CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		1

INDEX OF SHEETS

SEE SHEET NO. 2
FOR DETAILED INDEX

INDEX OF LOCATIONS

(SEE LOCATION MAPS FOR DETAILS)

1. FM 907 @ MILE 17 ½ RD
HIDALGO COUNTY
CSJ 1586-01-089
INSTALL TRAFFIC SIGNAL

2. FM 493 @ MURPHY AVE
HIDALGO COUNTY
CSJ 0863-01-078
INSTALL TRAFFIC SIGNAL

3. SH 4 @ CENTRAL AVE
CAMERON COUNTY
CSJ 0039-10-089
IMPROVE TRAFFIC SIGNAL

4. SH 4 @ FM 511
CAMERON COUNTY
CSJ 0039-10-088
IMPROVE TRAFFIC SIGNAL

5. US 83 @ FM 3167
STARR COUNTY
CSJ 0038-07-081
IMPROVE TRAFFIC SIGNAL

6. SH 48
CAMERON COUNTY
CSJ 0220-07-067
SAFETY ILLUMINATION

7. FM 493
HIDALGO COUNTY
CSJ 0863-03-040
SAFETY ILLUMINATION

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL PROJECT NUMBER

F 2022(934), ETC.

CSJ 1586-01-089, ETC.

NET LENGTH OF PROJECT = VARIOUS LOCATIONS

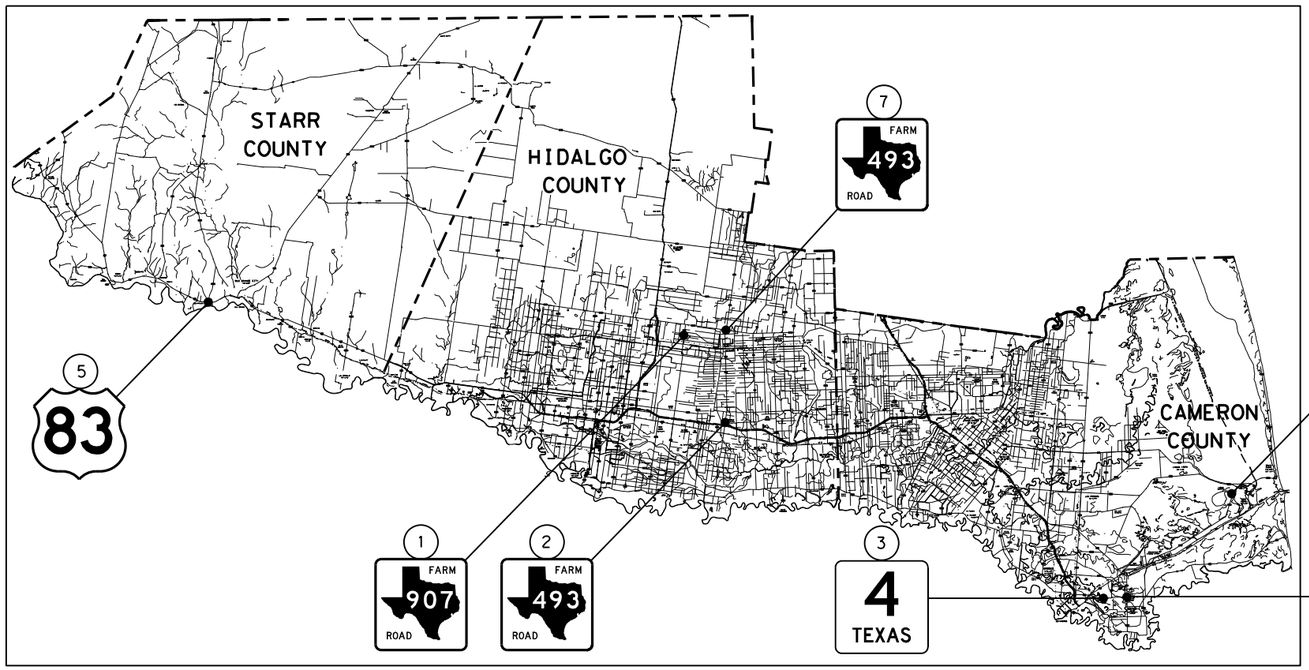
HIDALGO COUNTY, ETC.

FM 907, ETC.

LIMITS: VARIOUS LOCATIONS

FOR THE CONSTRUCTION OF: TRAFFIC SIGNALS, SAFETY ILLUMINATION & TRAFFIC SIGNAL IMPROVEMENTS

CONSISTING OF TRAFFIC SIGNAL AND PEDESTRIAN HEAD UPGRADES.



LOCATION MAP NOT TO SCALE

FINAL PLANS

DATE OF LETTING: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED: _____

DATE WORK ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

LIST OF APPROVED FIELD CHANGES, CHANGE ORDERS & SUPPLEMENTAL AGREEMENTS:

THIS IS TO CERTIFY THAT ALL CONSTRUCTION SUBSTANTIAL WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS SPECIFICATIONS AND CONTRACT. ALL PROPOSED CONSTRUCTION WAS COMPLETED UNLESS OTHERWISE NOTED.

_____ _____
RENE GARZA, P.E. DATE
PHARR AREA ENGINEER

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED
PROFESSIONAL ENGINEER

06.30.2022

PROJECT DATA

OVERALL NUMBER OF LOCATIONS:	7
DESIGN SPEED:	VARIES
EXCEPTIONS:	NONE
EQUATIONS:	NONE
RAILROAD CROSSINGS:	NONE

TDLR INSPECTION TABS2022022682

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON 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, MAY 2012).

