STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO.			
F 2B24(310)			
CONT	SECT	JOB	HIGHWAY
0910	16	187	VARIOUS
DIST	COUNTY		SHEET NO.
TYL	SMITH		1

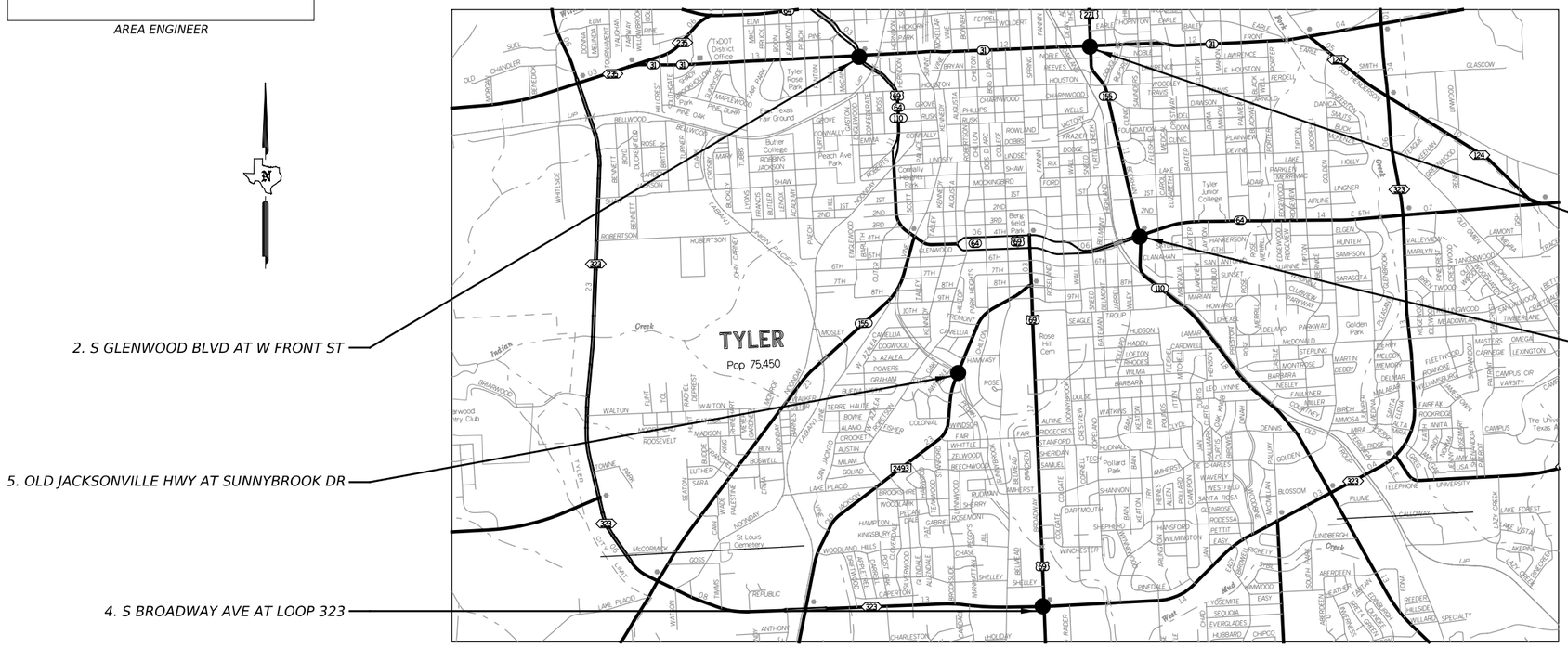
FEDERAL AID PROJECT NO. F 2B24(310)
CSJ: 0910-16-187

PROJECT LIMITS: VARIOUS LOCATIONS INSIDE CITY OF TYLER

FOR THE CONSTRUCTION OF PEDESTRIAN SIDEWALKS & CURB RAMPS CONSISTING OF UPGRADES FOR PEDESTRIANS PUSH BUTTONS AT VARIOUS INTERSECTIONS

PEDESTRIAN INFRASTRUCTURE UPGRADES
CSJ : 0910-16-187

1. *E FRONT ST AT S BECKHAM AVE*
   E FRONT ST
   SPEED LIMIT = 35 MPH
   AADT(2022) = 17,194
2. *S GLENWOOD BLVD AT W FRONT ST*
   S GLENWOOD BLVD
   SPEED LIMIT = 40 MPH
   AADT(2022) = 11,314
3. *E 5TH ST AT AT S BECKHAM AVE*
   E 5TH ST
   SPEED LIMIT = 35 MPH
   AADT(2022) = 14,852
4. *S BROADWAY AVE AT LOOP 323*
   S BROADWAY AVE
   SPEED LIMIT = 45 MPH
   AADT(2022) = 37,719
5. *OLD JACKSONVILLE HWY AT SUNNYBROOK DR*
   OLD JACKSONVILLE HWY
   SPEED LIMIT = 45 MPH
   AADT(2022) = 13,322



SMITH COUNTY
VICINITY MAP
NOT TO SCALE

INDEX OF SHEETS

1. TITLE SHEET
2. SUPPLEMENTAL INDEX OF SHEETS

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS COMPLETED & ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR : _____

USED_____OF_____ALOTTED DAYS: _____

FINAL AS BUILT PLANS

THE CONSTRUCTION WAS PERFORMED UNDER MY SUPERVISION IN ACCORDANCE WITH THE PLANS AND CONTRACT

DATE:

AREA ENGINEER

REGISTERED ACCESSIBILITY SPECIALIST (RAS) INSEPCTION REQUIRED

TDLR NO. TABS2024010699

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC (1) - 21 THRU BC (12) - 21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."

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

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

NAHIDUL Q. SIDDIQUE
98635
LICENSED
PROFESSIONAL ENGINEER
5/30/2024

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

RECOMMENDED FOR LETTING: 5/30/2024
DocuSigned by: Juanita Daniels-West, P.E.
0D87CB098758434...
DIRECTOR OF TRANSPORTATION OPERATIONS

SUBMITTED FOR LETTING: 5/30/2024
DocuSigned by: Rolando Mendez
8F5FF128DB7C484...
DISTRICT DESIGN ENGINEER

APPROVED FOR LETTING: 5/31/2024
DocuSigned by: Kevin McGill
6149184A8C65461...
DISTRICT ENGINEER

DATE: 5/30/2024 11:43:57 AM
FILE: c:\pw-infratechnlx\n.zhang\dms38550\TITLE SIGNAL TYL PLAN SET 4.dgn

100% SUBMITTAL

GENERAL

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	SUPPLEMENTAL INDEX OF SHEETS
3, 3A - 3E	GENERAL NOTES
4 - 5	ESTIMATE & QUANTITY SHEET
6	SUMMARY OF QUANTITIES

TRAFFIC CONTROL PLAN

	SHEET NO.	STANDARDS
* +	7 - 18	BC (1) - 21 THRU BC (12) - 21
* +	19 - 20	WZ (BTS - 1) - 13 AND WZ (BTS - 2) - 13
* +	21	TCP (1 - 4) - 18

TRAFFIC ITEMS

SHEET NO.	DESCRIPTION
22	PEDESTRIAN INFRASTURCTURE GENERAL NOTES
23	PROPOSED SIGN AND SIDEWALK IMPROVEMENTS (FRONT ST AT BECKHAM AVE)
24	PROPOSED CONDITION (FRONT ST AT BECKHAM AVE)
25 - 26	DETAIL / SUMMARY SHEET (FRONT ST AT BECKHAM AVE)
27	REMOVAL SHEET (FRONT ST AT GLENWOOD BLVD)
28	PROPOSED SIGN AND SIDEWALK IMPROVEMENTS (FRONT ST AT GLENWOOD BLVD)
29	PROPOSED CONDITION (FRONT ST AT GLENWOOD BLVD)
30 - 31	DETAIL / SUMMARY SHEET (FRONT ST AT GLENWOOD BLVD)
32	REMOVAL SHEET (5TH ST AT BECKHAM AVE)
33	PROPOSED SIGN AND SIDEWALK IMPROVEMENTS (5TH ST AT BECKHAM AVE)
34	PROPOSED CONDITION (5TH ST AT BECKHAM AVE)
35 - 36	DETAIL / SUMMARY SHEET (5TH ST AT BECKHAM AVE)
37 - 38	PROPOSED PAVEMENT MARKINGS AND PEDESTRIAN RAMPS (S BROADWAY AVE AT LOOP 323)
39	PROPOSED CONDITIONS (S BROADWAY AVE AT LOOP 323)
40	DETAIL / SUMMARY SHEET (S BROADWAY AVE AT LOOP 323)
41	REMOVAL LAYOUT (OLD JACKSONVILLE HWY AT SUNNYBROOK DR)
42 - 43	PROPOSED PAVEMENT MARKINGS AND PEDESTRIAN RAMPS (OLD JACKSONVILLE HWY AT SUNNYBROOK DR)
44	PROPOSED CONDITIONS (OLD JACKSONVILLE HWY AT SUNNYBROOK DR)
45	DETAIL / SUMMARY SHEET (OLD JACKSONVILLE HWY AT SUNNYBROOK DR)

ENVIRONMENTAL ISSUES

	SHEET NO.	DESCRIPTION
* +	67 - 68	SWP3
* +	69	EPIC

	SHEET NO.	STANDARDS
* +	70	EC(1) - 16
* +	71 - 73	EC(9) - 16

	SHEET NO.	STANDARDS
* +	46	CONCRETE DIRECTIONAL ISLAND DETAILS
* +	47	LANDSCAPE PAVERS
* +	48	CCCG-22
* +	49	PEDESTRIAN SIGNAL AND DETECTOR INSTALLATION DETAILS
* +	50 - 53	PED-18
* +	54	ED (1) - 14
* +	55	ED (3) - 14
* +	56	ED (4) - 14
* +	57	ED (8) - 14
* +	58 - 60	PM (1) - 22 THRU PM (3) - 22
* +	61	PM (4) - 22A (MOD)
* +	62	SMD (GEN) - 08
* +	63 - 65	SMD (SLIP - 1) - 08 THRU SMD (SLIP - 3) - 08
* +	66	TS - FD - 12

\+ THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY SUPERVISION AND ARE APPLICABLE TO THIS PROJECT.

ZAHIDUL Q. SIDDIQUE P.E. — 9/18/2024 DATE

STATE OF TEXAS · ZAHIDUL Q. SIDDIQUE · 98635 · LICENSED PROFESSIONAL ENGINEER

* THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY SUPERVISION AND ARE APPLICABLE TO THIS PROJECT.

NAZLIE SAEEDI P.E. — 9/18/2024 DATE

STATE OF TEXAS · NAZLIE SAEEDI · 131673 · LICENSED PROFESSIONAL ENGINEER

NO.	DATE	REVISION	APPROVED

infraTECH Engineers & Innovators, LLC
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

CARBON REDUCTION PROJECTS

SUPPLEMENTAL INDEX OF SHEETS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	TYL	SMITH	2
CHECK IEI	CONTROL	SECTION	JOB	
	0910	16	187	

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GENERAL NOTES:

GENERAL.

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

Juanita Daniels-West, P.E. Juanita.DanielsWest@txdot.gov

Steven Swindell, P.E. Steven.Swindell@txdot.gov

For Q&A on Proposals navigate to:

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

Use the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project and click on the link in the window that pops up to view the Q&A.

All relevant project documentation including Contract Time Determinations and cross-sections will still be posted to the districts FTP website.

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/Tyler%20District/Construction%20Projects

ITEM 5. CONTROL OF THE WORK

If utility lines need adjustments during construction operations, modify operations and continue the work in a manner that will allow others to make the utility adjustments. Additional working time may be allowed for delays caused by these utility adjustments.

Utility locations shown on the plans are approximate. Contact utilities in accordance with Article 5.6., “Cooperating With Utilities.”

ITEM 6. CONTROL OF MATERIALS

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

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

Project Number: **Sheet 3**

County: Smith **Control:** 0910-16-187

Highway: Various

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

https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html

ITEM 7. LEGAL RELATIONS AND RESPONSIBILITIES

Concrete truck drivers and concrete pump operators are required to wash out only in designated areas specifically constructed for eliminating run-off. Dispose of materials in accordance with federal, state, and local requirements.

Maintain positive drainage for permanent and temporary work for the duration of the project. The Contractor will be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work will be subsidiary to various bid items.
The total disturbed area for this project is 0 acres. The disturbed area in this project and the Contractor Project Specific Locations (PSL’s) within 1 mile of the project limits for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any Contractor PSL for construction support activities on or off the ROW. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceed 5 acres, before disturbance, provide a copy of the Contractor NOI for PSLs on the ROW and within 1 mile of the project limits to the Engineer and to any local government that operates a Municipal Separate Storm Sewer System (MSSS).

In accordance with Article 7.9, provide and maintain adequate, neat and sanitary toilet accommodations within the project limits for employees, including State employees.

No significant traffic generator events identified.

ITEM 8. PROSECUTION AND PROGRESS

Special Provision 008-056 (90-day convenience delay) is included in this Contract. This is to allow for the manufacturer’s delay in providing the traffic signal poles.

ITEM 9. MEASUREMENT & PAYMENT

In accordance with Article 9.1., “Measurement of Quantities,” furnish the tare and maximum gross weights as well as the volume capacity of all vehicles, trucks, truck-tractors, trailers, semi-trailers, or combination of such vehicles used to deliver materials for this Contract. Also, furnish

calculations supporting these weights and capacities. Provide all measurements required for pay a minimum of 2 days before the trucks are used.

ITEM 104. REMOVING CONCRETE

Blasting will not be permitted on this project.

The stockpile site for salvageable material is located at 15986 SH 155, Tyler, Texas 75703.

Before removing existing curb & gutter or laydown curb, saw cut between the gutter pan and the roadbed to eliminate the possibility of damage to the pavement structure. When the existing pavement edge has to be removed to facilitate the curb & gutter transition from existing to the proposed ramp landing, remove the old and replace the new pavement structure the same day unless otherwise directed. The use of temporary material may be allowed as approved. This work will be subsidiary to Item 104.

ITEM 105. REMOVING TREATED & UNTREATED BASE & ASPHALT PAVEMENT

The stockpile site for salvageable material is located at 15986 SH 155, Tyler, Texas 75703.

ITEM 162. SODDING FOR EROSION CONTROL

Identify existing sod type used in the project site and match existing while placing new block sod.

Blade and rake smooth the area before laying block sod. Refer to the plans and details for areas to receive the sod. Remove 1 in. of soil along paved edges and curb lines before laying sod and dress the slope to match all exposed edges after placing the sod. Fertilize the ground with a slow-release homogeneous coated fertilizer at a rate of 1 lb. per 9 sq. yd. before installation of the sod.

ITEM 168. VEGETATIVE WATERING

Apply water to all newly placed sod or seeded areas the same day of installation. Maintain the sod or seeded areas in a sufficiently watered condition. Do not allow sod or seeded areas to dry out so that water stress is evident.

ITEM 421. HYDRAULIC CEMENT CONCRETE

The Engineer will provide strength-testing equipment.

Provide the Engineer with a mixture design report using Department-provided software in accordance with Section 421.4.1., “Classification of Concrete Mix Designs,” of the standard

Project Number: **Sheet 3A**

County: Smith **Control:** 0910-16-187

Highway: Various

specifications. Include in the report the producer’s plant, all materials sources, and a unique identification number for the design.

Air is not required on concrete cast-in-place elements on this project. If the Contractor proposes the use of an existing concrete design containing air, the Engineer must approve the design in writing before placement. If used, air testing will be performed in accordance with the specifications.

ITEM 502. BARRICADES, SIGNS, AND TRAFFIC HANDLING

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

Use ground-mounted sign mounts with two posts for all temporary work zone signs unless otherwise directed.

Inspect and correct deficiencies each day throughout the duration of the Contract. In accordance with Article 502.4., “Payment,” no payment will be made for the month if the Contractor fails to provide or properly maintain signs and devices in compliance with Contract requirements. Temporary warning signs that are visible when conditions do not apply will be considered improper maintenance of signs.

Provide at least one employee on call nights and weekends (or any other time that work is not in progress) for maintenance of signs and traffic control devices. This employee must have an address and telephone number near the project, as approved. Notify the Engineer in writing of the name, address, and telephone number of this employee. The Engineer will furnish this information to local law enforcement officials.

In addition to providing a Contractor’s Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 30 minutes.

Sign all roads intersecting the project in accordance with current BC standards.

Refer to the traffic control plan sheets for traffic handling through the work area. Contractor may vary the signing arrangement and spacing as necessary to fit field conditions; however, any proposed changes in the traffic control plan must be approved before implementation.

When the sequence of work is shown on the plans, the Contractor may submit an alternate proposal for approval. Submit in writing all proposed variations and revisions.

High-visibility safety apparel is required for workers in accordance with the General Notes on current BC standards.

Place and maintain signs, channelizing devices, and flaggers to direct and route traffic at any location and for any period of time as may be required or directed.

When operations require a lane closure, provide cones, vertical panels, drums, signs, flaggers, and flashing arrow panels as necessary to route traffic around the closed lane as shown on the plans and as directed. Lane closures will be limited to one specific lane as directed.

Lane closures will not be allowed before 8:30 A.M. unless otherwise directed.

Unless otherwise approved, construction operations will not be allowed on Good Friday, Easter weekend, the Friday before Memorial Day thru Memorial Day, July 4th, the Friday before Labor Day thru Labor Day, the Wednesday before Thanksgiving Day thru Sunday, Christmas Eve, Christmas Day, New Year's Eve, New Year's Day, or on any other high traffic days or holidays as determined by the Engineer.

Erect R4-1 (Do Not Pass) and R4-2 (Pass With Care) signs to mark existing no-passing zones as directed. (These signs will not be required if these zones will not be eliminated during construction.)

Maintain existing roadside signs within this project's limits during this Contract. In order to accommodate the grading or other operations, temporarily relocate these signs in accordance with the TMUTCD as directed. Use ground-mounted sign mounts with two posts for all relocated signs unless otherwise directed. This work will not be paid for directly, but will be subsidiary to Item 502.

Provide truck-mounted attenuators (TMA) as shown on the appropriate traffic control plan sheets. Provide a letter certifying that all TMA used on this project meet NCHRP 350 or AASHTO Manual for Assessing Safety Hardware (MASH) requirements.

Regulate all construction activities and equipment to minimize inconvenience to the traveling public. At points where it is necessary for trucks to stop, load, or unload, provide warning signs and flaggers to protect the traveling public.

The pavement must be entirely open to traffic each night. Remove or clearly barricade all material stockpiles, equipment left overnight, or any obstruction within 30 ft. of a travelway as approved.

Project Number: **Sheet 3B**

County: Smith **Control:** 0910-16-187

Highway: Various

The Contractor Force Account "Safety Contingency" is intended to be used for work zone enhancements that could not be foreseen in the project planning and design stage for the purpose of improving the effectiveness of the Traffic Control Plan. 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.

Provide flaggers at county roads, commercial driveways, and other intersecting roadways deemed necessary by the Engineer to maintain control of the work zone during one-lane two-way operations. Provide communication radios to each flagger in the work zone and the pilot vehicle operator.

When operations require a sidewalk closure, use traffic control devices that control pedestrian flow as necessary to route pedestrians around the closed sidewalk as shown on sidewalk closures and bypass walkway sheet as directed.

The use of Law Enforcement Officers (LEOs) will be required for this project. Before the preconstruction meeting, coordinate with local agencies to be prepared for staffing needs.

Provide uniformed LEOs with marked vehicles during work zone activities. The officer in marked vehicle will be located as approved to monitor or direct traffic during the closure. The Engineer will approve the method used to direct traffic at signalized intersections. Additional officers and vehicles may be provided when directed.

Complete the daily tracking form provided by the Department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided. Minimums, scheduling fees, etc. will not be paid; TxDOT will consider paying cancellation fees on a case-by-case basis.

All law enforcement personnel used in work zone traffic control must be trained for performing duties in work zones and are required to take "Safe and Effective Use of Law Enforcement Personnel in Work Zones" (Course #133119) which can be found online at the following site: www.nhi.fhwa.dot.gov.

Certificates of completion should be available to all who finish the course. These should be kept by the officers to verify completion when reporting to the work site.

Provide the Engineer 72-hour notice of lane or ramp closures to provide advance notice to the traveling public by way of media and for any dynamic message sign programing. Place Portable Changeable Message Signs (PCMS) at locations as directed a minimum of 3 days in advance of entrance ramp closures on the affected crossroad. These signs are to remain in place during the ramp closures.

Cancel law enforcement personnel when the work is canceled due to weather. Cancellation, minimums or “show up” fees will not be paid when cancellation is made 12 hours prior to beginning of the work. Failure to cancel within 12 hours will not be cause for payment for cancellation, minimums, or "show up" time. Payment of actual “show up” time to the work site due to cancellation will be on a case-by-case basis at a maximum of 2 hours per officer.

All work required by these general notes, except as provided for by Item 502, will not be paid for directly, but will be subsidiary to Item 502 unless otherwise shown on the plans.

ITEM 506. TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

Remove dirt, silt, rocks, debris, and other foreign matter that accumulates in all structures due to project erosion and Contractor’s operations. Keep stream channels open at all times. This work will not be paid for directly, but will be subsidiary to this Item.

The Engineer will provide copies of documents to meet TxDOT’s posting requirements. Laminate, post, and maintain these documents at the project limits and at major roadways intersecting the project as directed. Post required Contractor documents in the same manner and location. This work will be subsidiary to Item 506.

ITEM 529. CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER

Provide steel reinforcement for all curb and curb and gutter unless otherwise directed.

ITEM 531. SIDEWALKS

Provide steel reinforcement for all sidewalks unless otherwise directed.

ITEM 618. CONDUIT

Conduit placed on the underside of the bridge slab overhang must be anchored with conduit straps at 5 ft. maximum intervals as shown on standard sheets ED(1) and (2)-14. Conduit hangers will not be allowed in this location.

Where conduit is to be placed under existing riprap, cut the existing riprap to neat lines as directed and replace to match original condition after conduit placement.

The Contractor may, at his option, substitute high-density polyethylene (HDPE) conduit meeting the specifications of Item 622 for all bores requiring PVC schedule 40 conduit and, when approved by the Engineer, may substitute HDPE for schedule 80 bored conduit. HDPE must be the same size as the PVC conduit shown on the plans. HDPE must be terminated with UL listed fittings. HDPE may be threaded and used with threaded PVC connectors or couplings. HDPE

Project Number: **Sheet 3C**

County: Smith **Control:** 0910-16-187

Highway: Various

should be extended through the bore in one continuous piece and should be coupled to RMC elbows or to PVC conduit at the bore pits prior to entering ground boxes (if ground boxes are required by the plans). HDPE should not contain conductors during installation in this manner. No additional compensation will be paid to the Contractor when HDPE is substituted for this purpose.

Use materials from prequalified material producers list as shown on the Material Producer List found on the TxDOT web site. Category is “Roadway Illumination and Electrical Supplies.”

ITEMS 618, 624, 680 & 684. CONDT, GRND BX, INSTL HWY TRF SIG & TRF SIG CBL

The location of the controller, conductors, conduits, junction boxes and ground boxes are diagrammatic only and may be shifted by the Engineer to accommodate field conditions.

ITEM 620. ELECTRICAL CONDUCTORS

Fuse holder is shown on list under Items 610 & 620.

Provide 10 amp time delay fuses.

ITEM 624. GROUND BOXES

All ground boxes will be precast polymer concrete of the size and type specified on the plans.

Remove and reinstall sidewalk, as needed, for installing ground boxes. No additional payments will be made for removal and reinstallation of sidewalk. Any such payments will be incidental to Item 624.

ITEM 636. SIGNS

Install signs in accordance with the Department of Transportation’s “Sign Crew Field Book,” latest edition, or as directed.

All signs removed from the project are deemed salvageable and become the property of the Department. The stockpile sites for salvageable material are located at:
414 N Bois D Arc Ave, Tyler, TX 75702.

ITEM 644. SMALL ROADSIDE SIGN ASSEMBLIES

Sign types for which details are not shown on the plans must conform to “Standard Highway Sign Designs for Texas,” latest edition.

Before construction begins, locate all Texas Reference Marker (TRM) signs and Adopt-a-Highway signs using survey control methods for accuracy. Provide the survey data to the Engineer. If either type of sign is relocated during construction activities, survey the sign location and notify the Engineer before placement of the permanent sign.

Stake all sign locations for approval prior to placement.

ITEM 656. FOUNDATIONS FOR TRAFFIC CONTROL DEVICES

The Contractor may reduce the size of the traffic signal controller slab as shown on standard sheet TS-CF in order to accommodate site conditions as approved by the Engineer.

ITEM 666. RETROREFLECTORIZED PAVEMENT MARKINGS

Use the spray method for application of the thermoplastic compound for lane lines, barrier lines, edge lines and channelizing lines.

Do not begin work before 9 A.M. and do not continue work after 4 P.M. unless otherwise approved. In other areas, the Engineer will approve and direct the time of work.

Extrude hot to the pavement surface thermoplastic compound for arrows, stop lines, yield triangles, transverse lines, crosswalk lines, words and symbols.

For lengths greater than 300-ft, provide guide markings that will not leave a permanent mark on the roadway. Have the guide marking material and equipment used for placement approved prior to use. Provide adequate notification for approval of the guide markings prior to placement of the permanent pavement markings.

Provide a crew experienced in the work of installing pilot guideline markings and in the necessary traffic control. Supply all the equipment, personnel, traffic control, and materials necessary for the placement of pilot guideline markings as directed. All work will be in conformance with Part 6 of the TMUTCD.

Correct deficiencies in the alignment of pavement markings at Contractor's expense, as directed. Use a strip seal with aggregate and asphalt types and rates as directed to eliminate the deficient pavement markings.

ITEM 672. RAISED PAVEMENT MARKERS

Provide dispensing equipment such that the bituminous material can be directly applied from the melting pot to the pavement surface without secondary handling. Dispensing material from the melting pot into a separate container and then to the pavement surface will not be permitted. Intermittent agitation of the bituminous material will be by a method approved by the Engineer

Project Number: **Sheet 3D**

County: Smith **Control:** 0910-16-187

Highway: Various

to ensure even heat distribution and must be such that the adhesive is agitated at approved and consistent intervals.

ITEM 677. ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS

Unless otherwise directed, utilize Surface Treatment Method for removal on asphaltic surfaces. The Engineer will approve materials and rates prior to use.

Furnish a high-pressure water blasting system for removing paint, thermoplastic, epoxy and preformed tape material from the following surfaces without causing any grooves or trenching of the surface: asphalt, concrete, permeable friction course, grooved asphalt and grooved concrete.

Use a high-pressure water blasting system that consists of a vacuum recovery system that must provide for a nearly dry surface eliminating the possibility of uncontained run-off blasting water or debris, or the need for any secondary clean-up vehicles or operations.

All components required for the complete operation of the water blasting system (ultra-high-pressure pump, vacuum system, clean water supply, vacuum recovery storage, primary truck-mounted and optional secondary tractor-mounted blasting components) must be mounted and transported on a single, fully self-contained and supporting single truck chassis, thereby eliminating the need for any additional water, vacuum or other transport vehicles.

ITEM 680. INSTALLATION OF HIGHWAY TRAFFIC SIGNALS

A manufacturer's representative must be present when the signal lights are placed in operation.

Provide a uniformed law enforcement officer to maintain traffic control when the signal lights are placed in operation and at any time the normal signal operation is interrupted due to failure of Contractor supplied materials or workmanship.

The Contractor's maintenance responsibility begins on the day work is authorized, and continues until final acceptance. Designate in writing an IMSA certified signal technician who is available to perform repair work within a 2-hour response time at all times. This work will not be paid for directly, but will be subsidiary to Item 680.

ITEM 682. VEHICLE AND PEDESTRIAN SIGNAL HEADS

Fabricate the traffic signal heads using polycarbonate. Cover the traffic signal heads with factory-made signal head covers until placed in operation. All signal heads shall be black in color.

ITEM 684. TRAFFIC SIGNAL CABLES

n extra length of 5 ft. for each cable run must remain in each steel signal pole. For each conductor that terminates in the controller cabinet, an extra 5-ft. length must be provided. Wire nuts will not be permitted.

ITEM 686. TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)

All traffic signal poles & arm assemblies and pedestrian poles must be round and powder-coated black.

ITEM 688. PEDESTRIAN DETECTORS & VEHICLE LOOP DETECTORS

For APS units, use Pelco Intellicross APS system or approved equivalent.

ITEM 6001. PORTABLE CHANGEABLE MESSAGE SIGN

Provide a non-erodible, stable surface to place the Portable Changeable Message Sign (PCMS) units adjacent to the roadway as directed. Payment for this surface is incidental to Item 6001.

ITEM 6185. TRUCK MOUNTED ATTENUATOR (TMA)

Shadow vehicles with truck mounted attenuator (TMA) are required on the traffic control plan and TCP standards for this project. The Contractor will be responsible for determining if one or more of these traffic control operations will be ongoing at the same time to determine the total number of TMAs needed for the project. Additional truck mounted attenuators (TMAs) may be required as deemed necessary by the Engineer.

The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0910-16-187 **DISTRICT** Tyler **COUNTY** Smith
HIGHWAY Various

			CONTROL SECTION JOB		**0910-16-187**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00198667**		
			COUNTY		**Smith**		
			HIGHWAY		**Various**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6011	REMOVING CONC (MEDIANS)	SY	3.000		3.000	
	104-6021	REMOVING CONC (CURB)	LF	48.000		48.000	
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF	230.000		230.000	
	104-6036	REMOVING CONC (SIDEWALK OR RAMP)	SY	231.000		231.000	
	104-6040	REMOVING CONC (PAVERS)	SY	30.000		30.000	
	105-6081	REMOV STAB BASE & ASPH PAV (4"-14")	SY	312.000		312.000	
	162-6002	BLOCK SODDING	SY	209.000		209.000	
	168-6001	VEGETATIVE WATERING	MG	0.440		0.440	
	432-6003	RIPRAP (CONC)(6 IN)	CY	5.000		5.000	
	479-6001	ADJUSTING MANHOLES	EA	1.000		1.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	4.000		4.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	120.000		120.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	120.000		120.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	263.000		263.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	263.000		263.000	
	528-6001	COLORED TEXTURED CONC (4")	SY	69.000		69.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF	586.000		586.000	
	531-6001	CONC SIDEWALKS (4")	SY	334.000		334.000	
	531-6004	CURB RAMPS (TY 1)	EA	1.000		1.000	
	531-6008	CURB RAMPS (TY 5)	EA	2.000		2.000	
	531-6010	CURB RAMPS (TY 7)	EA	9.000		9.000	
	531-6016	CURB RAMPS (TY 21)	EA	4.000		4.000	
	531-6017	CURB RAMPS (TY 22)	EA	30.000		30.000	
	536-6002	CONC MEDIAN	SY	2.000		2.000	
	536-6004	CONC DIRECTIONAL ISLAND	SY	81.000		81.000	
	618-6046	CONDT (PVC) (SCH 80) (2")	LF	72.000		72.000	
	618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	704.000		704.000	
	618-6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	80.000		80.000	
	618-6059	CONDT (PVC) (SCH 80) (4") (BORE)	LF	1,818.000		1,818.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	1,861.000		1,861.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA	14.000		14.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1.000		1.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	9.000		9.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	15.000		15.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	1,351.000		1,351.000	
	666-6225	PAVEMENT SEALER 6"	LF	90.000		90.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0910-16-187 **DISTRICT** Tyler **COUNTY** Smith
HIGHWAY Various

			CONTROL SECTION JOB		**0910-16-187**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00198667**		
			COUNTY		**Smith**		
			HIGHWAY		**Various**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6226	PAVEMENT SEALER 8"	LF	15.000		15.000	
	666-6230	PAVEMENT SEALER 24"	LF	1,351.000		1,351.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	60.000		60.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	30.000		30.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	71.000		71.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	23.000		23.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	1,472.000		1,472.000	
	682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA	40.000		40.000	
	684-6007	TRF SIG CBL (TY A)(12 AWG)(2 CONDR)	LF	7,385.000		7,385.000	
	684-6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	7,530.000		7,530.000	
	687-6001	PED POLE ASSEMBLY	EA	34.000		34.000	
	688-6001	PED DETECT PUSH BUTTON (APS)	EA	40.000		40.000	
	688-6003	PED DETECTOR CONTROLLER UNIT	EA	5.000		5.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	90.000		90.000	
	6185-6002	TMA (STATIONARY)	DAY	45.000		45.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

100% SUBMITTAL

SIGNING AND PAVEMENT MARKING SUMMARY

LOCATION	ITEM 644		ITEM 666							ITEM 677		
	INSTALL SM RD SN SUP & AM TY 10BWG (1)SA(P) EA	RELOCATE SM RD SN SUP&AM TY 10BWG EA	REFL PAV MRK TY I (W)8"(SLD) (100MIL) LF	PAVEMENT SEALER 6" LF	PAVEMENT SEALER 8" LF	PAVEMENT SEALER 24" LF	RE PM W/RET REQ TY I (W)6"(SLD) (100MIL) LF	RE PM W/RET REQ TY I (Y)6"(SLD) (100MIL) LF	REFL PAV MRK TY I (W) (24") (SLD) (100MIL) LF	ELIM EXT PAV MRK & MRKS (6") LF	ELIM EXT PAV MRK & MRKS (8") LF	ELIM EXT PAV MRK & MRKS (24") LF
E FRONT ST AT S BECKHAM AVE		*2*										
W FRONT ST AT S GLENWOOD BLVD		*3*				*258*			*258*			*468*
E 5TH ST AT S BECKHAM AVE		*4*				*474*			*474*			*720*
S BROADWAY AVE AT LP 323						*112*			*112*	*30*	*15*	*112*
OLD JACKSONVILLE HWY AT SUNNYBROOK DR	*1*		*15*	*90*	*15*	*507*	*60*	*30*	*507*	*41*	*8*	*172*
CSJ 0910-16-187 SUBTOTAL	***1***	***9***	***15***	***90***	***15***	***1351***	***60***	***30***	***1351***	***71***	***23***	***1472***
PROJECT TOTAL	***1***	***9***	***15***	***90***	***15***	***1351***	***60***	***30***	***1351***	***71***	***23***	***1472***

PORTABLE CHANGEABLE MESSAGE SIGN SUMMARY

SIGN	LOCATION	ITEM 6001 PORTABLE CHANGEABLE MESSAGE SIGN DAY
#1	*AS DIRECTED*	*45*
#2	*AS DIRECTED*	*45*
CSJ 0910-16-187 SUBTOTAL		***90***
PROJECT TOTAL		***90***

SIGNAL SUMMARY

LOCATION	ITEM 618				ITEM 620	ITEM 624	ITEM 682	ITEM 684		ITEM 687	ITEM 688	
	CONDT PVC (SCH 80) 2" LF	CONDT PVC (SCH 80) 2" (BORED) LF	CONDT (PVC) (SCH 80) 3" (BORE) LF	CONDT PVC (SCH 80) 4" (BORED) LF	ELEC COND (NO. 6) (BARE) LF	GROUND BOX TY D (162922) W/ APRON EA	PED SIG SEC (LED) (COUNTDOWN) EA	TRF SIG CBL (TY A) (12 AWG) (2 COND) LF	TRF SIG CBL (TY A) (14 AWG) (5 COND) LF	PED POLE ASSEM EA	PED DET PUSH BUTTON (APS) EA	PED DET CONTROLLER UNIT EA
E FRONT ST AT S BECKHAM AVE		*95*	*15*		*110*		*8*	*1025*	*1070*	*6*	*8*	*1*
W FRONT ST AT S GLENWOOD BLVD		*200*	*20*		*220*		*8*	*1815*	*1860*	*7*	*8*	*1*
E 5TH ST AT S BECKHAM AVE	*10*	*125*	*45*	*340*	*510*	*5*	*8*	*1355*	*1410*	*5*	*8*	*1*
S BROADWAY AVE AT LP 323	*18*	*207*		*758*	*553*	*5*	*8*	*1521*	*1521*	*8*	*8*	*1*
OLD JACKSONVILLE HWY AT SUNNYBROOK DR	*44*	*77*		*720*	*468*	*4*	*8*	*1669*	*1669*	*8*	*8*	*1*
CSJ 0910-16-187 SUBTOTAL	***72***	***704***	***80***	***1818***	***1861***	***14***	***40***	***7385***	***7530***	***34***	***40***	***5***
PROJECT TOTAL	***72***	***704***	***80***	***1818***	***1861***	***14***	***40***	***7385***	***7530***	***34***	***40***	***5***

TRUCK MOUNTED ATTENUATOR SUMMARY

PROJECT STAGE	NUMBER OF TRUCKS EA	ITEM 6185 TMA (STATIONARY) DAY
LANE CLOSURE TCP	*1*	*45*
CSJ 0910-16-187 SUBTOTAL		***45***
PROJECT TOTAL		***45***

NOTE: ESTIMATED NUMBER OF TRUCKS IS FOR WORKING AT ONE LOCATION AT A TIME.
ADDITIONAL TRUCKS WILL BE REQUIRED IF WORKING AT MULTIPLE LOCATIONS AT THE SAME TIME.

EROSION CONTROL SUMMARY

LOCATION	ITEM 162	ITEM 166*	ITEM 168	ITEM 506			
	BLOCK SODDING SY	FERTILIZER LB	VEGETATIVE WATERING MG	TEMP SEDMT CONT FENCE (INSTALL) LF	TEMP SEDMT CONT FENCE (REMOVE) LF	BIODEG EEROSN CONT LOGS (INSTALL) (8") LF	BIODEG EEROSN CONT LOGS (REMOVE) LF
E FRONT ST AT S BECKHAM AVE							
W FRONT ST AT S GLENWOOD BLVD	*20*		*0.340*			*28*	*28*
E 5TH ST AT S BECKHAM AVE							
S BROADWAY AVE AT LP 323						*165*	*165*
OLD JACKSONVILLE HWY AT SUNNYBROOK DR	*189*	*21*	*0.100*	*120*	*120*	*70*	*70*
CSJ 0910-16-187 SUBTOTAL	***209***	***21***	***0.440***	***120***	***120***	***263***	***263***
PROJECT TOTAL	***209***	***21***	***0.440***	***120***	***120***	***263***	***263***

** FOR INFORMATION ONLY.*

BASIS OF ESTIMATE

ITEM	DESCRIPTION	RATE	QUANTITY	UNIT
500	*MOBILIZATION*		*1*	*LS*
502	*BARRICADES, SIGNS AND TRAFFIC HANDLING*		*4*	*MO*

ROADWAY SUMMARY

LOCATION	ITEM 104					ITEM 105	ITEM 432	ITEM 479	ITEM 528	ITEM 529	ITEM 531						ITEM 536	
	REMOVING CONC (MEDIANS) SY	REMOVING CONC (CURB) LF	REMOVING CONC (CURB & GUTTER) LF	REMOVING CONC (SIDEWALK OR RAMP) SY	REMOVING CONC (PAVERS) SY	REMOVING STB BASE AND ASPH PAV (4" TO 14") SY	RIPRAP (CONC) (6 IN) CY	ADJUSTING MANHOLES EA	COLORED TEXTURED CONC (4") SY	CONC CURB & GUTTER (TY II) LF	CONC SIDEWALKS (4") SY	CURB RAMPS (TY 1) EA	CURB RAMPS (TY 5) EA	CURB RAMPS (TY 7) EA	CURB RAMPS (TY 21) EA	CURB RAMPS (TY 22) EA	CONC MEDIAN SY	CONC DIRECTIONAL ISLAND SY
E FRONT ST AT S BECKHAM AVE											*1*							
W FRONT ST AT S GLENWOOD BLVD	*3*	*48*		*52*						*26*	*3*	*1*		*2*	*2*	*3*	*2*	*43*
E 5TH ST AT S BECKHAM AVE				*78*	*30*		*1*		*22*							*12*		
S BROADWAY AVE AT LP 323										*20*	*128*			*4*		*12*		
OLD JACKSONVILLE HWY AT SUNNYBROOK DR			*230*	*101*		*312*	*4*	*1*	*47*	*540*	*202*		*2*	*3*	*2*	*3*		*38*
CSJ 0910-16-187 SUBTOTAL	***3***	***48***	***230***	***231***	***30***	***312***	***5***	***1***	***69***	***586***	***334***	***1***	***2***	***9***	***4***	***30***	***2***	***81***
PROJECT TOTAL	***3***	***48***	***230***	***231***	***30***	***312***	***5***	***1***	***69***	***586***	***334***	***1***	***2***	***9***	***4***	***30***	***2***	***81***

NO.	DATE	REVISION	APPROVED

infraTECH Engineers & Innovators, LLC
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

SUMMARY OF QUANTITIES

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	6
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0910	16	187	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	TYL	SMITH		7

DATE: 5/21/2024 2:13:02 PM
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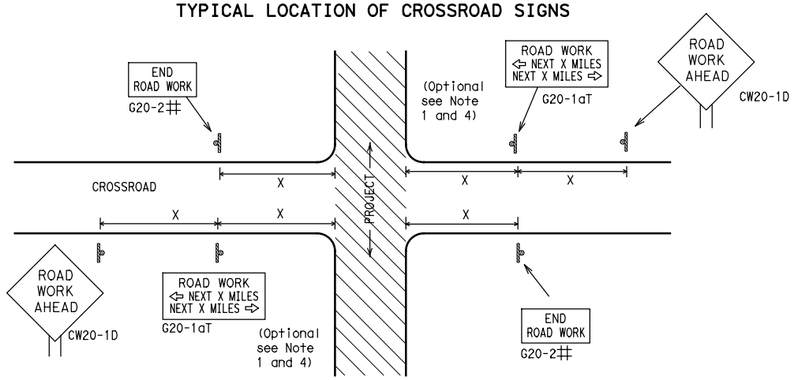
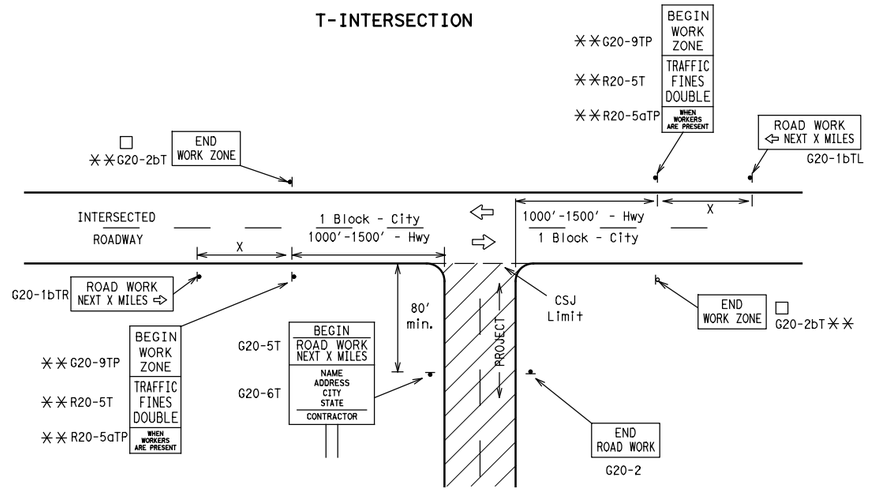
TYPICAL LOCATION OF CROSSROAD SIGNS



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.

