV)		Traffic Flow

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

GENERAL NOTES

1. All traffic control devices shall conform with the latest edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Additional guidelines for traffic control devices may be found in the TMUTCD. Signs conflicting with the roadway closure sequence should be completely removed or covered. Additional traffic control devices may be required for closure of access roads, cross streets, exit and entrance ramps as directed by the Engineer.

2. Law enforcement officers and all workers involved should review and understand all procedures before the roadway closure sequence begins. Pre-work meetings may be held for this purpose. Local emergency services and media should have advance notification of roadway closure, expected dates and approximate times of closures.

3. Law enforcement officers shall be in uniform and have jurisdiction in the locale of the work area. An additional WARNING Law Enforcement Officer's Vehicle (LEOV) may be used on the median side of the roadway where median shoulder width permits (See sequence #9).

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

5. Work should be limited to approximately 15 minutes maximum duration unless otherwise directed by the Engineer based on existing roadway conditions. If the work is not complete within 15 minutes, or if the end of the traffic queue extends past the most distant advance warning signs, the work area should be cleared of all equipment, materials, personnel, and other items, and the roadway reopened. When the queue has dissipated and the traffic flow appears normal the roadway closure sequence may be repeated.

6. For traffic volumes greater than 1000 Passenger Cars Per Hour Per Lane (PCPHPL), or for roadway closures that exceed 15 minutes, see details elsewhere in the plan.

7. If traffic queues beyond the advance warning signs during one road closure sequence, the advance warning should be extended prior to repeating the road closure sequence. When possible, PCMS signs should be located in advance of the last available exit prior to the closure to allow motorists the choice of an alternate route.

THIS PLAN IS INTENDED TO BE USED AT LOCATIONS/TIMES WHEN TRAFFIC VOLUMES ARE LESS THAN 1000 PASSENGER CARS PER HOUR PER LANE.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHORT DURATION FREEWAY CLOSURE SEQUENCE

TCP(6-7)-12

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©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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4-98	ATL	BOWIE ETC.		37

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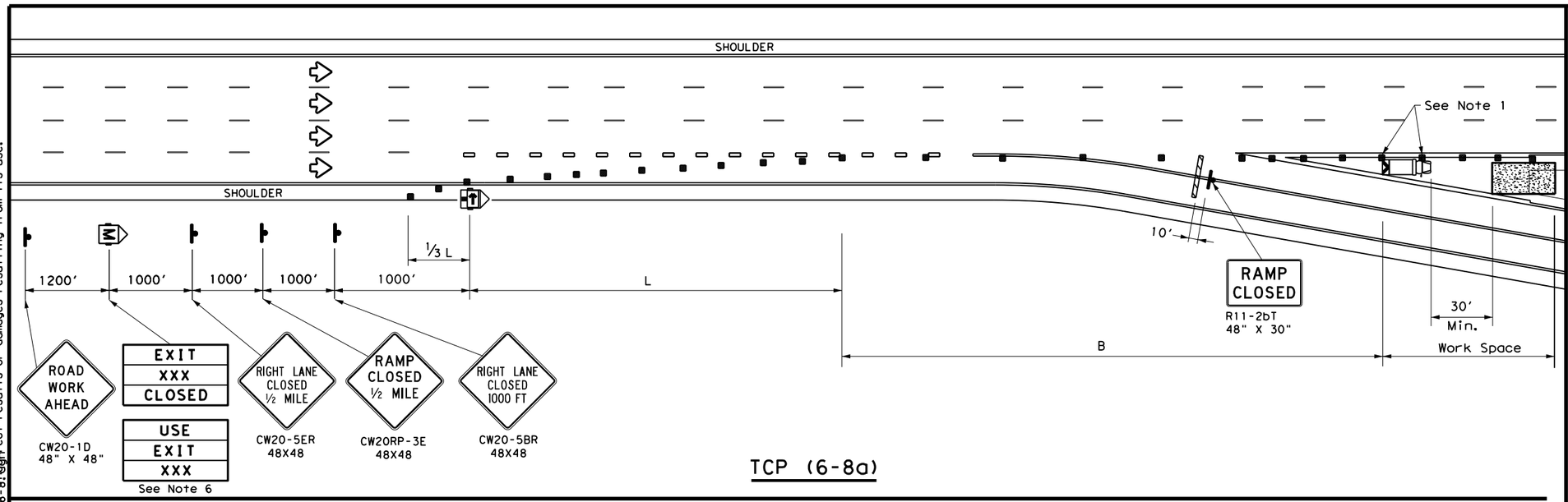

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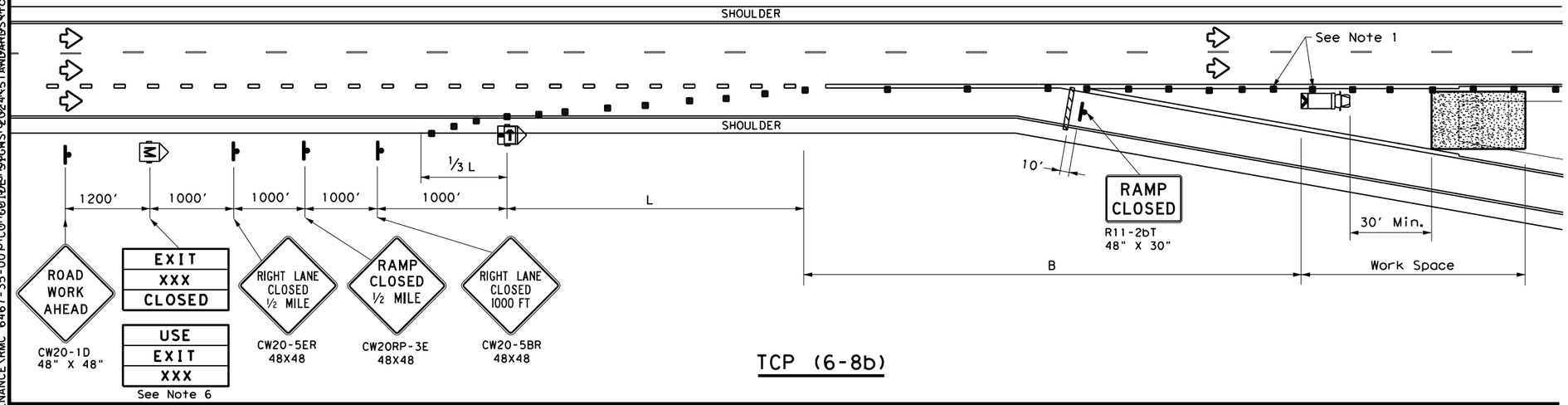

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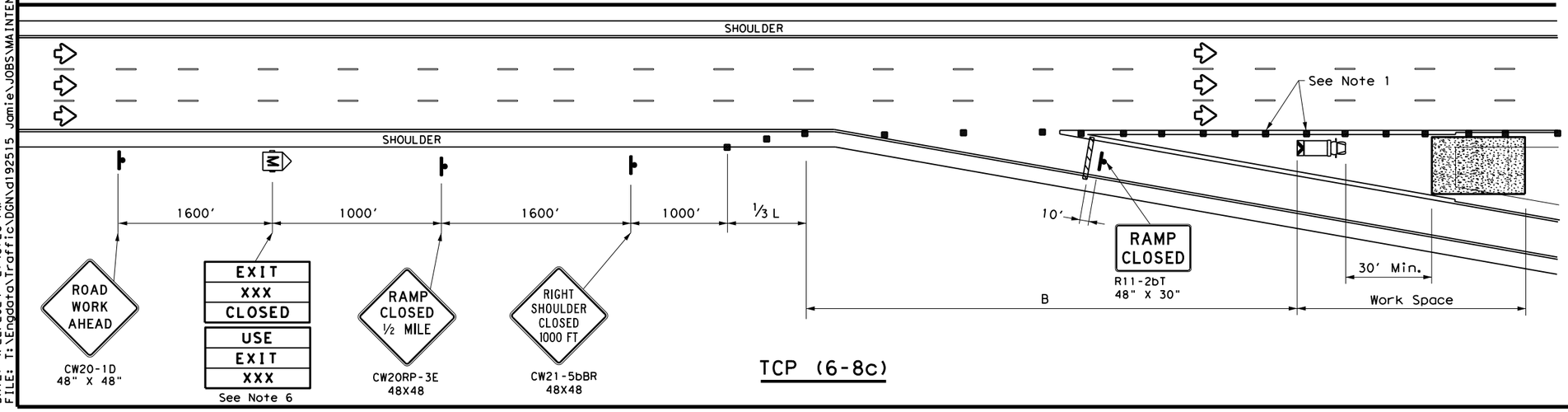


TCP (6-8c)

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

1. Place channelizing devices in the gore at 20' spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) for traffic control details.
5. Truck mounted attenuator is required.
6. The PCMS may be omitted if replaced with a "RAMP CLOSED" AHEAD (CW20RP-3D) Sign.
7. Roadway ADT should be greater than 10,000.

Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

FILE: tcp6-8.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
	DIST	COUNTY		SHEET NO.
	ATL	BOWIE ETC.		38

LEGEND

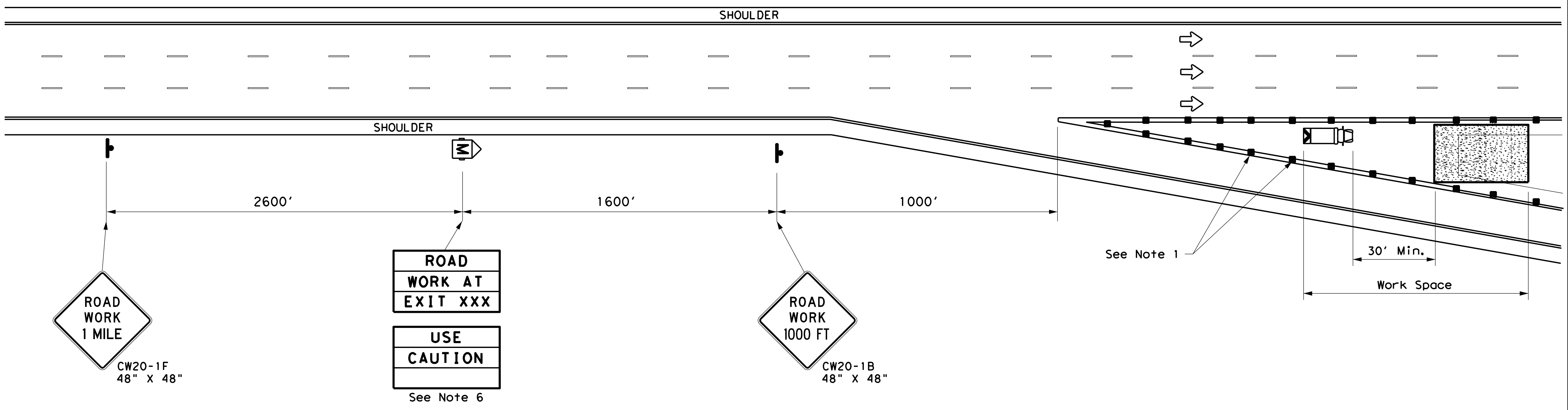
Symbol	Description	Symbol	Description
	Type 3 Barricade		Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

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
	✓	✓		



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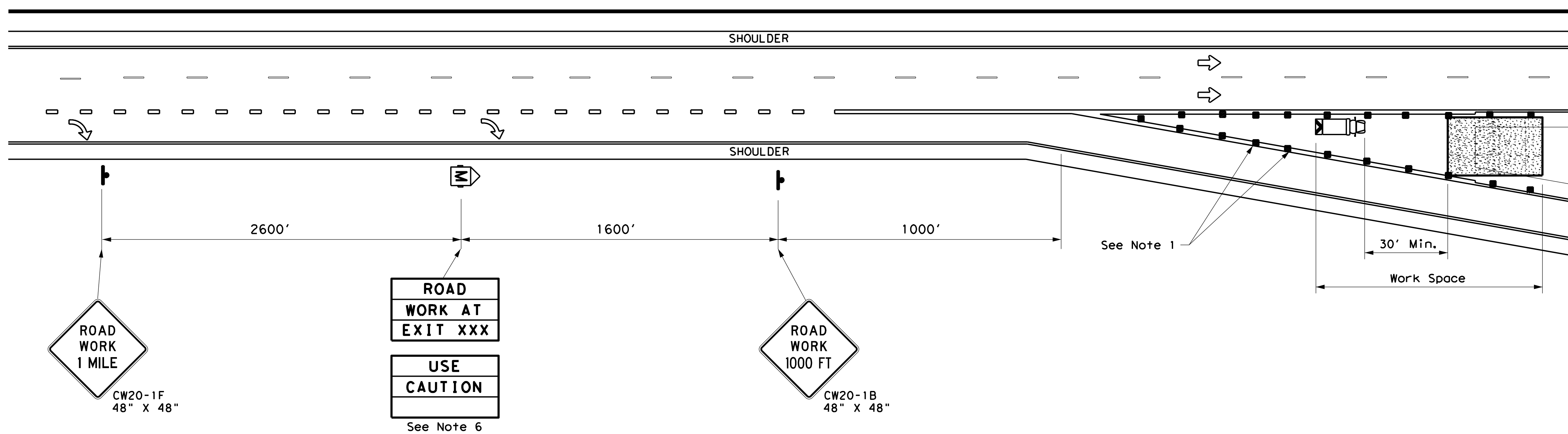

TCP (6-9b)

GENERAL NOTES

1. Place channelizing devices in the gore at 20' spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) and TCP(6-8) for traffic control details.
5. Truck mounted attenuators are required.
6. The PCMS may be omitted if replaced with a "ROAD WORK 1/2 MILE" (CW20-1E).
7. Roadway ADT should be less than 10,000.

Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT LESS THAN 10,000

TCP(6-9)-14

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© TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
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	ATL		BOWIE ETC.	39

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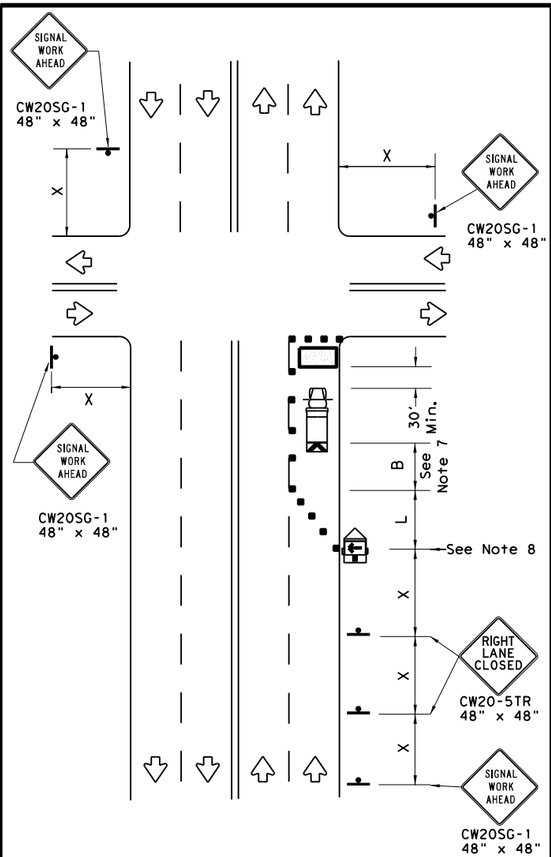
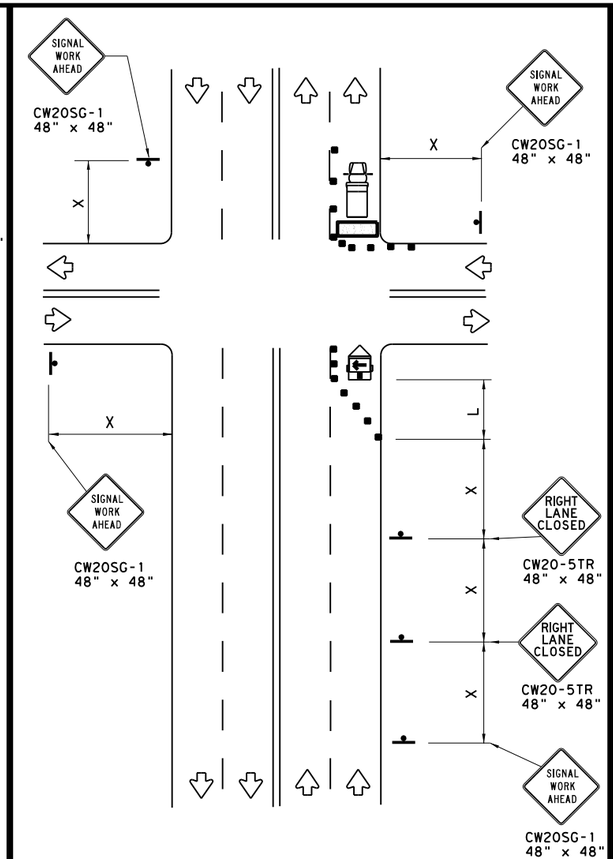


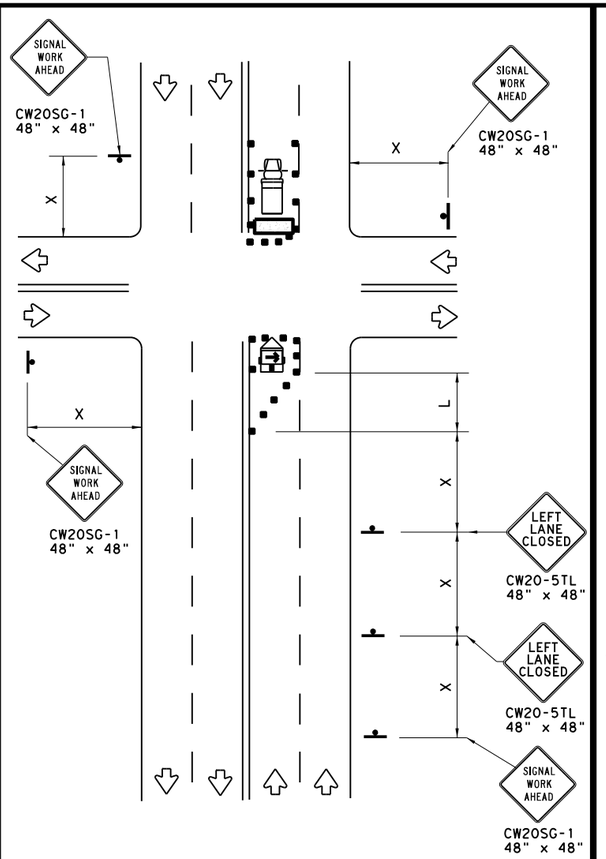
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



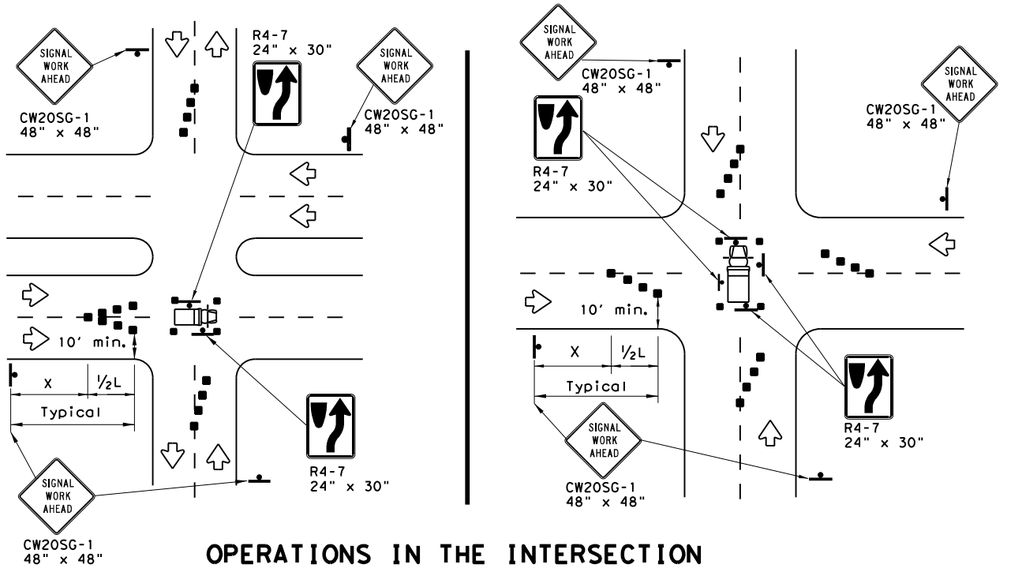
FAR SIDE RIGHT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



OPERATIONS IN THE INTERSECTION

SHORT DURATION

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

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

* Conventional Roads Only

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

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

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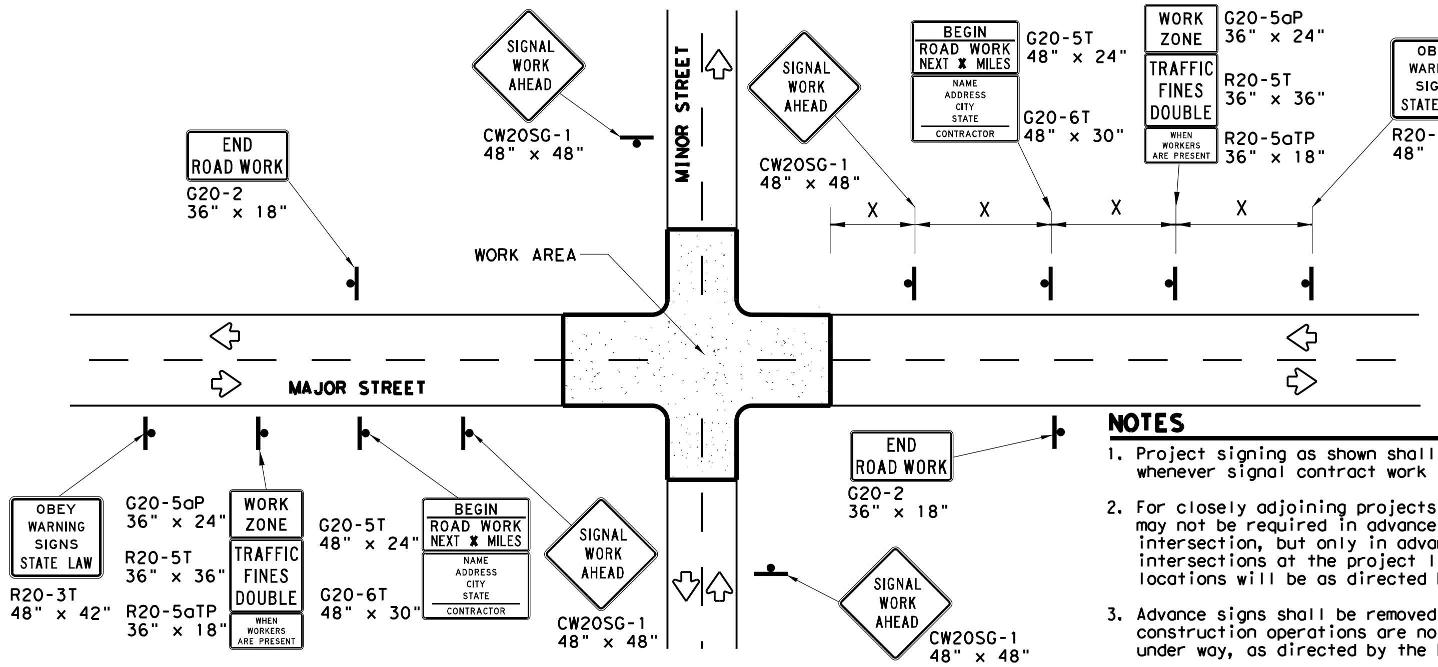
2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	ATL	BOWIE ETC.		40



TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. 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".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. 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. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

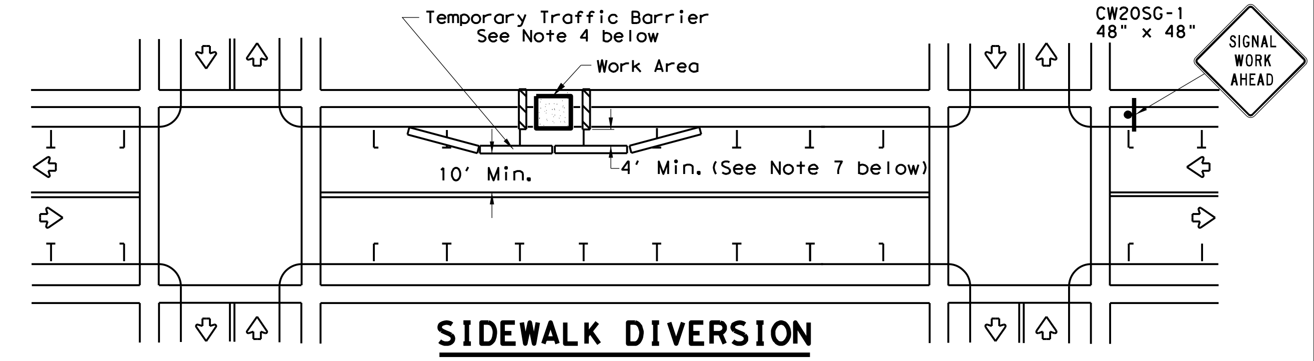
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support 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 fastners. 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.

LEGEND	
(symbol)	Sign
(symbol)	Channelizing Devices
(symbol)	Type 3 Barricade

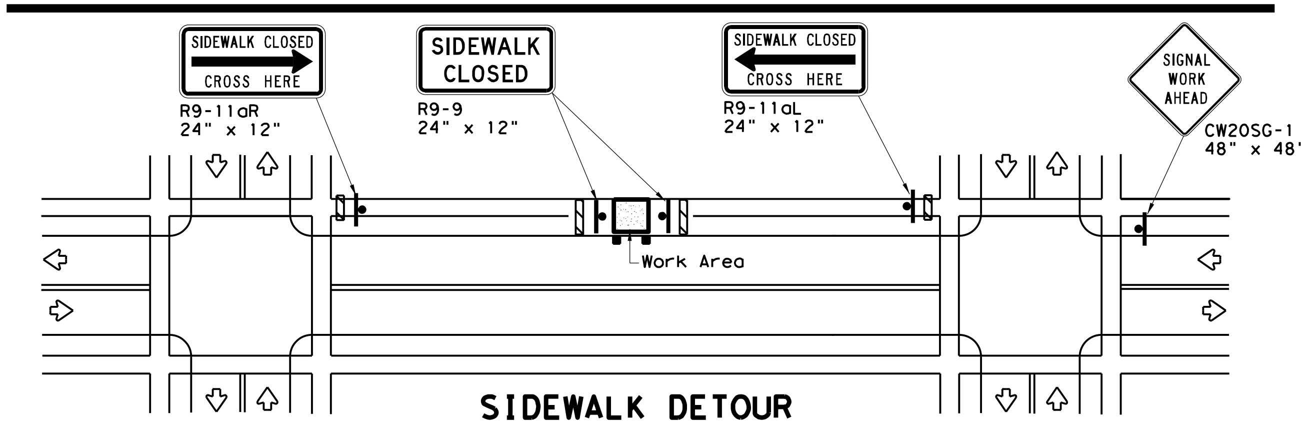
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

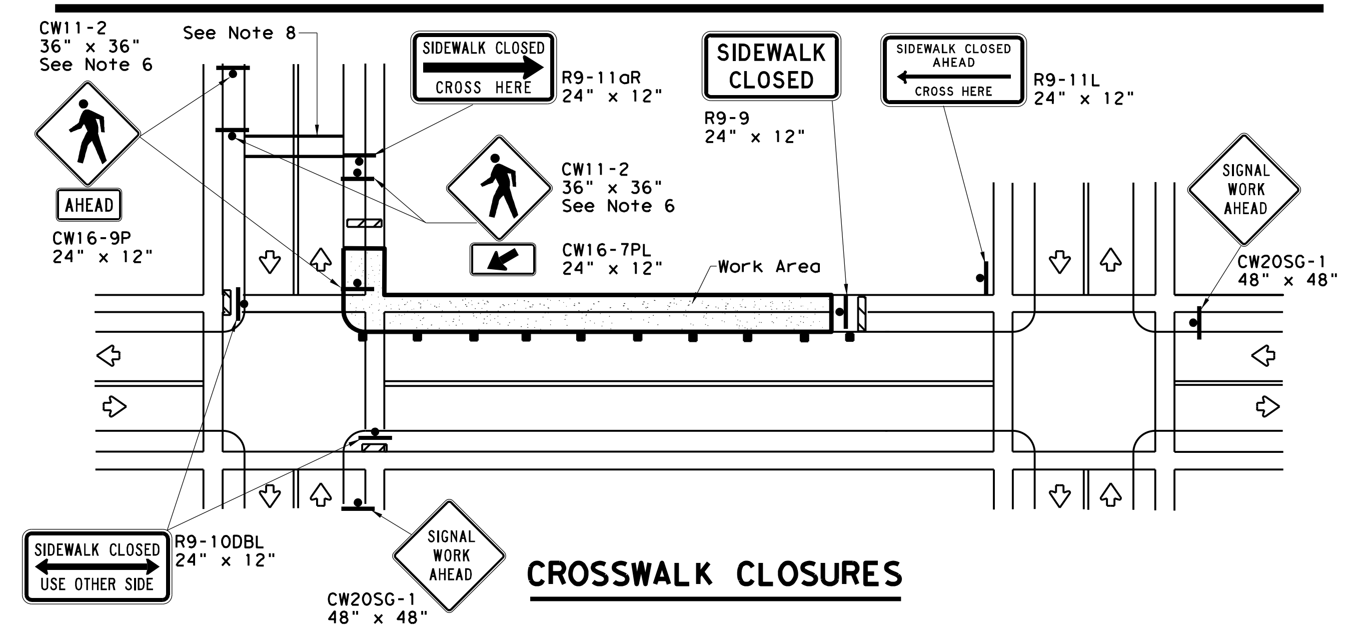
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

SHEET 2 OF 2

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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2-98 10-99 7-13 / 4-98 3-03	DIST		COUNTY	SHEET NO.
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Warning sign and rumble strip sequence in opposite direction is same as below.