SUBMITTED FOR LETTING: DATE: 7/5/2022

DocuSigned by:
Gabriel Isaac Garcia
E75CB72436B0468...
DISTRICT TRAFFIC ENGINEERING SUPERVISOR

RECOMMENDED FOR LETTING: DATE: 7/5/2022

DocuSigned by:
Pedro R. Alvarez
EABA335C2DAA48C...
DISTRICT ENGINEER

SUBMITTED FOR LETTING: DATE: 7/5/2022

DocuSigned by:
E. Jesus Hinojosa, P.E.
A5A9883ECD1E4F7...
DIRECTOR OF TRAFFIC OPERATIONS

FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\1. General\TITLE SHEET
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INDEX OF SHEETS

LEGEND

[S] STATE STANDAD

[D] DISTRICT STANDARD

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A "#" HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

07.05.2022

Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.

INDEX OF SHEETS

SHEET 1 OF 1

DS:	CK:	CONT	SECT	JOB	HIGHWAY
		1586	01	089, ETC.	FM 907, ETC.
DW:	CK:	DIST	COUNTY		SHEET NO.
		PHR	HIDALGO, ETC.		2

N

LOCATION #1: FM 907

CSJ: 1586-01-089

LIMITS: @ MILE 17 1/2 RD

POSTED SPEED: 50 MPH

A.A.D.T.: 2020 = 353 VPD
2040 = 353 VPD

HIDALGO COUNTY
CITY OF EDINBURG

NOTE: SEE PLAN SHEETS FOR LOCATION DETAILS.

	STARTING SHEET
CONDITION DIAGRAM =	29
PROPOSED PAVEMENT MARKINGS =	32
PROPOSED DIAGRAM =	30

Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.
LOCATION MAPS

NOT TO SCALE SHEET 1 OF 7

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089,ETC.	FM 907,ETC.
DW: CK:	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		3

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FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\8. Traffic\Location Maps\LOC 1 FM 907 @ MILE 17 1&slash;2 RD

LOCATION #2: FM 493

CSJ: 0863-01-078

LIMITS: @ MURPHY AVE

POSTED SPEED: 55 MPH

A.A.D.T.: 2020 = 21,347 VPD
2040 = 29,886 VPD

HIDALGO COUNTY
CITY OF DONNA

NOTE: SEE PLAN SHEETS FOR LOCATION DETAILS.

	STARTING SHEET
CONDITION DIAGRAM =	33
PROPOSED PAVEMENT MARKINGS =	36
PROPOSED DIAGRAM =	34

Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.
LOCATION MAPS

NOT TO SCALE SHEET 2 OF 7

DS:	CK:	CONT	SECT	JOB	HIGHWAY
		1586	01	089,ETC.	FM 907,ETC.
DW:	CK:	DIST	COUNTY		SHEET NO.
		PHR	HIDALGO,ETC.		4

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N

LOCATION #3: SH 4

CSJ: 0039-10-089

LIMITS: @ CENTRAL AVE

POSTED SPEED: 45 MPH

A.A.D.T.: 2020 = 16,567 VPD
2040 = 23,194 VPD

CAMERON COUNTY
CITY OF BROWNSVILLE

NOTE: SEE PLAN SHEETS FOR LOCATION DETAILS.

	STARTING SHEET
CONDITION DIAGRAM =	37
PROPOSED PAVEMENT MARKINGS =	40
PROPOSED DIAGRAM =	38

Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.
LOCATION MAPS

NOT TO SCALE SHEET 3 OF 7

DS:	CK:	CONT	SECT	JOB	HIGHWAY
		1586	01	089, ETC.	FM 907, ETC.
DW:	CK:	DIST	COUNTY		SHEET NO.
		PHR	HIDALGO, ETC.		5

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N

LOCATION #4: SH 4

CSJ: 0039-10-088

LIMITS: @ FM 511

POSTED SPEED: 55 MPH

A.A.D.T.: 2020 = 5,859 VPD
2040 = 8,203 VPD

CAMERON COUNTY
CITY OF BROWNSVILLE

NOTE: SEE PLAN SHEETS FOR LOCATION DETAILS.

	STARTING SHEET
CONDITION DIAGRAM =	41
PROPOSED PAVEMENT MARKINGS =	44
PROPOSED DIAGRAM =	42

Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.
LOCATION MAPS

NOT TO SCALE SHEET 4 OF 7

DS:	CK:	CONT	SECT	JOB	HIGHWAY
		1586	01	089,ETC.	FM 907,ETC.
DW:	CK:	DIST	COUNTY		SHEET NO.
		PHR	HIDALGO,ETC.		6

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N

LOCATION #5: US 83

CSJ: 0038-07-081

LIMITS: @ FM 3167

POSTED SPEED: 60 MPH

A.A.D.T.: 2020 = 20,515 VPD
2040 = 28,721 VPD

STARR COUNTY
CITY OF RIO GRANDE CITY

NOTE: SEE PLAN SHEETS FOR LOCATION DETAILS.

	STARTING SHEET
CONDITION DIAGRAM =	45
PROPOSED PAVEMENT MARKINGS =	48
PROPOSED DIAGRAM =	46

Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.
LOCATION MAPS

NOT TO SCALE SHEET 5 OF 7

DS:	CK:	CONT	SECT	JOB	HIGHWAY
		1586	01	089, ETC.	FM 907, ETC.
DW:	CK:	DIST	COUNTY		SHEET NO.
		PHR	HIDALGO, ETC.		7

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N

LOCATION #6: SH 48

CSJ: 0220-07-067

LIMITS: 6,045 FT S. OF SH 100 TO
4,300 FT S. OF SH 100

POSTED SPEED: 75 MPH

A.A.D.T.: 2020 = 6,931 VPD
2040 = 9,703 VPD

CAMERON COUNTY

NOTE: SEE PLAN SHEETS FOR LOCATION DETAILS.

STARTING SHEET

PROPOSED DIAGRAM = 49

Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.

