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STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO. STP 2B24(045)VRU

FOR THE CONSTRUCTION OF HAZARD ELIMINATION AND SAFETY
CONSISTING OF INSTALLING SAFETY LIGHTING

FEDERAL AID PROJECT NO.			
STP 2B24(045)VRU			
CONT	SECT	JOB	HIGHWAY
0062	07	103	US 59 etc.
DIST	COUNTY		SHEET NO.
ATL.	HARRISON, etc.		1

PRINCIPAL ARTERIAL
AADT (2022) = 12,038
AADT (2042) = 16,853

FINAL PLANS

LETTING DATE: _____
DATE CONTRACTOR BEGAN WORK: _____
DATE WORK WAS COMPLETED & ACCEPTED: _____
FINAL CONTRACT COST: \$ _____
CONTRACTOR : _____
CONTRACTOR ADDRESS: _____
LIST OF APPROVED FIELD CHANGES: _____

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

P. E.

DATE



RECOMMENDED FOR LETTING: 01/29/2024

Christina N. Trowler, P.E.

DIRECTOR OF TRANSPORTATION OPERATIONS

RECOMMENDED FOR LETTING: 2/1/2024

DocuSigned by:

Katie Martin, P.E.

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DISTRICT DIRECTOR OF TRANSPORTATION
PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: 2/1/2024

DocuSigned by:

Robert Williams, P.E.

23686C08B28F4A0...
DISTRICT ENGINEER

HARRISON COUNTY
CSJ 0062-07-103
STP 2B24(045)VRU
US 59
AT FM 1997
PROJECT LENGTH = 1.000
INSTALL SAFETY LIGHTING

HARRISON COUNTY
CSJ 0096-08-060
STP 2B24(045)VRU
US 80
FROM: 0.5 MI. W. OF FM 968
TO: 0.5 MI. E. OF FM 968
PROJECT LENGTH = 1.000
INSTALL SAFETY LIGHTING

HARRISON COUNTY
CSJ 0096-10-027
STP 2B24(045)VRU
US 80
FROM: 0.5 MI. W. OF FM 9 S.
TO: 0.5 MI. E. OF FM 9 S.
PROJECT LENGTH = 1.000
INSTALL SAFETY LIGHTING

PANOLA COUNTY
CSJ 0393-03-037
STP 2B24(045)VRU
SH 149
FROM: 0.5 MI. N. OF FM 124
TO: 0.5 MI. S. OF FM 124
PROJECT LENGTH = 1.000
INSTALL SAFETY LIGHTING

PANOLA COUNTY
CSJ 0394-01-069
STP 2B24(045)VRU
FM 959
FROM: 0.5 MI. N. OF FM 1794
TO: 0.5 MI. S. OF FM 1794
PROJECT LENGTH = 1.000
INSTALL SAFETY LIGHTING

PANOLA COUNTY
CSJ 0394-01-070
STP 2B24(045)VRU
SH 149
FROM: 0.5 MI. N. OF US 79
TO: 0.5 MI. S. OF US 79
PROJECT LENGTH = 1.000
INSTALL SAFETY LIGHTING

HARRISON COUNTY
CSJ 0402-03-043
STP 2B24(045)VRU
SH 154
FROM: 0.5 MI. W. OF FM 2208
TO: 0.5 MI. E. OF FM 2208
PROJECT LENGTH = 1.000
INSTALL SAFETY LIGHTING

HARRISON COUNTY
CSJ 0569-04-024
STP 2B24(045)VRU
SH 43
AT FM 134 N.
PROJECT LENGTH = 1.000
INSTALL SAFETY LIGHTING

HARRISON COUNTY
CSJ 1575-05-023
STP 2B24(045)VRU
SL 390
AT SH 43
PROJECT LENGTH = 1.000
INSTALL SAFETY LIGHTING

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF
TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS
LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED
CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS
(FORM FHWA 1273, OCTOBER 23, 2023)

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: 794577C RRMP 58.14

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COUNTY: HARRISON PROJ. NO. STP 2B24(045)VRU
HWY. NO. US 59 LETTING DATE: APRIL, 2024
DATE ACCEPTED

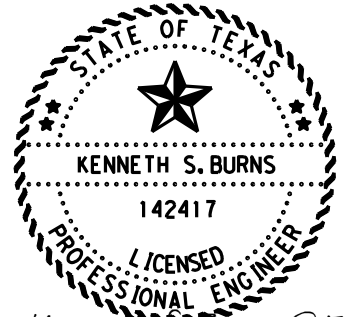
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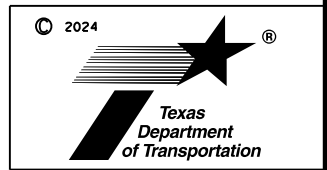
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Kenneth S. Burns, P.E.

1/29/2024

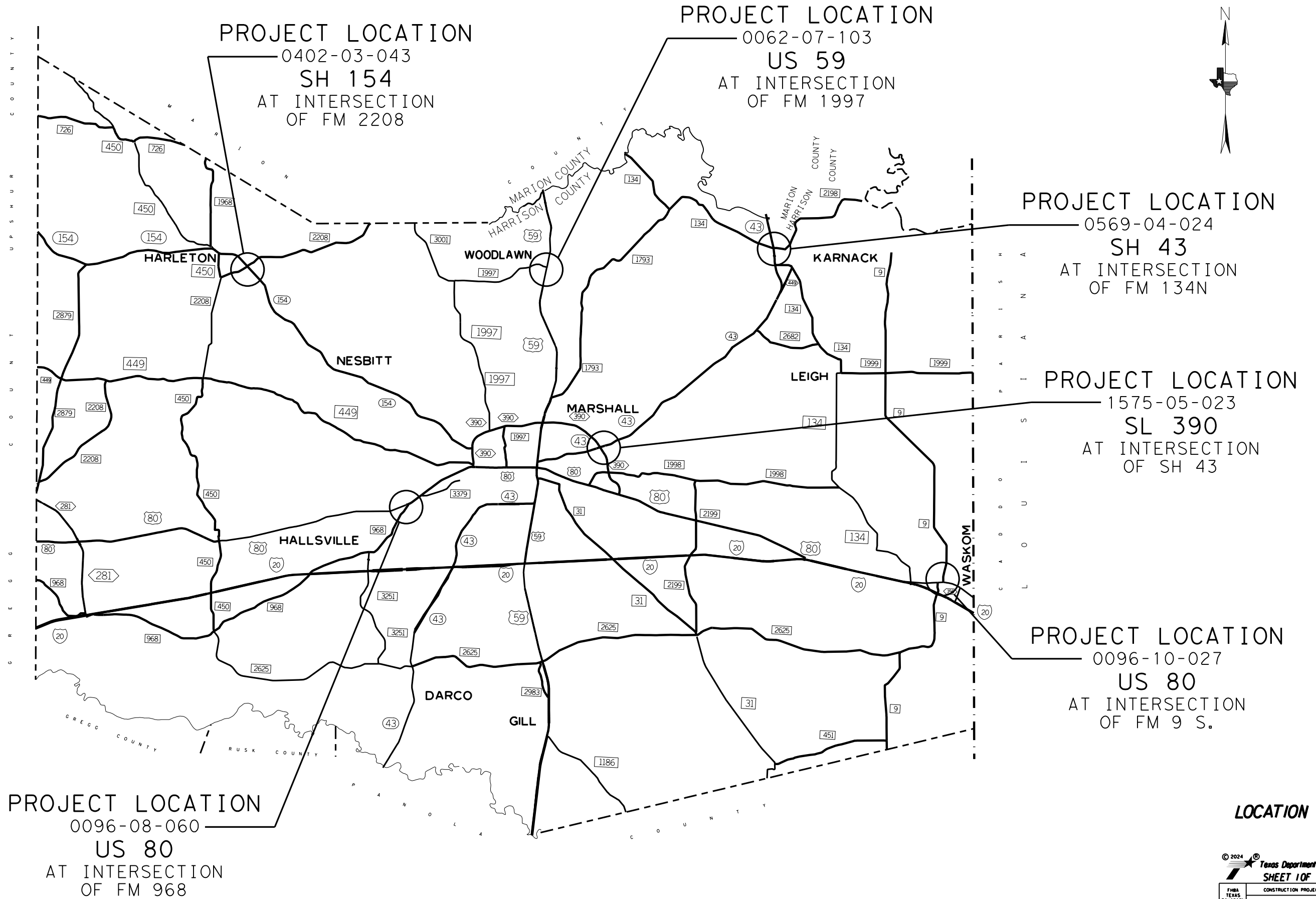
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STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

etc. etc. etc. etc.

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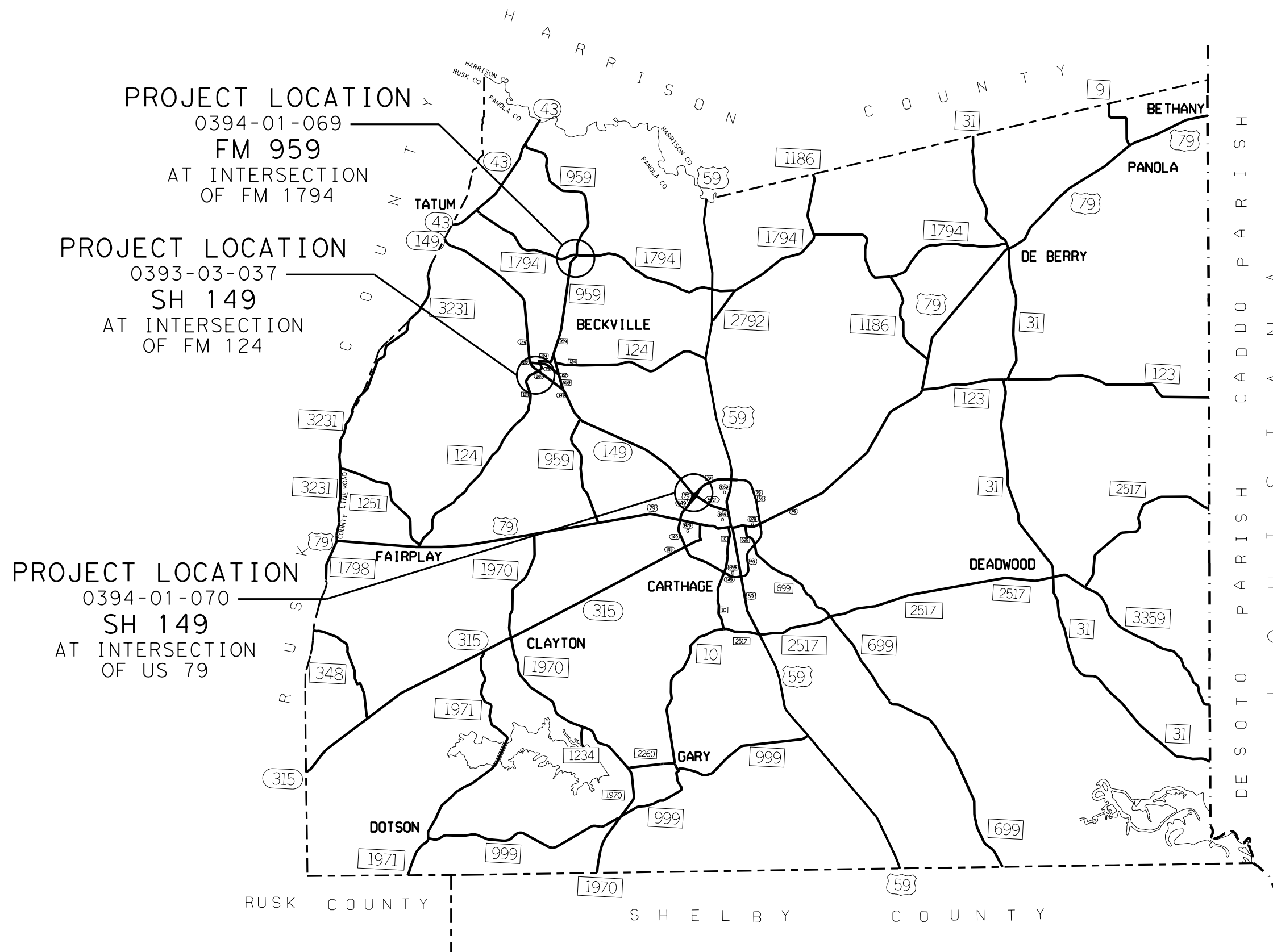


LOCATION MAP

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TEXAS	DISTRICT	COUNTY	3
CONTROL	SECTION	JOB	HIGHWAY NO.
0062	07	103	US 59

HARRISON COUNTY



LOCATION MAP

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STATE	DISTRICT	COUNTY			
TEXAS	ATL	HARRISON			
CONTROL	SECTION	JOB	HIGHWAY NO.		
0062	07	103	US 59		

NOT TO SCALE

PANOLA COUNTY

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Highway: US 59 etc.

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County: Harrison, etc.
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GENERAL NOTES:

General Requirements and Covenants:

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

Christina Trowler P.E. – Director of Transportation Operations
Christina.Trowler@Txdot.gov
Kenneth Burns P.E. – Transportation Engineer
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?%25>

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.

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 their 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.

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.

Plans are required for this project.

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.

Work on any project will not be accepted until all components have been shown to be fully operational.

At the intersections of US 59 at FM 1997 none of the proposed work will be on the Union Pacific Railroad right-of-way. The Contractor will be working less than 50' feet from the Railroad right-of-way line when they are working on installing the luminaires on the west side of the intersection at US 59 at FM 1997. Railroad Protective Flagging will be required while the Contractor is working on installing the luminaires at these locations only near the Union Pacific Track. Because the Contractor will be working in close proximity to the Union Pacific right-of-way line, the Contractor will need to meet all necessary railroad insurance requirements with the Union Pacific Railroad. Reference Railroad Scope of Work Project Specific Details DOT 794577C in the plan set.

ITEM 6 - Control of Material:

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit an original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

Refer to the Buy America Material Classification Sheet for clarification on material categorization.

The Buy America Material Classification Sheet is located at the below link.

<https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html> for clarification on material categorization.

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

Pre-qualified products can be found at <http://www.txdot.gov/business/resources/producer-list.html>

ITEM 7 – Legal Relations and Responsibilities:

This project is considered a maintenance activity and is exempt from the Construction General Permit (CGP) coverage.

No significant traffic generator events.

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County: Harrison, etc.
Highway: US 59 etc.

Sheet:

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County: Harrison, etc.
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ITEM 8 – Prosecution and Progress:

Working days will be charged in accordance with Section 8.3.1.4, “Standard Workweek”

Refer to SP 008---058 (180 days) for additional information regarding beginning of working day charges. The lead time will be to allow for fabrication of roadway illumination poles.

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.

Provide progress schedules meeting the requirements of Section 8.5.2 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 will be sent to the inspector with the item number, quantity, and location description.

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 421 – Hydraulic Cement Concrete:

The Department will furnish and maintain concrete compressive strength testing equipment.

ITEM 432 - Riprap:

Provide ½” expansion joint material with an area equal to the area of contact between the two concrete surfaces. The joint material will be visually inspected for approval.

ITEM 502 – Barricades, Signs, and Traffic Handling:

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) wherever short duration or short-term stationary lane closures are in place and workers are present.

The Contractor's responsible person (CRP) will be responsible for ensuring that the signs and traffic control devices are in place and functioning properly.

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.

Maintenance of driveways and intersections will not be paid for directly but is subsidiary to the pertinent bid items.

Restrict the movement of equipment across traffic lanes to an absolute minimum.

Use strobe lights or rotating beacons on all motorized equipment, operating on or adjacent to the road surface.

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 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

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.

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.

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County: Harrison, etc.
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Sheet:

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.

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.

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.

With reference to WZ (BTS-1), typical hanging signal installations, the Contractor may be required to close a traffic lane(s) as directed.

Restrict the movement of equipment across traffic lanes to an absolute minimum.

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

Install temporary rumble strips in accordance with WZ(RS) whenever short duration stationary lane closures are in place and workers are present. A minimum of two rumble strips shall be used.

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.

All locations will require WZ (BTS-2) setup for project signs. Roll up signs will be used daily when on site.

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County: Harrison, etc.
Highway: US 59 etc.

Sheet: 5B

ITEM 506 – Temporary Erosion, Sedimentation, and Environmental Controls:

Place erosion or pollution control measures deemed necessary by the Engineer. Work performed for which there is no applicable pay items in the contract will be reimbursed in accordance with Article 9.7, "Payment for Extra Work and Force Account Method".

It is the intent of this contract that no disturbance of vegetation occurs as a result of roadway operations. In the event vegetation is disturbed, place erosion or pollution control measures deemed necessary by the Engineer. Work performed for which there are no applicable pay items in the contract will be reimbursed in accordance with Article 9.7, "Payment for Extra Work and Force Account Method".

The project is exempt from the Texas Pollutant Discharge Elimination System (TPDES) General Permit (TXR15000). Exempt projects are those that disturb less than one acre or routine maintenance activities that maintain the original line and grade, hydraulic capacity, or original purposes of the site. No temporary erosion control measures or Storm Water Pollution Prevention Plan (SWP3) have been included in the plans.

ITEM 610 – Roadway Illumination Assemblies:

Luminaire foundations will require an apron as shown on standard RID(FND) or as directed.

There will not be any stockpiles on the job site from illumination installations. Remove any additional soil, rock, and concrete from job site the same day that they are produced.

ITEM 613 – High Mast Illumination Poles:

High mast lighting 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.

Both of the High mast lights at the intersection of SL 390 and SH 43 will require obstruction lighting for the installation of the High Mast Pole refer to HMID standard sheets. Obstruction lights will be Dual-Red and Medium Intensity. Obstruction lights will not be paid for separately but will be subsidiary to Item 613.

ITEM 618 – Conduit:

When the specifications for electrical items require UL listed products, it will be understood to mean UL listed or Any Nationally Recognized Testing Lab (NRTL).

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County: Harrison, etc.
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Sheet:

Aluminum conduit is acceptable for this project where rigid metal conduit is used above ground. Aluminum conduit specification will be submitted to the Engineer for approval. The aluminum conduit will be new and unused and UL-Listed. Notify the Engineer that aluminum conduit will be used on this project. Aluminum conduit will be installed, measured, and paid for under item 618.

The locations of conduit as shown are for diagrammatic purposes only and may be varied to meet local conditions, subject to approval.

All conduit placed under existing pavement will be bored as directed. Cutting, trenching or jacking across roadways or driveways will not be permitted without approval.

Install a 3-inch warning tape on trenched conduit runs during backfill operations. The tape will be red polyethylene marked "CAUTION-BURIED ELECTRIC LINE". Place the tape 12 inches above the conduit. Measurement and payment are subsidiary to Item 618, "Conduit".

When backfilling bore pits, ensure the conduit does not become damaged. Place select backfill in three equal lifts to the bottom of the conduit or place sand to a point 2 inches above the conduit. Compact the backfill to obtain a density equal to the existing, adjacent soil. Prevent backfill material from entering the conduit.

Excavate bore pits no closer than 2 feet from the edge of pavement or base.

The vertical and horizontal tolerances of bored conduits are not to exceed 18 inches as measured from the target point.

Ensure that all PVC conduit and fittings will be schedule 40.

Bell end fittings will be used at the ends of all non-metallic conduits. (e.g., metal junction box).

Where PVC, duct cable, and HDPE conduit 1" and larger is allowed and installed as per TxDOT standards, provide a PVC elbow in place of the galvanized rigid metal elbow required by the Electrical Detail Standards. Ensure the PVC elbow is of the same schedule rating as the conduit to which is connected. Ensure only a flat, high tensile strength polyester fiber pull tape is used for pulling conductor through the PVC conduit system.

ITEM 620 – Electrical Conductors:

Grounding conductors sharing the same conduit, junction box, ground box or structure will be bonded together at accessible points in accordance with the current edition of the National Electrical Code.

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County: Harrison, etc.
Highway: US 59 etc.

Sheet: 5C

Complete splices using approved splicing methods and insulate with an approved thermosetting compound, heavy duty heat shrinkable tubing with sealant, or heat shrinkable tape with sealant suitable for outdoor use.

Electrical certification for this project will be as per Item 7 of the current Texas Standard Specifications and any special provisions to Item 7.

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder as shown on the Texas Department of Transportation (TxDOT) materials producers list. Category is "Roadway Illumination and Electrical Supplies". Fuse holder is shown on list under Items 610 and 620. Provide 10-amp time delay fuses.

When the specifications for electrical items require UL listed products, it will be understood to mean UL listed or Any Nationally Recognized Testing Lab (NRTL).

ITEM 624 – Ground Boxes:

Locations of ground boxes are approximate. Final locations will be as approved.

Ground boxes will require an apron as directed by the Engineer as shown on standard ED (4).

When ground boxes are placed in existing concrete sidewalk, saw cut sidewalk and repair any damage to the surrounding concrete. This work will not be paid for separately but considered subsidiary to this item.

ITEM 628 – Electrical Services:

The power company will connect the power to the service lines at the weather heads and will furnish and install meters.

The power companies require a non-fuse safety disconnect switch on all 240/480-volt services. The non-fuse safety disconnect will be mounted on the side of pedestal services (U) or steel pole (O) as shown in the plans or as directed by the Engineer. This will apply to the two electrical services at SL 390 at SH 43 intersection.

Make arrangements with the appropriate electric power company to provide electric service. Notify the electric power company at least 3 weeks in advance of the need for the service connection. Time suspension will not be issued to Contractor for awaiting utility service connection.

Make all arrangements for electrical service and comply with local standards and practices for proper installation.

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County: Harrison, etc.
Highway: US 59 etc.

Sheet:

Foundations for the all of the proposed overhead electrical services on this project will be 30-A. Foundations will not be paid for separately but will be subsidiary to Item 628. Foundation depth for these services will be six feet.

Concrete rip rap service pad will be constructed on all proposed electrical services on this project. Concrete rip rap for the service pads will be paid for under Item 432.

Construct the proposed electrical service as shown on Electrical Detail (ED) Sheets, as shown in the electrical service summary and in accordance with Item 628, "Electrical Services". Make all arrangements for electrical service and comply with local standards and practices for proper installation.

Refer to Electrical Service Data with Modified Foundation and Pad Detail sheets for list of electrical services and power companies for each intersection.

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.

ITEM 644 – Small Roadside Sign Assemblies:

Type A signs will be made of flat 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.

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.

Do not remove existing sign assemblies until signs are ready to be installed on new mounts.

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County: Harrison, etc.
Highway: US 59 etc.

Sheet: 5D

Sign assemblies associated with warning signs or stop or yield signs will require Omni - Directional Post Wrap. Retroreflective sheeting wrapped around a warning sign is yellow. Stop or Yield signs will require red sheeting. Retroreflective sheeting wrapped around a sign has a height on the post of at least 12 inches. The bottom of the retroreflective sheeting will be placed two feet below the bottom of the sign. The Engineer will approve the retroreflective sheeting wrap prior to any installation. This work will not be paid for separately; but will be subsidiary to this Item.

Flat aluminum signs removed on the project will remain property of the State. The signs are to be delivered to the nearest Atlanta District Maintenance office yard, coordinate delivery with the Engineer. Mounting hardware and supports will remain property of the contractor to dispose of in accordance with federal, state and local regulations. This work will not be paid for separately but will be subsidiary to this Item.

ITEM 668 – Prefabricated Pavement Marking:

Prefabricated Pavement Markings will be placed at locations as directed.

ITEM 680 – Highway Traffic Signals:

The existing span wire is not to be removed until the proposed luminaires are functioning, and the proposed signs are in place. Remove the existing strain pole foundations 2 ft. below grade in accordance with this Item. The only exception for removal of foundations on this job will be at the intersection of SH 149 at FM 124 both strain pole foundations at the intersection of can be removed flush with the islands. All removal items for the signals will become the property of the Contractor upon removal.

ITEM 6185–Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA):

The shadow vehicle with truck mounted attenuator (TMA) will not be optional but will be required as shown on the appropriate traffic control plan sheets.

A total of one (1) shadow vehicle with TMA will be required for work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA's needed for the project.



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0062-07-103

DISTRICT Atlanta
 HIGHWAY FM 959, SH 149, SH 154, SH 43, SL 390, US 59, US 80

COUNTY Harrison, Panola

CONTROL SECTION JOB				0062-07-103		0096-08-060		0096-10-027		0393-03-037		0394-01-069		0394-01-070	
PROJECT ID				A00184141		A00177370		A00177379		A00177222		A00177192		A00177603	
COUNTY				Harrison		Harrison		Harrison		Panola		Panola		Panola	
HIGHWAY				US 59		US 80		US 80		SH 149		FM 959		SH 149	
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	416-6026	DRILL SHAFT (HIGH MAST POLE) (60 IN)	LF												
	416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	60.000		50.000		50.000		30.000		30.000		70.000	
	432-6006	RIPRAP (CONC)(CL B)	CY	3.000		3.000		3.000		2.000		2.000		3.000	
	500-6001	MOBILIZATION	LS											1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	1.000		1.000		1.000		1.000		1.000		2.000	
	610-6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA							3.000					
	610-6288	IN RD IL (TY SA) 50T-10 (400W EQ) LED	EA	6.000		5.000		5.000				3.000		7.000	
	613-6005	HI MST IL POLE (150 FT)(80 MPH)	EA												
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	627.000		492.000		339.000		249.000		240.000		460.000	
	618-6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	741.000		424.000		605.000		113.000		257.000		653.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	1,418.000		966.000		894.000		371.000		542.000		1,198.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	2,894.000		1,932.000		1,788.000		820.000		1,084.000		2,396.000	
	624-6001	GROUND BOX TY A (122311)	EA												
	624-6002	GROUND BOX TY A (122311)W/APRON	EA	3.000		4.000		3.000		2.000		5.000		7.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA											1.000	
	628-6003	ELC SRV TY A 120/240 060(NS)AL(E)PS(U)	EA							1.000					
	628-6004	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	EA	1.000		1.000		1.000				1.000		2.000	
	628-6054	ELC SRV TY A 240/480 060(SS)SS(E)SP(O)	EA												
	644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA			1.000		1.000		4.000		1.000		3.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA									1.000			
	644-6039	IN SM RD SN SUP&AM TYS80(1)SB(P)	EA											1.000	
	644-6061	IN SM RD SN SUP&AM TYTWT(1)WS(T)	EA			2.000		2.000		8.000		1.000		4.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA			2.000		2.000		8.000		3.000		6.000	
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF			22.000		22.000		76.000		77.000		74.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA			1.000				4.000				4.000	
	668-6080	PREFAB PAV MRK TY C (W) (UTURN ARROW)	EA											1.000	
	668-6083	PREFAB PAV MRK TY C (W) (LNDP ARROW)	EA											2.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA			1.000				4.000				4.000	
	668-6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	EA											7.000	
	680-6004	REMOVING TRAFFIC SIGNALS	EA			1.000		1.000		1.000		1.000		2.000	
	6156-6002	LED HI MST IL ASM (6 FIXT)(ASYM)(TY A)	EA												
	6185-6002	TMA (STATIONARY)	DAY	15.000		15.000		15.000		15.000		15.000		25.000	
	01	STATE FORCE ACCOUNT WORK (NON-PARTICIPATING)	LS			1.000		1.000		1.000		1.000		1.000	
	12	RAILROAD FLAGGING: RAILROAD FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000											
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000											



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0062-07-103

DISTRICT Atlanta

COUNTY Harrison, Panola

HIGHWAY FM 959, SH 149, SH 154, SH 43, SL 390, US 59, US 80

CONTROL SECTION JOB				0062-07-103		0096-08-060		0096-10-027		0393-03-037		0394-01-069		0394-01-070	
PROJECT ID				A00184141		A00177370		A00177379		A00177222		A00177192		A00177603	
COUNTY				Harrison		Harrison		Harrison		Panola		Panola		Panola	
HIGHWAY				US 59		US 80		US 80		SH 149		FM 959		SH 149	
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000											



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0062-07-103

DISTRICT Atlanta
HIGHWAY FM 959, SH 149, SH 154, SH 43, SL 390, US 59, US 80

COUNTY Harrison, Panola

CONTROL SECTION JOB				0402-03-043		0569-04-024		1575-05-023		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00177238		A00184148		A00184142			
COUNTY				Harrison		Harrison		Harrison			
HIGHWAY				SH 154		SH 43		SL 390			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	416-6026	DRILL SHAFT (HIGH MAST POLE) (60 IN)	LF					50.000		50.000	
	416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	60.000		40.000		90.000		480.000	
	432-6006	RIPRAP (CONC)(CL B)	CY	3.000		2.000		10.000		31.000	
	500-6001	MOBILIZATION	LS							1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		1.000		1.000		11.000	
	610-6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA							3.000	
	610-6288	IN RD IL (TY SA) 50T-10 (400W EQ) LED	EA	6.000		4.000		9.000		45.000	
	613-6005	HI MST IL POLE (150 FT)(80 MPH)	EA					2.000		2.000	
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	680.000		365.000		3,124.000		6,576.000	
	618-6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	426.000		334.000		529.000		4,082.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	1,170.000		754.000		3,798.000		11,111.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	2,458.000		1,508.000		7,814.000		22,694.000	
	624-6001	GROUND BOX TY A (122311)	EA					2.000		2.000	
	624-6002	GROUND BOX TY A (122311)W/APRON	EA	5.000		5.000		14.000		48.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA			1.000				2.000	
	628-6003	ELC SRV TY A 120/240 060(NS)AL(E)PS(U)	EA							1.000	
	628-6004	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	EA	1.000		1.000				8.000	
	628-6054	ELC SRV TY A 240/480 060(SS)SS(E)SP(O)	EA					2.000		2.000	
	644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA	2.000						12.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA							1.000	
	644-6039	IN SM RD SN SUP&AM TYS80(1)SB(P)	EA							1.000	
	644-6061	IN SM RD SN SUP&AM TYTWT(1)WS(T)	EA	4.000						21.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	4.000						25.000	
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	35.000						306.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA							9.000	
	668-6080	PREFAB PAV MRK TY C (W) (UTURN ARROW)	EA							1.000	
	668-6083	PREFAB PAV MRK TY C (W) (LNDP ARROW)	EA							2.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA							9.000	
	668-6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	EA							7.000	
	680-6004	REMOVING TRAFFIC SIGNALS	EA	1.000						7.000	
	6156-6002	LED HI MST IL ASM (6 FIXT)(ASYM)(TY A)	EA					2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	15.000		15.000		25.000		155.000	
	01	STATE FORCE ACCOUNT WORK (NON-PARTICIPATING)	LS	1.000						6.000	
	12	RAILROAD FLAGGING: RAILROAD FORCE ACCOUNT WORK (PARTICIPATING)	LS							1.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS							1.000	



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0062-07-103

DISTRICT Atlanta

COUNTY Harrison, Panola

HIGHWAY FM 959, SH 149, SH 154, SH 43, SL 390, US 59, US 80

CONTROL SECTION JOB				0402-03-043		0569-04-024		1575-05-023		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00177238		A00184148		A00184142			
COUNTY				Harrison		Harrison		Harrison			
HIGHWAY				SH 154		SH 43		SL 390			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS							1.000	

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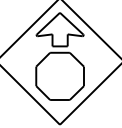
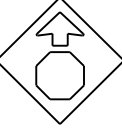


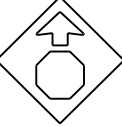
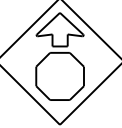
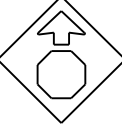
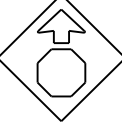
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0416	6026	DRILL SHAFT (HIGH MAST POLE) (60 IN)	LF									50
0416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	60	50	50	30	30	70	60	40	90
0432	6006	RIPRAP (CONC) (CL B)	CY	3	3	3	2	2	3	3	2	10
0610	6216	IN RD IL (TY SA) 40T-10(250W EQ)LED	EA				3					
0610	6288	IN RD IL (TY SA) 50T-10(400W EQ)LED	EA	6	5	5		3	7	6	4	9
0613	6005	HI MST IL POLE (150FT)(80MPH)	EA									2
0618	6023	CONDT (PVC)(SCH 40)(2")	LF	627	492	339	249	240	460	680	365	3124
0618	6024	CONDT (PVC)(SCH 40)(2")(BORE)	LF	741	424	605	113	257	653	426	334	529
0620	6009	ELEC CONDUCTOR (NO 6) BARE	LF	1418	966	894	371	542	1198	1170	754	3798
0620	6010	ELEC CONDUCTOR (NO 6) INSULATED	LF	2894	1932	1788	820	1084	2396	2458	1508	7814
0624	6001	GROUND BOX TY A (122311)	EA									2
0624	6002	GROUND BOX TY A (122311)W/APRON	EA	3	4	3	2	5	7	5	5	14
0624	6010	GROUND BOX TY D (162922)W/APRON	EA						1		1	
0628	6003	ELC SRV TY A 120/240 060 (NS)AL(E) PS(U)	EA				1					
0628	6004	ELC SRV TY A 120/240 060 (NS)AL(E) SP(O)	EA	1	1	1		1	2	1	1	
0628	6054	ELC SRV TY A 240/480 060 (SS)SS(E) SP(O)	EA									2
0644	6027	IN SM RD SN SUP&AM TY S80(1)SA(P)	EA		1	1	4	1	3	2		
0644	6030	IN SM RD SN SUP&AM TY S80(1)SA(T)	EA					1				
0644	6039	IN SM RD SN SUP&AM TY S80(1)SB(P)	EA						1			
0644	6061	IN SM RD SN SUP&AM TY TWT(1)WS(T)	EA		2	2	8	1	4	4		
0644	6076	REMOVE SM RD SN SUP&AM	EA		2	2	8	3	6	4		
0668	6076	PREFAB PAV MRK TY C (W)(24")(SLD)	LF		22	22	76	77	74	35		
0668	6077	PREFAB PAV MRK TY C (W)(ARROW)	EA		1		4		4			
0668	6080	PREFAB PAV MRK TY C (W)(UTURN ARROW)	EA						1			
0668	6083	PREFAB PAV MRK TY C (W)(LNDP ARROW)	EA						2			
0668	6085	PREFAB PAV MRK TY C (W)(WORD)	EA		1		4		4			
0668	6092	PREFAB PAV MRK TY C (W)(36")(YLD TRI)	EA						7			
0680	6004	REMOVING TRAFFIC SIGNALS	EA		1	1	1	1	2	1		
6156	6002	LED HI MST IL ASM(6 FIXT)(ASYM)(TY A)	EA									2
6185	6002	TMA (STATIONARY)	DAY	15	15	15	15	15	25	15	15	25
*		LED RINGS	EA		1	1	4	1	2	2		
*		PROVIDED BY TXDOT; INSTALLED BY TXDOT										

PROJECT SUMMARY



FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				7
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
										PREFABRICATED		1EXT or 2EXT = # of Ext
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"	BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TY = TYPE TY N TY S
44	1	R1-1		48"X48"	✓		S80	1	SA	P	3 BM	
		W4-4P		36"X18"	✓							
44	2	W3-1		36"X36"	✓		TWT	1	WS	T		
44	3	W3-1		36"X36"	✓		TWT	1	WS	T		
48	4	R1-1		48"X48"	✓		S80	1	SA	P	3 BM	
		W4-4P		36"X18"	✓							
48	5	W3-1		36"X36"	✓		TWT	1	WS	T		
48	6	W3-1		36"X36"	✓		TWT	1	WS	T		
52	7	W3-1		36"X36"	✓		TWT	1	WS	T		
52	8	W3-1		36"X36"	✓		TWT	1	WS	T		

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/>

- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
 - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

SHEET 1 OF 5




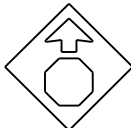
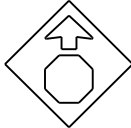

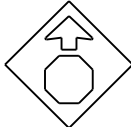
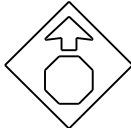

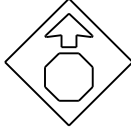
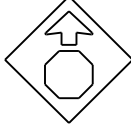
SUMMARY OF SMALL SIGNS

SOSS

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© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0062	07	103	US 59
4-16	DIST	COUNTY	SHEET NO.	
8-16	ATL	HARRISON	8	

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	PREFABRICATED P = "Plain" T = "T" U = "U"		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
52	9	R1-1 R1-3P		48"X48" 30"X12"	✓ ✓		S80	1	SA	P	3 BM	TY = TYPE TY N TY S
52	10	W3-1		36"X36"	✓		TWT	1	WS	T		
52	11	W3-1		36"X36"	✓		TWT	1	WS	T		
52	12	R1-1 R1-3P		48"X48" 30"X12"	✓ ✓		S80	1	SA	P	3 BM	
52	13	W3-1		36"X36"	✓		TWT	1	WS	T		
52	14	W3-1		36"X36"	✓		TWT	1	WS	T		
52	15	R1-1 R1-3P		48"X48" 30"X12"	✓ ✓		S80	1	SA	P	3 BM	
52	16	W3-1		36"X36"	✓		TWT	1	WS	T		
52	17	W3-1		36"X36"	✓		TWT	1	WS	T		

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/>

- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
 - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

SHEET 2 OF 5



SUMMARY OF SMALL SIGNS

SOSS

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REVISIONS	0062	07	103	US 59
4-16	DIST	COUNTY	SHEET NO.	
8-16	ATL	HARRISON	9	

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SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	PREFABRICATED P = "Plain" T = "T" U = "U"		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
52	18	R1-1		48"X48"	✓		S80	1	SA	P	3 BM	
		R1-3P		30"X12"	✓							
56	19	W3-1		36"X36"	✓		TWT	1	WS	T		
56	20	R1-1		48"X48"	✓		S80	1	SA	P	3 BM	
		W4-4P		36"X18"	✓							
56	21	R1-1		48"X48"	✓		S80	1	SA	T		
		W4-4P		36"X18"	✓							
62	22	W3-1		36"X36"	✓		TWT	1	WS	T		
62	23	W3-1		36"X36"	✓		TWT	1	WS	T		
62	24A	R5-1		30"X30"	✓		S80	1	SA	P	3 BM	
	24B	R1-1		48"X48"	✓							
		W4-4P		36"X18"	✓							

MOUNTED BACK TO BACK
SINGLE SIGN
MOUNT.

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.
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- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
 - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

SHEET 3 OF 5



SUMMARY OF SMALL SIGNS

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REVISIONS	0062	07	103	US 59
4-16	DIST	COUNTY	SHEET NO.	
8-16	ATL	HARRISON	10	

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SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	PREFABRICATED P = "Plain" T = "T" U = "U"		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
62	25A	R5-1		30"X30"	✓		S80	1	SA	P	3 BM	
	25B	R1-1		48"X48"	✓							
		W4-4P		36"X18"	✓							
63	26	W3-1		36"X36"	✓		TWT	1	WS	T		
63	27	W3-1		36"X36"	✓		TWT	1	WS	T		
63	28A	R5-1		30"X30"	✓		S80	1	SB	P	3 BM	
	28B	R1-1		48"X48"	✓							
		W4-4P		36"X18"	✓							
63	29A	R5-1		30"X30"	✓		S80	1	SA	P	3 BM	
	29B	R1-1		48"X48"	✓							
		W4-4P		36"X18"	✓							
68	30	W3-1		36"X36"	✓		TWT	1	WS	T		

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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.
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- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
 - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

SHEET 4 OF 5

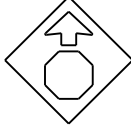




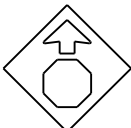
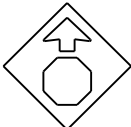


SUMMARY OF SMALL SIGNS

SOSS

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4-16	DIST	COUNTY	SHEET NO.	
8-16	ATL	HARRISON	11	

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
										PREFABRICATED		1EXT or 2EXT = # of Ext
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"	BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TY = TYPE TY N TY S
68	31	W3-1		36"X36"	✓		TWT	1	WS	T		
68	32	R1-1		48"X48"	✓		S80	1	SA	P	3 BM	
		W4-4P		36"X18"	✓							
68	33	R1-1		48"X48"	✓		S80	1	SA	P	3 BM	
		W4-4P		36"X18"	✓							
68	34	W3-1		36"X36"	✓		TWT	1	WS	T		
68	35	W3-1		36"X36"	✓		TWT	1	WS	T		

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/>

- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
 - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

SHEET 5 OF 5



SUMMARY OF SMALL SIGNS

SOSS

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4-16	DIST	COUNTY	SHEET NO.	
8-16	ATL	HARRISON	12	

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

- 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).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- 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:

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

SHEET 1 OF 12



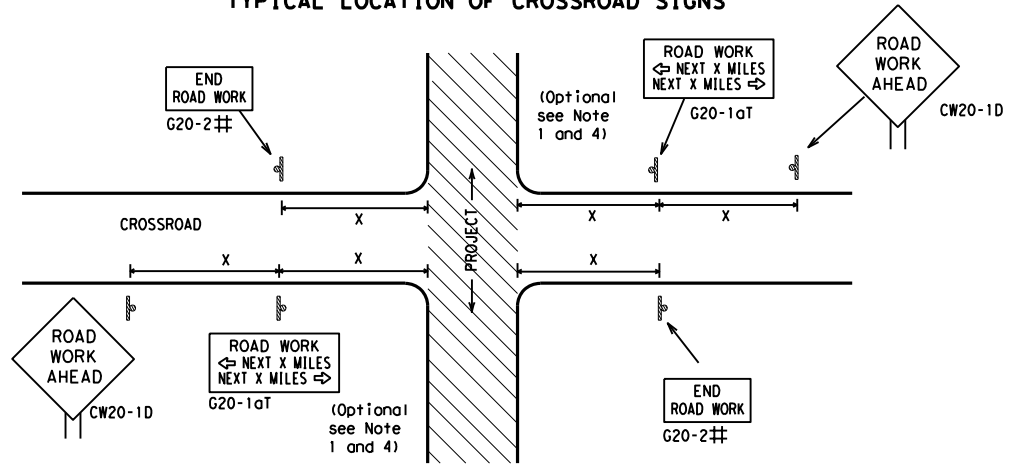
**BARRICADE AND CONSTRUCTION
GENERAL NOTES
AND REQUIREMENTS**

BC (1) -21

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
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4-03	7-13	0062	07	103	US 59				
9-07	8-14	DIST	COUNTY	SHEET NO.					
5-10	5-21	ATL	HARRISON	13					

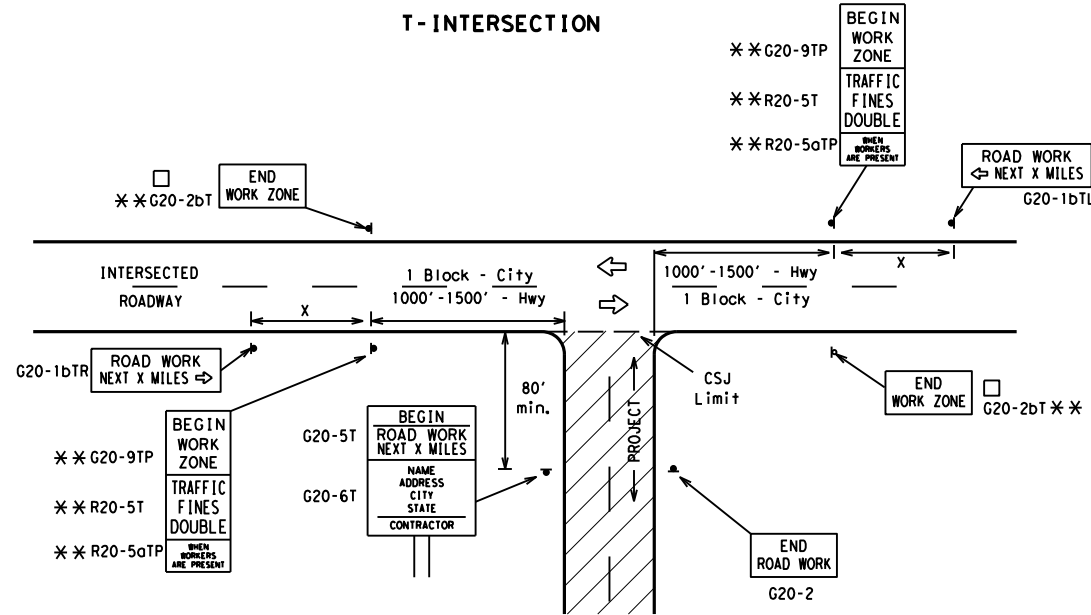
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TYPICAL LOCATION OF CROSSROAD SIGNS



- ## 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}

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 ⁴	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500 ²
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 ²
			65	700 ²
			70	800 ²
			75	900 ²
			80	1000 ²
			*	* ³

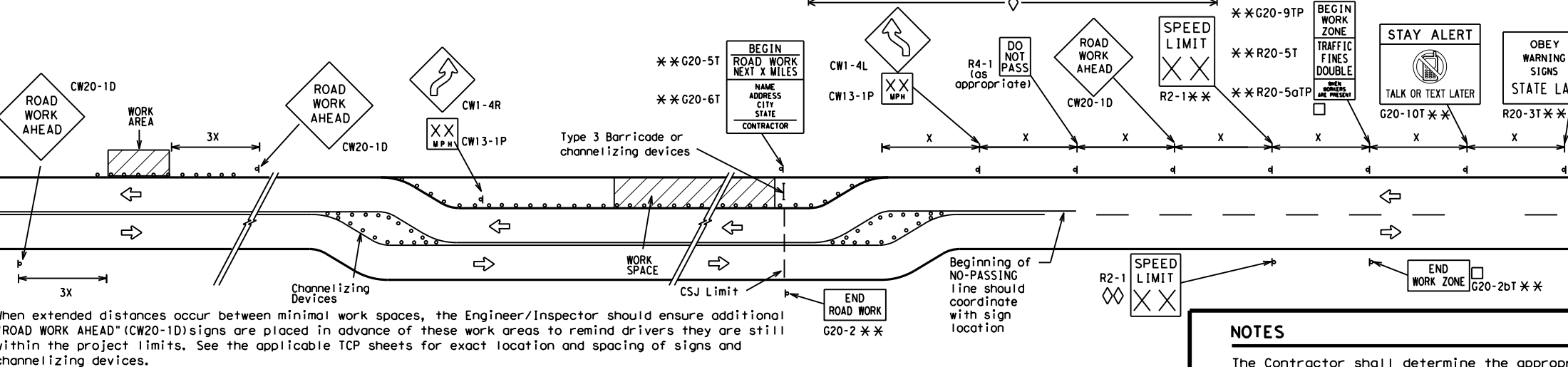
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

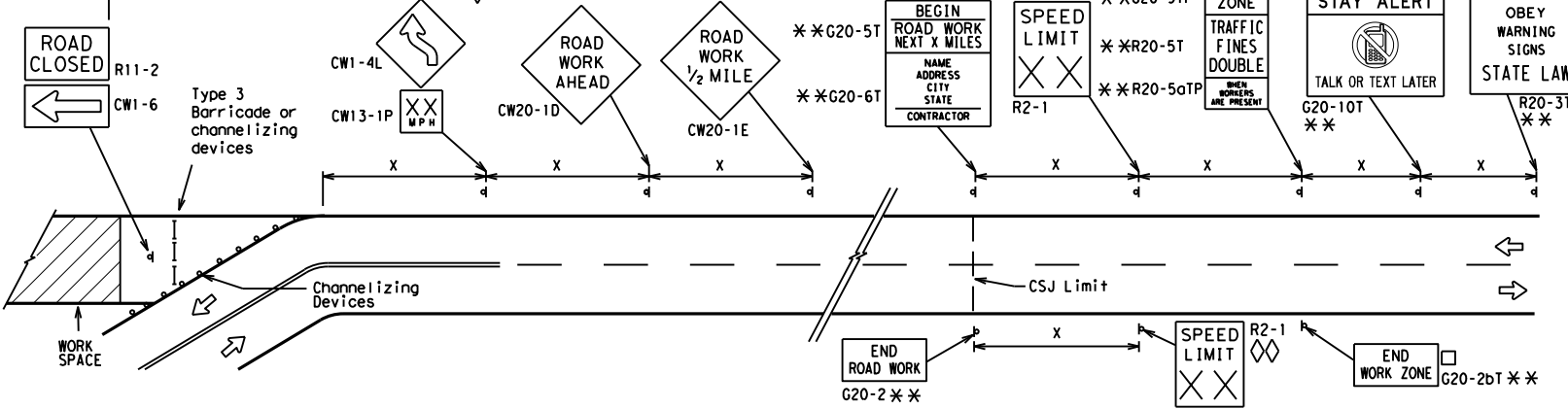
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

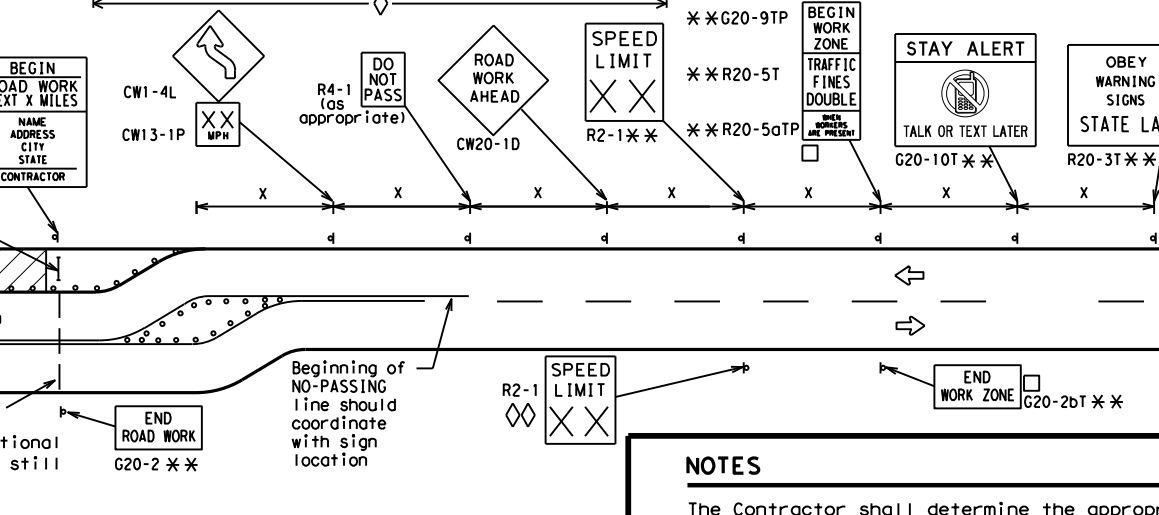


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

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

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

SHEET 2 OF 12

Texas Department of Transportation
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

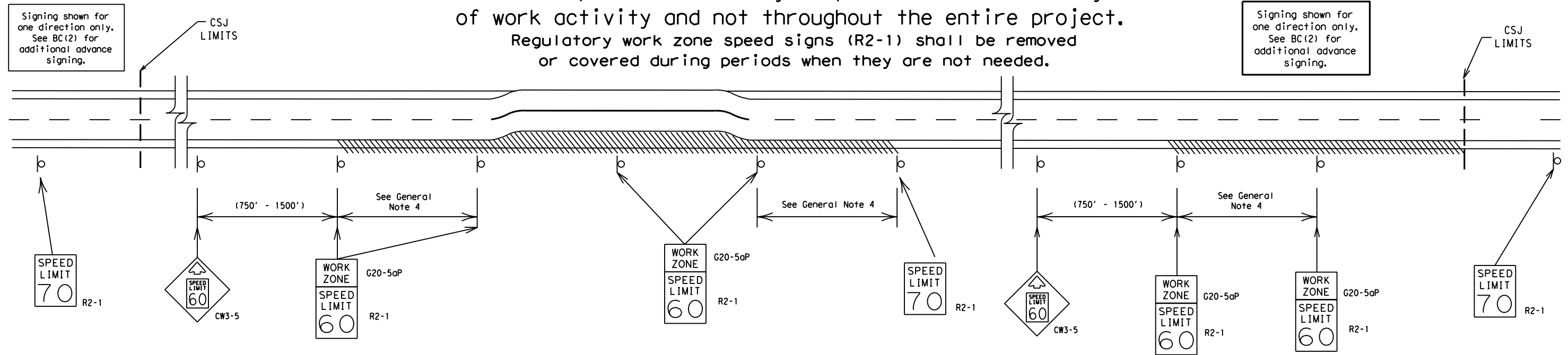
BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0062	07	103	US 59
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	ATL	HARRISON	14	

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:

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

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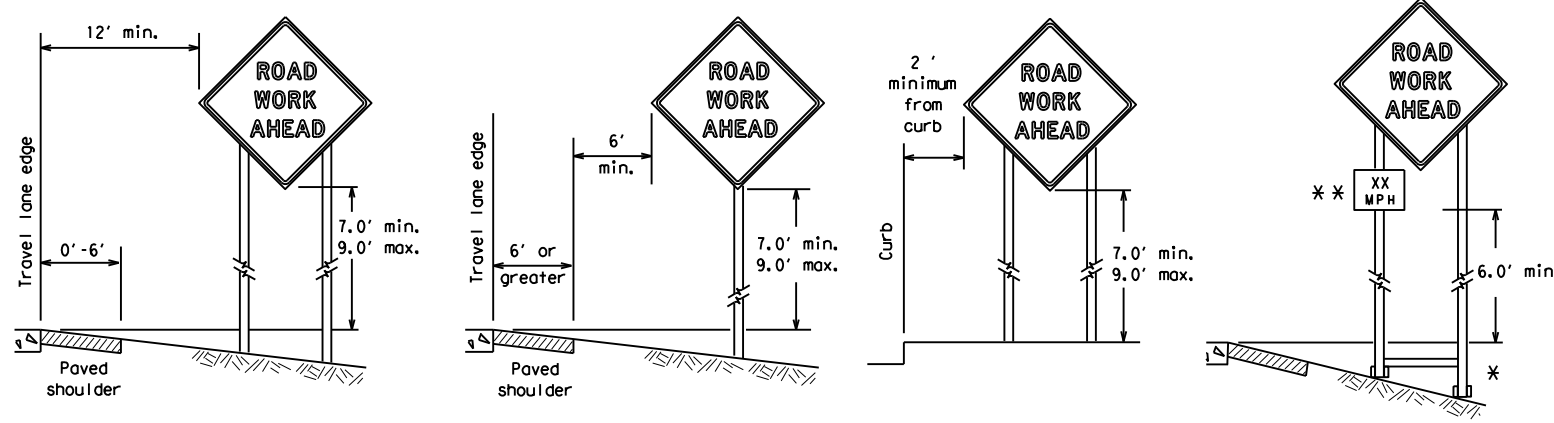
SHEET 3 OF 12

		Traffic Safety Division Standard	
<h2>BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT</h2>			
<h3>BC (3) - 21</h3>			
FILE:	bc-21.dgn	DW:	TxDOT
© TxDOT	November 2002	CONT SECT	JOB
REVISIONS	0062 07	103	US 59
9-07 8-14		DIST	COUNTY
7-13 5-21		ATL	HARRISON
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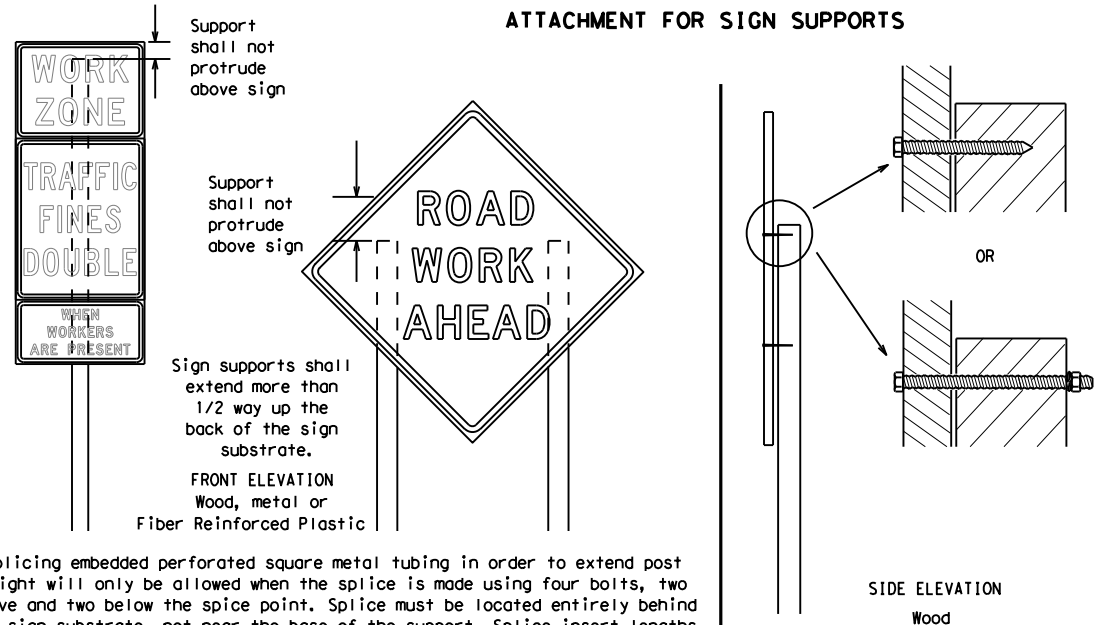
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* 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

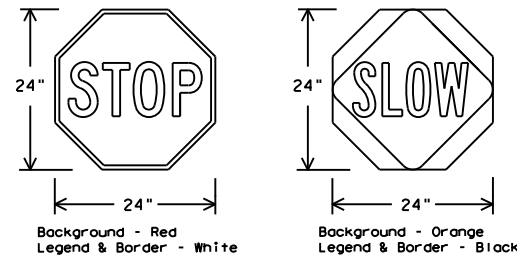


Nails shall NOT be allowed.
 Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

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

STOP/SLOW PADDLES

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



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B _{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.

SHEET 4 OF 12



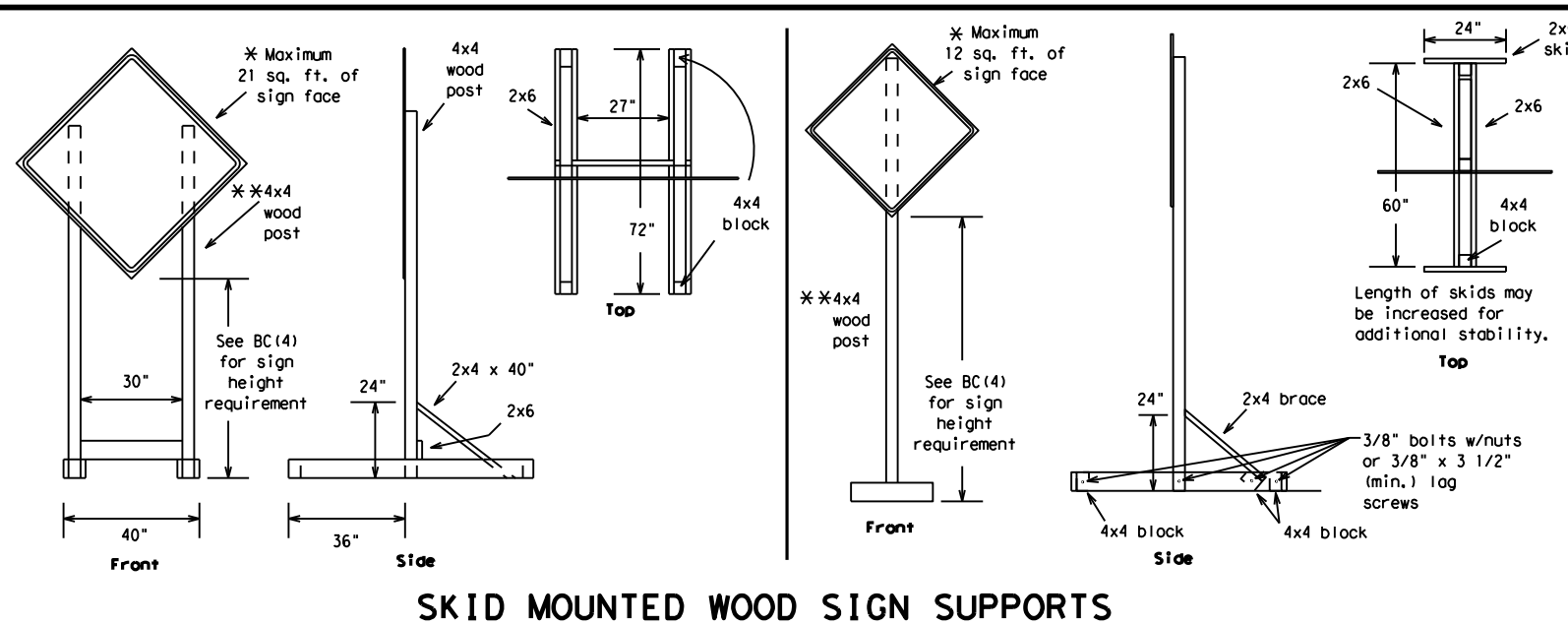
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

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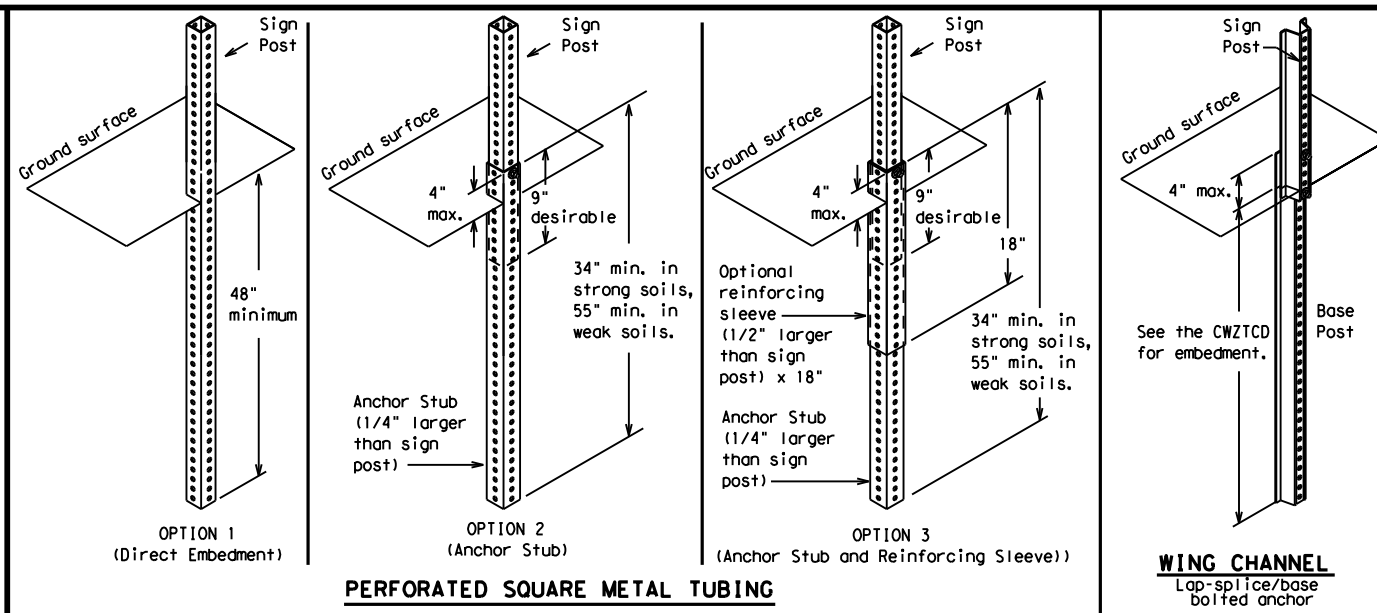
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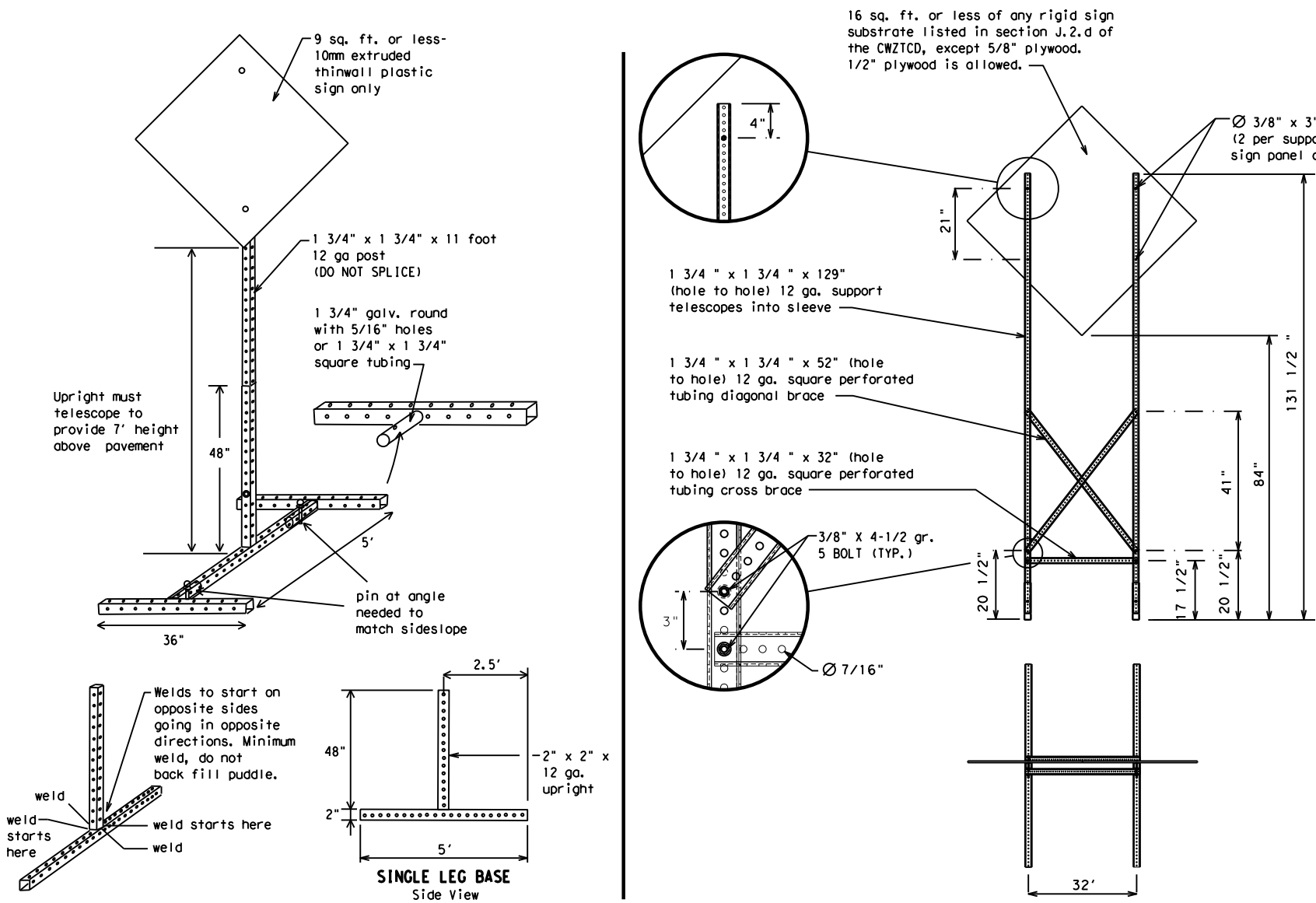
SKID MOUNTED WOOD SIGN SUPPORTS

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



GROUND MOUNTED SIGN SUPPORTS

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



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

- 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.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

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

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

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9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	ATL	HARRISON	17	

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

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

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



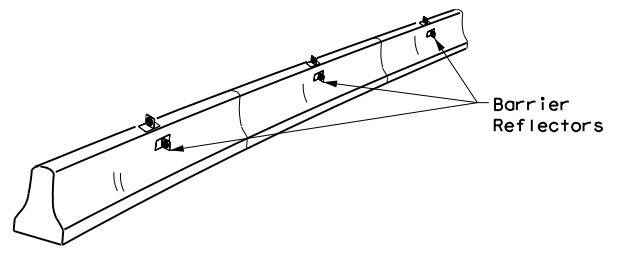
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC (6) - 21

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7-13	5-21	ATL	HARRISON	18					

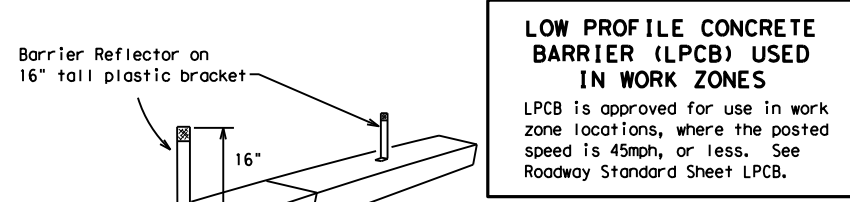
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



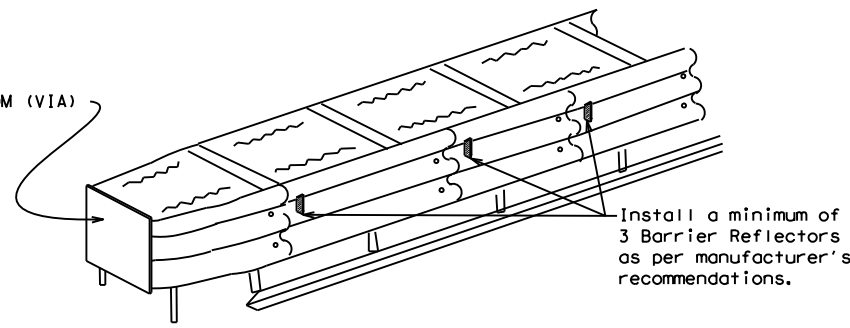
CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES
 LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

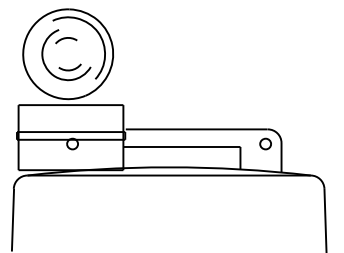
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

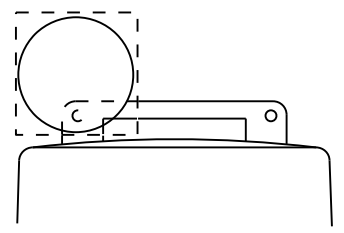
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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

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

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



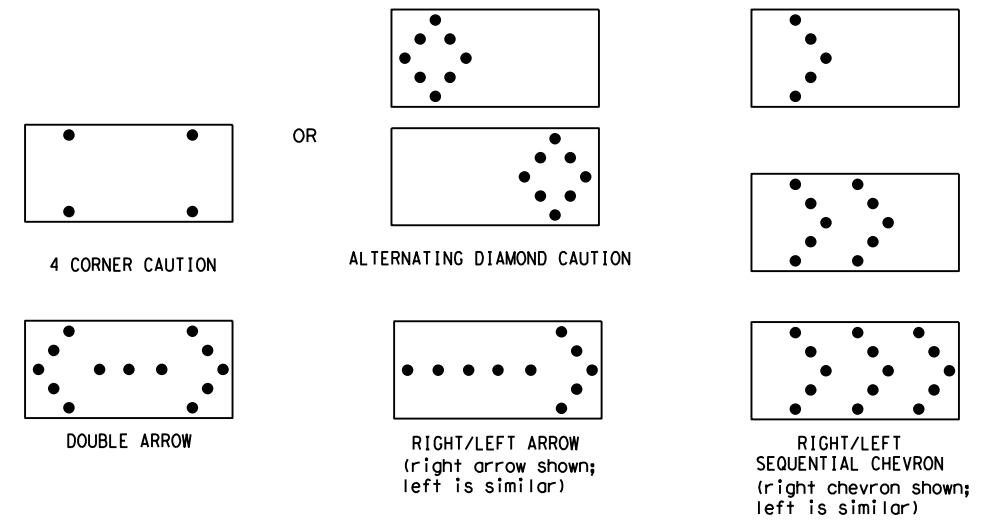
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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

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

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



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

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

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

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

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

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



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

BC (7) -21

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© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0062	07	103	US 59				
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	ATL	HARRISON	19					

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

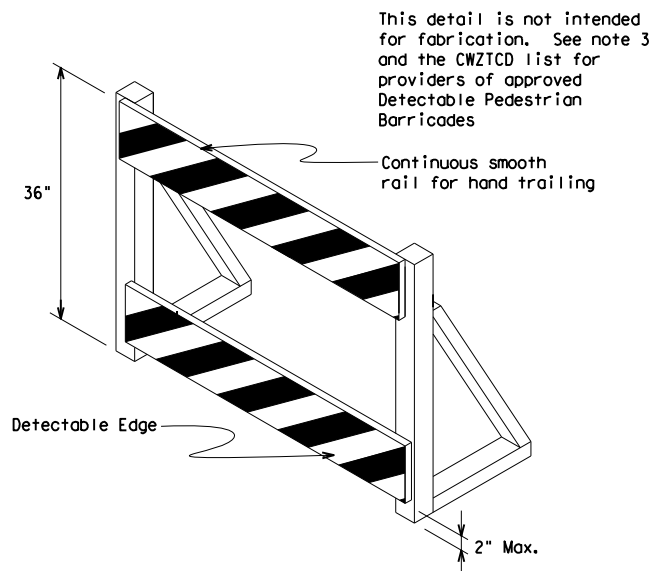
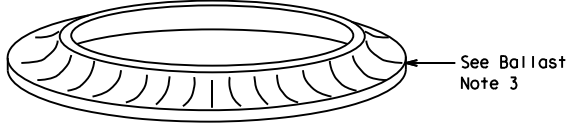
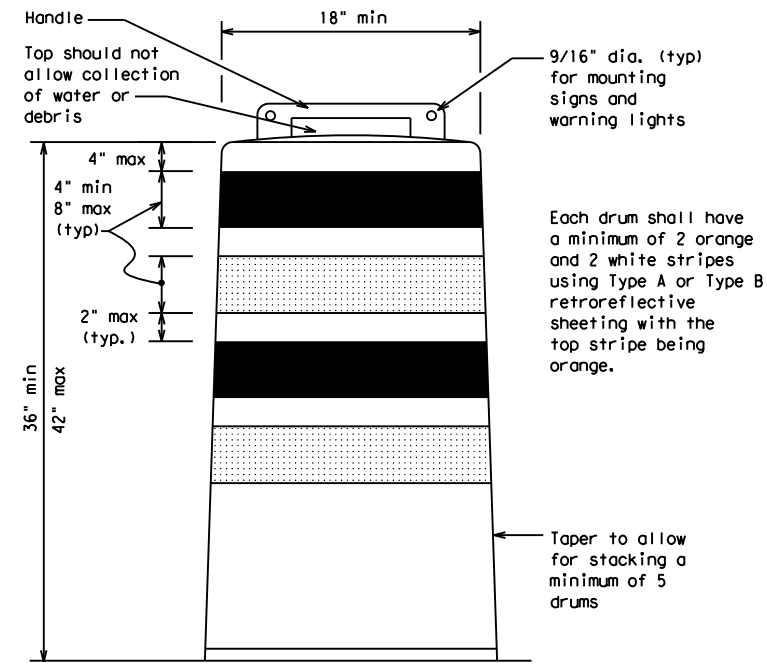
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

RETROREFLECTIVE SHEETING

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

BALLAST

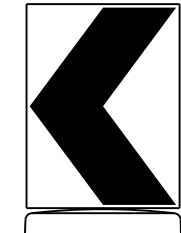
- Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other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



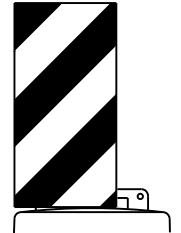
This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades

DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

SHEET 8 OF 12



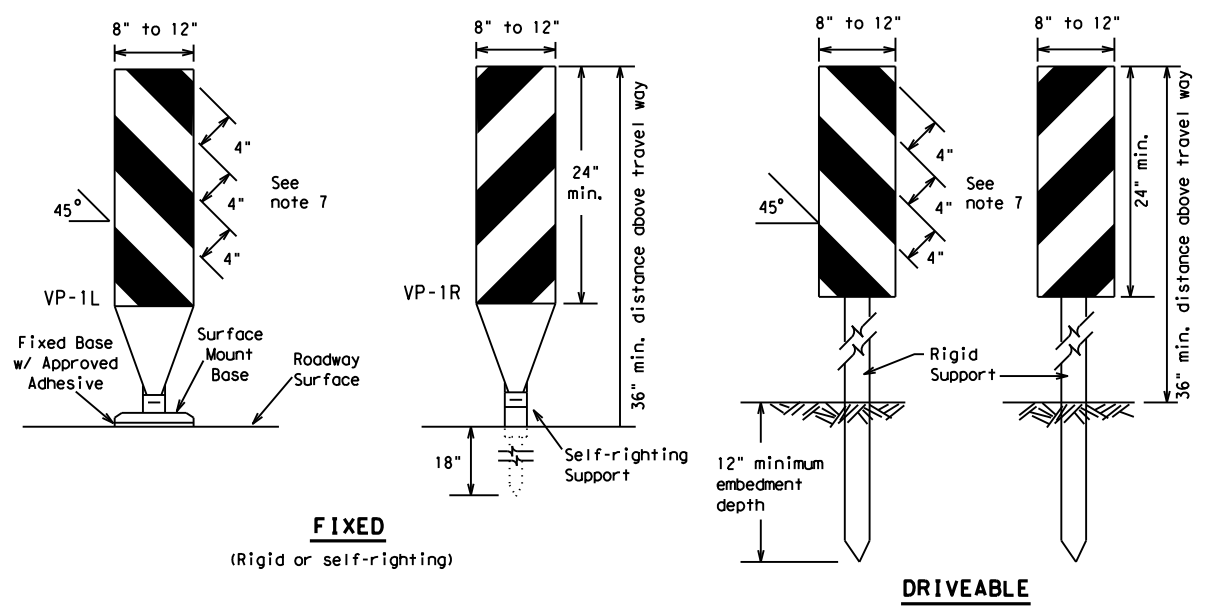
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 21

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© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
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4-03	8-14	DIST	COUNTY	SHEET NO.					
9-07	5-21	ATL	HARRISON	20					
7-13									

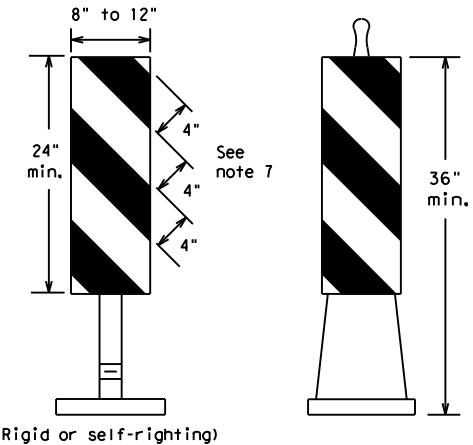
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FIXED
(Rigid or self-righting)

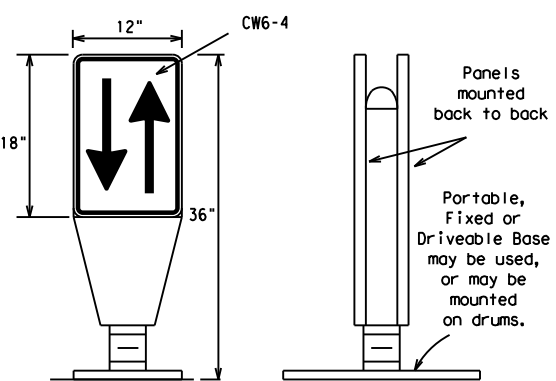
DRIVEABLE



PORTABLE

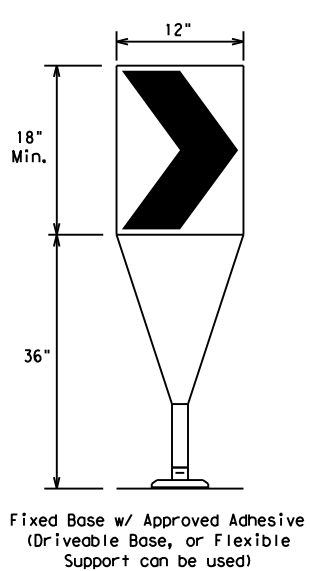
VERTICAL PANELS (VPs)

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



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

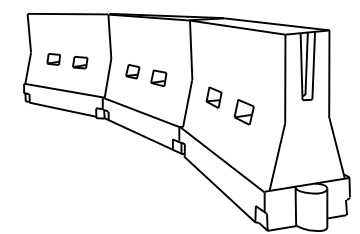
- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base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

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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 21

FILE: bc-21.dgn	DN: TxDOT	CR: 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.