TABLE 1

Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2

WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION

WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Remove Temporary Rumble Strips before removing the advanced warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
9. Replace defective Temporary Rumble Strips as directed by the Engineer.
10. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

TABLE 2

Speed	Approximate distance between strips in an array
≤ 40 MPH	10′
> 40 MPH & ≤ 55 MPH	15′
= 60 MPH	20′
≥ 65 MPH	✱ 35′+

LEGEND

▨	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel	M	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
	✓	✓		

◆ **Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.**

✱ **For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.**

Texas Department of Transportation

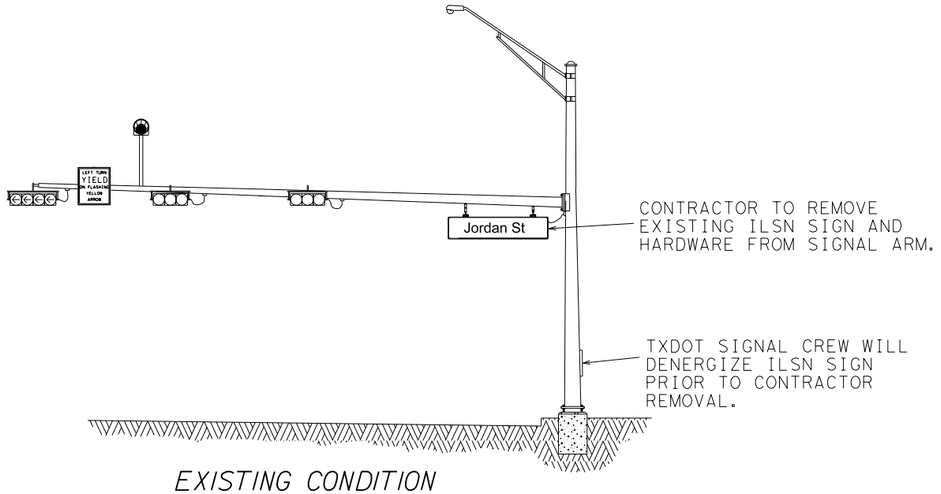
Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

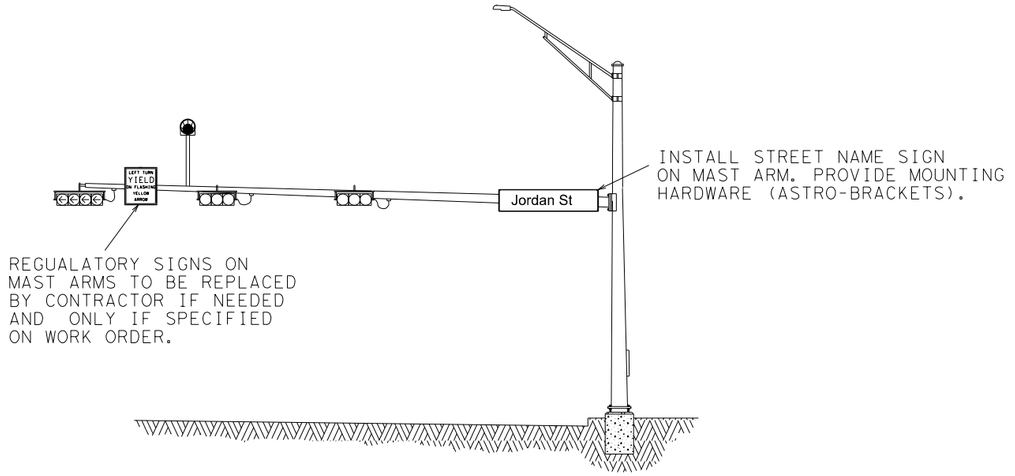
WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT 6467	SECT 35	JOB 001	HIGHWAY US 59 ETC.
REVISIONS 2-14 1-22 4-16	DIST ATL		COUNTY BOWIE ETC.	SHEET NO. 42

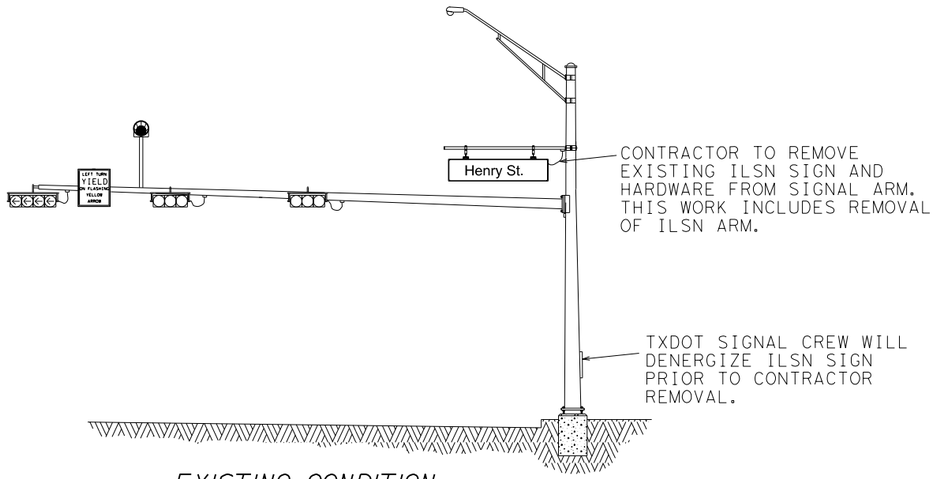
117



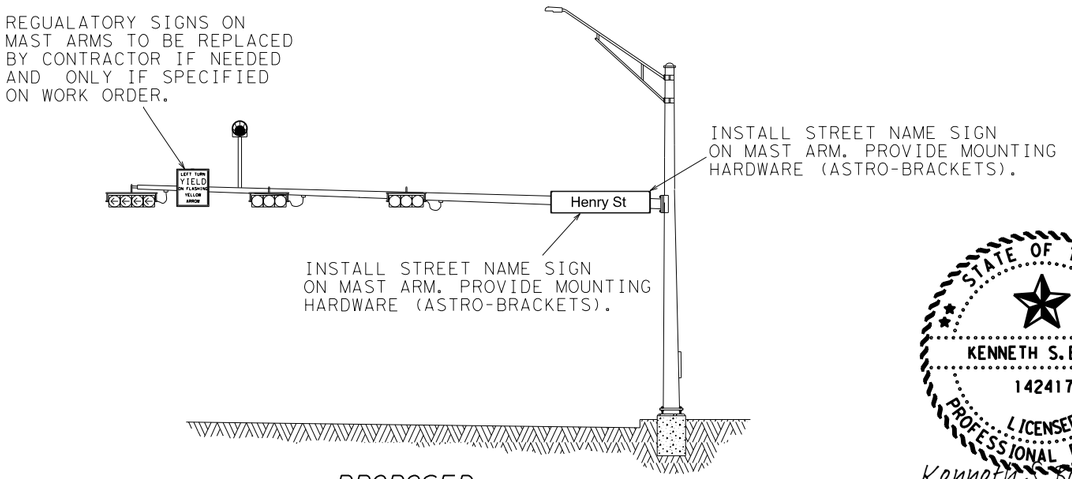
EXISTING CONDITION (ILSN MOUNTED ON OR UNDERNEATH MAST ARM) TYPE A



PROPOSED TYPE A



EXISTING CONDITION TYPE B (ILSN MOUNTED ON ILSN ARM)



PROPOSED TYPE B

NOTE:
1. THE INTENT OF THIS WORK IS TO REPLACE EXISTING ILSN SIGNS WITH FLAT PANEL STREET NAME SIGNS AT EXISTING SIGNAL INTERSECTIONS. THIS WORK WILL BE PAID FOR UNDER ITEM 690 REPLACE, REMOVE, AND INSTALL SIGNAL RELATED SIGNS AS DETAILED BY EACH INDIVIDUAL WORK ORDER. INDIVIDUAL REGULATORY SIGNS MAY ALSO BE REPLACED AT THESE INTERSECTIONS.
2. STATE FORCES WILL PROVIDE SIGN DETAILS FOR EACH INDIVIDUAL SIGN PRIOR TO THE CONTRACTOR PLACING THE SIGN ORDER. THE CONTRACTOR WILL NOT BE ASKED TO PERFORM THIS WORK ON ONE INDIVIDUAL POLE AT AN INTERSECTION. THE INTENT IS TO DUE MULTIPLE INTERSECTIONS IN CLOSE PROXIMITY TO MAKE EFFICIENT USE OF TXDOT AND CONTRACTORS TIME AND RESOURCES.
3. TXDOT SIGNAL CREW WILL GO AHEAD OF THE CONTRACTOR DENERGIZING ILSN SIGNS PRIOR TO THE CONTRACTOR REMOVING THE SIGN. THE CONTRACTOR IS NOT TO START ANY SIGN REMOVAL AT ANY INTERSECTION WITHOUT PRIOR CONFIRMATION THAT TXDOT SIGNAL CREWS HAVE REMOVED THE ILSN SIGN CONDUCTORS.
4. CONTRACTOR TO FURNISH ALL MOUNTING HARDWARE NEEDED TO MOUNT STREET NAME SIGNS. MOUNTING HARDWARE WILL NOT BE PAID FOR SEPARATELY, BUT WILL BE SUBSIDIARY TO ITEM 690. ALL REMOVED SIGN COMPONENTS WILL BECOME THE PROPERTY OF THE CONTRACTOR AFTER REMOVAL. REMOVAL OF ILSN ARMS WILL BE SUBSIDIARY TO REMOVAL OF SIGN. SIGN WILL BE SUBSIDIARY TO ITEM 690 SIGNAL RELATED SIGNS.

NOT TO SCALE

STATE OF TEXAS
KENNETH S. BURNS
142417
LICENSED PROFESSIONAL ENGINEER

Kenneth S. Burns, P.E.

5/3/2024

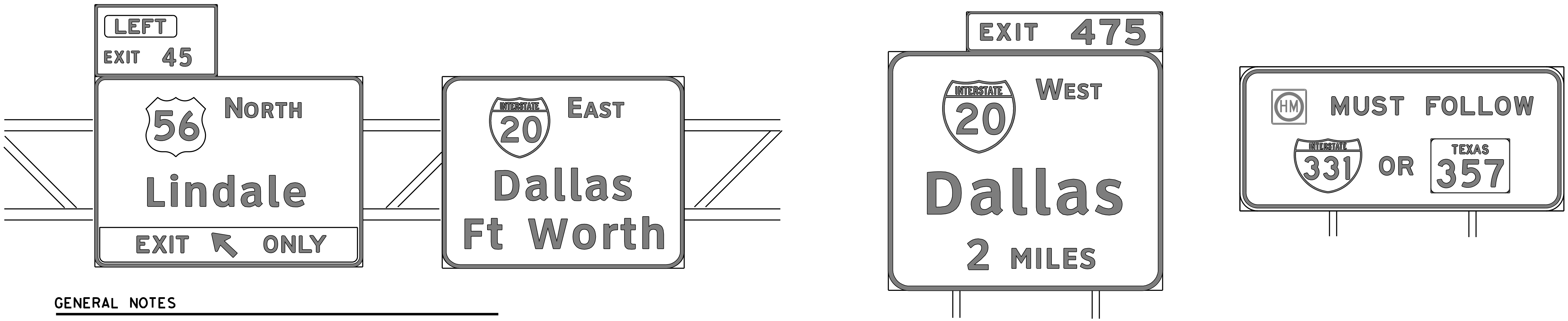
TYPICAL SIGNAL SIGN INSTALLATION LAYOUT

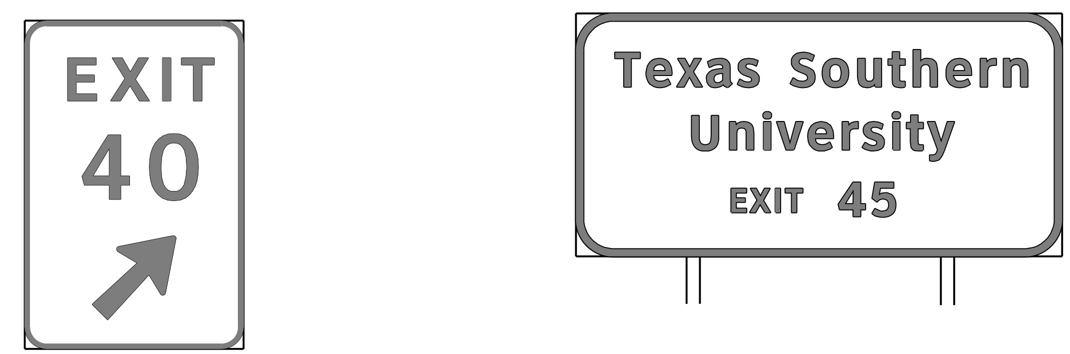
FHWA TEXAS DIVISION	MAINTENANCE PROJECT NO.		SHEET NO.
	646735001		43
STATE	DISTRICT	COUNTY	
TEXAS	ATL	BOWIE ETC.	
CONTROL	SECTION	JOB	HIGHWAY NO.
6467	35	001	US 59 ETC.

FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\TYPSIGNAL.dgn
DATE: 5/3/2024 11:56:36 AM

REQUIREMENTS FOR OVERHEAD AND LARGE GROUND-MOUNTED SIGNS

TYPICAL EXAMPLES





GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign summary sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Black legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod, or F). White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white FHWA lettering, when not specified in the SHSD or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. 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.
4. Black legend shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be cut-out white sheeting applied to colored background sheeting.
6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius need not be trimmed or rounded if fabricated from an extruded material.
7. Sign substrate for ground-mounted signs shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative. Sign substrate for overhead signs shall be any material that meets DMS-7110. Exit Number Panels attached above the parent sign shall be made with the same substrate and sheeting as the parent sign.
8. Mounting details of attachments to parent sign face are shown on Standard Plan Sheet TSR(5). Mounting details of exit number panels above parent sign are shown in the "SMD series" Standard Plan Sheets.
9. Background sheeting shall be applied to the substrate per sheeting manufacturer's recommendations. Sheeting will not be allowed to bridge the horizontal gap between panels.
10. Cut all legend, symbols, borders, and direct applied sign attachments at panel joints.

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/

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE B OR C SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(1)-13

FILE: tsr1-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-03 7-13 9-08	6467	35	001	US 59 ETC.
	DIST		COUNTY	SHEET NO.
	ATL		BOWIE ETC.	44

DATE: 4/22/2024 3:34:39 PM
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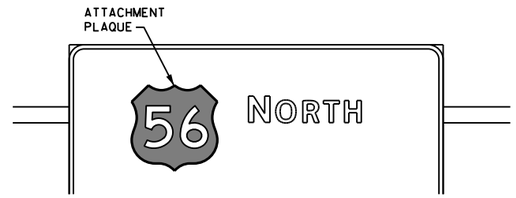
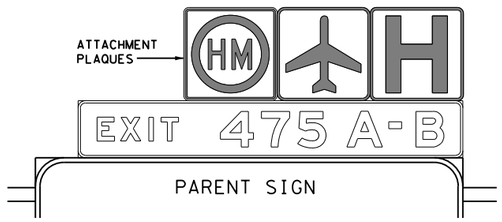
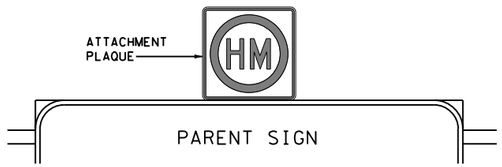
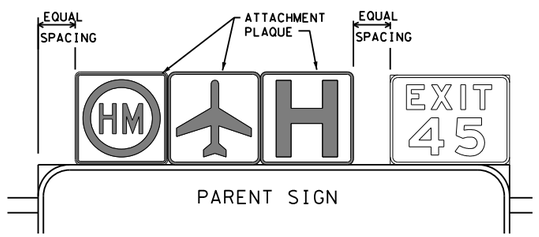
DATE: 4/22/2024 3:35:12 PM
FILE: I:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001\tsr2-13.dgn

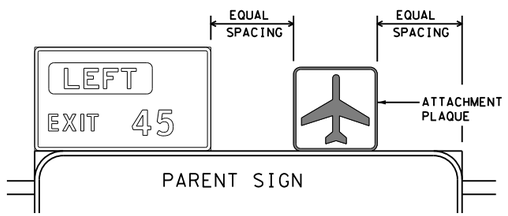
REQUIREMENTS FOR ATTACHMENTS TO OVERHEAD AND LARGE GROUND MOUNTED SIGNS











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

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B OR C SHEETING

GENERAL NOTES

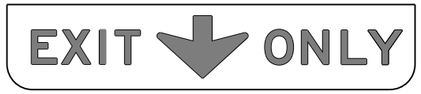
1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Route Marker legends (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod, or F).
3. 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.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. 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.
6. Colored legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to white background sheeting, or combination thereof.
7. Route markers and other attachments within the parent sign face shall be direct applied unless otherwise specified in the plans. Attachments not direct applied shall use 0.063 inch thick one piece sheet aluminum signs (Type A).
8. General Service Plaques shall be 0.080 inch thick and Routing Plaques shall be 0.100 inch thick.
9. The priority for Routing Plaques shall be (left to right) Hazardous Material, Airport then Hospital. See examples for mounting location.
10. Mounting details of attachments to parent signs face are shown on Standard Plan Sheet TSR(5). Mounting details of sign plaque attachments above and below parent sign are shown in the "SMD series" Standard Plan Sheets.
11. Plaques shall be horizontally centered at the top of the parent sign. If an exit number panel exists, the plaque shall be centered between the edge of the parent sign and the edge of the exit number panel. The plaque may be placed above the exit number panel when there is insufficient space.

TYPICAL EXAMPLES

REQUIREMENTS FOR EXIT ONLY AND LEFT EXIT PANELS

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

SHEETING REQUIREMENTS FOR OVERHEAD EXIT PANELS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLUORESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND	BLACK	ACRYLIC NON-REFLECTIVE FILM



TYPICAL EXAMPLES

GENERAL NOTES

1. 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). Individual panel sizes shown in the plans may be adjusted to fit actual parent sign sizes if necessary.
2. Exit Panel legend shall use the Federal Highway Administration (FHWA)Standard Highway Alphabets E Series.
3. 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.
4. Black legend shall be applied by screening process or cut-out acrylic non-reflective black film to yellow background sheeting, or combination thereof.
5. Exit Only and Left Exit panels within the parent sign face shall be direct applied unless otherwise specified in the plans. Panels not direct applied shall use 0.063 inch thick one piece sheet aluminum signs (Type A).
6. Mounting details of Exit Only and Left Exit panel attachments to parent signs face are shown on Standard Plan Sheet TSR(5).

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(2)-13

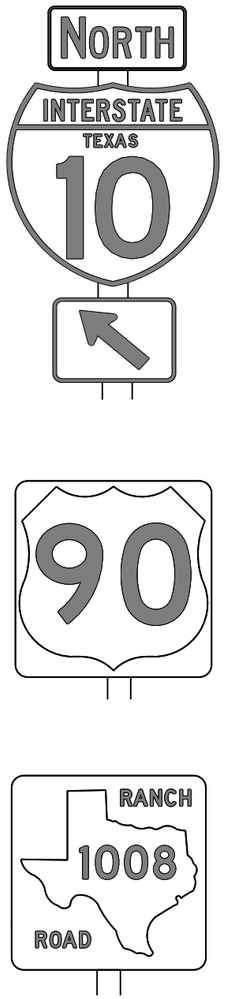
FILE: tsr2-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ATL	BOWIE ETC.		45

2

DATE: 4/22/2024 3:35:52 PM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001\TSR3-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

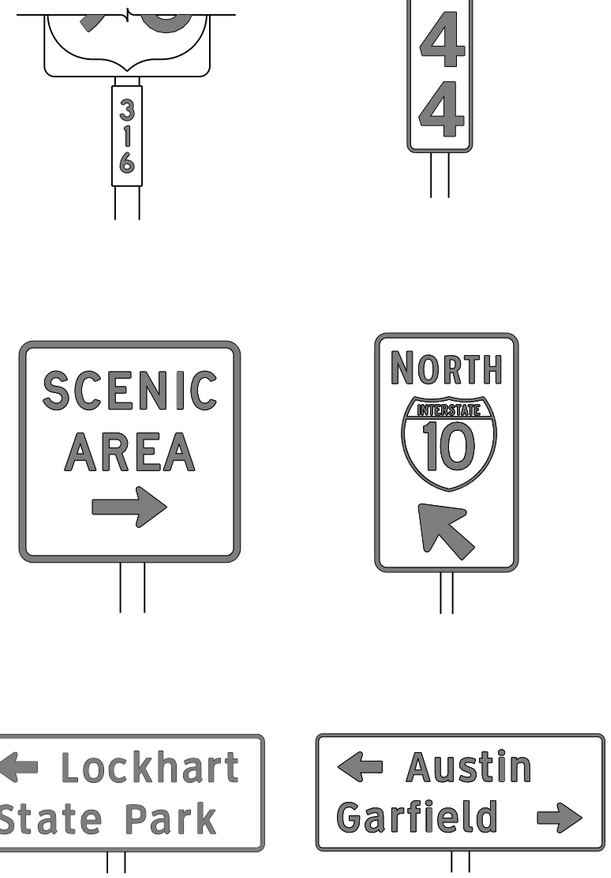
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. 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).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. 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.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

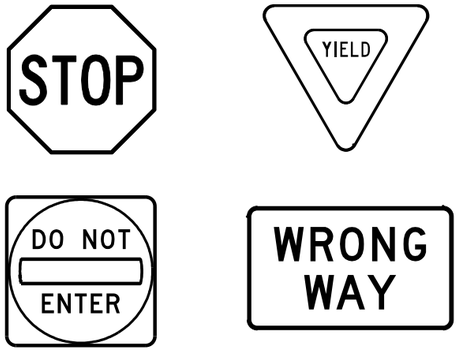
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ATL	BOWIE ETC.		46

DATE: 4/22/2024 3:36:42 PM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001\tsr4-13.dgn

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

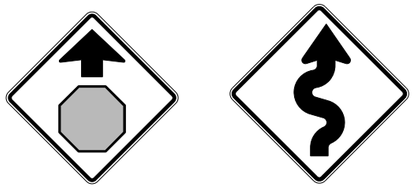
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(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_{FL} OR C_{FL} 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_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. 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).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. 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.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. 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.
6. 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.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. 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/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

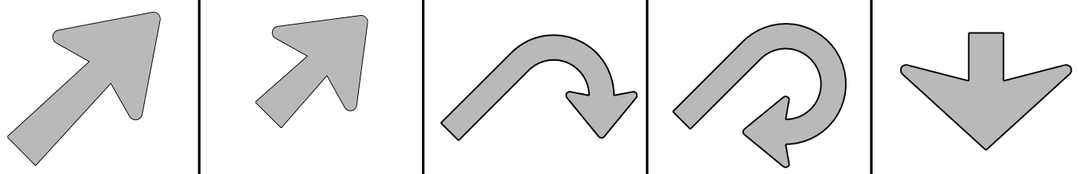
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ATL	BOWIE ETC.		47

DATE: 4/22/2024 3:37:11 PM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001\tsr5-13.dgn

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

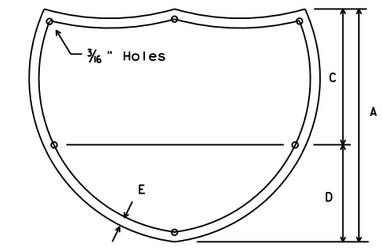
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

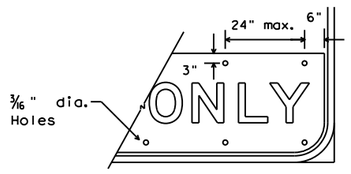
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

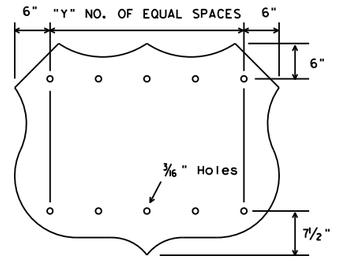


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

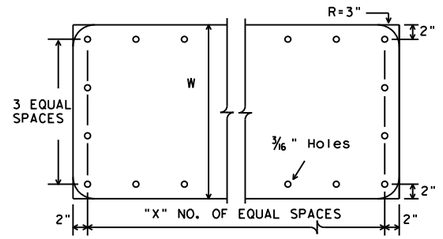


EXIT ONLY PANEL



U.S. ROUTE MARKERS

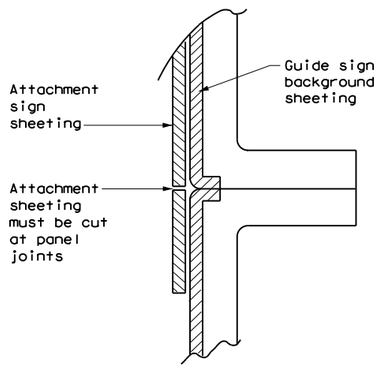
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

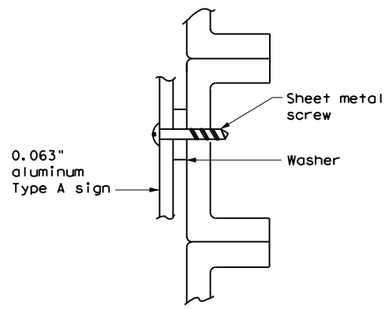
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



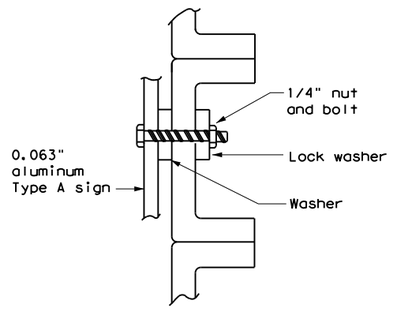
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



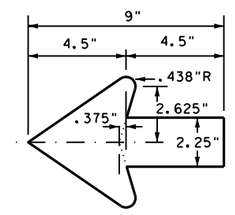
NUT/BOLT ATTACHMENT

NOTE:

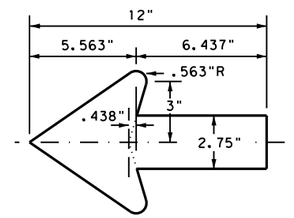
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	6467	35	001	US 59 ETC.
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ATL	BOWIE ETC.		48

DATE: 4/22/2024 3:40:15 PM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\STANDARDS\smdgen.dgn

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)

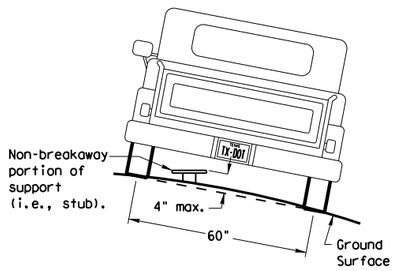
Anchor Type

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-1))

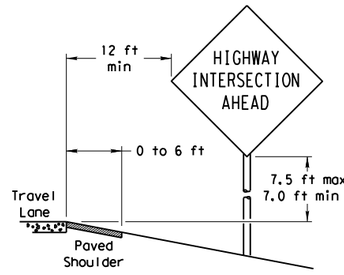
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

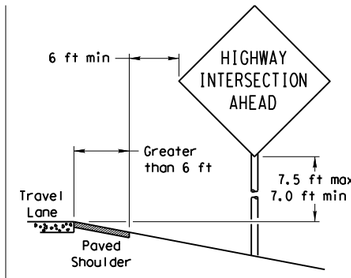
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

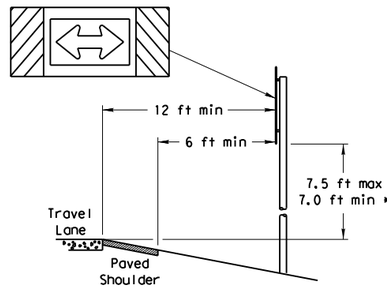
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



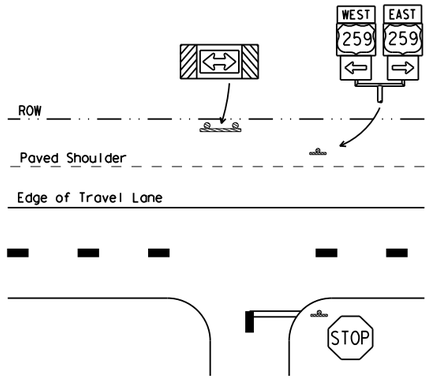
GREATER THAN 6 FT. WIDE

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.

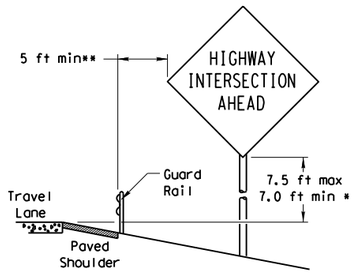
T-INTERSECTION



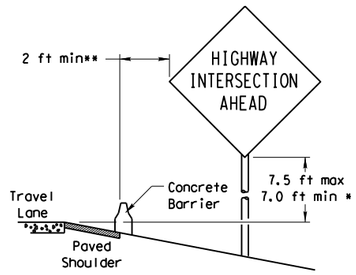
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



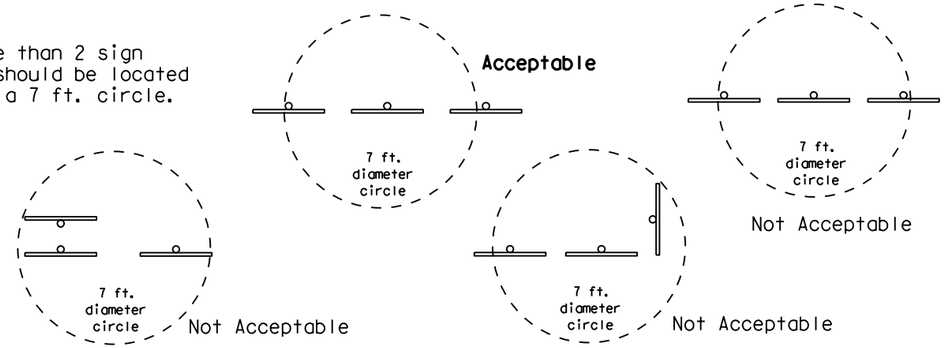
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

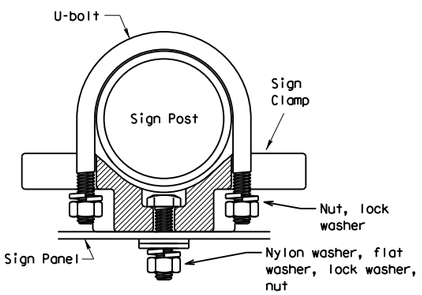
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

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



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

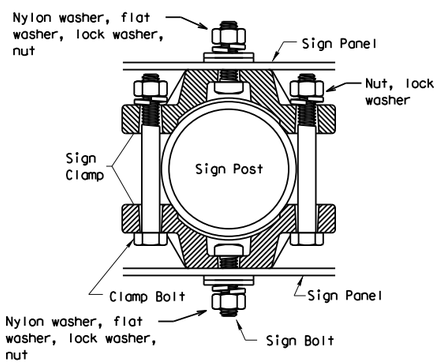


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

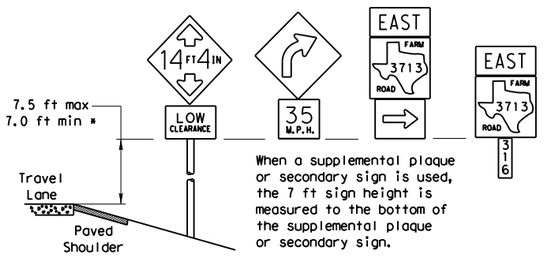
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



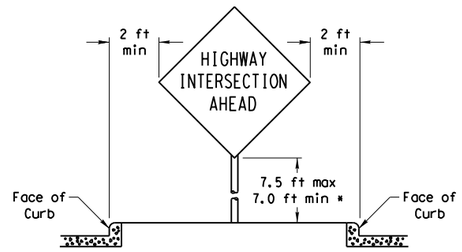
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



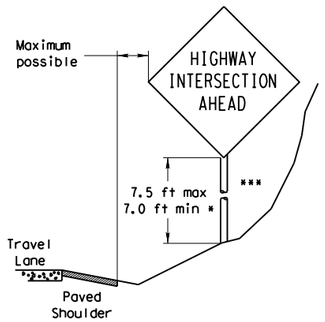
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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

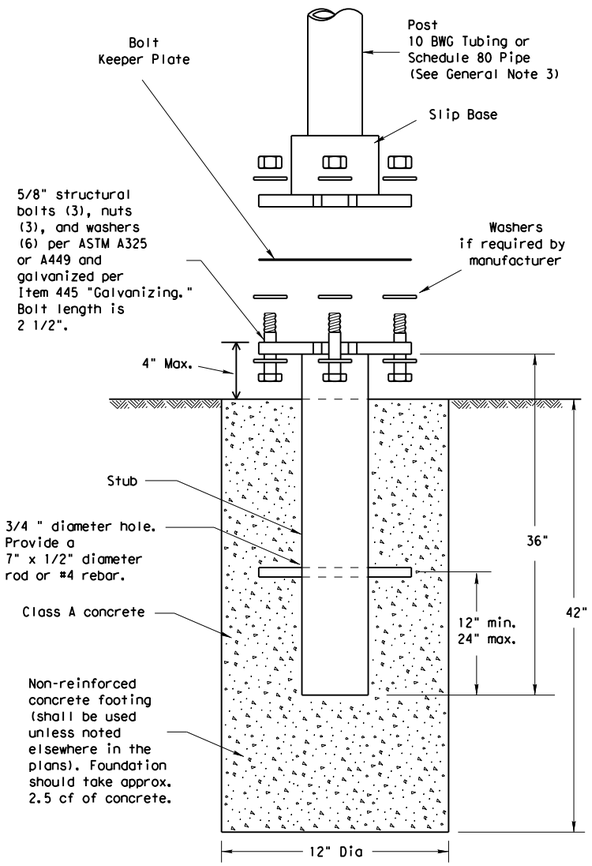
SMD(GEN)-08

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.
DIST	COUNTY		SHEET NO.
ATL	BOWIE ETC.		49

DATE: 4/22/2024 3:40:45 PM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS SIGNS 2024\STANDARDS\smds1.dgn

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

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 The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. 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.
2. 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.

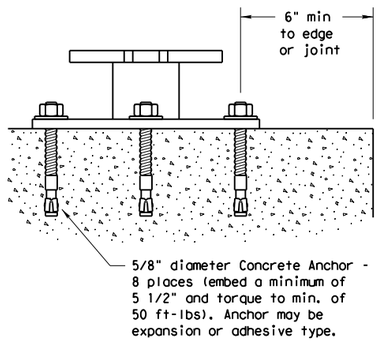
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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
3. 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
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. 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.
2. 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.
3. 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.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. 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.
2. 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



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, "Epoxies 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.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.