LOCATION MAPS

NOT TO SCALE SHEET 6 OF 7

© 2022		CONT	SECT	JOB	HIGHWAY
DS:	CK:	1586	01	089,ETC.	FM 907,ETC.
		DIST	COUNTY		SHEET NO.
DW:	CK:	PHR	HIDALGO,ETC.		8

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N

LOCATION #7: FM 493

CSJ: 0863-03-040

LIMITS: FM 1925 TO ROGERS RD

POSTED SPEED: 55 MPH

A.A.D.T.: 2020 = 7,193 VPD
2040 = 10,070 VPD

HIDALGO COUNTY

NOTE: SEE PLAN SHEETS FOR LOCATION DETAILS.

STARTING SHEET

PROPOSED DIAGRAM = 51

Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.

LOCATION MAPS

NOT TO SCALE SHEET 7 OF 7

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
DW: CK:	PHR	HIDALGO,ETC.		9

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2014 SPECS GENERAL NOTES:

****

General Requirements and Covenants to ITEMS 1 thru 9:

For all pits or quarries, comply with the "Texas Aggregate Quarry and Pit Safety Act."

Provide on a weekly basis a list of equipment, including idle equipment, utilized on the project that week.

The 1-800 call services for utility locations do not include TxDOT facilities. Contact the Pharr District Signal Section (956-702-6225) for coordination regarding TxDOT underground lines.

The Contractor's attention is directed to the possible presence of underground utilities on the Right of Way on this project. It is the responsibility of the Contractor to call for locates 48 hours in the advance of excavation or drilling.

All information concerning utility verification shall be provided to the Engineer.

The Contractor shall contact the local power companies prior to commencing construction. The Contractor shall coordinate with the power companies for the raising/relocation of existing power lines where deemed necessary by the Engineer or the Contractor to effect the proposed construction (subsidiary to the various bid items).

Erection of poles, luminaire, and structures located near any overhead or underground utilities shall be accomplished using established industry and utility safety practices. The Contractor shall consult with the appropriate utility companies prior to beginning such work.

The Contractor shall take extreme care when excavating or drilling in the vicinity of utilities. The Contractor shall verify the location of any underground utilities before drilling for steel pole foundations and service poles. The contractor shall hand dig, vacuum excavate, or employ any potholing practice necessary when trying to identify and avoid damage to utilities.

The Contractor shall repair any damage to existing facilities caused by his operations deemed his liability by the Engineer, at his own expense and shall restore facilities to service in a timely manner.

The Contractor shall attend a preconstruction conference to discuss traffic control, traffic safety, construction sequences and safety prior to start of construction. The Contractor's superintendent shall attend the preconstruction conference. The Contractor shall, at the preconstruction meeting or prior to beginning any work on the project submit a certificate indicating the completion of flagger training by a company representative.

Project Number: **Sheet 10**

County: Hidalgo, Etc. **Control:** 1586-01-089, Etc.

Highway: FM 907, Etc.

Contractor shall submit a work schedule, material sources and letters designating the project superintendent, safety officer and payroll officer.

ITEM 2: Instructions to Bidders

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

Rene Garza, P.E., Pharr Area Engineer; Rene.Garza@txdot.gov
Jesus Noriega, P.E., Assist. Area Engineer; Jesus.Noriega@txdot.gov

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

All Contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:

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

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

ITEM 5: Control of the Work

The responsibility for the construction surveying on this contract will be in accordance with Article 5.9.3., "Method C."

ITEM 7: Legal Relations and Responsibilities

No significant traffic generator events identified.

Roadway or Lane closures during the following key dates and/or special events are prohibited:

- National Holidays
- The day before a National Holiday
- During emergency events such as natural disasters or as directed by the Engineer

ITEM 8: Prosecution and Progress

Attention is called to Location 6: SH 48 (CSJ: 0220-07-067) for the installation of safety lighting. To prevent impact to red knot or piping plover, construction of the proposed safety lighting SHALL be conducted, and completed between the months of May 2023 to July 2023.

Working days will be computed and charged in accordance with Article 8.3.1.4. Standard Workweek.

The Contractor shall begin work as per the contract within 120 days as delineated by the Special Provision 008---004 and shall continuously prosecute the work thereafter. The Contractor shall complete the work within the time limit specified. The 120-day delay is to provide additional time for material acquisition prior to the authorization to begin work. The Contractor shall notify the Engineer at least 24 hours before beginning work and any new operation. The Contractor shall not start new operations to the detriment of work already begun. The prosecution of the work shall be conducted in such a manner as to impose minimum inconvenience to the traveling public.

Prepare progress schedules as a Bar Chart.

ITEM 416: Drilled Shaft Foundations

Payment for furnishing and installing anchor bolts mounted in drill shafts will be included in the unit price bid for the various diameter drill shafts.

The Contractor shall coordinate with the utility companies to verify utility locations before drilling foundations.

The Contractor shall form, or provide a smooth finish, the portions of drilled shaft that project above the ground line. Place a ¾ inch chamfer on the top edge of each pole foundation. This work will not be paid for directly but will be considered subsidiary to this bid Item.

All drilled shaft foundations will be based on the lengths shown on the plans or those established in writing. Adequate calculations for measurements of foundations have been made in accordance with Article 9.1. of the Standard Specifications. Increases or decreases in the quantities required by change in design will be measured as specified and the revised quantities will be the basis for payment.

In the presence of excess ground water and/or unstable conditions in sub-grade soils prevents excavation to the line and depths indicated on the plans for “Drilled Shaft Foundation”, other

Project Number: **Sheet 11**

County: Hidalgo, Etc. **Control:** 1586-01-089, Etc.

Highway: FM 907, Etc.

proposed methods of foundation installation such as casing, etc. shall be submitted for review and approved by the Engineer.

ITEM 421: Hydraulic Cement Concrete

Provide Sulfate Resistant Concrete for all concrete piling and drilled shafts.

