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INDEX OF SHEETS

SHEET NO.	DESCRIPTION
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STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT: NH 2021(228)

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	NH 2021(228)		
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	WACO	BELL	1
CHECK	CONTROL	SECTION	JOB	
	0231	03	152	

YEAR	EXISTING ADT
2018	72,512.00
YEAR	FUTURE ADT
2038	99,530.00

BELL COUNTY

CSJ: 0231-03-152

IH 14

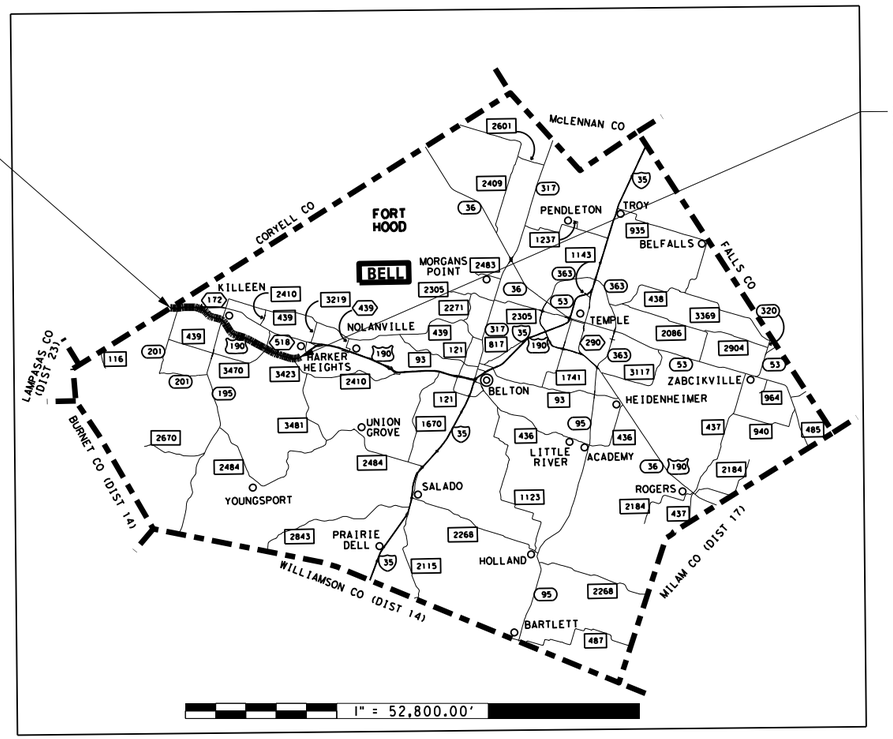
CSJ 0231-03-152

ROADWAY:	FT=50,566.56	MI.= 9.577
BRIDGE:	FT= 0.00	MI.= 0.000
TOTAL:	FT=50,566.56	MI.= 9.577

LIMITS: FROM CORYELL COUNTY LINE TO 0.5 MI WEST OF FM 3423

FOR THE CONSTRUCTION OF SAFETY IMPROVEMENT PROJECTS CONSISTING OF CONSTRUCTION OF FIBER OPTICS, TRAFFIC CAMERAS, AND DYNAMIC MESSAGE BOARDS.

CORYELL COUNTY LINE
CSJ: 0231-03-152
REF.MAKR 562+.038
STA 17+00



0.5 MI WEST FM 3423
CSJ: 0231-03-152
REF.MAKR 572+.140
STA 517+20.00

EXCEPTIONS: NONE
EQUATIONS: NONE
RR CROSSINGS: NONE

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

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Texas Department of Transportation

Recommended for Letting

Stephen Michael Kasberg, P.E.

Digitally signed by Stephen Michael Kasberg, P.E.
DN: cn=Stephen Michael Kasberg, P.E., o=Texas Department of Transportation, ou=Texas Department of Transportation, email=stephen.kasberg@txdot.gov, c=US
Date: 2020.11.04 10:08:01 -06'00'

Area Engineer

Recommended for Letting 11/4/2020

Director of Transportation Planning & Development

Approved for Letting 11/4/2020

DocuSigned by:
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District Engineer

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NODE

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NODE

* THE STANDARD SHEET SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY DIRECT SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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INDEX OF SHEETS

SHEET 1 OF 1

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		2

GENERAL

The construction, operation and maintenance of the proposed project will be consistent with the state implementation plan as prepared by the Texas Commission on Environmental Quality.

The disturbed area for this project, as shown on the plans is 0.00 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

Contractor questions on this project are to be emailed to the Waco District at the following address:

Bill Compton - Wacoprebid@txdot.gov, 254-867-2707, 100 S. Loop Dr., Waco, TX
Carmen Chau - Wacoprebid@txdot.gov, 254-867-2794, 100 S. Loop Dr., Waco, TX

All contractor questions will be reviewed by the District Traffic Engineer or Area Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

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

GENERAL NOTES

ITEM 1 ABBREVIATIONS AND DEFINITIONS:

This is a Non-Site-Specific Contract as defined in Item 1.3.90.

ITEM 4: SCOPE OF WORK

This project includes the construction of fiber optics and traffic cameras. This includes replacing an existing overhead Dynamic Message Sign (DMS) and installing a new structure / DMS within the project limits.

ITEM 5: CONTROL OF THE WORK

Submit all fabrication and shop drawings per TxDOT's online shop drawing submittal system and copy the District Traffic Engineer on the email submittal, unless otherwise directed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications maintained by TxDOT, call the TxDOT Traffic Signal Office (254) 867-2808 for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (254) 867-2726 for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor's negligence including, but not limited to, repair or replacement at the Contractor's expense.

ITEM 6: CONTROL OF MATERIALS

References to manufacturer's trade name or catalog numbers are for the purpose of identification only and the contractor will be permitted to furnish like materials of other manufacturers provided they are of equal quality and comply with specifications for this project.

ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

No significant traffic generator events identified.

If utilizing private property for waste disposal sites, field office sites, equipment storage sites or for any other purpose involved with this project, provide to the Engineer written proof of the property owner's approval of the use of this property. This proof may be in the form of a letter or agreement signed by the property owner or other documents acceptable to the Engineer.

Personal vehicles of the contractor's employees will not be parked within the right of way at any time including any section closed to public traffic, unless the vehicle is being utilized for construction procedures. However, the contractor's employees may park on the right of way at the sites where the contractor has his office, equipment and materials storage yard.

The contractor is alerted to the possible presence of swallows under the existing bridges or culverts. Because the migratory bird treaty act prohibits harm to swallows, their eggs or their nestlings, the contractor will not begin potentially disturbing activities on or near the bridge until the birds have abandoned any occupied nests (approximately September 1). Active nests may not be removed regardless of the date.

Prior to the swallows returning to the nests (approximately March 1), abandoned nests will be removed from the bridge. The contractor will prevent the establishment of new nests on any portion of the structure. Methods for preventing the establishment of new nests must be approved by the project Engineer. Examples of acceptable nest prevention methods are bird-deterrent netting and bird-repelling sprays and/or gels to be applied to the structure. This work will not be paid for directly, but will be subsidiary to the various bid items.

The Contractor will submit detailed site-specific plans for work in each "water of the United States" designated on the EPIC sheet. These plans must be approved by the TxDOT Engineer prior to starting any work in these areas. The plans must also describe facilities and work activities adjacent the Ordinary High-Water Marks. The plan must show actual dimensions and materials for:

- Proposed construction roads and work areas leading to or in close proximity to the Ordinary High-Water Marks
- Temporary material or equipment storage areas in close proximity to the Ordinary High-Water Marks
- Locations of proposed sediment and erosion control devices
- Identification of construction equipment and construction techniques to accomplish the work

Once this drawing and supporting information is reviewed and approved by TxDOT, all construction workers should be made aware of the limits designated on the drawings by the Contractor's supervision. Work in all waters of the US will be limited to the minimum necessary required to construct the bridge, culvert or roadway fills. Work will also include all activities needed for bridge and culvert demolitions. Working or disturbing soil in the stream channel outside the limits of the work plan will not be allowed. Orange fencing will be provided and maintained to establish the TxDOT approved boundaries in which work may be conducted between the Ordinary High-Water Marks. Orange fencing will not be paid for but will be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling".

ITEM 8: PROSECUTION AND PROGRESS

This Project will be a Standard Workweek in accordance with Article 8.3.1.4.

Nighttime work is allowed in accordance with Article 8.3.3.

For this project, provide a Bar Chart progress schedule.

ITEM 104: REMOVING CONCRETE

Properly dispose of unsalvageable material at Contractor's expense.

Remove the loose material from the roadway before opening to traffic.

ITEM 416: DRILLED SHAFT FOUNDATIONS

Provide a formed smooth finish for all portions of drill shafts extending above the proposed ground.

ITEM 500: MOBILIZATION

Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

ITEM 502: BARRICADES, SIGNS, AND TRAFFIC HANDLING

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic from edge drop-offs. Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

Provide written proposed lane closure information by 1:00 pm on the business day prior to the proposed closures. Do not close lanes when this requirement is not met.

When excavation is required next to a pavement lane carrying traffic and the widening is not completed by the end of the work day, backfill against the edge of the pavement with at least a 3:1 slope using an acceptable material to support vehicular traffic. Carefully remove and dispose of this material when work resumes. Backfilling pavement edges, and the materials required for the work will be subsidiary to this item.

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.

As approved by the Engineer, provide uniformed off duty police officers and squad cars during lane or ramp closures, night time work or other situations that indicate a need for additional traffic control to protect the traveling public or the construction workforce. Provide documentation such as payroll, log sheets with signatures and badge number, or invoices from the government entity providing the officers for reimbursement. Complete the weekly tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided. Reimbursement will not be made for coordination fees charged by any party.

The Contractor Responsible Person(s) (CRP) will be certified by TEEX, ATSSA, the National Safety Council or other approved organization. Certifications will be submitted to the Engineer at the pre-construction meeting.

The Contractor Responsible Person(s) (CRP) for Work Zone Traffic Controls will inspect and ensure any deficiencies are corrected each and every day throughout the duration of this contract. Any misaligned or damaged traffic control devices will be repaired as soon as practical after deficiency is discovered.

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee(s) available to respond on the project for emergencies and for taking corrective measures within One (1) Hour.

ITEM 506: TEMPROARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS

Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas, before the next rain event or within 24 hours of the discharge.

No soil disturbing activities will begin on any section of TxDOT ROW without adequate sedimentation controls first being installed and functioning at adjacent drainage outfalls. Begin and continuously prosecute the repairs, additions and maintenance of erosion and sedimentation control devices within seven days after the Contractor receives each Form 2118, Field Inspection and Maintenance Report, from the Engineer. Failure of the Contractor to fulfill either of the above requirements places TxDOT in potential non-compliance with permit requirements and may result in withholding estimates or stopping work or both until all environmental permit requirements are fulfilled.

Concrete Washouts are required per the CGP. The Concrete Washout Area(s) structural controls must consist of temporary berms, temporary shallow pits, and/or temporary storage tanks to prevent contaminated runoff and must be lined as to prevent contamination of underlying soil. Ensure pits properly maintained including removal of concrete as not to allow over flow. The location(s) of washout area will be approved by the Engineer. When washout pits are no longer needed, they will be removed and area will be restored to original condition. This work, materials and labor will not be measured or paid for directly but will be subsidiary to Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls."

Cleaning and sweeping of open roadways due to material spillage or loss from Contractor equipment or tires will be the responsibility of the Contractor at no cost to TxDOT. This work will not be charged as Item 738, "Cleaning and Sweeping Highways". Cleaning and sweeping of roadways will be completed as directed, including multiple times per day if necessary, to maintain acceptable roadways for the traveling public and to meet environmental regulations. Construction activities will cease when material deposited on the roadway is not properly removed or when equipment is not available as needed. Adequate construction exits will be planned, constructed and maintained by the Contractor per Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls".

ITEM 618: CONDUIT

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

"ITS" conduit refers to any conduit which contains fiber optic cable. As shown on the plans and as required, flowable backfill or concrete encasement is subsidiary to the "ITS" conduit.

When backfilling bore pits, ensure that the conduit does not become damaged during installation or due to any settling of the backfill material. Compact select backfill in three equal lifts to the bottom of the conduit or if sand is used, place to a point two (2) inches above the conduit. Backfill

density will be equal to the existing soil. Be careful to prevent any material from entering the conduit.

Backfill all open trenches before the end of the workday and do not leave any trench open overnight.

ITEM 620: ELECTRIAL CONDUCTORS

Place the communications and/or coaxial cables in a separate conduit from the 120 or 240-volt electrical conductors.

Any damage to any wire or any cable is cause for immediate rejection of the entire cable being tested. Remove and replace the entire cable at the Contractor's expense.

ITEM 624: GROUND BOXES

Ground box locations shown on the plans are approximate locations. Actual locations are as directed.

ITEM 628: ELECTRICAL SERVICES

Contact the Electric Utility Company to make all necessary arrangements to provide electrical service shown on the plans in accordance with Article 628.5 and the Electrical Details, except that TxDOT will make application to the Electric Utility Company for service (See note below).

NOTE:
Before fabricating the electrical service, contact the Waco District Traffic Signal Service Supervisor (Phone (254) 867-2807), to make application (billing arrangements) for service with the Electric Utility Company.

Furnish and install a lock on all electrical services. The lock is to be a Master-Lock number 2195.

The proposed electrical service location will be approved by TxDOT prior to installation.

ITEM 650: OVERHEAD SIGN SUPPORTS

Lengths of trusses, tower heights and posts shown in the summaries are for bidding purposes, only. Verify these dimensions upon substantial completion of the subgrade section at the location shown on the plans or as relocated. Notify the Engineer, prior to shop drawing production, concerning any discrepancies found, which may reduce established ground clearance requirements.

ITEM 6001: PORTABLE CHANGEABLE MESSAGE SIGN

This project will require "full matrix" type portable changeable message signs.

Ensure that the Contractor's Responsible Person for traffic control can revise messages within thirty (30) minutes of notification.

Furnish eight (8) portable changeable message signs. The portable changeable message sign(s) will be used for all lane closures and freeway closures as shown on the traffic control plan standard sheets.

ITEM 6007: FIBER OPTIC CABLE

Furnish all equipment, material and labor necessary for identification and protection of the utilized fibers.

The single mode fiber optic cable will be installed continuous, without splices. No splicing of fiber optic cable will be permitted in ground boxes unless shown on the plans or approved by the Engineer.

All fiber optic pigtails and patch cords shall have ST connectors and will be considered subsidiary to Item 6007.

ITEM 6028: DYNAMIC MESSAGE SIGN (DMS) SYSTEM

The Contractor will be responsible for installing all components of the DMS system with the following exception: the selected vendor will provide the cabling between the Dynamic Message Signs (DMS) and cabinet. The Contractor will be responsible for installing the cabling (provided by vendor) and providing traffic control as may be required.

The DMS will be stored by the Department at the Belton Area Office: 410 W. Loop 121, Belton, TX 76513.

Coordinate with the Engineer to determine vertical tilt for the DMS and horizontal rotation of the DMS foundation. This coordination will take place **before** construction of the DMS foundation. This coordination is required to position the DMS to ensure visibility based upon roadway grade, horizontal curvature, LED cone of vision, and distance from the sign to the farthest travel lane.

The contractor is responsible for surveying the locations of the new and/or replaced DMS signs to confirm they will be fabricated to meet the height and offset dimensions shown.

ITEM 6185: TRUCK MOUNTED ATTENUATORS

The total number of truck mounted attenuators (TMA) required when utilizing the traffic control standards are shown in the tables below.

TCP 1 Series	Scenario		Required TMA	
(1-1)-18 / (1-2)-18			1	
(1-3)-18	A	B	1	2
(1-4)-18 / (1-5)-18 / (1-6)-18			1	

TCP 2 Series	Scenario		Required TMA	
(2-1)-18 / (2-2)-18 / (2-4)-18 / (2-5)-18 / (2-6)-18	All		1	
(2-3)-18	A	B	1	2

TCP 6 Series	Scenario		Required TMA	
(6-1)-12	A	B	1	2
(6-2)-12 / (6-3)-12	All		1	
(6-4)-12	A	B	1	2
(6-5)-12	A	B	1	2
(6-6)-12 / (6-7)-12	All		1 Per Lane	
(6-8)-14 / (6-9)-14	All		1	

WZ (BTS) Series	Scenario	Required TMA
(BTS-1)-13	Near Side Lane Closure	1

Shadow vehicles equipped for truck mounted attenuators (TMA) for stationary operations will be paid for by the day and must be available for use at any time as determined by the Engineer.

The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA needed for the project for those times per plan requirements. Additional TMAs used that are not specified in the plans in which the contractor expects compensation will require prior approval from the Engineer.

ITEM 6186: INTELLIGENT TRANSPORTATION SYSTEM (ITS) GROUND BOX

The ground box locations are approximate and alternate locations may be used as directed. Avoid placing in sidewalks or driveways.

QUANTITY SHEET

CONTROLLING PROJECT ID 0231-03-152 **DISTRICT** Waco **COUNTY** Bell
HIGHWAY IH 14

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0231-03-152**			
		PROJECT ID		**A00004895**			
		COUNTY		**Bell**			
		HIGHWAY		**IH 14**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6009	REMOVING CONC (RIPRAP)	SY	20.000		20.000	
	416-6005	DRILL SHAFT (42 IN)	LF	133.000		133.000	
	416-6006	DRILL SHAFT (48 IN)	LF	25.000		25.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	10.500		10.500	
	500-6001	MOBILIZATION	LS	100.00%		100.00%	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	14.000		14.000	
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	305.000		305.000	
	618-6029	CONDT (PVC) (SCH 40) (3")	LF	91,724.000		91,724.000	
	618-6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	1,220.000		1,220.000	
	618-6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	15,990.000		15,990.000	
	618-6074	CONDT (RM) (3")	LF	260.000		260.000	
	620-6002	ELEC CONDR (NO.14) INSULATED	LF	52,579.000		52,579.000	
	620-6007	ELEC CONDR (NO.8) BARE	LF	4,870.000		4,870.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF	9,740.000		9,740.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	1,335.000		1,335.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	2,670.000		2,670.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA	27.000		27.000	
	628-6002	REMOVE ELECTRICAL SERVICES	EA	1.000		1.000	
	628-6151	ELC SRV TY D 120/240 060(NS)SS(N)PS(U)	EA	7.000		7.000	
	628-6239	ELC SRV TY D 120/240 100(NS)SS(E)PS(U)	EA	2.000		2.000	
	650-6028	INS OH SN SUP(30 FT BAL TEE)	EA	1.000		1.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	8.000		8.000	
	6004-6031	ITS COM CBL (ETHERNET)	LF	712.000		712.000	
	6007-6010	FIBER OPTIC CBL (SNGLE-MODE)(6 FIBER)	LF	515.000		515.000	
	6007-6017	FIBER OPTIC CBL (SNGLE-MODE)(144 FIBER)	LF	61,760.000		61,760.000	
	6007-6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	7.000		7.000	
	6007-6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	8.000		8.000	
	6010-6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	7.000		7.000	
	6016-6006	ITS MULTI-DUCT CND (PVC-40)	LF	87,650.000		87,650.000	
	6016-6008	ITS MULTI-DUCT CND (PVC-40)(CONC ENCSE)	LF	1,220.000		1,220.000	
	6016-6011	ITS MULTI-DUCT CND (PVC-80)(BORE)	LF	14,390.000		14,390.000	
	6016-6013	ITS MULTI-DUCT CND (RMC)	LF	260.000		260.000	
	6016-6015	FIBER OPTIC CABLE ROAD MARKER	EA	51.000		51.000	
	6028-6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	2.000		2.000	
	6064-6037	ITS POLE (50 FT)(90 MPH)	EA	7.000		7.000	
	6064-6084	ITS POLE MNT CAB (TY 2)(CONF 2)	EA	7.000		7.000	
	6123-6001	ETHERNET SWITCH (INSTALL ONLY)	EA	7.000		7.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 0231-03-152 **DISTRICT** Waco **COUNTY** Bell
HIGHWAY IH 14

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0231-03-152**			
		PROJECT ID		**A00004895**			
		COUNTY		**Bell**			
		HIGHWAY		**IH 14**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	6185-6002	TMA (STATIONARY)	DAY	225.000		225.000	
	6186-6002	ITS GND BOX(PCAST) TY 1 (243636)W/APRN	EA	100.000		100.000	
	6186-6010	ITS GND BOX(PCAST) TY 2 (366048)W/APRN	EA	7.000		7.000	
	6415-6001	REMOVE DYNAMIC MESSAGE SIGN SYSTEM	EA	1.000		1.000	
	06	MATERIAL FURNISHED BY STATE	LS	1.000		1.000	
	18	LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	

CONSOLIDATED ITS SUMMARY

PAY ITEM	DESCRIPTION	UNIT	TOTAL
0104 6009	REMOVING CONC (RIPRAP)	SY	20
0416 6005	DRILL SHAFT (42 IN)	LF	133
0416 6006	DRILL SHAFT (48 IN)	LF	25
0432 6001	RIPRAP (CONC) (4 IN)	CY	10.5
0618 6023	CONDT (PVC) (SCH 40) (2")	LF	305
0618 6029	CONDT (PVC) (SCH 40) (3")	LF	91724
0618 6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	1220
0618 6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	15990
0618 6074	CONDT (RM) (3")	LF	260
0620 6002	ELEC CONDR (NO.14) INSULATED	LF	52579
0620 6007	ELEC CONDR (NO.8) BARE	LF	4870
0620 6008	ELEC CONDR (NO.8) INSULATED	LF	9740
0620 6009	ELEC CONDR (NO.6) BARE	LF	1335
0620 6010	ELEC CONDR (NO.6) INSULATED	LF	2670
0624 6010	GROUND BOX TY D (162922) W / APRON	EA	27
0628 6002	REMOVE ELECTRICAL SERVICES	EA	1
0628 6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	7
0628 6239	ELC SRV TY D 120/240 100 (NS) SS (E) PS (U)	EA	2
0650 6028	INS OH SN SUP (30 FT BAL TEE)	EA	1
6001 6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	8
6004 6031	ITS COM CBL (ETHERNET)	LF	712
6007 6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	515
6007 6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	61760
6007 6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	7
6007 6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	8
6010 6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	7
6016 6006	ITS MULTI - DUCT CND (PVC - 40)	LF	87650
6016 6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	1220
6016 6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	14390
6016 6013	ITS MULTI - DUCT CND (RMC)	LF	260
6016 6015	FIBER OPTIC CABLE ROAD MARKER	EA	51
6028 6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	2
6064 6037	ITS POLE (50 FT) (90 MPH)	EA	7
6064 6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	7
6123 6001	ETHERNET SWITCH (INSTALL ONLY)	EA	7
6185 6002	TMA (STATIONARY)	DAY	225
6186 6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	100
6186 6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	7
N/A	TX DOT WILL PROVIDE HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	7
6415 6001	REMOVE DYNAMIC MESSAGE SIGN SYSTEM	EA	1

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CONSOLIDATED SUMMARY

SHEET 1 OF 1

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		5

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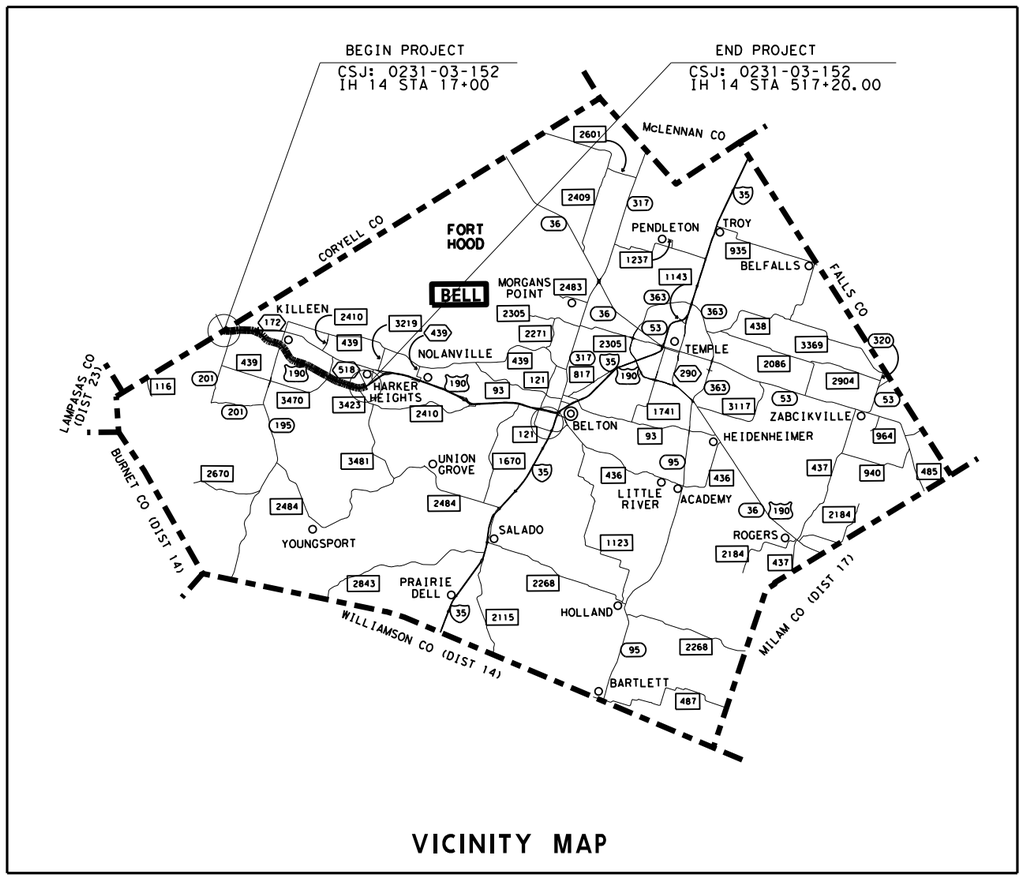


VICINITY MAP

1. SIGNS G20-1 WITH PLAQUE OR G20-5T, G20-6, G20-2a, G20-2b, CW20-1D, R20-3, R20-5, G20-9T AND R20-5 PLAQUE WILL BE REQUIRED AT PROJECT LIMITS.
2. CW20-1D AND G20-2a WILL BE REQUIRED AT ALL CROSSROADS.
3. G20-1a WILL BE REQUIRED AT ALL MAJOR CROSSROADS.

SIGNAGE LEGEND

G20-1 W/ PLAQUE OR G20-5T	48X26	BEGIN ROAD WORK NEXT X MILES
	48X24	BEGIN ROAD WORK NEXT X MILES
G20-6	48X30	NAME, ADDRESS, CITY, STATE, CONTRACTOR
G20-9T	36X30	BEGIN WORK ZONE
G20-2b	36X18	END WORK ZONE
R20-3	48X42	OBEY WARNING SIGNS STATE LAW
G20-1a	72X36	ROAD WORK NEXT X MILES
CW20-1D	48X48	ROAD WORK AHEAD
R20-5	36X36	TRAFFIC FINES DOUBLE
R20-5 PLAQUE	36X18	WHEN WORKERS ARE PRESENT
G20-2a	48X24	END ROAD WORK

NOTES:

1. ALL TRAFFIC CONTROL DEVICES WILL CONFORM WITH THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" (TMUTCD), AND WILL BE MAINTAINED AS DIRECTED. ADDITIONAL GUIDELINES FOR TRAFFIC CONTROL DEVICES MAY BE FOUND IN THE TMUTCD.
2. FOR CHANNELING DEVICE PLACEMENT AND SPACING FOR ALL PHASES, REFER TO THE TCP STANDARDS.
3. ALL WORK ON MEDIAN WILL REQUIRE SHOULDER CLOSURES IN BOTH WESTBOUND AND EASTBOUND DIRECTIONS. SHADOW VEHICLES ARE PROHIBITED FROM OPERATING IN REVERSE DURING OPERATIONS.

GENERAL

A. INSTALL ALL SIGNS, BARRICADES AND TRAFFIC CONTROL DEVICES AS SHOWN AND IN ACCORDANCE WITH THE STANDARD BC SHEETS AND AS DIRECTED.

B. ADDITIONAL SIGNS, BARRICADES OR TRAFFIC CONTROL DEVICES OTHER THAN THOSE SPECIFIED MAY BE REQUIRED FOR THE SAFE MOVEMENT OF TRAFFIC THROUGH THE PROJECT. PAYMENT FOR ALL SUCH SIGNS, BARRICADES OR TRAFFIC CONTROL DEVICES WILL BE CONSIDERED SUBSIDIARY TO THE ITEM "BARRICADES, SIGNS AND TRAFFIC HANDLING".

C. WORK SITES SHOULD BE CAREFULLY MONITORED TO ENSURE THAT TRAFFIC CONTROL MEASURES ARE OPERATING EFFECTIVELY AND THAT ALL DEVICES USED ARE CLEARLY VISIBLE, CLEAN AND IN GOOD REPAIR.

D. THE CONTRACTOR WILL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS.

E. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE OF WORK PRIOR TO THE BEGINNING OF CONSTRUCTION WHICH GENERALLY CONFORMS TO THE SEQUENCE SHOWN ON THE TCP SEQUENCE OF OPERATION BELOW.

F. COMPLETE ALL WORK ON PROJECT AS SHOWN ON THE VARIOUS PLAN SHEETS AND IN COMPLIANCE WITH THE GENERAL NOTES OF THIS CONTRACT.

G. ANY REQUEST TO ALTER THE SEQUENCE OF OPERATION OR TRAFFIC CONTROL PLAN WILL BE SUBMITTED TO THE ENGINEER FOR HIS WRITTEN APPROVAL.

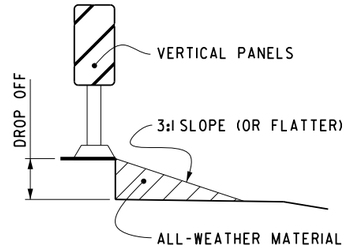
SEQUENCE OF CONSTRUCTION

A. THE CONTRACTOR MAY WORK IN MORE THAN ONE AREA AT A TIME, BUT THE WORK MUST PROGRESS AT EACH LOCATION. THIS PROJECT CONSISTS OF THE WORK AREA AS DEFINED BELOW:

1. LIMITS FROM CORYELL COUNTY LINE TO 0.5 MI WEST OF FM 3423. CSJ: 0231-03-152

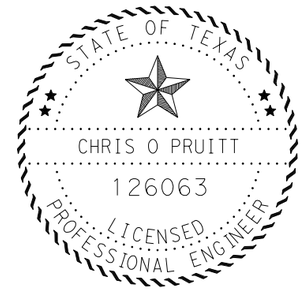
B. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE OF WORK TO THE AREA ENGINEER PRIOR TO THE BEGINNING OF CONSTRUCTION, WHICH GENERALLY CONFORMS TO THE FOLLOWING SEQUENCE:

1. PROVIDE AND INSTALL ALL SIGNS, BARRICADES, AND TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE TRAFFIC CONTROL STANDARDS.
2. ORDER EQUIPMENT, AS REQUIRED.
3. INSTALL CONDUIT.
4. INSTALL FIBER OPTICS, TRAFFIC CAMERAS, AND DYNAMIC MESSAGE BOARDS.
5. PULL WIRES.
6. FINAL CLEANUP
7. UPON APPROVAL FROM THE ENGINEER REMOVE WORKZONE BARRICADES.



PAV EDGE DROP-OFF DETAIL

1. LESS THAN 2 INCHES: CW 8-11 SIGNS ARE REQUIRED.
2. GREATER THAN 2 INCHES: VERTICAL PANELS AND EITHER CW 8-9a OR CW 8-11 SIGNS ARE REQUIRED.
3. THE SAFETY SLOPE WILL BE CONSTRUCTED WITH AN ALL- WEATHER MATERIAL SUCH AS RAP, WHICH IS CLEAN AND FREE OF DEBRIS AND LARGE ROCKS.



Chris O. Pruitt, P.E. 10/21/20

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IH 14 SEQUENCE OF CONSTRUCTION

Sheet 1 of 1

DESIGN	FED RD DIV No.	PROJECT No.	HIGHWAY No.
CHECK	6		IH 14
	STATE	DISTRICT / COUNTY	SHEET No.
GRAPHICS	TEXAS	WACO / BELL	6
CHECK	CONTROL	SECTION / JOB	
	0231	03 / 152	

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

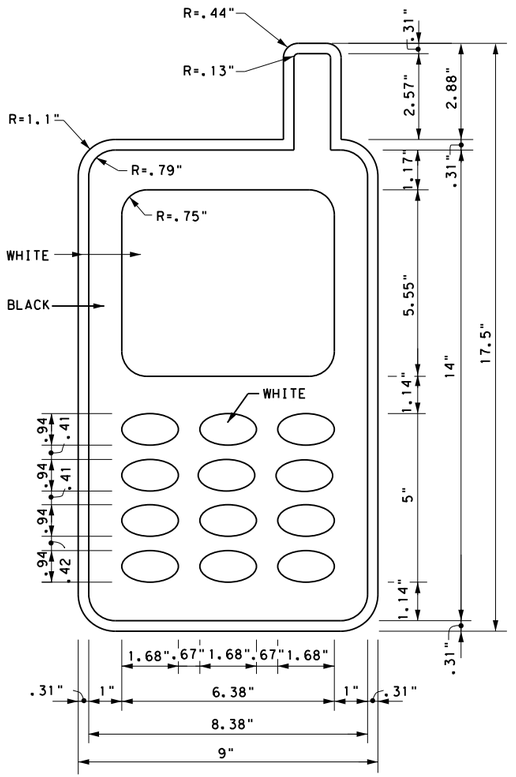
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

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

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

WORKER SAFETY APPAREL NOTES:

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



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

SIGN DETAIL (G20-10T)

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

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

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

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REVISIONS	0231	03	152	IH 14
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	WACO	BELL		7

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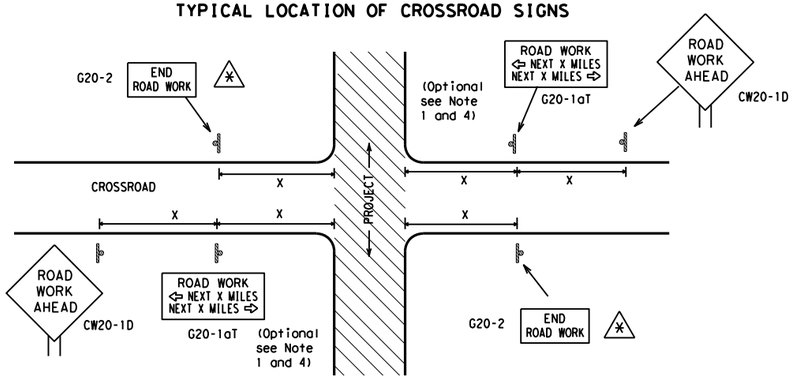
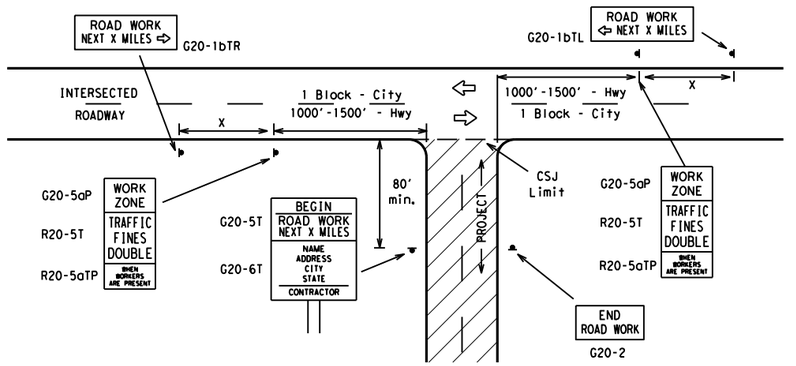
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

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

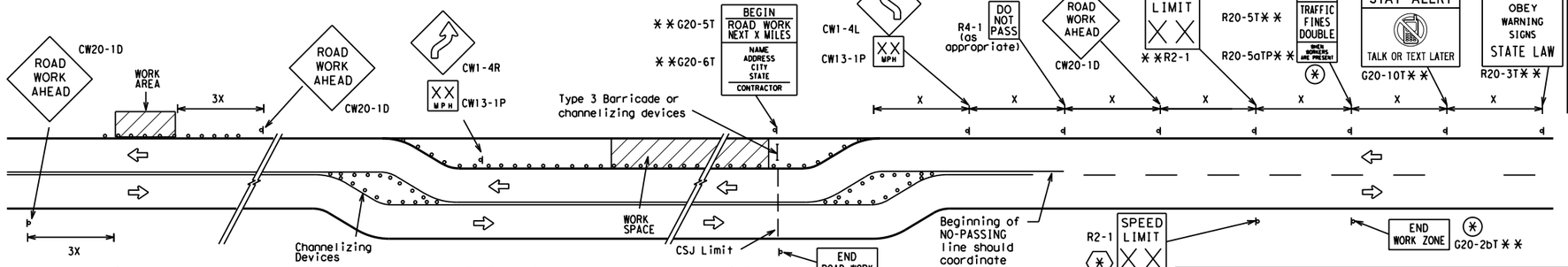
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

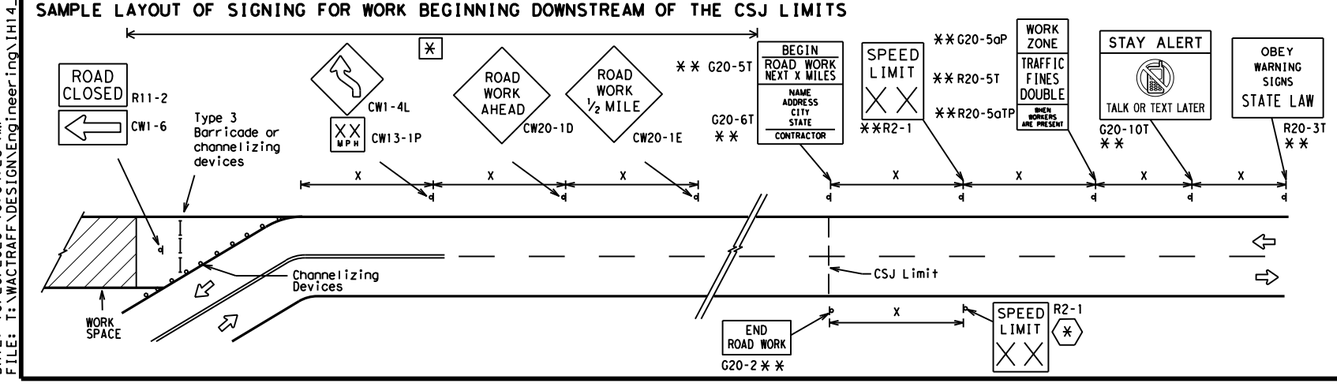
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

(*) Contractor will install a regulatory speed limit sign at the end of the work zone.

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WACO	BELL		8

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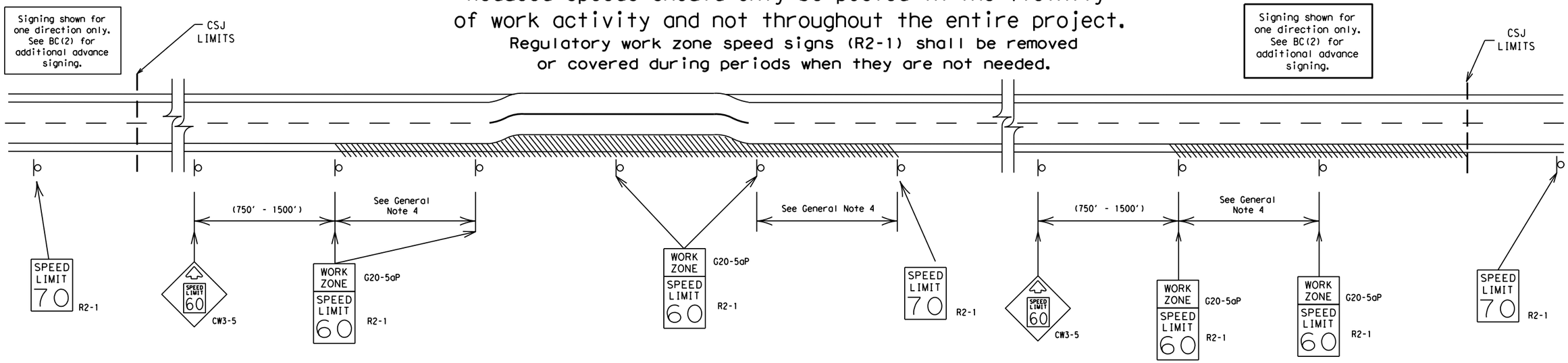
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

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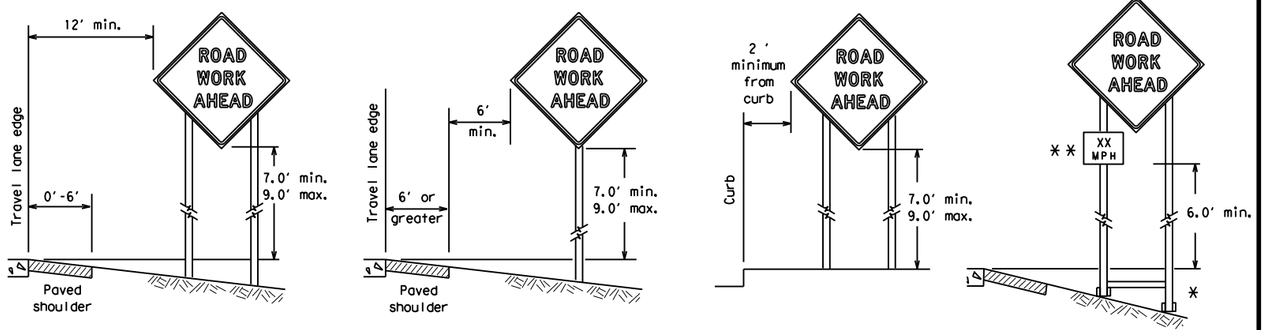
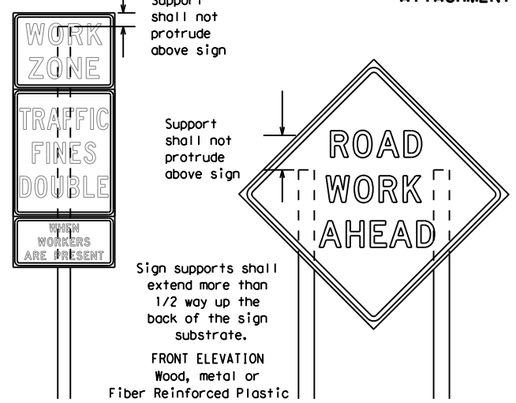
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

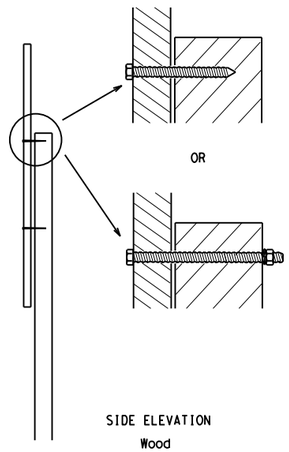


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





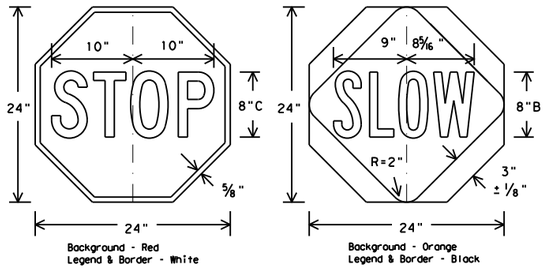
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

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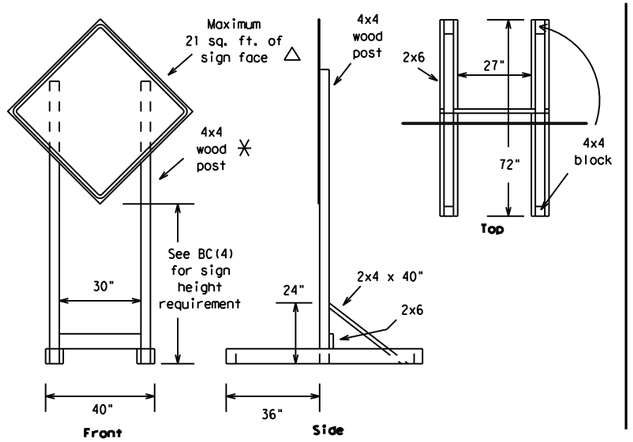
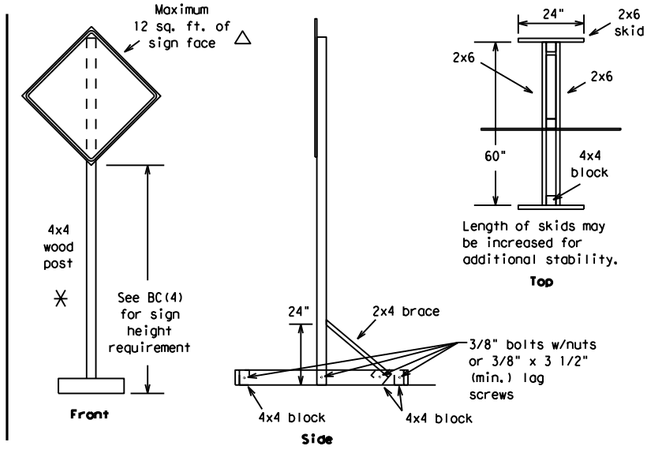
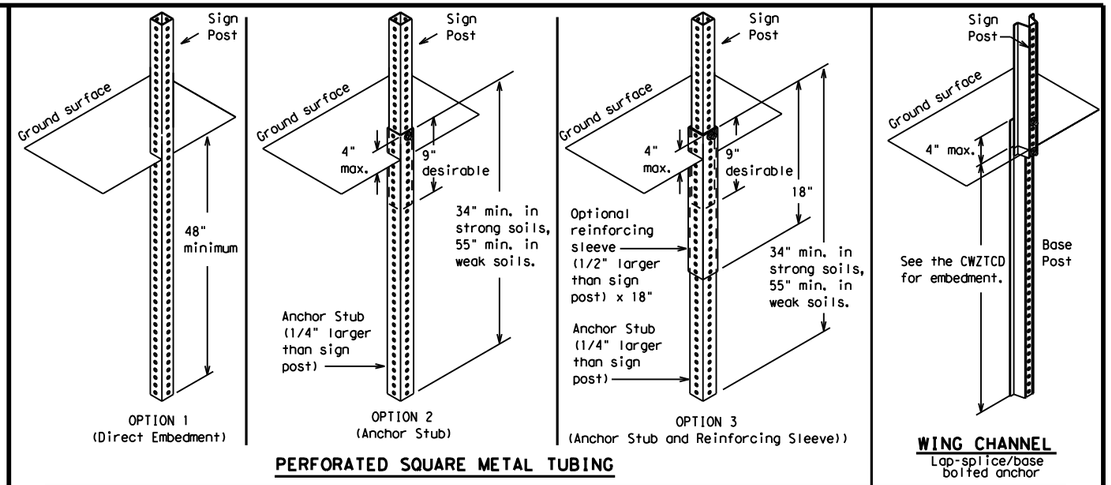




SKID MOUNTED WOOD SIGN SUPPORTS

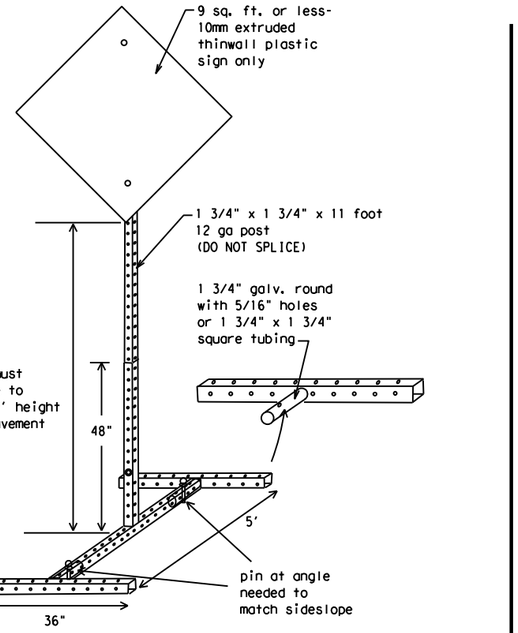
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

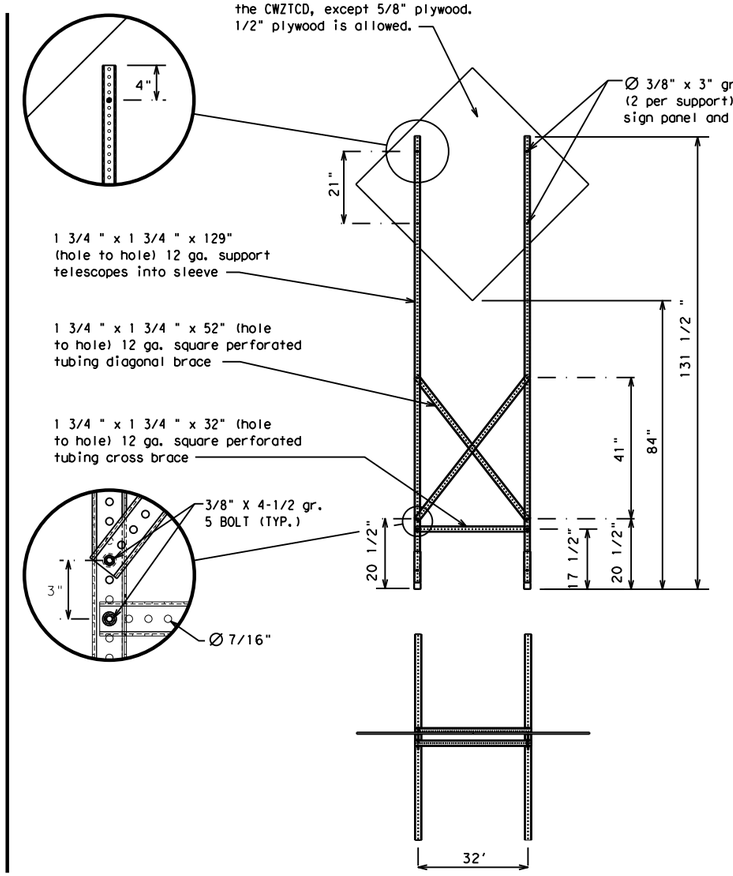


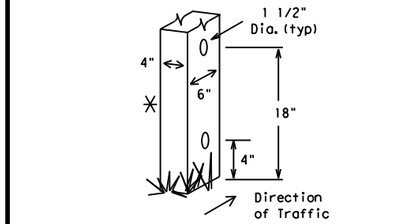
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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

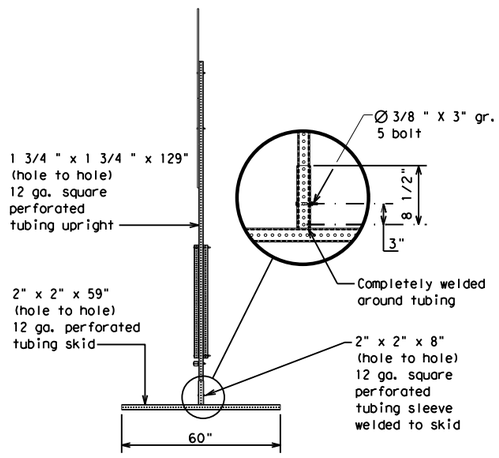






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

□ See BC(4) for definition of "Work Duration."

✳ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

△ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

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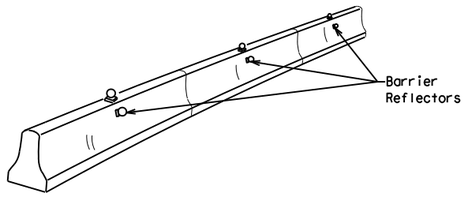
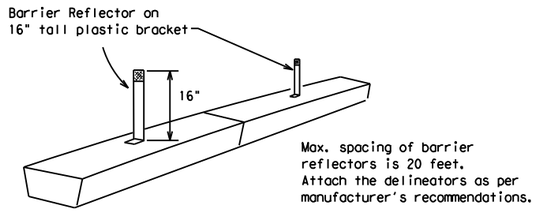
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

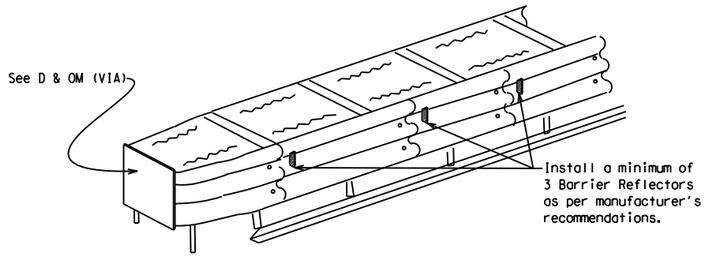


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

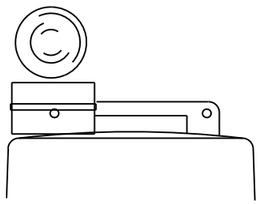


DELINEATION OF END TREATMENTS

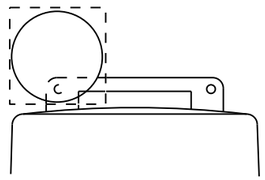
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

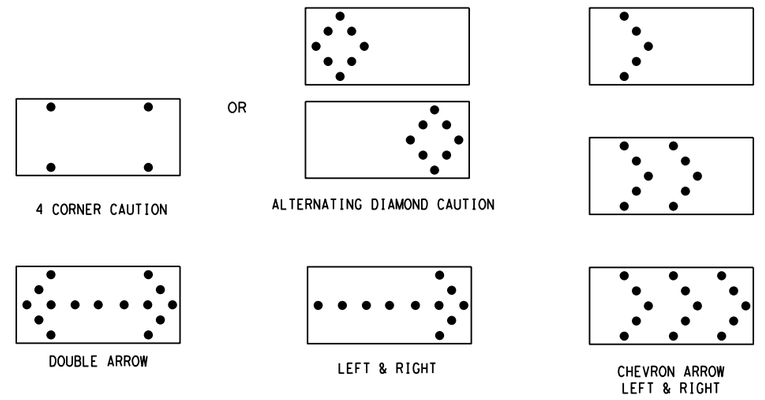
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
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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:

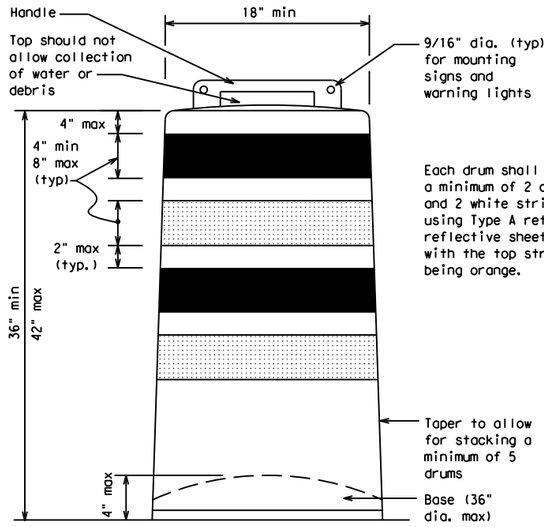
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

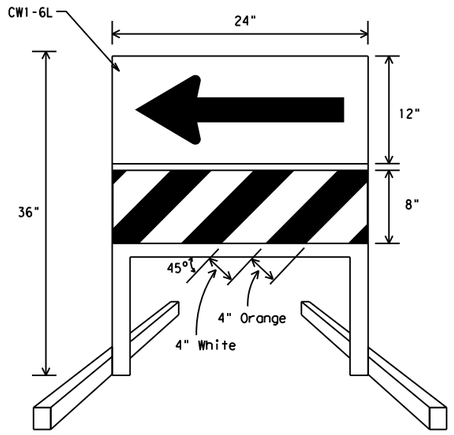
RETROREFLECTIVE SHEETING

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 reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

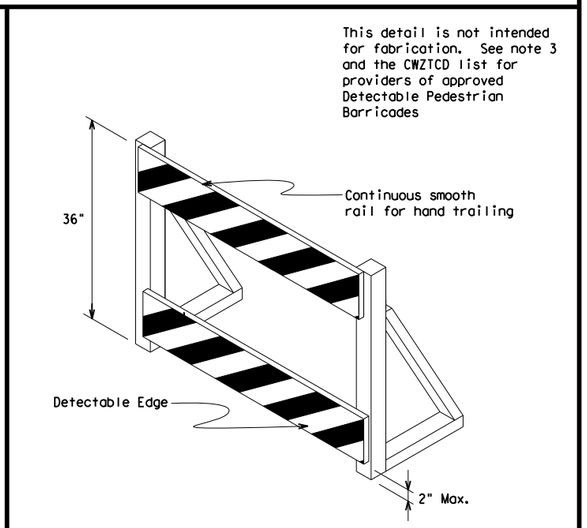
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other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





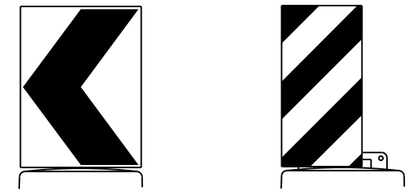
DIRECTION INDICATOR BARRICADE

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



DETECTABLE PEDESTRIAN BARRICADES

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



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

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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

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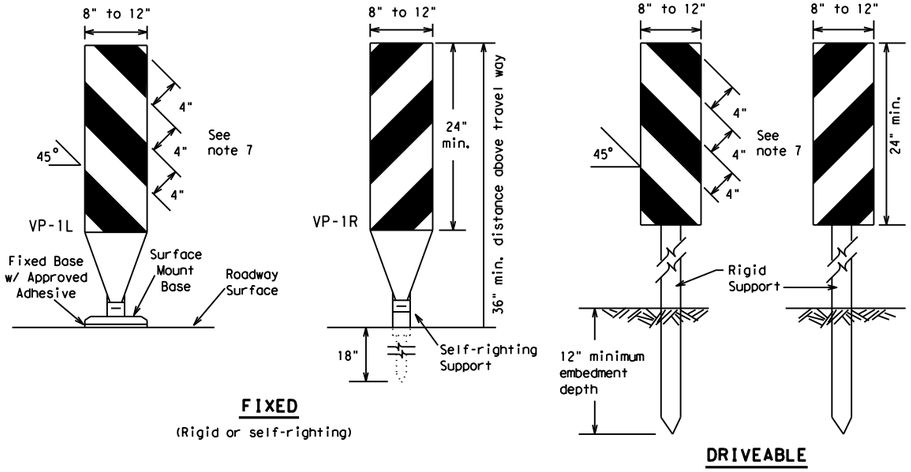
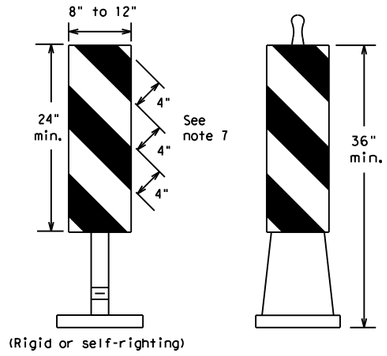


FIXED
(Rigid or self-righting)

DRIVEABLE

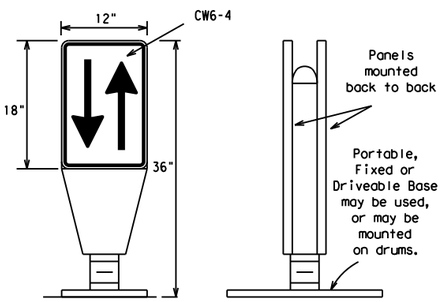


(Rigid or self-righting)

PORTABLE

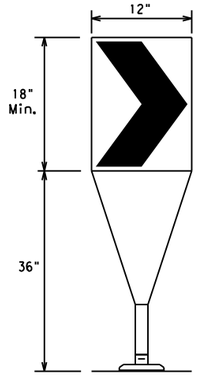
VERTICAL PANELS (VPs)

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



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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



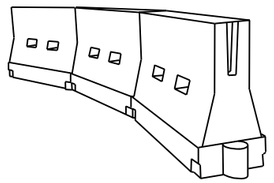
Fixed Base w/ Approved Adhesive
(Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WACO	BELL		15

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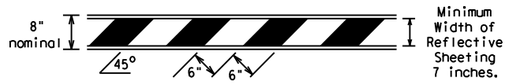
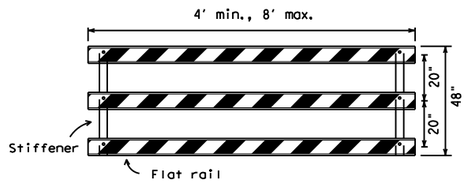
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



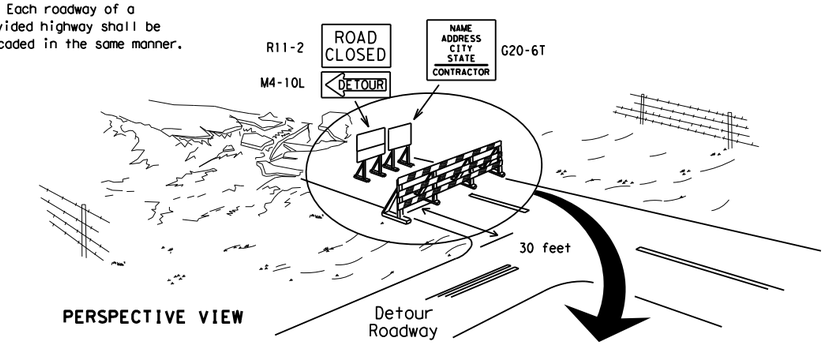
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

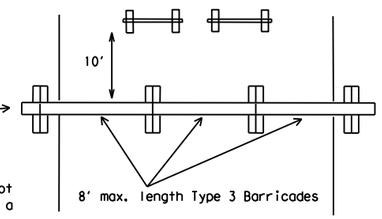
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

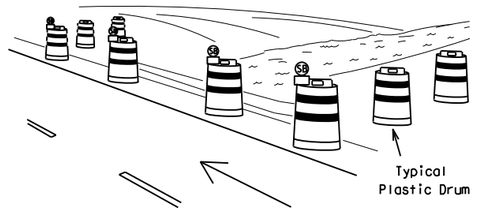
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

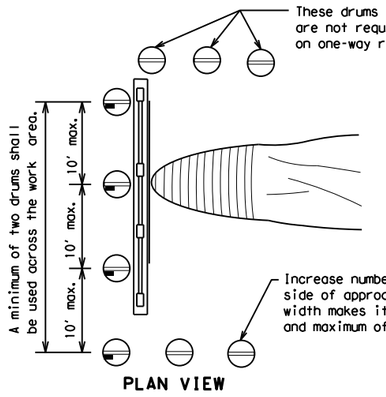
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

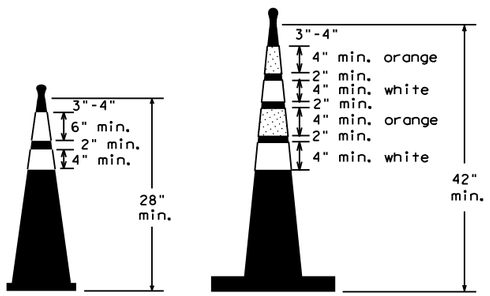
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

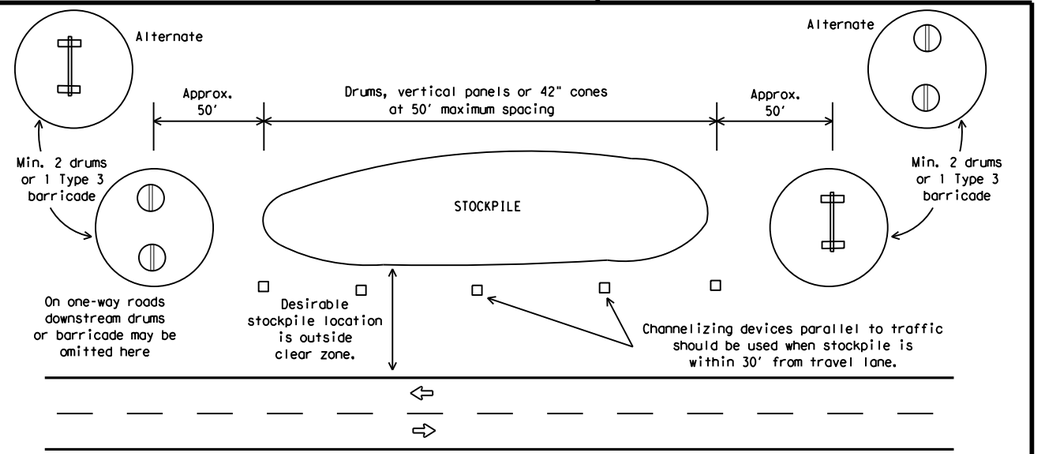
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

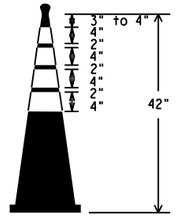
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



EDGELINE CHANNELIZER

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

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

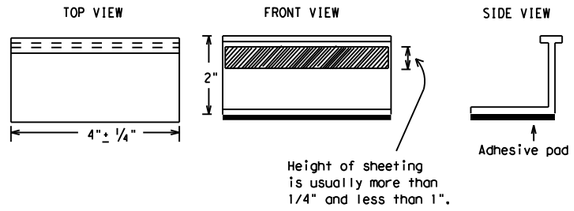
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

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2-98 9-07	DIST	COUNTY		SHEET NO.
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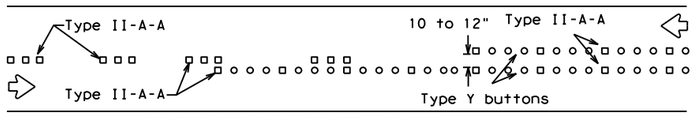
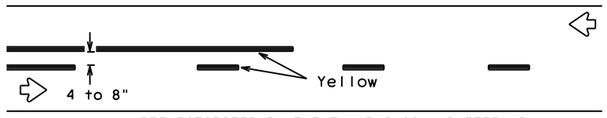
PAVEMENT MARKING PATTERNS

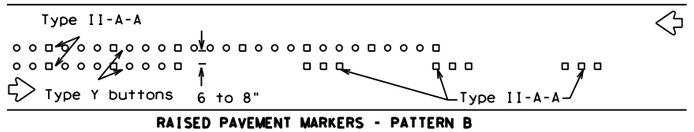
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



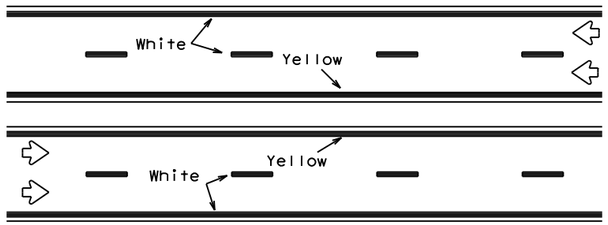
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



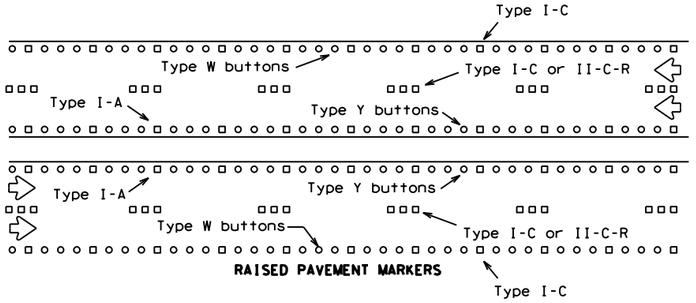
RAISED PAVEMENT MARKERS - PATTERN B

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

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



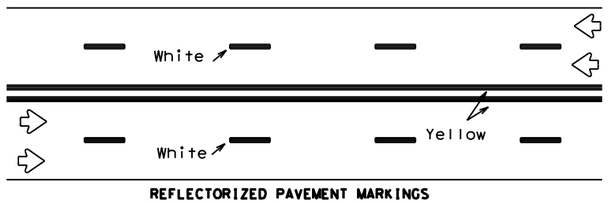
REFLECTORIZED PAVEMENT MARKINGS



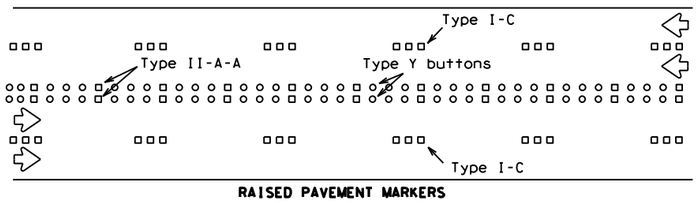
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



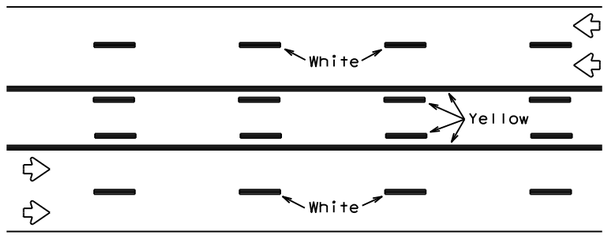
REFLECTORIZED PAVEMENT MARKINGS



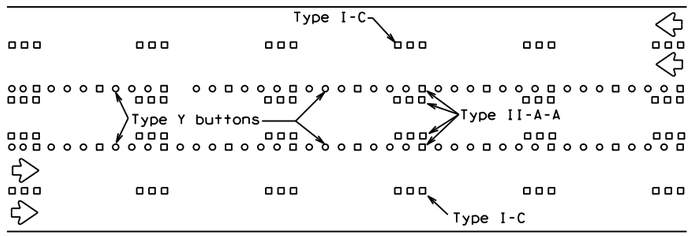
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

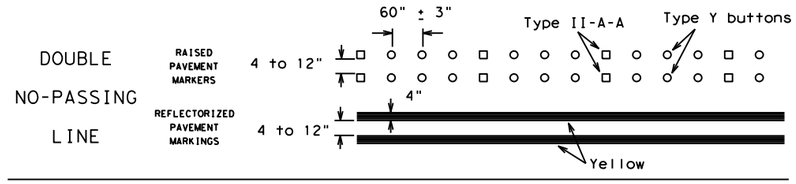
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

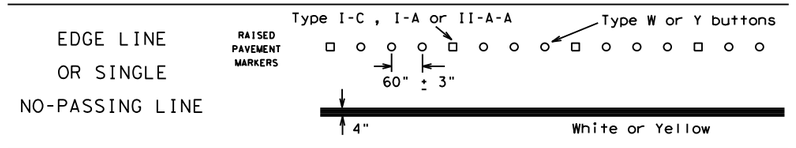
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

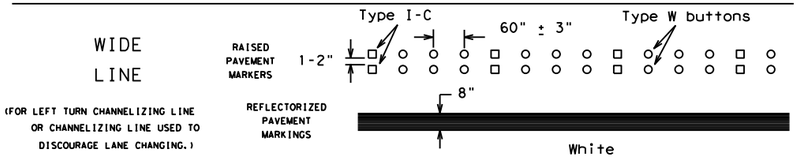


EDGE LINE OR SINGLE NO-PASSING LINE



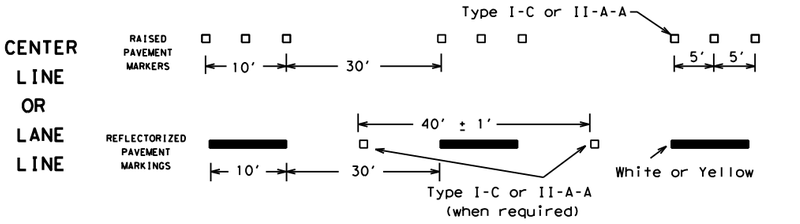
WIDE LINE

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

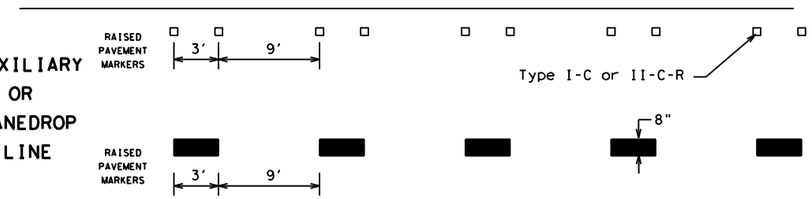


BROKEN LINES

CENTER LINE OR LANE LINE

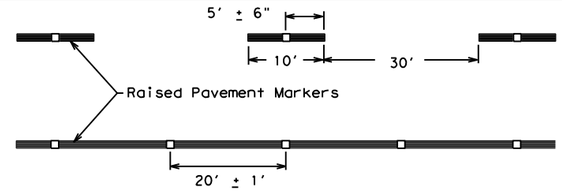


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
1-97 9-07	DIST	COUNTY		SHEET NO.
2-98 7-13	WACO	BELL		18
11-02 8-14				

106

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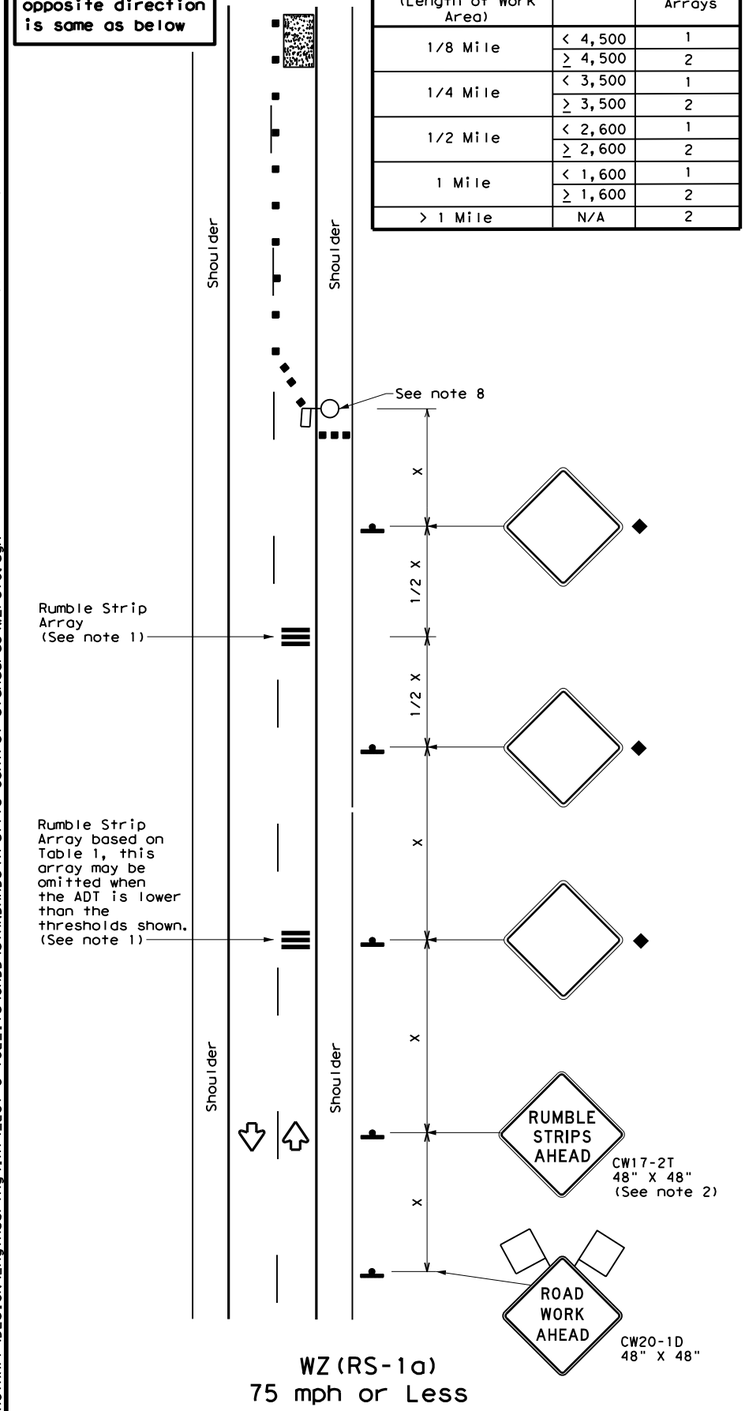
DATE: 10/20/2020 10:57:04 AM
FILE: I:\WACTRAFF\DESIGN\Engineering\IH14_231-3-152_ITS\CADD\STANDARDS\TrafficControl\wzrs16.dgn

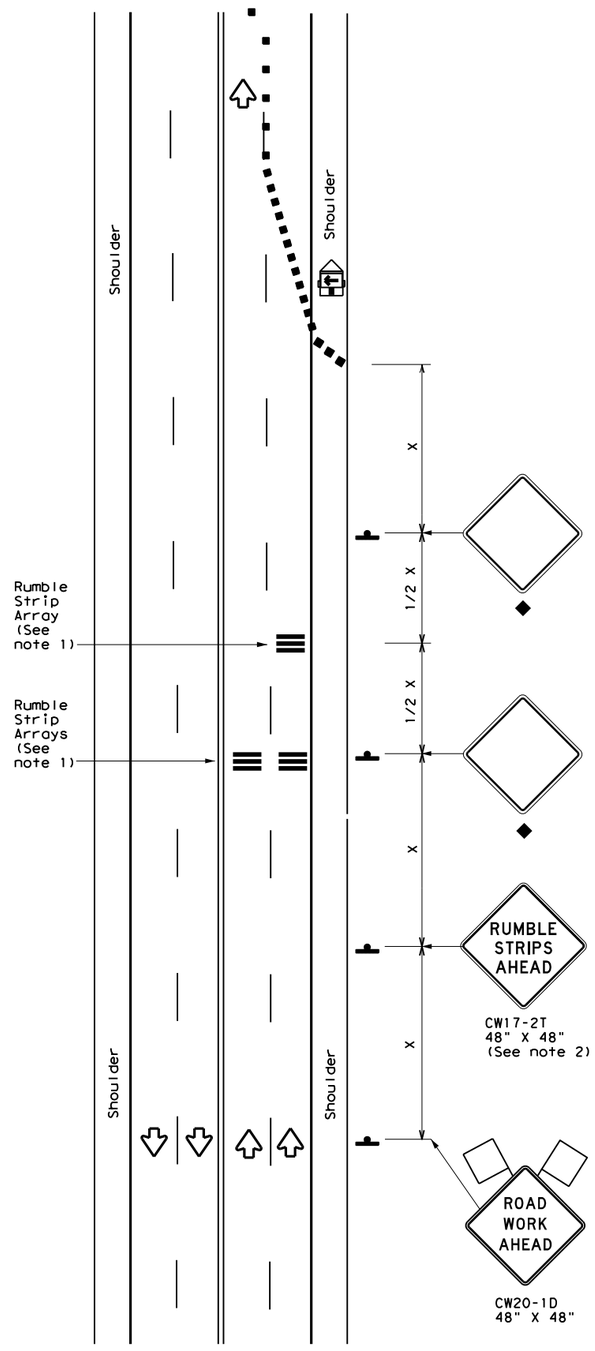
Warning sign and rumble strip sequence in opposite direction is same as below

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



WZ(RS-1a)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)
75 mph or Less

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation

Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-16

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
2-14	DIST	COUNTY		SHEET NO.
4-16	WACO	BELL		19

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DATE: 10/20/2020 11:21:44 AM
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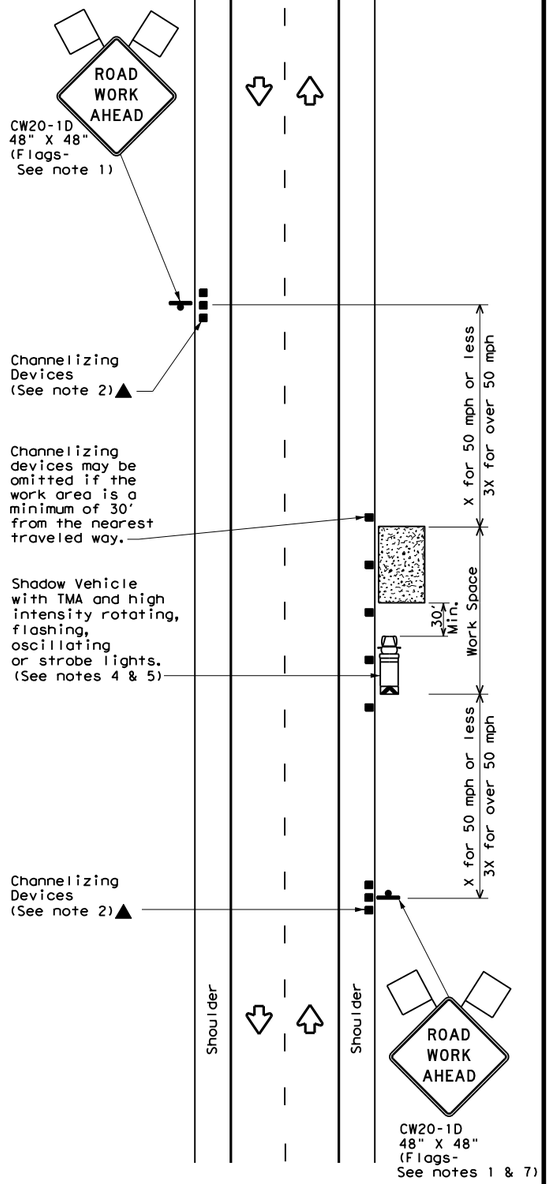
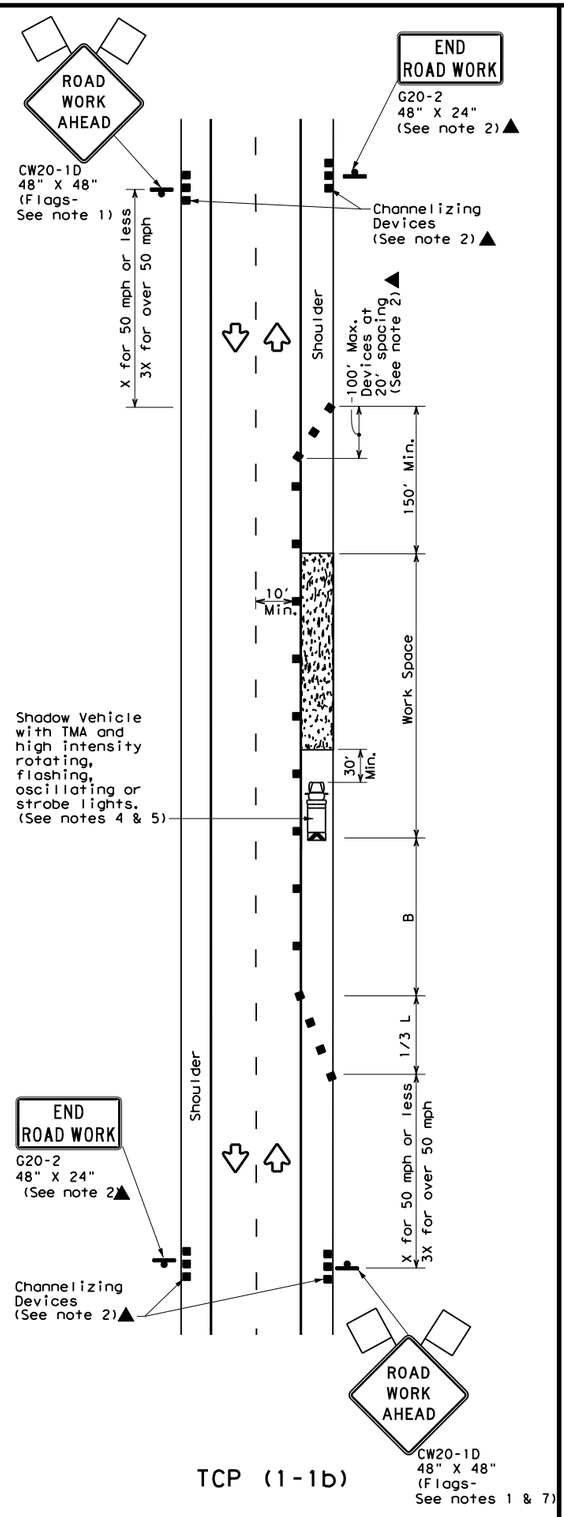


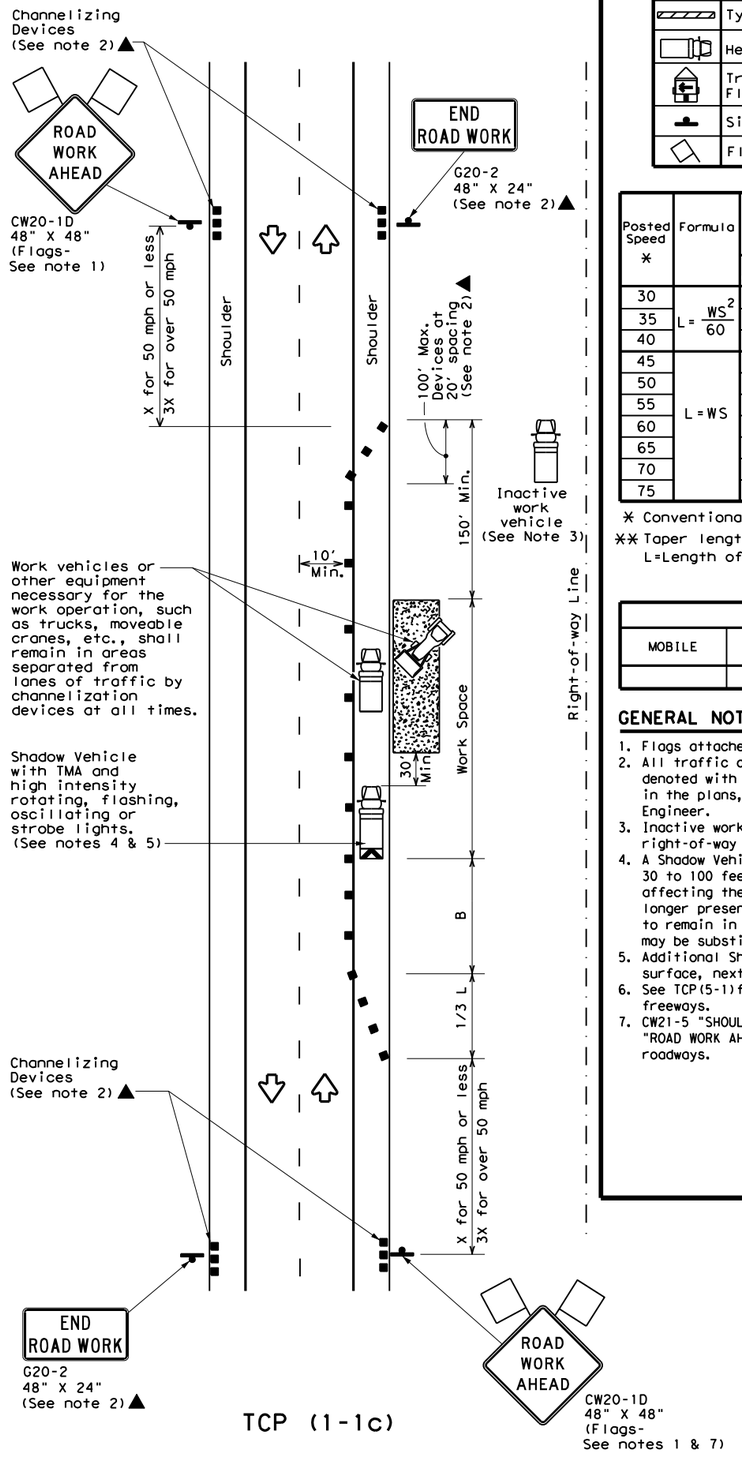
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		20

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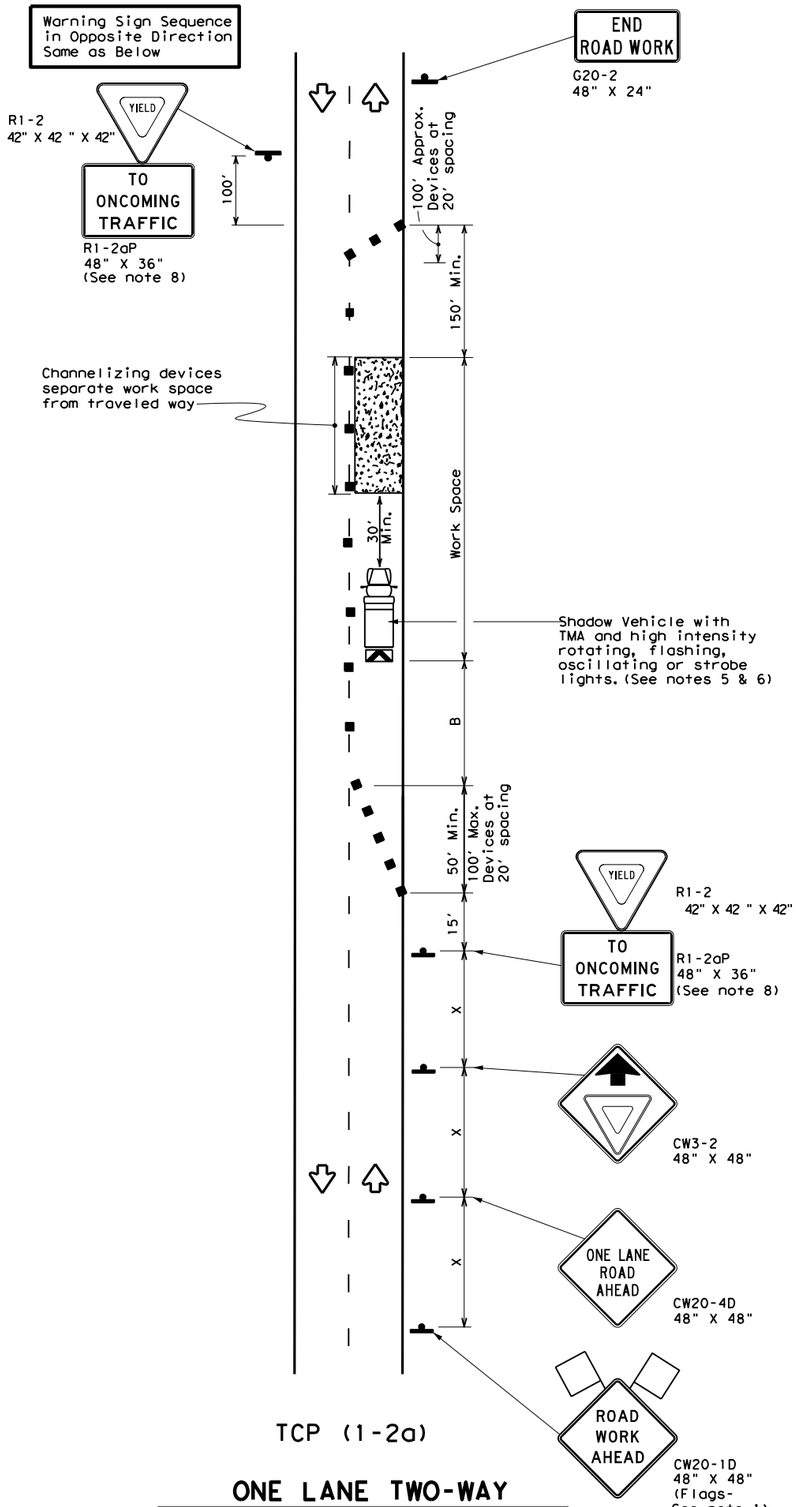
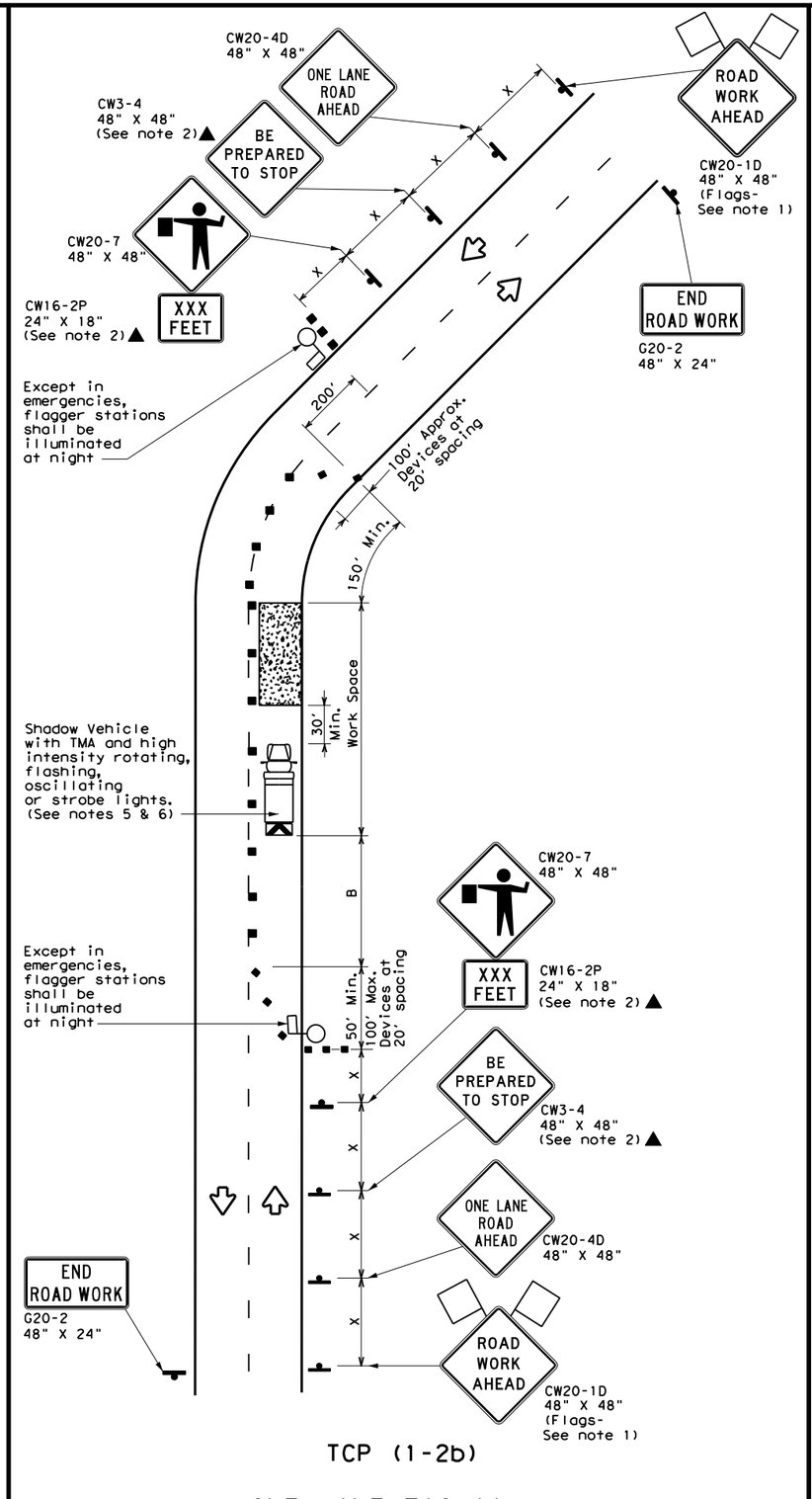


TCP (1-2a)

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



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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

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

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

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

GENERAL NOTES

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

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
4-90 4-98	DIST	COUNTY		SHEET NO.
2-94 2-12	WACO	BELL		21
1-97 2-18				

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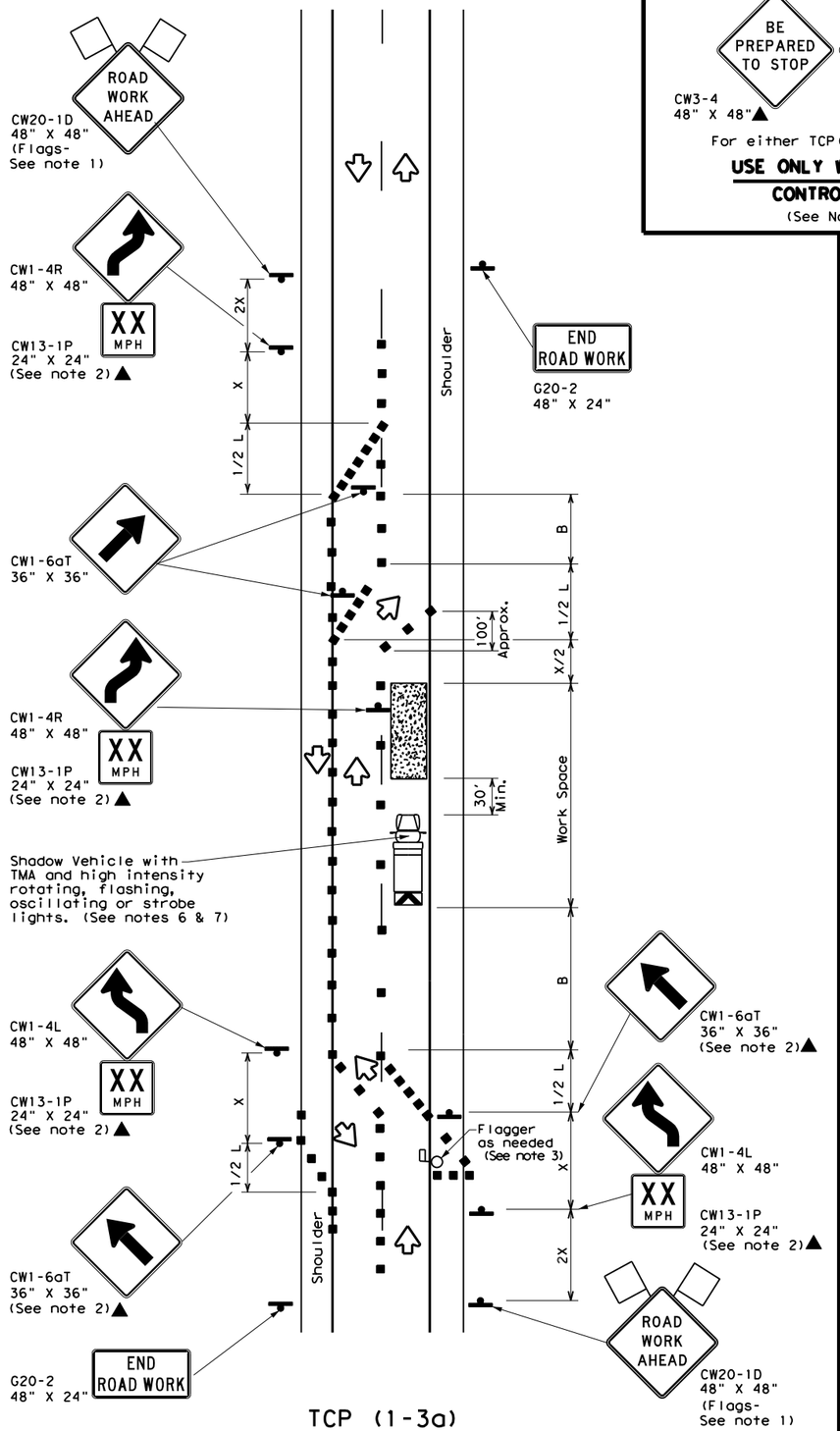
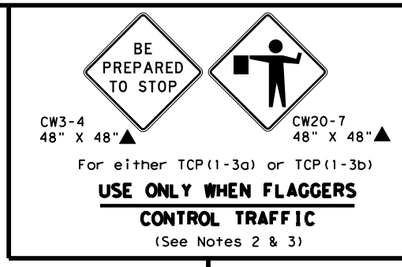


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

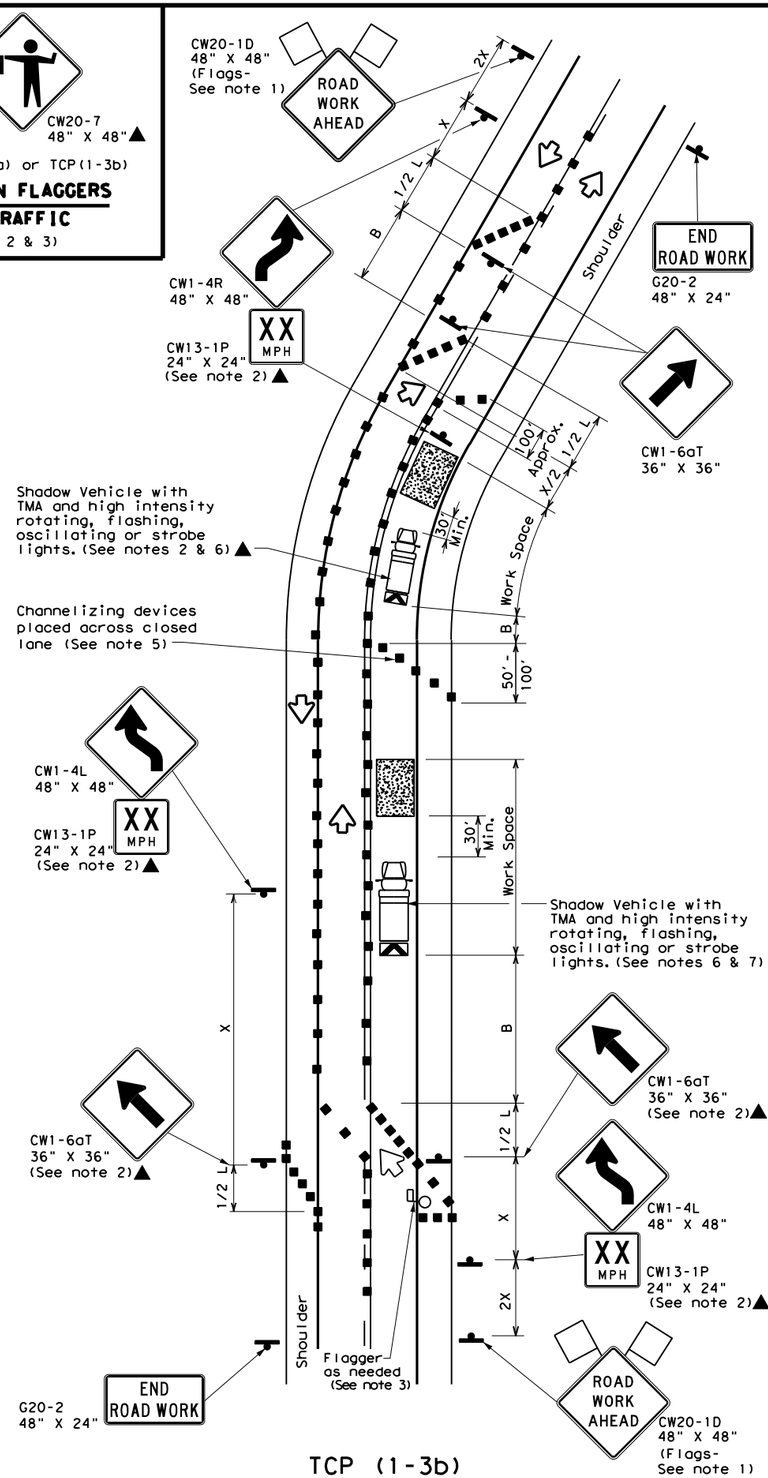
ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC

(See Notes 2 & 3)



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

FILE: tcp1-3-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	WACO	BELL		22
1-97 2-18				

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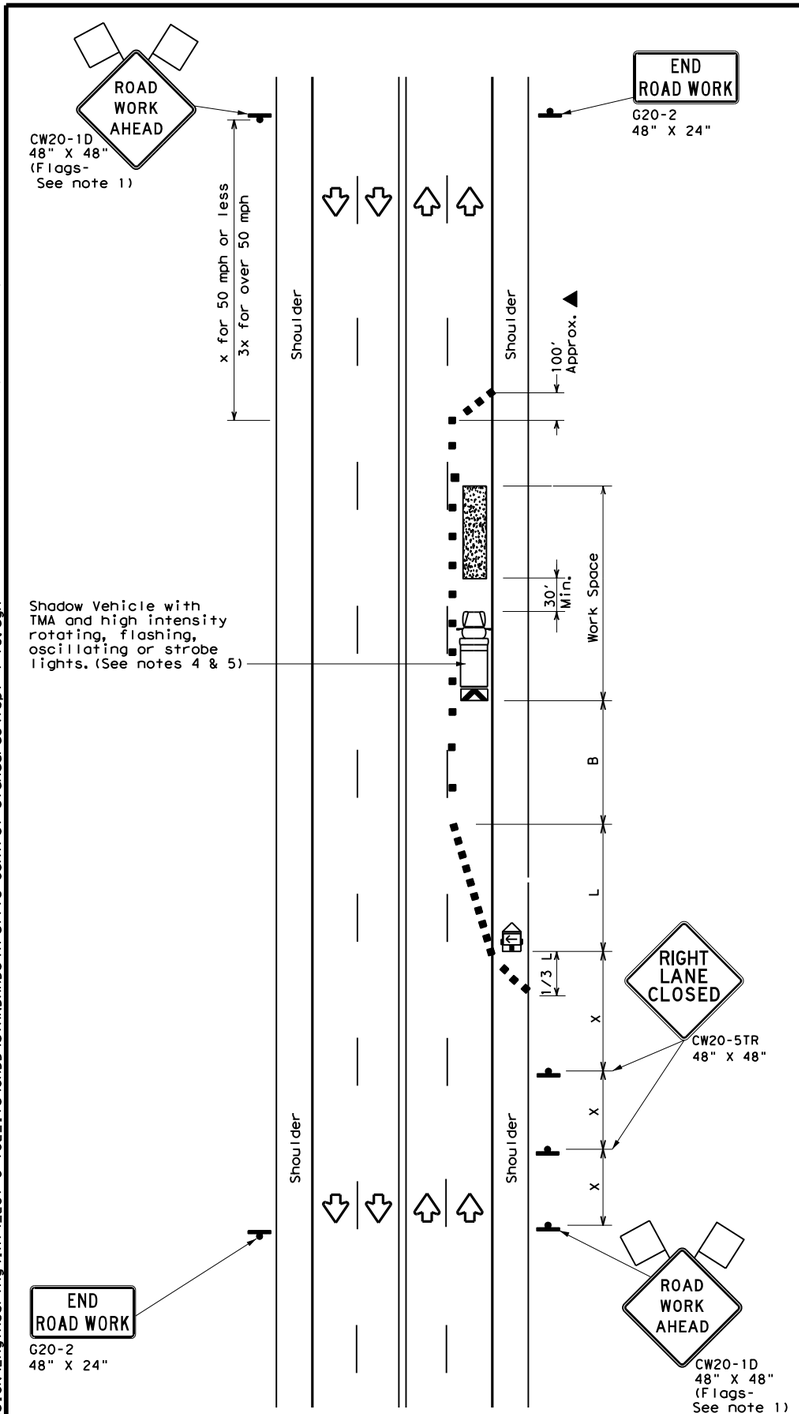
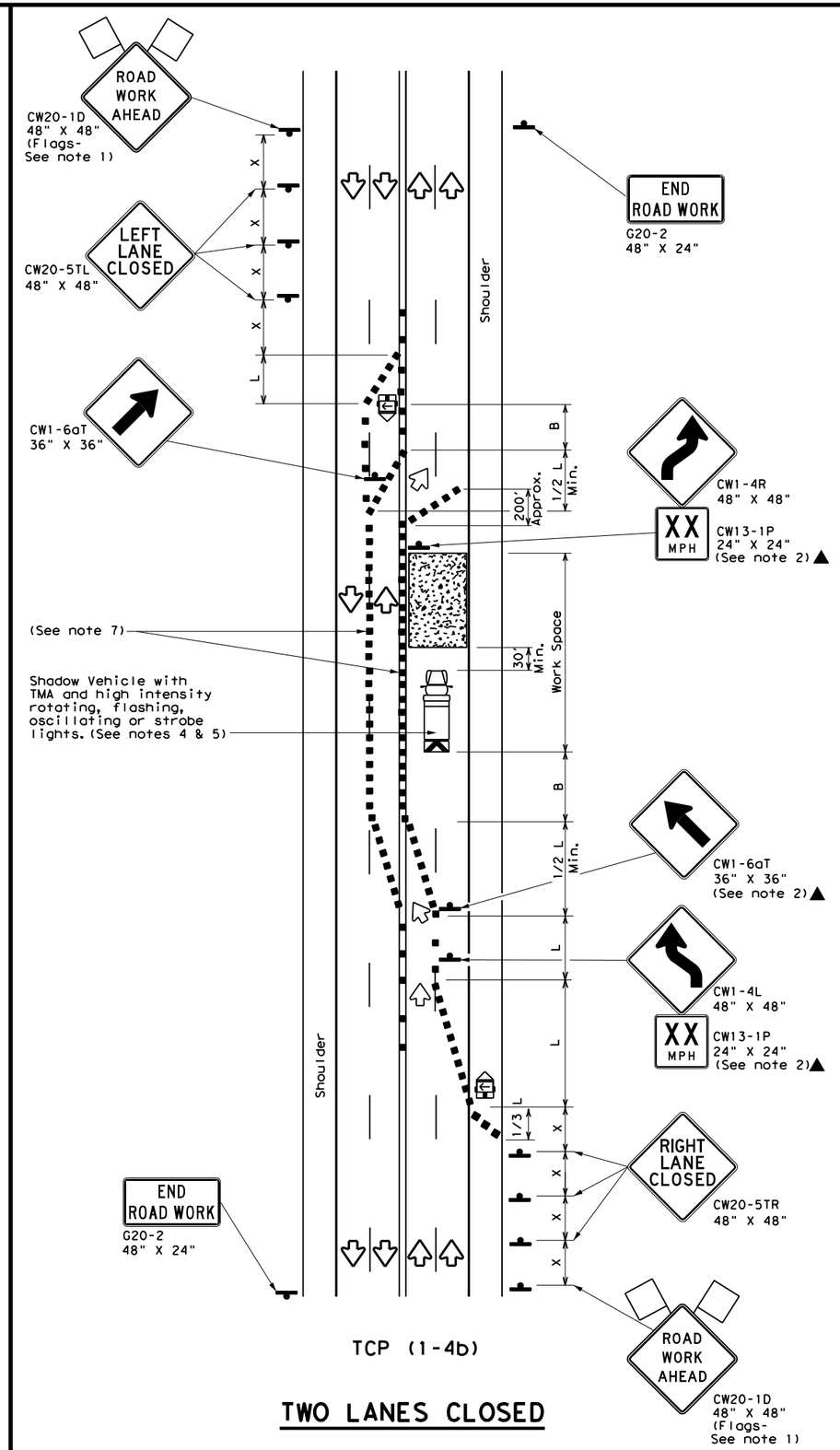


TCP (1-4a)

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

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

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

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

GENERAL NOTES

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

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	WACO	BELL		23
1-97 2-18				

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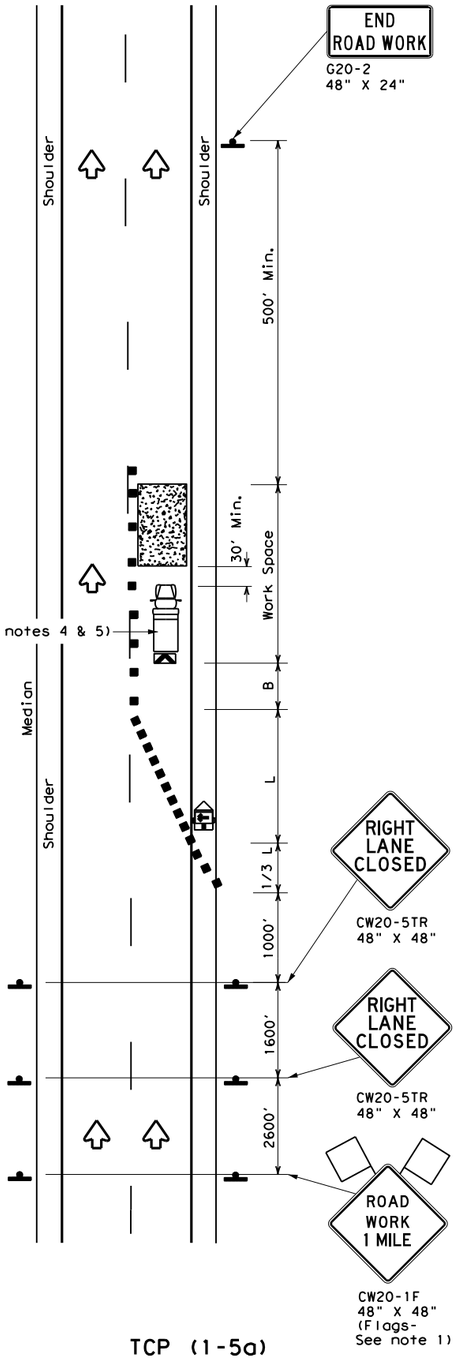
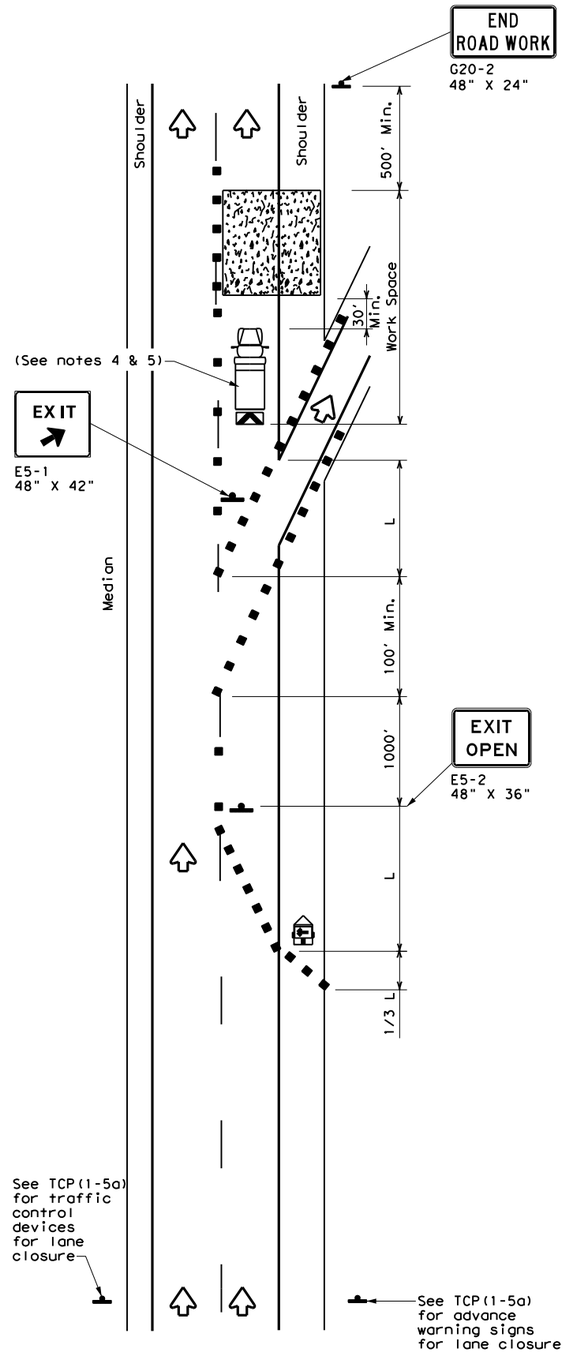
DATE: 10/20/2020 11:22:02 AM
FILE: T:\WACTRAFF\DESIGN\Engineering\IH14_231-3-152_ITS\CADD\STANDARDS\TrafficControlPlan\tcp1-5-18.dgn



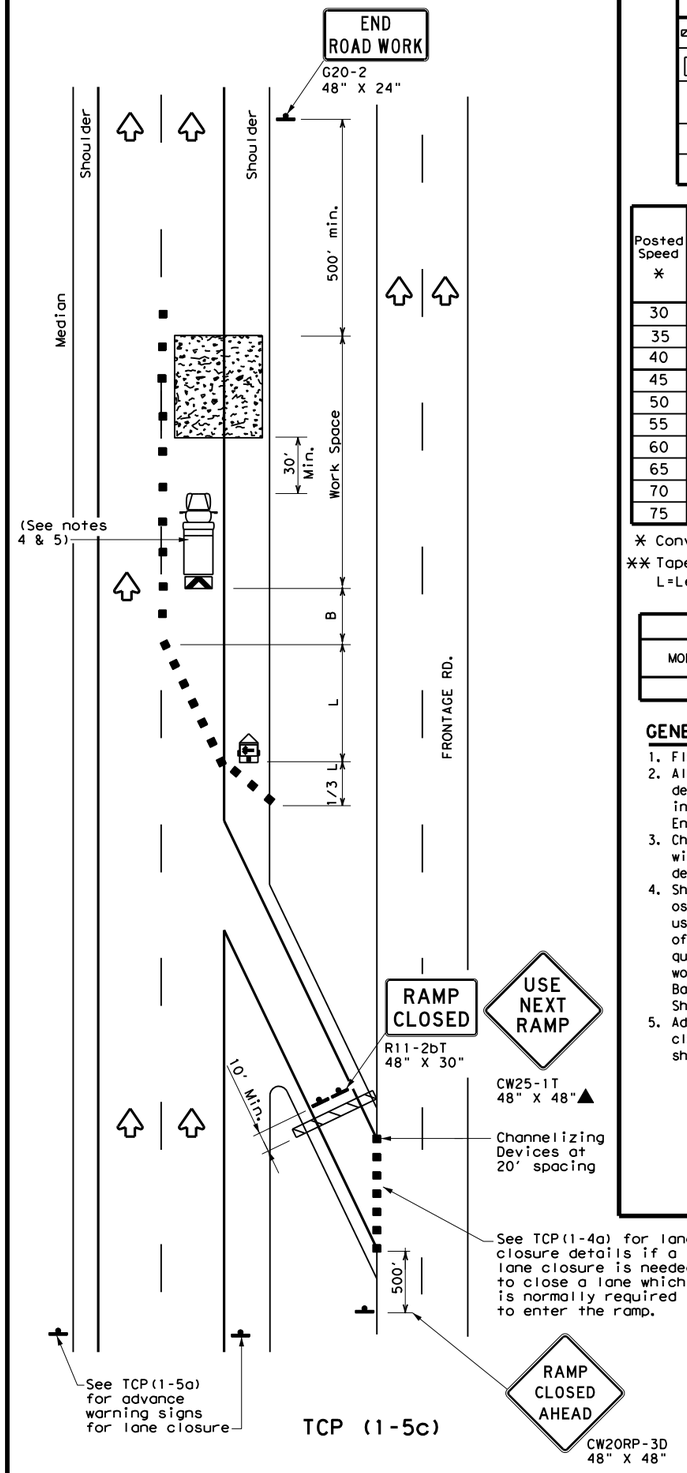
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		24

