

SEE SHEET 2 FOR INDEX OF SHEETS

STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

PROJECT NO. C 911-00-139

VARIOUS LOCATIONS DISTRICTWIDE ANGELINA COUNTY

NET LENGTH OF ROADWAY = N/A

LIMITS: VARIOUS LOCATIONS DISTRICT WIDE
FOR THE CONSTRUCTION OF TRAFFIC CONTROL DEVICES
CONSISTING OF TRAFFIC SIGNAL

SEE LOCATION MAP

PROJECT NO.			
C 911-00-139			
CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY		SHEET NO.
LFK	ANGELINA		1

FUNCTIONAL CLASS: N/A
DESIGN SPEED = N/A
A.D.T. (2022) = N/A

* DESIGN SPEED APPLICABLE ONLY TO
THE DESIGN ELEMENTS AFFECTED BY
THE SCOPE OF THE HSIP PROJECT.

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS COMPLETED: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: \$ _____

CONTRACTOR : _____

CONSTRUCTION WORK ON THIS PROJECT WAS PERFORMED IN ACCORDANCE
WITH THE PLANS, CONTRACT AND APPROVED CHANGE ORDERS.

_____ DATE _____

BARRICADES AND WARNING SIGNS
PROVIDE AND ERECT BARRICADES AND WARNING SIGNS
IN ACCORDANCE WITH THE BARRICADE & CONSTRUCTION
STANDARDS, TCP STANDARDS, THE "TEXAS MANUAL ON
UNIFORM TRAFFIC CONTROL DEVICES" AND AS DIRECTED.



RAILROAD CROSSINGS	
PROJ. REF. NO.	HIGHWAY
8	US 59 @ US 287-POLK CO.
17	SH 94/FRANK ST@ SL 287-ANGELINA CO.

EXCEPTIONS: NONE
EQUATIONS: NONE

RECOMMENDED FOR LETTING: _____

APPROVED FOR LETTING: _____

DocuSigned by:
Jennifer H. Adams
CE1DDBE07C00426... 3/19/2024

DocuSigned by:
Kelly O. Morris, P.E.
F044211639424B4... 3/19/2024

DISTRICT ADVANCE
TRANSPORTATION PLANNING DIRECTOR

DISTRICT ENGINEER

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 SPECIAL LABOR PROVISIONS
FOR ALL STATE CONSTRUCTION (SP000---008).

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LATEST REVISION: 5/19/2023
 DATE: 3/13/2024 10:46:14 AM
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THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH (#) HAVE BEEN SELECTED BY ME, OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

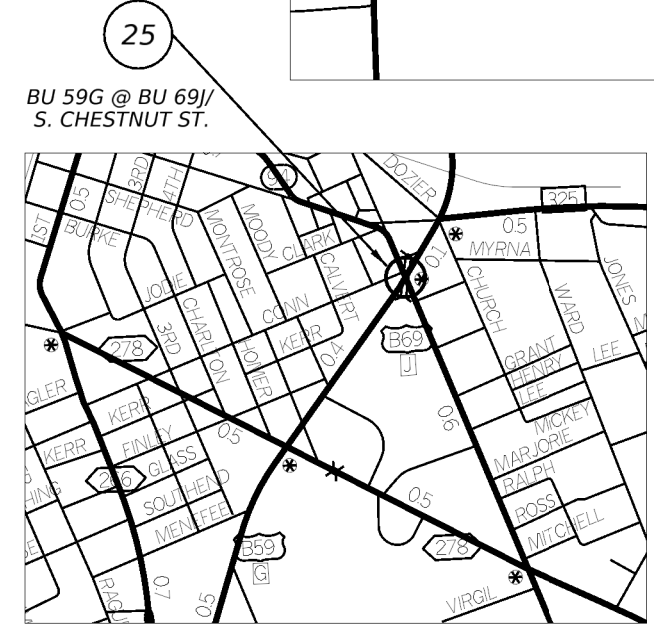
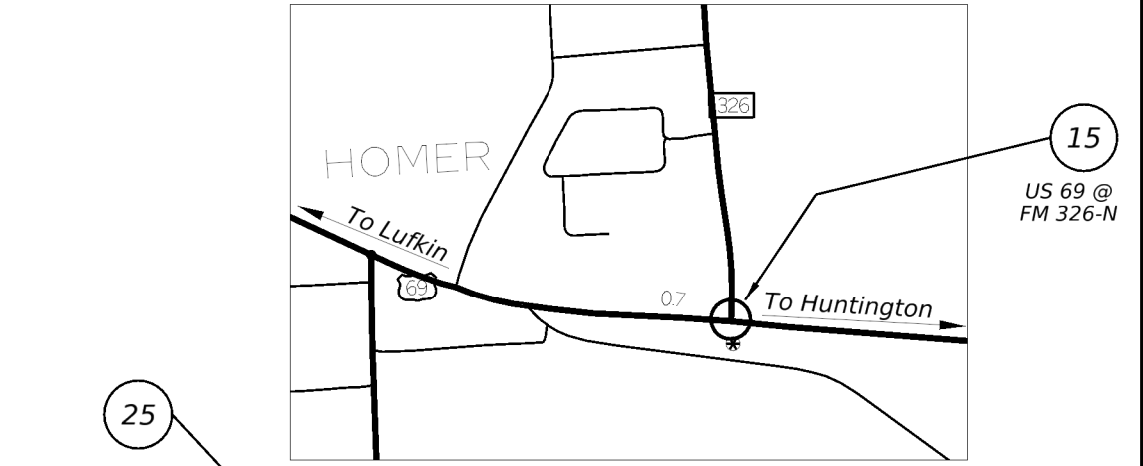
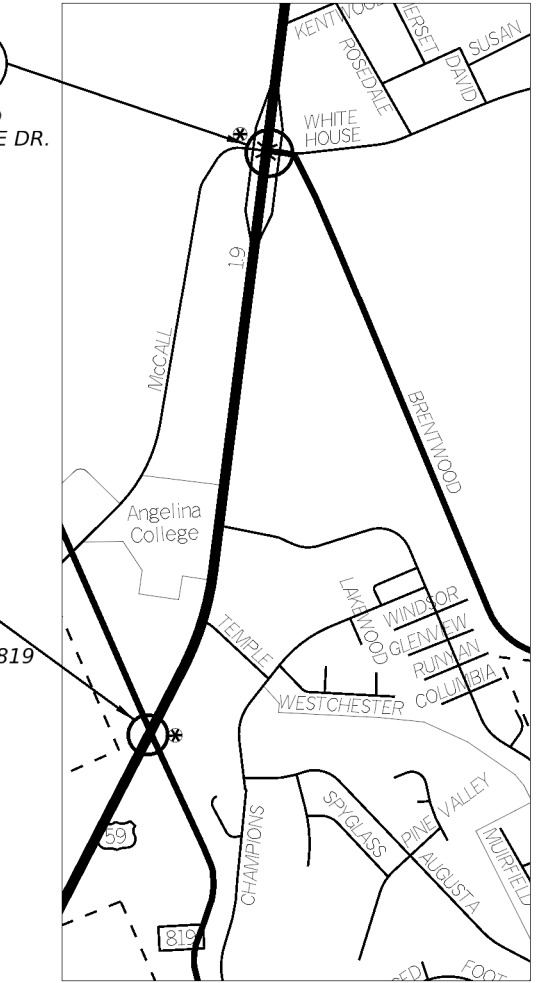
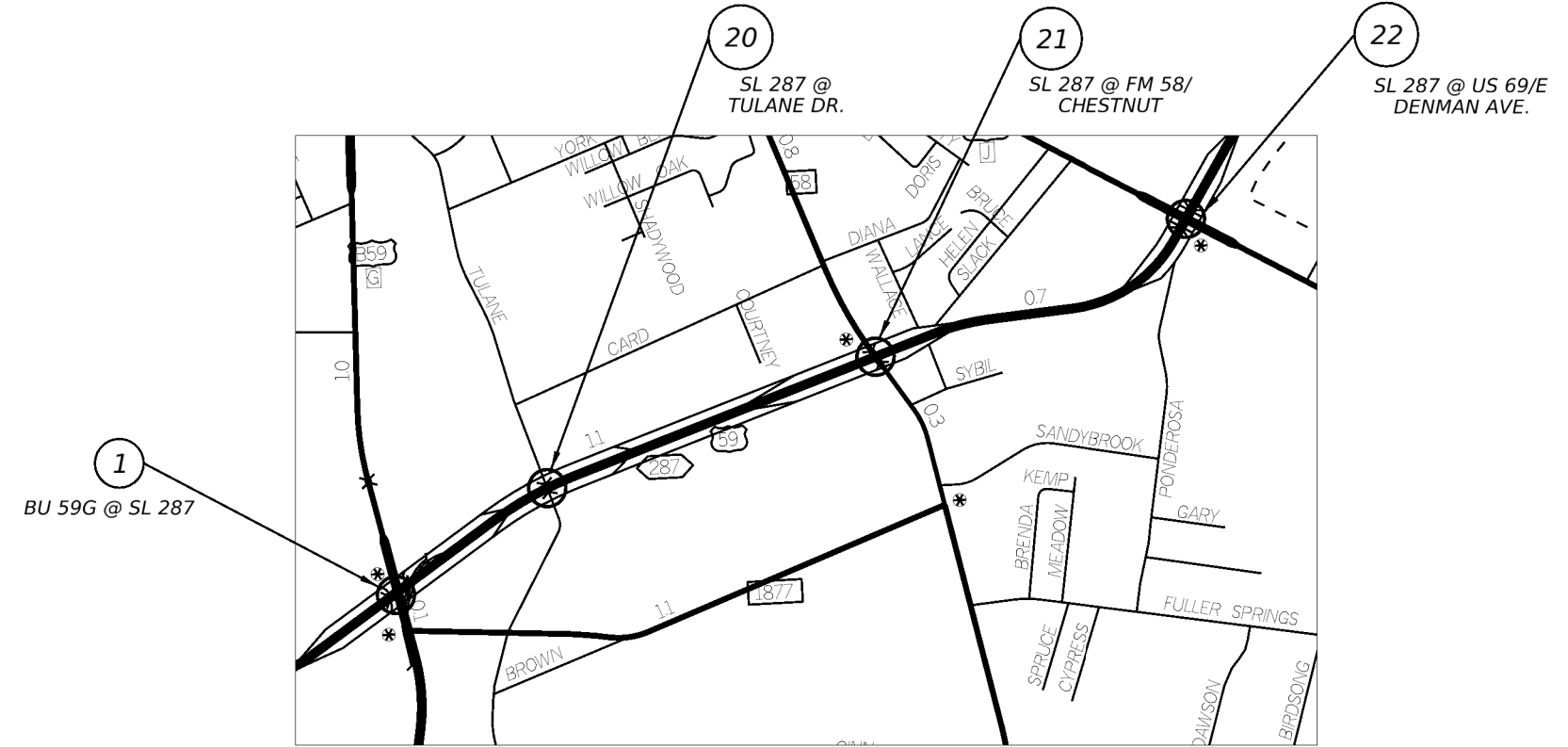
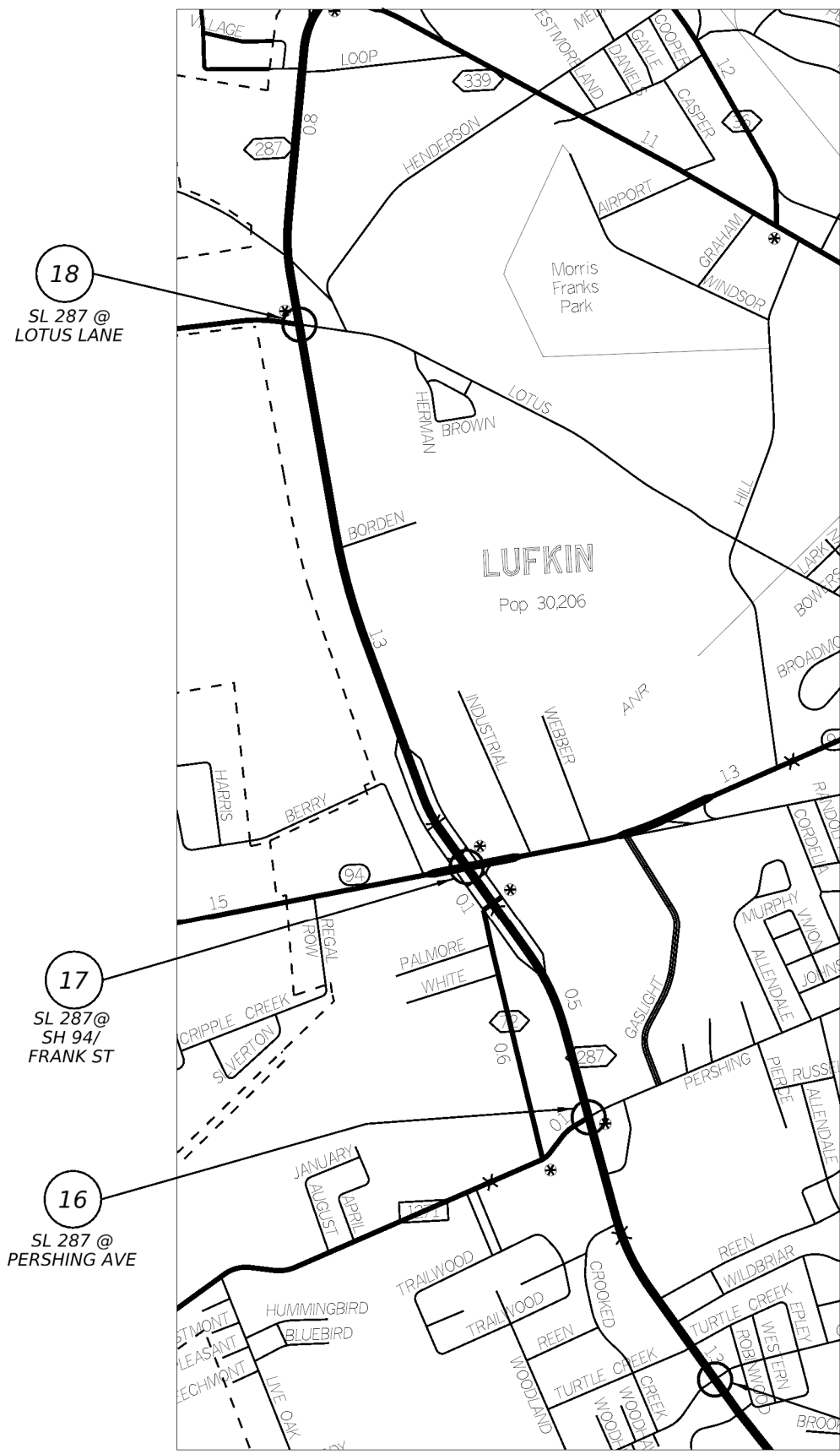
Seth D. Franks, P.E.
 SETH D. FRANKS, P.E. (NO. 126258)

03/18/2024
 DATE

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<p>INDEX OF SHEETS</p>			
CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY		SHEET NO.
LFK	ANGELINA		2

LUFKIN, ANGELINA COUNTY



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Texas Department of Transportation

LOCATION MAP

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST		COUNTY	SHEET NO.
LFK		ANGELINA	3

NACOGDOCHES, NACOGDOCHES COUNTY



- 27 SL 224 @ BU 59F/ NORTH ST
- 29 SL 224 @ FM 1275/ N UNIVERSITY DR
- 31 SL 224 @ FM 2609/ APPLEBY SAND RD
- 2 BU 59F/NORTH ST @ LLOYD STREET
- 3 FM 2609 @ FM 1411
- 30 SL 224 @ FM 1878/ E STARR AVE
- 28 SL 224 @ FM 1275/ S UNIVERSITY DR
- 26 SL 224 @ FM 2259

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LOCATION MAP

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST		COUNTY	SHEET NO.
LFK		ANGELINA	4

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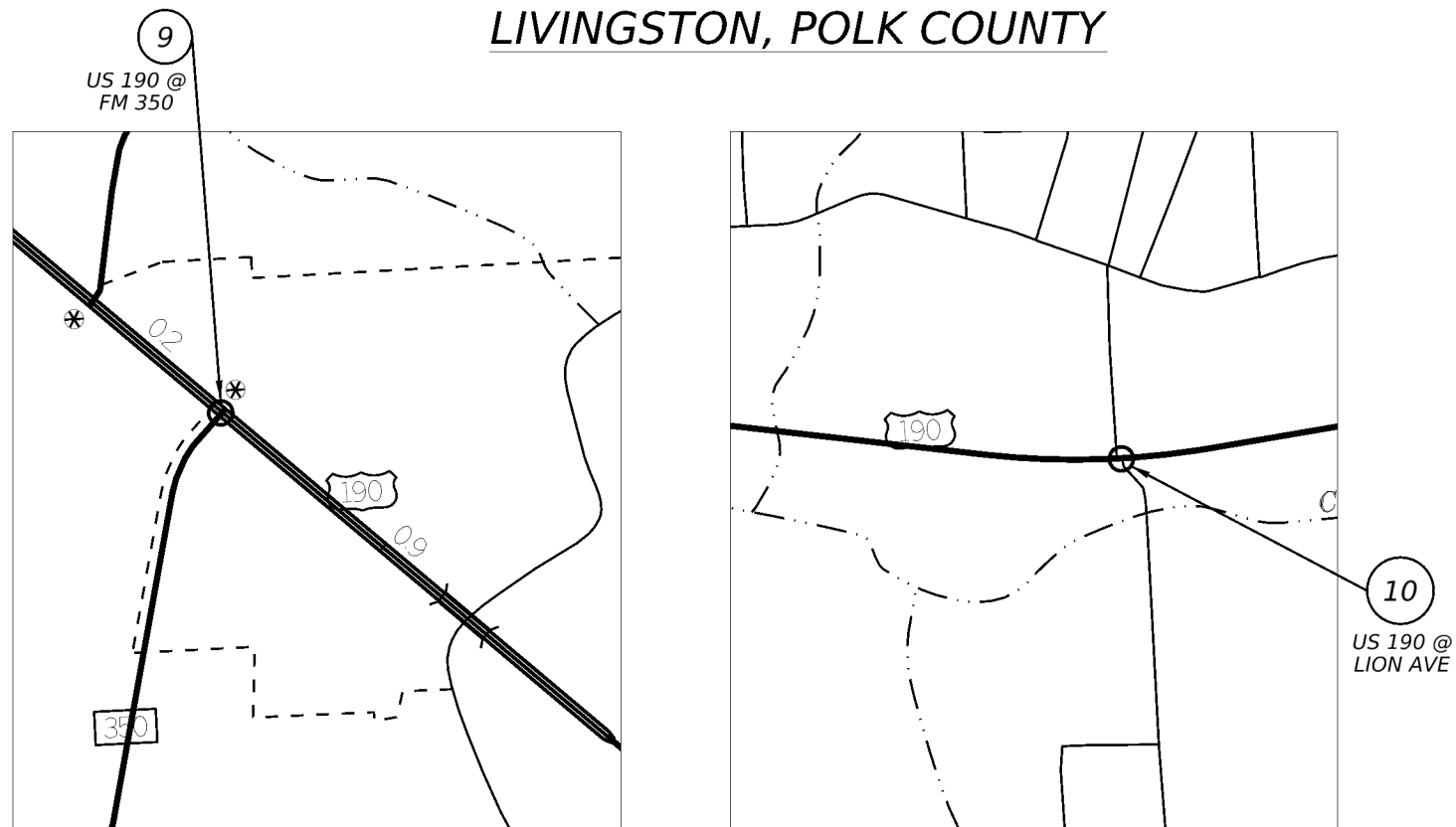
DIBOLL, ANGELINA COUNTY



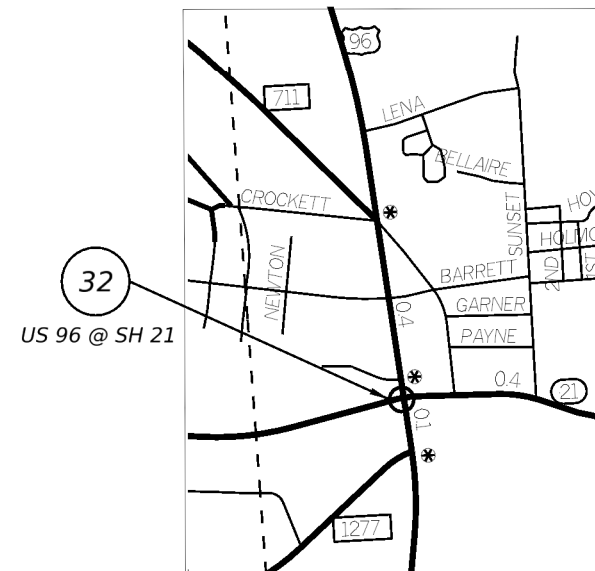
CORRIGAN, POLK COUNTY



LIVINGSTON, POLK COUNTY



SAN AUGUSTINE, SAN AUGUSTINE COUNTY



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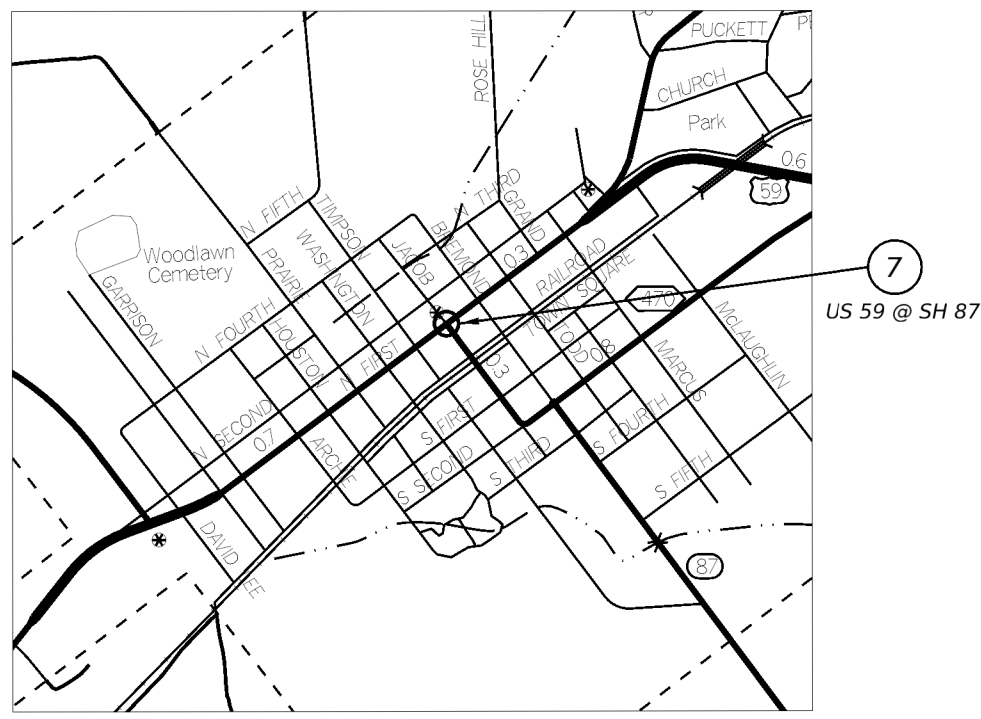
LOCATION MAP

SHEET 3 OF 4

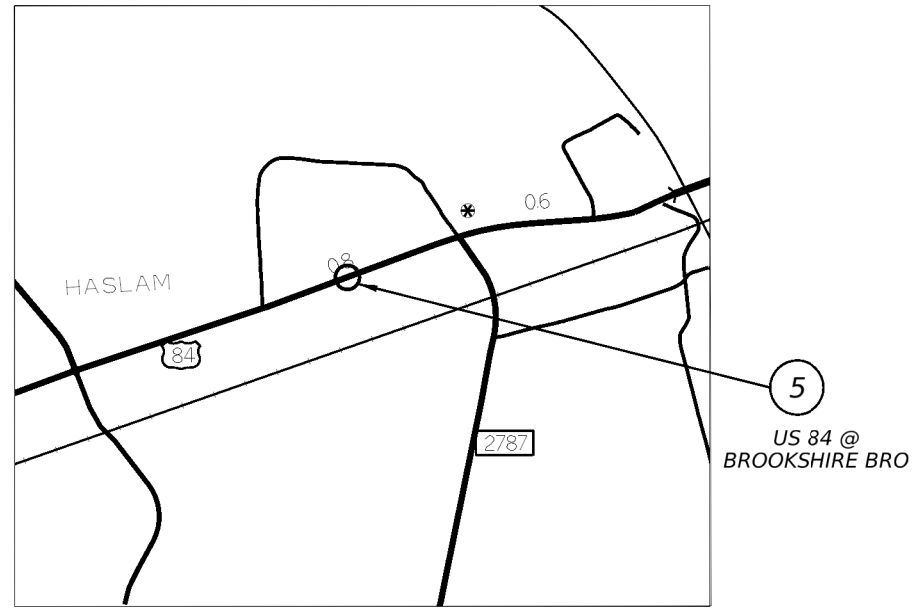
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0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	5	

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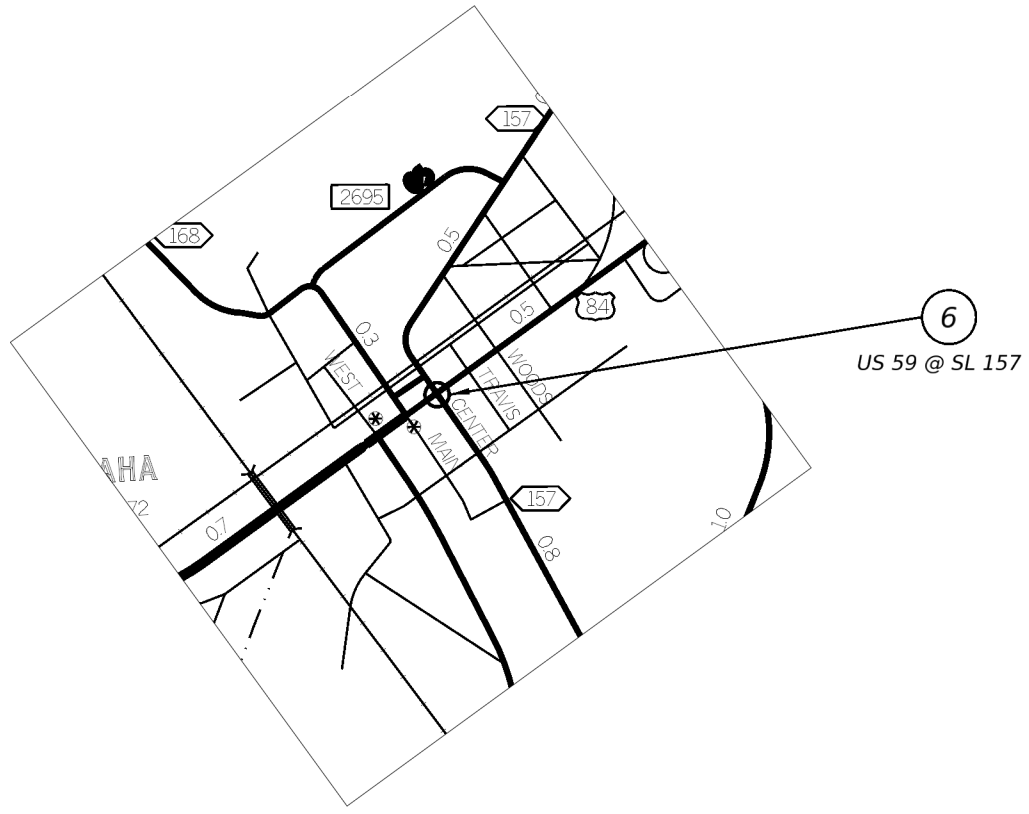
TIMPSON, SHELBY COUNTY



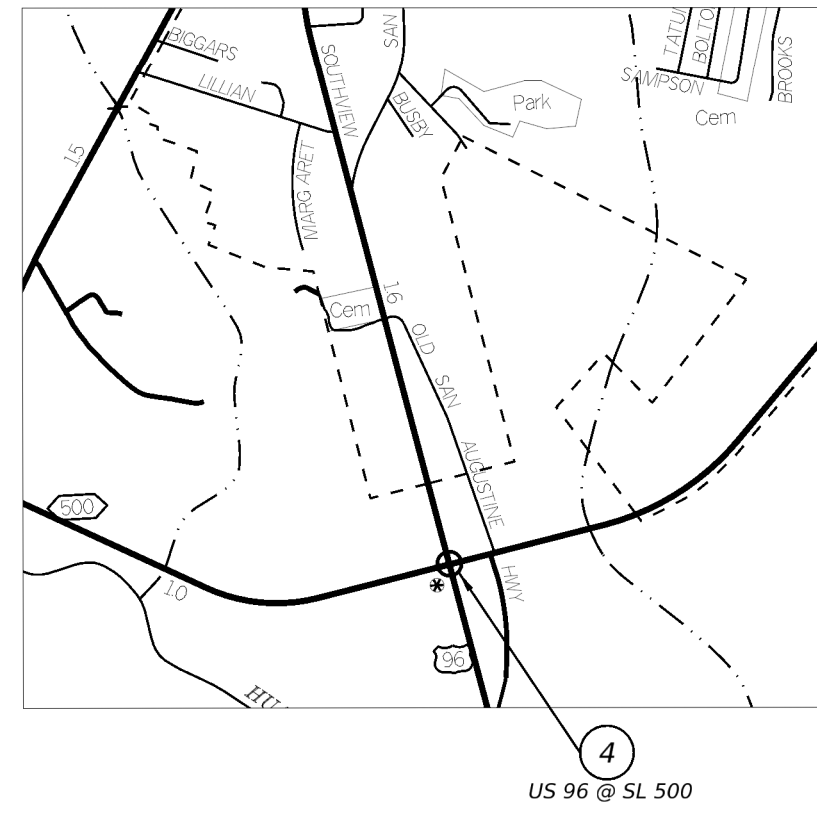
JOAQUIN, SHELBY COUNTY



TENAHA, SHELBY COUNTY



CENTER, SHELBY COUNTY



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Texas Department of Transportation

LOCATION MAP

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST		COUNTY	SHEET NO.
LFK		ANGELINA	6

GENERAL NOTES:

Existing regulatory, warning and guide signs within project limits are to remain visible to the traveling public at all times. If a sign must be repositioned during construction operations, move and install the sign to an approved location. Use care when working near existing signs and repair or replace signs damaged by work operations. All work involved repositioning existing signs will be subsidiary to various bid items.

Furnish materials and make repairs to the existing roadway at any location damaged by construction operations. This work shall be done in an approved manner and will be subsidiary to various bid items.

Ensure drainage structures and outfall channels constructed on this project are free of silt and debris at the time of project acceptance. Final clean out work will be subsidiary to various bid items.

Maintain adequate surface drainage throughout the project limits during all phases of construction.

Provide suitable access at all times to adjacent businesses, private property and side roads.

Remove dirt, silt, rocks, debris and other foreign matter that accumulates in structures due to the Contractor's operations as directed. Keep stream channels open at all times. This work will not be paid for directly, but will be subsidiary to pertinent Items.

Use approved safety and personal protection equipment (PPE) as directed. Non-compliance with the Safety, Qualification and Certification requirements will be ground for suspension of work.

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

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

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

All contractor questions will be reviewed by the Engineer. Contractor questions will be accepted through email, phone, and in person by the above individuals.

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.

The contractor's attention is directed to the EPIC sheet(s) included in this plan set for additional information regarding environmental permits, issues, and commitments.

Litter Pickup

Remove litter from the right of way in the limits of this project a maximum of 3 cycles per year as directed. Litter pickup will not be measured or paid for directly, but will be subsidiary to various bid items.

In addition to the requirements in Item 5, Section 11, Final Cleanup; remove litter from the right of way at locations where the Contractor may be required to mow. Litter pickup will not be measured or paid for directly, but will be subsidiary to various bid items.

The equipment used for litter pickup shall be approved.

Collect and dispose of all litter deposited by construction operations or the traveling public including cans, bottles, paper, plastic items, metal scraps, lumber, etc. from within the project right of way or as directed. Properly dispose of all collected litter. Do not dump or stockpile collected litter on State property.

For removal of large dead animals, contact nearest TxDOT maintenance section for disposal instructions. Do not bury animal carcasses on State property.

Item 5: Control of the Work

There are several existing sewer manholes within the right of way. Work around them with care to prevent damage to the sewer system.

In the event utility lines needing unforeseen adjustments are encountered during construction operations, alter operations and continue to prosecute the contract in such a manner that will allow utility adjustments to be made by others. An extension of working time may be granted for any delays caused by the utility adjustments if deemed necessary.

Item 7: Legal Relations and Responsibilities

Roadway closures during the following key dates and/or special events are prohibited and shall be verified by the contractor:

Angelina County	Lufkin	US 69 & SL 287	July	Fourth of July Celebration
Nacogdoches County	Nacogdoches	BU 7	June	Texas Blueberry Festival

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

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

In addition to lane closures, cease work three (3) days prior to hurricane landfall on or near the roadway that adversely impacts the flow of traffic and reduces the capacity of the highway during an evacuation. Prohibit the Contractor's, sub-contractors' or material suppliers' vehicle from entering or exiting the stream of traffic including material hauling and delivery, and mobilization or demobilization of equipment. When directed, this prohibition will include a reasonable time period for the evacuees to return to their point of origin.

In the event of the declaration of a hurricane watch, warning, other severe weather warning or national or state emergency that requires the roadways in the vicinity be used as evacuation routes, cease all work that requires the Contractor's, sub-contractors' or material suppliers' vehicles to enter the stream of traffic on these primary or secondary evacuation routes. This work includes material hauling and delivery, and mobilization or demobilization of equipment.

Work in this contract is required to be done on railroad property. Cooperate with the railroads and comply with all of their requirements including obtaining required insurance and training before performing work on railroad property.

This project consists of discrete construction projects separated a minimum ¼ mile by undisturbed areas: therefore they are treated as separate plans of development. These separate plans of development disturb less than 1 acre, however, the contractor shall place BMP's as directed. The disturbed area in the plans and the Contractor project specific locations (PSLs) within 1 mile of the project limits will further establish the authorization requirements for storm water discharges. If the total area disturbed shown in the plans and PSLs within 1 mi. of the project limits exceeds 1 acre, the engineer will develop an SWP3 site plan and post a small construction site notice for the construction activities.

Dispose of all vegetative matter and any other materials removed from State Right of Way in accordance with applicable environmental laws, rules, regulations and requirements.

Burning locations must be approved by the Engineer prior to beginning. Burning activities must be conducted in compliance with Texas Commission on Environmental Quality (TCEQ) regulations. Notify the Engineer when burning activities will take place.

In order to maintain compliance with Chapter 64 of the Texas Parks and Wildlife Code and Migratory Bird Treaty Act (MBTA), construction activities that may affect nests (i.e. tree removal, tree limbing, bridge work) shall be conducted outside of the nesting season (March 15 to September 15). In the event birds or active nests (eggs and/or nestlings present) are encountered, contact the engineer prior to conducting work.

Item 8: Prosecution and Progress

For this project, working days will be computed and charged in accordance with Item 8, Section 3.1.4 "Standard Workweek".

No lane closures will be allowed after Noon on Fridays or on days preceding National Holidays unless otherwise approved for work on US 59, US 69, & US 190.

Submit monthly progress schedules no later than the 20th calendar day of the month. Failure to comply with this deadline may result in the Engineer withholding progress (monthly) payments.

Provide a Critical Path Method (CPM) Construction Schedule unless otherwise approved.

A 90 day delay has been included as a convenience delay to allow the contractor additional time for mobilization and materials to be processed that are required to complete construction activities in the initial project phase.

Item 162: Sodding for Erosion Control

Provide Bermuda block sod unless St. Augustine is the prevailing grass cover at particular placement locations. Provide St. Augustine block sod at those locations.

Item 166: Fertilizer

Fertilize all seeded or sodded areas.

Item 168: Vegetative Watering

Equip water trucks with sprinkler systems capable of watering all of the entire seeded or sodded areas from the roadway.

Water all newly placed sodded or seeded areas at the time of installation. Thereafter, maintain the sodded or seeded areas in a well-watered condition, at no time allow the areas to dry to a condition where water stress is evident.

Item 416: Drilled Shaft Foundation

Contact appropriate utility companies to located underground utilities and storm sewers prior to drilling foundations. Use caution when working near utilities or existing storm sewers to prevent damage. Use One-Call for locates.

County: Angelina

Highway: Various

Control: 0911-00-139

Items 421: Hydraulic Cement Concrete

The engineer will provide curing facilities and strength testing equipment for acceptance testing at Lufkin Area Engineer Office, 1805 N. Timberland Dr., Lufkin, TX 75901.

Item 502: Barricades, Signs, and Traffic Handling

Traffic Control Plan (TCP):

Ensure the Contractor's Responsible Person (CRP) or their alternate for Barricades, Signs and Traffic Handling is available at all times and able to receive instructions from the Engineer or authorized Department representative. The CRP shall be a person that is usually at the project site during normal working hours.

For protection of the traveling public, direct traffic through the work area using signs, flaggers and other devices. Required signs are shown in the plans on the Barricade and Construction Standards and Traffic Control Plan Sheets. The latest edition of the "Texas Manual on Uniform Traffic Control Devices" shall also be used as a guide for handling traffic on this project.

Use "Do Not Pass" (R4-1) signs to mark the beginnings of roadway sections where passing is prohibited and use "Pass With Care" (R4-2) signs to mark the beginnings of roadway sections where passing is permitted. Install signs at the time signing for project limits are erected. Sign placement shall be verified and approved.

In general, restrict construction work to single lane widths. Control traffic in accordance with standard drawings WZ(BTS-1) "Traffic Signal Installation Typical Details"; WZ(BTS-2) "Traffic Signal Installation Barricades and Signs"; and, Part VI of the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways". Unless otherwise approved, use an advance warning, flashing arrow panel in addition to the necessary signs, barricades, or other traffic control devices at the work area.

Limit lane closures for multilane roads (4 or more lanes) to 2 mi. in length, unless otherwise approved.

Limit lane closures for 2 lane roads to 1 mi. in length, unless otherwise approved.

Lane closure lengths can exclude the end tapers.

Plan the sequence of work to minimize the time lane closures are in place. Install lane closures only where construction operations are anticipated to start within 1 hr. and limited to the amount of lane that can be reached by the construction activity within 2 hr. unless otherwise approved.

Provide channelizing devices to restrict traffic from traveling on the shoulders.

Provide flashing arrow panels and truck mounted attenuator to supplement required signs and devices for lane closures.

County: Angelina

Highway: Various

Control: 0911-00-139

Sheet 7B

Provide temporary rumble strips as shown on work zone rumble strip standards. Temporary rumble strips shall be a product listed on the Compliant Work Zone Traffic Control Devices and shall be a two-piece rumble strip that hinges in the middle.

Use a flashing arrow board in addition to the required signs to warn motorists of flaggers.

Use additional flaggers at roadway intersections to direct traffic entering the work area, when deemed necessary by the Engineer.

Open all traffic lanes to traffic at the close of work each day.

Provide one high-intensity yellow, rotating dome-light on all equipment such as distributors, spreader boxes, lay-down machines, dump trucks, rollers, backhoes, road graders, loaders, etc. within the work zone. Mount lights high enough to be visible from all directions and operating when the equipment is in the work zone. On all other equipment such as automobiles, trailers, etc. use emergency flashers while within the work zone.

Notify the Engineer prior to placing any materials or equipment on the right of way. Locate equipment, stockpiles or other materials not in use as far as possible from the driving lanes and in no case closer than 30 ft. unless otherwise authorized. Any equipment, stockpiles, or materials placed within 30 ft. of the driving lane must have adequate signs, barricades or other warning devices as approved. As a minimum place an 8 ft. wide TY III Barricade or barrels on the approach side of each site that is within 30 ft. of the driving lane. Use TY III Barricade or barrels for the site similarly on the departure side if the location is within 30 ft. of the opposing traffic lane.

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.

Texas Transportation Code 547.105 authorizes the use of warning lights to promote safety and provides an effective means of gaining the travelling public's attention as they drive in areas where construction crews are present. In order to influence the public to move over when high risk construction activities are taking place, minimize the utilization of blue warning lights. These lights must be used only while performing work on or near the travel lanes or shoulder where the travelling public encounters construction crews that are not protected by a standard work zone set up such as a lane closure, shoulder closure, or one-way traffic control. Refrain from leaving the warning lights engaged while travelling from one work location to another or while parked on the right of way away from the pavement or a work zone.

Install "Stay Alert" (G20-10T) and "OBEY" (R20-3T) signs at the beginning of the construction zone at "T" intersections as directed.

County: Angelina

Highway: Various

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All workers on TxDOT right-of-way shall wear reflective clothing meeting ANSI Class II requirements during the day and ANSI Class III requirements during the night.

Full barricade set up will be required at the following locations:

1. Reference #1 BU 59G @ SL 287
2. Reference #2 BU 59F @ Lloyd Street
3. Reference #3 FM 2609 @ FM 1411

All other locations will only require daily TCP set ups while working.

Item 618: Conduit

When conduit is laid in a trench or bored, minimum depth to the top of the conduit shall be 3 ft. Where obstructions prevent laying conduit at this depth, place conduit at the maximum depth possible.

Where a trench for laying conduit is cut through pavement, surfaced shoulder, median or driveway, replace the base and surfacing with similar materials equal in appearance and quality to the original construction. Replacing base and surfacing will be subsidiary to Item 618.

Place conduit under existing pavement by boring unless otherwise directed. Pits for boring shall not be closer than 2 ft. from edge of pavement unless otherwise approved. Water jetting will not be permitted. At the close of work each day, cover all open pits and barricade for safety.

When boring is used for under-pavement conduit installations, maximum allowable overcut shall be 1 in. diameter.

Use of a pneumatically driven device for punching holes beneath pavement (commonly known as a "missile") will not be permitted on this project.

All underground conduit bends of 45° or more in PVC conduit systems, including bends into ground boxes, shall be made with rigid metal conduit. Where rigid metal conduit is exposed at any point and where rigid metal conduit extends into ground boxes, bond the metal conduit to the grounding conduction with grounding type bushings or by other approved UL listed grounding connectors. Rigid metal bends will not be paid for separately but will be incidental to the PVC conduit system.

The location of conduits is diagrammatic only and may be shifted to accommodate field conditions as directed.

Item 620: Electrical Conductors

Provide breakaway electrical connectors for breakaway poles. Use Bussman HEBW, Littlefuse LEB, Ferraz-Shawmut FEB, or equal on underground conductors. For grounded conductors, use Bussman Het, Littlefuse LEB, Ferraz-Shawmut FEB, or equal. These breakaway connectors

County: Angelina

Highway: Various

Sheet 7C

Control: 0911-00-139

have a white colored marking and permanently installed solid neutral. The splice must be a fused breakaway connector as described elsewhere in the plans, or as directed.

Do not use non-certified person to perform electrical work. Article 7.18., "Electrical Requirements" for additional details.

Item 624: Ground Boxes

Location and estimated number of ground boxes are diagrammatic only. The location and number of ground boxes may vary to accommodate field conditions as directed.

Item 628: Electrical Services

Comply with local standards and practices for proper installation.

Cooperate with the utility companies to remove and rearrange utilities when necessary to avoid services interruptions and duplicate work.

Existing service will need to be de-energized and terminated at the source once the proposed signalized intersection is fully operational. Coordinate with utility and property owners to establish location and source of service.

Provide 6" black adhesive alpha-numeric labels to be placed on Electrical Services as directed. Labels shall be made from materials designated for outdoor use and capable of withstanding all weather conditions. Removal and placing labels will be considered incidental work and will be subsidiary to the various bid items.

Item 656: Foundations for Traffic Control Devices

Note and heed all utility warnings before digging in the vicinity of underground utilities.

Before excavating for foundations, take adequate precautions, by probing or uncovering by hand, to prevent damage to storm sewers and public or private utilities. Locations of utility lines and cables shown in the plans are approximate. Other lines and cables may have been installed since completion of these plans.

Item 668: Pedestrian Detectors

Furnish and install new pedestrian signal units and materials as directed. Equipment and materials must meet requirements of DMS-1132, "Accessible Pedestrian Signal (APS)". This equipment must be compatible with the controller assembly equipment and setup. Do not order any equipment or materials and commence work for the installation without the approval of the engineer.

County: Angelina

Highway: Various

Control: 0911-00-139

Item 680: Highway Traffic Signals

Provide for properly functioning traffic signals to remain in full operation for the duration of this project. Existing traffic signal devices may be turned off only for brief periods of time to allow for installation of new devices. Power may be turned off only during off-peak periods from 9:00 A.M. until 11:00 A.M. and 1:00 P.M. until 3:00 P.M. Provide temporary signing, flaggers or additional traffic control as directed so that safe traffic movement through the intersection is maintained.

The Department will provide the complete controller assembly. Install the controller assembly on the foundation, using anchor bolts and template supplied by the Engineer. Connect all field wiring to the controller assembly back panel.

Any work requiring lane closures will need to be performed at night for Reference #1.

Item 682: Vehicle and Pedestrian Signal Heads

Use polycarbonate traffic signal heads.

Cover all signal heads securely with burlap and keep covered until placed in operation.

Provide necessary mounting hardware to insure proper mounting of all signal heads.

Provide Articulating Brackets when required.

Alternate signal head mounting hardware may be used when approved.

Mount all signal heads so they hang level and plumb.

Use stainless steel for miscellaneous hardware not otherwise specified unless approved in writing.

Item 684: Traffic Signal Cables

Identify each cable as shown in the plans (Cable 1, etc.) with permanent marking labels (Panduit Type PLM standard single marker tie, Thomas and Betts TY 548M, or equivalent) at each ground box, pole base and controller.

Terminate all wiring from each signal head in the terminal block in the pole base where such terminal blocks are provided by the manufacturer. Otherwise, wire runs shall be continuous to the controller.

Furnish a written summary of the wire tests. This summary shall indicate a description of each wire run, length, and test readings for each test procedure. Additional information such as make, model and type of testing equipment used for each test and the name and title of the individual who performed the tests must be included. Certify the test results as being true and correct prior to submission to the Engineer. Upon detection of a failed wire run test, forward documentation of the failed test to the Engineer and replace the wire run.

County: Angelina

Highway: Various

Control: 0911-00-139

Sheet 7D

Item 687: Pedestal Pole Assemblies

All pedestrian signal heads and push buttons shall be mounted in accordance with the current TMUTCD and applicable ADA requirements.

All pedestrian push buttons on a single pole shall be mounted at the same height.

All pedestrian signal heads on a single pole shall be mounted at the same height.

Item 6001: Portable Changeable Message Sign

Six (6) Portable changeable message signs will be required for this project. The message signs will be paid for once, and the contractor will be responsible for transporting the message sign if necessary. Transporting the message sign will be subsidiary to Item 6001. Message signs will need to be installed two weeks in advance of new signal activation.

Item 6058: BBU System

Backup battery unit shall include an external generator plug.

Item 6185: Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

One (1) TMA (stationary) will be required for this project. The contractor will be responsible for determining if multiple operations will be ongoing at the same time to determine the total number of TMAs needed for the project.



CONTROLLING PROJECT ID 0911-00-139

DISTRICT Lufkin
HIGHWAY Various

COUNTY Angelina

Estimate & Quantity Sheet

CONTROL SECTION JOB				0911-00-139		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00196809			
COUNTY				Angelina			
HIGHWAY				Various			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	162-6002	BLOCK SODDING	SY	4.000		4.000	
	168-6001	VEGETATIVE WATERING	MG	0.300		0.300	
	416-6030	DRILL SHAFT (TRF SIG POLE) (24 IN)	LF	12.000		12.000	
	416-6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	12.000		12.000	
	416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	86.000		86.000	
	416-6034	DRILL SHAFT (TRF SIG POLE) (48 IN)	LF	22.000		22.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	12.000		12.000	
	618-6058	CONDT (PVC) (SCH 80) (4")	LF	640.000		640.000	
	618-6059	CONDT (PVC) (SCH 80) (4") (BORE)	LF	2,125.000		2,125.000	
	618-6078	CONDT (RM) (4")	LF	110.000		110.000	
	620-6007	ELEC CONDR (NO.8) BARE	LF	1,816.000		1,816.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	75.000		75.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	150.000		150.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA	32.000		32.000	
	628-6145	ELC SRV TY D 120/240 060(NS)SS(E)SP(O)	EA	3.000		3.000	
	636-6001	ALUMINUM SIGNS (TY A)	SF	87.000		87.000	
	680-6004	REMOVING TRAFFIC SIGNALS	EA	3.000		3.000	
	680-6005	INS HY TRF SIG (DPT SUP CNT & CAB)(ISO)	EA	3.000		3.000	
	682-6001	VEH SIG SEC (12")LED(GRN)	EA	25.000		25.000	
	682-6002	VEH SIG SEC (12")LED(GRN ARW)	EA	13.000		13.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	28.000		28.000	
	682-6004	VEH SIG SEC (12")LED(YEL ARW)	EA	6.000		6.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA	28.000		28.000	
	682-6006	VEH SIG SEC (12")LED(RED ARW)	EA	3.000		3.000	
	682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA	4.000		4.000	
	682-6049	BACKPLATE W/REFL BRDR(4 SEC)	EA	4.000		4.000	
	682-6050	BACKPLATE W/REFL BRDR(5 SEC)	EA	3.000		3.000	
	682-6060	BACKPLATE W/REFL BRDR(3 SEC)	EA	24.000		24.000	
	684-6028	TRF SIG CBL (TY A)(14 AWG)(2 CONDR)	LF	309.000		309.000	
	684-6030	TRF SIG CBL (TY A)(14 AWG)(4 CONDR)	LF	4,484.000		4,484.000	
	684-6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	308.000		308.000	
	686-6033	INS TRF SIG PL AM(S)1 ARM(32')	EA	1.000		1.000	
	686-6049	INS TRF SIG PL AM(S)1 ARM(48')	EA	1.000		1.000	
	686-6113	INS TRF SIG PL AM(S)2 ARM(36-24')	EA	2.000		2.000	
	686-6145	INS TRF SIG PL AM(S)2 ARM(40-36')	EA	2.000		2.000	
	686-6165	INS TRF SIG PL AM(S)2 ARM(44-36')	EA	1.000		1.000	



DISTRICT	COUNTY	CCSJ	SHEET
Lufkin	Angelina	0911-00-139	8



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0911-00-139

DISTRICT Lufkin
HIGHWAY Various

COUNTY Angelina

CONTROL SECTION JOB				0911-00-139		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00196809			
COUNTY				Angelina			
HIGHWAY				Various			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	686-6185	INS TRF SIG PL AM(S)2 ARM(50-36')	EA	1.000		1.000	
	687-6001	PED POLE ASSEMBLY	EA	2.000		2.000	
	688-6001	PED DETECT PUSH BUTTON (APS)	EA	4.000		4.000	
	690-6033	REMOVAL OF TRAFFIC SIGNAL POLE FND	LF	11.000		11.000	
	690-6086	REMOVE VID IMAGE VEH DET SYS (VIVDS)	EA	28.000		28.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	6.000		6.000	
	6058-6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	3.000		3.000	
	6083-6001	VIDEO IMAGING AND RAD VEH DETECTION SYS	EA	31.000		31.000	
	6089-6002	CAT 5 ETHERNET CABLE	LF	30,934.000		30,934.000	
	6185-6002	TMA (STATIONARY)	DAY	170.000		170.000	
	08	CONTRACTOR FORCE ACCOUNT RAILROAD FLAGGING (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	



DISTRICT	COUNTY	CCSJ	SHEET
Lufkin	Angelina	0911-00-139	8A

CK
 DW
 CK
 DW

SUMMARY OF SIGNAL ITEMS

ITEM	416	416	416	416	618	618	618	620	620	620					
BID CODE	6030	6031	6032	6034	6058	6059	6078	6007	6009	6010					
DESCRIPTION	DRILL SHAFT (TRF SIG POLE)(24 IN)	DRILL SHAFT (TRF SIG POLE)(30 IN)	DRILL SHAFT (TRF SIG POLE)(36 IN)	DRILL SHAFT (TRF SIG POLE) (48 IN)	CONDT (PVC)(SCH 80)(4")	CONDT (PVC)(SCH 80)(4")BORE	CONDT (RM) (4")	ELEC CONDR (NO. 8) BARE	ELEC CONDR (NO. 6) BARE	ELEC CONDR (NO. 6) INSULATED					
PROJ. REF. NO.	COUNTY	CITY	PROJECT LOCATION			LF	LF	LF	LF	LF	LF				
1	ANGELINA	LUFKIN	BU 59G @ SL 287			12	12	30	22	230	575	110	1038	60	120
2	NACOGDOCHES	NACOGDOCHES	BU 59F/NORTH ST @ LLOYD STREET			12		28		80	120		353	5	10
3	NACOGDOCHES	NACOGDOCHES	FM 2609 @ FM 1411					28		70	165		425	10	20
PROJECT TOTALS					12	12	86	22	380	860	110	1816	75	150	

NOTES:
 * SIGNAL CONTROLLER AND CABINET WILL BE FURNISHED BY THE DEPARTMENT AND INSTALLED BY THE CONTRACTOR AS DIRECTED.
 ** FOR CONTRACTOR'S INFORMATION ONLY, SUBSIDIARY TO ITEM 680.
 *** SIGN MATERIAL WILL BE PAID FOR UNDER ITEM 636 AND SIGN MOUNTING WILL BE INCLUDED FOR PAYMENT UNDER ITEM 680.
 && QUANTITIES INCLUDE SIGNAL CABLE FOR TRAFFIC POLES AND MAST ARMS.

SUMMARY OF SIGNAL ITEMS (CONTINUED)

ITEM	624	628	680	680	682	682	682	682	682	682					
BID CODE	6010	6145	6004	6005	6001	6002	6003	6004	6005	6006					
DESCRIPTION	GROUND BOX TY D (162922) W/APRON	ELC SRV TY D 120/240 060(NS)SS(E) SP(O)	REMOVING TRAFFIC SIGNALS	INS HY TRF SIG (DPT SUP CNT & CAB)(ISO)	VEH SIG SEC (12")LED (GRN)	VEH SIG SEC (12")LED (GRN ARW)	VEH SIG SEC (12")LED(YEL)	VEH SIG SEC (12")LED (YEL ARW)	VEH SIG SEC (12")LED(RED)	VEH SIG SEC (12")LED (RED ARW)					
PROJ. REF. NO.	COUNTY	CITY	PROJECT LOCATION			EA	EA	EA	EA	EA	EA				
1	ANGELINA	LUFKIN	BU 59G @ SL 287			10	1	1	1	9	8	12	3	12	3
2	NACOGDOCHES	NACOGDOCHES	BU 59F/NORTH ST @ LLOYD STREET			3	1	1	1	8	2	8	2	8	
3	NACOGDOCHES	NACOGDOCHES	FM 2609 @ FM 1411			3	1	1	1	8	3	8	1	8	
PROJECT TOTALS					16	3	3	3	25	13	28	6	28	3	

SUMMARY OF SIGNAL ITEMS (CONTINUED)

ITEM	682	682	682	682	684	684	684	686	686	686				
BID CODE	6018	6049	6050	6060	6028	6030	6033	6033	6049	6113				
DESCRIPTION	PED SIG SEC (LED) (COUNTDOWN)	BACKPLATE W/ REFL BRDR (4 SEC)	BACKPLATE W/ REFL BRDR (5 SEC)	BACKPLATE W/ REFL BRDR (3 SEC)	TRF SIG CBL (TY A)(14 AWG) (2 CONDR)	TRF SIG CBL (TY A)(14 AWG) (4 CONDR)	TRF SIG CBL (TY A)(14 AWG) (7 CONDR)	INS TRF SIG PL AM(S)1 ARM(32')	INS TRF SIG PL AM(S)1 ARM(48')	INS TRF SIG PL AM(S)2 ARM(36-24')				
PROJ. REF. NO.	COUNTY	CITY	PROJECT LOCATION			EA	EA	EA	EA	EA	EA			
1	ANGELINA	LUFKIN	BU 59G @ SL 287			4	2	13		1	1			
2	NACOGDOCHES	NACOGDOCHES	BU 59F/NORTH ST @ LLOYD STREET			4		2	6	309	813	242		2
3	NACOGDOCHES	NACOGDOCHES	FM 2609 @ FM 1411				2	1	5		844	66		
PROJECT TOTALS					4	4	3	24	309	4484	308	1	1	2

SUMMARY OF SIGNAL ITEMS (CONTINUED)

ITEM	686	686	686	687	688	688	690	6058	6083	6089				
BID CODE	6145	6165	6185	6001	6001	6003	6033	6001	6001	6002				
DESCRIPTION	INS TRF SIG PL AM(S)2 ARM(40-36')	INS TRF SIG PL AM(S)2 ARM(44-36')	INS TRF SIG PL AM(S)2 ARM(50-36')	PED POLE ASSEMBLY	PED DETECT PUSH BUTTON (APS)	PED DETECTOR CONTROLLER UNIT	REMOVAL OF TRAFFIC SIGNAL POLE FND	BBU SYSTEM (EXTERNAL BATT CABINET)	VIDEO IMAGING AND RAD VEH DETECTION SYS	CAT 5 ETHERNET CABLE				
PROJ. REF. NO.	COUNTY	CITY	PROJECT LOCATION			EA	EA	EA	EA	EA	EA			
1	ANGELINA	LUFKIN	BU 59G @ SL 287			2	1	1		1	1			
2	NACOGDOCHES	NACOGDOCHES	BU 59F/NORTH ST @ LLOYD STREET				2	4	1	11	1			
3	NACOGDOCHES	NACOGDOCHES	FM 2609 @ FM 1411				2				1			
PROJECT TOTALS					2	1	1	2	4	1	11	3	3	3513

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QUANTITY SUMMARIES

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST		COUNTY	SHEET NO.
LFK		ANGELINA	9

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SUMMARY OF TRAFFIC SIGNAL CAMERA UPGRADES

PROJ. REF. NO.	COUNTY	CITY	PROJECT LOCATION	ITEM	618	618	624	690	6083	6089
				BID CODE	6058	6059	6010	6086	6001	6002
DESCRIPTION				CONDT (PVC)(SCH 80) (4")	CONDT (PVC)(SCH 80)(4") BORE	GROUND BOX TY D (162922) W/APRON	REMOVE VID IMAGE VEH DET SYS (VIVDS)	VIDEO IMAGING AND RAD VEH DETECTION SYS	CAT 5 ETHERNET CABLE	
				LF	LF	EA	EA	EA	LF	
4	SHELBY	CENTER	US 96 @ SL 500					1	1	1,031
5	SHELBY	JOAQUIN	US 84 @ BROOKSHIRE BRO					1	1	641
6	SHELBY	TENAHA	US 59 @ SL 157					1	1	701
7	SHELBY	TIMPSON	US 59 @ SH 87		80	2		1	1	571
8	POLK	CORRIGAN	US 59 @ US 287					1	1	729
9	POLK	LIVINGSTON	US 190 @ FM 350					1	1	901
10	POLK	LIVINGSTON	US 190 @ LION AVE					1	1	998
11	ANGELINA	DIBOLL	US 59 @ FM 1818					1	1	654
12	ANGELINA	DIBOLL	US 59 @ JUDD					1	1	716
13	ANGELINA	DIBOLL	US 59 @ LUMBERJACK DR	50	240	5		1	1	773
14	ANGELINA	LUFKIN	US 59 @ FM 819	75	190			1	1	1,060
15	ANGELINA	LUFKIN	US 69 @ FM 326N					1	1	617
16	ANGELINA	LUFKIN	SL 287 @ PERSHING AVE					1	1	830
17	ANGELINA	LUFKIN	SL 287 @ SH 94/FRANK ST					1	1	914
18	ANGELINA	LUFKIN	SL 287 @ LOTUS LANE					1	1	450
19	ANGELINA	LUFKIN	SL 287 @ COPELAND ST					1	1	516
20	ANGELINA	LUFKIN	SL 287 @ TULANE DR.		55			1	1	1,365
21	ANGELINA	LUFKIN	SL 287 @ FM 58/S CHESTNUT ST					1	1	2,039
22	ANGELINA	LUFKIN	SL 287 @ US 69S/E DENMAN AVE					1	1	1,515
23	ANGELINA	LUFKIN	US 59 @ WHITEHOUSE DR					1	1	2,435
24	OMIT							0	0	0
25	ANGELINA	LUFKIN	BU 59G @ BU 69J/ S CHESTNUT ST			7		1	1	1,430
26	NACOGDOCHES	NACOGDOCHES	SL 224 @ FM 2259	10	60			1	1	747
27	NACOGDOCHES	NACOGDOCHES	SL 224 @ BU 59F/NORTH ST					1	1	864
28	NACOGDOCHES	NACOGDOCHES	SL 224 @ FM 1275/ S UNIVERSITY DR					1	1	834
29	NACOGDOCHES	NACOGDOCHES	SL 224 @ FM 1275/N UNIVERSITY DR	125				1	1	805
30	NACOGDOCHES	NACOGDOCHES	SL 224 @ FM 1878/ E STARR AVE			2		1	1	1,320
31	NACOGDOCHES	NACOGDOCHES	SL 224 @ FM 2609/ APPLEBY SAND RD					1	1	923
32	SAN AUGUSTINE	SAN AUGUSTINE	US 96 @ SH 21		165			1	1	1,042
PROJECT TOTALS				260	1,265	16	28	28	28	27,421

NOTES:
 * SIGNAL CONTROLLER AND CABINET WILL BE FURNISHED BY THE DEPARTMENT AND INSTALLED BY THE CONTRACTOR AS DIRECTED.
 ** FOR CONTRACTOR'S INFORMATION ONLY, SUBSIDIARY TO ITEM 680.
 *** SIGN MATERIAL WILL BE PAID FOR UNDER ITEM 636 AND SIGN MOUNTING WILL BE INCLUDED FOR PAYMENT UNDER ITEM 680.
 && QUANTITIES INCLUDE SIGNAL CABLE FOR TRAFFIC POLES AND MAST ARMS.

EROSION CONTROL SUMMARY

PROJECT LOCATION	ITEM	162	168
	BID CODE	6002	6001
DESCRIPTION	BLOCK SODDING	VEGETATIVE	10 GAL/SY/2 APPS
	SY	MG	
1	BU 59G @ SL 287	1	0.1
2	BU 59F/NORTH ST @ LLOYD STREET	1	0.1
3	FM 2609 @ FM 1411	2	0.1
PROJECT TOTALS		4	0.3

SUMMARY OF SIGNS ITEMS

DESCRIPTION	ITEM	636
	BID CODE	6001

	ALUMINUM SIGNS(TY A)	
PROJECT LOCATION	SF	
1	BU 59G @ SL 287	33
2	BU 59F/NORTH ST @ LLOYD STREET	17
3	FM 2609 @ FM 1411	37
PROJECT TOTALS		87.00

SUMMARY OF TMA & TRAFFIC CONTROL

DESCRIPTION	ITEM	6001	6185
	BID CODE	6002	6002
	PORTABLE CHANGEABLE MESSAGE	TMA (STATIONARY)	
PROJECT LOCATION	EA	DAY	
CSJ 0911-00-139	6	170	
PROJECT TOTALS		6	170

EROSION CONTROL SUMMARY NOTES
 1. LOCATIONS AND TYPES OF BMPs MAY REQUIRE ADJUSTMENTS PRIOR TO OR AFTER PLACEMENT AS DIRECTED BY THE ENGINEER. ADJUSTMENTS SHOULD BE MADE TO ENSURE BMPs ARE WORKING EFFECTIVELY. NOTIFY THE ENGINEER PRIOR TO MAKE ADJUSTMENTS.

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 Texas Department of Transportation

QUANTITY SUMMARIES

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	10	

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

WORKER SAFETY NOTES:

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

<p>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov</p>
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



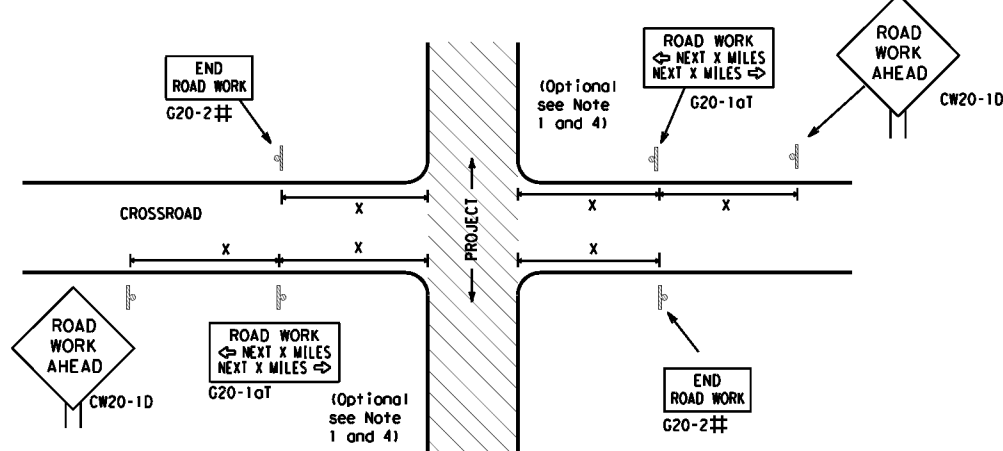
**BARRICADE AND CONSTRUCTION
GENERAL NOTES
AND REQUIREMENTS**

BC (1) - 21

FILE: bc-21.dgn	DWG: TxDOT	CHK: TxDOT	DNW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
	0911	00	139	VARIOUS
REVISIONS				
4-03 7-13				
9-07 8-14				
5-10 5-21				
	DIST	COUNTY	SHEET NO.	
	LFK	ANGELINA	11	

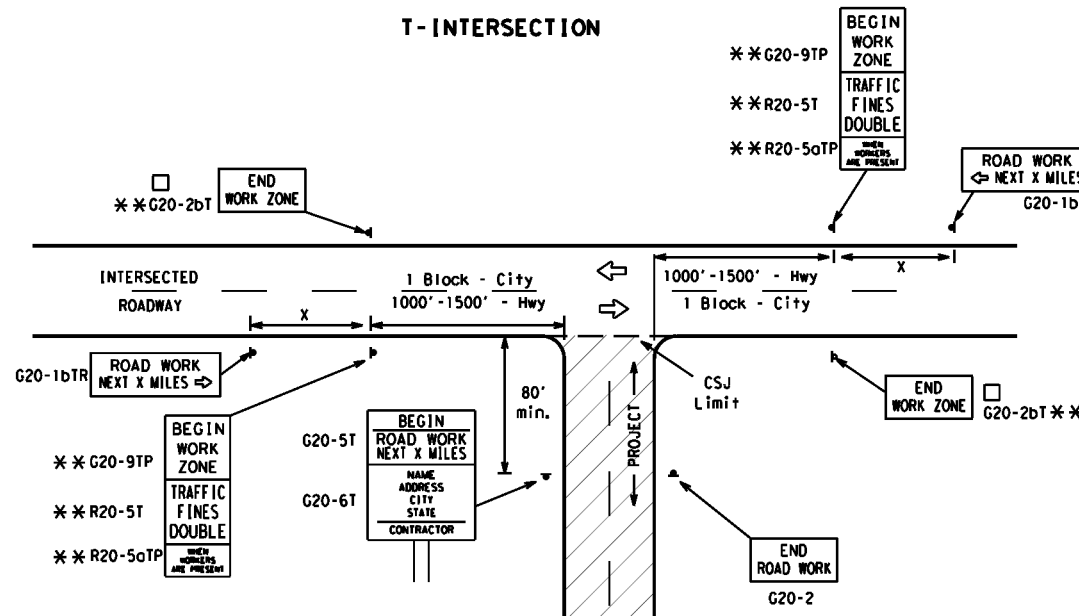
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TYPICAL LOCATION OF CROSSROAD SIGNS



- ## May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)
- 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.
 - 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.
 - 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.
 - 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.
 - Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
 - 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

- 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.
- 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
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 ²
			65	700 ²
			70	800 ²
			75	900 ²
			80	1000 ²
			*	* ³

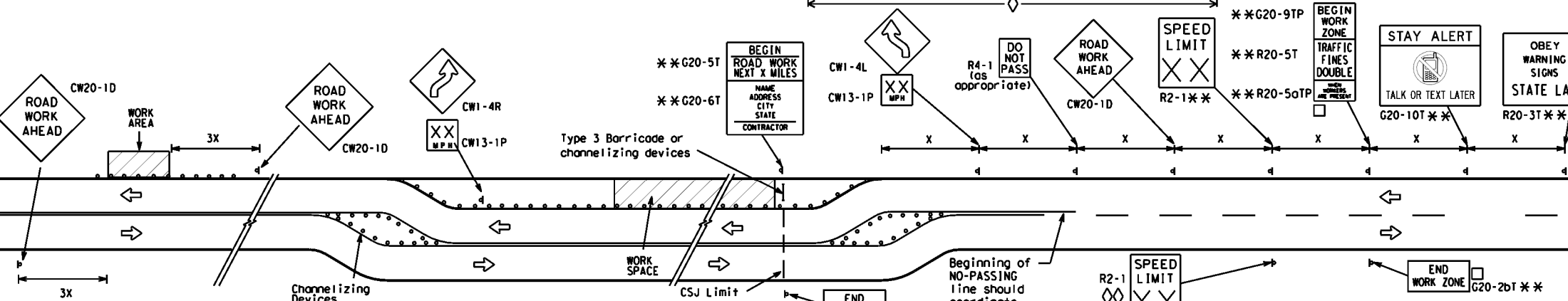
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

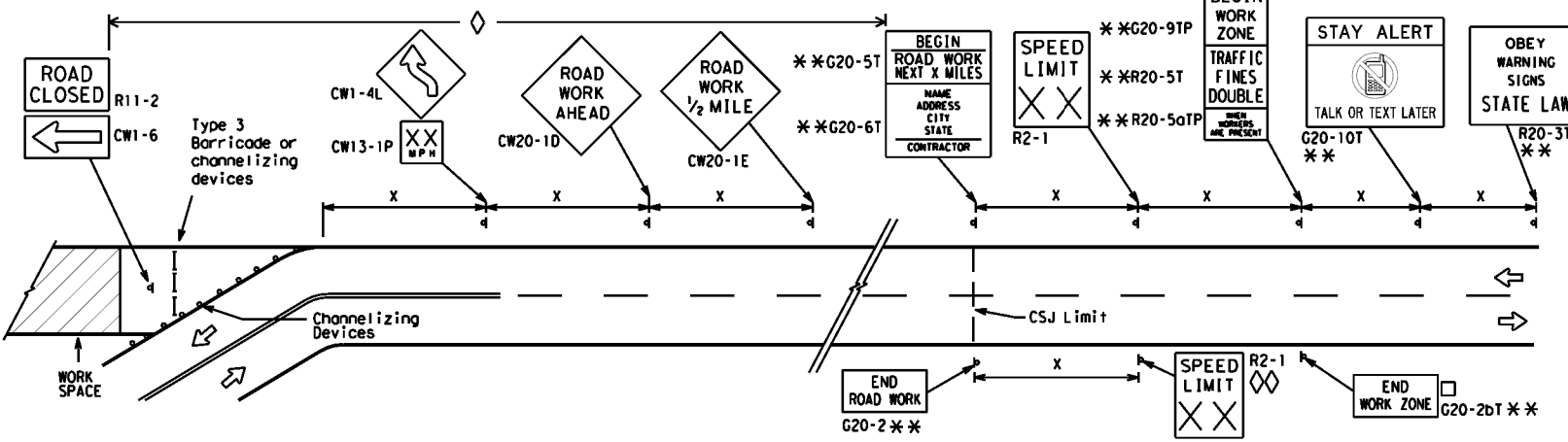
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be 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".
- Only diamond shaped warning sign sizes are indicated.
- 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

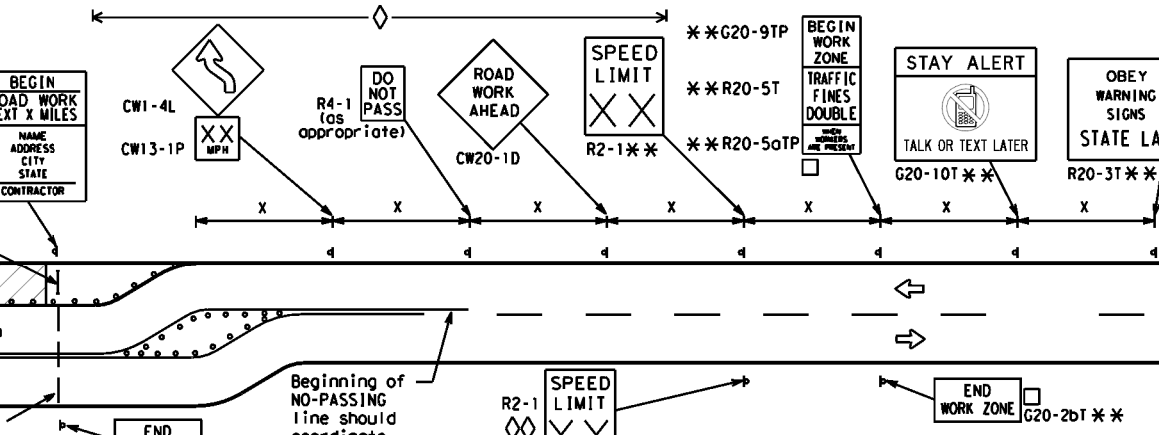


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing 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" (G20-1aT) 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.