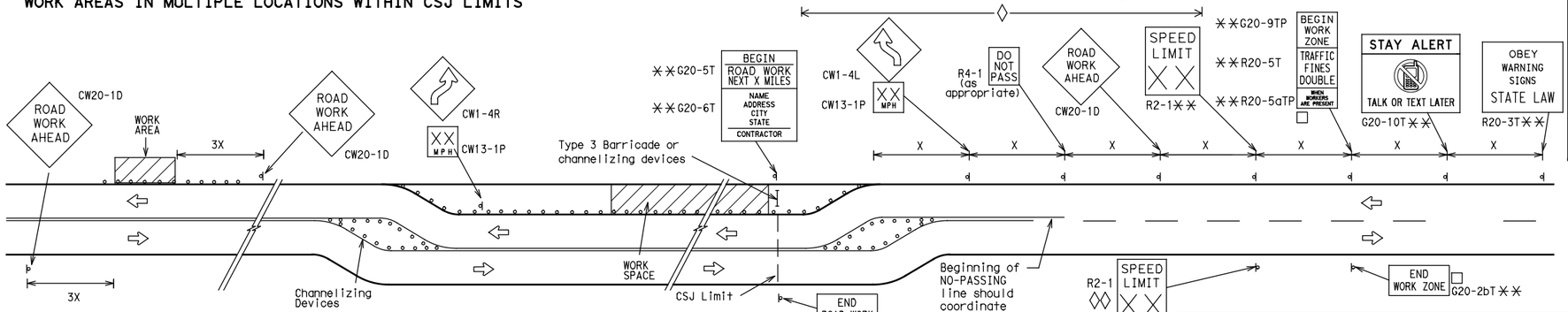
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

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.

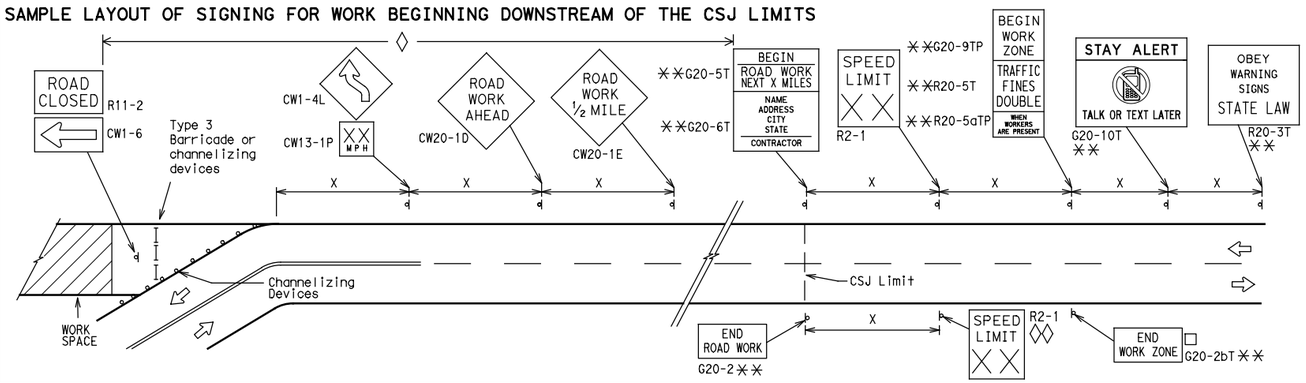
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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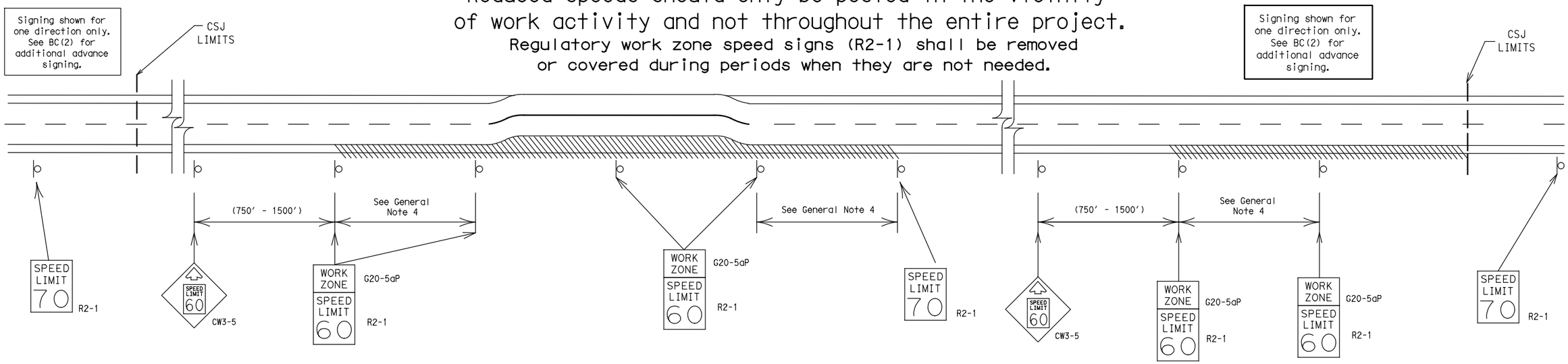
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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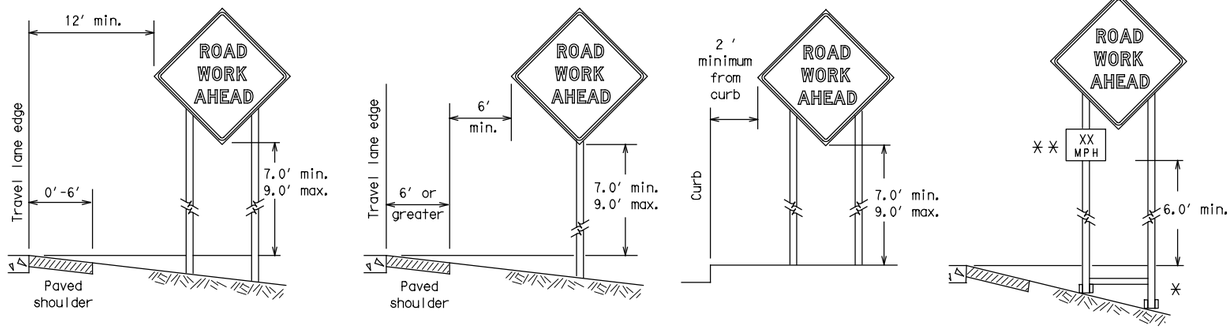
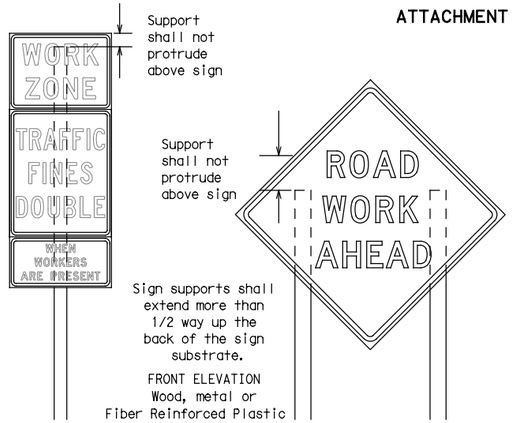
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

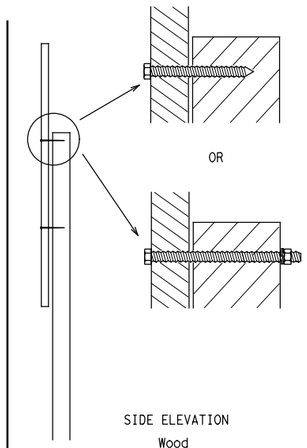


⚹ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⚹⚹ 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





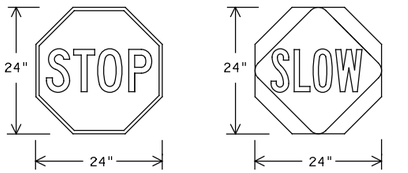
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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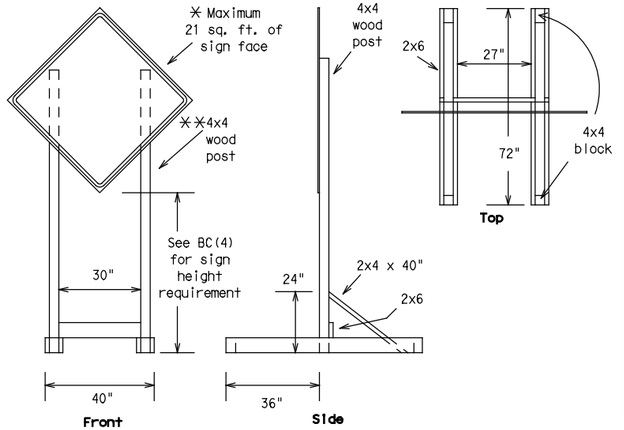
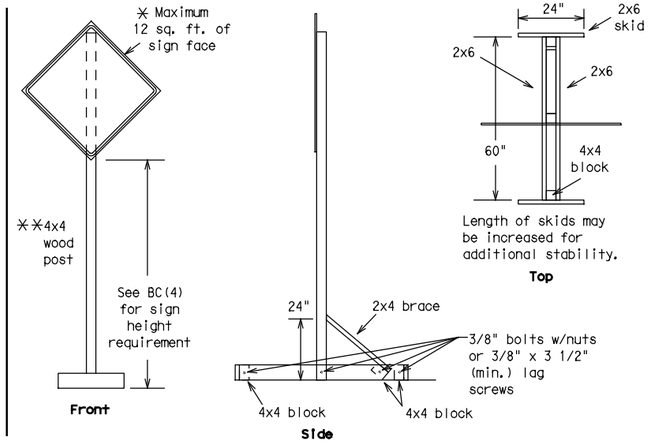
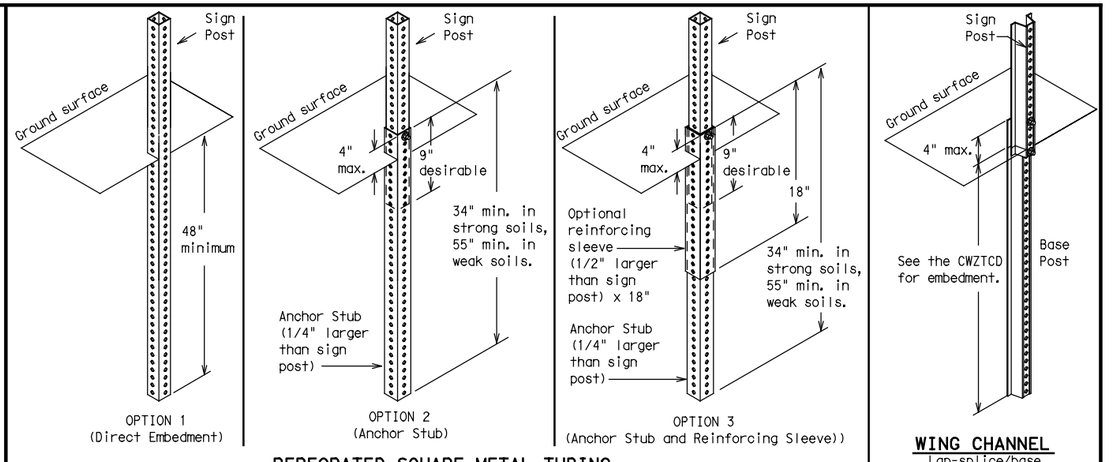




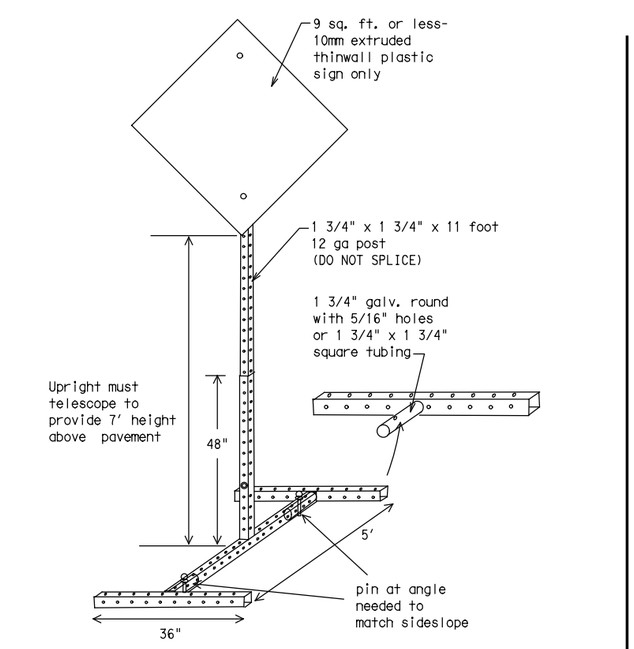
SKID MOUNTED WOOD SIGN SUPPORTS

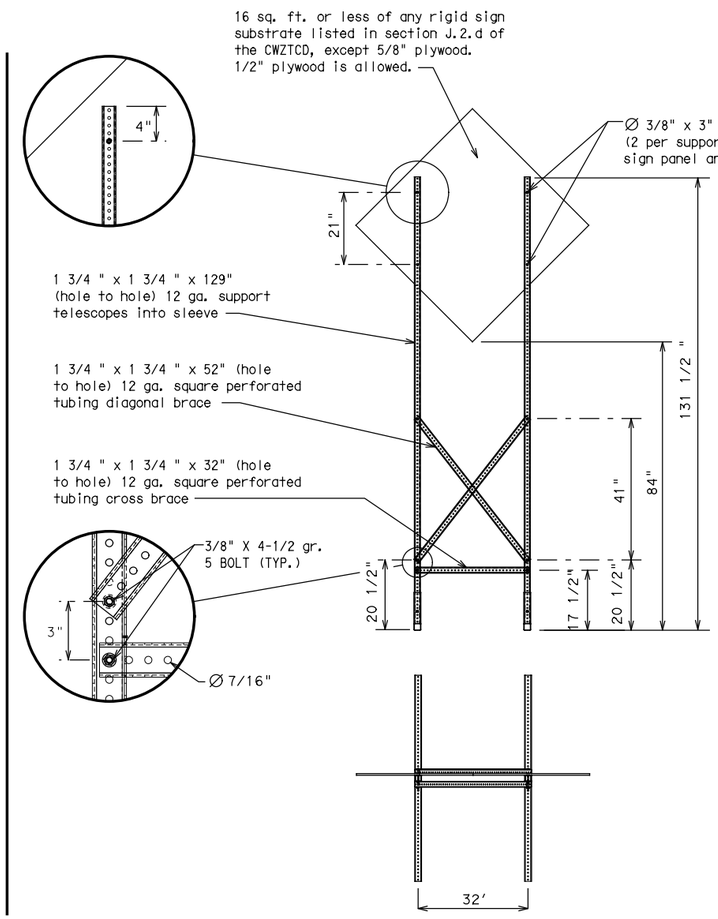
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

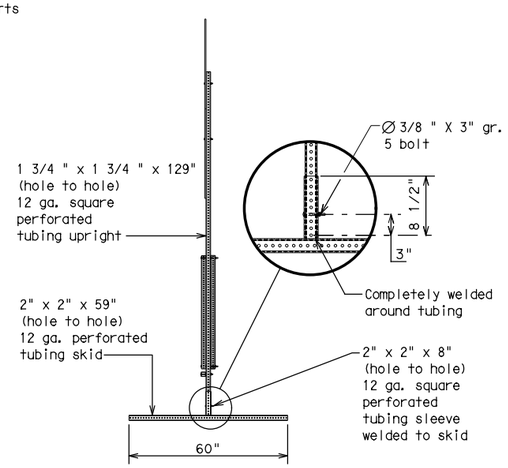


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

✳✳ Advance Notice List

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

✳✳ 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	0910	16	187	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		12

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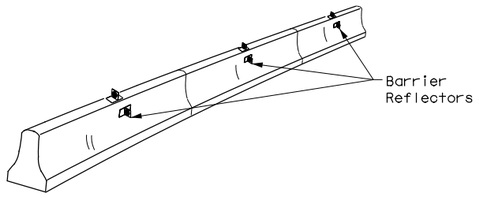
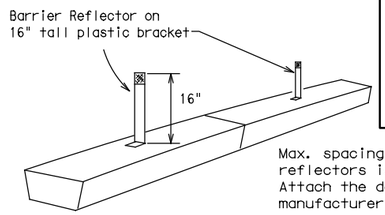
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



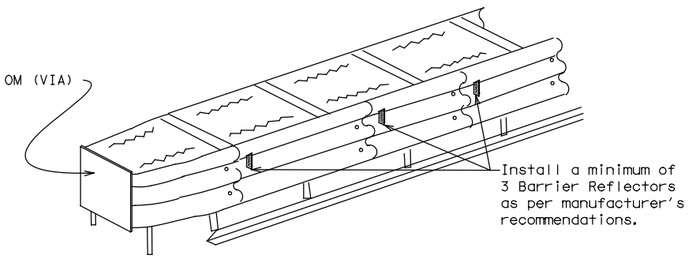
CONCRETE TRAFFIC BARRIER (CTB)

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

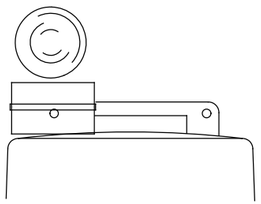
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

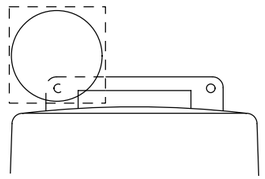
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

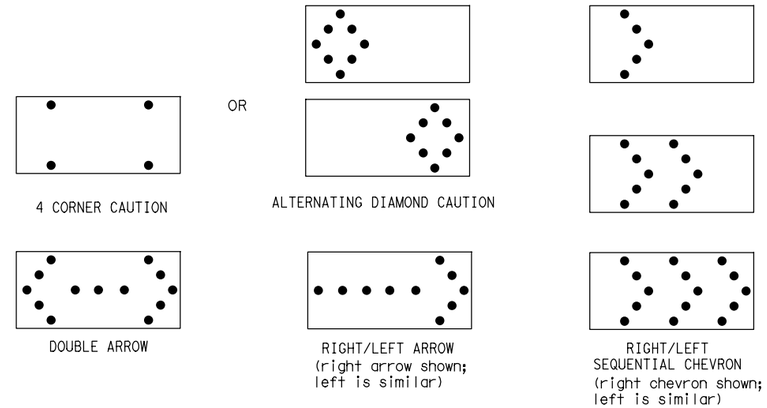
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	187	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		13

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

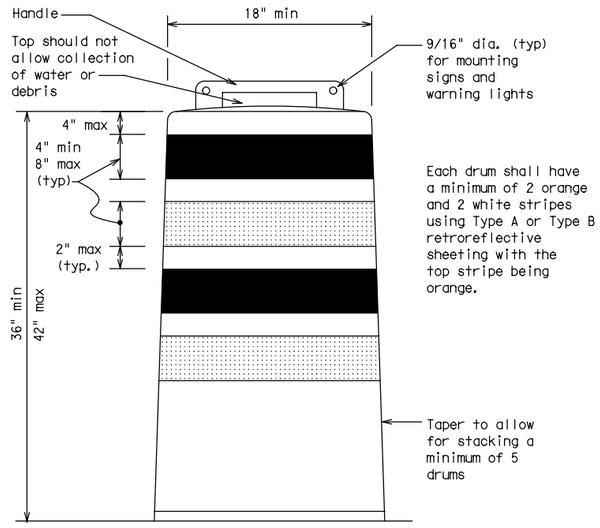
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

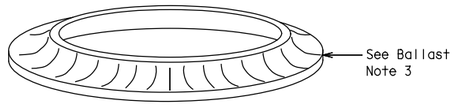
RETROREFLECTIVE SHEETING

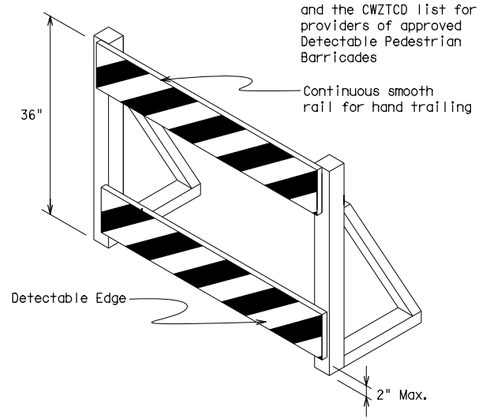
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

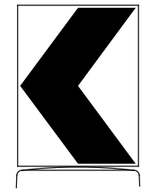




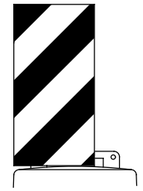


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

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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	0910	16	187	VARIOUS
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	TYL	SMITH		14
7-13				

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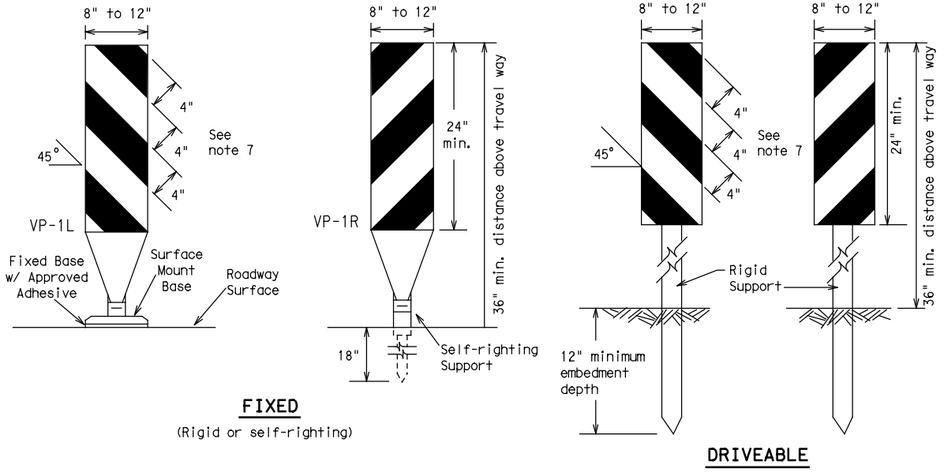
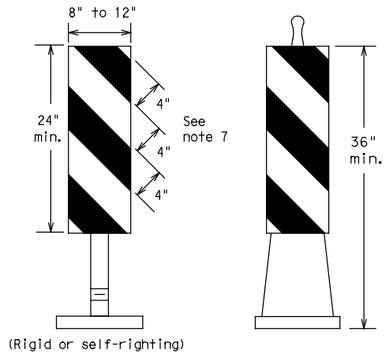


FIXED
(Rigid or self-righting)

DRIVEABLE

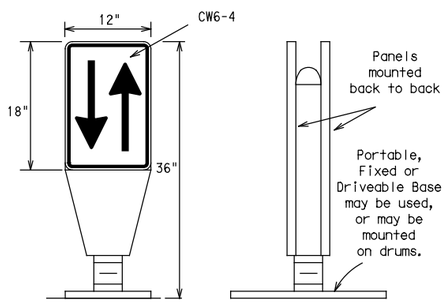


(Rigid or self-righting)

PORTABLE

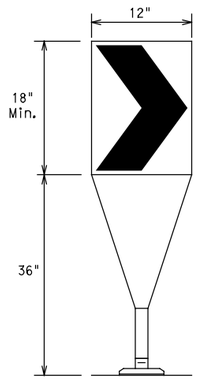
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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)



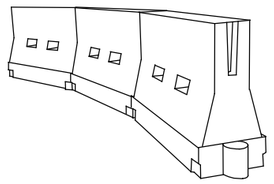
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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 ✻✻			Suggested Maximum Spacing of Channelizing Devices	
		10′ Offset	11′ Offset	12′ Offset	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

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	187	VARIOUS
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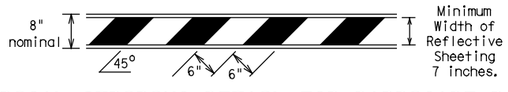
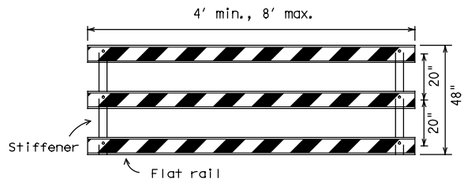
TYPE 3 BARRICADES

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.



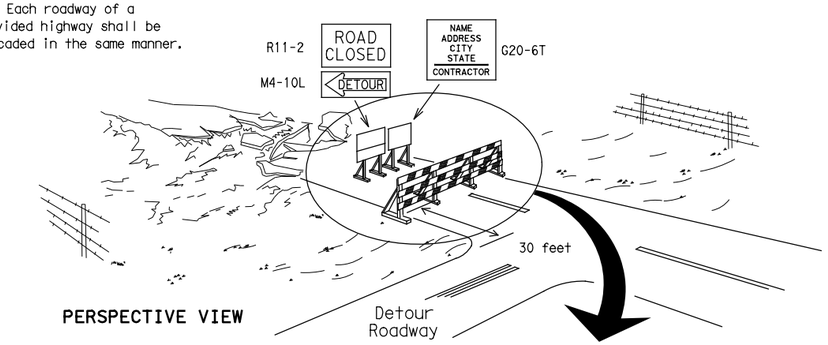
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

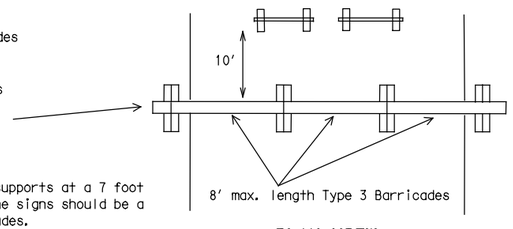
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

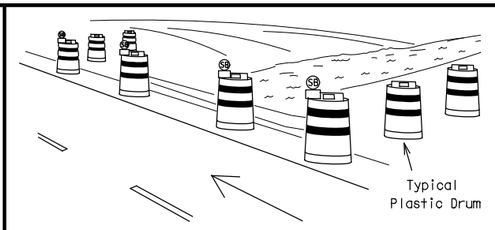
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

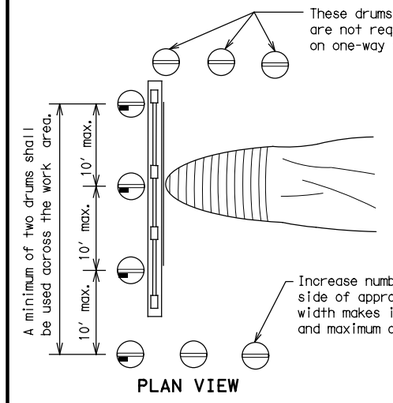
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

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.

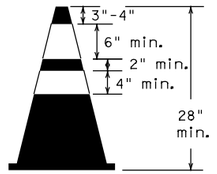


PLAN VIEW

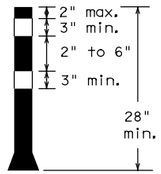
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

Two-Piece cones



One-Piece cones

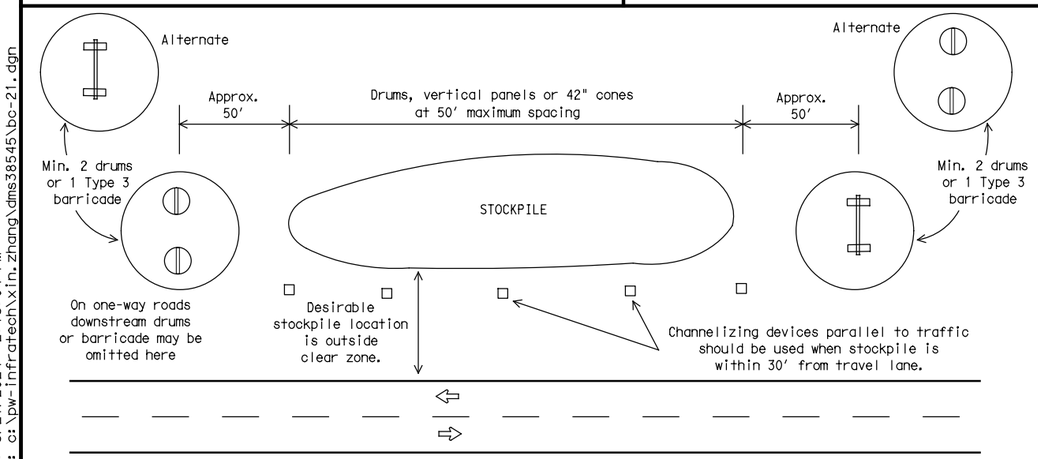


Tubular Marker

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

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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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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.

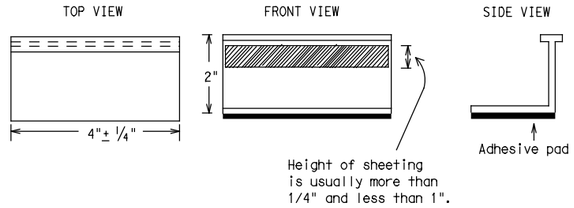
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	TYL	SMITH		17
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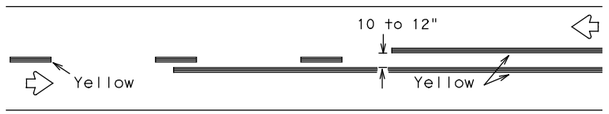
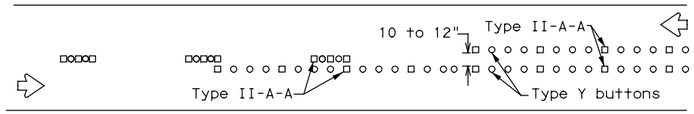
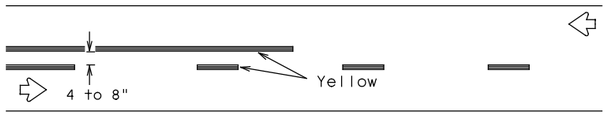
PAVEMENT MARKING PATTERNS



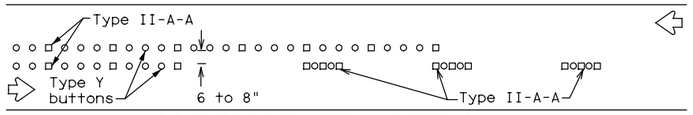
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



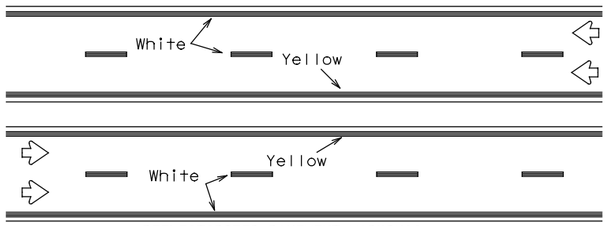
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



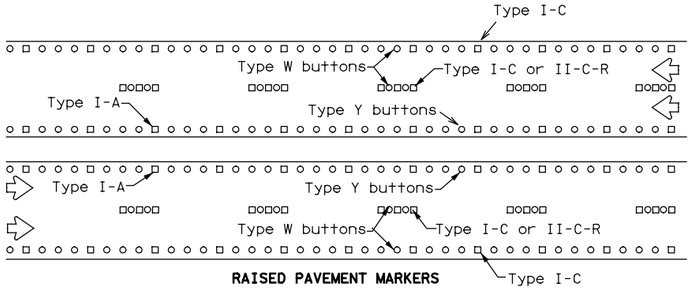
RAISED PAVEMENT MARKERS - PATTERN B

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

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



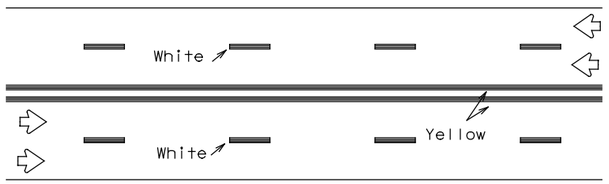
REFLECTORIZED PAVEMENT MARKINGS



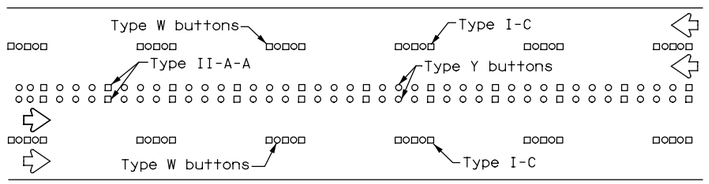
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



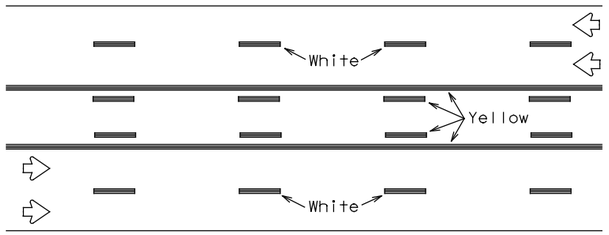
REFLECTORIZED PAVEMENT MARKINGS



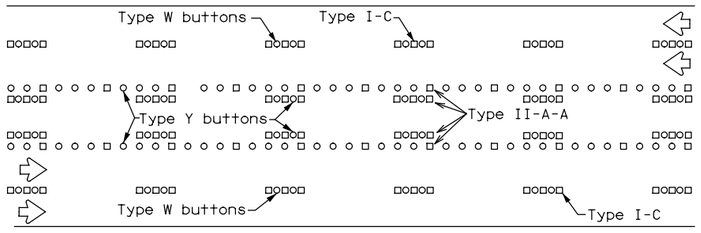
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

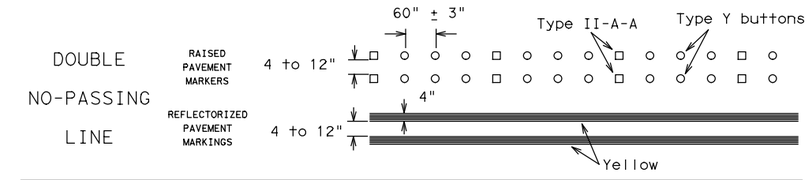
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

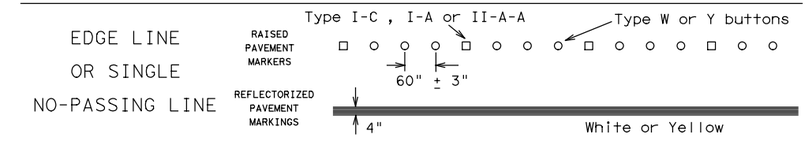
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

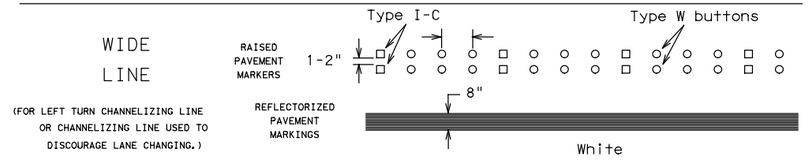


EDGE LINE OR SINGLE NO-PASSING LINE



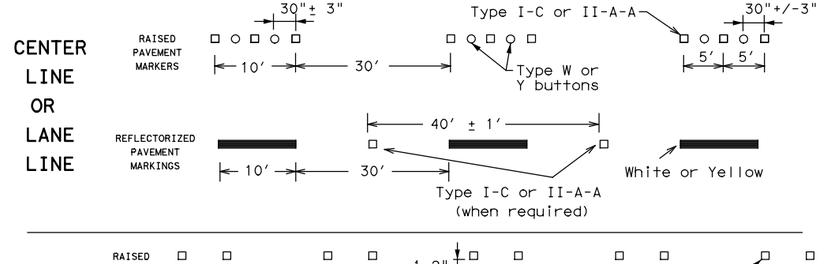
WIDE LINE

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

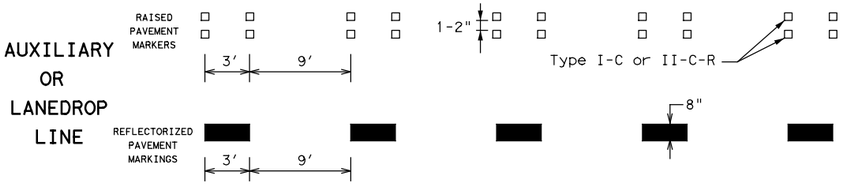


BROKEN LINES

CENTER LINE OR LANE LINE

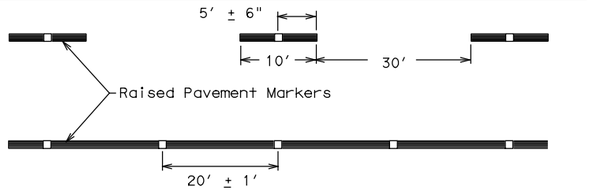


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

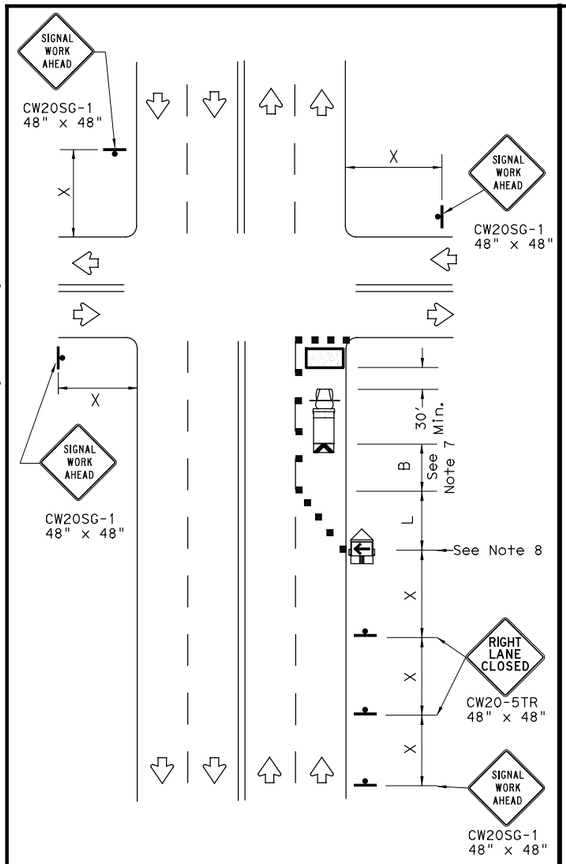
Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

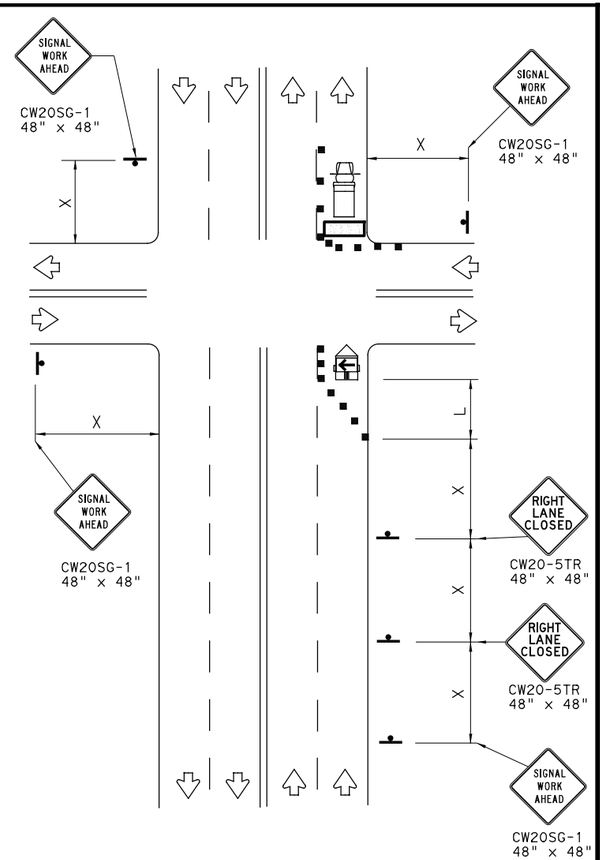
BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0910	16	187	VARIOUS
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		18



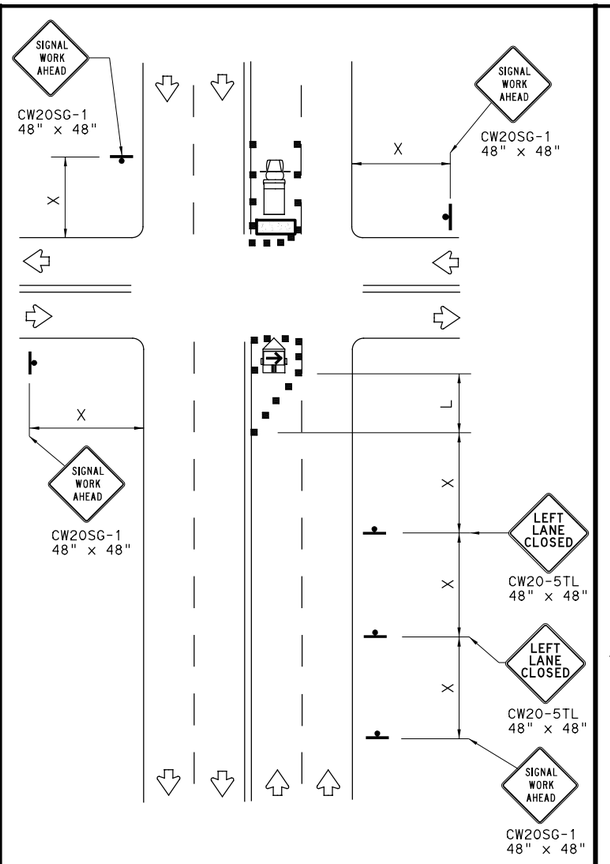
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



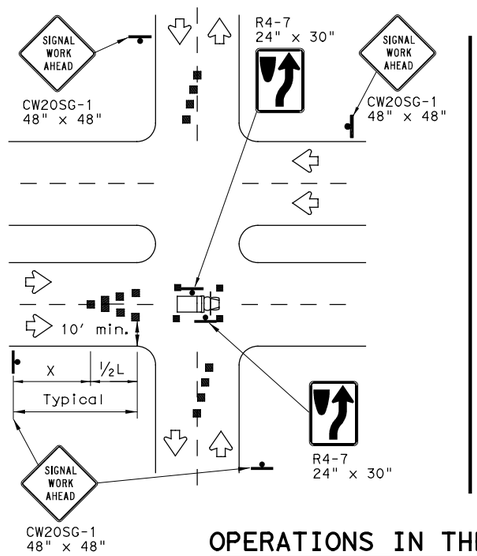
FAR SIDE RIGHT LANE CLOSURE

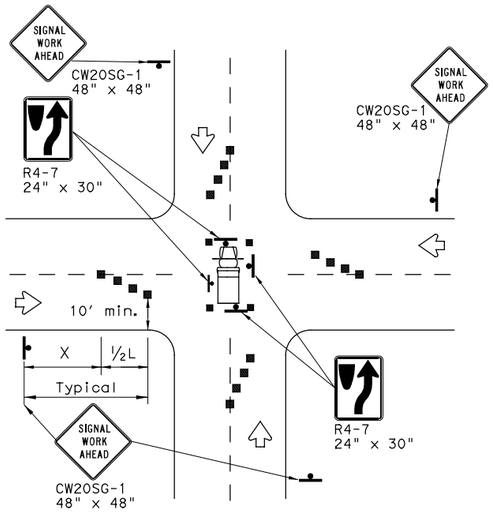
SHORT DURATION OR SHORT TERM STATIONARY



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

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	187	VARIOUS
2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	TYL	SMITH		19