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DATE: 10/20/2020 11:22:07 AM
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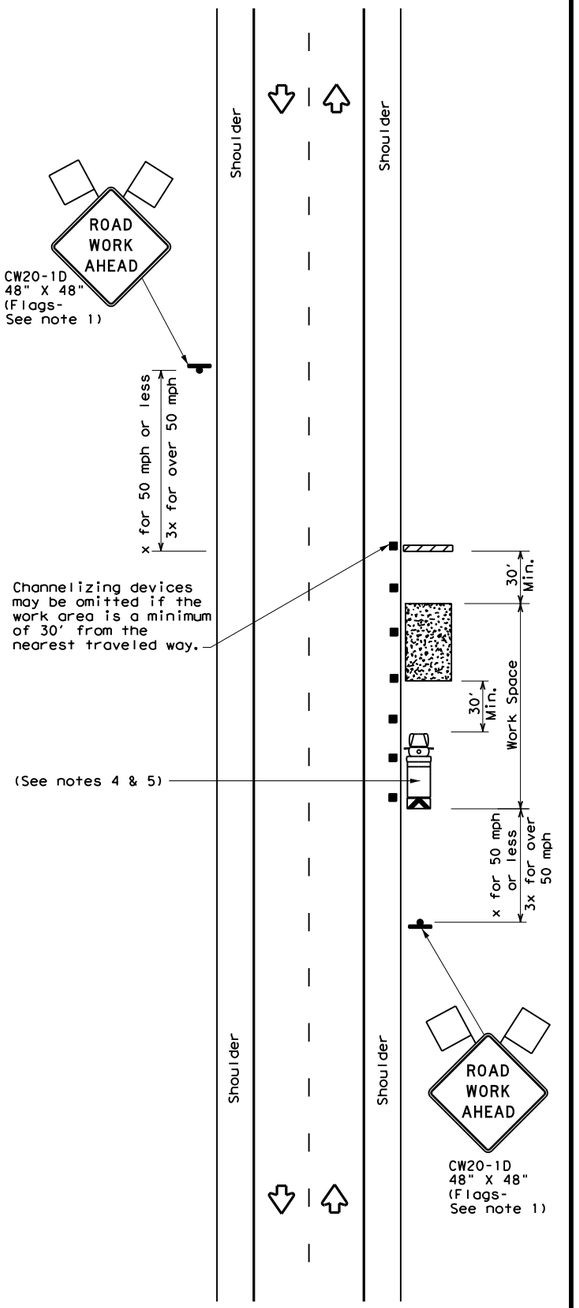
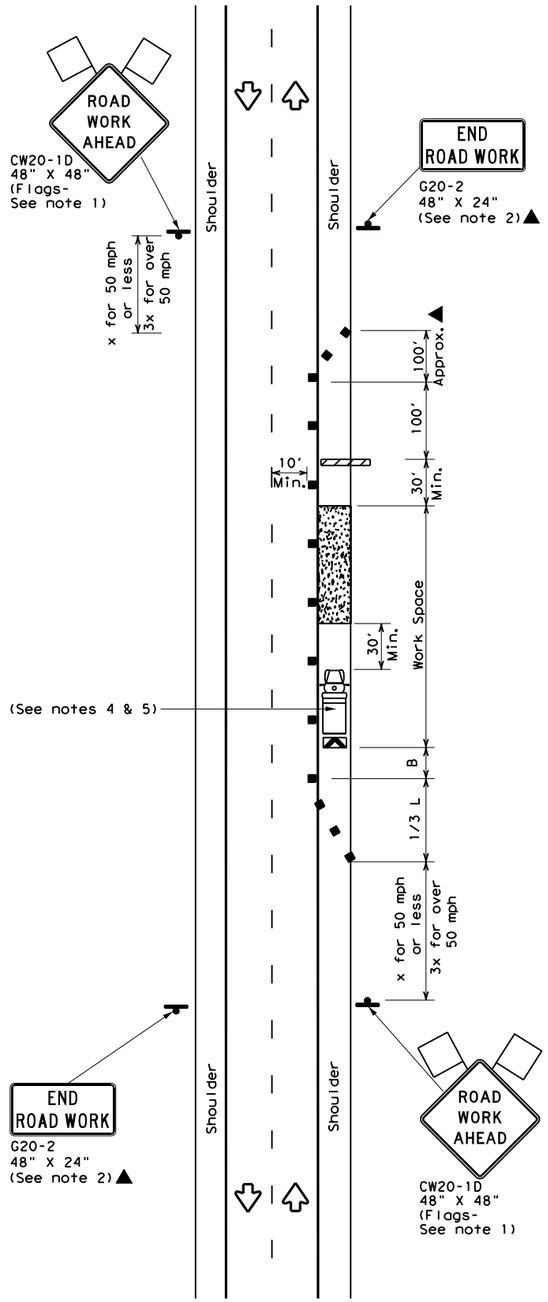


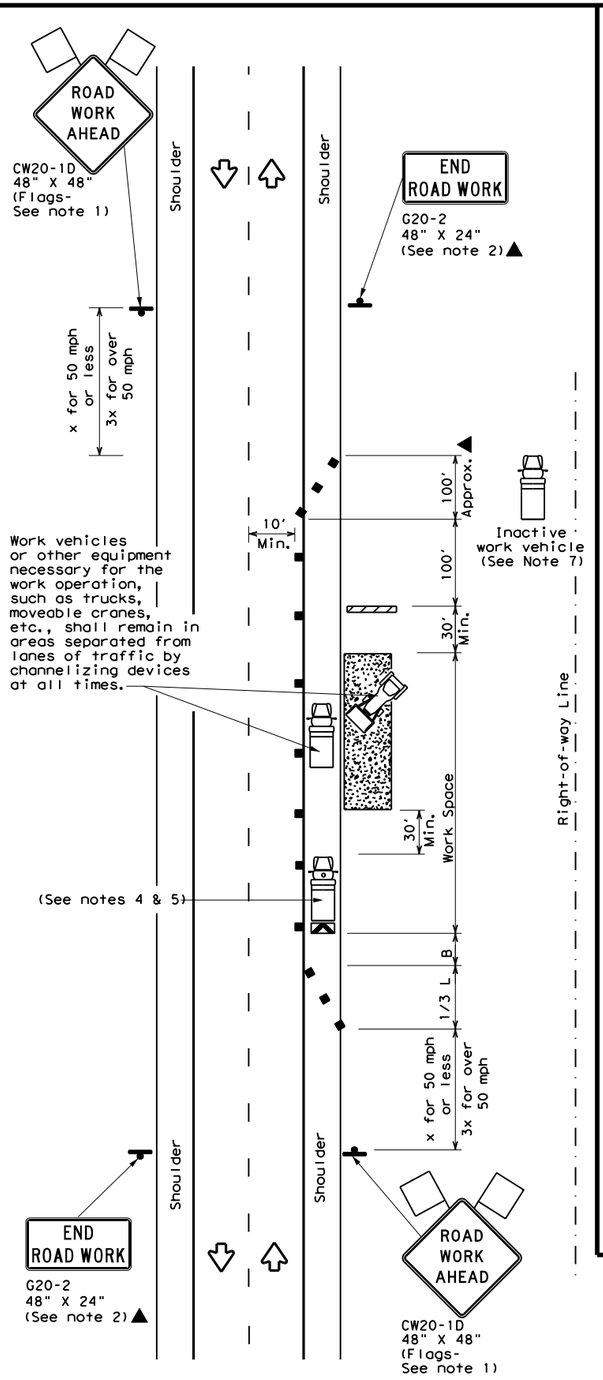
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	WACO	BELL		25
1-97 2-18				

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DATE: 10/20/2020 11:22:11 AM
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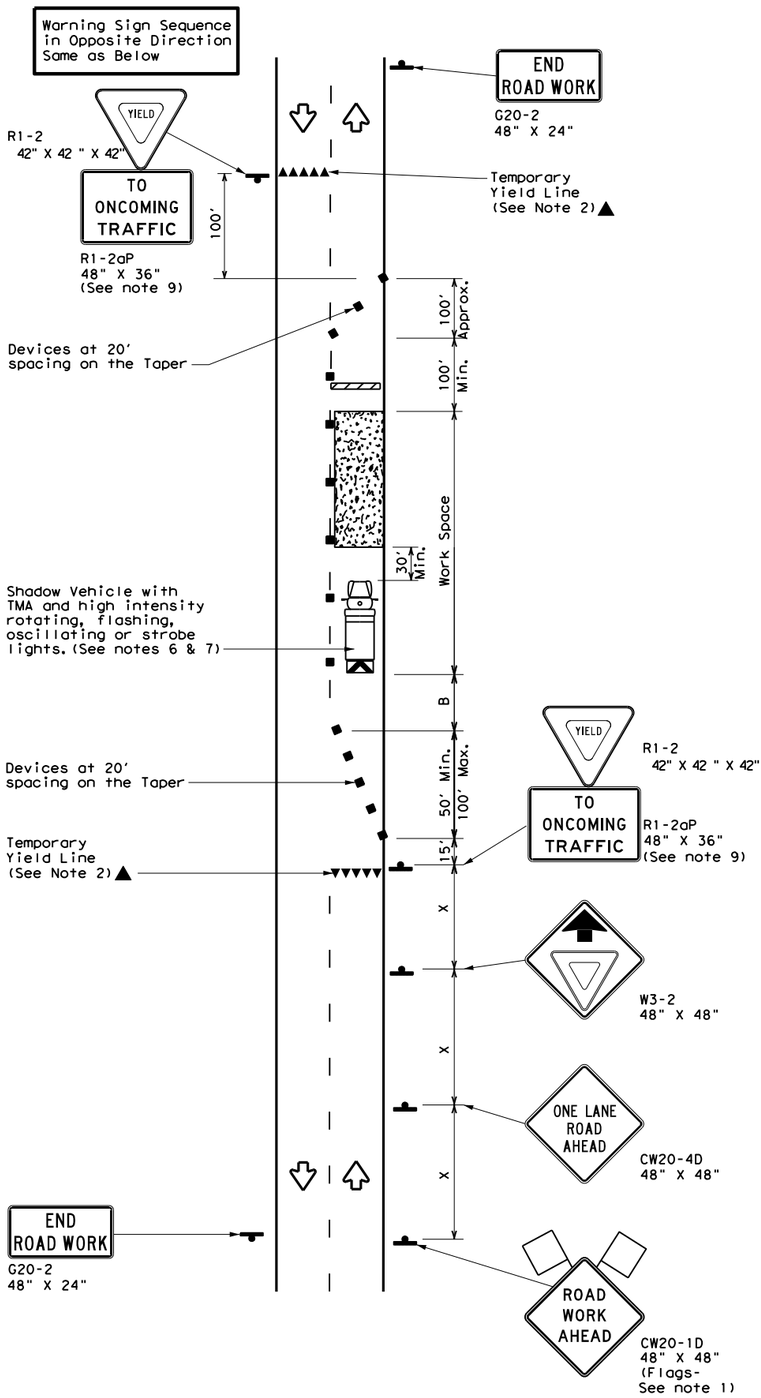
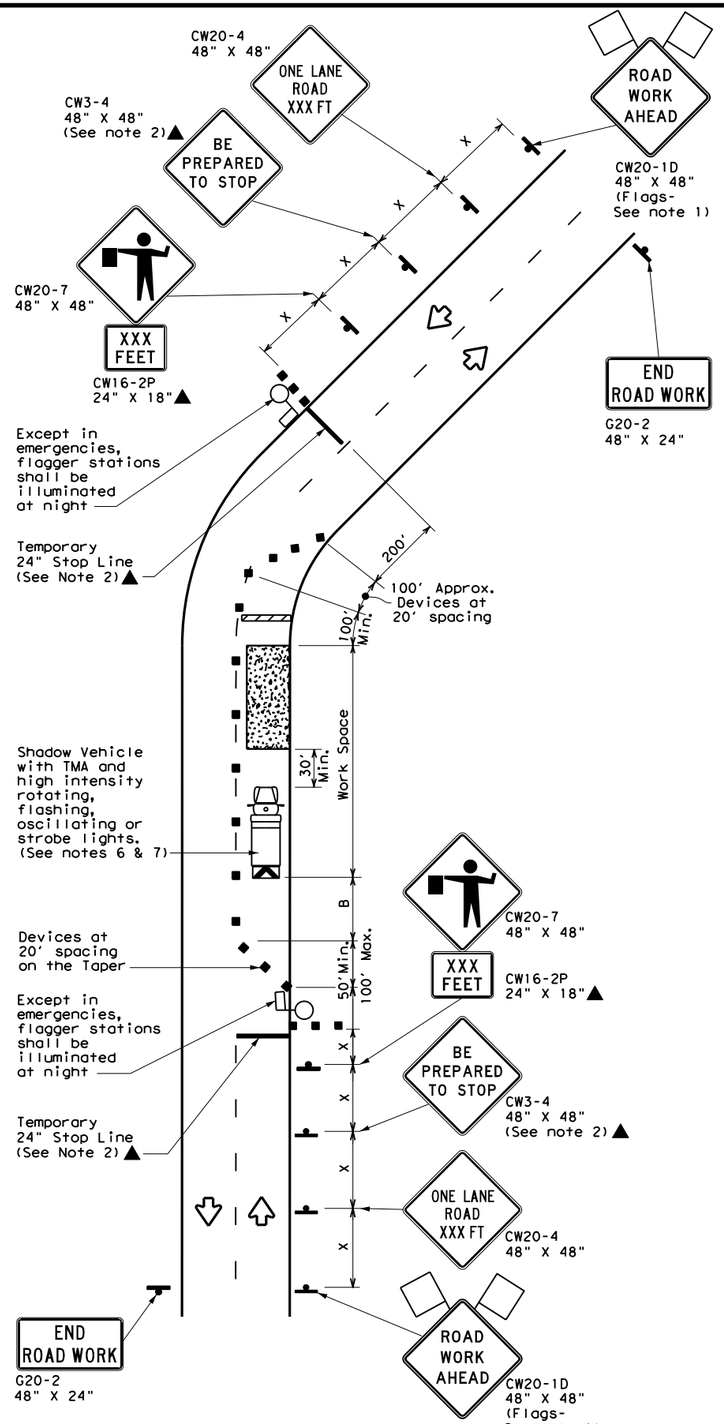


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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

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

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

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

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		26

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DATE: 10/20/2020 11:22:17 AM
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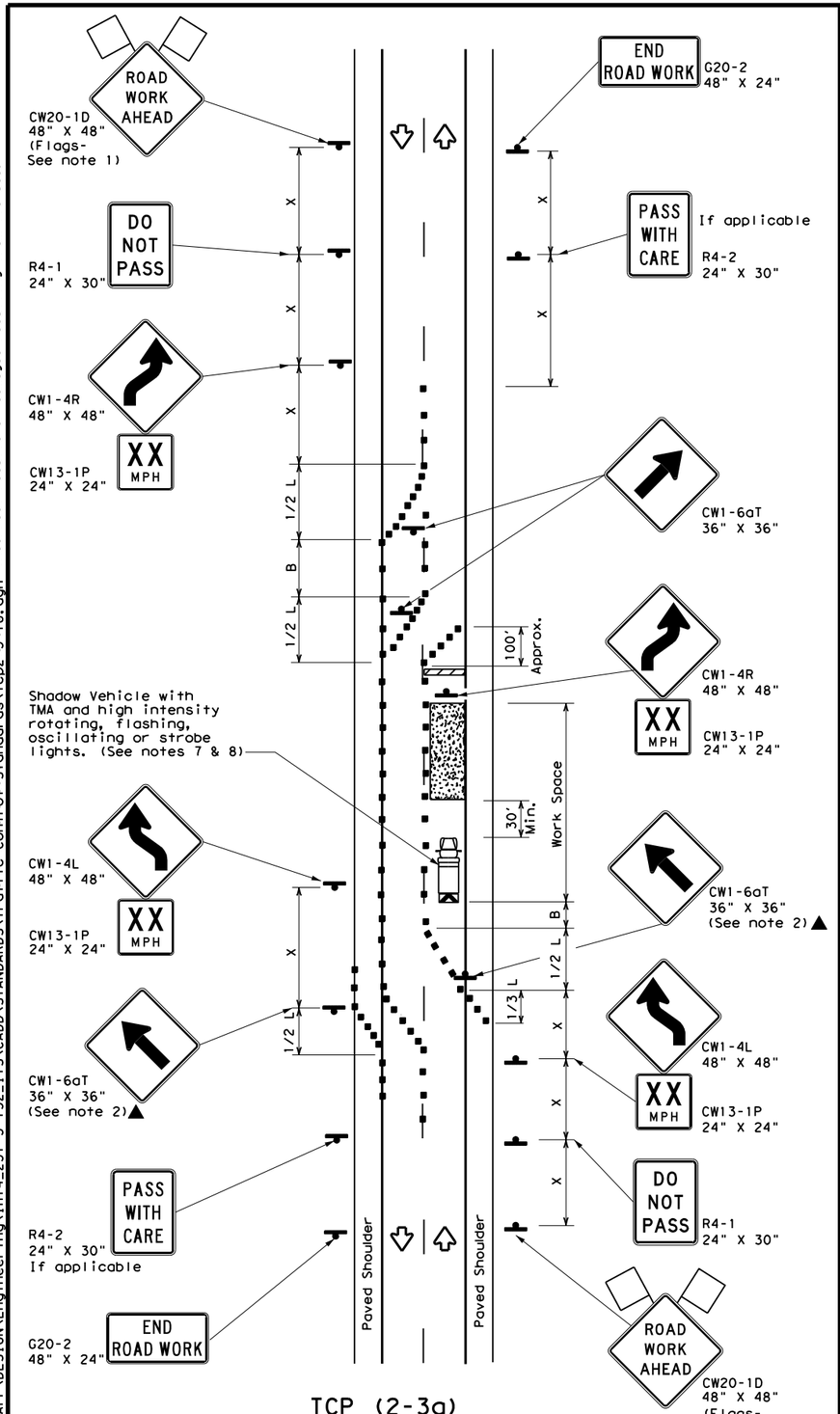
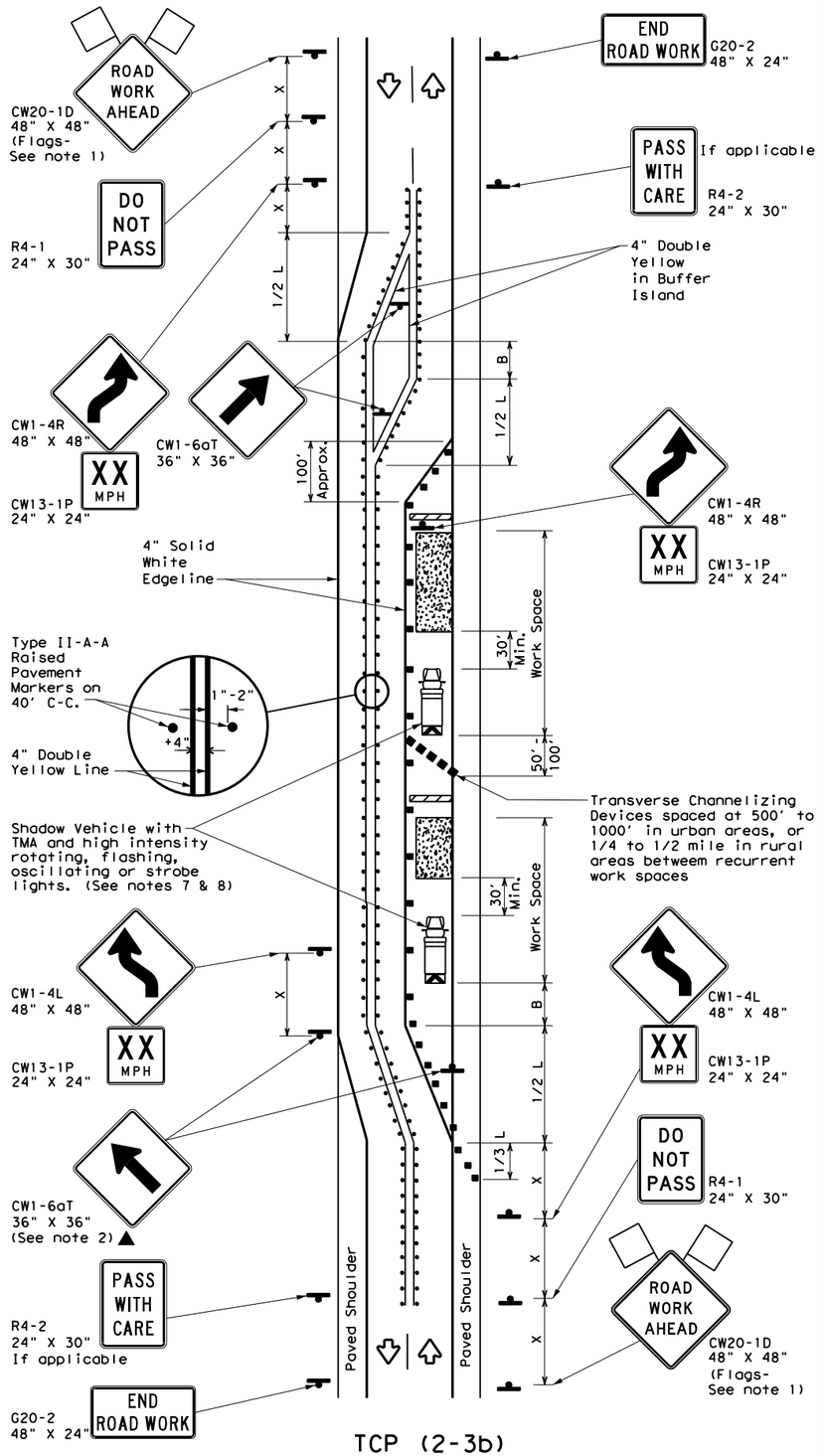


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

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

* Conventional Roads Only

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP(2-3b)ONLY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. 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 device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	WACO	BELL		27
4-98 2-18				

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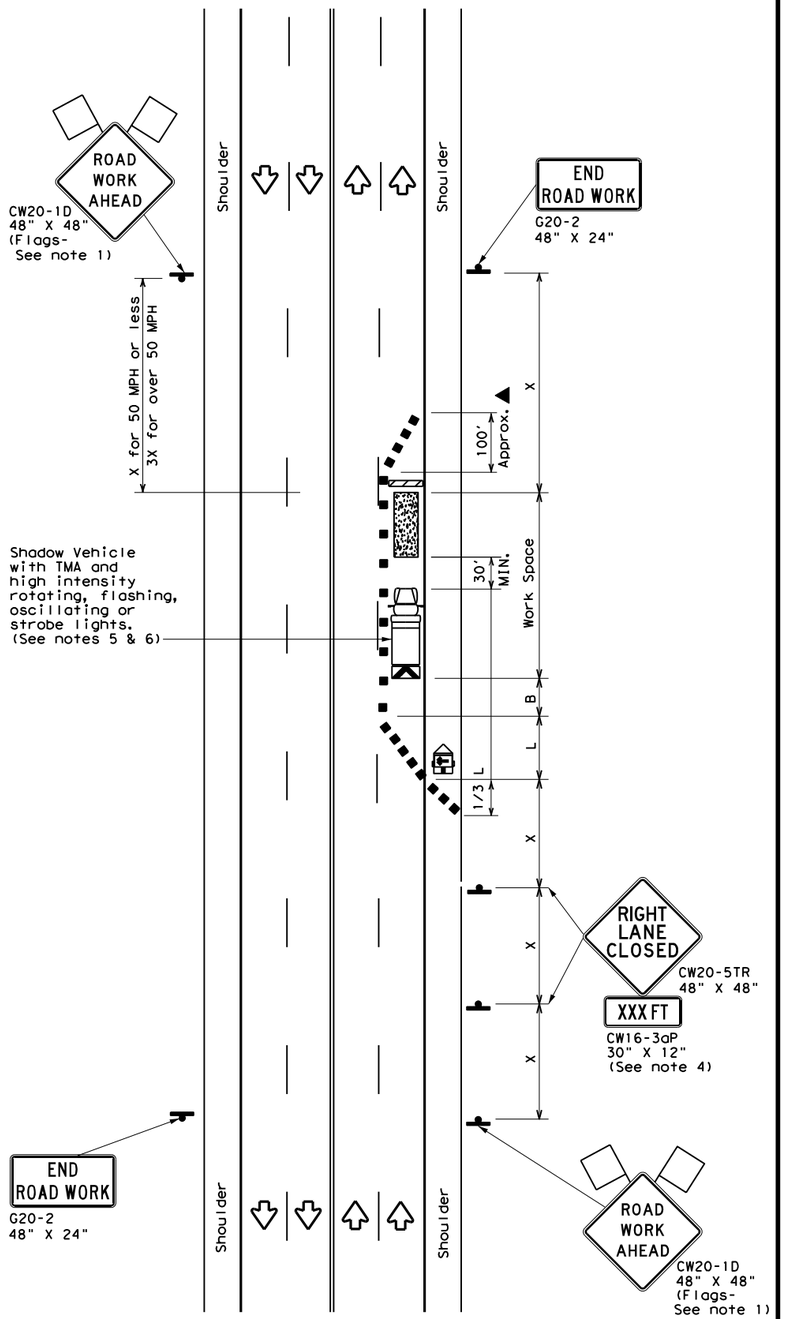
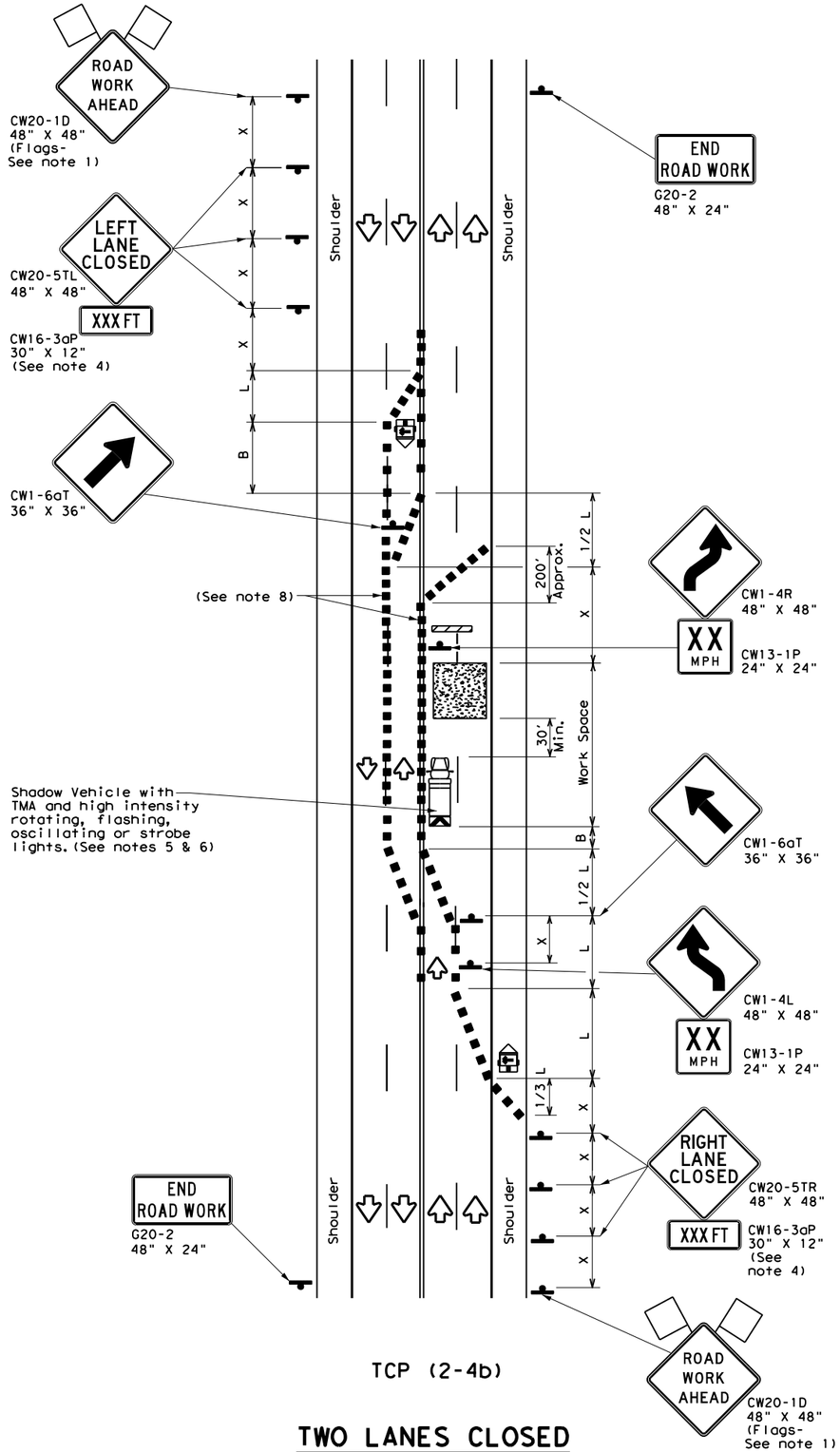


TCP (2-4a)

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. 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.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned 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)

7. 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)

8. 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.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	WACO	BELL		28
4-98 2-18				

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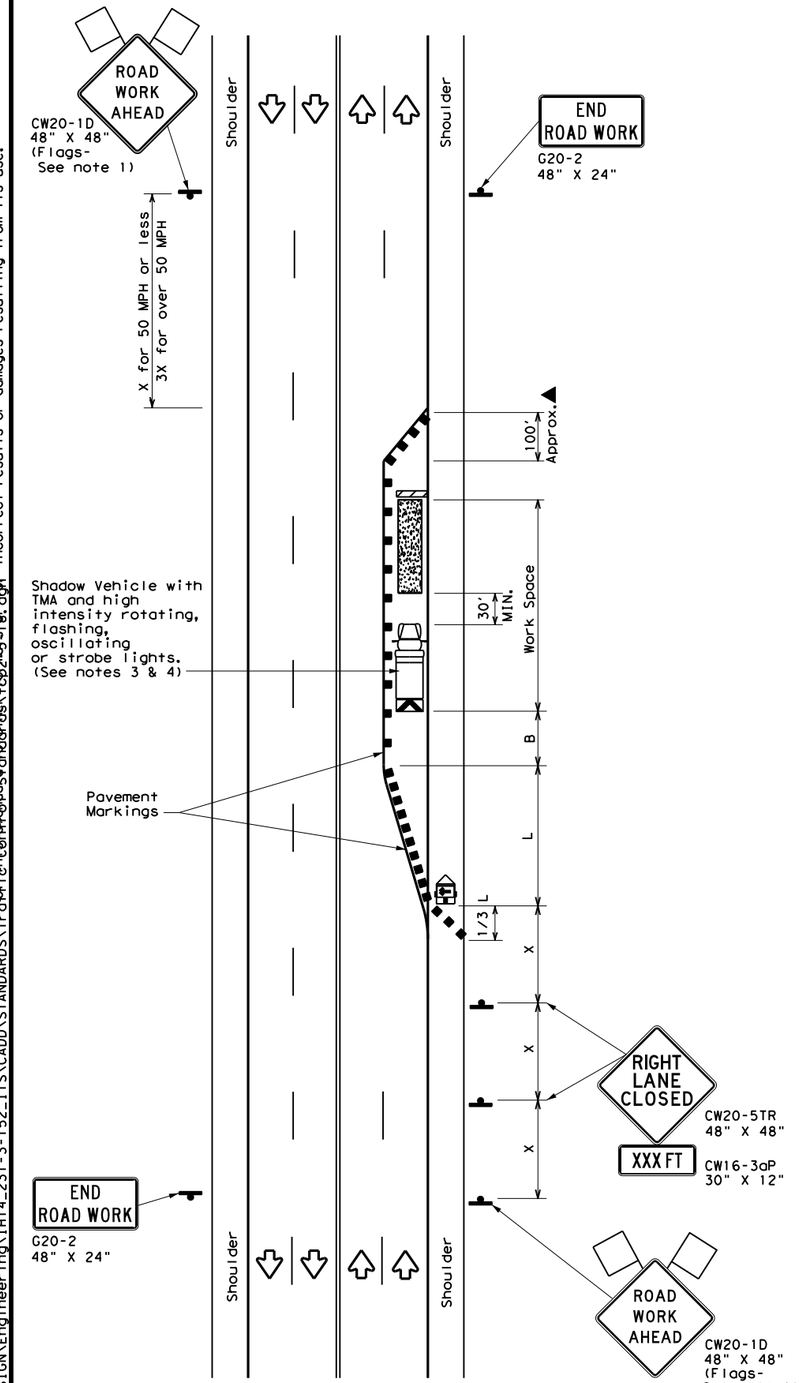
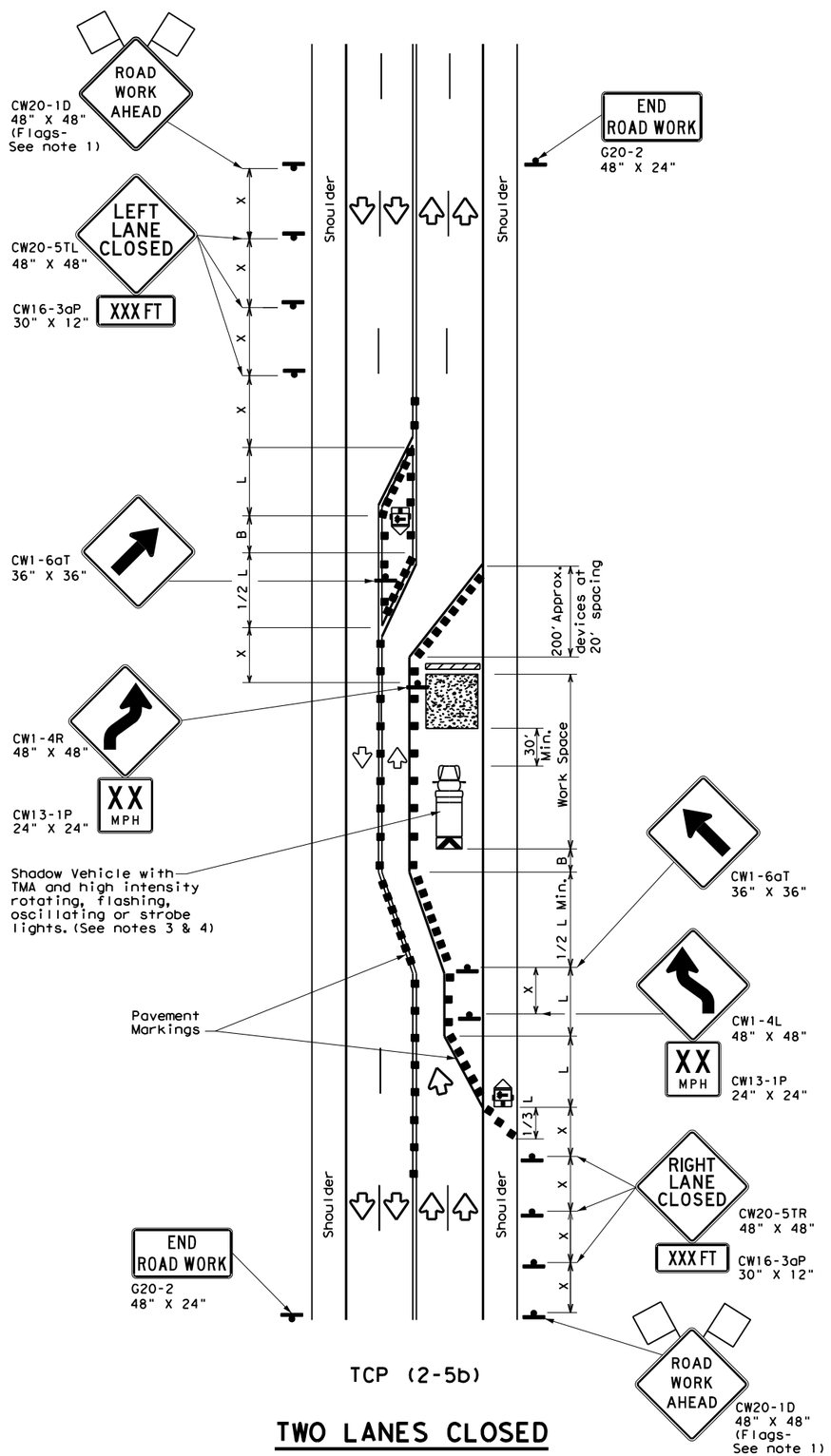
DATE: 10/20/2020 11:22:30 AM
FILE: T:\WACTRAFF\DESIGN\Engineering\IH14_231-3-152_ITS\CADD\STANDARDS\Traffic\tcp2-5-18.dgn



TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. 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 eposure 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 substitutued for the Shadow Vehicle and TMA.
4. 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.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline 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 (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

FILE: tcp2-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 2-12	0231	03	152	IH 14
1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18	WACO	BELL		29

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DATE: 10/20/2020 11:22:35 AM
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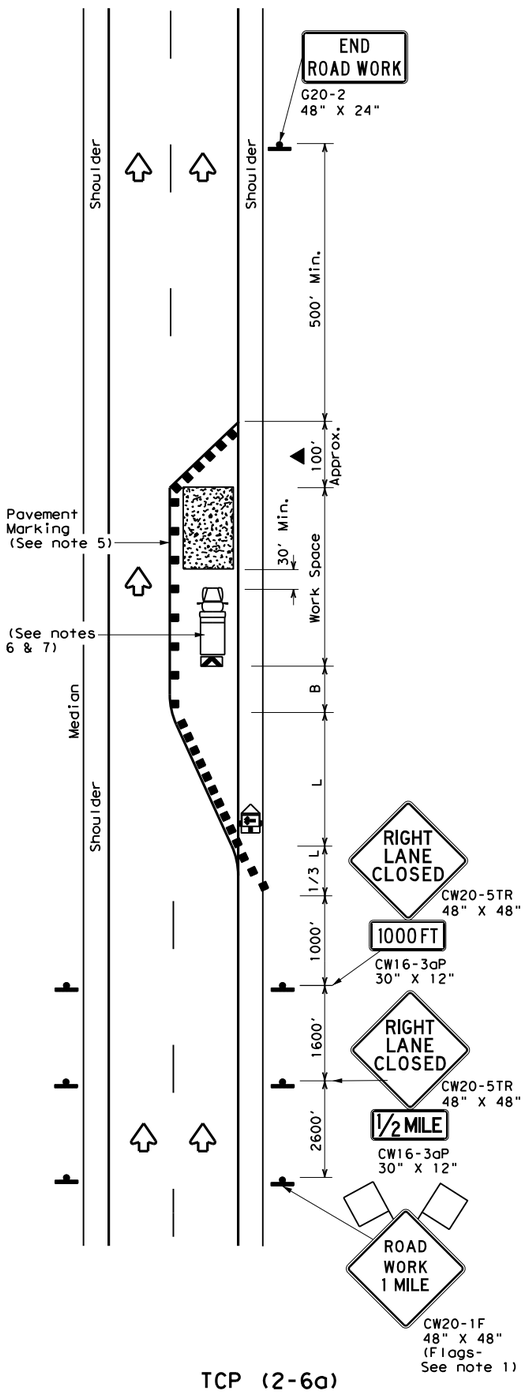
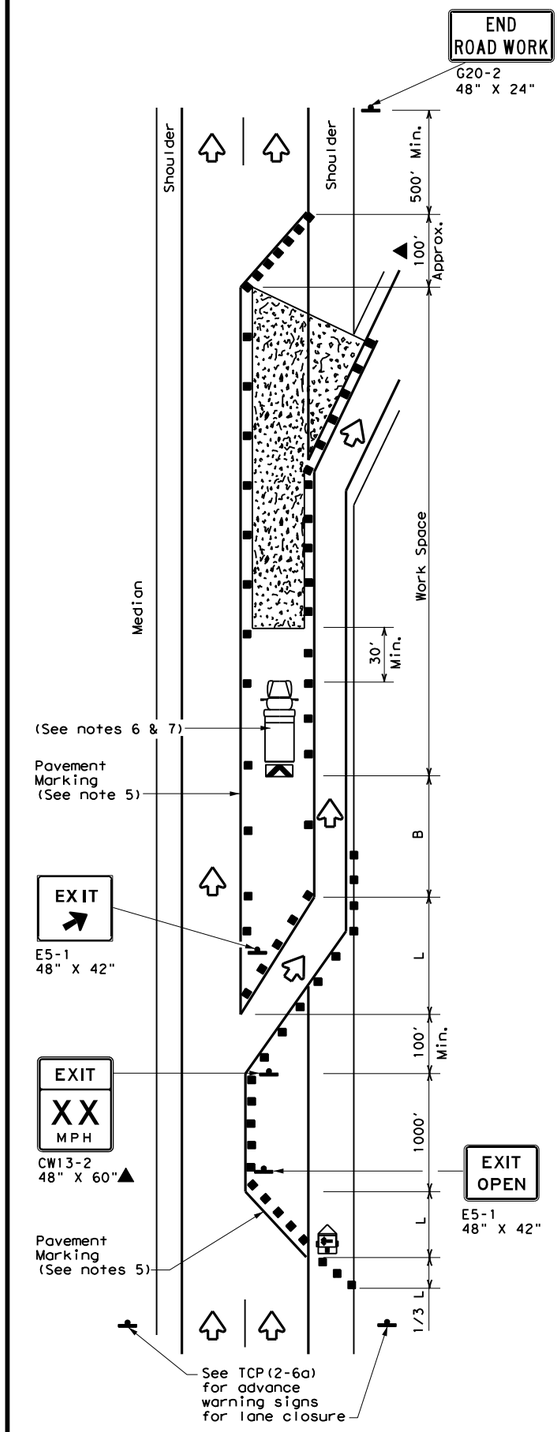


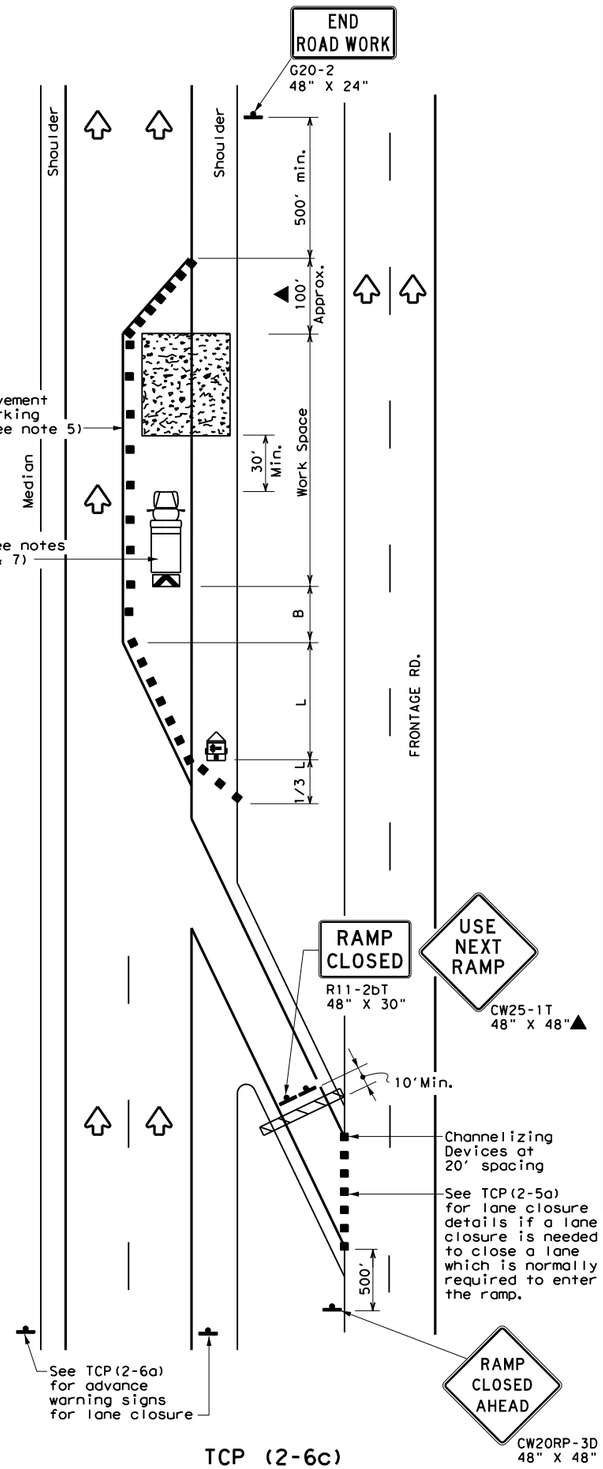
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		30

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DATE: 10/20/2020 11:22:40 AM
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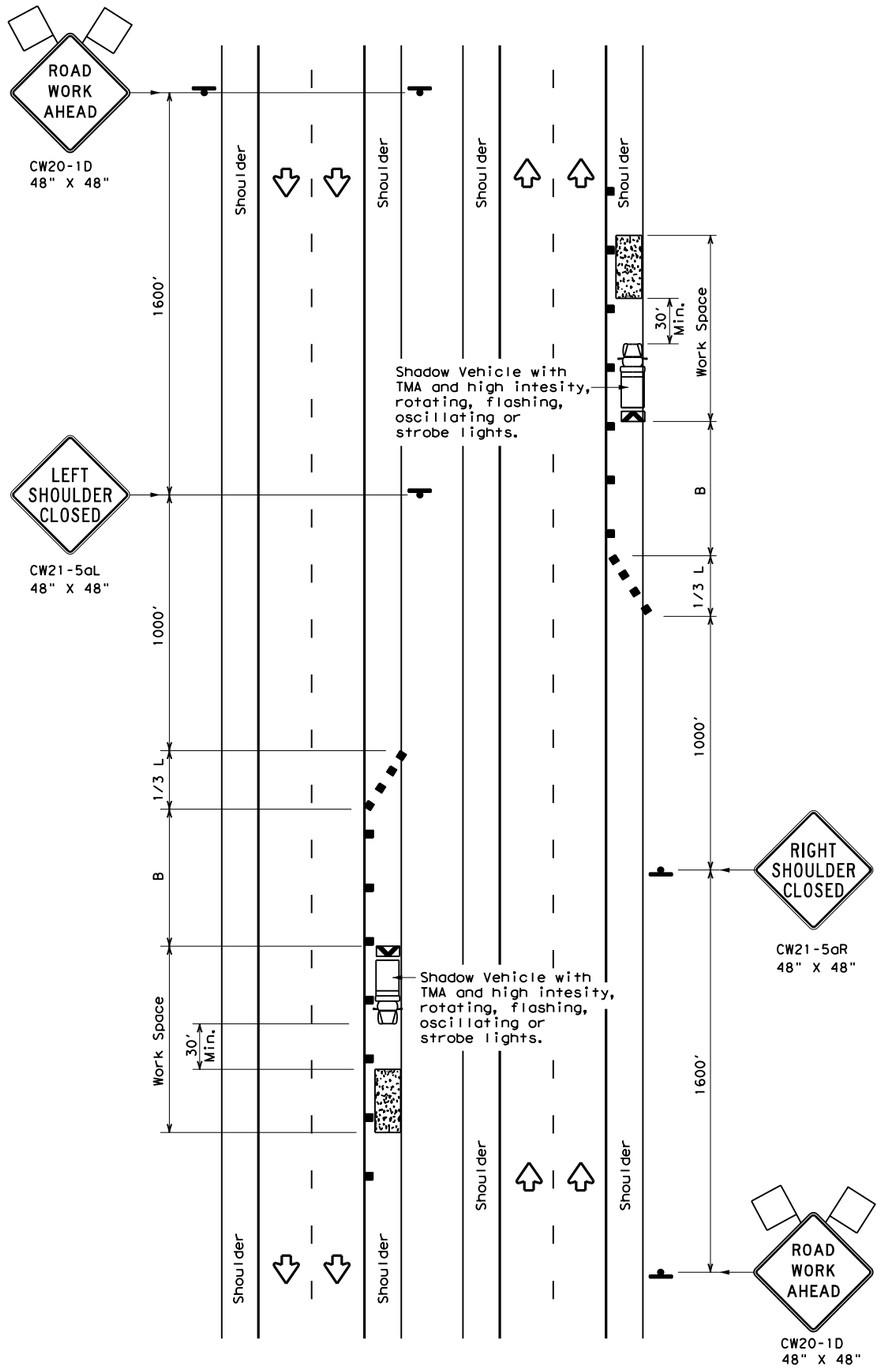
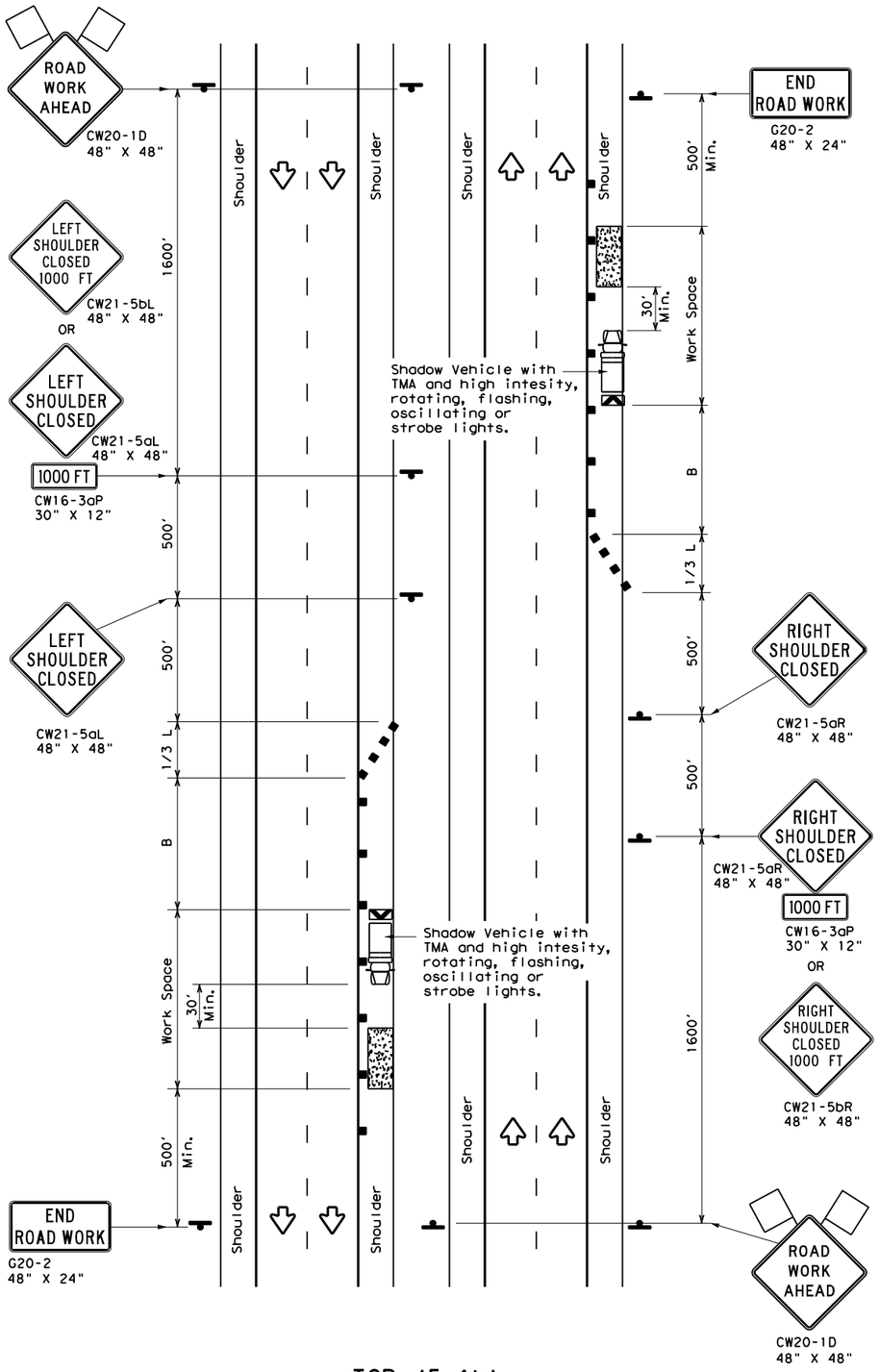


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
2-18	DIST	COUNTY		SHEET NO.
	WACO	BELL		31

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DATE: 10/20/2020 11:22:44 AM
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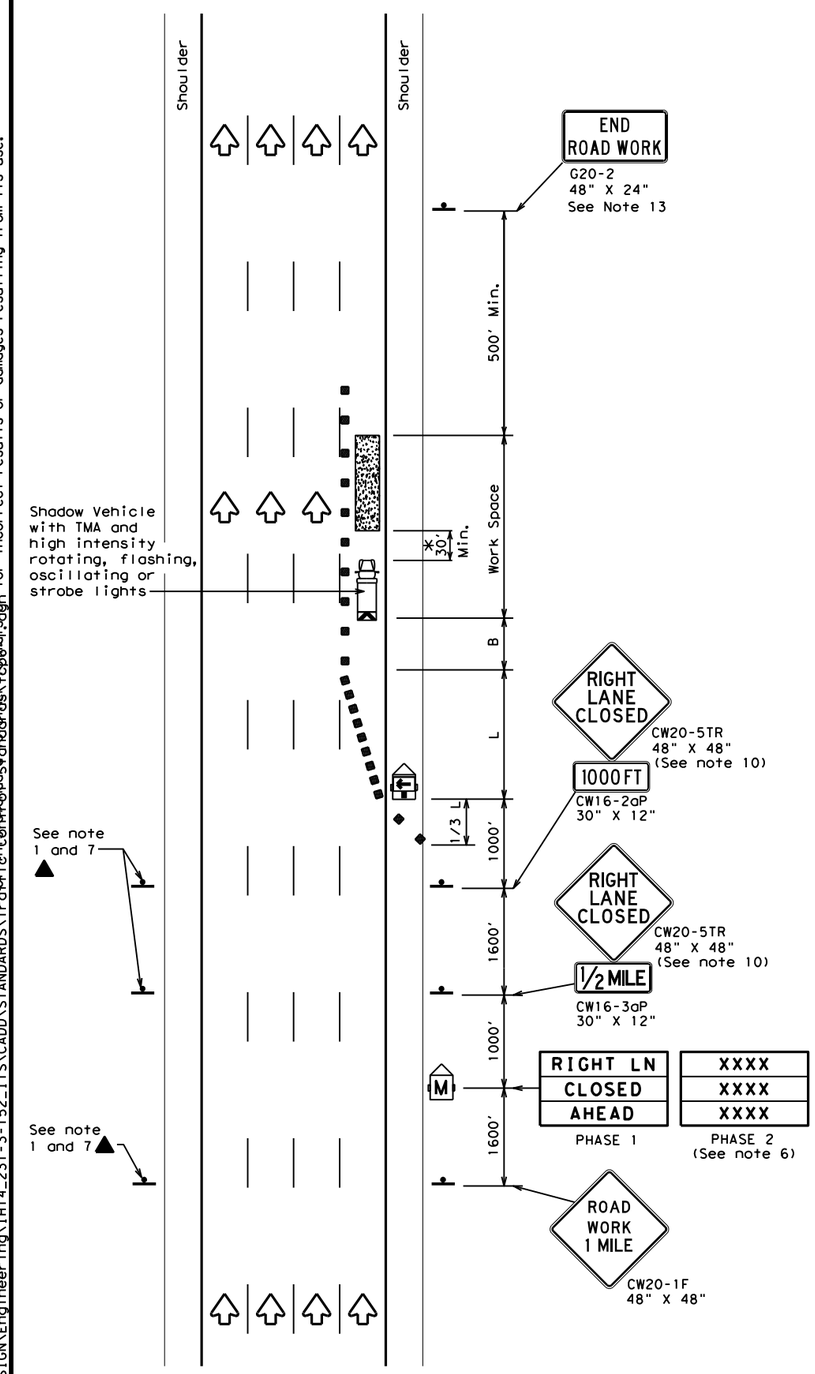
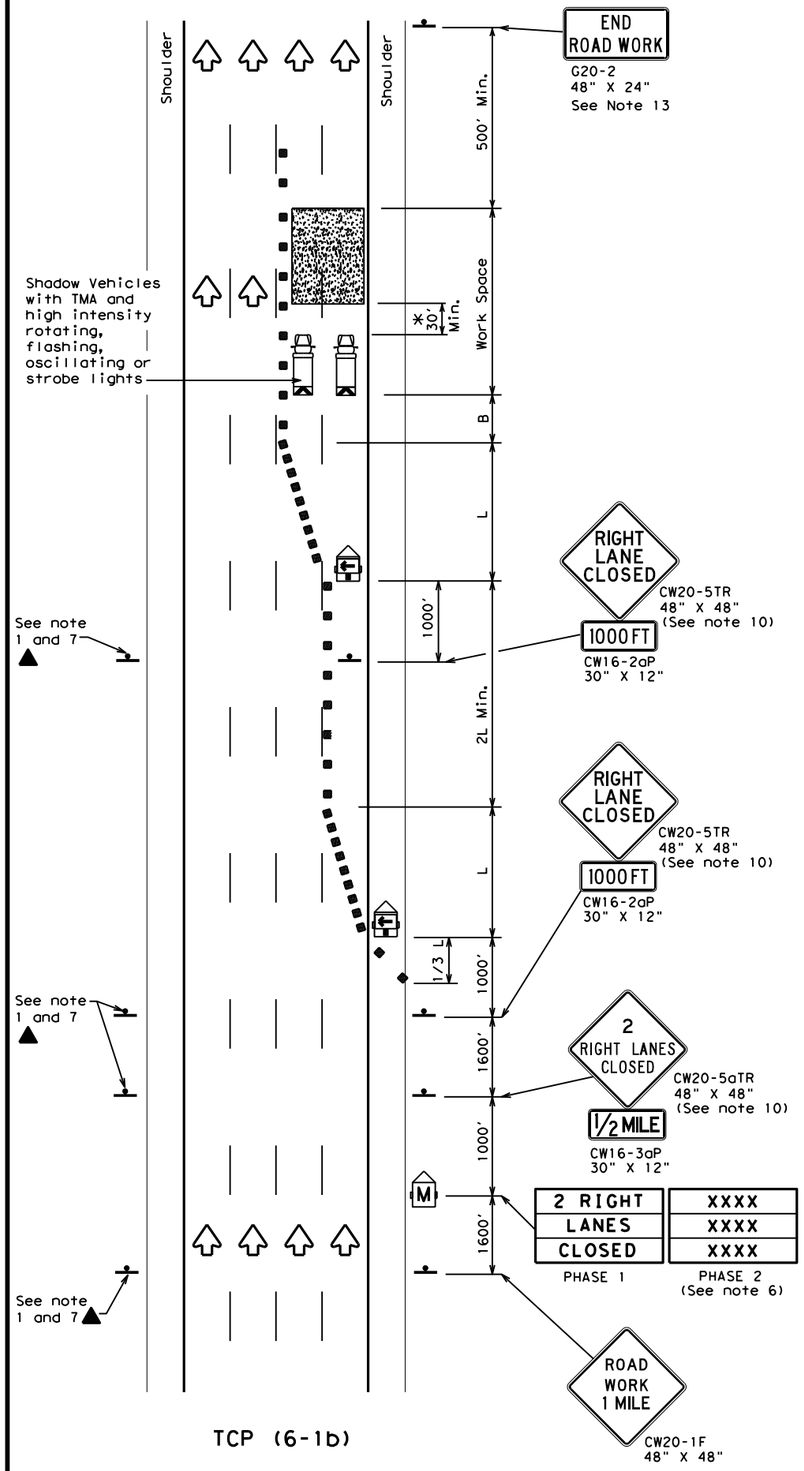


TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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

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

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

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

GENERAL NOTES

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		32

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DATE: 10/20/2020 11:22:51 AM
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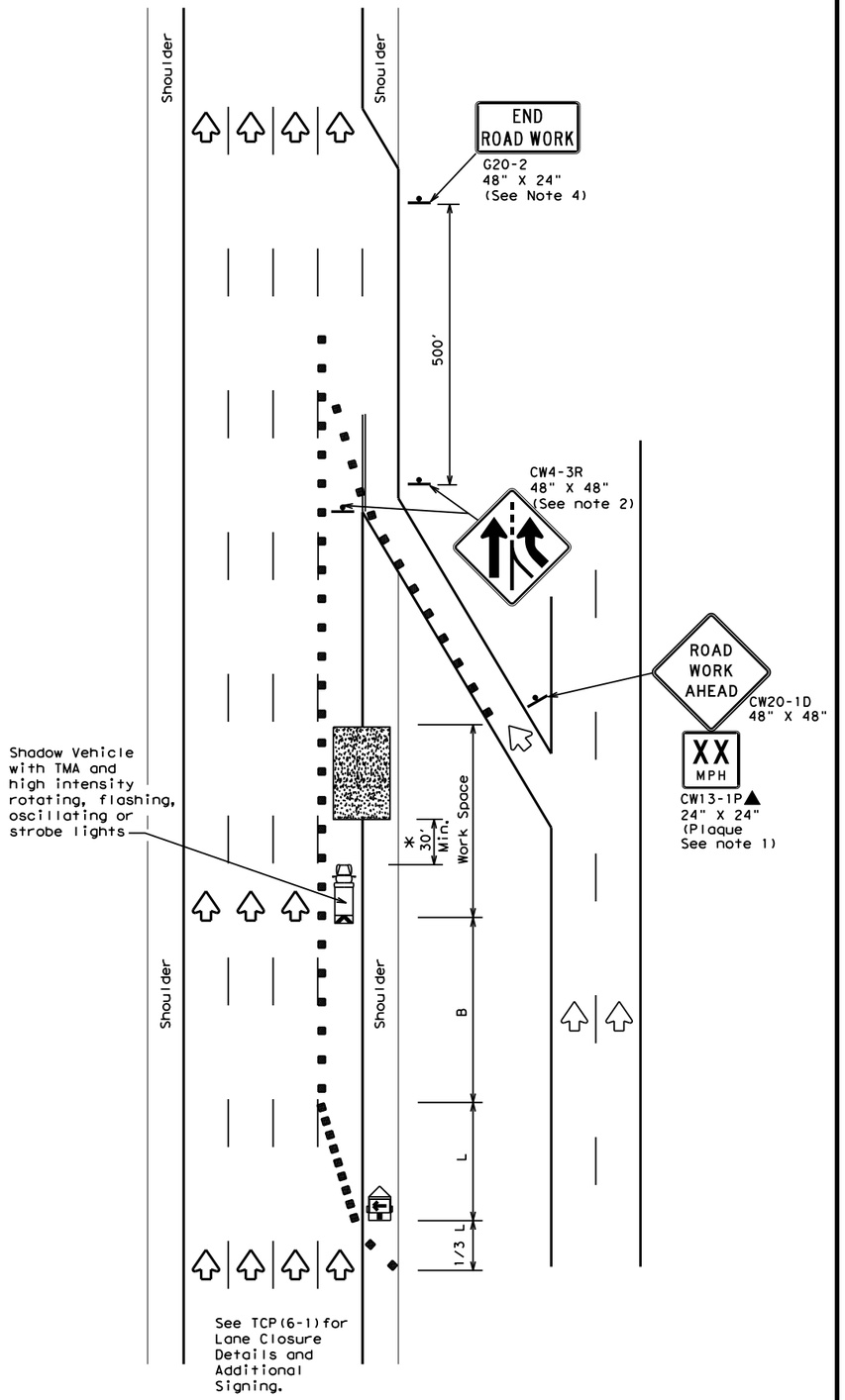
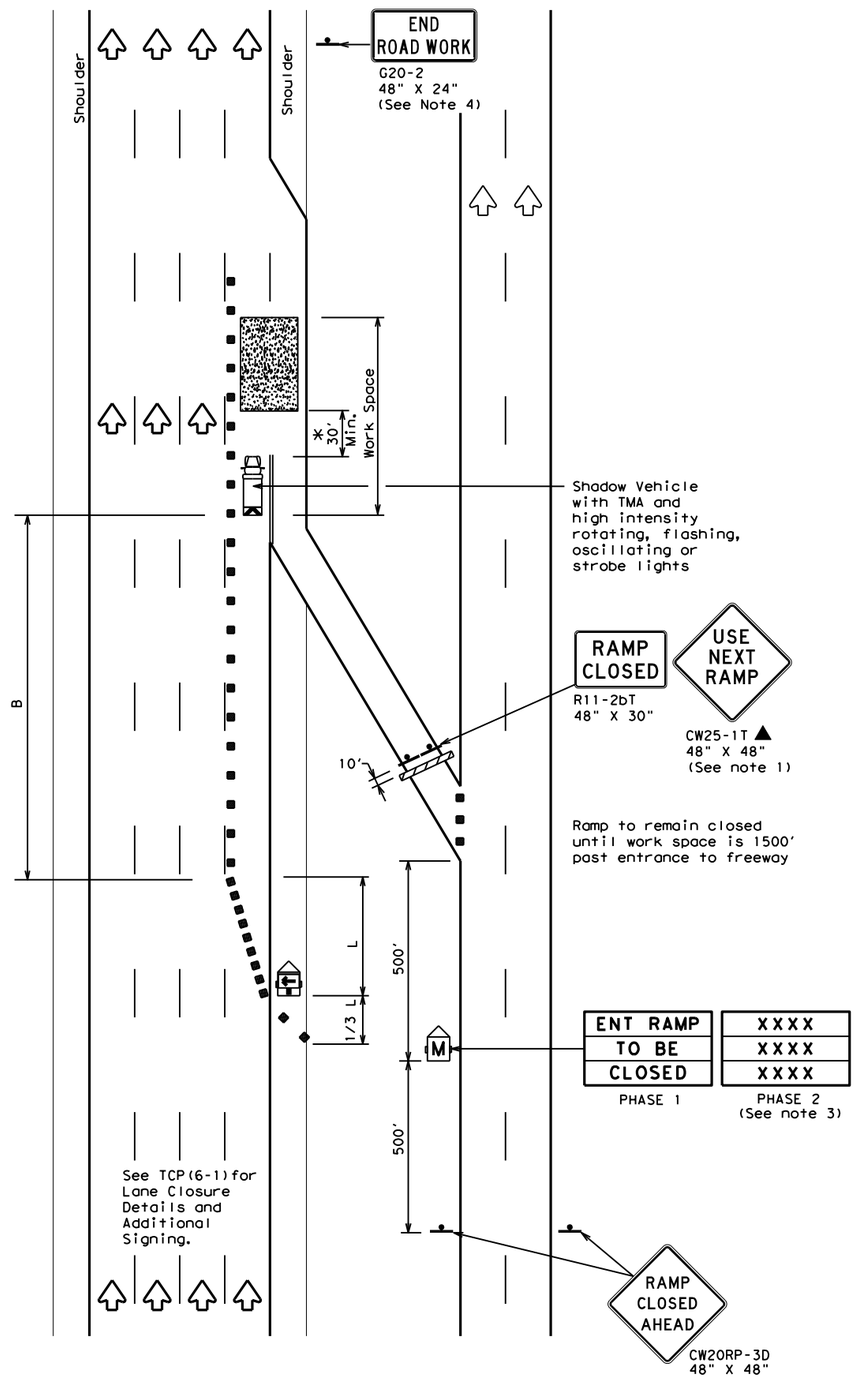


TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	WACO	BELL		33

202

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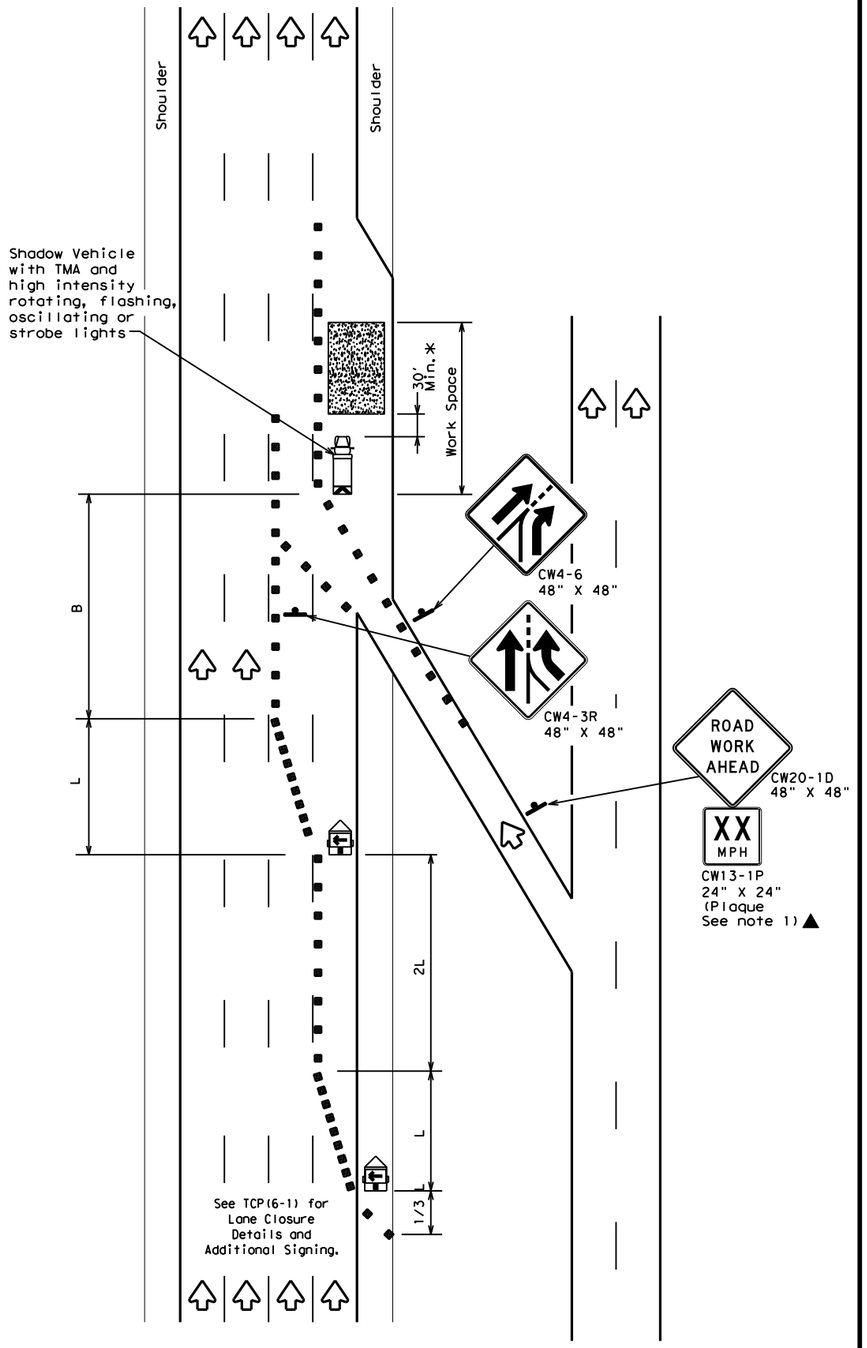
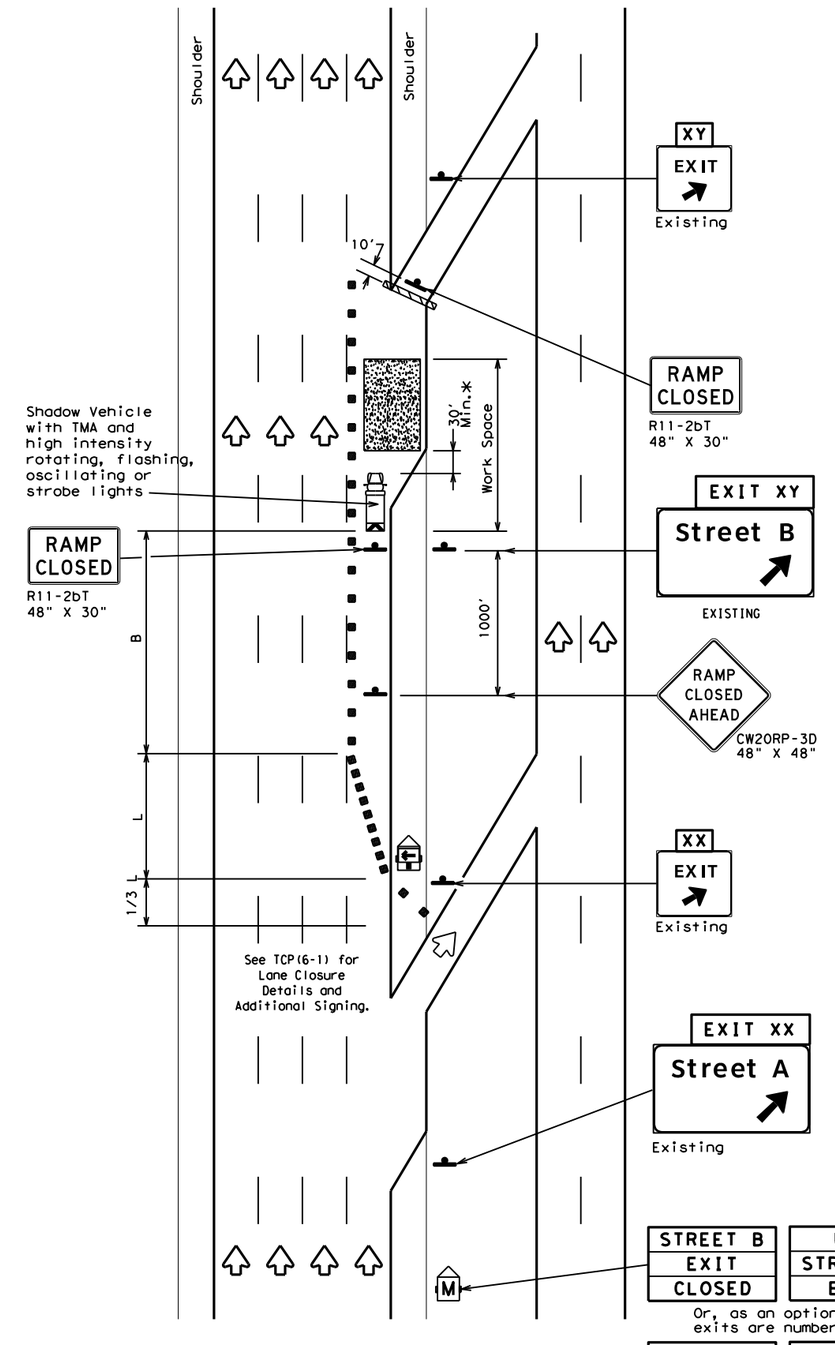


TCP (6-3a)

ENTRANCE RAMP OPEN



STREET B	USE
EXIT	STREET A
CLOSED	EXIT

Or, as an option when exits are numbered

EXIT XY	USE
CLOSED	EXIT XX

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

TCP (6-3b)

EXIT RAMP CLOSED
TRAFFIC EXITS PRIOR TO CLOSED RAMP

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

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

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

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

GENERAL NOTES:

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	WACO	BELL		34

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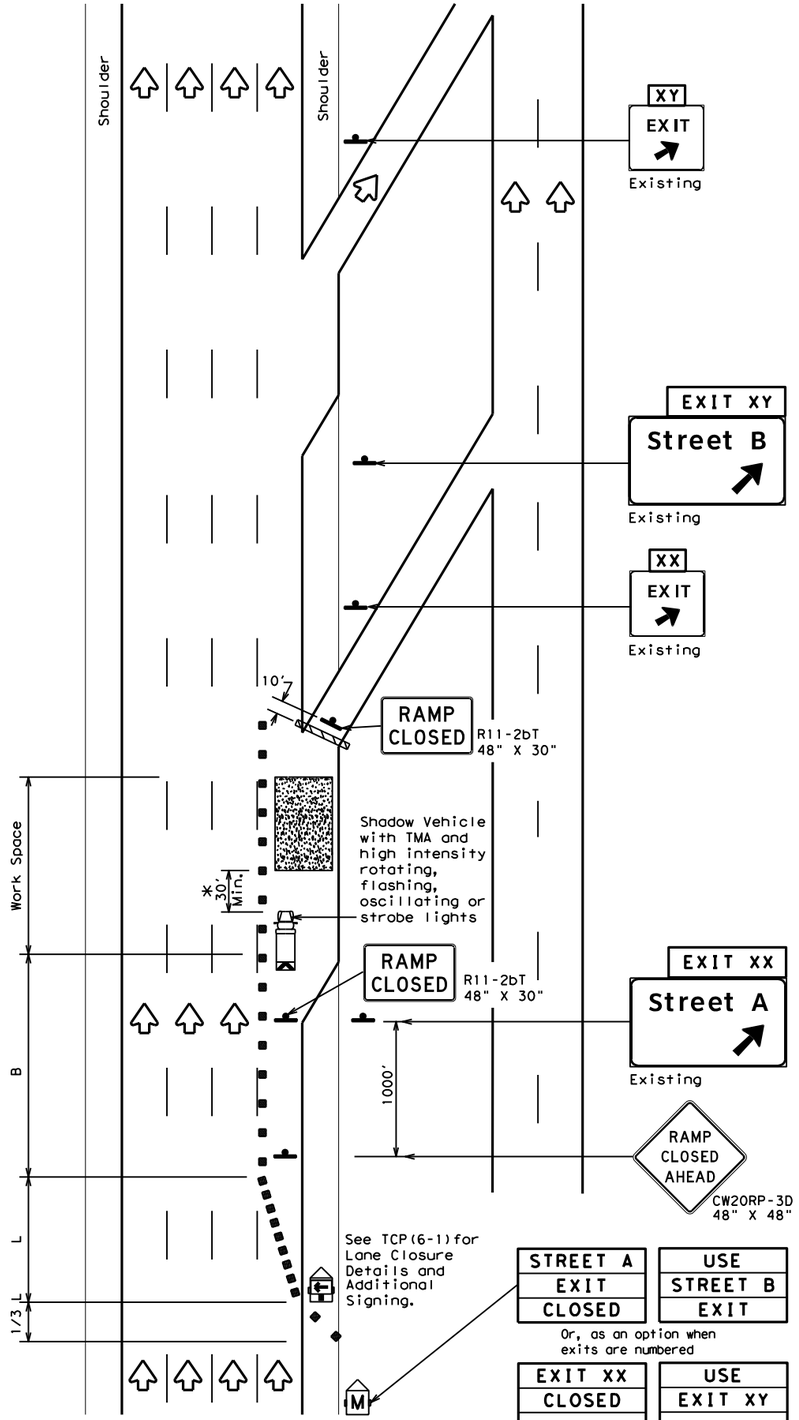
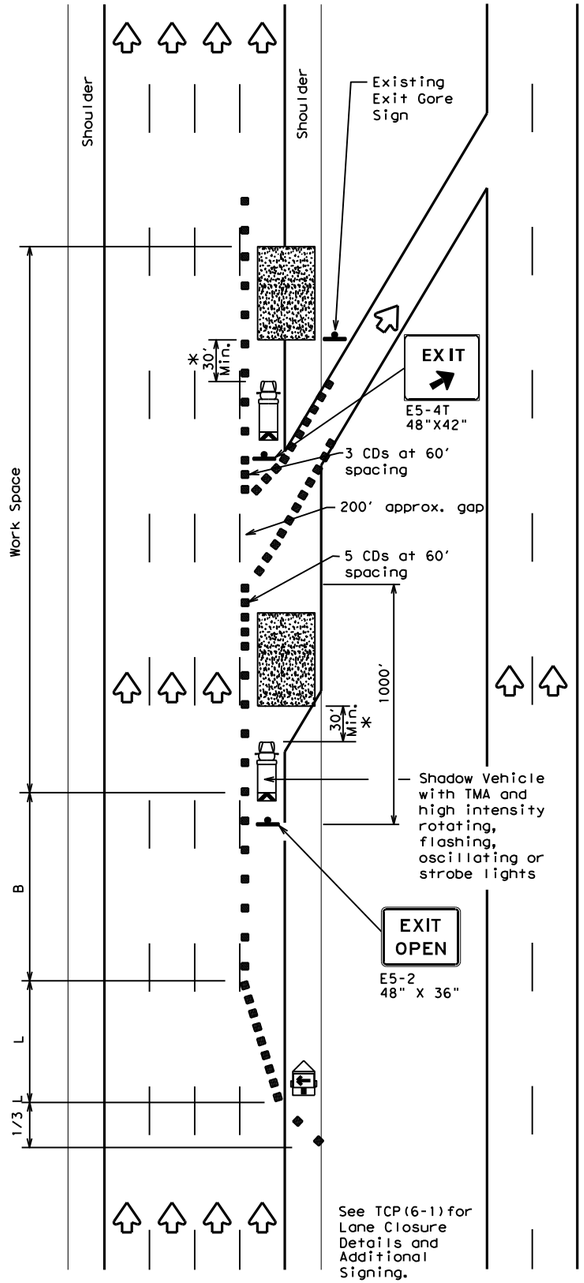


TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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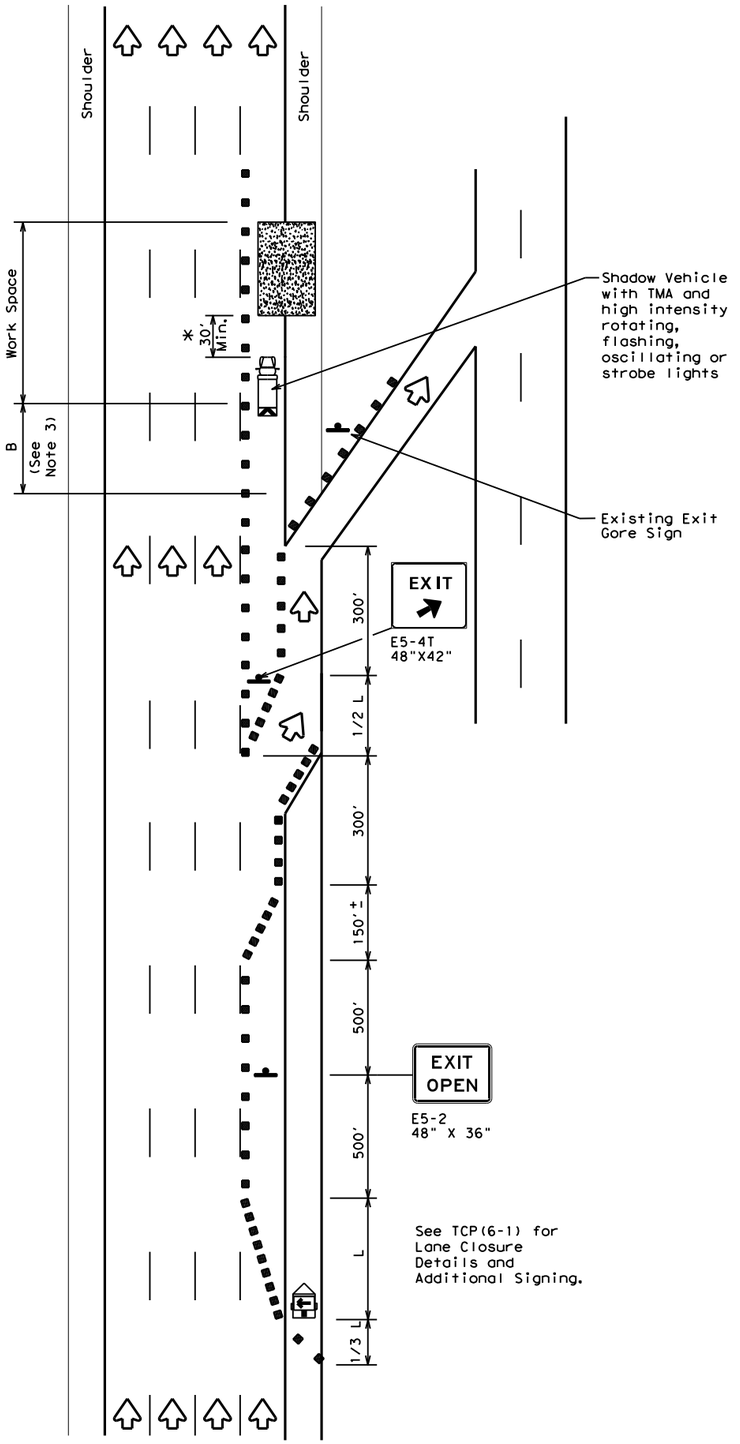
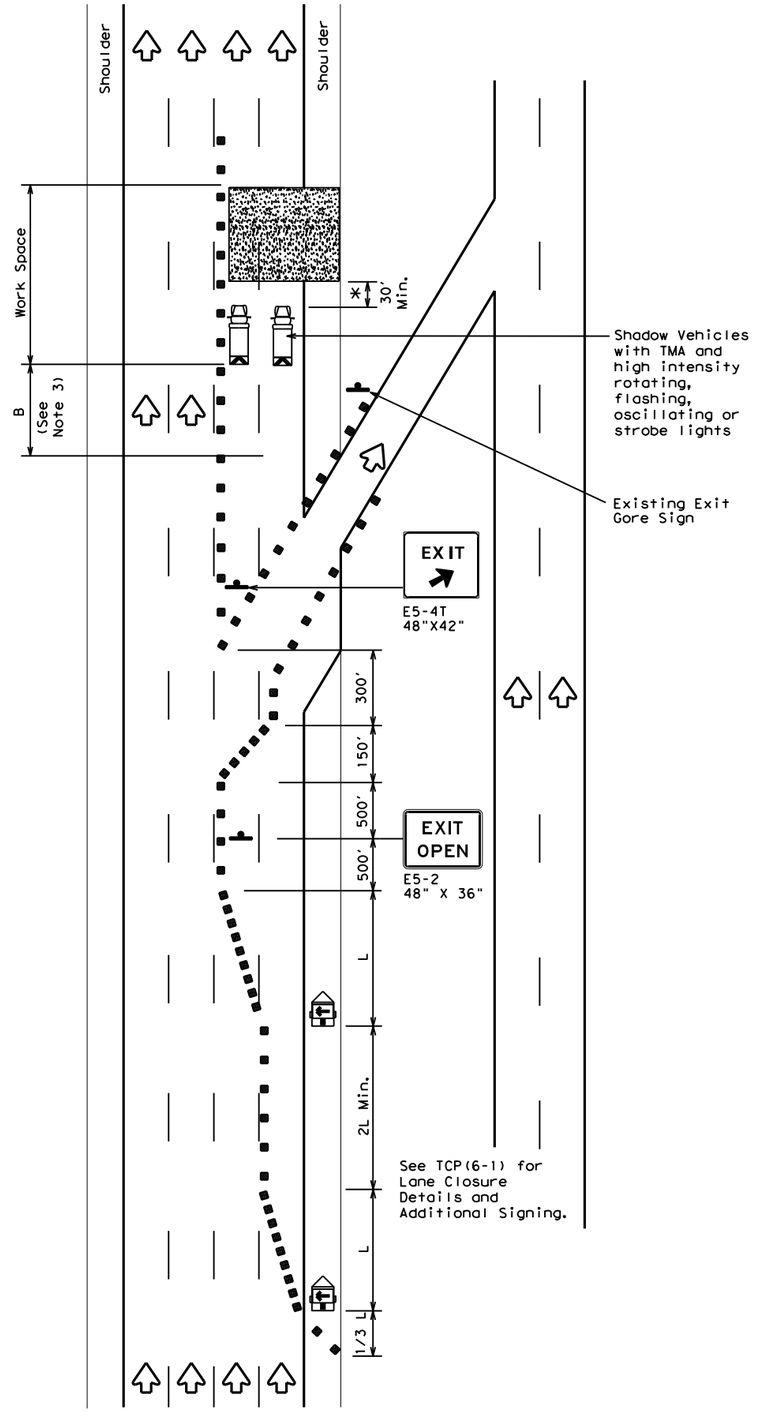


TCP (6-5a)

EXIT RAMP OPEN



TCP (6-5b)

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

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

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

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

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND EXIT RAMP

TCP(6-5)-12

FILE: tcp6-5.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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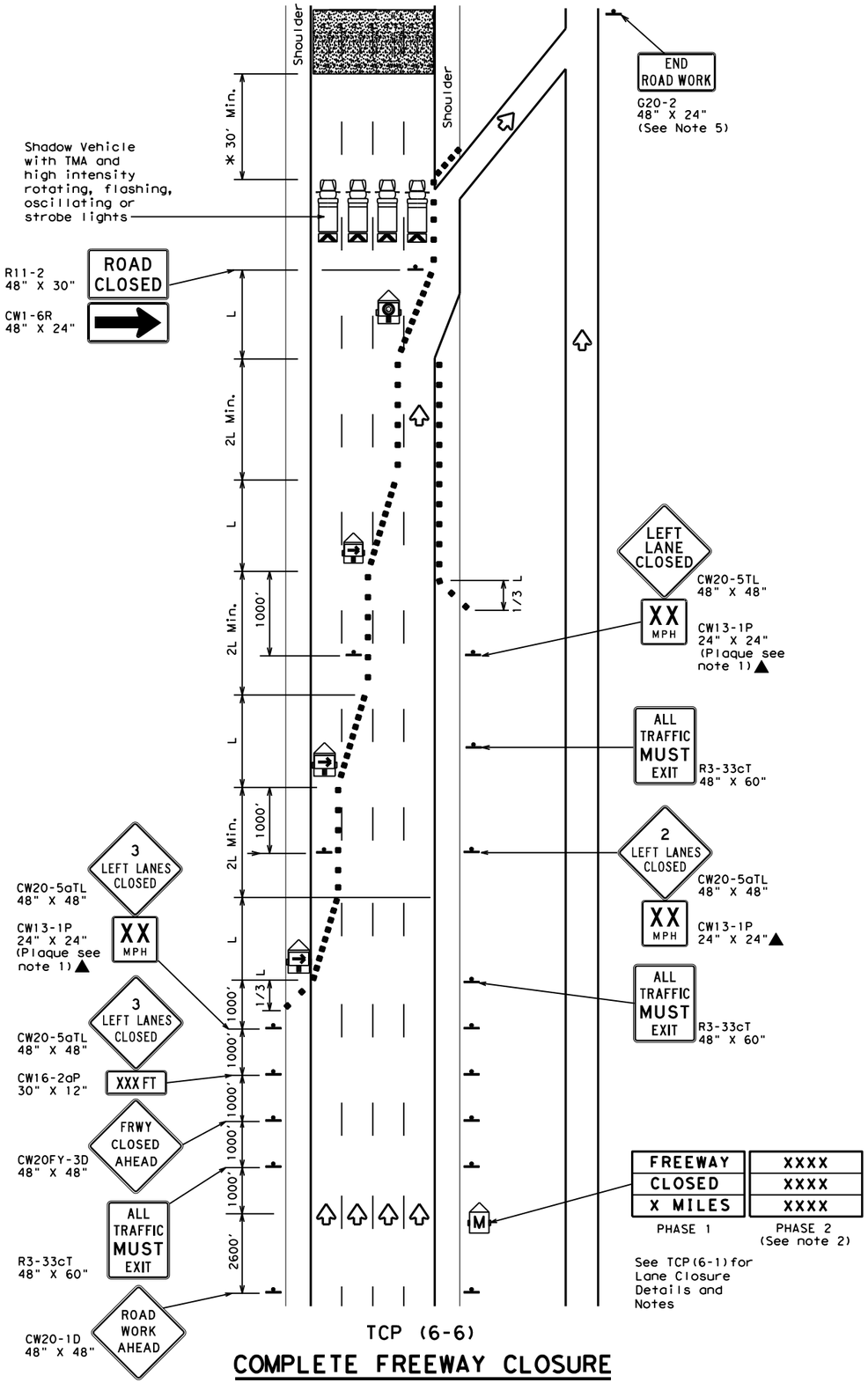

TCP (6-6)

COMPLETE FREEWAY CLOSURE

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

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

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

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY CLOSURE

TCP(6-6)-12

FILE: tcp6-6.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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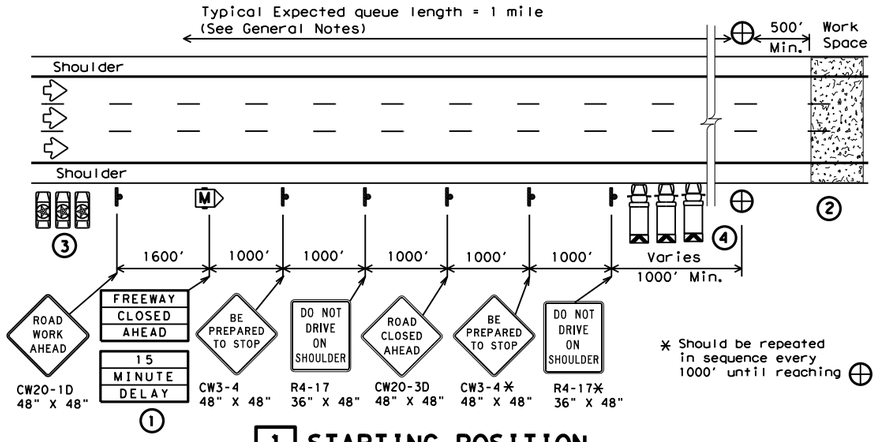


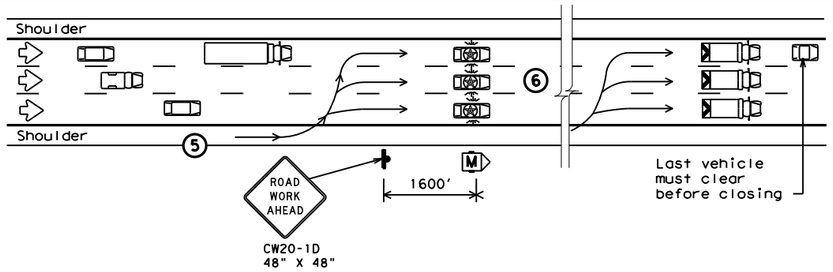
1 STARTING POSITION

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

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

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

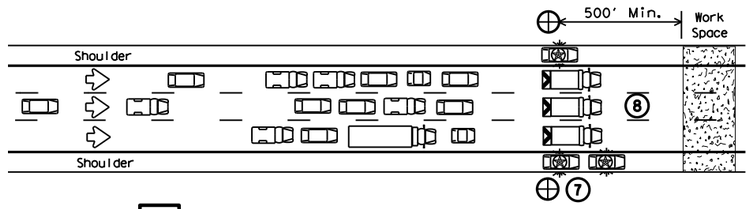
④ One barrier vehicle with a Truck Mounted Attenuator and amber or blue and amber high intensity flashing/oscillating/strobe lighting shall be used for each lane to be closed.



2 REDUCING SPEED OPERATION

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

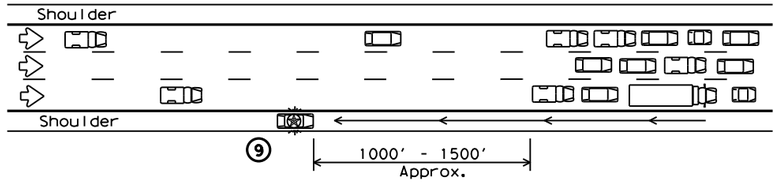
⑥ Once the LEOVs have achieved an abreast blocking formation while traveling toward the CP, emergency lights and headlights should be turned "ON". The LEOVs should maintain formation, not allow traffic to pass, and begin to decelerate. The LEOVs should continue to decelerate, giving the barrier vehicles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



3 ALL TRAFFIC STOPPED AT CP

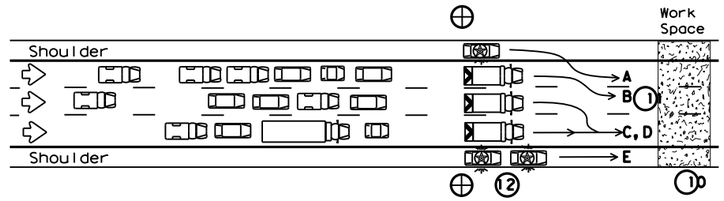
⑦ Once traffic is stopped the LEOVs should park on the shoulders with emergency lighting "ON" in order to provide law enforcement presence at the closure and keep shoulders blocked ahead of the work space. They should stay in radio contact with the WARNING LEOV.

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



4 WARNING THE TRAFFIC QUEUE

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



5 RELEASING STOPPED TRAFFIC

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

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

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

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

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

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

GENERAL NOTES

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

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

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

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

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

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHORT DURATION FREEWAY CLOSURE SEQUENCE

TCP(6-7)-12

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4-98	WACO	BELL		38

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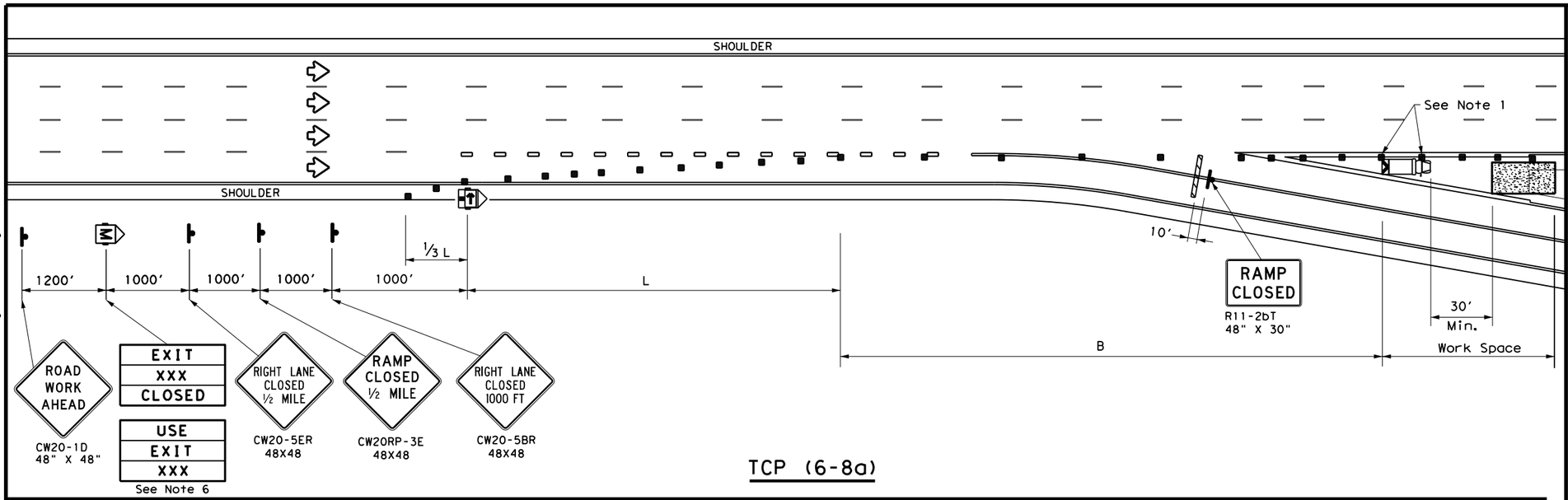
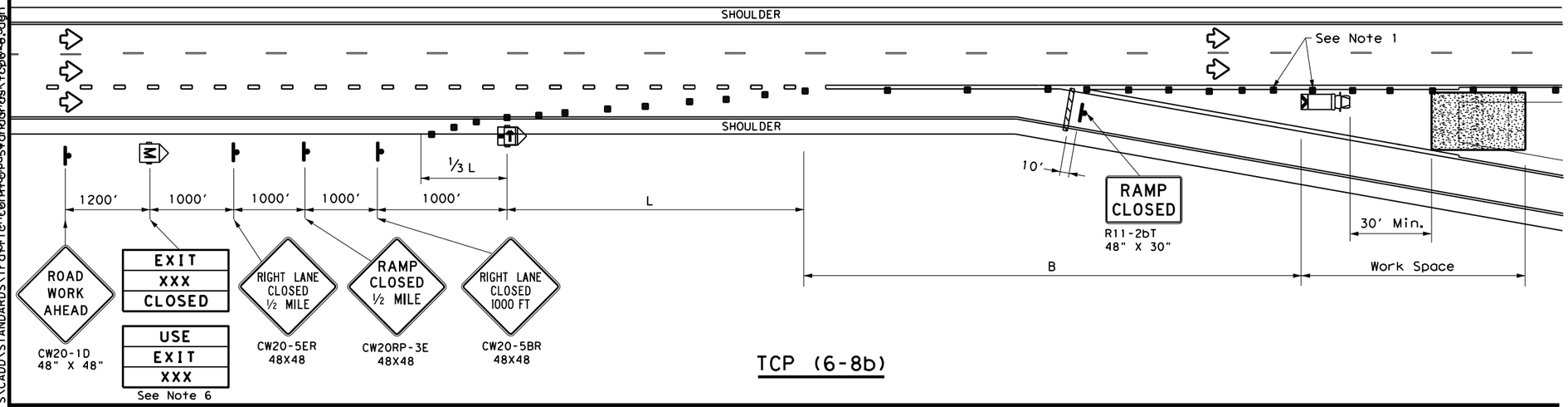
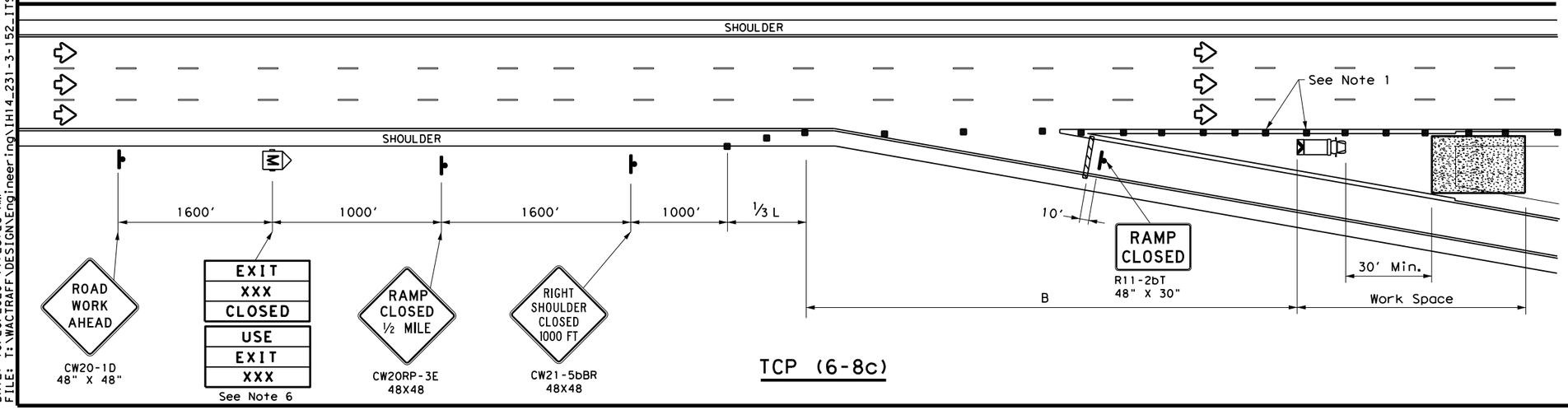


TCP (6-8a)



TCP (6-8b)



TCP (6-8c)

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

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

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

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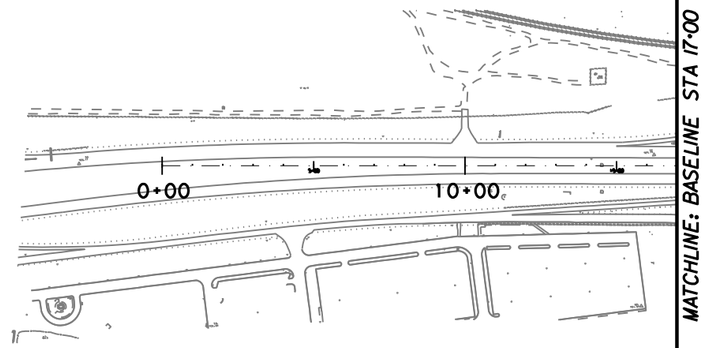
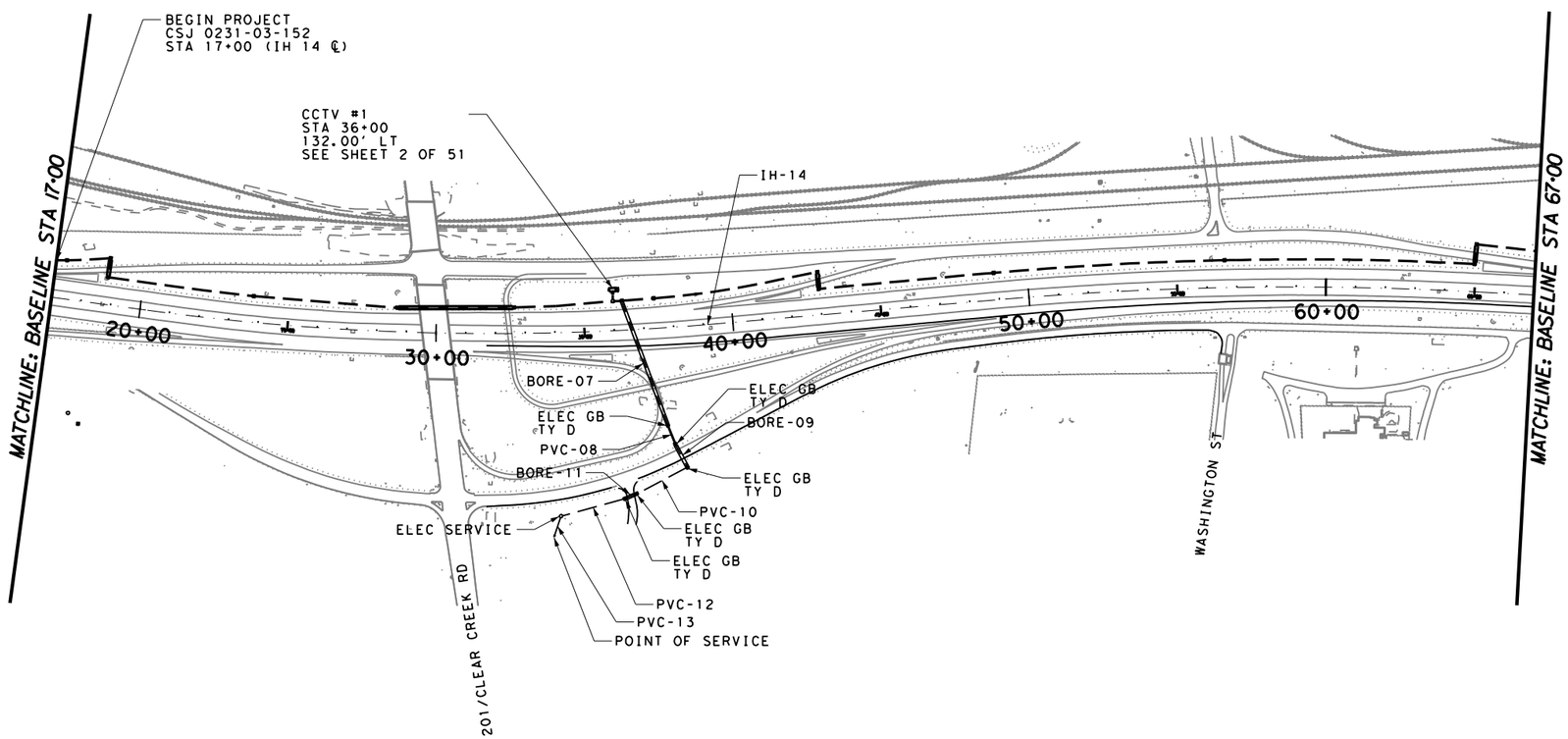
	WACO	BELL		39



MATCHLINE: BASELINE STA 17+00



LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS PROJECT LAYOUT

BEGIN PROJECT - STA 67+00

SCALE: 0 125 250 500 FEET
1" = 500' HORIZ.

SHEET 1 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		40

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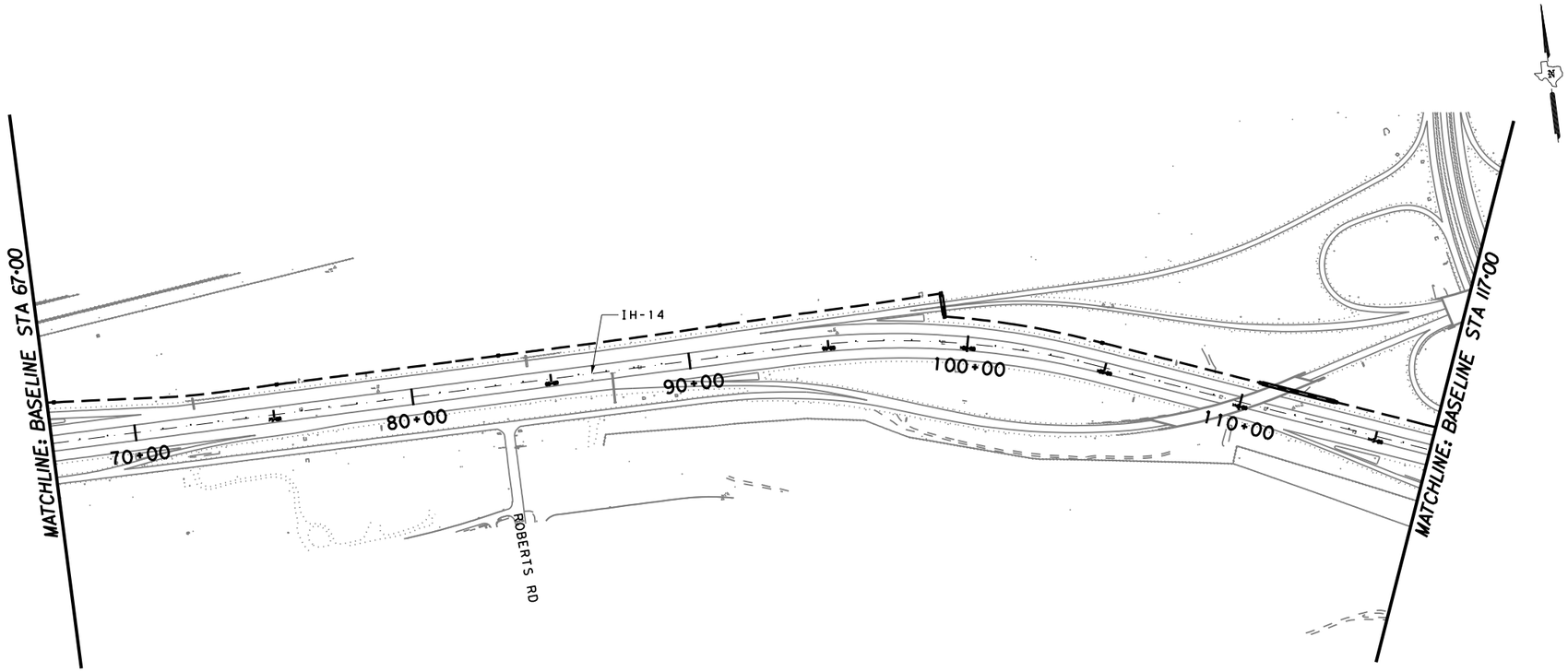

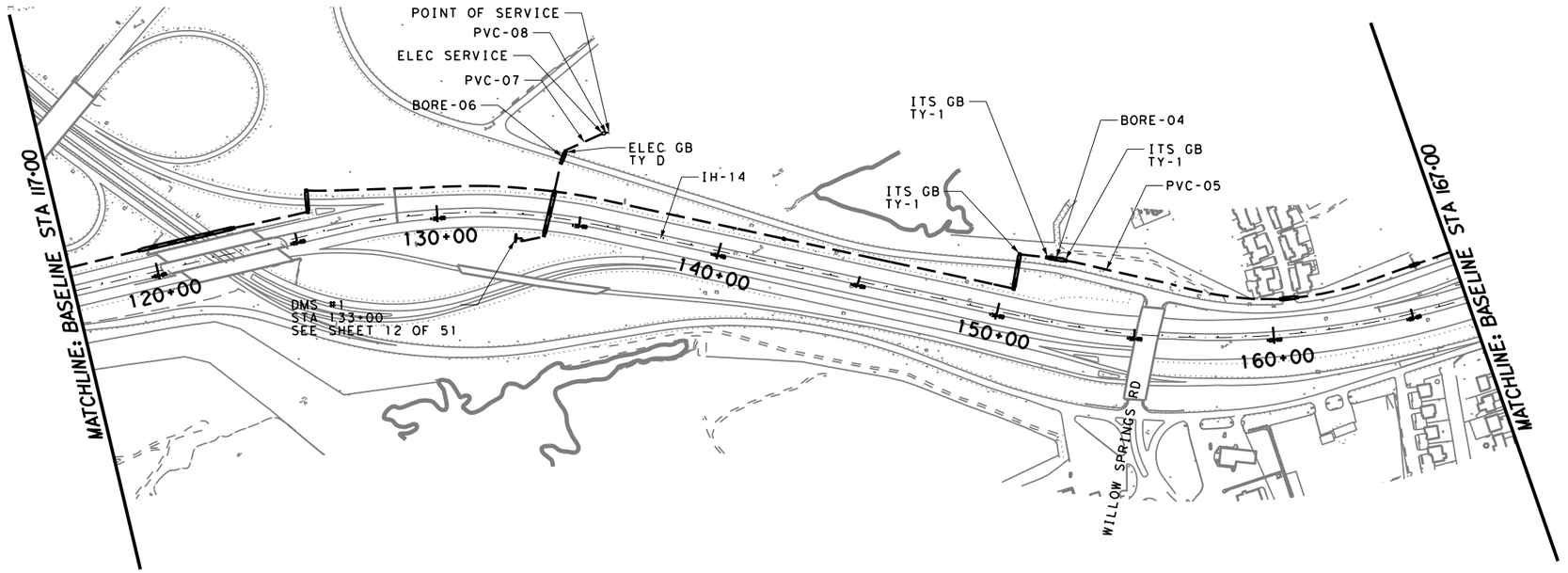

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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ITS PROJECT LAYOUT

STA 67+00 - STA 167+00

SCALE: 0 125 250 500 FEET
1" = 500' HORIZ.

SHEET 2 OF 6

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		41

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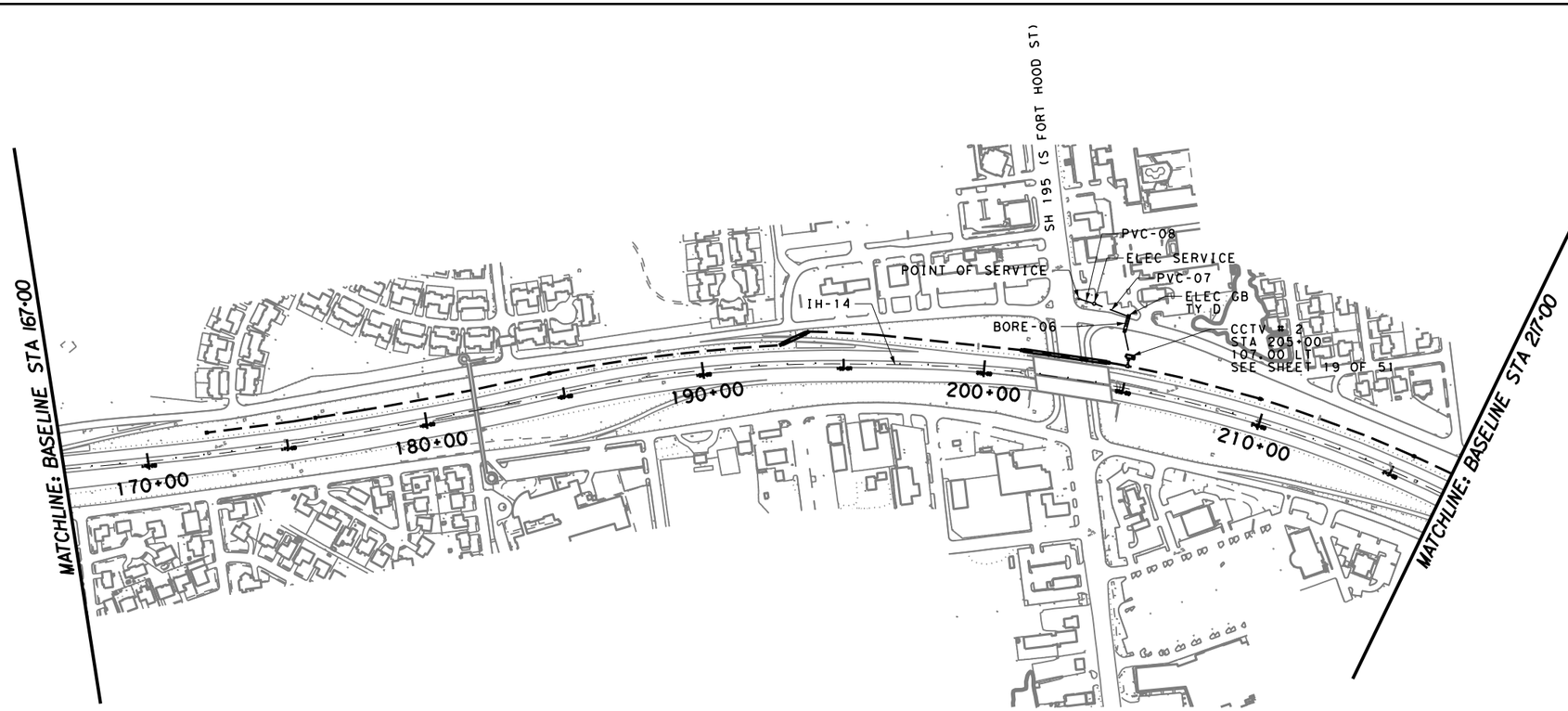

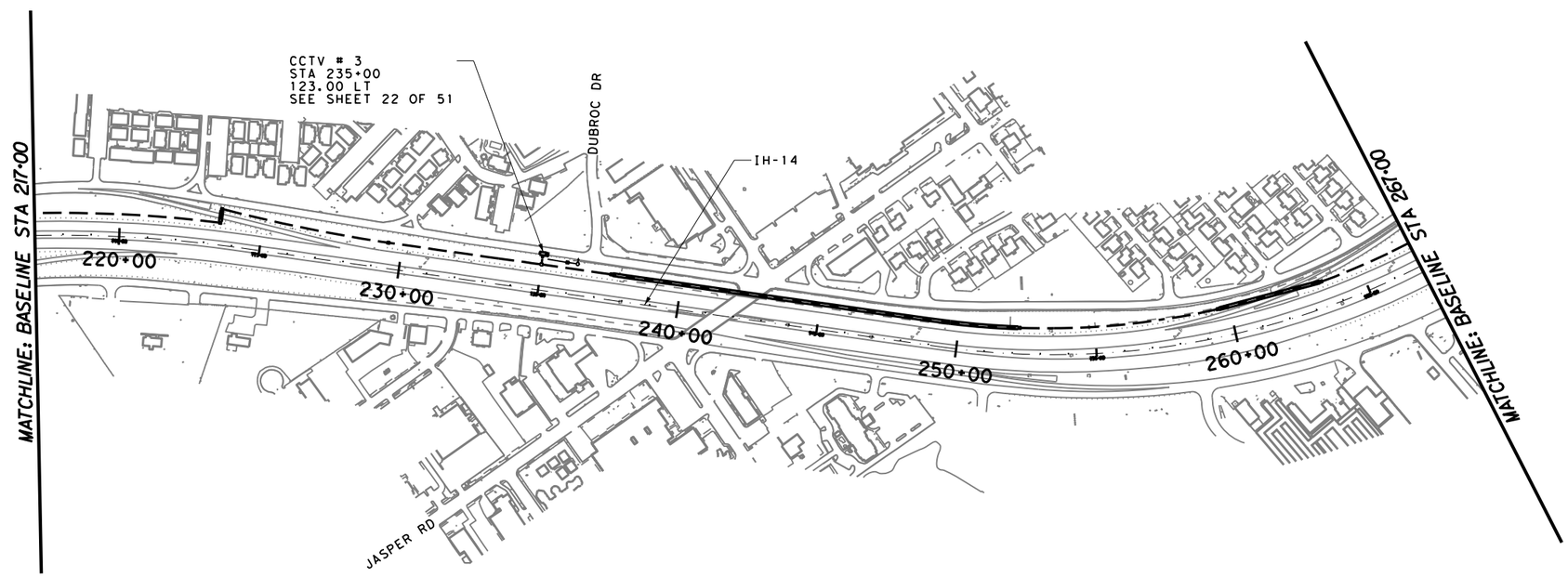

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
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ITS PROJECT LAYOUT

STA 167+00 - STA 267+00

SCALE: 0 125 250 500 FEET
1" = 500' HORIZ.