Provide equipment at the batch plant for determining the free moisture and/or absorption of aggregates in accordance with applicable TXDOT Test.

Provide the following items for concrete batch inspection in accordance with specifications outlined in DMS-10101, “Computer Equipment”:

(1) One Desktop Microcomputer or One Laptop Microcomputer
(2) One Integrated Printer/Scanner/Copier/Fax Unit
(3) Contractor-Furnished Software
(4) Hardware

Submit to the Engineer for approval the project locations for all Portland Cement concrete washout areas prior to starting any concrete work.

Fiber Reinforced Concrete is not permitted.

ITEM 432: Riprap

Provide Class “A” concrete minimum for riprap aprons placed around all box culvert and pipe safety end treatments. Provide ¼-inch thick dummy joints at least every 15-ft for riprap aprons placed around box and pipe culverts.

Do not use fiber reinforced concrete RIPRAP on side slopes equal to or steeper than 6:1 unless approved by the Engineer.

ITEM 502: Barricades, Signs, and Traffic Handling

Shadow vehicles equipped with Truck-Mounted Attenuators are required for traffic handling. See notes for Item 6185: Truck Mounted Attenuator/Trailer Attenuator, for additional references pertaining to the TMAs.

Replace/relocate all regulatory signs removed due to construction operations with the same sign on fixed support(s) immediately upon its removal. First obtain Project Engineer approval before removing any regulatory roadway sign. Required flaggers are to be available to direct traffic during sign intermediate down time.

Relocate any Directional Sign Assemblies removed during construction operations immediately upon their removal.

These signs shall be relocated to a location in accordance with the Latest Version of the "Texas Manual on Uniform Traffic Control Devices". In no case will a sign be removed without a replacement sign and support(s) being readily available and a location established. Removal and relocation of these signs required for traffic control will not be paid for directly but shall be considered subsidiary to Item 502.

From the beginning to the end of the project, all traffic control devices need to be in acceptable condition as per the Texas Quality Guidelines for Work Zone Traffic Control Devices.

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

Remove and dispose of all litter, debris, objectionable material, excess materials that accumulate at the base of all traffic control devices as directed by the Engineer.

ITEM 506: Temporary Erosion, Sedimentation, and Environmental Controls

Due to the nature of this project, it is unlikely a significant amount of soil will be disturbed. However, if erosion control logs are needed; it shall be placed as directed by the Engineer.

Before starting each phase of construction, review with the Engineer the SW3P used for temporary erosion control as outlined on the plans. Before construction, place the temporary erosion and sedimentation control features as shown on the SW3P. Location of Construction Exits are to be approved by the Engineer. After completing earthwork operations, restore and reseed the disturbed areas in accordance with the Department's specifications for permanent or temporary erosion control. Before starting grading operations and during the project duration, place the temporary or permanent erosion control measures to prevent sediment from leaving the right of way.

Project Number: **Sheet 12**

County: Hidalgo, Etc. **Control:** 1586-01-089, Etc.

Highway: FM 907, Etc.

The Contractor Force Account "Erosion Control Maintenance" that has been established for this project is intended to be utilized for work zone Best Management Practice (BMP) maintenance, to improve the effectiveness of the Environmental Controls that may need maintenance attention and/or require replacement while the project is still under the construction stage. These procedures will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent BMP management reviews on the project. The "Erosion Control Maintenance" is not intended to be used in lieu of bid Items established by the contract.

ITEM 531: Sidewalks

Construct ¼-inch thick score joints at a maximum 6-foot spacing and expansion joints at a maximum 18 foot spacing. Construct a joint in the center of the sidewalk if it is over 15-feet wide. For steel reinforcement, use 6x6-inch spacing with #3 bars or 6x6 – D6 welded wire fabric.

ITEM 610: Roadway Illumination Assemblies

Luminaires shown on the proposed Traffic Signal installation layout sheets may be shown at an angle for clarity. All luminaires shown shall be installed perpendicular to the main roadway under construction.

In addition to ED (3)-14, each cable for luminaires on traffic signal poles shall be identified in each ground box, pole base, or other accessible location with yellow electrical tape wrapped around the cable. The tape marking shall be at least 2 inches.

All luminaires on traffic signal poles shall be rated for 240 vac. All safety lighting poles shall be serviced for 480 vac.

Luminaires installed on traffic signal poles will not be paid for directly but shall be considered subsidiary to the various bid Items of the project.

For the installation of the safety lighting for **Location 6: SH 48 (CSJ:0220-07-067)**, the Contractor shall furnish and install LED lighting fixtures with a **color temperature of 3000K**. These fixtures shall abide by the Department's Material Specifications, DMS-11011 & be obtained from one of the producers/manufacturers approved on TxDOT's Material Producer List (MPL).

Fabricate steel roadway illumination poles in accordance with TxDOT standards RIP-17 (Roadway Illumination Poles -2017). Poles fabricated according to RIP-17 require no shop drawings.

Alternate designs to RIP-17 or the use of aluminum to fabricate poles will require the submission of shop drawings electronically.

For instructions on submitting shop drawings electronically go to TxDOT home page, Business with TxDOT, Bridge information, Shop drawings.

File is titled: **Guide to Electronic Shop Drawing Submittal**

Limitations on Use of the RIP-17 Standard

The Roadway Illumination Pole (RIP-17) standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e., not more than) 25' above the elevation of surrounding terrain, in accordance with the latest edition of the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals." For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, the Contractor shall provide poles meeting the following requirements:

A. Submittals. Following the electronic shop drawing submittal process (see ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/e_submit_guide.pdf), the Contractor shall submit to the Engineer, for approval, fabrication drawings and calculations for the poles. The drawings and calculations shall be sealed by a Texas registered or licensed Professional Engineer (P.E.).