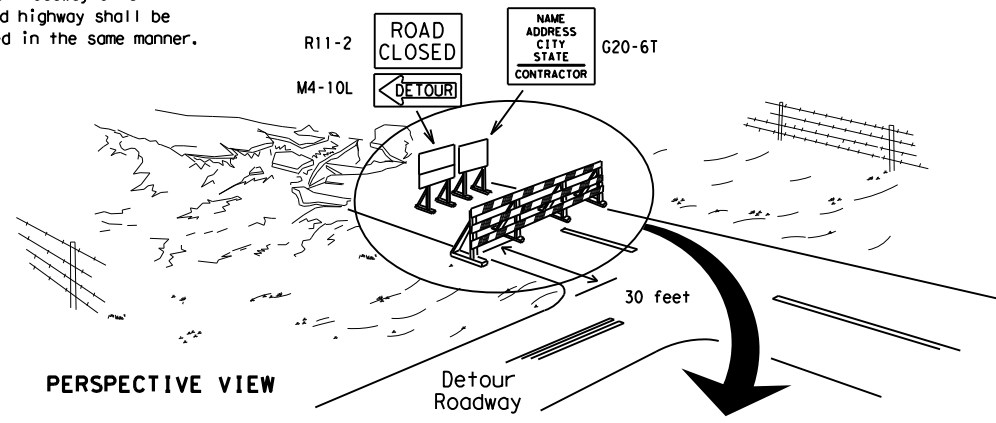
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

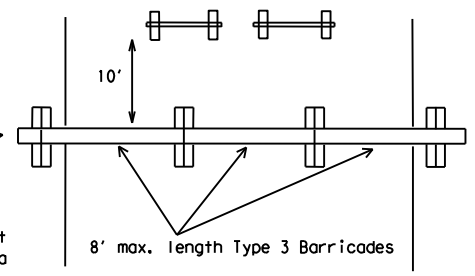
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

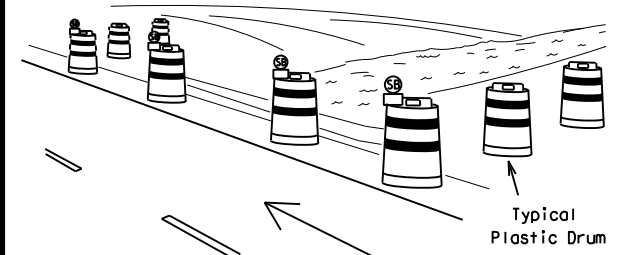
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



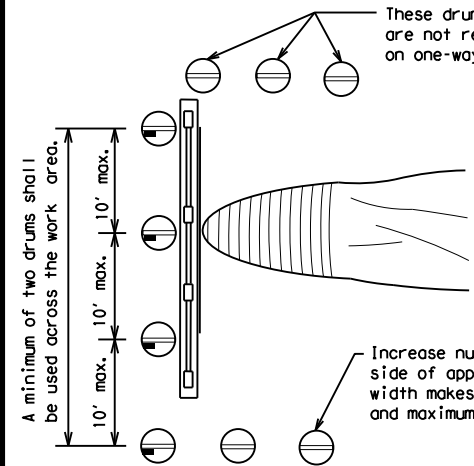
PLAN VIEW

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

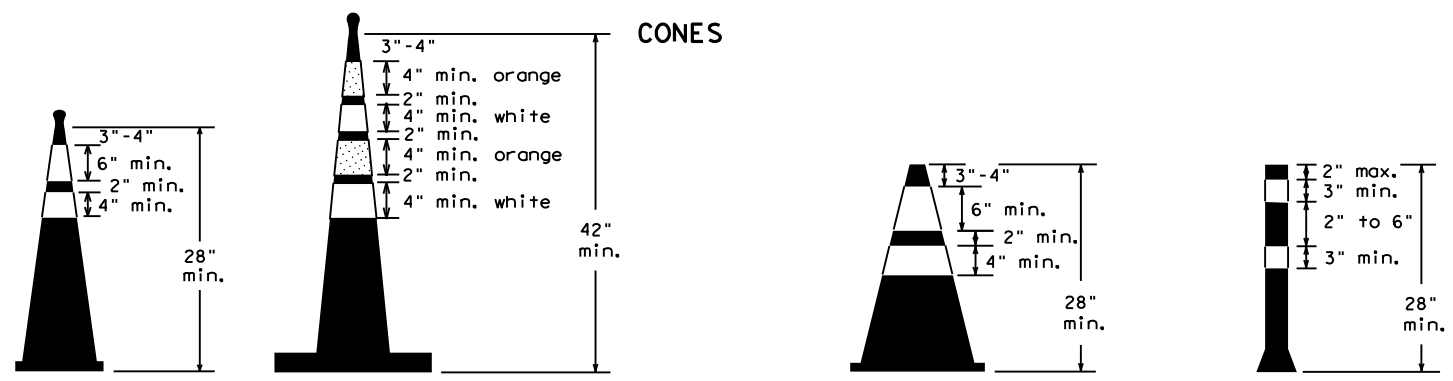


PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

1. Where positive redirection 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
	Steady burn warning light or yellow warning reflector



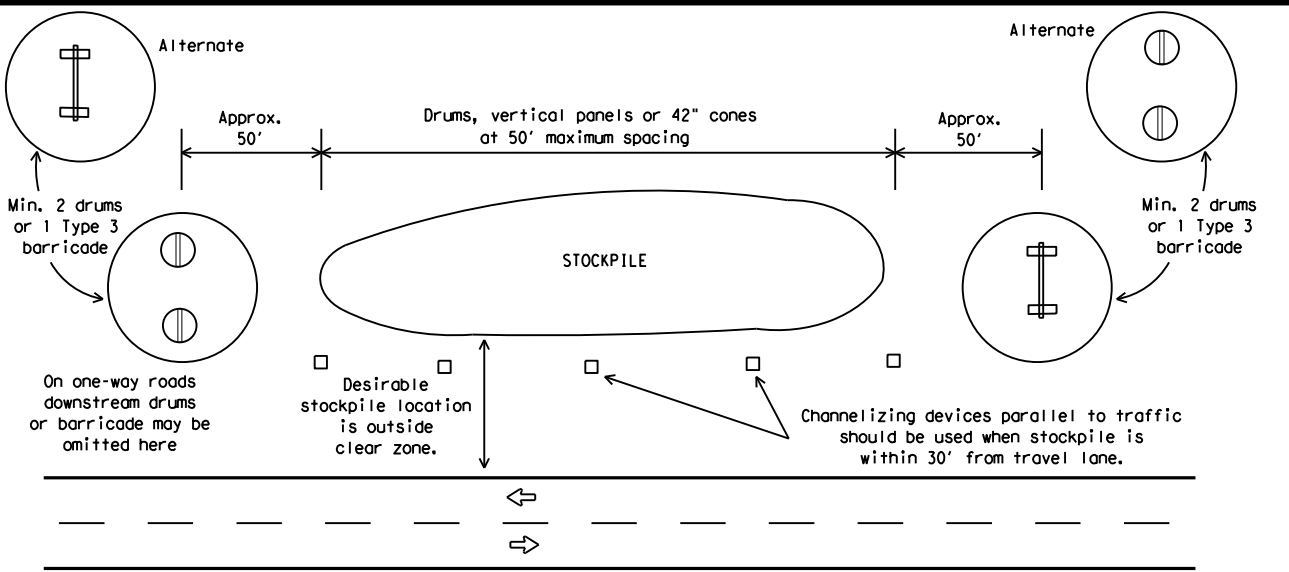
Two-Piece cones

One-Piece cones

Tubular Marker

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CR: TxDOT
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9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	ATL	HARRISON	22	

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

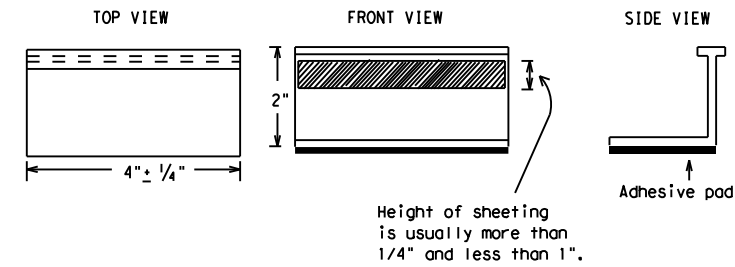
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

SHEET 11 OF 12



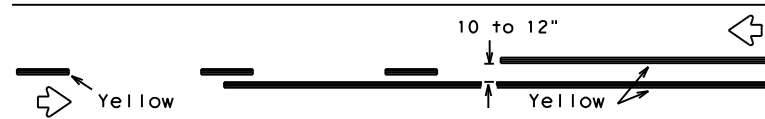
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

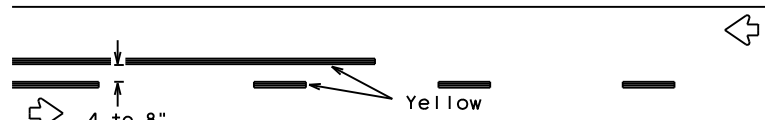
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© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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11-02 8-14				

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PAVEMENT MARKING PATTERNS

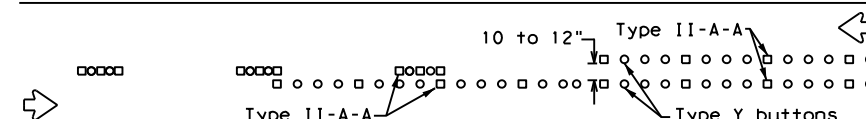


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

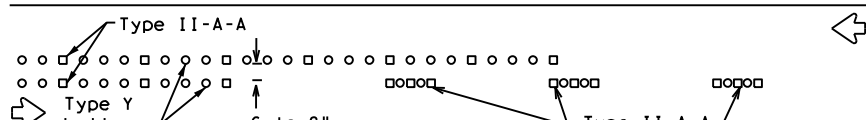


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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



RAISED PAVEMENT MARKERS - PATTERN A



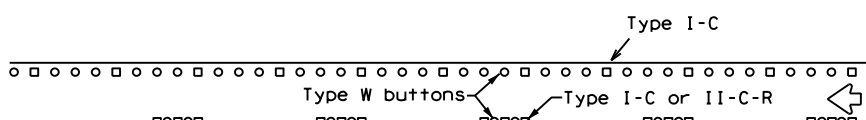
RAISED PAVEMENT MARKERS - PATTERN B

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



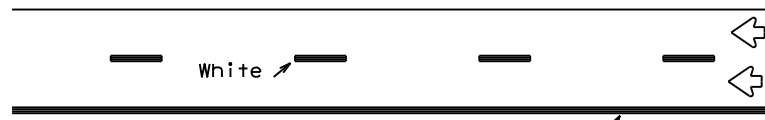
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



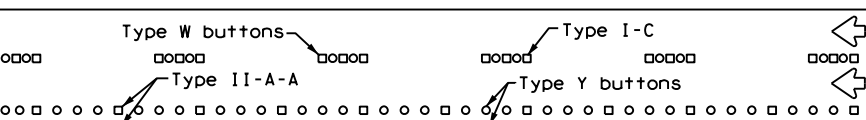
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



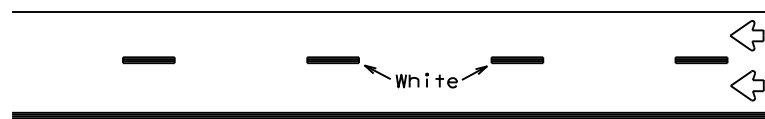
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



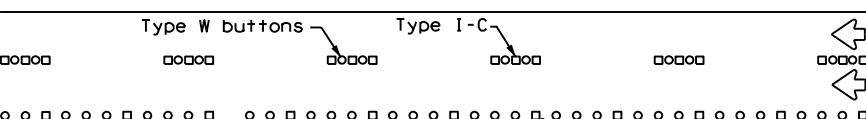
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

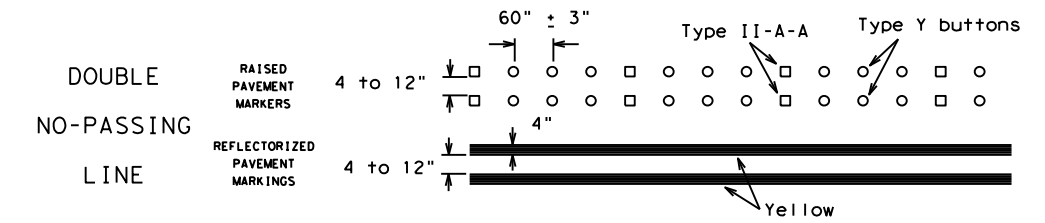
Prefabricated markings may be substituted for reflectORIZED pavement markings.



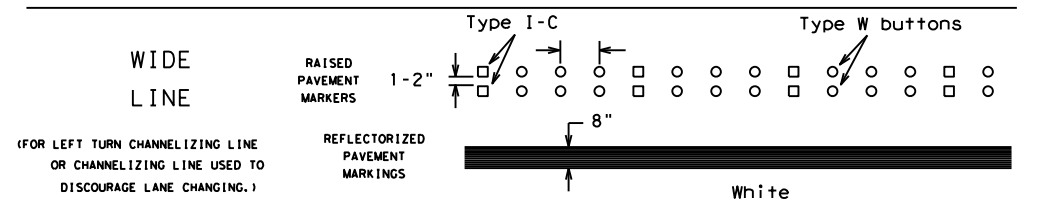
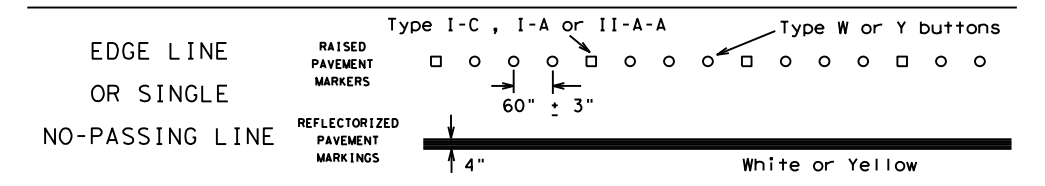
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

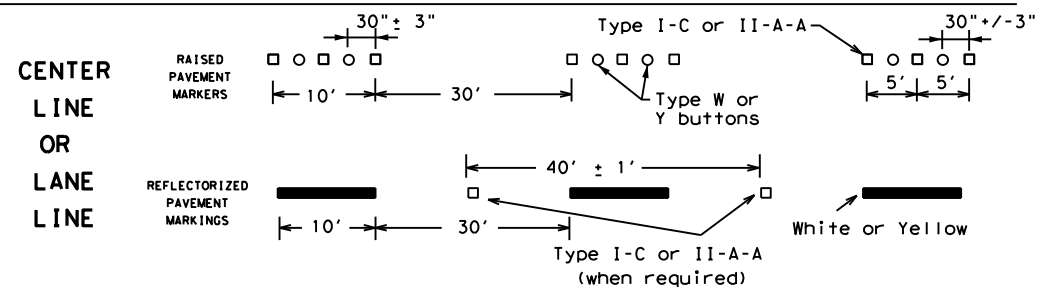
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



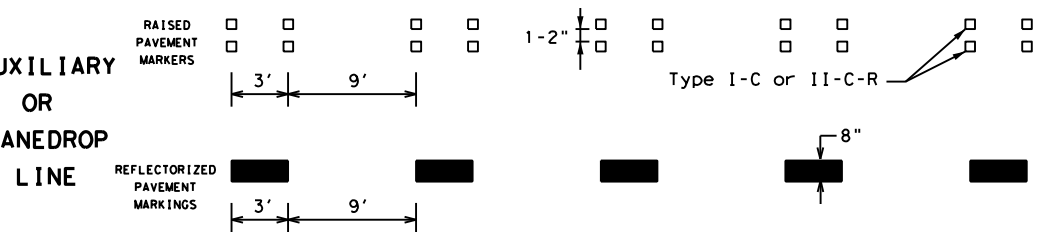
SOLID LINES



BROKEN LINES

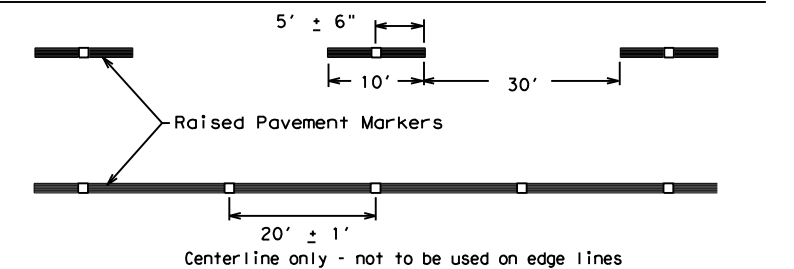


AUXILIARY OR LANEDROP LINE



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.



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

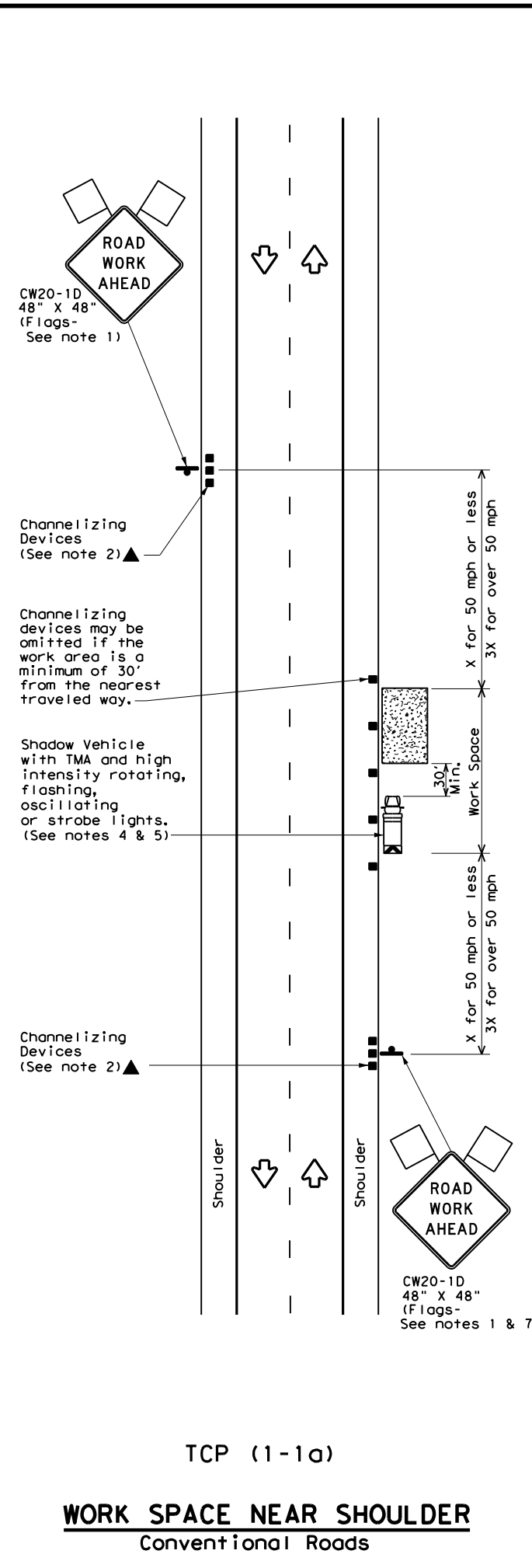
BC(12)-21

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

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2-98 7-13	ATL	HARRISON	24	
11-02 8-14				

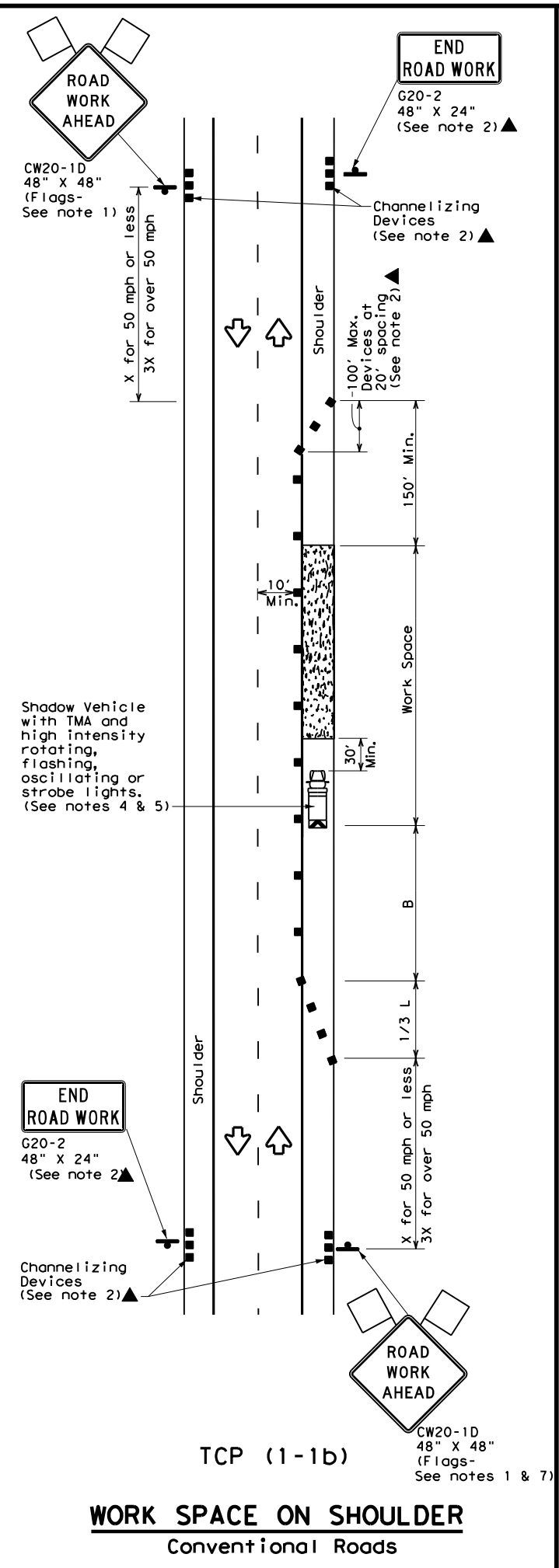
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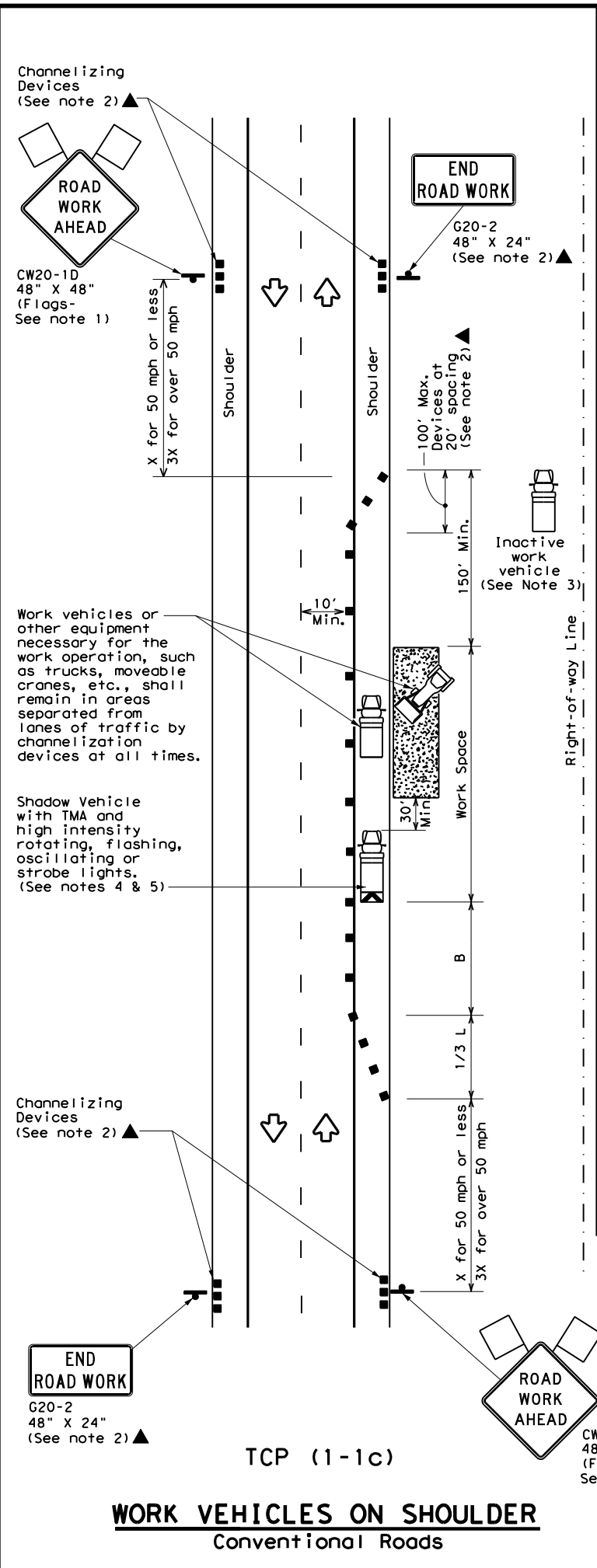
TCP (1-1a)

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

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

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

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

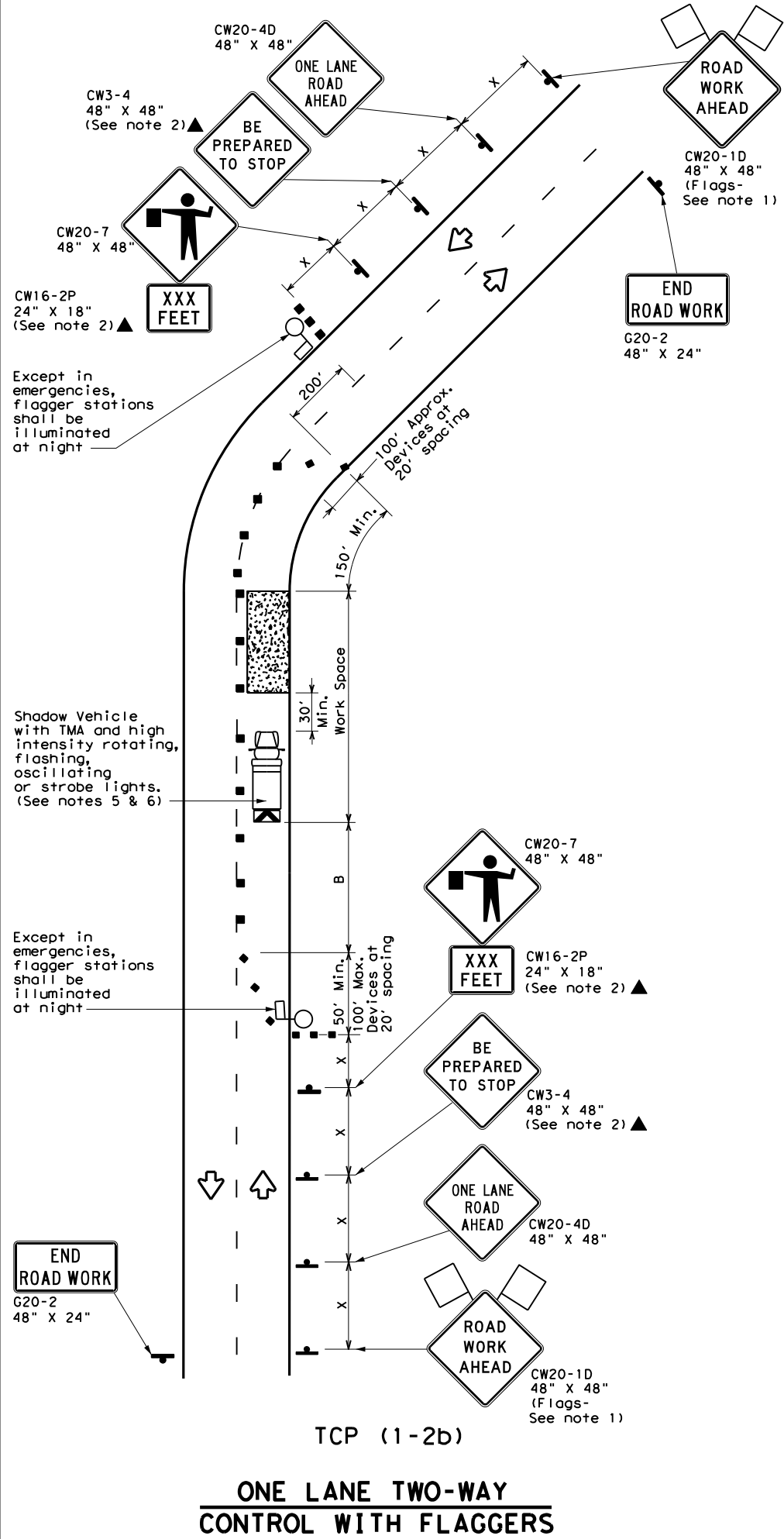
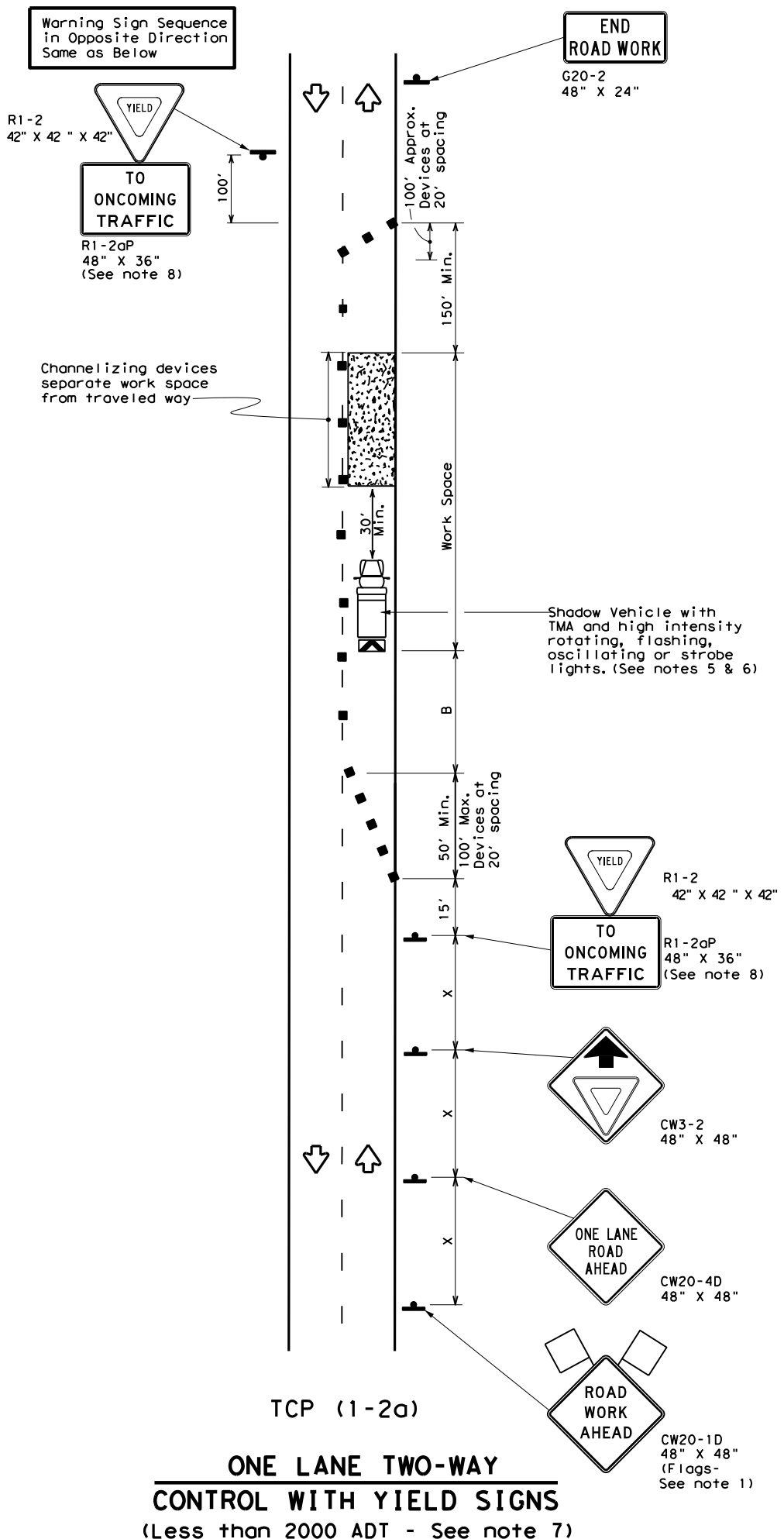
- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - Inactive work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

TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (1-1) - 18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
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REVISIONS	0062	07	103	US 59
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	ATL	HARRISON	25	
1-97 2-18				

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = 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

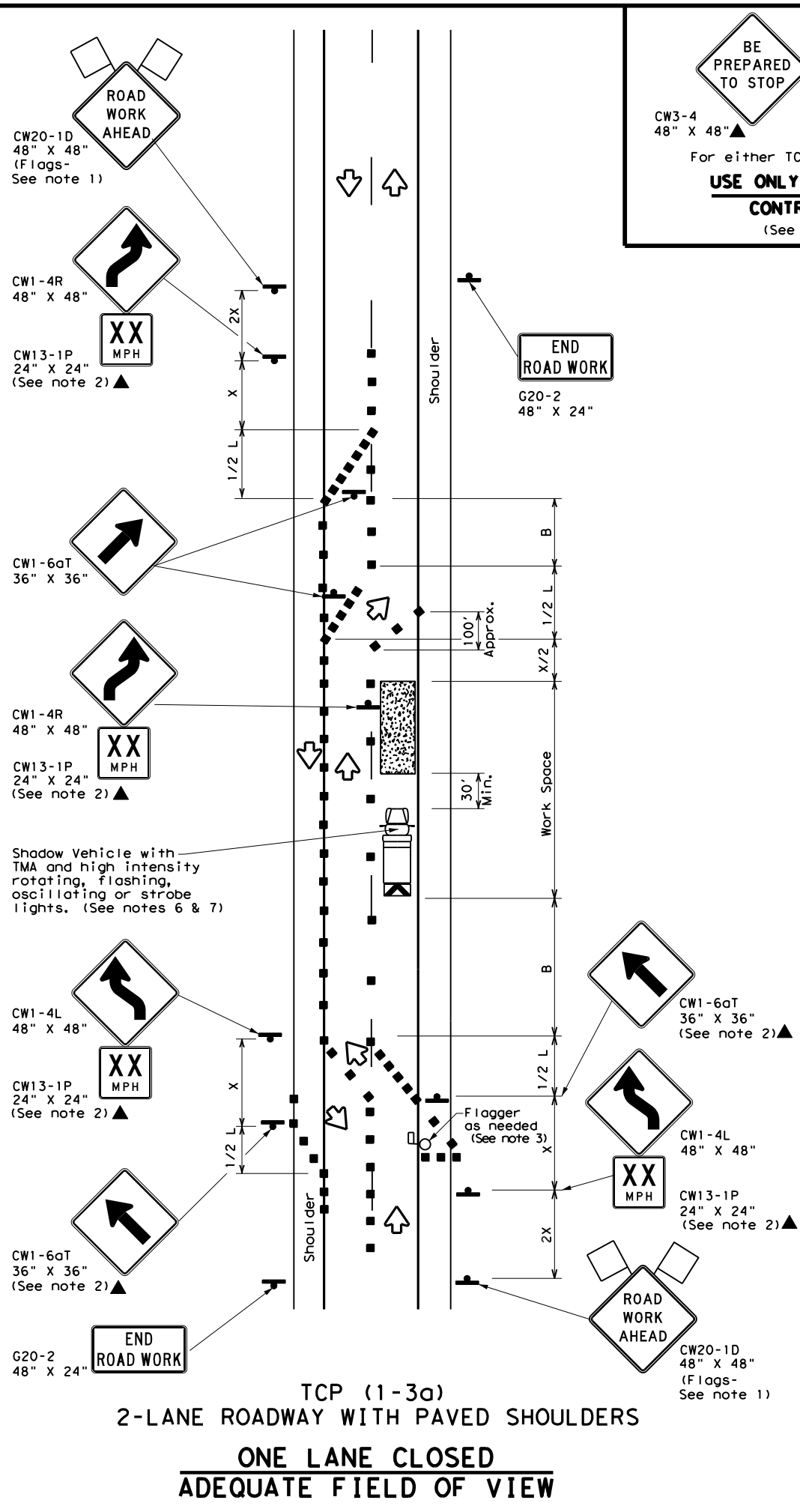
- Flags attached to signs where shown are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
 - 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.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
- TCP (1-2a)**
- 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.
 - 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)**
- Flaggers should use two-way radios or other methods of communication to control traffic.
 - Length of work space should be based on the ability of flaggers to communicate.
 - 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).
 - Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
 - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

		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:
© TxDOT December 1985	CON:	SECT:	JOB:
REVISIONS	0062	07	103
4-90 4-98			
2-94 2-12			
1-97 2-18			
	DIST:	COUNTY:	SHEET NO.:
	ATL	HARRISON	26

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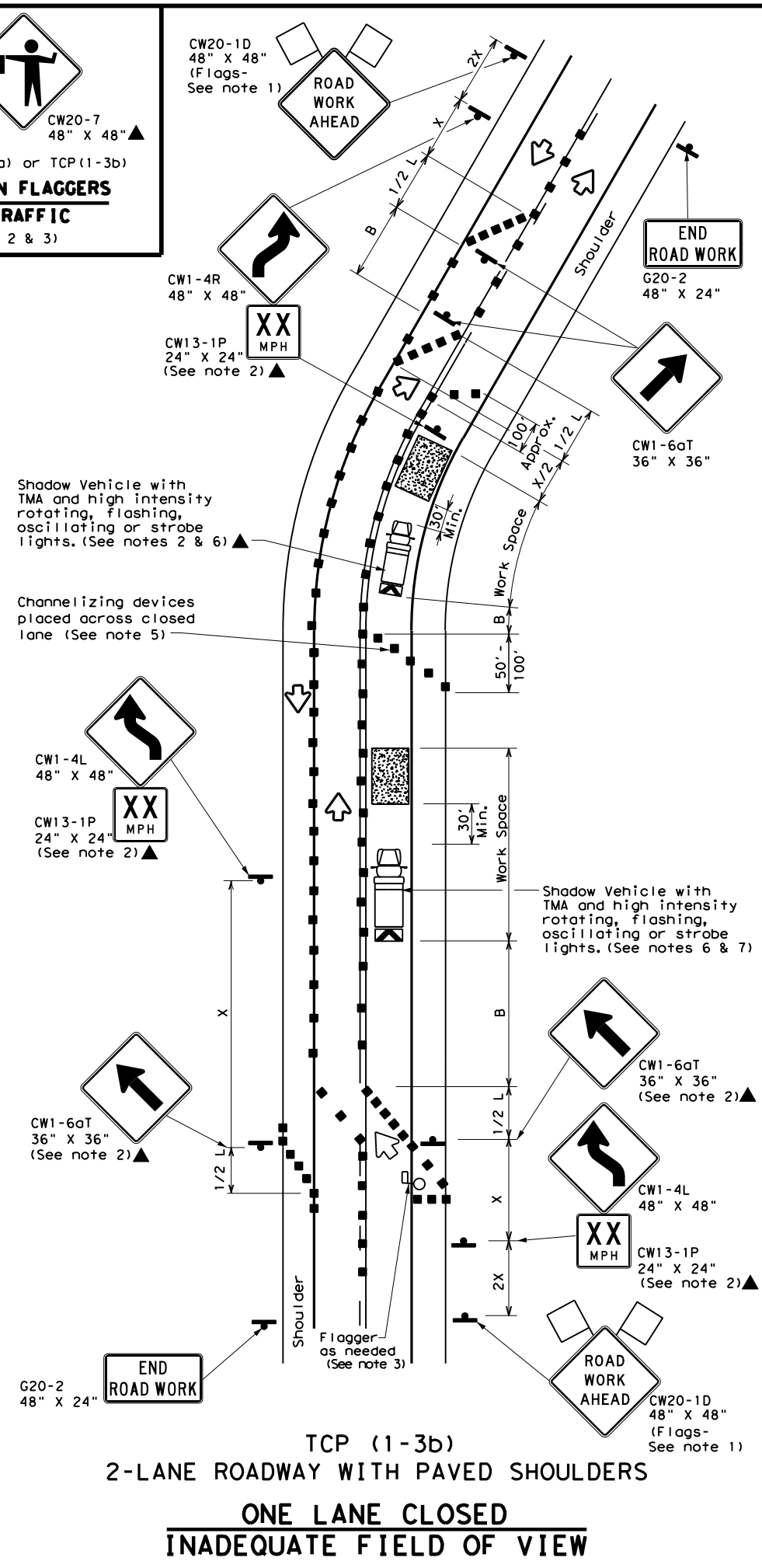
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TCP (1-3a)
 2-LANE ROADWAY WITH PAVED SHOULDERS
 ONE LANE CLOSED
 ADEQUATE FIELD OF VIEW

BE PREPARED TO STOP
 CW3-4 48" X 48"
 CW20-7 48" X 48"
 For either TCP(1-3a) or TCP(1-3b)
USE ONLY WHEN FLAGGERS CONTROL TRAFFIC
 (See Notes 2 & 3)



TCP (1-3b)
 2-LANE ROADWAY WITH PAVED SHOULDERS
 ONE LANE CLOSED
 INADEQUATE FIELD OF VIEW

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

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

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

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

- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
 - DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
 - When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
 - 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 speed 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 area of conflicting markings not the entire work zone.

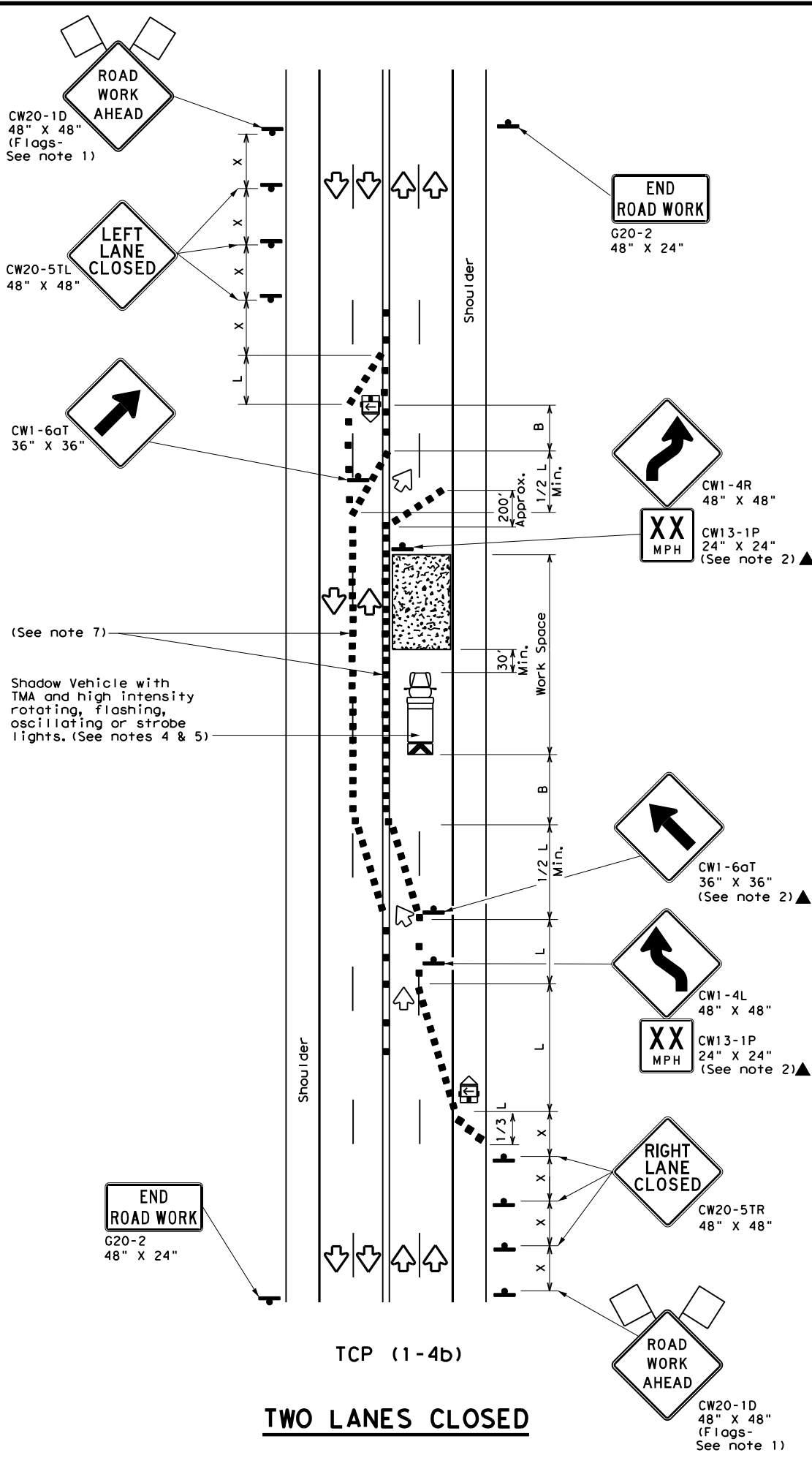
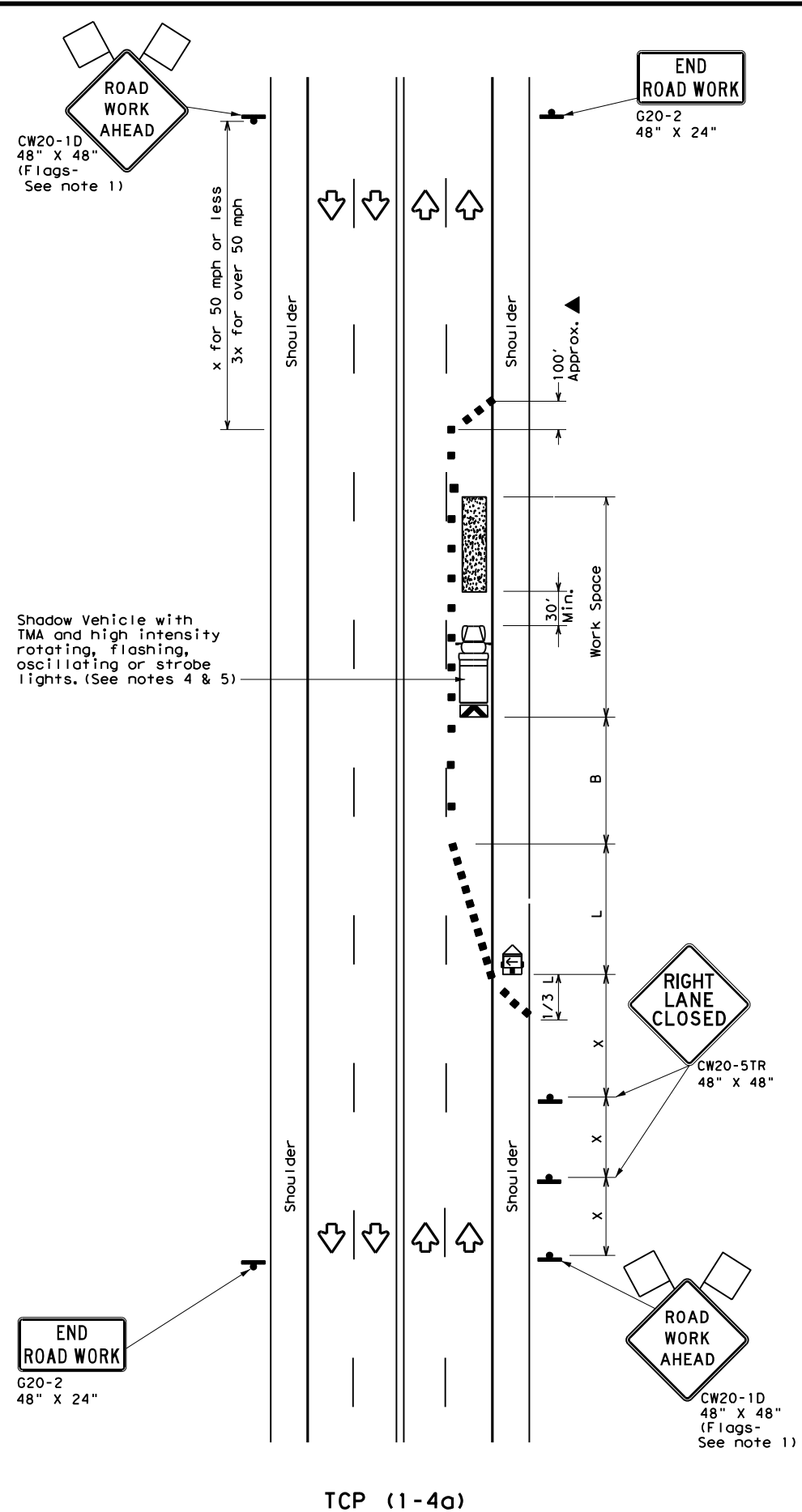
Texas Department of Transportation
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN
 TRAFFIC SHIFTS ON
 TWO LANE ROADS
 TCP(1-3)-18**

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0062	07	103	US 59
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	ATL	HARRISON	27	
1-97 2-18				

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LEGEND

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

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

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

TYPICAL USAGE

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

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

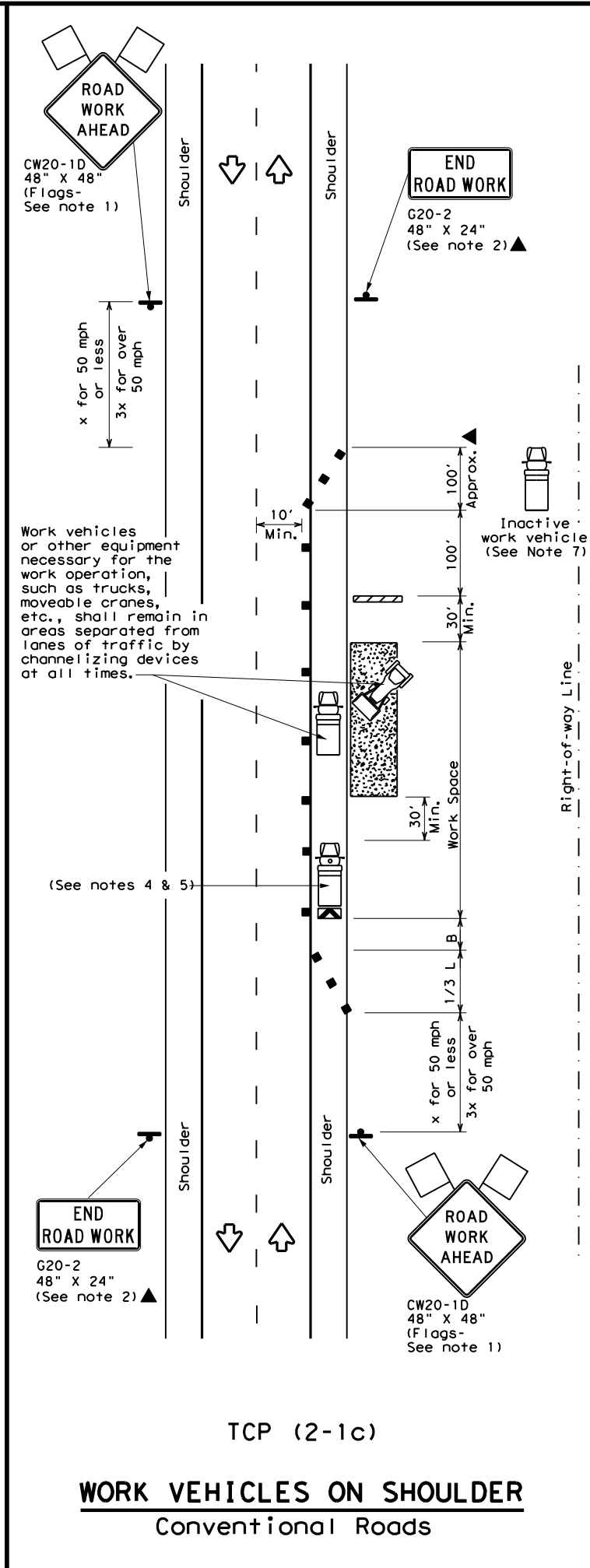
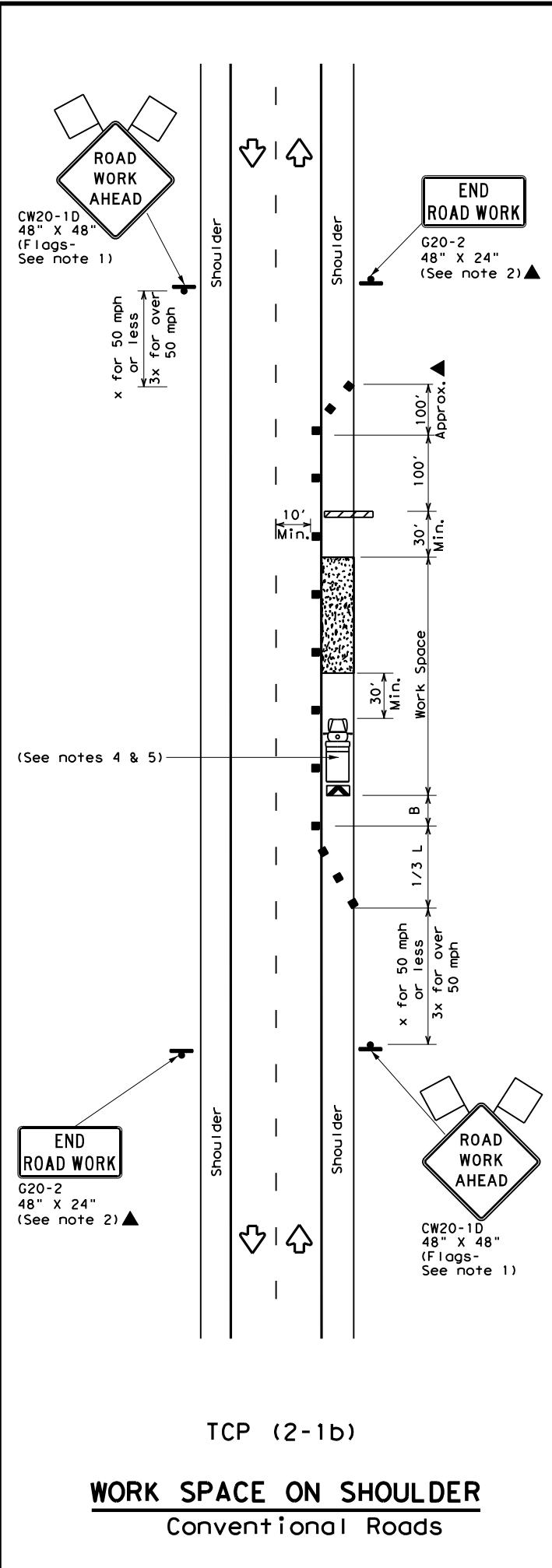
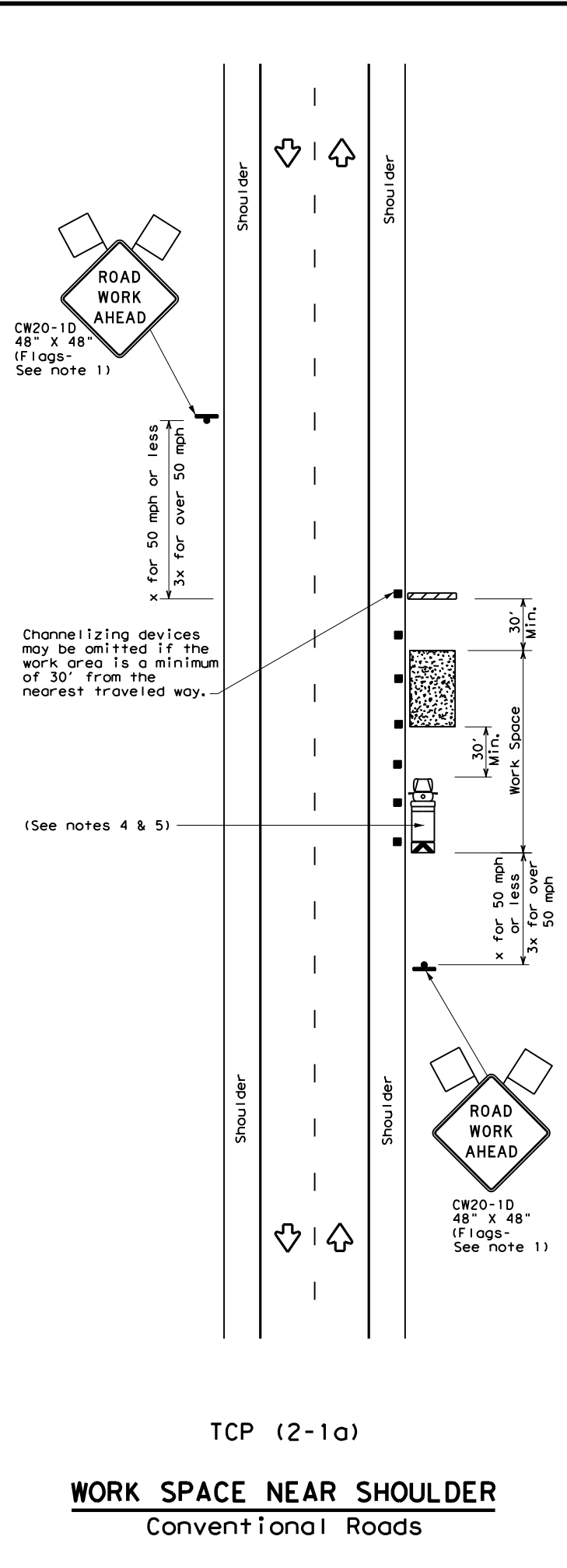
TRAFFIC CONTROL PLAN
LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP (1-4) - 18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0062	07	103	US 59
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	ATL	HARRISON	28	
1-97 2-18				

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

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

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

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

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

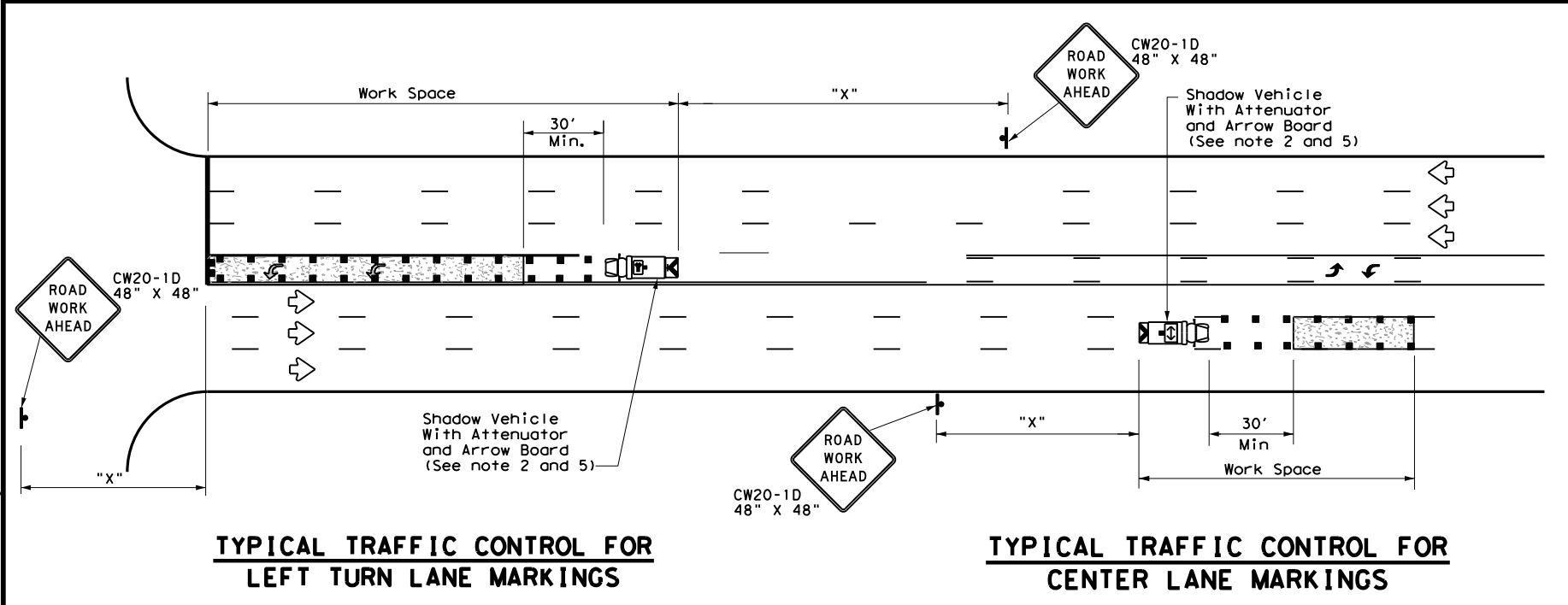
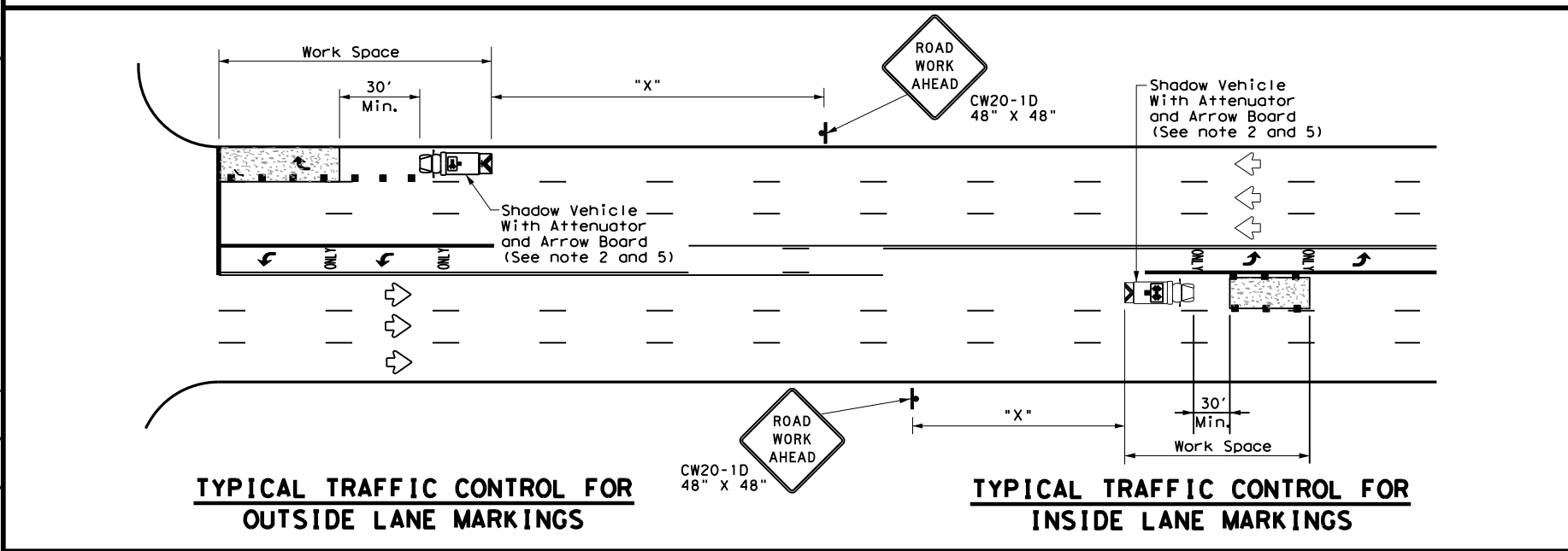
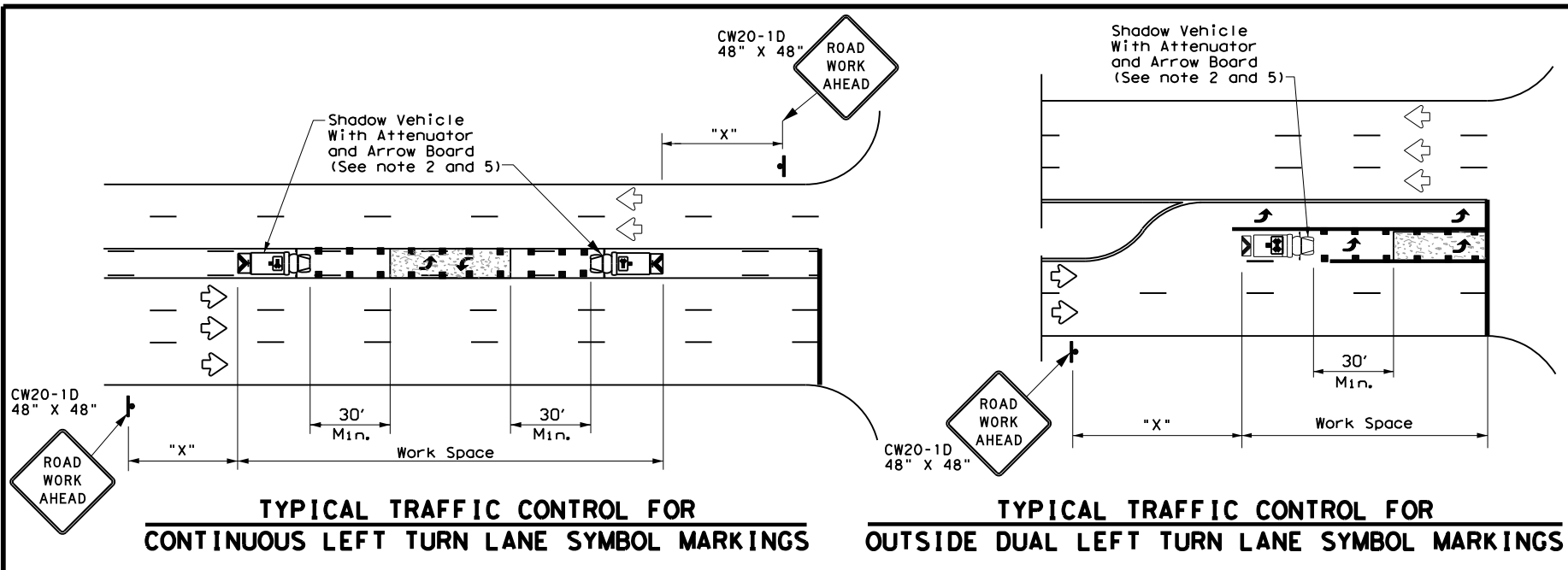
Texas Department of Transportation
 Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (2-1) - 18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY	SHEET NO.	
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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	Channelizing Devices

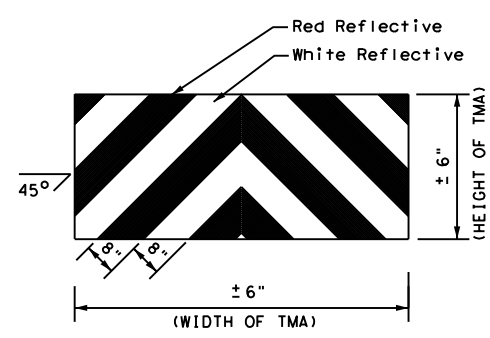
Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'
35		205'	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. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic control plan should be used.
2. A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.
3. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
4. The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
5. Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.



STRIPING FOR TMA

Texas Department of Transportation
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN
 MOBILE OPERATIONS FOR
 ISOLATED WORK AREAS
 UNDIVIDED HIGHWAYS**

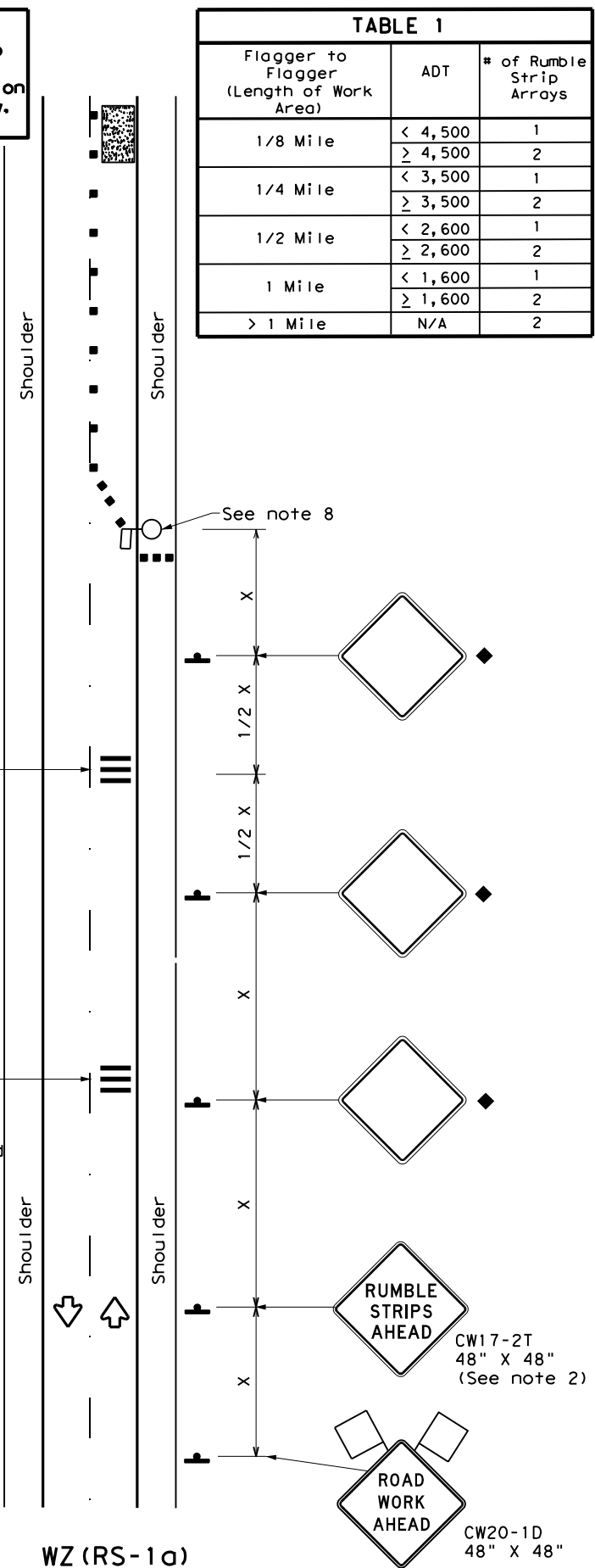
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ATL	HARRISON	31		

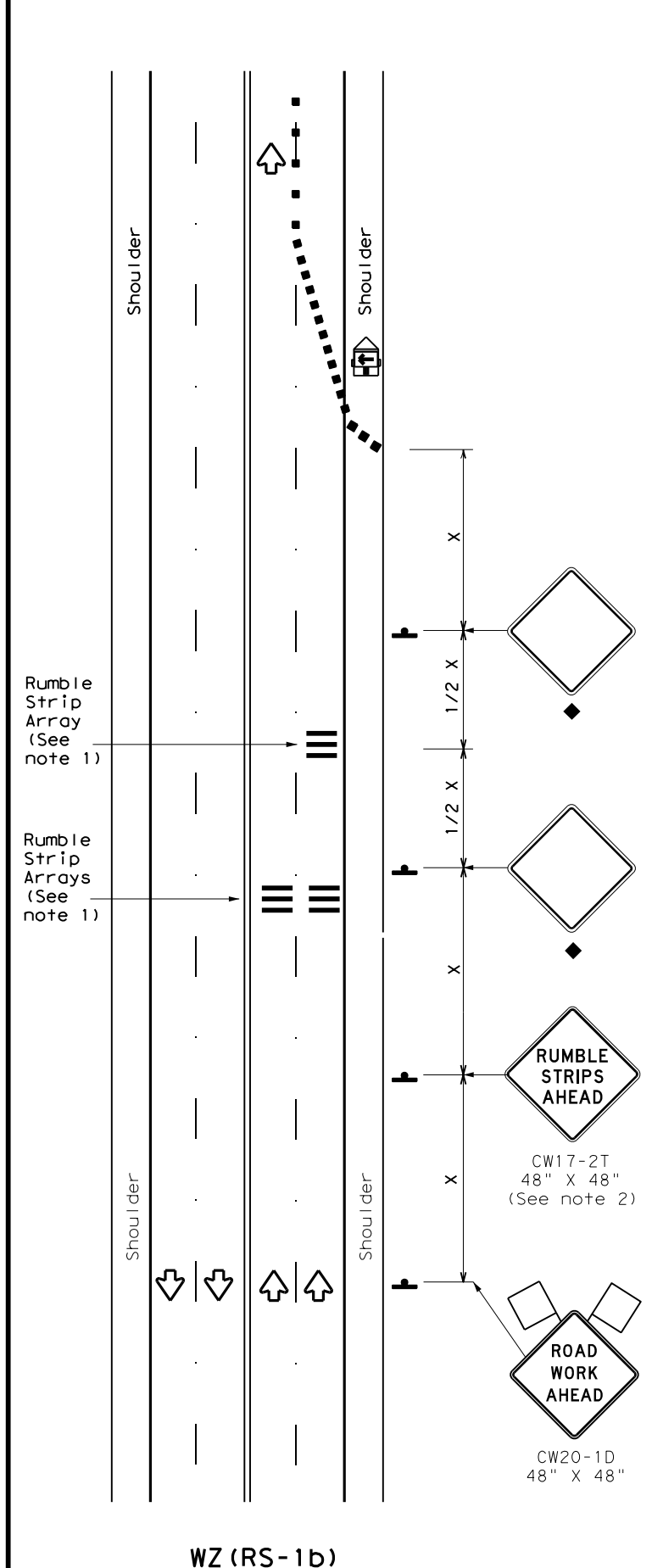
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Warning sign and rumble strip sequence in opposite direction is same as below.

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



RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

- 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.
- 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.
- Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
- Remove Temporary Rumble Strips before removing the advanced warning signs.
- Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
- Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
- This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
- The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
- Replace defective Temporary Rumble Strips as directed by the Engineer.
- Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

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

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel		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 = WS/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)

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

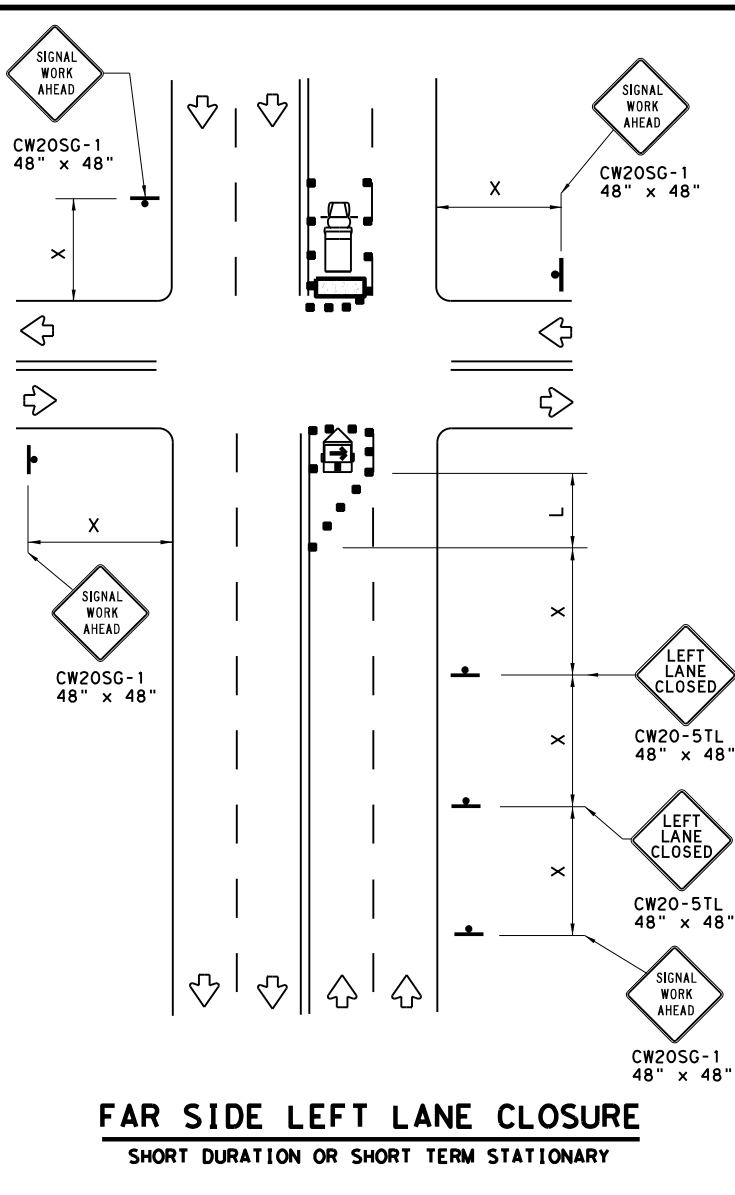
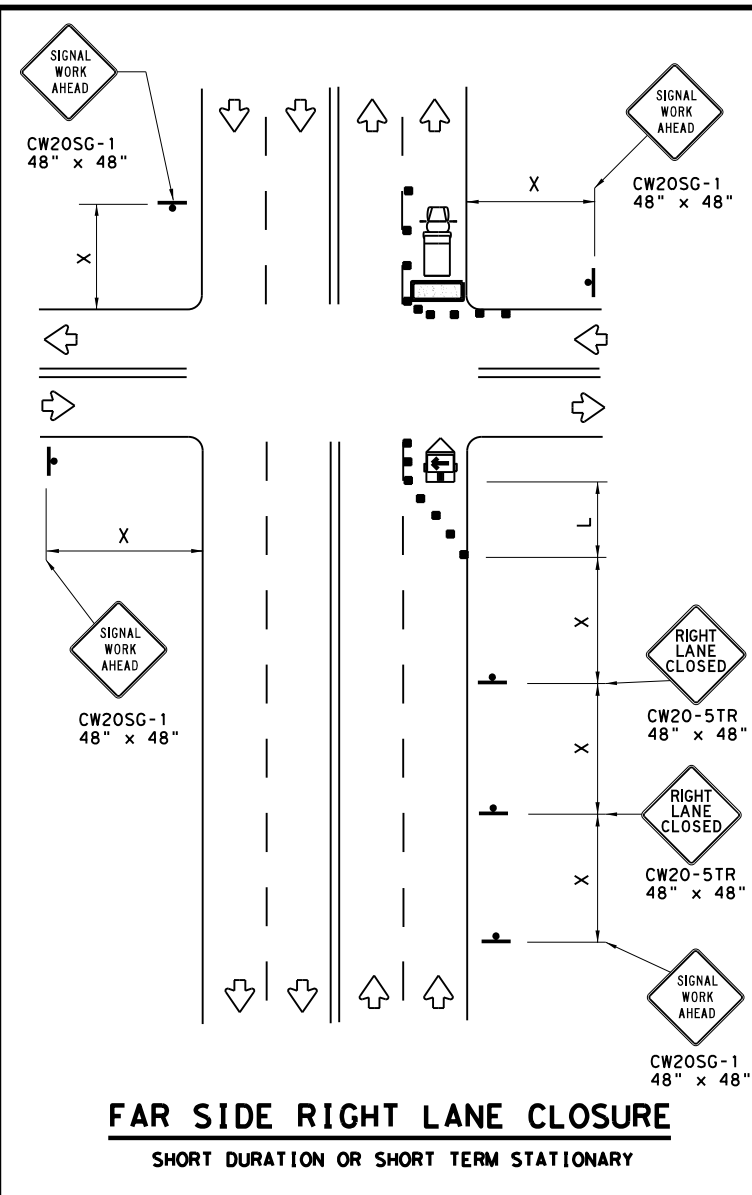
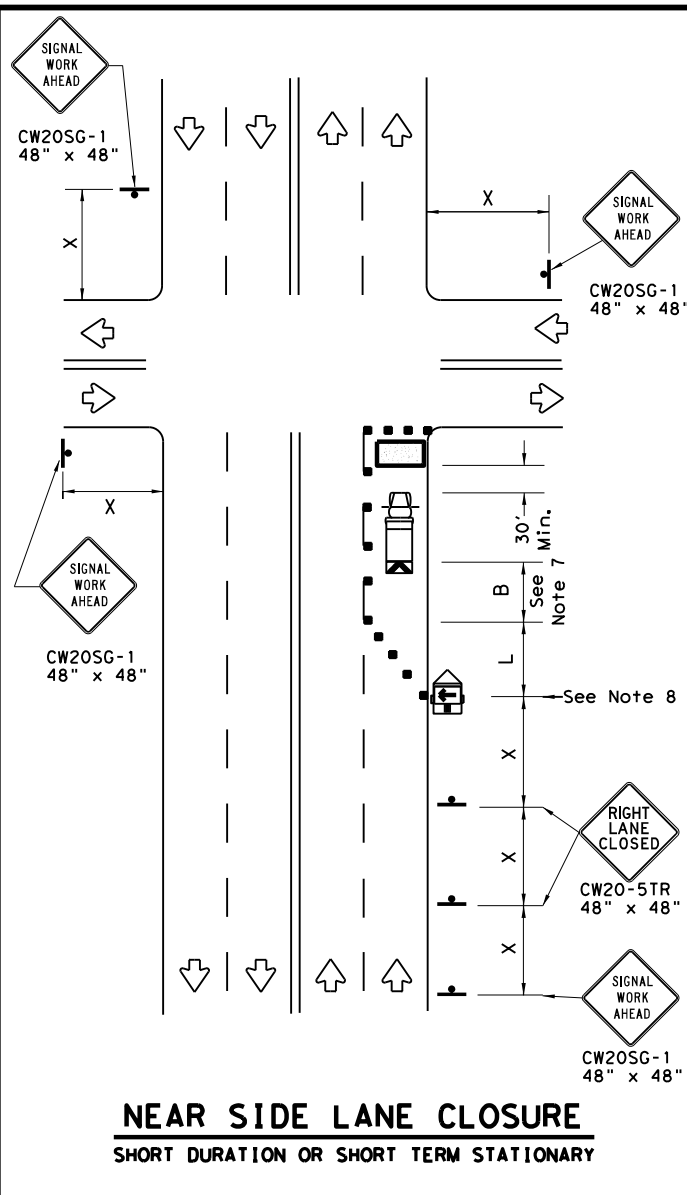
TEMPORARY RUMBLE STRIPS

WZ (RS) - 22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0062	07	103	US 59
2-14 1-22 4-16	DIST	COUNTY	SHEET NO.	
	ATL	HARRISON	32	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or for the accuracy of the information provided herein. The user of this standard is responsible for its proper use.