BARRICADE AND CONSTRUCTION PROJECT LIMIT

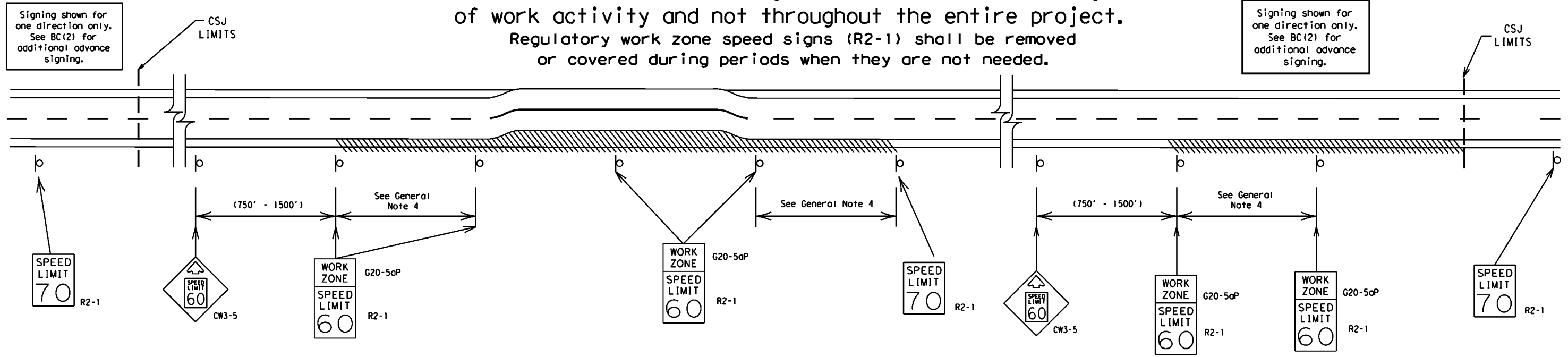
BC (2) - 21

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9-07 8-14	DIST: LFK	COUNTY: ANGELINA	SHEET NO. 12	
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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SHEET 3 OF 12



BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

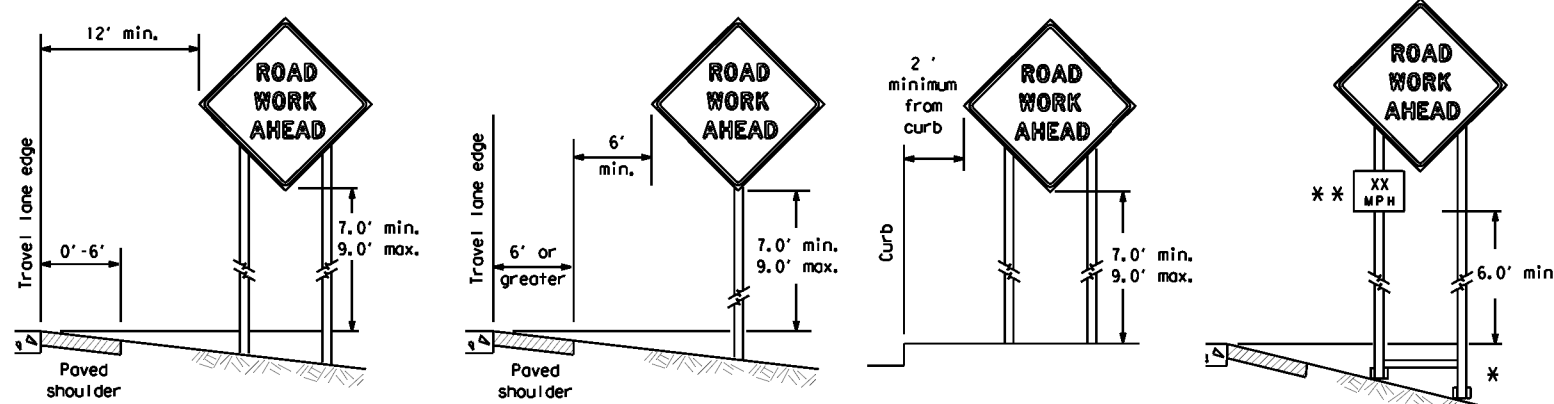
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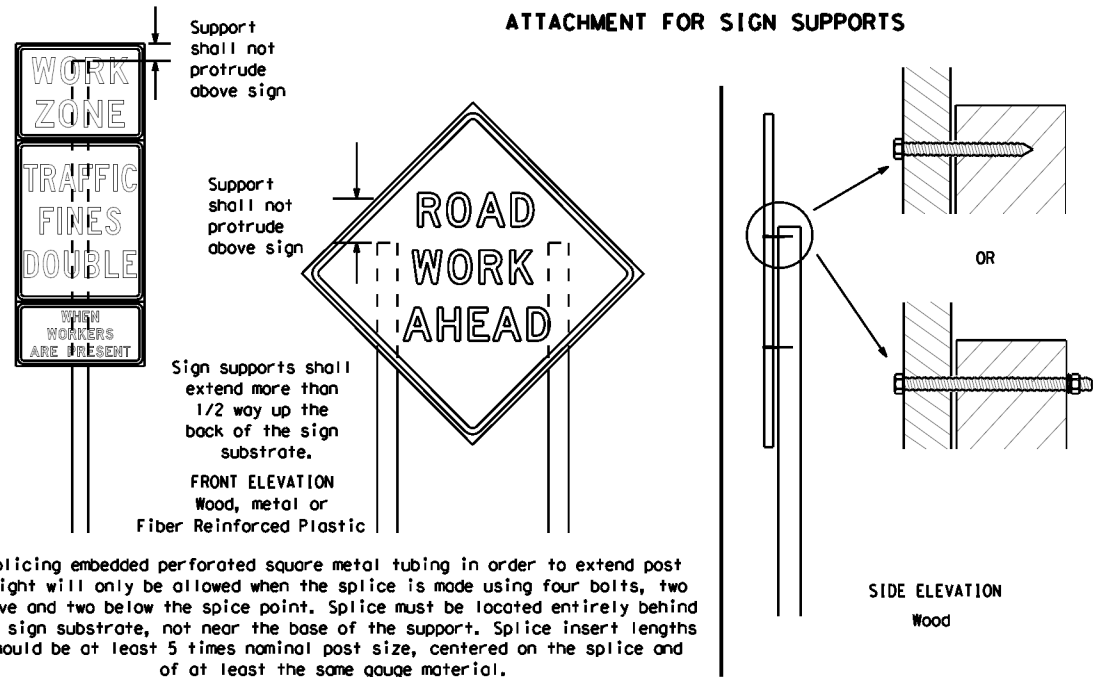
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* 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



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.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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)

- 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.
 - Long-term stationary - work that occupies a location more than 3 days.
 - 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.
 - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - Short, duration - work that occupies a location up to 1 hour.
 - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- 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.
- 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.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- 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.
- 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

- 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

- 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.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- 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

- 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).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- 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

- 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

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- 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.
- 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.
- 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 shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

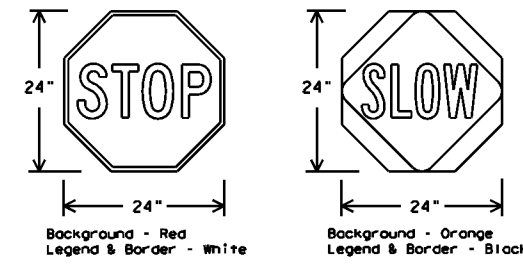
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- 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.
- 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.
- 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.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

- 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.

STOP/SLOW PADDLES

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- STOP/SLOW paddles shall be retroreflectORIZED when used at night.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- 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

- 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.
- 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.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- 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.
- 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.
- 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.

Texas Department of Transportation
 Traffic Safety Division Standard

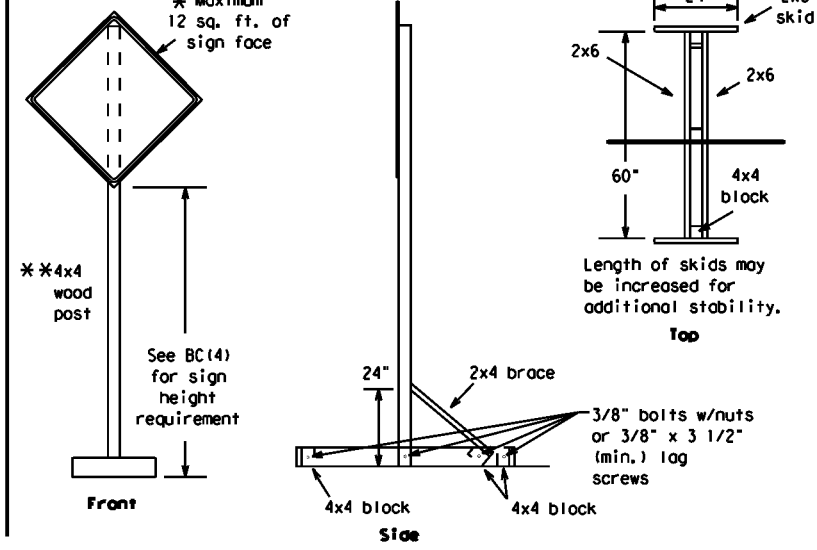
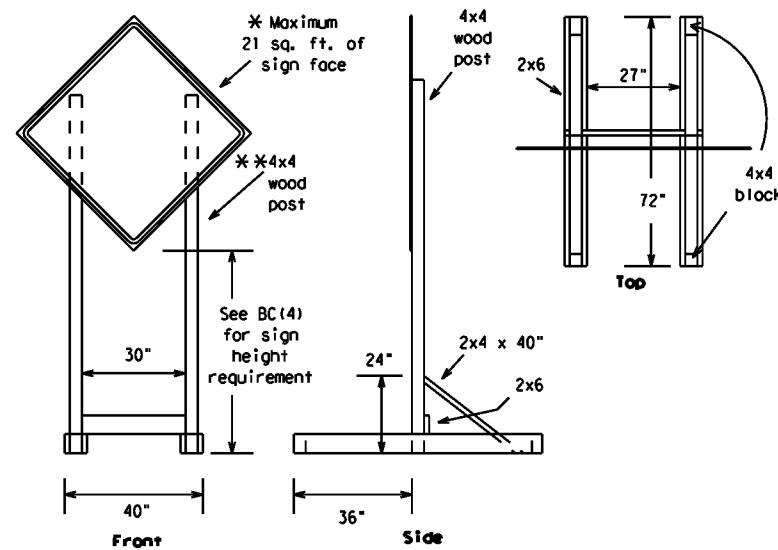
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

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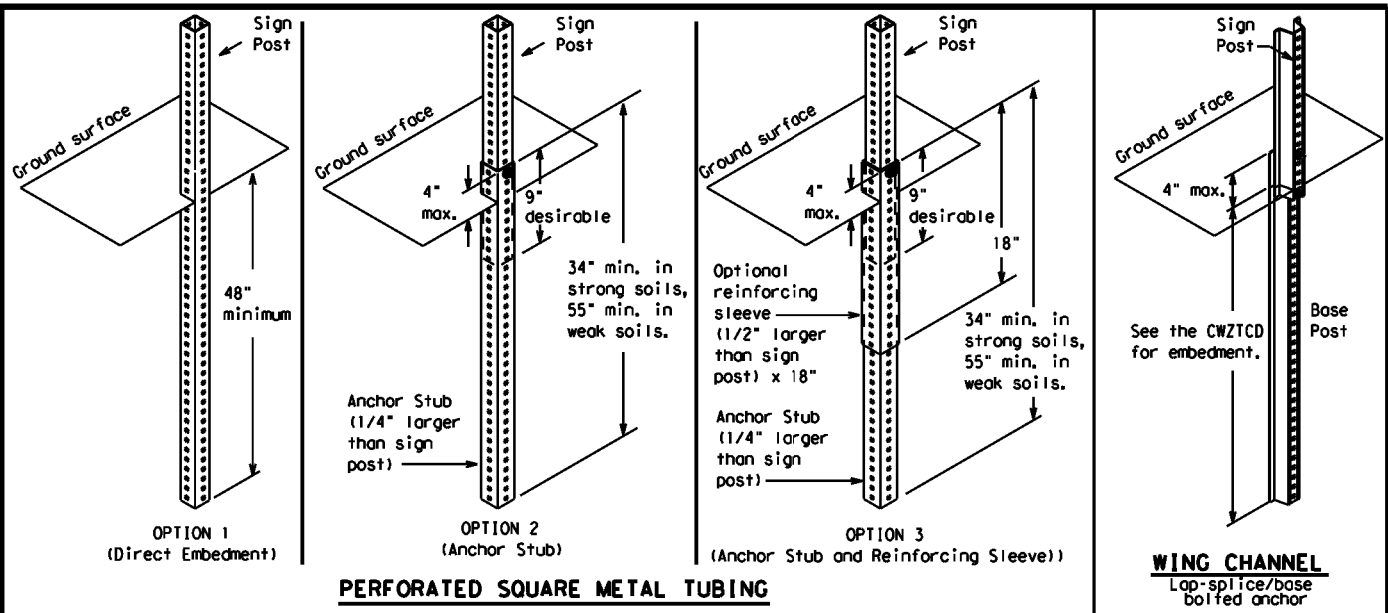
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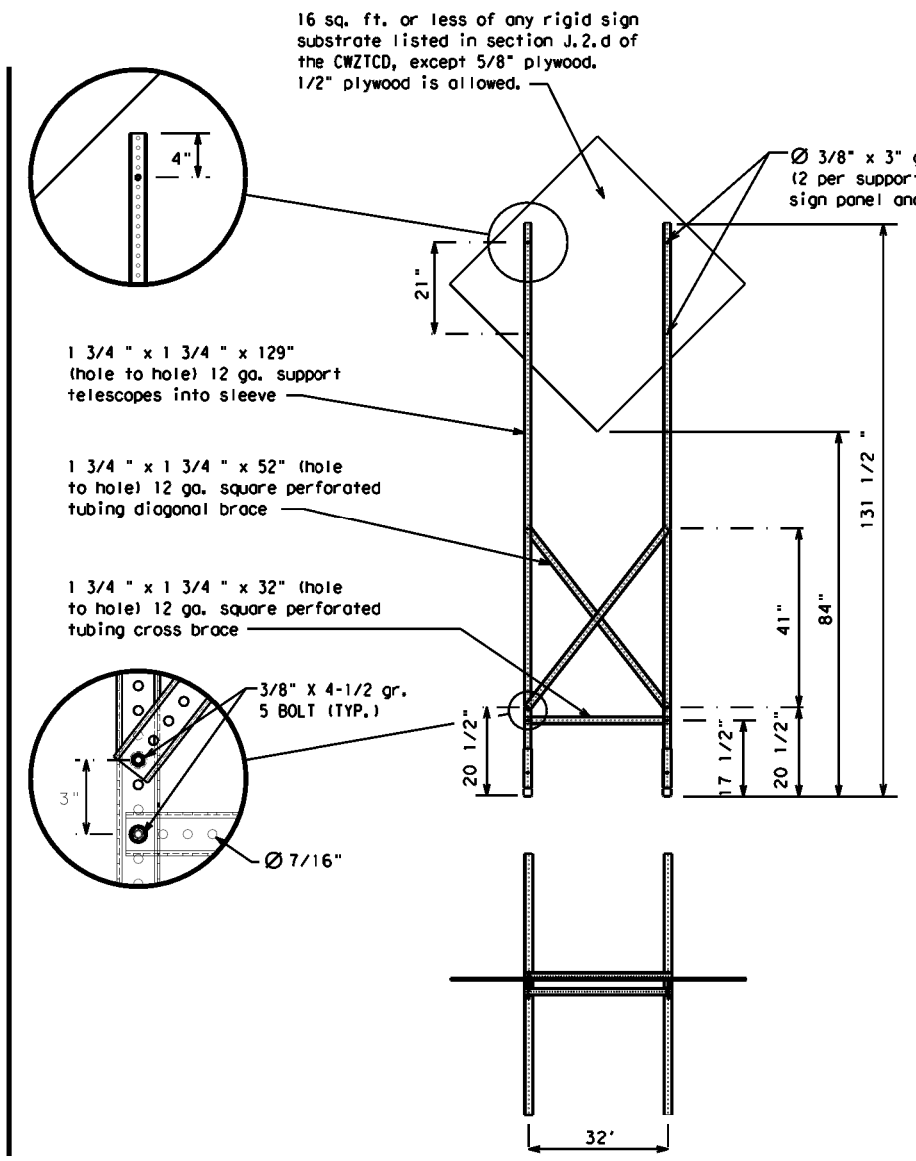
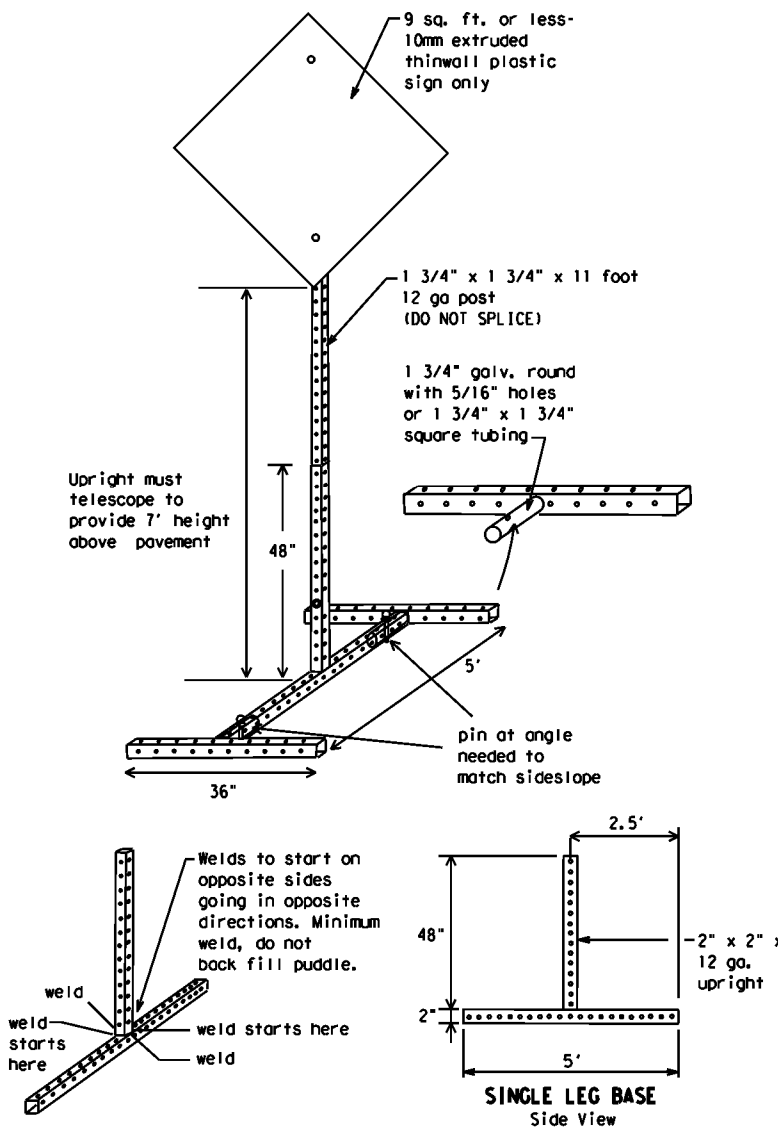
SKID MOUNTED WOOD SIGN SUPPORTS

* 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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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
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXX BLVD CLOSED

Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI
ROADWORK XXX FT
FLAGGER XXXX FT
RIGHT LN NARROWS XXXX FT
MERGING TRAFFIC XXXX FT
LOOSE GRAVEL XXXX FT
DETOUR X MILE
ROADWORK PAST SH XXXX
BUMP XXXX FT
TRAFFIC SIGNAL XXXX FT
ROAD REPAIRS XXXX FT
LANE NARROWS XXXX FT
TWO-WAY TRAFFIC XX MILE
CONST TRAFFIC XXX FT
UNEVEN LANES XXXX FT
ROUGH ROAD XXXX FT
ROADWORK NEXT FRI-SUN
US XXX EXIT X MILES
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
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE *
FORM X LINES RIGHT
USE XXXXX RD EXIT
USE EXIT I-XX NORTH
USE I-XX E TO I-XX N
WATCH FOR TRUCKS
EXPECT DELAYS
END SHOULDER USE
WATCH FOR WORKERS

Location List

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

Warning List

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

** Advance Notice List

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

** 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
Cannot	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	HOV	Tuesday	TUES
Vehicle	HWY	Time Minutes	TIME MIN
Highway	HWY	Upper Level	UPR LEVEL
Hour(s)	HR, HRS	Vehicles (s)	VEH, VEHS
Information	INFO	Warning	WARN
It Is	ITS	Wednesday	WED
Junction	JCT	Weight Limit	WT LIMIT
Left	LFT	West	W
Left Lane	LFT LN	Westbound	(route) W
Lane Closed	LN CLOSED	Wet Pavement	WET PVMT
Lower Level	LWR LEVEL	Will Not	WONT
Maintenance	MAINT		

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



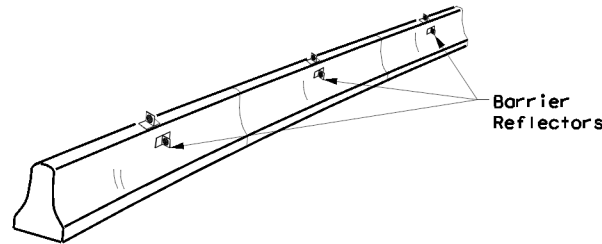
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DWG: TxDOT	CR: TxDOT	DWG: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	LFK	ANGEL INA	16	

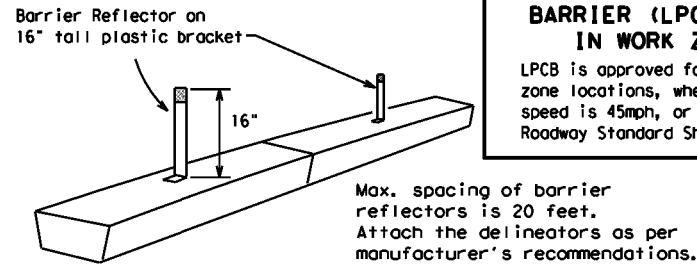
No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

- 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)

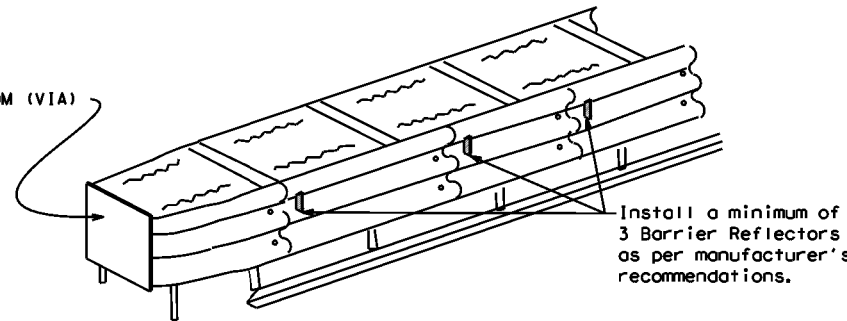
- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. 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

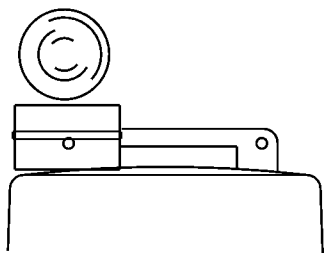
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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_{PL} 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

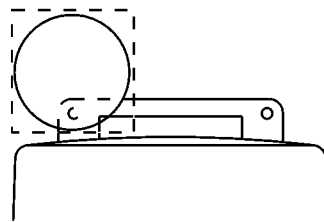
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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.



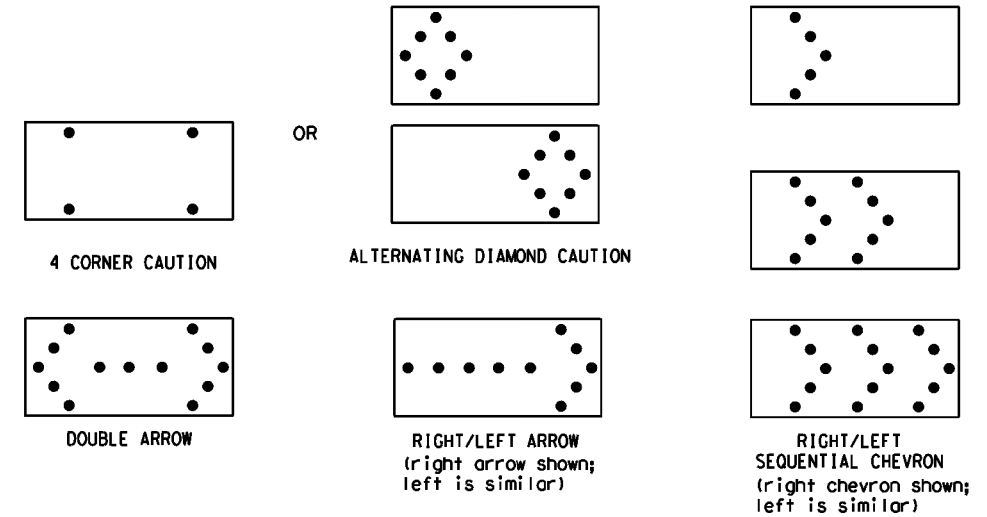
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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: 0911	SECT: 00	JOB: 139
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7-13	5-21			

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

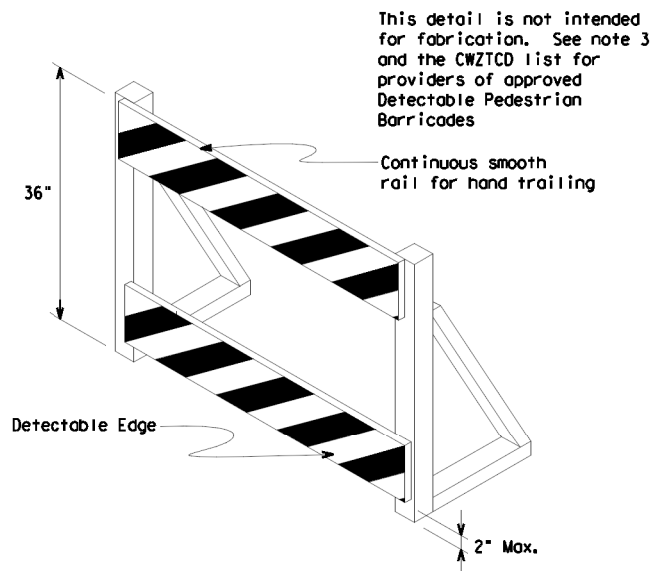
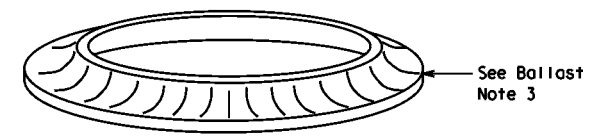
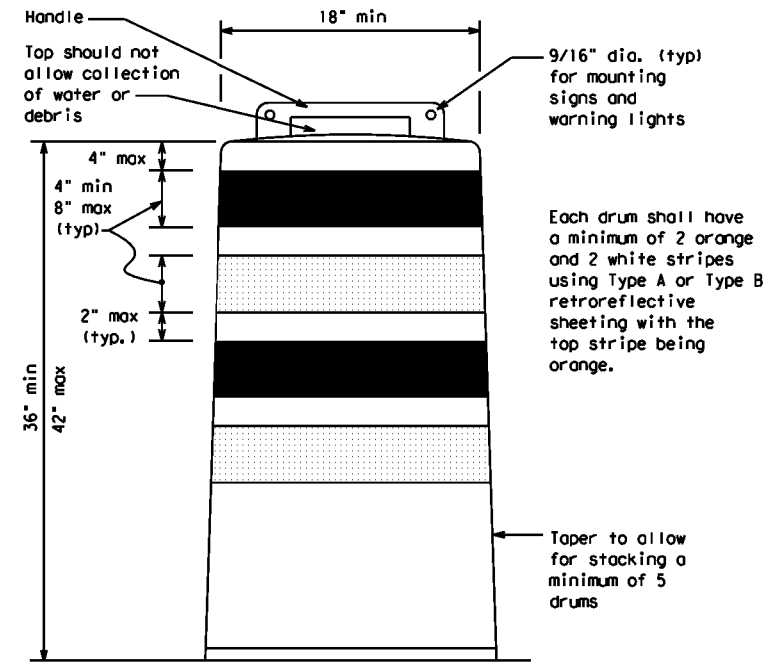
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

RETROREFLECTIVE SHEETING

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

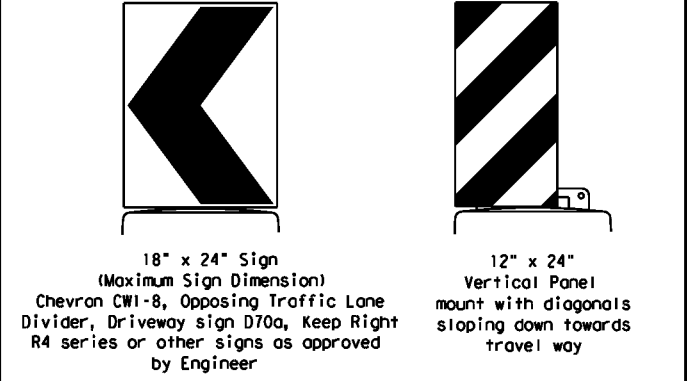
BALLAST

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



DETECTABLE PEDESTRIAN BARRICADES

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



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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

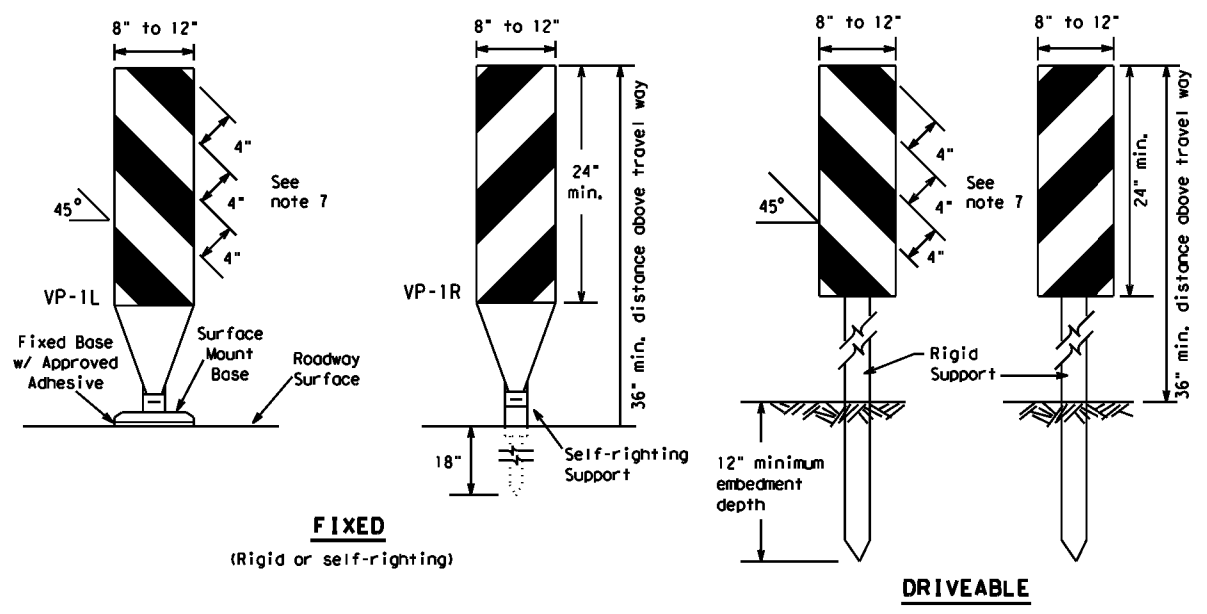
SHEET 8 OF 12

			Traffic Safety Division Standard	
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES				
BC (8) - 21				
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7-13		LFK	ANGELINA	18

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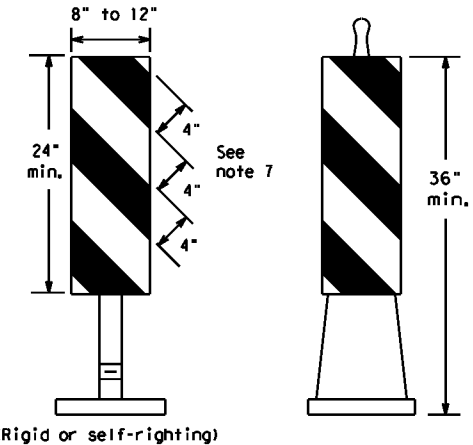
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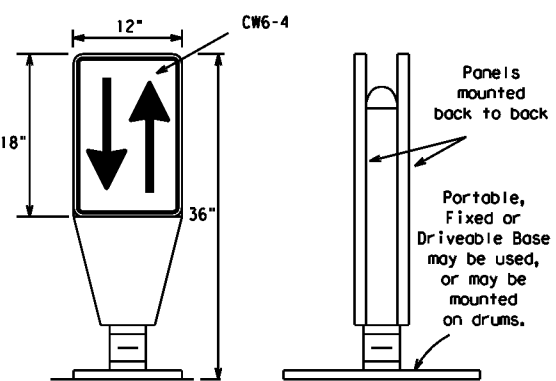
DRIVEABLE



PORTABLE

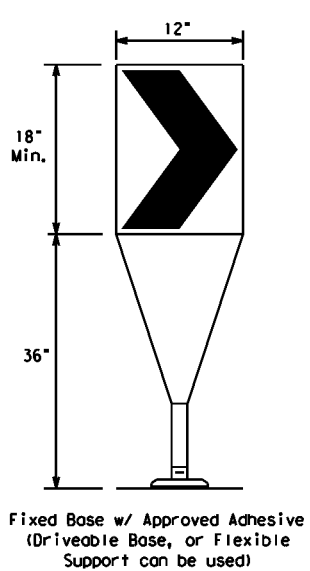
VERTICAL PANELS (VPs)

- 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.



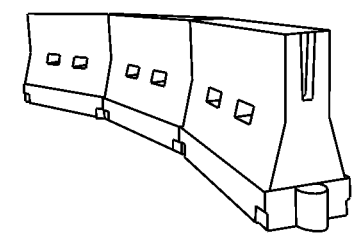
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

- 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.



- 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

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0911	00	139	VARIOUS
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	LFK	ANGEL INA	19	

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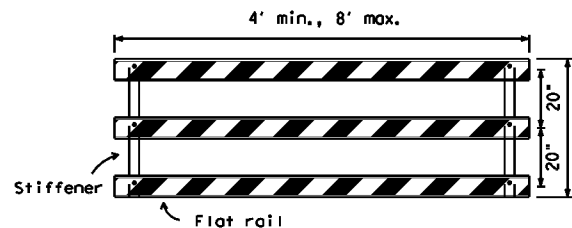
TYPE 3 BARRICADES

- 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.
- Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
- 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.
- 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.
- 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".
- Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
- Warning lights shall NOT be installed on barricades.
- 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.
- 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.

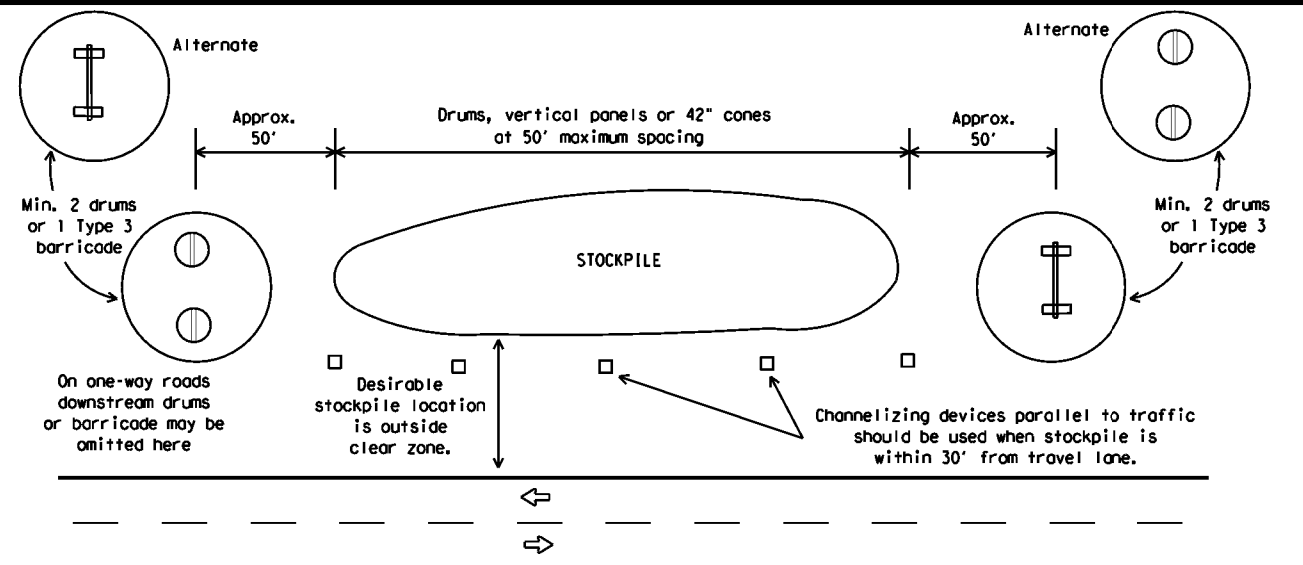


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



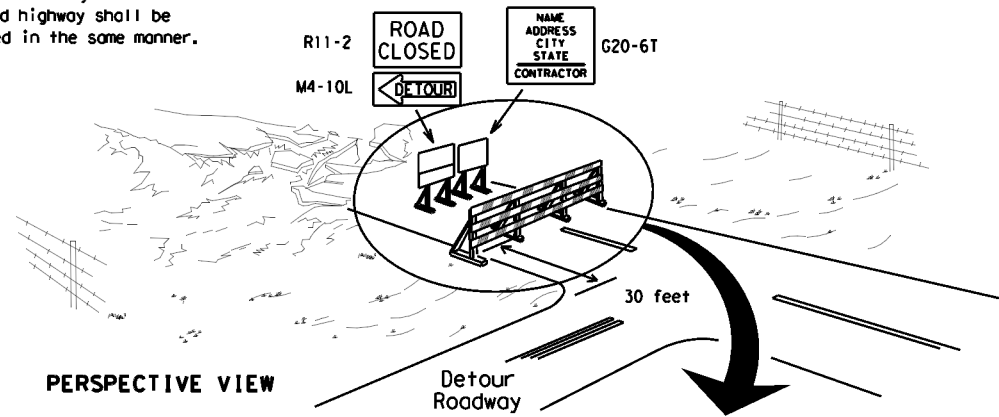
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



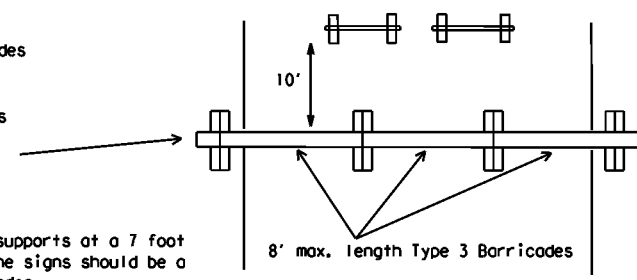
TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



PERSPECTIVE VIEW

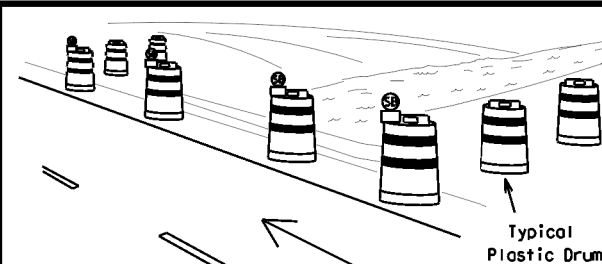
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



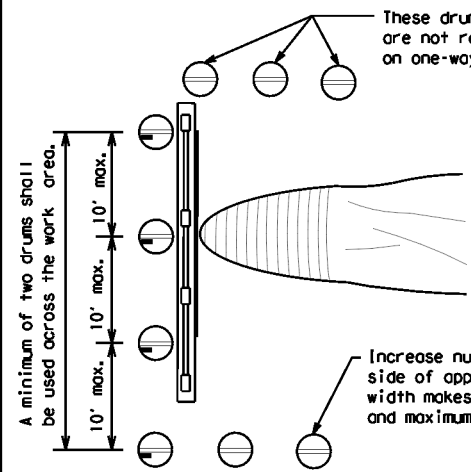
PLAN VIEW

- 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.
- Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW



PLAN VIEW

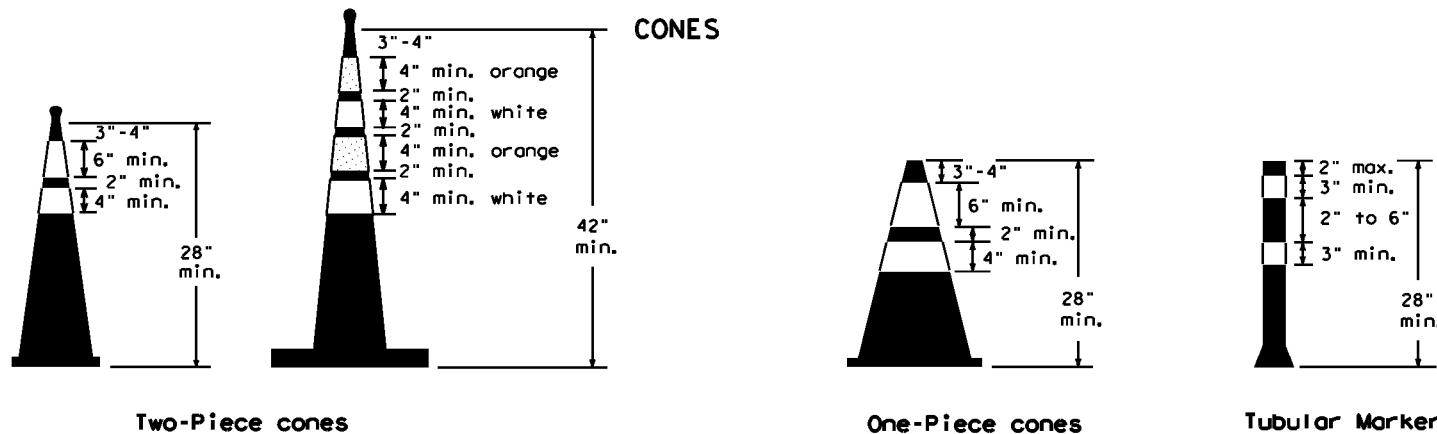
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

- Where positive redirection capability is provided, drums may be omitted.
- Plastic construction fencing may be used with drums for safety as required in the plans.
- Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
- When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
- 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

These drums are not required on one-way roadway.
 Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

CONES



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.

- Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
- 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.
- 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.
- 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.
- 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.
- 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
- Cones or tubular markers used on each project should be of the same size and shape.

SHEET 10 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) -21

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7-13 5-21	LFK	ANGEL INA	20	

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.

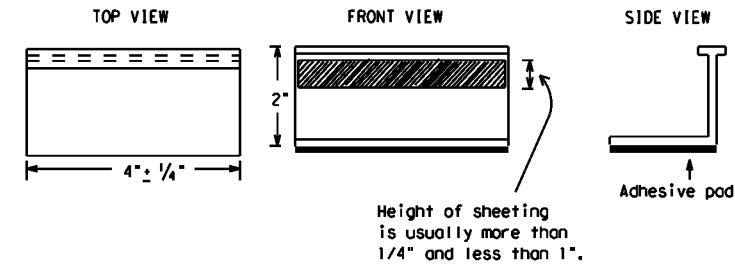
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- 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

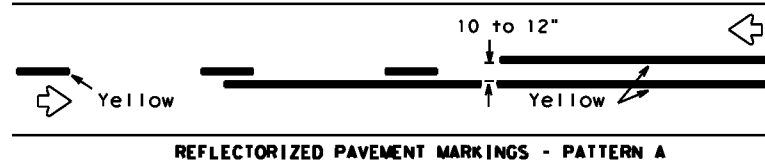
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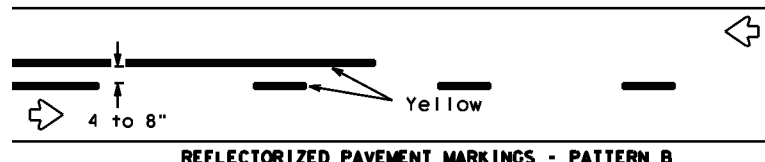
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PAVEMENT MARKING PATTERNS

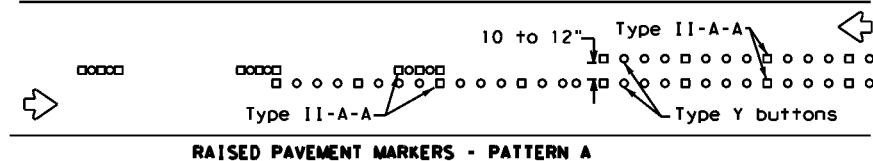


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

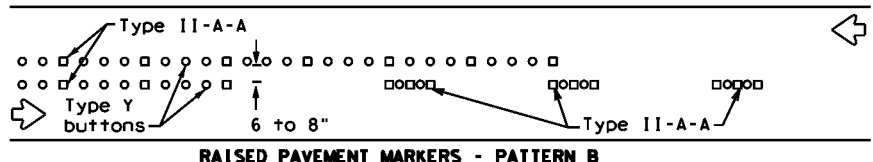


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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

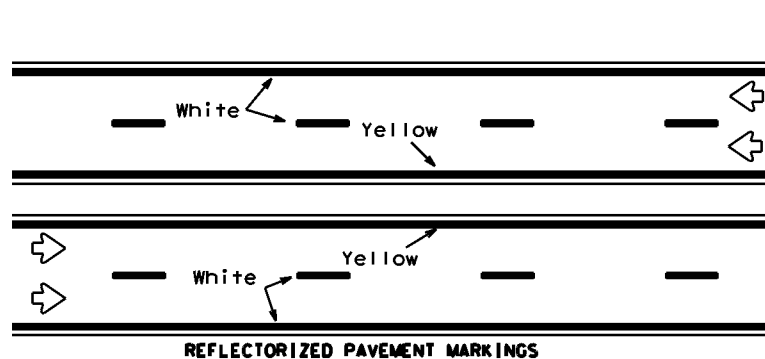


RAISED PAVEMENT MARKERS - PATTERN A



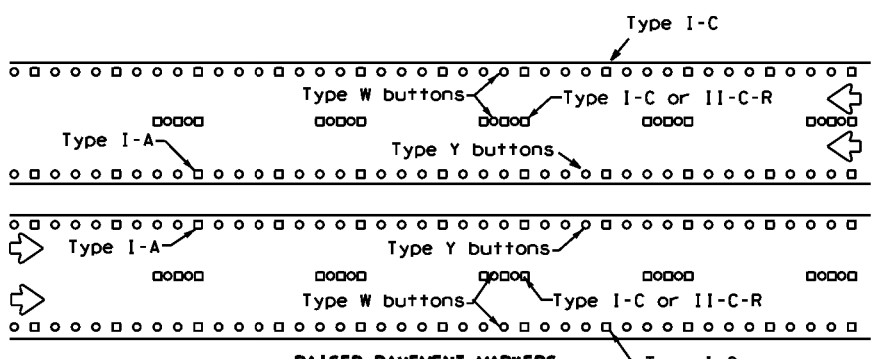
RAISED PAVEMENT MARKERS - PATTERN B

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



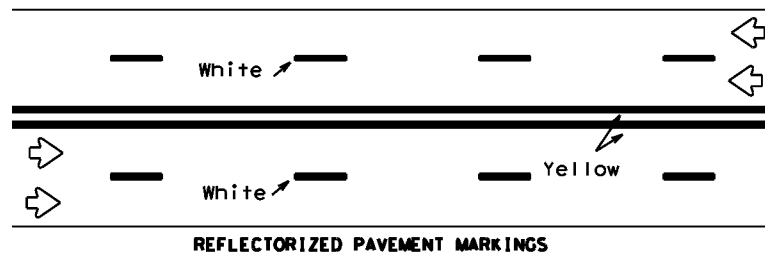
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



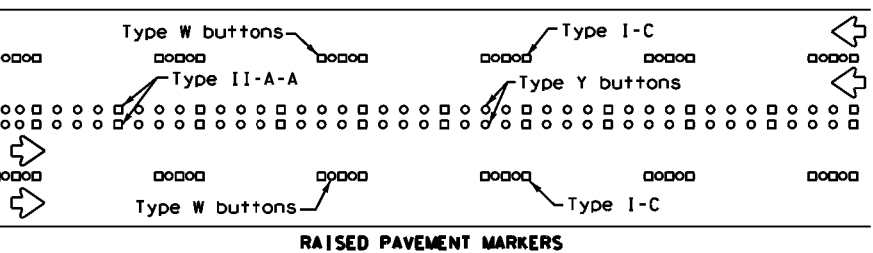
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



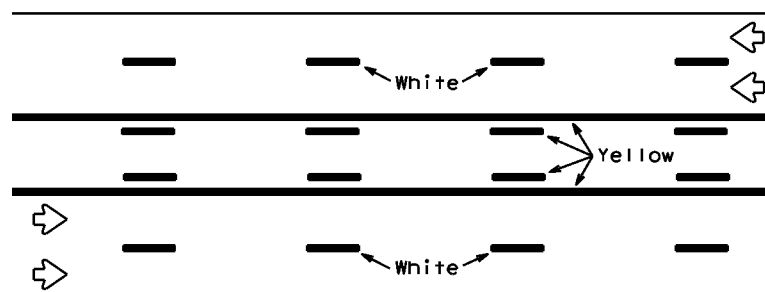
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



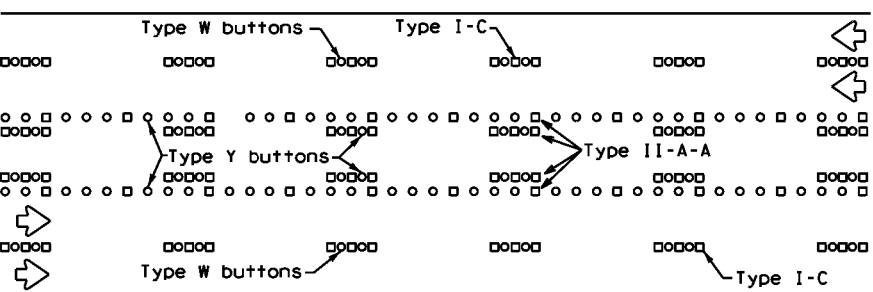
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

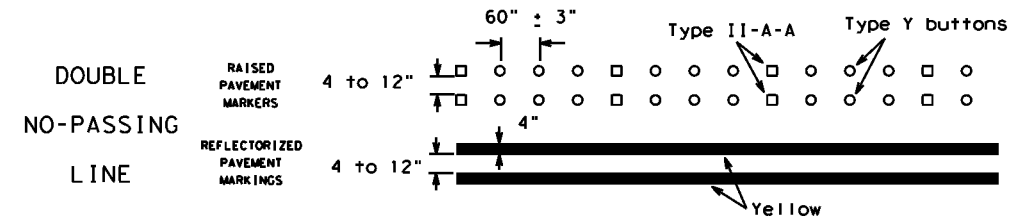
Prefabricated markings may be substituted for reflectorized pavement markings.



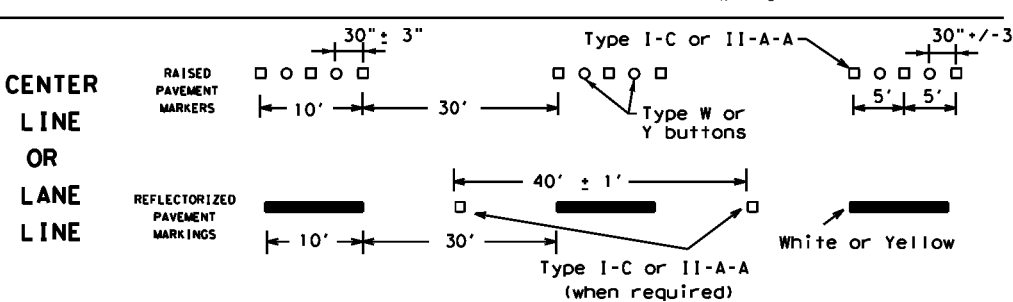
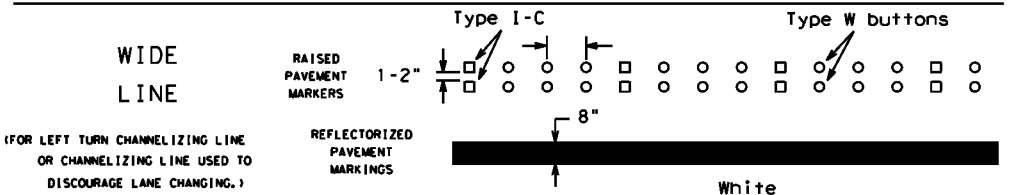
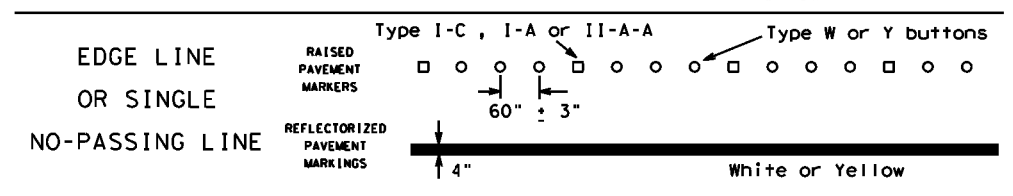
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

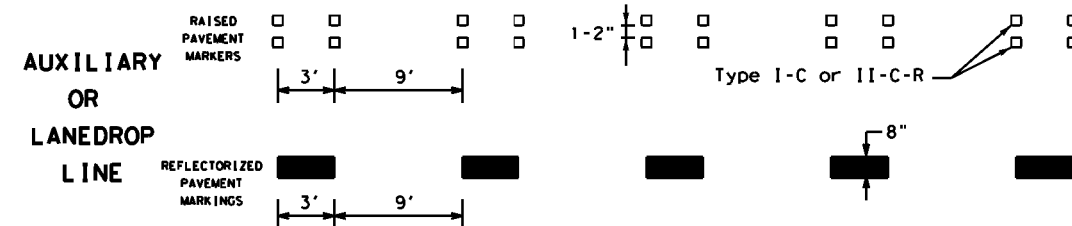
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SOLID LINES

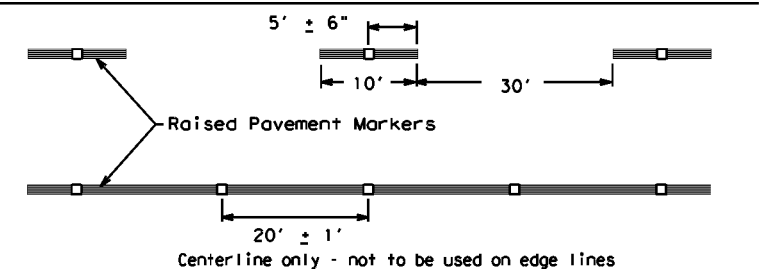


BROKEN LINES



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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."

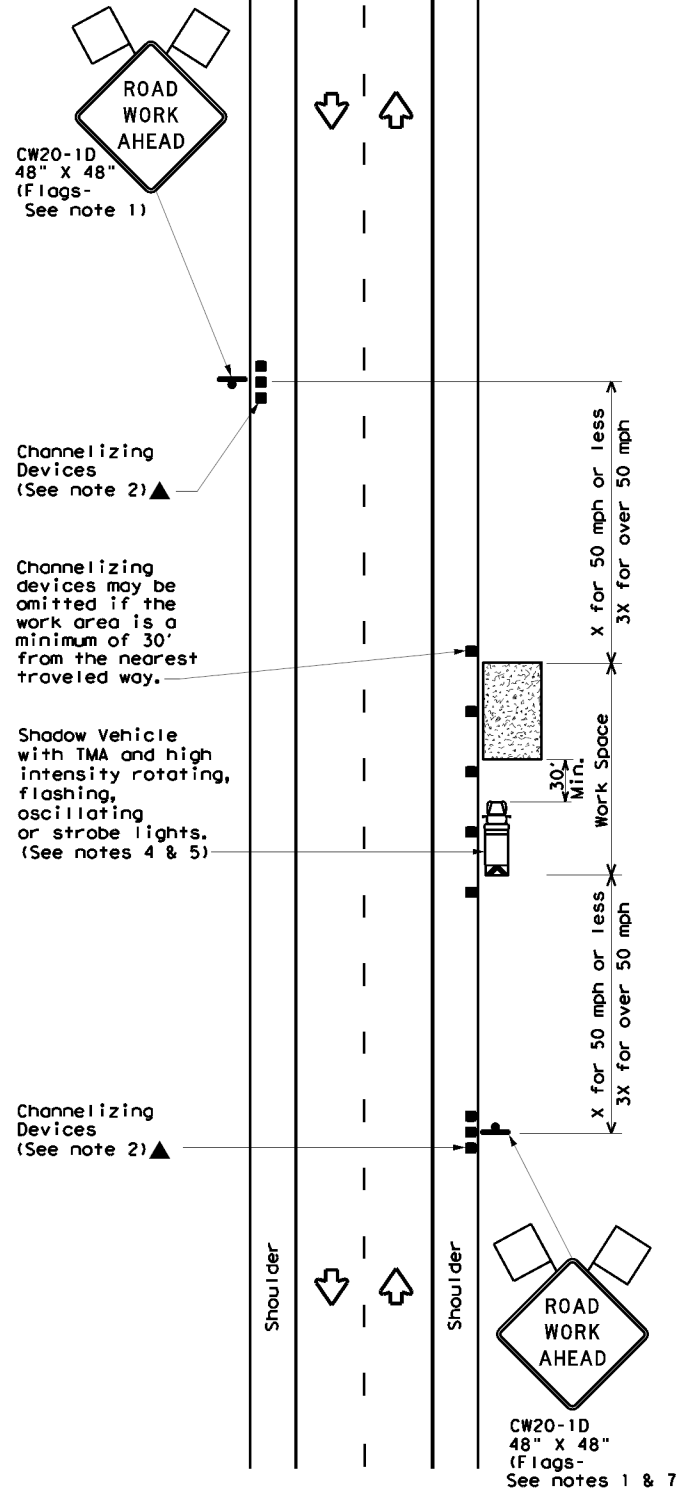
FILE: bc-21.dgn	DWG: TxDOT	CHK: TxDOT	DRW: TxDOT	CR: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	091100		139	VARIOUS
1-97 9-07 5-21	DIST	COUNTY		SHEET NO.
2-98 7-13	LFK	ANGELINA		22
11-02 8-14				

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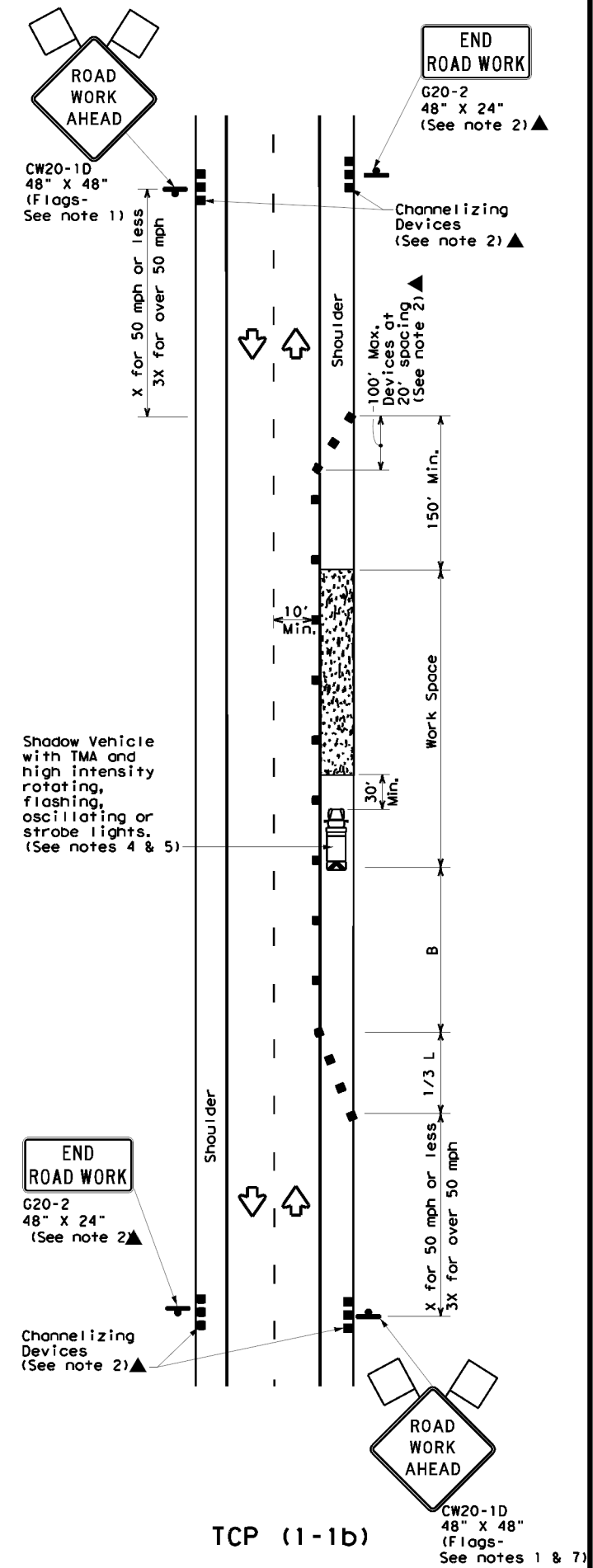
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 2/16/2024 1:45:21 PM
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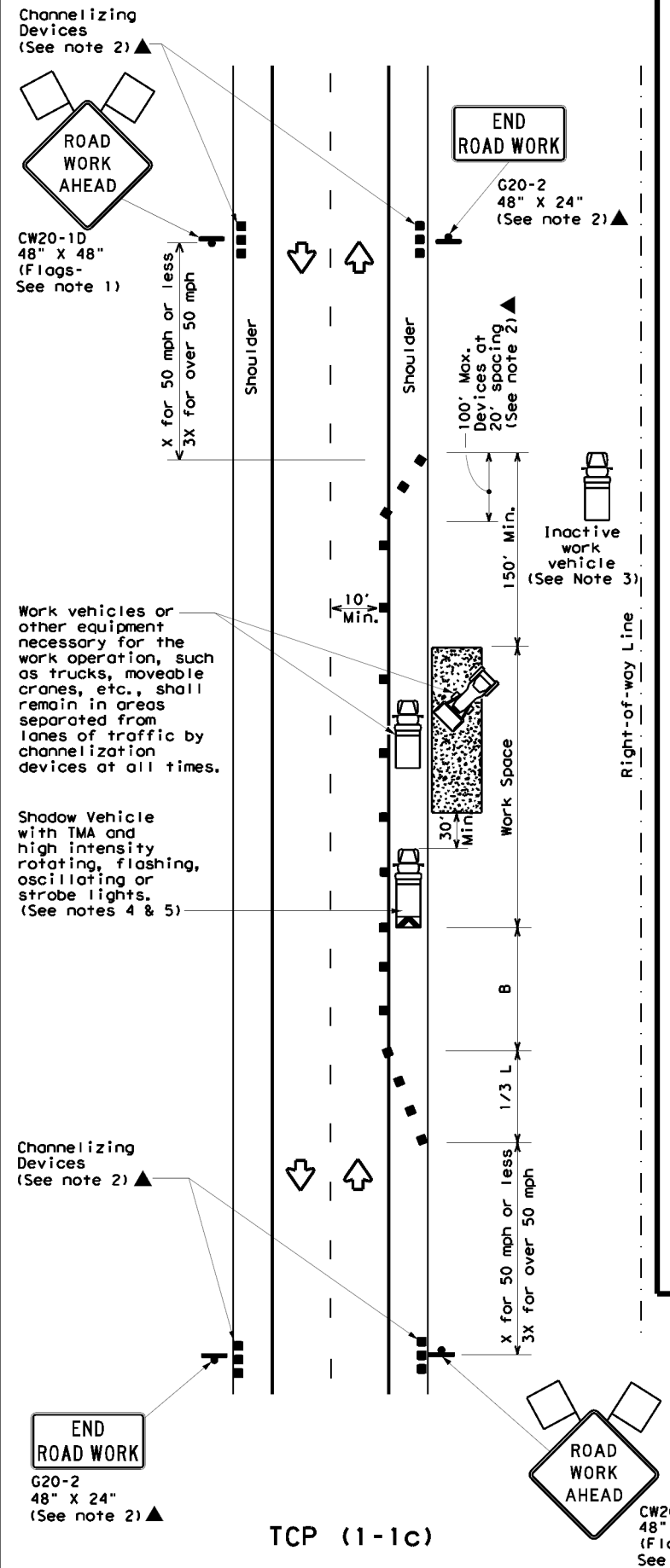
TCP (1-1a)

WORK SPACE NEAR SHOULDER
 Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
 Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
 Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		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 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.

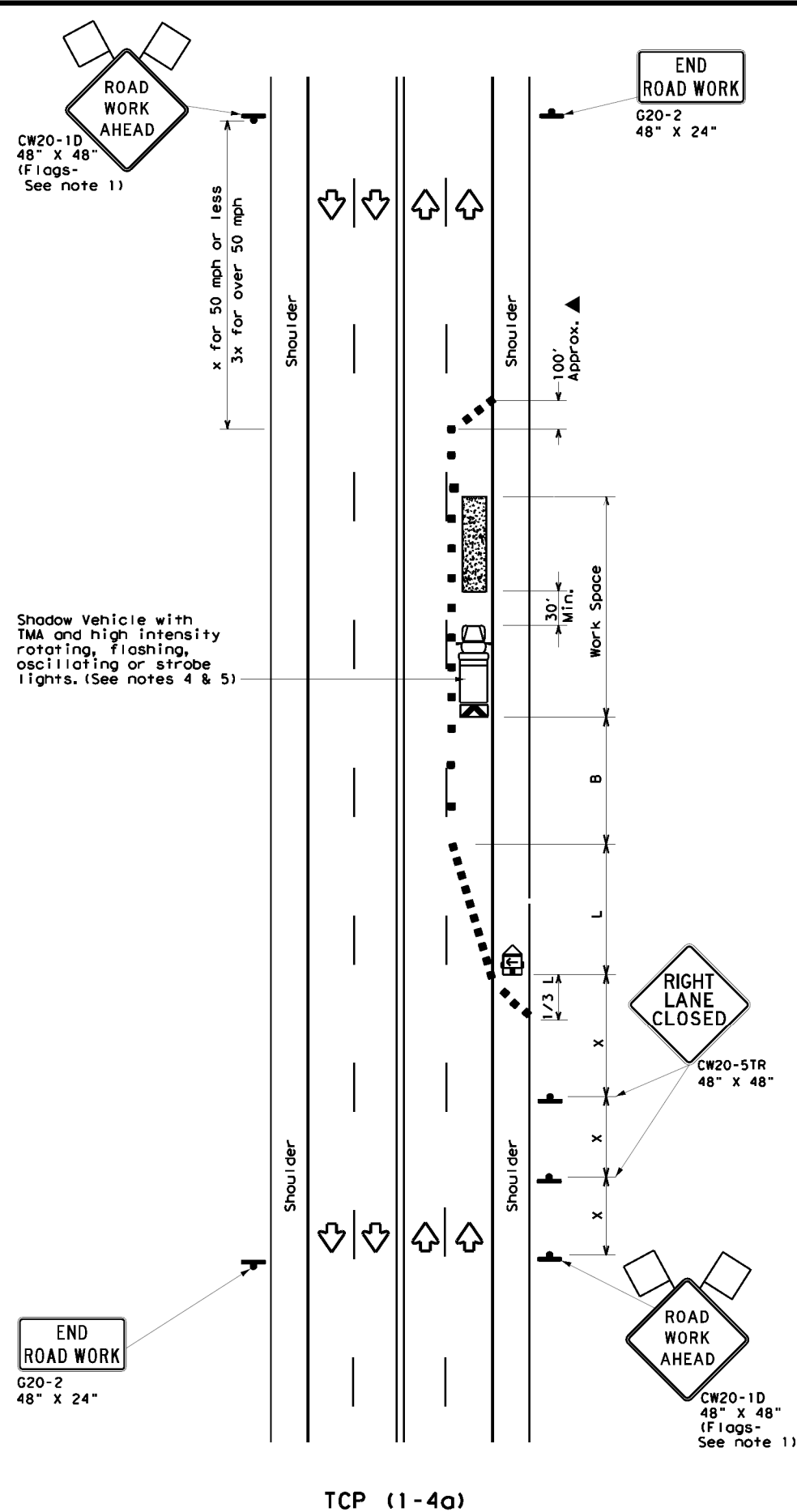
TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (1-1) - 18

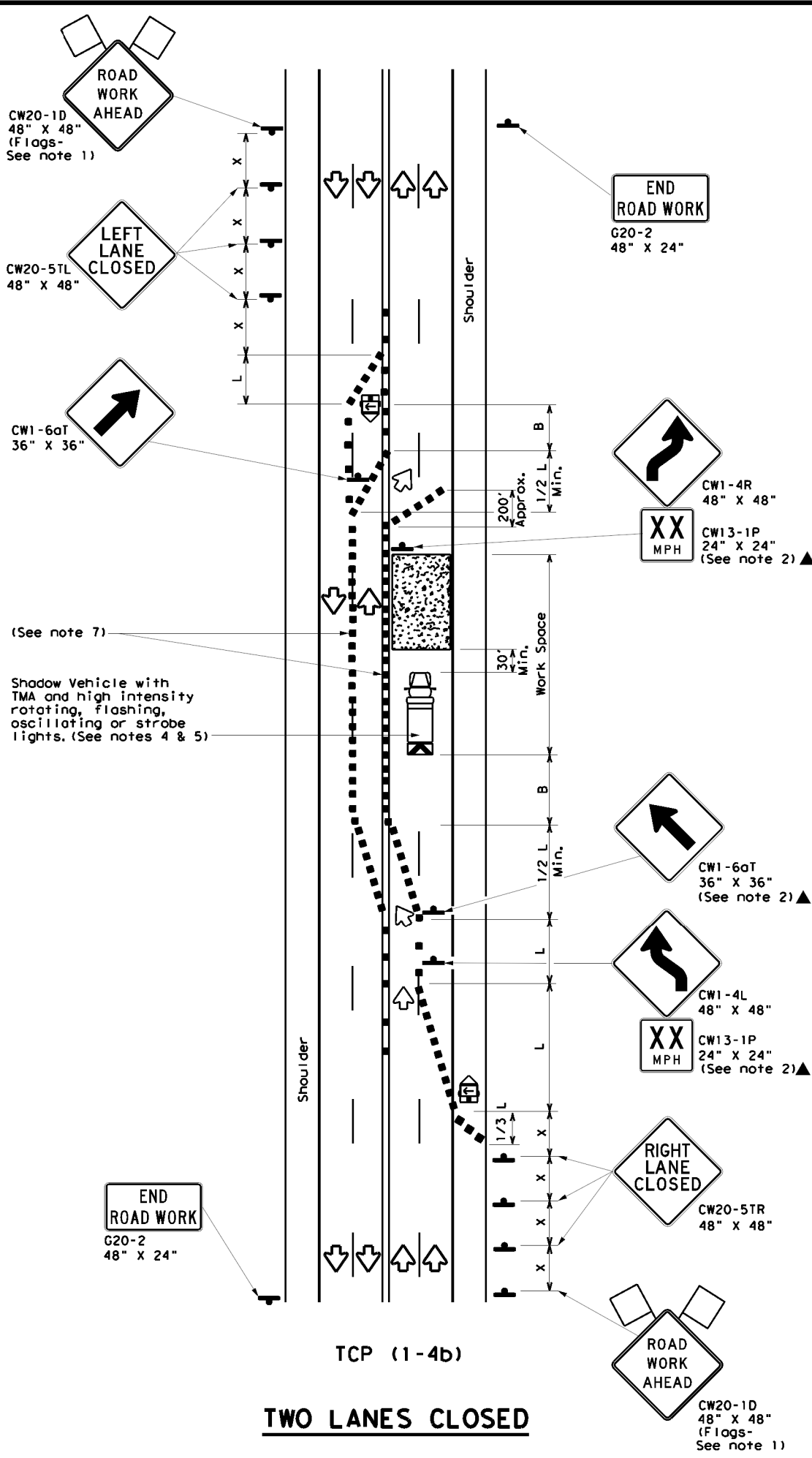
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© TxDOT	REVISIONS	CONTRACT NO. 0911 00
2-94 4-98	8-95 2-12	JOB NO. 139
1-97 2-18		COUNTY ANGELINA
		SHEET NO. 23

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DATE: 2/16/2024 1:45:35 PM
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TCP (1-4a)
ONE LANE CLOSED



TCP (1-4b)
TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		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)

- 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)

- 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

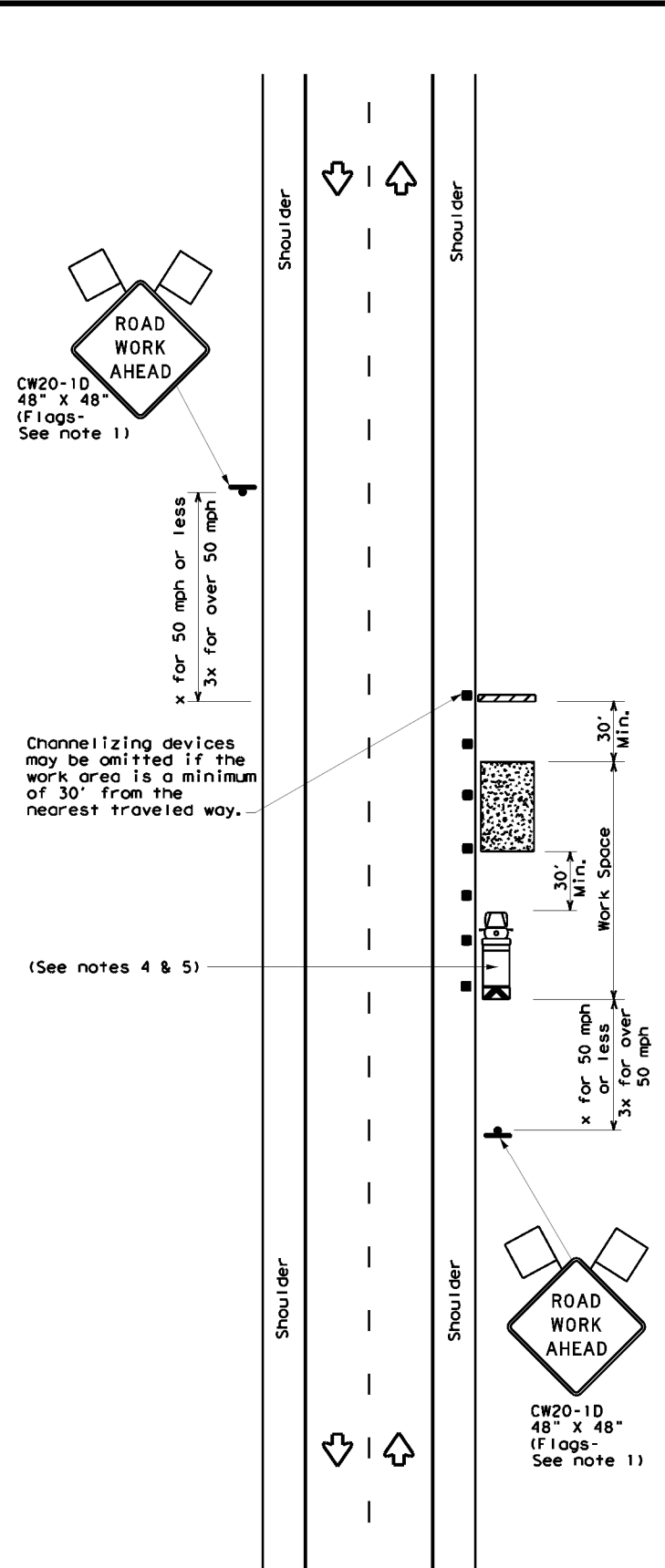
**TRAFFIC CONTROL PLAN
 LANE CLOSURES ON MULTILANE
 CONVENTIONAL ROADS**

TCP (1-4) - 18

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REVISIONS: 2-94 4-98 8-95 2-12 1-97 2-18	DIST: LFK	COUNTY: ANGELINA	SHEET NO.: 24	

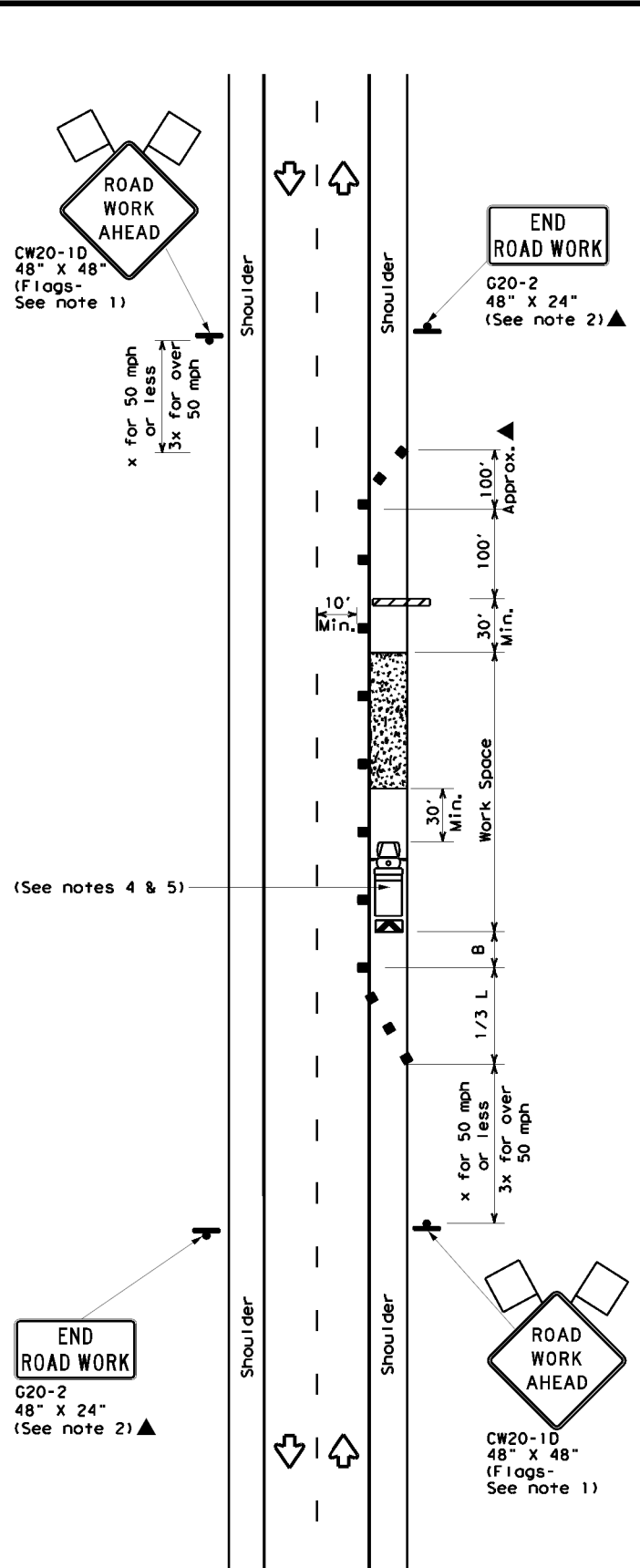
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DATE: 2/16/2024 1:45:49 PM
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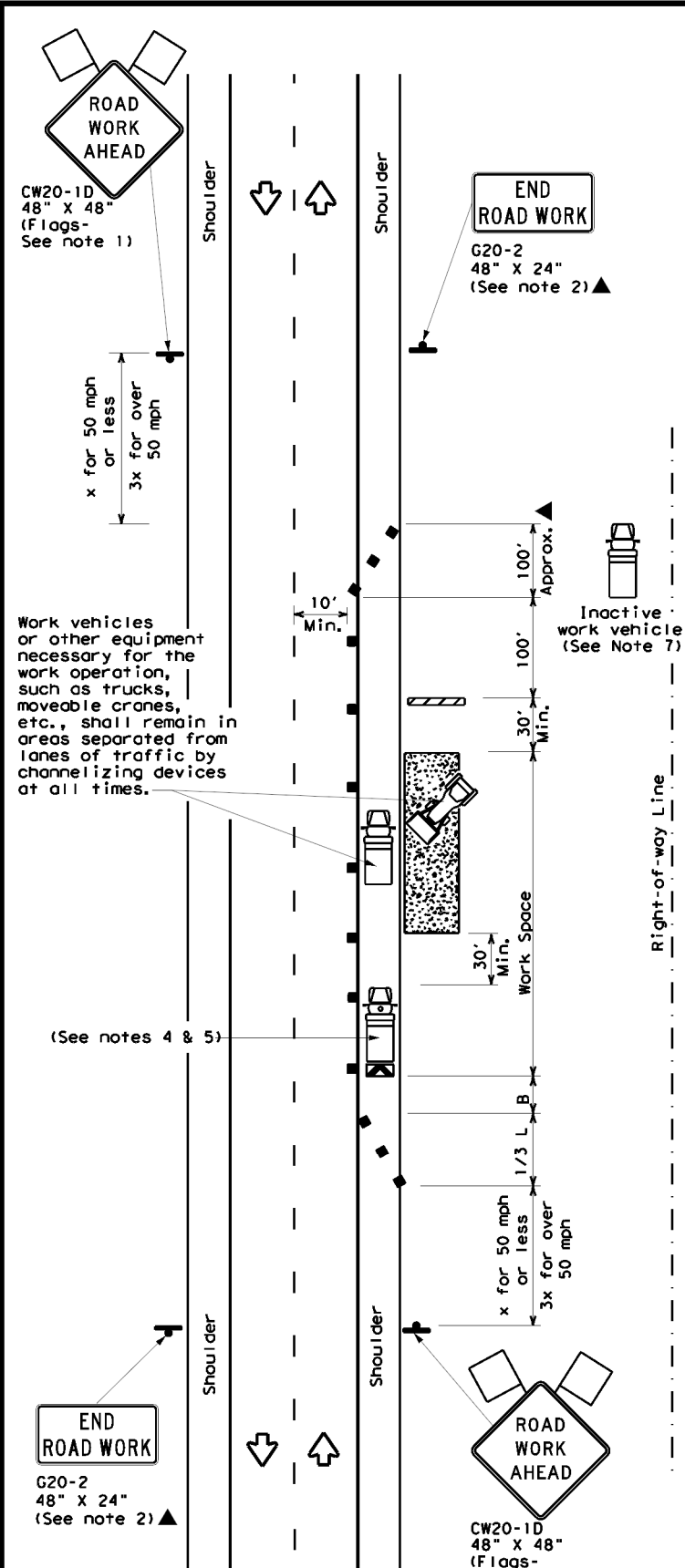
TCP (2-1a)

WORK SPACE NEAR SHOULDER
 Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
 Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
 Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		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.



