INDEX OF SHEETS

SEE SHEET 2

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PROJECT NO.			
C 27-8-182			
CONT	SECT	JOB	HIGHWAY
0027	08	182	US 90A
DIST	COUNTY		SHEET NO.
HOU	FORT BEND		1

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

PROJECT NO: C 27-8-182

CSJ: 0027-08-182

HIGHWAY: US 90A

COUNTY: FORT BEND

LIMITS: US-59/IH-69 TO PRESENT ST

FOR THE CONSTRUCTION OF CORRIDOR TRAFFIC MANAGEMENT
CONSISTING OF ADVANCED TRAFFIC MANAGEMENT SYSTEM

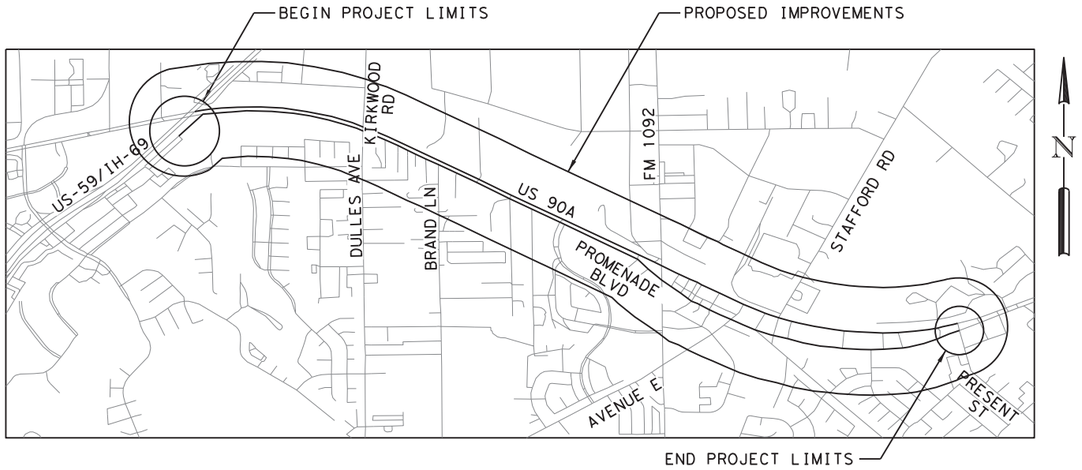
SPEED LIMIT: 55 MPH

2021 ADT: 55,199

2041 ADT: 77,279

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH THE LATEST BC STANDARDS AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

TDLR INSPECTION NOT REQUIRED



VICINITY MAP
NTS

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER

10/20/2023

1. SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED SPECIAL LABOR PROVISIONS FOR ALL STATE CONSTRUCTION PROJECTS (SP000---008).

2. FOR BARRICADES AND SIGNING ALONG THE ROADWAY AND AT INDIVIDUAL INTERSECTIONS REFER TO STANDARD SHEETS, WZ(BTS-1)-13 THRU WZ(BTS-2)-13, TCP(1-1)-18 THRU TCP(1-4)-18, TCP(2-4)-18 THRU TCP(2-6)-18, TCP(5-1)-18, AND TCP(61-)-18.

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

SUBMITTED FOR LETTING: 10/23/2023

P.E.

For DISTRICT TRAFFIC ENGINEER

RECOMMENDED FOR LETTING: 11/1/2023

James Koch , P.E.

For DISTRICT ENGINEER

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GENERAL ITEMS

1	TITLE SHEET
2	INDEX OF SHEETS
3, 3A - 3F	GENERAL NOTES
4	ESTIMATE AND QUANTITY SHEET
5	SUMMARY OF QUANTITIES

TRAFFIC ITEMS

6	NOTES FOR FIBER OPTIC LAYOUT
7 - 24	FIBER OPTIC LAYOUT
25 - 27	ITS TERMINATION ASSIGNMENTS

TRAFFIC CONTROL PLAN

28 - 39	* BC(1)-21 THRU BC(12)-21
40 - 41	* WZ(BTS-1)-13 THRU WZ(BTS-2)-13
42 - 45	* TCP(1-1)-18 THRU TCP(1-4)-18
46 - 48	* TCP(2-4)-18 THRU TCP(2-6)-18
49	* TCP(5-1)-18
50	* TCP(6-1)-12

STANDARD DETAILS

51 - 60	* ITS(27)-16, ITS(28)-16, ITS(29)-22, & ITS(30)-16 THRU ITS(36)-16
61 - 64	* ITS(37)-22, ITS(38)-17, ITS(39)-16, & ITS(40)-17
65 - 66	* ITS(42)-16 & ITS(43)-16
67	* LANDSCAPE PAVERS (HOU)
68	* ED(4)-14

ENVIRONMENTAL ISSUES

69	* EC(1)-16
70 - 71	* SWP3
72	* EPIC

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

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER

11/22/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-512

Texas Department of Transportation

US 90 ALTERNATE

INDEX OF SHEETS

(SHEET 1 OF 1)

			PROJECT NO.	
DWN: ATG	CKD: ATG		C 27-8-182	
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY	
TEXAS	HOU	6	FORT BEND	
CONTROL	SECTION	JOB	HWY. NO.	SHEET NO.
0027	08	182	US 90A	2

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General Notes:

General:

Area Engineer contact information for this project follows:

Dock S. Gee, dock.gee@txdot.gov
Yannick F. Dwatie, yannick.dwatie@txdot.gov

Submit any questions about this project via the Letting Pre-Bid Q&A web page, located at:

https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

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

Large files with relevant project documentation, such as Geotech reports, As-Built plans, and cross-sections will continue to be provided on the following FTP site:

Index of /pub/txdot-info/Pre-Letting Responses/Houston District (state.tx.us) or
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/Houston%20District/

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved, except for roadway illumination, electrical, and traffic signal items.

The cost for materials, labor, and incidentals to provide for traffic across the roadway and for ingress and egress to private property in accordance with Section 7.2.4 of the standard specifications is subsidiary to the various bid items. Restore access roadways to their original condition upon completing construction.

Clearly mark or highlight on the shop drawings, the items being furnished for this project. Submit required shop drawings in accordance with the shop drawing distribution list shown in the note for Item 5 for review and distribution.

Unless otherwise shown on the plans or otherwise directed, commence work after sunrise and ensure construction equipment is off the road by sunset.

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

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

General: Roadway Illumination and Electrical

For roadway illumination and electrical items, use materials from pre-qualified producers as shown on the Construction Division (CST) of the Department's material producers list. Check the latest link on the Department's website for this list. The category/item is "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials found on this list.

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

General: Traffic Signals

For traffic signal items, use materials from the Pre-Qualified Producers List (located at http://www.dot.state.tx.us/GSD/purchasing/supps.htm) and the materials pre-qualified for illumination and electrical items (located at http://ftp.dot.state.tx.us/pub/txdot-info/cmd/mpl/riaes.pdf) as shown on the Department's Material Producers List and the Roadway Illumination and Electrical Supplies List. Check the latest links on the Department's website for these lists. No substitutions will be allowed for materials found on these lists.

General: Site Management

Mow the grass and weeds within the project limits a maximum of 3 times a year as directed. This work is subsidiary to the various bid items.

Mark stations every 100 ft. and maintain the markings for the project duration. Remove the station markings at the completion of the project. This work is subsidiary to the various bid items.

Personal vehicles of employees are not permitted to park within the right of way, including sections closed to public traffic. Employees may park on the right of way at the Contractor's office, equipment, and materials storage yard sites.

Assume ownership of debris and dispose of at an approved location. Do not dispose of debris on private property unless approved in writing by the District Engineer.

General: Traffic Control and Construction

Schedule construction operations such that preparing individual items of work follows in close sequence to constructing storm drains in order to provide as little inconvenience as practical to the businesses and residents along the project.

This project requires extensive grading operations in an environmentally sensitive area.

If fences cross construction easements shown on the plans and work is required beyond the fences, remove and replace the fences as directed. This work and the materials are subsidiary to the various bid items.

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

General: Utilities

Consider the locations of underground utilities depicted in the plans as approximate and employ responsible care to avoid damaging utility facilities. Depending upon scope and magnitude of planned construction activities, advanced field confirmation by the utility owner or operator may be prudent. Where possible, protect and preserve permanent signs, markers, and designations of underground facilities.

If the Contractor damages or causes damage (breaks, leaks, nicks, dents, gouges, etc.) to the utility, contact the utility facility owner or operator immediately.

Be aware that an operational Computerized Transportation Management System (CTMS) exists within the limits of this project and that the system must remain operational throughout construction. If the Contractor damages or causes damage to this system, repair such damage within 8 hours of occurrence at no cost to the Department. In the event of system damage, notify the Director of Traffic Management Systems at 713-881-3283 within one hour of occurrence. Failure of the Contractor to repair damage to the main fiber optic cable and CCTV cable trunk lines, which convey all corridor information to TranStar, will result in the Contractor being billed for the full cost of emergency repairs.

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

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

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

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

Before beginning any underground work, notify the City of Houston's Chief Inspector, Public Works and Engineering, to establish the locations of any existing electrical systems for lighting facilities within the limits of this project.

Item 5: Control of Work

Submit shop drawings electronically for the fabrication of items as documented in Table 2 below. Information and requirements for electronic submittals can be viewed in the "Guide to Electronic Shop Drawing Submittal" which can be accessed through the following web link, ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/e_submit_guide.pdf. References to 11 in. x 17 in. sheets in individual specifications for structural items imply electronic CAD sheets.

Table 2

2014 Construction Specification Required Shop/Working Drawing Submittals - Consultant Generated Plans

Spec Item No.'s	Product	Submittal Required	Approval Required (Y/N)	Contractor/ Fabricator P.E. Seal Required	Reviewing Party	Shop or Working Drawing (Note 1)
7.16.1&.2	Construction Load Analyses	Y	Y	Y	D	WD
400	Excavation and Backfill for Structures (cofferdams)	Y	N	Y	D	WD
403	Temporary Special Shoring	Y	N	Y	D	WD
420	Formwork/Falsework	Y	N	Y	D	WD
423	Retaining Walls, (calcs req'd.)	Y	Y	Y	D	SD
425	Optional Design Calculations (Prstrs Bms)	Y	Y	Y	D	SD
425	Prestr Concr Sheet Piling	Y	Y	N	D	SD
425	Prestr Concr Beams	Y	Y	N	D	SD
425	Prestr Concr Bent	Y	Y	N	D	SD
426	Post Tension Details	Y	Y	N	D	SD
434	Elastomeric Bearing Pads (All)	Y	Y	N	D	SD
441	Bridge Protective Assembly	Y	Y	N	D	SD
441	Misc Steel (various steel assemblies)	Y	Y	N	D	SD
441	Steel Pedestals (bridge raising)	Y	Y	N	D	SD
441	Steel Bearings	Y	Y	N	D	SD
441	Steel Bent	Y	Y	N	D	SD
441	Steel Diaphragms	Y	Y	N	D	SD
441	Steel Finger Joint	Y	Y	N	D	SD
441	Steel Plate Girder	Y	Y	N	D	SD
441	Steel Tub-Girders	Y	Y	N	D	SD
441	Erection Plans, including Falsework	Y	N	Y	D	WD
449	Sign Structure Anchor Bolts	Y	Y	N	D	SD
450	Railing	Y	Y	N	D	SD
462	Concrete Box Culvert	Y	Y	N	D	SD
462	Concrete Box Culvert (Alternate Designs Only,calcs reqd.)	Y	Y	Y	D	SD
464	Reinforced Concrete Pipe (Jack and Bore only; ONLY when requested)	Y	Y	Y	D	SD
465	Pre-cast Junction Boxes, Grates, and Inlets	Y	Y	N	D	SD
465	Pre-cast Junction Boxes, Grates, and Inlets (Alternate Designs Only, calcs req'd.)	Y	Y	Y	D	SD
466	Pre-cast Headwalls and Wingwalls	Y	Y	N	D	SD
467	Pre-cast Safety End Treatments	Y	Y	N	D	SD

495	Raising Existing Structure (calcs reqd.)	Y	Y	Y	D	SD
610	Roadway Illumination Supports (Non-Standard only, calcs reqd.)	Y	Y	Y	D	SD
613	High Mast Illumination Poles (Non-standard only, calcs reqd.)	Y	Y	Y	D	SD
627	Treated Timber Poles	Y	Y	N	D	SD
644	Special Non-Standard Supports (Bridge Mounts, Barrier Mounts, Etc.)	Y	Y	Y	D	SD
647	Large Roadside Sign Supports	Y	Y	Y	D	SD
650	Cantilever Sign Structure Supports - Alternate Design Calcs.	Y	Y	Y	D	SD
650	Sign Structures	Y	Y	N	D	SD
680	Installation of Highway Traffic Signals	Y	Y	N	D	SD
682	Vehicle and Pedestrian Signal Heads	Y	Y	N	D	SD
684	Traffic Signal Cables	Y	Y	N	D	SD
685	Roadside Flashing Beacon Assemblies	Y	Y	N	D	SD
686	Traffic Signal Pole Assemblies (Steel) (Non-Standard only)	Y	Y	Y	D	SD
687	Pedestal Pole Assemblies	Y	Y	N	D	SD
688	Detectors	Y	Y	N	D	SD
784	Repairing Steel Bridge Members	Y	Y	Y	D	WD
SS	Prestr Concr Crown Span	Y	Y	N	D	SD
SS	Sound Barrier Walls	Y	Y	Y	D	SD
SS	Camera Poles	Y	Y	Y	TMS	SD
SS	Pedestrian Bridge (Calcs req'd.)	Y	Y	Y	D	SD
SS	Screw-In Type Anchor Foundations	Y	Y	N	D	SD
SS	Fiber Optic/Communication Cable	Y	Y	N	TMS	SD
SS	Spread Spectrum Radios for Signals	Y	Y	N	D	SD
SS	VIVDS System for Signals	Y	Y	N	D	SD
SS	CTMS Equipment	Y	Y	N	TMS	SD

Notes:

1. Document flow for Working Drawings differs from Shop Drawings in that Working Drawings must be submitted to the Engineer rather than the Engineer of Record and they are for the information of the Engineer only; an approval stamp and distribution to all project offices is not required.

Key to Reviewing Party

D – Consultant: Submit to Engineer of Record at *jsessions@emailatg.com*
TMS – Traffic Management System

Computerized Traffic Management Systems (CTMS)	HOU-CTMSShpDrwgs@txdot.gov

Item 7: Legal Relations and Responsibilities

Do not initiate activities in a Project Specific Location (PSL), associated with a U.S. Army Corps of Engineers (USACE) permit area, that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include those pertaining to, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined

here means materials are delivered to or from the PSL. The permit area includes the waters of the U.S. or associated wetlands affected by activities associated with this project. Special restrictions may be required for such work. Assume responsibility for consultations with the USACE regarding activities, including PSLs that have not been previously evaluated by the USACE. Provide the Department with a copy of consultations or approvals from the USACE before initiating activities.

The Contractor may proceed with activities in PSLs that do not affect a USACE permit area if a self-determination has been made that the PSL is non-jurisdictional or if proper USACE clearances have been obtained in jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. The Contractor is solely responsible for documenting any determinations that their activities do not affect a USACE permit area. Maintain copies of their determinations for review by the Department or any regulatory agency.

Document and coordinate with the USACE, if required, before hauling any excavation from or hauling any embankment to a USACE permit area by either 1 or 2 below:

1. **Restricted Use of Materials for the Previously Evaluated Permit Areas.**
   Document both the Project Specific Locations (PSL) and their authorization. Maintain copies for review by the Department or any regulatory agency. When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:
   a. Suitable excavation of required material in the areas shown on the plans and cross sections as specified in the Item, “Excavation” is used for permanent or temporary fill (under the Item, “Embankment”) within a USACE permit area.
   b. Suitable embankment (under the Item, “Embankment”) from within the USACE permit area is used as fill within a USACE evaluated area.
   c. Unsuitable excavation or excess excavation, “Waste” (under the Item, “Excavation”), that is disposed of at a location approved within a USACE evaluated area.

2. **Contractor Materials from Areas Other than Previously Evaluated Areas.**
   Provide the Department with a copy of USACE coordination or approvals before initiating any activities for an area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to, haul roads, equipment staging areas, borrow and disposal sites:
   a. The Item, “Embankment” used for temporary or permanent fill within a USACE permit area.
   b. Unsuitable excavation or excess excavation, “Waste” (under the Item, “Excavation”), that is disposed of outside a USACE evaluated area.

This project does not require a U.S. Army Corps of Engineers (USACE) Section 404 Permit before letting, but if a permit is needed during construction, assume responsibility for preparing the permit application. Submit the permit application to the Department’s District Environmental Section for approval. Once the permit application is approved, the Department

will submit it to the USACE. Assume responsibility for the requested revisions, in coordination with the Department's District Environmental Section.

Maintain the roadway slope stability. Maintaining slope stability is subsidiary to the various bid items.

No significant traffic generator events have been identified.

Item 8: Prosecution and Progress

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

Working days will be computed and charged based on a *5-day* workweek in accordance with Section 8.3.1.*1.*

The maximum number of days the time charges on this contract may be suspended due to contractor mobilization, and material fabrication/accumulation or processing delays is *90* days. The Engineer and the Contractor may mutually agree, in writing, to decrease this maximum number of days.

Item 100: Preparing Right of Way

Clean existing ditches under fill sections of undesirable materials including grass, muck, and trash. Perform this work in accordance with the Construction section of the Item, "Preparing Right of Way." This work is subsidiary to this bid Item.

The Item, "Preparing Right of Way" will be measured for payment only in those designated areas shown on the plans. Preparing right of way necessary to perform construction that is outside designated areas is subsidiary to this bid Item.

Remove abandoned utilities that are in conflict with the new utilities, at no expense to the Department.

Reestablish and maintain right of way stakes after completing the right of way preparation activities and until the new utilities are in place.

Item 110: Excavation

If manipulating the excavated material requires moving the same material more than once to accomplish the desired results, the excavation is measured and paid for only once regardless of the manipulation required.

Transition the ditch grades and channel bottom widths at structure locations. Use only approved channel excavation in the embankment.

Item 502: Barricades, Signs, and Traffic Handling

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

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

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

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

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

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

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

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

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

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

Before closing any City of Stafford sidewalk, one or more city street lanes, or entire city streets during construction, obtain a permit to do so from the City. Obtain the required permit in person at the City of Stafford Public Works Department.

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

Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

Item 506: Temporary Erosion, Sedimentation and Environmental Controls

The use of hay bales is not permitted as Storm Water Pollution Prevention Plan (SWP3) measures.

The Storm Water Pollution Prevention Plan (SWP3) consists of temporary erosion control measures needed and provided for under this Item. The disturbed area is less than one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7. Since the disturbed area is less than 5 acres, a "Notice of Intent" (NOI) is not required.

Use appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction staging area. Remove and dispose of materials in compliance with State and Federal laws.

Before starting construction, review with the Engineer the SWP3 used for temporary erosion control as outlined on the plans. Before construction, place the temporary erosion and sedimentation control features as shown on the SWP3.

After completing earthwork operations, restore and reseed the disturbed areas in accordance with the Department's specifications for permanent or temporary erosion control.

Implement temporary and permanent erosion control measures to comply with the National Pollution Discharge Elimination System (NPDES) general permit under the Clean Water Act.

Before starting grading operations and during the project duration, place the temporary or permanent erosion control measures to prevent sediment from leaving the right of way.

Item 618: Conduit
Item 620: Electrical Conductors
Item 628: Electrical Services

If the specifications for electrical items require UL-listed products, this means UL-listed or CSA-listed.

Item 618: Conduit

When backfilling bore pits, ensure that the conduit is not damaged during installation or due to settling backfill material. Compact select backfill in 3 equal lifts to the bottom of the conduit; or if using sand, place it 2 in. above the conduit. Ensure backfill density is equal to that of the existing soil. Prevent material from entering the conduit.

Construct bore pits a minimum of 5 ft. from the edge of the base or pavement. Close the bore pit holes overnight.

Unless otherwise shown on the plans, install underground conduit a minimum of 24 in. deep. Install the conduit in accordance with the latest National Electrical Code (NEC) and applicable Department standard sheets. Place conduit under driveways or roadways a minimum of 24 in. below the pavement surface.

If using casing to place bored conduit, the casing is subsidiary to the conduit.

If placing the conduit under existing pavement to reach the service poles, bore the conduit in place and extend it a minimum distance of 5 ft. beyond the edge of shoulder or the back of curb.

Where PVC, duct cable, and HDPE conduit 1 in. and larger is allowed and installed per Department standards, provide a PVC elbow in place of the galvanized rigid metal elbow required by the Electrical Details standards. Ensure the PVC elbow is of the same schedule rating as the conduit to which it is connected. Use only a flat, high tensile strength polyester fiber pull tape to pull conductors through the PVC conduit system.

Remove conductor and conduit to be abandoned to 1 ft. below the ground level. This work is subsidiary to the various bid items.

Do not use cast iron junction boxes in concrete traffic barriers and single slope traffic barriers. Use polymer concrete junction boxes as shown on standard sheet ED(4)-14. Mount the junction boxes flush (+ 0 in., - 1/2 in.) with the concrete surface of the concrete barrier.

Locate the underground utilities within the project limits. Provide the equipment necessary for locating these utilities, locate, and mark them before starting any excavation work in the area. This work is subsidiary to the various bid items. If the Contractor damages or cause damage to any existing underground utilities, repair such damage at no cost to the Department.

Ensure the interconnection of new equipment to the existing system does not interfere with the operation of the remaining system components. Ensure the system remains completely operational between the hours of 6:00 a.m. Monday and 12:00 a.m. (midnight) Saturday.

Do not interrupt system operation without coordinating with the Department's operations personnel at Houston Transtar at (713) 881-3285.

Perform work to be done on cables during weekends only.

Provide Liquid-Tight Flexible Metal (LTFM) conduit if the plans refer to flexible metal conduit. Do not use flexible metal conduit.

Unless otherwise shown on the plans, place conduit runs behind curbs at locations where curbs exist.

Use schedule 80 PVC conduit to house conductor runs under paved riprap, roadway, or driveways, unless otherwise shown on the plans.

Use Rigid Metal Conduit (RMC) for exposed conduit.

Before backfilling conduit trenches, place a detectable underground metalized mylar marking tape above the conduit and concrete encasement. Imprint the marking tape with, "TxDOT CONDUIT AND FIBER OPTIC CABLE SYSTEM. CALL (713) 802-5909 BEFORE PROCEEDING" every 18 in. Supplying and installing the marking tapes is subsidiary to the various bid items.

Conduit elbows and rigid metal extensions required when installing PVC conduit systems are subsidiary to the various bid items.

Install a continuous bare or green insulated copper wire No. 8 AWG or larger in every conduit throughout the electrical system in accordance with the Electrical Detail Standard Sheets, and the latest edition of the NEC.

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 a temperature range of -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."

Item 620: Electrical Conductors

Test each wire of each cable or conductor after installation. Incomplete circuits or damage to the wire or the cable are cause for immediate rejection of the entire cable being tested. Remove and replace the entire cable at no expense to the Department. Also test the replacement cable after installation.

When pulling cables or conductors through the conduit, do not exceed the manufacturer's recommended pulling tensions. Lubricate the cables or conductors with a lubricant recommended by the cable manufacturer.

Ensure that circuits test clear of faults, grounds, and open circuits.

Split bolt connectors are allowed only for splices on the grounding conductors.

For electrical licensing and electrical certification requirements for this project, see Item 7 of the Standard Specifications and any applicable special provisions to Item 7.

Item 624: Ground Boxes

The ground box locations are approximate. Alternate ground box locations may be used as directed, to avoid placing in sidewalks or driveways.

Ground metal ground box covers. Bond the ground box cover and ground conductors to a ground rod located in the ground box and to the system ground.

Ground the existing metal ground box covers as shown on the latest standard sheet ED (4)-14.

During construction and until project completion, provide personnel and equipment necessary to remove ground box lids for inspection. Provide this assistance within 24 hours of notification.

Construct concrete aprons in accordance with the latest standard sheet ED (4)-14. Make the depth of the concrete apron the same as the depth of the ground box, except for Type 1 and Type 2 ground boxes. For Type 1 or Type 2 ground boxes, construct the concrete apron in accordance with details shown on the "Ground Box Details Installations" standard.

Item 662: Work Zone Pavement Markings

At the end of each workday, mark roadways that remain open to traffic during construction operations with standard pavement markings, in accordance with the latest "Texas Manual on Uniform Traffic Control Devices."

Using raised markers for removable work zone pavement markings on final concrete surfaces is optional.

For transition lane lines and detour lane lines, use raised pavement markers as shown for solid lines on the latest Barricade and Construction standard sheet for "Work Zone Pavement Marking Details."

For roadways with asphalt surfaces to be striped with work zone or permanent thermoplastic markings, the Contractor has the option to apply paint and beads markings for a maximum 30-day period until placing the thermoplastic markings, or until starting the succeeding phase of work on the striped area. Maintain the paint and beads markings, at no expense to the Department, until placing the thermoplastic markings or starting the succeeding phase of work on the striped area. The work zone markings, whether paint and beads or thermoplastic, are paid under the Item, "Work Zone Pavement Markings" and the markings are paid for only once for the given phase of construction.

If using paint and bead markings as described above, purchase the traffic paint from the open market.

If the Type II markings become dirty and require cleaning by washing, brushing, compressed air, or other approved methods before applying the Type I thermoplastic markings, this additional cleaning is subsidiary to the Item, "Reflectorized Pavement Markings."

Establish the alignment and layout for work zone striping and permanent striping.

Stripe all roadways before opening them to traffic.

Place pavement markings under these items in accordance with details shown on the plans, the latest "Texas Manual on Uniform Traffic Control Devices," or as directed.

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

Item 672: Raised Pavement Markers

If other operations are complete on the project and if the curing time period is not yet elapsed, the contract time will be suspended until the curing is done.

Before placing the raised pavement markers on concrete pavement, blast clean the surface using an abrasive-blasting medium. This work is subsidiary to the Item, "Raised Pavement Markers."

Provide epoxy adhesive that is machine-mixed or nozzle-mixed and dispensed. Equip the machine or nozzle with a mechanism to ensure positive mix measurement control.

Item 677: Eliminating Existing Pavement Markings and Markers

Remove existing pavement markings on concrete or asphalt surfaces by flail milling or as directed.

Item 678: Pavement Surface Preparation for Markings

Do not blast clean asphalt concrete pavement. Clean asphalt concrete pavement as required under the applicable specifications or as directed.

On new concrete pavement or on existing concrete pavement when placing a new stripe on a new location, remove the curing compounds and contamination from the pavement surface by flail milling or as directed. In addition, air-blast the surface with compressed air just before placing the new stripe.

On existing concrete pavement when placing a new stripe on an existing location, after removing the existing stripe under the Item, "Eliminating Existing Pavement Markings and Markers," air-blast the surface with compressed air just before placing the new stripe.

Do not clean concrete pavement by grinding.

Item 6007: Communication Cable

Seal each end of the communications cable that is exposed to elements during storage or after installing with a waterproof sealant, or as per manufacturer recommendations.

Ensure each communication cable run is continuous without splices from controller to controller.

Assume responsibility for the signal carrying capability and performance of the cable. Install each wire with a lightning protection device unless otherwise noted. Ground the cable in accordance with the manufacturer's recommendation.

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

A shadow vehicle with Truck Mounted Attenuators (TMAs) or Trailer Attenuators (TAs) is required as shown on the appropriate Traffic Control Plan (TCP) sheets. TMAs/TAs must meet the requirements of the Compliant Work Zone Traffic Control Device List.

Level 3 Compliant TMAs/TAs are required for this project.

A total of one (1) shadow vehicle with a TMA/TA is required for the work with the exception of Pavement Marking Operations. The Contractor is responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs/TAs needed on the project.

A total of three (3) shadow vehicles with a TMA/TA are required for Pavement Marking Operations. The Contractor is responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs/TAs needed on the project.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0027-08-182 **DISTRICT** Houston **COUNTY** Fort Bend
HIGHWAY UA 90

			CONTROL SECTION JOB		**0027-08-182**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00130766**		
			COUNTY		**Fort Bend**		
			HIGHWAY		**UA 90**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	4.000		4.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	120.000		120.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	120.000		120.000	
	528-6006	REMOVE AND RELAY PAVERS	SY	15.000		15.000	
	618-6053	CONDT (PVC) (SCH 80) (3")	LF	9,545.000		9,545.000	
	618-6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	7,620.000		7,620.000	
	618-6074	CONDT (RM) (3")	LF	365.000		365.000	
	620-6002	ELEC CONDR (NO.14) INSULATED	LF	17,335.000		17,335.000	
	6007-6011	FIBER OPTIC CBL (SNGLE-MODE)(12 FIBER)	LF	945.000		945.000	
	6007-6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	18,140.000		18,140.000	
	6007-6021	FIBER OPTIC SPLICE ENCLOSURE	EA	6.000		6.000	
	6007-6023	FIBER OPTIC PATCH PANEL (12 POSITION)	EA	6.000		6.000	
	6007-6094	FIBER OPTIC FUSION SPLICE	EA	72.000		72.000	
	6027-6008	GROUND BOX (PREPARE)	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	66.000		66.000	
	6186-6002	ITS GND BOX(PCAST) TY 1 (243636)W/APRN	EA	30.000		30.000	
	6186-6008	ITS GND BOX(PCAST) TY 2 (366036)W/APRN	EA	4.000		4.000	
	08	CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	

MATERIALS FOR ITS FIBER INTERCONNECTS				
ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
500	6001	MOBILIZATION	LS	1
502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3
506	6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	120
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	120
528	6006	REMOVE AND RELAY PAVERS	SY	15
618	6053	CONDT (PVC) (SCH 80) (3")	LF	9545
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	7620
618	6074	CONDT (RM) (3")	LF	365
620	6002	ELEC CONDR (NO.14) INSULATED	LF	17335
6007	6011	FIBER OPTIC CBL (SNGLE-MODE)(12 FIBER)	LF	945
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	18140
6007	6021	FIBER OPTIC SPLICE ENCLOSURE	EA	6
6007	6023	FIBER OPTIC PATCH PANEL (12 POSITION)	EA	6
6007	6094	FIBER OPTIC FUSION SPLICE	EA	72
6027	6008	GROUND BOX (PREPARE)	EA	2
6185	6002	TMA (STATIONARY)	DAY	66
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	30
6186	6008	ITS GND BOX (PCAST) TY 2(366036) W/APRON	EA	4

*MATERIALS AND EQUIPMENT SUBSIDIARY FOR FIBER OPTIC CABLE

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ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

SUMMARY OF QUANTITIES

(SHEET 1 OF 1)

			PROJECT NO.	
DWN: ATG	CKD: ATG		C 27-8-182	
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY	
TEXAS	HOU	6	FORT BEND	
CONTROL	SECTION	JOB	HWY. NO.	SHEET NO.
0027	08	182	US 90A	5

NOTES FOR FIBER OPTICS:

1. USE TYPE 1 GROUND BOX, INSTALLED NEAR CONTROLLER, EXCLUSIVELY FOR FIBER OPTIC CABLE WITH CONDUIT ONLY.

2. DO NOT INSTALL ANY OTHER ELECTRICAL CABLE OR CONDUIT IN THE TYPE 1 GROUND BOX. GROUND METAL GROUND BOX COVERS. BOND THE GROUND BOX COVER AND GROUND CONDUCTORS TO THE GROUND ROD LOCATED IN THE GROUND BOX AND THE SYSTEM GROUND.

3. ALL EXISTING CONTROLLERS SHOULD BE COMPATABLE WITH ITS SYSTEM.

4. DURING CONSTRUCTION AND UNTIL PROJECT COMPLETION, PROVIDE PERSONNEL AND EQUIPMENT NECESSARY TO REMOVE GROUND BOX LIDS FOR INSPECTION. PROVIDE THIS ASSISTANCE WITHIN 24 HOURS OF NOTIFICATION.

5. FOR EACH GROUND BOX ON THIS PROJECT IN WHICH CABLE IS ADDED OR REMOVED, AFFIX A TAG TO THE CABLING REMAINING IN THE BOX CLEARLY STATING THAT THE BOX CONTAINS CABLING WHICH IS SUPPLIED BY MORE THAN ONE POWER SOURCE. ENSURE THE TAG IS LAMINATED AND HAS MINIMUM DIMENSTIONS OF 4 INCHES BY 6 INCHES.

6. THE GROUND BOX LOCATIONS ARE APPROXIMATE. ALTERNATE GROUND BOX LOCATIONS MAY BE USED AS DIRECTED, TO AVOID PLACING IN SIDEWALKS OR DRIVEWAYS.

7. FOR TY 1 GROUND BOX CONSTRUCT THE CONCRETE APRON IN ACCORDANCE WITH THE DETAILS SHOWN ON THE "GROUND BOX DETAILS ITS(37)-22" STANDARD.

8. FULLY TEST THE PROPOSED FIBER OPTIC CABLE IN ACCORDANCE WITH THE TESTING REQUIREMENTS OF THE SPECIFICATIONS.

9. FIBER OPTIC CABLES COILED IN GROUND BOXES WITH WATER PROOF SPLICE ENCLOSURES SHALL NOT EXCEED FIFTEEN FEET PER CABLE UNLESS OTHERWISE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER IN THE FIELD.

10. IF USING CASING TO PLACE BORED CONDUIT, CONSIDER THE CASING INCIDENTAL TO THE CONDUIT.

11. IF WORKING NEAR POWER LINES, COMPLY WITH THE APPROPRIATE SECTIONS OF TEXAS STATE LAW AND FEDERAL REGULATIONS RELATING TO THE TYPE OF WORK INVOLVED.

12. PROVIDE A SINGLE #14 INSULATED WIRE IN CONDUIT RUNS WHICH HAVE BEEN INDENTIFIED IN THE PLANS TO CARRY FIBER OPTIC CABLE. PROVIDE UL LISTED SOLID COPPER WIRE WITH ORANGE COLOR TYPE XHHW POLYETHYLENE INSULATION. 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."

13. PROVIDE THE FIBER OPTIC CABLE SYSTEM COMPLETE WITH INCIDENTAL WORK, MATERIAL, AND SERVICES NOT EXPRESSLY CALLED FOR IN THE SPECIFICATIONS, OR NOT SHOWN ON THE PLANS, BUT WHICH MAY BE NECESSARY FOR A COMPLETE AND PROPERLY FUNCTIONING SYSTEM. CONSIDER THIS AS PART OF THIS BID ITEM.

14. FURNISH ALL EQUIPMENT, MATERIAL, AND LABOR NECESSARY FOR IDENTIFICATION AND PROTECTION OF THE UTILIZED FIBERS.

15. CONSTRUCT BORE PITS A MINIMUM OF FIVE FEET FROM THE EDGE OF THE BASE OR PAVEMENT. CLOSE THE BORE PIT HOLES OVERNIGHT. CONSIDER PAYMENT FOR BORED CONDUIT AS THE WIDTH OF THE ROADWAY PLUS FIVE FEET ON EACH SIDE OF ROADWAY.

16. REPAIR OR REPLACE PAVEMENT AND SIDEWALKS DAMAGED BY THE CONTRACTOR'S FORCES DURING CONSTRUCTION AT NO COST TO THE DEPARTMENT.

17. CLEAR AND TEST THE EXISTING CONDUITS DESTINED FOR USE ON THIS PROJECT.

18. EACH FIBER OPTIC CABLE RUN IN UNDERGROUND CONDUITS SHALL HAVE AN EXTRA LENGTH OF FIFTEEN FEET COILED AND LEFT IN EACH GROUND BOX UNLESS OTHERWISE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER IN THE FIELD.

19. GROUND ALL EXISTING METAL GROUND BOX COVERS AS OUTLINED ON LATEST STANDARD SHEET ED(4)-14. REPLACEMENTS FOR THESE GROUND BOXES MUST BE MADE OF POLYMER CONCRETE AS DETAILED ON THE LATEST STANDARD SHEET ED(4)-14. THE MATERIALS AND LABOR ASSOCIATED WITH THIS WORK IS SUBSIDIARY TO VARIOUS BID ITEMS IN THE PROJECT.

20. IF EXISTING GROUND BOXES ARE FOUND TO BE INSUFFICIENT IN SIZE TO ACCOMMODATE THE PROPOSED CONDUITS AND CABLES AS SHOWN ON THE PLANS OR IF THEY HAVE BEEN DAMAGED TO THE EXTENT THEY WILL NOT ACCOMMODATE THE ADDITIONAL CONDUITS AND CABLES, REPLACE THE GROUND BOX WITH A NEW GROUND BOX (SIZE AS REQUIRED) OR INSTALL A NEW GROUND BOX ADJACENT TO THE EXISTING GROUND BOX AS APPROVED BY THE ENGINEER. SUCH REPAIR OR REPLACEMENT IS INCIDENTAL TO ITEM 624,"GROUND BOX".

21. LIMITS OF PAY FOR BORED CONDUITS SHALL NOT EXTEND MORE THAN FIVE FEET IN FRONT OF AND BEYOND THE ROADWAY OR DRIVEWAY THAT IS BEING BORED UNDER. WHEN MULTIPLE DRIVEWAYS EXIST, THE CONTRACTOR MAY BE ALLOWED TO BORE UNDER THE ENTIRE GROUP OF DRIVEWAYS PROVIDED THE DRIVEWAYS DO NOT EXCEED FORTY FOOT SPACING AS APPROVED BY THE ENGINEER IN THE FIELD. NO INCREASE FOR BORED CONDUITS WILL BE INCURRED FOR THIS WORK. CONDUIT BORED BETWEEN MULTIPLE DRIVEWAYS TO BE PAID FOR AS TRENCHED CONDUIT.

22. CONSTRUCT CONCRETE APRON, IF NECESSARY, IN ACCORDANCE WITH THE LATEST STANDARD SHEET ED(4)-14. FOR TY 1 GROUND BOX CONSTRUCT THE CONCRETE APRON IN ACCORDANCE WITH DETAILS SHOWN ON THE "GROUND BOX DETAILS ITS(37)-16" STANDARD.

23. INSTALL A FIBER OPTIC FAN OUT KIT ON THE FIBER DROP CABLE IN EACH CONTROLLER CABINET. THE FAN OUT KIT SHALL BE CONSIDERED INCIDENTAL TO THE PERTINENT BID ITEMS IN THIS PROJECT.

24. FURNISH AND INSTALL ALL FIBER OPTIC CABLES AND ACCESSORIES FOR A COMPLETE AND OPERATIONAL SYSTEM.

25. USE SCHEDULE 80 PVC CONDUIT TO HOUSE ALL CONDUCTOR RUNS UNDER PAVED RIPRAP, ROADWAY, OR DRIVEWAYS UNLESS OTHERWISE SHOWN IN THE PLANS.

26. UNLESS OTHERWISE NOTED ON THE PLANS, PLACE CONDUIT RUNS BEHIND CURBS AT ALL LOCATIONS WHERE CURB EXISTS.

27. REFER TO TXDOT'S WEBSITE FOR PREQUALIFIED PRODUCTS LIST REGARDING CONDUITS, CONDUCTORS, GROUND BOXES, AND ELECTRICAL SERVICE. CHECK WEBSITE PERIODICALLY FOR CURRENT UPDATES.

28. USE RIGID METAL CONDUIT (RMC) FOR EXPOSED CONDUIT.

29. JUNCTION BOXES USED TO ATTACH TO BRIDGE STRUCTURES SHALL BE INCIDENTAL TO ITEM 618, "CONDT (RM)".

30. WHEN PULLING CABLES OR CONDUCTORS THROUGH THE CONDUIT, DO NOT EXCEED THE MANUFACTURER'S RECOMMENDED PULLING TENSIONS. LUBRICATE THE CABLES OR CONDUCTORS WITH LUBRICANT RECOMMENDED BY THE CABLE MANUFACTURER.

31. FURNISH ALL MATERIAL AND SERVICES NECESSARY FOR CONNECTION OF NEW EQUIPMENT AND CABLE TO THE EXISTING FIBER OPTIC CABLE.

32. DURING CONSTRUCTION OF THE PROPOSED SIGNAL WORK, IF THE EXISTING TRAFFIC SIGNAL EQUIPMENT REQUIRES REPLACEMENT DUE TO WEAR, DETERIORATION, OR ANY CIRCUMSTANCE OVER WHICH THE CONTRACTOR HAS NO CONTROL, THE EQUIPMENT WILL BE FURNISHED BY THE DEPARTMENT AT NO COST TO THE CONTRACTOR. INSTALL THIS EQUIPMENT AT NO COST TO THE DEPARTMENT. SUCH MATERIALS WILL BE PROVIDED AT THE DEPARTMENT'S SIGNAL SHOP LOCATED AT 6810 KATY ROAD, HOUSTON, TEXAS. CONTACT MR. MICHAEL AWA, P.E., AT TELEPHONE NUMBER (713) 802-5661.

33. PROVIDE THE FIBER OPTIC CABLE SYSTEM COMPLETE WITH INCIDENTAL WORK, MATERIAL, AND SERVICES NOT EXPRESSLY CALLED FOR IN THE SPECIFICATIONS, OR NOT SHOWN ON THE PLANS, BUT WHICH MAY BE NECESSARY FOR A COMPLETE AND PROPERLY FUNCTIONING SYSTEM. CONSIDER THIS AS A PART OF THIS BID ITEM.

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER
10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

US 90 ALTERNATE

NOTES FOR FIBER OPTIC LAYOUT

(SHEET 1 OF 1)

		PROJECT NO.	
DWN: ATG	CKD: ATG	C 27-8-182	
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 6

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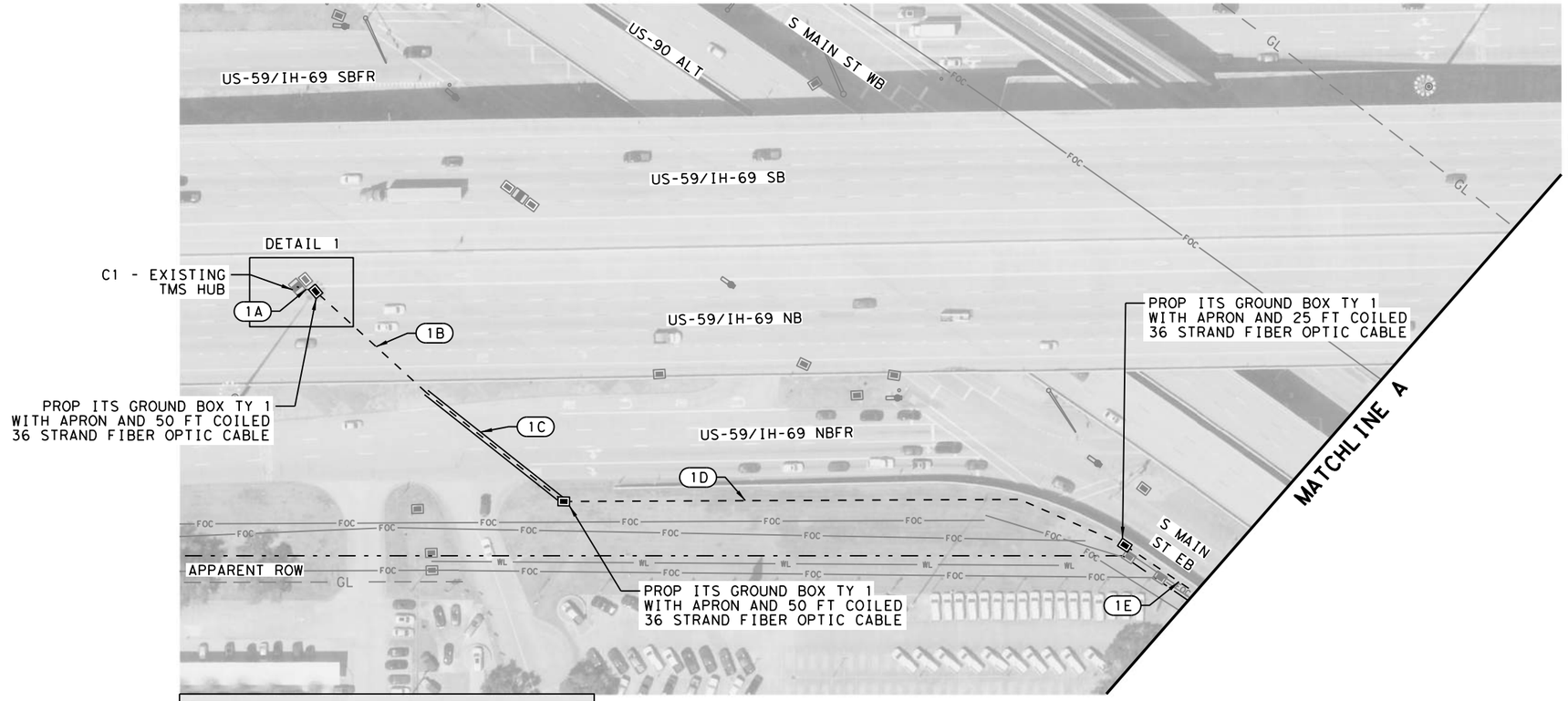

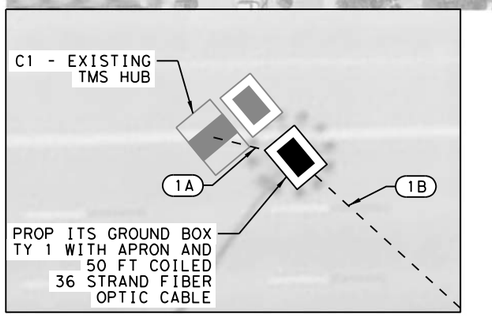

DETAIL 1

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

0 100

SCALE: 1"=100'

NOTES:

1. LOCATIONS OF EXISTING UTILITIES, EXISTING ROW, AND SIGNAL EQUIPMENT SHOWN IN THESE PLANS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY ALL INFRASTRUCTURE AND UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

2. CONTRACTOR SHALL CALL TEXAS 811 FOR LOCATES PRIOR TO EXCAVATION. IT SHOULD BE NOTED THAT TEXAS 811 MAY NOT HAVE ALL NECESSARY DATA FOR LOCATING ALL UTILITIES IN THE PROJECT AREA. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY OWNERS AND OPERATORS TO ACQUIRE ACCURATE UTILITY DATA FOR USE DURING CONSTRUCTION.

3. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGE CAUSED BY CONTRACTOR'S FAILURE TO LOCATE AND PRESERVE THESE UTILITIES, WHETHER UNDERGROUND, ABOVE GROUND, OR OVERHEAD.

CONDUIT AND CABLE RUNS					
RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER
		0618 6053	0618 6054	0620 6002	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
C1	10				1
1A	25	1			1
1B	115	1		1	1
1C	130		1	1	1
1D	425	1		1	1
1E	65	1		1	1

ESTIMATED QUANTITIES				
ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	630
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	130
620	6002	ELEC CONDR (NO.14) INSULATED	LF	735
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	895
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	3

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER
10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 1 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 7

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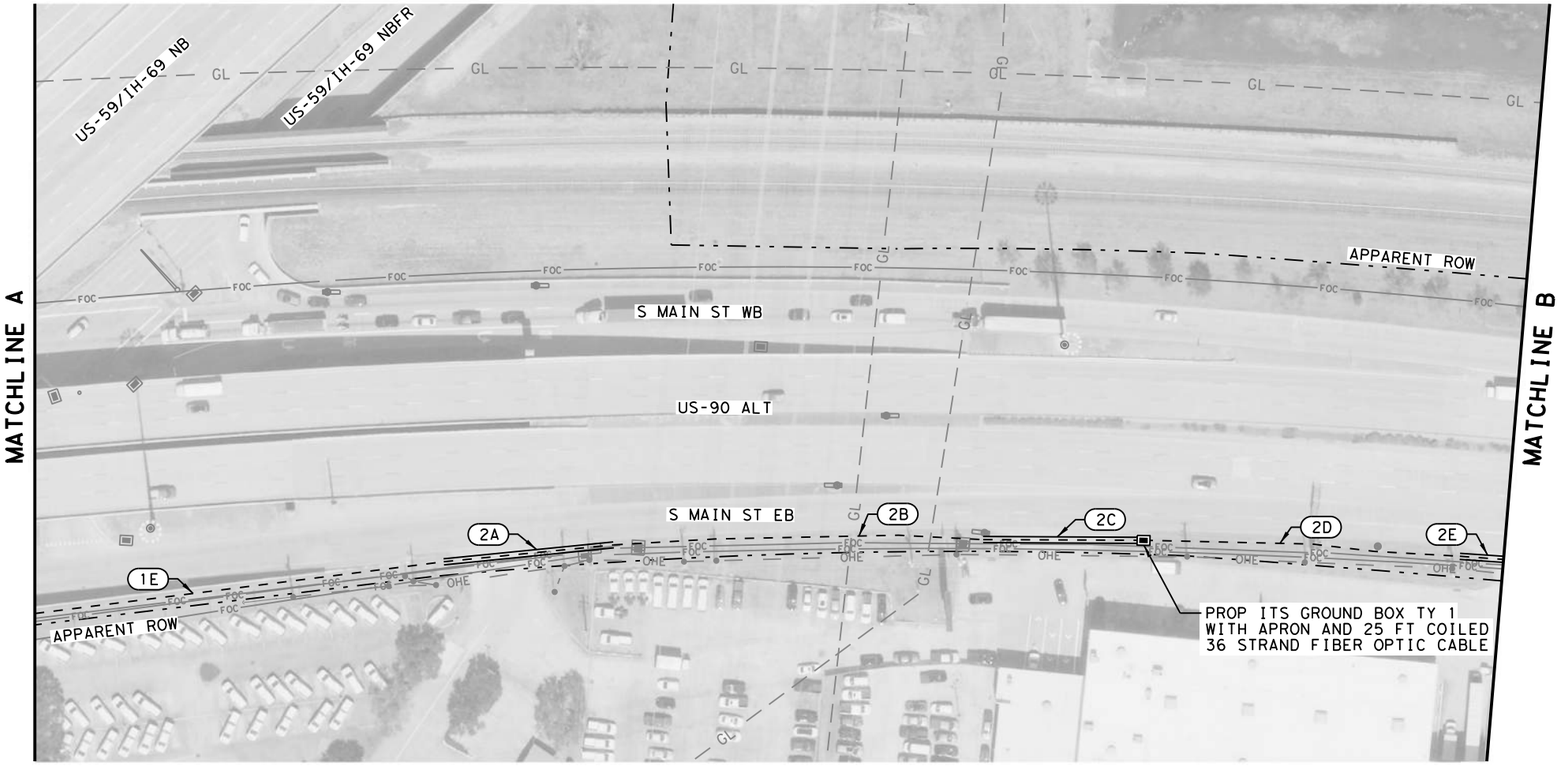

LEGEND

- EXIST OH ELECTRIC LINE (OHE)
- EXIST OH TELEPHONE LINE (OHTL)
- EXIST UG COMMUNICATION LINE (COMM)
- EXIST UG GAS LINE (GL)
- EXIST UG FIBER OPTIC LINE (FOC)
- EXIST UG TELEPHONE LINE (TELE)
- EXIST UG WATER LINE (WL)
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

N

0 100

SCALE: 1"=100'

NOTES:

1. LOCATIONS OF EXISTING UTILITIES, EXISTING ROW, AND SIGNAL EQUIPMENT SHOWN IN THESE PLANS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY ALL INFRASTRUCTURE AND UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

2. CONTRACTOR SHALL CALL TEXAS 811 FOR LOCATES PRIOR TO EXCAVATION. IT SHOULD BE NOTED THAT TEXAS 811 MAY NOT HAVE ALL NECESSARY DATA FOR LOCATING ALL UTILITIES IN THE PROJECT AREA. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY OWNERS AND OPERATORS TO ACQUIRE ACCURATE UTILITY DATA FOR USE DURING CONSTRUCTION.

3. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGE CAUSED BY CONTRACTOR'S FAILURE TO LOCATE AND PRESERVE THESE UTILITIES, WHETHER UNDERGROUND, ABOVE GROUND, OR OVERHEAD.

CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER
		0618 6053	0618 6054	0620 6002	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
1E	275	1		1	1
2A	115		1	1	1
2B	245	1		1	1
2C	110		1	1	1
2D	215	1		1	1
2E	30		1	1	1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	735
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	255
620	6002	ELEC CONDR (NO.14) INSULATED	LF	990
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1015
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 2 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 8

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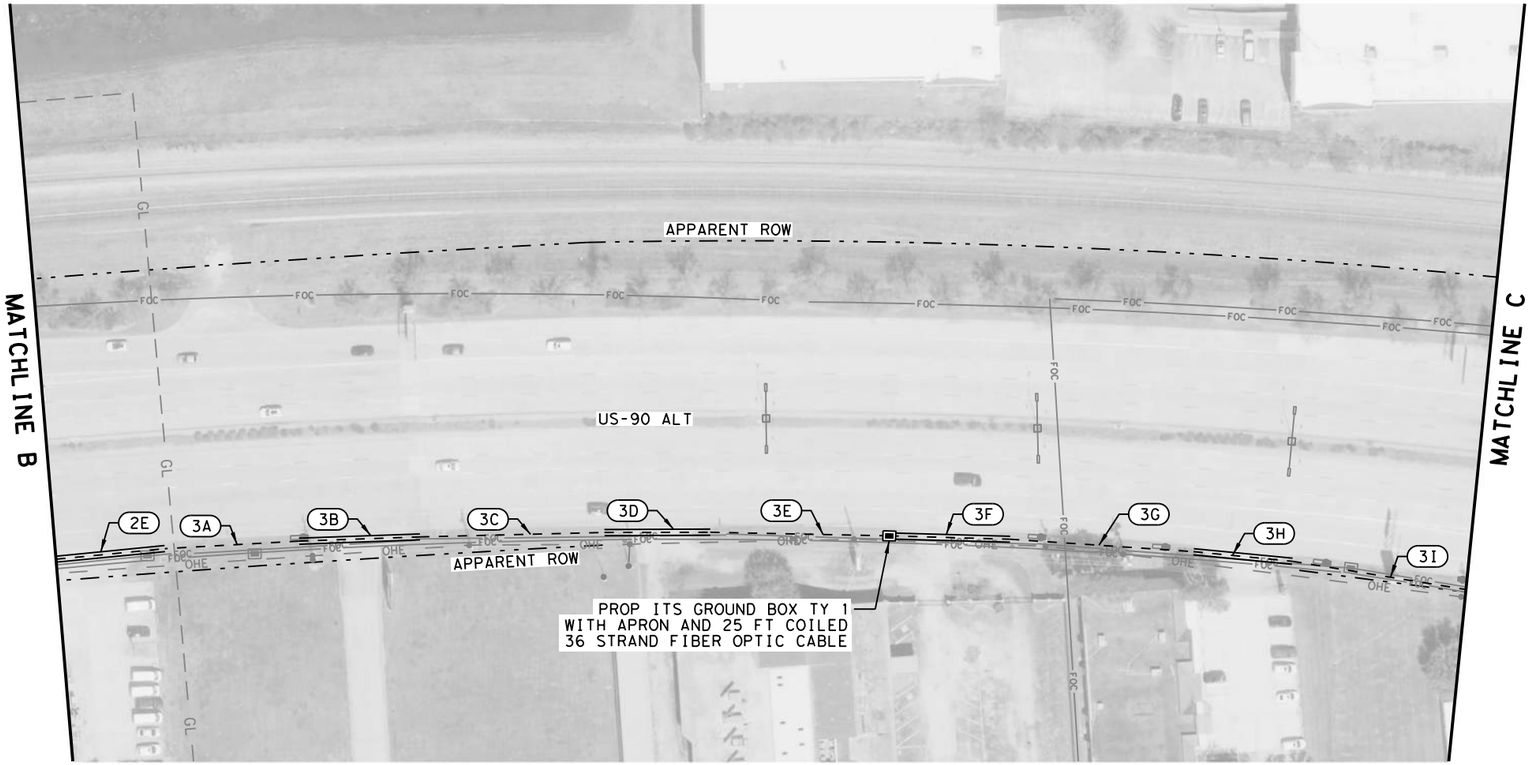

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

N

0 100

SCALE: 1"=100'

NOTES:

1. LOCATIONS OF EXISTING UTILITIES, EXISTING ROW, AND SIGNAL EQUIPMENT SHOWN IN THESE PLANS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY ALL INFRASTRUCTURE AND UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

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CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER
		0618 6053	0618 6054	0620 6002	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
2E	75		1	1	1
3A	90	1		1	1
3B	80		1	1	1
3C	125	1		1	1
3D	70		1	1	1
3E	125	1		1	1
3F	85		1	1	1
3G	125	1		1	1
3H	65		1	1	1
3I	120	1		1	1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	585
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	375
620	6002	ELEC CONDR (NO.14) INSULATED	LF	960
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	985
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-512

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 3 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 9

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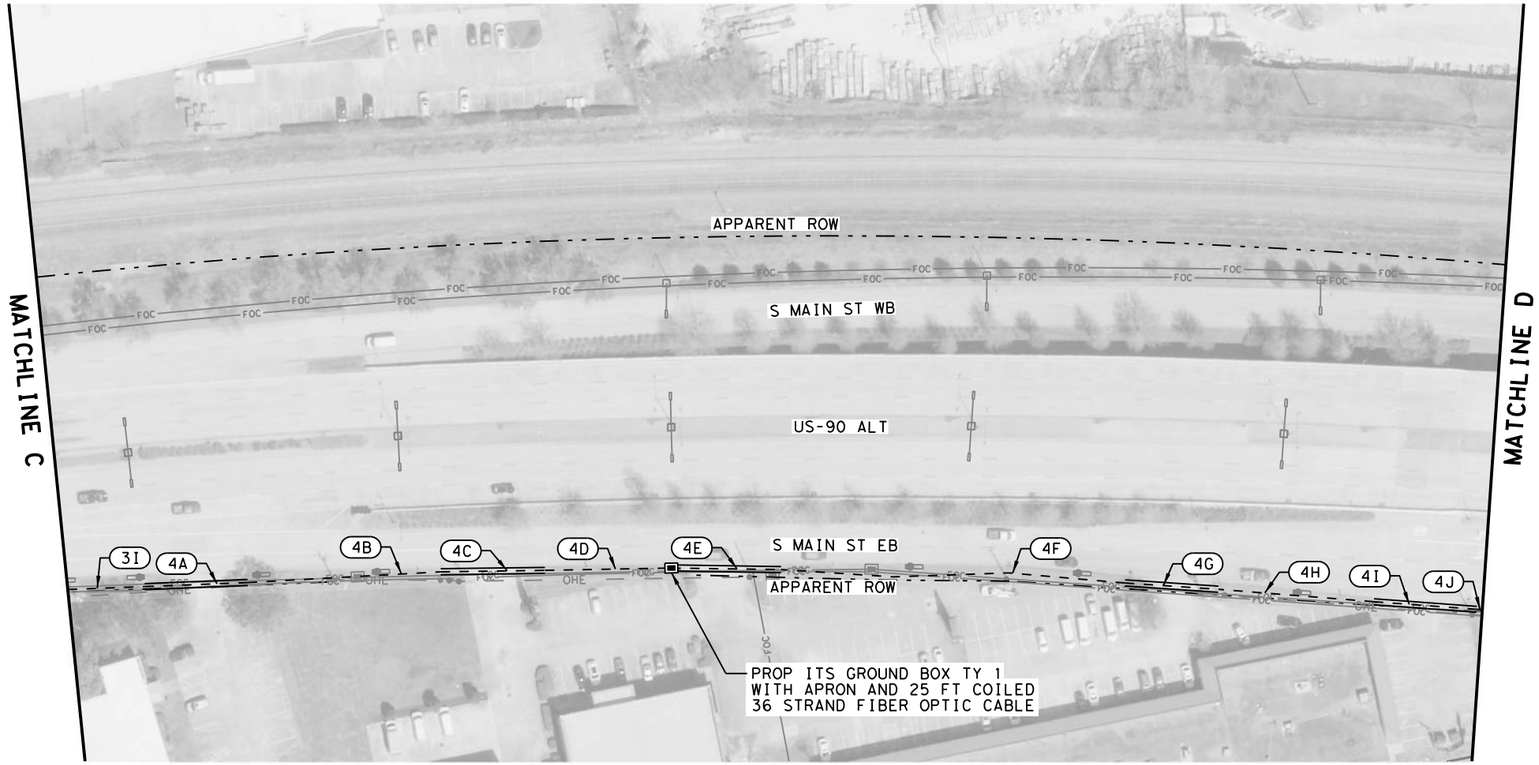

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

N

0 100

SCALE: 1"=100'

NOTES:

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CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER
		0618 6053	0618 6054	0620 6002	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
3I	50	1		1	1
4A	70		1	1	1
4B	130	1		1	1
4C	70		1	1	1
4D	90	1		1	1
4E	80		1	1	1
4F	230	1		1	1
4G	65		1	1	1
4H	105	1		1	1
4I	70		1	1	1
4J	5	1		1	1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	610
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	355
620	6002	ELEC CONDR (NO.14) INSULATED	LF	965
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	990
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-852

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 4 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 10

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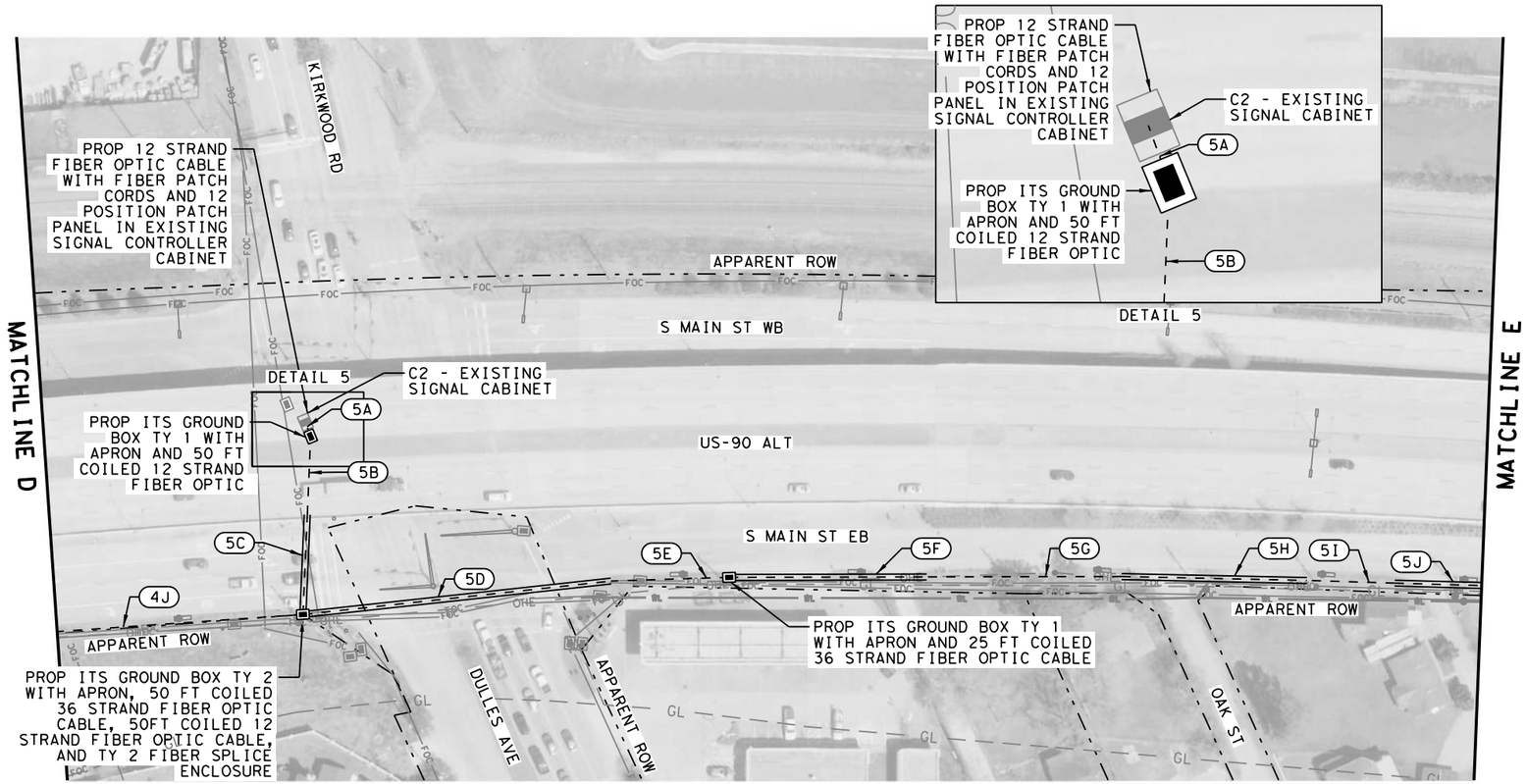

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

0 100

SCALE: 1"=100'

CONDUIT AND CABLE RUNS						
RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER	
		0618 6053	0618 6054	0620 6002	6007 6011	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (12 SMF)	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
4J	170	1				1
C2	10				1	
5A	20	1			1	
5B	60	1			1	
5C	75		1		1	
5D	220		1	1		1
5E	85	1		1		1
5F	135		1	1		1
5G	140	1		1		1
5H	125		1	1		1
5I	60	1		1		1
5J	60		1	1		1

NOTES:

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ESTIMATED QUANTITIES				
ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	535
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	615
620	6002	ELEC CONDR (NO.14) INSULATED	LF	1150
6007	6011	FIBER OPTIC CBL (SNGLE-MODE)(12 FIBER)	LF	265
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1045
6007	6021	FIBER OPTIC SPLICE ENCLOSURE	EA	1
6007	6023	FIBER OPTIC PATCH PANEL (12 POSITION)	EA	1
6007	6094	FIBER OPTIC FUSION SPLICE	EA	12
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	2
6186	6008	ITS GND BOX (PCAST) TY 2(366036) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 5 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 11

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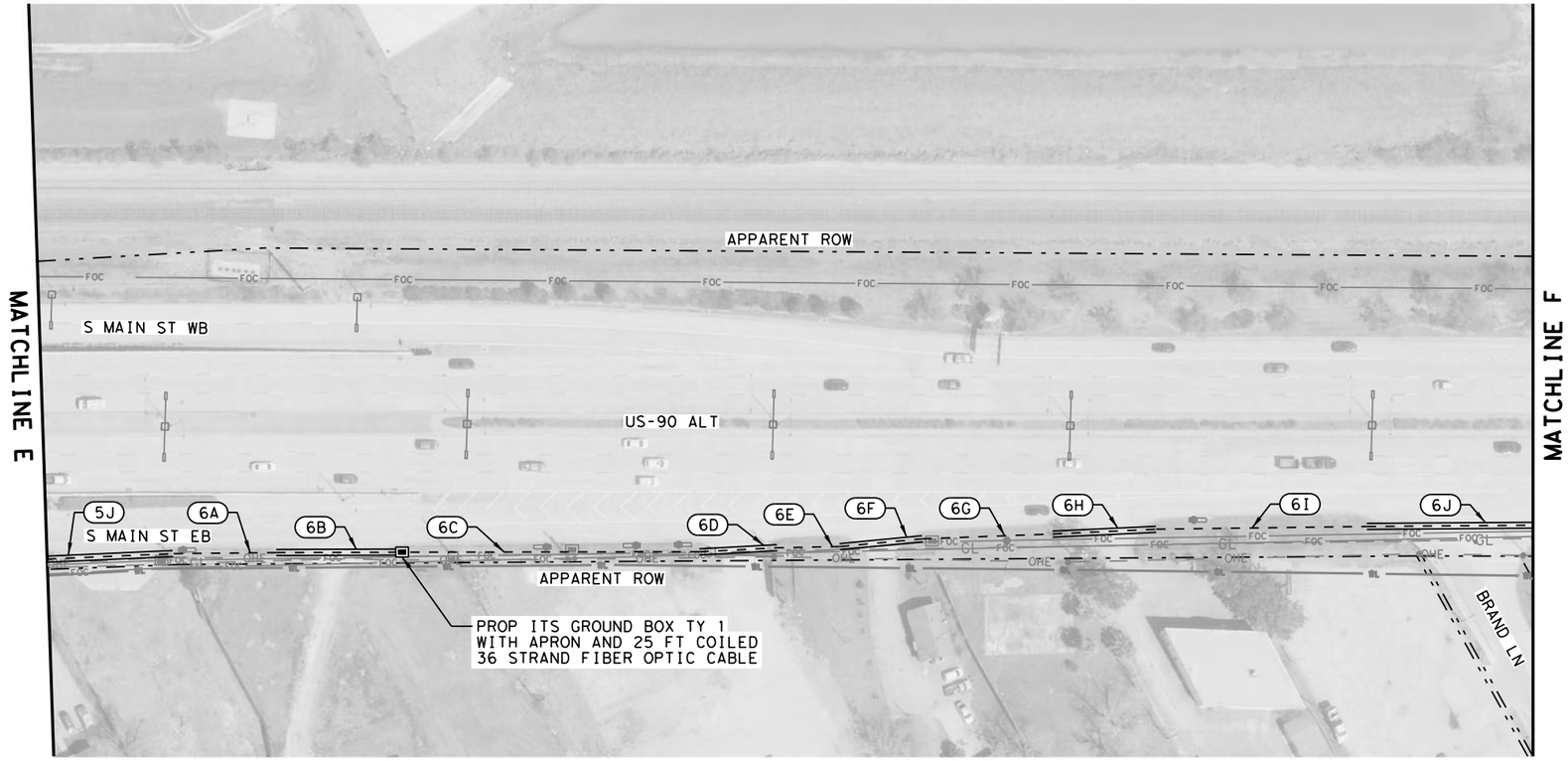

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

0 100

SCALE: 1"=100'

NOTES:

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CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER
		0618 6053	0618 6054	0620 6002	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
5J	85		1	1	1
6A	70	1		1	1
6B	90		1	1	1
6C	205	1		1	1
6D	55		1	1	1
6E	45	1		1	1
6F	55		1	1	1
6G	90	1		1	1
6H	70		1	1	1
6I	140	1		1	1
6J	110		1	1	1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	550
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	465
620	6002	ELEC CONDR (NO.14) INSULATED	LF	1015
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1040
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 6 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 12

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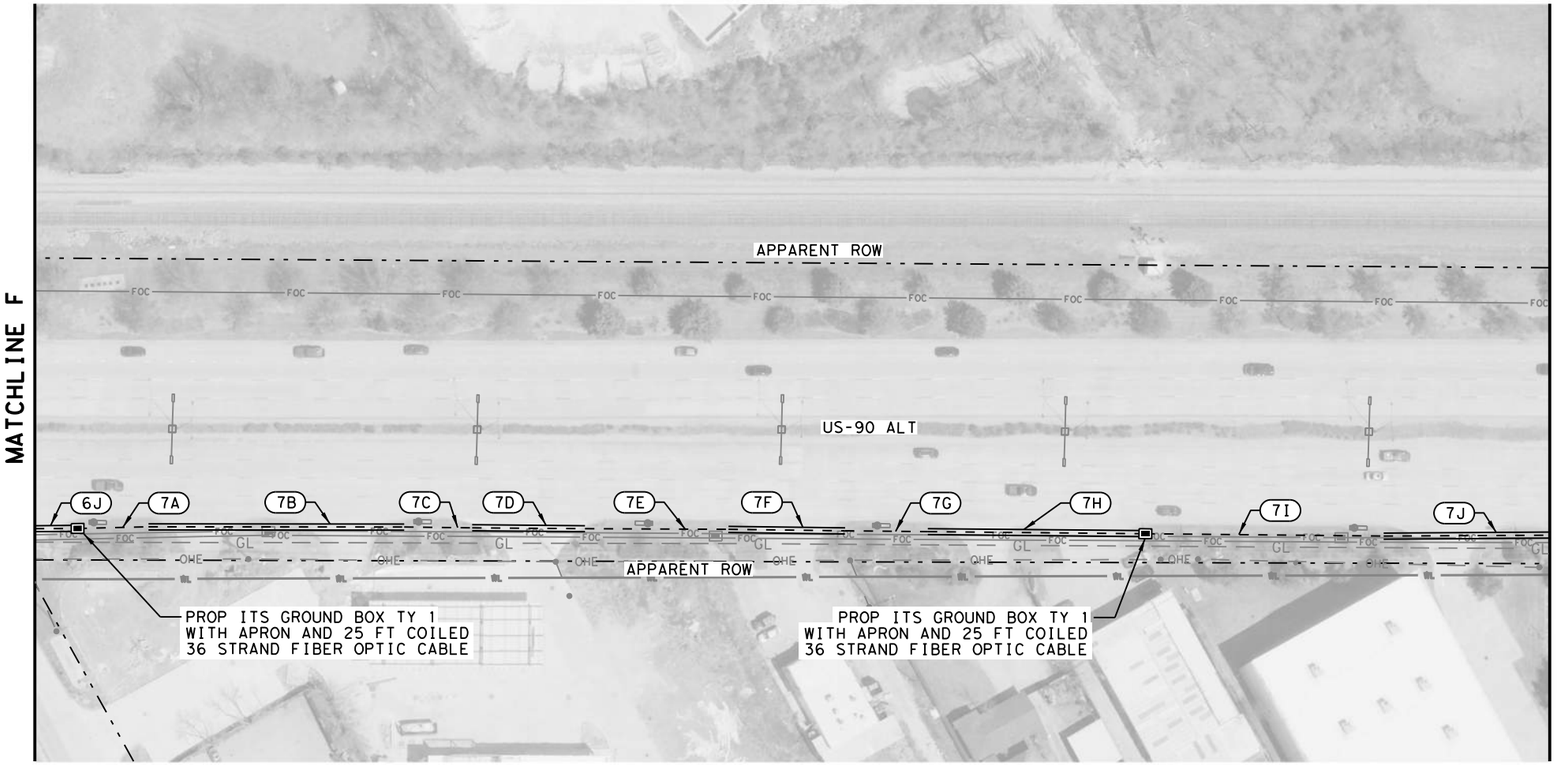

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

0 100

SCALE: 1"=100'

CONDUIT AND CABLE RUNS					
RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER
		0618 6053	0618 6054	0620 6002	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
6J	30		1	1	1
7A	50	1		1	1
7B	170		1	1	1
7C	45	1		1	1
7D	75		1	1	1
7E	95	1		1	1
7F	80		1	1	1
7G	55	1		1	1
7H	145		1	1	1
7I	165	1		1	1
7J	110		1	1	1

NOTES:

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ESTIMATED QUANTITIES				
ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	410
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	610
620	6002	ELEC CONDR (NO.14) INSULATED	LF	1020
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1070
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	2

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 7 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 13

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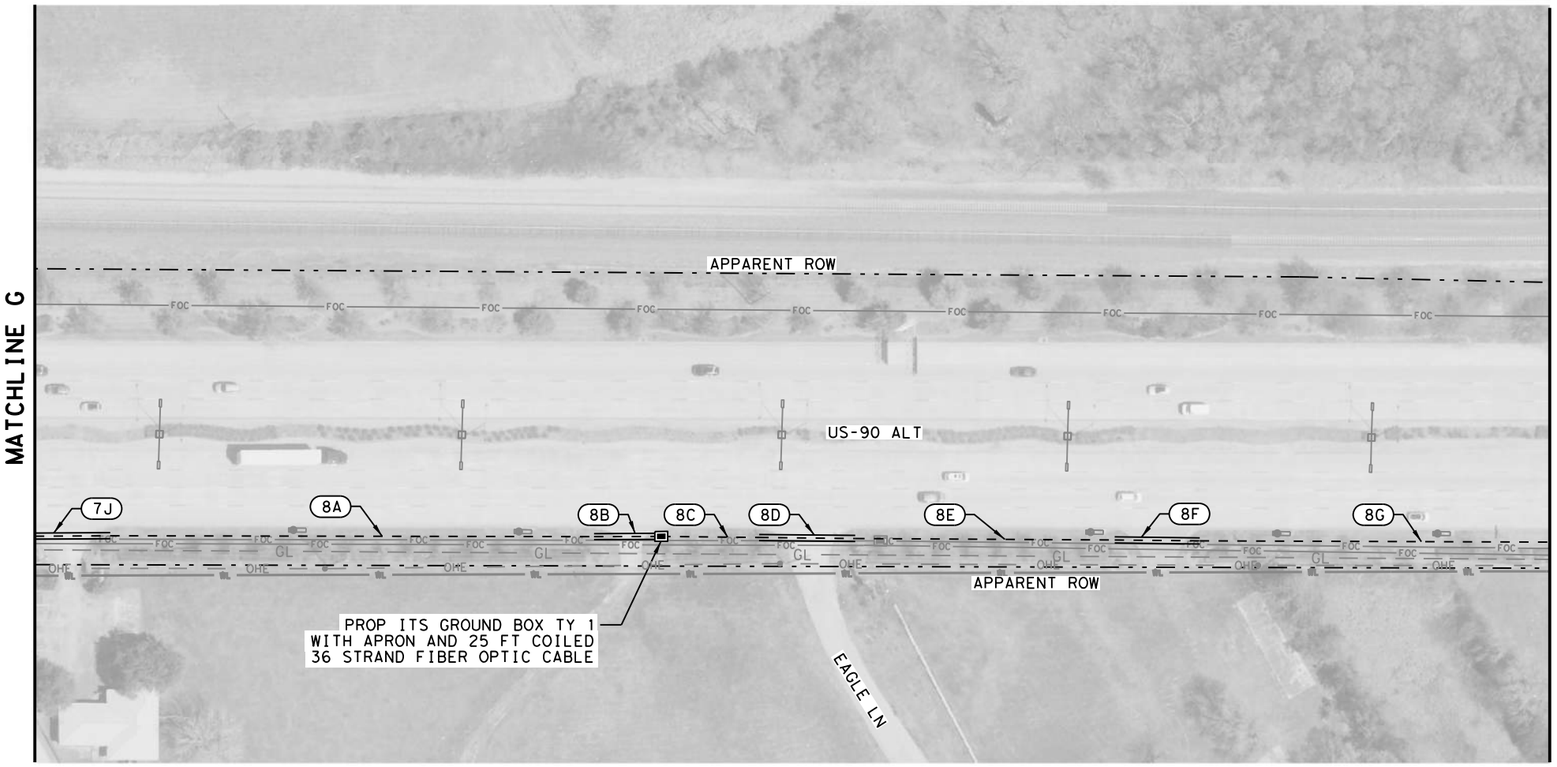

LEGEND

- OHE — EXIST OH ELECTRIC LINE
- OHTL — EXIST OH TELEPHONE LINE
- COMM — EXIST UG COMMUNICATION LINE
- GL — EXIST UG GAS LINE
- FOC — EXIST UG FIBER OPTIC LINE
- TELE — EXIST UG TELEPHONE LINE
- WL — EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

0 100

SCALE: 1"=100'

NOTES:

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CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER
		0618 6053	0618 6054	0620 6002	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
7J	50		1	1	1
8A	320	1		1	1
8B	50		1	1	1
8C	70	1		1	1
8D	65		1	1	1
8E	175	1		1	1
8F	60		1	1	1
8G	230	1		1	1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	795
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	225
620	6002	ELEC CONDR (NO.14) INSULATED	LF	1020
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1045
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 8 OF 18)

SCALE: 1" = 100'		PROJECT NO.	
DWN: ATG	CKD: ATG	C 27-8-182	
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 14

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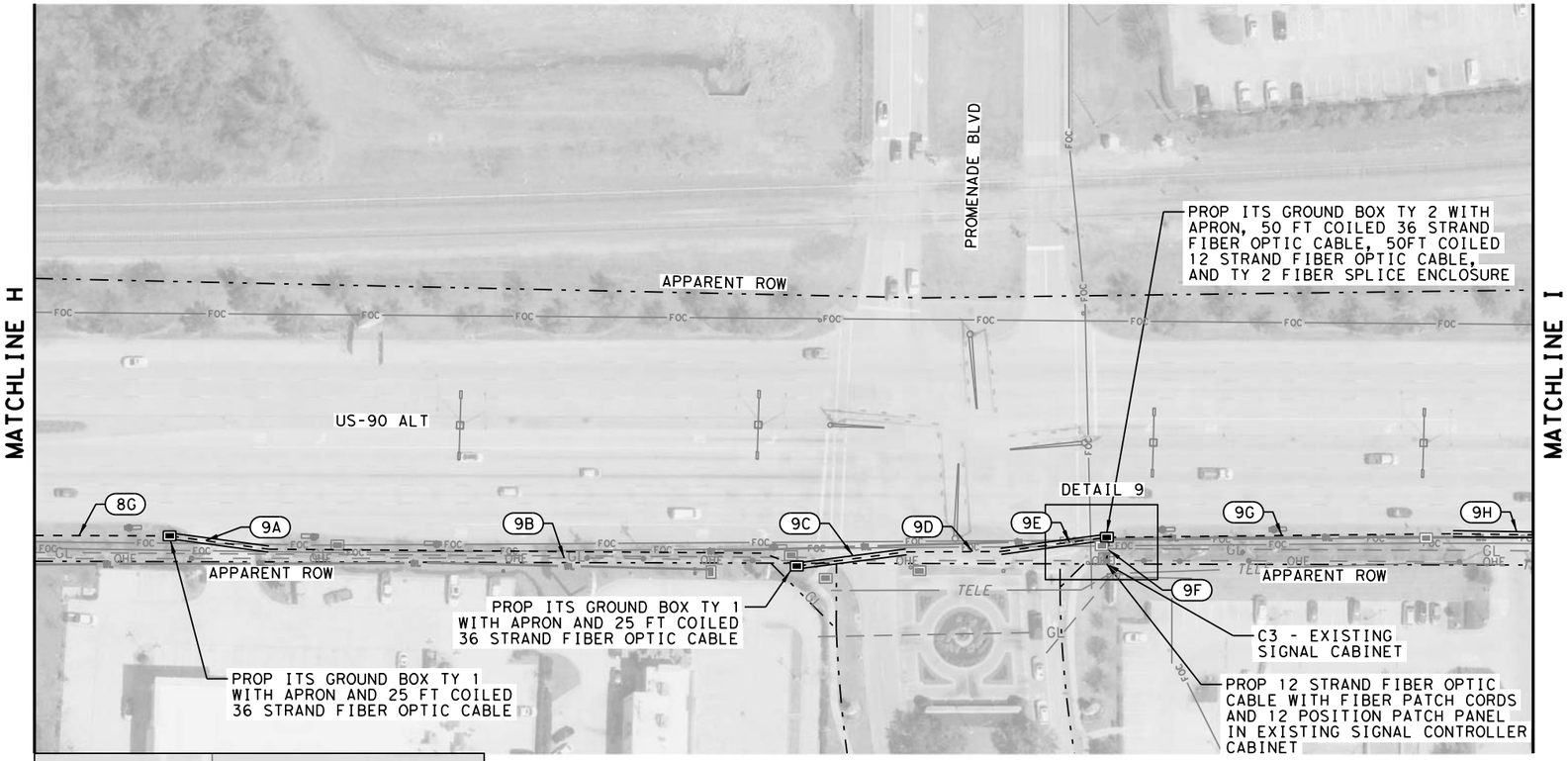

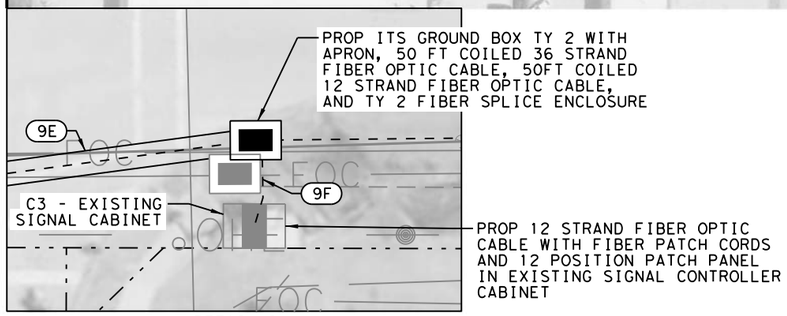

DETAIL 9

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

0 100

SCALE: 1"=100'

NOTES:

1. LOCATIONS OF EXISTING UTILITIES, EXISTING ROW, AND SIGNAL EQUIPMENT SHOWN IN THESE PLANS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY ALL INFRASTRUCTURE AND UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

2. CONTRACTOR SHALL CALL TEXAS 811 FOR LOCATES PRIOR TO EXCAVATION. IT SHOULD BE NOTED THAT TEXAS 811 MAY NOT HAVE ALL NECESSARY DATA FOR LOCATING ALL UTILITIES IN THE PROJECT AREA. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY OWNERS AND OPERATORS TO ACQUIRE ACCURATE UTILITY DATA FOR USE DURING CONSTRUCTION.

3. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGE CAUSED BY CONTRACTOR'S FAILURE TO LOCATE AND PRESERVE THESE UTILITIES, WHETHER UNDERGROUND, ABOVE GROUND, OR OVERHEAD.

CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER	
		0618 6053	0618 6054	0620 6002	6007 6011	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (12 SMF)	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
8G	95	1		1		1
9A	70		1	1		1
9B	360	1		1		1
9C	80		1	1		1
9D	65	1		1		1
9E	80		1	1		1
9F	25	1			1	
C3	10				1	
9G	240	1		1		1
9H	55		1	1		1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
528	6006	REMOVE AND RELAY PAVERS	SY	15
618	6053	CONDT (PVC) (SCH 80) (3")	LF	785
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	285
620	6002	ELEC CONDR (NO.14) INSULATED	LF	1045
6007	6011	FIBER OPTIC CBL (SNGLE-MODE)(12 FIBER)	LF	85
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1145
6007	6021	FIBER OPTIC SPLICE ENCLOSURE	EA	1
6007	6023	FIBER OPTIC PATCH PANEL (12 POSITION)	EA	1
6007	6094	FIBER OPTIC FUSION SPLICE	EA	12
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	2
6186	6008	ITS GND BOX (PCAST) TY 2(366036) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER
10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-892

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 9 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 15

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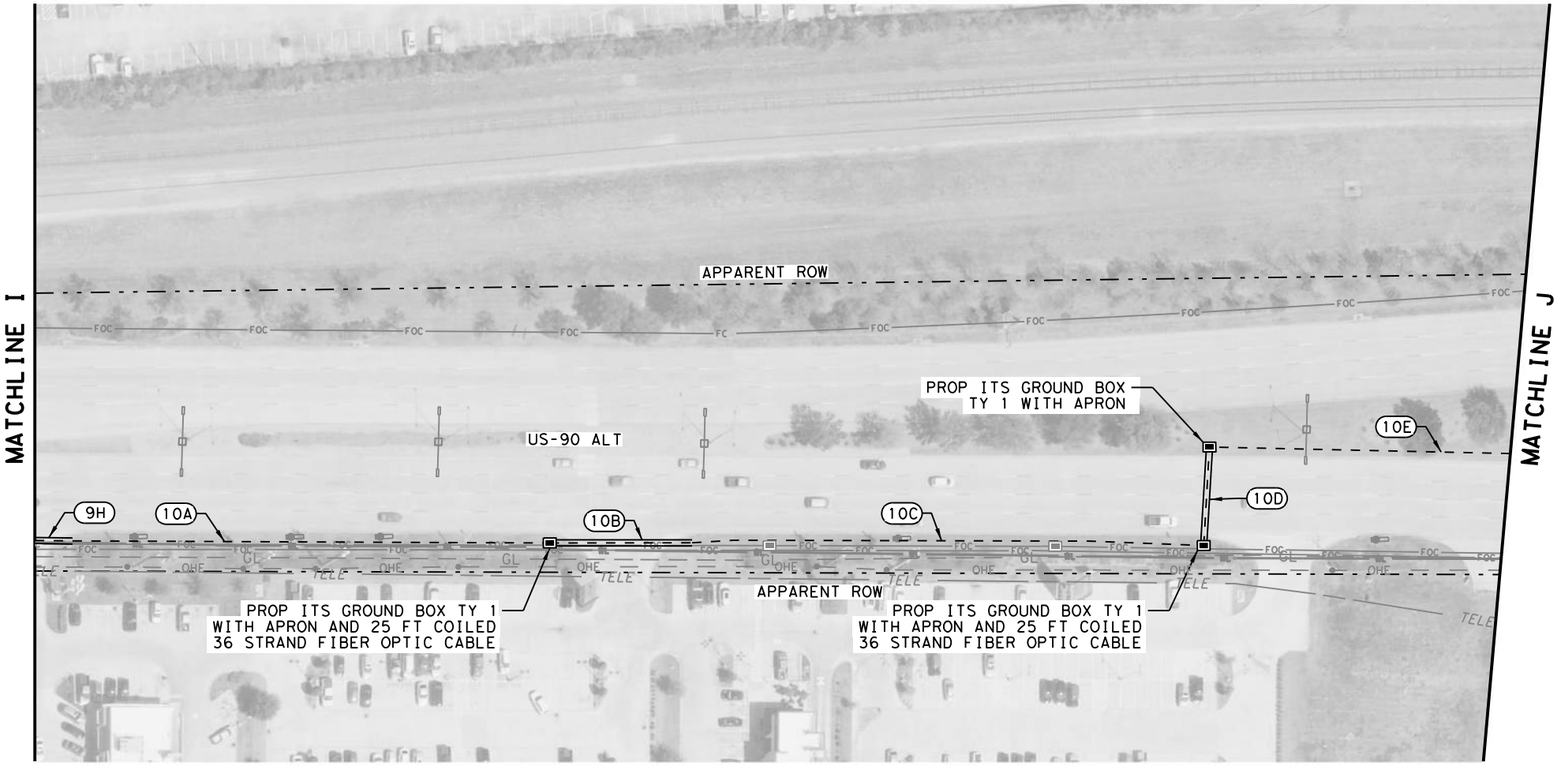

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

0 100

SCALE: 1"=100'

NOTES:

1. LOCATIONS OF EXISTING UTILITIES, EXISTING ROW, AND SIGNAL EQUIPMENT SHOWN IN THESE PLANS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY ALL INFRASTRUCTURE AND UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

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CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER
		0618 6053	0618 6054	0620 6002	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
9H	25		1	1	1
10A	320	1		1	1
10B	95		1	1	1
10C	345	1		1	1
10D	75		1	1	1
10E	205	1		1	1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	870
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	195
620	6002	ELEC CONDR (NO.14) INSULATED	LF	1065
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1115
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	3

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 10 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 16

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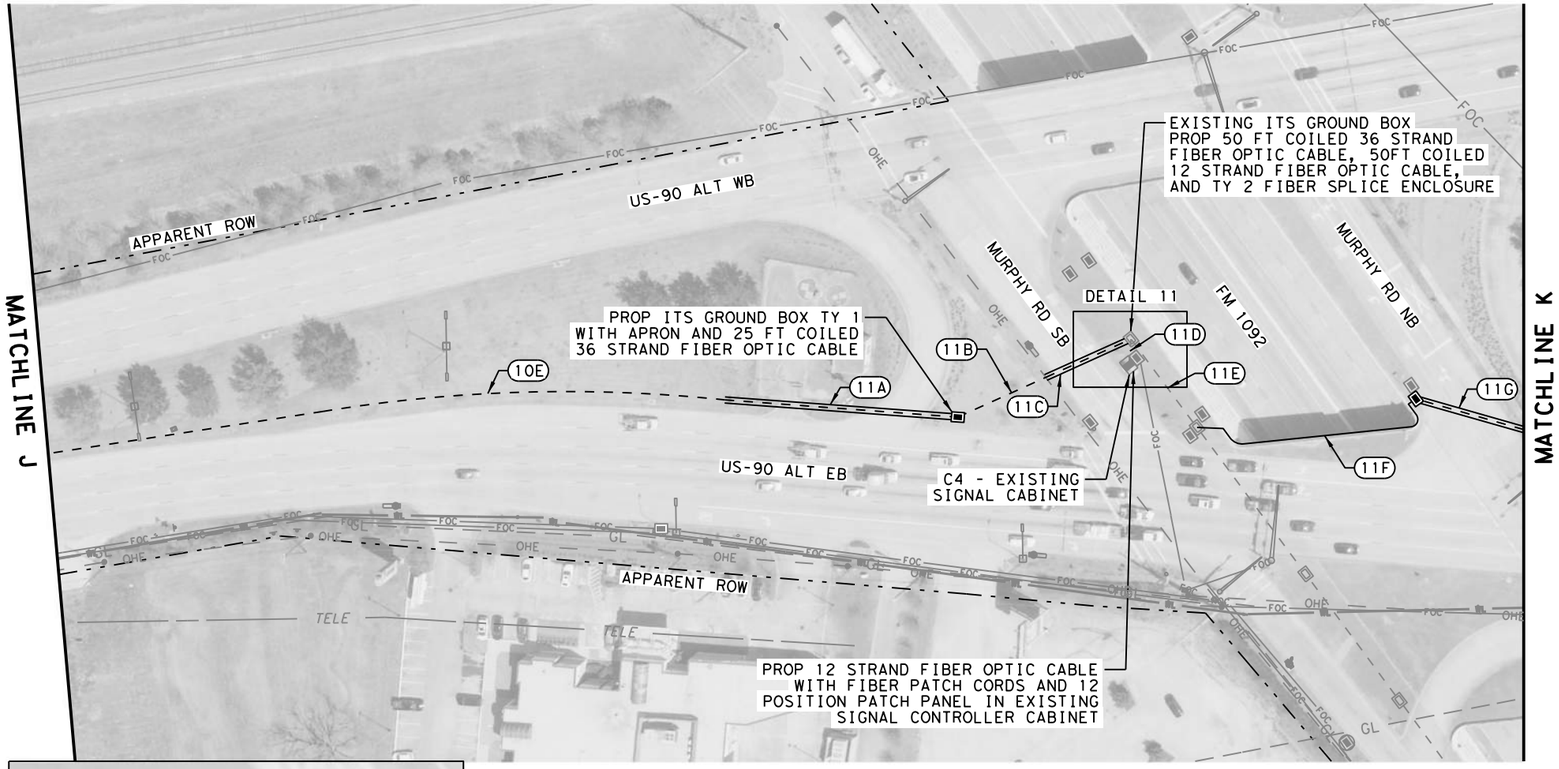
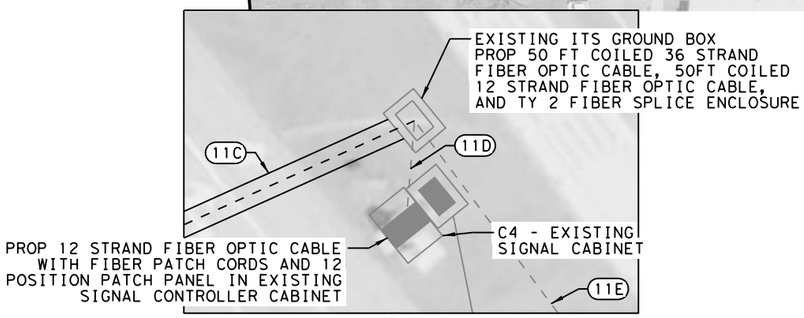
* CONDUIT RUNS 11D AND 11E AND THE GROUND BOXES ADJACENT TO THE RUNS WILL BE INSTALLED AS PART OF THE TRAFFIC MANAGEMENT SYSTEM ALONG FM 1092.





DETAIL 11

CONDUIT AND CABLE RUNS							
RUN	RUN LENGTH (LF)	CONDUIT			ELECTRICAL	FIBER	
		0618 6053	0618 6054	0618 6074	0620 6002	6007 6011	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	CONDT (RM) (3")	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (12 SMF)	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
10E	455	1			1		1
11A	155		1		1		1
11B	70	1			1		1
11C	70		1		1		1
C4	10					1	
11D	25	EXISTING				1	
11E	80	EXISTING			1		1
11F	185			1	1		1
11G	80		1		1		1

NOTES:

1. LOCATIONS OF EXISTING UTILITIES, EXISTING ROW, AND SIGNAL EQUIPMENT SHOWN IN THESE PLANS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY ALL INFRASTRUCTURE AND UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

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3. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGE CAUSED BY CONTRACTOR'S FAILURE TO LOCATE AND PRESERVE THESE UTILITIES, WHETHER UNDERGROUND, ABOVE GROUND, OR OVERHEAD.