DATE: 5/21/2024 2:13:08 PM
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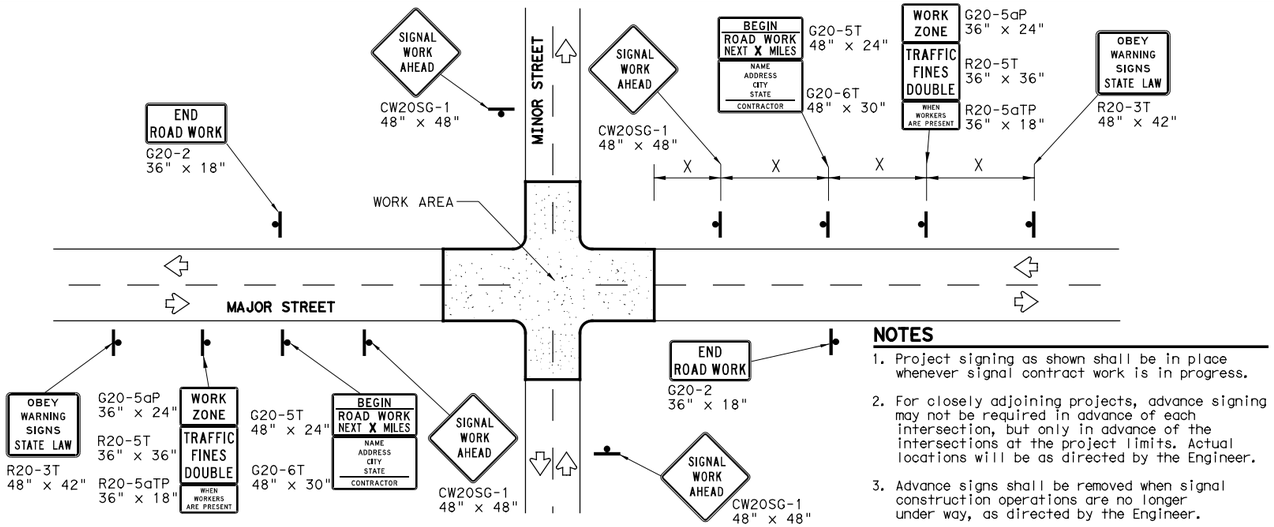


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

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

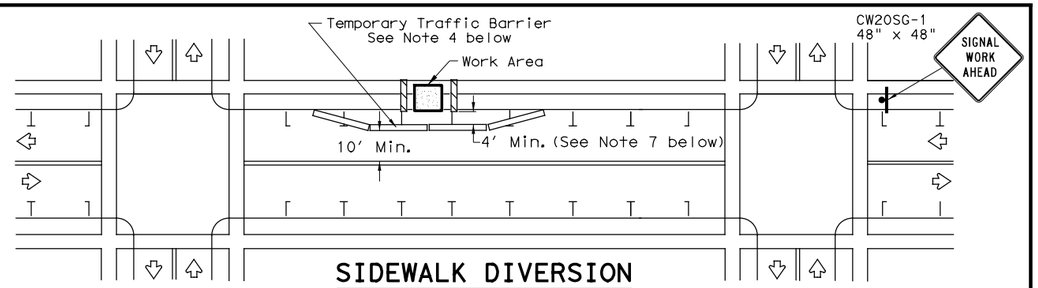
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

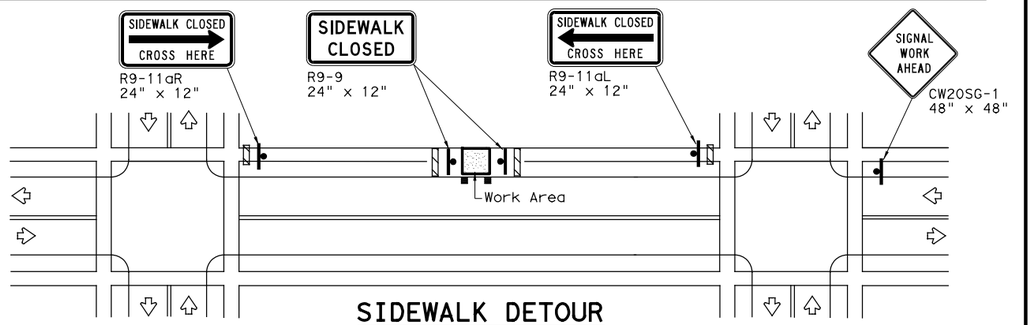
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

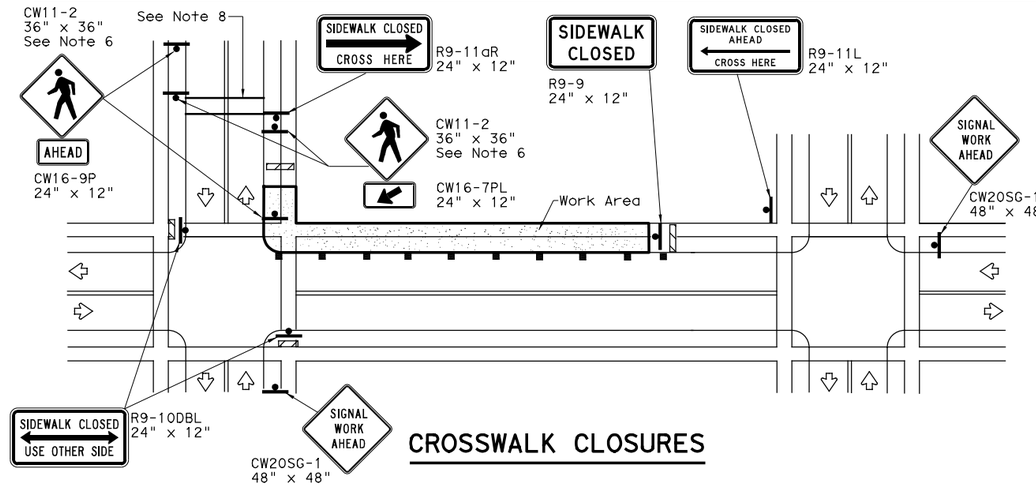
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



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

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	TYL	SMITH		20

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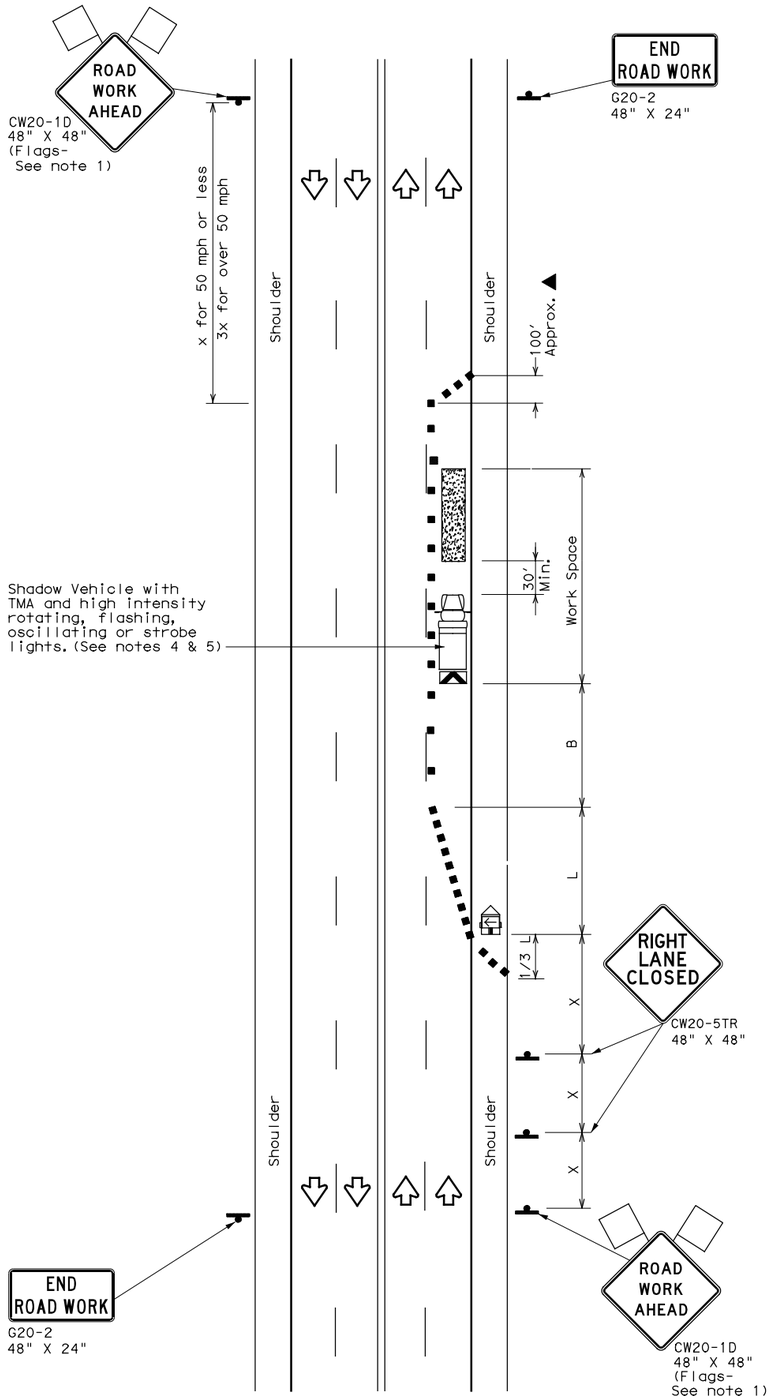
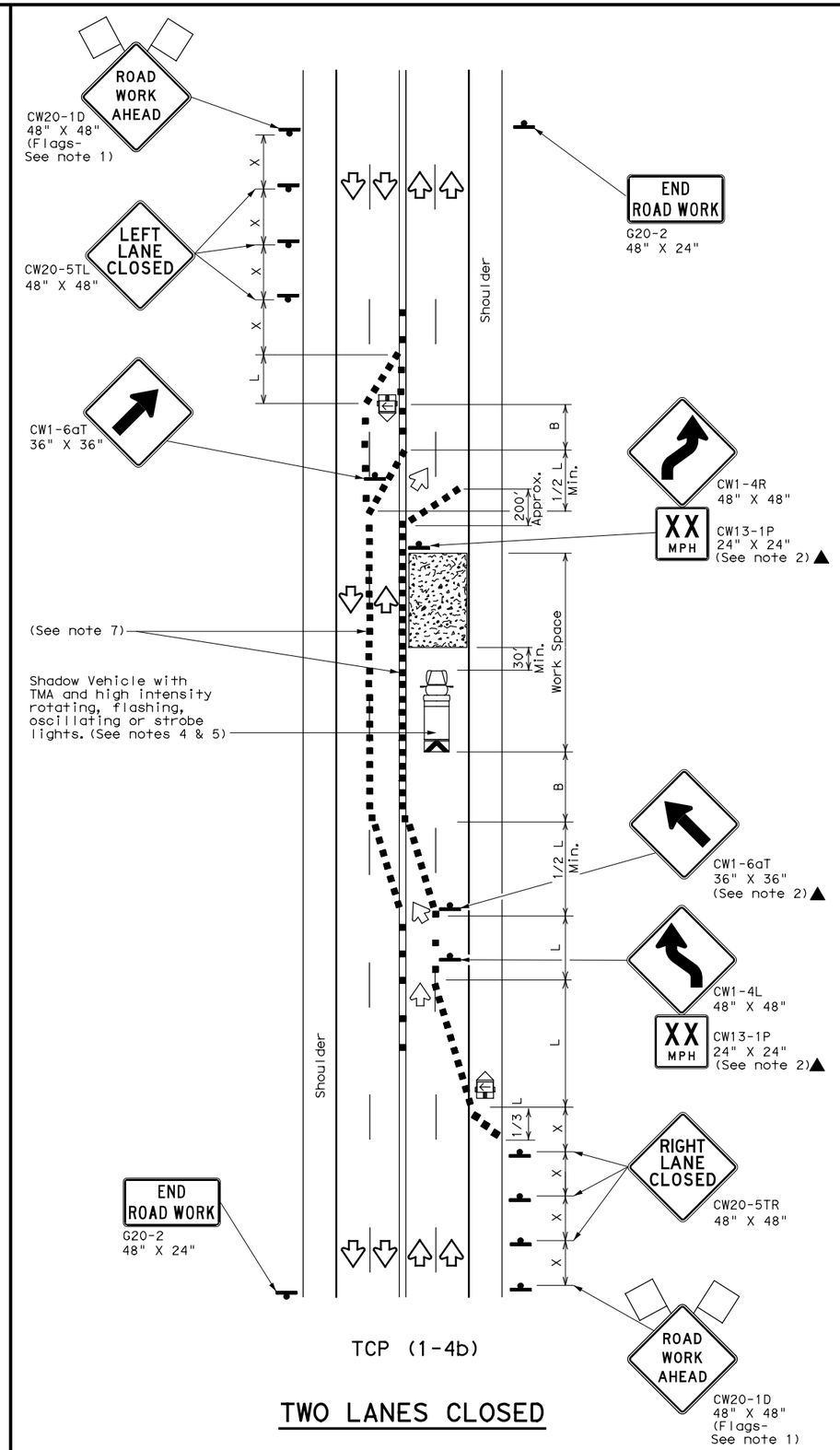


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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

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

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

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

GENERAL NOTES

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

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	187	VARIOUS
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	TYL	SMITH		21
1-97 2-18				

100% SUBMITTAL

GENERAL NOTES:

1. THE GOVERNING SPECIFICATIONS FOR THIS PROJECT ARE AS FOLLOWS: (1) TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES, 2014 ED., (2) THE CITY OF TYLER (COT) STANDARD SPECIFICATIONS FOR PAVING AND UTILITIES AS CONTAINED IN THE DESIGN GUIDELINES FOR SUBDIVISION IMPROVEMENTS, 2021 EDITION.
2. ALL WORK ON THESE PLANS SHALL BE DONE IN STRICT ACCORDANCE WITH THE APPLICABLE CITY OF TYLER/TXDOT SPECIFICATIONS.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS BEFORE CONSTRUCTION BEGINS.
4. CONSTRUCTION SHALL COMPLY WITH ALL GOVERNING CODES AND REQUIREMENTS. CONDUCT ALL REQUIRED TESTS TO THE SATISFACTION OF THE OWNER'S INSPECTING AUTHORITIES.
5. EXISTING FACILITIES AND UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS PER INFORMATION AND RECORDS AVAILABLE. VERIFY ALL UTILITIES AND NOTIFY THE APPROPRIATE UTILITY COMPANIES PRIOR TO BEGINNING CONSTRUCTION WORK. CONTAC CITY OF TYLER WATER SERVICE CENTER AT 903-531-1285 FOR WET UTILITY LOCATES.
6. TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES RESULTING FROM CONSTRUCTION WORK SHALL BE REPAIRED TO ITS ORIGINAL CONDITION OR BETTER AT THE CONTRACTOR'S EXPENSE.
7. NO ADDITIONAL PAYMENT WILL BE MADE FOR REMOVAL OF EXISTING SIDEWALK OR ISLAND TO INSTALL PEDESTRIAN POLES, GROUND BOXES, AND COUDITS. PAYMENT WILL BE INCIDENTAL TO VARIOUS SIGNAL ITEMS.
8. ENSURE PUBLIC SAFETY DURING CONSTRUCTION AND PROVIDE THE NECESSARY TRAFFIC BARRICADES AND WARNING SIGNAGE TO PROTECT THE CONSTRUCTION SITE. CONSTRUCTION BARRICADES SHALL BE IN CONFORMANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD), LATEST EDITION. IN AREAS WHERE LONG TERM NIGHTTIME BARRICADES ARE USED, BARRICADES SHOULD INCLUDE HIGH INTENSITY REFLECTIVE SHEETING.
9. THE LOCATION OF THE ALL EXISTING AND PROPOSED TRAFFIC SIGNAL ELEMENTS INCLUIDNG BUT NOT LIMITED TO TRAFFIC SIGNAL POLES, SIGNAL HEADS, VIVDS DETECTORS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
10. PROTECT ALL CONDUITS ENTERING A GROUND BOX OR CABINET WITH "DUCT SEAL PUTTY"(OR APPROVED EQUAL) BY INSERTING INTO THE CONDUIT AND FORMING IT AROUND THE WIRES. DO NOT USE SPRAY FOAM.
11. INSTALL MULE TAPE ON SPARE CONDUITS TO FACILITATE EASIER PULLING OF NEW CABLES AT A LATER DATE.
12. FILL ON CONDUITS SHALL NOT EXCEED 40%. IF CONDUIT FILL WILL EXCEED 40%, NOTIFY THE ENGINEER AND PROPOSE A SOLUTION.
13. USE PVC PRIMER ON ALL PVC CONDUIT SURFACES AT ANY JOINTS PRIOR TO APPLICATION OF PVC CEMENT.
14. ALL CONDUIT BORES TO BE A MINIMUM 36" DEEP UNLESS THERE IS A UTILITY CONFLICT OR FIELD CONDITION THAT CAUSES A CONFLICT.
15. INSTALL STANDARD GROUND BOXES WITH CONCRETE APRONS AS SHOWN ON PLANS.
16. GROUND BOXES FOR TRAFFIC SIGNAL INSTALLATION SHALL HAVE THE WORDS TRAFFIC SIGNAL PERMANENTLY ENGRAVED ON THE GROUND BOX TOP.
17. CONTACT CITY OF TYLER TRAFFIC ENGINEERING AT 903-531-1204 PRIOR TO PROCUREMENT OF ANY TRAFFIC SIGNAL EQUIPMENT TO CONFIRM ALL PROPOSED EQUIPMENT IS COMPATIBLE WITH THE EXISTING TRAFFIC SIGNAL SYSTEM. SUBMIT SHOP DRAWINGS TO THE CITY OF TYLER TRAFFIC ENGINEER TO REVIEW AND APPROVE PRIOR TO PROCUREMENT.
18. CONTACT THE CITY OF TYLER AT (903) 531-1292 A MINIMUM OF ONE (1) WEEK PRIOR TO THE BEGINNING OF ANY SIGNAL WORK. DELIVER ANY SALVAGEABLE MATERIAL, AS DETERMINED BY THE CITY, THE SIGNAL SHOP LOCATED AT 406 W. OAKWOOD, TYLER, TEXAS 75702.
19. A SIGNAL TECHNICIAN FROM THE CITY OF TYLER SHALL BE PRESENT WHEN THE SIGNALS ARE PLACED IN OPERATION. NOTIFY THE CITY AT LEAST 48 HOURS IN ADVANCE OF TURN ON. TURN ON SHOULD OCCUR ON EITHER A TUESDAY, WEDNESDAY, OR THURSDAY BETWEEN THE HOURS OF 9 AM AND 3 PM.
20. COORDINATE THE POLE FOUNDATION WORK WITH THE CURB RAMP AND SIDEWALK INSTALLATION. IF CURB RAMPS ARE CONSTRUCTED FIRST, NOTIFY THE ENGINEER TO SCDEULE A FIELD MEETING TO DETERMINE IF FOUNDATIONS NEED TO BE SHIFTED TO BE ADJACENT TO THE LANDING AREAS. IF POLE FOUNDATIONS ARE INSTALLED FIRST, MODIFY THE CURB RAMPS AND SIDEWALKS SO THAT RAMP LANDING AREAS ARE ADJACENT TO THE PUSH BUTTONS AND THE SIDE REACH TO THE PUSH BUTTONS ARE 10" OR LESS. IF THE REACH DISTANCE EXCEEDS 10 INCHES, FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10 INCES OR LESS AT NO ADDITIONAL COST. THE COST WILL BE SUBSIDIARY TO SIGNAL EQUIPMENT INSTALLATION.
21. POUR PROPOSED CURB RAMP LANDINGS TO THE POLE FOUNDATION, LEAVING NO GAPS.
22. PLACE PEDESTRIAN POLES ON THE FOUNDATIONS NO SOONER THAN SEVEN (7) DAYS FOLLOWING THE PLACEMENT OF CONCRETE.
23. DO NOT RELOCATE OR REMVOE TRAFFIC SIGNS WITHOUT PRIOR APPROVAL OF THE CITY OF TYLER.
24. DO NOT DISTURB EXISTING SIGNAL OPERATIONS DURING CONSTRUCTION.
25. NATIONAL ELECTRIC CODE (NEC) REQUIRES THAT ANY UNUSED OPENINGS IN A BOX OR CABINET, INCLUDING A GROUND BOX, BE EFFECTIVELY CLOSED TO AFFORD PROTECTION SUBSTANTIALLY EQUIVALENT TO THE WALL OF EQUIPMENT. ENSURE THIS IS FOLLOWED ON ALL INSTALLATIONS.
26. ALL PEDESTRIAN POLES SHALL BE POWDERCOATED BLACK (COLOR #9017 – TRAFFIC BLACK) OR ALTERNATE COLOR IF EXISITNG POLES ARE DIFFERENT.
27. LABEL ALL CABLES AND CONDUCTORS FOR EASY IDENTIFICATION.
28. PROPERLY CAP ALL UNUSED SIGNAL CABLE TO AVOID SHORT CIRCUIT.
29. FOR APS UNIT, PROVIDE PELCO INTERLLICROSS APS SYSTEM OR APPROVED EQUIVALENT.

STATE OF TEXAS
ZAHIDUL Q. SIDDIQUE
98635
LICENSED
PROFESSIONAL ENGINEER
5/21/2024

NO.	DATE	REVISION	APPROVED

infraTECH
Engineers & Innovators, LLC
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

PEDESTRIAN INFRASTRUCURE
GENERAL NOTES

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	22
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

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USER:

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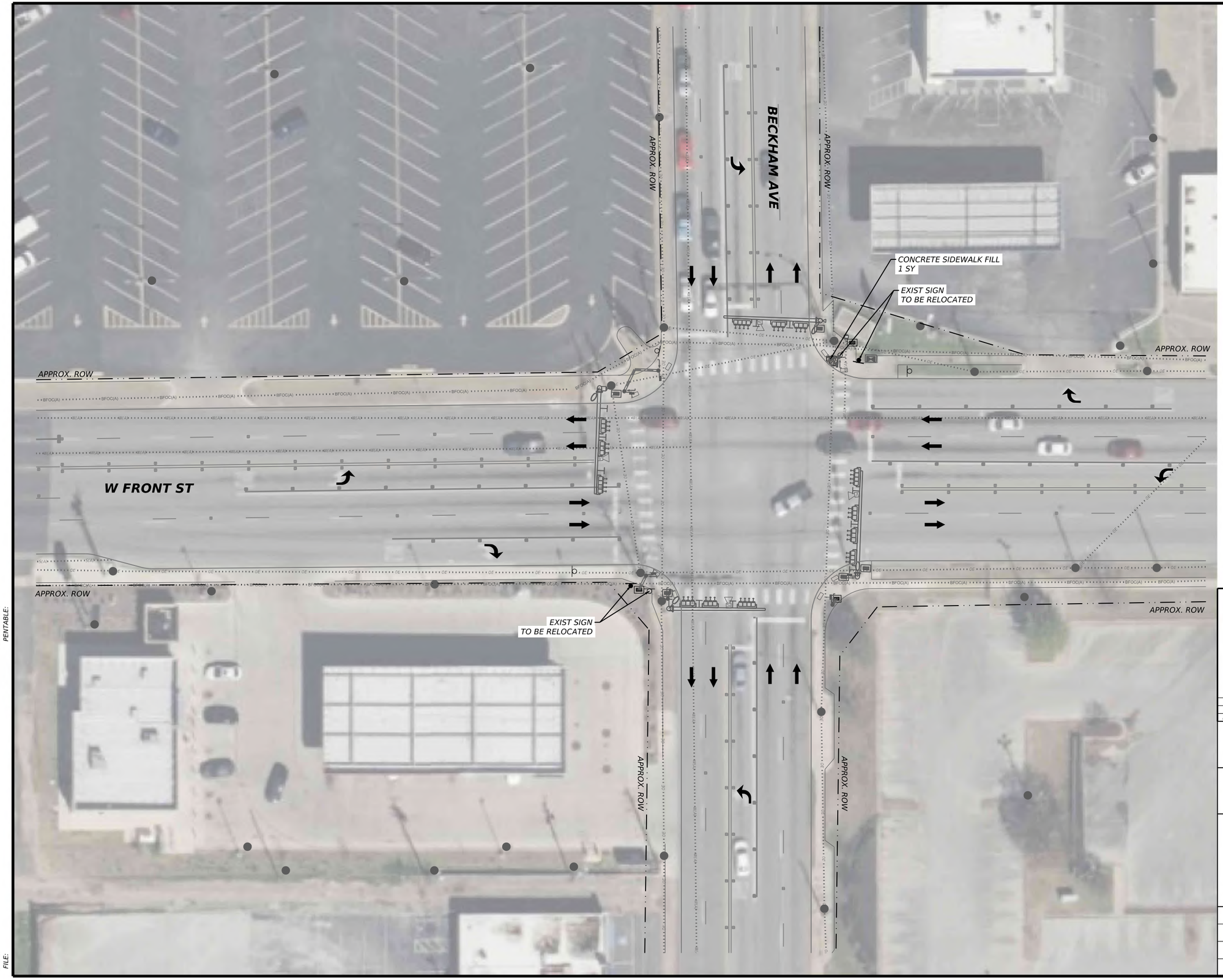


PLOT DRIVER:
PENTABLE:

DATE:
FILE:

LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED. SIGNAL POLE W/ PED. PUSH BUTTON & PED. SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- EXIST SIGN
- PROP GROUND BOX
- PROP PED. PUSH BUTTON
- PROP PED. SIGNAL HEAD
- CONDUIT RUN DESIGNATION
- EXIST CONDUIT
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP SIGN
- PREFAB PAV MRK TY C (W) (24") (SLD)
- CONCRETE SIDEWALK
- CONCRETE MEDIAN
- CONCRETE PAVERS
- RIPRAP
- BLOCK SOD
- BIODEG EROSN LOGS (INSTL) (20")

0 20 40

SCALE: 1" = 40'

STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER

05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED SIGN AND SIDEWALK IMPROVEMENTS

FRONT ST AT BECKHAM AVE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	
CHECK	CONTROL	SECTION	JOB	23
IEI	0910	16	187	
CHECK				
IEI				

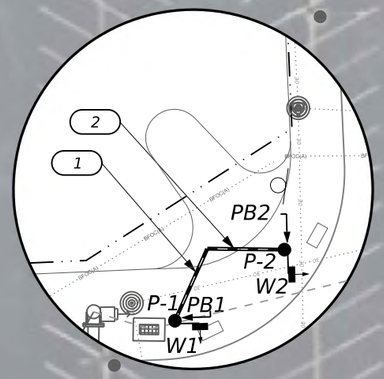
USER:

PROPOSED SIGNALS

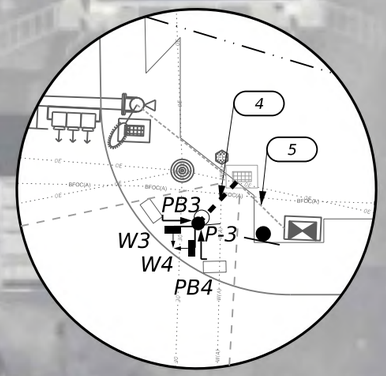
COUNTDOWN PEDESTRIAN SIGNAL HEAD

W1,W2,W3,W4
W5,W6,W7,W8

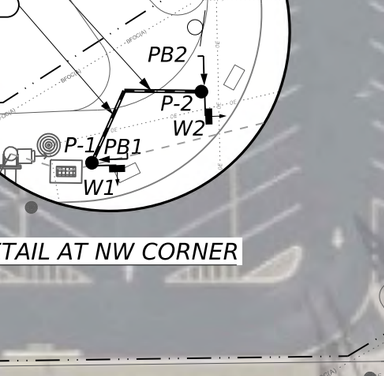
THE CONTRACTOR'S ATTENTION IS DIRECTED TO DETAIL A. THE CONTRACTOR IS REQUIRED TO LOCATE EXISTING UTILITIES IN THIS AREA AND CAUTIOUSLY DIG THE TRENCH TO PLACE THE CONDUIT. IF EXISTING UTILITIES ARE FOUND, THE CONTRACTOR IS RESPONSIBLE FOR TAKING ALL NECESSARY PRECAUTIONS TO PROTECT EXISITNG FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED TO ITS ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.



DETAIL AT NW CORNER



DETAIL AT NE CORNER



DETAIL AT SW CORNER

DETAIL AT SE CORNER

BECKHAM AVE

W FRONT ST

APPROX. ROW

Φ1 Φ2 Φ3 Φ4 Φ5 Φ6 Φ7 Φ8

DETAIL A

3 6 9

PROPOSED SIGNS

R10-3eL (9x15)

PB1,PB2, PB4,PB5,PB7

R10-3eR (9x15)

PB3,PB6,PB8

LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED. SIGNAL POLE W/ PED. PUSH BUTTON & PED. SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- EXIST SIGN
- PROP GROUND BOX
- PROP PED. PUSH BUTTON
- PROP PED. SIGNAL HEAD
- (X) CONDUIT RUN DESIGNATION
- EXIST CONDUIT
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP SIGN
- CONCRETE MEDIAN
- CONCRETE PAVERS
- RIPRAP

0 10 20 — SCALE: 1" = 20' PED RAMP DET

0 20 40 — SCALE: 1" = 40'

PLOT DRIVER: PENTABLE:

DATE:

FILE:

STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER
05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED CONDITION

FRONT ST AT BECKHAM AVE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	TYL	SMITH	24
CHECK IEI	CONTROL	SECTION	JOB	
	0910	16	187	

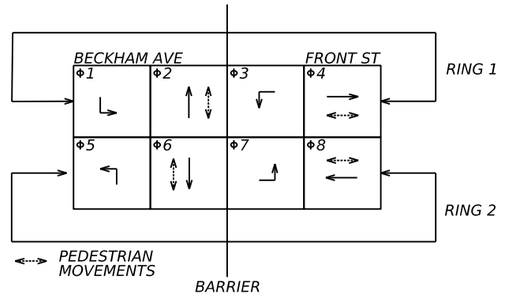
USER:

CABLE TERMINATION CHART																	
CNDR. NO.	CONDR. COLOR	CABLE 1 FROM POLE P-1 TO CNTRL. 5 CNDR.	CABLE 2 FROM POLE P-2 TO CNTRL. 5 CNDR.	CABLE 3 FROM POLE P-3 TO CNTRL. 5 CNDR.	CABLE 4 FROM POLE P-3 TO CNTRL. 5 CNDR.	CABLE 5 FROM POLE P-4 TO CNTRL. 5 CNDR.	CABLE 6 FROM POLE P-5 TO CNTRL. 5 CNDR.	CABLE 7 FROM POLE P-6 TO CNTRL. 5 CNDR.	CABLE 8 FROM POLE E-1 TO CNTRL. 5 CNDR.	CABLE 9 FROM POLE P-1 TO CNTRL. 2 CNDR.	CABLE 10 FROM POLE P-2 TO CNTRL. 2 CNDR.	CABLE 11 FROM POLE P-3 TO CNTRL. 2 CNDR.	CABLE 12 FROM POLE P-3 TO CNTRL. 2 CNDR.	CABLE 13 FROM POLE P-4 TO CNTRL. 2 CNDR.	CABLE 14 FROM POLE P-5 TO CNTRL. 2 CNDR.	CABLE 15 FROM POLE P-6 TO CNTRL. 2 CNDR.	CABLE 16 FROM POLE E-1 TO CNTRL. 2 CNDR.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	PH 6 PED. CALL	PH 8 PED. CALL	PH 8 PED. CALL	PH 2 PED. CALL	PH 4 PED. CALL	PH 4 PED. CALL	PH 6 PED. CALL	PH 2 PED. CALL
2	WHITE	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM
3	RED	PH 6 DW	PH 8 DW	PH 8 DW	PH 2 DW	PH 4 DW	PH 4 DW	PH 6 DW	PH 2 DW								
4	GREEN	PH 6 W	PH 8 W	PH 8 W	PH 2 W	PH 4 W	PH 4 W	PH 6 W	PH 2 W								
5	ORANGE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE								

CONDUIT & CONDUCTORS SCHEDULE							
RUN NO.	NO. OF CONDUIT		LENGTH (LF)	BORE (B) TRENCH (T) EXIST (E)	1C #6 AWG BARE	2C #12 AWG APS	5C #14 AWG PED
	2 (IN)	3 (IN)					
1	1		15	B	1	1	1
2	1		15	B	1	1	1
3			95	E		2	2
4	1		20	T	1	1	1
5	1		10	B	1	8	8
6			110	E		4	4
7		1	15	E		1	1
8	1		10	B	1	1	1
9			85	E		2	2
10	1		15	T	1	1	1
11	1		10	B	1	1	1
TOTAL (LF)	95	15	-	-	95	980	980

POLE AND ARM WIRING		
POLE	2C #12 AWG APS	5C #14 AWG PED
P-1	5	10
P-2	5	10
P-3	10	20
P-4	5	10
P-5	5	10
P-6	5	10
E-1	10	20
TOTAL (FT)	45	90

POLE SCHEDULE							
POLE	P-1	P-2	P-3	P-4	P-5	P-6	E-1
POLE STATUS	PROP	PROP	PROP	PROP	PROP	PROP	EXIST
FOUNDATION TYPE	24-A	24-A	24-A	24-A	24-A	24-A	EXIST
LED SIGNAL INDICATIONS	DW	DW	DW	DW	DW	DW	DW
	W	W	W	W	W	W	W



STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER
05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

DETAIL/SUMMARY SHEET

FRONT ST AT BECKHAM AVE

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	
CHECK	CONTROL	SECTION	JOB	25
IEI	0910	16	187	
CHECK				
IEI				

PLOT DRIVER: PENTABLE:
DATE:
FILE:
USER:

APS MESSAGE CHART			
POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-1	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS FRONT STREET AT BECKHAM AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FRONT STREET AT BECKHAM AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-2	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS BECKHAM AVENUE AT FRONT STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS BECKHAM AVENUE AT FRONT STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-3	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS BECKHAM AVENUE AT FRONT STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS BECKHAM AVENUE AT FRONT STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION	BECKHAM AVENUE. WALK SIGN IS ON TO CROSS BECKHAM AVENUE
P-3	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS FRONT STREET AT BECKHAM AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FRONT STREET AT BECKHAM AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION	FRONT STREET. WALK SIGN IS ON TO CROSS FRONT STREET
P-4	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS BECKHAM AVENUE AT FRONT STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS BECKHAM AVENUE AT FRONT STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-5	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS BECKHAM AVENUE AT FRONT STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS BECKHAM AVENUE AT FRONT STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-6	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS FRONT STREET AT BECKHAM AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FRONT STREET AT BECKHAM AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
E-1	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS FRONT STREET AT BECKHAM AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FRONT STREET AT BECKHAM AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE

*COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

PLOT DRIVER:
PENTABLE:

DATE:
FILE:

STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER
05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

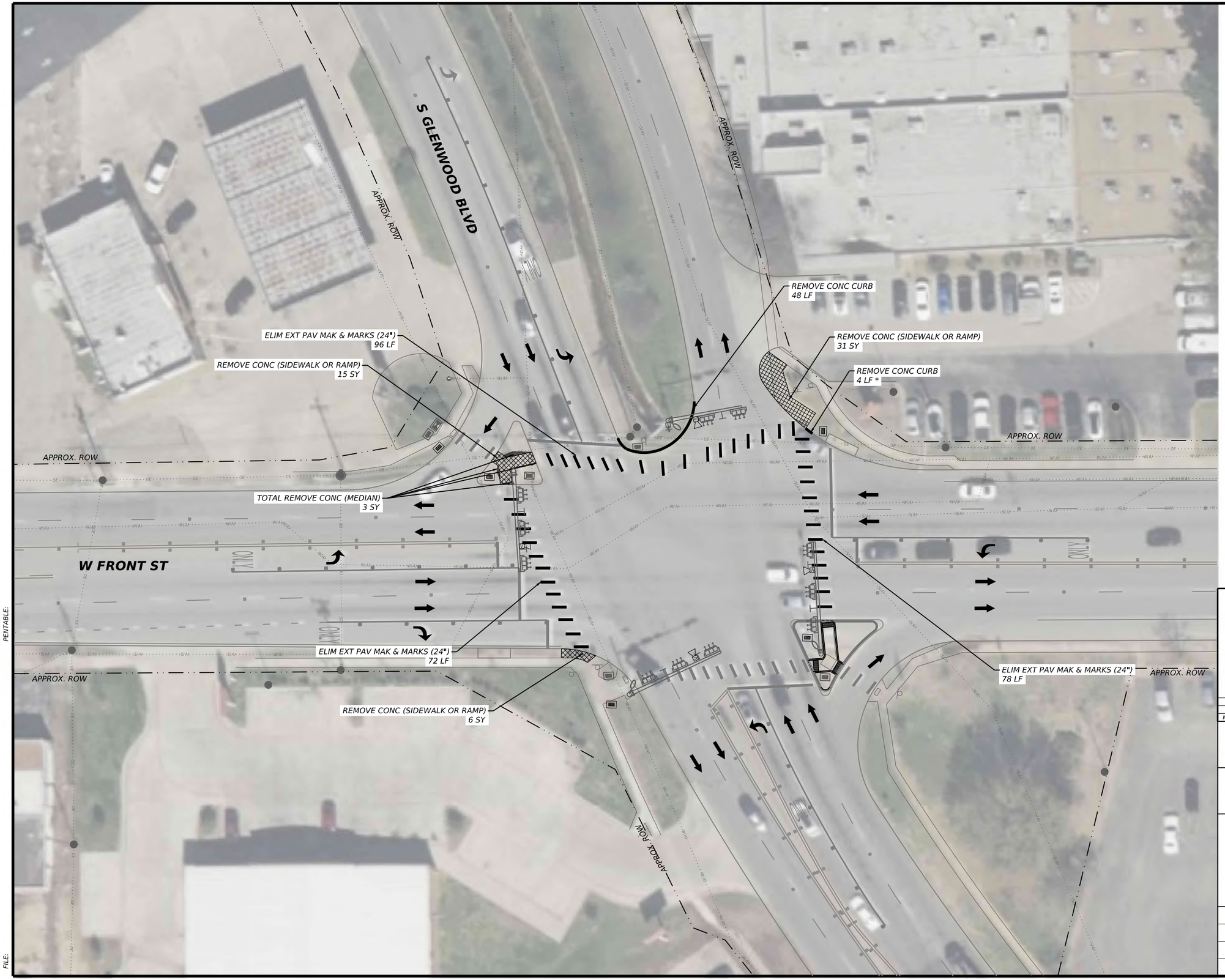
DETAIL/SUMMARY SHEET

FRONT ST AT BECKHAM AVE

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	26
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

USER:



LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED. SIGNAL POLE W/ PED. PUSH BUTTON & PED. SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- EXIST SIGN
- PROP GROUND BOX
- PROP PED. PUSH BUTTON
- PROP PED. SIGNAL HEAD
- CONDUIT RUN DESIGNATION
- EXIST CONDUIT
- REMOVE CONCRETE CURB
- REMOVE PAVERS
- REMOVE SIDEWALK AND CURB RAMP
- REMOVE MEDIAN

* NO PAYMENT WILL BE MADE FOR REMOVAL OF EXISTING CURB AND GUTTER. THE COST WILL BE INCIDENTAL TO THE INSTALLATION OF CURB RAMP

0 20 40

SCALE: 1" = 40'

PLOT DRIVER:
PENTABLE:
DATE:
FILE:

STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER
05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

REMOVAL SHEET

FRONT ST AT GLENWOOD BLVD

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	27
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

USER:

1. CAUTION: UNDERGROUND UTILITIES MAY BE PRESENT.

S GLENWOOD BLVD

APPROX. ROW

INSTALL MEDIAN
2 SY

INSTALL TY 22 RAMP
3 EA

DETAIL AT NW CORNER

INSTALL TY 21 RAMP
2 EA

INSTALL DIRECTIONAL ISLAND
12 SY

INSTALL DIRECTIONAL ISLAND
31 SY

R=21'
6'
12'
R=6'
R=10'
R=10'

MEDIAN DETAIL**

** REFER TO SHEET CONCRETE DIRECTIONAL ISLAND DETAILS FOR MORE INFO.

INSTALL TY 1 RAMP

INSTALL SIDEWALK
3 SY

INSTALL TY 7 RAMP

BEGL

DETAIL AT NE CORNER

PROP CURB (TY II)
26 LF

PROP SODDING
20 SY

EXIST SIGNS TO BE RELOCATED

D 42 LF

D 42 LF

1.