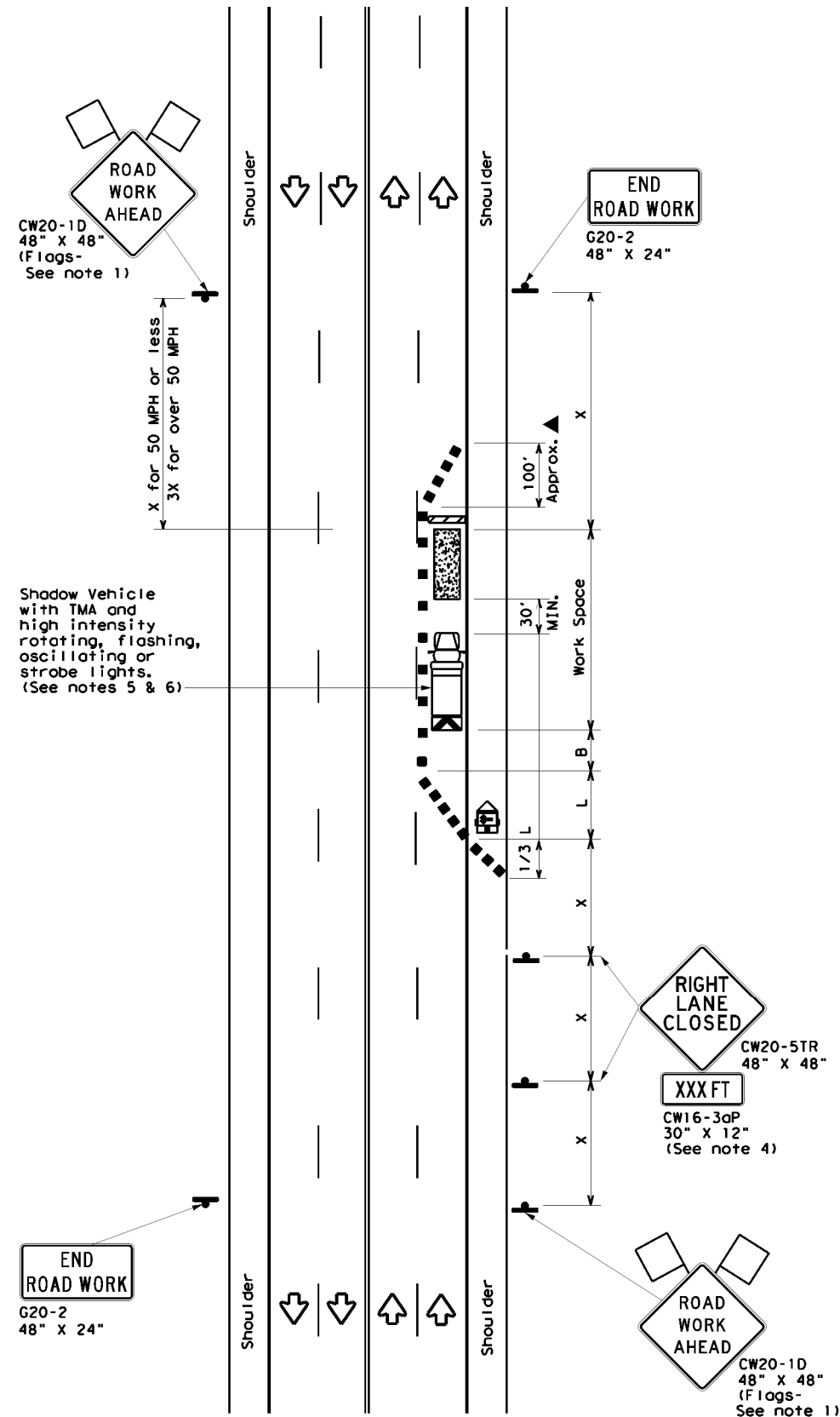
TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (2-1) - 18

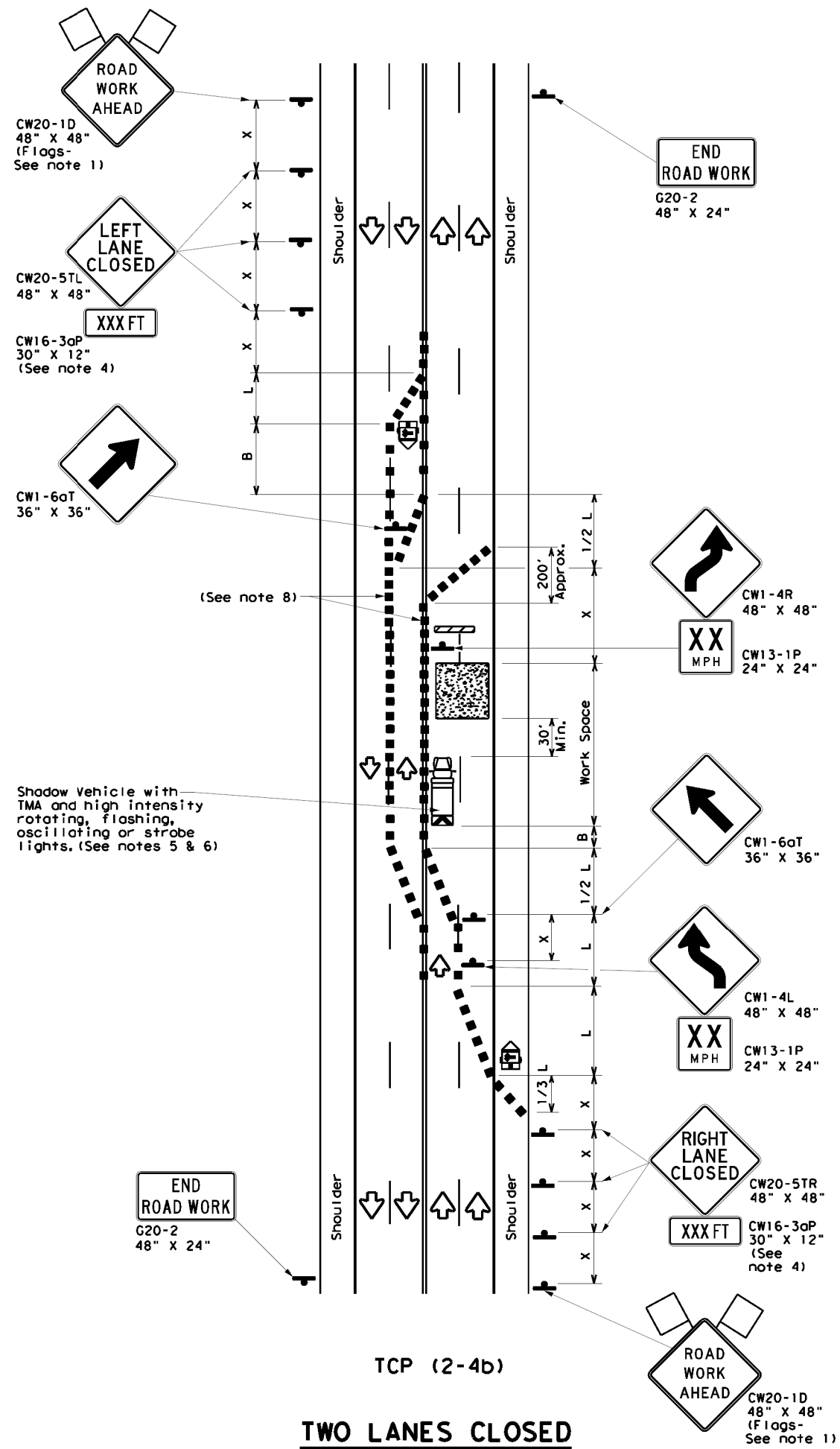
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© TxDOT	December 1985	CONT	SECT	JOB
REVISIONS	0911	00	139	VARIOUS
2-94 4-98	8-95 2-12	DIST	COUNTY	SHEET NO.
1-97 2-18	LFK	ANGEL	INA	25

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DATE: 2/16/2024 1:46:03 PM
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TCP (2-4a)
ONE LANE CLOSED



TCP (2-4b)
TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		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 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 downstream taper is optional. When used, it should be 100 feet minimum length per lane.
- For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

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

TCP (2-4b)

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



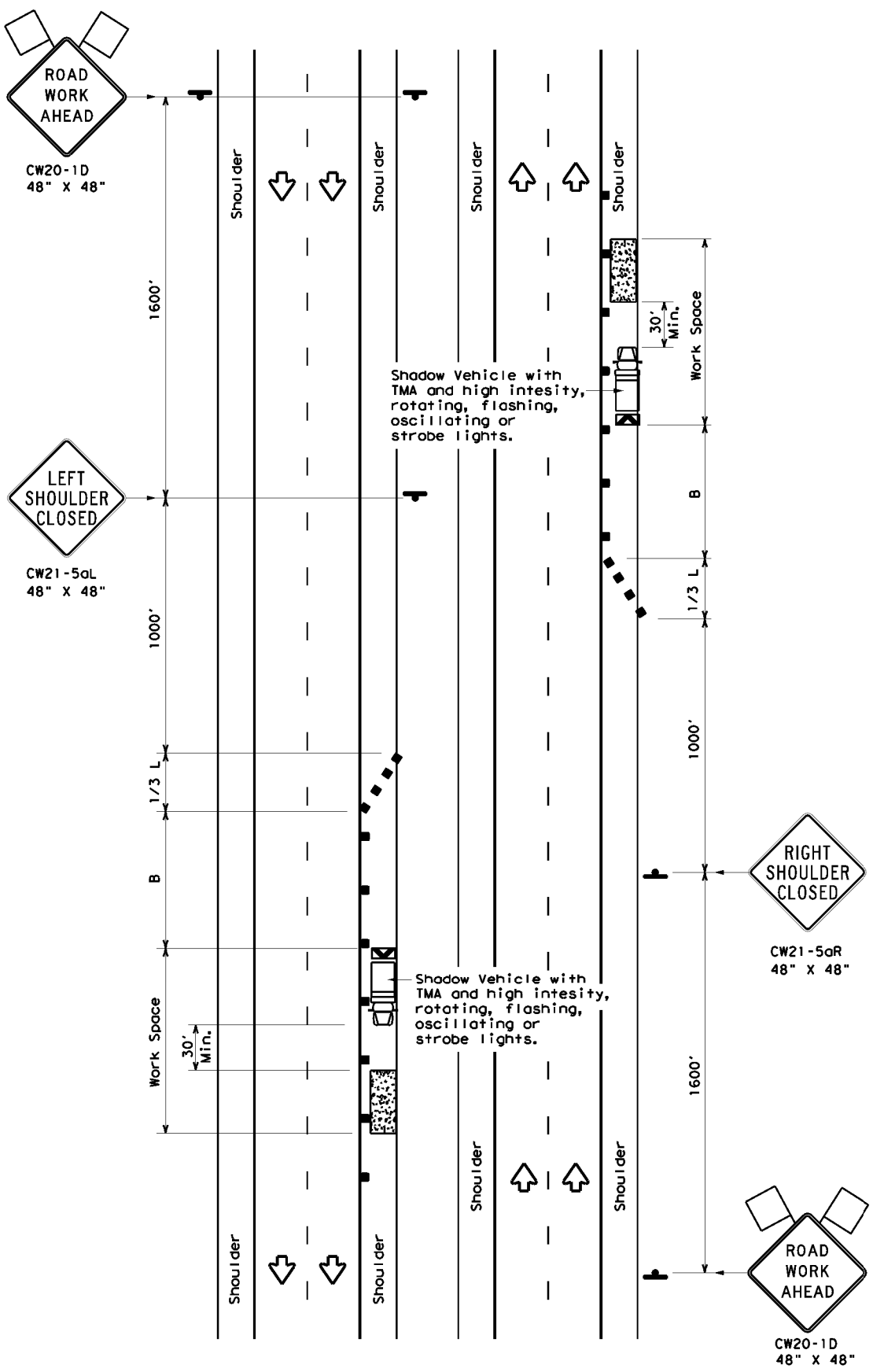
**TRAFFIC CONTROL PLAN
 LANE CLOSURES ON MULTILANE
 CONVENTIONAL ROADS**

TCP (2-4) - 18

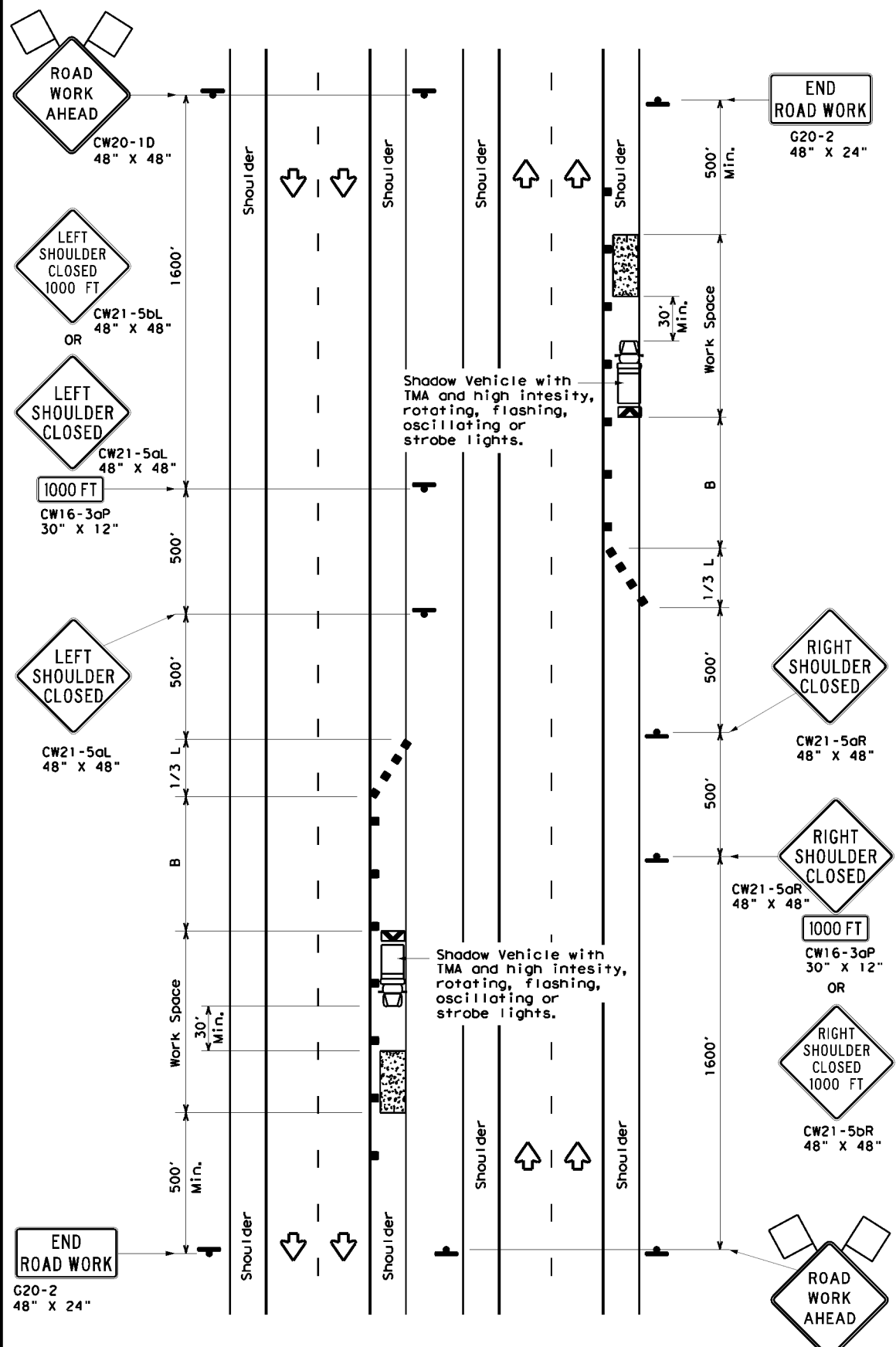
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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0911	00	139	VARIOUS
8-95 3-03	DIST	COUNTY	SHEET NO.	
1-97 2-12	LFK	ANGEL INA	26	
4-98 2-18				

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DATE: 2/16/2024 1:46:17 PM
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TCP (5-1a)
WORK AREA ON SHOULDER



TCP (5-1b)
WORK AREA ON SHOULDER

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

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

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

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

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



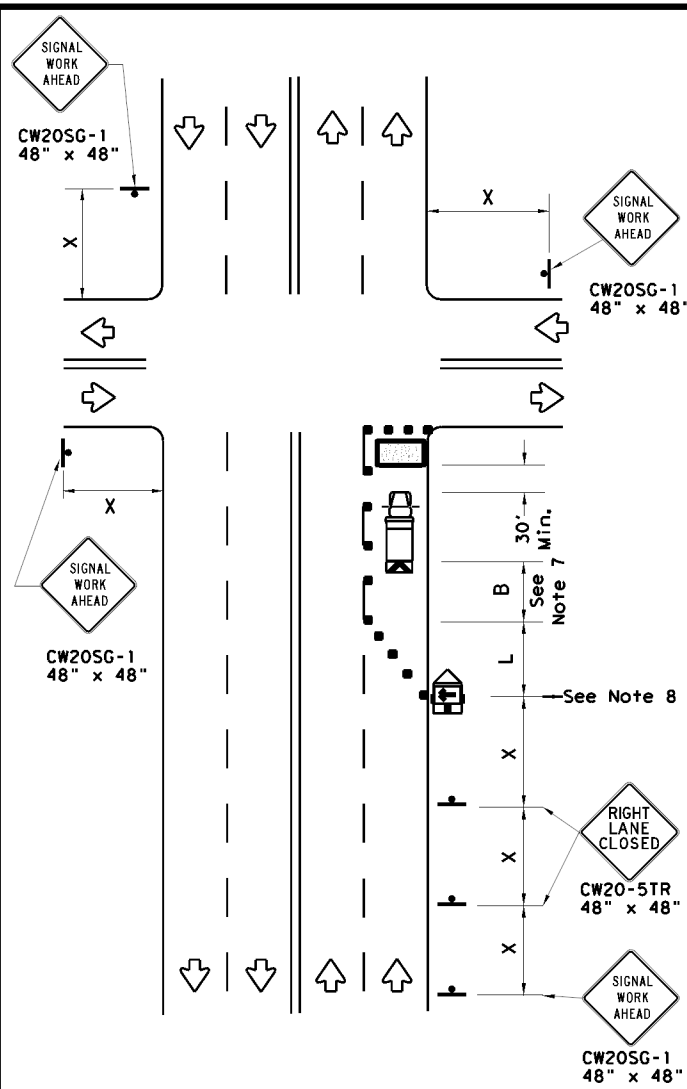
**TRAFFIC CONTROL PLAN
 SHOULDER WORK FOR
 FREEWAYS / EXPRESSWAYS**

TCP (5-1) - 18

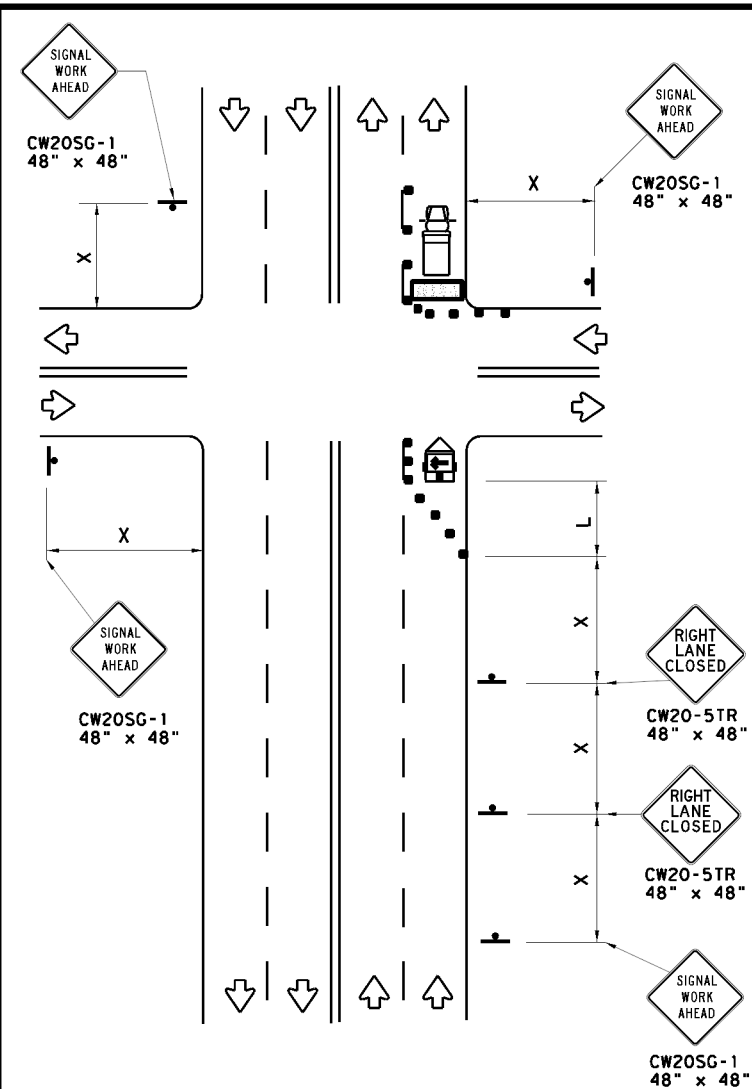
FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
2-18	REVISIONS	0911	00	139
	DIST	COUNTY	SHEET NO.	
	LFK	ANGEL INA	27	

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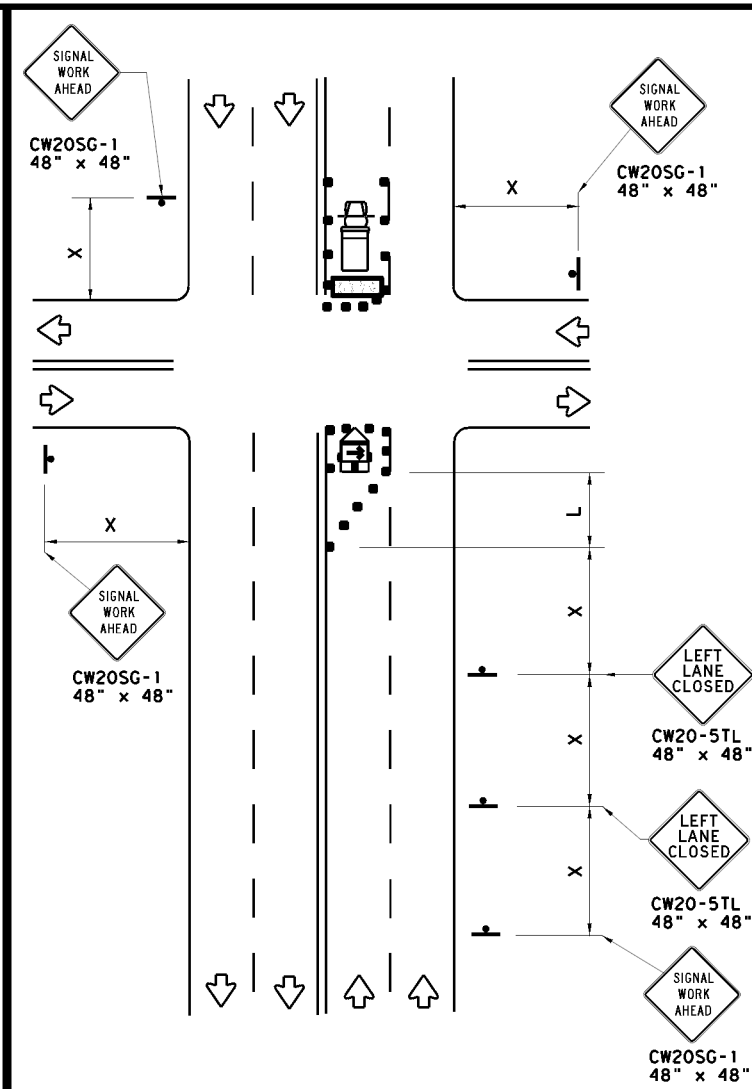
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NEAR SIDE LANE CLOSURE
 SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE RIGHT LANE CLOSURE
 SHORT DURATION OR SHORT TERM STATIONARY



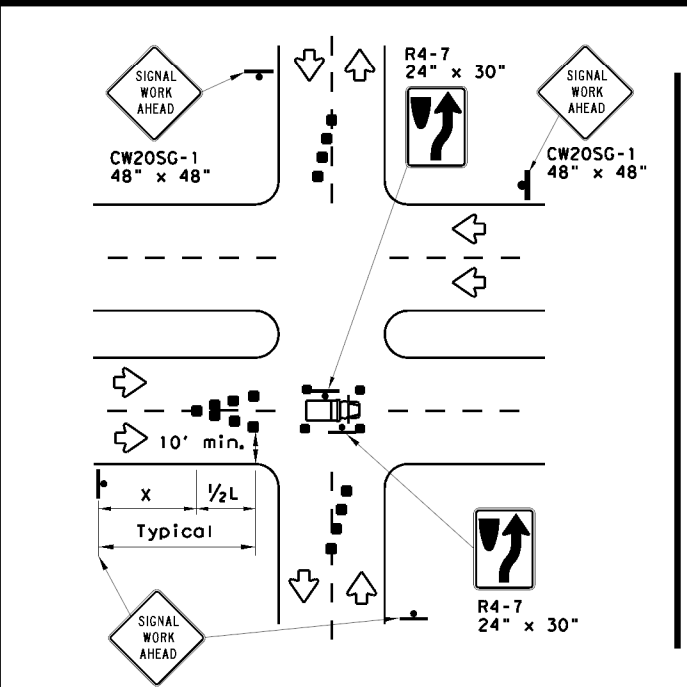
FAR SIDE LEFT LANE CLOSURE
 SHORT DURATION OR SHORT TERM STATIONARY

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

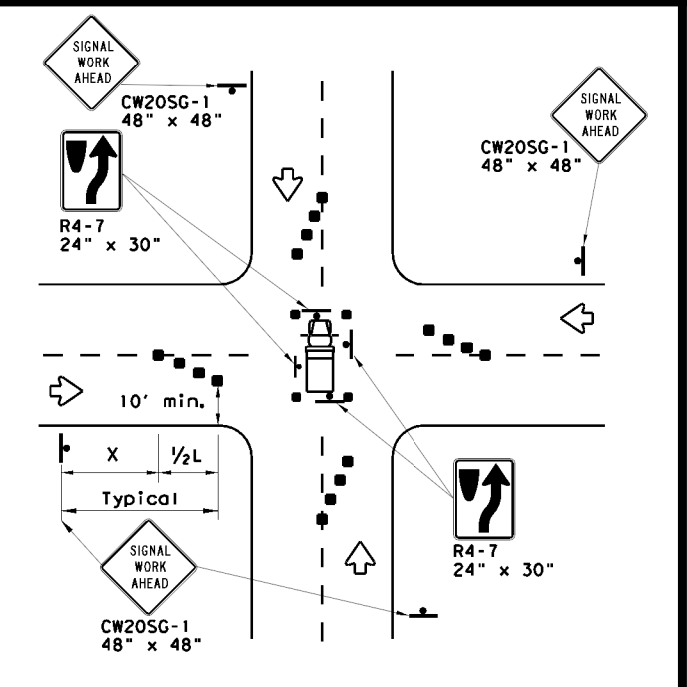
Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
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.



OPERATIONS IN THE INTERSECTION
 SHORT DURATION



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.

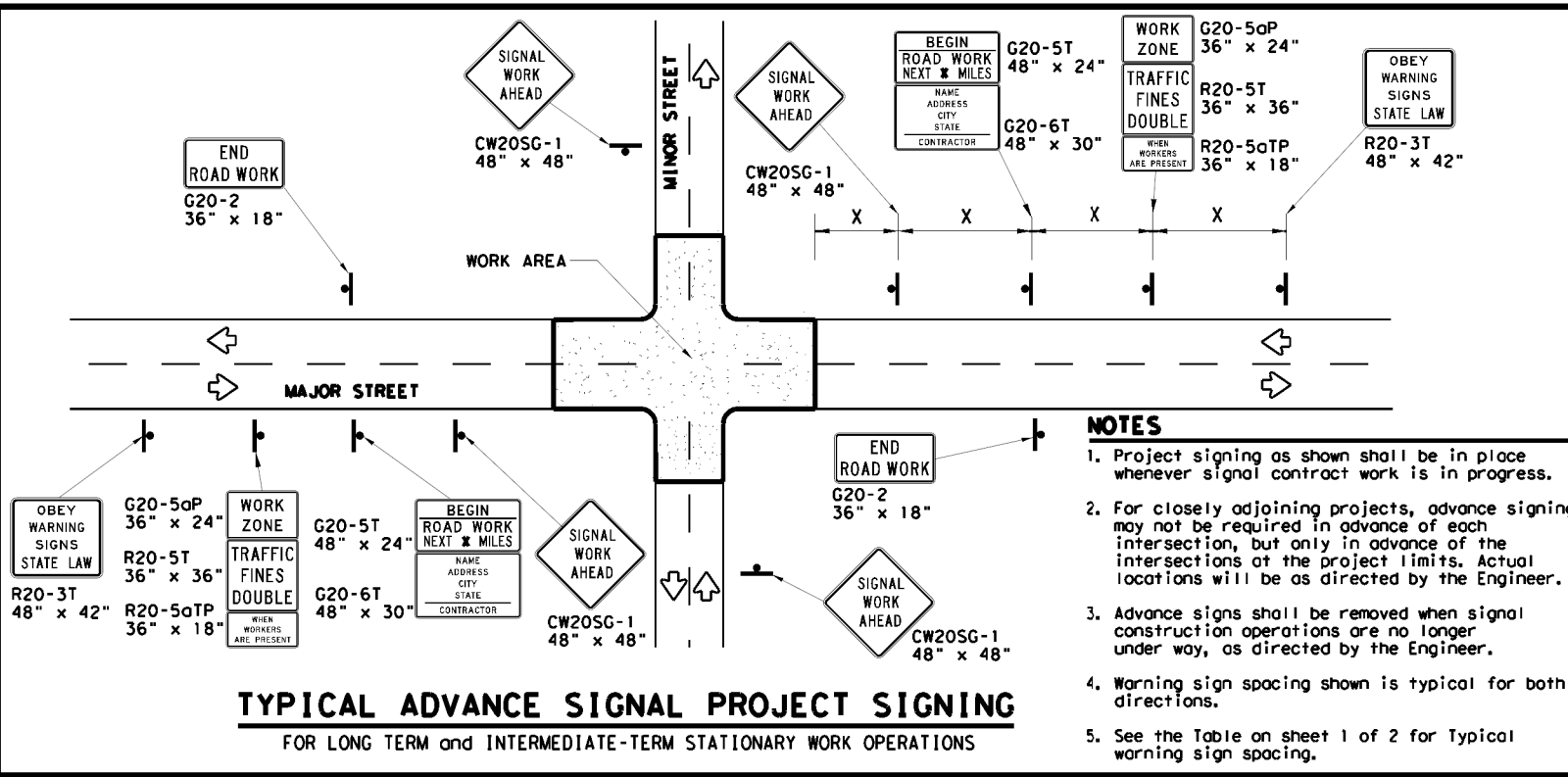
Texas Department of Transportation
 Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts-13.dgn	DWG: TxDOT	CHK: TxDOT	REV: TxDOT	CR: TxDOT
© TxDOT April 1992	CONT: 0911	SECT: 00	JOB: 139	HIGHWAY: VARIOUS
2-98 10-99 7-13	DIST: LFK	COUNTY: ANGELINA	SHEET NO. 28	

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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 66.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

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

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night without damaging the sign sheeting. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

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

SIGN SUPPORT WEIGHTS

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

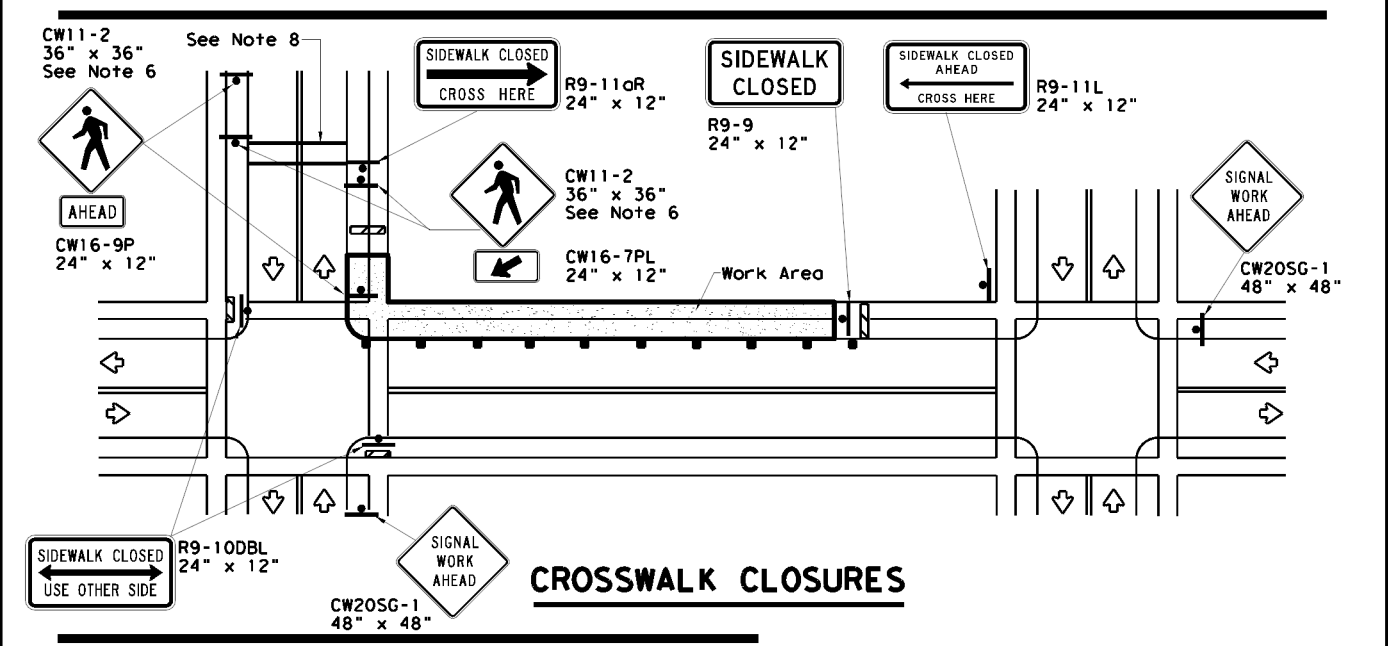
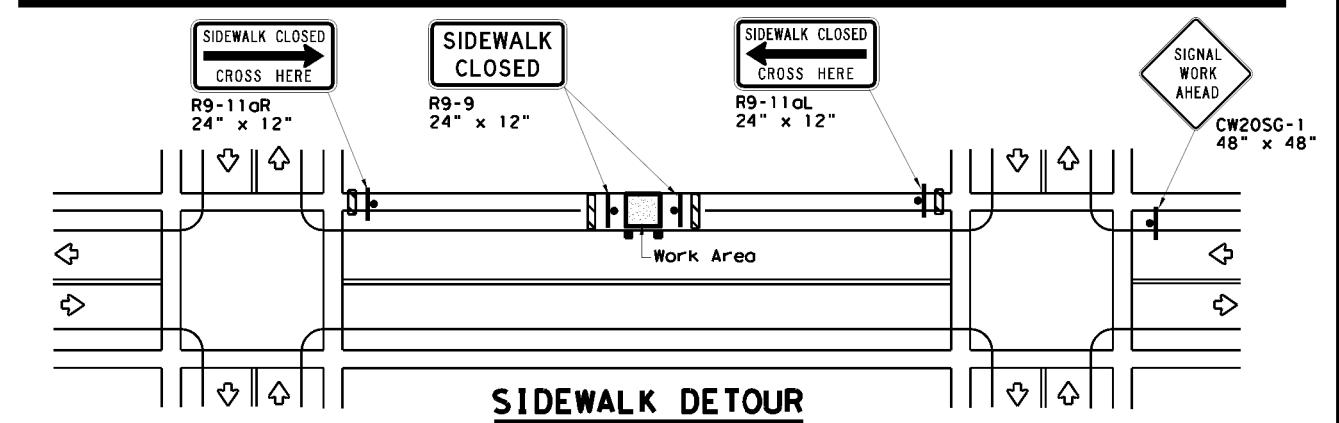
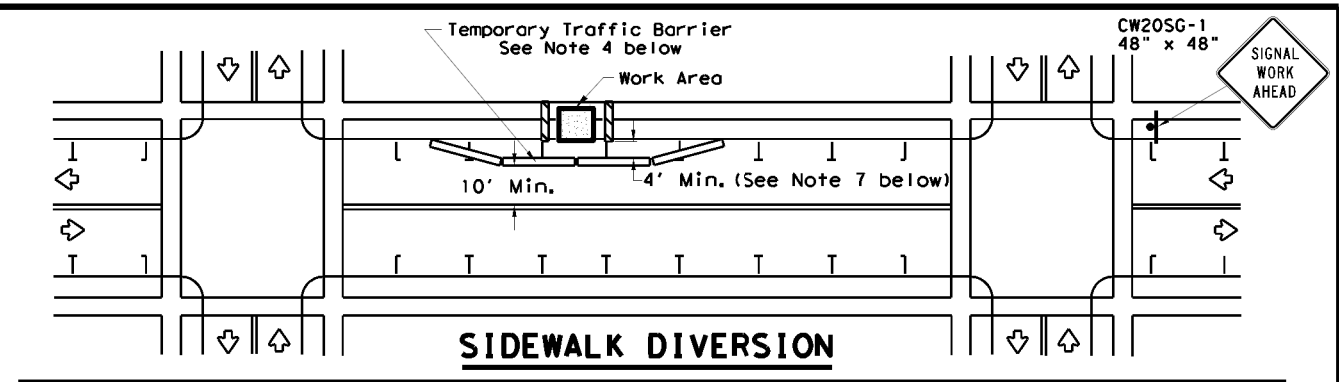
	Sign
	Channelizing Devices
	Type 3 Barricade

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



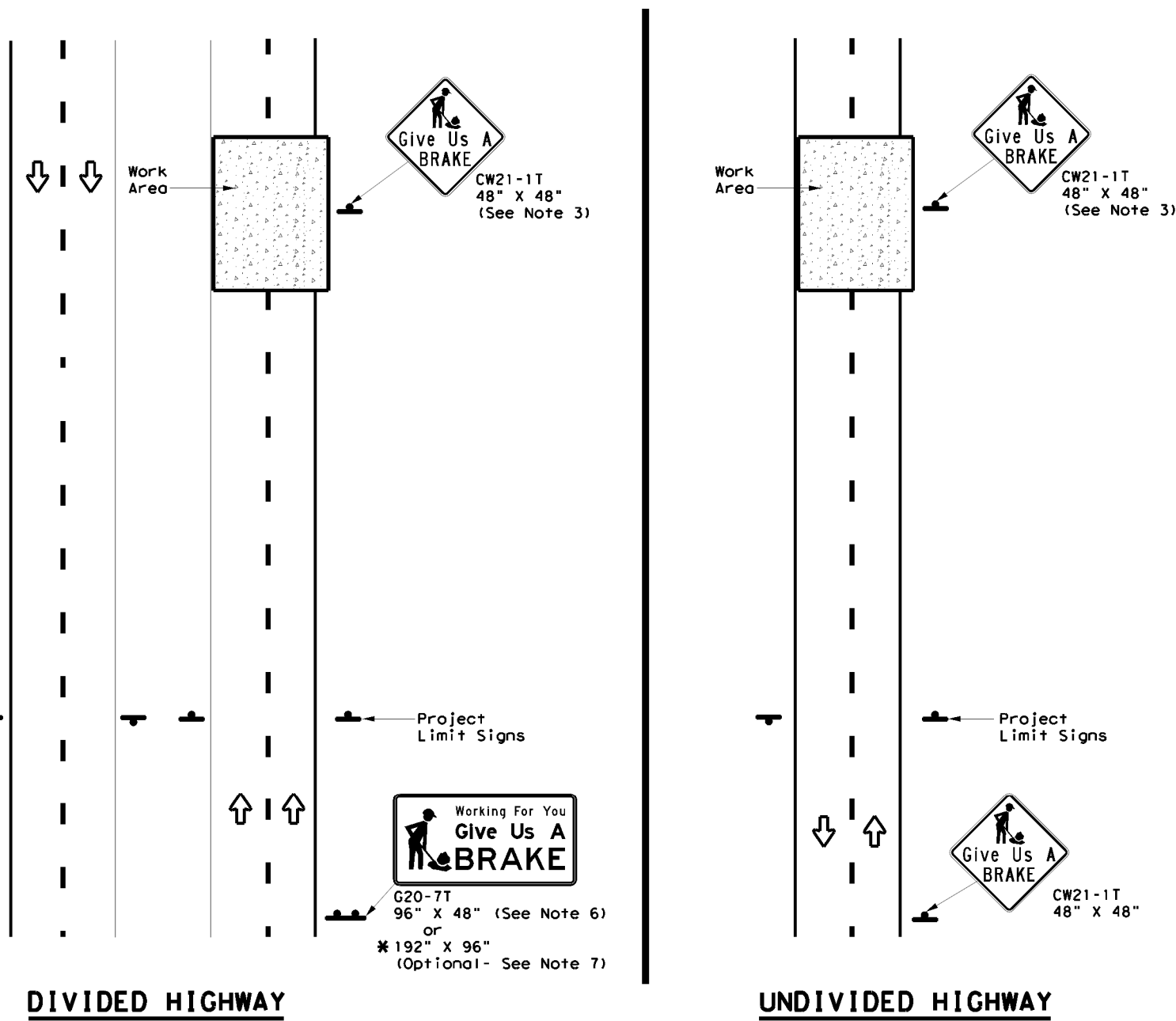
TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ (BTS-2) - 13

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4-98	3-03		LFK						

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SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL		DRILLED SHAFT
						Size	(LF)	
Orange	G20-7T		96" X 48"	Type B _{FL} or C _{FL}	32	▲	▲	▲
Orange	G20-7T		192" X 96"	Type B _{FL} or C _{FL}	128	W8x18	16 17	12

▲ See Note 6 Below

LEGEND

	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS

PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

Texas Department of Transportation
 Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

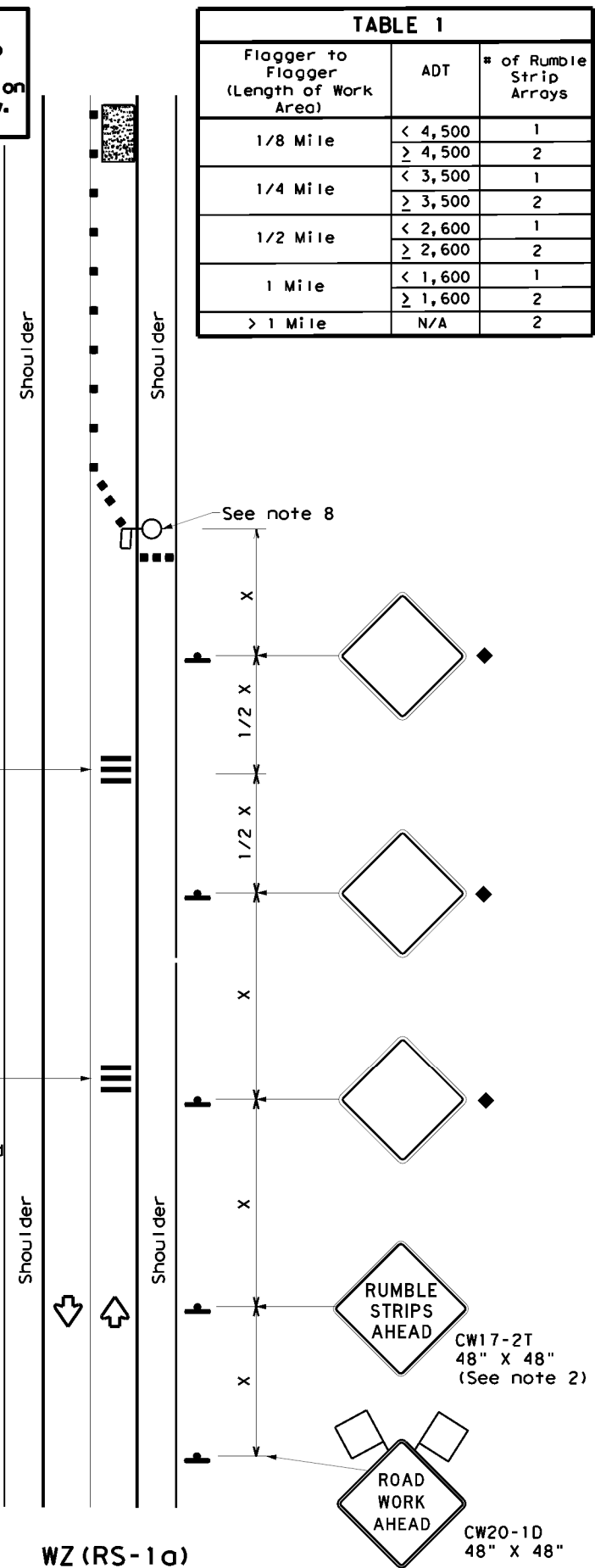
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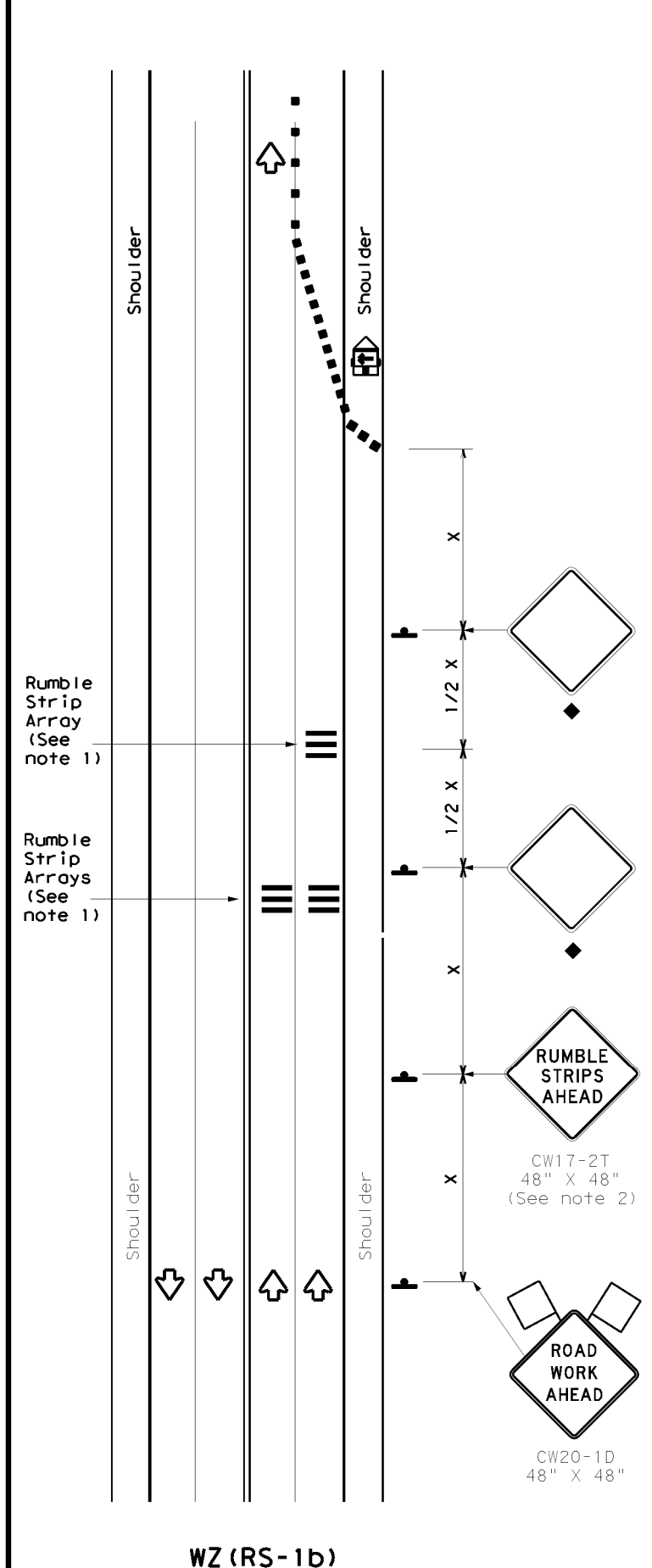
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Warning sign and rumble strip sequence in opposite direction is same as below.

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 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)

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

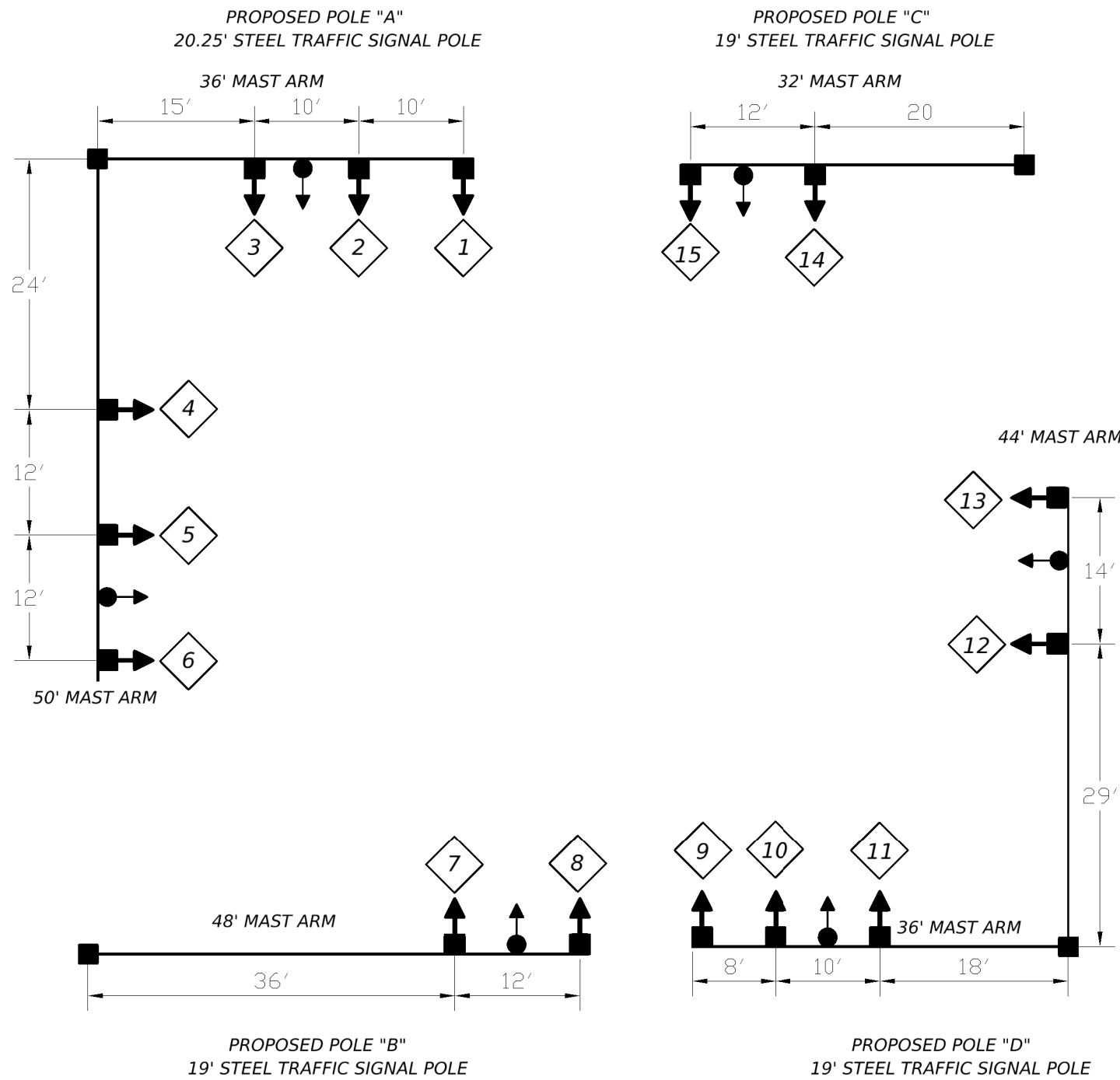
TEMPORARY RUMBLE STRIPS

WZ (RS) - 22

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BU 59G @ SL 287 (REFERENCE #1)

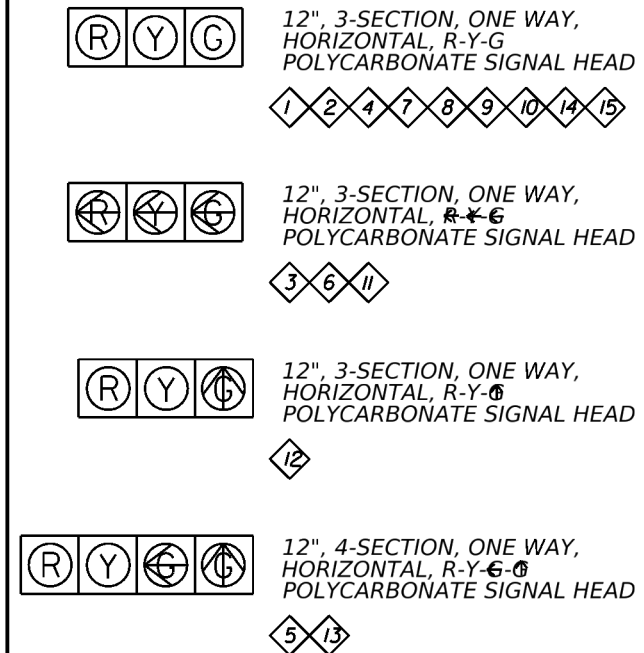
SIGNAL HEAD SPACING



NOTE:
1. PLACE PROPOSED VIVDS CAMERAS ON MAST ARMS AT APPROVED LOCATIONS OR AS DIRECTED.

BU 59G @ SL 287

SIGNAL HEAD



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N.T.S.

Seth D. Franks, P.E.

3/18/2024

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TRAFFIC SIGNAL DETAILS

SHEET 1 OF 4			
CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST		COUNTY	SHEET NO.
LFK		ANGELINA	32


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SL 287 @ BU 59G (REFERENCE #1)


WIRE RUN AND CONDUIT SIZE


		SIGNAL																
RUN		RUN #1	RUN #2	RUN #3	RUN #4	RUN #5	RUN #6	RUN #7	RUN #8	RUN #9	RUN # 10	RUN #11	RUN #12	RUN #13	RUN #14	RUN #15	RUN #16	TOTALS
WIRE	CAT 5 ETHERNET CABLE		6	3	2	1	1	1	3	3	3	3	1	1	2	2	2	2075
	4/C #14		6	3	2	1	1	1	3	3	3	3	1	1	2	2	2	2075
	#6 BARE	1																60
	#6 INSULATED	2																120
	#8 BARE		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	715
	CONDT (PVC) (SCH 80) (4")	X	X		X			X		X		X		X			X	230
	CONDT (RM) (4")										X							110
	CONDT (PVC) (4") BORE			X		X	X		X				X		X	X		575
	LENGTH OF RUN (FT)	60	35	90	10	75	80	15	80	60	110	20	50	15	95	155	15	

WIRE TERMINATIONS

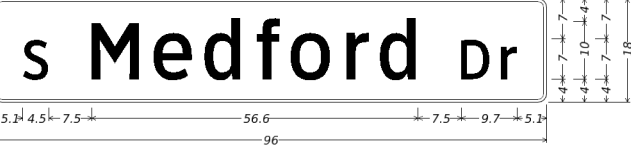

1-4 CONDR NO 14 AWG


1-4 CONDR NO 14 AWG



1-4 CONDR NO 14 AWG


1-4 CONDR NO 14 AWG


**RADAR
DETECTION CAT 5 ETHERNET CABLE
ASSEMBLY**



D3-1G(7) 10in;
 1.5" Radius, 0.5" Border, White on Green;
 "S", ClearviewHwy-3-W; "Medford", ClearviewHwy-3-W; "Dr", ClearviewHwy-3-W;




D3-1G(1) 8in;
 1.5" Radius, 0.5" Border, White on Green;
 "S", ClearviewHwy-3-W; "John Reddit", ClearviewHwy-3-W;



D3-1G(7) 10in;
 1.5" Radius, 0.5" Border, White on Green;
 "S", ClearviewHwy-3-W; "First", ClearviewHwy-3-W;
 "St", ClearviewHwy-3-W;

NOTE:
 1. SIGNS TO BE MOUNTED ON MAST ARMS AS DIRECTED.
 2. SIGN BLANKS WILL BE PAID FOR UNDER ITEM 636.
 3. SIGN INSTALLATION FOR EACH SIGN MOUNTED WILL BE INCLUDED FOR PAYMENT UNDER ITEM 680.

N.T.S.



SETH D. FRANKS
126258
LICENSED PROFESSIONAL ENGINEER

Seth D. Franks, P.E.

3/4/2024

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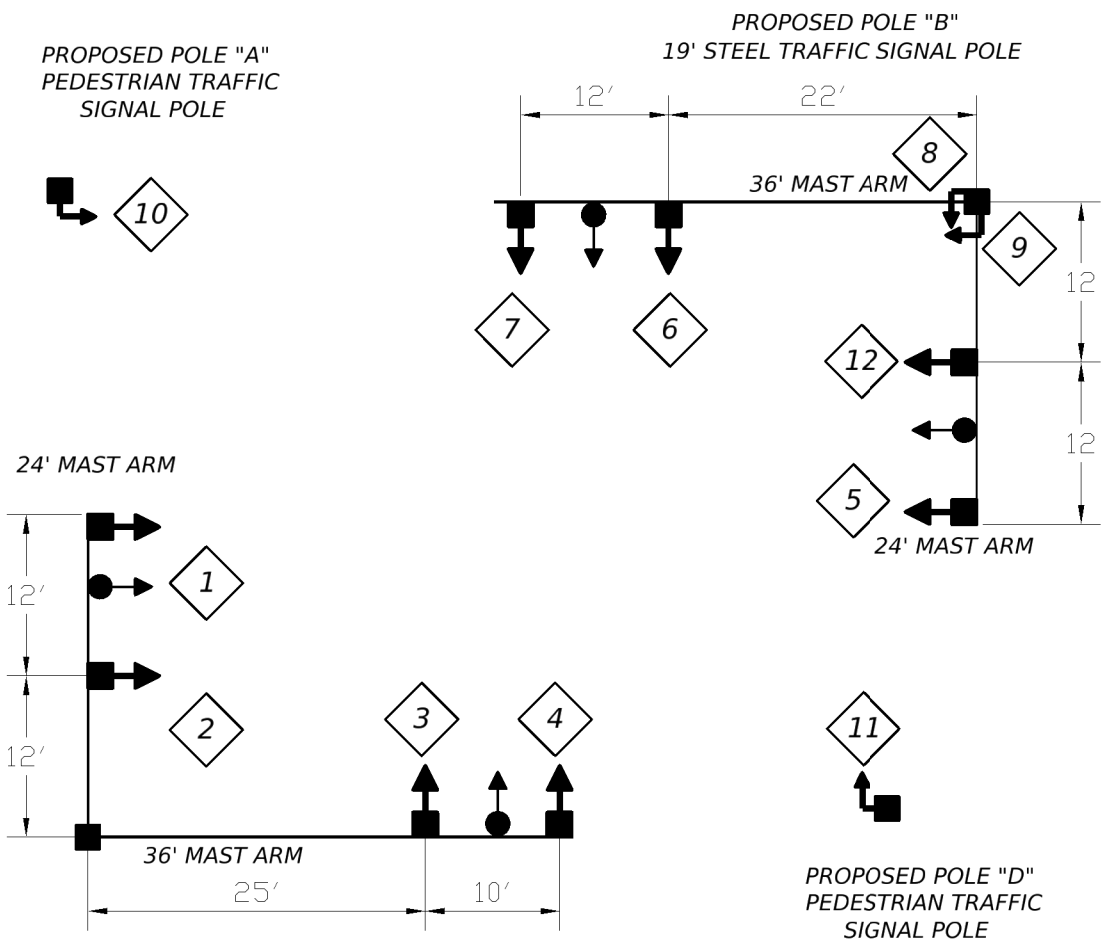
Texas Department of Transportation

TRAFFIC
SIGNAL
DETAILS

SHEET 2 OF 4			
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LFK		ANGELINA	33

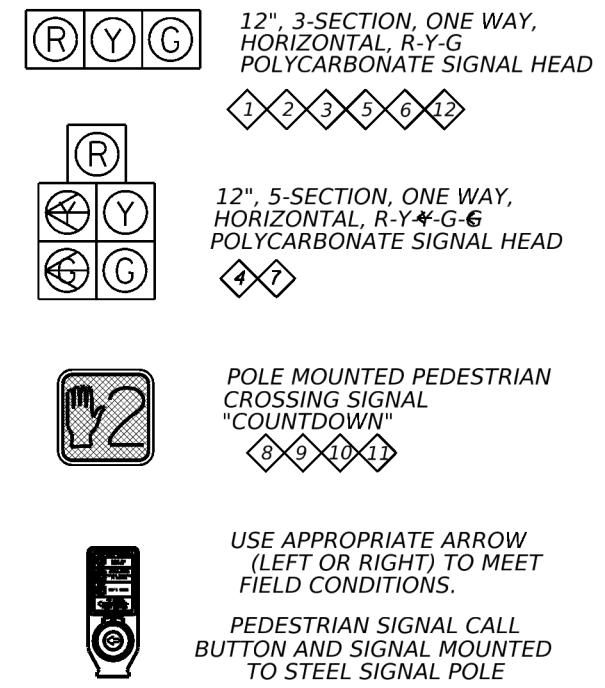
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SIGNAL HEAD SPACING

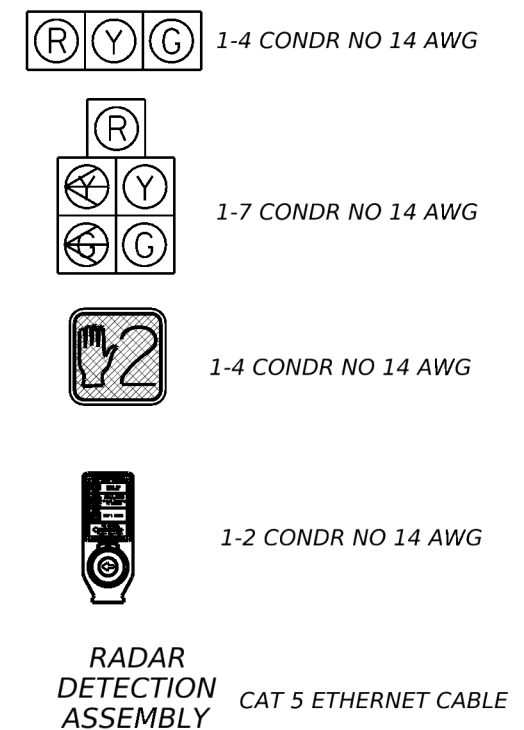


NOTE:
 1. PROPOSED PEDESTRIAN SIGNAL POLES WILL BE INSTALLED SEPARATELY AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED.
 2. PLACE PROPOSED VIVDS CAMERAS ON MAST ARMS AT APPROVED LOCATIONS OR AS DIRECTED.

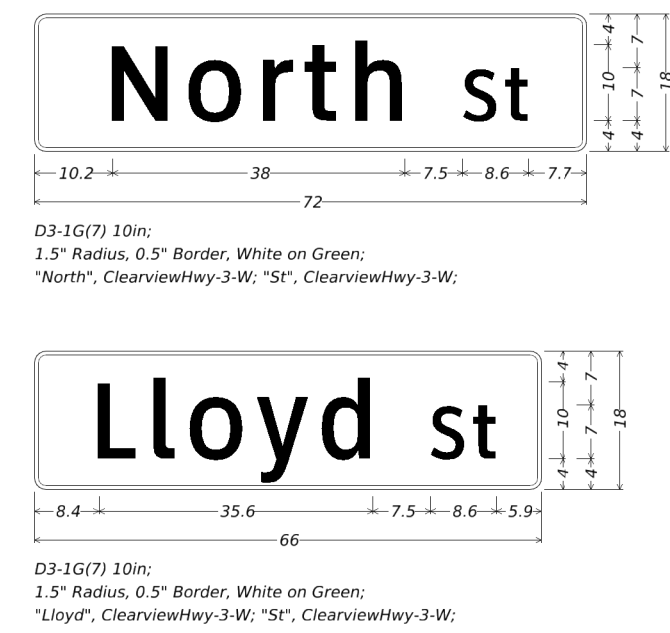
SIGNAL HEAD



WIRE TERMINATIONS



SIGNS



NOTES:
 1. SIGNS TO BE MOUNTED ON MAST ARMS AS DIRECTED.
 2. SIGN BLANKS WILL BE PAID FOR UNDER ITEM 636.
 3. SIGN INSTALLATION FOR EACH SIGN MOUNTD WILL BE INCLUDED FOR PAYMENT UNDER ITEM 680.

BU 59F/NORTH ST @ LLOYD ST. (REFERENCE #2)

WIRE RUN AND CONDUIT SIZE

		SIGNAL								
RUN		RUN #1	RUN #2	RUN #3	RUN #4	RUN #5	RUN #6	RUN #7	RUN #8	TOTALS
WIRE	CAT 5 ETHERNET CABLE	4	2	2	2					270
	2/C #14	3		3	2	1	1		1	295
	4/C #14	7	2	5	4	1	1		1	565
	7/C #14	2	1	1	1					135
	#6 BARE							1		5
	#6 INSULATED							2		10
	#8 BARE	1	1	1	1	1	1		1	195
	CONDT (PVC) (SCH 80) (4")	X	X		X		X	X	X	80
	CONDT (PVC) (4") BORE			X		X				120
	LENGTH OF RUN (FT)	5	50	65	10	55	5	5	5	

N.T.S.



Seth D. Franks, P.E.
 3/18/2024



TRAFFIC SIGNAL DETAILS

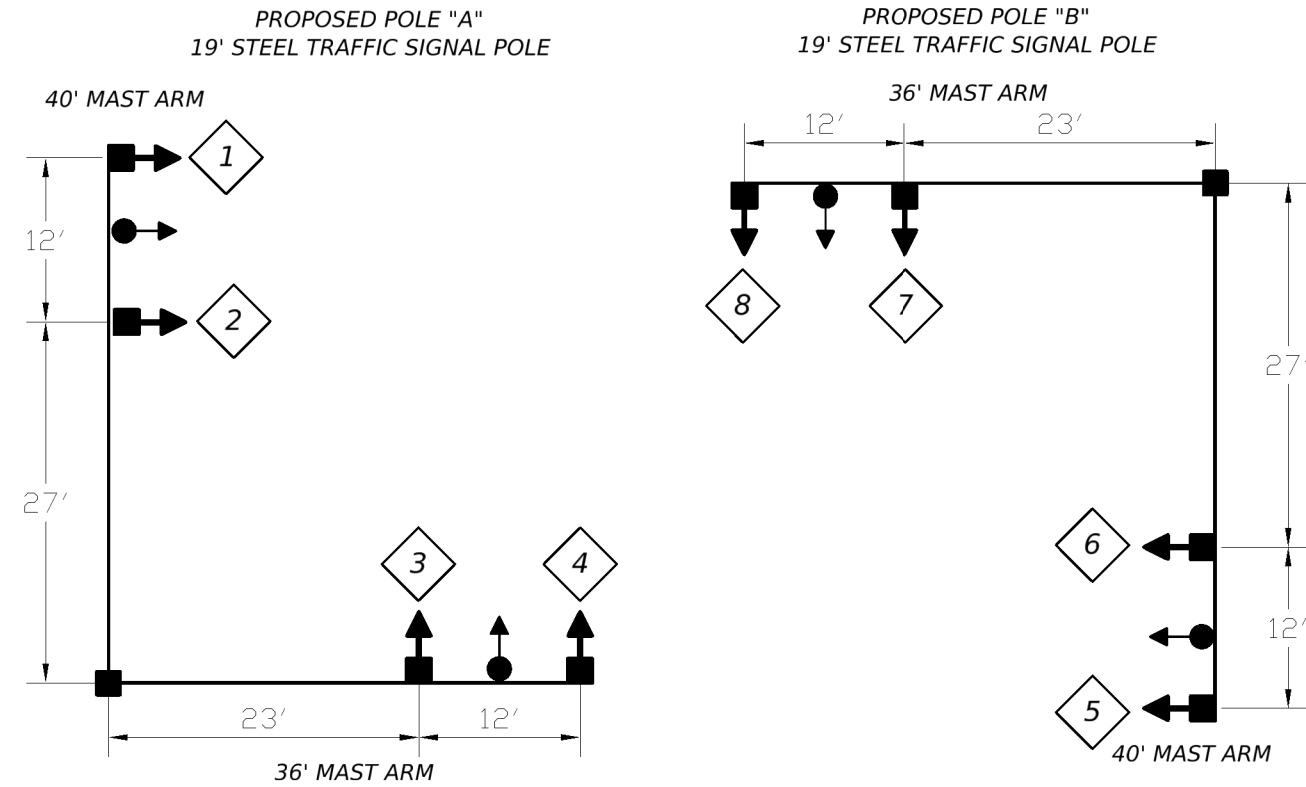
SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
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LFK	ANGELINA	34	

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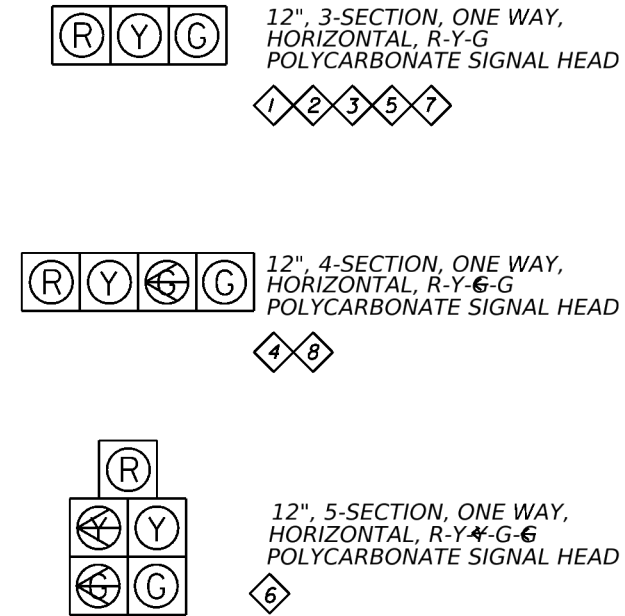
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SIGNAL HEAD SPACING

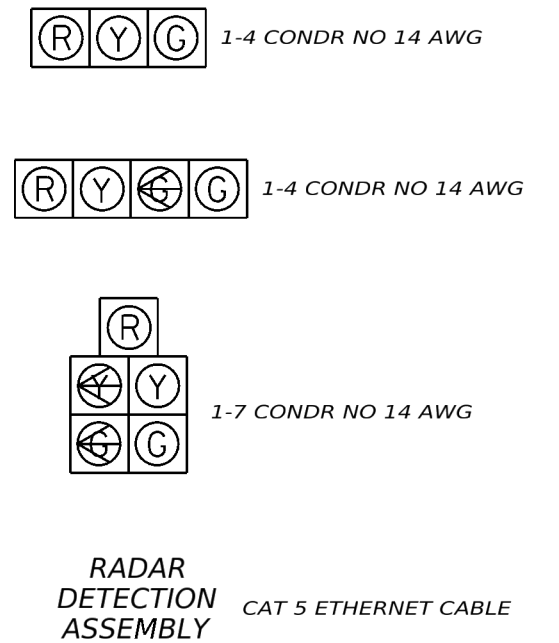


NOTE:
1. PLACE PROPOSED VIVDS CAMERAS ON MAST ARMS AT APPROVED LOCATIONS OR AS DIRECTED.

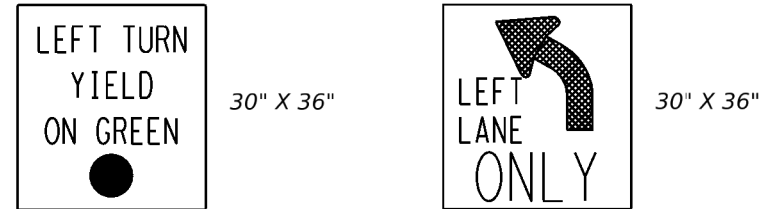
SIGNAL HEAD



WIRE TERMINATIONS



SIGNS



SIGN SHALL BE PLACED TO THE RIGHT OF THE 5-SECTION HEAD AS DIRECTED BY THE ENGINEER

SIGN SHALL BE PLACED TO THE RIGHT OF THE 5-SECTION HEAD AS DIRECTED BY THE ENGINEER

Austin st

D3-1G(7) 10in;
1.5" Radius, 0.5" Border, White on Green;
"Austin", ClearviewHwy-3-W; "St", ClearviewHwy-3-W;

Appleby Sand Rd

D3-1G(1) 8in;
1.5" Radius, 0.5" Border, White on Green;
"Appleby Sand", ClearviewHwy-3-W 60% spacing; "Rd", ClearviewHwy-3-W;

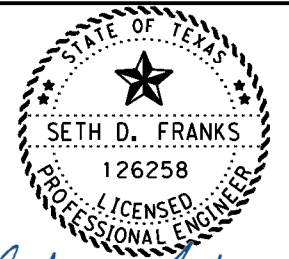
NOTE:
1. SIGNS TO BE MOUNTED ON MAST ARMS AS DIRECTED.
2. SIGN BLANKS WILL BE PAID FOR UNDER ITEM 636.
3. SIGN INSTALLATION FOR EACH SIGN MOUNTED WILL BE INCLUDED FOR PAYMENT UNDER ITEM 680.