B. Luminaire Structural Support Requirements. Lighting poles, arms, and anchor bolt assemblies shall have a 25-year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the current edition of the AASHTO Design Specifications. For transformer base poles, the fabricator shall include transformer base and connecting hardware in calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.

ITEM 618: Conduit

All conduit ends in pole bases, controllers and ground boxes shall be plugged with 4 to 6 inches of polyurethane sealant or its equivalent after cables are in place.

Project Number: **Sheet 13**

County: Hidalgo, Etc. **Control:** 1586-01-089, Etc.

Highway: FM 907, Etc.

Conduit shall be placed in a straight line not to exceed 2.0 feet in any direction. The depth of the conduit shall be 2.0 feet except when crossing a roadway where the depth shall not be more than 3.0 feet nor less than 1.0 foot below the bottom of the base material in the roadway when placed by the jacking or boring method. Any evidence of damage to the roadway during the jacking or boring operation shall be sufficient grounds to stop the method being used.

Conduit runs under paved roadways or driveways shall be jacked or bored and then pushed across. At these locations, galvanized rigid metal may be used. All other runs shall be made by trenching. Existing pavement which will be removed, reconstructed, or overlaid with new pavement may be trenched across. Trenches for conduit runs shall be a minimum 2 feet deep and 4 inches wide. The conduit shall be placed on a 2-inch sand cushion and then backfilled with a minimum of 6 inches sand fill. The remainder of the trench shall be backfilled with flexible base, soil or two-sack concrete as required by location of conduit on the project or as directed. The top 3 inches shall match the existing surface material.

All conduit elbows and rigid extensions required to be installed on PVC conduit systems will not be paid for separately but will be considered subsidiary to the various bid Items.

Use materials from prequalified Material Producer List as shown on the Texas Department of Transportation (TxDOT) - Construction Division's (CST) Material Producer List. Category is "Roadway Illumination and Electrical Supplies."

Use materials from prequalified producers as shown on the Construction Division (CST) of the Texas Department of Transportation (TXDOT) Material Producer List. Use the following website to view the list:

https://www.txdot.gov/inside-txdot/division/materials-and-tests/producer-list.html

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

ITEM 620: Electrical Conductors

For Flashing Beacons (Item 685) and Ped poles (Item 687) within the project, provide single-pole breakaway disconnects.

Use Bussman HEBW, Littelfuse LEB, Ferraz-Shawmut FEB, or equal on ungrounded conductors.

For all grounded conductors use Bussman HET, Littelfuse LET, Ferraz-Shawmut FEBN, or equal on ungrounded conductors. For all grounded conductors use Bussman HET, Littelfuse LET, Ferraz Shawmut FEBN, or equal. These breakaway connectors have a white colored marking and a permanently installed solid neutral.

ITEM 621: Tray Cable

Connect luminaires on traffic signal poles using a 4-conductor tray cable with conductor colors of red, black, and green #12 AWG (XHHW). The white (neutral) conductor will not be needed and will be capped.

ITEM 628: Electrical Services

Arrange for and cooperate with the utility company to provide electrical power for the service(s) shown and as required by the plans. A meter will be required on all electrical services.

For Location 2 – FM 493 @ Murphy Ave. (CSJ: 0863-01-078), Location 6 – SH 48 (CSJ: 0220-07-067), and Location 7 – FM 493(CSJ: 0863-03-040), an additional 5/8 in X 8 ft copper clad ground road will be needed, as per AEP's requirements. Therefore, a total of two (2) ground rods will be installed per location and will be subsidiary to this item.

ITEMS 636: Signs

Complete sign blanks and panels shall be handled and stored at the job site in such a manner that corners, edges and faces are not damaged. Finished sign blanks shall be stored in either a weatherproof warehouse or outside and off the ground in a vertical position. All paper, cardboard and chemically treated separators and packaging shall be removed prior to outside storage.

ITEM 644: Small Roadside Sign Assemblies

All signs shall be installed as shown in the plans and in accordance with the current edition of the "Texas Manual on Uniform Traffic Control Devices" and the "Sign Crew Field Book" (SCFB).

All signs shall be erected according to the locations shown on the signing layout sheets except that a sign may be shifted in order to secure a more desirable location. All sign locations will be staked as shown in the plans and as approved. It is the intent of the plans to erect all roadside traffic signs with the sign edge a minimum of 6 feet from the edge of the shoulder, or if none, 12 feet from the edge of the travel lane. In curb and gutter sections, the sign edge shall be a minimum of 2 feet from the face of the curb.

Project Number: **Sheet 14**

County: Hidalgo, Etc. **Control:** 1586-01-089, Etc.

Highway: FM 907, Etc.

For this project, aluminum type sign blanks as provided for under Item 636 will be required for all proposed signing installed under Item 644. Aluminum sign blanks less than 7.5 square feet shall be 0.08-inch-thick, sign blanks 7.5 to 15 square feet shall be 0.100-inch-thick and sign blanks greater than 15 square feet shall be 0.125 inch thick.

All excess excavation shall be spread uniformly inside the right of way as directed and shall be included in the price of these Items.

Sign types which design details are not shown on the plans shall conform with the latest edition of the Department's "Standard Highway Sign Design for Texas" Manual.

Signs shown to be removed shall include the complete sign installation and separate the sign post at the concrete foundation. The concrete foundation shall be disposed in accordance with this bid Item. Except for concrete foundations, all removed sign panels, sign posts, and hardware shall remain then property of the Department. All removed sign installations shall be completely disassembled. All salvageable sections of sign panels shall be recycled by TxDOT. The removed sign material will be required to be hauled to the maintenance yard closest to the project. No signs shall be removed without prior approval.

Existing signs shown to be removed and relocated within this project shall first be identified in the field before they are removed and relocated to their new installation position as determined in the plans. The complete sign assembly shall be removed and the sign with post shall be separated at the concrete foundation. The concrete foundation shall be disposed off in accordance with this bid Item. No sign shall be removed without prior approval.
All excess excavation shall be spread uniformly inside the right of way as directed and shall be included in the price of this Item.