SHEET 3 OF 6

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		42

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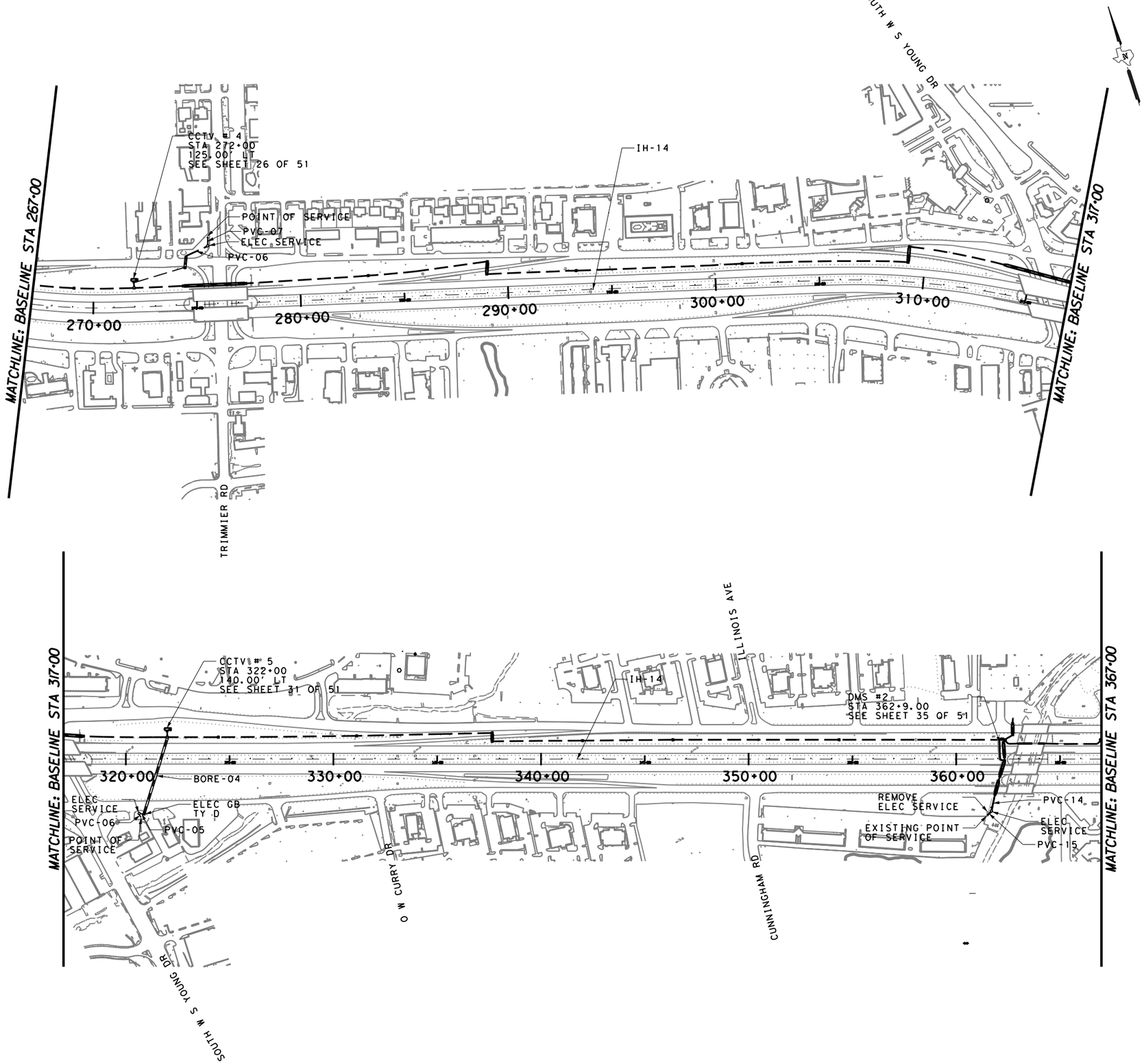

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

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ITS PROJECT LAYOUT

STA 267+00 - STA 367+00

SCALE: 0 125 250 500 FEET
1" = 500' HORIZ.

SHEET 4 OF 6

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		43

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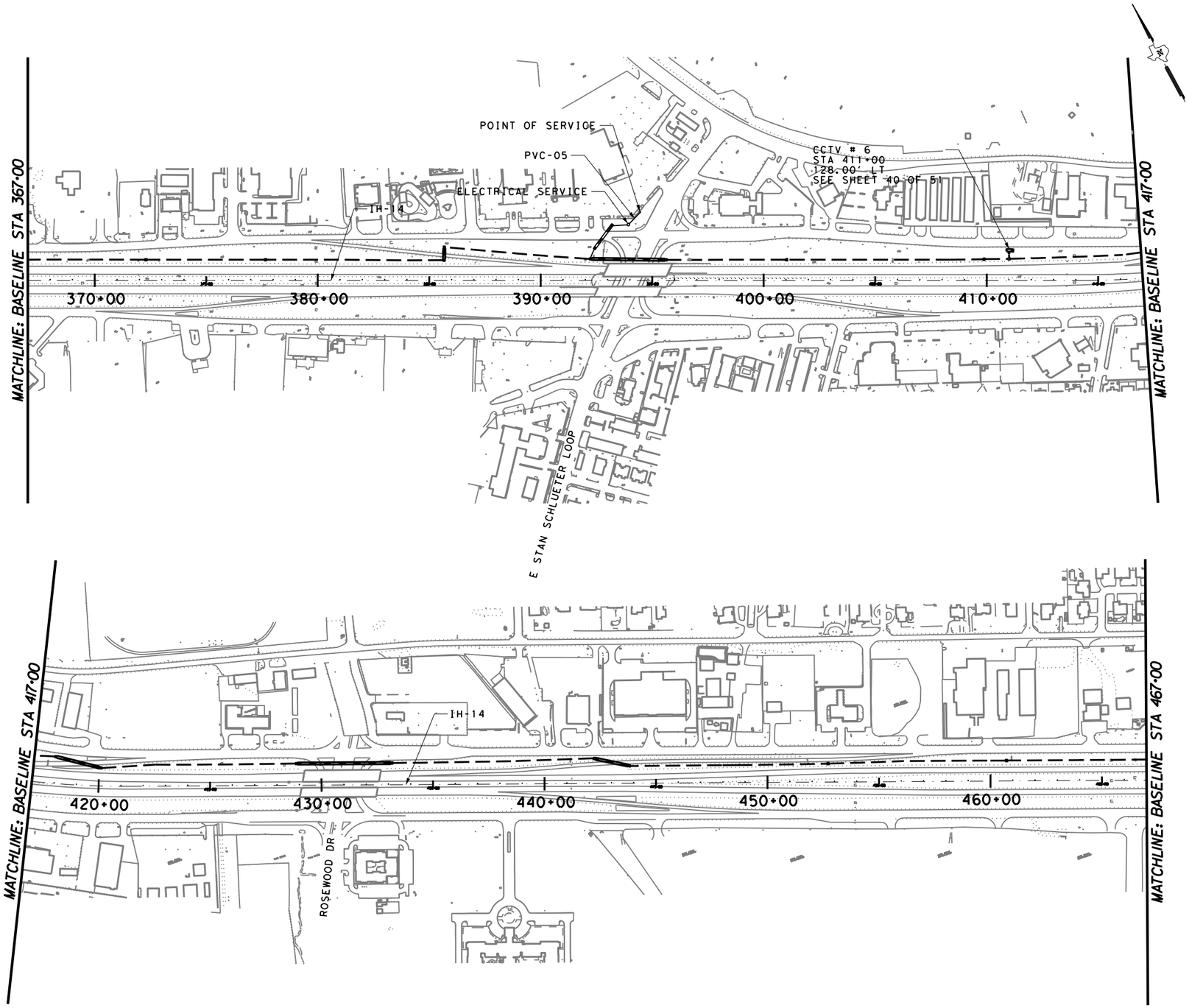

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
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PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

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ITS PROJECT LAYOUT

STA 367+00 - STA 467+00

SCALE: 0 125 250 500 FEET
1" = 500' HORIZ.

SHEET 5 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		44

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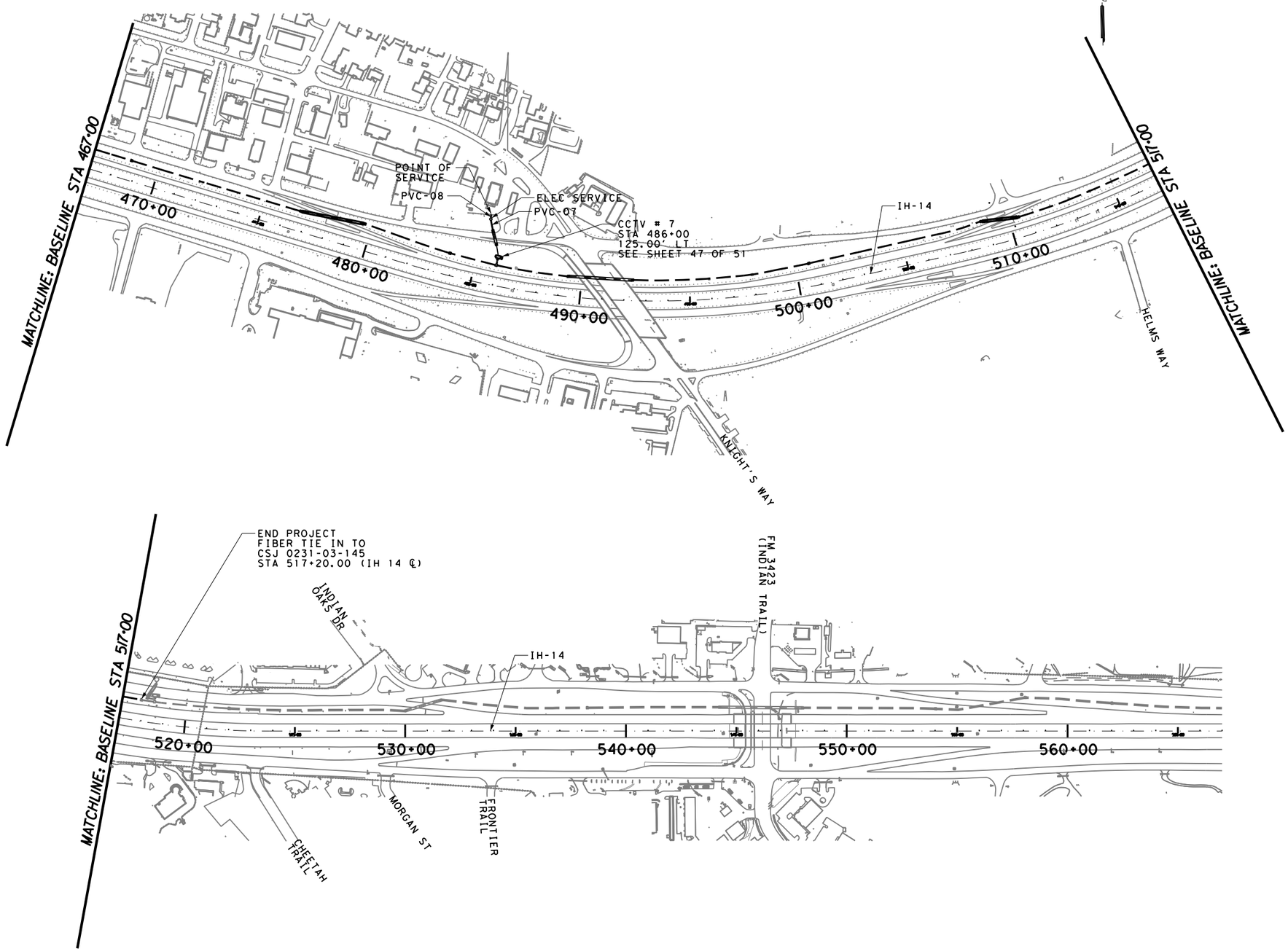

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
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ITS PROJECT LAYOUT

STA 467+00 - END PROJECT

SCALE: 0 125 250 500 FEET
1" = 500' HORIZ.

SHEET 6 OF 6

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		45

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NOTES:

1. EXISTING UTILITIES AND DRAINAGE STRUCTURES SHOWN ARE APPROXIMATE AND SHALL BE VERIFIED BY CONTRACTOR BEFORE CONSTRUCTION. ANY UTILITY DAMAGED BY CONTRACTOR SHALL BE REPAIRED BY CONTRACTOR AT NO COST TO TXDOT.

2. CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF THE EQUIPMENT PROVIDED. IF THE EQUIPMENT IS DAMAGED DURING TRANSPORTATION OR INSTALLATION THE CONTRACTOR SHALL REPLACE THE EQUIPMENT AT NO COST TO TXDOT.

3. CONTRACTOR SHALL FURNISH AND INSTALL ALL CABLING AND CONNECTORS NEEDED TO COMPLETE A FULLY FUNCTIONAL SYSTEM.

4. CONDUIT BETWEEN ELECTRIC METER AND POWER SOURCE TO BE INSTALLED BY CONTRACTOR AND PAID FOR BY ITEM 618.

5. UNLESS SHOWN OTHERWISE ON THE PLAN SHEETS, SLACK CABLE IS INCLUDED IN THE QUANTITIES AND PROVIDED AS FOLLOWS:

- NO. 14 TRACER WIRE: 3 LF AT EACH GROUND BOX.

- 6 STRAND FIBER: 25 LF AT EACH GROUND BOX AND EACH CABINET.

- 144 STRAND FIBER: 100 LF AT EACH GROUND BOX AND EACH FUTURE SPLICE POINT.

- FLOWABLE BACKFILL AND CONCRETE ENCASEMENT SHALL BE SUBSIDIARY TO ITS CONDUIT.

- ALL ITS BACKBONE CONDUIT TO BE BURIED AT MINIMUM 42" FROM FINISHED GRADE PER ITS (27)-16 WHICH DOES NOT REQUIRE ENCASEMENT WHEN INSTALLED UNDER A ROADWAY. WHERE A MINIMUM 42" IS NOT POSSIBLE DUE TO FIELD CONDITIONS OR UTILITY CONFLICTS, THE CONDUIT SHALL BE ENCASED IN CONCRETE.

- CONTRACTOR SHALL IMPLEMENT NECESSARY LANE CLOSURES, AS NEEDED, AFTER THE INSTALLATION OF THE DYNAMIC MESSAGE SIGNS TO ALLOW ACCESS TO THE SIGN DURING COMMISSIONING AND TESTING BEFORE THE SIGN HAS SUCCESSFULLY COMPLETED FINAL ACCEPTANCE TESTING. ALL LABOR AND MATERIALS NEEDED SHALL BE SUBSIDIARY TO THE ITEM 6028 "INSTALL DMS (FOUNDATION MTD CABINET)"

ITS AND ELECTRICAL SERVICE DATA

SERVICE POLE #	ITS PLAN LAYOUT SHEET #	SERVICE POLE DESCRITION (SEE ED(5)-14)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS SIZE #	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT.BRK. POLE/AMP	TWO POLE CONTACTOR (AMPS)	PANEL BD./ LOADCENTER AMP RATING (MIN)	SERVICE TO CABINET	BRANCH CKT. BRK. POLE/AMPS	BRANCH CIRCUIT AMPS	TOTAL KVA LOAD
ITS 1	2 OF 51	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	2" PVC	3/#6	N/A	2P / 60 A	N/A	60 A	CCTV #1	1P / 20 A	10	1.2
ITS 2	12 OF 51	ELC SRV TY D 120/240 100 (NS) SS (E) PS (U)	2" PVC	3/#6	N/A	2P / 100 A	N/A	100 A	DMS #1	2P / 50 A	25	6
ITS 3	19 OF 51	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	2" PVC	3/#6	N/A	2P / 60 A	N/A	60 A	CCTV #2	1P / 20 A	10	1.2
ITS 4	22 OF 51	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	2" PVC	3/#6	N/A	2P / 60 A	N/A	60 A	CCTV #3	1P / 20 A	10	1.2
ITS 5	26 OF 51	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	2" PVC	3/#6	N/A	2P / 60 A	N/A	60 A	CCTV #4	1P / 20 A	10	1.2
ITS 6	31 OF 51	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	2" PVC	3/#6	N/A	2P / 60 A	N/A	60 A	CCTV #5	1P / 20 A	10	1.2
ITS 7	35 OF 51	ELC SRV TY D 120/240 100 (NS) SS (E) PS (U)	2" PVC	3/#6	N/A	2P / 100 A	N/A	100 A	DMS #2	2P / 50 A	25	6
ITS 8	40 OF 51	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	2" PVC	3/#6	N/A	2P / 60 A	N/A	60 A	CCTV #6	1P / 20 A	10	1.2
ITS 9	47 OF 51	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	2" PVC	3/#6	N/A	2P / 60 A	N/A	60 A	CCTV #7	1P / 20 A	10	1.2

STATE OF TEXAS
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SIGNATURE OF REGISTRANT & DATE

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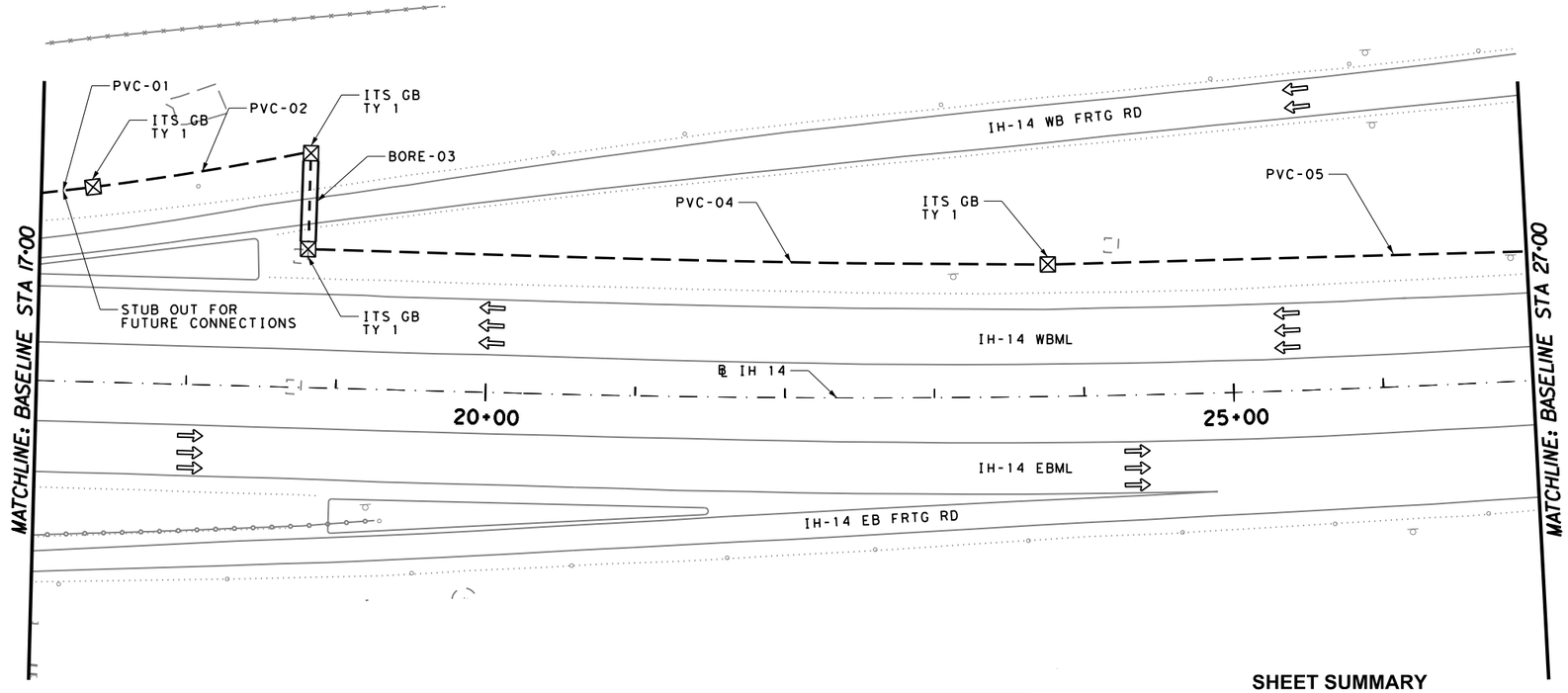
ITS NOTES AND ELECTRICAL SERVICE DATA

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		46



CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 41	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	40											2				1	1	2				1
2	155											2				1	1	2				2
3	70													2		1	1			2		3
4	500											2				1	1	2				4
5	325											2				1	1	2				5

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2040
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	140
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1102
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1490
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2040
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	140
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	4
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
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PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 17+00 - STA 27+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 1 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		47

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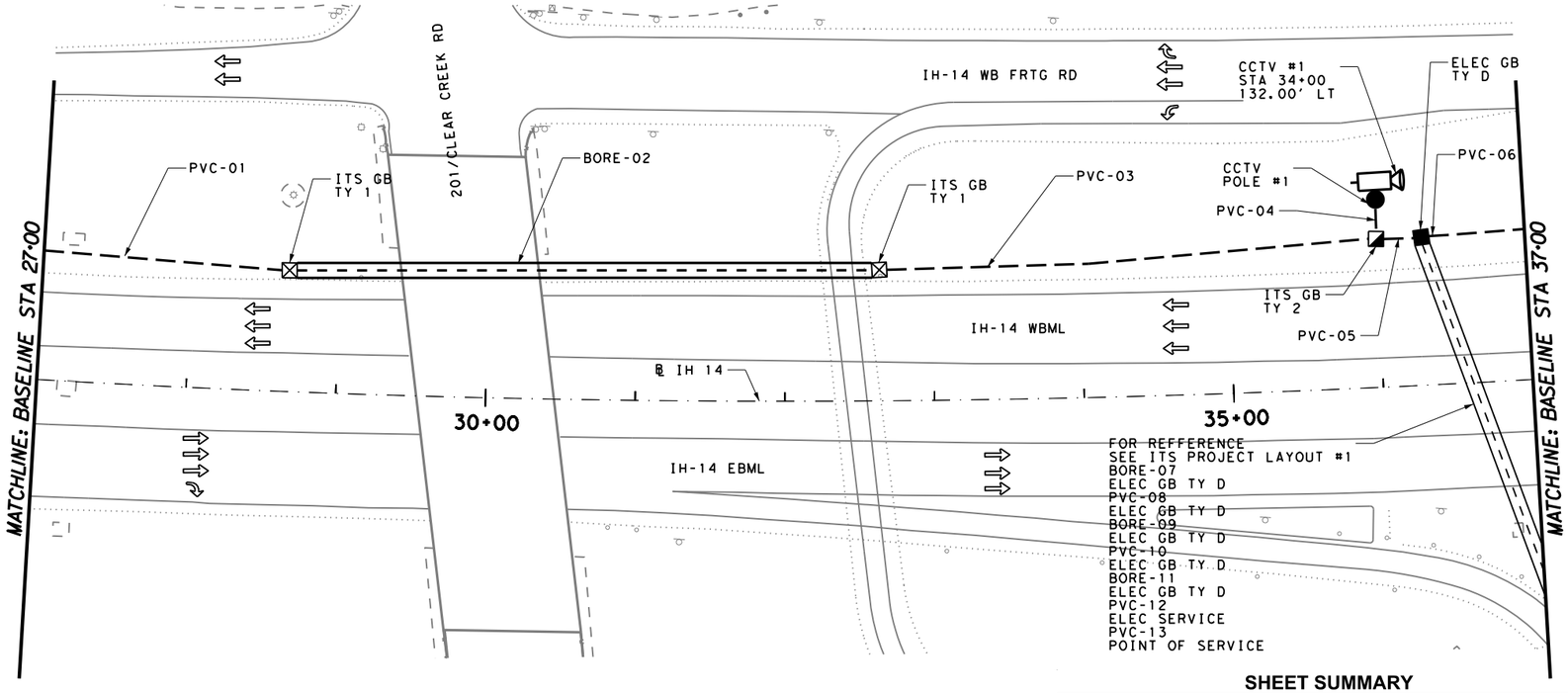

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER							0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND			FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	ITS COM CLB (ETHERNET)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6004 6031	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	165												2				1	1	2				1
2	400														2		1	1			2		2
3	335												2				1	1	2				3
4	25		1			1		1	1	2													4
5	30		1						1	2			2				1	1	2				5
6	70												2				1	1	2				6
7	445			1					1	2													7
8	70		1						1	2													8
9	90			1					1	2													9
10	195		1						1	2													10
11	45			1					1	2													11
12	220		1						1	2													12
13	65	1									1	2											13

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	19
0432	6001	RIPRAP (CONC) (4 IN)	CY	1.5
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	65
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1740
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	1380
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1031
0620	6007	ELEC CONDR (NO.8) BARE	LF	1120
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	2240
0620	6009	ELEC CONDR (NO.6) BARE	LF	65
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	130
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	6
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	1
6004	6031	ITS COM CLB (ETHERNET)	LF	65
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	75
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1200
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1200
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	800
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	1
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	1
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	1
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	1
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	1

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 27+00 - STA 37+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 2 OF 51

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		48

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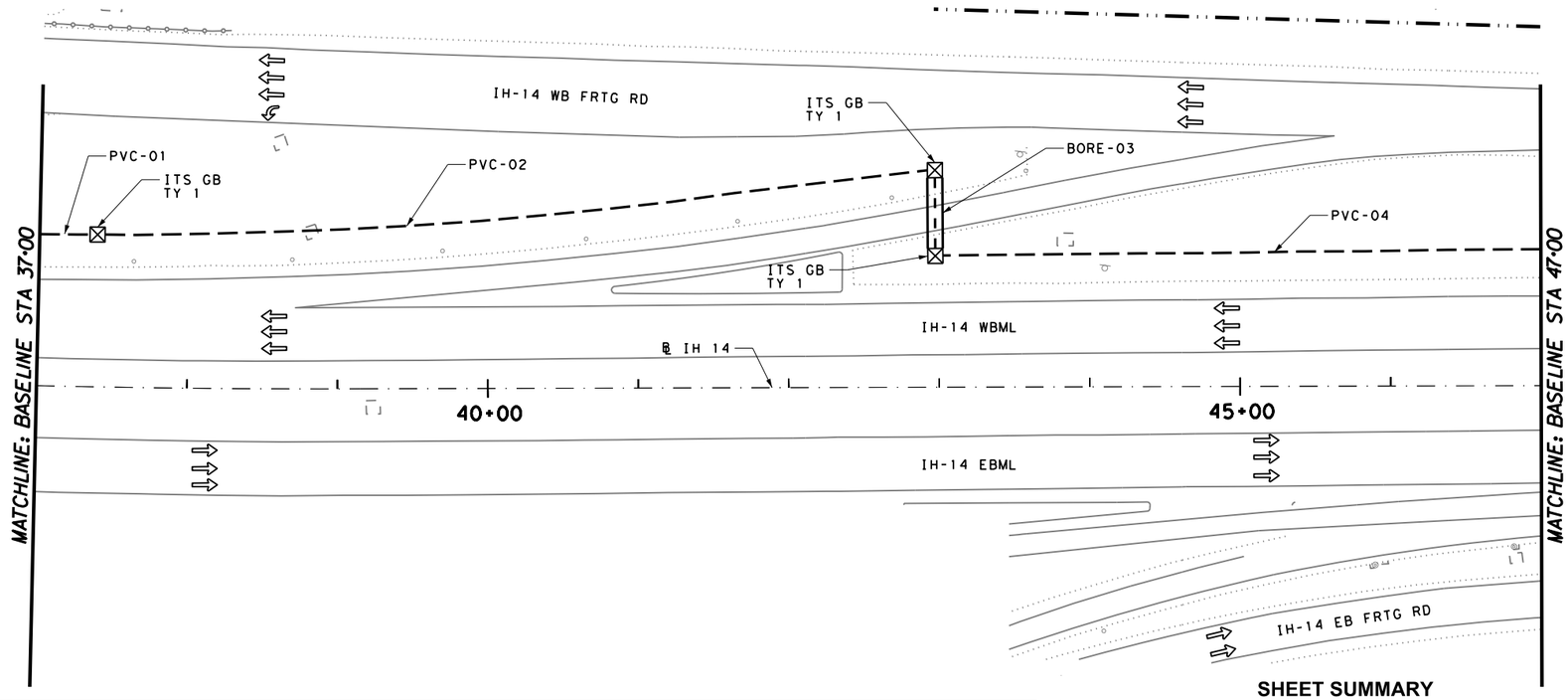

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE										
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 41	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	45											2				1	1	2				1
2	565											2				1	1	2				2
3	60													2		1	1			2		3
4	405											2				1	1	2				4

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2030
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	120
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1084
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1375
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2030
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	120
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	3
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 37+00 - STA 47+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 3 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		49

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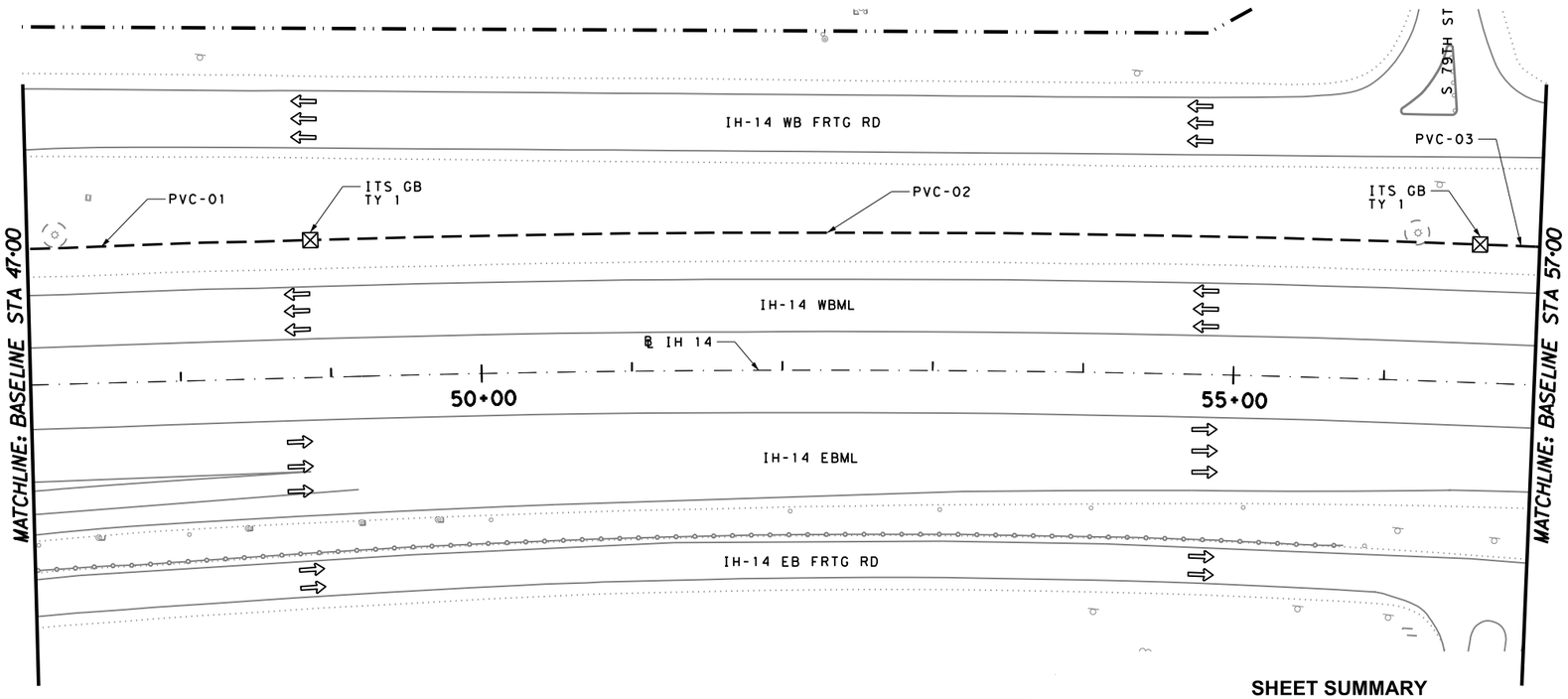

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 41	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	195											2				1	1	2				1
2	785											2				1	1	2				2
3	45											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2050
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1031
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1225
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2050
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 47+00 - STA 57+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 4 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		50

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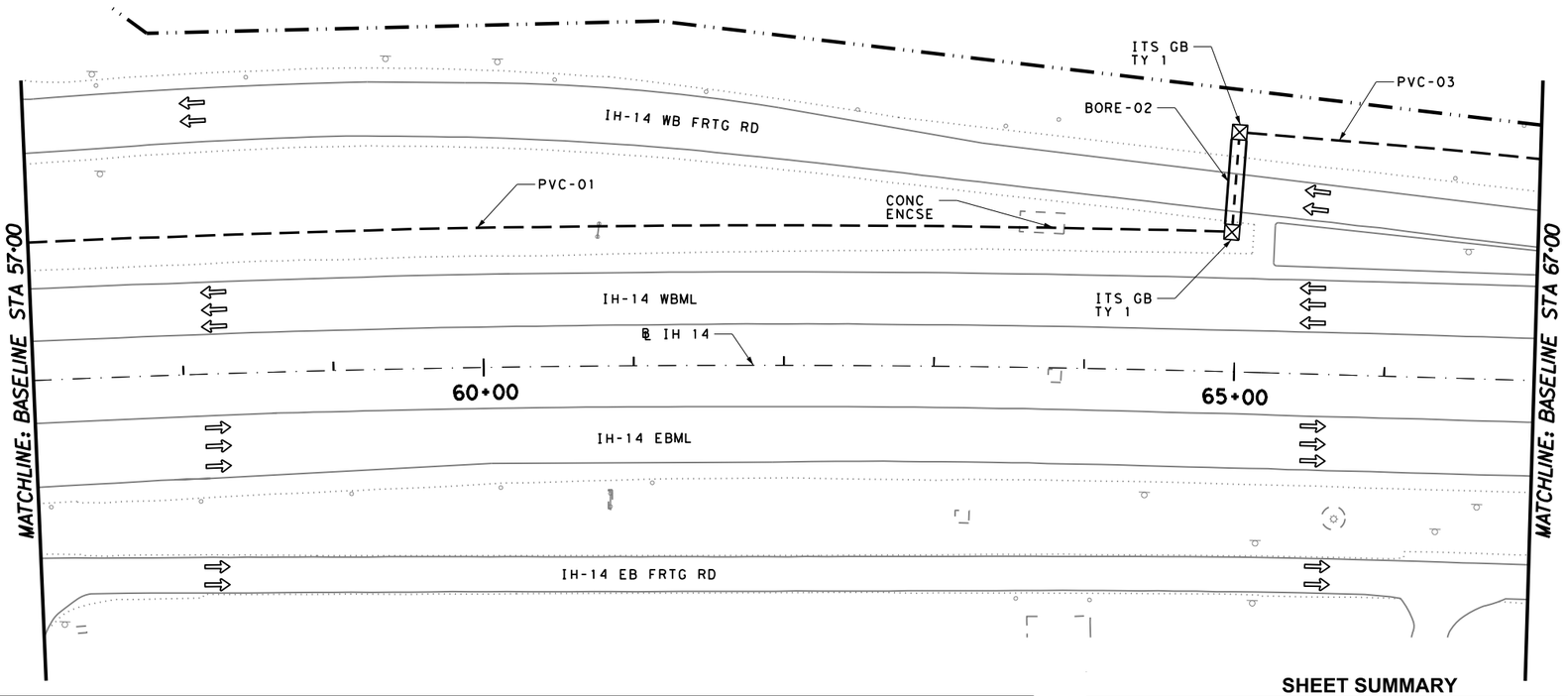

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE										
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 41	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	750											2				1	1	2				1
	50												2			1	1		2			
2	70													2		1	1			2		2
3	205											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1910
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	100
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	140
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1081
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1275
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1910
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	100
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	140
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 57+00 - STA 67+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 5 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		51

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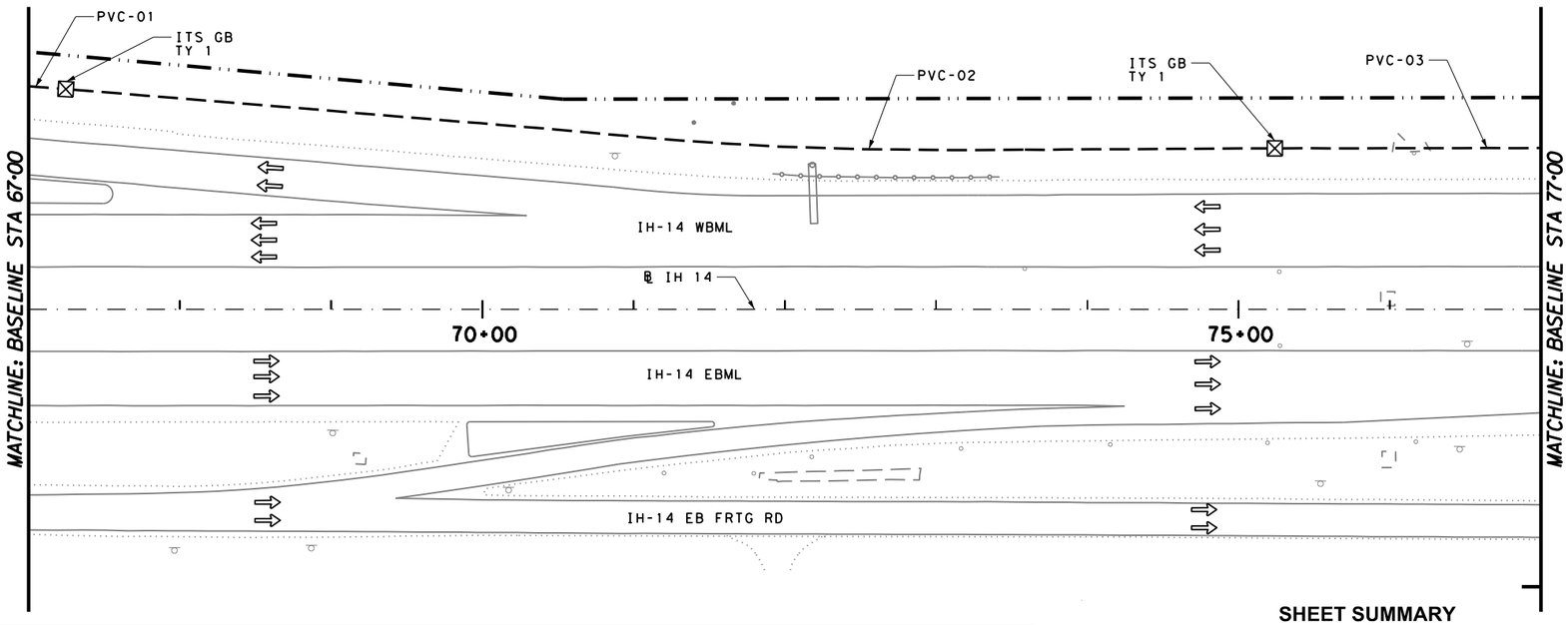

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 41	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	30											2				1	1	2				1
2	805											2				1	1	2				2
3	180											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2030
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1021
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1215
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2030
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 67+00 - STA 77+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 6 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		52

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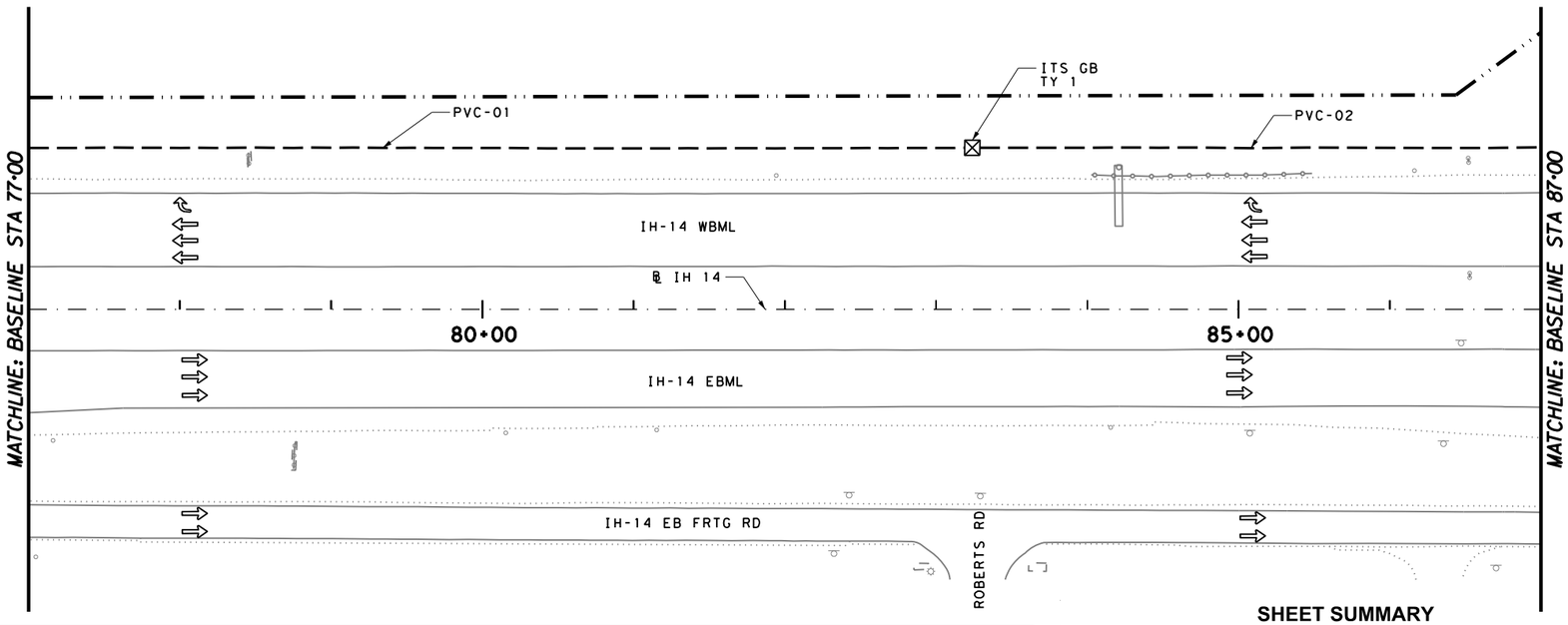

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 41	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	630											2				1	1	2				1
2	380											2				1	1	2				2

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2020
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1013
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1110
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2020
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 77+00 - STA 87+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 7 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		53

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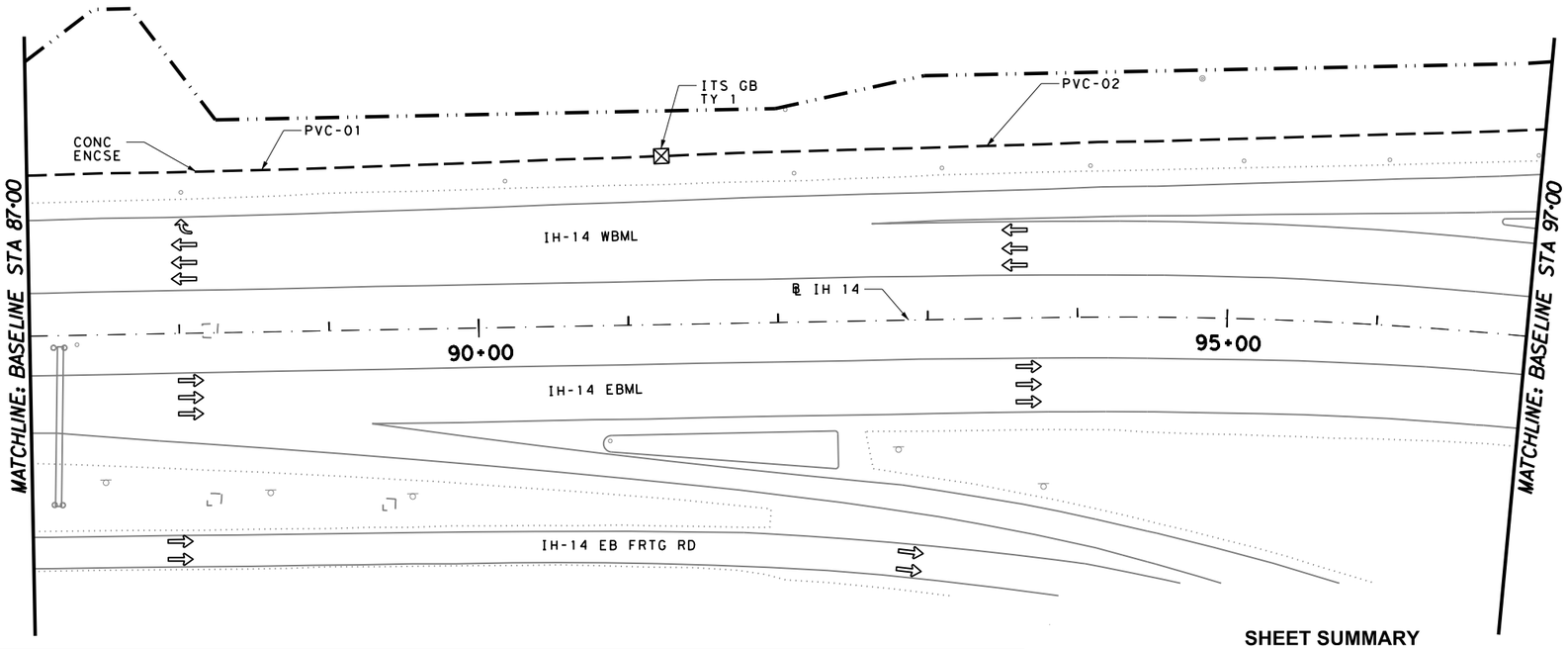

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 41	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	400											2				1	1	2				1
	30												2			1	1		2			
2	595											2				1	1	2				2

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1990
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	60
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1028
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1125
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1990
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	60
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 87+00 - STA 97+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 8 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		54

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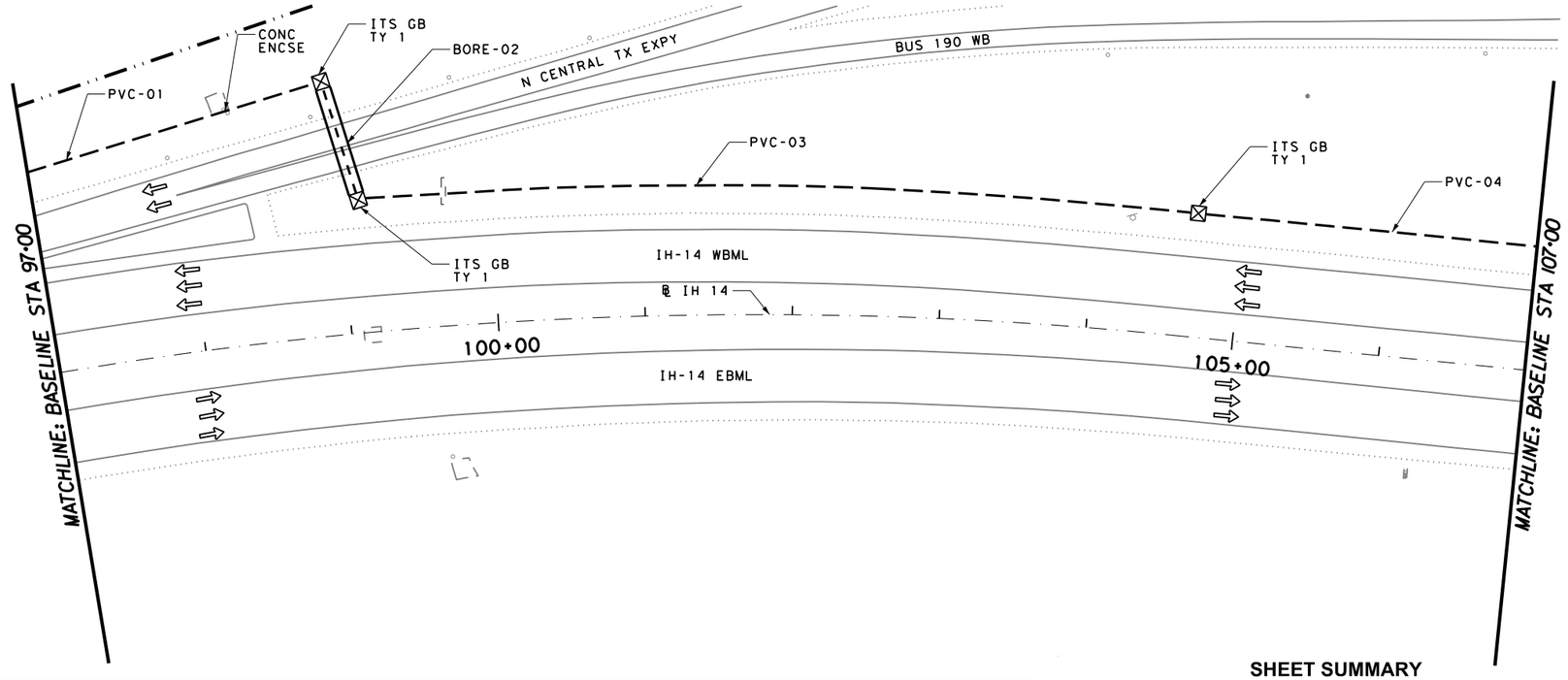

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 41	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	185											2				1	1	2				1
	30												2			1	1		2			
2	90													2		1	1			2		2
3	575											2				1	1	2				3
4	235											2				1	1	2				4

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1990
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	60
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	180
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1124
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1415
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1990
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	60
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	180
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	3
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 97+00 - STA 107+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 9 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		55

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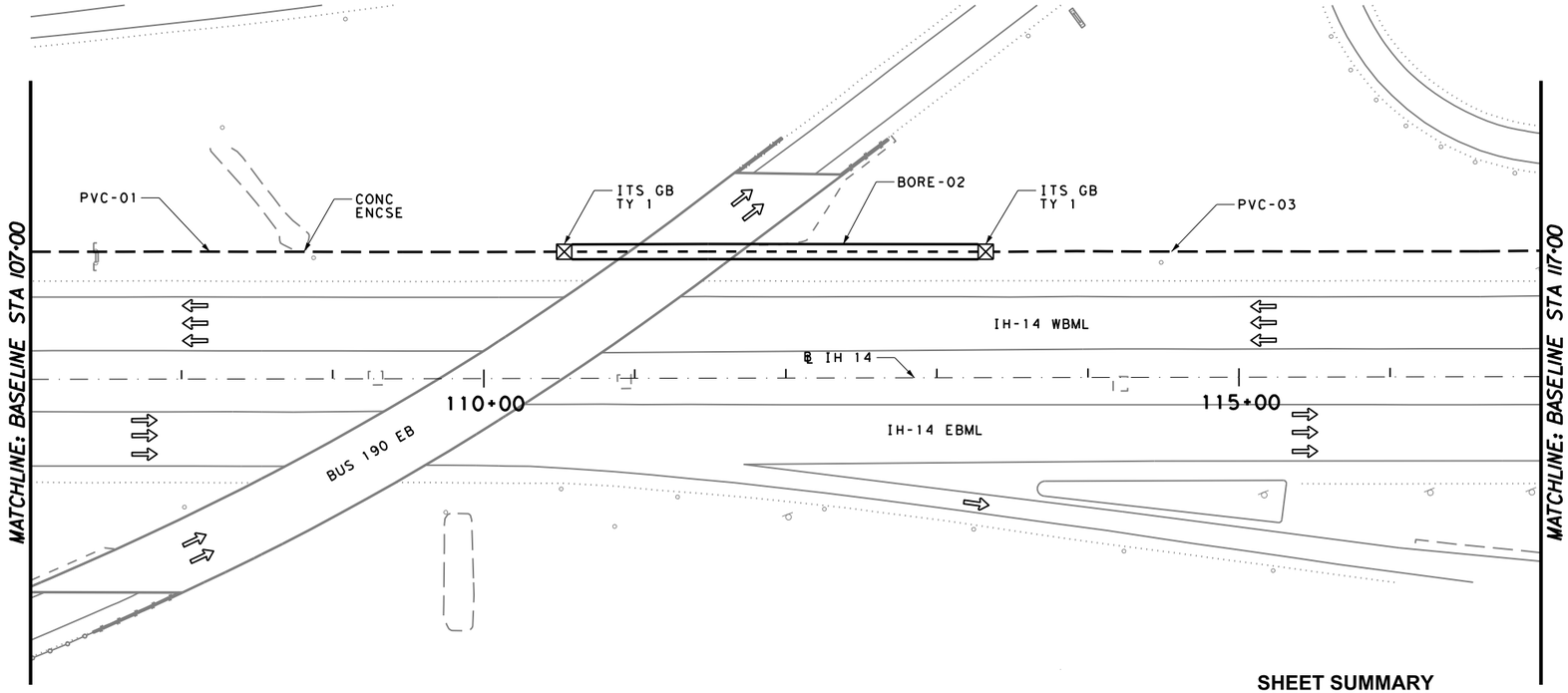

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 41	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	320											2				1	1	2				1
	40												2			1	1		2			
2	285													2		1	1			2		2
3	375											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1390
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	80
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	570
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1026
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1220
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1390
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	80
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	570
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 107+00 - STA 117+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 10 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		56

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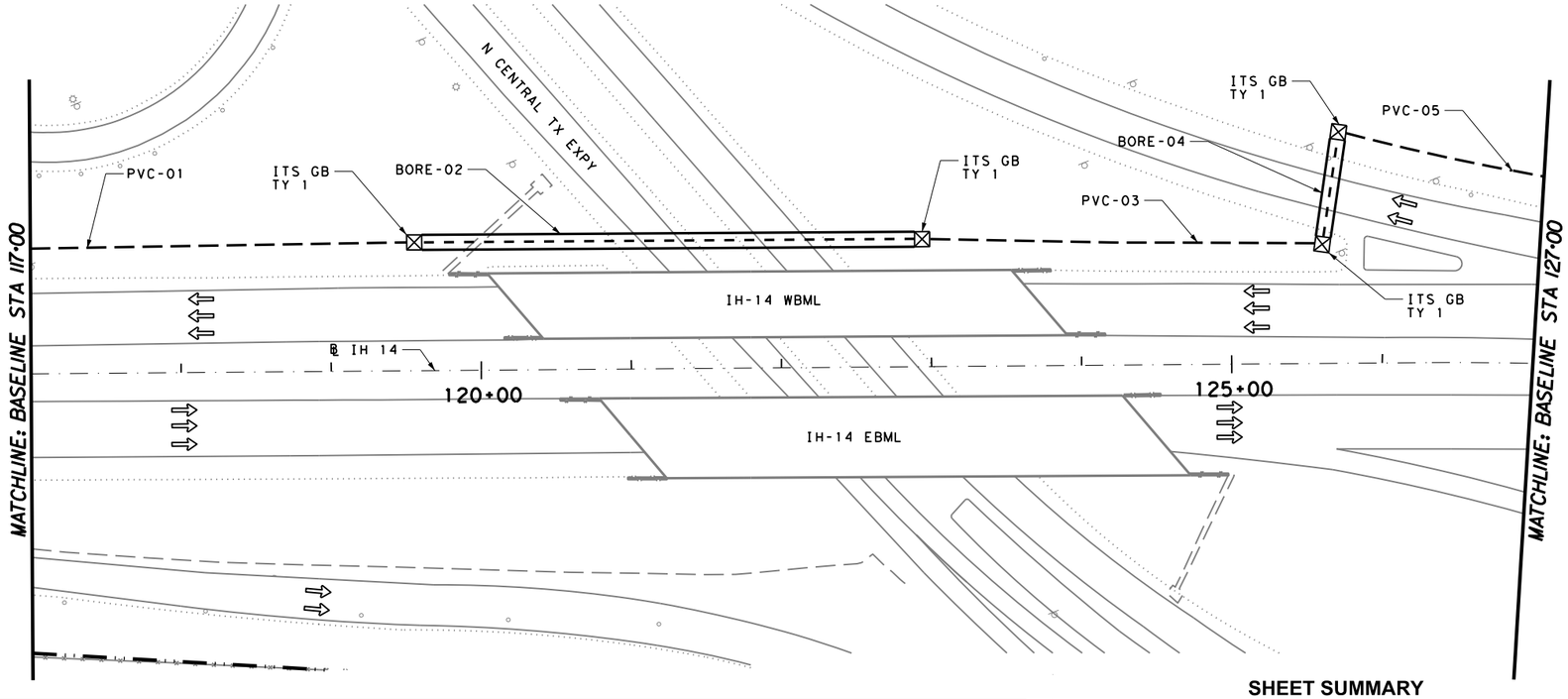

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	260											2				1	1	2				1
2	345													2		1	1			2		2
3	270											2				1	1	2				3
4	80													2		1	1			2		4
5	145											2				1	1	2				5

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1350
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	850
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1112
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1500
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1350
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	850
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	4
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 117+00 - STA 127+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 11 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		57

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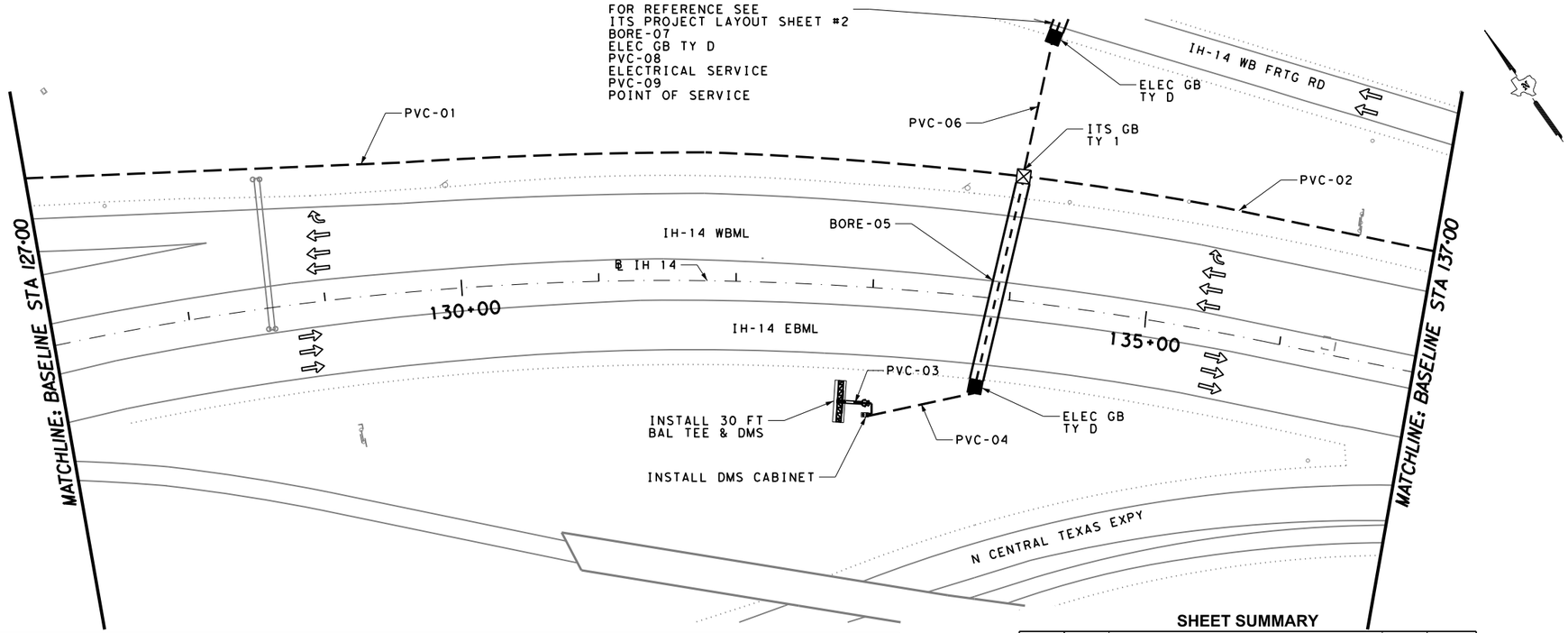

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER							0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND			FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	ITS COM CLB (ETHERNET)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6004 6031	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	735												2				1	1	2				1
2	305												2				1	1	2				2
3	67		2			1	1																3
4	85		1								1	2											4
5	160			1							1	2											5
6	105		1								1	2											6
7	45			1							1	2											7
8	150		1								1	2											8
9	15	1									1	2											9

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6006	DRILL SHAFT (48 IN)	LF	25
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	15
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2554
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	205
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1110
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	560
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	1120
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	3
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
0628	6239	ELC SRV TY D 120/240 100 (NS) SS (E) PS (U)	EA	1
0650	6028	INS OH SN SUP (30 FT BAL TEE)	EA	1
6004	6031	ITS COM CLB (ETHERNET)	LF	67
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1140
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2080
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6028	6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 127+00 - STA 137+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 12 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		58

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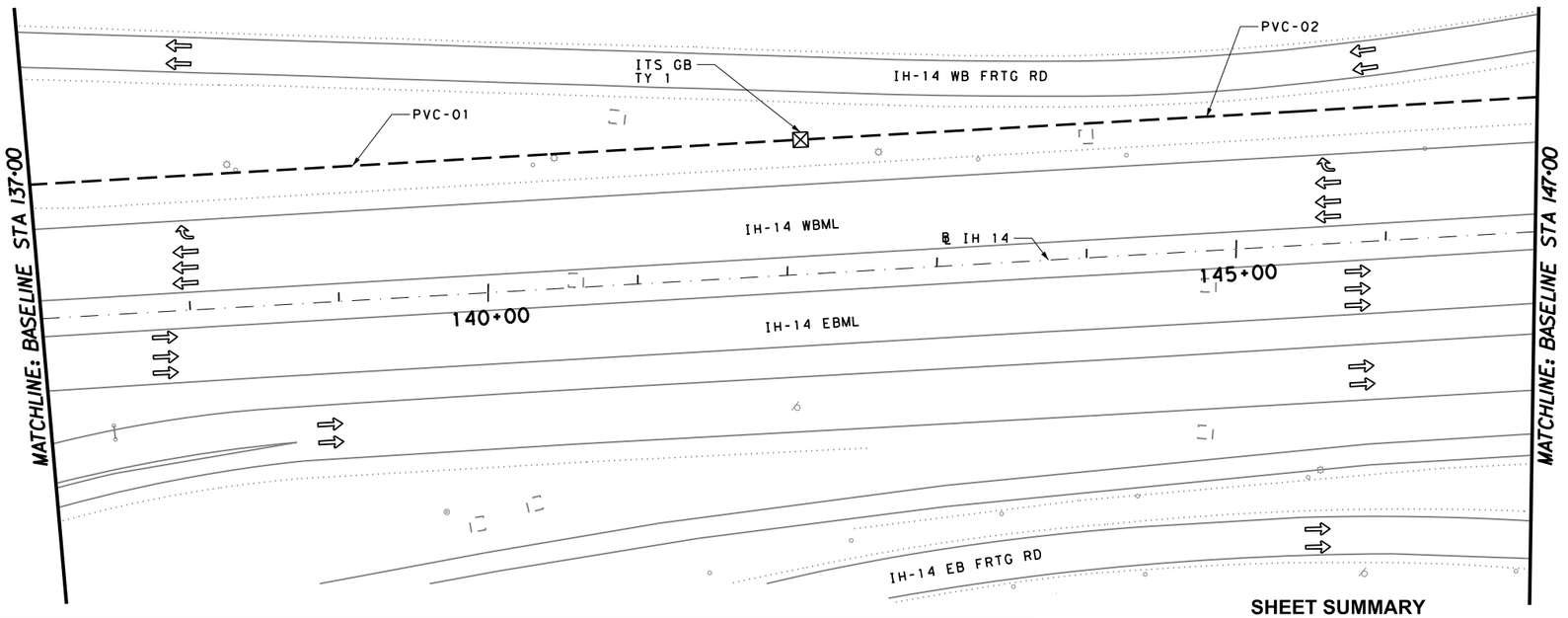

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	520											2				1	1	2				1
2	500											2				1	1	2				2

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2040
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1023
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1120
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2040
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 137+00 - STA 147+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 13 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		59

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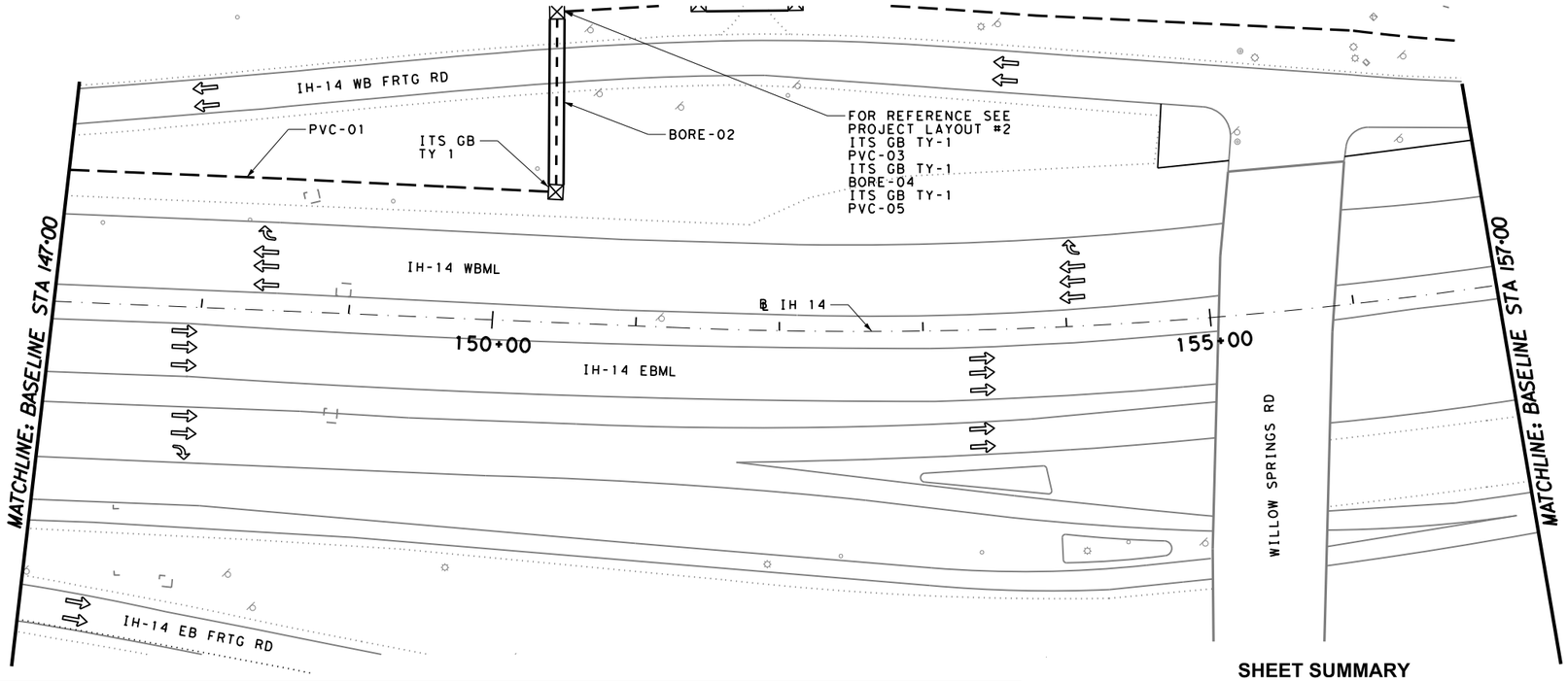

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	335											2				1	1	2				1
2	125													2		1	1			2		2
3	100											2				1	1	2				3
4	70													2		1	1			2		4
5	450											2				1	1	2				5

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1770
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	390
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1092
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1480
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1770
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	390
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	4
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 147+00 - STA 157+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 14 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		60

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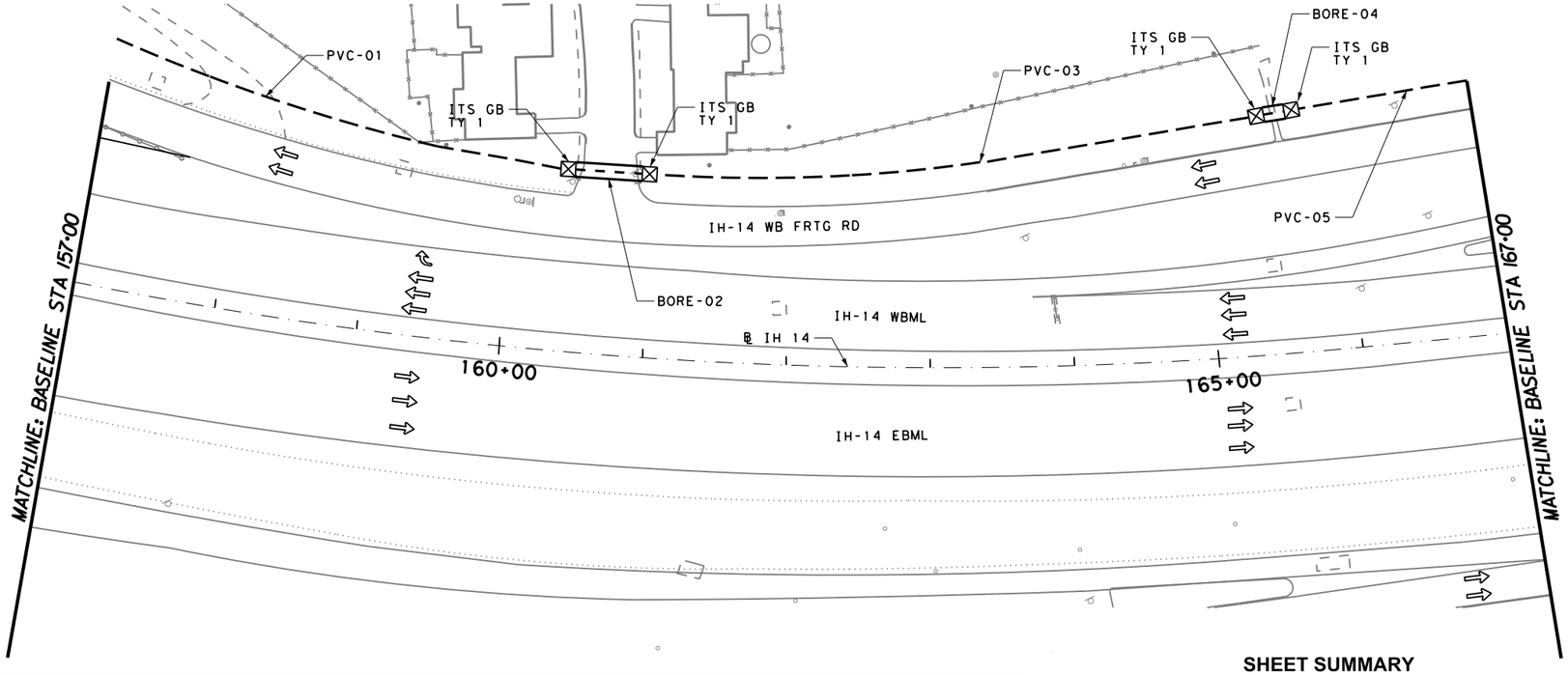

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	325											2				1	1	2				1
2	60													2		1	1			2		2
3	420											2				1	1	2				3
4	25													2		1	1			2		4
5	125											2				1	1	2				5

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1740
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	170
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	967
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1355
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1740
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	170
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	4
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 157+00 - STA 167+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 15 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		61

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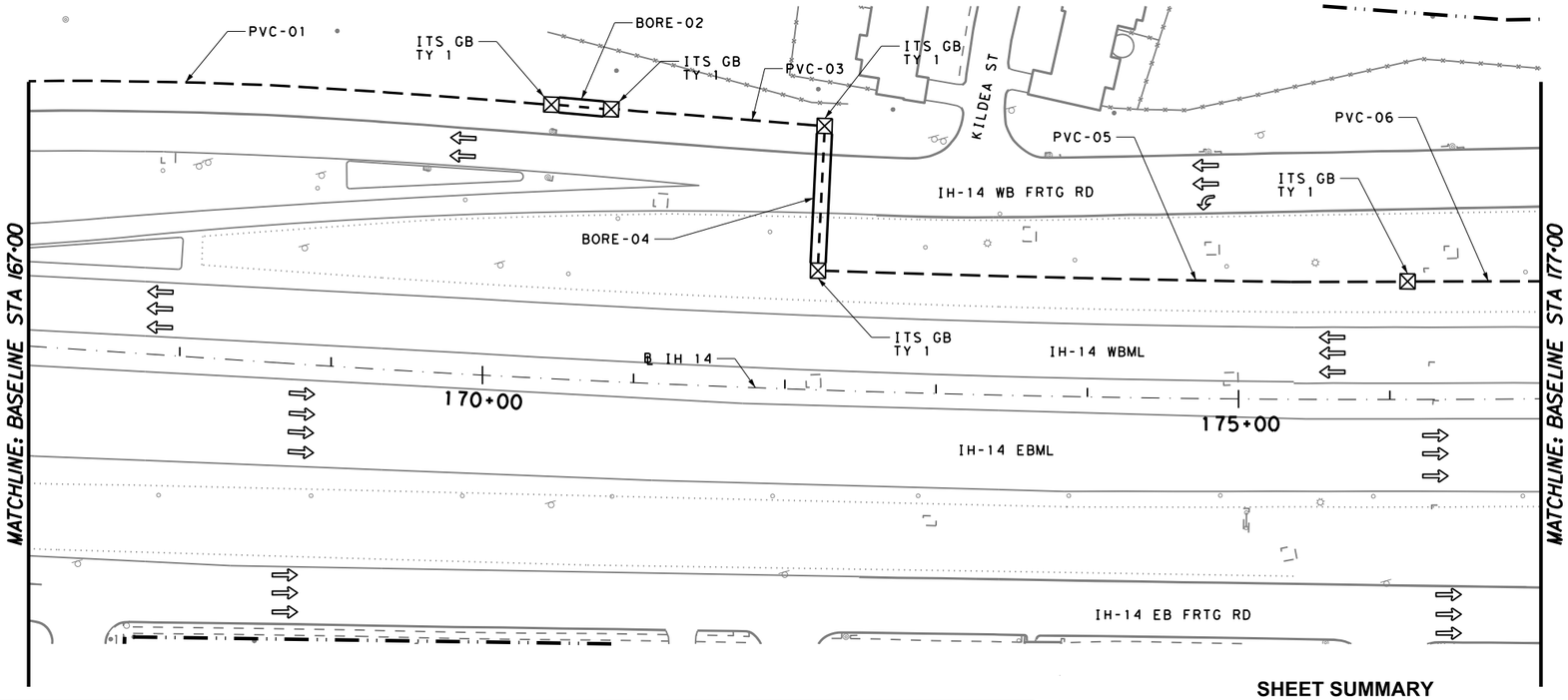

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	345											2				1	1	2				1
2	40													2		1	1			2		2
3	145											2				1	1	2				3
4	95													2		1	1			2		4
5	390											2				1	1	2				5
6	90											2				1	1	2				6

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1940
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	270
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1120
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1605
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1940
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	270
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	5
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 167+00 - STA 177+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 16 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		62

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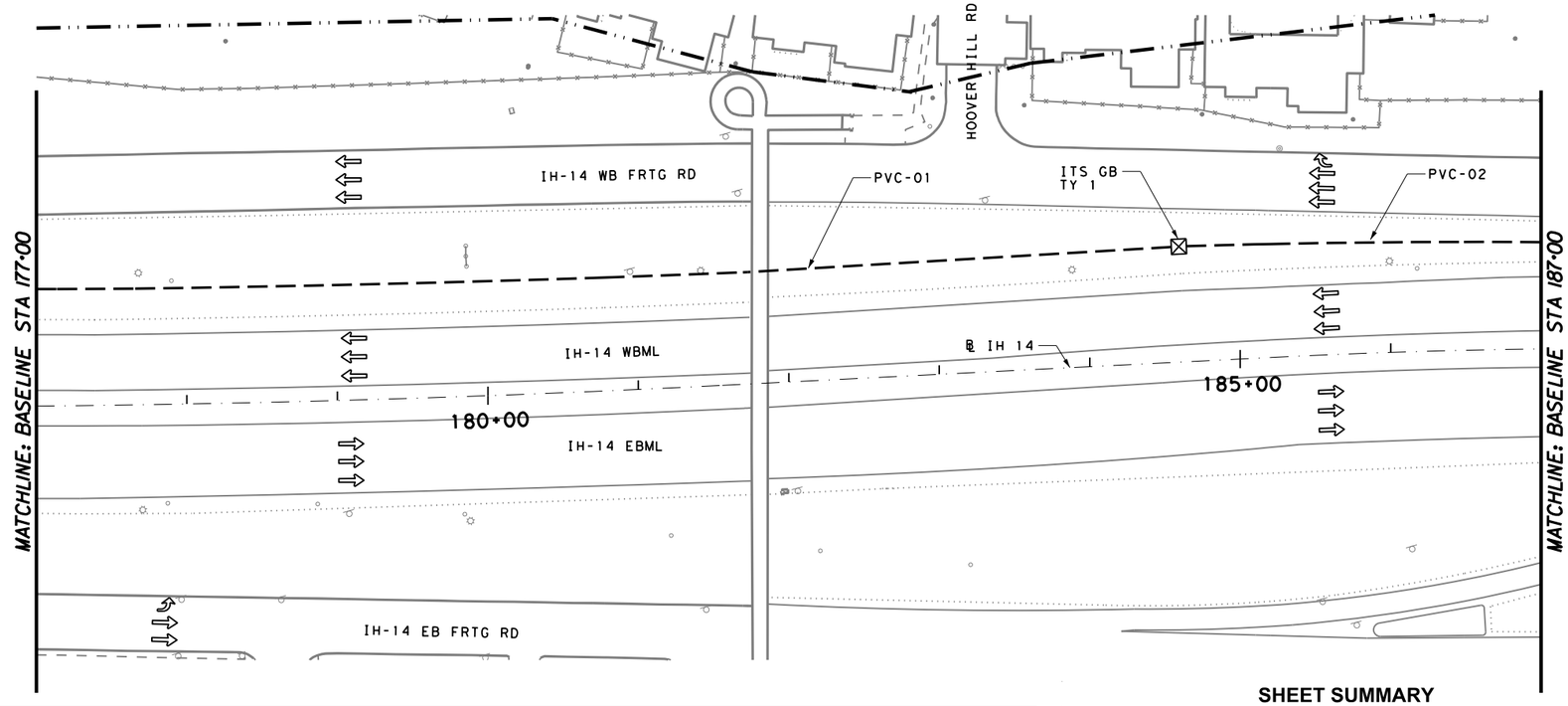

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	805											2				1	1	2				1
2	245											2				1	1	2				2

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2100
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1053
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1150
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2100
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 177+00 - STA 187+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 17 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		63

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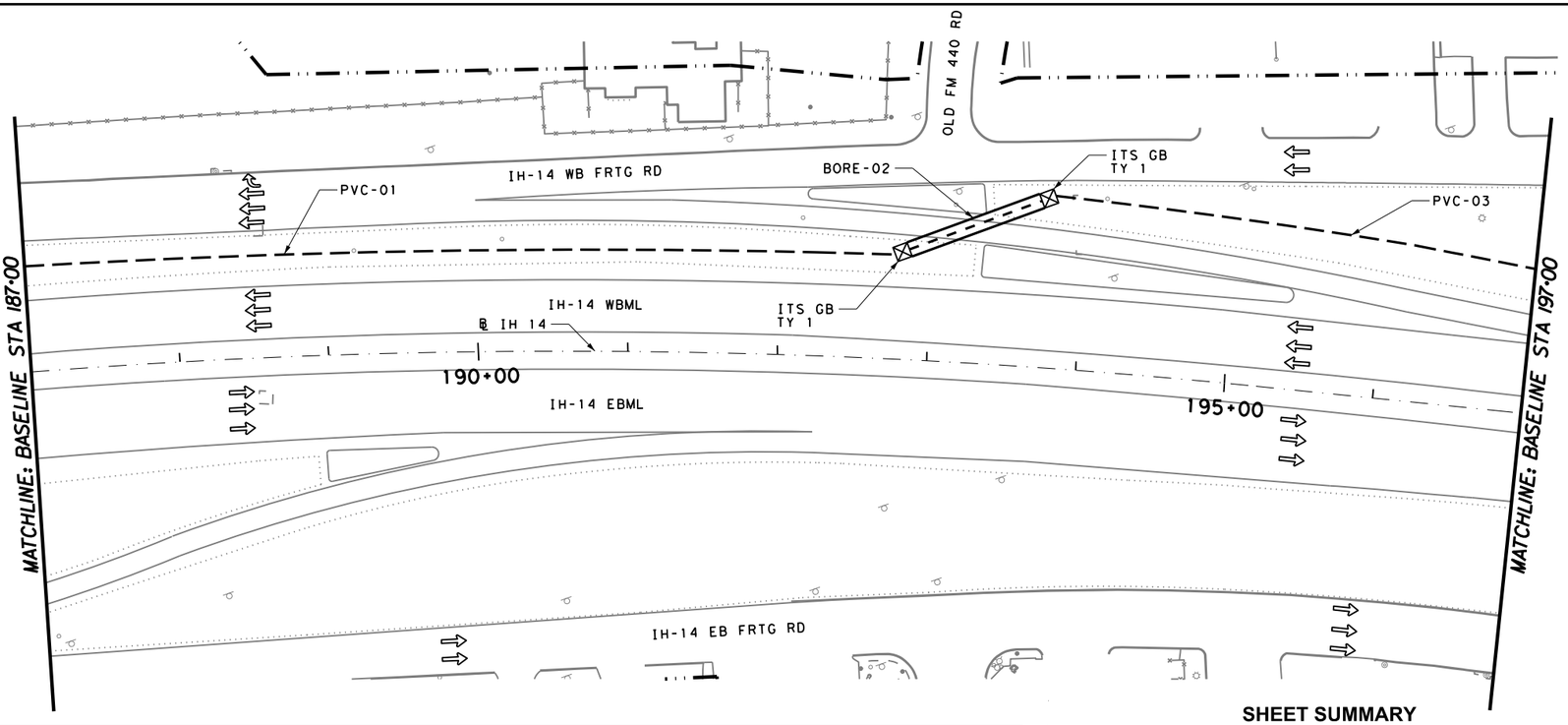

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	595											2				1	1	2				1
2	110													2		1	1			2		2
3	335											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1860
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	220
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1046
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1240
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1860
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	220
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 187+00 - STA 197+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 18 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		64

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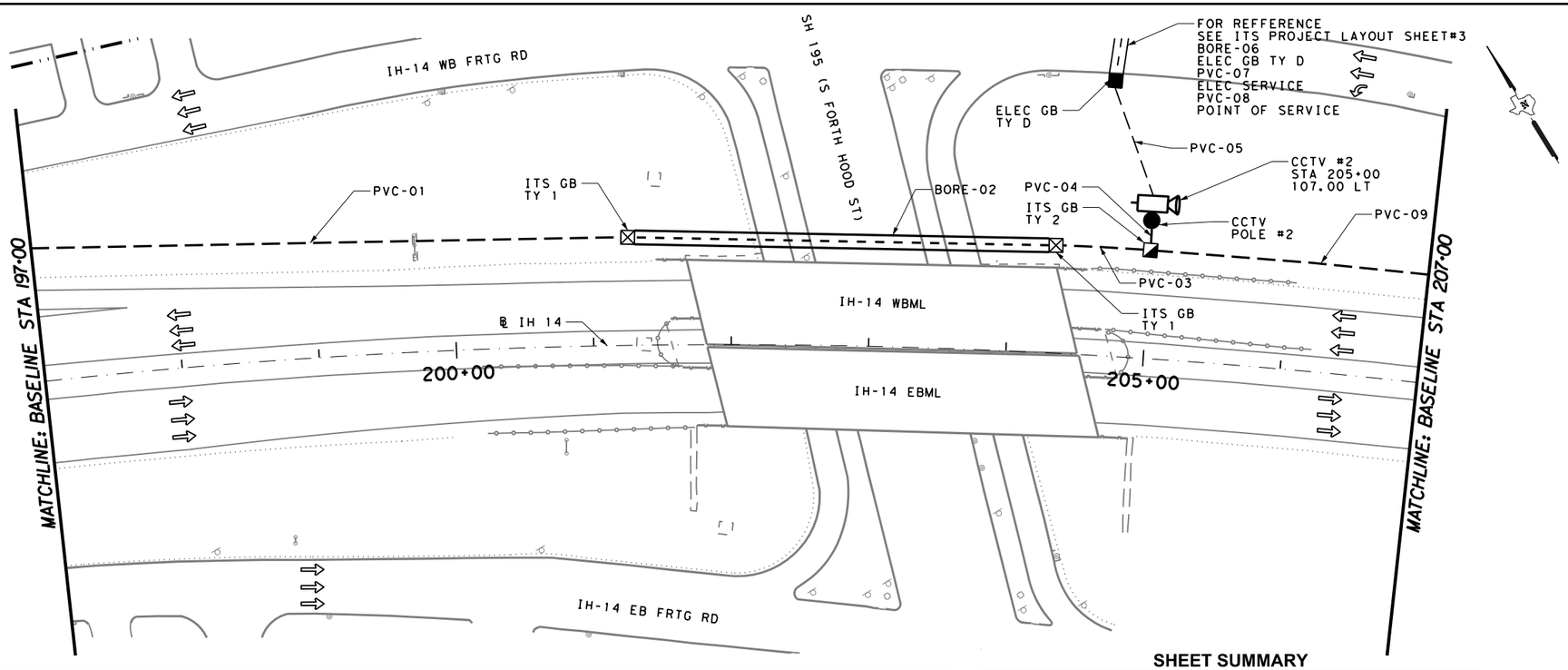

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	440											2				1	1	2				1
2	315													2		1	1			2		2
3	75											2				1	1	2				3
4	20		1			1	1															4
5	95		1					1	2													5
6	55			1				1	2													6
7	125		1					1	2													7
8	55	1								1	2											8
9	210											2				1	1	2				9

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	19
0432	6001	RIPRAP (CONC) (4 IN)	CY	1.5
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	55
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1690
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	685
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1066
0620	6007	ELEC CONDR (NO.8) BARE	LF	275
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	550
0620	6009	ELEC CONDR (NO.6) BARE	LF	55
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	110
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	2
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	1
6004	6031	ITS COM CLB (ETHERNET)	LF	65
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	70
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1240
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1450
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	630
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	1
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	1
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	1
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	1
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	1

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 197+00 - STA 207+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 19 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		65

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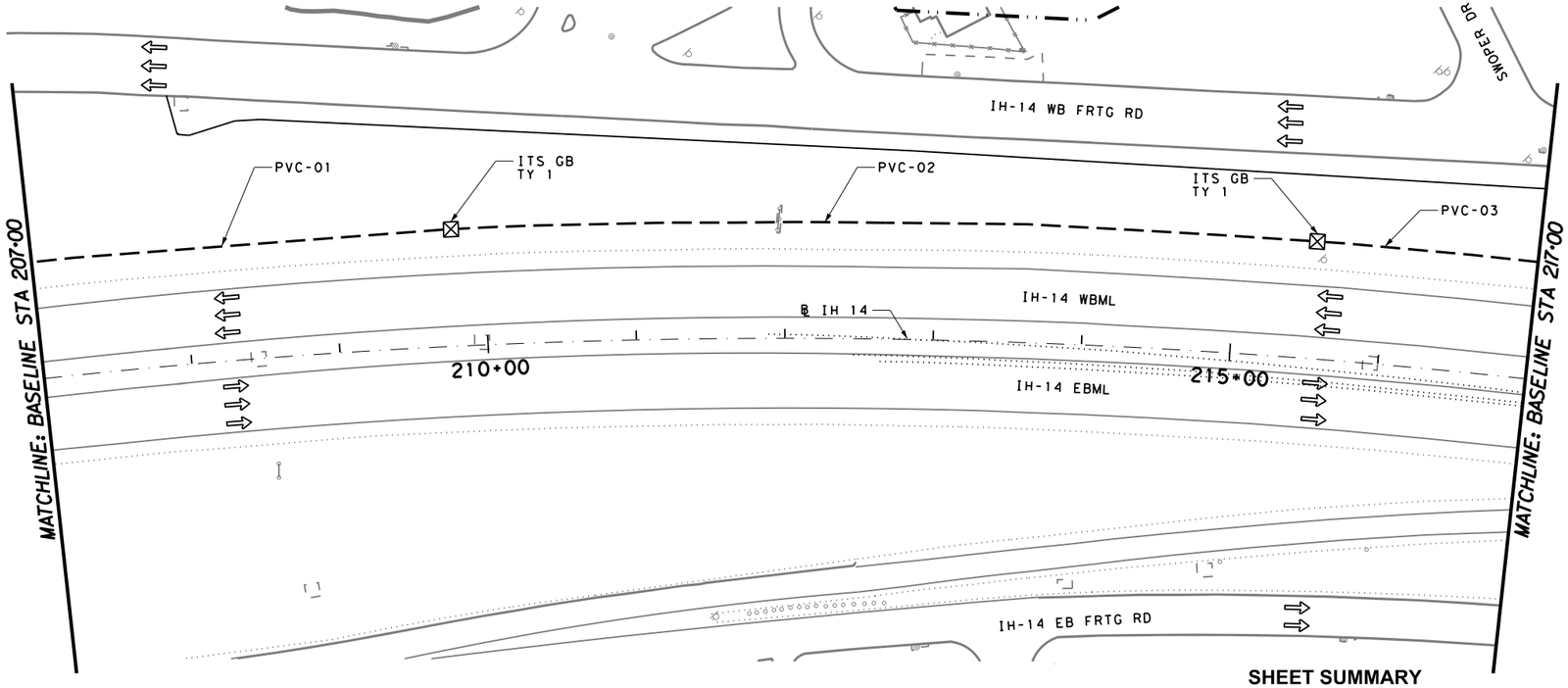

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	290											2				1	1	2				1
2	590											2				1	1	2				2
3	155											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2070
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1041
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1235
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2070
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 207+00 - STA 217+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 20 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		66

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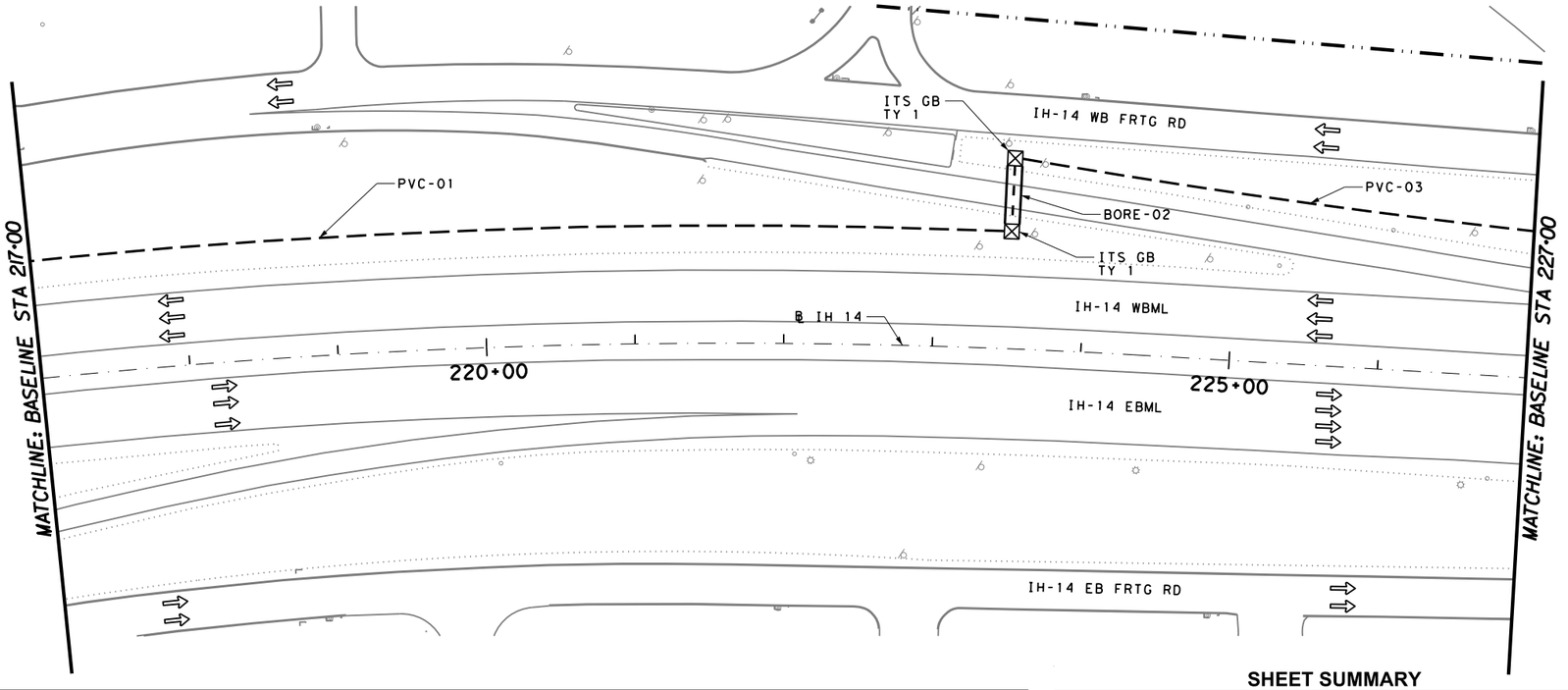

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	665											2				1	1	2				1
2	55													2		1	1			2		2
3	360											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2050
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	110
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1086
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1280
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2050
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	110
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 217+00 - STA 227+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 21 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		67

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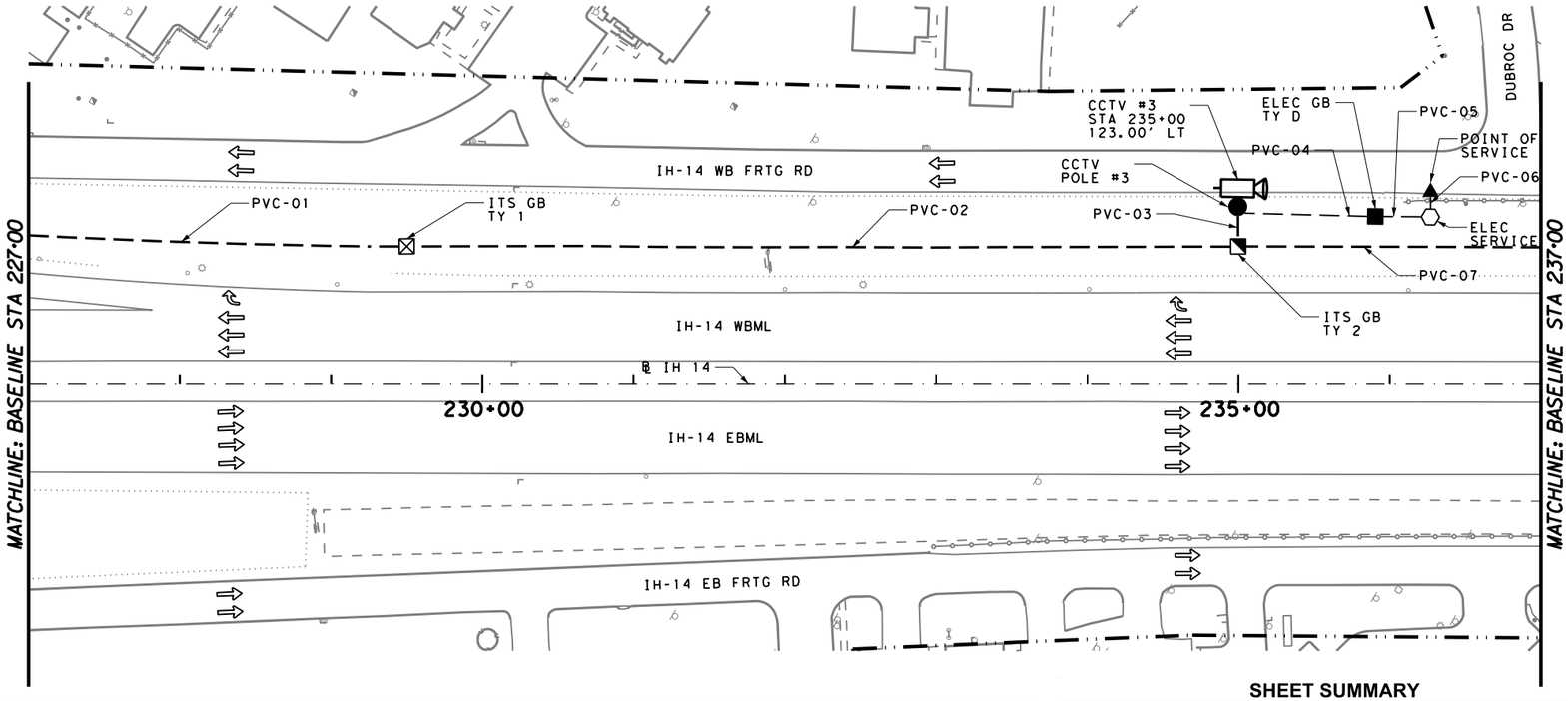

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	255											2				1	1	2				1
2	555											2				1	1	2				2
3	25		1			1	1															3
4	90		1					1	2													4
5	35		1					1	2													5
6	10	1								1	2											6
7	205											2				1	1	2				7

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	19
0432	6001	RIPRAP (CONC) (4 IN)	CY	1.5
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	10
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2180
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1043
0620	6007	ELEC CONDR (NO.8) BARE	LF	125
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	250
0620	6009	ELEC CONDR (NO.6) BARE	LF	10
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	20
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	1
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	1
6004	6031	ITS COM CLB (ETHERNET)	LF	65
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	75
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1115
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2030
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	1
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	1
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	1
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	1
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	1

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 227+00 - STA 237+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 22 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		68

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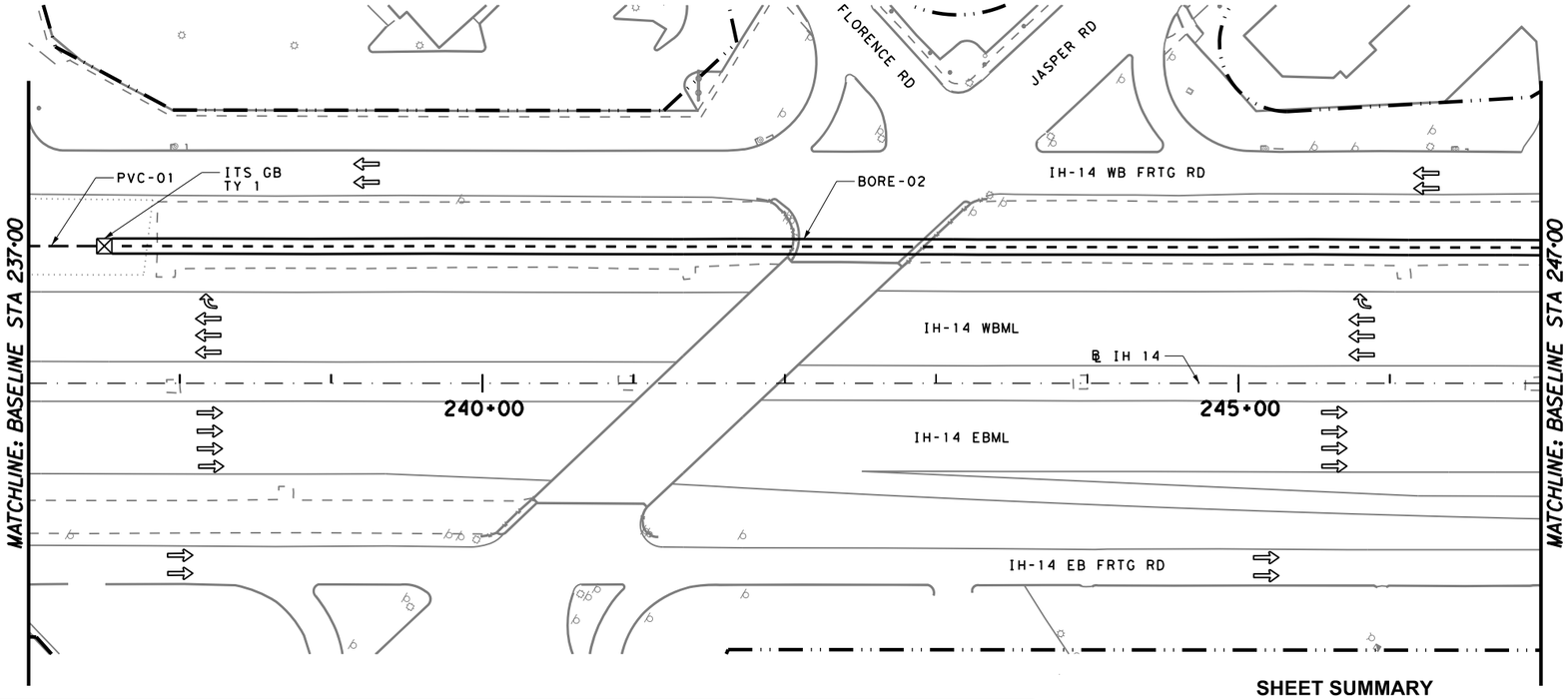

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	55											2				1	1	2				1
2	955													2		1	1			2		2

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	110
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	1910
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1013
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1110
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	110
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	1910
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 237+00 - STA 247+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 23 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		69

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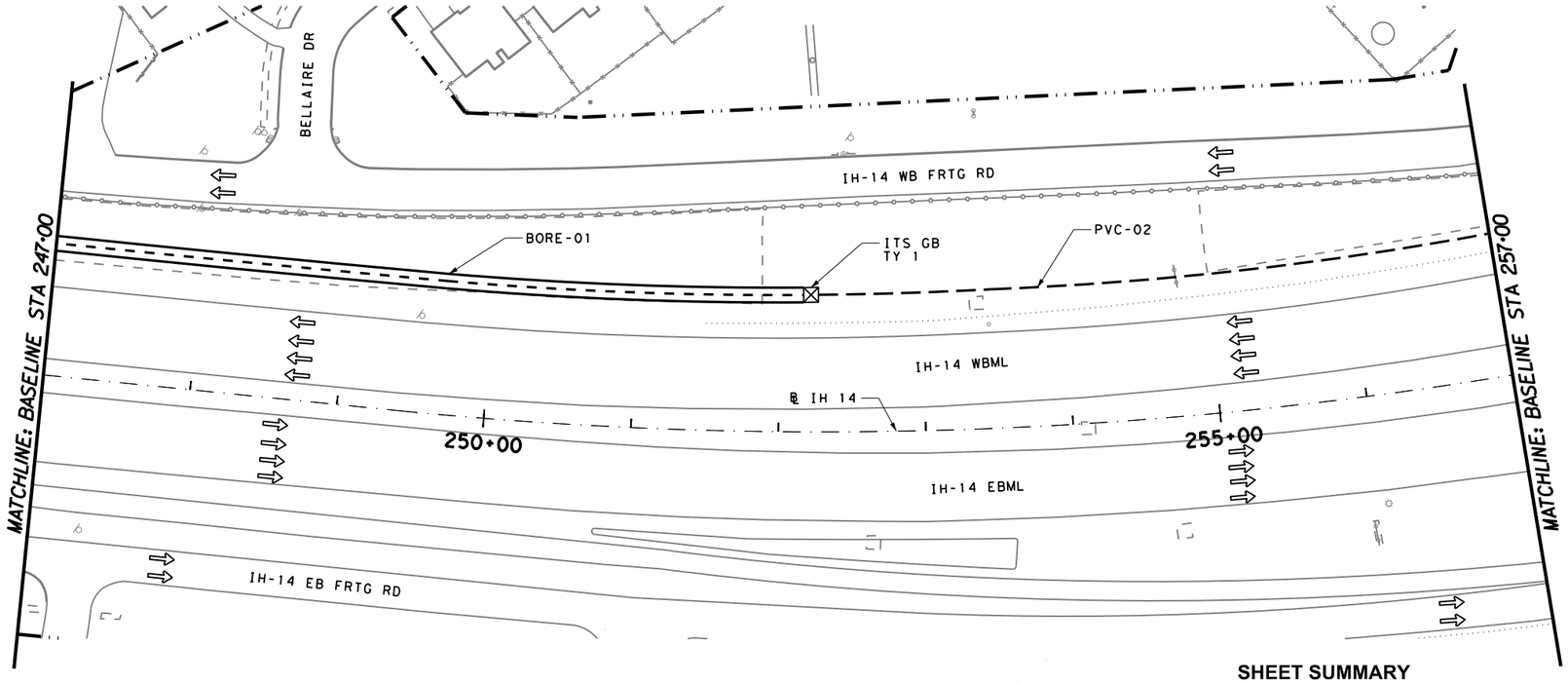

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	515													2		1	1			2		1
2	470											2				1	1	2				2

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	940
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	1030
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	988
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1085
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	940
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	1030
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 247+00 - STA 257+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 24 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		70

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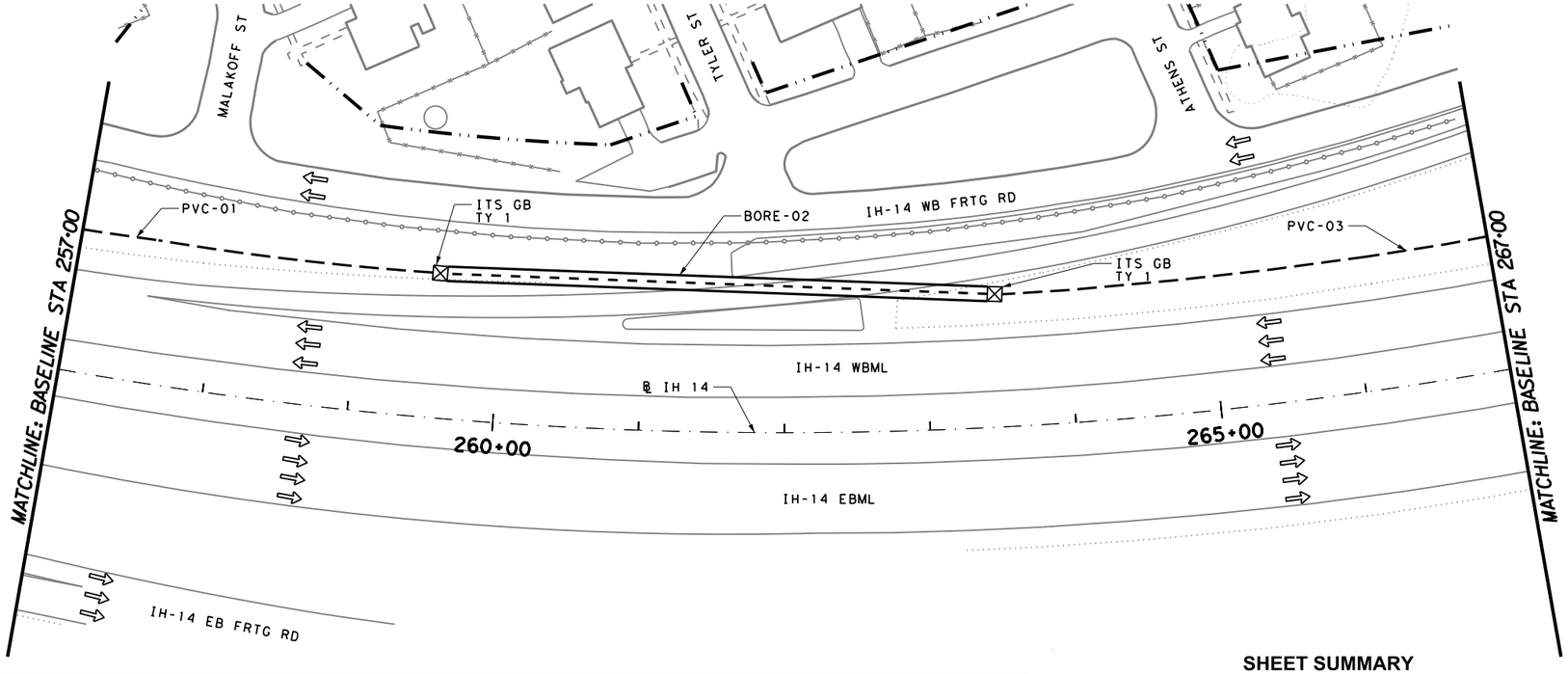

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	250											2				1	1	2				1
2	385													2		1	1			2		2
3	345											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1190
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	770
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	986
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1180
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1190
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	770
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 257+00 - STA 267+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 25 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		71

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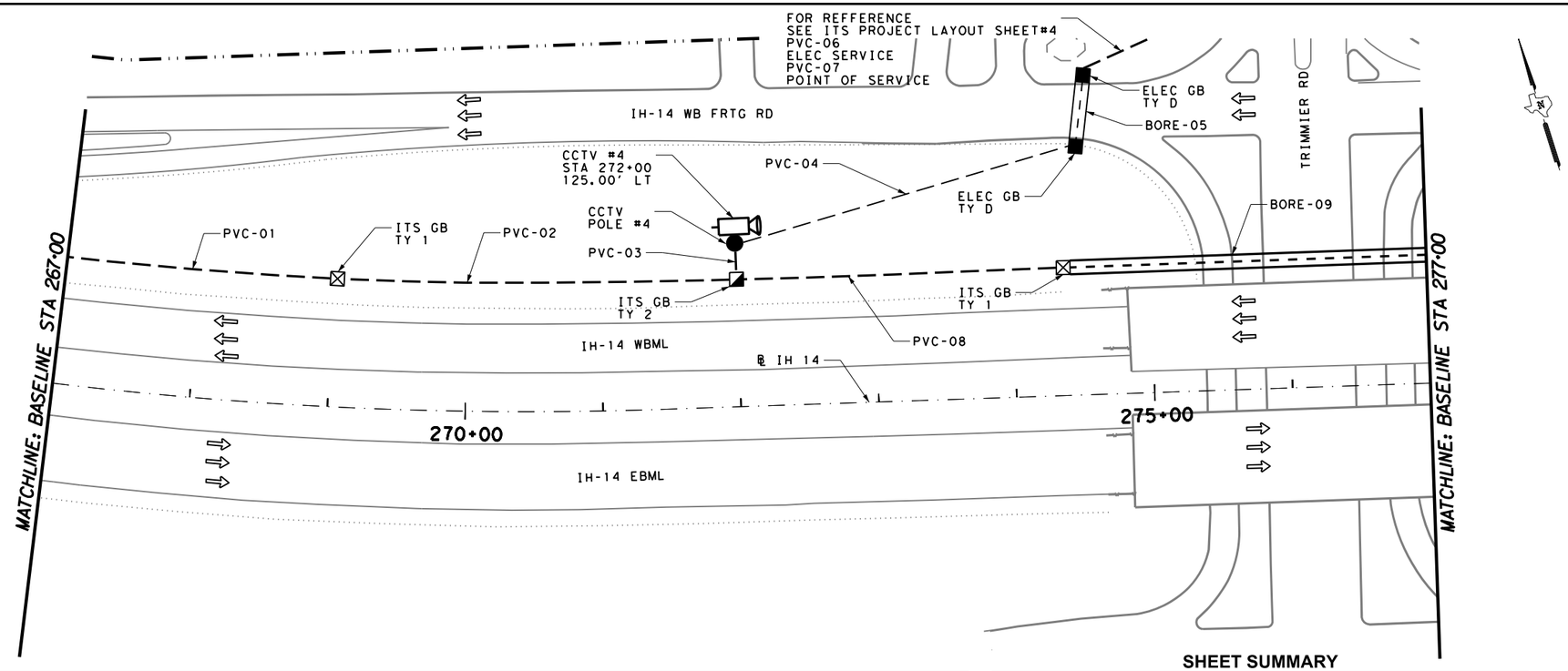

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	205											2				1	1	2				1
2	295											2				1	1	2				2
3	25		1			1	1															3
4	255		1					1	2													4
5	55			1				1	2													5
6	115		1					1	2													6
7	35	1								1	2											7
8	240											2				1	1	2				8
9	270													2		1	1			2		9

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	19
0432	6001	RIPRAP (CONC) (4 IN)	CY	1.5
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	35
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1875
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	595
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1038
0620	6007	ELEC CONDR (NO.8) BARE	LF	425
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	850
0620	6009	ELEC CONDR (NO.6) BARE	LF	35
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	70
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	2
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	1
6004	6031	ITS COM CLB (ETHERNET)	LF	65
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	75
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1110
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1480
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	540
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	1
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	1
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	1
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	1
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	1

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 11/03/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 267+00 - STA 277+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 26 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		72

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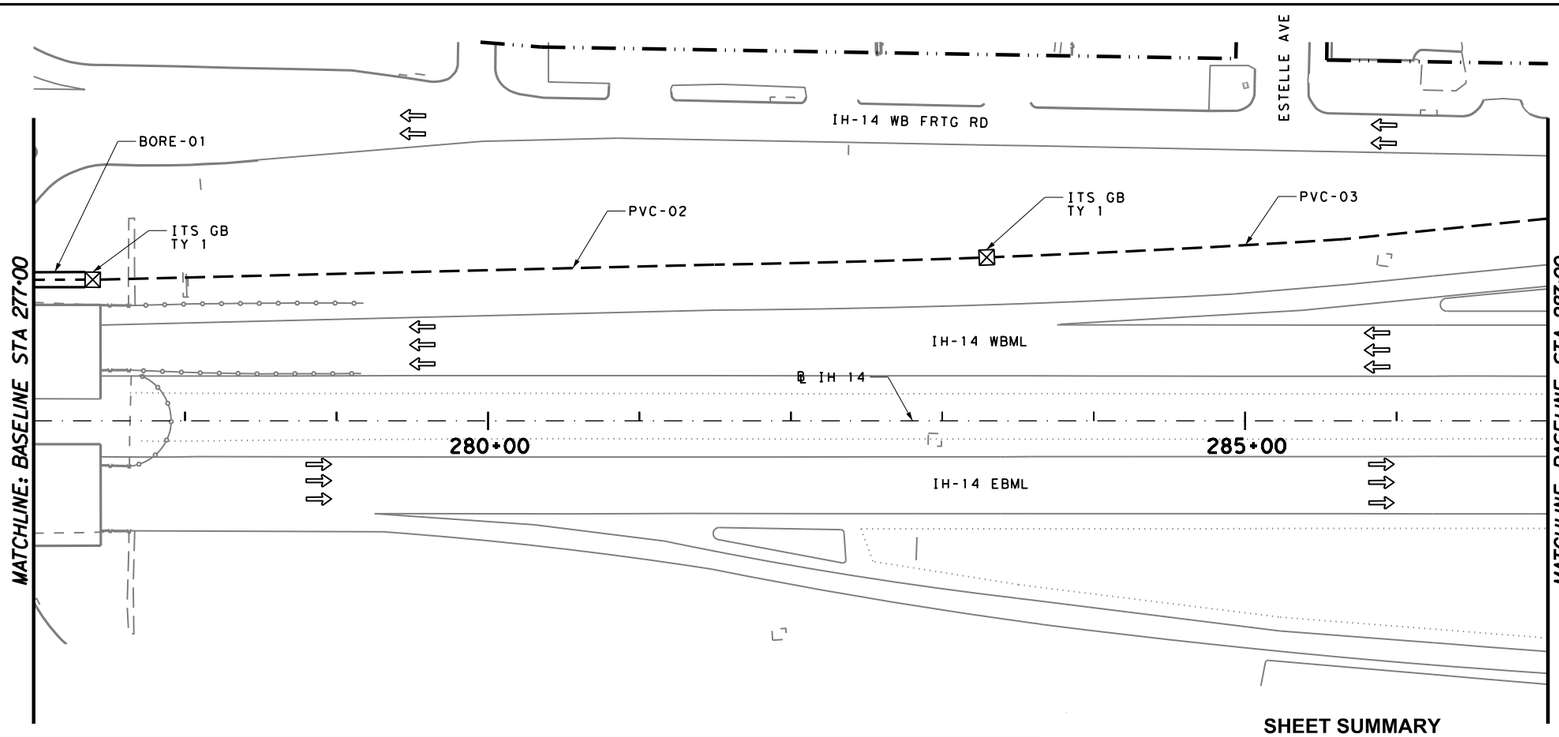

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	45													2		1	1			2		1
2	595											2				1	1	2				2
3	375											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1940
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	90
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1021
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1215
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1940
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	90
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 277+00 - STA 287+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 27 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		73

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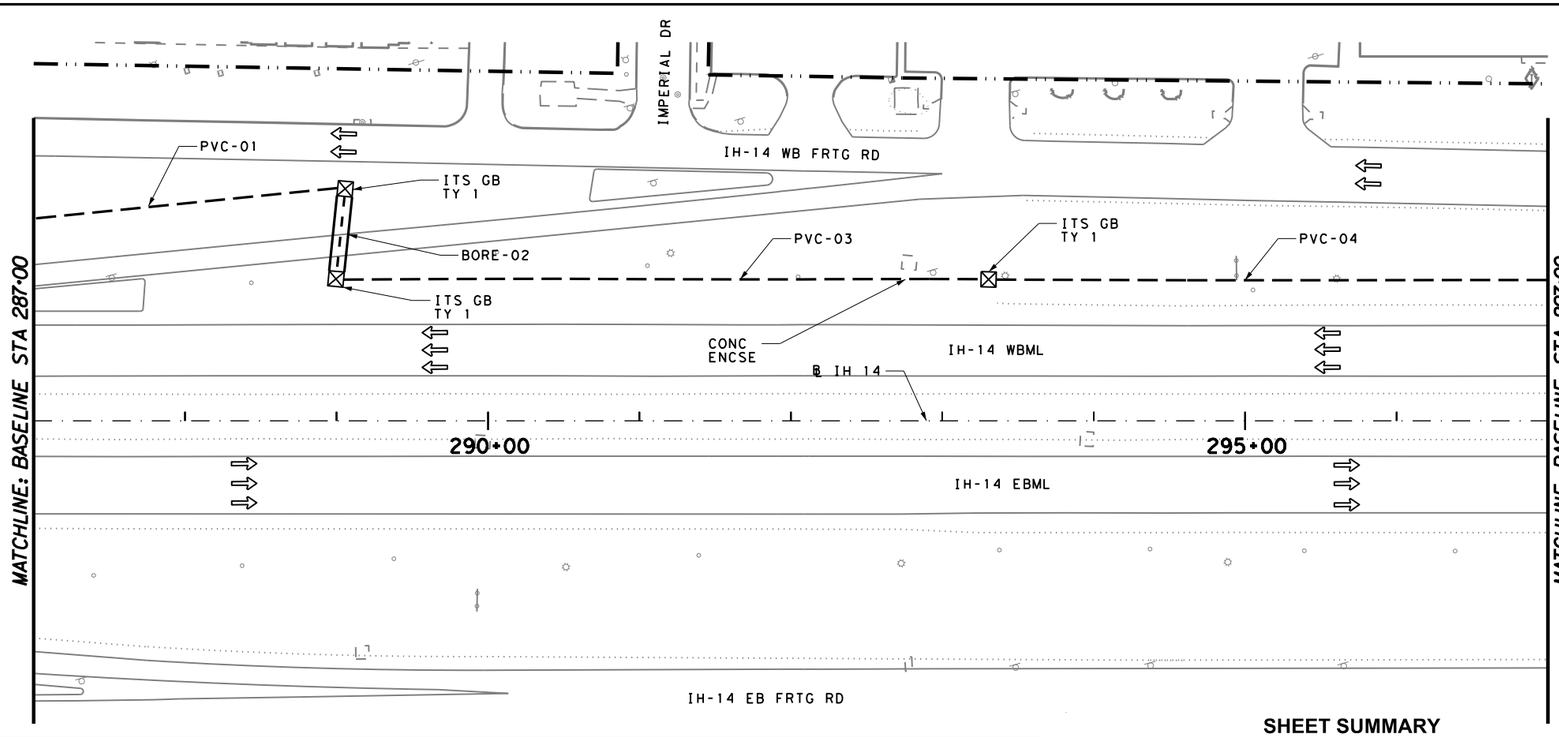