FM 2609 @ FM 1411 (REFERENCE #3)

WIRE RUN AND CONDUIT SIZE

		SIGNAL						
RUN		RUN #1	RUN #2	RUN #3	RUN #4	RUN #5	RUN #6	TOTALS
WIRE	CAT 5 ETHERNET CABLE	4	2	2	2	2		490
	4/C #14	4	2	2	2	2		490
	7/C #14	1	1					20
	#6 BARE						1	10
	#6 INSULATED						2	20
	#8 BARE	1	1	1	1	1		235
	CONDT (PVC) (SCH 80) (4")	X	X			X		70
	CONDT (PVC) (SCH 80) (4") BORE			X	X			165
	LENGTH OF RUN (FT)	10	10	85	80	50	10	

N.T.S.



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3/4/2024

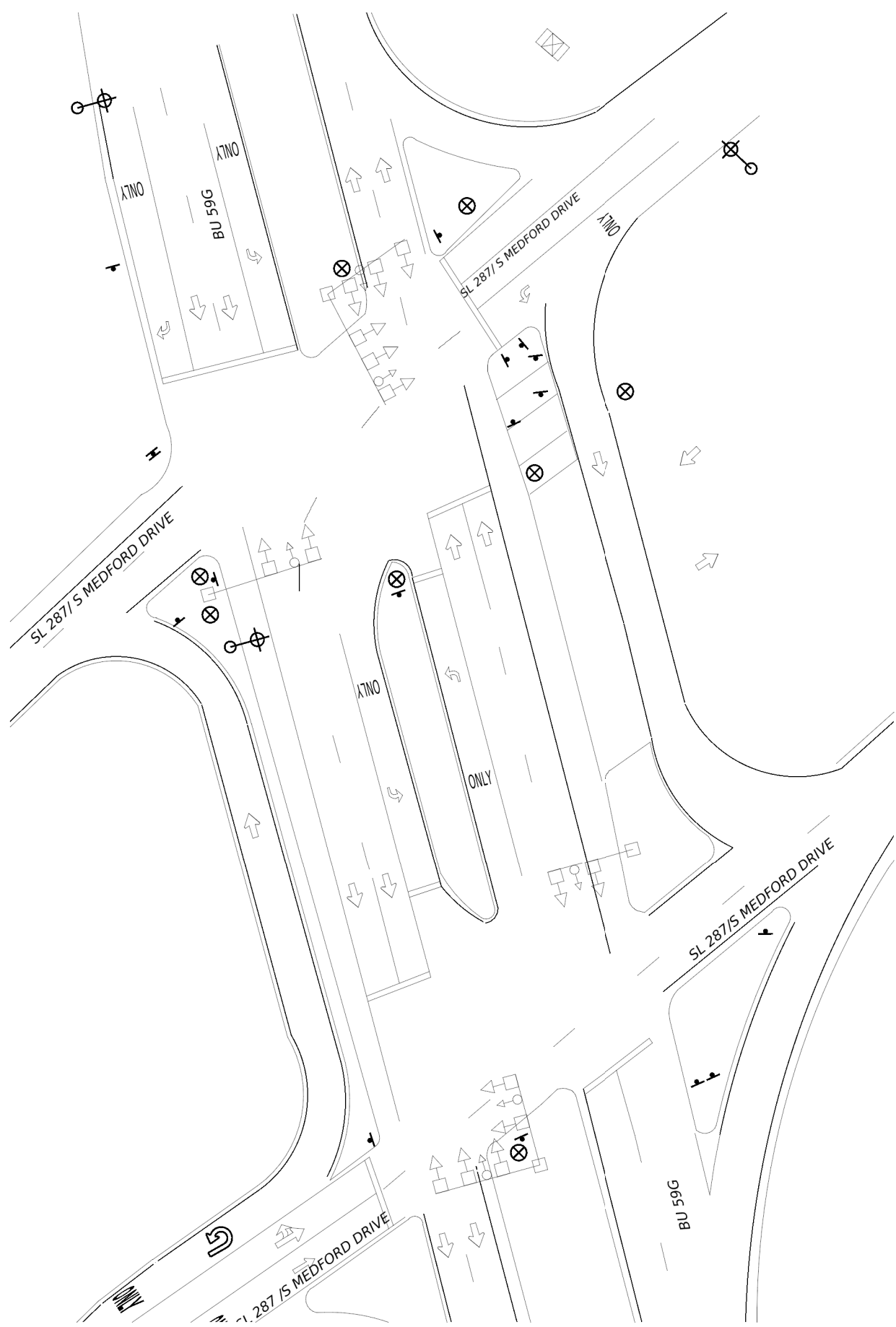


TRAFFIC SIGNAL DETAILS

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	35	

CK: DW: CK: DW: CK: DW:



LEGEND

	PROPOSED TRAFFIC SIGNAL POLE		PROPOSED CONDUIT RUN (IN TRENCH)
	EXISTING TRAFFIC SIGNAL POLE		EXISTING CONDUIT RUN (IN TRENCH)
	PROPOSED GROUND BOX		PROPOSED ROAD BORE
	EXISTING GROUND BOX		EXISTING ROAD BORE
	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED		TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED		OVERHEAD ELECTRICITY
	PROPOSED VIVDS CAMERA ASSEMBLY		WATER LINE
	EXISTING VIVDS CAMERA ASSEMBLY		GAS LINE
	PROPOSED TRAFFIC SIGNAL HEAD		TELEPHONE (UNDERGROUND)
	EXISTING TRAFFIC SIGNAL HEAD		SANITARY SEWER
	PROPOSED LUMINAIRE DEVICE		PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	EXISTING LUMINAIRE DEVICE		EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	PROPOSED WOOD POLE		PROPOSED SIGN
	EXISTING WOOD POLE		EXISTING SIGN
	PROPOSED ELECTRICAL SERVICES		TRAFFIC DIRECTION ARROW
	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

DATE: 2/28/2024 10:13:43 AM
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SCALE 1" = 50'

Seth D. Franks, P.E.

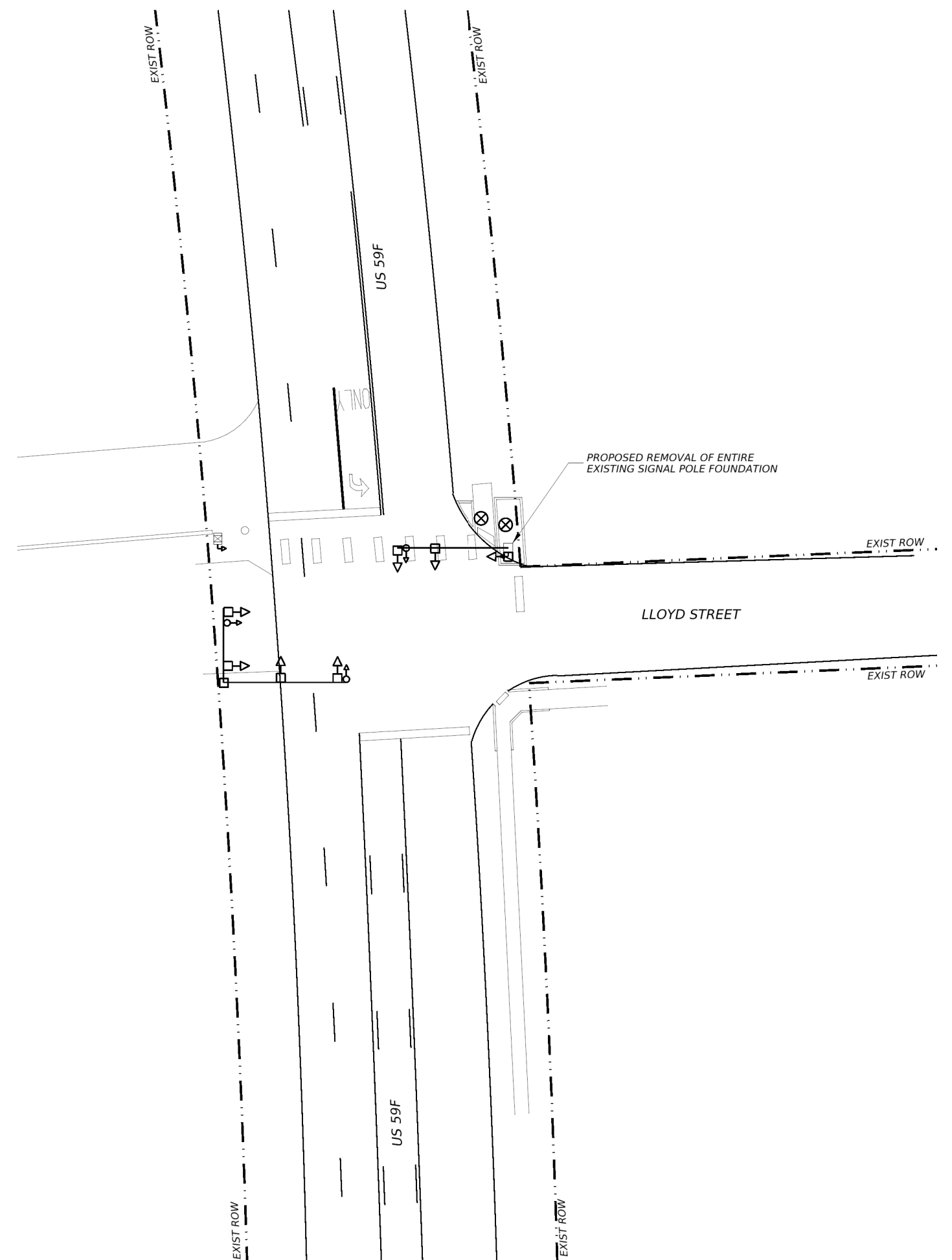
3/4/2024



**EXISTING LAYOUT
 (INTERSECTION AT SL 287 @
 @ BU 59G)
 (REFERENCE #1)**

SHEET 1 OF 3			
CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	36	

CK: DW: CK: DW: CK: DW:



LEGEND

<ul style="list-style-type: none"> ■ PROPOSED TRAFFIC SIGNAL POLE □ EXISTING TRAFFIC SIGNAL POLE ⊗ PROPOSED GROUND BOX ⊗ EXISTING GROUND BOX ⊠ PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED ⊠ EXISTING TRAFFIC CONTROLLER GROUND MOUNTED ⊙ PROPOSED VIVDS CAMERA ASSEMBLY ⊙ EXISTING VIVDS CAMERA ASSEMBLY ⬆ PROPOSED TRAFFIC SIGNAL HEAD ⬆ EXISTING TRAFFIC SIGNAL HEAD ⬆ PROPOSED LUMINAIRE DEVICE ⬆ EXISTING LUMINAIRE DEVICE ● PROPOSED WOOD POLE ○ EXISTING WOOD POLE ⊕ PROPOSED ELECTRICAL SERVICES ○ EXISTING ELECTRICAL SERVICES 	<ul style="list-style-type: none"> — PROPOSED CONDUIT RUN (IN TRENCH) — EXISTING CONDUIT RUN (IN TRENCH) — PROPOSED ROAD BORE — EXISTING ROAD BORE ⊕ TYPICAL CONDUIT & SIGNAL WIRE RUN NO. — OE — OVERHEAD ELECTRICITY — W — WATER LINE — G — GAS LINE — T — TELEPHONE (UNDERGROUND) — SS — SANITARY SEWER ⬆ PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ⬆ EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ⬆ PROPOSED SIGN ⬆ EXISTING SIGN ➡ TRAFFIC DIRECTION ARROW
--	---

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

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SCALE 1" = 40'

Seth D. Franks, P.E.

3/4/2024



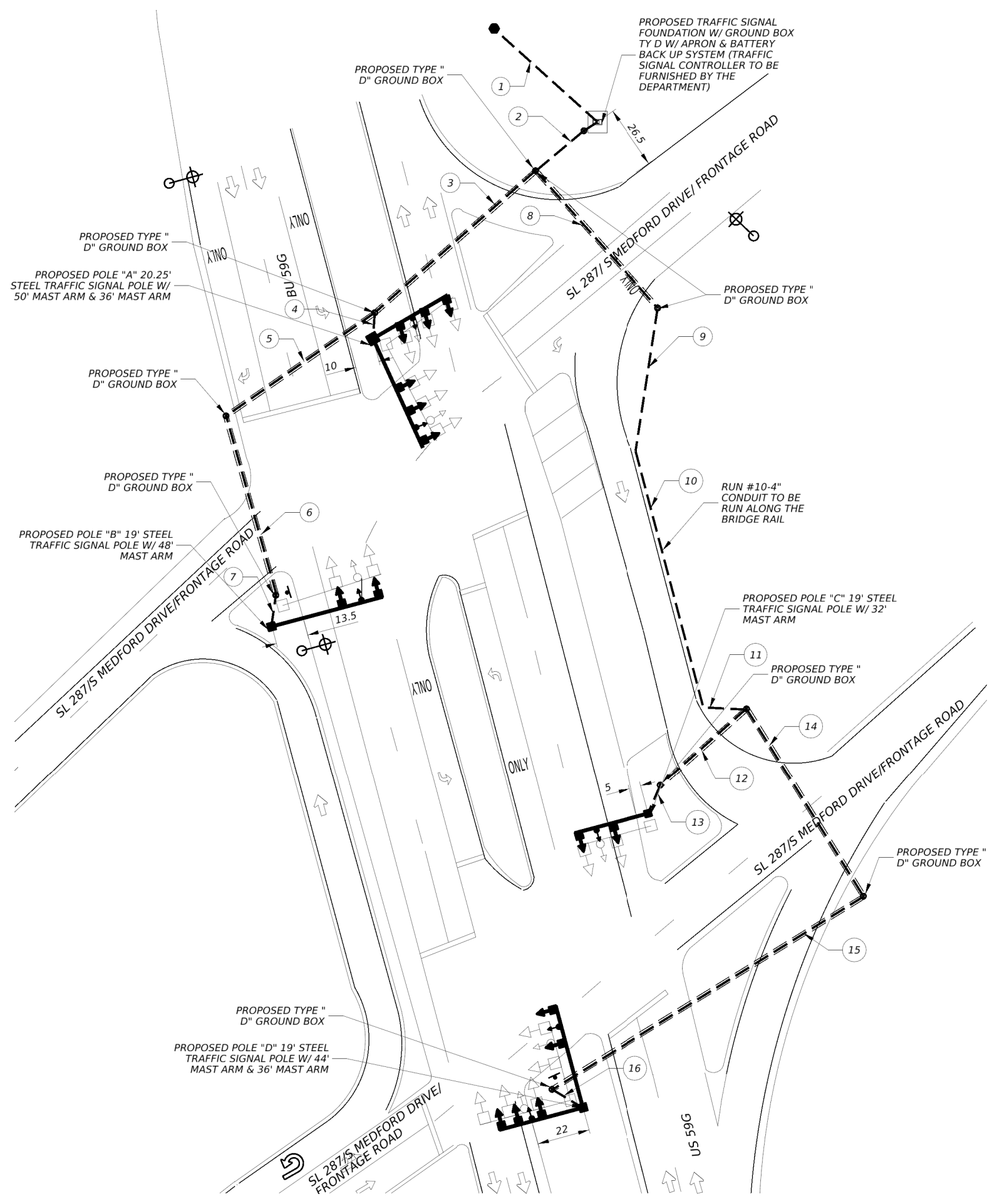
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 (INTERSECTION AT BU 59F @
 LLOYD STREET)
 (REFERENCE #2)**

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	37	

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LEGEND

<ul style="list-style-type: none"> ■ PROPOSED TRAFFIC SIGNAL POLE □ EXISTING TRAFFIC SIGNAL POLE ⊗ PROPOSED GROUND BOX ⊗ EXISTING GROUND BOX ⊠ PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED ⊠ EXISTING TRAFFIC CONTROLLER GROUND MOUNTED ⊙ PROPOSED VIVDS CAMERA ASSEMBLY ⊙ EXISTING VIVDS CAMERA ASSEMBLY ⬆ PROPOSED TRAFFIC SIGNAL HEAD ⬆ EXISTING TRAFFIC SIGNAL HEAD ⬆ PROPOSED LUMINAIRE DEVICE ⬆ EXISTING LUMINAIRE DEVICE ● PROPOSED WOOD POLE ● EXISTING WOOD POLE ⊙ PROPOSED ELECTRICAL SERVICES ⊙ EXISTING ELECTRICAL SERVICES 	<ul style="list-style-type: none"> — PROPOSED CONDUIT RUN (IN TRENCH) — EXISTING CONDUIT RUN (IN TRENCH) — PROPOSED ROAD BORE — EXISTING ROAD BORE ⊙ TYPICAL CONDUIT & SIGNAL WIRE RUN NO. — OE — OVERHEAD ELECTRICITY — W — WATER LINE — G — GAS LINE — T — TELEPHONE (UNDERGROUND) — SS — SANITARY SEWER ⬆ PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ⬆ EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ⬆ PROPOSED SIGN ⬆ EXISTING SIGN ➔ TRAFFIC DIRECTION ARROW
--	---

NOTES:

1. LOCATIONS AND OFFSETS SHOWN FOR PROPOSED SIGNAL POLES, ELECTRICAL SERVICE POLES, TRAFFIC SIGNAL FOUNDATIONS AND CONTROLLER, CONDUIT RUNS AND GROUND BOXES ARE APPROXIMATE AND MUST BE STAKED, FIELD VERIFIED, AND APPROVED PRIOR TO DRILLING FOR EXCAVATION. COORDINATE WITH UTILITY OWNERS TO PREVENT ANY DISRUPTION IN SERVICE.
2. SIZE OF THE CONTROLLER FOUNDATION MAY BE ADJUSTED TO ACCOMMODATE SPACE RESTRICTIONS.
3. SEE TRAFFIC DETAIL SHEETS FOR CONDUIT & WIRE RUN INFORMATION.
4. UNLESS OTHERWISE DIRECTED OR APPROVED, THE EXISTING SIGNAL AND CONTROLLER WILL REMAIN IN PLACE AND FULLY OPERATIONAL UNTIL ALL PROPOSED CONDUIT AND SIGNAL WIRING HAS BEEN INSTALLED AND WIRED INTO THE PROPOSED CONTROLLER, FULLY TESTED, AND OPERATIONAL BEFORE SWITCHING. ONCE THE PROPOSED TRAFFIC SIGNAL ASSEMBLIES AND CONTROLLER IS INSTALLED AND FULLY OPERATIONAL, ACCEPTED AND PLACED INTO OPERATION, REMOVE THE EXISTING TRAFFIC SIGNAL ASSEMBLY AND CONTROLLER AS DIRECTED, AND DELIVER ALL PARTS DEEMED SALVAGABLE TO THE DEPARTMENT'S SIGNAL SHOP LOCATED AT 1805 NORTH TIMBERLAND DRIVE IN LUFKIN.

SCALE 1" = 50'

SETH D. FRANKS
 126258
 LICENSED PROFESSIONAL ENGINEER

Seth D. Franks, P.E.

3/18/2024

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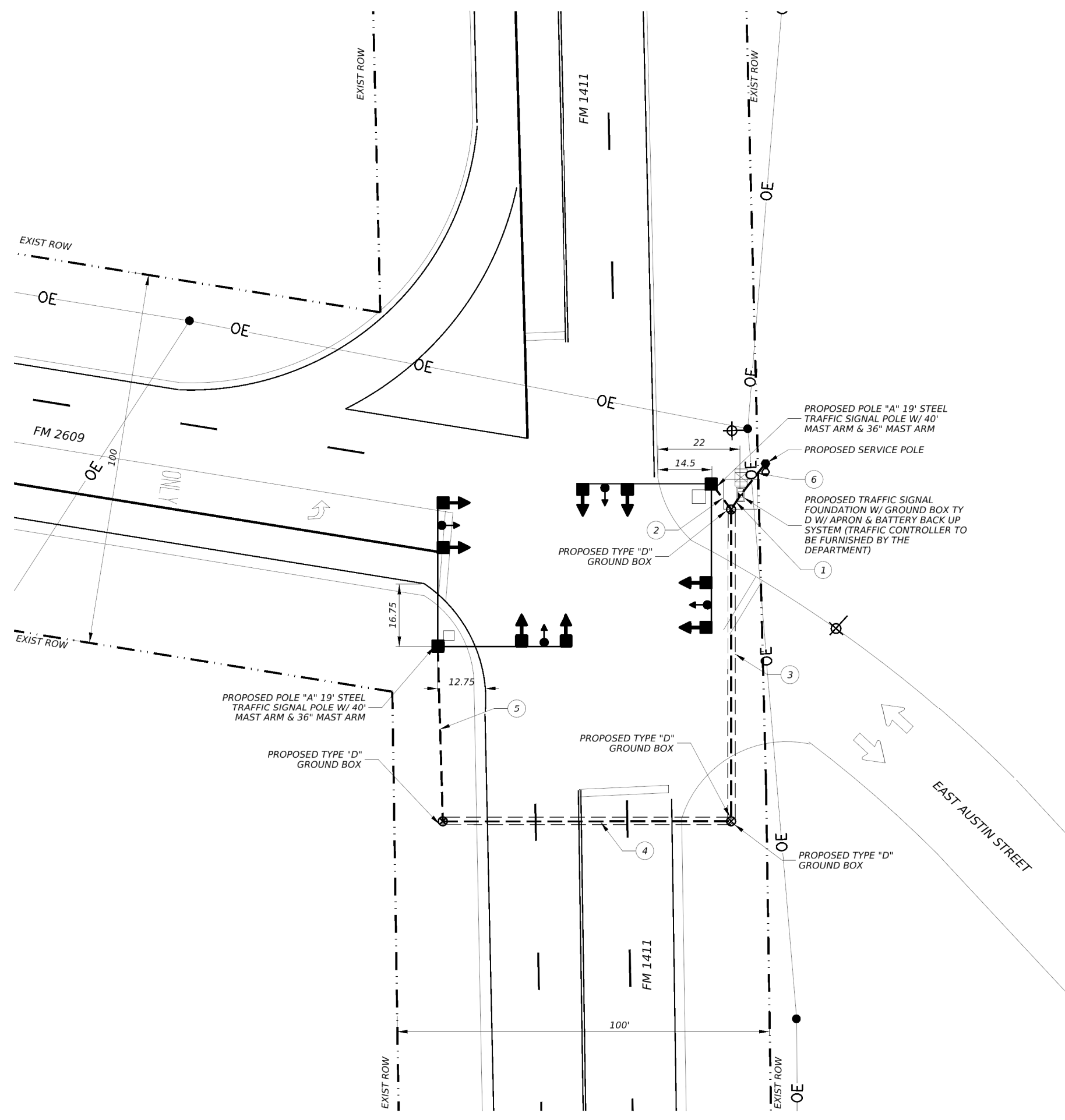
**PROPOSED LAYOUT
 (INTERSECTION AT BU 59G
 @ SL 287)
 (REFERENCE #1)**

SHEET 1 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	39	

CK: DW: CK: DW:

DATE: 2/29/2024 01:07:18 AM
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NOTES:

- LOCATIONS AND OFFSETS SHOWN FOR PROPOSED SIGNAL POLES, ELECTRICAL SERVICE POLES, TRAFFIC SIGNAL FOUNDATION AND CONTROLLER, CONDUIT RUNS AND GROUND BOXES ARE APPROXIMATE AND MUST BE STAKED, FIELD VERIFIED AND APPROVED PRIOR TO DRILLING OR EXCAVATING. COORDINATE WITH UTILITY OWNERS TO PREVENT ANY DISRUPTION IN SERVICE.
- SIZE OF THE CONTROLLER FOUNDATION MAY BE ADJUSTED TO ACCOMMODATE SPACE RESTRICTIONS.
- SEE TRAFFIC SIGNAL DETAIL SHEETS FOR CONDUIT & WIRE RUN INFORMATION.

SCALE 1" = 30'

126258
LICENSED PROFESSIONAL ENGINEER

3/4/2024

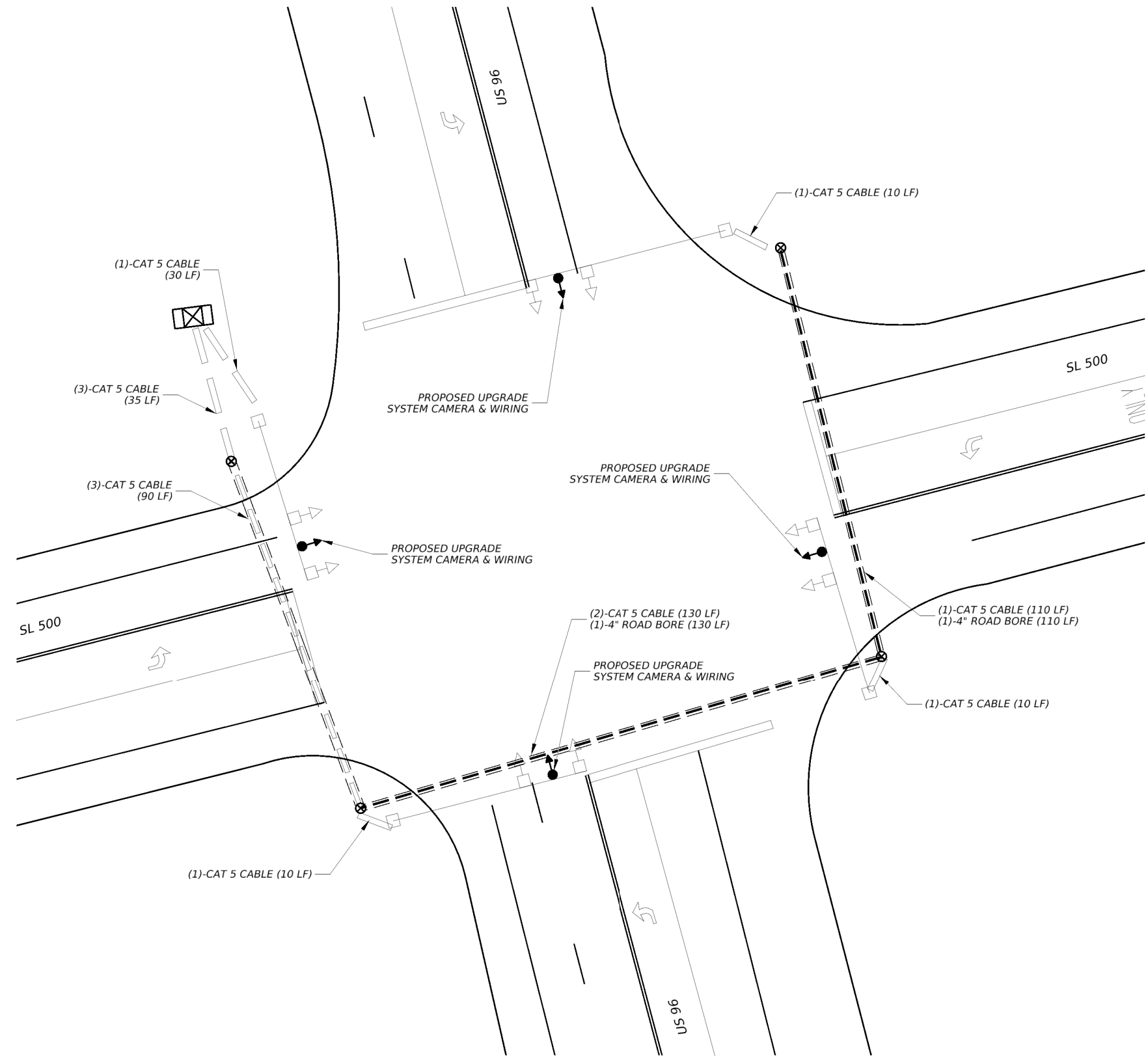
Texas Department of Transportation

**PROPOSED LAYOUT
 (INTERSECTION AT FM 2609 @
 FM 1411)
 (REFERENCE #3)**

SHEET 3 OF 32

CONT.	SECT.	JOB.	HIGHWAY.
0911	00	139	VARIOUS
DIST.		COUNTY	SHEET NO.
LFK		ANGELINA	41

DATE: 3/13/2024 11:12:45 AM
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LEGEND

	PROPOSED TRAFFIC SIGNAL POLE		PROPOSED CONDUIT RUN (IN TRENCH)
	EXISTING TRAFFIC SIGNAL POLE		EXISTING CONDUIT RUN (IN TRENCH)
	PROPOSED GROUND BOX		PROPOSED ROAD BORE
	EXISTING GROUND BOX		EXISTING ROAD BORE
	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED		TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED		OVERHEAD ELECTRICITY
	PROPOSED VIVDS CAMERA ASSEMBLY		WATER LINE
	EXISTING VIVDS CAMERA ASSEMBLY		GAS LINE
	PROPOSED TRAFFIC SIGNAL HEAD		TELEPHONE (UNDERGROUND)
	EXISTING TRAFFIC SIGNAL HEAD		SANITARY SEWER
	PROPOSED LUMINAIRE DEVICE		PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	EXISTING LUMINAIRE DEVICE		EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	PROPOSED WOOD POLE		PROPOSED SIGN
	EXISTING WOOD POLE		EXISTING SIGN
	PROPOSED ELECTRICAL SERVICES		TRAFFIC DIRECTION ARROW
	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 30'

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 126258
 LICENSED PROFESSIONAL ENGINEER

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3/18/2024

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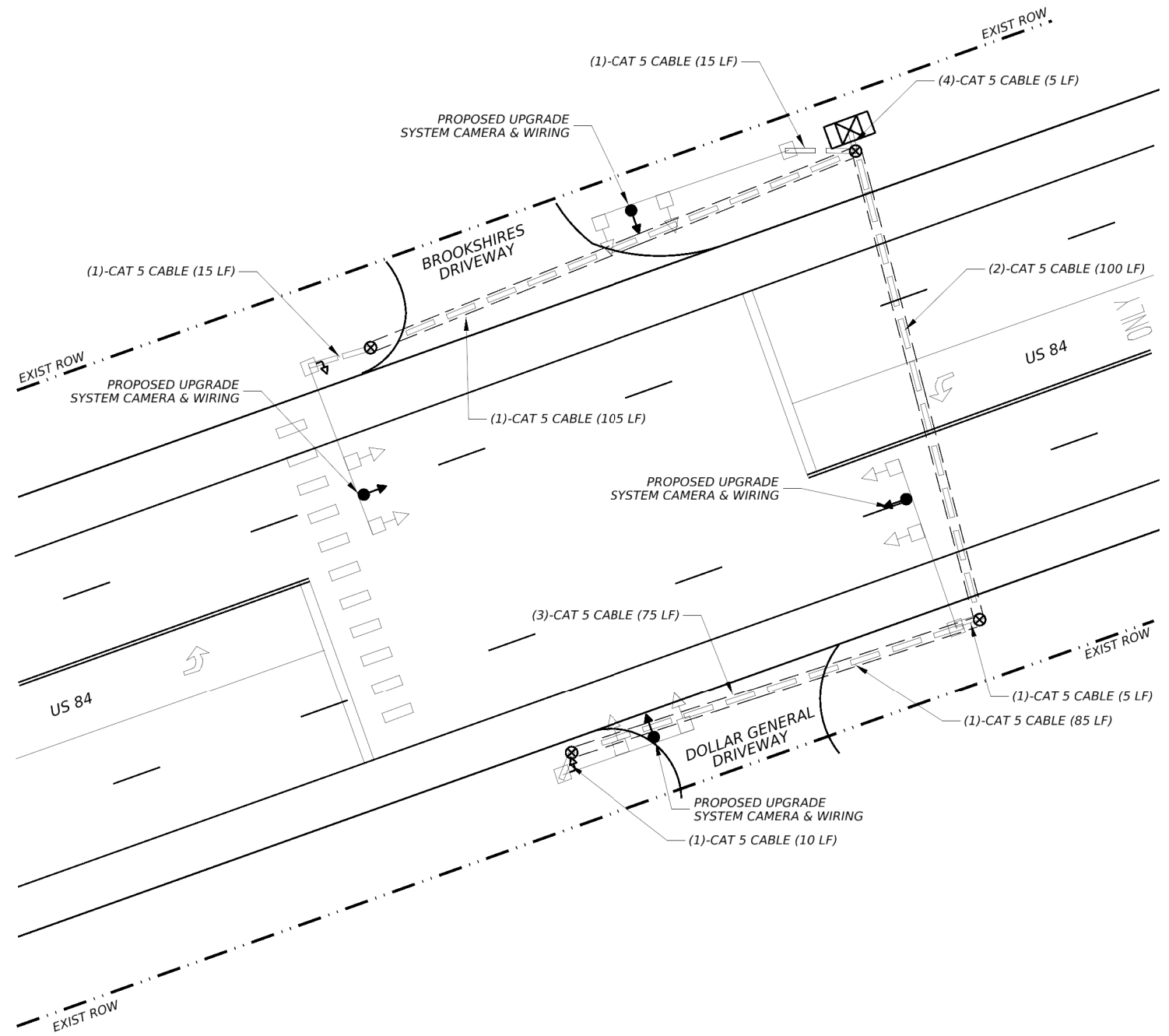
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 @ SL 500)
 (REFERENCE #4)**

SHEET 4 OF 32

CONT	SECT	JOB	HIGHWAY
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DIST		COUNTY	SHEET NO.
LFK		ANGELINA	42

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LEGEND			
■	PROPOSED TRAFFIC SIGNAL POLE	—	PROPOSED CONDUIT RUN (IN TRENCH)
□	EXISTING TRAFFIC SIGNAL POLE	—	EXISTING CONDUIT RUN (IN TRENCH)
⊗	PROPOSED GROUND BOX	—	PROPOSED ROAD BORE
⊙	EXISTING GROUND BOX	—	EXISTING ROAD BORE
⊠	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED	⊕	TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
⊡	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED	—OE—	OVERHEAD ELECTRICITY
●	PROPOSED VIVDS CAMERA ASSEMBLY	—W—	WATER LINE
○	EXISTING VIVDS CAMERA ASSEMBLY	—G—	GAS LINE
⬆	PROPOSED TRAFFIC SIGNAL HEAD	—T—	TELEPHONE (UNDERGROUND)
⬇	EXISTING TRAFFIC SIGNAL HEAD	—SS—	SANITARY SEWER
◆	PROPOSED LUMINAIRE DEVICE	⬆	PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
⬆	EXISTING LUMINAIRE DEVICE	⬇	EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
●	PROPOSED WOOD POLE	⬆	PROPOSED SIGN
○	EXISTING WOOD POLE	⬇	EXISTING SIGN
●	PROPOSED ELECTRICAL SERVICES	⬆	TRAFFIC DIRECTION ARROW
○	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 30'

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3/4/2024

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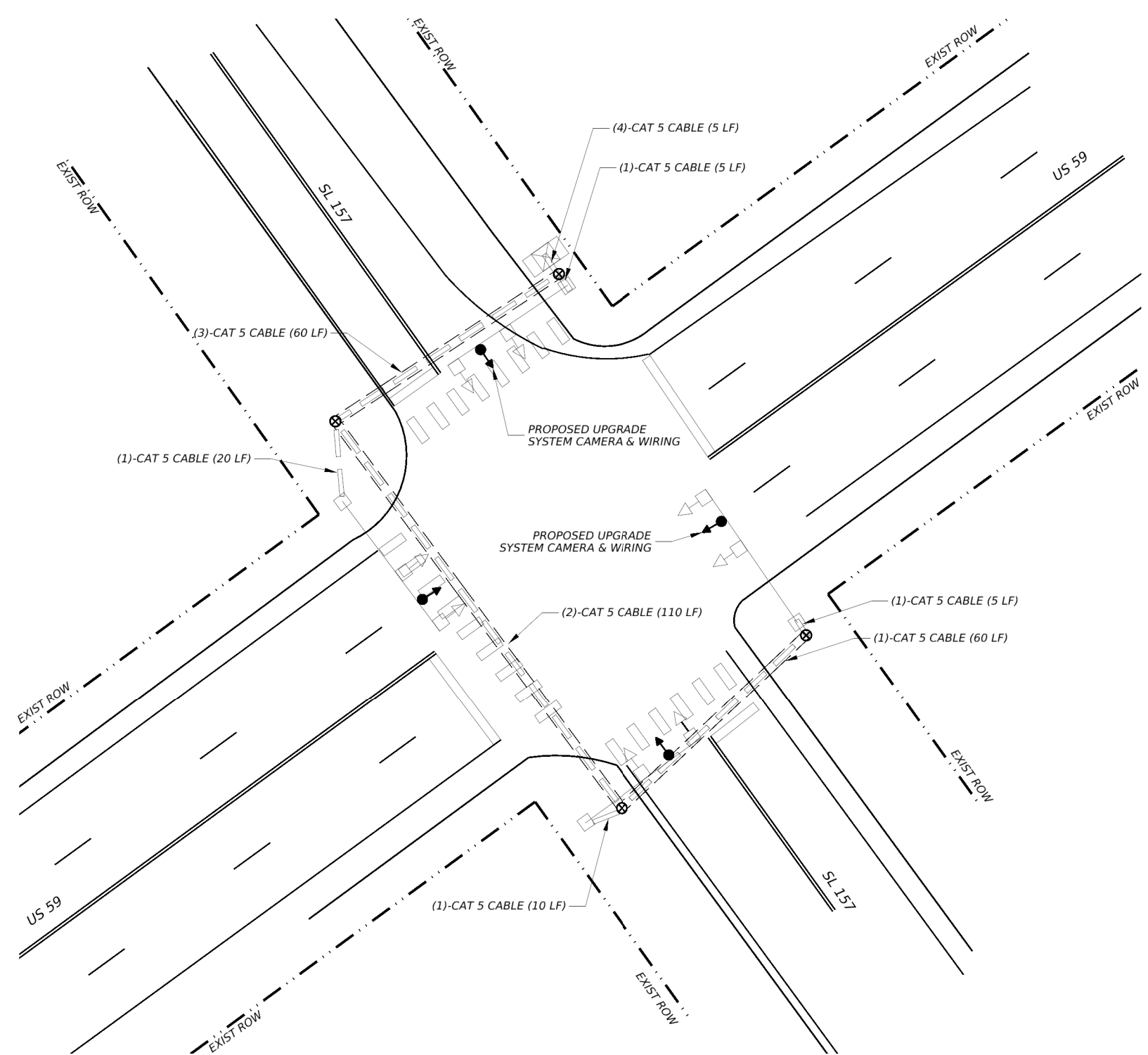
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 (INTERSECTION US 84
 @ BROOKSHIRES)
 (REFERENCE #5)

SHEET 5 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	43	

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LEGEND

	PROPOSED TRAFFIC SIGNAL POLE		PROPOSED CONDUIT RUN (IN TRENCH)
	EXISTING TRAFFIC SIGNAL POLE		EXISTING CONDUIT RUN (IN TRENCH)
	PROPOSED GROUND BOX		PROPOSED ROAD BORE
	EXISTING GROUND BOX		EXISTING ROAD BORE
	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED		TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED		OVERHEAD ELECTRICITY
	PROPOSED VIVDS CAMERA ASSEMBLY		WATER LINE
	EXISTING VIVDS CAMERA ASSEMBLY		GAS LINE
	PROPOSED TRAFFIC SIGNAL HEAD		TELEPHONE (UNDERGROUND)
	EXISTING TRAFFIC SIGNAL HEAD		SANITARY SEWER
	PROPOSED LUMINAIRE DEVICE		PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	EXISTING LUMINAIRE DEVICE		EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	PROPOSED WOOD POLE		PROPOSED SIGN
	EXISTING WOOD POLE		EXISTING SIGN
	PROPOSED ELECTRICAL SERVICES		TRAFFIC DIRECTION ARROW
	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 30'

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3/4/2024

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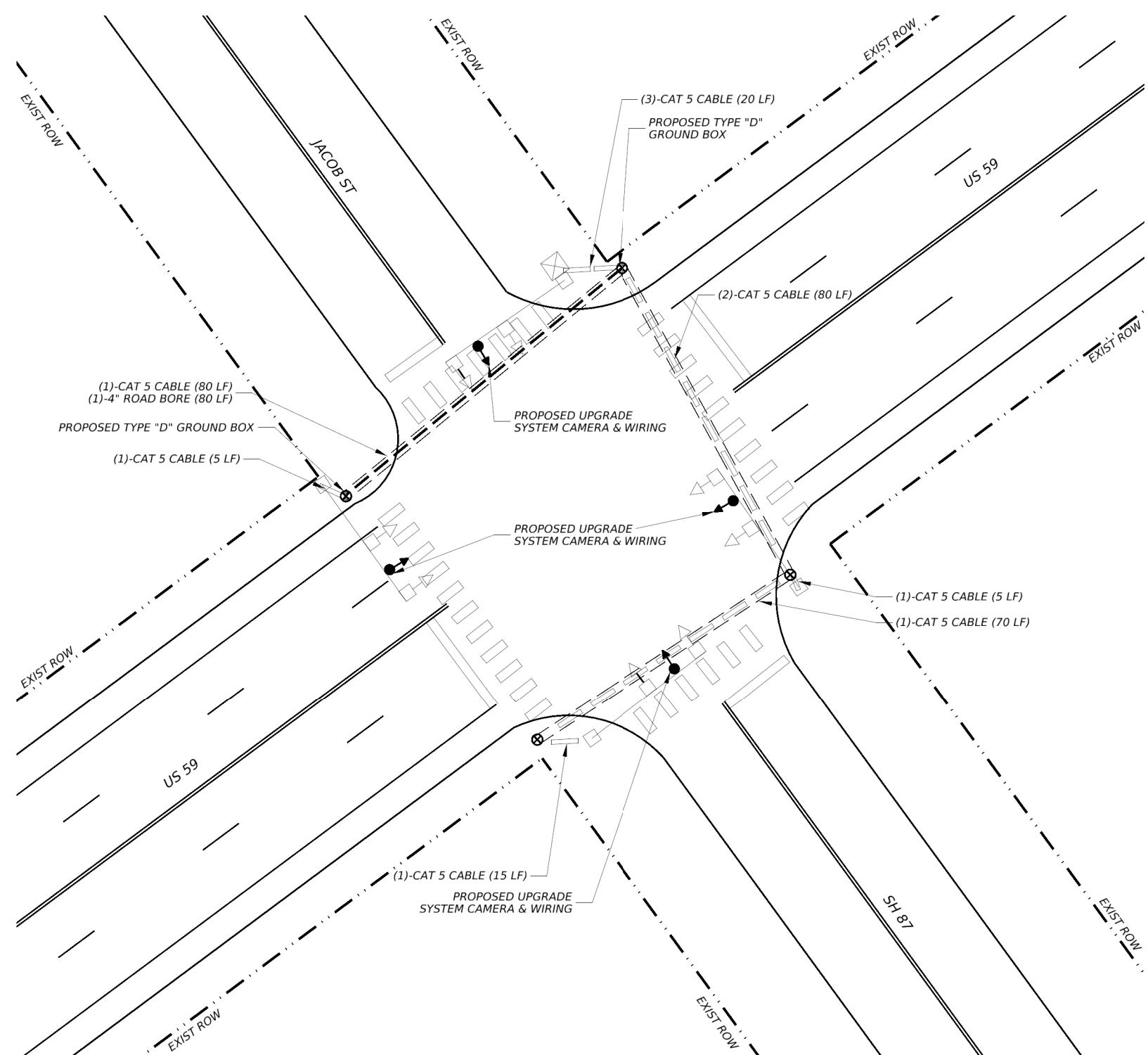
**PROPOSED LAYOUT
 (INTERSECTION US 59
 @ SL 157)
 (REFERENCE #6)**

SHEET 6 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	44	

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LEGEND

	PROPOSED TRAFFIC SIGNAL POLE		PROPOSED CONDUIT RUN (IN TRENCH)
	EXISTING TRAFFIC SIGNAL POLE		EXISTING CONDUIT RUN (IN TRENCH)
	PROPOSED GROUND BOX		PROPOSED ROAD BORE
	EXISTING GROUND BOX		EXISTING ROAD BORE
	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED		TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED		OVERHEAD ELECTRICITY
	PROPOSED VIVDS CAMERA ASSEMBLY		WATER LINE
	EXISTING VIVDS CAMERA ASSEMBLY		GAS LINE
	PROPOSED TRAFFIC SIGNAL HEAD		TELEPHONE (UNDERGROUND)
	EXISTING TRAFFIC SIGNAL HEAD		SANITARY SEWER
	PROPOSED LUMINAIRE DEVICE		PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	EXISTING LUMINAIRE DEVICE		EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	PROPOSED WOOD POLE		PROPOSED SIGN
	EXISTING WOOD POLE		EXISTING SIGN
	PROPOSED ELECTRICAL SERVICES		TRAFFIC DIRECTION ARROW
	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 30'

SETH D. FRANKS
 126258
 LICENSED PROFESSIONAL ENGINEER

Seth D. Franks, P.E.

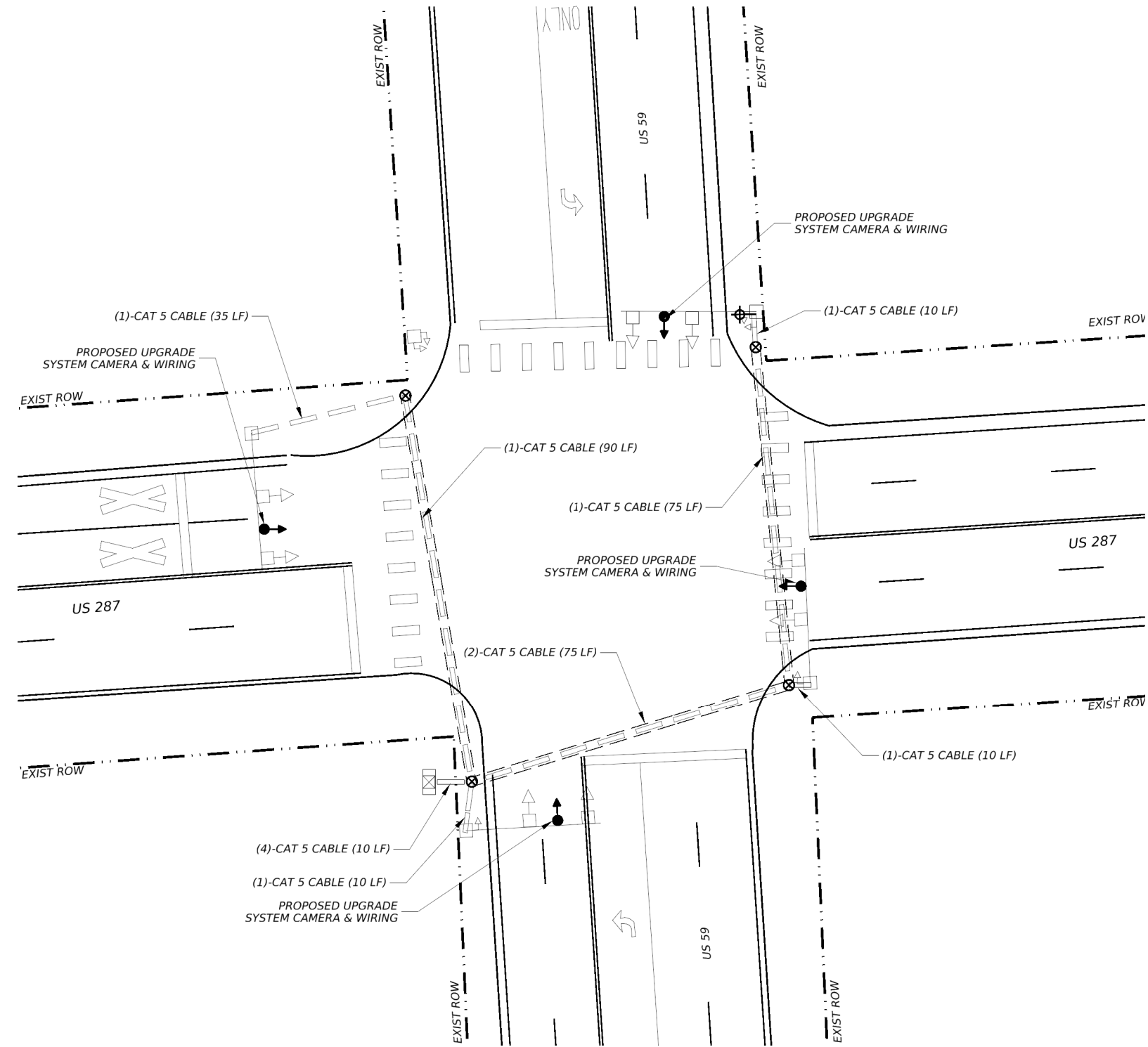
3/4/2024

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**PROPOSED LAYOUT
 (INTERSECTION US 59
 @ SH 87)
 (REFERENCE #7)**

SHEET 7 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	45	



LEGEND			
■	PROPOSED TRAFFIC SIGNAL POLE	—	PROPOSED CONDUIT RUN (IN TRENCH)
□	EXISTING TRAFFIC SIGNAL POLE	—	EXISTING CONDUIT RUN (IN TRENCH)
⊗	PROPOSED GROUND BOX	—	PROPOSED ROAD BORE
⊗	EXISTING GROUND BOX	—	EXISTING ROAD BORE
⊗	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED	⊕	TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
⊗	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED	—OE—	OVERHEAD ELECTRICITY
⊗	PROPOSED VIVDS CAMERA ASSEMBLY	—W—	WATER LINE
⊗	EXISTING VIVDS CAMERA ASSEMBLY	—G—	GAS LINE
⊗	PROPOSED TRAFFIC SIGNAL HEAD	—T—	TELEPHONE (UNDERGROUND)
⊗	EXISTING TRAFFIC SIGNAL HEAD	—SS—	SANITARY SEWER
⊗	PROPOSED LUMINAIRE DEVICE	▶	PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
⊗	EXISTING LUMINAIRE DEVICE	▶	EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
●	PROPOSED WOOD POLE	⊗	PROPOSED SIGN
○	EXISTING WOOD POLE	○	EXISTING SIGN
⊗	PROPOSED ELECTRICAL SERVICES	▶	TRAFFIC DIRECTION ARROW
⊗	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 30'

Seth D. Franks, P.E.
 3/4/2024

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PROPOSED LAYOUT
 (INTERSECTION US 59
 @ US 287)
 (REFERENCE #8)

SHEET 8 OF 32

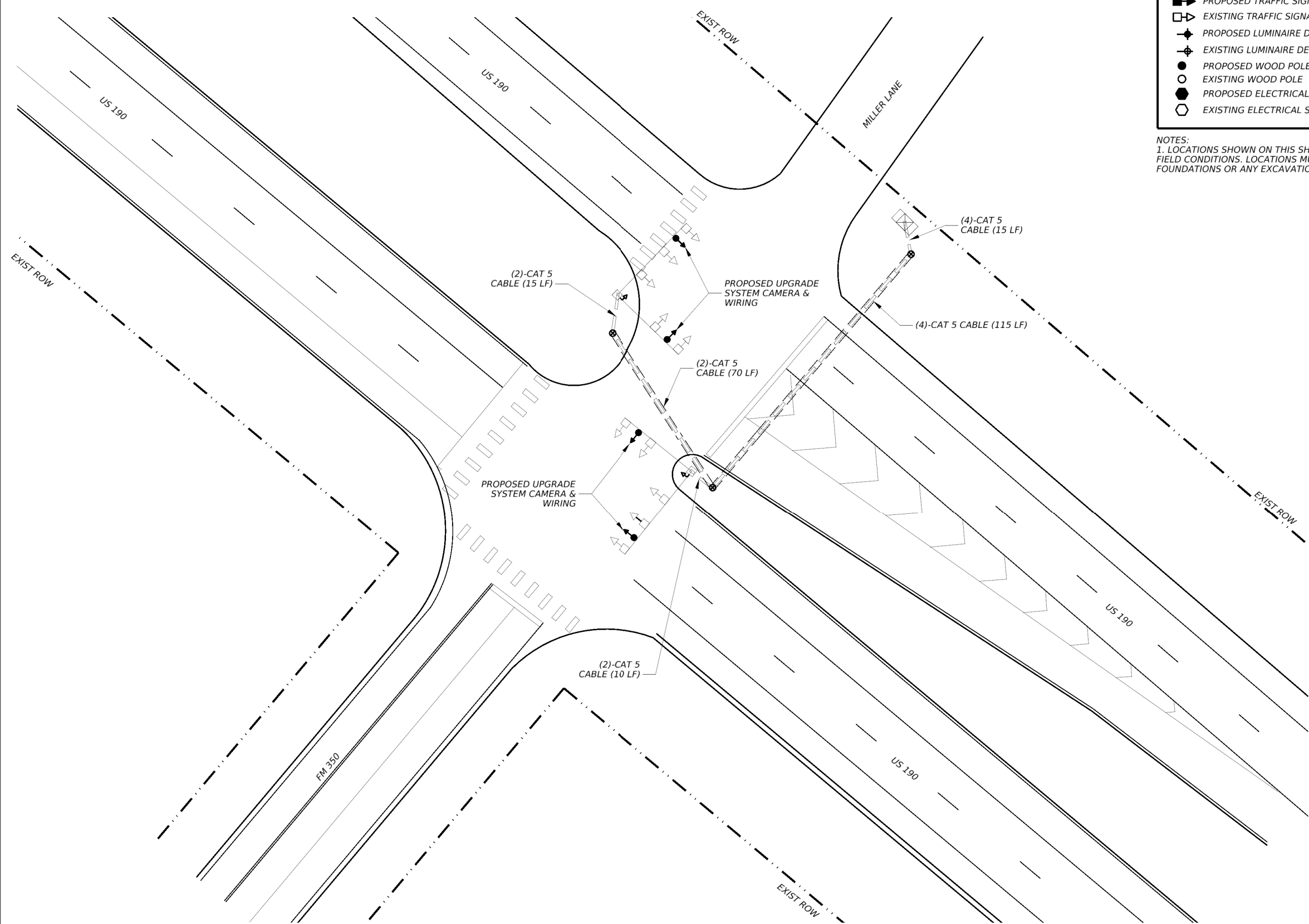
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0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	46	

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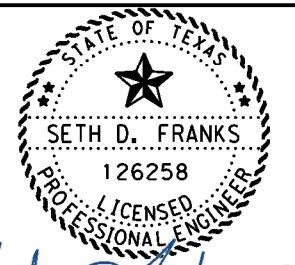
LEGEND			
■	PROPOSED TRAFFIC SIGNAL POLE	—	PROPOSED CONDUIT RUN (IN TRENCH)
□	EXISTING TRAFFIC SIGNAL POLE	—	EXISTING CONDUIT RUN (IN TRENCH)
⊙	PROPOSED GROUND BOX	—	PROPOSED ROAD BORE
⊗	EXISTING GROUND BOX	—	EXISTING ROAD BORE
⊠	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED	⊕	TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
⊡	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED	—OE—	OVERHEAD ELECTRICITY
●	PROPOSED VIVDS CAMERA ASSEMBLY	—W—	WATER LINE
○	EXISTING VIVDS CAMERA ASSEMBLY	—G—	GAS LINE
■	PROPOSED TRAFFIC SIGNAL HEAD	—T—	TELEPHONE (UNDERGROUND)
□	EXISTING TRAFFIC SIGNAL HEAD	—SS—	SANITARY SEWER
◆	PROPOSED LUMINAIRE DEVICE	▶	PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
⊕	EXISTING LUMINAIRE DEVICE	◀	EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
●	PROPOSED WOOD POLE	■	PROPOSED SIGN
○	EXISTING WOOD POLE	◊	EXISTING SIGN
●	PROPOSED ELECTRICAL SERVICES	↔	TRAFFIC DIRECTION ARROW
○	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.



DATE: 2/28/2024 10:15:49 AM
 FILE: c:\tdot\pw_on\melt\dot3\quadalupe_sandoval\0676692\REF# 9 Proposed US 190 @ FM 350-LIVINGSTON.dgn

SCALE 1" = 40'



Seth D. Franks, P.E.

3/4/2024



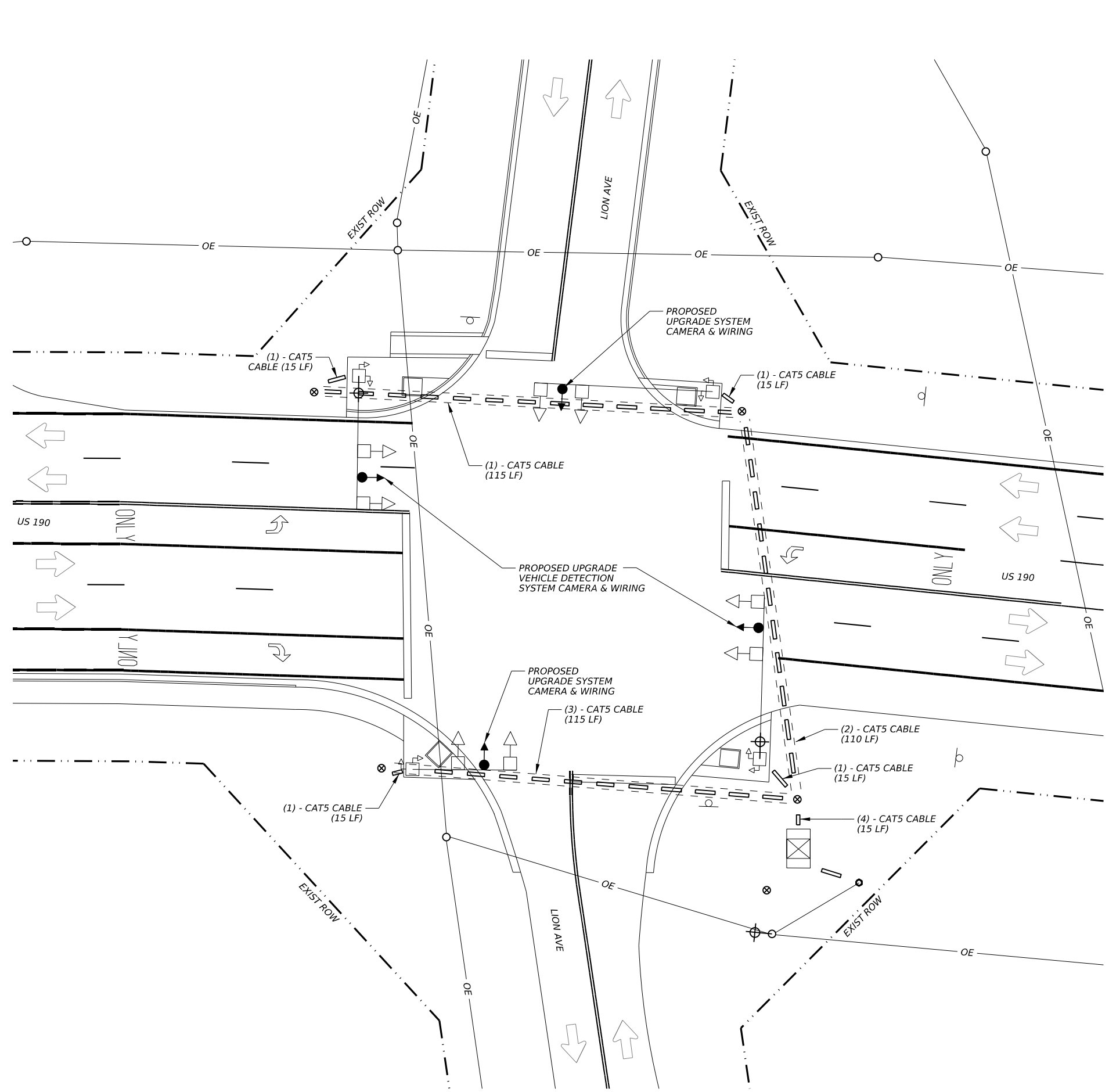
PROPOSED LAYOUT
 (INTERSECTION US 190
 @ FM 350)
 (REFERENCE #9)

SHEET 9 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	47	

CK: DW: CK: DN:

DATE: 2/28/2024 10:53:25 AM
 FILE: c:\t\dot\pw_online\t\dot\3\guadalupe_sandoval\d0676692\REF# 10 Proposed Layout US 190 @ Lion Ave.dgn



NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.
 2. EXISTING CROSSWALK PAVEMENT MARKINGS OMITTED FROM INTERSECTION FOR CLARITY.

SCALE 1" = 30'

Seth D. Franks, P.E.

3/4/2024

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 Texas Department of Transportation

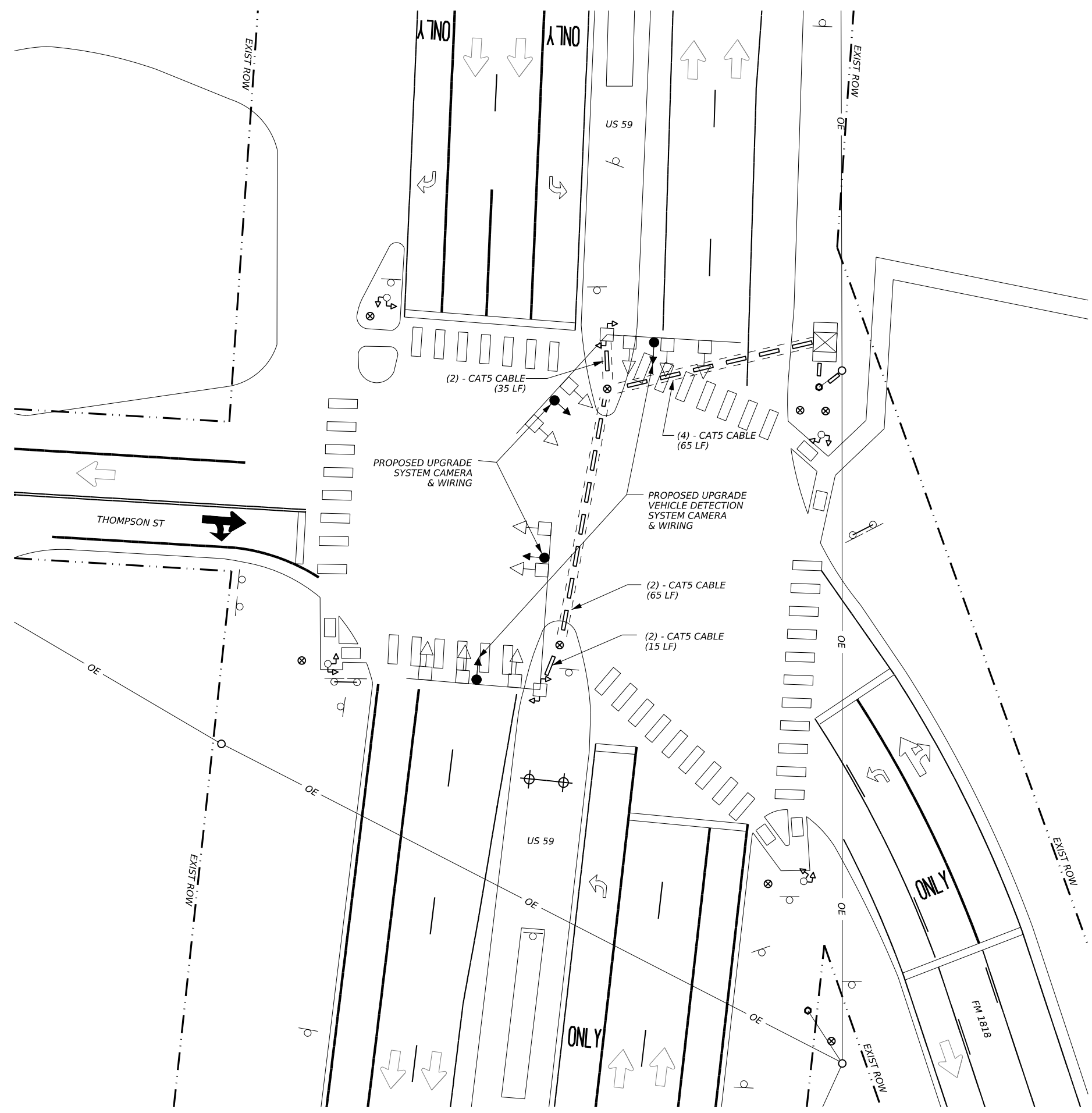
**PROPOSED LAYOUT
 (INTERSECTION US 190
 US 190 AT LION AVE)
 (REFERENCE # 10)**

SHEET 10 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	48	

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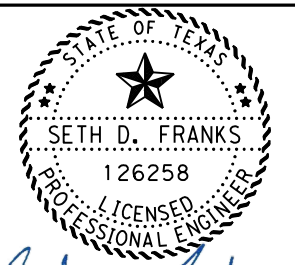
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LEGEND			
■	PROPOSED TRAFFIC SIGNAL POLE	—	PROPOSED CONDUIT RUN (IN TRENCH)
□	EXISTING TRAFFIC SIGNAL POLE	—	EXISTING CONDUIT RUN (IN TRENCH)
⊗	PROPOSED GROUND BOX	—	PROPOSED ROAD BORE
⊗	EXISTING GROUND BOX	—	EXISTING ROAD BORE
⊗	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED	⊕	EXISTING ROAD BORE
⊗	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED	⊕	TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
⊗	PROPOSED VIVDS CAMERA ASSEMBLY	—OE—	OVERHEAD ELECTRICITY
⊗	EXISTING VIVDS CAMERA ASSEMBLY	—W—	WATER LINE
⊗	PROPOSED TRAFFIC SIGNAL HEAD	—G—	GAS LINE
⊗	EXISTING TRAFFIC SIGNAL HEAD	—T—	TELEPHONE (UNDERGROUND)
⊗	PROPOSED LUMINAIRE DEVICE	—SS—	SANITARY SEWER
⊗	EXISTING LUMINAIRE DEVICE	▶	PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
●	PROPOSED WOOD POLE	▶	EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
○	EXISTING WOOD POLE	●	PROPOSED SIGN
●	PROPOSED ELECTRICAL SERVICES	○	EXISTING SIGN
○	EXISTING ELECTRICAL SERVICES	↔	TRAFFIC DIRECTION ARROW

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 30'



Seth D. Franks, P.E.

3/4/2024

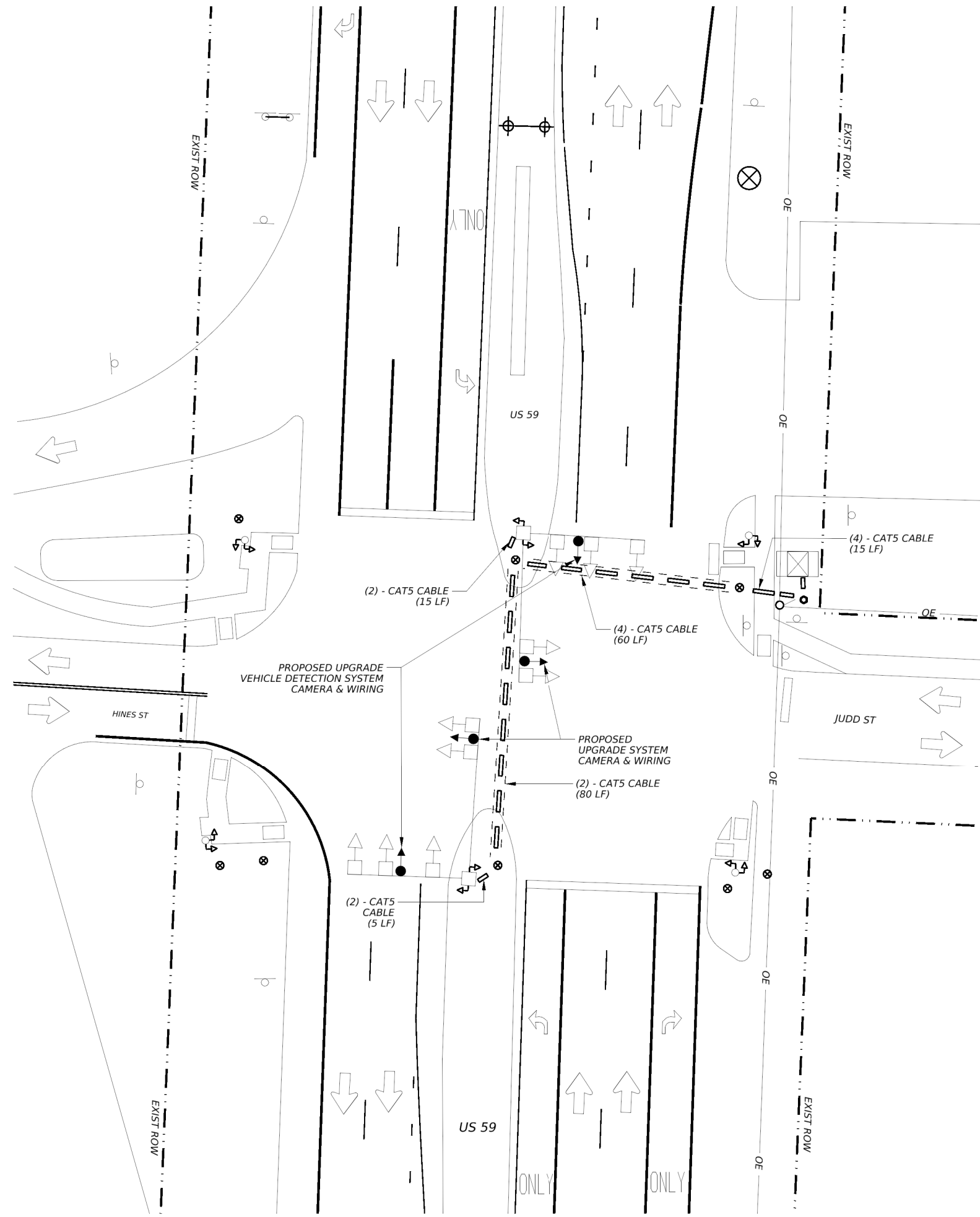


PROPOSED LAYOUT
 (INTERSECTION US 59
 @ FM 1818)
 (REFERENCE #11)

SHEET 11 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	49	

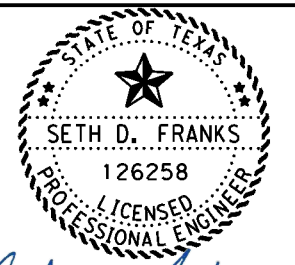
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LEGEND			
■	PROPOSED TRAFFIC SIGNAL POLE	—	PROPOSED CONDUIT RUN (IN TRENCH)
□	EXISTING TRAFFIC SIGNAL POLE	—	EXISTING CONDUIT RUN (IN TRENCH)
⊗	PROPOSED GROUND BOX	—	PROPOSED ROAD BORE
⊙	EXISTING GROUND BOX	—	EXISTING ROAD BORE
⊠	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED	⊕	TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
⊡	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED	—OE—	OVERHEAD ELECTRICITY
⊕	PROPOSED VIVDS CAMERA ASSEMBLY	—W—	WATER LINE
⊙	EXISTING VIVDS CAMERA ASSEMBLY	—G—	GAS LINE
⊠	PROPOSED TRAFFIC SIGNAL HEAD	—T—	TELEPHONE (UNDERGROUND)
⊡	EXISTING TRAFFIC SIGNAL HEAD	—SS—	SANITARY SEWER
⊕	PROPOSED LUMINAIRE DEVICE	▶	PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
⊙	EXISTING LUMINAIRE DEVICE	◀	EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
●	PROPOSED WOOD POLE	⊕	PROPOSED SIGN
○	EXISTING WOOD POLE	⊙	EXISTING SIGN
⊕	PROPOSED ELECTRICAL SERVICES	▶	TRAFFIC DIRECTION ARROW
⊙	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.
 2. EXISTING CROSSWALK PAVEMENT MARKINGS OMITTED FROM INTERSECTION FOR CLARITY.

SCALE 1" = 30'



Seth D. Franks, P.E.

3/4/2024



PROPOSED LAYOUT
 (INTERSECTION US 59
 @ JUDD ST)
 (REFERENCE #12)

SHEET 12 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	50	

CK: DW: CK: DN:

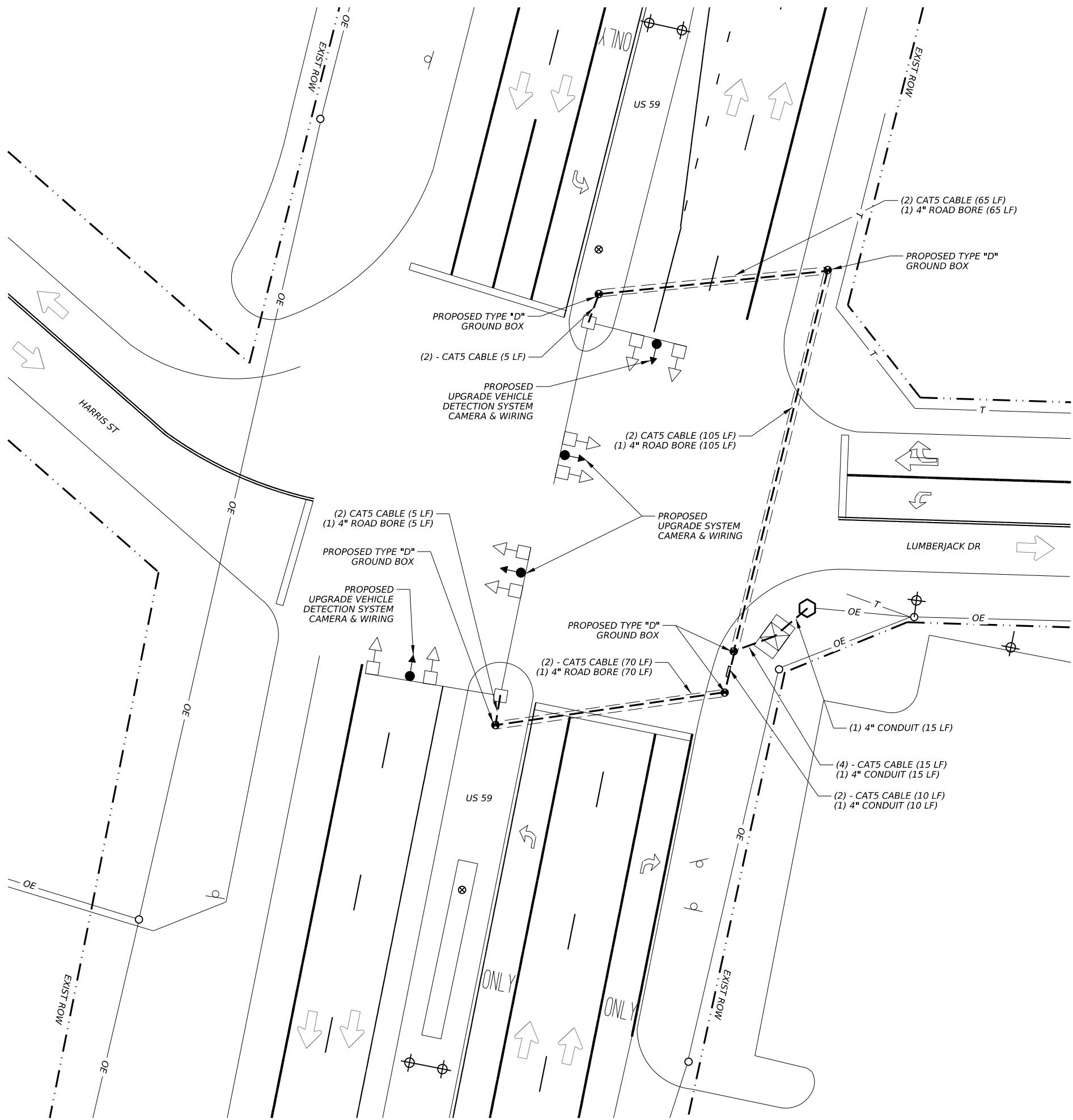
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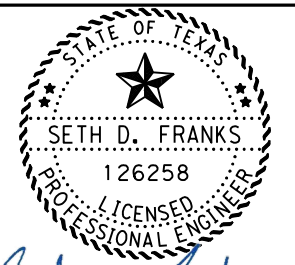
LEGEND

	PROPOSED TRAFFIC SIGNAL POLE		PROPOSED CONDUIT RUN (IN TRENCH)
	EXISTING TRAFFIC SIGNAL POLE		EXISTING CONDUIT RUN (IN TRENCH)
	PROPOSED GROUND BOX		PROPOSED ROAD BORE
	EXISTING GROUND BOX		EXISTING ROAD BORE
	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED		TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED		OE— OVERHEAD ELECTRICITY
	PROPOSED VIVDS CAMERA ASSEMBLY		- W - WATER LINE
	EXISTING VIVDS CAMERA ASSEMBLY		- G - GAS LINE
	PROPOSED TRAFFIC SIGNAL HEAD		- T - TELEPHONE (UNDERGROUND)
	EXISTING TRAFFIC SIGNAL HEAD		- SS - SANITARY SEWER
	PROPOSED LUMINAIRE DEVICE		PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	EXISTING LUMINAIRE DEVICE		EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	PROPOSED WOOD POLE		PROPOSED SIGN
	EXISTING WOOD POLE		EXISTING SIGN
	PROPOSED ELECTRICAL SERVICES		TRAFFIC DIRECTION ARROW
	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.
 2. WIRE CONNECTION CUT OVER FROM EXISTING GROUND BOXES AND CONDUIT TO PROPOSED GROUND BOXES AND CONDUIT TO BE COMPLETED AT NIGHT TO REDUCE THE IMPACT ON THE TRAVELING PUBLIC.