ESTIMATED QUANTITIES				
ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	525
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	305
618	6074	CONDT (RM) (3")	LF	185
620	6002	ELEC CONDR (NO.14) INSULATED	LF	1095
6007	6011	FIBER OPTIC CBL (SNGLE-MODE)(12 FIBER)	LF	85
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1170
6007	6021	FIBER OPTIC SPLICE ENCLOSURE	EA	1
6007	6023	FIBER OPTIC PATCH PANEL (12 POSITION)	EA	1
6007	6094	FIBER OPTIC FUSION SPLICE	EA	12
6027	6008	GROUND BOX (PREPARE)	EA	2
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	2

* FIBER OPTIC CBL INCLUDES COILED SLACK

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

N

0 100

SCALE: 1"=100'

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 11 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 17

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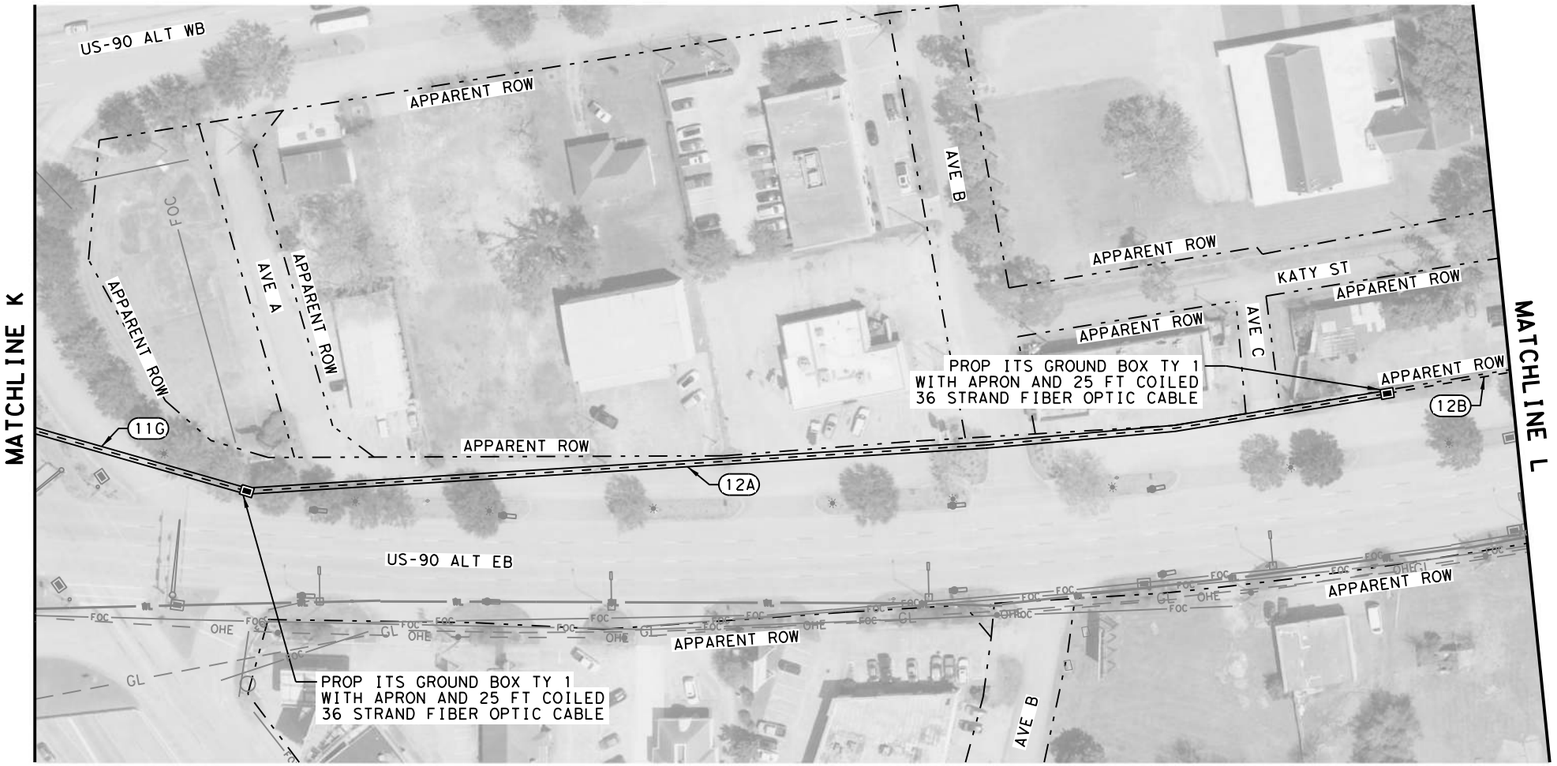

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

N

0 100

SCALE: 1"=100'

NOTES:

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CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER
		0618 6053	0618 6054	0620 6002	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
11G	150		1	1	1
12A	770		1	1	1
12B	85	1		1	1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	85
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	920
620	6002	ELEC CONDR (NO.14) INSULATED	LF	1005
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1055
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	2

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 12 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 18

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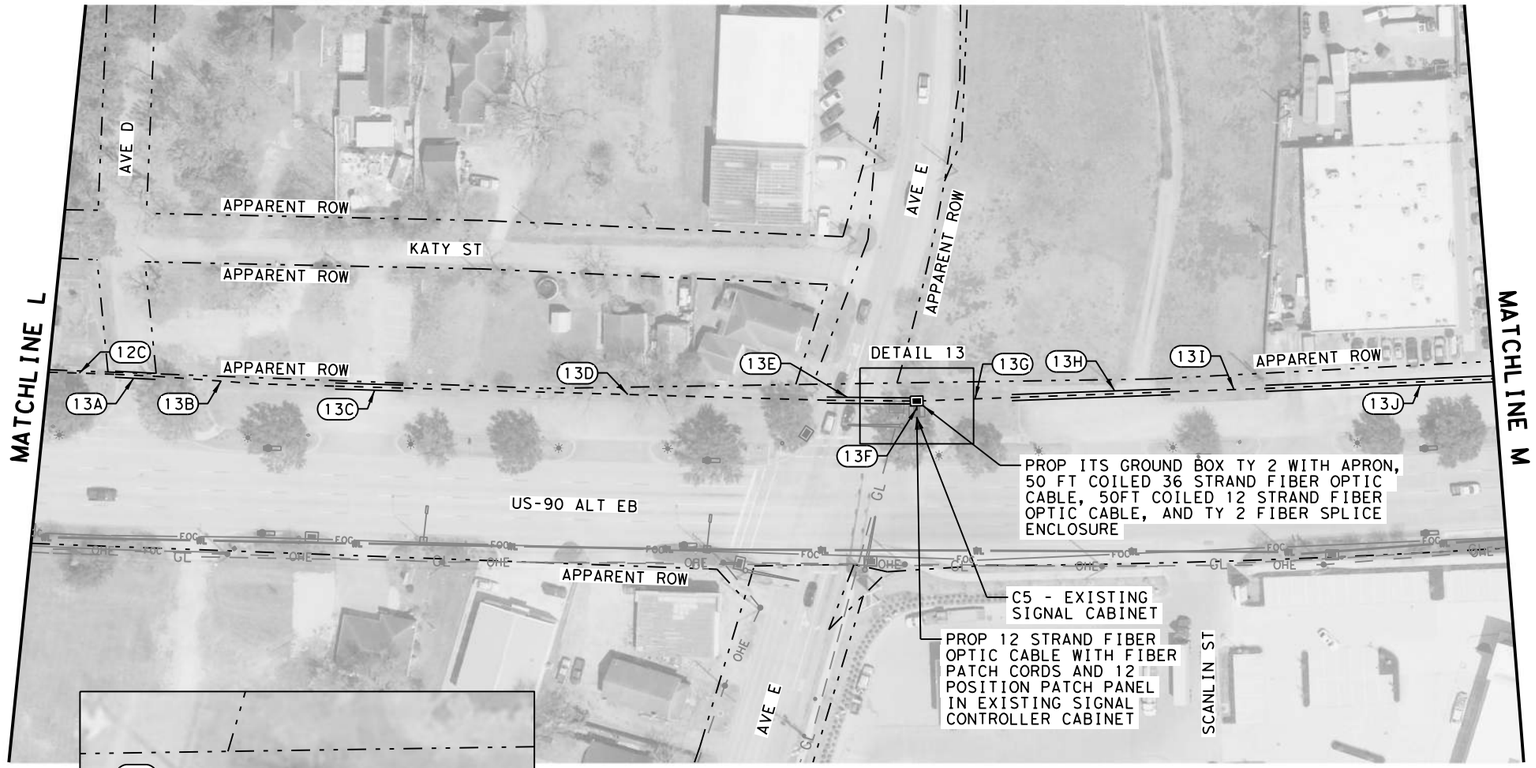

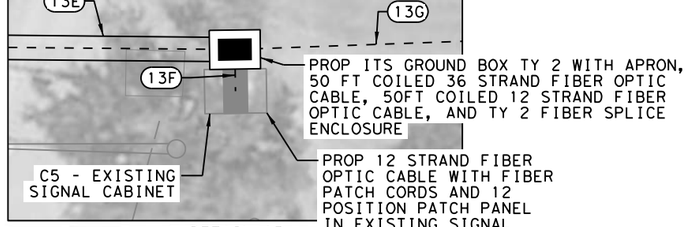

DETAIL 13

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

0 100

SCALE: 1"=100'

NOTES:

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CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER	
		0618 6053	0618 6054	0620 6002	6007 6011	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (12 SMF)	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
12B	45	1		1		1
13A	30		1	1		1
13B	120	1		1		1
13C	45		1	1		1
13D	280	1		1		1
13E	65		1	1		1
C5	10				1	
13F	15	1			1	
13G	70	1		1		1
13H	105		1	1		1
13I	65	1		1		1
13J	150		1	1		1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	595
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	395
620	6002	ELEC CONDR (NO.14) INSULATED	LF	975
6007	6011	FIBER OPTIC CBL (SNGLE-MODE)(12 FIBER)	LF	75
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1025
6007	6021	FIBER OPTIC SPLICE ENCLOSURE	EA	1
6007	6023	FIBER OPTIC PATCH PANEL (12 POSITION)	EA	1
6007	6094	FIBER OPTIC FUSION SPLICE	EA	12
6186	6008	ITS GND BOX (PCAST) TY 2(366036) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-512

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 13 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 19

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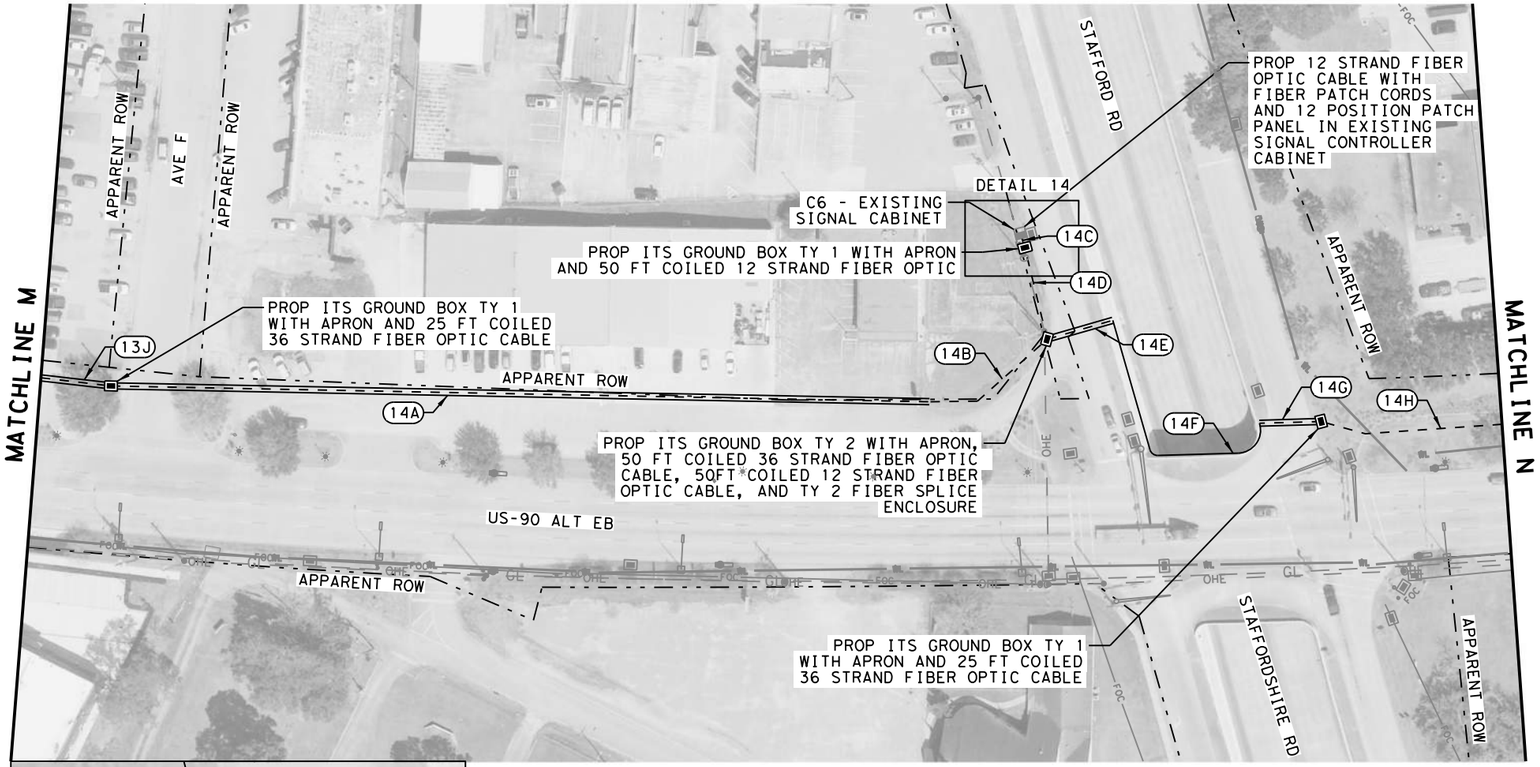

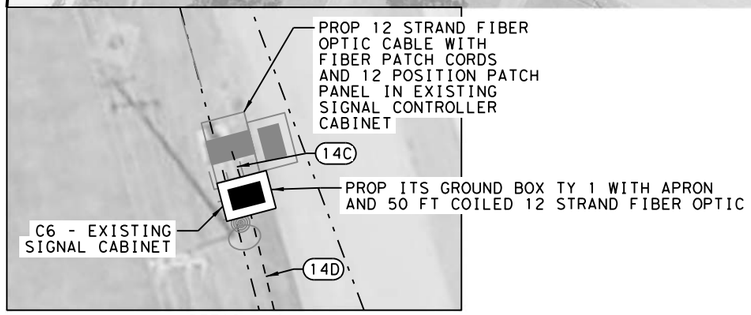

DETAIL 14

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

0 100

SCALE: 1"=100'

NOTES:

1. LOCATIONS OF EXISTING UTILITIES, EXISTING ROW, AND SIGNAL EQUIPMENT SHOWN IN THESE PLANS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY ALL INFRASTRUCTURE AND UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

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3. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGE CAUSED BY CONTRACTOR'S FAILURE TO LOCATE AND PRESERVE THESE UTILITIES, WHETHER UNDERGROUND, ABOVE GROUND, OR OVERHEAD.

CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT 0618 6053 CONDT PVC (SCH 80) (3")	CONDUIT 0618 6054 CONDT PVC (SCH 80) (3") (BORE)	CONDUIT 0618 6074 CONDT (RM) (3")	ELECTRICAL 0620 6002 ELEC CONDR (NO.14) INSULATED	FIBER 6007 6011 FIBER OPTIC CBL (SNGLE-MODE) (12 SMF)	FIBER 6007 6013 FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
13J	55		1		1		1
14A	550		1		1		1
14B	100	1			1		1
C6	10					1	
14C	15	1				1	
14D	75	1				1	
14E	50		1		1		1
14F	185			1	1		1
14G	50		1		1		1
14H	125	1			1		1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	315
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	705
618	6074	CONDT (RM) (3")	LF	185
620	6002	ELEC CONDR (NO.14) INSULATED	LF	1115
6007	6011	FIBER OPTIC CBL (SNGLE-MODE)(12 FIBER)	LF	200
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1215
6007	6021	FIBER OPTIC SPLICE ENCLOSURE	EA	1
6007	6023	FIBER OPTIC PATCH PANEL (12 POSITION)	EA	1
6007	6094	FIBER OPTIC FUSION SPLICE	EA	12
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	3
6186	6008	ITS GND BOX (PCAST) TY 2(366036) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER
10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 14 OF 18)

SCALE: 1" = 100'		PROJECT NO.	
DWN: ATG	CKD: ATG	C 27-8-182	
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 20

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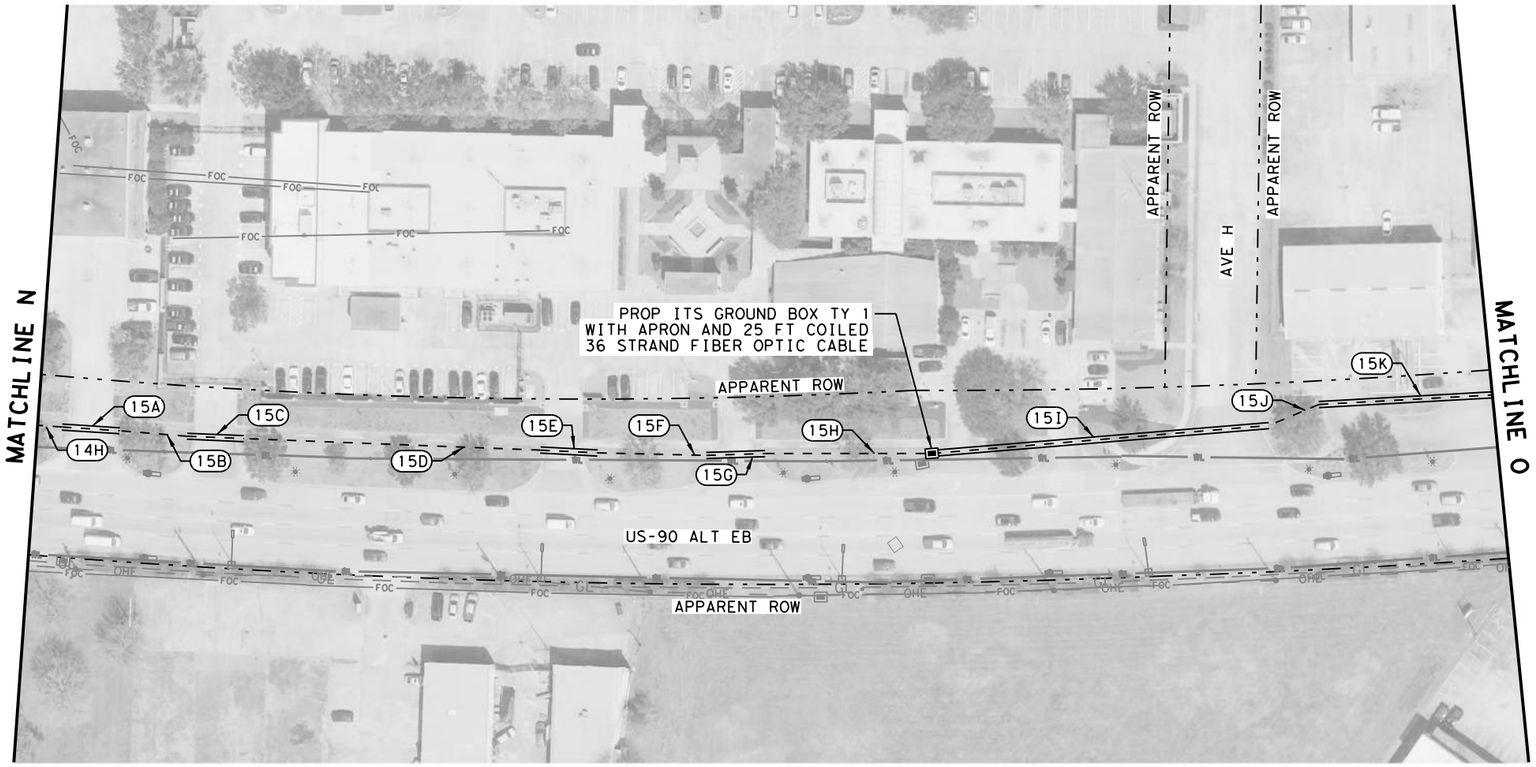

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

N

0 100

SCALE: 1"=100'

NOTES:

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CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT 0618 6053 CONDT PVC (SCH 80) (3")	CONDUIT 0618 6054 CONDT PVC (SCH 80) (3") (BORE)	ELECTRICAL 0620 6002 ELEC CONDR (NO.14) INSULATED	FIBER 6007 6013 FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
14H	20	1		1	1
15A	40		1	1	1
15B	45	1		1	1
15C	40		1	1	1
15D	200	1		1	1
15E	40		1	1	1
15F	75	1		1	1
15G	40		1	1	1
15H	115	1		1	1
15I	230		1	1	1
15J	40	1		1	1
15K	115		1	1	1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	495
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	505
620	6002	ELEC CONDR (NO.14) INSULATED	LF	1000
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1025
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 15 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 21

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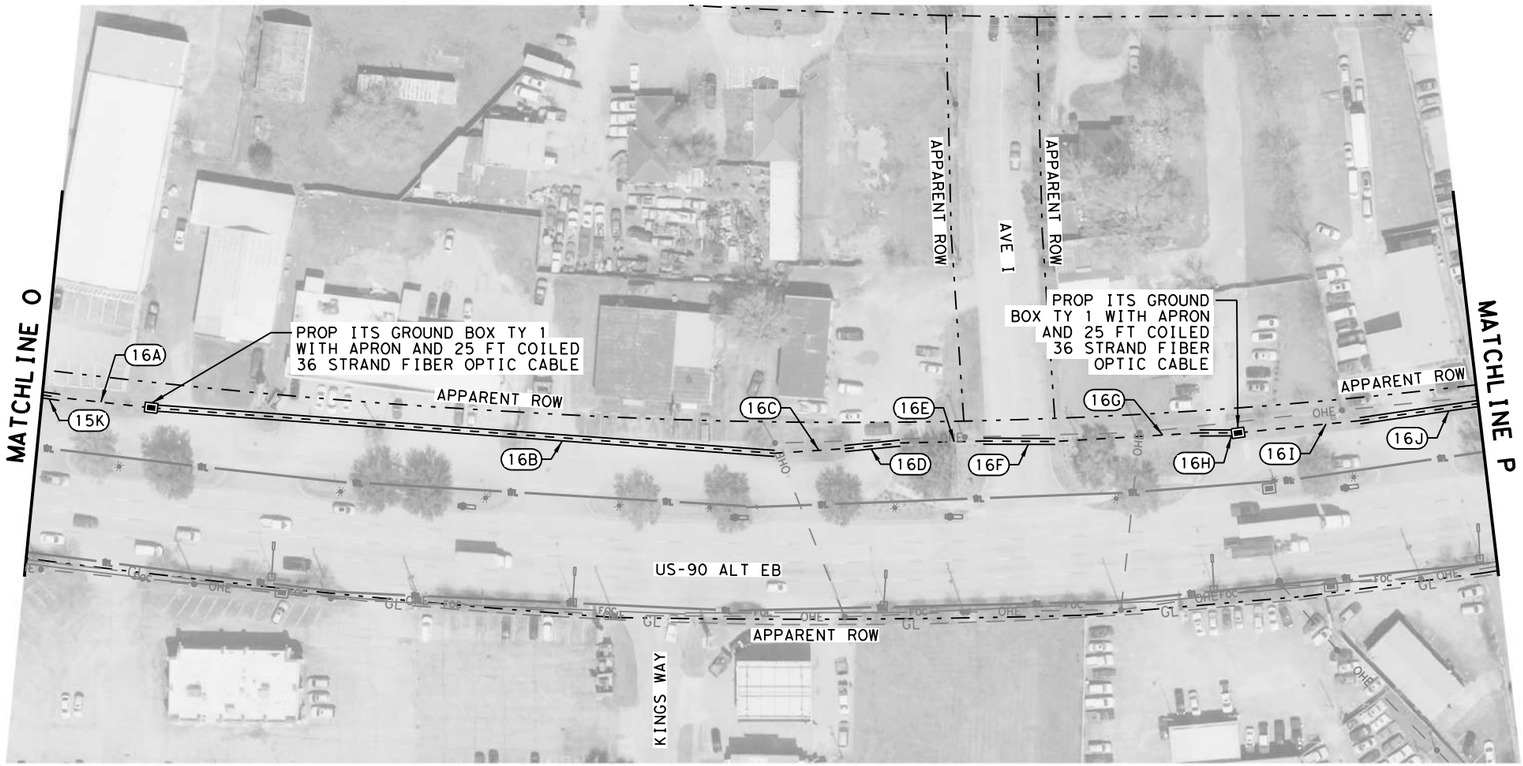

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

N

0 100

SCALE: 1"=100'

CONDUIT AND CABLE RUNS					
RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER
		0618 6053	0618 6054	0620 6002	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
15K	20		1	1	1
16A	65	1		1	1
16B	420		1	1	1
16C	50	1		1	1
16D	40		1	1	1
16E	55	1		1	1
16F	50		1	1	1
16G	100	1		1	1
16H	30		1	1	1
16I	85	1		1	1
16J	80		1	1	1

NOTES:

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ESTIMATED QUANTITIES				
ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	355
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	640
620	6002	ELEC CONDR (NO.14) INSULATED	LF	995
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1045
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	2

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 16 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 22

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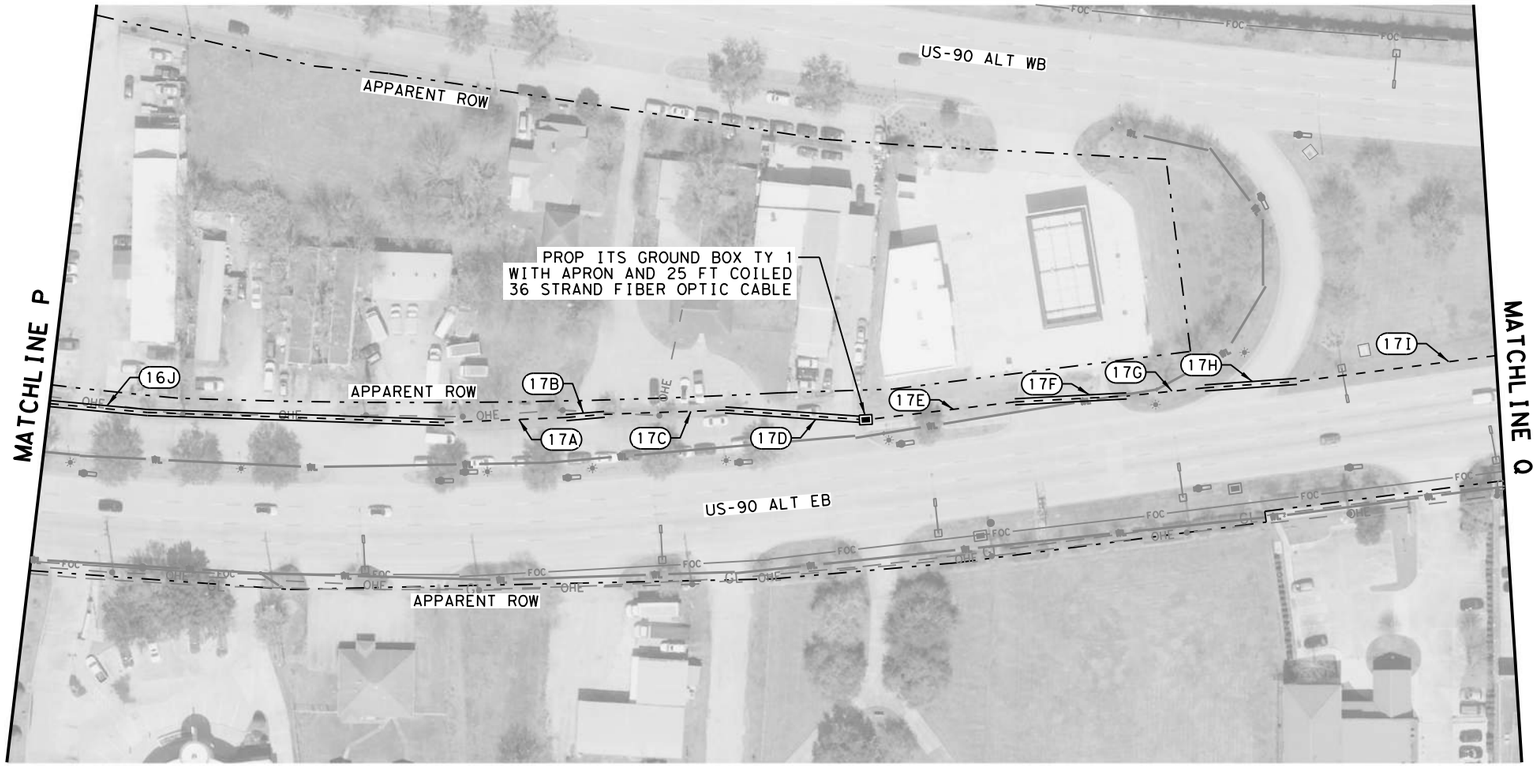

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

N

0 100

SCALE: 1"=100'

NOTES:

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CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT 0618 6053 CONDT PVC (SCH 80) (3")	CONDUIT 0618 6054 CONDT PVC (SCH 80) (3") (BORE)	ELECTRICAL 0620 6002 ELEC CONDR (NO.14) INSULATED	FIBER 6007 6013 FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
16J	265		1	1	1
17A	85	1		1	1
17B	30		1	1	1
17C	80	1		1	1
17D	95		1	1	1
17E	105	1		1	1
17F	80		1	1	1
17G	55	1		1	1
17H	65		1	1	1
17I	135	1		1	1

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	460
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	535
620	6002	ELEC CONDR (NO.14) INSULATED	LF	995
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	1020
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER
10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 17 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 23

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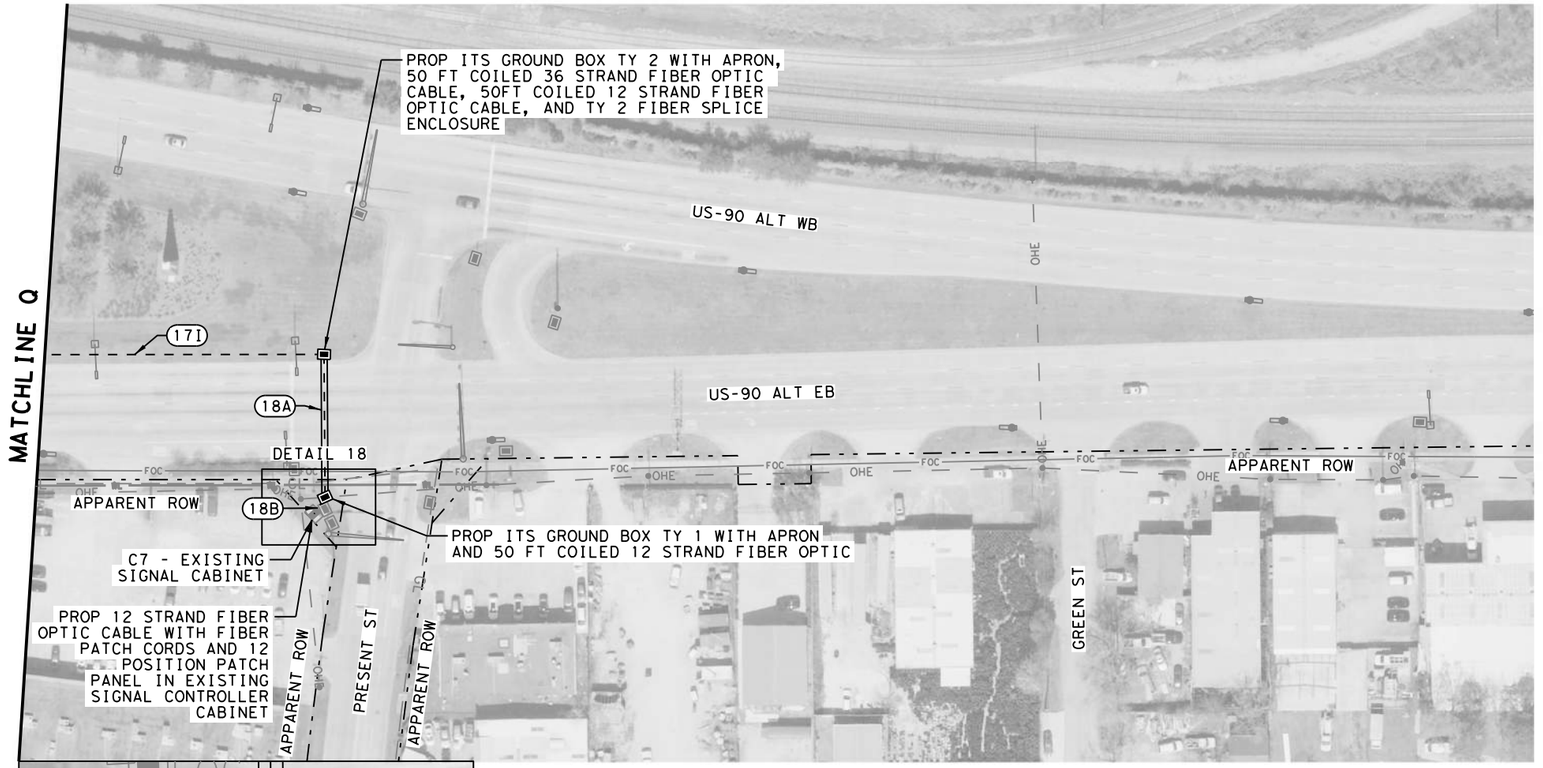

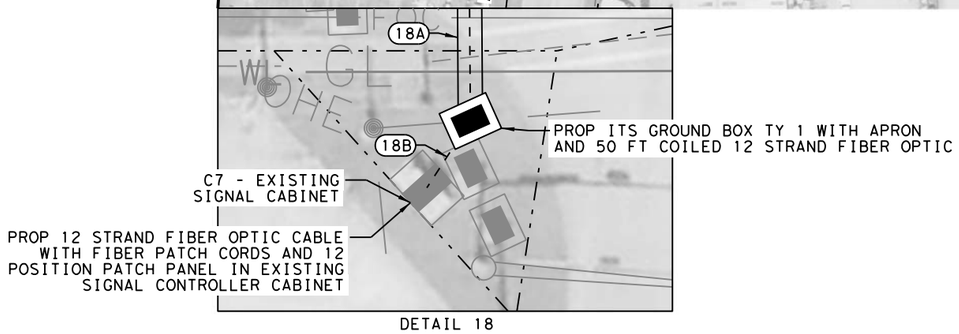

DETAIL 18

LEGEND

- EXIST OH ELECTRIC LINE
- EXIST OH TELEPHONE LINE
- EXIST UG COMMUNICATION LINE
- EXIST UG GAS LINE
- EXIST UG FIBER OPTIC LINE
- EXIST UG TELEPHONE LINE
- EXIST UG WATER LINE
- EXIST POWER POLE
- EXIST GUY ANCHOR
- EXIST ELECTRIC METER
- EXIST ELECTRIC PEDESTAL
- EXIST STORM DRAIN
- EXIST SANITARY SEWER MANHOLE
- EXIST STORM SEWER MANHOLE
- EXIST TELEPHONE MANHOLE
- EXIST TELEPHONE PEDESTAL
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST WATER METER
- EXIST SIGN
- EXIST MAST ARM AND POLE
- EXIST PED POLE
- EXIST LUMINAIRE
- EXIST DECORATIVE LUMINAIRE
- EXIST HIGH MAST LUMINAIRE
- EXIST CONTROLLER CABINET
- EXIST CONDUIT
- EXIST GROUND BOX
- EXIST ITS GROUND BOX
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP CONDUIT (RM)
- PROP ITS GROUND BOX W/ APRON (TYPE PER PLAN)

N

0 100

SCALE: 1"=100'

NOTES:

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CONDUIT AND CABLE RUNS

RUN	RUN LENGTH (LF)	CONDUIT		ELECTRICAL	FIBER	
		0618 6053	0618 6054	0620 6002	6007 6011	6007 6013
		CONDT PVC (SCH 80) (3")	CONDT PVC (SCH 80) (3") (BORE)	ELEC CONDR (NO.14) INSULATED	FIBER OPTIC CBL (SNGLE-MODE) (12 SMF)	FIBER OPTIC CBL (SNGLE-MODE) (36 SMF)
17I	190	1		1		1
18A	105		1		1	
18B	20	1			1	
C7	10				1	

ESTIMATED QUANTITIES

ITEM	DESC CODE	DESCRIPTION	UNIT	QUANTITY
618	6053	CONDT (PVC) (SCH 80) (3")	LF	210
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	105
620	6002	ELEC CONDR (NO.14) INSULATED	LF	190
6007	6011	FIBER OPTIC CBL (SNGLE-MODE)(12 FIBER)	LF	235
6007	6013	FIBER OPTIC CBL (SNGLE-MODE)(36 FIBER)	LF	240
6007	6021	FIBER OPTIC SPLICE ENCLOSURE	EA	1
6007	6023	FIBER OPTIC PATCH PANEL (12 POSITION)	EA	1
6007	6094	FIBER OPTIC FUSION SPLICE	EA	12
6186	6002	ITS GND BOX (PCAST) TY 1(243636) W/APRON	EA	1
6186	6008	ITS GND BOX (PCAST) TY 2(366036) W/APRON	EA	1

* FIBER OPTIC CBL INCLUDES COILED SLACK

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER

10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-852

Texas Department of Transportation

US 90 ALTERNATE

FIBER OPTIC LAYOUT

(SHEET 18 OF 18)

SCALE: 1" = 100'			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 24

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C1
ITS HUB AT
US 90A AND IH 69

SPLICE TRAY WITH
FAN-OUTS

T ALTERNATE 1
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE 6
T ALTERNATE 7
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE 12
T 13-30
T ALTERNATE 31
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE 36

FIBER ETHERNET SWITCH
PROVIDED BY TXDOT

<- 36 STRAND SM FOC

1 C ALTERNATE C 1
C ALTERNATE C
C ALTERNATE C
C ALTERNATE C
C ALTERNATE C
6 C ALTERNATE C 6
7 C ALTERNATE C 7
C ALTERNATE C
C ALTERNATE C
C ALTERNATE C
C ALTERNATE C
C ALTERNATE C
12 C ALTERNATE C 12
13-30 C C 13-30
31 C ALTERNATE C 31
C ALTERNATE C
C ALTERNATE C
C ALTERNATE C
C ALTERNATE C
36 C ALTERNATE C 36

ITS GROUND BOX

<- 36 STRAND SM FOC

C2
SIGNAL CABINET AT US 90A AND
DULLES AVE / KIRKWOOD RD

FIBER OPTIC PATCH PANEL
(12 POSITION)

T ALTERNATE 1
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE 6
T ALTERNATE 7
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE
T ALTERNATE 12

12 STRAND SM FOC

FIBER ETHERNET SWITCH
PROVIDED BY TXDOT

1 S ALTERNATE S 7
S ALTERNATE S
S ALTERNATE S
S ALTERNATE S
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6 S ALTERNATE S 12
1 S ALTERNATE S 1
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S ALTERNATE S 6

FIBER OPTIC SPLICE ENCLOSURE

7 C ALTERNATE C 7
C ALTERNATE C
C ALTERNATE C
C ALTERNATE C
C ALTERNATE C
12 C ALTERNATE C 12
13-30 C C 13-30
31 C ALTERNATE C 31
C ALTERNATE C
C ALTERNATE C
C ALTERNATE C
C ALTERNATE C
36 C ALTERNATE C 36

ITS GROUND BOX

<- 36 STRAND SM FOC

MATCHLINE 1

LEGEND

T FC CONNECTOR
S FUSION SPLICE
C COILED

10/20/2023 10:43:08 AM
2021.0088_03_Termination.dgn

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER
10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-512

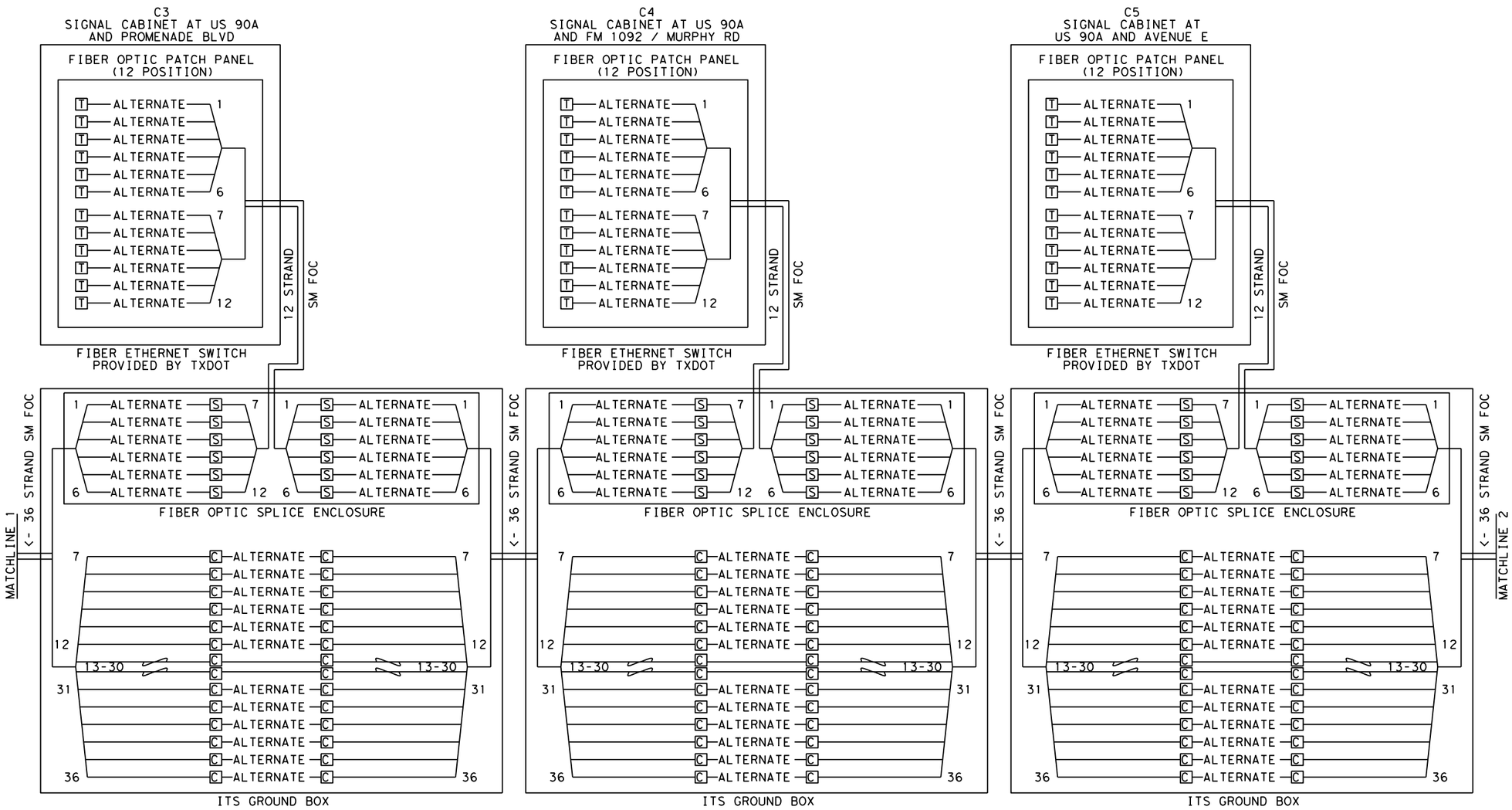
Texas Department of Transportation

US 90 ALTERNATE

ITS TERMINATION ASSIGNMENTS

(SHEET 1 OF 3)

			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 25



LEGEND

- [T] FC CONNECTOR
- [S] FUSION SPLICE
- [C] COILED

10/20/2023 10:43:09 AM
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STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER
10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

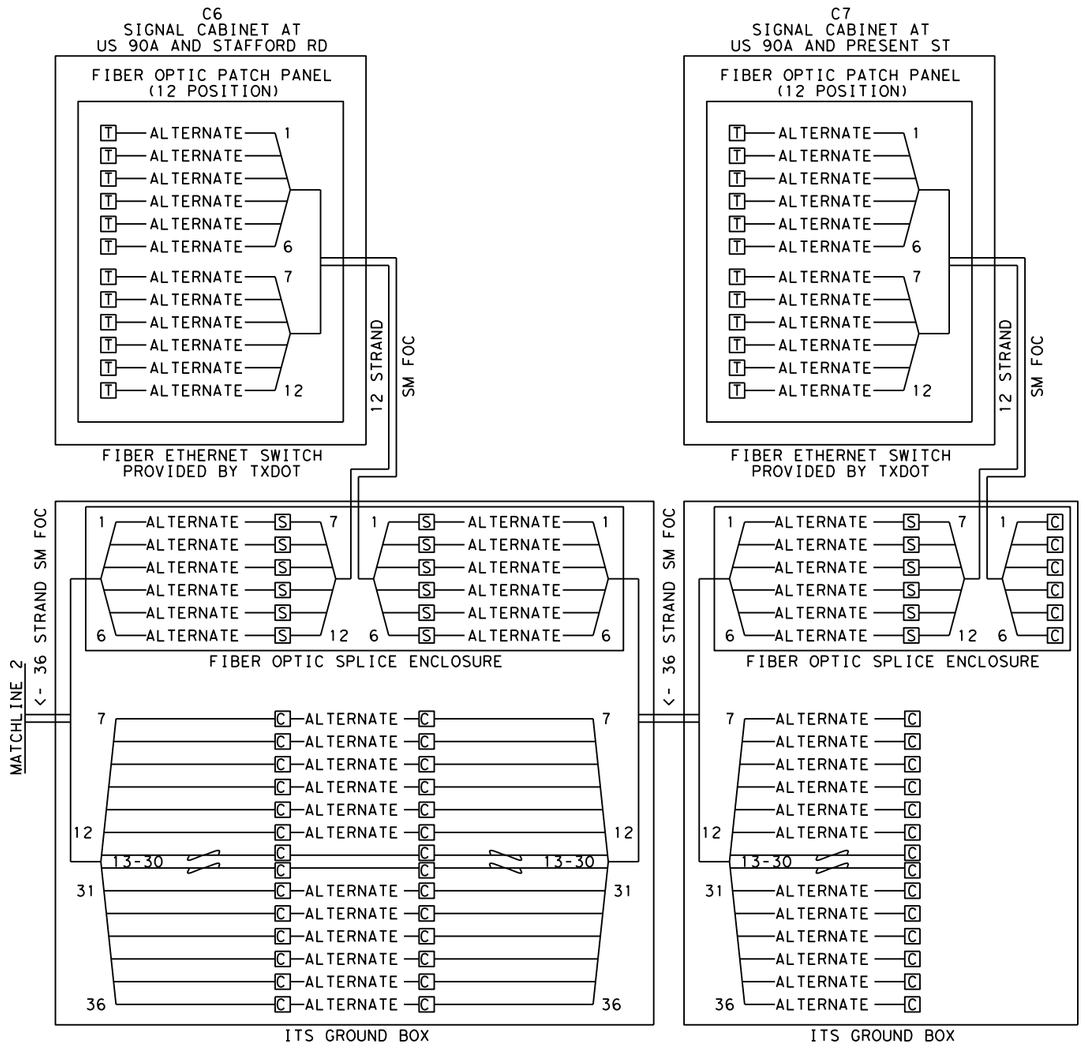
Texas Department of Transportation

US 90 ALTERNATE

ITS TERMINATION ASSIGNMENTS

(SHEET 2 OF 3)

			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 26



LEGEND

- T FC CONNECTOR
- S FUSION SPLICE
- C COILED

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STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED
PROFESSIONAL ENGINEER
10/20/2023

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

Texas Department of Transportation

US 90 ALTERNATE

ITS TERMINATION ASSIGNMENTS

(SHEET 3 OF 3)

			PROJECT NO.
DWN: ATG	CKD: ATG		C 27-8-182
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	HOU	6	FORT BEND
CONTROL	SECTION	JOB	HWY. NO. / SHEET NO.
0027	08	182	US 90A / 27

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0027	08	182	US 90A
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	HOU	FORT BEND		28

DATE: 10/20/2023 10:43:16 AM
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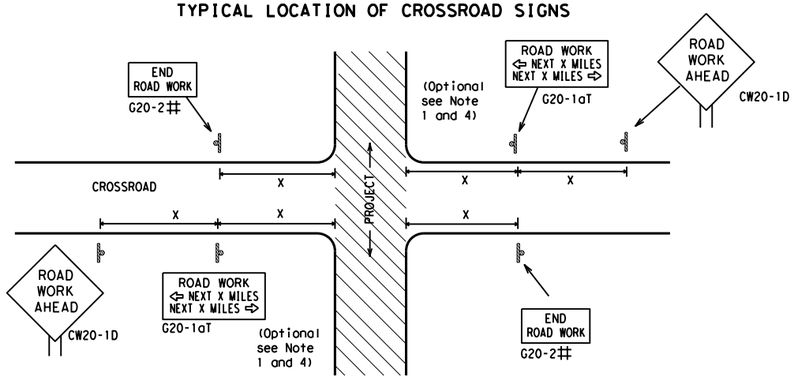
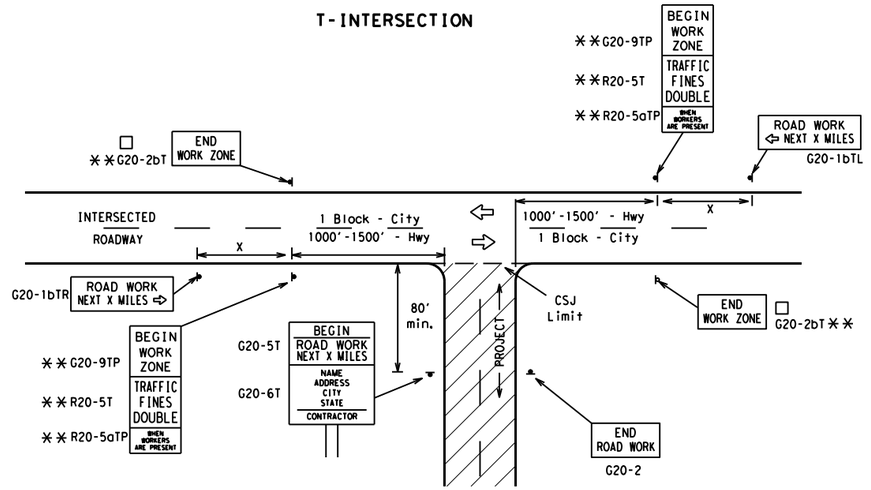
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

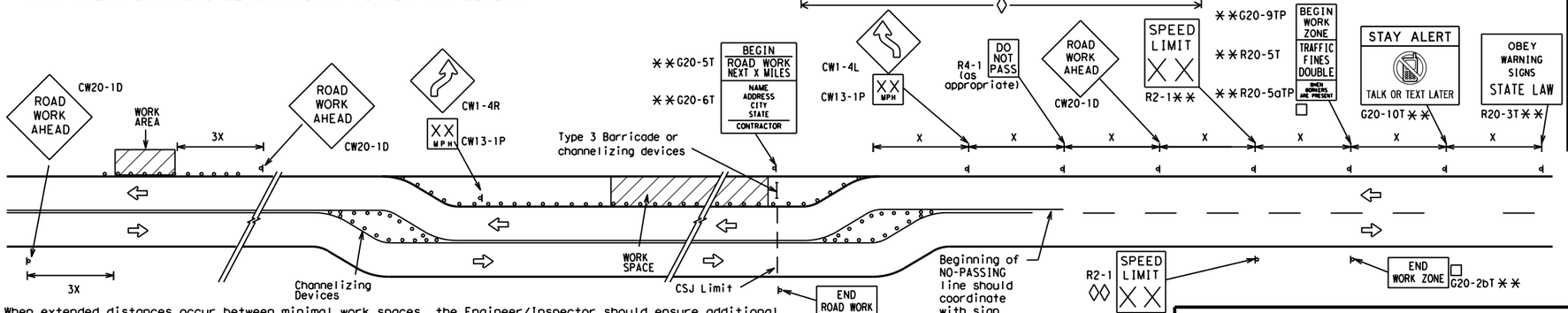
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

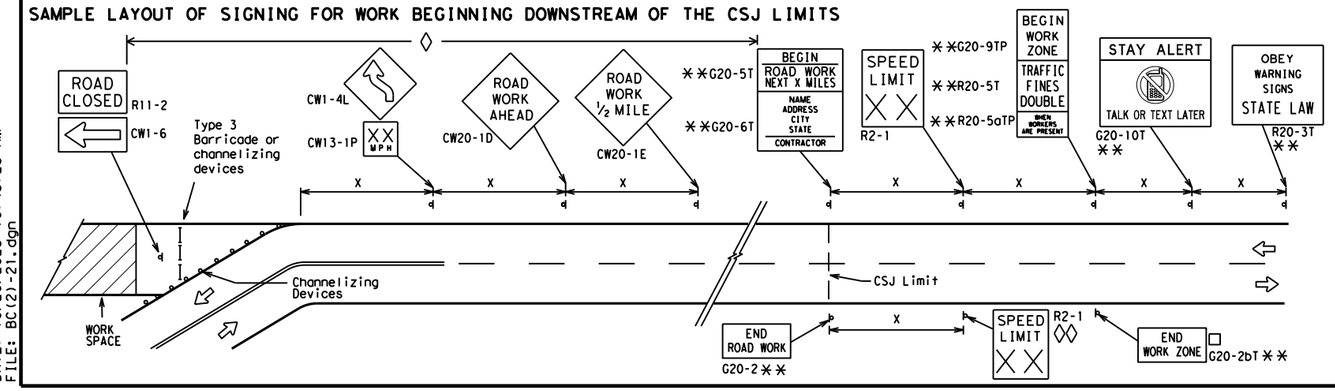
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	08	182	US 90A
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	FORT BEND		29

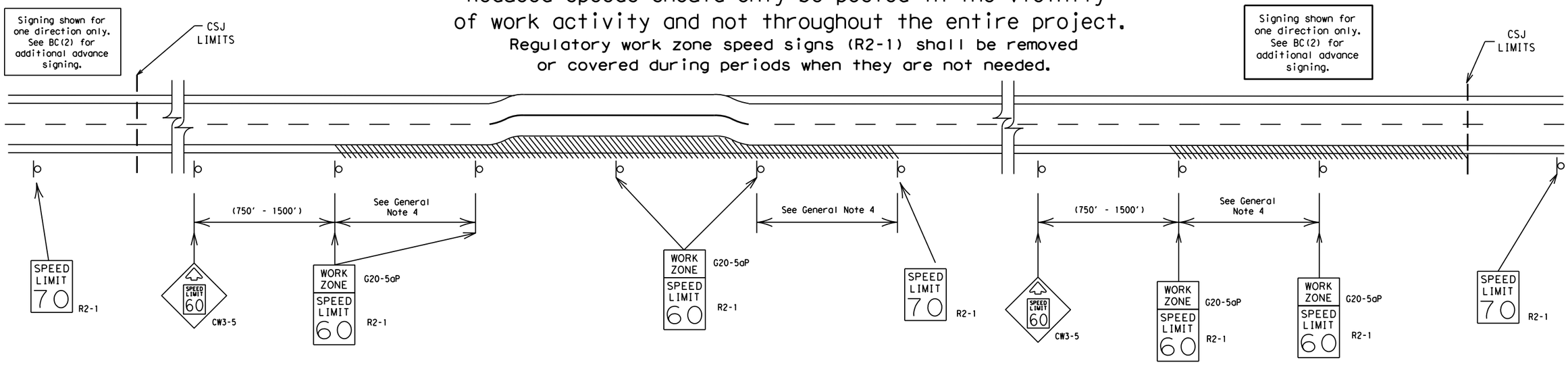
DATE: 10/20/2023 10:43:23 AM
FILE: BC(2)-21.dgn