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	210											2				1	1	2				1
2	65													2		1	1			2		2
3	395											2				1	1	2				3
	40												2			1	1		2			
4	375											2				1	1	2				4

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1960
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	80
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	130
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1094
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1385
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1960
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	80
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	130
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	3
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 287+00 - STA 297+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 28 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		74

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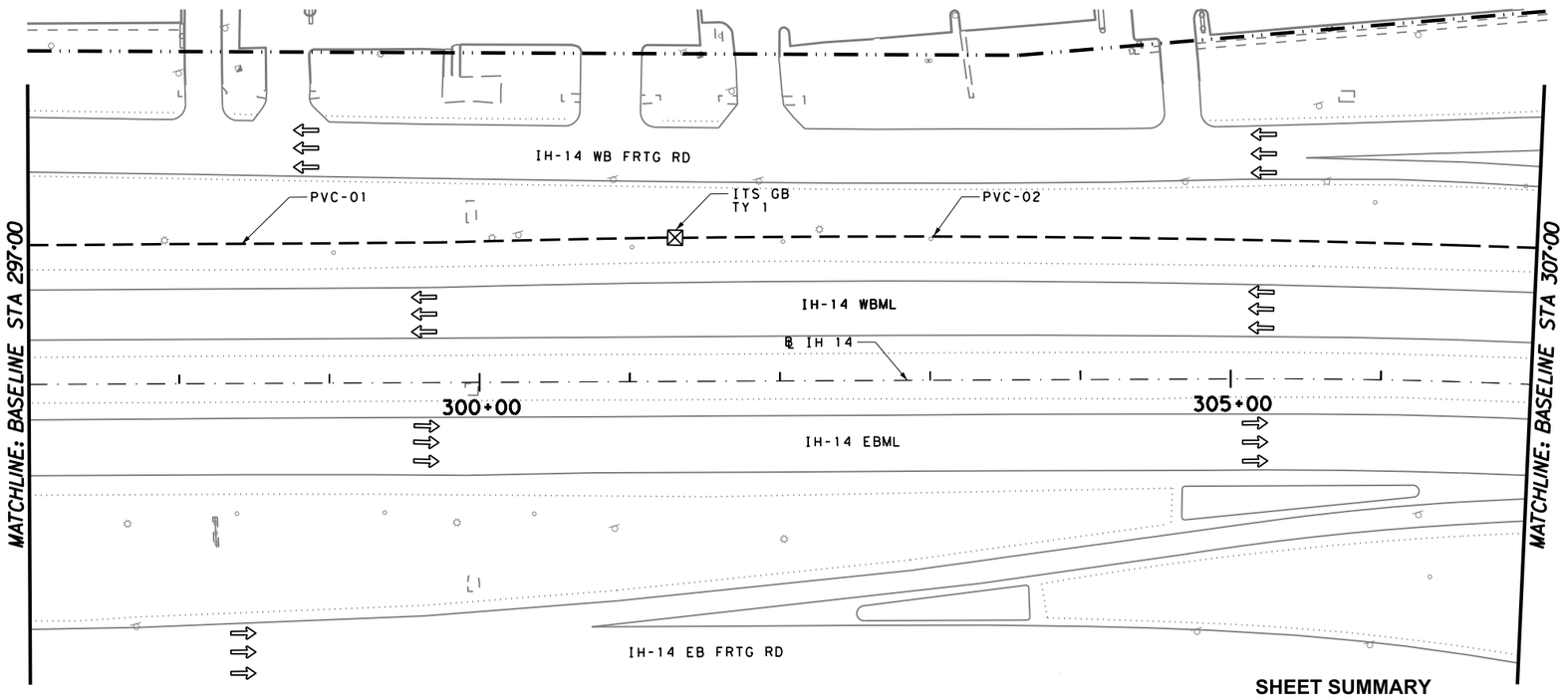

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	435											2				1	1	2				1
2	580											2				1	1	2				2

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2030
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1018
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1115
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2030
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 297+00 - STA 307+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 29 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		75

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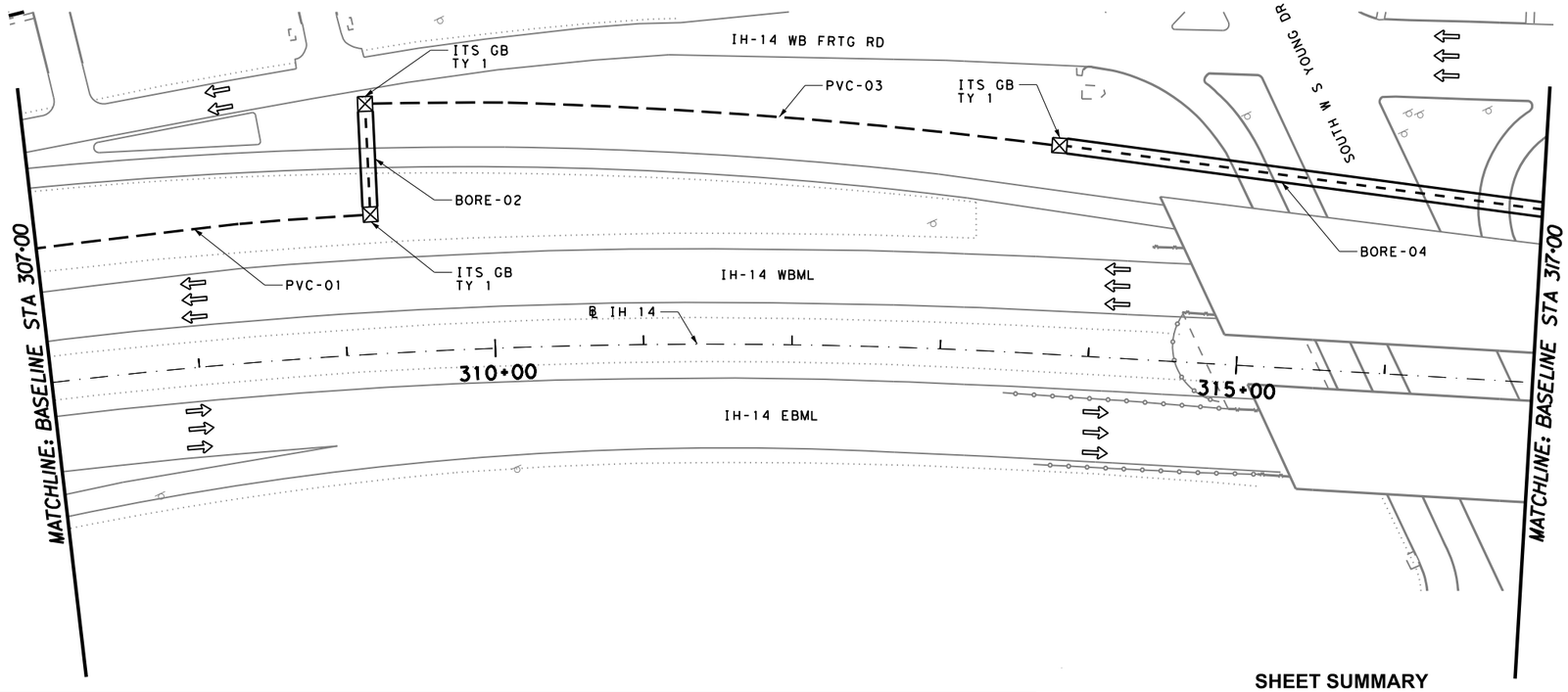

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	230											2				1	1	2				1
2	80													2		1	1			2		2
3	475											2				1	1	2				3
4	335													2		1	1			2		4

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1410
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	830
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1129
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1420
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1410
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	830
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	3
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 307+00 - STA 317+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 30 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		76

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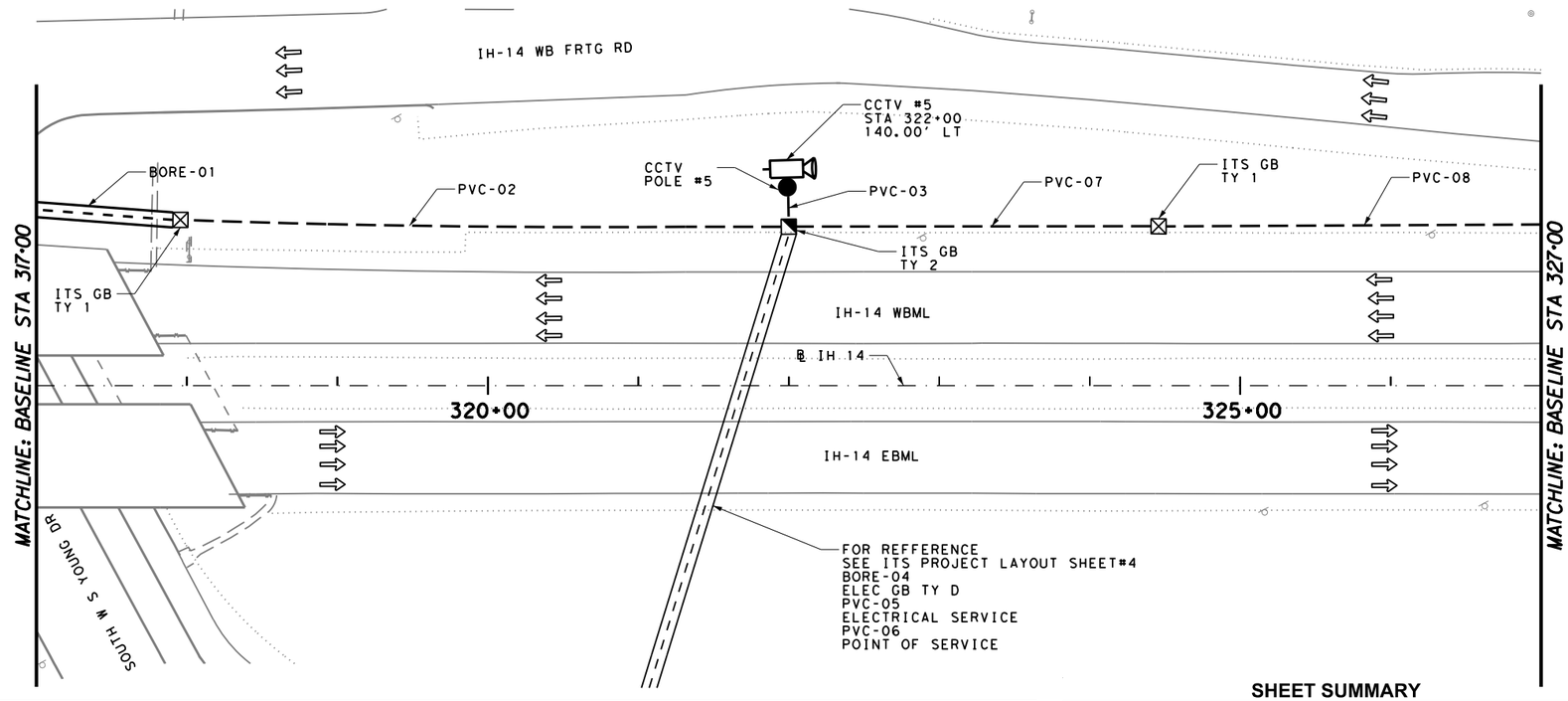

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	100													2		1	1			2		1
2	410											2				1	1	2				2
3	25		1			1	1	1	2													3
4	390			1				1	2													4
5	25		1					1	2													5
6	15	1								1	2											6
7	250											2				1	1	2				7
8	260											2				1	1	2				8

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	19
0432	6001	RIPRAP (CONC) (4 IN)	CY	1.5
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	15
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1890
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	215
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1051
0620	6007	ELEC CONDR (NO.8) BARE	LF	440
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	880
0620	6009	ELEC CONDR (NO.6) BARE	LF	15
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	30
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	1
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	1
6004	6031	ITS COM CLB (ETHERNET)	LF	65
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	75
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1220
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1840
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	200
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	1
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	1
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	1
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	1
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	1

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 317+00 - STA 327+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 31 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		77

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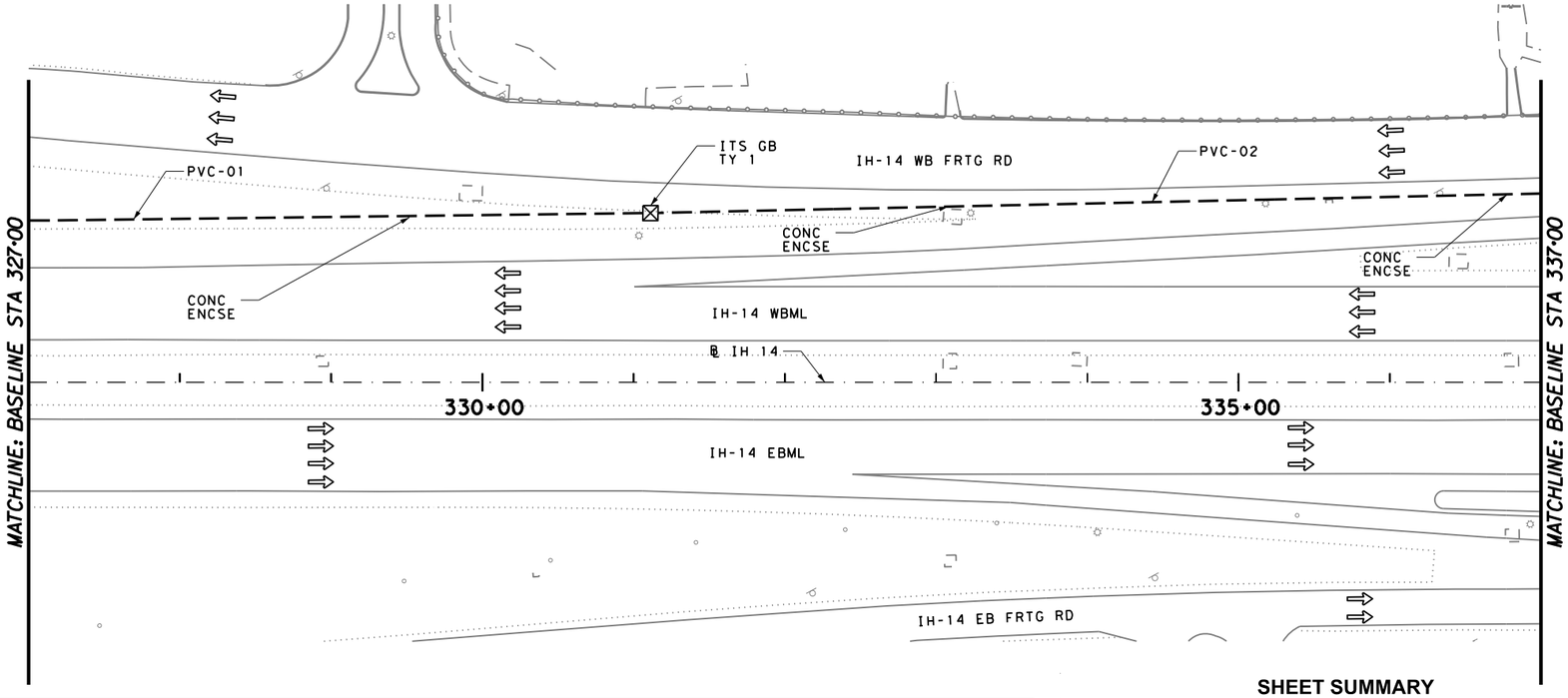

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	325											2				1	1	2				1
	90												2			1	1		2			
2	555											2				1	1	2				2
	40												2			1	1		2			

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1760
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	260
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1013
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1110
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1760
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	260
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 327+00 - STA 337+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 32 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		78

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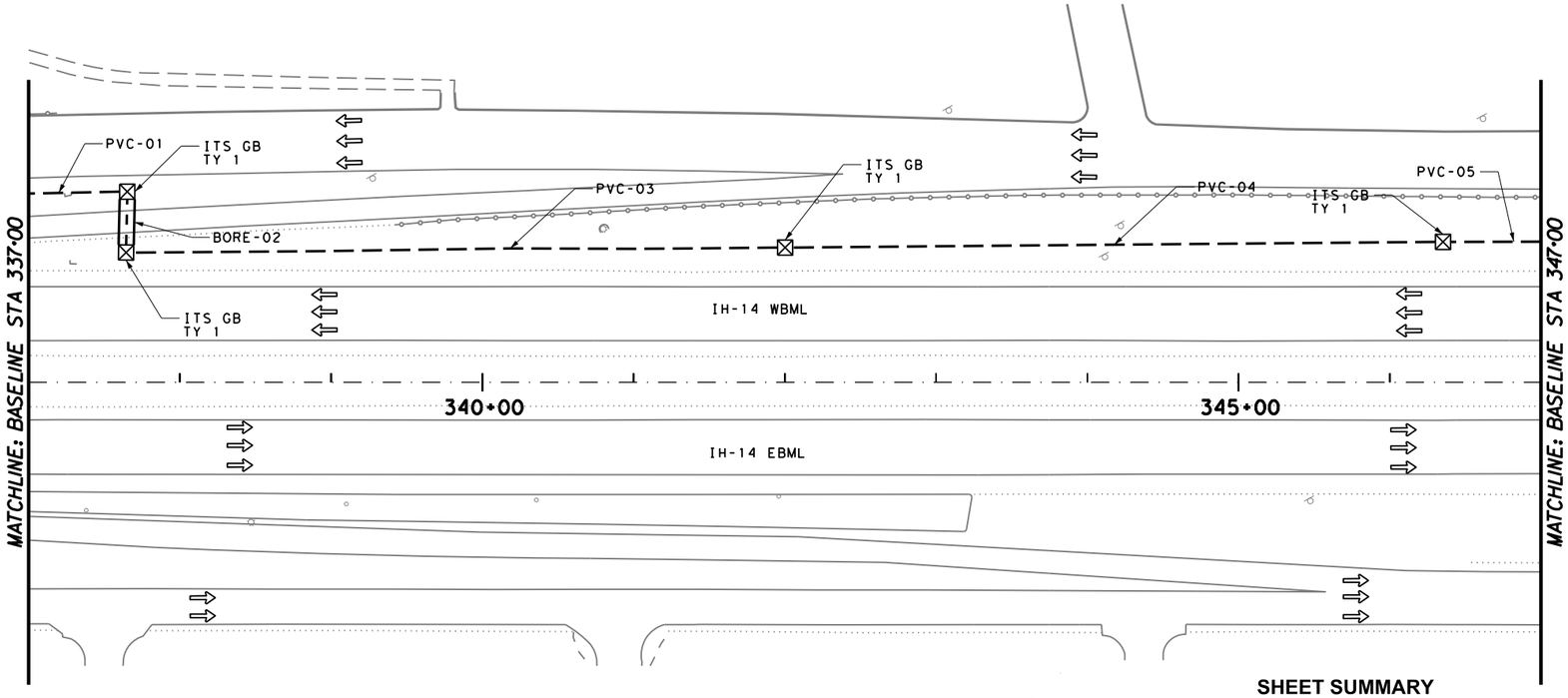

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	70											2				1	1	2				1
2	45													2		1	1			2		2
3	440											2				1	1	2				3
4	440											2				1	1	2				4
5	70											2				1	1	2				5

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2040
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	90
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1077
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1465
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2040
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	90
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	4
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 337+00 - STA 347+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 33 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		79

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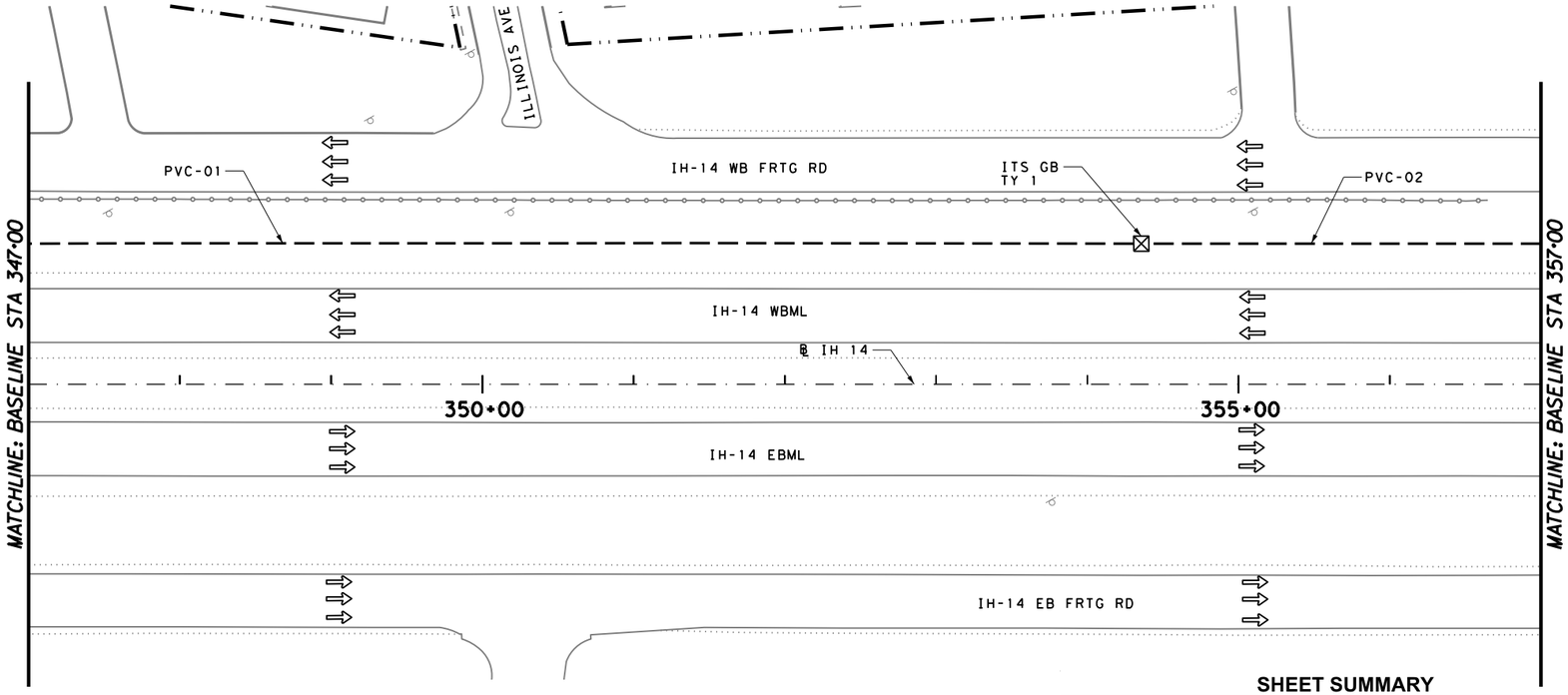

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	740											2				1	1	2				1
2	270											2				1	1	2				2

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2020
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1013
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1110
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2020
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 347+00 - STA 357+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 34 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		80

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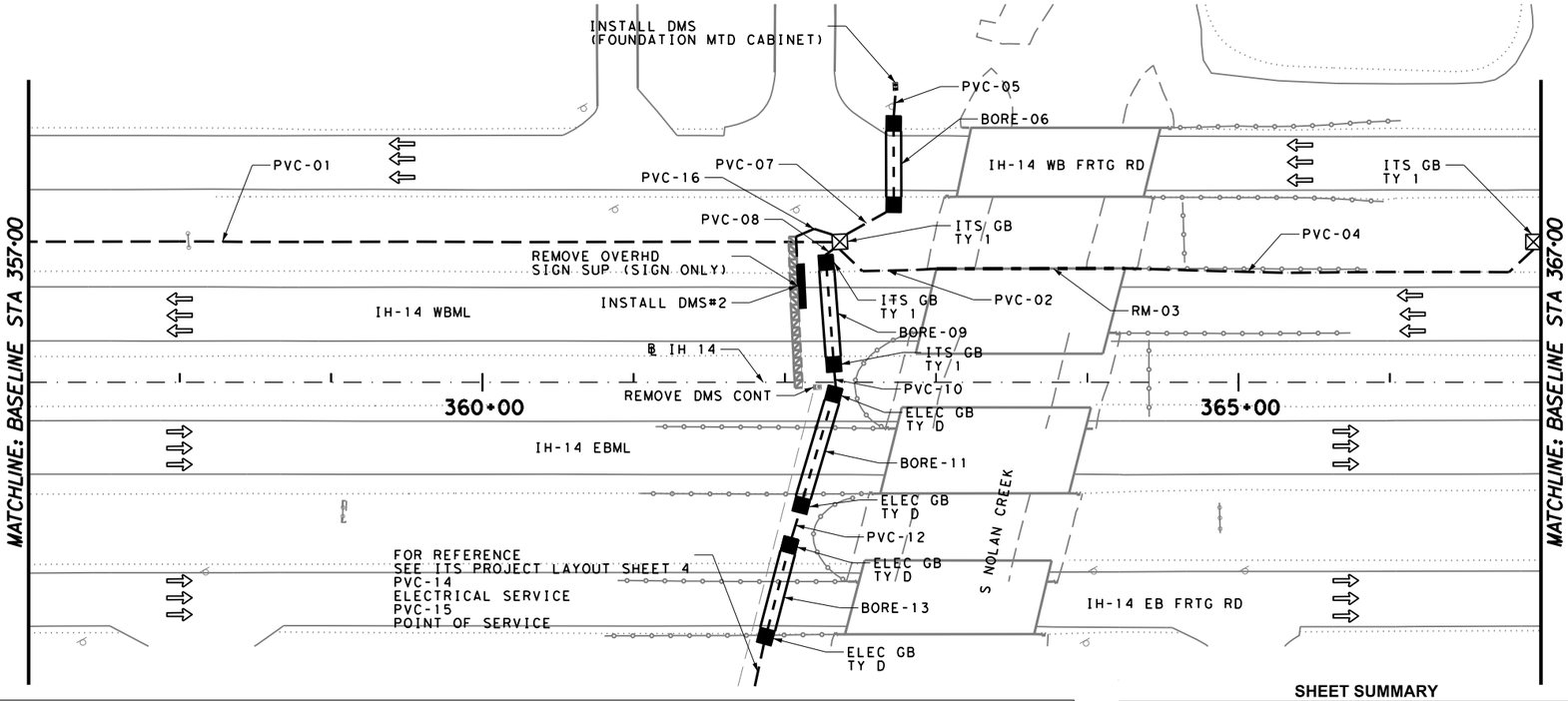

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER							0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND			FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	ITS COM CLB (ETHERNET)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6004 6031	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	545												2				1	1	2				1
2	80												2				1	1	2				2
3	130															2	1	1				2	3
4	285												2				1	1	2				4
5	25		2			1	1				1	2											5
6	55			2		1	1				1	2											6
7	45		2			1	1				1	2											7
8	20		1								1	2											8
9	70			1							1	2											9
10	20		1								1	2											10
11	77			1							1	2											11
12	30		1								1	2											12
13	63			1							1	2											13
14	80		1								1	2											14
15	25	1									1	2											15
16	65		2			1	1																16

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0104	6009	REMOVING CONC (RIPRAP)	SY	0
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	25
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2240
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	320
0618	6074	CONDT (RM) (3")	LF	260
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1236
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	510
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	1020
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	8
0628	6002	REMOVE ELECTRICAL SERVICES	EA	1
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
0628	6239	ELC SRV TY D 120/240 100 (NS) SS (E) PS (U)	EA	1
6004	6031	ITS COM CBL (ETHERNET)	LF	190
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1240
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1820
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	260
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6028	6002	INSTALL DMS (FOUNDATION MTD CABINET)	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0
6415	6001	REMOVE DYNAMIC MESSAGE SIGN SYSTEM	EA	1

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 11/05/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 357+00 - STA 367+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 35 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		81

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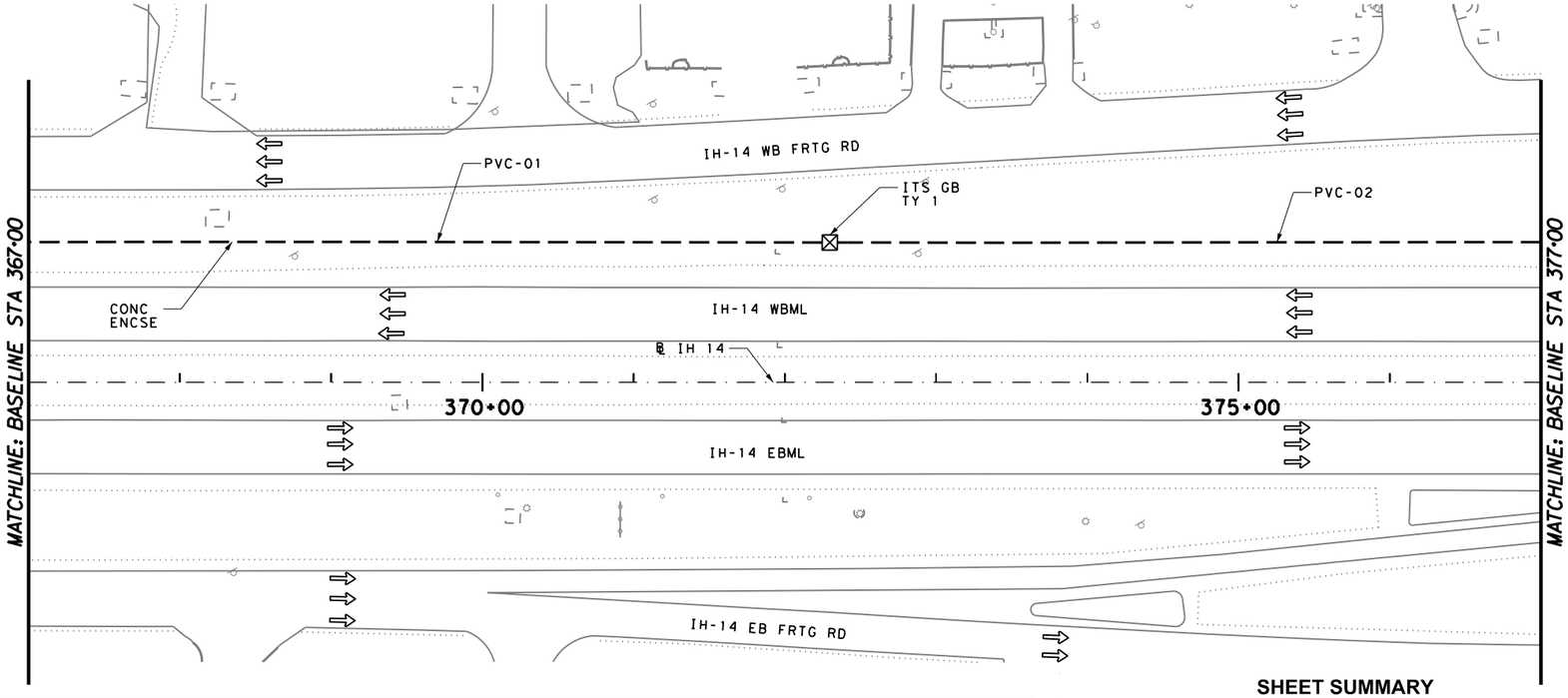

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	485											2				1	1	2				1
	50												2			1	1		2			
2	475											2				1	1	2				2

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1920
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	100
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1110
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1110
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1920
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	100
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 367+00 - STA 377+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 36 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		82

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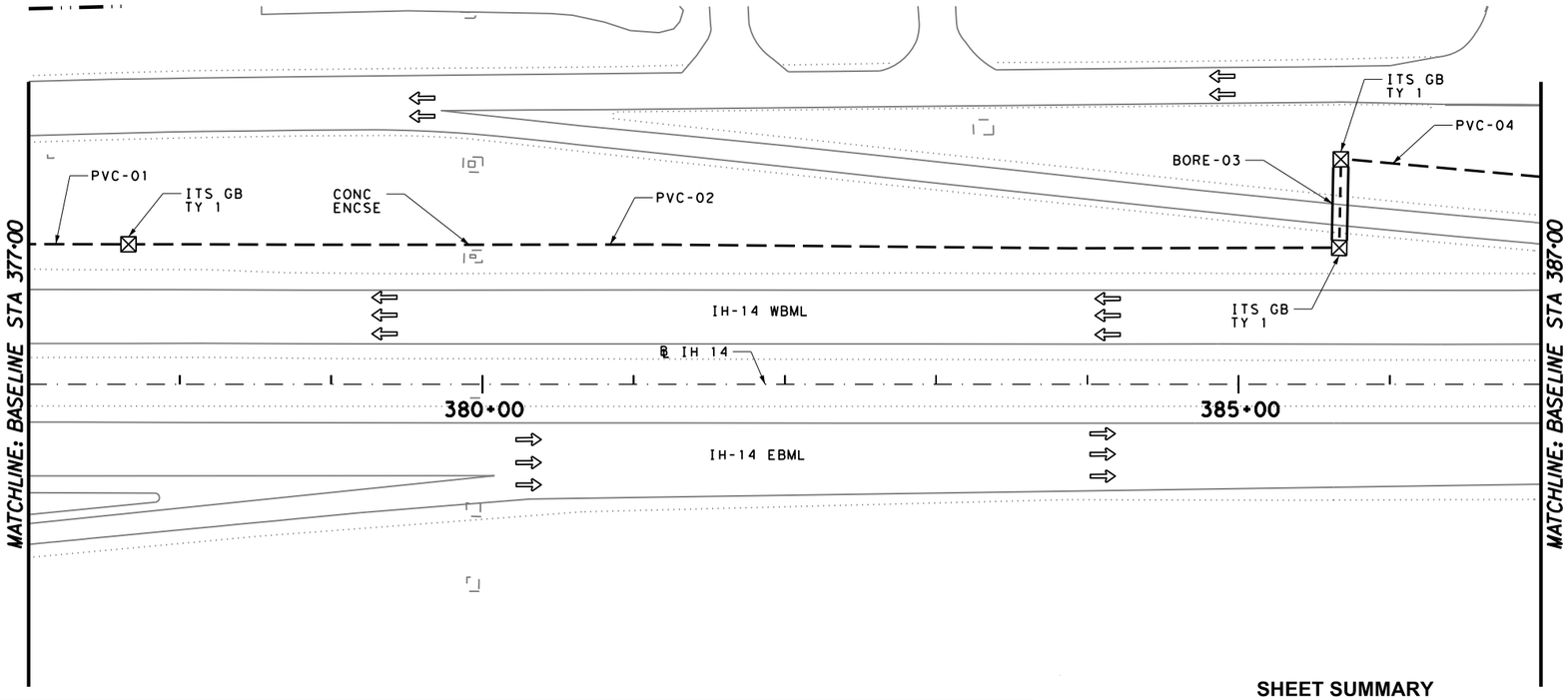

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	70											2				1	1	2				1
2	765											2				1	1	2				2
	40												2			1	1		2			
3	65													2		1	1			2		3
4	135											2				1	1	2				4

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1940
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	80
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	130
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1084
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1375
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1940
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	80
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	130
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	3
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 377+00 - STA 387+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 37 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		83

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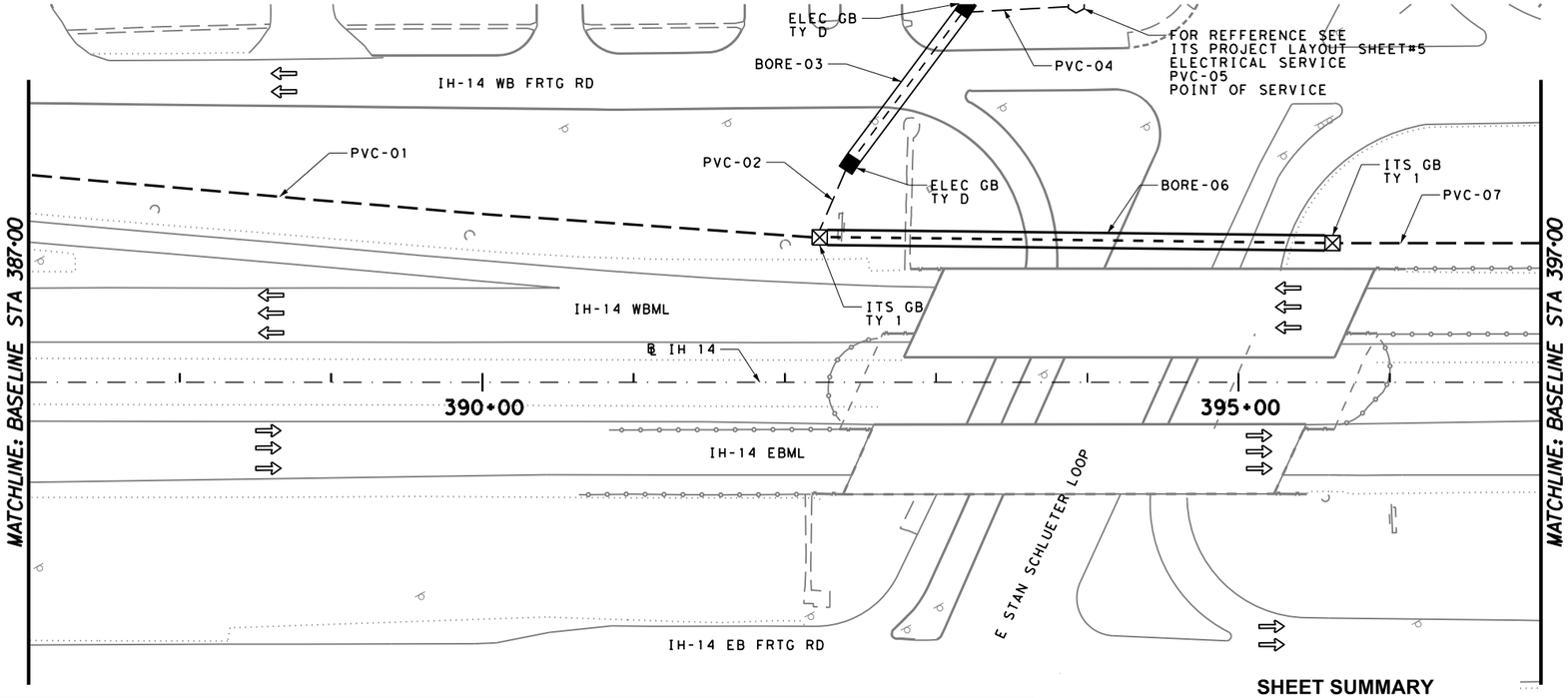

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	530											2				1	1	2				1
2	60		1					1	2													2
3	135			1				1	2													3
4	75		1					1	2													4
5	75	1								1	2											5
6	445			1				1	2					2		1	1			2		6
7	145		1					1	2			2				1	1	2				7

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	75
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1630
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	1470
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1126
0620	6007	ELEC CONDR (NO.8) BARE	LF	860
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	1720
0620	6009	ELEC CONDR (NO.6) BARE	LF	75
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	150
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	2
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	1
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1320
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1350
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	890
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	1
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	1

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 387+00 - STA 397+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 38 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		84

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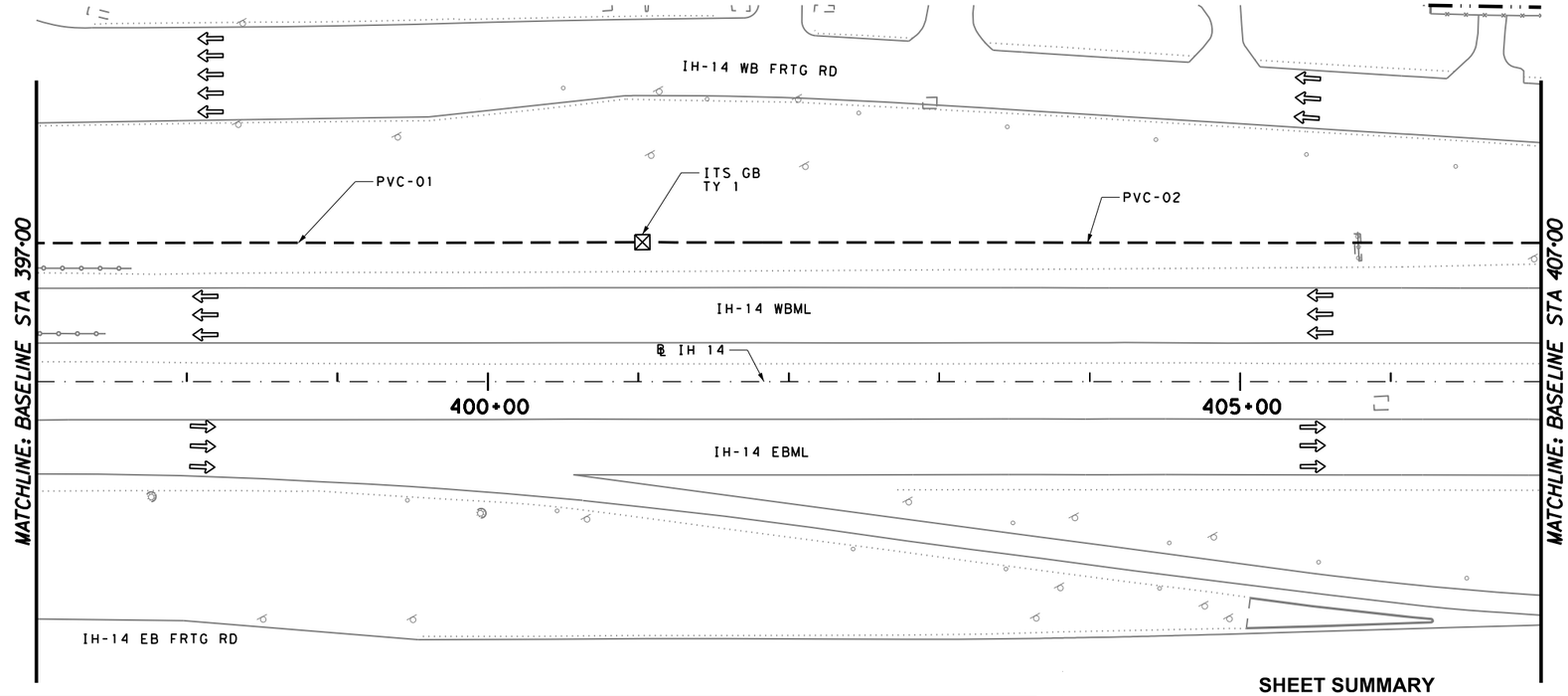

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	405	1						1	2			2				1	1	2				1
2	605	1						1	2			2				1	1	2				2

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	3030
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1013
0620	6007	ELEC CONDR (NO.8) BARE	LF	1010
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	2020
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1110
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2020
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 397+00 - STA 407+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 39 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		85

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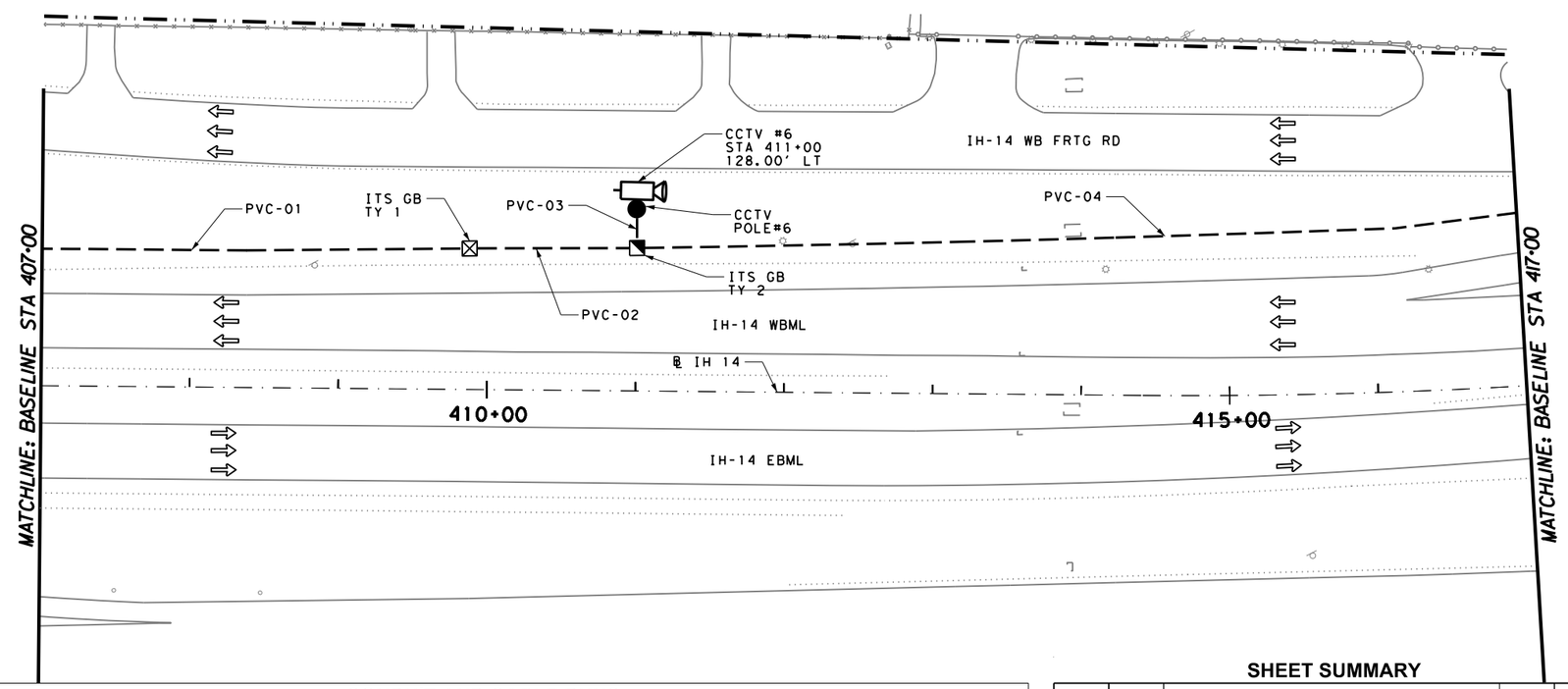

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	295		1					1	2			2				1	1	2				1
2	120		1					1	2			2				1	1	2				2
3	25		1			1	1	1	2													3
4	600											2				1	1	2				4

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	19
0432	6001	RIPRAP (CONC) (4 IN)	CY	1.5
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	2470
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1043
0620	6007	ELEC CONDR (NO.8) BARE	LF	440
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	880
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6004	6031	ITS COM CLB (ETHERNET)	LF	65
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	75
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1115
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	2030
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	1
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	1
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	1
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 407+00 - STA 417+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 40 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		86

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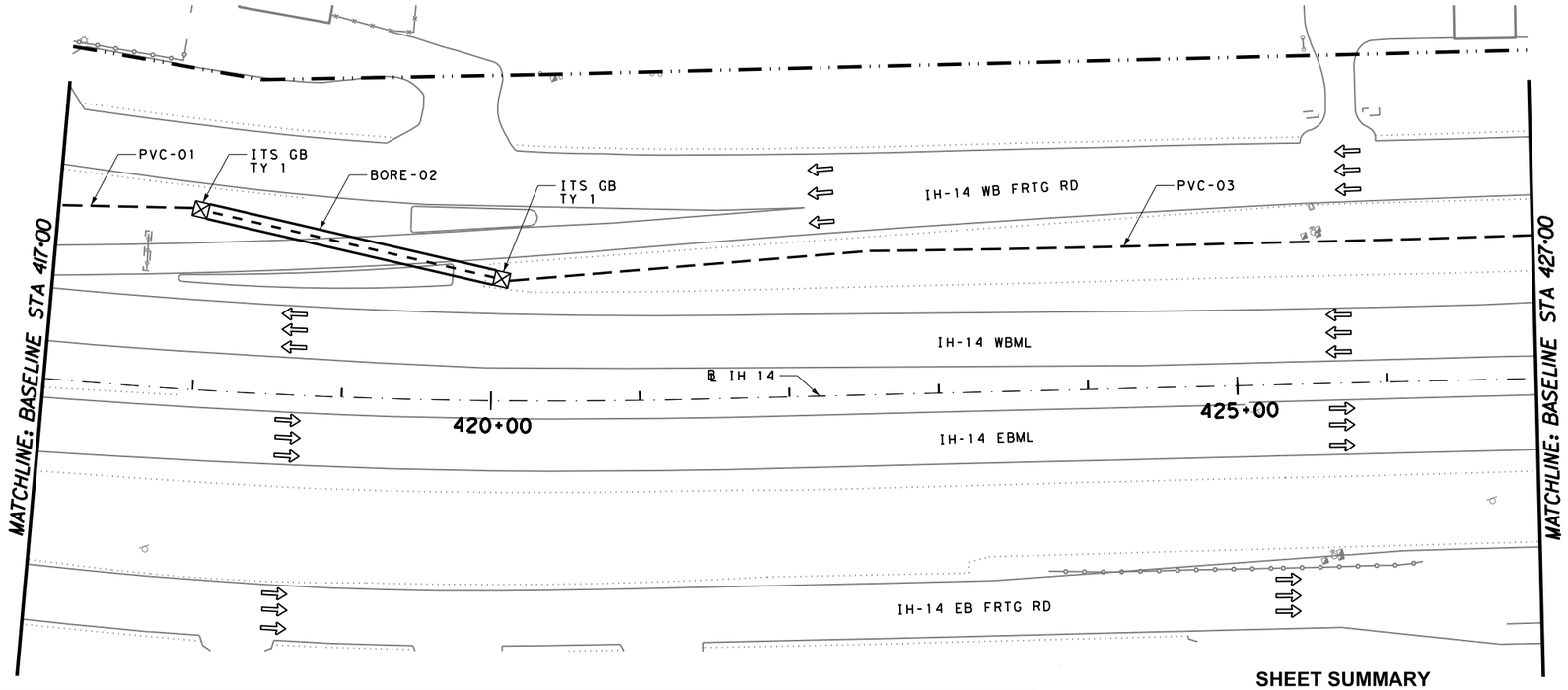

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	100											2				1	1	2				1
2	210													2		1	1			2		2
3	695											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1590
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	420
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1011
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1205
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1590
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	420
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 417+00 - STA 427+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 41 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		87

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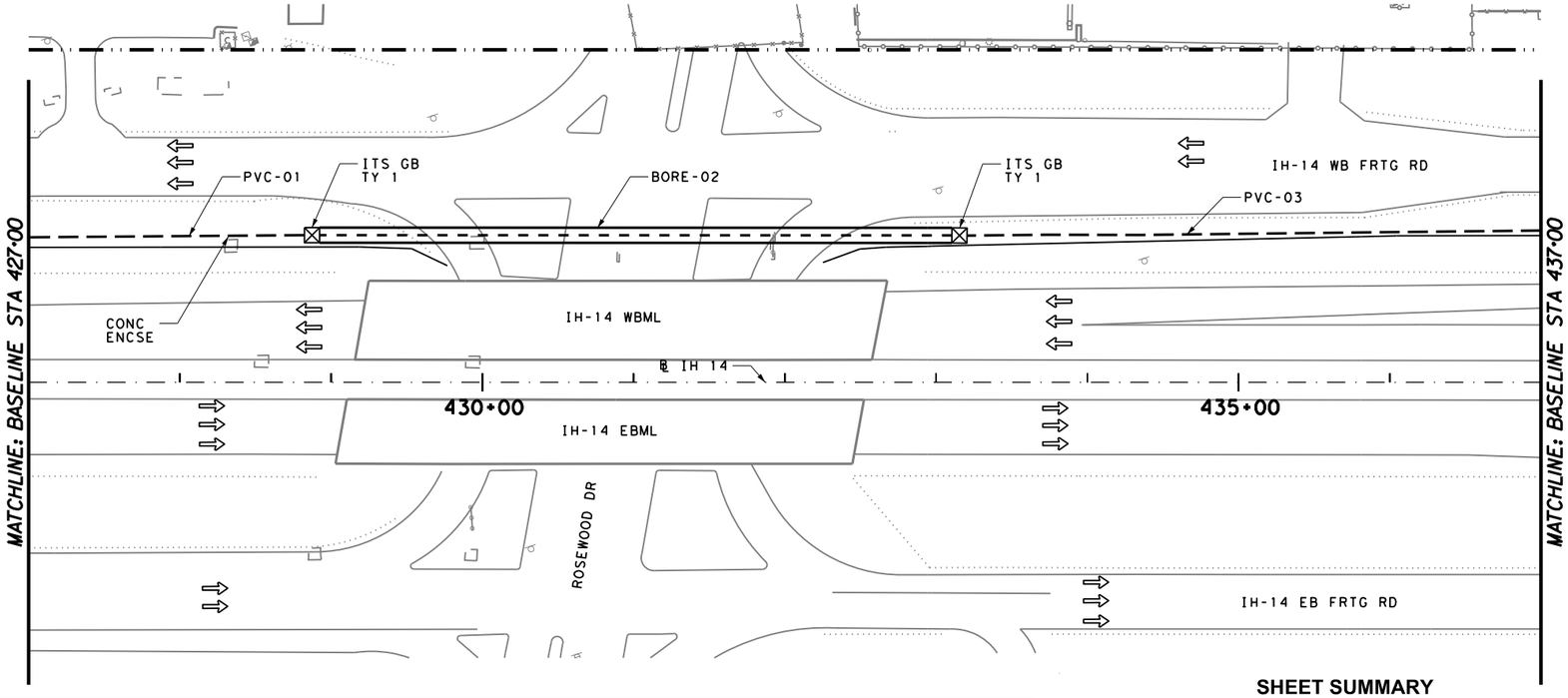

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	155											2				1	1	2				1
	40												2			1	1		2			
2	435													2		1	1			2		2
3	390											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1090
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	80
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	870
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1026
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1220
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1090
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	80
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	870
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
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LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 427+00 - STA 437+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 42 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		88

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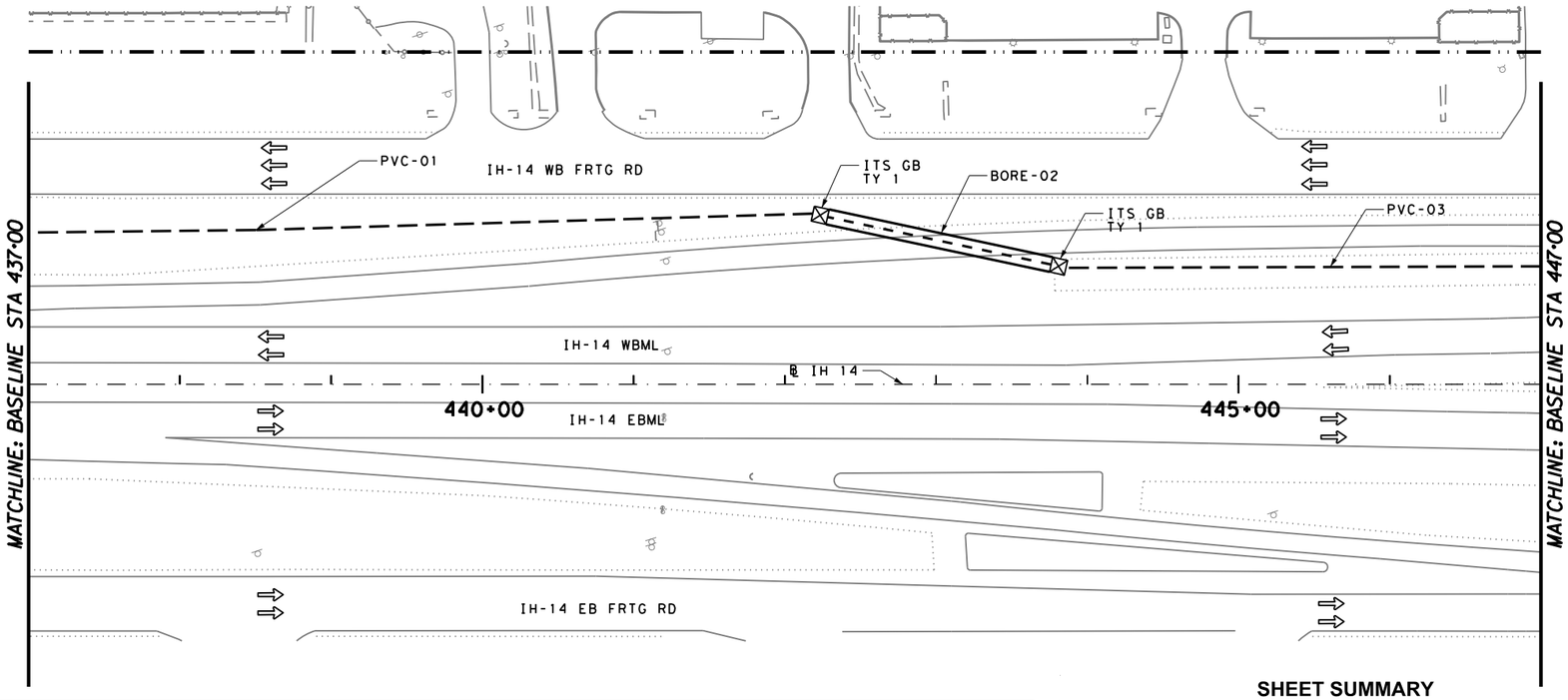

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	530											2				1	1	2				1
2	165													2		1	1			2		2
3	325											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1710
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1026
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1220
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1710
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	330
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 437+00 - STA 447+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 43 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		89

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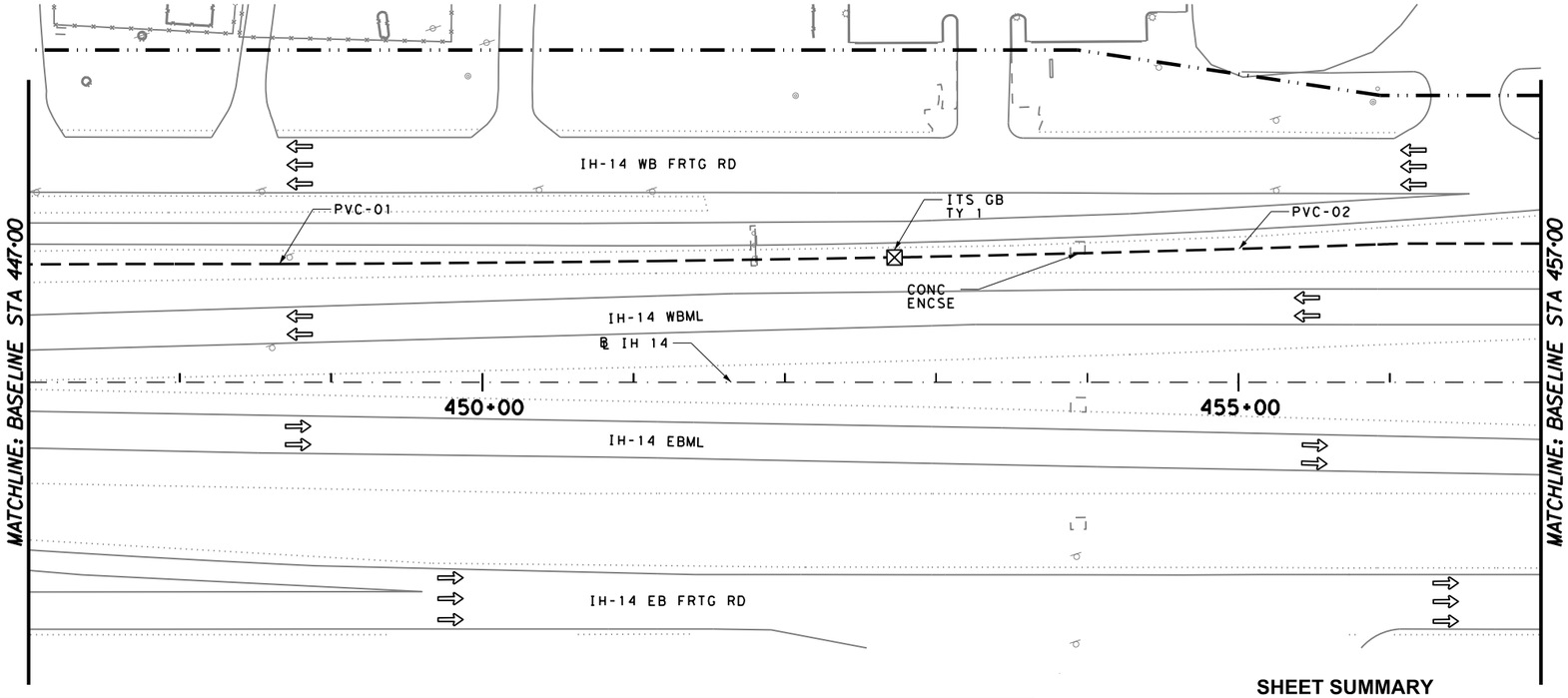

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	575											2				1	1	2				1
2	395											2				1	1	2				2
	40												2			1	1		2			

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1940
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	80
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1013
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1110
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1940
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	80
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 447+00 - STA 457+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 44 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		90

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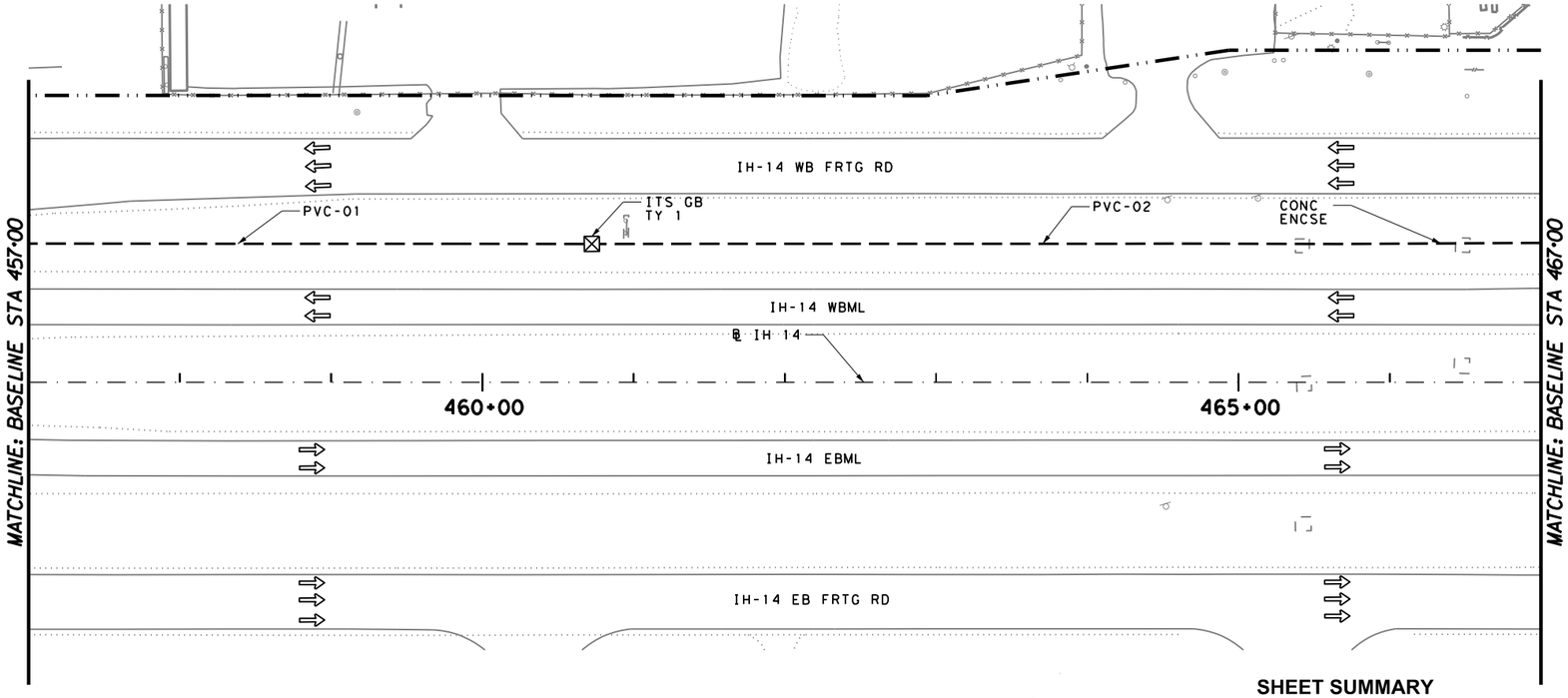

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	375											2				1	1	2				1
2	595											2				1	1	2				2
	40												2			1	1		2			

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1940
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	80
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1013
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1110
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1940
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	80
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 457+00 - STA 467+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 45 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		91

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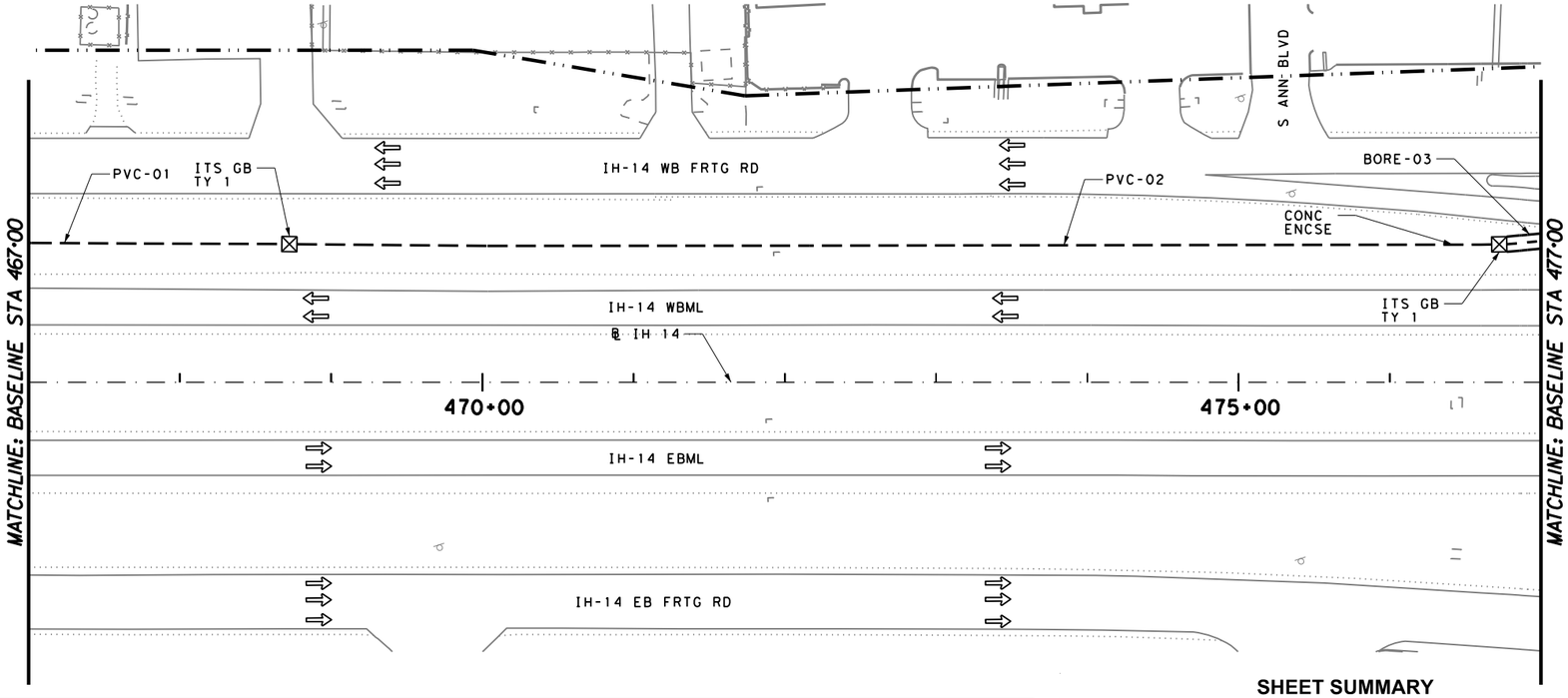

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	175											2				1	1	2				1
2	765											2				1	1	2				2
	40												2			1	1		2			
3	35													2		1	1			2		3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1880
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	80
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	70
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1021
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1215
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1880
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	80
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	70
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND:

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 467+00 - STA 477+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 46 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		92

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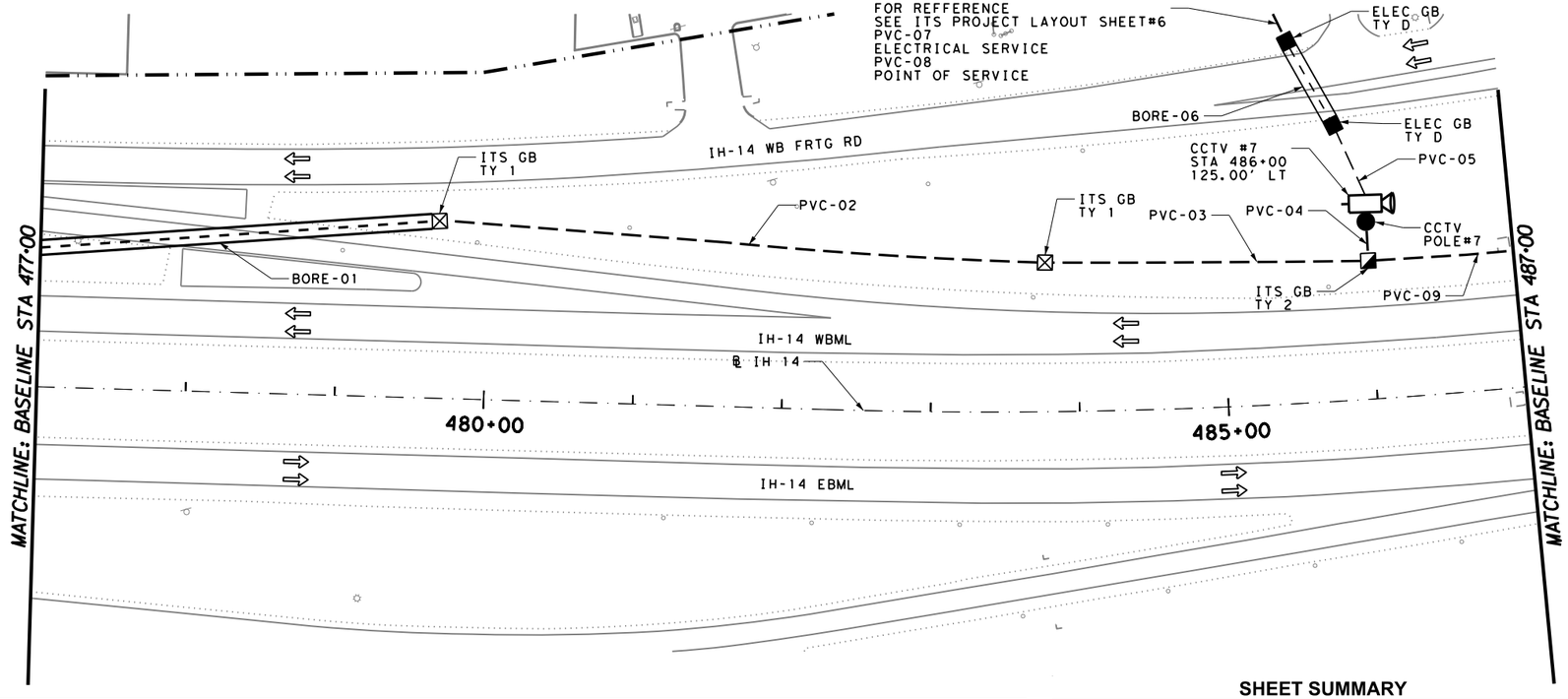

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	275													2		1	1			2		1
2	410											2				1	1	2				2
3	220											2				1	1	2				3
4	20		1			1	1															4
5	55		1					1	2													5
6	65			1				1	2													6
7	50		1					1	2													7
8	10	1								1	2											8
9	105											2				1	1	2				9

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	19
0432	6001	RIPRAP (CONC) (4 IN)	CY	1.5
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	10
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1545
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	670
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1036
0620	6007	ELEC CONDR (NO.8) BARE	LF	175
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	350
0620	6009	ELEC CONDR (NO.6) BARE	LF	10
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	20
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	2
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	1
6004	6031	ITS COM CLB (ETHERNET)	LF	65
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	70
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1210
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	1
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	1
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1470
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	550
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	1
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	1
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	1
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	1
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	1

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 477+00 - STA 487+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 47 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		93

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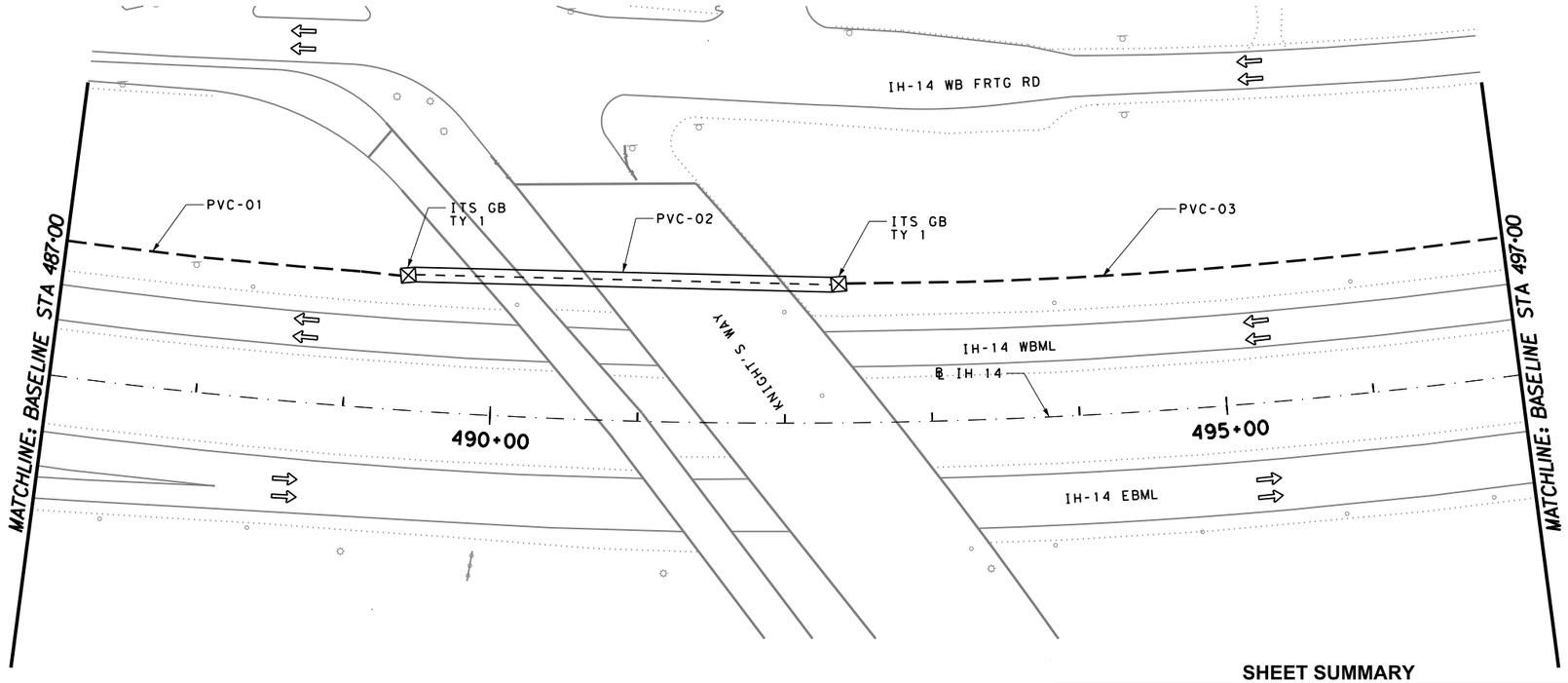

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	235											2				1	1	2				1
2	300													2		1	1			2		2
3	455											2				1	1	2				3

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1380
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	600
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	996
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1190
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1380
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	600
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

© 2021 Texas Department of Transportation

IH 14

ITS LAYOUT

STA 487+00 - STA 497+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 48 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		94

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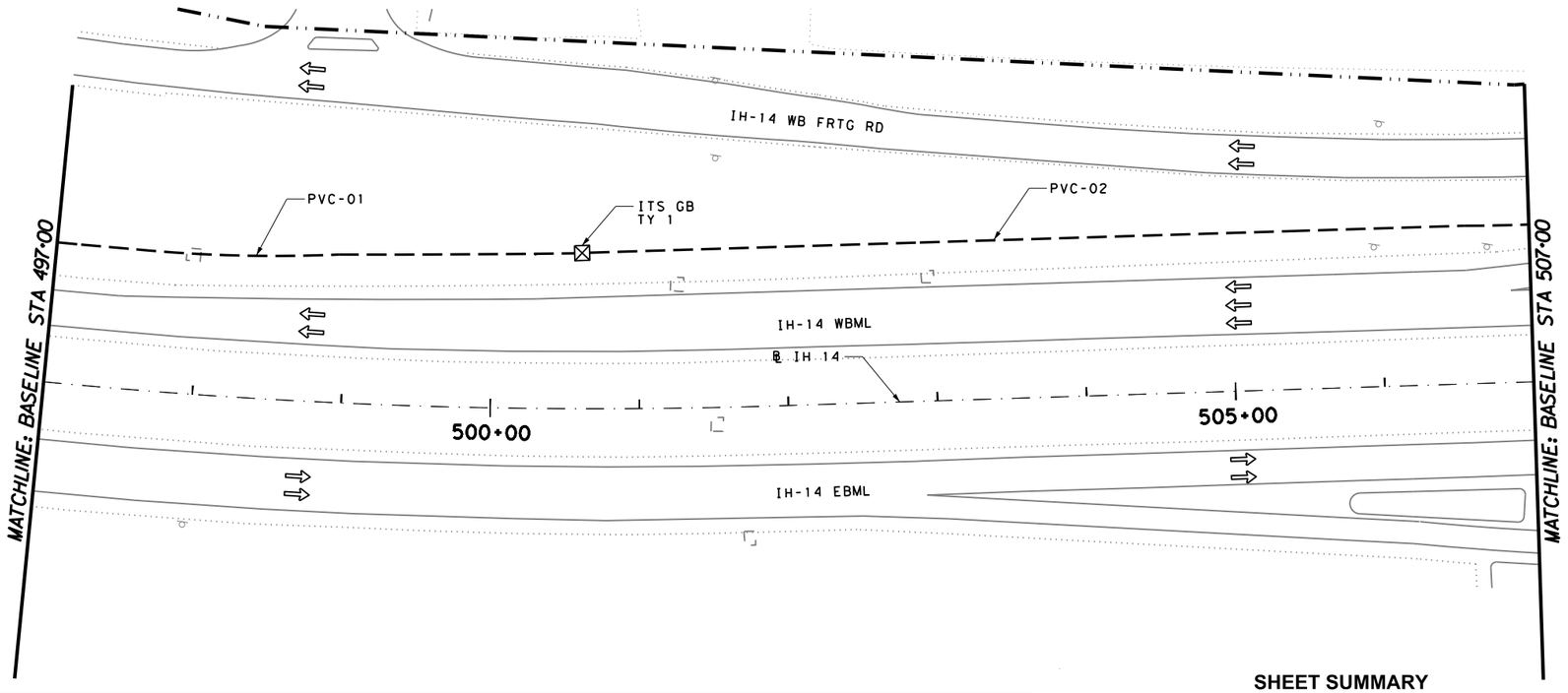

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	355											2				1	1	2				1
2	640											2				1	1	2				2

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1990
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	998
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1095
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1990
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	1
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 497+00 - STA 507+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 49 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		95

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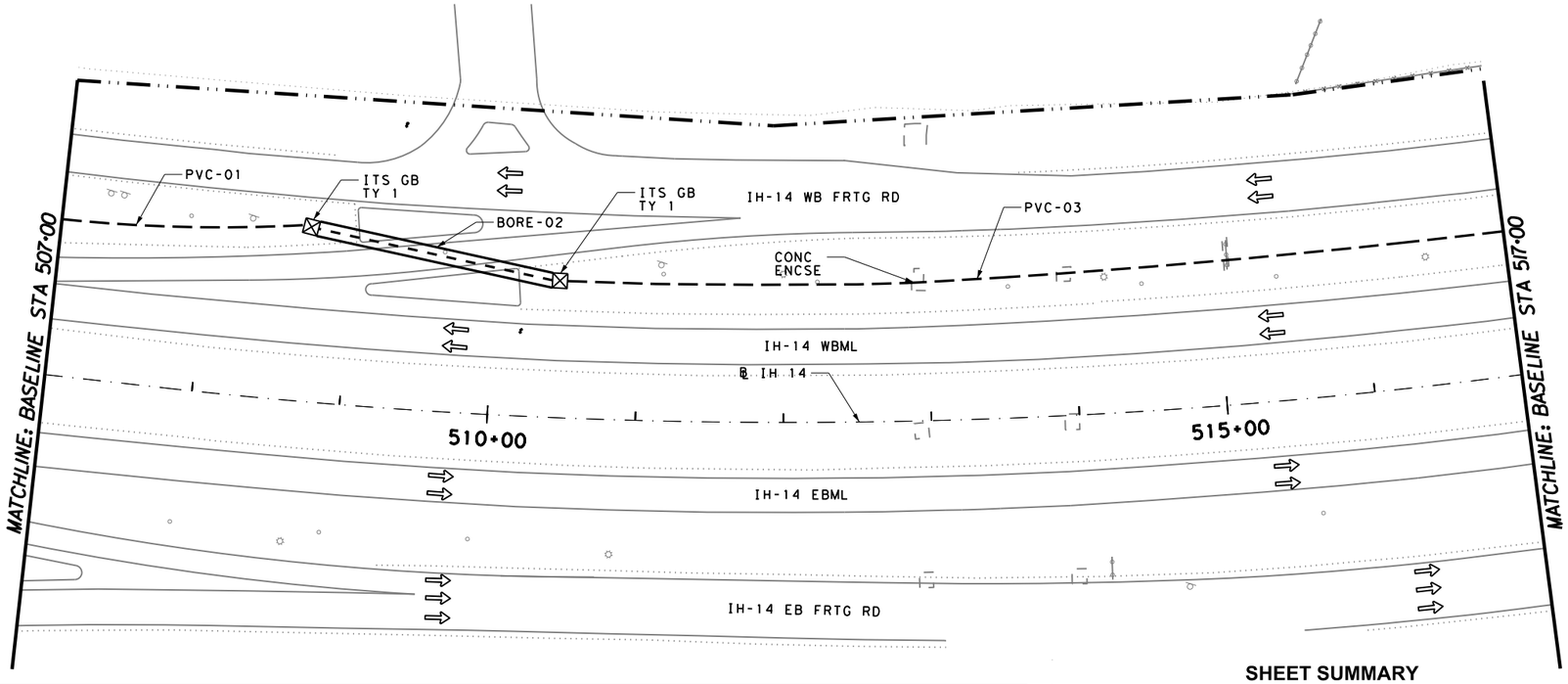

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	175											2				1	1	2				1
2	175													2		1	1			2		2
3	605											2				1	1	2				3
	40												2			1	1		2			

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	1560
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	80
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	350
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	1001
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	1195
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	0
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	1560
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	80
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	350
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	2
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 507+00 - STA 517+00

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 50 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		96

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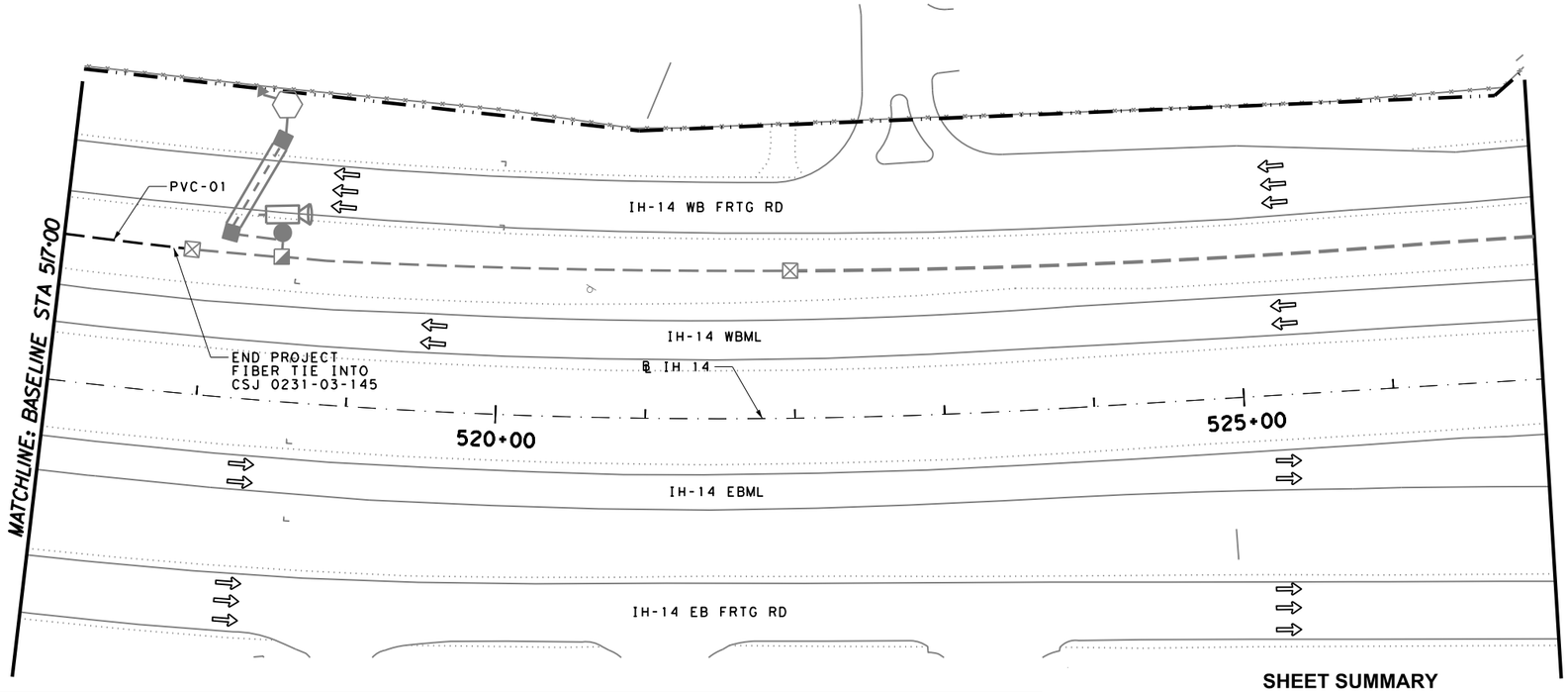

CONDUIT AND CABLE RUNS

		0618 CONDUIT AND FIBER						0620 ELEC CONDUCTORS				ITS FIBER BACKBONE									
		TRENCH	TRENCH	BORED	ABOVE GND		FIBER					TRENCH	TRENCH	BORED	ABOVE GND		FIBER	TRENCH	TRENCH	BORED	ABOVE GND	
RUN	LENGTH OF RUN (FT)	2" SCH 40	3" SCH 40	3" SCH 80 PVC	3" RMC	NO. 14 (INSULATED)	6 STRAND (S/M FIBER)	NO. 8 (BARE)	NO. 8 (INSULATED)	NO. 6 (BARE)	NO. 6 (INSULATED)	3" SCH 40	3" SCH 40 (CONC ENCSE)	3" SCH 80	3" RMC	NO.14 (INSULATED)	144 STRAND (S/M FIBER)	ITS MULTI DUCT (PVC - 40)	ITS MULTI DUCT (CONC ENCSE)	ITS MULTI DUCT (PVC - 80) (BORE)	ITS MULTI DUCT (RMC)	RUN
		0618 6023	0618 6029	0618 6054	0618 6074	0620 6002	6007 6010	0620 6007	0620 6008	0620 6009	0620 6010	0618 6029	0618 6031	0618 6054	0618 6074	0620 6002	6007 6017	6016 6006	6016 6008	6016 6011	6016 6013	
1	85											2				1	1	2				1

NOTES:

1. FOUR CONDUIT NON - CONCRETE ENCASED TRENCH USED, UNLESS SHOWN OTHERWISE ON PLANS.
2. PROVIDE FIBER SLACK PER ITS NOTES. SLACK IS INCLUDED IN QUANTITIES.

* ENCASE CONDUIT IN CONCRETE

**FIBER BACKBONE CONDUITS TO BE STRUCTURE MOUNTED IN ACCORDANCE WITH ITS (30)-16

SHEET SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	0
0432	6001	RIPRAP (CONC) (4 IN)	CY	0
0618	6029	CONDT (PVC) (SCH 40) (3")	LF	170
0618	6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	0
0618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	0
0618	6074	CONDT (RM) (3")	LF	0
0620	6002	ELEC CONDR (NO.14) INSULATED	LF	85
0620	6007	ELEC CONDR (NO.8) BARE	LF	0
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	0
0620	6009	ELEC CONDR (NO.6) BARE	LF	0
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	0
0624	6010	GROUND BOX TY D (162922) W / APRON	EA	0
0628	6151	ELC SRV TY D 120/240 060 (NS) SS (N) PS (U)	EA	0
6007	6010	FIBER OPTIC CBL (SINGLE-MODE) (6 FIBER)	LF	0
6007	6017	FBER OPTIC CBL (SINGLE-MODE) (144 FIBER)	LF	85
6007	6022	FIBER OPTIC PATCH PANEL (6 POSITION)	EA	0
6007	6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	1
6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	0
6016	6006	ITS MULTI - DUCT CND (PVC - 40)	LF	170
6016	6008	ITS MULTI - DUCT CND (PVC - 40) (CONC ENCSE)	LF	0
6016	6011	ITS MULTI - DUCT CND (PVC - 80) (BORE)	LF	0
6016	6013	ITS MULTI - DUCT CND (RMC)	LF	0
6016	6015	FIBER OPTIC CABLE ROAD MARKER	EA	1
6064	6037	ITS POLE (50 FT) (90 MPH)	EA	0
6064	6084	ITS POLE MNT CAB (TY 2) (CONF 2)	EA	0
6123	6001	ETHERNET SWITCH (INSTALL ONLY)	EA	0
6186	6002	ITS GND BOX (PCAST) TY 1 (243636) W / APRN	EA	0
6186	6010	ITS GND BOX (PCAST) TY 2 (366048) W / APRN	EA	0
***	***	HARDENED ETHERNET SWITCH W/POWER SUPPLY	EA	0

***EQUIPMENT TO BE PROVIDED BY TXDOT AND INSTALLED BY CONTRACTOR

LEGEND :

ITS LEGEND

- POINT OF SERVICE
- PROPOSED ELECTRICAL SERVICE
- PROPOSED CONDUIT, PVC
- PROPOSED CONDUIT, BORE
- PROPOSED CONDUIT, (RM)
- PROPOSED CCTV CAMERA
- CCTV POLE
- PROP ITS GROUND BOX (TY 1)
- PROP ITS GROUND BOX (TY 2)
- ELEC GROUND BOX (TY D)
- PROP GRND MNT CAB
- PROP DMS

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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IH 14

ITS LAYOUT

STA 517+00 - END PROJECT

SCALE: 0 25 50 100 FEET
1" = 100' HORIZ.

SHEET 51 OF 51

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		97

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NODE

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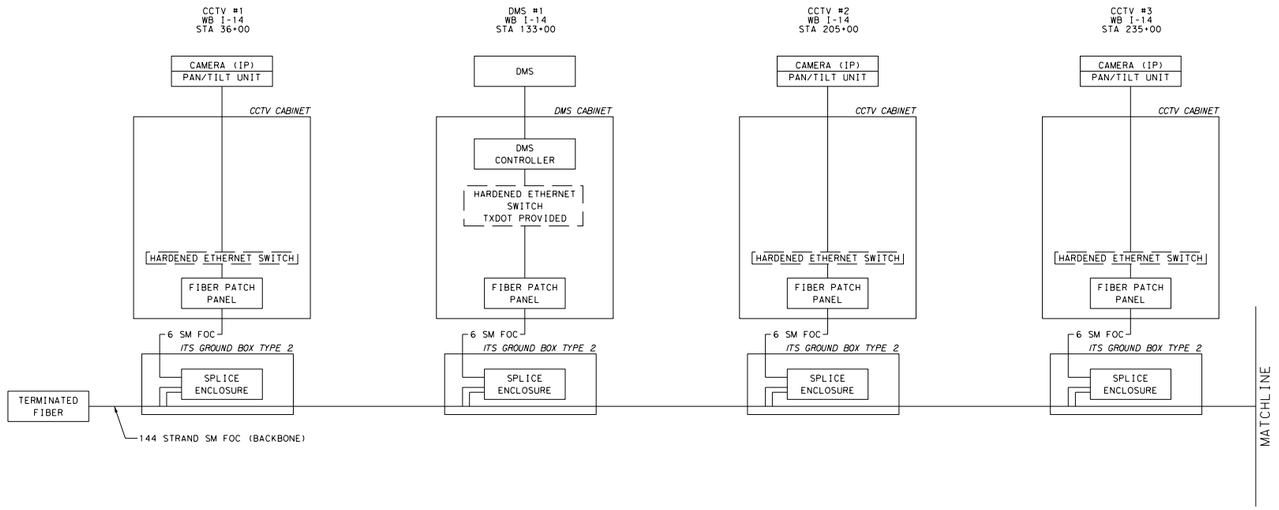
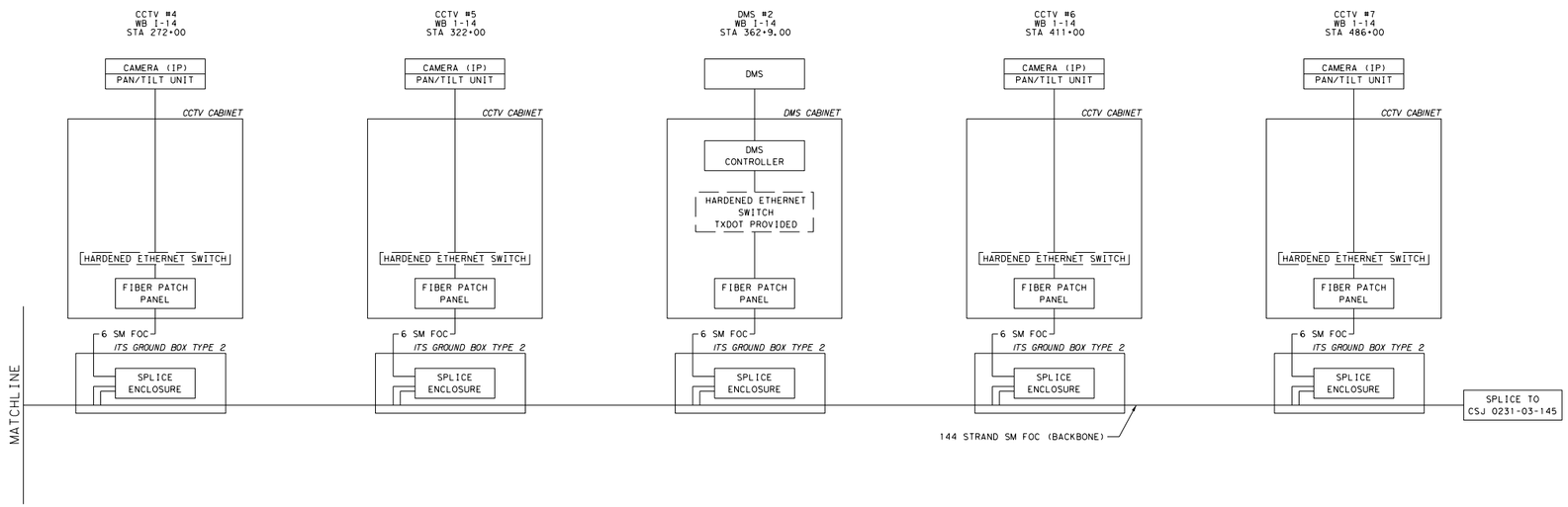
NOTES:

1. THIS SHEET IS A CONCEPTUAL DESIGN OF ITS COMPONENTS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE SYSTEM PROVIDEDIS COMPLETE AND OPERATIONAL.





ITS LEGEND

———	PROPOSED
⌐¬	PROVIDED BY TXDOT
FOC	FIBER OPTIC CABLE
SM	SINGLE MODE
IP	INTERNET PROTOCOL (DIGITAL)

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED
PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

SIGNATURE OF REGISTRANT & DATE

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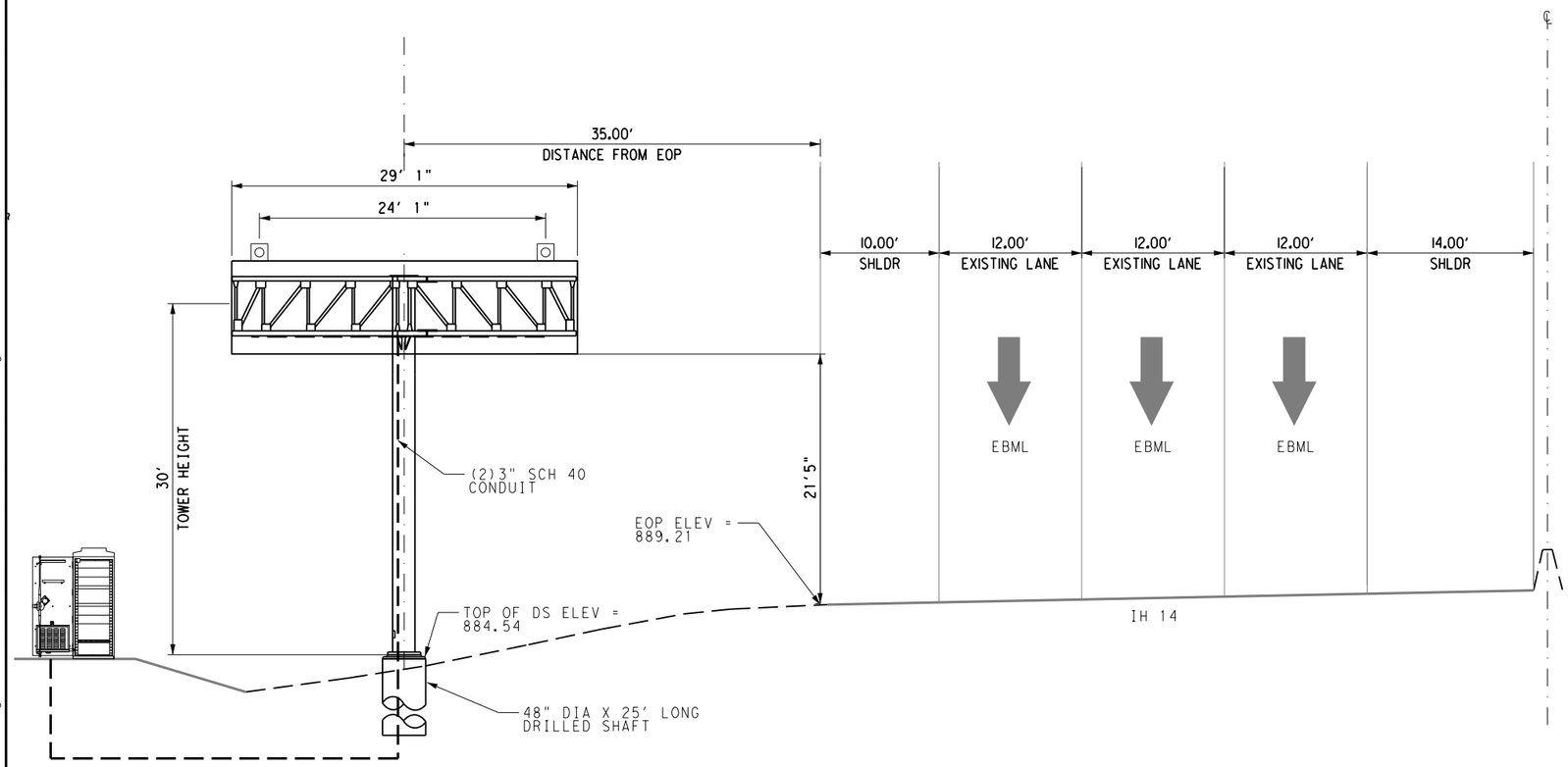
ITS SYSTEM SCHEMATIC

SHEET 1 OF 1

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		98

NOTES

1. CONTRACTOR IS RESPONSIBLE FOR SURVEYING THE LOCATIONS OF THE NEW AND/OR REPLACED DMS SIGNS TO CONFIRM THEY WILL BE FABRICATED TO MEET THE HEIGHT AND OFFSET DIMENSION SHOWN.



NOTES

1. THE DMS SIGN SUPPLIED BY TXDOT MEASURES APPROXIMATELY 29'-1" WIDE X 7'-10 3/16" TALL. IT INCLUDES 2 FLASHING BEACONS ON TOP THAT EXTEND APPROXIMATELY 1' - 5 3/16" ABOVE THE TOP EDGE OF THE SIGN. SHOP DRAWINGS MAY BE REQUESTED FROM TXDOT.

STATE OF TEXAS
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IH 14

DMS ELEVATION VIEW

PROP DMS #1
STA 133+00

SHEET 1 OF 2

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		99

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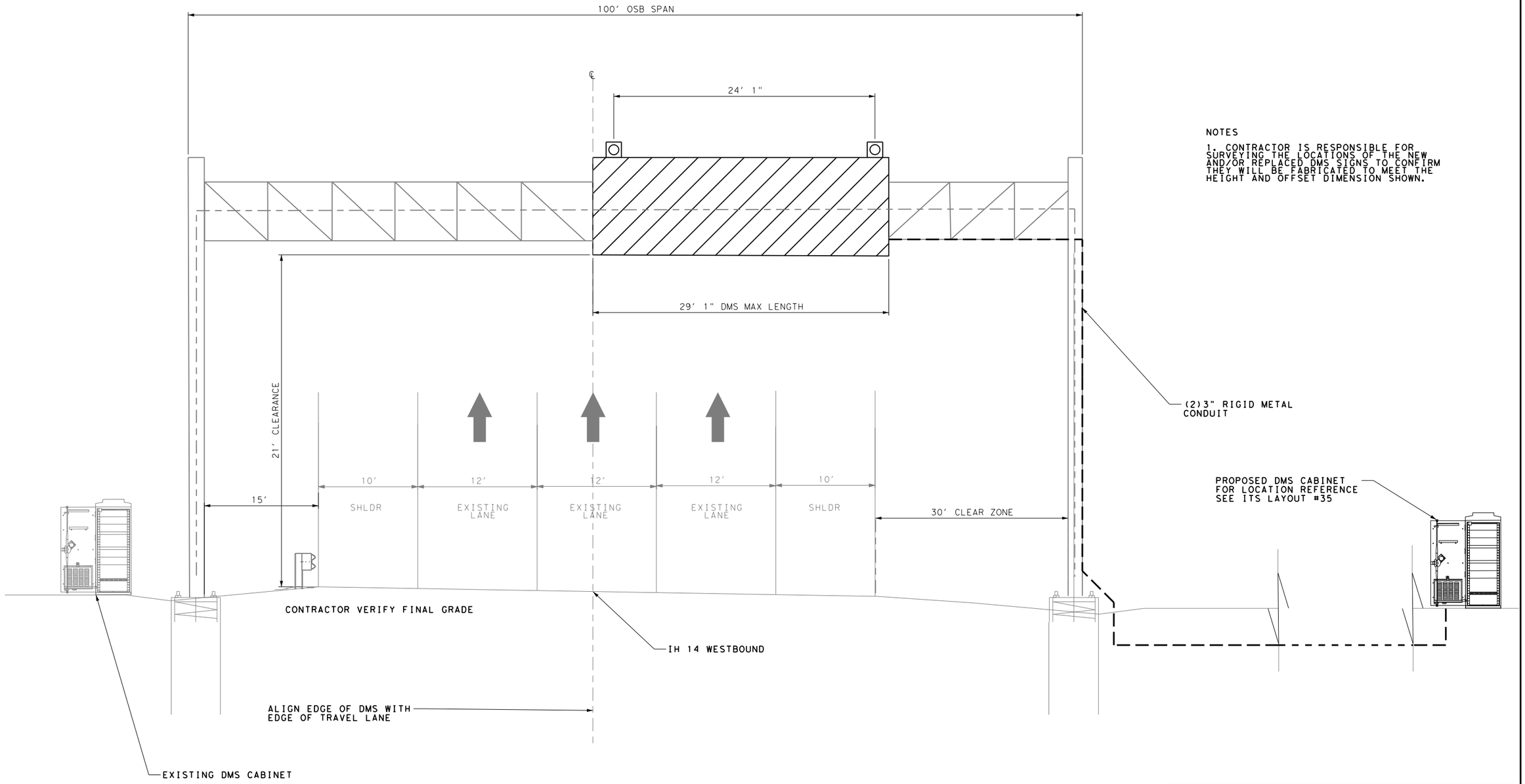

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IH 14

DMS ELEVATION VIEW

PROP DMS #2
STA 362+9.00

SHEET 2 OF 2

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	152	IH 14
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	BELL		100

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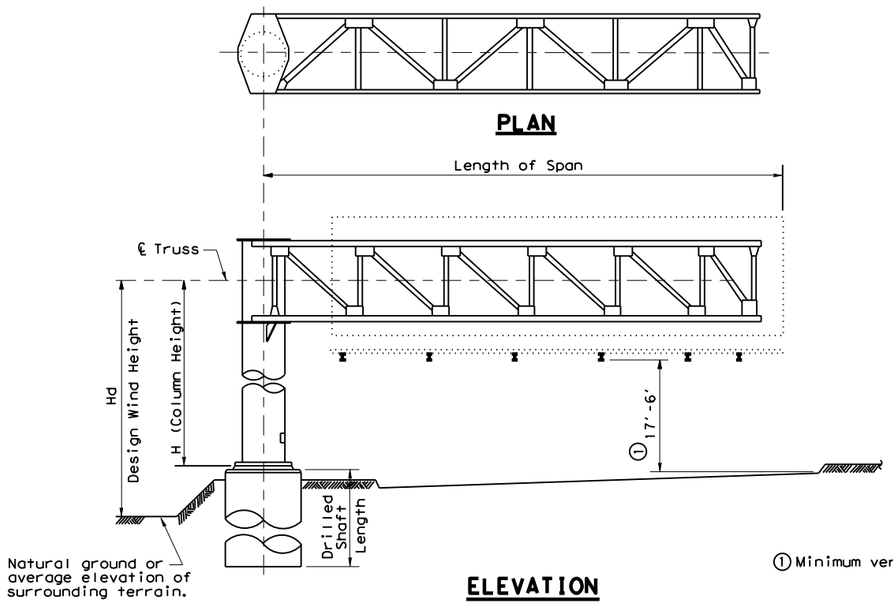
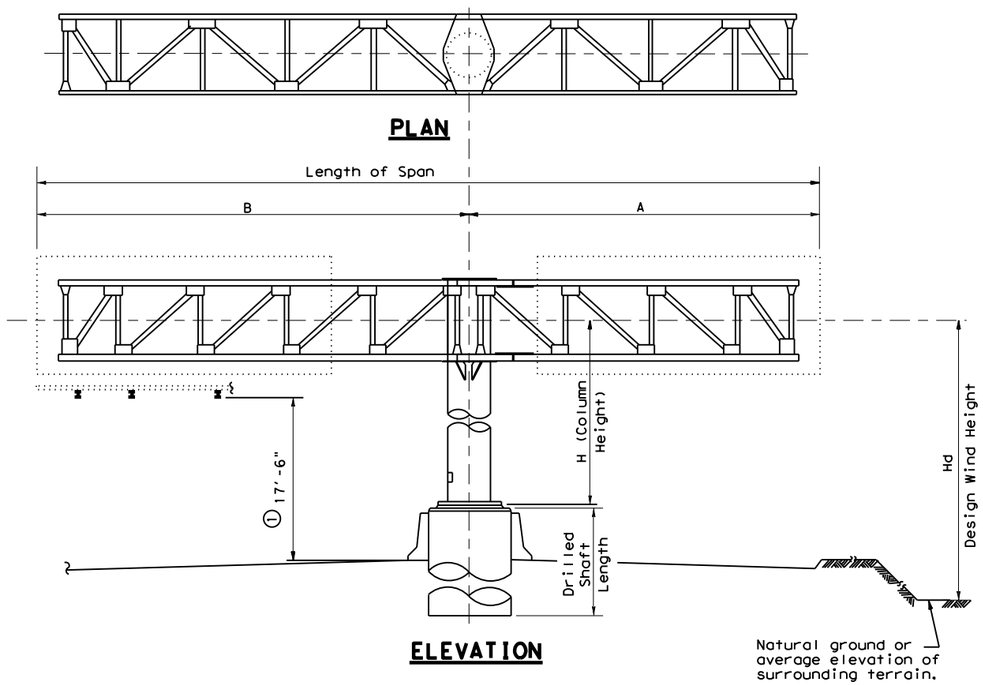


① Minimum vertical clearance



SELECTION EXAMPLE CANTILEVER SPAN

Given: Cantilever Span = 33′; Column Height, H = 23.3.′; Design Wind Height, Hd = 27′; Avg. Penetrometer Value, N = 15 (clay type soil); Hill County

Step 1: Select applicable COSS standard.
From Wind Velocity and Ice Zone sheet (WV & IZ-96) determine that Hill County is in Zone 4 (70 mph) and is above the ice line. Since Design Wind Height is less than 30′, use standard COSS-Z4 & Z4I. If Design Wind Height is more than 30′, use COSS-Z3 & Z3I. NOTE: In Zone 1 if Design Wind Height is greater than 30′ use HCOSS-Z1.

Step 2: Determine tower details from COSS-Z4 & Z4I. Use column height to nearest tabulated value′ i.e., 23′. Round span length up to the nearest tabulated value, i.e., 35′.
Tower details are:
Tower pipe 24" Dia with min. wall thickness = 0.312"
Base plate 33 ¾" Dia x 1 ¾"
Anchor bolts 8~1 ¾" Dia on 29 ⅜" bolt circle
Horizontal deflection of tower at ℄ truss = 0.889". During installation, double nuts at base plate may be used to plumb tower to compensate for horizontal deflection.
Design Moment = 244 Kip-ft
Design Torsion = 162 Kip-ft

Step 3: Determine truss details from COSS-Z4 & Z4I.
Read from small table at bottom of sheet for span = 35′.
Truss design width, W and depth, D = 4.0′x 4.0′.
Chord L 3 x 3 x 5/16 (HYC) with 6 bolt connection at tower
D.L. Diag. L 2 x 2 x 5/16 (HYC) with 2 bolt connection
W. L. Diag. L 3 x 3 x 5/16 (HYC) with 2 bolt connection
D. L. Vert. L 2 x 2 x 5/16 (HYC) with 2 bolt connection
W. L. Strut. L 2 x 2 x 5/16 (HYC) with 1 bolt connection
Bolts are ⅝" Dia high strength with 5~¾" Dia bolt alternate for chord connection at tower.
D.L. of truss = 50 lb/ft
Truss deflection at free end = 3.2". The fabricator shall compensate for this deflection by offsetting bolt holes between the upper and lower chords at the truss-to-tower connection.

Step 4: Determine foundation details. Use standard COSSF.
From COSSF with 24" Dia pipe and 1 ¾" Dia anchor bolts:
Anchor Bolts 1 ¾" Dia x 3′-10"
Drilled Shaft Dia 42"
Vertical Reinforcing 12 ~ #10 bars
Spiral C = #4 at 6" pitch Grade 60.
Misc. handhole, base plate, anchor bolt, and foundation details are shown on COSSF.

Step 5: Determine drilled shaft length from COSS-FD.
Enter the appropriate graph (for 42" Dia drilled shaft in clay soil) from the bottom with N = 15. Proceed upward interpolating moment curves (solid lines) to locate 244 Kip-ft. Project to the left side of the graph to determine the required embedment length, i.e., 12′.
Repeat the procedure for torsion curves (dashed lines) to locate 162 Kip-ft. The embedment length required to satisfy torsion is 14′. Add 3′-0" to the longer length to obtain a required drilled shaft length of 17′.

SELECTION EXAMPLE DOUBLE CANTILEVER SPAN

Given: Short span, A = 9′; Long Span, B = 25′; Total Cantilever Span = 34′; Column Height, H = 24′; Design Wind Height, Hd = 26′; Avg. Penetrometer Value, N = 20 (clay type soil); Wheeler County.

Step 1: Select applicable COSS standard.
From Wind Velocity and Ice Zone sheet determine that Wheeler County is in Zone 2 (90 mph) and is above the ice line. Since Design Wind Height is less than 30′ use standard COSS-Z2I. If Design Wind Height is more than 30′, use HCOSS-Z1.

Step 2: Determine tower details from COSS-Z2I.
Use column height = 24′. Round total span length up to the next longer tabulated length span, i.e., 35′. If total span length is greater than 40′, a special design would be required.
Tower details are:
Tower pipe 30" Dia with min. wall thickness = 0.310"
Base Plate 40 ½" Dia x 1 ¾"
Anchor bolts 8 ~ 2" Dia on 35 ¾" bolt circle
Horizontal deflection of tower at ℄ truss = 0.574-0.316 = 0.26". During installation, double nuts at base plate may be used to plumb tower and compensate for horizontal deflection.
Design Moment = 403 Kip-ft (use total span = 35′)
Design Torsion = 136 Kip-ft (use long span = 25′)

Step 3: Determine truss details from COSS-Z2I.
Read from small table at bottom of sheet 2 of 2 for Span A = 9′ (use 10′):
Chord L 3 x 3 x 5/16 (HYC) with 3 bolt connection at splice
D.L. Diag. L 2 x 2 x 5/16 (HYC) with 2 bolt connection
W.L. Diag. L 3 x 3 x 5/16 (HYC) with 2 bolt connection
D.L. Vert. L 2 x 2 x 5/16 (HYC) with 2 bolt connection
W.L. Strut. L 2 x 2 x 5/16 (HYC) with 1 bolt connection
Bolts are ⅝" Dia high strength.
D.L. of truss = 42 lb/ft.
Span B = 25′:
Chord L 3 x 3 x 1/4 (HYC) with 4 bolt connection at tower
D.L. Diag. L 2 x 2 x 5/16 (HYC) with 2 bolt connection
W.L. Diag. L 3 x 3 x 5/16 (HYC) with 2 bolt connection
D.L. Vert. L 2 x 2 x 5/16 (HYC) with 2 bolt connection
W.L. Strut. L 2 x 2 x 5/16 (HYC) with 1 bolt connection
Bolts are ⅝" Dia high strength with 3 ~ ¾" Dia bolt alternate for chord connection at tower.
D.L. of truss = 47 lb/ft.
Truss defl. at free end = 0.2" for Span A, = 1.3" for Span B.
The fabricator shall compensate for deflections by offsetting bolt holes between upper and lower chords at splice and at truss-to-tower connection. Top chord shall be shortened between the tower and the splice to achieve the required offset.

Step 4: Determine foundation details. Use standard COSSF.
From COSSF with 30" Dia pipe and 2" Dia anchor bolts:
Anchor bolts 2" Dia x 4′-3"
Drilled shaft Dia 54"
Vertical Reinforcing 18 ~ #10 bars
Spiral C = #4 at 6" pitch Grade 60
Misc. handhole, base plate, anchor bolt, and foundation details are shown on COSSF.

Step 5: Determine drilled shaft length from COSS-FD.
Enter the appropriate graph (for 54" Dia drilled shaft in clay type soil) from the bottom with N = 20. Proceed upward interpolating moment curves (solid lines) to locate 403 Kip-ft. Project to the left side of graph to determine required embedment length, i.e., 13′.
Repeat the procedure for the torsion curves (dashed lines) to locate 136 Kip-ft. Embedment length required to satisfy torsion is 9′.
Add 3′ to the longer length to obtain required drilled shaft length of 16′.