SCALE 1" = 30'



Seth D. Franks, P.E.
 3/4/2024



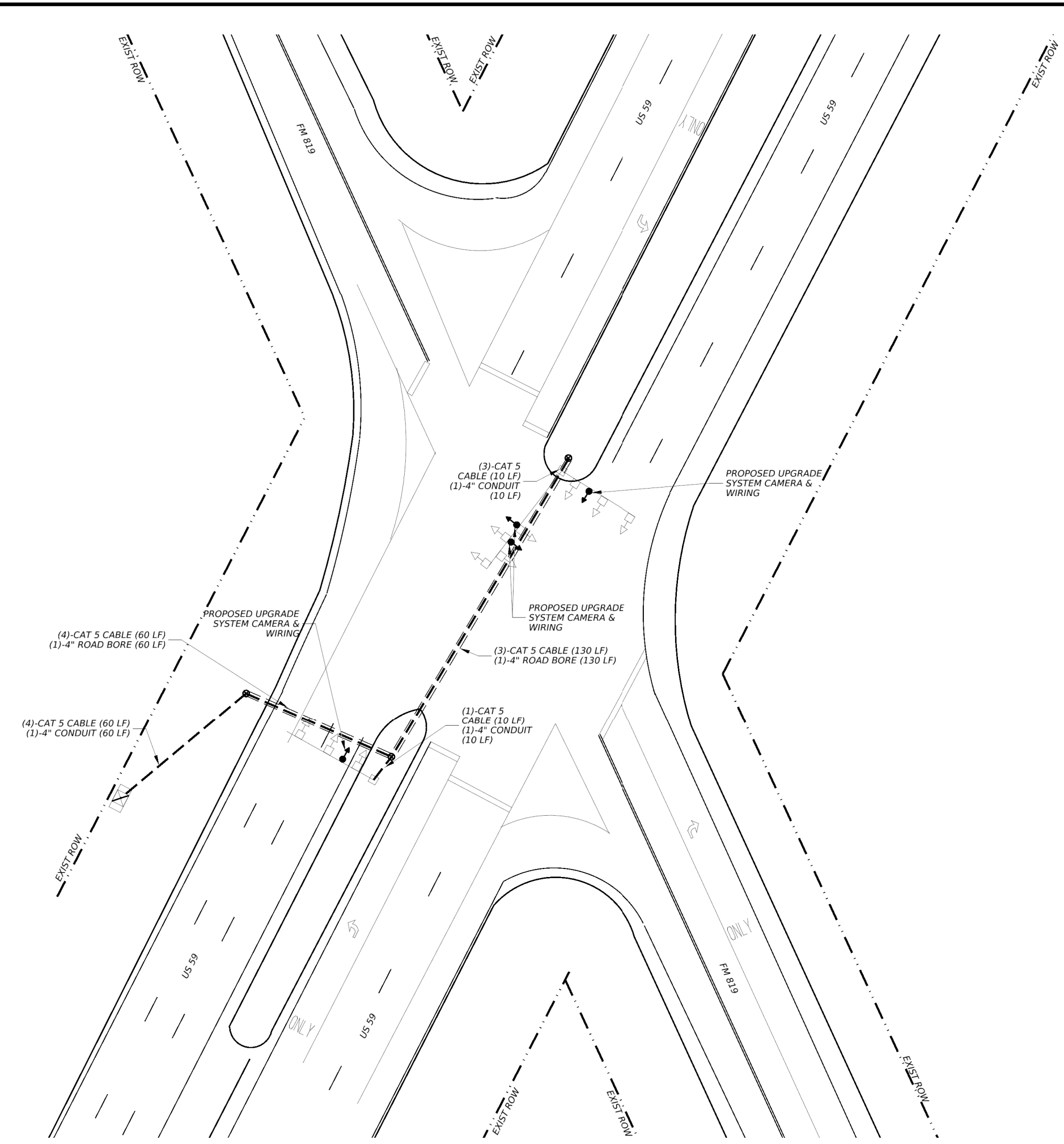
PROPOSED LAYOUT
 (INTERSECTION US 59
 @ LUMBERJACK DR)
 (REFERENCE # 13)

SHEET 13 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	51	

CK: DW: CK: DW:

DATE: 3/13/2024 11:12:54 AM
FILE: c:\tdot\pw\onlinetxdot3\guadalupe.sandoval\0676692\REF# 14 Proposed US 59 @ FM 819-LUFKIN.dgn



LEGEND			
■	PROPOSED TRAFFIC SIGNAL POLE	—○—	OVERHEAD ELECTRICITY
□	EXISTING TRAFFIC SIGNAL POLE	- - W - -	WATER LINE
⊗	PROPOSED GROUND BOX	- - G - -	GAS LINE
⊙	EXISTING GROUND BOX	- T -	TELEPHONE (UNDERGROUND)
⊠	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED	- SS -	SANITARY SEWER
⊠	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED	▶	PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
●	PROPOSED VIVDS CAMERA ASSEMBLY	◁	EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
○	EXISTING VIVDS CAMERA ASSEMBLY	●	PROPOSED SIGN
▶	PROPOSED TRAFFIC SIGNAL HEAD	○	EXISTING SIGN
◁	EXISTING TRAFFIC SIGNAL HEAD	◁	TRAFFIC DIRECTION ARROW
◆	PROPOSED LUMINAIRE DEVICE		
◆	EXISTING LUMINAIRE DEVICE		
●	PROPOSED WOOD POLE		
○	EXISTING WOOD POLE		
●	PROPOSED ELECTRICAL SERVICES		
○	EXISTING ELECTRICAL SERVICES		
—	PROPOSED CONDUIT RUN (IN TRENCH)		
—	EXISTING CONDUIT RUN (IN TRENCH)		
—	PROPOSED ROAD BORE		
—	EXISTING ROAD BORE		
⊙	TYPICAL CONDUIT & SIGNAL WIRE RUN NO.		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.
 2. WIRE CONNECTION CUT OVER FROM EXISTING GROUND BOXES AND CONDUIT TO PROPOSED GROUND BOXES AND CONDUIT TO BE COMPLETED AT NIGHT TO REDUCE THE IMPACT ON THE TRAVELING PUBLIC.

SCALE 1" = 40'

Seth D. Franks, P.E.

3/18/2024



PROPOSED LAYOUT
 (INTERSECTION US 59
 @ FM 819)
 (REFERENCE #14)

SHEET 14 OF 32			
CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY		SHEET NO.
LFK	ANGELINA		52

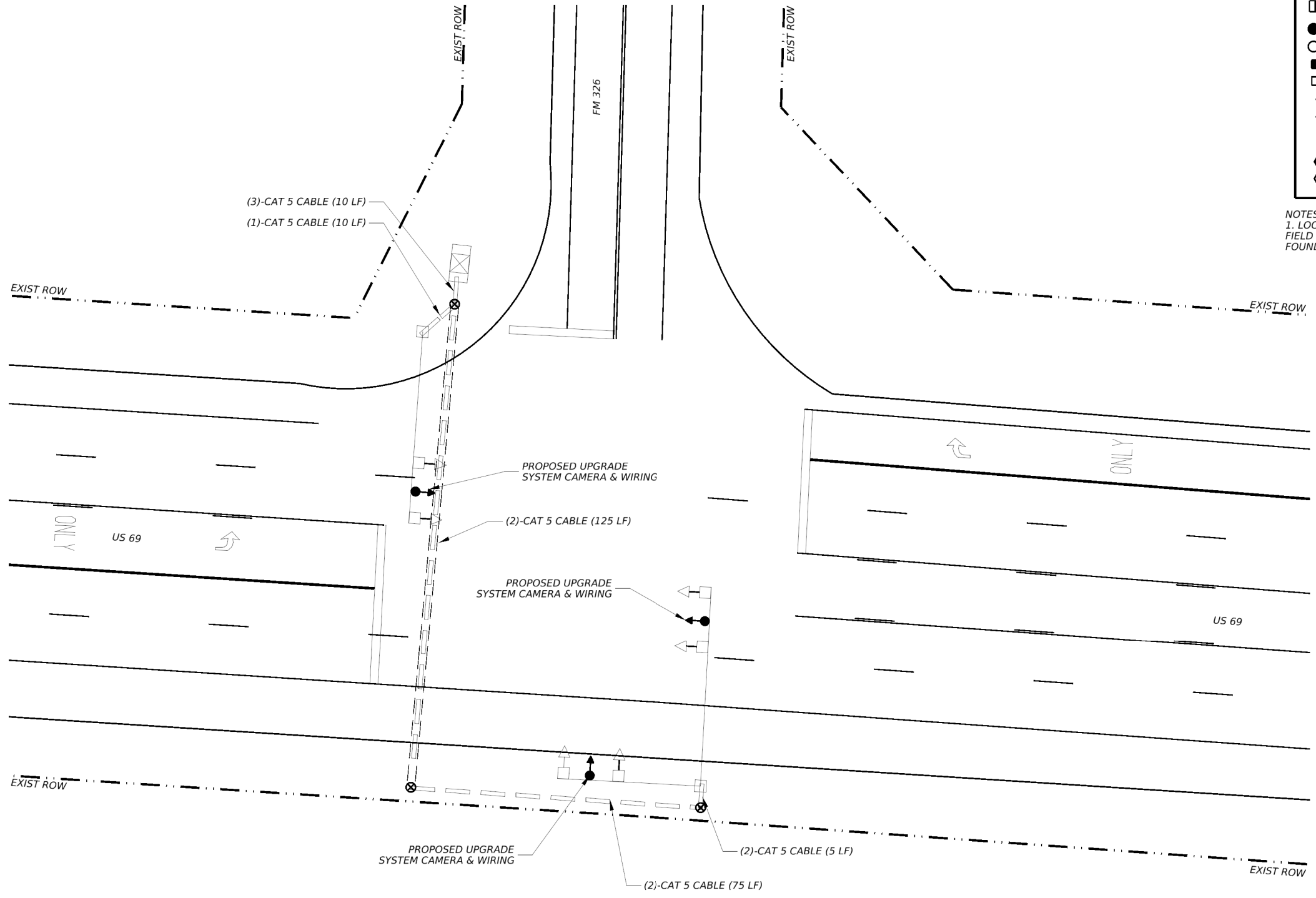
CK: DW: CK: DW: CK: DW: CK: DW:



LEGEND

- | | |
|--|---|
| <ul style="list-style-type: none"> ■ PROPOSED TRAFFIC SIGNAL POLE □ EXISTING TRAFFIC SIGNAL POLE ⊗ PROPOSED GROUND BOX ⊗ EXISTING GROUND BOX ⊠ PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED ⊠ EXISTING TRAFFIC CONTROLLER GROUND MOUNTED ● PROPOSED VIVDS CAMERA ASSEMBLY ○ EXISTING VIVDS CAMERA ASSEMBLY ◼ PROPOSED TRAFFIC SIGNAL HEAD ◼ EXISTING TRAFFIC SIGNAL HEAD ◆ PROPOSED LUMINAIRE DEVICE ◆ EXISTING LUMINAIRE DEVICE ● PROPOSED WOOD POLE ○ EXISTING WOOD POLE ● PROPOSED ELECTRICAL SERVICES ○ EXISTING ELECTRICAL SERVICES | <ul style="list-style-type: none"> ▬ PROPOSED CONDUIT RUN (IN TRENCH) ▬ EXISTING CONDUIT RUN (IN TRENCH) ▬ PROPOSED ROAD BORE ▬ EXISTING ROAD BORE ⊕ TYPICAL CONDUIT & SIGNAL WIRE RUN NO. —OE— OVERHEAD ELECTRICITY — W — WATER LINE — G — GAS LINE — T — TELEPHONE (UNDERGROUND) — SS — SANITARY SEWER ▶ PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ▶ EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ● PROPOSED SIGN ○ EXISTING SIGN ➡ TRAFFIC DIRECTION ARROW |
|--|---|

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.



DATE: 2/28/2024 10:16:53 AM
 FILE: c:\tdot\pw_online\txdot3\quadalupe.sandoval\0676692\REF# 15 Proposed US 69 @ FM 326N-LUFKIN.dgn

SCALE 1" = 30'



Seth D. Franks, P.E.

3/4/2024

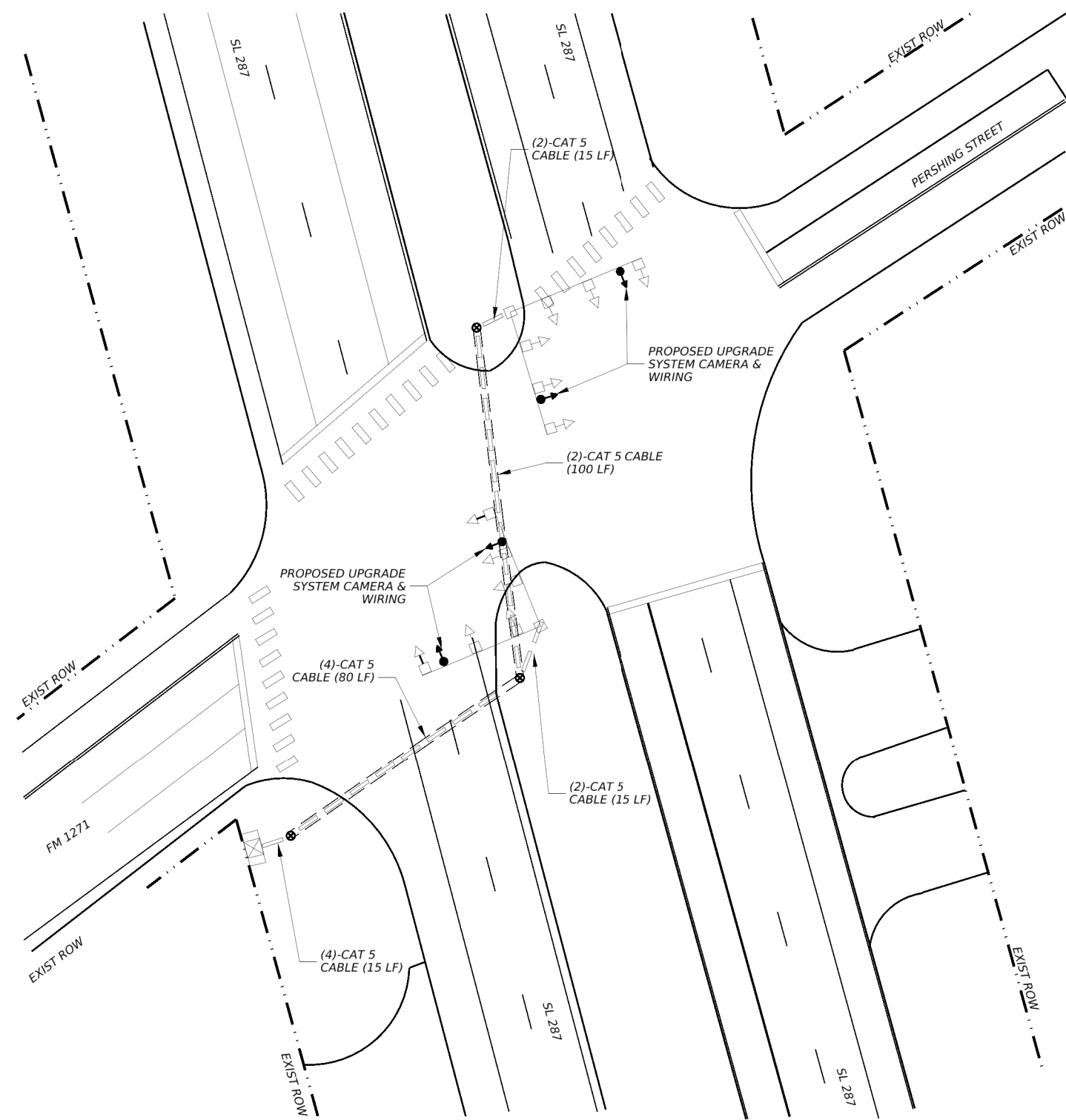


**PROPOSED LAYOUT
 (INTERSECTION US 69
 @ FM 326N)
 (REFERENCE #15)**

SHEET 15 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	53	

CK: DW: CK: DW:

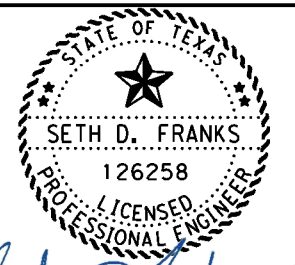


LEGEND			
■	PROPOSED TRAFFIC SIGNAL POLE	—	PROPOSED CONDUIT RUN (IN TRENCH)
□	EXISTING TRAFFIC SIGNAL POLE	—	EXISTING CONDUIT RUN (IN TRENCH)
⊗	PROPOSED GROUND BOX	—	PROPOSED ROAD BORE
⊗	EXISTING GROUND BOX	—	EXISTING ROAD BORE
⊗	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED	⊗	TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
⊗	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED	—OE—	OVERHEAD ELECTRICITY
⊗	PROPOSED VIVDS CAMERA ASSEMBLY	—W—	WATER LINE
⊗	EXISTING VIVDS CAMERA ASSEMBLY	—G—	GAS LINE
⊗	PROPOSED TRAFFIC SIGNAL HEAD	—T—	TELEPHONE (UNDERGROUND)
⊗	EXISTING TRAFFIC SIGNAL HEAD	—SS—	SANITARY SEWER
⊗	PROPOSED LUMINAIRE DEVICE	▶	PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
⊗	EXISTING LUMINAIRE DEVICE	▶	EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
●	PROPOSED WOOD POLE	⊗	PROPOSED SIGN
○	EXISTING WOOD POLE	○	EXISTING SIGN
⊗	PROPOSED ELECTRICAL SERVICES	▶	TRAFFIC DIRECTION ARROW
⊗	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

DATE: 2/28/2024 10:17:05 AM
 FILE: c:\tdot\pw_onlinet\tdot3\guadalupe.sandoval\0676692\REF# 16 Proposed SL 287 @ PERSHING-LUFKIN.dgn

SCALE 1" = 40'



Seth D. Franks, P.E.

3/4/2024



PROPOSED LAYOUT
 (INTERSECTION SL 287
 @ PERSHING AVE)
 (REFERENCE #16)

SHEET 16 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	54	

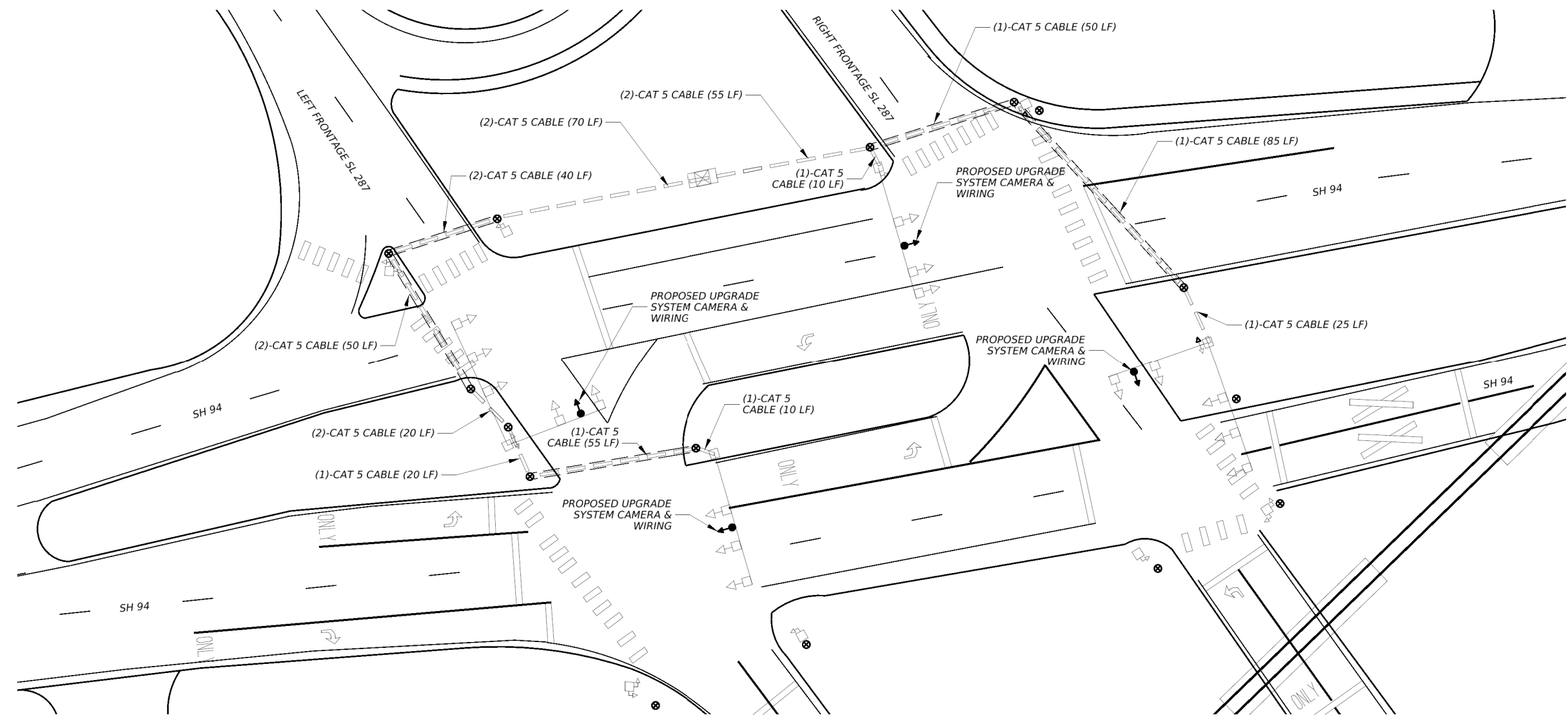
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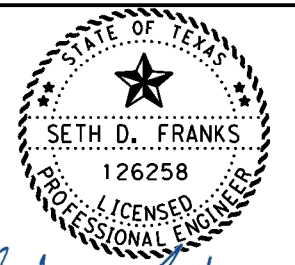
	PROPOSED TRAFFIC SIGNAL POLE		PROPOSED CONDUIT RUN (IN TRENCH)
	EXISTING TRAFFIC SIGNAL POLE		EXISTING CONDUIT RUN (IN TRENCH)
	PROPOSED GROUND BOX		PROPOSED ROAD BORE
	EXISTING GROUND BOX		EXISTING ROAD BORE
	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED		TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED		OVERHEAD ELECTRICITY
	PROPOSED VIVDS CAMERA ASSEMBLY		WATER LINE
	EXISTING VIVDS CAMERA ASSEMBLY		GAS LINE
	PROPOSED TRAFFIC SIGNAL HEAD		TELEPHONE (UNDERGROUND)
	EXISTING TRAFFIC SIGNAL HEAD		SANITARY SEWER
	PROPOSED LUMINAIRE DEVICE		PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	EXISTING LUMINAIRE DEVICE		EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	PROPOSED WOOD POLE		PROPOSED SIGN
	EXISTING WOOD POLE		EXISTING SIGN
	PROPOSED ELECTRICAL SERVICES		TRAFFIC DIRECTION ARROW
	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.



DATE: 2/28/2024 10:17:15 AM
 FILE: c:\txdot\pw\onlinetxdat3\guadalupe.sandoval\0676692\REF# 17 Proposed SL 287 @ SH 94-LUFKIN.dgn

SCALE 1" = 40'



Seth D. Franks, P.E.

3/4/2024

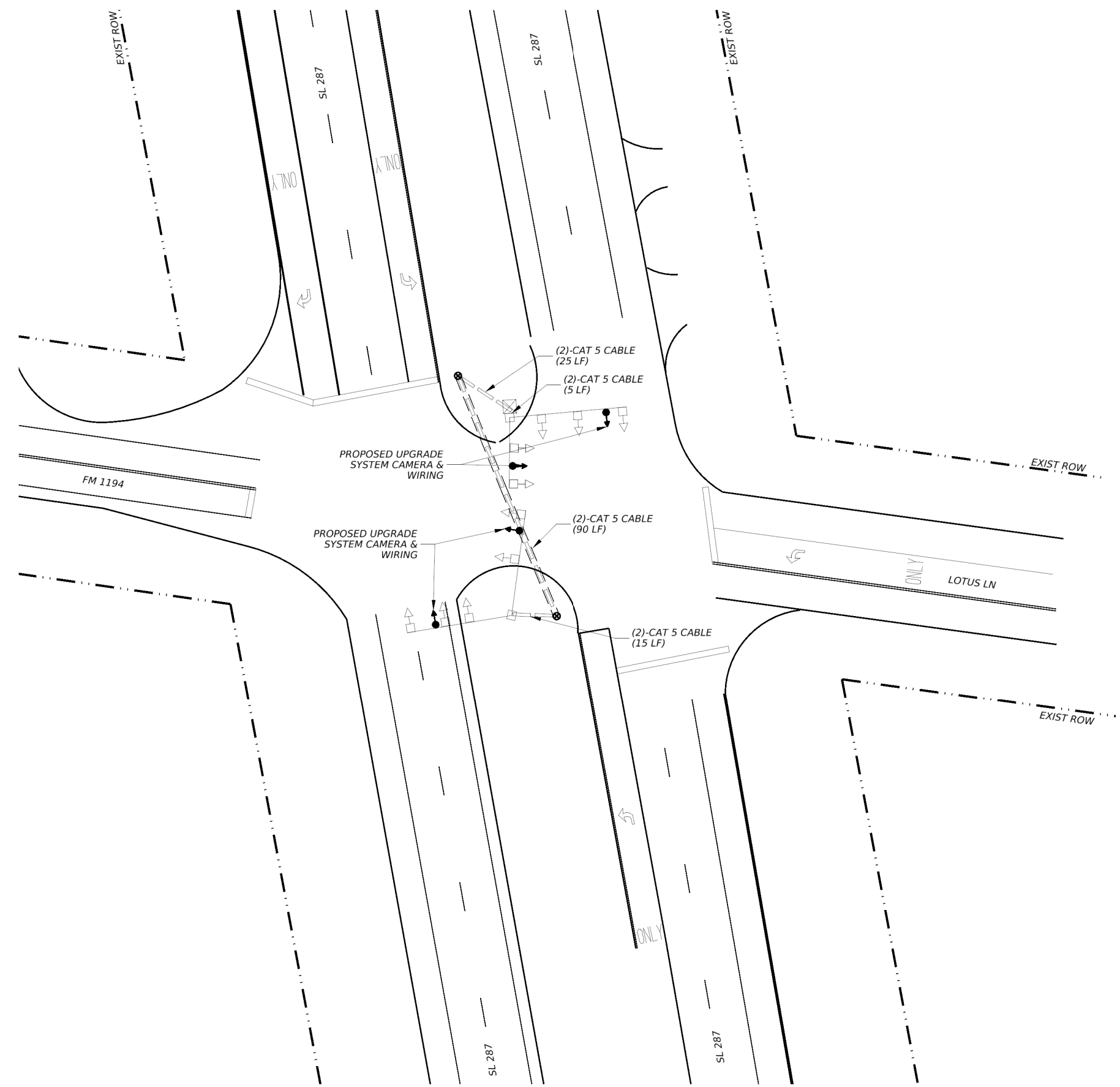


**PROPOSED LAYOUT
 (INTERSECTION SL 287
 @ SH 94)
 (REFERENCE #17)**

SHEET 17 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	55	

DATE: 2/28/2024 10:17:25 AM
 FILE: c:\tdot\pw\onlinetxdot3\guadalupe.sandoval\0676692\REF# 18 Proposed SL 287 @ LOTUS LN-LUFKIN.dgn



LEGEND			
■	PROPOSED TRAFFIC SIGNAL POLE	—	PROPOSED CONDUIT RUN (IN TRENCH)
□	EXISTING TRAFFIC SIGNAL POLE	—	EXISTING CONDUIT RUN (IN TRENCH)
□	PROPOSED GROUND BOX	—	PROPOSED ROAD BORE
⊗	EXISTING GROUND BOX	—	EXISTING ROAD BORE
⊗	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED	⊕	TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
⊗	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED	—OE—	OVERHEAD ELECTRICITY
⊗	PROPOSED VIVDS CAMERA ASSEMBLY	—W—	WATER LINE
⊗	EXISTING VIVDS CAMERA ASSEMBLY	—G—	GAS LINE
⊗	PROPOSED TRAFFIC SIGNAL HEAD	—T—	TELEPHONE (UNDERGROUND)
⊗	EXISTING TRAFFIC SIGNAL HEAD	—SS—	SANITARY SEWER
⊗	PROPOSED LUMINAIRE DEVICE	▶	PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
⊗	EXISTING LUMINAIRE DEVICE	▶	EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
●	PROPOSED WOOD POLE	⊗	PROPOSED SIGN
○	EXISTING WOOD POLE	○	EXISTING SIGN
⊗	PROPOSED ELECTRICAL SERVICES	▶	TRAFFIC DIRECTION ARROW
⊗	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 40'

Seth D. Franks, P.E.

3/4/2024

Texas Department of Transportation

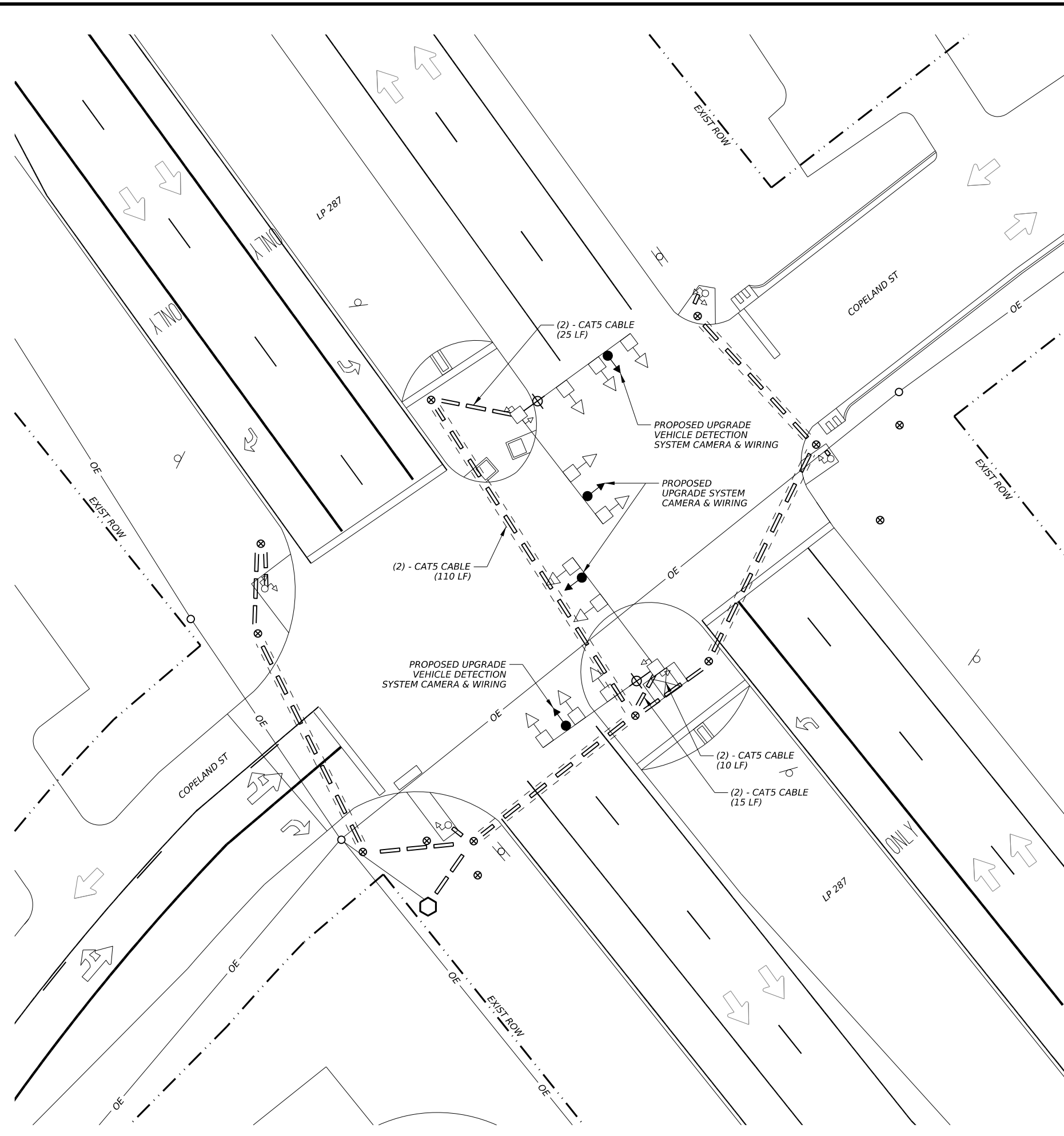
PROPOSED LAYOUT
 (INTERSECTION SL 287
 @ LOTUS LANE)
 (REFERENCE #18)

SHEET 18 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	56	

CK: DW: CK: DW: CK: DW:

DATE: 2/28/2024 11:31:47 AM
 FILE: c:\txdot\pw_onlinetxdot\3\guadalupe.sandoval\0676692\REF# 19 Proposed Layout SL 287 @ Copeland St.dgn



LEGEND			
■	PROPOSED TRAFFIC SIGNAL POLE	—	PROPOSED CONDUIT RUN (IN TRENCH)
□	EXISTING TRAFFIC SIGNAL POLE	—	EXISTING CONDUIT RUN (IN TRENCH)
⊗	PROPOSED GROUND BOX	—	PROPOSED ROAD BORE
⊗	EXISTING GROUND BOX	—	EXISTING ROAD BORE
⊗	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED	⊕	TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
⊗	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED	—OE—	OVERHEAD ELECTRICITY
⊗	PROPOSED VIVDS CAMERA ASSEMBLY	—W—	WATER LINE
⊗	EXISTING VIVDS CAMERA ASSEMBLY	—G—	GAS LINE
⊗	PROPOSED TRAFFIC SIGNAL HEAD	—T—	TELEPHONE (UNDERGROUND)
⊗	EXISTING TRAFFIC SIGNAL HEAD	—SS—	SANITARY SEWER
⊗	PROPOSED LUMINAIRE DEVICE	▶	PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
⊗	EXISTING LUMINAIRE DEVICE	▶	EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
⊗	PROPOSED WOOD POLE	⊗	PROPOSED SIGN
⊗	EXISTING WOOD POLE	⊗	EXISTING SIGN
⊗	PROPOSED ELECTRICAL SERVICES	↔	TRAFFIC DIRECTION ARROW
⊗	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.
 2. EXISTING CROSSWALK PAVEMENT MARKINGS OMITTED FROM INTERSECTION FOR CLARITY.

SCALE 1" = 30'

STATE OF TEXAS
 SETH D. FRANKS
 126258
 LICENSED PROFESSIONAL ENGINEER
Seth D. Franks, P.E.
 3/4/2024



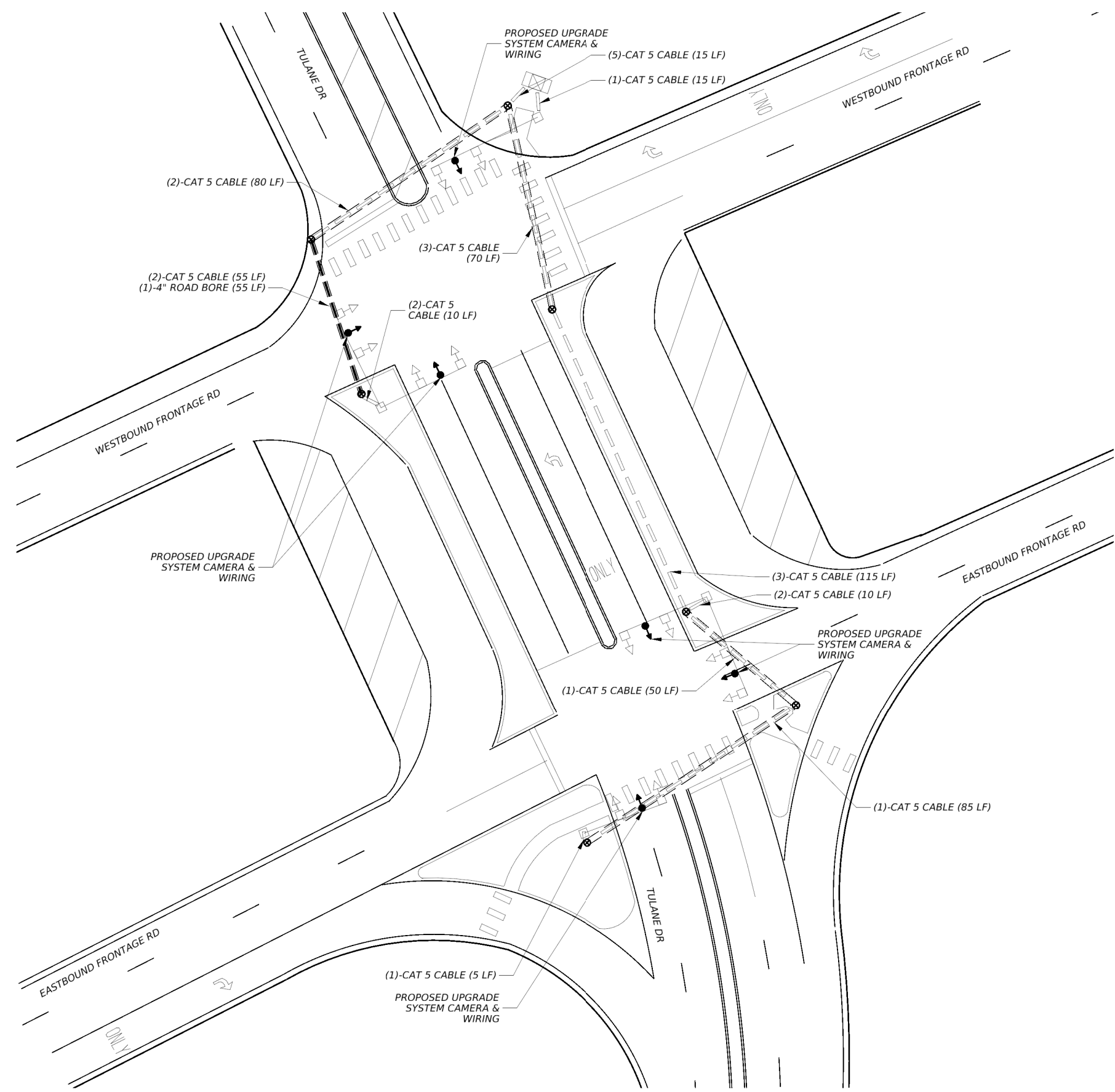
PROPOSED LAYOUT
 INTERSECTION SL 287
 @ COPELAND ST
 (REFERENCE #19)

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	57	

SHEET 19 OF 32

CK:
DW:
CK:
DW:

DATE: 3/13/2024 11:13:02 AM
FILE: c:\t\dot\pw\onlinet\dot\3\quadalupe.sandoval\0676692\REF# 20 Proposed SL 287 @ TULANE-LUFKIN.dgn



LEGEND

<ul style="list-style-type: none"> ■ PROPOSED TRAFFIC SIGNAL POLE □ EXISTING TRAFFIC SIGNAL POLE ○ PROPOSED GROUND BOX ⊗ EXISTING GROUND BOX ⊠ PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED ⊡ EXISTING TRAFFIC CONTROLLER GROUND MOUNTED ● PROPOSED VIVDS CAMERA ASSEMBLY ○ EXISTING VIVDS CAMERA ASSEMBLY ⬆ PROPOSED TRAFFIC SIGNAL HEAD ⬆ EXISTING TRAFFIC SIGNAL HEAD ⬆ PROPOSED LUMINAIRE DEVICE ⬆ EXISTING LUMINAIRE DEVICE ● PROPOSED WOOD POLE ○ EXISTING WOOD POLE ⊕ PROPOSED ELECTRICAL SERVICES ⊕ EXISTING ELECTRICAL SERVICES 	<ul style="list-style-type: none"> — PROPOSED CONDUIT RUN (IN TRENCH) — EXISTING CONDUIT RUN (IN TRENCH) — PROPOSED ROAD BORE — EXISTING ROAD BORE — TYPICAL CONDUIT & SIGNAL WIRE RUN NO. — OE — OVERHEAD ELECTRICITY — W — WATER LINE — G — GAS LINE — T — TELEPHONE (UNDERGROUND) — SS — SANITARY SEWER ⬆ PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ⬆ EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ⬆ PROPOSED SIGN ⬆ EXISTING SIGN ➡ TRAFFIC DIRECTION ARROW
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NOTES:
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SCALE 1" = 40'

Seth D. Franks, P.E.

3/18/2024

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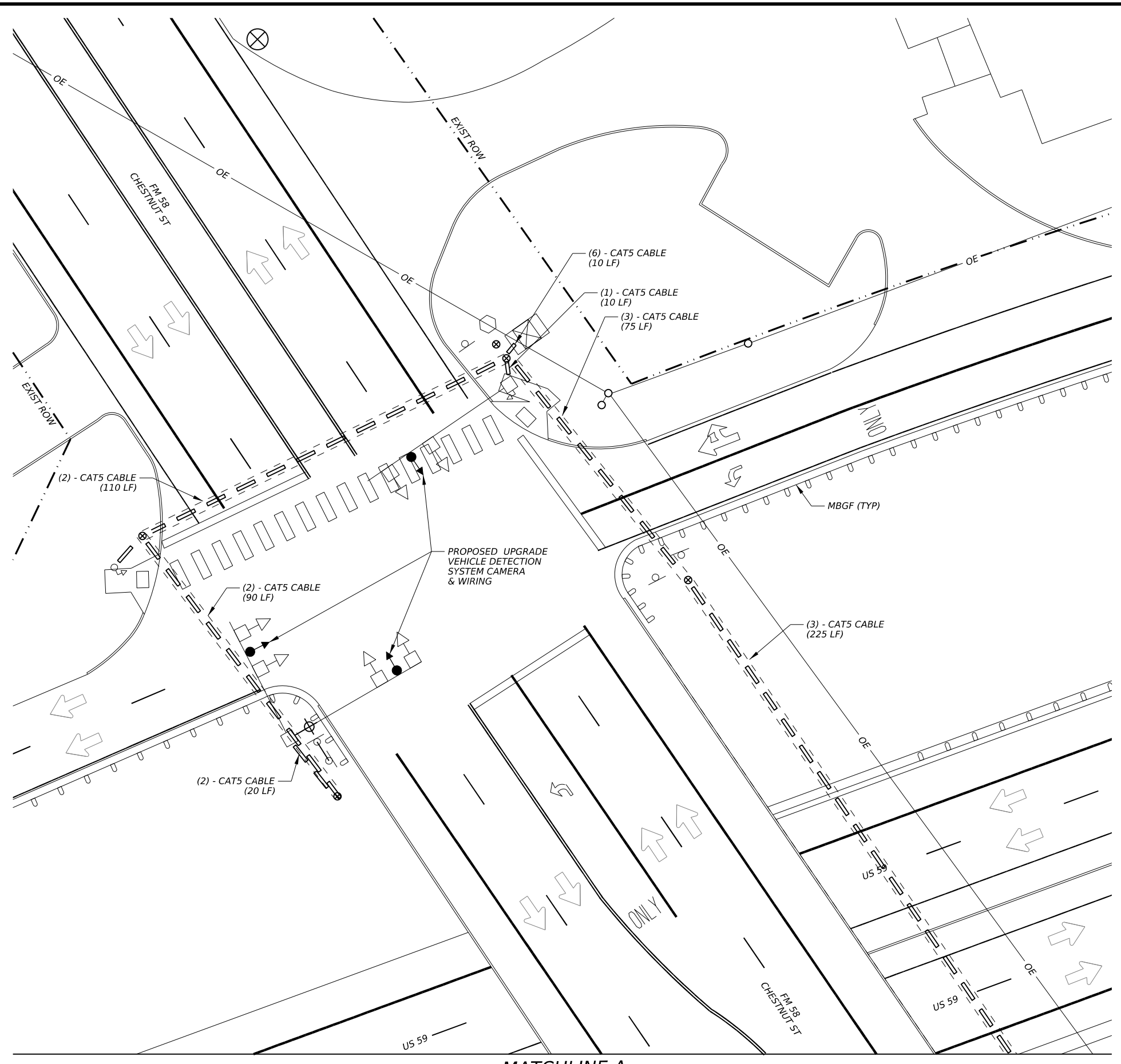
**PROPOSED LAYOUT
(INTERSECTION SL 287
@ TULANE)
(REFERENCE #20)**

SHEET 20 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST		COUNTY	SHEET NO.
LFK		ANGELINA	58

CK:
DW:
CK:
DN:

DATE: 2/28/2024 11:37:26 AM
FILE: c:\txdot\pw_online\txdot\3\guadalupe.sandoval\d0676692\REF# 21 Proposed Layout US 59 @ FM 58-Chestnut St. Inside Loop.dgn

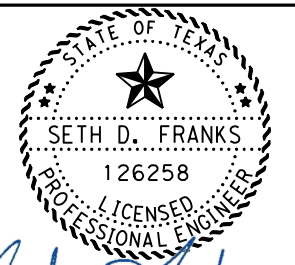


LEGEND

<ul style="list-style-type: none"> ■ PROPOSED TRAFFIC SIGNAL POLE □ EXISTING TRAFFIC SIGNAL POLE ⊗ PROPOSED GROUND BOX ⊗ EXISTING GROUND BOX ⊗ PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED ⊗ EXISTING TRAFFIC CONTROLLER GROUND MOUNTED ● PROPOSED VIVDS CAMERA ASSEMBLY ○ EXISTING VIVDS CAMERA ASSEMBLY ▣ PROPOSED TRAFFIC SIGNAL HEAD □ EXISTING TRAFFIC SIGNAL HEAD ◆ PROPOSED LUMINAIRE DEVICE ⊕ EXISTING LUMINAIRE DEVICE ● PROPOSED WOOD POLE ○ EXISTING WOOD POLE ● PROPOSED ELECTRICAL SERVICES ○ EXISTING ELECTRICAL SERVICES 	<ul style="list-style-type: none"> — PROPOSED CONDUIT RUN (IN TRENCH) — EXISTING CONDUIT RUN (IN TRENCH) — PROPOSED ROAD BORE — EXISTING ROAD BORE ⊕ TYPICAL CONDUIT & SIGNAL WIRE RUN NO. — OE — OVERHEAD ELECTRICITY — W — WATER LINE — G — GAS LINE — T — TELEPHONE (UNDERGROUND) — SS — SANITARY SEWER ▶ PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ▶ EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ● PROPOSED SIGN ○ EXISTING SIGN ➔ TRAFFIC DIRECTION ARROW
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NOTES:
1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 30'



Seth D. Franks, P.E.

3/4/2024

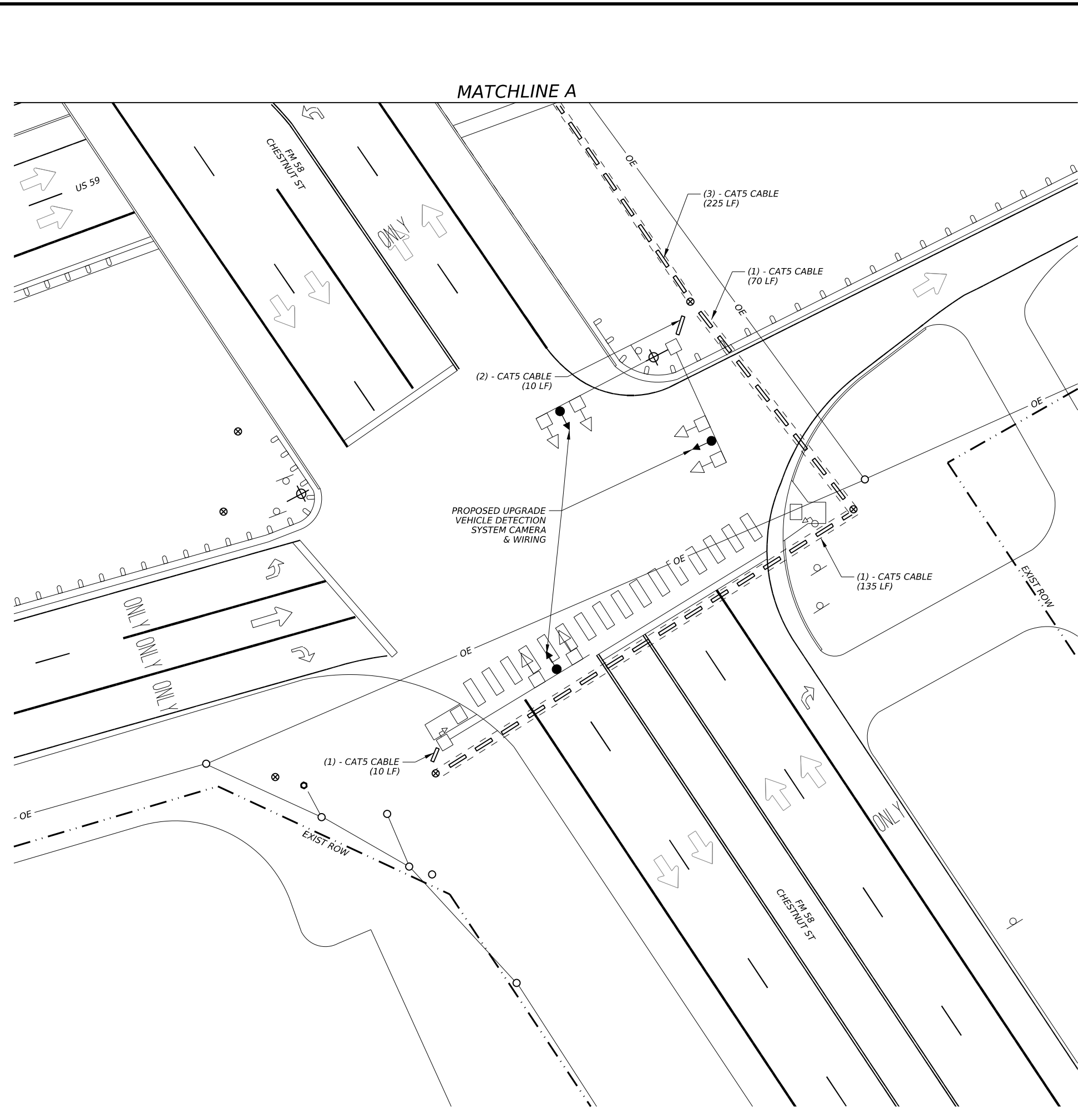


**PROPOSED LAYOUT
(INTERSECTION US 59
@ FM 58/CHESTNUT ST)
(REFERENCE #21)**

SHEET 21 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	59	

DATE: 2/28/2024 11:36:04 AM
 FILE: c:\t\dot\pw_onlinet\tdot3\guadalupe.sandoval\d0676692\REF# 21 Proposed Layout US 59 @ FM 58-Chestnut St. Outside Loop.dgn



LEGEND			
■	PROPOSED TRAFFIC SIGNAL POLE	—	PROPOSED CONDUIT RUN (IN TRENCH)
□	EXISTING TRAFFIC SIGNAL POLE	—	EXISTING CONDUIT RUN (IN TRENCH)
⊙	PROPOSED GROUND BOX	—	PROPOSED ROAD BORE
⊗	EXISTING GROUND BOX	—	EXISTING ROAD BORE
⊠	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED	⊕	TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
⊡	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED	—OE—	OVERHEAD ELECTRICITY
●	PROPOSED VIVDS CAMERA ASSEMBLY	-W-	WATER LINE
○	EXISTING VIVDS CAMERA ASSEMBLY	-G-	GAS LINE
▶	PROPOSED TRAFFIC SIGNAL HEAD	—T—	TELEPHONE (UNDERGROUND)
◻▶	EXISTING TRAFFIC SIGNAL HEAD	—SS—	SANITARY SEWER
◆	PROPOSED LUMINAIRE DEVICE	▶	PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
⊕	EXISTING LUMINAIRE DEVICE	◻▶	EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
●	PROPOSED WOOD POLE	●	PROPOSED SIGN
○	EXISTING WOOD POLE	○	EXISTING SIGN
⊙	PROPOSED ELECTRICAL SERVICES	⇨	TRAFFIC DIRECTION ARROW
⊕	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 30'

STATE OF TEXAS
 SETH D. FRANKS
 126258
 LICENSED PROFESSIONAL ENGINEER
Seth D. Franks, P.E.

3/4/2024



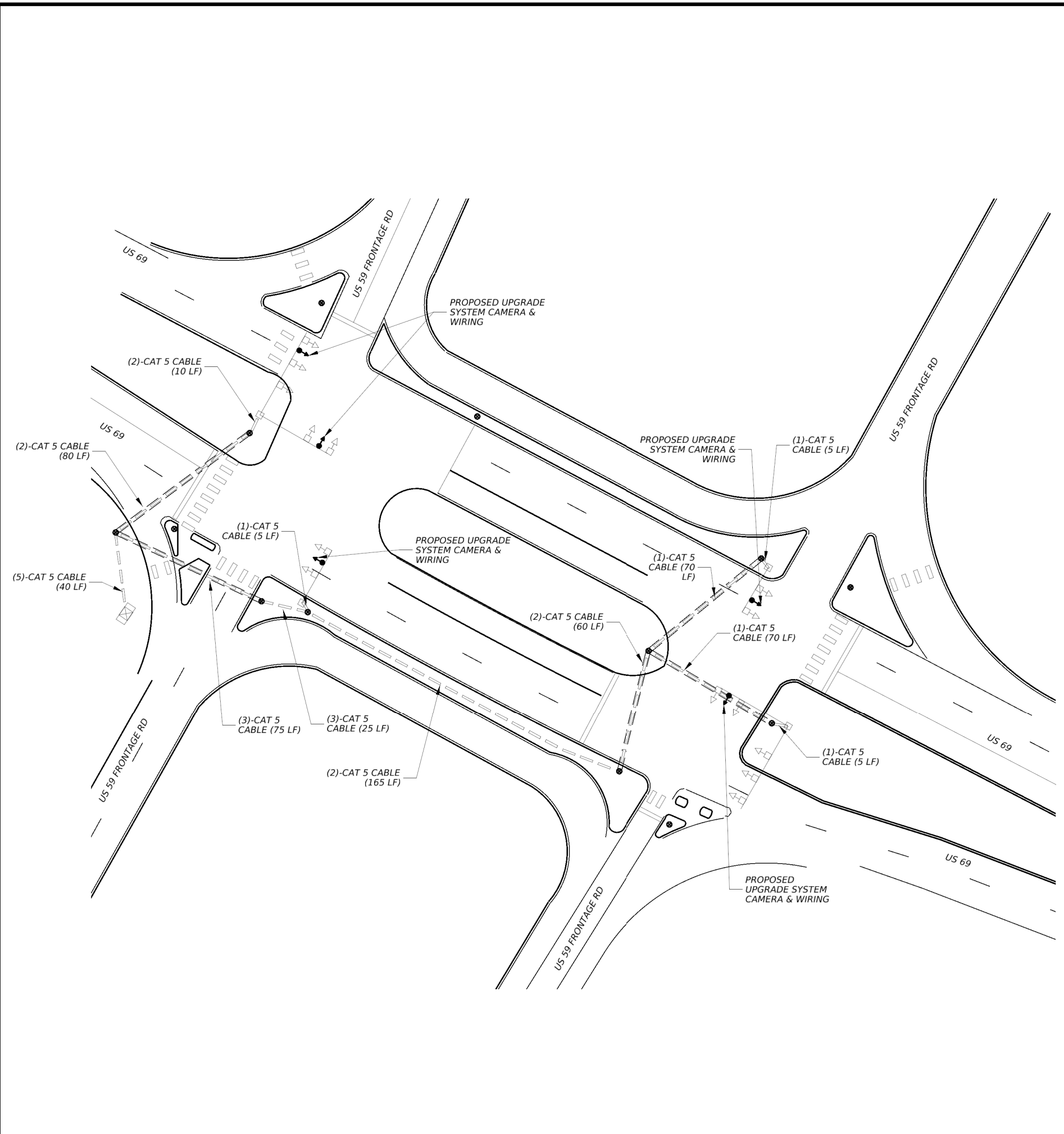
PROPOSED LAYOUT
 (INTERSECTION US 59
 @ FM 58/CHESTNUT ST)
 (REFERENCE #21)

SHEET 22 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	60	

CK: DW: CK: DW:

DATE: 2/28/2024 10:18:22 AM
 FILE: c:\tdot\pw_online\tdot3\guadalupe.sandoval\0676692\REF# 22 Proposed SL 287 @ US 69 DENMAN-LUFKIN.dgn



LEGEND

	PROPOSED TRAFFIC SIGNAL POLE		PROPOSED CONDUIT RUN (IN TRENCH)
	EXISTING TRAFFIC SIGNAL POLE		EXISTING CONDUIT RUN (IN TRENCH)
	PROPOSED GROUND BOX		PROPOSED ROAD BORE
	EXISTING GROUND BOX		EXISTING ROAD BORE
	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED		TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED		OVERHEAD ELECTRICITY
	PROPOSED VIVDS CAMERA ASSEMBLY		WATER LINE
	EXISTING VIVDS CAMERA ASSEMBLY		GAS LINE
	PROPOSED TRAFFIC SIGNAL HEAD		TELEPHONE (UNDERGROUND)
	EXISTING TRAFFIC SIGNAL HEAD		SANITARY SEWER
	PROPOSED LUMINAIRE DEVICE		PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	EXISTING LUMINAIRE DEVICE		EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	PROPOSED WOOD POLE		PROPOSED SIGN
	EXISTING WOOD POLE		EXISTING SIGN
	PROPOSED ELECTRICAL SERVICES		TRAFFIC DIRECTION ARROW
	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 50'

Seth D. Franks, P.E.

3/4/2024

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 Texas Department of Transportation

**PROPOSED LAYOUT
 (INTERSECTION SL 287
 @ US 69/S DENMAN AVE.)
 (REFERENCE #22)**

SHEET 23 OF 32

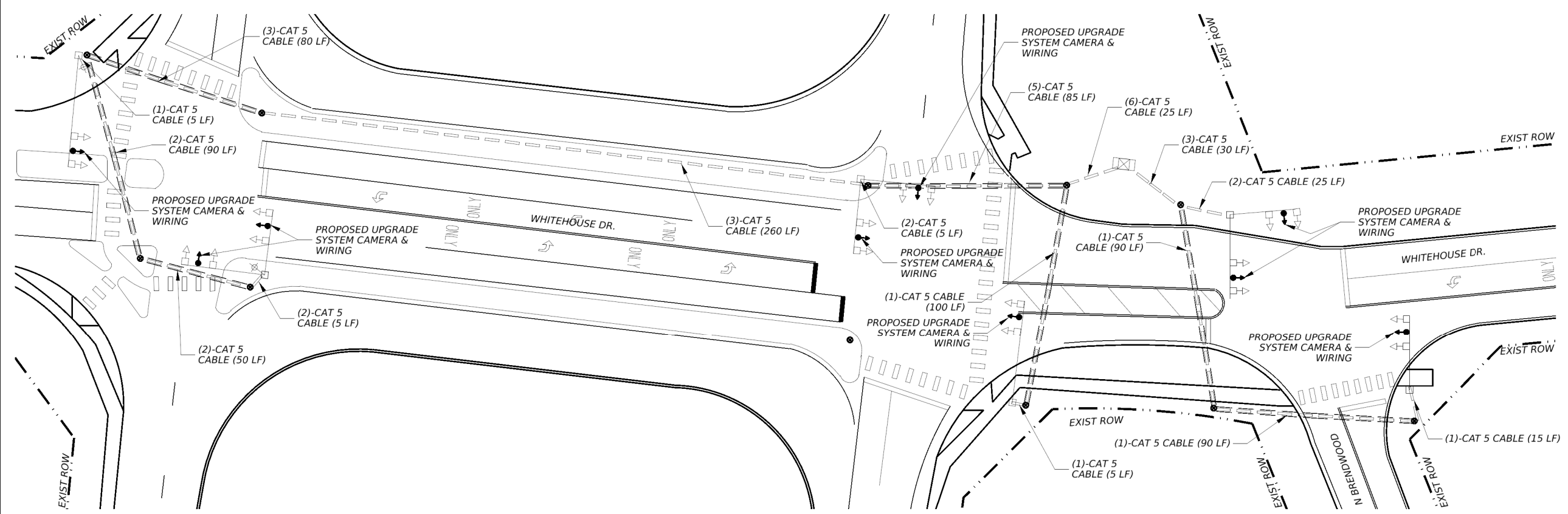
CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	61	

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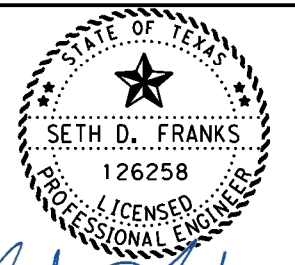
LEGEND

<ul style="list-style-type: none"> ■ PROPOSED TRAFFIC SIGNAL POLE □ EXISTING TRAFFIC SIGNAL POLE ⊗ PROPOSED GROUND BOX ⊗ EXISTING GROUND BOX ⊠ PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED ⊠ EXISTING TRAFFIC CONTROLLER GROUND MOUNTED ● PROPOSED VIVDS CAMERA ASSEMBLY ○ EXISTING VIVDS CAMERA ASSEMBLY ▶ PROPOSED TRAFFIC SIGNAL HEAD ◻ EXISTING TRAFFIC SIGNAL HEAD ◆ PROPOSED LUMINAIRE DEVICE ◆ EXISTING LUMINAIRE DEVICE ● PROPOSED WOOD POLE ○ EXISTING WOOD POLE ● PROPOSED ELECTRICAL SERVICES ○ EXISTING ELECTRICAL SERVICES 	<ul style="list-style-type: none"> ▬ PROPOSED CONDUIT RUN (IN TRENCH) ▬ EXISTING CONDUIT RUN (IN TRENCH) ▬ PROPOSED ROAD BORE ▬ EXISTING ROAD BORE ⊕ TYPICAL CONDUIT & SIGNAL WIRE RUN NO. —OE— OVERHEAD ELECTRICITY —W— WATER LINE —G— GAS LINE —T— TELEPHONE (UNDERGROUND) —SS— SANITARY SEWER ▶ PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ◻ EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ▶ PROPOSED SIGN ○ EXISTING SIGN ▶ TRAFFIC DIRECTION ARROW
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NOTES:
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SCALE 1" = 40'



Seth D. Franks, P.E.

3/4/2024

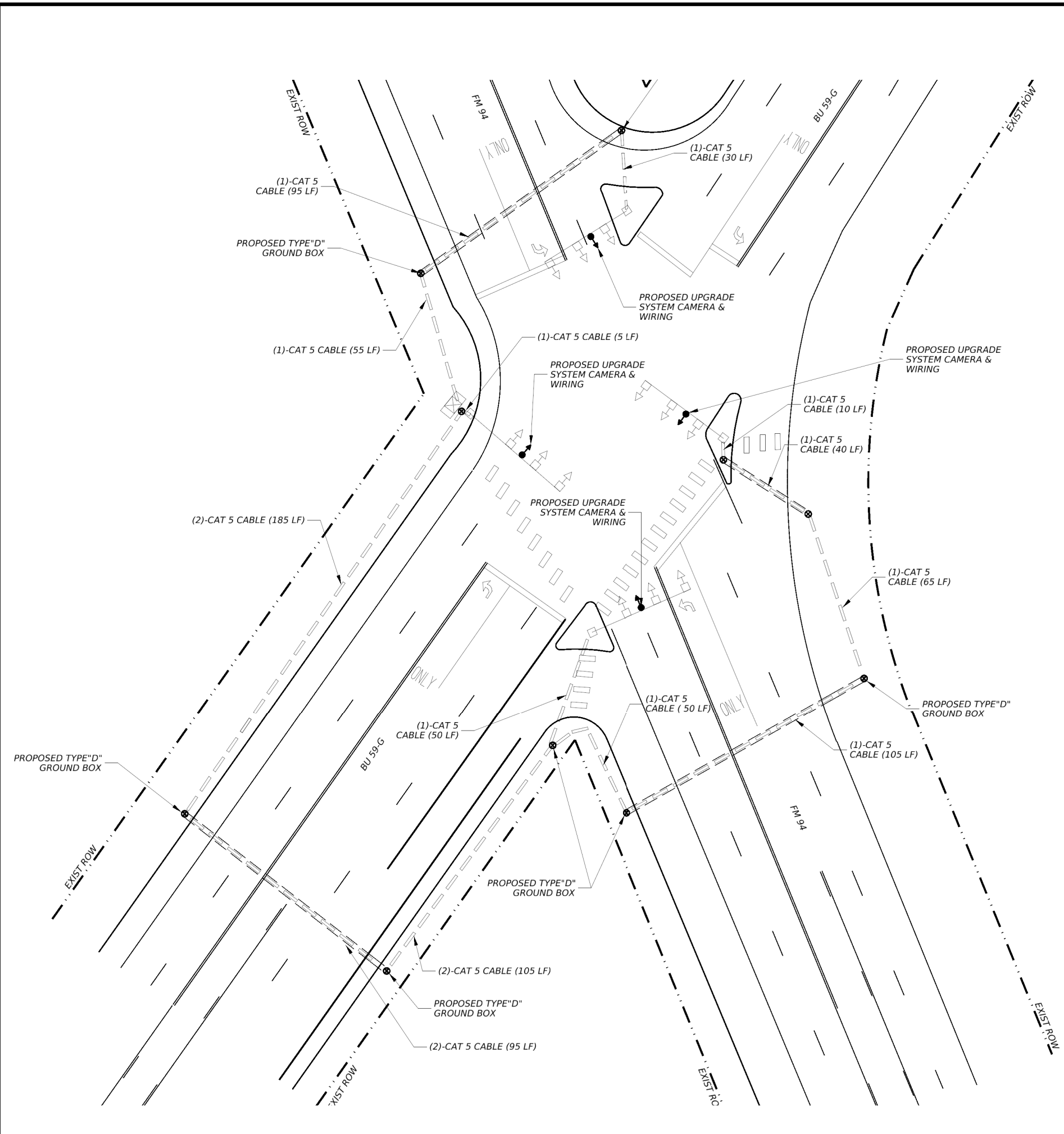


**PROPOSED LAYOUT
 (INTERSECTION N BRENTWOOD
 @ WHITEHOUSE DR.)
 (REFERENCE #23)**

SHEET 24 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	62	

DATE: 2/28/2024 10:18:43 AM
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LEGEND

<ul style="list-style-type: none"> ■ PROPOSED TRAFFIC SIGNAL POLE □ EXISTING TRAFFIC SIGNAL POLE ⊗ PROPOSED GROUND BOX ⊗ EXISTING GROUND BOX ⊗ PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED ⊗ EXISTING TRAFFIC CONTROLLER GROUND MOUNTED ⊗ PROPOSED VIVDS CAMERA ASSEMBLY ⊗ EXISTING VIVDS CAMERA ASSEMBLY ⊗ PROPOSED TRAFFIC SIGNAL HEAD ⊗ EXISTING TRAFFIC SIGNAL HEAD ⊗ PROPOSED LUMINAIRE DEVICE ⊗ EXISTING LUMINAIRE DEVICE ● PROPOSED WOOD POLE ○ EXISTING WOOD POLE ⊗ PROPOSED ELECTRICAL SERVICES ⊗ EXISTING ELECTRICAL SERVICES 	<ul style="list-style-type: none"> — PROPOSED CONDUIT RUN (IN TRENCH) — EXISTING CONDUIT RUN (IN TRENCH) — PROPOSED ROAD BORE — EXISTING ROAD BORE ⊗ TYPICAL CONDUIT & SIGNAL WIRE RUN NO. — OE — OVERHEAD ELECTRICITY — W — WATER LINE — G — GAS LINE — T — TELEPHONE (UNDERGROUND) — SS — SANITARY SEWER ⊗ PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ⊗ EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ⊗ PROPOSED SIGN ⊗ EXISTING SIGN ➔ TRAFFIC DIRECTION ARROW
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NOTES:
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SCALE 1" = 40'

Seth D. Franks, P.E.

3/4/2024

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**PROPOSED LAYOUT
 (INTERSECTION BU 59G
 @ BU 69J/S CHESTNUT ST)
 (REFERENCE #25)**

SHEET 25 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	63	

CK: DW: CK: DW:

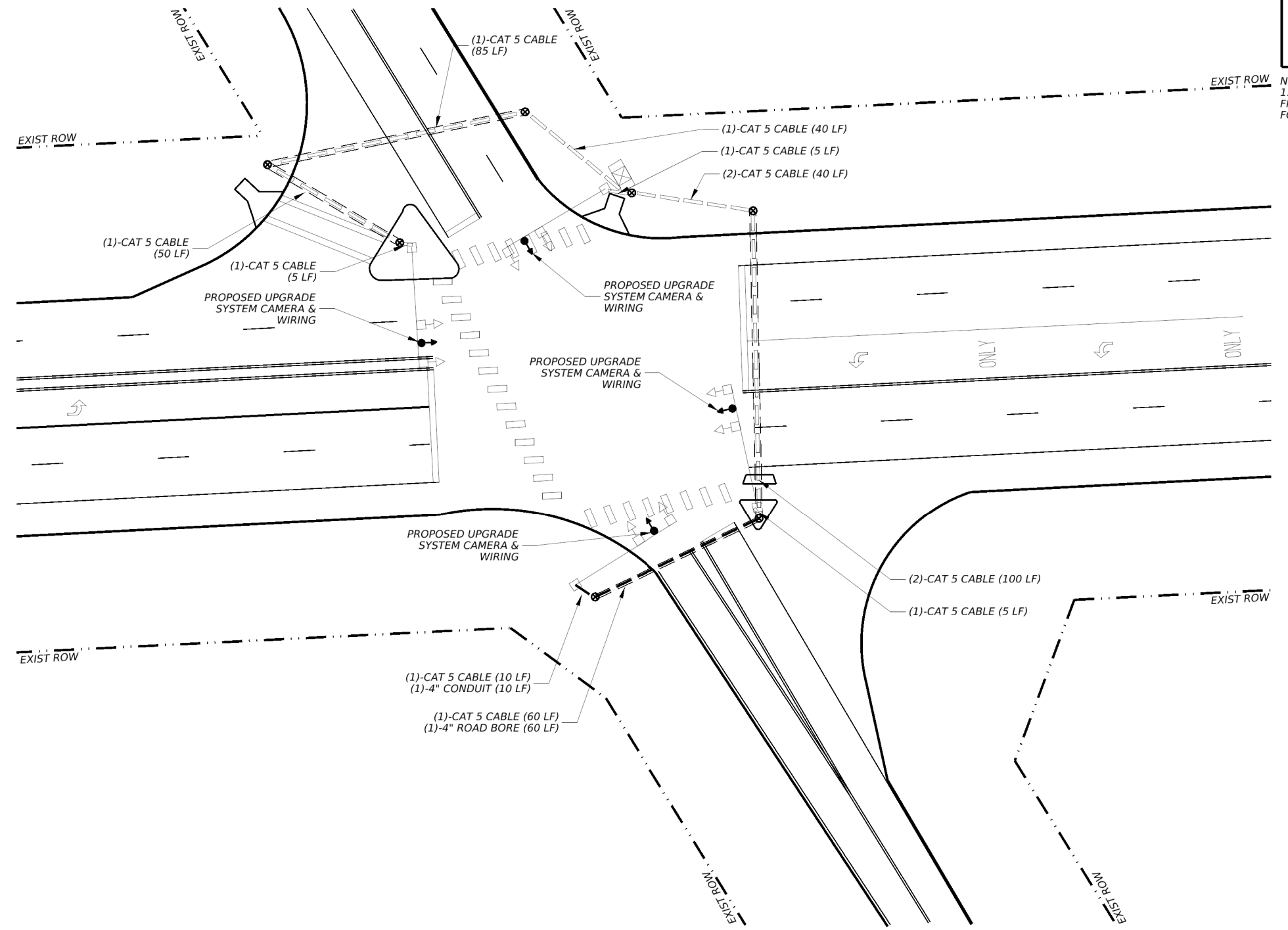
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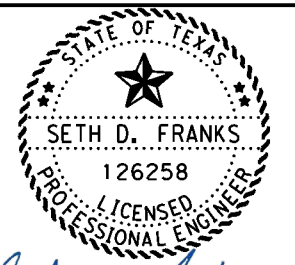
LEGEND

	PROPOSED TRAFFIC SIGNAL POLE		PROPOSED CONDUIT RUN (IN TRENCH)
	EXISTING TRAFFIC SIGNAL POLE		EXISTING CONDUIT RUN (IN TRENCH)
	PROPOSED GROUND BOX		PROPOSED ROAD BORE
	EXISTING GROUND BOX		EXISTING ROAD BORE
	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED		TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED		OVERHEAD ELECTRICITY
	PROPOSED VIVDS CAMERA ASSEMBLY		WATER LINE
	EXISTING VIVDS CAMERA ASSEMBLY		GAS LINE
	PROPOSED TRAFFIC SIGNAL HEAD		TELEPHONE (UNDERGROUND)
	EXISTING TRAFFIC SIGNAL HEAD		SANITARY SEWER
	PROPOSED LUMINAIRE DEVICE		PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	EXISTING LUMINAIRE DEVICE		EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	PROPOSED WOOD POLE		PROPOSED SIGN
	EXISTING WOOD POLE		EXISTING SIGN
	PROPOSED ELECTRICAL SERVICES		TRAFFIC DIRECTION ARROW
	EXISTING ELECTRICAL SERVICES		

NOTES:
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SCALE 1" = 40'



Seth D. Franks, P.E.