DATE: 1/9/2024 10:58:10 AM
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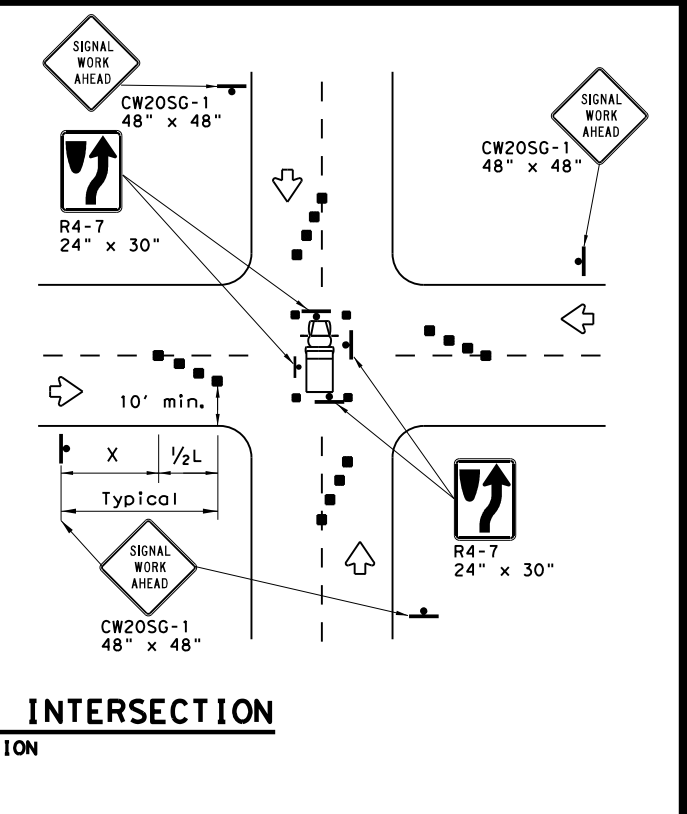
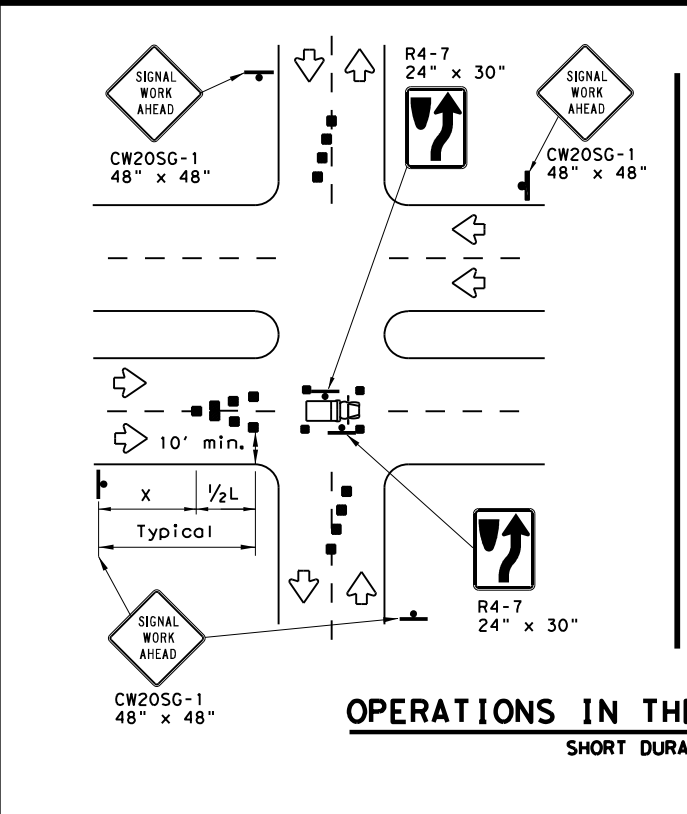


LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

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

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

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



GENERAL NOTES

- 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.
- Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
- Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
- Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
- High level warning devices (flag trees) may be used at corners of the vehicle.
- 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.
- 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.
- 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.
- 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

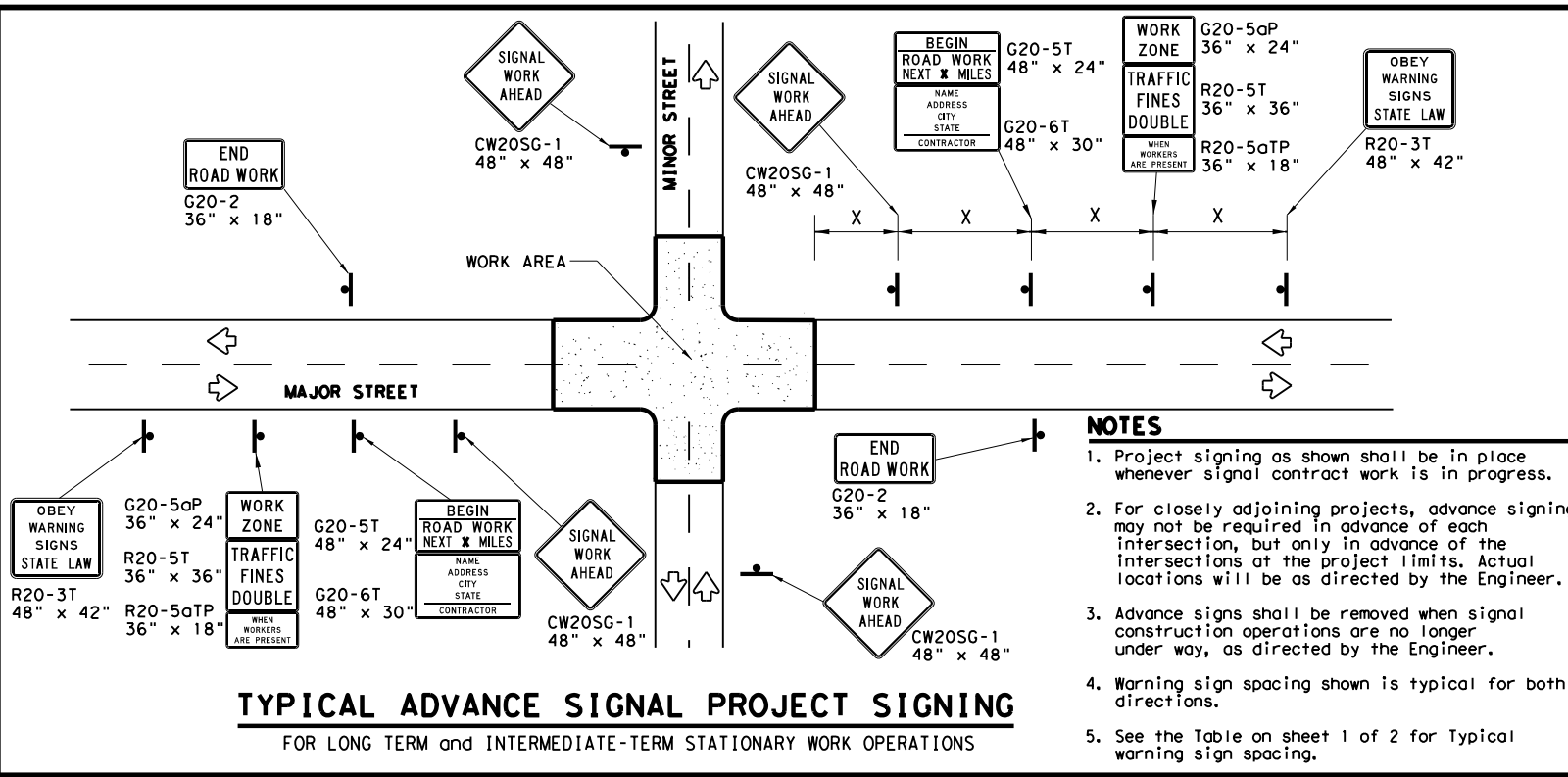
TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbt-13.dgn	DN: TxDOT	CR: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0062	07	103	US 59
2-98 10-99 7-13	DIST	COUNTY	SHEET NO.	
4-98 3-03	ATL	HARRISON	33	

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DATE: 1/9/2024 10:58:48 AM
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- 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 60.02 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

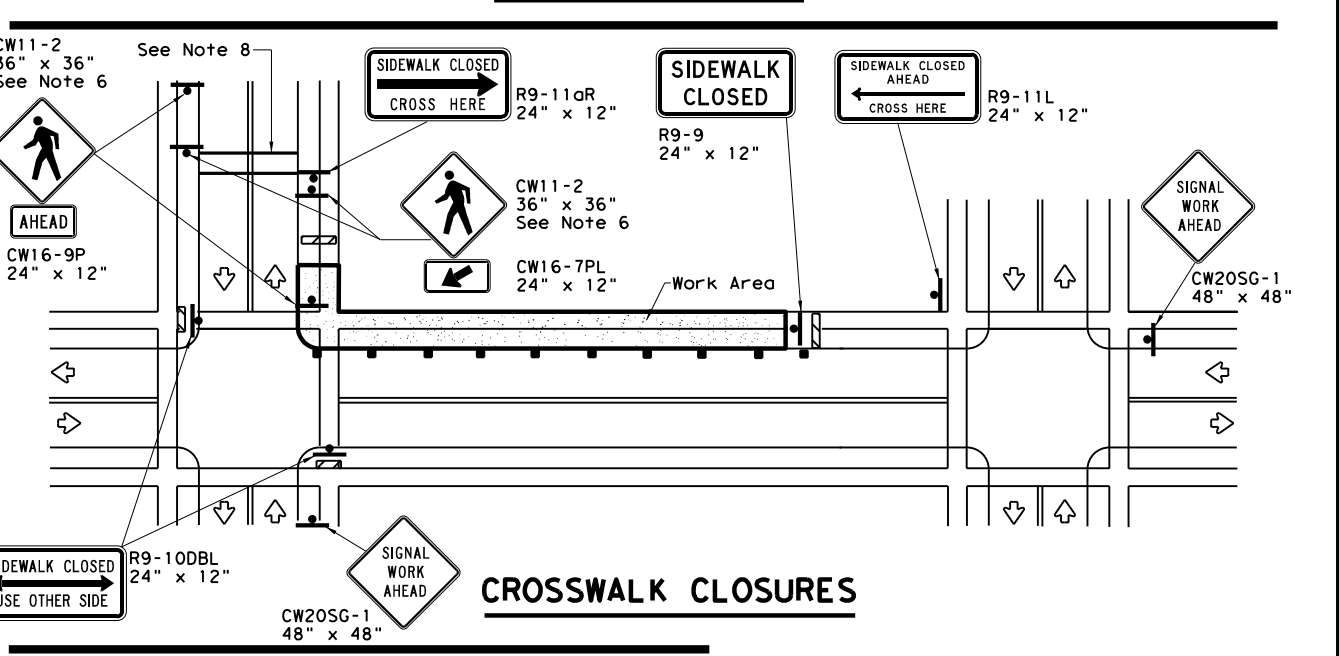
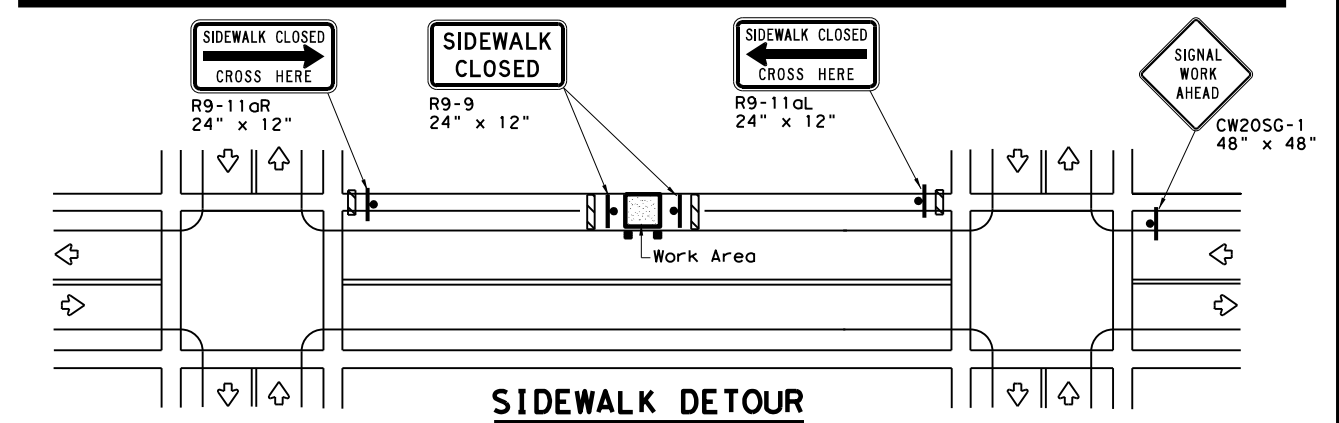
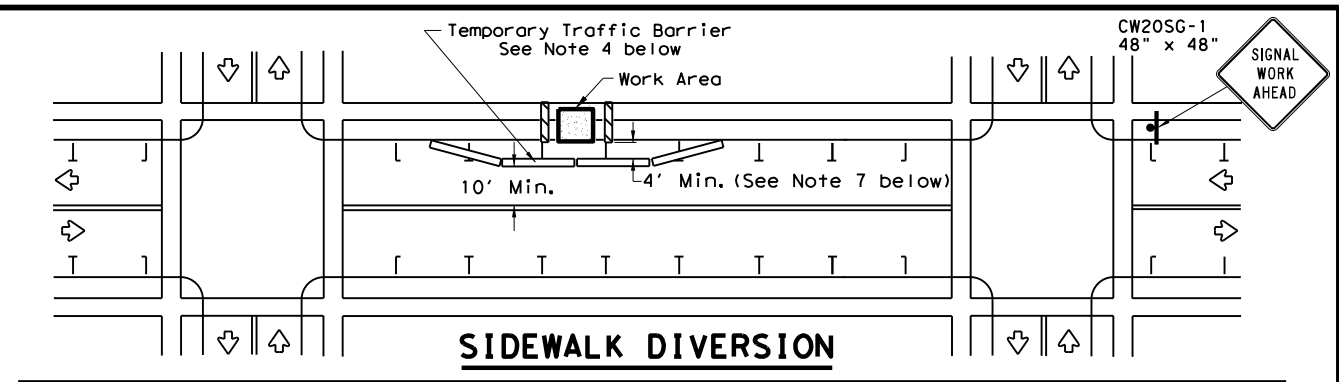
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

LEGEND	
	Sign
	Channelizing Devices
	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



PEDESTRIAN CONTROL

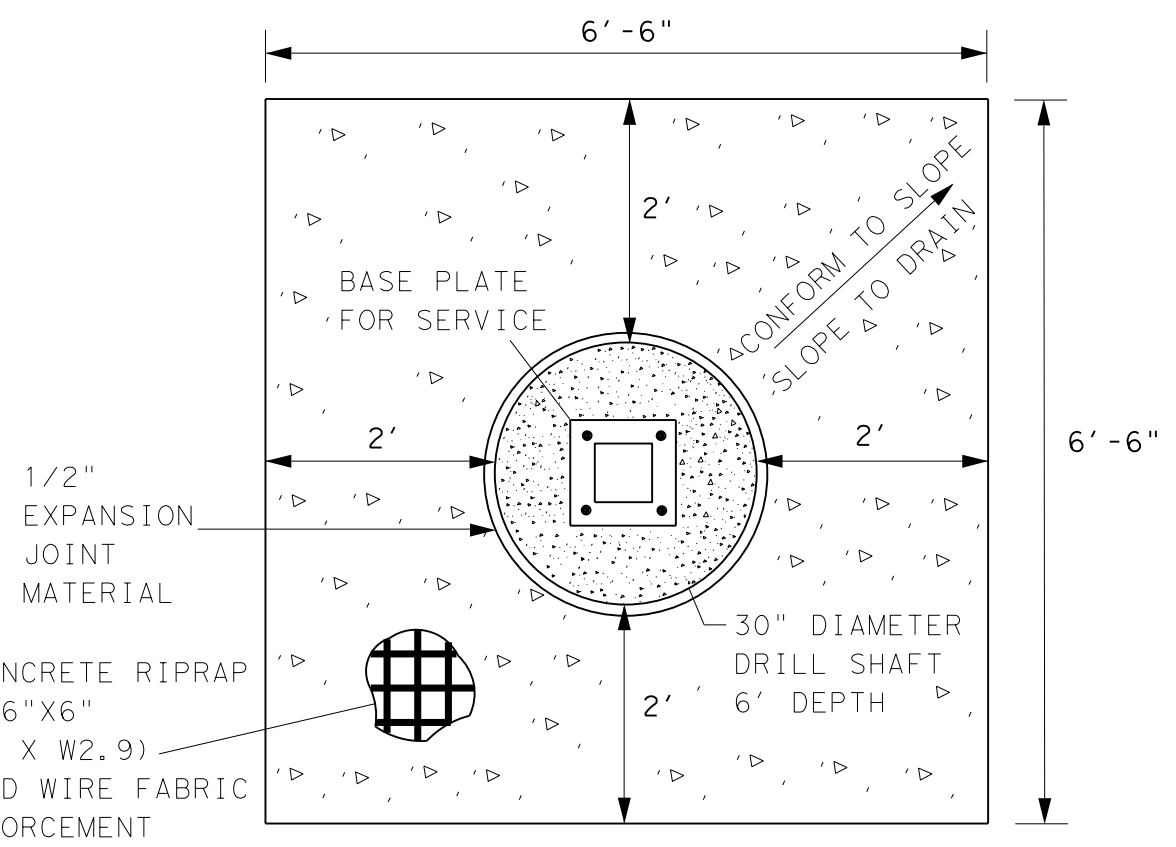
1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval 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

		Traffic Operations Division Standard	
TRAFFIC SIGNAL WORK BARRICADES AND SIGNS			
WZ (BTS-2) - 13			
FILE: wzbts-13.dgn	DN: TxDOT	CR: TxDOT	DW: TxDOT
© TxDOT April 1992	CONT: 0062	SECT: 07	JOB: 103
REVISIONS	0062	07	103
2-98 10-99 7-13	DIST: ATL	COUNTY: HARRISON	SHEET NO. 34
4-98 3-03			

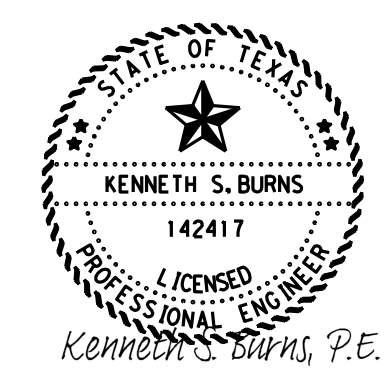
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ELECTRICAL SERVICE ASSEMBLY SUMMARY													
POWER PROVIDER AND TXDOT SERVICE ID	ELEC. SERVICE NO.	SHEET NO.	ELECTRICAL SERVICE DESCRIPTION (SEE ED (4)&(5))	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBD/LOADCENTER AMP RATING	CIRCUIT NO.	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
UPSHUR RURAL 41.L4	1	39	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	2"	3/#6	N/A	2P/60	60	N/A	A	2P/15	3	1.4
			US 59 AT FM 1997							B	2P/15	3	
AEP 61.L14	2	43	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	2"	3/#6	N/A	2P/60	60	N/A	A	2P/15	5	1.2
			US 80 AT FM 968										
AEP 61.L15	3	47	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	2"	3/#6	N/A	2P/60	60	N/A	A	2P/15	5	1.2
			US 80 AT FM 9 S.										
AEP 12.L9	4	50	ELC SRV TY A 120/240 060(NS)AL(E)PS(U)	2"	3/#6	N/A	2P/60	60	N/A	A	2P/15	2	0.5
			SH 149 AT FM 124										
RUSK 13.L6	5	54	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	2"	3/#6	N/A	2P/60	60	N/A	A	2P/15	3	0.7
			FM 959 AT FM 1794										
AEP 11.L24	6	59	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	2"	3/#6	N/A	2P/60	60	N/A	A	2P/15	4	1.0
			SH 149 AT US 79										
AEP 11.L25	7	60	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	2"	3/#6	N/A	2P/60	60	N/A	A	2P/15	3	0.4
			SH 149 AT US 79										
UPSHUR RURAL 42.L9	8	66	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	2"	3/#6	N/A	2P/60	60	N/A	A	2P/15	3	1.4
			SH 154 AT FM 2208							B	2P/15	3	
PANOLA HARRISON 42.L7	9	69	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	2"	3/#6	N/A	2P/60	60	N/A	A	2P/15	4	1.0
			SH 43 AT FM 134 N.										
AEP 64.L2	10	71	ELC SRV TY A 240/480 060(SS)SS(E)SP(O)	2"	3/#6	100	2P/60	60	N/A	A	2P/15	8	5.3
			SL 390 AT SH 43								2P/15	3	
AEP 64.L3	11	72	ELC SRV TY A 240/480 060(SS)SS(E)SP(O)	2"	3/#6	100	2P/60	60	N/A	A	2P/15	10	4.8
			SL 390 AT SH 43										



NOTES:

- 1.) PLACE CONCRETE RIP RAP APRON AROUND 30" DRILL SHAFT FOR ELECTRICAL SERVICE AS SHOWN IN THE DETAIL WITH A 4" DEPTH.
- 2.) USE 6"X6" W2.9 X W2.9 WELDED WIRE FABRIC FOR REINFORCEMENT.
- 3.) RIP RAP APRON WILL BE PAID FOR UNDER ITEM 432. DRILL SHAFT FOR ELECTRICAL SERVICE IS SUBSIDIARY TO ITEM 628 AND WILL NOT BE PAID FOR SEPERATELY. DRILL SHAFT DEPTH WILL BE 6'.
- 4.) RIP RAP APRON WILL CONFORM TO SLOPE OF SURROUNDING GRADE. IT IS NOT INTENDED TO BE FLAT.
- 5.) PROVIDE EXPANSION JOINT MATERIAL BETWEEN THE 30" DRILL SHAFT AND THE RIP RAP APRON.



1/25/2024

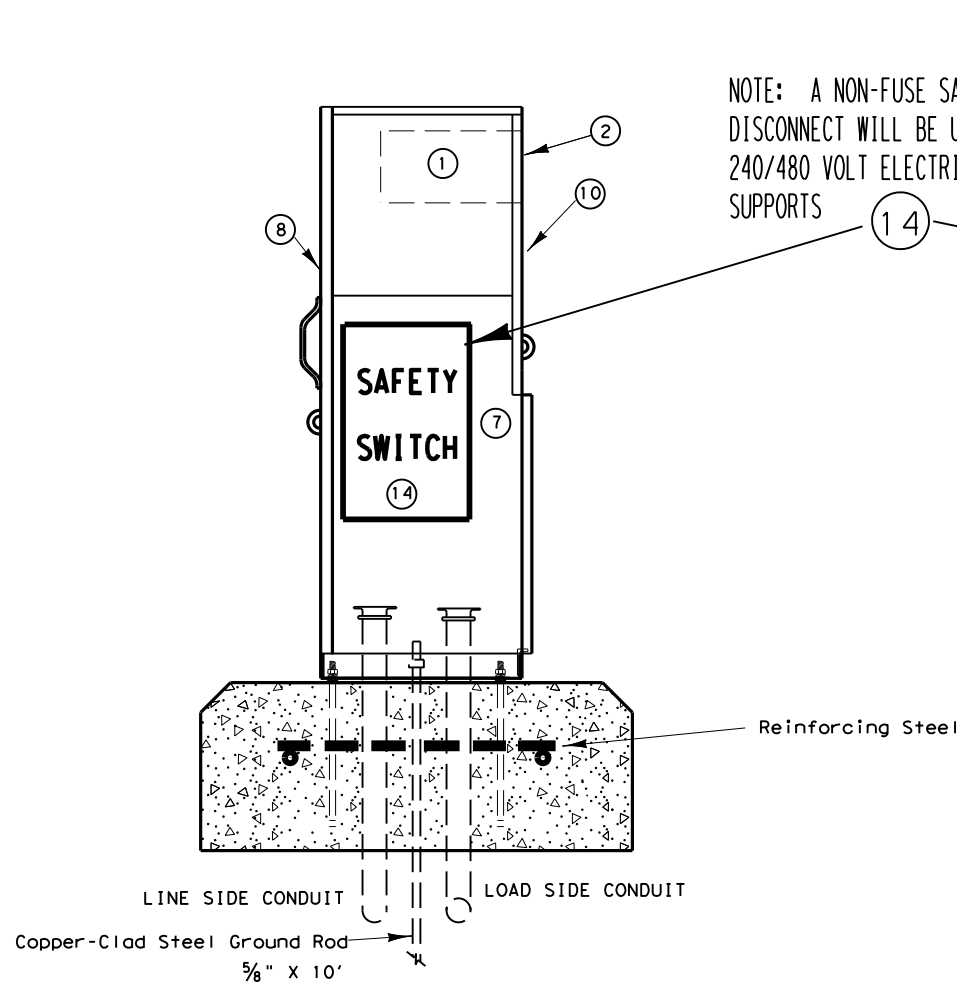
ELECTRICAL SERVICE DATA WITH MODIFIED FOUNDATION AND PAD DETAIL



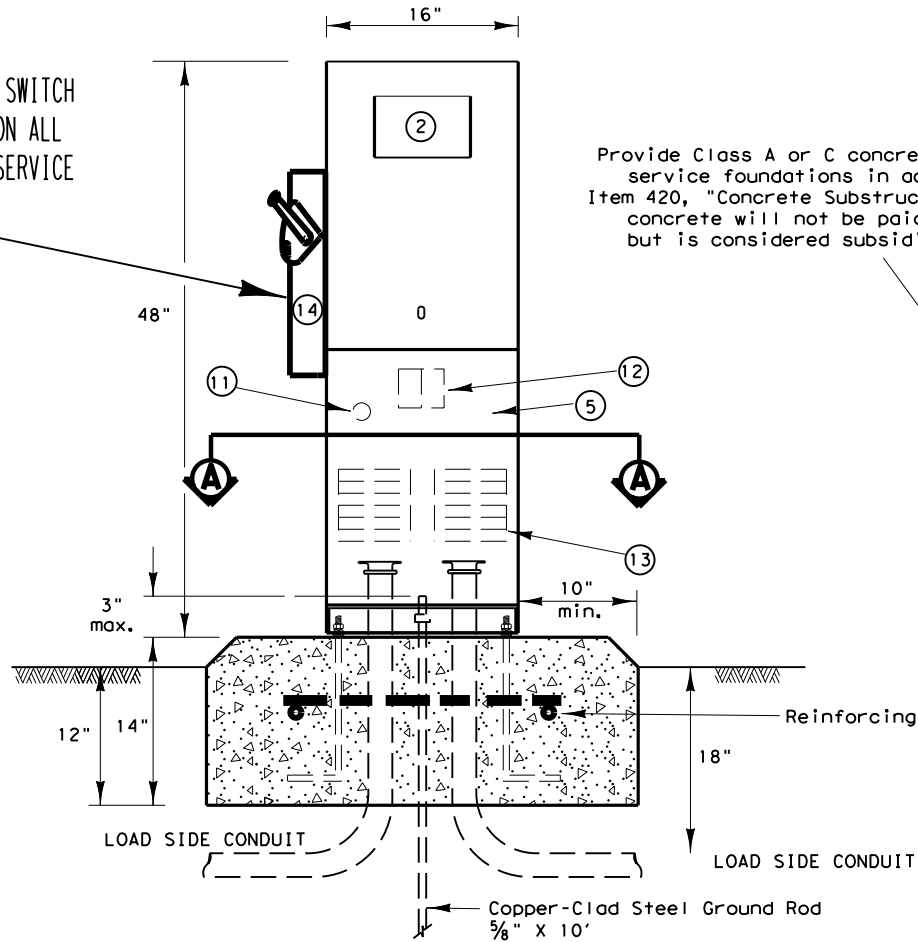
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				35
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

NOT TO SCALE

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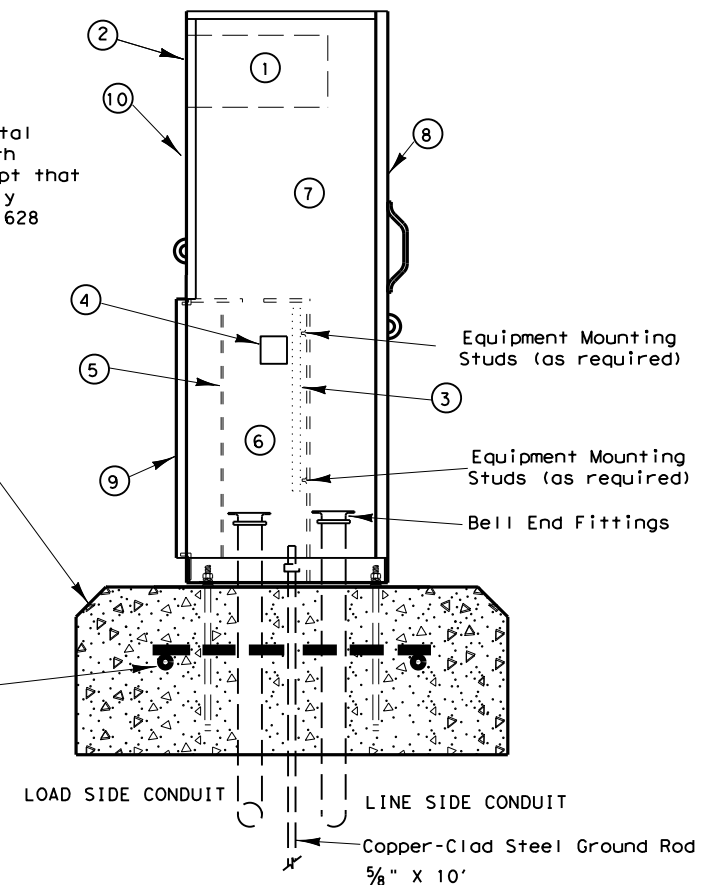
SIDE VIEW



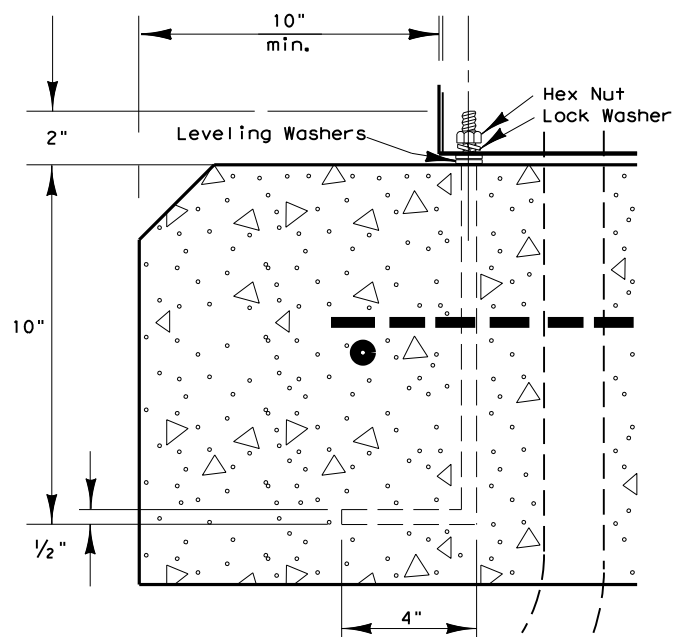
FRONT VIEW

Note: Ells in foundation are rigid metal, size called for on the plans. Extension conduits from these ells may be PVC, provided ends of rigid metal conduits are more than 2 in. below top of concrete foundation. Where extension conduits are metal, grounding bushing must be installed and a bonding jumper properly terminated.

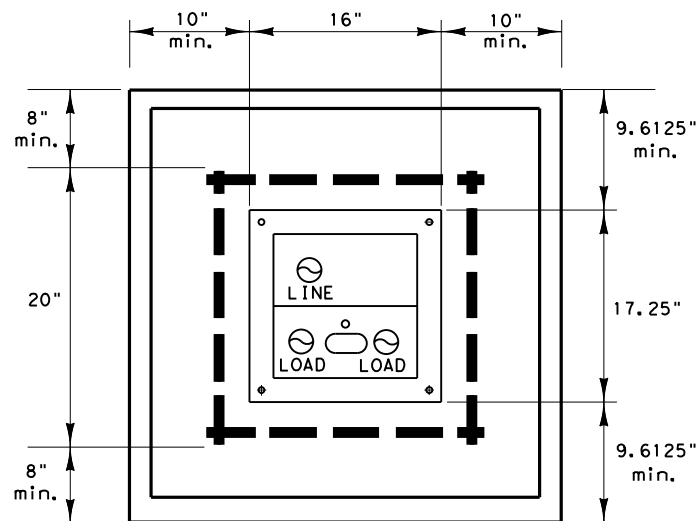
Ty C shown, Ty A similar except that Ty A shall have individual circuit breakers mounted on a equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SIDE VIEW



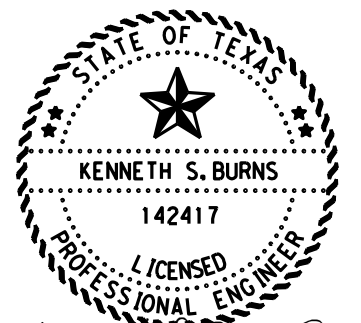
**ANCHOR BOLT
DETAIL**



**SECTION A-A
36" X 36" ±**

LEGEND

- ① METER SOCKET, (when required)
- ② METER SOCKET WINDOW, (when required)
- ③ EQUIPMENT MOUNTING PANEL
- ④ PHOTO ELECTRIC CONTROL WINDOW, (when required)
- ⑤ HINGED DEADFRONT TRIM
- ⑥ LOAD SIDE CONDUIT AREA
- ⑦ LINE SIDE CONDUIT AREA
- ⑧ UTILITY ACCESS DOOR, with handle
- ⑨ PEDESTAL DOOR
- ⑩ HINGED METER ACCESS
- ⑪ CONTROL STATION (H-O-A Switch)
- ⑫ MAIN DISCONNECT
- ⑬ BRANCH CIRCUIT BREAKERS
- ⑭ NON-FUSE SAFETY SWITCH DISCONNECT



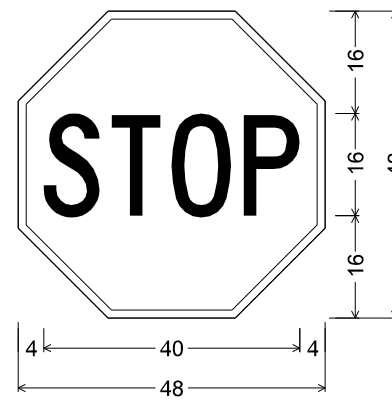
Kenneth S. Burns, P.E.

1/25/2024

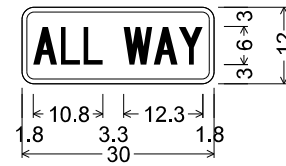
**TYPICAL
ELECTRICAL PEDESTAL
SERVICE TYPE (U)
AND MODIFIED FOUNDATION
36" X 36"**



FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO. 36
STATE TEXAS	DISTRICT ATL	COUNTY HARRISON		
CONTROL 0062	SECTION 07	JOB 103	HIGHWAY NO. US 59	

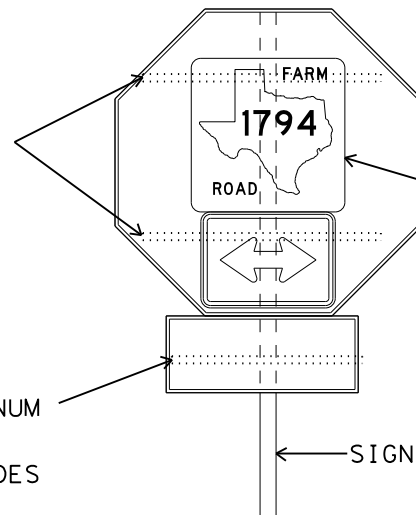


R1-1_48x48;
1.3" Border, White on Red;
"STOP", C 60% spacing;



R1-3P_30x12;
1.9" Radius, 0.8" Border, White on Red;
"ALL WAY", C specified length;

32" EXTRUDED ALUMINUM WINDBEAMS

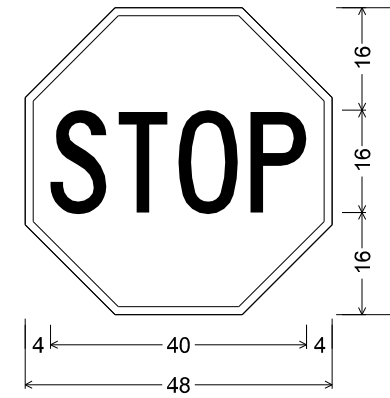


RT. MARKER MOUNTED BACKSIDE OF 48"X48" STOP SIGN.

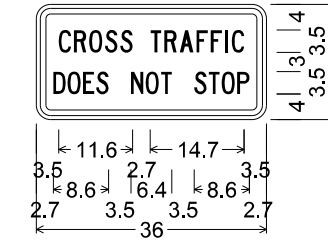
VARIABLE EXTRUDED ALUMINUM WINDBEAM
32" FOR CROSS TRAFFIC DOES NOT STOP.
26" FOR ALL WAY

SIGN POST 10 BWG (P)

TYPICAL INSTALL FOR STOP SIGN WITH ALL WAY STOP PLAQUE

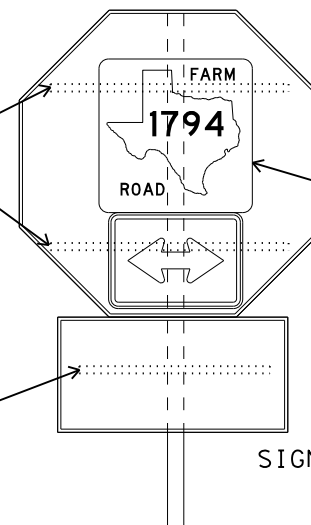


R1-1_48x48;
1.3" Border, White on Red;
"STOP", C 60% spacing;



W4-4P_36x18;
2.3" Radius, 0.9" Border, 0.6" Indent, Black on Yellow;
"CROSS TRAFFIC", C 79% spacing;
"DOES NOT STOP", C 54% spacing;

32" EXTRUDED ALUMINUM WINDBEAMS



RT. MARKER MOUNTED BACKSIDE OF 48"X48" STOP SIGN.

VARIABLE EXTRUDED ALUMINUM WINDBEAM
32" FOR CROSS TRAFFIC DOES NOT STOP.
26" FOR ALL WAY

SIGN POST 10 BWG (P)

TYPICAL INSTALL FOR STOP SIGN WITH CROSS TRAFFIC DOES NOT STOP PLAQUE

NOTES:

- 1.) SOME OF THE INTERSECTIONS CALL FOR A BACK TO BACK MOUNT WITH A ROUTE MARKER MOUNTED ON THE BACKSIDE OF A STOP SIGN. MOUNT THE ROUTE MARKER SO THAT NO PART OF THE ROUTE MARKER IS SHOWING ON THE FRONT SIDE (STOP SIGN SIDE FACING ONCOMING TRAFFIC). REASON FOR THIS IS SO THAT WE DO NOT IN ANY WAY DISTORT THE OCTAGON SHAPE OF THE STOP SIGN AND CAUSE ANY CONFUSION TO THE DRIVER.
- 2.) SEE STANDARD SMD (SLIP-2)-08 INSTALL EXTRUDED ALUMINUM WIND BEAM AS SHOWN.



Kenneth S. Burns, P.E.

1/25/2024

TYPICAL INSTALLATION BACK TO BACK SIGN MOUNT



FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				37
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

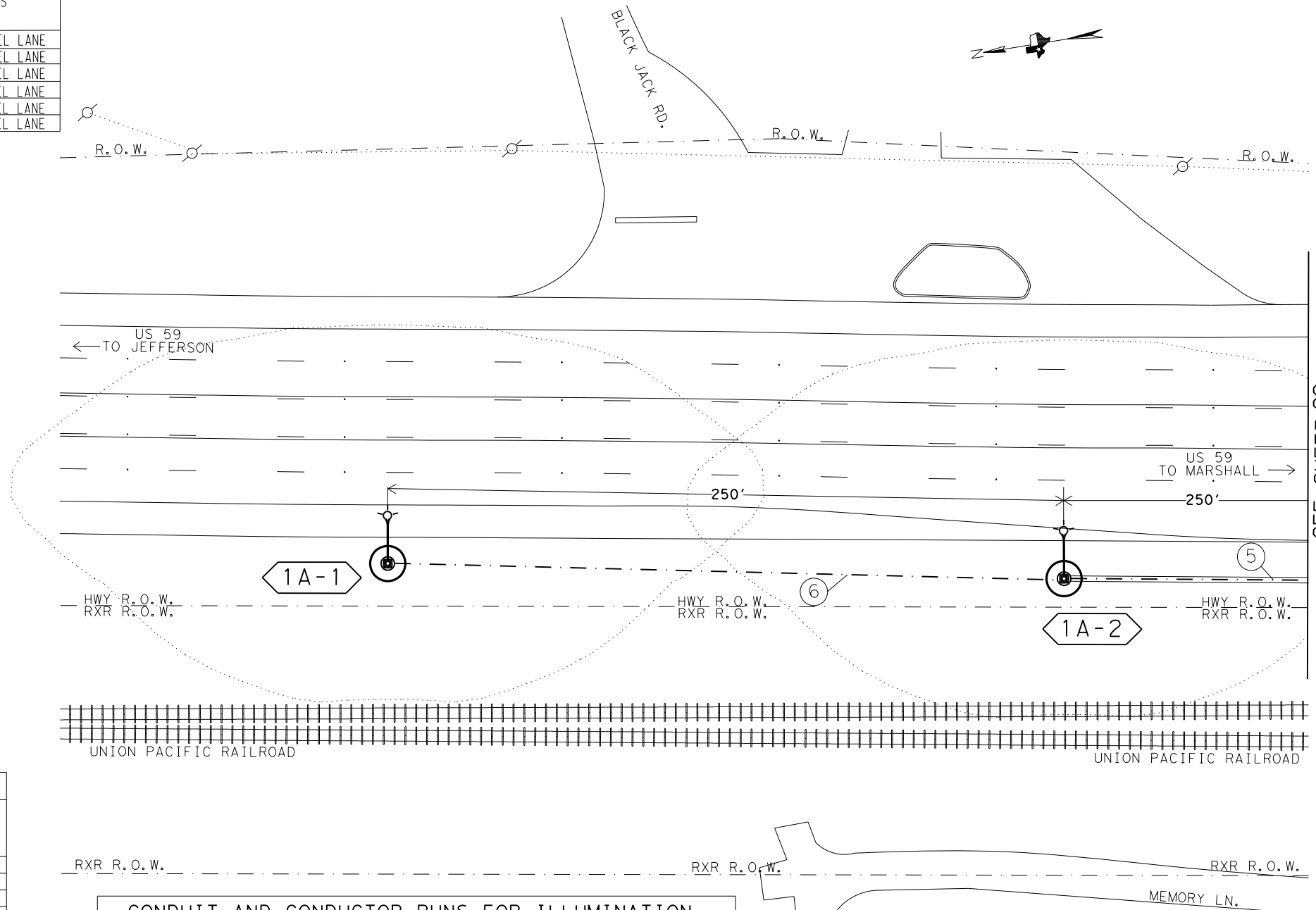
NOT TO SCALE

FILE: T:\engdata\Traffic\NGN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\US 59 at FM 1997.dgn
 DATE: 1/24/2024 9:25:52 AM

ROADWAY ILLUMINATION ASSEMBLY SUMMARY			
POLE	TYPE	FND. (LF)	REMARKS
1A-1	(TY SA)50T-10(400W EQ)LED	10	15' OFF TRAVEL LANE
1A-2	(TY SA)50T-10(400W EQ)LED	10	16' OFF TRAVEL LANE
1A-3	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE
1B-1	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE
1B-2	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE
1B-3	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE

LEGEND

- RDWY ILL ASSEM W/RIPRAP APRON
- GROUND BOX (TY D) (162922) W/APRON
- GROUND BOX (TY A) (122311) W/APRON
- GROUND BOX (TY A) (122311)
- TRENCHED CONDUIT
- BORED CONDUIT
- OVERHEAD POWER LINE
- WIRE RUN NUMBER
- LUMINAIRE CIRCUIT & POLE NUMBER
- ELECTRICAL SERVICE
- TELEPHONE AND/OR POWER POLE
- CULVERT
- DRAINAGE PIPE



SEE SHEET 39

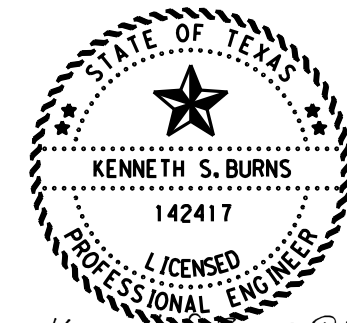
SUMMARY OF QUANTITIES-ILLUMINATION				
ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	60
0432	6006	RIPRAP (CONC) (CL B)	CY	3
0610	6288	IN RD IL (TY SA)50T-10(400W EQ)LED	EA	6
0618	6023	CONDT (PVC) (SCHD 40) (2")	LF	627
0618	6024	CONDT (PVC) (SCHD 40) (2") (BORE)	LF	741
0620	6009	ELEC CONDR (NO. 6) BARE	LF	1418
0620	6010	ELEC CONDR (NO. 6) INSULATED	LF	2894
0624	6002	GROUND BOX TY A (122311) W/APRON	EA	3
0628	6004	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	EA	1
6185	6002	TMA (STATIONARY)	DAY	15

NOTE:

- 1.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 2.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 3.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 4.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

RUN NO.	CONDUIT 2" PVC		TYP D GROUND BOX		TYP A GROUND BOX		CONDUCTORS			
	BORED (LF)	TRENCHED (LF)	APRON NONE		APRON NONE		#6 INSULATED	#6 BARE		
							NO. OF CONDUCTORS	LF	NO. OF CONDUCTORS	LF
1		19			1		4	116	1	29
2		43			1		2	96	1	48
3	113				1		2	236	1	118
4		18					2	46	1	23
5	250						2	510	1	255
6		250					2	510	1	255
7		185					2	380	1	190
8		112					2	224	1	112
9	138						2	286	1	143
10	240						2	490	1	245
TOTALS	741	627			3			2894		1418

* CALCULATIONS FOR WIRE TOTALS:
 -5' OF SLACK FOR GROUND BOXES. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE SERVICE. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE BASE OF ILLUMINATION POLES. (PER CONDUCTOR)



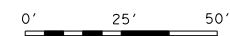
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1/25/2024

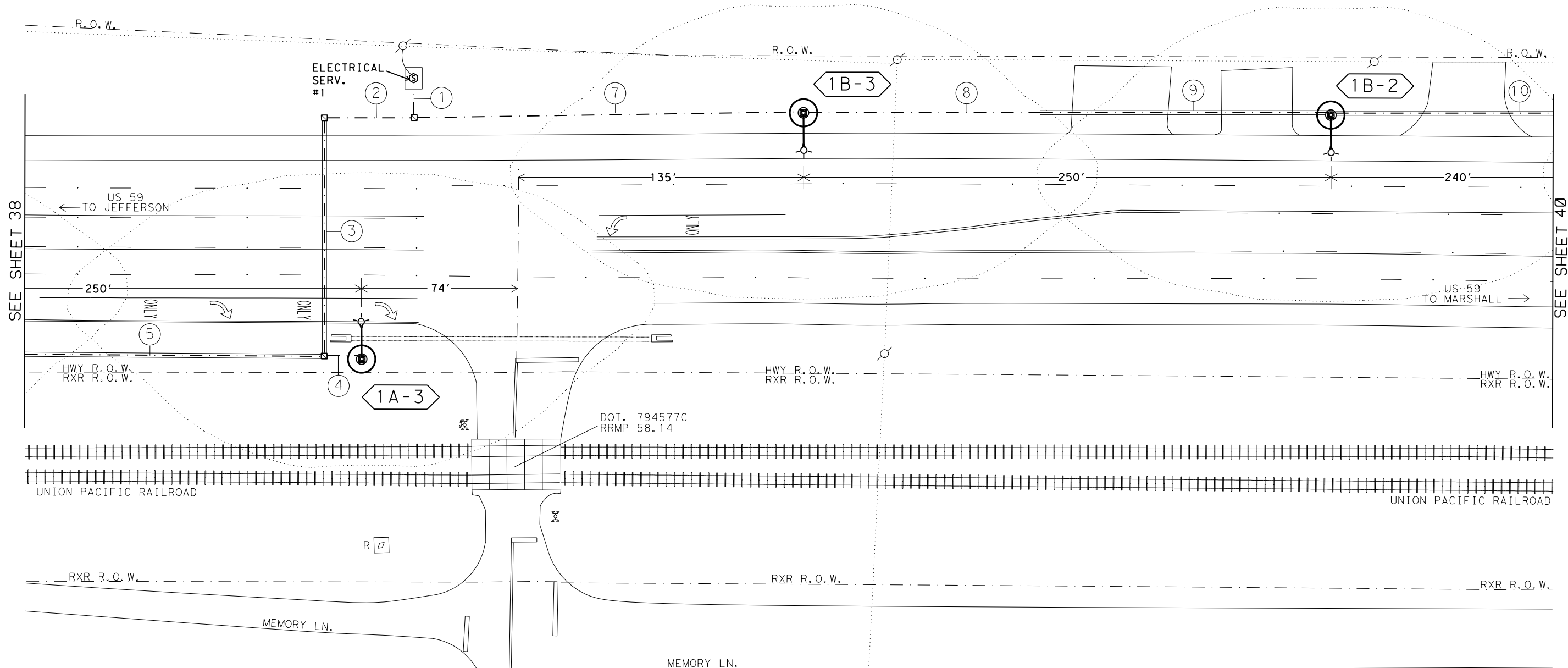
PROPOSED ILLUMINATION LAYOUT US 59 AT FM 1997

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STATE	DISTRICT	COUNTY
TEXAS	ATL	HARRISON
CONTROL	SECTION	JOB
0062	07	103
HIGHWAY NO.		US 59



FILE: T:\engdata\Traffic\DN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\US 59 at FM 1997\US 59 AT FM 1997.dgn
 DATE: 1/24/2024 8:25:51 AM



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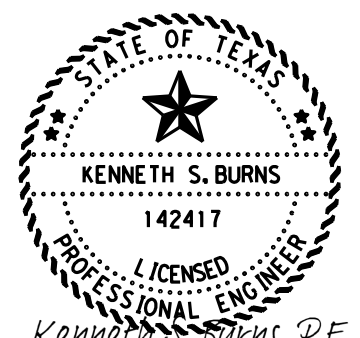
SEE SHEET 40

NOTE:

- 1.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 2.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 3.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 4.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

LEGEND

- RDWY ILL ASSEM W/RIPRAP APRON
- GROUND BOX (TY D) (162922) W/APRON
- GROUND BOX (TY A) (122311) W/APRON
- GROUND BOX (TY A) (122311)
- TRENCHED CONDUIT
- BORED CONDUIT
- OVERHEAD POWER LINE
- WIRE RUN NUMBER
- LUMINAIRE CIRCUIT & POLE NUMBER
- ELECTRICAL SERVICE
- TELEPHONE AND/OR POWER POLE
- CULVERT
- DRAINAGE PIPE

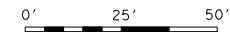


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PROPOSED ILLUMINATION LAYOUT
US 59 AT FM 1997

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 SHEET 2 OF 3

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				39
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	
















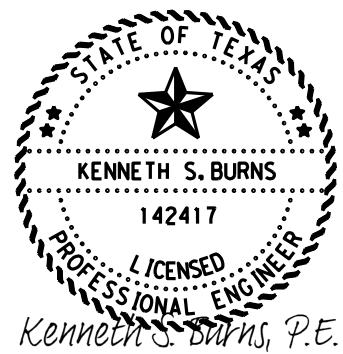
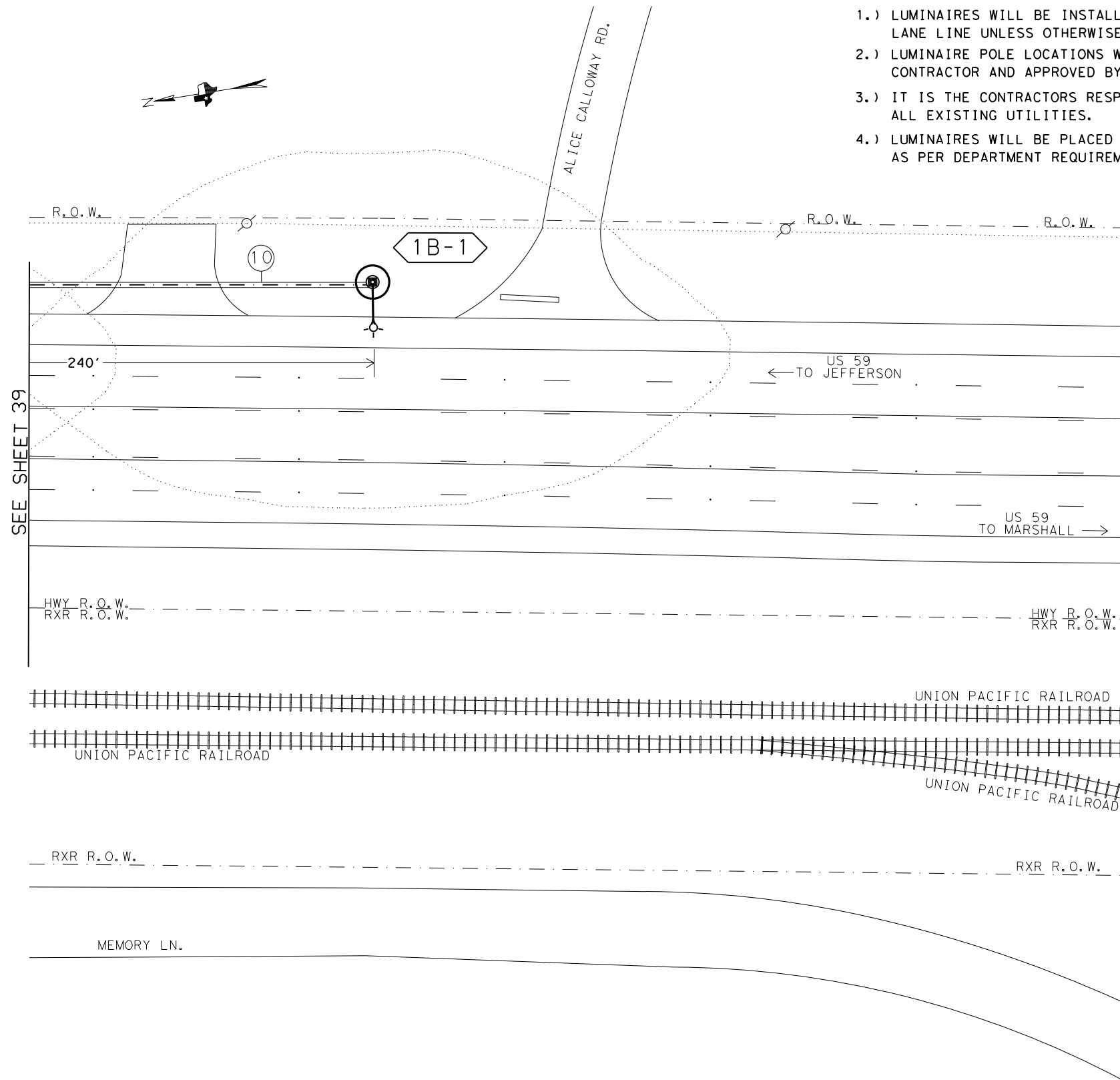
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NOTE:

- 1.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 2.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 3.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 4.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

LEGEND

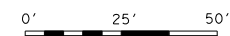
-  RDWY ILL ASSEM W/RIPRAP APRON
-  GROUND BOX (TY D) (162922) W/APRON
-  GROUND BOX (TY A) (122311) W/APRON
-  GROUND BOX (TY A) (122311)
-  TRENCHED CONDUIT
-  BORED CONDUIT
-  OVERHEAD POWER LINE
-  WIRE RUN NUMBER
-  LUMINAIRE CIRCUIT & POLE NUMBER
-  ELECTRICAL SERVICE
-  TELEPHONE AND/OR POWER POLE
-  CULVERT
-  DRAINAGE PIPE









**PROPOSED
 ILLUMINATION
 LAYOUT
 US 59 AT FM 1997**

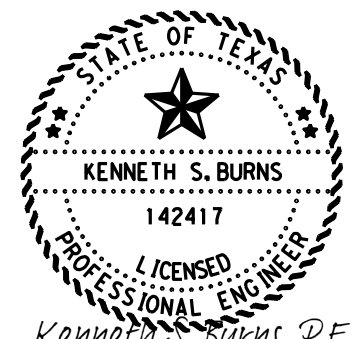
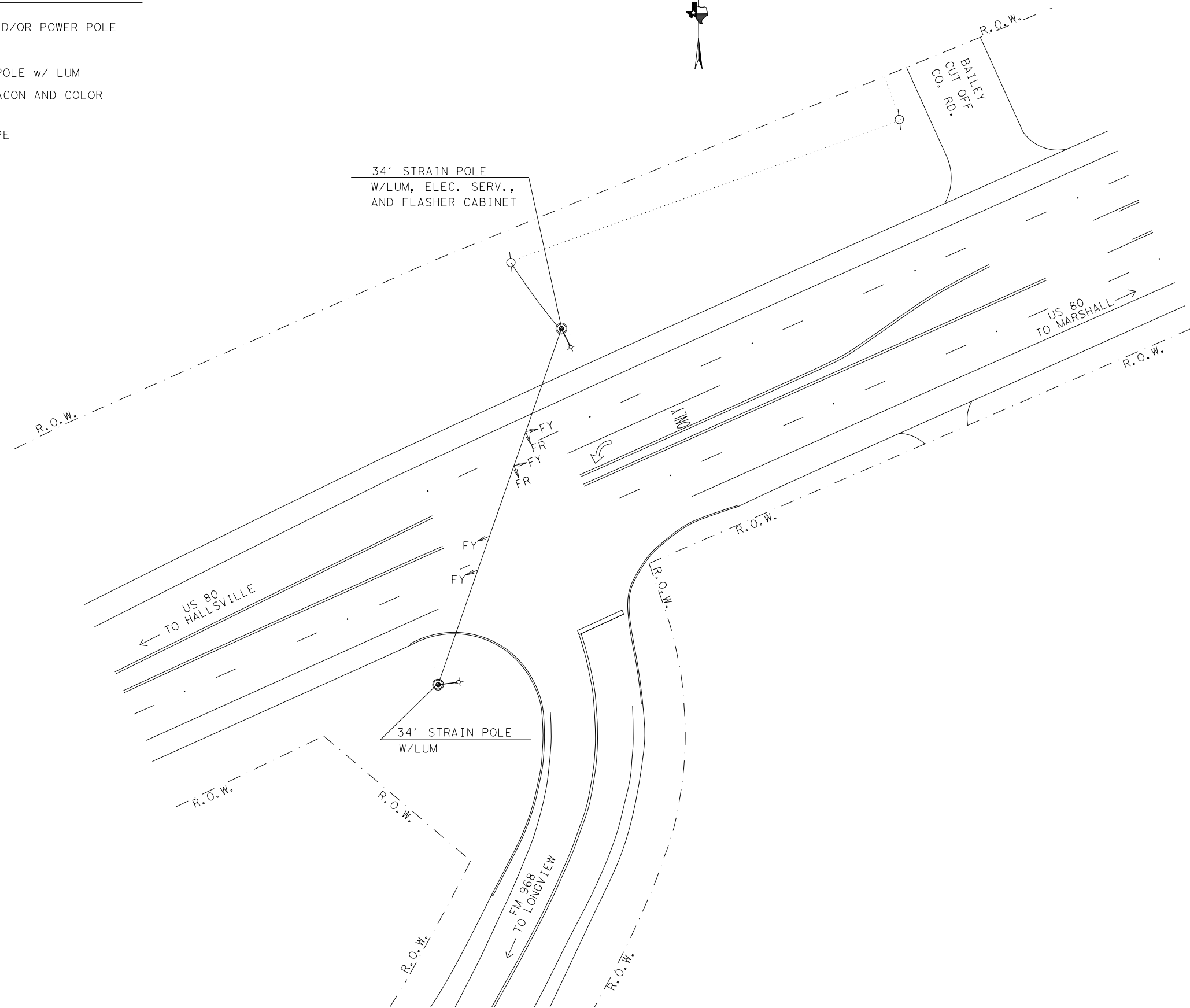
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 SHEET 3 OF 3

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				40
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



FILE: T:\engdata\Traffic\DN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr11 2024\Intersections\US 80 AT FM 968\US 80 AT FM 968.dgn
 DATE: 1/24/2024 8:27:25 AM

- LEGEND
-  TELEPHONE AND/OR POWER POLE
 -  POWER LINE
 -  34' STRAIN POLE w/ LUM
 -  FLASHING BEACON AND COLOR
 -  CULVERT
 -  DRAINAGE PIPE

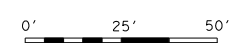


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 1/25/2024

**EXISTING CONDITION
 LAYOUT
 US 80 AT FM 968**



FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				41
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



FILE: T:\engdata\Traffic\Traffic\Lighting Projects\Lighting Project Apr 11 2024\Intersections\US 80 AT FM 968\US 80 AT FM 968.dgn
 DATE: 1/24/2024 9:35:51 AM

RUN NO.	CONDUIT 2" PVC		TYP D GROUND BOX APRON NONE	TYP A GROUND BOX APRON NONE	CONDUCTORS			
	BORED (LF)	TRENCHED (LF)			#6 INSULATED		#6 BARE	
					NO. OF CONDUCTORS	LF	NO. OF CONDUCTORS	LF
1		15		1	2	50	1	25
2		30		1	2	70	1	35
3	136			1	2	282	1	141
4		20			2	50	1	25
5	86			1	2	182	1	91
6		74			2	158	1	79
7		168			2	336	1	168
8	82				2	174	1	87
9		75			2	160	1	80
10		110			2	220	1	110
11	120				2	250	1	125
TOTALS	424	492		4		1932		966

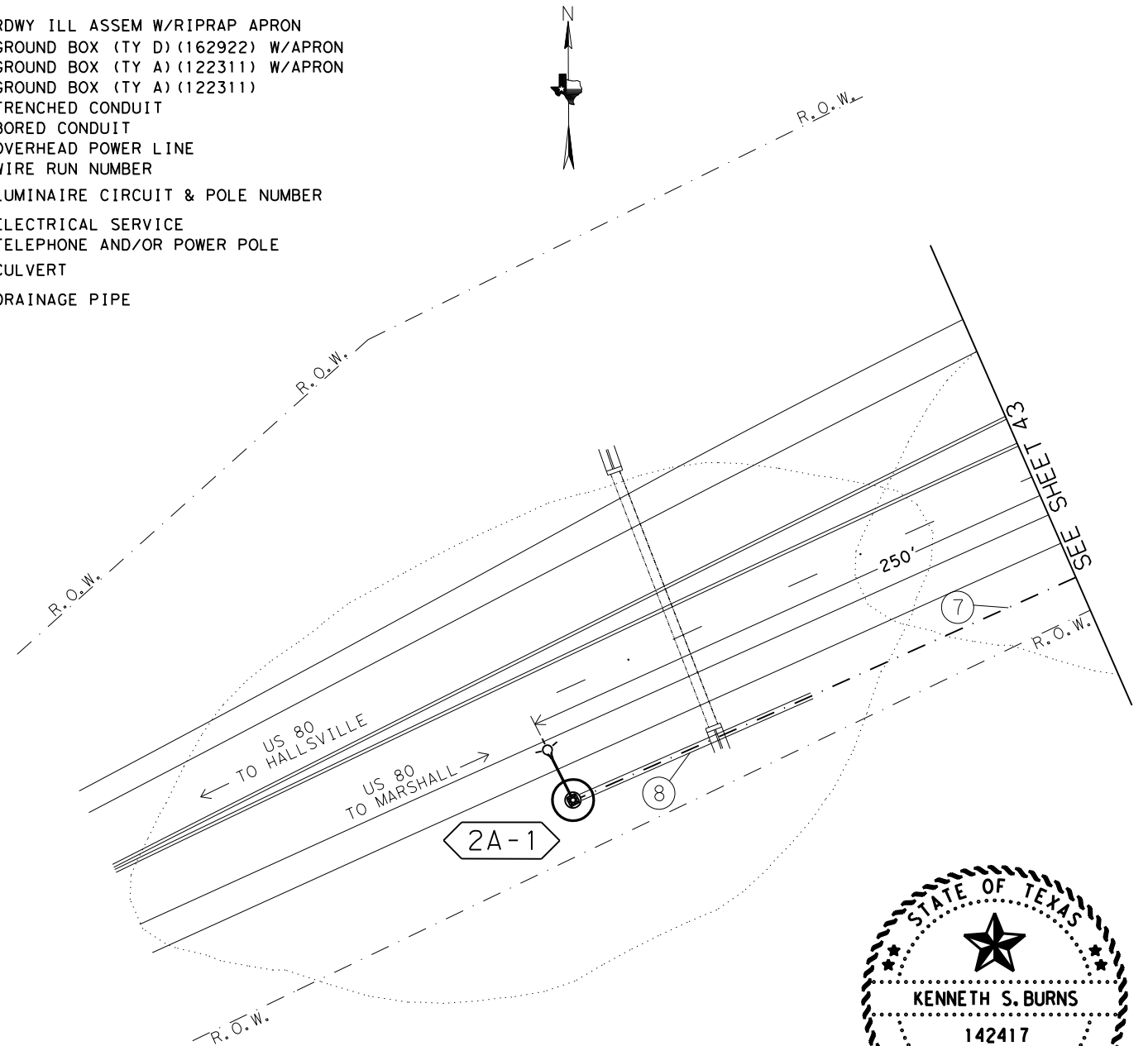
* CALCULATIONS FOR WIRE TOTALS:
 -5' OF SLACK FOR GROUND BOXES. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE SERVICE. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE BASE OF ILLUMINATION POLES. (PER CONDUCTOR)

ROADWAY ILLUMINATION ASSEMBLY SUMMARY			
POLE	TYPE	FND. (LF)	REMARKS
2A-1	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE
2A-2	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE
2A-3	(TY SA)50T-10(400W EQ)LED	10	12' OFF BACK OF CURB
2A-4	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE
2A-5	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE

SUMMARY OF QUANTITIES-ILLUMINATION				
ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	50
0432	6006	RIPRAP (CONC) (CL B)	CY	3
0610	6288	IN RD IL (TY SA)50T-10(400W EQ)LED	EA	5
0618	6023	CONDT (PVC) (SCHD 40) (2")	LF	492
0618	6024	CONDT (PVC) (SCHD 40) (2") (BORE)	LF	424
0620	6009	ELEC CONDR (NO. 6) BARE	LF	966
0620	6010	ELEC CONDR (NO. 6) INSULATED	LF	1932
0624	6002	GROUND BOX TY A (122311) W/APRON	EA	4
0628	6004	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	EA	1
0680	6004	REMOVING TRAFFIC SIGNALS	EA	1
6185	6002	TMA (STATIONARY)	DAY	15

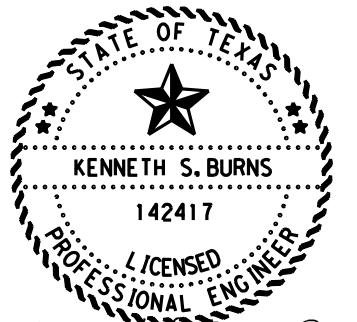
LEGEND

- RDWY ILL ASSEM W/RIPRAP APRON
- GROUND BOX (TY D) (162922) W/APRON
- GROUND BOX (TY A) (122311) W/APRON
- GROUND BOX (TY A) (122311)
- TRENCHED CONDUIT
- BORED CONDUIT
- OVERHEAD POWER LINE
- WIRE RUN NUMBER
- LUMINAIRE CIRCUIT & POLE NUMBER
- ELECTRICAL SERVICE
- TELEPHONE AND/OR POWER POLE
- CULVERT
- DRAINAGE PIPE



NOTE:

- 1.) INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. REMOVE FOUNDATIONS FOR STRAIN POLES 2' BELOW GRADE IN ACCORDANCE WITH ITEM 680 6004 REMOVING TRAFFIC SIGNALS. ALL REMOVAL ITEMS WILL BECOME THE PROPERTY OF THE CONTRACTOR UPON REMOVAL.
- 2.) OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- 3.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 4.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 5.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 6.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.



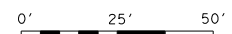
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1/25/2024

PROPOSED ILLUMINATION LAYOUT US 80 AT FM 968














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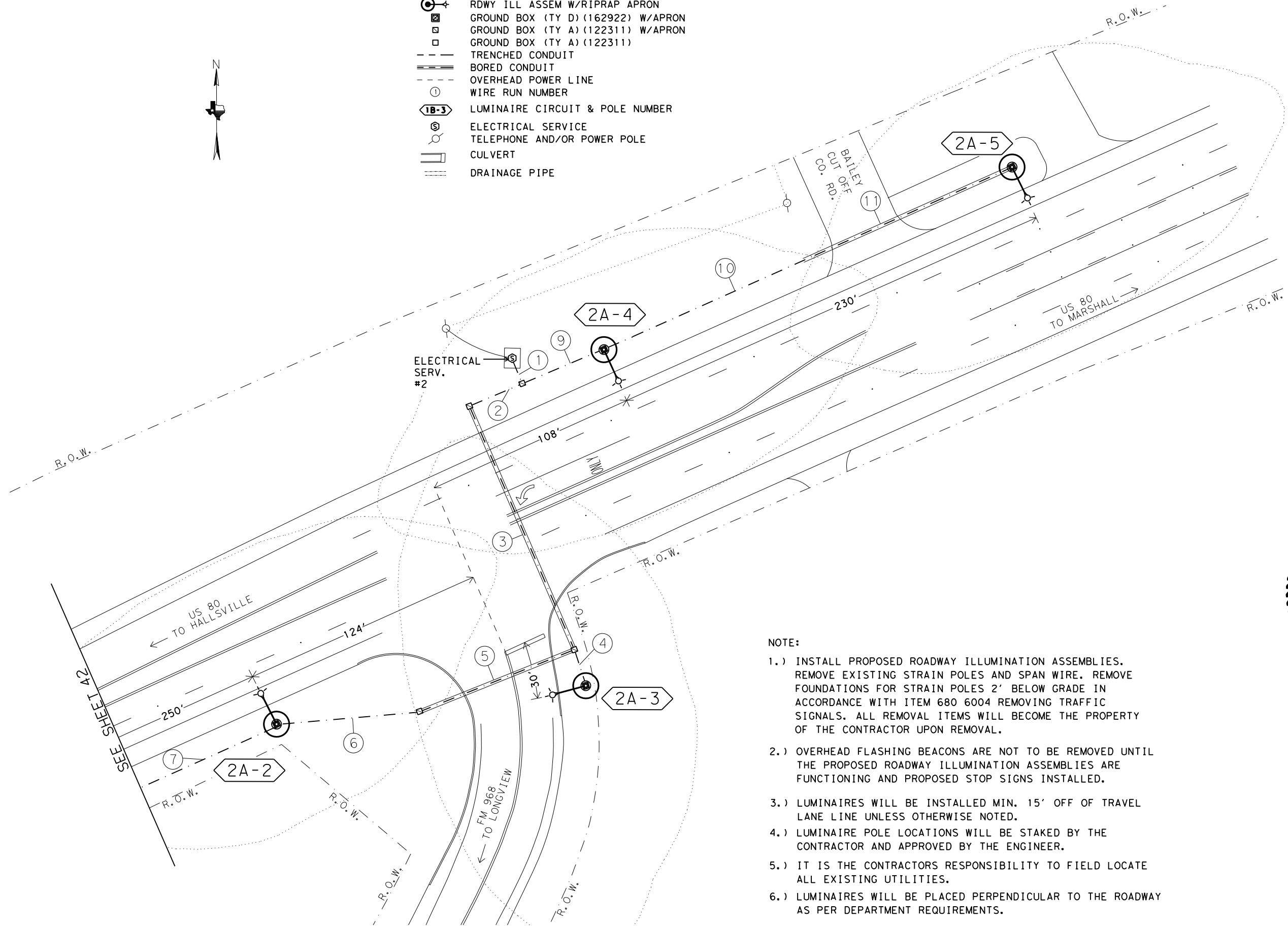
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				42
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



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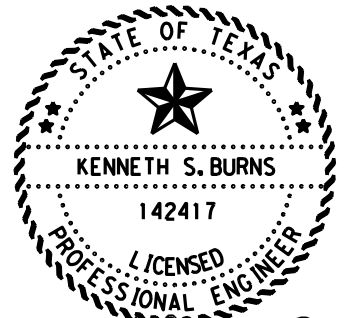
LEGEND

-  RDWY ILL ASSEM W/RIPRAP APRON
-  GROUND BOX (TY D) (162922) W/APRON
-  GROUND BOX (TY A) (122311) W/APRON
-  GROUND BOX (TY A) (122311)
-  TRENCHED CONDUIT
-  BORED CONDUIT
-  OVERHEAD POWER LINE
-  WIRE RUN NUMBER
-  LUMINAIRE CIRCUIT & POLE NUMBER
-  ELECTRICAL SERVICE
-  TELEPHONE AND/OR POWER POLE
-  CULVERT
-  DRAINAGE PIPE



NOTE:

- 1.) INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. REMOVE FOUNDATIONS FOR STRAIN POLES 2' BELOW GRADE IN ACCORDANCE WITH ITEM 680 6004 REMOVING TRAFFIC SIGNALS. ALL REMOVAL ITEMS WILL BECOME THE PROPERTY OF THE CONTRACTOR UPON REMOVAL.
- 2.) OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- 3.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 4.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 5.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 6.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.



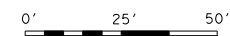
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1/25/2024

**PROPOSED
ILLUMINATION
LAYOUT
US 80 AT FM 968**

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SHEET 2 OF 2

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				43
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



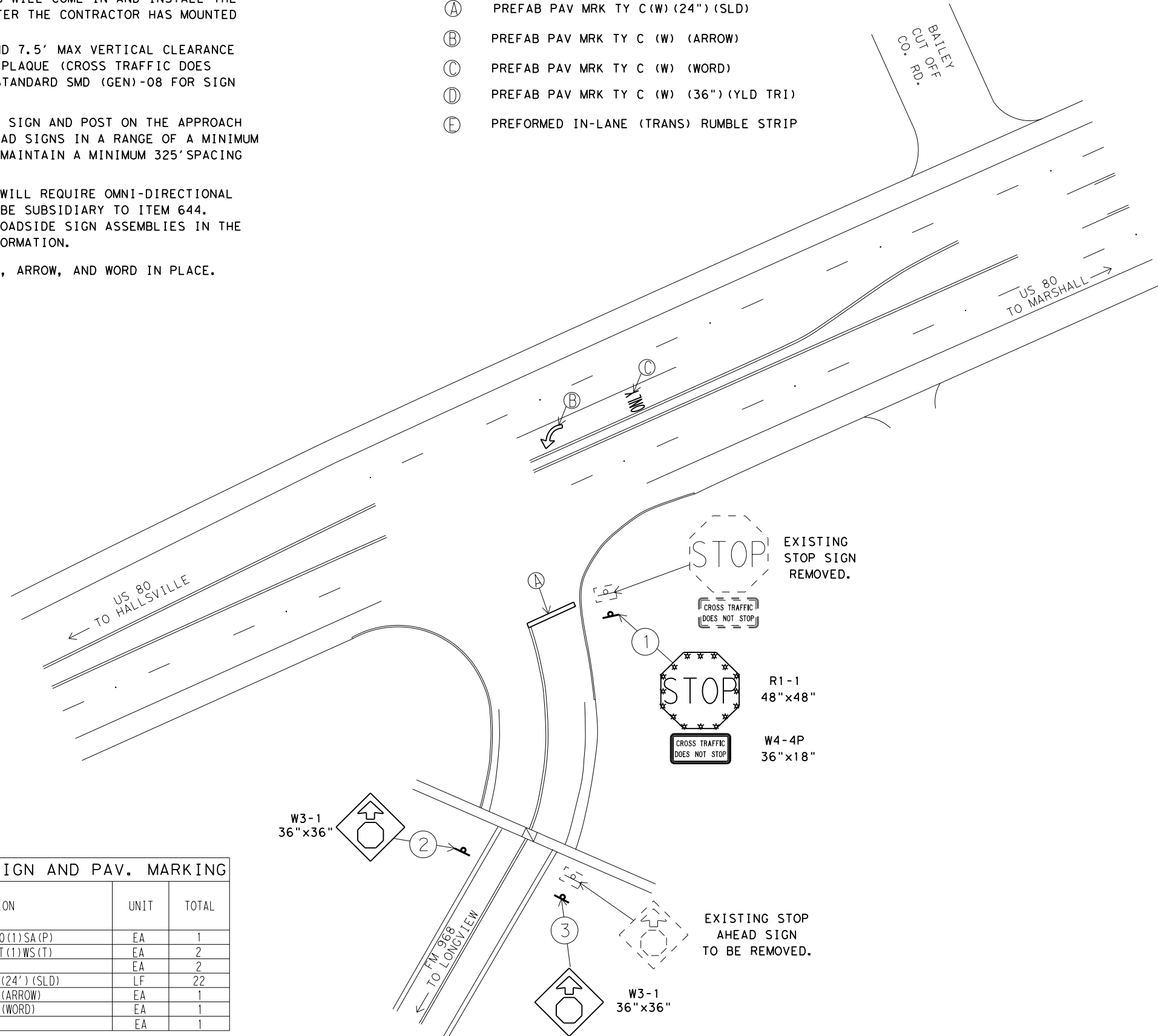
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NOTE:

- 1.) REMOVE EXISTING STOP SIGN. INSTALL PROPOSED STOP SIGN WITH CROSS TRAFFIC DOES NOT STOP PLAQUE AS SHOWN. THE STOP SIGN WILL HAVE AN LED RING AND WILL NEED TO HAVE THE POST 12" TALLER THAN THE TOP OF THE SIGN FOR BEACON INSTALLATION. STATE FORCES WILL COME IN AND INSTALL THE RING ASSEMBLY FOR THIS AFTER THE CONTRACTOR HAS MOUNTED THE SIGN.
- 2.) ENSURE 7' MIN CLEARANCE AND 7.5' MAX VERTICAL CLEARANCE TO BOTTOM OF SUPPLEMENTAL PLAQUE (CROSS TRAFFIC DOES NOT STOP). REFER TO SIGN STANDARD SMD (GEN)-08 FOR SIGN PLACEMENT DETAILS.
- 3.) REMOVE EXISTING STOP AHEAD SIGN AND POST ON THE APPROACH AS SHOWN. INSTALL STOP AHEAD SIGNS IN A RANGE OF A MINIMUM DISTANCE OF 975' TO 1150'. MAINTAIN A MINIMUM 325' SPACING BETWEEN EXISTING SIGNS.
- 4.) INSTALLED SIGN ASSEMBLIES WILL REQUIRE OMNI-DIRECTIONAL POST WRAP. THIS WRAP WILL BE SUBSIDIARY TO ITEM 644. REFERENCE ITEM 644 SMALL ROADSIDE SIGN ASSEMBLIES IN THE GENERAL NOTES FOR MORE INFORMATION.
- 5.) RESTRIPE EXISTING STOP BAR, ARROW, AND WORD IN PLACE.

LEGEND

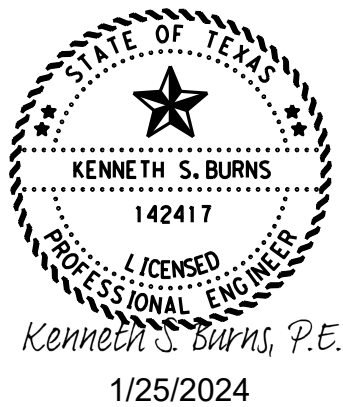
- [] EXISTING SIGN TO BE REMOVED
- P PROPOSED SIGN
- (A) PREFAB PAV MRK TY C (W) (24") (SLD)
- (B) PREFAB PAV MRK TY C (W) (ARROW)
- (C) PREFAB PAV MRK TY C (W) (WORD)
- (D) PREFAB PAV MRK TY C (W) (36") (YLD TRI)
- (E) PREFORMED IN-LANE (TRANS) RUMBLE STRIP



SUMMARY OF QUANTITIES-SIGN AND PAV. MARKING

ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0644	6027	IN SM RD SN SUP&AM TY S80(1)SA(P)	EA	1
0644	6061	IN SM RD SN SUP&AM TY TWT(1)WS(T)	EA	2
0644	6076	REMOVE SM RD SN SUP&AM	EA	2
0668	6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	22
0668	6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	1
0668	6085	PREFAB PAV MRK TY C (W) (WORD)	EA	1
*		LED RING	EA	1

* PROVIDED BY TXDOT AND INSTALLED BY TXDOT.



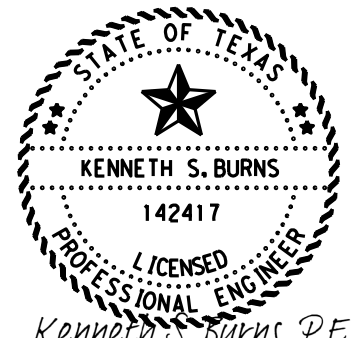
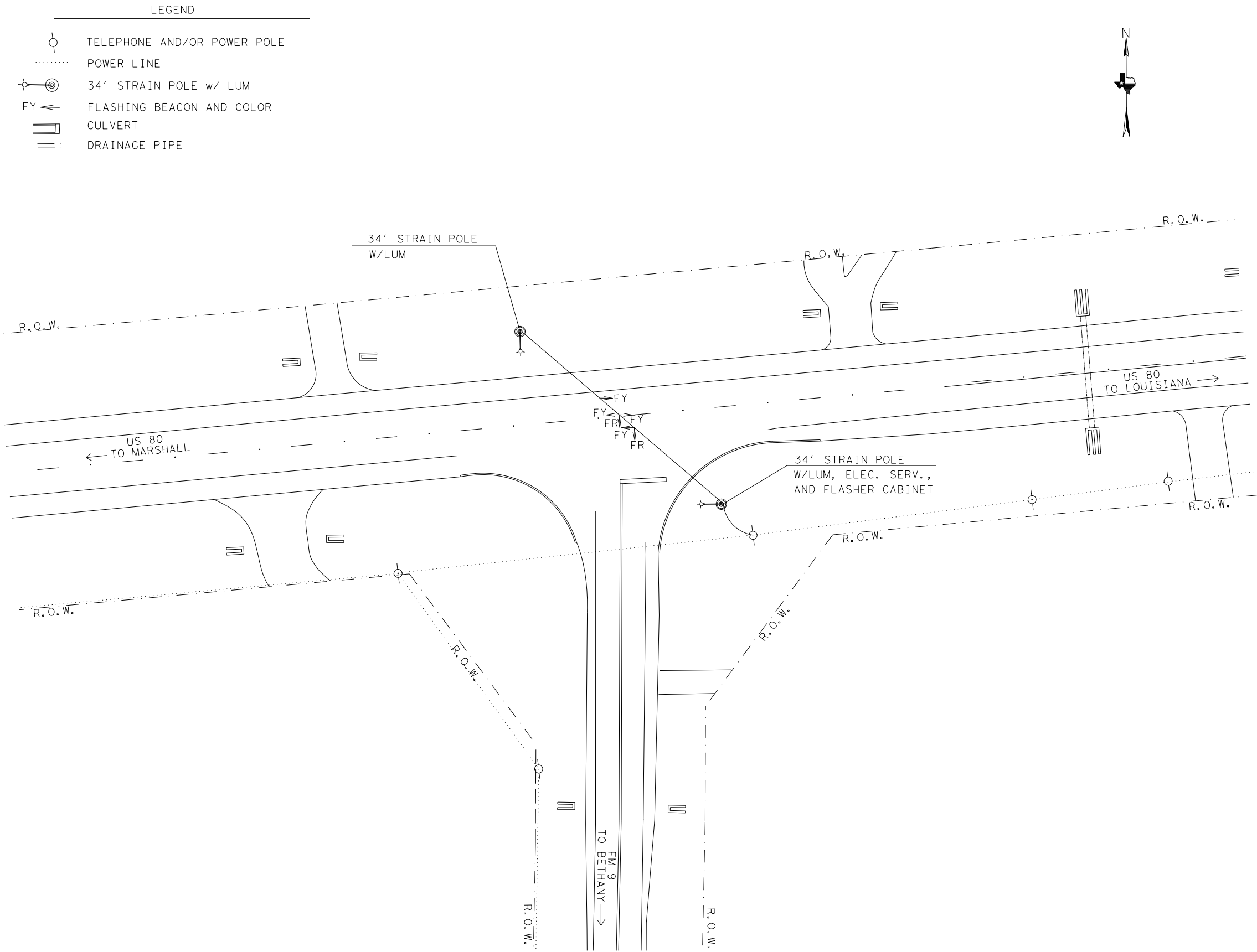
**PROPOSED
SIGN AND
PAVEMENT MARKING
LAYOUT
US 80 AT FM 968**



FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				44
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

NOT TO SCALE

FILE: T:\engdata\Traffic\DGN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr11 2024\Intersections\US 80 AT FM 9\US 80 at FM 9.dgn
 DATE: 1/24/2024 8:30:24 AM

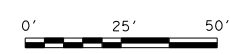


Kenneth S. Burns, P.E.
 1/25/2024

**EXISTING CONDITION
 LAYOUT
 US 80 AT FM 9 S.**



FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				45
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



T:\engdata\Traffic\Traffic\Lighting Projects\Lighting Project Apr 11 2024\Intersections\US 80 AT FM 9\US 80 at FM 9.dgn
 FILE: 1/24/2024
 DATE:

RUN NO.	CONDUIT 2" PVC		TYP D GROUND BOX APRON NONE	TYP A GROUND BOX APRON NONE	CONDUCTORS			
	BORED (LF)	TRENCHED (LF)			#6 INSULATED		#6 BARE	
					NO. OF CONDUCTORS	LF	NO. OF CONDUCTORS	LF
1		14			2	48	1	24
2	119				2	248	1	124
3		82			2	174	1	87
4		67			2	144	1	72
5	74				2	158	1	79
6		176			2	162	1	81
7	70			1	2	150	1	75
8	92				2	194	1	97
9	250				2	510	1	255
TOTALS	605	339		3		1788		894

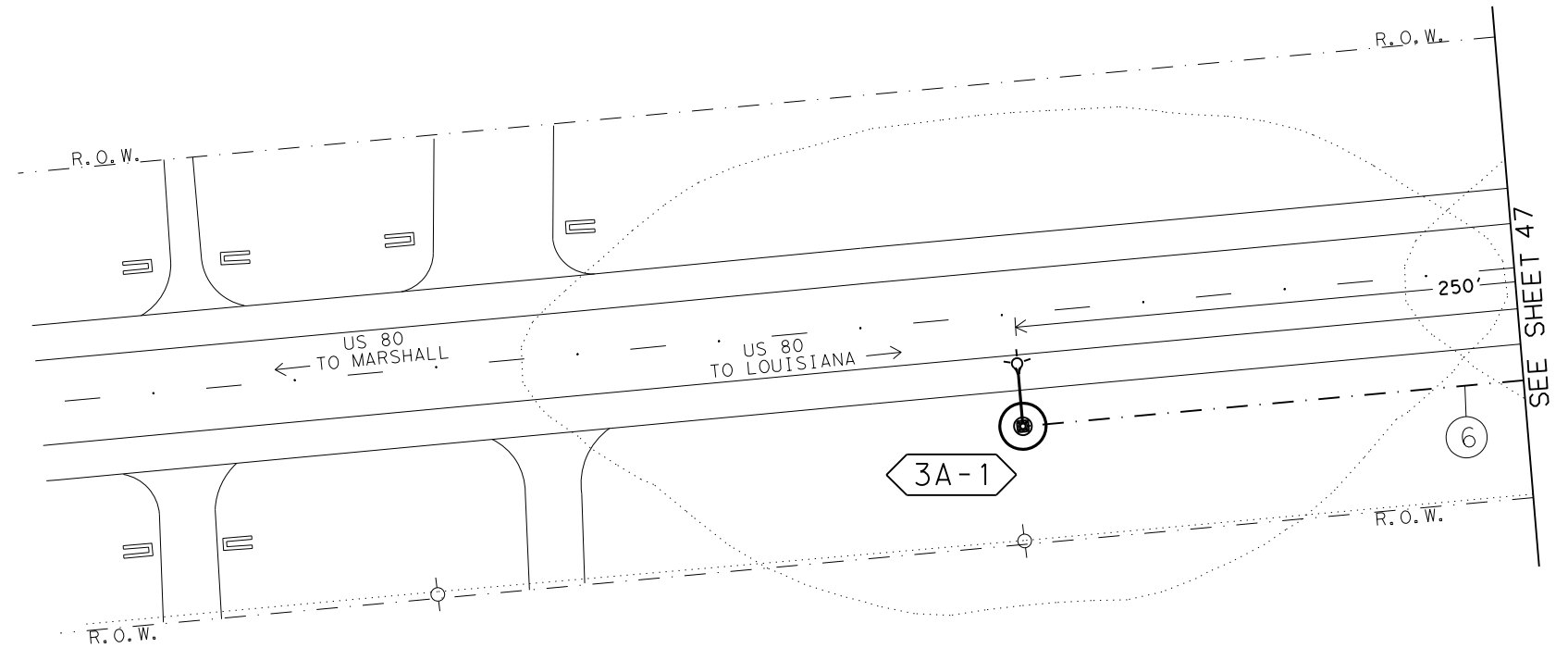
* CALCULATIONS FOR WIRE TOTALS:
 -5' OF SLACK FOR GROUND BOXES. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE SERVICE. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE BASE OF ILLUMINATION POLES. (PER CONDUCTOR)

ROADWAY ILLUMINATION ASSEMBLY SUMMARY			
POLE	TYPE	FND. (LF)	REMARKS
3A-1	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE
3A-2	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE
3A-3	(TY SA)50T-10(400W EQ)LED	10	15' OFF TRAVEL LANE
3A-4	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE
3A-5	(TY SA)50T-10(400W EQ)LED	10	18' OFF TRAVEL LANE

SUMMARY OF QUANTITIES-ILLUMINATION				
ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	50
0432	6006	RIPRAP (CONC) (CL B)	CY	3
0610	6288	IN RD IL (TY SA)50T-10(400W EQ)LED	EA	5
0618	6023	COND (PVC) (SCHD 40) (2")	LF	339
0618	6024	COND (PVC) (SCHD 40) (2") (BORE)	LF	605
0620	6009	ELEC CONDR (NO. 6) BARE	LF	894
0620	6010	ELEC CONDR (NO. 6) INSULATED	LF	1788
0624	6002	GROUND BOX TY A (122311) W/APRON	EA	3
0628	6004	ELC SRV TY A 120/240 060 (NS)AL (E) SP (O)	EA	1
0680	6004	REMOVING TRAFFIC SIGNALS	EA	1
6185	6002	TMA (STATIONARY)	DAY	15

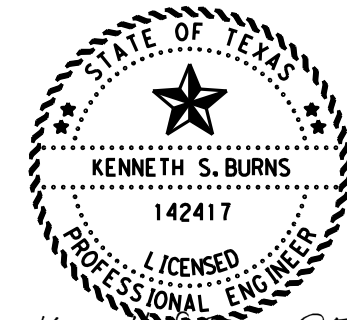
LEGEND

- RDWY ILL ASSEM W/RIPRAP APRON
- GROUND BOX (TY D) (162922) W/APRON
- GROUND BOX (TY A) (122311) W/APRON
- GROUND BOX (TY A) (122311)
- TRENCHED CONDUIT
- BORED CONDUIT
- OVERHEAD POWER LINE
- WIRE RUN NUMBER
- LUMINAIRE CIRCUIT & POLE NUMBER
- ELECTRICAL SERVICE
- TELEPHONE AND/OR POWER POLE
- CULVERT
- DRAINAGE PIPE



NOTE:

- 1.) INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. REMOVE FOUNDATIONS FOR STRAIN POLES 2' BELOW GRADE IN ACCORDANCE WITH ITEM 680 6004 REMOVING TRAFFIC SIGNALS. ALL REMOVAL ITEMS WILL BECOME THE PROPERTY OF THE CONTRACTOR UPON REMOVAL.
- 2.) OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- 3.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 4.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 5.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 6.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

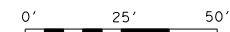


Kenneth S. Burns, P.E.
 1/25/2024

PROPOSED ILLUMINATION LAYOUT
US 80 AT FM 9 S.