ITEM 656: Foundations for Traffic Control Devices

The dimensions shown on the plans for location of signal pole foundations, conduit and other items may be varied to meet existing conditions as approved.

The work area shall be cleaned up and all loose material resulting from the contract operations shall be removed from the work area each day before work is suspended.

No traffic signal pole shall be placed on the foundations prior to seven (7) days following placement of concrete.

ITEMS 662 and 666: Work Zone Pavement Markings and Retroreflectorized Pavement Markings

All permanent pavement markings and work zone pavement markings for this project under these Items shall be 0.100 inches (100 mil) thick thermoplastic.

Any permanent pavement markings or non-removal work zone pavement markings lacking reflectivity in accordance with the requirements of Tex 828-B, or that fail to meet minimum retro reflectivity requirements for longitudinal pavement markings when required, will be addressed per the requirements of the specification. The roadway will be re-striped at no additional compensation.

Pavement surface preparation for markings and markers will not be paid for directly but shall be considered subsidiary to Item 666.

Prior to any striping operations, an on-site coordination meeting between all the parties involved will be required to review striping details and requirements to ensure quality work.

The beads used on this project shall meet the requirements of Departmental Materials Specification DMS-8290, Glass Traffic Beads Texas Type II & III. Use a 50% Type II/ 50% Type III mix utilizing a double drop system with Type III beads dropped first.

ITEM 677: Eliminating Existing Pavement Markings and Markers

Asphalt and aggregate types and grades shall be as approved in writing when a surface treatment is used to eliminate existing pavement markings.

ITEM 680: Highway Traffic Signals

The installation of highway traffic signals shall consist of the following principal Items:

1. Furnishing and installing 16-phase full traffic actuated controllers, base mounted cabinets, conflict monitors, load switches and loop amplifiers.
2. Furnishing and installing post mounted flashing beacon controllers and cabinets.
3. Furnishing and installing either, steel strain and/or mast arm poles, electrical service, luminaires, signal heads and cables, pedestrian heads and push buttons with signs that meet the "Americans with Disabilities Act" Standards, galvanized steel span wire, loop detectors, ground boxes, conduit runs and controller foundations.
4. Removal and disposal of existing signal material specified in the plans.
5. All other Items not listed above which are needed to provide for complete traffic signal installations and for proper signal operation as called for in the plans and specifications shall be furnished and installed.

Project Number: **Sheet 15**

County: Hidalgo, Etc. **Control:** 1586-01-089, Etc.

Highway: FM 907, Etc.

Any deviation of location for proposed signal work shall be as approved.

Signal controller

The signal installations shall be wired in accordance with the phase diagrams in the plans. The proposed base mounted cabinets shall contain 16-phase conflict monitors, which display the "R-Y-G" and "Walk" phases. In addition to detecting phasing conflicts, the Conflict monitors shall also be able to detect multiple signal head indications within every phase. The conflict monitors shall continue to operate in the event of a power supply failure in the timer and shall be able to retain in memory the time and date of the failure detection. Time changes shall be programmable in the field without replacing components or use of external devices. The full-actuated controllers shall meet N.E.M.A. Specifications. The flasher Controllers shall be solid state.

A controller manufacturer's technician shall be required to load initial timing programs into the controllers as called for in the plans. Once the traffic signals are turned on, the same technician shall monitor the signal operation and traffic movement and shall adjust settings for best signal operation. The technician shall provide the State with a certification that the timing plan and coordination has been established according to the plans. This certification shall include a record showing all settings and functions programmed into the timer and any related units.

The controller must be delivered with two sets of wiring diagrams and operating manuals enclosed in a weatherproof bag.

All wiring not covered by the plans and specifications shall be in accordance with the latest edition of the National Electrical Code.

Under this Item, the proposed cabinets shall be base mounted or as shown in the plans.

Existing utilities

The exact location of existing underground utilities shall be verified with the utility companies prior to construction to avoid conflict with or damage to these utilities.

The coordination with the utility companies will be required to make any adjustments, due to utility conflicts, as defined in the specifications or deemed necessary.

Uniformity in equipment

1. All traffic signal controllers furnished shall be by the same manufacturer.
2. Traffic Signal controllers and Malfunction Management Units shall be flashing yellow arrow capable and shall be compatible with Pharr District’s traffic signal management software ATMS.now.
3. All flashing beacon controllers furnished shall be by the same manufacturer.

4. All traffic signal heads, and flashing beacon heads furnished shall be by the same manufacturer.
5. All signal fittings and pipe brackets shall be of an approved metallic material and of the same design and manufacturer.
6. All traffic signal poles furnished shall be by the same manufacturer.
7. All loop detector amplifiers furnished shall be by the same manufacturer and of the same type.

Handling of traffic

Roads and streets shall be kept open to traffic at all times. The setting of loop detectors shall be arranged so as to close only one lane of a roadway at a time. The installation of signal heads, poles and conduit shall also be arranged so as to permit the continuous movement of traffic in both directions at all times.

All construction operations shall be conducted to provide the least possible interference to traffic as shown on the plans, as provided for in the specifications and/or as directed. All signing, barricading, and handling of traffic shall conform to the current edition of the "Texas Manual on Uniform Traffic Control Devices".

Sequence of work

1. The existing traffic signal installations and/or flashing beacon installations shall remain in operation at all times during construction of the proposed traffic signal and/or flashing beacon installations or modifications.
2. The complete removal of the specified existing traffic signal and/or flashing beacon installations or specified Items when the proposed traffic signal and/or flashing beacon installations are in place and operational.
3. All labor, tools, and materials used to remove the specified existing traffic signal material shall not be paid for directly but shall be considered subsidiary to the various items of work.
4. Final inspection shall be performed in conjunction with the district signal shop.