3/4/2024

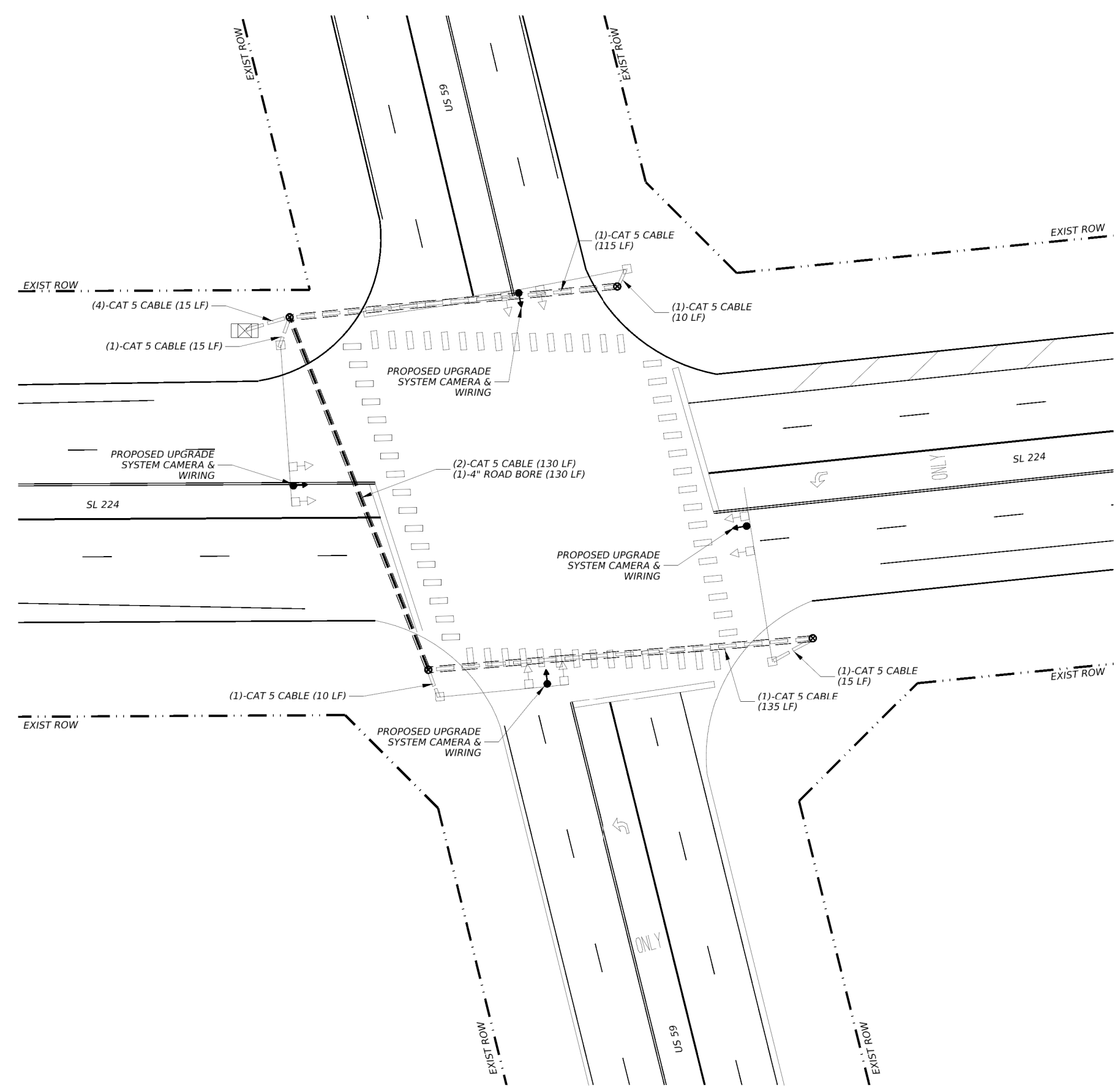


PROPOSED LAYOUT
 (INTERSECTION SL 224
 @ FM 2259)
 (REFERENCE #26)

SHEET 26 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST		COUNTY	SHEET NO.
LFK		ANGELINA	64

DATE: 3/13/2024 11:13:11 AM
 FILE: c:\t\dot\pw\onl\m\txdot\3\guadalupe.sandoval\0676692\REF# 27 Proposed SL 224 @ BU 59F-NAC.dgn



LEGEND

<ul style="list-style-type: none"> ■ PROPOSED TRAFFIC SIGNAL POLE □ EXISTING TRAFFIC SIGNAL POLE ⊗ PROPOSED GROUND BOX ⊗ EXISTING GROUND BOX ⊠ PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED ⊠ EXISTING TRAFFIC CONTROLLER GROUND MOUNTED ● PROPOSED VIVDS CAMERA ASSEMBLY ○ EXISTING VIVDS CAMERA ASSEMBLY ▶ PROPOSED TRAFFIC SIGNAL HEAD ◻ EXISTING TRAFFIC SIGNAL HEAD ◆ PROPOSED LUMINAIRE DEVICE ⊕ EXISTING LUMINAIRE DEVICE ● PROPOSED WOOD POLE ○ EXISTING WOOD POLE ⊕ PROPOSED ELECTRICAL SERVICES ○ EXISTING ELECTRICAL SERVICES 	<ul style="list-style-type: none"> — PROPOSED CONDUIT RUN (IN TRENCH) — EXISTING CONDUIT RUN (IN TRENCH) — PROPOSED ROAD BORE — EXISTING ROAD BORE ⊕ TYPICAL CONDUIT & SIGNAL WIRE RUN NO. — OE — OVERHEAD ELECTRICITY — W — WATER LINE — G — GAS LINE — T — TELEPHONE (UNDERGROUND) — SS — SANITARY SEWER ▶ PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ▶ EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ● PROPOSED SIGN ○ EXISTING SIGN ▶ TRAFFIC DIRECTION ARROW
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NOTES:
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 2. WIRE CONNECTION CUT OVER FROM EXISTING GROUND BOXES AND CONDUIT TO PROPOSED GROUND BOXES AND CONDUIT TO BE COMPLETED AT NIGHT TO REDUCE THE IMPACT ON THE TRAVELING PUBLIC.

SCALE 1" = 40'

Seth D. Franks, P.E.

3/18/2024

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 Texas Department of Transportation

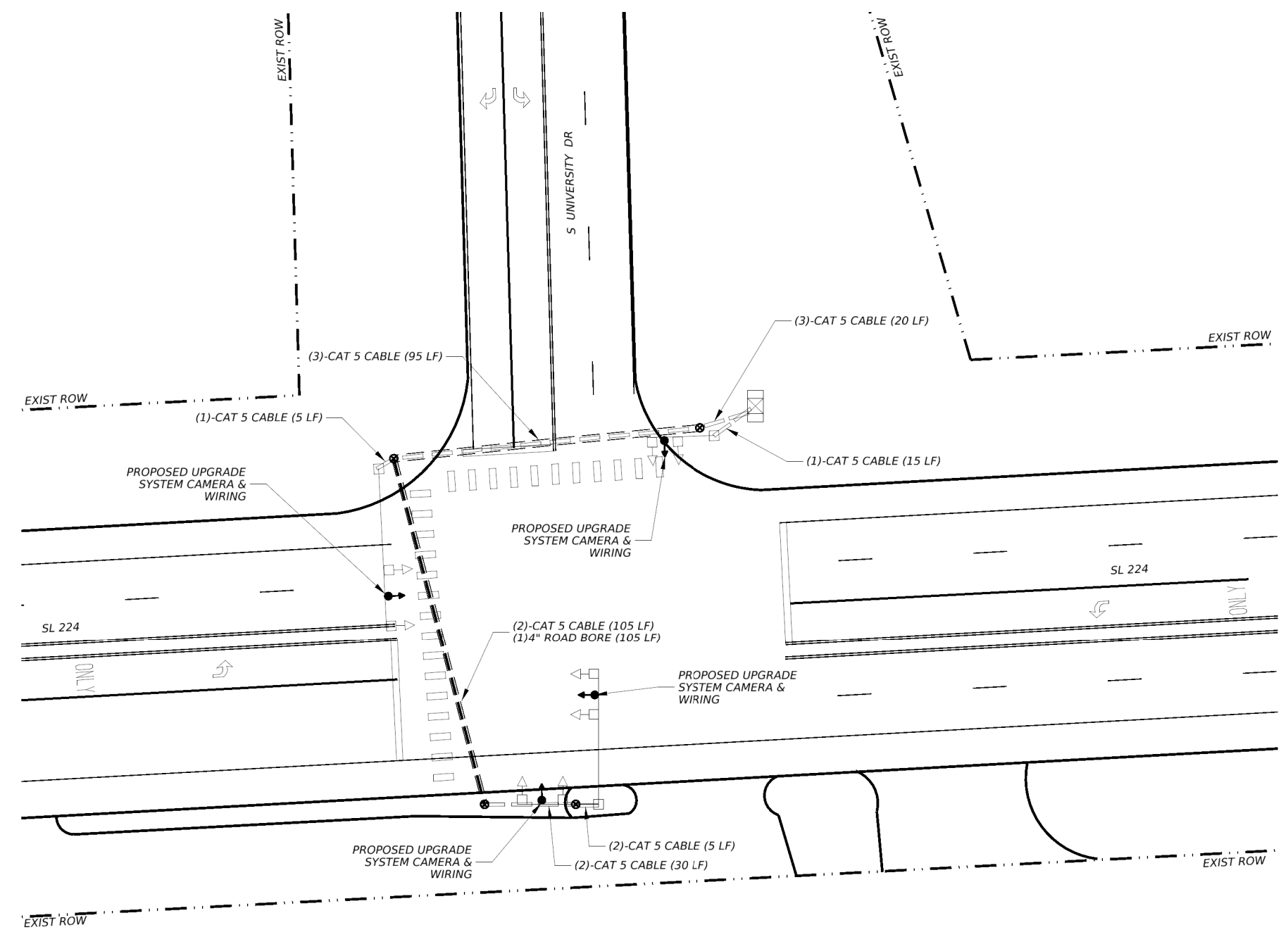
**PROPOSED LAYOUT
 (INTERSECTION SL 224
 @ BU 59F)
 (REFERENCE #27)**

SHEET 27 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	65	

CK: DW: CK: DW:

DATE: 2/28/2024 10:19:13 AM
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LEGEND

<ul style="list-style-type: none"> ■ PROPOSED TRAFFIC SIGNAL POLE □ EXISTING TRAFFIC SIGNAL POLE ⊗ PROPOSED GROUND BOX ⊙ EXISTING GROUND BOX ⊠ PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED ⊡ EXISTING TRAFFIC CONTROLLER GROUND MOUNTED ⊙ PROPOSED VIVDS CAMERA ASSEMBLY ○ EXISTING VIVDS CAMERA ASSEMBLY ⊠ PROPOSED TRAFFIC SIGNAL HEAD ⊡ EXISTING TRAFFIC SIGNAL HEAD ◆ PROPOSED LUMINAIRE DEVICE ⊙ EXISTING LUMINAIRE DEVICE ● PROPOSED WOOD POLE ○ EXISTING WOOD POLE ⊙ PROPOSED ELECTRICAL SERVICES ○ EXISTING ELECTRICAL SERVICES 	<ul style="list-style-type: none"> — PROPOSED CONDUIT RUN (IN TRENCH) --- EXISTING CONDUIT RUN (IN TRENCH) — PROPOSED ROAD BORE --- EXISTING ROAD BORE ⊙ TYPICAL CONDUIT & SIGNAL WIRE RUN NO. —OE— OVERHEAD ELECTRICITY -W- WATER LINE -G- GAS LINE -T- TELEPHONE (UNDERGROUND) -SS- SANITARY SEWER ➔ PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ➔ EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ⊙ PROPOSED SIGN ○ EXISTING SIGN ➔ TRAFFIC DIRECTION ARROW
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NOTES:
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SCALE 1" = 40'

SETH D. FRANKS
 126258
 LICENSED PROFESSIONAL ENGINEER

Seth D. Franks, P.E.

3/4/2024

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 Texas Department of Transportation

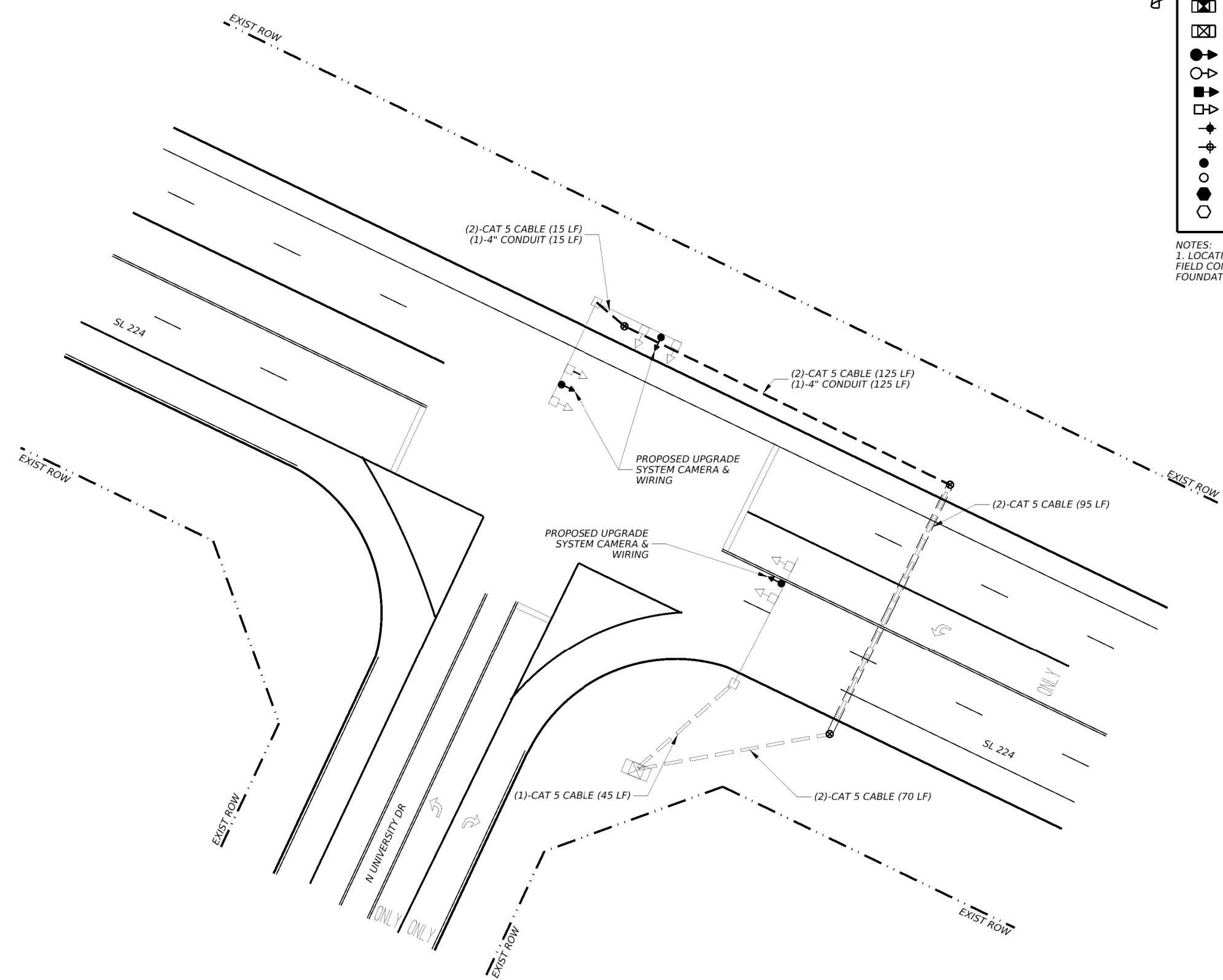
**PROPOSED LAYOUT
 (INTERSECTION SL 224
 @ S UNIVERSITY)
 (REFERENCE #28)**

SHEET 28 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	66	

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CK: DW: CK: DW: CK: DW: CK: DW:



LEGEND

	PROPOSED TRAFFIC SIGNAL POLE		PROPOSED CONDUIT RUN (IN TRENCH)
	EXISTING TRAFFIC SIGNAL POLE		EXISTING CONDUIT RUN (IN TRENCH)
	PROPOSED GROUND BOX		PROPOSED ROAD BORE
	EXISTING GROUND BOX		EXISTING ROAD BORE
	PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED		TYPICAL CONDUIT & SIGNAL WIRE RUN NO.
	EXISTING TRAFFIC CONTROLLER GROUND MOUNTED		OVERHEAD ELECTRICITY
	PROPOSED VIVDS CAMERA ASSEMBLY		WATER LINE
	EXISTING VIVDS CAMERA ASSEMBLY		GAS LINE
	PROPOSED TRAFFIC SIGNAL HEAD		TELEPHONE (UNDERGROUND)
	EXISTING TRAFFIC SIGNAL HEAD		SANITARY SEWER
	PROPOSED LUMINAIRE DEVICE		PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	EXISTING LUMINAIRE DEVICE		EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION
	PROPOSED WOOD POLE		PROPOSED SIGN
	EXISTING WOOD POLE		EXISTING SIGN
	PROPOSED ELECTRICAL SERVICES		TRAFFIC DIRECTION ARROW
	EXISTING ELECTRICAL SERVICES		

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 40'

SETH D. FRANKS
 126258
 LICENSED PROFESSIONAL ENGINEER

Seth D. Franks, P.E.

3/4/2024

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 Texas Department of Transportation

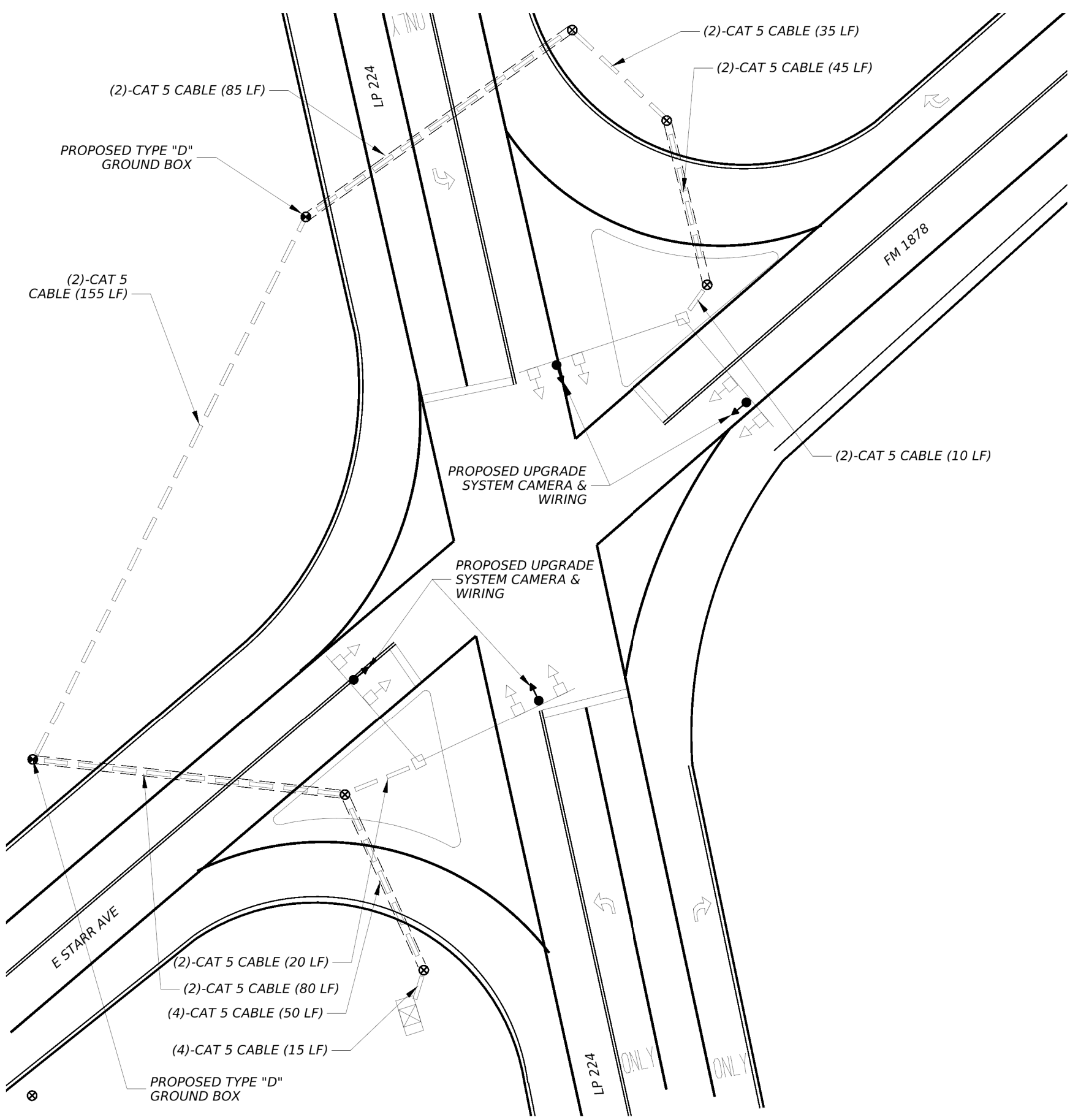
**PROPOSED LAYOUT
 (INTERSECTION SL 224
 @ N UNIVERSITY)
 (REFERENCE #29)**

SHEET 29 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST		COUNTY	SHEET NO.
LFK		ANGELINA	67

CK: DW: CK: DW:

DATE: 2/28/2024 10:20:03 AM
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LEGEND

<ul style="list-style-type: none"> ■ PROPOSED TRAFFIC SIGNAL POLE □ EXISTING TRAFFIC SIGNAL POLE ⊗ PROPOSED GROUND BOX ⊗ EXISTING GROUND BOX ⊠ PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED ⊠ EXISTING TRAFFIC CONTROLLER GROUND MOUNTED ● PROPOSED VIVDS CAMERA ASSEMBLY ○ EXISTING VIVDS CAMERA ASSEMBLY ▶ PROPOSED TRAFFIC SIGNAL HEAD ◻ EXISTING TRAFFIC SIGNAL HEAD ◆ PROPOSED LUMINAIRE DEVICE ◆ EXISTING LUMINAIRE DEVICE ● PROPOSED WOOD POLE ○ EXISTING WOOD POLE ⊙ PROPOSED ELECTRICAL SERVICES ⊙ EXISTING ELECTRICAL SERVICES 	<ul style="list-style-type: none"> ▬ PROPOSED CONDUIT RUN (IN TRENCH) ▬ EXISTING CONDUIT RUN (IN TRENCH) ▬ PROPOSED ROAD BORE ▬ EXISTING ROAD BORE ⊕ TYPICAL CONDUIT & SIGNAL WIRE RUN NO. —OE— OVERHEAD ELECTRICITY -W- WATER LINE -G- GAS LINE -T- TELEPHONE (UNDERGROUND) -SS- SANITARY SEWER ▶ PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ◻ EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ⊙ PROPOSED SIGN ○ EXISTING SIGN ➡ TRAFFIC DIRECTION ARROW
--	---

NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 40'

Seth D. Franks, P.E.

3/4/2024

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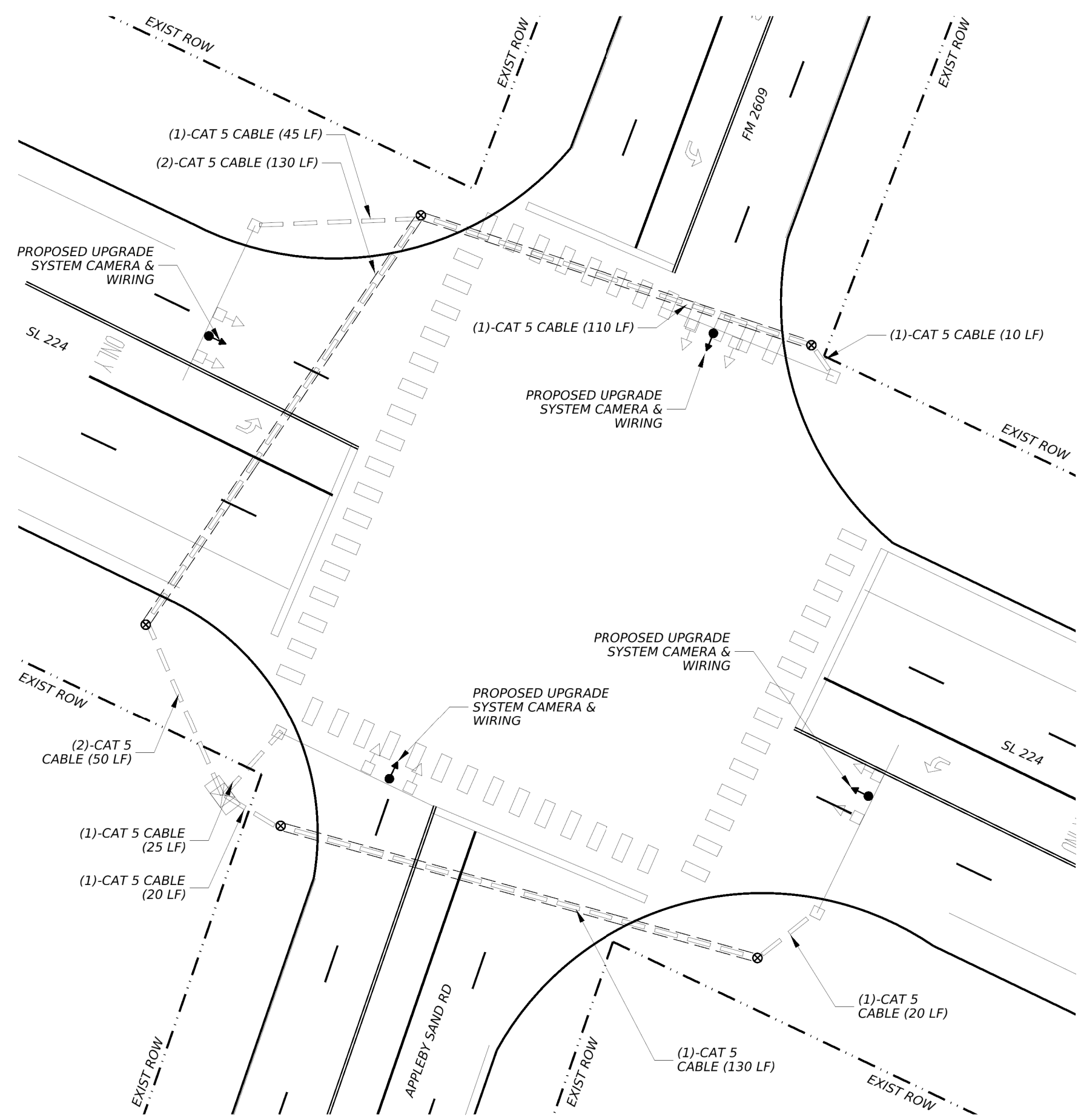
**PROPOSED LAYOUT
 (INTERSECTION SL 224
 @ FM 1878/E STARR AVE)
 (REFERENCE #30)**

SHEET 30 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST		COUNTY	SHEET NO.
LFK		ANGELINA	68

DATE: 2/28/2024 10:20:14 AM
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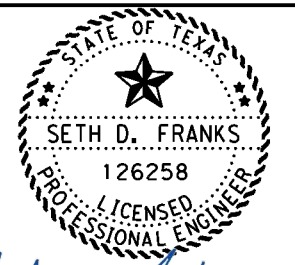


LEGEND

<ul style="list-style-type: none"> ■ PROPOSED TRAFFIC SIGNAL POLE □ EXISTING TRAFFIC SIGNAL POLE □ PROPOSED GROUND BOX ⊗ EXISTING GROUND BOX ⊠ PROPOSED TRAFFIC CONTROLLER GROUND MOUNTED ⊠ EXISTING TRAFFIC CONTROLLER GROUND MOUNTED 📷 PROPOSED VIVDS CAMERA ASSEMBLY 📷 EXISTING VIVDS CAMERA ASSEMBLY 📡 PROPOSED TRAFFIC SIGNAL HEAD 📡 EXISTING TRAFFIC SIGNAL HEAD 💡 PROPOSED LUMINAIRE DEVICE 💡 EXISTING LUMINAIRE DEVICE ● PROPOSED WOOD POLE ○ EXISTING WOOD POLE ⊕ PROPOSED ELECTRICAL SERVICES ⊕ EXISTING ELECTRICAL SERVICES 	<ul style="list-style-type: none"> — PROPOSED CONDUIT RUN (IN TRENCH) — EXISTING CONDUIT RUN (IN TRENCH) — PROPOSED ROAD BORE — EXISTING ROAD BORE ⊕ TYPICAL CONDUIT & SIGNAL WIRE RUN NO. — OE — OVERHEAD ELECTRICITY — W — WATER LINE — G — GAS LINE — T — TELEPHONE (UNDERGROUND) — SS — SANITARY SEWER ▶ PROPOSED PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ▶ EXISTING PEDESTRIAN PUSH BTN, LED & SIGNAL SECTION ● PROPOSED SIGN ○ EXISTING SIGN ➡ TRAFFIC DIRECTION ARROW
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NOTES:
 1. LOCATIONS SHOWN ON THIS SHEET ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. LOCATIONS MUST BE STAKED, VERIFIED, AND APPROVED PRIOR TO DRILLING FOR FOUNDATIONS OR ANY EXCAVATION WORK.

SCALE 1" = 40'



Seth D. Franks, P.E.

3/4/2024



**PROPOSED LAYOUT
 (INTERSECTION SL 224
 @ FM 2609/APPLEBY SAND RD)
 (REFERENCE #31)**

SHEET 31 OF 32

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY	SHEET NO.	
LFK	ANGELINA	69	

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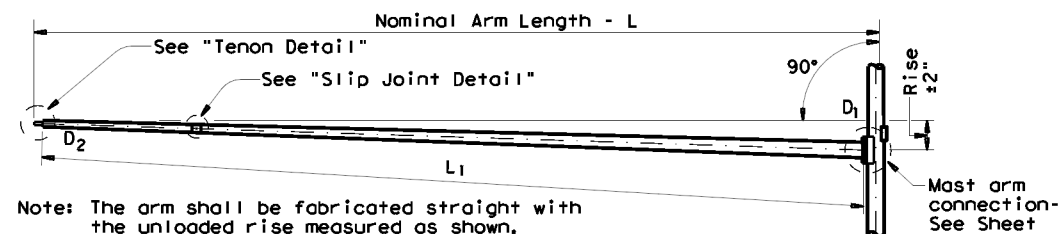
DATE: 2/20/2024 2:19:52 PM
 FILE: c:\t\dot\p\w\online\t\dot\3\quadalupe.sandoval\d0676702\SMA-80(1)-20.dgn

Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D _B	D ₁₉	D ₂₄	D ₃₀	① thk	D _B	D ₁₉	D ₂₄	D ₃₀	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

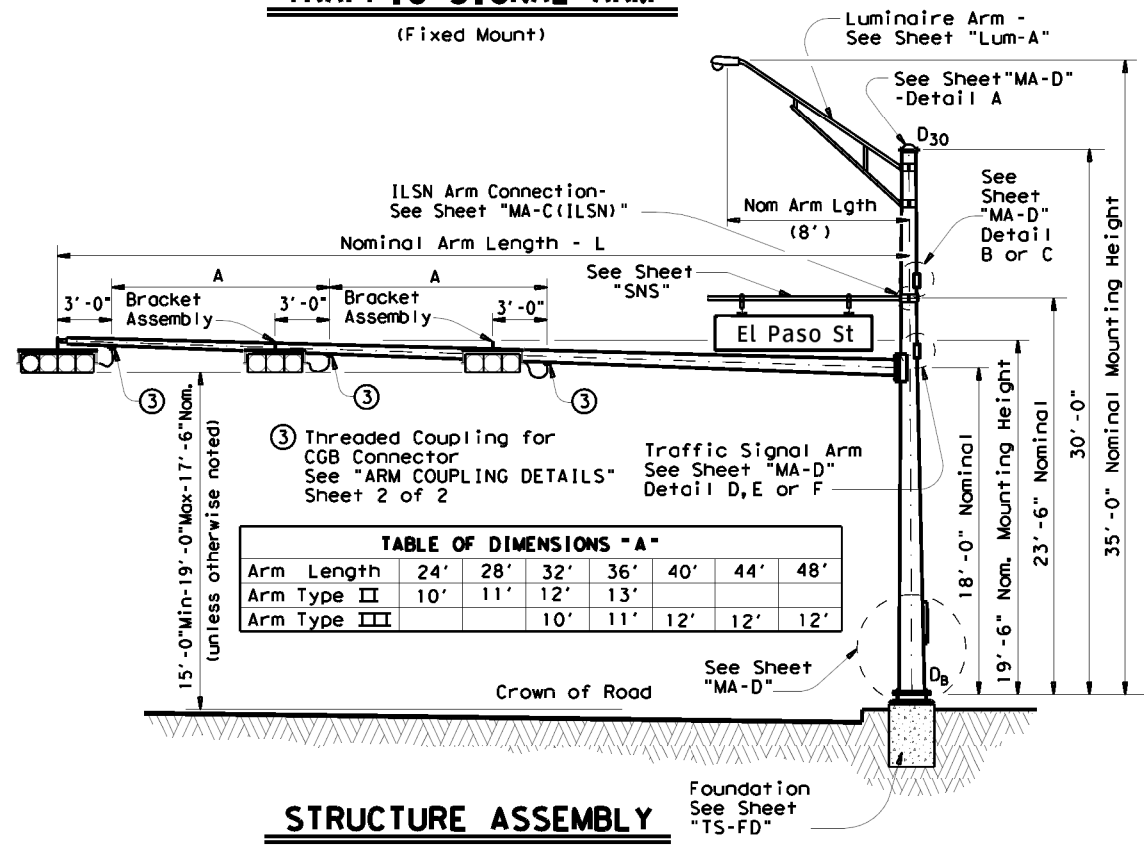
Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L ₁	D ₁	D ₂	① thk	Rise	L ₁	D ₁	② D ₂	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"
48	47.0	10.5	4.1	.239	3'-4"	47.0	11.0	3.5	.239	2'-9"

D_B = Pole Base O.D.
 D₁₉ = Pole Top O.D. with no Luminaire and no ILSN
 D₂₄ = Pole Top O.D. with ILSN w/out Luminaire
 D₃₀ = Pole Top O.D. with Luminaire
 D₁ = Arm Base O.D.
 D₂ = Arm End O.D.
 L₁ = Shaft Length
 L = Nominal Arm Length

- ① Thickness shown are minimums, thicker materials may be used.
- ② D₂ may be increased by up to 1" for polygonal arms.



TRAFFIC SIGNAL ARM
(Fixed Mount)



Arm Length	24'	28'	32'	36'	40'	44'	48'
Arm Type II	10'	11'	12'	13'			
Arm Type III			10'	11'	12'	12'	12'

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire		24' Poles With ILSN		19' Poles With No Luminaire and No ILSN	
	Designation	Quantity	Designation	Quantity	Designation	Quantity
ft	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80		28S-80		28-80	
32	32L-80		32S-80		32-80	1
36	36L-80		36S-80		36-80	
40	40L-80		40S-80		40-80	
44	44L-80		44S-80		44-80	
48	48L-80		48S-80		48-80	1

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	Designation	Quantity	Designation	Quantity	Designation	Quantity
ft	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80	1	32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	
48					48III-80	1

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 1/2"	3'-4"	1
1 3/4"	3'-10"	1

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

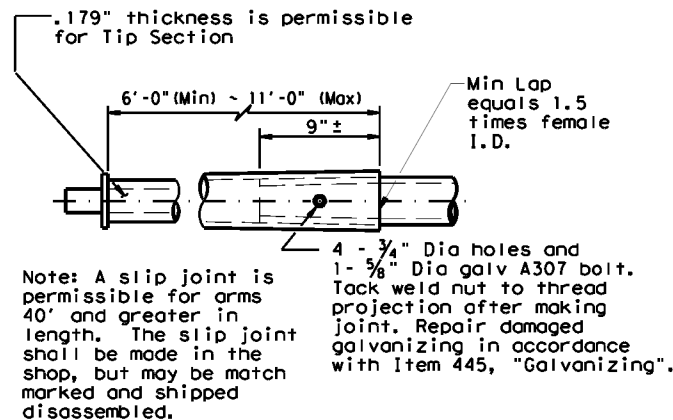
Templates may be removed for shipment.

Texas Department of Transportation
 Traffic Operations Division
TRAFFIC SIGNAL SUPPORT STRUCTURES
 SINGLE MAST ARM ASSEMBLY
 (80 MPH WIND ZONE)
SMA-80(1)-12

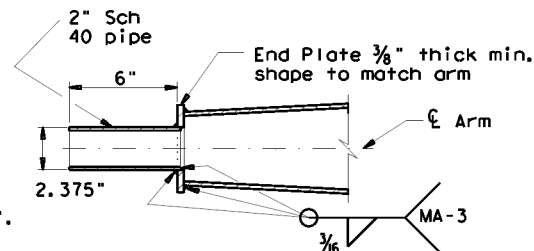
REVISIONS		DNR MS	CR: JSY	DWR: MMF	CR: JSY
5-96	11-99	0911	00	139	VARIOUS
11-12		DIST	COUNTY		SHEET NO.
		LFK	ANGELINA		71

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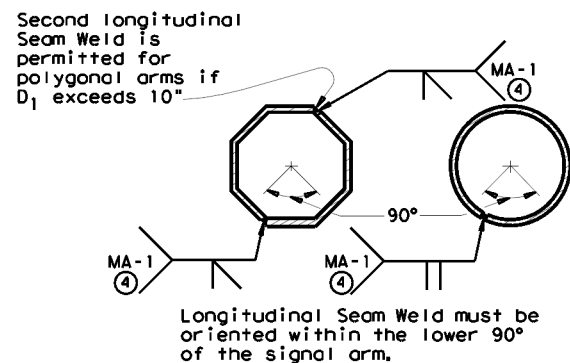
SLIP JOINT DETAIL



TENON DETAIL

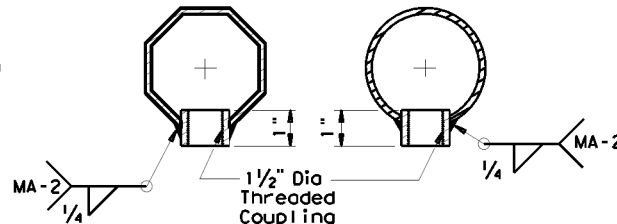
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 1/2" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

④ 60% Min. penetration
 100% penetration within
 6" of circumferential
 base welds.



ARM COUPLING DETAILS

VIBRATION WARNING

Most Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backplates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and 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 this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Texas Department of Transportation
 Traffic Operations Division

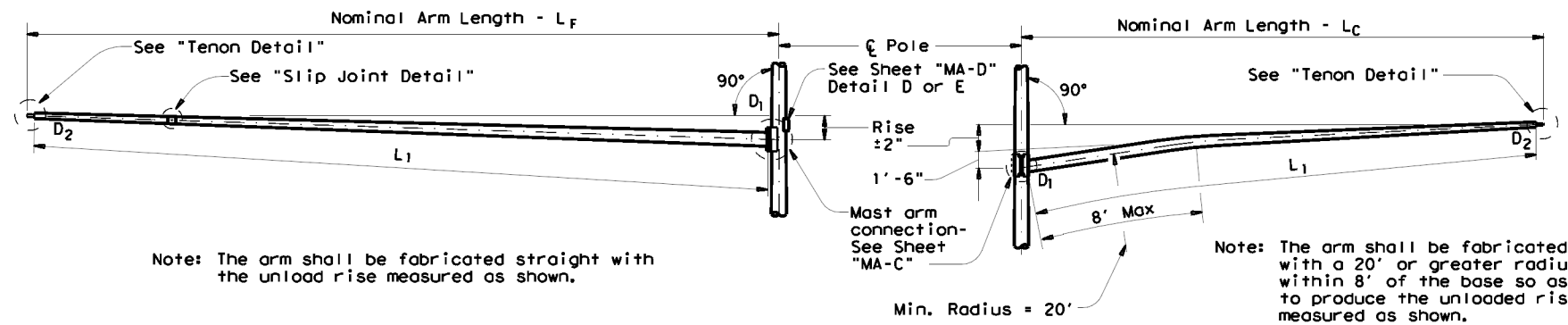
**TRAFFIC SIGNAL
 SUPPORT STRUCTURES
 SINGLE MAST ARM ASSEMBLY**

(80 MPH WIND ZONE)

SMA-80(2)-12

© TxDOT August 1995	DNR MS	CR: JSY	DWR MMF	CR: JSY
5-96 1-12	REVISIONS		CONTRACT NO.	HIGHWAY
	0911	00	139	VARIOUS
	DIST.	COUNTY	SHEET NO.	
	LFK	ANGELINA	72	

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FIXED MOUNT TRAFFIC SIGNAL ARM

CLAMP-ON TRAFFIC SIGNAL ARM

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

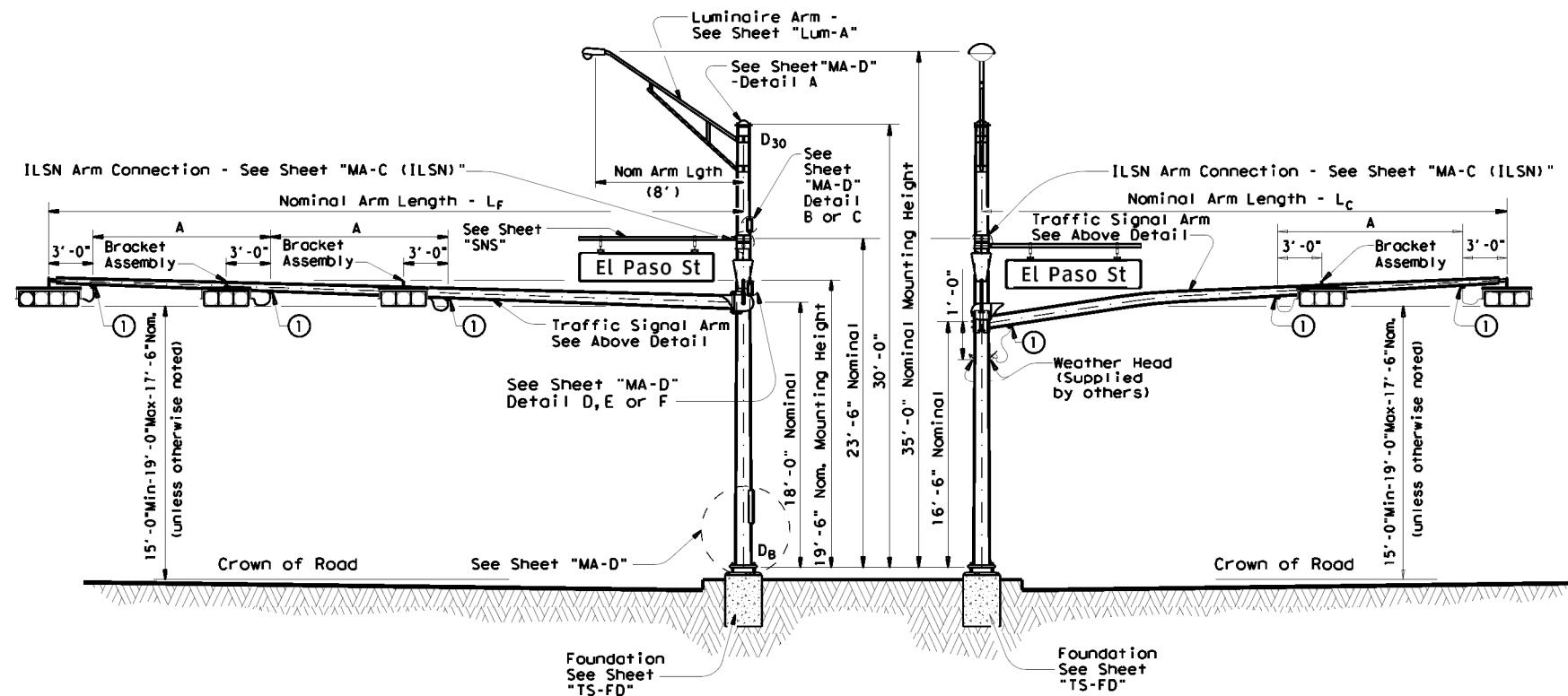
Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name signs and two traffic signal arms with length combinations as tabulated. The specified luminaire load applied at the end of luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign applied 4'-6" from the centerline of the pole equals 85 lbs vertical dead load plus the horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and 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 this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.



ELEVATION

(Showing fixed mount arm)

STRUCTURE ASSEMBLY

① Threaded Coupling for CGB Connector See "ARM COUPLING DETAILS" Sheet 2 of 3

ELEVATION

(Showing clamp mount arm)

TABLE OF DIMENSIONS "A"						
Arm Length	24'	28'	32'	36'	40'	44'
Arm Type I	10'	11'	12'	13'		
Arm Type III			10'	11'	12'	12'

Texas Department of Transportation

 Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

DUAL MAST ARM ASSEMBLY

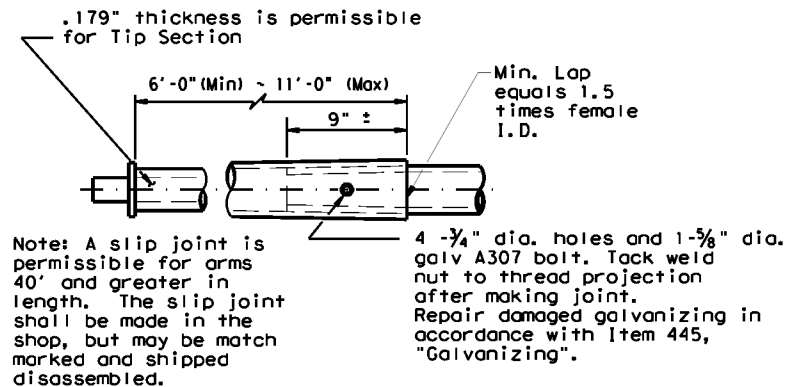
(80 MPH WIND ZONE)

DMA-80 (1)-12

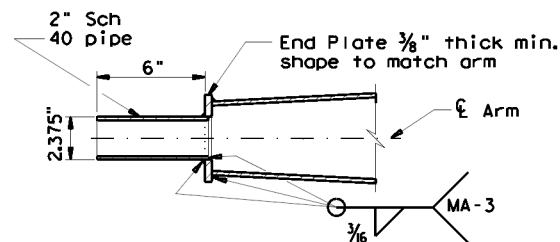
© TxDOT August 1995	DNR MS	CK: JSY	DWR MMF	CK: JSY	
5-96 1-12	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0911	00	139	VARIOUS
		DIST	COUNTY	SHEET NO.	
		LFK	ANGELINA	73	

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DATE:
FILE:



SLIP JOINT DETAIL



TENON DETAIL

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 1/2" Dia Threaded Coupling.

BRACKET ASSEMBLY

VIBRATION WARNING

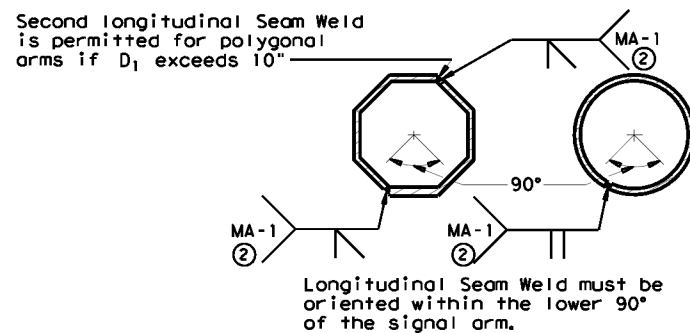
Most Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

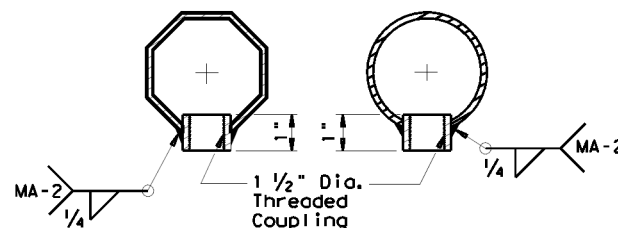
The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backplates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.



ARM WELD DETAIL

② 60% Min. penetration
100% penetration within
6" of circumferential
base welds.



ARM COUPLING DETAILS

Texas Department of Transportation
Traffic Operations Division
**TRAFFIC SIGNAL
SUPPORT STRUCTURES**
DUAL MAST ARM ASSEMBLY
(80 MPH WIND ZONE)
DMA-80 (2)-12

© TxDOT August 1995		DNR MS	CK: JSY	DNR MMF	CK: JSY
REVISIONS		CONT	SECT	JOB	HIGHWAY
5-96		0911	00	139	VARIOUS
1-12		DIST	COUNTY		SHEET NO.
		LFK	ANGELINA		74

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SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire		24' Poles With ILSN		19' Poles With no Luminaire and no ILSN		
	LF	LC	See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex		See note above plus one small hand hole		See note above
ft.	ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20	2020L-80		2020S-80		2020-80	
24	20	2420L-80		2420S-80		2420-80	
	24	2424L-80		2424S-80		2424-80	
28	20	2820L-80		2820S-80		2820-80	
	24	2824L-80		2824S-80		2824-80	
	28	2828L-80		2828S-80		2828-80	
32	20	3220L-80		3220S-80		3220-80	
	24	3224L-80		3224S-80		3224-80	
	28	3228L-80		3228S-80		3228-80	
	32	3232L-80		3232S-80		3232-80	
36	20	3620L-80		3620S-80		3620-80	
	24	3624L-80		3624S-80		3624-80	2
	28	3628L-80		3628S-80		3628-80	
	32	3632L-80		3632S-80		3632-80	
	36	3636L-80		3636S-80		3636-80	
40	20	4020L-80		4020S-80		4020-80	
	24	4024L-80		4024S-80		4024-80	
	28	4028L-80		4028S-80		4028-80	
	32	4032L-80		4032S-80		4032-80	
	36	4036L-80		4036S-80		4036-80	2
44	20	4420L-80		4420S-80		4420-80	
	24	4424L-80		4424S-80		4424-80	
	28	4428L-80		4428S-80		4428-80	
	32	4432L-80		4432S-80		4432-80	
	36	4436L-80		4436S-80		4436-80	1

Traffic Signal Arms (Fixed Mount) (1 per pole) Ship each arm w/ the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80	2	36III-80	
40					40III-80	2
44					44III-80	1

Traffic Signal Arms (Clamp-On Mount) (1 per pole) Ship each arm w/ the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	2 CGB connector and 1 clamp w/bolts and washers		1 Bracket Assembly, 3 CGB Connectors, and 1 clamp w/bolts and washers		2 Bracket Assemblies, 4 CGB Connectors, and 1 clamp w/bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80	2		
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80	2	36III-80	1

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

ILSN Arm (1 or 2 per pole) ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 1/2"	3'-4"	
1 3/4"	3'-10"	
2 1/4"	4'-9"	5

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.


ARMS	ROUND POLES						POLYGONAL POLES					Foundation Type
	LF	Lc	D _B	D ₁₉	D ₂₄	D ₃₀	(3) thk	D _B	D ₁₉	D ₂₄	D ₃₀	
ft.	ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
20	20	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
24	20	12.0	9.3	8.6	7.8	.179	13.0	10.0	9.2	8.3	.179	30-A
	24	12.0	9.3	8.6	7.8	.179	13.0	10.0	9.2	8.3	.239	30-A
28	20	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
	24	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
32	20	13.0	10.3	9.6	8.8	.179	12.5	9.5	8.7	7.8	.239	30-A
	24	13.0	10.3	9.6	8.8	.179	12.5	9.5	8.7	7.8	.239	30-A
	28	12.0	9.3	8.6	7.8	.239	13.0	10.0	9.2	8.3	.239	30-A
	32	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
36	20	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
	24	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
	28	12.5	9.8	9.1	8.3	.239	13.5	10.5	9.7	8.8	.239	36-A
	32	12.5	9.8	9.1	8.3	.239	13.5	10.5	9.7	8.8	.239	36-A
40	20	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
	24	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
	28	13.0	10.3	9.6	8.8	.239	14.0	11.0	10.2	9.3	.239	36-A
	32	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A
44	20	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
	24	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
	28	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
	32	14.0	11.3	10.6	9.8	.239	15.5	12.5	11.7	10.8	.239	36-B
36	14.0	11.3	10.6	9.8	.239	15.5	12.5	11.7	10.8	.239	36-B	

Arm LF or LC	ROUND ARMS					POLYGONAL ARMS				
	L ₁	D ₁	D ₂	(3) thk	Rise	L ₁	D ₁	(4) D ₂	(3) thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"

D_B = Pole Base O.D.
 D₁₉ = Pole Top O.D.
 D₂₄ = Pole Top O.D. with ILSN
 D₃₀ = Pole Top O.D. with Luminaire
 L₁ = Shaft Length
 L_F = Fixed Arm Length
 L_C = Clamp-on Arm Length (36" Max)

D₁ = Arm Base O.D.
 D₂ = Arm End O.D.
 L₁ = Shaft Length
 L_F = Fixed Arm Length
 L_C = Clamp-on Arm Length (36" Max)

- (3) Thickness shown are minimums, thicker materials may be used.
- (4) D₂ may be increased by up to 1.0" for polygonal arms.



Texas Department of Transportation
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TRAFFIC SIGNAL SUPPORT STRUCTURES

DUAL MAST ARM ASSEMBLY

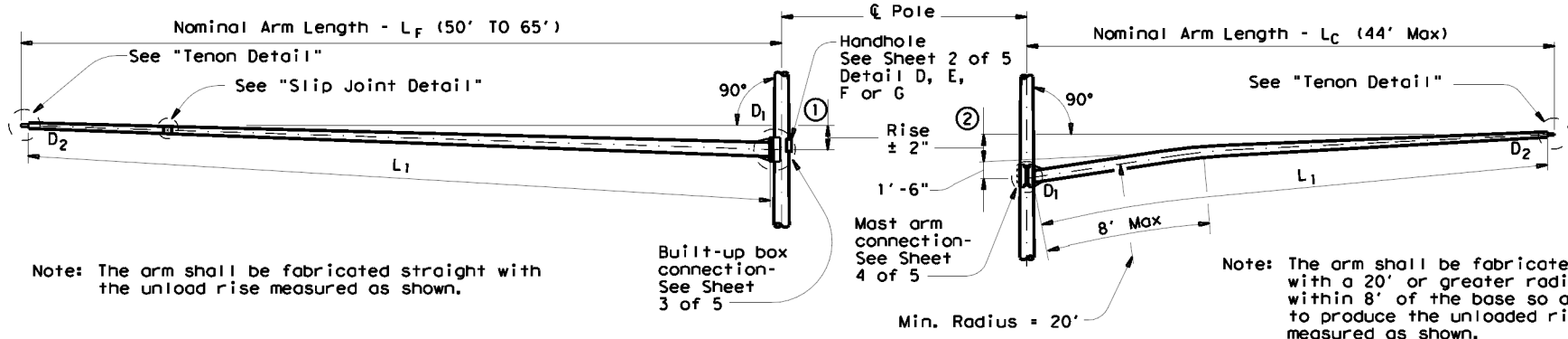
(80 MPH WIND ZONE)

DMA-80 (3)-12

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DIST	COUNTY	SHEET NO.			
LFK	ANGELINA	75			

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Note: The arm shall be fabricated straight with the unload rise measured as shown.

Note: The arm shall be fabricated with a 20' or greater radius within 8' of the base so as to produce the unloaded rise measured as shown.

FIXED MOUNT TRAFFIC SIGNAL ARM

① See Sheet 3 of 5 for Arm Rise

CLAMP-ON TRAFFIC SIGNAL ARM (IF REQUIRED)

② See Sheet 4 of 5 for Arm Rise and Clamp-on Arm Details

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed can be either 100 mph or 80 mph plus a 1.3 gust factor. If clamp-on traffic signal is required, designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name (ILSN) signs and two traffic signal arms with limited length combinations.

Each arm with its related attachment is shown below

Arm	Equivalent DL ⑤	WL EPA ⑤⑥
8' Luminaire Arm	Luminaire 60 lbs	1.6 sq ft
9' ILSN Arm	Sign 85 lbs	11.5 sq ft
50' to 65' Fixed Mount Arm	Signal Loads 310 lbs	52 sq ft
Up to 44' Clamp-on Arm	Signal Loads 180 lbs	32.4 sq ft

⑤ Equivalent dead load plus horizontal wind load applied at the end of arm except ILSN arm, which applied 4.5' from the centerline of the pole.

⑥ Effective projected area (actual area times drag coefficient) for the application of horizontal wind load.

Except as noted in Sheet 1 thru 5 of 5, other details not covered shall refer to Standard Sheet "MA-D" for pole details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details.

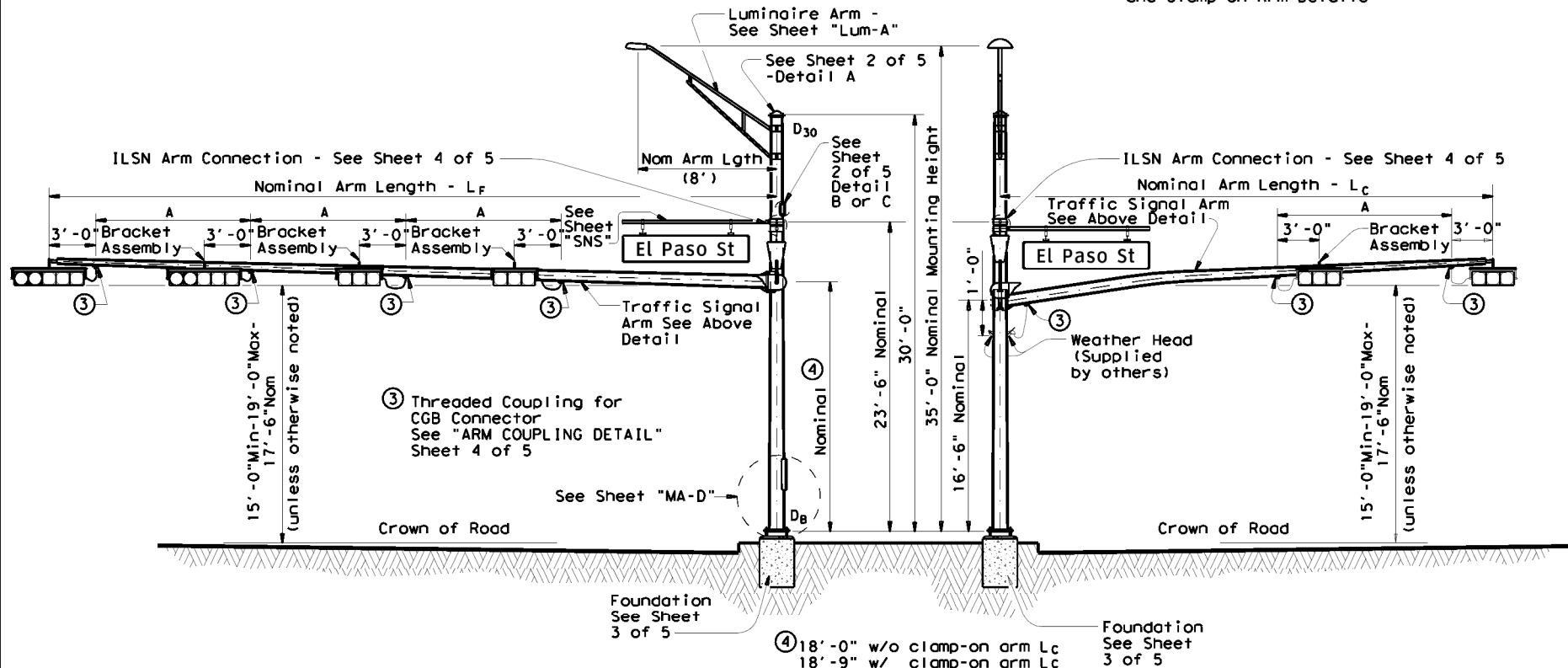
Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Material, fabrication tolerances, and shipping practices shall also meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing" after fabrication.

Deviations from the details and dimensions shown herein require submission of shop drawings in accordance with the Item 441, "Steel Structures". Alternate designs are not acceptable.

Installation of damping plate for the long mast arm is not recommended.

Provision of the bracket assembly used to support the traffic signal heads shall be under the direction of the Engineer for approval.



ELEVATION

(Showing fixed mount arm)

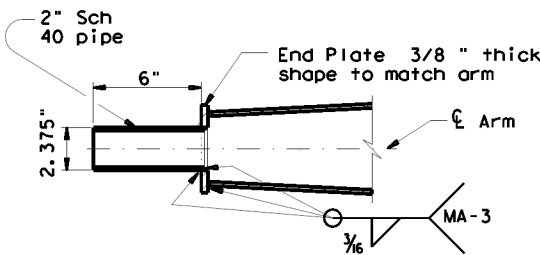
STRUCTURE ASSEMBLY

ELEVATION

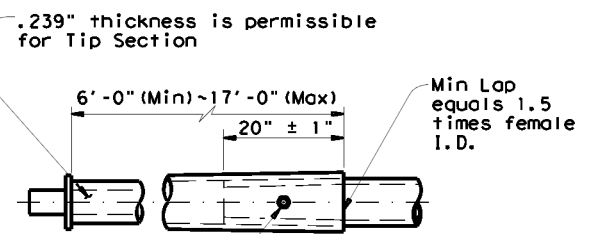
(Showing clamp-on arm)

TABLE OF DIMENSIONS "A"

Arm Length	24'	28'	32'	36'	40'	44'	50'	55'	60'	65'
Arm Type II	10'	11'	12'	13'						
Arm Type III			10'	11'	12'	12'				
Arm Type IV							12'	12'	12'	12'



TENON DETAIL



SLIP JOINT DETAIL (FIXED MOUNT ARM)

Design also conforms to NCHRP Report 412 for fatigue resistance except that there are no stiffeners at the base plate. TxDOT is conducting tests to determine if stiffeners at the base plate will or will not result in optimal performance; depending upon the results of the tests, poles may need a retrofit to ensure optimal fatigue performance.

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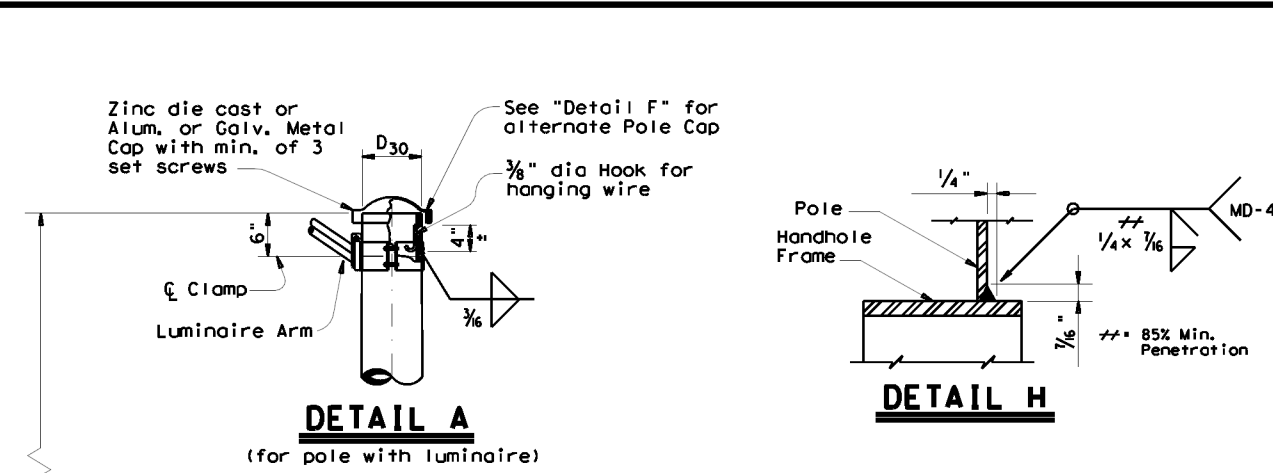
TRAFFIC SIGNAL SUPPORT STRUCTURES LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE) LMA(1)-12

Sheet 1 of 5

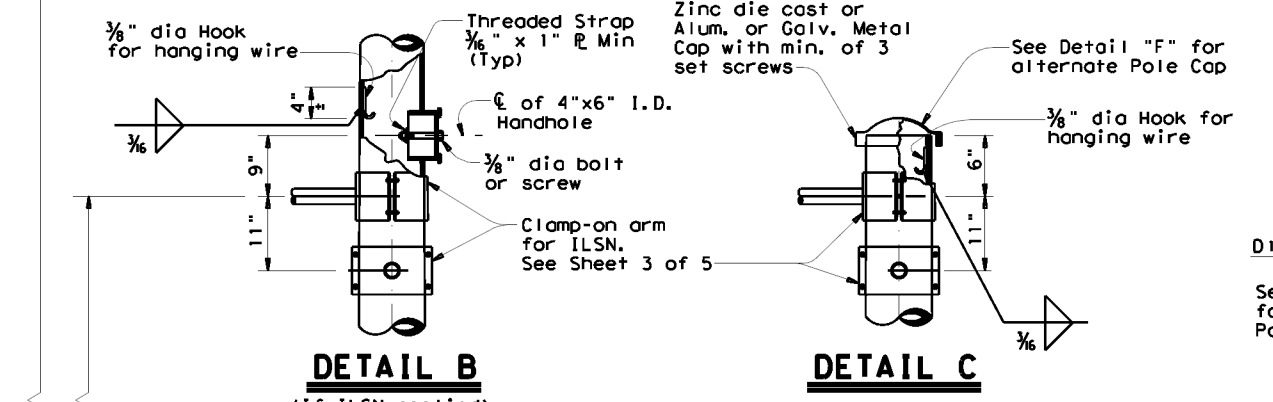
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LFK	ANGELINA			76	

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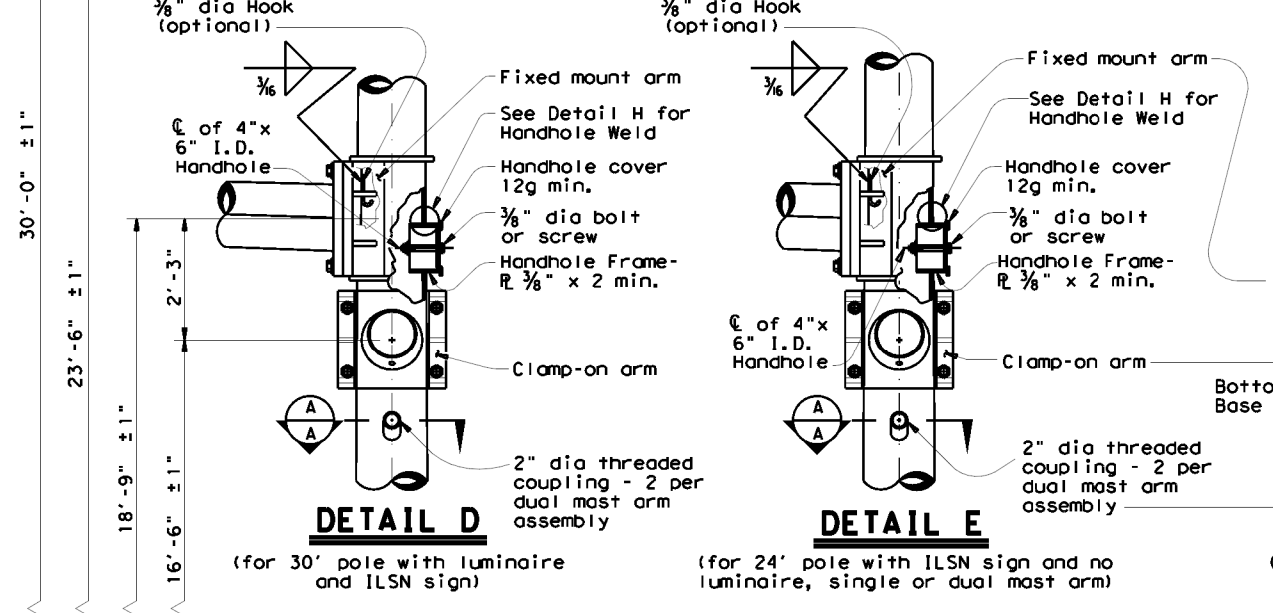
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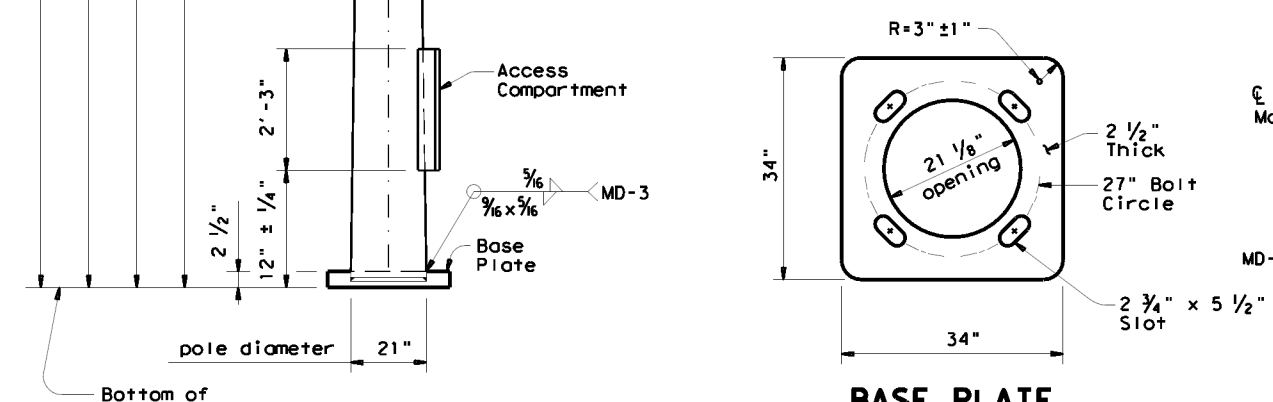
DETAIL A
(for pole with luminaire)



DETAIL B
(If ILSN applied)



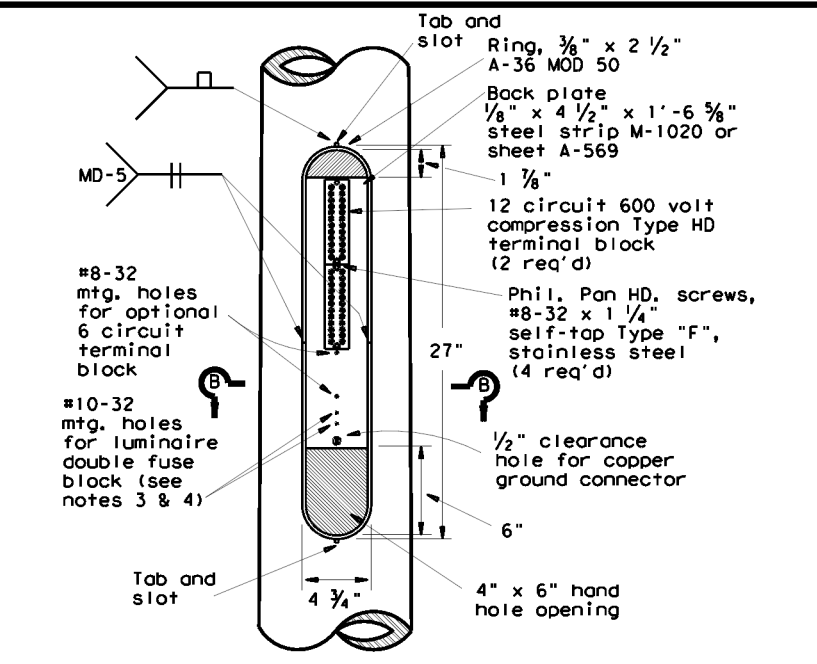
DETAIL C



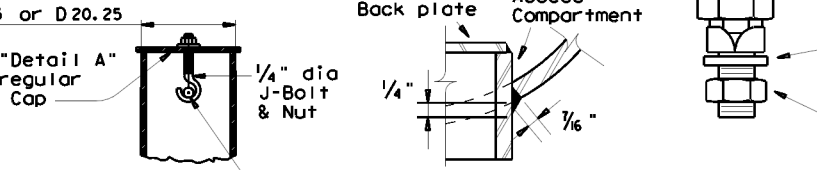
DETAIL D
(for 30' pole with luminaire and ILSN sign)



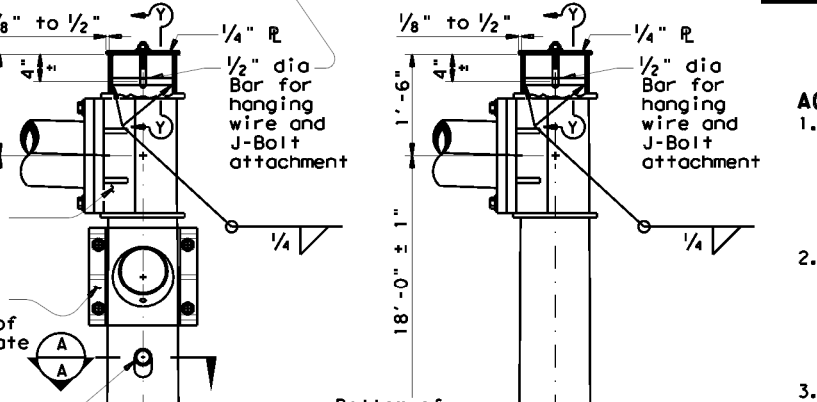
DETAIL E
(for 24' pole with ILSN sign and no luminaire, single or dual mast arm)



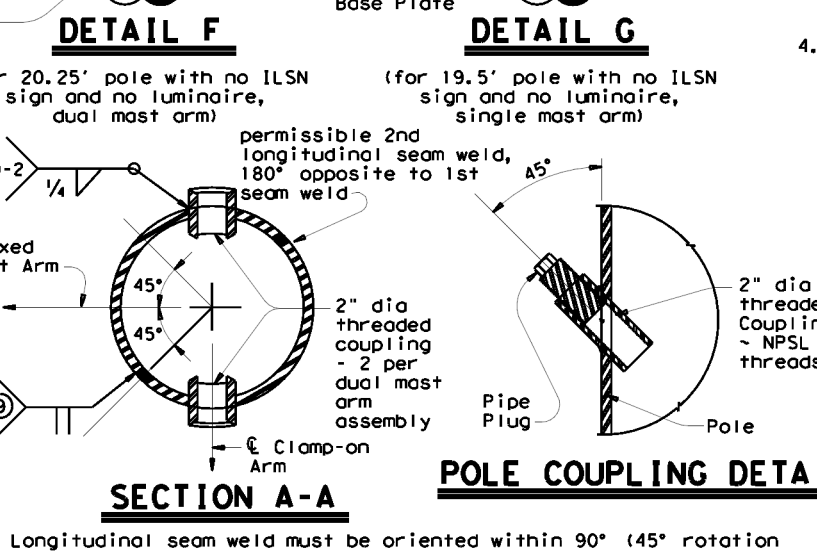
ACCESS COMPARTMENT



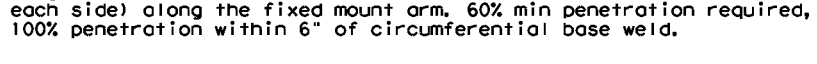
SECTION Y-Y



DETAIL F
(for 20.25' pole with no ILSN sign and no luminaire, dual mast arm)



DETAIL G
(for 19.5' pole with no ILSN sign and no luminaire, single mast arm)

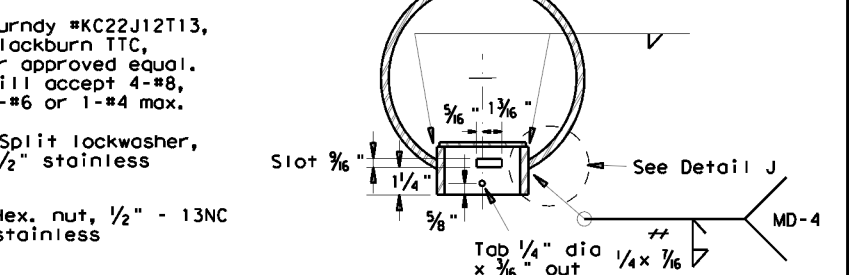


SECTION A-A

MATERIALS	
Round Shafts or Polygonal Shafts ⁽⁷⁾	ASTM A595 Gr. A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ⁽⁸⁾
Plates ⁽⁷⁾	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325, or A449 except where noted
Pin Bolts	ASTM A325
Pipe ⁽⁷⁾	ASTM A53 Gr. B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

⁽⁷⁾ ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

⁽⁸⁾ ASTM A1011 SS Gr.50 shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.