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 SHEET 1 OF 2

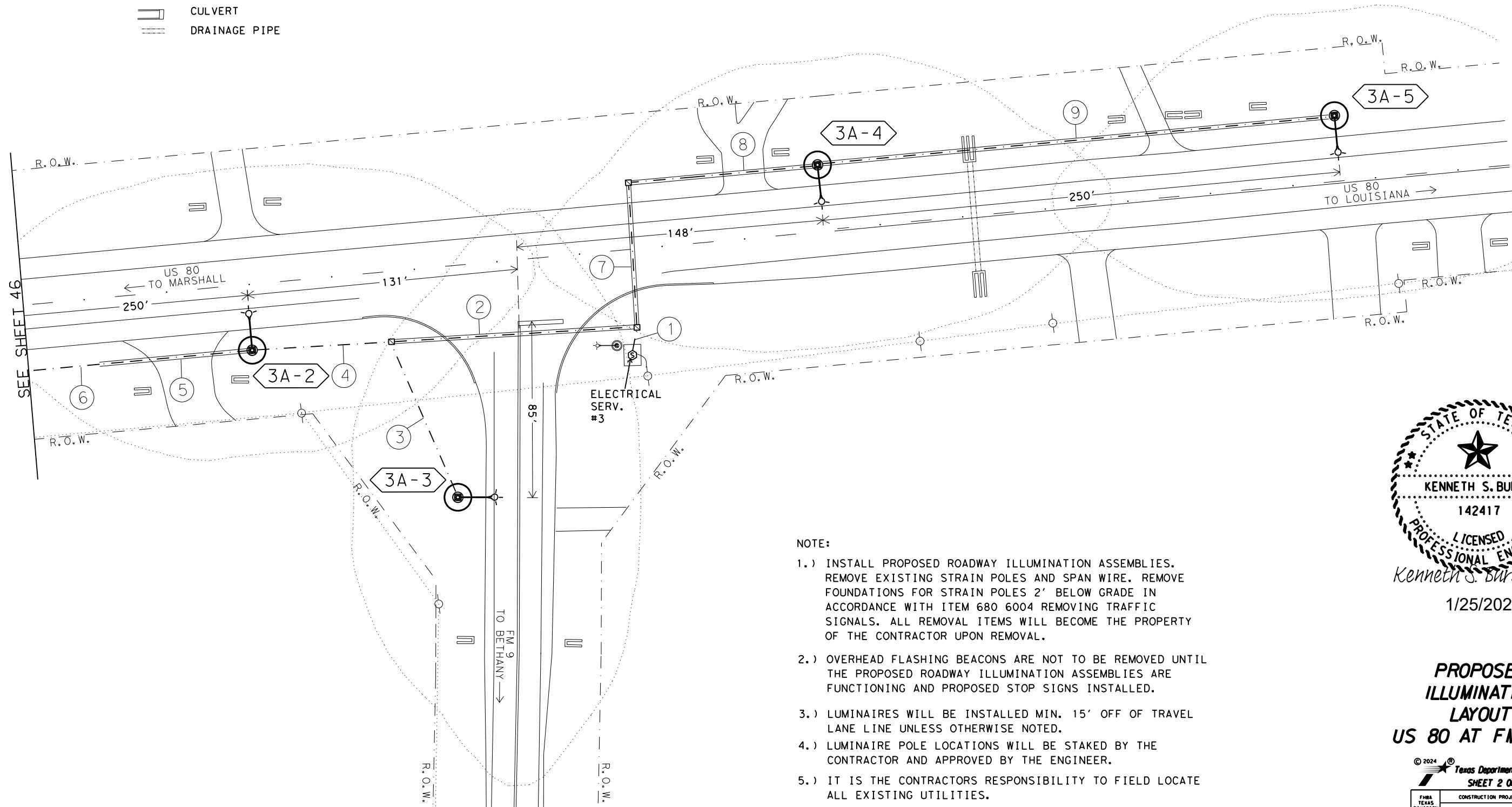
FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				46
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



FILE: T:\engdata\Traffic\DN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\US 80 AT FM 9\US 80 at FM 9.dgn
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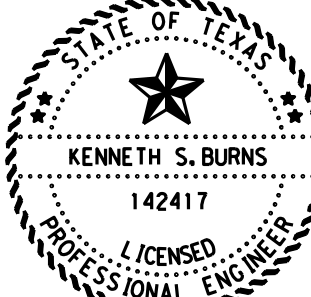
LEGEND

-  RDWY ILL ASSEM W/RIPRAP APRON
-  GROUND BOX (TY D) (162922) W/APRON
-  GROUND BOX (TY A) (122311) W/APRON
-  GROUND BOX (TY A) (122311)
-  TRENCHED CONDUIT
-  BORED CONDUIT
-  OVERHEAD POWER LINE
-  WIRE RUN NUMBER
-  LUMINAIRE CIRCUIT & POLE NUMBER
-  ELECTRICAL SERVICE
-  TELEPHONE AND/OR POWER POLE
-  CULVERT
-  DRAINAGE PIPE



NOTE:

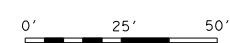
- 1.) INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. REMOVE FOUNDATIONS FOR STRAIN POLES 2' BELOW GRADE IN ACCORDANCE WITH ITEM 680 6004 REMOVING TRAFFIC SIGNALS. ALL REMOVAL ITEMS WILL BECOME THE PROPERTY OF THE CONTRACTOR UPON REMOVAL.
- 2.) OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- 3.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 4.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 5.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 6.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.


 KENNETH S. BURNS
 142417
 LICENSED PROFESSIONAL ENGINEER
Kenneth S. Burns, P.E.
 1/25/2024

**PROPOSED ILLUMINATION LAYOUT
US 80 AT FM 9 S.**

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SHEET 2 OF 2

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				47
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



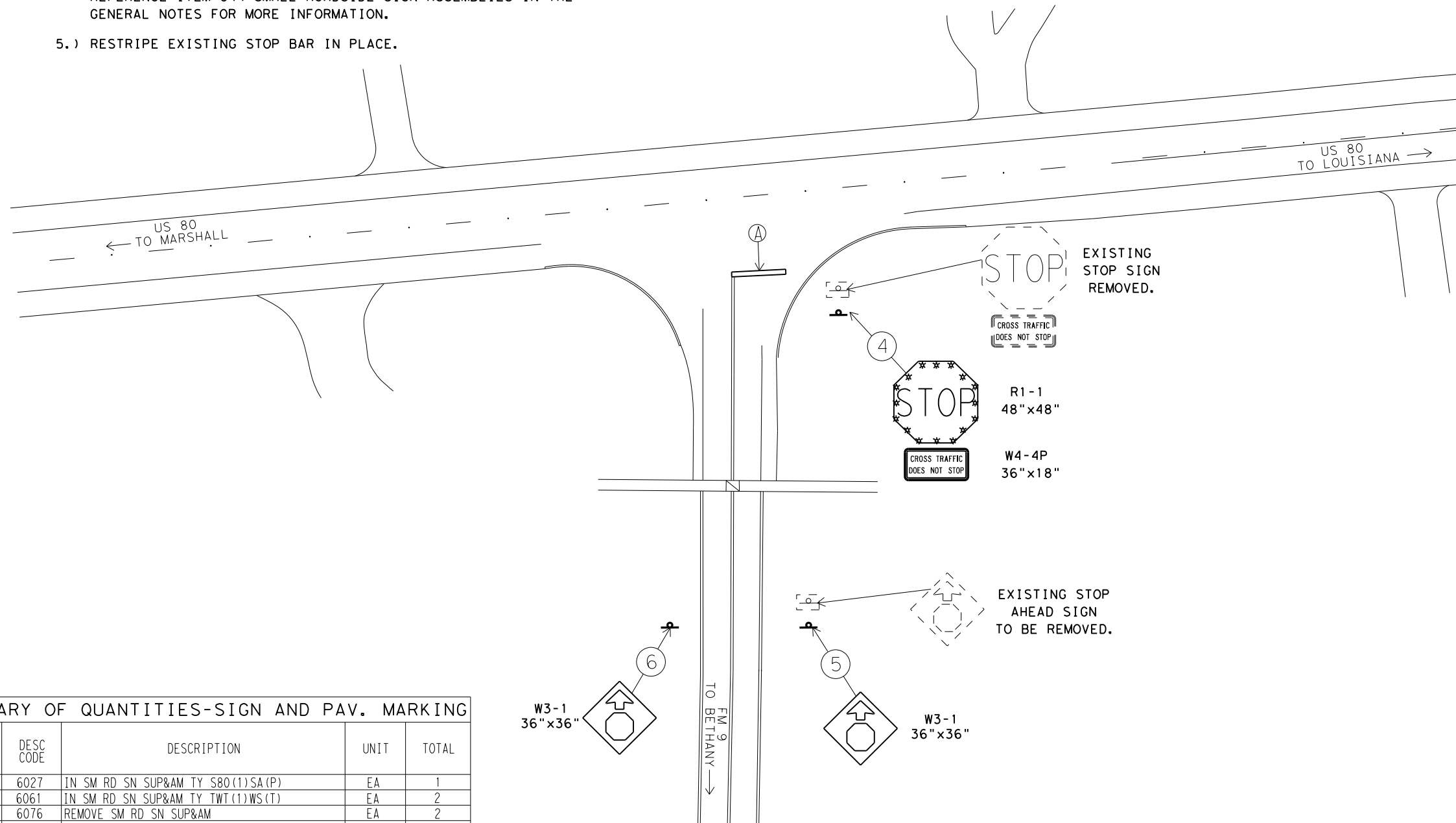
FILE: T:\engdata\Traffic\NGN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\US 80 AT FM 9\US 80 at FM 9.dgn
 DATE: 1/24/2024 8:33:59 AM

NOTE:

- 1.) REMOVE EXISTING STOP SIGN. INSTALL PROPOSED STOP SIGN WITH CROSS TRAFFIC DOES NOT STOP PLAQUE AS SHOWN. THE STOP SIGN WILL HAVE AN LED RING AND WILL NEED TO HAVE THE POST 12" TALLER THAN THE TOP OF THE SIGN FOR BEACON INSTALLATION. STATE FORCES WILL COME IN AND INSTALL THE RING ASSEMBLY FOR THIS AFTER THE CONTRACTOR HAS MOUNTED THE SIGN.
- 2.) ENSURE 7' MIN CLEARANCE AND 7.5' MAX VERTICAL CLEARANCE TO BOTTOM OF SUPPLEMENTAL PLAQUE (CROSS TRAFFIC DOES NOT STOP). REFER TO SIGN STANDARD SMD (GEN)-08 FOR SIGN PLACEMENT DETAILS.
- 3.) REMOVE EXISTING STOP AHEAD SIGN AND POST ON THE APPROACH AS SHOWN. INSTALL STOP AHEAD SIGNS IN A RANGE OF A MINIMUM DISTANCE OF 975' TO 1150'. MAINTAIN A MINIMUM 325' SPACING BETWEEN EXISTING SIGNS.
- 4.) INSTALLED SIGN ASSEMBLIES WILL REQUIRE OMNI-DIRECTIONAL POST WRAP. THIS WRAP WILL BE SUBSIDIARY TO ITEM 644. REFERENCE ITEM 644 SMALL ROADSIDE SIGN ASSEMBLIES IN THE GENERAL NOTES FOR MORE INFORMATION.
- 5.) RESTRIPE EXISTING STOP BAR IN PLACE.

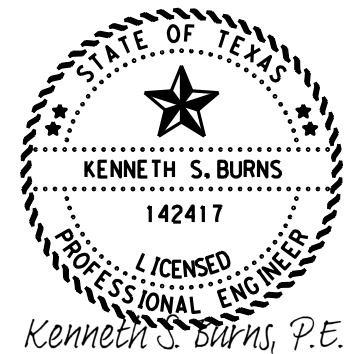
LEGEND

- [F] EXISTING SIGN TO BE REMOVED
- P PROPOSED SIGN
- (A) PREFAB PAV MRK TY C (W) (24") (SLD)
- (B) PREFAB PAV MRK TY C (W) (ARROW)
- (C) PREFAB PAV MRK TY C (W) (WORD)
- (D) PREFAB PAV MRK TY C (W) (36") (YLD TRI)
- (E) PREFORMED IN-LANE (TRANS) RUMBLE STRIP



SUMMARY OF QUANTITIES-SIGN AND PAV. MARKING				
ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0644	6027	IN SM RD SN SUP&AM TY S80(1)SA(P)	EA	1
0644	6061	IN SM RD SN SUP&AM TY TWT(1)WS(T)	EA	2
0644	6076	REMOVE SM RD SN SUP&AM	EA	2
0668	6076	PREFAB PAV MRK TY C (W) (24') (SLD)	LF	22
*		LED RING	EA	1

* PROVIDED BY TXDOT AND INSTALLED BY TXDOT.



Kenneth S. Burns, P.E.
1/25/2024







**PROPOSED
SIGN AND
PAVEMENT MARKING
LAYOUT
US 80 AT FM 9 S.**

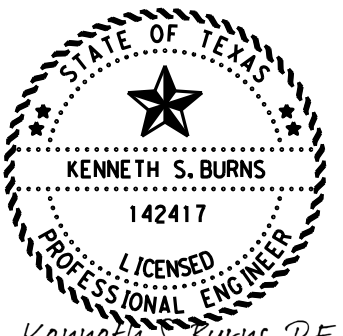
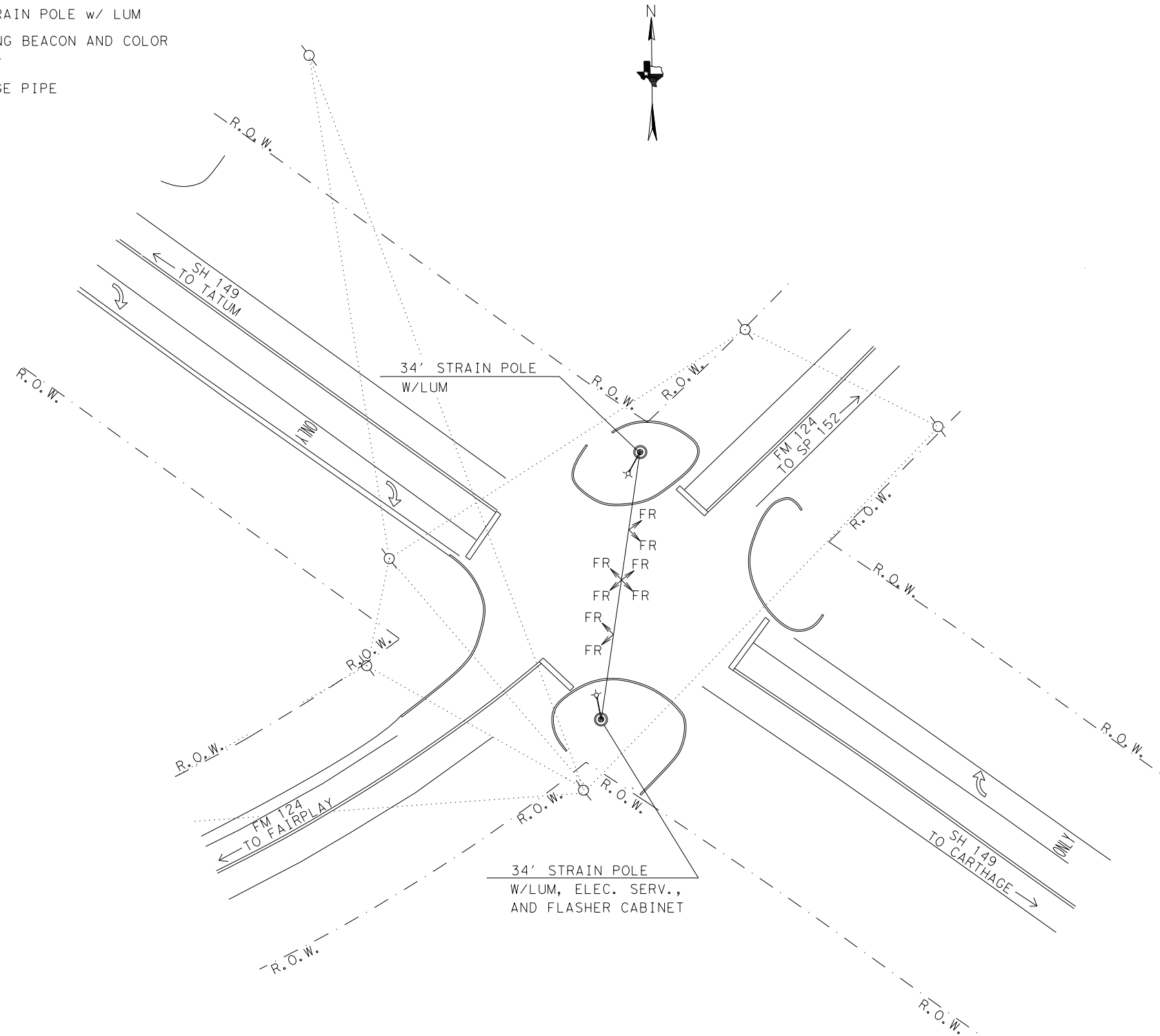


FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				48
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

NOT TO SCALE

FILE: T:\engdata\Traffic\DGN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\SH 149 at FM 124\SH 149 at FM 124.dgn
 DATE: 1/24/2024 8:35:03 AM

- LEGEND
-  TELEPHONE AND/OR POWER POLE
 -  POWER LINE
 -  34' STRAIN POLE w/ LUM
 -  FLASHING BEACON AND COLOR
 -  CULVERT
 -  DRAINAGE PIPE

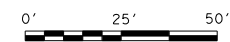


Kenneth S. Burns, P.E.
 1/25/2024

**EXISTING CONDITION
 LAYOUT
 SH 149 AT FM 124**



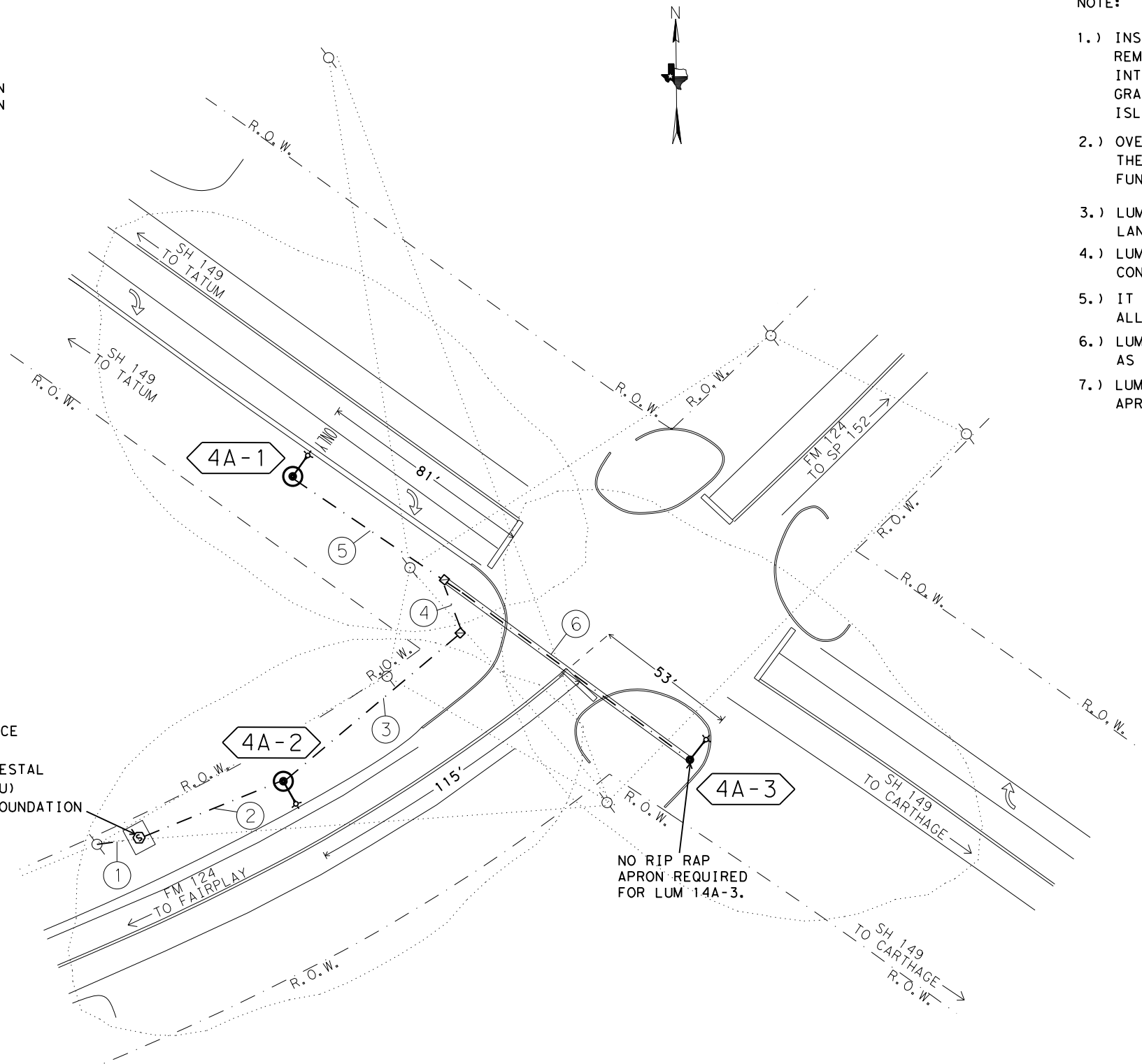
FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				49
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



FILE: T:\engdata\Traffic\DGN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\SH 149 at FM 124.dgn
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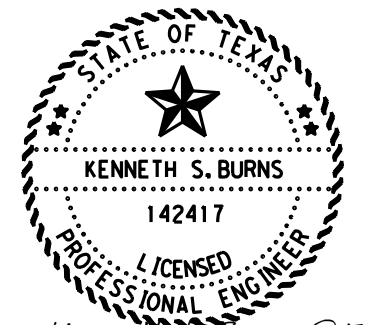
- LEGEND**
- RDWY ILL ASSEM W/RIPRAP APRON
 - GROUND BOX (TY D) (162922) W/APRON
 - GROUND BOX (TY A) (122311) W/APRON
 - TRENCHED CONDUIT
 - BORED CONDUIT
 - OVERHEAD POWER LINE
 - WIRE RUN NUMBER
 - LUMINAIRE CIRCUIT & POLE NUMBER
 - ELECTRICAL SERVICE
 - TELEPHONE AND/OR POWER POLE
 - CULVERT
 - DRAINAGE PIPE

ELECTRICAL SERV.
 #4
 PEDESTAL SERVICE
 SEE TYPICAL
 ELECTRICAL PEDESTAL
 SERVICE TYPE (U)
 AND MODIFIED FOUNDATION
 36" X 36"



NOTE:

- 1.) INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. FOR THIS INTERSECTION BOTH STRAIN POLES ARE SET IN ISLANDS WITH GRAVEL AND MIX MATERIAL. REMOVE FOUNDATIONS FLUSH WITH ISLAND INSEAD OF 2' BELOW GRADE.
- 2.) OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- 3.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 4.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 5.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 6.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.
- 7.) LUM 14A-3 WILL NOT REQUIRE A CONCRETE RIP RAP APRON AS IT WILL BE SET IN THE ISLAND.

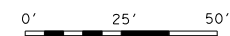


Kenneth S. Burns, P.E.
 1/25/2024

PROPOSED ILLUMINATION LAYOUT SH 149 AT FM 124

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 SHEET 1 OF 2

40' POLES WITH (250W EQ) LED HEADS ALL APPROACHES.



FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				50
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

FILE: T:\engdata\Traffic\DN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\SH 149 at FM 124\SH 149 at FM 124.dgn
 DATE: 1/24/2024 10:12:17 AM

CONDUIT AND CONDUCTOR RUNS FOR ILLUMINATION								
RUN NO.	CONDUIT 2" PVC		TYP D GROUND BOX	TYP A GROUND BOX	CONDUCTORS			
	BORED (LF)	TRENCHED (LF)	APRON NONE	APRON NONE	#6 INSULATED NO. OF CONDUCTORS	LF	#6 BARE NO. OF CONDUCTORS	LF
1		16			3	78		
2		58			2	126	1	63
3		86		1	2	182	1	91
4		22		1	2	54	1	27
5		67			2	144	1	72
6	113				2	236	1	118
TOTALS	113	249		2		820		371

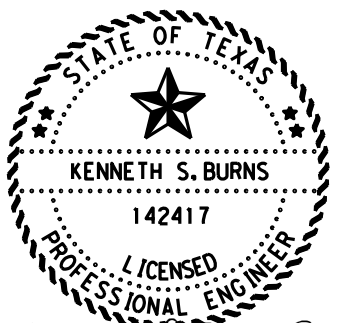
* CALCULATIONS FOR WIRE TOTALS:
 -5' OF SLACK FOR GROUND BOXES. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE SERVICE. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE BASE OF ILLUMINATION POLES. (PER CONDUCTOR)

SUMMARY OF QUANTITIES-ILLUMINATION				
ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	30
0432	6006	RIPRAP (CONC) (CL B)	CY	2
0610	6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA	3
0618	6023	CONDT (PVC) (SCHD 40) (2")	LF	249
0618	6024	CONDT (PVC) (SCHD 40) (2") (BORE)	LF	113
0620	6009	ELEC CONDR (NO. 6) BARE	LF	371
0620	6010	ELEC CONDR (NO. 6) INSULATED	LF	820
0624	6002	GROUND BOX TY A (122311) W/APRON	EA	2
0628	6003	ELC SRV TY A 120/240 060(NS) AL (E) PS (U)	EA	1
0680	6004	REMOVING TRAFFIC SIGNALS	EA	1
6185	6002	TMA (STATIONARY)	DAY	15

ROADWAY ILLUMINATION ASSEMBLY SUMMARY			
POLE	TYPE	FND. (LF)	REMARKS
4A-1	(TY SA) 40T-10 (250W EQ) LED	10	11' OFF TRAVEL LANE
4A-2	(TY SA) 40T-10 (250W EQ) LED	10	14' OFF TRAVEL LANE
4A-3	(TY SA) 40T-10 (250W EQ) LED	10	13' OFF BACK OF CURB

NOTE:

- LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.



Kenneth S. Burns, P.E.

1/25/2024

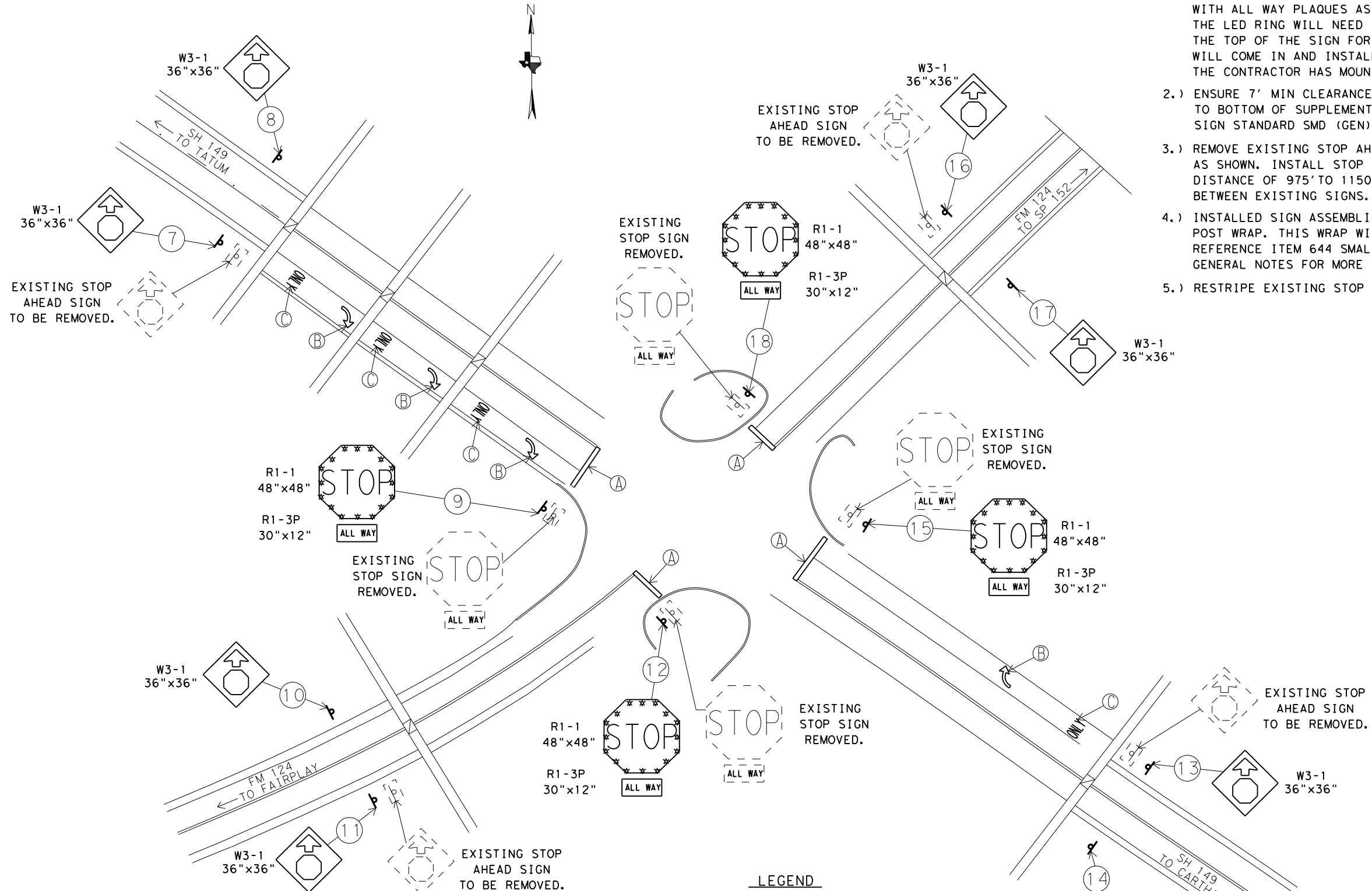
PROPOSED ILLUMINATION LAYOUT SH 149 AT FM 124

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 SHEET 2 OF 2

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				51
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

NOT TO SCALE

FILE: T:\engdata\Traffic\DN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\SH 149 at FM 124.dgn
 DATE: 1/24/2024 8:40:08 AM



NOTE:

- 1.) REMOVE EXISTING STOP SIGNS. INSTALL PROPOSED STOP SIGNS WITH ALL WAY PLAQUES AS SHOWN. THE STOP SIGNS SHOWN WITH THE LED RING WILL NEED TO HAVE THE POST 12" TALLER THAN THE TOP OF THE SIGN FOR BEACON INSTALLATION. STATE FORCES WILL COME IN AND INSTALL THE RING ASSEMBLIES FOR THIS AFTER THE CONTRACTOR HAS MOUNTED THE SIGNS.
- 2.) ENSURE 7' MIN CLEARANCE AND 7.5' MAX VERTICAL CLEARANCE TO BOTTOM OF SUPPLEMENTAL PLAQUE (ALL WAY). REFER TO SIGN STANDARD SMD (GEN)-08 FOR SIGN PLACEMENT DETAILS.
- 3.) REMOVE EXISTING STOP AHEAD SIGNS AND POSTS ON THE APPROACHES AS SHOWN. INSTALL STOP AHEAD SIGNS IN A RANGE OF A MINIMUM DISTANCE OF 975' TO 1150'. MAINTAIN A MINIMUM 325' SPACING BETWEEN EXISTING SIGNS.
- 4.) INSTALLED SIGN ASSEMBLIES WILL REQUIRE OMNI-DIRECTIONAL POST WRAP. THIS WRAP WILL BE SUBSIDIARY TO ITEM 644. REFERENCE ITEM 644 SMALL ROADSIDE SIGN ASSEMBLIES IN THE GENERAL NOTES FOR MORE INFORMATION.
- 5.) RESTRIPE EXISTING STOP BARS, ARROWS, AND WORDS IN PLACE.

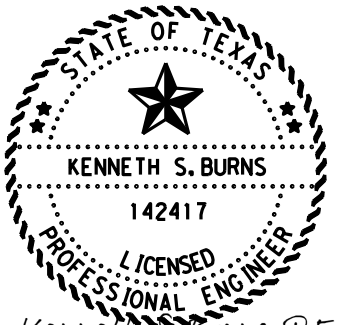
SUMMARY OF QUANTITIES-SIGN AND PAV. MARKING

ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0644	6027	IN SM RD SN SUP&AM TY S80(1)SA(P)	EA	4
0644	6061	IN SM RD SN SUP&AM TY TWT(1)WS(T)	EA	8
0644	6076	REMOVE SM RD SN SUP&AM	EA	8
0668	6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	76
0668	6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	4
0668	6085	PREFAB PAV MRK TY C (W) (WORD)	EA	4
*		LED RING	EA	4

* PROVIDED BY TXDOT AND INSTALLED BY TXDOT.

LEGEND

- EXISTING SIGN TO BE REMOVED
- PROPOSED SIGN
- PREFAB PAV MRK TY C (W) (24") (SLD)
- PREFAB PAV MRK TY C (W) (ARROW)
- PREFAB PAV MRK TY C (W) (WORD)
- PREFAB PAV MRK TY C (W) (36") (YLD TRI)
- PREFORMED IN-LANE (TRANS) RUMBLE STRIP



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 1/25/2024







PROPOSED SIGN AND PAVEMENT MARKING LAYOUT SH 149 AT FM 124

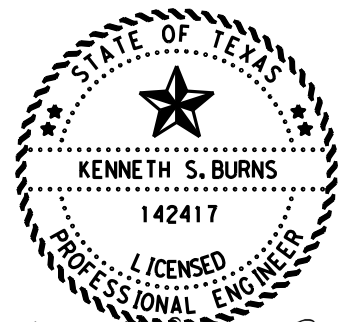
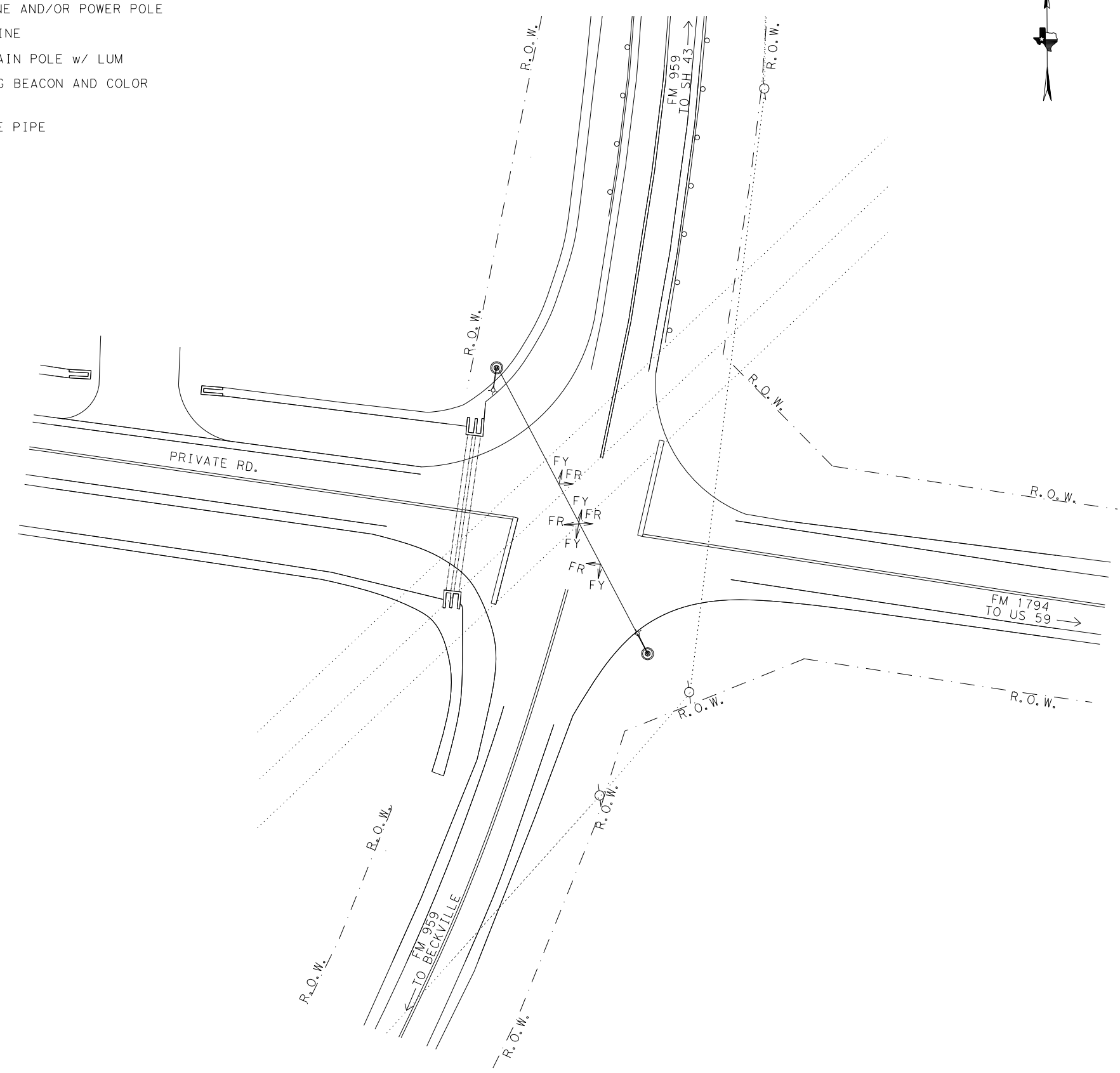


FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				52
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

NOT TO SCALE

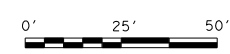
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 DATE: 1/24/2024 8:40:59 AM

- LEGEND
-  TELEPHONE AND/OR POWER POLE
 -  POWER LINE
 -  34' STRAIN POLE w/ LUM
 -  FLASHING BEACON AND COLOR
 -  CULVERT
 -  DRAINAGE PIPE



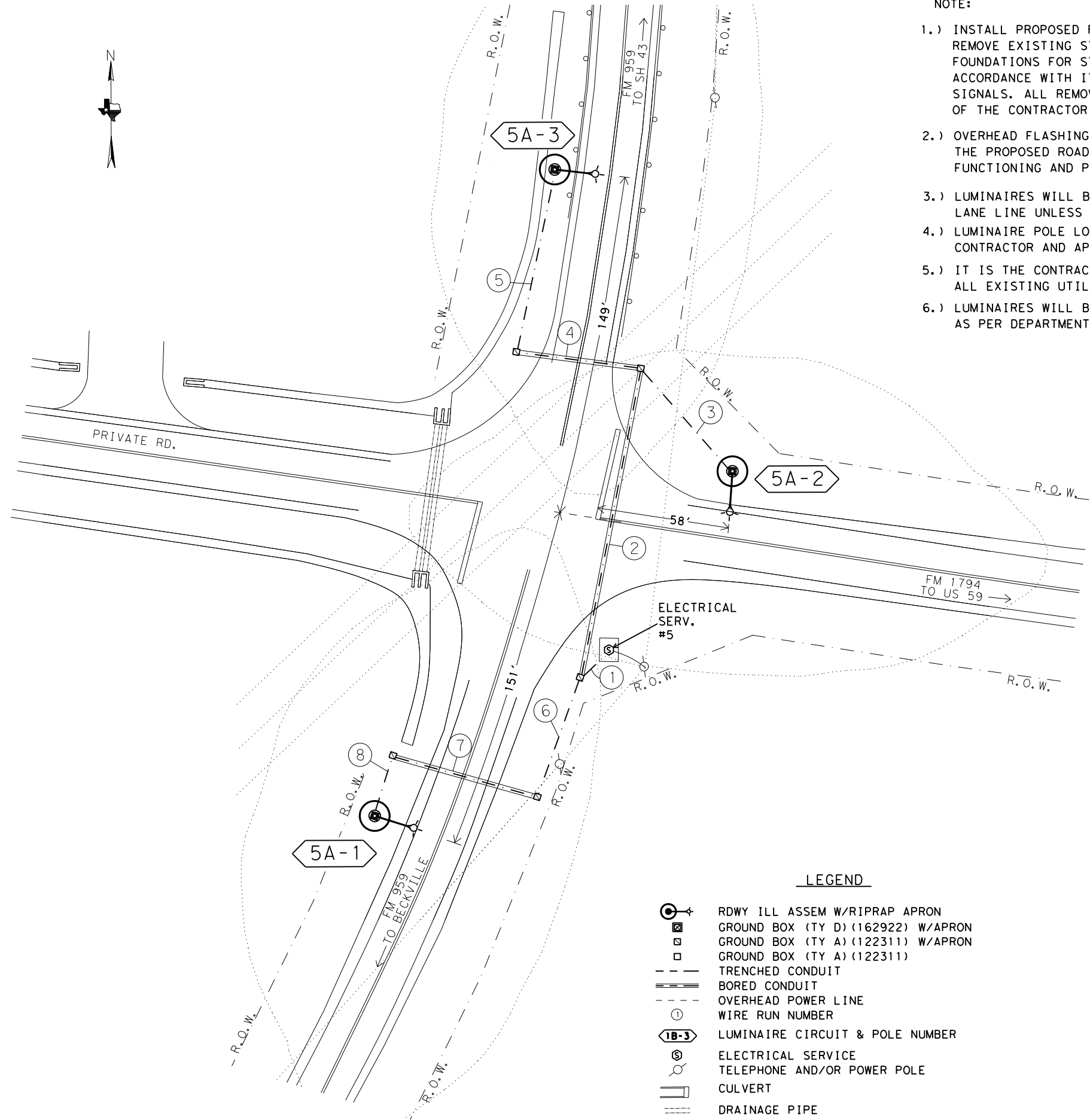
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 1/25/2024

**EXISTING CONDITION
 LAYOUT
 FM 959 AT FM 1794**



FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				53
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

FILE: T:\engdata\Traffic\DN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\FM 959 at FM 1794\FM 959 at FM 1794 .dgn
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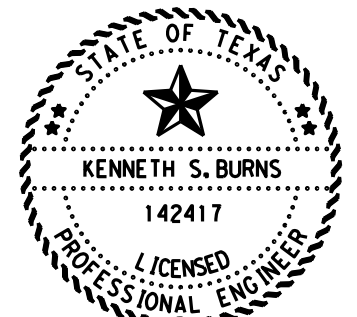


NOTE:

- 1.) INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. REMOVE FOUNDATIONS FOR STRAIN POLES 2' BELOW GRADE IN ACCORDANCE WITH ITEM 680 6004 REMOVING TRAFFIC SIGNALS. ALL REMOVAL ITEMS WILL BECOME THE PROPERTY OF THE CONTRACTOR UPON REMOVAL.
- 2.) OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- 3.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 4.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 5.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 6.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

LEGEND

- RDWY ILL ASSEM W/RIPRAP APRON
- GROUND BOX (TY D) (162922) W/APRON
- GROUND BOX (TY A) (122311) W/APRON
- GROUND BOX (TY A) (122311)
- TRENCHED CONDUIT
- BORED CONDUIT
- OVERHEAD POWER LINE
- WIRE RUN NUMBER
- LUMINAIRE CIRCUIT & POLE NUMBER
- ELECTRICAL SERVICE
- TELEPHONE AND/OR POWER POLE
- CULVERT
- DRAINAGE PIPE

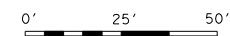


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**PROPOSED
 ILLUMINATION
 LAYOUT
 FM 959 AT FM 1794**

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 SHEET 1 OF 2

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				54
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



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 DATE: 1/24/2024 10:33:58 AM

CONDUIT AND CONDUCTOR RUNS FOR ILLUMINATION										
RUN NO.	CONDUIT 2" PVC		TYP D GROUND BOX		TYP A GROUND BOX		CONDUCTORS			
	BORED (LF)	TRENCHED (LF)	APRON NONE	NONE	APRON NONE	NONE	#6 INSULATED		#6 BARE	
							NO. OF CONDUCTORS	LF	NO. OF CONDUCTORS	LF
1		17			1		2	54	1	27
2	137				1		2	284	1	142
3		60					2	130	1	65
4	55				1		2	120	1	60
5		81					2	172	1	86
6		55			1		2	120	1	60
7	65				1		2	140	1	70
8		27					2	64	1	32
TOTALS	257	240			5			1084		542

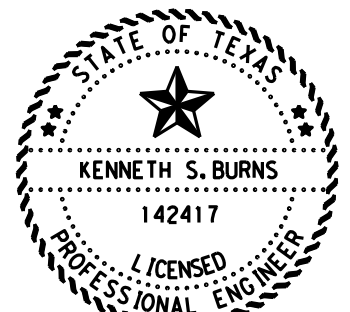
* CALCULATIONS FOR WIRE TOTALS:
 -5' OF SLACK FOR GROUND BOXES. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE SERVICE. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE BASE OF ILLUMINATION POLES. (PER CONDUCTOR)

SUMMARY OF QUANTITIES-ILLUMINATION				
ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	30
0432	6006	RIPRAP (CONC) (CL B)	CY	2
0610	6288	IN RD IL (TY SA) 50T-10 (400W EQ) LED	EA	3
0618	6023	COND (PVC) (SCHD 40) (2")	LF	240
0618	6024	COND (PVC) (SCHD 40) (2") (BORE)	LF	257
0620	6009	ELEC CONDR (NO. 6) BARE	LF	542
0620	6010	ELEC CONDR (NO. 6) INSULATED	LF	1084
0624	6002	GROUND BOX TY A (122311) W/APRON	EA	5
0628	6004	ELC SRV TY A 120/240 060 (NS) AL (E) SP (O)	EA	1
0680	6004	REMOVING TRAFFIC SIGNALS	EA	1
6185	6002	TMA (STATIONARY)	DAY	15

ROADWAY ILLUMINATION ASSEMBLY SUMMARY			
POLE	TYPE	FND. (LF)	REMARKS
5A-1	(TY SA) 50T-10 (400W EQ) LED	10	17' OFF TRAVEL LANE
5A-2	(TY SA) 50T-10 (400W EQ) LED	10	15' OFF TRAVEL LANE
5A-3	(TY SA) 50T-10 (400W EQ) LED	10	18' OFF TRAVEL LANE

NOTE:

- INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. REMOVE FOUNDATIONS FOR STRAIN POLES 2' BELOW GRADE IN ACCORDANCE WITH ITEM 680 6004 REMOVING TRAFFIC SIGNALS. ALL REMOVAL ITEMS WILL BECOME THE PROPERTY OF THE CONTRACTOR UPON REMOVAL.
- OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.



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1/25/2024

PROPOSED ILLUMINATION LAYOUT FM 959 AT FM 1794

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 SHEET 2 OF 2

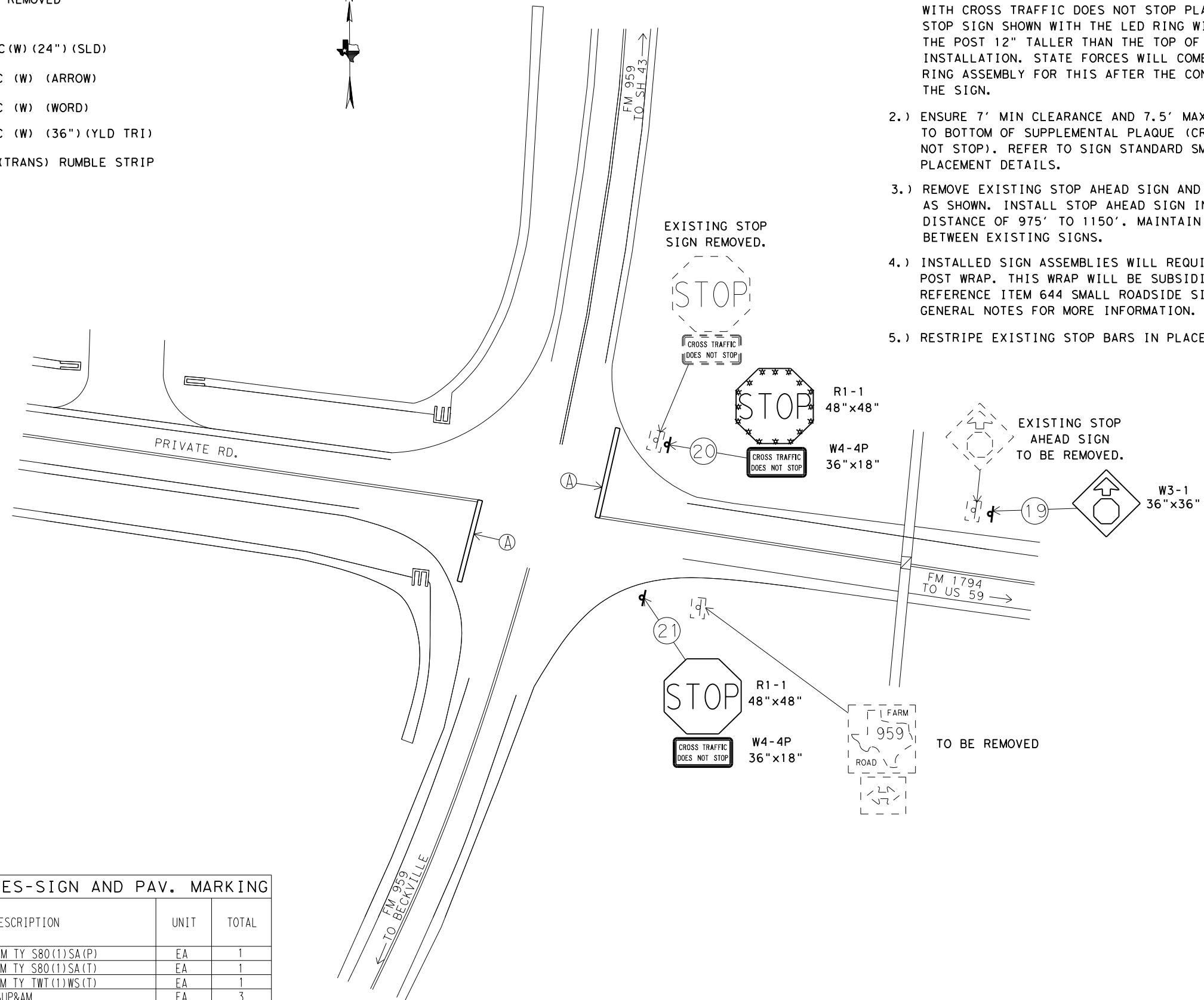
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				55
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

NOT TO SCALE

T:\engdata\Traffic\DN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\FM 959 at FM 1794 .dgn
 1/24/2024 8:44:47 AM

LEGEND

- [p] EXISTING SIGN TO BE REMOVED
- P PROPOSED SIGN
- (A) PREFAB PAV MRK TY C (W) (24") (SLD)
- (B) PREFAB PAV MRK TY C (W) (ARROW)
- (C) PREFAB PAV MRK TY C (W) (WORD)
- (D) PREFAB PAV MRK TY C (W) (36") (YLD TRI)
- (E) PREFORMED IN-LANE (TRANS) RUMBLE STRIP

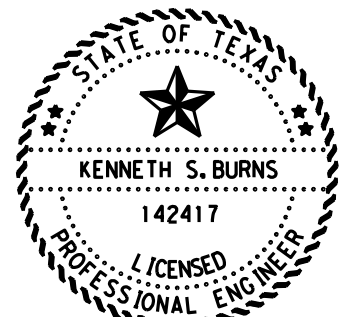


NOTE:

- 1.) REMOVE EXISTING STOP SIGN. INSTALL PROPOSED STOP SIGNS WITH CROSS TRAFFIC DOES NOT STOP PLAQUES AS SHOWN. THE STOP SIGN WITH THE LED RING WILL NEED TO HAVE THE POST 12" TALLER THAN THE TOP OF THE SIGN FOR BEACON INSTALLATION. STATE FORCES WILL COME IN AND INSTALL THE RING ASSEMBLY FOR THIS AFTER THE CONTRACTOR HAS MOUNTED THE SIGN.
- 2.) ENSURE 7' MIN CLEARANCE AND 7.5' MAX VERTICAL CLEARANCE TO BOTTOM OF SUPPLEMENTAL PLAQUE (CROSS TRAFFIC DOES NOT STOP). REFER TO SIGN STANDARD SMD (GEN)-08 FOR SIGN PLACEMENT DETAILS.
- 3.) REMOVE EXISTING STOP AHEAD SIGN AND POSTS ON THE APPROACHES AS SHOWN. INSTALL STOP AHEAD SIGN IN A RANGE OF A MINIMUM DISTANCE OF 975' TO 1150'. MAINTAIN A MINIMUM 325' SPACING BETWEEN EXISTING SIGNS.
- 4.) INSTALLED SIGN ASSEMBLIES WILL REQUIRE OMNI-DIRECTIONAL POST WRAP. THIS WRAP WILL BE SUBSIDIARY TO ITEM 644. REFERENCE ITEM 644 SMALL ROADSIDE SIGN ASSEMBLIES IN THE GENERAL NOTES FOR MORE INFORMATION.
- 5.) RESTRIPE EXISTING STOP BARS IN PLACE.

SUMMARY OF QUANTITIES-SIGN AND PAV. MARKING				
ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0644	6027	IN SM RD SN SUP&AM TY S80(1)SA(P)	EA	1
0644	6030	IN SM RD SN SUP&AM TY S80(1)SA(T)	EA	1
0644	6061	IN SM RD SN SUP&AM TY TWT(1)WS(T)	EA	1
0644	6076	REMOVE SM RD SN SUP&AM	EA	3
0668	6076	PREFAB PAV MRK TY C (W) (24') (SLD)	LF	77
*		LED RING	EA	1

* PROVIDED BY TXDOT AND INSTALLED BY TXDOT.



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 1/25/2024







**PROPOSED
 SIGN AND
 PAVEMENT MARKING
 LAYOUT
 FM 959 AT FM 1794**

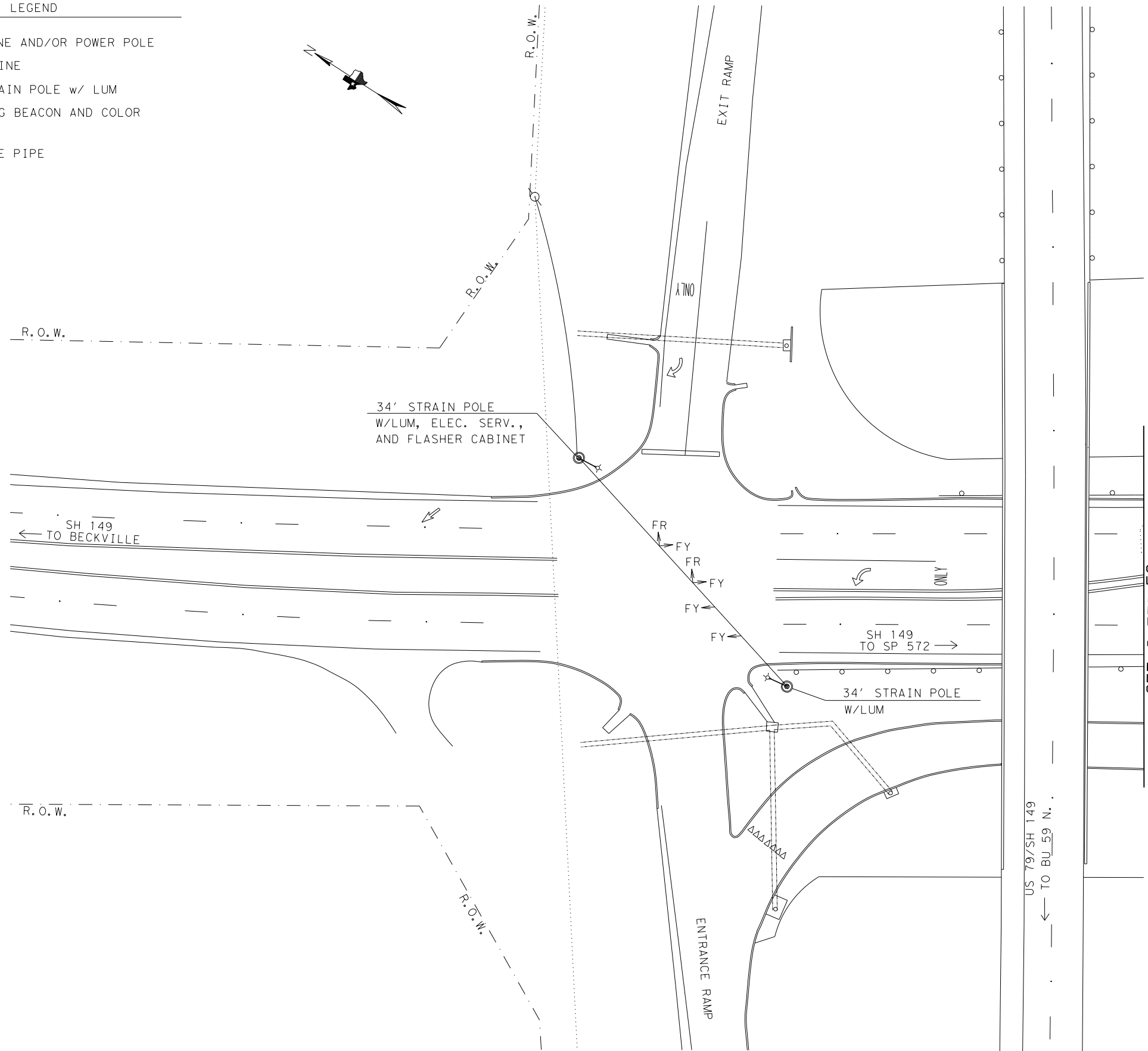
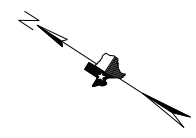


FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				56
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

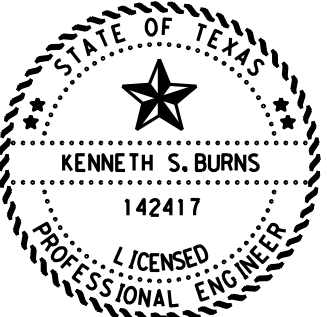
NOT TO SCALE

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 DATE: 1/24/2024 8:46:45 AM

- LEGEND
-  TELEPHONE AND/OR POWER POLE
 -  POWER LINE
 -  34' STRAIN POLE w/ LUM
 -  FLASHING BEACON AND COLOR
 -  CULVERT
 -  DRAINAGE PIPE



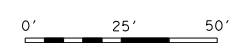
SEE SHEET 58


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 1/25/2024

**EXISTING CONDITION
LAYOUT
SH 149 AT US 79**

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SHEET 1 OF 2

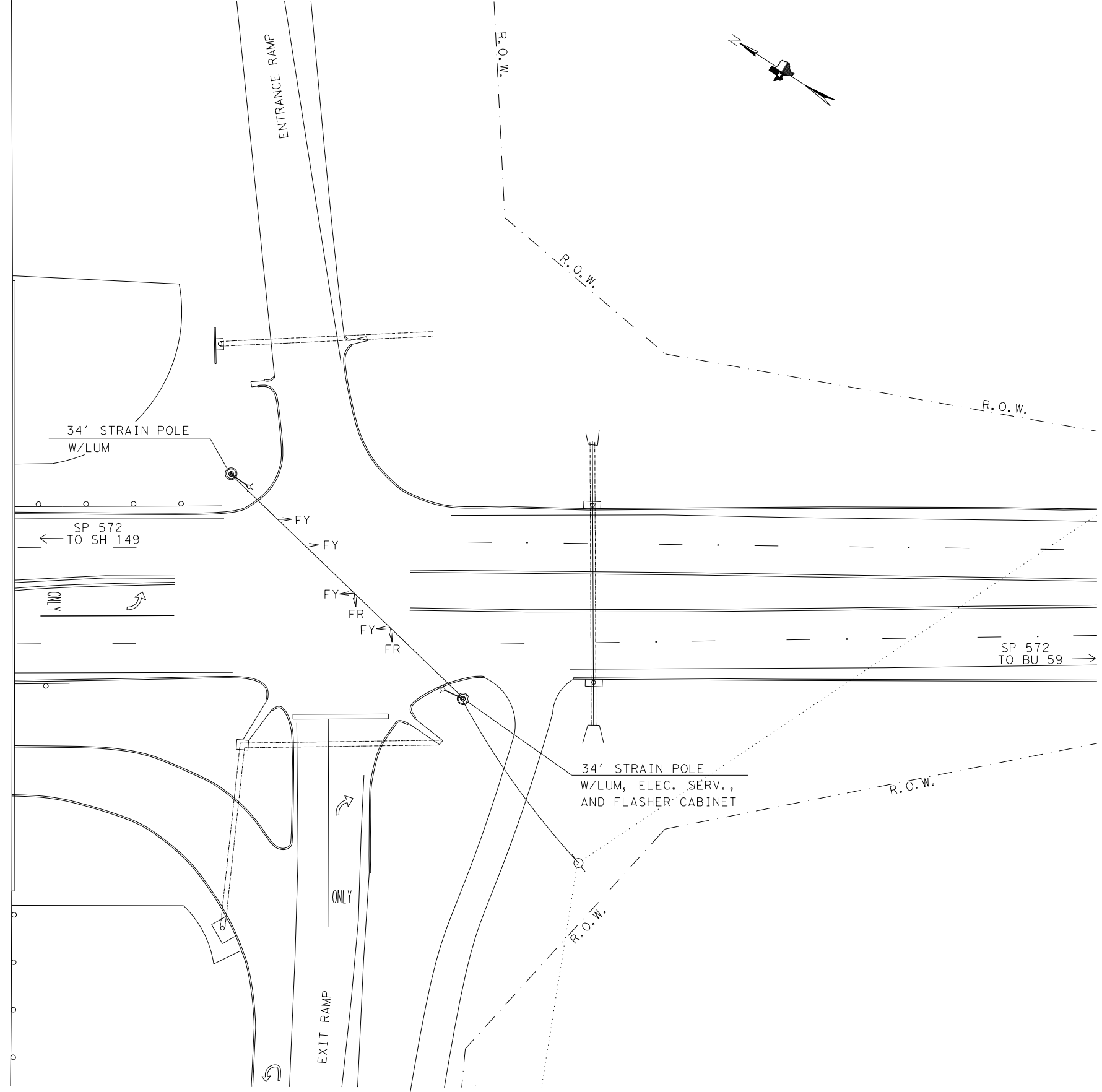
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				57
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



FILE: T:\engdata\Traffic\DN\192515 Jamie\JOBS\LIGHTING PROJECTS\LIGHTING Project Apr 11 2024\Intersections\SH 149 at SL 149\SH 149 at SL 149.dgn
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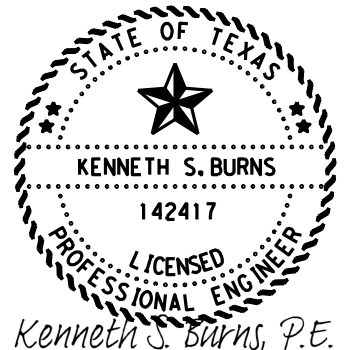
SEE SHEET 57

US 79/SH 149
 TO BU 59 N. →



LEGEND

- TELEPHONE AND/OR POWER POLE
- POWER LINE
- 34' STRAIN POLE w/ LUM
- FLASHING BEACON AND COLOR
- CULVERT
- DRAINAGE PIPE

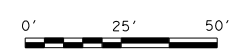


1/25/2024

EXISTING CONDITION LAYOUT
SH 149 AT US 79



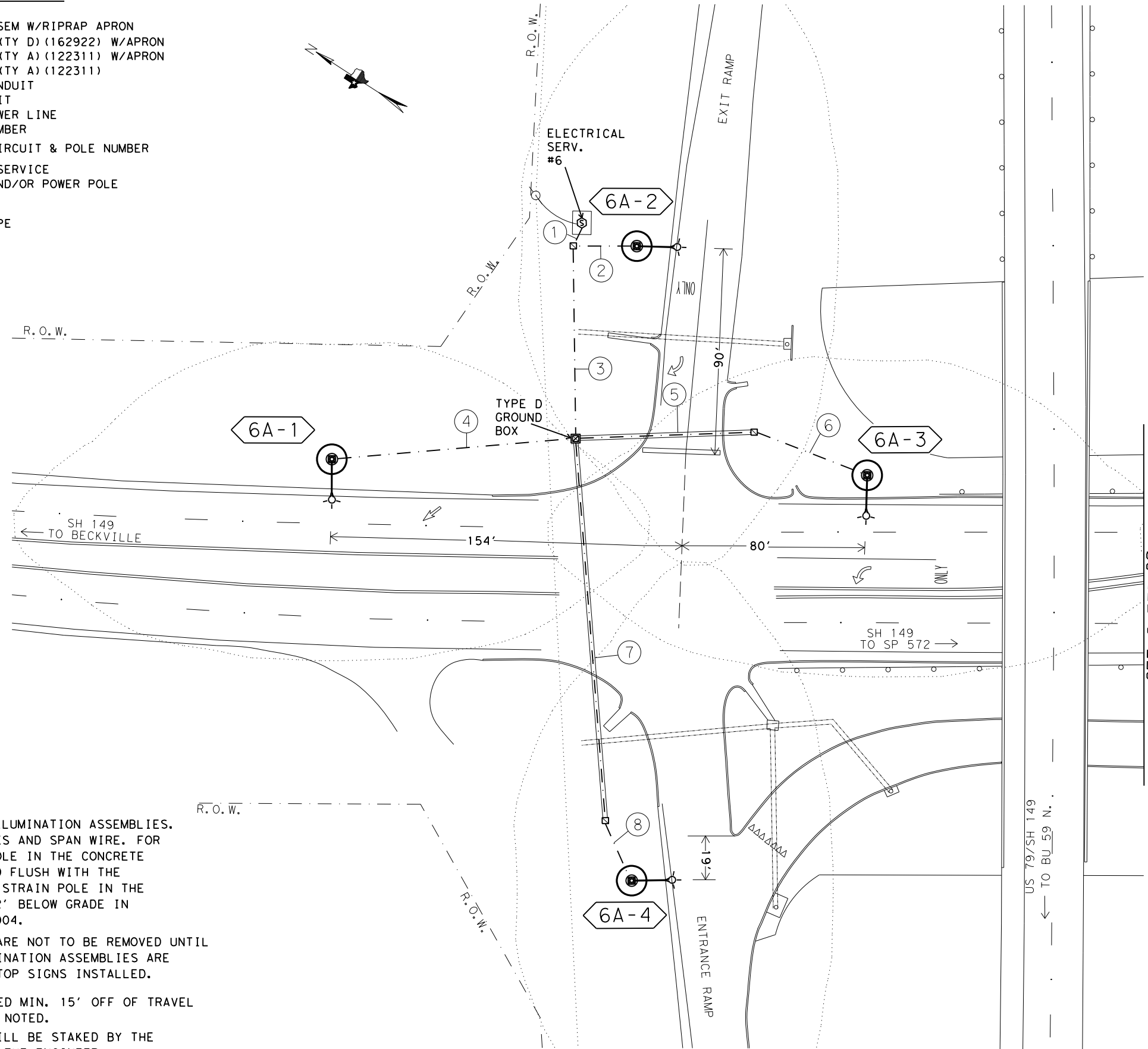
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				58
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



FILE: T:\engdata\Traffic\DN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\SH 149 at SL 149\SH 149 at SL 149.dgn
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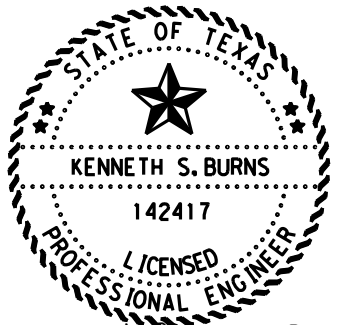
LEGEND

- RDWY ILL ASSEM W/RIPRAP APRON
- GROUND BOX (TY D) (162922) W/APRON
- GROUND BOX (TY A) (122311) W/APRON
- GROUND BOX (TY A) (122311)
- TRENCHED CONDUIT
- BORED CONDUIT
- OVERHEAD POWER LINE
- WIRE RUN NUMBER
- LUMINAIRE CIRCUIT & POLE NUMBER
- ELECTRICAL SERVICE
- TELEPHONE AND/OR POWER POLE
- CULVERT
- DRAINAGE PIPE



NOTE:

- 1.) INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. FOR THIS LOCATION THE STRAIN POLE IN THE CONCRETE ISLAND WE JUST NEED REMOVED FLUSH WITH THE CONCRETE ISLAND. THE OTHER STRAIN POLE IN THE NE QUADRANT TO BE REMOVED 2' BELOW GRADE IN ACCORDANCE WITH ITEM 680-6004.
- 2.) OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- 3.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 4.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 5.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 6.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

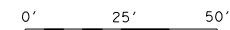


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**PROPOSED
 ILLUMINATION
 LAYOUT
 SH 149 AT US 79**

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 SHEET 1 OF 3

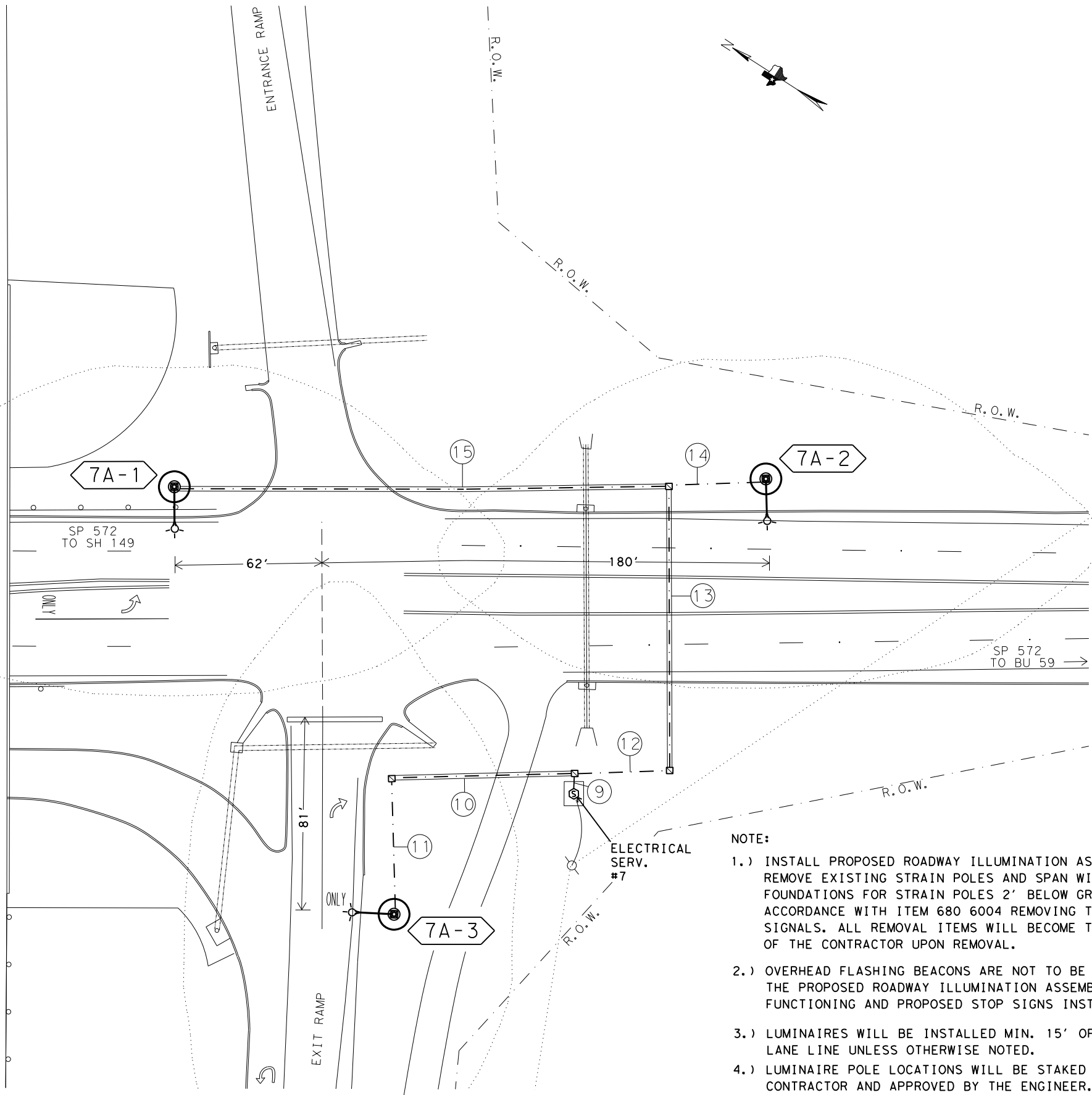
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				59
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



FILE: T:\engdata\Traffic\DN\d192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\SH 149 at SL 149\SH 149 at SL 149.dgn
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SEE SHEET 59

US 79/SH 149
 TO BU 59 N. →

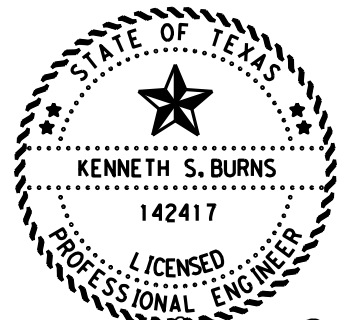


LEGEND

- RDWY ILL ASSEM W/RIPRAP APRON
- GROUND BOX (TY D) (162922) W/APRON
- GROUND BOX (TY A) (122311) W/APRON
- GROUND BOX (TY A) (122311)
- TRENCHED CONDUIT
- BORED CONDUIT
- OVERHEAD POWER LINE
- WIRE RUN NUMBER
- LUMINAIRE CIRCUIT & POLE NUMBER
- ELECTRICAL SERVICE
- TELEPHONE AND/OR POWER POLE
- CULVERT
- DRAINAGE PIPE

NOTE:

- 1.) INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. REMOVE FOUNDATIONS FOR STRAIN POLES 2' BELOW GRADE IN ACCORDANCE WITH ITEM 680 6004 REMOVING TRAFFIC SIGNALS. ALL REMOVAL ITEMS WILL BECOME THE PROPERTY OF THE CONTRACTOR UPON REMOVAL.
- 2.) OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- 3.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 4.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 5.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 6.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.



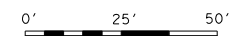
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1/25/2024

**PROPOSED
 ILLUMINATION
 LAYOUT
 SH 149 AT US 79**

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 SHEET 2 OF 3

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				60
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



FILE: T:\engdata\Traffic\DN\d192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\SH 149 at SL 149\SH 149 at SL 149.dgn
 DATE: 1/24/2024 10:45:39 AM

RUN NO.	CONDUIT 2" PVC		TYP D GROUND BOX		TYP A GROUND BOX		CONDUCTORS			
	BORED (LF)	TRENCHED (LF)	APRON	NONE	APRON	NONE	#6 INSULATED		#6 BARE	
							NO. OF CONDUCTORS	LF	NO. OF CONDUCTORS	LF
1		11			1		2	42	1	21
2		28					2	66	1	33
3		84			1		2	178	1	89
4		107					2	224	1	112
5	78					1	2	166	1	83
6		53					2	116	1	58
7	168		1				2	346	1	173
8		29					2	68	1	34
9		9				1	2	38	1	19
10	77					1	2	164	1	82
11		57					2	124	1	62
12		40				1	2	90	1	45
13	121					1	2	252	1	126
14		42					2	94	1	47
15	209						2	428	1	214
TOTALS	653	460	1			7		2396		1198

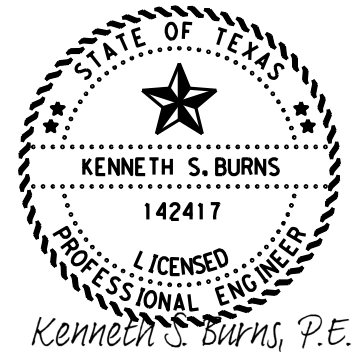
* CALCULATIONS FOR WIRE TOTALS:
 -5' OF SLACK FOR GROUND BOXES. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE SERVICE. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE BASE OF ILLUMINATION POLES. (PER CONDUCTOR)

ROADWAY ILLUMINATION ASSEMBLY SUMMARY			
POLE	TYPE	FND. (LF)	REMARKS
6A-1	(TY SA)50T-10(400W EQ)LED	10	15' OFF TRAVEL LANE
6A-2	(TY SA)50T-10(400W EQ)LED	10	15' OFF TRAVEL LANE
6A-3	(TY SA)50T-10(400W EQ)LED	10	11' OFF BACK OF CURB
6A-4	(TY SA)50T-10(400W EQ)LED	10	15' OFF TRAVEL LANE
7A-1	(TY SA)50T-10(400W EQ)LED	10	11' OFF BACK OF CURB
7A-2	(TY SA)50T-10(400W EQ)LED	10	11' OFF BACK OF CURB
7A-3	(TY SA)50T-10(400W EQ)LED	10	15' OFF TRAVEL LANE

SUMMARY OF QUANTITIES-ILLUMINATION				
ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	70
0432	6006	RIPRAP (CONC) (CL B)	CY	3
0610	6288	IN RD IL (TY SA)50T-10(400W EQ)LED	EA	7
0618	6023	CONDT (PVC) (SCHD 40) (2")	LF	460
0618	6024	CONDT (PVC) (SCHD 40) (2") (BORE)	LF	653
0620	6009	ELEC CONDR (NO. 6) BARE	LF	1198
0620	6010	ELEC CONDR (NO. 6) INSULATED	LF	2396
0624	6002	GROUND BOX TY A (122311)W/APRON	EA	7
0624	6010	GROUND BOX TY D (162922)W/APRON	EA	1
0628	6004	ELC SRV TY A 120/240 060(NS)AL(E)SP(O)	EA	2
0680	6004	REMOVING TRAFFIC SIGNALS	EA	2
6185	6002	TMA (STATIONARY)	DAY	25

NOTE:

- 1.) INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. REMOVE FOUNDATIONS FOR STRAIN POLES 2' BELOW GRADE IN ACCORDANCE WITH ITEM 680 6004 REMOVING TRAFFIC SIGNALS. ALL REMOVAL ITEMS WILL BECOME THE PROPERTY OF THE CONTRACTOR UPON REMOVAL.
- 2.) OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- 3.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 4.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 5.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 6.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.



1/25/2024

PROPOSED ILLUMINATION LAYOUT SH 149 AT US 79

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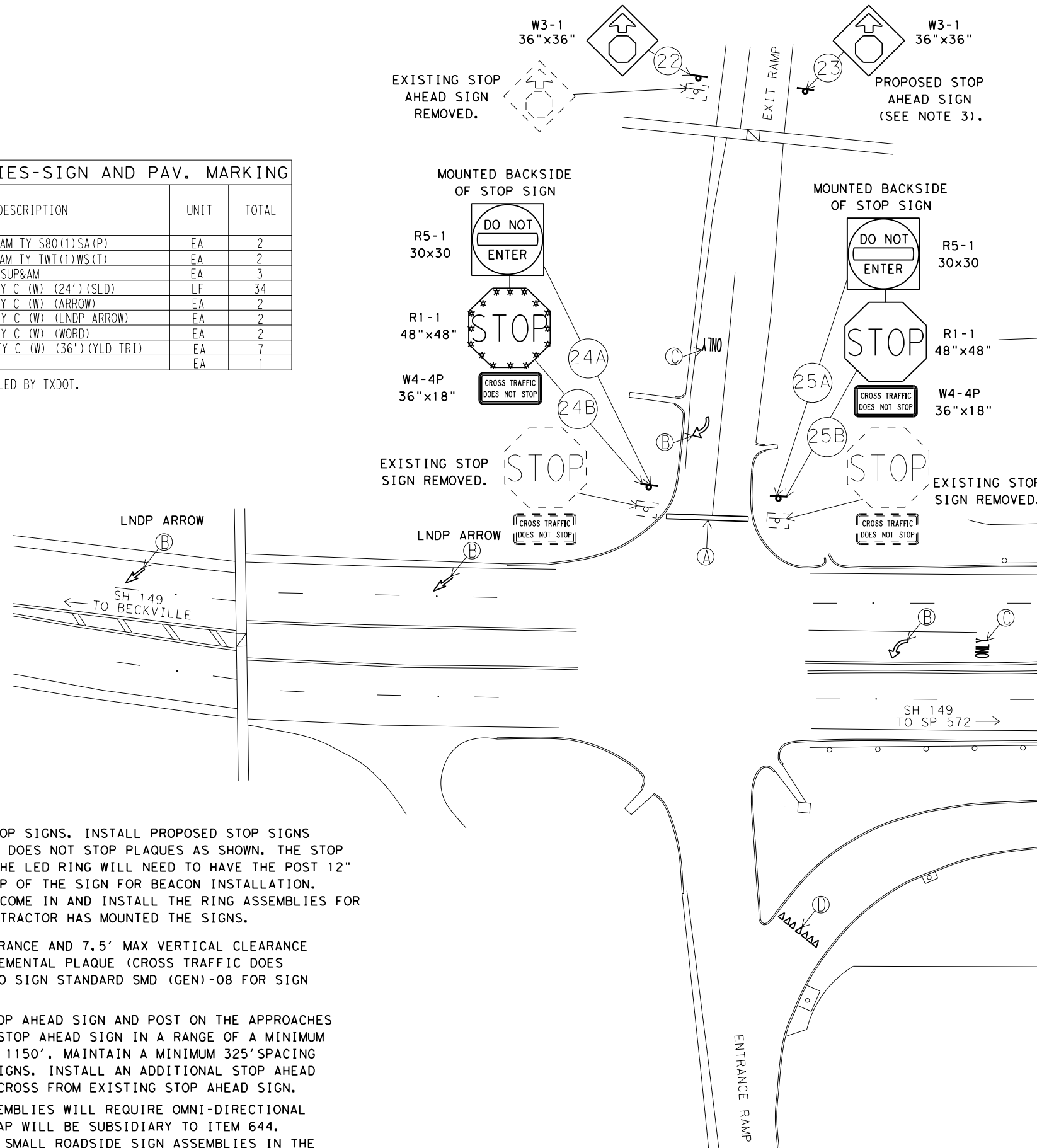
FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				61
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

NOT TO SCALE

FILE: T:\engdata\Traffic\NGN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\SH 149 at SL 149\SH 149 at SL 149.dgn
 DATE: 1/24/2024 8:53:35 AM

SUMMARY OF QUANTITIES-SIGN AND PAV. MARKING				
ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0644	6027	IN SM RD SN SUP&AM TY S80(1)SA(P)	EA	2
0644	6061	IN SM RD SN SUP&AM TY TWT(1)WS(T)	EA	2
0644	6076	REMOVE SM RD SN SUP&AM	EA	3
0668	6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	34
0668	6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	2
0668	6083	PREFAB PAV MRK TY C (W) (LNDP ARROW)	EA	2
0668	6085	PREFAB PAV MRK TY C (W) (WORD)	EA	2
0668	6092	PREFAB PAV MRK TY C (W) (36") (YLD TRI)	EA	7
*		LED RING	EA	1

* PROVIDED BY TXDOT AND INSTALLED BY TXDOT.



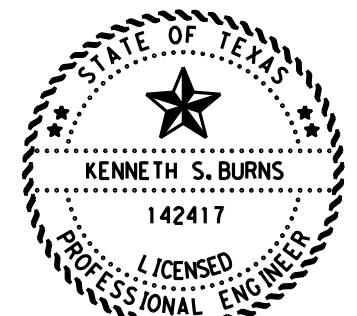
LEGEND

- [dashed symbol] EXISTING SIGN TO BE REMOVED
- [P symbol] PROPOSED SIGN
- [A symbol] PREFAB PAV MRK TY C (W) (24") (SLD)
- [B symbol] PREFAB PAV MRK TY C (W) (ARROW)
- [C symbol] PREFAB PAV MRK TY C (W) (WORD)
- [D symbol] PREFAB PAV MRK TY C (W) (36") (YLD TRI)
- [E symbol] PREFORMED IN-LANE (TRANS) RUMBLE STRIP

NOTE:

- 1.) REMOVE EXISTING STOP SIGNS. INSTALL PROPOSED STOP SIGNS WITH CROSS TRAFFIC DOES NOT STOP PLAQUES AS SHOWN. THE STOP SIGNS SHOWN WITH THE LED RING WILL NEED TO HAVE THE POST 12" TALLER THAN THE TOP OF THE SIGN FOR BEACON INSTALLATION. STATE FORCES WILL COME IN AND INSTALL THE RING ASSEMBLIES FOR THIS AFTER THE CONTRACTOR HAS MOUNTED THE SIGNS.
- 2.) ENSURE 7' MIN CLEARANCE AND 7.5' MAX VERTICAL CLEARANCE TO BOTTOM OF SUPPLEMENTAL PLAQUE (CROSS TRAFFIC DOES NOT STOP). REFER TO SIGN STANDARD SMD (GEN)-08 FOR SIGN PLACEMENT DETAILS.
- 3.) REMOVE EXISTING STOP AHEAD SIGN AND POST ON THE APPROACHES AS SHOWN. INSTALL STOP AHEAD SIGN IN A RANGE OF A MINIMUM DISTANCE OF 975' TO 1150'. MAINTAIN A MINIMUM 325' SPACING BETWEEN EXISTING SIGNS. INSTALL AN ADDITIONAL STOP AHEAD SIGN ON THE RAMP ACROSS FROM EXISTING STOP AHEAD SIGN.
- 4.) INSTALLED SIGN ASSEMBLIES WILL REQUIRE OMNI-DIRECTIONAL POST WRAP. THIS WRAP WILL BE SUBSIDIARY TO ITEM 644. REFERENCE ITEM 644 SMALL ROADSIDE SIGN ASSEMBLIES IN THE GENERAL NOTES FOR MORE INFORMATION.
- 5.) RESTRIPE EXISTING STOP BARS, ARROWS, WORDS, AND YIELD TRIANGLES IN PLACE.