ITEM 682: Vehicle and Pedestrian Signal Heads

All signal heads shall be covered with burlap from the time of installation until the signal is placed in operation. All signal heads shall be of polycarbonate material and yellow in color. Signal heads shall have standard detachable visors. LEDs shall be furnished for all traffic signal heads.

Signal heads shall be positioned carefully to provide the best view of signal indications to motorists. All signal heads shall be installed to a neat overall appearance.

Project Number: **Sheet 16**

County: Hidalgo, Etc. **Control:** 1586-01-089, Etc.

Highway: FM 907, Etc.

Nominal height for signal heads above pavement surface shall be 18 feet 6 inches, plus/minus 3 inches.

Pedestrian signal heads shall be positioned carefully to provide the best view to pedestrians.

ITEM 684: Traffic Signal Cables

All signal cable shall be #12 AWG; 2/c loop. Lead-In shall be #14 AWG shielded and loop wires in pavement.

ITEM 686: Traffic Signal Pole Assemblies (Steel)

The locations for the proposed traffic signal poles are approximate. The exact locations will be determined in the field in coordination with the District Signal Shop.

Erection and/or removal of poles and luminaries located near any overhead electrical power lines shall be accomplished using established industry and utility safety practices. The appropriate utility company shall be consulted with prior to beginning such work.

ITEM 688: Pedestrian Detectors and Vehicle Loop Detectors

The Contractor shall install loop vehicle detectors in accordance with the Intersection layouts in the plans or as directed. Each loop detector Lead-In cable shall be tagged inside the controller cabinet with its loop number. The loop amplifiers shall indicate the loop and phase of control or direction of control. Loop wires in street shall be #14 AWG. Pedestrian detectors shall meet the minimum requirements called for by the "Americans with Disabilities Act".

Loop detector lead-in cable shall be continuous from ground box to the controller.

Splices for loop wire will be permitted only at ground boxes or pole base with approved weatherproof splice kits.

A minimum length of 2.0 feet for each cable shall be left in each ground box.

ITEM 6185: Truck Mounted Attenuator/Trailer Attenuator

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for the project, provide 1 additional shadow vehicle(s) with TMA as per TCP (1-2) -18 as detailed on General Note 6 of this standard sheet;

or as per TCP (1-3) -18 as detailed on General Note 7 of this standard sheet;
or as per TCP (1-4) -18 as detailed on General Note 5 of this standard sheet.

Therefore, 2 total shadow vehicles with TMA will be required on this project for the type of work as shown on the plans. The Contractor will be responsible for determining if one or more of his construction operations will be ongoing at the same time and thus determine the total number of TMAs needed for the project.

ITEM 6292: Radar Vehicle Detection System for Signalized Intersection Control

Radar presence detection device must utilize true-presence detection. Systems using locking algorithms to attempt presence detection will not be accepted. In addition, radar systems will not be allowed to use extensions/delays or place the controller on locking detection to aid in the presence detection.

The radar presence detection device must be able to detect up to 10 lanes with a minimum offset of 6’ and have at least 16 zones and channels per unit.

The radar presence detection device software must not require internet for configuration.

Radar advance detection device must continuously track vehicle speed, distance, and estimated time of arrival.

Radar presence detection devices and radar advance detection devices must be compatible with each other and from the same manufacturer.

Communication and power to the radar devices shall be via continuous cable run of up to 1,000 feet without the use of repeaters.

Final placement of radar devices to be approved by the Engineer.

ITEM 6306: Vehicle Imaging Video Detection System

Install and make fully operational the Vehicle Imaging Video Detection System (VIVDS). This includes set up devices, video monitor, detection processor, connectors, and surge suppression panel for AV & video.

Project Number: **Sheet 17**

County: Hidalgo, Etc. **Control:** 1586-01-089, Etc.

Highway: FM 907, Etc.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1586-01-089 **DISTRICT** Pharr **COUNTY** Cameron, Hidalgo, Starr
HIGHWAY FM 493, FM 907, SH 4, SH 48, US 83