COPPER GROUND CONNECTOR

- ACCESS COMPARTMENT NOTES:**
- The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
 - The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or IlSCO SSS-5). The traffic signal contractor shall install the kit items in the field.
 - The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
 - Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

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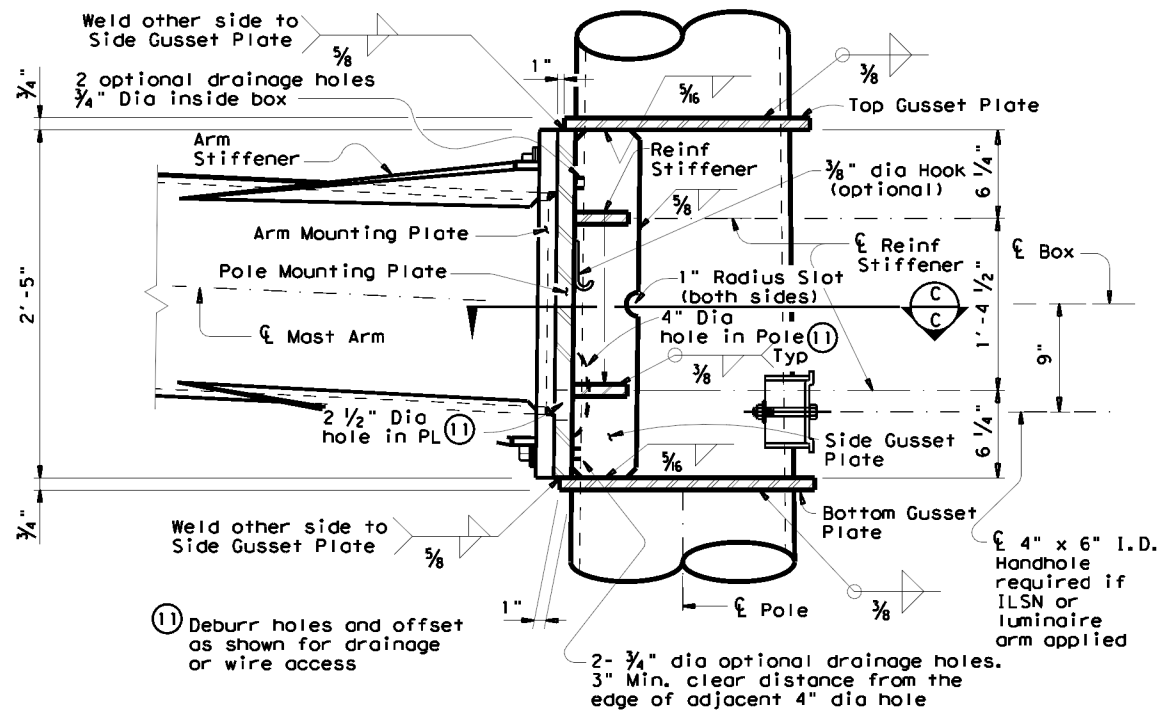
**TRAFFIC SIGNAL SUPPORT STRUCTURES
 LONG MAST ARM ASSEMBLY
 (50 TO 65 FT)
 (80 AND 100 MPH WIND ZONE)
 LMA(2)-12**

Sheet 2 of 5

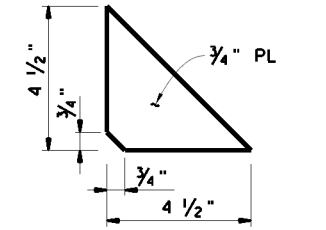
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LFK	ANGELINA		77		

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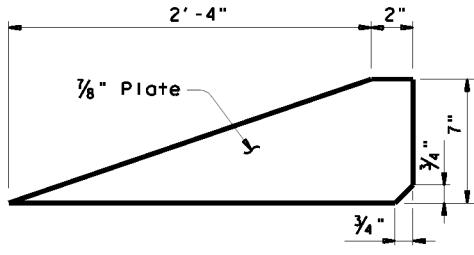
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BUILT-UP BOX CONNECTION

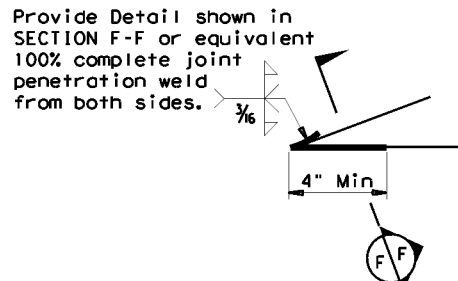


REINFORCING STIFFENER



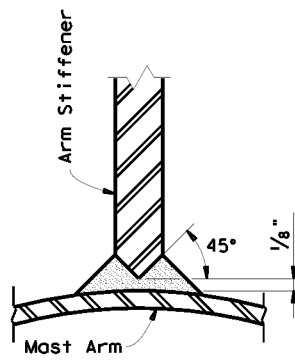
ARM STIFFENER

(Cut to match arm inclination and taper)

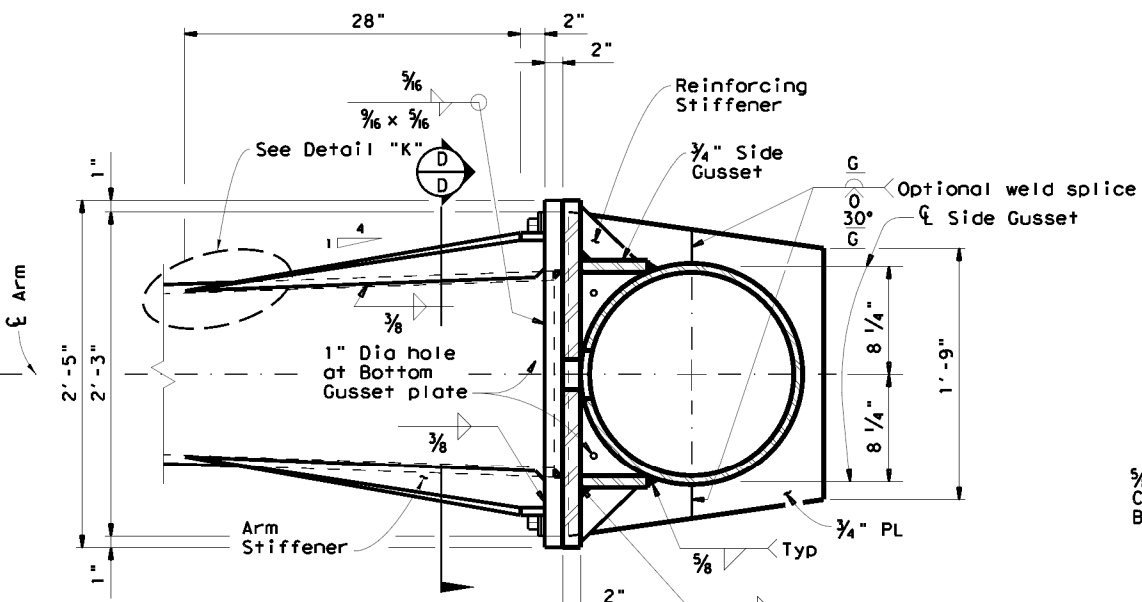


Provide Detail shown in SECTION F-F or equivalent 100% complete joint penetration weld from both sides.
 Only 4" length at tip of Arm Stiffener requires a complete joint penetration weld. Smooth weld radius to connect Stiffener. Only a fillet weld is required for the remaining weld length.

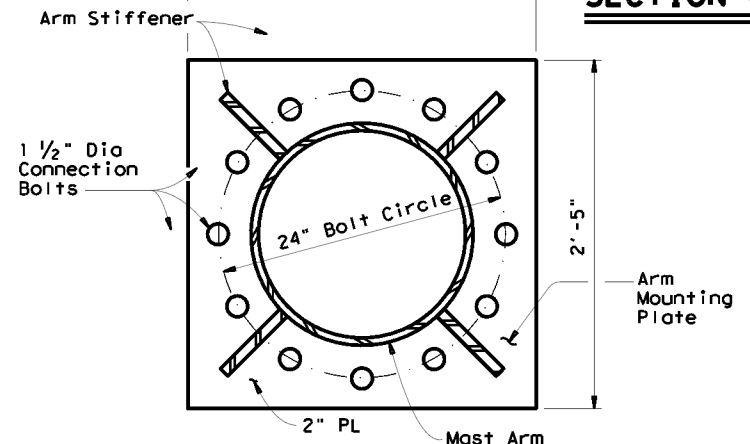
DETAIL "K"



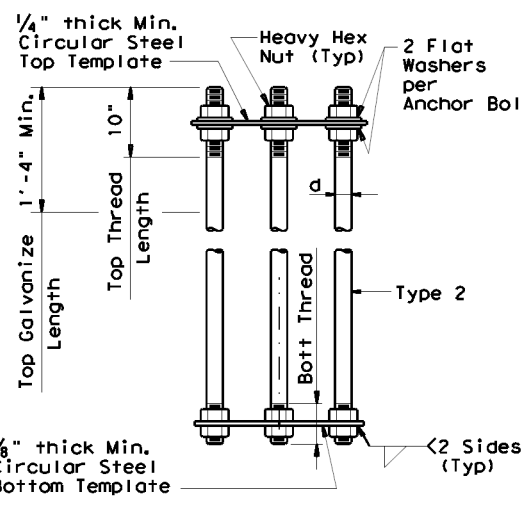
SECTION F-F



SECTION C-C

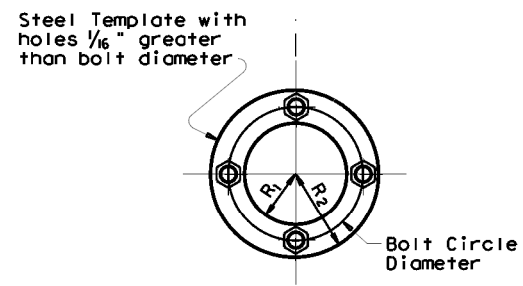


SECTION D-D



NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY



TEMPLATE DETAIL

Fixed Mount Arm L F	ROUND POLES (13)					Foundation Type
	D _B	D _{19.5}	D _{20.25}	D ₂₄	D ₃₀	
ft.	in.	in.	in.	in.	(12)thk in.	
50', 55', 60', 65'	21.0	18.2	17.6	16.8	.3125	48-A

Fixed Mount Arm L F	ROUND ARMS (13)				
	L ₁	D ₁	D ₂	(12)thk in.	Rise
ft.	ft.	in.	in.	in.	
50	49	18.5	11.7	.3125	3'- 3"
55	54	18.5	11.0	.3125	3'- 7"
60	59	18.5	10.3	.3125	3'- 11"
65	64	18.5	9.6	.3125	4'- 4"

- D_B = Pole Base O.D.
- D_{19.5} = Pole Top O.D. with no Luminaire and no ILSN (single mast arm)
- D_{20.25} = Pole Top O.D. with no Luminaire and no ILSN (dual mast arm)
- D₂₄ = Pole Top O.D. with ILSN w/out Luminaire
- D₃₀ = Pole Top O.D. with Luminaire
- D₁ = Arm Base O.D.
- D₂ = Arm End O.D.
- L₁ = Shaft Length
- L_F = Fixed Arm Length

- (12) Thickness shown is minimum, thicker materials may be used.
- (13) Shaft profile 16-sided or 18-sided is considered to be equivalent to round section.

GENERAL NOTES:

Built-up Box Connection: For the welded arm-to-pole connection as a built-up box configuration illustrated here is an example only, fabricators are required to submit a shop drawing of box connection for approval. The drawing shall specify the details of each box element, welds of arm-to-pole connection, arm-to-plate socket connection, and arm rise creation. Specify the proper location of drain holes along the pole. 2 1/2" dia hole in the pole mounting plate and 4" dia hole in the pole need to be aligned for wiring access or drainage. Arm stiffeners cut to match arm inclination and taper shall also be included.

The deviation from flat for either arm or pole mounting plate shall not exceed 1/32 in., which is measured along the center of mounting plate to a radial distance of 13.5 in. The deformed-from-flat connection between arm and pole mounting plates shall not be allowed if the center of both mounting plates cannot contact directly.

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

ANCHOR BOLT & TEMPLATE SIZE						
Bolt Dia in.	Length †	Top Thread	Bottom Thread	Bolt Circle	R ₂	R ₁
2 1/2"	5'-2"	10"	6 1/2"	27"	16"	11"

†Min dimension given, longer bolts are acceptable.

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		DRILLED SHAFT LENGTH-ft (16), (17), (18)			ANCHOR BOLT DESIGN (14)			FOUNDATION DESIGN LOAD (15)		TYPICAL APPLICATION	
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	F _y (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft		SHEAR Kips
		48-A	48"	20 #9	#4 at 6"	10	15	40	2 1/2"	55	27"		2

SEE SHEET "TS-FD" FOR ADDITIONAL DETAILS.

- (14) Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
- (15) Foundation Design Loads are the allowable moments and shears at the base of the structure.
- (16) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.
- (17) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.
- (18) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

Texas Department of Transportation
 Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

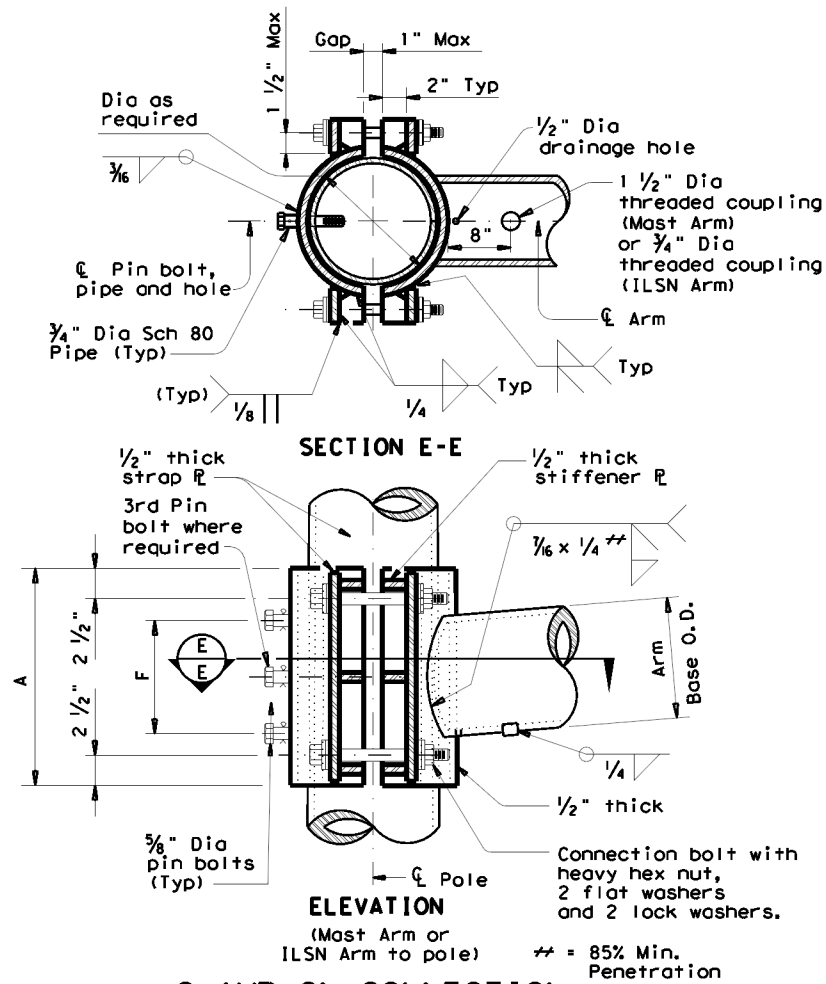
Sheet 3 of 5 **LMA (3) - 12**

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CONTRACT	SECTION	JOB	HIGHWAY
0911 00		139	VARIOUS
DISTRICT	COUNTY	SHEET NO.	
LFK	ANGELINA	78	

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CLAMP-ON CONNECTION

80 MPH WIND										
Clamp-on Arm LC	ROUND ARMS					POLYGONAL ARMS				
	L ₁	D ₁	D ₂	thk (12)	Rise	L ₁	D ₁	D ₂	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-0"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"

100 MPH WIND										
Clamp-on Arm LC	ROUND ARMS					POLYGONAL ARMS				
	L ₁	D ₁	D ₂	thk (12)	Rise	L ₁	D ₁	D ₂	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

D₁ = Arm Base O.D.
 D₂ = Arm End O.D.
 L₁ = Shaft Length
 LC = Clamp-on Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

CLAMP-ON ARM CONNECTION					
Sch 40 pipe Dia	Thick	A	F	4 Conn. Bolts	5/8" Dia. Pin Bolts
				Dia	No.
in.	in.	in.	in.	in.	ea
3	.216	10	4	3/4	2

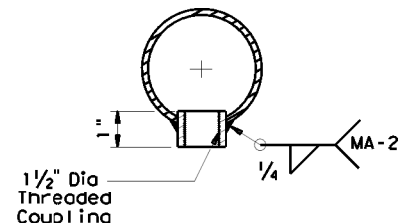
Base Dia	Thick	A	F	4 Conn. Bolts	5/8" Dia. Pin Bolts
				Dia	No.
in.	in.	in.	in.	in.	ea
6.5	.179	12	6	1	2
7.5	.179	14	8	1	2
8.0	.179	14	8	1	2
9.0	.179	16	10	1	2
9.5	.179	18	12	1 1/4	3
9.5	.239	18	12	1 1/4	3
10.0	.239	18	12	1 1/4	3
10.5	.239	18	12	1 1/4	3
11.0	.239	18	12	1 1/4	3
11.5	.239	18	12	1 1/4	3

GENERAL NOTES:

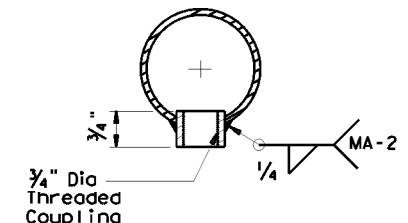
Clamp-on details are used for the second arm on dual mast arm assemblies or ILSN arm support. For a clamp-on mast arm, a maximum 1 1/2" wide vertical slotted hole may be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1". For an ILSN arm, a 1 1/2" diameter hole shall be cut in the front clamp plate for wire access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for part shall apply to all similar parts on the detail.

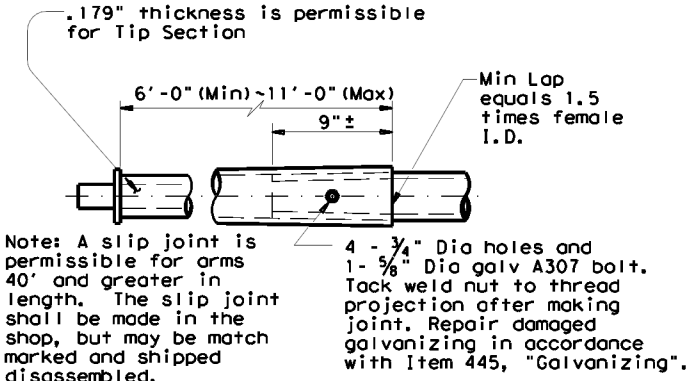
Pin bolts are required to prevent rotation of clamp-on arms under design wind forces. Pin bolts shall be ASTM A325 with threads excluded from the shear plane. Pin bolt and 3/4" diameter pipe shall have 3/16" diameter holes for a 1/8" diameter galvanized cotter pin. Back clamp plate shall be furnished with a 3/4" diameter hole for each pin bolt. An 1/8" diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.



ARM COUPLING DETAIL



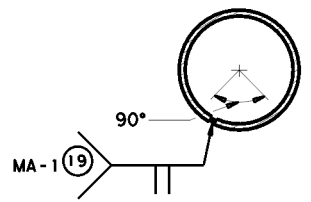
ILSN ARM COUPLING DETAIL



SLIP JOINT DETAIL (CLAMP-ON ARM)

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 1/2" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

(19) Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm. 60% Min penetration 100% penetration within 6" of circumferential base welds.

Texas Department of Transportation
 Traffic Operations Division

**TRAFFIC SIGNAL SUPPORT STRUCTURES
 LONG MAST ARM ASSEMBLY
 (50 TO 65 FT)
 (80 AND 100 MPH WIND ZONE)**

Sheet 4 of 5 **LMA(4)-12**

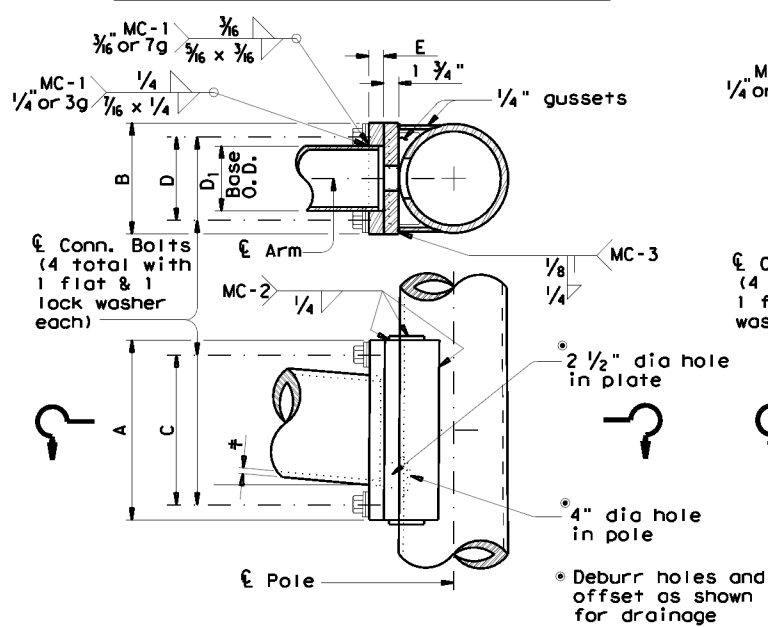
© TxDOT November 2000		DNR JK	CR: GRB	DWR FDN	CR: CAL
4-20-01 1-12	REVISIONS	CONT	SECT	JOB	HIGHWAY
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		DIST	COUNTY		SHEET NO.
		LFK	ANGELINA		79

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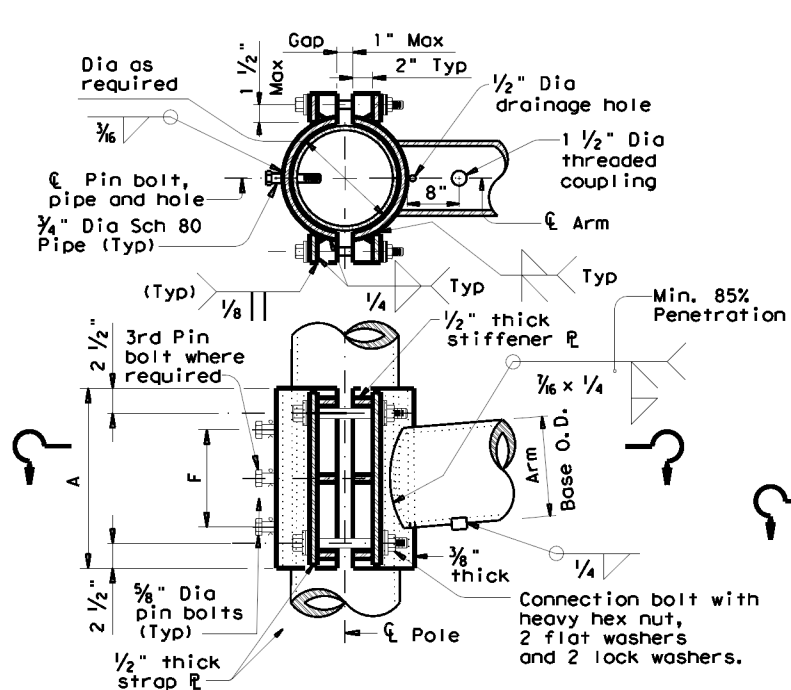
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ARM SIZE		A	B	C	D	E	CONN. BOLT DIA
D ₁	ϕ	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 3/4	1
7.5	.179	13	9	10	6	1 3/4	1
8.0	.179	14	10	11	7	2	1 1/4
9.0	.179	16	11	13	8	2	1 1/4
9.5	.179	17	12	14	9	2	1 1/4
9.5	.239	18	12	15	9	2	1 1/4
10.0	.239	18	12	15	9	2	1 1/4
10.5	.239	18	13	15	10	3	1 1/2
11.0	.239	18	13	15	10	3	1 1/2



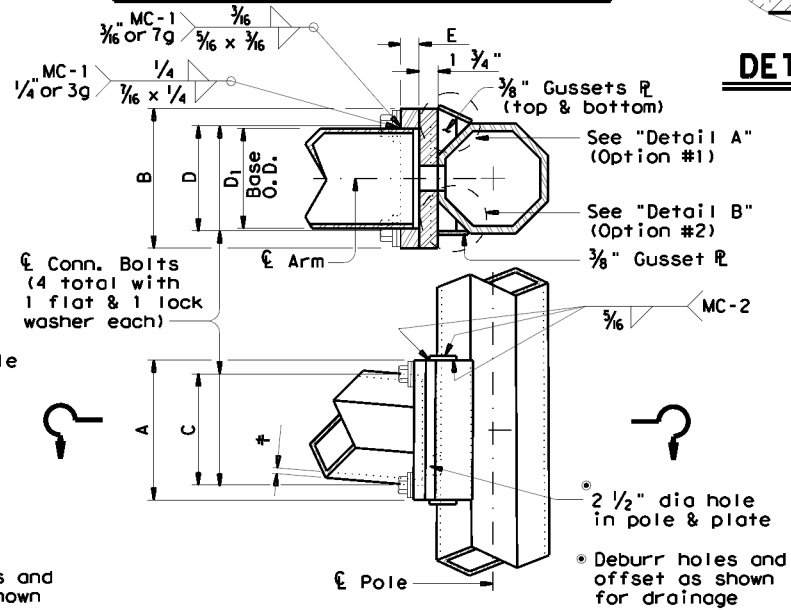
FIXED MOUNT DETAIL 1

ARM SIZE		A	F	CONN. BOLTS	PIN BOLTS
D ₁	ϕ	in.	in.	No. Dia	No. Dia
6.5	.179	12	6	4 1	2 3/8
7.5	.179	14	8	4 1	2 3/8
8.0	.179	14	8	4 1	2 3/8
9.0	.179	16	10	4 1	2 3/8
9.5	.179	18	12	4 1 1/4	3 3/8
9.5	.239	18	12	4 1 1/4	3 3/8
10.0	.239	18	12	4 1 1/4	3 3/8



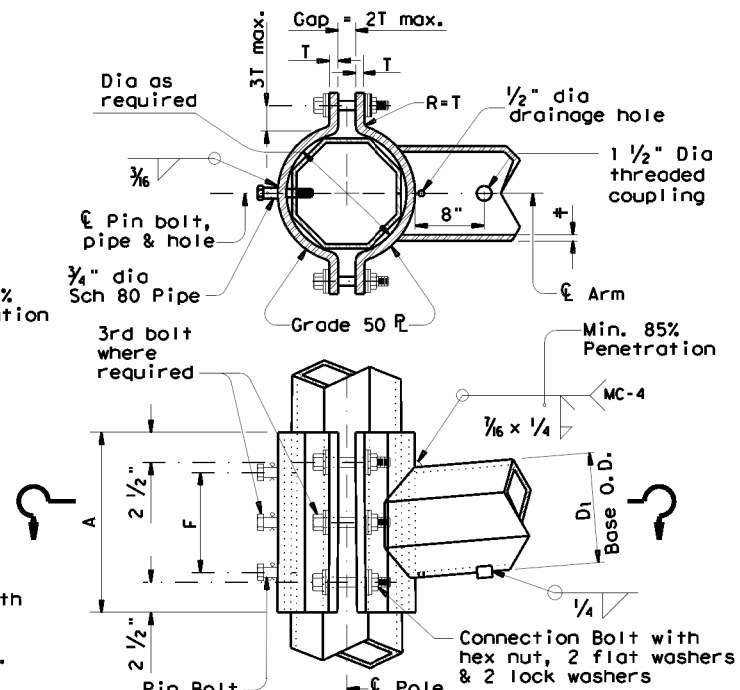
CLAMP-ON DETAIL 1

ARM SIZE		A	B	C	D	E	CONN. BOLT DIA
D ₁	ϕ	in.	in.	in.	in.	in.	in.
7.0	.179	11	11	8	8	1 3/4	1 1/4
7.5	.179	11	11	8	8	1 3/4	1 1/4
8.0	.179	11	11	8	8	2	1 1/4
9.0	.179	13	13	10	10	2	1 1/4
10.0	.179	13	13	10	10	2	1 1/4
9.5	.239	13	13	10	10	2	1 1/4
10.0	.239	14	14	11	11	2	1 1/2
11.0	.239	14	14	11	11	3	1 1/2
11.5	.239	14	14	11	11	3	1 1/2

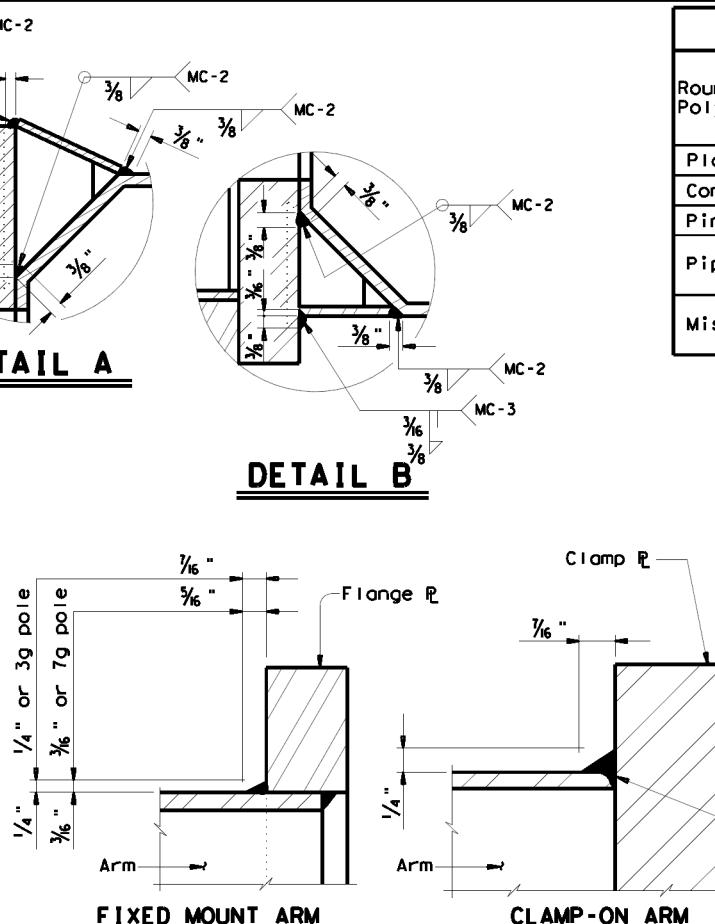


FIXED MOUNT DETAIL 2

ARM SIZE		A	F	T	CONN. BOLTS	PIN BOLTS
D ₁	ϕ	in.	in.	in.	No. Dia	No. Dia
7.0	.179	12	6	3/4	4 3/4	2 3/8
7.5	.179	14	8	3/4	4 3/4	2 3/8
8.0	.179	14	8	3/4	4 3/4	2 3/8
9.0	.179	16	10	3/8	4 1	2 3/8
10.0	.179	18	10	3/8	4 1	2 3/8
9.5	.239	18	10	1	6 1	3 3/8
10.0	.239	18	10	1	6 1	3 3/8

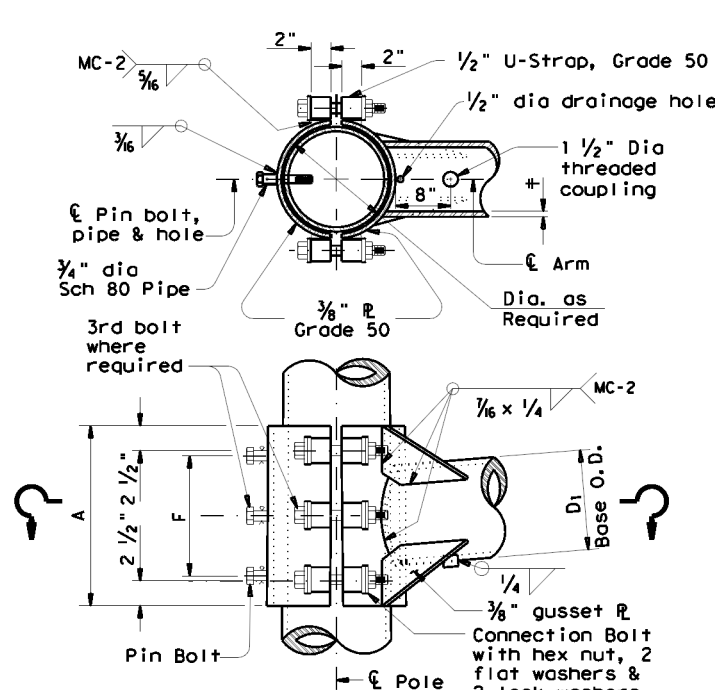


CLAMP-ON DETAIL 2



ARM BASE WELD DETAILS

ARM SIZE		A	F	CONN. BOLTS	PIN BOLTS
D ₁	ϕ	in.	in.	No. Dia	No. Dia
6.5	.179	12	6	4 1	2 3/8
7.5	.179	14	8	4 1	2 3/8
8.0	.179	14	8	4 1	2 3/8
9.0	.179	16	10	4 1	2 3/8
9.5	.179	18	12	6 1	3 3/8
9.5	.239	18	12	6 1	3 3/8
10.0	.239	18	12	6 1	3 3/8



CLAMP-ON DETAIL 3

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

- ① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.
- ② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 1/2" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and 3/4" dia pipe shall have 3/8" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a 3/4" dia hole for each pin bolt. An 1/8" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

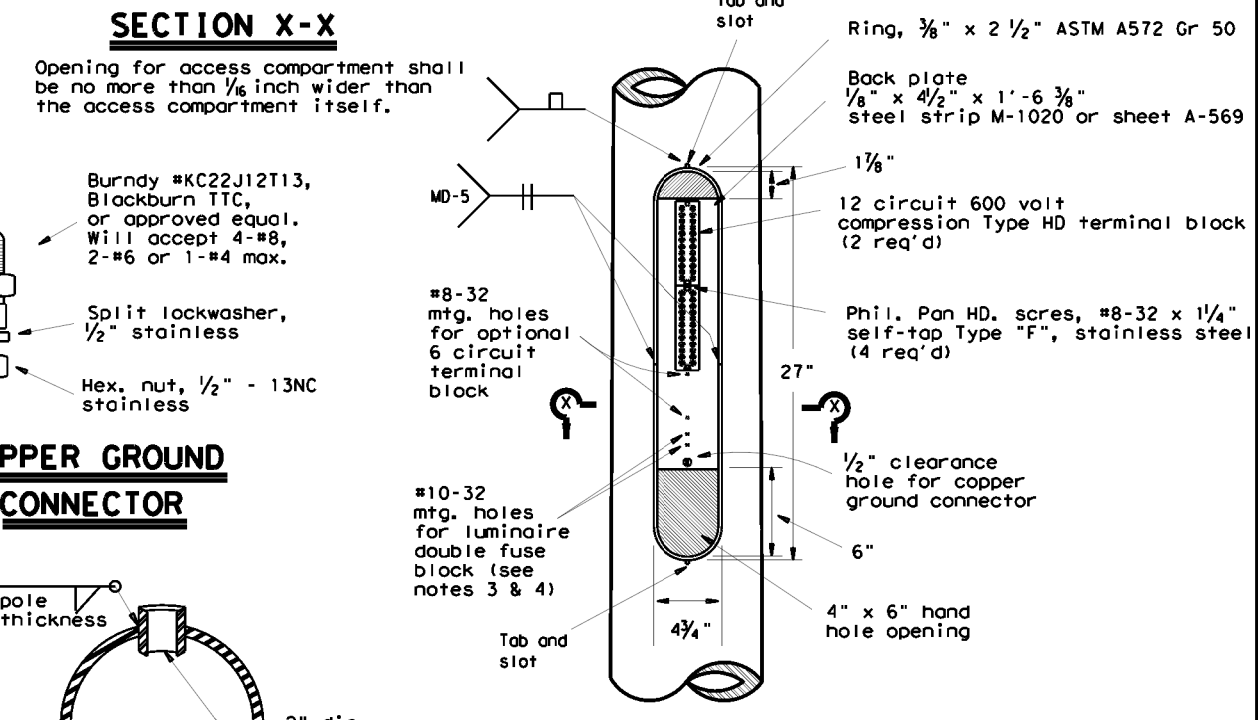
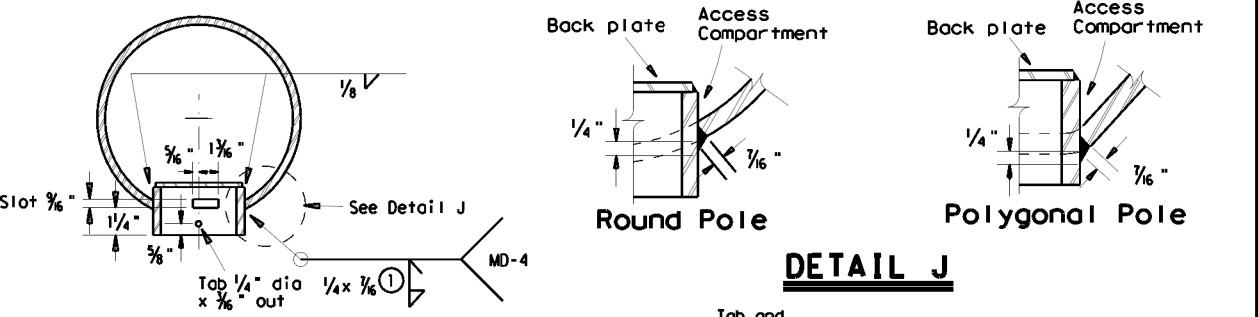
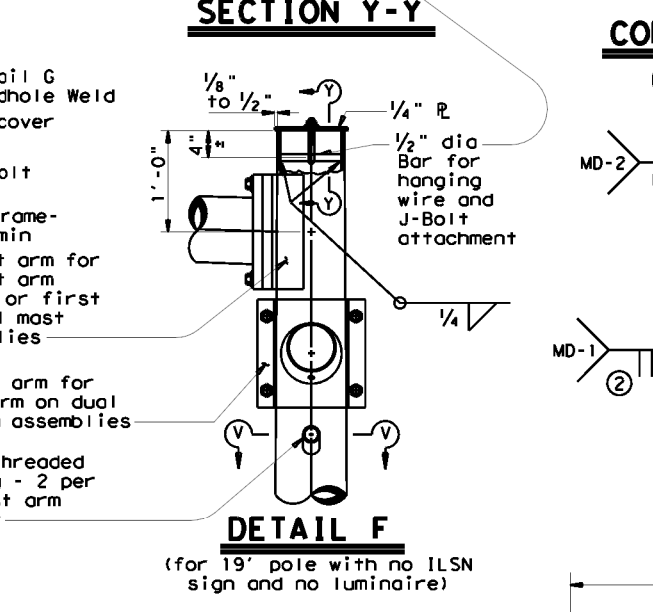
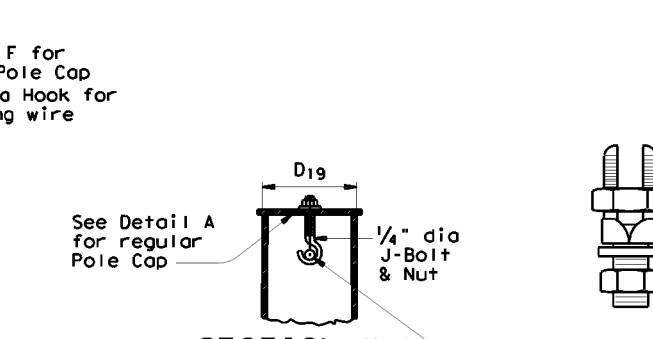
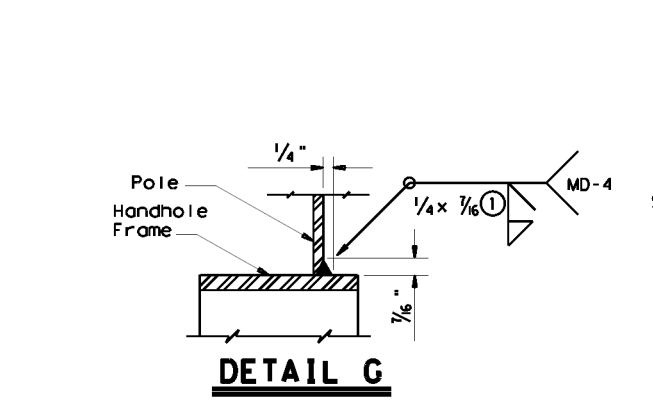
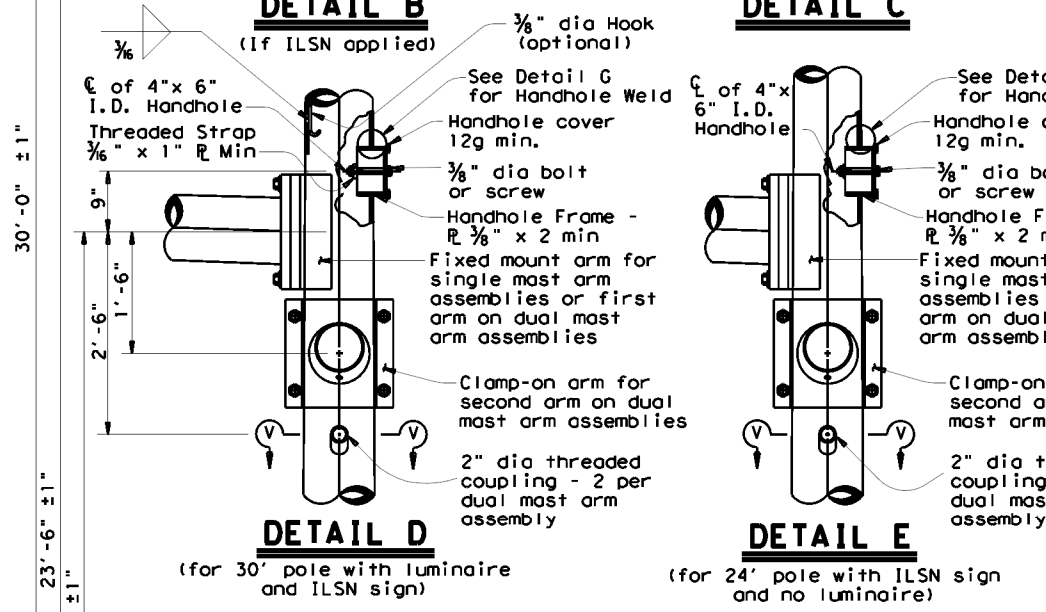
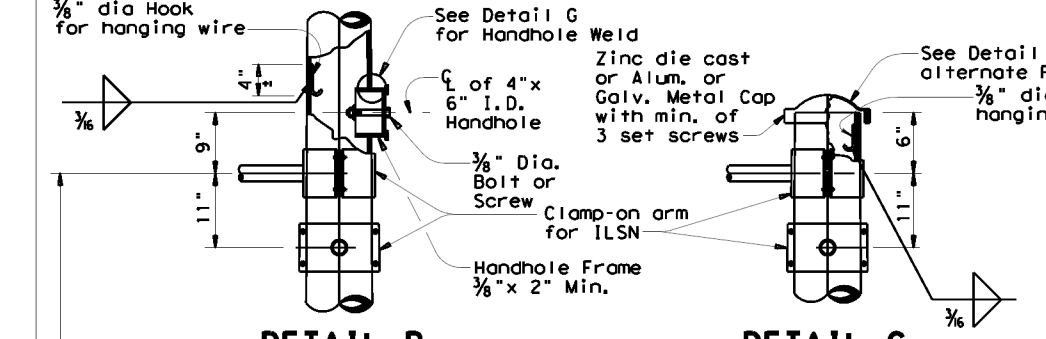
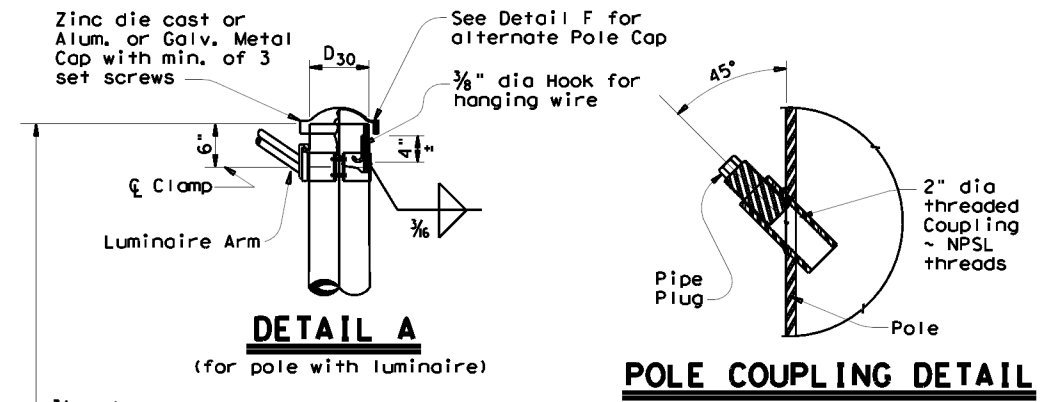
MAST ARM CONNECTIONS

MA-C-12

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REVISIONS		CONT	SECT	JOB	HIGHWAY
5-96		0911	00	139	VARIOUS
5-09		DIST	COUNTY		SHEET NO.
1-12		LFK	ANGELINA		81

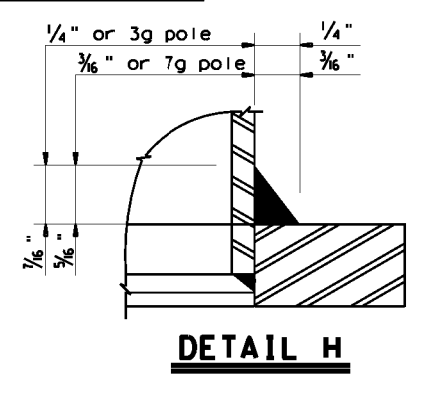
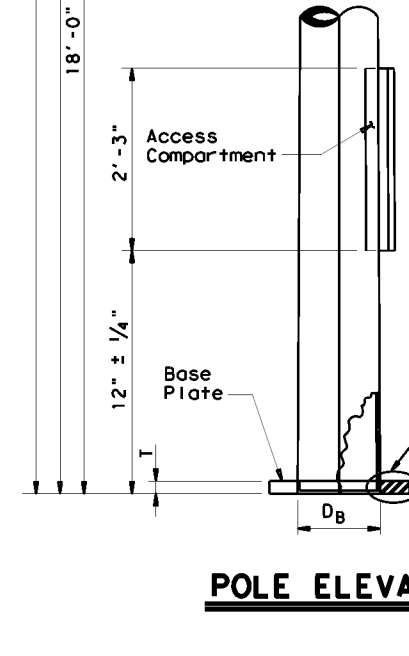
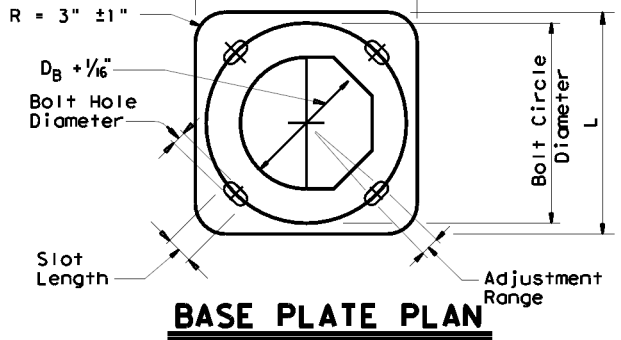
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- NOTES:**
- The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
 - The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilco SSS-5). The traffic signal contractor shall install the kit items in the field.
 - The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
 - Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base R Dim, L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



- 85% Min. penetration
- 60% Min. penetration
100% penetration within 6" of circumferential base welds.

Texas Department of Transportation
 Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

© TxDOT August 1995		DNR MS	CR1 JSY	DWR FDN	CR1 CAL
REVISIONS					
0911	00	139	VARIOUS		
DIST	COUNTY	SHEET NO.			
LFK	ANGELINA	82			

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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	
<h2>ELECTRICAL DETAILS CONDUITS & NOTES</h2>					
<h3>ED(1) - 14</h3>					
FILE:	ed1-14.dgn	DWG:	CK:	DWG:	CK:
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		DIST	COUNTY		SHEET NO.
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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.

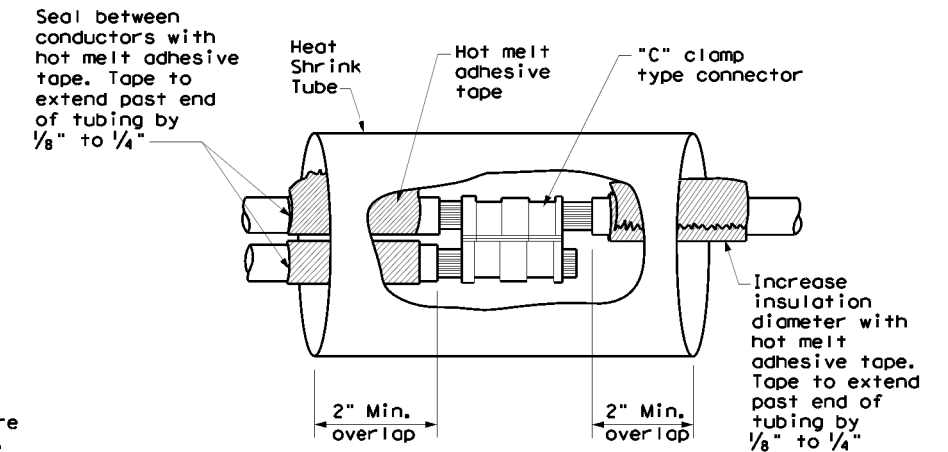
B. CONSTRUCTION METHODS

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.



**SPLICE OPTION 1
Compression Type**

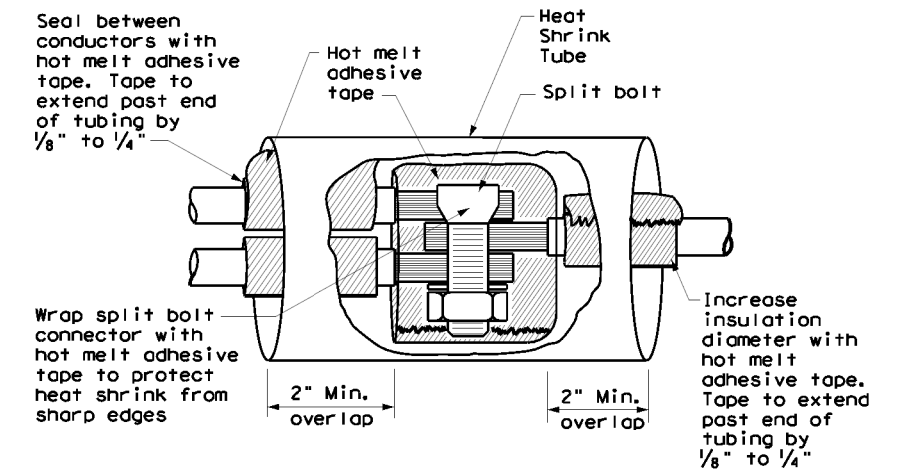
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

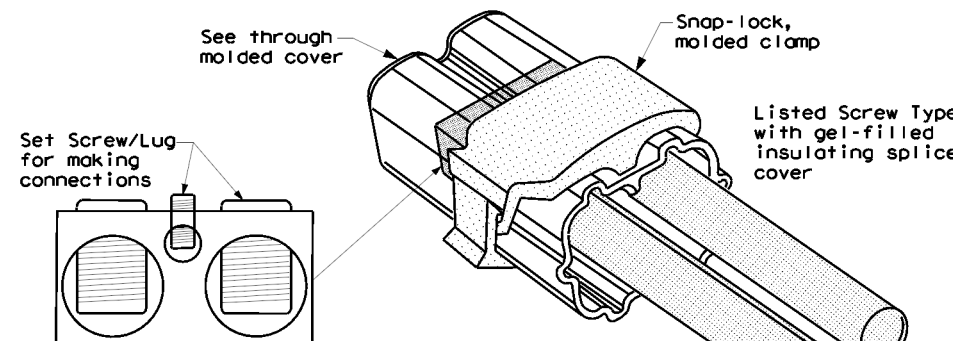
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in 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 2
Split Bolt Type**



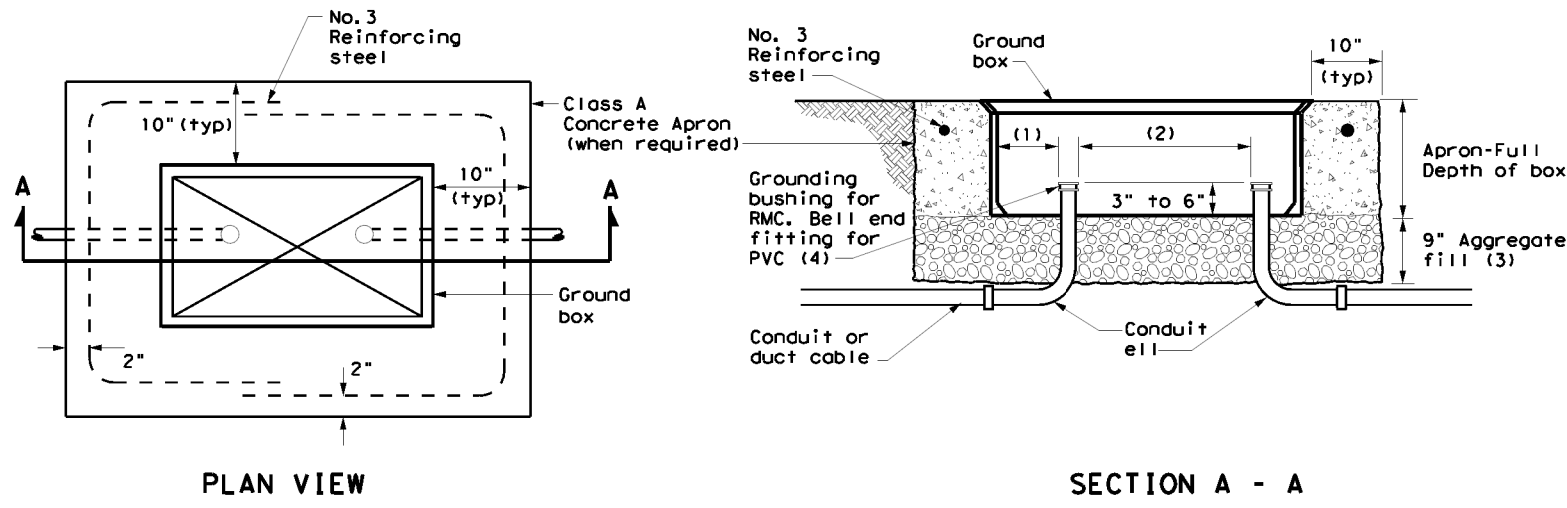
**SPLICE OPTION 3
Listed Screw Type**

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		Traffic Operations Division Standard	
<h1>ELECTRICAL DETAILS CONDUCTORS</h1>			
<h2>ED(3) - 14</h2>			
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REVISIONS			HIGHWAY: VARIOUS
	DIST: LFK	COUNTY: ANGELINA	SHEET NO.: 84

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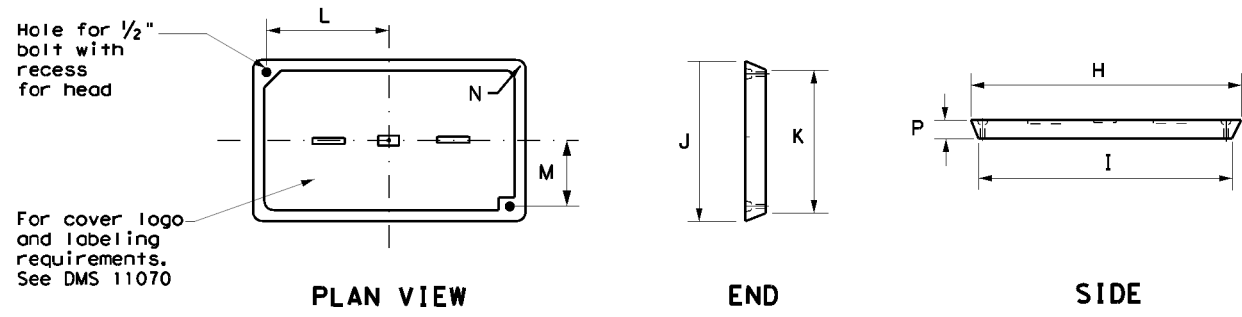


APRON FOR GROUND BOX

- (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 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

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.

				Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS</h2> <h3>GROUND BOXES</h3> <h4>ED(4) - 14</h4>					
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		COUNTY:	ANGELINA	DW:	TxDOT
		HIGHWAY:		CK:	TxDOT
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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.
2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)," and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.
3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.
4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.
6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.
9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.
10. Provide rigid metal conduit (RMC) for all conduits on service, except for the 1/2 in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.
11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.
12. Ensure all mounting hardware and installation details of services conform to utility company specifications.
13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.
15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.
2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.
3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.
4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.
2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

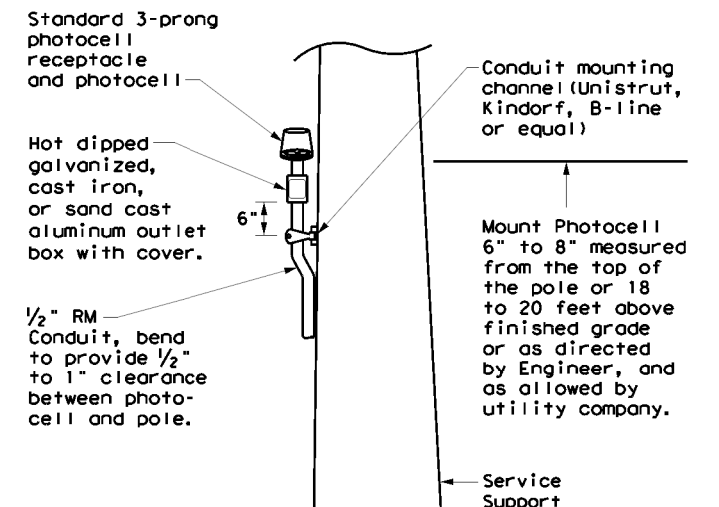
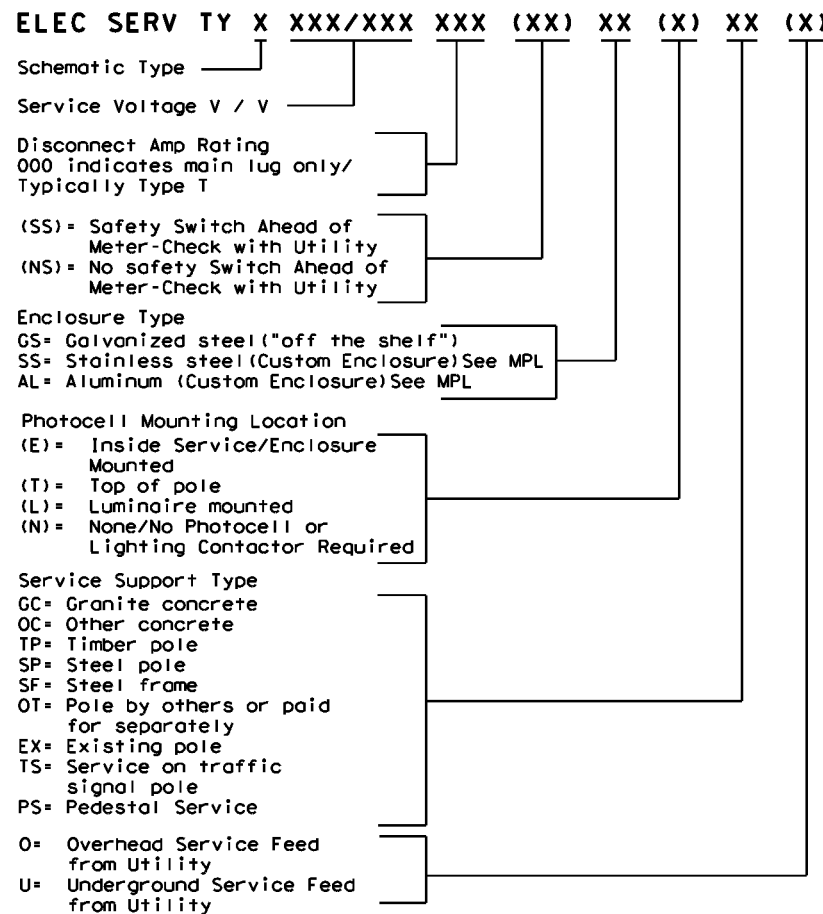
PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA												
Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit #xSize	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 1/4"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 1/4"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.
 ** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National Electrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation
 Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

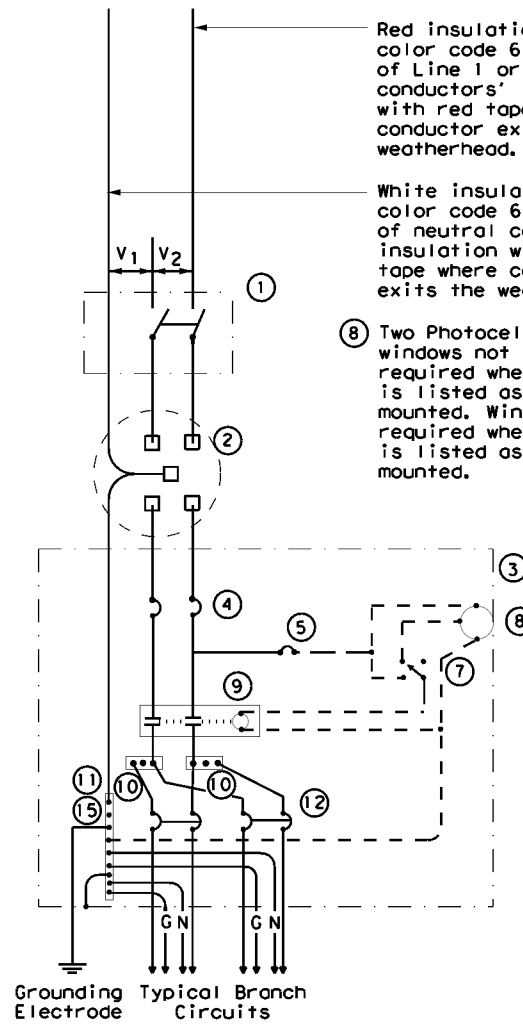
ED(5) - 14

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© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY		SHEET NO.	
LFK	ANGEL INA		86	

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**SCHEMATIC TYPE A
THREE WIRE**

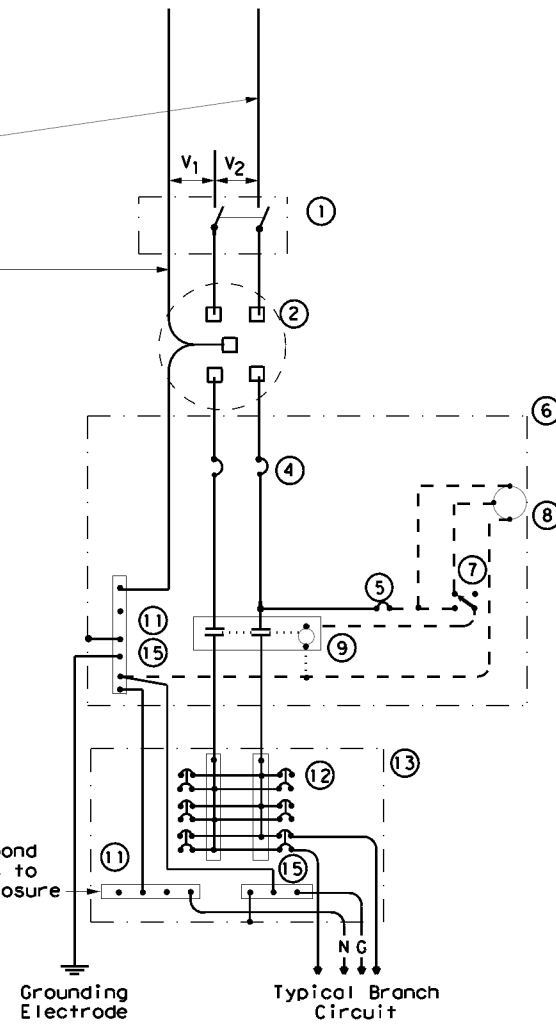
Red insulation or color code 6" length of Line 1 or Line 2 conductors' insulation with red tape where conductor exits the weatherhead.

White insulation or color code 6" length of neutral conductors' insulation with white tape where conductor exits the weatherhead.

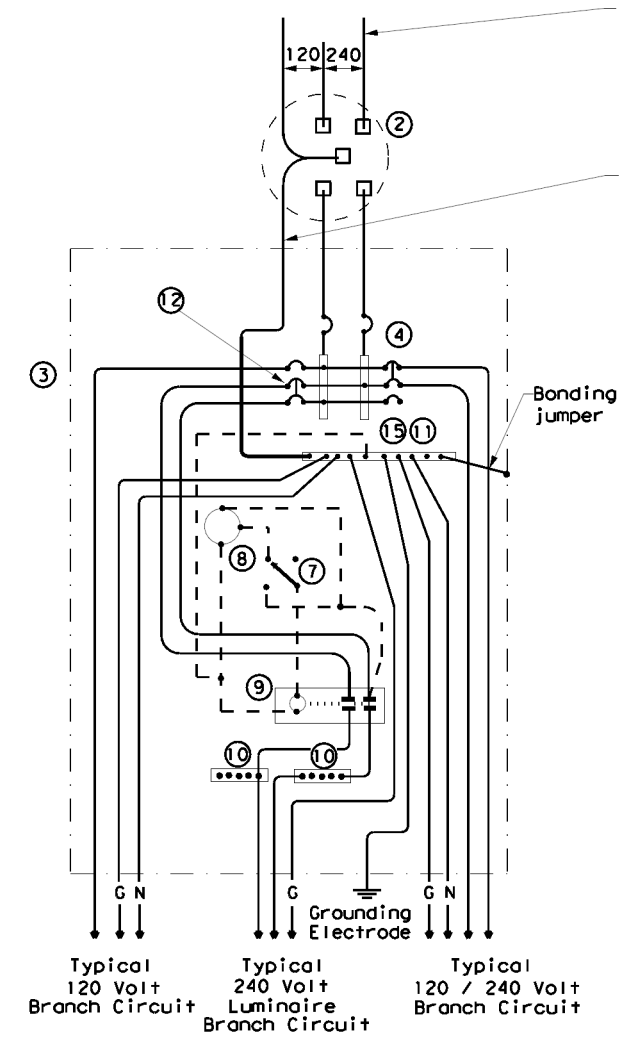
8 Two Photocell viewing windows not shown but required when photocell is listed as enclosure mounted. Windows not required when photocell is listed as pole top mounted.

Do not bond this bus to the enclosure

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



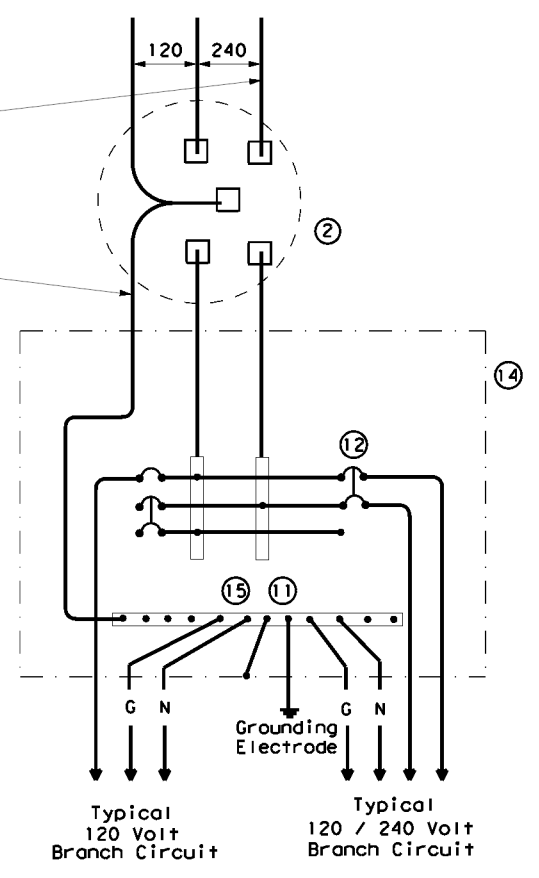
**SCHEMATIC TYPE C
THREE WIRE**



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

Red insulation or color code 6" length of Line 1 or Line 2 conductors' insulation with red tape where conductor exits the weatherhead.

White insulation or color code 6" length of neutral conductors' insulation with white tape where conductor exits the weatherhead.



**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.

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

				Traffic Operations Division Standard	
ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES					
ED(6) - 14					
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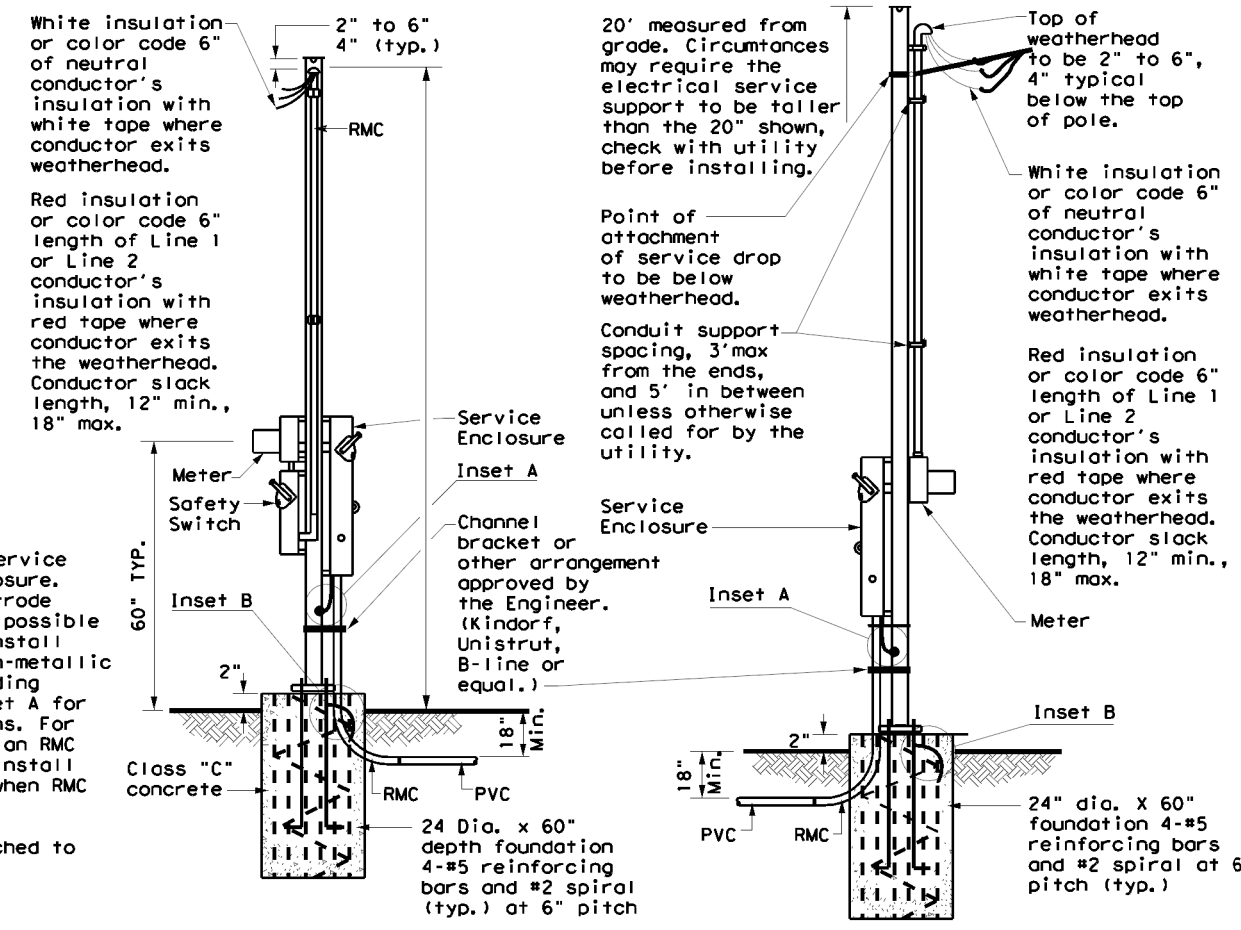
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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS) 11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 1/2 in. or 1 3/8 in. wide by 1 in. up to 3 3/4 in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.
2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.
3. Provide and install galvanized 3/4 in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized 3/4 in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in. of thread, with 3 1/4 in. to 3 1/2 in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.
4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.
5. Furnish and install rigid metallic ellis in all steel pole and steel frame foundations for all conduits entering the service from underground.
6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.
7. Drill and top steel poles and frames for 1/2 in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.
8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.
9. Provide 1/4" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.
10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.
11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

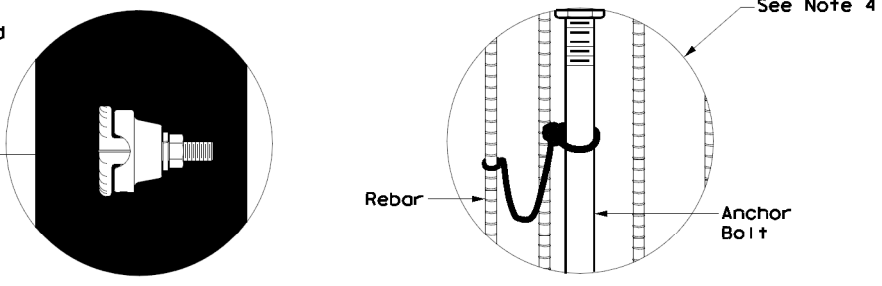
White insulation or color code 6" of neutral conductor's insulation with white tape where conductor exits weatherhead.

Red insulation or color code 6" length of Line 1 or Line 2 conductor's insulation with red tape where conductor exits the weatherhead. Conductor slack length, 12" min., 18" max.

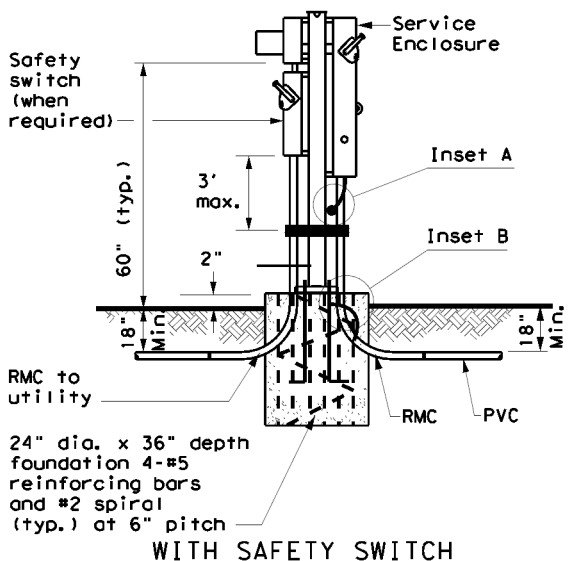


WITH SAFETY SWITCH WITHOUT SAFETY SWITCH
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE

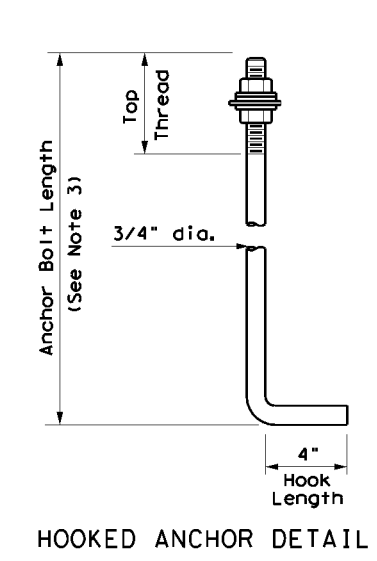
Drill, top, and thread 1/2" X 13 UNC. Install tank ground fitting, connect electrical service grounding electrode conductor. See Note 7.



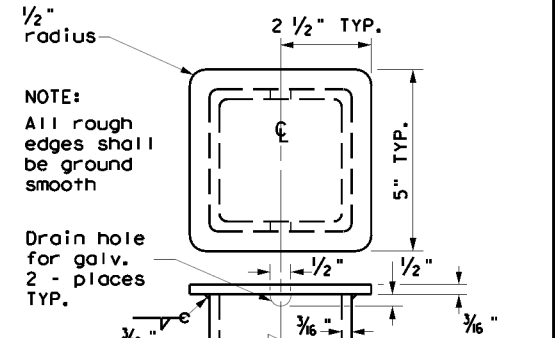
SERVICE SUPPORT TYPE SP (U) - UNDERGROUND SERVICE



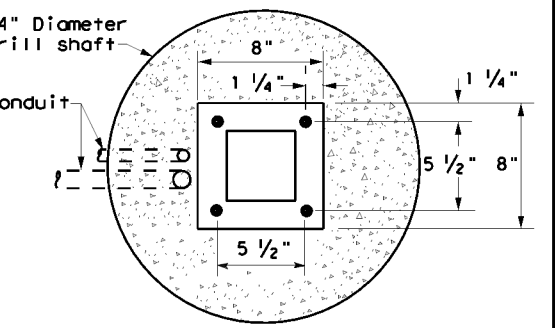
WITH SAFETY SWITCH WITHOUT SAFETY SWITCH
SERVICE SUPPORT TYPE SF (U) - UNDERGROUND SERVICE



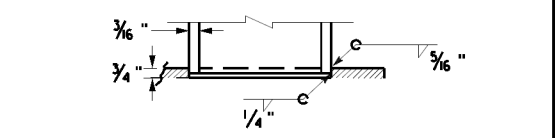
HOOKED ANCHOR DETAIL



POLE TOP PLATE

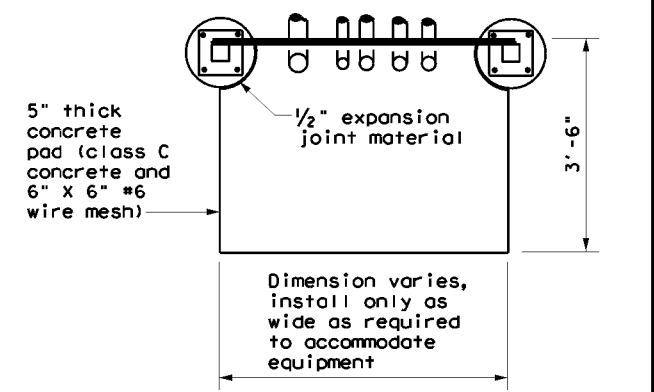


BASE PLATE DETAIL



BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



SERVICE SUPPORT TY SF (O) & SF (U)

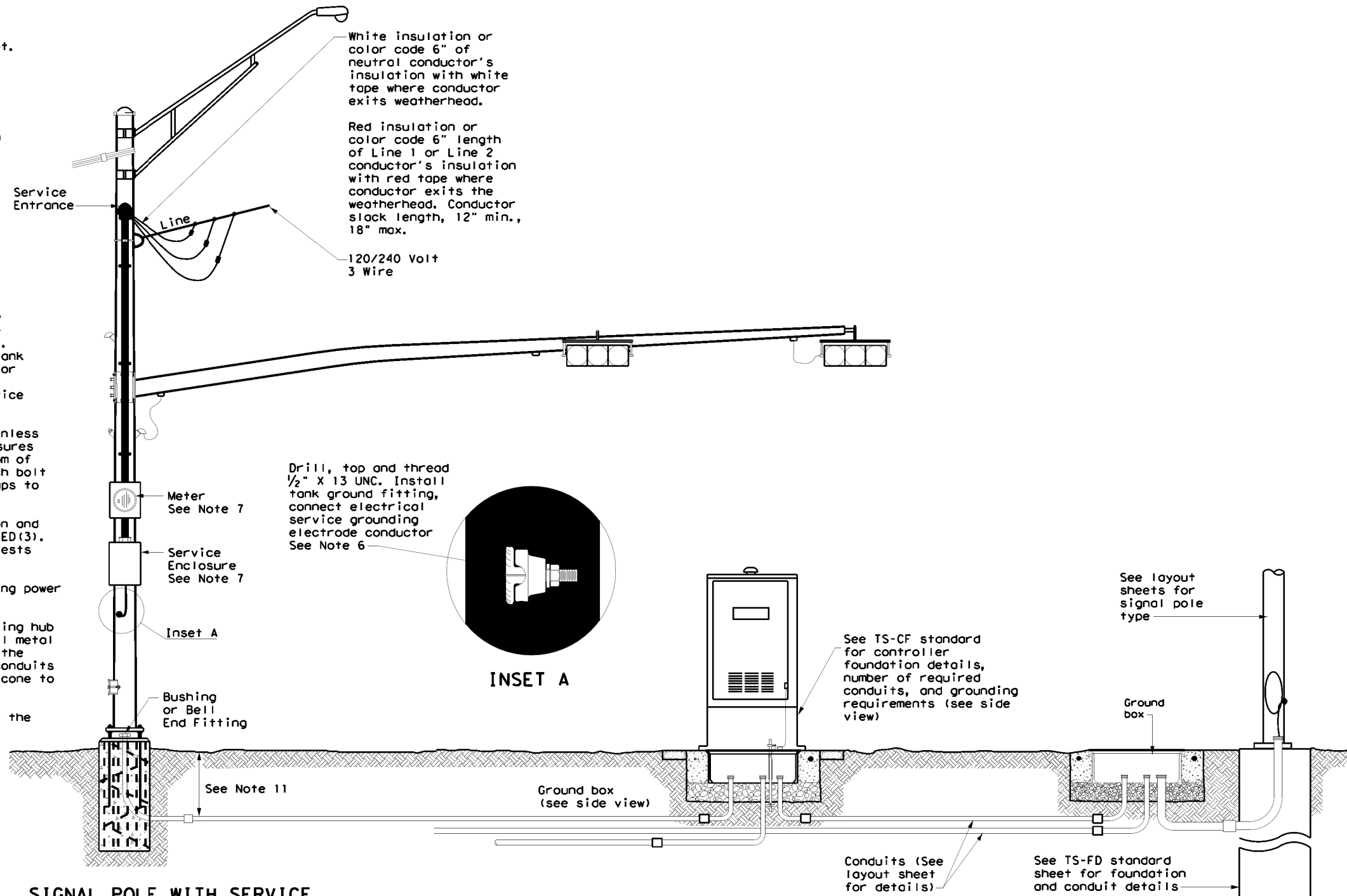
Texas Department of Transportation		Traffic Operations Division Standard	
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© TxDOT October 2014	CONT: 0911	SECT: 00	JOB: 139
REVISIONS	DIST: LFK	COUNTY: ANGELINA	SHEET NO.: 88

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TRAFFIC SIGNAL NOTES

1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TxDOT standard TS-FD for further details.
6. Drill and tap signal poles for 1/2 in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of 3/4 in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".