SEE SHEET 63



Kenneth S. Burns, P.E.

1/25/2024

**PROPOSED
SIGN AND
PAVEMENT MARKING
LAYOUT
SH 149 AT US 79**

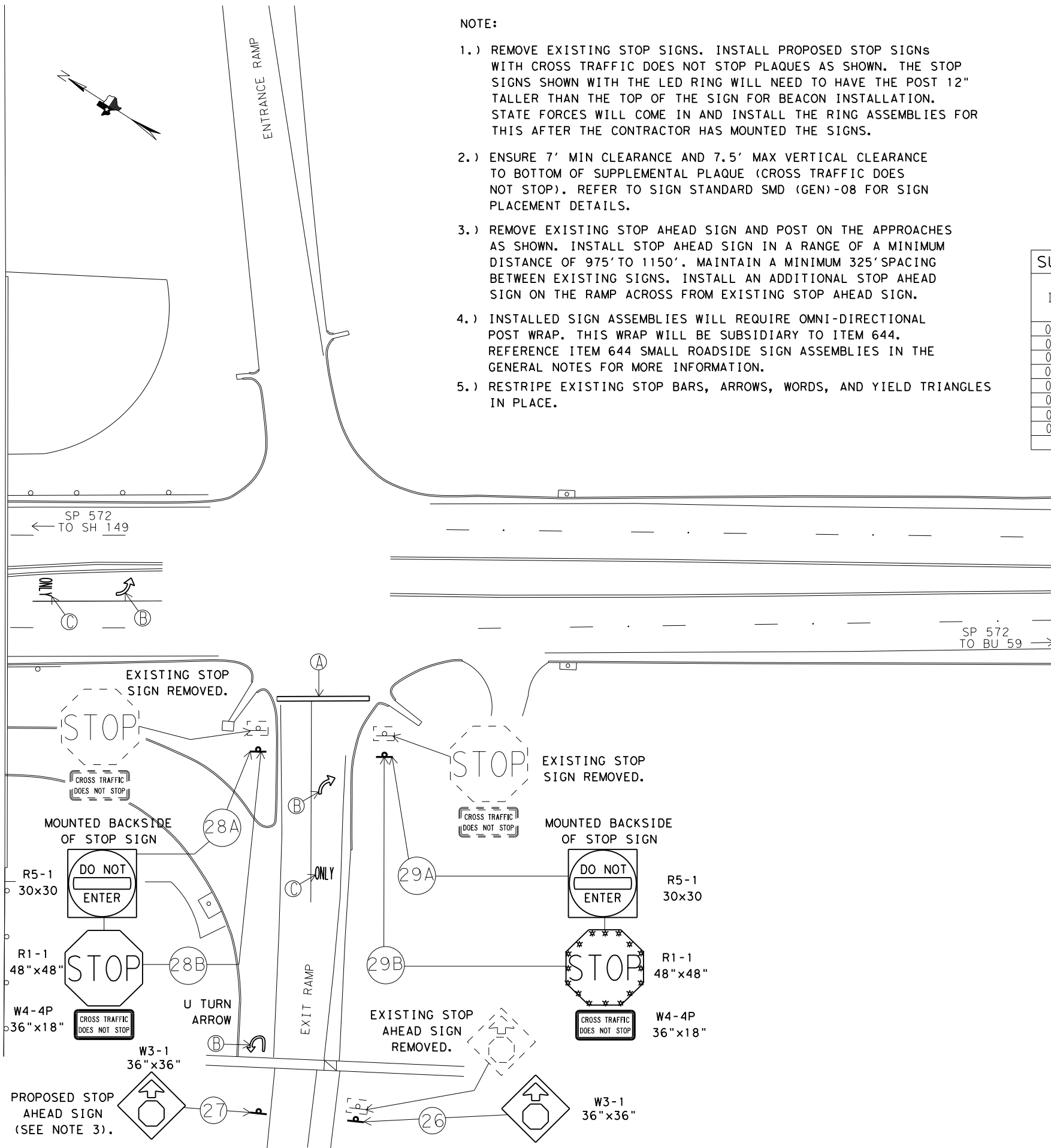
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SHEET 1 OF 2

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				62
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

NOT TO SCALE

SEE SHEET 62

US 79/SH 149
 TO BU 59 N. →



NOTE:

- 1.) REMOVE EXISTING STOP SIGNS. INSTALL PROPOSED STOP SIGNS WITH CROSS TRAFFIC DOES NOT STOP PLAQUES AS SHOWN. THE STOP SIGNS SHOWN WITH THE LED RING WILL NEED TO HAVE THE POST 12" TALLER THAN THE TOP OF THE SIGN FOR BEACON INSTALLATION. STATE FORCES WILL COME IN AND INSTALL THE RING ASSEMBLIES FOR THIS AFTER THE CONTRACTOR HAS MOUNTED THE SIGNS.
- 2.) ENSURE 7' MIN CLEARANCE AND 7.5' MAX VERTICAL CLEARANCE TO BOTTOM OF SUPPLEMENTAL PLAQUE (CROSS TRAFFIC DOES NOT STOP). REFER TO SIGN STANDARD SMD (GEN)-08 FOR SIGN PLACEMENT DETAILS.
- 3.) REMOVE EXISTING STOP AHEAD SIGN AND POST ON THE APPROACHES AS SHOWN. INSTALL STOP AHEAD SIGN IN A RANGE OF A MINIMUM DISTANCE OF 975' TO 1150'. MAINTAIN A MINIMUM 325' SPACING BETWEEN EXISTING SIGNS. INSTALL AN ADDITIONAL STOP AHEAD SIGN ON THE RAMP ACROSS FROM EXISTING STOP AHEAD SIGN.
- 4.) INSTALLED SIGN ASSEMBLIES WILL REQUIRE OMNI-DIRECTIONAL POST WRAP. THIS WRAP WILL BE SUBSIDIARY TO ITEM 644. REFERENCE ITEM 644 SMALL ROADSIDE SIGN ASSEMBLIES IN THE GENERAL NOTES FOR MORE INFORMATION.
- 5.) RESTRIPE EXISTING STOP BARS, ARROWS, WORDS, AND YIELD TRIANGLES IN PLACE.

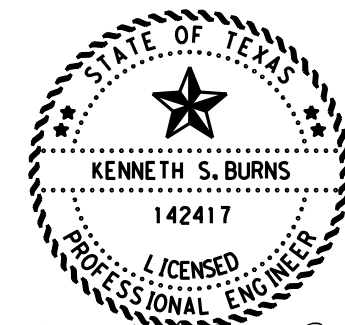
LEGEND

- EXISTING SIGN TO BE REMOVED
- PROPOSED SIGN
- PREFAB PAV MRK TY C (W) (24") (SLD)
- PREFAB PAV MRK TY C (W) (ARROW)
- PREFAB PAV MRK TY C (W) (WORD)
- PREFAB PAV MRK TY C (W) (36") (YLD TRI)
- PREFORMED IN-LANE (TRANS) RUMBLE STRIP

SUMMARY OF QUANTITIES-SIGN AND PAV. MARKING

ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0644	6027	IN SM RD SN SUP&AM TY S80(1)SA(P)	EA	1
0644	6039	IN SM RD SN SUP&AM TYS80(1)SB(P)	EA	1
0644	6061	IN SM RD SN SUP&AM TY TWT(1)WS(T)	EA	2
0644	6076	REMOVE SM RD SN SUP&AM	EA	3
0668	6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	40
0668	6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	2
0668	6080	PREFAB PAV MRK TY C (W) (UTURN ARROW)	EA	1
0668	6085	PREFAB PAV MRK TY C (W) (WORD)	EA	2
*		LED RING	EA	1

* PROVIDED BY TXDOT AND INSTALLED BY TXDOT.



Kenneth S. Burns, P.E.

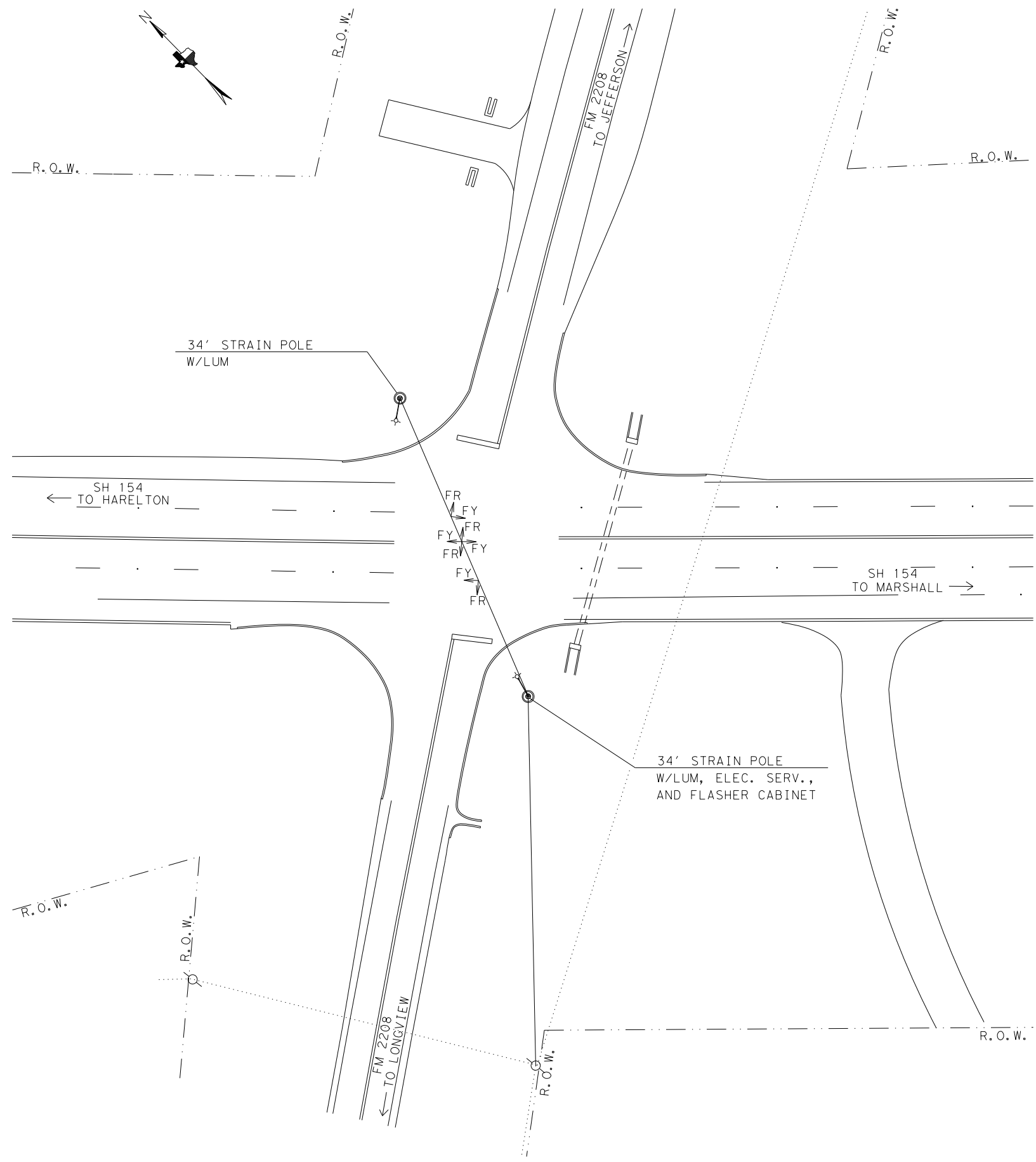
1/25/2024

**PROPOSED
 SIGN AND
 PAVEMENT MARKING
 LAYOUT
 SH 149 AT US 79**

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 SHEET 2 OF 2

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				63
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

NOT TO SCALE



LEGEND

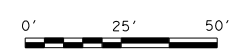
	TELEPHONE AND/OR POWER POLE
	POWER LINE
	34' STRAIN POLE w/ LUM
	FLASHING BEACON AND COLOR
	CULVERT
	DRAINAGE PIPE

STATE OF TEXAS
 KENNETH S. BURNS
 142417
 LICENSED PROFESSIONAL ENGINEER
 Kenneth S. Burns, P.E.
 1/25/2024














**EXISTING CONDITION
 LAYOUT
 SH 154 AT FM 2208**

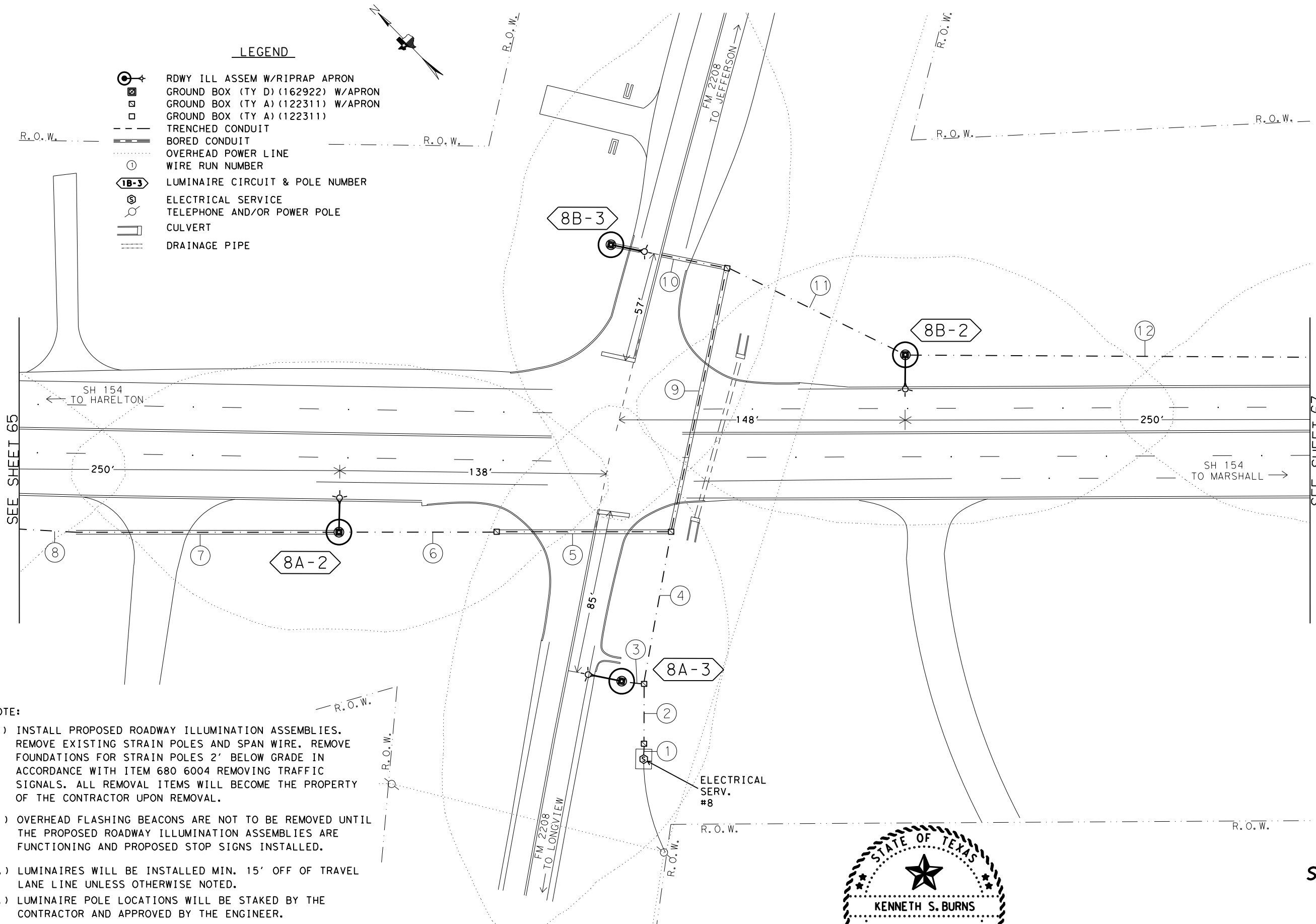


FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				64
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

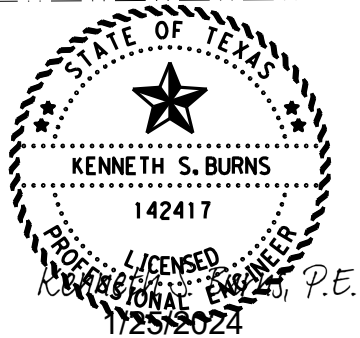


LEGEND

-  RDWY ILL ASSEM W/RIPRAP APRON
-  GROUND BOX (TY D) (162922) W/APRON
-  GROUND BOX (TY A) (122311) W/APRON
-  GROUND BOX (TY A) (122311)
-  TRENCHED CONDUIT
-  BORED CONDUIT
-  OVERHEAD POWER LINE
-  WIRE RUN NUMBER
-  LUMINAIRE CIRCUIT & POLE NUMBER
-  ELECTRICAL SERVICE
-  TELEPHONE AND/OR POWER POLE
-  CULVERT
-  DRAINAGE PIPE



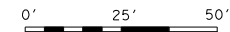
- 1.) INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. REMOVE FOUNDATIONS FOR STRAIN POLES 2' BELOW GRADE IN ACCORDANCE WITH ITEM 680 6004 REMOVING TRAFFIC SIGNALS. ALL REMOVAL ITEMS WILL BECOME THE PROPERTY OF THE CONTRACTOR UPON REMOVAL.
- 2.) OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- 3.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 4.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 5.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 6.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.



PROPOSED ILLUMINATION LAYOUT SH 154 AT FM 2208














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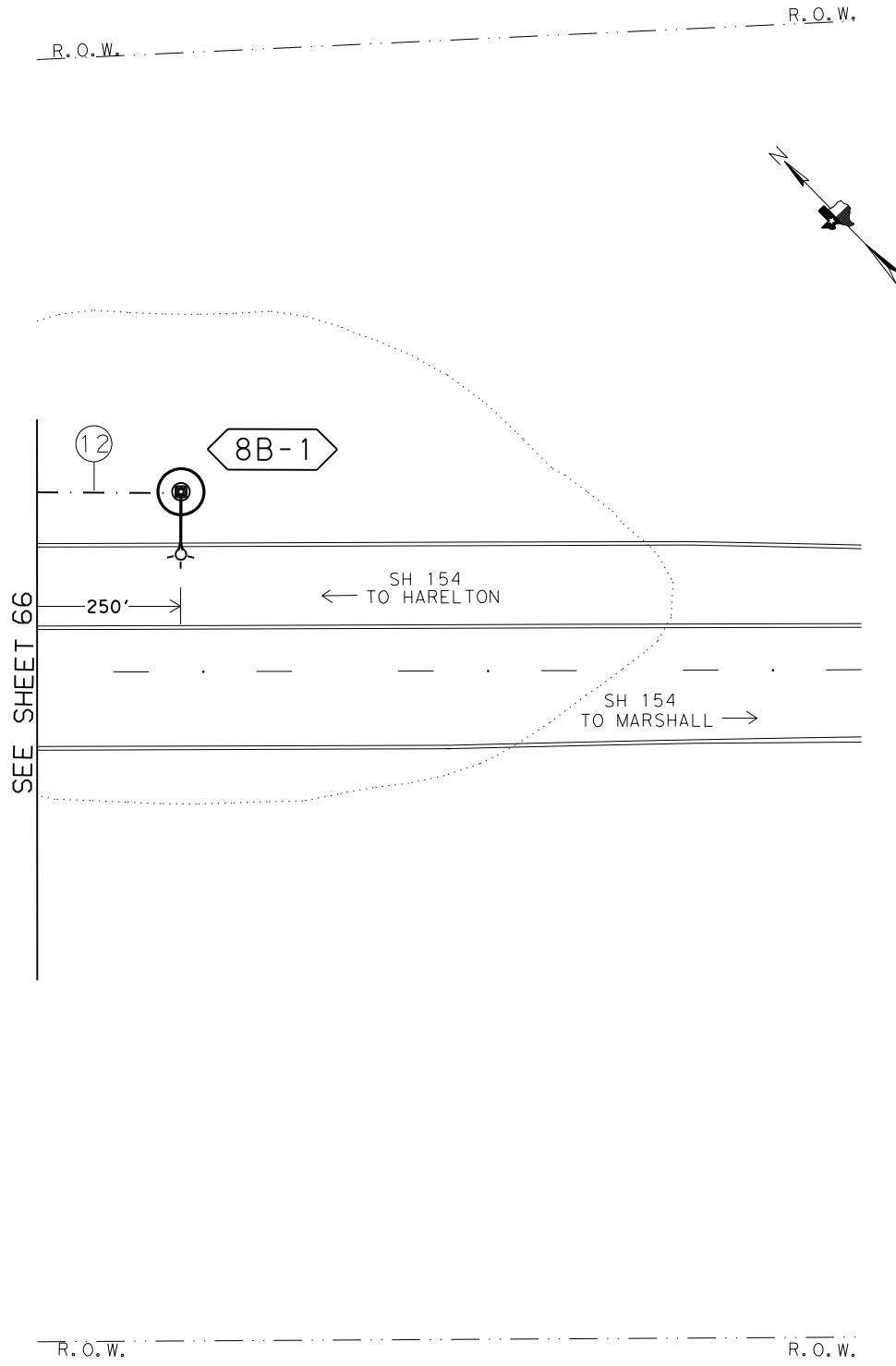
FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				66
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



FILE: T:\engdata\Traffic\DN\192515 Jamie\JOBS\LIGHTING PROJECTS\Lighting Project Apr 11 2024\Intersections\SH 154 at FM 2208\SH 154 at FM 2208.dgn
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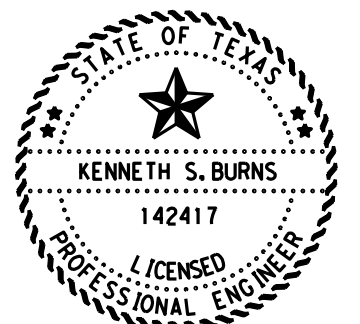
LEGEND

-  RDWY ILL ASSEM W/RIPRAP APRON
-  GROUND BOX (TY D) (162922) W/APRON
-  GROUND BOX (TY A) (122311) W/APRON
-  GROUND BOX (TY A) (122311)
-  TRENCHED CONDUIT
-  BORED CONDUIT
-  OVERHEAD POWER LINE
-  WIRE RUN NUMBER
-  LUMINAIRE CIRCUIT & POLE NUMBER
-  ELECTRICAL SERVICE
-  TELEPHONE AND/OR POWER POLE
-  CULVERT
-  DRAINAGE PIPE



NOTE:

- 1.) INSTALL PROPOSED ROADWAY ILLUMINATION ASSEMBLIES. REMOVE EXISTING STRAIN POLES AND SPAN WIRE. REMOVE FOUNDATIONS FOR STRAIN POLES 2' BELOW GRADE IN ACCORDANCE WITH ITEM 680 6004 REMOVING TRAFFIC SIGNALS. ALL REMOVAL ITEMS WILL BECOME THE PROPERTY OF THE CONTRACTOR UPON REMOVAL.
- 2.) OVERHEAD FLASHING BEACONS ARE NOT TO BE REMOVED UNTIL THE PROPOSED ROADWAY ILLUMINATION ASSEMBLIES ARE FUNCTIONING AND PROPOSED STOP SIGNS INSTALLED.
- 3.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 4.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 5.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 6.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

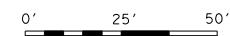


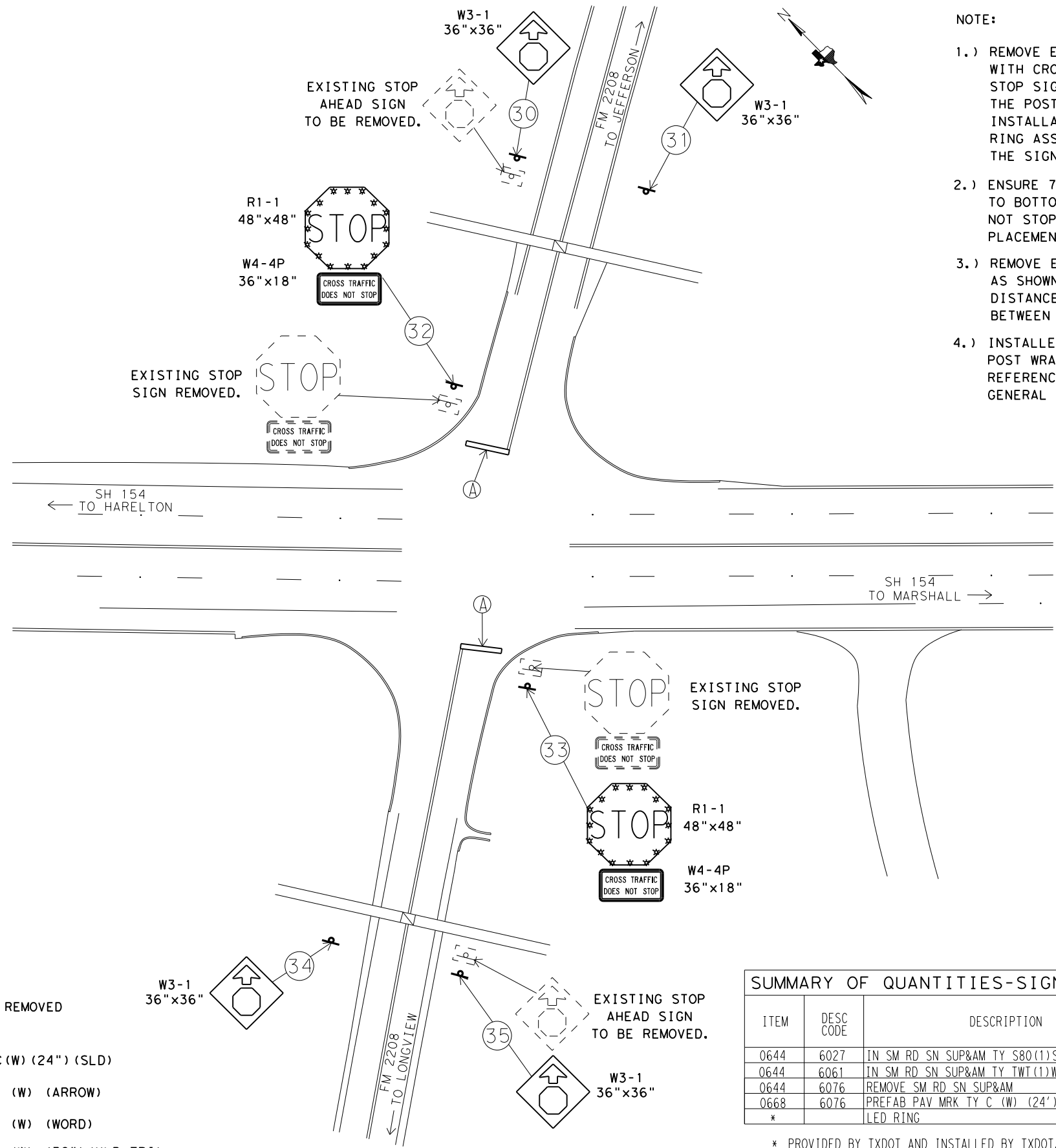
Kenneth S. Burns, P.E.
 1/25/2024

**PROPOSED
 ILLUMINATION
 LAYOUT
 SH 154 AT FM 2208**

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 SHEET 3 OF 3

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				67
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	





- NOTE:
- 1.) REMOVE EXISTING STOP SIGNS. INSTALL PROPOSED STOP SIGNS WITH CROSS TRAFFIC DOES NOT STOP PLAQUES AS SHOWN. THE STOP SIGNS SHOWN WITH THE LED RING WILL NEED TO HAVE THE POST 12" TALLER THAN THE TOP OF THE SIGN FOR BEACON INSTALLATION. STATE FORCES WILL COME IN AND INSTALL THE RING ASSEMBLY FOR THIS AFTER THE CONTRACTOR HAS MOUNTED THE SIGNS.
 - 2.) ENSURE 7' MIN CLEARANCE AND 7.5' MAX VERTICAL CLEARANCE TO BOTTOM OF SUPPLEMENTAL PLAQUE (CROSS TRAFFIC DOES NOT STOP). REFER TO SIGN STANDARD SMD (GEN)-08 FOR SIGN PLACEMENT DETAILS.
 - 3.) REMOVE EXISTING STOP AHEAD SIGNS AND POSTS ON THE APPROACHES AS SHOWN. INSTALL STOP AHEAD SIGNS IN A RANGE OF A MINIMUM DISTANCE OF 975' TO 1150. MAINTAIN A MINIMUM 325' SPACING BETWEEN EXISTING SIGNS.
 - 4.) INSTALLED SIGN ASSEMBLIES WILL REQUIRE OMNI-DIRECTIONAL POST WRAP. THIS WRAP WILL BE SUBSIDIARY TO ITEM 644. REFERENCE ITEM 644 SMALL ROADSIDE SIGN ASSEMBLIES IN THE GENERAL NOTES FOR MORE INFORMATION.

- LEGEND**
- [dashed symbol] EXISTING SIGN TO BE REMOVED
 - [P symbol] PROPOSED SIGN
 - [A symbol] PREFAB PAV MRK TY C(W) (24") (SLD)
 - [B symbol] PREFAB PAV MRK TY C (W) (ARROW)
 - [C symbol] PREFAB PAV MRK TY C (W) (WORD)
 - [D symbol] PREFAB PAV MRK TY C (W) (36") (YLD TRI)
 - [E symbol] PREFORMED IN-LANE (TRANS) RUMBLE STRIP

SUMMARY OF QUANTITIES-SIGN AND PAV. MARKING

ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0644	6027	IN SM RD SN SUP&AM TY S80(1)SA(P)	EA	2
0644	6061	IN SM RD SN SUP&AM TY TWT(1)WS(T)	EA	4
0644	6076	REMOVE SM RD SN SUP&AM	EA	4
0668	6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	35
*		LED RING	EA	2

* PROVIDED BY TXDOT AND INSTALLED BY TXDOT.

STATE OF TEXAS
 KENNETH S. BURNS
 142417
 LICENSED PROFESSIONAL ENGINEER
 Kenneth S. Burns, P.E.
 1/25/2024

PROPOSED SIGN AND PAVEMENT MARKING LAYOUT SH 154 AT FM 2208

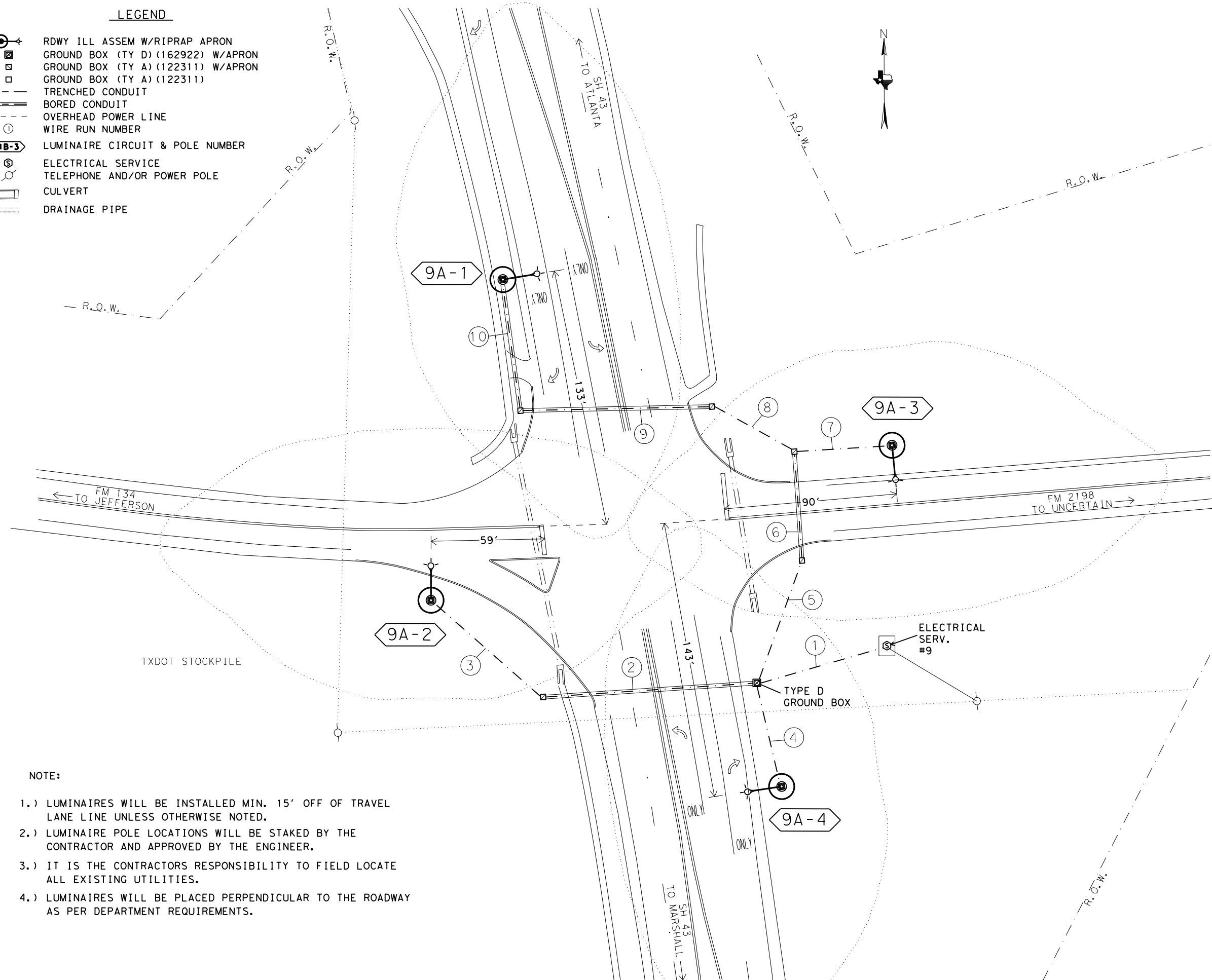


FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				68
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

NOT TO SCALE

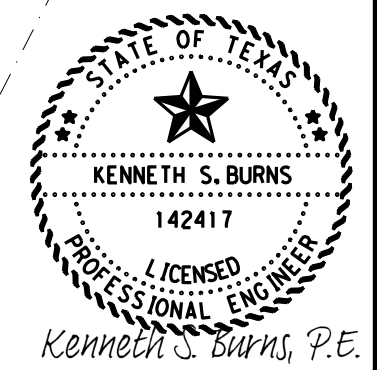
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- LEGEND**
- RDWY ILL ASSEM W/RIPRAP APRON
 - GROUND BOX (TY D) (162922) W/APRON
 - GROUND BOX (TY A) (122311) W/APRON
 - GROUND BOX (TY A) (122311)
 - TRENCHED CONDUIT
 - BORED CONDUIT
 - OVERHEAD POWER LINE
 - WIRE RUN NUMBER
 - LUMINAIRE CIRCUIT & POLE NUMBER
 - ELECTRICAL SERVICE
 - TELEPHONE AND/OR POWER POLE
 - CULVERT
 - DRAINAGE PIPE



NOTE:

- 1.) LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- 2.) LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- 3.) IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- 4.) LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

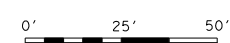


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 1/25/2024

**PROPOSED ILLUMINATION LAYOUT
 SH 43 AT FM 134 N.**

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 SHEET 1 OF 2

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				69
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	



RUN NO.	CONDUIT 2" PVC		TYP D GROUND BOX		TYP A GROUND BOX		CONDUCTORS			
	BORED (LF)	TRENCHED (LF)	APRON	NONE	APRON	NONE	#6 INSULATED		#6 BARE	
							NO. OF CONDUCTORS	LF	NO. OF CONDUCTORS	LF
1		69	1				2	158	1	79
2	111				1		2	232	1	116
3		76					2	162	1	81
4		54					2	118	1	59
5		68			1		2	146	1	73
6	56				1		2	122	1	61
7		50					2	110	1	55
8		48			1		2	106	1	53
9	99				1		2	208	1	104
10	68						2	146	1	73
TOTALS	334	365	1		5			1508		754

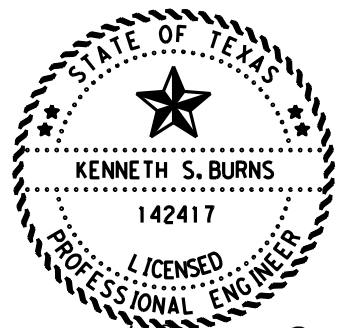
* CALCULATIONS FOR WIRE TOTALS:
 -5' OF SLACK FOR GROUND BOXES. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE SERVICE. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE BASE OF ILLUMINATION POLES. (PER CONDUCTOR)

SUMMARY OF QUANTITIES-ILLUMINATION				
ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	40
0432	6006	RIPRAP (CONC) (CL B)	CY	2
0610	6288	IN RD IL (TY SA) 50T-10 (400W EQ) LED	EA	4
0618	6023	CONDT (PVC) (SCHD 40) (2")	LF	365
0618	6024	CONDT (PVC) (SCHD 40) (2") (BORE)	LF	334
0620	6009	ELEC CONDR (NO. 6) BARE	LF	754
0620	6010	ELEC CONDR (NO. 6) INSULATED	LF	1508
0624	6002	GROUND BOX TY A (122311) W/APRON	EA	5
0624	6003	GROUND BOX TY D (162922) W/APRON	EA	1
0628	6004	ELC SRV TY A 120/240 060 (NS) AL (E) SP (O)	EA	1
6185	6002	TMA (STATIONARY)	DAY	15

ROADWAY ILLUMINATION ASSEMBLY SUMMARY			
POLE	TYPE	FND. (LF)	REMARKS
9A-1	(TY SA) 50T-10 (400W EQ) LED	10	13' OFF TRAVEL LANE
9A-2	(TY SA) 50T-10 (400W EQ) LED	10	10' OFF BACK OF CURB
9A-3	(TY SA) 50T-10 (400W EQ) LED	10	21' OFF TRAVEL LANE
9A-4	(TY SA) 50T-10 (400W EQ) LED	10	15' OFF TRAVEL LANE

NOTE:

- LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- LUMINAIRE POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.



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1/25/2024

PROPOSED ILLUMINATION LAYOUT SH 43 AT FM 134 N.

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FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				70
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

NOT TO SCALE

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1. HIGH MAST POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
2. HIGH MAST POLES WILL REQUIRE OBSTRUCTION LIGHTING.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
4. LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
5. LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

LEGEND

	RDWY ILL ASSEM W/RIPRAP APRON
	HIGH MAST ILL ASSEM W/RIPRAP APRON
	GROUND BOX (TY D) (162922) W/APRON
	GROUND BOX (TY A) (122311) W/APRON
	GROUND BOX (TY A) (122311)
	TRENCHED CONDUIT
	BORED CONDUIT
	EXISTING CONDUIT
	OVERHEAD POWER LINE
	WIRE RUN NUMBER
	LUMINAIRE CIRCUIT & POLE NUMBER
	ELECTRICAL SERVICE
	TELEPHONE AND/OR POWER POLE

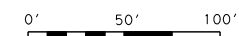
LAT 32.563079 N
 LONG 94.306869 W
 1079' NORTH OF
 CENTERLINE SH 43

STATE OF TEXAS
 KENNETH S. BURNS
 142417
 LICENSED PROFESSIONAL ENGINEER
 Kenneth S. Burns, P.E.
 1/25/2024

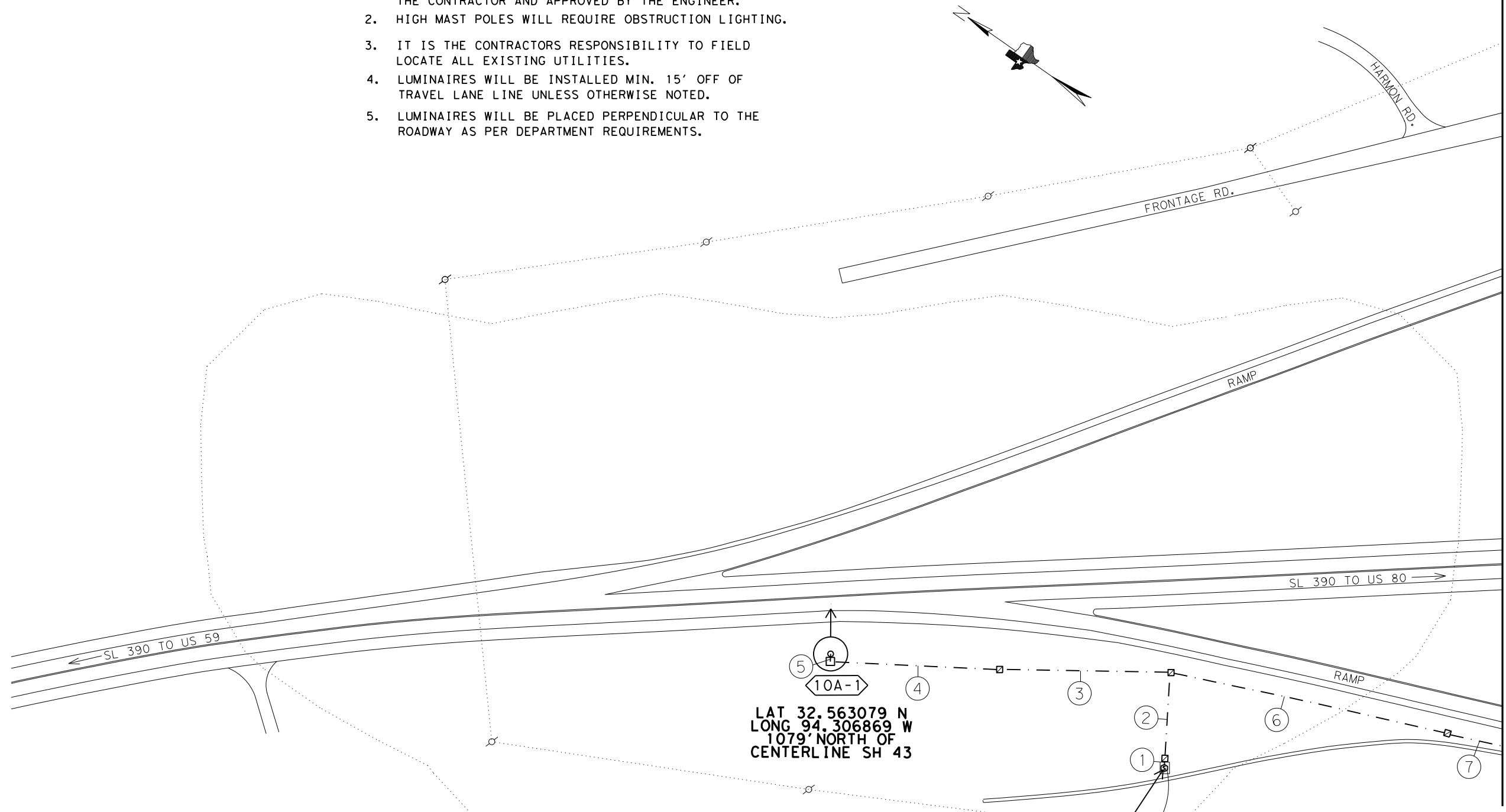
**PROPOSED
 ILLUMINATION
 LAYOUT
 SL 390 AT SH 43**

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SHEET 1 OF 4

STATE	DISTRICT	COUNTY	
TEXAS	ATL	HARRISON	
CONTROL	SECTION	JOB	HIGHWAY NO.
0062	07	103	US 59



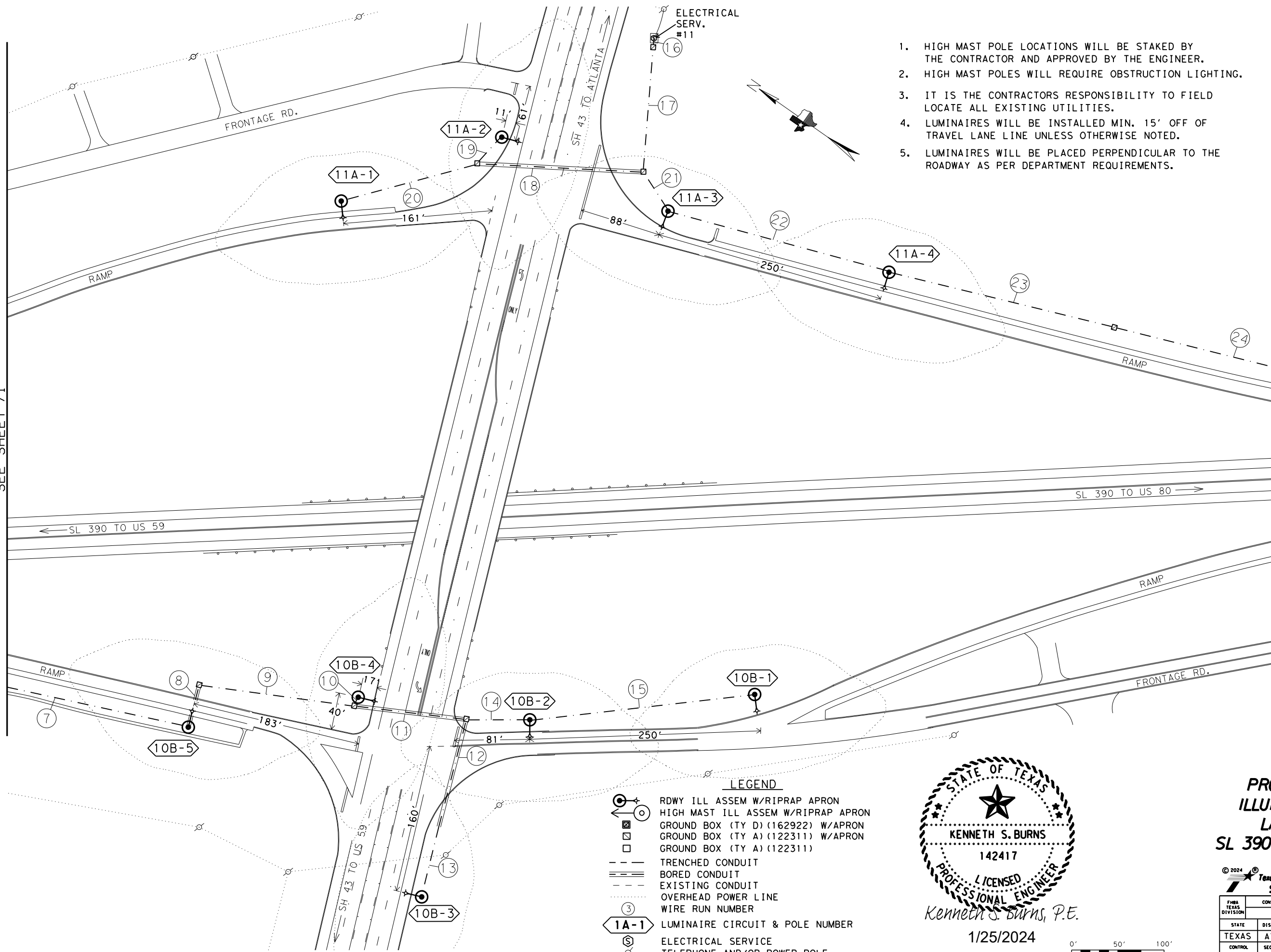
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SEE SHEET 71

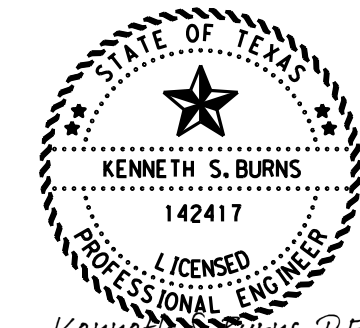
SEE SHEET 73



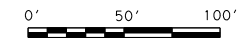
1. HIGH MAST POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
2. HIGH MAST POLES WILL REQUIRE OBSTRUCTION LIGHTING.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
4. LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
5. LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

LEGEND

- RDWY ILL ASSEM W/RIPRAP APRON
- HIGH MAST ILL ASSEM W/RIPRAP APRON
- GROUND BOX (TY D) (162922) W/APRON
- GROUND BOX (TY A) (122311) W/APRON
- GROUND BOX (TY A) (122311)
- TRENCHED CONDUIT
- BORED CONDUIT
- EXISTING CONDUIT
- OVERHEAD POWER LINE
- WIRE RUN NUMBER
- LUMINAIRE CIRCUIT & POLE NUMBER
- ELECTRICAL SERVICE
- TELEPHONE AND/OR POWER POLE



Kenneth S. Burns, P.E.
 1/25/2024

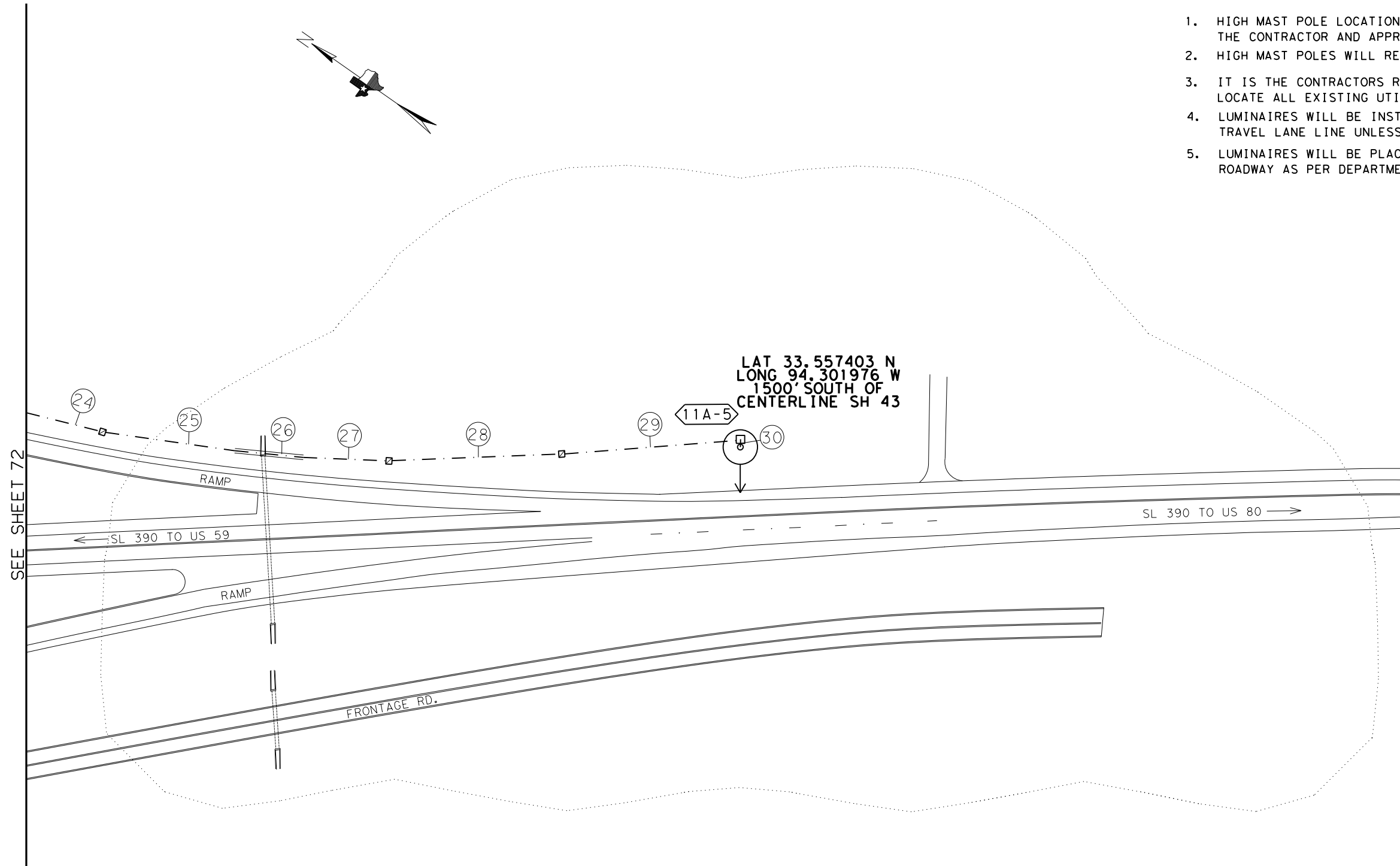


**PROPOSED ILLUMINATION LAYOUT
 SL 390 AT SH 43**

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SHEET 2 OF 4

FHWA TEXAS DIVISION	CONSTRUCTION PROJECT NO.		SHEET NO.
			72
STATE	DISTRICT	COUNTY	
TEXAS	ATL	HARRISON	
CONTROL	SECTION	JOB	HIGHWAY NO.
0062	07	103	US 59

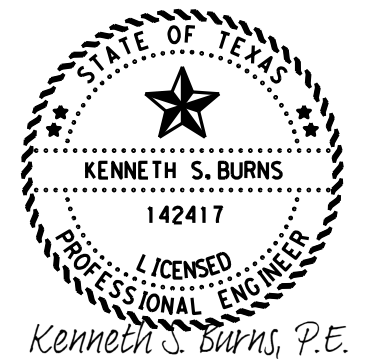
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1. HIGH MAST POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
2. HIGH MAST POLES WILL REQUIRE OBSTRUCTION LIGHTING.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
4. LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
5. LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

LEGEND

- RDWY ILL ASSEM W/RIPRAP APRON
- HIGH MAST ILL ASSEM W/RIPRAP APRON
- GROUND BOX (TY D) (162922) W/APRON
- GROUND BOX (TY A) (122311) W/APRON
- GROUND BOX (TY A) (122311)
- TRENCHED CONDUIT
- BORED CONDUIT
- EXISTING CONDUIT
- OVERHEAD POWER LINE
- WIRE RUN NUMBER
- LUMINAIRE CIRCUIT & POLE NUMBER
- ELECTRICAL SERVICE
- TELEPHONE AND/OR POWER POLE



1/25/2024

**PROPOSED
ILLUMINATION
LAYOUT
SL 390 AT SH 43**

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SHEET 3 OF 4

FHWA TEXAS DIVISION		CONSTRUCTION PROJECT NO.		SHEET NO.
				73
STATE	DISTRICT	COUNTY		
TEXAS	ATL	HARRISON		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0062	07	103	US 59	

0' 50' 100'

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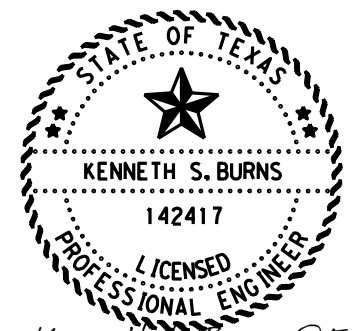
- HIGH MAST POLE LOCATIONS WILL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
- HIGH MAST POLES WILL REQUIRE OBSTRUCTION LIGHTING.
- IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD LOCATE ALL EXISTING UTILITIES.
- LUMINAIRES WILL BE INSTALLED MIN. 15' OFF OF TRAVEL LANE LINE UNLESS OTHERWISE NOTED.
- LUMINAIRES WILL BE PLACED PERPENDICULAR TO THE ROADWAY AS PER DEPARTMENT REQUIREMENTS.

RUN NO.	CONDUIT 2" PVC		TYP A GROUND BOX	TYP D GROUND BOX	CONDUCTORS			
	BORED (LF)	TRENCHED (LF)			#6 INSULATED NO. OF CONDUCTORS	LF	#6 BARE	
			APRON NONE	APRON NONE			NO. OF CONDUCTORS	LF
1		9	1		4	76	1	19
2		85	1		4	360	1	90
3		152	1		2	314	1	157
4		149		1	2	308	1	154
5		10			2	30	1	15
6		250	1		2	510	1	255
7		250			2	510	1	255
8	47		1		2	104	1	52
9		170	1		2	350	1	175
10		11			2	32	1	16
11	122		1		2	254	1	127
12	120				2	240	1	120
13		78			2	166	1	83
14		69			2	148	1	74
15		250			2	510	1	255
16		9	1		2	38	1	19
17		136	1		2	282	1	141
18	180		1		2	370	1	185
19		38			2	86	1	43
20		153			2	316	1	158
21		50			2	110	1	55
22		250			2	510	1	255
23		250	1		2	510	1	255
24		250	1		2	510	1	255
25		117			2	234	1	117
26	60				2	120	1	60
27		73	1		2	156	1	78
28		150	1		2	310	1	155
29		155		1	2	320	1	160
30		10			2	30	1	15
TOTALS	529	3124	14	2		7814		3798

* CALCULATIONS FOR WIRE TOTALS:
 -5' OF SLACK FOR GROUND BOXES. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE SERVICE. (PER CONDUCTOR)
 -5' OF SLACK FOR WIRE IN THE BASE OF ILLUMINATION POLES. (PER CONDUCTOR)

SUMMARY OF QUANTITIES-ILLUMINATION				
ITEM	DESC CODE	DESCRIPTION	UNIT	TOTAL
0416	6026	DRILL SHAFT (HIGH MAST POLE) (60 IN)	LF	50
0416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	90
0432	6006	RIPRAP (CONC) (CL B)	CY	10
0610	6288	IN RD IL (TY SA) 50T-10 (400W EQ) LED	EA	9
0613	6005	HI MST IL POLE (150 FT) (80 MPH)	EA	2
0618	6023	COND (PVC) (SCHD 40) (2")	LF	3124
0618	6024	COND (PVC) (SCHD 40) (2") (BORE)	LF	529
0620	6009	ELEC CONDR (NO. 6) BARE	LF	3798
0620	6010	ELEC CONDR (NO. 6) INSULATED	LF	7814
0624	6001	GROUND BOX TY A (122311)	EA	2
0624	6002	GROUND BOX TY A (122311) W/APRON	EA	14
0628	6054	ELC SRV TY A 240/480 060 (SS) SS (E) SP (O)	EA	2
6156	6002	LED HI MST IL ASM (6 FIXT) (ASYM) (TY A)	EA	2
6185	6002	TMA (STATIONARY)	DAY	25

ROADWAY ILLUMINATION ASSEMBLY SUMMARY			
POLE	TYPE	FND. (LF)	REMARKS
10A-1	150' HIGH MAST ILL POLE	25	36' OFF TRAVEL LANE
10B-1	(TY SA) 50T-10 (400W EQ) LED	10	21' OFF TRAVEL LANE
10B-2	(TY SA) 50T-10 (400W EQ) LED	10	10' OFF BACK OF CURB
10B-3	(TY SA) 50T-10 (400W EQ) LED	10	10' OFF BACK OF CURB
10B-4	(TY SA) 50T-10 (400W EQ) LED	10	17' OFF BACK OF CURB
10B-5	(TY SA) 50T-10 (400W EQ) LED	10	19' OFF BACK OF CURB
11A-1	(TY SA) 50T-10 (400W EQ) LED	10	15' OFF TRAVEL LANE
11A-2	(TY SA) 50T-10 (400W EQ) LED	10	11' OFF BACK OF CURB
11A-3	(TY SA) 50T-10 (400W EQ) LED	10	15' OFF BACK OF CURB
11A-4	(TY SA) 50T-10 (400W EQ) LED	10	19' OFF TRAVEL LANE
11A-5	150' HIGH MAST ILL POLE	25	47' OFF TRAVEL LANE



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 1/25/2024

PROPOSED ILLUMINATION LAYOUT
SL 390 AT SH 43

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SHEET 4 OF 4

FHWA TEXAS DIVISION	CONSTRUCTION PROJECT NO.		SHEET NO.
			74
STATE	DISTRICT	COUNTY	
TEXAS	ATL	HARRISON	
CONTROL	SECTION	JOB	HIGHWAY NO.
0062	07	103	US 59

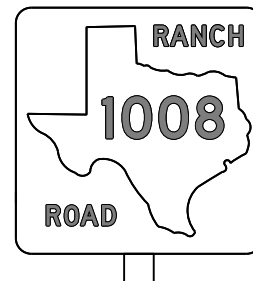
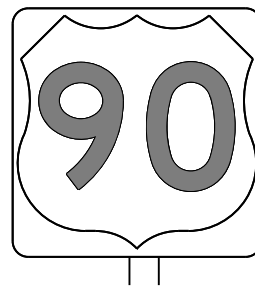
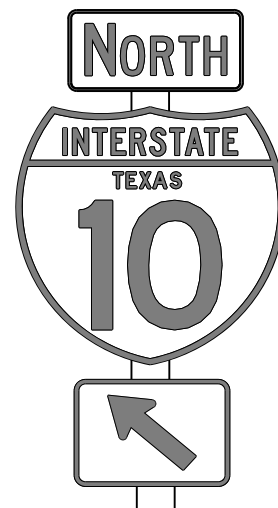
NOT TO SCALE

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REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

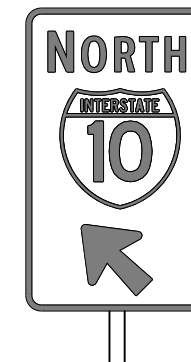
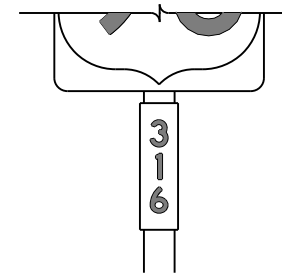
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



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

- 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).
- 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

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

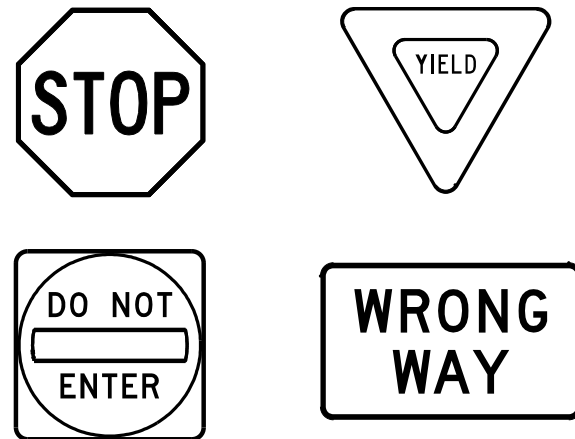
<http://www.txdot.gov/>

		Traffic Operations Division Standard	
<h3>TYPICAL SIGN REQUIREMENTS</h3>			
<h3>TSR(3) - 13</h3>			
FILE:	tsr3-13.dgn	DN:	TxDOT
©TxDOT	October 2003	CK:	TxDOT
REVISIONS	0062 07	OW:	TxDOT
12-03 7-13		JOB	HIGHWAY
9-08		103	US 59
		DIST	COUNTY
		ATL	HARRISON
		SHEET NO.	75

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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

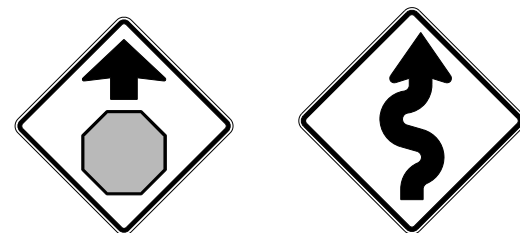
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



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

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

ALUMINUM SIGN BLANKS THICKNESS

Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS

ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

<http://www.txdot.gov/>

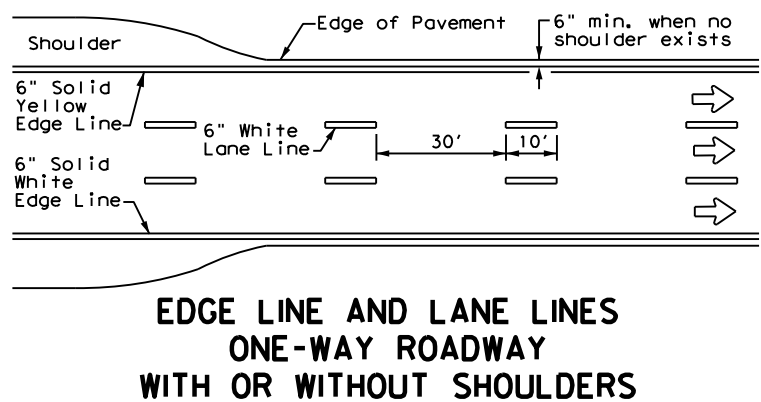


TYPICAL SIGN REQUIREMENTS

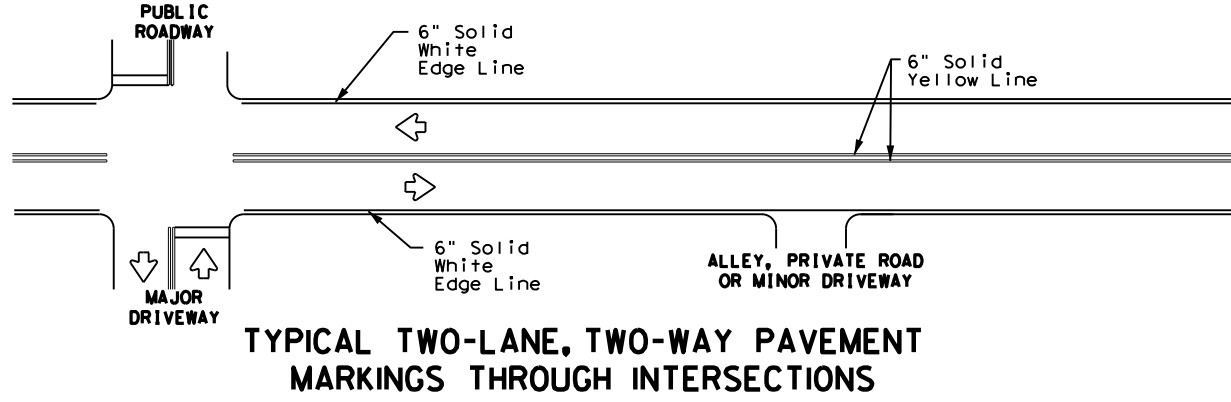
TSR(4) - 13

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© TxDOT	October 2003	CONT	SECT	JOB	HIGHWAY				
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12-03	7-13	DIST	COUNTY	SHEET NO.					
9-08		ATL	HARRISON	76					

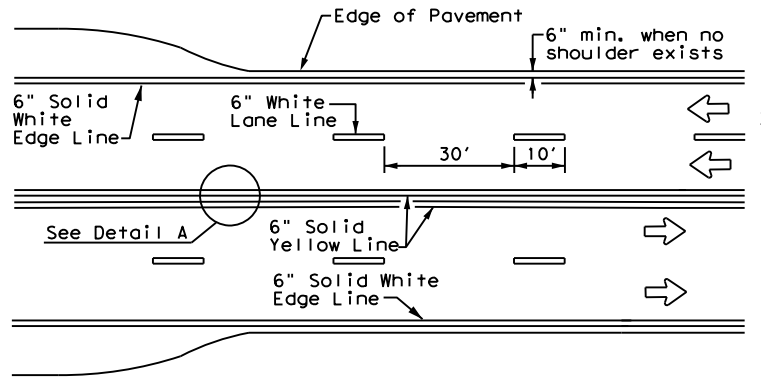
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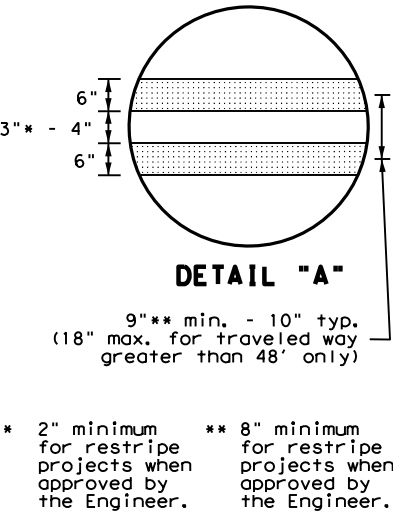
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



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

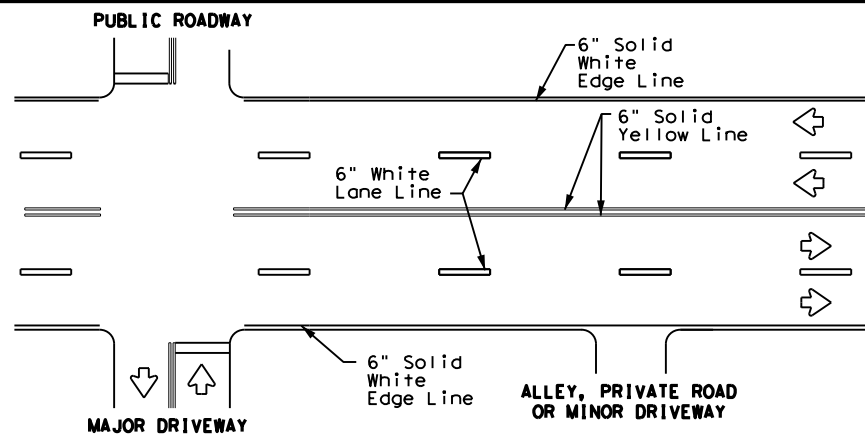


**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**

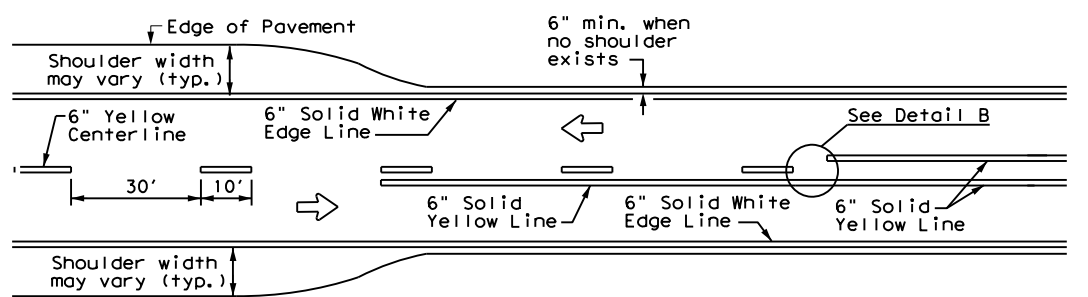


DETAIL "A"
 9" min. - 10" typ.
 (18" max. for traveled way greater than 48' only)

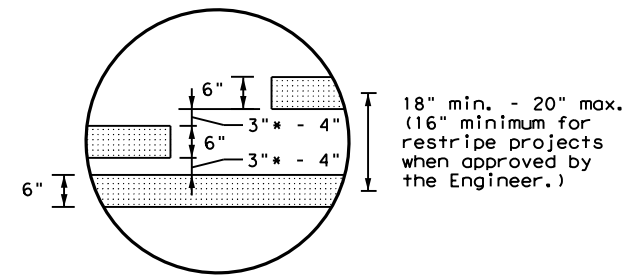
* 2" minimum for restripe projects when approved by the Engineer.
 ** 8" minimum for restripe projects when approved by the Engineer.



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

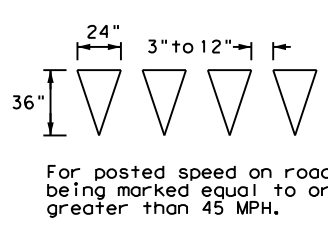


**TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



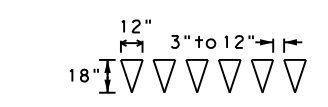
DETAIL "B"
 18" min. - 20" max.
 (16" minimum for restripe projects when approved by the Engineer.)

* 2" minimum for restripe projects when approved by the Engineer.



YIELD LINES

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

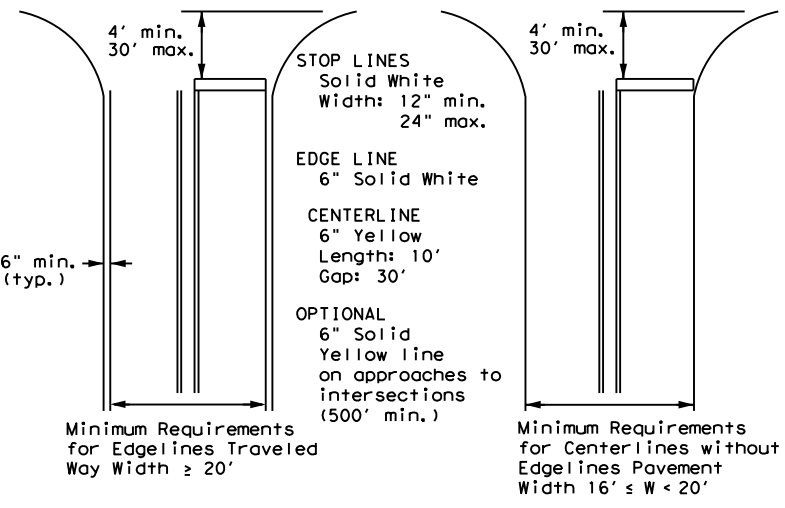


For posted speed on road being marked equal to or less than 40 MPH.