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORTS SELECTION EXAMPLES

COSS-SE

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REVISIONS

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

CONT	SECT	JOB	HIGHWAY
0231	03	152	IH 14

DIST	COUNTY	SHEET NO.
WACO	BELL	101

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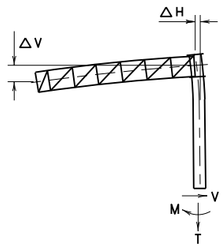
ZONE 1 100 MPH WIND

TOWER HEIGHT (ft)	10' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	15' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	20' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	25' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
14'	16	0.250	0.108	1 ¼	8	20 ½"	24 x1¼	0.2	5.61	25.29	77.33	16	0.344	0.180	1 ½	8	21"	25 x1¾	0.5	8.43	58.69	118.08	20	0.310	0.177	1 ¾	8	25 ⅜"	29¾x1¾	0.6	11.53	107.50	162.73	24	0.310	0.165	1 ¾	8	29 ⅜"	33¾x1½	0.8	14.40	168.25	205.58	14'
15'			0.124				24 x1¼		5.64		82.92		0.344	0.206						8.46		126.44		0.310	0.203					0.6	11.56		174.09		0.310	0.189				33¾x1½		14.44		219.64	15'
16'			0.141				24 x1¼		5.66		88.55		0.344	0.235						8.48		134.84		0.310	0.231					0.7	11.59		185.51		0.310	0.215				33¾x1⅝		14.48		233.79	16'
17'			0.159				24 x1¼		5.69		94.20		0.344	0.265						8.51		143.72		0.344	0.240						11.62		197.01		0.344	0.221				33¾x1⅝		14.52		248.01	17'
18'			0.178				24 x1⅜		5.71		99.88		0.375	0.274						8.54		151.73		0.344	0.269						11.66		208.52		0.344	0.248				33¾x1⅝	0.8	14.56		262.29	18'
19'			0.198				24 x1⅜		5.74		105.58		0.375	0.306	1 ½		21"	25 x1¾		8.56		160.23		0.344	0.300				29¾x1¾		11.69		220.08		0.344	0.276	1 ¾		29 ⅜"	33¾x1¾	0.9	14.60		276.65	19'
20'			0.220	1 ¼		20 ½"	24 x1½		5.77		111.32		0.406	0.315	1 ¾		21 ½"	26 x1⅛		8.59		168.72		0.375	0.306				29¾x1⅞		11.72		231.68		0.344	0.306	2		29 ¾"	34½x1¾		14.64		291.07	20'
21'		0.250	0.242	1 ⅜		20 ¾"	24½x1½		5.79		117.09		0.406	0.347				26 x1⅛		8.62		177.32		0.375	0.337				29¾x1⅞		11.76		243.33		0.375	0.311				34½x1⅛		14.68		305.54	21'
22'		0.281	0.238				24½x1½		5.82		122.88		0.438	0.354				26 x 2		8.64		185.91		0.406	0.341				29¾x1⅞		11.79		255.00		0.375	0.341				34½x1⅛		14.72		320.07	22'
23'		0.281	0.260				24½x1⅝		5.85		128.70		0.438	0.387				26 x 2		8.67		194.53		0.406	0.373	1 ¾		25 ⅜"	29¾x 2	0.7	11.82		266.73		0.375	0.373				34½x 2		14.76		334.66	23'
24'		0.281	0.283				24½x1⅝		5.87		134.55		0.469	0.395				26 x 2		8.69		203.18		0.406	0.406	2		25 ¾"	30½x 2	0.8	11.86		278.50		0.406	0.376				34½x 2	0.9	14.80		349.29	24'
25'		0.312	0.279	1 ⅜		20 ¾"	24½x1⅝		5.90		140.42		0.469	0.429				26 x2⅛		8.72		211.85		0.438	0.410				30½x2⅛		11.89		290.30		0.406	0.408				34½x 2	1.0	14.84		363.98	25'
26'		0.312	0.302	1 ½		21"	25 x1¾		5.93		146.33		0.500	0.440				26 x2⅛		8.75		220.56		0.438	0.443				30½x2⅛		11.92		302.15		0.406	0.442				34½x 2		14.88		378.72	26'
27'		0.312	0.325				25 x1¾		5.95		152.26		0.500	0.474				26 x2⅛		8.77		229.30		0.469	0.449				30½x2⅛		11.96		314.03		0.406	0.476				34½x2⅛		14.92		393.51	27'
28'		0.344	0.320				25 x1¾		5.98		158.22		0.531	0.482	1 ¾		21 ½"	26 x2¼		8.80		238.06		0.469	0.483				30½x2¼		11.99		325.95		0.438	0.477	2		29 ¾"	34½x2⅛		14.96		408.34	28'
29'		0.344	0.343				25 x1⅞		6.01		164.20		0.531	0.517	2		22"	27 x2¼		8.83		246.85		0.500	0.488				30½x2¼		12.02		337.91		0.438	0.512	2 ¼		30"	35 x2¼		15.00		423.22	29'
30'		0.344	0.367	1 ½		21"	25 x1⅞		6.03		170.21		0.656	0.459	2		22"	27 x2⅜		8.85		255.67		0.500	0.523				30½x2¼		12.05		349.90		0.469	0.513				35 x2¼		15.04		438.15	30'
31'		0.375	0.362	1 ¾		21 ½"	26 x1⅞		6.06		176.25		0.656	0.490	2		22"	27 x2⅜		8.88		264.52		0.531	0.528				30½x2¼		12.09		361.93		0.469	0.548				35 x2¼	1.0	15.08		453.12	31'
32'	16	0.375	0.385	1 ¾	8	21 ½"	26 x1⅞	0.2	6.09	25.29	182.32	16	0.656	0.523	2	8	22"	27 x2⅜	0.5	8.91	58.69	273.39	20	0.531	0.563	2	8	25 ¾"	30½x2⅜	0.8	12.12	107.50	374.00	24	0.469	0.584	2 ¼	8	30"	35 x2¼	1.1	15.12	168.25	468.13	32'

ZONE 1 100 MPH WIND

TOWER HEIGHT (ft)	30' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	35' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	40' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
14'	24	0.375	0.199	2	8	29 ¾"	34½x1¾	1.1	17.16	242.54	249.26	30	0.310	0.178	2	8	35 ¾"	40½x1⅝	1.3	20.11	330.60	296.99	30	0.375	0.206	2 ¼	8	36"	41 x1⅞	1.8	22.89	432.38	347.21	14'
15'		0.375	0.238				34½x1¾	1.2	17.20		265.80		0.310	0.205				40½x1⅝	1.4	20.16		316.04		0.410	0.219					1.8	22.94		368.40	15'
16'		0.406	0.251				34½x1⅞		17.24		282.45		0.310	0.233				40½x1⅝		20.21		335.27		0.410	0.249					1.8	22.99		389.82	16'
17'		0.406	0.283				34½x1⅞		17.28		299.21		0.344	0.239				40½x1¾		20.26		354.65		0.410	0.282					1.9	23.04		411.46	17'
18'		0.438	0.296				34½x1⅞	1.2	17.32		316.06		0.344	0.268				40½x1¾	1.4	20.31		374.16		0.410	0.316				41 x1⅞	2.0	23.09		433.29	18'
19'		0.438	0.329				34½x 2	1.3	17.36		332.99		0.344	0.299				40½x1¾	1.5	20.36		393.81		0.440	0.327				41 x 2	2.0	23.14		455.29	19'
20'		0.438	0.355				34½x 2	1.3	17.40		350.00		0.344	0.331	2		35 ¾"	40½x1¾	1.5	20.41		413.56		0.440	0.362					2.0	23.19		477.44	20'
21'		0.467	0.377	2		29 ¾"	34½x 2	1.3	17.44		367.09		0.375	0.336	2 ¼		36"	41 x1⅞	1.5	20.46		433.43		0.440	0.399					2.1	23.24		499.74	21'
22'		0.467	0.414	2 ¼		30"	35 x2⅛	1.4	17.48		384.25		0.375	0.369				41 x1⅞	1.6	20.51		453.39		0.440	0.438				41 x 2	2.2	23.29		522.16	22'
23'		0.467	0.452				35 x2⅛	1.4	17.52		401.47		0.375	0.403				41 x 2	1.6	20.56		473.44		0.470	0.531	2 ¼		36"	41 x2⅛	2.2	23.34		544.69	23'
24'		0.500	0.463				35 x2⅛	1.5	17.56		418.75		0.375	0.439				41 x 2	1.7	20.61		493.59		0.470	0.489	2 ½		36 ½"	42 x2⅛	2.2	23.39		567.34	24'
25'		0.530	0.475				35 x2¼		17.60		436.09		0.406	0.442				41 x 2		20.66		513.81		0.470	0.531				42 x2¼	2.3	23.44		590.10	25'
26'		0.530	0.514				35 x2¼	1.4	17.64		453.50		0.406	0.478				41 x 2		20.70		534.12		0.500	0.540				42 x2¼		23.49		612.95	26'
27'		0.530	0.554				35 x2¼	1.5	17.68		470.95		0.406	0.512				41 x 2		20.75		554.50		0.500	0.582				42 x2¼		23.54		635.89	27'
28'		0.530	0.596				35 x2⅜	1.5	17.72		488.46		0.438	0.514				41 x2⅛		20.80		574.96		0.500	0.626				42 x2⅜		23.59		658.93	28'
29'		0.562	0.607				35 x2⅜	1.5	17.76		506.03		0.438	0.552				41 x2¼	1.7	20.85		595.49		0.531	0.647				42 x2⅜	2.3	23.64		682.04	29'
30'		0.562	0.649	2 ¼		30"	35 x2⅜	1.6	17.80		523.64		0.438	0.591	2 ¼		36"	41 x2¼	1.8	20.90		616.08		0.531	0.692				42 x2⅜	2.4	23.69		705.24	30'
31'		0.594	0.659	2 ½		30 ½"	36 x2½	1.6	17.84		541.31		0.469	0.591	2 ½		36 ½"	42 x2¼	1.8	20.95		636.75		0.562	0.687				42 x2⅜	2.4	23.73		728.52	31'
32'	24	0.594	0.702	2 ½	8	30 ½"	36 x2½	1.6	17.88	242.54	559.02	30	0.469	0.630	2 ½	8	36 ½"	42 x2¼	1.8	21.00	330.60	657.48	30	0.562	0.732	2 ½	8	36 ½"	42 x2½	2.4	23.78	432.38	751.87	32'



ELEVATION

(SHOWING DESIGN LOADS AND DEAD LOAD DEFLECTIONS)

TRUSS DETAILS

SPAN	10', 15', & 20'	25'	30'	35'	40'
W x D = WIDTH x DEPTH	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5
CHORD-①, Unless Otherwise Shown	L 3 x 3 x 3/16 ② [3]	L 3 x 3 x 1/4 ② [4]	L 3 ½x3 ½x 1/4 [7]	L 3 ½x3 ½x 5/16 [9]	L 3 ½x3 ½x 3/8 [8]
DEAD LOAD DIAGONAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 3 x 2 x 3/16 [2]
WIND LOAD DIAGONAL-②	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [2]	L 3 x2 ½x 1/4 [3]	L 3 x 3 x 1/4 [3]	L 3 x 3 x 1/4 [3]
DEAD LOAD VERTICAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 3 x 2 x 3/16 [2]
WIND LOAD STRUT-②	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 ½x2 ½x 3/16 [1]
TRUSS DEAD LOAD	42 lb/ft	47 lb/ft	53 lb/ft	60 lb/ft	70 lb/ft
SIZE H. S. BOLTS IN CONNECTION	5/8" DIA	5/8" DIA	5/8" DIA	5/8" DIA	3/4" DIA
NO. & SIZE OF H. S. BOLTS IN CHORD		5 ~ 5/8" DIA or	7 ~ 5/8" DIA or	9 ~ 5/8" DIA or	
ANGLE TO TOWER CONNECTION PLATE	3 ~ 5/8" DIA ea	3 ~ 3/4" DIA ea	5 ~ 3/4" DIA ea	7 ~ 3/4" DIA ea	8 ~ 3/4" DIA ea

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

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

GENERAL NOTES :

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

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

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

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

For truss details see standard drawing COSSD.

For base and foundation details see standard drawing COSSF.

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

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

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

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

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

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORTS

COSS-Z1-10

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
4-10	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		102

DATE: 10/20/2020 11:41:36 AM
FILE: I:\WACTRAFF\DESIGN\Engineering\IH14#231-3-152#ITS\CADD\STANDARDS\cantilever\stds61.dgn

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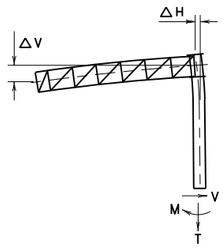
ZONE 1 100 MPH WIND

TOWER HEIGHT (ft)	10' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	15' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	20' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	25' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
25'	16	0.375	0.240	1 ½	8	21"	25 ×1¾	0.2	6.46	27.82	153.70	16	0.531	0.384	1 ¾	8	21 ½"	26 ×2¼	0.5	9.30	62.60	225.51	20	0.438	0.411	2	8	25 ¾"	30½×2⅛	0.8	12.34	111.29	300.38	24	0.469	0.356	2	8	29 ¾"	34½×2⅛	0.9	15.37	173.89	375.94	25'
26'		0.375	0.250				25 ×1¾		6.49		160.15		0.531	0.415	1 ¾		21 ½"	26 ×2¼		9.33		234.80		0.438	0.444				30½×2⅛		12.37		312.67		0.469	0.385	2		29 ¾"	34½×2⅛		15.41		391.21	26'
27'		0.406	0.260				25 ×1¾		6.52		166.65		0.531	0.448	1 ¾		21 ½"	26 ×2¼		9.36		244.12		0.469	0.449				30½×2¼		12.41		325.01		0.500	0.391	2		29 ¾"	34½×2¼		15.46		406.54	27'
28'		0.438	0.260				25 ×1⅞		6.55		173.18		0.656	0.400	2		22"	27 ×2⅜		9.39		253.47		0.500	0.455						12.44		337.38			0.421	2 ¼		30"	35 ×2¼		15.50		421.92	28'
29'		0.469	0.260	1 ½		21"	25 ×1⅞		6.58		179.73		0.656	0.429				27 ×2⅜		9.42		262.85		0.500	0.488						12.48		349.80			0.451						15.54		437.35	29'
30'			0.270	1 ¾		21 ½"	26 ×1⅞		6.61		186.32		0.687	0.441				27 ×2½		9.45		272.26		0.531	0.495				30½×2¼		12.52		362.25		0.500	0.483						15.59		452.82	30'
31'			0.290				26 × 2		6.64		192.94			0.471						9.48		281.70		0.562	0.501	2		25 ¾"	30½×2⅜		12.55		374.75		0.531	0.488					0.9	15.63		468.35	31'
32'		0.469	0.310				26 × 2		6.67		199.59			0.502						9.50		291.17		0.562	0.534	2 ¼		26"	31 ×2⅜		12.59		387.28			0.520					1.0	15.68		483.93	32'
33'		0.500	0.320				26 ×2⅛		6.70		206.26		0.687	0.534						9.53		300.68		0.562	0.568				31 ×2⅜		12.63		399.85			0.553				35 ×2¼		15.72		499.55	33'
34'		0.500	0.330						6.73		212.97		0.750	0.525	2		22"	27 ×2½		9.56		310.21		0.594	0.573				31 ×2⅜		12.66		412.46			0.587	2 ¼		30"	35 ×2⅜		15.76		515.23	34'
35'		0.500	0.350						6.75		219.70			0.557	2 ¼		22 ½"	28 ×2⅝		9.59		319.77		0.594	0.607				31 ×2½		12.70		425.11		0.531	0.622	2 ½		30 ½"	36 ×2⅜		15.81		530.95	35'
36'		0.531	0.350				26 ×2⅛		6.78		226.47			0.589				28 ×2⅝		9.62		329.37		0.594	0.643				31 ×2⅝		12.74		437.80		0.562	0.624				36 ×2½		15.85		546.71	36'
37'		0.531	0.370				26 ×2¼		6.81		233.26			0.622				28 ×2¾		9.65		338.99		0.625	0.648				31 ×2⅝		12.77		450.53		0.562	0.659				36 ×2½	1.0	15.89		562.53	37'
38'		0.531	0.390						6.84		240.08		0.750	0.656				28 ×2¾		9.65		347.49		0.625	0.684				31 ×2⅝		12.81		463.29		0.562	0.695				36 ×2½	1.1	15.94		578.39	38'
39'		0.656	0.350						6.87		246.94		0.843	0.626				28 ×2⅞		9.71		358.32		0.656	0.689				31 ×2¾		12.84		476.09		0.594	0.696				36 ×2⅝		15.98		594.30	39'
40'		0.656	0.360	1 ¾		21 ½"	26 ×2¼		6.90		253.82		0.843	0.658				28 ×2⅞		9.74		368.03		0.656	0.725	2 ¼		26"	31 ×2¾		12.88		488.93		0.594	0.732				36 ×2⅝		16.03		610.25	40'
42'		0.656	0.400	2		22"	27 ×2⅜		6.96		267.67		0.843	0.726				28 × 3		9.80		387.55		0.719	0.736	2 ½		26 ½"	31½×2¾		12.95		514.72		0.625	0.770				36 ×2¾		16.11		642.29	42'
44'		0.687	0.420	2		22"	27 ×2⅜		7.02		281.64		1.031	0.675				28 × 3		9.85		407.18		0.750	0.779	2 ½		26 ½"	31½×2⅞		13.03		540.66		0.656	0.808				36 ×2¾		16.20		674.52	44'
45'	16	0.687	0.440	2	8	22"	27 ×2⅜	0.2	7.05	27.82	288.67	16	1.218	0.619	2 ¼	8	22 ½"	28 × 3	0.5	9.88	62.60	417.04	20	0.750	0.814	2 ½	8	26 ½"	31½×2⅞	0.8	13.06	111.29	553.68	24	0.688	0.809	2 ½	8	30 ½"	36 ×2¾	1.1	16.24	173.89	690.71	45'

ZONE 1 100 MPH WIND

TOWER HEIGHT (ft)	30' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	35' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	40' SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
25'	24	0.531	0.475	2 ¼	8	30"	35 ×2¼	1.4	18.21	250.41	449.85	30	0.406	0.442	2 ¼	8	36"	41 × 2	1.6	21.34	340.83	529.13	30	0.500	0.502	2 ½	8	36 ½"	42 ×2¼	2.1	24.18	445.17	606.83	25'
26'		0.531	0.514				35 ×2¼		18.25		467.86		0.406	0.478				41 × 2	1.7	21.40		550.13		0.500	0.543				42 ×2¼	2.2	24.23		630.43	26'
27'		0.562	0.526				35 ×2⅜		18.29		485.93		0.438	0.479				41 ×2⅛		21.45		571.21		0.500	0.586				42 ×2⅜	2.3	24.29		654.13	27'
28'		0.562	0.566				35 ×2⅜	1.4	18.34		504.07			0.515				41 ×2⅛		21.50		592.37		0.531	0.595				42 ×2⅜		24.34		677.92	28'
29'		0.562	0.607	2 ¼		30"	35 ×2⅜	1.5	18.38		522.25			0.552	2 ¼		36"	41 ×2⅛		21.56		613.61		0.531	0.638				42 ×2⅜		24.40		701.81	29'
30'		0.594	0.617	2 ½		30 ½"	36 ×2½	1.5	18.43		540.50		0.438	0.591	2 ½		36 ½"	42 ×2¼		21.61		634.92		0.531	0.683				42 ×2½	2.3	24.45		725.77	30'
31'		0.594	0.659				36 ×2½	1.5	18.47		558.79		0.469	0.591				42 ×2¼	1.7	21.67		656.31		0.562	0.691	2 ½		36 ½"	42 ×2½	2.4	24.51		749.82	31'
32'		0.594	0.702				36 ×2⅝	1.6	18.51		577.14		0.469	0.630				42 ×2¼	1.8	21.72		677.76		0.562	0.737	2 ¾		37"	43 ×2½		24.56		773.96	32'
33'		0.625	0.712				36 ×2⅝		18.56		595.54		0.469	0.670				42 ×2⅜		21.78		699.28		0.562	0.783				43 ×2⅝		24.61		798.17	33'
34'		0.625	0.756				36 ×2⅝		18.60		614.00		0.500	0.669				42 ×2⅜		21.83		720.87		0.594	0.789				43 ×2⅝		24.67		822.45	34'
35'		0.656	0.766				36 ×2¾		18.64		632.50		0.500	0.709				42 ×2½		21.89		742.53		0.594	0.836				43 ×2⅝	2.4	24.72		846.81	35'
36'		0.656	0.811				36 ×2¾		18.69		651.05		0.500	0.750				42 ×2½		21.94		764.25		0.594	0.885				43 ×2¾	2.5	24.78		871.25	36'
37'		0.688	0.820				36 ×2¾		18.73		669.66		0.531	0.749	2 ½		36 ½"	42 ×2½		22.00		786.04		0.625	0.891				43 ×2¾		24.83		895.75	37'
38'		0.688	0.865				36 ×2¾		18.78		688.31		0.531	0.790	2 ¾		37"	43 ×2⅝		22.05		807.89		0.625	0.940				43 ×2¾		24.89		920.33	38'
39'		0.719	0.875	2 ½		30 ½"	36 ×2⅞		18.82		707.01		0.562	0.788				43 ×2⅝		22.10		829.80		0.656	0.946				43 ×2¾		24.94		944.97	39'
40'		0.719	0.920	2 ¾		31 ½"	38 ×2⅞		18.86		725.76		0.562	0.829				43 ×2¾		22.16		851.78		0.656	0.995	2 ¾		37"	43 ×2⅞	2.5	25.00		969.68	40'
42'		0.750	0.977				38 × 3		18.95		763.41		0.594	0.868				43 ×2¾		22.27		895.92		0.688	1.150	3		37 ½"	44 × 3	2.7	25.11		1019.30	42'
44'		0.937	0.877				38 × 3		19.04		801.24		0.625	0.905				43 ×2¾	1.8	22.38		940.31		0.719	1.106	3		37 ½"	44 × 3	2.6	25.22		1069.19	44'
45'	24	0.937	0.918	2 ¾	8	31 ½"	38 ×3⅛	1.6	19.08	250.41	820.23	30	0.625	0.947	2 ¾	8	37"	43 ×2¾	1.9	22.43	340.83	962.59	30	0.719	1.157	3	8	37 ½"	44 × 3	2.6	25.27	445.17	1094.23	45'



ELEVATION

(SHOWING DESIGN LOADS AND DEAD LOAD DEFLECTIONS)

TRUSS DETAILS

SPAN	10', 15', & 20'	25'	30'	35'	40'
W x D = WIDTH x DEPTH	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5
CHORD-①, Unless Otherwise Shown	L 3 x 3 x 3/16 ② [3]	L 3 x 3 x 1/4 ② [4]	L 3 ½x3 ½x 5/16 [8]	L 3 ½x3 ½x 5/16 [9]	L 3 ½x3 ½x 3/8 [8]
DEAD LOAD DIAGONAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 3 x 2 x 3/16 [2]
WIND LOAD DIAGONAL-②	L 3 x 3 x 3/16 [3]	L 3 x 3 x 3/16 [3]	L 3 x2 ½x 1/4 [3]	L 3 x2 ½x 1/4 [4]	L 3 x 3 x 1/4 [3]
DEAD LOAD VERTICAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 3 x 2 x 3/16 [2]
WIND LOAD STRUT-②	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 ½x2 ½x 3/16 [1]
TRUSS DEAD LOAD	42 lb/ft	47 lb/ft	59 lb/ft	60 lb/ft	70 lb/ft
SIZE H. S. BOLTS IN CONNECTION	5/8" DIA	5/8" DIA	5/8" DIA	5/8" DIA	3/4" DIA
NO. & SIZE OF H. S. BOLTS IN CHORD		5 ~ 5/8" DIA or	8 ~ 5/8" DIA or	9 ~ 5/8" DIA or	
ANGLE TO TOWER CONNECTION PLATE	3 ~ 5/8" DIA ea	3 ~ 3/4" DIA ea	6 ~ 3/4" DIA ea	7 ~ 3/4" DIA ea	8 ~ 3/4" DIA ea

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For base and foundation details see standard drawing COSSF.

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

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

Details called for hereon are applicable for Design Wind Heights of 30' to 50' inclusive.

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

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

Texas Department of Transportation
Traffic Operations Division

HIGH LEVEL CANTILEVER OVERHEAD SIGN SUPPORTS

HCOSS-Z1-10

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
4-10	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		103

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ZONE 2 WITH ICE 90 MPH WIND

10' SPAN

TOWER HEIGHT (ft)	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS		
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)
14'	16	0.250	0.108	1¼	6	20½"	24 ×1¼	0.2	4.54	20.49	62.82
15'	↑	↑	0.124	↑	6	↑	↑	↑	4.56	↑	67.33
16'			0.141		8				4.59		71.88
17'			0.159		↑				4.61		76.44
18'			0.178						4.63		81.04
19'			0.198				↓		4.65		85.65
20'			0.220				24 ×1¼		4.67		90.29
21'			0.242				24 ×1⅜		4.69		94.96
22'			0.266				↑		4.71		99.64
23'			0.291						4.74		104.35
24'			0.316	↓		↓	↓		4.76		109.09
25'			0.343	1¼		20½"	24 ×1⅜		4.78		113.84
26'		↓	0.371	1⅜		20¾"	24½×1½		4.80		118.62
27'		0.250	0.401	↑		↑	↑		4.82		123.42
28'		0.281	0.386				↓		4.84		128.24
29'		0.281	0.414				24½×1½		4.86		133.09
30'		0.281	0.443	↓		↓	24½×1⅝		4.89		137.95
31'	↓	0.312	0.429	1⅜	↓	20¾"	24½×1⅝	↓	4.91	↓	142.84
32'	16	0.312	0.457	1½	8	21"	25 ×1⅝	0.2	4.93	20.49	147.75

15' SPAN

TOWER HEIGHT (ft)	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS		
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)
14'	16	0.250	0.242	1⅜	8	20¾"	24½×1⅜	0.6	6.83	47.54	96.18
15'	↑	0.250	0.278	↑	↑	↑	24½×1½	↑	6.85	↑	102.92
16'		0.280	0.283				24½×1½		6.87		109.69
17'		0.280	0.320	↓		↓	24½×1½		6.89		116.49
18'		0.280	0.359	1⅜		20¾"	24½×1½		6.91		123.32
19'		0.312	0.362	1½		21"	25 ×1⅝		6.94		130.18
20'		0.312	0.402	↑		↑	25 ×1⅝		6.96		137.07
21'		0.344	0.404				25 ×1¾		6.98		143.98
22'		0.344	0.444	↓		↓	25 ×1¾		7.00		150.92
23'		0.344	0.485	1½		21"	25 ×1¾	↓	7.02		157.89
24'		0.375	0.488	1¾		21½"	26 ×1⅞	0.6	7.04		164.88
25'		0.375	0.529	↑		↑	26 ×1⅞	0.7	7.06		171.90
26'		0.406	0.532				26 × 2	↑	7.09		178.94
27'		0.406	0.573				26 × 2		7.11		186.01
28'		0.438	0.574				26 × 2		7.13		193.09
29'		0.438	0.616				26 × 2		7.15		200.21
30'		0.470	0.617				26 × 2		7.17		207.34
31'	↓	0.470	0.659	↓	↓	↓	26 ×2⅛	↓	7.19	↓	214.50
32'	16	0.470	0.702	1¾	8	21½"	26 ×2⅛	0.7	7.21	47.54	221.68

20' SPAN

TOWER HEIGHT (ft)	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS		
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)
14'	20	0.280	0.196	1½	8	25"	29 ×1½	0.6	9.34	87.07	132.99
15'	↑	↑	0.225	↑	↑	↑	↑	0.7	9.36	↑	142.12
16'			0.256					0.7	9.39		151.30
17'			0.289				↓	0.8	9.42		160.53
18'		↓	0.324	↓		↓	29 ×1½	↑	9.44		169.80
19'		0.280	0.361	1½		25"	29 ×1⅝		9.47		179.12
20'		0.310	0.361	1¾		25⅜"	29¾×1⅝	↓	9.50		188.47
21'		0.310	0.398	↑		↑	29¾×1¾	0.8	9.52		197.87
22'		0.310	0.437				↑	0.9	9.55		207.30
23'		0.310	0.478				↓	↑	9.58		216.77
24'		0.340	0.475				29¾×1¾		9.60		226.27
25'		0.340	0.515				29¾× 2		9.63		235.81
26'		0.375	0.518				↑		9.66		245.38
27'		0.375	0.558	↓		↓	↓		9.68		255.00
28'		0.375	0.600	1¾		25⅜"	29¾× 2		9.71		264.63
29'		0.410	0.593	2		25¾"	30½× 2		9.74		274.28
30'		0.410	0.635	↑		↑	30½× 2		9.76		283.97
31'	↓	0.410	0.678	↓	↓	↓	30½× 2	↓	9.79	↓	293.70
32'	20	0.438	0.672	2	8	25¾"	30½×2⅛	0.9	9.82	87.07	303.45

25' SPAN

TOWER HEIGHT (ft)	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS		
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)
14'	20	0.344	0.254	1¾	8	25⅜"	29¾×1⅝	1.1	11.57	136.28	167.72
15'	↑	0.344	0.292	↑	↑	↑	29¾×1⅝	1.1	11.60	↑	178.90
16'		0.344	0.332				29¾×1¾	1.2	11.63		190.14
17'		0.375	0.346				29¾×1¾	1.2	11.65		201.46
18'		0.375	0.378				29¾×1¾	1.2	11.68		212.83
19'		0.375	0.432	↓		↓	29¾× 2	1.3	11.71		224.27
20'		0.406	0.441	1¾		25⅜"	29¾× 2	↑	11.73		235.69
21'		0.406	0.486	2		25¾"	30½× 2		11.76		247.23
22'		0.438	0.500	↑		↑	30½× 2		11.79		258.86
23'		0.438	0.546				30½× 2	↓	11.82		270.49
24'		0.469	0.574				30½×2⅛	1.3	11.84		282.35
25'		0.469	0.623				30½×2⅛	1.4	11.87		294.05
26'		0.500	0.618				30½×2⅛	↑	11.90		305.60
27'		0.500	0.666				30½×2¼		11.92		317.37
28'		0.531	0.678				30½×2¼		11.95		329.19
29'		0.531	0.727	↓		↓	30½×2¼		11.98		341.04
30'		0.562	0.733	2		25¾"	30½×2¼		12.00		352.88
31'	↓	0.562	0.783	2¼	↓	26"	31 ×2⅜	↓	12.03	↓	364.80
32'	20	0.562	0.835	2¼	8	26"	31 ×2⅜	1.4	12.06	136.28	376.75

ZONE 2 WITH ICE 90 MPH WIND

30' SPAN

TOWER HEIGHT (ft)	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS		
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)
14'	24	0.312	0.240	1¾	8	29⅜"	33¾×1⅝	1.3	13.90	196.46	205.45
15'	↑	0.312	0.276	↑	↑	↑	↑	1.4	13.94	↑	218.62
16'		0.312	0.314	↓		↓	↓	1.5	13.97		231.92
17'		0.344	0.323	1¾		29⅜"	33¾×1⅝	1.5	14.00		245.32
18'		0.344	0.362	2		29¾"	34½×1¾	1.5	14.03		258.81
19'		0.344	0.403	↑		↑	34½×1¾	1.6	14.06		272.38
20'		0.375	0.411				34½×1⅞	↑	14.10		286.04
21'		0.375	0.454				↑		14.13		299.76
22'		0.375	0.498				↓	↓	14.16		313.55
23'		0.406	0.504				34½×1⅞	1.6	14.19		327.40
24'		0.406	0.549				34½× 2	1.7	14.23		341.31
25'		0.406	0.596				↑	↑	14.26		355.27
26'		0.438	0.601	↓		↓	↓	↓	14.29		369.29
27'		0.438	0.648	2		29¾"	34½× 2	1.7	14.32		383.36
28'		0.438	0.697	2¼		30"	35 ×2⅛	1.8	14.35		397.48
29'		0.469	0.700	↑		↑	35 ×2⅛	↑	14.39		411.64
30'		0.469	0.749				35 ×2¼	↓	14.42		425.85
31'	↓	0.469	0.800	↓	↓	↓	35 ×2¼	1.8	14.45	↓	440.10
32'	24	0.469	0.852	2¼	8	30"	35 ×2¼	1.9	14.48	196.46	454.40

35' SPAN

TOWER HEIGHT (ft)	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS		
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)
14'	30	0.281	0.188	1¾	8	35⅜"	39¾×1½	1.3	16.29	267.78	245.60
15'	↑	↑	0.215	↑	↑	↑	↑	1.4	16.33	↑	260.73
16'			0.245	↓		↓	↓	1.5	16.37		276.03
17'		↓	0.277	1¾		35⅜"	39¾×1½	1.5	16.41		291.49
18'		0.281	0.310	2		35¾"	40½×1⅝	1.6	16.45		307.08
19'		0.310	0.312	↑		↑	40½×1⅝	1.6	16.49		322.79
20'		↑	0.345				40½×1¾	1.6	16.53		338.62
21'			0.381				↑	1.7	16.57		354.54
22'			0.418					1.7	16.61		370.56
23'			0.457					1.8	16.65		386.67
24'		↓	0.498	↓		↓	↓	1.8	16.69		402.85
25'		0.310	0.540	2		35¾"	40½×1¾	1.9	16.73		419.12
26'		0.344	0.560	2¼		36"	41 ×1⅞	1.9	16.77		436.53
27'		↑	0.604	↑		↑	41 ×1⅞	1.9	16.81		452.90
28'		↓	0.650				41 ×1⅞	2.0	16.85		469.33
29'		0.344	0.697				41 × 2	↑	16.89		485.84
30'		0.375	0.652				↑		16.93		501.47
31'	↓	0.375	0.696	↓	↓	↓	↓	↓	16.97	↓	518.13
32'	30	0.375	0.740	2¼	8	36"	41 × 2	2.0	17.01	267.78	534.85

40' SPAN

TOWER HEIGHT (ft)	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS		
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)
14'	30	0.312	0.239	2	8	35¾"	40½×1⅝	2.0	18.54	350.23	290.55
15'	↑	0.312	0.274	↑	↑	↑	↑	2.1	18.58	↑	307.19
16'		0.344	0.284				↓	2.1	18.62		324.08
17'		↑	0.321				40½×1⅝	2.1	18.66		341.18
18'		↓	0.359				40½×1¾	2.2	18.70		358.47
19'		0.344	0.400	↓		↓	40½×1¾	2.3	18.74		375.94
20'		0.375	0.408	2		35¾"	40½×1¾	2.3	18.78		393.55
21'		↑	0.450	2¼		36"	41 ×1⅞	2.3	18.82		411.31
22'			0.494	↑		↑	41 ×1⅞	2.4	18.86		429.19
23'		↓	0.540				41 × 2	2.5	18.90		447.20
24'		0.375	0.588				↑	2.6	18.94		465.30
25'		0.406	0.591					2.6	18.98		483.52
26'		↑	0.639					2.6	19.02		501.82
27'		↓	0.689				↓	2.7	19.06		520.22
28'		0.406	0.741				41 × 2	↑	19.10		538.69
29'		0.438	0.739	↓		↓	41 ×2⅛	↓	19.14		557.25
30'		↑	0.791	2¼		36"	41 ×2⅛	2.7	19.18		575.89
31'	↓	↓	0.844	2½	↓	36½"	42 ×2⅛	2.8	19.23	↓	594.59
32'	30	0.438	0.900	2½	8	36½"	42 ×2⅛	2.9	19.27	350.23	613.37

GENERAL NOTES :

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

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

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

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

For truss details see standard drawing COSSD.

For base and foundation details see standard drawing COSSF.

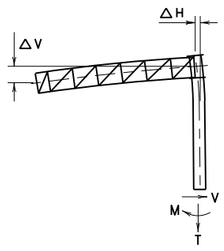
For cantilever truss lengths falling between those shown use sizes called for in the next longer span.

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

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

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

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



ELEVATION

(SHOWING DESIGN LOADS AND DEAD LOAD DEFLECTIONS)

TRUSS DETAILS

SPAN	10', 15', & 20'	25'	30'	35'	40'
W × D = WIDTH × DEPTH	4.5 × 4.5	4.5 × 4.5	4.5 × 4.5	4.5 × 4.5	4.5 × 4.5
CHORD-①, Unless Otherwise Shown	L 3 × 3 × 3/16 ② [3]	L 3 × 3 × ¼ ② [4]	L 3 × 3 × ¼ [6]	L 3½×3½× 5/16 [9]	L 3½×3½× 5/16 [7]
DEAD LOAD DIAGONAL-②	L 2 × 2 × 3/16 [2]	L 2 × 2 × 3/16 [2]	L 2 × 2 × 3/16 [2]	L 2 × 2 × 3/16 [2]	L 3 × 2 × 3/16 [2]
WIND LOAD DIAGONAL-②	L 3 × 3 × 3/16 [2]	L 3 × 3 × 3/16 [2]	L 3 ×2½× ¼ [3]	L 3 ×2½× ¼ [3]	L 3 × 3 × ¼ [2]
DEAD LOAD VERTICAL-②	L 2 × 2 × 3/16 [2]	L 2 × 2 × 3/16 [2]	L 2 × 2 × 3/16 [2]	L 2½×2½× 3/16 [2]	L 3 × 2 × 3/16 [2]
WIND LOAD STRUT-②	L 2 × 2 × 3/16 [1]	L 2 × 2 × 3/16 [1]	L 2 × 2 × 3/16 [1]	L 2 × 2 × 3/16 [1]	L 2½×2½× 3/16 [1]
TRUSS DEAD LOAD	42 lb/ft	47 lb/ft	49 lb/ft	60 lb/ft	64 lb/ft
SIZE H.S. BOLTS IN CONNECTION	⅝" DIA	⅝" DIA	⅝" DIA	⅝" DIA	¾" DIA
NO. & SIZE OF H.S. BOLTS IN CHORD ANGLE TO TOWER CONNECTION PLATE	3 ~ ⅝" DIA ea	4 ~ ⅝" DIA or 3 ~ ¾" DIA ea	6 ~ ⅝" DIA or 5 ~ ¾" DIA ea	9 ~ ⅝" DIA or 7 ~ ¾" DIA ea	7 ~ ¾" DIA ea

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

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

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORTS

COSS-Z2I-10

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REVISIONS
4-10

CONT	SECT	JOB	HIGHWAY
0231	03	152	IH 14

DIST	COUNTY	SHEET NO.
WACO	BELL	104

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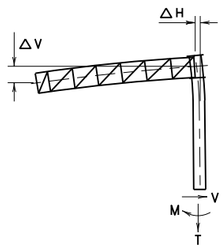
DISCLAIMER:

ZONE 3 WITH AND WITHOUT ICE 80 MPH WIND

TOWER HEIGHT (ft)	10′ SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	15′ SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	20′ SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	25′ SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
14′	16	0.250	0.105	1 ¼	6	20 ½"	24 x1¼	0.2	3.59	16.19	49.87	16	0.250	0.235	1 ⅜	8	20 ¾"	24½x1⅜	0.5	5.40	37.56	76.63	20	0.250	0.213	1 ¼	8	24 ½"	28 x1¼	0.7	7.43	69.08	107.16	20	0.281	0.308	1 ½	8	25"	29 x1½	1.3	9.14	107.68	135.49	14′
15′			0.120						3.61		53.42			0.270					0.6	5.41		81.91			0.244	1 ¼		24 ½"	28 x1¼	0.7	7.43		113.96		0.281	0.354					1.4	9.17		144.13	15′
16′			0.137						3.62		57.00			0.308					0.6	5.43		87.23			0.278	1 ⅜		24 ¾"	28½x1⅜	0.8	7.45		121.17		0.281	0.403					1.4	9.19		152.86	16′
17′			0.154						3.64		60.59			0.347					0.7	5.45		92.57			0.314					0.8	7.47		128.42		0.281	0.455	1 ½		25"	29 x1½	1.5	9.21		161.65	17′
18′			0.173						3.66		64.21			0.389				24½x1⅜	0.7	5.46		97.94			0.352					0.9	7.49		135.72		0.312	0.460	1 ¾		25 ⅜"	29¾x1⅝	1.5	9.23		170.51	18′
19′			0.193		6				3.67		67.85			0.434				24½x1½	0.7	5.48		103.33			0.392	1 ⅜		24 ¾"	28½x1⅜	0.9	7.51		143.06		0.312	0.513					1.5	9.25		179.43	19′
20′			0.214		8				3.69		71.51			0.481					0.8	5.50		108.75			0.435	1 ½		25"	29 x1½	1.0	7.53		150.43		0.312	0.568				29¾x1¾	1.6	9.27		188.39	20′
21′			0.235						3.71		75.18		0.250	0.530						5.51		114.19			0.479					1.0	7.55		157.84		0.312	0.627					1.6	9.29		197.41	21′
22′			0.258					0.2	3.73		78.88		0.281	0.521	1 ⅜		20 ¾"	24½x1½		5.53		119.66			0.526					1.1	7.57		165.28		0.344	0.628					1.6	9.31		206.47	22′
23′			0.282					0.3	3.74		82.59		0.281	0.569	1 ½		21"	25 x1⅜		5.55		125.14		0.250	0.575				29 x1½		7.60		172.75		0.344	0.686				29¾x1¾	1.7	9.34		215.57	23′
24′			0.308						3.76		86.33		0.281	0.620						5.56		130.65		0.281	0.560				29 x1⅝		7.62		180.26		0.344	0.747				29¾x1⅞		9.36		224.71	24′
25′			0.334				24 x1¼		3.78		90.08		0.312	0.610						5.58		136.18		0.281	0.607	1 ½		25"	29 x1⅝		7.64		187.79		0.375	0.748				29¾x1⅞		9.38		233.89	25′
26′			0.361				24 x1⅜		3.79		93.85		0.312	0.660				25 x1⅝		5.60		141.73		0.281	0.657	1 ¾		25 ⅜"	29¾x1⅝		7.66		195.35		0.375	0.809	1 ¾		25 ⅜"	29¾x1⅞	1.7	9.40		243.10	26′
27′			0.389						3.81		97.64		0.312	0.711				25 x1¾		5.62		147.30		0.310	0.640				29¾x1¾		7.68		202.94		0.375	0.872	2		25 ¾"	30½x 2	1.8	9.42		252.34	27′
28′			0.419						3.83		101.44		0.344	0.699						5.63		152.89		0.310	0.688						7.70		210.55		0.406	0.870					1.9	9.44		261.62	28′
29′			0.449						3.84		105.26		0.344	0.750						5.65		158.50		0.310	0.738						7.72		218.20		0.406	0.933						9.46		270.93	29′
30′			0.481						3.86		109.11		0.344	0.802	1 ½		21"	25 x1¾		5.67		164.12		0.340	0.721				29¾x1¾		7.74		225.86		0.406	0.999				30½x 2		9.48		280.27	30′
31′			0.513				24 x1⅜		3.88		112.96		0.375	0.791	1 ¾		21 ½"	26 x1⅞		5.68		169.77		0.340	0.770				29¾x1⅞		7.77		233.56		0.441	0.992				30½x2¼		9.50		289.64	31′
32′	16	0.250	0.547	1 ¼	8	20 ½"	24 x1½	0.3	3.89	16.19	116.84	16	0.375	0.843	1 ¾	8	21 ½"	26 x1⅞	0.8	5.70	37.56	175.43	20	0.340	0.821	1 ¾	8	25 ⅜"	29¾x1⅞	1.1	7.79	69.08	241.27	20	0.441	1.057	2	8	25 ¾"	30½x2¼	1.8	9.53	107.68	299.04	32′

ZONE 3 WITH AND WITHOUT ICE 80 MPH WIND

TOWER HEIGHT (ft)	30′ SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	35′ SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	40′ SPAN TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
14′	24	0.250	0.289	1 ½	8	29"	33 x1½	1.6	11.00	155.44	167.11	30	0.250	0.210	1 ¾	8	35 ⅜"	39¾x1½	1.5	12.87	211.58	202.48	30	0.280	0.260	1 ¾	8	35 ⅜"	39⅞x1½	2.1	14.65	276.72	242.20	14′
15′		0.250	0.331	1 ½		29"	33 x1½	1.6	11.03		177.27			0.241					1.6	12.90		213.97			0.298	1 ¾		35 ⅜"	39⅞x1½	2.2	14.68		254.69	15′
16′		0.281	0.338	1 ¾		29 ⅜"	33¾x1½	1.6	11.05		187.54			0.275					1.6	12.93		225.63			0.339	1 ¾		35 ⅜"	39⅞x1½	2.3	14.71		267.44	16′
17′			0.381				33¾x1½	1.7	11.08		197.93		0.250	0.310					1.7	12.97		237.46			0.383	2		35 ¾"	40½x1½	2.4	14.75		280.40	17′
18′			0.428				33¾x1½	1.8	11.10		208.40		0.281	0.310					1.7	13.00		249.43			0.429				40½x1⅝	2.5	14.78		293.56	18′
19′		0.281	0.477				33¾x1⅝	1.8	11.13		218.97			0.346					1.7	13.03		261.52		0.280	0.478					2.6	14.81		306.90	19′
20′		0.312	0.477				33¾x1⅝	1.8	11.15		229.60			0.383					1.8	13.06		273.72	0.312	0.478						2.6	14.84		320.39	20′
21′			0.526				33¾x1⅝	1.8	11.18		240.31			0.422					1.8	13.09		286.04			0.527				40½x1⅝	2.6	14.87		334.02	21′
22′			0.577				33¾x1¾	1.9	11.20		251.08			0.463					1.9	13.12		298.44			0.578				40½x1¾	2.7	14.90		347.79	22′
23′			0.631				33¾x1¾	2.0	11.23		261.91			0.507	1 ¾		35 ⅜"	39¾x1½	2.0	13.16		310.94			0.632					2.8	14.94		361.67	23′
24′		0.312	0.687	1 ¾		29 ⅜"	33¾x1¾		11.25		272.80			0.552	2		35 ¾"	40½x1⅝	2.0	13.19		323.51			0.688					2.9	14.97		375.66	24′
25′		0.344	0.679	2		29 ¾"	34½x1¾		11.28		283.74			0.598				40½x1⅝	2.1	13.22		336.16	0.312	0.747					40½x1¾	3.0	15.00		389.75	25′
26′			0.735				34½x 2	2.0	11.30		294.73			0.647				40½x1⅝	2.2	13.25		348.89	0.340	0.736					40½x 2	3.0	15.03		403.94	26′
27′			0.792					2.1	11.33		305.77			0.698				40½x1¾	2.2	13.28		361.68			0.794	2		35 ¾"	40½x 2	3.0	15.06		418.22	27′
28′			0.852					2.2	11.36		316.85		0.281	0.751					2.3	13.31		374.53			0.854	2 ¼		36"	41 x 2	3.1	15.09		432.57	28′
29′		0.344	0.914						11.38		327.97		0.310	0.726					2.2	13.35		387.45			0.916					3.2	15.13		447.01	29′
30′		0.375	0.901						11.41		339.13			0.777					2.2	13.38		400.42		0.340	0.980						15.16		461.52	30′
31′		0.375	0.962					2.2	11.43		350.34			0.830					2.3	13.41		413.45		0.375	0.963						15.19		476.10	31′
32′	24	0.375	1.023	2	8	29 ¾"	34½x 2	2.3	11.44	155.44	361.13	30	0.310	0.884	2	8	35 ¾"	40½x1¾	2.4	13.44	211.58	426.53	30	0.375	1.026	2 ¼	8	36"	41 x 2	3.2	15.22	276.72	490.75	32′



ELEVATION

(SHOWING DESIGN LOADS AND DEAD LOAD DEFLECTIONS)

TRUSS DETAILS

SPAN	10′, 15′, & 20′	25′	30′	35′	40′
W x D = WIDTH x DEPTH	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.5 x 4.5	4.5 x 4.5
CHORD-①, Unless Otherwise Shown	L 3 x 3 x 3/16 ② [3]	L 3 x 3 x 1/4 ② [4]	L 3 x 3 x 1/4 [6]	L 3 x 3 x 5/16 [7]	L3 ½x3 ½x 5/16 [9]
DEAD LOAD DIAGONAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [3]
WIND LOAD DIAGONAL-②	L2 ½x2 ½x 3/16 [2]	L2 ½x2 ½x 3/16 [2]	L 3 x 3 x 1/4 [2]	L 3 x 3 x 1/4 [2]	L 3 x 3 x 1/4 [3]
DEAD LOAD VERTICAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L2 ½x2 ½x 3/16 [2]	L2 ½x2 ½x 3/16 [2]
WIND LOAD STRUT-②	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]
TRUSS DEAD LOAD	38 lb/ft	43 lb/ft	45 lb/ft	53 lb/ft	62 lb/ft
SIZE H. S. BOLTS IN CONNECTION	5/8" DIA	5/8" DIA	5/8" DIA	5/8" DIA	5/8" DIA
NO. & SIZE OF H.S. BOLTS IN CHORD		4 ~ 5/8" DIA or	6 ~ 5/8" DIA or	7 ~ 5/8" DIA or	9 ~ 5/8" DIA or
ANGLE TO TOWER CONNECTION PLATE	3 ~ 5/8" DIA ea	3 ~ ¾" DIA ea	5 ~ ¾" DIA ea	5 ~ ¾" DIA ea	7 ~ ¾" DIA ea

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

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

GENERAL NOTES :

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

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

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

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

For truss details see standard drawing COSSD.

For base and foundation details see standard drawing COSSF.

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

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

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

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

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

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORTS

COSS-Z3 & Z3I-10

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS			
4-10			

CONT	SECT	JOB	HIGHWAY
0231	03	152	IH 14
DIST	COUNTY		SHEET NO.
WACO	BELL		105

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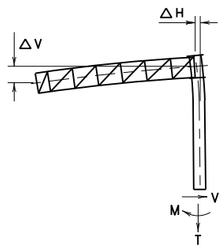
ZONE 4 WITH AND WITHOUT ICE 70 MPH WIND

TOWER HEIGHT (ft)	10′ SPAN: TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS: SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS: SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	15′ SPAN: TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS: SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS: SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	20′ SPAN: TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS: SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS: SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	25′ SPAN: TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS: SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS: SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
14′	16	0.250	0.104	1 ¼	6	20 ½"	24 x1¼	0.2	2.75	12.39	38.53	16	0.250	0.234	1 ⅜	6	20 ¾"	24½x1¼	0.5	4.13	28.76	59.63	16	0.250	0.419	1 ¾	6	21 ½"	26 x1¾	1.3	5.59	52.67	83.06	20	0.250	0.333	1 ⅜	8	24 ¾"	28½x1⅜	1.4	7.00	82.44	107.23	14′
15′			0.119						2.76		41.23			0.268				24½x1¼	0.6	4.14		63.62		0.250	0.481					1.4	5.61		88.34			0.382							1.5	7.02		113.64	15′
16′			0.136						2.77		43.94			0.305				24½x1⅜	0.6	4.16		67.63		0.250	0.547					1.5	5.62		93.66			0.435							1.6	7.03		120.14	16′
17′			0.153						2.79		46.68			0.345	1 ⅜		20 ¾"	24½x1⅜	0.6	4.17		71.67		0.281	0.549					1.4	5.63		99.03			0.491							1.7	7.05		126.71	17′
18′			0.172						2.80		49.43			0.386	1 ½		21"	25 x1⅜	0.7	4.18		75.74			0.615					1.5	5.64		104.44			0.550	1 ⅜		24 ¾"	28½x1⅜	1.7	7.07		133.34	18′
19′			0.191						2.81		52.20			0.431				25 x1½	0.7	4.20		79.83			0.685					1.5	5.66		109.88			0.613	1 ½		25"	29 x1½	1.8	7.08		140.03	19′
20′			0.212						2.83		54.99			0.477					0.7	4.21		83.94		0.281	0.759				26 x1¾	1.6	5.67		115.36			0.679					1.9	7.10		146.77	20′
21′			0.234						2.84		57.79			0.526					0.8	4.22		88.08		0.310	0.759				26 x 2	1.5	5.68		120.86		0.250	0.749					2.0	7.12		153.56	21′
22′			0.257					0.2	2.85		60.61			0.577		6		25 x1½	0.8	4.23		92.23			0.834					1.6	5.70		126.40		0.281	0.735				29 x1½		7.13		160.39	22′
23′			0.280					0.3	2.87		63.45			0.631		8		25 x1⅜	0.9	4.25		96.40			0.911		6			1.7	5.71		131.96			0.803				29 x1⅜		7.15		167.26	23′
24′			0.305						2.88		66.30			0.687					0.9	4.26		100.60		0.310	0.992		8				5.77		138.12			0.874	1 ½		25"			7.16		174.17	24′
25′			0.331	1 ¼		20 ½"	24 x1¼		2.89		69.16			0.745					0.9	4.27		104.81		0.340	0.990						5.73		143.15		0.281	0.949	1 ¾		25 ⅜"		2.0	7.18		181.12	25′
26′			0.358	1 ⅜		20 ¾"	24½x1⅜		2.90		72.04			0.806					1.0	4.29		109.03		0.340	1.071					1.7	5.75		148.78		0.312	0.920				29 x1⅝	2.1	7.20		188.02	26′
27′			0.386						2.92		74.93			0.869						4.30		113.28		0.340	1.155					1.8	5.76		154.43			0.992				29¾x1¾		7.21		195.03	27′
28′			0.416						2.93		77.84		0.250	0.935						4.31		117.54		0.375	1.139					1.7	5.77		160.10			1.067				29¾x1¾		7.23		202.07	28′
29′			0.446						2.94		80.76		0.280	0.898						4.33		121.82		0.375	1.221					1.8	5.79		165.79			1.145				29¾x1¾	2.1	7.24		209.14	29′
30′			0.477	1 ⅜		20 ¾"	24½x1⅜		2.96		83.69			0.961						4.34		126.11		0.375	1.307						5.80		171.49		0.344	1.119				29¾x 2	2.2	7.26		216.23	30′
31′			0.509	1 ½		21"	25 x1½		2.97		86.64			1.026					1.0	4.35		130.42		0.410	1.297						5.81		177.22		0.344	1.194				29¾x 2	2.2	7.28		223.35	31′
32′	16	0.250	0.543	1 ½	6	21"	25 x1½	0.3	2.98	12.39	89.61	16	0.280	1.094	1 ½	8	21"	25 x1⅝	1.1	4.36	28.76	134.74	16	0.410	1.382	1 ¾	8	21 ½"	26 x 2	1.8	5.83	52.67	182.97	20	0.344	1.273	1 ¾	8	25 ⅜"	29¾x 2	2.2	7.29	82.44	230.50	32′

ZONE 4 WITH AND WITHOUT ICE 70 MPH WIND

TOWER HEIGHT (ft)	30′ SPAN: TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS: SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS: SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	35′ SPAN: TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS: SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS: SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	40′ SPAN: TOWER PIPE O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	ANCHOR BOLTS: SIZE DIA (in)	NO.	BOLT CIR DIA	BASE PLATE SIZE (in)	TRUSS DEFL ΔV (in)	DESIGN LOADS: SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)	TOWER HEIGHT (ft)
14′	24	0.250	0.285	1 ½	8	29"	33 x1½	1.6	8.42	119.01	134.48	24	0.250	0.406	1 ¾	8	29 ⅜"	33¾x1½	2.6	9.77	161.98	165.20	30	0.250	0.280	1 ¾	8	35 ⅜"	39¾x1½	2.4	11.22	211.94	200.44	14′
15′			0.327					1.6	8.44		141.90			0.467					2.7	9.79		173.37			0.322					2.5	11.24		209.33	15′
16′			0.372					1.7	8.46		149.44			0.531					2.8	9.81		181.71			0.366					2.6	11.27		218.45	16′
17′			0.420					1.8	8.48		157.10		0.250	0.599				33¾x1½	3.0	9.83		190.21			0.413					2.7	11.29		227.79	17′
18′			0.471					1.9	8.50		164.85		0.281	0.602				33¾x1⅝	2.9	9.85		198.85			0.463					2.8	11.32		237.32	18′
19′			0.524					2.0	8.52		172.68			0.671					3.0	9.87		207.61		0.250	0.516					2.9	11.34		247.01	19′
20′			0.581					2.1	8.54		180.60			0.743					3.1	9.89		216.48		0.281	0.510					2.8	11.37		256.86	20′
21′			0.641	1 ½		29"	33 x1½	2.2	8.56		188.59			0.820				33¾x1⅝	3.2	9.91		225.46			0.562					2.9	11.39		266.86	21′
22′			0.703	1 ¾		29 ⅜"	33¾x1½	2.2	8.58		196.65		0.281	0.900				33¾x1¾	3.4	9.93		234.52			0.617					3.0	11.41		276.98	22′
23′			0.768				33¾x1½	2.3	8.60		204.76		0.312	0.889				33¾x1¾	3.2	9.95		243.67			0.675				39¾x1½	3.1	11.44		287.22	23′
24′			0.837				33¾x1⅝	2.4	8.62		212.93			0.968	1 ¾		29 ⅜"	33¾x1¾	3.3	9.96		252.90			0.735	1 ¾		35 ⅜"	39¾x1⅝	3.2	11.46		297.57	24′
25′			0.908				33¾x1⅝	2.5	8.64		221.15			1.050	2		29 ¾"	34½x1⅞	3.5	9.98		262.20			0.797	2		35 ¾"	40½x1⅝	3.3	11.49		308.01	25′
26′		0.250	0.982				33¾x1⅝	2.6	8.66		229.42			1.136					3.6	10.00		271.57			0.862				40½x1⅝	3.4	11.51		318.55	26′
27′		0.281	0.949				33¾x1¾	2.4	8.67		237.74		0.312	1.225					3.7	10.02		280.99			0.930				40½x1⅝	3.5	11.54		329.18	27′
28′			1.021				33¾x1¾	2.5	8.69		246.10		0.340	1.200				34½x1⅞	3.5	10.04		290.48			1.000				40½x1¾	3.6	11.56		339.89	28′
29′			1.095	1 ¾		29 ⅜"	33¾x1¾	2.6	8.71		254.49			1.287				34½x 2	3.6	10.06		300.02			1.073					3.7	11.58		350.68	29′
30′			1.172	2		29 ¾"	34½x1¾	2.7	8.73		262.93			1.377					3.7	10.08		309.61			1.148					3.8	11.61		361.53	30′
31′			1.251	2		29 ¾"	34½x1¾	2.8	8.75		271.41			1.471					3.8	10.10		319.25			1.226					3.9	11.63		372.46	31′
32′	24	0.281	1.333	2	8	29 ¾"	34½x1¾	2.8	8.77	119.01	279.92	24	0.340	1.567	2	8	29 ¾"	34½x 2	3.9	10.12	161.98	328.93	30	0.281	1.306	2	8	35 ¾"	40½x1¾	4.0	11.68	211.94	384.26	32′



ELEVATION

(SHOWING DESIGN LOADS AND DEAD LOAD DEFLECTIONS)

TRUSS DETAILS

SPAN	10′, 15′, & 20′	25′	30′	35′	40′
W x D = WIDTH x DEPTH	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0
CHORD-①, Unless Otherwise Shown	L 3 x 3 x 3/16 ② [4]	L 3 x 3 x 3/16 ② [4]	L 3 x 3 x ¼ [6]	L 3 x 3 x 5/16 [6]	L 3 x 3 x ⅜ [9]
DEAD LOAD DIAGONAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L2 ½x2 ½x 3/16 [3]
WIND LOAD DIAGONAL-②	L2 ½x2 ½x 3/16 [2]	L2 ½x2 ½x 3/16 [2]	L2 ½x2 ½x 3/16 [2]	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [2]
DEAD LOAD VERTICAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]
WIND LOAD STRUT-②	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]
TRUSS DEAD LOAD	37 lb/ft	38 lb/ft	43 lb/ft	50 lb/ft	56 lb/ft
SIZE H. S. BOLTS IN CONNECTION	5/8" DIA	5/8" DIA	5/8" DIA	5/8" DIA	5/8" DIA
NO. & SIZE OF H.S. BOLTS IN CHORD		4 ~ 5/8" DIA or	6 ~ 5/8" DIA or	6 ~ 5/8" DIA or	9 ~ 5/8" DIA or
ANGLE TO TOWER CONNECTION PLATE	4 ~ 5/8" DIA ea	3 ~ ¾" DIA ea	5 ~ ¾" DIA ea	5 ~ ¾" DIA ea	7 ~ ¾" DIA ea

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

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

GENERAL NOTES :

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

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

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

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

For truss details see standard drawing COSSD.

For base and foundation details see standard drawing COSSF.

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

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

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

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

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

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORTS

COSS-Z4 & Z41-10

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REVISIONS
4-10

CONT	SECT	JOB	HIGHWAY
0231	03	152	IH 14
DIST	COUNTY		SHEET NO.
WACO	BELL		106

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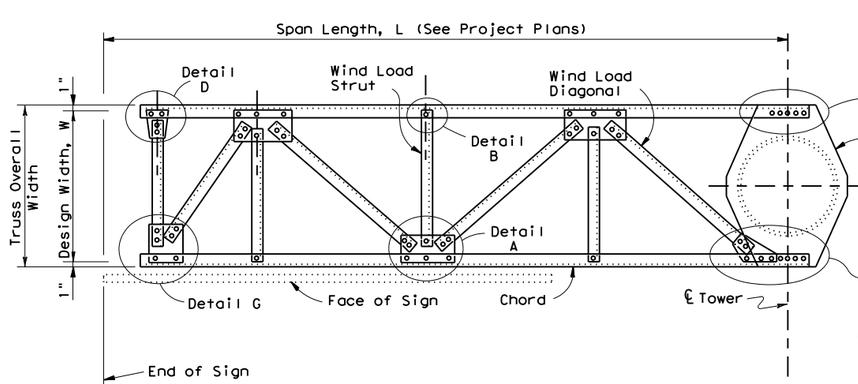
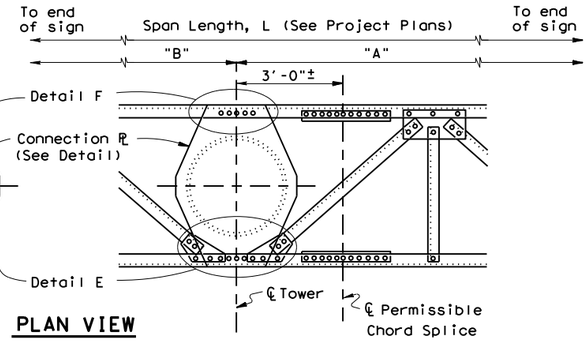


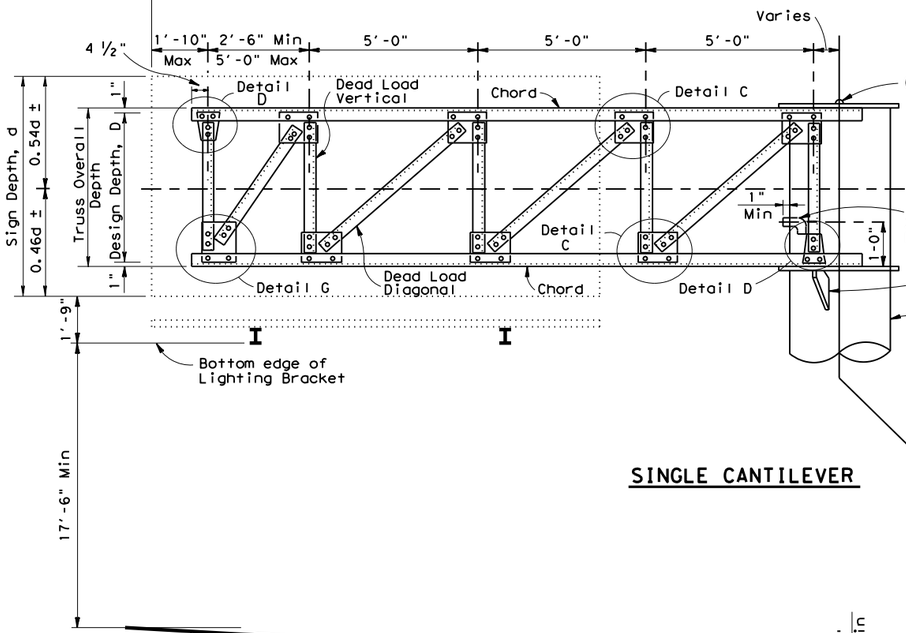


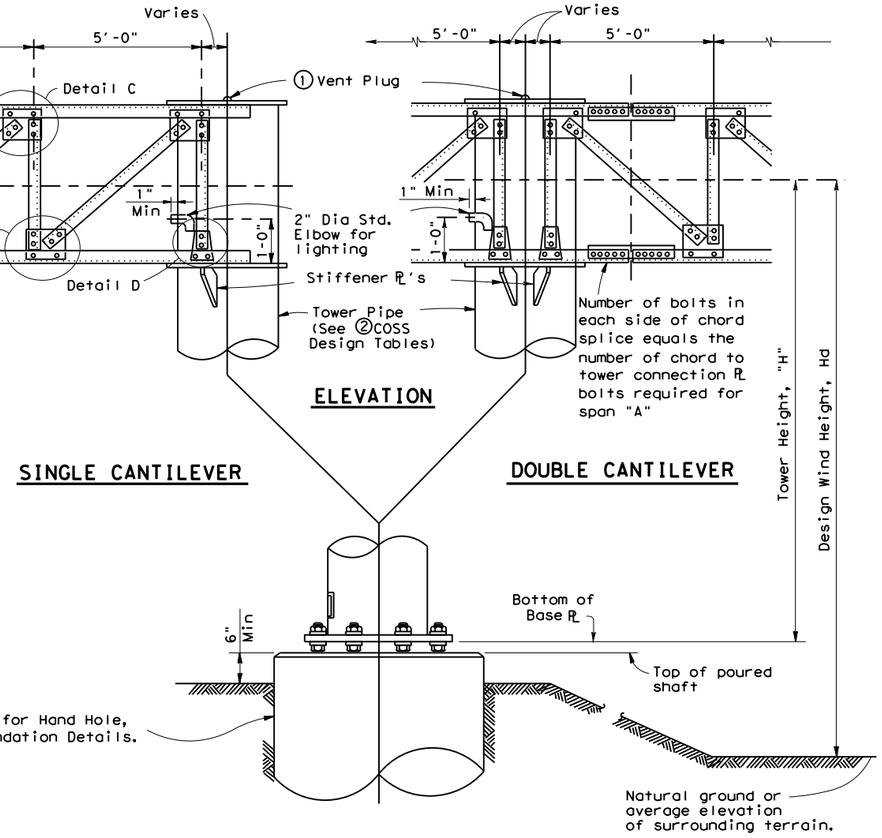
PLAN VIEW

GENERAL NOTES:

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

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





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

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

SHEET 1 OF 2

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORT DETAILS

COSSD

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CONT	SECT	JOB	HIGHWAY
0231	03	152	IH 14

DIST	COUNTY	SHEET NO.
WACO	BELL	107

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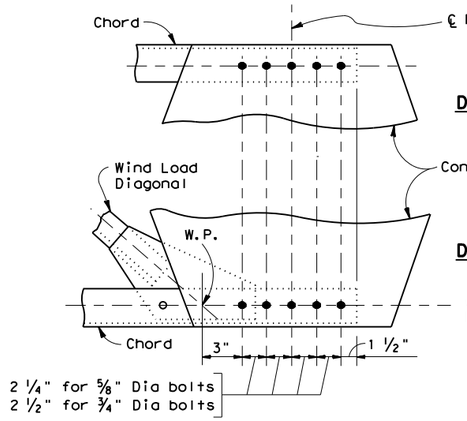
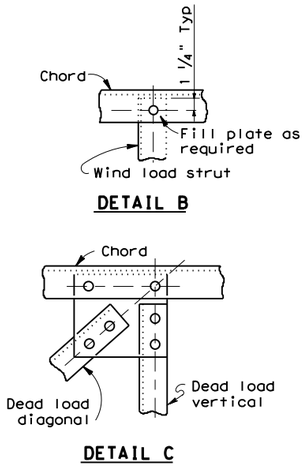
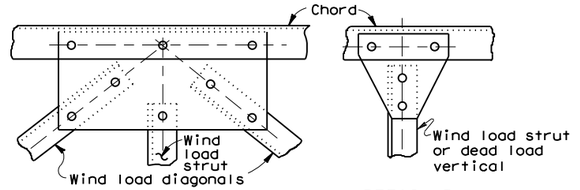


SINGLE CANTILEVER

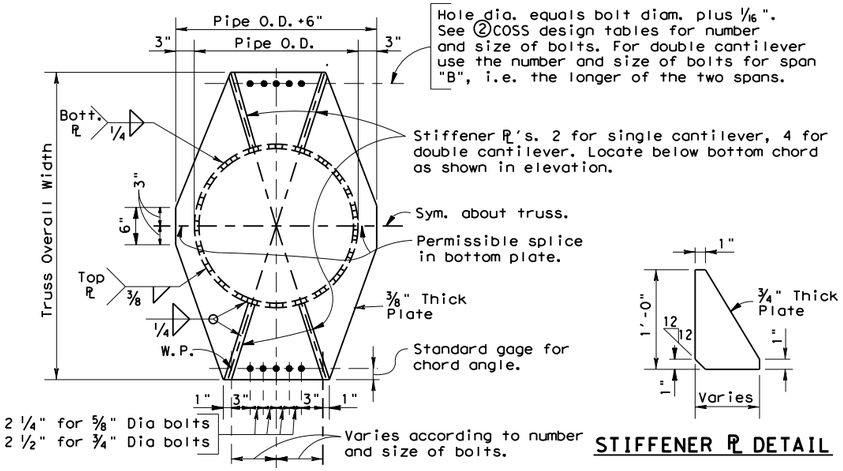
DOUBLE CANTILEVER





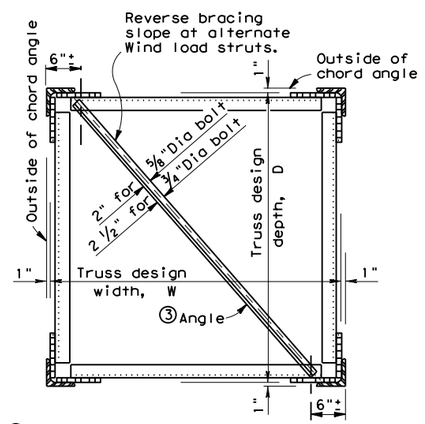
CONNECTION DETAILS

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



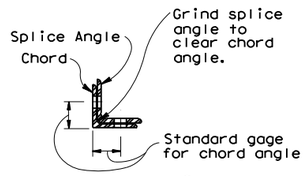
CONNECTION PLATE DETAIL

STIFFENER ℄ DETAIL

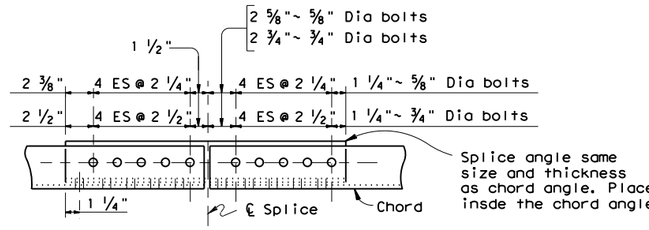


③2" x 2" x 3/16" angle for ⅝" Dia bolts [1]
2½" x 2" x 3/16" angle for ¾" Dia bolts [1]

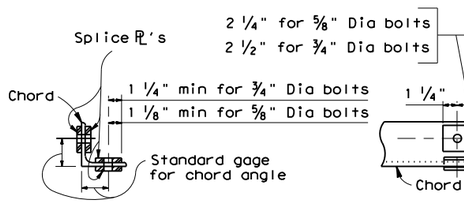
TRUSS SECTION
(DIAGONALS NOT SHOWN)



SECTION ON ℄ SPLICE



SINGLE SHEAR CHORD SPLICE



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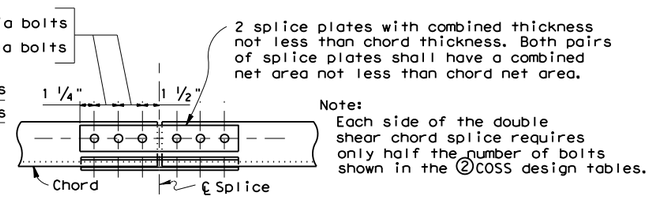
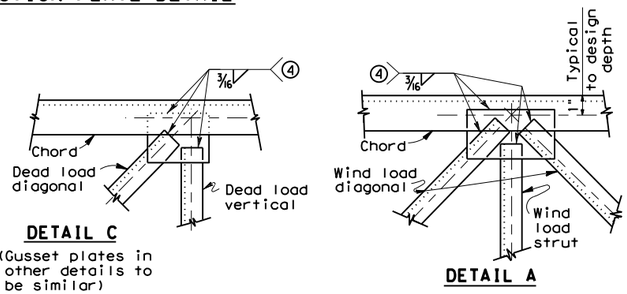


DOUBLE SHEAR CHORD SPLICE

SPLICE DETAILS



ALTERNATE WELDED CONNECTION DETAILS

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

SHEET 2 OF 2

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORT DETAILS

COSSD

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REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
	CONT	SECT	JOB	HIGHWAY
	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		108

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Washers shall conform to ASTM F436.

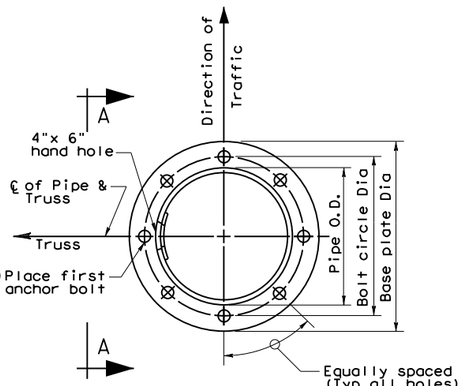
ANCHOR BOLT DIA.	WASHER DIMENSIONS				HOLE IN BASE PLATE
	OUTSIDE DIAMETER	HOLE DIAMETER	THICKNESS		
d			MIN.	MAX.	
1 ½" or less	2d	d + ⅛"	0.136"	0.177"	d + ¼"
1 ¾"	2d - ⅛"	d + ⅛"	0.178"	0.280"	d + 5/16"
2"	2d - ¼"	d + ⅛"	0.178"	0.280"	d + 5/16"
Over 2"	2d - ½"	d + ⅛"	0.240"	0.340"	d + 5/16"

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

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

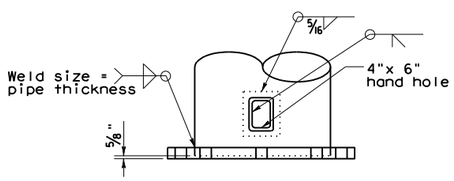
ANCHOR BOLT SIZE	PIPE OUTSIDE DIAMETER											
	16"			20"			24"			30"		
	BOLT CIRCLE DIA	DRILLED SHAFT SIZE	DRILLED SHAFT REINF	BOLT CIRCLE DIA	DRILLED SHAFT SIZE	DRILLED SHAFT REINF	BOLT CIRCLE DIA	DRILLED SHAFT SIZE	DRILLED SHAFT REINF	BOLT CIRCLE DIA	DRILLED SHAFT SIZE	DRILLED SHAFT REINF
1 ¼"Dia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

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



PLAN

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

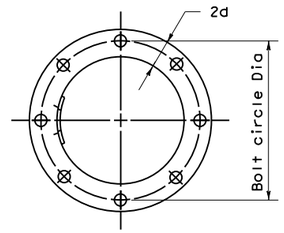


Cut 5" x 7" hole in pipe. Center 4" x 6" hand hole in ⅜" x 8" x 10" back up plate. Provide attachable cover made from section cut from pipe.

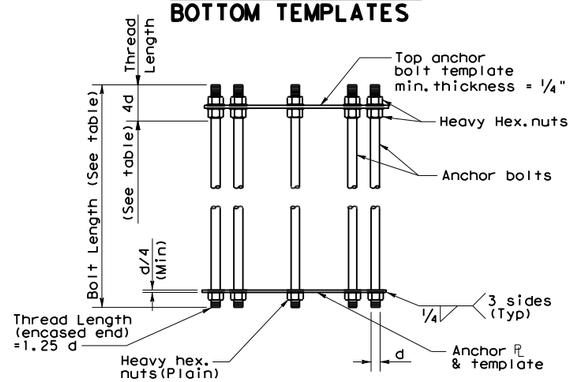
VIEW A-A

③ BASE PLATE & HANDHOLE DETAILS

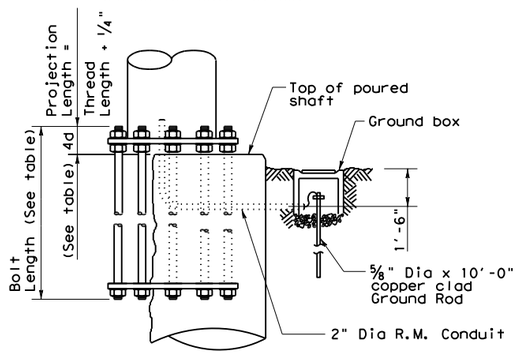
③ See "Cantilever Overhead Sign Support" or "High Level Cantilever Overhead Sign Support" sheets for Diameter and thickness of base plate.



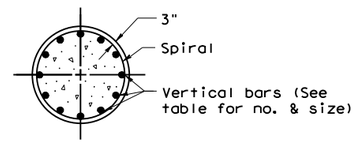
TOP VIEW OF TOP & BOTTOM TEMPLATES



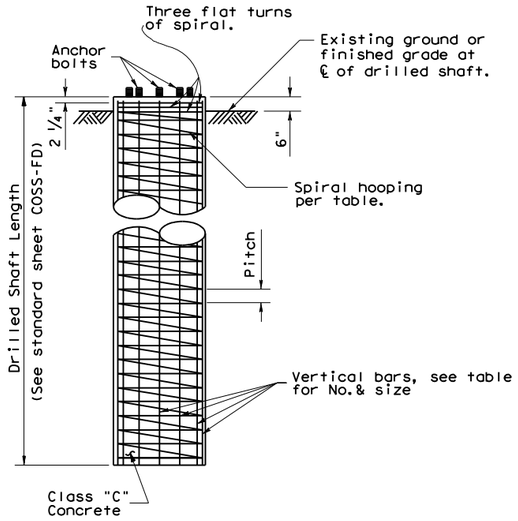
ANCHOR BOLT ASSEMBLY
(PRIOR TO INSTALLATION)



BEARING SEAT ELEVATION



SECTION



FOUNDATION DETAIL

GENERAL NOTES:

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

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORT FOUNDATION

COSSF

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CONT	SECT	JOB	HIGHWAY
0231	03	152	IH 14

DIST	COUNTY	SHEET NO.
WACO	BELL	109

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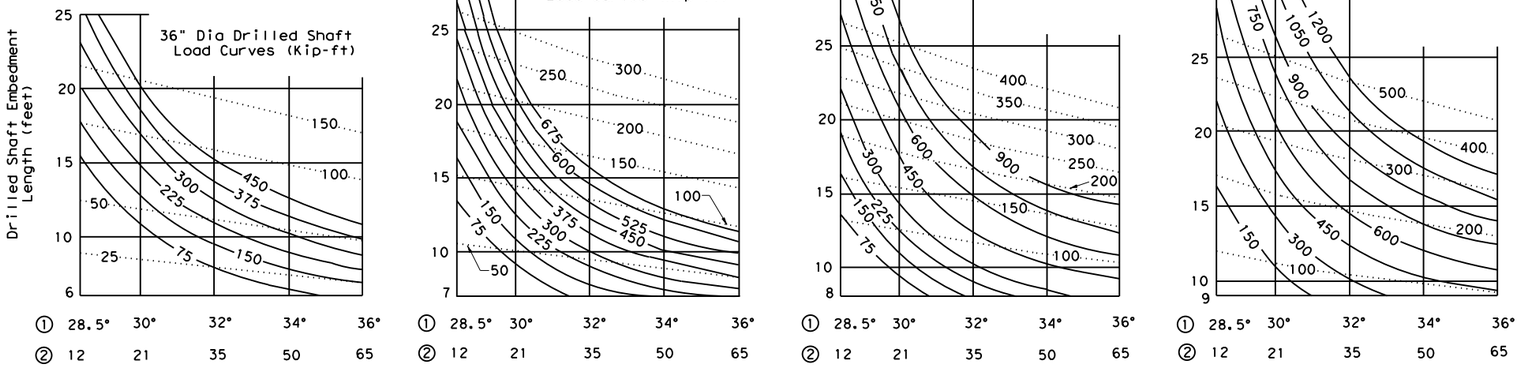


① Ø = Angle of internal friction of soil (degrees)

② N = Texas cone penetrometer value (blows per ft)

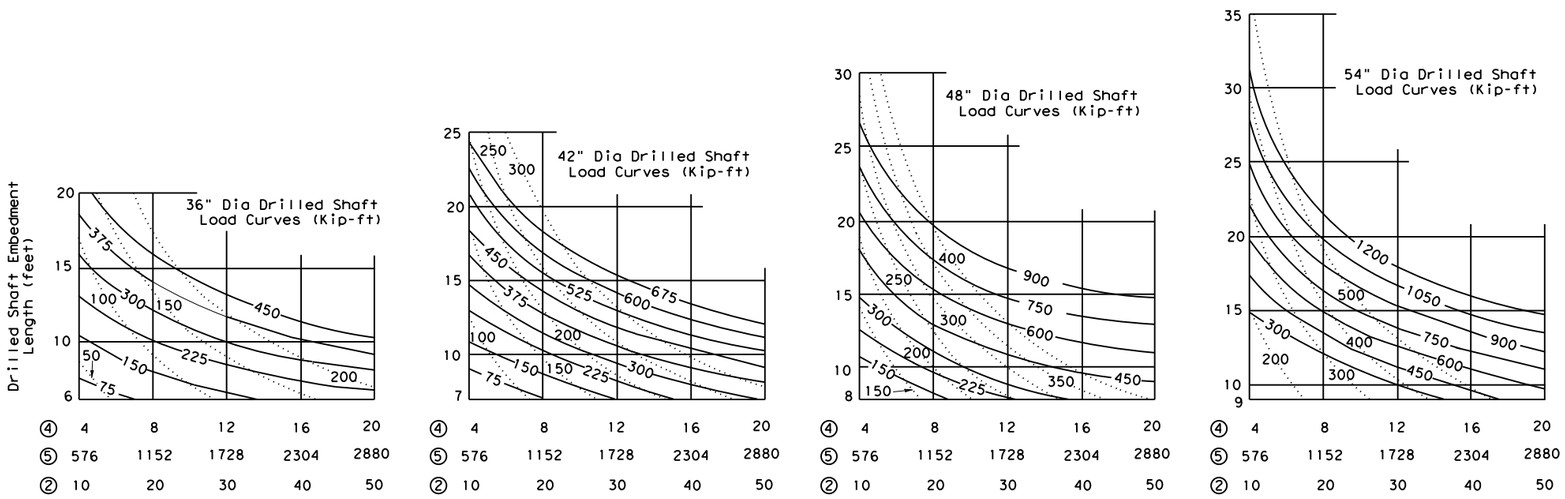
④ C(psi) = Cohesive shear strength of soil (psi)

⑤ C(psf) = Cohesive shear strength of soil (psf)

③ **SUBMERGED SAND SOIL (COHESIONLESS)**

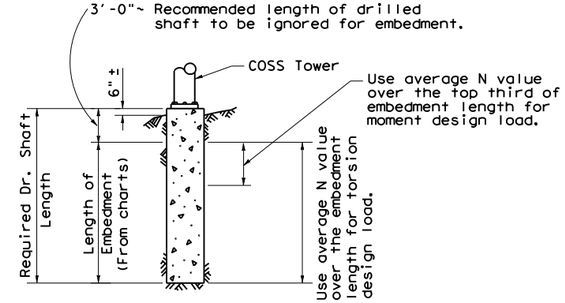
Moment ——————
Torsion ·····

③ Note:
For unsubmerged sands and clayey sands the charts for clay soil will give a conservative foundation design.



CLAY SOIL (COHESIVE)

Moment ——————
Torsion ·····



PROCEDURE:

1. Determine design moment and torsion, and the required drilled shaft diameter as outlined in the selection example sheet COSS-SE.
2. Make an initial estimate of the required embedment length.
3. From soil exploration data determine type of soil and average N value or soil property along the upper third of the drilled shaft.
4. Enter chart (for the correct shaft diameter and soil type) from the bottom at the average N value or soil property determined in step 3.
5. Proceed vertically into chart and locate intersection with design moment. Interpolate between moment curves (solid lines) as needed.
6. From intersection point turn 90° to left and read embedment length along vertical scale.
7. If embedment length differs significantly from estimated value return to step 3 with the embedment length determined in step 6.
8. From soil exploration data determine average N value or soil property over the entire length of the embedment.
9. Enter chart (for correct shaft diameter and soil type) from the bottom at the average N value or soil property determined in step 8.
10. Proceed vertically into chart and locate intersection with design torsion. Interpolate between torsion curves (dashed lines) as needed.
11. From intersection point turn 90° to left and read embedment length along vertical scale.
12. Compute the required length of drilled shaft by adding 3'-0" to longer embedment length required for moment or torsion.

GENERAL NOTES:

These charts are for use with Cantilever Overhead Sign Supports with one shaft per tower.
Solid curves are base moment in Kip-ft.
Dash curves are base torsion in Kip-ft.
Minimum embedment of drilled shaft is two diameters.
Add 3'-0" to the required embedment length to determine the required length of drilled shaft.

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Traffic Operations Division

FOUNDATION EMBEDMENT SELECTION CHARTS

COSS-FD

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. 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.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. 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.

5. 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.

6. 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

1. 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.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. 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"

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.

5. 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.

6. 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.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. 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.

9. 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.

10. 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

1. 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.

2. 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.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. 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.

5. 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."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. 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.

8. 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.

9. 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.

10. 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.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. 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).

13. 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.

14. 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.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

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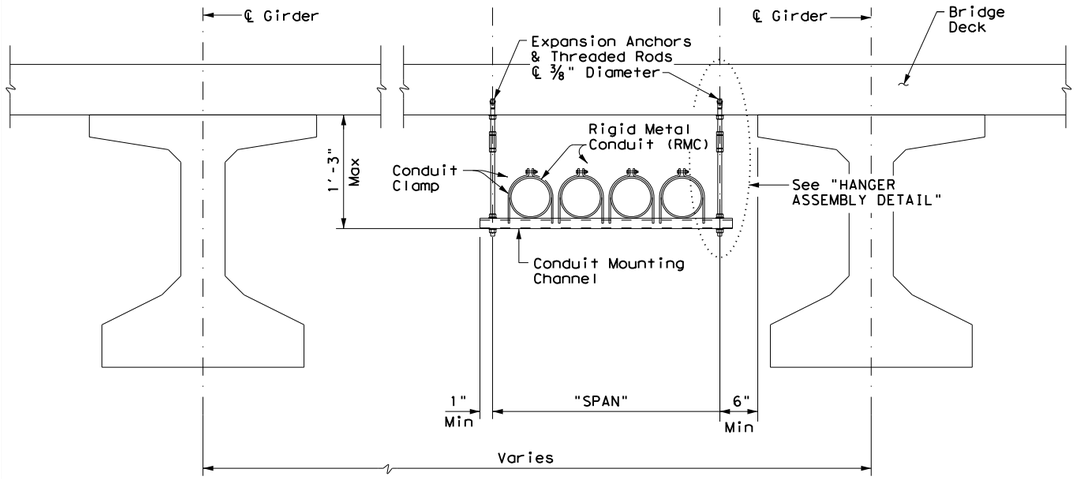
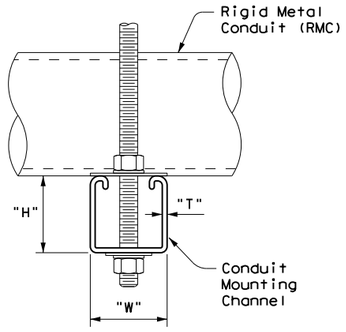
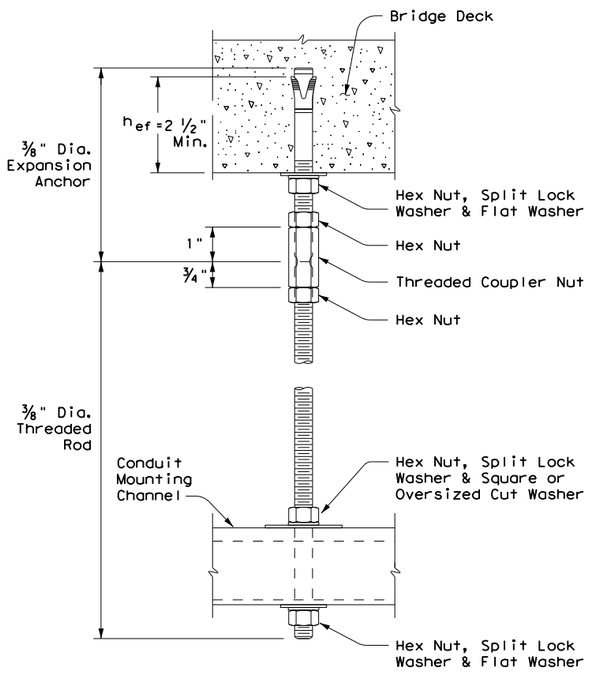


CONDUIT HANGING DETAIL

CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

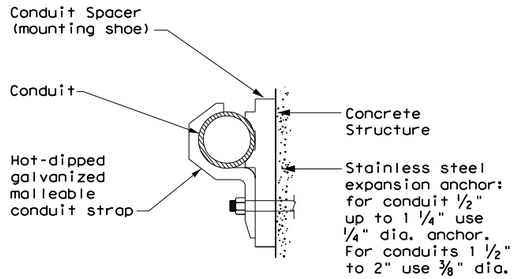
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

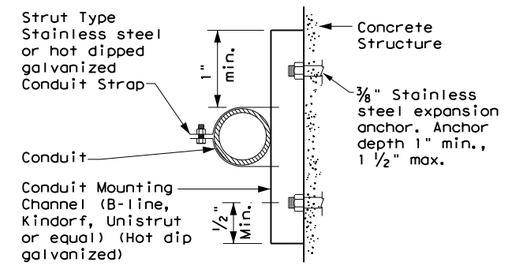




HANGER ASSEMBLY DETAIL

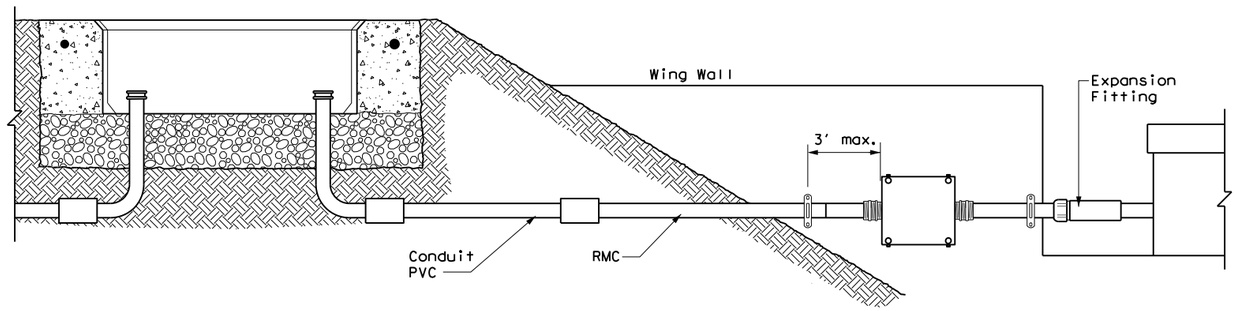
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT





CONDUIT MOUNTING OPTIONS

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



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUIT SUPPORTS

ED(2)-14

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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.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

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

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

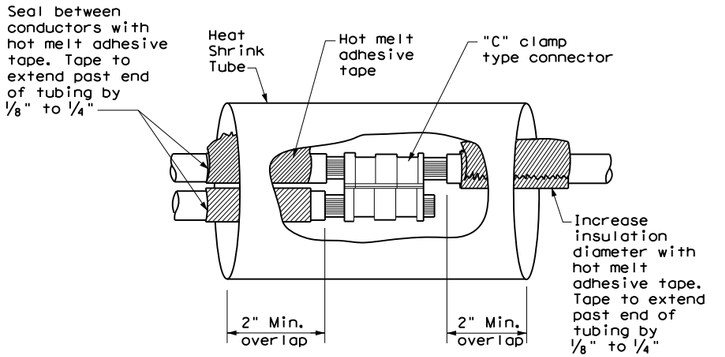
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

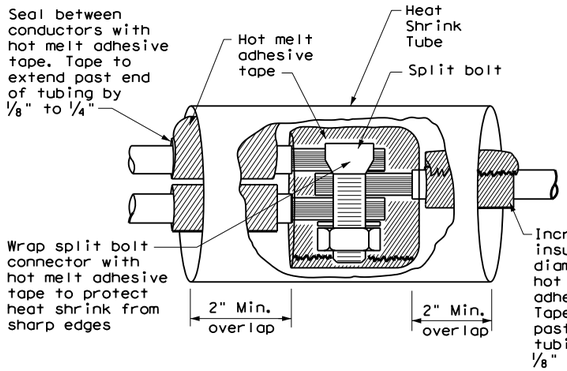
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

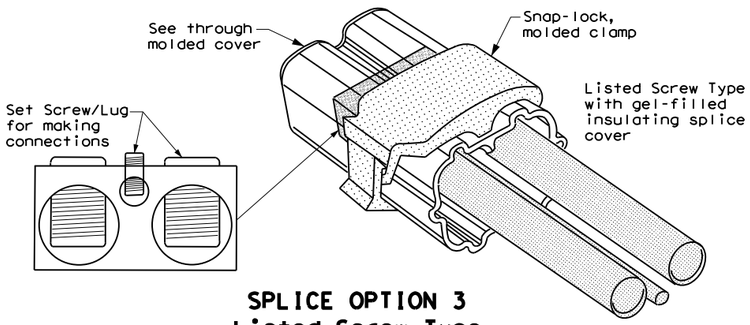
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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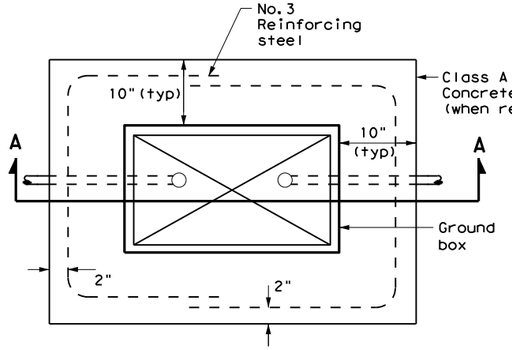
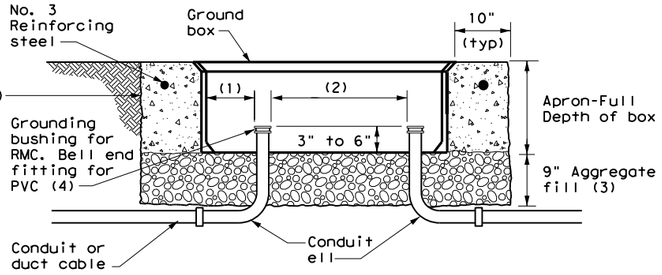


PLAN VIEW



SECTION A - A

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.

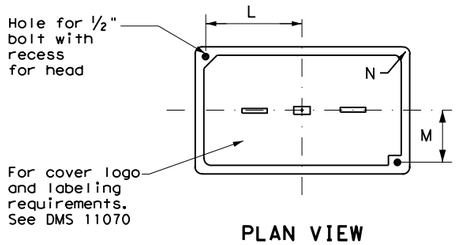
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

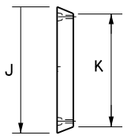
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

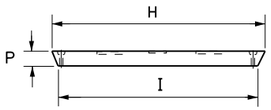
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



END



SIDE

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.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

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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 ½ 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 ½ 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 ½ 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 **Size	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 ¼"	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 ¼"	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

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

Schematic Type

Service Voltage V / V

Disconnect Amp Rating
000 indicates main lug only/
Typically Type T

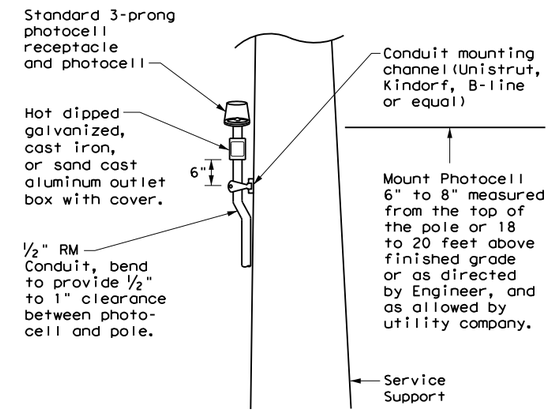
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

Enclosure Type
GS= Galvanized steel("off the shelf")
SS= Stainless steel(Custom Enclosure)See MPL
AL= Aluminum (Custom Enclosure)See MPL

Photocell Mounting Location
(E)= Inside Service/Enclosure Mounted
(T)= Top of pole
(L)= Luminaire mounted
(N)= None/No Photocell or Lighting Contactor Required

Service Support Type
GC= Granite concrete
OC= Other concrete
TP= Timber pole
SP= Steel pole
SF= Steel frame
OT= Pole by others or paid for separately
EX= Existing pole
TS= Service on traffic signal pole
PS= Pedestal Service

O= Overhead Service Feed from Utility
U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

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

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Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

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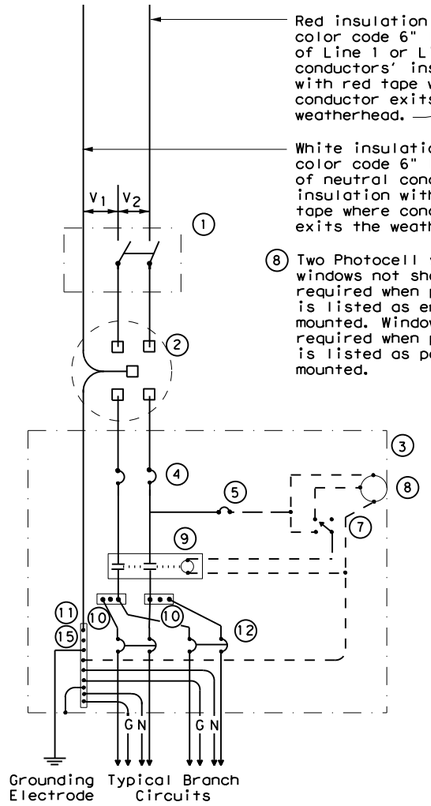
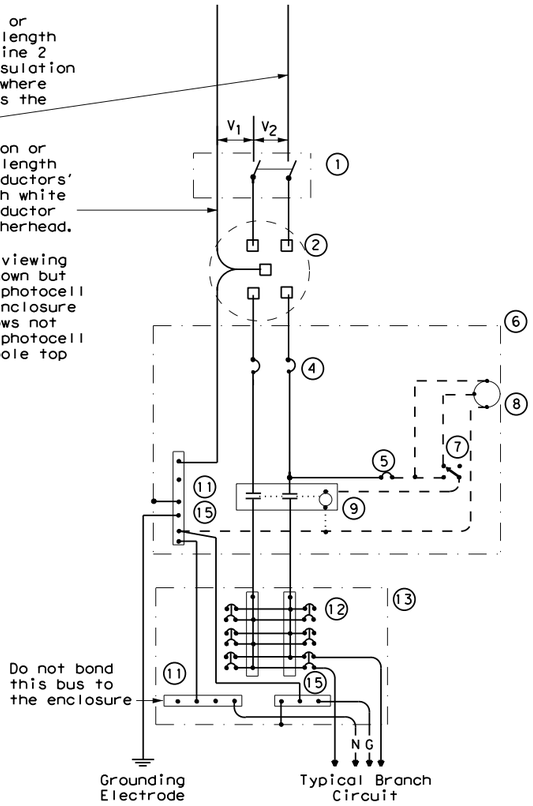
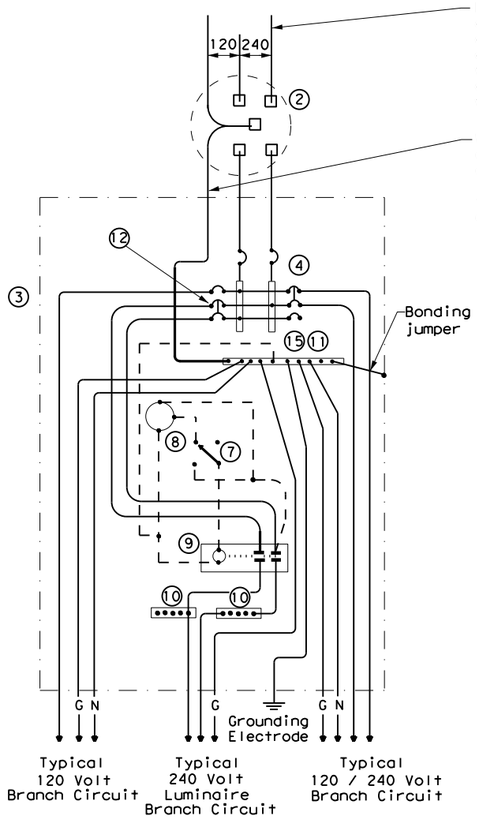


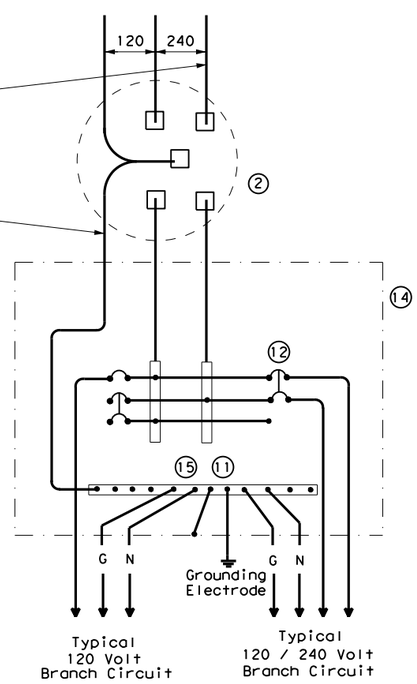
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



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



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

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

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

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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 ½ in. or 1 5/8 in. wide by 1 in. up to 3 ¾ 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 ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ 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 ells 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.

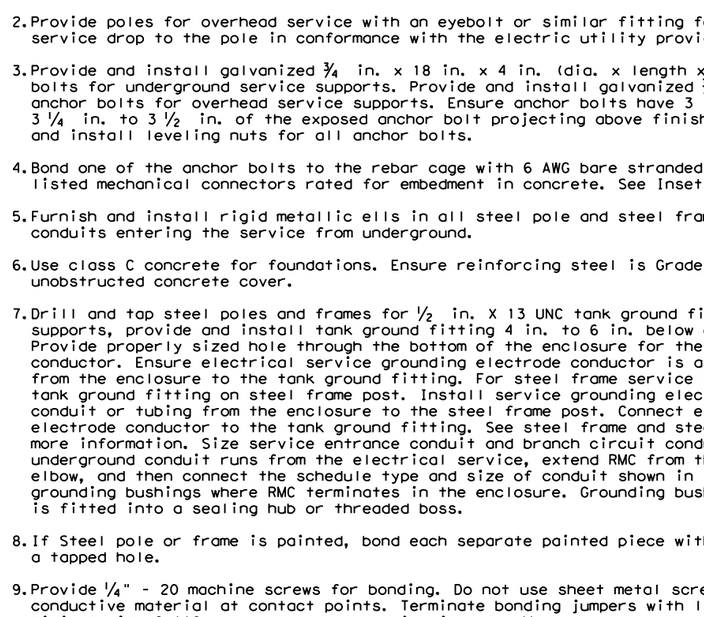
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode 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 ¼" - 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.

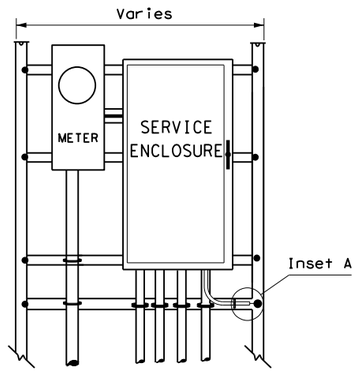
10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.



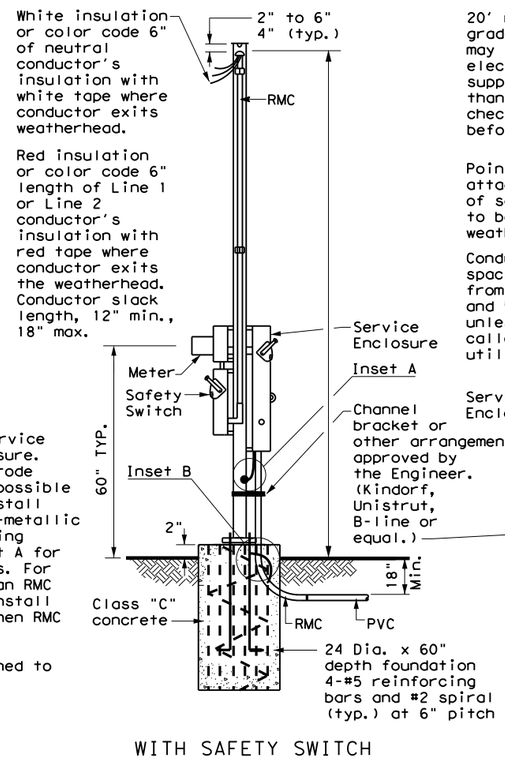
WITH SAFETY SWITCH

FRONT VIEW

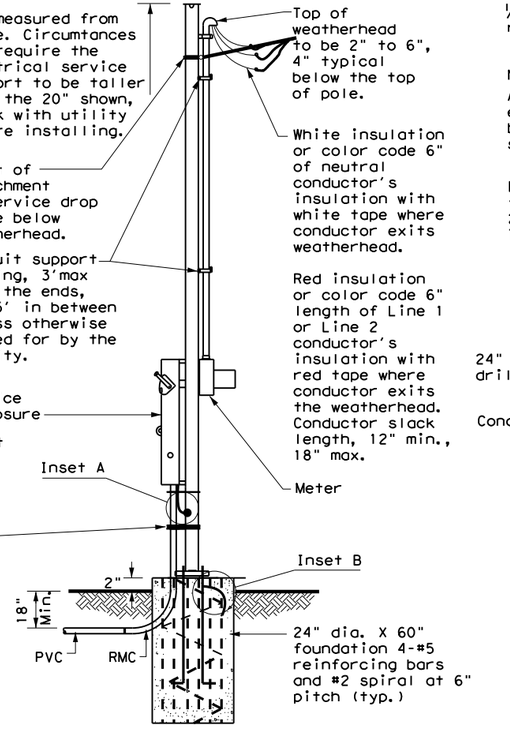


WITHOUT SAFETY SWITCH

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE

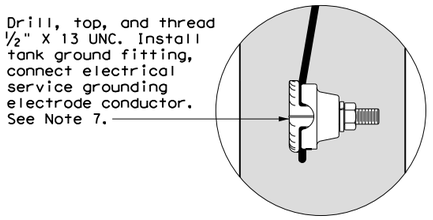


WITH SAFETY SWITCH



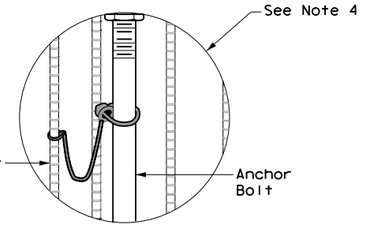
WITHOUT SAFETY SWITCH

SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE

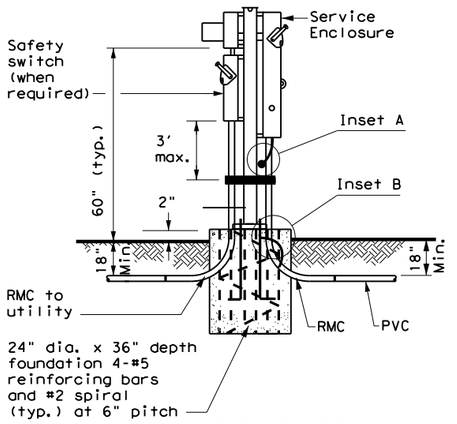


FRONT VIEW

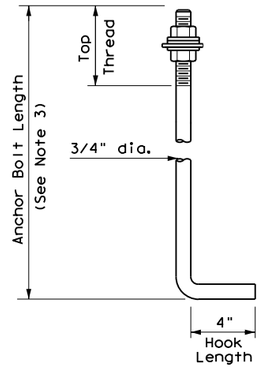
INSET A



INSET B

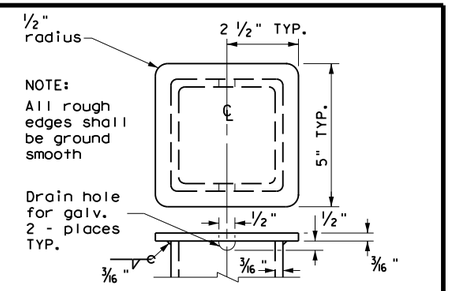


WITH SAFETY SWITCH

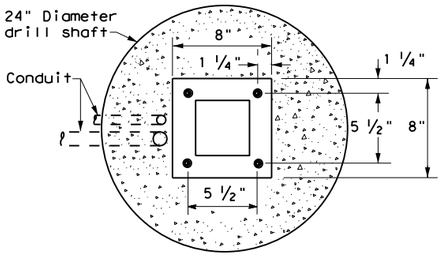


HOOKED ANCHOR DETAIL

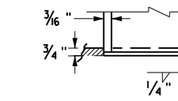
SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE



POLE TOP PLATE

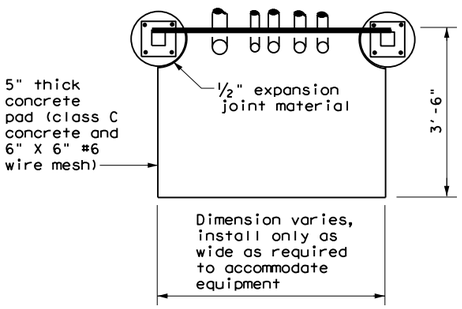


BASE PLATE DETAIL



BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



TOP VIEW

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

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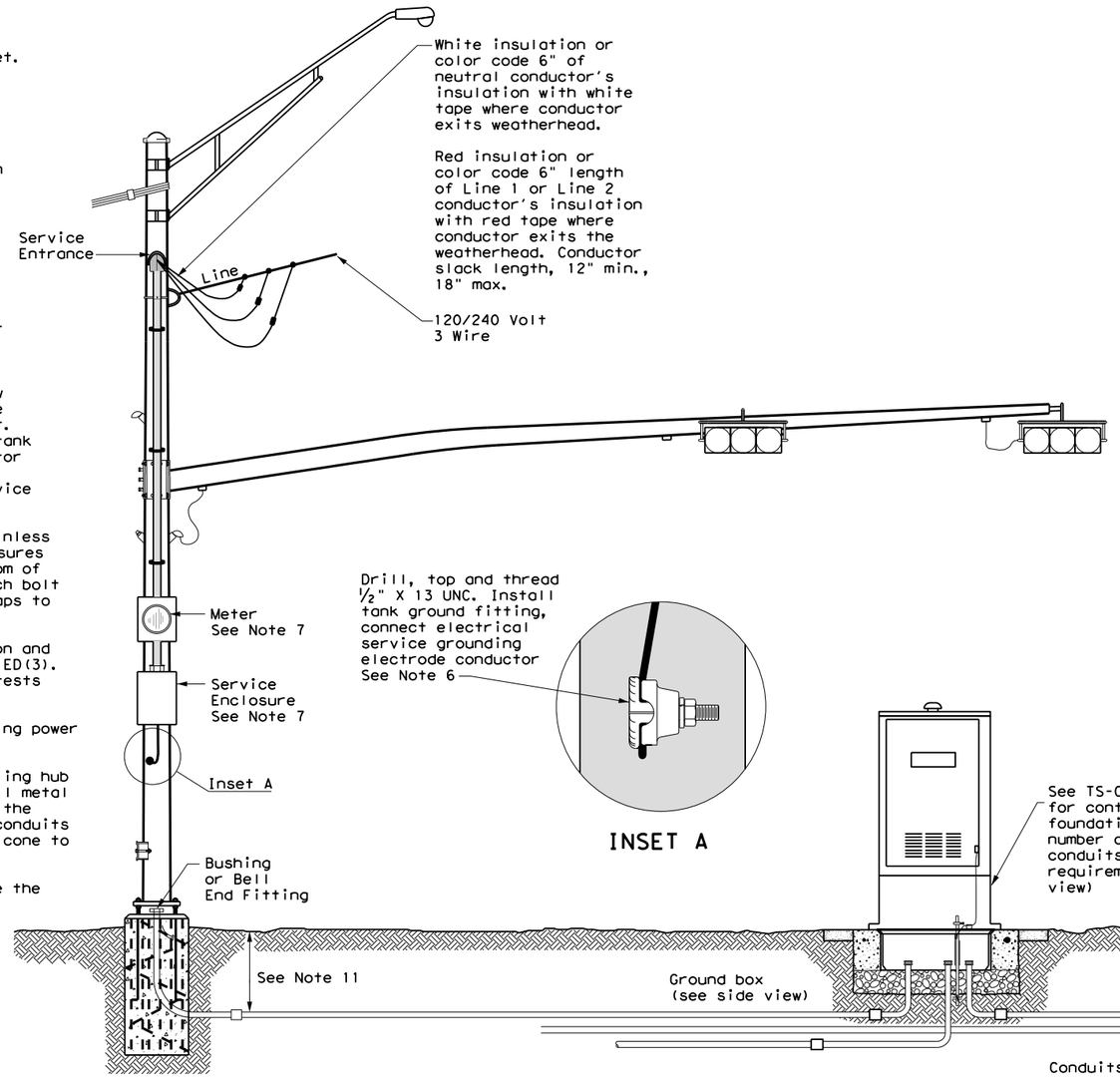
TRAFFIC SIGNAL NOTES

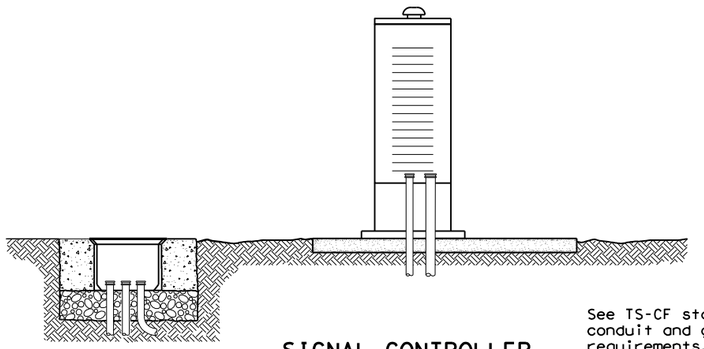
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material 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 ½ 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 ¾ 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.

INSET A



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.

SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE

Texas Department of Transportation

Traffic Operations Division Standard

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.

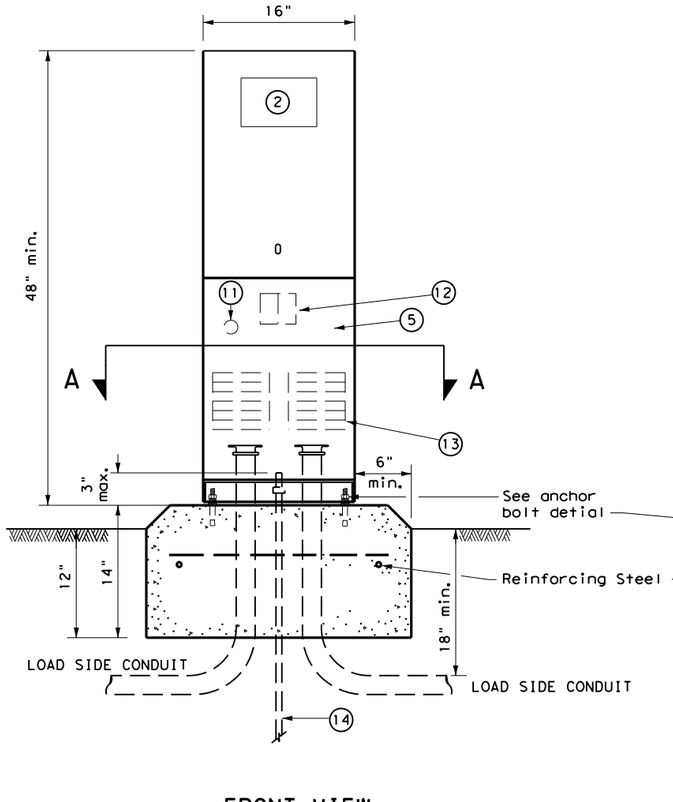
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 ⅛ 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 ½ 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 ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within ¼ in. Repair rocking or movement of the service enclosure at no additional cost to the department.

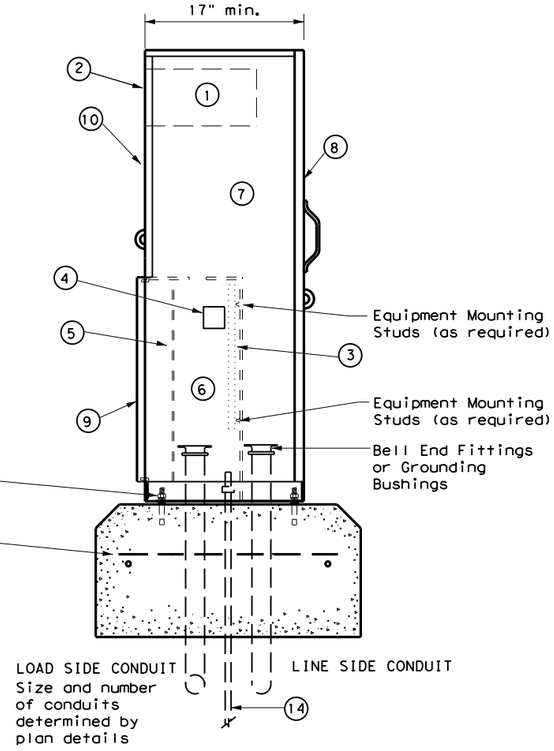
7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.

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.

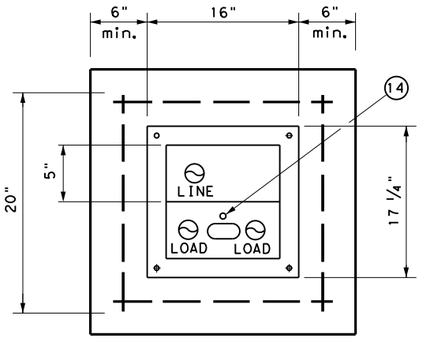


FRONT VIEW

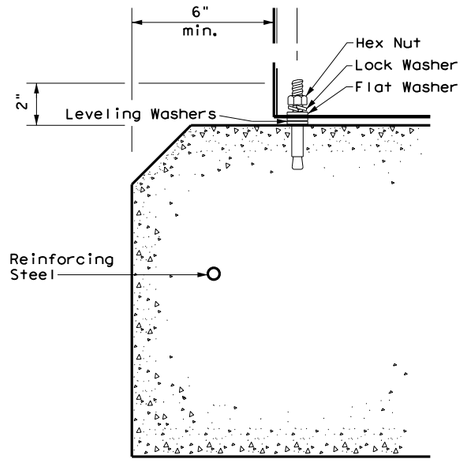
TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SIDE VIEW



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'

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS

ED(9)-14

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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 electrial 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 5/8 in. max. depth and 1 7/8 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 3/4 in. maximum depth, and 1 1/2 in. to 1 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, 1/4 in. minimum diameter by 1 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 1/2 in. PVC to ground rod - extend 1/2 in. PVC 6 in. underground.

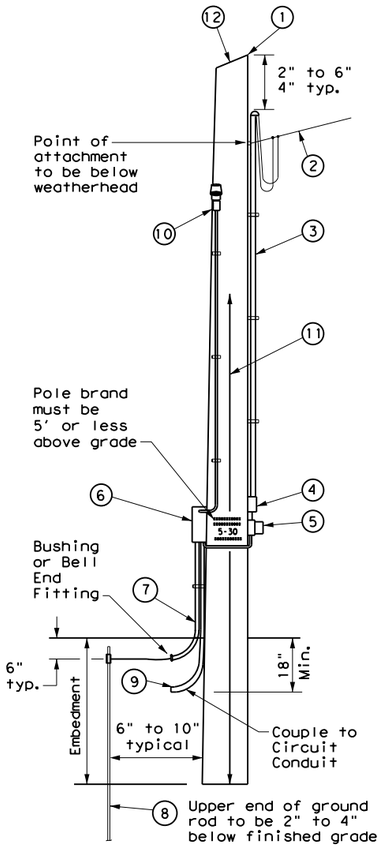
(8) 5/8 in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(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.

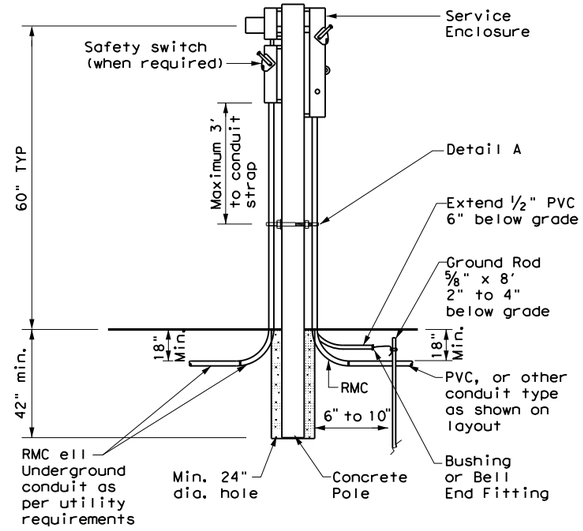


SERVICE SUPPORT TYPE TP (O)

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

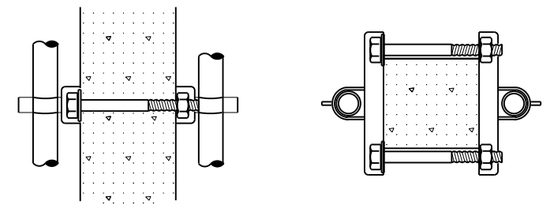
Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

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 1/2 in. or 1 5/8 in. wide by 1 in. up to 3 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.