BIODEG EROSN CONT LOGS
14 LF

D 96 LF

D 78 LF

W FRONT ST

BIODEG EROSN CONT LOGS
14 SY

EXIST SIGN TO BE RELOCATED

INSTALL TY 7 RAMP

DETAIL AT SW CORNER

LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED. SIGNAL POLE W/ PED. PUSH BUTTON & PED. SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- EXIST SIGN
- PROP GROUND BOX
- PROP PED. PUSH BUTTON
- PROP PED. SIGNAL HEAD
- CONDUIT RUN DESIGNATION
- EXIST CONDUIT
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP SIGN
- D PREFAB PAV MRK TY C (W) (24") (SLD)
- CONCRETE SIDEWALK
- CONCRETE MEDIAN
- CONCRETE PAVERS
- RIPRAP
- BLOCK SOD
- BIODEG EROSN LOGS (INSTL) (20")

0 10 20
SCALE: 1" = 20'
PED RAMP DET

0 20 40
SCALE: 1" = 40'

STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER

05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED SIGN AND SIDEWALK IMPROVEMENT

FRONT ST AT GLENWOOD BLVD

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	TYL	SMITH	28
CHECK IEI	CONTROL	SECTION	JOB	
	0910	16	187	

PLOT DRIVER: PENTABLE:
DATE:
FILE:
USER:

PROPOSED SIGNALS

COUNTDOWN PEDESTRIAN SIGNAL HEAD

W1,W2,W3,W4, W5,W6,W7,W8

S GLENWOOD BLVD

W FRONT ST

APPROX. ROW

DETAIL AT NW CORNER

DETAIL AT NE CORNER

DETAIL AT SW CORNER

DETAIL AT SE CORNER

PROPOSED SIGNS

R10-3eL (9x15)

PB1,PB3,PB5 PB6,PB7,PB8

R10-3eR (9x15)

PB2,PB4

LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED. SIGNAL POLE W/ PED. PUSH BUTTON & PED. SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- EXIST SIGN
- PROP GROUND BOX
- PROP PED. PUSH BUTTON
- PROP PED. SIGNAL HEAD
- CONDUIT RUN DESIGNATION
- EXIST CONDUIT
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP SIGN
- CONCRETE MEDIAN
- CONCRETE PAVERS
- RIPRAP

SCALE: 1" = 20' PED RAMP DET

SCALE: 1" = 40'

STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER

05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED CONDITION

FRONT ST AT GLENWOOD BLVD

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	TYL	SMITH	29
CHECK IEI	CONTROL	SECTION	JOB	
	0910	16	187	

PLOT DRIVER: PENTABLE:

DATE:

FILE:

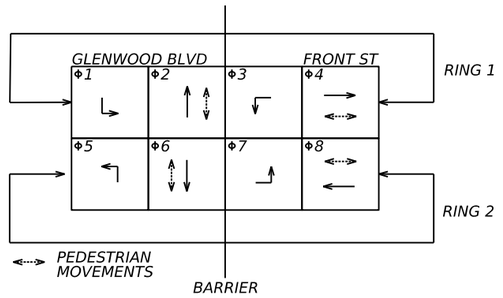
USER:

CABLE TERMINATION CHART																	
CNDR. NO.	CONDR. COLOR	CABLE 1 FROM POLE P-1 TO CNTRL. 5 CNDR.	CABLE 2 FROM POLE P-2 TO CNTRL. 5 CNDR.	CABLE 3 FROM POLE P-3 TO CNTRL. 5 CNDR.	CABLE 4 FROM POLE P-4 TO CNTRL. 5 CNDR.	CABLE 5 FROM POLE P-5 TO CNTRL. 5 CNDR.	CABLE 6 FROM POLE P-6 TO CNTRL. 5 CNDR.	CABLE 7 FROM POLE P-7 TO CNTRL. 5 CNDR.	CABLE 8 FROM POLE E-1 TO CNTRL. 5 CNDR.	CABLE 9 FROM POLE P-1 TO CNTRL. 2 CNDR.	CABLE 10 FROM POLE P-2 TO CNTRL. 2 CNDR.	CABLE 11 FROM POLE P-3 TO CNTRL. 2 CNDR.	CABLE 12 FROM POLE P-4 TO CNTRL. 2 CNDR.	CABLE 13 FROM POLE P-5 TO CNTRL. 2 CNDR.	CABLE 14 FROM POLE P-6 TO CNTRL. 2 CNDR.	CABLE 15 FROM POLE P-7 TO CNTRL. 2 CNDR.	CABLE 16 FROM POLE E-1 TO CNTRL. 2 CNDR.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	PH 6 PED. CALL	PH 8 PED. CALL	PH 8 PED. CALL	PH 2 PED. CALL	PH 2 PED. CALL	PH 4 PED. CALL	PH 6 PED. CALL	PH 4 PED. CALL
2	WHITE	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM
3	RED	PH 6 DW	PH 8 DW	PH 8 DW	PH 2 DW	PH 2 DW	PH 4 DW	PH 6 DW	PH 4 DW								
4	GREEN	PH 6 W	PH 8 W	PH 8 W	PH 2 W	PH 2 W	PH 4 W	PH 6 W	PH 4 W								
5	ORANGE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE								

CONDUIT & CONDUCTORS SCHEDULE							
RUN NO.	NO. OF CONDUIT		LENGTH (LF)	BORE (B) TRENCH (T) EXIST (E)	1C #6 AWG BARE	2C #12 AWG APS	5C #14 AWG PED
	2 (IN)	3 (IN)					
1			10	E		8	8
2			30	E		8	8
3	1		10	B	1	1	1
4	1		40	B	1	1	1
5	1		45	B	1	1	1
6	1		25	B	1	1	1
7			90	E		2	2
8	1		30	B	1	1	1
9		1	20	E		1	1
10			90	E		4	4
11	1		10	B	1	1	1
12	1		40	B	1	1	1
13			115	E		6	6
TOTAL (LF)	200	20	-	-	200	1770	1770

POLE AND ARM WIRING		
POLE	2C #12 AWG APS	5C #14 AWG PED
P-1	5	10
P-2	5	10
P-3	5	10
P-4	5	10
P-5	5	10
P-6	5	10
P-7	5	10
E-1	10	20
TOTAL (FT)	45	90

POLE SCHEDULE								
POLE	P-1	P-2	P-3	P-4	P-5	P-6	P-7	E-1
POLE STATUS	PROP	PROP	PROP	PROP	PROP	PROP	PROP	EXIST
FOUNDATION TYPE	24-A	24-A	24-A	24-A	24-A	24-A	24-A	EXIST
LED SIGNAL INDICATIONS	DW	DW	DW	DW	DW	DW	DW	DW
	W	W	W	W	W	W	W	W



STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER
05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

DETAIL/SUMMARY SHEET

FRONT ST AT GLENWOOD BLVD

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	TYL	SMITH	30
CHECK IEI	CONTROL	SECTION	JOB	
	0910	16	187	

PLOT DRIVER:
PENTABLE:

DATE:
FILE:

USER:

APS MESSAGE CHART			
POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-1	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS FRONT STREET AT GLENWOOD AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FRONT STREET AT GLENWOOD AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-2	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS GLENWOOD AVENUE AT FRONT STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS GLENWOOD AVENUE AT FRONT STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-3	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS GLENWOOD AVENUE AT FRONT STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS GLENWOOD AVENUE AT FRONT STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-4	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS FRONT STREET AT GLENWOOD AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FRONT STREET AT GLENWOOD AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-5	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS FRONT STREET AT GLENWOOD AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FRONT STREET AT GLENWOOD AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-6	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS GLENWOOD AVENUE AT FRONT STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS GLENWOOD AVENUE AT FRONT STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-7	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS FRONT STREET AT GLENWOOD AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FRONT STREET AT GLENWOOD AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
E-1	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS GLENWOOD AVENUE AT FRONT STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS GLENWOOD AVENUE AT FRONT STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE

*COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

PLOT DRIVER:
PENTABLE:

DATE:
FILE:

STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER
05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

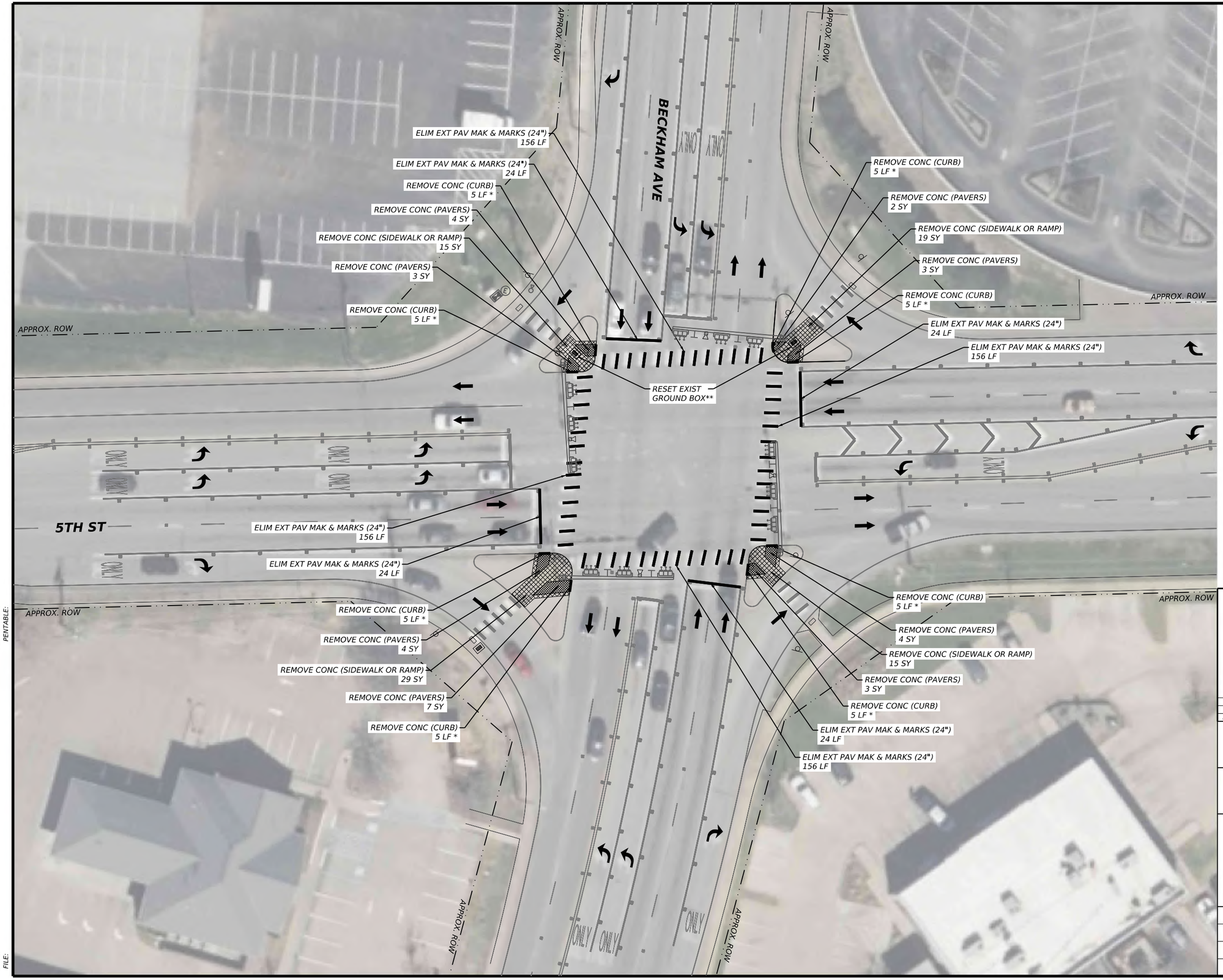
DETAIL/SUMMARY SHEET

FRONT ST AT GLENWOOD BLVD

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	TYL	SMITH	31
CHECK IEI	CONTROL	SECTION	JOB	
	0910	16	187	

USER:



LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED. SIGNAL POLE W/ PED. PUSH BUTTON & PED. SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- EXIST SIGN
- PROP GROUND BOX
- PROP PED. PUSH BUTTON
- PROP PED. SIGNAL HEAD
- CONDUIT RUN DESIGNATION
- EXIST CONDUIT
- REMOVE CONCRETE CURB
- REMOVE PAVERS
- REMOVE SIDEWALK AND CURB RAMP
- REMOVE MEDIAN

* NO PAYMENT WILL BE MADE FOR REMOVAL OF EXISTING CURB AND GUTTER. THE COST WILL BE INCIDENTAL TO THE INSTALLATION OF CURB RAMP

** NO ADDITIONAL PAYMENT WILL BE MADE FOR RESETTING GROUND BOX. THE COST WILL BE INCIDENTAL TO THE CONSTRUCTION OF CURB RAMP

0 20 40

SCALE: 1" = 40'

PLOT DRIVER: PENTABLE:

DATE: FILE:

STATE OF TEXAS
NAZLIE SAEEDI
131673
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PROFESSIONAL ENGINEER
05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

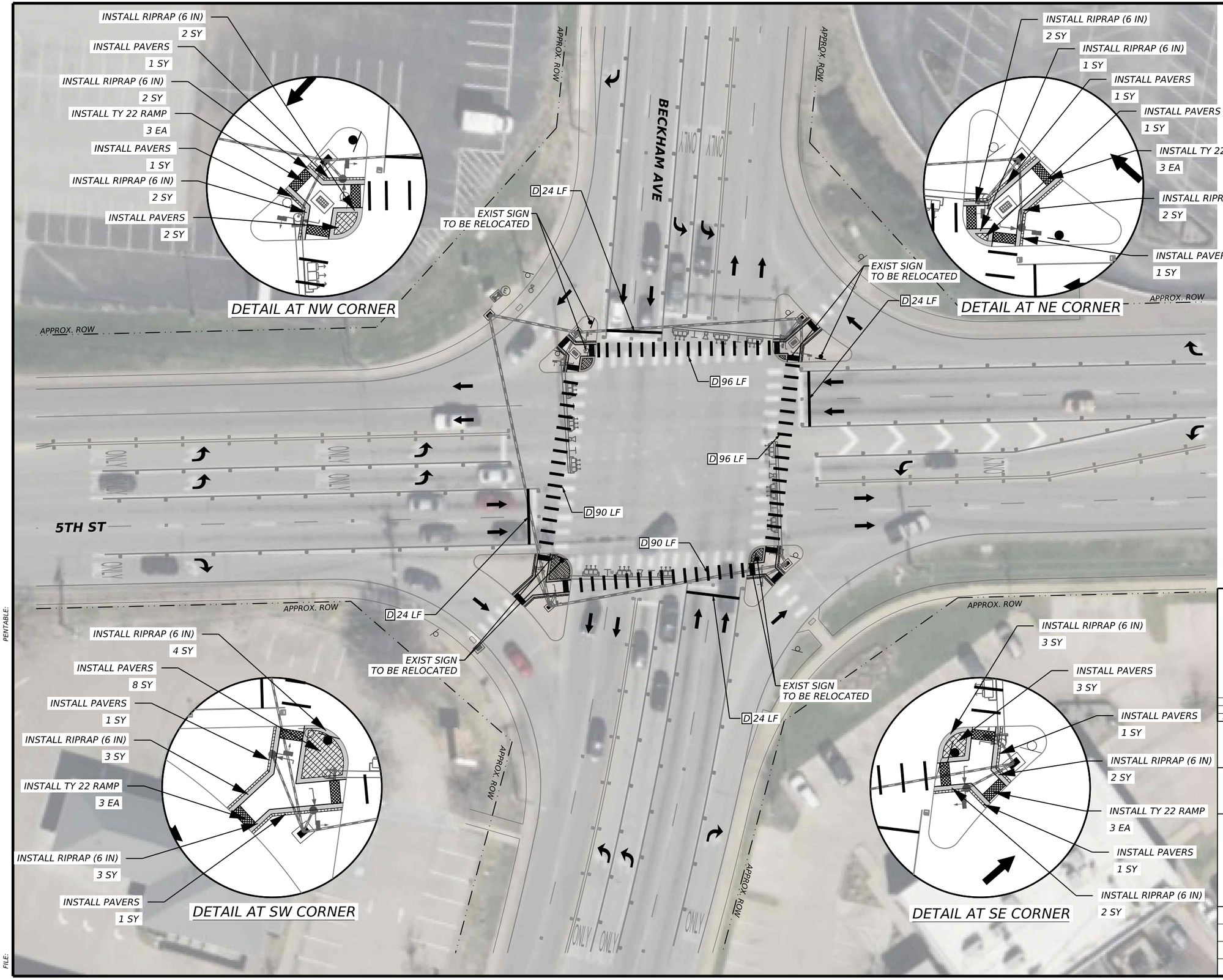
REMOVAL SHEET

5TH ST AT BECKHAM AVE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	32
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

USER:



LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED. SIGNAL POLE W/ PED. PUSH BUTTON & PED. SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- EXIST SIGN
- PROP GROUND BOX
- PROP PED. PUSH BUTTON
- PROP PED. SIGNAL HEAD
- CONDUIT RUN DESIGNATION
- EXIST CONDUIT
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP SIGN
- PREFAB PAV MRK TY C (W) (24") (SLD)
- CONCRETE SIDEWALK
- CONCRETE MEDIAN
- CONCRETE PAVERS
- RIPRAP
- BLOCK SOD
- BIODEG EROSN LOGS (INSTL) (20")

0 10 20 — SCALE: 1" = 20' PED RAMP DET

0 20 40 — SCALE: 1" = 40'

STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER
05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED SIGN AND SIDEWALK IMPROVEMENTS

5TH ST AT BECKHAM AVE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	33
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

PLOT DRIVER: PENTABLE:

DATE:

FILE:

USER:

PROPOSED SIGNALS

COUNTDOWN PEDESTRIAN SIGNAL HEAD

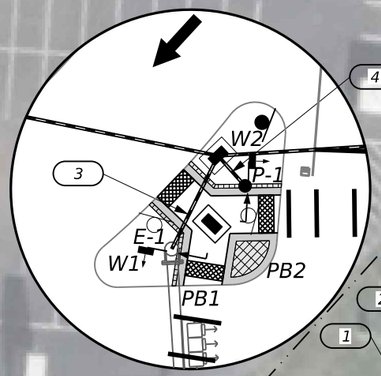
W1,W2,W3,W4, W5,W6,W7,W8

BECKHAM AVE

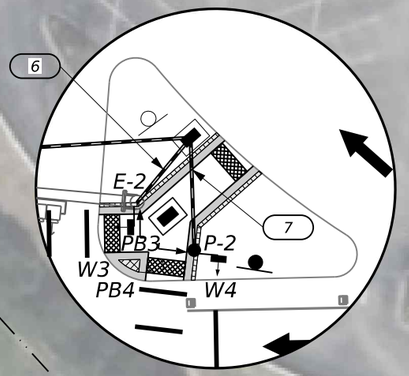
5TH ST

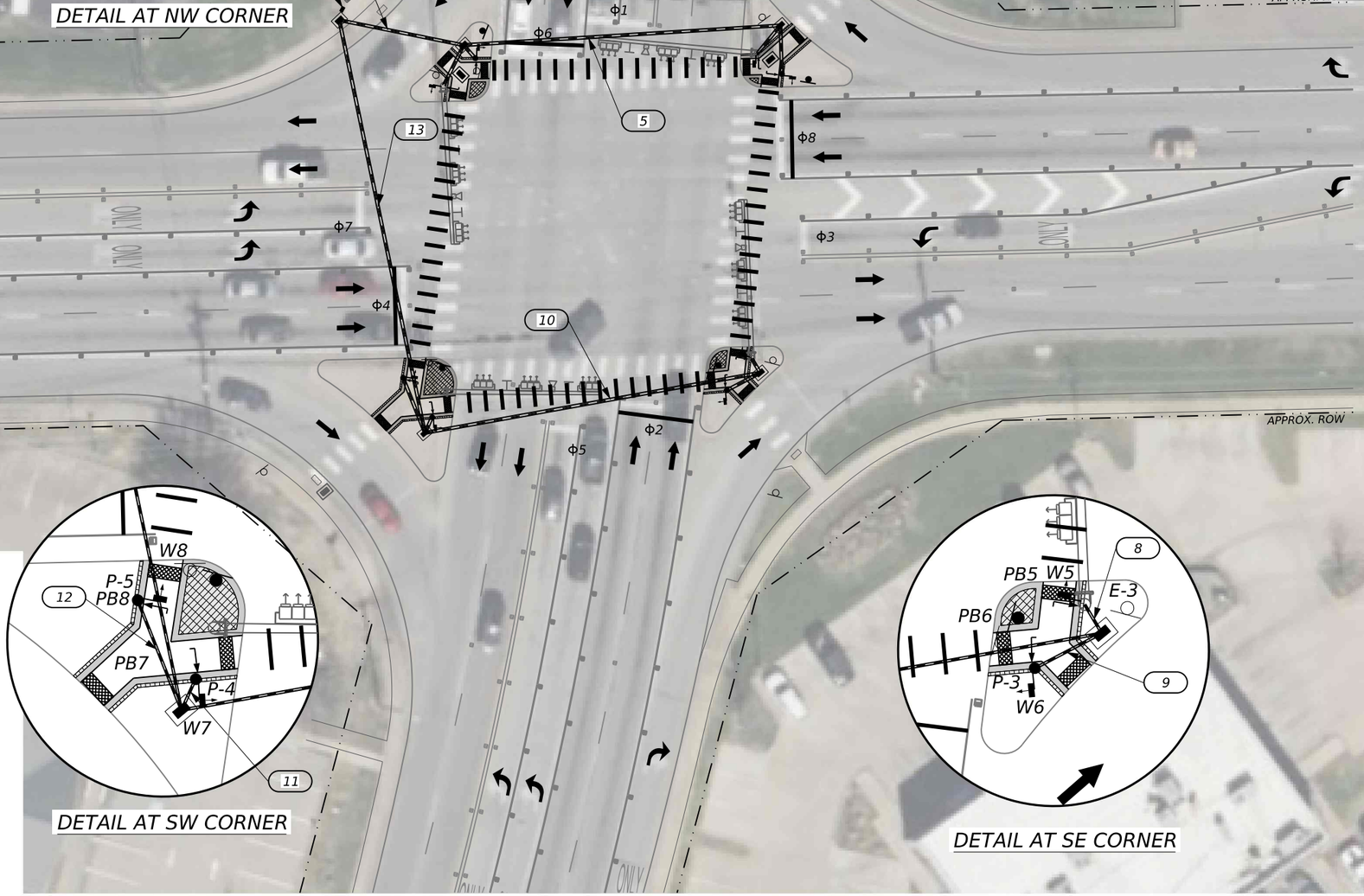
APPROX. ROW

DETAIL AT NW CORNER



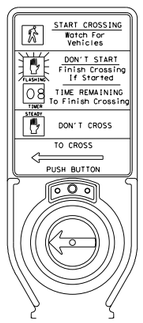
DETAIL AT NE CORNER





PROPOSED SIGNS

R10-3eL (9x15)



R10-3eR (9x15)

DETAIL AT SW CORNER

DETAIL AT SE CORNER

LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED. SIGNAL POLE W/ PED. PUSH BUTTON & PED. SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- EXIST SIGN
- PROP GROUND BOX
- PROP PED. PUSH BUTTON
- PROP PED. SIGNAL HEAD
- (X) CONDUIT RUN DESIGNATION
- EXIST CONDUIT
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)
- PROP SIGN
- CONCRETE MEDIAN
- CONCRETE PAVERS
- RIPRAP

SCALE: 1" = 20' PED RAMP DET

SCALE: 1" = 40'

STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER

05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED CONDITION

5TH ST AT BECKHAM AVE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	TYL	SMITH	34
CHECK IEI	CONTROL	SECTION	JOB	
	0910	16	187	

PLOT DRIVER: PENTABLE:

DATE:

FILE:

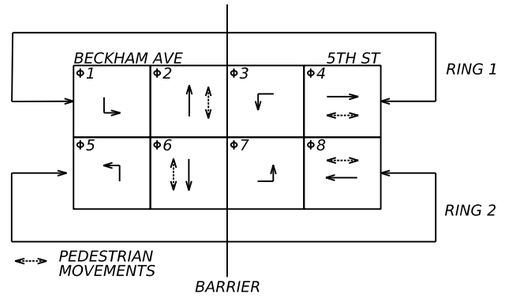
USER:

CABLE TERMINATION CHART																	
CNDR. NO.	CONDR. COLOR	CABLE 1 FROM POLE P-1 TO CNTRL. 5 CNDR.	CABLE 2 FROM POLE P-2 TO CNTRL. 5 CNDR.	CABLE 3 FROM POLE P-3 TO CNTRL. 5 CNDR.	CABLE 4 FROM POLE P-4 TO CNTRL. 5 CNDR.	CABLE 5 FROM POLE P-5 TO CNTRL. 5 CNDR.	CABLE 6 FROM POLE E-1 TO CNTRL. 5 CNDR.	CABLE 7 FROM POLE E-2 TO CNTRL. 5 CNDR.	CABLE 8 FROM POLE E-3 TO CNTRL. 5 CNDR.	CABLE 9 FROM POLE P-1 TO CNTRL. 2 CNDR.	CABLE 10 FROM POLE P-2 TO CNTRL. 2 CNDR.	CABLE 11 FROM POLE P-3 TO CNTRL. 2 CNDR.	CABLE 12 FROM POLE P-4 TO CNTRL. 2 CNDR.	CABLE 13 FROM POLE P-5 TO CNTRL. 2 CNDR.	CABLE 14 FROM POLE E-1 TO CNTRL. 2 CNDR.	CABLE 15 FROM POLE E-2 TO CNTRL. 2 CNDR.	CABLE 16 FROM POLE E-3 TO CNTRL. 2 CNDR.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	PH 8 PED. CALL	PH 2 PED. CALL	PH 4 PED. CALL	PH 4 PED. CALL	PH 6 PED. CALL	PH 6 PED. CALL	PH 8 PED. CALL	PH 2 PED. CALL
2	WHITE	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM
3	RED	PH 8 DW	PH 2 DW	PH 4 DW	PH 4 DW	PH 6 DW	PH 6 DW	PH 8 DW	PH 2 DW								
4	GREEN	PH 8 W	PH 2 W	PH 4 W	PH 4 W	PH 6 W	PH 6 W	PH 8 W	PH 2 W								
5	ORANGE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE								

CONDUIT & CONDUCTORS SCHEDULE								
RUN NO.	NO. OF CONDUIT			LENGTH (LF)	BORE (B) TRENCH (T) EXIST (E)	1C #6 AWG BARE	2C #12 AWG APS	5C #14 AWG PED
	2 (IN)	3 (IN)	4 (IN)					
1	1			10	T	1	8	8
2	1			40	B	1	4	4
3		1		20	B	1	1	1
4	1			10	B	1	1	1
5			1	100	B	1	2	2
6		1		15	B	1	1	1
7	1			20	B	1	1	1
8		1		10	B	1	1	1
9	1			15	B	1	1	1
10			1	110	B	1	2	2
11	1			10	B	1	1	1
12	1			20	B	1	1	1
13			1	130	B	1	4	4
TOTAL (LF)	125	45	340	-	-	510	1300	1300

POLE AND ARM WIRING		
POLE	2C #12 AWG APS	5C #14 AWG PED
P-1	5	10
P-2	5	10
P-3	5	10
P-4	5	10
P-5	5	10
E-1	10	20
E-2	10	20
E-3	10	20
TOTAL (FT)	55	110

POLE SCHEDULE								
POLE	P-1	P-2	P-3	P-4	P-5	E-1	E-2	E-3
POLE STATUS	PROP	PROP	PROP	PROP	PROP	EXIST	EXIST	EXIST
FOUNDATION TYPE	24-A	24-A	24-A	24-A	24-A	EXIST	EXIST	EXIST
LED SIGNAL INDICATIONS	DW	DW	DW	DW	DW	DW	DW	DW
	W	W	W	W	W	W	W	W



STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER
05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

DETAIL/SUMMARY SHEET

5TH ST AT BECKHAM AVE

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	
CHECK	CONTROL	SECTION	JOB	35
IEI	0910	16	187	
CHECK				
IEI				

PLOT DRIVER: PENTABLE:
DATE:
FILE:
USER:

APS MESSAGE CHART			
POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-1	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS BECKHAM AVENUE AT FIFTH STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS BECKHAM AVENUE AT FIFTH STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-2	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS FIFTH STREET AT BECKHAM AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FIFTH STREET AT BECKHAM AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION	FIFTH STREET. WALK SIGN IS ON TO CROSS FIFTH STREET
P-3	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS BECKHAM AVENUE AT FIFTH STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS BECKHAM AVENUE AT FIFTH STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-4	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS BECKHAM AVENUE AT FIFTH STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS BECKHAM AVENUE AT FIFTH STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-5	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS FIFTH STREET AT BECKHAM AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FIFTH STREET AT BECKHAM AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
E-1	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS FIFTH STREET AT BECKHAM AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FIFTH STREET AT BECKHAM AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
E-2	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS BECKHAM AVENUE AT FIFTH STREET
		EXTENDED BUTTON PUSH	WAIT TO CROSS BECKHAM AVENUE AT FIFTH STREET
		LOCATOR TONE	SLOW TICK
		WALK INDICATION	BECKHAM AVENUE. WALK SIGN IS ON TO CROSS BECKHAM AVENUE
E-3	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS FIFTH STREET AT BECKHAM AVENUE
		EXTENDED BUTTON PUSH	WAIT TO CROSS FIFTH STREET AT BECKHAM AVENUE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE

*COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

PLOT DRIVER:
PENTABLE:

DATE:
FILE:

STATE OF TEXAS
NAZLIE SAEEDI
131673
LICENSED
PROFESSIONAL ENGINEER
05/23/2024

NO.	DATE	REVISION	APPROVED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TEXAS REGISTERED ENGINEERING FIRM F-739

Texas Department of Transportation

CARBON REDUCTION PROJECTS

DETAIL/SUMMARY SHEET

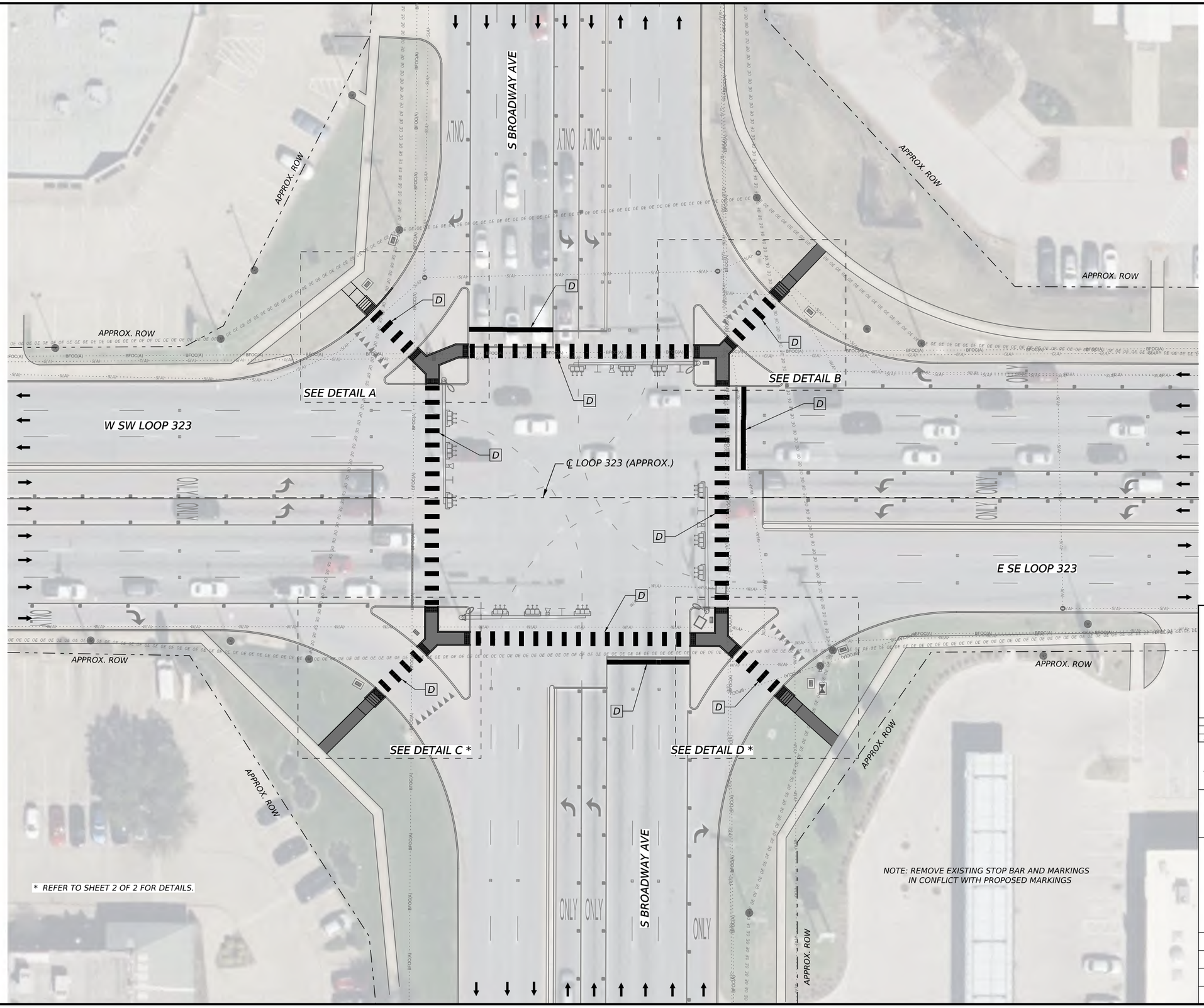
5TH ST AT BECKHAM AVE

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	TYL	SMITH	36
CHECK IEI	CONTROL	SECTION	JOB	
	0910	16	187	

USER:

100% SUBMITTAL



LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED SIGNAL POLE W/ PED PUSH BUTTON & PED SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- PROP TRAFFIC SIGN
- PROP CONSTRUCTION AREA
- PROP RED-COLORED STAMPED CONCRETE
- PROP DETECTABLE WARNING SURFACE
- PROP BLOCK SODDING
- [A] RE PM W/RET REQ TY I (W) 6" (SLD)
- [B] RE PM W/RET REQ TY I (Y) 6" (SLD)
- [C] REFL PAV MRK TY I (W) 8" (SLD)
- [D] PREFAB PAV MRK TY C (W) (24") (SLD)
- [E] REFL PAV MRKR TY II-A-A
- [F] REFL PAV MRKR TY I-C
- [G] REFL PAV MRK TY I (W) 18" (YLD TRI) (≤ 40MPH)

0 20 40

SCALE: 1" = 40'

5/21/2024

NO.	DATE	REVISION	APPROVED

infraTECH
Engineers & Innovators, LLC
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED PAVEMENT MARKINGS AND PEDESTRIAN RAMPS

S BROADWAY AVE AT LOOP 323

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6	SEE TITLE SHEET		VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	37
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

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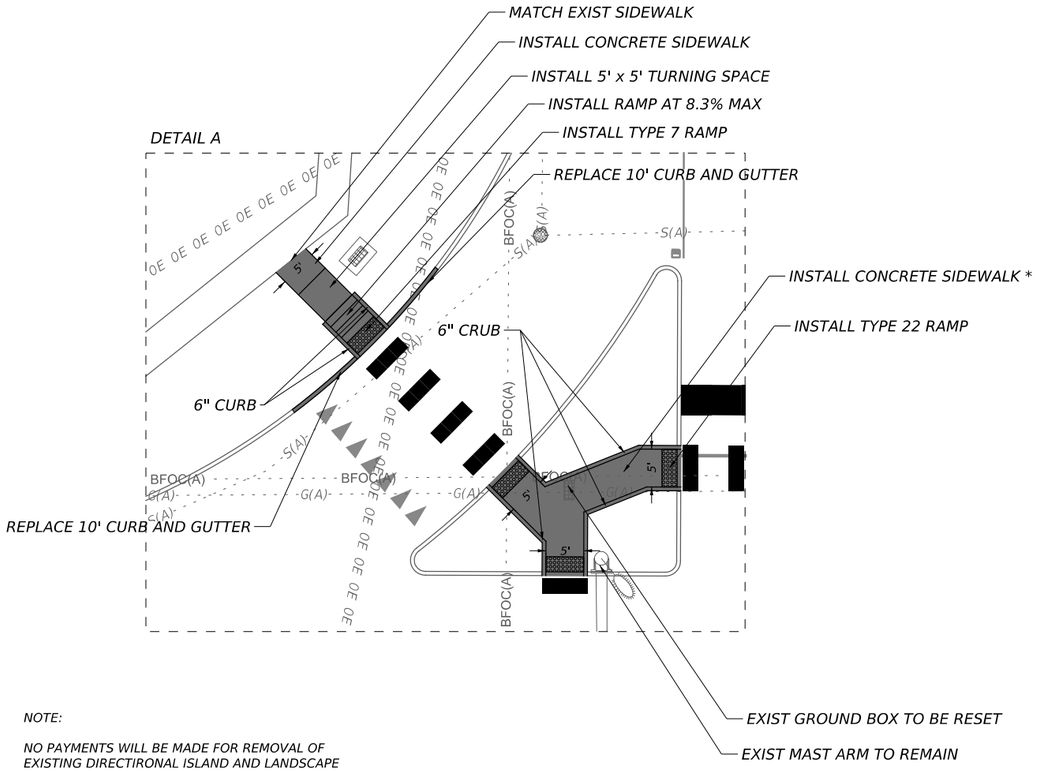
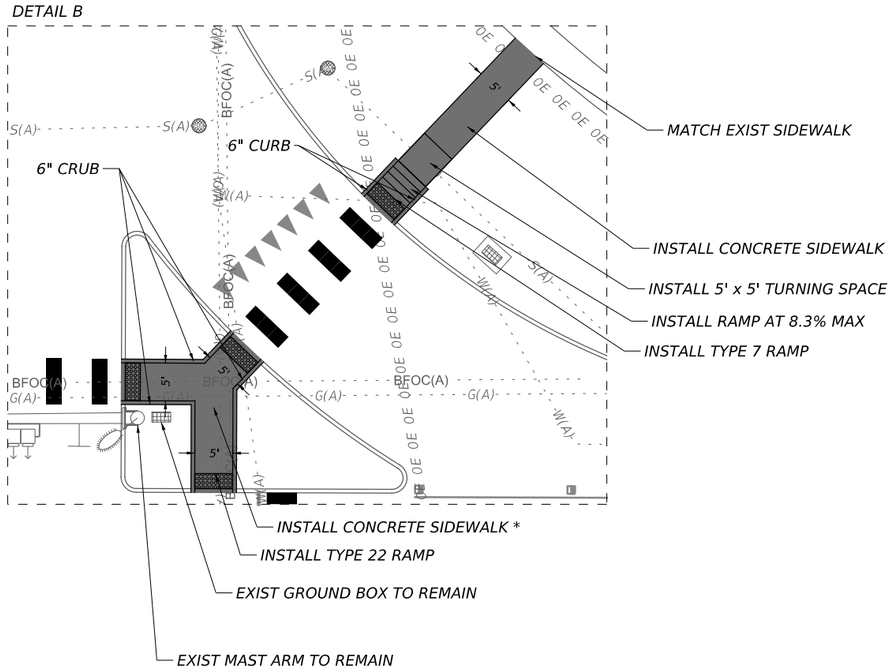




LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED SIGNAL POLE W/ PED PUSH BUTTON & PED SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- PROP TRAFFIC SIGN
- PROP CONSTRUCTION AREA
- PROP RED-COLORED STAMPED CONCRETE
- PROP DETECTABLE WARNING SURFACE
- PROP BLOCK SODDING
- [A] RE PM W/RET REQ TY I (W) 6" (SLD)
- [B] RE PM W/RET REQ TY I (Y) 6" (SLD)
- [C] REFL PAV MRK TY I (W) 8" (SLD)
- [D] PREFAB PAV MRK TY C (W) (24") (SLD)
- [E] REFL PAV MRKR TY II-A-A
- [F] REFL PAV MRKR TY I-C
- [G] REFL PAV MRK TY I (W) 18" (YLD TRI) (≤ 40MPH)

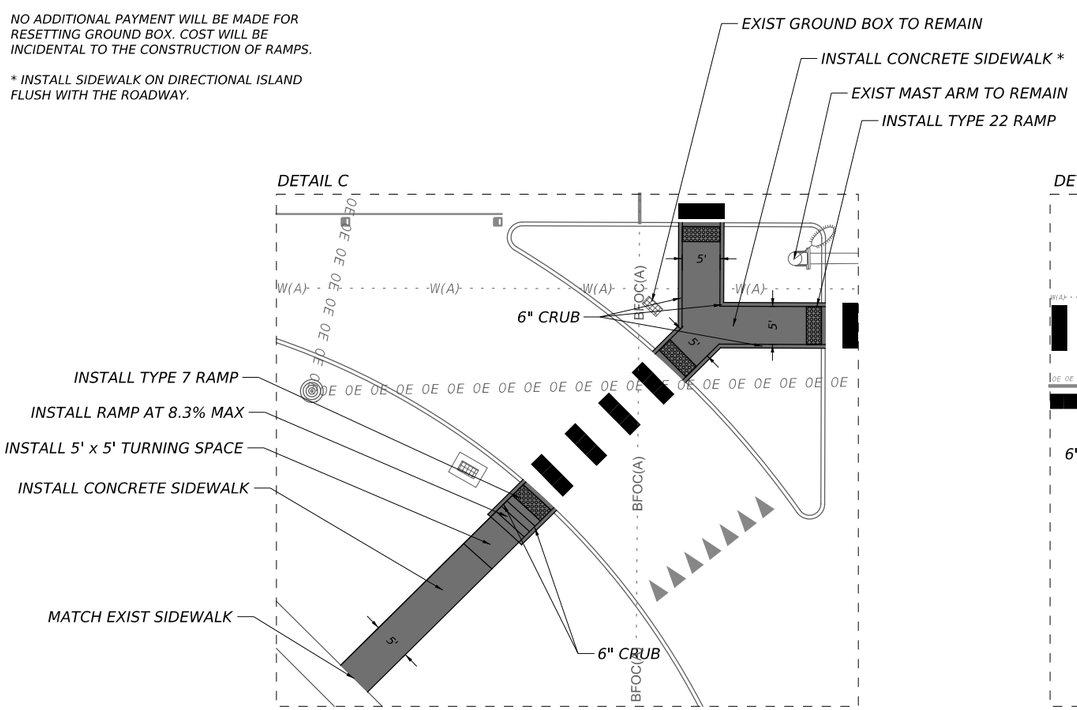
NOTE:

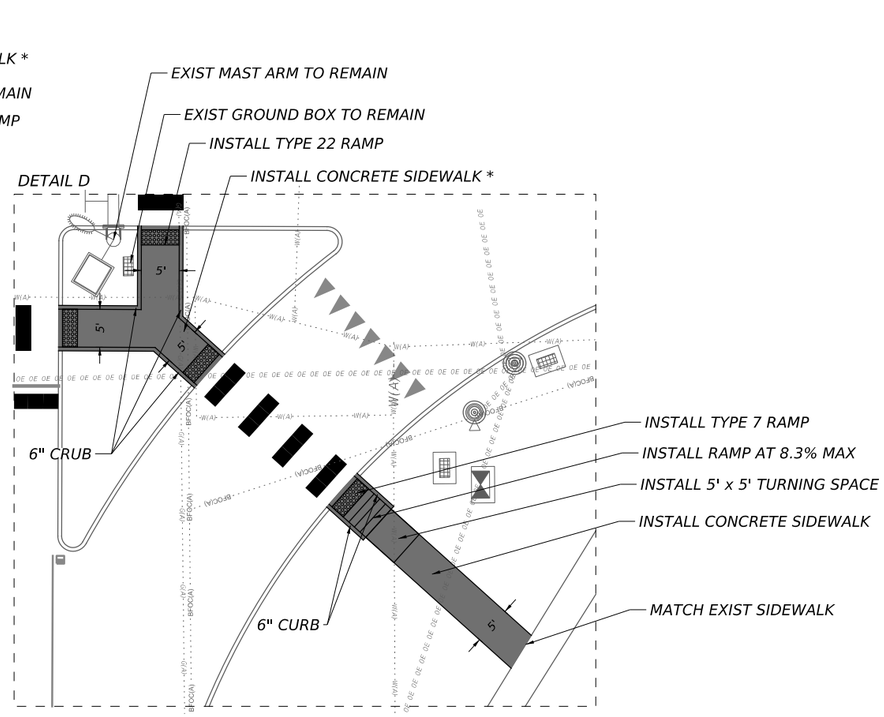
NO PAYMENTS WILL BE MADE FOR REMOVAL OF EXISTING DIRECTIRONAL ISLAND AND LANDSCAPE PAVERS. THE COST WILL BE INCIDENTAL TO THE CONSTRUCTION OF RAMPS AND SIDEWALK, MATCH WITH EXISTING DESIGN.

NO ADDITIONAL PAYMENT WILL BE MADE FOR RESETTING GROUND BOX. COST WILL BE INCIDENTAL TO THE CONSTRUCTION OF RAMPS.

* INSTALL SIDEWALK ON DIRECTIONAL ISLAND FLUSH WITH THE ROADWAY.