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

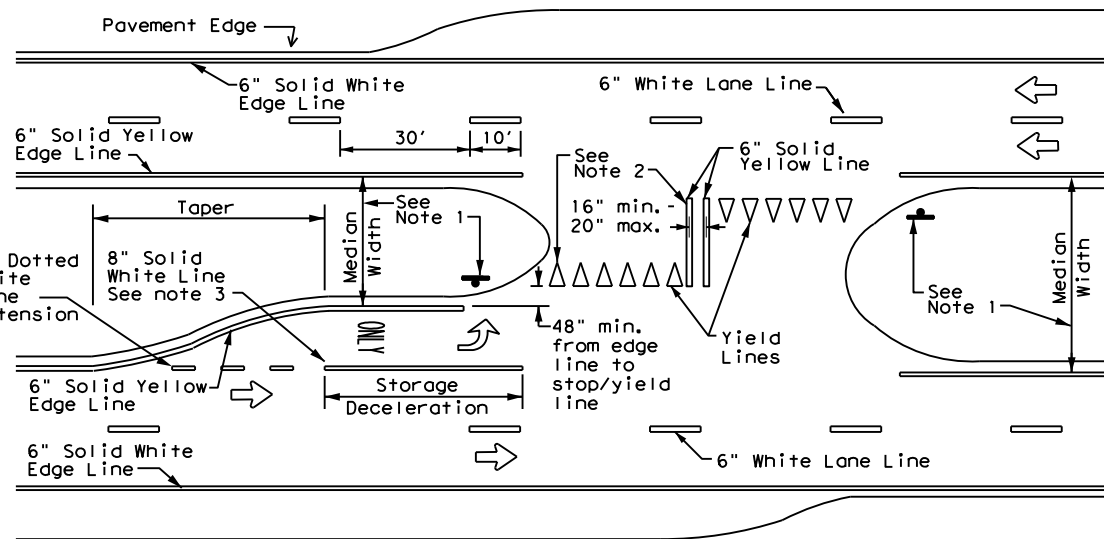
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

**GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE**
 Based on Traveled Way and Pavement Widths for Undivided Roadways



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

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

Texas Department of Transportation
 Traffic Safety Division Standard

**TYPICAL STANDARD
PAVEMENT MARKINGS**

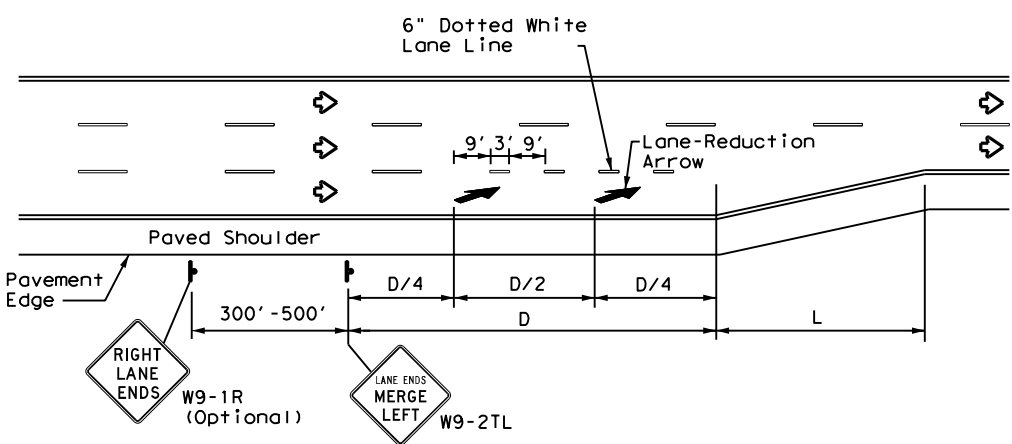
PM(1) - 22

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© TxDOT December 2022	CONT SECT	JOB	HIGHWAY
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11-78 8-00 6-20	DIST	COUNTY	SHEET NO.
8-95 3-03 12-22	ATL	HARRISON	77
5-00 2-12			

22A

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LANE REDUCTION

NOTES

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

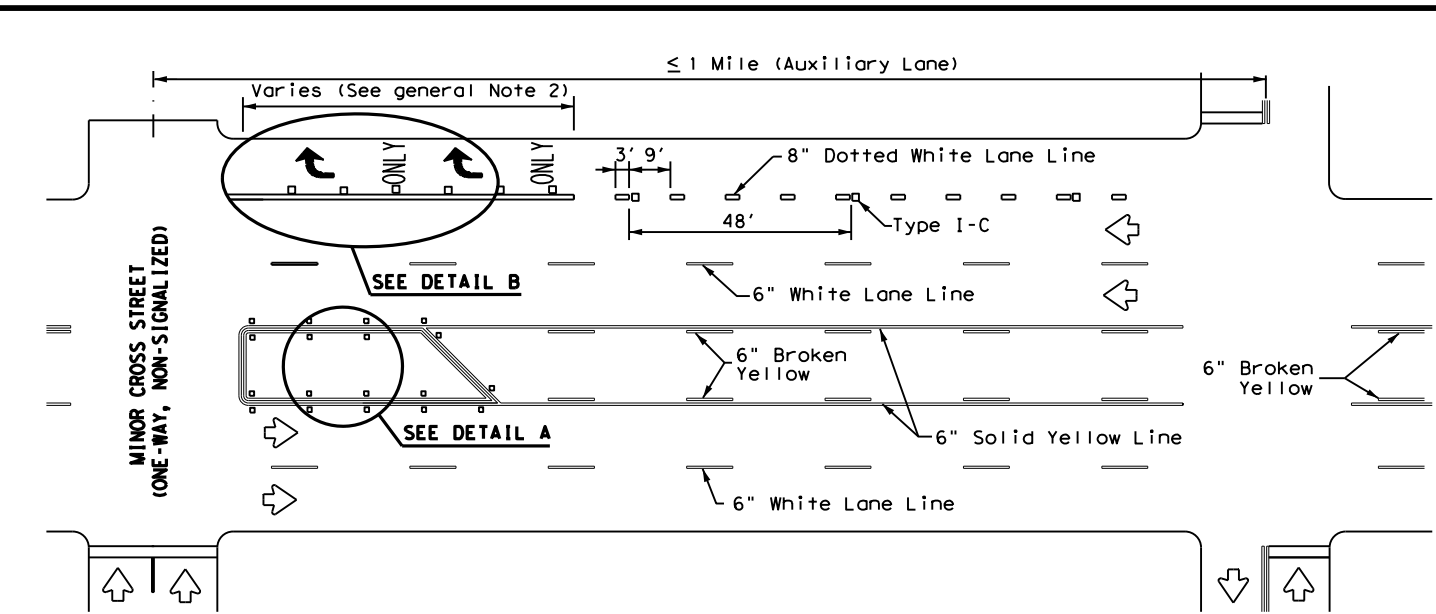
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L = \frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

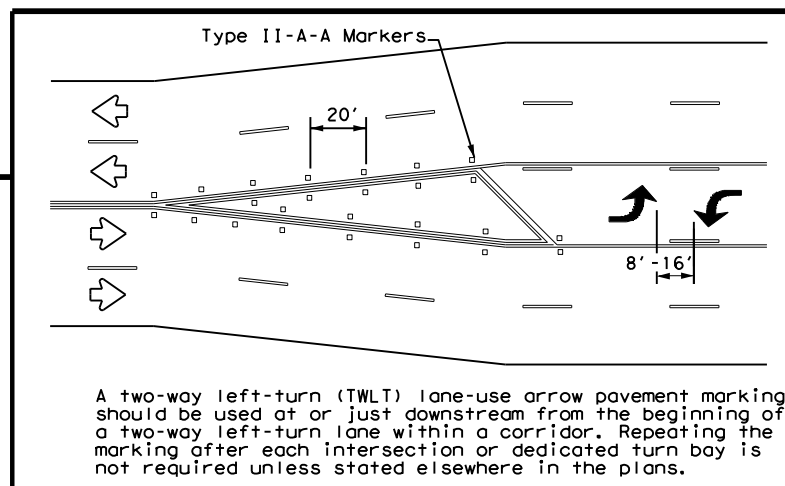
- Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
- When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
- Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

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

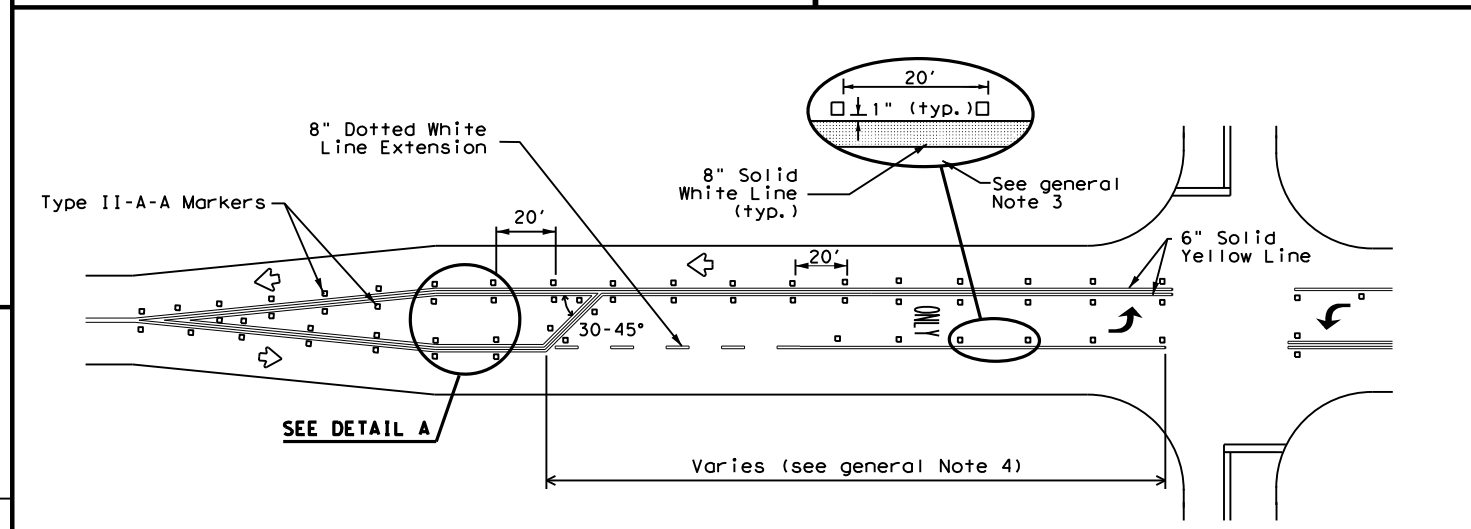
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



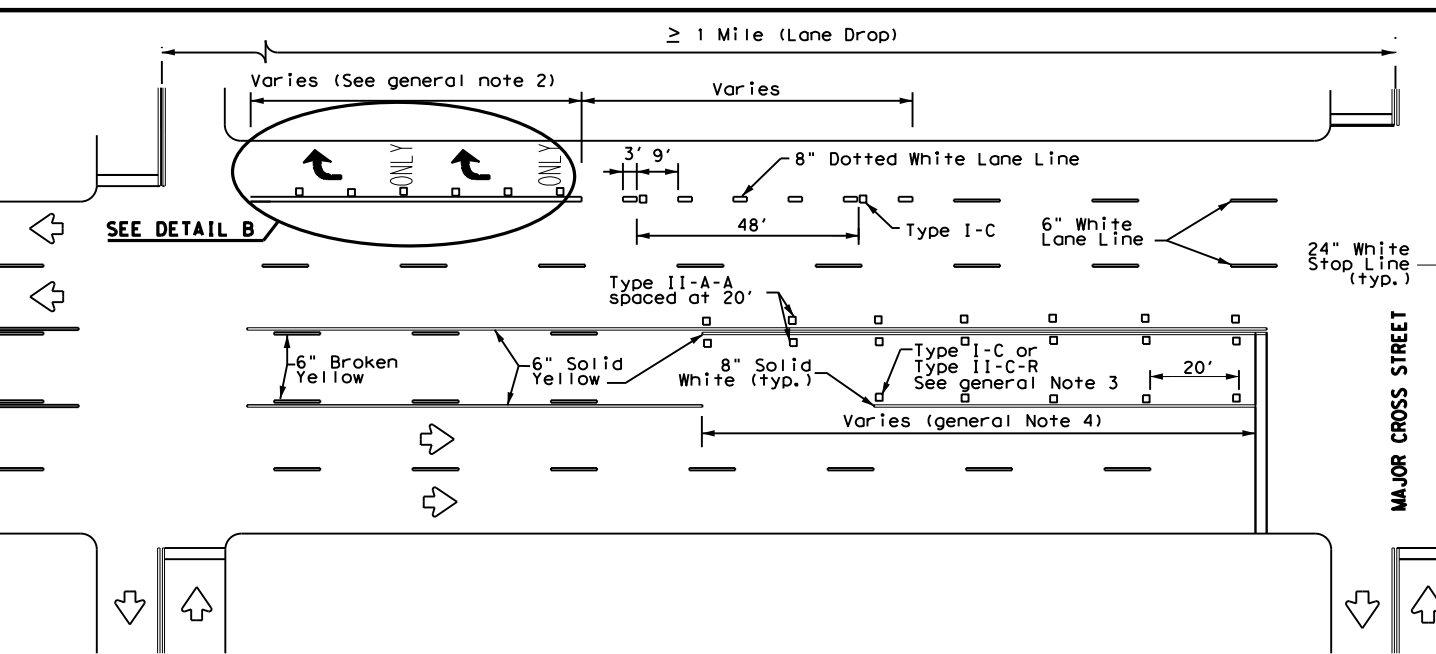
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



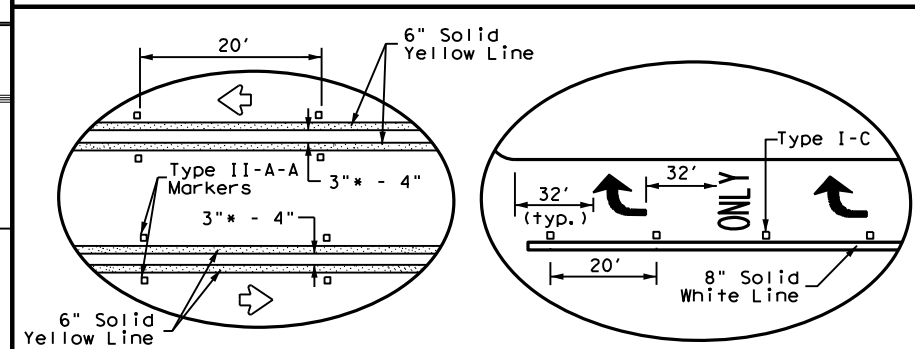
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



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



DETAIL A

DETAIL B

* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation
 Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3) - 22

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© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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8-00 2-12				

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

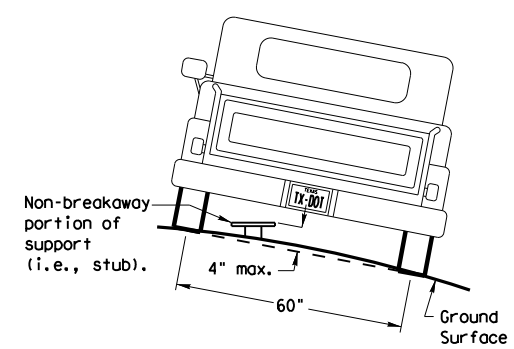
Post Type
 FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
 TWT = Thin-Walled Tubing (see SMD(TWT))
 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
 S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

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

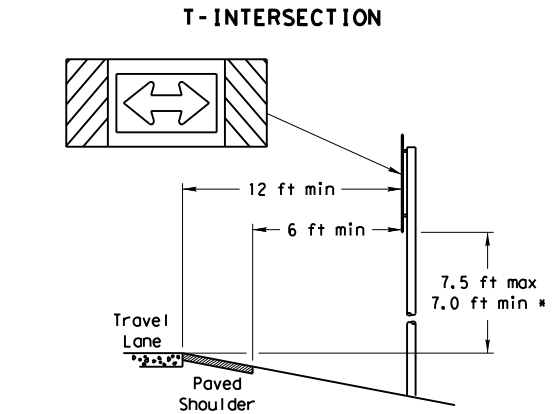
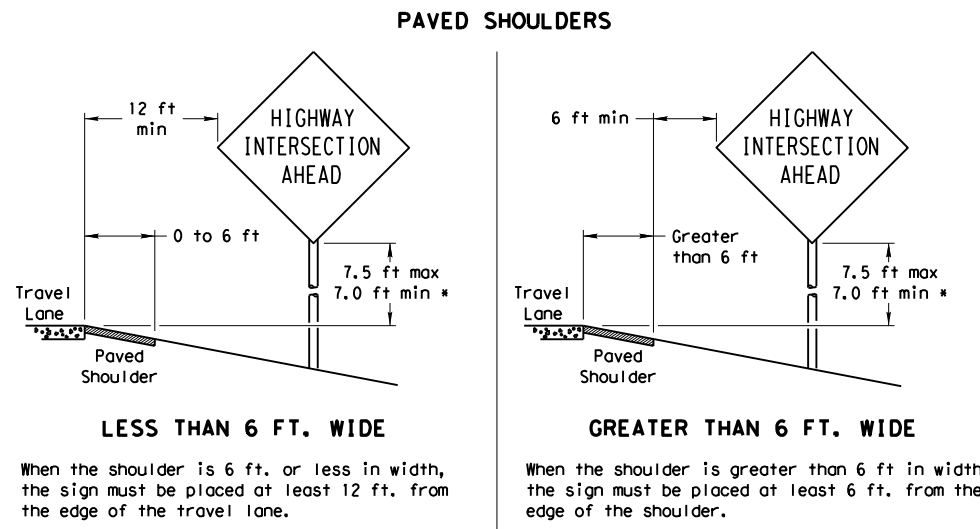
Sign Mounting Designation
 P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
 T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
 U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
 IF REQUIRED
 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
 BM = Extruded Wind Beam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

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



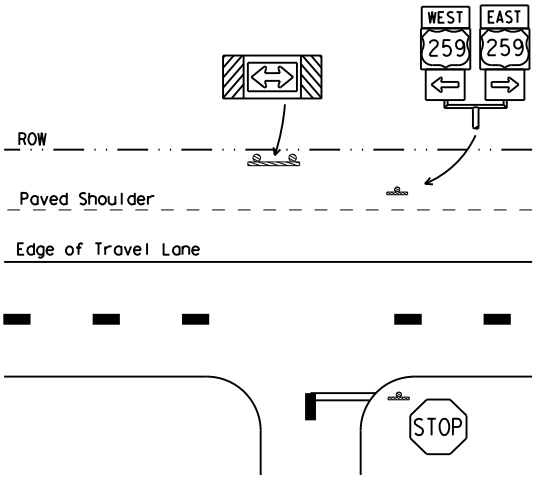
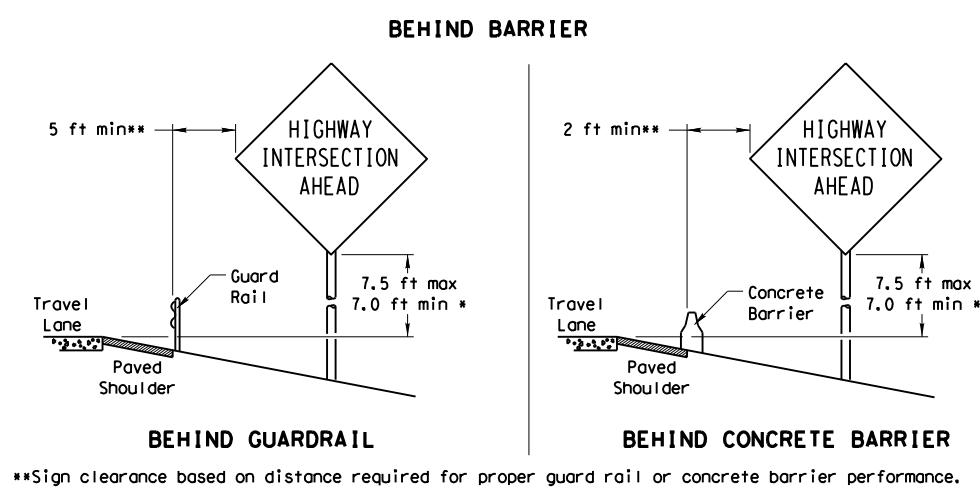
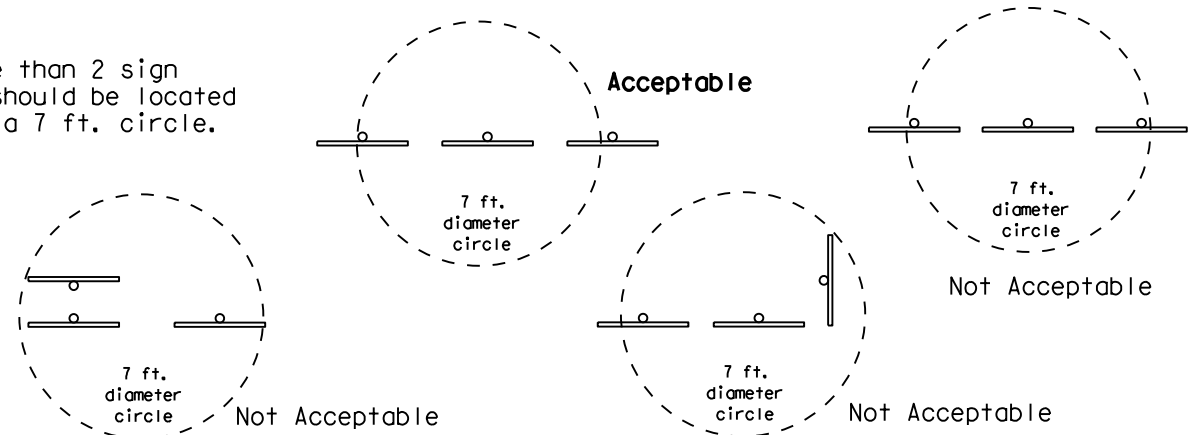
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

SIGN LOCATION



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

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



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

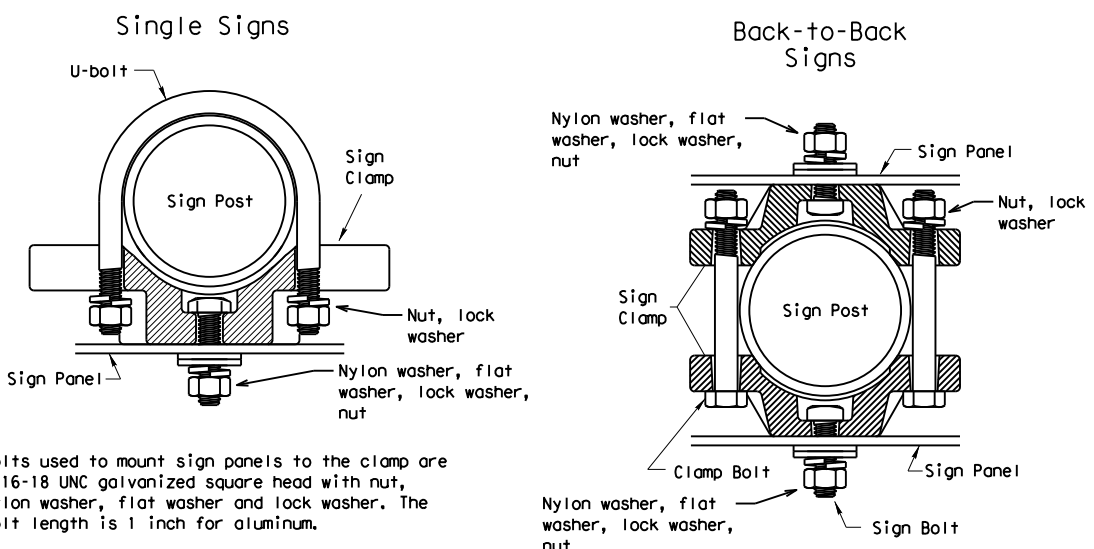
- (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
- (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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>

TYPICAL SIGN ATTACHMENT DETAIL



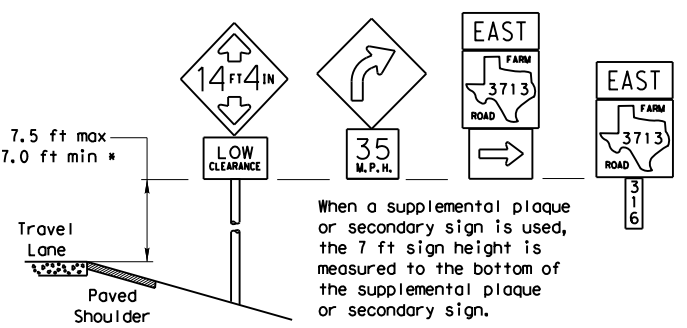
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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

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

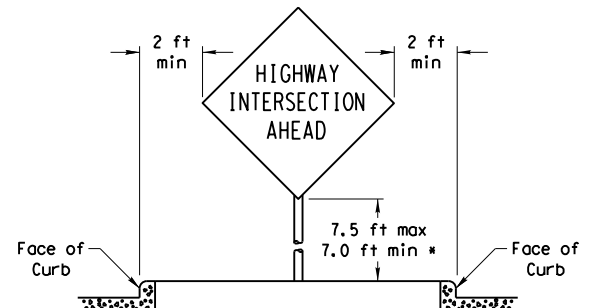
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

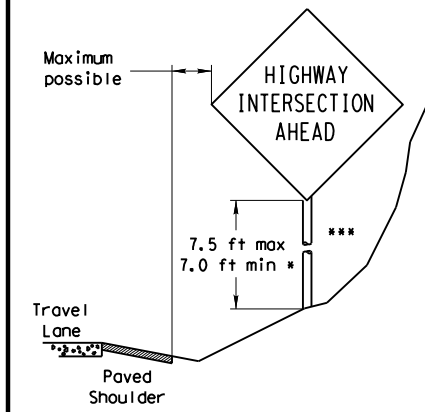


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



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



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

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

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

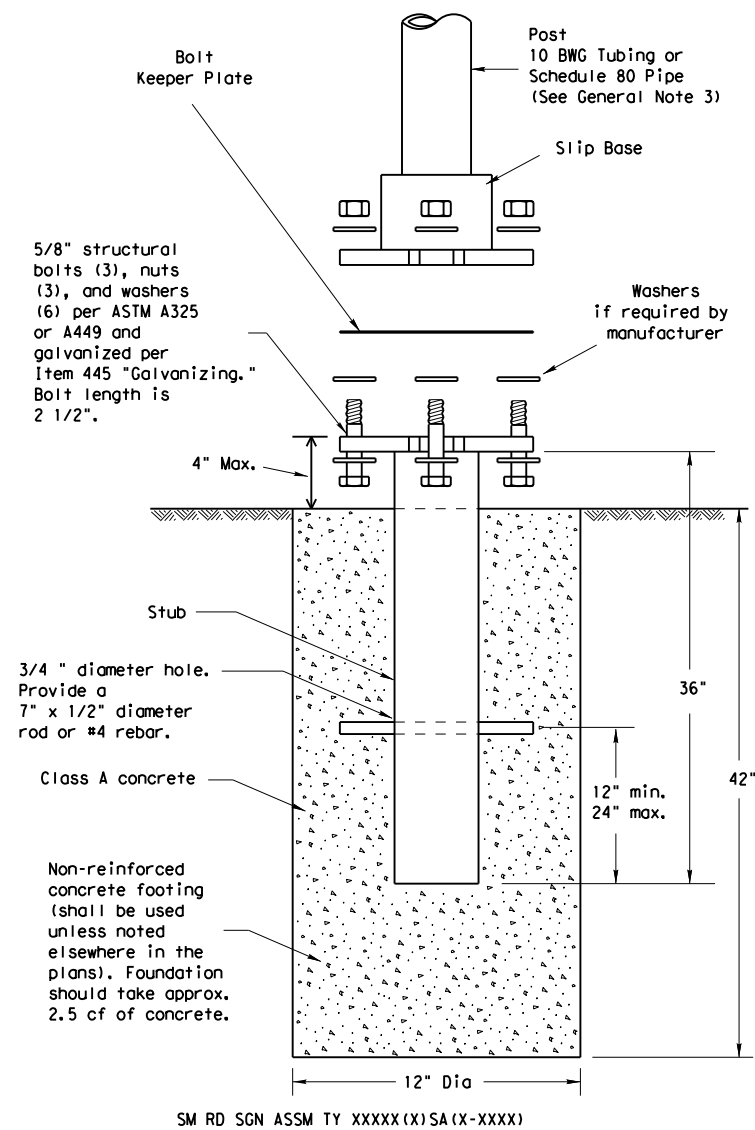


SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS SMD(GEN)-08

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9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
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TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



NOTE

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

GENERAL NOTES:

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

ASSEMBLY PROCEDURE

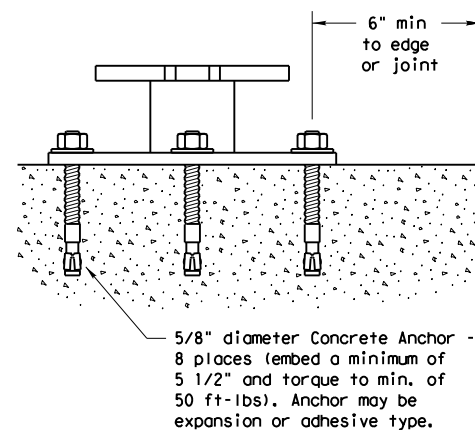
Foundation

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

Support

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

CONCRETE ANCHOR



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



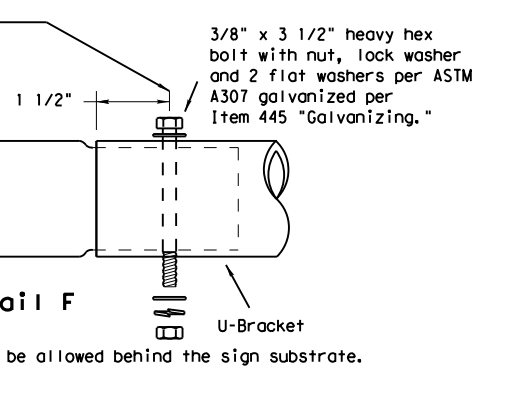
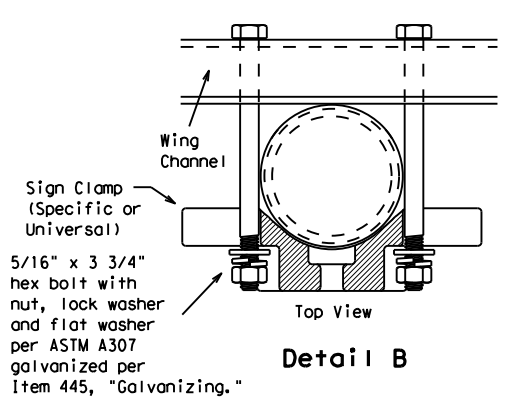
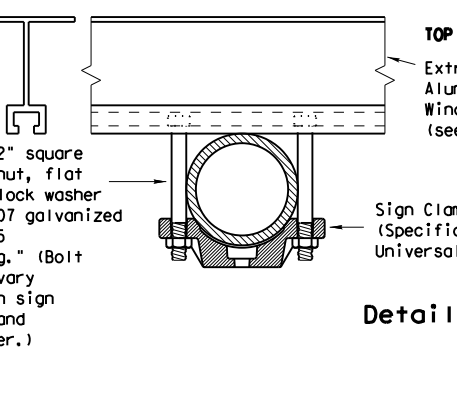
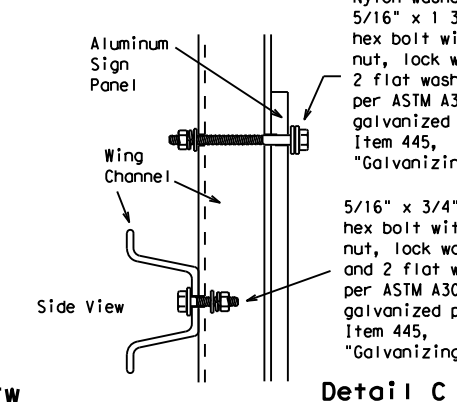
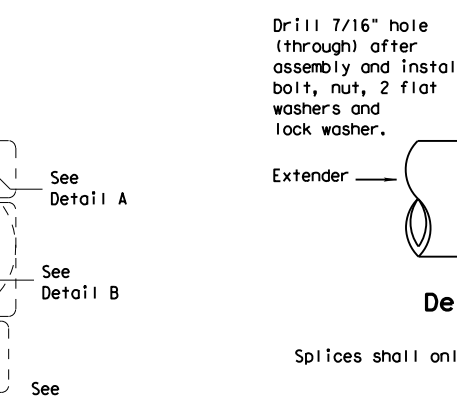
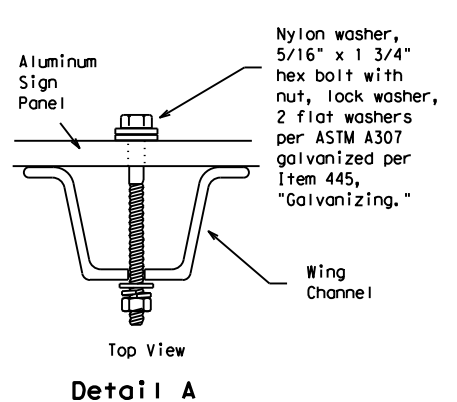
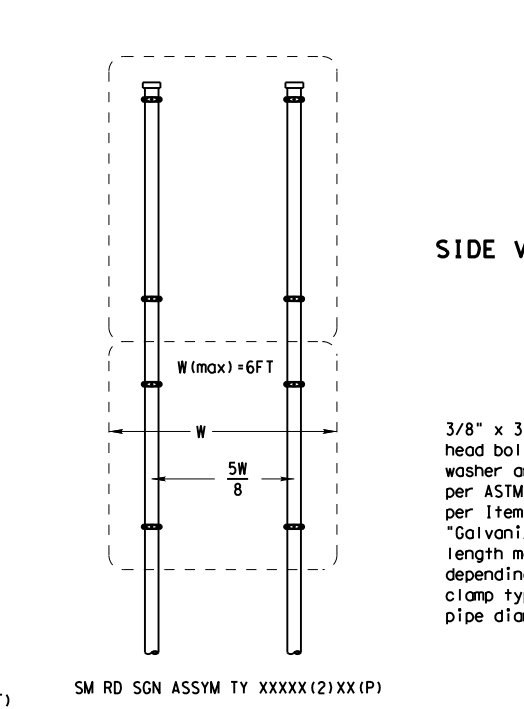
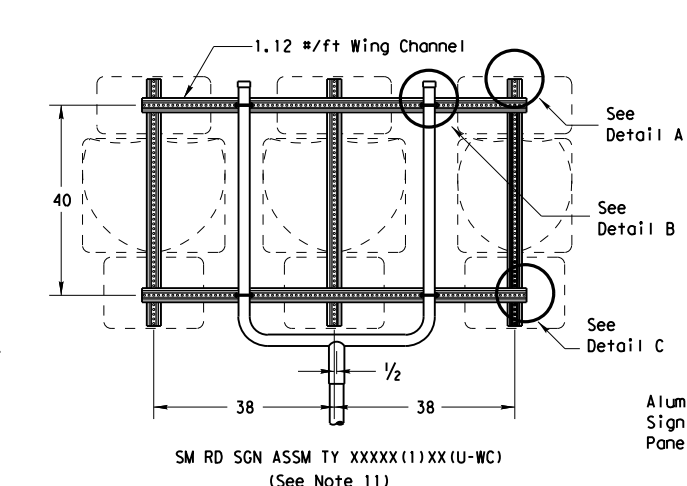
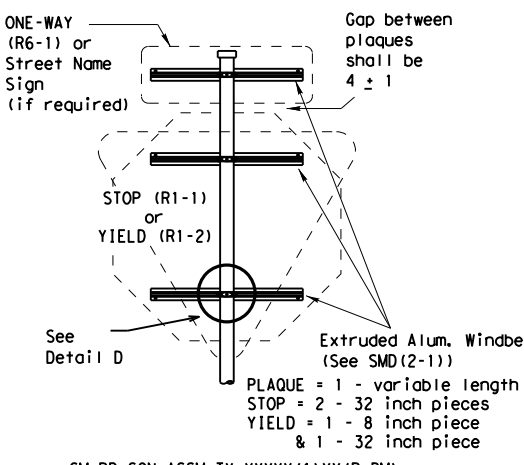
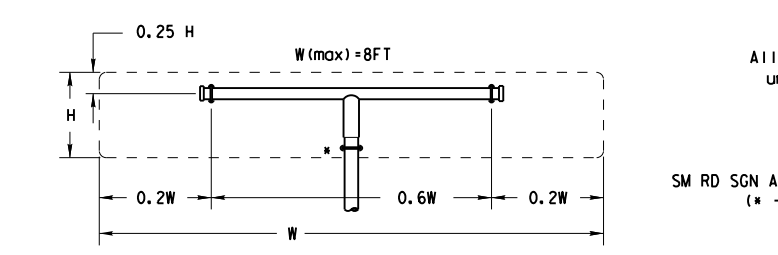
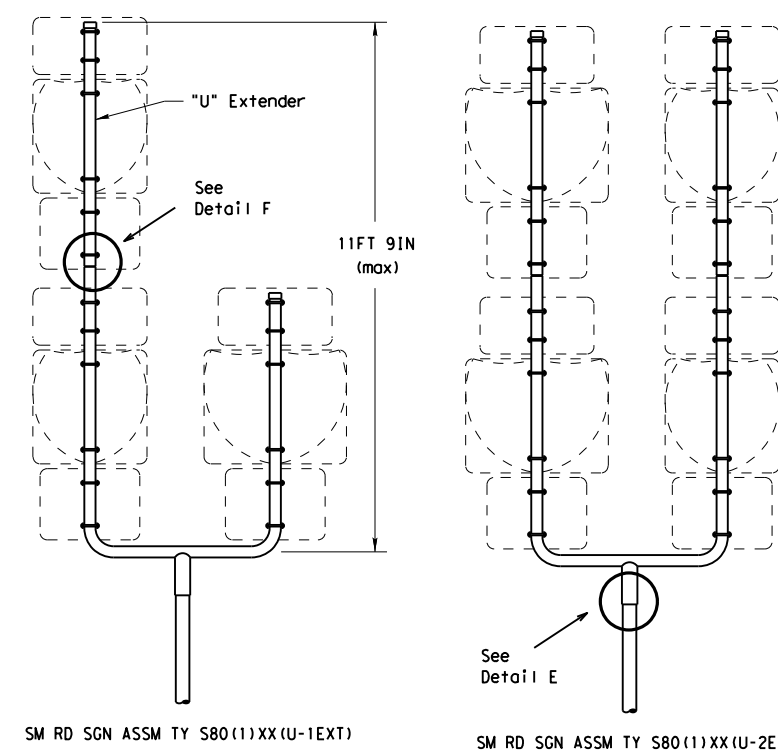
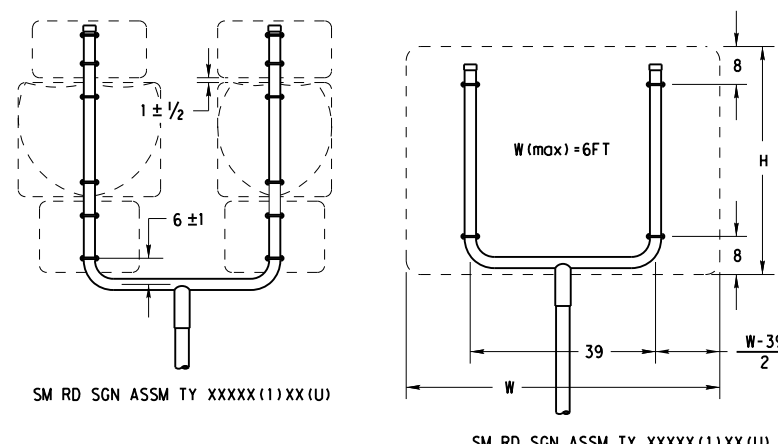
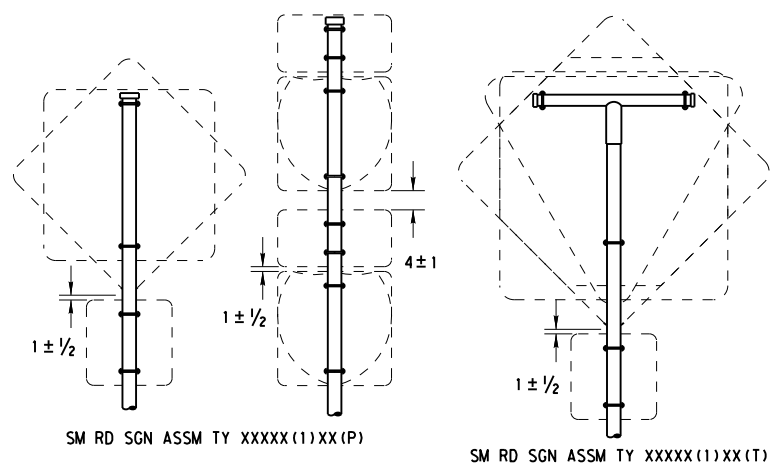
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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9-08	REVISIONS		CONT	SECT	JOB	HIGHWAY
			0062	07	103	US 59
	DIST	COUNTY			SHEET NO.	
	ATL	HARRISON			80	

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GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

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

REQUIRED SUPPORT

SIGN DESCRIPTION	SUPPORT
	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
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)
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)

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.

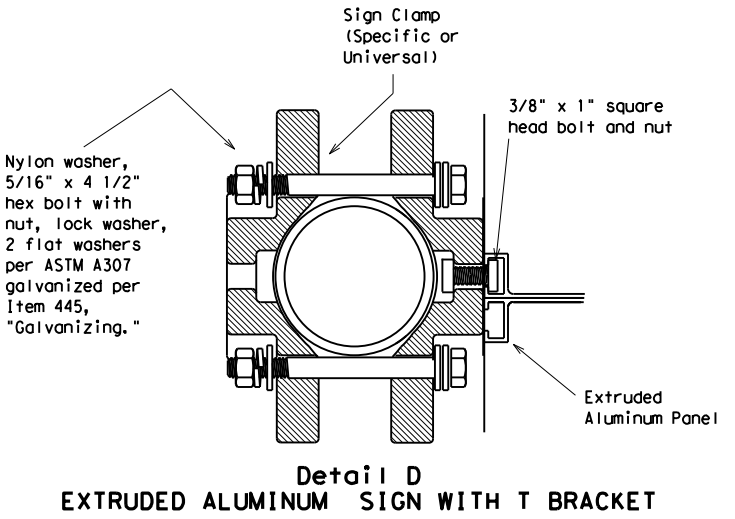
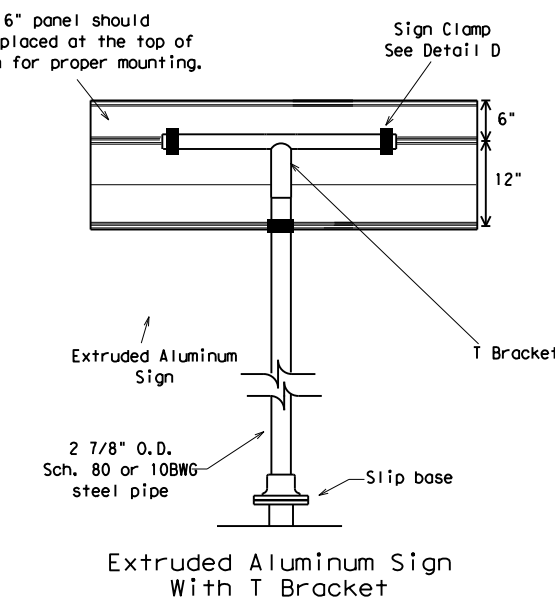
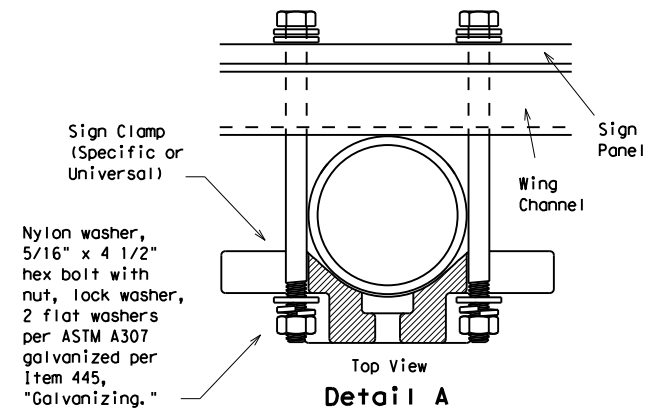
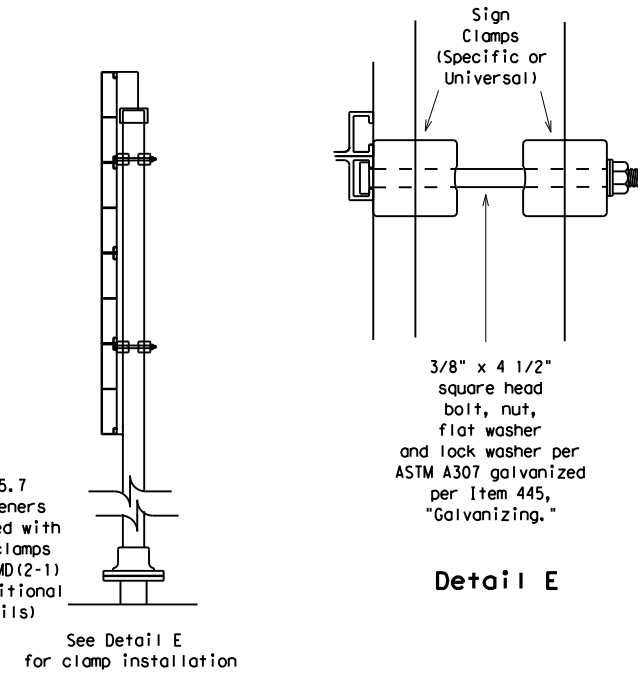
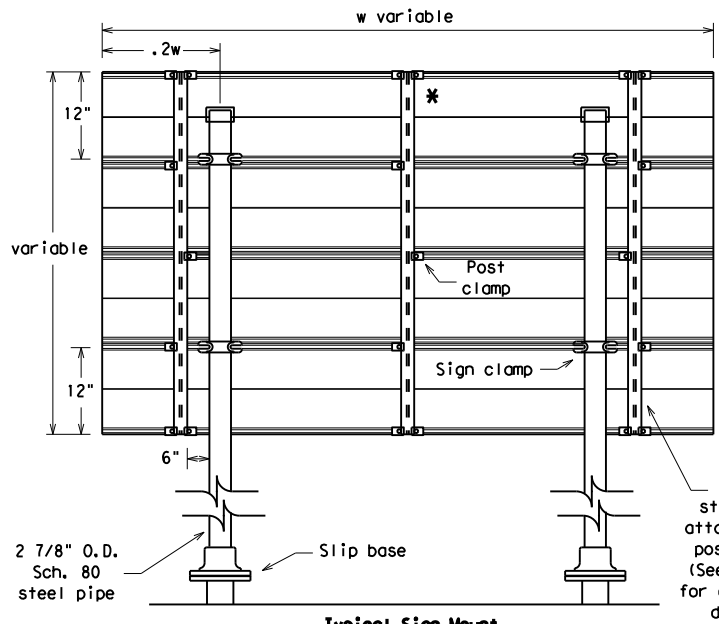
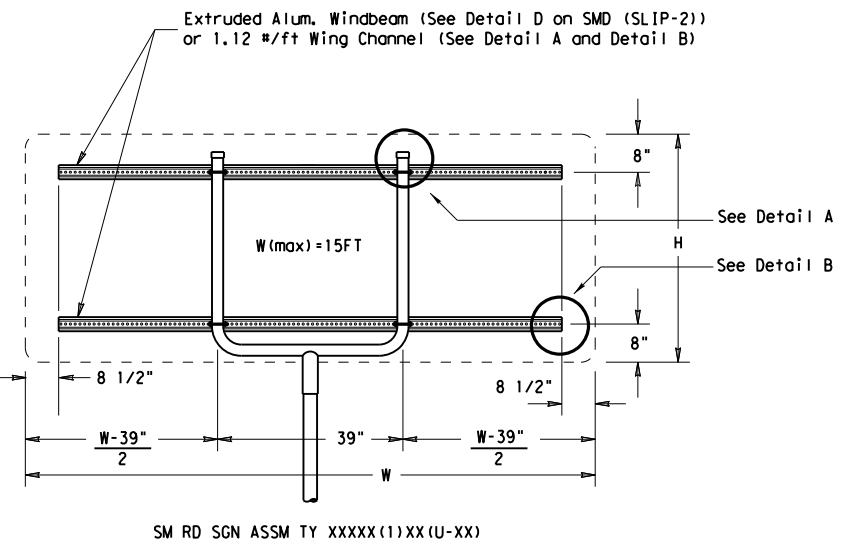
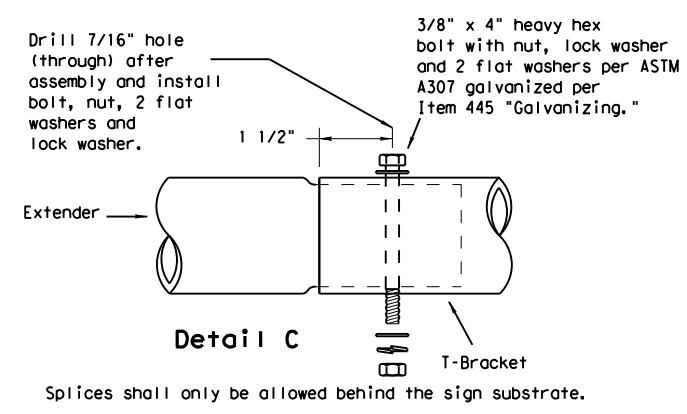
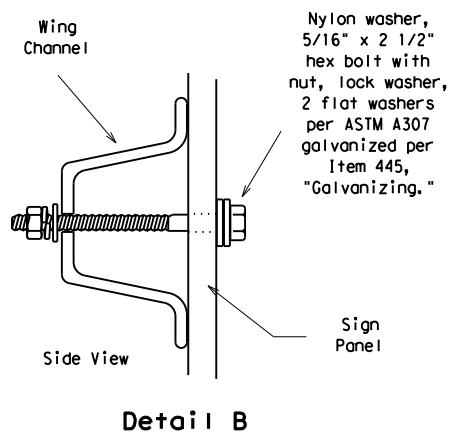
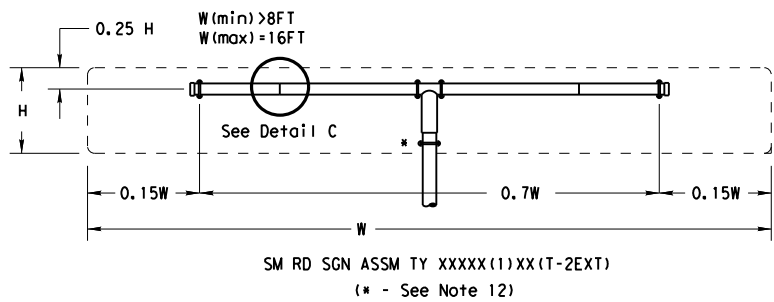
Texas Department of Transportation
 Traffic Operations Division

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

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		ATL	HARRISON	81	

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GENERAL NOTES:

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

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	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

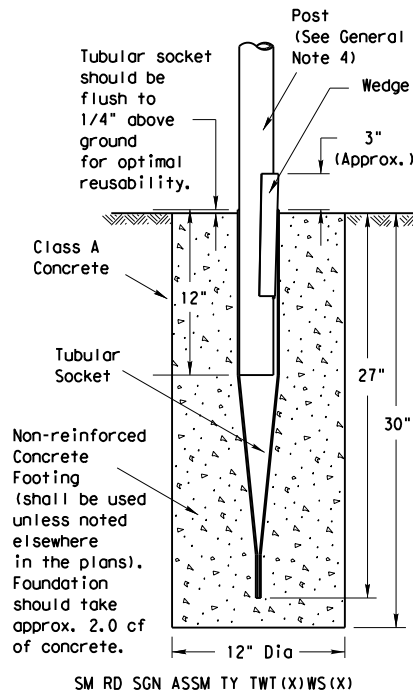
**SIGN MOUNTING DETAILS
 SMALL ROADSIDE SIGNS
 TRIANGULAR SLIPBASE SYSTEM**

SMD(SLIP-3)-08

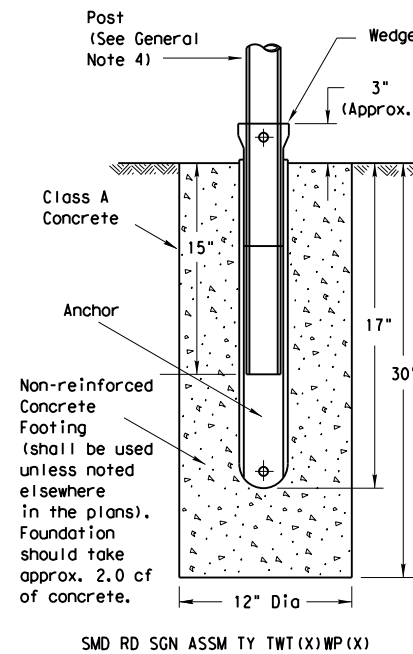
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		ATL	HARRISON		82

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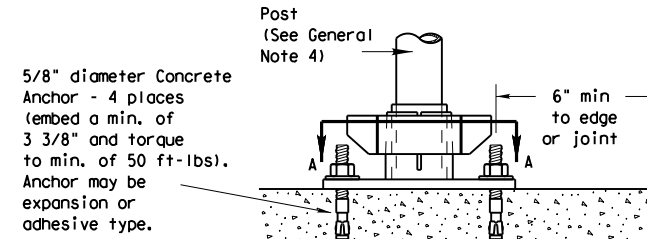
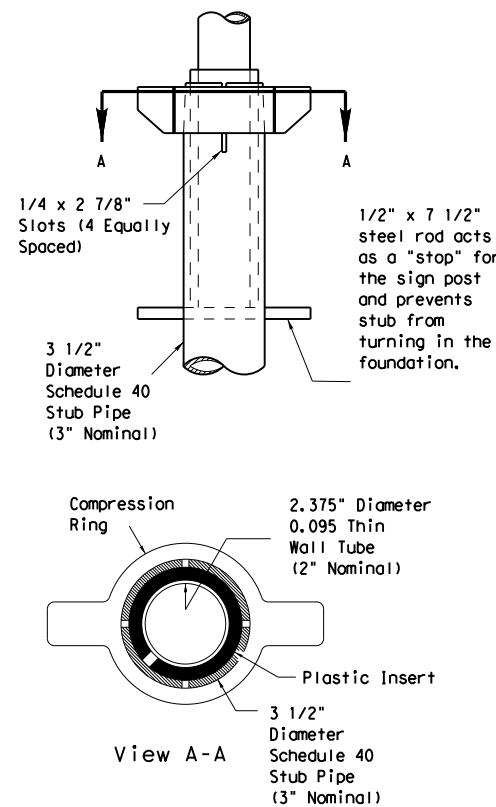
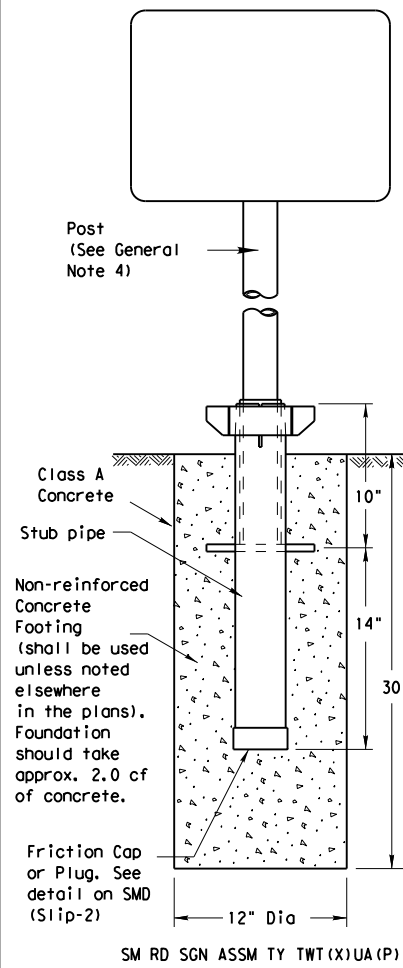
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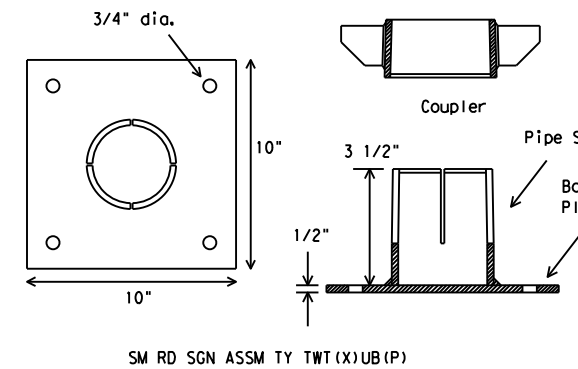
Wedge Anchor High Density Polyethylene (HDPE) System



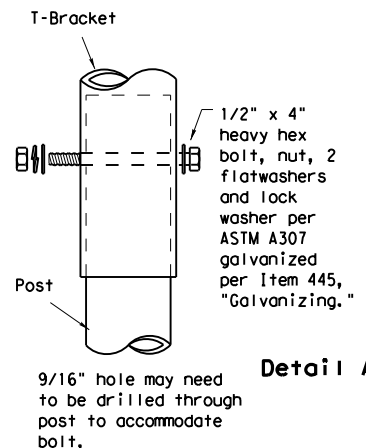
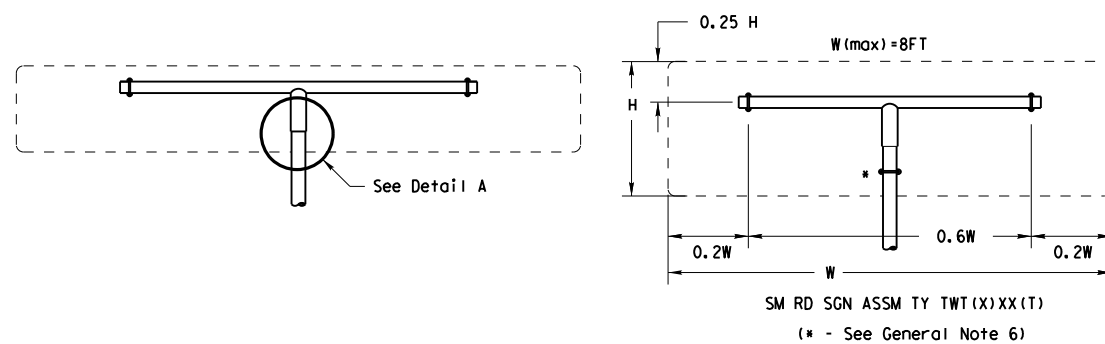
Universal Anchor System with Thin-Walled Tubing Post



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, "Epoxy and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.



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



NOTE

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

GENERAL NOTES:

- 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.
- 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.
- 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
- 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 HSLA 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.
- Sign blanks shall be the sizes and shapes shown on the plans.
- Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- 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

- 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.
- 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.
- Insert tubular socket into concrete until top of socket is approximately 1/4" above the concrete footing.
- Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer.
- Attach the sign to the sign post.
- Insert the sign post into socket and align sign face with roadway.
- Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

- 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.
- Insert base post in hole to depths shown and backfill hole with concrete.
- 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.
- Attach the sign to the sign post.
- Install plastic insert around bottom of post.
- Insert sign post into base post. Lower until the post comes to rest on steel rod.
- Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
- Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.



SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST SMD (TWT) -08

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		ATL	HARRISON	83	

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GENERAL NOTES FOR ALL ELECTRICAL WORK

- The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
- Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.
- Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
- Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
- Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
- When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

- Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.
- Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
- Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.


AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

- Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.
- Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.
- Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.
- Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

- Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.
- When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.
- Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

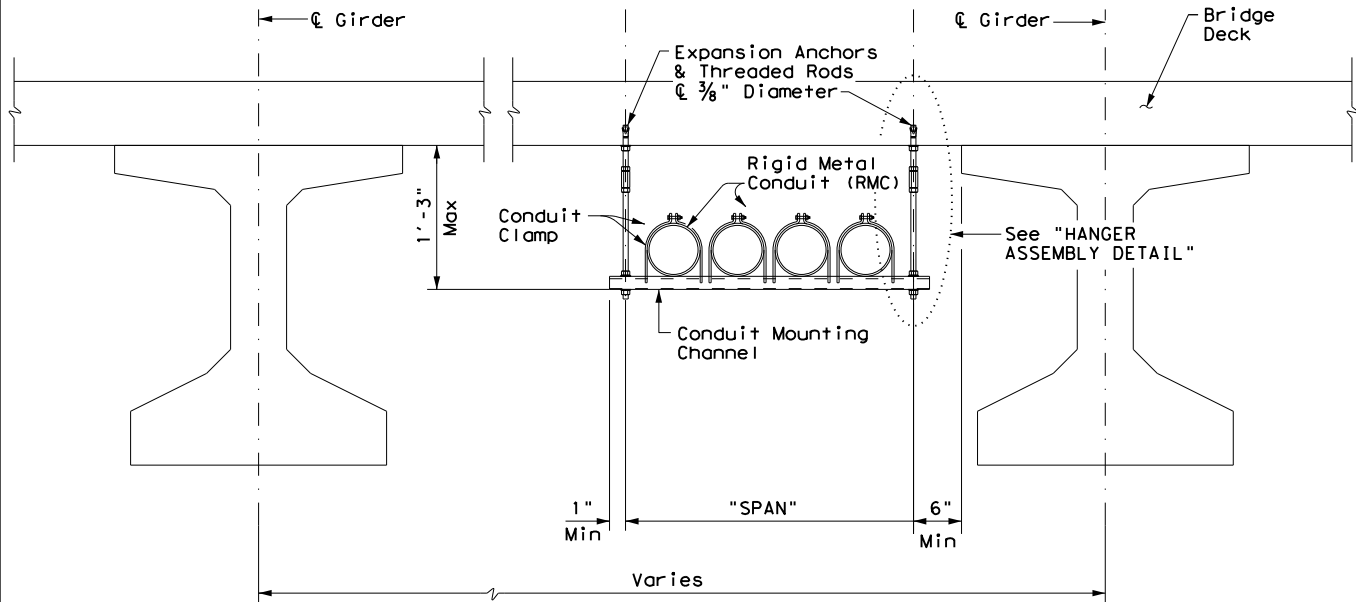
B. CONSTRUCTION METHODS

- Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.
- Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.
- Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
- Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.
- When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."
- Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
- During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
- Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.
- Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
- Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.
- At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
- Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).
- Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.
- File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

				Traffic Operations Division Standard	
<h1>ELECTRICAL DETAILS CONDUITS & NOTES</h1>					
<h2>ED(1) - 14</h2>					
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		DIST	COUNTY		SHEET NO.
		ATL	HARRISON		84

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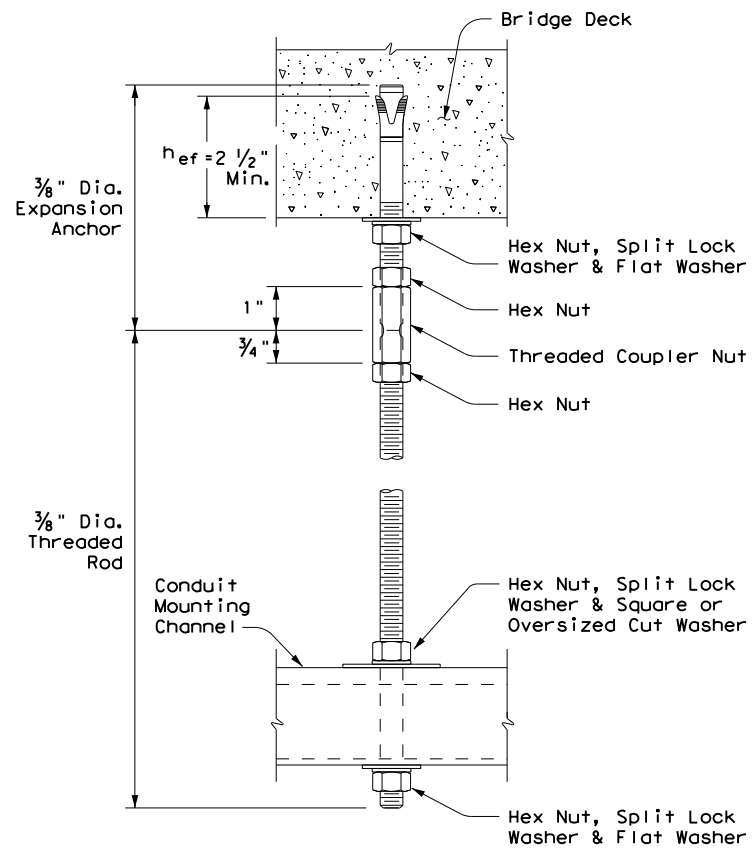
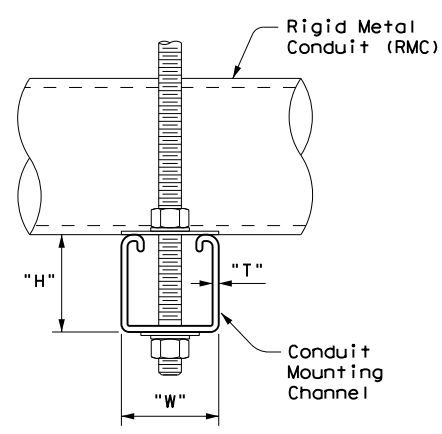
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CONDUIT HANGING DETAIL

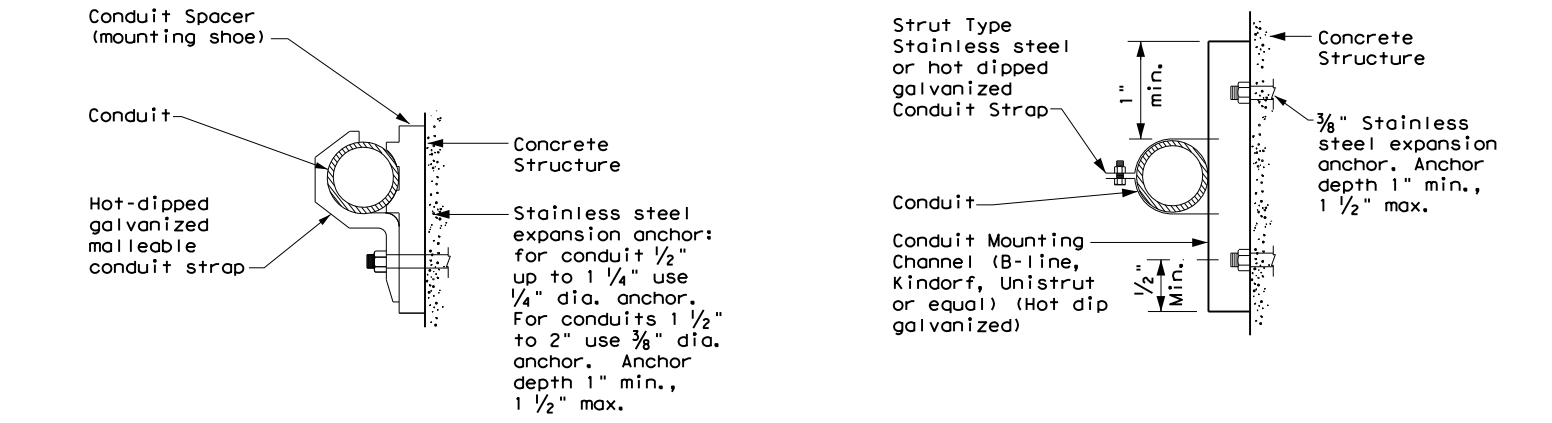
CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 1/16"	12 Ga.

Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.



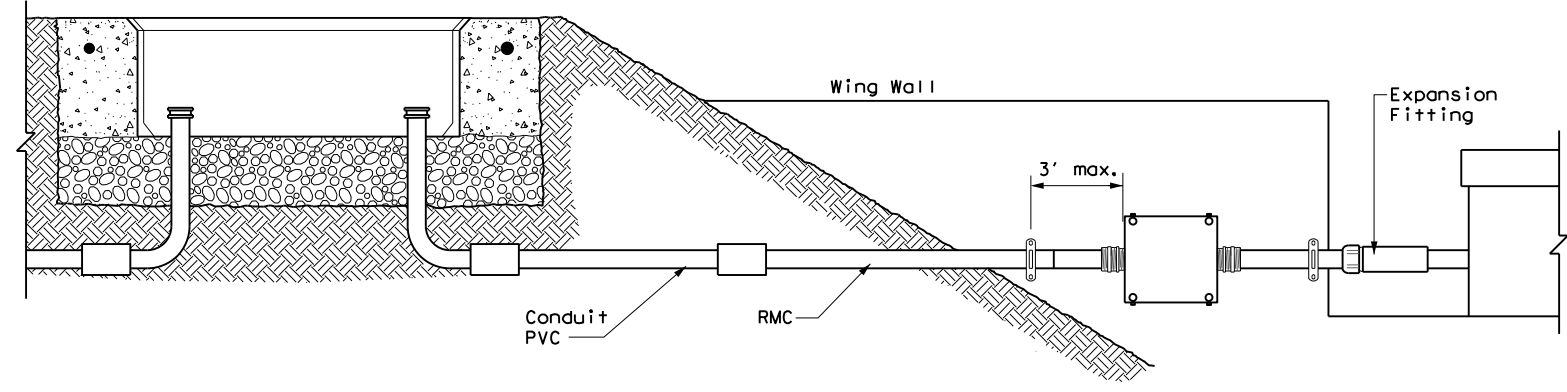
HANGER ASSEMBLY DETAIL

ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT



CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces
 See ED(1)B.2



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.
2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.
3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.
4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.
5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (h_{ef}), as shown. Increase (h_{ef}) as needed to ensure sufficient thread length for proper torquing and tightening of anchors.
6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (h_{ef}). No lateral loads shall be introduced after conduit installation.

		Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS CONDUIT SUPPORTS</h2>			
<h3>ED(2) - 14</h3>			
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REVISIONS			US 59
	DIST ATL	COUNTY HARRISON	SHEET NO. 85

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS) 11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

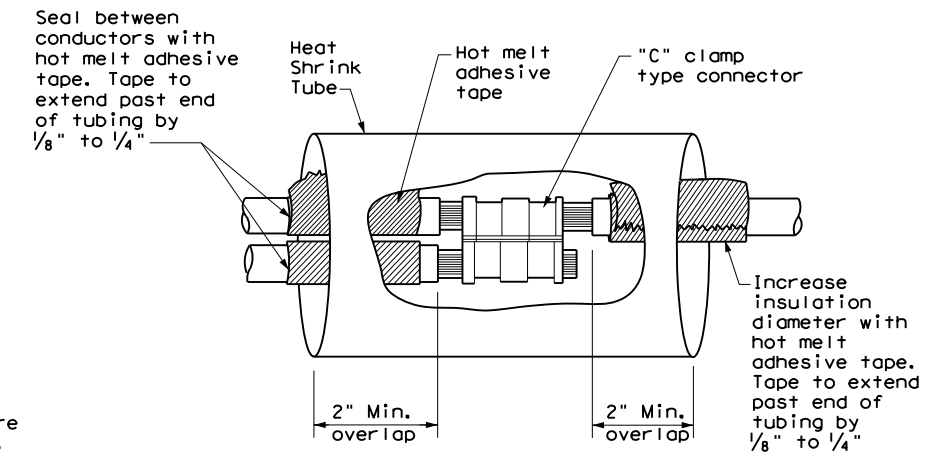
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

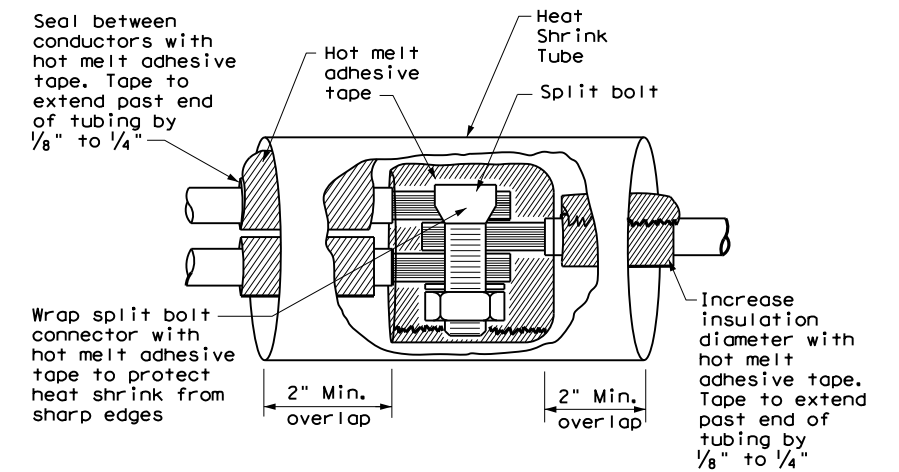
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

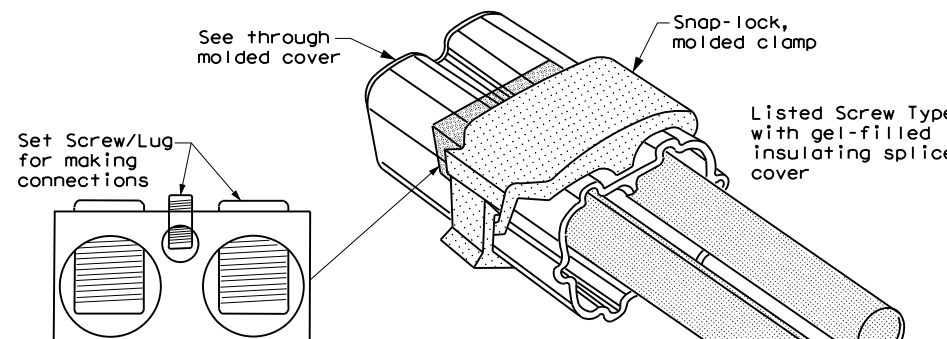
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



**SPLICE OPTION 1
Compression Type**



**SPLICE OPTION 2
Split Bolt Type**



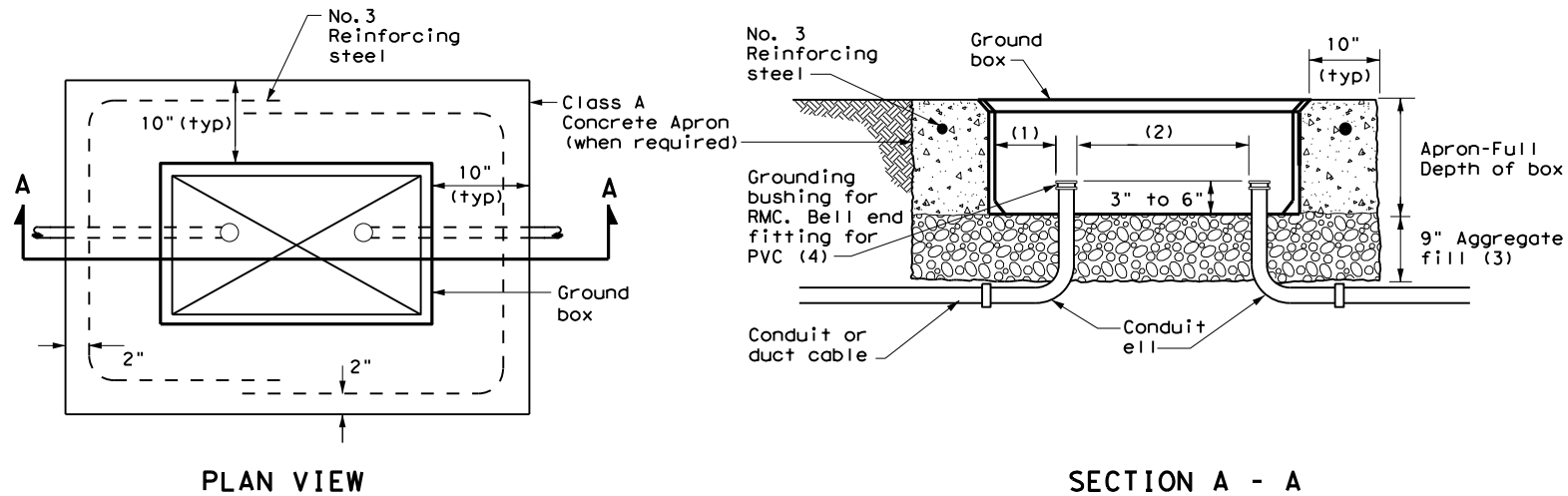
**SPLICE OPTION 3
Listed Screw Type**

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		Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS CONDUCTORS</h2>			
<h3>ED(3) - 14</h3>			
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	ATL	HARRISON	86

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APRON FOR GROUND BOX

- (1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushing.
- (3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.
- (4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

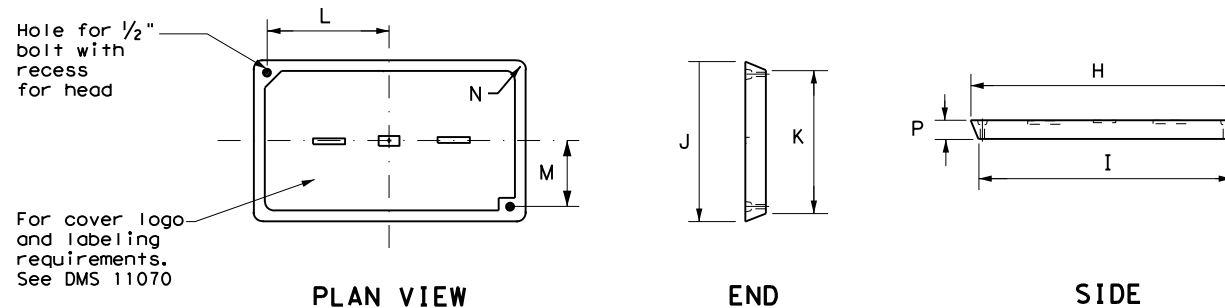
4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.
2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.
3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.
4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.
5. Temporarily seal all conduits in the ground box until conductors are installed.
6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.
7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.
8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.
9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.
10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2

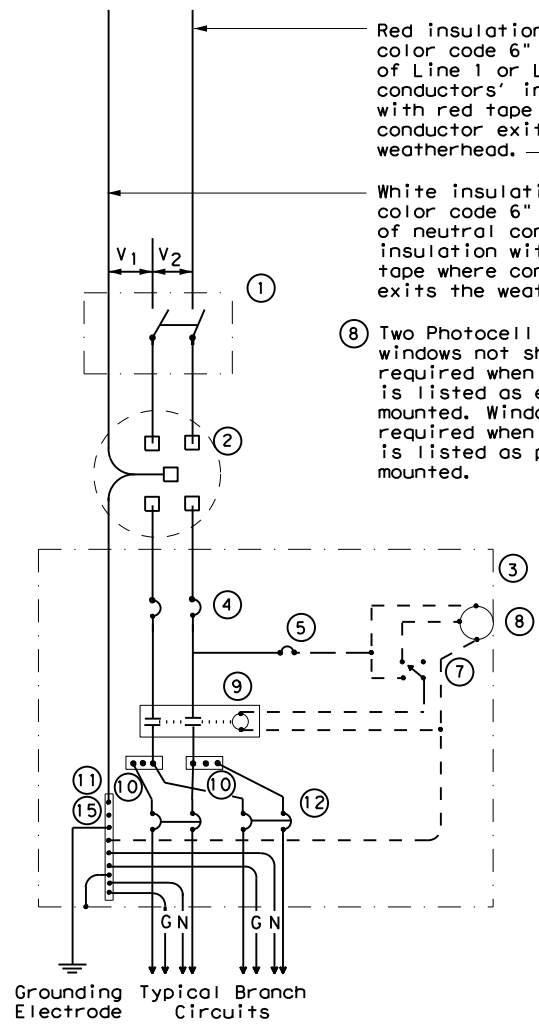


GROUND BOX COVER

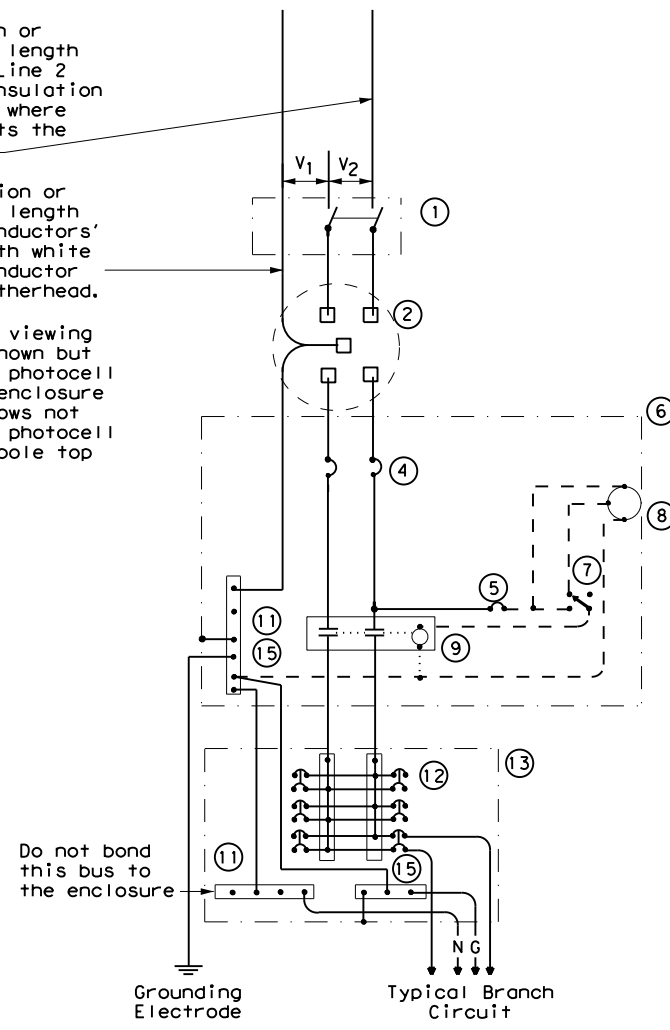
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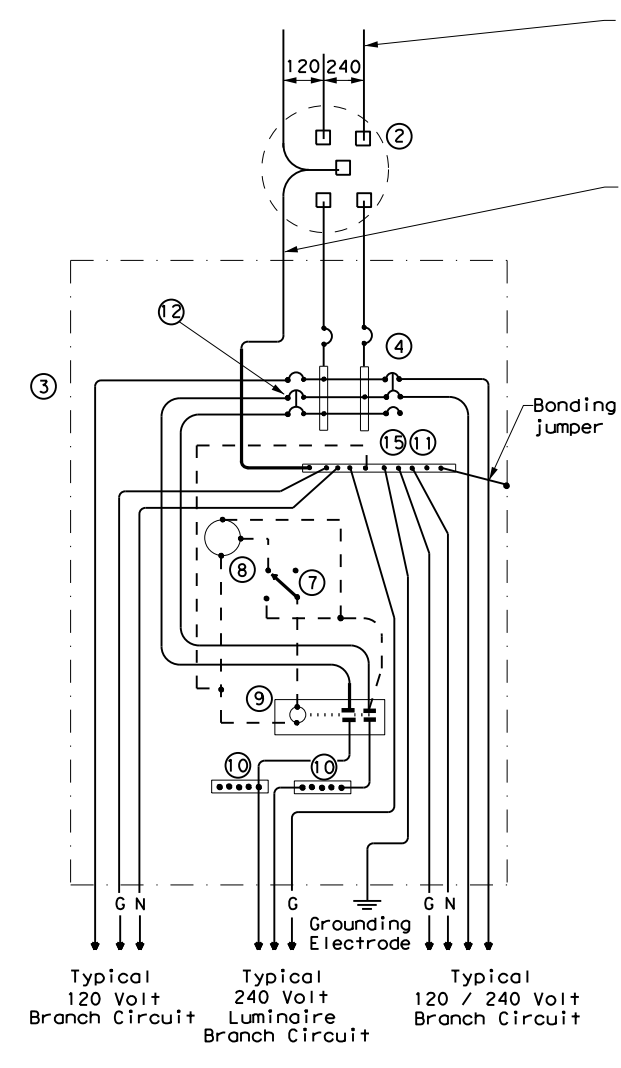
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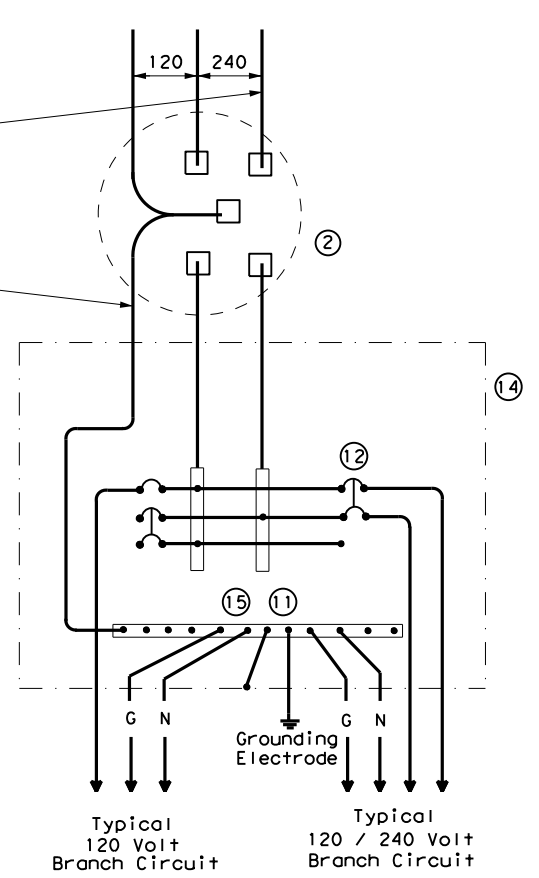
**SCHEMATIC TYPE A
THREE WIRE**



**SCHEMATIC TYPE C
THREE WIRE**



**SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE**



**SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE**
 Galvanized steel - "Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
—	Power Wiring
- - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

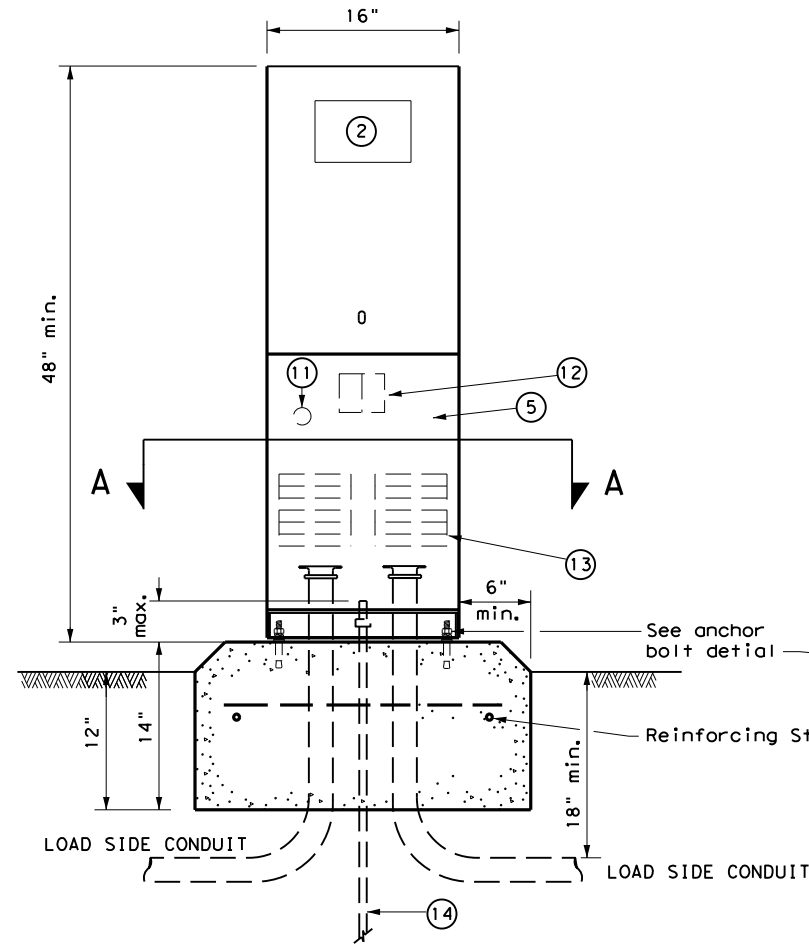
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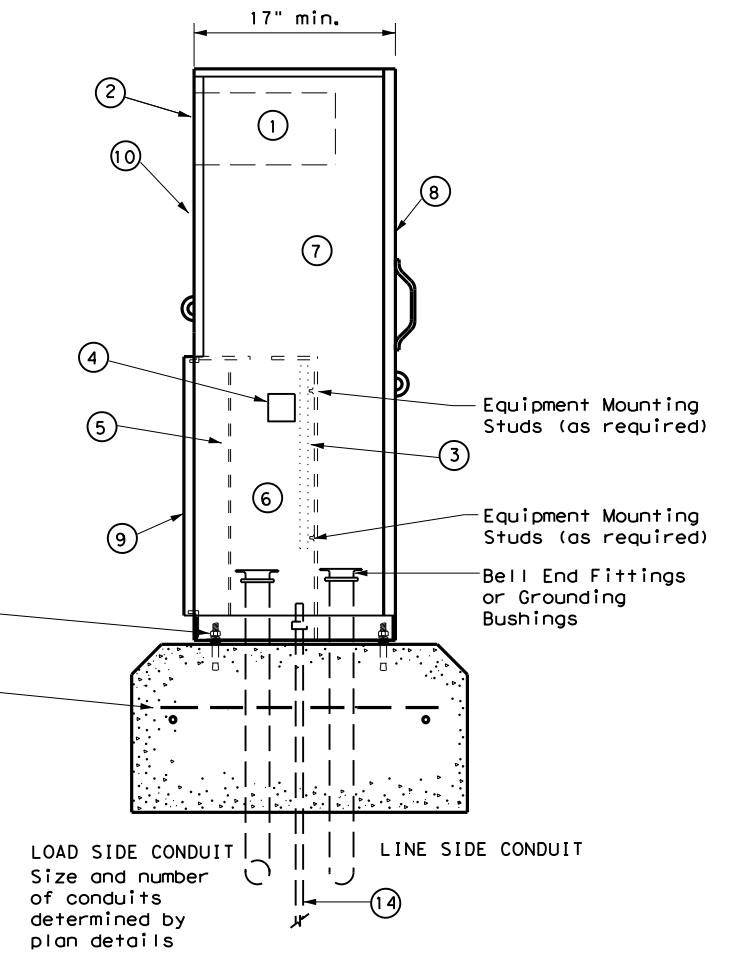
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PEDESTAL SERVICE NOTES

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS) 11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services." Provide pedestal electrical services as listed on the Material Producers List (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.
2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.
3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."
5. Install 1/2 in. X 2 1/16 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a 1/2 in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than 1/8 in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of 1/8 in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within 1/4 in. Repair rocking or movement of the service enclosure at no additional cost to the department.
7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.
8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.

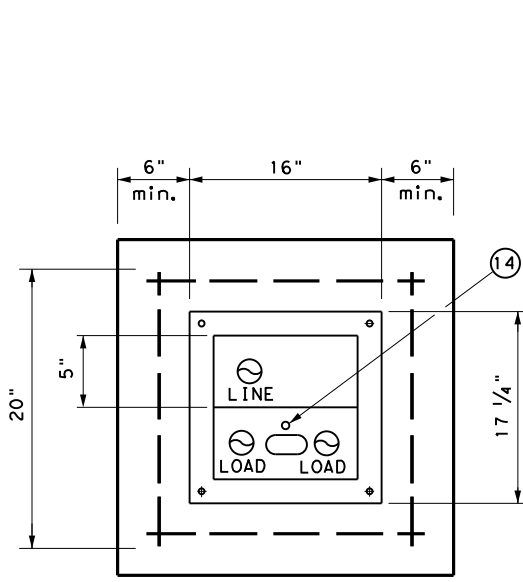


FRONT VIEW

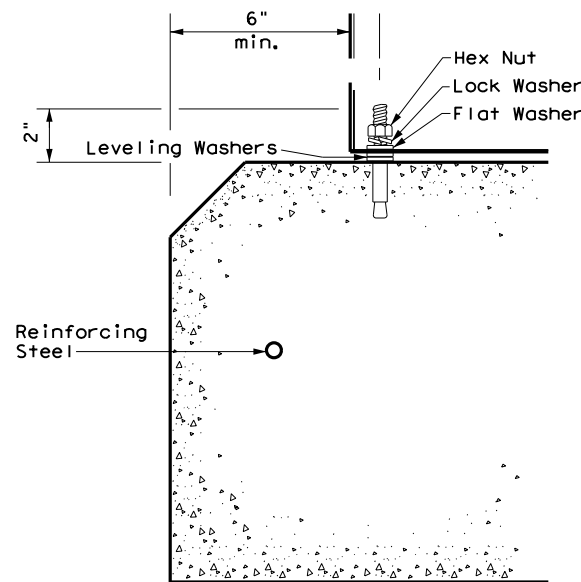


SIDE VIEW

TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SECTION A-A



ANCHOR BOLT DETAIL

LEGEND

Number	Description
1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access
11	Control Station (H-O-A Switch)
12	Main Disconnect
13	Branch Circuit Breakers
14	Copper Clad Ground Rod - 5/8" X 10'

Traffic Operations Division Standard

ELECTRICAL DETAILS

ELECTRICAL SERVICE SUPPORT

PEDESTAL SERVICE TYPE PS

ED(9) - 14

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REVISIONS	0062	07	103	US 59
DIST	COUNTY	SHEET NO.		
ATL	HARRISON			91

ROADWAY ILLUMINATION ASSEMBLY NOTES

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1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.
2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.
3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.
4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.
5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.
 - a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.
 - b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, provide poles meeting the following requirements:
 - i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).
 - ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.
6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.
7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.
8. Install T-Base with following procedure:
 - a. Anchor Bolt Tightening.
 - i. Coat the threads of the anchor bolts with electrically conductive lubricant.
 - ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.
 - iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.
 - iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.
 - v. Check top of T-base for level. If not level then foundation must be leveled.
 - b. Top Bolt Procedure
 - i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

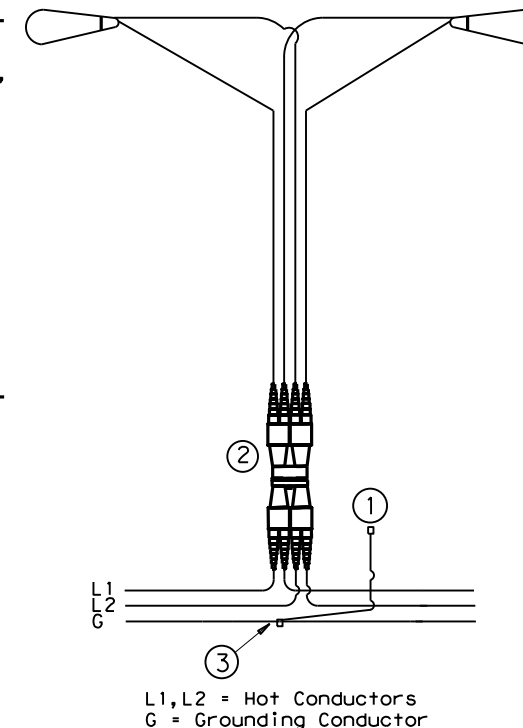
- ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."
 - iii. Tighten each nut to 150 ft-lb. using a torque wrench.
- c. Level and Plumb
- i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.
9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).
 10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.
 11. Mount luminaires on arms level as shown by the luminaire level indicator.
 12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

- ① Use 1/2 in. -13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.
- ② Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.
- ③ Split Bolt or other connector.