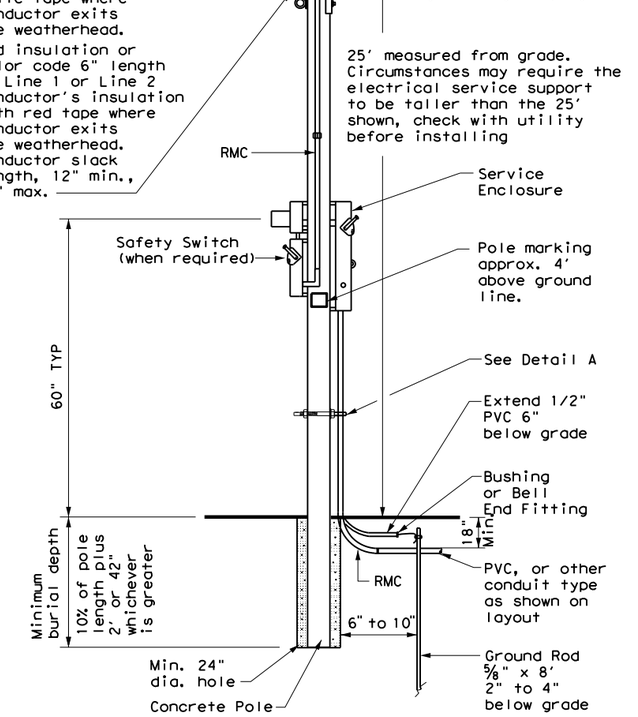
CONCRETE SERVICE SUPPORT

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.



CONCRETE SERVICE SUPPORT

Overhead (O)

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

ED(10)-14

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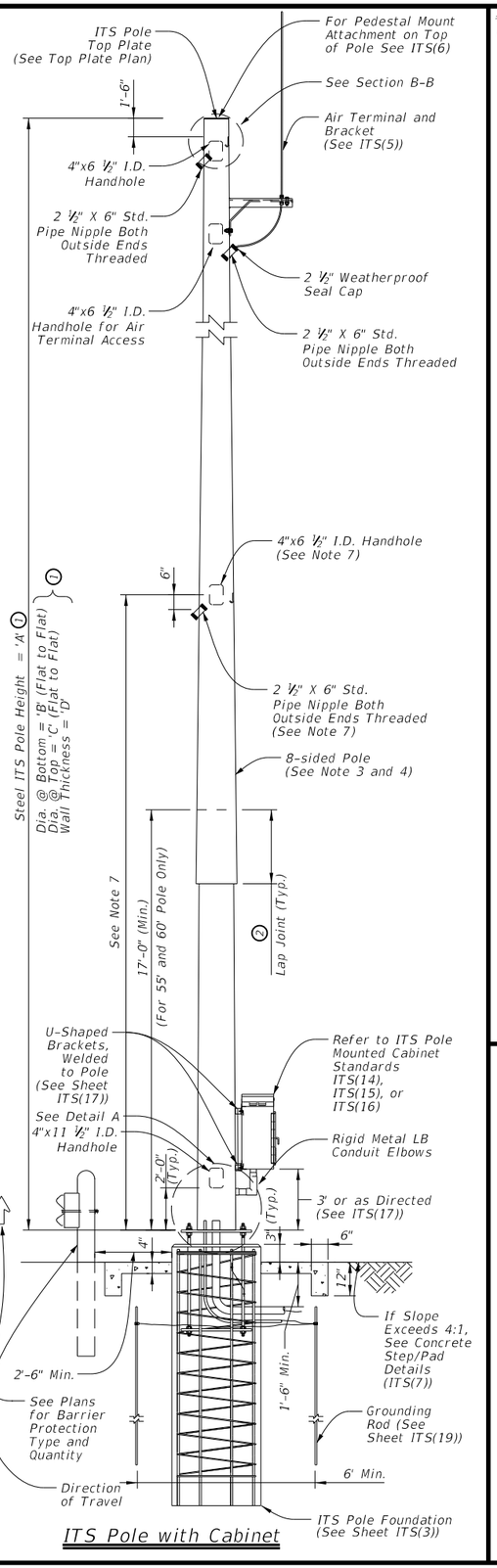
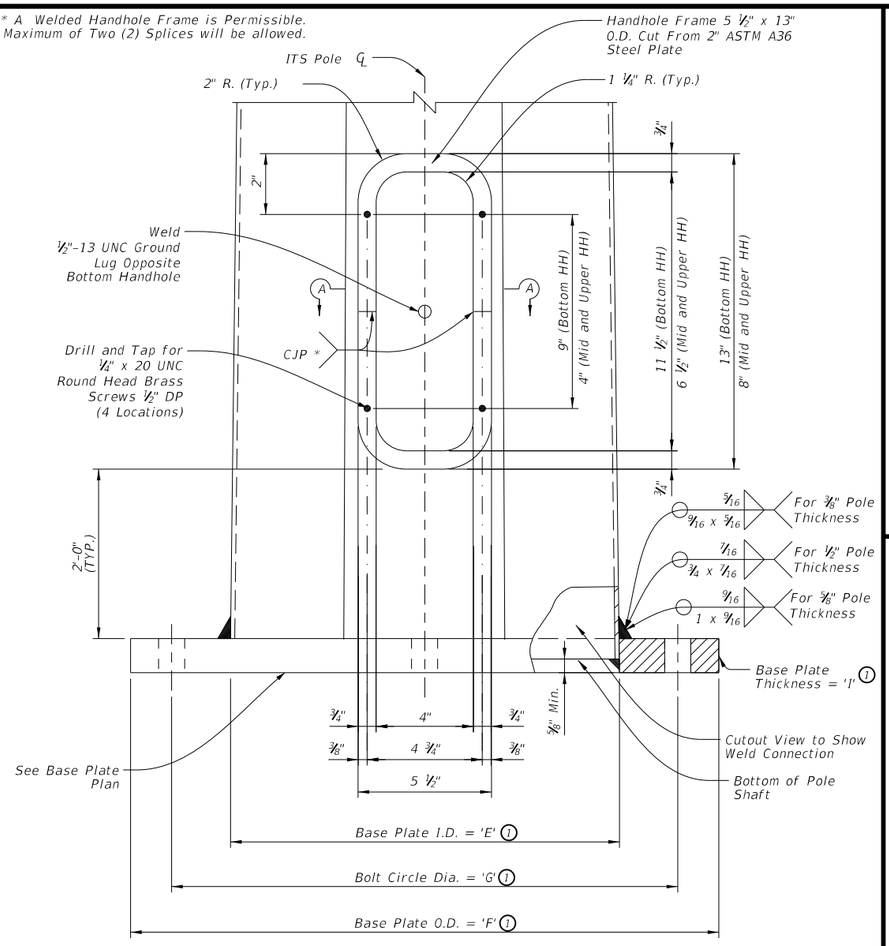
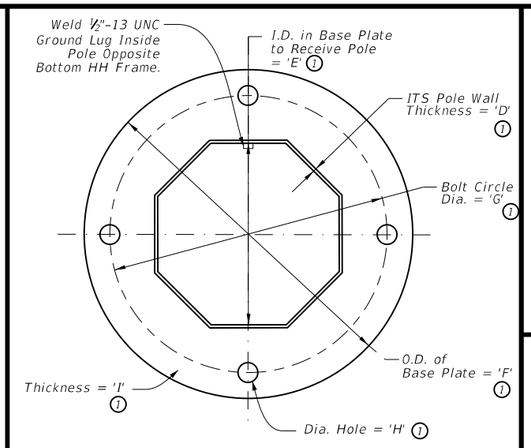


ITS Pole with Cabinet

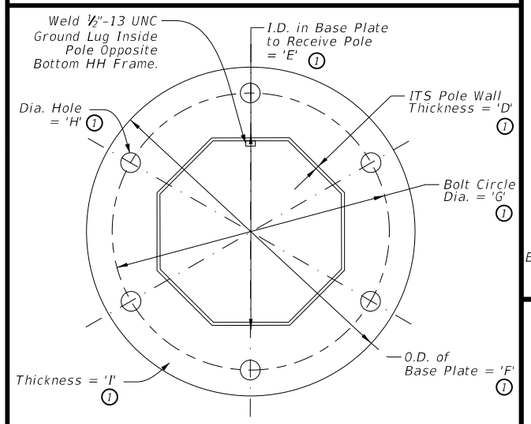


Detail A



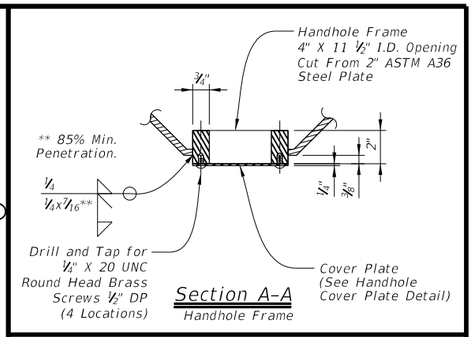
Base Plate Plan

4 Bolt Base Plate (ASTM A36)



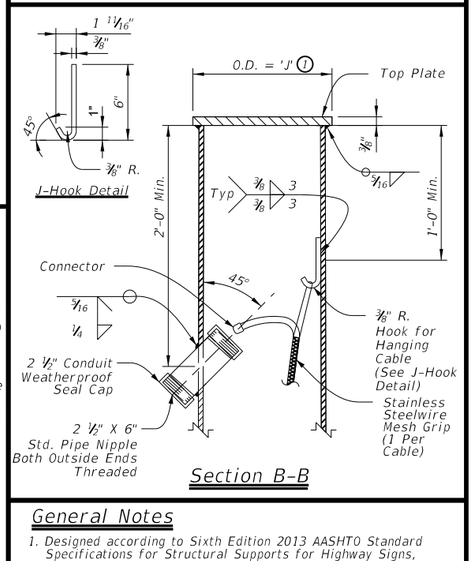
Base Plate Plan

6 Bolt Base Plate (ASTM A36)



Section A-A

Handhole Frame



Section B-B

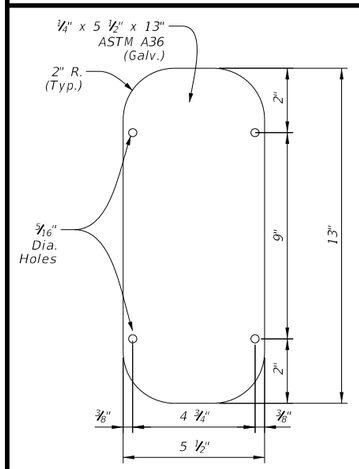
General Notes

1. Designed according to Sixth Edition 2013 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications.
2. Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
3. Deviation from the design criteria, values, and dimensions shown herein and on ITS(4), constitutes an alternative design and will require submission of shop drawings and calculations for approval, sealed by a Texas Professional Engineer.
4. Direct substitution of twelve sided or round poles, matching the design criteria, values, and dimensions shown herein, require submission of shop drawings for approval to confirm design criteria and values on ITS(4) is met.
5. Locate handholes opposite of the direction of travel.
6. Appropriate number of anchor bolts for base plate determined by height of pole. See 'L' on sheet ITS(4).
7. Location for ITS equipment mount may vary by device. Locate mid span handhole and pipe nipple to accommodate location for ITS equipment as identified in the plans or per manufacturer recommendations. Identify location for mid span handhole and pipe nipple on shop drawings for approval.

Reference Notes:

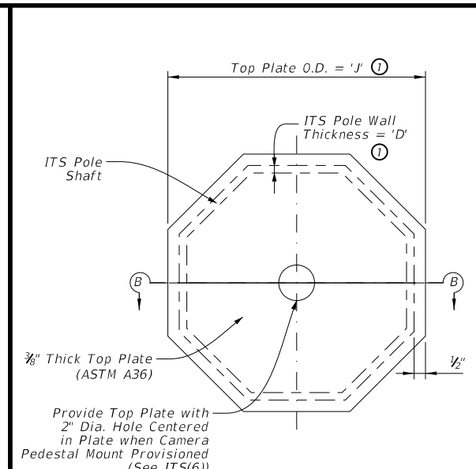
(1) See tables on Sheet ITS(4) for values of dimension variables.

(2) See lap joint note for 55' and 60' pole heights on ITS(4) at the bottom of each table.

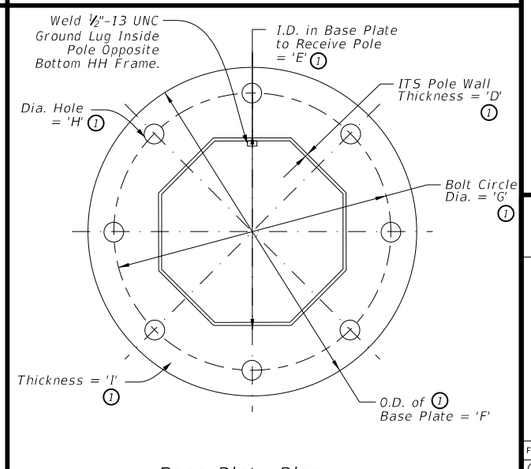


Handhole Cover Plate Detail

(Bottom Handhole)



Top Plate Plan



Base Plate Plan

8 Bolt Base Plate (ASTM A36)

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE DETAILS OCTAGONAL POLE (EIGHT SIDED POLE)

ITS(1)-15

FILE: its(1)-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		121

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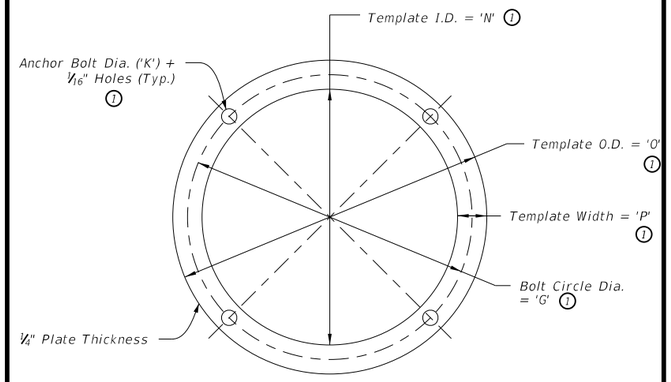
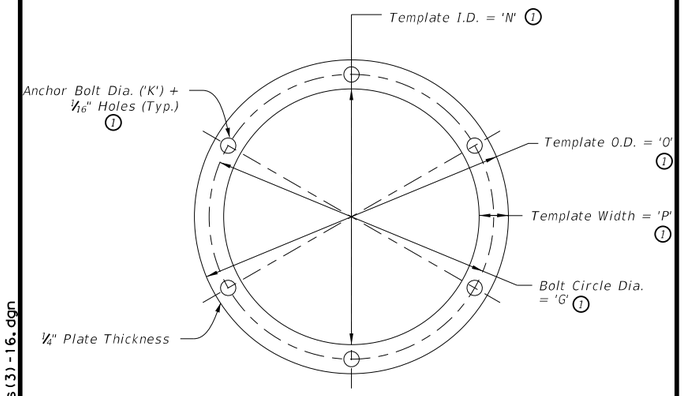
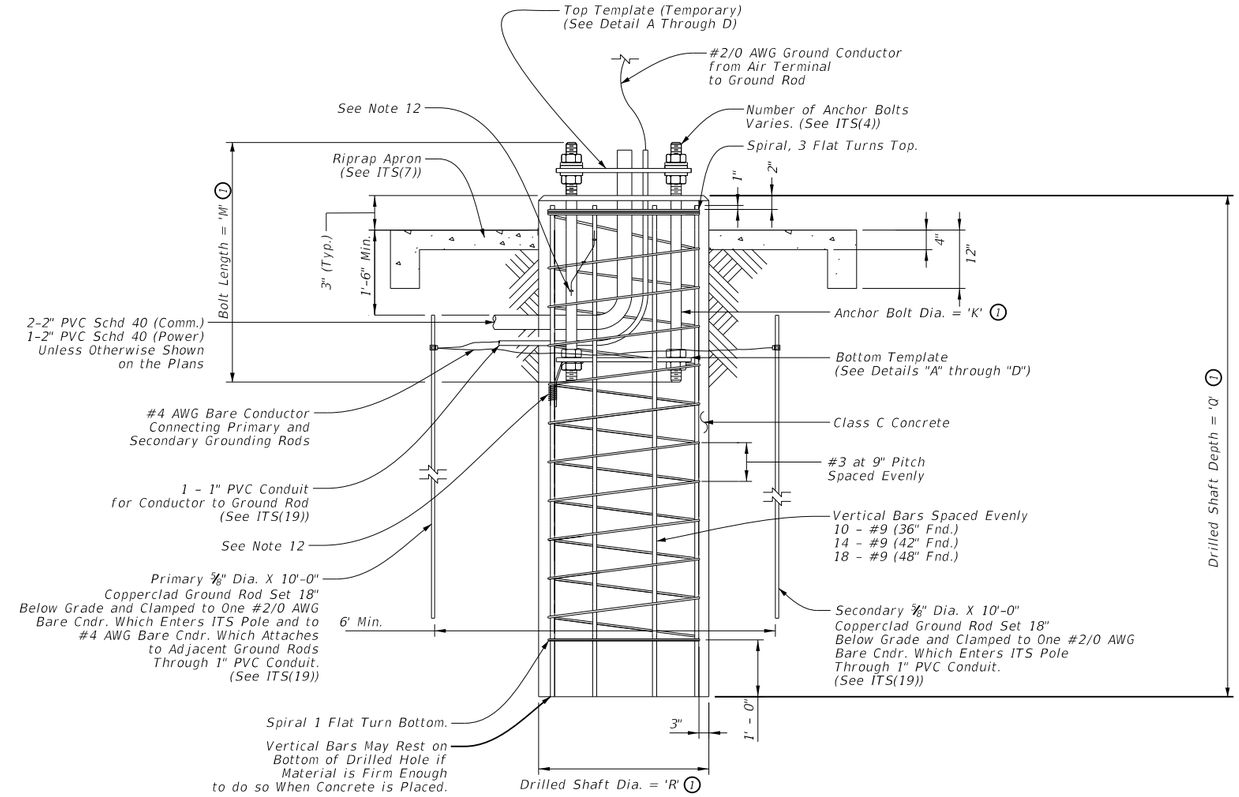


Top and Bottom Template (Four Bolt)
Detail A



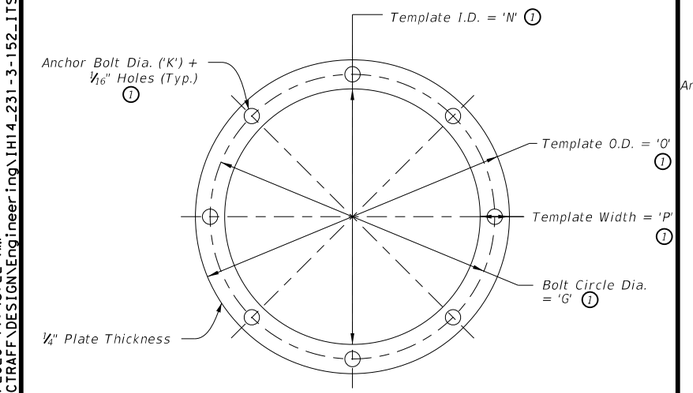
Top and Bottom Template (Six Bolt)
Detail B



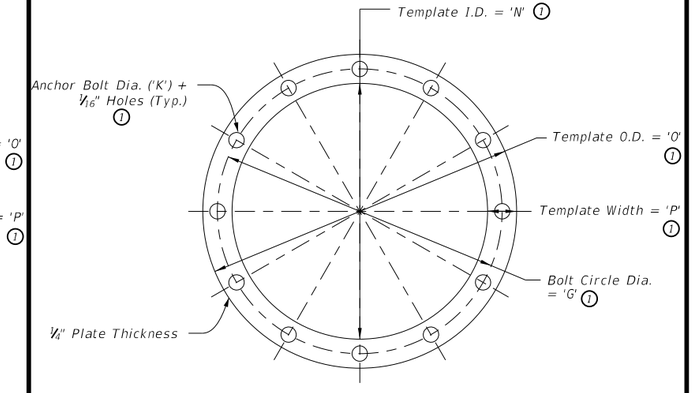
Foundation Details (Typical)
Elevation
Not to Scale

General Notes:

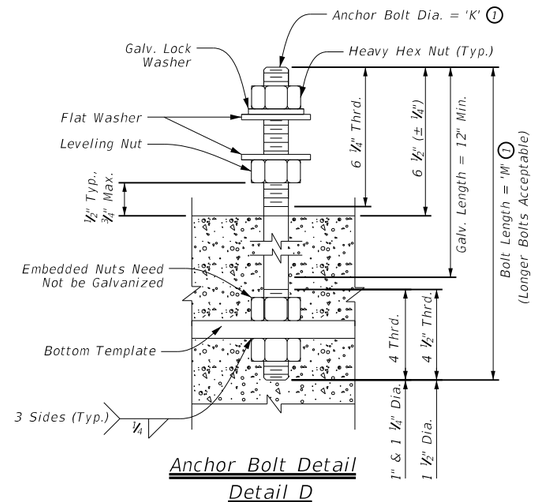
1. Drilled shaft concrete shall be Class "C" (f'c = 3,600 PSI) in accordance with Item 416, "Drilled Shaft Foundations."
2. Reinforcing bars shall be Grade 60 (Fy = 60 KSI) and conform to ASTM A-615. All reinforcing shall conform to Item 440, "Reinforcing Steel."
3. Provide ASTM A-36 steel for templates. Top and bottom templates need not be galvanized.
4. Anchor bolts shall be rigidly held in position during concrete placement using steel templates at the top and bottom. Top templates shall remain in place until the concrete has cured in place beyond initial set time.
5. Lubricate and tighten anchor bolts, when erecting pole, in accordance with Item 449, "Anchor Bolts."
6. Anchor bolts shall conform to ASTM F1554 Grade 55, or ASTM A193 B7 with ASTM A194 Grade 2H or A563 heavy hex nuts with F436 washers. Galvanize a minimum of the top end thread length plus 6 inches 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."
7. All vertical reinforcement shall be carried to the bottom of the drilled shaft.
8. Place three flat turns of the spiral bar at the top and one flat turn at the bottom of the drilled shaft.
9. Drilled shaft shall be measured by the linear foot and paid under Item 416, "Drill Shaft Foundations."
10. If rock is encountered, the drilled shaft to extend a minimum of two diameters into solid rock.
11. Location for conduit entering foundation may vary. Orient conduit entering foundation to coincide with location of ground boxes and primary ground rod.
12. Bond anchor bolts to rebar with #2/0 AWG jumper and two mechanical connectors or by bending No. 3 bar on bottom template as shown and wire tightly with ten turns of No. 10 wire or one mechanical connector. Mechanical connectors shall be UL Listed for concrete encasement.



Top and Bottom Template (Eight Bolt)
Detail C



Top and Bottom Template (Twelve Bolt)
Detail D



Anchor Bolt Detail
Detail D

Reference Notes:

(1) See tables on Sheet ITS(4) for values of dimension variables.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE FOUNDATION DETAILS

ITS(3)-16

FILE: its(3)-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS April 2016	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		122

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TABLE 1: ITS POLE – 90 MPH (W/ 2 SOLAR PANELS) (4)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1) (10)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	20	10	8	1/2	10-1/16	21	16	1-1/4	1-1/2	9	1	4	29	14	18	2	12	11	10	36
	30	13	9	1/2	13-1/16	24	19	1-9/16	1-1/2	10	1-1/4	4	35	16-1/2	21-1/2	2-1/2	15	13	10	36
	40	15	9	1/2	15-1/16	26	21	1-9/16	1-1/2	10	1-1/4	6	35	18-1/2	23-1/2	2-1/2	17	14	11	42
	45	16	10	1/2	16-1/16	27	22	1-9/16	1-1/2	11	1-1/4	6	35	19-1/2	24-1/2	2-1/2	18	16	12	42
	50	17	10	1/2	17-1/16	28	23	1-9/16	1-1/2	11	1-1/4	6	35	20-1/2	25-1/2	2-1/2	19	16	12	42
	55 (6) (7)	19	11	5/8	19-1/16	30	25	1-13/16	2	12	1-1/2	6	40	22	28	3	21	18	13	42
	60 (6) (7)	20	11	5/8	20-1/16	31	26	1-13/16	2	12	1-1/2	6	40	23	29	3	21	19	14	48

TABLE 2: ITS POLE – 110 MPH (W/ 2 SOLAR PANELS) (4)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1) (10)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	20	10	8	1/2	10-1/16	21	16	1-1/4	1-1/2	9	1	4	29	14	18	2	14	12	10	36
	30	13	9	1/2	13-1/16	24	19	1-9/16	1-3/4	10	1-1/4	6	35	16-1/2	21-1/2	2-1/2	18	15	11	36
	40	15	9	1/2	15-1/16	25	21	1-9/16	1-3/4	10	1-1/4	6	35	18-1/2	23-1/2	2-1/2	20	17	12	42
	45	16	10	1/2	17-1/16	27	22	1-9/16	1-3/4	11	1-1/4	8	35	19-1/2	24-1/2	2-1/2	21	18	13	42
	50	17	10	1/2	18-1/16	28	23	1-9/16	1-3/4	11	1-1/4	8	35	20-1/2	25-1/2	2-1/2	22	19	14	42
	55 (7)	19	11	5/8	19-1/16	30	25	1-9/16	2	12	1-1/4	8	35	22-1/2	27-1/2	2-1/2	24	20	14	42
	60 (7)	20	11	5/8	20-1/16	31	26	1-13/16	2	12	1-1/2	6	40	23	29	3	25	21	15	48

TABLE 3: ITS POLE – 130 MPH (W/ 1 SOLAR PANEL) (5)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1) (10)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	20	10	8	1/2	10-1/16	21	16	1-9/16	1-3/4	9	1-1/4	4	35	13-1/2	18-1/2	2-1/2	16	14	10	36
	30	13	9	1/2	15-1/16	24	19	1-9/16	1-3/4	10	1-1/4	6	35	16-1/2	21-1/2	2-1/2	18	16	11	36
	40	15	9	1/2	15-1/16	26	21	1-9/16	1-3/4	10	1-1/4	6	35	18-1/2	23-1/2	2-1/2	21	18	13	42
	45	16	10	1/2	16-1/16	27	22	1-9/16	1-3/4	11	1-1/4	8	35	19-1/2	24-1/2	2-1/2	23	19	14	42
	50	17	10	1/2	17-1/16	28	23	1-9/16	2	11	1-1/2	8	40	20	26	3	24	20	14	42
	55 (7)	19	11	5/8	19-1/16	30	25	1-13/16	2	12	1-1/2	8	40	22	28	3	27	22	15	42
	60 (7)	20	11	5/8	20-1/16	31	26	1-13/16	2	12	1-1/2	8	40	23	29	3	28	23	16	48

TABLE 4: ITS POLE WITH STIFFENERS – 90 MPH (W/ 4 SOLAR PANELS) (8)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	30	13	9	3/8	13-1/16	28	22	1-1/4	1-3/4	10	1	8	29	20	24	2	17	15	11	42
	40	15	9	1/2	15-1/16	30	24	1-1/4	2	10	1	8	29	22	26	2	20	17	12	42
	45	16	10	1/2	16-1/16	31	25	1-9/16	2	11	1-1/4	8	35	22-1/2	27-1/2	2-1/2	21	18	13	42
	50	17	10	1/2	17-1/16	32	26	1-9/16	2	11	1-1/4	8	35	23-1/2	28-1/2	2-1/2	21	18	13	42
12 sided	55 (7)	19	11	5/8	19-1/16	34	27	1-9/16	2	12	1-1/4	12	35	24-1/2	29-1/2	2-1/2	21	18	13	48
	60 (7)	20	12	5/8	20-1/16	35	28	1-9/16	2	13	1-1/4	12	35	25-1/2	30-1/2	2-1/2	22	19	14	48

TABLE 5: ITS POLE WITH STIFFENERS – 110 MPH (W/ 4 SOLAR PANELS) (8)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	30	13	9	1/2	13-1/16	28	22	1-9/16	2-1/4	10	1-1/4	8	35	19-1/2	24-1/2	2-1/2	20	17	12	42
	40	16	10	1/2	16-1/16	31	25	1-9/16	2-1/4	11	1-1/4	8	35	22-1/2	27-1/2	2-1/2	24	20	14	42
	45	17	11	1/2	17-1/16	32	26	1-9/16	2-1/4	12	1-1/4	8	35	23-1/2	28-1/2	2-1/2	25	21	15	42
	50	18	11	1/2	18-1/16	32	26	1-13/16	2-1/2	12	1-1/2	8	40	23	29	3	25	21	15	48
12 SIDED	55 (7)	19	11	5/8	19-1/16	34	27	1-9/16	2-1/4	12	1-1/4	12	35	24-1/2	29-1/2	2-1/2	24	21	15	48
	60 (7)	20	12	5/8	20-1/16	35	28	1-9/16	2-1/4	13	1-1/4	12	35	25-1/2	30-1/2	2-1/2	25	22	15	48

TABLE 6: ITS POLE WITH STIFFENERS – 130 MPH (W/ 3 SOLAR PANELS) (9)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
																	'Q'			
	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'				'R'
8 SIDED	30	13	9	1/2	13-1/16	28	22	1-9/16	2-1/2	10	1-1/4	8	35	19-1/2	24-1/2	2-1/2	23	19	14	42
	40	16	10	1/2	16-1/16	31	25	1-9/16	2-1/2	11	1-1/2	8	40	22	28	3	25	21	14	42
	45	17	11	1/2	17-1/16	32	26	1-13/16	2-1/2	12	1-1/2	8	40	23	29	3	26	22	16	48
	50	18	11	1/2	18-1/16	33	27	1-13/16	2-1/2	12	1-1/2	8	40	24	30	3	27	23	16	48
12 SIDED	55 (7)	19	11	5/8	19-1/16	34	27	1-9/16	2-1/4	12	1-1/4	12	35	24-1/2	29-1/2	2-1/2	26	22	16	48
	60 (7)	20	12	5/8	20-1/16	35	28	1-9/16	2-1/4	13	1-1/4	12	35	25 1/2	30 1/2	2-1/2	27	23	16	48

General Notes:

1. Designed according to Sixth Edition 2013 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto.
2. Table 1 and Table 4 design wind speed equals 90 MPH (3-Second Wind Gusts) with a 1.14 gust factor. A wind importance factor of 1.00 is applied to adjust the wind speed to a 50 year recurrence interval at 33 FT above the ground for Exposure C category in accordance with TxDOT WV&IZ(LTS2013). Design values listed in the table allow the base of the pole to be elevated above the surrounding ground level no more than 20 FT.
3. Table 2 and Table 5 design wind speed equals 110 MPH (3-Second Wind Gusts) with a 1.14 gust factor. A wind importance factor of 1.00 is applied to adjust the wind speed to a 50 year recurrence interval at 33 FT above the ground for Exposure C category in accordance with TxDOT WV&IZ(LTS2013). Design values listed in the table allow the base of the pole to be elevated above the surrounding ground level no more than 20 FT.
4. Table 3 and Table 6 design wind speed equals 130 MPH (3-Second Wind Gusts) with a 1.14 gust factor. A wind importance factor of 1.00 is applied to adjust the wind speed to a 50 year recurrence interval at 33 FT above the ground for Exposure C category in accordance with TxDOT WV&IZ(LTS2013). Design values listed in the table allow the base of the pole to be elevated above the surrounding ground level no more than 20 FT.
5. Recommended embedment lengths are for information purposes only. Foundation embedment depth is based off Texas Cone Penetrometer Value N = 10 blows/ft. for soft soils and up to 40 blows/ft. for hard soils. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations" unless otherwise shown on the plans.
6. Deviation from the design criteria and values contained in the tables above constitute and alternative design and will require submission of shop drawings and calculations for approval, sealed by a Texas Professional Engineer.
7. 12-sided or round poles as a direct substitution for 8-sided and round poles as a direct substitution for 12-sided poles, meeting the design criteria and values contained in the tables above, require submission of shop drawings for approval.

Reference Notes

(1) See the following ITS Pole Standard sheets:
- 8-sided Pole – ITS(1)
- 12-sided Pole – ITS(2)

(2) Provision for 2" Dia. opening in top plate for poles requiring cameras mounted on top.
- See ITS Pole Mounting Details – ITS(6)

(3) See ITS Pole Foundation Details – ITS(3)

(4) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- Two 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

(5) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- One 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

(6) Pole heights at 55 Ft. and 60 Ft. located in the AMA, CHS, and LBB Districts, will require special design and design values shown shall not be used. Submit shop drawings for pole design and supporting calculations for 55 Ft. and 60 Ft. pole heights signed and sealed by a Texas Professional Engineer for approval.

(7) Ensure minimum nominal splice length is 1.5 times the average pole diameter at the splice to the nearest inch. Ensure longitudinal seam welds that will be in contact at a slip joint splice are ground smooth for the length of splice plus a minimum of six inches. Ensure a 100% longitudinal seam weld for a length of 1.5 pole diameter plus a minimum of 6 inches in outer sections at splices and at base plate. Provide 85% penetration in longitudinal seam welds at other pole sections.

(8) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- Four 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

Refer to ITS(4A) for stiffening plate details at the pole to base plate connection.

(9) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- Three 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

Refer to ITS(4A) for stiffening plate details at the pole to base plate connection.

(10) When solar panels are not provisioned in the plans, ITS pole wall thickness may be reduced by 1/2".

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE DESIGN DETAILS DATA LOOKUP TABLE

ITS(4)-15

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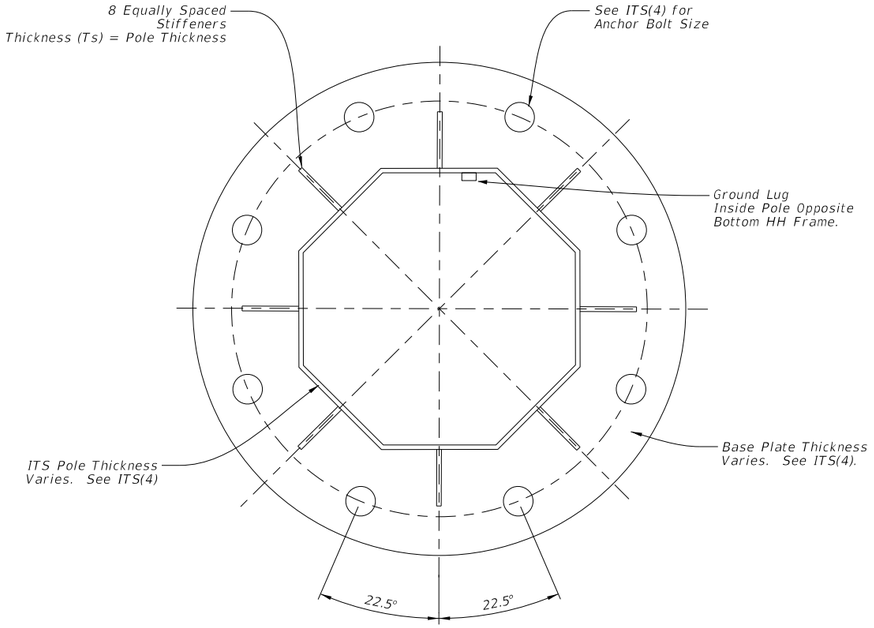
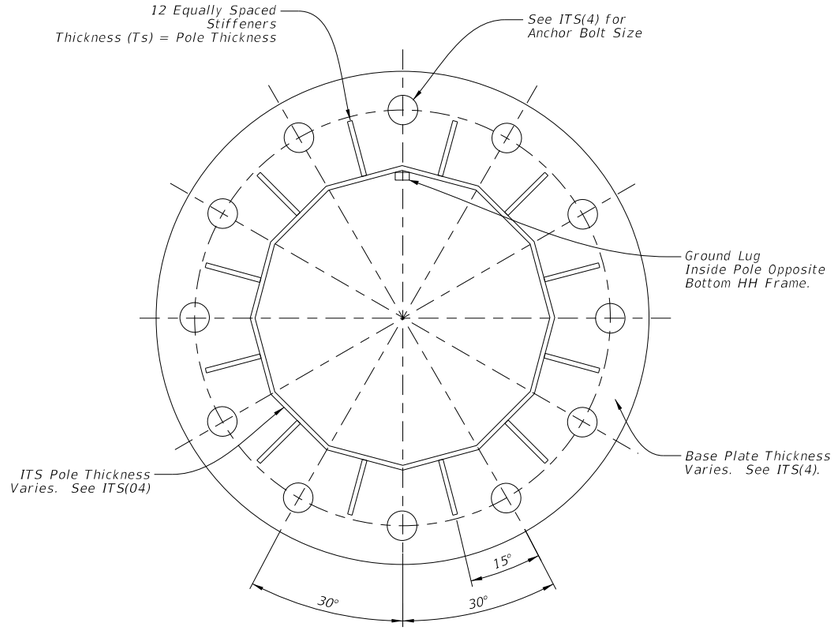


8-sided Pole Base Plate Detail



12-sided Pole Base Plate Detail

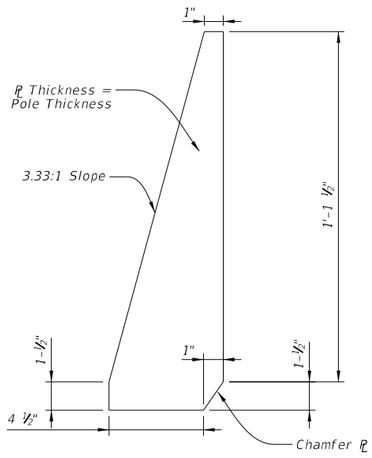
General Notes:

1. Steel stiffening plates shall conform to ASTM A36.
2. Make all welds conform to Item 441, "Steel Structures."
3. Galvanize in accordance with Item 445, "Galvanizing" unless otherwise noted.
4. Submit shop drawings detailing stiffening plate orientation along with ITS equipment intended for mounting for review and approval prior to fabrication.
5. HH = Handhole
6. T_s = Thickness

Reference Notes:

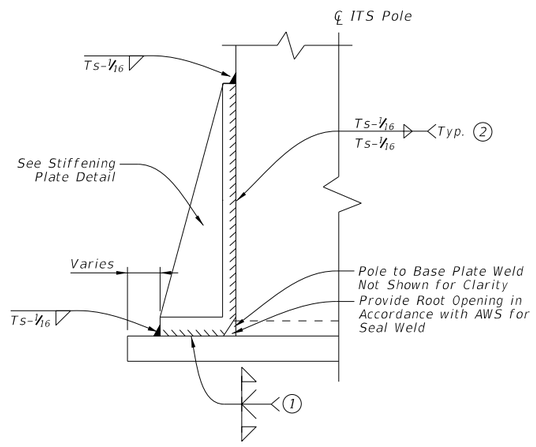
(1) Complete Joint Penetration Weld per AWS

(2) Wrap Fillet Weld Around Tip of Stiffener



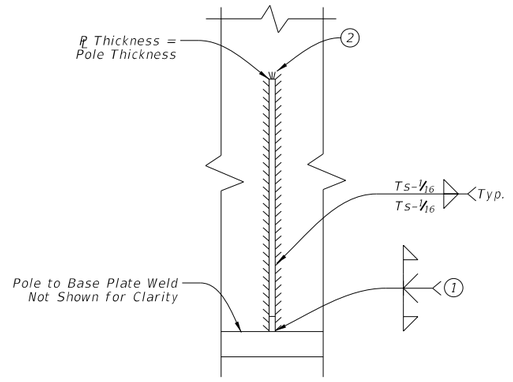
Stiffening Plate Detail

Not to Scale



Stiffening Detail - Elevation View

Not to Scale



Stiffening Detail - Front View

Not to Scale

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE STIFFENER PLATE DETAILS

ITS(4A)-15

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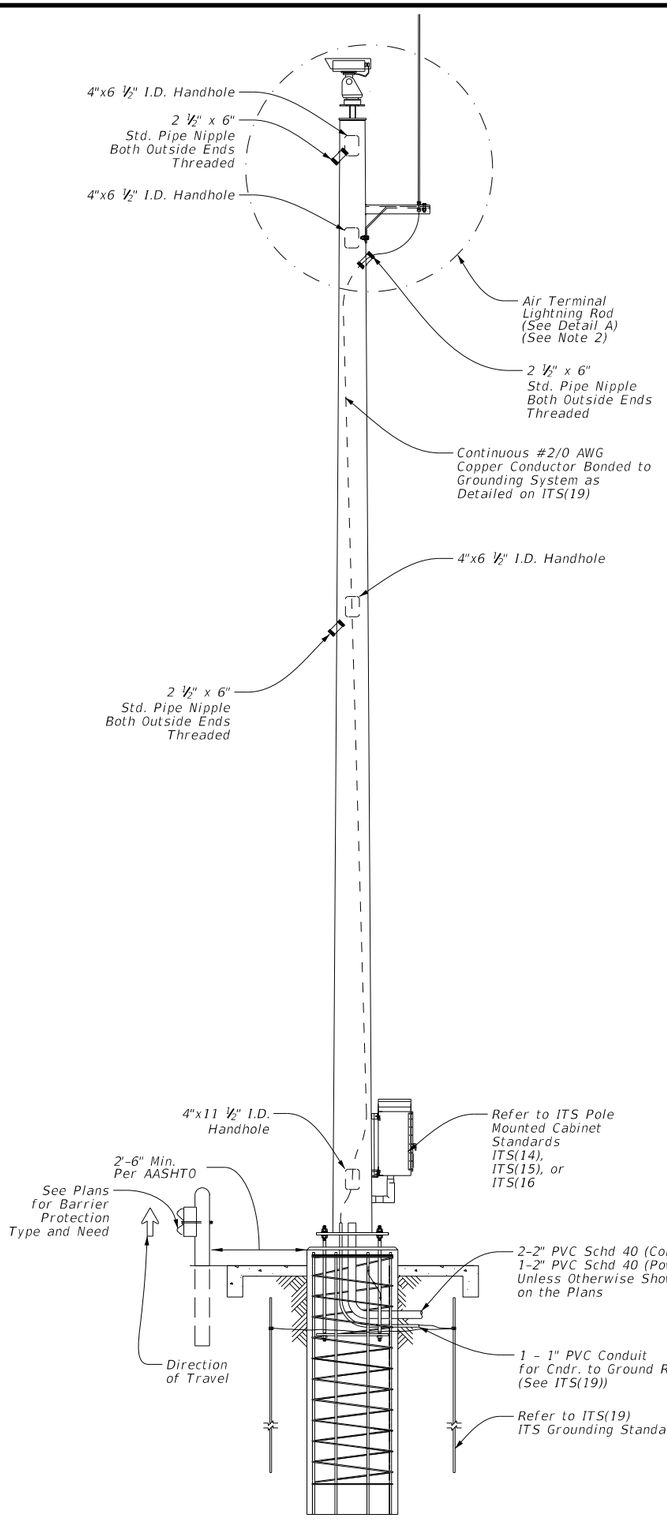
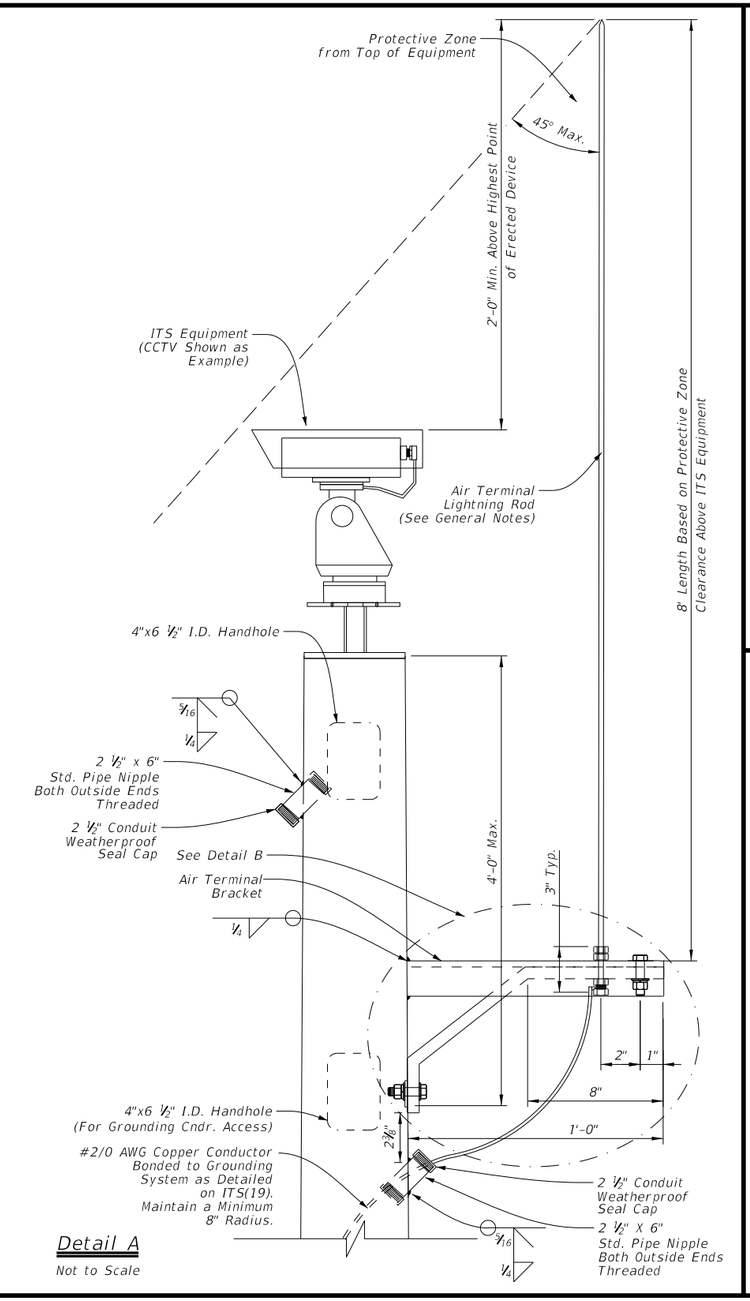
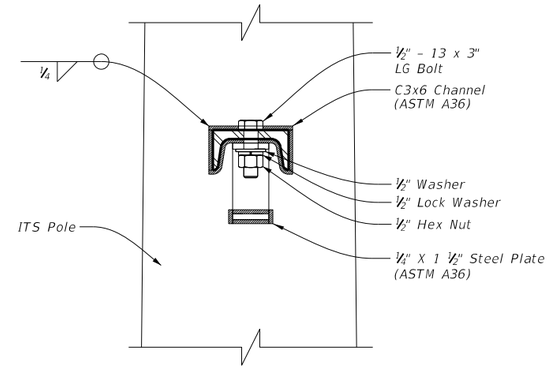


ITS Pole with Cabinet



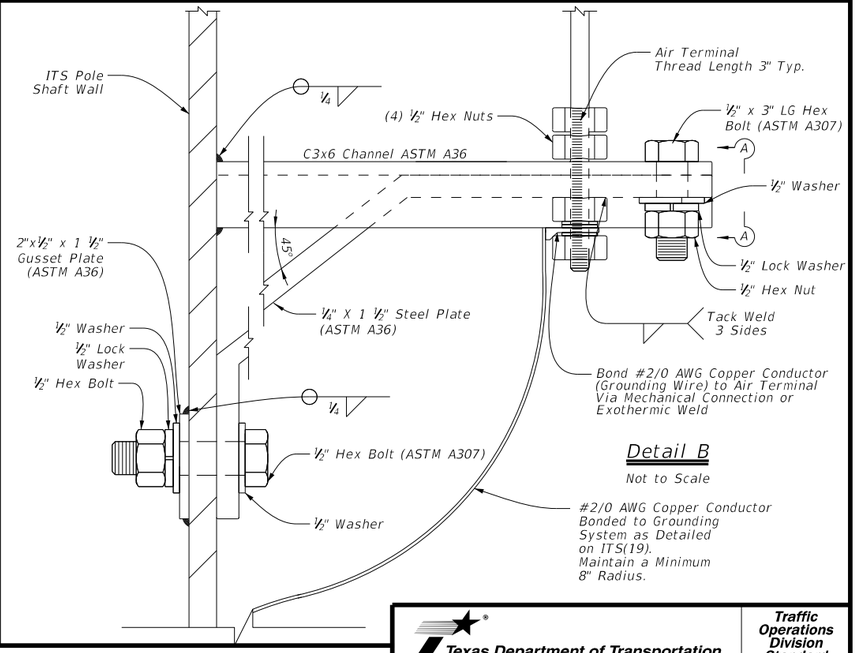
Detail A

Not to Scale



Section A-A

Not to Scale



Detail B

Not to Scale

General Notes:

1. Provide lightning protection using air terminals on structures utilizing the rolling sphere method. Provide lightning protection system consisting of air terminals, down conductor, and grounding system installed in accordance with NFPA 780 and tested in accordance with IEEE 142. Meet the following requirements:
   A. Position - in center of least utilized field of view.
   B. Height - camera equipment to be within 45 degree protective zone of air terminal.
   C. Material - ½" ETP alloy 110 copper air terminal (Class II)
   D. Clearance - 24" minimum height above highest point of ITS equipment.
   E. Bonding - attach air terminal to bracket by exothermic weld or with approved clamping.
   F. Structure wind rating in accordance with TxDOT WV & IZ (LTS2013).
   G. Galvanize air terminal bracket in accordance with Item 445, "Galvanizing."
2. Alternative orientation for air terminal and pole mounted cabinet due to project specific needs to be indicated on the plans and detailed in shop drawing submittal for approval.
3. Weld air terminal bracket to ITS pole in accordance with Item 448 "Structural Field Welding." Bracket may be welded by the fabricator in the shop prior to delivery. A bolted connection for the air terminal bracket is acceptable in lieu of a welded connection with approval by the Engineer and detailed in the shop drawings.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE AIR TERMINAL DETAILS

ITS(5)-15

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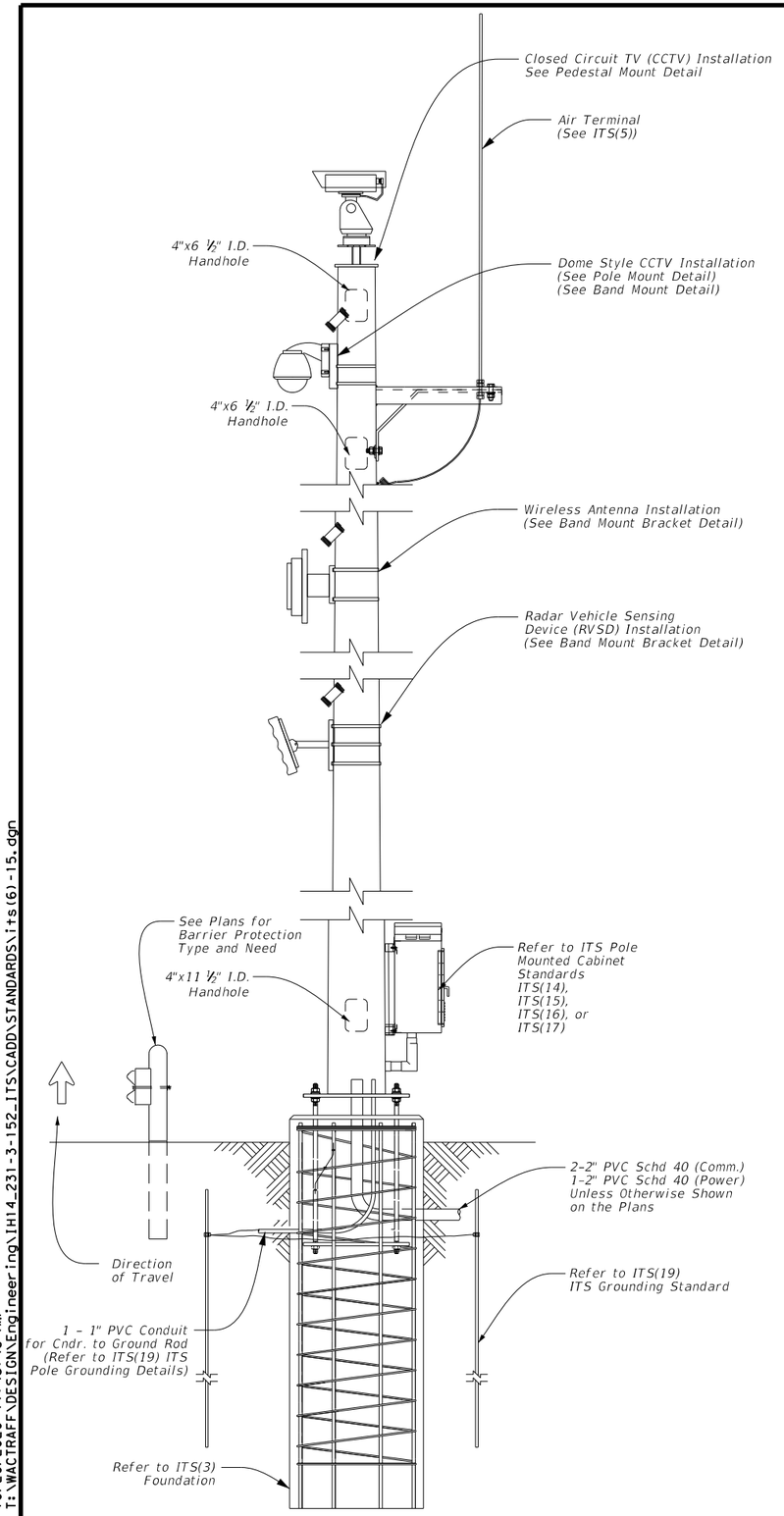
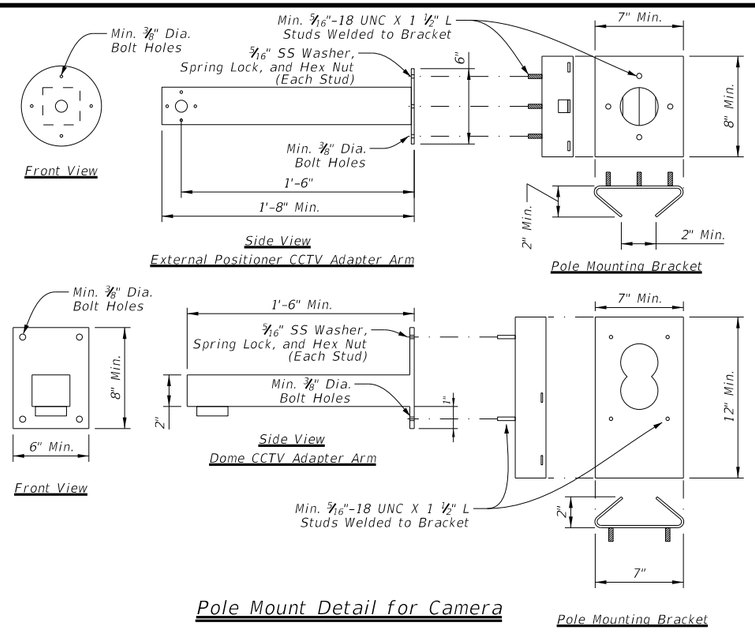
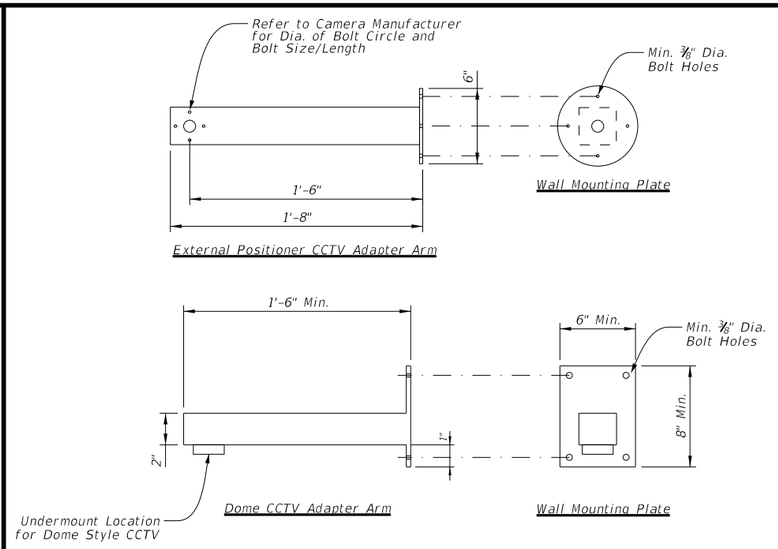


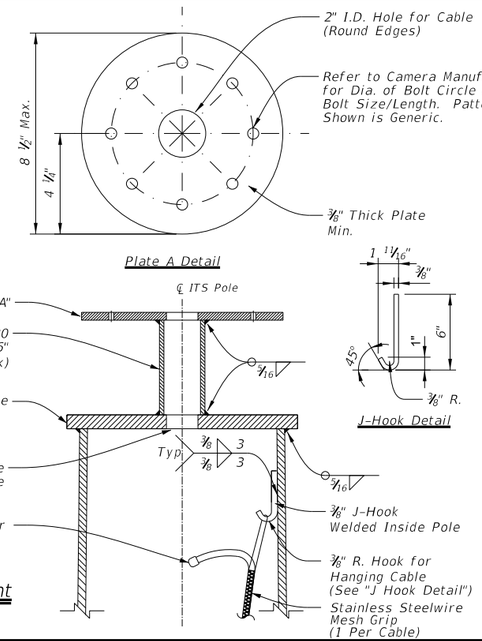
ITS Pole with Cabinet



Pole Mount Detail for Camera

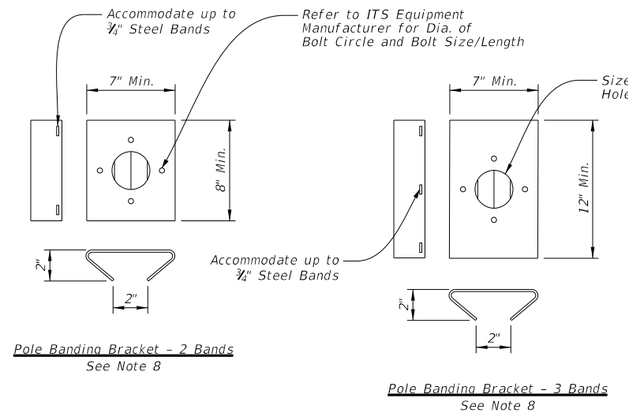


Wall Mount Detail



Pedestal Mount

Pole Top Detail



Band Mount Bracket Details

General Notes:

1. Designed according to Sixth Edition AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications.
2. Hang all cabling inside ITS pole structure with stainless steel wire mesh grips.
3. Bolt positioning in the pedestal top plate (Plate "A") for the pan/tilt base must be determined in the field per camera manufacturers recommendations. This will allow positioning of the camera to maximize coverage area. The Engineer will determine the camera's blind zone at each location.
4. Provide pedestal top plate and Plate "A" that conform to ASTM A36.
5. Make all welds conform to Item 441 and AWSD 1.1 (Structural Welding). Repair damaged galvanized coating per Item 445, "Galvanizing."
6. Galvanize parts in accordance with Item 445, "Galvanizing" unless otherwise noted.
7. The type of ITS equipment shown to be mounted to the ITS pole is intended to represent the most common ITS equipment applications and should not be treated as all inclusive. Other ITS equipment applications may exist that are project specific.
8. Mounting brackets are intended to be diagrammatic and for information only, and are not all inclusive. Contractor responsible for submitting mounting bracket design for approval by the Engineer prior to fabrication. Mounting bracket designed to support a maximum 35 Lbs. Off-the-shelf mounting brackets are acceptable and shall be submitted by shop drawing for approval.
9. Mounting heights to be determined in the field based on manufacturer recommendations.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE EQUIPMENT MOUNTING DETAILS

ITS(6)-15

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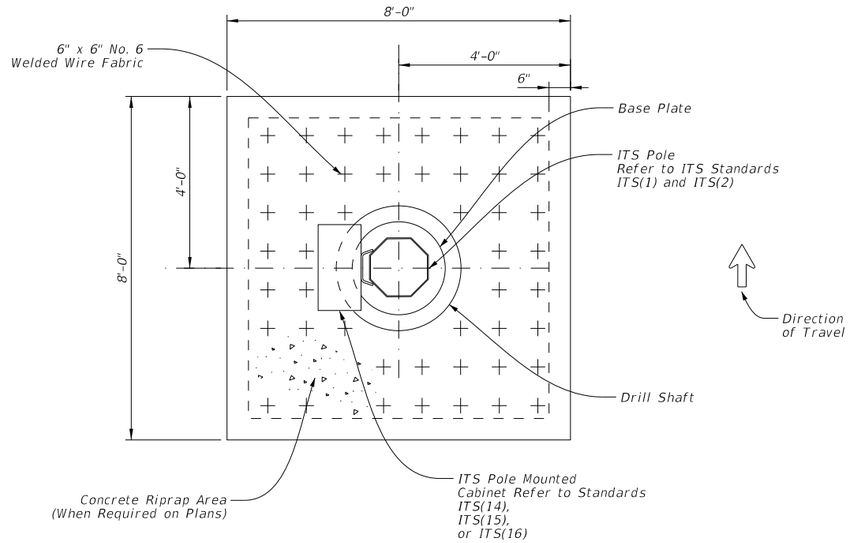
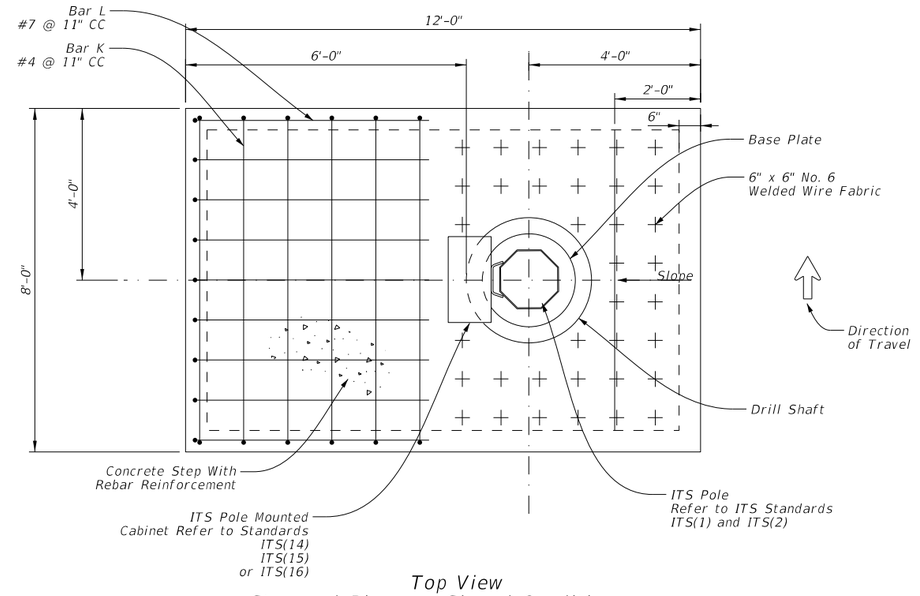
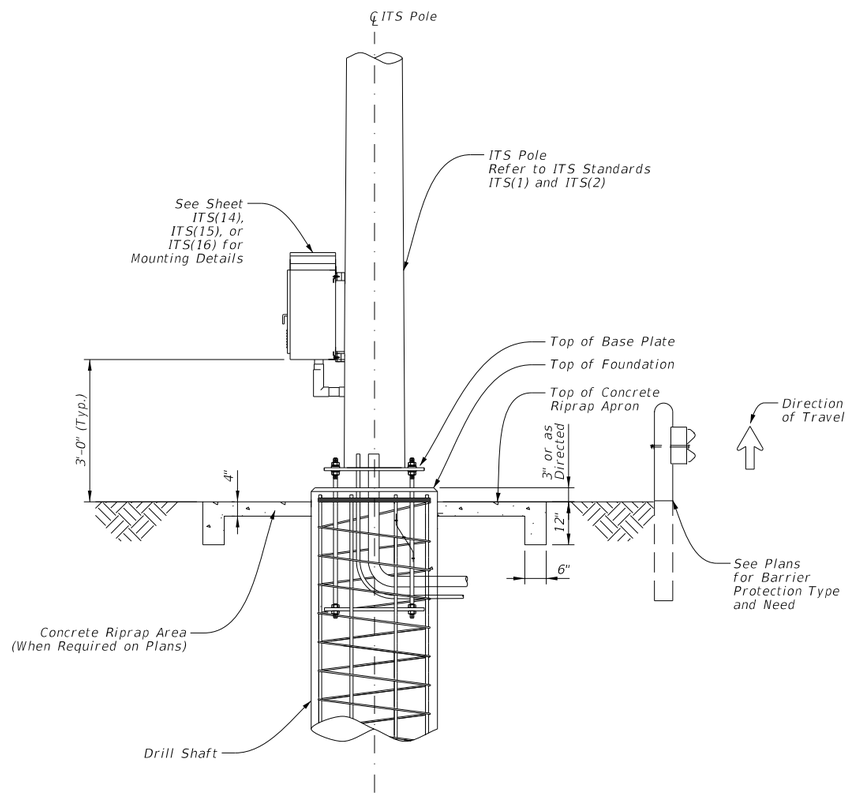


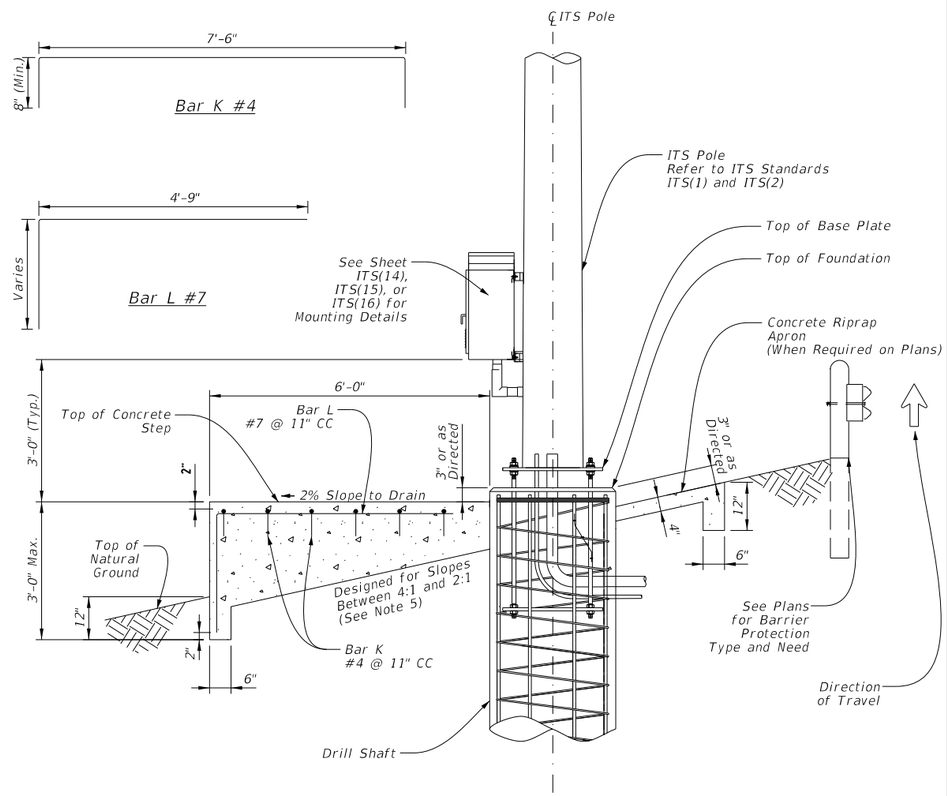
Top View
Riprap - Non-Sloped Conditions



Top View
Step and Riprap - Sloped Conditions



Elevation View
Riprap Apron Detail - Non-Sloped Conditions



Elevation View
Riprap Apron/Step Detail - Sloped Conditions
(Slopes Exceeding 4:1)

General Notes:

1. For non-sloped grassy areas, an 8' x 8' concrete riprap apron shall be poured around ITS pole foundations (see detail on this sheet), estimated at 1.25 CY per site, paid for under Item 432 "Riprap."
2. For sloped grassy areas, a concrete "step" (for maintenance personnel to access cabinet) shall be poured as part of the riprap apron. The step shall vary in height depending on slope, but shall extend 6' horizontally from ITS pole drilled shaft foundation and be the same width as riprap apron (8'). Step shall be poured at same time as riprap apron (see detail on this sheet). Any additional concrete necessary to fabricate step (over and above the 1.25 CY) shall be considered subsidiary to the various bid items and no direct payment shall be made.
3. For sloped areas where riprap exists, a 6' (horizontal from drilled shaft foundation) x 4' wide step shall be installed (see detail this sheet). Concrete for step shall be considered subsidiary to the various bid items and no direct payment shall be made.
4. Cabinet orientation may vary depending on field conditions or project constraints. Accommodate configuration of platform according to cabinet orientation.
5. Slopes greater than a 2:1 or when 3'-0" Max. step wall height is exceeded, an alternative design with safety railing is required and shall be detailed in the shop drawings for approval.

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ITS POLE RIPRAP DETAILS

ITS(7)-15

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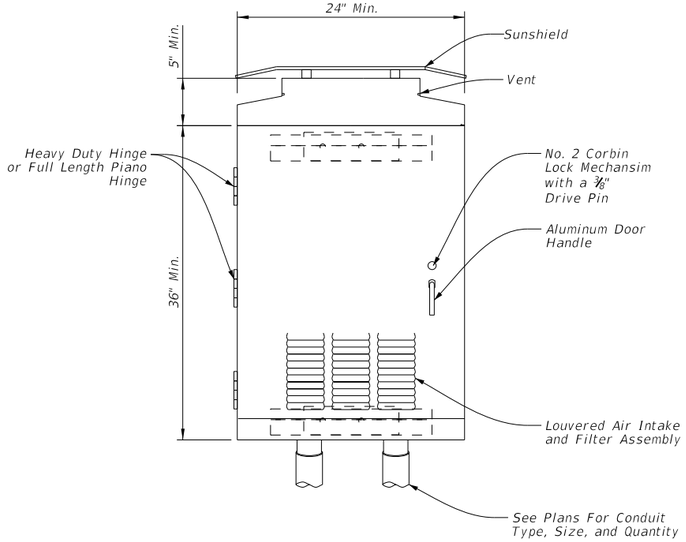
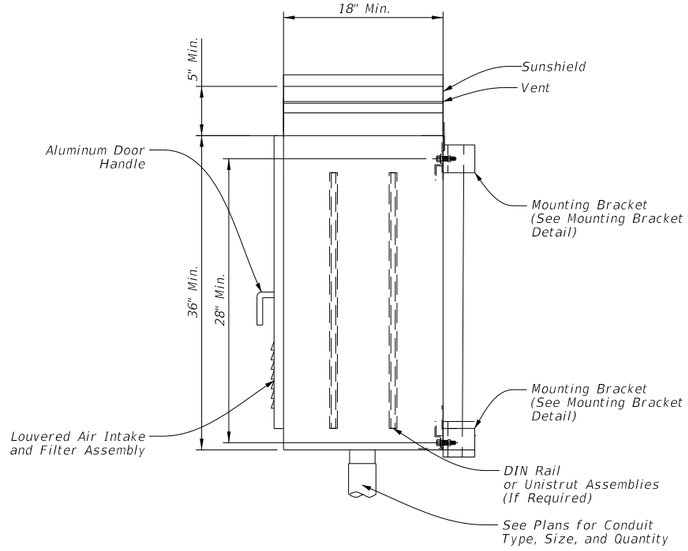


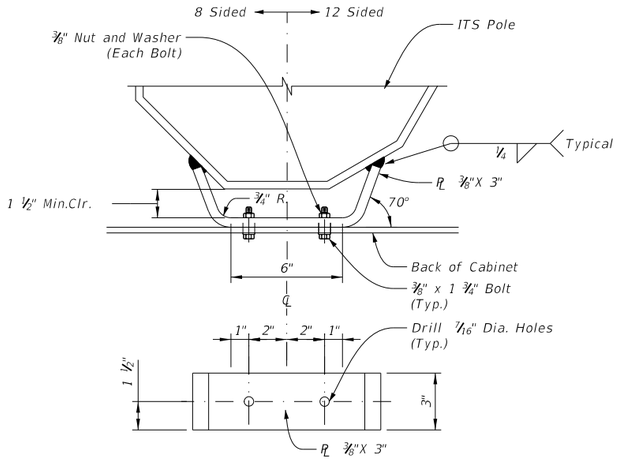
Pole Mounted Cabinet – Type 2 Front View

Not to Scale



Pole Mounted Cabinet – Type 2 Side View

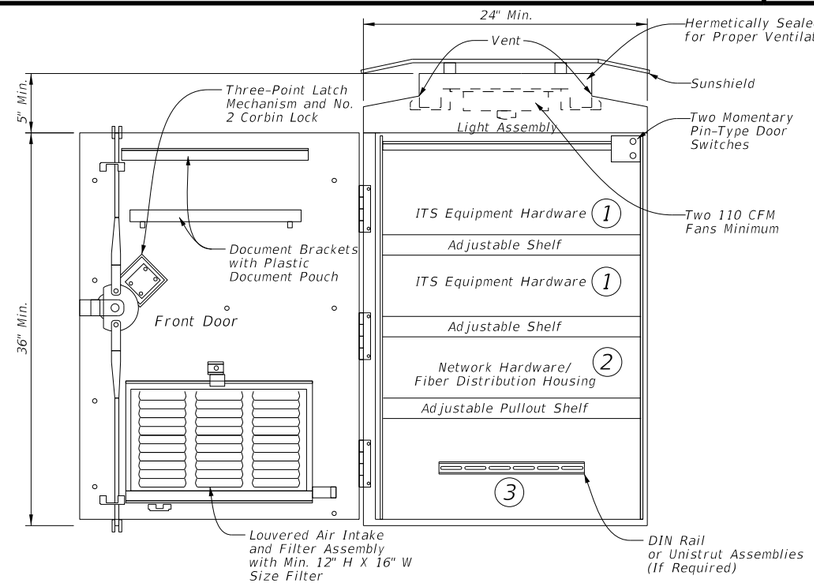
Not to Scale



Note:
ITS Pole May be Round, Octagonal (8 Sided), or Dodecahedron (12 Sided).
See ITS(1), and ITS(2) for Details.

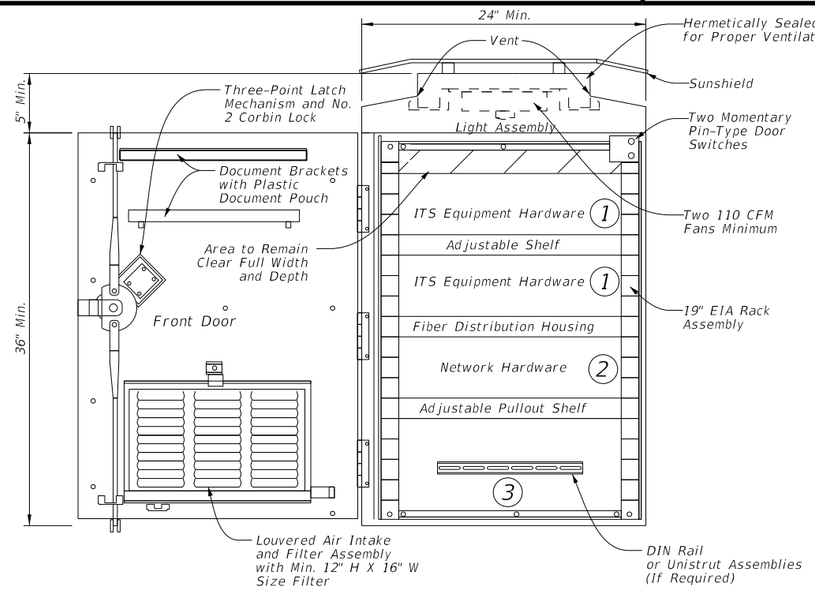
Mounting Bracket Detail

Not to Scale



Interior – Type 2 Without 19" EIA Rack – Front View

Not to Scale



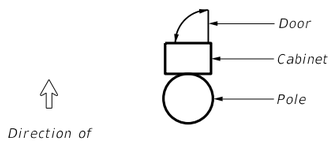
Interior – Type 2 With 19" EIA Rack – Front View

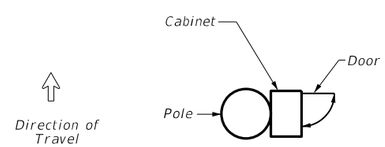
Not to Scale

Typical Equipment Layout Legend	
	Example Equipment
1	CCTV Interface Panel, Radar Vehicle Sensing Device (RVSD) Equipment, DMS/LCS Controller Environmental Sensor Station (ESS) Equipment, Bluetooth Equipment, or ITS Radio Equipment (See General Note 1)
2	Ethernet Switch, Video Encoder, Terminal Server, Fiber Optic Transceivers, or Media Conversion Equipment (See General Note 1)
3	Power Distribution Assembly, Service Entrance Breakers, Primary AC Power, Auxiliary Power Strip, Ground Bus Bar Surge Protection Equipment

General Notes:

1. Layout of hardware equipment and configuration shown is diagrammatic in nature and intended to represent a preferred Type 2 pole mounted cabinet setup. Hardware needed for each Type 2 cabinet varies and not all cabinet equipment may be shown. The contractor will be responsible for configuring cabinets with all appropriate ITS hardware and power supplies in accordance with the plans and specifications. The contractor may alter the cabinet configuration shown to maximize space and ensure easy access for maintenance.
2. Mount cabinet as detailed on ITS(15) or ITS(17). Orientation of cabinet on ITS pole may vary depending on field conditions. Mount the pole mounted cabinet to the backside of the ITS pole, to allow maintenance personnel to access the cabinet while being able to view oncoming traffic.
3. For ITS pole sites located on slopes greater than 4H:1V, mount the cabinet to the backside of the ITS pole as detailed on ITS(7). Mounting height to accommodate maintenance pad for easy access.
4. All dimensions are approximate and represent minimum cabinet dimensions.
5. Provide conduit entrances at the bottom of the cabinet.
6. Paid under Special Specification "ITS Pole with Cabinet" (Configuration 1) without 19" EIA rack. Paid under Special Specification "ITS Pole with Cabinet" (Configuration 2) with 19" EIA rack.





Orientation of Type 2 Cabinet on ITS Pole (Typical)

Not to Scale

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Traffic Operations Division Standard

ITS POLE MOUNTED CABINET TYPE 2 DETAILS

ITS(15)-15

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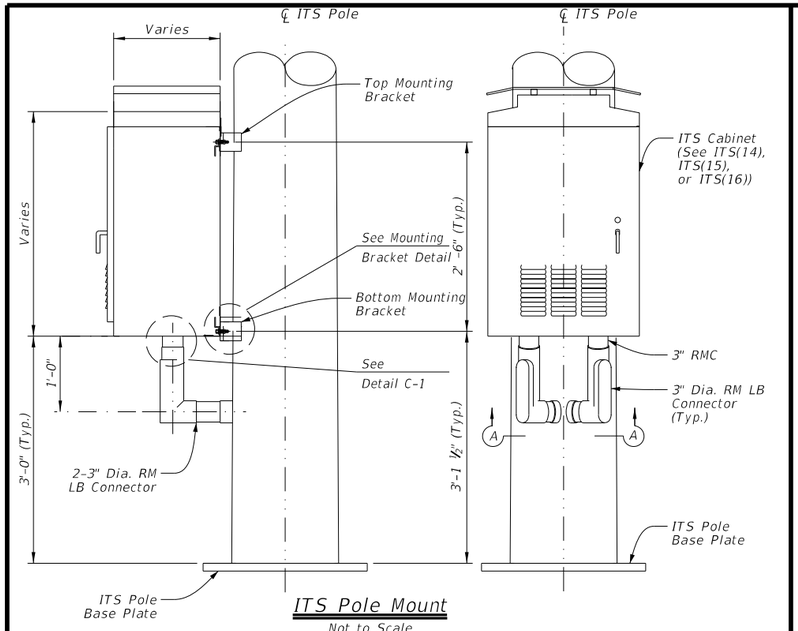
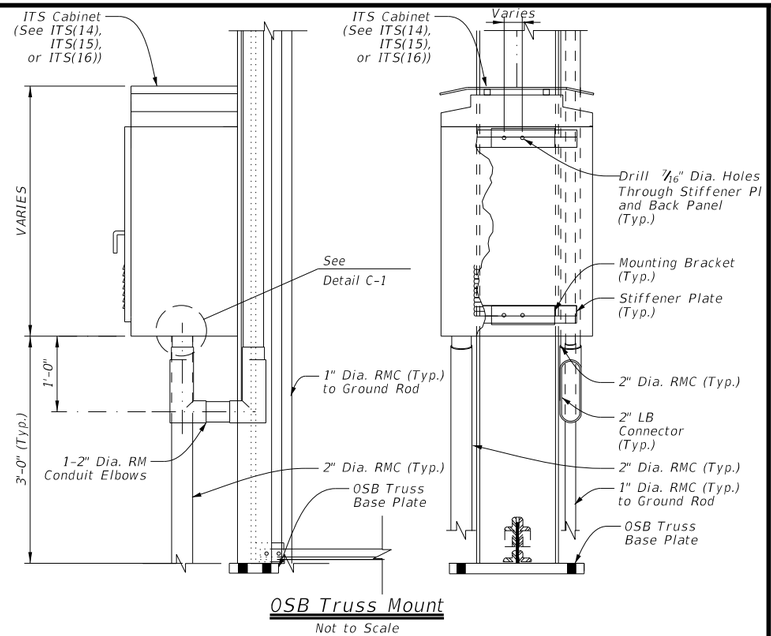


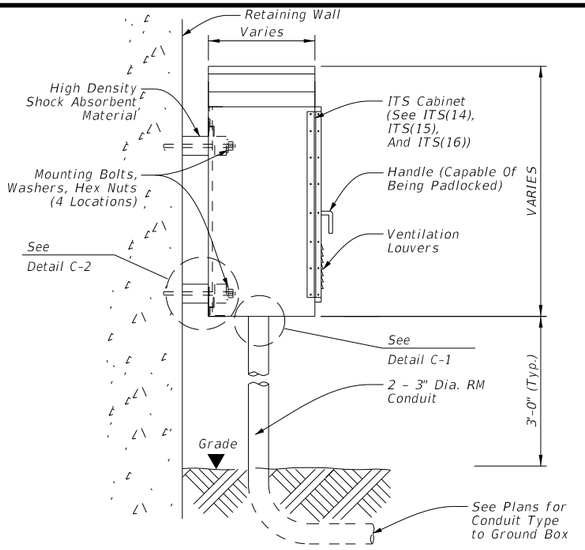
ITS Pole Mount

Not to Scale



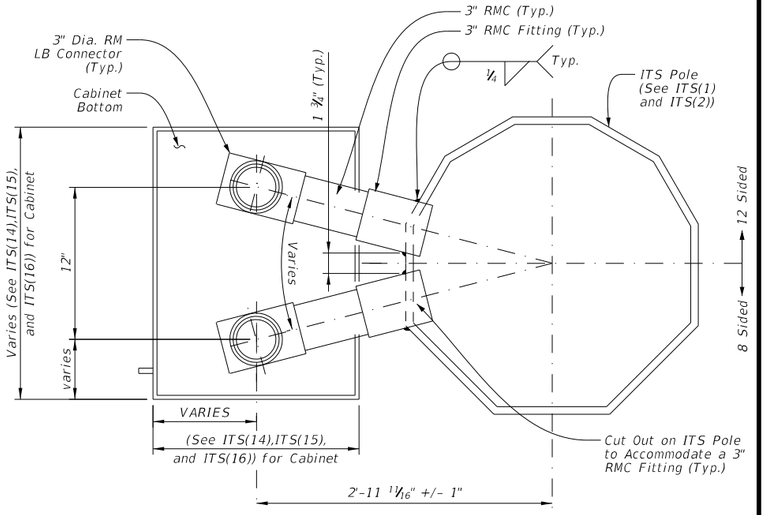
OSB Truss Mount

Not to Scale



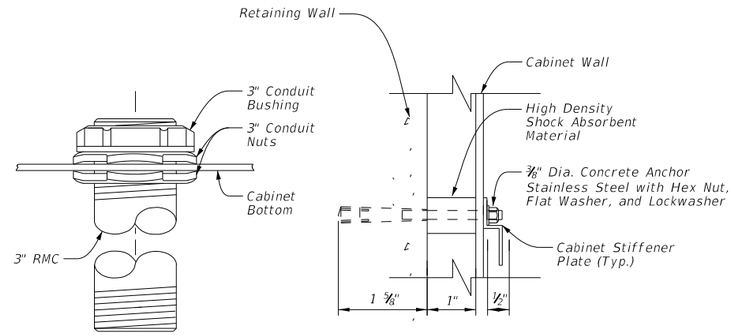
Retaining Wall Mount

Not to Scale



Section A-A

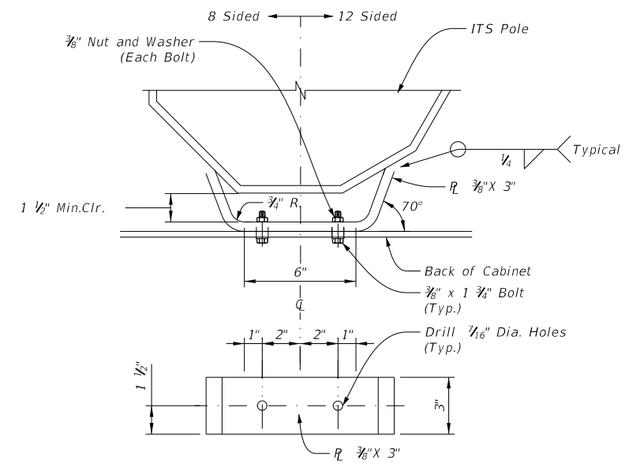
Not to Scale



Detail C-1

Detail C-2

Not to Scale



Note:
ITS Pole May be Round, Octagonal (8 Sided), or Dodecahedron (12 Sided).
See ITS(1), and ITS(2) for Details.

Mounting Bracket Detail

Not to Scale

General Notes:

1. Mount cabinet as detailed on ITS(14), ITS(15), ITS(16), or ITS(17). Orientation of cabinet on ITS pole may vary depending on field conditions. Mount the pole mounted cabinet to the backside of the ITS pole, to allow maintenance personnel to access the cabinet while being able to view oncoming traffic.
2. For ITS pole sites located on slopes greater than 4V:1H, mount the cabinet to the backside of the ITS pole as detailed on ITS(7). Mounting height to accommodate maintenance pad for easy access.
3. All dimensions are approximate and represent minimum dimensions.
4. Provide conduit entrances at the bottom of the cabinet.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE MOUNTED CABINET MISC. MOUNTING DETAILS

ITS(17)-15

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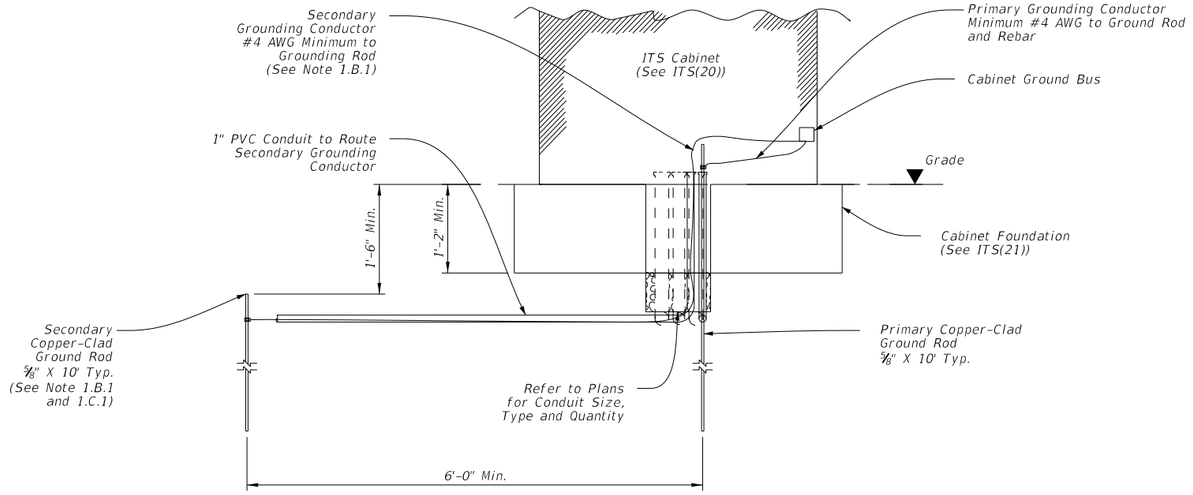
General Notes:

1. Grounding System:
   - A. Description:
     1. Provide ground system consisting of copper wires, ground rods, and concrete-encased grounding electrodes (Ufers), of the configuration shown to minimize potential gradient irregularities, drain leakage, and fault currents to earth.
   - B. Performance:
     1. Provide a grounding system, consisting of a minimum one ground rod, having a resistance not greater than 5 Ohms to ground. Additional ground rods may be added to the system to achieve less than 5 Ohms resistance.
   - C. Design Criteria:
     1. The combined ground resistance of separate systems bonded together below grade may be used to meet the specified ground resistance, but the minimum number of rods indicated shall still be provided.
     2. Measure the resistance of systems requiring separate ground resistance separately before bonding below grade.
     3. Only provide UL-approved materials listed for grounding systems.
     4. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture, unless moisture is permanently excluded from the junction of such materials.
     5. Submit product data for the materials and products used to perform the work of this section.
   - D. Materials:
     1. Conductors:
        - a. Bare Ground Conductor:
          1) For No. 8 AWG or larger bare ground wire sizes, provide soft drawn copper, Class A or Class B, stranded wire meeting the requirements of ASTM B 8.
     2. Ground Compression Connectors:
        - a. Provide molds, thermite packages, and other material for ground compression connectors that are full-rated to carry 100% of the cable rating and which meet IEEE 837.
          1) Provide the compression materials from a single manufacturer throughout the project.
        - b. Provide the items necessary for connecting cable to ground rods.
     3. Ground Rods:
        - a. Provide copper-clad steel ground rods conforming to the requirements specified in UL 467.
          1) Diameter: ⅝ in.
          2) Length: 10 Ft.

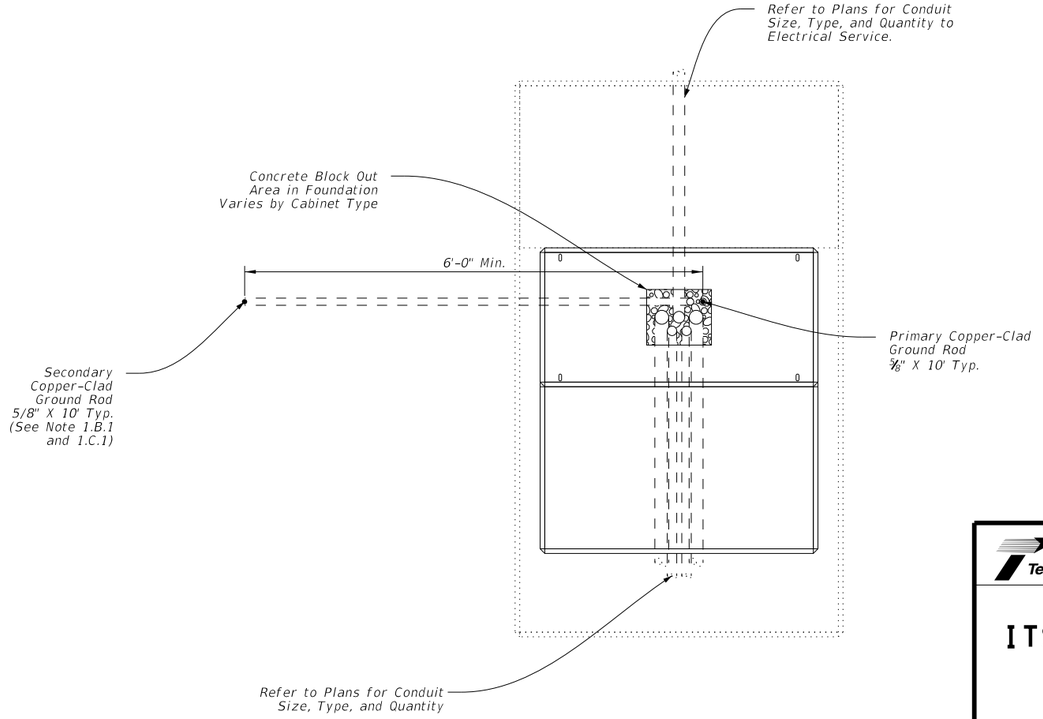
2. Installation:
   - A. Install grounding components and systems in accordance with the requirements specified in UL 467, IEEE 81, and IEEE 142.
   - B. System Grounding:
     1. Ground Rods:
        - a. Drive ground rods into the ground until the tops of the rods are approximately 18 in. below finished grade.
        - b. If multiple ground rods are needed to meet the minimum resistance of 5 Ohms, space ground rods as evenly as possible, at least 6 feet apart, and so conductors will be connected below grade.
     2. Conductors:
        - a. Provide minimum No. 4 AWG ground wire for system and equipment grounding.
        - b. Using suitable fasteners, securely attach exposed ground wires to structural supports at not more than 2 ft. intervals, where applicable.
        - c. Bends in ground wires greater than 45 degrees are unacceptable.
     3. Cable Connections:
        - a. Use approved exothermic-welded connections for conductor splices and connections between conductors and other components.

3. Testing:
   - A. Resistance Test:
     1. Test Procedure:
        - a. The ground-resistance measurements of each ground Rod shall be taken.
          1) The resistance to ground shall be measured in accordance with the fall-of-potential method specified in IEEE 81 and IEEE 142.
          2) Ground-resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with the ground under test isolated from other grounds.
        - b. Test reports shall be prepared that indicate the location of the ground rod, the grounding system, and the resistance and soil conditions at the time the test was performed.
     2. Acceptance Criteria:
        - a. The grounding system must have a resistance not greater than 5 Ohms.
        - b. Do not energize any part of the electrical distribution system prior to the resistance testing of that system's ground rods and grounding system, and submission of the test results for approval.
     3. Inspections:
        - a. Prepare and submit as-built record drawings of the grounding system as installed and test reports for approval.



Ground Mounted Cabinet - Side View

(Slab & Base)
Not to Scale



Ground Mounted Cabinet - Top View

(Slab & Base)
Not to Scale

Texas Department of Transportation

Traffic Operations Division Standard

ITS CABINET GROUNDING DETAILS

ITS(18)-15

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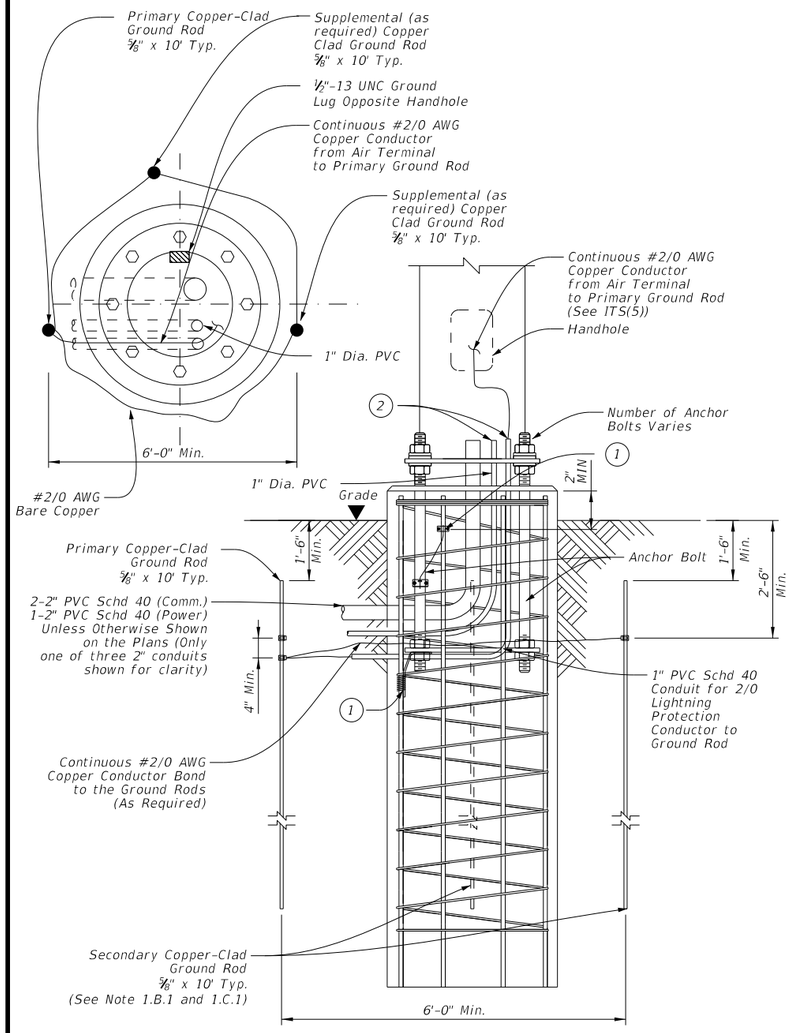
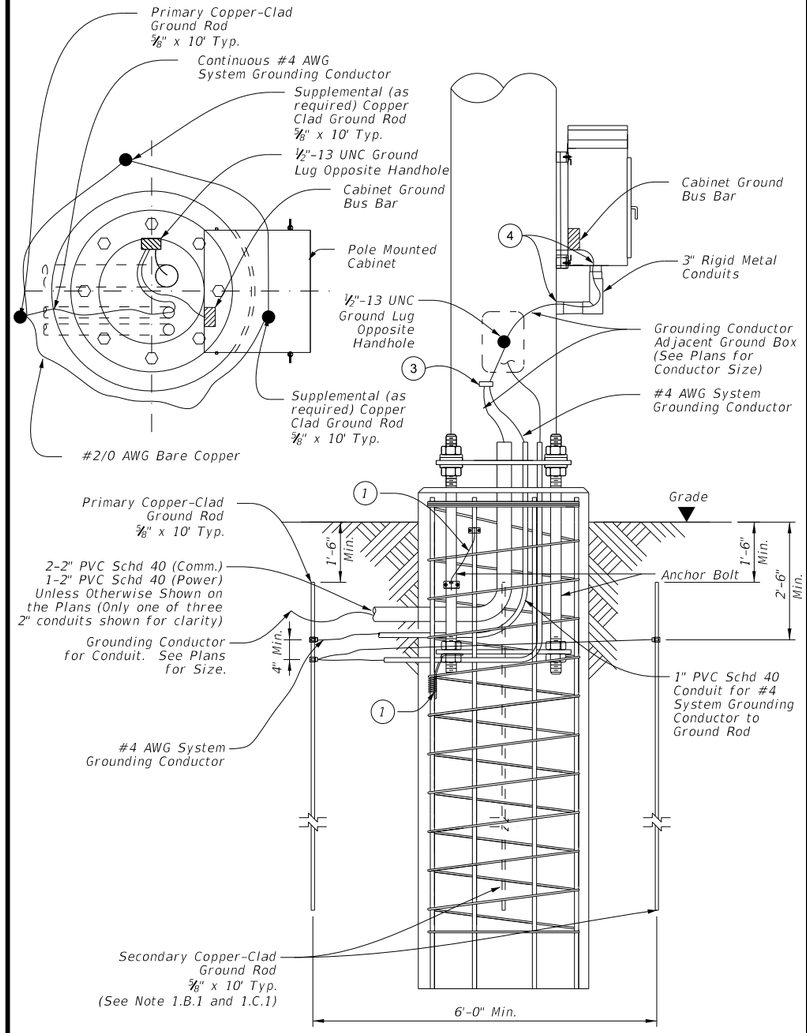
General Notes:

1. Grounding System:
   - A. Description:
     1. Provide ground system consisting of copper wires, ground rods, and concrete-encased grounding electrodes (Ufers), of the configuration shown to minimize potential gradient irregularities, drain leakage, and fault currents to earth.
   - B. Performance:
     1. Provide a grounding system, consisting of a minimum one ground rod, having a resistance not greater than 5 Ohms to ground. Provide up to 2 additional supplemental ground rods if necessary to achieve a resistance not greater than 5 Ohms to ground. If a total of 3 ground rods is needed then install as as part of a ground ring.
     2. If a ground ring is required, provide a minimum conductor length of 20 ft. placed at a minimum depth of 30 in..
   - C. Design Criteria:
     1. The grounding system of the ITS pole may be bonded below grade to the grounding systems of other nearby equipment to meet the specified grounding resistance. A minimum of one ground rod for the ITS pole is still required.
     2. Separately measure the grounding resistance of each system before bonding together below grade.
     3. Only provide UL-approved materials listed for grounding systems.
     4. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture, unless moisture is permanently excluded from the junction of such materials.
     5. Submit product data for the materials and products used to perform the work of this section.
   - D. Materials:
     1. Conductors:
        - a. Bare Ground Conductor:
          1) Provide prequalified copper conductors appearing on the Material Producers List according to Item 618.
     2. Ground Compression Connectors:
        - a. Provide molds, thermite packages, and other material for exothermic welding of grounding connections.
        - b. Provide listed compression connectors fully rated to carry 100% of the cable rating and that meet IEEE 837. Provide compression materials from a single manufacturer througout the project.
     3. Ground Rods:
        - a. Provide copper-clad steel ground rods conforming to the requirements specified in DMS 11040.
          1) Diameter: ⅝ in.
          2) Length: 10 ft.
2. Installation:
   - A. Install grounding components and systems in accordance with the requirements specified in IEEE 142.
   - B. System Grounding:
     1. Ground Rods:
        - a. Drive ground rods into the ground until the tops of the rods are a minimum of 18 in. below finished grade.
        - b. If multiple ground rods are needed to meet the minimum resistance of 5 Ohms, space ground rods as evenly as possible, at least 6 feet apart, so conductors will be connected below grade.
     2. Conductors:
        - a. Provide minimum No. 2/0 AWG ground wire for lightning protection from air terminal.
        - b. Provide minimum No. 4 AWG ground wire for system and equipment grounding.
        - c. Using suitable fasteners, securely attach exposed ground wires to structural supports at not more than 2 ft. intervals, where applicable.
        - d. Bends in ground wires greater than 45 degrees are unacceptable.
     3. Cable Connections:
        - a. Use exothermic-welded connections or listed compression connectors for conductor splices and connections between conductors and other components.
3. Testing:
   - A. Resistance Test:
     1. Test Procedure:
        - a. The ground-resistance measurements of each ground Rod shall be taken.
          1) The resistance to ground shall be measured in accordance with the fall-of-potential method specified in IEEE 81 and IEEE 142.
          2) Ground-resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with the ground under test isolated from other grounds.
        - b. Test reports shall be prepared that indicate the location of the ground rod, the grounding system, and the resistance and soil conditions at the time the test was performed.
     2. Acceptance Criteria:
        - a. The grounding system must have a resistance not greater than 5 Ohms.
        - b. Do not energize any part of the electrical distribution system prior to the resistance testing of that system's ground rods and grounding system, and submission of the test results for approval.
     3. Inspections:
        - a. Prepare and submit as-built record drawings of the grounding system as installed and test reports for approval.



Grounding System

Not to Scale



Grounding System with Pole Mounted Cabinet

Not to Scale

Reference Notes:

1. Bond anchor bolts to rebar with #2/0 AWG jumper and two mechanical connectors or by bending No. 3 bar on bottom template as shown and wire tightly with ten turns of No. 10 wire or one mechanical connector. Mechanical connectors shall be UL Listed for concrete encasement.
2. Cut PVC approximately 1 in. above concrete and install bell or bushing. Align conduit as close as possible to point of attachment to base plate to minimize bends in #2/0 wire.
3. Bond grounding conductors via cadweld or mechanical connector, rated for size and number of conductors.
4. Provide and install a grounding type bushing on 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.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE GROUNDING DETAILS

ITS(19)-17

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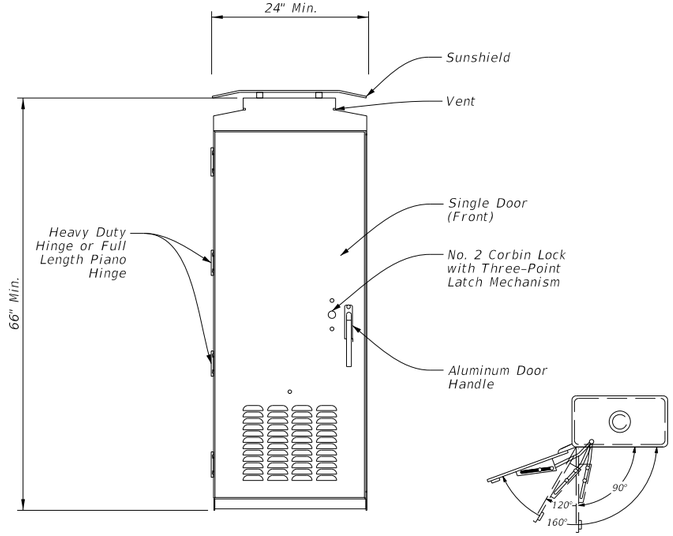
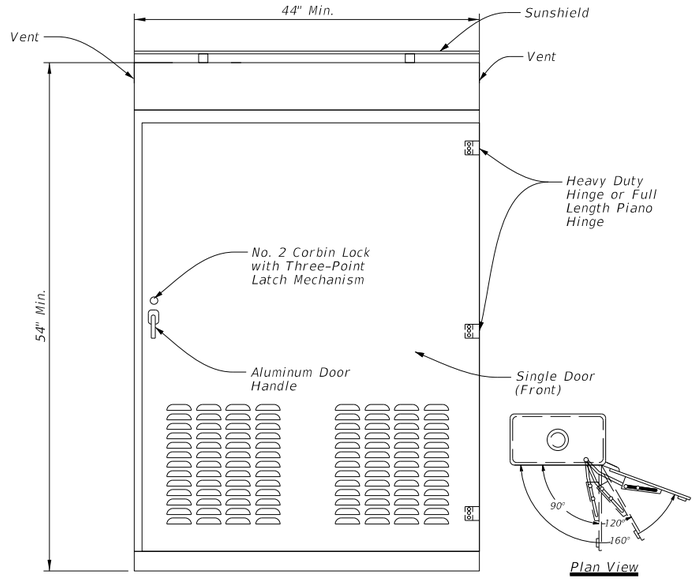


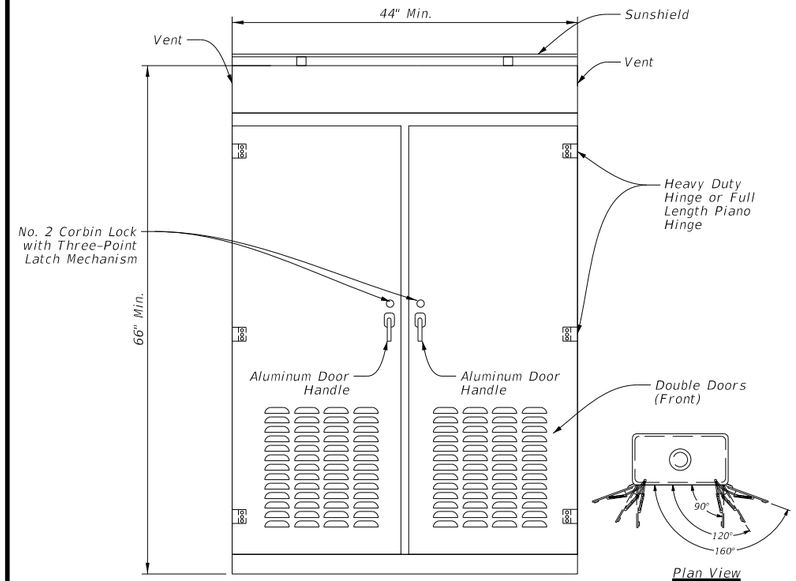
Plan View
Door Stop Detail
(3 Positions)

Type 4 (Small) Cabinet
Front View



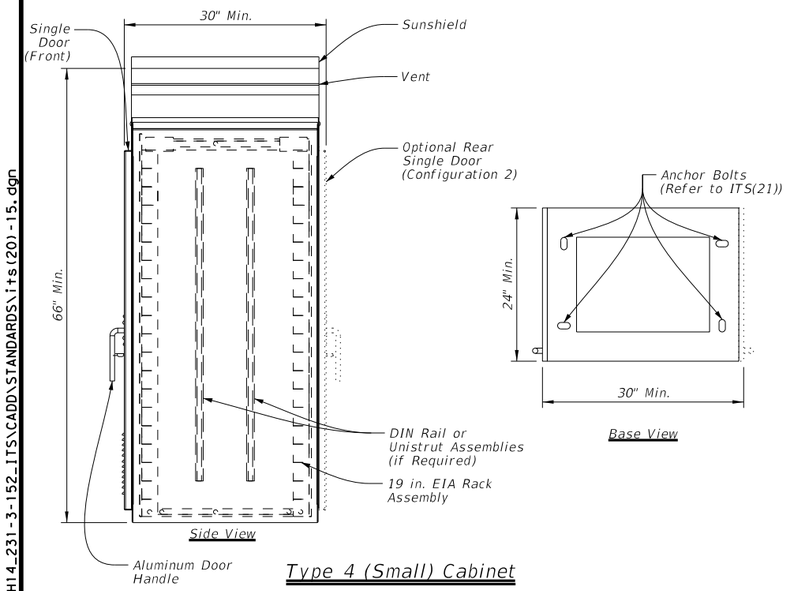
Plan View
Door Stop Detail
(3 Positions)

Type 5 (Medium) Cabinet
Front View



Plan View
Door Stop Detail
(3 Positions)

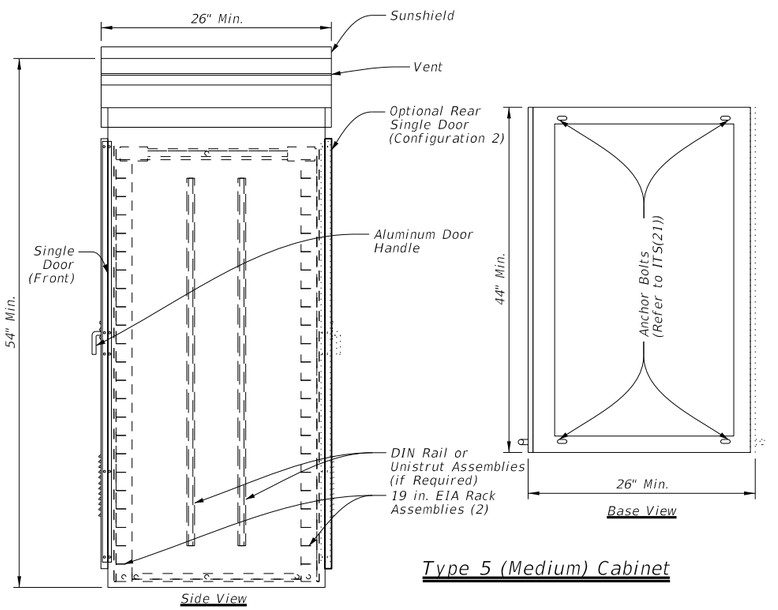
Type 6 (Large) Cabinet
Front View



Side View

Base View

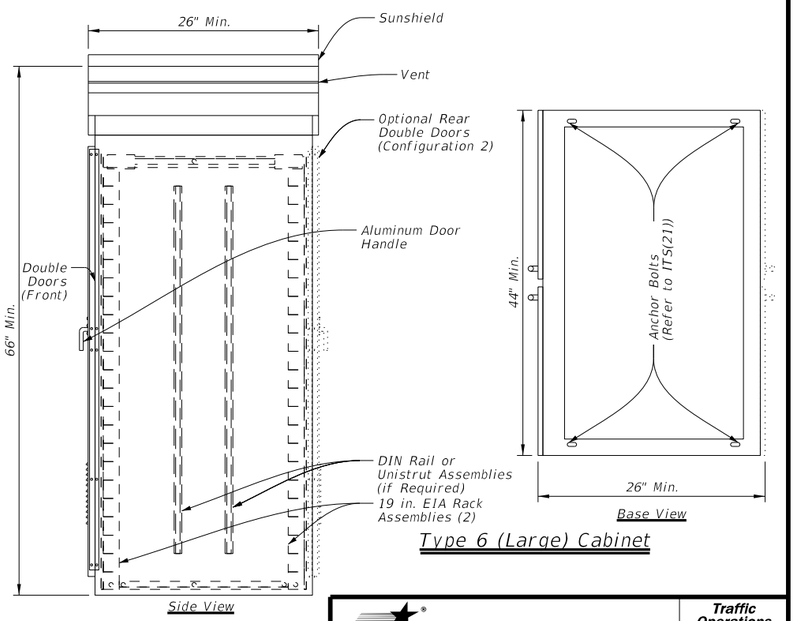
Type 4 (Small) Cabinet



Side View

Base View

Type 5 (Medium) Cabinet



Side View

Base View

Type 6 (Large) Cabinet

General Notes:

1. Cabinet hardware equipment and door configuration shown is diagrammatic in nature and intended to represent a preferred ground mounted cabinet setup. Door orientation may vary and will be noted in the plans. The contractor will be responsible for configuring cabinets with all appropriate ITS hardware and power supplies in accordance with the plans and specifications. The contractor may alter the cabinet configuration shown to maximize space and ensure easy access for maintenance.
2. All dimensions are approximate and represent minimum dimensions.
3. Provide conduit entrances at the bottom of the cabinet.
4. Paid under Special Specification "ITS Ground Mounted Cabinet" (Configuration 1) with single door. Paid under Special Specification "ITS Ground Mounted Cabinet" (Configuration 2) for rear door option.
5. Sunshield to be mounted to cabinet using nuts, bolts, and spacers. Water proof sealant to be used at cabinet surface/bolt contact points.

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND MOUNTED CABINET ELEVATION DETAILS

ITS(20)-15

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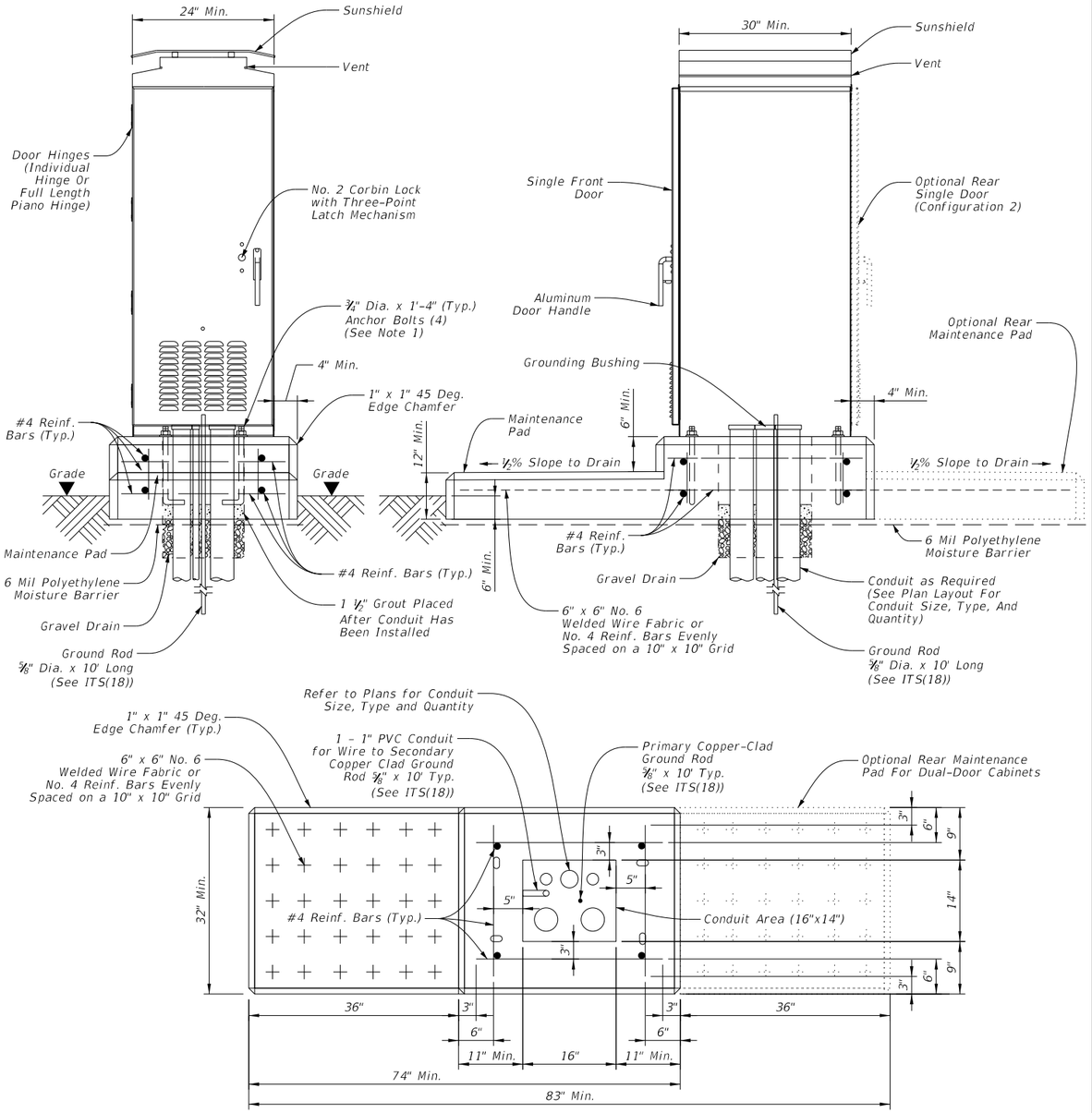
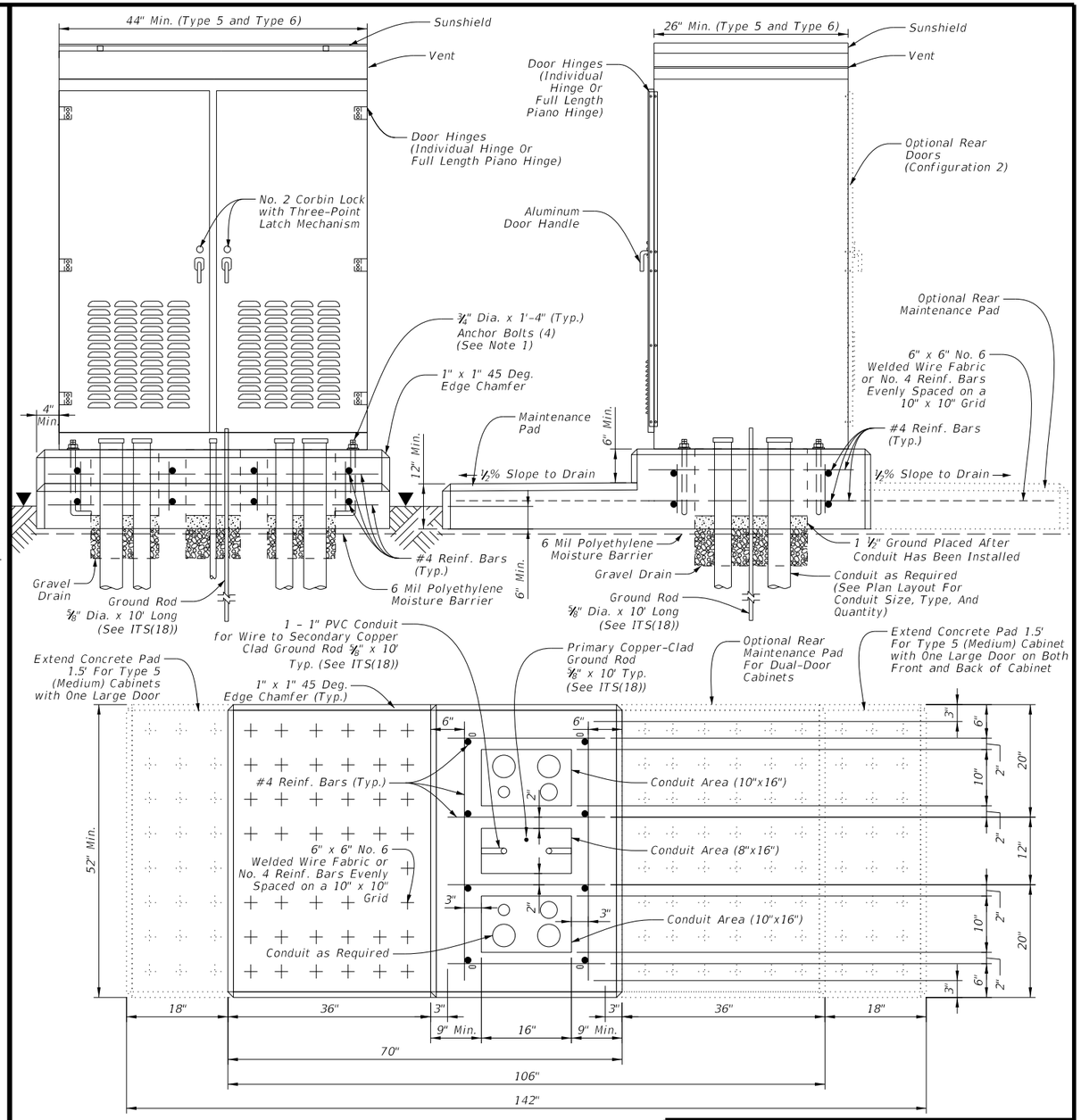


Type 4 (Small) Cabinet



Type 5 (Medium) & Type 6 (Large) Cabinet

General Notes:

1. Details of anchor bolt location to be furnished by the cabinet manufacturer. Size and length of anchor bolts shown in details may vary by manufacturer.
2. Modify concrete base dimensions to fit required cabinet type.
3. Ensure conduit area has gravel drain, 12" depth, course aggregate, grade No. 1.
4. All concrete to be Class "A" in accordance with Item 421.
5. Set the cabinet foundation level with the pavement surface, in unpaved area. The foundation shall be a minimum of 4" above surrounding grade, or as approved by the Engineer.
6. Furnish any additional concrete which may be necessary to stabilize foundation at unusual locations.
7. Foundation will be subsidiary to Special Specification "ITS Ground Mounted Cabinet.
8. Ground cabinet as required in cabinet specifications and as detailed on ITS(18) in accordance with the National Electric Code (NEC).
9. Treat cabinet foundation with moisture sealant.
10. Type 5 cabinet foundation will have a slightly larger foundation than Type 6. See foundation notes on details.
11. Drain pipe shall be screened for drainage portion below foundation in gravel.