0 10 20
SCALE: 1" = 20'





STATE OF TEXAS
ZAHIDUL Q. SIDDIQUE
98635
LICENSED
PROFESSIONAL ENGINEER
5/21/2024

NO.	DATE	REVISION	APPROVED

infraTECH
Engineers & Innovators, LLC
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED PAVEMENT MARKINGS AND PEDESTRIAN RAMPS

S BROADWAY AVE AT LOOP 323

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6	SEE TITLE SHEET		VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	38
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

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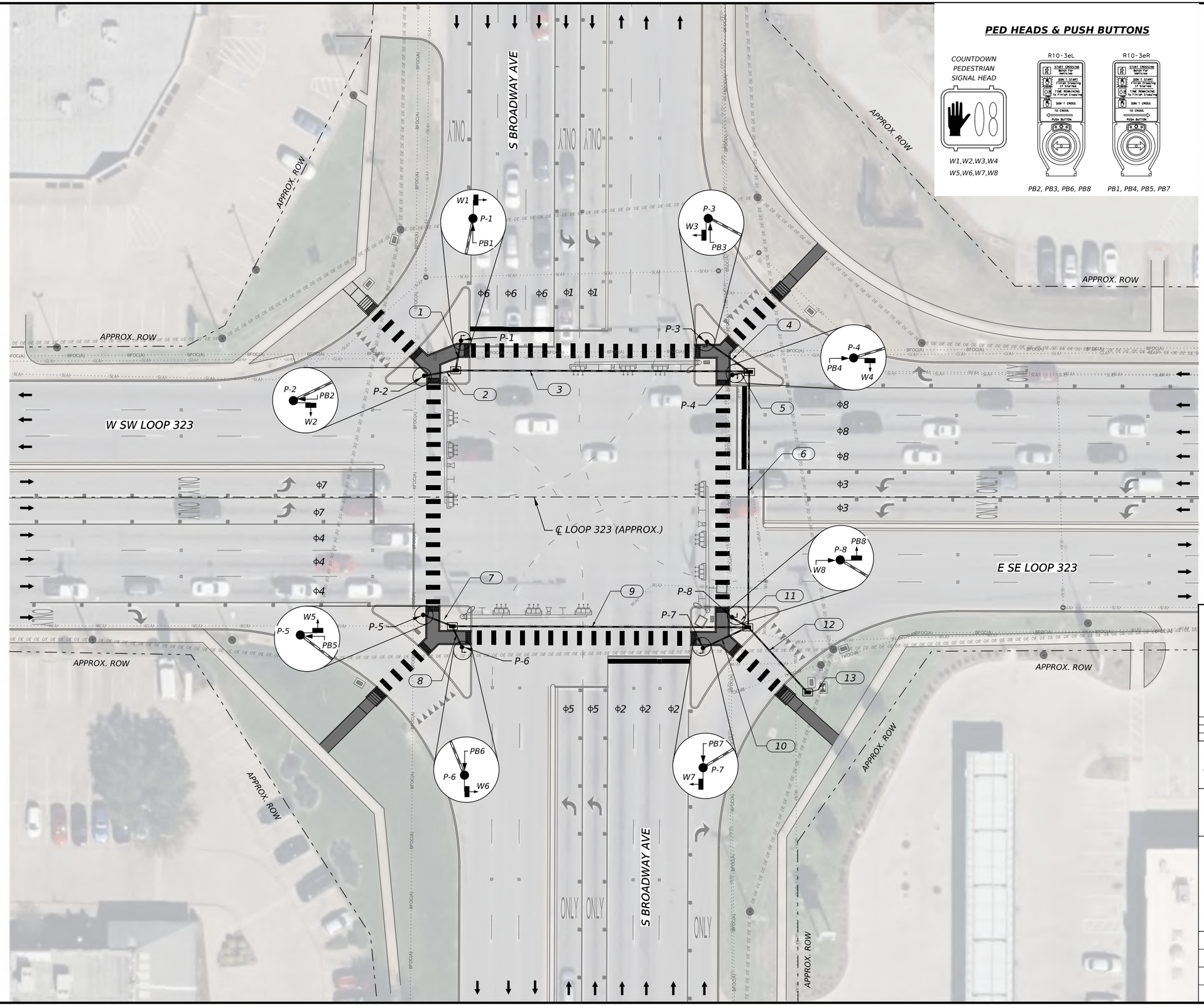
USER:

100% SUBMITTAL



PED HEADS & PUSH BUTTONS

COUNTDOWN PEDESTRIAN SIGNAL HEAD

W1,W2,W3,W4
W5,W6,W7,W8

R10-3eL

PB2, PB3, PB6, PB8

R10-3eR

PB1, PB4, PB5, PB7

LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED. SIGNAL POLE W/ PED. PUSH BUTTON & PED. SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- PROP GROUND BOX
- PROP PED SIGNAL POLE W/ PED PUSH BUTTON & PED SIGNAL HEAD
- PROP VIDEO DETECTOR
- PROP VEHICLE DETECTION ZONE
- (X) CONDUIT RUN DESIGNATION
- PROP CONDUIT (BORE)
- PROP CONDUIT (TRENCH)

0 20 40
SCALE: 1" = 40'

STATE OF TEXAS
ZAHIDUL Q. SIDDIQUE
98635
LICENSED
PROFESSIONAL ENGINEER
5/21/2024

NO.	DATE	REVISION	APPROVED

infraTECH Engineers & Innovators, LLC
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED CONDITIONS

S BROADWAY AVE AT LOOP 323

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	TYL	SMITH	39
CHECK IEI	CONTROL	SECTION	JOB	
	0910	16	187	

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100% SUBMITTAL

CABLE TERMINATION CHART																	
		CABLE 1	CABLE 2	CABLE 3	CABLE 4	CABLE 5	CABLE 6	CABLE 7	CABLE 8	CABLE 9	CABLE 10	CABLE 11	CABLE 12	CABLE 13	CABLE 14	CABLE 15	CABLE 16
CNDR.	CONDR. COLOR.	FROM POLE P-1 TO CNTRL.	FROM POLE P-2 TO CNTRL.	FROM POLE P-3 TO CNTRL.	FROM POLE P-4 TO CNTRL.	FROM POLE P-5 TO CNTRL.	FROM POLE P-6 TO CNTRL.	FROM POLE P-7 TO CNTRL.	FROM POLE P-8 TO CNTRL.	FROM POLE P-1 TO CNTRL.	FROM POLE P-2 TO CNTRL.	FROM POLE P-3 TO CNTRL.	FROM POLE P-4 TO CNTRL.	FROM POLE P-5 TO CNTRL.	FROM POLE P-6 TO CNTRL.	FROM POLE P-7 TO CNTRL.	FROM POLE P-8 TO CNTRL.
		5 CNDR.	5 CNDR.	5 CNDR.	5 CNDR.	5 CNDR.	5 CNDR.	5 CNDR.	5 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	PH 8 PED. CALL	PH 6 PED. CALL	PH 8 PED. CALL	PH 2 PED. CALL	PH 6 PED. CALL	PH 4 PED. CALL	PH 4 PED. CALL	PH 2 PED. CALL
2	WHITE	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM
3	RED	PH 8 DW	PH 6 DW	PH 8 DW	PH 2 DW	PH 6 DW	PH 4 DW	PH 4 DW	PH 2 DW								
4	GREEN	PH 8 W	PH 6 W	PH 8 W	PH 2 W	PH 6 W	PH 4 W	PH 4 W	PH 2 W								
5	ORANGE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE								

APS MESSAGE CHART			
POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE /SOUND DETAILS
P-1	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS S BORADWAY AVE AT LOOP 323
		EXTENDED BUTTON PUSH	WAIT TO CROSS S BORADWAY AVE AT LOOP 323
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-2	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS LOOP 323 AT S BORADWAY AVE
		EXTENDED BUTTON PUSH	WAIT TO CROSS LOOP 323 AT S BORADWAY AVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-3	PHASE 8	BUTTON PUSH ON DW	WAIT TO CROSS S BORADWAY AVE AT LOOP 323
		EXTENDED BUTTON PUSH	WAIT TO CROSS S BORADWAY AVE AT LOOP 323
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-4	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS LOOP 323 AT S BORADWAY AVE
		EXTENDED BUTTON PUSH	WAIT TO CROSS LOOP 323 AT S BORADWAY AVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-5	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS LOOP 323 AT S BORADWAY AVE
		EXTENDED BUTTON PUSH	WAIT TO CROSS LOOP 323 AT S BORADWAY AVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-6	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS S BORADWAY AVE AT LOOP 323
		EXTENDED BUTTON PUSH	WAIT TO CROSS S BORADWAY AVE AT LOOP 323
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-7	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS S BORADWAY AVE AT LOOP 323
		EXTENDED BUTTON PUSH	WAIT TO CROSS S BORADWAY AVE AT LOOP 323
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	PERCUSSIVE TONE
P-8	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS LOOP 323 AT S BORADWAY AVE
		EXTENDED BUTTON PUSH	WAIT TO CROSS LOOP 323 AT S BORADWAY AVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE

* COUNTDOWN SPEECH MESSAGE ="OFF" FOR ALL UNITS

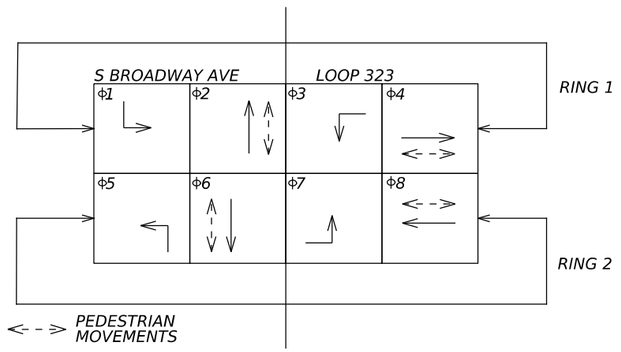
POLE SCHEDULE								
POLE	P-1	P-2	P-3	P-4	P-5	P-6	P-7	P-8
POLE STATUS	PROP	PROP	PROP	PROP	PROP	PROP	PROP	PROP
FOUNDATION TYPE	24-A	24-A	24-A	24-A	24-A	24-A	24-A	24-A
DRILLED SHAFT LENGTH (LF)	6	6	6	6	6	6	6	6
LED SIGNAL INDICATIONS	DW	DW	DW	DW	DW	DW	DW	DW
	W	W	W	W	W	W	W	W

CONDUIT AND CONDUCTORS SCHEDULE							
RUN NO.	NO. OF CONDUIT		LENGTH	BORE (B) TRENCH (T)	1C #6 AWG BARE	2C #12 AWG APS	5C #14 AWG PED
	2 (IN)	4 (IN)					
1	1		14	B	1	1	1
2	1		15	B	1	1	1
3		2	131	B	1	2	2
4	1		24	B	1	1	1
5	1		9	B	1	1	1
6		2	116	B	1	4	4
7	1		15	B	1	1	1
8	1		13	B	1	1	1
9		2	132	B	1	2	2
10	1		24	B	1	1	1
11	1		9	B	1	1	1
12	2		42	B	1	8	8
13	2		9	T	1	8	8
TOTAL	**225**	**758**			**553**	**1,521**	**1,521**

POLE AND ARM WIRING		
POLE	2C#12 AWG APS	5C #14 AWG PED
P-1	5	10
P-2	5	10
P-3	5	10
P-4	5	10
P-5	5	10
P-6	5	10
P-7	5	10
P-8	5	10
TOTAL (FT)	**40**	**80**

GROUND BOX SUMMARY			
ITEM NO.	DESCRIPTION	UNIT	QTY.
624	GROUND BOX TY D (162922) W / APRON	EA	5

PHASING DIAGRAM



STATE OF TEXAS
ZAHIDUL Q. SIDDIQUE
98635
LICENSED
PROFESSIONAL ENGINEER
5/21/2024

NO.	DATE	REVISION	APPROVED

infraTECH Engineers & Innovators, LLC
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

CARBON REDUCTION PROJECTS

DETAIL/SUMMARY SHEET

S BROADWAY AVE AT LOOP 323

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	TYL	SMITH	40
CHECK IEI	CONTROL	SECTION	JOB	
	0910	16	187	

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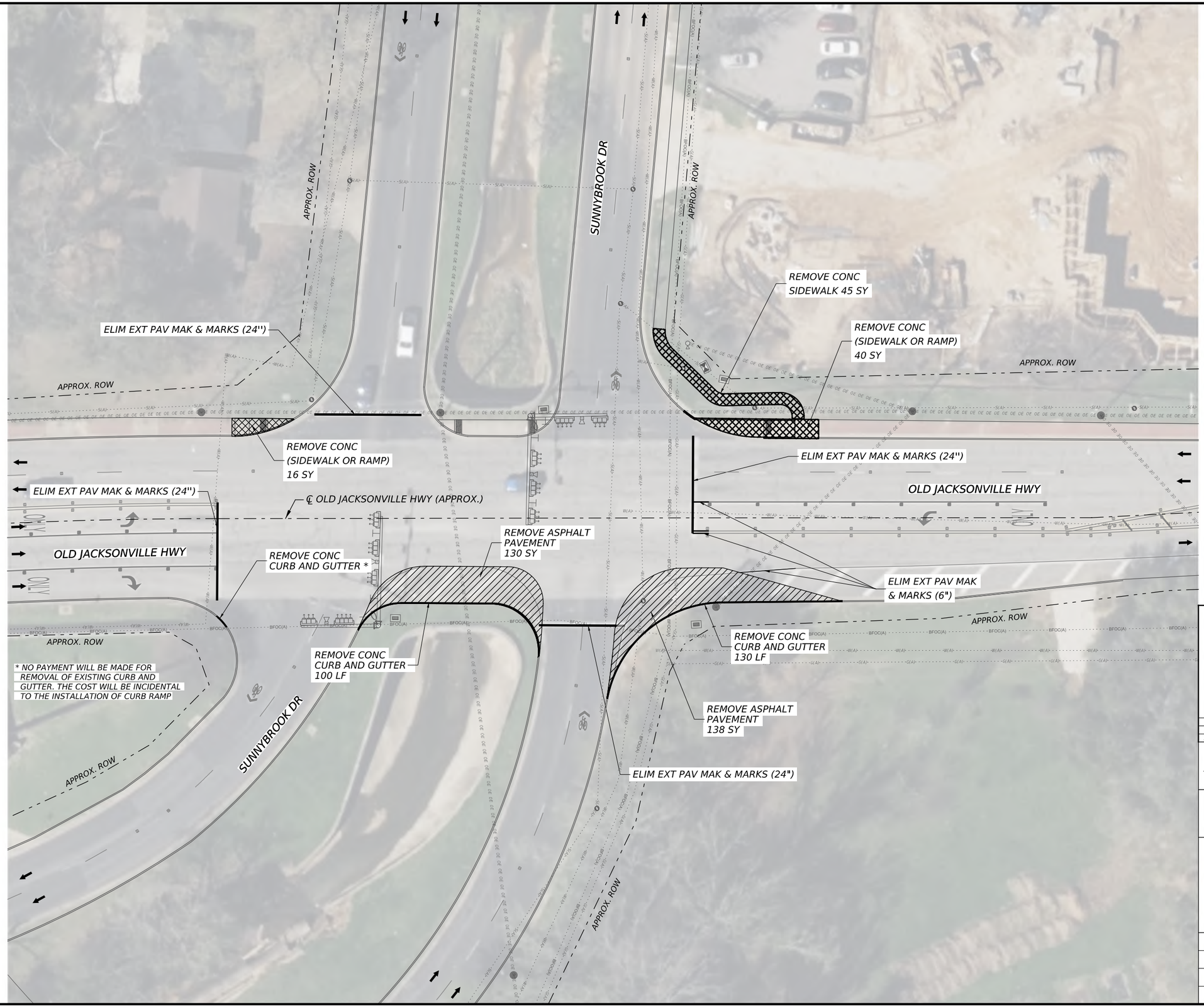

LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED. SIGNAL POLE W/ PED. PUSH BUTTON & PED. SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- REMOVE CONCRETE CURB
- REMOVE ASHPALT PAVEMENT
- REMOVE SIDEWALK AND CURB RAMP

0 20 40

SCALE: 1" = 40'

ZAHIDUL Q. SIDDIQUE
98635
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
5/21/2024

NO.	DATE	REVISION	APPROVED

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042

Texas Department of Transportation

CARBON REDUCTION PROJECTS

REMOVAL LAYOUT

OLD JACKSONVILLE HWY AT
SUNNYBROOK DR

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6	SEE TITLE SHEET		VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	41
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

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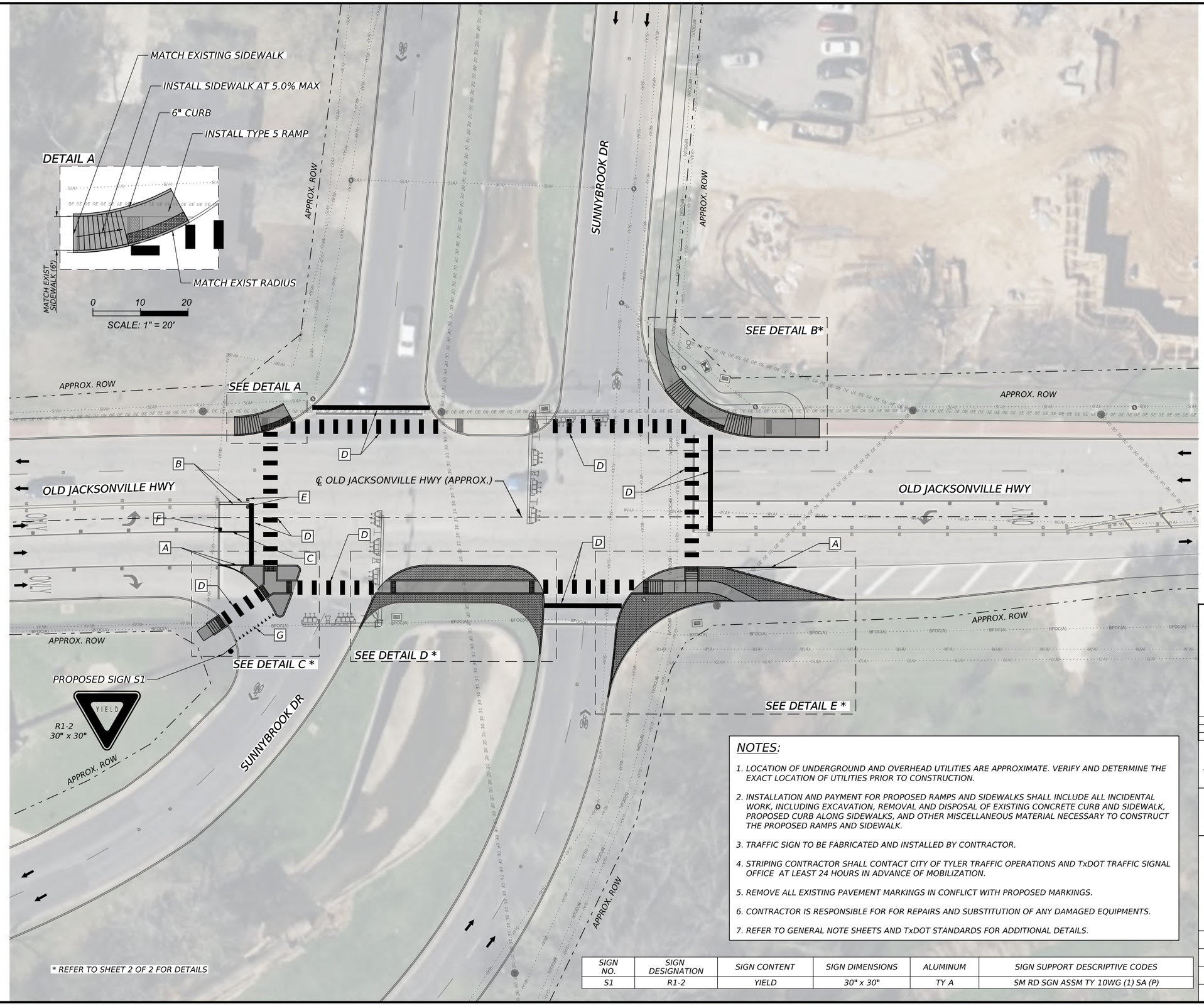

* REFER TO SHEET 2 OF 2 FOR DETAILS

LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED SIGNAL POLE W/ PED PUSH BUTTON & PED SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- PROP TRAFFIC SIGN
- PROP CONSTRUCTION AREA
- PROP RED-COLORED STAMPED CONCRETE
- PROP DETECTABLE WARNING SURFACE
- PROP BLOCK SODDING
- [A] RE PM W/RET REQ TY I (W) 6" (SLD)
- [B] RE PM W/RET REQ TY I (Y) 6" (SLD)
- [C] REFL PAV MRK TY I (W) 8" (SLD)
- [D] PREFAB PAV MRK TY C (W) (24") (SLD)
- [E] REFL PAV MRKR TY II-A-A
- [F] REFL PAV MRKR TY I-C
- [G] REFL PAV MRK TY I (W) 18" (YLD TRI) (≤ 40MPH)

0 20 40
SCALE: 1" = 40'

NOTES:

1. LOCATION OF UNDERGROUND AND OVERHEAD UTILITIES ARE APPROXIMATE. VERIFY AND DETERMINE THE EXACT LOCATION OF UTILITIES PRIOR TO CONSTRUCTION.
2. INSTALLATION AND PAYMENT FOR PROPOSED RAMPS AND SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED RAMPS AND SIDEWALK.
3. TRAFFIC SIGN TO BE FABRICATED AND INSTALLED BY CONTRACTOR.
4. STRIPING CONTRACTOR SHALL CONTACT CITY OF TYLER TRAFFIC OPERATIONS AND TxDOT TRAFFIC SIGNAL OFFICE AT LEAST 24 HOURS IN ADVANCE OF MOBILIZATION.
5. REMOVE ALL EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED MARKINGS.
6. CONTRACTOR IS RESPONSIBLE FOR FOR REPAIRS AND SUBSTITUTION OF ANY DAMAGED EQUIPMENTS.
7. REFER TO GENERAL NOTE SHEETS AND TxDOT STANDARDS FOR ADDITIONAL DETAILS.

SIGN NO.	SIGN DESIGNATION	SIGN CONTENT	SIGN DIMENSIONS	ALUMINUM	SIGN SUPPORT DESCRIPTIVE CODES
S1	R1-2	YIELD	30" x 30"	TY A	SM RD SGN ASSM TY 10WG (1) SA (P)

STATE OF TEXAS
ZAHIDUL Q. SIDDIQUE
98635
LICENSED
PROFESSIONAL ENGINEER
5/21/2024

NO.	DATE	REVISION	APPROVED

infraTECH
Engineers & Innovators, LLC
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED PAVEMENT MARKINGS AND PEDESTRIAN RAMPS

OLD JACKSONVILLE HWY AT SUNNYBROOK DR

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6	SEE TITLE SHEET		VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	42
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	

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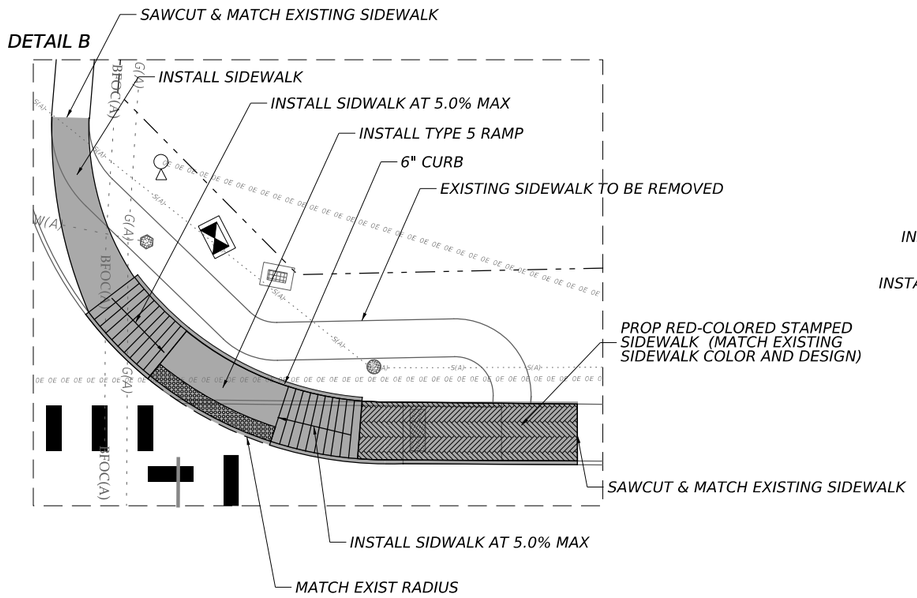
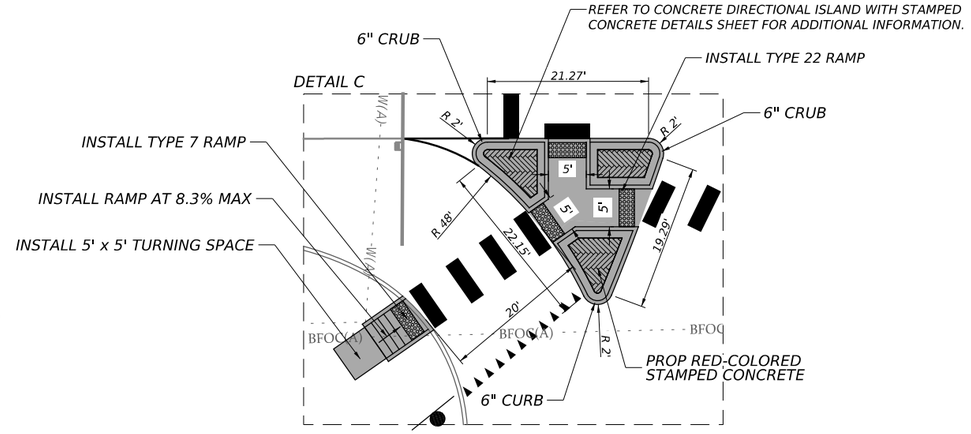
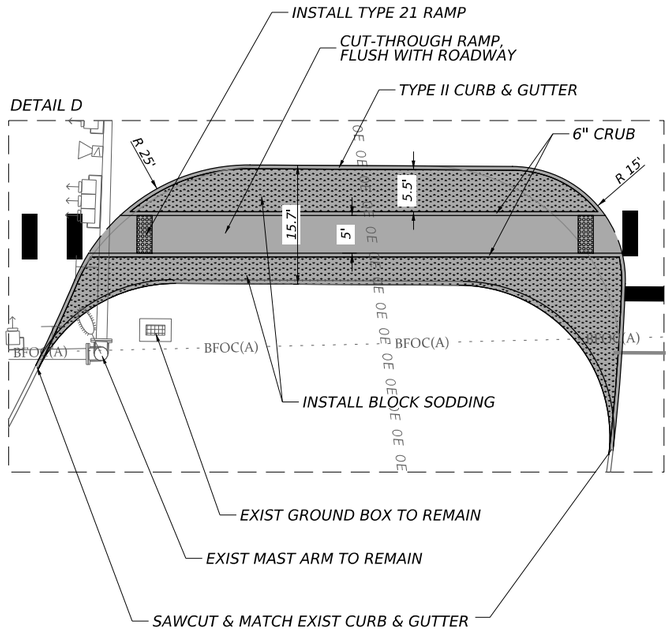
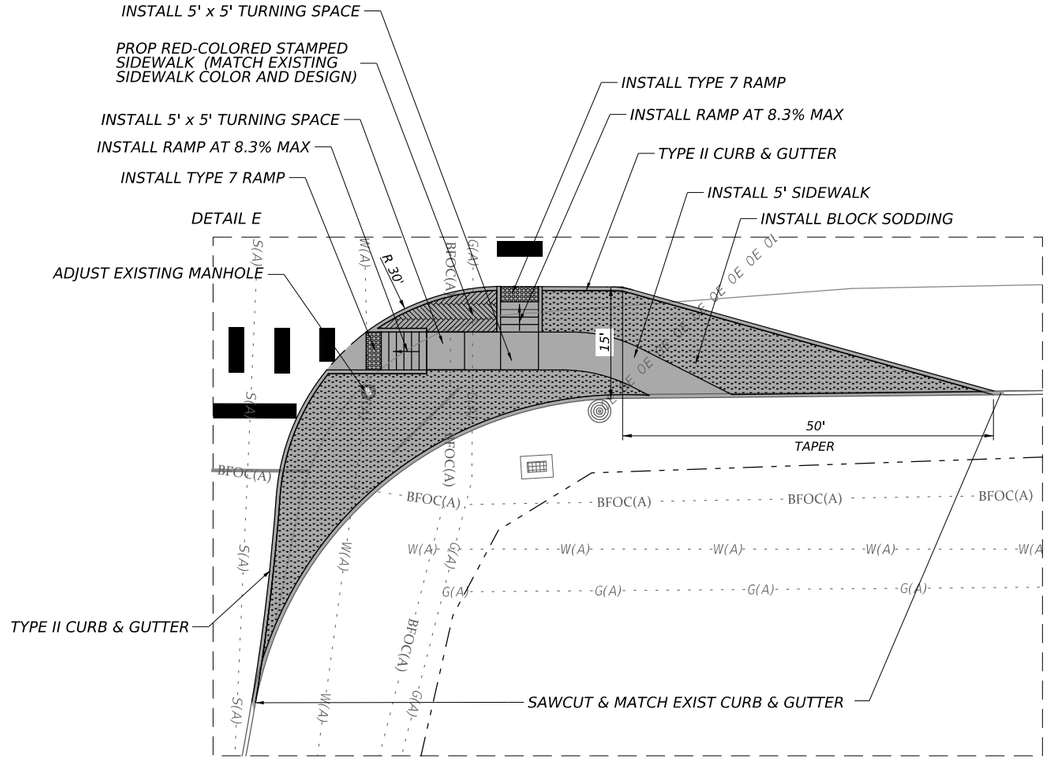
100% SUBMITTAL









LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED SIGNAL POLE W/ PED PUSH BUTTON & PED SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- PROP TRAFFIC SIGN
- PROP CONSTRUCTION AREA
- PROP RED-COLORED STAMPED CONCRETE
- PROP DETECTABLE WARNING SURFACE
- PROP BLOCK SODDING
- A RE PM W/RET REQ TY I (W) 6" (SLD)
- B RE PM W/RET REQ TY I (Y) 6" (SLD)
- C REFL PAV MRK TY I (W) 8" (SLD)
- D PREFAB PAV MRK TY C (W) (24") (SLD)
- E REFL PAV MRKR TY II-A-A
- F REFL PAV MRKR TY I-C
- G REFL PAV MRK TY I (W) 18" (YLD TRI) (≤ 40MPH)

0 10 20

SCALE: 1" = 20'

5/21/2024

NO.	DATE	REVISION	APPROVED

infraTECH Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED PAVEMENT MARKINGS AND PEDESTRIAN RAMPS

OLD JACKSONVILLE HWY AT SUNNYBROOK DR

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6	SEE TITLE SHEET		VARIOUS
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	TYL	SMITH	43
CHECK IEI	CONTROL	SECTION	JOB	
	0910	16	187	

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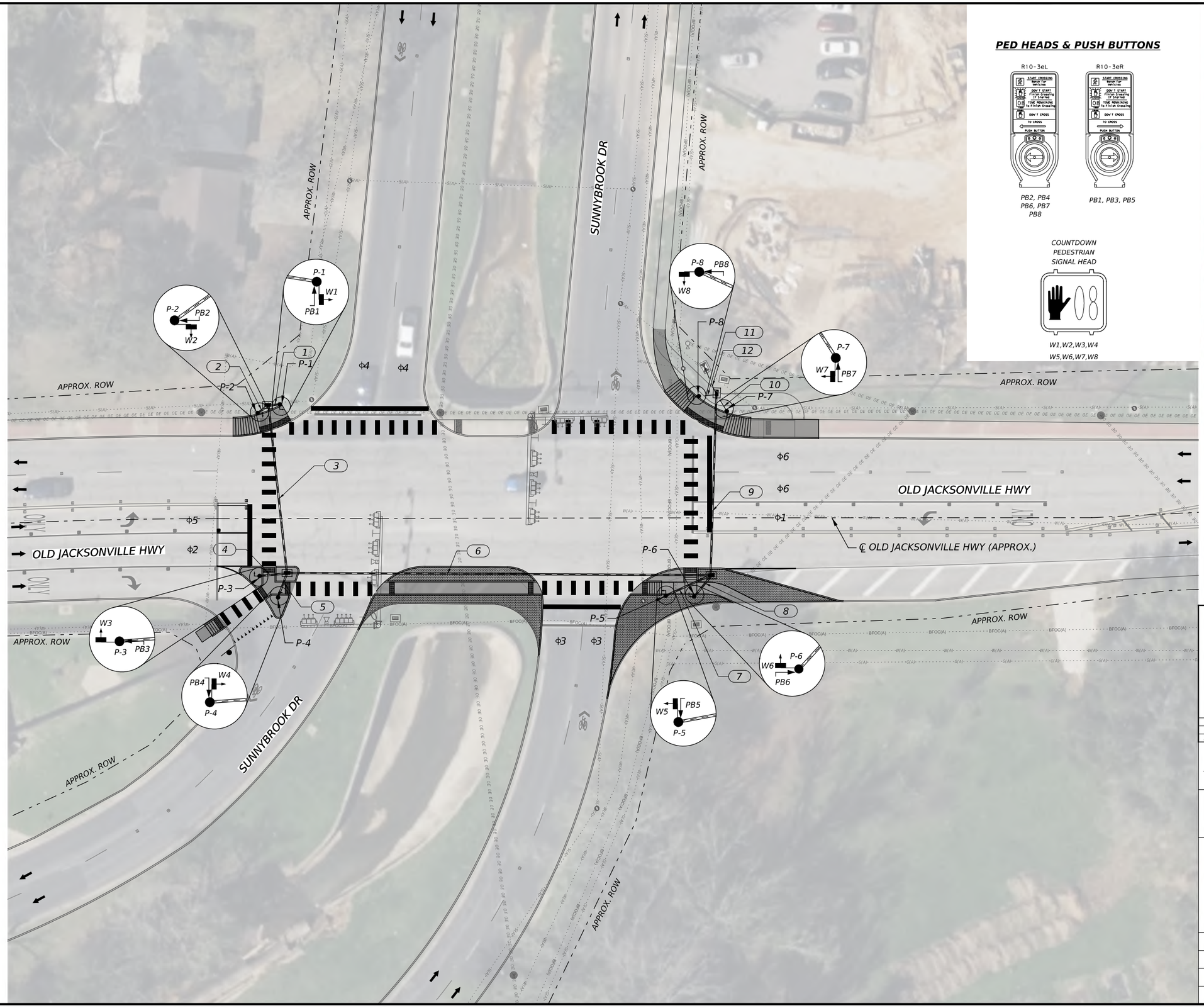
USER:

100% SUBMITTAL



PED HEADS & PUSH BUTTONS

PB2, PB4
PB6, PB7
PB8

PB1, PB3, PB5

COUNTDOWN
PEDESTRIAN
SIGNAL HEAD

W1,W2,W3,W4
W5,W6,W7,W8

LEGEND

- DIRECTION OF TRAVEL
- EXIST SIGNAL HEAD (HOR)
- EXIST SIGNAL HEAD (VER)
- EXIST ANTENA
- EXIST RADAR
- EXIST GROUND BOX
- EXIST VIDEO DETECTOR
- EXIST PED. SIGNAL POLE W/ PED. PUSH BUTTON & PED. SIGNAL HEAD
- EXIST CONTROLLER
- EXIST MAST ARM
- EXIST LUMINAIRE
- EXIST SERVICE METER AND DISCONNECT
- EXIST OVERHEAD SIGN
- PROP GROUND BOX
- PROP PED SIGNAL POLE W/ PED PUSH BUTTON & PED SIGNAL HEAD
- PROP VIDEO DETECTOR
- PROP VEHICLE DETECTION ZONE
- (X) CONDUIT RUN DESIGNATION
- PROP CONDUIT (BORE)
- PROP CONDUIT (TRENCH)

0 20 40

SCALE: 1" = 40'

5/21/2024

NO.	DATE	REVISION	APPROVED

infraTECH
Engineers & Innovators, LLC
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PROPOSED CONDITIONS

OLD JACKSONVILLE HWY AT
SUNNYBROOK DR

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	44
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

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100% SUBMITTAL

CABLE TERMINATION CHART

		CABLE 1	CABLE 2	CABLE 3	CABLE 4	CABLE 5	CABLE 6	CABLE 7	CABLE 8	CABLE 9	CABLE 10	CABLE 11	CABLE 12	CABLE 13	CABLE 14	CABLE 15	CABLE 16
CNDR.	CONDR. COLOR.	FROM POLE P-1 TO CNTRL.	FROM POLE P-2 TO CNTRL.	FROM POLE P-3 TO CNTRL.	FROM POLE P-4 TO CNTRL.	FROM POLE P-5 TO CNTRL.	FROM POLE P-6 TO CNTRL.	FROM POLE P-7 TO CNTRL.	FROM POLE P-8 TO CNTRL.	FROM POLE P-1 TO CNTRL.	FROM POLE P-2 TO CNTRL.	FROM POLE P-3 TO CNTRL.	FROM POLE P-4 TO CNTRL.	FROM POLE P-5 TO CNTRL.	FROM POLE P-6 TO CNTRL.	FROM POLE P-7 TO CNTRL.	FROM POLE P-8 TO CNTRL.
		5 CNDR.	5 CNDR.	5 CNDR.	5 CNDR.	5 CNDR.	5 CNDR.	5 CNDR.	5 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.	2 CNDR.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	PH 6 PED. CALL	PH 4 PED. CALL	PH 4 PED. CALL	PH 2 PED. CALL	PH 2 PED. CALL	PH 3 PED. CALL	PH 6 PED. CALL	PH 3 PED. CALL
2	WHITE	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	S. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM	PED. COMM
3	RED	PH 6 DW	PH 4 DW	PH 4 DW	PH 2 DW	PH 2 DW	PH 3 DW	PH 6 DW	PH 3 DW								
4	GREEN	PH 6 W	PH 4 W	PH 4 W	PH 2 W	PH 2 W	PH 3 W	PH 6 W	PH 3 W								
5	ORANGE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE								

APS MESSAGE CHART

POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE /SOUND DETAILS
P-1	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS SUNNYBROOK DR AT OLD JACKSONVILLE HWY
		EXTENDED BUTTON PUSH	WAIT TO CROSS SUNNYBROOK DR AT OLD JACKSONVILLE HWY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-2	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS OLD JACKSONVILLE HWY AT SUNNYBROOK DR
		EXTENDED BUTTON PUSH	WAIT TO CROSS OLD JACKSONVILLE HWY AT SUNNYBROOK DR
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-3	PHASE 4	BUTTON PUSH ON DW	WAIT TO CROSS OLD JACKSONVILLE HWY AT SUNNYBROOK DR
		EXTENDED BUTTON PUSH	WAIT TO CROSS OLD JACKSONVILLE HWY AT SUNNYBROOK DR
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-4	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS SUNNYBROOK DR AT OLD JACKSONVILLE HWY
		EXTENDED BUTTON PUSH	WAIT TO CROSS SUNNYBROOK DR AT OLD JACKSONVILLE HWY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-5	PHASE 2	BUTTON PUSH ON DW	WAIT TO CROSS SUNNYBROOK DR AT OLD JACKSONVILLE HWY
		EXTENDED BUTTON PUSH	WAIT TO CROSS SUNNYBROOK DR AT OLD JACKSONVILLE HWY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-6	PHASE 3	BUTTON PUSH ON DW	WAIT TO CROSS OLD JACKSONVILLE HWY AT SUNNYBROOK DR
		EXTENDED BUTTON PUSH	WAIT TO CROSS OLD JACKSONVILLE HWY AT SUNNYBROOK DR
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-7	PHASE 6	BUTTON PUSH ON DW	WAIT TO CROSS OLD JACKSONVILLE HWY AT SUNNYBROOK DR
		EXTENDED BUTTON PUSH	WAIT TO CROSS OLD JACKSONVILLE HWY AT SUNNYBROOK DR
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE
P-8	PHASE 3	BUTTON PUSH ON DW	WAIT TO CROSS SUNNYBROOK DR AT OLD JACKSONVILLE HWY
		EXTENDED BUTTON PUSH	WAIT TO CROSS SUNNYBROOK DR AT OLD JACKSONVILLE HWY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION *	PERCUSSIVE TONE

* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

POLE SCHEDULE

POLE	P-1	P-2	P-3	P-4	P-5	P-6	P-7	P-8
POLE STATUS	PROP	PROP	PROP	PROP	PROP	PROP	PROP	PROP
FOUNDATION TYPE	24-A	24-A	24-A	24-A	24-A	24-A	24-A	24-A
DRILLED SHAFT LENGTH (LF)	6	6	6	6	6	6	6	6
LED SIGNAL INDICATIONS	DW	DW	DW	DW	DW	DW	DW	DW
	W	W	W	W	W	W	W	W

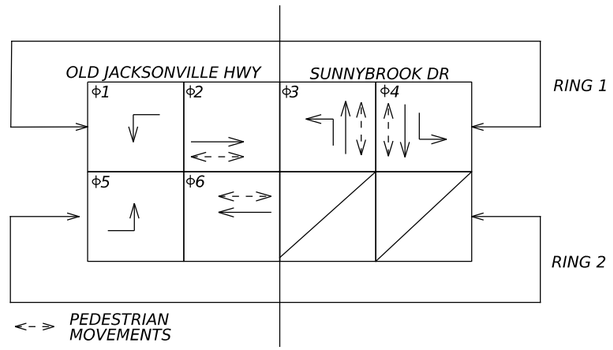
CONDUIT AND CONDUCTORS SCHEDULE

RUN NO.	NO. OF CONDUIT		LENGTH	BORE (B) TRENCH (T)	1C #6 AWG BARE	2C #12 AWG APS	5C #14 AWG PED
	2 (IN)	4 (IN)					
1	1		7	B	1	1	1
2	1		6	B	1	1	1
3		2	75	B	1	2	2
4	1		13	B	1	1	1
5	1		11	B	1	1	1
6		2	195	B	1	4	4
7	1		27	B	1	1	1
8	1		13	B	1	1	1
9		2	90	B	1	6	6
10	1		9	T	1	1	1
11	1		9	T	1	1	1
12	2		13	T	1	8	8
TOTAL	**121**	**720**			**468**	**1,669**	**1,669**

GROUND BOX SUMMARY

ITEM NO.	DESCRIPTION	UNIT	QTY.
624	GROUND BOX TY D (162922) W / APRON	EA	4

PHASING DIAGRAM



POLE AND ARM WIRING

POLE	2C#12 AWG APS	5C #14 AWG PED
P-1	5	10
P-2	5	10
P-3	5	10
P-4	5	10
P-5	5	10
P-6	5	10
P-7	5	10
P-8	5	10
TOTAL (FT)	**40**	**80**

STATE OF TEXAS
ZAHIDUL Q. SIDDIQUE
98635
LICENSED
PROFESSIONAL ENGINEER
5/21/2024

NO.	DATE	REVISION	APPROVED

infraTECH Engineers & Innovators, LLC
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

CARBON REDUCTION PROJECTS

DETAIL/SUMMARY SHEET

OLD JACKSONVILLE HWY AT SUNNYBROOK DR

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6			VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	45
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

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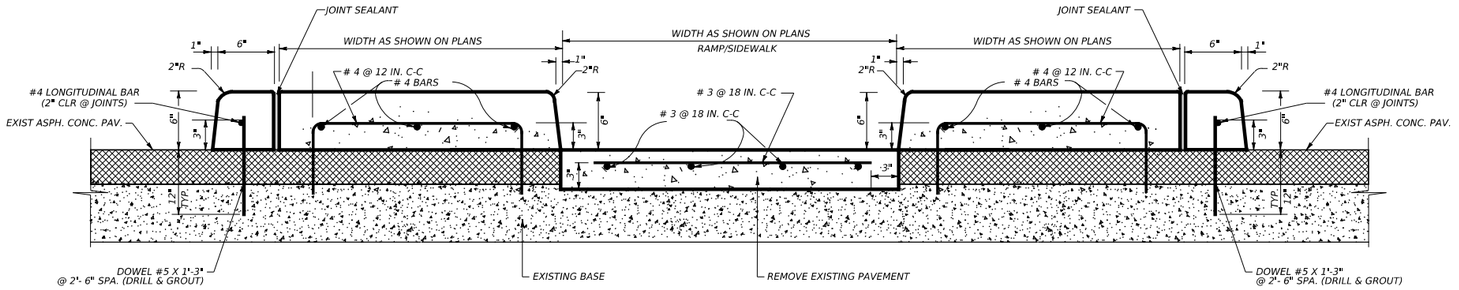
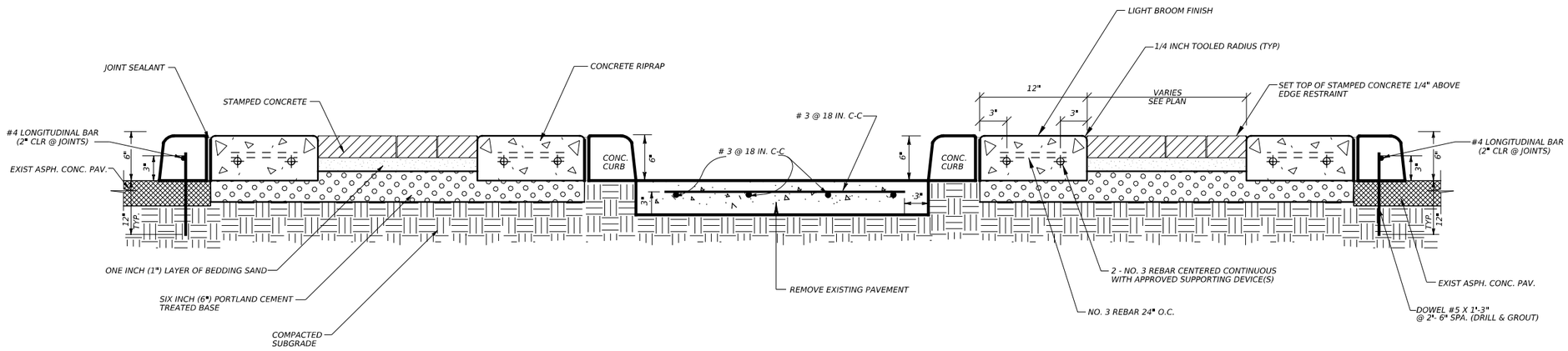


CONCRETE DIRECTIONAL ISLAND DETAILS

NOTES:

1. USE GRADE 60 STEEL AND CLASS A CONCRETE.
2. NO ADDITIONAL PAYMENT WILL BE MADE FOR THE REMOVAL OF ASPHALT PAVEMENT, CURB, RAMP/SIDEWALK ITEMS. THIS COST WILL BE INCIDENTAL TO PAY ITEM 536 6004.
3. NO ADDITIONAL PAYMENT WILL BE MADE FOR THE INSTALLATION OF 6-INCH CURB. THIS COST WILL BE INCIDENTAL TO PAY ITEM 536 6004.
4. REFER TO GENERAL NOTE SHEETS AND STANDARDS FOR ADDITIONAL DETAILS.