DIST	COUNTY	SHEET NO.
ATL	BOWIE ETC.	50

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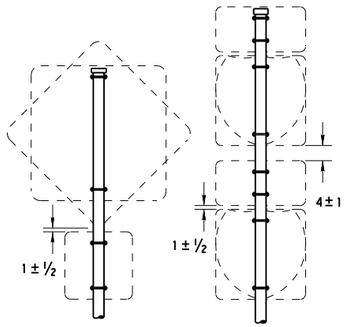
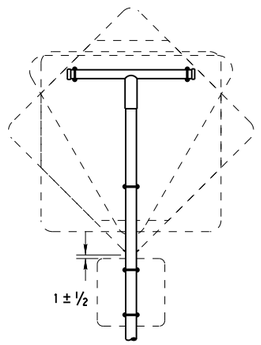
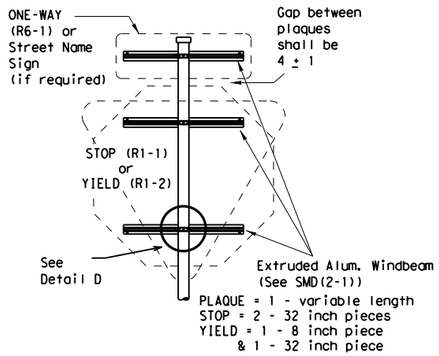


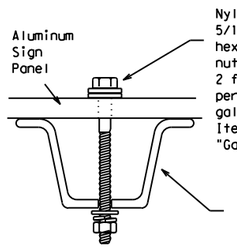
SM RD SGN ASSM TY XXXXX(1)XX(P)



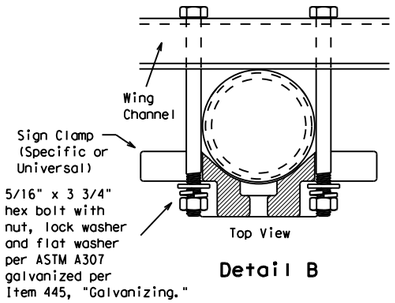
SM RD SGN ASSM TY XXXXX(1)XX(T)



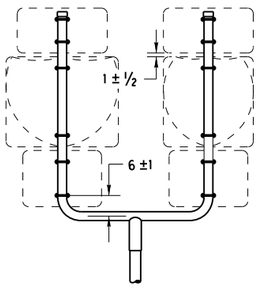
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



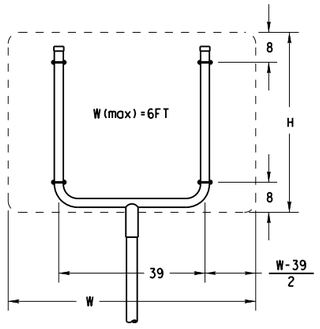
Detail A



Detail B



SM RD SGN ASSM TY XXXXX(1)XX(U)



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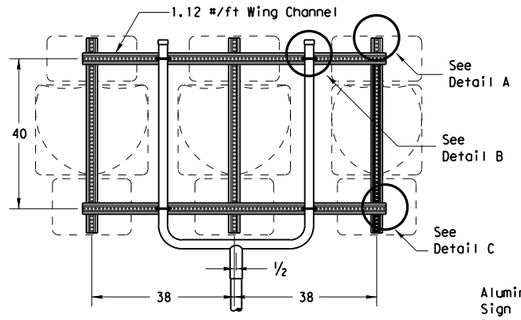
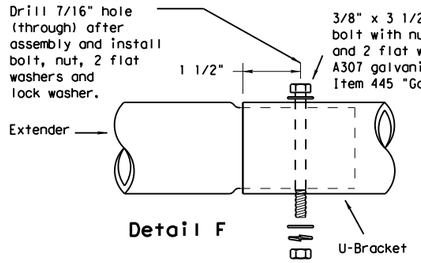
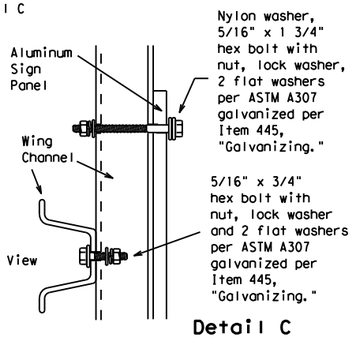


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

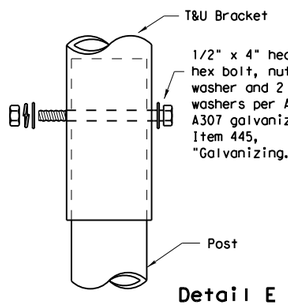


Detail F

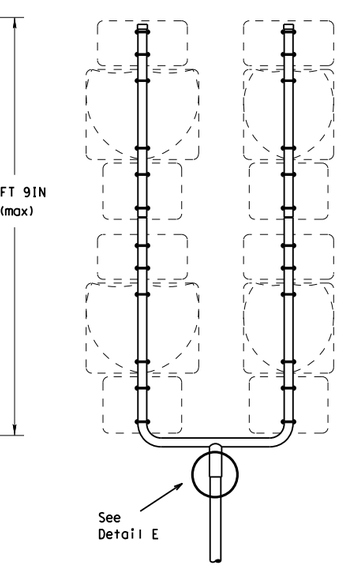
Splices shall only be allowed behind the sign substrate.



Detail C

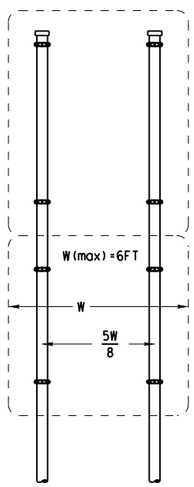


Detail E



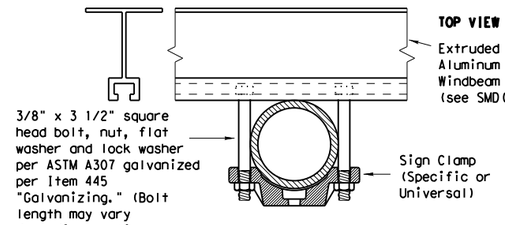
SM RD SGN ASSM TY S80(1)XX(U-1EXT)

SM RD SGN ASSM TY S80(1)XX(U-2EXT)

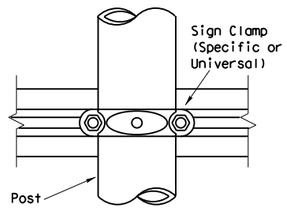


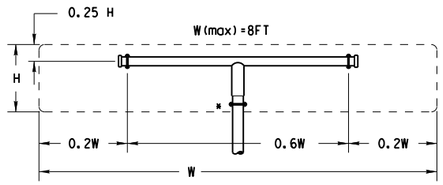
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

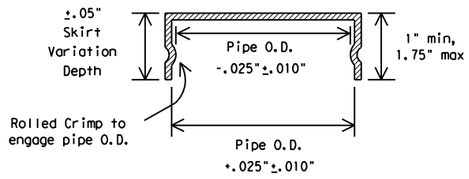




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



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)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	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-2)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	6467	35	001	US 59 ETC.
	DIST	COUNTY		SHEET NO.
	ATL	BOWIE ETC.		51

DATE: 4/22/2024 3:43:40 PM
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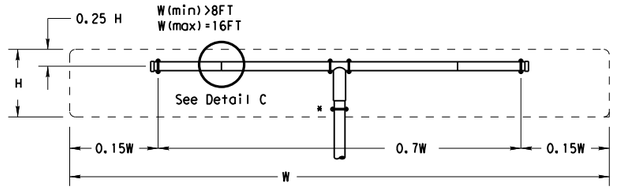
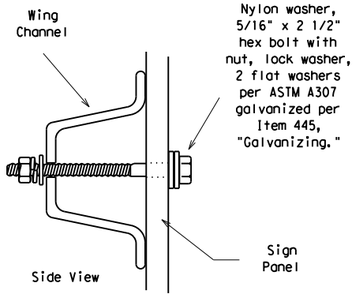
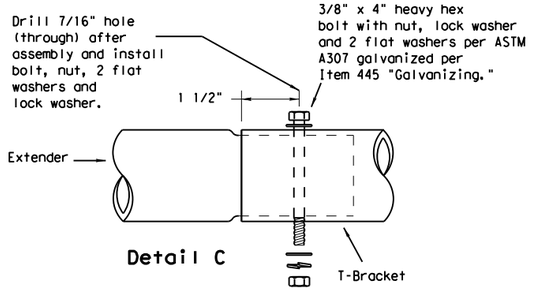


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



Detail B



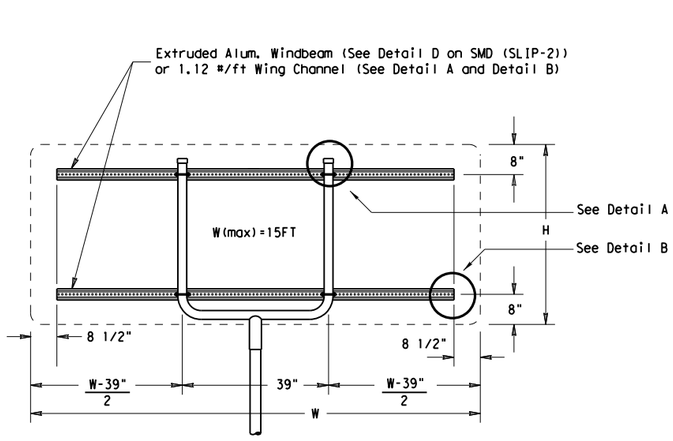
Detail C

Splices shall only be allowed behind the sign substrate.

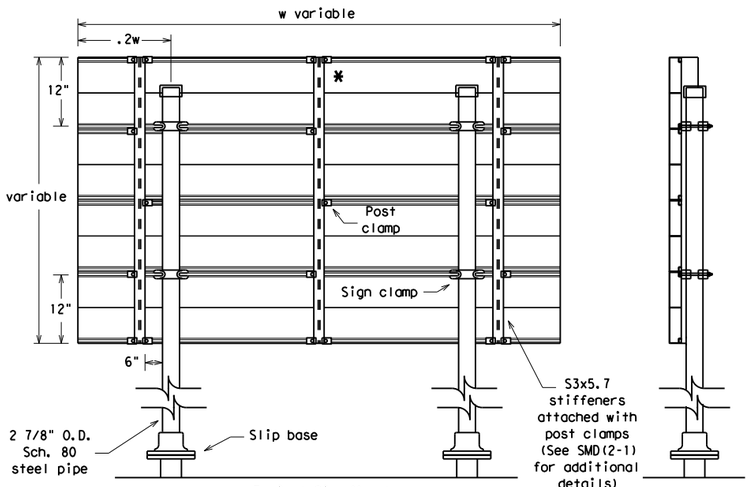
GENERAL NOTES:

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

1. 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.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. 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.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. 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.
6. 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.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. 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."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. 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.
11. Post open ends shall be fitted with Friction Caps.



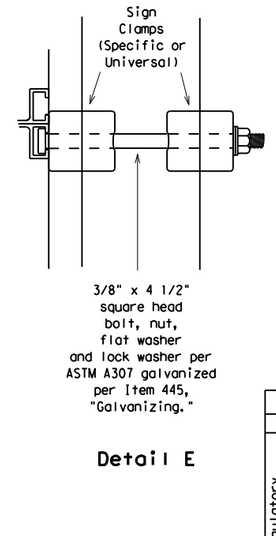
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



Typical Sign Mount

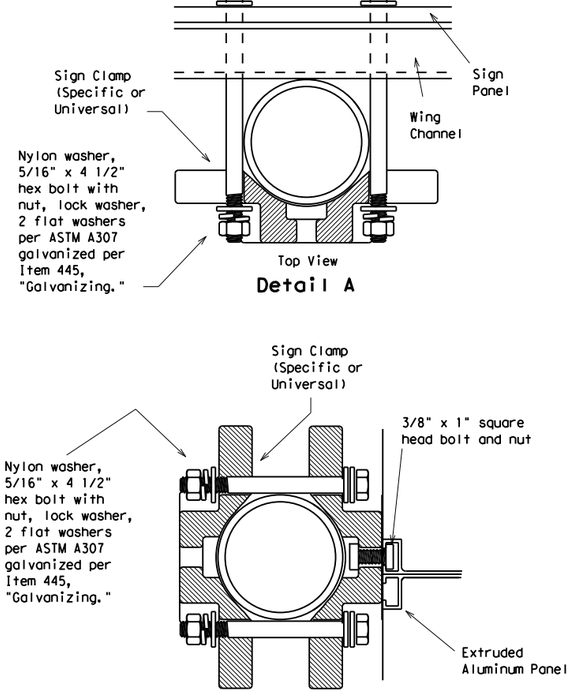
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



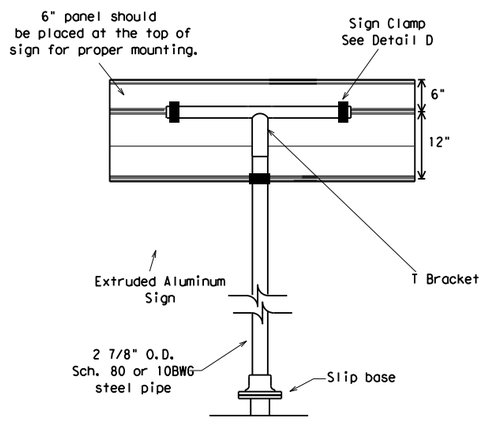
Detail E

See Detail E for clamp installation

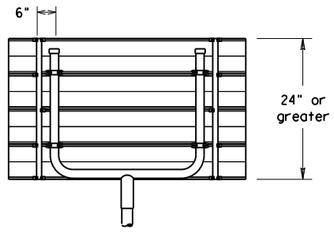


Detail A

Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

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)
	48x60-inch signs	TY S80(1)XX(T)
Warning	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

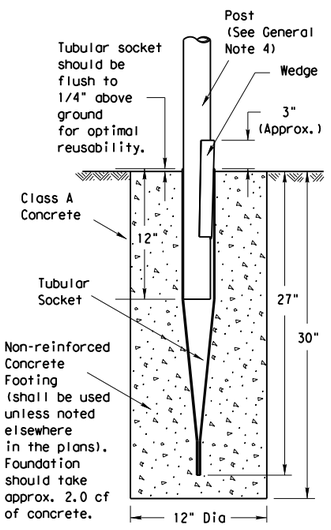
SMD(SLIP-3)-08

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.
DIST	COUNTY		SHEET NO.
ATL	BOWIE ETC.		52

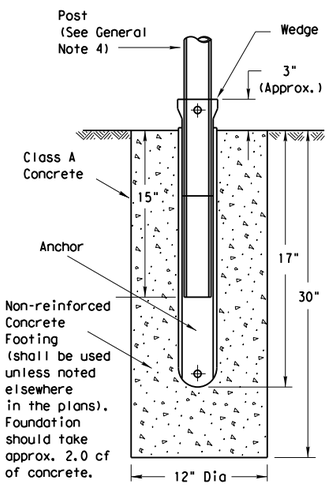
DATE: 4/22/2024 3:44:12 PM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\STANDARDS\smdtwt.dgn

Wedge Anchor Steel System



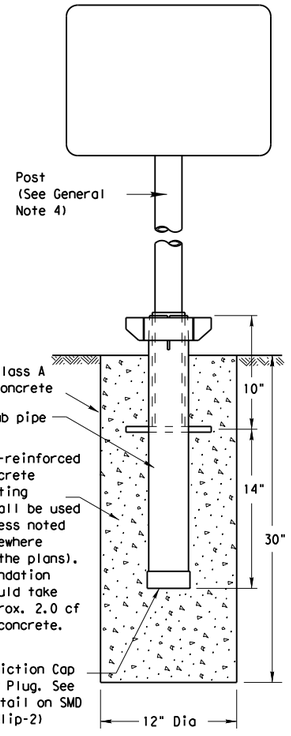
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

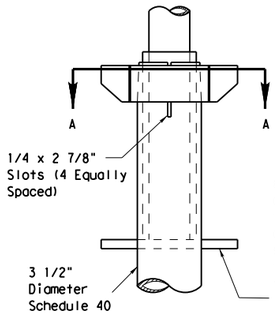


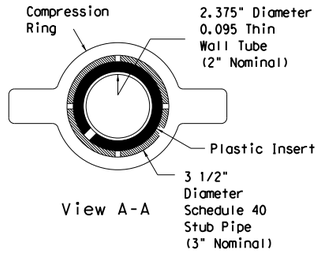
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



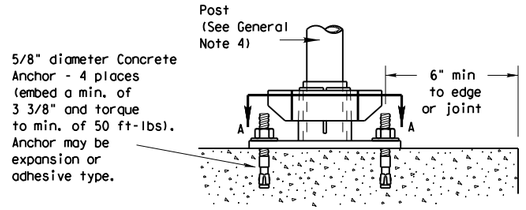
SM RD SGN ASSM TY TWT(X)UA(P)



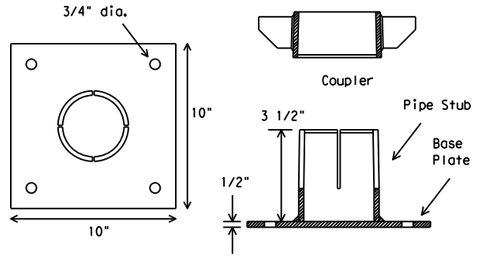


View A-A

Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

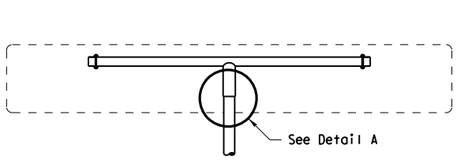


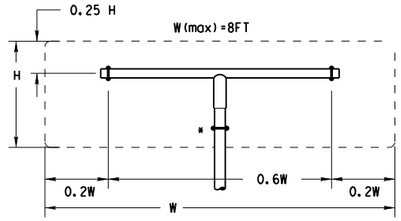
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.



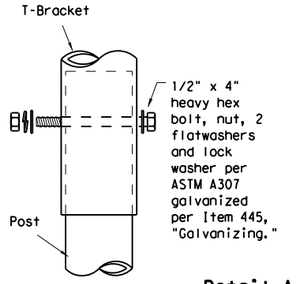
SM RD SGN ASSM TY TWT(X)UB(P)

Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)
(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

The devices shall be installed per manufacturer's recommendations.
Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   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
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. 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. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

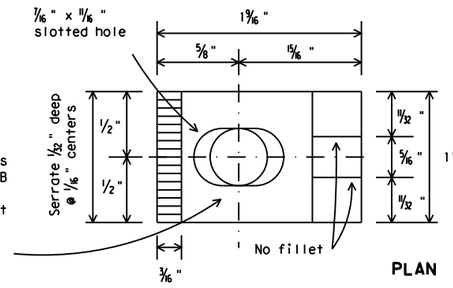
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

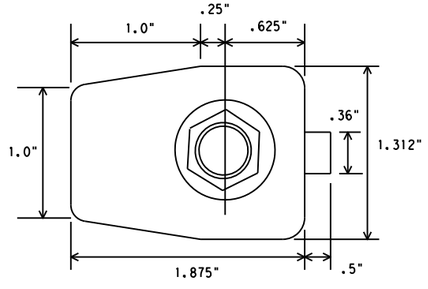
CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.
DIST	COUNTY		SHEET NO.
ATL	BOWIE ETC.		53

DATE: 4/22/2024 3:44:45 PM
FILE: I:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\STANDARDS\smd21-08.dgn

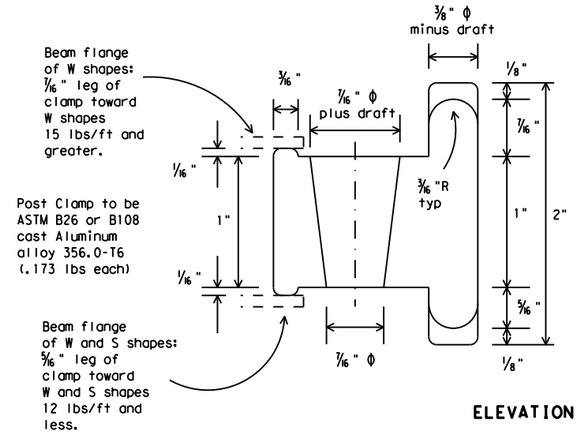
NOTE: centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.



PLAN

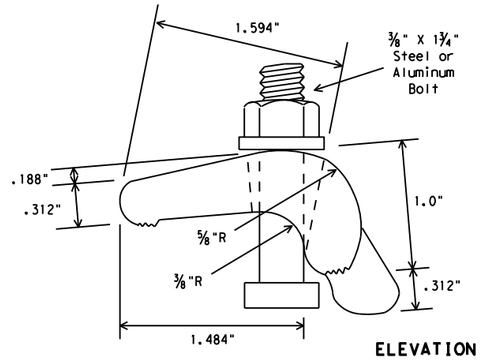


PLAN



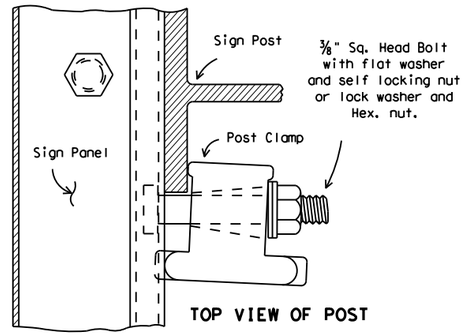
ELEVATION

POST CLAMP DETAIL

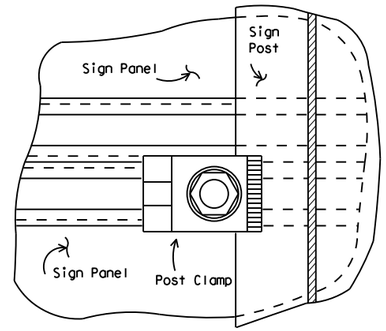


ELEVATION

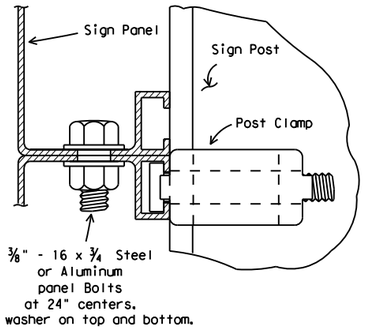
ALTERNATE POST CLAMP DETAIL



TOP VIEW OF POST



TOP VIEW OF CLAMP



SIDE VIEW OF PANELS

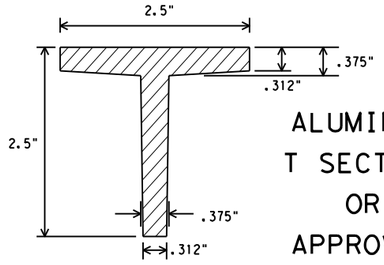
CONNECTION DETAILS

DEPARTMENTAL MATERIAL SPECIFICATIONS

SIGN HARDWARE DMS-7120

GENERAL NOTES:

1. Design conforms with AASHTO Specifications for the design and construction of structural supports for highway signs.
2. Materials and fabrication shall conform to the requirements of the Department material specifications.
3. Structural steel shall be "low-alloy steel" for non-bridge structures per Item 442, "Metal For Structures."
4. For fiberglass substrate connection details, see manufacturer's recommendations.

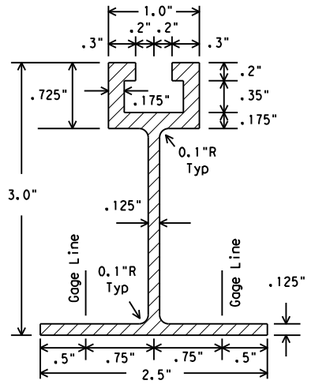


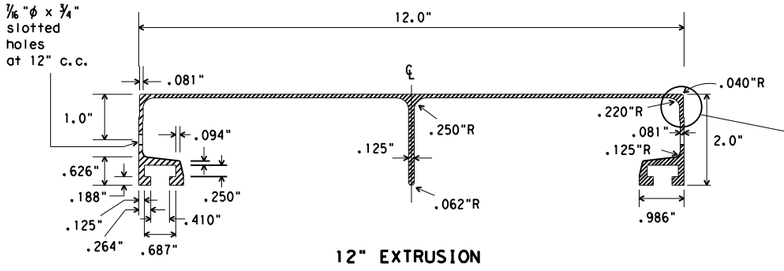
1.912 lbs/ft

ALUMINUM T SECTION OR APPROVED ALTERNATIVE

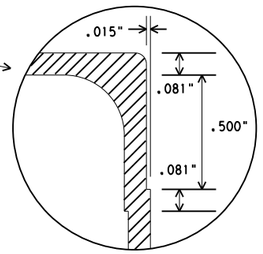
WINDBEAM CROSS SECTION

Windbeam to be extruded aluminum (1.175 lbs/ft) or approved alternative

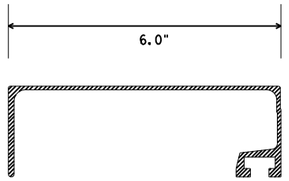




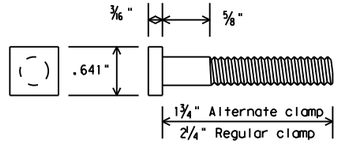
12" EXTRUSION



ALUMINUM SIGN PANEL EXTRUSION DETAILS



6" EXTRUSION



POST CLAMP BOLT DETAIL

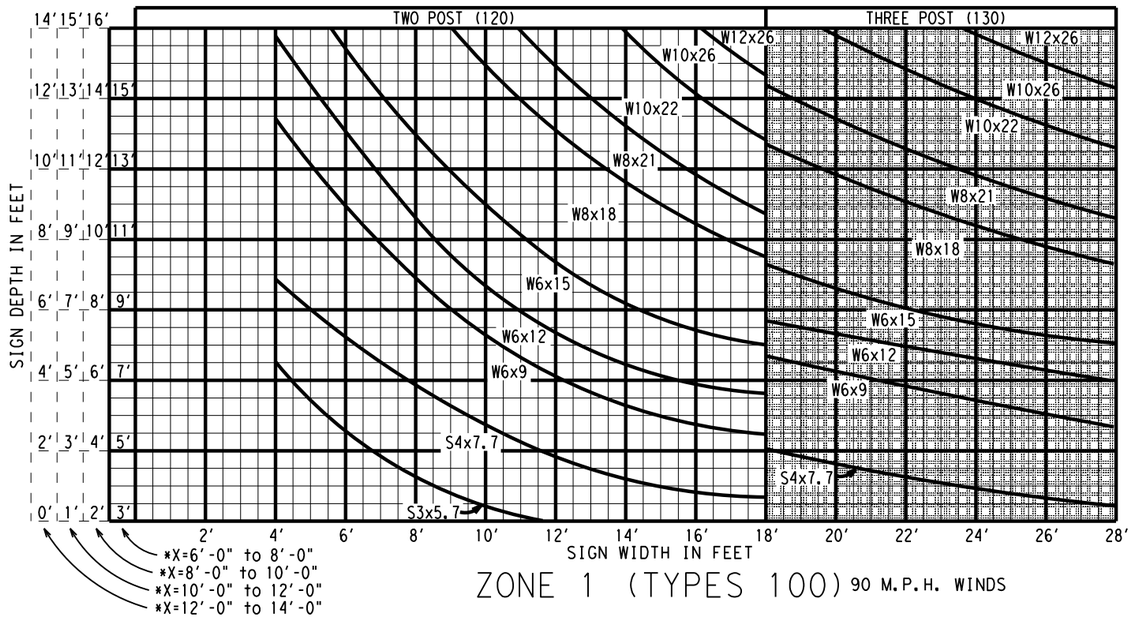
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- EXTRUDED ALUMINUM SIGN PANELS & HARDWARE

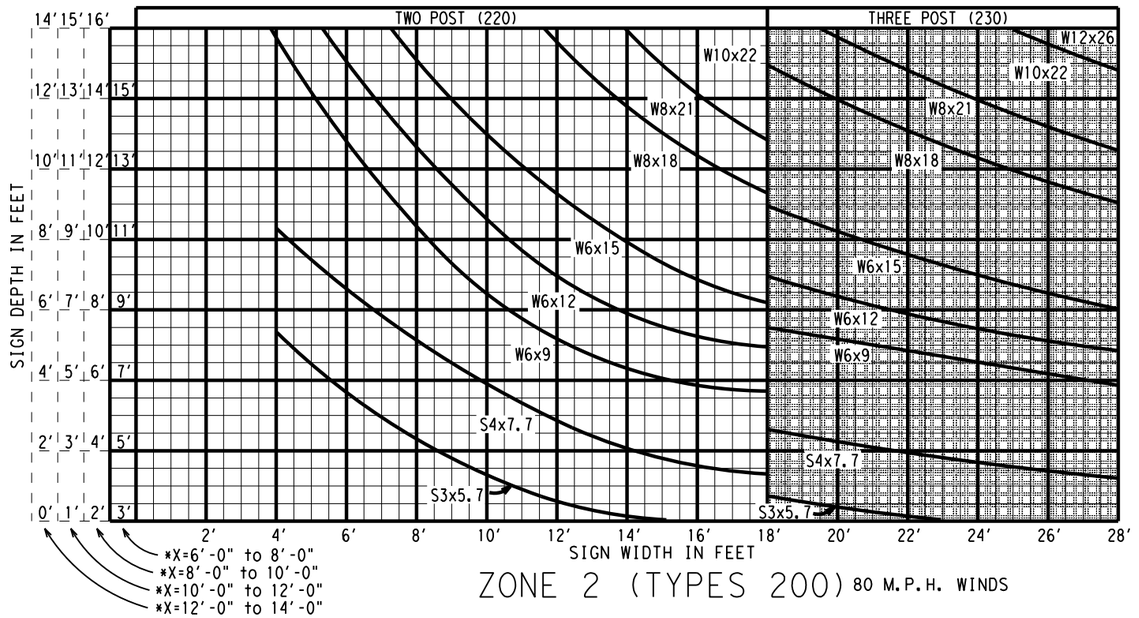
SMD(2-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

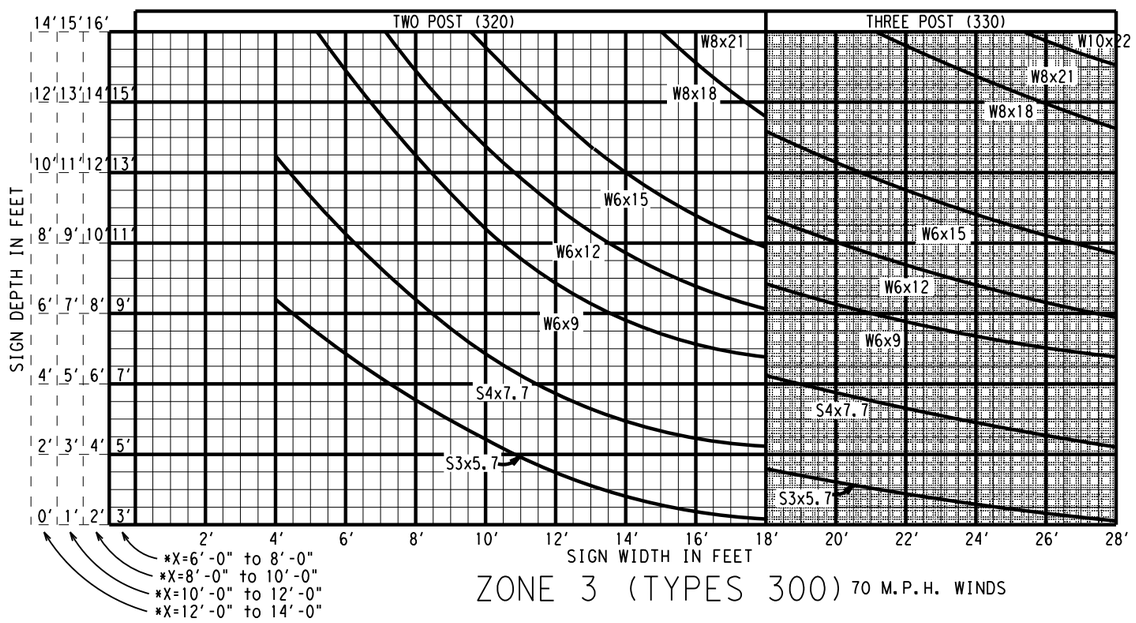
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	6467	35	001	US 59 ETC.
	DIST	COUNTY		SHEET NO.
	ATL	BOWIE ETC.		54



ZONE 1 (TYPES 100) 90 M.P.H. WINDS



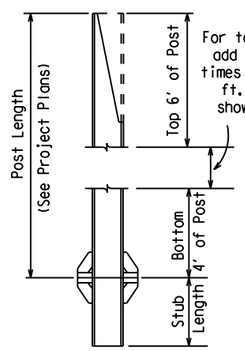
ZONE 2 (TYPES 200) 80 M.P.H. WINDS



ZONE 3 (TYPES 300) 70 M.P.H. WINDS

* NOTE: "X" EQUALS THE AVERAGE HEIGHT FROM THE GROUND LINE TO THE BOTTOM EDGE OF THE SIGN.