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Traffic Operations Division Standard

ITS GROUND MOUNTED CABINET FOUNDATION DETAILS

ITS(21)-15

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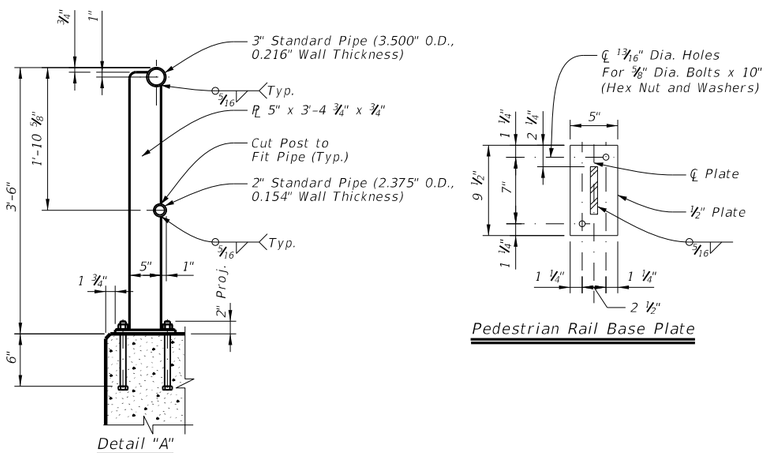
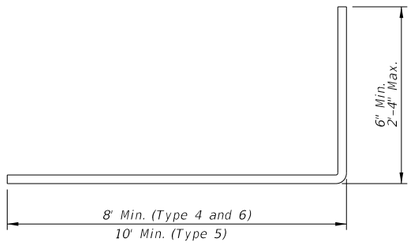
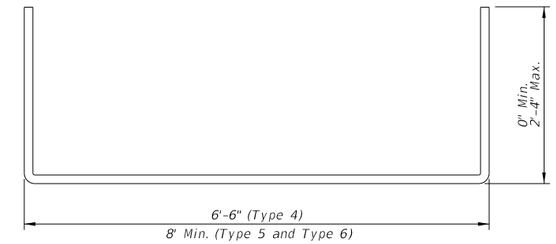


Detail "A"
Pedestrian Rail

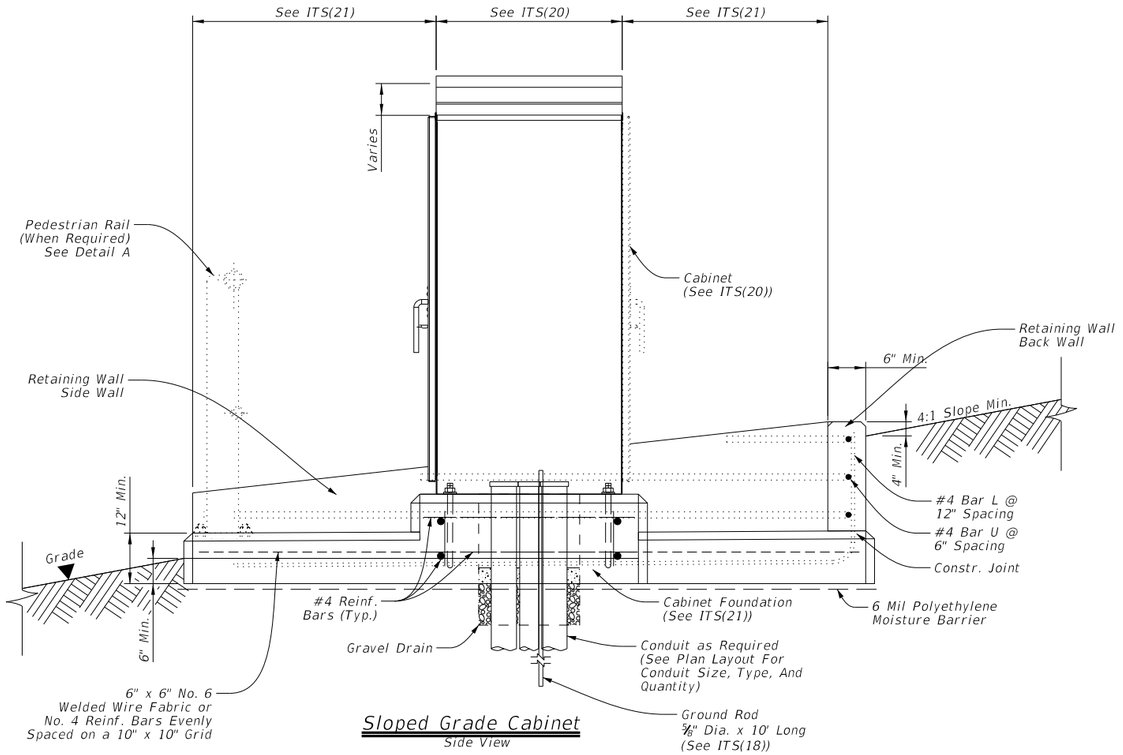
Pedestrian Rail Base Plate



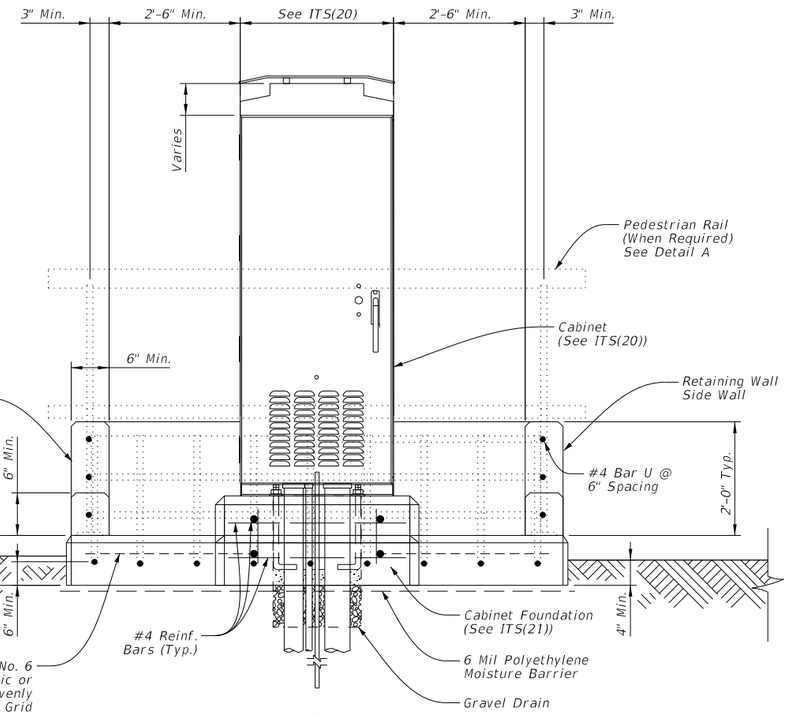
Reinforcement Bar L
#4 Bar @ 12" Spacing



Reinforcement Bar U
#4 Bar @ 6" Spacing



Sloped Grade Cabinet
Side View



Sloped Grade Cabinet
Front View

General Notes:

1. Details of anchor bolt location to be furnished by the cabinet manufacturer. See ITS(21) for size and type of anchor bolts. May vary by manufacturer.
2. Modify concrete base dimensions to fit required cabinet type.
3. Ensure conduit area has gravel drain, 12" depth, course aggregate, Grade No. 1.
4. All concrete to be Class "A" in accordance with Item 421.
5. Set the cabinet foundation level with the pavement surface, in unpaved area. The foundation shall be a minimum of 6" above surrounding grade, or as approved by the Engineer.
6. Furnish any additional concrete which may be necessary to stabilize foundation at unusual locations.
7. Foundation will be considered subsidiary to Special Specification "ITS Ground Mounted Cabinet."
8. Ground cabinet as required in cabinet specifications and as per National Electric Code (NEC).
9. Treat cabinet foundation with moisture sealant.
10. Type 5 cabinet foundation will have a slightly larger foundation than Type 6. See foundation notes on details.
11. Drain pipe shall be screened for drainage portion below foundation in gravel.
12. Pipe for pipe rail must conform to ASTM A53 GR B, or A500 GR B. Posts and plates must be ASTM A36. All steel components to be galvanized unless otherwise shown in plans.
13. Pedestrian rail anchor bolts must be 5/8" diameter ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Threaded rods may be 0.557" minimum diameter with rolled threads. Nuts must conform to A563 requirements.
14. Exposed edges of pipe rail and pipe rail posts must be rounded or chamfered to approximately 1/16" by grinding. Provide an end cap at either end of pipe railing.
15. Welded wire mesh not required in maintenance pad area when retaining wall rebar is integrated into maintenance pad.

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND MOUNTED CABINET FOUNDATION ON SLOPE DETAILS

ITS(22)-15

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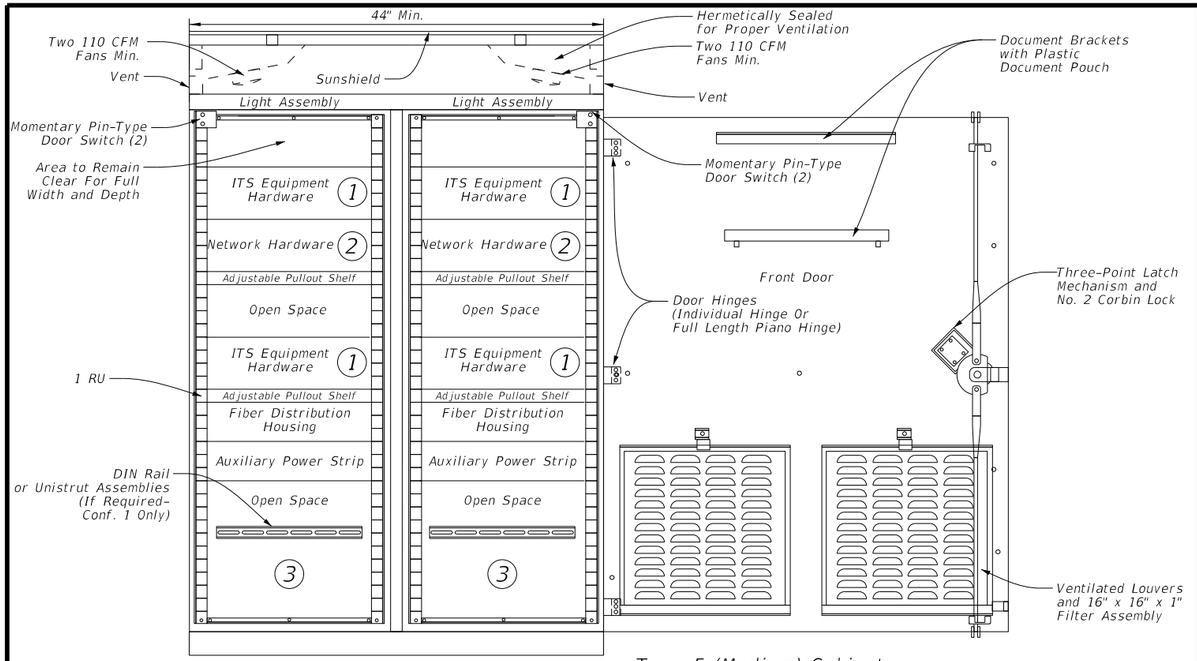
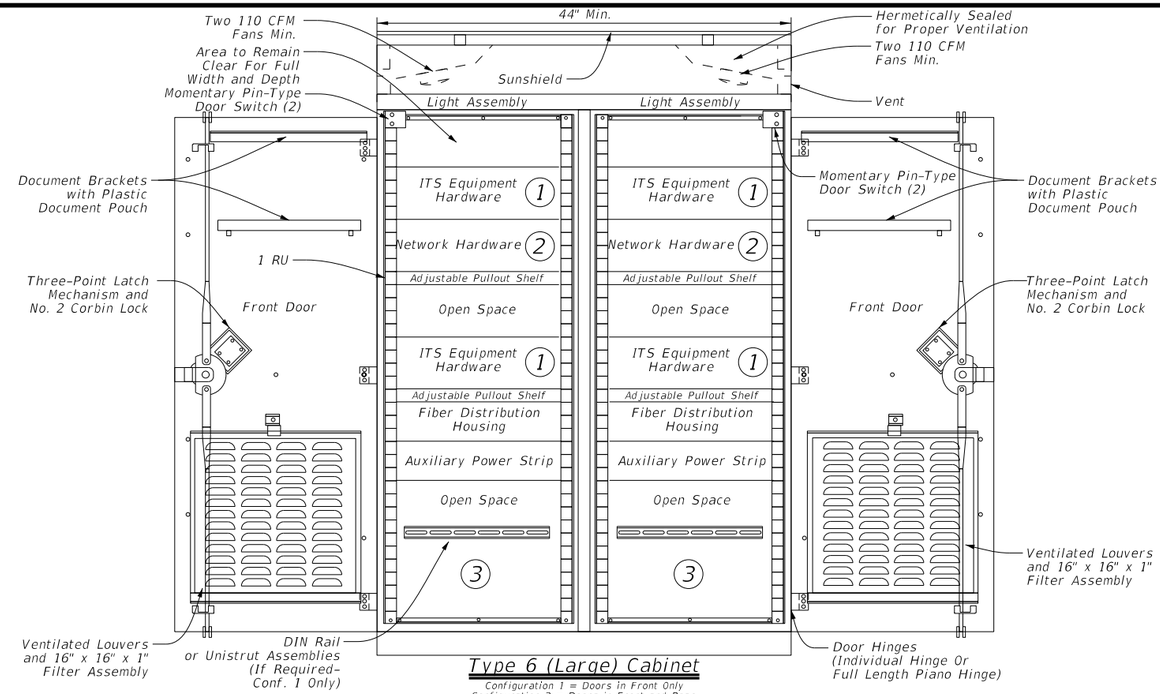


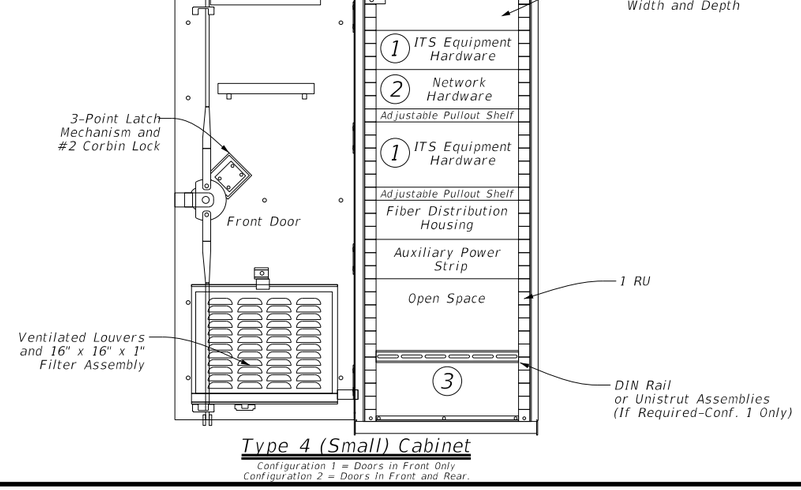
Type 5 (Medium) Cabinet

Configuration 1 = Doors in Front Only
Configuration 2 = Doors in Front and Rear.



Type 6 (Large) Cabinet

Configuration 1 = Doors in Front Only
Configuration 2 = Doors in Front and Rear.



Type 4 (Small) Cabinet

Configuration 1 = Doors in Front Only
Configuration 2 = Doors In Front and Rear.

Typical Equipment Layout Legend

	Example Equipment
1	CCTV Interface Panel, Radar Vehicle Sensing Device (RVSD) Equipment, DMS/LCS Controller Environmental Sensor Station (ESS) Equipment, Bluetooth Equipment, Highway Advisory Radio (HAR), Ramp Meter or Inductive Loop Card Rack, Automatic Vehicle Identification (AVI) Equipment, or ITS Radio Equipment (See General Note 1)
2	Ethernet Switch, Video Encoder, Terminal Server, Fiber Optic Transceivers, or Media Conversion Equipment (See General Note 1)
3	Power Distribution Assembly, Service Entrance Breakers, Primary AC Power, Auxiliary Power Strip, Ground Bus Bar Surge Protection Equipment, Solar Power System (If Required)

General Notes:

1. Layout of hardware equipment and configuration shown is diagrammatic in nature and intended to represent a preferred ground mounted cabinet setup. Hardware needed for each cabinet varies and not all cabinet equipment may be shown. The contractor will be responsible for configuring cabinets with all appropriate ITS hardware and power supplies in accordance with the plans and specifications. The contractor may alter the cabinet configuration shown to maximize space and ensure easy access for maintenance.
2. All dimensions are approximate and represent minimum dimensions.
3. Provide conduit entrances at the bottom of the cabinet.
4. Paid under Special Specification "ITS Ground Mounted Cabinet" (Configuration 1) with single door. Paid under Special Specification "ITS Ground Mounted Cabinet" (Configuration 2) for rear door option.
5. RU = rack unit.
6. Contractor to remove the cabinet removable center support, which ensures cabinet rigidity during shipping, during installation.

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND MOUNTED CABINET INTERIOR DETAILS

ITS(23)-15

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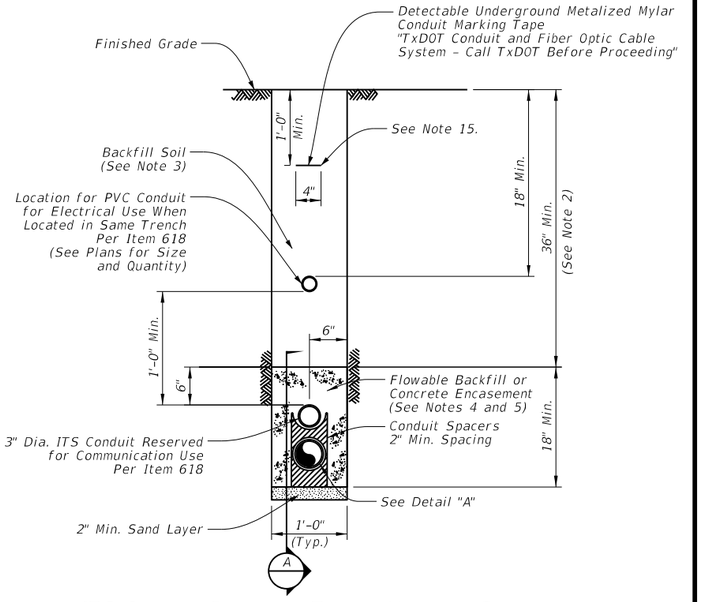
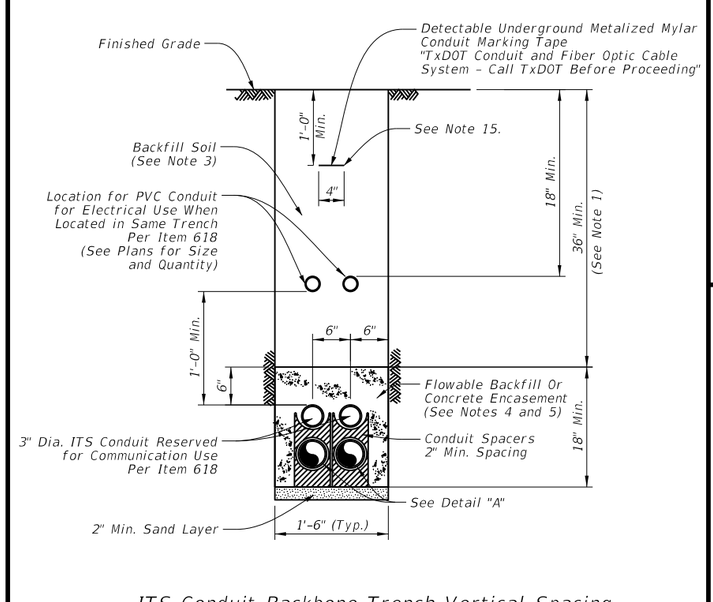


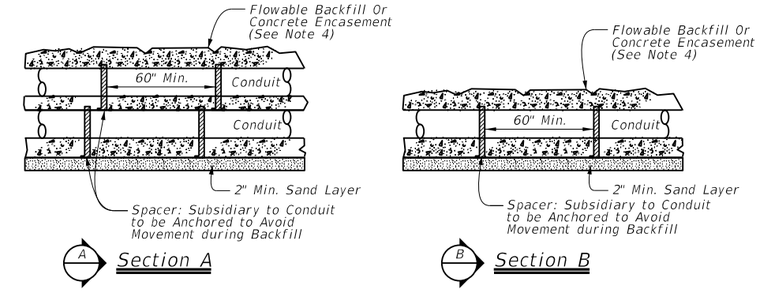
ITS Conduit Backbone Trench Vertical Spacing

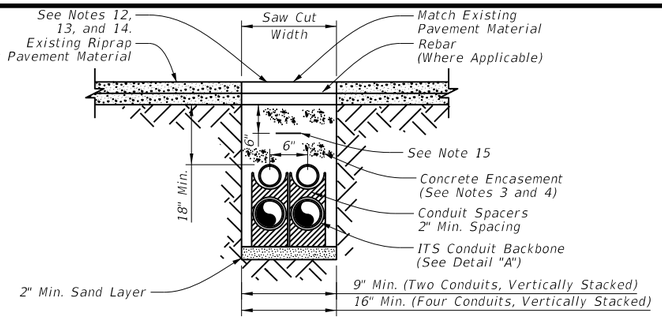
Two Conduit System



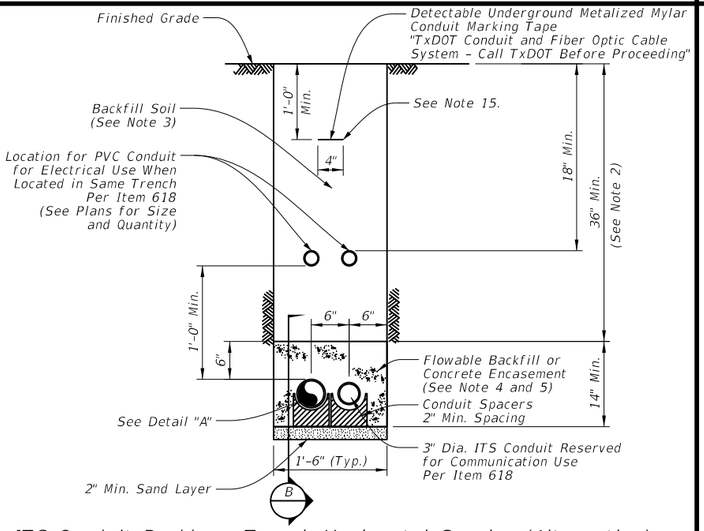
ITS Conduit Backbone Trench Vertical Spacing

Four Conduit System



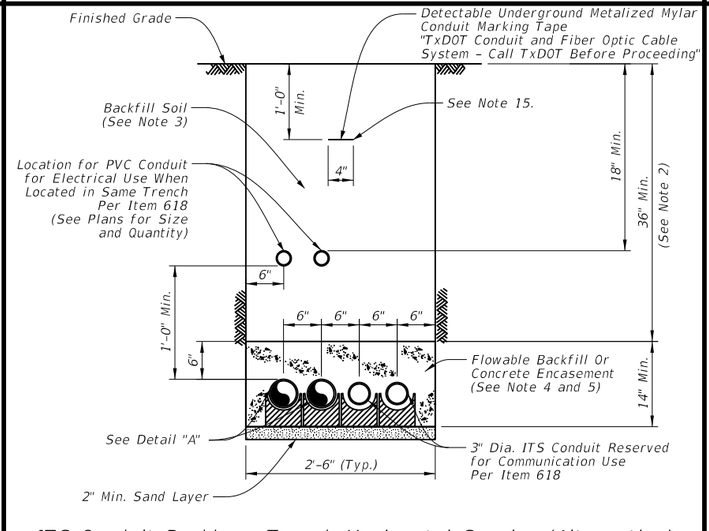


Open Cut Trenching Details



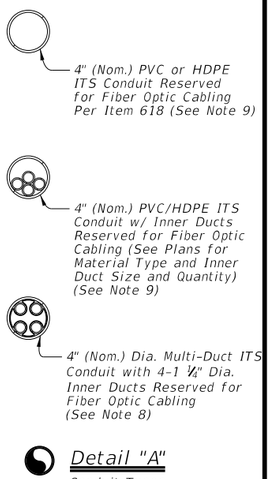
ITS Conduit Backbone Trench Horizontal Spacing (Alternative)

Two Conduit System



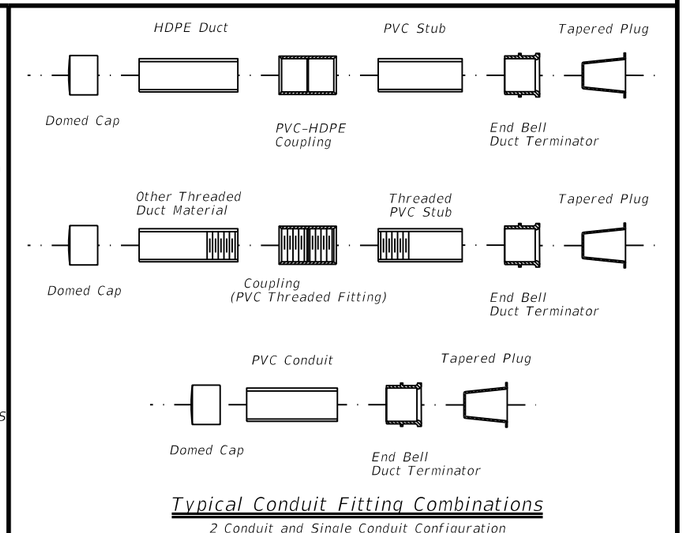
ITS Conduit Backbone Trench Horizontal Spacing (Alternative)

Four Conduit System



Detail "A"

Conduit Types
(See Plans for Type and Quantity)



Typical Conduit Fitting Combinations

2 Conduit and Single Conduit Configuration

SHEET 1 OF 2

General Notes:

1. Construct the ITS conduit backbone system by vertically spacing conduit, unless field constraints, obstructions, or utility conflicts require horizontal spacing of conduits. Both vertical and horizontal spacing configurations have been detailed for contractor information for construction.
2. Install ITS conduit backbone system a minimum of 42 inches from finished grade to the top of the conduit unless otherwise directed or to avoid conflicts or field conditions such as utilities or obstructions. Vary depth of the trench in order to pass over/under any existing utilities. Refer to ITS Conduit Obstruction Crossing Standard ITS(35) for further detail.
3. Perform trench excavation and backfilling in accordance with Item 400, "Excavation and Backfill for Structures."
4. When a trench depth greater than 24 inches can be achieved from the finished grade to the top of ITS conduit, encase the conduits with flowable backfill in accordance with Item 401, "Flowable Backfill." Use Class B concrete as a substitute in accordance with Item 421, "Hydraulic Cement Concrete" at the discretion of the Engineer.
5. When a trench depth of less than 24 inches is required due to field conditions, encase the conduits in Class B concrete in accordance with Item 421, "Hydraulic Cement Concrete."
6. Concrete encasement will be paid for under Special Specification "ITS Multi-Duct Conduit" or as shown on the plans.
7. Provide ITS PVC conduit identified for electrical and communication use in accordance with Item 618, "Conduit."
8. Provide ITS multi-duct conduit identified for fiber optic communication use in accordance with Special Specification "ITS Multi-Duct Conduit."
9. Conduit per Item 618, "Conduit" (See Plans for Material Type and Quantity).
10. Provide a single 1/C #14 insulated wire in conduit runs which have been identified in the plans to carry fiber optic cable. Provide UL listed solid copper wire with orange color low density polyethylene insulation suitable for conduit installation rated for temperature range -20 C to 60 C and a voltage rating of 600V. This wire will serve as a tracer, or locate, wire for locating underground conduit containing fiber optic cabling and will be paid for under Item 620, "Electrical Conductors."
11. Provide a flat pull cord in all empty conduits and innerducts. Provide a pull cord with a tensile strength of 1,250 Lbs. minimum and have foot markings to determine length installed. Pull cord and installation to be subsidiary to various bid items.
12. Remove saw cut width to accommodate conduit installation.
13. Replace rebar as necessary, lapped and tied a minimum of 3 inches to existing rebar.
14. Replace broken pavement materials with similar materials to exact shape, and thickness of existing.
15. Place marking tape a minimum of 1 foot – 0 inches below grade when no other electrical marking tape required, or 8 inches below electrical marking tape when provisioned under Item 618.
16. Provide a 1/C #8 insulated grounding conductor within one inner duct of a pre-assembled multi-duct when no other grounding conductor is provisioned for in the plans.

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Texas Department of Transportation

Traffic Operations Division Standard

ITS CONDUIT TRENCH DETAILS

ITS(27)-16

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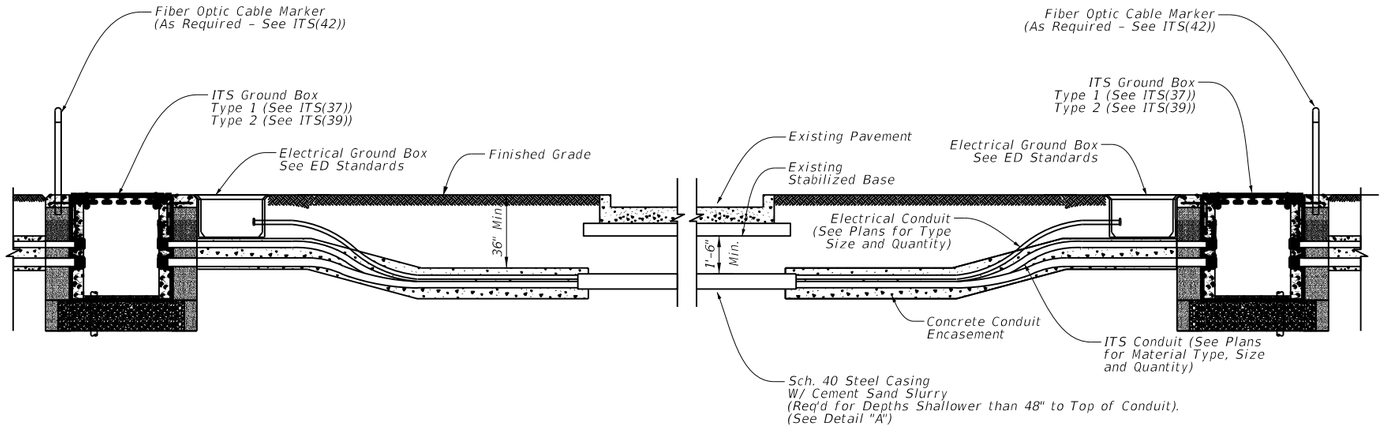
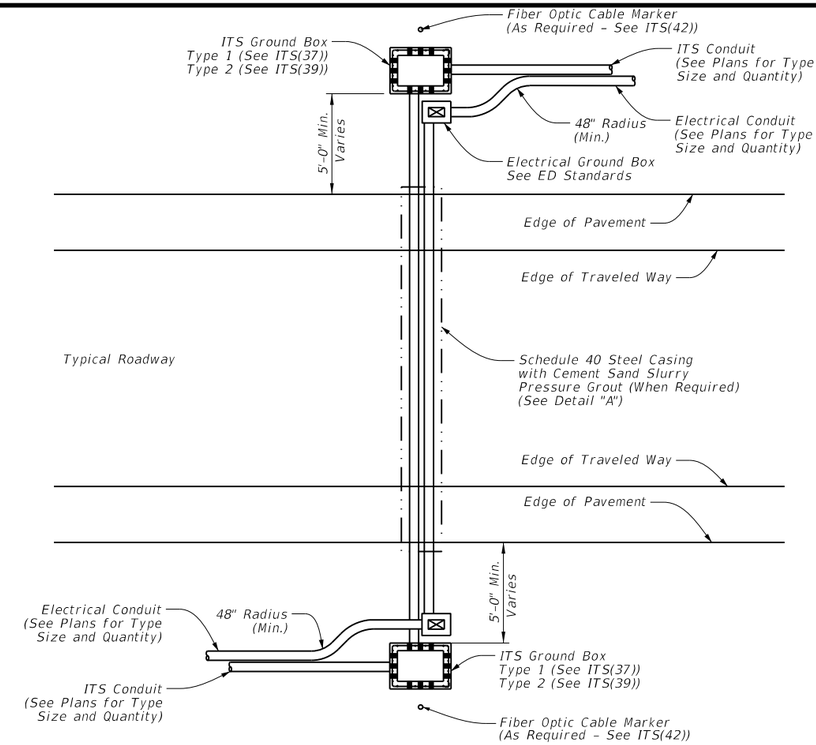
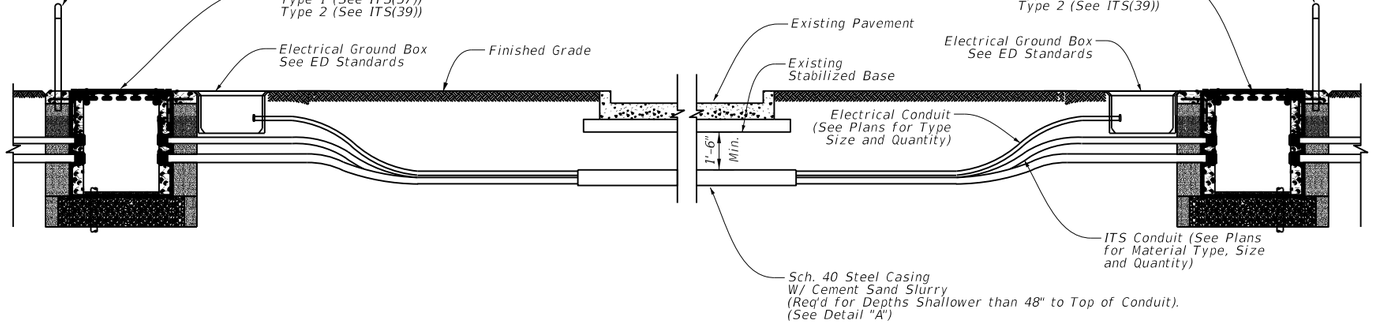


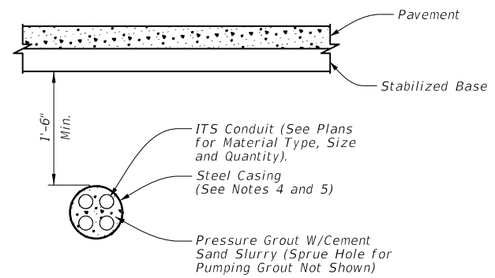
Typical Conduit Installation Jacking
or Boring Beneath Existing Roadway



Bore Under Pavement



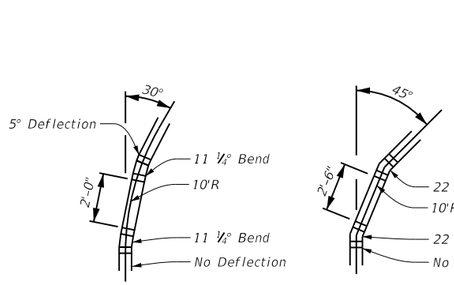
Typical Conduit Installation Jacking
or Boring Beneath Existing Roadway
(Where Concrete Encasement Not Required)



Steel Casing Detail "A"

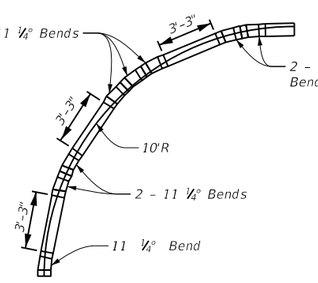
General Notes:

1. Typical conduit installation details for jacking or boring beneath existing roadway is diagrammatic in nature. Roadway cross-slopes may vary for each crossing.
2. Jack or bore in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box" except for measurement and payment.
3. Furnishing and installation of pressure grouting will not be paid for directly but considered incidental to Special Specification "ITS Multi-Duct Conduit" or Item 618, "Conduit."
4. When boring under pavement shallower than 48 inches from finished grade to top of conduit, provide Schedule 40 steel casing under pavement to encase the conduit system. Provide steel casing of a size to accommodate ITS conduit and electrical conduit as shown in the plans. Provide a minimum 20 percent void space around all conduits. Steel casing will not be paid for directly but considered incidental to Special Specification, "ITS Multi-Duct Conduit" or Item 618, "Conduit."
5. When a depth greater than 48 inches can be achieved from finished grade to top of conduit, provide Schedule 80 PVC. No steel casing required unless otherwise directed.
6. Ensure all conduit bends are in conformance with the latest edition of the National Electrical Code.
7. Provide GPS coordinate points to the District for all ground boxes installed, and shifts or deviations of the conduit alignment from the plans required to avoid obstructions or utilities. Take GPS coordinate points at the start of the transition, at the point of curvature, and at the end of the transition at the point of tangency. Document the turnout radius and installed depth. Provide GPS coordinate points in NAD83 coordinate system and be accurate to 5 feet.



30° Turnout Detail

45° Turnout Detail



90° Turnout Detail

Provide this arrangement of conduit and fittings or approved equal at all 30°, 45°, and 90° bends, horizontal and vertical, to achieve a nominal 10' conduit radius for pre-assembled multi-duct conduit. See Note 7.

Sheet Details
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SHEET 2 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

ITS CONDUIT BORE AND STEEL CASING DETAILS

ITS(28)-16

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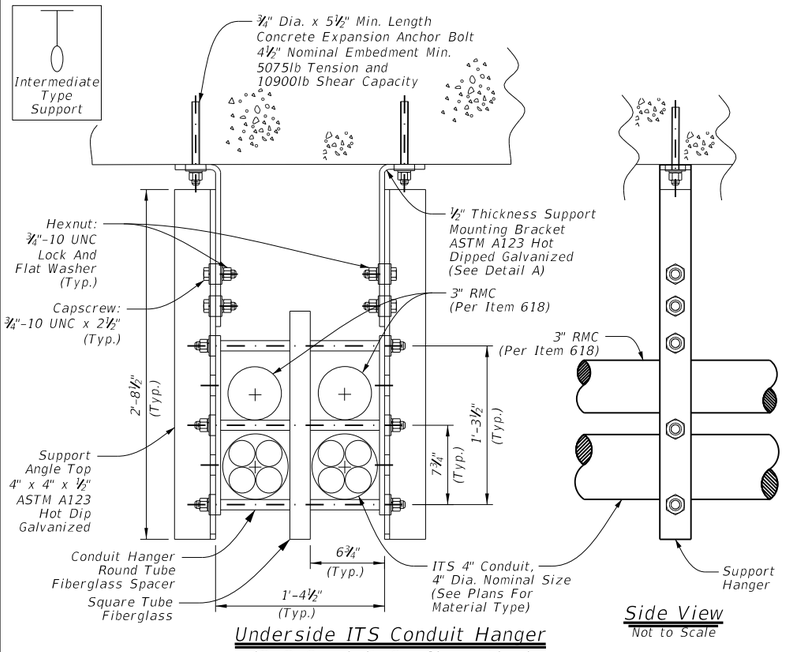
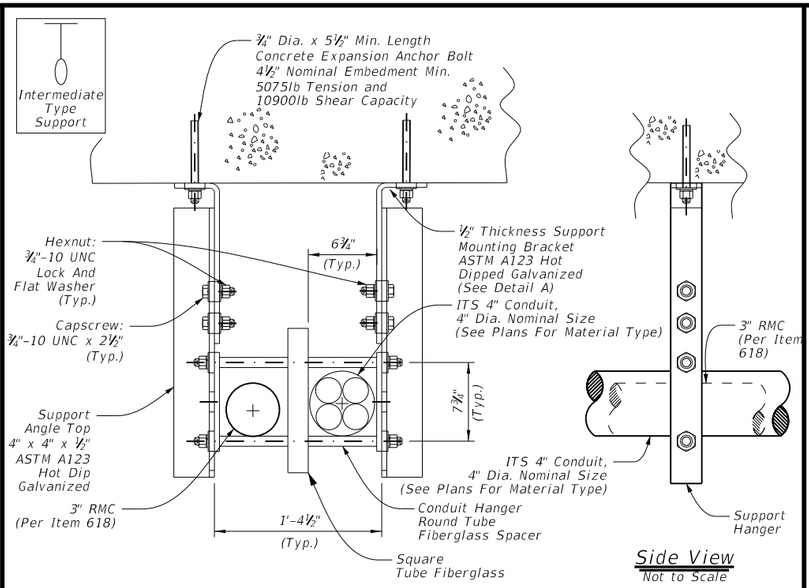
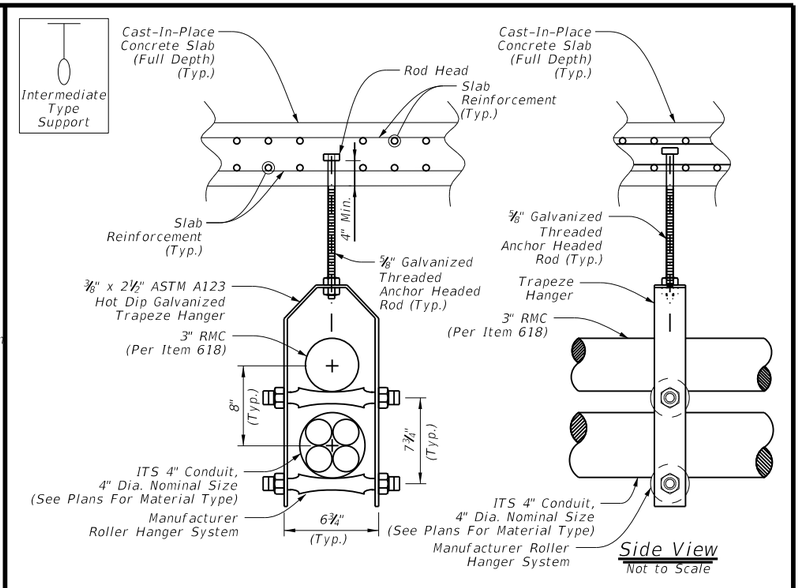


Underside ITS Conduit Hanger (2x2 Conduit Configuration)



Underside ITS Conduit Hanger (2x1 Conduit Configuration)



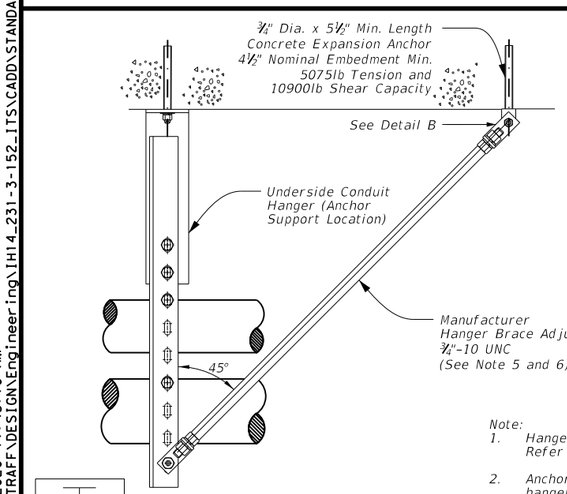
Underside ITS Conduit Roller Hanger For New Construction (1x2 Conduit Configuration)

Underside ITS Conduit Hanger Spacer - Top View (Typ.)

Detail A Support Mounting Bracket Detail

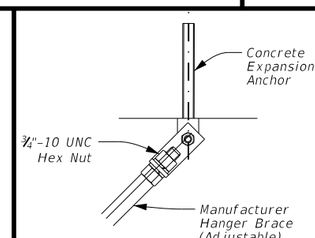
General Notes:

1. Use commercially designed multiple conduit support hangers as an alternative to the hanger details on this sheet. Submit hanger details and specifications to the Engineer for approval prior to using on project.
2. Refer to the contract plans for conduit design and hanger configuration requirements. For two (2) conduit configurations, use the typical underside hanger or roller hanger system.
3. Maximum spacing of intermediate conduit hangers is 5'-0" C-C.
4. Hangers vary in length, but do not allow conduit to hang below bridge beams. Refer to ITS(30) for minimum clearance requirement below bridge deck.
5. Ensure all conduit hanger steel shapes conform to ASTM A36 and expansion anchors conform to ASTM A307 and are supplied with minimum of one nut and washer per bolt. Galvanize all steel plate, shapes, and hardware per Item 445, "Galvanizing".
6. Use angle bracing on both sides of conduit support for conduit anchor point hangers.
7. Refer to ITS(32) for expansion-deflection joint details.
8. Provide a minimum of two (2) expansion joints at all bridges. Ensure expansion joint spacing does not exceed manufacturer recommendations.
9. Select conduit lengths so that couplings do not coincide with conduit hanger locations.
10. Allowable types of outer duct material for above ground ITS conduit include rigid metallic conduit (RMC) and fiberglass.
11. Ground all galvanized rigid metallic conduit (RMC) hangers per manufacturer recommendations when electrical conductors present.
12. Refer to ITS(30) for anchor details through pre-stressed concrete panels.
13. Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).

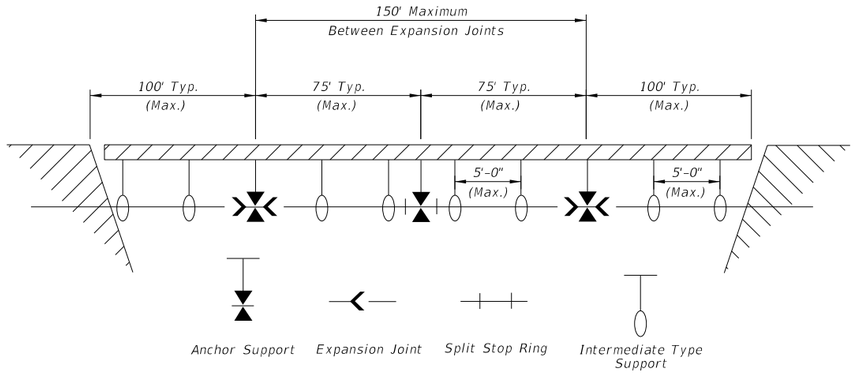


Note:
1. Hanger support shown is a typical configuration. Refer to General Note 1 on this sheet.
2. Anchor supports are required for all conduit hanger configurations.

Underside ITS Conduit Anchor Hanger Support (Typ.)



Detail B Brace Mounting Bracket Detail



Notes:
1. Install conduit supports within 3'-0" of all enclosures and conduit terminations.
2. The number of intermediate supports varies based upon the distance between anchor supports.

Underside Anchor Hanger Support Spacing (Typ.) *

* Refer To BICSI Outside Plant Design Reference Manual (OSPDRM) For Conduit Hanger Expansion Joint Placement

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ITS CONDUIT HANGER DETAILS

ITS(29)-16

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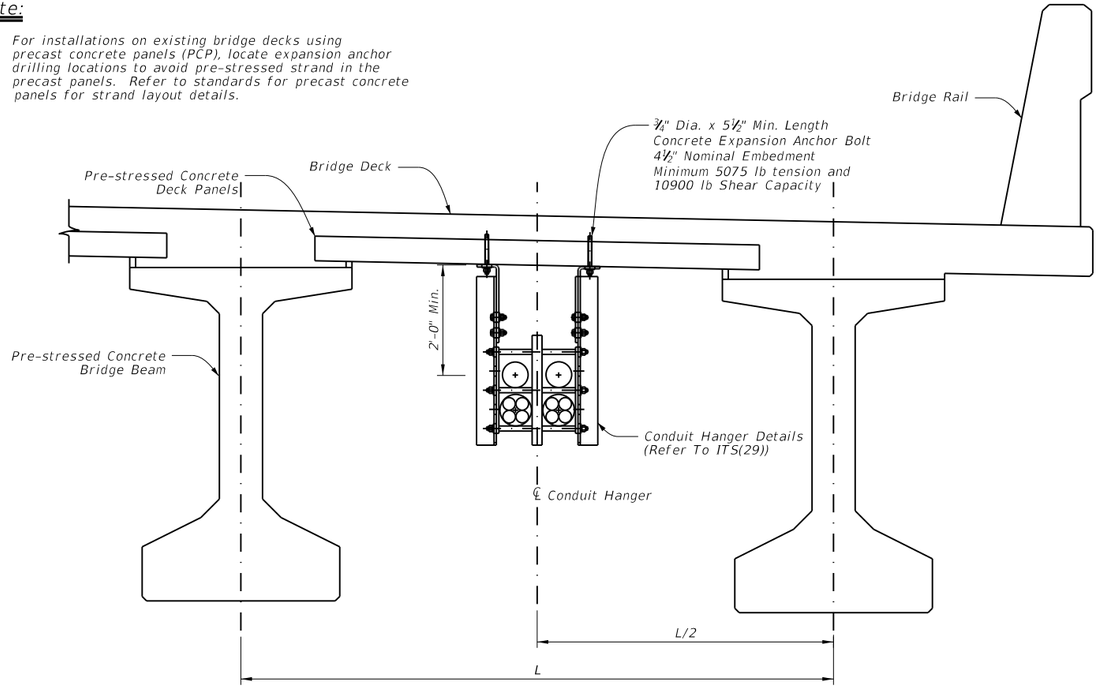
Note:

1. For installations on existing bridge decks using precast concrete panels (PCP), locate expansion anchor drilling locations to avoid pre-stressed strand in the precast panels. Refer to standards for precast concrete panels for strand layout details.

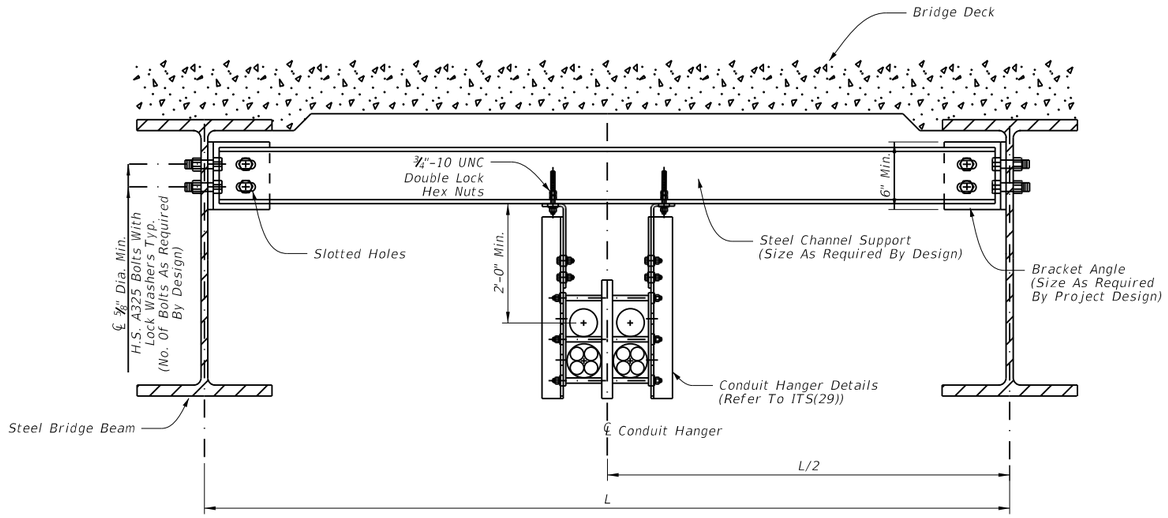


Structure Mounted ITS Conduit – Concrete Bridge Deck With Precast Panels

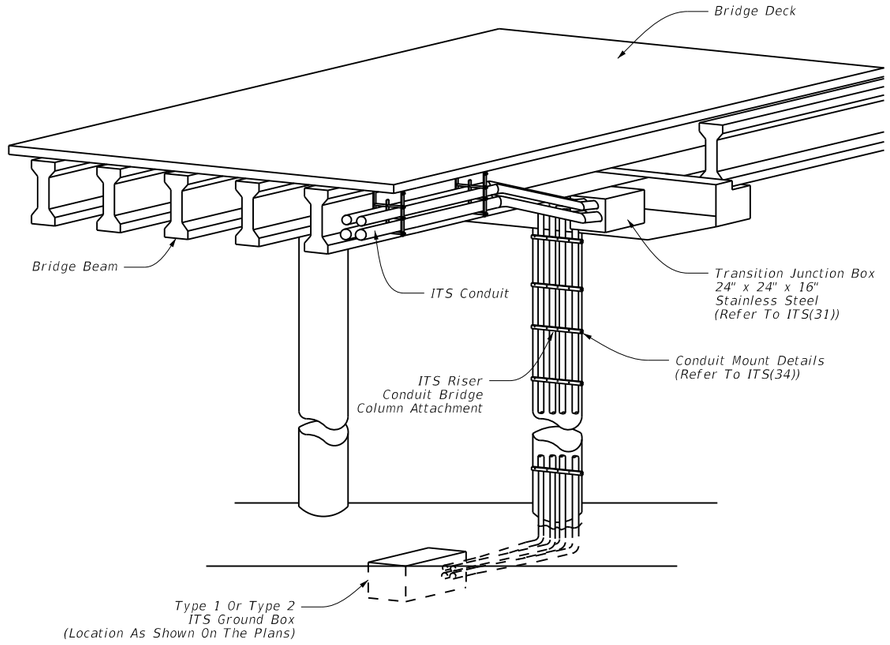
Refer To ITS(29) For General Notes

Note:

1. Position conduit hanger height to avoid conflicts with diaphragms in the conduit runs.



Typical Alternate Conduit Hanger Support (Steel I-Beam Mount)



Underside Conduit Hanger Transition Detail

General Notes:

1. The alternative mounting conduit hanger support mounting detail for steel I-Beam structures as shown is a suggested detail for steel structures. Submit details for the configuration shown on this sheet via shop drawings and include structural load analysis, support member and connection design. Seal all calculations and shop drawings by a Texas P.E.
2. Conduit hanger support mounting details for concrete bridge deck with precast panels as shown are a suggested method for pre-stressed concrete beam structures. Submit any deviation from these details via shop drawing and include structural load analysis, support member, and connection design. Seal all calculations and shop drawings by a Texas P.E.
3. Locate auxiliary conduit hanger supports for steel structures at a maximum 5'-0" spacing.
4. For conduit loads located between beams exceeding 5 lbs per ft, furnish structural load analysis calculations for adjacent beams in the shop drawing submission.
5. Submit design details for structure with cathodic protection in the shop drawing submission.
6. Do not extend conduit hangers below the bottom of the bridge beams (any exceptions at end spans are subject to approval).
7. Drilling in pre-stressed beams or field welding of steel beams is not permitted. Submit any exceptions on a case by case basis for evaluation and approval by the Engineer.
8. Ensure all conduit hanger assemblies are furnished and supplied by the conduit hanger manufacturer.
9. Galvanize all hardware and structural steel that is not stainless steel. Ensure all bolt hardware used to secure hangers to steel structures conforms to A325 for high strength. Ensure all expansion anchors conform to ASTM A307. Separate dissimilar materials for use of galvanized hardware with weathering steel girders.
10. Select conduit lengths so that couplings do no coincide with conduit hanger locations.
11. Refer to Special Specification, "ITS Multi-Duct Conduit" or Item 618 "Conduit", for details on conduit mandreling and other testing required upon conduit installation.
12. Provide a flat pull cord in each conduit and inner duct to allow for installation of future cables to match 1250 lbs-ft tension. Refer to ITS(27) for additional conduit details.
13. Provide a transition junction box for conduit access located outside the abutments for bridge spans < 800 ft. For bridge spans > 800 ft., locate an additional junction box for conduit access near the mid-span/pier.
14. Provide ITS conduit of the type and configuration shown on the plans in accordance with Special Specification, "ITS Multi-Duct Conduit" or Item 618 "Conduit". Ensure all other conduit is in accordance with Item 618 "Conduit" and as shown on the plans.
15. Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).

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STRUCTURE MOUNTED ITS CONDUIT

ITS(30)-16

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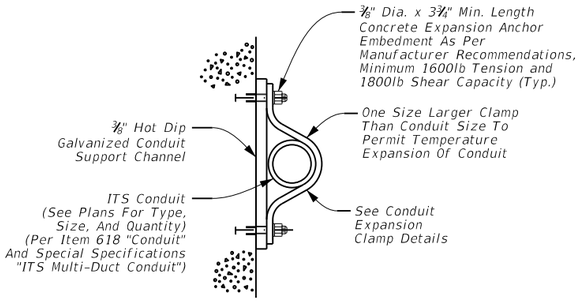
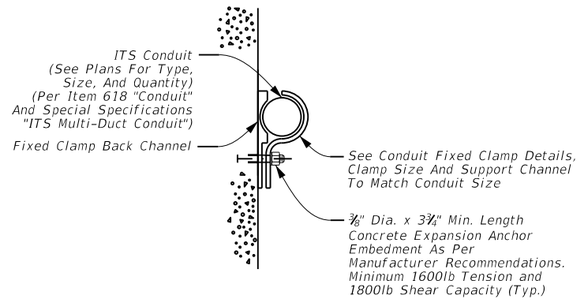
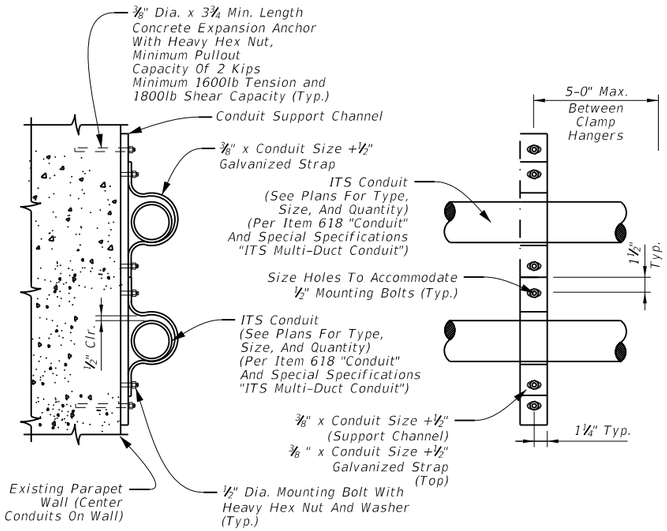


Conduit Expansion Clamp



Conduit Fixed Clamp

Conduit Clamp Details (Typ.)

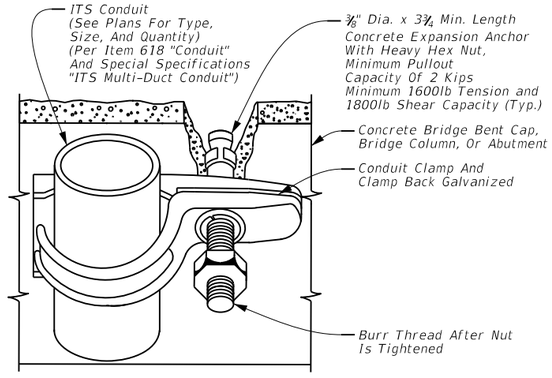


Side View

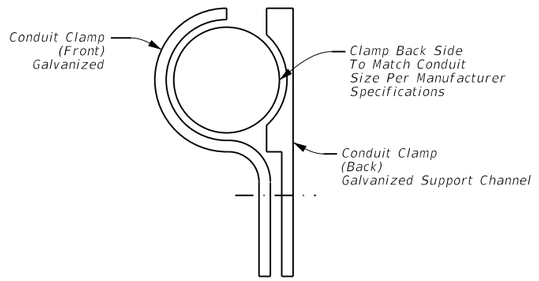
Top View

Elevation View

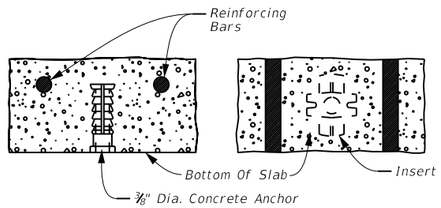
Conduit Expansion Clamp Details



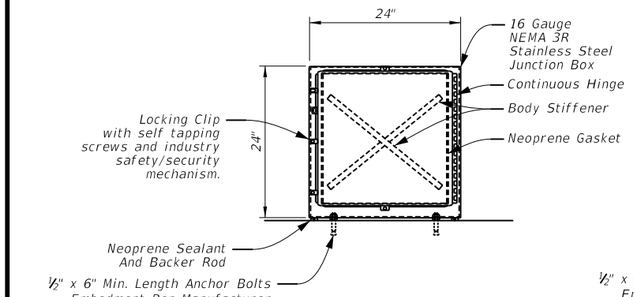
Conduit Fixed Clamp Back Channel



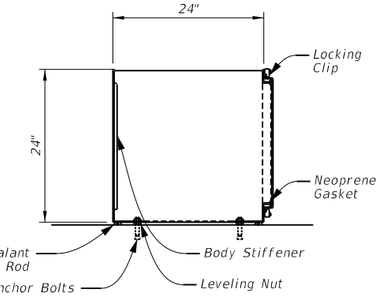
Conduit Fixed Clamp Details
Side View



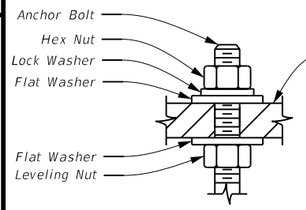
Conduit Fixed Clamp Concrete Insert Detail



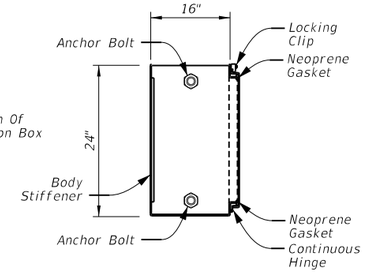
Front View



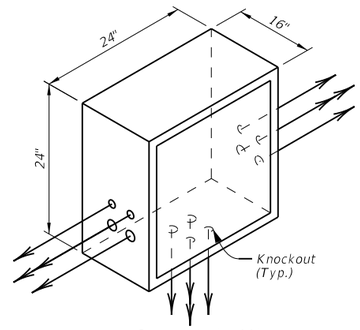
Side View



Anchor Bolt Detail
(May Vary On Mounting Scenario)



Top View



Isometric View

24" X 24" X 16" Stainless Steel Transition Junction Box Detail

Notes:
1. Transition box as depicted is top mount. Actual anchor fasteners and knockout location will vary based upon mount location and manufacturer recommendations.
2. Secure the transition box cover using self tapping screws with industry safety/security mechanism.
3. Typical knockout locations shown are for diagrammatic purposes only. The number of transition boxes required at a given location will vary depending on the number of conduits and cable storage requirements for cabling run(s).

General Notes:

1. Ensure all duct/conduit bends are in accordance with the latest version of the NFPA 70, National Electrical Code and as recommended by the manufacturer.
2. Utilize separate transition junction boxes for communications and electrical conduit runs.
3. Maintain constant slope in all duct/conduit runs.
4. Ensure maximum spacing of conduit clamps is 5'-0" C-C.
5. Galvanize all hardware, including anchor bolts, nuts, and washers per TxDOT Item 445, "Galvanizing". Ensure all expansion anchors conform to ASTM A307.
6. Provide a minimum NEMA 3R junction boxes. Construct all junction boxes in accordance with manufacturer specifications. Install junction boxes in accordance with the latest edition of NFPA 70, National Electrical Code.
7. Junction boxes and associated appurtenances are incidental to ITS conduit.
8. Install all conduit sweeps into junction boxes in accordance with allowable bend radius of the installed cable.
9. Install conduit support within 3'-0" of all enclosures and conduit terminations.
10. Refer to ED standard sheets for additional details on parapet mounted conduit.

Texas Department of Transportation

Traffic Operations Division Standard

PARAPET MOUNTED ITS CONDUIT AND TRANSITION BOX DETAIL

ITS(31)-16

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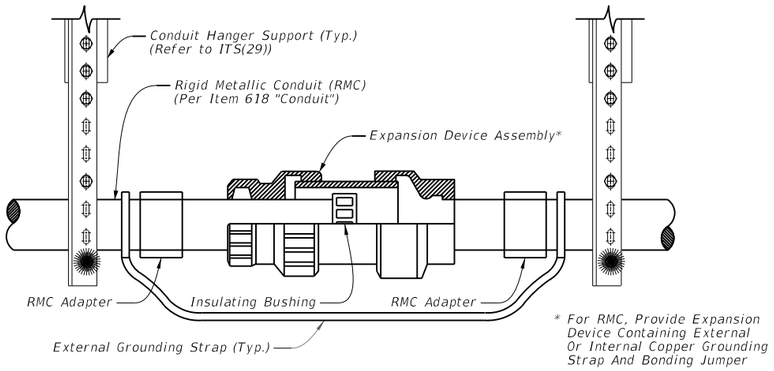
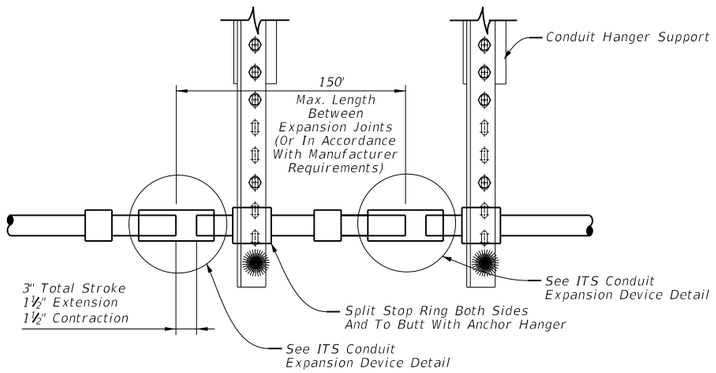
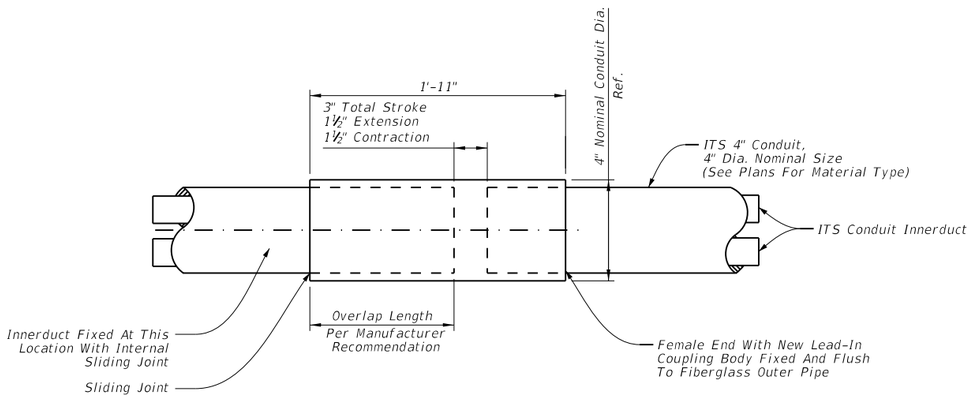


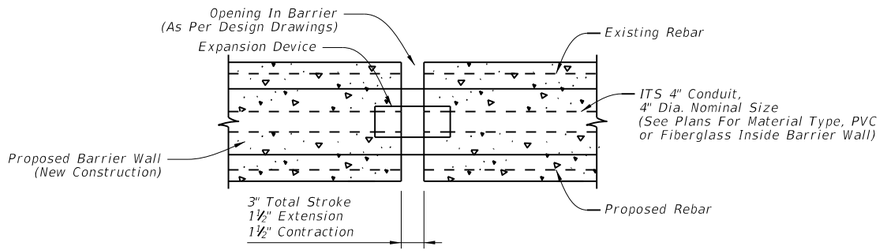
RMC Conduit Expansion Device Detail (Typ.)



ITS Conduit Expansion Device Placement (Typ.)



ITS Conduit Expansion Device Detail



ITS Conduit In New Construction Barrier Wall Expansion And Deflection Joint Fitting (Typ.)

General Notes:

1. Install expansion device at all open joints, at each end of bridge abutments and between bridge bents, allowing for 3" movement.
2. Provide a minimum of two (2) expansion joints at all bridges. Ensure expansion joint spacing does not exceed manufacturer recommendations.
3. Ensure conduit lengths are selected so that couplings do not coincide with hanger locations.
4. Ensure all rigid metallic conduit (RMC) expansion devices are constructed per manufacturer specifications.
5. Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).

Texas Department of Transportation

Traffic Operations Division Standard

EXPANSION / DEFLECTION JOINT

ITS(32)-16

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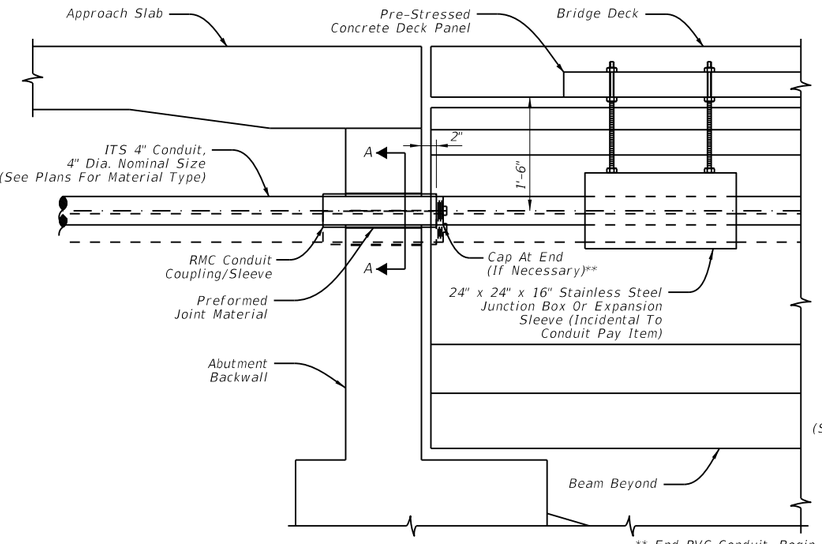
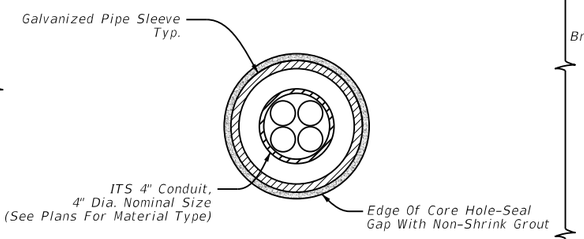


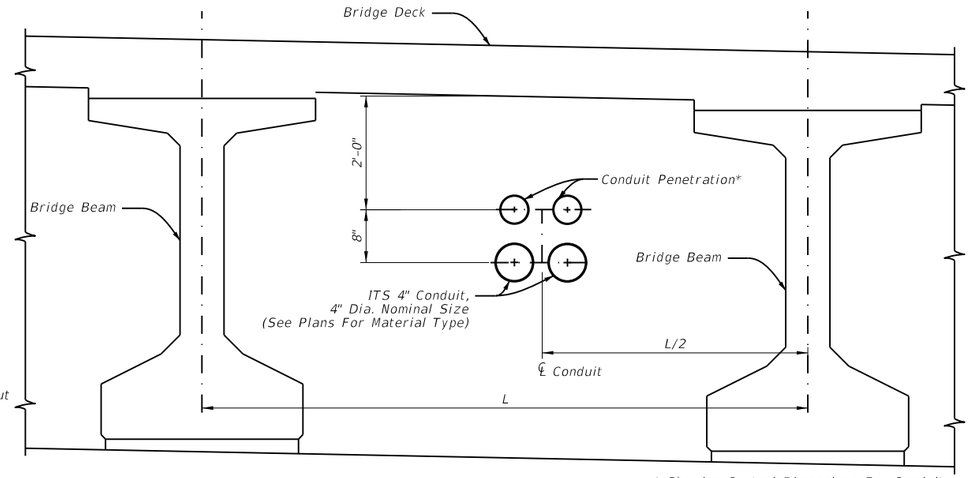
Section Through New Construction Abutment Backwall

Standard Notes:

1. If constant conduit elevation is maintained from the abutment backwall to the underside conduit hangers, provide an expansion joint sleeve (same size as conduit) with one travel overlap. If conduit elevation varies from the abutment backwall to the underside conduit hangers, provide an abutment wall mounted transition junction box (NEMA 3R rated).
2. Provide separate pipe sleeve for each conduit through abutment backwall. Size sleeve per manufacturer recommendations.



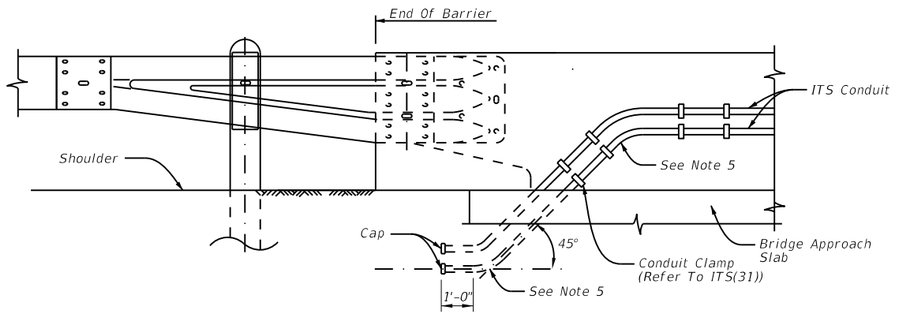
Section A-A (Typical Pipe Sleeve)



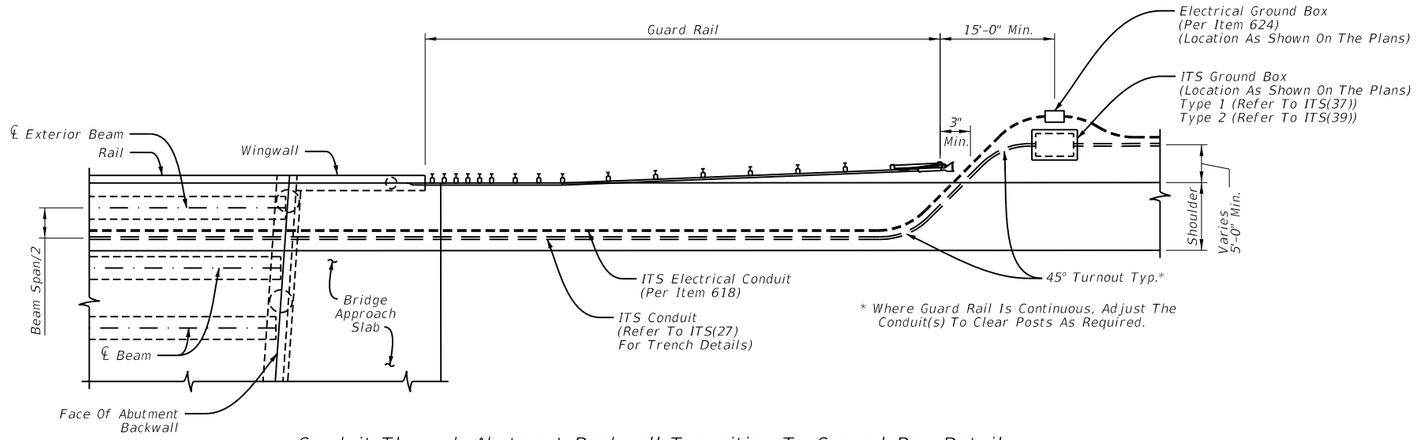
* Showing Control Dimensions For Conduits Thru Abutment Backwall. 2 x 2 Conduit Configuration Shown.

Abutment Elevation

ITS Conduit Transition At Bridge Abutment Detail



Parapet Mounted Conduit Transition To Ground Detail



* Where Guard Rail Is Continuous, Adjust The Conduit(s) To Clear Posts As Required.

Conduit Through Abutment Backwall Transition To Ground Box Detail

General Notes:

1. An alternative option to conduit mountings shown is conduit encased within parapet or bridge structure at crossings. Submit shop drawings and specifications to the engineer for approval.
2. Install expansion sleeves at bridge expansion joints and per manufacturer recommendations.
3. For conduit crossings over bridges, provide ITS communications junction boxes at 1000' maximum spacing and electrical junction boxes at 450' maximum spacing.
4. Keep all junction boxes sufficiently clear of guard rail or other obstructions to maintain clear access.
5. Install conduit sweep at an angle that accommodates cable bend radius. Do not exceed 45 degrees to the shoulder line. Refer to ITS(28) for conduit turn-out details.
6. Do not install junction boxes within paved shoulder area.
7. Ensure all work is in compliance with the latest edition of NFPA 70, National Electrical Code.
8. Junction boxes and associated appurtenances are incidental to ITS conduit.
9. For installation requiring ITS conduit transition within mechanically stabilized earth (MSE) walls with select fill, locate conduit to avoid reinforced straps. Refer to retaining wall standards for further details.
10. Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).

Sheet Details
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Texas Department of Transportation

Traffic Operations Division Standard

ITS CONDUIT TRANSITION AT ABUTMENT

ITS(33)-16

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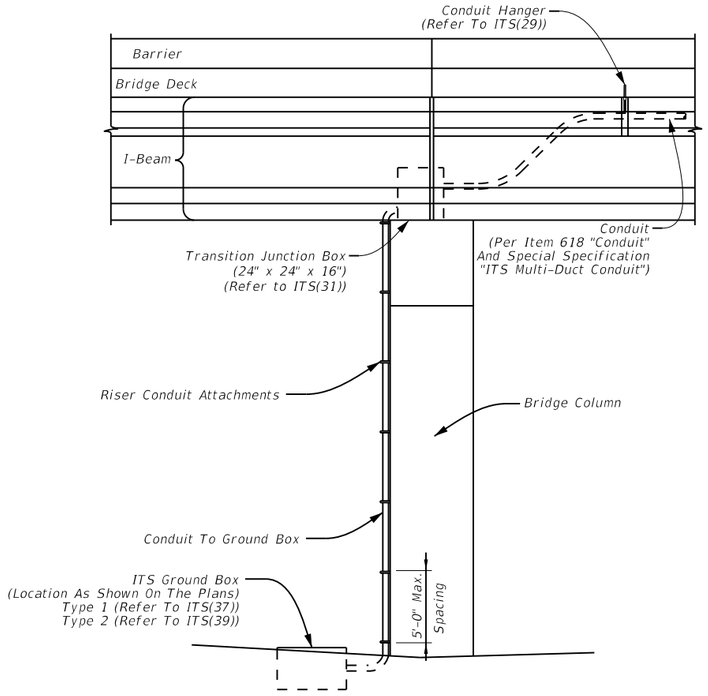
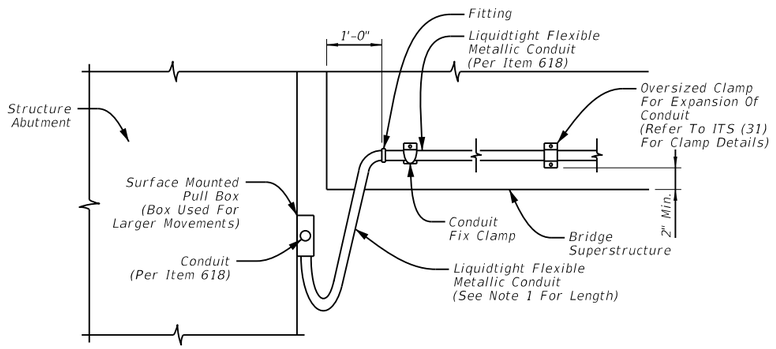


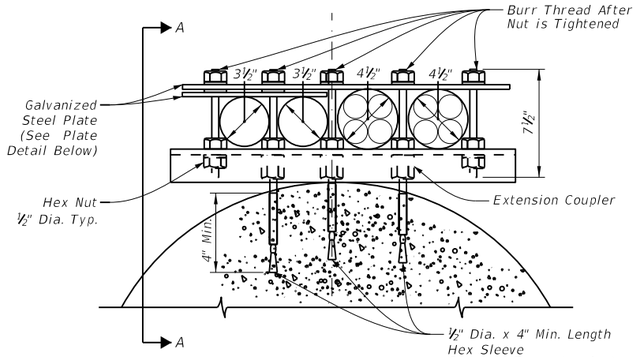
ITS Conduit Riser

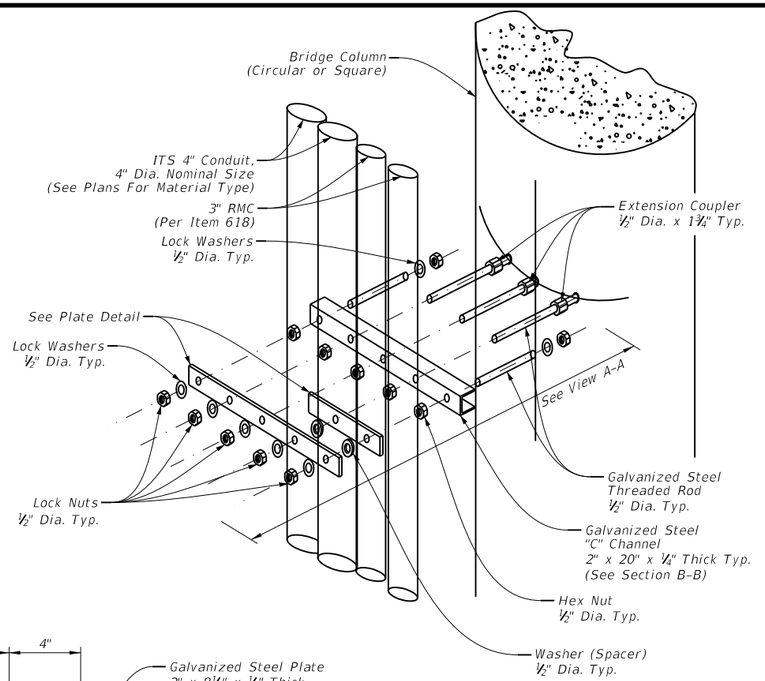


Exposed Conduit Connections At Expansion Joints

Notes:

1. Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).
2. The detail shown applies to conduit connections for conduit per Item 618 and is not intended for conduit for fiber optic cable applications.





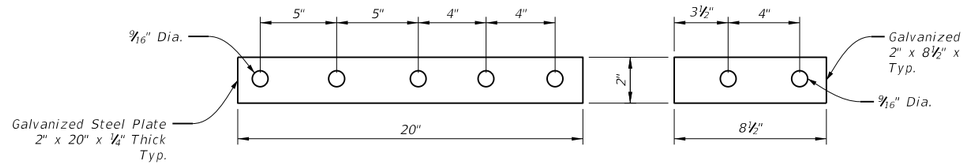
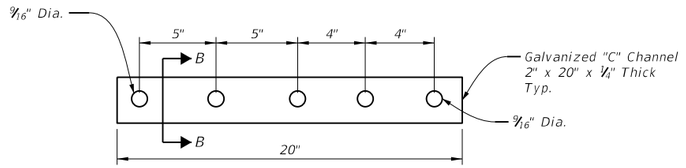
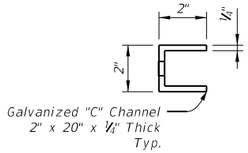


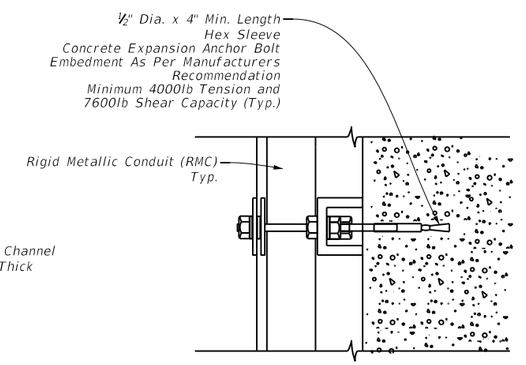
Plate Detail



"C" Channel Detail



Section B-B



View A-A

ITS Riser Conduit Bridge Column Attachment

General Notes:

1. Utilize an approximate length of flexible conduit at exposed connections of 2 times anticipated movement or 4'-0" minimum.
2. Size all transition boxes and surface mounted pull boxes per National Electrical Code Article 314 boxes and fittings.
3. For under bridge locations, ensure all junction boxes are kept inaccessible from general public and placed a minimum 10'-0" above surrounding ground.
4. Refer to ED standard sheets for additional notes and attachment details for riser conduit.
5. See plan sheets for number and size of conduit(s) to be installed.
6. Refer to ITS(33) for details involving conduit passing through the abutment.
7. Ensure maximum spacing between ITS riser conduit attachments is 5'-0" C-C.
8. Install conduit supports within 3'-0" of all enclosures and conduit terminations.
9. Ground all rigid metallic conduit (RMC) hangers per manufacturer recommendations when electrical conductors present.
10. Ensure all expansion anchors conform to ASTM A307.
11. Allowable types of outer duct material for above ground ITS conduit include rigid metallic conduit (RMC) and fiberglass.

Sheet Details
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Traffic Operations Division Standard

ITS CONDUIT RISER

ITS(34)-16

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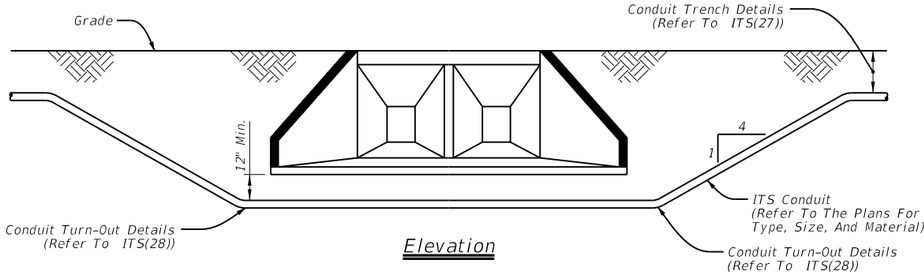
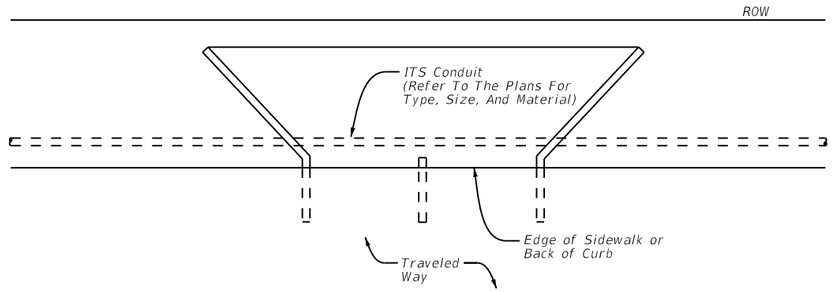
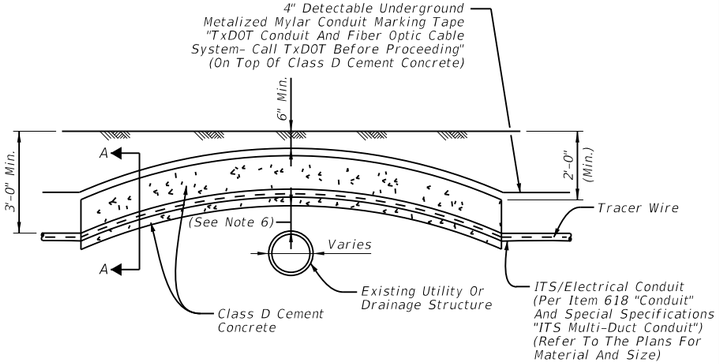


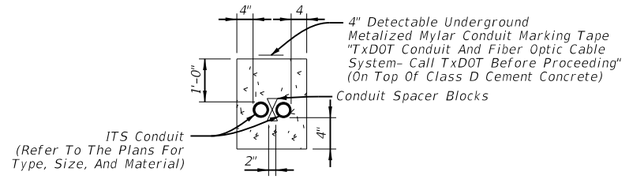
Elevation



Plan View

Conduit Bored Under Culvert



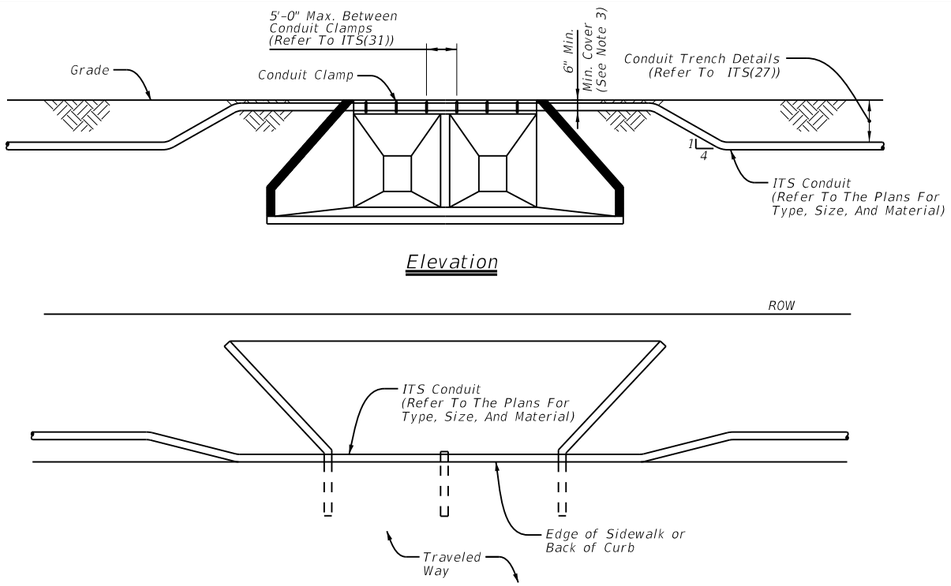


Section A-A

Conduit Installation Detail Above
Existing Drain Pipes Or Utilities

General Notes:

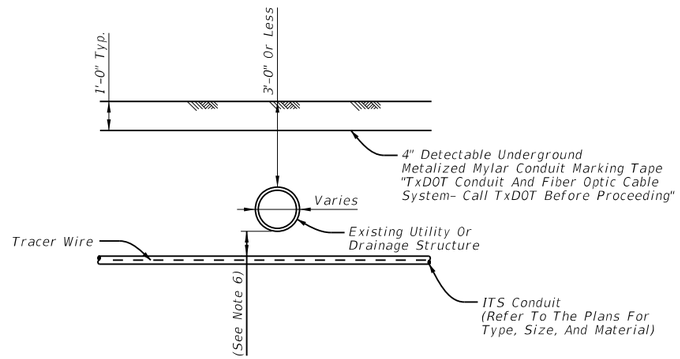
1. With approval from the field engineer adjust the final burial depth of conduit(s) in circumstances requiring traversal of non-movable object conflicts.
2. Where conduits are to be installed over existing underground infrastructure (i.e., existing utility or drainage structure) which are less than 3'-0" deep, encase conduit in Class D cement concrete in accordance with Item 421, "Hydraulic Cement Concrete", for the entire length of the conduit that is installed at a depth of less than 3'-0".
3. If depth of cover over encasement is less than 6", install the conduit to pass beneath the underground infrastructure.
4. Refer to the plans for type, size and configuration of all conduits. Refer to ITS(27) and ITS(28) for further installation details.
5. It is the responsibility of the contractor to verify all existing underground infrastructure. The contractor is responsible for any damage to any underground infrastructure during construction. Verify all utility locations at least 100' in advance of trenches, plowing or boring, and make changes in conduit placement in the event of conflict.
6. If proposed conduit is crossing or in close proximity to an existing underground utility, maintain a minimum clearance of 1'-6" vertical, 1'-6" horizontal or a clearance dictated by municipal code and or utility owner.
7. Install underground warning tape directly above all conduits per ITS(27) standard.
8. Do not install communications and electric cables in the same conduit. Separate conduits installed within the same trench based on NFPA 70, National Electrical Code. Refer to ITS(27) for additional conduit installation details.
9. Ensure all work is in compliance with the latest edition of NFPA 70, National Electrical Code.
10. Utilize PVC conduit for all underground applications as required by design. Transition with a conduit coupling to RMC conduit or other as required by design that is approved for above ground applications.
11. Do not exceed a rise:run ratio of 1:4 for conduit sloped through increases or decreases in elevation.



Elevation

Plan View

Conduit Attached To Culvert Headwall



Conduit Installation Detail Below
Existing Drain Pipes Or Utilities

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Traffic Operations Division Standard

ITS CONDUIT OBSTRUCTION CROSSING

ITS(35)-16

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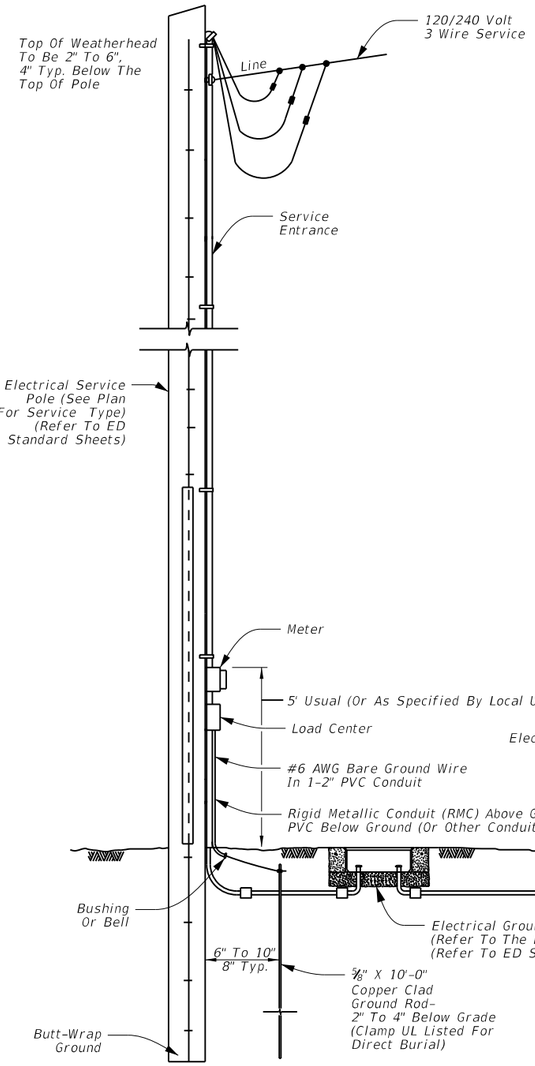

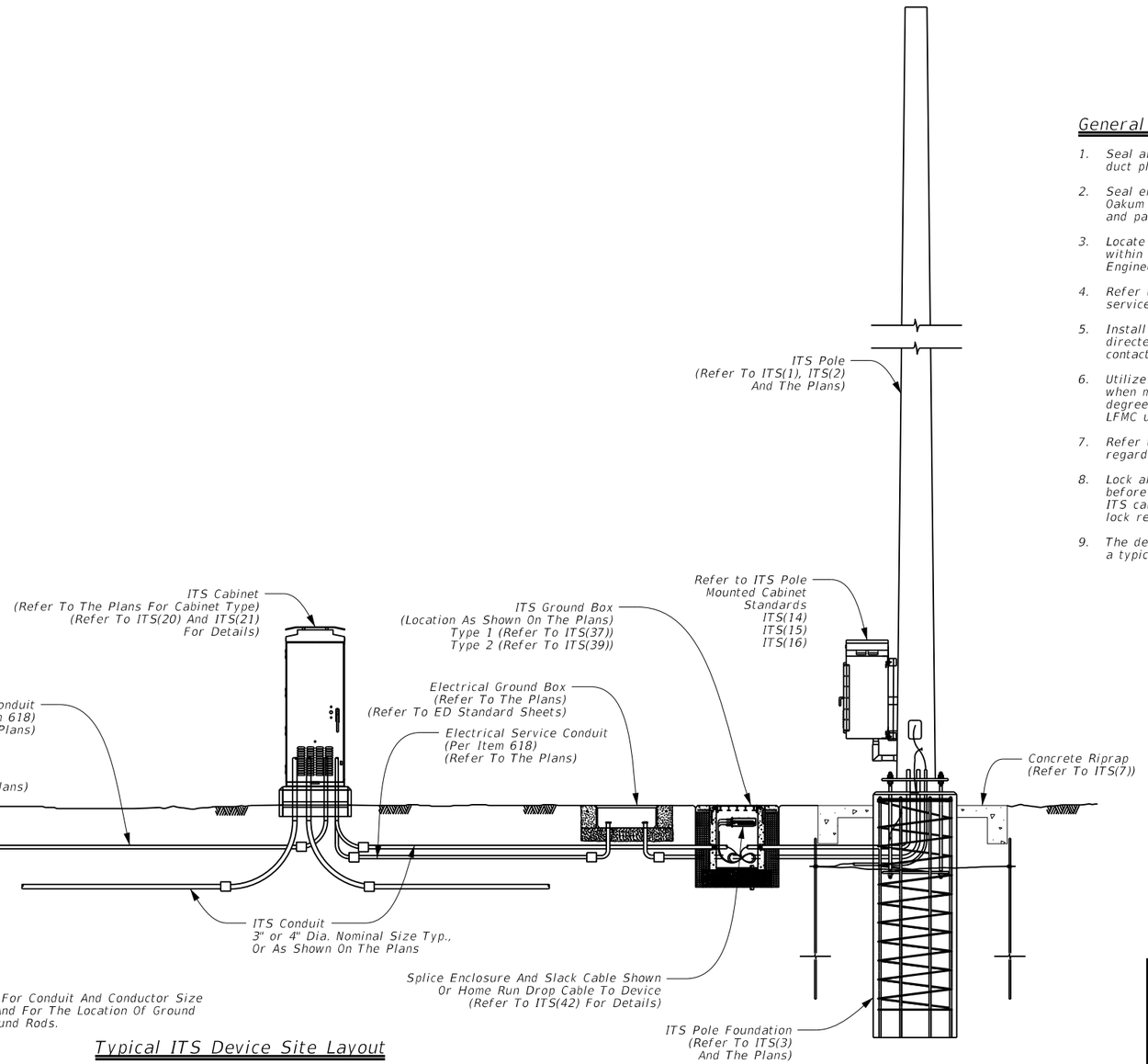

Typical ITS Device Site Layout

General Notes:

1. Seal all ITS communications conduits with waterproof duct plugs and seals.
2. Seal ends of all conduit entries into ITS cabinets with Oakum or other as approved by the District representative and pack with duct sealant.
3. Locate ground boxes for electrical and ITS communications within 5'-0" of cabinet enclosure, or as directed by the Engineer.
4. Refer to ED standard sheets for additional notes regarding electrical service.
5. Install service pole ground rod at alternate location when directed by the engineer. Maintain a minimum of 8'-0" in contact with the earth.
6. Utilize liquidtight flexible metal conduit (LFMC), as required when meter and service enclosure are mounted 90 to 180 degrees to each other. Refer to ED standard sheets for details on LFMC use.
7. Refer to ITS(21), ITS(37) and ITS(39) for details regarding conduit depth and entry into ITS ground boxes.
8. Lock all enclosures and bolt all ground box covers before power is applied to the circuit. Refer to the ITS cabinet references indicated on this sheet for cabinet lock requirements.
9. The detail shown is diagrammatic and is intended to represent a typical layout from electrical service to ITS devices.

Sheet Details
Not to Scale

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL ITS DEVICE SITE LAYOUT

ITS(36)-16

FILE: its(36)-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT FEBRUARY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		145

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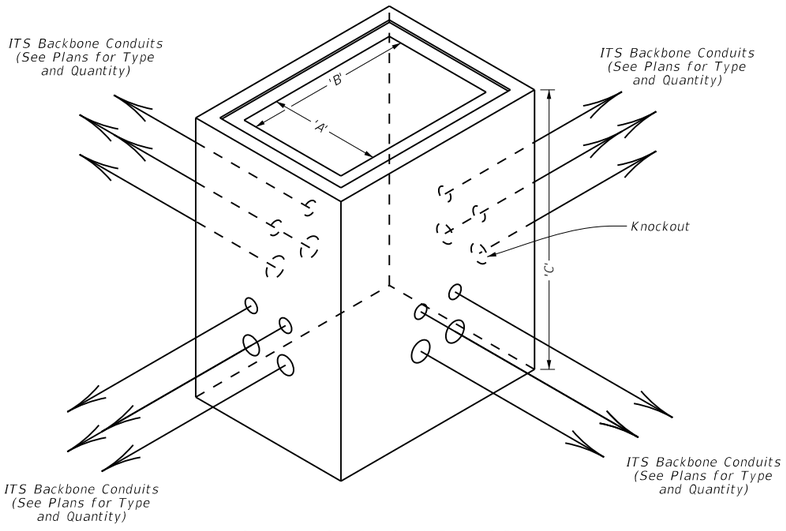
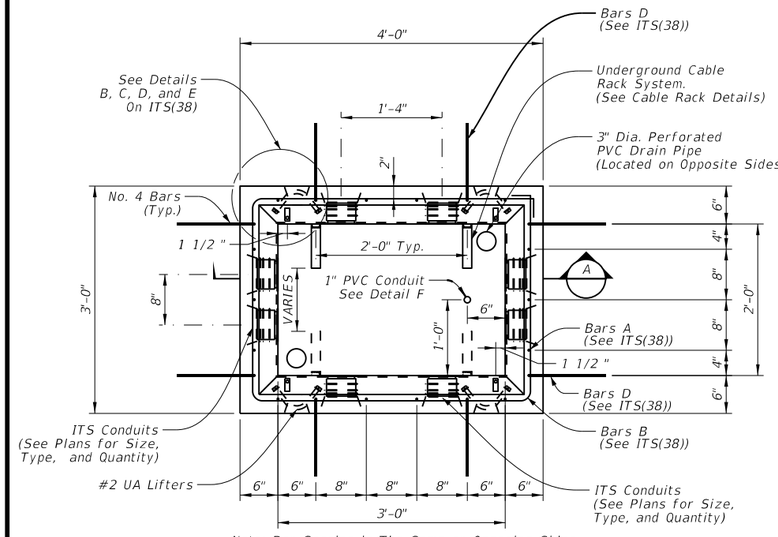


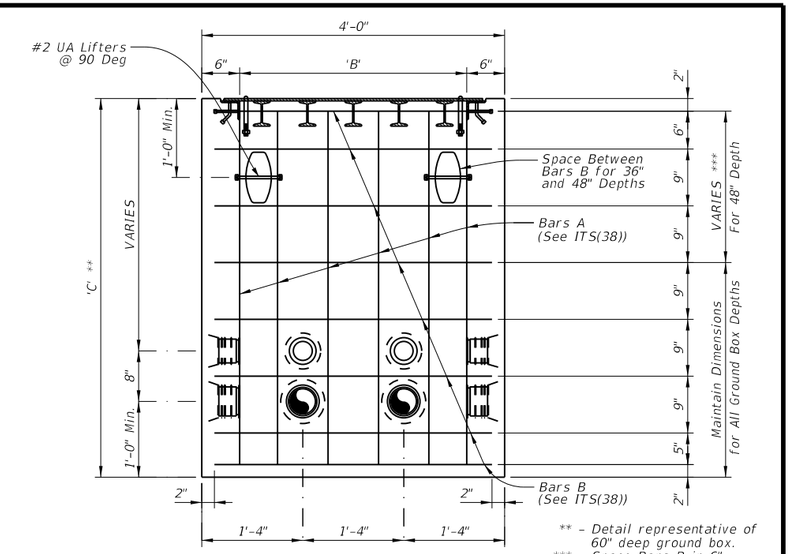
See Ground Box Schedule for A, B, and C Dimensions

Type 1 Ground Box Isometric View



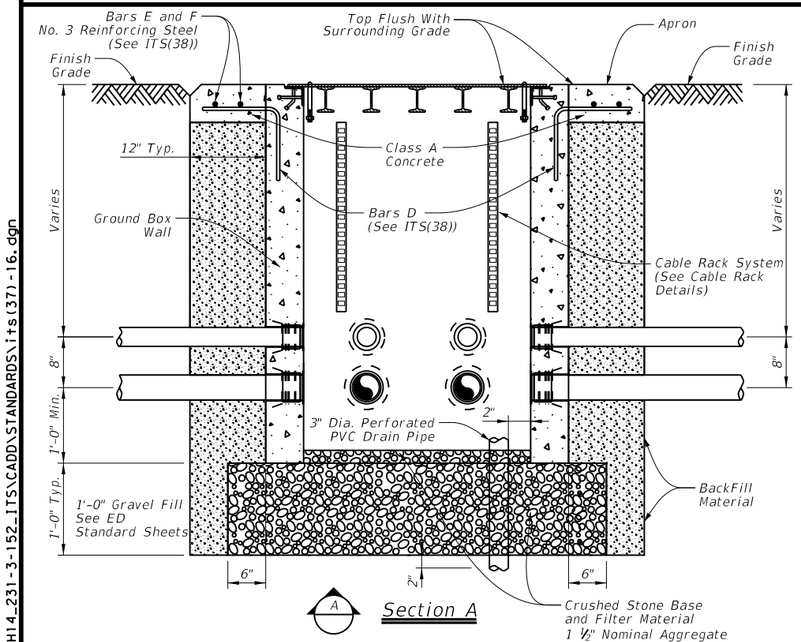
Note: Bar Spacing is The Same on Opposing Sides.

Type 1 Ground Box Plan View

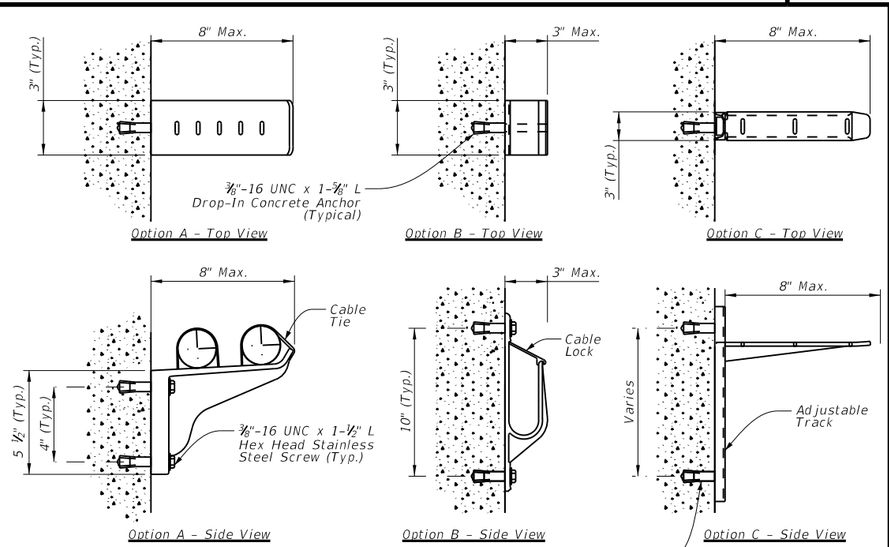


** – Detail representative of 60" deep ground box.
*** – Space Bars B in 6" Intervals for 48" Depth

Type 1 Ground Box Elevation View

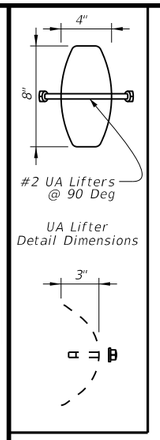


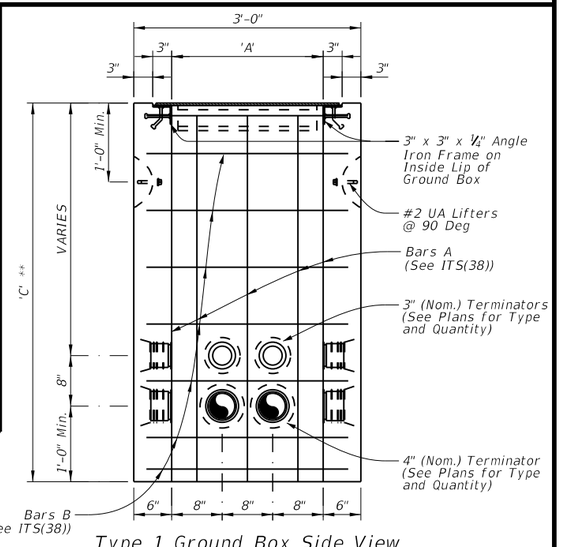
Section A



Note: Options Shown for Cable Racks and Attachment Methods. Furnish Shop Drawings of Cable Rack for Engineer Approval Prior to Installation.

Type 1 Cable Rack Details





Type 1 Ground Box Side View

** – Detail representative of 60" deep ground box.

SHEET 1 OF 2

General Notes:

1. Conduit entry points shown represent the standard configuration for backbone conduit as detailed on ITS(27). Additional conduits may be required as shown on the plans.
2. Provide Class A concrete for Type "1" ground boxes.
3. Provide terminators for the PVC conduit cast in the walls and placed symmetrically about the centerline of the box at the depths shown, unless otherwise noted, for the number of conduits identified on the plans to enter the box.
4. Provide terminators appropriately sized for the conduits indicated on the plans. Provide terminators with an air tight and water tight connection.
5. Closed bottom Type "1" ground boxes are acceptable in lieu of open bottom boxes. Provide two 3" Dia. perforated PVC drain pipes on opposite corners to optimize water drainage. Provide 12-inch base of crushed stone which extends 6 inches in all directions from the perimeter of the box for closed bottom boxes. Crushed stone will be subsidiary to Special Specification, "ITS Ground Box."
6. Install all open bottom Type "1" ground boxes on a 12-inch base of crushed stone which extends 6 inches in all directions from the perimeter of the box. Crushed stone will be subsidiary to Special Specification, "ITS Ground Box."
7. Cap and seal terminators that do not have conduits attached.
8. When additional conduit entry points are needed to accommodate existing conduit, core drill conduit knockouts in the field of the appropriate number and size of conduit at each location, as directed by the Engineer.
9. Provide a bell fitting on the end of each conduit to ensure a flush fit inside the ground box.
10. Concrete grout around the knockout (inside and out) and around the conduit and bell fitting to ensure a neat watertight fit after the conduit and bell fitting have been placed in a knockout. Ensure all openings in the ground box are sealed prior to grouting operations.
11. Install a nylon string and plug all unused conduits with tug-plugs sized for the particular conduits. Provide split innerduct plugs in conduits or innerducts with cables to seal the innerduct around the cables to prevent water and dirt from entering.
12. Provide steel (ASTM A-153), glass reinforced nylon, or equivalent cable rack assemblies designed to support the amount of cable storage slack identified in the plans. Locate cable rack system on one side only (longer length side) to allow access to the inside of the ground box. Cable racks may be installed at the factory or in the field. When mounting cable racks in the field, seal all penetrations to the concrete side wall to prevent moisture penetration. Ground metallic cable rack systems to grounding system inside ground box in accordance with the National Electrical Code.

Ground Box Schedule

Ground Box Type	'A' Width Inside (Inches)	'B' Length Inside (Inches)	'C' Depth Inside (Inches)
Type 1	24	36	36, 48, 60

Sheet Details
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Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER

ITS(37)-16

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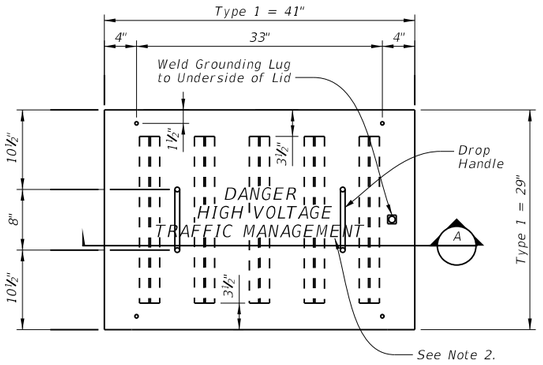
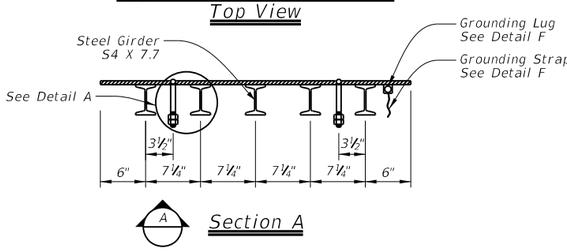
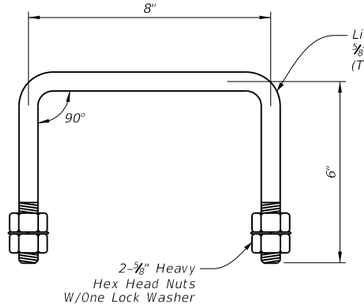


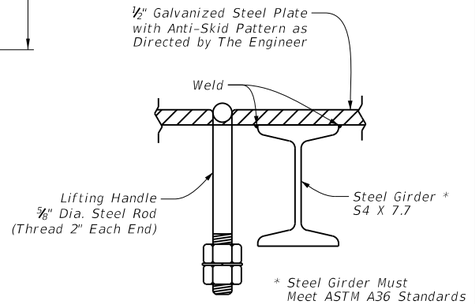
Type 1 Steel Cover Details
Top View



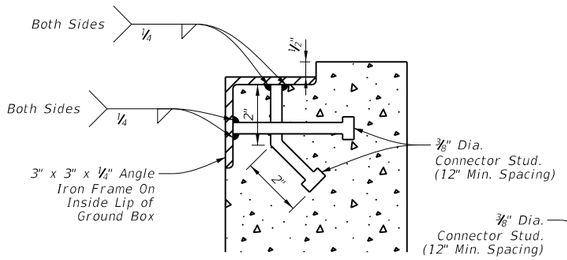
Section A



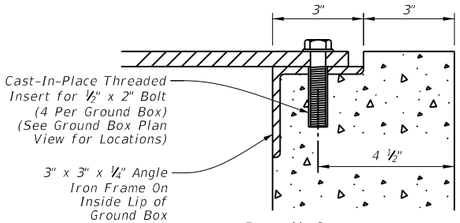
Drop Handle Detail



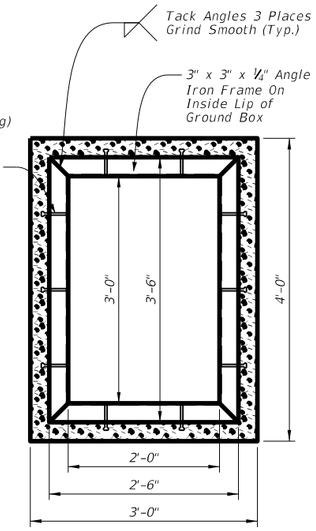
Detail A



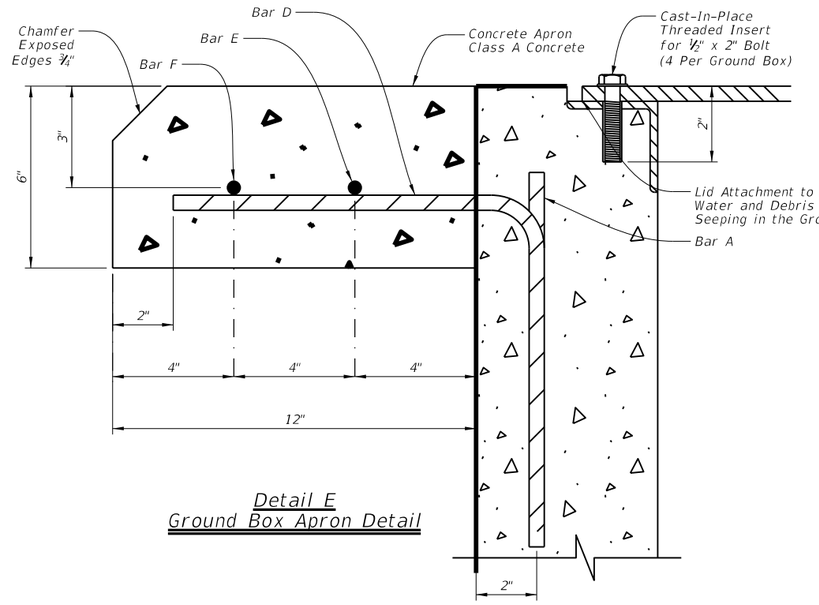
Detail B



Detail C
Lid Attachment Detail



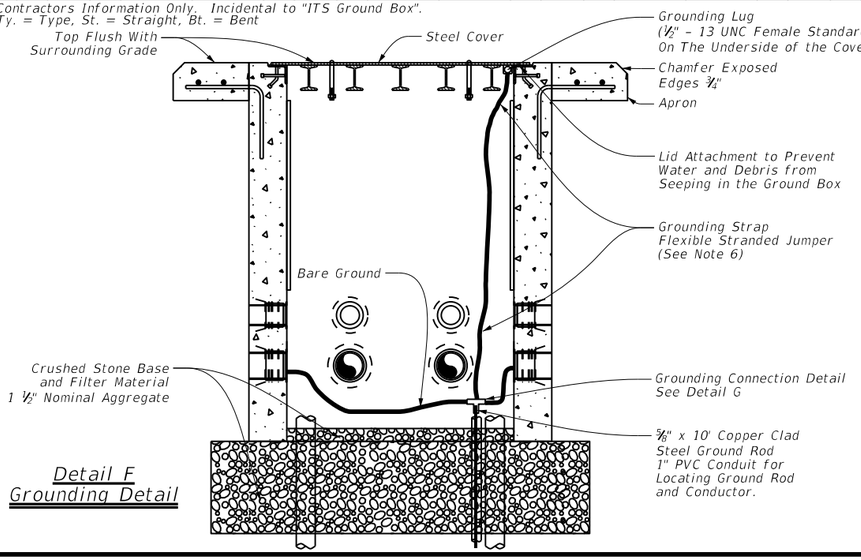
Detail D



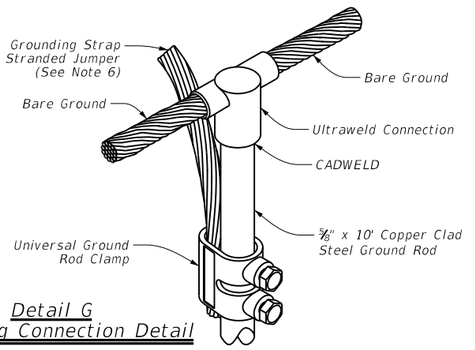
Detail E
Ground Box Apron Detail

Ground Box Type 1	BAR A					BAR B					BAR D					BAR E					BAR F					TOTALS	
	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	Steel * LBS.	Conc. * CY
36" Depth	22	#4	St.	2'-8"	39.3	5	#4	Bt.	13'-2"	44.1	8	#4	Bt.	2'-0"	10.7	1	#3	Bt.	17'-2"	6.5	1	#3	Bt.	19'-10"	7.5	108.1	.67
48" Depth	22	#4	St.	3'-8"	54.0	7	#4	Bt.	13'-2"	61.8	8	#4	Bt.	2'-0"	10.7	1	#3	Bt.	17'-2"	6.5	1	#3	Bt.	19'-10"	7.5	140.5	.89
60" Depth	22	#4	St.	4'-8"	68.8	8	#4	Bt.	13'-2"	70.6	8	#4	Bt.	2'-0"	10.7	1	#3	Bt.	17'-2"	6.5	1	#3	Bt.	19'-10"	7.5	164.1	1.11

* - For Contractors Information Only. Incidental to "ITS Ground Box".
Legend: Ty. = Type, St. = Straight, Bt. = Bent



Detail F
Grounding Detail



Detail G
Grounding Connection Detail

Note - All grounding connections to be CADWELD or approved equal. This work will not be paid for directly, but is considered incidental to ITS ground box.