CONCRETE DIRECTIONAL ISLAND WITH STAMPED CONCRETE DETAILS

NOTES:

1. USE GRADE 60 STEEL AND CLASS A CONCRETE.
2. NO ADDITIONAL PAYMENT WILL BE MADE FOR THE REMOVAL OF ASPHALT PAVEMENT, CURB, RAMP/SIDEWALK ITEMS. THIS COST WILL BE INCIDENTAL TO CONSTRUCTION OF DIRECTIONAL ISLAND AND LANDSCAPE PAVERS.
3. NO ADDITIONAL PAYMENT WILL BE MADE FOR THE INSTALLATION OF 6-INCH CURB. THIS COST WILL BE INCIDENTAL TO CONCRETE RIPRAP, PAY ITEM 432-6003.
4. REFER TO GENERAL NOTE SHEETS AND STANDARDS FOR ADDITIONAL DETAILS.

NOT TO SCALE

STATE OF TEXAS
ZAHIDUL Q. SIDDIQUE
98635
LICENSED
PROFESSIONAL ENGINEER
5/21/2024

NO.	DATE	REVISION	APPROVED

infraTECH
Engineers & Innovators, LLC
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

CARBON REDUCTION PROJECTS

CONCRETE DIRECTIONAL ISLAND DETAILS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6	SEE TITLE SHEET		VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	46
CHECK	CONTROL	SECTION	JOB	
IEI	0910	16	187	
CHECK				
IEI				

...\Directional Island Details
USER:

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DATE: 5/21/2024 2:14:11 PM
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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:

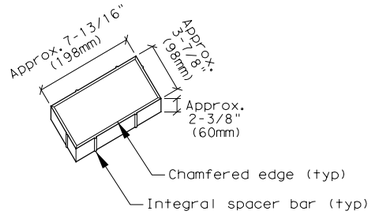
	SUBMITTALS RECEIVED FROM CONTRACTOR? YES	NO
a. Certification from the manufacturer stating that the pavers have been tested and meet all the requirements of ASTM C 936.		
b. Mix design, including information indicating percentage of fly ash to be used as cementitious material = less than or equal to 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.

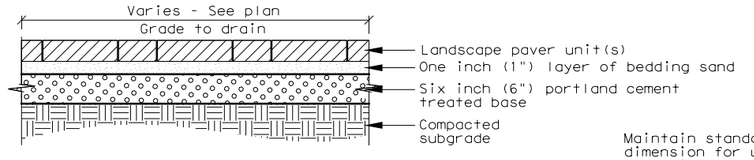
PAVER UNIT

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

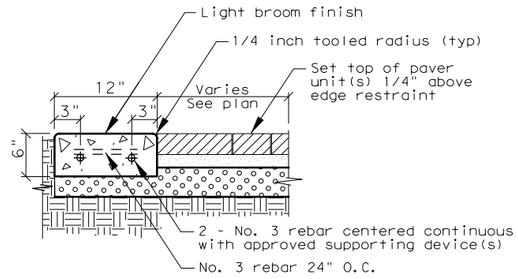


PAVER COLOR

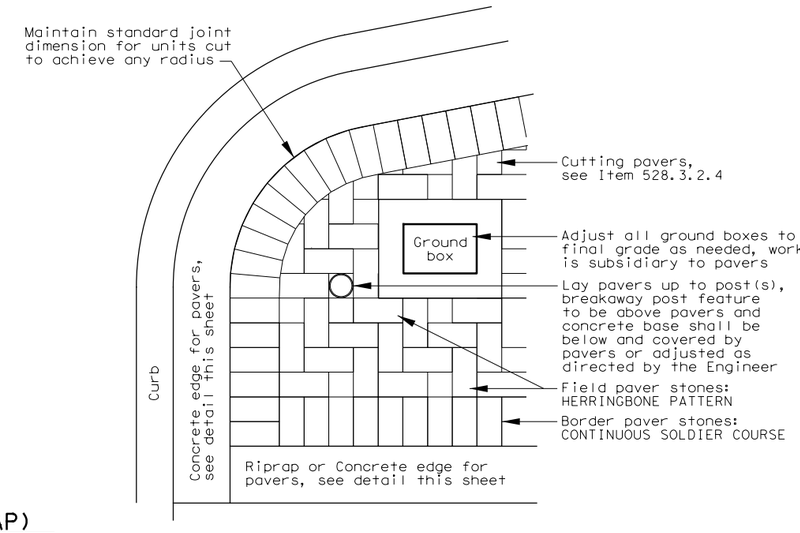
IPC Building Products "TxDOT HOUSTON DISTRICT GRP II BLEND"
or
approved equal
Color mix includes Houston District approved:
Green, charcoal, bronze and tan.
(Border stones and field stones are to be same color blend)



PAVERS ON PORTLAND CEMENT TREATED BASE

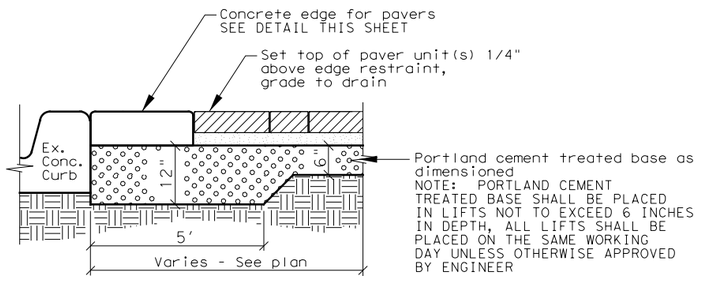


CONCRETE EDGE FOR PAVERS (CL B RIPRAP)



PAVER PATTERN LAYOUT

Install In Herringbone Pattern With
Soldier Course Along Perimeter As Shown



PORTLAND CEMENT TREATED BASE UNDER PAVERS AT EXISTING CONCRETE CURB

STATE OF TEXAS
ZAHIDUL Q. SIDDIQUE
98635
LICENSED
PROFESSIONAL ENGINEER
5/21/2024

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

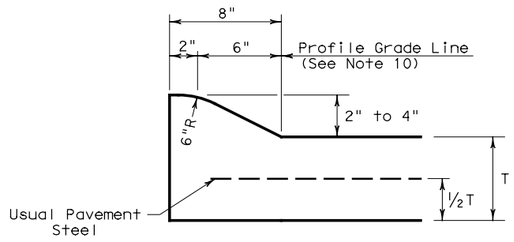
SHEET 1 OF 1

Details not to scale

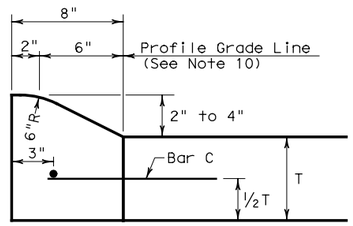
FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				47
REVISED: OCT 2014 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	12	SMITH	0910	16	187	VARIOUS

STD K-2

DATE: 5/21/2024
FILE: c:\pw-infratech\xin.zhang\dms38545\cccg22.dgn



TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



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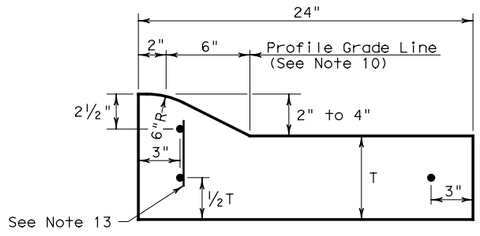
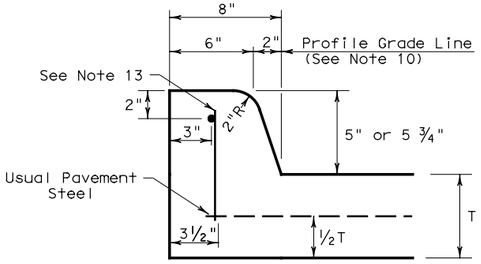


TYPE I CURB AND GUTTER
2" - 4" HEIGHT



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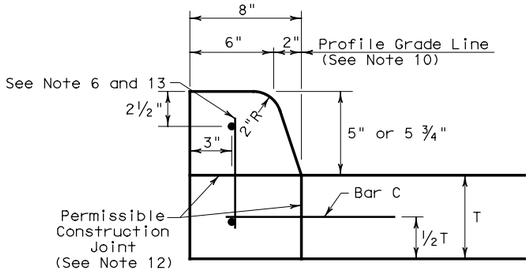
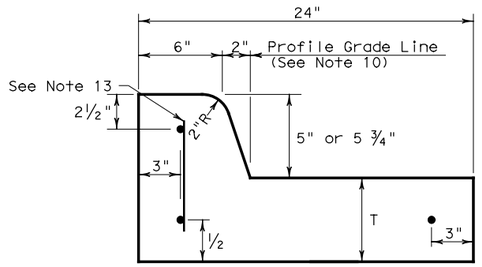
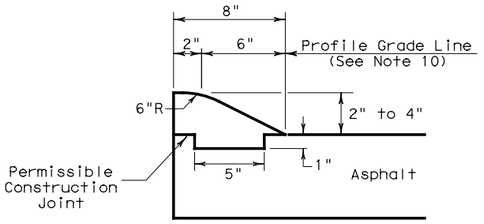
5" - 5 ¾" HEIGHT



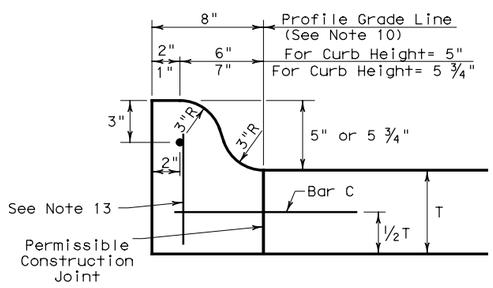
TYPE II CURB
5" - 5 ¾" HEIGHT



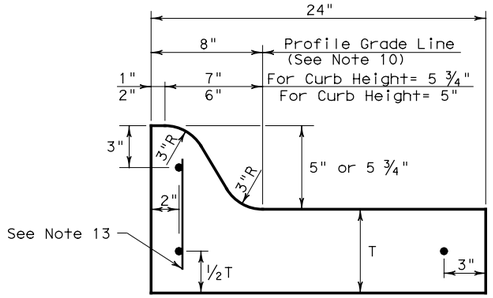
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



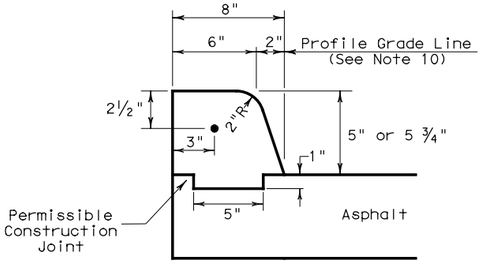
TYPE III CURB (KEYED)
2" - 4" HEIGHT



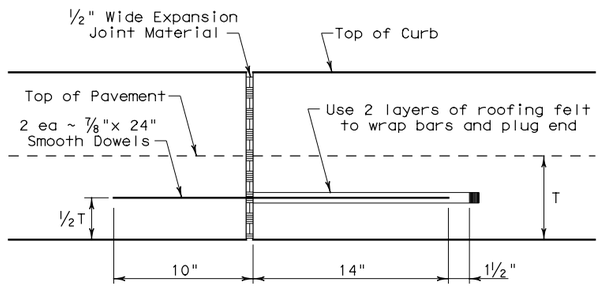
TYPE IIa CURB
5" - 5 ¾" HEIGHT



TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

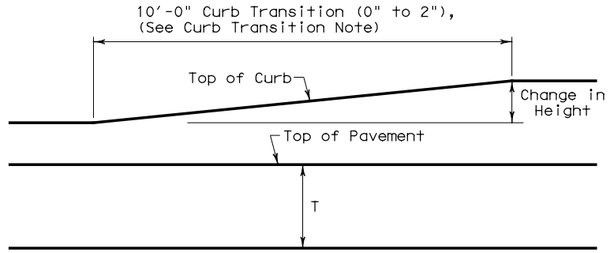


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

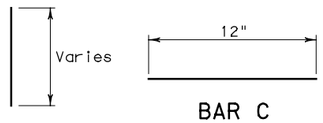
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



BAR B

BAR C

Texas Department of Transportation

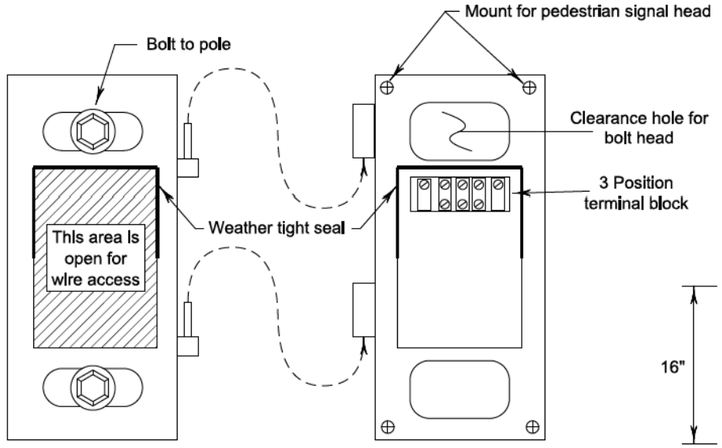
Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

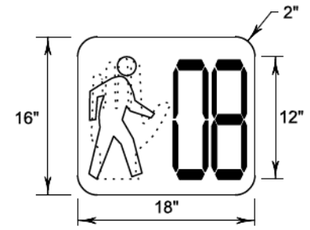
CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	187	VARIOUS
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		48

100% SUBMITTAL



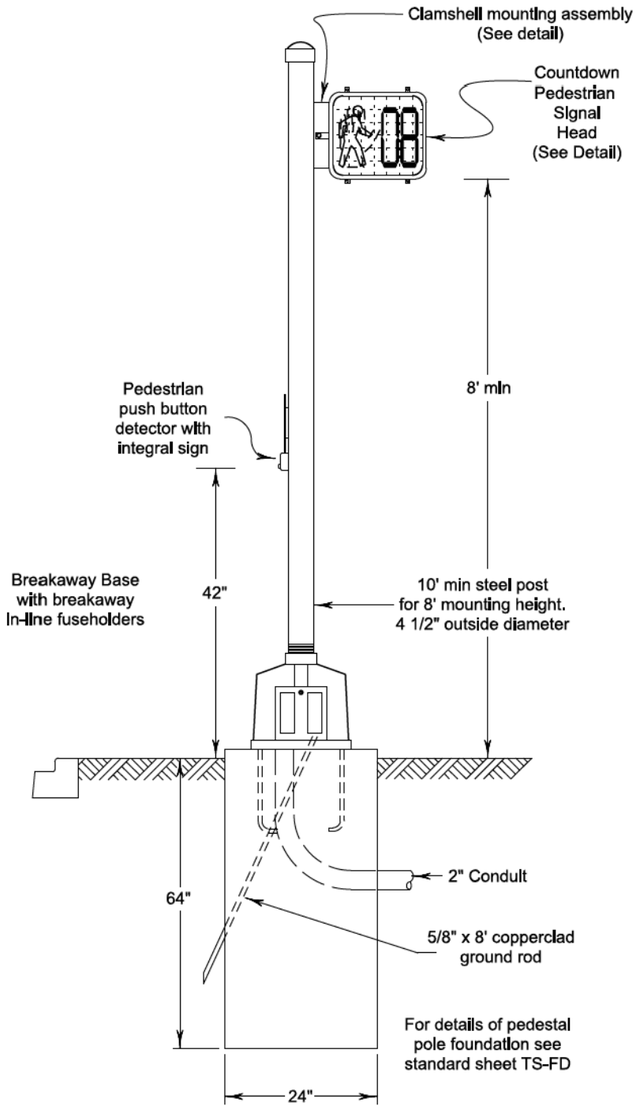
DETAIL OF CLAMSHELL TWO-PART MOUNTING ASSEMBLY WITH VANDAL-PROOF EXTERIOR LOCK



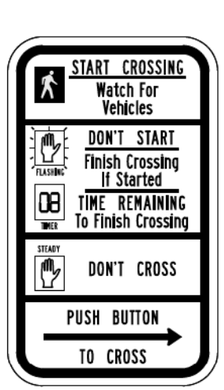
PEDESTRIAN COUNTDOWN SIGNAL HEAD DETAIL

NOTES:

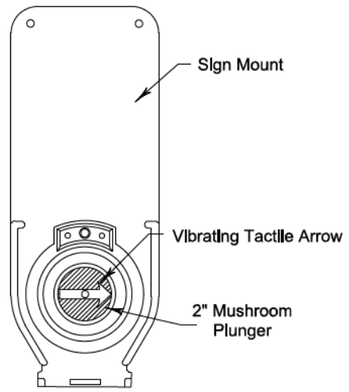
1. All pedestrian signal heads shall be installed on the away-from-traffic side of the pedestal pole or signal pole.
2. All wiring for pedestrian signals shall be completely enclosed within the signal mounting hardware.
3. All pedestrian signal heads and push button detectors shall display the symbolized message shown.
4. There shall be a continuous bare ground wire from all steel poles back to the electrical service.
5. All pedestrian signal heads shall be 12" LED with 2 indications per signal head, unless otherwise shown in the plans.
6. Use either a Screw-In Type Anchor Foundation or 24" Drill Shaft Foundation as shown elsewhere in the plans.
7. See Special Specification 4004, "Screw-In Type Anchor Foundations" for further requirements.
8. Engage all thread on the pedestal pole base and pipe, according to manufacturers recommendation. unless pipe is fully seated into base.
9. Conduit in foundation and within 6" of foundation is subsidiary to Item 687, "Pedestal Pole Assemblies."
10. Provide non-fused watertight breakaway electrical connectors for breakaway poles. (Bussmann HET, Littelfuse LET, Ferraz-Shawmut FEBN, or approved equal).
11. For both pedestal pole and signal pole mounts, provide clearance as shown above the sidewalk level.
12. Make connections to ground rods according to the NEC. Ground rod clamps shall be listed for their intended purpose.
13. Provide pedestal pole base in accordance with Departmental Material Specifications.
14. Unless otherwise shown on the plans, pole shaft shall be one piece, SCH 40 aluminum pipe, ASTM B221 (Alloy 6061-T6) only. Aluminum conduit will not be permitted.



DETAIL OF PEDESTAL POLE WITH OPTIONAL CONCRETE FOUNDATION

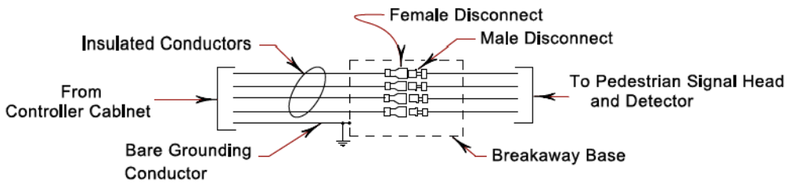


R10-3e
(9"x15")

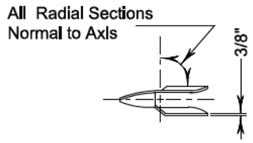


Audible Pedestrian Signal

ACCESSIBLE PEDESTRIAN PUSH BUTTON DETECTOR WITH SIGN



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



SECTION A-A

SCREW-IN ANCHOR FOUNDATION DETAIL

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368
11111 WILCREST GREEN DR #410
HOUSTON, TEXAS 77042

Texas Department of Transportation

CARBON REDUCTION PROJECTS

PEDESTRIAN SIGNAL AND DETECTOR INSTALLATION DETAILS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6	SEE TITLE SHEET		VARIOUS
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	TYL	SMITH	
CHECK	CONTROL	SECTION	JOB	49
IEI	0910	16	187	
CHECK				
IEI				

...\Pedestrian Signal and Detector Installation Details
USER:

DATE: 5/21/2024 2:14:22 PM
FILE: c:\pw-infratechlxin.zhang\dms362691\Pedestrian Signal and Detector Installation Details.dgn
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DATE: 5/21/2024
FILE: c:\pw-infratech\xin.zhang\dms38545\ped18.dgn

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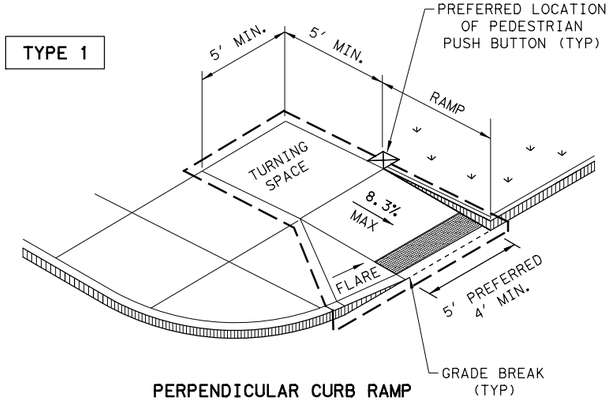
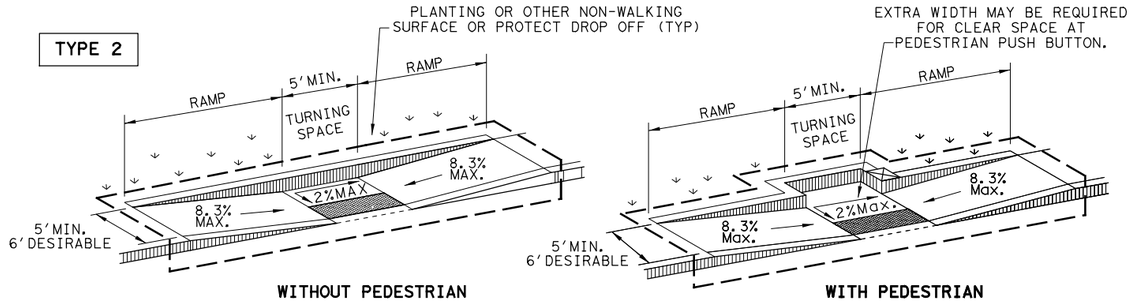


PERPENDICULAR CURB RAMP

TYPE 2

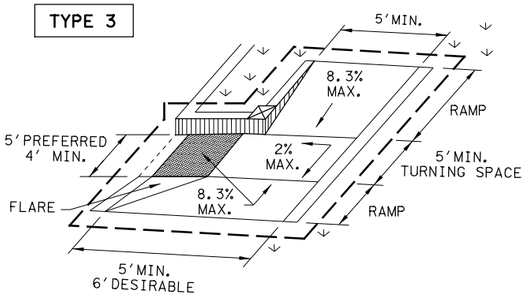


WITHOUT PEDESTRIAN PUSH BUTTON

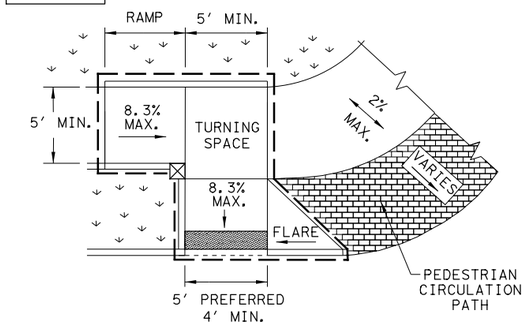
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

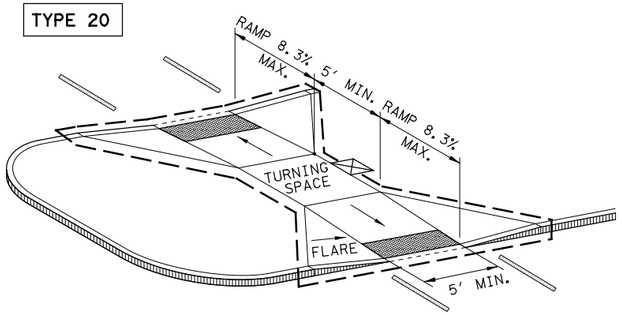


TYPE 6



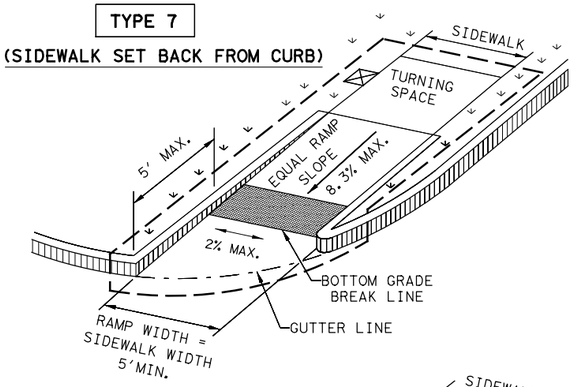
COMBINATION CURB RAMPS

TYPE 20

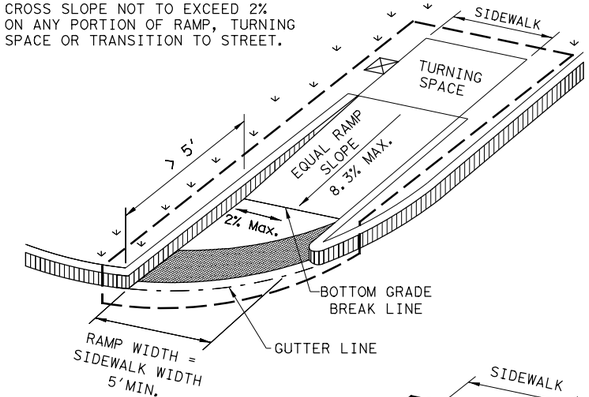


CURB RAMPS AT MEDIAN ISLANDS

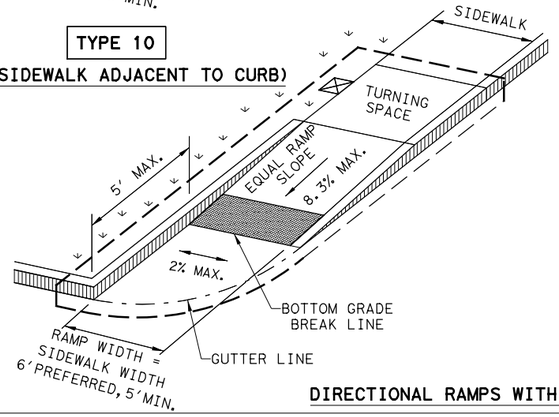
TYPE 7
(SIDEWALK SET BACK FROM CURB)



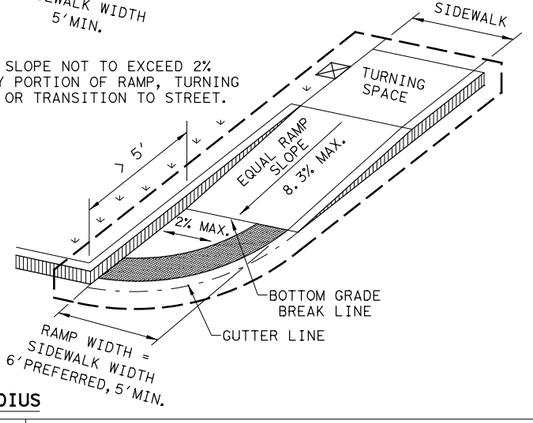
CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



TYPE 10
(SIDEWALK ADJACENT TO CURB)

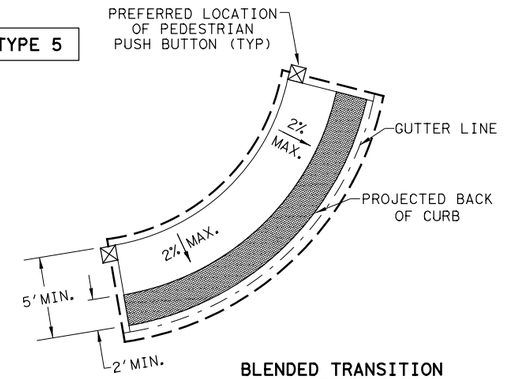


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

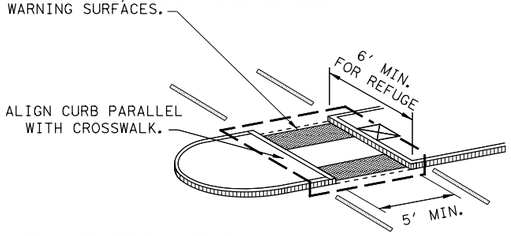
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

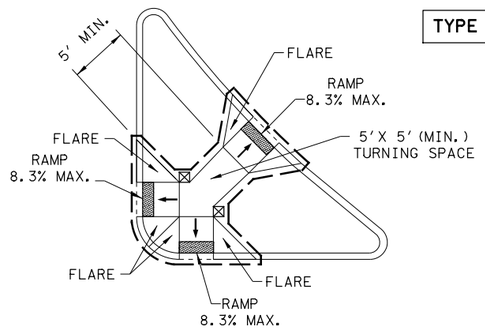
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.



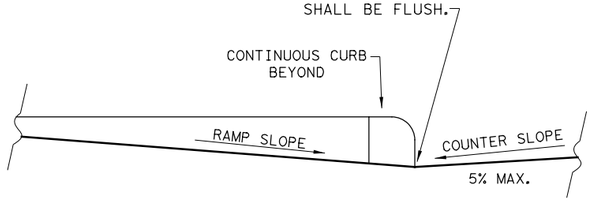
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	187	VARIOUS
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	TYL	SMITH		50

DATE: 5/21/2024
FILE: c:\pw-infratech\xin.zhang\dms38545\ped18.dgn

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5′. Where the sidewalk is adjacent to the back of curb, a 6′ sidewalk width is desirable. Where a 5′ sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4′ for short distances. 5′x 5′ passing areas at intervals not to exceed 200′ are required.
5. Turning Spaces shall be 5′x 5′ minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4′x 4′ wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6′ wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5′x 5′ landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicaible standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

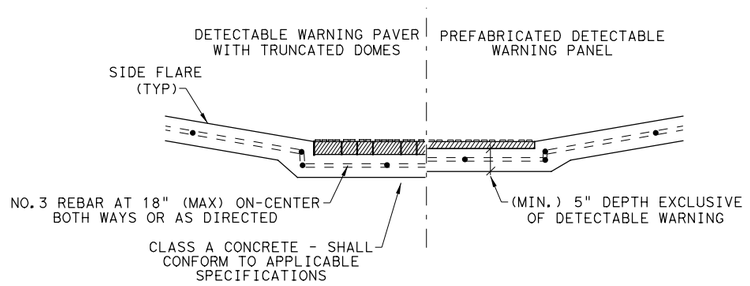
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

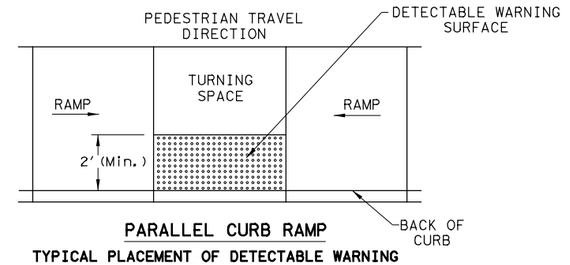
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

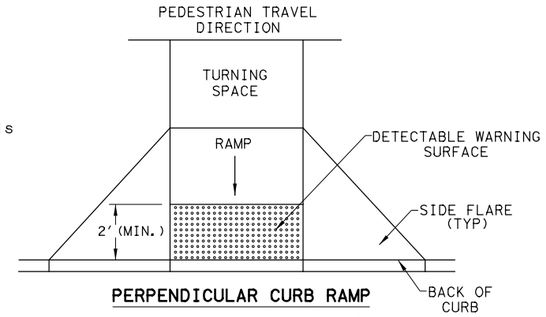


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

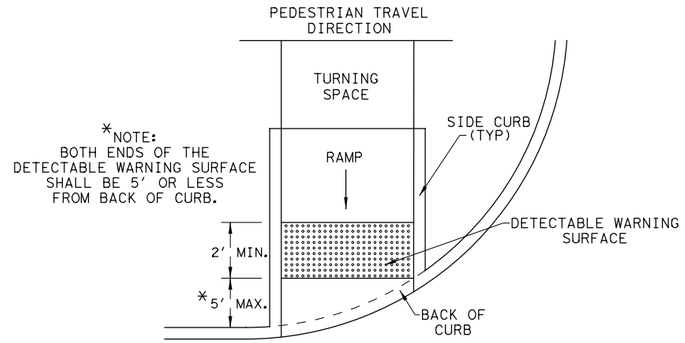
DETECTABLE WARNING SURFACE DETAILS



PARALLEL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation | Design Division Standard

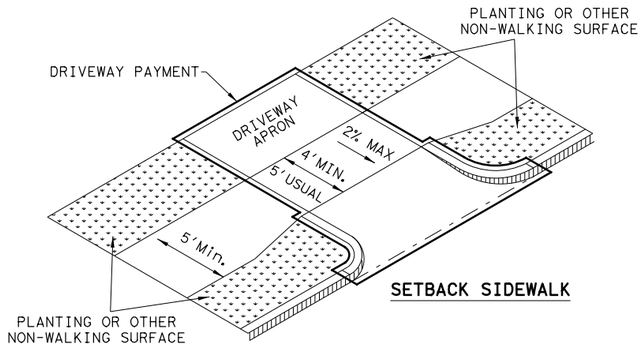
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

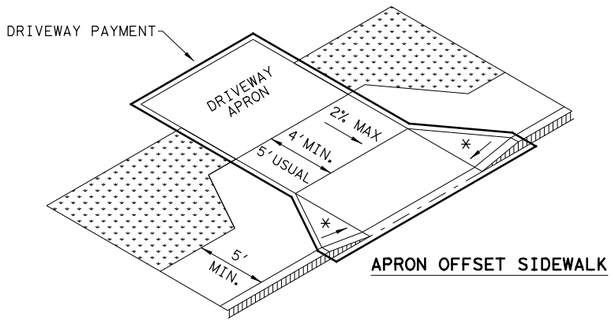
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	187	VARIOUS
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	TYL	SMITH		51

DATE: 5/21/2024
FILE: c:\pw-infratech\xin.zhang\dms38545\ped18.dgn

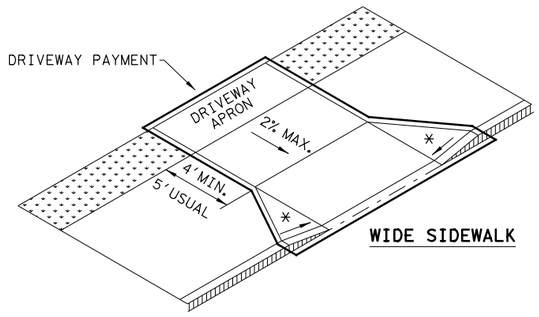
SIDEWALK TREATMENT AT DRIVEWAYS



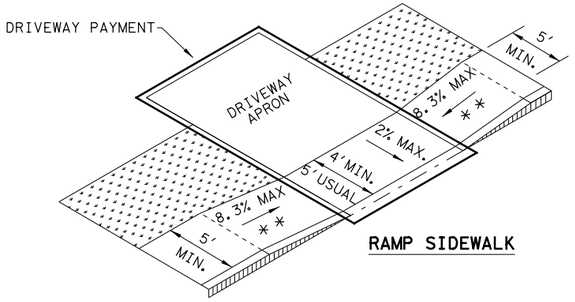
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

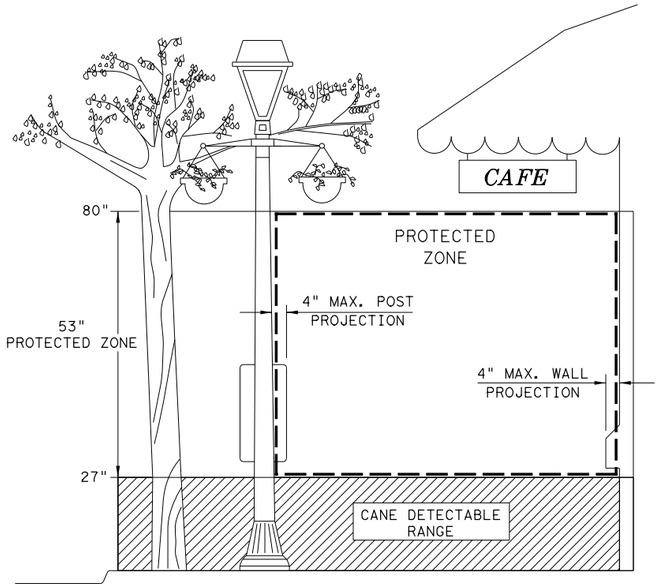


RAMP SIDEWALK

NOTES:

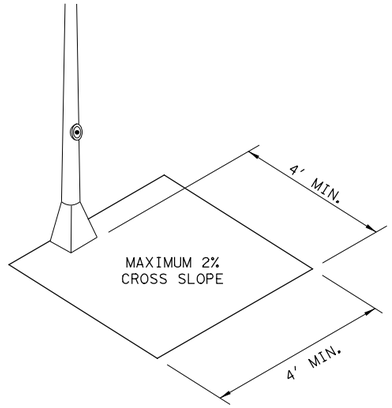
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

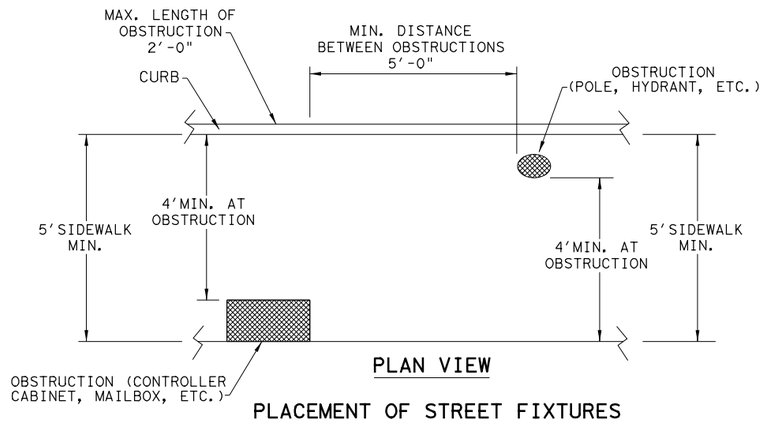


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



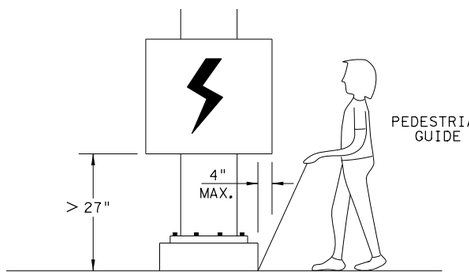
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



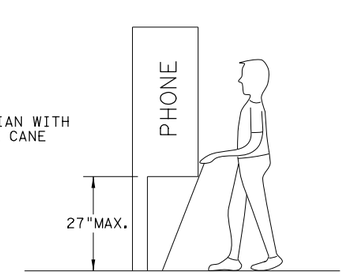
PLAN VIEW

PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT ≤27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

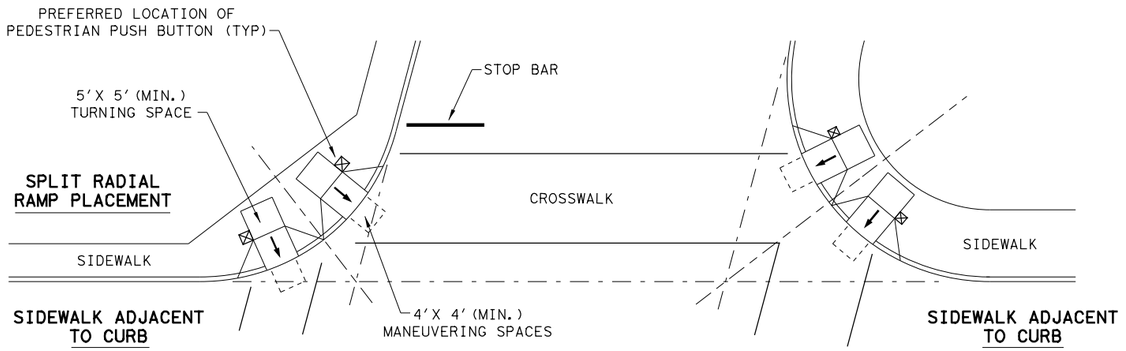
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0910	16	187	VARIOUS	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.	
	TYL	SMITH		52	

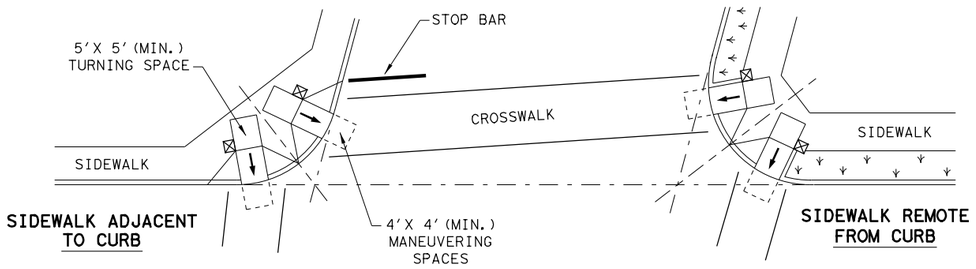
DATE: 5/21/2024
FILE: c:\pw-infratech\xin.zhang\dms38545\ped18.dgn

TYPICAL CROSSING LAYOUTS

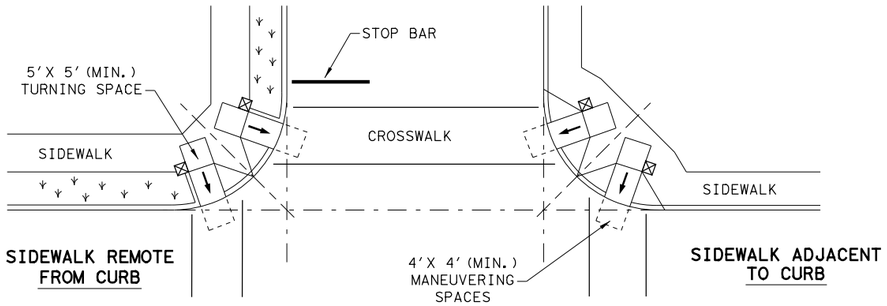
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



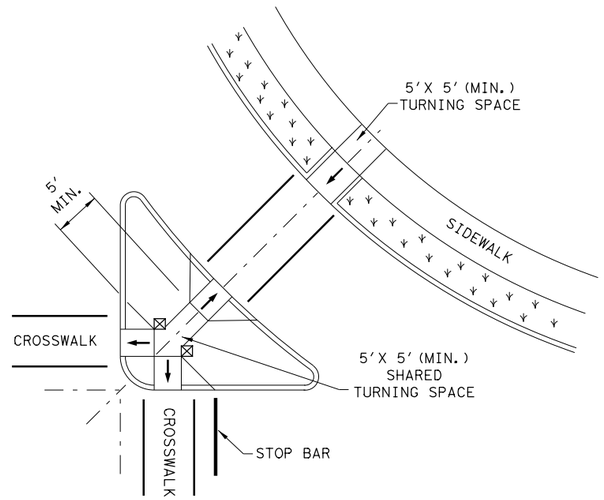
SKEWED INTERSECTION WITH "LARGE" RADIUS



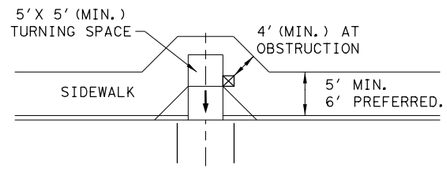
SKEWED INTERSECTION WITH "SMALL" RADIUS

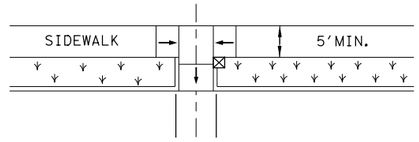


NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND





MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
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REVISIONS	0910	16	187	VARIOUS
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	TYL	SMITH		53

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

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

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
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REVISIONS		0910	16	187	VARIOUS
		DIST	COUNTY		SHEET NO.
		TYL	SMITH		54

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

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

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.
12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

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

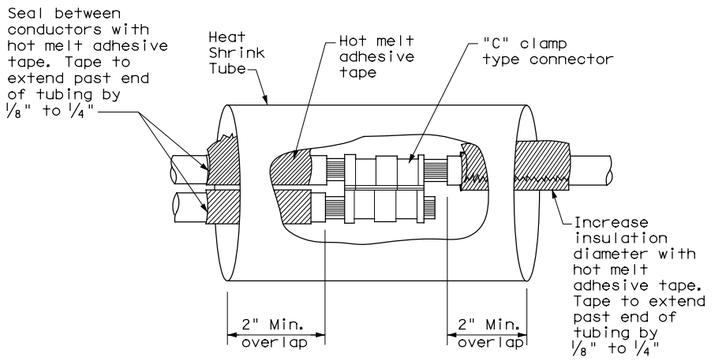
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

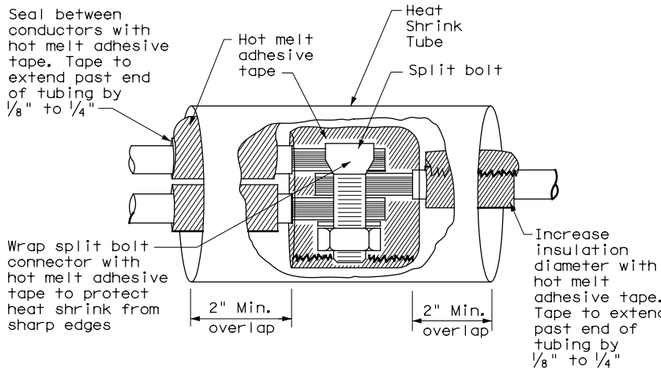
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in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

B. CONSTRUCTION METHODS

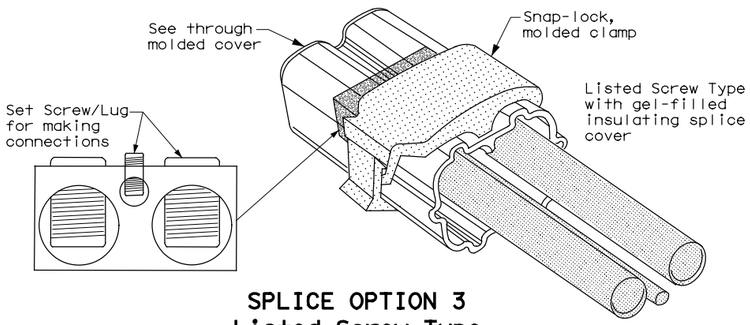
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil,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



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

FILE: ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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	TYL	SMITH		55

71C

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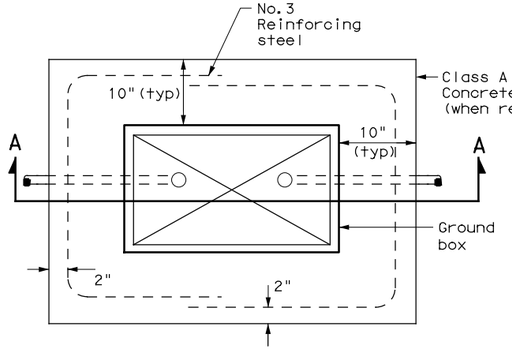
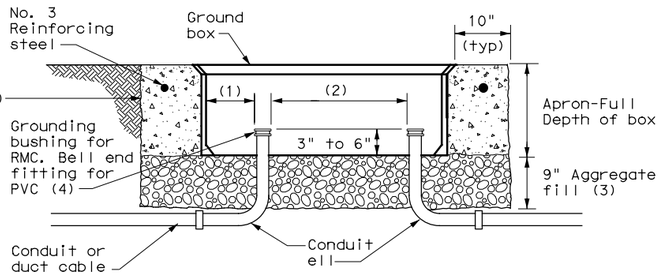


PLAN VIEW



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.