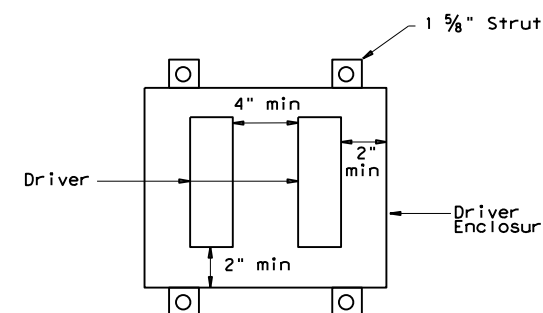
Decorative LED Lighting Notes:

1. LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):
 - a. Provide NEMA 3R outdoor enclosure or as approved.
 - b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.
 - c. Install drivers with at least 2 inches of space from enclosure walls.
 - d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment
 - e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.
 - f. Provide remote drivers with a maximum of 100 watts
 - g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

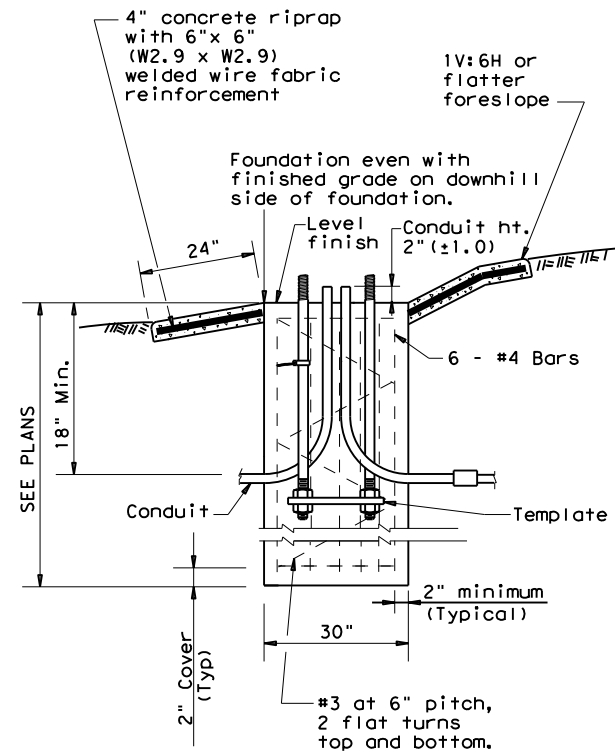


Driver Spacing In Remote Enclosure

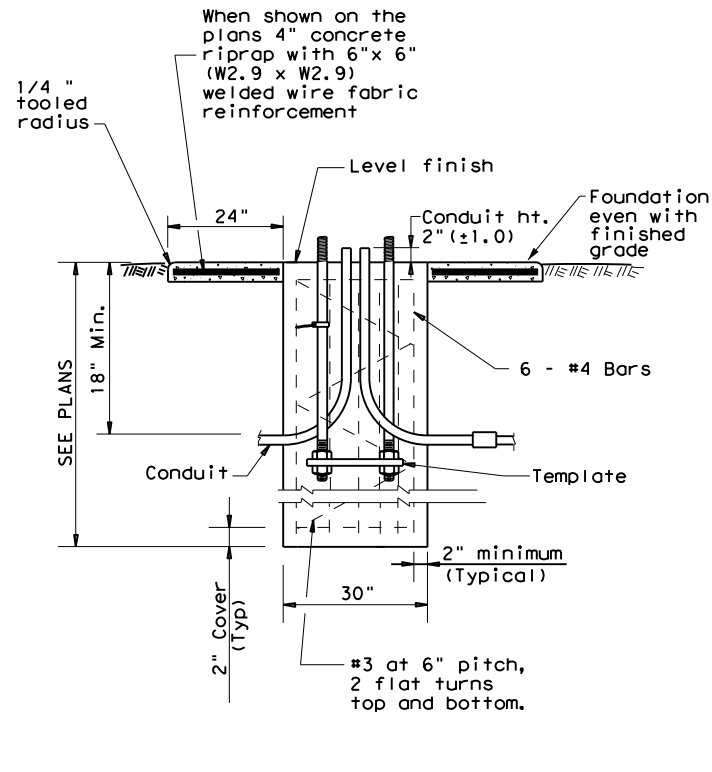
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7-17	DIST	COUNTY	SHEET NO.
12-20	ATL	HARRISON	92

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SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE

TABLE 1

ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1 in. x 30 in.
40-50 ft.	15 in.	17 1/4 in.	1 1/4 in. x 30 in.

TABLE 2

RECOMMENDED FOUNDATION LENGTHS
(See note 1)

MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
≤20 ft.	6'	6'	6'
>20 ft. to 30 ft.	8'	6'	6'
>30 ft. to 40 ft.	8'	8'	6'
>40 ft. to 50 ft.	10'	8'	6'

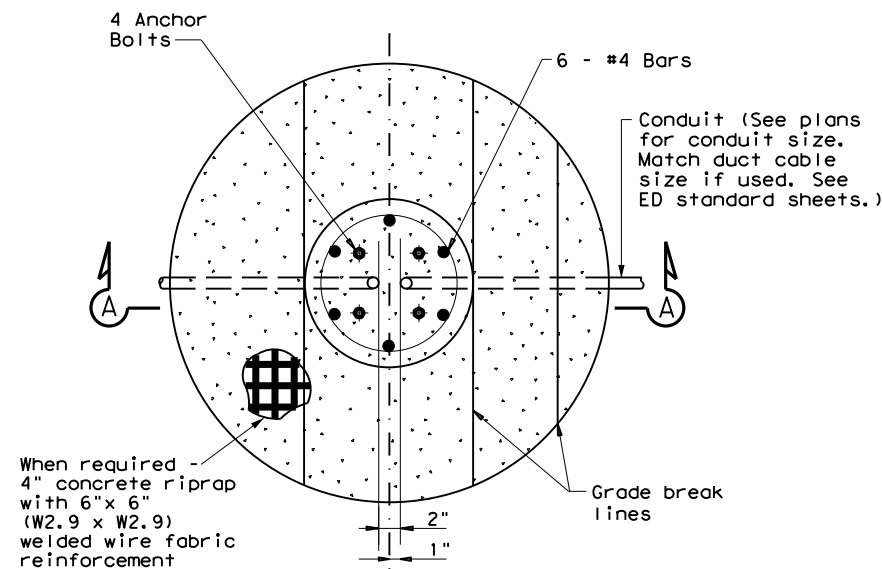
TABLE 3

PAY QUANTITY OF RIPRAP PER FOUNDATION
(Install only when shown on the plans)

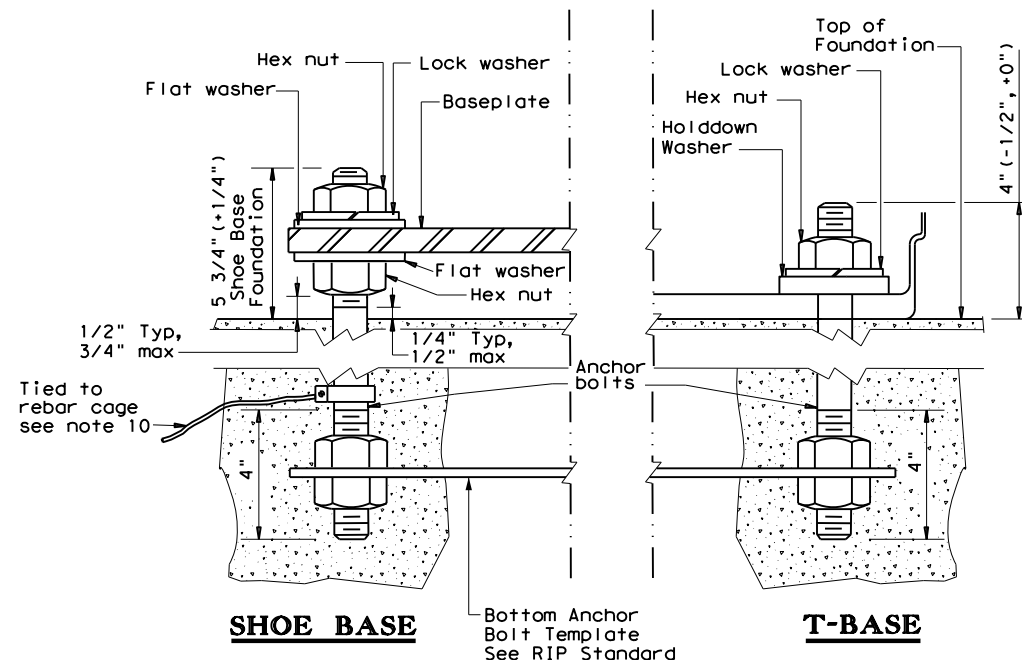
Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

GENERAL NOTES:

- "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
- Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
- Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
- Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the Department.
- Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
- Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
- Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
- Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
- Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
- Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
- Grade earthwork around T-base foundations even with the finished grade as shown in Section A-A to ensure proper function of the breakaway device. Use riprap on T-base foundations that are located on sloped grades, and as shown on the plans for level grades.



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

TABLE 4

BREAKAWAY POLE PLACEMENT (See note 6)

ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

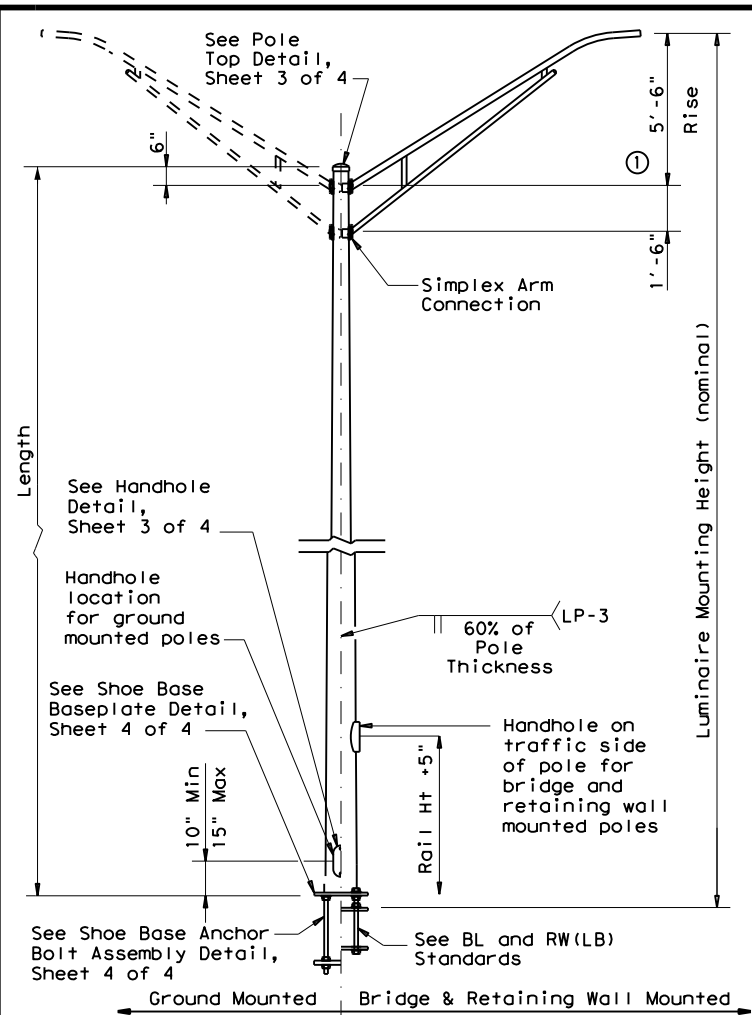
* or as close to ROW line as is practical
 ** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.

ROADWAY ILLUMINATION DETAILS
(RDWY ILLUM FOUNDATIONS)
RID(2)-20

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1-11	DIST	COUNTY	SHEET NO.	
7-17	ATL	HARRISON	93	
12-20				

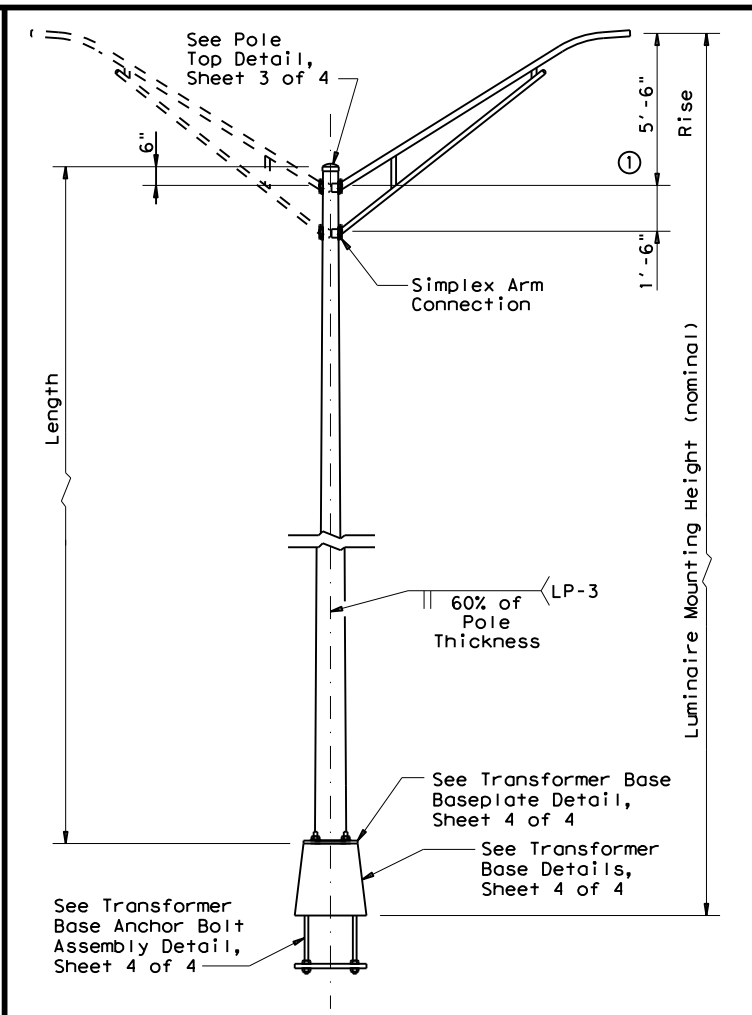
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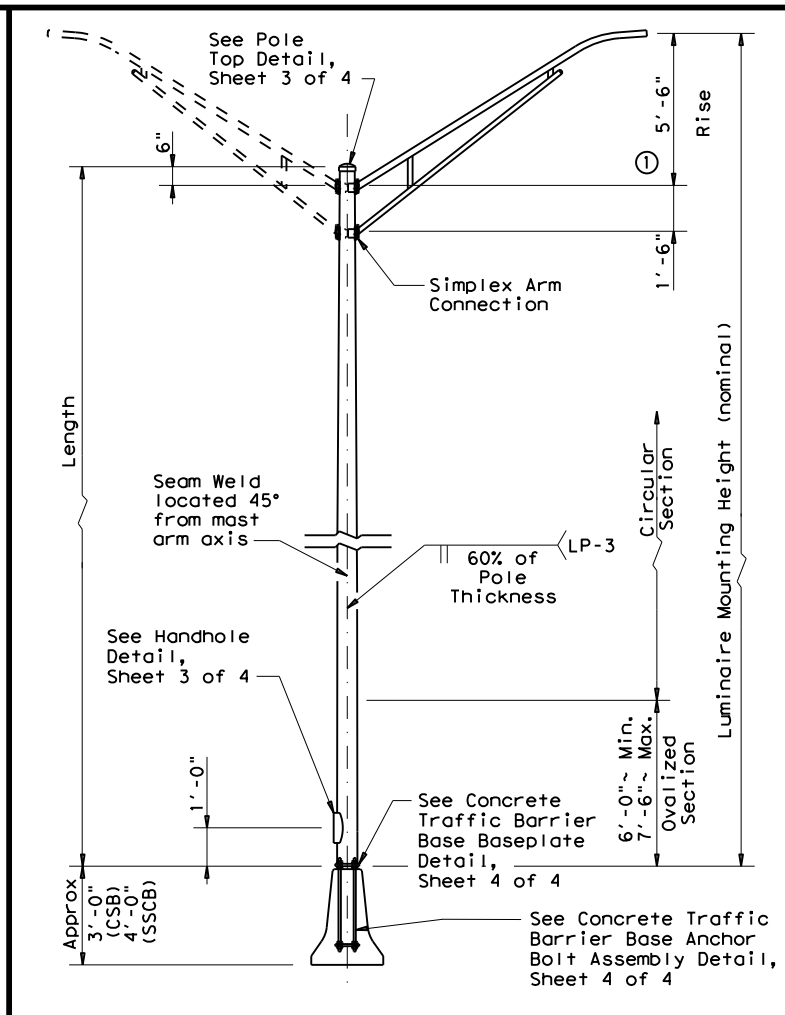
SHOE BASE POLE

Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	4.90	15.00	0.1196	7.1
30.00	7.50	4.00	25.00	0.1196	13.2
31.00-39.00	8.00	4.36-3.24	26.00-34.00	0.1196	20.7
40.00	8.50	3.60	35.00	0.1196	20.7
50.00	10.50	4.20	45.00	0.1196	30.3



TRANSFORMER BASE POLE

Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	5.11	13.50	0.1196	7.1
30.00	7.50	4.21	23.50	0.1196	13.2
31.00-39.00	8.00	4.57-3.45	24.50-32.50	0.1196	20.7
40.00	8.50	3.81	33.50	0.1196	20.7
50.00	10.00	3.91	43.50	0.1196	30.3



CONCRETE TRAFFIC BARRIER BASE POLE

CONCRETE TRAFFIC BARRIER BASE POLE (CSB/SSCB)						
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)	
					About C of Rail	Perp. to Rail
28.00	9.00	5.78	23.00	0.1196	10.3	13.2
38.00	9.00	4.38	33.00	0.1196	16.6	20.8
48.00	10.50	4.48	43.00	0.1345	25.1	30.5

GENERAL NOTES:

- Designs conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. Design 3-Second Gust Wind Speed equals 110 mph with a 1.14 gust factor. A wind importance factor of 0.80 is applied to adjust the wind speed to a 25 year recurrence interval. Design moments listed in tables assume base of pole is 25' above natural ground level.
- Structures are designed to support two 12' luminaire mast arms and luminaires. Mast arms are designed to support a 60-pound luminaire having an effective projected area of 1.6 square feet.
- Fabrication shall be in accordance with the Specifications and with the details, dimensions, and weld procedures shown herein. Do not submit shop drawings for roadway illumination pole assemblies fabricated in accordance with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of these sheets and the Specifications. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
- For mounting heights between values shown in the tables, use base diameter and thickness values for the larger height.
- Unless otherwise noted, all steel parts shall be galvanized in accordance with Item 445, "Galvanizing."
- Steel poles shall be fabricated in accordance with Item 441, "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. All welding shall be in accordance with AWS D1.1, Structural Welding Code-Steel.
- Two-section poles joined by circumferential welds will not be permitted, unless otherwise shown on the plans. Poles may be fabricated in two sections and field-assembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1-1/2 times the shaft diameter at the lap joint.
- Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.
- Lubricate and tighten anchor bolts, when erecting shoe base poles and concrete traffic barrier base poles, in accordance with Item 449, "Anchor Bolts."
- All poles, except Transformer Base Poles, shall have hand holes with reinforcing frames and covers. For ground mounted shoe base poles, hand holes shall be placed 90 degrees to mast arm unless otherwise noted on the plans. For poles mounted on a concrete traffic barrier with one luminaire arm, hand holes shall be located 180 degrees from luminaire arm. For poles mounted on a concrete traffic barrier with two luminaire arms, all hand holes shall be on the same side of the barrier. For poles mounted on a bridge lighting bracket or a retaining wall lighting bracket, hand hole shall be on traffic side of the pole, at a height that will clear the barrier.
- The finished pole shall have a smooth, uniform finish free of pits, blisters, or other defects. Scratched, chipped, and other damaged galvanized areas on poles and mast arms shall be repaired in accordance with Item 445, "Galvanizing."
- Pole length is based on a 5'-6" luminaire arm rise. 4 ft. luminaire arms have a 2'-6" rise. A pole with 4 ft. luminaire arms will have an actual mounting height 3'-0" less than the nominal mounting height. Increasing the pole length to meet the nominal mounting height is allowed, but unnecessary unless otherwise directed by the engineer.
- Erect transformer base poles in accordance with sheet RID(1).

MATERIAL DATA

COMPONENT	ASTM DESIGNATION	MIN. YIELD (ksi)
Pole Shaft (0.14"/ft. Taper)	A572 Gr 50, A595 Gr A, A1011 HSLAS Gr 50 Cl 2 ③, or A1008 HSLAS Gr 50 Cl 2	50
Base Plate and Handhole Frame	A572 Gr.50, or A36	36
T-Base Connecting Bolts	F3125 Gr A325	92
Anchor Bolts	F1554 Gr 55, A193-B7 or A321	55 105
Anchor Bolt Templates	A36	36
Heavy Hex (H.H.) Nuts	A194 Gr 2H, or A563 Gr DH	
Flat Washers	F436	

NOTES:

- 2'-6" rise for 4 ft. luminaire arms.
- Before ovalized as shown on Concrete Traffic Barrier Base Baseplate details, Sheet 4 of 4.
- A1011 SS Gr 50 may be used instead of HSLAS, provided the material meets the elongation requirements for HSLAS.

POLE ASSEMBLY FABRICATION TOLERANCES TABLE

DIMENSION	TOLERANCE
Shaft length	+1"
I.D. of outside piece of slip fitting pieces	+1/8", -1/16"
O.D. of inside piece of slip fitting pieces	+1/32", -1/8"
Shaft diameter: other	+3/16"
Out of "round"	1/4"
Straightness of shaft	±1/4" in 10 ft
Twist in multi-sided shaft	4° in 50 ft
Perpendicular to baseplate	1/8" in 24"
Pole centered on baseplate	±1/4"
Location of Attachments	±1/4"
Bolt hole spacing	±1/16"

SHEET 2 OF 4

Texas Department of Transportation
 Traffic Safety Division Standard

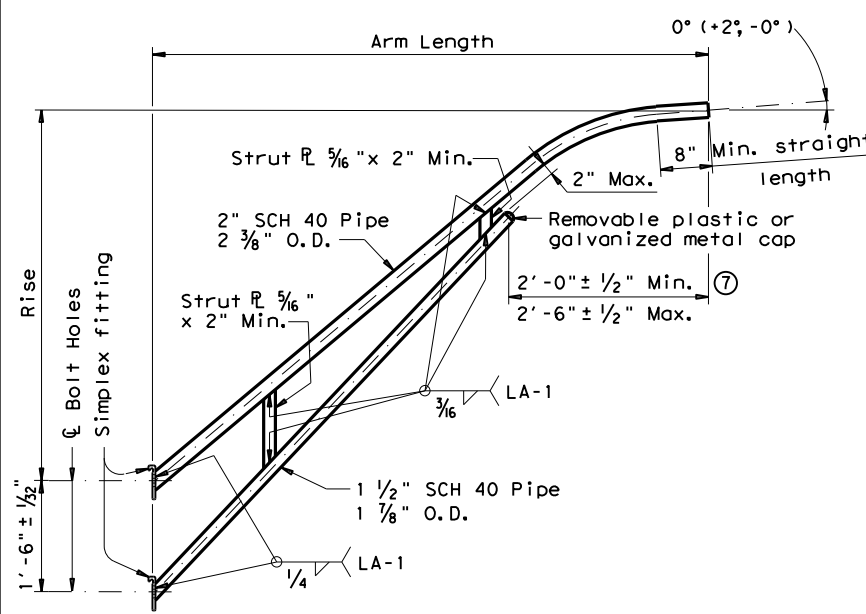
ROADWAY ILLUMINATION POLES

RIP(2)-19

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12-19	ATL	HARRISON	95	

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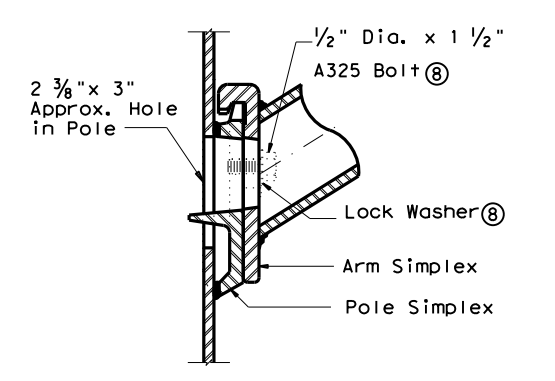
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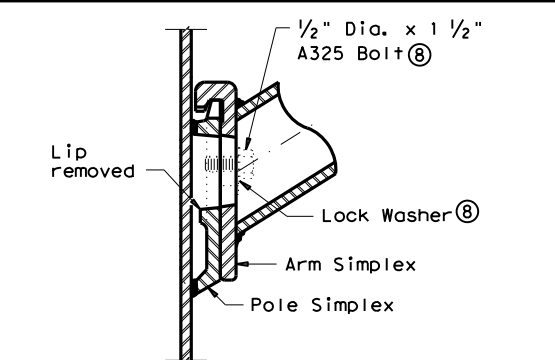
LUMINAIRE ARM

LUMINAIRE ARM DIMENSIONS		
Nominal Arm Length	Arm Length	Rise
4'-0"	3'-6"	2'-6"
6'-0"	5'-6"	5'-6"
8'-0"	7'-6"	5'-6"
10'-0"	9'-6"	5'-6"
12'-0"	11'-6"	5'-6"

ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±1"
Arm Rise	±1"
Deviation from flat	1/8" in 12"
Spacing between holes	±1/32"

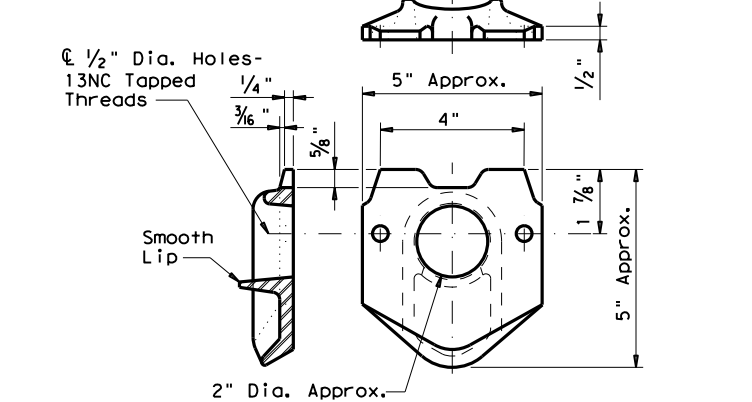


UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

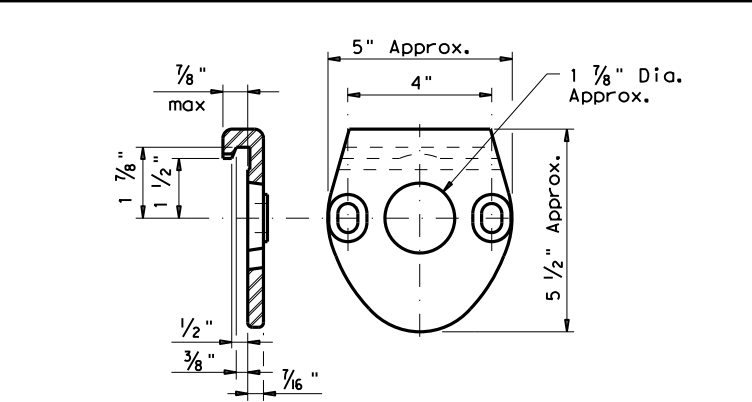


LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

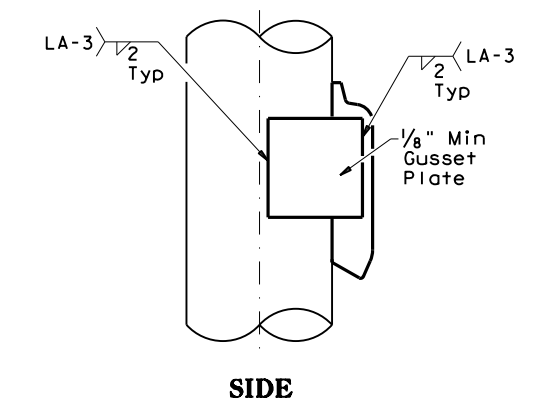
SECTION B-B



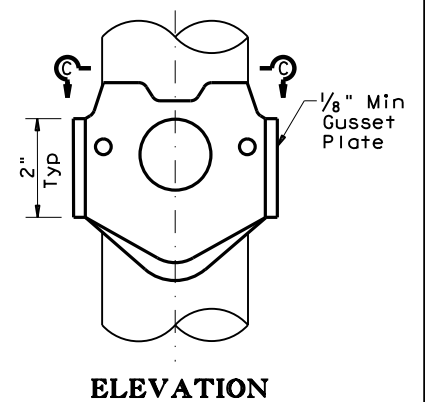
POLE SIMPLEX DETAIL



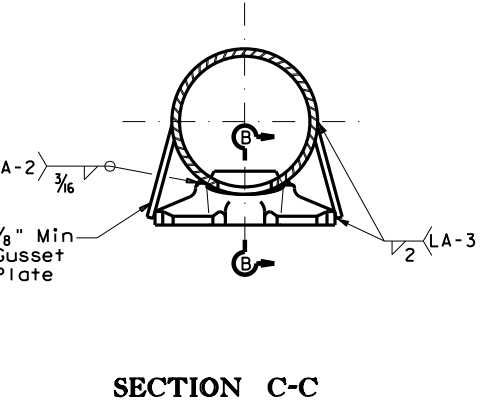
ARM SIMPLEX DETAIL



SIDE

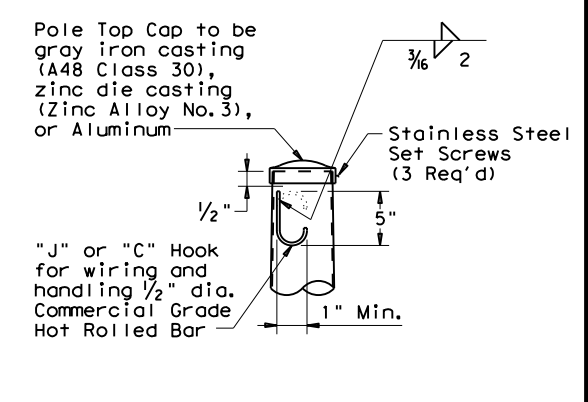


ELEVATION

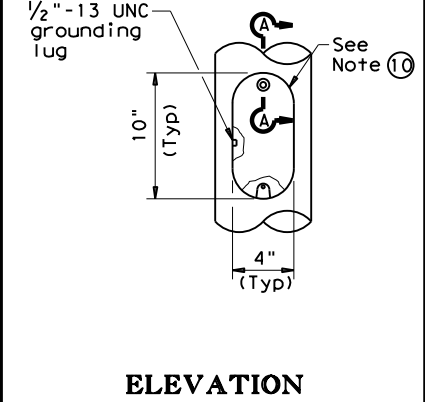


SECTION C-C

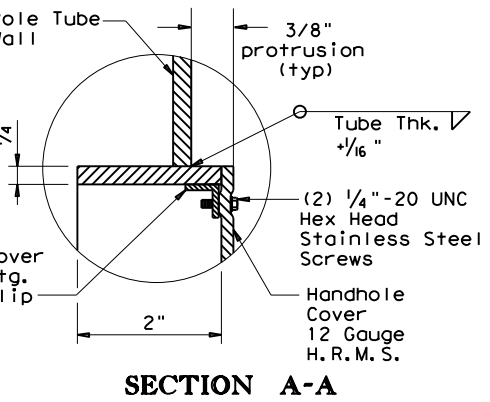
SIMPLEX ATTACHMENT DETAIL



POLE TOP



ELEVATION



SECTION A-A

NOTES:

- ④ Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.
- ⑤ A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.
- ⑥ A572, A1008 HSLAS-F, and A1011 HSLAS-F materials may have higher yield strengths but shall not have less elongation than the grade indicated.
- ⑦ Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.
- ⑧ Each pole simplex fitting shall be supplied with 2 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans.
- ⑨ Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.
- ⑩ A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

MATERIALS

Pole or Arm Simplex	ASTM A27 Gr 65-35 or Gr 70-36, A148 Gr 80-50, A576 Gr 1021 ⑤, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 ⑥, or A1011 HSLAS-F Gr 50 ⑥
Arm Struts and Gusset Plates ④	ASTM A36, A572 Gr 50 ⑥, or A588
Misc.	ASTM designations as noted

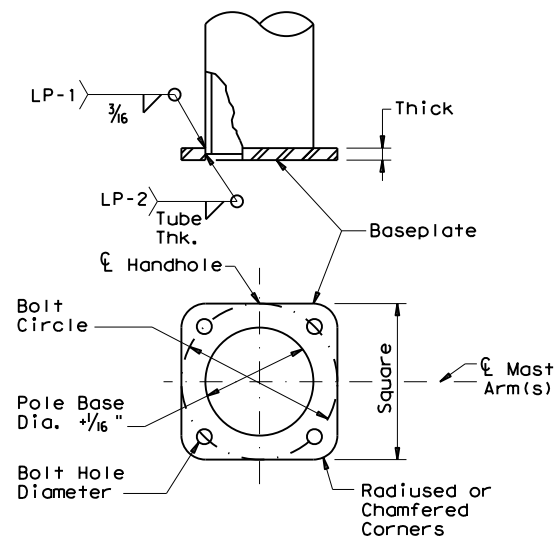
SHEET 3 OF 4



ROADWAY ILLUMINATION POLES
RIP(3) - 19

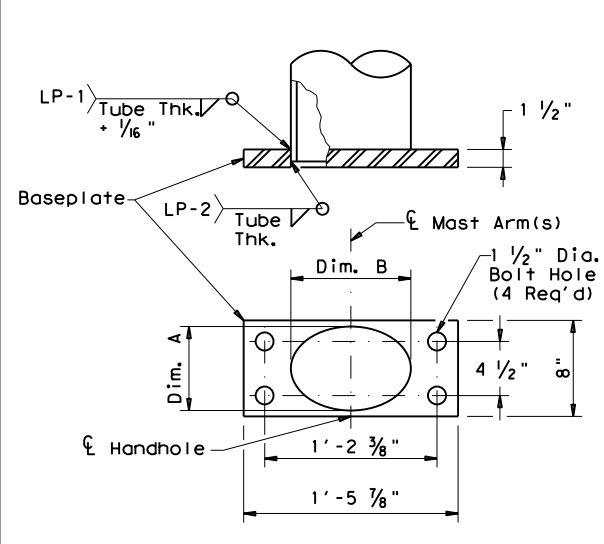
FILE: rip-19.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0062	07	103	US 59
7-17	DIST	COUNTY	SHEET NO.	
12-19	ATL	HARRISON	96	

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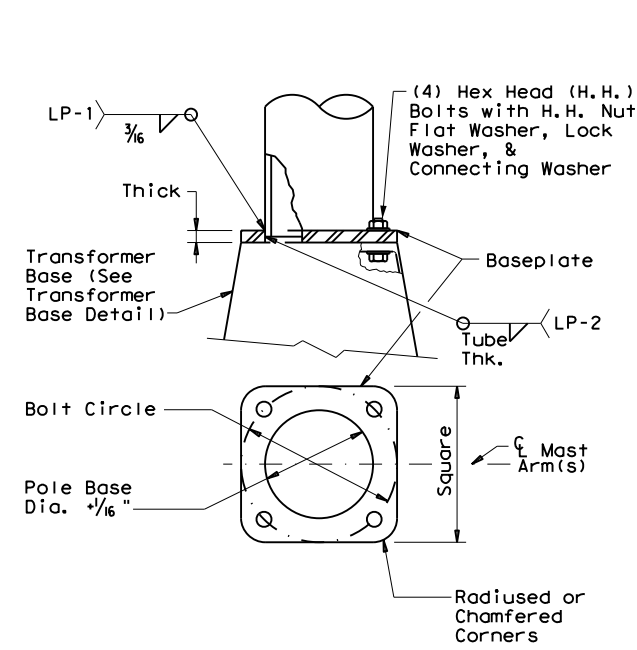
SHOE BASE BASEPLATE

SHOE BASE BASEPLATE TABLE				
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	BOLT HOLE DIAMETER
20' - 39'	13"	13"	1 1/4"	1 1/4"
40'	15"	15"	1 1/4"	1 1/2"
50'	15"	15"	1 1/2"	1 1/2"



CONCRETE TRAFFIC BARRIER BASE BASEPLATE

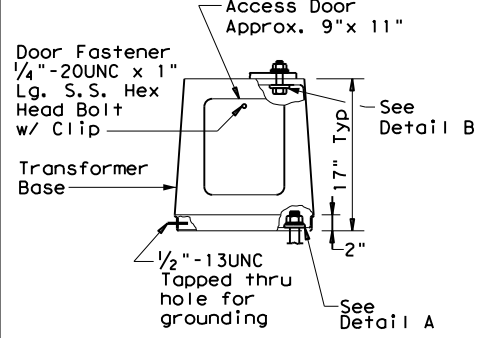
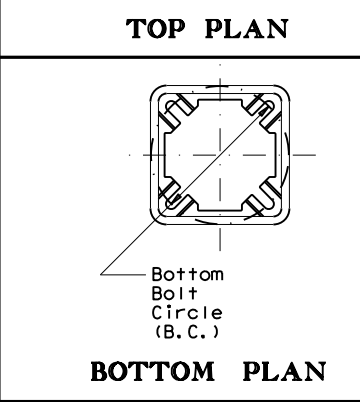
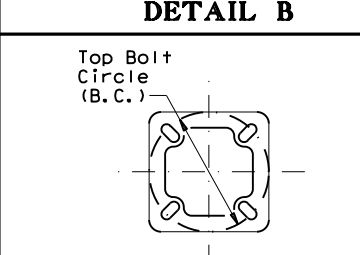
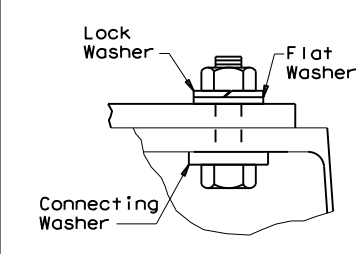
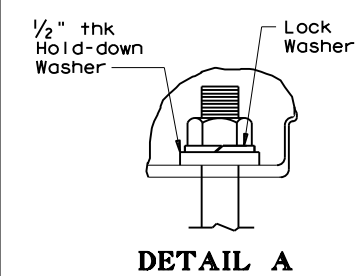
CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE			
MOUNTING HEIGHTS (nominal)	POLE DIA. (12)	DIM. A	DIM. B
28' - 38'	9"	7" ± 1/4"	10" ± 1/4"
48'	10 1/2"	7" ± 1/4"	13" ± 1/4"



TRANSFORMER BASE BASEPLATE

TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFORMER BASE TYPE
20' - 39'	13"	13"	1 1/4"	1"	1 1/4"	A
40'	15"	15"	1 1/4"	1 1/4"	1 1/2"	B
50'	15"	15"	1 1/2"	1 1/4"	1 1/2"	B

TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



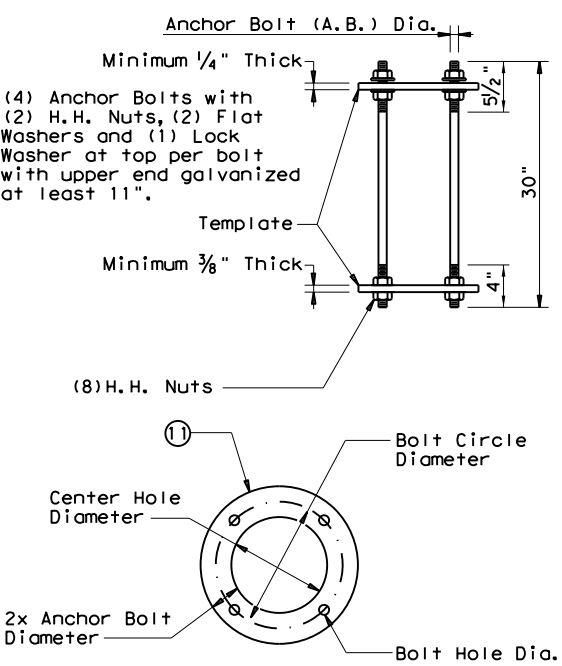
TRANSFORMER BASE DETAILS

- GENERAL NOTES:**
- For mounting heights between those shown in the table, use the values in the table for the larger mounting height.
 - All breakaway bases shall meet the breakaway requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto, and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to resist 150% of the design moment.
 - Transformer bases shall be cast from aluminum, ASTM B108 or B26 Alloy 356.0-T6, or other material approved by the Engineer. Four Hex Head (H.H.) bolts with four H.H. nuts, four lock washers, four flat washers, and connecting and hold-down washers as recommended by the manufacturer, galvanized to ASTM A153 Class C or D, or B695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A563 grade DH galvanized.
 - Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.
 - Doors for transformer bases shall be made of plastic, fiberglass or other non-metallic material approved by the Engineer and shall be attached with stainless steel screws or bolts. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing.

NOTES:

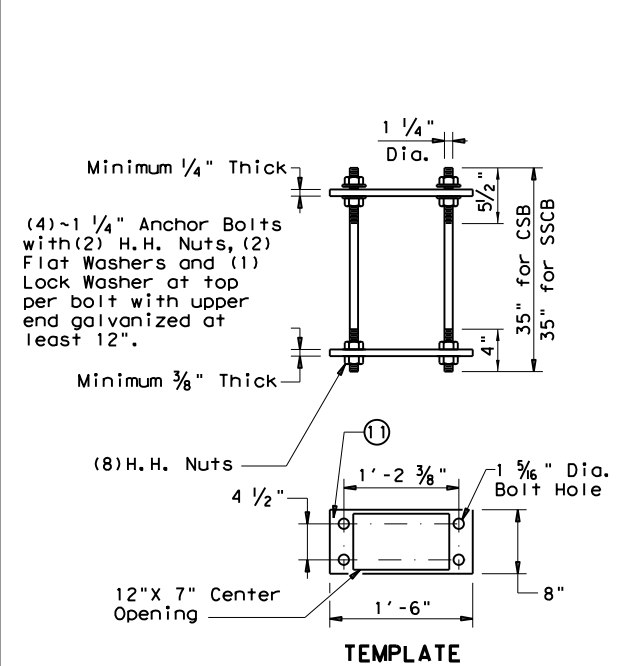
- Anchor Bolt Templates do not need to be galvanized.
- Pole diameter before ovalized.

ANCHOR BOLT FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Length	± 1/2"
Threaded length	± 1/2"
Galvanized length (if required)	- 1/4"



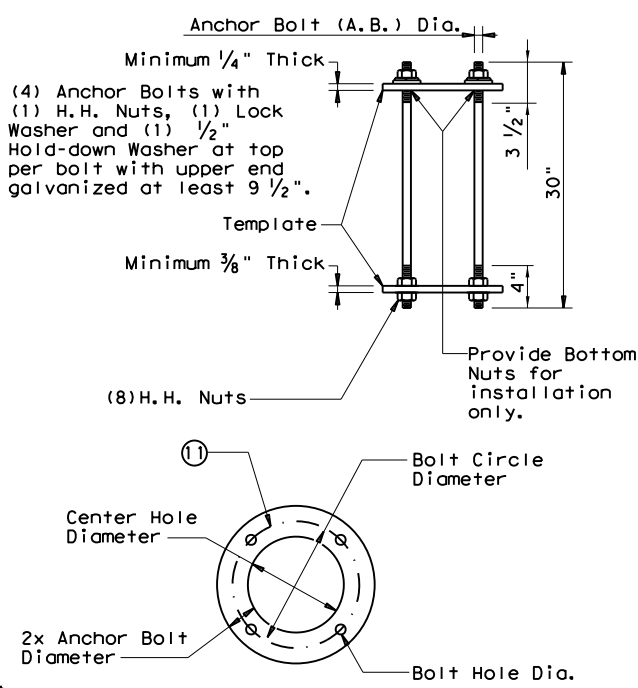
SHOE BASE ANCHOR BOLT ASSEMBLY

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1"	13"	11"	1 1/16"
40' - 50'	1 1/4"	15"	12 1/2"	1 5/16"



CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1"	14"	12"	1 1/16"
40' - 50'	1 1/4"	17 1/4"	14 3/4"	1 5/16"



TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

SHEET 4 OF 4

ROADWAY ILLUMINATION POLES
RIP(4) - 19

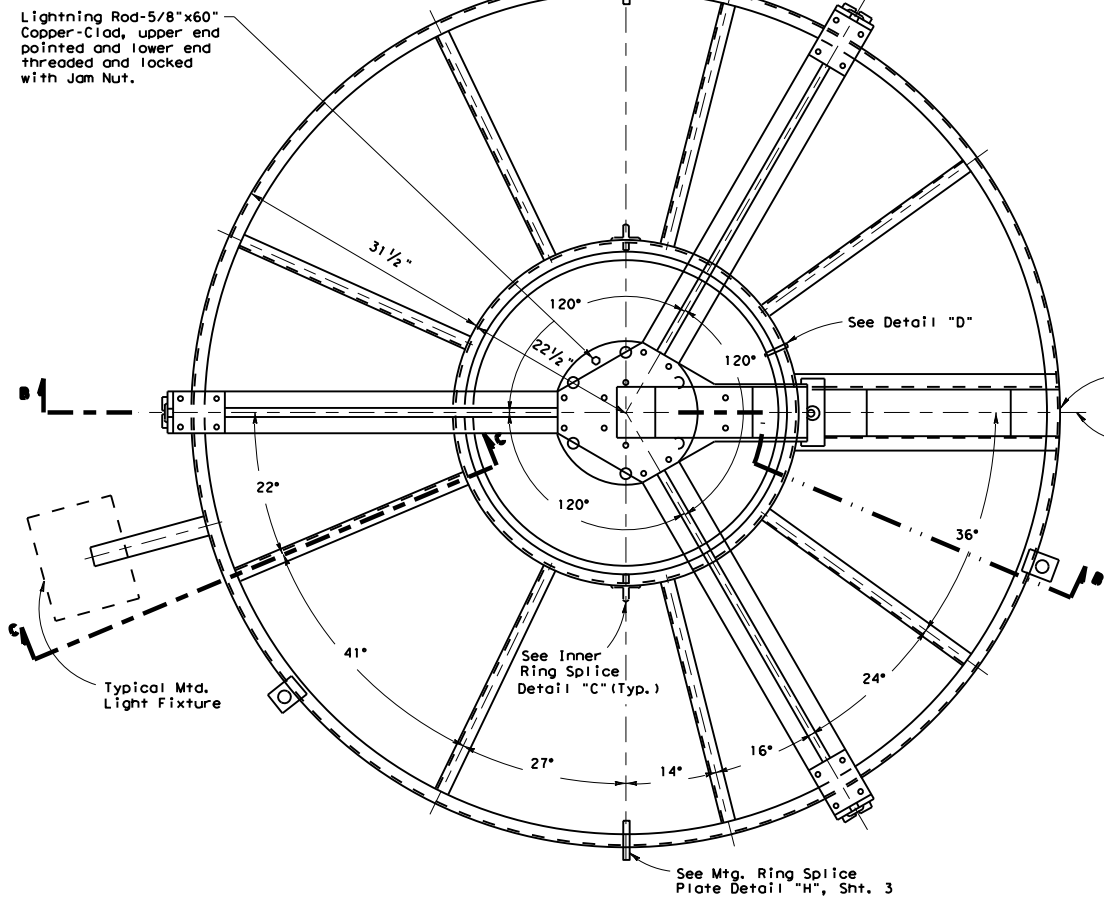
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© TxDOT January 2007	CONT: 0062	SECT: 07	JOB: 103
REVISIONS	DIST: ATL	COUNTY: HARRISON	US 59
7-17			SHEET NO. 97
12-19			

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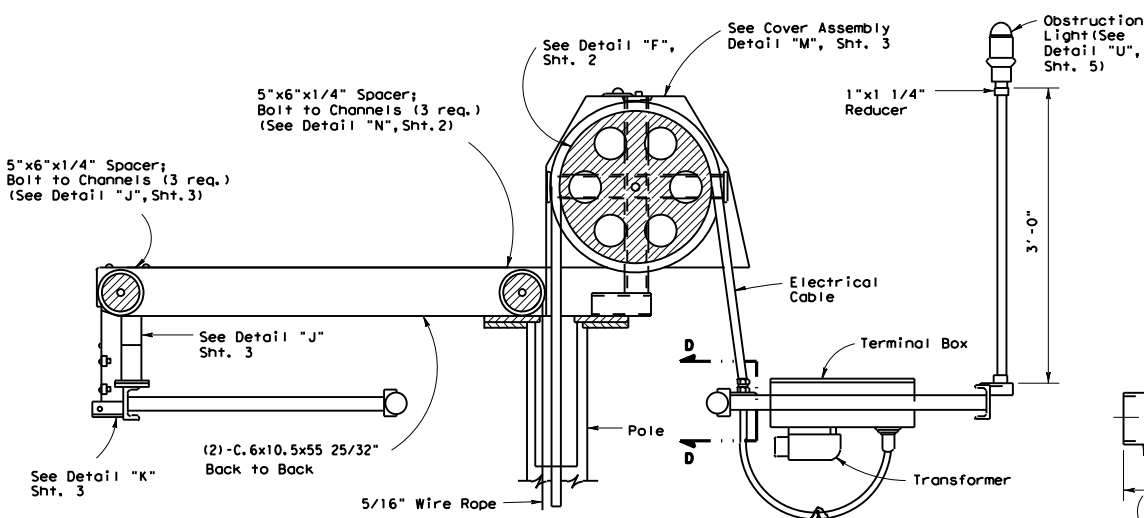
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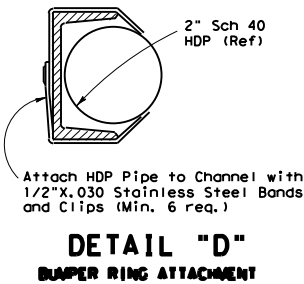
1. Pole, Ring, and Ring Support shall be assembled and erected so that Reference Line is parallel to center line of roadway or as shown on "Lighting Layouts" sheets.
2. Fixture Placement on ring shall provide a min. Clearance of 7" between Fixtures.



LIGHT MOUNTING RING & SUPPORT ASSEMBLY

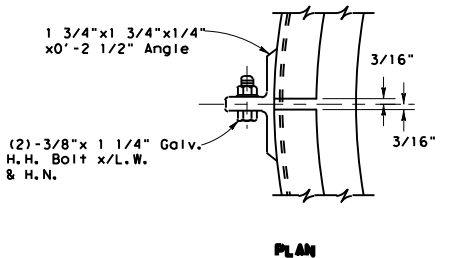


SECTION B-B

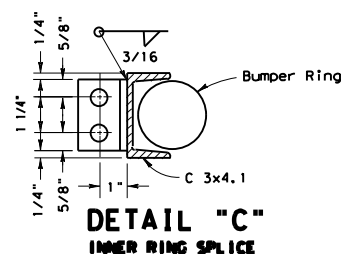


**DETAIL "D"
BUMPER RING ATTACHMENT**

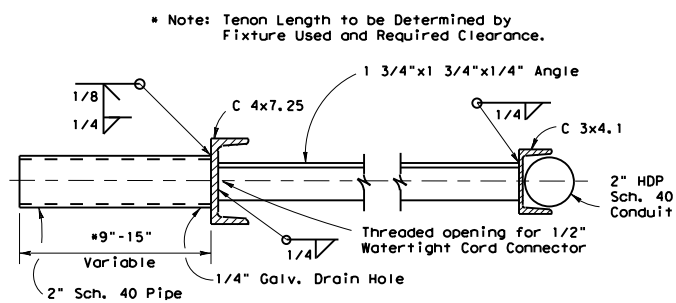
Handhole Located on Reference Line. See Lighting Layout.
 Reference Line (See Light Setting Diagrams)



PLAN

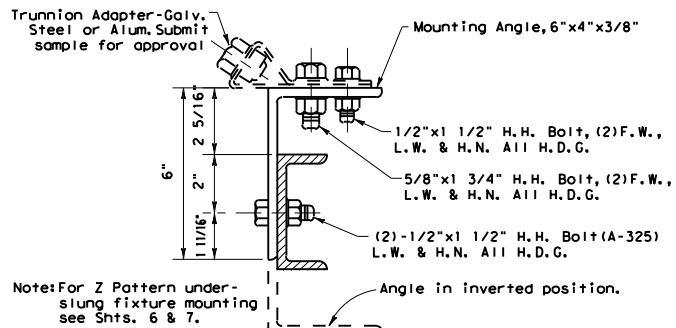
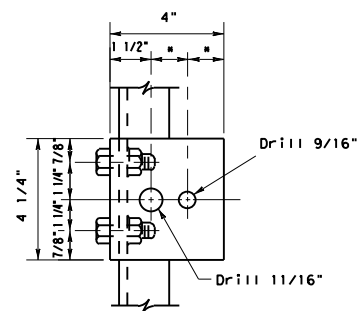


**DETAIL "C"
INNER RING SPLICE**



**SECTION C-C
(FOR AREAL LIGHTS)**

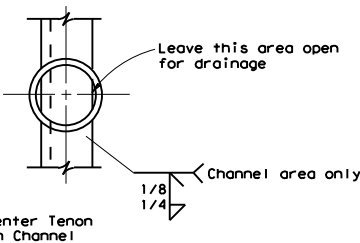
As required by Trunnion Adapter supplied.



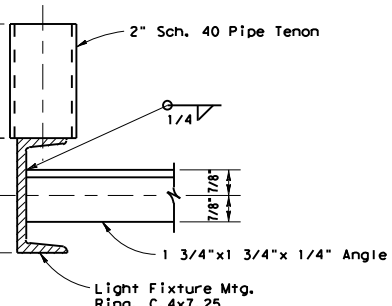
Note: For Z Pattern underslung fixture mounting see Shts. 6 & 7.

**SECTION C-C
(FOR TRUNNION MOUNT)**

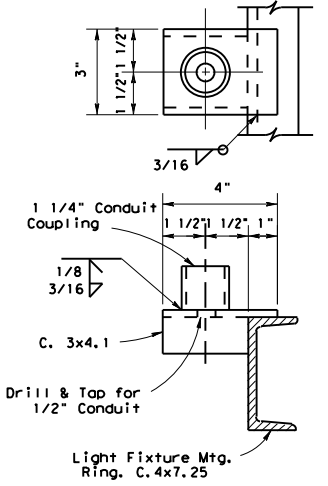
NOTE: Provide S.S. or galv. cable safety lanyard for Light Fixture when Trunnion Mount is used.



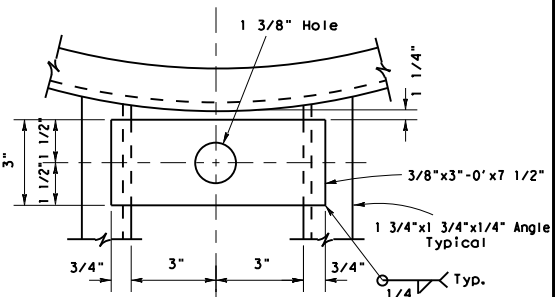
Note: Center Tenon on Channel



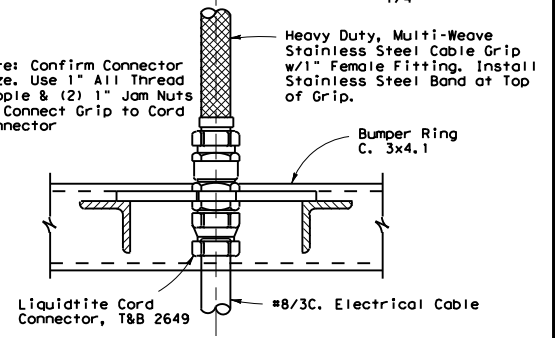
**SECTION C-C
(FOR FLOODLIGHTS)**



**DETAIL "E"
(CONDUIT ATTACHMENT FOR OBSTRUCTION LIGHTS, TYPICAL (3) PLACES)**



Note: Confirm Connector Size. Use 1\"/>



NOTE: COVER CORD WITH HEAT SHRINK TUBING FROM CABLE GRIP TO WITHIN ONE INCH OF GRIP TO CONNECTOR TRANSITION PRIOR TO INSTALLING CABLE GRIP.

Texas Department of Transportation
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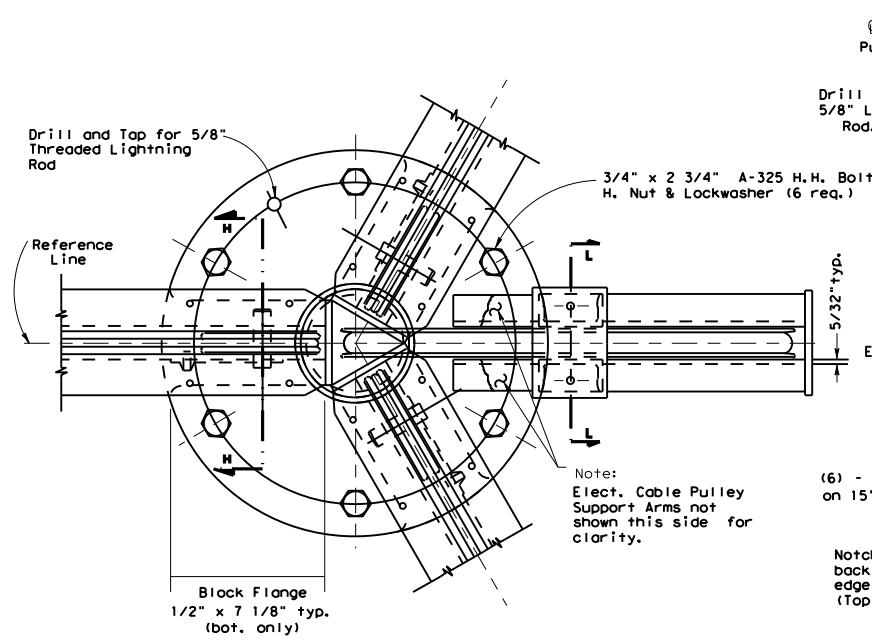
HIGH MAST ILLUMINATION DETAILS

HMID(1)-03

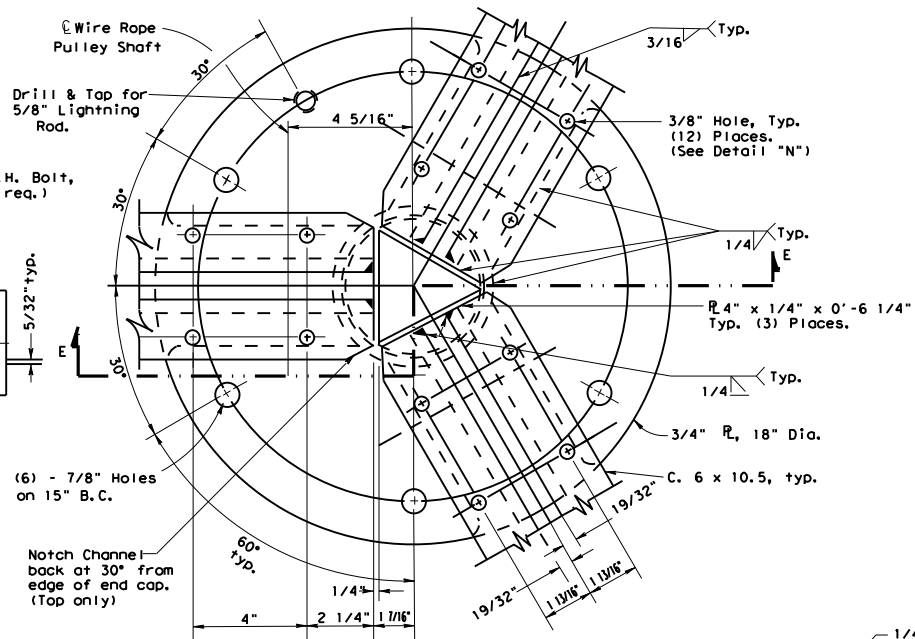
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4-87	10-14-87	0062	07	103	US 59
5-87	4-96	DIST	COUNTY		SHEET NO.
10-1-87		ATL	HARRISON		98

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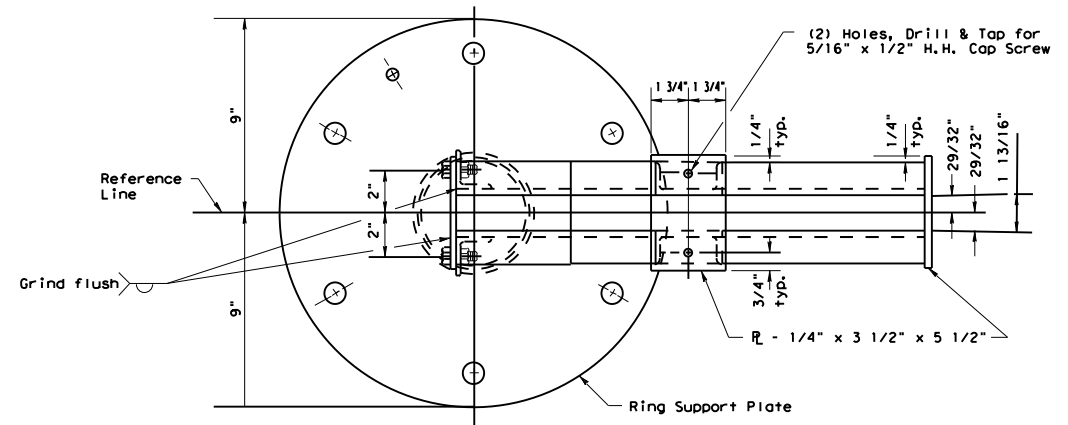
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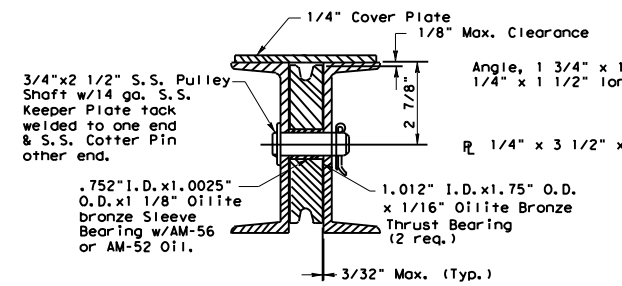
PLAN VIEW



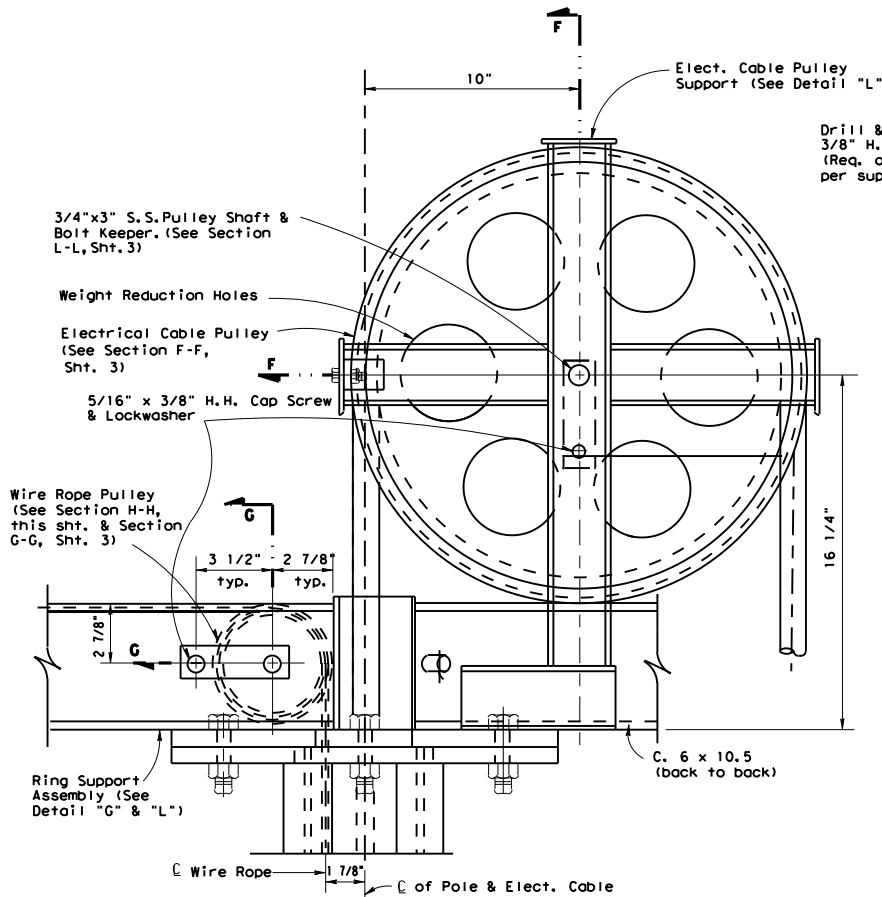
DETAIL "G"
 TOP PLATE CONNECTION
 (LESS ELECT. CABLE PULLEY SUPPORT)
 (SEE DETAIL "L")



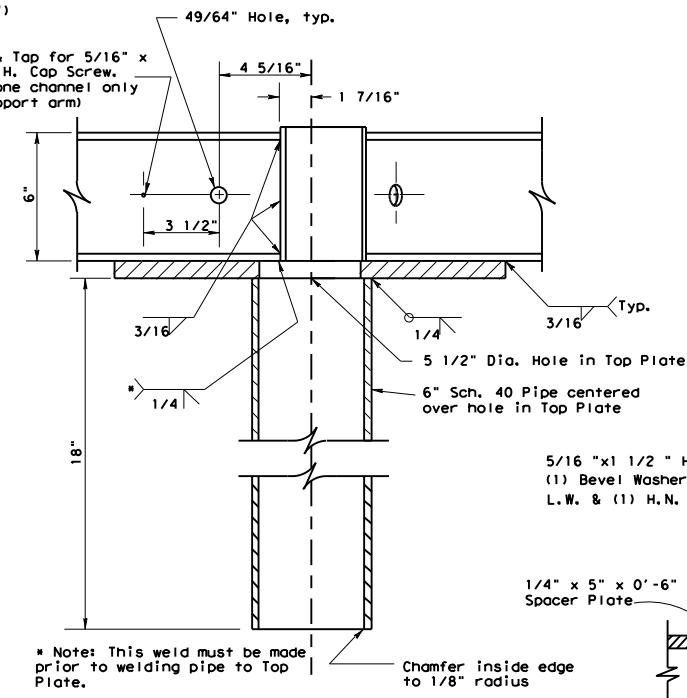
PLAN VIEW



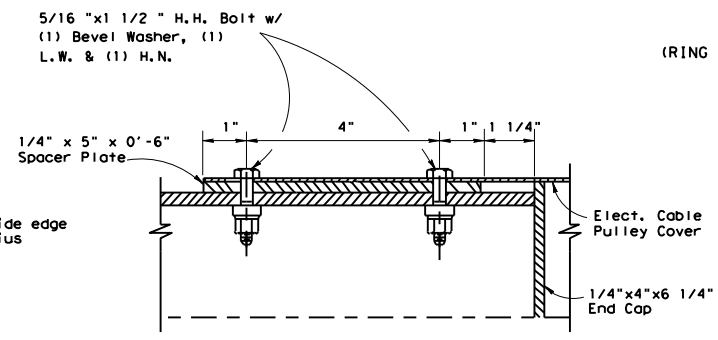
SECTION "H-H"
 PULLEY MOUNTING FOR
 RING SUPPORT ARMS



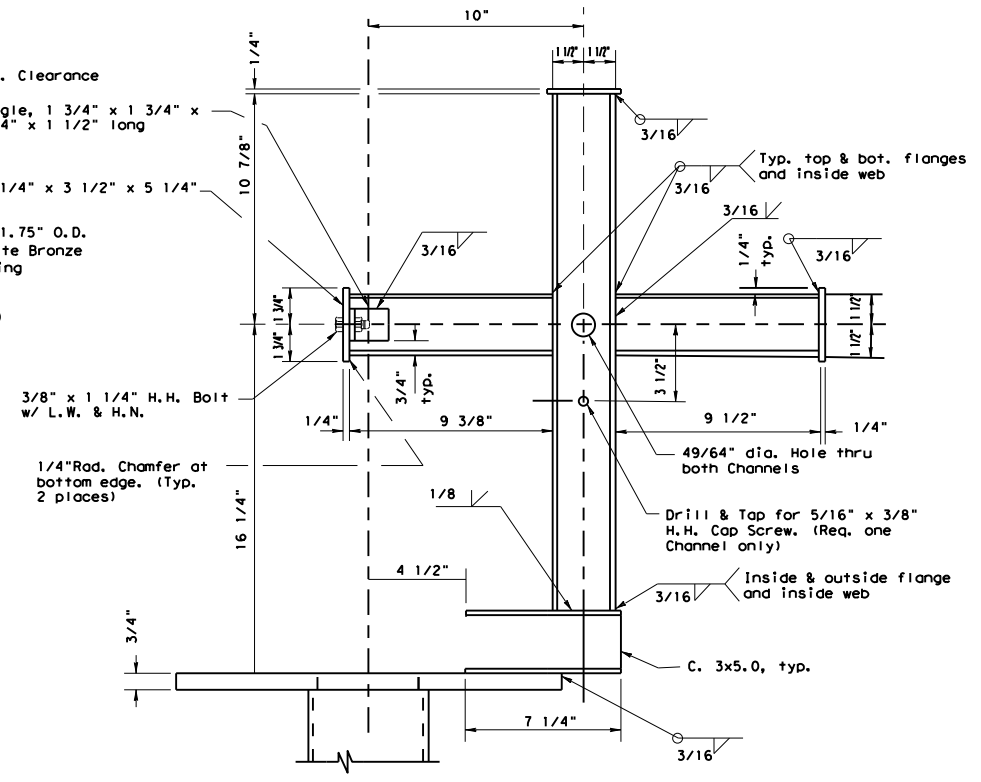
DETAIL "F"
 RING SUPPORT ASSEMBLY
 (NEAR SIDE SUPPORT ARM & ELECT. CABLE
 PULLEY COVER NOT SHOWN FOR CLARITY)



SECTION "E - E"



DETAIL "N"



DETAIL "L"
 ELECT. CABLE PULLEY SUPPORT
 (RING SUPPORT ARMS NOT SHOWN FOR CLARITY)

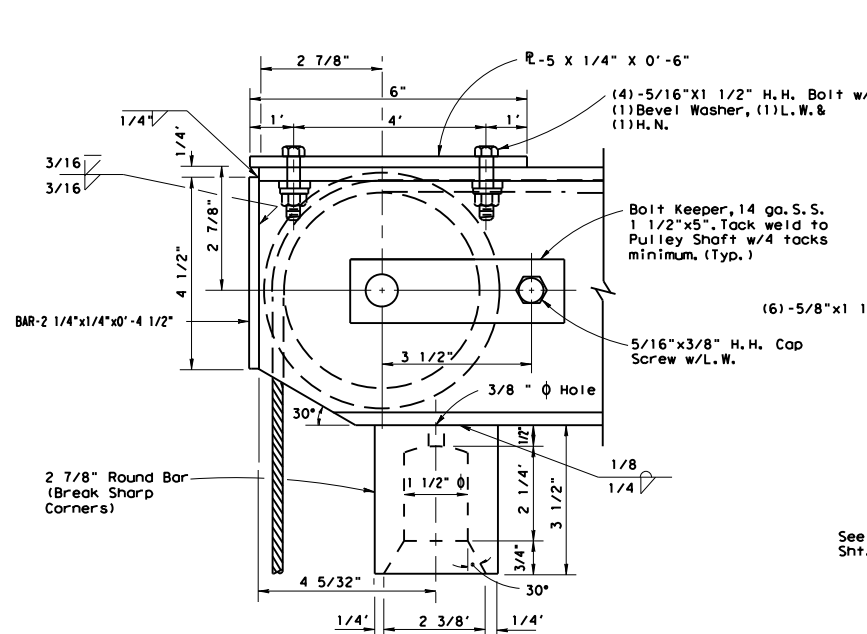
Texas Department of Transportation
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HIGH MAST ILLUMINATION DETAILS
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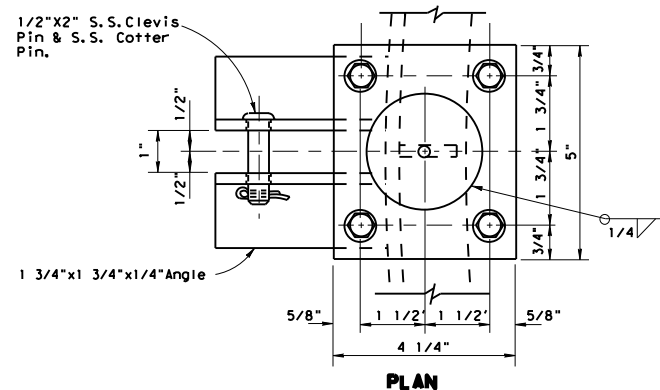
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12-87		ATL	HARRISON		99

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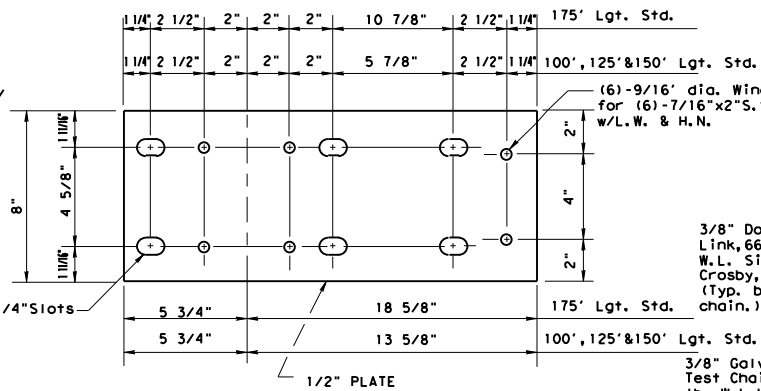


DETAIL "J"



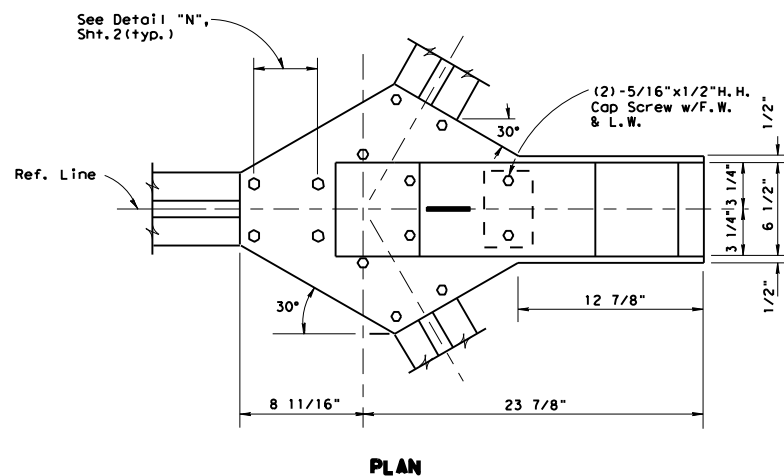
DETAIL "K"
 MOUNTING RING CONNECTION & STABILIZER

* EXTRA 2'-0" of wire cable to be attached to ring with SS Bands as directed by Engineer.



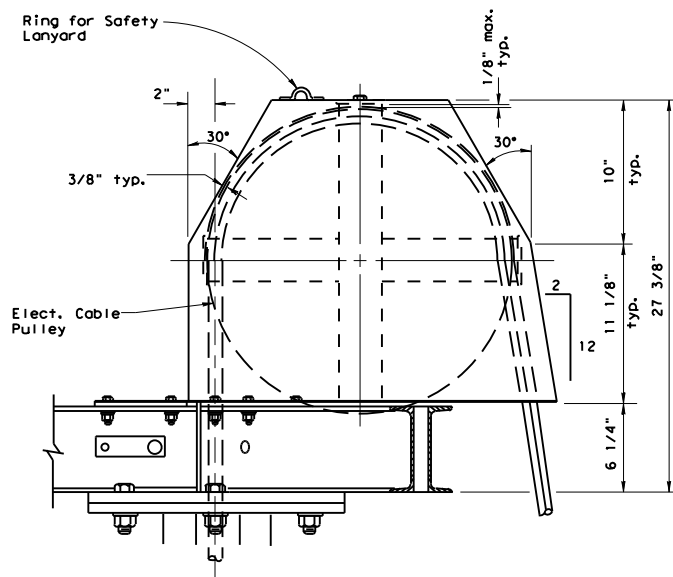
DETAIL "V"
 WINCH MOUNTING PLATE

NOTE: Dimensions may vary - Verify with winch manufacturer.

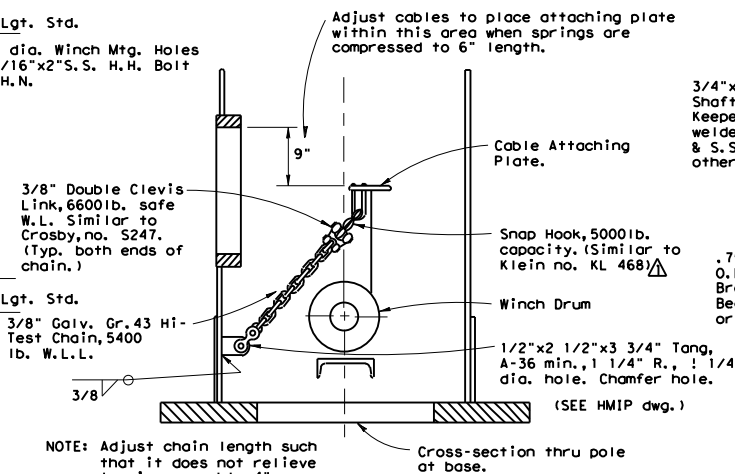


PLAN

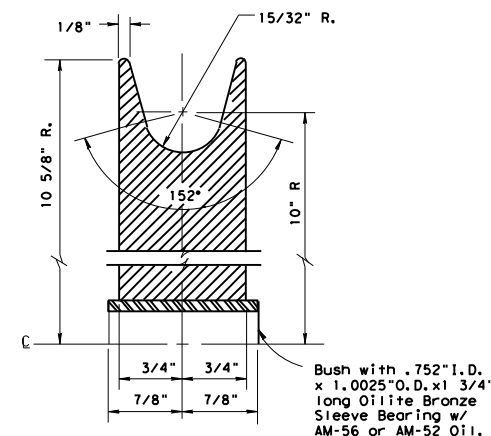
NOTE: Cover to be 14 ga. galv. sht. metal or 0.10" anodized aluminum sheet.



DETAIL "M"
 COVER CAP ASSEMBLY

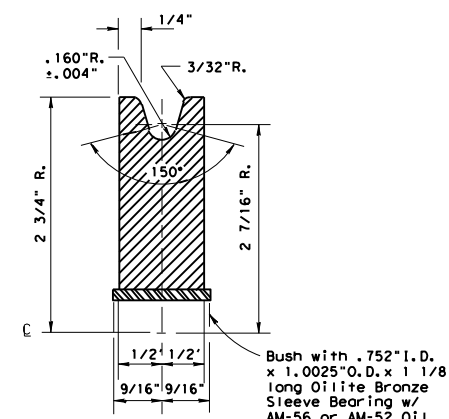


SAFETY LANYARD DETAIL



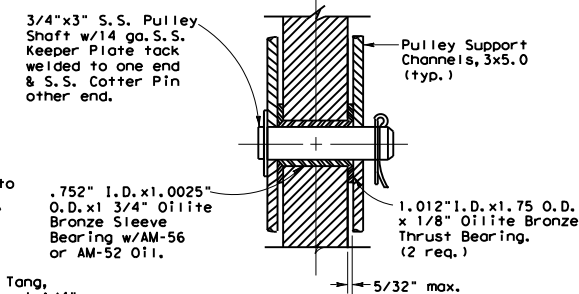
SECTION F-F
 ELECTRICAL CABLE PULLEY

(Pulley material to be aluminum alloy, Type 356-T6 or equal)

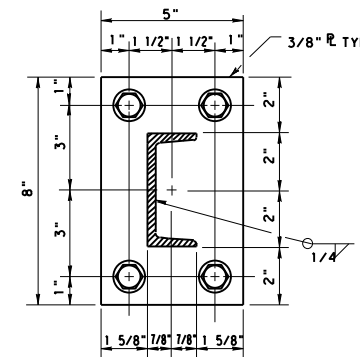
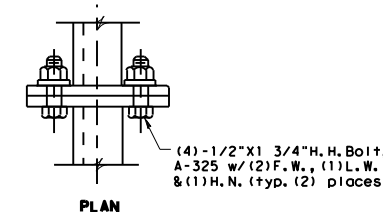


SECTION G-G
 WIRE ROPE PULLEY

(Pulley material to be plated steel or Stainless Steel)



SECTION L-L
 ELECTRICAL CABLE PULLEY MOUNTING



DETAIL "H"
 MOUNTING RING SPLICE PLATE

Texas Department of Transportation
 Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

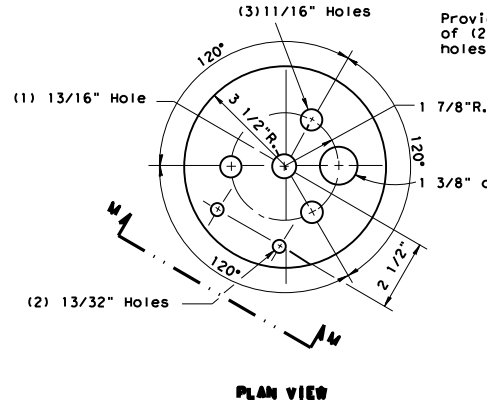
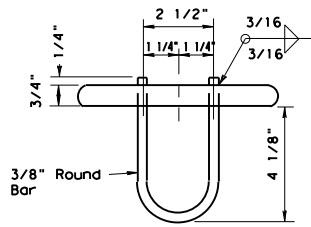
HMID (3) - 03

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5-5-86	REVISIONS	CONT	SECT	JOB	HIGHWAY
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10-87		DIST	COUNTY		SHEET NO.
10-88		ATL	HARRISON		100

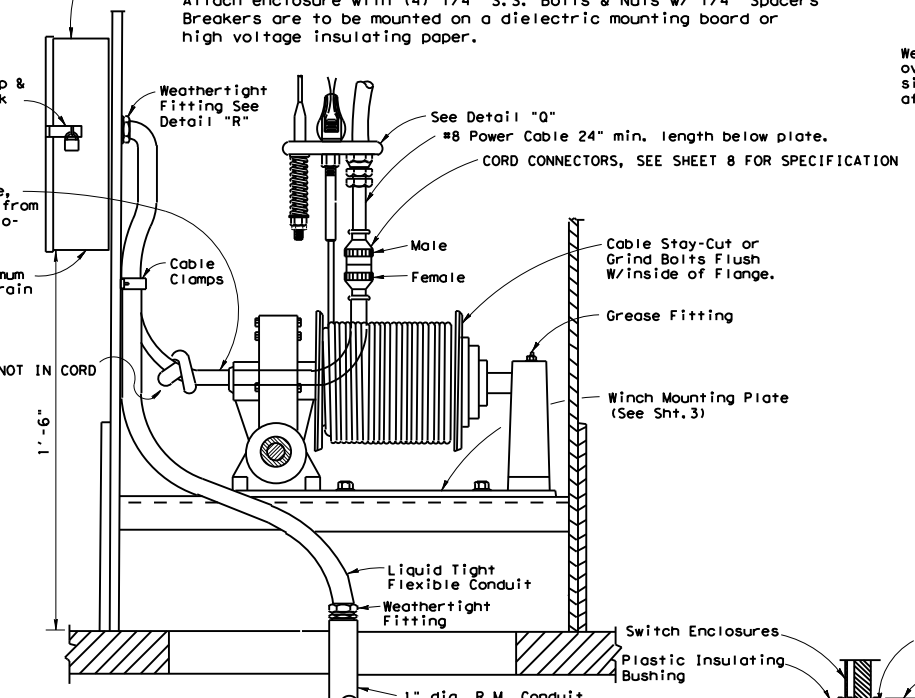
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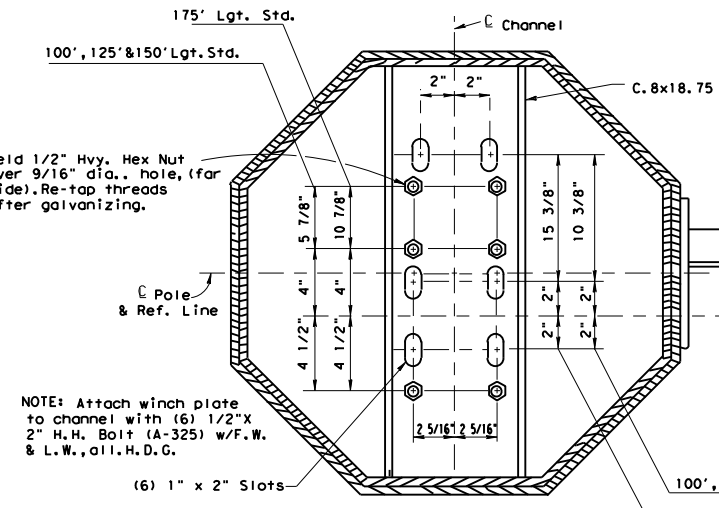
50 A 480V. Circuit Breaker, NEMA 4 for total lamp watts exceeding 9000, 30A, 480V. Circuit Breaker, NEMA 4 for 9000 or less total lamp watts. Enclosure shall be stainless steel, 14 ga., weatherproof with full length vertical door hinge, welded hasp, lock and two sets of keys. Hinge pin shall be tack-welded to prevent removal. Lock (Master # 2195) and keys shall be furnished by the contractor and shall be the same type as used for the service enclosures. Enclosure dimensions shall be approx. 20" high x 9" wide x 5" deep. Attach enclosure with (4) 1/4" S.S. Bolts & Nuts w/ 1/4" Spacers. Breakers are to be mounted on a dielectric mounting board or high voltage insulating paper.



#8 Power Cable, 5'0" min. length from Connector to Enclosure Entrance. Provide a minimum of (2) 3/16" drain holes.