SHADED AREA DENOTES 3 POST SUPPORTS



POST WEIGHT DATA

POST SIZE	WEIGHT OF ONE POST (#)	WEIGHT OF TWO POSTS (#)	WEIGHT OF THREE POSTS (#)
W6x9*	123.2	246.4	369.6
W6x12*	160.3	320.6	480.9
W6x15*	167.8	335.6	503.4
W8x18*	201.8	403.6	605.4
W8x21*	254.7	509.4	764.1
W10x22*	266.0	532.0	798.0
W10x26*	308.0	616.0	924.0
W12x26*	308.6	617.2	925.8
S3x5.7*	85.9	171.8	257.7
S4x7.7*	112.2	224.4	336.6

*LAST FIGURES=POST WT. PER FT.

Weight Data is the weight of items shown for one, two or three posts - (includes top 6' of post, bottom 4' of post, post foundation stub, related base connection plates and stiffeners, friction fuse plate and all high strength bolts, nuts and washers).

SIGN TYPE

SIGN TYPE 1 3 0

- 1 — Wind Design Zone
- 3 — Series No.
- 0 — No. of Posts
  - 0 Aluminum/Fiberglass
  - 1 Aluminum
  - 2 Fiberglass

Note: Footings for S3x5.7 and S4x7.7 post sizes shall be non-reinforced with Class A concrete, while footing for all other post sizes shall be reinforced with Class C concrete.

Texas Department of Transportation
Traffic Operations Division

LARGE ROADSIDE SIGN SUPPORTS
POST SELECTION
WORKSHEET
SMD(8W1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
1-82
5-01
9-08

CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.

DIST	COUNTY	SHEET NO.
ATL	BOWIE ETC.	59

DATE: 4/22/2024 3:48:53 PM
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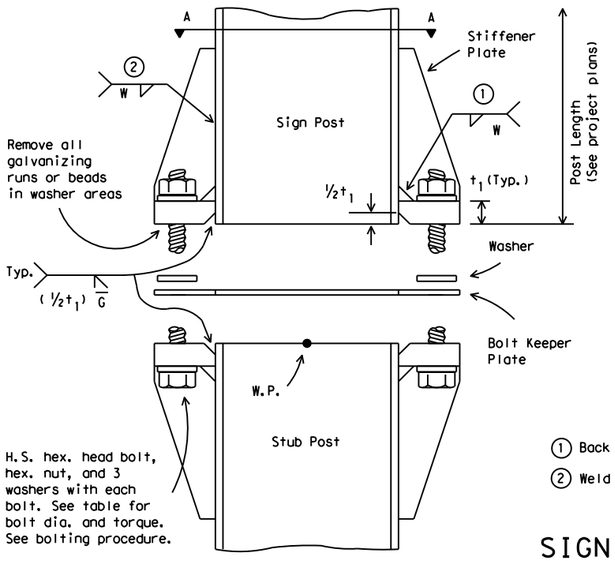
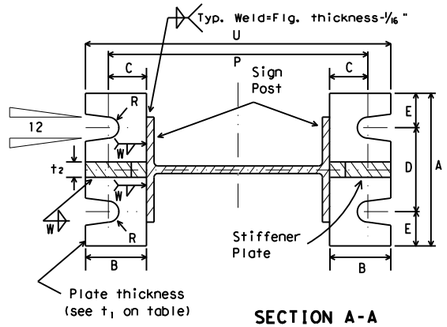
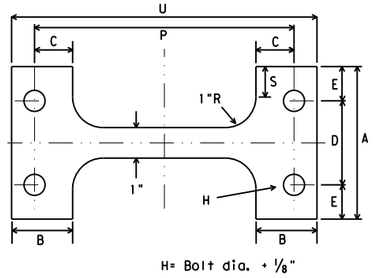


ELEVATION

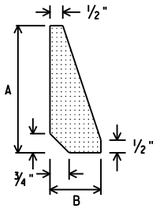


SECTION A-A



H= Bolt dia. + ⅛"

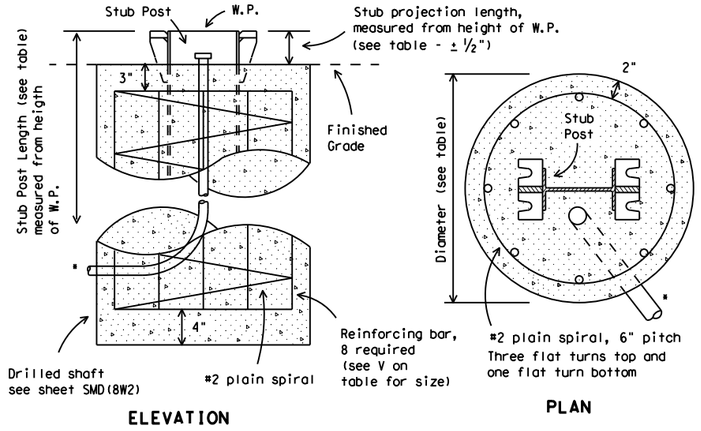
BOLT KEEPER PLATE
30 Ga galv. sheet steel



STIFFENER PLATE DETAIL

Steel Plate (thickness = t_2)

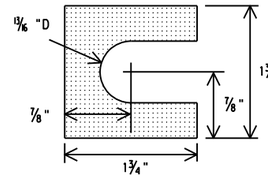
(See table for dimensions)



ELEVATION PLAN

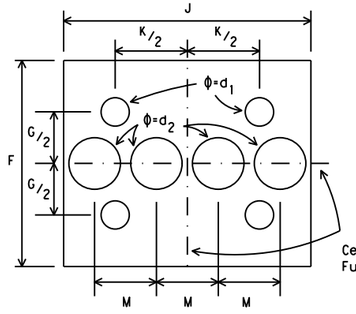
FOUNDATION DETAIL

*Note: For signs with electrical apparatus, see ED(10) for conduit required in founation.



SHIM DETAIL

Furnish two .012"± thick and two .032"± thick shims per post. Shims shall be fabricated from brass shim stock or strip conforming to ASTM B36.



PERFORATED FUSE PLATE DETAIL

Use H.S. hex head bolts, hex head nut and bevel or flat washer (where req'd) under nut. All holes shall be drilled, sub-punched and reamed. All plate cuts shall preferably be saw cuts. However, flame cutting will be permitted provided all edges are ground. Metal projecting beyond the plane of the plate face will not be permitted. Steel fuse plates shall conform to the requirements of ASTM A36. ASTM A572 Grade 50 or ASTM A588 may be substituted for A36 at the option of the fabricator. Mill test reports shall be submitted for Fuse Plates. Steel used shall have an ultimate tensile strength not to exceed 80 KSI. For alternative Fuse Plate contact Traffic Operations Division.

① Back up weld to be made before installing stiffener plate

② Weld W may be continued across clips to seal joint

SIGN POST AND STUB POST

(For W Shapes)

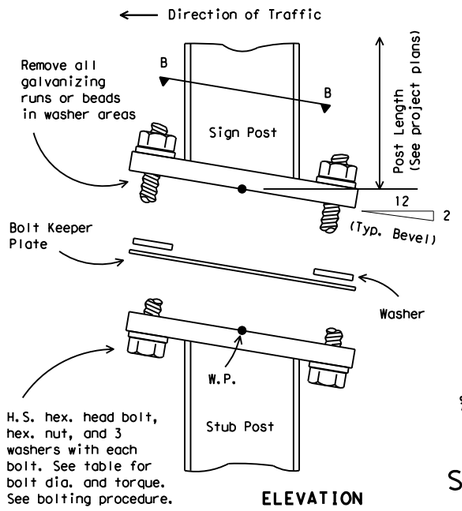
BOLTING PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

1. Assemble sign post, BOLT KEEPER PLATE and stub post with bolts and three flat washers per bolt as shown.
2. Shim as required to plumb post.
3. Tighten all bolts the maximum possible with a 12 to 15 inch wrench to clean bolt threads and to bed washers and shims.
4. Loosen each bolt in sequence and retighten bolts in a systematic order to the prescribed torque. Do not overtighten.
5. To prevent nut loosening, burr threads of bolt at junction with nut using a center punch.

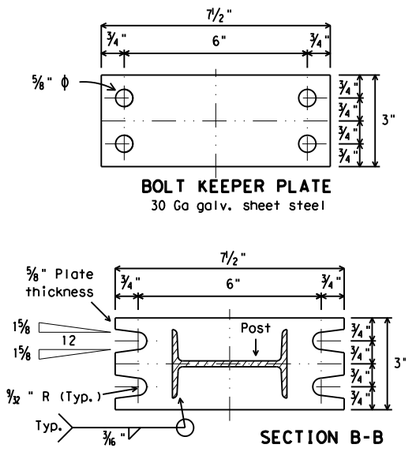
Dimensions / Post Size	Base Connection Data Table: Bolt Size & Torque	A	B	C	D	E	t_1	t_2	W	R
W6x9	⅝"ϕ x 2¾" 440-450 inch pounds 36-38 foot pounds	5"	2"	1¼"	2¾"	1⅛"	¾"	½"	¼"	11/32"
W6x12										
W6x15										
W8x18										
W8x21	¾"ϕ x 3½" 740-750 inch pounds 62-63 foot pounds	6"	2¼"	1⅜"	3½"	1¼"	1"	¾"	5/16"	13/32"
W10x22										
W10x26										
W12x26										
S3x5.7	½"ϕ x 2½" 440-450 inch pounds 36-38 foot pounds	See Detail Below								
S4x7.7										

Perforated Fuse Plate Data Table												Bolt Keeper Data			Foundation Data			
F	G	J	K	M	d_1	d_2	t_3	Bolt Dia.	Wt. (ea.) (lbs.)	Bolt length	P	S	U	Stub length	Stub projection	Dr. Shaft diameter	Bar V Size
4¼"	2"	4"	2¼"	1"	9/16"	¾"	¼"	½"	1.01	1½"	8⅜"	1"	9⅞"	2'-0"	3"	24"	#5
											8½"		10"	2'-0"	3"		#5
5"	2½"	6"	3½"	1½"	11/16"	1¼"	⅜"	⅝"	2.51	2¼"	8½"		10"	2'-6"	3"		#6
5"	2½"	5¼"	2¾"	1¼"	11/16"	1 1/16"	⅜"	⅝"	2.26	2¼"	10⅝"		12⅛"	2'-6"	3"		#7
5½"	2½"	5¼"	2¾"	1¼"	13/16"	1"	½"	¾"	3.35	2¼"	11"	1½"	12¾"	3'-0"	2½"		#8
6"	3"	5¾"	2¾"	1⅜"	13/16"	1⅛"	½"	¾"	4.03	2¼"	12⅞"		14⅝"	3'-0"	2½"		#9
											13⅛"		14⅞"	3'-0"	2½"		#10
6"	3"	6½"	3½"	1⅝"	13/16"	1 5/16"	½"	¾"	4.47	2¼"	15"		16¾"	3'-0"	2½"		#11
3¾"	1½"	2⅝"	1½"	⅝"	9/16"	⅜"	¼"	½"	0.60	1½"	See Detail Below			3'-3½"	3½"	12"	Non-reinforced ③

③ Foundation design shall be Type G Mount, see SMD (TY G).

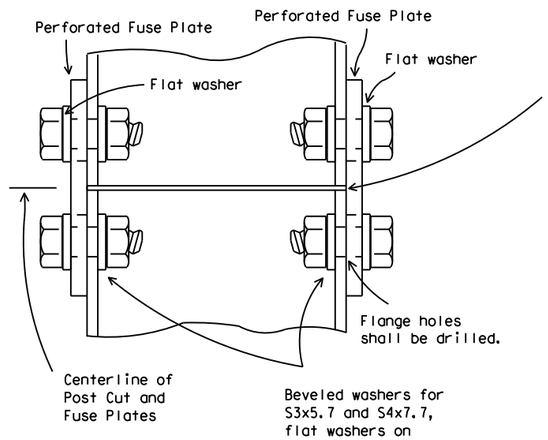


ELEVATION



SIGN POST AND STUB POST

(For S4x7.7 and S3x5.7)



DETAIL "A"

Parts shall be saw cut either before galvanizing and the galvanized cut cleaned of zinc build-up, or saw cut after galvanizing and the cut surface repaired per Item 445, "Galvanizing."

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- LARGE ROADSIDE SIGNS FOUNDATION & STUB

SMD(2-2)-08

REVISIONS
4-98
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.

DIST	COUNTY	SHEET NO.
ATL	BOWIE ETC.	55

DATE: 4/22/2024 3:47:01 PM
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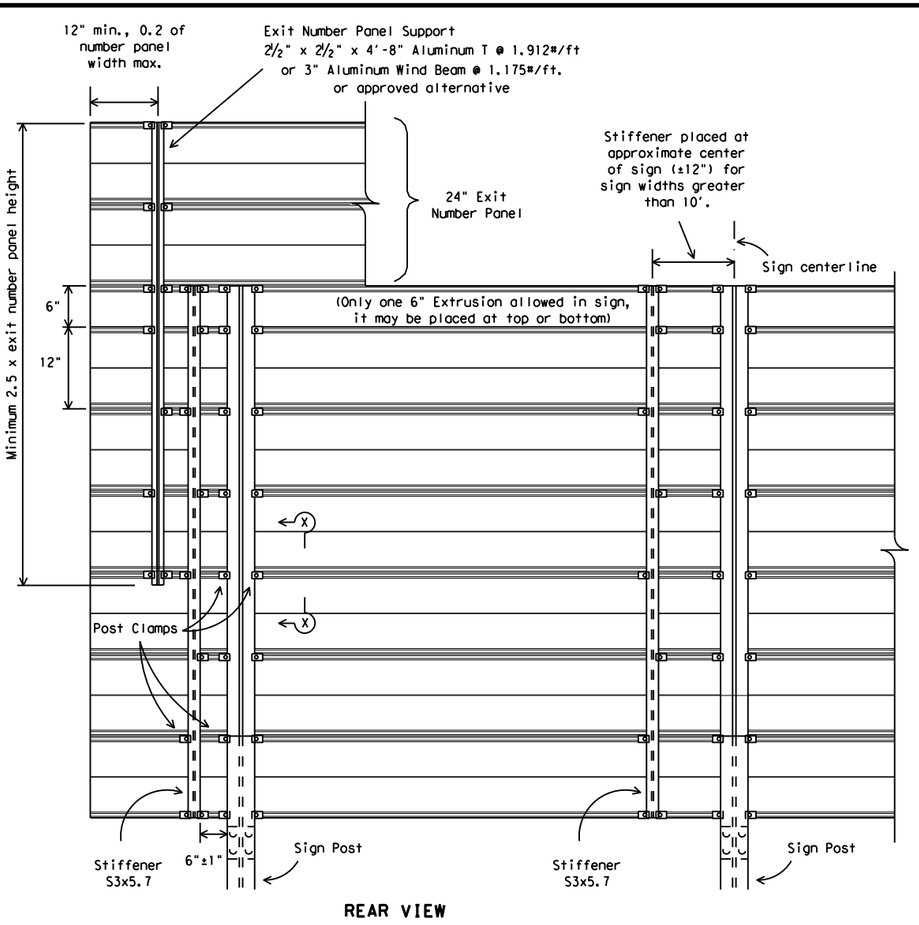
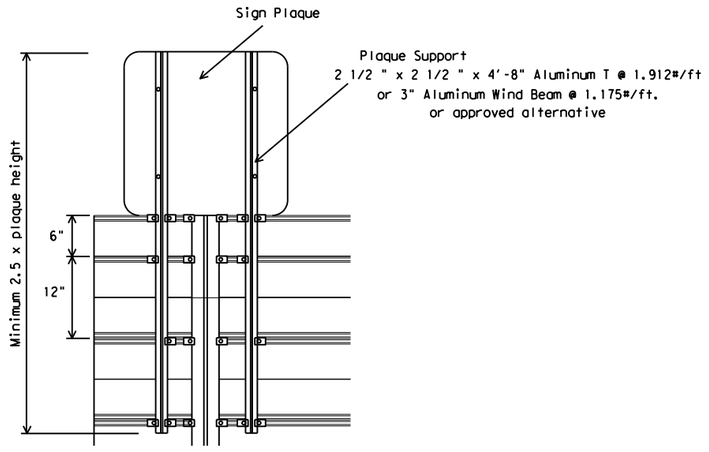
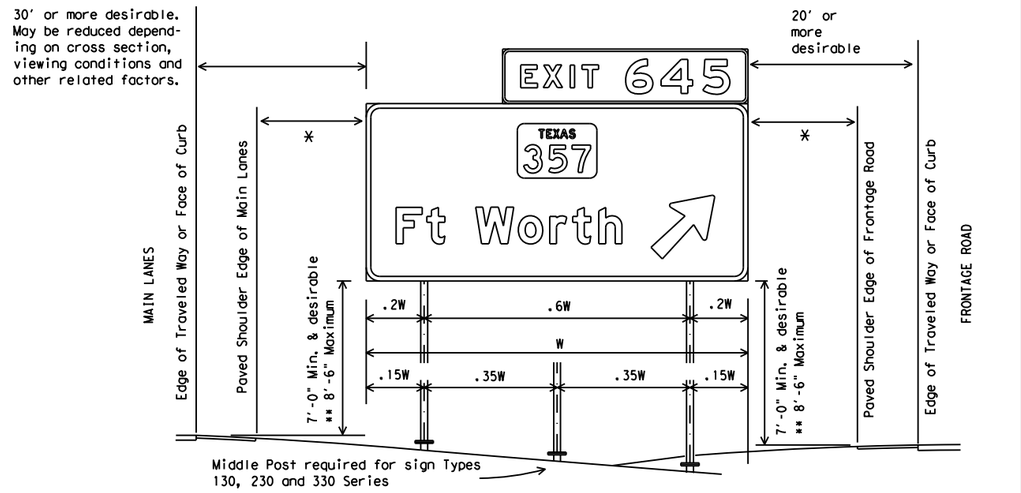


ALUMINUM PARENT SIGN & EXIT NUMBER PANEL MOUNTING DETAILS



SIGN PLAQUE MOUNTING DETAIL TO ALUMINUM PARENT SIGN



TYPICAL SIGN INSTALLATION AND LOCATION

LATERAL CLEARANCE NOTES:

Lateral clearances of signs mounted on median side of main lanes are the same as shown above where space will permit.

Where a sign is to be located behind guardrail, an allowable minimum clearance of five feet may be used, measured from the face of the guardrail to the near edge of sign.

⁎ - 6' minimum and desirable may be used only in areas of limited lateral clearance and when approved by the Engineer.

POST SPACING NOTES:

Post spacing on a two post sign may vary a maximum of plus or minus 10% of total sign width to fit field conditions.

Post spacing on a three post sign may vary a maximum of plus or minus 5% of total sign width to fit field conditions.

SIGN HEIGHT NOTES:

** The 8' 6" maximum may be exceeded when placing signs on extreme slopes. In these conditions, a 7' minimum from natural ground to bottom of sign must be maintained.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN HARDWARE	DMS-7120

GENERAL NOTES:

1. Exit number panel shall be mounted to the right hand side of the parent sign for right exits and to the left hand side for left exits. The number panel shall be mounted with two uprights so its right edge is even with the right edge of the parent sign or vice-versa for left hand exits.
2. Exit number panel support shall be symmetrical about number panel centerline.
3. Exit number panel support shall be ASTM A36 structural steel galvanized after fabrication, or ASTM B221 aluminum alloy 6061-T6 or approved alternative.
4. All bolts, nuts and washers shall be galvanized per ASTM Designation: B695 Class 50, or A153 Class C or D.
5. Posts, parent sign panels, and exit number panels shall comply with notes on sheets SMD(2-1) and SMD(2-2).
6. Signs (such as exit number panels) attached above a parent sign shall be made of the same type material as the parent sign. General Service and Routing signs may be fabricated from flat sheet aluminum.
7. Exit number panel support and other connection hardware required to fasten exit number panel to parent sign shall be subsidiary to "Aluminum Signs" or "Fiberglass Signs."
8. For fiberglass sign installation details, see manufacturer's recommendations.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS-LARGE ROADSIDE SIGNS

SMD(2-3)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.

DIST	COUNTY	SHEET NO.
ATL	BOWIE ETC.	56

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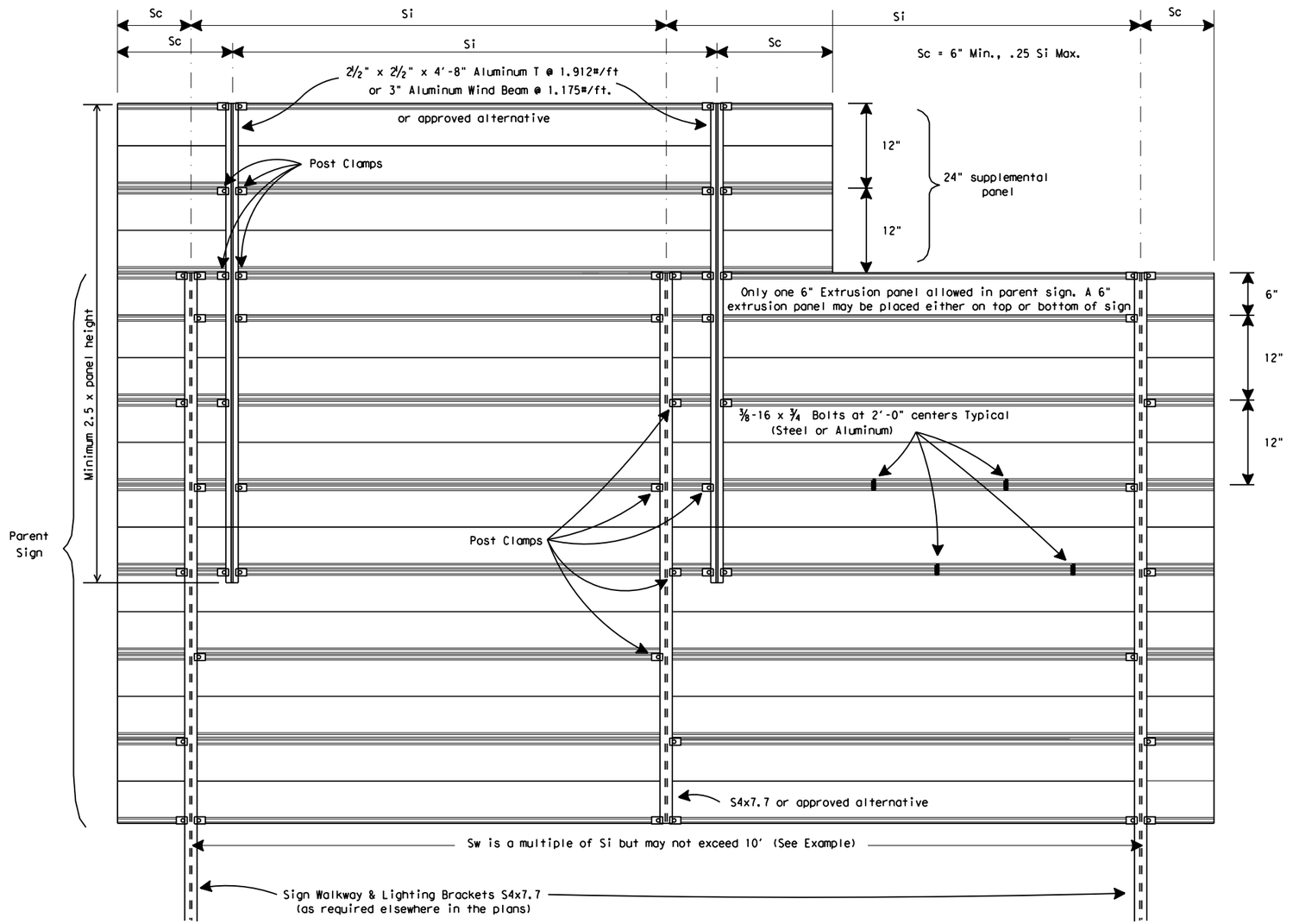
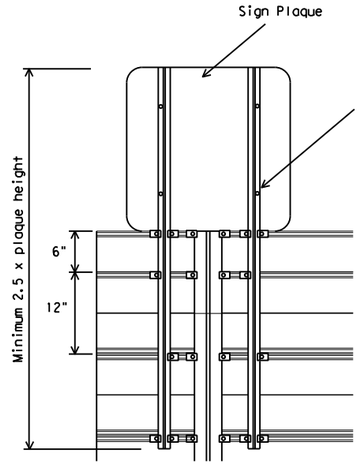


REAR VIEW

EXAMPLES (FOR DETERMINING Si and Sw)

NO.	ZONE	"d"	EXIT PANEL	WALKWAY	Si	Sw	COMMENT
1	1	15.0	YES	YES	4.5	9.0	Sw=2x(Si)
2	2	14.0	YES	NO	7.5	7.5	Sw = Si
3	1	15.0	NO	NO	8.5	8.5	Sw = Si
4	3	14.0	NO	YES	10.0	10.0	Sw = Si

Values shown for Si are maximum values. Si may be varied for different sign lengths and Truss mounting conditions. Sw should not exceed two times Si(Max.) or 10 feet.



SIGN PLAQUE MOUNTING DETAIL

MAXIMUM SIGN SUPPORT SPACING "Si" (FEET)

"d" Deepest Sign in Group (Ft.)	EXTRUDED ALUMINUM SIGN PANELS															
	WITH EXIT NUMBER PANELS								WITHOUT EXIT NUMBER PANELS							
	WITH WALKWAYS				WITHOUT WALKWAYS				WITH WALKWAYS				WITHOUT WALKWAYS			
	WIND ZONE				WIND ZONE				WIND ZONE				WIND ZONE			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
15	4.5	7	8	10	5	7	8	10	7	8	9	10	8.5	10	10	10
14	6	7.5	9.5	10	6	7.5	9.5	10	8	9	10	10	10	10	10	10
13	7.5	9	10	10	7.5	9	10	10	9	10	10	10	10	10	10	10
12	8.5	10	10	10	8.5	10	10	10	10	10	10	10	10	10	10	10
11 or less	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

For fiberglass sign installations, see manufacturer's recommendations.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS-OVERHEAD SIGNS EXTRUDED ALUMINUM

SMD(2-4)-08

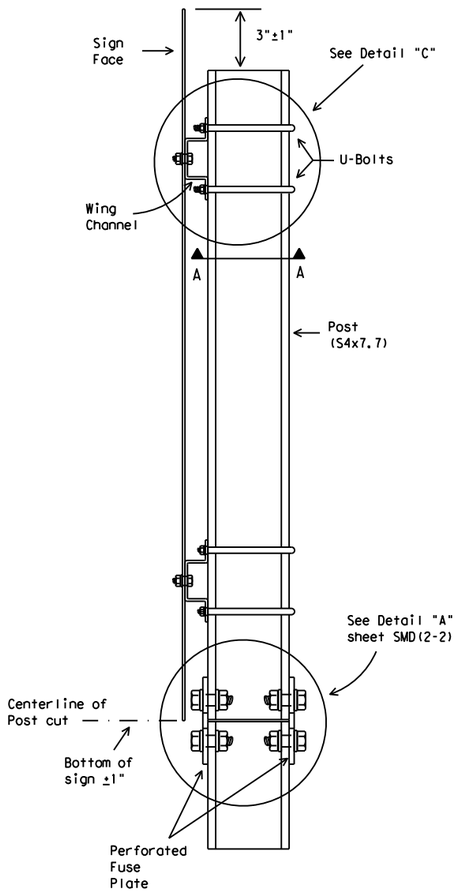
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

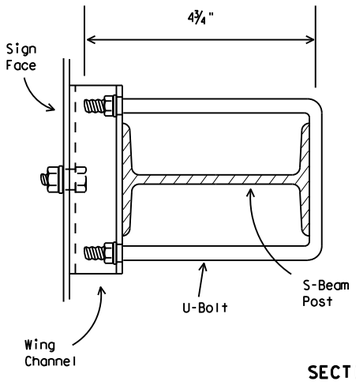
CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.
DIST	COUNTY		SHEET NO.
ATL	BOWIE ETC.		57

27D

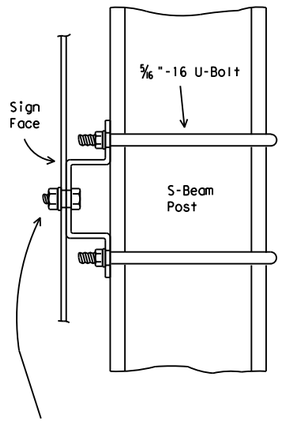
WING CHANNEL CLAMP DETAIL FOR TYPE G MOUNT



SIDE VIEW

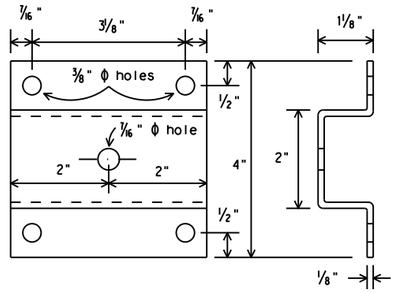


SECTION A-A



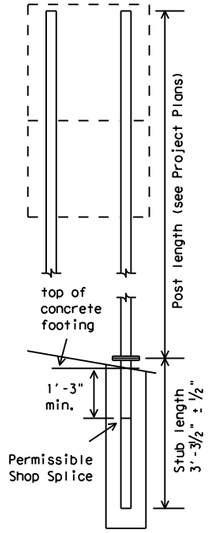
Galvanized steel or aluminum self-locking hex. head nut. 3/8 " - 16 x 3/4 " hex. head bolt for sheet metal. 3/8 " - 16 x 1 1/4 " hex. head bolt for plywood. 3/8 " galvanized medium washer.

DETAIL "C"

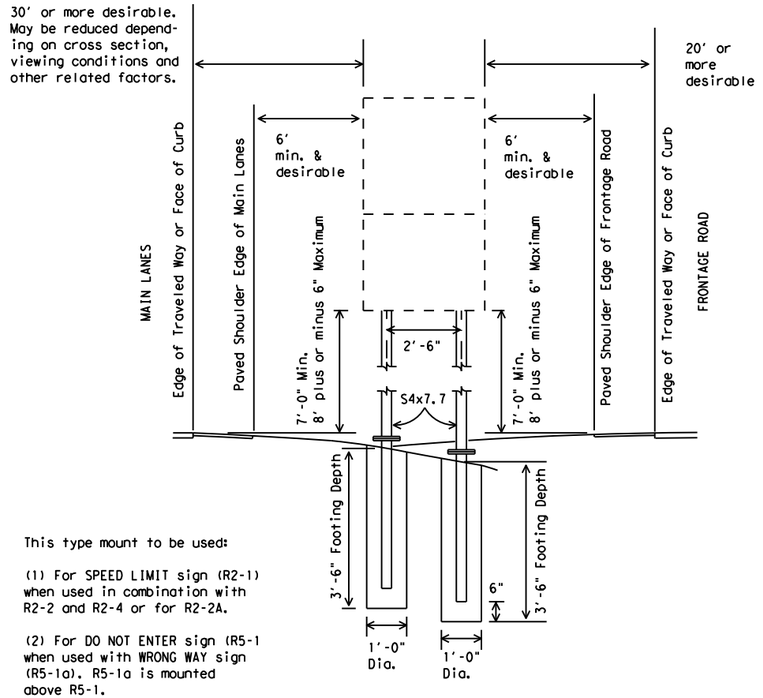


WING CHANNEL

Wing channel, 4" width x 1⅛" depth x ⅛" thickness, shall be aluminum (ASTM B221 6061-T6 or B308 6061-T6), galvanized steel (ASTM A36) or stainless steel (ASTM A167 type 304, No. 2B finish).



The weight of one S4x7.7 post is equal to 112.2 lbs. plus 7.7 lbs./ft x (post length in feet minus 10 ft). The weight of 112.2 lbs. includes 10 feet of post length, post foundation stub, related connection plates, friction fuse plate, and all high strength bolts, nuts and washers.



This type mount to be used:

(1) For SPEED LIMIT sign (R2-1) when used in combination with R2-2 and R2-4 or for R2-2A.

(2) For DO NOT ENTER sign (R5-1 when used with WRONG WAY sign (R5-1a). R5-1a is mounted above R5-1.

DEPARTMENTAL MATERIAL SPECIFICATIONS
SIGN HARDWARE DMS-7120

GENERAL NOTES:

1. Design conforms with AASHTO Specifications for the design and construction of structural supports for highway signs.
2. Materials and fabrication shall conform to the requirements of the Department material specifications.
3. Structural steel shall be "Low-Alloy Steel" for non-bridge structures per Item 442, "Metal For Structures."
4. Parts shall be saw cut either before galvanizing and the galvanized cut cleaned of zinc build-up, or saw cut after galvanizing and the cut surface repaired per Item 445, "Galvanizing." (Cut surface will not be treated until plate is installed and all bolts fully tightened.)