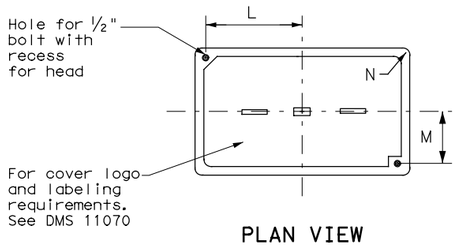
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

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

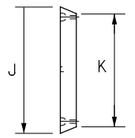
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

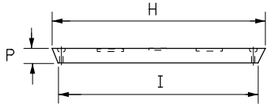
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



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
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	TYL	SMITH		56

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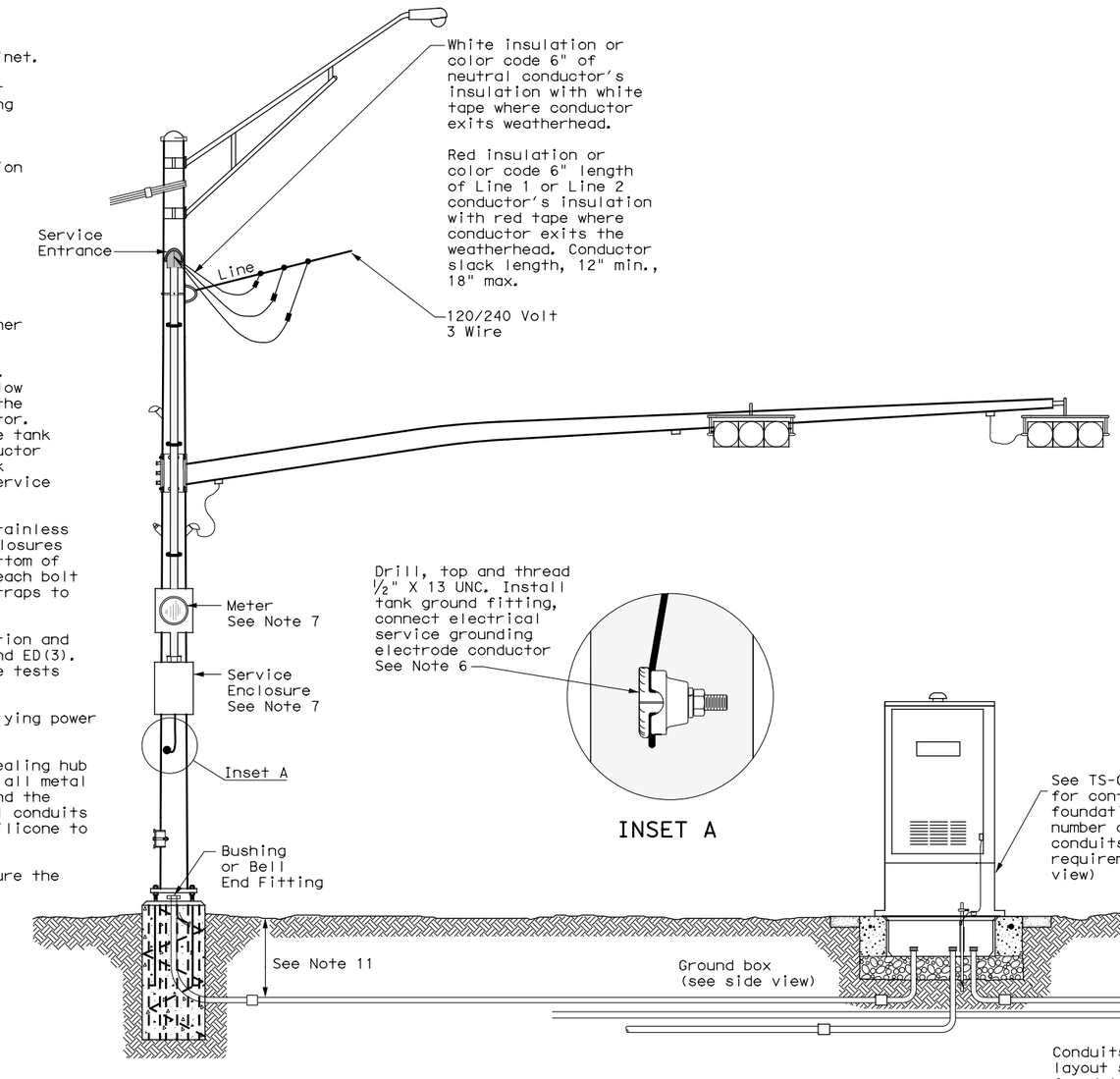
TRAFFIC SIGNAL NOTES

1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".

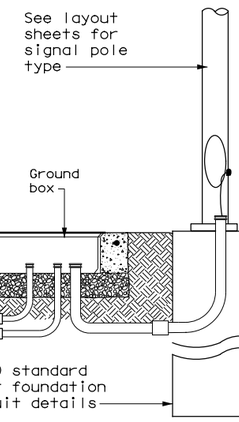


SIGNAL POLE WITH SERVICE

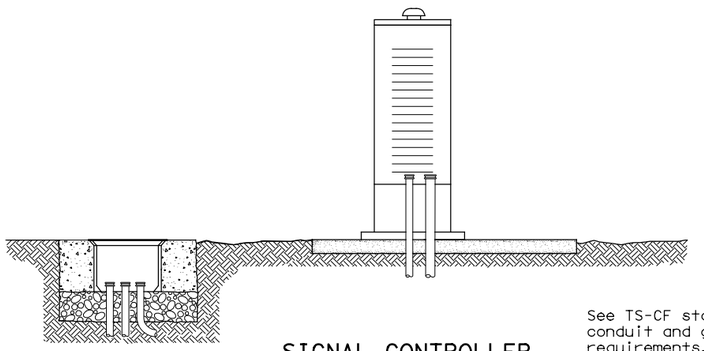
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

INSET A

SIGNAL CONTROLLER FRONT VIEW



SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

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© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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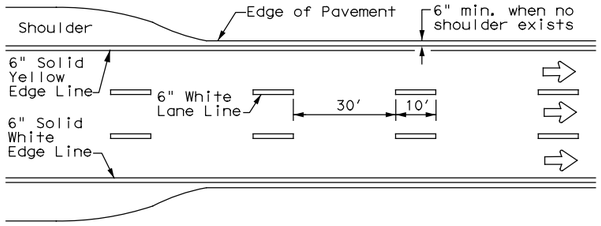
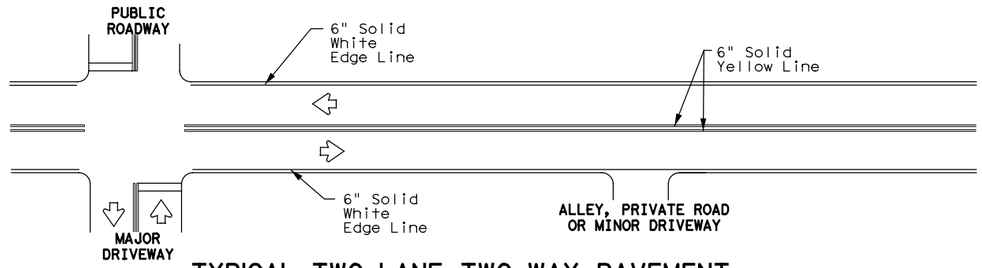
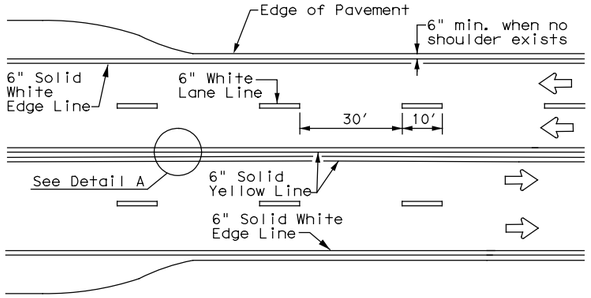
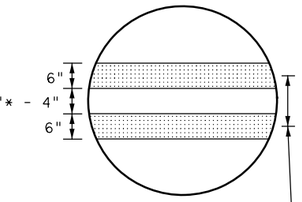


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





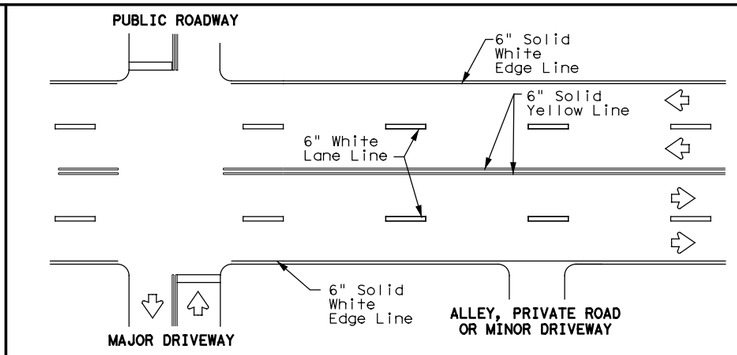
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48′ only)

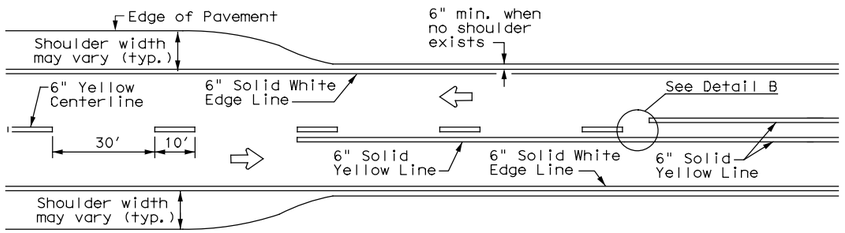
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

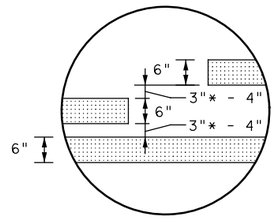
** 8" minimum for restripe projects when approved by the Engineer.



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



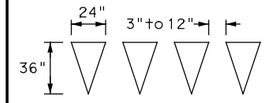
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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

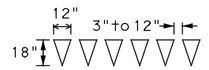
DETAIL "B"

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

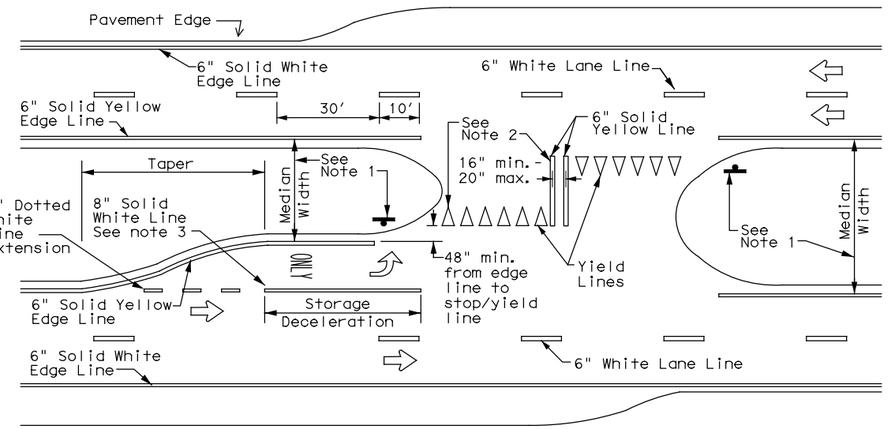


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50′ or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

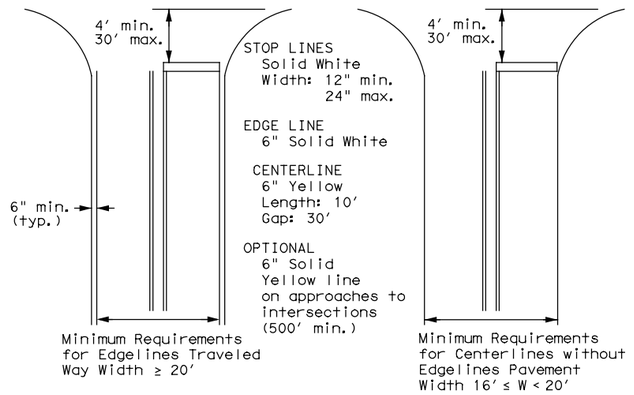
GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

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

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



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

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

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©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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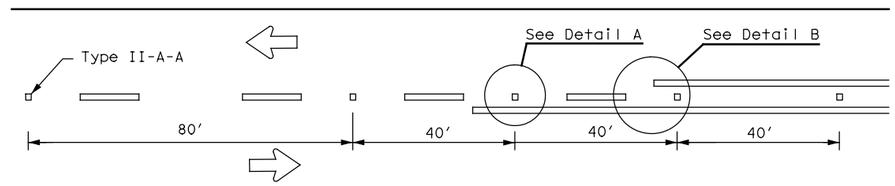
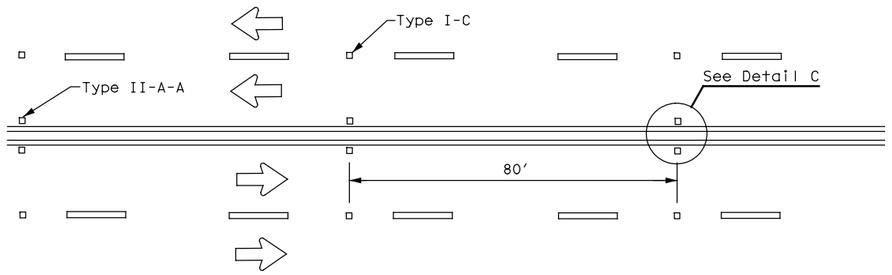
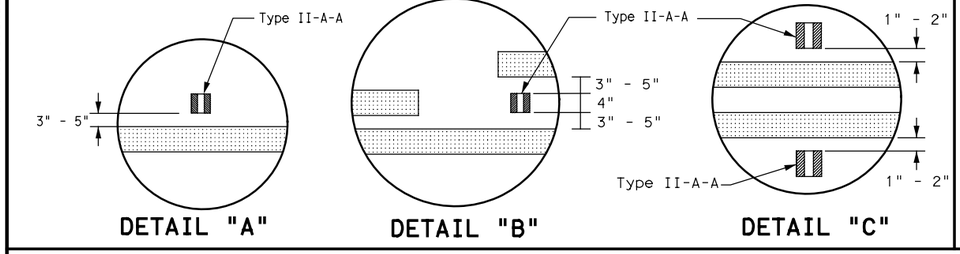
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

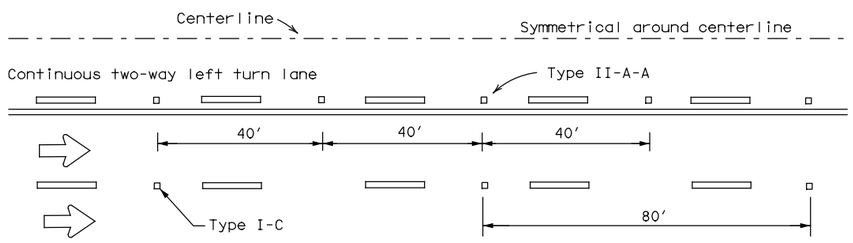


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

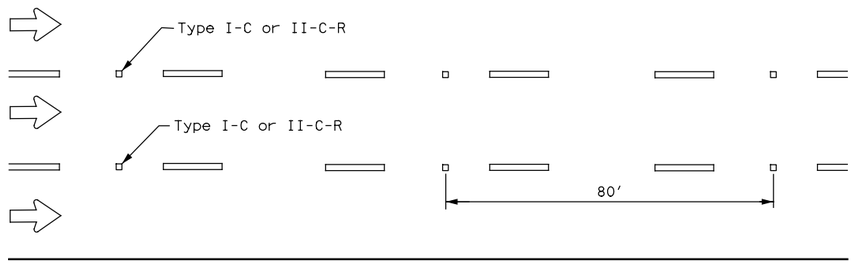


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



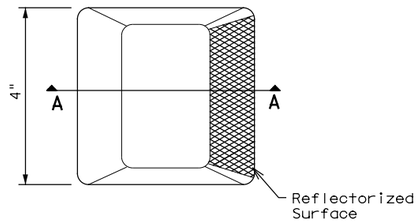
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

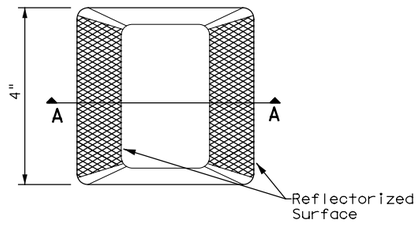
See Note 3.

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

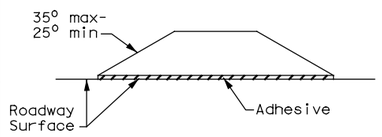
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

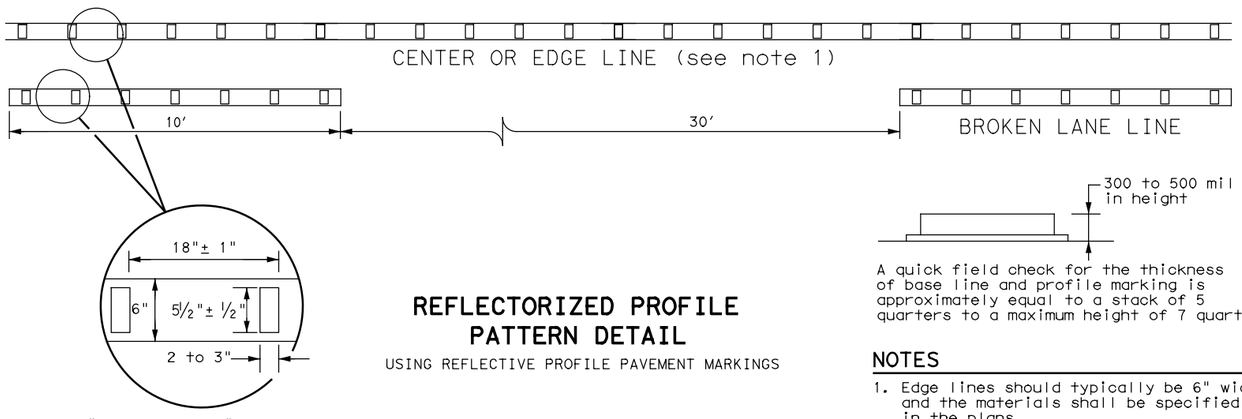


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	0910	16	187	VARIOUS
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		59

22B

DATE: 5/21/2024 2:14:47 PM
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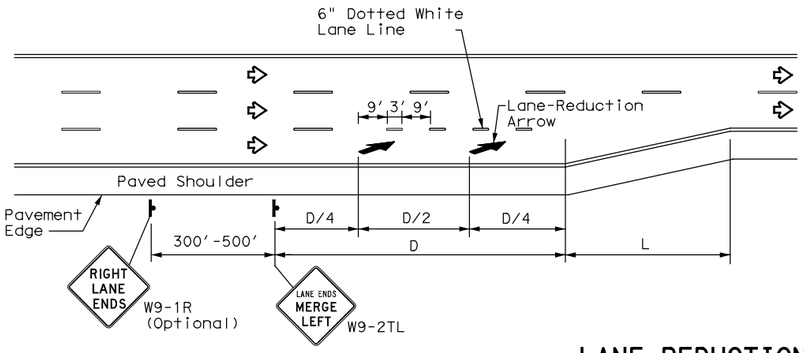
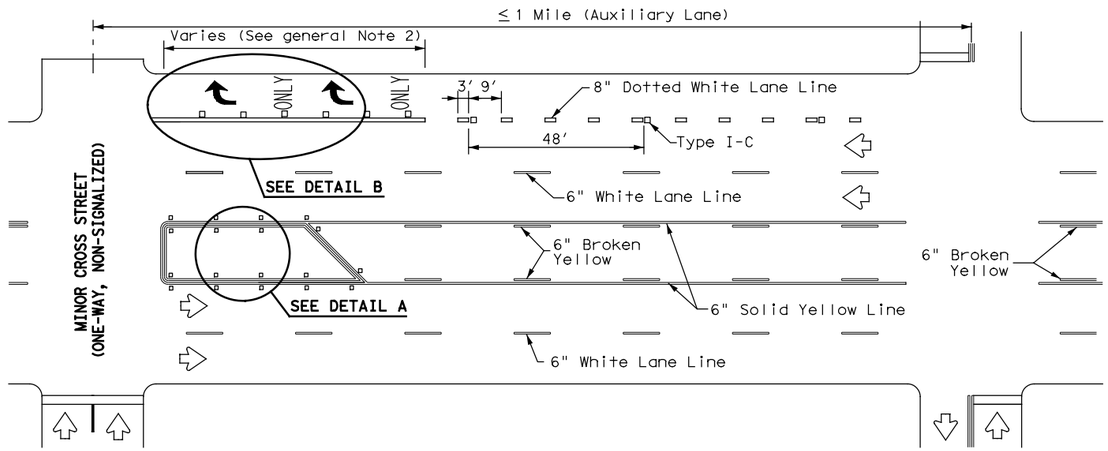


LANE REDUCTION

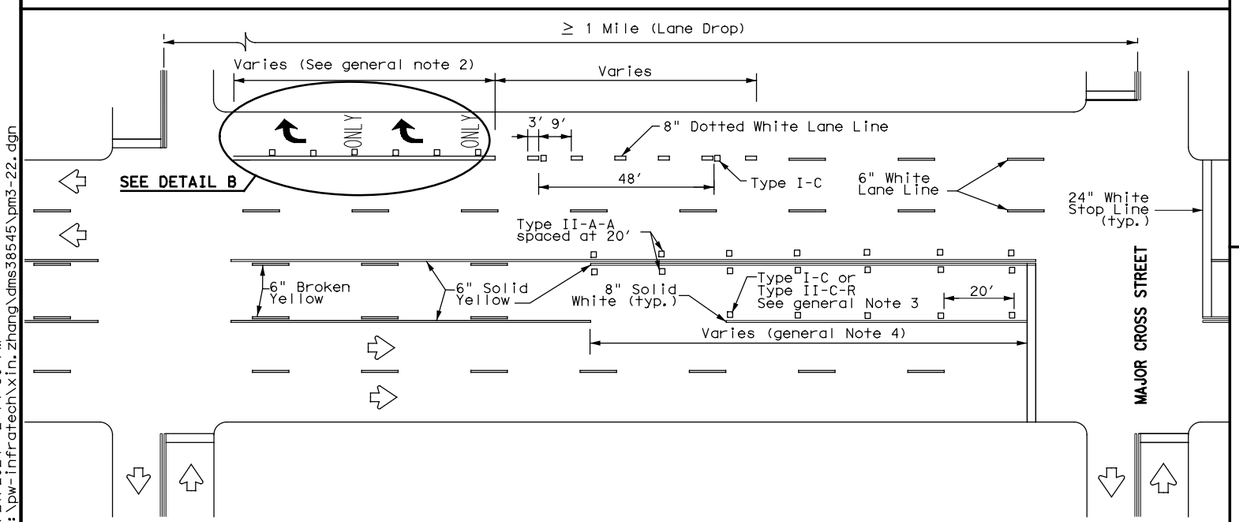
NOTES

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

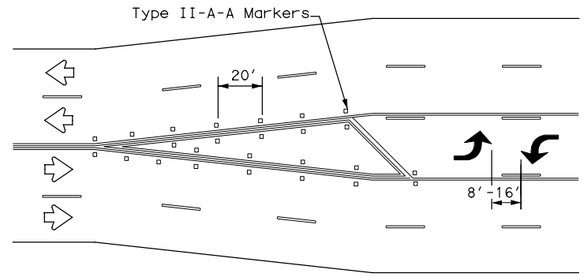
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



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



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



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

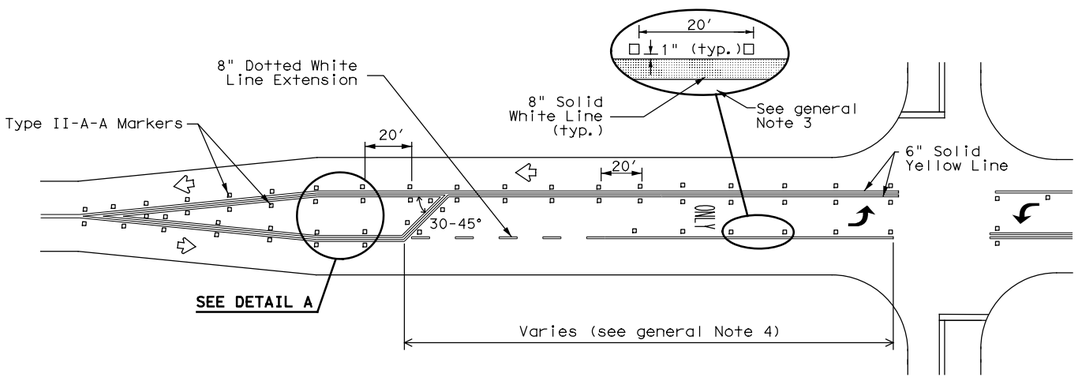
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

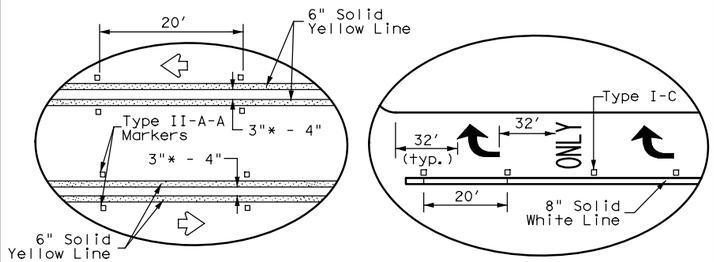
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn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

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

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



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



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

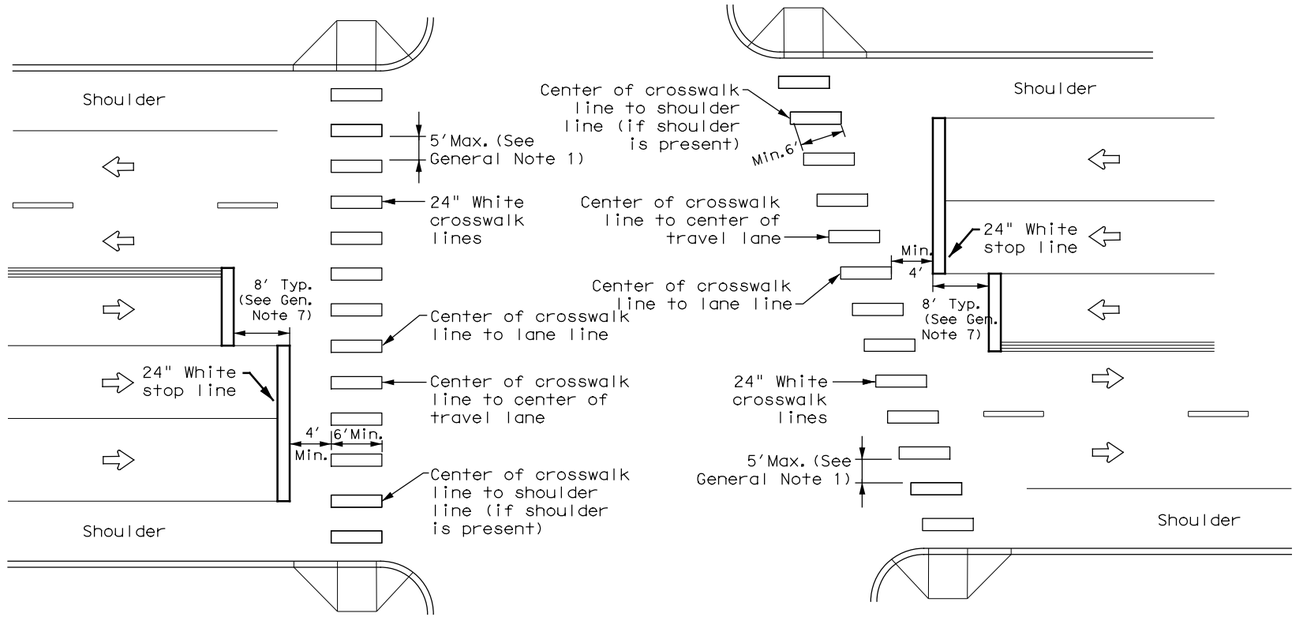
Texas Department of Transportation

Traffic Safety Division Standard

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

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	0910	16	187	VARIOUS
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		60

22C



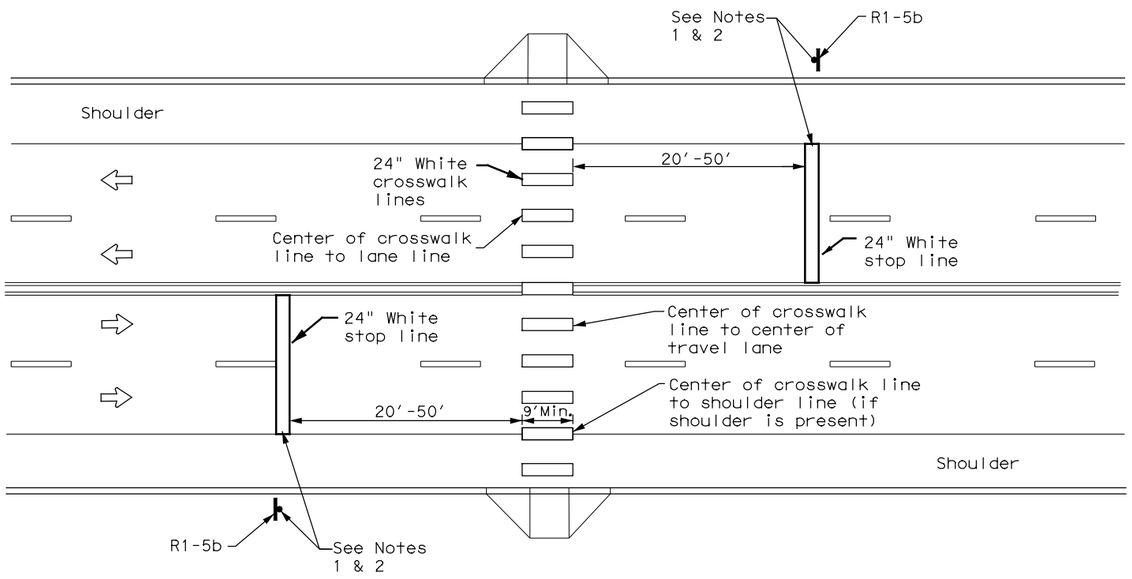
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

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

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



UNSIGNALIZED MID BLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

CROSSWALK WIDTH = 9' FOR APPROACH SPEEDS OF 30 MPH OR LESS
CROSSWALK WIDTH = 12' FOR APPROACH SPEEDS OF 35 MPH OR MORE

STATE OF TEXAS
ZAHIDUL Q. SIDDIQUI
98635
LICENSED
PROFESSIONAL ENGINEER

5/29/2024

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22A (MOD)

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-22	0910	16	187	VARIOUS
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		61

22D

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

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

Number of Posts (1 or 2)

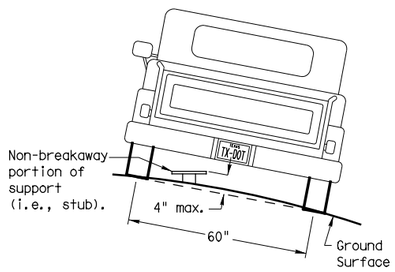
Anchor Type

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

Sign Mounting Designation

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

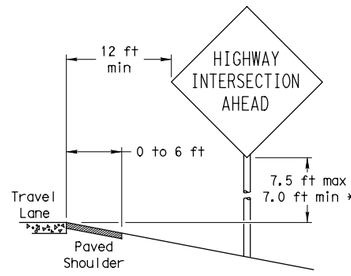
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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

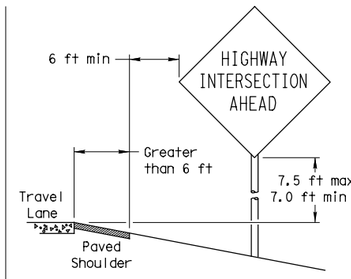
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

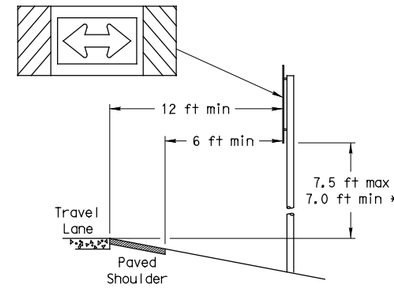
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



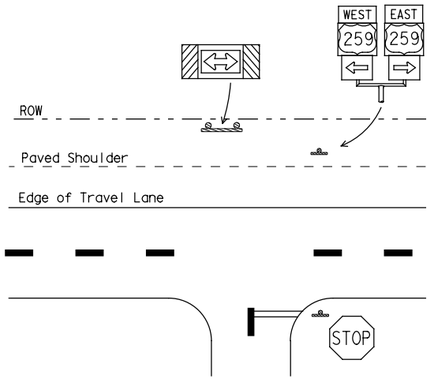
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

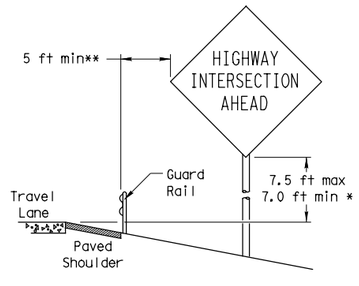
T-INTERSECTION



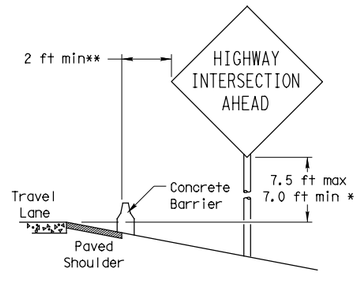
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



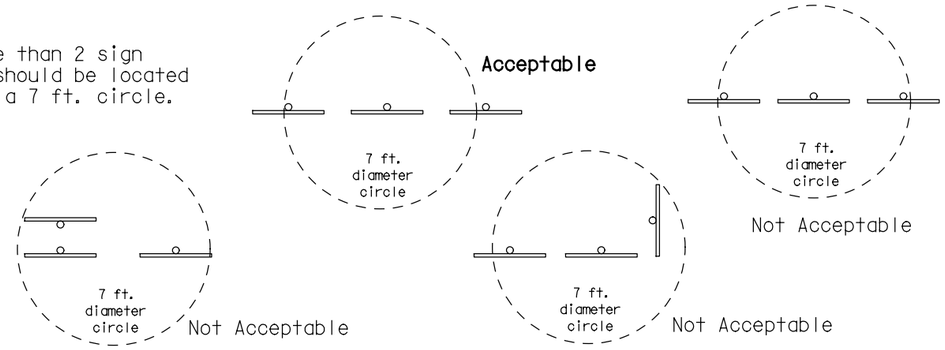
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

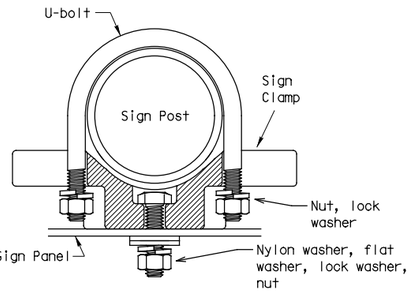
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

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

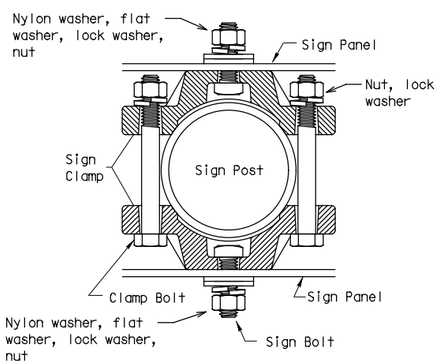


TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



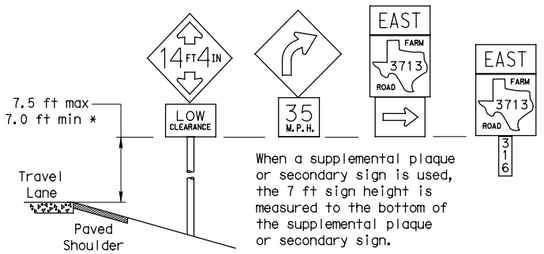
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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

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

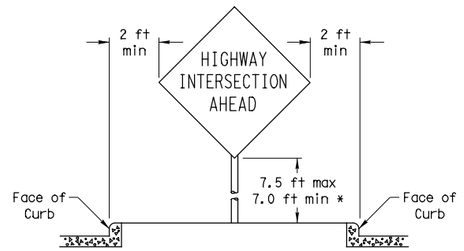
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



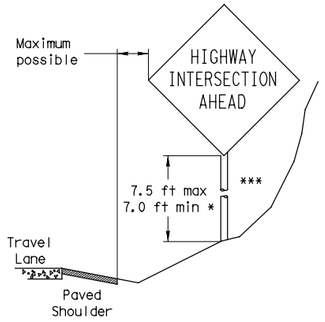
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



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

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

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

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

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

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

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

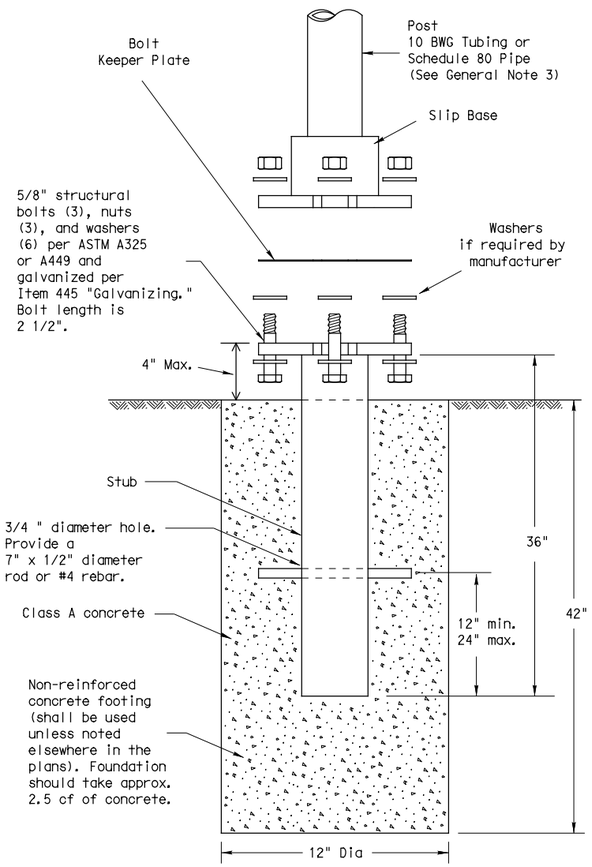
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0910	16	187	VARIOUS
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		62