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

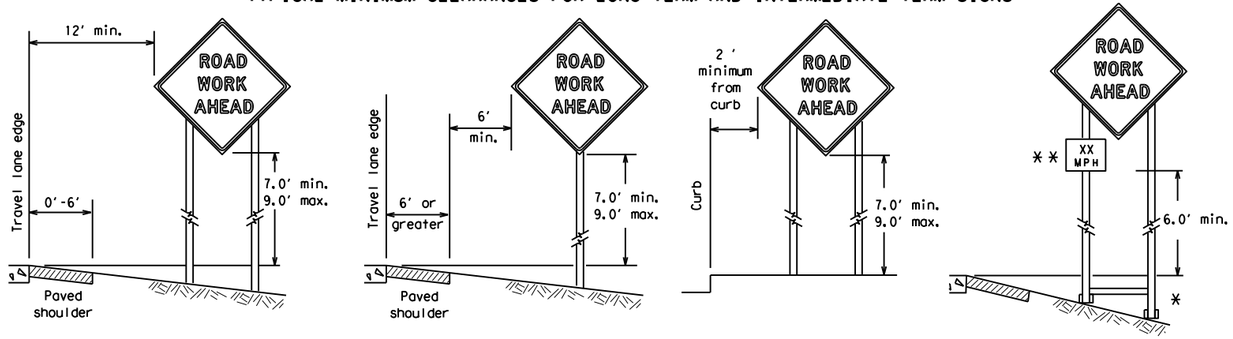
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	0027	08	182	US 90A
	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		30

DATE: 10/20/2023 10:43:30 AM
FILE: BC(3)-21.dgn

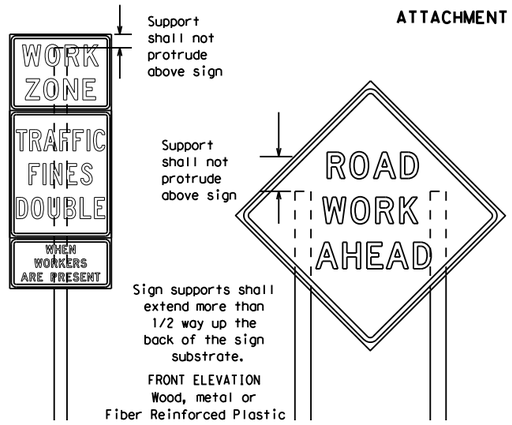
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

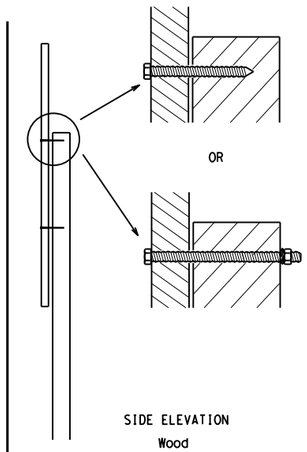


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





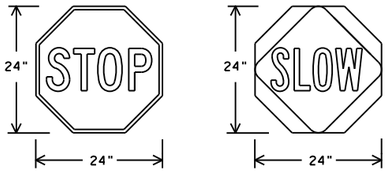
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	08	182	US 90A
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	FORT BEND		31

DATE: 10/20/2023 10:43:37 AM
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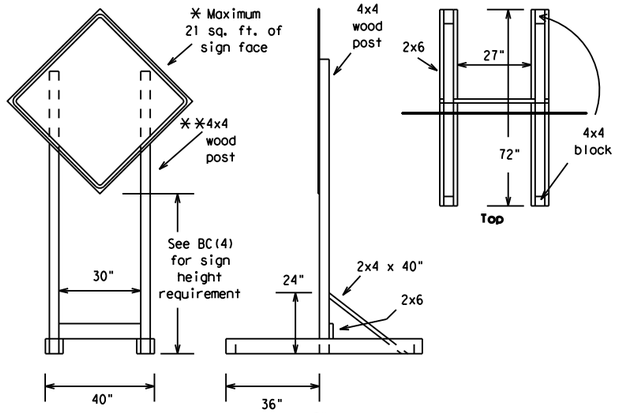
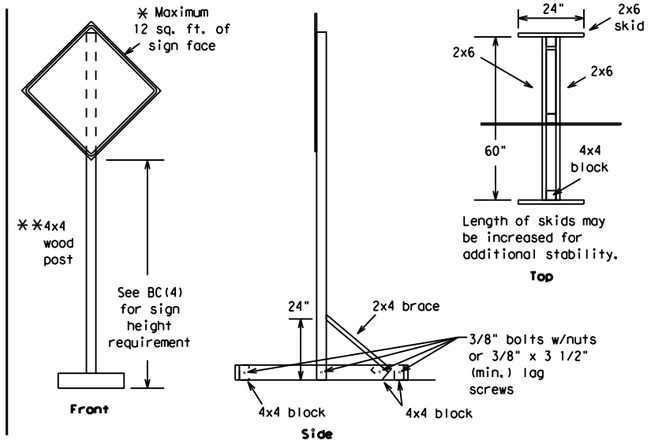
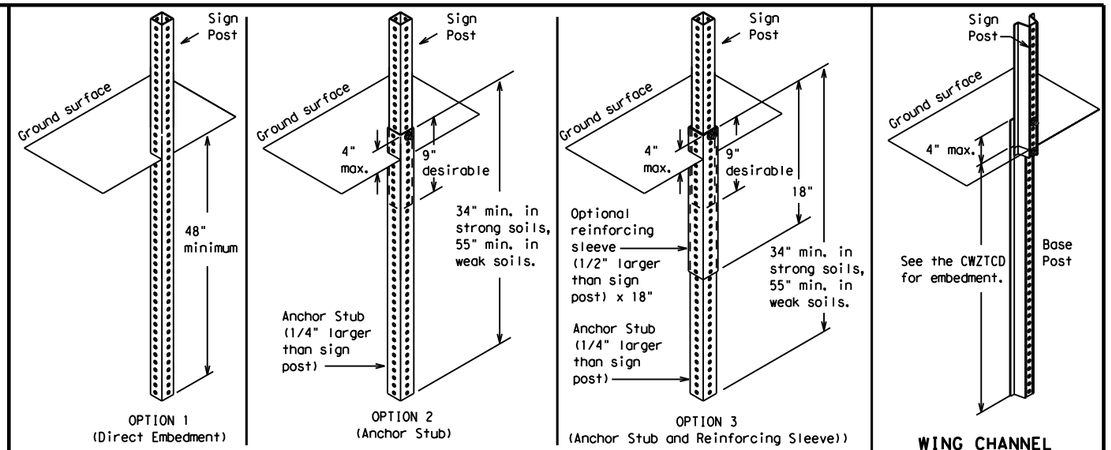




SKID MOUNTED WOOD SIGN SUPPORTS

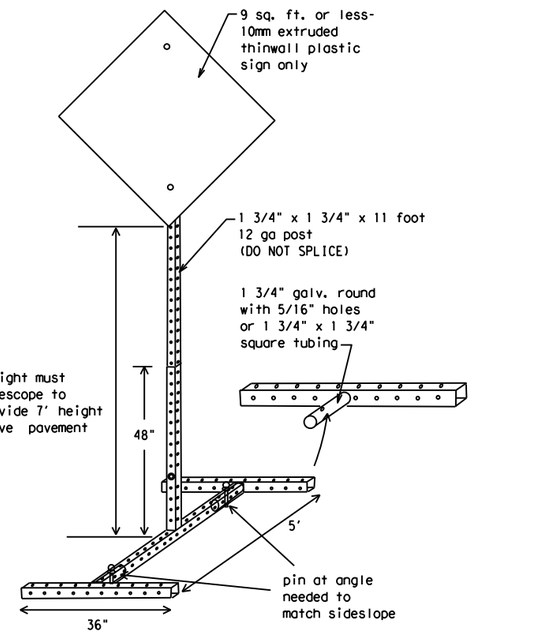
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

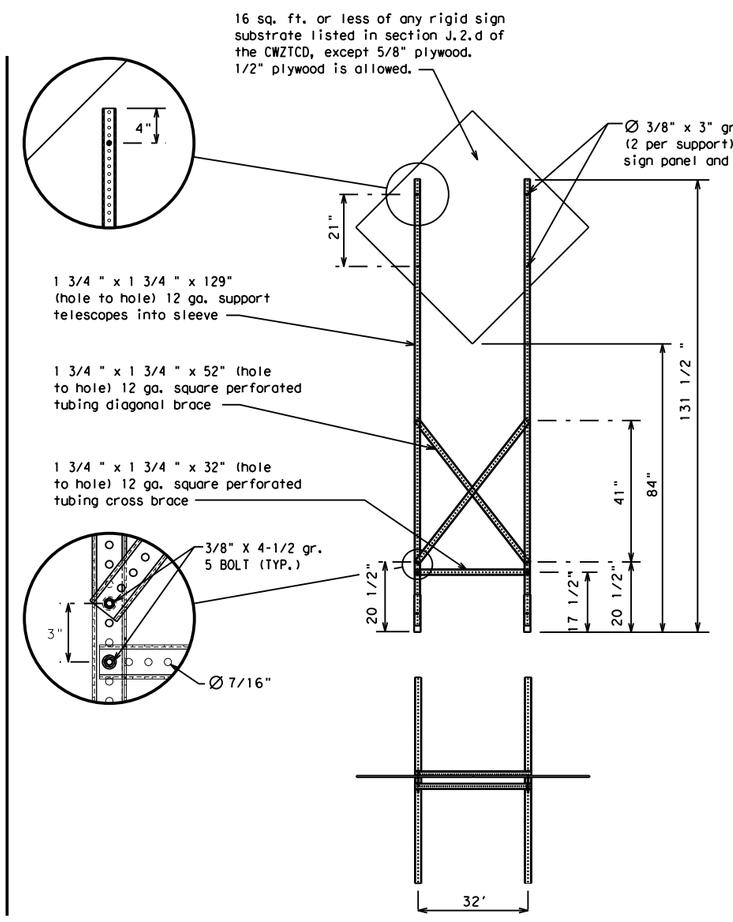


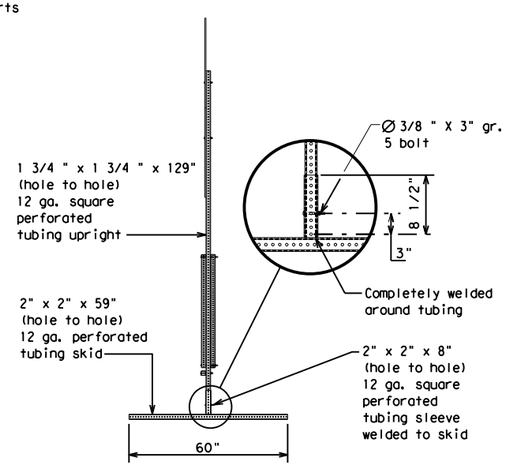
PERFORATED SQUARE METAL TUBING

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.







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0027	08	182	US 90A
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	FORT BEND		32

DATE: 10/20/2023 10:43:44 AM
FILE: BC(5)-21.dgn

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	08	182	US 90A
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	FORT BEND		33

100

DATE: 10/20/2023 10:43:50 AM
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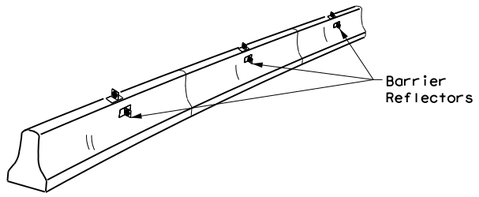
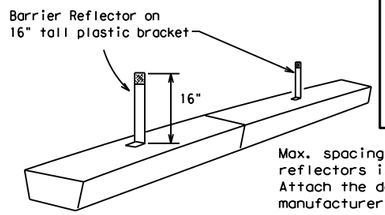
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



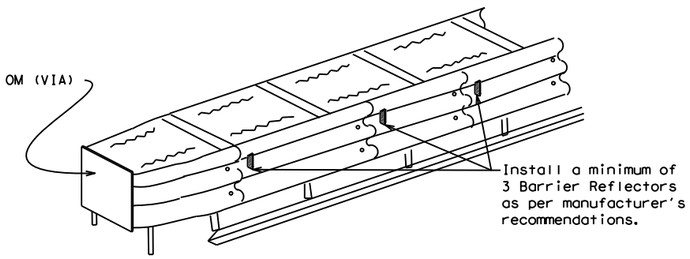
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

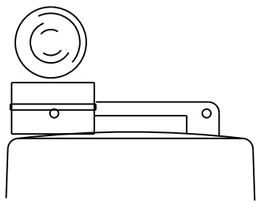
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

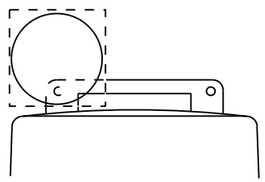
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

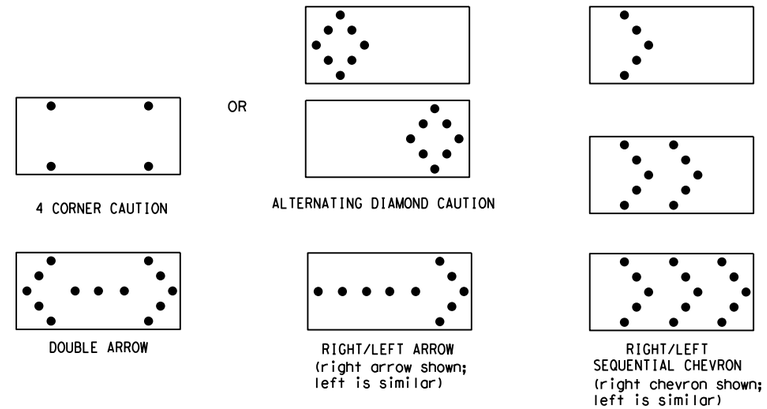
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	08	182	US 90A
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	FORT BEND		34

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DATE: 10/20/2023 10:43:58 AM
FILE: BC(7)-21.dgn

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

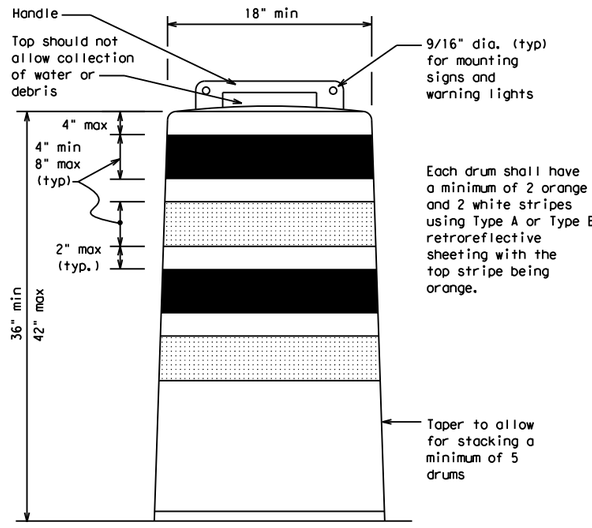
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

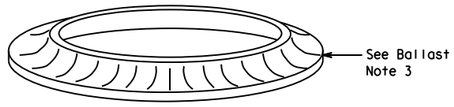
RETROREFLECTIVE SHEETING

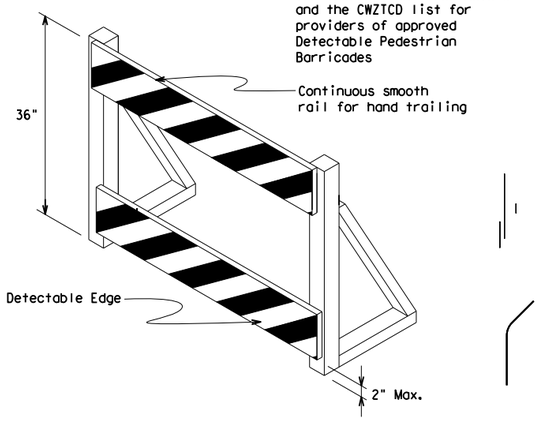
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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



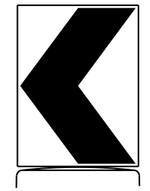




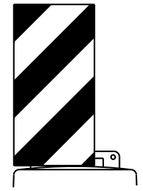
This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades

DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	08	182	US 90A
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	HOU	FORT BEND		35
7-13				

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DATE: 10/20/2023 10:44:05 AM
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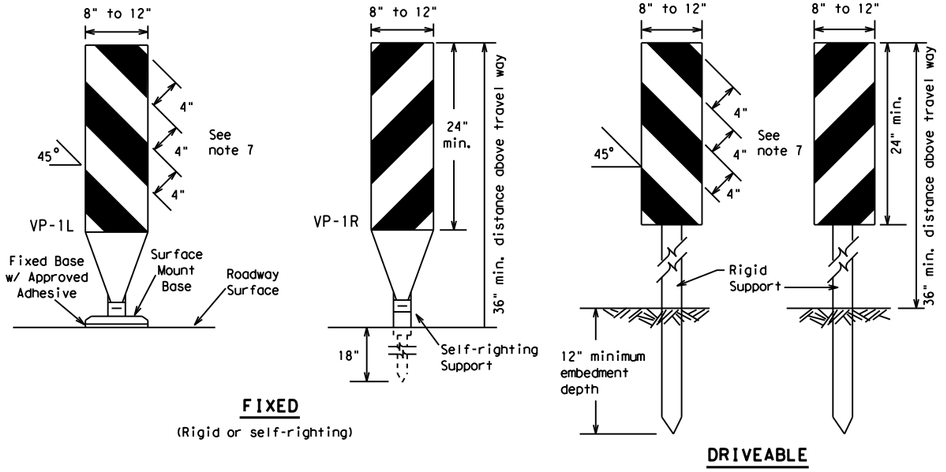
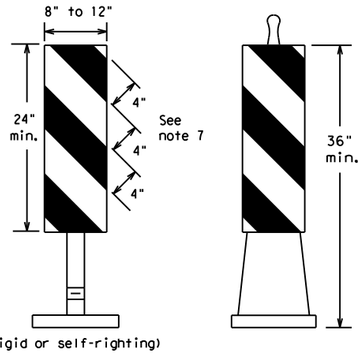


FIXED
(Rigid or self-righting)

DRIVEABLE

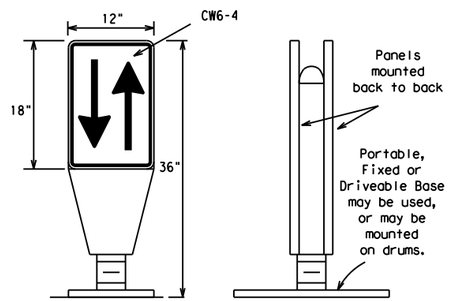


(Rigid or self-righting)

PORTABLE

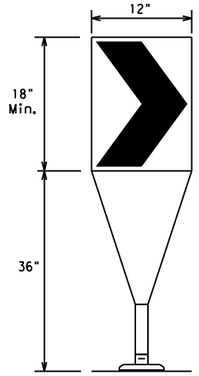
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



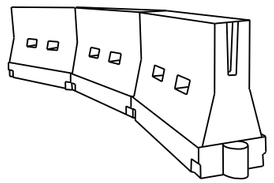
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	08	182	US 90A
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	FORT BEND		36

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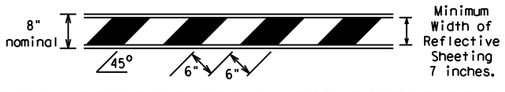
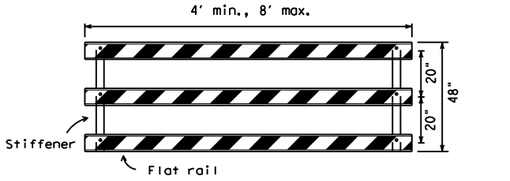
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



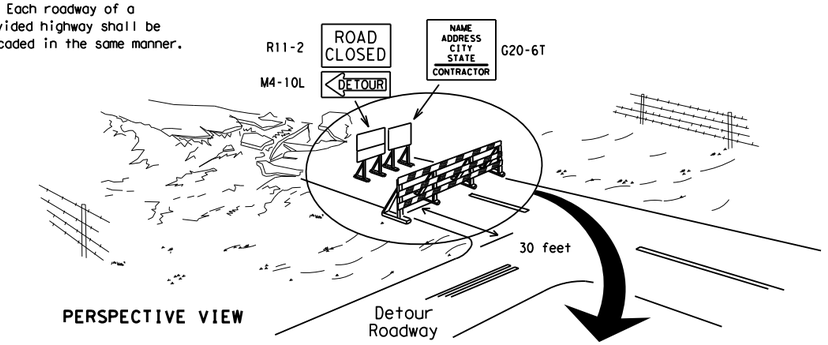
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

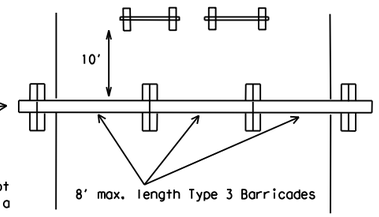
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

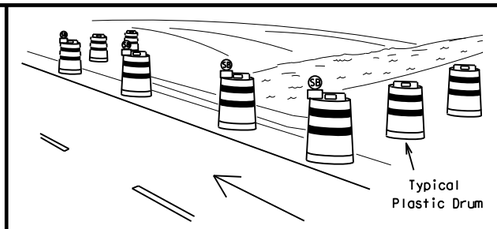
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

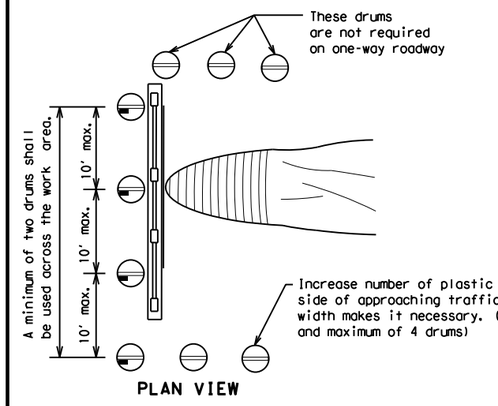
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

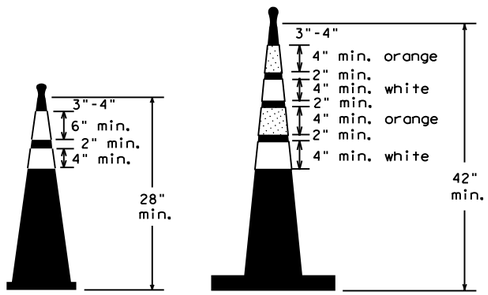
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



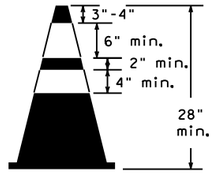
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

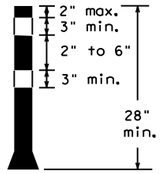
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

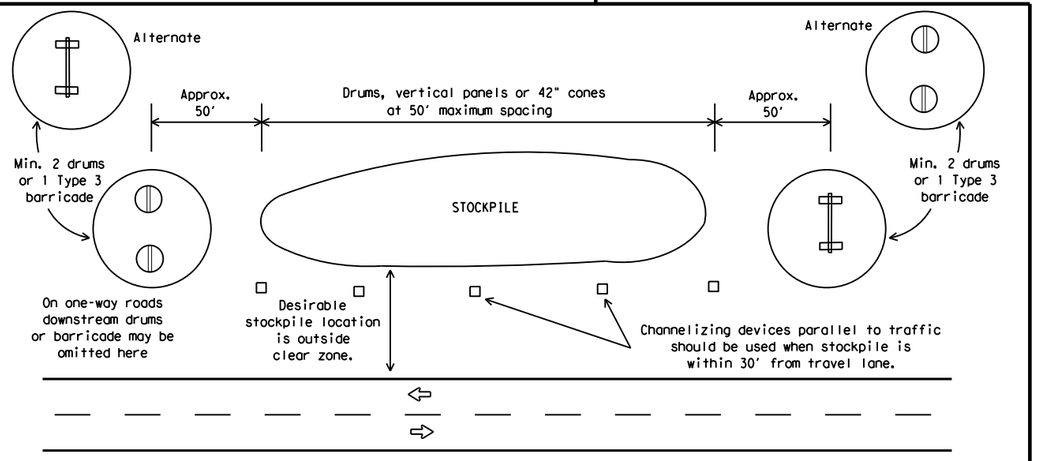


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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FILE: BC(10)-21.dgn

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

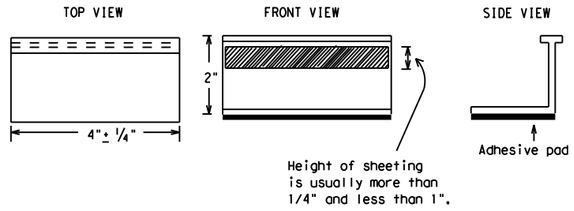
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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REVISIONS	0027	08	182	US 90A
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	HOU	FORT BEND		38
11-02 8-14				

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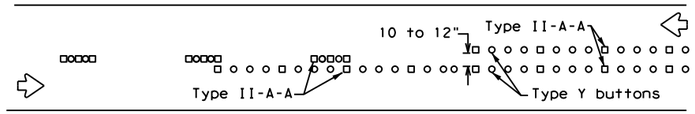
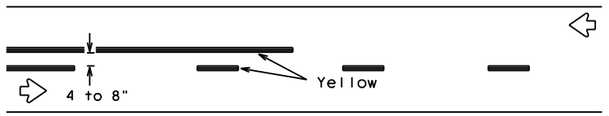
PAVEMENT MARKING PATTERNS

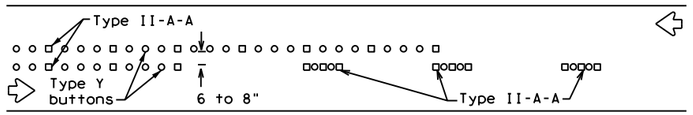
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



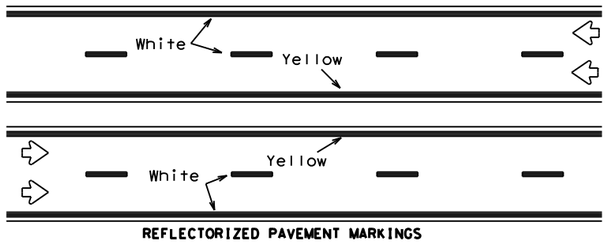
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



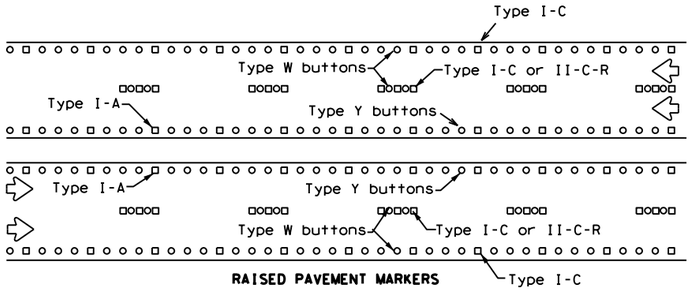
RAISED PAVEMENT MARKERS - PATTERN B

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

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



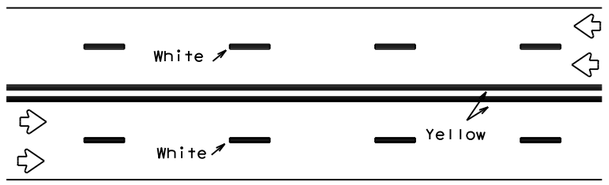
REFLECTORIZED PAVEMENT MARKINGS



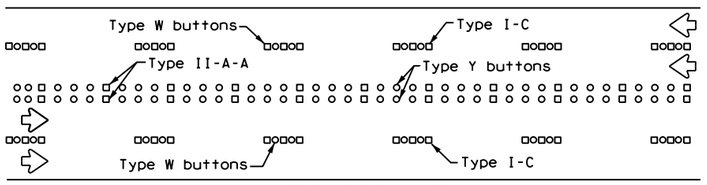
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



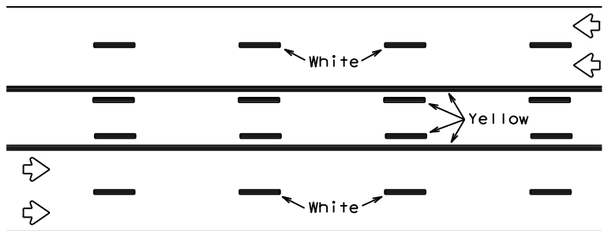
REFLECTORIZED PAVEMENT MARKINGS



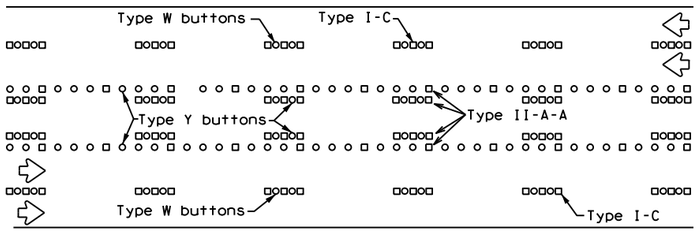
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

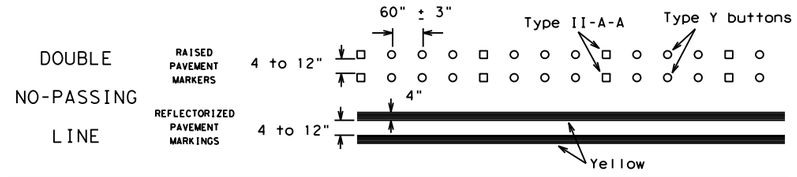
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

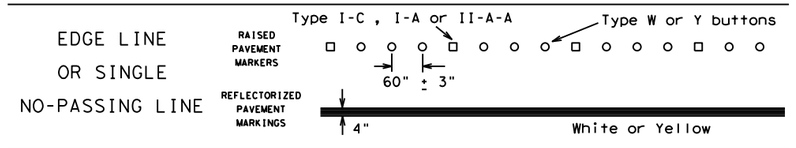
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

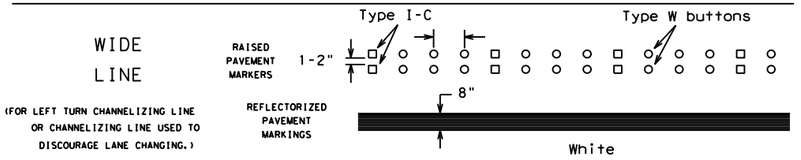


EDGE LINE OR SINGLE NO-PASSING LINE



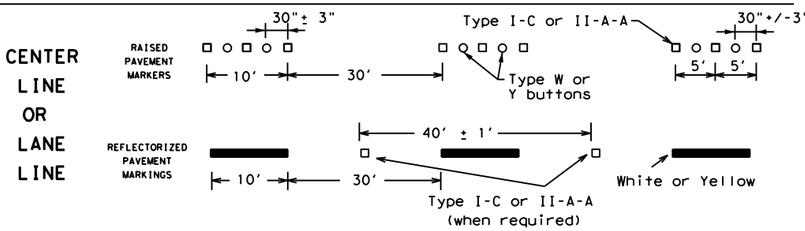
WIDE LINE

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

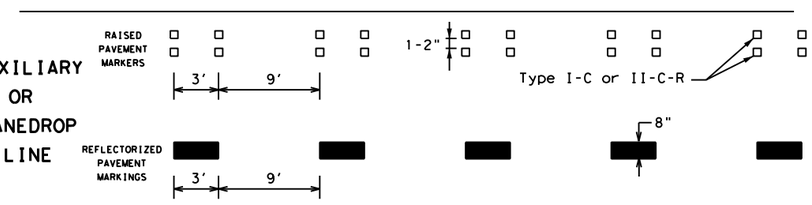


BROKEN LINES

CENTER LINE OR LANE LINE

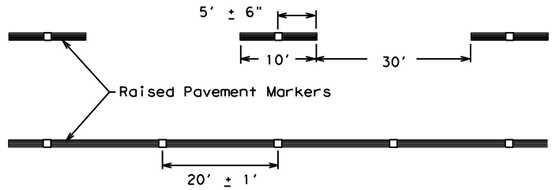


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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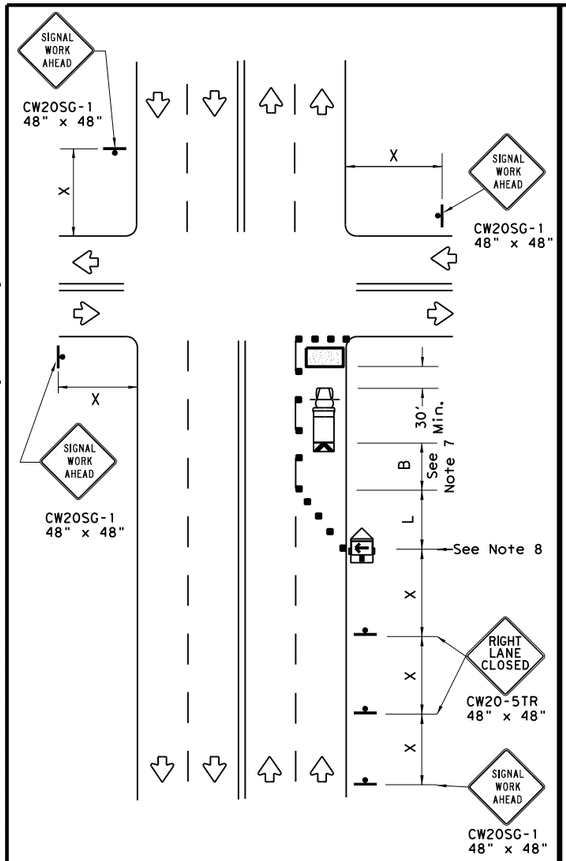
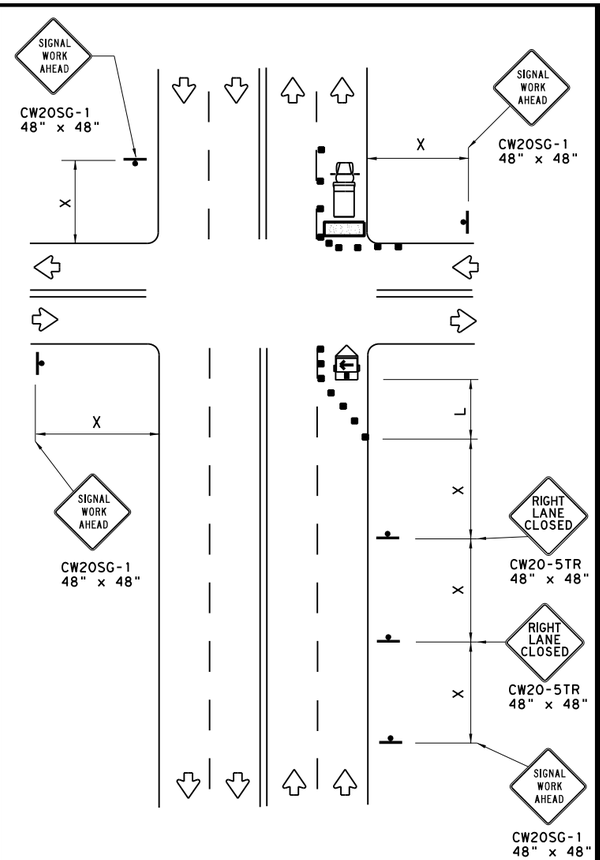


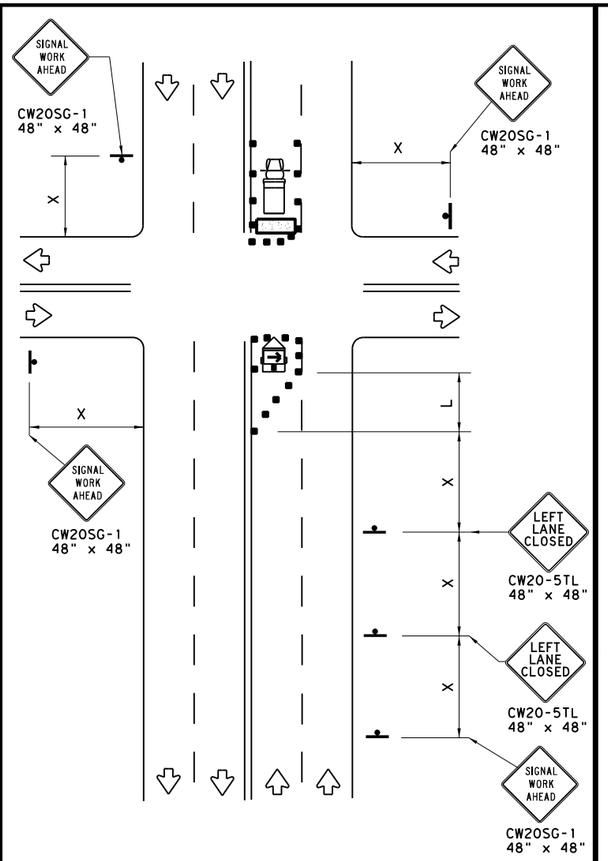
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



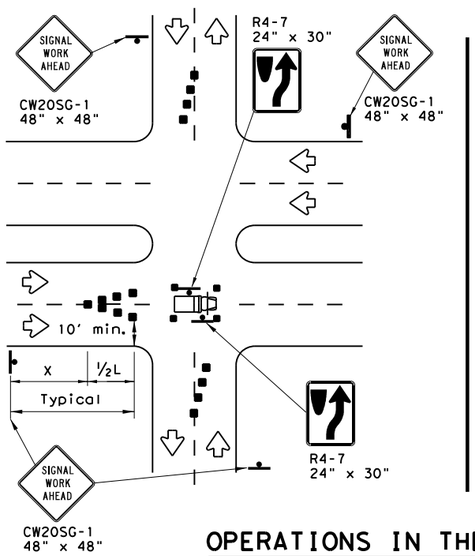
FAR SIDE RIGHT LANE CLOSURE

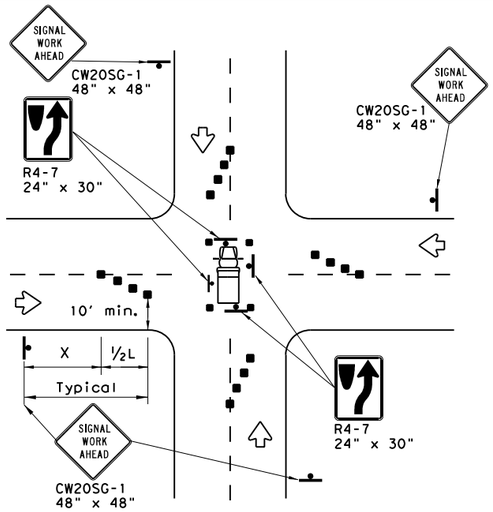
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

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2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	HOU	FORT BEND		40

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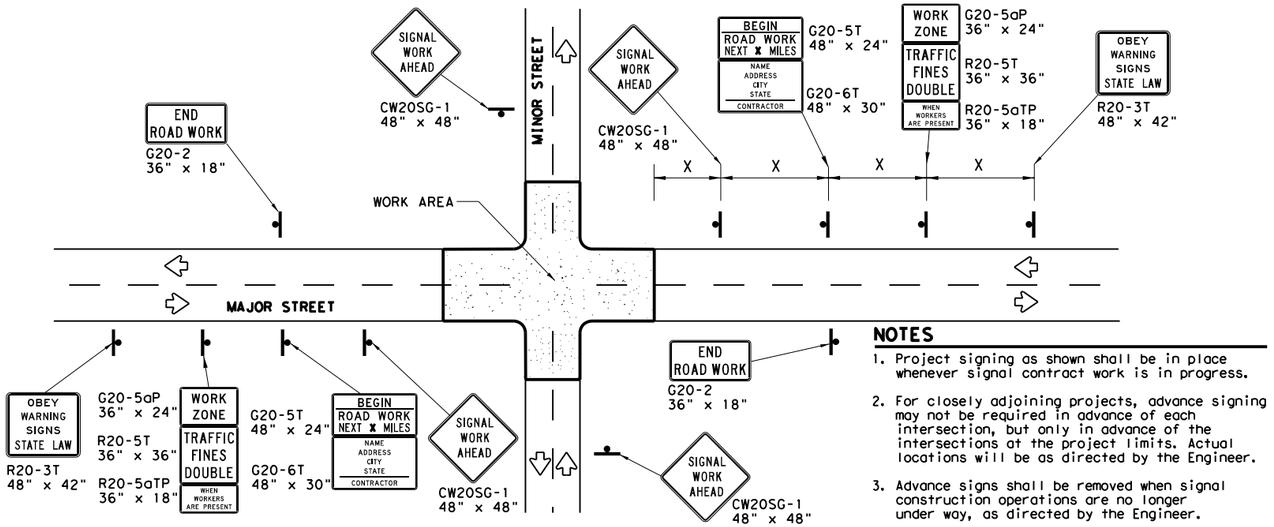


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

DURATION OF WORK

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

SIGN MOUNTING HEIGHT

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

REMOVING OR COVERING

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

REFLECTIVE SHEETING

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

SIGN SUPPORT WEIGHTS

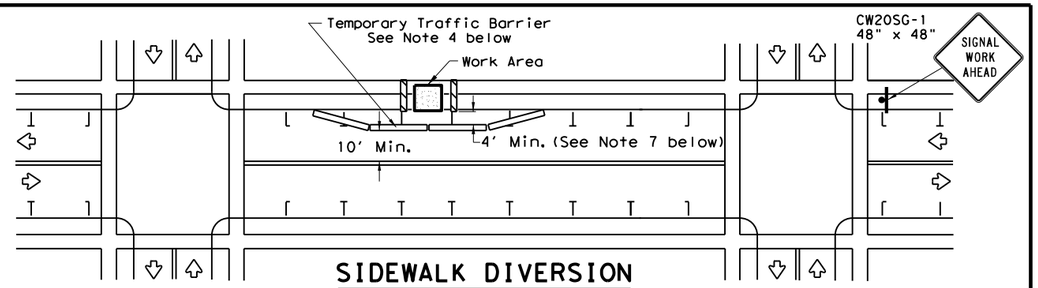
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

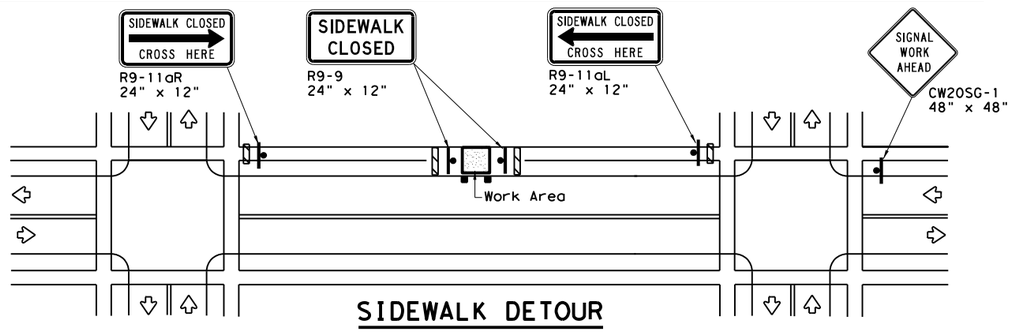
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

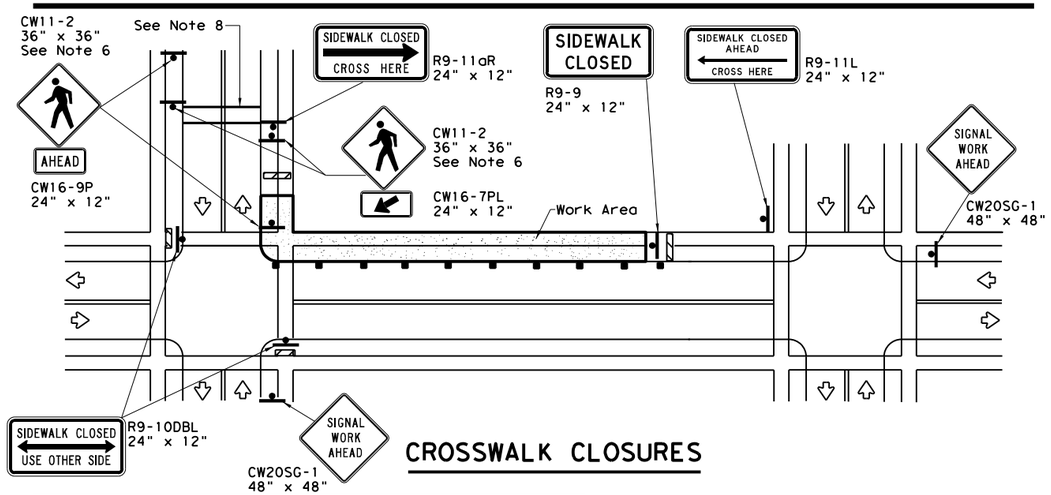
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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	HOU	FORT BEND		41

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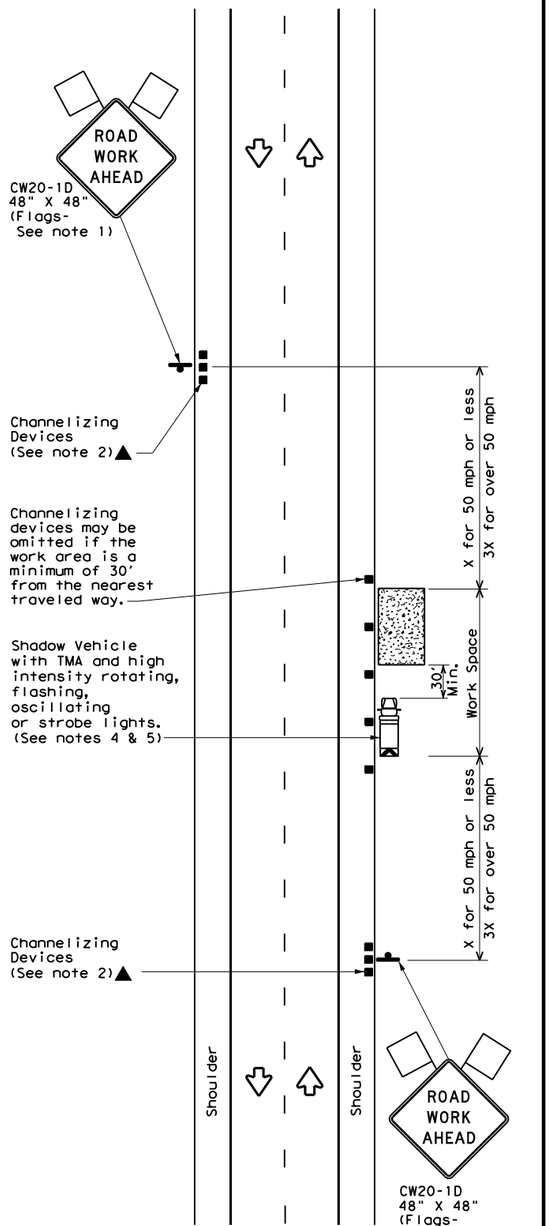
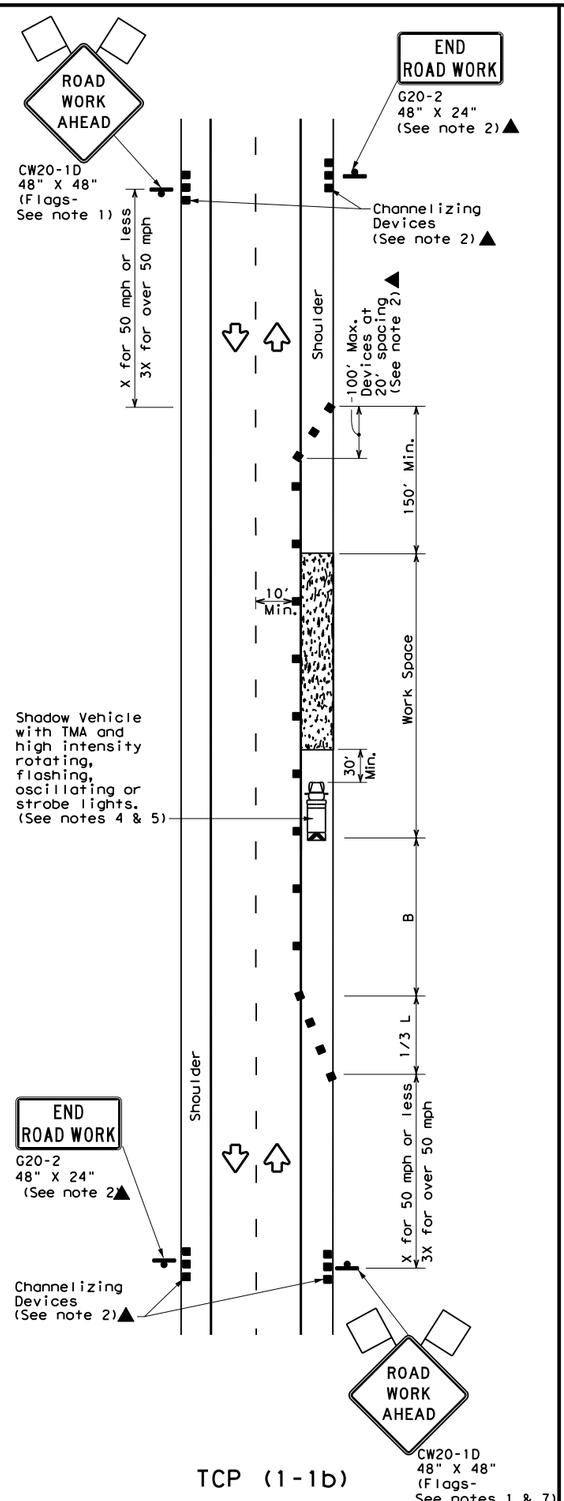