Texas Department of Transportation
Traffic Operations Division

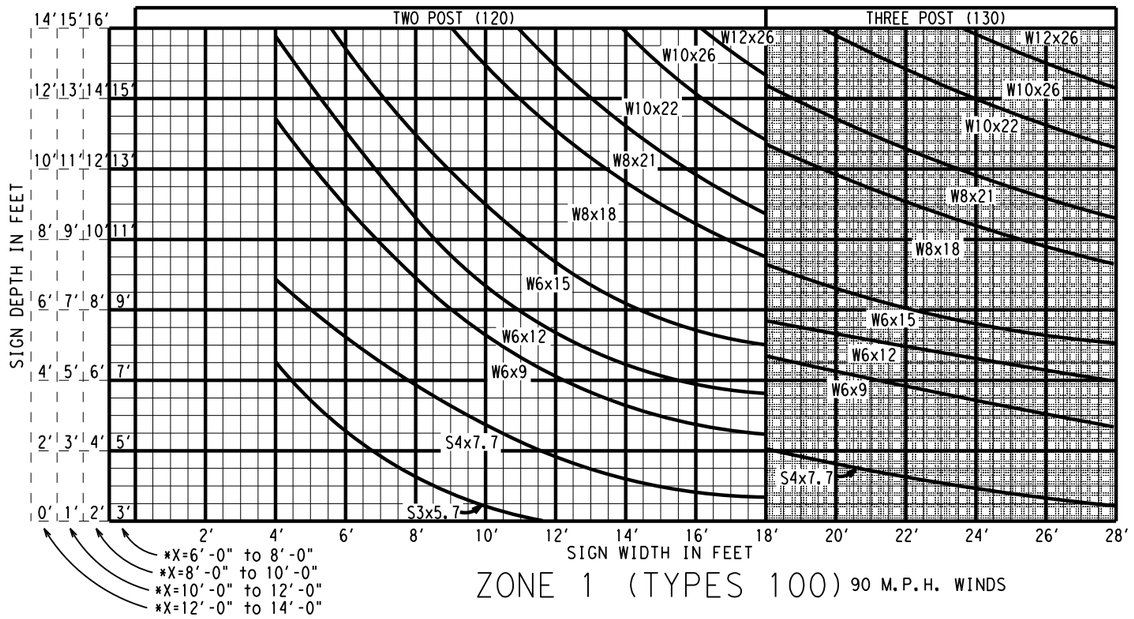
SIGN MOUNTING DETAILS, TYPE G SUPPORT

SMD(TY G)-08

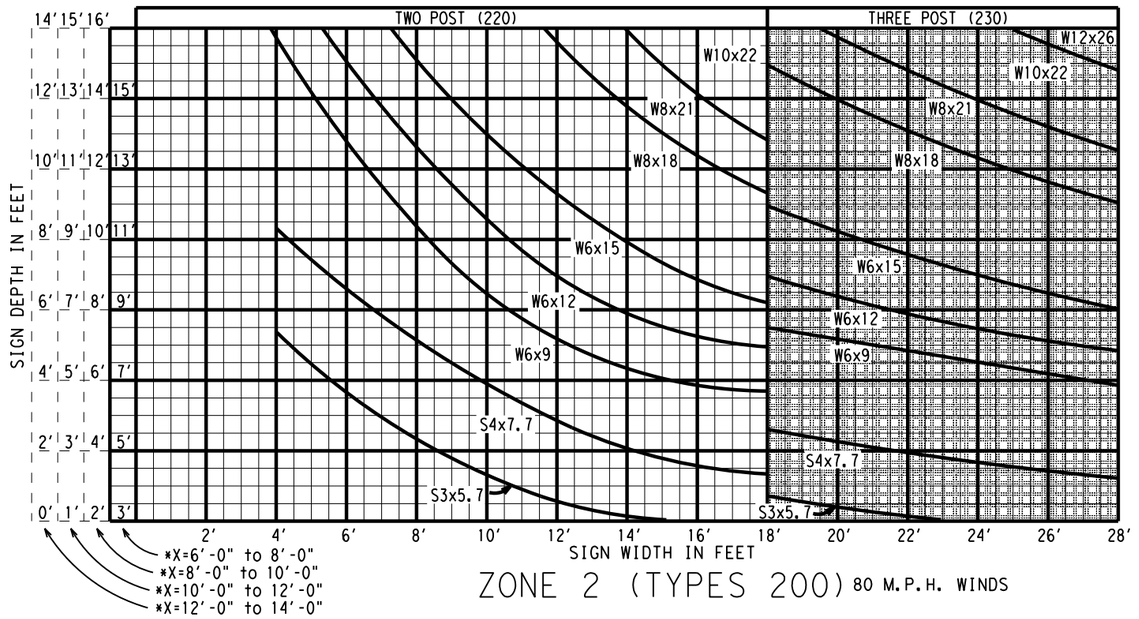
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
1-97	CONT	SECT	JOB	HIGHWAY
9-08	6467	35	001	US 59 ETC.
	DIST	COUNTY		SHEET NO.
	ATL	BOWIE ETC.		58

DATE:
FILE:

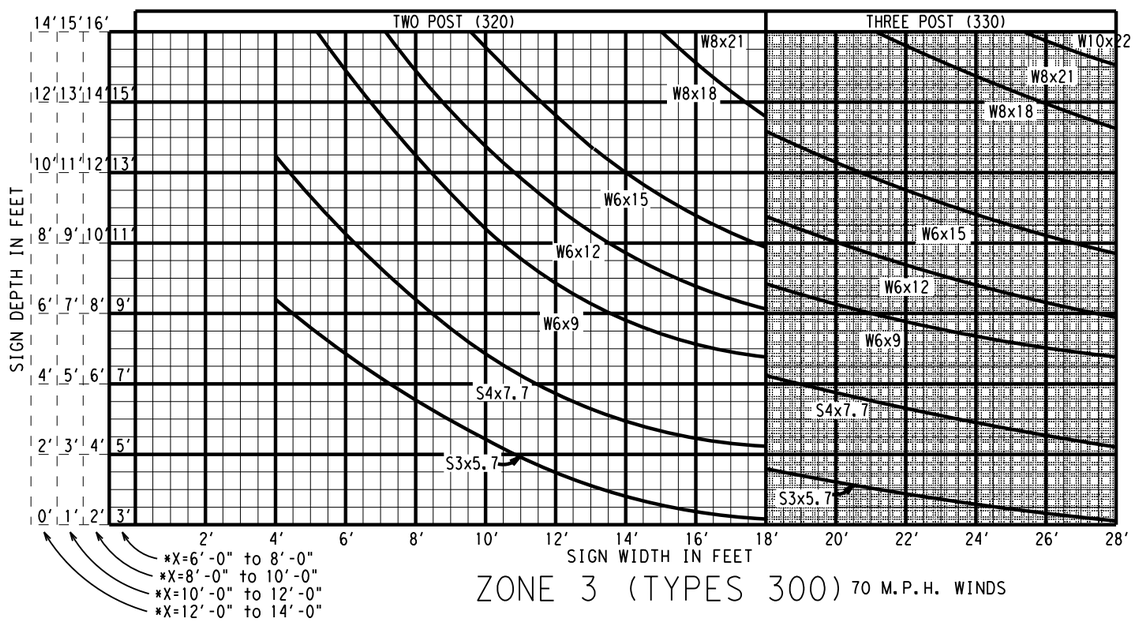
DATE: 4/23/2024 7:07:06 AM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\STANDARDS\smd8-08.dgn



ZONE 1 (TYPES 100) 90 M.P.H. WINDS



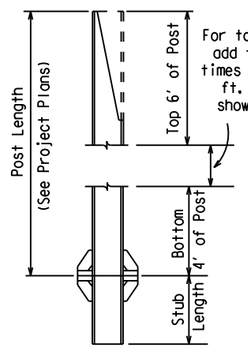
ZONE 2 (TYPES 200) 80 M.P.H. WINDS



ZONE 3 (TYPES 300) 70 M.P.H. WINDS

* NOTE: "X" EQUALS THE AVERAGE HEIGHT FROM THE GROUND LINE TO THE BOTTOM EDGE OF THE SIGN.

SHADED AREA DENOTES 3 POST SUPPORTS



POST WEIGHT DATA

POST SIZE	WEIGHT OF ONE POST (#)	WEIGHT OF TWO POSTS (#)	WEIGHT OF THREE POSTS (#)
W6x9*	123.2	246.4	369.6
W6x12*	160.3	320.6	480.9
W6x15*	167.8	335.6	503.4
W8x18*	201.8	403.6	605.4
W8x21*	254.7	509.4	764.1
W10x22*	266.0	532.0	798.0
W10x26*	308.0	616.0	924.0
W12x26*	308.6	617.2	925.8
S3x5.7*	85.9	171.8	257.7
S4x7.7*	112.2	224.4	336.6

*LAST FIGURES=POST WT. PER FT.

Weight Data is the weight of items shown for one, two or three posts - (includes top 6' of post, bottom 4' of post, post foundation stub, related base connection plates and stiffeners, friction fuse plate and all high strength bolts, nuts and washers).

SIGN TYPE

SIGN TYPE 1 3 0
- 1 — Wind Design Zone
- 3 — Series No.
- 0 — No. of Posts

Series No.: 0 Aluminum/Fiberglass; 1 Aluminum; 2 Fiberglass

Note: Footings for S3x5.7 and S4x7.7 post sizes shall be non-reinforced with Class A concrete, while footing for all other post sizes shall be reinforced with Class C concrete.

Texas Department of Transportation
Traffic Operations Division

LARGE ROADSIDE SIGN SUPPORTS
POST SELECTION
WORKSHEET
SMD(8W1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
1-82
5-01
9-08

CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.

DIST	COUNTY	SHEET NO.
ATL	BOWIE ETC.	59

DATE: 4/23/2024 7:07:58 AM
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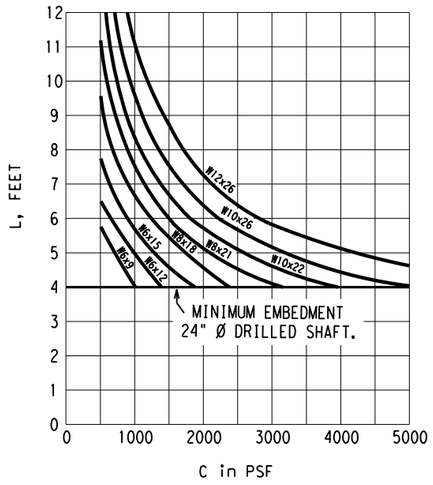
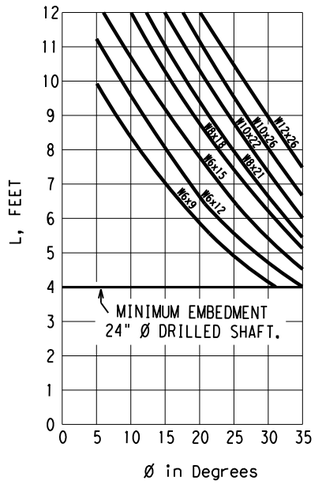
I



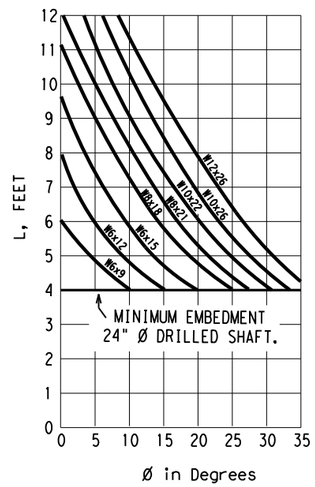
Ø = 0 Degrees

II



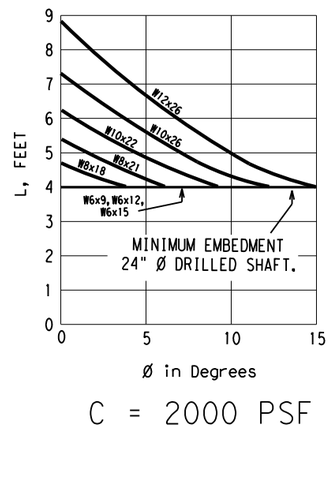
C = 0 PSF

III



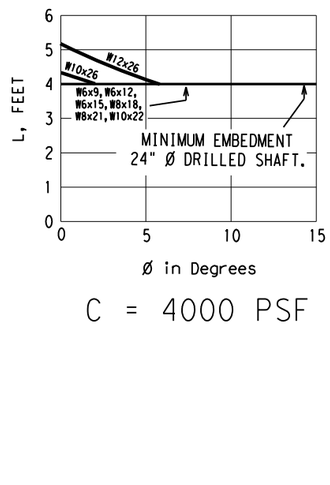
C = 500 PSF

IV



C = 2000 PSF

V



C = 4000 PSF

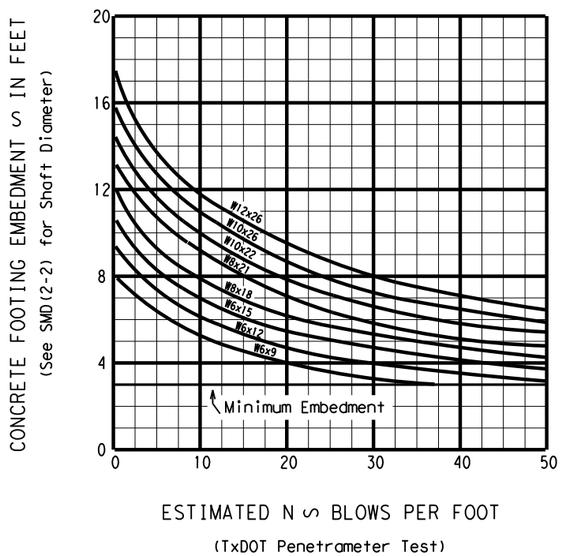
DRILLED CONCRETE FOOTING DEPTH CHART
(COHFRIC DESIGN)

NOTE: THESE CHARTS MAY BE USED AS AN ALTERNATE TO THE CHART BELOW, PROVIDED THAT SOIL COHESION AND INTERNAL FRICTION (COHFRIC) DATA ARE AVAILABLE.

LEGEND:

L = Required embedment of concrete drilled shaft, in feet
C = Cohesive shear strength of soil, in psf
Ø = Angle of internal friction of soil, in degrees

For values of C and Ø which are intermediate to those on the charts, embedments may be determined by straight - line interpolation.



DRILLED CONCRETE FOOTING DEPTH CHART
(TxDOT PENETROMETER DESIGN)

NOTE: ESTIMATED N SHOULD BE BASED AT APPROXIMATELY THE UPPER ONE-THIRD POINT OF THE DRILLED CONCRETE FOOTING BELOW THE GROUND LINE

Note:
1. Curves shown on this sheet are applicable for reinforced concrete footings only.

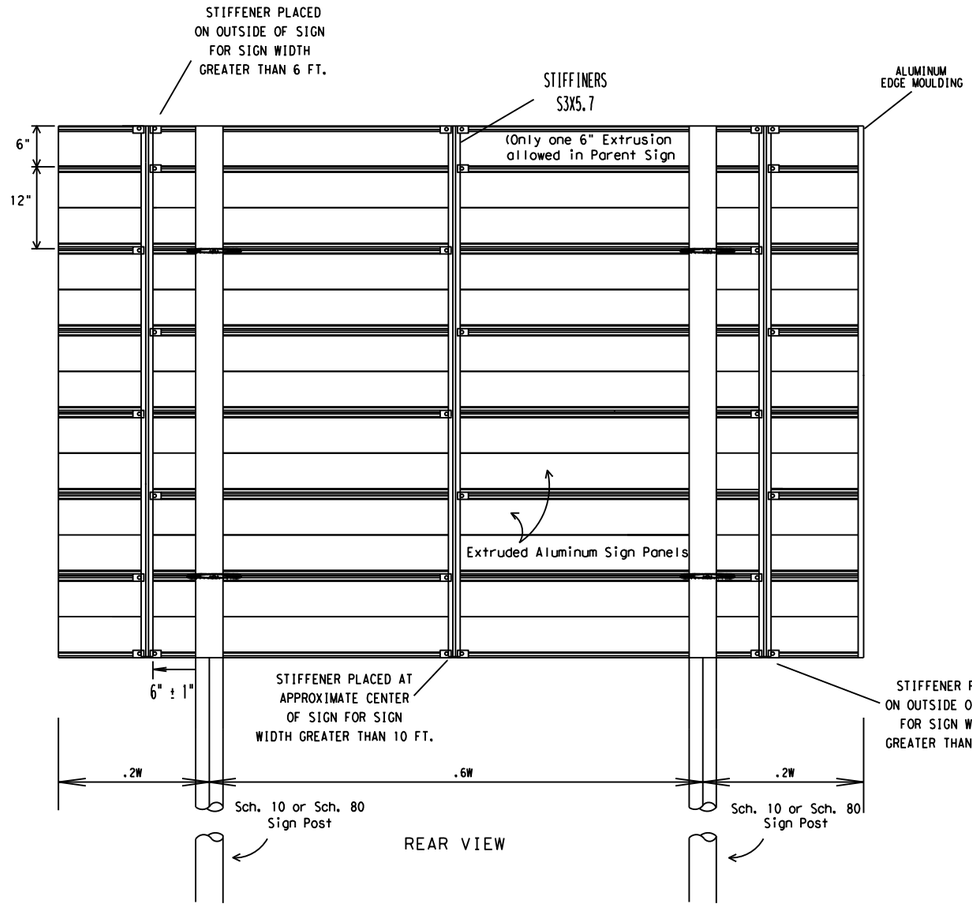
Texas Department of Transportation
Traffic Operations Division

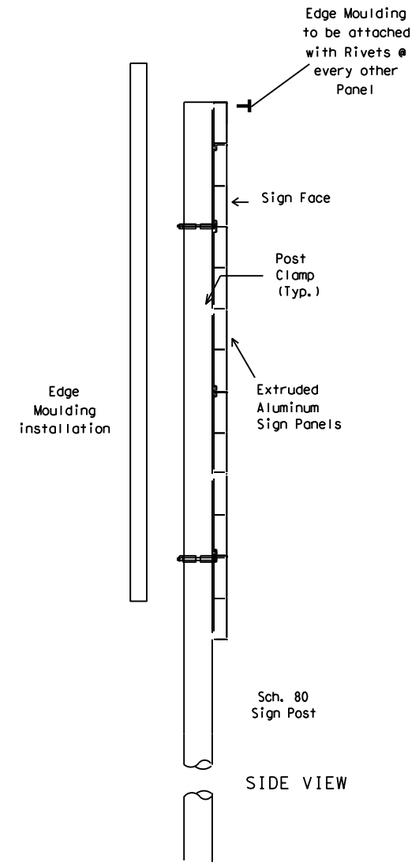
LARGE ROADSIDE SIGN SUPPORTS FOUNDATION WORKSHEET
SMD(8W2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

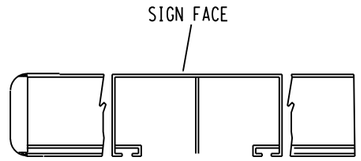
REVISIONS
5-74
4-78
9-08

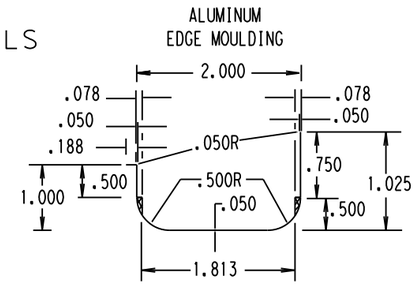
CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.
DIST	COUNTY		SHEET NO.
ATL	BOWIE ETC.		60





PARENT SIGN WITH TWO SCH. 80 POST MOUNTING DETAILS FOR TYPE G MOUNT SIGN





GENERAL NOTES:

1. Sign post shall be Schedule 80 steel post and shall be galvanized in accordance to ASTM Designation A123 and mounted on a Texas Universal Triangular Slip Base.
2. 63 Sq. Feet Maximum Sign Area for Sch. 80 Steel Post.
3. All bolts, nuts and washers shall be galvanized per ASTM Designation: B695 Class 50, or A153 Class C or D.

STATE OF TEXAS
KENNETH S. BURNS
142417
LICENSED PROFESSIONAL ENGINEER
Kenneth S. Burns, P.E.

5/3/2024

Atlanta District Standard

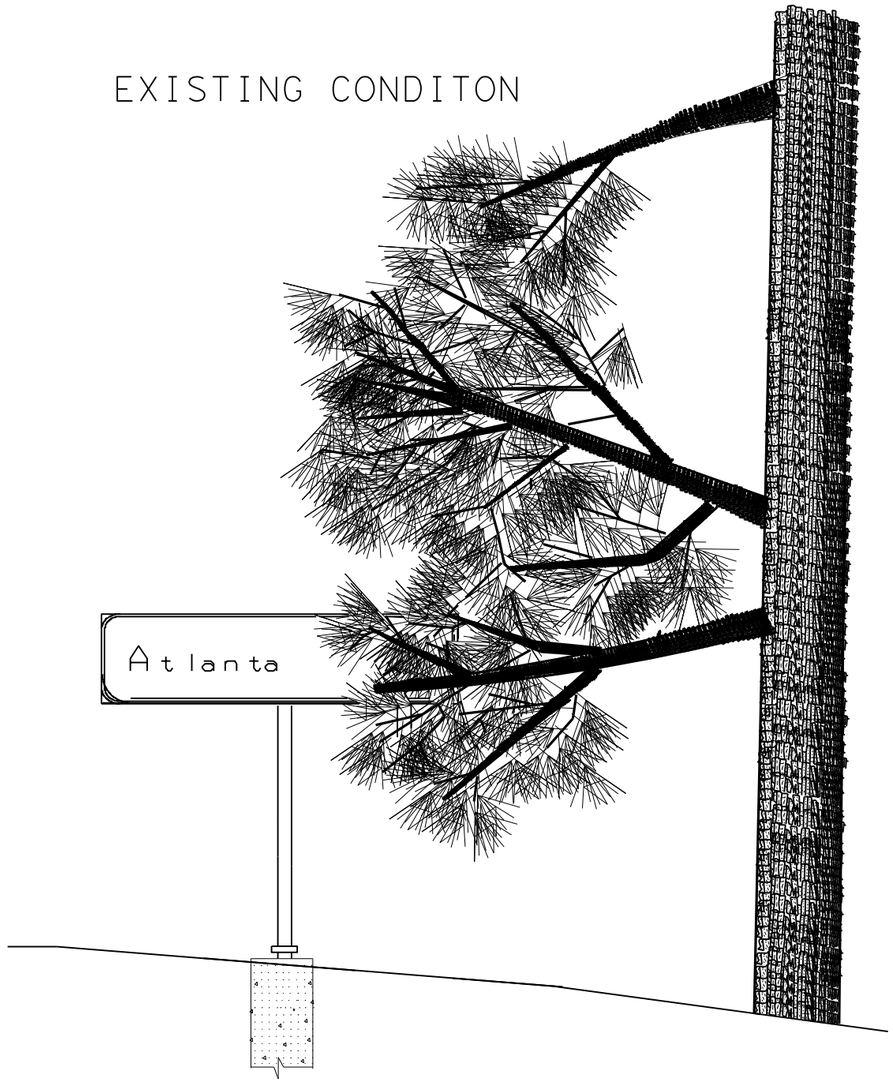
SIGN MOUNTING DETAILS LARGE ROADSIDE SIGNS. EDGE MOULDING DETAIL

 Texas Department of Transportation

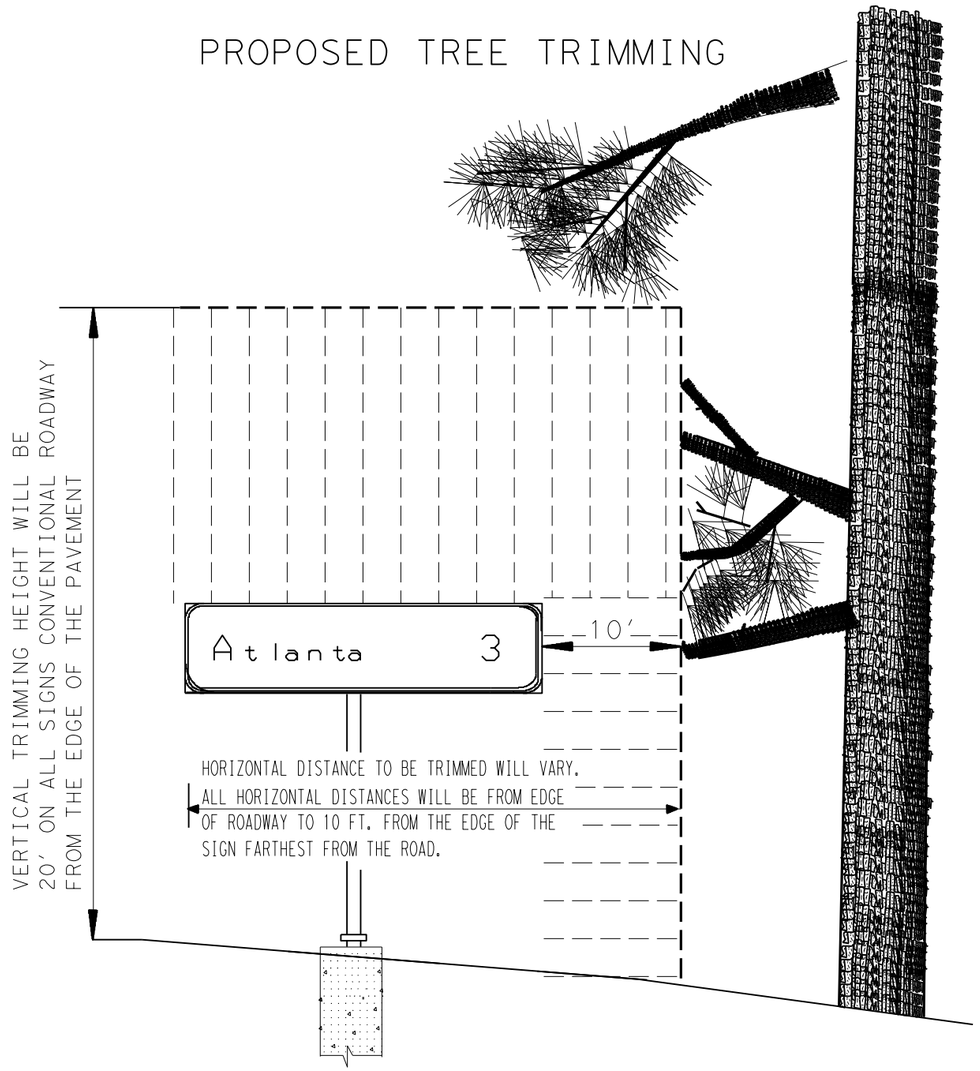
FHWA TEXAS DIVISION	MAINTENANCE PROJECT NO.		SHEET NO.
	646735001		61
STATE	DISTRICT	COUNTY	
TEXAS	ATL	BOWIE ETC.	
CONTROL	SECTION	JOB	HIGHWAY NO.
6467	35	001	US 59 ETC.

FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\STANDARDS\ATLSMDedgemoldingdetail.dgn
DATE: 5/3/2024 11:57:42 AM

EXISTING CONDITON



PROPOSED TREE TRIMMING



NOTES:

TRIM VEGETATION 20 FT. VERTICALY ON ALL SIGNS LOCATED ON CONVENTIONAL ROADWAYS, AND 10 FT. HORIZONTALY FROM EDGE OF SIGN FARTHEST FROM ROADWAY.

STATE OF TEXAS
KENNETH S. BURNS
142417
LICENSED
PROFESSIONAL ENGINEER

Kenneth S. Burns, P.E.

5/3/2024

N. T. S.

TYPICAL APPLICATION TREE TRIMMING & BRUSH REMOVAL SHEET 1 OF 2

FHWA TEXAS DIVISION	MAINTENANCE PROJECT NO.		SHEET NO.
	646735001		62
STATE	DISTRICT	COUNTY	
TEXAS	ATL	BOWIE ETC.	
CONTROL	SECTION	JOB	HIGHWAY NO.
6467	35	001	US 59 ETC.

ROADWAY : FM 1734

COUNTY : TITUS

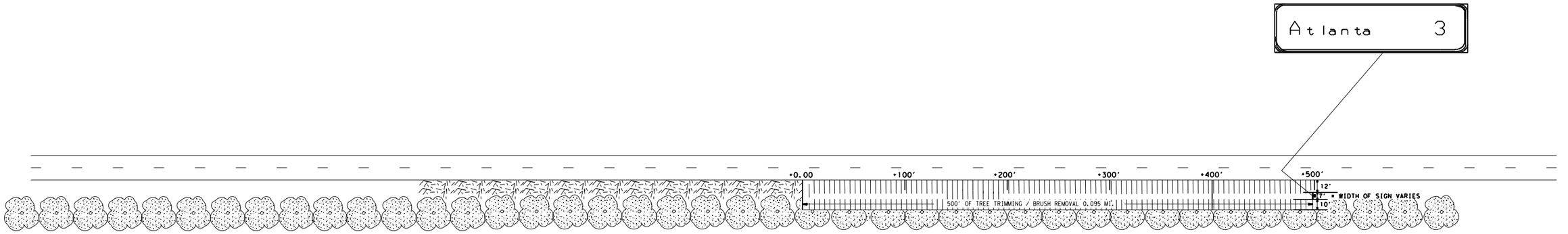
LOCATION : 15,840 FT. E. OF Mt. Pleasant

SIGN TEXT : Atlanta 3

ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
752	6022	TREE TRIMMING/BRUSH REMOVAL	FT.	502

NOTE:

ON CONVENTIONAL HIGHWAYS, ALL LIMB VEGETATION WITHIN THE 20' VERTICAL DIMENSION & WITHIN THE HORIZONTAL DIMENSION AT THE SIGN, WILL BE REMOVED FROM THE SIGN TO 25' MINIMUM UPSTREAM FROM THE SIGN. A MINIMUM MEASUREMENT OF 25' WILL BE PAID FOR AT ALL LOCATIONS.



STATE OF TEXAS
KENNETH S. BURNS
142417
LICENSED
PROFESSIONAL ENGINEER

Kenneth S. Burns, P.E.

5/3/2024

0' 50' 100'

TYPICAL APPLICATION TREE TRIMMING & BRUSH REMOVAL SHEET 2 OF 2

FHWA TEXAS DIVISION	MAINTENANCE PROJECT NO.		SHEET NO.
	646735001		63
STATE	DISTRICT	COUNTY	
TEXAS	ATL	BOWIE ETC.	
CONTROL	SECTION	JOB	HIGHWAY NO.
6467	35	001	US 59 ETC.

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DATE: 5/3/2024 12:02:52 PM

DATE: 4/23/2024 7:22:28 AM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\STANDARDS\Srds67.dgn

Washers shall conform to ASTM F436.