DATE:
FILE:

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

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

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

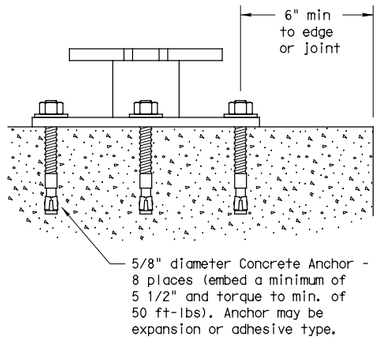
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

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

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

CONCRETE ANCHOR



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

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

Texas Department of Transportation
Traffic Operations Division

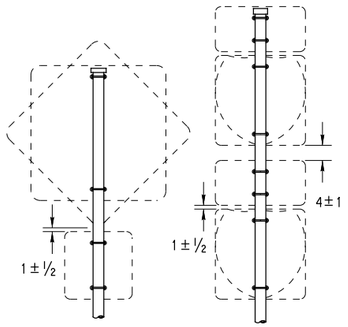
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

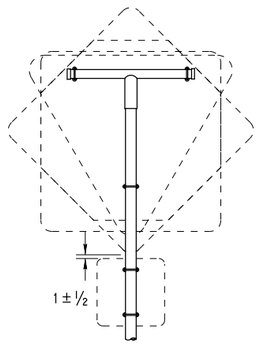
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0910	16	187	VARIOUS
DIST	COUNTY		SHEET NO.
TYL	SMITH		63

REVISIONS
9-08

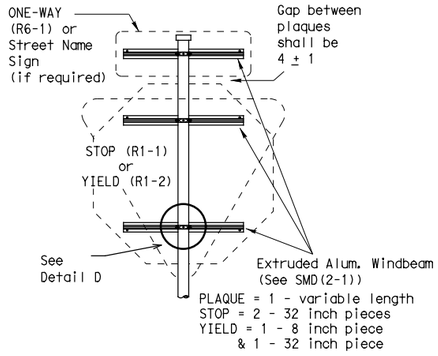
DATE:
FILE:



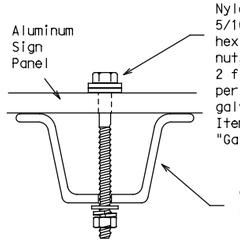
SM RD SGN ASSM TY XXXXX(1)XX(P)



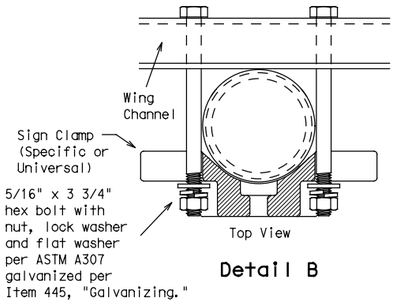
SM RD SGN ASSM TY XXXXX(1)XX(T)



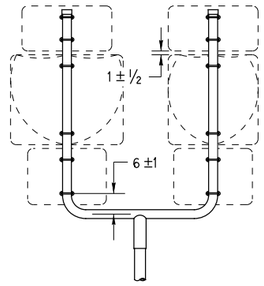
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



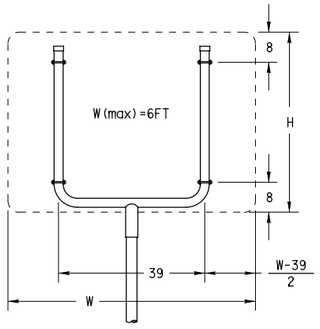
Detail A



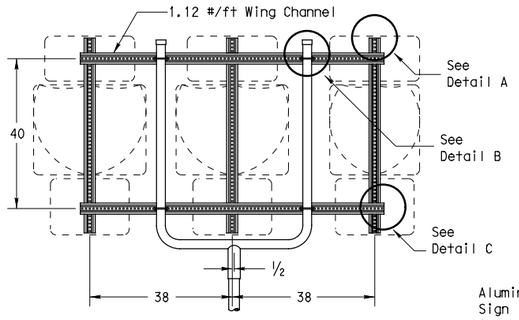
Detail B



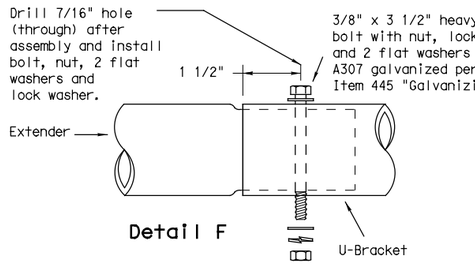
SM RD SGN ASSM TY XXXXX(1)XX(U)



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

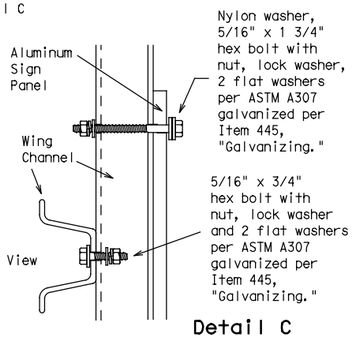


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

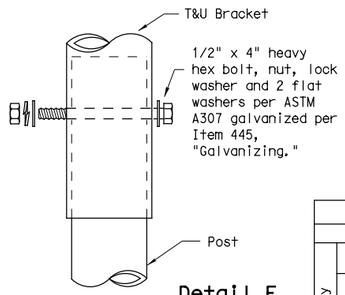


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



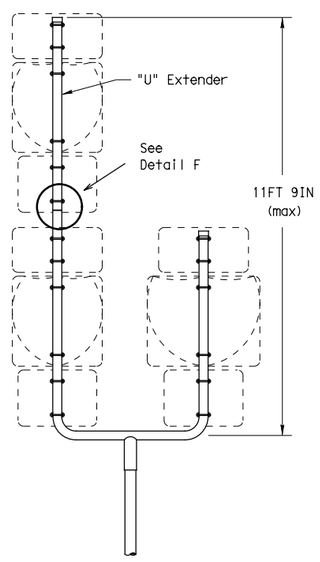
Detail E

GENERAL NOTES:

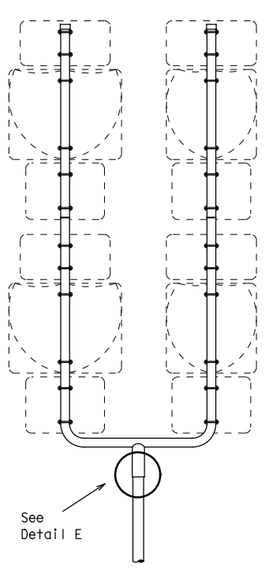
1.

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

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



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



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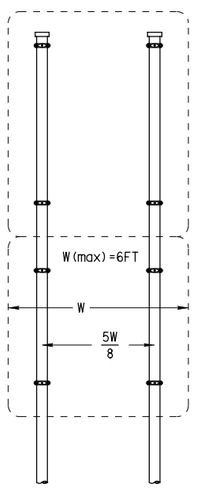
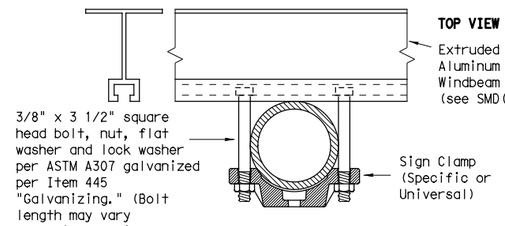
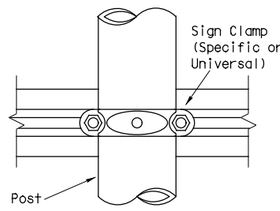


SM RD SGN ASSYM TY XXXXX(2)XX(P)

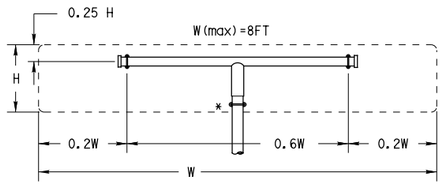
SIDE VIEW



Detail D



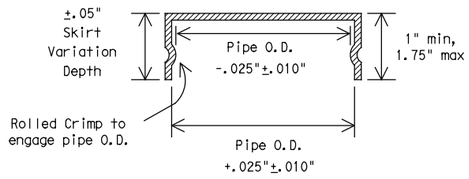
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



All dimensions are in english unless detailed otherwise.

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

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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

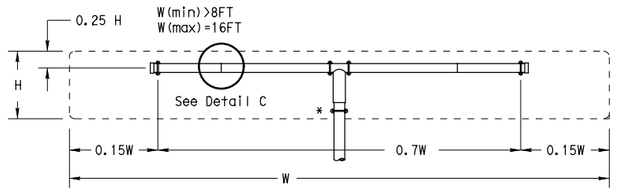
CONT	SECT	JOB	HIGHWAY
0910	16	187	VARIOUS

DIST	COUNTY	SHEET NO.
TYL	SMITH	64

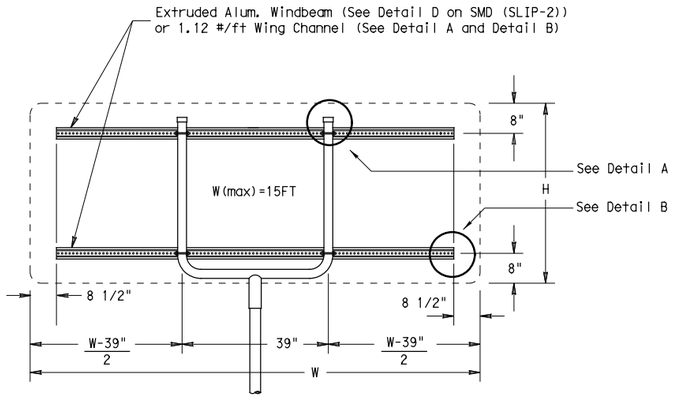
9-08 REVISIONS

DATE:
FILE:

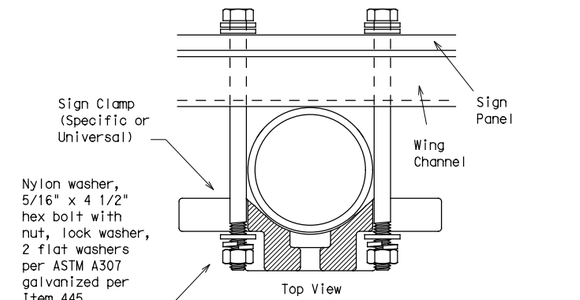
DATE:
FILE:



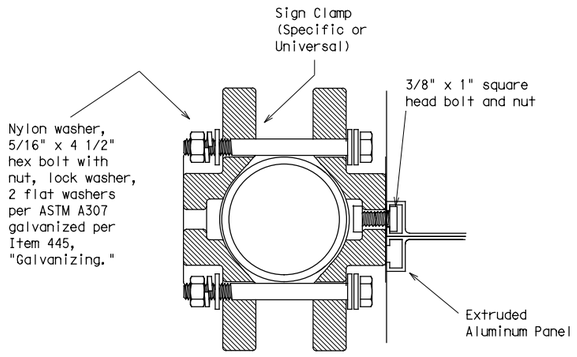
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



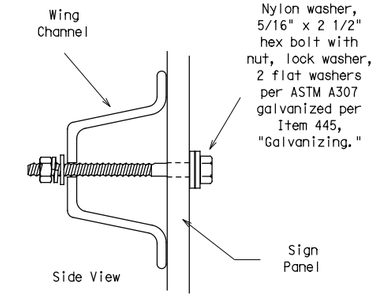
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



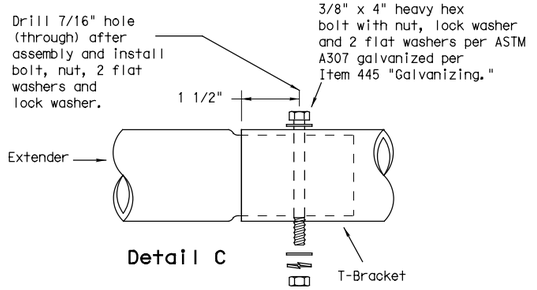
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

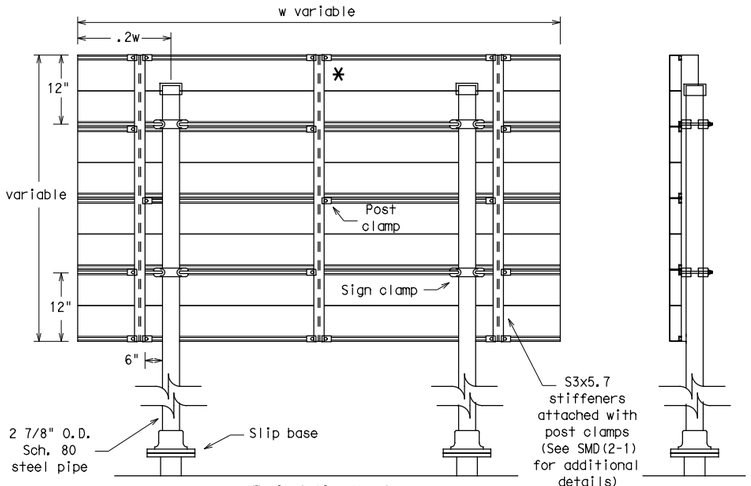


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

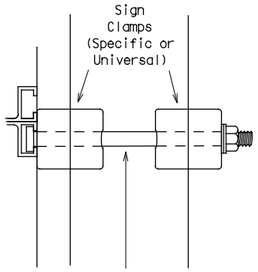


Typical Sign Mount

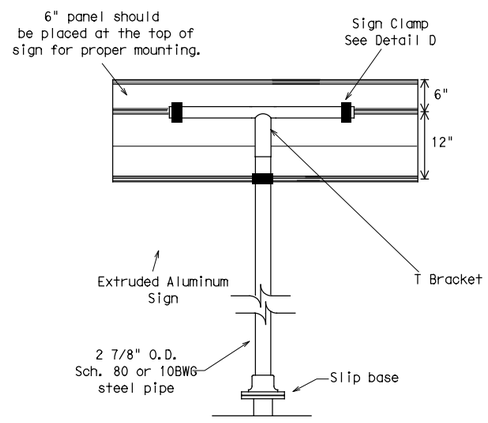
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

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

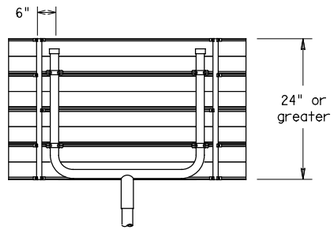
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



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

See Detail E
for clamp installation

GENERAL NOTES:

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

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

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0910	16	187	VARIOUS
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		65

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DATE:
FILE:

FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft ④, ⑤, ⑥			ANCHOR BOLT DESIGN ①				FOUNDATION DESIGN LOAD ②		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

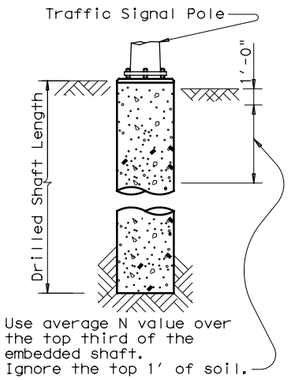
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET)				
				24-A	30-A	36-A	36-B	42-A
TOTAL DRILLED SHAFT LENGTHS								

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

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

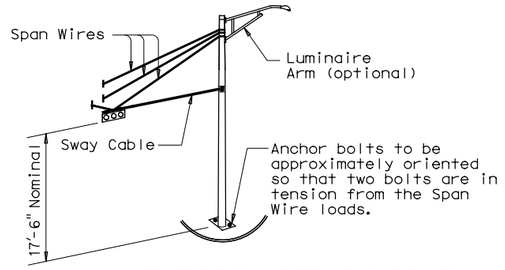


ANCHOR BOLT & TEMPLATE SIZES

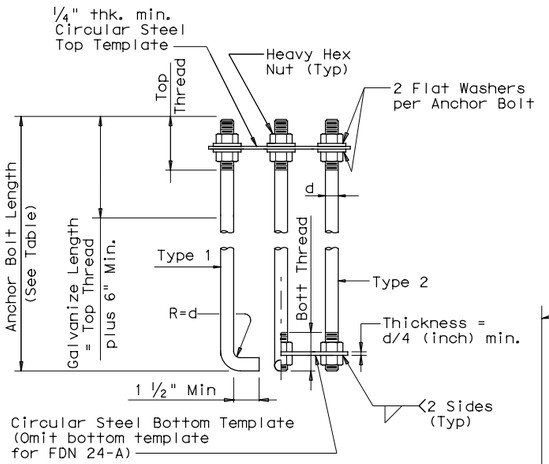
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

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



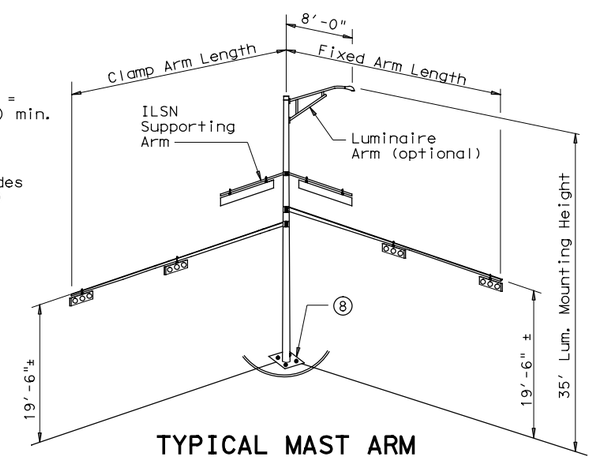
TYPICAL STRAIN POLE ASSEMBLY



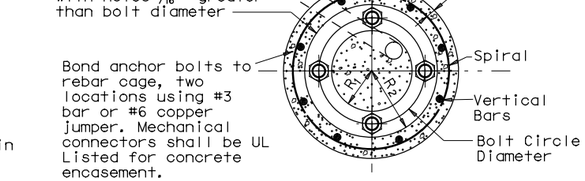
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

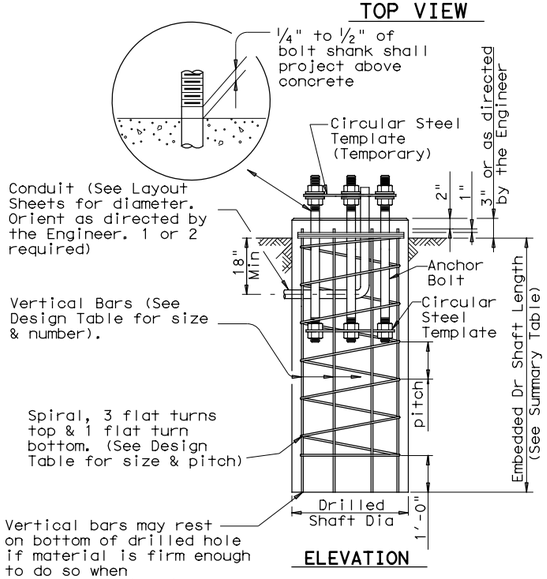
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL MAST ARM ASSEMBLY



TOP VIEW



ELEVATION

FOUNDATION DETAILS

GENERAL NOTES:

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

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

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

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

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

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

REVISIONS
5-96
11-99
1-12

DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB

CONT	SECT	JOB	HIGHWAY
0910	16	187	VARIOUS

DIST	COUNTY	SHEET NO.
TYL	SMITH	66

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):

0910-16-187

1.2 PROJECT LIMITS: VARIOUS LOCATIONS

1. FRONT AND BECKHAM, 2. GLENWOOD AND FRONT, 3. 5TH AND BECKHAM,
4. S. BROADWAY AND LOOP 323, 5. OLD JACKSONVILLE AND SUNNYBROOK.

1.3 PROJECT COORDINATES: VARIES

BEGIN: (Lat)_____,(Long)_____

END: (Lat)_____,(Long)_____

1.4 TOTAL PROJECT AREA (Acres): 11.6 ACRES

1.5 TOTAL AREA TO BE DISTURBED (Acres): < 1.0 ACRE

1.6 NATURE OF CONSTRUCTION ACTIVITY:

Pedestrian infrastructure technology upgrades for pedestrians including push buttons, pedestrian signals, etc.

1.7 MAJOR SOIL TYPES:

Soil Type	Description

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
N/A	N/A

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

1.9 CONSTRUCTION ACTIVITIES:

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

- ☒ Mobilization
- ☒ Install sediment and erosion controls
- ☐ Blade existing topsoil into windrows, prep ROW, clear and grub
- ☐ Remove existing pavement
- ☐ Grading operations, excavation, and embankment
- ☐ Excavate and prepare subgrade for proposed pavement widening
- ☐ Remove existing culverts, safety end treatments (SETs)
- ☐ Remove existing metal beam guard fence (MBGF), bridge rail
- ☐ Install proposed pavement per plans
- ☐ Install culverts, culvert extensions, SETs
- ☐ Install mow strip, MBGF, bridge rail
- ☐ Place flex base
- ☐ Rework slopes, grade ditches
- ☐ Blade windrowed material back across slopes
- ☐ Revegetation of unpaved areas
- ☐ Achieve site stabilization and remove sediment and erosion control measures
- ☒ Other: Update if project scope changes to require soil disturbing activities. None planned at this time.
- ☐ Other: _____
- ☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

- ☐ Sediment laden stormwater from stormwater conveyance over disturbed area
- ☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
- ☐ Solvents, paints, adhesives, etc. from various construction activities
- ☐ Transported soils from offsite vehicle tracking
- ☐ Construction debris and waste from various construction activities
- ☐ Contaminated water from excavation or dewatering pump-out water
- ☐ Sanitary waste from onsite restroom facilities
- ☐ Trash from various construction activities/receptacles
- ☐ Long-term stockpiles of material and waste
- ☐
- ☒ Other: _Update if project scope changes to require soil disturbing activities. None planned at this time.
- ☐ 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

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

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

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

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

STATE OF TEXAS
ZAHIDUL Q. SIDDIQUI
98635
LICENSED
PROFESSIONAL ENGINEER

5/21/2024

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

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			67
STATE	STATE DIST.	COUNTY	
TEXAS	TYL	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
0910	16	187	VARIOUS

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

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

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☐ ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☒ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☒ Other: __Update if project scope changes_____
- ☐ ☐ 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
N/A		

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

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

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☒ Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☒ Other: __Update if project scope changes_____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 DEWATERING:

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.

STATE OF TEXAS
ZAHIDUL Q. SIDDIQUE
98635
LICENSED
PROFESSIONAL ENGINEER

5/21/2024

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

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			68
STATE	STATE DIST.	COUNTY	
TEXAS	TYL	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
0910	16	187	VARIOUS

DATE:
FILE:

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.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000

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

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

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

☒ No Permit Required

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

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

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1. Contractor to adhere to specs listed above in IV.

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. Adhere to the Migratory Bird Treaty Act As Listed Below.

2.

3.

4.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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

☐ Yes ☒ No

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

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

☐ Yes ☐ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

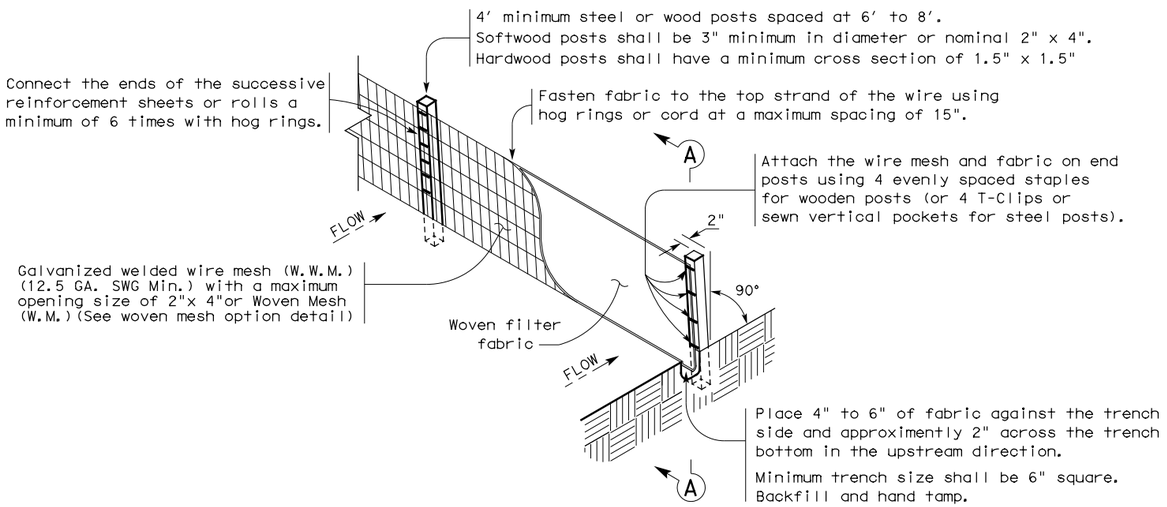
Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

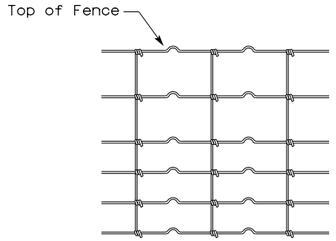
EPIC

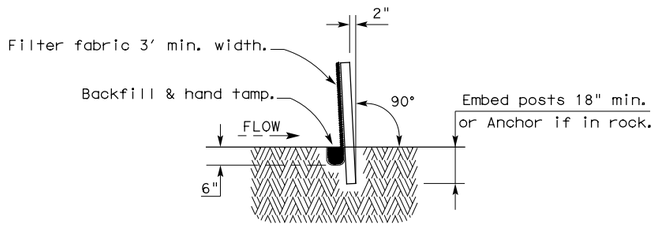
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0910	16	187	VARIOUS
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		69



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.

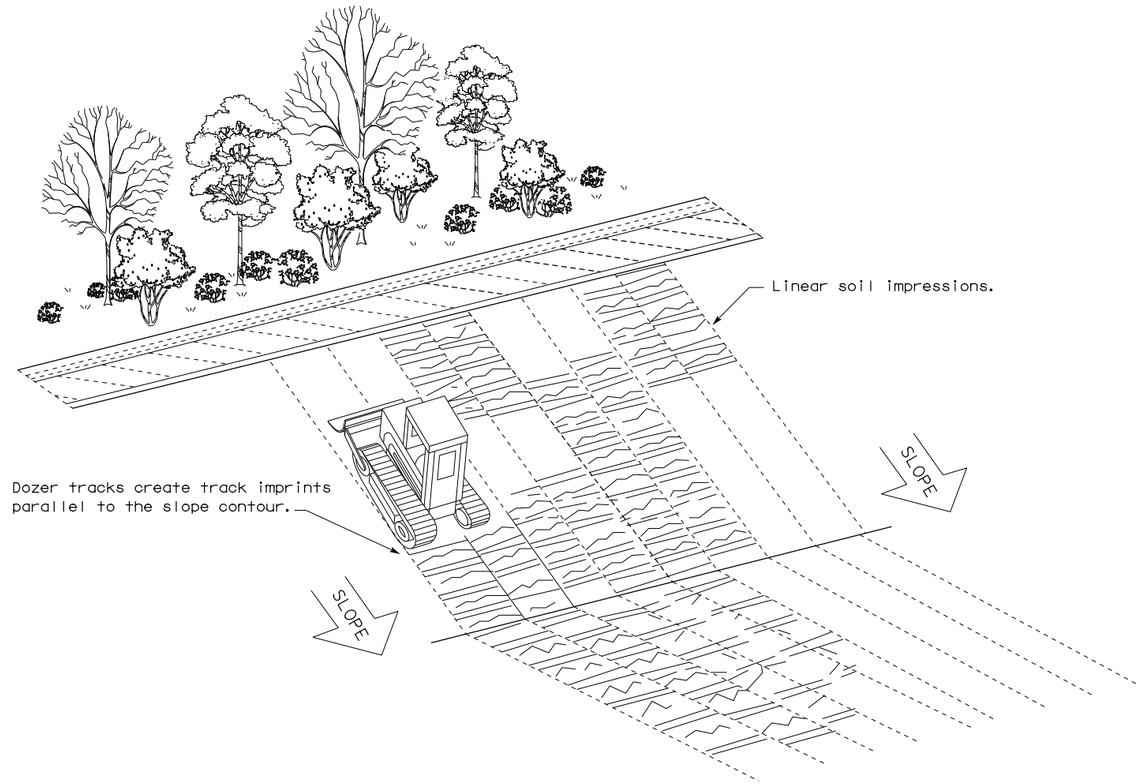
LEGEND

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	0910	16	187		VARIOUS		
	DIST	COUNTY					SHEET NO.
	TYL	SMITH					70

5/31/2024
C:\Users\xin.zhang\infratech\xin.zhang\dms38545\ec116.dgn

DATE: 5/21/2024
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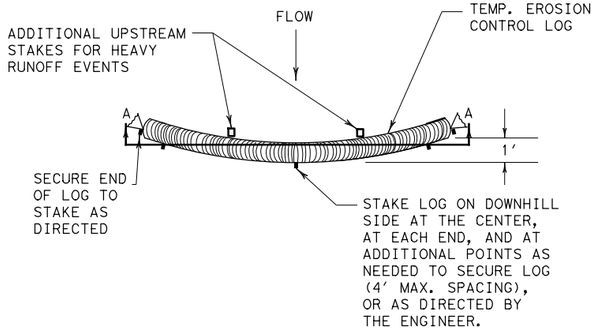
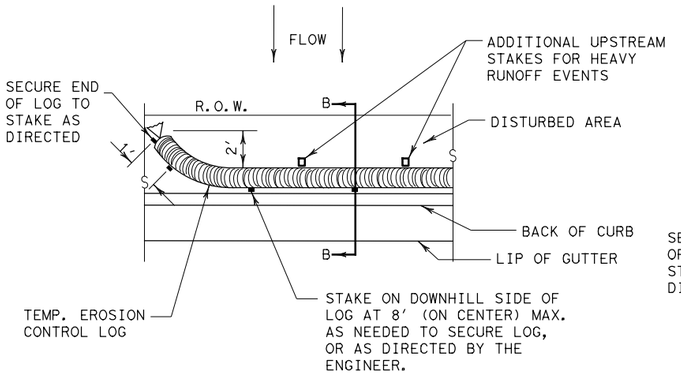
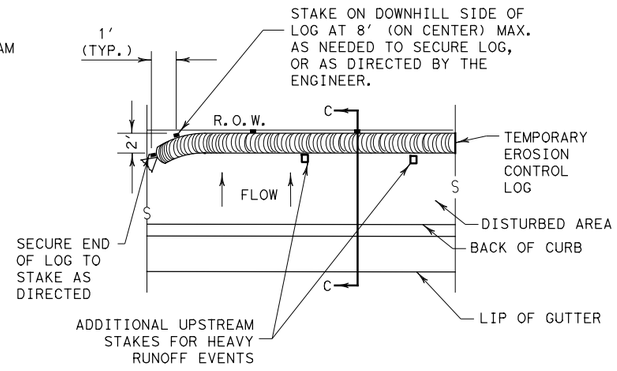


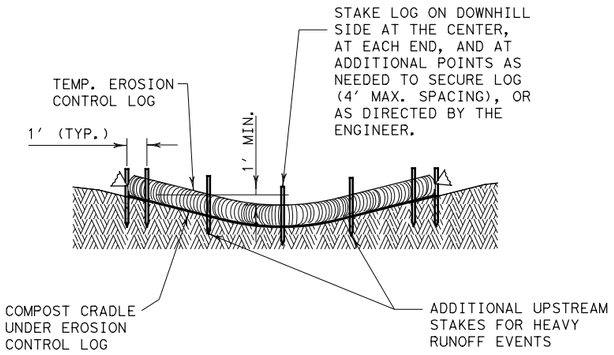
PLAN VIEW



PLAN VIEW



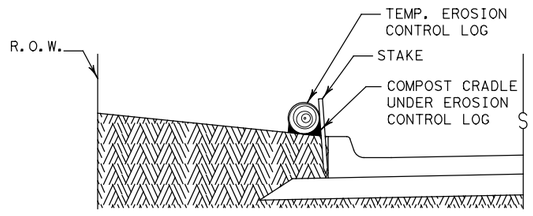
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

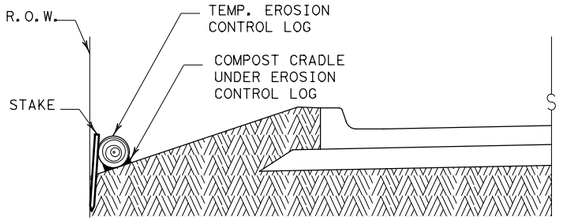
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

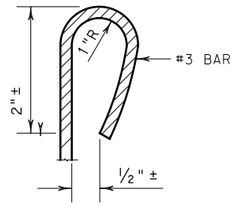
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



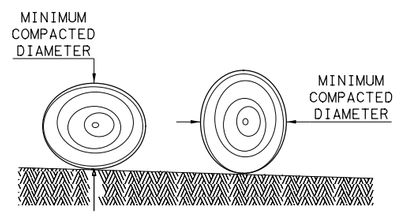
REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0910	16	187		VARIOUS		
	DIST	COUNTY			SHEET NO.		
	TYL	SMITH			71		

DATE: 5/21/2024
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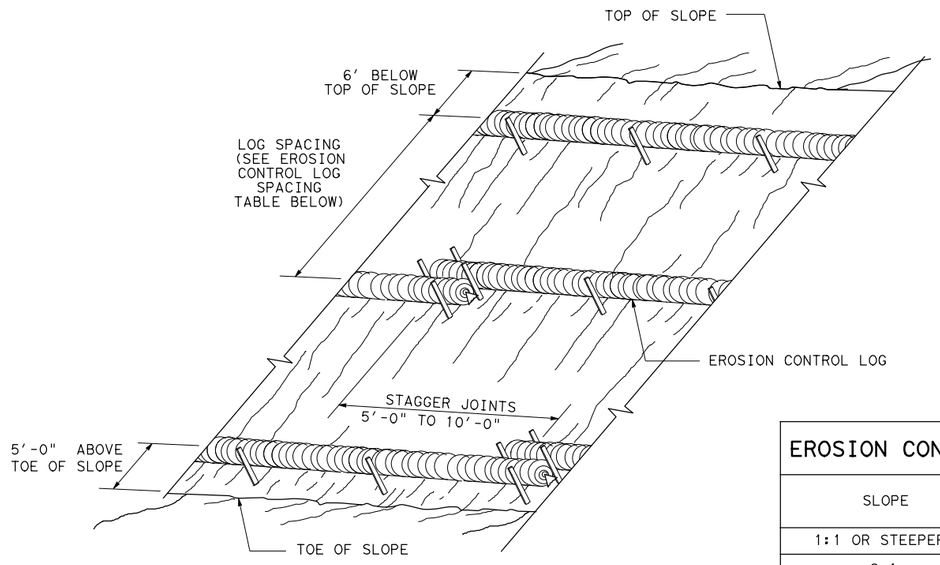
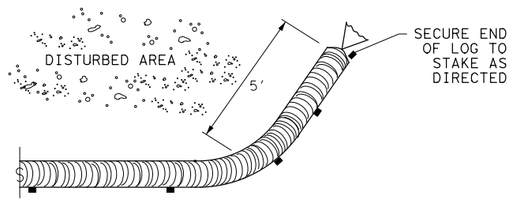


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

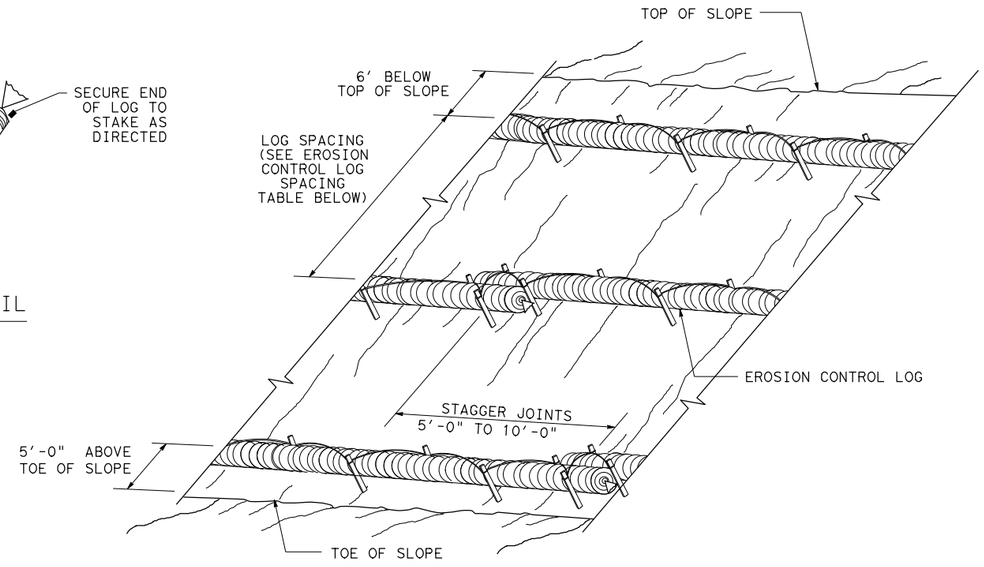
CL-SST



END SECTION RAP DETAIL

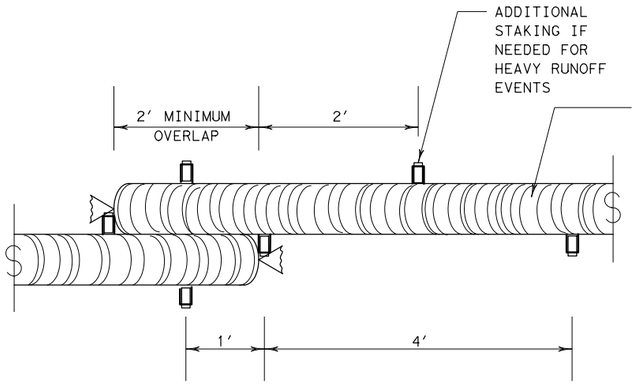
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

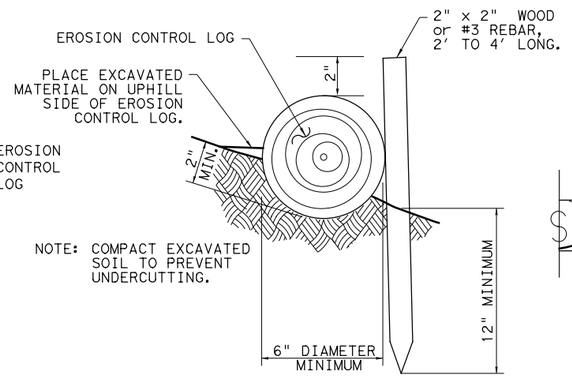
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

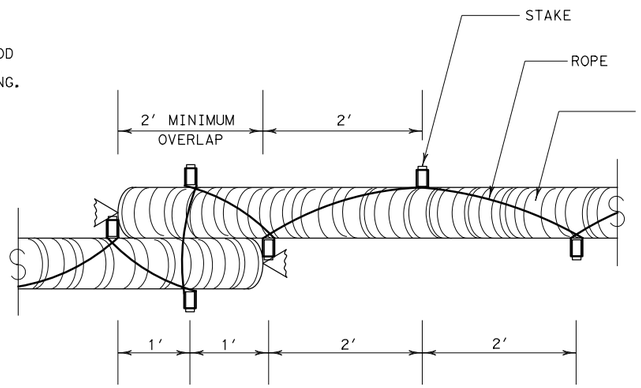


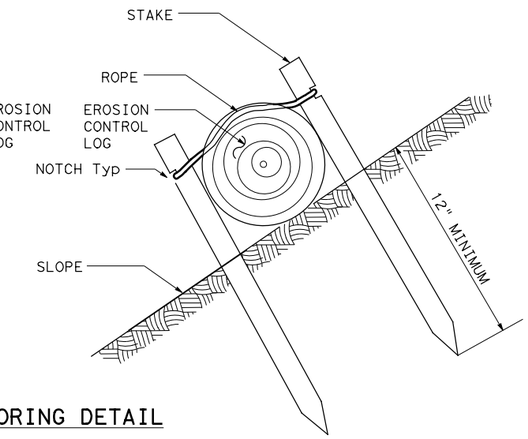


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

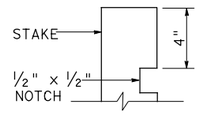
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation

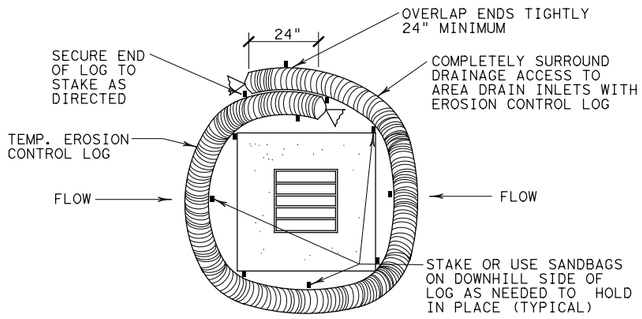
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

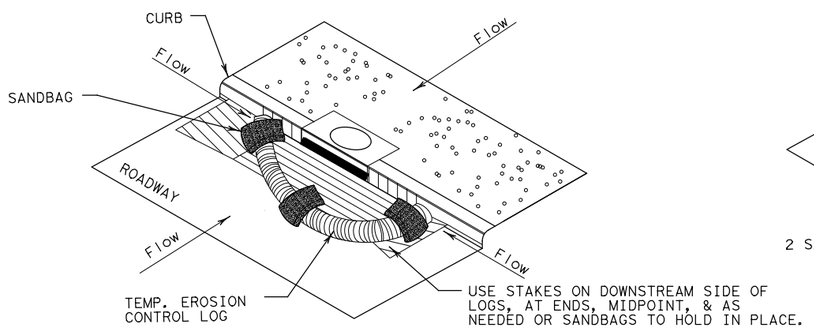
EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	187	VARIOUS
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		72



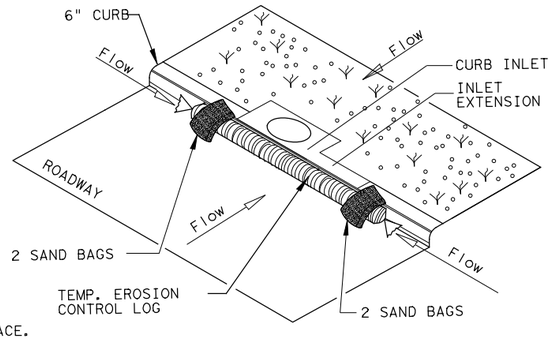
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

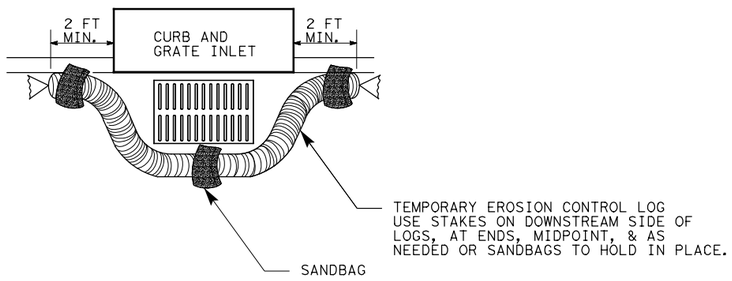
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

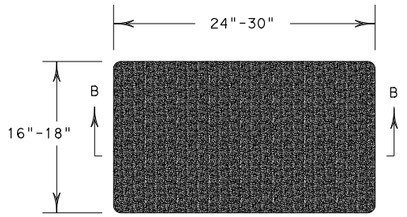
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	187	VARIOUS
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		73

DATE: 5/21/2024
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