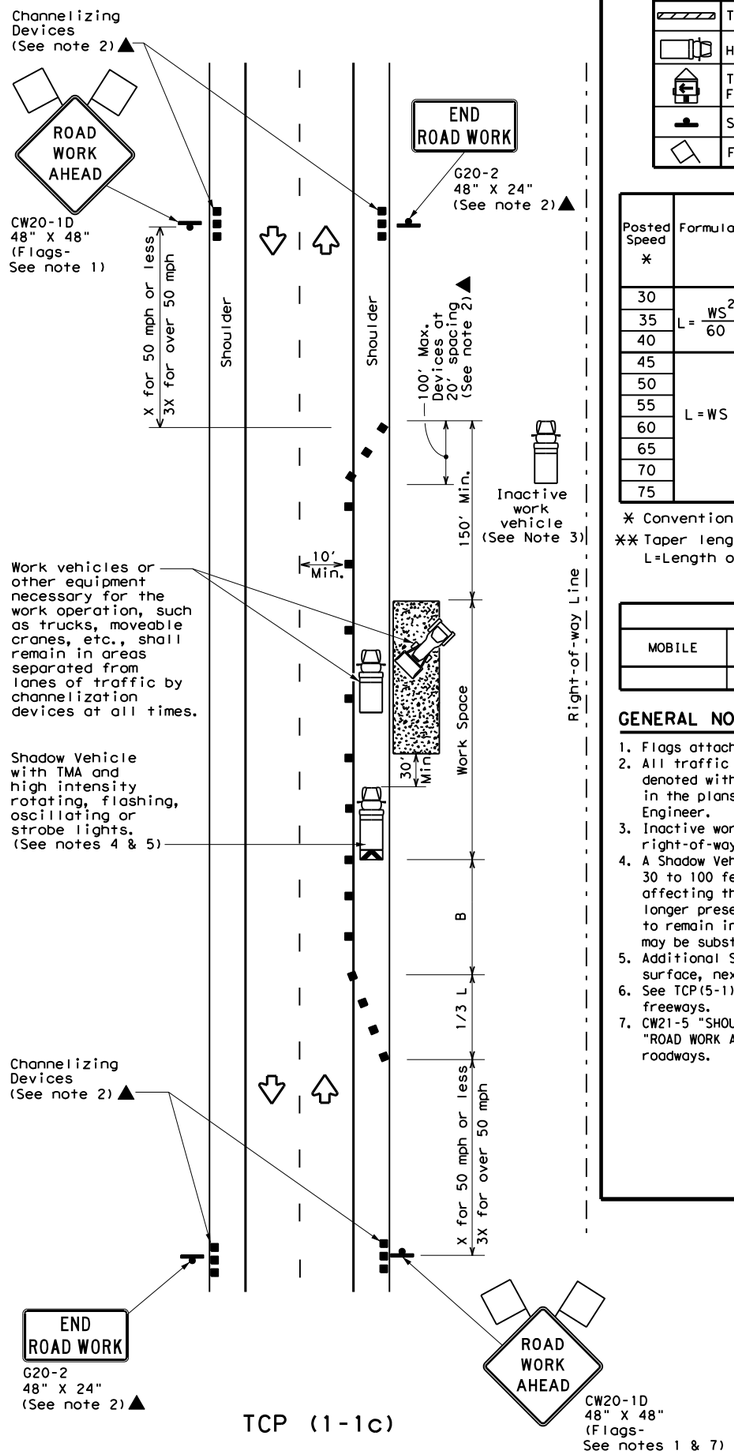
TCP (1-1a)

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

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8-95 2-12	HOU	FORT BEND		42
1-97 2-18				

151

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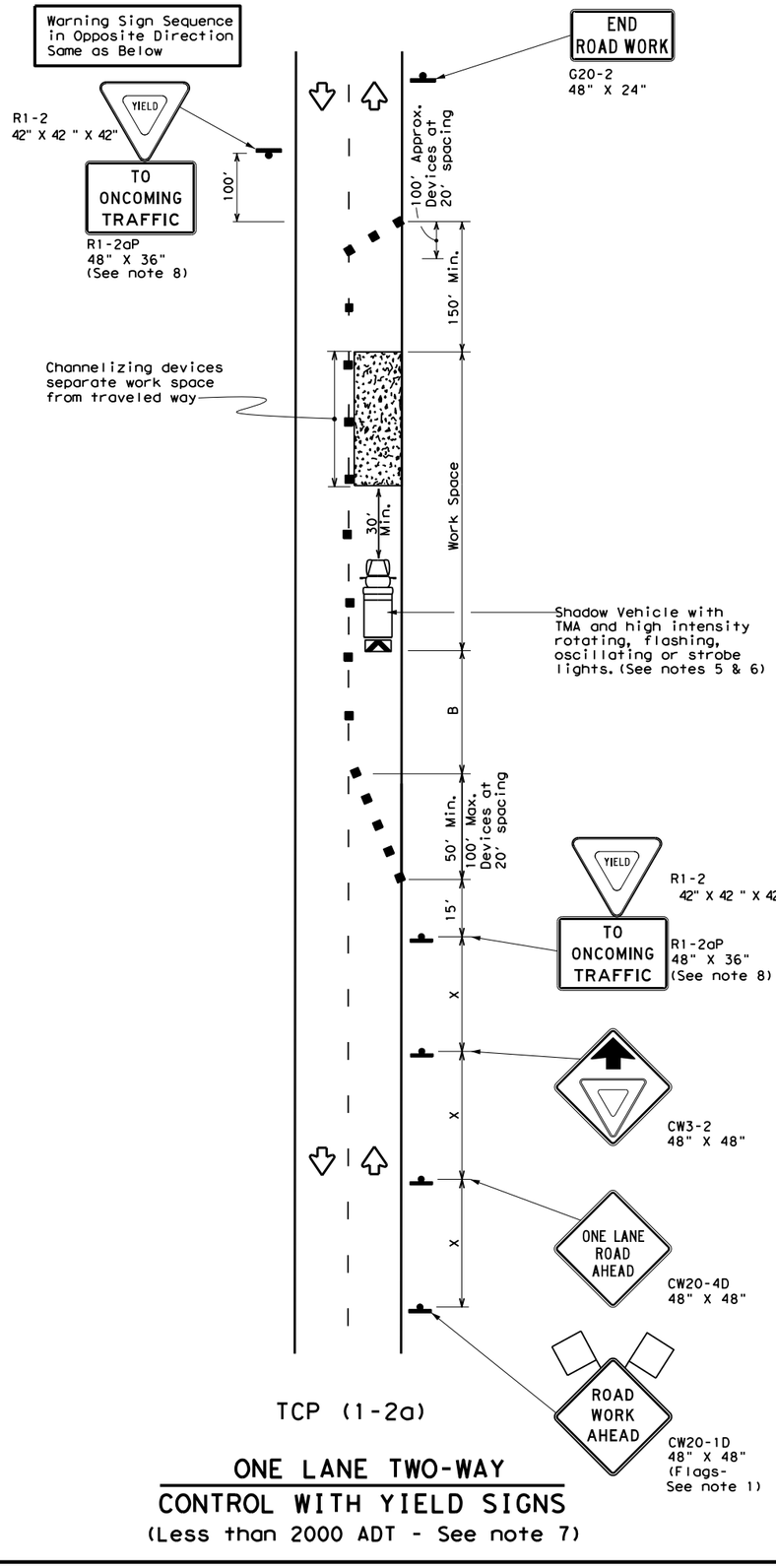
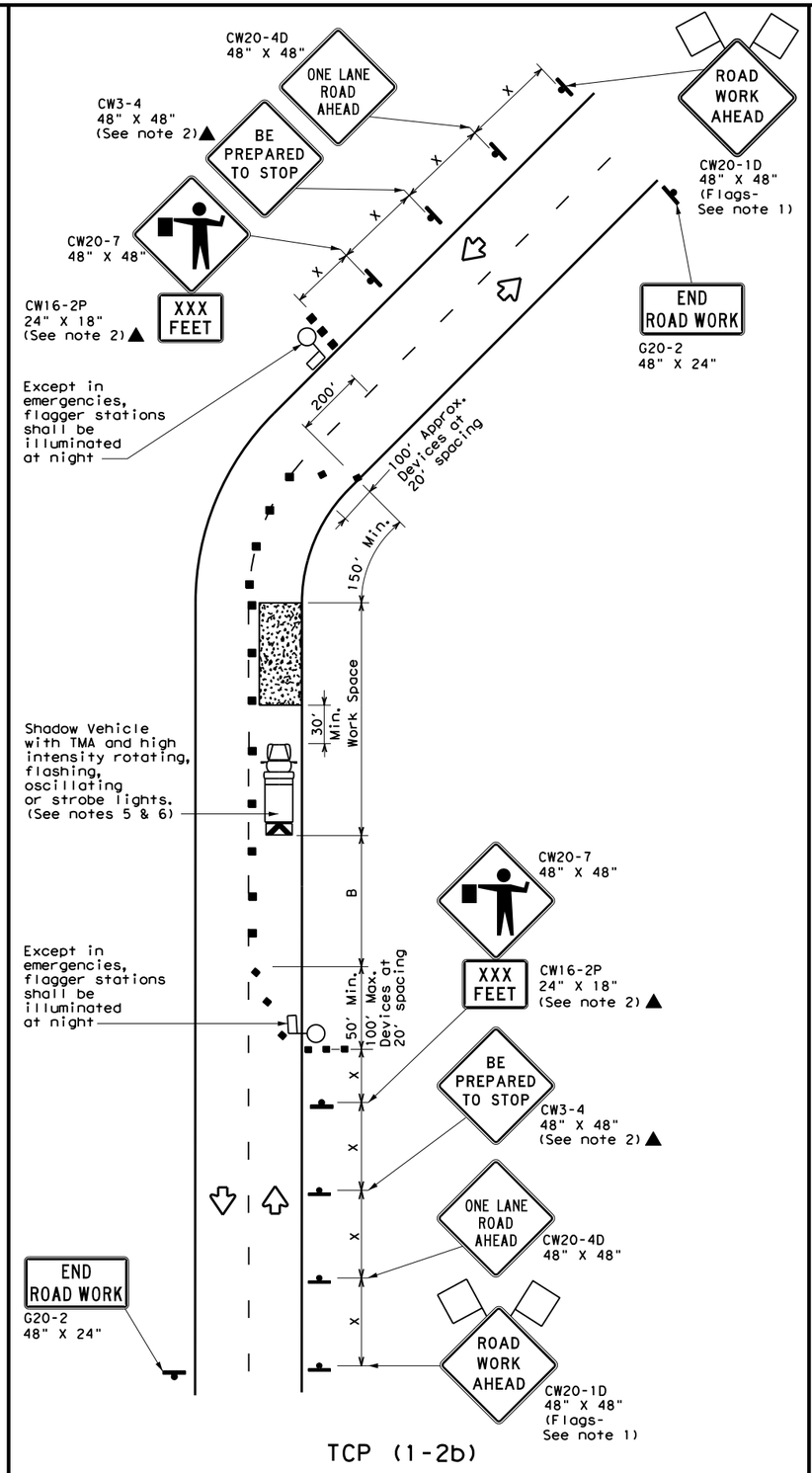


TCP (1-2a)

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

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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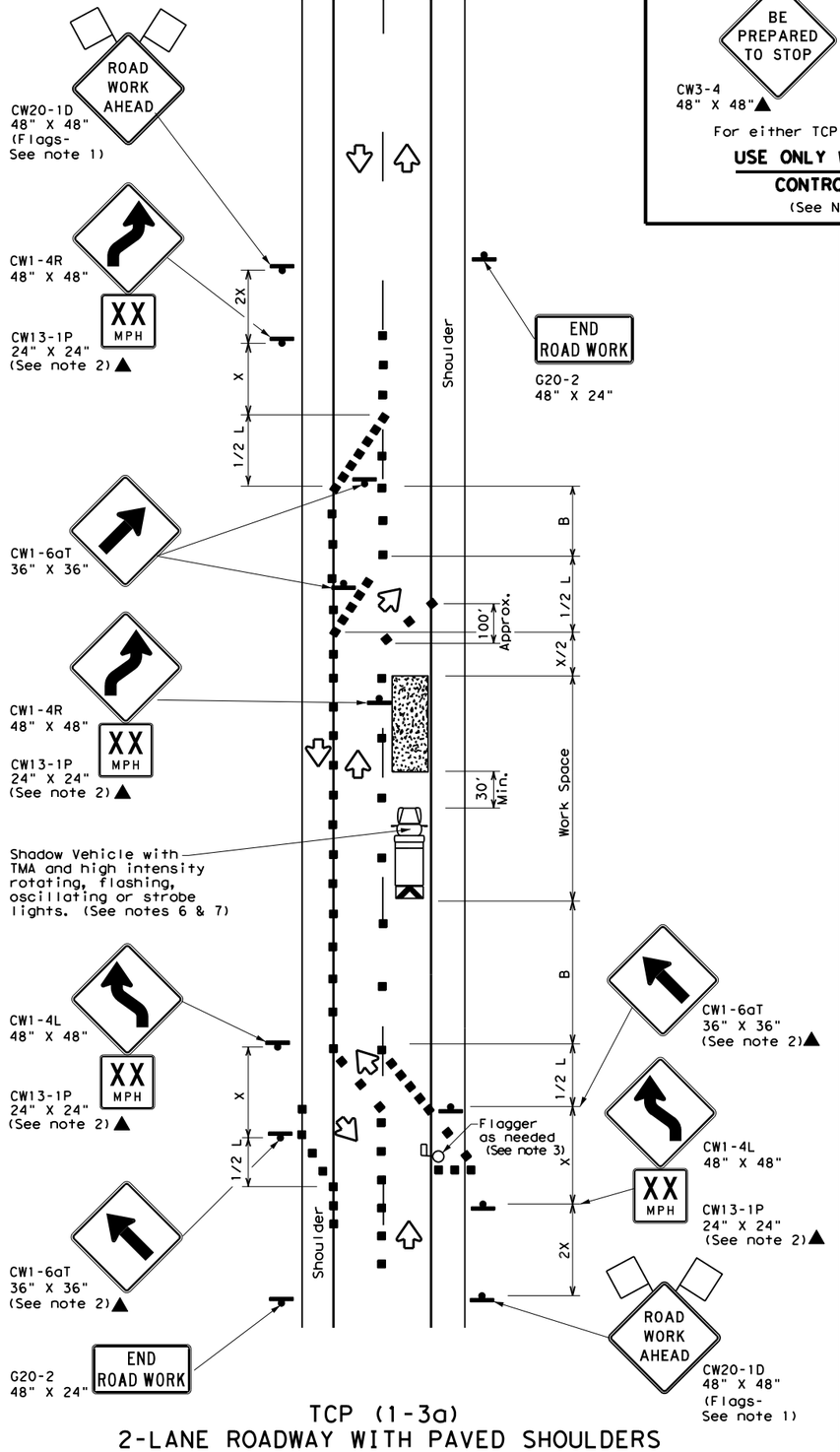


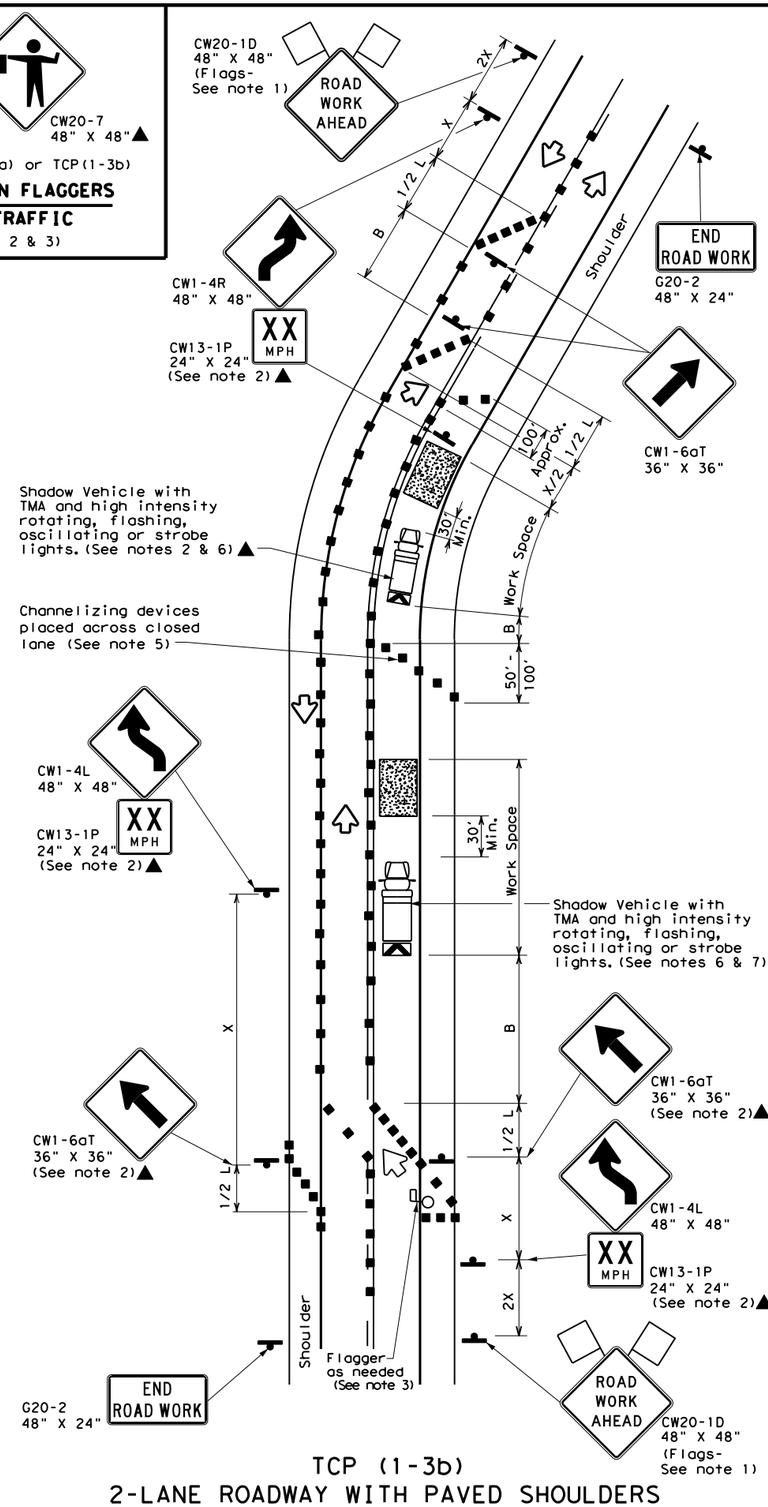
TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

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

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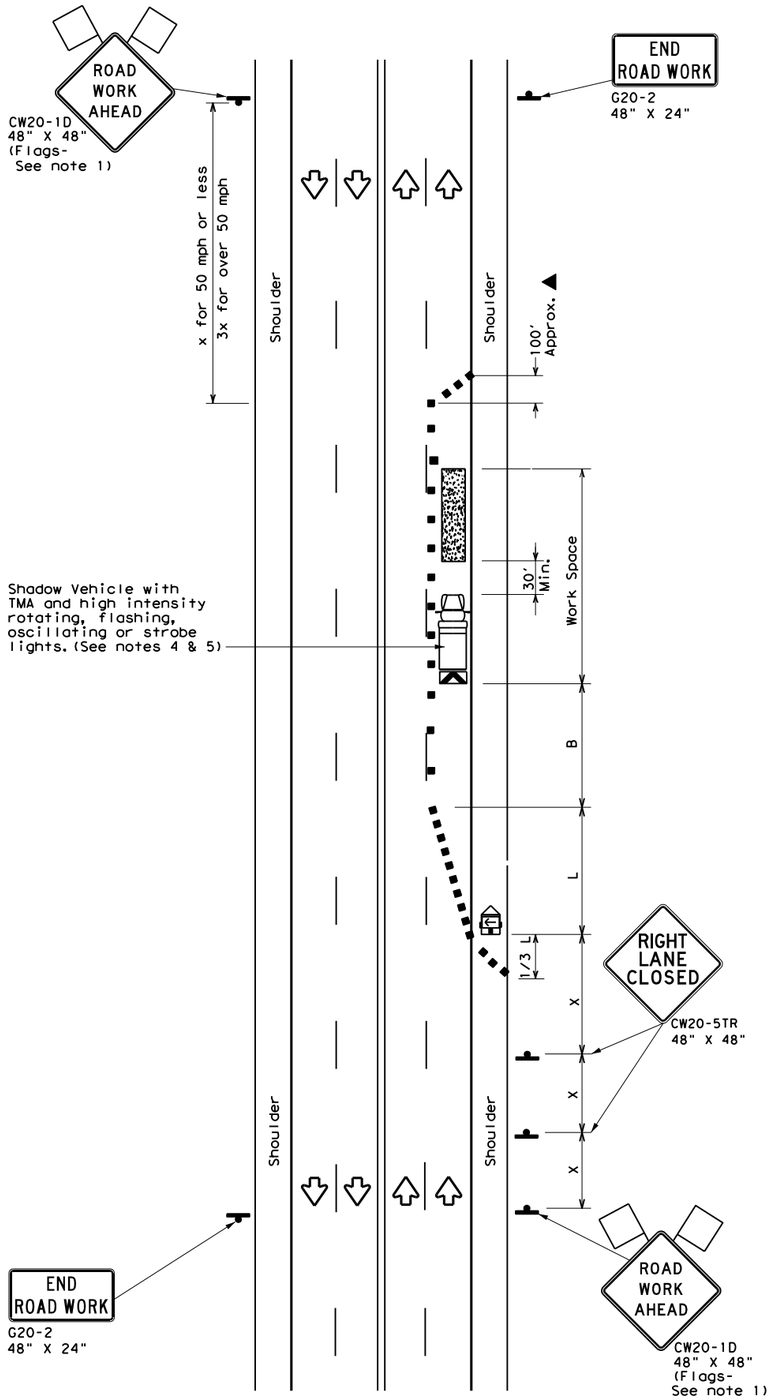
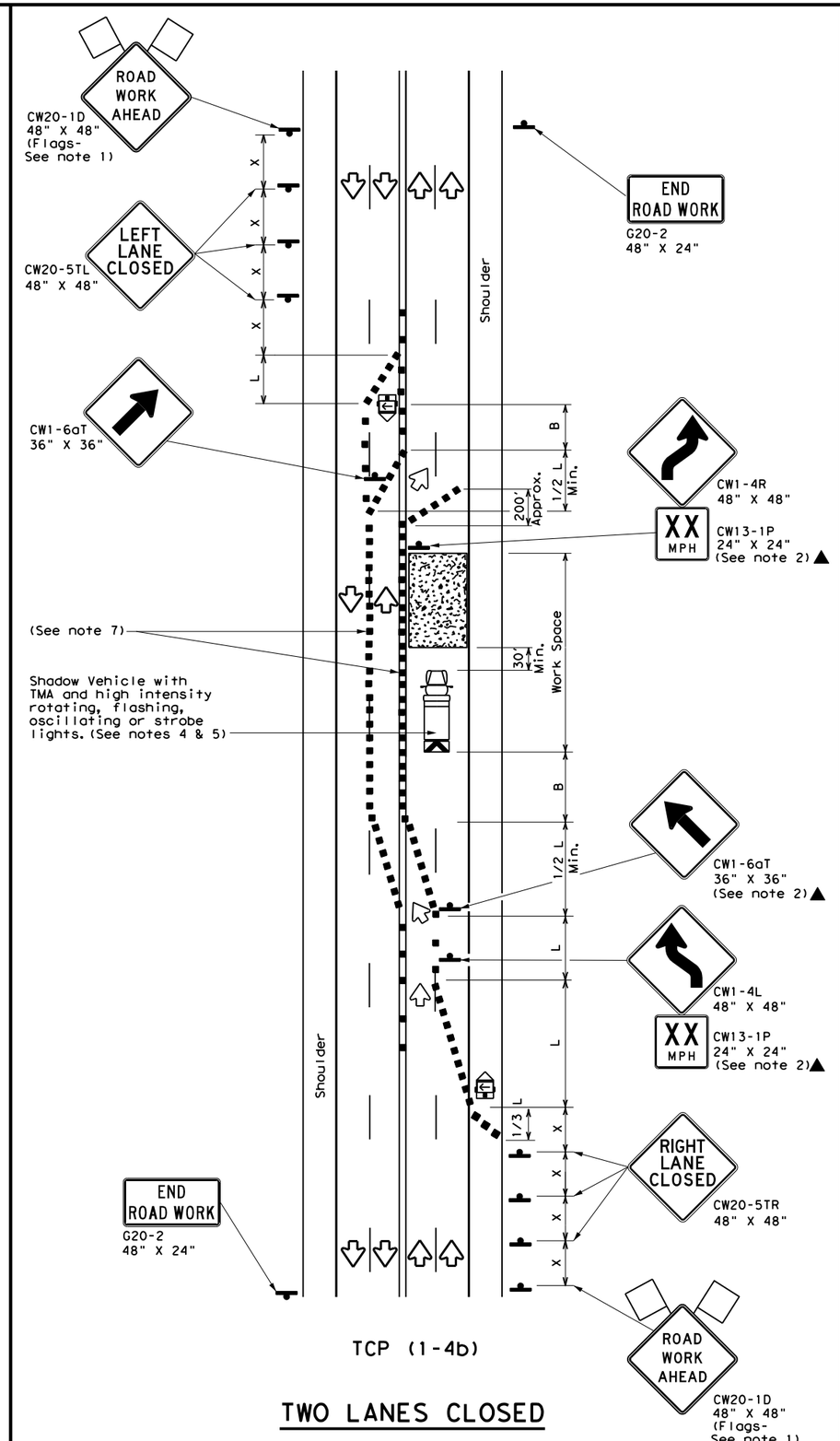
8-95 2-12	HOU	FORT BEND		44
1-97 2-18				

153



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

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8-95 2-12	HOU	FORT BEND		45
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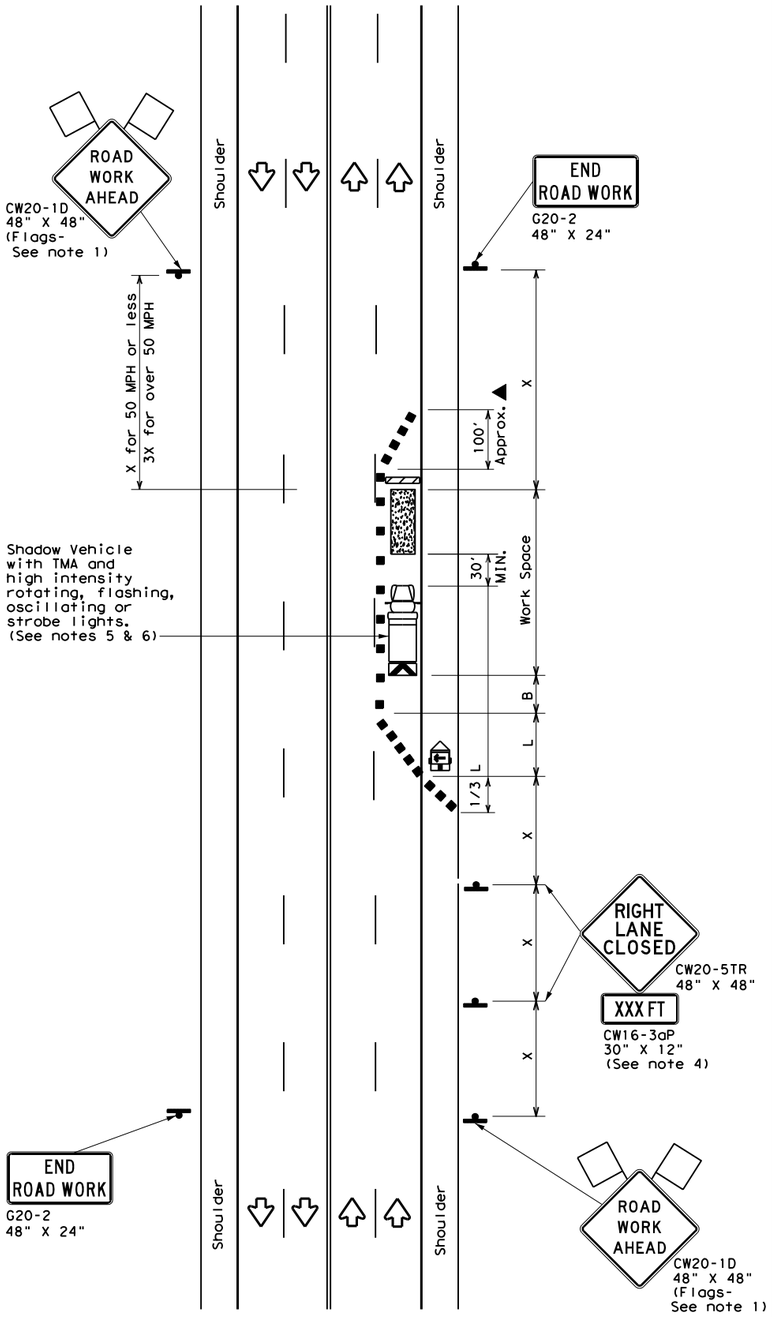
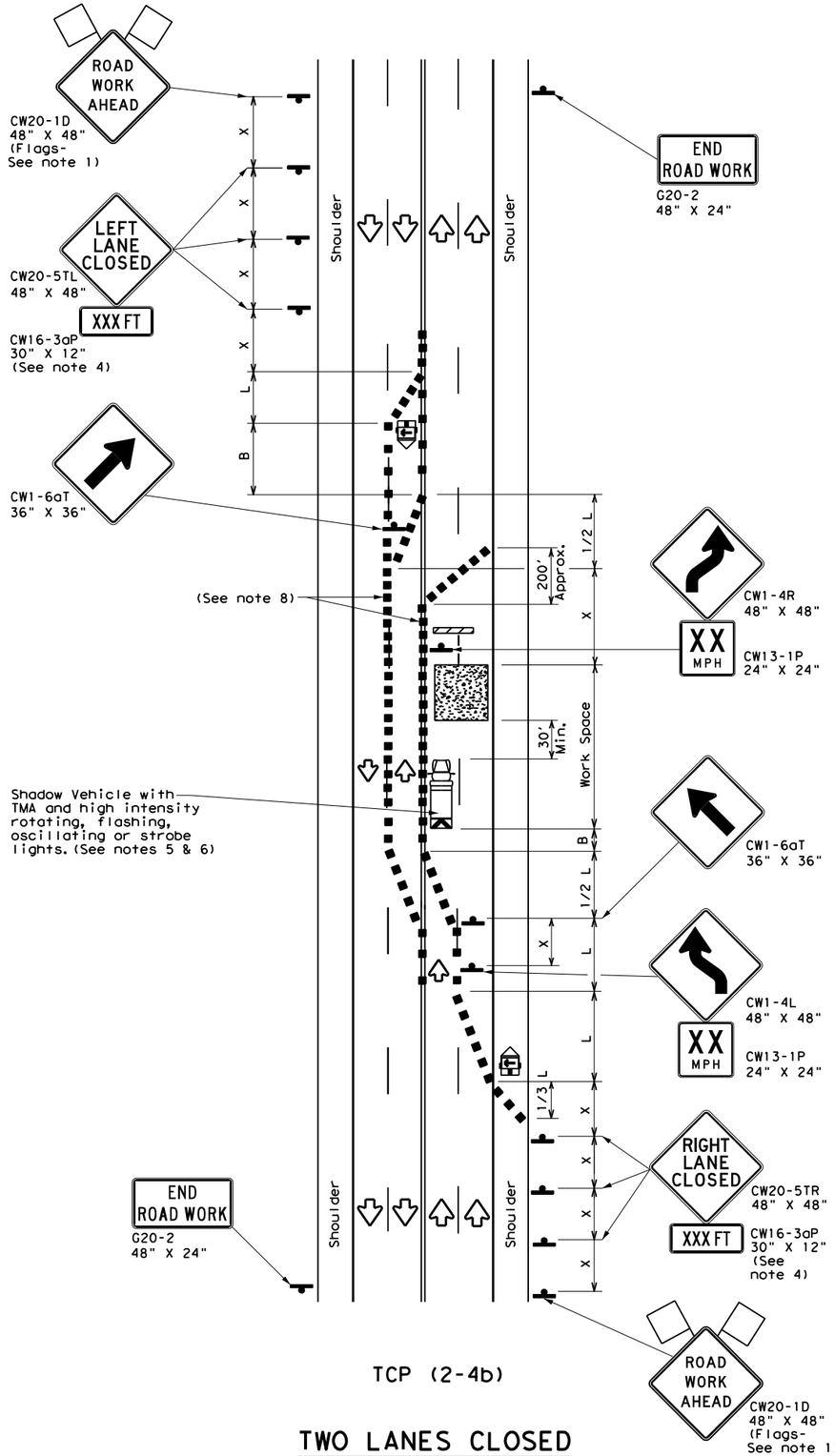


TCP (2-4a)

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)

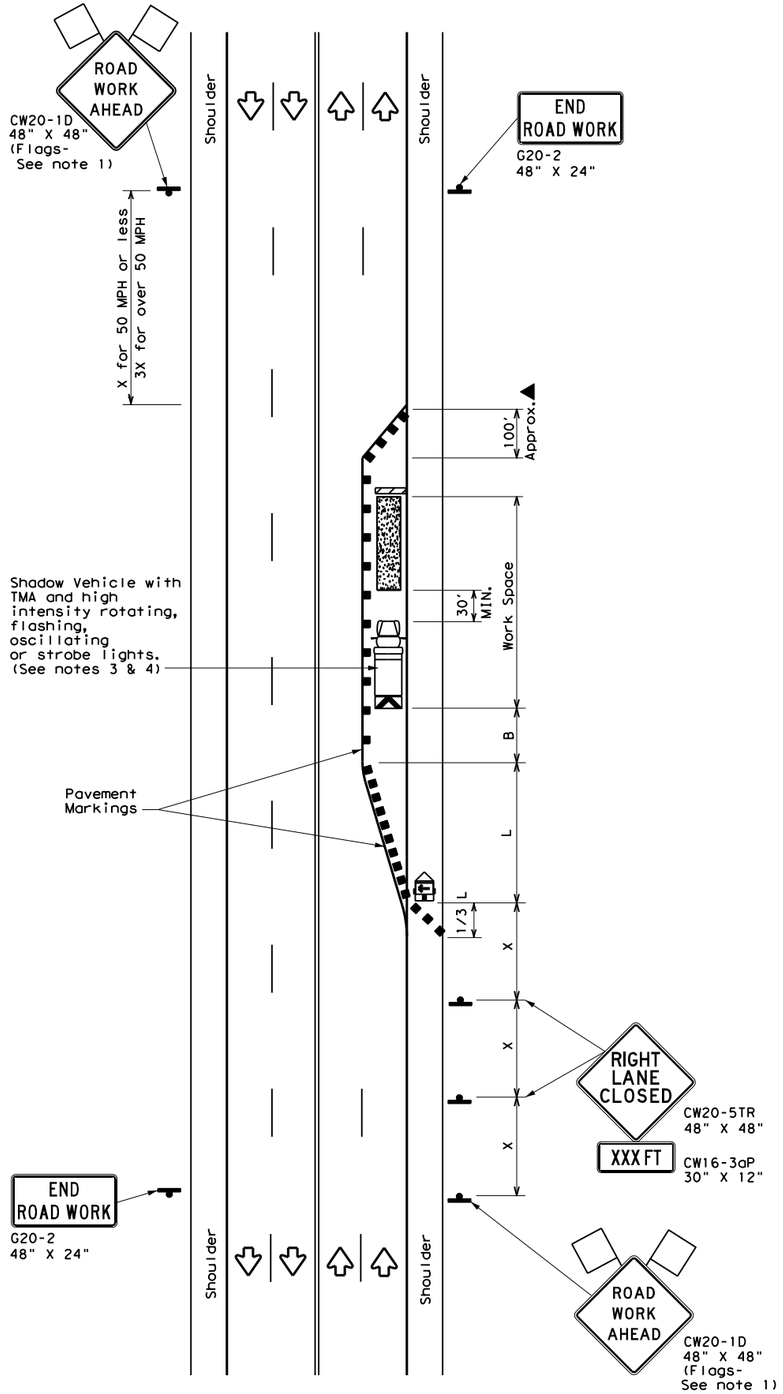
8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing 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

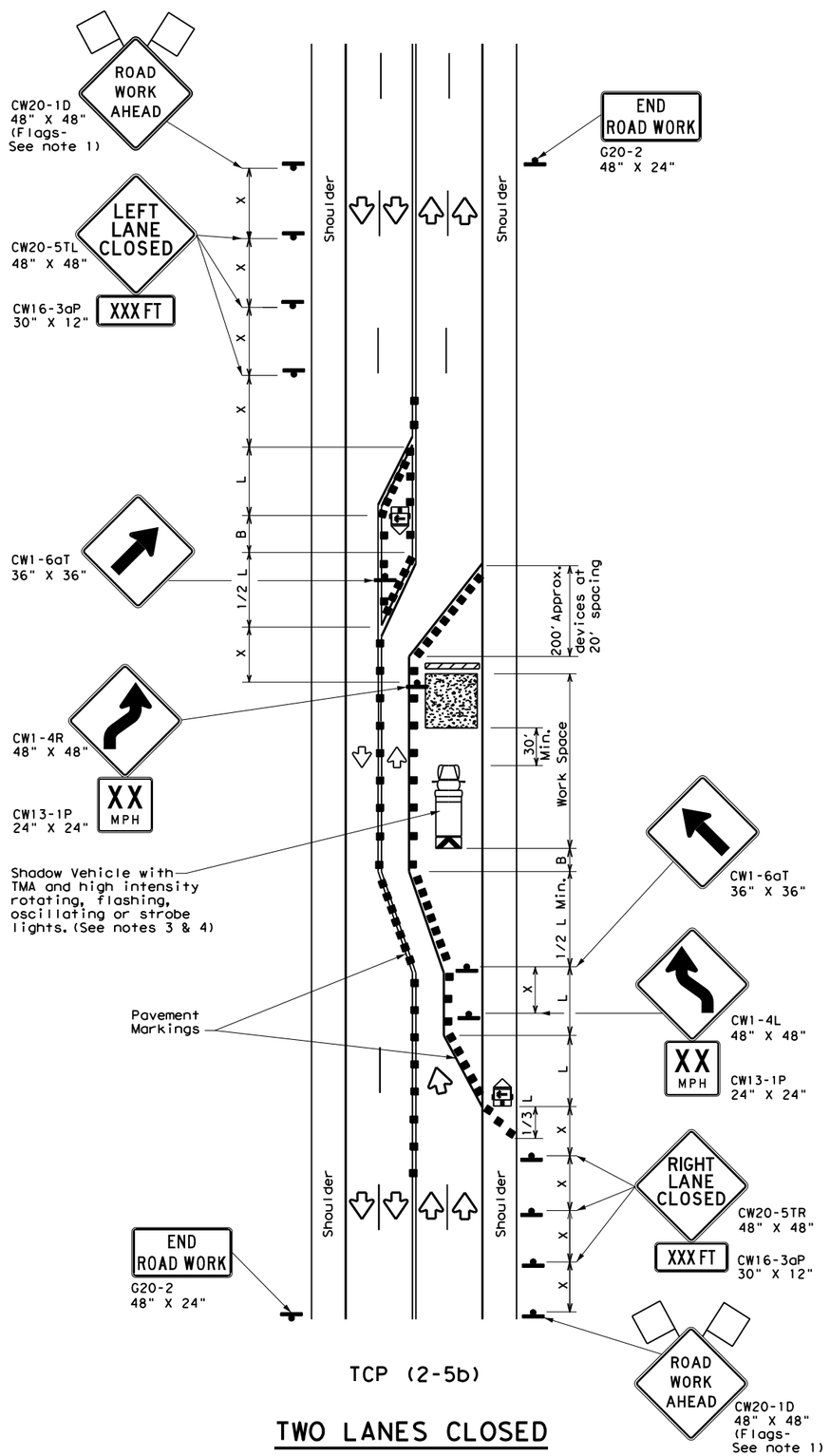
TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0027	08	182	US 90A
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	HOU	FORT BEND		46



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	0027	08	182	US 90A
1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18	HOU	FORT BEND		47

DATE: 10/20/2023 10:45:33 AM
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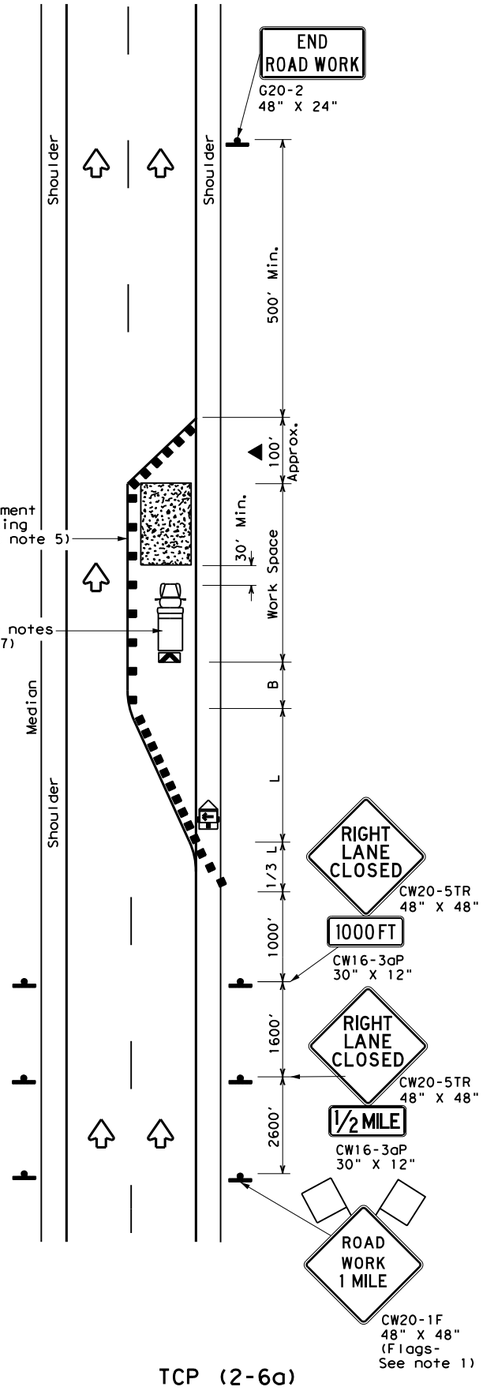
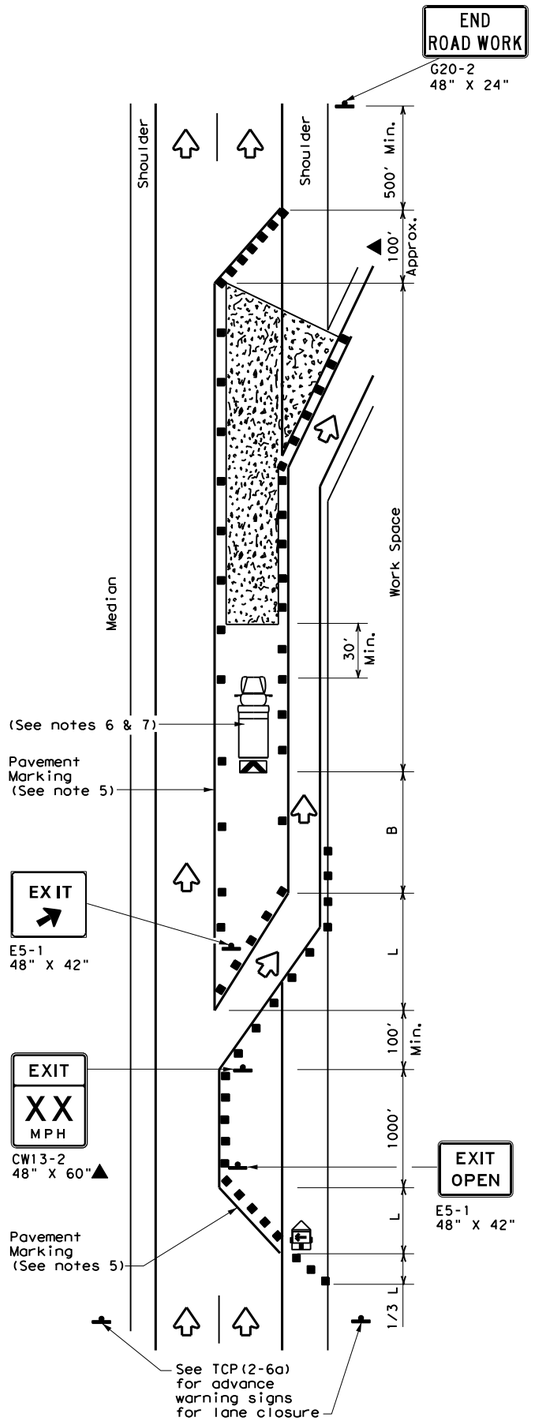


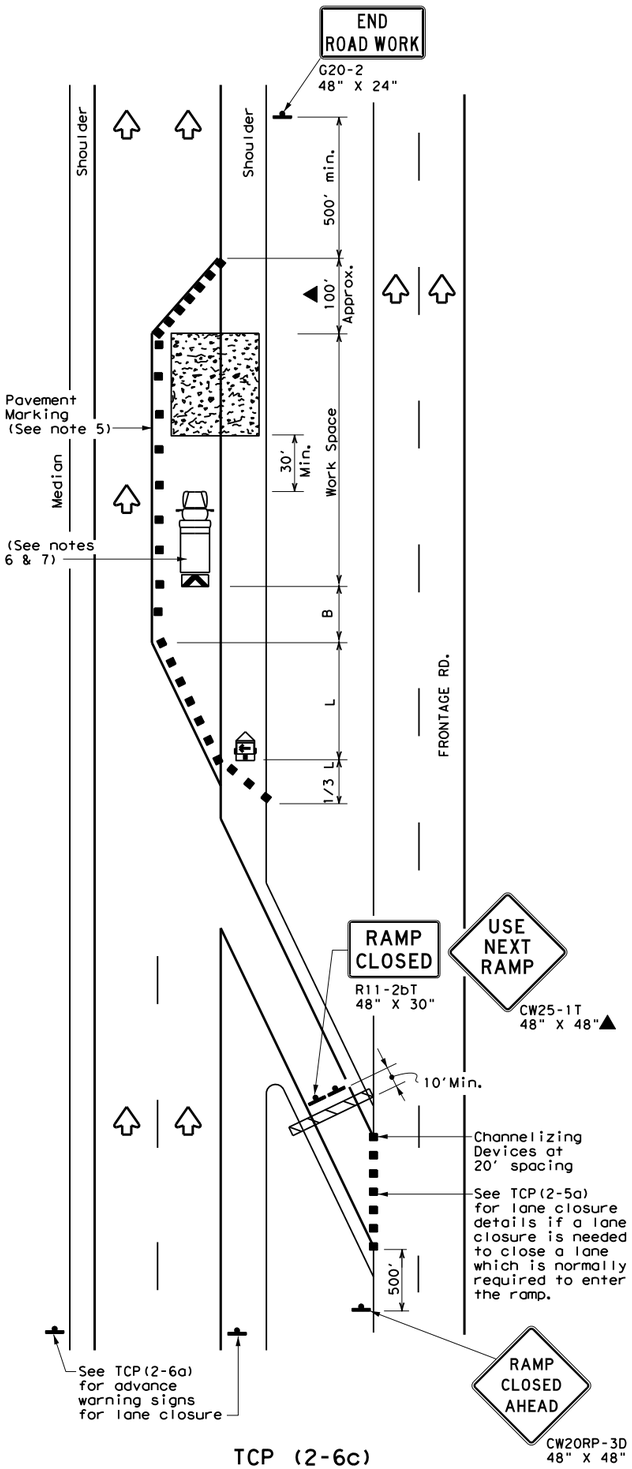
TCP (2-6a)

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

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	08	182	US 90A
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	HOU	FORT BEND		48
1-97 2-18				