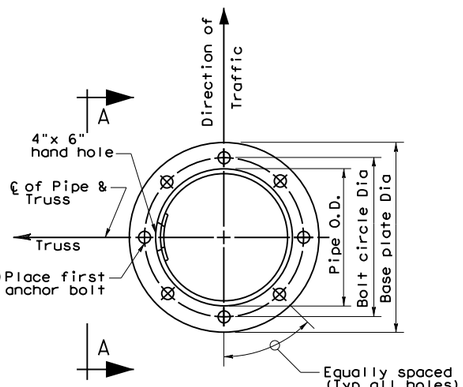
ANCHOR BOLT DIA.	WASHER DIMENSIONS				HOLE IN BASE PLATE
	OUTSIDE DIAMETER	HOLE DIAMETER	THICKNESS		
d			MIN.	MAX.	
1 ½" or less	2d	d + ⅛"	0.136"	0.177"	d + ¼"
1 ¾"	2d - ⅛"	d + ⅛"	0.178"	0.280"	d + 5/16"
2"	2d - ¼"	d + ⅛"	0.178"	0.280"	d + 5/16"
Over 2"	2d - ½"	d + ⅛"	0.240"	0.340"	d + 5/16"

ANCHOR BOLT SIZE				
DIA	BOLT ① LENGTH	THREAD ① LENGTH	PROJECTION LENGTH	GALVAN. ① LENGTH
1 ¼"	2'-11"	5"	5 ¼"	11 ¼"
1 ⅜"	3'-1"	5 ½"	5 ¾"	11 ¾"
1 ½"	3'-4"	6"	6 ¼"	1'-0 ¼"
1 ¾"	3'-10"	7"	7 ¼"	1'-1 ¼"
2"	4'-3"	8"	8 ¼"	1'-2 ¼"
2 ¼"	4'-9"	9"	9 ¼"	1'-3 ¼"
2 ½"	5'-2"	10"	10 ¼"	1'-4 ¼"
2 ¾"	5'-8"	11"	11 ¼"	1'-5 ¼"
3"	6'-1"	1'-0"	1'-0 ¼"	1'-6 ¼"

① Anchor Bolt Fabrication Tolerances:
Bolt Length ~ ±½"
Thread Length ~ ±½"
Galvanized Length ~ -¼"

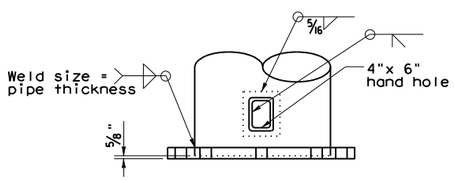
ANCHOR BOLT SIZE	PIPE OUTSIDE DIAMETER											
	16"			20"			24"			30"		
	BOLT CIRCLE DIA	DRILLED SHAFT SIZE	DRILLED SHAFT REINF	BOLT CIRCLE DIA	DRILLED SHAFT SIZE	DRILLED SHAFT REINF	BOLT CIRCLE DIA	DRILLED SHAFT SIZE	DRILLED SHAFT REINF	BOLT CIRCLE DIA	DRILLED SHAFT SIZE	DRILLED SHAFT REINF
1 ¼"Dia x 2'-11"	20 ½"	36" Dia	14-#8 (A)	24 ½"	36" Dia	14-#8 (A)						
1 ⅜"Dia x 3'-1"	20 ¾"	36" Dia	12-#9 (A)	24 ¾"	36" Dia	12-#9 (A)						
1 ½"Dia x 3'-4"	21"	36" Dia	12-#9 (A)	25"	42" Dia	14-#9 (A)	29"	42" Dia	14-#9 (C)			
1 ¾"Dia x 3'-10"	21 ½"	36" Dia	10-#10(A)	25 ⅜"	42" Dia	12-#10(B)	29 ⅜"	42" Dia	12-#10(C)	35 ⅜"	48" Dia	16-#10(C)
2"Dia x 4'-3"	22"	36" Dia	12-#10(A)	25 ¾"	42" Dia	12-#10(B)	29 ¾"	48" Dia	16-#10(C)	35 ¾"	54" Dia	18-#10(C)
2 ¼"Dia x 4'-9"	22 ½"	36" Dia	10-#11(A)	26"	42" Dia	10-#11(B)	30"	48" Dia	14-#11(C)	36"	54" Dia	14-#11(D)
2 ½"Dia x 5'-2"				26 ½"	42" Dia	12-#11(B)	30 ½"	48" Dia	16-#11(C)	36 ½"	54" Dia	16-#11(D)
2 ¾"Dia x 5'-8"							31 ½"	48" Dia	18-#11(D)	37"	54" Dia	20-#11(D)
3"Dia x 6'-1"										37 ½"	54" Dia	24-#11(D)

A = #3 Plain spiral at 6" pitch (Grade 40)
B = #4 Plain spiral at 6" pitch (Grade 40)
C = #4 Plain spiral at 6" pitch (Grade 60)
D = #4 Plain spiral at 3 ½" pitch (Grade 60)



PLAN

② See "Cantilever Overhead Sign Support" or "High Lever Cantilever Overhead Sign Support" sheets for number and size.

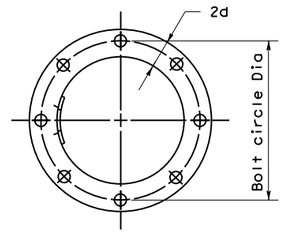


Cut 5" x 7" hole in pipe. Center 4" x 6" hand hole in ⅜" x 8" x 10" back up plate. Provide attachable cover made from section cut from pipe.

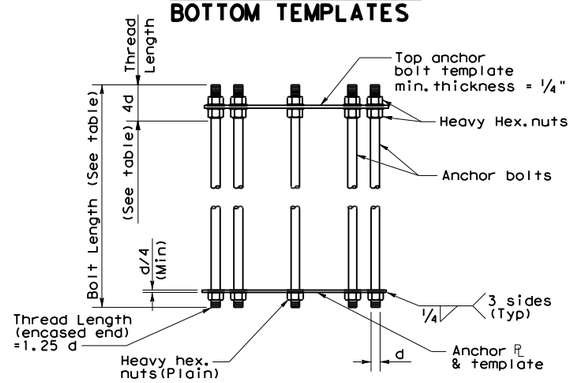
VIEW A-A

③ BASE PLATE & HANDHOLE DETAILS

③ See "Cantilever Overhead Sign Support" or "High Level Cantilever Overhead Sign Support" sheets for Diameter and thickness of base plate.

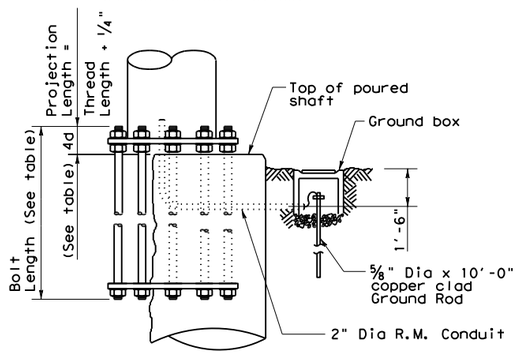


TOP VIEW OF TOP & BOTTOM TEMPLATES

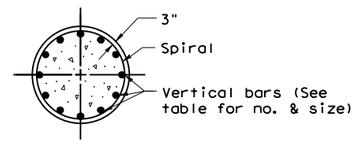


ANCHOR BOLT ASSEMBLY

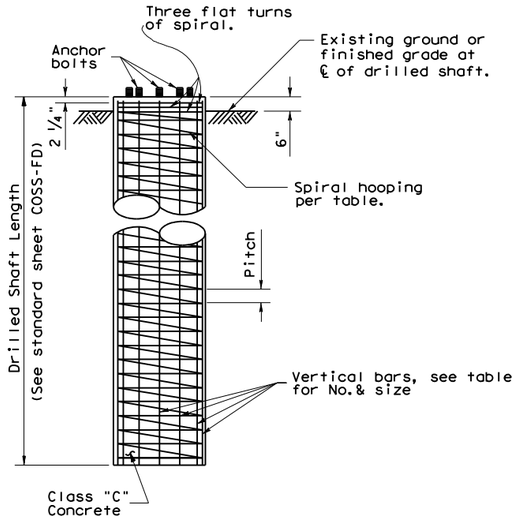
(PRIOR TO INSTALLATION)



BEARING SEAT ELEVATION



SECTION



FOUNDATION DETAIL

GENERAL NOTES:

Concrete shall be Class "C".
Reinforcing shall conform to Item 440, "Reinforcing Steel".
Anchor bolts and nuts for anchor bolts shall be "Alloy Steel" per Item 449, "Anchor Bolts".
Anchor bolts shall be rigidly held in position during concrete placement using steel templates at the top and bottom. The top templates shall be removed after the concrete has set.
Lubricate and tighten anchor bolts when erecting the structure per Item 449, "Anchor Bolts". After the structure has been aligned in its final position and the anchor bolts have been properly tightened, tack weld anchor bolt nuts to washer, and tack weld washers to base plate. Galvanizing in tack welded areas shall be repaired in accordance with Item 445, "Galvanizing".
All vertical reinforcing shall be carried to the bottom of the Drilled Shaft.

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORT FOUNDATION

COSSF

REVISIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.

DIST	COUNTY	SHEET NO.
ATL	BOWIE ETC.	64

DATE: 4/23/2024 7:22:56 AM
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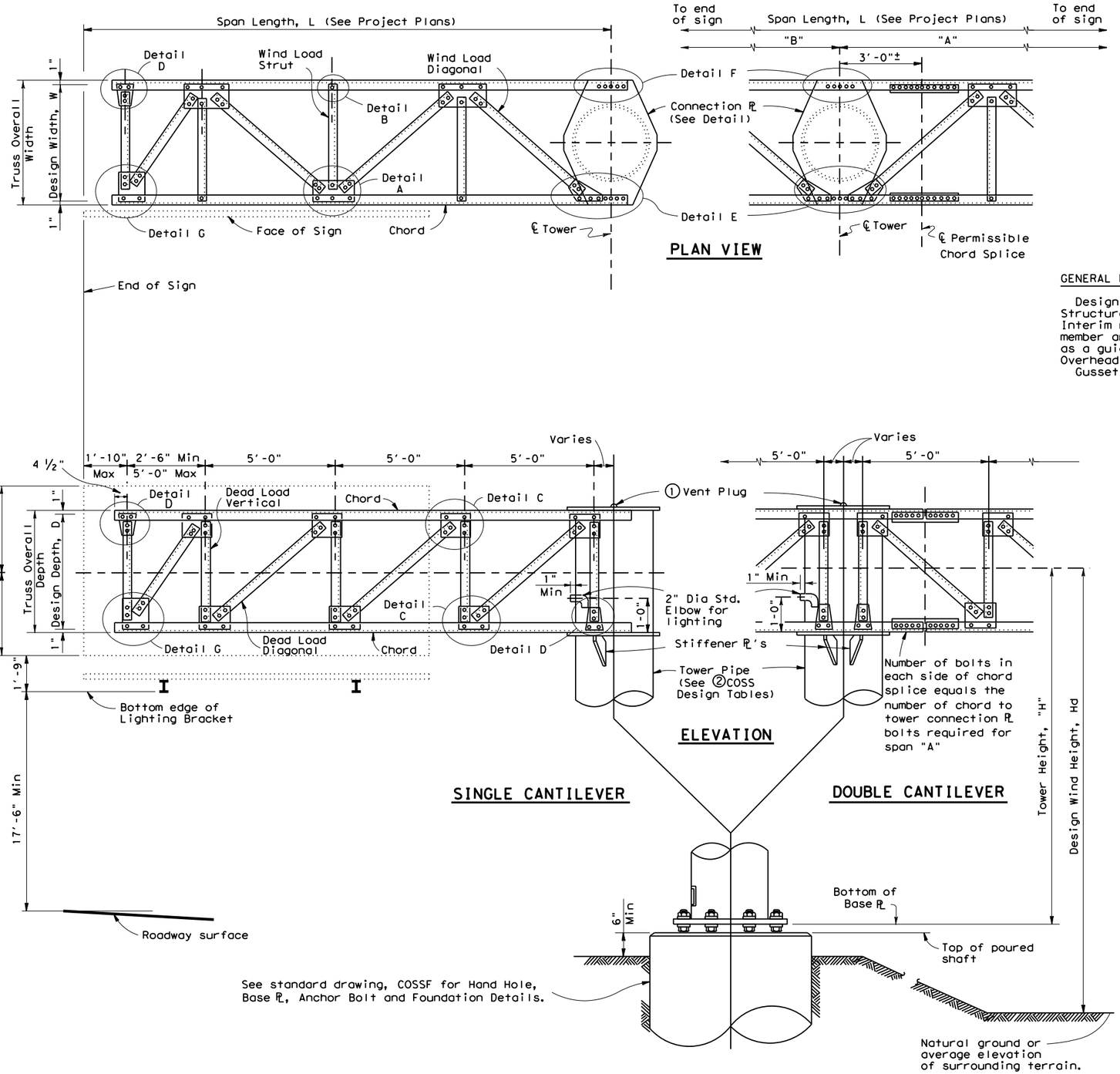

GENERAL NOTES:

Design conforms to 1975 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and Interim revisions thereto. Connection details are typical only. Actual size of member and number of bolts will vary. The details on this sheet are intended as a guide only. See "Cantilever Overhead Sign Supports" or "High Level Cantilever Overhead Sign Supports" sheets for number of bolts and size of members.

Gusset plates to be same thickness as thickest web member in connection.

① Note: Cap shall be solid steel sheet ⅜" nominal thickness. Drill, tap and plug galvanizing vent. Weld plate to pipe with ⅜" weld all around.

② For COSS design tables see standard drawing, "Cantilever Overhead Sign Supports" or "High Level Cantilever Overhead Sign Supports".

SHEET 1 OF 2

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORT DETAILS

COSSD

REVISIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.

DIST	COUNTY	SHEET NO.
ATL	BOWIE ETC.	65

66A

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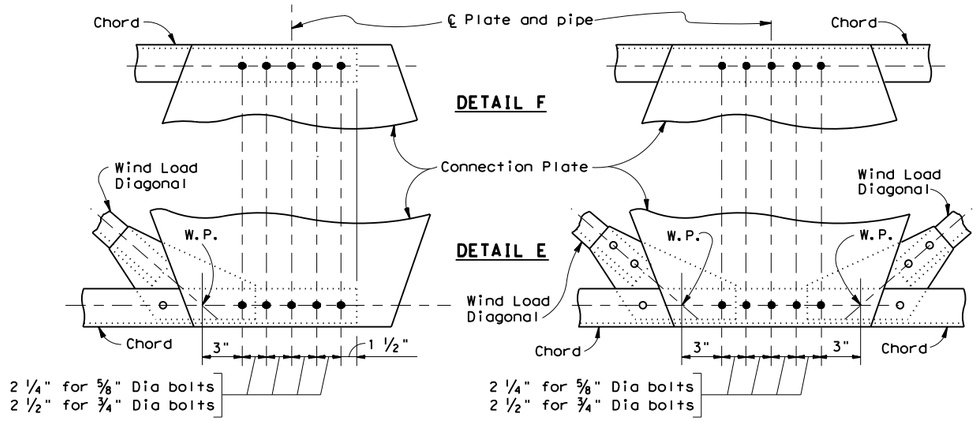
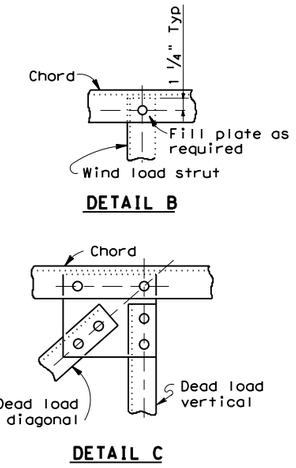
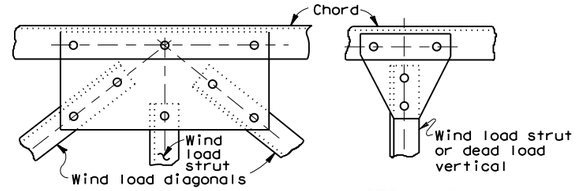


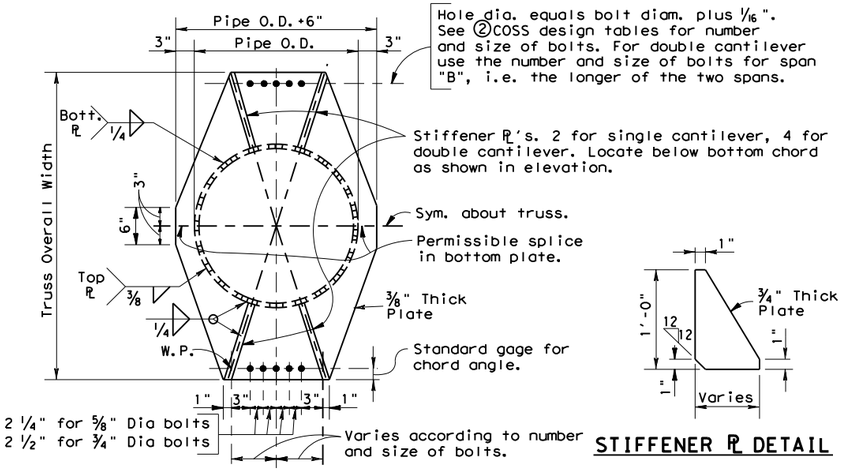
SINGLE CANTILEVER DOUBLE CANTILEVER





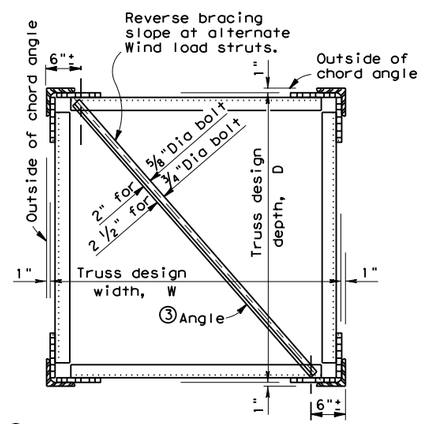
TOTAL NO. OF BOLTS IN DIAG'S. IN JOINT	NUMBER OF BOLTS REQD. IN GUSSET ℄ TO CHORD CONNECTION
0	2
2	2
3	3
4	3
5	4
6	4
8	5
10	6

CONNECTION DETAILS



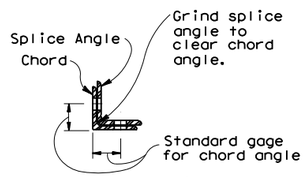
CONNECTION PLATE DETAIL

STIFFENER ℄ DETAIL

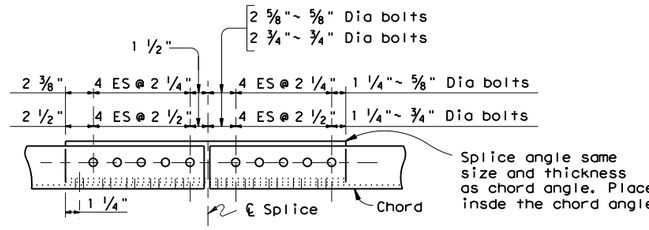


③2" x 2" x 3/16" angle for ⅝" Dia bolts [1]
2½" x 2" x 3/16" angle for ¾" Dia bolts [1]

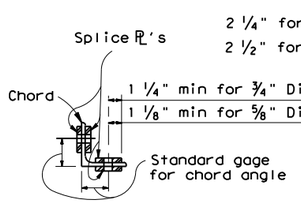
TRUSS SECTION
(DIAGONALS NOT SHOWN)



SECTION ON ℄ SPLICE



SINGLE SHEAR CHORD SPLICE



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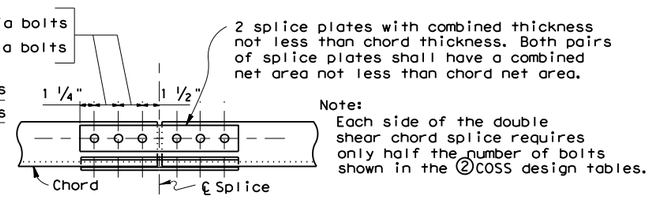
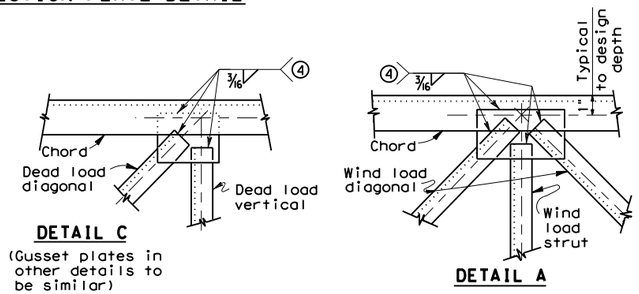


DOUBLE SHEAR CHORD SPLICE

SPLICE DETAILS



ALTERNATE WELDED CONNECTION DETAILS

④MINIMUM LENGTH OF 3/16" FILLET WELD REQUIRED		
NUMBER OF BOLTS	TO REPLACE ⅝" DIA BOLTS	TO REPLACE ¾" DIA BOLTS
1	2"	3"
2	4"	6"
3	6"	9"
4	8"	11 ½"
5	10"	14 ½"
6	12"	17 ½"
7	14"	20"

SHEET 2 OF 2

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORT DETAILS

COSSD

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS			

CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.
DIST	COUNTY		SHEET NO.
ATL	BOWIE ETC.		66

DATE: 4/23/2024 7:24:00 AM
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ZONE 3 WITH AND WITHOUT ICE 80 MPH WIND

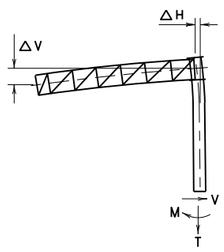
TOWER HEIGHT (ft)	10′ SPAN												15′ SPAN											
	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS				TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS			
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
14′	16	0.250	0.105	1 ¼	6	20 ½"	24 x1¼	0.2	3.59	16.19	49.87		16	0.250	0.235	1 ⅜	8	20 ¾"	24½x1⅜	0.5	5.40	37.56	76.63	
15′			0.120						3.61		53.42				0.270					0.6	5.41		81.91	
16′			0.137						3.62		57.00				0.308					0.6	5.43		87.23	
17′			0.154						3.64		60.59				0.347					0.7	5.45		92.57	
18′			0.173						3.66		64.21				0.389				24½x1⅜	0.7	5.46		97.94	
19′			0.193		6				3.67		67.85				0.434				24½x1½	0.7	5.48		103.33	
20′			0.214		8				3.69		71.51				0.481					0.8	5.50		108.75	
21′			0.235						3.71		75.18		0.250	0.530							5.51		114.19	
22′			0.258					0.2	3.73		78.88		0.281	0.521	1 ⅜			20 ¾"	24½x1½		5.53		119.66	
23′			0.282					0.3	3.74		82.59		0.281	0.569	1 ½			21"	25 x1⅝		5.55		125.14	
24′			0.308						3.76		86.33		0.281	0.620							5.56		130.65	
25′			0.334				24 x1¼		3.78		90.08		0.312	0.610							5.58		136.18	
26′			0.361				24 x1⅜		3.79		93.85		0.312	0.660					25 x1⅝		5.60		141.73	
27′			0.389						3.81		97.64		0.312	0.711					25 x1¾		5.62		147.30	
28′			0.419						3.83		101.44		0.344	0.699							5.63		152.89	
29′			0.449						3.84		105.26		0.344	0.750							5.65		158.50	
30′			0.481						3.86		109.11		0.344	0.802	1 ½			21"	25 x1¾		5.67		164.12	
31′			0.513				24 x1⅜		3.88		112.96		0.375	0.791	1 ¾			21 ½"	26 x1⅞		5.68		169.77	
32′	16	0.250	0.547	1 ¼	8	20 ½"	24 x1½	0.3	3.89	16.19	116.84		16	0.375	0.843	1 ¾	8	21 ½"	26 x1⅞	0.8	5.70	37.56	175.43	

TOWER HEIGHT (ft)	20′ SPAN												25′ SPAN											
	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS				TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS			
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
14′	20	0.250	0.213	1 ¼	8	24 ½"	28 x1¼	0.7	7.43	69.08	107.16		20	0.281	0.308	1 ½	8	25"	29 x1½	1.3	9.14	107.68	135.49	
15′			0.244	1 ¼		24 ½"	28 x1¼	0.7	7.43		113.96			0.281	0.354					1.4	9.17		144.13	
16′			0.278	1 ⅜		24 ¾"	28½x1⅜	0.8	7.45		121.17			0.281	0.403					1.4	9.19		152.86	
17′			0.314					0.8	7.47		128.42			0.281	0.455	1 ½		25"	29 x1½	1.5	9.21		161.65	
18′			0.352					0.9	7.49		135.72			0.312	0.460	1 ¾		25 ⅜"	29¾x1⅝	1.5	9.23		170.51	
19′			0.392	1 ⅜		24 ¾"	28½x1⅜	0.9	7.51		143.06			0.312	0.513					1.5	9.25		179.43	
20′			0.435	1 ½		25"	29 x1½	1.0	7.53		150.43			0.312	0.568				29¾x1¾	1.6	9.27		188.39	
21′			0.479					1.0	7.55		157.84			0.312	0.627					1.6	9.29		197.41	
22′			0.526					1.1	7.57		165.28			0.344	0.628					1.6	9.31		206.47	
23′	0.250	0.575					29 x1½		7.60		172.75			0.344	0.686				29¾x1¾	1.7	9.34		215.57	
24′	0.281	0.560					29 x1⅝		7.62		180.26			0.344	0.747				29¾x1⅞		9.36		224.71	
25′	0.281	0.607	1 ½			25"	29 x1⅝		7.64		187.79			0.375	0.748				29¾x1⅞		9.38		233.89	
26′	0.281	0.657	1 ¾			25 ⅜"	29¾x1⅝		7.66		195.35			0.375	0.809	1 ¾		25 ⅜"	29¾x1⅞	1.7	9.40		243.10	
27′	0.310	0.640					29¾x1¾		7.68		202.94			0.375	0.872	2		25 ¾"	30½x 2	1.8	9.42		252.34	
28′	0.310	0.688							7.70		210.55			0.406	0.870						9.44		261.62	
29′	0.310	0.738							7.72		218.20			0.406	0.933						9.46		270.93	
30′	0.340	0.721					29¾x1¾		7.74		225.86			0.406	0.999				30½x 2		9.48		280.27	
31′	0.340	0.770					29¾x1⅞		7.77		233.56			0.441	0.992				30½x2¼		9.50		289.64	
32′	20	0.340	0.821	1 ¾	8	25 ⅜"	29¾x1⅞	1.1	7.79	69.08	241.27		20	0.441	1.057	2	8	25 ¾"	30½x2¼	1.8	9.53	107.68	299.04	

ZONE 3 WITH AND WITHOUT ICE 80 MPH WIND

TOWER HEIGHT (ft)	30′ SPAN												35′ SPAN											
	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS				TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS			
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
14′	24	0.250	0.289	1 ½	8	29"	33 x1½	1.6	11.00	155.44	167.11		30	0.250	0.210	1 ¾	8	35 ⅜"	39¾x1½	1.5	12.87	211.58	202.48	
15′		0.250	0.331	1 ½		29"	33 x1½	1.6	11.03		177.27				0.241					1.6	12.90		213.97	
16′		0.281	0.338	1 ¾		29 ⅜"	33¾x1½	1.6	11.05		187.54				0.275					1.6	12.93		225.63	
17′			0.381				33¾x1½	1.7	11.08		197.93		0.250	0.310						1.7	12.97		237.46	
18′			0.428				33¾x1½	1.8	11.10		208.40		0.281	0.310						1.7	13.00		249.43	
19′		0.281	0.477				33¾x1⅝		11.13		218.97			0.346						1.7	13.03		261.52	
20′		0.312	0.477				33¾x1⅝		11.15		229.60			0.383						1.8	13.06		273.72	
21′			0.526				33¾x1⅝	1.8	11.18		240.31			0.422						1.8	13.09		286.04	
22′			0.577				33¾x1¾	1.9	11.20		251.08			0.463						1.9	13.12		298.44	
23′			0.631				33¾x1¾	2.0	11.23		261.91			0.507	1 ¾			35 ⅜"	39¾x1½	2.0	13.16		310.94	
24′		0.312	0.687	1 ¾		29 ⅜"	33¾x1¾		11.25		272.80			0.552	2			35 ¾"	40½x1⅝	2.0	13.19		323.51	
25′		0.344	0.679	2		29 ¾"	34½x1¾		11.28		283.74			0.598					40½x1⅝	2.1	13.22		336.16	
26′			0.735				34½x 2	2.0	11.30		294.73			0.647					40½x1⅝	2.2	13.25		348.89	
27′			0.792					2.1	11.33		305.77			0.698					40½x1¾	2.2	13.28		361.68	
28′			0.852					2.2	11.36		316.85		0.281	0.751						2.3	13.31		374.53	
29′		0.344	0.914						11.38		327.97		0.310	0.726						2.2	13.35		387.45	
30′		0.375	0.901						11.41		339.13			0.777						2.2	13.38		400.42	
31′		0.375	0.962					2.2	11.43		350.34			0.830						2.3	13.41		413.45	
32′	24	0.375	1.023	2	8	29 ¾"	34½x 2	2.3	11.44	155.44	361.13		30	0.310	0.884	2	8	35 ¾"	40½x1¾	2.4	13.44	211.58	426.53	

TOWER HEIGHT (ft)	40′ SPAN											
	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS			
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
14′	30	0.280	0.260	1 ¾	8	35 ⅜"	39⅞x1½	2.1	14.65	276.72	242.20	
15′			0.298	1 ¾		35 ⅜"	39⅞x1½	2.2	14.68		254.69	
16′			0.339	1 ¾		35 ⅜"	39⅞x1½	2.3	14.71		267.44	
17′			0.383	2		35 ¾"	40½x1½	2.4	14.75		280.40	
18′			0.429				40½x1⅝	2.5	14.78		293.56	
19′		0.280	0.478					2.6	14.81		306.90	
20′		0.312	0.478					2.6	14.84		320.39	
21′			0.527				40½x1⅝	2.6	14.87		334.02	
22′			0.578				40½x1¾	2.7	14.90		347.79	
23′			0.632					2.8	14.94		361.67	
24′			0.688					2.9	14.97		375.66	
25′		0.312	0.747				40½x1¾	3.0	15.00		389.75	
26′		0.340	0.736				40½x 2	3.0	15.03		403.94	
27′			0.794	2		35 ¾"	40½x 2	3.0	15.06		418.22	
28′			0.854	2 ¼		36"	41 x 2	3.1	15.09		432.57	
29′			0.916					3.2	15.13		447.01	
30′		0.340	0.980						15.16		461.52	
31′		0.375	0.963						15.19		476.10	
32′	30	0.375	1.026	2 ¼	8	36"	41 x 2	3.2	15.22	276.72	490.75	



ELEVATION

(SHOWING DESIGN LOADS AND DEAD LOAD DEFLECTIONS)

TRUSS DETAILS

SPAN	10′, 15′, & 20′	25′	30′	35′	40′
W x D = WIDTH x DEPTH	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.5 x 4.5	4.5 x 4.5
CHORD-①, Unless Otherwise Shown	L 3 x 3 x 3/16 ② [3]	L 3 x 3 x 1/4 ② [4]	L 3 x 3 x 1/4 [6]	L 3 x 3 x 5/16 [7]	L3 1/2x3 1/2x 5/16 [9]
DEAD LOAD DIAGONAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [3]
WIND LOAD DIAGONAL-②	L2 1/2x2 1/2x 3/16 [2]	L2 1/2x2 1/2x 3/16 [2]	L 3 x 3 x 1/4 [2]	L 3 x 3 x 1/4 [2]	L 3 x 3 x 1/4 [3]
DEAD LOAD VERTICAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L2 1/2x2 1/2x 3/16 [2]	L2 1/2x2 1/2x 3/16 [2]
WIND LOAD STRUT-②	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]
TRUSS DEAD LOAD	38 lb/ft	43 lb/ft	45 lb/ft	53 lb/ft	62 lb/ft
SIZE H. S. BOLTS IN CONNECTION	5/8" DIA	5/8" DIA	5/8" DIA	5/8" DIA	5/8" DIA
NO. & SIZE OF H. S. BOLTS IN CHORD ANGLE TO TOWER CONNECTION PLATE	3 ~ 5/8" DIA ea	4 ~ 5/8" DIA or 3 ~ 3/4" DIA ea	6 ~ 5/8" DIA or 5 ~ 3/4" DIA ea	7 ~ 5/8" DIA or 5 ~ 3/4" DIA ea	9 ~ 5/8" DIA or 7 ~ 3/4" DIA ea

① "Low-Alloy Steel" for non-bridge structures per Item 442, "Metal For Structures".

② "Carbon Steel" for non-bridge structures per Item 442, "Metal For Structures".

GENERAL NOTES :

Design conforms to AASHTO 1994 Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto.

Steel for tower pipe shall conform to ASTM A53 Grade B or to ASTM A501. Tower pipe wall thickness shown is the minimum allowable. Fabricator may use the wall thickness shown or pipe of the same diameter with greater wall thickness.

All connection bolts shall conform to Item 447, "Structural Bolting". All structural steel, connection bolts, nuts and washers shall be galvanized in accordance with the Specifications.

Compensate for truss deflection at free end by offsetting upper and lower bolt holes at truss-to-tower connection.

For truss details see standard drawing COSSD.

For base and foundation details see standard drawing COSSF.

For cantilever truss lengths falling between those shown use sizes called for in the next longer span.

Truss and towers for cantilever sign supports are designed for the equivalent area of a 10′-0" deep sign panel over 100% of the span length. Design includes 3 pounds per foot squared for sign panel and 20 pounds per foot for lights and 50 pounds per foot for walkways all placed as specified for the design sign panel.

Details called for hereon are applicable for Design Wind Heights up to 30′ inclusive.

Number of High Strength bolts required in truss connection or splice are indicated in brackets, e.g. [3], after the member size.

Deflections shown include the design loads for Truss, Sign Panel, Lights and Walkways.