General Notes:

1. See ITS(37) for additional Type "1" ground box details.
2. Hot-dip galvanized steel covers after all welds are made.
3. Label top of cover with the words "DANGER HIGH VOLTAGE TRAFFIC MANAGEMENT" using template-guided, hand-welded lettering at a height of 2 inches to ensure neatness.
4. Provide all Type "1" ground boxes with a securable, tamper-proof cover equipped with a bolting system that positively secures the cover in place.
5. Ground steel covers in accordance with the National Electrical Code.
6. Ground covers to the grounding cable using a split-bolt kearney clamp, and a minimum 8-foot long flexible stranded jumper the same size as the grounding conductor. Terminate to metal ground box cover with a tank ground type lug as approved and directed by the Engineer.
7. Provide Type "1" ground box and cover designed for heavy duty loading in accordance with AASHTO H20 loading when located where the box may experience deliberate, continuous vehicular traffic, such as near the shoulder or an auxiliary lane, or immediately adjacent to the unprotected edge of pavement.
8. Provide a Type "1" ground box and cover tested by a laboratory independent of the manufacturer certifying loading requirements are met. Provide certification of such tests to the Engineer for approval.
9. Provide a steel or cast iron cover in accordance with Item 471, Article 471.2, "Frames, Grates, Rings, and Covers." Provide covers with the number of drop handles shown. Provide Class "A" concrete for ground box construction and aprons.
10. Fabricate cover so to fits properly on the ground box, and no undue noise results when traffic contacts the cover.

Sheet Details
Not to Scale

SHEET 2 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER

ITS(38)-17

FILE: its(38)-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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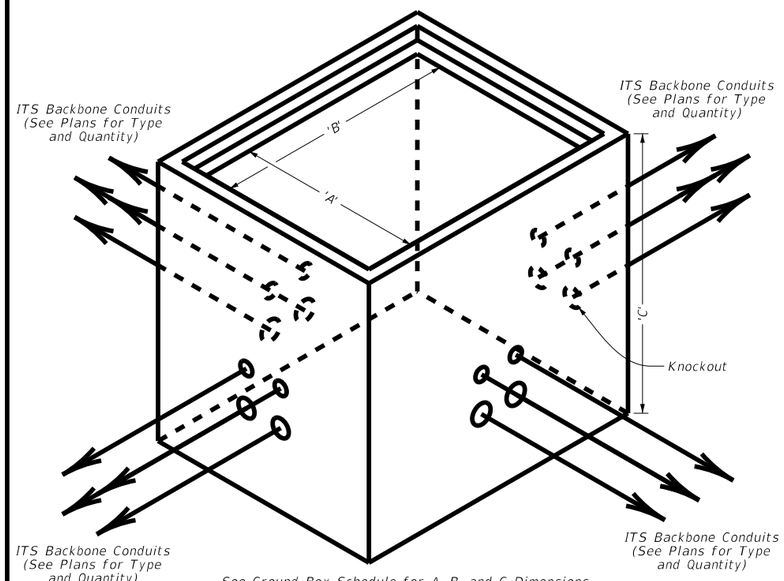
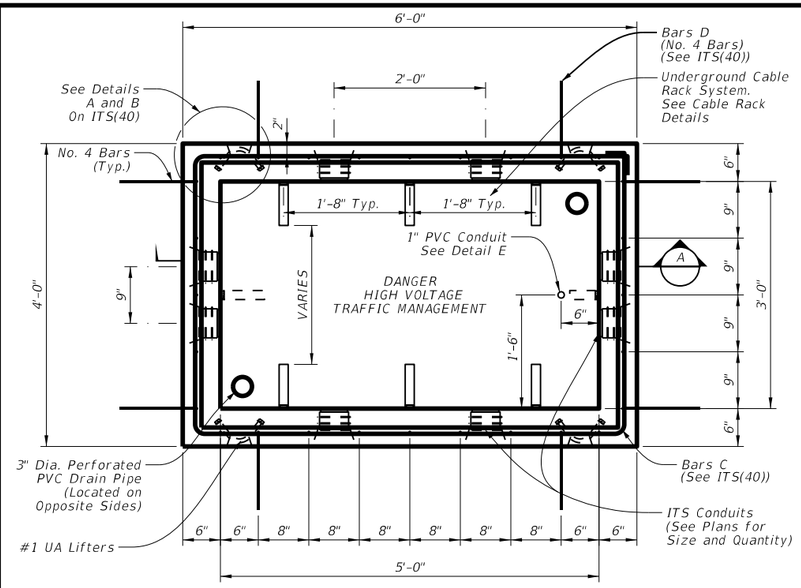


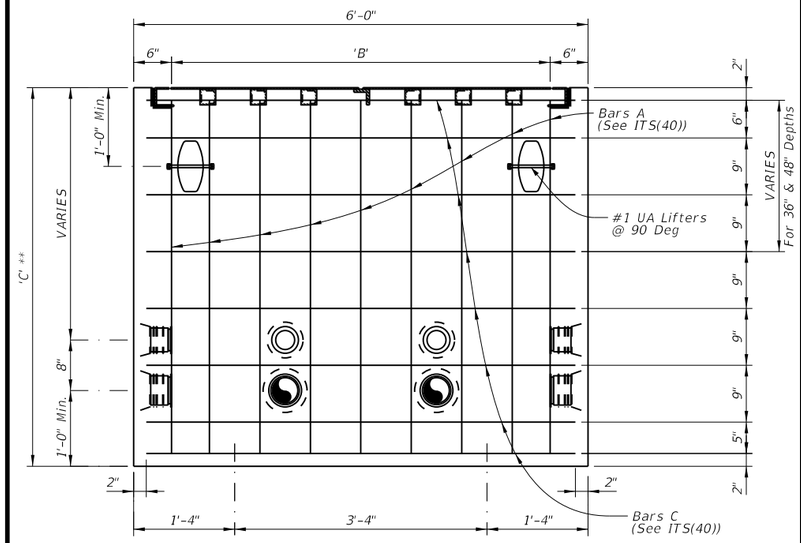
See Ground Box Schedule for A, B, and C Dimensions

Type 2 Ground Box Isometric View



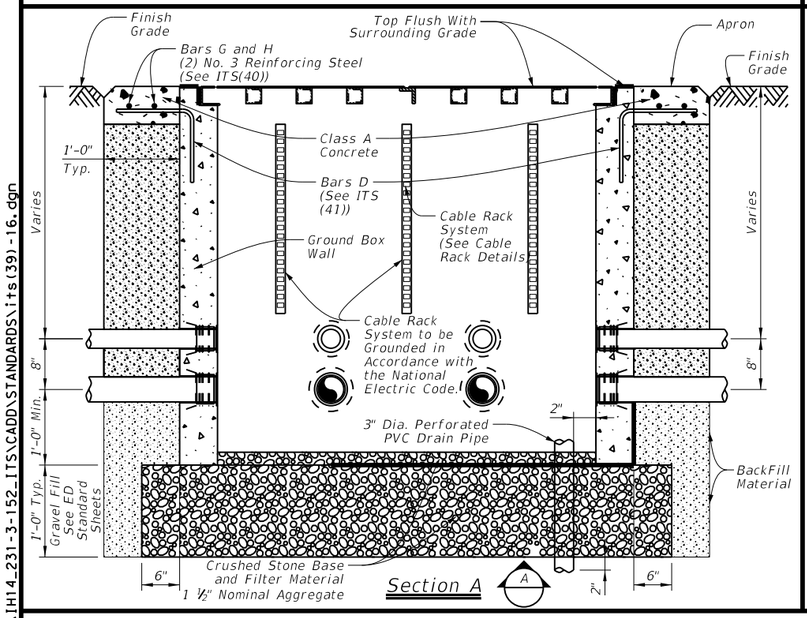
Note: Bar Spacing is The Same on Opposing Sides.

Type 2 Ground Box Plan View

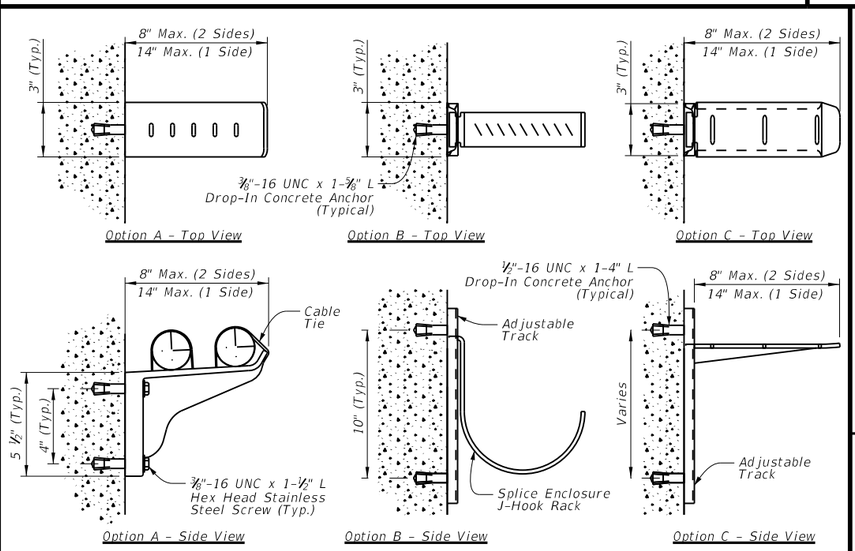


** - Detail representative of 60" deep ground box.

Type 2 Ground Box Elevation View

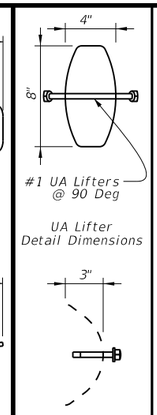


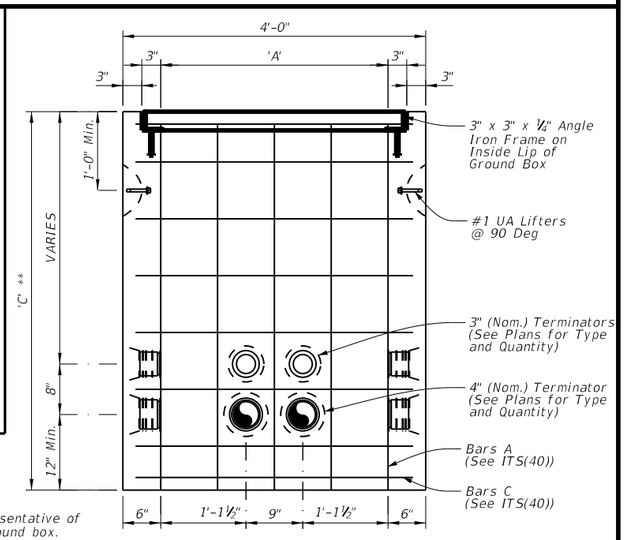
Section A



Note: Options Shown for Cable Racks and Attachment Methods Contractor to Supply Shop Drawings of Cable Rack and Cable Rack Grounding System (If Applicable) for Engineer Approval Prior to Installation.

Type 2 Cable Rack Details





** - Detail representative of 60" deep ground box.

Type 2 Ground Box Side View

SHEET 1 OF 2

General Notes:

1. Conduit entry points shown represent the standard configuration for backbone conduit as detailed on ITS(27). Additional conduits may be required as shown on the plans.
2. Provide Class "A" concrete for Type "2" ground boxes.
3. Provide terminators for the PVC conduit cast in the walls and placed symmetrically about the centerline of the box at the depths shown, unless otherwise noted, for the number of conduits identified on the plans to enter the box.
4. Provide terminators appropriately sized for the conduits indicated on the plans. Provide terminators with an air tight and water tight connection.
5. Closed bottom Type "2" ground boxes are acceptable in lieu of open bottom boxes. Provide two 3" Dia. perforated PVC drain pipes on opposite corners to optimize water drainage. Provide closed bottom boxes with a 12-inch base of crushed stone which extends 6 inches in all directions from the perimeter of the box. Crushed stone will be subsidiary to Special Specification, "ITS Ground Box."
6. When additional conduit entry points are needed to accommodate existing conduit, core drill conduit knockouts in the field of the appropriate number and size of conduit at each location, as directed by the Engineer.
7. Provide a bell fitting on the end of each conduit to ensure a flush fit inside the ground box.
8. Concrete grout around the knockout (inside and out) and around the conduit and bell fitting to ensure a neat watertight fit after the conduit and bell fitting have been placed in a knockout. Ensure all openings in the ground box are sealed prior to grouting operations.
9. Install a nylon string and plug all unused conduits with tug-plugs sized for the particular conduits. Provide split innerduct plugs in conduits or innerducts with cables to seal the innerduct around the cables to prevent water and dirt from entering.
10. Install all open bottom Type "2" ground boxes on a 12-inch base of crushed stone which extends 6 inches in all directions from the perimeter of the box. Crushed stone will be subsidiary to special specification, "ITS Ground Box."
11. Cap and seal terminators that do not have conduits attached.
12. Backfill in accordance with Item 400, "Excavation and Backfill for Structures."
13. Provide steel (ASTM A-153), glass reinforced nylon, or equivalent cable rack assemblies designed to support the amount of cable storage slack and splice enclosures identified in the plans. Locate cable rack system on any side but allow for sufficient access to the inside of the ground box. Cable racks may be installed at the factory or in the field. When mounting cable racks in the field, seal all penetrations to the concrete side wall to prevent moisture penetration. Ground metallic cable rack systems to grounding system inside ground box in accordance with the National Electrical Code.

Ground Box Schedule

Ground Box Type	'A' Width Inside (Inches)	'B' Length Inside (Inches)	'C' Depth Inside (Inches)
Type 2	36	60	36, 48, 60

Sheet Details
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Traffic Operations Division Standard

ITS GROUND BOX DETAILS TYPE "2" WITH STEEL COVER

ITS(39)-16

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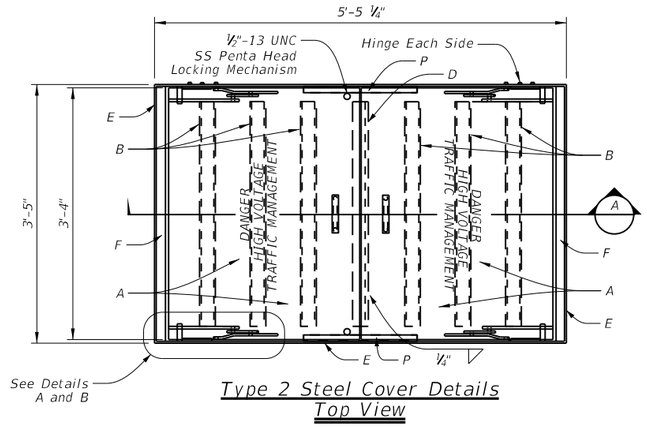
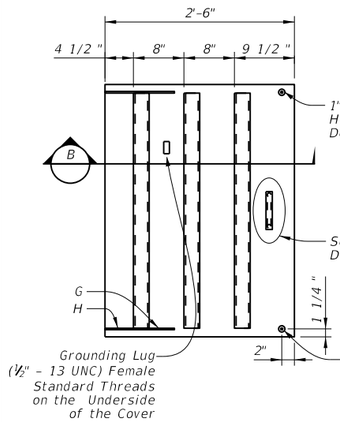
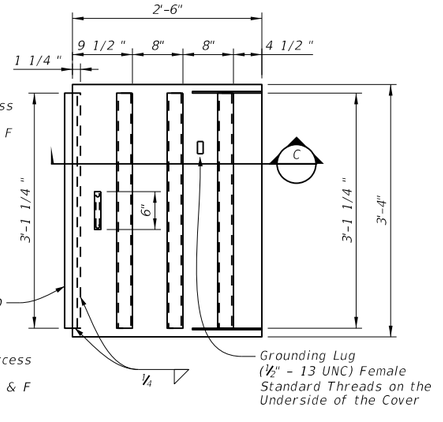


Type 2 Steel Cover Details
Top View

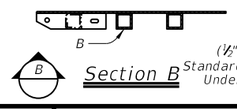
Section A



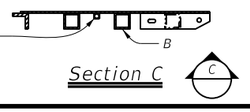
Type 2 Steel Cover Details
Bottom View (Left)



Type 2 Steel Cover Details
Bottom View (Right)



Section B



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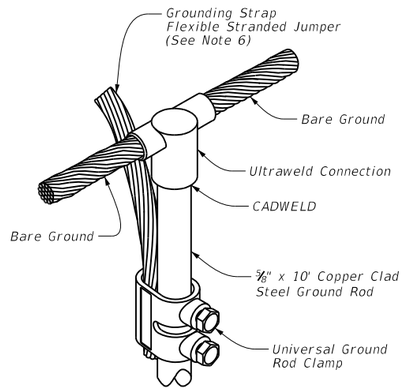
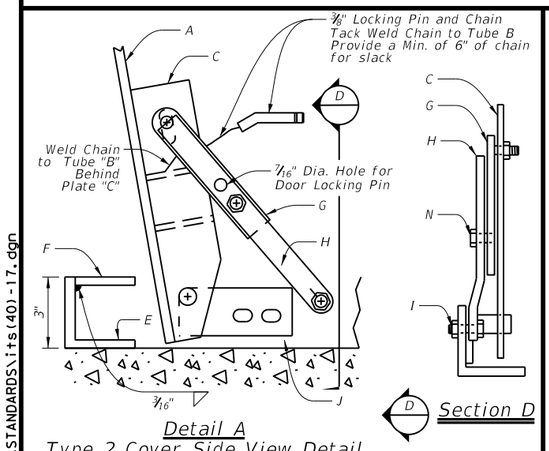


Detail G
Grounding Connection Detail

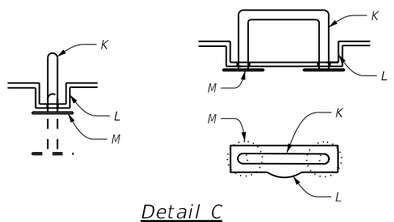
Note - All grounding connections to be CADWELD or approved equal. This work will not be paid for directly, but is considered incidental to ITS ground box.

Item	Qty	Incidental "ITS Ground Box" Material
A	2	1/4" Floor Plate 40" x 30"
B	6	2 1/2" x 2 1/2" x 37 1/4" Tube
C	4	11" x 2 1/2" x 1/4" Plate
D	1	2 1/2" x 2 1/2" x 1/2" x 37" 1/4 Angle
E	4	3" x 3" x 1/4" Angle
F	2	40 1/2" x 2" x 1/4" Plate
G	4	6 1/2" x 1 1/4" x 1/4" Plate
H	4	10 1/2" x 1 1/4" x 1/4" Plate
I	12	1/2" Bolt/Nut
J	4	4 3/4 x 2" x 3/16" Plate
K	2	5/8" Drop Handle
L	2	1 1/2" x 5/8" x 3/16" Channel x 7"
M	4	1 1/2" x 1/8" P Disk
N	8	1/2" x 3/8" Bolt
P	2	1" x 1" x 1/8" Angle x 18"

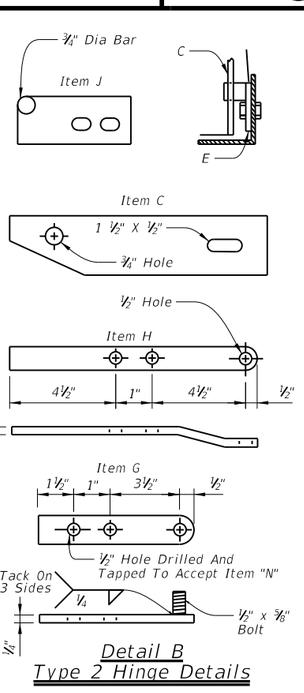


Detail A
Type 2 Cover Side View Detail

Section D



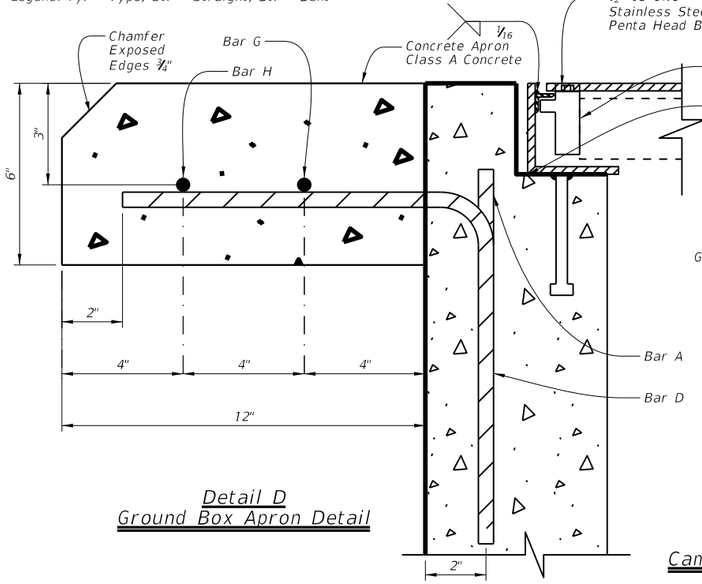
Detail C
Type 2 Drop Handle Details



Detail B
Type 2 Hinge Details

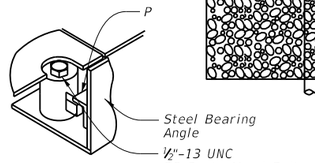
Ground Box Type 2	BAR A					BAR C					BAR D					BAR G					BAR H					TOTALS	
	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	No.	Size	Ty.	Length	Weight	Steel * LBS.	Conc. * CY
36" Depth	28	#4	St.	2'-8"	50.0	5	#4	Bt.	19'-1"	63.9	8	#4	Bt.	2'-0"	10.7	1	#3	Bt.	23'-3"	8.8	1	#3	Bt.	25'-11"	9.8	143.2	1.00
48" Depth	28	#4	St.	3'-8"	68.8	7	#4	Bt.	19'-1"	89.5	8	#4	Bt.	2'-0"	10.7	1	#3	Bt.	23'-3"	8.8	1	#3	Bt.	25'-11"	9.8	187.6	1.33
60" Depth	28	#4	St.	4'-8"	87.5	8	#4	Bt.	19'-1"	102.3	8	#4	Bt.	2'-0"	10.7	1	#3	Bt.	23'-3"	8.8	1	#3	Bt.	25'-11"	9.8	219.1	1.67

* - For Contractors Information Only. Incidental to "ITS Ground Box".
Legend: Ty. = Type, St. = Straight, Bt. = Bent



Detail D
Ground Box Apron Detail

Detail E
Grounding Detail



Detail F
Cam Locking Mechanism

SHEET 2 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND BOX DETAILS TYPE "2" WITH STEEL COVER

ITS(40)-17

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REVISIONS	0231	03	152	IH 14
5-17	DIST	COUNTY		SHEET NO.
	WACO	BELL		149

Sheet Details
Not to Scale

General Notes:

1. See ITS(39) for additional Type "2" ground box details.
2. Hot-dip galvanized steel covers after all welds are made.
3. Label top of cover with the words "DANGER HIGH VOLTAGE TRAFFIC MANAGEMENT" using template-guided, hand-welded lettering at a height of 2 inches to ensure neatness.
4. Provide all Type "2" ground boxes with a securable, tamper-proof cover equipped with a bolting system that positively secures the cover in place.
5. Ground steel covers in accordance with the National Electrical Code.
6. Ground covers to the grounding cable using a split-bolt kearney clamp, and a minimum 8-foot long flexible stranded jumper the same size as the grounding conductor. Terminate to metal ground box cover with a tank ground type lug as approved and directed by the Engineer.
7. Provide Type "2" ground box and cover designed for heavy duty loading in accordance with AASHTO H20 loading when located where the box may experience deliberate, continuous vehicular traffic, such as near the shoulder or an auxiliary lane, or immediately adjacent to the unprotected edge of pavement.
8. Provide a Type "2" ground box and cover tested by a laboratory independent of the manufacturer certifying loading requirements are met. Provide certification of such tests to the Engineer for approval.
9. Provide a steel or cast iron cover in accordance with Item 471, Article 471.2, "Frames, Grates, Rings, and Covers." Provide covers with the number of drop handles shown. Provide Class "A" concrete for ground box construction and aprons.
10. Fabricate cover so to fits properly on the ground box, and no undue noise results when traffic contacts the cover.

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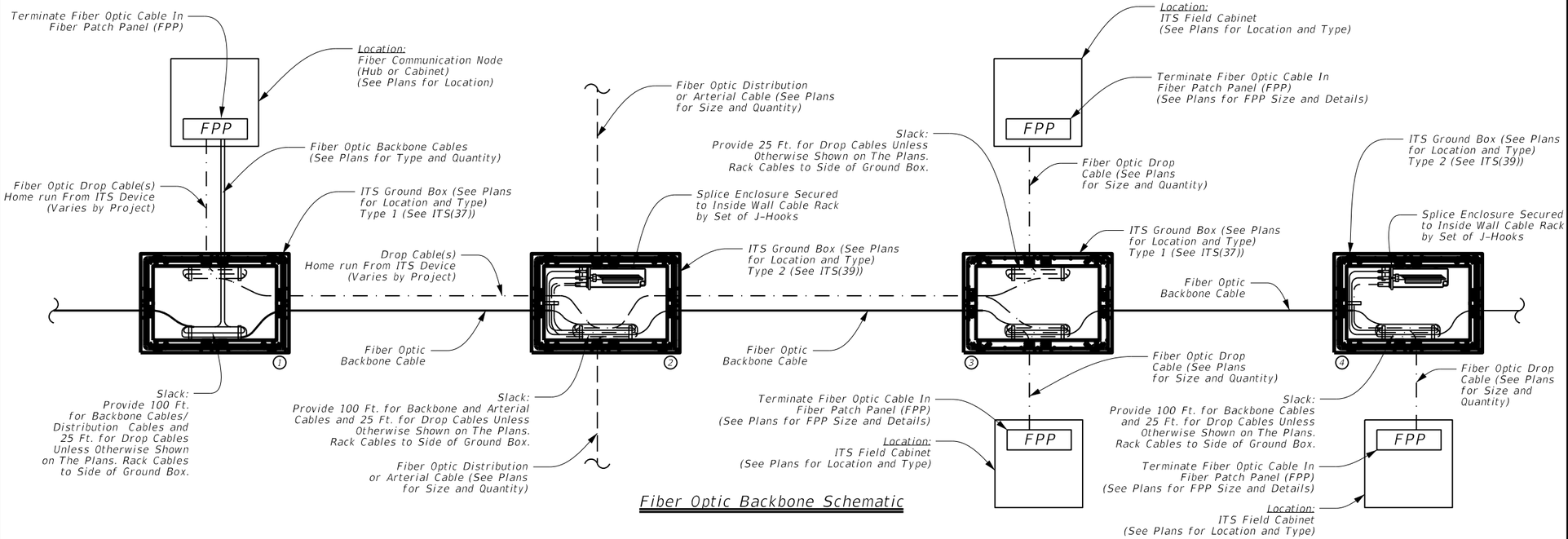
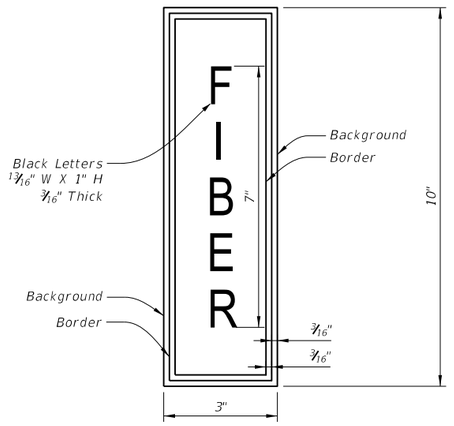
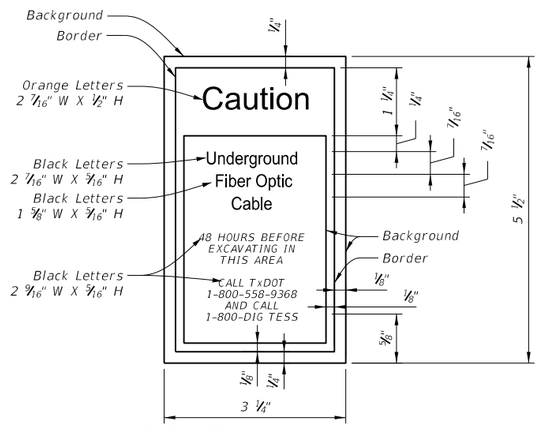


Fiber Optic Backbone Schematic



Border - Black
Background - Orange Reflective

Fiber Decal Details



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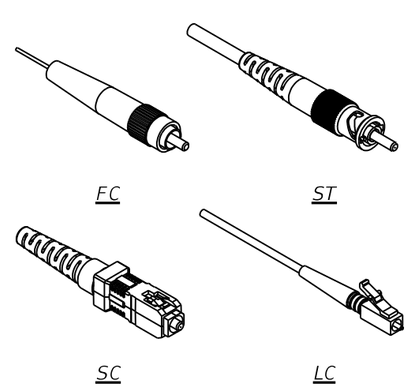
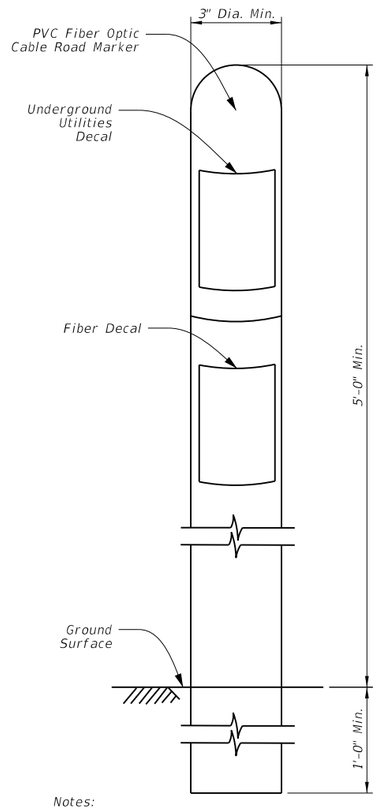
Symbol - Black
Background - Orange Reflective

Underground Utilities Decal Details



Fiber Optic Connectors

Note - Details are diagrammatic and may vary by manufacturer.



Notes:
1. Space fiber optic cable road markers at maximum 1000' intervals or at significant changes in direction such as a 90 degree turn.
2. Provide all orange fiber optic cable road markers for non-splice locations.
3. Provide orange fiber optic cable road markers with white dome for splice locations.
4. Locate marker within concrete apron of fiber ground box.

Fiber Optic Cable Road Markers

General Notes:

1. The fiber optic backbone schematic shown is diagrammatic only and intended to represent the various fiber optic communication architectures seen across the state and may not show all configurations seen. Connection of ITS field equipment to ITS communication nodes or hubs is achieved through home run drop cables or spliced to the backbone in a splice enclosure. Refer to fiber communication schematic details and fiber termination information shown on the plans for further information.
2. Install a flat pull cord in all empty conduits and inner-ducts identified for communication use. The pull cord must have a tensile strength of 1,250 lbs minimum and have foot markings to determine length installed. Furnish and installation of pull cord will be subsidiary to special specification "ITS Fiber Optic Cable".
3. Color code each type of fiber optic cable to identify the cable as a "backbone" (green or blue), "distribution" (red), or "drop" (orange or yellow).
4. Terminate fibers at fiber patch panel (FPP), also referred to as patch panel, with SC connectors for new installations. When connecting to existing FPP, terminate with FC or ST connectors as shown on the plans. Provide connector adaptors as required to accommodate existing equipment if information is not provided in the plans.
5. Provide a list showing cable number assignments and highway or facility that the cable services.
6. Provide a single 1/C #14 insulated wire in conduit runs which have been identified in the plans to carry fiber optic cable. Provide UL listed solid copper wire with orange color low density polyethylene insulation suitable for conduit installation rated for temperature range -20 C to 60 C and a voltage rating of 600V. This wire will serve as a tracer, or locate, wire for locating underground conduit containing fiber optic cabling and will be paid for under Item 620, "Electrical Conductors."
7. Ensure each cable is marked on the outer jacket with a label detailing the manufacturer's name, the date of manufacturer (month/year), the fiber count (Example: 48F SM or 48 SMF), and sequential length markings at maximum 3 FT increments.

Reference Notes:

1. Fiber architecture at communication node.
2. Fiber architecture for splicing arterial distribution cables.
3. Fiber architecture for home run of drop cables from ITS field equipment cabinets to communication node.
4. Fiber architecture for splicing drop cable from ITS field equipment cabinet.

SHEET 1 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

ITS FIBER OPTIC CABLE MISCELLANEOUS DETAILS

ITS(42)-16

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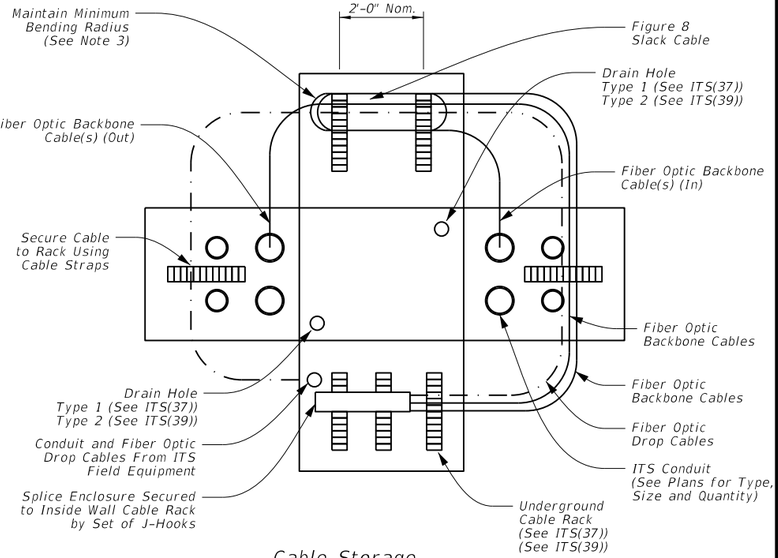
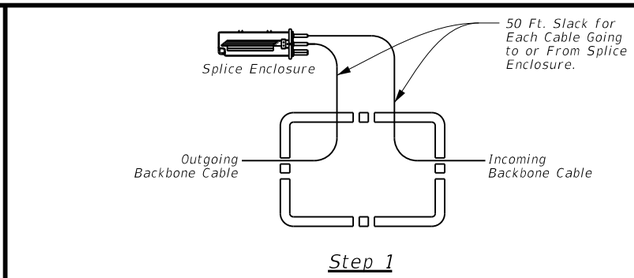
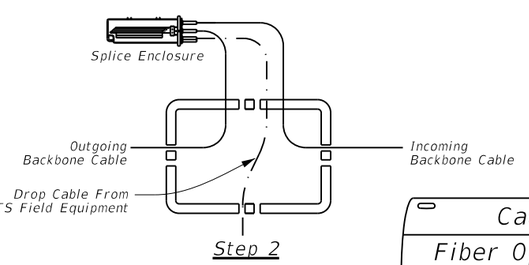


Cable Storage

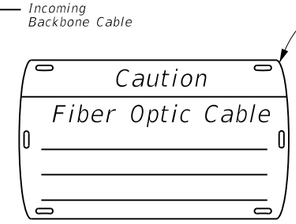
Top View - Ground Box Walls Folded Down for Clarity



Step 1



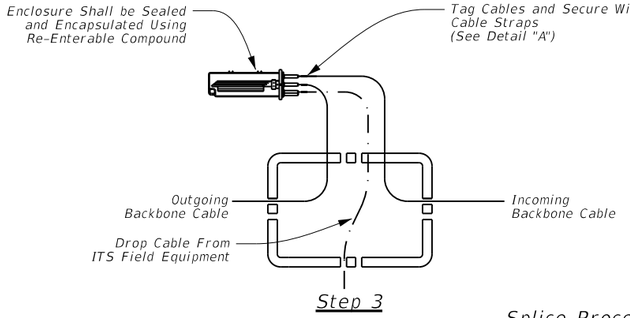
Step 2



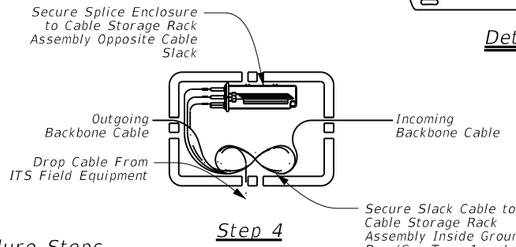
Fiber Optic Cable Tag

Panduit Inc. No. PST-FO
Hellerman-Tyton No. CST2003x2
Self-Lam Tag or Approved Equal

Detail "A"

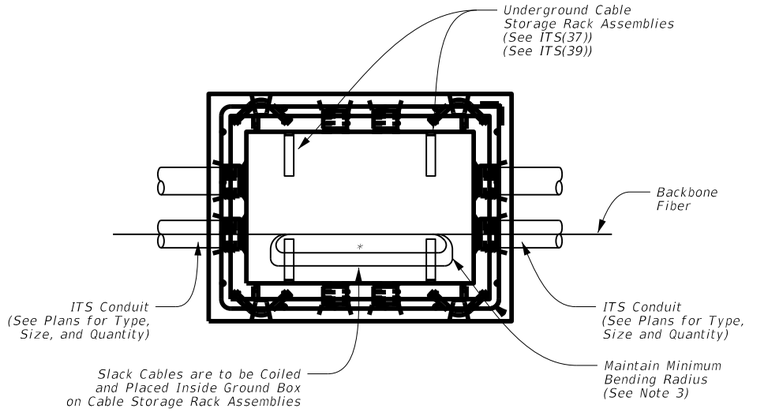


Step 3



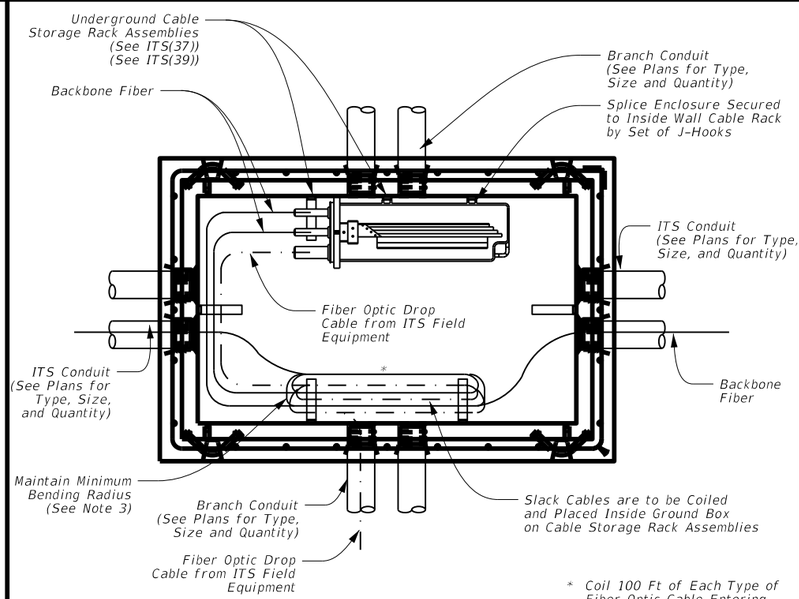
Step 4

Splice Procedure Steps



Type "1" Ground Box

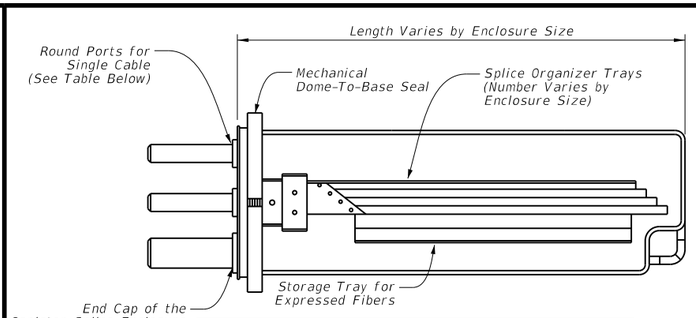
* Coil 25 Ft of Fiber Optic Cable for Slack



Type "2" Ground Box

with Splice

* Coil 100 Ft of Each Type of Fiber Optic Cable Entering the Ground Box



Splice Enclosure Sizes			
Type	No. of Ports	Port Capacity	Fiber Use
1	4	2 - Up to 144 Sm	Backbone
		2 - Up to 48 Sm	Drop
2	6	4 - Up to 144 Sm	Backbone/Arterial
		2 - Up to 48 Sm	Drop
3	8	4 - Up to 144 Sm	Backbone/Arterial
		4 - Up to 48 Sm	Drop

Splice Enclosure Fiber Accommodations

General Notes:

1. Conduit entry points to the Type 1 and Type 2 ground boxes are diagrammatic. Refer to ITS ground box standards, ITS(37) and ITS(39), for more information. Additional conduits may be required as shown on the plans.
2. Type 2 ground boxes are to be used, as shown on the plans, when splice enclosures are required.
3. Maintain a minimum bend radius of 20 times the fiber optic cable diameter during installation, relocation, and removal and a minimum of 10 times the fiber optic cable diameter when in operation.
4. Caulk all conduit around the top of the cable ducts with an engineer approved caulking compound to seal clearance between the cables and ducts. Place conduit plugs in all vacant conduits or inner-ducts.
5. Provide cable straps that will withstand ultra-violet exposure and do not damage cables when tightening.
6. All incidental equipment necessary for the cable installation and mounting of splice enclosure within the ground box will be incidental to Special Specification, "ITS Fiber Optic Cable."
7. Submit all splice locations to the field engineer for approval before beginning work.
8. Provide splice enclosures designed to seal, bond, anchor, and protect fiber optic cable splices. Provide splice enclosures designed to handle mechanical and fusion type splices. Provide splice enclosures with port configurations for the sizes detailed above.
9. Provide splice enclosures designed for underground placement with a sealing system preventing water penetration when submerged under 10 ft. of water.
10. Furnish, install, and secure fiber optic cable tags for each fiber optic cable entering a ground box, ITS field equipment cabinet (ground and pole), and hub building or communication node as detailed above. Provide information including fiber optic type, count, origin, and destination on the cable tag. Use UV resistant tie-wraps for securing the tag to the cable. Provide tie-wraps that do not damage fiber when securing to cable.

Sheet Details

Not to Scale

SHEET 2 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

ITS FIBER OPTIC CABLE MISCELLANEOUS DETAILS

ITS(43)-16

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	WACO	BELL		151

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SITE DESCRIPTION

PROJECT LIMITS:

From Coryell County Line To 0.5 MI WEST FM 3423 (Indian Trail)

LOCATION MAPS:

Refer to the Title Sheet for project location map

PROJECT DESCRIPTION:

CSJ 0231-03-152 :

FOR THE CONSTRUCTION OF TRAFFIC CONTROL DEVICES CONSISTING OF CONSTRUCTION OF FIBER OPTICS, TRAFFIC CAMERAS, AND DYNAMIC MESSAGE BOARDS.

MAJOR SOIL DISTURBING ACTIVITIES:

No major soil disturbing activities for this project.

TOTAL PROJECT AREA:	348.254 AC
TOTAL AREA TO BE DISTURBED:	0.00 AC

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

CSJ 0231-03-152 :

Predominate soil type is Silty Clay.
Vegetative cover is in good condition with 90-95% grass coverage.

NAME OF RECEIVING WATERS:

CSJ 0231-03-152 :

Branches of South Nolan Creek Receive drainage from this project. Which ultimately drain into the Brazos River within stream segment 1218E.

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- [ ] TEMPORARY SEEDING
- [ ] PERMANENT PLANTING, SODDING, OR SEEDING
- [ ] MULCHING
- [x] SOIL RETENTION BLANKET
- [x] NATURAL BARRIERS OR BUFFER ZONES
- [x] PRESERVATION OF NATURAL RESOURCES

OTHER: TXR 150000, Part III, Section G, 2 Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating, or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. Temporary stabilization must be completed no more than 14 calendar days after initiation of soil stabilization measures, and final stabilization must be achieved prior to termination of permit coverage.

STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, As Applicable)

- [x] SILT FENCES
- [ ] HAY BALES
- [ ] SANDBAG OR ROCK BERMS
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [ ] PIPE SLOPE DRAINS
- [ ] PAVED FLUMES
- [ ] ROCK BEDDING AT CONSTRUCTION EXIT
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS
- [ ] SEDIMENT BASINS
- [ ] STORM INLET SEDIMENT TRAP
- [ ] STONE OUTLET STRUCTURES
- [ ] CURBS AND GUTTERS
- [ ] STORM SEWERS
- [ ] VELOCITY CONTROL DEVICES

OTHER:

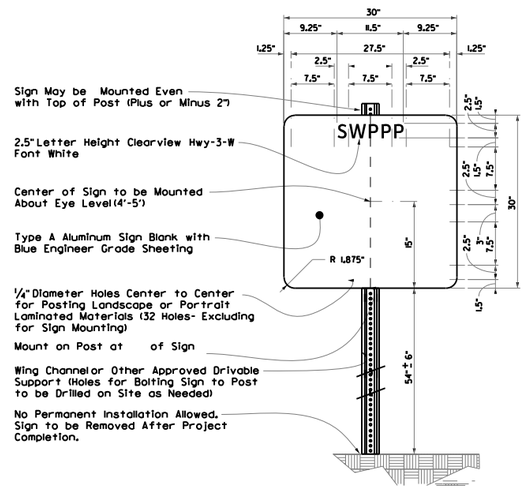
NARRATIVE-SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

The order of activities will be as follows:
1. Preserve existing vegetative cover as much as possible.
2. Install temporary sediment control fencing, rock berms and other items as shown on plans prior to any soil disturbing activities.
3. Remove existing bridge, construct proposed culvert and roadway and perform any necessary excavation, embankment and grading.
4. Place soil retention blankets and temporary/permanent seeding as shown in the plans and as directed by the engineer.

STORM WATER MANAGEMENT:

An integral part of the SWPPP for this project includes the EPIC Sheet, Item 506, Waco District Waters of the US Notes, Waco District Typical Applications for Best Management Practices, Form 2118 TxDOT inspection forms, Contractor daily inspection forms, miscellaneous general notes on environmental requirements, TxDOT EC Standards, 2014 Standard Specifications, TxDOT roadway design drawings, SWPPP design and working BMP drawings, Site Manager Data Base, EMS Stage Gate Inspections and the Waco District environmental folders. The requirements of the TxDOT EMS will be fully implemented including training requirements for Contractors and TxDOT staff.

STORM WATER POLLUTION PREVENTION PLAN PERMIT POSTING



OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE:

All erosion and sediment best management practices (BMPs) will be maintained in good working order per the environmental notes, details and standards included as part of the project plans and contract documents. BMP repairs will be made at the earliest possible date, but no later than seven calendar days after the inspection report has been completed and immediately after the ground has dried sufficiently to allow equipment access. BMPs damaged by the Contractor will be repaired or replaced immediately. The installation and repair of BMPs at creeks and outfalls will be given priority.

INSPECTION:

TxDOT Form 2118 inspections to support TXR150000 and 404 permits will be conducted on a seven day interval on the same day of the week, until permits are terminated. The Contractor will provide daily BMP inspection reports on work days. Stage Gate Inspections and other BMP inspections will be conducted by the District and Area Office Staff based on requirements of the TxDOT Environmental Management System (EMS).

WASTE MATERIALS:

Any waste materials generated during construction will be disposed of in accordance with existing federal, state, and local laws.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING):

At a minimum, any products in the following categories are considered to be hazardous: Fuels, Lubricating products, Asphalt products, or Concrete curing compounds and any additives. In the event of a spill which may be hazardous, clean-up will be done in accordance with federal, state, and local regulations. The Contractor will maintain a list of all chemicals and wastes required for the project; including chemicals used by sub-contractors, and will implement written spill prevention and clean-up plans.

SANITARY WASTE:

Sanitary waste from portable units will be collected by a licensed sanitary waste management contractor.

OFF SITE VEHICLE TRACKING:

- [ ] HAUL ROADS DAMPENED FOR DUST CONTROL
- [ ] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [ ] EXCESS DIRT ON ROAD REMOVED DAILY
- [ ] STABILIZED CONSTRUCTION ENTRANCE

REMARKS:

Disposal areas, stockpiles,and haul roads will be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas will not be located in any wetland, waterbody or streambed. Construction staging area and vehicle maintenance area will be constructed by the contractor in a manner to minimize the runoff pollutants.

Furnish one SW3P permit posting sign and sign support as detailed on the SW3P Sheet. Install this sign in a location selected by the Engineer. The sign and support should be removed upon completion of the project and is the property of the Contractor. The purchase of the sign and support, installation, relocation(s) if determined necessary by the Engineer and removal at project end will be subsidiary to Item 506.

SEDIMENTATION BASINS:

Since the area disturbed is less than 10 acres, per outfall location, a sedimentation basin is not required.

STATE OF TEXAS
CHRIS O. PRUITT
126063
LICENSED PROFESSIONAL ENGINEER

Chris O. Pruitt, P.E. 10/21/20

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WACO DISTRICT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

SHEET 1 OF 1

FED. RD. DIV. NO.	STATE	CONT	SECT	JOB	HIGHWAY
6	TEXAS	0231	03	152	IH 14
		DIST	COUNTY		SHEET NO.
		WACO	BELL		152

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

1. Prior to TxDOT allowing the Contractor to start construction, the Contractor will provide the required storm water and 404 permit documentation and support activities, including but not limited to the following:

   - Provide a list of all chemicals, construction and waste products that will be generated, stored or brought upon TxDOT ROW. The list includes expected construction debris, sanitary wastes, construction chemicals and petroleum products used or generated by the Contractor and sub-contractors. Along with the list, the Contractor will supply a spill prevention plan and clean up procedures that will include each of these chemical products or generated waste.

   - Provide in the construction schedule the necessary line items that will comply with the schedule and planning requirements of the storm water permit.

   - Post the TxDOT storm water permit and any Contractor permits, per permit requirements.

   - Provide copies of storm water permits for Contractor PSL(s). As new PSL(s) may be obtained for the project, provide copies of new or amended permits to TxDOT. The Contractor will not disturb soil without the proper permits.

   - Provide scale drawings of off ROW PSL's within one mile of the project, for field offices, borrow sources, plant sites or other uses.

   - Provide permit information on any Contractor batch plants or concrete crushing plants to be located at a Contractor PSL(s) within one mile of the project limits or boundaries. Copies of the air and water permits are to be provided to TxDOT before materials will be used on the project. No asphalt or concrete batch plants or concrete crushing plants will be located on TxDOT ROW.

   - Provide a letter indicating a Contractor Responsible Person for environmental compliance (CRP) for the project, and maintain a CRP throughout the project duration.

   - Provide all environmental documentation including certification of compliance and EMS training documents/certificates prior to starting work. The Contractor is to provide daily BMP inspection reports that document all field BMPs needing repair or replacement. The Contractor is to clearly document specific BMPs needing repair and location each work day. The Contractor is encouraged to be proactive in fixing BMPs without TxDOT direction.

   - Provide documentation required for Waters of the US, Note #3 and submittals for Item 496 bridge removal. Bridge removal methods submitted will follow all Waters of the US note requirements. The Contractor is not to start construction within the Ordinary High Water Marks of any stream until receiving approval for stream channel construction methods from TxDOT.

   - Provide a written procedure for managing all chemicals and construction items placed in vertical containment structures. Also, provide methods to be used for the treatment, disposal, collection or release of storm water.

   - Provide an estimated date by letter, for the submittal of marked up bridge drawings, indicating cut locations for any structural steel requiring cutting or torching of steel, coated with lead containing paints.

2. Place and maintain trash cans and portable sanitary facilities at locations where there is active construction. Worker generated trash and construction debris will be kept from being transported by storm water and will be collected daily from the ground and routinely hauled from the work area.

3. Contractor will provide TxDOT copies of all correspondence with MS4s, TCEQ, EPA, DSHS and Corps of Engineers regarding activities on this project.

4. Contractor to conduct storm water inspections and develop SWPPP documents to support Contractor permits obtained for the project including PSL(s).

5. Contractor will maintain written documentation of locations of all portable sanitary facilities. The Contractor is required to document the location and disposition of all spills and cleanups from portable sanitary facilities.

6. Contractor will not store chemicals on TxDOT ROW, unless chemicals are stored following all environmental and safety regulations. Fuels for construction equipment will not be stored on TxDOT ROW.

7. The Contractor will store fuels and bulk chemicals on Contractor PSL(s) using a secondary containment method, such as double lined tanks and/or free standing containment reservoirs made of plastic or steel designed to hold bulk chemicals or drums.

8. The Contractor will not remove sediment controls without the prior approval of TxDOT, except for a sediment control that may back up water and cause safety or traffic problems.

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

9. Any sediment controls removed by the Contractor must be re-installed before the next rainfall event or by the end of day, as approved in advance.

10. Vegetative buffer strips may be used in place of temporary sediment controls such as silt fences and rock filter dams. The amount of disturbed soil area will be limited to 1/3 of an acre or less for a minimum of 50 feet of grassed ditch and 2/3 of an acre of disturbed soil for a minimum of 100 feet of grassed ditch.

11. Construction equipment found to be leaking oil, fuel or coolant will be immediately stopped, the leaking fluid collected and the equipment fixed. Equipment continuing to leak will be removed from the project at no cost to TxDOT. Leaking fluids from equipment will be collected and removed from the project or PSL.

12. Earth berms or mounds typically used to stockpile topsoil and used in place of boundary silt fence will be seeded upon being constructed. Long term use of earth berms or mounds will not be continued without establishing grass on the control.

13. The Contractor will inform TxDOT of new areas where soil will be disturbed to facilitate planning for new sediment controls. Areas of vegetated soil will not be disturbed by the Contractor, unless adequate sediment controls can be installed before the next rainfall event. The Contractor will assist TxDOT in keeping an accurate set of working SWPPP drawings that show the locations of all temporary sediment and erosion controls.

14. The Contractor will maintain an adequate amount of temporary sediment controls on hand at the field office or project staging area for critical SWPPP maintenance, including silt fence (minimum of 200 feet) and rock / fabric for rock filter dams (minimum for 100 feet of Type III dams).

    The requirement for BMP rock quantities on hand is waived for small projects for on and off system bridge installations. The Contractor having a BMP Subcontractor does not eliminate the requirement for the Contractor to have the required silt fence and rock on hand, typically stored at the Contractor PSL.

15. Failure of a sub-contractor to complete storm water work on time will require the Contractor to start storm water sediment control work immediately and complete the work with high priority, or be subject to stop work on the entire project.

16. Earth materials on roads as a result of soil tracking will not be allowed to be transported off ROW in storm water. Soil or rock material found on roadways deposited from Contractor equipment will be removed daily.

17. Unless approved, completed concrete curb inlets will not be blocked by sediment controls. The contractor will frequently sweep the completed or partially completed roadway to keep sediment out of drainage pipes.

18. The Contractor will be responsible for proper dust control and will route construction traffic in a manner that minimizes dust generation.

19. Water for dust control will contain no pollutants, but may be non-potable from upland stock ponds. No quantity of water to be used for construction purposes may be taken from a 404 stream, prior to the proper authorizations or permits being obtained by the Contractor.

20. Contractor is to direct workers and sub-contractors to use portable sanitary facilities provided by the Contractor and not to trespass off ROW.

21. Contractor will provide written verification to TxDOT that earth borrow pits and disposal sources meet environmental and regulatory requirements, prior to use. Excavations will meet all OSHA requirements and the current safety guidelines established for TxDOT Quarries and Pits.

22. Boundary silt fences that are terminated down slope, with one end being at the lowest elevation, will be installed with an L - hook to contain sediment. Boundary silt fences that are installed on flat ground will have L-hooks on both ends.

23. Rock filter dams across ditches will be constructed where the rock filter dam ends are embedded within the ditch side slopes and ditch bottom. The top center elevation of the rock filter dam will be at least 6 inches lower than the elevations on the rock filter dam ends.

24. Silt fence will be constructed in a U or V pattern across ditch lines and up the ditch side slope to keep storm water from flowing around the ends of the silt fence. Small silt fences that do not adequately span the ditch and allows storm water around the end(s) will not be used. Where there is adequate space, large U pattern silt fences are preferred to facilitate sediment collection and sediment removal with equipment.

25. Sediment controls (RFDs or silt fences) will be located along road ditches as marked on the SWPPP drawings. Modifications to the sediment control spacing will be adjusted during the project based on sediment control effectiveness. The installation and maintenance of sediment controls at or near outfalls, where storm water leaves TxDOT ROW, takes persistent over ditch line sediment controls.

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

26. Storm water draining sheet flow over disturbed soil sloped towards the ROW property line, will be intercepted by a boundary silt fence typically installed with L-shaped ends.

27. For ditch grading and shoulder up work, the Contractor is limited during good weather to remove up to one mile (limited to five acres of disturbed soil) of ditch line sediment controls; on one side of the roadway. Outfall controls cannot be removed during this activity. Ditch line controls must be replaced upon completion of work and before the next rain event.

28. Sediment controls damaged by the Contractor, as defined by permit, must be fixed or replaced immediately upon discovery.

29. Notches in silt fences are not typically allowed. Specific silt fences that back up water onto lanes of traffic may be notched if approved.

30. For silt fence maintenance, the Contractor will leave approximately 4 inches of deposited sediment up stream of silt fences and not over excavate around silt fences or rock filter dams.

31. The Contractor will inform TxDOT of new construction areas and where soil is planned to be disturbed. Sediment controls will be installed at outfalls prior to the Contractor beginning soil disturbing activities up slope from the outfall.

32. Water from concrete saw cutting, concrete grinding and concrete coring activities; or fine materials from concrete chipping and salvage will not be allowed to enter storm drains or enter streams.

33. Storm water containing suspended sediment and turbidity needing to be removed from excavations or low areas will be pumped or gravity drained through vegetated buffer strips (50 foot minimum) or placed in ditches with temporary sediment controls, prior to the water being discharged into a stream.

34. Uncontaminated water from natural groundwater seepage, springs, foundations and drains that does not contain suspended sediment or any pollutants may be discharged without storm water controls.

35. Lime or cement if spilled in ditches or outside the defined limits of application is considered a pollutant and will be excavated and removed the same day, to avoid contaminating streams.

36. If located along the project ROW, RAP stockpiles will be located where there is a minimum 100 feet of vegetative buffer strip before storm water will reach a stream. RAP will not be used as a construction material within the Ordinary High Water Marks of a stream channel of a 404 designated stream.

37. If allowed on the project, concrete truck wash out areas will have adequate volume to allow 12 inch freeboard for rain and will be lined with 6 mils of plastic. No concrete will be stored higher than the 12 inch freeboard. Cleaning of truck chutes and equipment does not constitute concrete truck wash out and this activity may be completed at the concrete placement location. Wash out areas will not be located closer than 50 ft from down slope inlets or stream channels.

38. For outfalls near stock ponds closer than 50 foot from disturbed soil at the ROW line, redundant sediment controls will be provided, typically a combination of rock filter dam and a silt fence constructed in line of the flow.

39. Earth stockpiles will utilize silt fence sediment controls, positioned on the low end of the stockpile drainage area with L-hooks or silt fence installed around the entire stockpile.

40. Sediment controls including rock filter dams and silt fences will not be installed across any 404 streams. Sediment controls at 404 streams will be positioned to limit sediment entering the stream from the banks and around structures/culverts, and will allow free flow of storm water to pass through the ROW without being dammed by any sediment controls. Remove loose materials from stream channels prior to each rain event.

41. Sediment controls for non-404 streams may be constructed across the drainage channel in unlimited locations. It is appropriate to use sediment control details typically used for 404 streams for non-404 streams when flow velocities are high. Remove loose material from stream channels prior to each rain event.

42. Incomplete drainage pipe installation across the roadway does not remove the requirement for having sediment controls around the ends of the pipe. To stay within permit requirements, sediment controls should be installed over and around the terminated end and along each side of the banks as soon as construction on the pipe has been completed. Remove loose material from stream channels prior to each rain event.

43. Safety end / headwall construction temporarily will require the removal of part of the sediment control placed over and around the pipe end. Retain in place as much functioning sediment control as possible. Replace the silt fence over and around the top of the pipe, immediately upon concrete placement and form removal. Do not remove culvert sediment controls that cannot be replaced before the next rain event. Sediment control at the ends of culverts must be in place and available for any rain event until the disturbed soil areas are re-vegetated.

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

44. Between the Ordinary High Water Marks of a 404 stream channel, the Contractor will disturb only the minimum amount of stream channel that is necessary to complete the work.

45. Rock riprap for erosion control does not replace the requirements to maintain sediment control until vegetation is re-established. Replace sediment controls immediately after installing erosion rock.

46. At the direction of TxDOT, sediment deposited into existing and new culverts will be removed subsidiary to Item 506. Sediment to be removed is either pre-existing material before construction starts or sediment generated as a part of this project.

47. Provide treated 2X4 cross bracing for rectangular inlet silt fence, subsidiary to Item 506.

48. Loose or granular earth materials will not be used to repair silt fence undercuts. Silt fence undercut repairs will be conducted with well compacted soils or the silt fence will be reset in a nearby location.

49. Silt fence steel T posts of approximately 1.25 pounds per foot are allowed at a spacing of 8 feet or less. Silt fence steel T posts between approximately 1.25 pounds per foot and 0.85 pounds per foot are allowed for T post spacing of 5 feet or less.

50. Silt fence to be used to slow the flow of storm water down slopes will be positioned approximately horizontal (on the contour) with L hooks on the ends and limited to approximately 200 feet in length. Multiple sections and levels of silt fence may be required in addition to temporary / permanent erosion control flumes.

51. Soil retention blankets will be installed rolled down the slope with the small dimension side embedded at the top of slope, unless recommended otherwise by the manufacturer. Excess grass, rocks, trash, debris or clods will be removed before seeding and installing soil retention blankets. All installations will be by the manufacturer recommendations. Contractor equipment, including tractor mowers will be kept off areas with soil retention blankets until the grass is established.

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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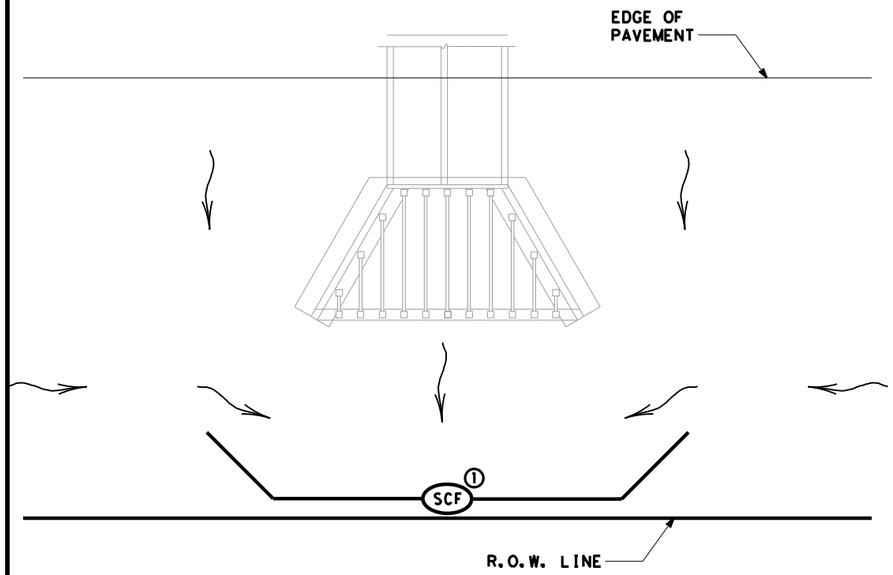
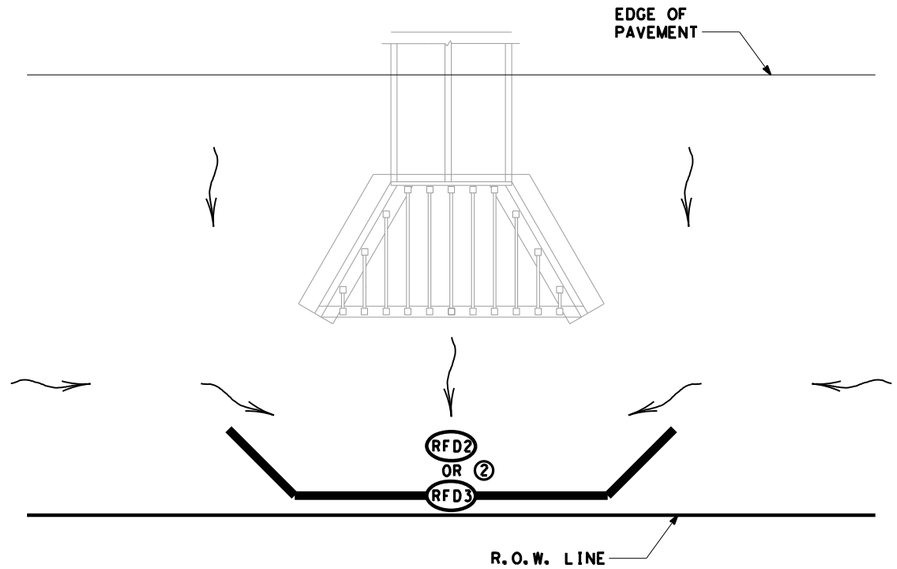


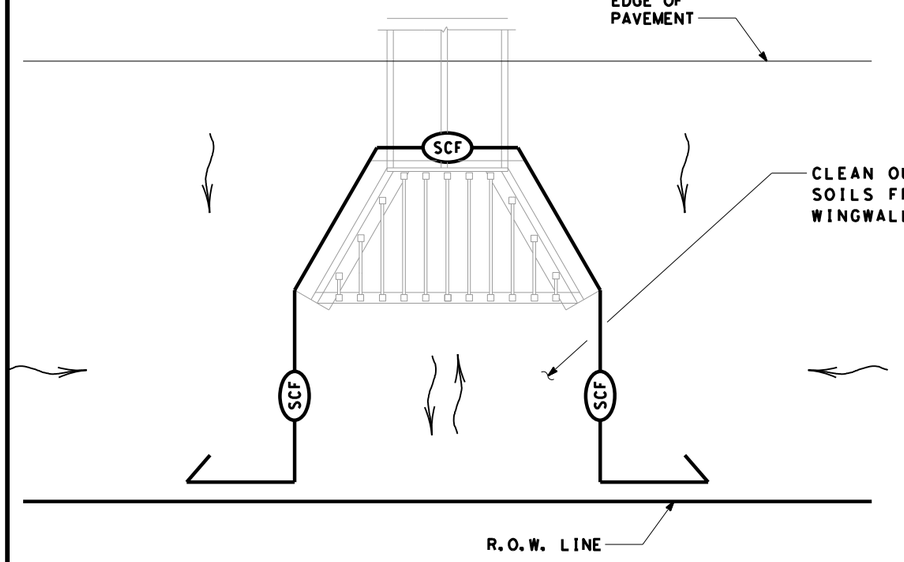
BEST MANAGEMENT PRACTICE (BMP) #1

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



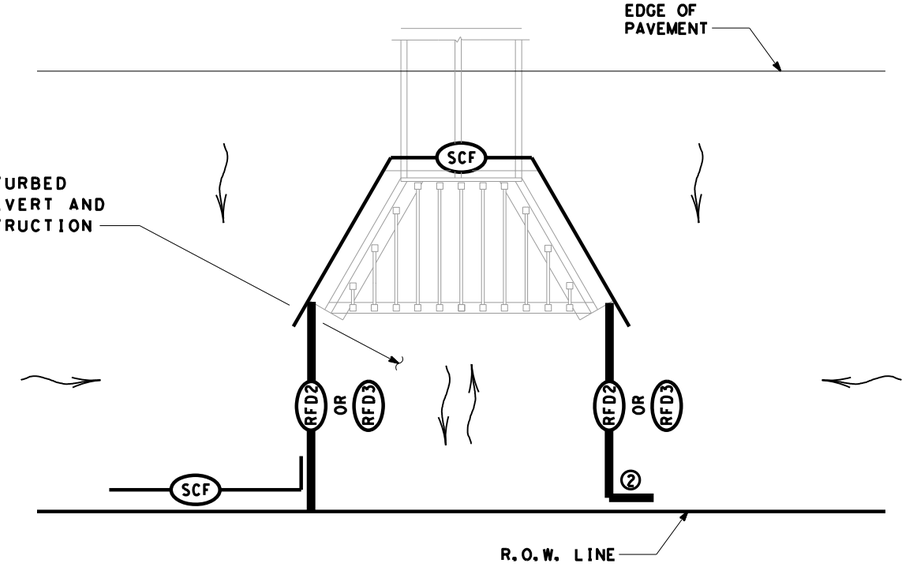
BEST MANAGEMENT PRACTICE (BMP) #2

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #3

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #4

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

1. EXTEND SILT FENCE SO STORM WATER DOES NOT GO AROUND THE ENDS. USE L-HOOKS ON ENDS AS REQUIRED.
2. EXTEND ROCK FILTER DAM SO STORM WATER DOES NOT GO AROUND THE ENDS.

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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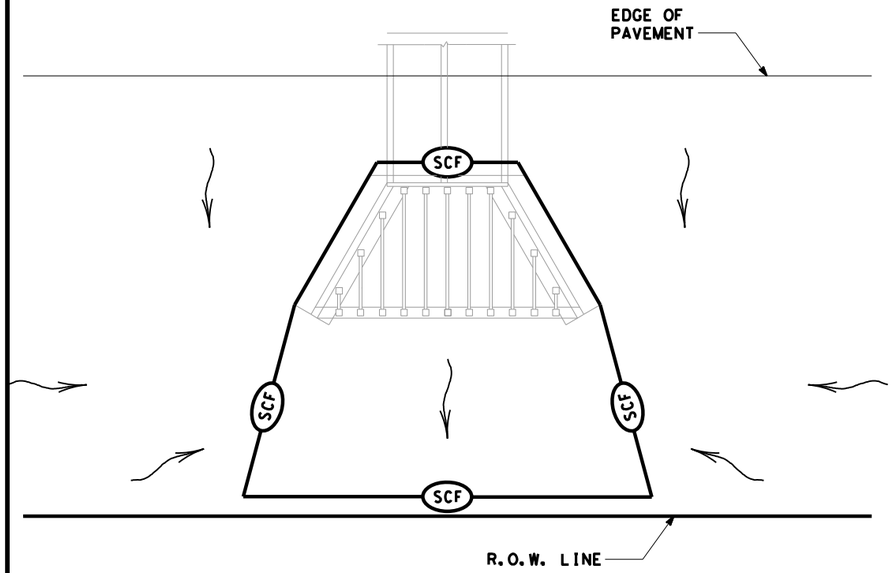
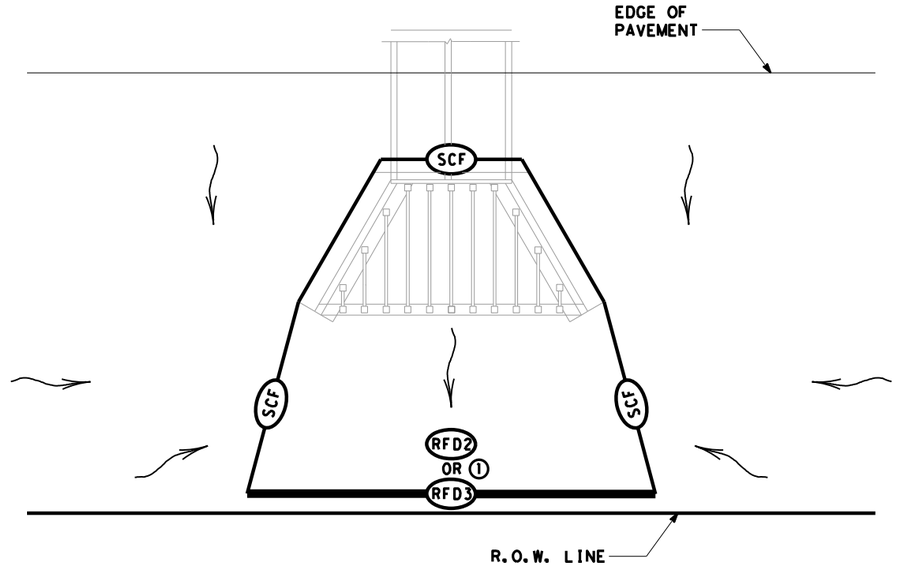


BEST MANAGEMENT PRACTICE (BMP) #5

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #6

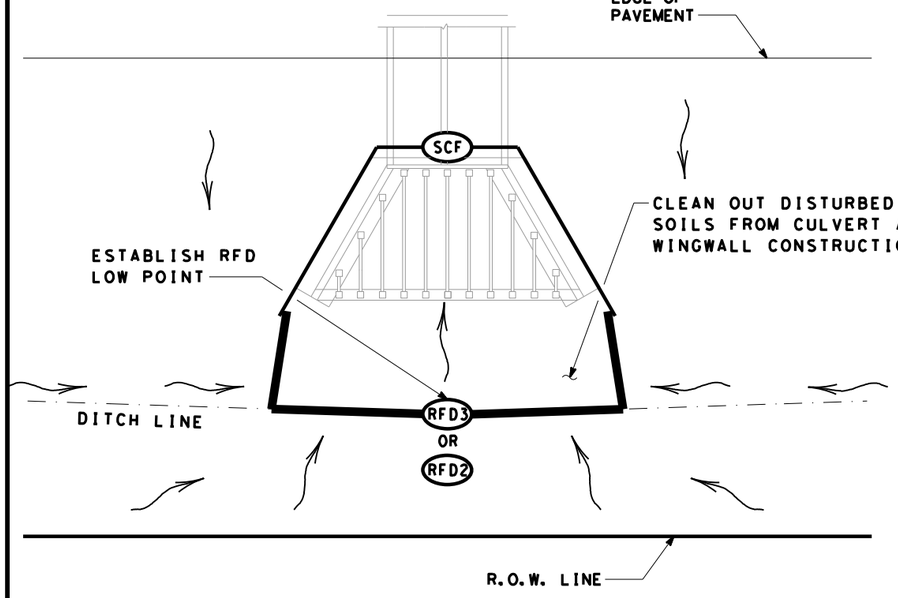
FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

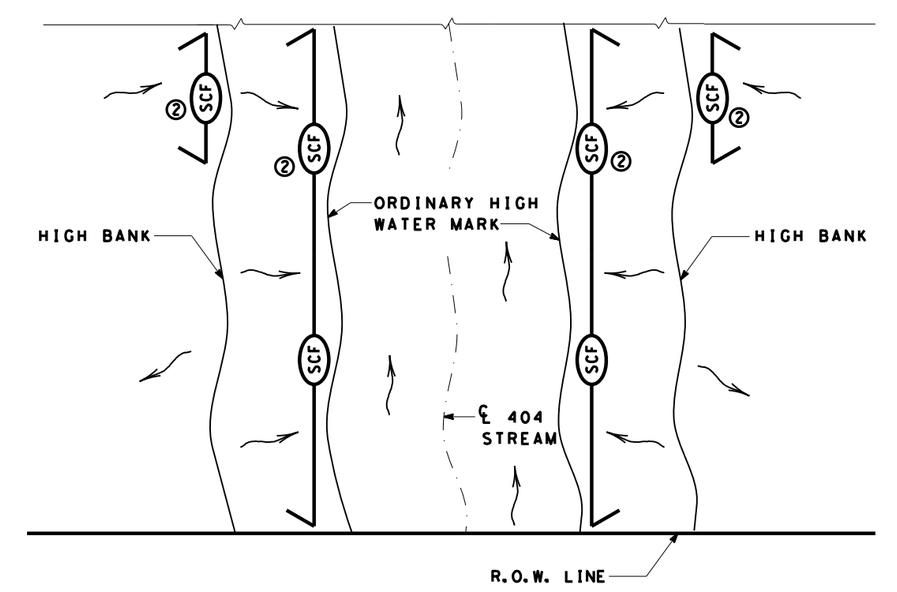
① PROVIDE OVERLAP OF SILT FENCE WITH ROCK FILTER DAM.

② USE SILT FENCE L-HOOKS ON ENDS TO BLOCK STORM WATER SEDIMENT



BEST MANAGEMENT PRACTICE (BMP) #7

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #8

FOR 404 STREAMS ~ SEDIMENT CONTROL DURING PROJECT CLEARING AND GRUBBING

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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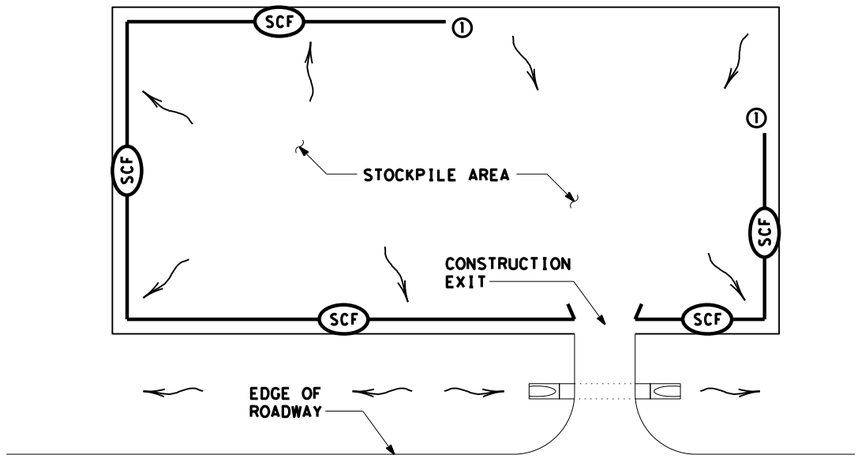
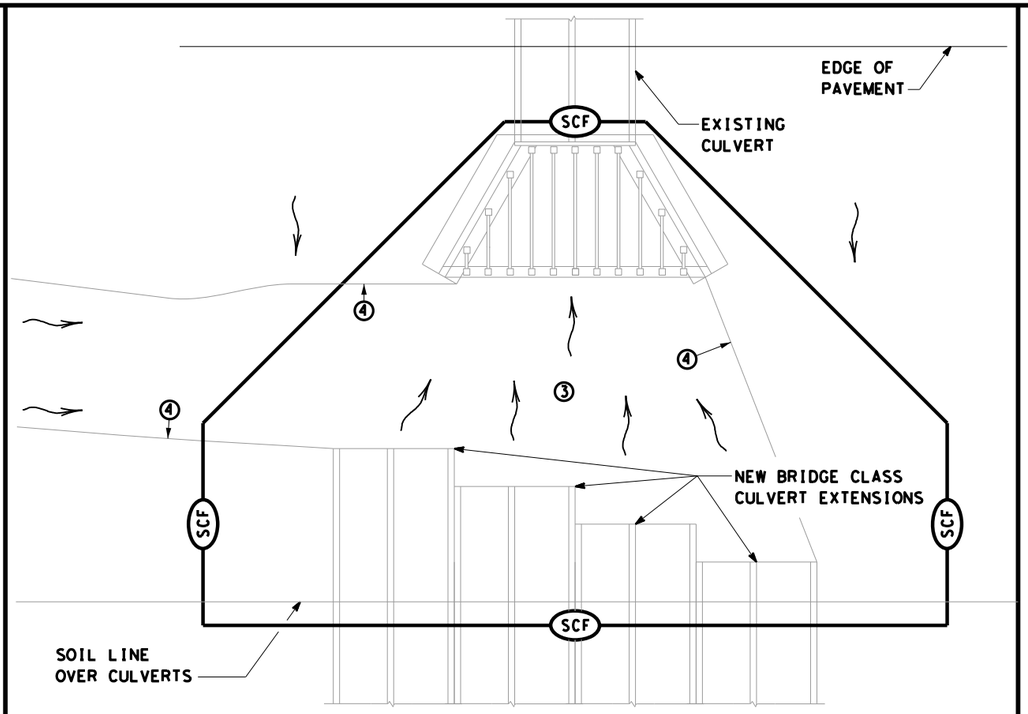


BEST MANAGEMENT PRACTICE (BMP) #9

STOCKPILE SEDIMENT CONTROL



BEST MANAGEMENT PRACTICE (BMP) #10

FOR 404 OR NON-404 STREAMS ONLY ~
SEDIMENT CONTROL AT PHASED CONSTRUCTION OF BRIDGE CLASS CULVERTS

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

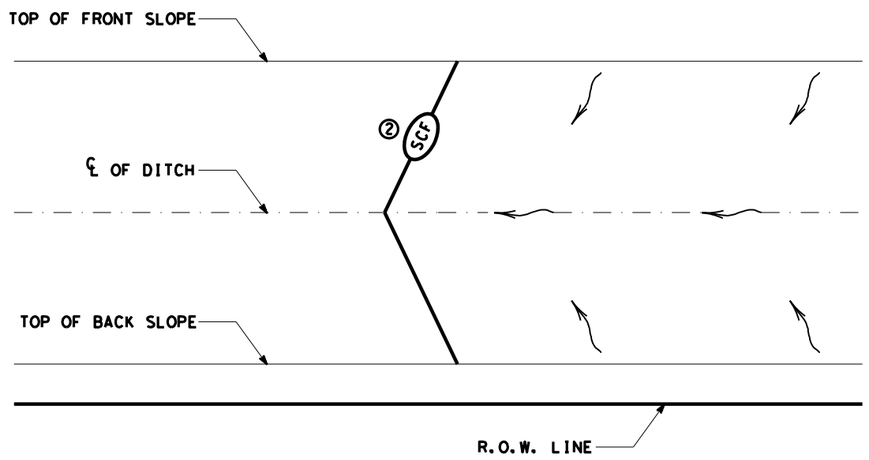
NOTES:

① START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED

② ROCK FILTER DAMS OR EARTH/GRASSED EMBANKMENTS CAN BE SUBSTITUTED AS DIRECTED.

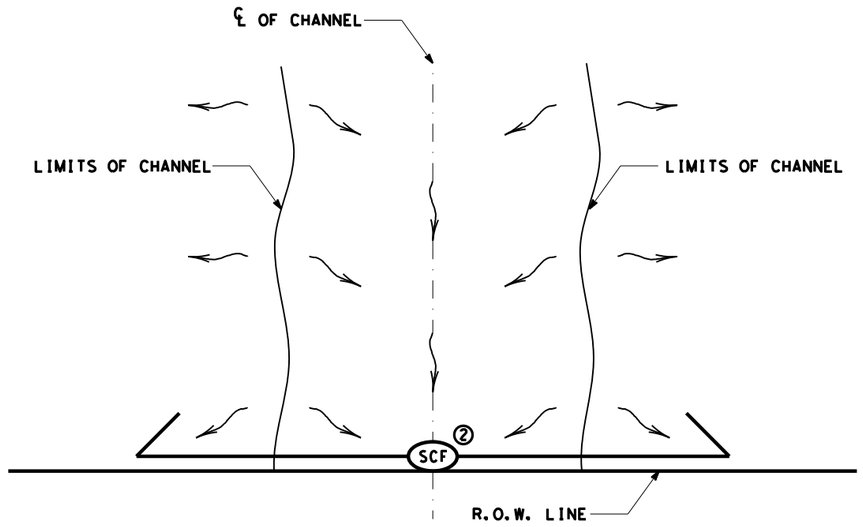
③ PROVIDE A SMOOTH TRANSITION FROM THE INVERT ELEVATIONS BETWEEN CULVERTS. REMOVE LOOSE SOIL FROM EXCAVATED AREA BETWEEN CULVERTS.

④ PROVIDE AND INSTALL PNEUMATICALLY PLACED CONCRETE ON THE DITCH BOTTOM AND SIDE SLOPES BETWEEN TEMPORARY TERMINATIONS BETWEEN OLD AND NEW CULVERTS. PNEUMATICALLY PLACED CONCRETE WILL BE PLACED TO THE HEIGHT OF THE LARGEST CULVERT ON THE DITCH SIDE SLOPES; AND TO A LIMIT 10 FEET OUTSIDE THE LOCATION OF BMPS ALONG THE DITCH BOTTOM. CEMENT STABILIZED SAND MAY BE SUBSTITUTED FOR PNEUMATICALLY PLACED CONCRETE, IN AREAS WHERE INSTALLATION WORKS AND AT THE OPTION OF TXDOT.



BEST MANAGEMENT PRACTICE (BMP) #11

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED UP SLOPE



BEST MANAGEMENT PRACTICE (BMP) #12

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED DOWN SLOPE

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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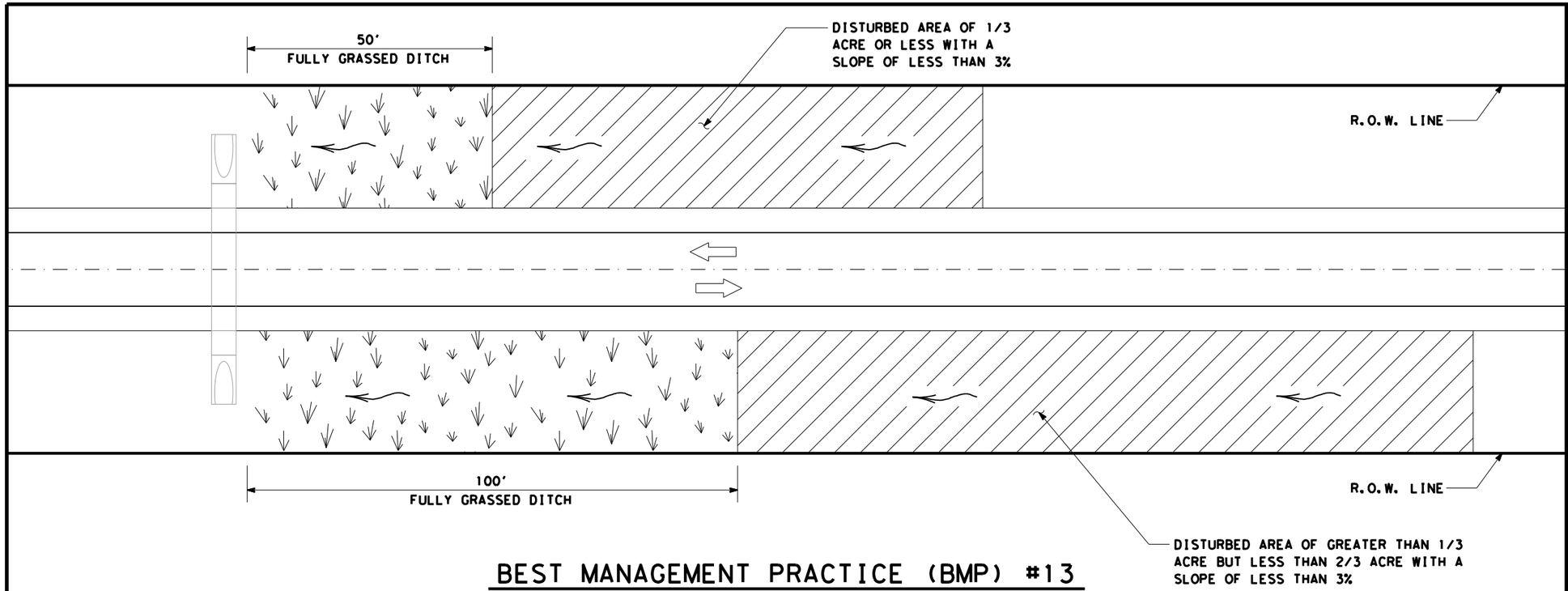
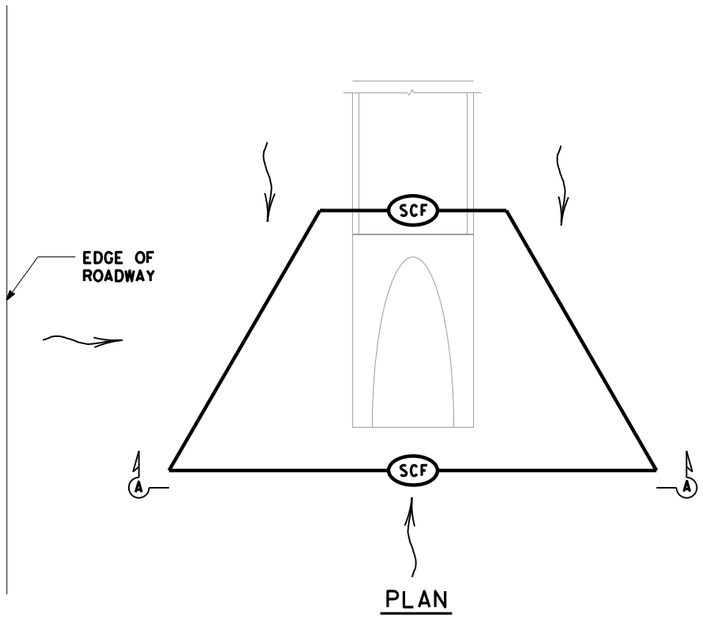
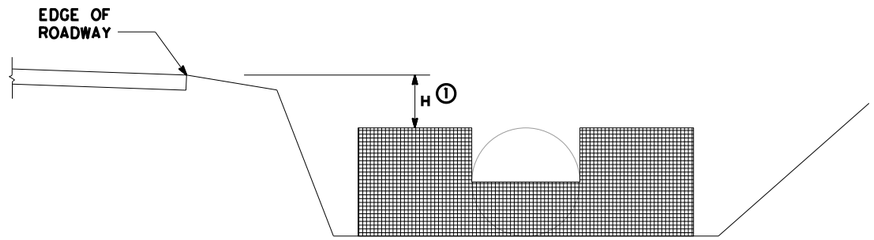


BEST MANAGEMENT PRACTICE (BMP) #13

USE OF VEGETATIVE BUFFERS IN PLACE OF TEMPORARY SEDIMENT CONTROLS SUCH AS SILT FENCE AND ROCK FILTER DAMS



PLAN



VIEW A-A

BEST MANAGEMENT PRACTICE (BMP) #14

NON-404 STREAMS AND DITCHES ONLY - SEDIMENT CONTROL AT PARALLEL DRAINAGE STRUCTURE ENTRANCE ②

	FULLY GRASSED DITCH
	DISTURBED AREA
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE

① FOR H DIMENSIONS LESS THAN 1.5' SILT FENCE MAY NEED TO BE NOTCHED AS SHOWN IN VIEW A-A. ADD EXTRA POSTS AT NOTCH.

② BMP #14 MAY BE USED AT CROSS DRAINAGE STRUCTURES AS DIRECTED.

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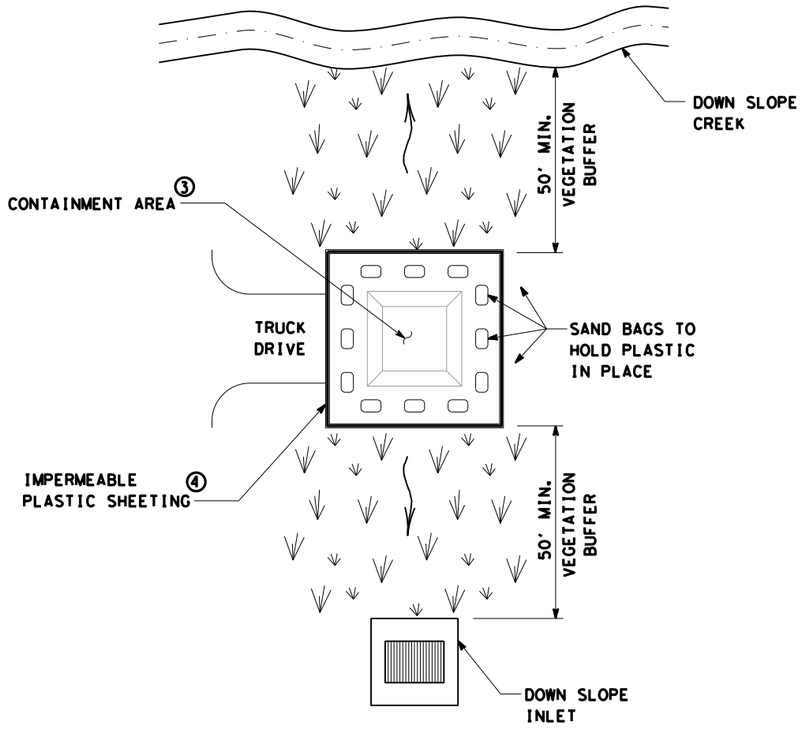
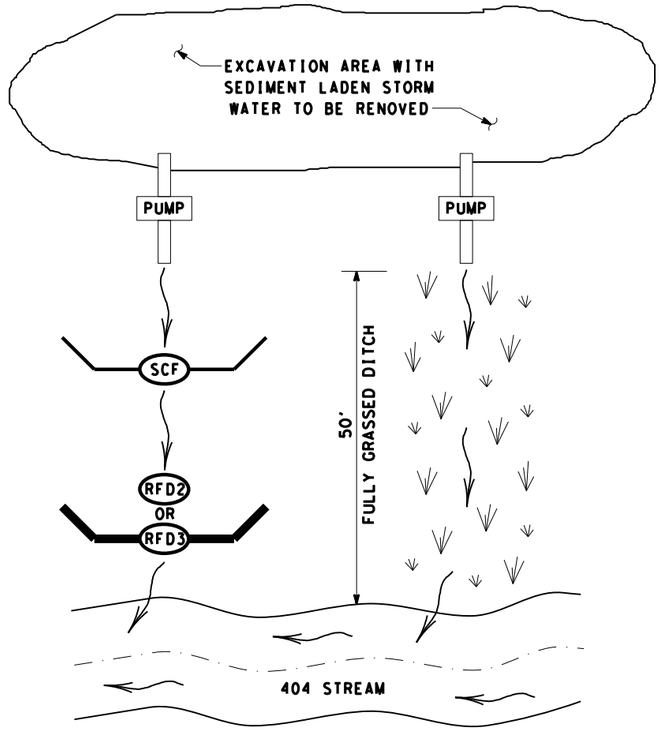


BEST MANAGEMENT PRACTICE (BMP) #15

CONCRETE TRUCK WASHOUT AREA



BEST MANAGEMENT PRACTICE (BMP) #16

PUMPED STORM WATER SEDIMENT CONTROLS ①

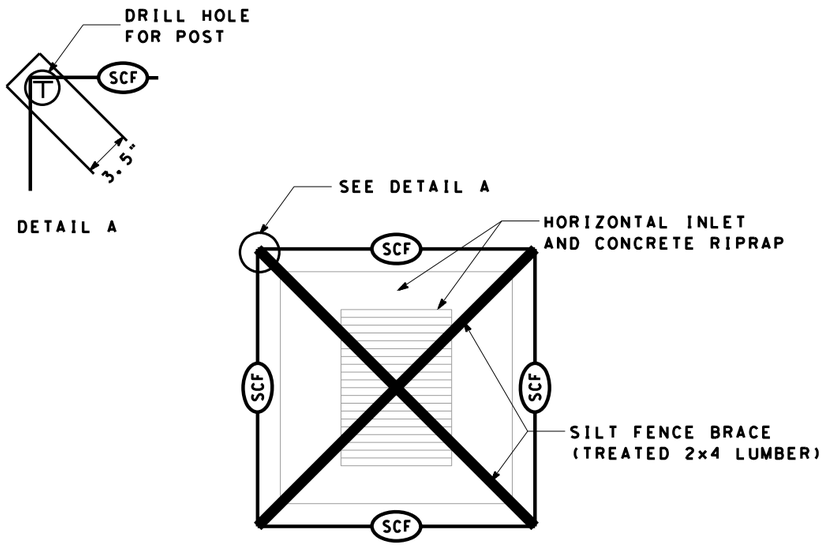
	FULLY GRASSED DITCH
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)

① PUMPED STROM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS BEFORE ENTERING A 404 STREAM.

② FOR LANDOWNER STOCKPONDS WITHIN 50' OF THE RIGHT OF WAY LINE, PROVIDE REDUNDANT SEDIMENT CONTROLS AT THE CONVEYANCE OF THE POND. MINIMUM OF TWO SEDIMENT CONTROLS.

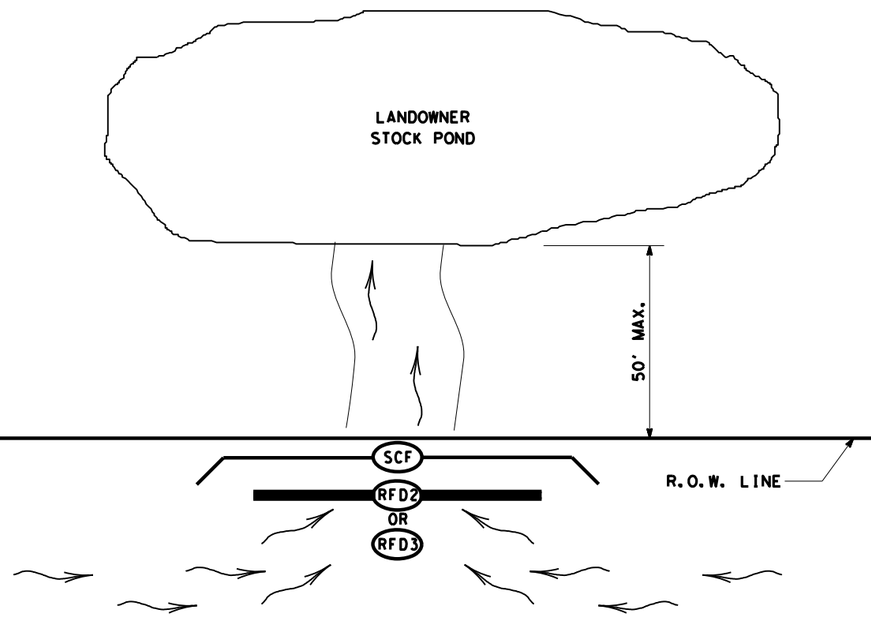
③ WHEN CONTAINMENT AREA REACHES 1' FREEBOARD, DISCONTINUE WASHOUT PLACEMENT AND REMOVE MATERIAL UPON SOLIDIFICATION.

④ EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING.



BEST MANAGEMENT PRACTICE (BMP) #17

HORIZONTAL INLET SEDIMENT CONTROL



BEST MANAGEMENT PRACTICE (BMP) #18

LANDOWNER STOCKPOND SEDIMENT CONTROL ②

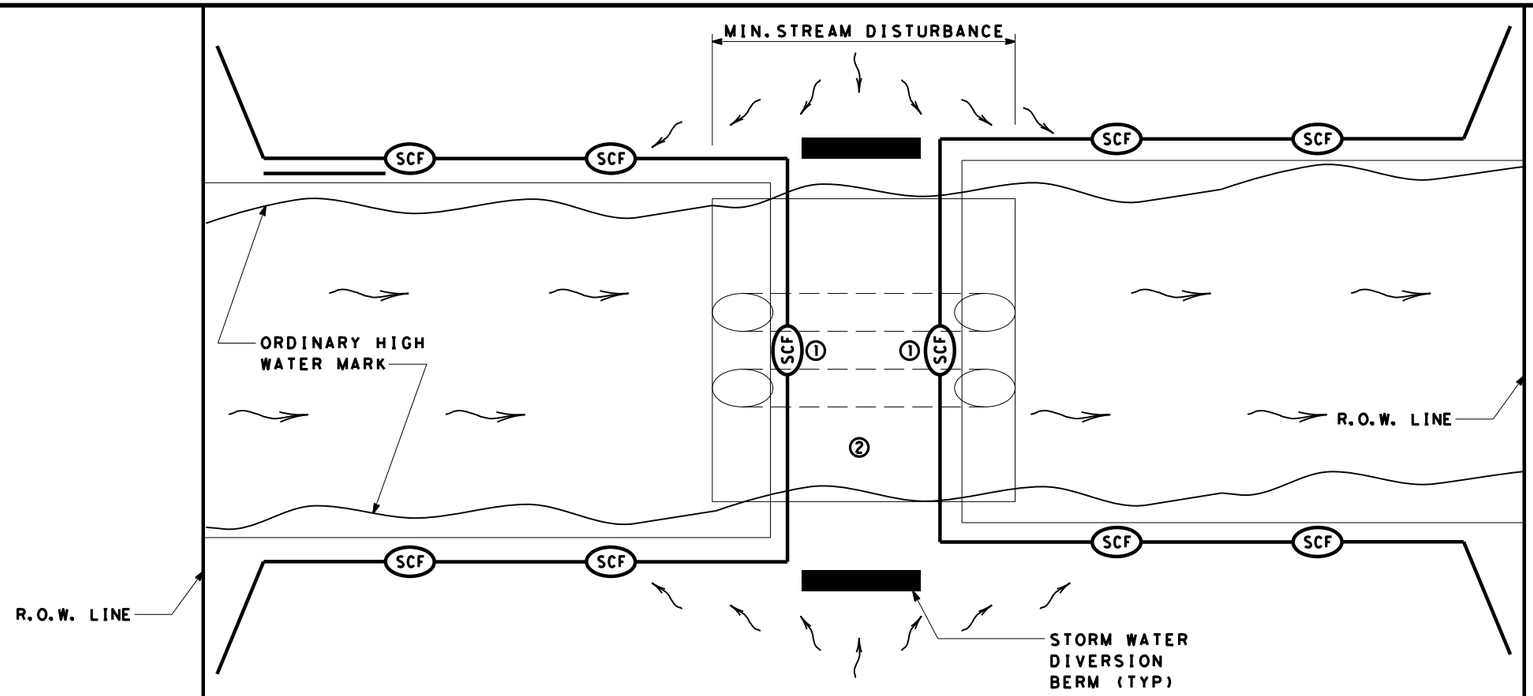
SCALE = NTS SHEET 9 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

FILE: BMPLAYOUTS.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
DEC 2013 FEB 2015	DIST	COUNTY		SHEET NO.
	WACO	BELL		161



BEST MANAGEMENT PRACTICE (BMP) #19

TYPICAL 404 STREAM CROSSING (SEDIMENT CONTROL AT CROSSING)

	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD	ROCK FILTER DAM
	SECURITY FENCING

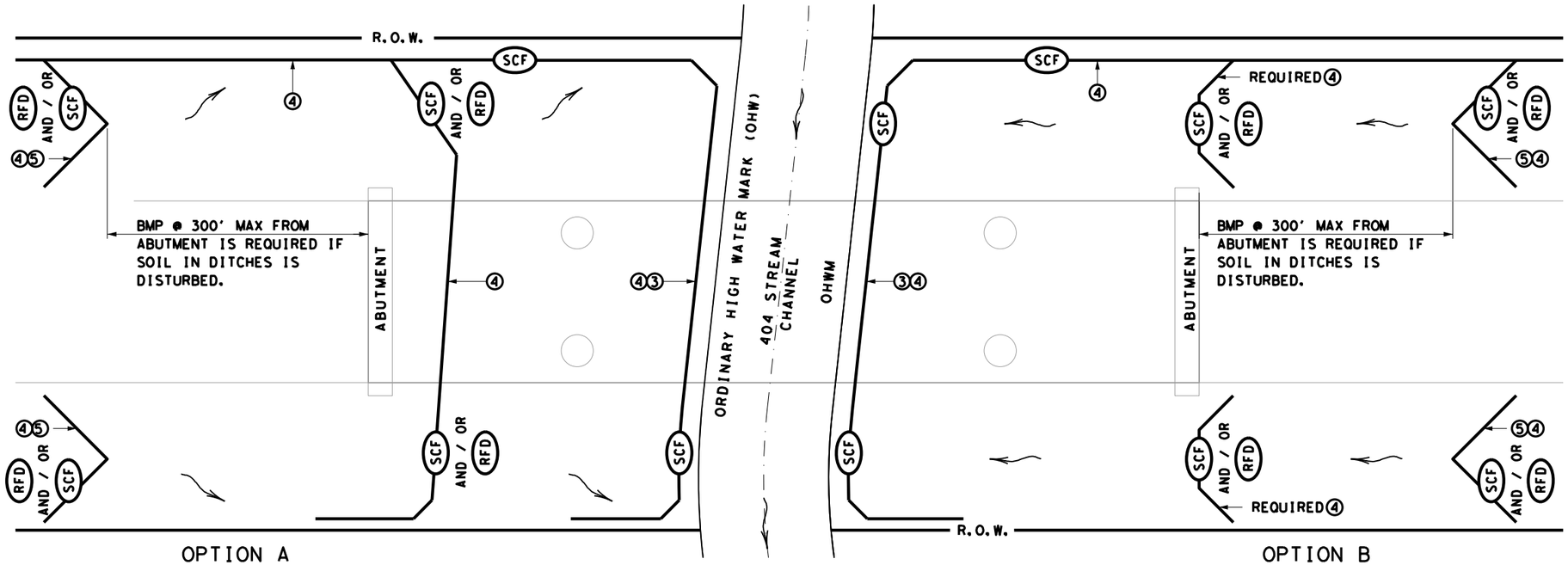
① HAY BALES MAY BE SUBSTITUTED FOR SILT FENCE OVER THE STREAM CROSSING.

② CROSSING WILL BE AS PER REQUIREMENTS OF THE WATERS OF THE US GENERAL NOTES.

③ INSTALL SILT FENCE SLIGHTLY UP FROM OHW MARK FROM R.O.W. TO R.O.W.

④ USE SILT FENCE L-HOOKS ON LEVEL OR DOWN SLOPING ENDS TO BLOCK STORM WATER SEDIMENT

⑤ INSTALL LARGE V OR U SHAPED BMP'S FROM ABUTMENT AS SHOWN. IF THERE IS STEEP DITCH CONDITIONS DECREASE SPACING AND CONSIDER RFD'S. ADD ADDITIONAL BMP'S IF GRADE IS STEEP OR IF FLOW IS HIGH.



OPTION A

OPTION B

BEST MANAGEMENT PRACTICE (BMP) #20

FOR 404 STREAMS ~ BMP'S AT BRIDGES

SCALE = NTS SHEET 10 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

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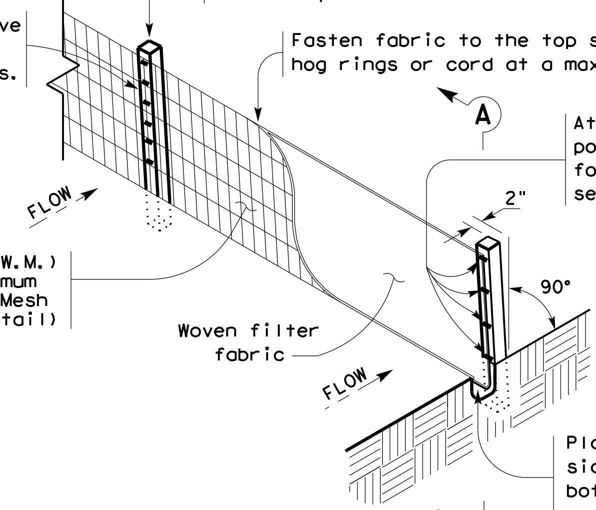
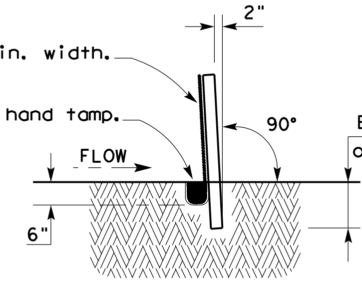
REVISIONS DEC 2013 FEB 2015	0231	03	152	IH 14
	DIST	COUNTY		SHEET NO.
	WACO	BELL		162

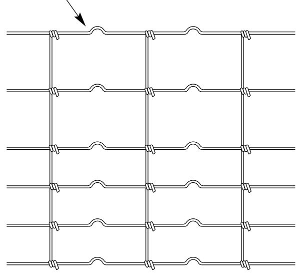


TEMPORARY SEDIMENT CONTROL FENCE

SCF



SECTION A-A



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

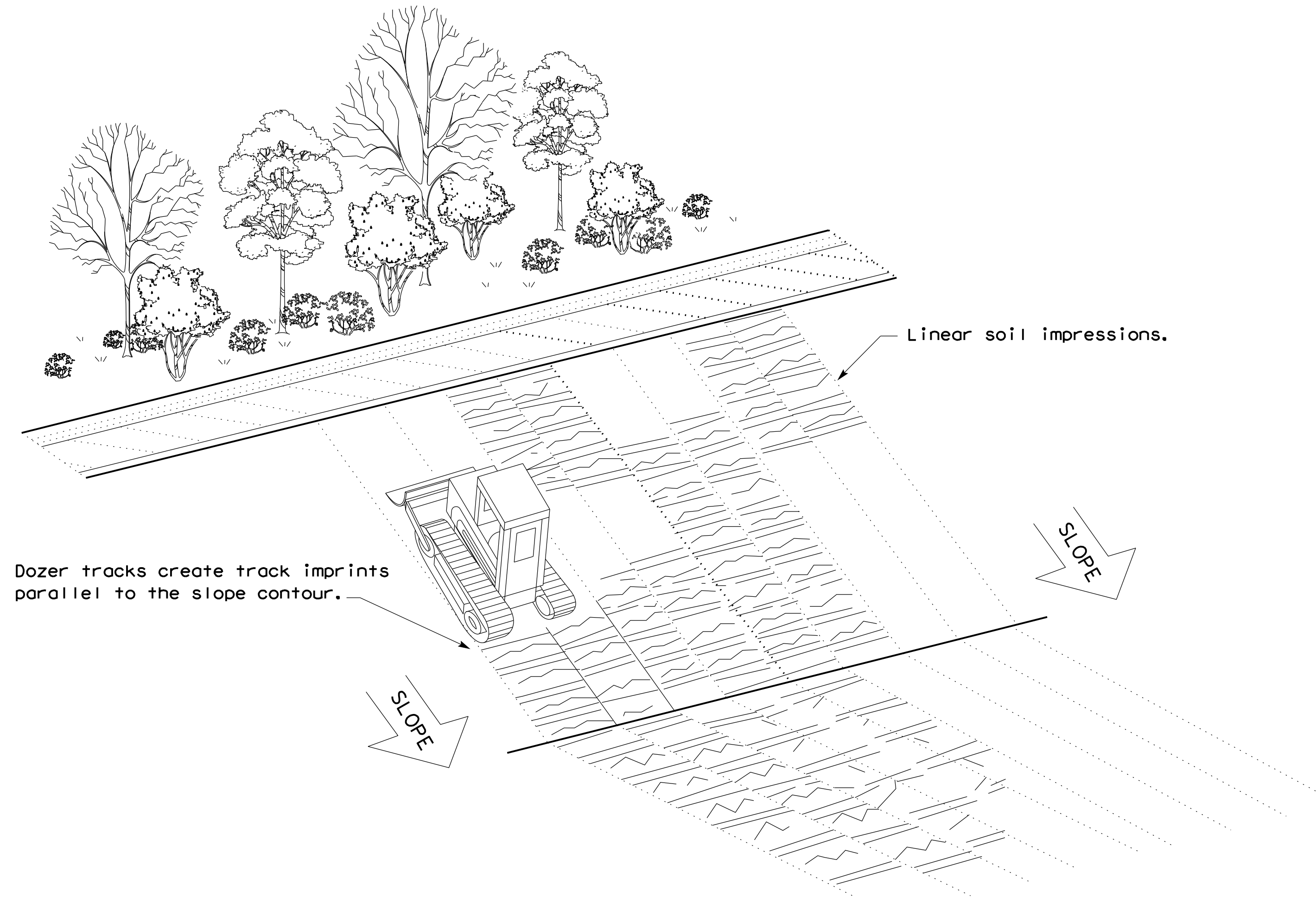
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0231	03	152	IH 14	
	DIST	COUNTY		SHEET NO.	
	WACO	BELL		163	

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10/28/2020
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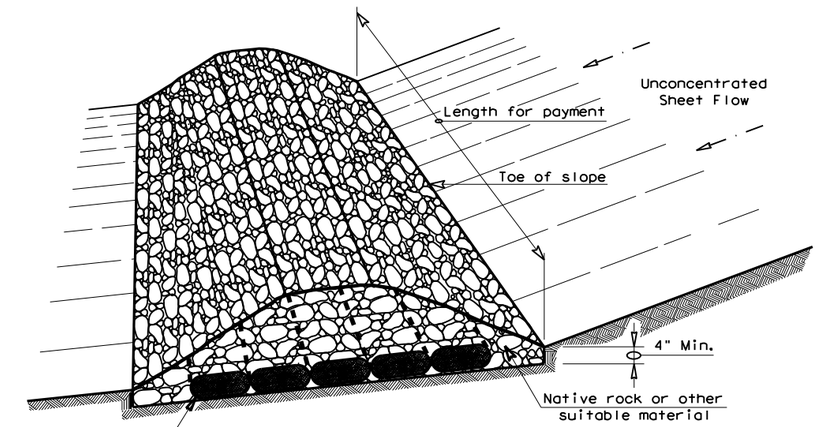
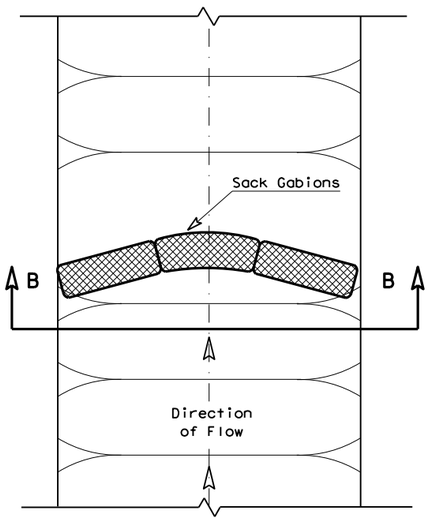
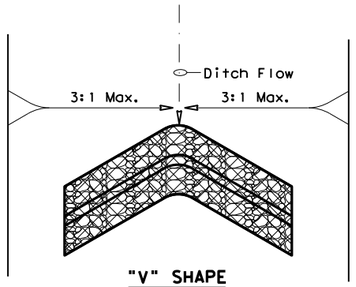


FILTER DAM AT TOE OF SLOPE

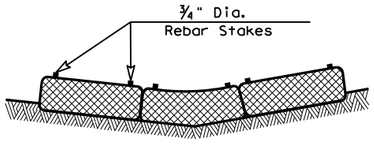
RFD1



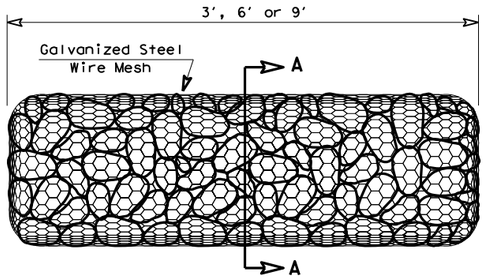
PLAN VIEW



"V" SHAPE PLAN VIEW

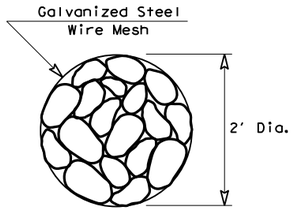


SECTION B-B

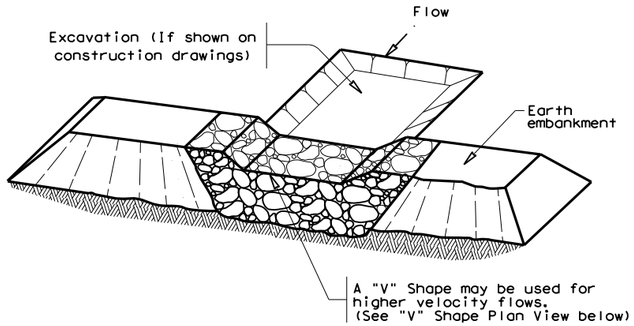


TYPE 4 (SACK GABIONS)

RFD4

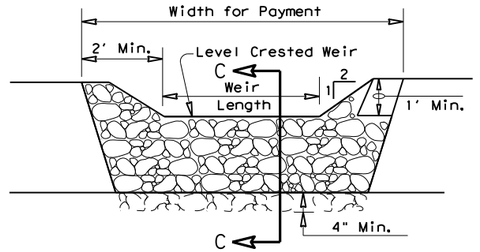


SECTION A-A

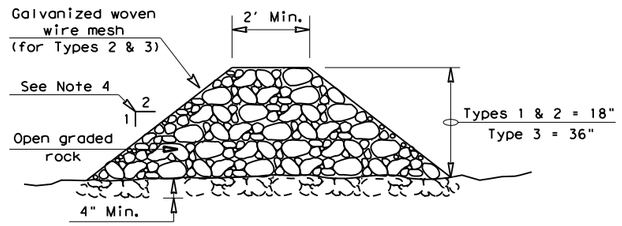


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

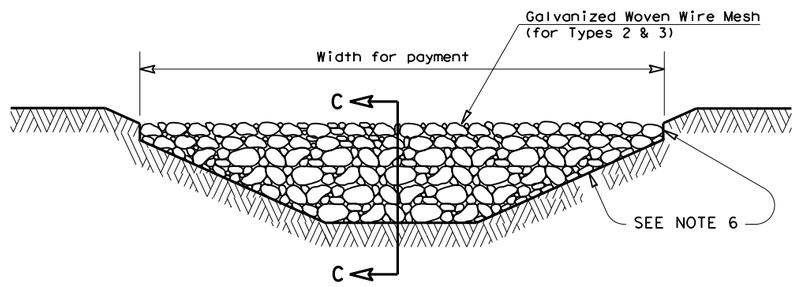
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0231	03	152	IH 14
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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.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000

2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.

3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.

4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

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

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

☒ No Permit Required

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

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

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1.

2.

3.

4.

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

☐ No Action Required ☒ Required Action

Action No.

1.

2.

3.

4.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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

☐ Yes ☒ No

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

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

☐ Yes ☐ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC

FILE: epic.dgn	DN:	CK:	DW:	CK:
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0231	03	152	IH 14
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY		SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	WACO	BELL		165