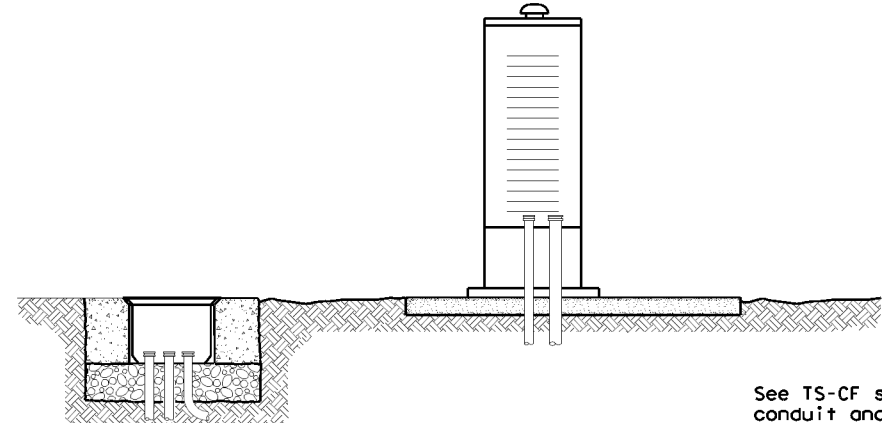


SIGNAL POLE WITH SERVICE

Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

**ELECTRICAL DETAILS
 TYPICAL TRAFFIC SIGNAL
 SYSTEM DETAILS
 ED(8) - 14**

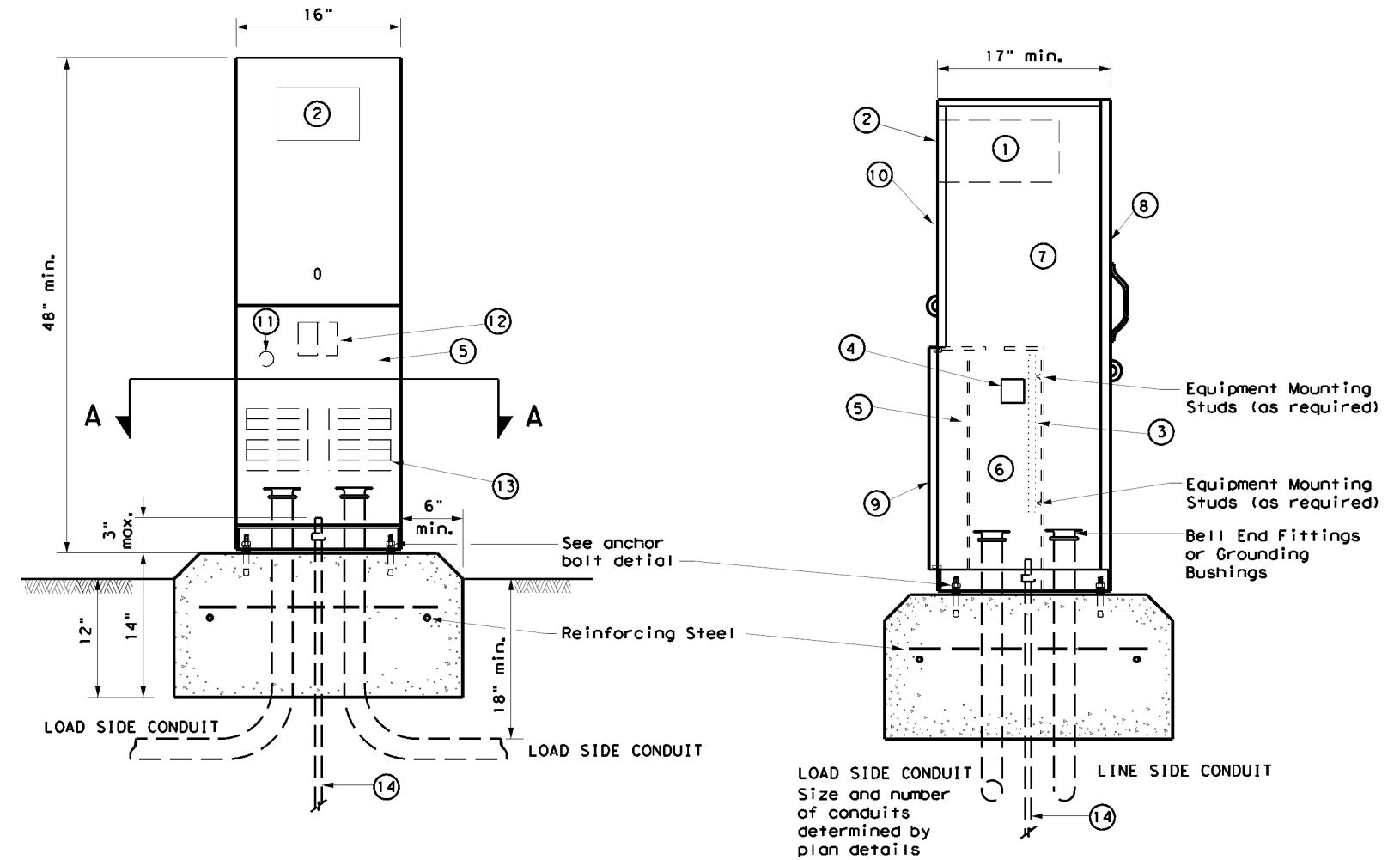
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PEDESTAL SERVICE NOTES

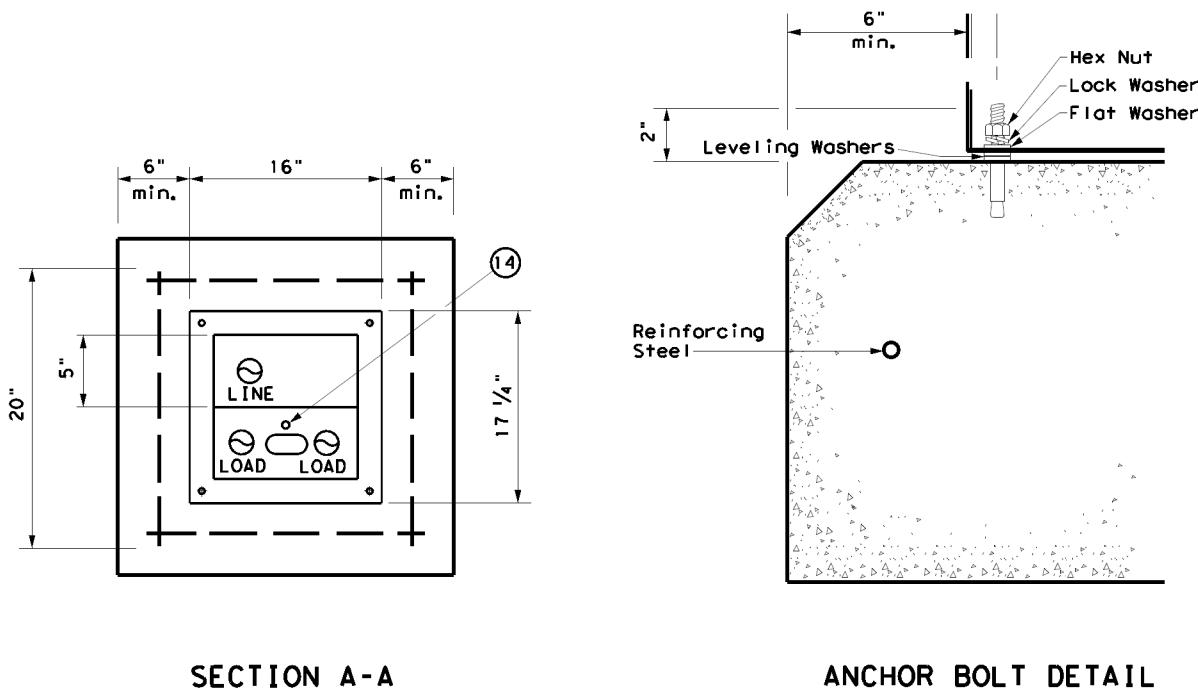
1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS) 11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services." Provide pedestal electrical services as listed on the Material Producers List (MPL) on the 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

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'

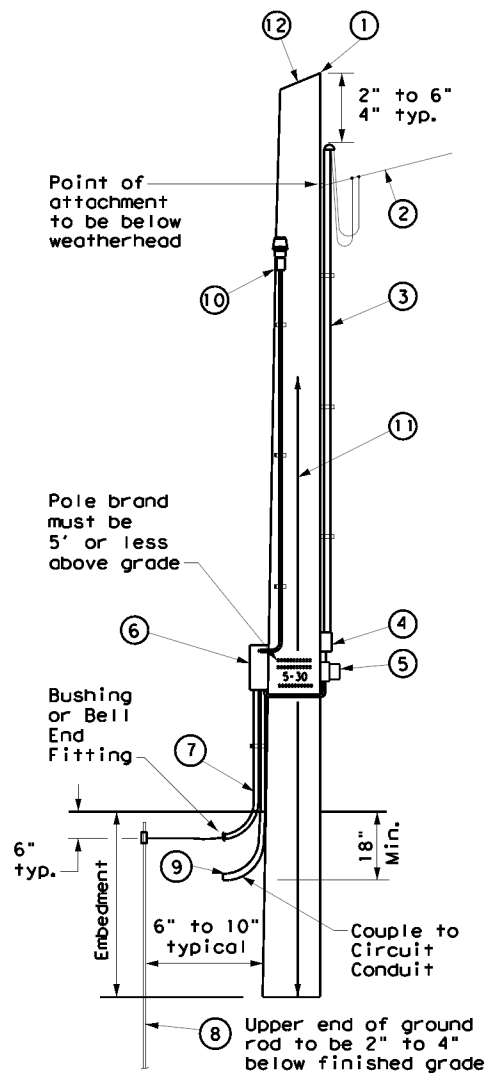
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ELECTRICAL DETAILS ELECTRICAL SERVICE SUPPORT PEDESTAL SERVICE TYPE PS			
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TIMBER POLE (TP) SERVICE SUPPORT NOTES

1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrical service.
3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to $\frac{3}{8}$ in. max. depth and $1\frac{1}{8}$ in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to $3\frac{3}{4}$ in. maximum depth, and $1\frac{1}{2}$ in. to $1\frac{5}{8}$ in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, $\frac{1}{4}$ in. minimum diameter by $1\frac{1}{2}$ in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
6. When excess length must be trimmed from poles, trim from the top end only.

- ① Class 5 pole, height as required
- ② Service drop from utility company (attached below weatherhead)
- ③ Service conduit (RMC) and service entrance conductors - One Red, One Black, One White (See Electrical Service Data)
- ④ Safety switch (when required)
- ⑤ Meter (when required)
- ⑥ Service enclosure
- ⑦ 6 AWG bare grounding electrode conductor in $\frac{1}{2}$ in. PVC to ground rod - extend $\frac{1}{2}$ in. PVC 6 in. underground.
- ⑧ $\frac{5}{8}$ in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.
- ⑨ RMC same size as branch circuit conduit.
- ⑩ See pole-top mounted photocell detail on ED(5).
- ⑪ When required by the serving utility provide bare 6 AWG copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor with non-conductive material to a height of 8 ft. above finished grade.
- ⑫ When required by utility, cut top of pole at an angle to enhance rain run off.

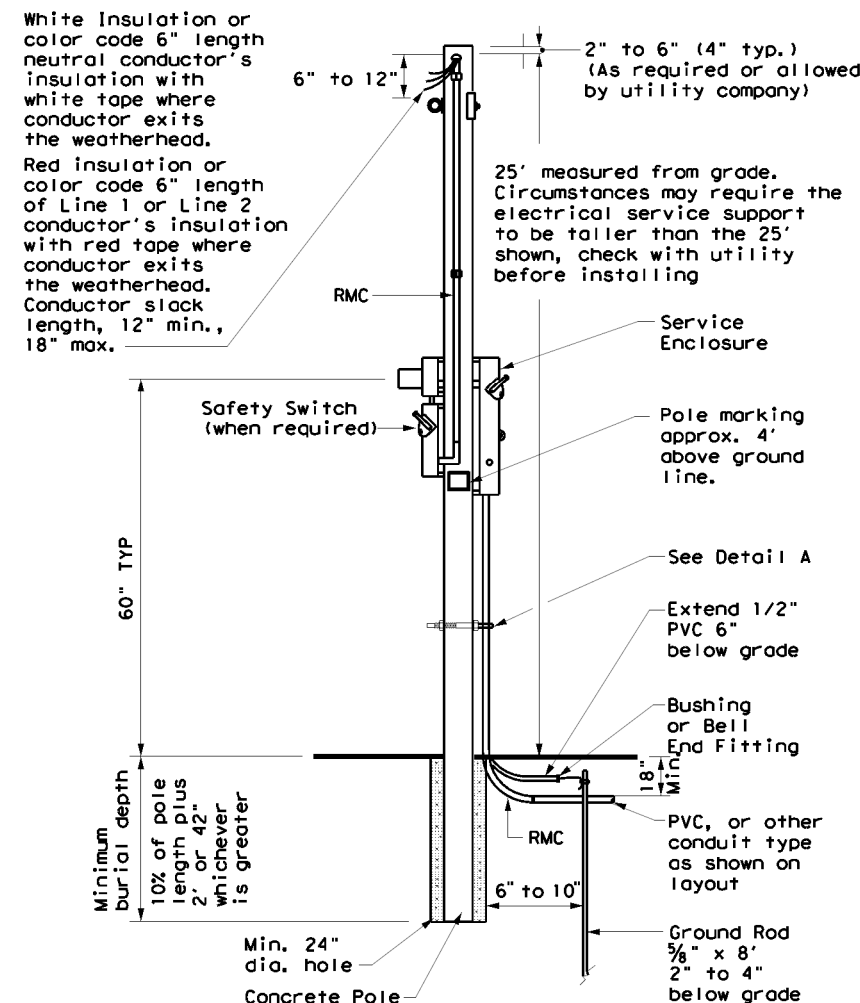


SERVICE SUPPORT TYPE TP (O)

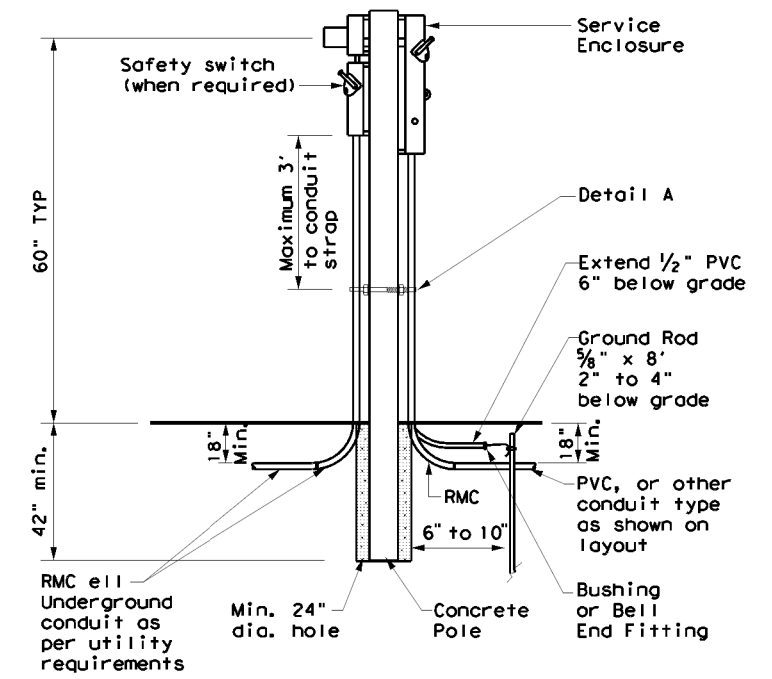
GRANITE CONCRETE (GC) & OTHER CONCRETE (OC) NOTES

Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

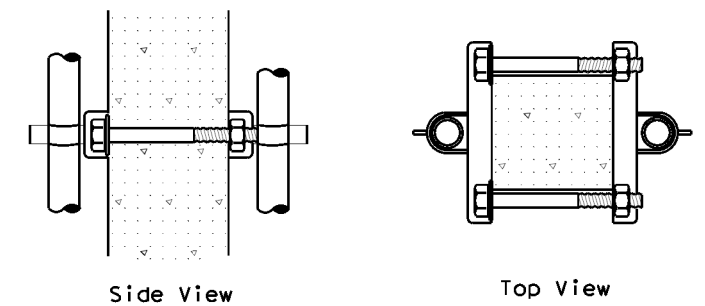
1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
5. Ensure all installation details of services are in accordance with utility company specifications.
6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the electric utility.
7. Furnish and install galvanized or stainless steel channel strut $1\frac{1}{2}$ in. or $1\frac{3}{8}$ in. wide by 1 in. up to $3\frac{3}{4}$ in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. 1" depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stack channel struts.
8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.



CONCRETE SERVICE SUPPORT
Overhead (O)



CONCRETE SERVICE SUPPORT
Underground (U)



DETAIL A

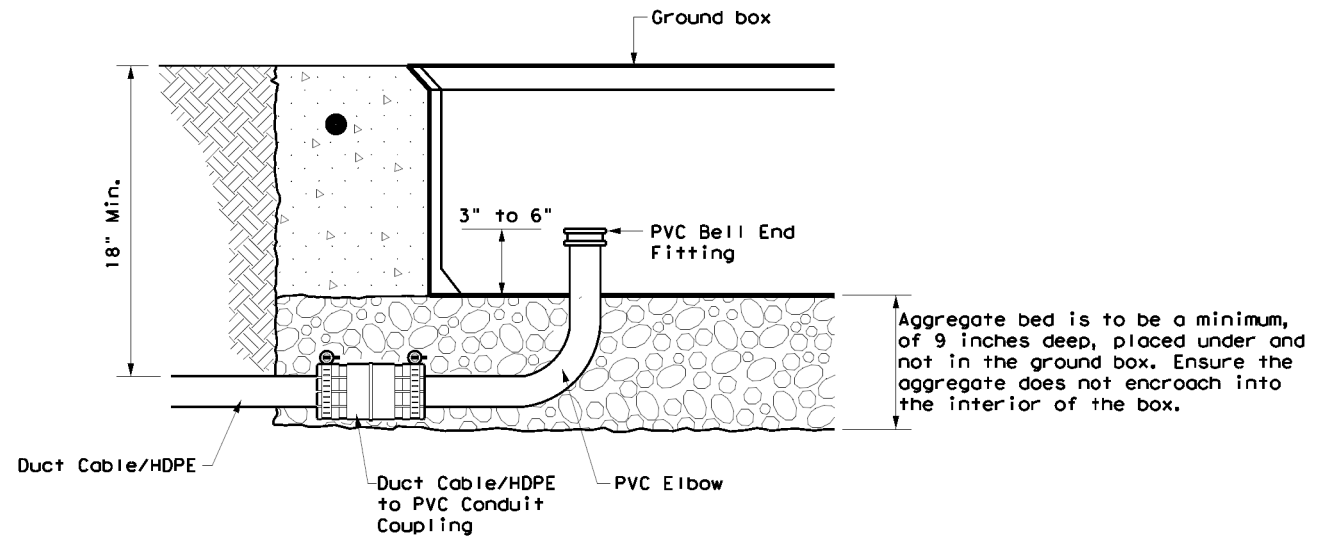
See Note 7. Before installing channel that has been cut, file sharp edges and paint with zinc-rich paint. Ensure there is no paint splatter on the pole.

		Traffic Operations Division Standard	
ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP			
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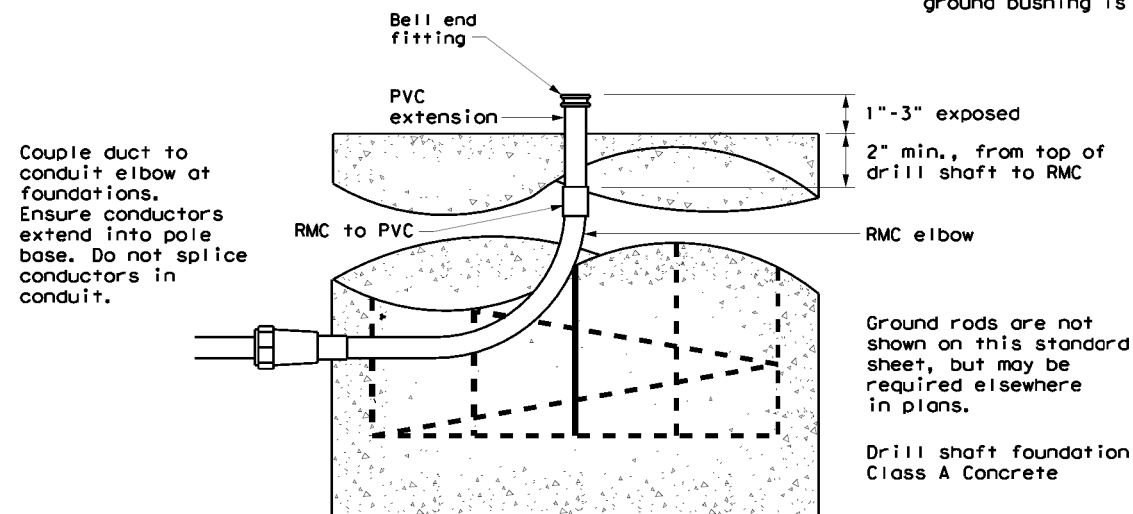
DUCT CABLE & HDPE CONDUIT NOTES

- Provide duct cable in accordance with Departmental Material Specification (DMS) 11060 "Duct Cable" and Item 622 "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 622.
- Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS 11060 and Item 618, "Conduit." Provide HDPE as listed on the MPL on the Department web site under "Roadway Illumination and Electrical Supplies," Item 618.
- Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Bend duct cable and HDPE conduit as recommended by the manufacturer, with a minimum bending radius of 26 in. for 2 in. duct. Follow manufacturers' recommendations when handling duct cable and HDPE conduit reels and during installation of duct cable and HDPE conduit.
- Do not splice conductors within duct cable or HDPE conduit. Couple duct cable and HDPE entering a ground box or foundation to a PVC elbow. When galvanized steel RMC elbows are called for in the plans and any portion of the RMC elbow is buried less than 18" from possible contact, ground the RMC elbow.
- Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."
- When conduit casing is called for in the plans, extend duct cable or HDPE conduit through the conduit casing in one continuous length without connection to the casing.
- Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.
- Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.
- Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed coupling made of HDPE with stainless steel external banding clamps and locking rings; connected with approved electrofusion conduit couplings; or connected using an approved chemical fusion method using an epoxy or adhesive specifically designed for HDPE couplings and connectors all installed in accordance with their manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.

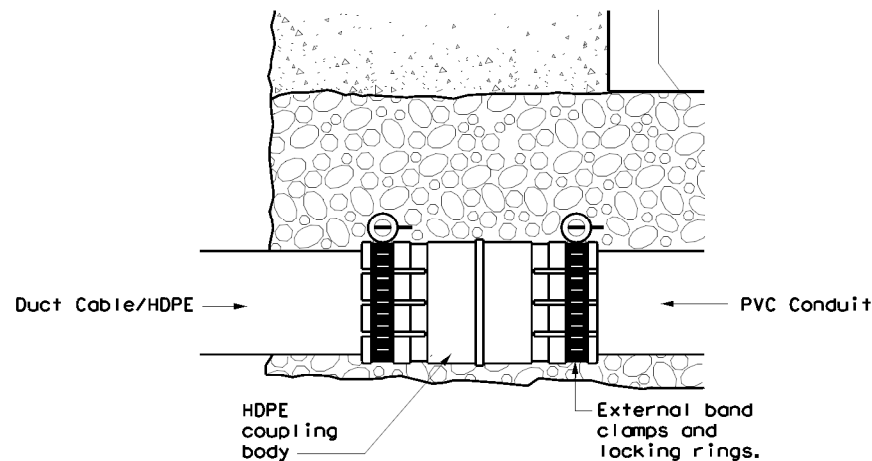


DUCT CABLE/HDPE AT GROUND BOX

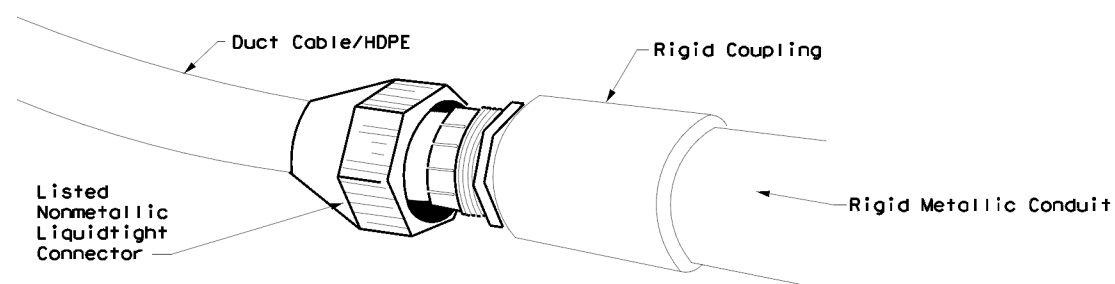
When the upper end of an RMC EII does not enter the ground box, it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18" of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.



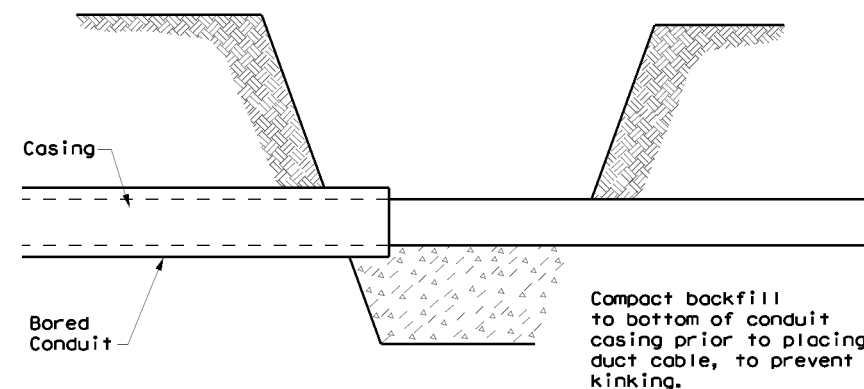
DUCT CABLE / HDPE AT FOUNDATION



DUCT CABLE/HDPE TO PVC



DUCT CABLE/HDPE TO RMC

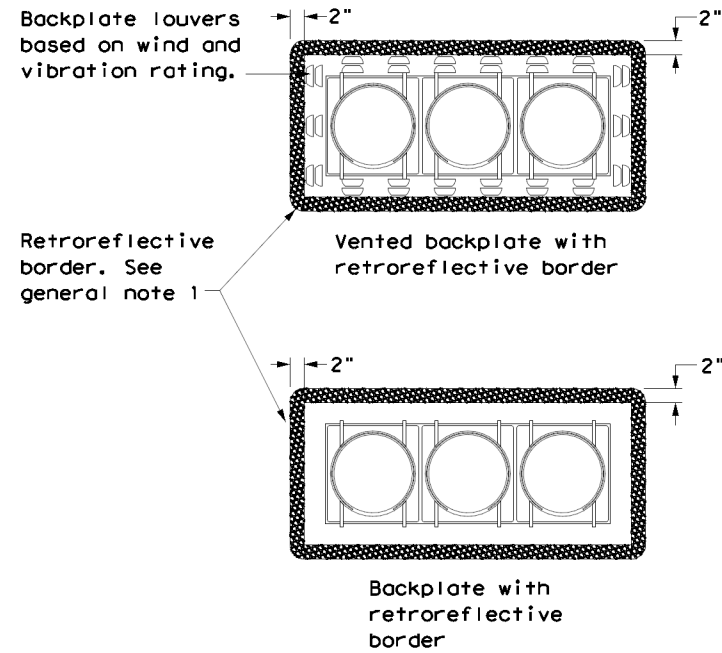


BORE PIT DETAIL

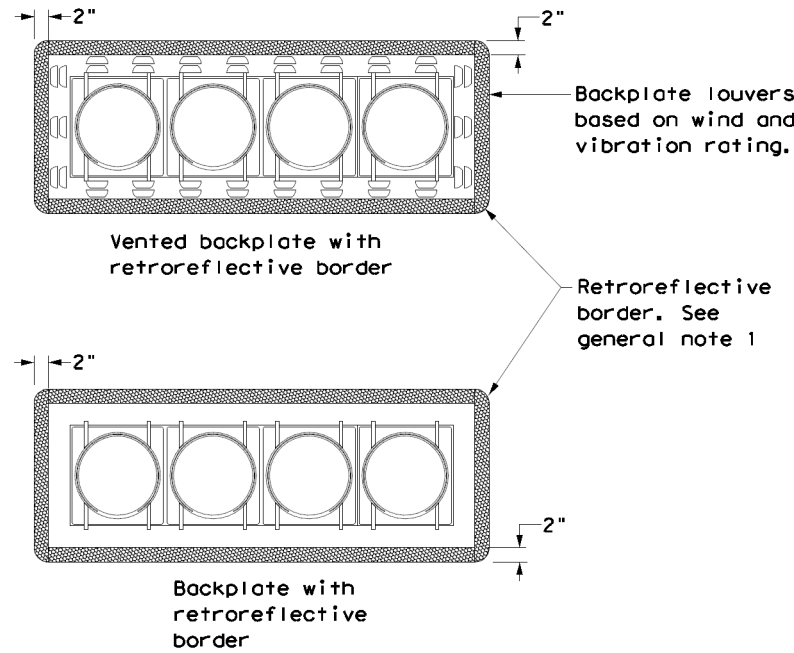
				Traffic Operations Division Standard	
ELECTRICAL DETAILS DUCT CABLE/ HDPE CONDUIT					
ED(11)-14					
FILE: ed11-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT	
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0911	00	139	VARIOUS	
	DIST	COUNTY	SHEET NO.		
	LFK	ANGEL INA	92		

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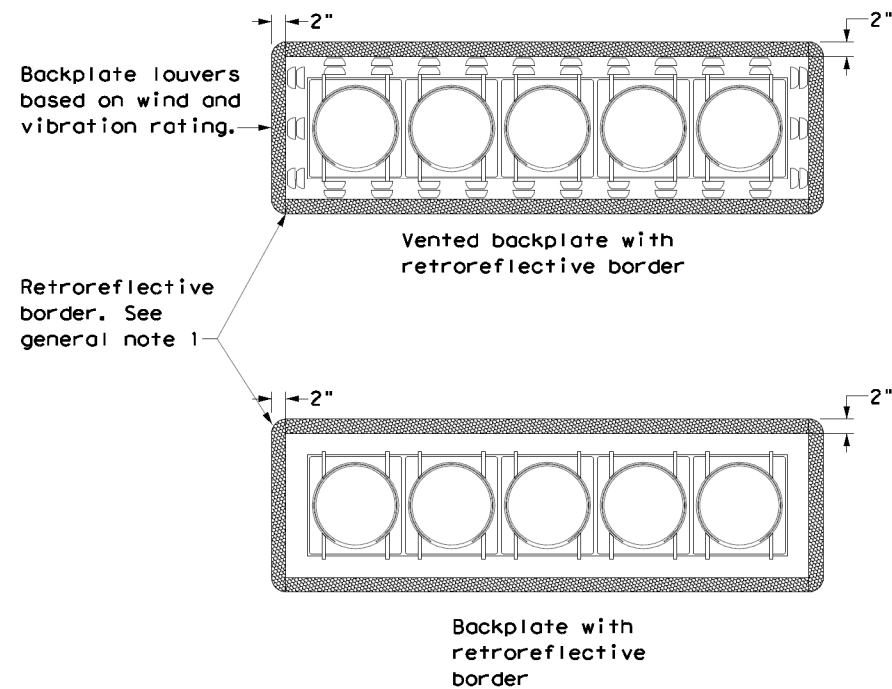
DATE: 2/20/2024 2:22:24 PM
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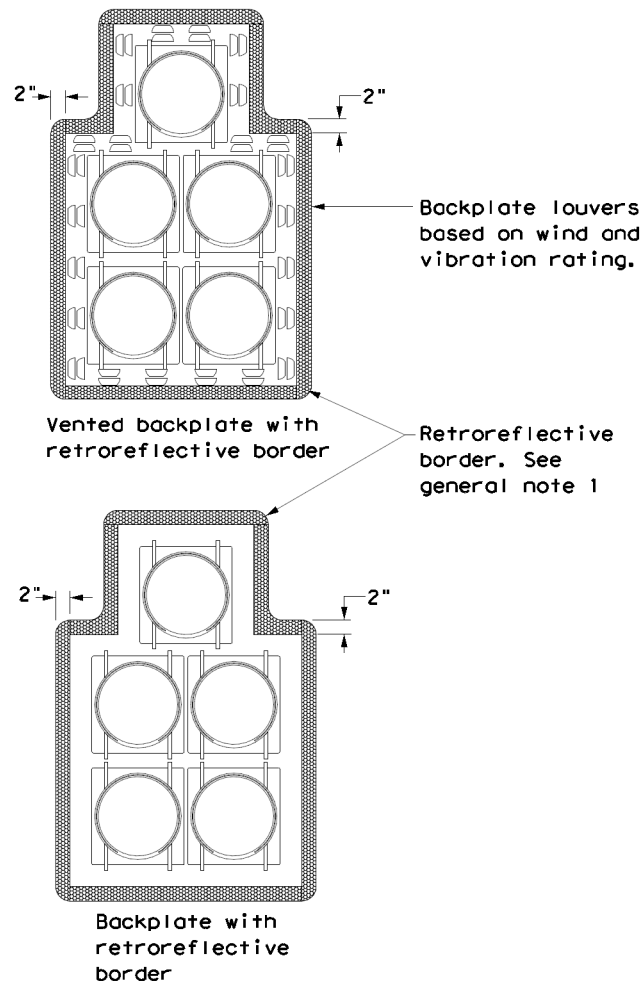
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



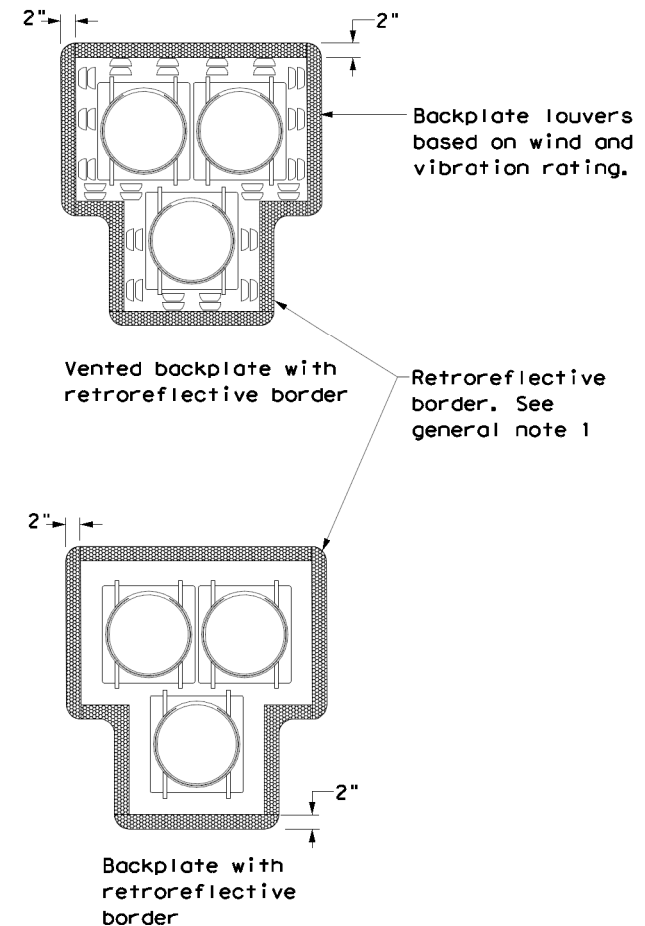
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

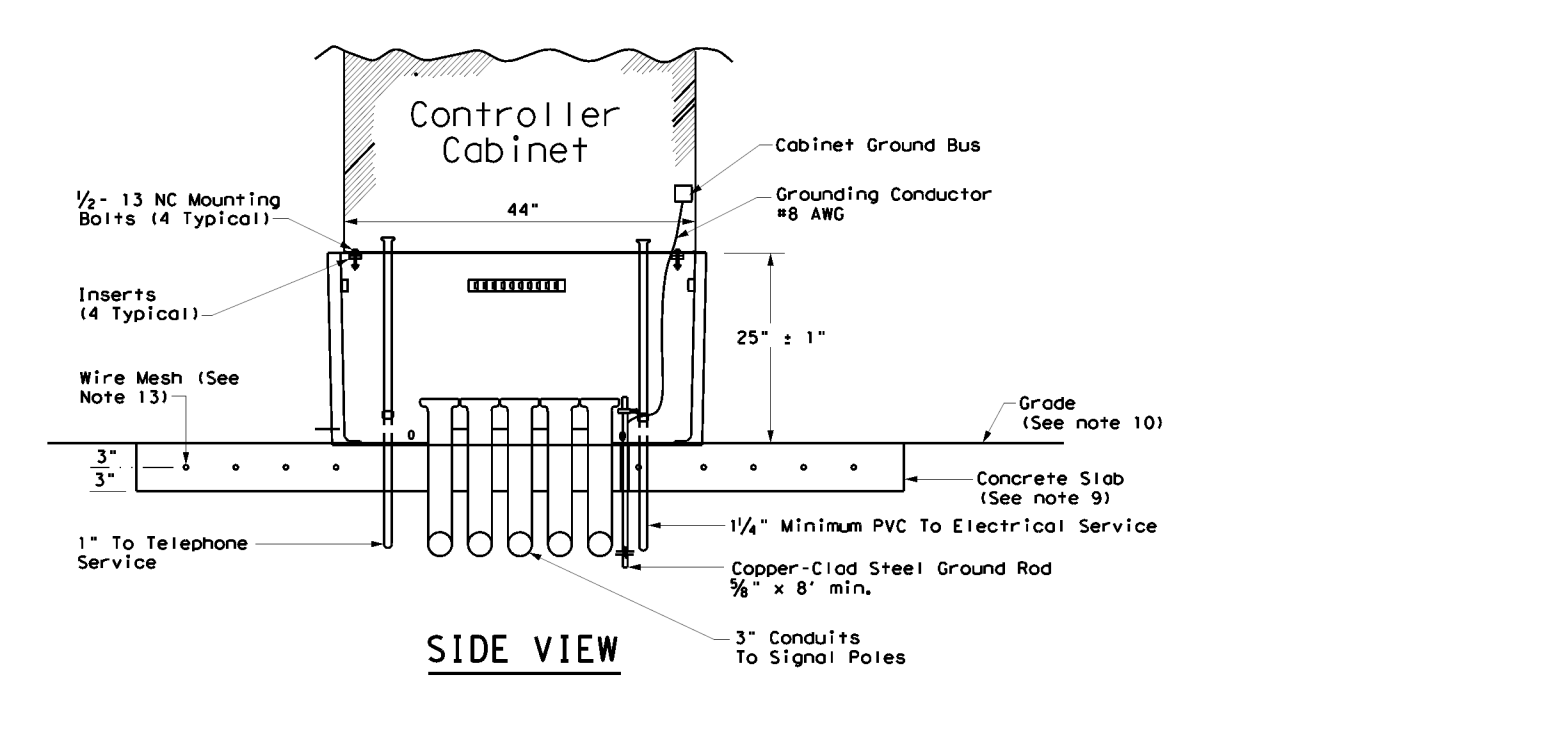
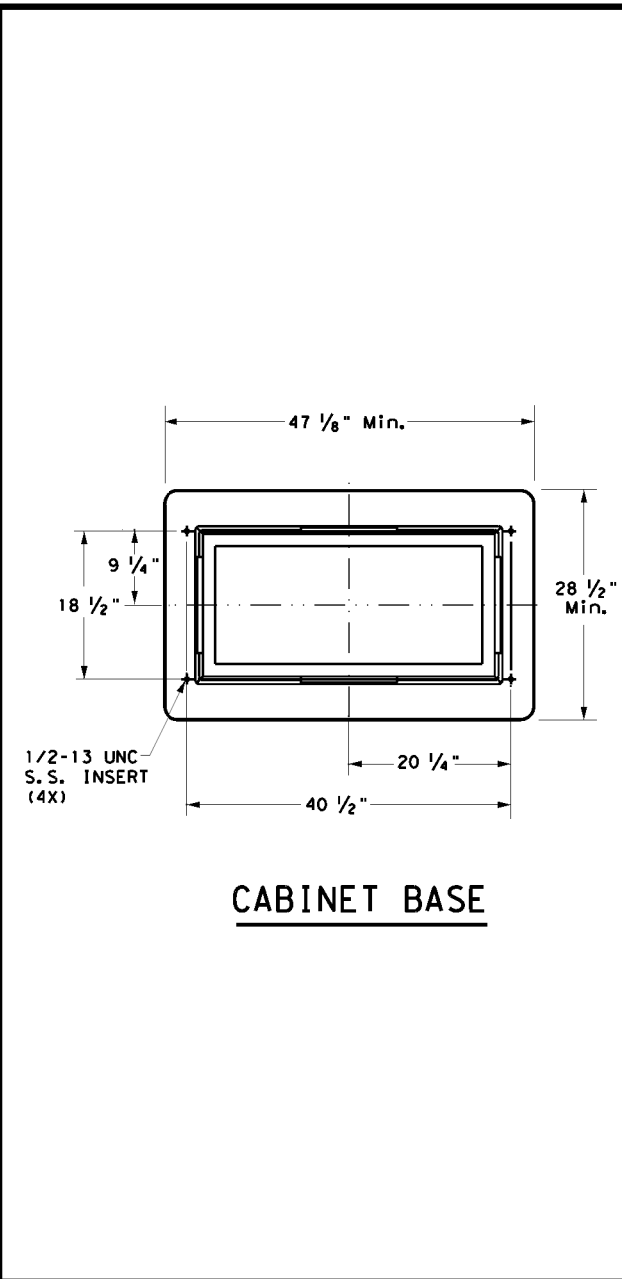
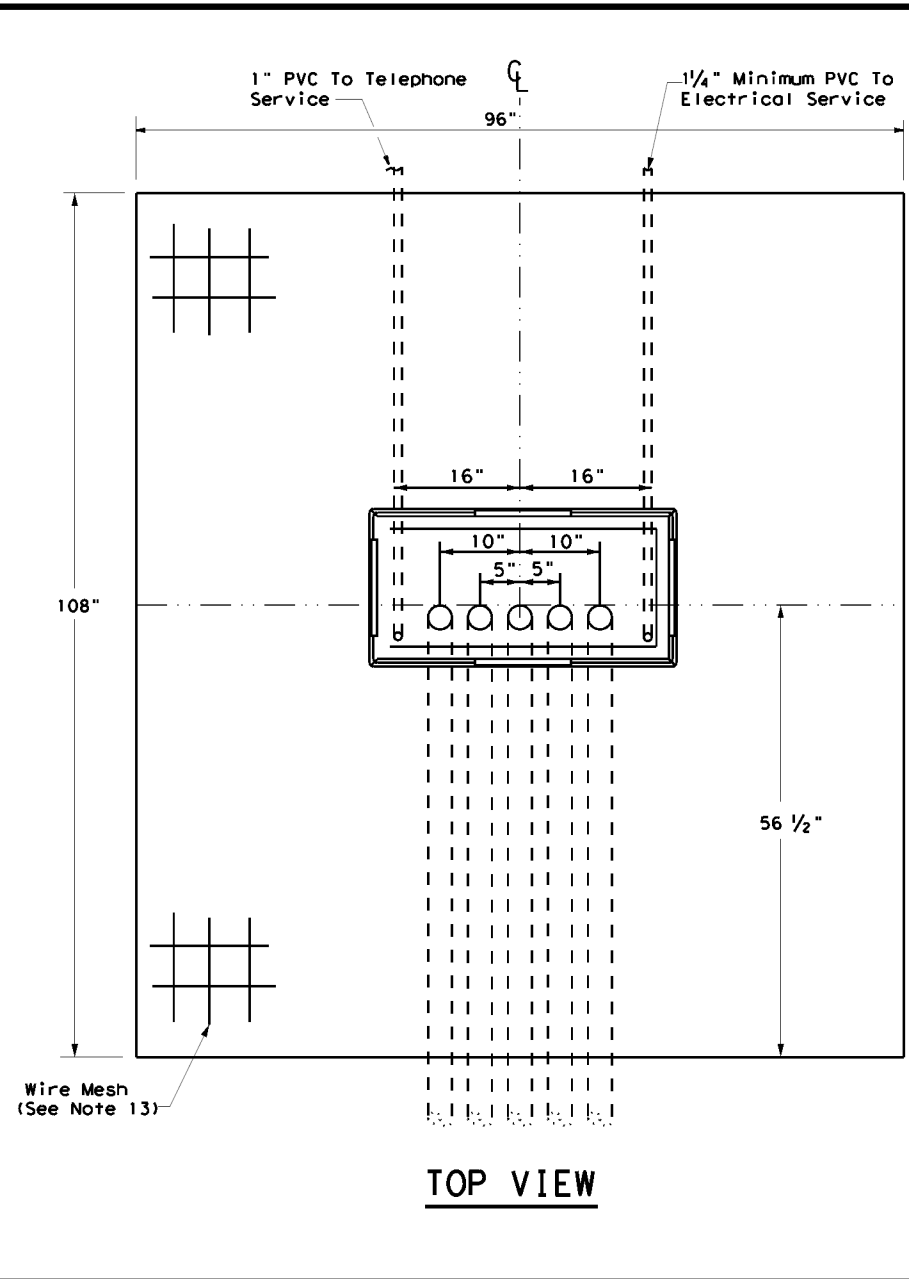
GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatibility must be verified by the contractor prior to installation.
3. When using backplates on signal heads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signal heads with backplates, including but not limited to:
 - Pole mounted
 - Overhead mounted
 - Span wire mounted
 - Mast arm mounted
 - Vertical signal heads
 - Horizontal signal heads
 - Clustered signal heads
 - Pedestrian hybrid beacons

		Traffic Safety Division Standard	
TRAFFIC SIGNAL HEAD WITH BACKPLATE TS-BP-20			
FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DR: TxDOT
© TxDOT June 2020	CONT: 0911	SECT: 00	JOB: 139
REVISIONS	DIST: LFK		COUNTY: ANGELINA
			SHEET NO.: 93

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TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Safety Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four 1#2"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7" from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 9#16x 3#16inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using 1#2"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Grade earthwork such that it is flush with the concrete pad on all four sides, unless otherwise shown on the plans. Subsidiary to ITEM 680, four inch rip rap may be used in lieu of earthwork. Slopes shall gradually contour to match plans.
11. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
12. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
13. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
14. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

15. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
16. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
17. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
18. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

19. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
20. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

21. Bid TS-CF as subsidiary to Item 680.

<p>TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD</p> <p>TS-CF-21</p>			
FILE: ts-cf-21.dgn	DN: October 2000	CK: 0911 00	CR: 139
REVISIONS 12-04 2-21		COUNTY LFK	HIGHWAY VARIOUS SHEET NO. 94

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DATE: FILE:

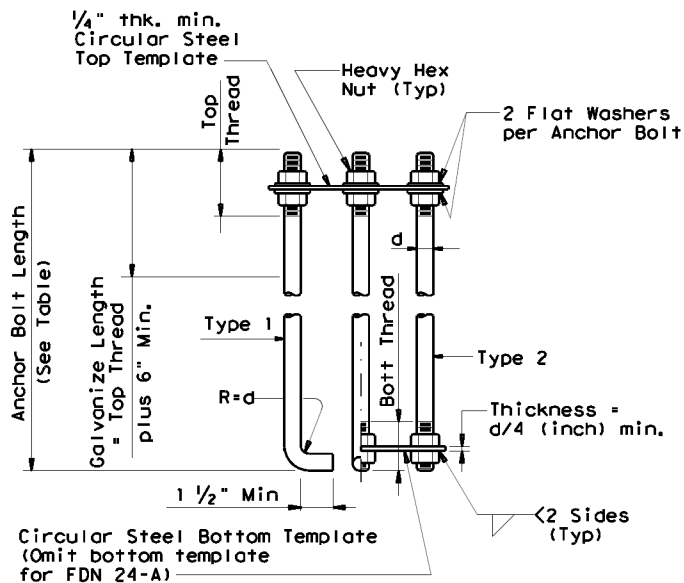
FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft (4), (5), (6)			ANCHOR BOLT DESIGN (1)			FOUNDATION DESIGN LOAD (2)		TYPICAL APPLICATION	
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N Blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft		SHEAR Kips
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	3/4"	36	12 3/4"	1	1	Pedestal pole, pedestal mounted controller.	
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 1/2"	55	17"	2	3	Mast arm assembly. (see Selection Table)	
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 3/4"	55	19"	2	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.	
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm	
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 1/4"	55	23"	2	9	Mast arm assembly. (see Selection Table)	

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

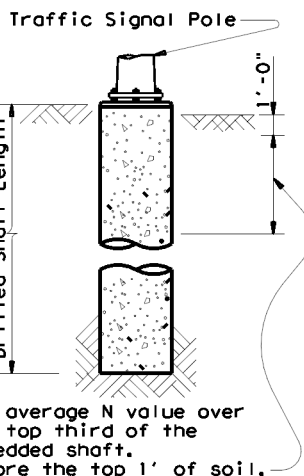
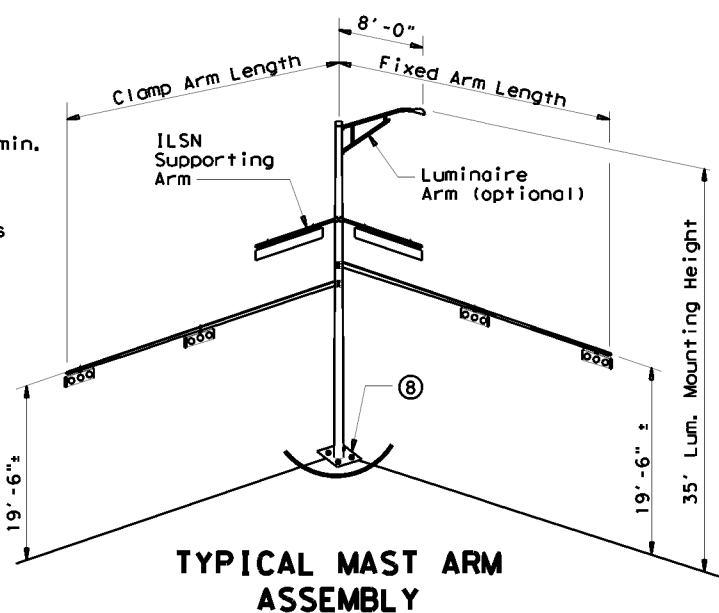
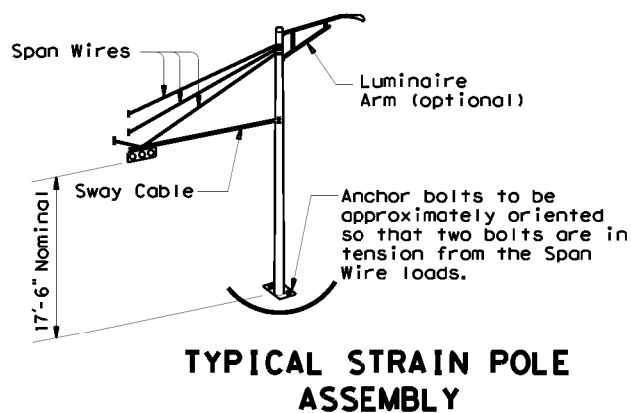
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
		MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' x 24' 28' x 28' 32' x 28'	32' x 32' 36' x 36' 40' x 36' 44' x 28'	44' x 36'
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	24' x 24' 28' x 28' 32' x 24'	32' x 32' 36' x 36' 40' x 24'	40' x 36'	44' x 36'
		MAXIMUM DOUBLE ARM LENGTH COMBINATIONS			

- EXAMPLE:**
- For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
 - For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2) ANCHOR BOLT ASSEMBLY

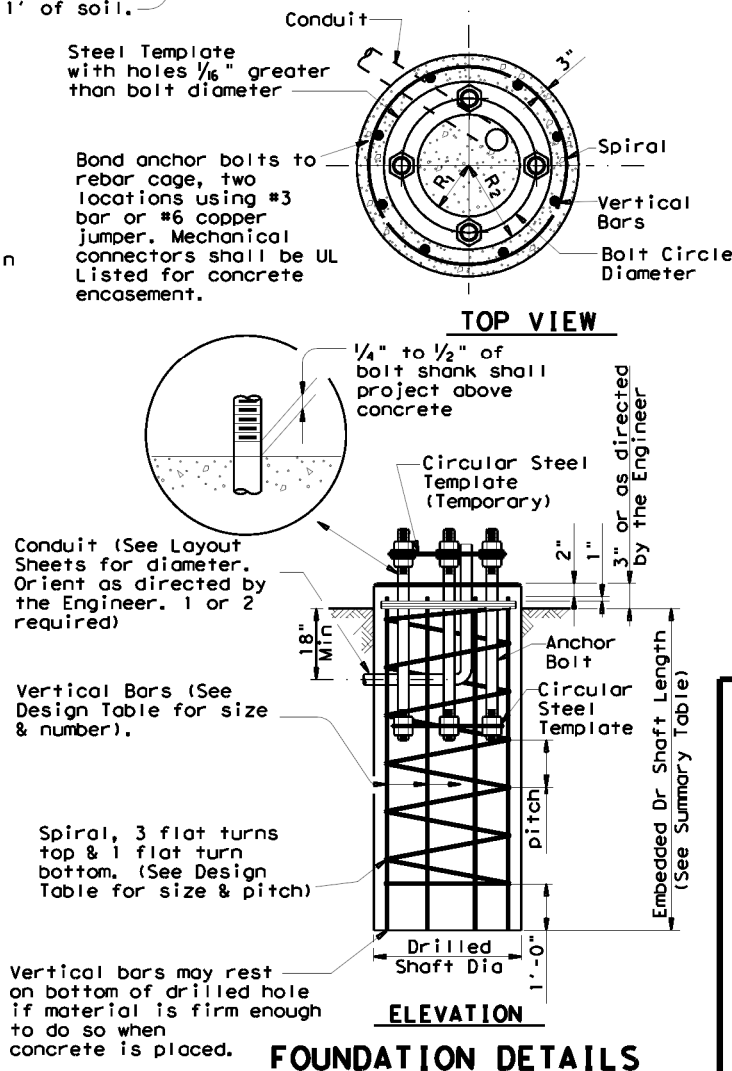
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



ANCHOR BOLT & TEMPLATE SIZES

BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
3/4"	1'-6"	3"	—	12 3/4"	7 1/8"	5 3/8"
1 1/2"	3'-4"	6"	4"	17"	10"	7"
1 3/4"	3'-10"	7"	4 1/2"	19"	11 1/4"	7 3/4"
2"	4'-3"	8"	5"	21"	12 1/2"	8 1/2"
2 1/4"	4'-9"	9"	5 1/2"	23"	13 3/4"	9 1/4"

⑦ Min dimensions given, longer bolts are acceptable.



NOTES:

- Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
- Foundation Design Loads are the allowable moments and shears at the base of the structure.
- Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.
- Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.
- If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.
- Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE (3)

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (6) (FEET)				
				24-A	30-A	36-A	36-B	42-A
REFERENCE #1								
SIGNAL POLE "B"	10	36-A	1			14		
SIGNAL POLE "C"	10	30-A	1		12			
SIGNAL POLE "D"	10	36-B	1				16	
REFERENCE #2								
PED POLE "A"	10	24-A	1	6				
SIGNAL POLE "B"	10	36-A	1			14		
SIGNAL POLE "C"	10	36-A	1			14		
PED POLE "D"	10	24-A	1	6				
REFERENCE #3								
SIGNAL POLE "A"	10	36-A	1			14		
SIGNAL POLE "B"	10	36-A	1			14		
TOTAL DRILLED SHAFT LENGTHS				12	12	70	16	

GENERAL NOTES:

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

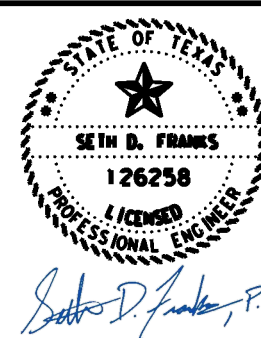
Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of BUN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".



Seth D. Franks, P.E.

3/4/2024

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

© TxDOT August 1995		DNR MS	CR- JSY	DNR MAO/MMF	CR/JSY/TEE
1-98	11-92	CONTRACT	SECTION	JOB	HIGHWAY
		091100		139	VARIOUS
		DIST	COUNTY		SHEET NO.
		LFK	ANGELINA		95

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APPLICABLE STANDARDS SHEETS

OVERHEAD SIGN BRIDGE STANDARDS:

- OSB-SE
- OSB-Z#
- OSB-Z#1
- HOSB-Z#
- HOSB-Z1L
- HOSB-Z#1
- OSBT
- OSBC
- OSBC-SC-Z#
- OSBS-SC
- OSB-FD
- OSB-FD-SC

CANTILEVER OVERHEAD SIGN SUPPORT STANDARDS:

- COSS-SE
- COSS-Z#-10
- HCOSS-Z#-10
- COSS-Z21-10
- COSS-Z#&Z#1-10
- COSSD
- COSSF
- COSS-FD

Note: # = Wind Zone number 1, 2, 3 or 4

HIGH MAST ILLUMINATION POLE STANDARDS:

- HMIP-98
- HMIF-98

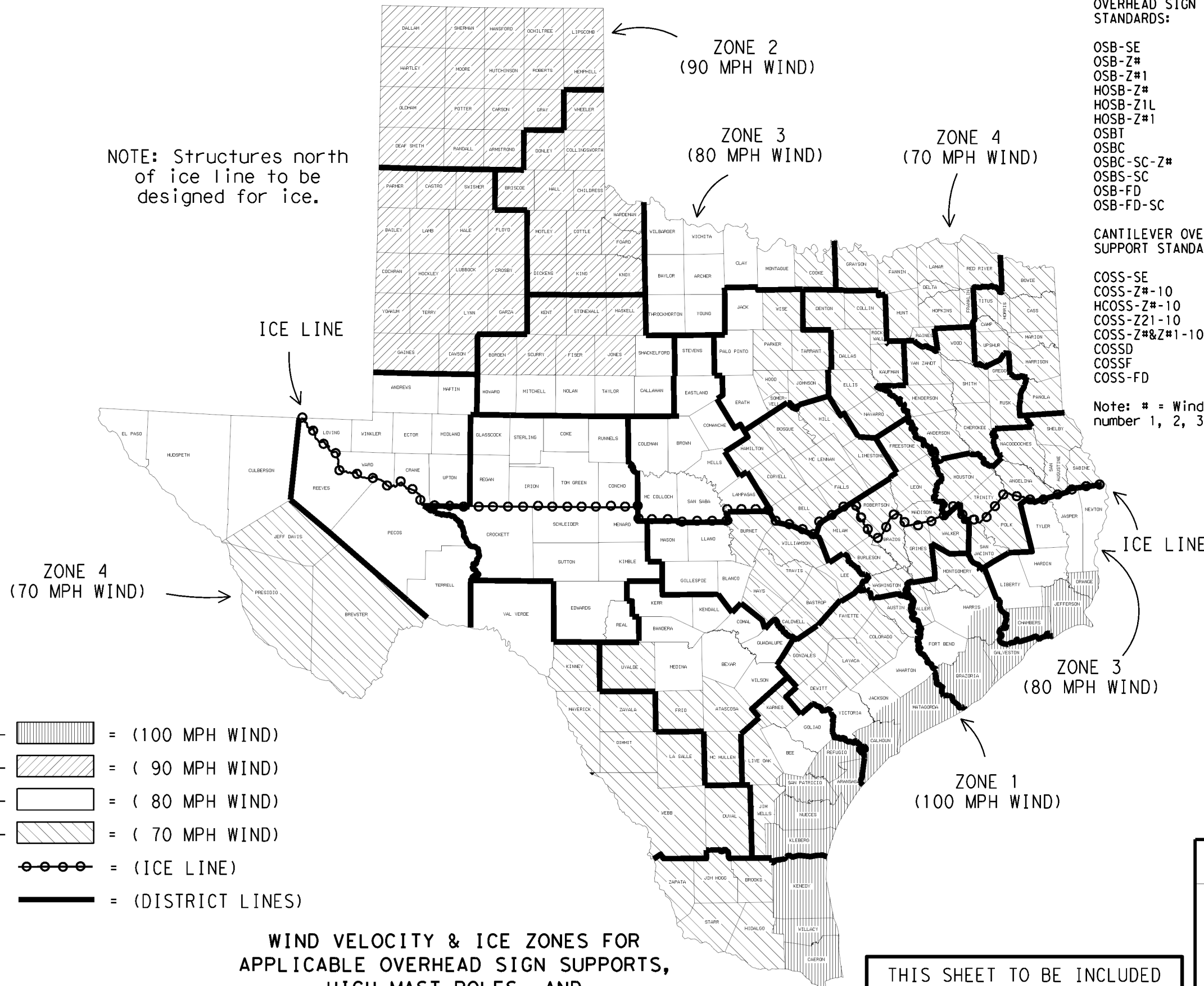
WALKWAYS AND BRACKETS STANDARDS:

- SWW
- SB(SWL-1)

TRAFFIC SIGNAL POLE STANDARDS:

- SP-80
- SP-100
- SMA-80
- SMA-100
- DMA-80
- DMA-100
- MA-C
- MAC(ILSN)
- MAD-D
- TS-FD
- LUM-A
- CFA
- LMA
- TS-C
- MA-DPD

NOTE: Structures north of ice line to be designed for ice.



LEGEND

- ZONE 1 - [diagonal lines] = (100 MPH WIND)
- ZONE 2 - [diagonal lines] = (90 MPH WIND)
- ZONE 3 - [diagonal lines] = (80 MPH WIND)
- ZONE 4 - [diagonal lines] = (70 MPH WIND)
- [dashed line with circles] = (ICE LINE)
- [solid black line] = (DISTRICT LINES)

WIND VELOCITY & ICE ZONES FOR APPLICABLE OVERHEAD SIGN SUPPORTS, HIGH MAST POLES, AND TRAFFIC SIGNAL POLES

Based on 50 Year Mean Recurrence Interval of Fastest Mile Wind Velocity at 33 feet height.

THIS SHEET TO BE INCLUDED IN ALL P.S.&E. PACKAGES CONTAINING ONE OR MORE OF THE APPLICABLE STANDARD SHEETS LISTED HEREON

FOR HARRIS CO. ONLY
 Zone line is just North of US 90, around the North, West and South sides of IH 610 and down the West side of SH 288.

FOR JACKSON CO. ONLY
 Zone line is just North of SH 616.

		Traffic Operations Division Standard	
<h3>WIND VELOCITY AND ICE ZONES</h3> <h3>WV & IZ-14</h3>			
FILE:	windice.dgn	DN:	TxDOT
© TxDOT	April 1996	CK:	TxDOT
REVISIONS	CONT	SECT	JOB
8-14-Added list of applicable standards, restricting use to structures designed for Fastest Mile wind speeds.	0911	00	139
DIST	COUNTY		SHEET NO.
LFK	ANGELINA		96

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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.: 852283C
 Crossing Type: AT GRADE
 RR Company Operating Track at Crossing: ANGELINA & NECHES RIVER RAILROAD
 RR Company Owning Track at Crossing: ANGELINA & NECHES RIVER RAILROAD
 RR MP: N/A
 RR Subdivision: N/A
 City: LUFKIN
 County: ANGELINA
 CSJ at this Crossing: PROJECT CSJ 0911-00-139

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

THIS PROJECT IS TO INSTALL TRAFFIC SIGNAL CAMERA UPGRADES TO EXISTING TRFFIC SIGNAL AT INTERSECTION OF SL 287 & SH 94.

Scope of Work to be performed by Railroad Company:

N/A

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 1
 On this project, night or weekend flagging is:
 Expected
 Not Expected

Flagging services will be provided by:
 Railroad Company: TxDOT will pay flagging invoices. Flagging Agreement with Railroad will be needed
 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 877-984-677

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

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

OTHERS:
 TIMOTHY HAMMOND-VICE PRESIDENT & GENERAL MANAGER
 P.O. BOX 1328
 LUFKIN, TEXAS 75902
 936-634-4403
 EMAIL: thammond@anrrr.com

Contractor must incorporate Construction Inspection into anticipated construction schedule.

Not Required
 Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

Required. Railroad Point of Contact: _____
 Not Required

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

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

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: ANGELINA & NECHES RIVER RAILROAD
 Railroad Emergency Line at: 936-634-4403
 Location: DOT 852283C
 RR Milepost: N/A
 Subdivision: N/A

RRD Review Only
 Initials: _____
 Date: 1/24/2024

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
3/2023	0911	00	139	VARIOUS
	DIST	COUNTY	SHEET NO.	
	LFK	ANGELINA	97	

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.

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.: 755785X
 Crossing Type: AT GRADE
 RR Company Operating Track at Crossing: UNION PACIFIC RAILROAD COMPANY
 RR Company Owning Track at Crossing: UNION PACIFIC RAILROAD COMPANY
 RR MP: 93.083
 RR Subdivision: LUFKIN
 City: CORRIGAN
 County: POLK
 CSJ at this Crossing: PROJECT CSJ 0911-00-139

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

THIS PROJECT IS TO INSTALL TRAFFIC SIGNAL CAMERA UPGRADES TO EXISTING TRAFFIC SIGNAL AT INTERSECTION OF US 59 & US 287.

Scope of Work to be performed by Railroad Company:

N/A

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 1
 On this project, night or weekend flagging is:
 Expected
 Not Expected

Flagging services will be provided by:

- Railroad Company: TxDOT will pay flagging invoices. Flagging Agreement with Railroad will be needed
 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 877-984-677
 BNSF BNSFinfo@railprosfs.com
 Call Center 877-315-0513, Select #1 for flagging
 KCS KCS.info@railpros.com
 Call Center 877-315-0513, Select #1 for flagging
 Bottom Line On-Track Safety Services
 bottomline076@aol.com, 903-767-7630

OTHERS:

Contractor must incorporate Construction Inspection into anticipated construction schedule.

- Not Required
 Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

- Required. Railroad Point of Contact: _____
 Not Required

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

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.

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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
 - KCS
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>

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

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 COMPANY
 Railroad Emergency Line at: 800-848-8715
 Location: DOT 755785X
 RR Milepost: 93.083
 Subdivision: LUFKIN

RRD Review Only
 Initials: [Signature]
 Date: 1/24/2024

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
3/2023	0911	00	139	VARIOUS
	DIST	COUNTY		SHEET NO.
	LFK	ANGELINA		98

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.

 Texas Department of Transportation				Rail Division	
RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS					
FILE#	DWG: TxDOT	CKG: TxDOT	DWG: TxDOT	CKG: TxDOT	
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS March 2020	0911	00	139	VARIOUS	
	DIST	COUNTY		SHEET NO.	
	LFK	ANGEL INA		99	

DATE: 2/20/2024 2:23:05 PM
FILE: c:\t\dot\pw_online\t\dot\3\guadalupe_sandoval\0676692\RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS.dgn

DATE: 2/20/2024 2:23:06 PM
 FILE: c:\txdot\pw_online\txdot3\quadalupe.sandoval\0676692\RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS.dgn

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 Contractors'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	
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS March 2020	0911	00	139	VARIOUS	
DIST	COUNTY			SHEET NO.	
LFK	ANGEL INA			100	

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For projects with less than one acre of soil disturbing activity and that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0911-00-139

1.2 PROJECT LIMITS:

From: VARIOUS LOCATIONS DISTRICT WIDE

To: _____

1.3 PROJECT COORDINATES:

BEGIN: (Lat) N/A, (Long) _____

END: (Lat) N/A, (Long) _____

1.4 TOTAL PROJECT AREA (Acres): 0.1

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.1

1.6 NATURE OF CONSTRUCTION ACTIVITY:

INSTALLATION OF TRAFFIC CONTROL DEVICES;
TRAFFIC SIGNAL IMPROVEMENTS

1.7 MAJOR SOIL TYPES:

Soil Type	Description
FULLER-URBAN LAND COMPLEX	1 TO 4 PERCENT SLOPE
NACOGDOCHES-URBAN LAND COMPLEX	1 TO 5 PERCENT SLOPE
DARCO-URBAN LAND COMPLEX	1 TO 8 PERCENT SLOPE

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

- PSLs determined during preconstruction meeting
- PSLs determined during construction
- No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

- Mobilization
- Install sediment and erosion controls
- Blade existing topsoil into windrows, prep ROW, clear and grub
- Remove existing pavement
- Grading operations, excavation, and embankment
- Excavate and prepare subgrade for proposed pavement widening
- Remove existing culverts, safety end treatments (SETs)
- Remove existing metal beam guard fence (MBGF), bridge rail
- Install proposed pavement per plans
- Install culverts, culvert extensions, SETs
- Install mow strip, MBGF, bridge rail
- Place flex base
- Rework slopes, grade ditches
- Blade windrowed material back across slopes
- Revegetation of unpaved areas
- Achieve site stabilization and remove sediment and erosion control measures

Other: REMOVE EXISTING SIGNAL LIGHTS AND INSTALL NEW SIGNAL LIGHTS

Other: _____

Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

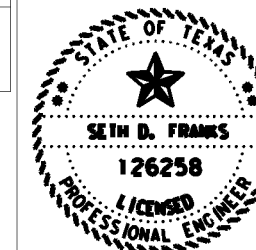
- Sediment laden stormwater from stormwater conveyance over disturbed area
- Fuels, oils, and lubricants from construction vehicles, equipment, and storage
- Solvents, paints, adhesives, etc. from various construction activities
- Transported soils from offsite vehicle tracking
- Construction debris and waste from various construction activities
- Contaminated water from excavation or dewatering pump-out water
- Sanitary waste from onsite restroom facilities
- Trash from various construction activities/receptacles
- Long-term stockpiles of material and waste
- Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities
- Other: _____
- Other: _____
- Other: _____

1.11 RECEIVING WATERS:

Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
N/A	N/A

* Add (*) for impaired waterbodies with pollutant in ().



Seth D. Franks, P.E.
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STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- Protection of Existing Vegetation
- Vegetated Buffer Zones
- Soil Retention Blankets
- Geotextiles
- Mulching/ Hydromulching
- Soil Surface Treatments
- Temporary Seeding
- Permanent Planting, Sodding or Seeding
- Biodegradable Erosion Control Logs
- Rock Filter Dams/ Rock Check Dams
- Vertical Tracking
- Interceptor Swale
- Riprap
- Diversion Dike
- Temporary Pipe Slope Drain
- Embankment for Erosion Control
- Paved Flumes
- Other: _____
- Other: _____
- Other: _____
- Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- Biodegradable Erosion Control Logs
- Dewatering Controls
- Inlet Protection
- Rock Filter Dams/ Rock Check Dams
- Sandbag Berms
- Sediment Control Fence
- Stabilized Construction Exit
- Floating Turbidity Barrier
- Vegetated Buffer Zones
- Vegetated Filter Strips
- Other: _____
- Other: _____
- Other: _____
- Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- Excess dirt/mud on road removed daily
- Haul roads dampened for dust control
- Loaded haul trucks to be covered with tarpaulin
- Stabilized construction exit
- Daily street sweeping
- Other: _____
- Other: _____
- Other: _____
- Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- Chemical Management
- Concrete and Materials Waste Management
- Debris and Trash Management
- Dust Control
- Sanitary Facilities
- Other: _____
- Other: _____
- Other: _____
- Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- Fire hydrant flushings
- Irrigation drainage
- Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- Potable water sources
- Springs
- Uncontaminated groundwater
- Water used to wash vehicles or control dust
- Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

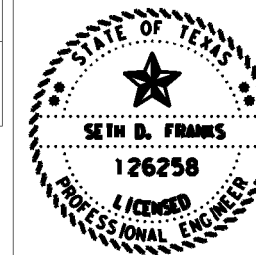
Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.



Seth D. Franks, P.E.

3/4/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

© 2024 July 2023 Sheet 2 of 2
Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
				102
STATE	STATE DIST.	COUNTY		
TEXAS	LFK	ANGELINA		
CONT.	SECT.	JOB	HIGHWAY NO.	
0911	00	139	VARIOUS	

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

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

1. N/A

No Action Required Required Action

Action No.

1. This project consists of discrete construction projects separated a minimum 1/4 mile by undisturbed areas; therefore, they are treated as separate plans of development. These separate plans of development disturb less than 1 acre. The disturbed area in the plans and the Contractor project specific locations (PSLs) within 1 mile of the project limits will further establish the authorization requirements for storm water discharges. If the total area disturbed shown in the plans and PSLs within 1 mile of the project limits exceeds 1 acre, the engineer will develop an SWP3 site plan and post a small construction site notice for the construction activities.

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 (1/10th 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. N/A

Best Management Practices:

Erosion	Sedimentation	Post-Cconstruction 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.

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

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

No Action Required Required Action

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.

1. N/A

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.

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

VII. OTHER ENVIRONMENTAL ISSUES

No Action Required Required Action

LIST OF ABBREVIATIONS

BMP: Best Management Practice	SPCC: Spill Prevention Control and Countermeasure
CGP: Construction General Permit	SWP3: 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 Treat 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

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Texas Department of Transportation

EPIC

(ENVIRONMENTAL PERMITS,
ISSUES AND COMMITMENTS)

CONT	SECT	JOB	HIGHWAY
0911	00	139	VARIOUS
DIST	COUNTY		SHEET NO.
LFK	ANGELINA		103