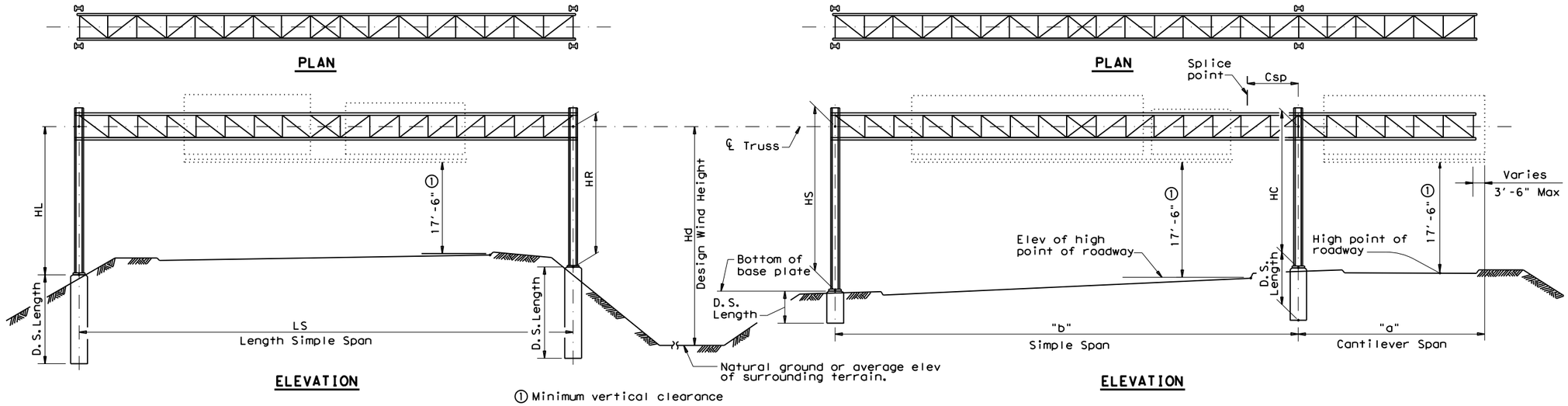
Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORTS

COSS-Z3 & Z3I-10

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
4-10	6467	35	001	US 59 ETC.
	DIST	COUNTY		SHEET NO.
	ATL	BOWIE ETC.		67

DATE: 4/23/2024 7:30:59 AM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\STANDARDS\stds31.dgn



① Minimum vertical clearance

② "Low-Alloy Steel" for non-bridge structures per Item 442, "Metal For Structures".

③ "Carbon Steel" for non-bridge structures per Item 442, "Metal For Structures".

SIMPLE SPAN

SIMPLE SPAN PROCEDURE:

Given: Span, Ls = 93.0′; Left Tower Height, H_L = 26.3′; Right Tower Height, H_R = 22.6′; Design Height, Hd = 27.0′; Avg. Penetrometer Value, N = 25; Dawson County.

Step 1: Select applicable OSB standard. From Wind Velocity and Ice Zone sheet (WV&IZ-96) determine that Dawson County is in Zone 2 (90 mph) and ice above the ice line. Since Design Height, Hd = 27.0′, use standard OSB-Z2I. If the Design Height were more than 30.0′, the applicable standard would be HOSB-Z2I.

Step 2: Determine truss details and tower size from OSB-Z2I. For our 93.0′ span go to the next larger span, i.e. 95.0′. Truss members are:
Chord ~ L 4"x 4"x 3/8" ② w/ 10 bolt splice
D.L. Diag. ~ L 3"x 2 1/2"x 3/16" ③ w/ 2 bolt connection
W.L. Diag. ~ L 3"x 3"x 1/4" ③ w/ 3 bolt connection
D.L. Vert. ~ L 3"x 2"x 3/16" ③ w/ 2 bolt connection
W.L. Strut ~ 2 1/2"x 2 1/2"x 3/16" ③ w/ 1 bolt connection
Bolts are 3/4" Dia high strength. Truss W x D = 4.5′x 4.5′. Required truss camber to compensate for dead load deflection is 1.46". Dead load of truss is 77 lb/ft. Avg. Tower Height = (26.3′+ 22.6′)÷ 2 = 24.45′. Use 25.0′ to determine column size and spacing for both towers, i.e. W14 x 34 spaced at 7.0′. Use actual tower heights for drilled shaft uplift as follows. For H_L = 26.3′ use 26.0′ to determine design uplift at the left tower = 79.8ᵏ. For H_R = 22.6′ use 23.0′ to determine design uplift at the right tower = 69.9ᵏ.

Step 3: Determine tower and anchor bolt details. Use OSBT standard.
From OSBT with W14 x 34 columns spaced at 7′-0":
Anchor Bolts = 1 3/4" Dia x 3′-10"
Base Plate = 11 1/2"x 2 1/4"x 2′-1"
X, Y, and Z = 9 1/2", 3", and 2 3/4" respectively
Tower Bracing = 2Ls ~ 3"x 2 1/2"x 1/4"
Foundation = 36" Dia shafts with 8 ~ #9 Bars.

Step 4: Determine drilled shaft length from OSB-FD. Enter chart for 36" Dia drilled shafts at N = 25.
Left Tower Uplift = 79.8ᵏ, therefore, L = 9′+ 3′= 12′
Right Tower Uplift = 69.9ᵏ, therefore, L = 8′+ 3′= 11′.

Step 5: Determine maximum spacing of tower bracing. The maximum spacing would normally be the same as the column spacing, i.e. 7.0′. However, the special note for tower bracing on Sheet 1 of the OSBT standard makes provision for an increase in spacing as follows:
On OSB-Z2I under 95.0′ span, the W14 x 34 column is shown for 25.0′ and 26.0′ column heights. Thus, the W14 x 34 is shown one time for heights greater than the design height of 25′-0". The special note for tower bracing allows a 1′-0" increase in the maximum spacing from 7.0′ to 8.0′.

CANTILEVER SPAN

CANTILEVER SPAN PROCEDURE:

Given: Simple Span, b = 80.0′; Cantilever Span, a = 30.0′; Left Tower Height, H_L = 20.0′; Right Tower Height, H_R = 28.0′; Design Wind Height, H = 30.0′; Avg. Penetrometer Value, N = 25.0′; Duval County.

Step 1: Calculate the following:
Equiv. Simple Span, E_{ss} = b + 2a + (a^2÷ b)
= 151.30′, Use 155.0′.
If E_{ss} exceeds 155.0′ a special tower design is required. Cantilever Equiv. Simple Span, Cess = 2a = 60.0′; Splice Point, Csp = (a^2÷ b) = 11.30′;
Equiv. Simple Span for Truss Web, Essw = b + (a^2÷ b) = 91.0′, Use 95.0′.

Step 2: Select applicable OSB standard. From Wind Velocity and Ice Zone sheet determine that Duval County is in Zone 4 (70 mph) and is below the ice line. Since Design Wind Height, H = 30.0′, Use standard OSB-Z4. If the Design Height were more than 30.0′ the applicable standard would be HOSB-Z4.

Step 3: Determine truss details and tower size from OSB-Z4.
Cantilever Truss: For Ccss= 60.0′ truss members are:
Chord L 3"x 3"x 1/4"② with 6 bolt splice
D.L. Diag. L 2"x 2"x 3/16" with 2 bolt connection
W.L. Diag. L 2 1/2"x 2 1/2"x 3/16" with 2 bolt connection
D.L. Vert. L 2"x 2"x 3/16" with 2 bolt connection
W.L. Strut L 2"x 2"x 3/16" with 1 bolt connection
Bolts are 5/8" Dia High Strength. Truss WxD = 4.0′x 4.0′. Required cantilever truss camber to compensate for dead load deflection is 0.49".

Simple Span Truss: For b = 80.0′ truss members are:
Chord L 3"x 3"x 3/8"② with 9 bolt splice
D.L. Diag. L 2"x 2"x 3/16" with 2 bolt connection
W.L. Diag. L 3"x 3"x 3/16" with 2 bolt connection
D.L. Vert. L 2"x 2"x 3/16" with 2 bolt connection
W.L. Strut L 2"x 2"x 3/16" with 1 bolt connection
Bolts are 5/8" Dia High Strength. Truss WxD = 4.0′x 4.0′. If W and D for the cantilever and simple spans are different, increase smaller W and D to match the larger truss. Required simple span camber to compensate for dead load deflection is 1.12".

Truss from cantilever tower to splice point: Extend cantilever chords past the tower a distance, Csp= 11.2′ which falls in the third panel. The splice is permissible at any point within the third panel. Web members from the tower out to and including the splice panel, i.e. the third panel, shall be modified as follows. For Essw= 95.0′ web members are:
D.L. Diag. L 2 1/2"x 2 1/2"x 3/16" with 2 bolt connection
W.L. Diag. L 3"x 2 1/2"x 1/4" with 2 bolt connection
D.L. Vert. L 2"x 2"x 3/16" with 2 bolt connection
W.L. Strut L 2"x 2"x 3/16" with 1 bolt connection
Ignore W and D dimensions. Instead, use W and D as required for cantilever and simple span trusses. Use 5/8" Dia high strength bolts as required for 95.0′ span.

Tower Size: Avg. Tower Height = (20.0′+ 28.0′)÷ 2 = 24.0′. Use 24.0′ height and 155.0′ equivalent simple span to determine column size and spacing for both towers, i.e. W14 x 34 spaced at 7.5′
Use spans and actual tower heights for uplift as follows:
For H_S = 20.0′, and b = 80.0′ determine uplift = 31.7ᵏ.
For H_C = 28.0′, and E_{ss} = 155.0′ determine uplift = 77.9ᵏ.

Step 4: Determine tower and anchor bolt details. Use standard OSBT.
From OSBT with W14 x 34 columns spaced at 7.5′:
Anchor Bolts = 1 3/4" Dia x 3′-10"
Base Plate = 11 1/2"x 2 1/4"x 2′-1"
X, Y, and Z = 9 1/2", 3", and 2 3/4" respectively
Tower Bracing = 2Ls ~ 3"x 2 1/2"x 1/4"
Foundation = 36" Dia shafts with 8~#9 bars.

Step 5: Determine drilled shaft length from OSB-FD.
Enter chart for 36" Dia drilled shaft at N = 25.0′
Left Tower Uplift = 31.7ᵏ, therefore L = 6′+ 3′= 9′
Right Tower Uplift = 77.9ᵏ, therefore L = 8′+ 3′= 11′.

Step 6: Determine maximum spacing of tower bracing. The maximum spacing would normally be the same as the column spacing, i.e. 7.5′. However, the special note for tower bracing on Sheet 1 of the OSBT standard makes provision for an increase in spacing as follows:
On OSB-Z4 under 155.0′ span, the W14 x 34 column is shown for 23.0′ through 26.0′ column heights. Thus, the W14 x 34 column is shown two times for heights greater than 24.0′. The special note allows a 2.0′ increase from 7.5′ to 9.5′.

Texas Department of Transportation
Traffic Operations Division

OVERHEAD SIGN BRIDGE SELECTION EXAMPLES

OSB-SE

REVISIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.

DIST	COUNTY	SHEET NO.
ATL	BOWIE ETC.	68

DATE: 4/23/2024 7:35:53 AM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\STANDARDS\stds37.dgn

ZONE 3 NO ICE 80 M.P.H. WIND

TRUSS DETAILS — 5/8" Dia. H.S. Bolts, Spans 40' Thru 95'

SPAN	40'	45'	50'	55'	60'	65'	70'	75'
W x D = WIDTH x DEPTH	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.5 x 4.5	4.5 x 4.5
CHORD -②, Unless Otherwise Shown	L 3 x 3 x 3/16 ③ [3]	L 3 x 3 x 3/16 ③ [3]	L 3 x 3 x 1/4 ③ [4]	L 3 x 3 x 1/4 ③ [4]	L 3 x 3 x 1/4 [6]	L 3 x 3 x 5/16 [7]	L 3 x 3 x 5/16 [7]	L 3 1/2 x 3 1/2 x 5/16 [9]
DEAD LOAD DIAGONAL -③	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]
WIND LOAD DIAGONAL -③	L 2 1/2 x 2 1/2 x 3/16 [2]	L 2 1/2 x 2 1/2 x 3/16 [2]	L 2 1/2 x 2 1/2 x 3/16 [2]	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [3]
DEAD LOAD VERTICAL -③	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]
WIND LOAD STRUT - ③	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]
TOTAL DEFL. & TRUSS D.L.	DEFL=0.14" L=38 lb/ft	DEFL=0.21" L=38 lb/ft	DEFL=0.25" L=43 lb/ft	DEFL=0.36" L=45 lb/ft	DEFL=0.50" L=45 lb/ft	DEFL=0.58" L=50 lb/ft	DEFL=0.63" L=52 lb/ft	DEFL=0.73" L=57 lb/ft

TOWER DETAILS

S = COLUMN SPACING	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	6.5'	6.5'
TOWER HEIGHT								
15'	W 10 x 15 (18.0)	W 10 x 15 (20.1)	W 10 x 15 (22.1)	W 10 x 15 (24.2)	W 10 x 15 (26.2)	W 10 x 17 (25.8)	W 10 x 17 (27.9)	W 10 x 22 (29.8)
16'	W 10 x 15 (19.3)	W 10 x 15 (21.5)	W 10 x 15 (23.7)	W 10 x 15 (25.9)	W 10 x 15 (28.1)	W 10 x 17 (27.6)	W 10 x 22 (29.9)	W 10 x 22 (31.9)
17'	W 10 x 15 (20.6)	W 10 x 15 (23.0)	W 10 x 15 (25.3)	W 10 x 17 (27.6)	W 10 x 17 (29.9)	W 10 x 22 (29.4)	W 10 x 22 (31.8)	W 10 x 22 (34.0)
18'	W 10 x 15 (21.9)	W 10 x 15 (24.4)	W 10 x 17 (26.9)	W 10 x 17 (29.3)	W 10 x 17 (31.8)	W 10 x 22 (31.3)	W 10 x 22 (33.8)	W 10 x 22 (36.1)
19'	W 10 x 15 (23.3)	W 10 x 17 (25.9)	W 10 x 17 (28.5)	W 10 x 22 (31.1)	W 10 x 22 (33.7)	W 10 x 22 (33.1)	W 10 x 22 (35.7)	W 10 x 22 (38.2)
20'	W 10 x 15 (24.6)	W 10 x 17 (27.4)	W 10 x 17 (30.1)	W 10 x 22 (32.8)	W 10 x 22 (35.5)	W 10 x 22 (35.0)	W 10 x 22 (37.7)	W 10 x 22 (40.3)
21'	W 10 x 17 (25.9)	W 10 x 17 (28.9)	W 10 x 22 (31.7)	W 10 x 22 (34.6)	W 10 x 22 (37.1)	W 10 x 22 (36.9)	W 10 x 26 (39.7)	W 10 x 26 (42.5)
22'	W 10 x 17 (27.3)	W 10 x 17 (30.4)	W 10 x 22 (33.3)	W 10 x 22 (36.4)	W 10 x 22 (39.0)	W 10 x 22 (38.7)	W 10 x 26 (41.8)	W 10 x 26 (44.6)
23'	W 10 x 22 (28.7)	W 10 x 22 (31.9)	W 10 x 22 (35.0)	W 10 x 22 (38.4)	W 10 x 26 (41.3)	W 10 x 26 (40.6)	W 10 x 26 (43.8)	W 12 x 26 (47.1)
24'	W 10 x 22 (30.1)	W 10 x 22 (33.4)	W 10 x 22 (36.6)	W 10 x 22 (39.9)	W 10 x 26 (43.2)	W 10 x 26 (42.5)	W 10 x 26 (45.8)	W 12 x 26 (49.3)
25'	W 10 x 22 (31.4)	W 10 x 22 (34.9)	W 10 x 22 (38.3)	W 10 x 26 (41.7)	W 10 x 26 (44.6)	W 10 x 26 (44.5)	W 12 x 26 (48.3)	W 12 x 26 (51.5)
26'	W 10 x 22 (32.9)	W 10 x 22 (36.5)	W 10 x 26 (40.0)	W 10 x 26 (43.5)	W 10 x 26 (46.6)	W 12 x 26 (46.4)	W 12 x 26 (50.4)	W 12 x 26 (53.7)
27'	W 10 x 22 (33.7)	W 10 x 26 (38.0)	W 10 x 26 (41.8)	W 10 x 26 (45.4)	W 12 x 26 (49.6)	W 12 x 26 (48.8)	W 12 x 26 (52.5)	W 12 x 26 (56.0)
28'	W 10 x 22 (35.1)	W 10 x 26 (39.6)	W 10 x 26 (43.4)	W 12 x 26 (47.2)	W 12 x 26 (51.6)	W 12 x 26 (50.8)	W 12 x 26 (54.6)	W 14 x 30 (58.2)
29'	W 10 x 26 (37.1)	W 10 x 26 (41.6)	W 12 x 26 (45.7)	W 12 x 26 (50.0)	W 12 x 26 (53.6)	W 12 x 26 (52.7)	W 12 x 26 (56.7)	W 14 x 30 (61.5)
30'	W 10 x 26 (38.6)	W 10 x 26 (42.8)	W 12 x 26 (47.4)	W 12 x 26 (51.6)	W 12 x 26 (55.6)	W 12 x 26 (54.7)	W 12 x 26 (58.8)	W 14 x 30 (63.8)

COLUMN SIZE & UPLIFT (kips) — Tower Height = (HL + HR)/2

ZONE 3 NO ICE 80 M.P.H. WIND

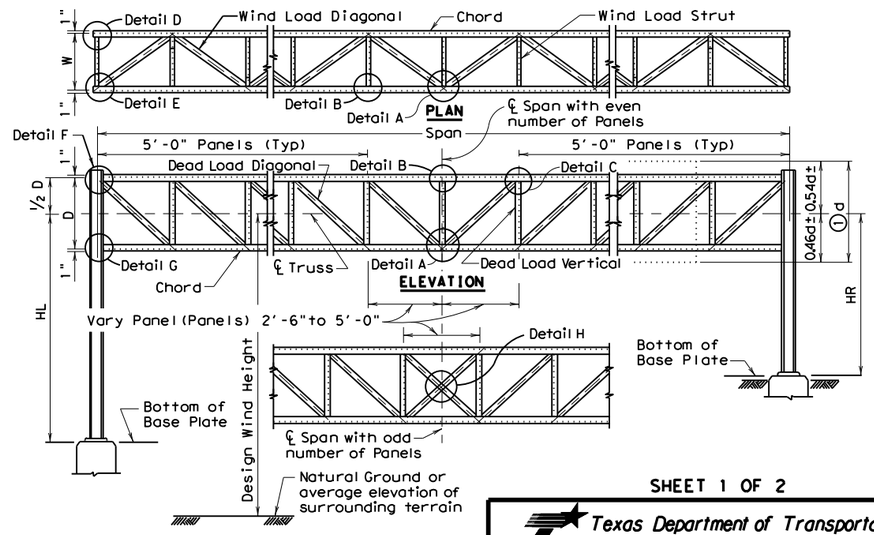
TRUSS DETAILS — 5/8" Dia. H.S. Bolts, Spans 40' Thru 95'

SPAN	80'	85'	90'	95'
W x D = WIDTH x DEPTH	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5
CHORD -②, Unless Otherwise Shown	L 3 1/2 x 3 1/2 x 5/16 [9]	L 3 1/2 x 3 1/2 x 5/16 [9]	L 3 1/2 x 3 1/2 x 3/8 [10]	L 3 1/2 x 3 1/2 x 3/8 [11]
DEAD LOAD DIAGONAL -③	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]
WIND LOAD DIAGONAL -③	L 3 x 3 x 1/4 [3]	L 3 x 3 x 1/4 [3]	L 3 x 3 x 1/4 [3]	L 3 x 3 x 1/4 [3]
DEAD LOAD VERTICAL -③	L 2 x 2 x 3/16 [2]	L 2 1/2 x 2 1/2 x 3/16 [2]	L 3 x 2 x 3/16 [2]	L 3 x 2 x 3/16 [2]
WIND LOAD STRUT - ③	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]
TOTAL DEFL. & TRUSS D.L.	DEFL=0.95" L=61 lb/ft	DEFL=1.19" L=61 lb/ft	DEFL=1.32" L=67 lb/ft	DEFL=1.61" L=67 lb/ft

TOWER DETAILS

S = COLUMN SPACING	6.5'	6.5'	6.5'	6.5'
TOWER HEIGHT				
15'	W 10 x 22 (31.7)	W 10 x 22 (33.6)	W 10 x 22 (35.5)	W 10 x 22 (37.5)
16'	W 10 x 22 (33.9)	W 10 x 22 (36.0)	W 10 x 22 (38.0)	W 10 x 22 (40.1)
17'	W 10 x 22 (36.1)	W 10 x 22 (38.3)	W 10 x 22 (40.5)	W 10 x 26 (42.8)
18'	W 10 x 22 (38.4)	W 10 x 22 (40.7)	W 10 x 26 (43.0)	W 10 x 26 (45.4)
19'	W 10 x 26 (40.6)	W 10 x 26 (43.1)	W 10 x 26 (45.8)	W 10 x 26 (47.8)
20'	W 10 x 26 (42.9)	W 10 x 26 (45.5)	W 10 x 26 (48.4)	W 10 x 26 (50.4)
21'	W 10 x 26 (45.1)	W 12 x 26 (48.2)	W 12 x 26 (50.9)	W 12 x 26 (53.7)
22'	W 10 x 26 (47.4)	W 12 x 26 (50.6)	W 12 x 26 (53.5)	W 12 x 26 (56.4)
23'	W 12 x 26 (50.0)	W 12 x 26 (52.7)	W 12 x 26 (56.1)	W 12 x 26 (59.7)
24'	W 12 x 26 (52.4)	W 12 x 26 (55.2)	W 12 x 26 (58.7)	W 12 x 26 (61.8)
25'	W 12 x 26 (54.7)	W 12 x 26 (58.0)	W 14 x 30 (62.1)	W 14 x 30 (65.4)
26'	W 12 x 26 (57.1)	W 14 x 30 (60.5)	W 14 x 30 (64.7)	W 14 x 30 (68.2)
27'	W 14 x 30 (60.3)	W 14 x 30 (63.9)	W 14 x 30 (67.4)	W 14 x 34 (71.0)
28'	W 14 x 30 (62.8)	W 14 x 30 (66.5)	W 14 x 30 (70.1)	W 14 x 34 (73.8)
29'	W 14 x 30 (65.2)	W 14 x 30 (69.0)	W 14 x 34 (72.9)	W 14 x 34 (76.7)
30'	W 14 x 30 (67.8)	W 14 x 34 (71.6)	W 14 x 34 (75.8)	W 14 x 34 (79.5)

COLUMN SIZE & UPLIFT (kips) — Tower Height = (HL + HR)/2



① d = Sign Depth
Where signs of different depths are used, the bottom edges of all signs may be placed in line. Where this is done, all signs should be so positioned that the bottom edges are approximately 0.46 of the depth of the deepest sign below the ℄ of the truss.

② "Low-Alloy Steel" for non-bridge structures per Item 442, "Metal For Structures".

③ "Carbon Steel" for non-bridge structures per Item 442, "Metal For Structures".

SHEET 1 OF 2

Texas Department of Transportation
Traffic Operations Division

OVERHEAD SIGN BRIDGE DETAILS

OSB-Z3

© TxDOT November 2007	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
	6467	35	001	US 59 ETC.
	DIST	COUNTY		SHEET NO.
	ATL	BOWIE ETC.		69

DATE: 4/23/2024 7:36:21 AM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\STANDARDS\stds37.dgn

ZONE 3 NO ICE 80 M.P.H. WIND

	TRUSS DETAILS (¾" Dia. H.S. Bolts, Spans 96' Thru 155')								
SPAN	100'	105'	110'	115'	120'	125'	130'	135'	
W x D = WIDTH x DEPTH	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0	
CHORD -②, Unless Otherwise Shown	L 4 x 4 x 3/8	[9]	L 4 x 4 x 3/8	[10]	L 4 x 4 x 7/16	[11]	L 4 x 4 x 1/2	[12]	L 4 x 4 x 1/2	[12]	L 4 x 4 x 1/2	[13]	L 5 x 5 x 7/16	[14]	L 5 x 5 x 7/16	[15]
DEAD LOAD DIAGONAL -③	L 3 x 2 x 3/16	[2]	L 3 x 2 x 3/16	[2]	L 3 x 2 x 3/16	[2]	L 3 x 2 1/2 x 3/16	[2]	L 3 x 2 1/2 x 3/16	[2]	L 3 x 3 x 3/16	[2]	L 3 x 3 x 3/16	[2]	L 3 x 3 x 3/16	[2]
WIND LOAD DIAGONAL -③	L 3 x 3 x 1/4	[2]	L 3 x 3 x 1/4	[3]	L 3 x 3 x 1/4	[3]	L 3 x 3 x 1/4	[3]	L 3 1/2 x 3 1/2 x 1/4	[3]	L 3 1/2 x 3 1/2 x 1/4	[3]	L 3 1/2 x 3 1/2 x 1/4	[3]	L 3 1/2 x 3 1/2 x 1/4	[3]
DEAD LOAD VERTICAL -③	L 3 x 2 x 3/16	[2]	L 3 x 2 x 3/16	[2]	L 3 x 2 x 3/16	[2]	L 3 x 2 x 3/16	[2]	L 3 x 2 1/2 x 3/16	[2]	L 3 x 2 1/2 x 3/16	[2]	L 3 x 2 1/2 x 3/16	[2]	L 3 x 2 1/2 x 3/16	[2]
WIND LOAD STRUT - ③	L 2 1/2 x 2 1/2 x 3/16	[1]	L 2 1/2 x 2 1/2 x 3/16	[1]	L 2 1/2 x 2 1/2 x 3/16	[1]	L 2 1/2 x 2 1/2 x 3/16	[1]	L 2 1/2 x 2 1/2 x 3/16	[1]	L 2 1/2 x 2 1/2 x 3/16	[1]	L 2 1/2 x 2 1/2 x 3/16	[1]	L 2 1/2 x 2 1/2 x 3/16	[1]
TOTAL DEFL. & TRUSS D.L.	DEFL=1.77" L=76 lb/ft		DEFL=2.13" L=76 lb/ft		DEFL=2.32" L=82 lb/ft		DEFL=2.54" L=90 lb/ft		DEFL=2.54" L=95 lb/ft		DEFL=3.03" L=97 lb/ft		DEFL=3.22" L=103 lb/ft		DEFL=3.72" L=103 lb/ft	

	TOWER DETAILS								
S = COLUMN SPACING	7.0'	7.0'	7.0'	7.0'	7.5'	7.5'	7.5'	7.5'	
TOWER HEIGHT									
15'	W 10 x 22	(36.0)	W 10 x 26	(37.8)	W 10 x 26	(39.5)	W 10 x 26	(41.1)	W 12 x 26	(39.9)	W 12 x 26	(41.5)	W 12 x 26	(43.1)	W 12 x 26	(44.7)
16'	W 10 x 22	(38.6)	W 10 x 26	(40.5)	W 10 x 26	(42.3)	W 10 x 26	(44.0)	W 12 x 26	(42.7)	W 12 x 26	(44.5)	W 12 x 26	(46.2)	W 12 x 26	(48.0)
17'	W 10 x 26	(40.9)	W 10 x 26	(43.2)	W 10 x 26	(45.1)	W 12 x 26	(47.1)	W 12 x 26	(45.6)	W 12 x 26	(47.4)	W 12 x 26	(49.3)	W 12 x 26	(51.2)
18'	W 10 x 26	(43.5)	W 10 x 26	(45.9)	W 12 x 26	(47.9)	W 12 x 26	(50.1)	W 12 x 26	(48.5)	W 12 x 26	(50.4)	W 12 x 26	(52.4)	W 12 x 26	(54.4)
19'	W 12 x 26	(46.5)	W 12 x 26	(48.8)	W 12 x 26	(51.0)	W 12 x 26	(53.1)	W 12 x 26	(51.4)	W 12 x 26	(53.4)	W 14 x 30	(56.0)	W 14 x 30	(58.1)
20'	W 12 x 26	(49.1)	W 12 x 26	(51.5)	W 12 x 26	(53.8)	W 12 x 26	(56.0)	W 12 x 26	(54.3)	W 14 x 30	(56.9)	W 14 x 30	(59.2)	W 14 x 30	(61.4)
21'	W 12 x 26	(51.7)	W 12 x 26	(54.3)	W 12 x 26	(56.7)	W 14 x 30	(59.6)	W 14 x 30	(57.7)	W 14 x 30	(60.0)	W 14 x 30	(62.3)	W 14 x 30	(64.7)
22'	W 12 x 26	(54.3)	W 12 x 26	(57.0)	W 14 x 30	(59.6)	W 14 x 30	(62.6)	W 14 x 30	(60.7)	W 14 x 30	(63.1)	W 14 x 30	(65.5)	W 14 x 34	(68.0)
23'	W 14 x 30	(57.7)	W 14 x 30	(60.4)	W 14 x 30	(63.1)	W 14 x 30	(65.7)	W 14 x 30	(63.7)	W 14 x 34	(66.2)	W 14 x 34	(68.8)	W 14 x 34	(71.3)
24'	W 14 x 30	(60.4)	W 14 x 30	(63.3)	W 14 x 30	(66.0)	W 14 x 30	(67.8)	W 14 x 30	(66.6)	W 14 x 34	(69.3)	W 14 x 34	(72.0)	W 14 x 34	(74.7)
25'	W 14 x 30	(63.1)	W 14 x 30	(66.3)	W 14 x 34	(69.8)	W 14 x 34	(71.8)	W 14 x 34	(69.6)	W 14 x 34	(72.4)	W 16 x 36	(76.0)	W 16 x 36	(78.8)
26'	W 14 x 30	(65.8)	W 14 x 30	(68.9)	W 14 x 34	(72.8)	W 14 x 34	(74.9)	W 14 x 34	(72.6)	W 14 x 34	(75.5)	W 16 x 36	(79.3)	W 16 x 36	(82.2)
27'	W 14 x 34	(68.6)	W 14 x 34	(72.0)	W 14 x 34	(74.9)	W 16 x 36	(78.9)	W 16 x 36	(76.5)	W 16 x 36	(79.5)	W 16 x 36	(82.6)	W 16 x 40	(85.6)
28'	W 14 x 34	(71.3)	W 14 x 34	(74.7)	W 14 x 34	(77.9)	W 16 x 36	(82.1)	W 16 x 36	(79.6)	W 16 x 36	(82.7)	W 16 x 36	(85.9)	W 16 x 40	(89.1)
29'	W 14 x 34	(74.1)	W 16 x 36	(78.6)	W 16 x 36	(82.0)	W 16 x 36	(85.3)	W 16 x 36	(82.7)	W 16 x 40	(85.9)	W 16 x 40	(89.2)	W 16 x 40	(92.5)
30'	W 14 x 34	(76.9)	W 16 x 36	(81.5)	W 16 x 36	(85.0)	W 16 x 36	(88.5)	W 16 x 40	(85.8)	W 16 x 40	(89.1)	W 16 x 40	(92.6)	W 16 x 40	(96.0)

COLUMN SIZE & UPLIFT (kips)

Tower Height = (HL + HR)/2

ZONE 3 NO ICE 80 M.P.H. WIND

¾" Dia. H.S. Bolts, Spans 96' Thru 155' — TRUSS DETAILS								
SPAN	140'	145'	150'	155'	
W x D = WIDTH x DEPTH	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0	
CHORD -②, Unless Otherwise Shown	L 5 x 5 x 1/2	[17]	L 5 x 5 x 1/2	[18]	L 6 x 6 x 1/2	[20]	L 6 x 6 x 1/2	[21]
DEAD LOAD DIAGONAL -③	L 3 x 2 1/2 x 1/4	[2]	L 3 x 2 1/2 x 1/4	[2]	L 3 x 2 1/2 x 1/4	[2]	L 3 x 3 x 1/4	[2]
WIND LOAD DIAGONAL -③	L 3 1/2 x 3 1/2 x 1/4	[3]	L 3 1/2 x 3 1/2 x 1/4	[3]	L 3 1/2 x 3 1/2 x 1/4	[3]	L 3 1/2 x 3 1/2 x 1/4	[3]
DEAD LOAD VERTICAL -③	L 3 x 3 x 3/16	[2]	L 3 x 3 x 3/16	[2]	L 3 x 3 x 3/16	[2]	L 3 x 3 x 3/16	[2]
WIND LOAD STRUT - ③	L 2 1/2 x 2 1/2 x 3/16	[1]	L 2 1/2 x 2 1/2 x 3/16	[1]	L 2 1/2 x 2 1/2 x 3/16	[1]	L 2 1/2 x 2 1/2 x 3/16	[1]
TOTAL DEFL. & TRUSS D.L.	DEFL=3.96" L=114 lb/ft	DEFL=4.53" L=114 lb/ft	DEFL=4.65" L=129 lb/ft	DEFL=5.27" L=131 lb/ft

TOWER DETAILS								
S = COLUMN SPACING	7.5'	7.5'	7.5'	7.5'	
TOWER HEIGHT					
15'	W 12 x 26	(46.1)	W 12 x 26	(47.9)	W 12 x 26	(49.3)	W 12 x 26	(51.1)
16'	W 12 x 26	(49.4)	W 12 x 26	(51.3)	W 12 x 26	(52.9)	W 12 x 26	(54.7)
17'	W 12 x 26	(52.7)	W 14 x 30	(55.2)	W 14 x 30	(56.9)	W 14 x 30	(58.8)
18'	W 14 x 30	(56.1)	W 14 x 30	(58.7)	W 14 x 30	(60.5)	W 14 x 30	(62.6)
19'	W 14 x 30	(59.9)	W 14 x 30	(62.2)	W 14 x 30	(64.2)	W 14 x 34	(66.4)
20'	W 14 x 30	(63.3)	W 14 x 30	(65.8)	W 14 x 34	(67.9)	W 14 x 34	(70.2)
21'	W 14 x 34	(66.7)	W 14 x 34	(69.3)	W 14 x 34	(71.5)	W 16 x 36	(74.0)
22'	W 14 x 34	(70.2)	W 14 x 34	(72.9)	W 14 x 34	(75.2)	W 16 x 36	(77.9)
23'	W 14 x 34	(73.6)	W 16 x 36	(77.1)	W 16 x 36	(79.6)	W 16 x 36	(81.7)
24'	W 16 x 36	(77.1)	W 16 x 36	(80.7)	W 16 x 36	(83.4)	W 16 x 36	(85.6)
25'	W 16 x 36	(81.3)	W 16 x 36	(84.4)	W 16 x 40	(87.2)	W 16 x 40	(90.2)
26'	W 16 x 36	(84.8)	W 16 x 40	(88.0)	W 16 x 40	(91.0)	W 16 x 40	(94.1)
27'	W 16 x 40	(88.4)	W 16 x 40	(91.7)	W 16 x 40	(94.8)	W 18 x 46	(98.9)
28'	W 16 x 40	(91.9)	W 16 x 40	(95.4)	W 18 x 46	(98.6)	W 18 x 46	(102.9)
29'	W 18 x 46	(97.9)	W 18 x 46	(100.1)	W 18 x 46	(103.4)	W 18 x 46	(106.9)
30'	W 18 x 46	(101.6)	W 18 x 46	(103.9)	W 18 x 46	(107.3)	W 18 x 46	(110.9)

COLUMN SIZE & UPLIFT (kips)

Tower Height = (HL + HR)/2

KEY TO TRUSS AND TOWER DETAILS

Truss members are all angles.
Truss columns are all wide flange shapes.