DATE: 10/20/2023 10:45:39 AM
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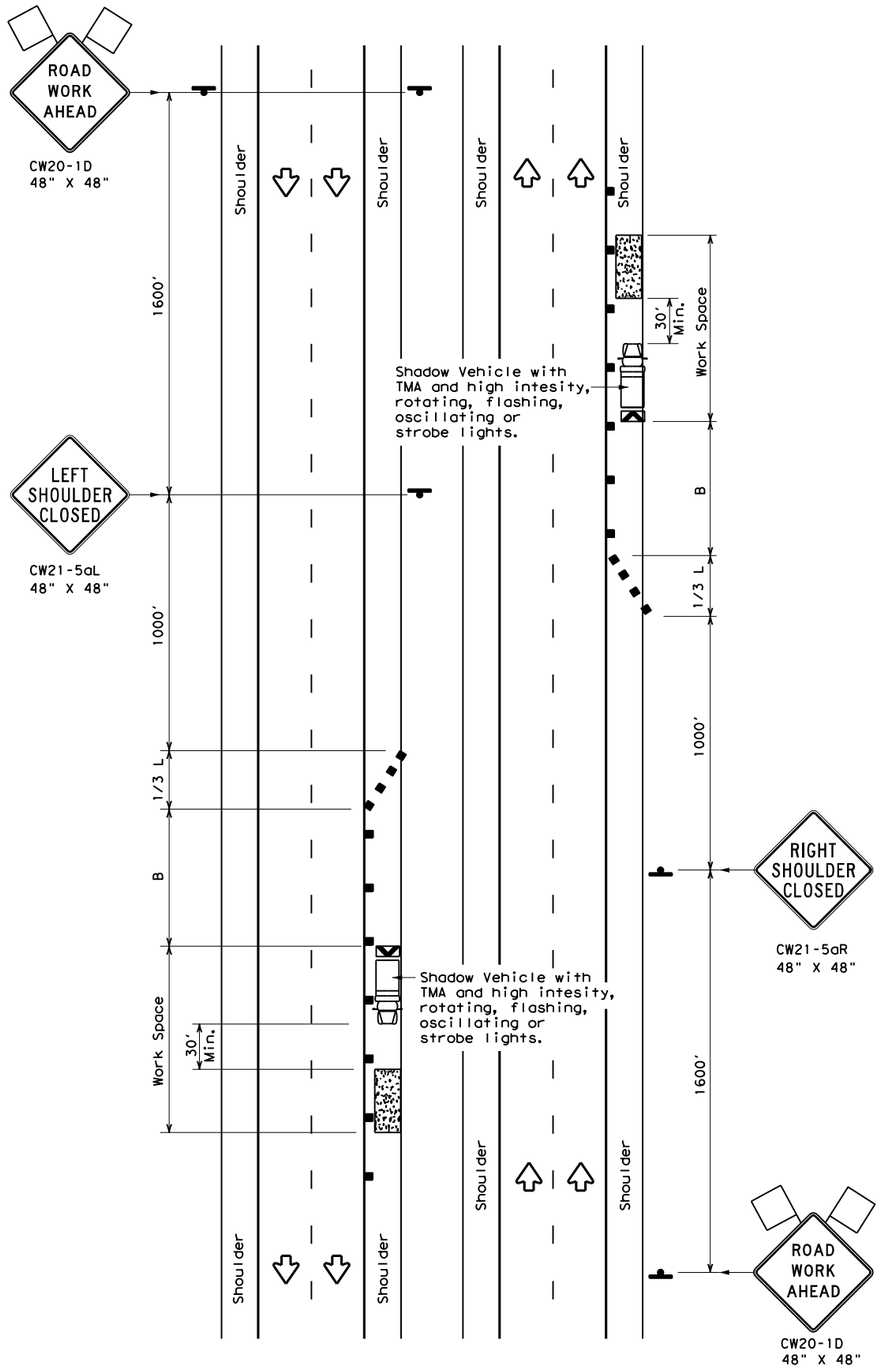
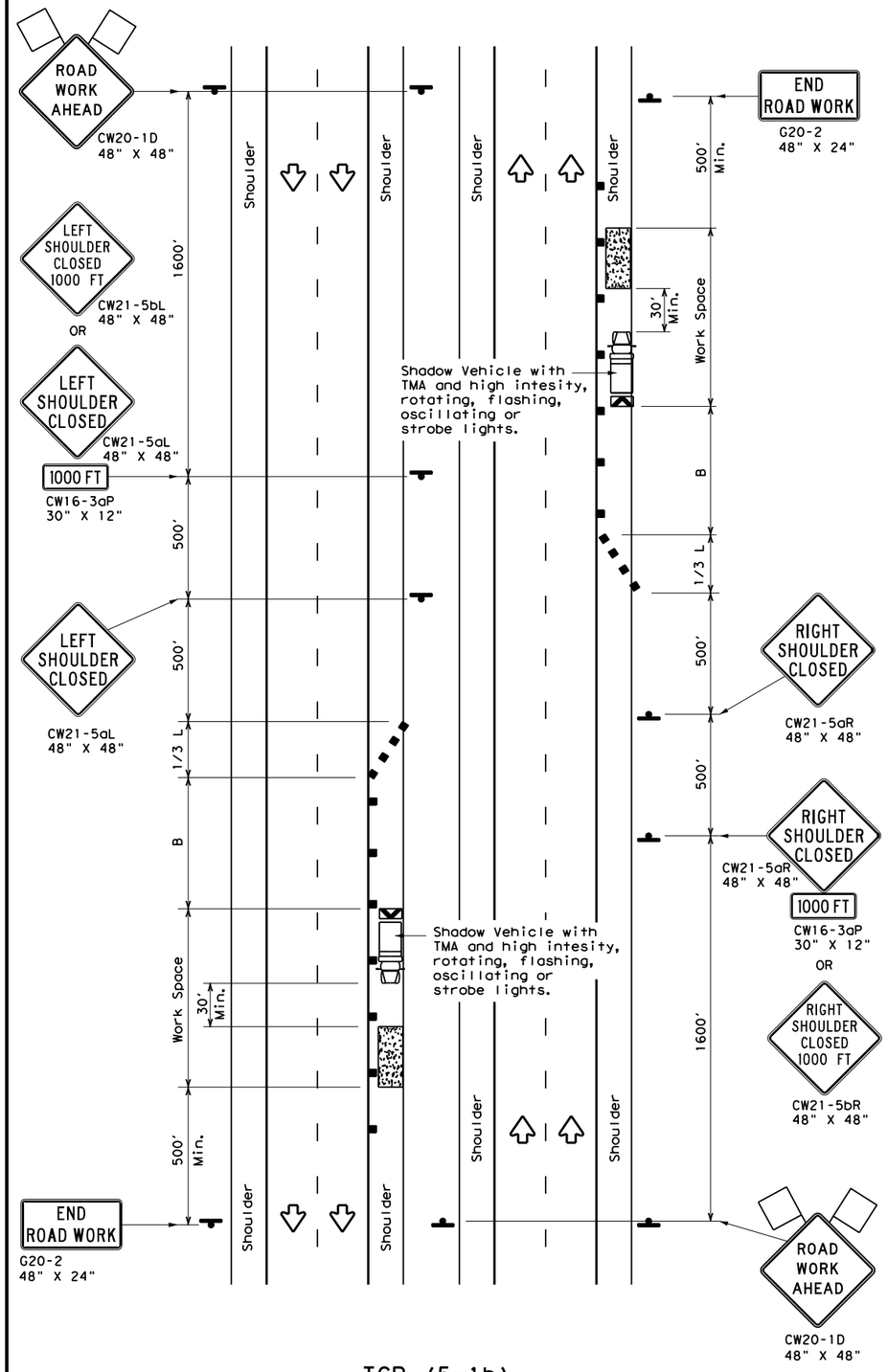


TCP (5-1a)

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	0027	08	182	US 90A
2-18	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		49

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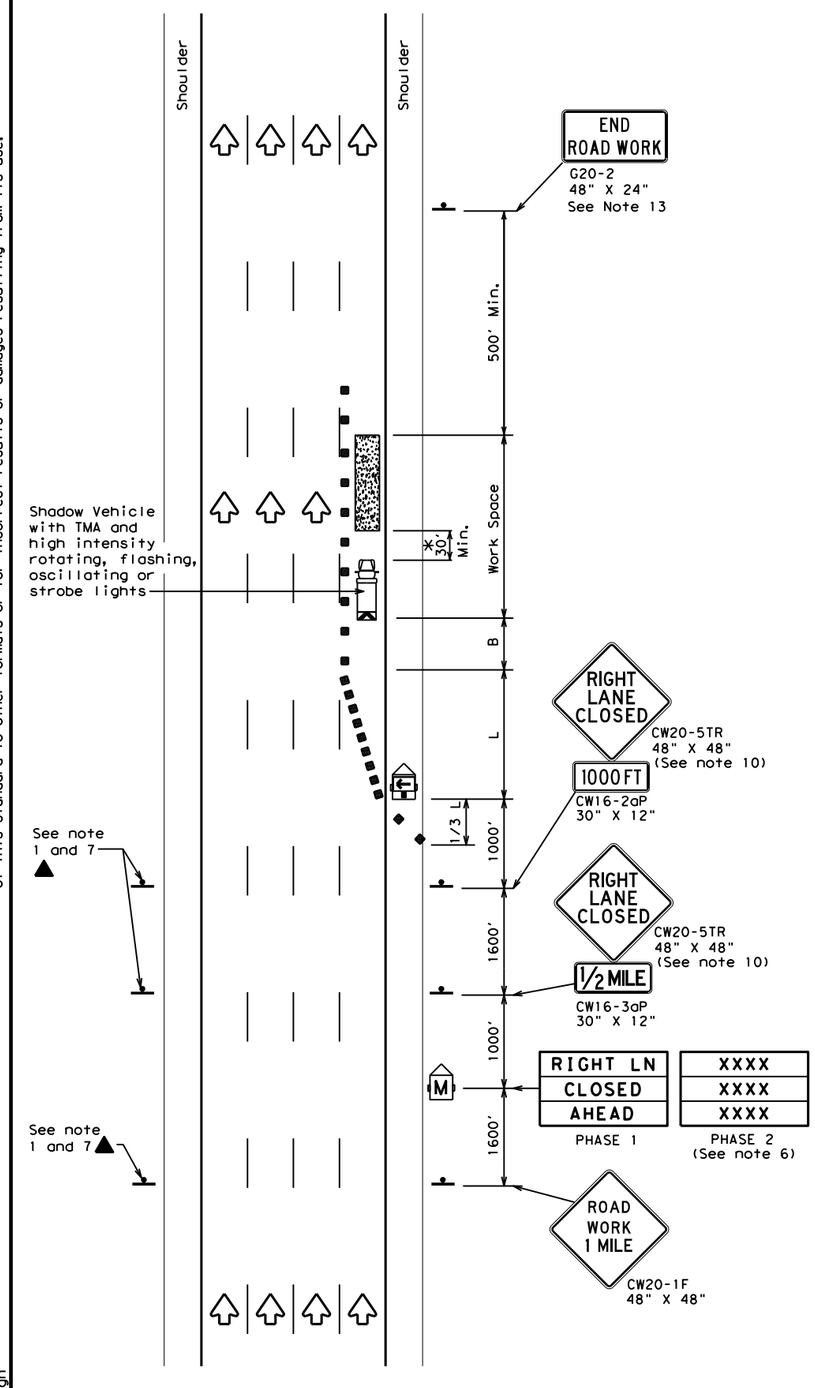
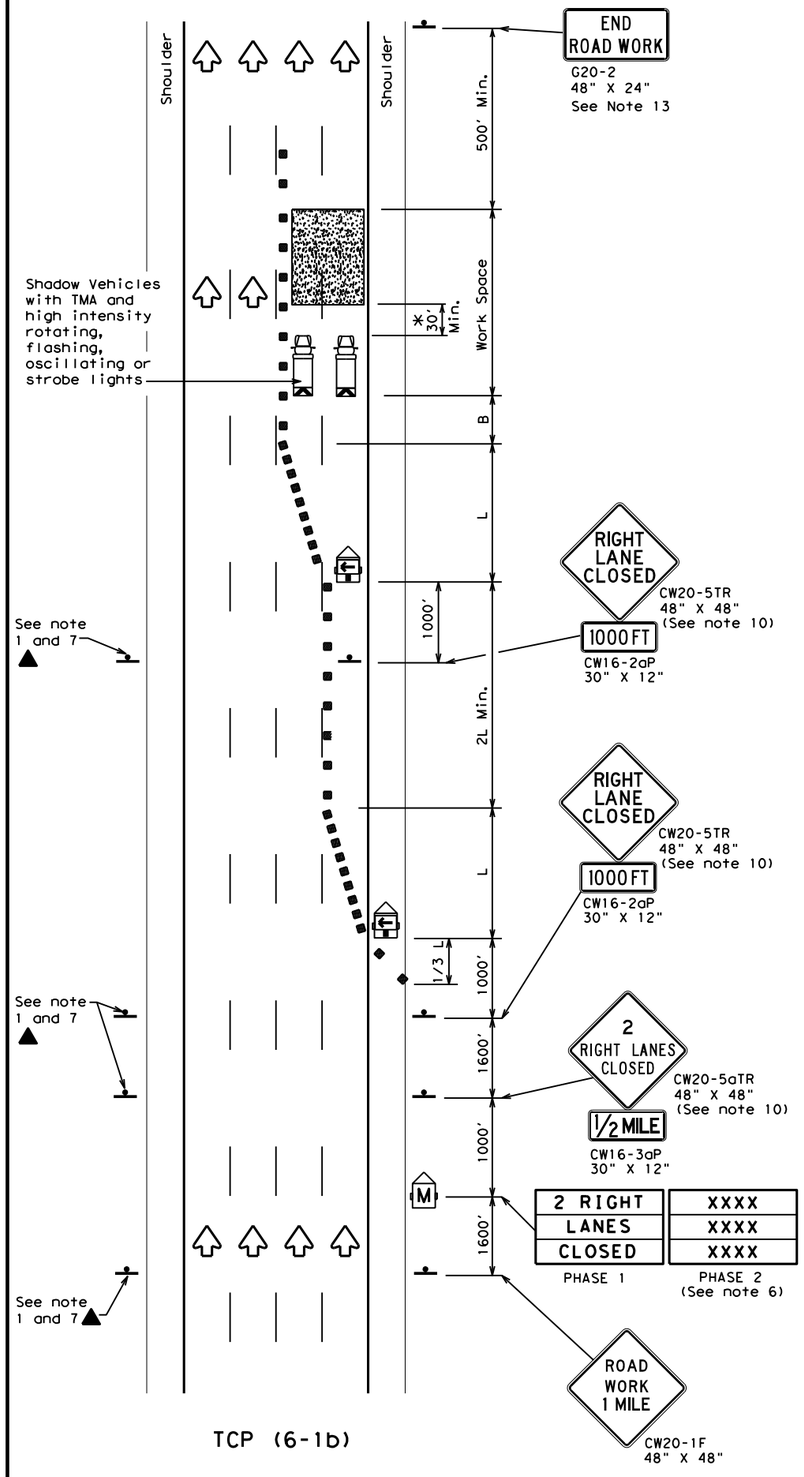


TCP (6-1a)

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

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

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

GENERAL NOTES

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	0027	08	182	US 90A
	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		50

DATE: 10/20/2023 10:45:54 AM
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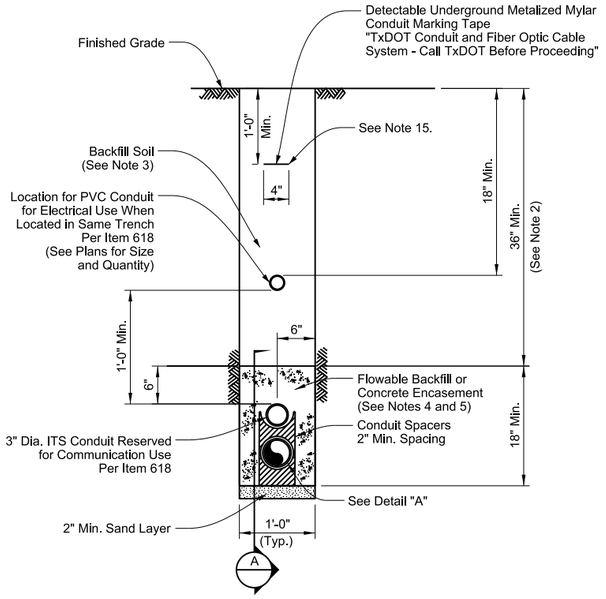
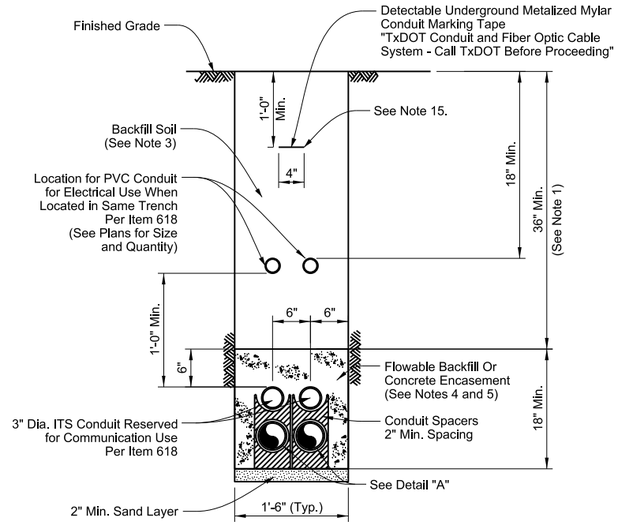


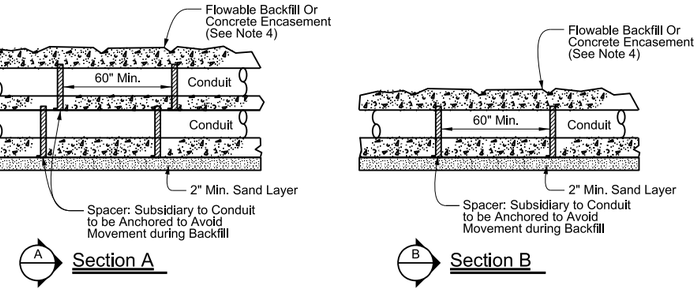
ITS Conduit Backbone Trench Vertical Spacing

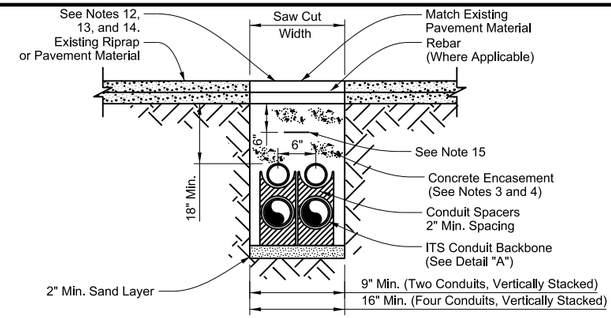
Two Conduit System



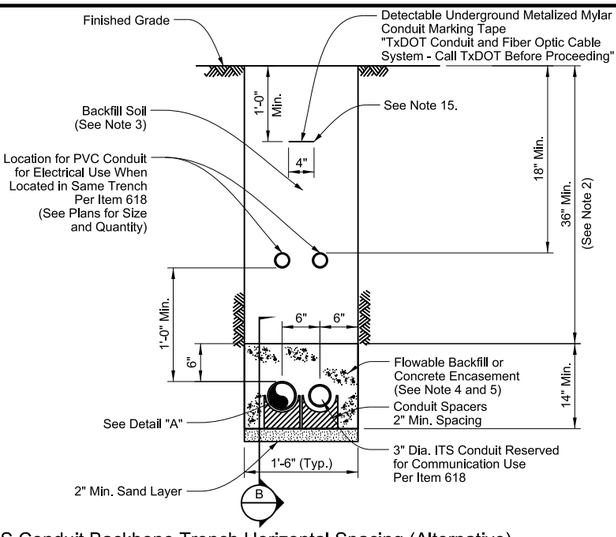
ITS Conduit Backbone Trench Vertical Spacing

Four Conduit System



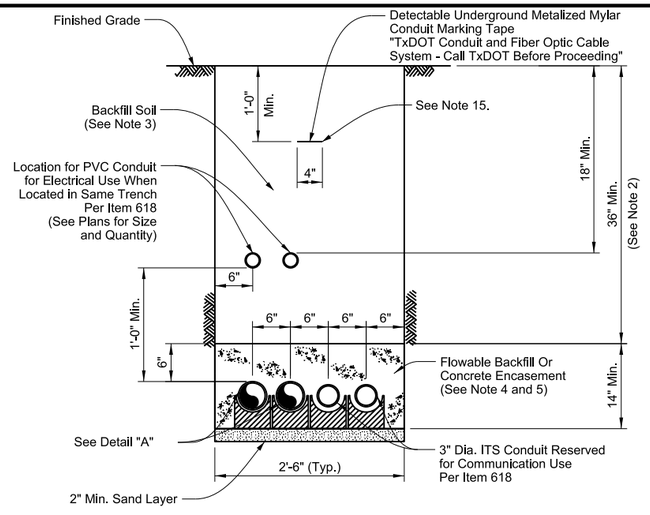


Open Cut Trenching Details



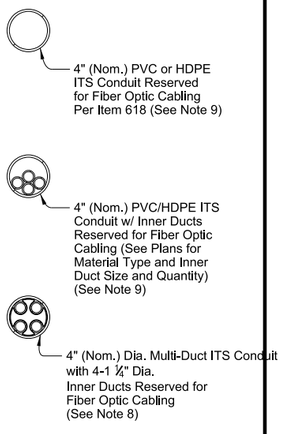
ITS Conduit Backbone Trench Horizontal Spacing (Alternative)

Two Conduit System



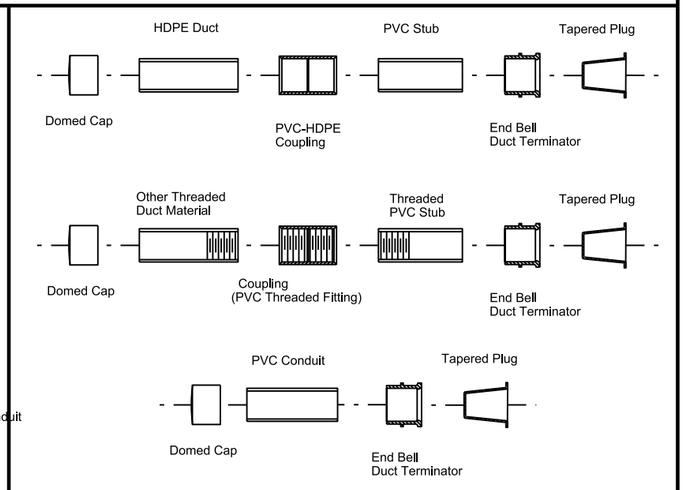
ITS Conduit Backbone Trench Horizontal Spacing (Alternative)

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.

Sheet Details
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Texas Department of Transportation

Traffic Operations Division Standard

ITS CONDUIT TRENCH DETAILS

ITS(27)-16

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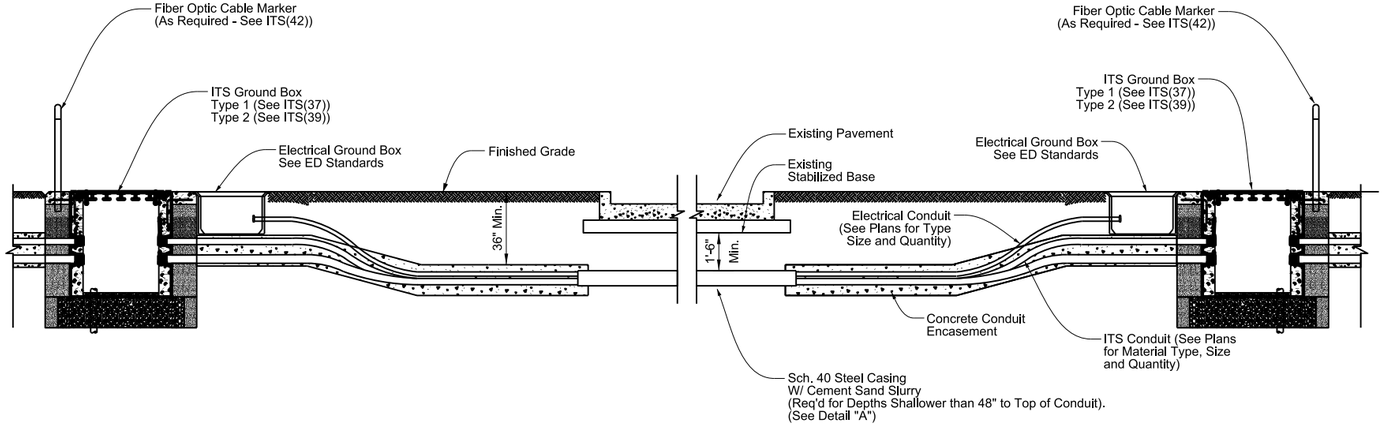
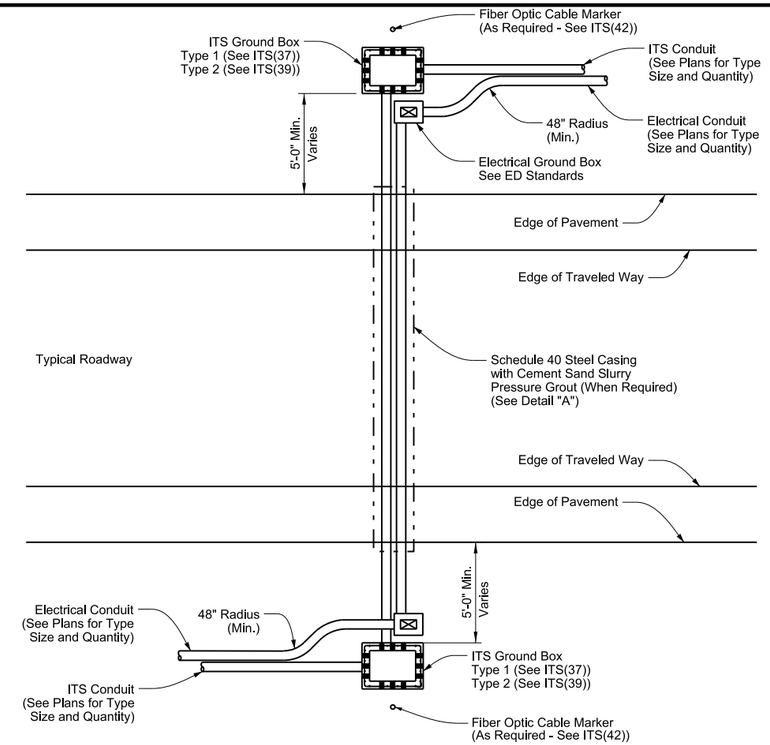
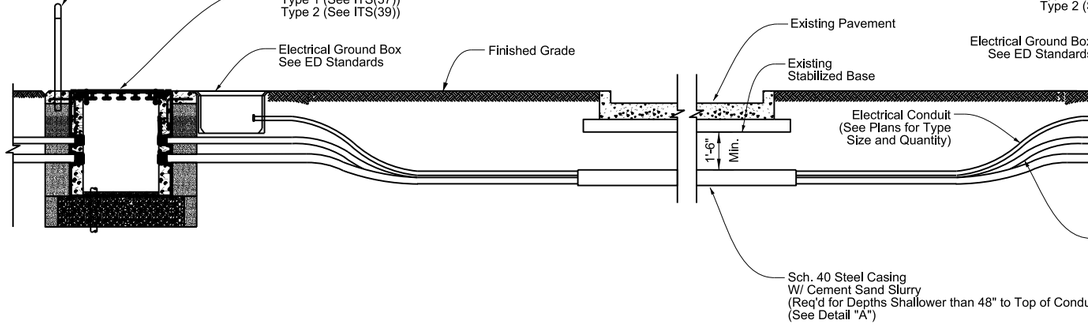
FILE: ITS(27)-16.dgn



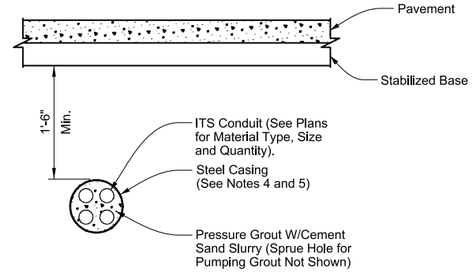
Typical Conduit Installation Jacking
or Boring Beneath Existing Roadway



Bore Under Pavement



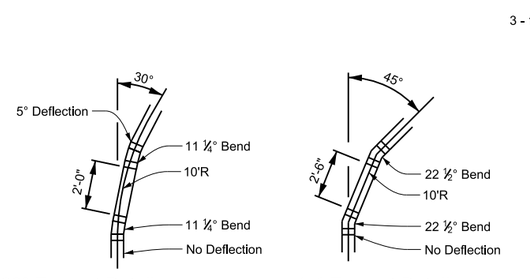
Typical Conduit Installation Jacking
or Boring Beneath Existing Roadway
(Where Concrete Encasement Not Required)



Steel Casing Detail "A"

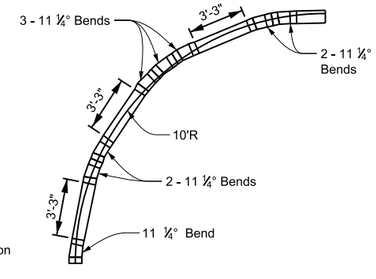
General Notes:

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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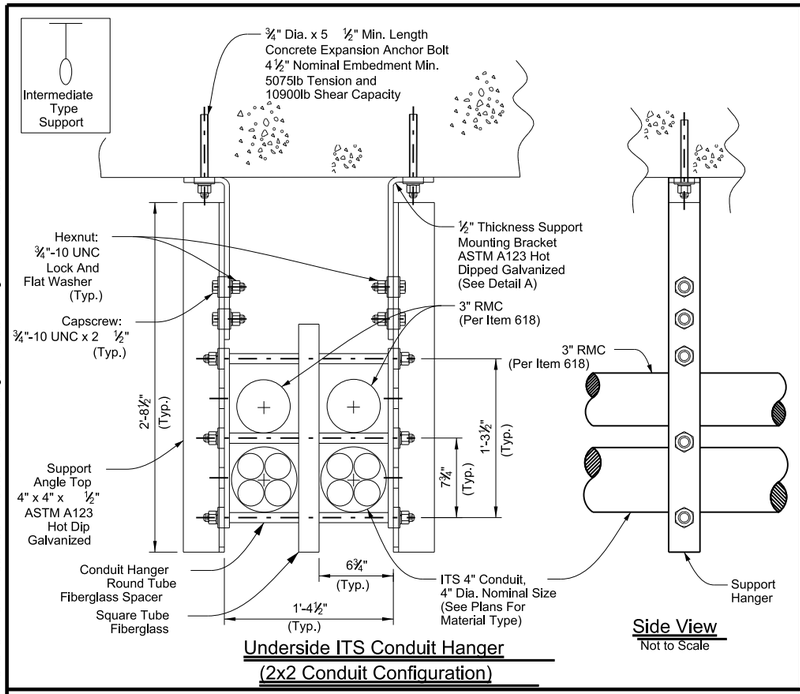
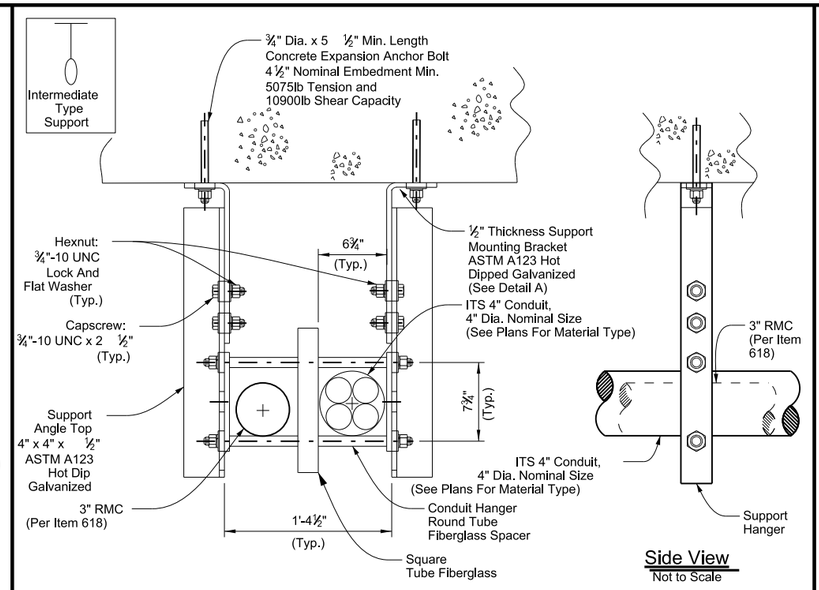
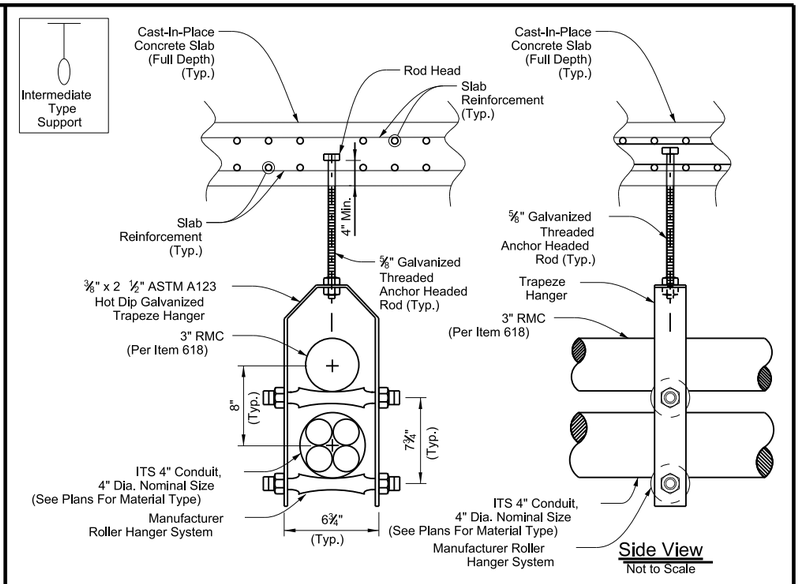


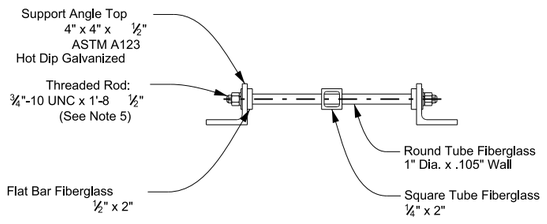
Underside ITS Conduit Hanger
(2x2 Conduit Configuration)



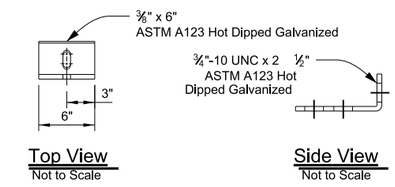
Underside ITS Conduit Hanger
(2x1 Conduit Configuration)



Underside ITS Conduit Roller Hanger
For New Construction
(1x2 Conduit Configuration)



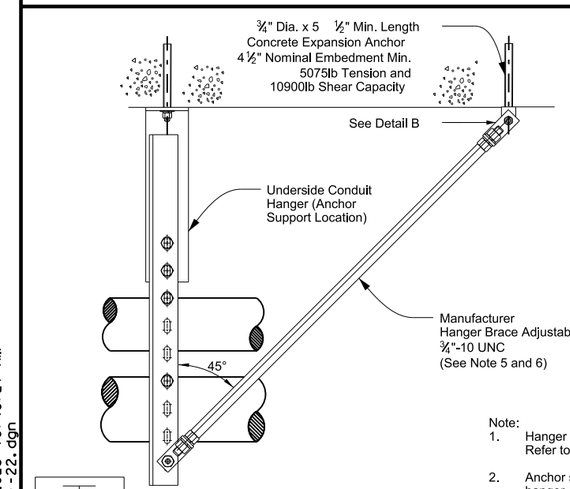
Underside ITS Conduit Hanger Spacer - Top View (Typ.)



Detail A
Support Mounting Bracket Detail

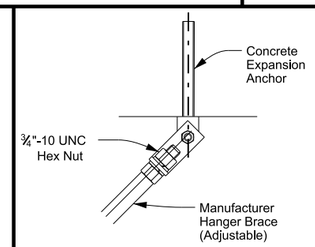
General Notes:

1. Use commercially designed multiple conduit support hangers as an alternative to the hanger details on this sheet, or standard sheet ED(2)-14 may be used. Verify sufficient tension and shear capacity before proposed substitution. 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. Refer to ITS(30) for anchor details through pre-stressed concrete panels.
12. Bond all external structure conduit throughout entire length of run and ground at ground box locations according to ITS(38).

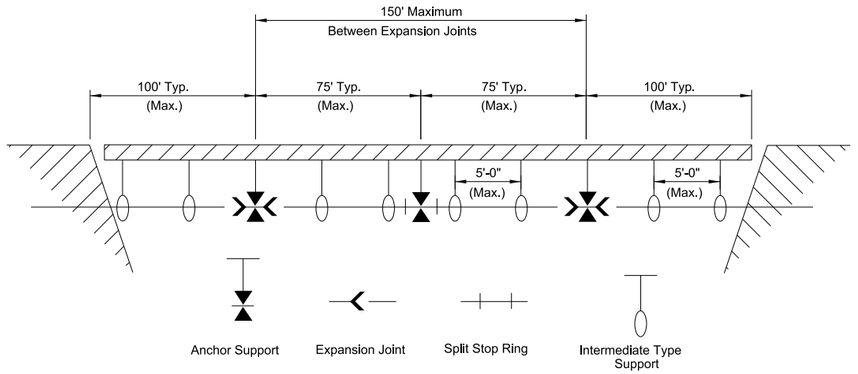


Note:
1. Hanger support shown is a typical configuration. Refer to General Note 1 on this sheet.
2. Anchor supports are required for all conduit hanger configurations.

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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Traffic Safety Division Standard

ITS CONDUIT HANGER DETAILS

ITS(29)-22

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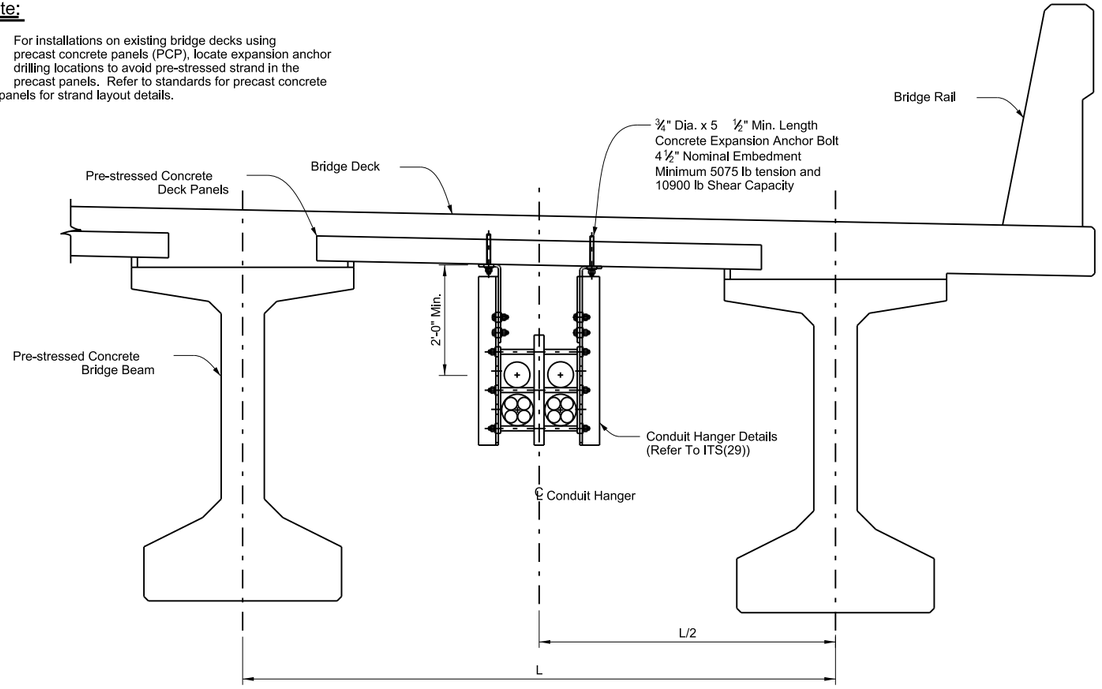
Note:

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.

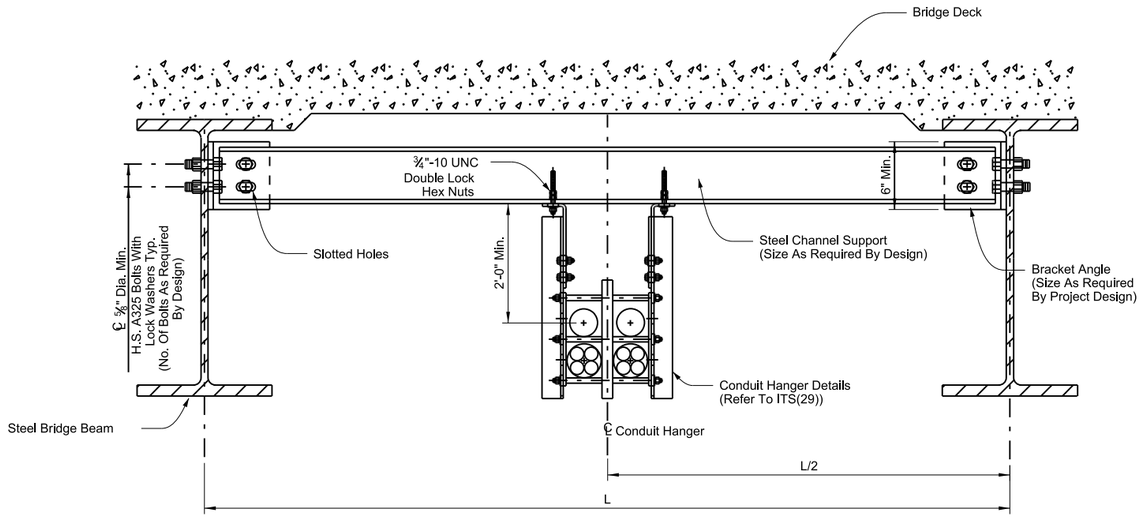


Structure Mounted ITS Conduit - Concrete Bridge Deck With Precast Panels

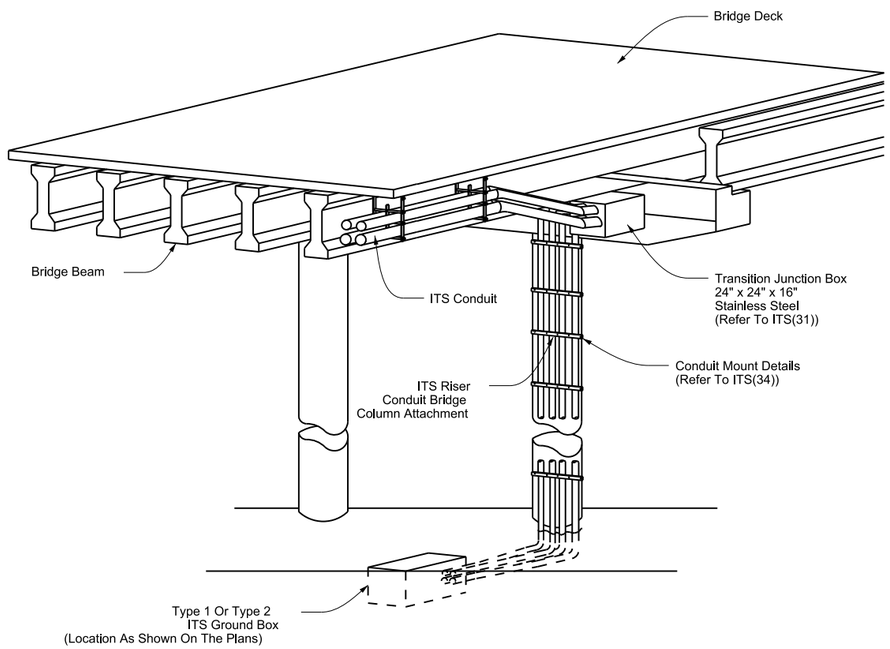
Refer To ITS(29) For General Notes

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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Traffic Operations Division Standard

STRUCTURE MOUNTED ITS CONDUIT

ITS(30)-16

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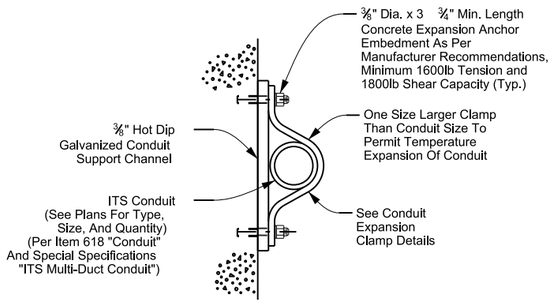
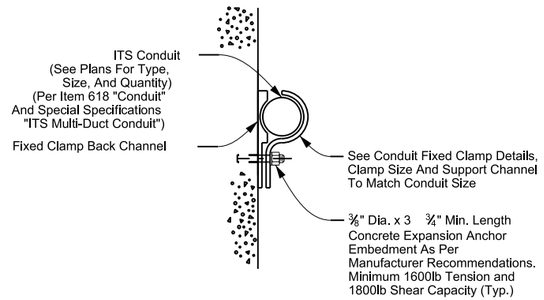
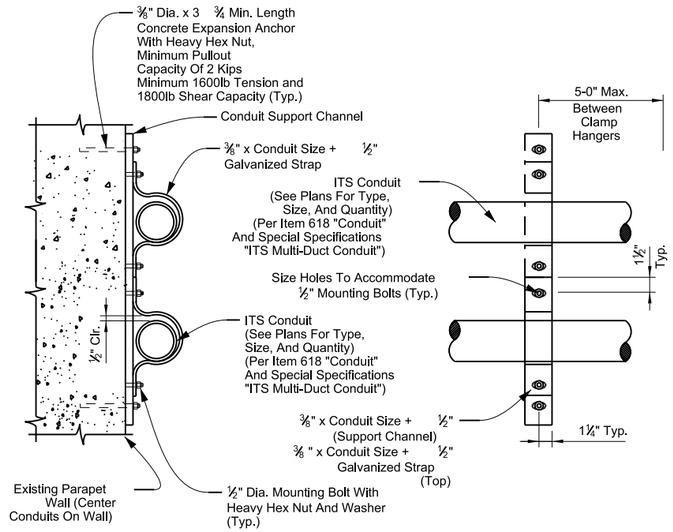


Conduit Expansion Clamp



Conduit Fixed Clamp

Conduit Clamp Details (Typ.)

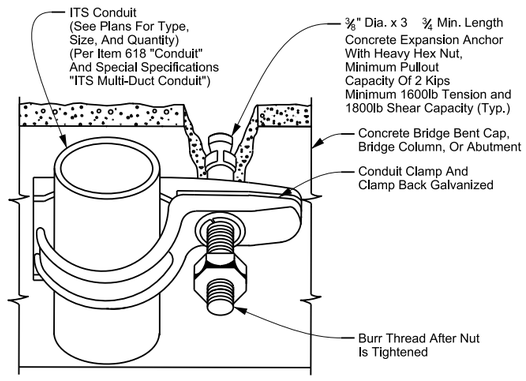


Side View

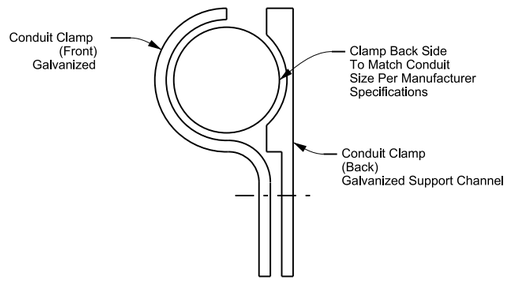
Top View

Elevation View

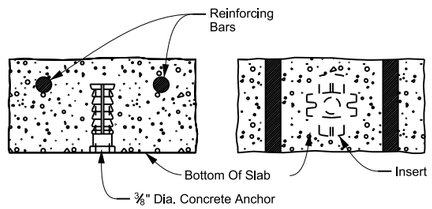
Conduit Expansion Clamp Details



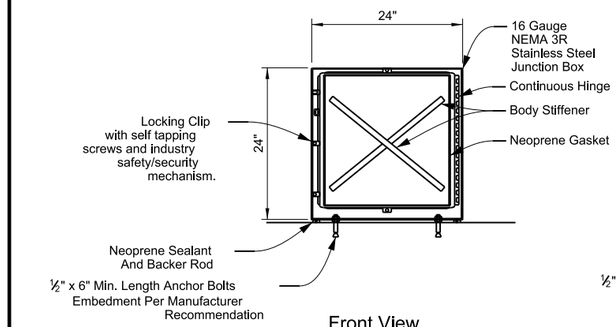
Conduit Fixed Clamp Back Channel



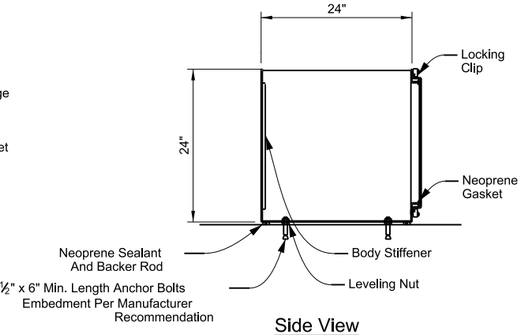
Conduit Fixed Clamp Details
Side View



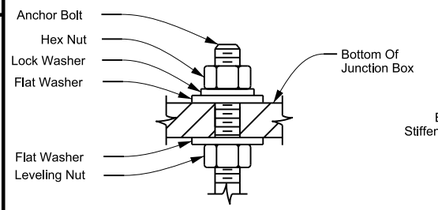
Conduit Fixed Clamp Concrete Insert Detail



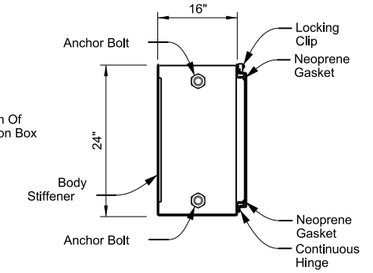
Front View



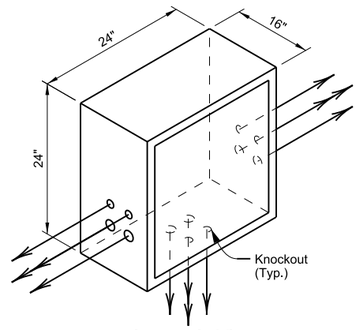
Side View



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.

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Traffic Operations Division Standard

PARAPET MOUNTED ITS CONDUIT AND TRANSITION BOX DETAIL

ITS(31)-16

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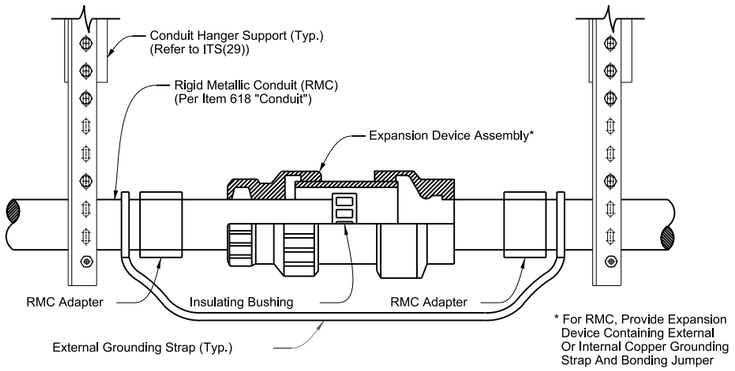
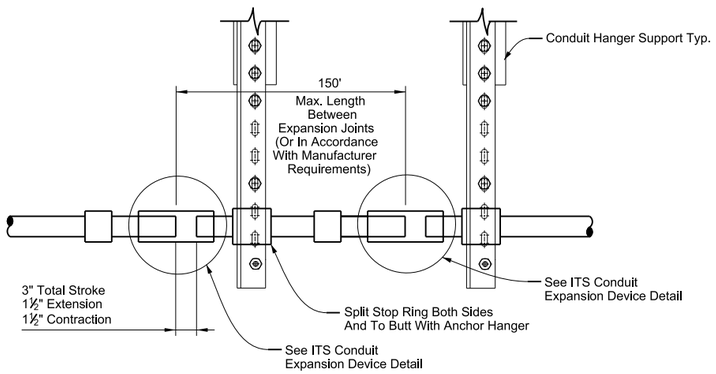
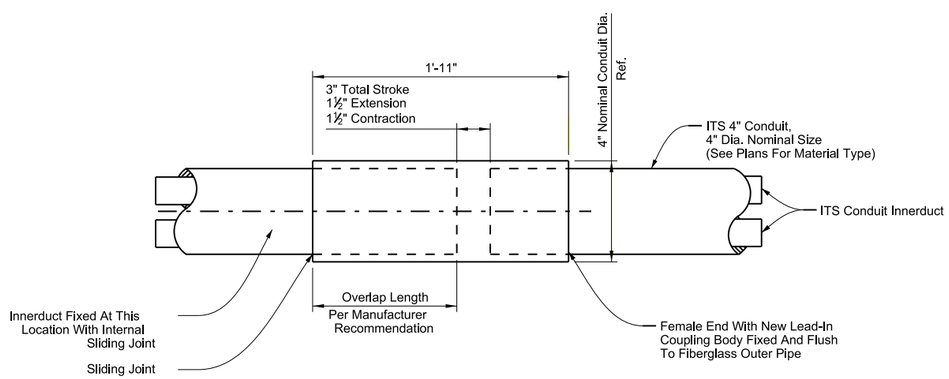


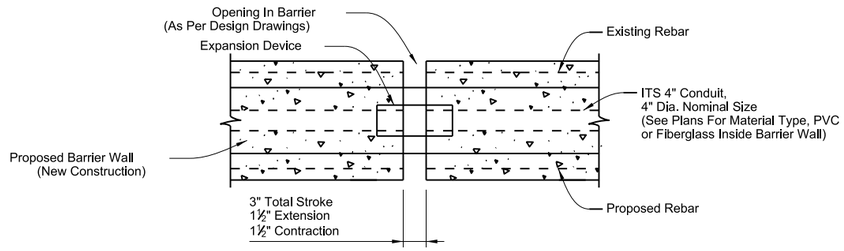
RMC Conduit Expansion Device Detail (Typ.)