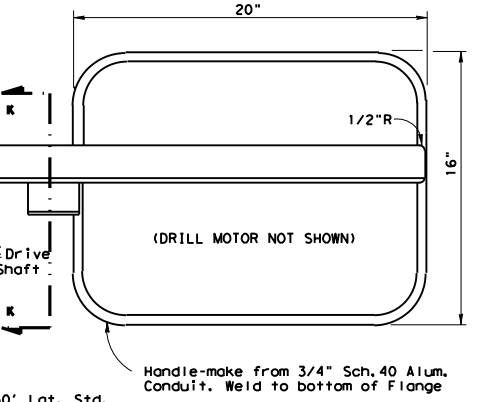


SECTION J-J
(WINCH ASSEMBLY)

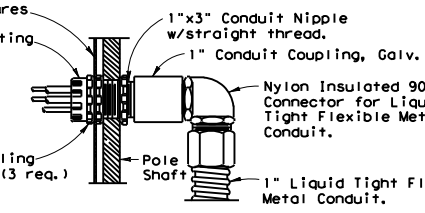


DETAIL 'P'
(WINCH MOUNTING CHANNEL)
Dimensions may vary-Verify with winch manufacturer.

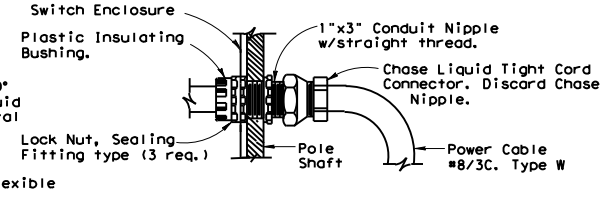
NOTE: The drive train of the Power Drive Assembly between the driving motor and the winch shall be within two degrees of perfect alignment.



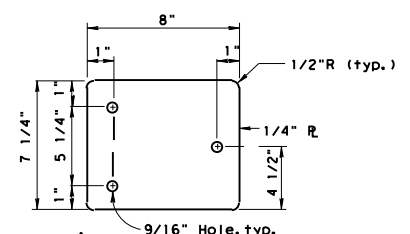
Pole Ht. Ft.	8 Sided 80 MPH	8 Sided 100 MPH	12 Sided 80 MPH	12 Sided 100 MPH
100	3 1/2"	3 1/2"	2 1/2"	2 1/2"
125	3 1/2"	3 1/2"	2 1/2"	2 1/2"
150	3 1/2"	3 1/2"	2 1/2"	2 1/2"
175	4 1/2"	4 1/2"	3 1/2"	3 1/2"



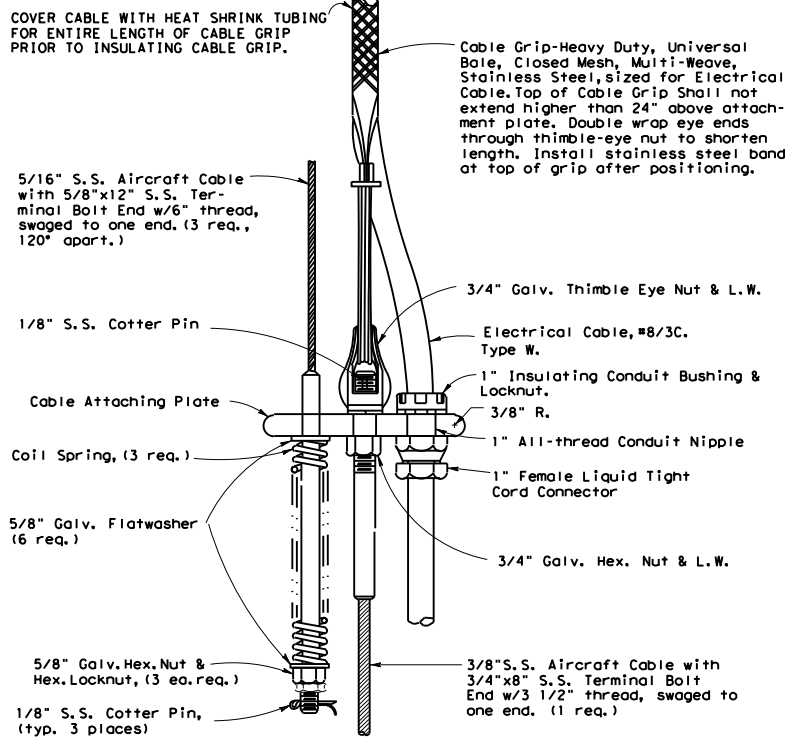
(POWER FEED FROM GROUND BOX)



(POWER OUT TO LIGHT RING)

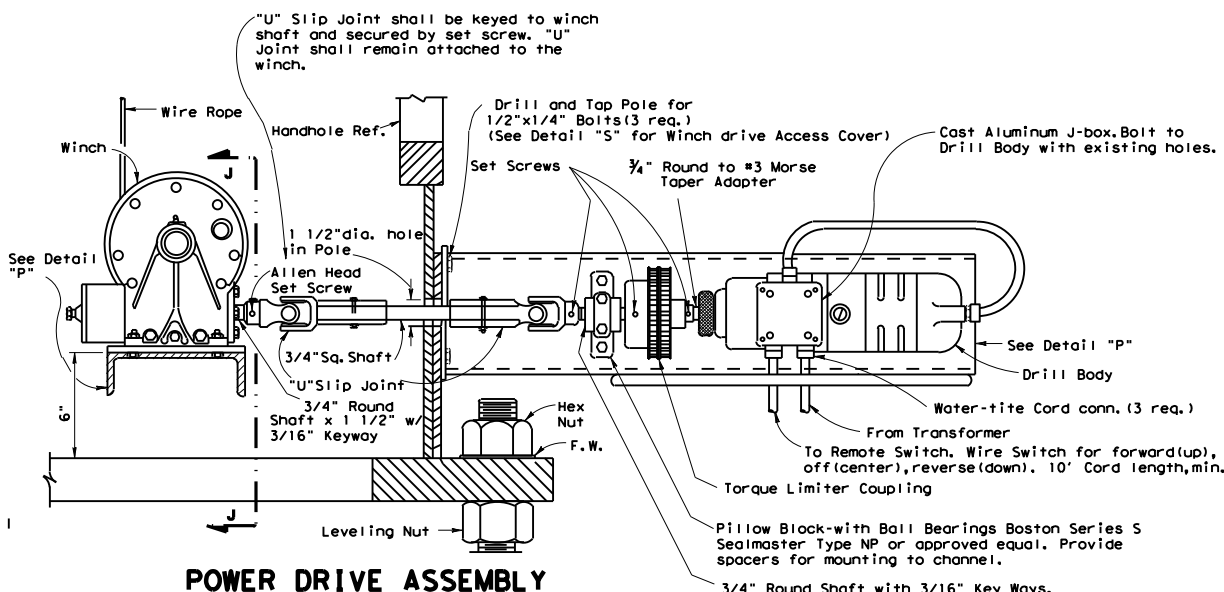


DETAIL 'S'
(WINCH DRIVE ACCESS COVER)

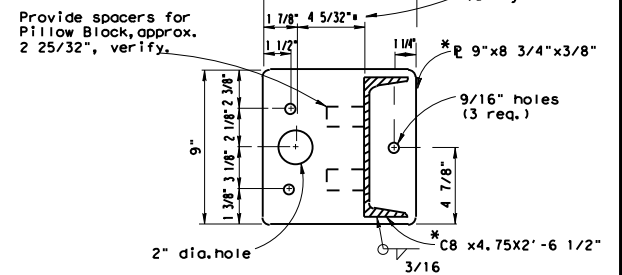


DETAIL 'O'
(CABLE ATTACHING PLATE)

NOTE: 3/8" Cable for this Project shall be 19x7 Rotation Resistant per Sheet 9.



POWER DRIVE ASSEMBLY



SECTION K-K
(DRILL MOTOR MOUNTING PLATE)
* Make from 6061-T6 Aluminum

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

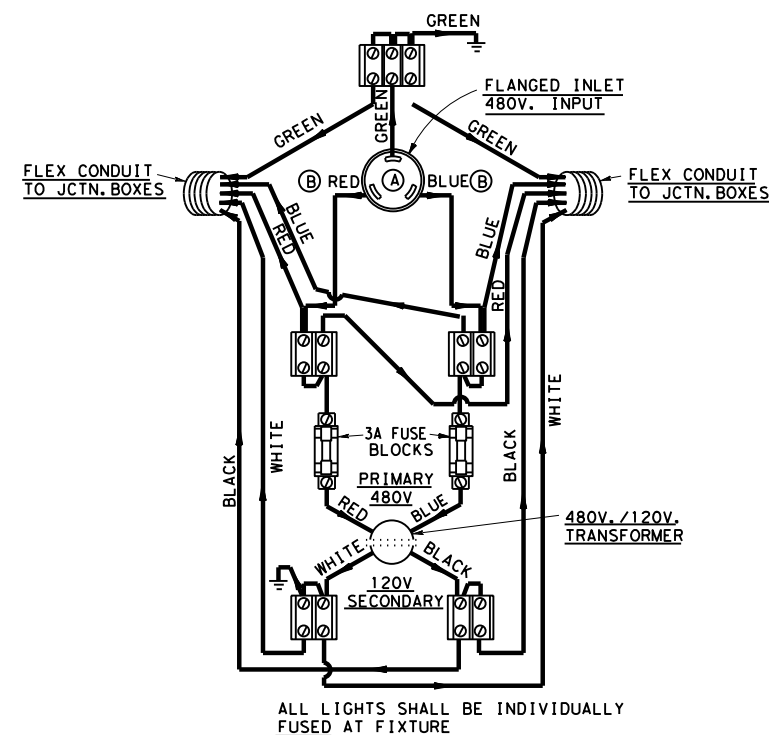
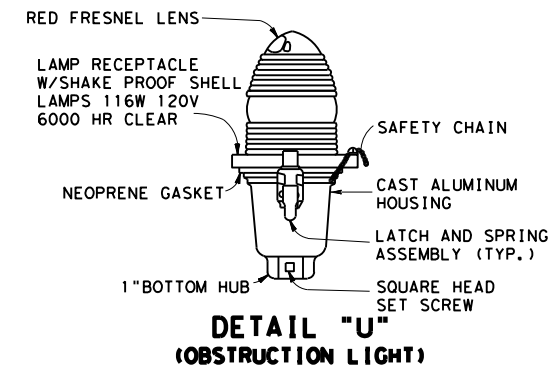
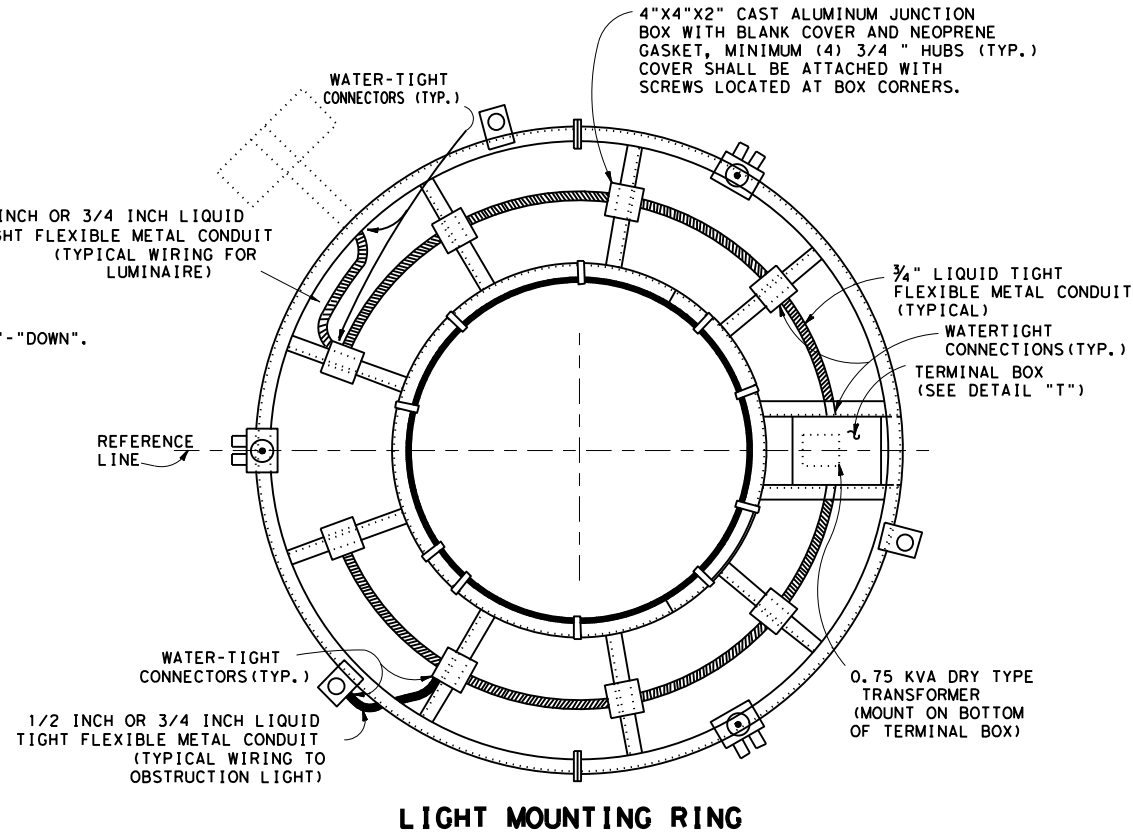
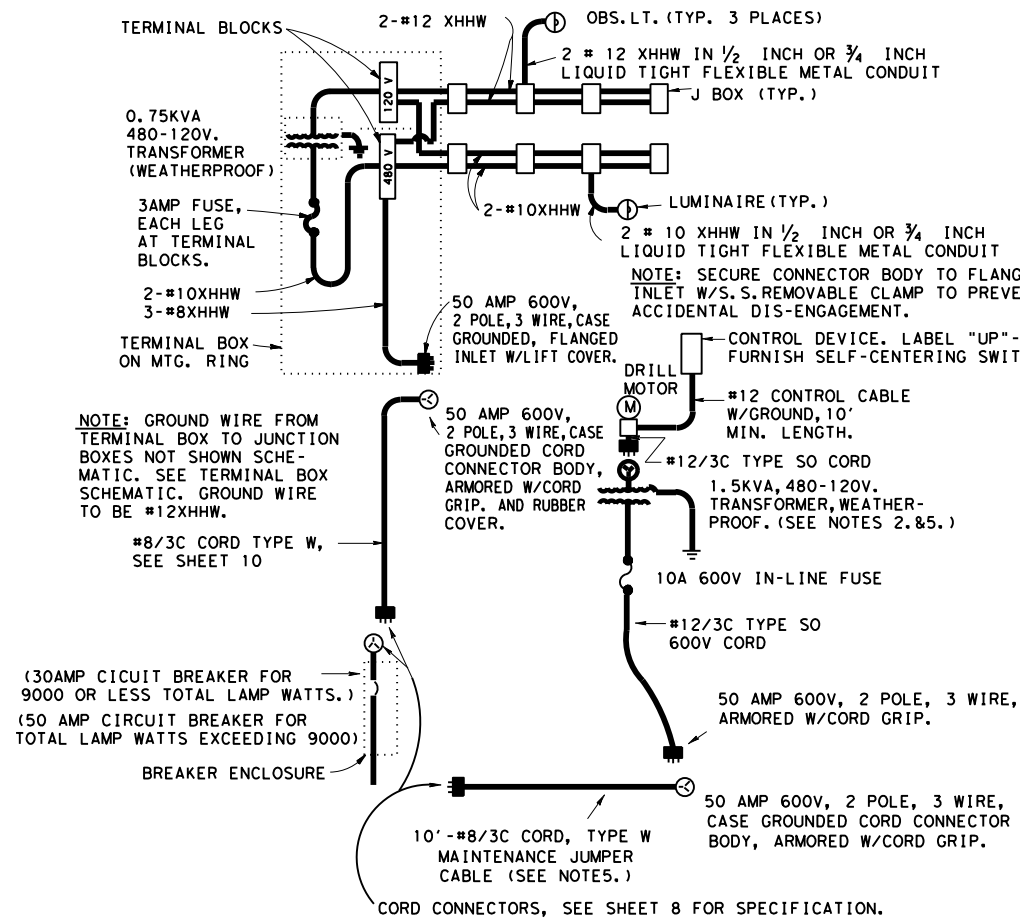
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4-86	REVISIONS	CONTRACT	SECTION	JOB	HIGHWAY
5-86	12-87	0062	07	103	US 59
12-3-86	4-89	DIST	COUNTY	SHEET NO.	
12-8-86	10-93	ATL	HARRISON	101	

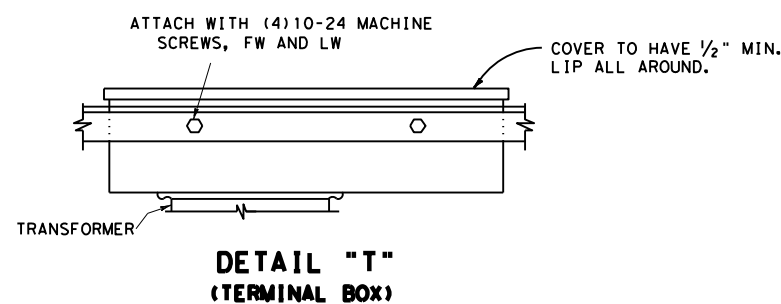
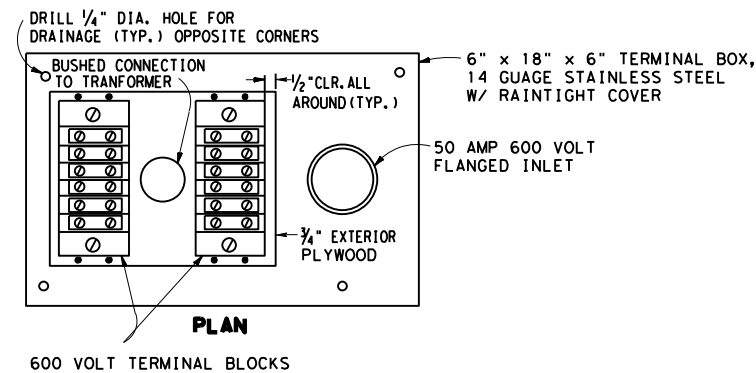
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- NOTES:
- OBSTRUCTION LIGHTS COLOR CODE: FROM SECONDARY SIDE OF TRANSFORMER THROUGH-OUT-CIRCUIT TO SOCKET, WHITE-NEUTRAL, BLACK-LOAD.
 - POWER SUPPLY CORD TO FLANGED INLET: GREEN-GROUND, WHITE LINE, BLACK LINE. FROM FLANGED INLET (A) TO TERMINAL BLOCKS: GREEN-GROUND, RED LINE, BLUE-LINE. FROM THERE ON ALL 480V. CIRCUIT WIRES TO BE RED AND BLUE TO JUNCTION BOXES.
 - WIRE SIZE FROM POWER SUPPLY TO TERMINAL BLOCKS SHALL BE #8 AWG-SEE (B).
 - WIRE SIZE FROM TERMINAL BLOCKS TO JUNCTION BOXES SHALL BE #12 AWG.
 - MOUNT TERMINAL BLOCKS ON 3/4" EXTERIOR GRADE PLYWOOD.
 - FOR 2-WIRE, 480V. SERVICE, OMIT FUSE IN GROUNDED CONDUCTOR IN LEADS TO TRANSFORMER.



- NOTES:
- PLUGS, CONNECTOR BODIES AND FLANGED INLETS AT CORD TO RING CONNECTION SHALL BE "TWIST LOCK" TYPE, 3-PRONG, RATED 50 AMPS AT 600V, AND 20 AMPS FOR 120 V. 50 AMP CONNECTORS SHALL BE 3 WIRE CASE GROUNDED, ARMORED, WITH CORD GRIP, 20 AMP CONNECTOR SHALL BE 3 WIRE GROUNDING WITH CORD GRIP, NEMA TYPE L5-20.
 - PROVIDE HANDLE ON 1.5KVA TRANSFORMER FOR PORTABILITY. (SEE ONE-LINE SCHEMATIC)
 - CIRCUIT BREAKERS SHALL BE ITE #E43B030 OR #E43B050, SQUARE "D" #FAL24030 S/N OR #FAL24050 S/N, OR EQUAL.
 - CONDUIT ENTRIES INTO TERMINAL BOX SHALL BE INTO THE SIDE OF THE BOX.
 - A MINIMUM OF ONE (1) MAINTENANCE JUMPER CABLE SHALL BE SUPPLIED FOR EACH PROJECT. SUPPLY ONE (1) PORTABLE TRANSFORMER FOR EACH POWER DRIVE UNIT REQUIRED FOR PROJECT.

Texas Department of Transportation
Traffic Operations Division

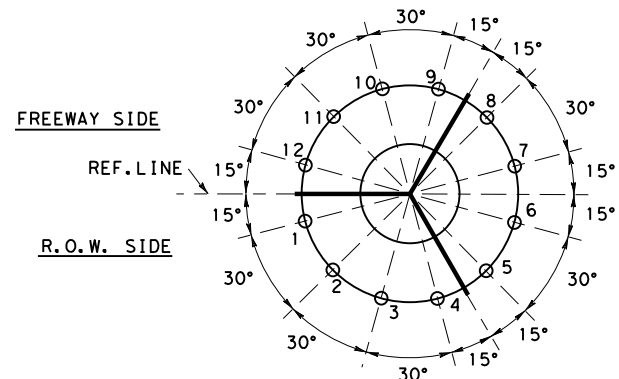
HIGH MAST ILLUMINATION DETAILS

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6-87	REVISIONS	CONTRACT	SECTION	JOB	HIGHWAY
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10-88		DISTRICT	COUNTY		SHEET NO.
10-93		ATL	HARRISON		102

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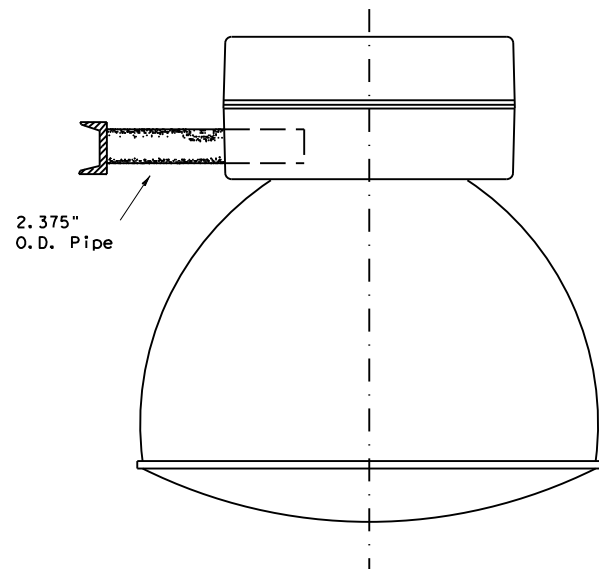
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12-LIGHT SETTING

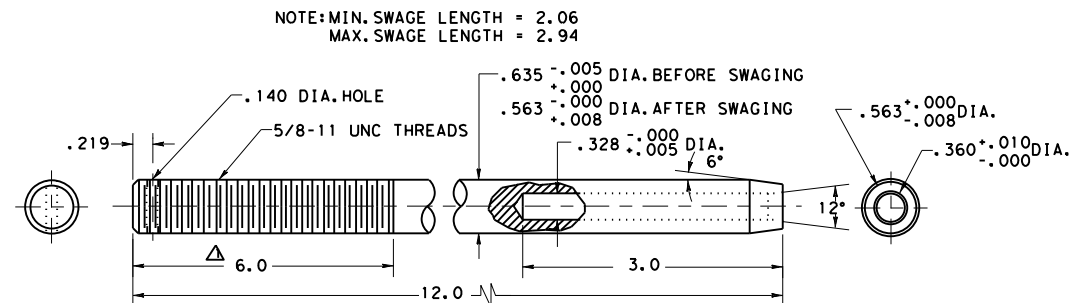
LUMINAIRE LOCATIONS

NOTE: AIRCRAFT OBSTRUCTION LIGHT LOCATIONS NOT SHOWN. THREE ARE REQUIRED LOCATED APPROX. 120° APART. LOCATIONS WILL VARY DEPENDENT ON THE LIGHT SETTING USED.



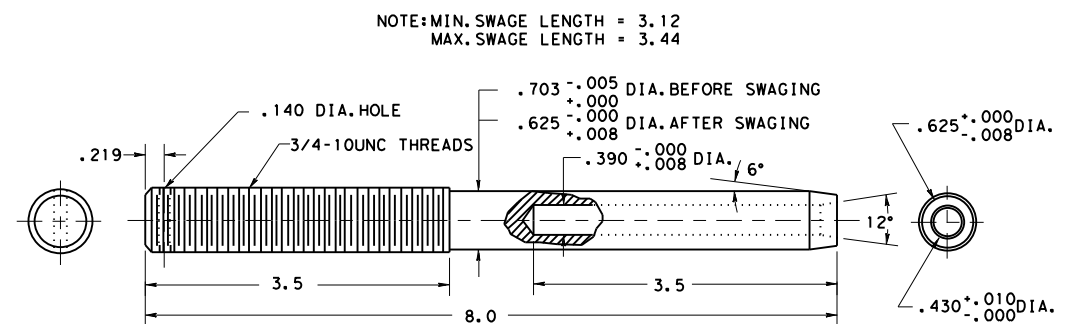
**AREALIGHT MOUNTING ASSEMBLY
 (SYMMETRIC AND ASYMMETRIC)**

NOTES: IF ASYMMETRIC FIXTURES ARE USED, THE REFRACTORS SHALL BE ORIENTED TO PROPERLY ILLUMINATE THE ADJACENT ROADWAYS. ORIENTATION SHALL BE AS SHOWN IN PLANS.



NOTE: MIN. SWAGE LENGTH = 2.06
 MAX. SWAGE LENGTH = 2.94

TERMINAL FOR 3/8" WIRE ROPE
 MATERIAL: STAINLESS STEEL, TYPE 303SE OR 304
 WITH 115,000 P. S. I. MAX. ULTIMATE TENSILE STRENGTH.



NOTE: MIN. SWAGE LENGTH = 3.12
 MAX. SWAGE LENGTH = 3.44

TERMINAL FOR 3/8" WIRE ROPE
 MATERIAL: STAINLESS STEEL, TYPE 303SE OR 304
 WITH 115,000 P. S. I. MAX. ULTIMATE TENSILE STRENGTH.

GENERAL NOTES:

1. AFTER FINAL AIMING HAS BEEN COMPLETED AND APPROVED BY THE ENGINEER, FIXTURES MUST BE LOCKED IN POSITION. CONTRACTOR MUST SUBMIT PROPOSED LOCKING SCHEME WITH THE FIXTURE SUBMITTAL. (FLOODLIGHTS ONLY).

3/03 Revision

Removed obsolete diagrams and updated drawings.

Texas Department of Transportation
 Traffic Operations Division

**HIGH MAST
 ILLUMINATION
 DETAILS**

HMID (6) -03

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10-95		0062	07	103	US 59
4-96		DIST		COUNTY	SHEET NO.
3-03		ATL		HARRISON	103

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1. AREA LIGHTING (Bid under Item 614, "High Mast Illumination Assemblies")

- A. Area lighting shall be symmetric or asymmetric, as shown on the descriptive code. The number and wattage of the fixtures on each pole shall be as shown on the lighting layouts. The lighting pattern for symmetric fixtures shall be IES Type V; for asymmetric fixtures, it shall be IES Type II, III, or IV.
- B. All luminaires shall be pre-qualified before installation. A sample of each type of luminaire to be considered for pre-qualification shall be submitted to TxDOT's Traffic Operations Division - Traffic Engineering Section (TRF-TE).

Traffic Operations Division - TE
 Texas Department of Transportation
 125 East 11th Street
 Austin, TX 78701-2483

Sample luminaires are non-returnable. A list of pre-qualified luminaires may be obtained by contacting TRF-TE. In addition, luminaires will be sampled and tested in accordance with Item 614. Luminaires that inconsistently pass testing or that are inconsistent with published photometric information will be removed from the pre-qualified list at the discretion of the Engineer. Once a fixture has been approved, no changes shall be made in any material or manufacturing methods without prior approval of the Department. Unapproved changes will result in rejection of all fixtures.

- C. Symmetric and Asymmetric fixtures shall meet the following requirements unless otherwise approved by the Engineer:

1. Luminaire Construction

- a) The luminaire housing shall be formed, cast or drawn from low copper aluminum and shall be free of cracks and excessive porosity. Formed aluminum shall have a minimum thickness of 0.090, and shall have all seams welded. The minimum thickness of cast parts shall be as approved by the Engineer. Nuts, screws, and washers shall be made of Type 316 stainless steel. The housing shall be marked with minimum 2" letters to indicate the photometric type as being either A, B, C, or S as specified. Marking shall be permanent and shall be by stencil or stick on labels similar to "wattage" label on cobra heads. Wattage label will not be required on high mast fixtures. The fixture housing shall be constructed separate from the fixture reflector.
- b) Fixtures shall be natural aluminum in color or shall be painted gray.
- c) The slipfitter shall securely attach the luminaire to the tenon on the ring assembly with a minimum of 2 bolts and clamp. A positive means of vertical adjustment shall be provided.
- d) For optical assemblies with lenses, reflectors shall be polished aluminum with Alzak or equal coating and shall not be painted. The optic assembly shall be sealed. The lens shall be tempered glass or prismatic glass, either flat or sag. The optic assembly shall be provided with a resilient seamless or sonically welded silicone rubber gasket, and constructed so that a positive seal against weather and other contaminants will be maintained. The latches shall be stainless steel, spring loaded, and hand operated (2 latches minimum, 3 attachment points), and shall provide a positive means of maintaining closure of the luminaire.
- e) For optical assemblies without lenses, optical assembly shall consist of an open ventilated borosilicate glass reflector. The reflecting prisms shall be protected from dirt depreciation by a spun on hermetically sealed aluminum cover. There shall be no glass lens/refractor on this optical assembly.
- f) Asymmetric fixtures shall have field rotatable optics with accurate degree of rotation markings. Reflector shall have "house side" and "street side" markings.
- g) The socket shell shall be nickel plated and shall be rigidly attached to a high grade porcelain mogul base, which shall extend and enclose the metal shell. A locking means shall be incorporated in the shell of the socket to positively resist the removal of the lamp. This locking means shall be a spring loaded center tip. Lamp socket shall be non-adjustable and shall be riveted, welded, or otherwise permanently installed. Lamps shall be held securely in the proper position with a lamp support.
- h) The terminal block shall use nickel plated brass connectors.
- i) Fixture weight including ballast shall not exceed 80 pounds, and effective projected area (EPA) shall not exceed 2.62 square feet.
- j) The Contractor may be responsible for fixture testing costs. See TxDOT's "Manual of Testing Procedures," Chapter 11 - "Traffic Systems and Illumination," TEX-1110-T - "Sampling Lighting Assemblies," at <http://manuals.dot.state.tx.us/dynaweb/>.

2. Photometrics

- a) The Contractor shall submit a computer generated light level array of the area to be lighted by high mast poles. All computer generated arrays shall have 400 watt fixtures derated to 40,000 lumens per lamp.
- b) The Type "A" 400 watt asymmetric fixture shall be IES cutoff. The Department will use the measured photometric data of sampled fixtures to run the following tests on a computer simulation:

- (1) When mounted in the level position, 50 ft. above the midpoint and 20 ft outside of either long side of a rectangular area measuring 340 ft. by 50 ft., the fixture shall pass the following tests:

- (a) The fixture shall provide a measured minimum intensity of 0.15 horizontal foot-candles at any point on the surface of this area.
- (b) The fixture shall provide a measured maximum to minimum light ratio, based on horizontal foot-candles, of less than 25.
- (c) The fixture shall provide an average measured intensity of 0.6 horizontal foot-candles on the surface area.

- (2) When mounted in the level position, 50 ft. above the midpoint and 20 ft outside of either long side of a rectangular area measuring 260 ft. by 30 ft., the fixture shall provide a measured minimum intensity of 0.30 horizontal foot-candles at any point on the surface of this area.

- c) The Type "B" 400 watt asymmetric fixture shall be IES cutoff. The Department will use the measured photometric data of sampled fixtures to run the following tests on a computer simulation:

- (1) When mounted in the level position, 50 ft. above the midpoint and 20 ft outside of either long side of a rectangular area measuring 260 ft. by 65 ft., the fixture shall pass the following tests:

- (a) The fixture shall provide a measured minimum intensity of 0.15 horizontal foot-candles at any point on the surface of this area.
- (b) The fixture shall provide a measured maximum to minimum light ratio, based on horizontal foot-candles, of less than 25.
- (c) The fixture shall provide an average measured intensity of 0.6 horizontal foot-candles on the surface area.

- (2) When mounted in the level position, 50 ft. above the midpoint and 20 ft outside of either long side of a rectangular area measuring 200 ft. by 40 ft., the fixture shall provide a measured minimum intensity of 0.30 horizontal foot-candles at any point on the surface of this area.

- d) The Type "C" 400 watt asymmetric fixture shall be IES cutoff. The Department will use the measured photometric data of sampled fixtures to run the following tests on a computer simulation:

- (1) When mounted in the level position, 50 ft. above the midpoint and 20 ft. outside of either long side of a rectangular area measuring 220 ft. by 80 ft., the fixture shall pass the following tests:

- (a) The fixture shall provide a measured minimum intensity of 0.15 horizontal foot-candles at any point on the surface of this area.
- (b) The fixture shall provide a measured maximum to minimum light ratio, based on horizontal foot-candles, of less than 25.
- (c) The fixture shall provide an average measured intensity of 0.6 horizontal foot-candles on the surface area.

- (2) When mounted in the level position, 50 ft. above the midpoint and 20 ft. outside of either long side of a rectangular area measuring 160 ft. by 50 ft., the fixture shall provide a measured minimum intensity of 0.30 horizontal foot-candles at any point on the surface of this area.

- e) The Type "S" 400 watt Symmetric fixture shall be IES cutoff. The Department will use the measured photometric data of sampled fixtures to run the following tests on a computer simulation:

- (1) When mounted in the level position at 50 foot mounting height, the fixture shall provide the minimum light levels as shown below:

- (a) 0.15 horizontal foot-candles within a 130 foot radius.
- (b) 0.30 horizontal foot-candles within a 100 foot radius.
- (c) 0.50 horizontal foot-candles within a 60 foot radius.

3. Ballasts

- a) All ballasts shall be isolated-winding lag-type magnetic regulators designed to operate 400 watt high pressure sodium lamps rated 480 volts. Ballasts shall be capable of starting lamps at an ambient temperature of -20 degrees F. Ballast wiring shall include a grounding terminal bonded to metal housing. Ballasts shall be fused with a 5 amp time-delay fuse in an insulated fuse holder. Fuse holders shall be internal to the housing. Ballast wiring to the terminal board shall be through a quick-disconnect plug. Windings shall be made from copper wire.
- b) When the circuit voltage indicated on the plans is applied, the ballast input wattage during fluctuations of the test voltage of +10% and -10% shall not exceed 552 watts for a 400 watt HPS lamp.

3/03 Revision



Revised Area Lighting Requirements

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

HMID (7) -03

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10-93					
4-96					
3-03					
		DIST	COUNTY		SHEET NO.
		ATL	HARRISON		104

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- c) During fluctuation of the line voltage of +10% or -10%, the lamp wattage fluctuation shall not exceed a total of 20%. Ballast shall maintain lamp wattage between 280 and 475 watts for a 400 watt HPS lamp.
- d) The power factor of any ballast when tested at the circuit voltage indicated in the plans shall not be less than 90% at any point in life. Ballast factor shall be between .95 and 1.0.
- e) The electronic starting aid shall provide a starting pulse with an amplitude of 2500 volts minimum, 4000 volts maximum. The pulse width shall be a minimum of 0.8 microseconds at 2250 volts. The pulse shall occur when the open-circuit voltage is equal to or greater than 90 percent of peak open-circuit voltage. Pulse repetition rate shall be a minimum of one per cycle and pulse current shall be a minimum of 0.18 amperes. Electronic starting aids shall be replaceable without the use of tools. The starting aid shall discontinue to pulse when the lamp starts. Starter shall sense an inoperative or missing HPS lamp and automatically shut down luminaire to protect ballast after 10 minutes.
- f) Ballasts shall permanently and clearly indicate the following: lamp type, catalog number, voltage rating, connection diagram, and manufacturer. Capacitors in all luminaires shall be non-PCB type.

4. Lamps

- a) All lamps shall be new and of recent manufacture.
- b) Lamps shall be high pressure sodium and shall meet ANSI C78 requirements. Lamps shall be the type that extinguish at the end of usable lamp life and remain extinguished without cycling. 400 watt lamps shall contain less than 4.0 mg of mercury. Lamps shall be lead free and shall pass the Federal Toxic Characteristic Leachate Procedure (TCLP). Lamp shall be Osram-Sylvania LU400/Eco Plus. No alternatives will be approved.
- c) 400 watt high pressure sodium lamps shall have average initial lumens of 50000 and average rated life of 24000 hours.

2. GENERAL

- A. All material shall be in accordance with the applicable sections of the NEC. All conduit and conductors shall be in accordance with the materials and construction methods requirements of Items 618 and 620. Heat shrink tubing for use with cable grips and cable splicing shall meet the requirements of Item 620.
- B. Where stainless steel bands are called for on the HMID sheets, stainless steel hose clamps may be provided. Stainless steel bands and stainless steel hose clamps shall be provided with stainless steel clips or stainless steel screws.
- C. Obstruction Lights

- 1. When obstruction lights are required by layout sheets, summary sheets or general notes, the entire high mast assembly shall be controlled by an FAA approved photocell mounted inside the service enclosure. Ring mounted luminaires shall be controlled by up to 4 additional ring mounted photocells, with each photocell controlling up to 3 fixtures. Photocells shall meet the following requirements:
 - a) All photocells shall consist of a photoelectric cell, an internal lightning arrester, and a relay or bimetallic switch mounted inside a weather proof enclosure with standard 3-prong twist lock photocell plug and receptacle. The enclosure shall be made of poly-acrylic with clear acrylic window. Enclosure chassis shall be molded thermosetting plastic. The photocell shall have an arrester rated 2.0kV sparkover with 5000 amps follow-through. Relay or switch shall be time delay type with normally closed contacts. Photocell shall be rated a minimum of 1800 VA.
 - b) Service enclosure mounted photocell (FAA photocell) shall turn on at light levels below 35 foot-candles and off at levels above 58 foot-candles, in accordance with FAA requirements. This photocell shall be rated for operation at 240 volts. A permanent placard shall be installed on the inside of the service enclosure door to indicate that an FAA approved photocell is required.
 - c) High mast assembly ring mounted photocells (one foot-candle photocells) shall turn on at light levels below 1.0 (plus or minus 0.5) foot-candle, and shall turn off at 2 foot-candles higher than this level. These photocells shall be rated for operation at 480 volts. Photocells shall be mounted upright on the terminal box or on various junction boxes around the ring as approved by the Engineer. Conduit entries shall not be made into the top of the terminal box or junction boxes. The Contractor shall submit mounting details to the Engineer for approval.

- 2. When obstruction lights are not required, eliminate the 3 obstruction light fixtures, 3 mounting posts, 480/120 volt transformer, 120 volt wiring, and 3 mounting post support connections shown on detail "E", sheet 1.

- D. The male cord connector on the lower end of the Type W cord running up the pole, the female cord connector for the Type W cord running to the circuit breaker enclosure and the male connector on the maintenance jumper shall meet the following or approved equal specifications:
 - 1. Arrow Hart pin and sleeve watertight connectors UL listed, catalog numbers AH330C7W and AH330P6W.
 - 2. Bryant watertight pin and sleeve connectors UL listed, catalog numbers 330C6W and 330P6W.

- 3. Hubble pin and sleeve connectors UL listed, catalog numbers HBL330C7W and HBL 330P7W.
- 4. The male connector for use with the Type W maintenance jumper shall be a pin and sleeve connector of one of the above types. The Contractor shall attach a 50 amp twist lock receptacle to the opposite end of the maintenance jumper to match the flange mounted plug on the ring and the portable transformer.
- 5. The Contractor shall make a brochure submittal on the cord connectors.
- E. When shown on the plans, spill light shall be restricted to less than 0.15 horizontal footcandles.
- F. The Contractor shall provide shop drawings for high mast illumination assemblies in accordance with this Item and Item 441. An Engineer licensed in the State of Texas shall seal the shop drawings.

3. TESTING

- A. Fixtures, lamps and ballasts will be sampled and tested in accordance with the Department "Manual of Testing Procedures" except as noted in these specifications.
- B. Ballasts and fixtures will be tested using a reference lamp.
- C. The Department will bear the cost of all testing of equipment that complies with the specification requirements. However, the source of supply of fixtures and ballasts must be approved as required in Article 6.1 of the Standard Specifications. Such approval will be contingent on the supplier agreeing to bear the cost of testing any equipment that fails to comply with the specification requirements listed in this specification.
- D. All other equipment will be tested in accordance with Item 614 of the Standard Specifications and Materials and Test Division Test Standards.
- E. After High Mast Assembly has been completely assembled, the Engineer may require Contractor to fully lower and raise each high mast ring one time to demonstrate proper operation of the lowering mechanism, or may require the ring to be lowered for ring or fixture inspection. If any malfunction occurs, the problem shall be corrected at the Contractor's expense and the lowering test will be repeated.

4. MOUNTING RING AND SUPPORT ASSEMBLY

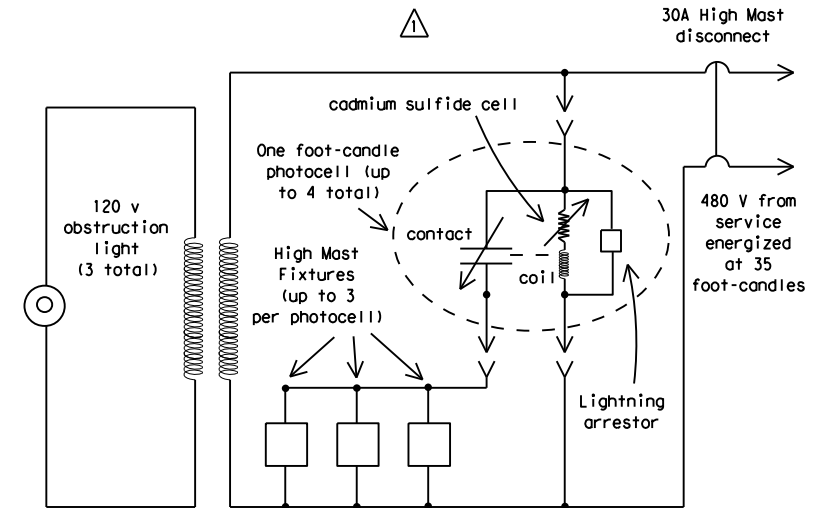
- A. Ring and support assembly shall be fabricated from steel having a minimum yield strength of 36 KSI.
- B. Cover assemblies, fittings and miscellaneous parts shall be as outlined on the plans.
- C. All hardware shall be hot-dipped galvanized per ASTM A153 or shall be stainless steel, unless noted otherwise on the plans.

5. WINCH

- A. Housing shall be high tensile strength die-cast silicon aluminum. Cable drum shall be fabricated from seamless steel tubing with stamped steel flanges and shall be hot-dipped galvanized. Drum shall have a minimum diameter of 4.5 inches. Drum shall be keyed to drum shaft. Drum and flanges shall be sized so that, when the fixture mounting ring is in the raised position, the cable including one full layer will fill the drum to no more than two-thirds of full capacity. Drum shaft shall be ground from stainless steel and mounted on lubricated bronze bearings with seals. Wormgear shall be made of nickel-bronze and worm shaft shall be high-strength stress-proofed steel, ground and polished and supported by tapered roller bearings.
- B. Gear ratio shall be 36:1 with safe hoisting capacity of not less than 4000 pounds.
- C. Winch shall incorporate adjustable automatic brake to assure positive load suspension. Brake shall be multiple disc with friction plates running in oil bath and one-direction clutch which operates only when load is suspended or lowered. Winch shall not have throw-out clutch.
- D. Any winch that is operated without oil shall be considered damaged and shall be replaced by the contractor at the contractor's expense.

6. WIRE ROPE AND TERMINALS

- A. 5/16 and 3/8 wire rope shall be 19x7 Rotation Resistant IWRC stainless steel. 19x7 rotation resistant wire rope shall meet the construction requirements of Fed. Spec. RR-W-410D, Type IV, class 2, modified for stainless steel with a nominal breaking strength of 11,100 lbs. All wire rope shall be pre-formed and factory lubricated. Wire rope shall meet the requirements of the applicable specification except where modified by this specification. Quality Assurance testing shall be the responsibility of the manufacturer and shall meet recognized wire rope industry standards. No special tensile or torsion testing will be required. Mill Test Reports shall be furnished.
- B. Winch cable shall be of sufficient length to leave a minimum of one full layer of cable on the drum when the fixture mounting ring is in the full down position.
- C. Wire rope terminals shall be stainless steel, solid stud type as shown on Sheet 7. All terminals shall be drilled for cotter pin. Material to be 303 SE or 304 stainless steel with a maximum tensile strength of 115,000 p.s.i. Mill Test Reports shall be furnished.



One foot-candle photocell keeps High Mast fixtures off when FAA photocell energizes circuit at 35 foot-candles. Fixtures come on when sun goes down at 1 foot-candle.

One Foot-candle PhotoCell Schematic

Use on ring when obstruction lights are installed and FAA photocell is installed in electrical service.

3/03 Revision

- ⚠ Revised General requirements; add diagram
- ⚠ Revised Wire Rope and Terminals

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

HMID (8) -03

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- D. All terminals shall be proof-tested by the manufacturer to 40% of rated strength of the wire rope. Each terminal shall be identified by manufacturer's logo permanently incised on terminal. Manufacturer shall furnish certification of tests. Contractor shall also furnish one sample of each size of terminal with 5 ft. of wire rope for load tests by the State. Samples tested must withstand test load not less than 100% of rated breaking strength of wire rope. If sample fails test, all terminals of same size will be rejected.
- E. Wire rope shall be delivered from the manufacturer on a reel.
7. SPRINGS
- A. Provide three steel springs as shown on plans.
- B. Springs shall have an uncompressed length of approximately 8 inches and shall compress 3 inches under 700-pound load.
- C. Springs shall contain approximately 19 total coils with ID of 0.875 and OD of 1.375 inches. Ends shall be closed and ground. Springs shall be zinc-plated.
- D. Springs shall be made from 1/4" diameter oil-tempered MB Steel treated for overstress. Springs shall not develop permanent set from 3-inch compression.
8. ELECTRICAL POWER CABLE
- A. Power cable shall be No. 8 AWG three-conductor round Type W, rated 90 degrees C, 600 volt or 2000 volt. Each conductor shall be tinned copper and shall consist of 133 strands. Insulation shall be ethylene propylene rubber. Jacket shall be chlorosulfonated polyethylene (CSPE), with glass fiber or nylon reinforcing mesh between two layers of CSPE. Nominal diameter shall be 0.91". Filler shall be rubber compound or other approved non-hygroscopic compound. Jacket shall be Hypalon Power Flex 90, with no substitutions allowed.
9. POWER DRIVE ASSEMBLY (ONE ONLY THIS CONTRACT UNLESS OTHERWISE SHOWN ELSEWHERE ON THE PLANS)
- A. Drive Motor
1. Drive motor shall be 1-1/4" heavy-duty reversible portable electric drill modified as shown on plans.
 2. Shall have a minimum of 6 radial ball bearings, one thrust bearing, and one needle bearing.
 3. Shall have No. 3 Morse Taper socket.
 4. Shall be designed for 115 volt 60 Hertz single phase operation 250 RPM at no load.
 5. Shall be designed for continuous rated duty of 160 RPM and 15 amperes at 115 volts with delivery of 33-pound-feet of torque. Drill motor to be operated only at low speed range. (i.e. 150 to 160 RPM)
 6. Shall develop 240 pound-feet of torque at stalled rotor condition.
- B. Torque Limiter Coupling
1. Torque limiter coupling shall consist of standard torque limiter with Type A sprocket center member coupled to a Type B sprocket by an ASA double strand roller chain. Type A sprocket shall be chrome-plated.
 2. Coupling shall have torque capacity minimum of 15 pound-feet and a maximum of 55 pound-feet.
 3. Limiter section of coupling shall consist of integral hub and pressure plate, two friction facings, sintered iron bushing, pilot plate, disk spring, lock washer and hex adjustment nut. All major components except spring and friction facings shall be cadmium-plated with dichromate treatment.
 4. Type A center sprocket shall have ground face (63 micro-inch) and shall be run-in for 4 minutes at approximately 60 RPM at a torque setting 70% to 80% of spring rating. Contractor shall provide written certification that run-in has been accomplished.
 5. The torque limiter coupling shall, after run-in, be set to a torque limit of 35 pound-feet or as directed by the Engineer. The proper setting of the coupling shall be demonstrated to the Engineer.
- C. Universal Joints
1. Shall be slip-type with 4-inch barrel. A grease fitting shall be so located in the spider that all caps and needle bearings may be adequately serviced. The assembly shall be disassembled and zinc-plated, then reassembled and properly lubricated.
 2. Shall have a minimum torque rating of 1270 inch-pounds at 200 RPM.
 3. Shall have set screw and keyed coupling as shown on plans.



10. CONSTRUCTION METHODS

A. Fabrication

1. Fabrication and welding shall be in accordance with Item 441, "Steel Structures".
2. All holes supporting pulley shafts shall be drilled (not punched) prior to galvanizing.
3. All component parts shall be galvanized where galvanizing is applicable, after fabrication.
4. Galvanizing on all parts which have become scratched, chipped or otherwise damaged shall be thoroughly cleaned and the cleaned area painted with two coats of zinc dust-zinc oxide paint conforming to the requirements of repair compounds meeting Federal Specification TT-P-641 b.
5. Mounting rings and ring support assemblies shall be fabricated with the use of jigs that have been inspected and approved by Material and Test Division personnel prior to their usage.
6. The fabricator shall submit his proposed welding procedures in accordance with Item 441, "Steel Structures".

B. Installing Wire Rope

1. Extreme care shall be used to prevent wire rope from kinking, nicking, or from sustaining other damage during installation. Rope shall not be installed by pulling from flat coil, but shall be carefully unrolled its full length or placed on a horizontal axis and unreel according to wire rope industry standards.
2. For right lay rope, the rope shall be attached to the drum on the end opposite the winch gear train, and wound on drum so that the free end of the rope comes off the backside of the drum during normal operation of the winch. Rope must be unreel carefully as stated above. Care must be taken to insure that all layers lay full and tight on drum.
3. Installation of all wire rope shall be accomplished only under direct supervision of the Engineer or his authorized representative. Contractor shall not remove wire rope from manufacturer's reel until authorized by the Engineer. Installation of wire rope on winch shall be in accordance with the above and accepted industry practice. Installation of the three hoist cables shall be made from the top end of the pole and as directed by the Engineer or his representative.

C. Installing Wire Rope Clips

1. Turn back approx. 2' 3" of rope, measured from the top of thimble. Apply seizing to pigtail end of wire rope prior to cutting to length. See detail "K", Sheet 3. Apply first clip approx. 3" from the dead end of the wire rope with U-bolt over dead end and live end in clip saddle. Tighten nuts evenly to 30 pound-feet of torque, or as recommended by manufacturer.
2. Install second clip as near loop as possible, take out slack and torque nuts evenly to 30 pound-feet or as recommended by manufacturer.
3. After final erection and assembly of the pole and high mast assembly, retighten nuts to required torque.

D. Installing Light Ring and Luminaires

1. Prior to mounting luminaires to the light ring, Contractor shall ensure the ring is level. Luminaires shall be mounted level on the light ring. Luminaires shall be oriented as shown on plans.

3/03 Revision



Revised Construction Methods.

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

HMID (9) -03

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TABLE OF VARIABLE POLE DIMENSIONS												
Ht (ft)	Section	8 SIDED POLE					12 SIDED POLE					
		Diameter (Inches)		Thickness (inches)	Length (feet)	Splice (inches)	Diameter (Inches)		Thickness (inches)	Length (feet)	Splice (inches)	
		Bottom	Top				Bottom	Top				
80 MPH DESIGNS	175	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.92	25	24.858	15.817	.313	51.67	36
		C	22.250	16.583	.375	35.42	32	32.625	23.583	.313	51.67	48
		D	25.375	20.948	.438	27.67	36	36.250	31.175	.375	29.00	~
		E	28.375	23.895	.500	28.00	41					
		F	31.250	26.703	.500	28.42	~					
	150	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.92	25	24.858	15.817	.313	51.67	36
		C	22.250	16.583	.375	35.42	32	32.625	23.583	.313	51.67	~
		D	25.375	20.948	.438	27.67	36					
		E	28.375	23.895	.500	28.00	~					
	125	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.92	25	24.858	15.817	.313	51.67	36
		C	22.250	16.583	.375	35.67	32	28.250	23.583	.313	26.67	~
		D	25.375	20.948	.438	27.67	~					
	100	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.67	25	24.625	15.817	.313	50.33	~
		C	22.250	16.583	.375	35.67	~					
100 MPH DESIGNS	175	A	14.208	7.875	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.747	16.173	.438	51.75	37
		C	25.250	18.473	.438	35.67	36	33.750	24.176	.438	51.75	49
		D	29.000	23.680	.500	28.00	42	37.375	31.995	.500	29.08	~
		E	32.625	27.210	.563	28.50	47					
		F	36.125	30.631	.563	28.92	~					
	150	A	14.208	7.875	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.747	16.173	.438	51.75	37
		C	25.250	18.473	.438	35.67	36	33.750	24.176	.438	51.75	~
		D	29.00	23.680	.500	28.00	42					
		E	32.625	27.210	.563	28.50	~					
	125	A	14.208	7.875	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.747	16.173	.438	51.75	37
		C	25.250	18.473	.438	35.67	36	29.125	24.176	.438	26.75	~
		D	29.00	23.680	.500	28.00	~					
	100	A	14.208	7.875	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.500	16.173	.375	50.42	~
		C	25.250	18.473	.438	35.67	~					

Diameters are measured across the flats.

MATERIALS	
Polygonal Shafts Ground Sleeves	ASTM A709 Grade 50 A572 Grade 50 ①②
Base Plate and Handhole Frame	ASTM A709 Grade 50 A572 Grade 50 ① A633 Grade C ①
Miscellaneous Steel	ASTM A36 or equal

- ① ASTM A572 and A633 may have higher yield strength but shall not have less elongation than the grade indicated.
- ② The silicon content of all steel shall be controlled to ensure high quality galvanizing and to avoid discoloration.

TABLE OF VARIABLE BASE DIMENSIONS							
Ht (ft)	O.D. (inches)	I.D. (inches)	Bolt Cir (inches)	No. Bolts	S (inches)	T (inches)	U (inches)
80 MPH DESIGNS							
8 SIDED POLE							
175'	47	22	41	16	2.00	3.75	4.50
150'	44	18	38	12	2.00	4.00	3.50
125'	41	16	35	8	2.00	4.50	3.50
100'	37	14	31	6	2.00	5.00	3.50
12 SIDED POLE							
175'	50	24	44	12	1.75	3.50	3.50
150'	47	22	41	10	1.75	3.50	2.50
125'	42	18	36	8	1.75	3.75	2.50
100'	38	13	32	6	1.75	4.00	2.50
100 MPH DESIGNS							
8 SIDED POLE							
175'	52	27	46	20	1.75	3.50	4.50
150'	49	23	43	16	1.75	4.00	3.50
125'	45	21	39	12	1.75	4.50	3.50
100'	40	17	34	10	1.75	4.50	3.50
12 SIDED POLE							
175'	52	27	46	16	1.75	3.25	3.50
150'	50	25	44	12	1.75	3.50	2.50
125'	46	22	40	10	1.75	3.75	2.50
100'	42	19	36	6	1.75	4.00	2.50

NOTE: Base Plate may be round or with 8 or 12 equal segments matching the pole.

GENERAL NOTES:

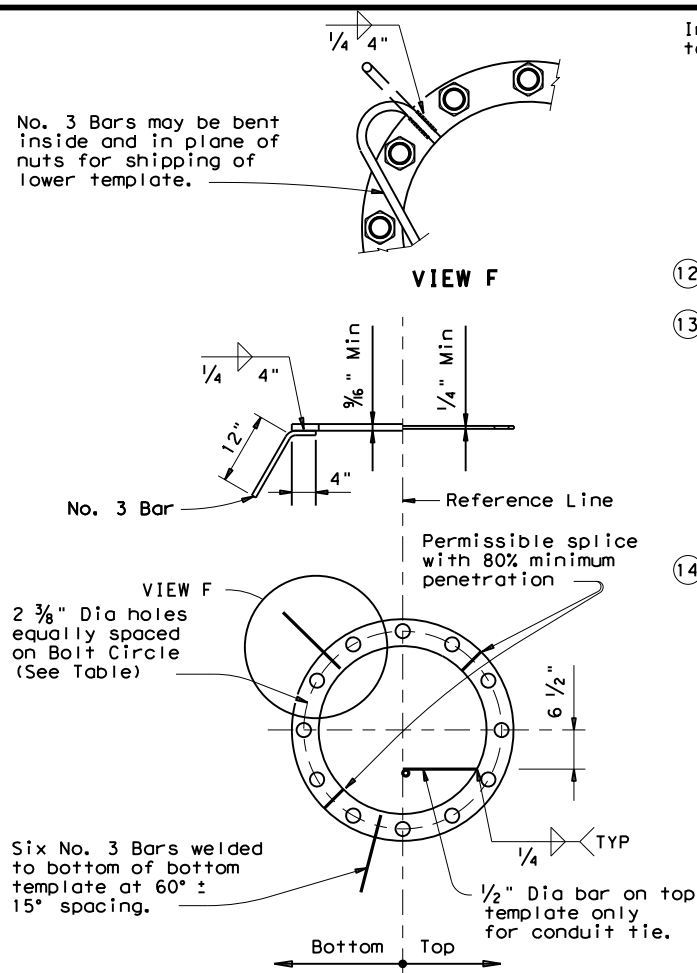
- Design conforms to AASHTO 1994 Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals and Interim Revisions thereto. The Design Wind Speed is 80 mph or 100 mph.
- The required design height and wind speed shall be as shown elsewhere in the plans.
- Each pole section, top flange plate and base plate shall be permanently marked on the reference line. The required mark locations are shown on the baseplate, top plate, and foundation plan details. These marks shall be used in pole assembly and erection alignment. The reference line and anchor bolt orientation shall be parallel to roadway centerline unless otherwise shown on Lighting Layouts.

SHEET 2 OF 2

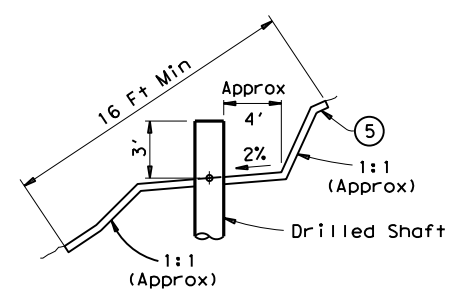
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5-98	DIST	COUNTY	SHEET NO.
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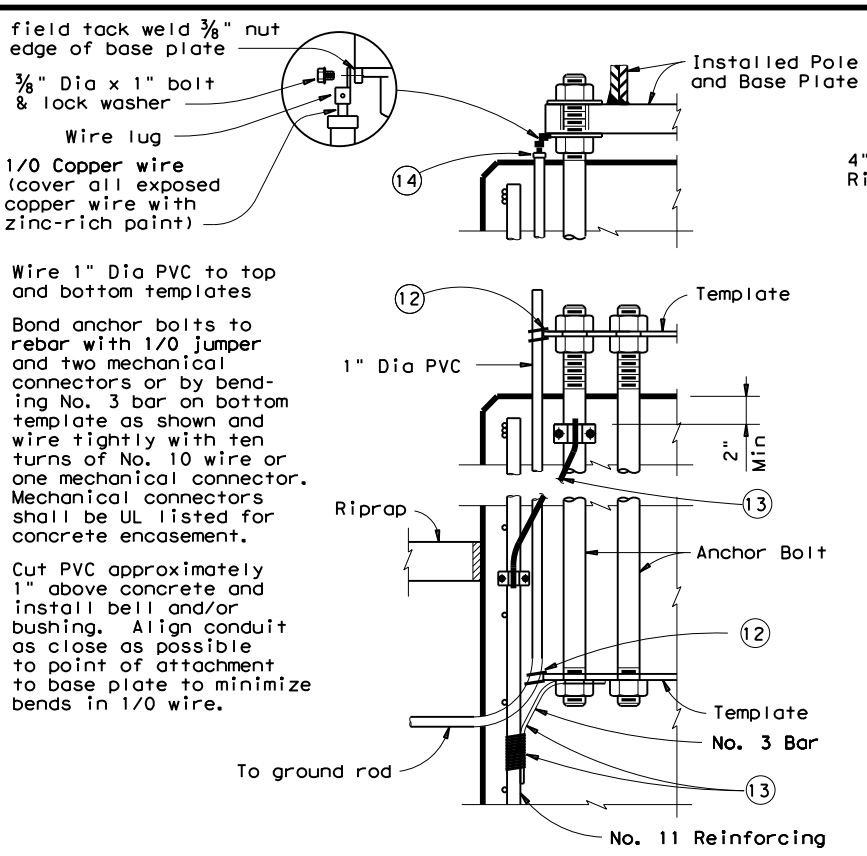
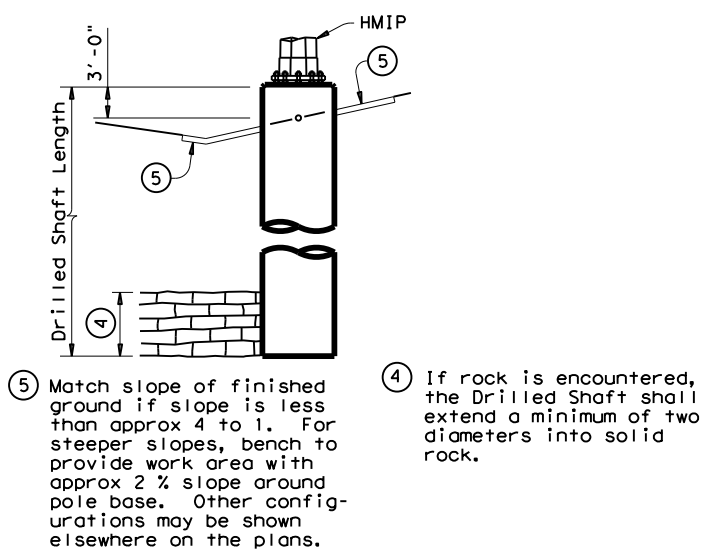
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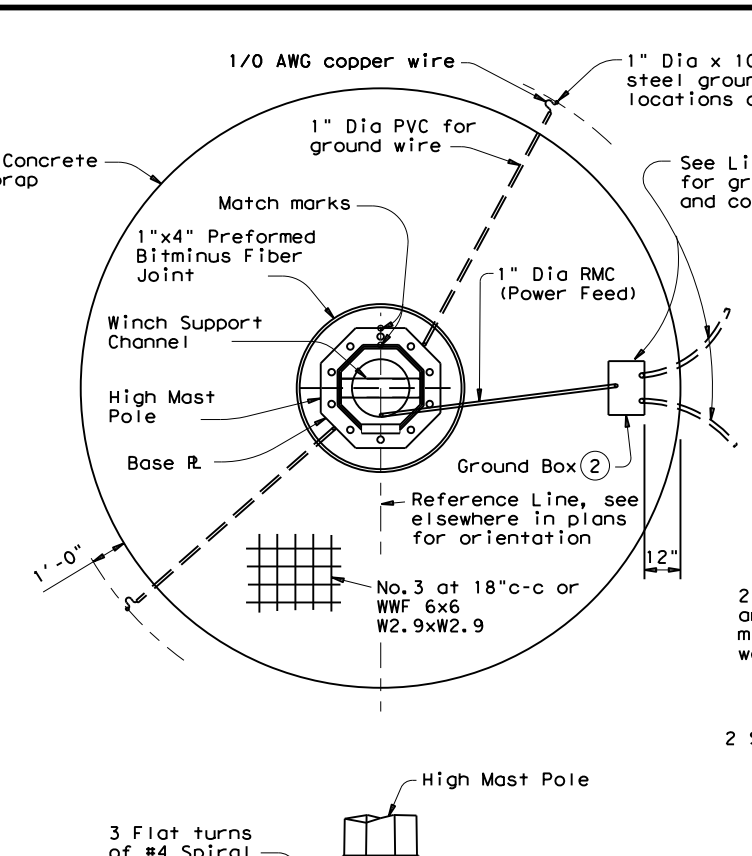
ANCHOR BOLT TEMPLATES



RIPRAP ON SLOPES



LIGHTNING PROTECTION SYSTEM



- 2 Place ground box cover flush with riprap.
- 10 If, due to tolerances in fabrication, the anchor bolt hole to ground sleeve weld is less than approx 1/8", clipped 1/2" thick washers shall be supplied at those

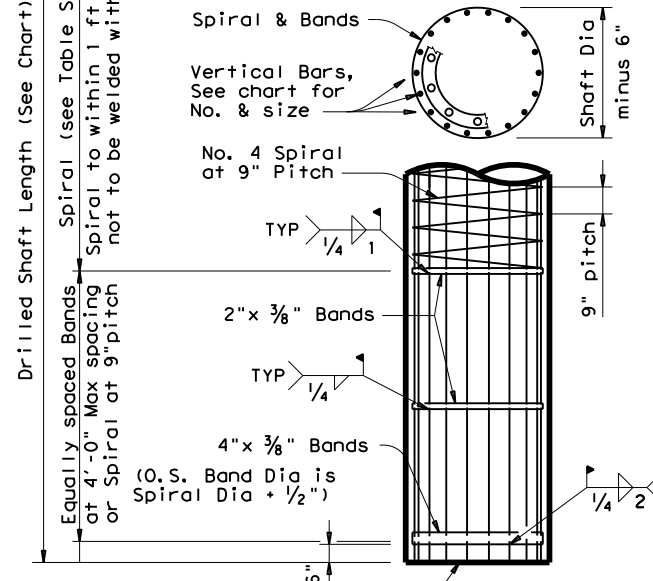
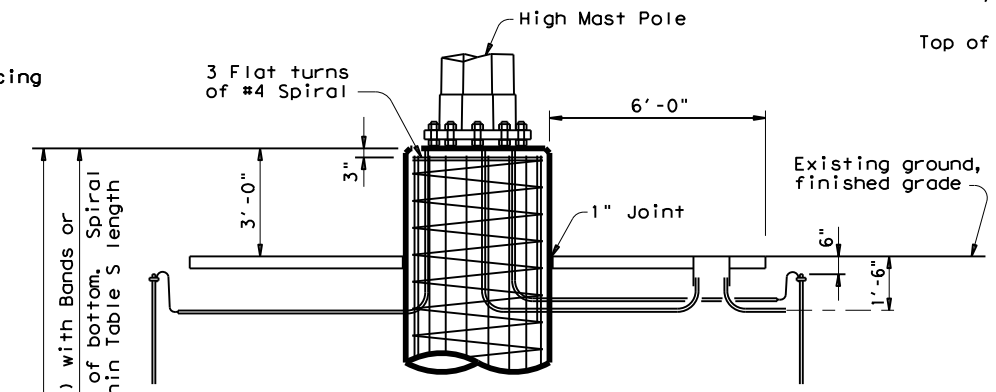
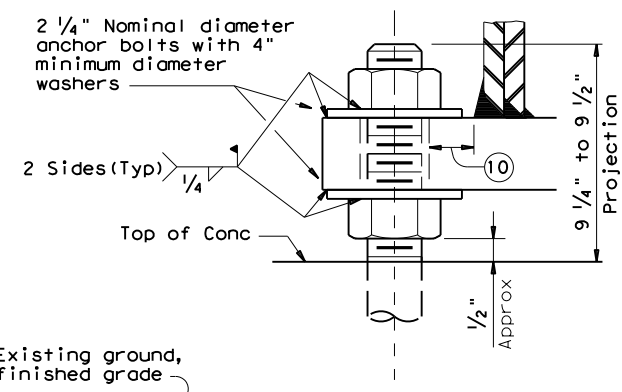
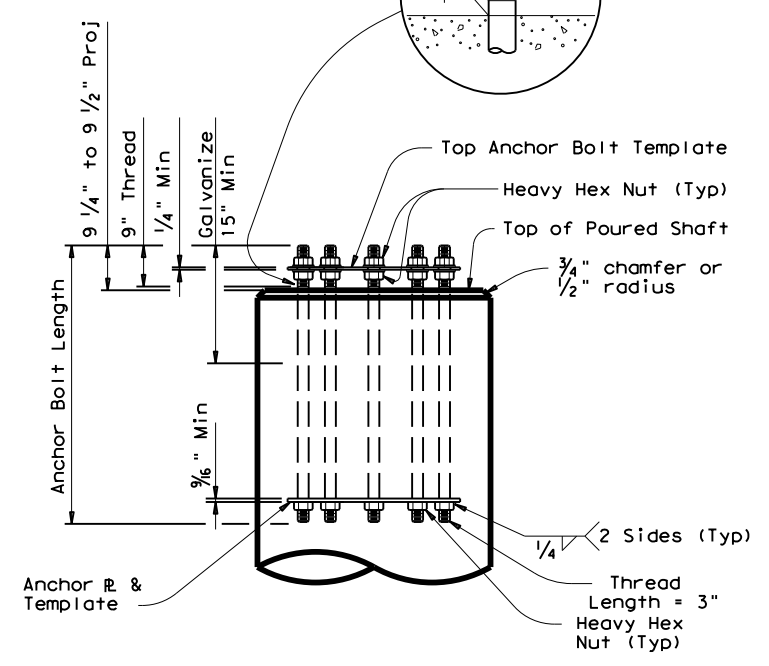


TABLE 5	
Shaft Dia (inches)	Min Spiral Length (feet)
48	19
54	21
60	23
66	26

Vertical bars may be supported on bottom of drilled hole if material is firm enough to do so when concrete is placed

DRILLED SHAFT FOUNDATION DETAIL



ANCHOR BOLT ASSEMBLY

(See Anchor Bolt Table for number of bolts required)

Texas Department of Transportation
 Traffic Operations Division

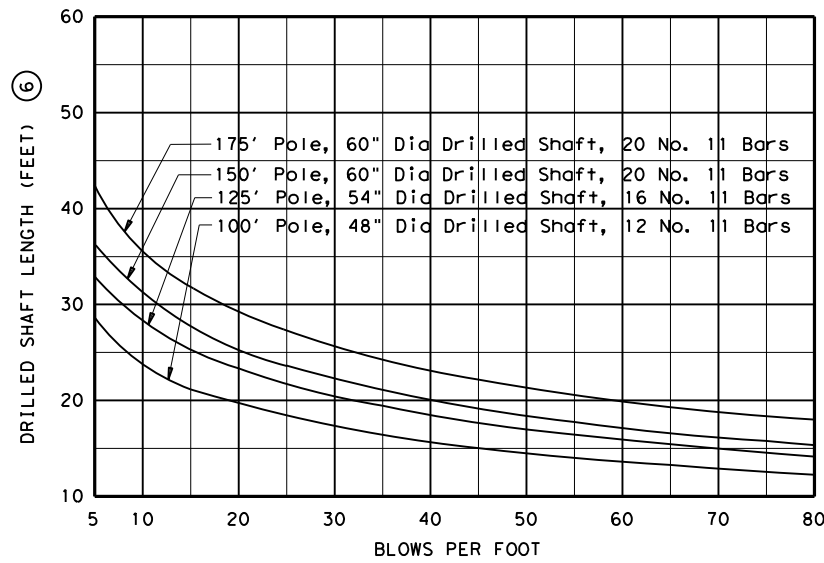
HIGH MAST ILLUMINATION POLE FOUNDATIONS

SHEET 1 OF 2 HMIF (1) -98

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5-98	Anchor Bolt Circle Dia	0062	07	103	US 59
		DIST	COUNTY		SHEET NO.
		ATL	HARRISON		109

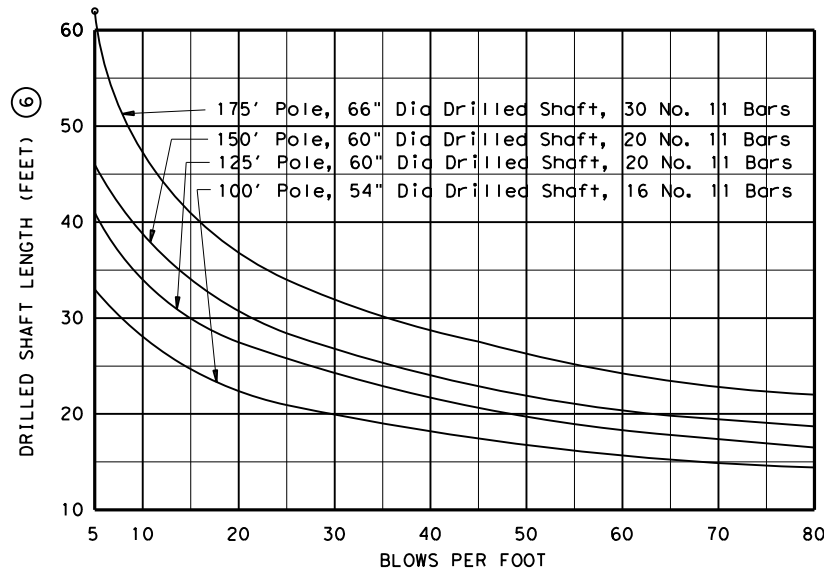
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⑥ Includes normal 3 Ft exposure. Shafts with more than 3 Ft exposure must have additional length.



80 MPH POLES

Do not extrapolate below 5 Blows/Ft. A special design will be required for soil less than 5 Blows/Ft.



100 MPH POLES

Do not extrapolate below 5 Blows/Ft. A special design will be required for soil less than 5 Blows/Ft.

TEXAS CONE PENETROMETER TEST TABLES

NOTE: Use average "N" value over the top third of the embedded shaft. Ignore the top 2' of soil.


ANCHOR BOLT TABLE						
Pole Height (feet)	Bolt Diameter (inches)	Bolt Length (feet)	Bolt Templates		No. of Bolts	Bolt Cir Dia (inches)
			O D (inches)	I D (inches)		
8 SIDED POLE						
175	2.25	4.83	45.5	36.5	16	41
150	2.25	4.83	42.5	33.5	12	38
125	2.25	4.83	39.5	30.5	8	35
100	2.25	4.83	35.5	26.5	6	31
12 SIDED POLE						
175	2.25	4.83	48.5	39.5	12	44
150	2.25	4.83	45.5	36.5	10	41
125	2.25	4.83	40.5	31.5	8	36
100	2.25	4.83	36.5	27.5	6	32
8 SIDED POLE						
175	2.25	4.83	50.5	41.5	20	46
150	2.25	4.83	47.5	38.5	16	43
125	2.25	4.83	43.5	34.5	12	39
100	2.25	4.83	38.5	29.5	10	34
12 SIDED POLE						
175	2.25	4.83	50.5	41.5	16	46
150	2.25	4.83	48.5	39.5	12	44
125	2.25	4.83	44.5	35.5	10	40
100	2.25	4.83	40.5	31.5	6	36

MISCELLANEOUS QUANTITIES - ONE HMIF			
Shaft Diameter (in) ⑦	48	54	60
Concrete Riprap (CY)	2.33	2.44	2.56
Reinforcing (Lbs) ⑧	94	99	103
Ground Box (ea)	1	1	1
R O W Marker (ea) ⑨	1	1	1

- ⑦ See elsewhere on plans for length of Drilled Shaft required.
- ⑧ For Contractors information only.
- ⑨ Designated elsewhere on plans if required.

GENERAL NOTES:

- Unless otherwise noted, the welded steel bands may be replaced with spiral as shown on the foundation details.
- Anchor bolts shall be placed in foundation so there are always two bolts on reference line.
- Drilled shaft lengths as determined from the foundation design chart or other acceptable methods are to be as shown elsewhere on the plans.
- ODSR may not be used for HMIF drilled shafts.
- Concrete for drilled shafts shall be Class C.
- Repair welded areas with zinc-rich paint.
- All Anchor Bolts, Nuts and Washers shall be galvanized in accordance with Item 445, "Galvanizing".



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Traffic Operations Division

HIGH MAST ILLUMINATION POLE FOUNDATIONS

SHEET 2 OF 2 HMIF (2) - 98

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5-98 - Anchor Bolt	REVISIONS	CONT	SECT	JOB	HIGHWAY
Circle Dia	0062	07	103	US 59	
	DIST	COUNTY		SHEET NO.	
	ATL	HARRISON		110	

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

This project is adjacent or parallel work, not within RR ROW:
 DOT No.: 794577C
 Crossing Type: At Grade
 RR Company Operating Track at Crossing: Union Pacific Railroad
 RR Company Owning Track at Crossing: Union Pacific Railroad
 RR MP: 58.14
 RR Subdivision: Little Rock
 City: Jefferson
 County: Harrison
 CSJ at this Crossing: 0062-07-103
 Latitude: 32.6678934
 Longitude: -94.3432467

Scope of Work, including any TCP, to be performed by State Contractor:

No work within the railroad right of way and no traffic control devices in railroad right of way. All work will be performed on US 59 main lanes and will have no effect on the adjacent crossing. TxDOT to install illumination poles near the Railroad right of way.

Scope of Work to be performed by Railroad Company:

Perform protective flagging to make sure no issues of fouling track with any equipment and to ensure construction does not block and que traffic at the crossing itself.

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 8
 On this project, night or weekend flagging is:
 Expected
 Not Expected

Flagging services will be provided by:

Railroad Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be needed or, 2) Permitted crossing. Railroad company to provide flagging.
 Outside Party: Contractor will pay flagging invoices to be reimbursed by TxDOT

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

Contact Information for Flagging:

UPRR UP.info@railpros.com
 Call Center 877-315-0513, Select #1 for flagging
 UP.request@nrssinc.net
 Call Center 877-984-6777

BNSF BNSFinfo@railprofs.com
 Call Center 877-315-0513, Select #1 for flagging

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

OTHERS:

Contractor must incorporate railroad construction inspection into anticipated construction schedule.

Not Required
 Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

Required.
 Not Required
 Railroad Point of Contact: _____

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

IV. RAILROAD INSURANCE REQUIREMENTS

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

Insurance policies and corresponding certificates of insurance must be issued by the contractor on behalf of the Railroad. Separate insurance policies and certificates are required when more than one Railroad Company is operating on the same right of way, or when several Railroad Companies are involved and operate on their own separate right of ways.

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

Escalated Limits	
Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	\$500,000 / \$500,000 / \$500,000
Commercial General Liability	\$2,000,000 / \$4,000,000
Business Automobile	\$2,000,000

Railroad Protective Liability Limits	
<input type="checkbox"/> Not Required	
<input checked="" type="checkbox"/> Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	\$2,000,000 / \$6,000,000
<input type="checkbox"/> Bridge Structure Projects. Includes new construction or replacement of overpass/underpass structures	\$5,000,000 / \$10,000,000
<input type="checkbox"/> Other: _____	

V. CONTRACTOR'S RIGHT OF ENTRY (CROE)

Not Required
 Required: UPRR Maintenance Consent Letter. TxDOT to assist
 Required: TxDOT to assist in obtaining the UPRR CROE
 Required: Contractor to obtain

- BNSF: _____
https://bnsf.railpermitting.com
- CPKCR
https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- Other Railroads: _____

To view previously approved CROE templates agreed upon between the State and Railroad, see: <https://www.txdot.gov/business/resources/railroad-highway-crossing/sample-right-of-entry-agreements.html>

Approved CROE templates are not to be modified by the Contractor.

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

VI. RAILROAD COORDINATION MEETING

A Railroad Coordination Meeting is required. See item 5, Article 8.1, of the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges Manual for more details.

VII. RAILROAD SAFETY ORIENTATION

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

UPRR, BNSF, CPKCR will not accept on-track safety training certificates from other Railroads. Refer to each Railroad's specific contractor right of entry for training information.

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

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are subject to the same insurance requirements as the Prime Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
 Call: Union Pacific Railroad Emergency Line
 Railroad Emergency Line at: 888-877-7267
 Location: DOT 794577C
 RR Milepost: 58.14
 Subdivision: Little Rock

RRD Review Only
 Initials: KS
 Date: 01/09/2024

Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: rr-scope-of-work.pdf	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
6/2023	0062	07	103	US 59
REVISIONS				
	DIST	COUNTY		SHEET NO.
	ATL	HARRISON		111

PART 1 - GENERAL

1.01 DESCRIPTION

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

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

1.02 REQUEST FOR INFORMATION / CLARIFICATION

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

1.03 PLANS / SPECIFICATIONS

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

PART 2 - UTILITIES AND FIBER OPTIC

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

PART 3 - CONSTRUCTION

3.01 GENERAL

- A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.
- B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.
- C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.
- D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.
- E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.
- F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.
- G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

- A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.
- B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. Railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.
- C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:
 - 1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.
 - 2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

- A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.
- B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.
- C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.
- D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
 - 1. Exactly what the work entails.
 - 2. The days and hours that work will be performed.
 - 3. The exact location of work, and proximity to the tracks.
 - 4. The type of window requested and the amount of time requested.
 - 5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.
- E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

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

3.05 RAILROAD SAFETY ORIENTATION

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

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."
- B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

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



3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

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

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

3.08 APPROVAL OF REDUCED CLEARANCES

- A. Maintain minimum track clearances during construction as specified in Section 3.07.
- B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.
- C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

					
RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS					
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	DIST	COUNTY	SHEET NO.		
	ATL	HARRISON	112		

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3.09 MAINTENANCE OF RAILROAD FACILITIES

- A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.
- B. Perform all such maintenance and repair of damages due to the Contractor's operations at Contractor's expense.
- C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD'S DESIGNATED REPRESENTATIVE

- A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
 1. Pre-construction meetings.
 2. Pile driving/drilling of caissons or drilled shafts.
 3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
 4. Erection of precast concrete or steel bridge superstructure.
 5. Placement of waterproofing (prior to placing ballast on bridge deck).
 6. Completion of the bridge structure.
- B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.
- C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

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

- A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.
- B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.
- C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.
- D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.
- E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

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

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

- A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".
- B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

UPRR 1-800-336-9193
 7:00 AM to 9:00 PM CST Monday-Friday except holidays,
 staffed 24 hrs/day for emergencies
 48 hrs notice required

BNSF 1-800-533-2891
 24 hour number
 5 working days notice required

KCS 1-800-344-8377
 Texas One Call, a 24 hour number
 48 hrs notice required, excluding weekends and holidays

If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

- C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4 inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.16 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

Texas Department of Transportation				Rail Division	
RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS					
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT	
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DATE: DATE TIME
 FILE: DOCUMENT NAME

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. There are no MS4 Operators in the project area.

2. 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
<input type="checkbox"/> Temporary Vegetation	<input type="checkbox"/> Silt Fence	<input type="checkbox"/> Vegetative Filter Strips
<input type="checkbox"/> Blankets/Matting	<input type="checkbox"/> Rock Berm	<input type="checkbox"/> Retention/Irrigation Systems
<input type="checkbox"/> Mulch	<input type="checkbox"/> Triangular Filter Dike	<input type="checkbox"/> Extended Detention Basin
<input type="checkbox"/> Sodding	<input type="checkbox"/> Sand Bag Berm	<input type="checkbox"/> Constructed Wetlands
<input type="checkbox"/> Interceptor Swale	<input type="checkbox"/> Straw Bale Dike	<input type="checkbox"/> Wet Basin
<input type="checkbox"/> Diversion Dike	<input type="checkbox"/> Brush Berms	<input type="checkbox"/> Erosion Control Compost
<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Mulch Filter Berm and Socks
<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks
<input type="checkbox"/> Compost Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks	<input type="checkbox"/> Vegetation Lined Ditches
	<input type="checkbox"/> Stone Outlet Sediment Traps	<input type="checkbox"/> Sand Filter Systems
	<input type="checkbox"/> Sediment Basins	<input type="checkbox"/> 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.
- 3.
- 4.

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	SPCC: Spill Prevention Control and Countermeasure
CGP: Construction General Permit	SWSP: Storm Water Pollution Prevention Plan
DSHS: Texas Department of State Health Services	PCN: Pre-Construction Notification
FHWA: Federal Highway Administration	PSL: Project Specific Location
MOA: Memorandum of Agreement	TCEQ: Texas Commission on Environmental Quality
MOU: Memorandum of Understanding	TPDES: Texas Pollutant Discharge Elimination System
MS4: Municipal Separate Stormwater Sewer System	TPWD: Texas Parks and Wildlife Department
MBTA: Migratory Bird Treaty Act	TxDOT: Texas Department of Transportation
NOT: Notice of Termination	T&E: Threatened and Endangered Species
NWP: Nationwide Permit	USACE: U.S. Army Corps of Engineers
NOI: Notice of Intent	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.
- 2.
- 3.


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		
<h2 style="margin: 0;">ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC</h2>				
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
12-12-2011 (DS) REVISIONS	0062	07	103	US 59
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY	SHEET NO.	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	ATL	HARRISON	114	