W 10 x 26 (44.2) ← 44.2 kips Uplift at base plate
- 26 Pounds per foot.
- 10" Nominal size
- Wide Flange

DEFL = 0.12" = inches Deflection due to dead load of truss, walkway, signs and lights.
DL = 42 lb/ft = pounds per foot dead load of truss members only; does not include walkway, signs, and lights.

NOTE: Details on these sheets are for Design Wind Heights up to 30 feet.

GENERAL NOTES

Design conforms to AASHTO 1994 Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto.

For overhead sign bridges with different tower heights, average the height of the two towers and use the tabulated height nearest the calculated average. For average heights falling midway between the two tabulated heights use the larger height.

For truss lengths falling between those shown in the tables use the sizes called for in the next longer span.

Overhead sign bridges are designed for the equivalent area of a 10 foot deep sign panel over 75 percent of the span length, located as necessary to produce maximum stress. Design includes 3 pounds per square foot for sign panel, 20 pounds per linear foot for lights, and 50 pounds per linear foot for walkway, all placed as specified for the design sign panel.

Refer to "Overhead Sign Bridge Truss Details" for details called out in plan and elevation views.

The number of High Strength Bolts required in truss connection or splice are indicated in brackets, e.g. [3], after the member size.

SHEET 2 OF 2

Texas Department of Transportation
Traffic Operations Division

OVERHEAD SIGN BRIDGE DETAILS

OSB-Z3

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
8/08 add missing HS bolt dia (select spans); applicability note; noted design specifications

CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.

DIST	COUNTY	SHEET NO.
ATL	BOWIE ETC.	70

DATE: 4/23/2024 7:37:15 AM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\STANDARDS\stds39.dgn

ZONE 3 WITH ICE 80 M.P.H. WIND

TRUSS DETAILS

5/8" Dia. H.S. Bolts — Spans 40' Thru 95'

SPAN	40'	45'	50'	55'	60'	65'	70'	75'
W x D = WIDTH x DEPTH	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.5 x 4.5	4.5 x 4.5
CHORD -②, Unless Otherwise Shown	L 3 x 3 x 3/16 ③ [3]	L 3 x 3 x 3/16 ③ [3]	L 3 x 3 x 1/4 ③ [4]	L 3 x 3 x 1/4 ③ [4]	L 3 x 3 x 1/4 [6]	L 3 x 3 x 5/16 [7]	L 3 x 3 x 5/16 [7]	L 3 1/2 x 3 1/2 x 5/16 [9]
DEAD LOAD DIAGONAL -③	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [3]
WIND LOAD DIAGONAL -③	L 2 1/2 x 2 1/2 x 3/16 [2]	L 2 1/2 x 2 1/2 x 3/16 [2]	L 2 1/2 x 2 1/2 x 3/16 [2]	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [3]
DEAD LOAD VERTICAL -③	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 1/2 x 2 1/2 x 3/16 [2]	L 2 1/2 x 2 1/2 x 3/16 [2]
WIND LOAD STRUT - ③	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]
TOTAL DEFL. & TRUSS D.L.	DEFL=0.14" L=38 lb/ft	DEFL=0.21" L=38 lb/ft	DEFL=0.25" L=43 lb/ft	DEFL=0.36" L=45 lb/ft	DEFL=0.50" L=45 lb/ft	DEFL=0.58" L=50 lb/ft	DEFL=0.63" L=53 lb/ft	DEFL=0.73" L=58 lb/ft

TOWER DETAILS

S = COLUMN SPACING	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	6.5'	6.5'
TOWER HEIGHT								
15'	W 10 x 15 (18.0)	W 10 x 15 (20.1)	W 10 x 15 (22.1)	W 10 x 15 (24.2)	W 10 x 15 (26.2)	W 10 x 17 (25.8)	W 10 x 17 (27.9)	W 10 x 22 (29.8)
16'	W 10 x 15 (19.3)	W 10 x 15 (21.5)	W 10 x 15 (23.7)	W 10 x 15 (25.9)	W 10 x 15 (28.1)	W 10 x 17 (27.6)	W 10 x 22 (29.9)	W 10 x 22 (31.9)
17'	W 10 x 15 (20.6)	W 10 x 15 (23.0)	W 10 x 15 (25.3)	W 10 x 17 (27.6)	W 10 x 17 (29.9)	W 10 x 22 (29.4)	W 10 x 22 (31.8)	W 10 x 22 (34.0)
18'	W 10 x 15 (21.9)	W 10 x 15 (24.4)	W 10 x 17 (26.9)	W 10 x 17 (29.3)	W 10 x 17 (31.8)	W 10 x 22 (31.3)	W 10 x 22 (33.8)	W 10 x 22 (36.1)
19'	W 10 x 15 (23.3)	W 10 x 17 (25.9)	W 10 x 17 (28.5)	W 10 x 22 (31.1)	W 10 x 22 (33.7)	W 10 x 22 (33.1)	W 10 x 22 (35.7)	W 10 x 22 (38.2)
20'	W 10 x 15 (24.6)	W 10 x 17 (27.4)	W 10 x 17 (30.1)	W 10 x 22 (32.8)	W 10 x 22 (35.5)	W 10 x 22 (35.0)	W 10 x 22 (37.7)	W 10 x 22 (40.3)
21'	W 10 x 17 (25.9)	W 10 x 17 (28.9)	W 10 x 22 (31.7)	W 10 x 22 (34.6)	W 10 x 22 (37.1)	W 10 x 22 (36.9)	W 10 x 26 (39.7)	W 10 x 26 (42.5)
22'	W 10 x 17 (27.3)	W 10 x 17 (30.4)	W 10 x 22 (33.3)	W 10 x 22 (36.4)	W 10 x 22 (39.0)	W 10 x 22 (38.7)	W 10 x 26 (41.8)	W 10 x 26 (44.6)
23'	W 10 x 22 (28.7)	W 10 x 22 (31.9)	W 10 x 22 (35.0)	W 10 x 22 (38.4)	W 10 x 26 (41.3)	W 10 x 26 (40.6)	W 10 x 26 (43.8)	W 12 x 26 (47.1)
24'	W 10 x 22 (30.1)	W 10 x 22 (33.4)	W 10 x 22 (36.6)	W 10 x 22 (39.9)	W 10 x 26 (43.2)	W 10 x 26 (42.5)	W 10 x 26 (45.8)	W 12 x 26 (49.3)
25'	W 10 x 22 (31.4)	W 10 x 22 (34.9)	W 10 x 22 (38.3)	W 10 x 26 (41.7)	W 10 x 26 (44.6)	W 10 x 26 (44.5)	W 12 x 26 (48.3)	W 12 x 26 (51.5)
26'	W 10 x 22 (32.9)	W 10 x 22 (36.5)	W 10 x 26 (40.0)	W 10 x 26 (43.5)	W 10 x 26 (46.6)	W 12 x 26 (46.4)	W 12 x 26 (50.4)	W 12 x 26 (53.7)
27'	W 10 x 22 (33.7)	W 10 x 26 (38.0)	W 10 x 26 (41.8)	W 10 x 26 (45.4)	W 12 x 26 (49.6)	W 12 x 26 (48.8)	W 12 x 26 (52.5)	W 12 x 26 (56.0)
28'	W 10 x 22 (35.1)	W 10 x 26 (39.6)	W 10 x 26 (43.4)	W 12 x 26 (47.2)	W 12 x 26 (51.6)	W 12 x 26 (50.8)	W 12 x 26 (54.6)	W 14 x 30 (58.2)
29'	W 10 x 26 (37.1)	W 10 x 26 (41.6)	W 12 x 26 (45.7)	W 12 x 26 (50.0)	W 12 x 26 (53.6)	W 12 x 26 (52.7)	W 12 x 26 (56.7)	W 14 x 30 (61.5)
30'	W 10 x 26 (38.6)	W 10 x 26 (42.8)	W 12 x 26 (47.4)	W 12 x 26 (51.6)	W 12 x 26 (55.6)	W 12 x 26 (54.7)	W 12 x 26 (58.8)	W 14 x 30 (63.8)

COLUMN SIZE & UPLIFT (kips)

Tower Height = (HL + HR)/2

ZONE 3 WITH ICE 80 M.P.H. WIND

TRUSS DETAILS

5/8" Dia. H.S. Bolts — Spans 40' Thru 95'

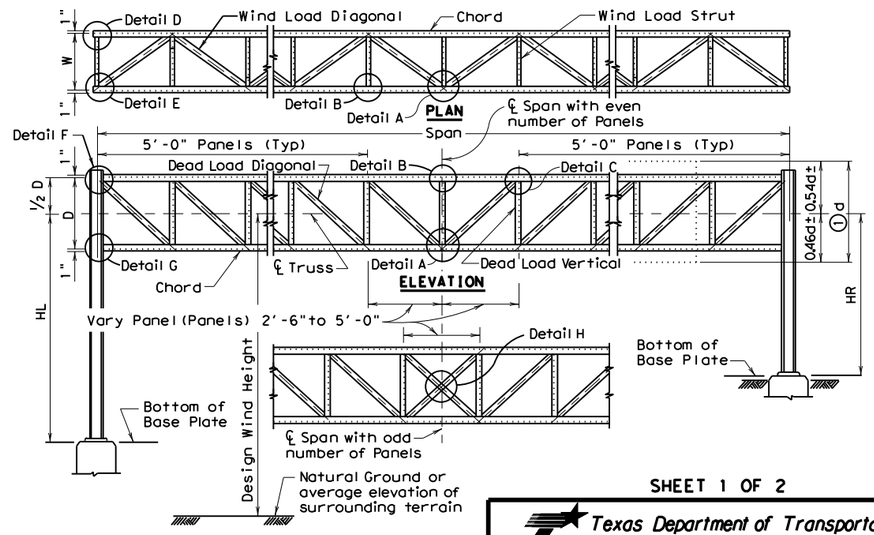
SPAN	80'	85'	90'	95'
W x D = WIDTH x DEPTH	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5
CHORD -②, Unless Otherwise Shown	L 3 1/2 x 3 1/2 x 5/16 [9]	L 3 1/2 x 3 1/2 x 5/16 [9]	L 3 1/2 x 3 1/2 x 3/8 [10]	L 3 1/2 x 3 1/2 x 3/8 [11]
DEAD LOAD DIAGONAL -③	L 2 1/2 x 2 1/2 x 3/16 [3]	L 2 1/2 x 2 1/2 x 3/16 [3]	L 2 1/2 x 2 1/2 x 3/16 [3]	L 2 1/2 x 2 1/2 x 3/16 [3]
WIND LOAD DIAGONAL -③	L 3 x 3 x 1/4 [3]	L 3 x 3 x 1/4 [3]	L 3 x 3 x 1/4 [3]	L 3 x 3 x 1/4 [3]
DEAD LOAD VERTICAL -③	L 2 1/2 x 2 1/2 x 3/16 [2]	L 2 1/2 x 2 1/2 x 3/16 [2]	L 3 x 2 x 3/16 [2]	L 3 x 2 x 3/16 [2]
WIND LOAD STRUT - ③	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]
TOTAL DEFL. & TRUSS D.L.	DEFL=0.95" L=62 lb/ft	DEFL=1.18" L=63 lb/ft	DEFL=1.30" L=69 lb/ft	DEFL=1.59" L=69 lb/ft

TOWER DETAILS

S = COLUMN SPACING	6.5'	6.5'	6.5'	6.5'
TOWER HEIGHT				
15'	W 10 x 22 (31.7)	W 10 x 22 (33.6)	W 10 x 22 (35.5)	W 10 x 22 (37.5)
16'	W 10 x 22 (33.9)	W 10 x 22 (36.0)	W 10 x 22 (38.0)	W 10 x 22 (40.1)
17'	W 10 x 22 (36.1)	W 10 x 22 (38.3)	W 10 x 22 (40.5)	W 10 x 26 (42.8)
18'	W 10 x 22 (38.4)	W 10 x 22 (40.7)	W 10 x 26 (43.0)	W 10 x 26 (45.4)
19'	W 10 x 26 (40.6)	W 10 x 26 (43.1)	W 10 x 26 (45.8)	W 10 x 26 (47.8)
20'	W 10 x 26 (42.9)	W 10 x 26 (45.5)	W 10 x 26 (48.4)	W 10 x 26 (50.4)
21'	W 10 x 26 (45.1)	W 12 x 26 (48.2)	W 12 x 26 (50.9)	W 12 x 26 (53.7)
22'	W 10 x 26 (47.4)	W 12 x 26 (50.6)	W 12 x 26 (53.5)	W 12 x 26 (56.4)
23'	W 12 x 26 (50.0)	W 12 x 26 (52.7)	W 12 x 26 (56.1)	W 12 x 26 (59.7)
24'	W 12 x 26 (52.4)	W 12 x 26 (55.2)	W 12 x 26 (58.7)	W 12 x 26 (61.8)
25'	W 12 x 26 (54.7)	W 12 x 26 (58.0)	W 14 x 30 (62.1)	W 14 x 30 (65.4)
26'	W 12 x 26 (57.1)	W 14 x 30 (60.5)	W 14 x 30 (64.7)	W 14 x 30 (68.2)
27'	W 14 x 30 (60.3)	W 14 x 30 (63.9)	W 14 x 30 (67.4)	W 14 x 34 (71.0)
28'	W 14 x 30 (62.8)	W 14 x 30 (66.5)	W 14 x 30 (70.1)	W 14 x 34 (73.8)
29'	W 14 x 30 (65.2)	W 14 x 30 (69.0)	W 14 x 34 (72.9)	W 14 x 34 (76.7)
30'	W 14 x 30 (67.8)	W 14 x 34 (71.6)	W 14 x 34 (75.8)	W 14 x 34 (79.5)

COLUMN SIZE & UPLIFT (kips)

Tower Height = (HL + HR)/2



① d = Sign Depth
Where signs of different depths are used, the bottom edges of all signs may be placed in line. Where this is done, all signs should be so positioned that the bottom edges are approximately 0.46 of the depth of the deepest sign below the ℄ of the truss.

② "Low-Alloy Steel" for non-bridge structures per Item 442, "Metal For Structures".

③ "Carbon Steel" for non-bridge structures per Item 442, "Metal For Structures".

SHEET 1 OF 2

Texas Department of Transportation
Traffic Operations Division

OVERHEAD SIGN BRIDGE DETAILS

OSB-Z31

© TxDOT November 2007	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
8/08 # of HS bolts; angle sizes	6467	35	001	US 59 ETC.
	DIST	COUNTY		SHEET NO.
	ATL	BOWIE ETC.		71

DATE: 4/23/2024 7:37:57 AM
FILE: T:\Engdata\Traffic\DGN\d192515 Jamie\JOBS\MAINTENANCE\RMC 6467-35-001 CO GUIDE SIGNS 2024\STANDARDS\stds39.dgn

ZONE 3 WITH ICE 80 M.P.H. WIND

TRUSS DETAILS

" Dia. H.S. Bolts
Spans 96' Thru 155'

SPAN	100'	105'	110'	115'	120'	125'	130'	135'
W x D = WIDTH x DEPTH	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0
CHORD -②, Unless Otherwise Shown	L 4 x 4 x 3/8 [9]	L 4 x 4 x 3/8 [10]	L 4 x 4 x 7/16 [11]	L 4 x 4 x 1/2 [12]	L 4 x 4 x 1/2 [12]	L 4 x 4 x 1/2 [13]	L 5 x 5 x 7/16 [14]	L 5 x 5 x 7/16 [15]
DEAD LOAD DIAGONAL -③	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [3]	L 3 x 3 x 3/16 [3]	L 3 x 2 1/2 x 1/4 [3]	L 3 x 2 1/2 x 1/4 [3]	L 3 x 3 x 1/4 [3]	L 3 x 3 x 1/4 [3]	L 3 x 3 x 1/4 [3]
WIND LOAD DIAGONAL -③	L 3 x 3 x 1/4 [2]	L 3 x 3 x 1/4 [3]	L 3 x 3 x 1/4 [3]	L 3 x 3 x 1/4 [3]	L 3 1/2 x 3 1/2 x 1/4 [3]	L 3 1/2 x 3 1/2 x 1/4 [3]	L 3 1/2 x 3 1/2 x 1/4 [3]	L 3 1/2 x 3 1/2 x 1/4 [3]
DEAD LOAD VERTICAL -③	L 3 x 2 x 3/16 [2]	L 3 x 2 x 3/16 [2]	L 3 x 2 x 3/16 [2]	L 3 x 2 1/2 x 3/16 [2]	L 3 x 2 1/2 x 3/16 [2]	L 3 x 2 1/2 x 3/16 [2]	L 3 x 2 1/2 x 3/16 [2]	L 3 x 3 x 3/16 [2]
WIND LOAD STRUT - ③	L 2 1/2 x 2 1/2 x 3/16 [1]	L 2 1/2 x 2 1/2 x 3/16 [1]	L 2 1/2 x 2 1/2 x 3/16 [1]	L 2 1/2 x 2 1/2 x 3/16 [1]	L 2 1/2 x 2 1/2 x 3/16 [1]	L 2 1/2 x 2 1/2 x 3/16 [1]	L 2 1/2 x 2 1/2 x 3/16 [1]	L 2 1/2 x 2 1/2 x 3/16 [1]
TOTAL DEFL. & TRUSS D.L.	DEFL=1.77" L=78 lb/ft	DEFL=2.13" L=78 lb/ft	DEFL=2.31" L=84 lb/ft	DEFL=2.53" L=93 lb/ft	DEFL=2.53" L=98 lb/ft	DEFL=2.96" L=100 lb/ft	DEFL=3.22" L=107 lb/ft	DEFL=3.72" L=108 lb/ft

TOWER DETAILS

S = COLUMN SPACING	7.0'	7.0'	7.0'	7.0'	7.5'	7.5'	7.5'	7.5'
TOWER HEIGHT								
15'	W 10 x 22 (36.0)	W 10 x 26 (37.8)	W 10 x 26 (39.5)	W 10 x 26 (41.1)	W 12 x 26 (39.9)	W 12 x 26 (41.5)	W 12 x 26 (43.1)	W 12 x 26 (44.7)
16'	W 10 x 22 (38.6)	W 10 x 26 (40.5)	W 10 x 26 (42.3)	W 10 x 26 (44.0)	W 12 x 26 (42.7)	W 12 x 26 (44.5)	W 12 x 26 (46.2)	W 12 x 26 (48.0)
17'	W 10 x 26 (40.9)	W 10 x 26 (43.2)	W 10 x 26 (45.1)	W 12 x 26 (47.1)	W 12 x 26 (45.6)	W 12 x 26 (47.4)	W 12 x 26 (49.3)	W 12 x 26 (51.2)
18'	W 10 x 26 (43.5)	W 10 x 26 (45.9)	W 12 x 26 (47.9)	W 12 x 26 (50.1)	W 12 x 26 (48.5)	W 12 x 26 (50.4)	W 12 x 26 (52.4)	W 12 x 26 (54.4)
19'	W 12 x 26 (46.5)	W 12 x 26 (48.8)	W 12 x 26 (51.0)	W 12 x 26 (53.1)	W 12 x 26 (51.4)	W 12 x 26 (53.4)	W 14 x 30 (56.0)	W 14 x 30 (58.1)
20'	W 12 x 26 (49.1)	W 12 x 26 (51.5)	W 12 x 26 (53.8)	W 12 x 26 (56.0)	W 12 x 26 (54.3)	W 14 x 30 (56.9)	W 14 x 30 (59.2)	W 14 x 30 (61.4)
21'	W 12 x 26 (51.7)	W 12 x 26 (54.3)	W 12 x 26 (56.7)	W 14 x 30 (59.6)	W 14 x 30 (57.7)	W 14 x 30 (60.0)	W 14 x 30 (62.3)	W 14 x 30 (64.7)
22'	W 12 x 26 (54.3)	W 12 x 26 (57.0)	W 14 x 30 (59.6)	W 14 x 30 (62.6)	W 14 x 30 (60.7)	W 14 x 30 (63.1)	W 14 x 30 (65.5)	W 14 x 34 (68.0)
23'	W 14 x 30 (57.7)	W 14 x 30 (60.4)	W 14 x 30 (63.1)	W 14 x 30 (65.7)	W 14 x 30 (63.7)	W 14 x 34 (66.2)	W 14 x 34 (68.8)	W 14 x 34 (71.3)
24'	W 14 x 30 (60.4)	W 14 x 30 (63.3)	W 14 x 30 (66.0)	W 14 x 30 (67.8)	W 14 x 30 (66.6)	W 14 x 34 (69.3)	W 14 x 34 (72.0)	W 14 x 34 (74.7)
25'	W 14 x 30 (63.1)	W 14 x 30 (66.3)	W 14 x 34 (69.8)	W 14 x 34 (71.8)	W 14 x 34 (69.6)	W 14 x 34 (72.4)	W 16 x 36 (76.0)	W 16 x 36 (78.8)
26'	W 14 x 30 (65.8)	W 14 x 30 (68.9)	W 14 x 34 (72.8)	W 14 x 34 (74.9)	W 14 x 34 (72.6)	W 14 x 34 (75.5)	W 16 x 36 (79.3)	W 16 x 36 (82.2)
27'	W 14 x 34 (68.6)	W 14 x 34 (72.0)	W 14 x 34 (74.9)	W 16 x 36 (78.9)	W 16 x 36 (76.5)	W 16 x 36 (79.5)	W 16 x 36 (82.6)	W 16 x 40 (85.6)
28'	W 14 x 34 (71.3)	W 14 x 34 (74.7)	W 14 x 34 (77.9)	W 16 x 36 (82.1)	W 16 x 36 (79.6)	W 16 x 36 (82.7)	W 16 x 36 (85.9)	W 16 x 40 (89.1)
29'	W 14 x 34 (74.1)	W 16 x 36 (78.6)	W 16 x 36 (82.0)	W 16 x 36 (85.3)	W 16 x 36 (82.7)	W 16 x 40 (85.9)	W 16 x 40 (89.2)	W 16 x 40 (92.5)
30'	W 14 x 34 (76.9)	W 16 x 36 (81.5)	W 16 x 36 (85.0)	W 16 x 36 (88.5)	W 16 x 40 (85.8)	W 16 x 40 (89.1)	W 16 x 40 (92.6)	W 16 x 40 (96.0)

COLUMN SIZE & UPLIFT (kips)

Tower Height = (HL + HR)/2

ZONE 3 WITH ICE 80 M.P.H. WIND

TRUSS DETAILS

" Dia. H.S. Bolts
Spans 96' Thru 155'

SPAN	140'	145'	150'	155'
W x D = WIDTH x DEPTH	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0
CHORD -②, Unless Otherwise Shown	L 5 x 5 x 1/2 [17]	L 5 x 5 x 1/2 [18]	L 6 x 6 x 1/2 [20]	L 6 x 6 x 1/2 [21]
DEAD LOAD DIAGONAL -③	L 3 x 3 x 1/4 [3]	L 3 1/2 x 3 1/2 x 1/4 [3]	L 3 1/2 x 3 1/2 x 1/4 [4]	L 3 1/2 x 3 1/2 x 1/4 [4]
WIND LOAD DIAGONAL -③	L 3 1/2 x 3 1/2 x 1/4 [3]	L 3 1/2 x 3 1/2 x 1/4 [3]	L 3 1/2 x 3 1/2 x 1/4 [3]	L 3 1/2 x 3 1/2 x 1/4 [3]
DEAD LOAD VERTICAL -③	L 3 x 2 1/2 x 1/4 [3]	L 3 x 2 1/2 x 1/4 [3]	L 3 x 2 1/2 x 1/4 [3]	L 3 x 2 1/2 x 1/4 [3]
WIND LOAD STRUT - ③	L 2 1/2 x 2 1/2 x 3/16 [1]	L 2 1/2 x 2 1/2 x 3/16 [1]	L 2 1/2 x 2 1/2 x 3/16 [1]	L 2 1/2 x 2 1/2 x 3/16 [1]
TOTAL DEFL. & TRUSS D.L.	DEFL=3.98" L=117 lb/ft	DEFL=4.55" L=120 lb/ft	DEFL=4.66" L=135 lb/ft	DEFL=5.29" L=135 lb/ft

TOWER DETAILS

S = COLUMN SPACING	7.5'	7.5'	7.5'	7.5'
TOWER HEIGHT				
15'	W 12 x 26 (46.1)	W 12 x 26 (47.9)	W 12 x 26 (49.3)	W 12 x 26 (51.1)
16'	W 12 x 26 (49.4)	W 12 x 26 (51.3)	W 12 x 26 (52.9)	W 12 x 26 (54.7)
17'	W 12 x 26 (52.7)	W 14 x 30 (55.2)	W 14 x 30 (56.9)	W 14 x 30 (58.8)
18'	W 14 x 30 (56.1)	W 14 x 30 (58.7)	W 14 x 30 (60.5)	W 14 x 30 (62.6)
19'	W 14 x 30 (59.9)	W 14 x 30 (62.2)	W 14 x 30 (64.2)	W 14 x 34 (66.4)
20'	W 14 x 30 (63.3)	W 14 x 30 (65.8)	W 14 x 34 (67.9)	W 14 x 34 (70.2)
21'	W 14 x 34 (66.7)	W 14 x 34 (69.3)	W 14 x 34 (71.5)	W 16 x 36 (74.0)
22'	W 14 x 34 (70.2)	W 14 x 34 (72.9)	W 14 x 34 (75.2)	W 16 x 36 (77.9)
23'	W 14 x 34 (73.6)	W 16 x 36 (77.1)	W 16 x 36 (79.6)	W 16 x 36 (81.7)
24'	W 16 x 36 (77.1)	W 16 x 36 (80.7)	W 16 x 36 (83.4)	W 16 x 36 (85.6)
25'	W 16 x 36 (81.3)	W 16 x 36 (84.4)	W 16 x 40 (87.2)	W 16 x 40 (90.2)
26'	W 16 x 36 (84.8)	W 16 x 40 (88.0)	W 16 x 40 (91.0)	W 16 x 40 (94.1)
27'	W 16 x 40 (88.4)	W 16 x 40 (91.7)	W 16 x 40 (94.8)	W 18 x 46 (98.9)
28'	W 16 x 40 (91.9)	W 16 x 40 (95.4)	W 18 x 46 (98.6)	W 18 x 46 (102.9)
29'	W 18 x 46 (97.9)	W 18 x 46 (100.1)	W 18 x 46 (103.4)	W 18 x 46 (106.9)
30'	W 18 x 46 (101.6)	W 18 x 46 (103.9)	W 18 x 46 (107.3)	W 18 x 46 (110.9)

COLUMN SIZE & UPLIFT (kips)

Tower Height = (HL + HR)/2

KEY TO TRUSS AND TOWER DETAILS

Truss members are all angles.
Truss columns are all wide flange shapes.

W 10 x 26 (44.2) ← 44.2 kips Uplift at base plate
- 26 Pounds per foot.
- 10" Nominal size
- Wide Flange

DEFL = 0.12" = inches Deflection due to dead load of truss, walkway, signs and lights.
DL = 42 lb/ft = pounds per foot dead load of truss members only; does not include walkway, signs, and lights.

NOTE: Details on these sheets are for Design Wind Heights up to 30 feet.

GENERAL NOTES

Design conforms to AASHTO 1994 Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto.

For overhead sign bridges with different tower heights, average the height of the two towers and use the tabulated height nearest the calculated average. For average heights falling midway between the two tabulated heights use the larger height.

For truss lengths falling between those shown in the tables use the sizes called for in the next longer span.

Overhead sign bridges are designed for the equivalent area of a 10 foot deep sign panel over 75 percent of the span length, located as necessary to produce maximum stress. Design includes 3 pounds per square foot for sign panel, 20 pounds per linear foot for lights, and 50 pounds per linear foot for walkway, all placed as specified for the design sign panel.

Refer to "Overhead Sign Bridge Truss Details" for details called out in plan and elevation views.

The number of High Strength Bolts required in truss connection or splice are indicated in brackets, e.g. [3], after the member size.

SHEET 2 OF 2

Texas Department of Transportation
Traffic Operations Division

OVERHEAD SIGN BRIDGE DETAILS

OSB-Z31

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
8/08 add missing HS bolt dia (select spans); applicability note; noted design specifications

CONT	SECT	JOB	HIGHWAY
6467	35	001	US 59 ETC.
DIST	COUNTY		SHEET NO.
ATL	BOWIE ETC.		72

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit 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.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. N/A

☐ No Action Required ☒ Required Action

Action No.

1. This project is considered a maintenance activity and is exempt from the requirements of TPDES TXR 150000.

Commitment No.

1. Refer to the SWP3 Plan Sheet, BMPs, and Detail. It will address sweeping, chemical storage, sanitary waste, and all other management practices.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# ________

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP: Best Management Practice
CGP: Construction General Permit
DSHS: Texas Department of State Health Services
FHWA: Federal Highway Administration
MOA: Memorandum of Agreement
MOU: Memorandum of Understanding
MS4: Municipal Separate Stormwater Sewer System
MBTA: Migratory Bird Treaty Act
NOT: Notice of Termination
NWP: Nationwide Permit
NOI: Notice of Intent
SPCC: Spill Prevention Control and Countermeasure
SW3P: Storm Water Pollution Prevention Plan
PCN: Pre-Construction Notification
PSL: Project Specific Location
TCEQ: Texas Commission on Environmental Quality
TPDES: Texas Pollutant Discharge Elimination System
TPWD: Texas Parks and Wildlife Department
TxDOT: Texas Department of Transportation
T&E: Threatened and Endangered Species
USACE: U.S. Army Corps of Engineers
USFWS: U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation | Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS: 12-12-2011 (DS); 05-07-14 ADDED NOTE SECTION IV.; 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	6467	35	001	US 59 ETC.
	DIST		COUNTY	SHEET NO.
	ATL		BOWIE ETC.	73

DATE: 4/23/2024 7:38:23 AM
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