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).

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Traffic Operations Division Standard

EXPANSION / DEFLECTION JOINT

ITS(32)-16

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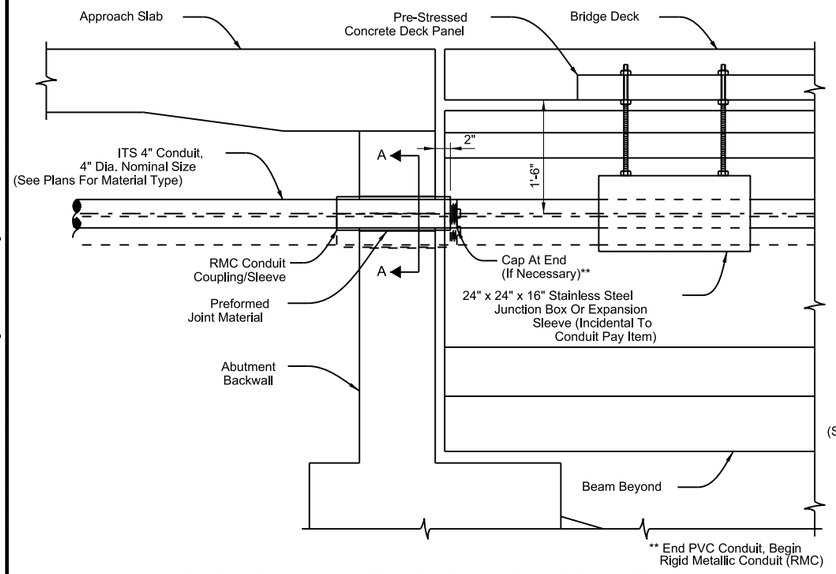
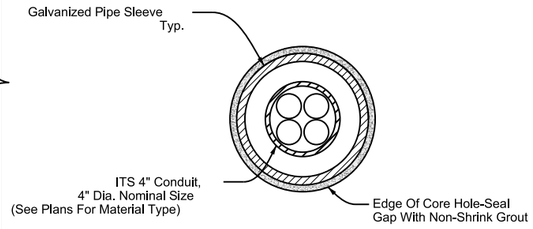


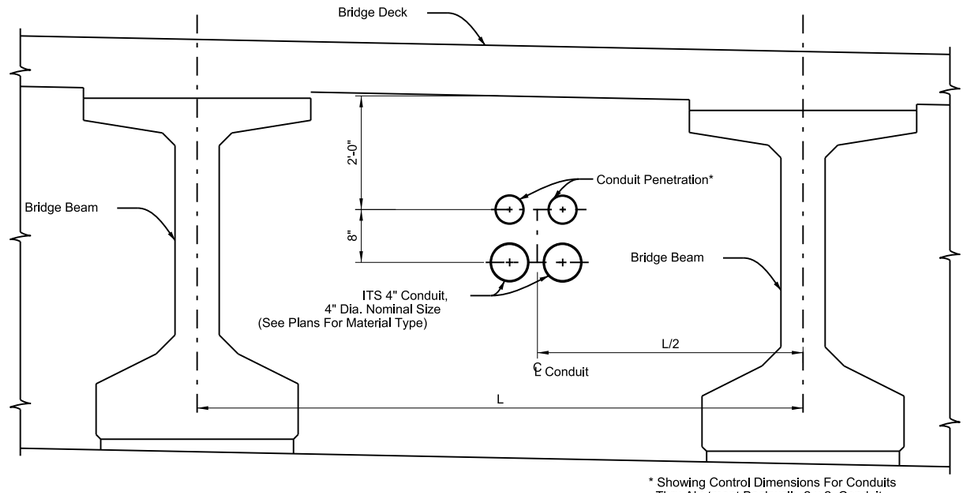
Section Through New Construction Abutment Backwall

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.



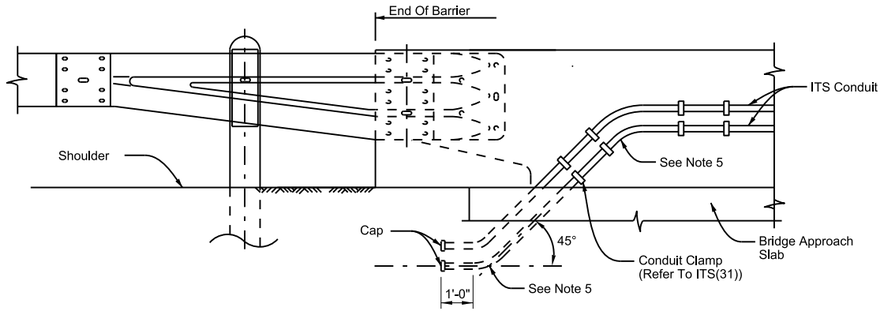
Section A-A (Typical Pipe Sleeve)



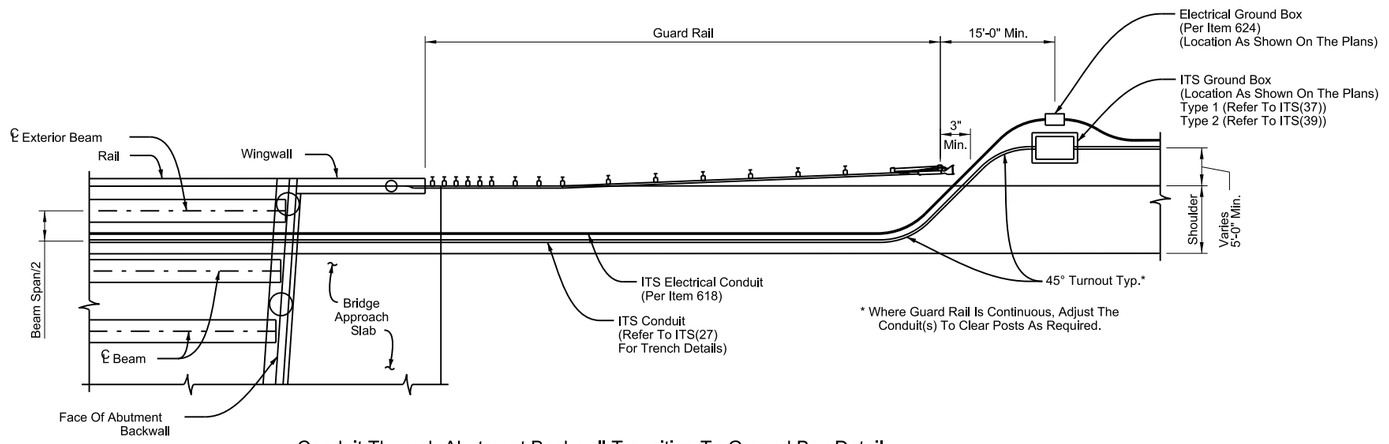
* Showing Control Dimensions For Conduits Thru Abutment Backwall. 2 x 2 Conduit Configuration Shown.

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).

Texas Department of Transportation

Traffic Operations Division Standard

ITS CONDUIT TRANSITION AT ABUTMENT

ITS(33)-16

FILE: its(33)-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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Sheet Details
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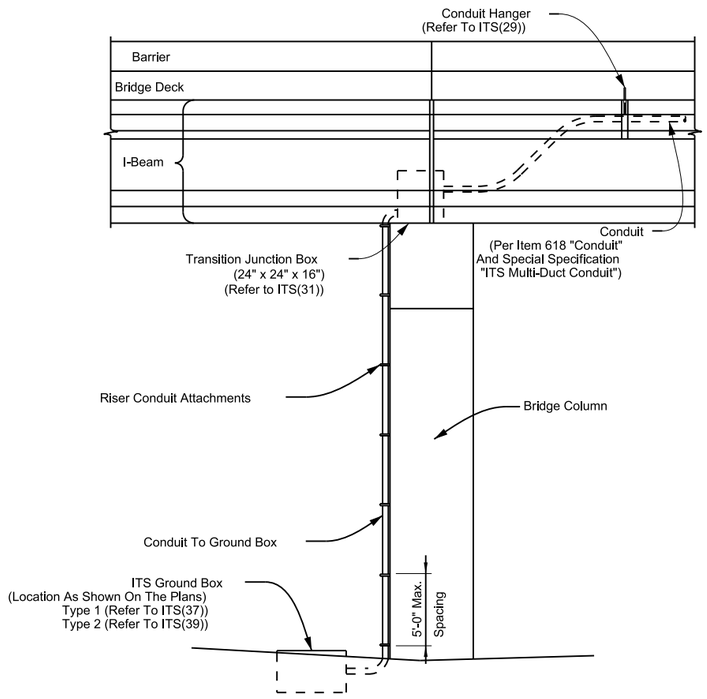
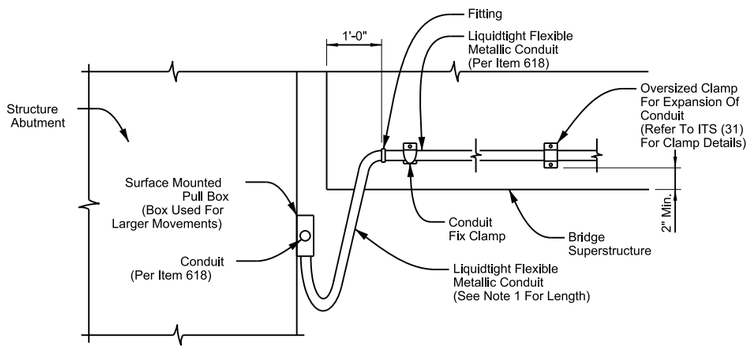


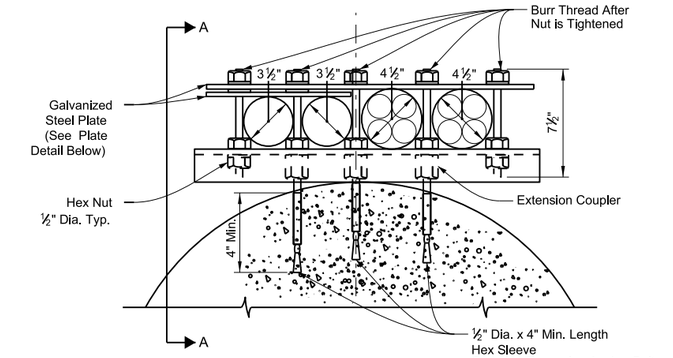
ITS Conduit Riser

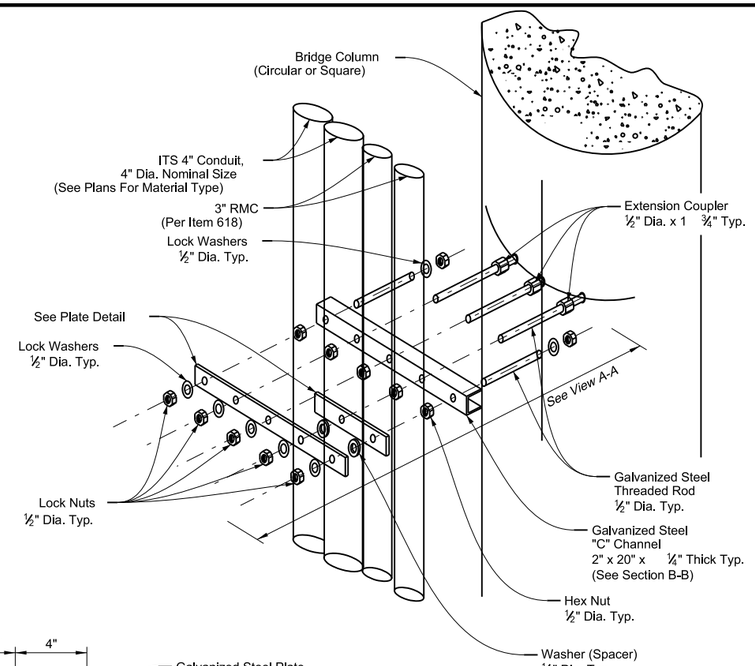


Exposed Conduit Connections At Expansion Joints

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.





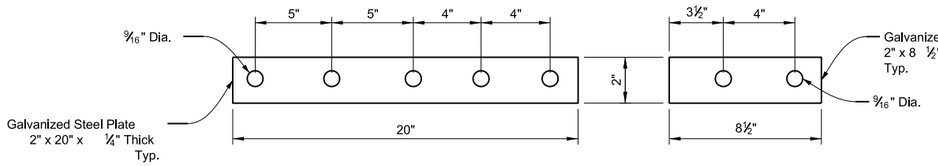
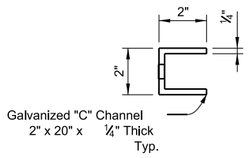
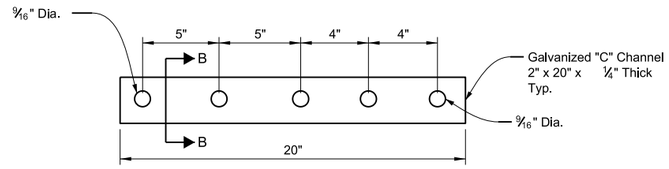


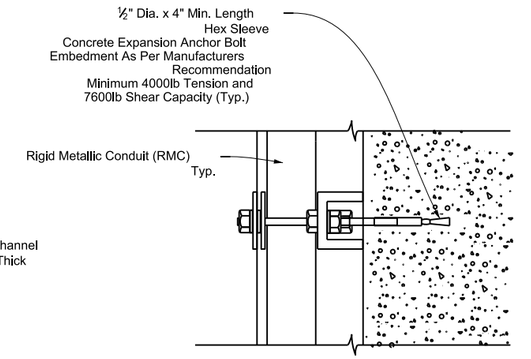
Plate Detail



Section B-B



"C" Channel Detail



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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Texas Department of Transportation

Traffic Operations Division Standard

ITS CONDUIT RISER

ITS(34)-16

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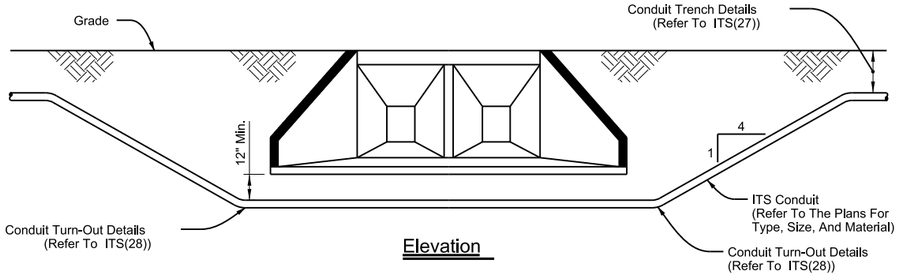
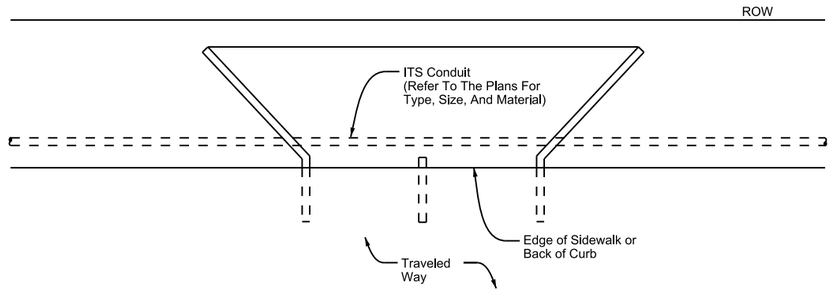
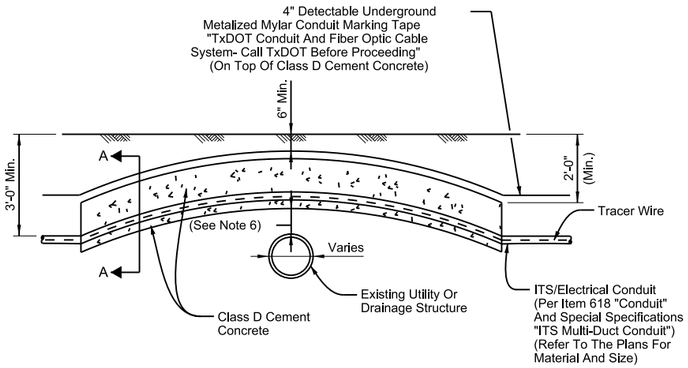


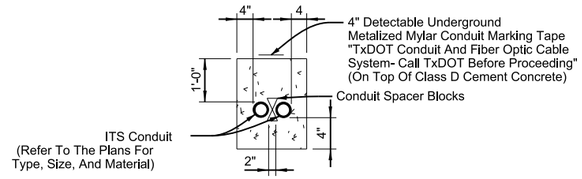
Elevation



Plan View

Conduit Bored Under Culvert



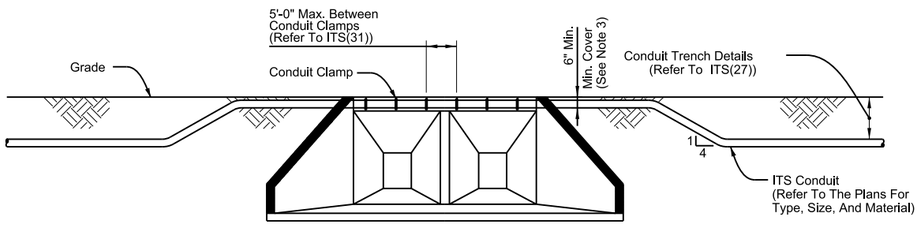


Section A-A

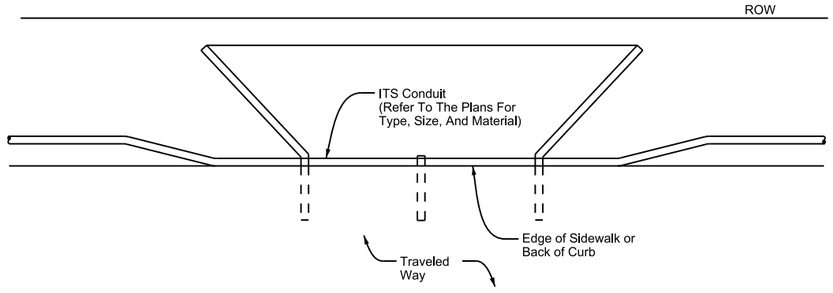
Conduit Installation Detail Above
Existing Drain Pipes Or Utilities

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.

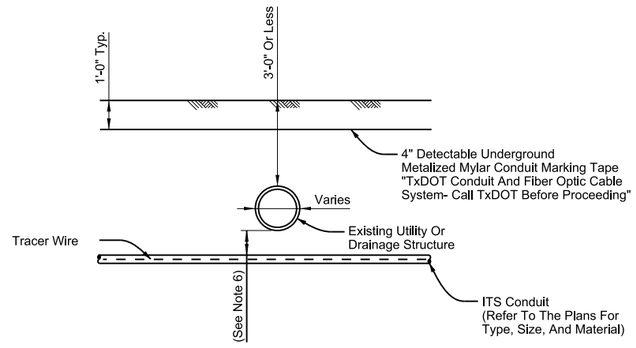


Elevation



Plan View

Conduit Attached To Culvert Headwall



Conduit Installation Detail Below
Existing Drain Pipes Or Utilities

Sheet Details
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Texas Department of Transportation

Traffic Operations Division Standard

ITS CONDUIT OBSTRUCTION CROSSING

ITS(35)-16

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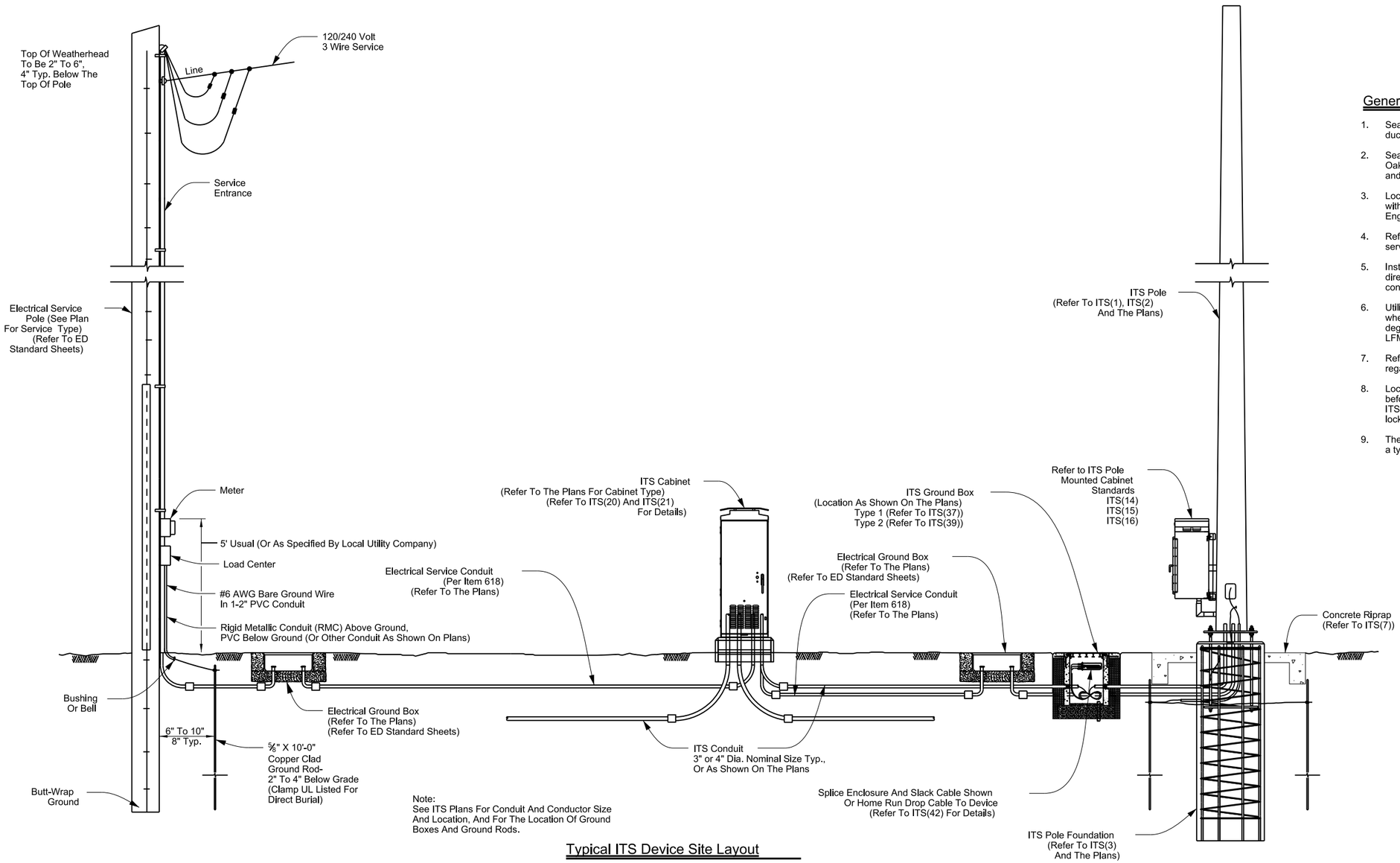

Typical ITS Device Site Layout

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
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Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL ITS DEVICE SITE LAYOUT

ITS(36)-16

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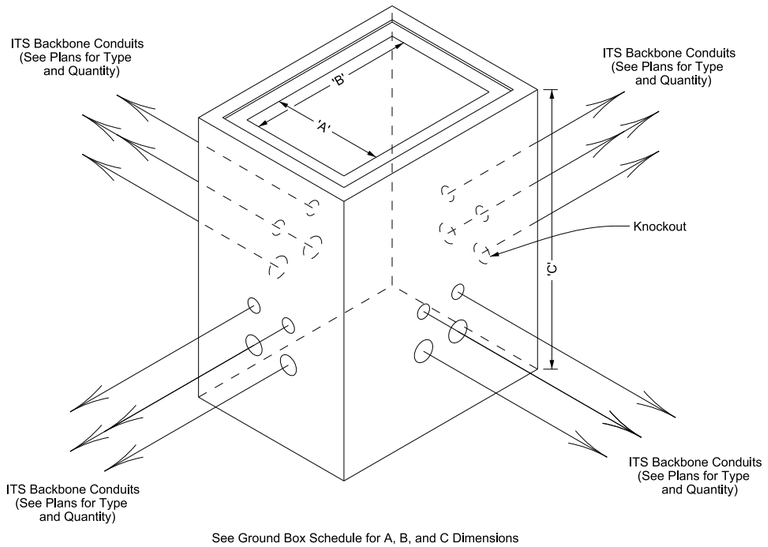
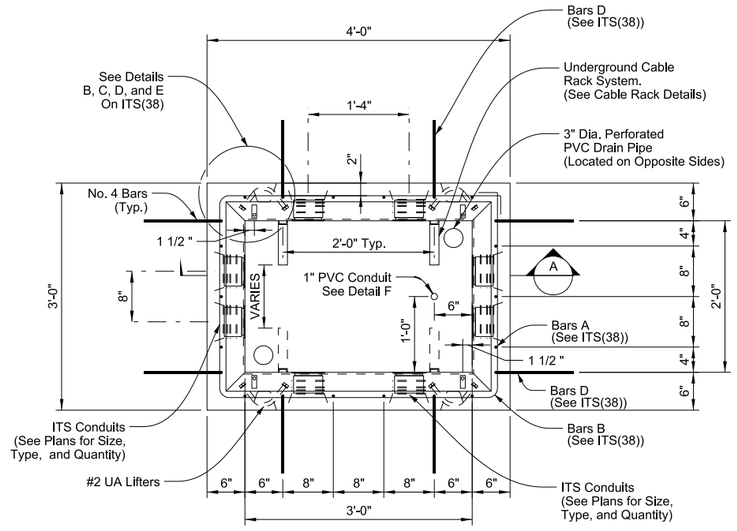


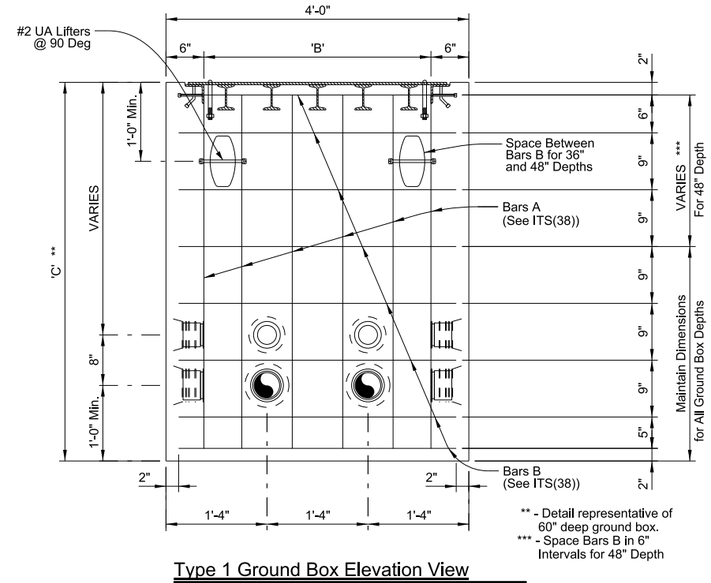
See Ground Box Schedule for A, B, and C Dimensions

Type 1 Ground Box Isometric View

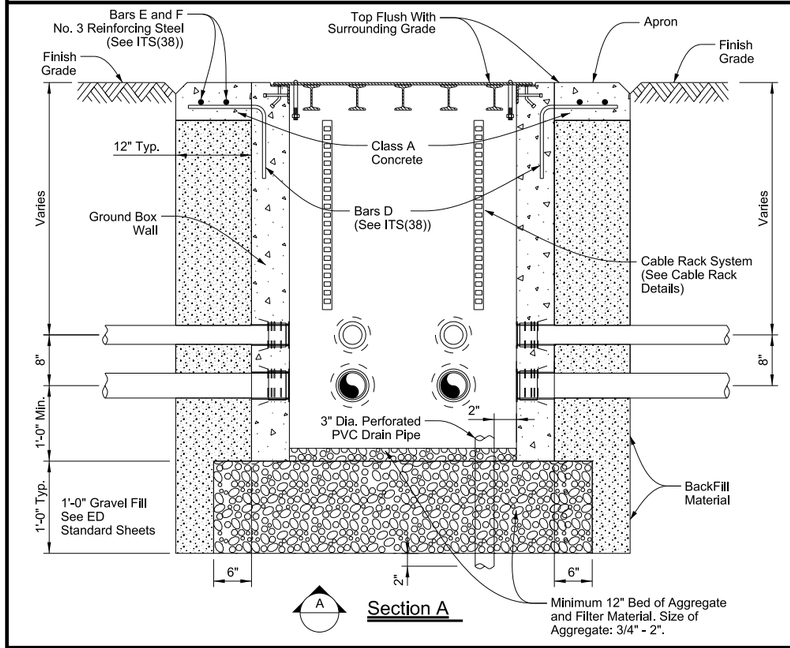


Note: Bar Spacing is The Same on Opposing Sides.

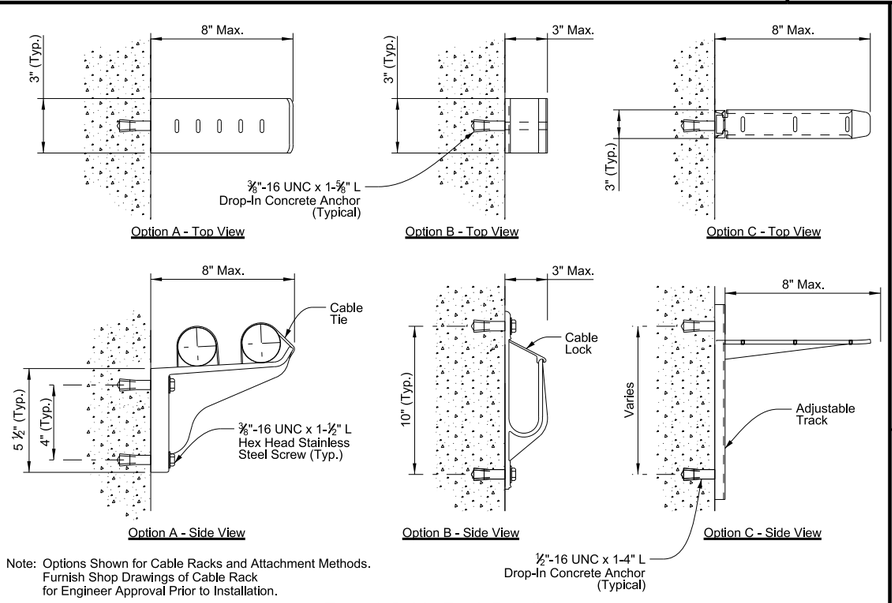
Type 1 Ground Box Plan View



Type 1 Ground Box Elevation View

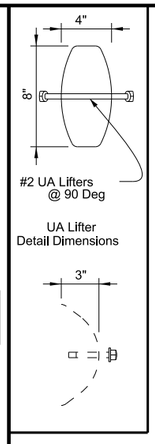


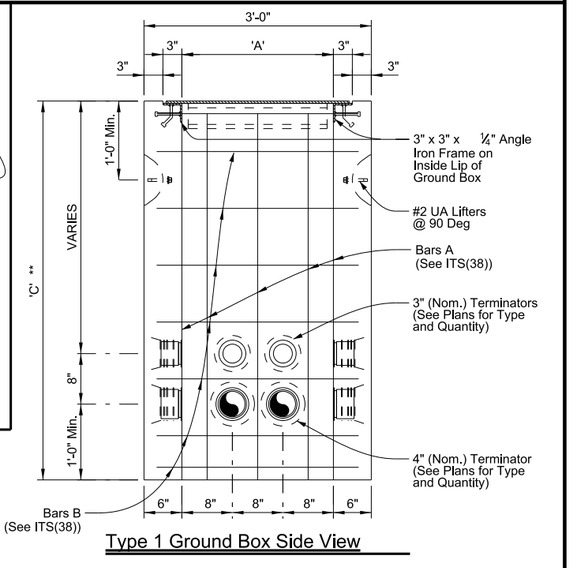
Section A



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 bed of aggregate that extends 6 inches in all directions from the perimeter of the box for closed bottom boxes. Aggregate bed will be subsidiary to Special Specification, "ITS Ground Box."
6. Install all open bottom Type "1" ground boxes on a 12-inch bed of aggregate that extends 6 inches in all directions from the perimeter of the box. Aggregate bed 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 Safety Division Standard

ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER

ITS(37)-22

FILE: its(37)-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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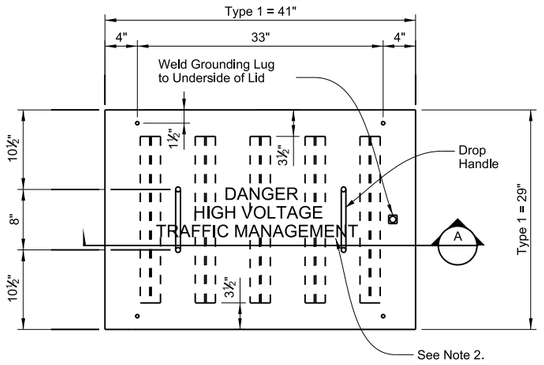
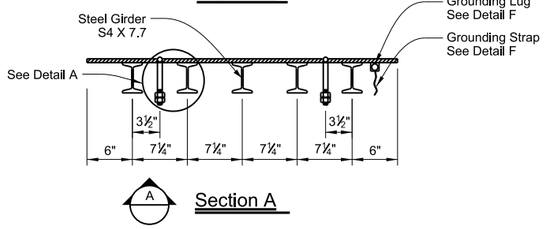
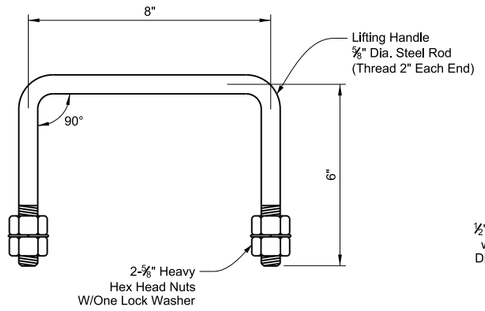


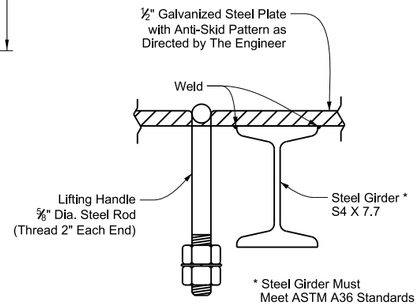
Type 1 Steel Cover Details
Top View



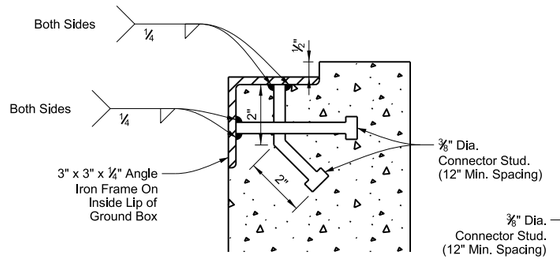
Section A



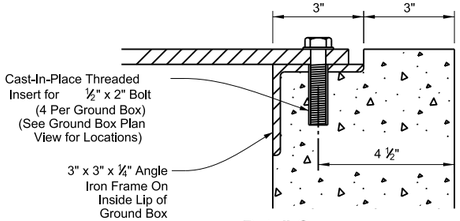
Drop Handle Detail



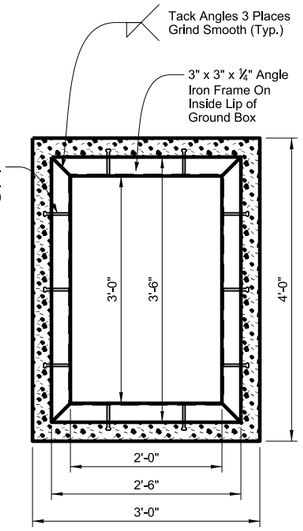
Detail A



Detail B



Detail C
Lid Attachment Detail



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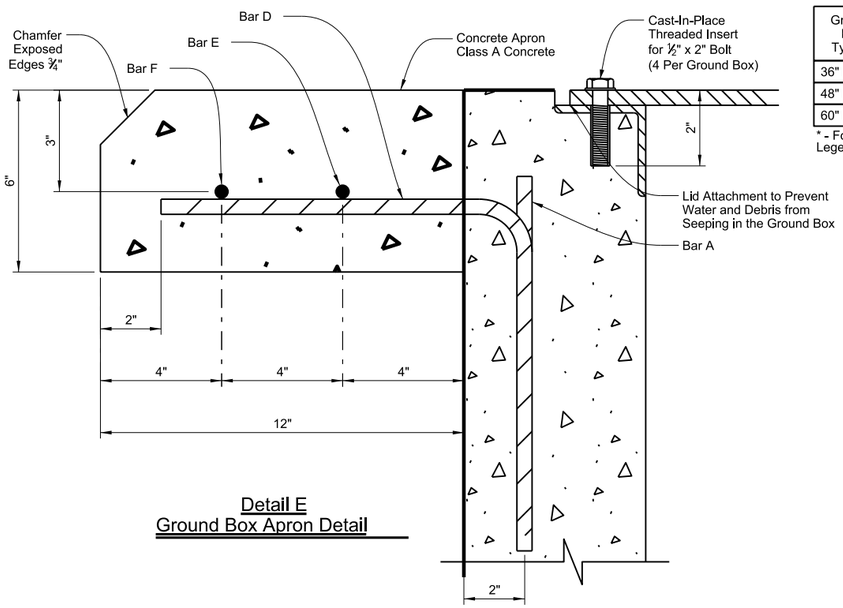
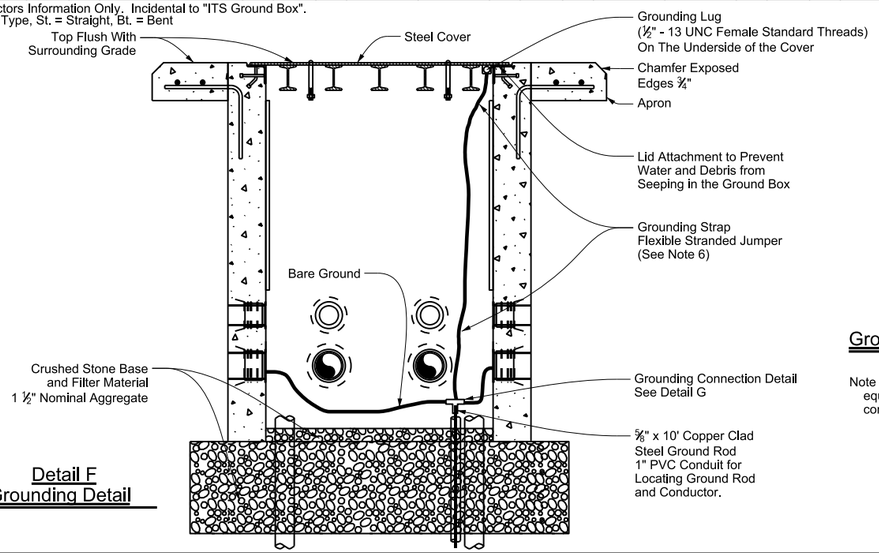


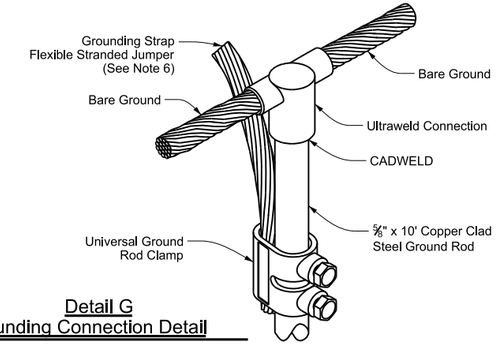
Detail E
Ground Box Apron Detail

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.

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FILE: ITS(38)-17.dgn

Sheet Details
Not to Scale

SHEET 2 OF 2

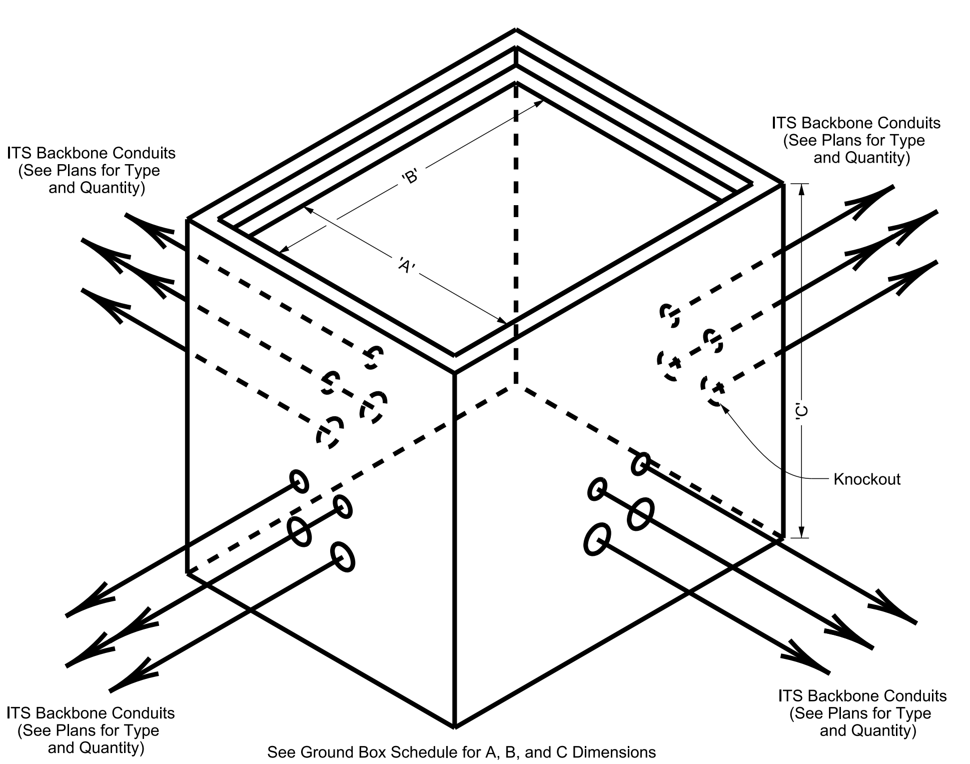
Texas Department of Transportation

Traffic Operations Division Standard

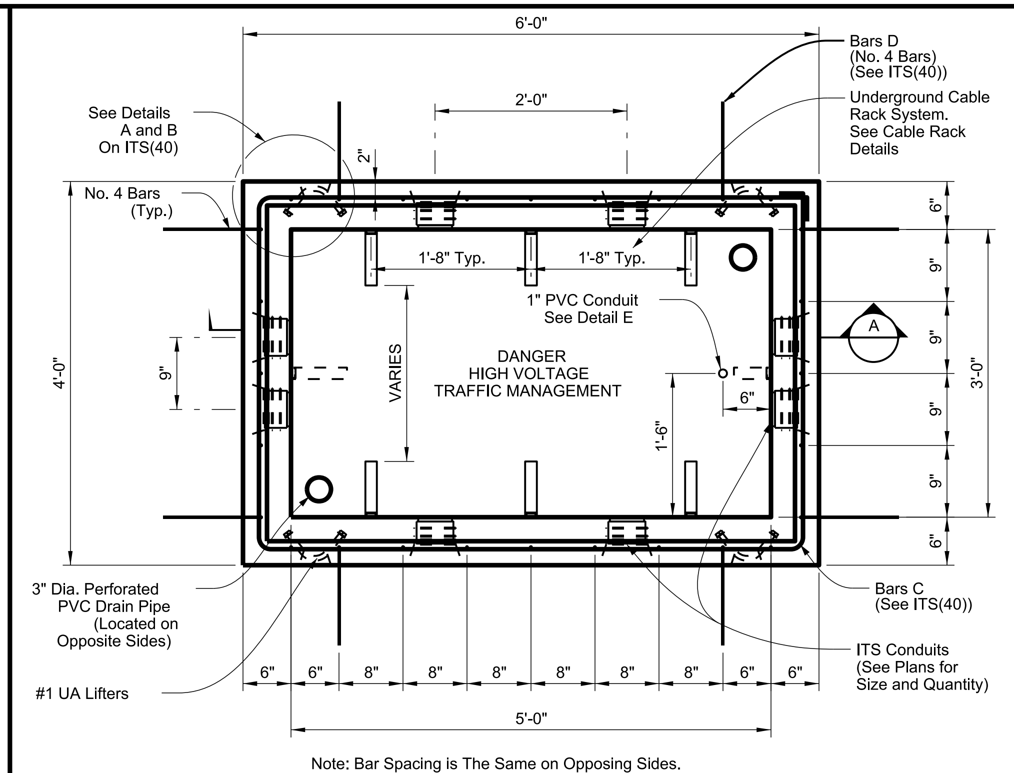
ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER

ITS(38)-17

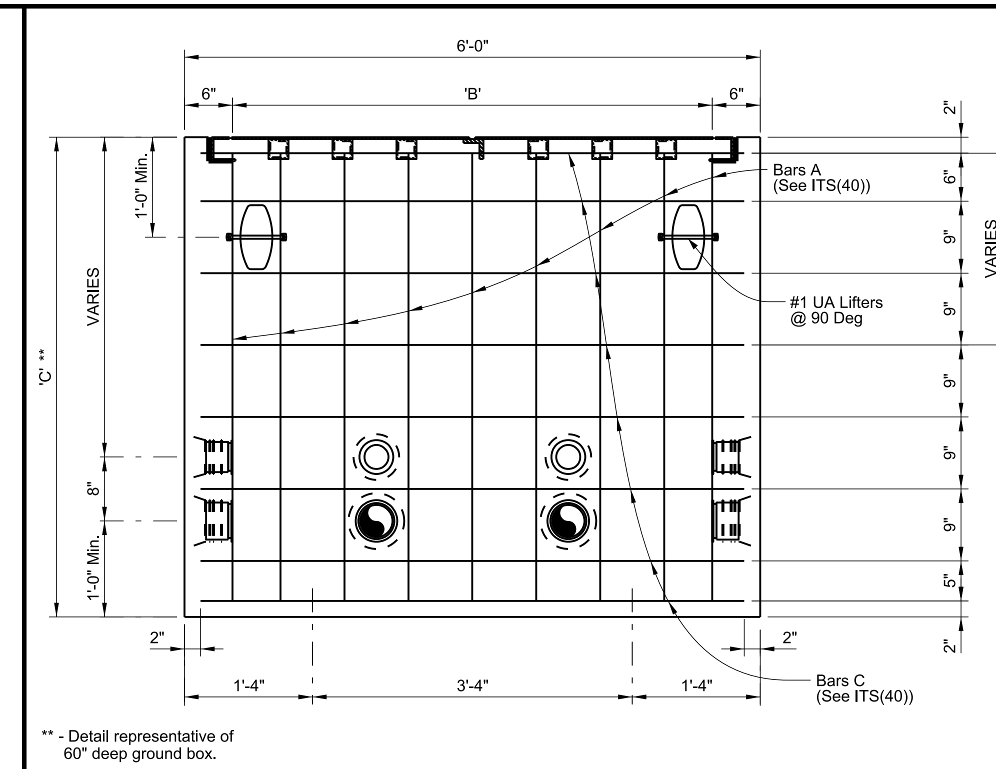
FILE: its(38)-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT FEBRUARY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS 5-17	0027	08	182	US 90A
	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		62



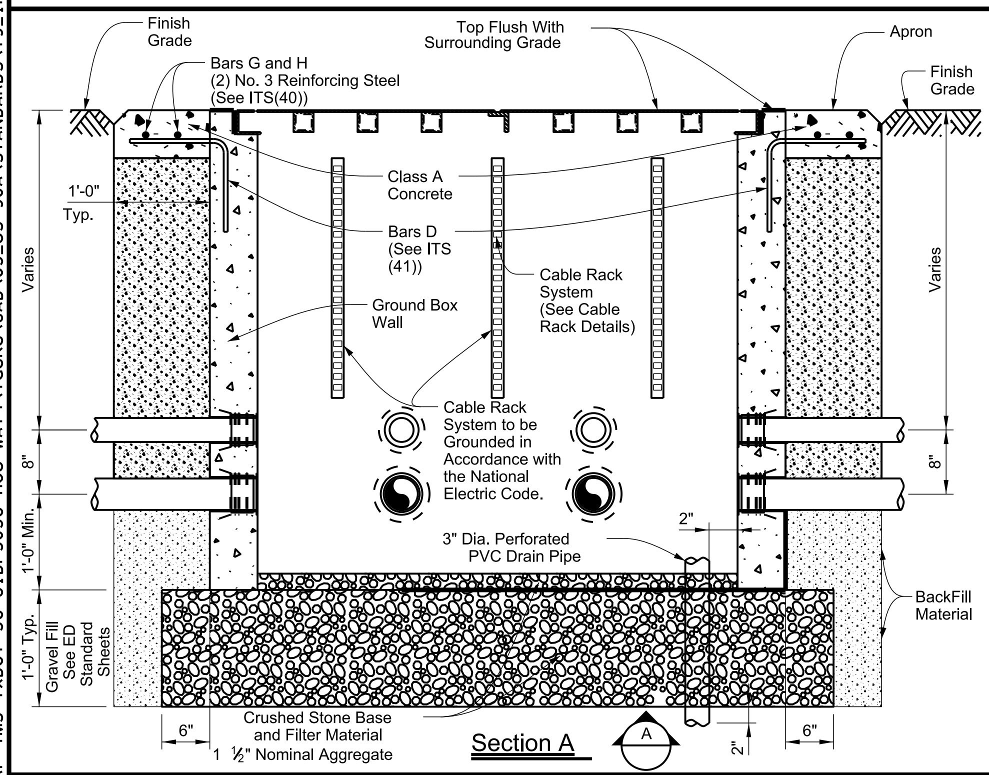
Type 2 Ground Box Isometric View



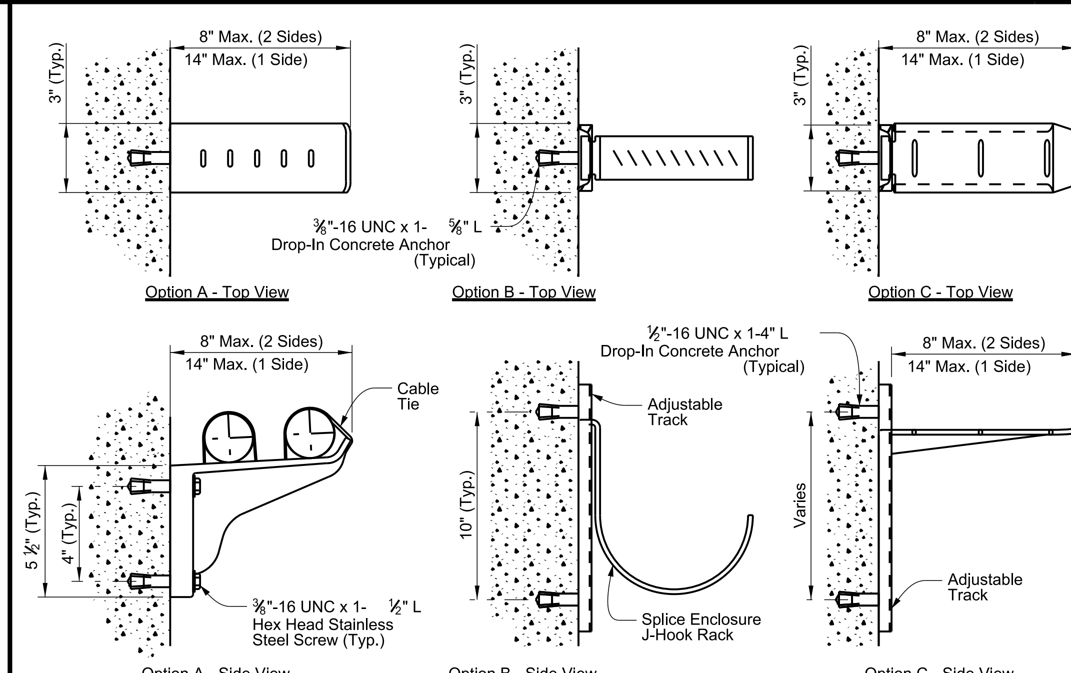
Type 2 Ground Box Plan View



Type 2 Ground Box Elevation View

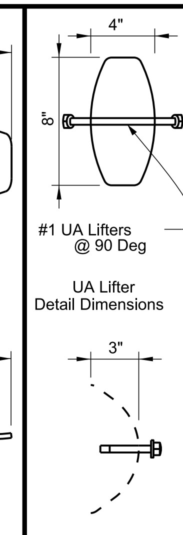


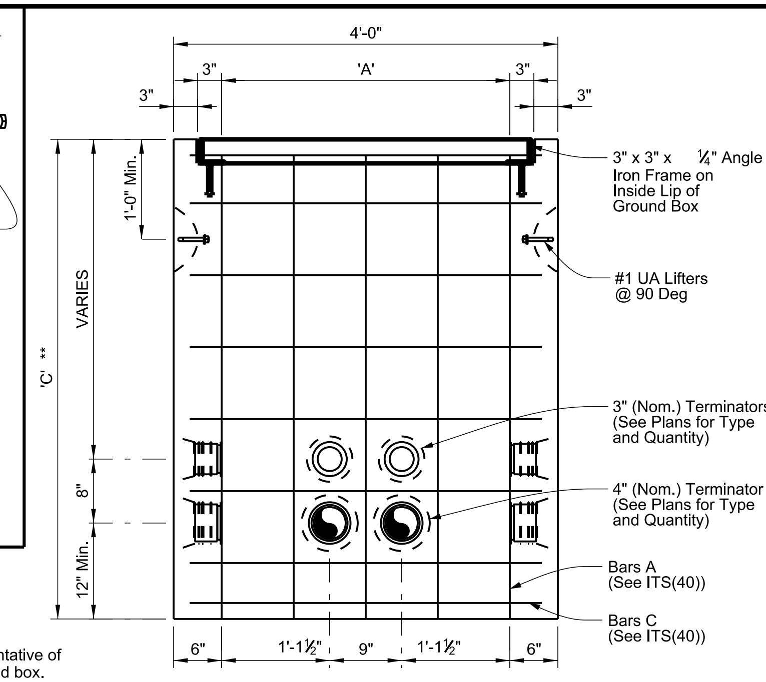
Section A



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





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 provide 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
Not to Scale

Texas Department of Transportation

Traffic Operations Division Standard

ITS GROUND BOX DETAILS TYPE "2" WITH STEEL COVER

ITS(39)-16

FILE: its(39)-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT FEBRUARY 2016	CONT 0027	SECT 08	JOB 182	HIGHWAY US 90A
REVISIONS	DIST HOU	COUNTY FORT BEND		SHEET NO. 63

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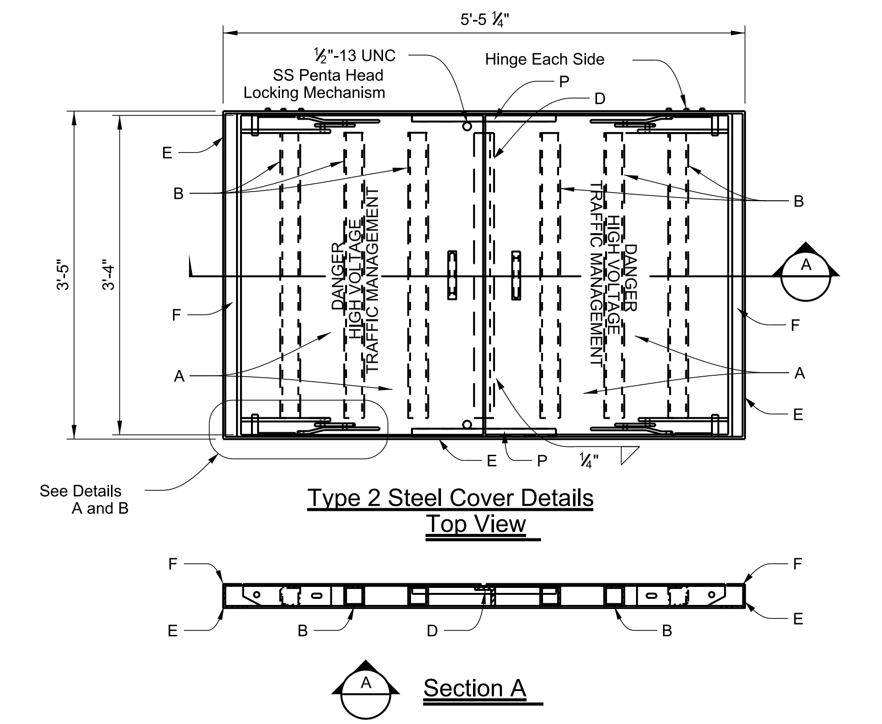
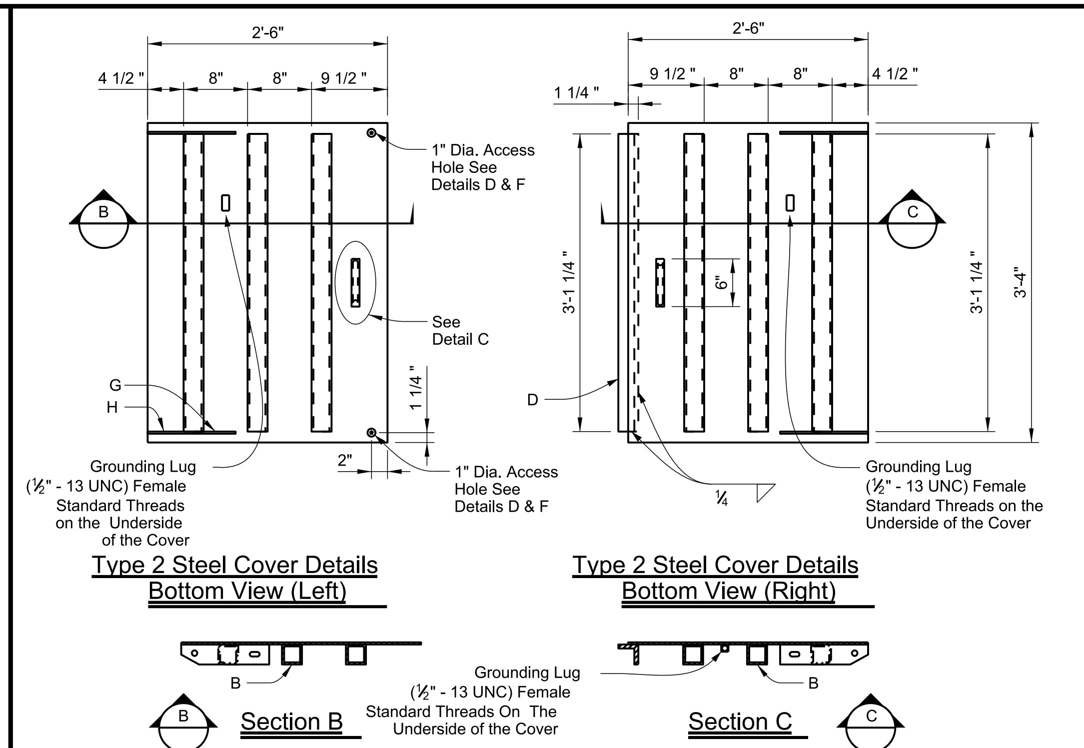
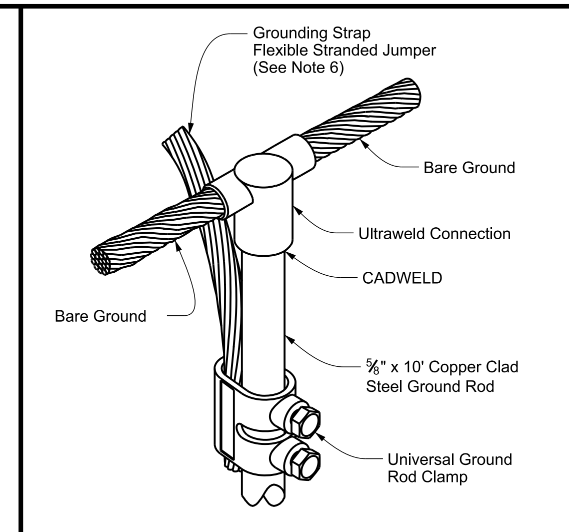


Type 2 Steel Cover Details
Top View



Type 2 Steel Cover Details
Bottom View (Left)

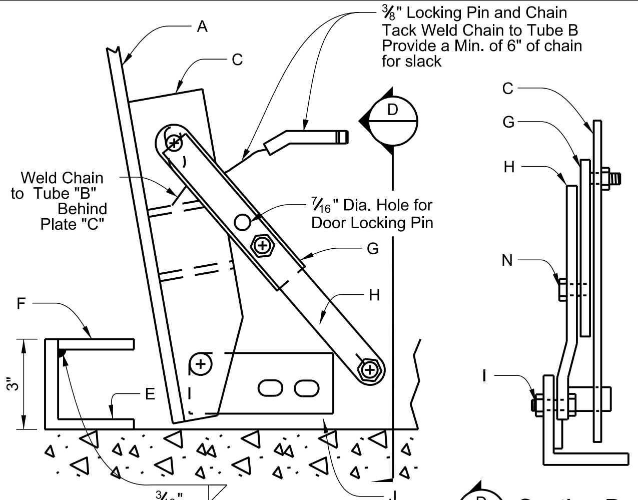
Type 2 Steel Cover Details
Bottom View (Right)



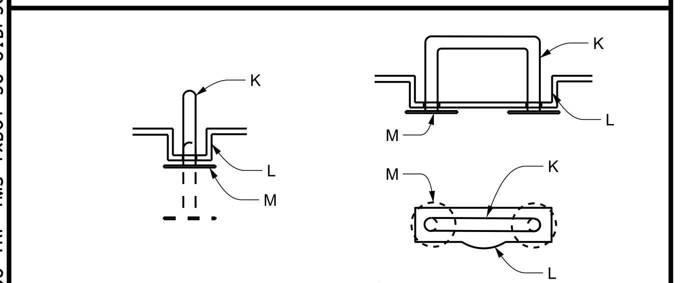
Detail G
Grounding Connection Detail

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.

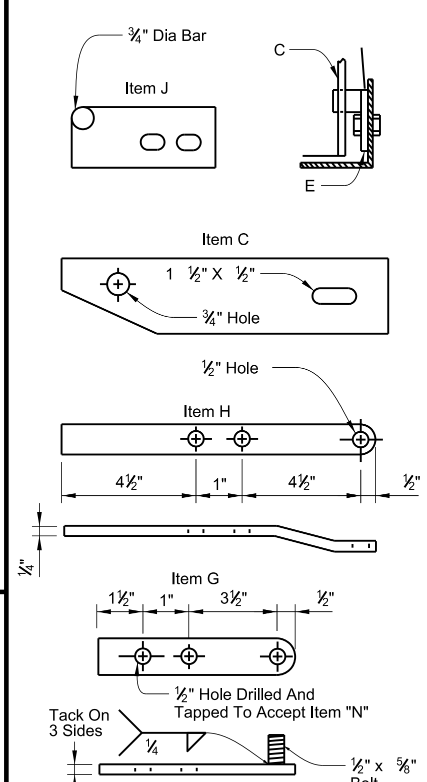
Item	Qty	Incidental "ITS Ground Box" Material
A	2	¼" Floor Plate 40" x 30"
B	6	2 ½" x 2 ½" x 37 ¼" Tube
C	4	11" x 2 ½" x ¼" Plate
D	1	2 ½" x 2 ½" x ½" x 37" ¼ Angle
E	4	3" x 3" x ¼" Angle
F	2	40 ½" x 2" x ¼" Plate
G	4	6 ½" x 1 ¼" x ¼" Plate
H	4	10 ½" x 1 ¼" x ¼" Plate
I	12	½" Bolt/Nut
J	4	4 ¾ x 2" x ¾" Plate
K	2	⅝" Drop Handle
L	2	1 ½" x ⅝" x 3⁄16" Channel x 7"
M	4	1 ½" x ⅛" P Disk
N	8	½" x ⅝" Bolt
P	2	1" x 1" x ⅛" Angle x 18"



Detail A
Type 2 Cover Side View Detail



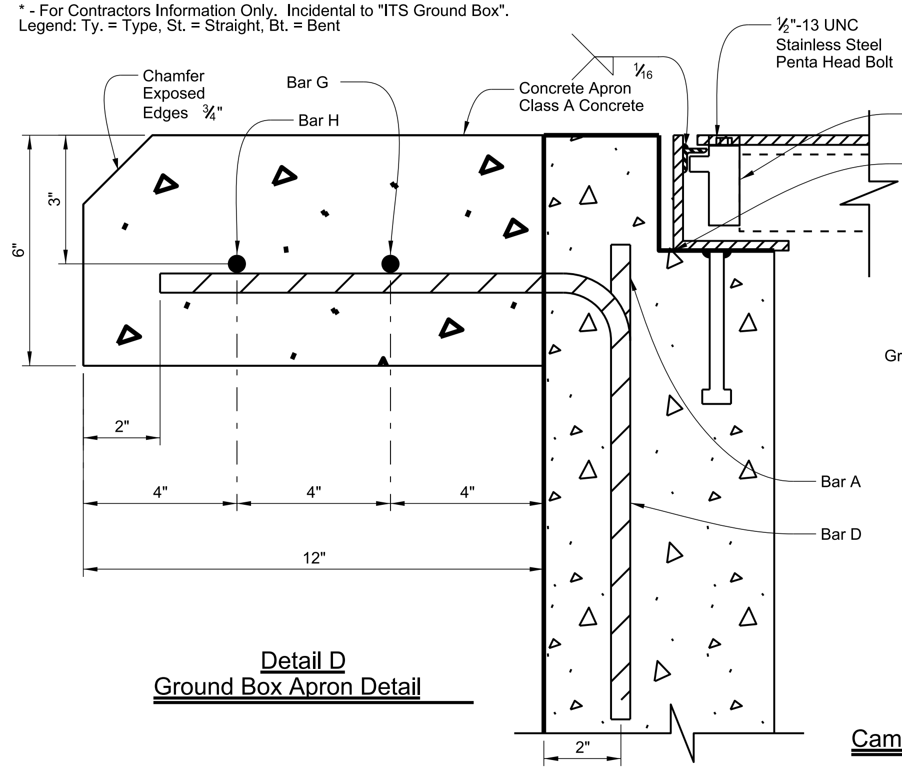
Detail C
Type 2 Drop Handle Details



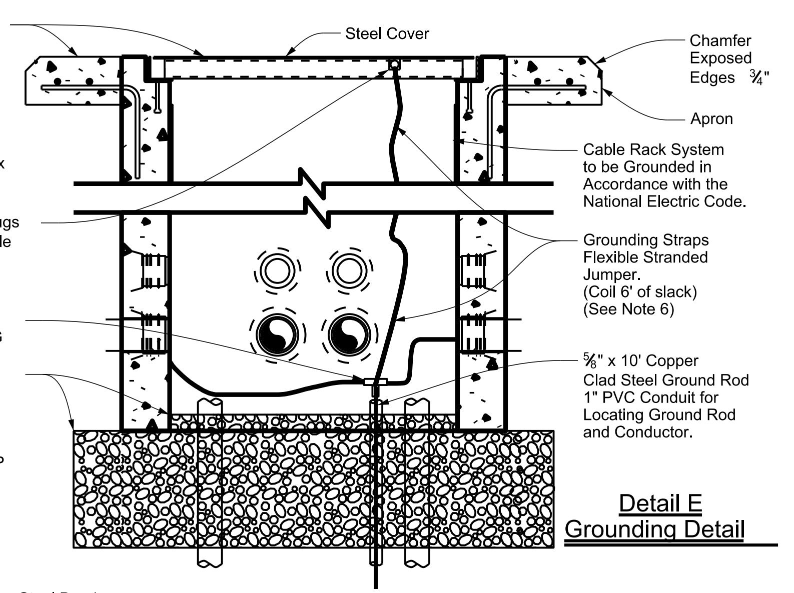
Detail B
Type 2 Hinge Details

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

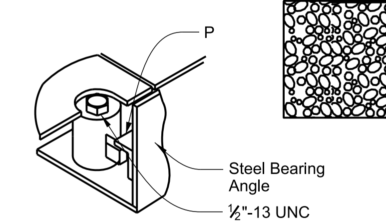
* - For Contractors Information Only. Incidental to "ITS Ground Box".
Legend: Ty. = Type, St. = Straight, Bt. = Bent



Detail D
Ground Box Apron Detail



Detail E
Grounding Detail



Detail F
Cam Locking Mechanism

SHEET 2 OF 2

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.

Sheet Details
Not to Scale

Texas Department of Transportation — Traffic Operations Division Standard

ITS GROUND BOX DETAILS TYPE "2" WITH STEEL COVER

ITS(40)-17

FILE: its(40)-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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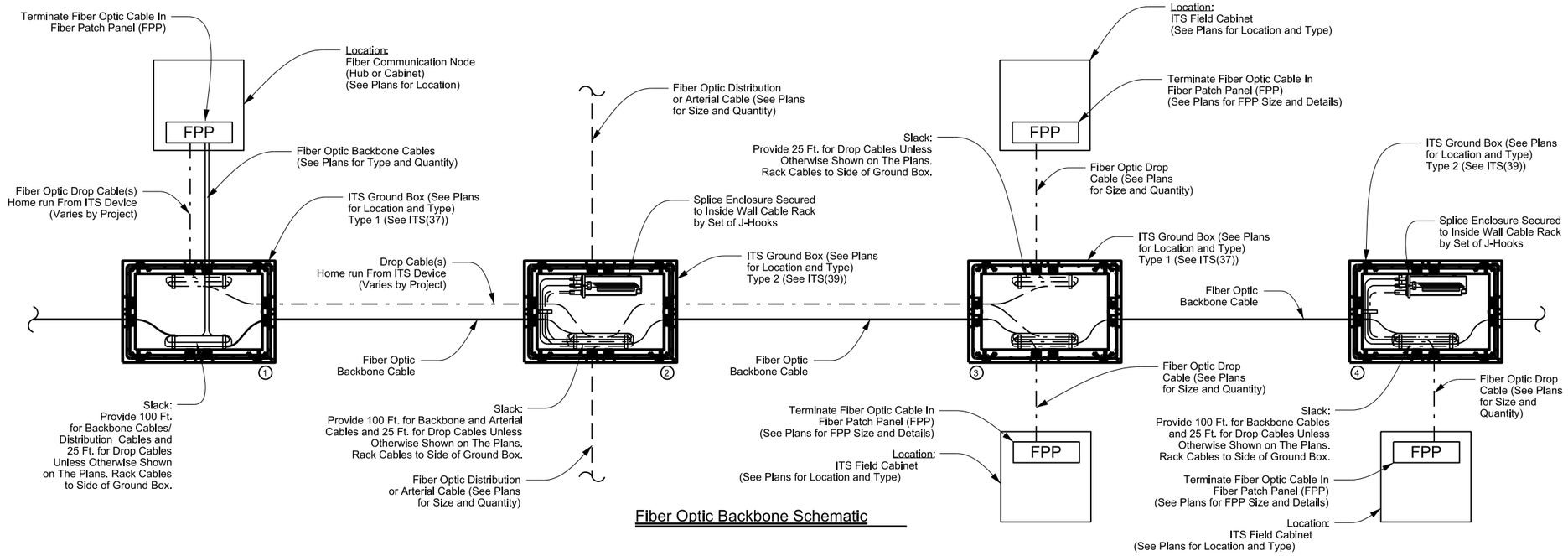
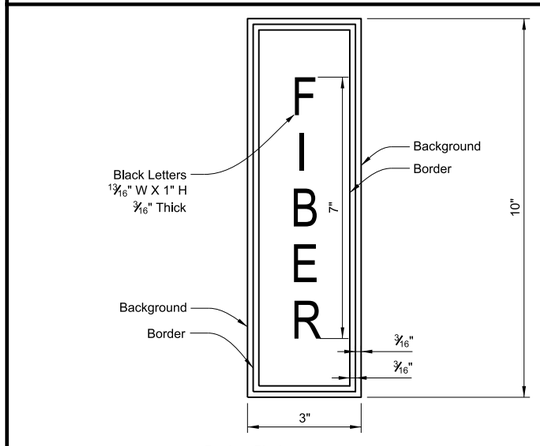
5-17	DIST		COUNTY	SHEET NO.
	HOU		FORT BEND	64

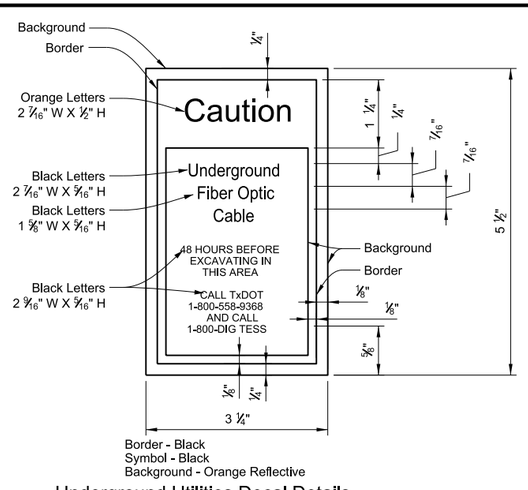


Fiber Optic Backbone Schematic



Border - Black
Background - Orange Reflective

Fiber Decal Details



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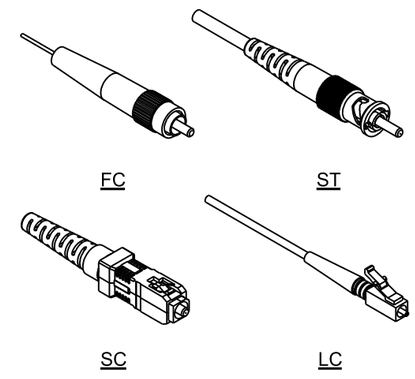
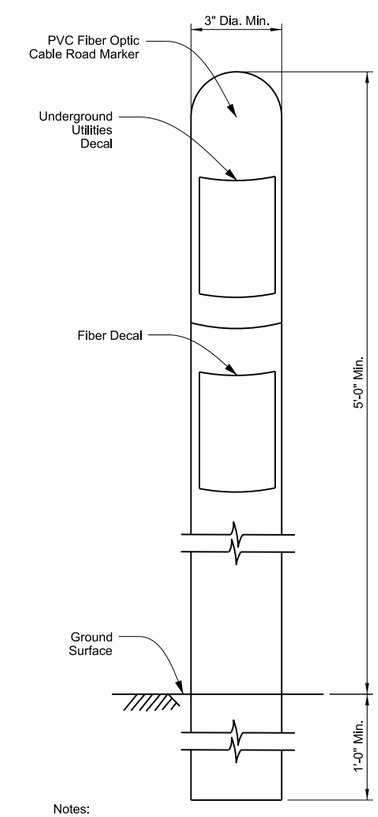
Symbol - Black
Background - Orange Reflective

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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REVISIONS	0027	08	182	US 90A
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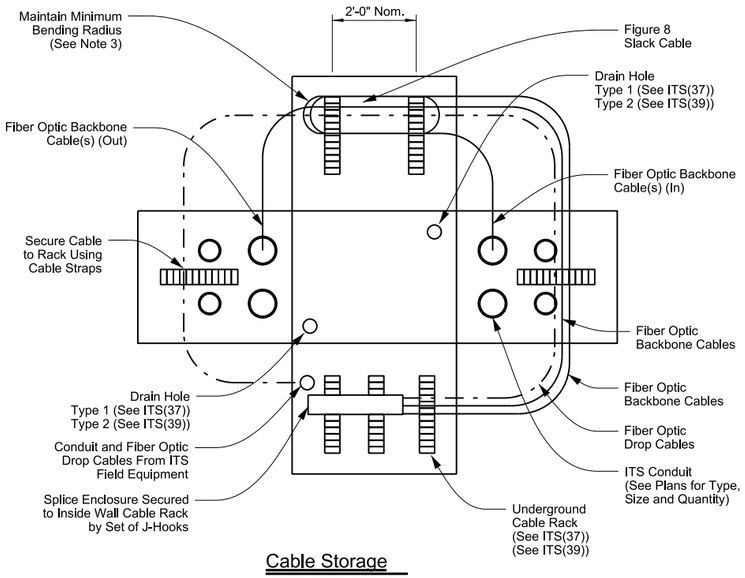
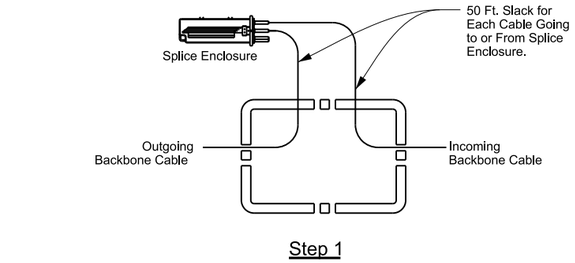
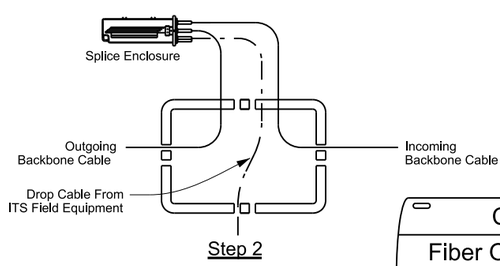


Cable Storage

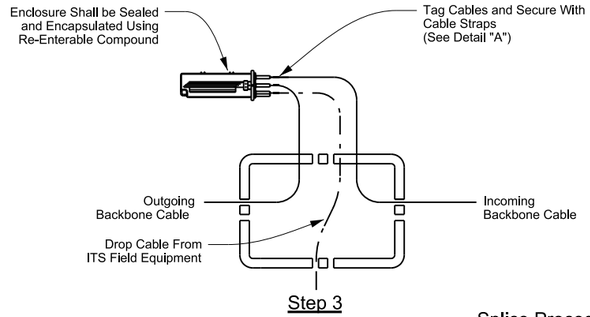
Top View - Ground Box Walls Folded Down for Clarity



Step 1



Step 2



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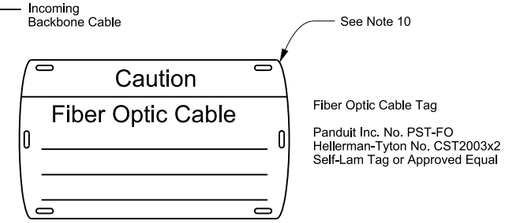
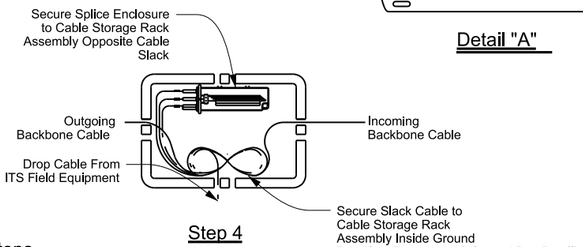
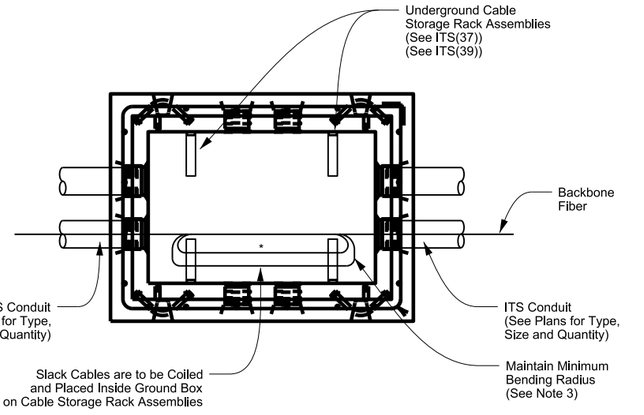


Detail "A"



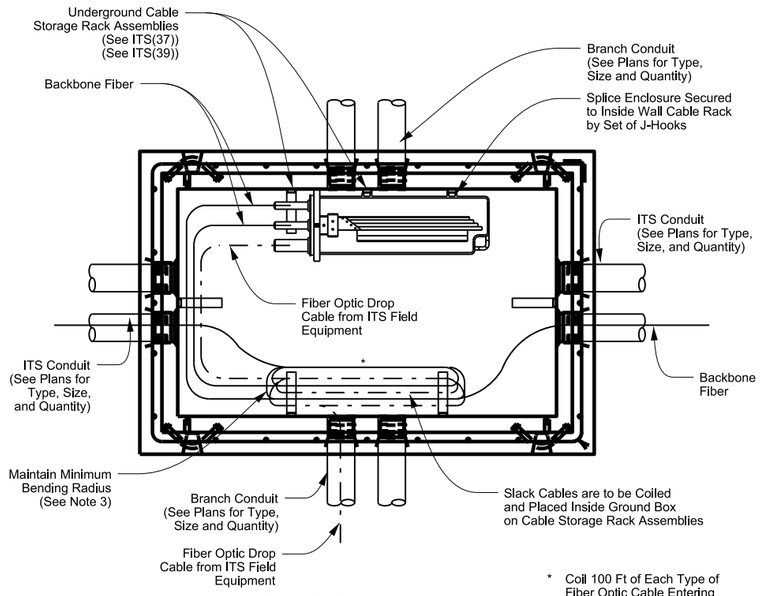
Step 4

Splice Procedure Steps



Type "1" Ground Box

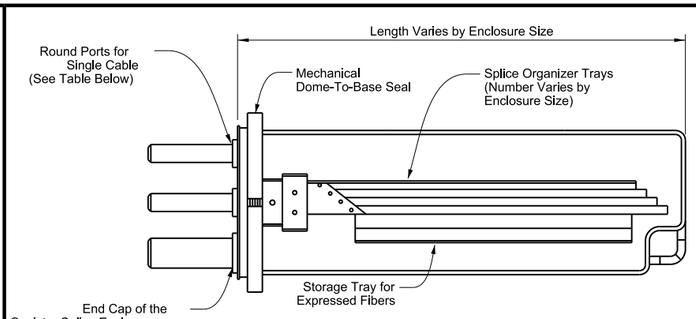
* Coil 25 Ft of Fiber Optic Cable for Slack



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

Texas Department of Transportation

Traffic Operations Division Standard

ITS FIBER OPTIC CABLE MISCELLANEOUS DETAILS

ITS(43)-16

FILE: its(43)-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT FEBRUARY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	08	182	US 90A
	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		66

DATE: 10/20/2023 10:48:00 AM
FILE: ITS(43)-16.dgn

GENERAL PAVER NOTES:

1. Reference Item 528, Colored Textured Concrete and Landscape Pavers, of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements not shown. NOTE: Item 528 references several ASTM standard specifications required as part of this Item.
2. Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS power supply, lighting, signal wires and detectors, gas, electrical, telephone, fiber optics, etc.
3. Locate and stake existing ground boxes, inlets, culverts, manholes, etc. within the project area with a 4' wooden stake, painted orange. Maintain the stakes in place for duration of construction period of the contract. Remove stakes when directed by Engineer.
4. Repair and/or replacement of any damaged underground conduits or utilities, structures, pavement, riprap, equipment, materials, slopes, vegetation, surfaces, etc. at no expense to the Department.

MATERIALS:

1. Use "Class B" concrete for concrete edge for pavers shown in detail. Concrete edge is paid for separately under Item 432-6003 RIPRAP(CONC)(6 IN) CY.
2. Use portland cement treated base which meets the requirements of Item 276, Strength L. Portland cement treated base is subsidiary to Item 528.
3. Use bedding sand described in Item 528.2.2.2. Bedding sand is subsidiary to Item 528.
4. Use paver unit type and color type as shown. Submit sample units for approval by Engineer prior to construction with manufacturer's information certifying that paver units:
   a. Meet the requirements of Item 528.2.2.1. Pavers. including:
      1) Portland cements conform to ASTM C 150
      2) Fly ash conforms to ASTM C 618
      3) Aggregates conform to ASTM C 33 - 07
      4) Color pigments conform to ASTM C 979
   b. Are manufactured so all grey cement products are produced with a concrete mix design that contains a pigment loading that represents, by weight, 3% of the total cementitious weight of the batch. White cement products will contain sufficient pigment to achieve the specified color. Pigment dispensing will be accomplished by automated equipment designed to meter pigment granules accurately to the concrete mixer within +/- 1/2 ounce per 10 pounds of pigment.
   c. Are manufactured using accelerating plasticizer and an efflorescence reducer. Follow manufacturer's application rates, but in no case dose admixture less than 8 ounces per 100 pounds of cementitious material.
   d. Are manufactured by a standard process on equipment capable of creating a four color blend with a full range of colors to occur on each pallet.
5. Use joint sand described in Item 528.2.2.3. Joint sand is subsidiary to ITEM 528.

SUBMITTALS

1. The following submittals are required to ensure conformance with specifications:

	SUBMITTALS RECEIVED FROM CONTRACTOR? YES	NO
a. Certification from the manufacturer stating that the pavers have been tested and meet all the requirements of ASTM C 936.		
b. Mix design, including information indicating percentage of fly ash to be used as cementitious material = less than or equal to 20%.		
c. Current mill certificate from cement supplier for grey cement. Meets all requirements of ASTM C 150.		
d. Current mill certificate from cement supplier for white cement. Meets requirements of ASTM C 150.		
e. Material certification information for fly ash. Meets requirements of ASTM C 618.		
f. Current quality test reports and gradation results of stockpiles from aggregate supplier for sand and gravel products.		
g. Pigment suppliers information.		
h. Complete technical data for admixtures including information relating to percentage of total cementitious material in mix design.		
i. Technical data and specifications for equipment used in dispensing pigment to mixing equipment.		

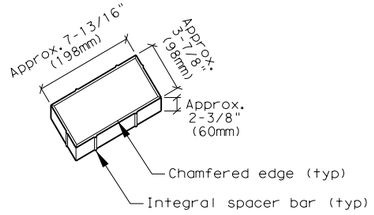
FOR ENGINEER'S USE TO ENSURE ALL SUBMITTALS ARE RECEIVED

CONSTRUCTION METHODS:

1. Provide a minimum 10'X10' (100SF) mock-up adjacent to existing display located at TxDOT District Headquarters, 7600 Washington Ave. Remove mock-up as directed by Engineer.
2. Locate and stake all items and/or limits of landscape pavers and related work in the field. Receive approval from Engineer prior to continuing.
3. Item 528.3.2.2, receive approval from Engineer before covering base material.
4. Maintain a straight joint line orientation both directions in pattern with no deviation more than 1/8 inch in a ten foot horizontal dimension.
5. Maintain vertical elevation of paver units with no surface elevation deviation greater than 3/8 inch under a ten foot straight edge.
6. Item 528.3.2.5, complete a minimum of two sweepings of joint sand, complete additional sweepings to fill the joints to the approval of the Engineer. Leave surplus sand on the surface during construction period. Sweep and clean all excess joint sand, soil, foreign material, and/or stains from pavers as directed by Engineer.
7. Immediately remove and replace paver units damaged during installation.

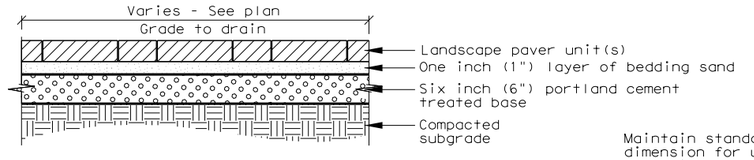
PAVER UNIT

"Holland Stone"
as manufactured by
IPC Building Products, Sugar Land, Tx,
or
approved equal

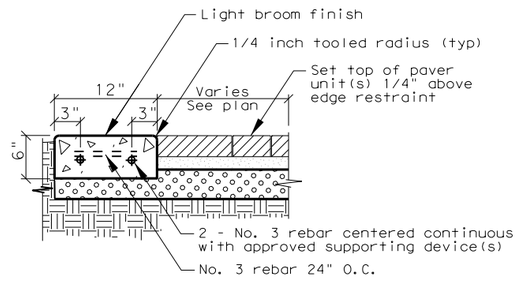


PAVER COLOR

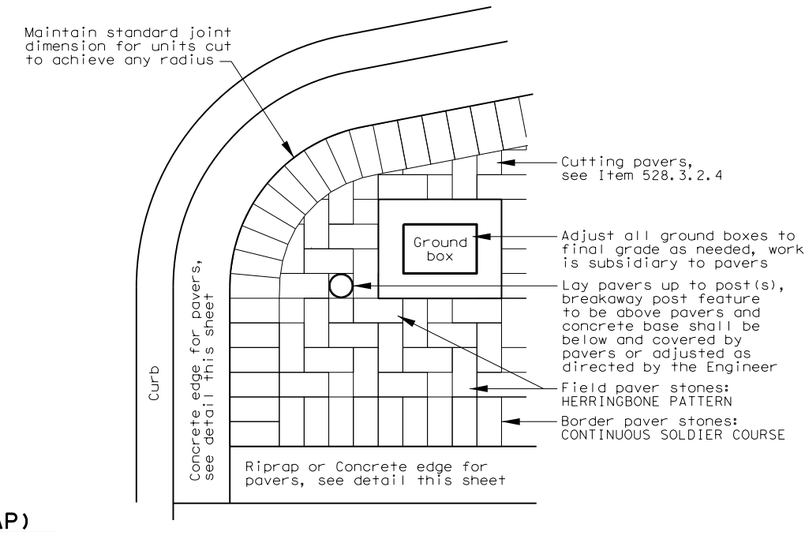
IPC Building Products "TxDOT HOUSTON DISTRICT GRP II BLEND"
or
approved equal
Color mix includes Houston District approved:
Green, charcoal, bronze and tan.
(Border stones and field stones are to be same color blend)



PAVERS ON PORTLAND CEMENT TREATED BASE

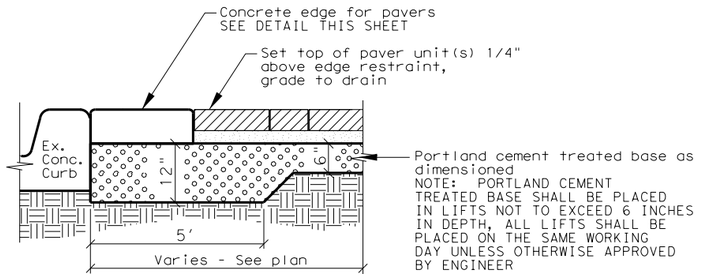


CONCRETE EDGE FOR PAVERS (CL B RIPRAP)



PAVER PATTERN LAYOUT

Install In Herringbone Pattern With
Soldier Course Along Perimeter As Shown



PORTLAND CEMENT TREATED BASE UNDER PAVERS AT EXISTING CONCRETE CURB

REQUIRED ITEMS:

- Item 432-6003 RIPRAP(CONC)(6 IN) CY
- Item 528-6004 LANDSCAPE PAVERS SY

APPROVED EQUAL NOTE:

Reference to manufacturer's trade name or product is for the purpose of identificatin only, Contractor is permitted to furnish like materials of other manufacturers provided they are of equal quality and comply with specifications for this project. All materials for consideration as an "approved equal" must be submitted to the Engineer at the preconstruction meeting. Consideration for late submittals will only be for any materials, shown in plans, which become unavailable as required.

Texas Department of Transportation

HOUSTON DISTRICT

LANDSCAPE PAVERS

SHEET 1 OF 1

Details not to scale

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				67
REVISED: OCT 2014 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	12	FORT BEND	0027	08	182	US 90A

STD K-2

DATE: 10/20/2023 10:48:15 AM
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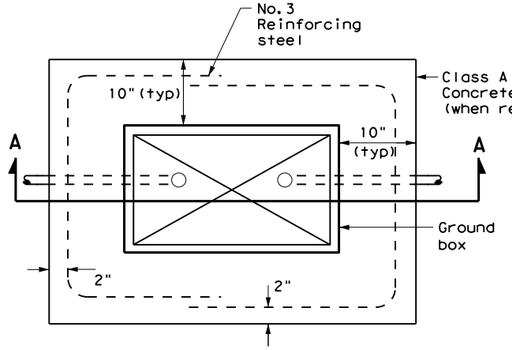
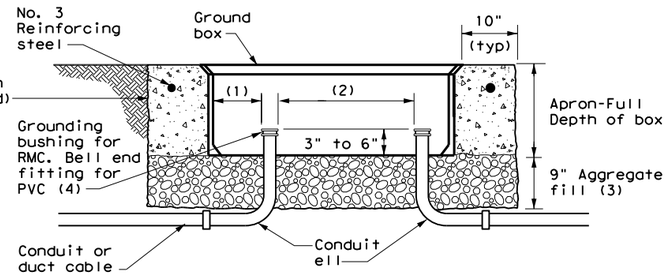


PLAN VIEW



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.

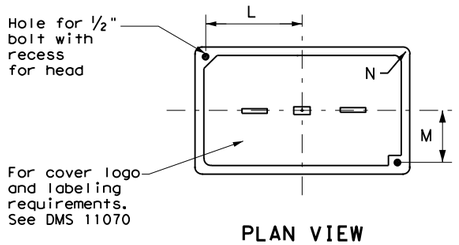
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

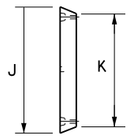
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

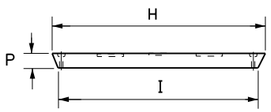
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



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

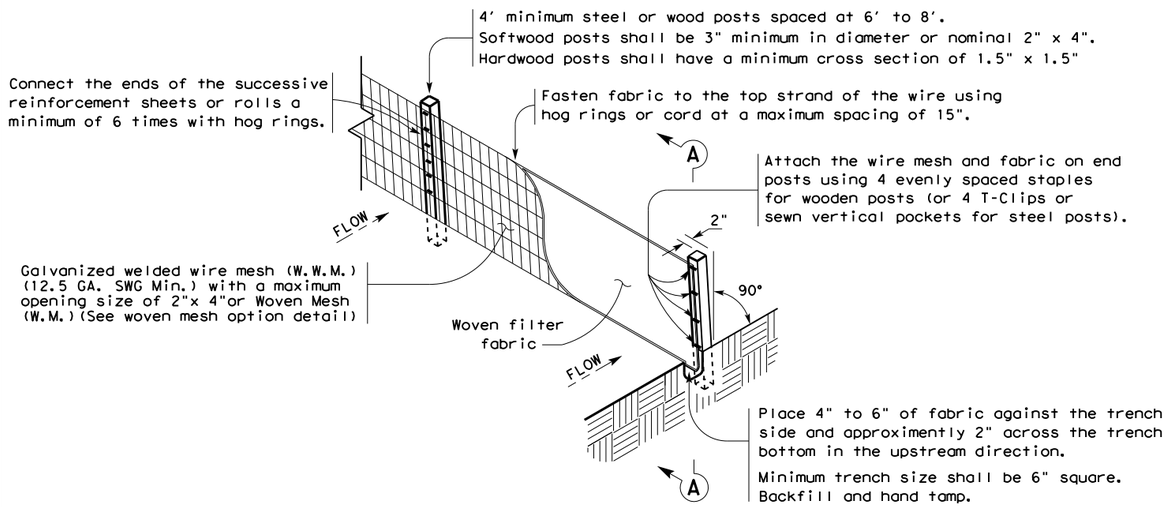
Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

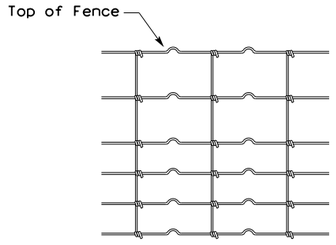
FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	08	182	US 90A
	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		68

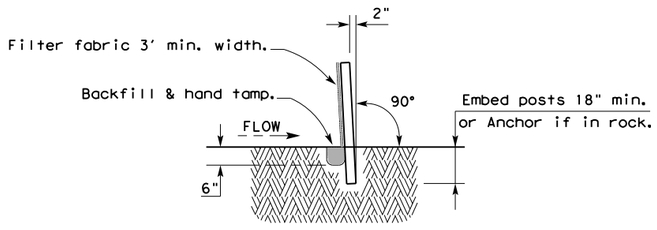
71D



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.

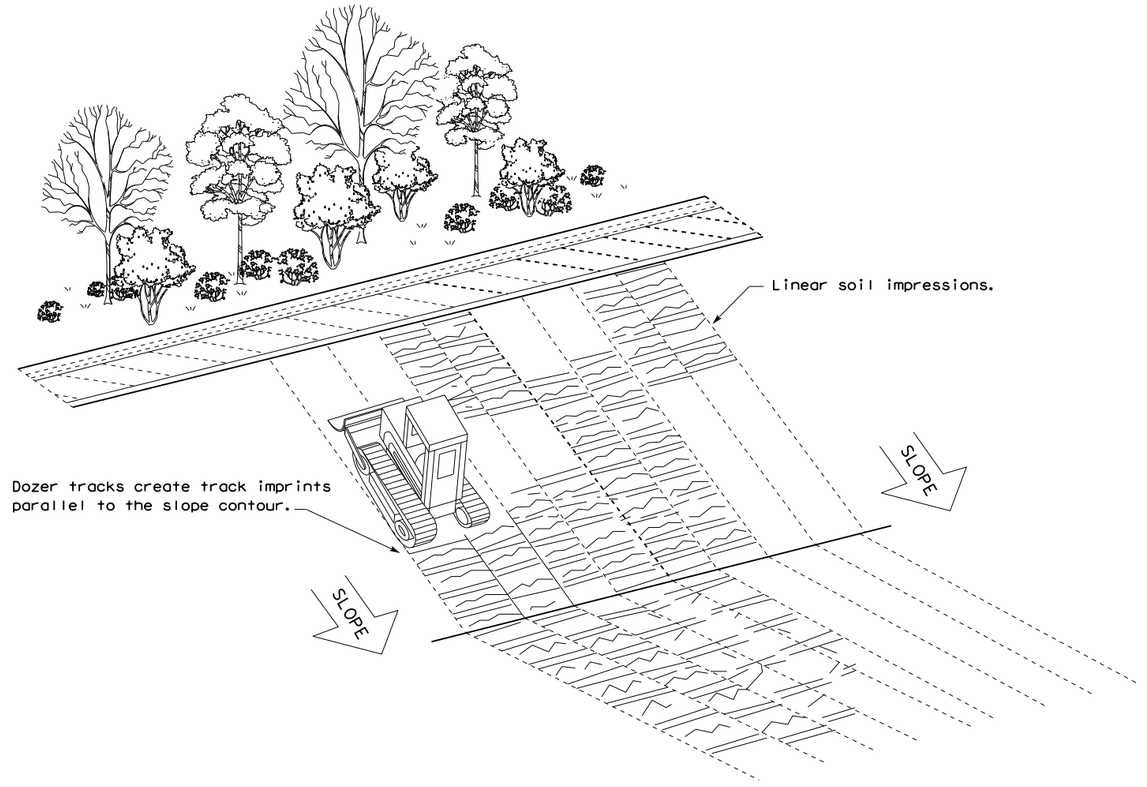
LEGEND

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	0027	08	182	US 90A
	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		69

DATE: 10/20/2023 10:48:21 AM
FILE: EC(1)-16.dgn

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

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

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

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):

0027-08-182

1.2 PROJECT LIMITS:

From: US90A from US-59/IH-69

To: Present St

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 29.627165° (N) ,(Long) 95.594211° (W)

END: (Lat) 29.615180° (N) ,(Long) 95.546866° (W)

1.4 TOTAL PROJECT AREA (Acres): < 1 Acre

1.5 TOTAL AREA TO BE DISTURBED (Acres): < 1 Acre

1.6 NATURE OF CONSTRUCTION ACTIVITY:

Construction of corridor traffic management consisting of advanced traffic management system

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Lake Charles Clay, 0 to 1% slopes	Very deep, moderately well drained, very slowly permeable
Beaumont Clay	Very deep, poorly drained, very slowly permeable
Bernard Clay Loam, 0 to 1% slopes	Very deep, somewhat poorly drained
Bernard-Edna Complex, 0 to 1% slopes	Very deep, somewhat poorly drained

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

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

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

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:

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

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

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

1.11 RECEIVING WATERS:

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

Tributaries	Classified Waterbody
Stafford Run	Oyster Creek (1245)

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- X Development of plans and specifications
- X Perform SWP3 inspections
- X Maintain SWP3 records and update to reflect daily operations
- ☐ Other: _____
- ☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- X Day To Day Operational Control
- X Maintain schedule of major construction activities
- X Install, maintain and modify BMPs
- ☐ Other: _____
- ☐ Other: _____

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

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	C 27-8-182		70
STATE	STATE DIST.	COUNTY	
TEXAS	HOU	FORT BEND	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	08	182	US 90A

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

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

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

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

2.5 POLLUTION PREVENTION MEASURES:

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

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 DEWATERING:

2.9 INSPECTIONS:

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

2.10 MAINTENANCE:

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

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

STATE OF TEXAS
JACOB A. SESSIONS
127122
LICENSED PROFESSIONAL ENGINEER
10/20/2023

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	C 27-8-182		71
STATE	STATE DIST.	COUNTY	
TEXAS	HOU	FORT BEND	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	08	182	US 90A

DATE: 10/20/2023 10:48:40 AM
FILE: EPIC.dgn

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.

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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.

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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.

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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: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0027	08	182	US 90A
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.	HOU	FORT BEND		72