				0038-07-081		0039-10-088		0039-10-089		0220-07-067		0863-01-078		0863-03-040	
		CONTROL SECTION JOB													
		PROJECT ID		A00184403		A00184409		A00184413		A00184398		A00183579		A00184390	
		COUNTY		Starr		Cameron		Cameron		Cameron		Hidalgo		Hidalgo	
		HIGHWAY		US 83		SH 4		SH 4		SH 48		FM 493		FM 493	
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	104-6036	REMOVING CONC (SIDEWALK OR RAMP)	SY					50.000							
	416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF							80.000				90.000	
	416-6030	DRILL SHAFT (TRF SIG POLE) (24 IN)	LF												
	416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF									60.000			
	432-6009	RIPRAP (CONC) (CL B) (4")	CY							3.000				4.000	
	500-6001	MOBILIZATION	LS	0.120		0.110		0.120		0.140		0.170		0.160	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	1.000		1.000		1.000		1.000		2.000		1.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	120.000		120.000		120.000		120.000		120.000		120.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	120.000		120.000		120.000		120.000		120.000		120.000	
	529-6024	CONC CURB (MOUNTABLE)	LF	293.000		86.000									
	531-6001	CONC SIDEWALKS (4")	SY	9.000		10.000									
	531-6004	CURB RAMPS (TY 1)	EA	4.000		8.000		8.000				2.000			
	610-6102	REPLACE LUMINAIRE W/LED (250W EQ)	EA	3.000		2.000									
	610-6214	IN RD IL (TY SA) 40T-8 (250W EQ) LED	EA											9.000	
	610-6322	IN RD IL (TY ST) 50T-12 (400W EQ) LED	EA							8.000					
	618-6016	CONDT (PVC) (SCH 40) (1")	LF	85.000				50.000				105.000			
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	1,190.000				755.000		2,140.000		1,010.000		1,965.000	
	618-6033	CONDT (PVC) (SCH 40) (4")	LF			235.000		155.000				328.000			
	618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	300.000				185.000		120.000		126.000			
	618-6059	CONDT (PVC) (SCH 80) (4") (BORE)	LF			195.000		220.000				140.000			
	620-6002	ELEC CONDR (NO.14) INSULATED	LF	1,738.000				746.000				1,034.000			
	620-6007	ELEC CONDR (NO.8) BARE	LF	1,215.000		430.000		375.000				110.000			
	620-6009	ELEC CONDR (NO.6) BARE	LF							2,280.000		110.000		1,965.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF							4,560.000		260.000		3,930.000	
	621-6005	TRAY CABLE (4 CONDR) (12 AWG)	LF	640.000		405.000						310.000			
	624-6002	GROUND BOX TY A (122311)W/APRON	EA	11.000		6.000		18.000		2.000		16.000		1.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA	1.000		1.000		1.000				1.000			
	625-6003	ZINC-COAT STL WIRE STRAND (3/8")	LF	1,040.000		740.000						780.000			
	628-6089	ELC SRV TY A 240/480 100(SS)SS(T)TP(O)	EA							1.000				1.000	
	628-6301	ELC SRV TY T 120/240 000(NS)GS(L)TS(O)	EA									1.000			
	636-6001	ALUMINUM SIGNS (TY A)	SF	46.000		53.000		53.000				45.000			
	644-6076	REMOVE SM RD SN SUP&AM	EA									2.000			
	666-6006	REFL PAV MRK TY I (W)4"(DOT)(100MIL)	LF	36.000											
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1,100.000		480.000		400.000				755.000			
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	390.000		420.000		560.000				382.000			
	666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF			110.000									
	666-6224	PAVEMENT SEALER 4"	LF	5,750.000								800.000			

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1586-01-089 **DISTRICT** Pharr **COUNTY** Cameron, Hidalgo, Starr
HIGHWAY FM 493, FM 907, SH 4, SH 48, US 83

				0038-07-081		0039-10-088		0039-10-089		0220-07-067		0863-01-078		0863-03-040	
		CONTROL SECTION JOB													
		PROJECT ID		A00184403		A00184409		A00184413		A00184398		A00183579		A00184390	
		COUNTY		Starr		Cameron		Cameron		Cameron		Hidalgo		Hidalgo	
		HIGHWAY		US 83		SH 4		SH 4		SH 48		FM 493		FM 493	
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	666-6226	PAVEMENT SEALER 8"	LF	1,100.000								755.000			
	666-6228	PAVEMENT SEALER 12"	LF												
	666-6230	PAVEMENT SEALER 24"	LF	390.000		420.000		560.000				382.000			
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	630.000		100.000		200.000				400.000			
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	2,230.000		1,215.000		290.000				1,600.000			
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	230.000								280.000			
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	2,660.000		2,650.000		1,720.000				2,300.000			
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	8.000		8.000		4.000				7.000			
	668-6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA	1.000		2.000						2.000			
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	8.000		5.000		4.000				7.000			
	672-6007	REFL PAV MRKR TY I-C	EA	86.000		33.000		30.000				50.000			
	672-6009	REFL PAV MRKR TY II-A-A	EA	116.000		110.000		86.000				93.000			
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF									800.000			
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF	420.000		640.000		290.000							
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	145.000				130.000				36.000			
	677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	8.000				8.000				5.000			
	677-6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA	2.000											
	677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	6.000				4.000				4.000			
	678-6001	PAV SURF PREP FOR MRK (4")	LF	5,750.000		3,965.000		2,210.000				4,575.000			
	678-6004	PAV SURF PREP FOR MRK (8")	LF	1,100.000		480.000		400.000				755.000			
	678-6006	PAV SURF PREP FOR MRK (12")	LF			110.000									
	678-6008	PAV SURF PREP FOR MRK (24")	LF	390.000		420.000		560.000				382.000			
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	8.000		5.000		4.000				7.000			
	678-6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA	1.000		1.000						2.000			
	678-6016	PAV SURF PREP FOR MRK (WORD)	EA	8.000		5.000		4.000				7.000			
	680-6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1.000		1.000		1.000				1.000			
	680-6004	REMOVING TRAFFIC SIGNALS	EA	1.000		1.000		1.000							
	682-6001	VEH SIG SEC (12")LED(GRN)	EA	7.000		8.000		8.000				8.000			
	682-6002	VEH SIG SEC (12")LED(GRN ARW)	EA	4.000		4.000		4.000				4.000			
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	7.000		8.000		8.000				8.000			
	682-6004	VEH SIG SEC (12")LED(YEL ARW)	EA	4.000		5.000		4.000				8.000			
	682-6005	VEH SIG SEC (12")LED(RED)	EA	7.000		8.000		8.000				8.000			
	682-6006	VEH SIG SEC (12")LED(RED ARW)	EA	2.000		3.000		2.000				4.000			
	682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA	4.000		8.000		8.000				4.000			
	682-6049	BACKPLATE W/REFL BRDR(4 SEC)	EA	4.000		3.000		4.000				4.000			
	682-6060	BACKPLATE W/REFL BRDR(3 SEC)	EA	5.000		8.000		6.000				8.000			
	684-6007	TRF SIG CBL (TY A)(12 AWG)(2 CONDR)	LF	745.000		1,670.000		865.000				535.000			

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1586-01-089 **DISTRICT** Pharr **COUNTY** Cameron, Hidalgo, Starr
HIGHWAY FM 493, FM 907, SH 4, SH 48, US 83

			CONTROL SECTION JOB	**0038-07-081**		**0039-10-088**		**0039-10-089**		**0220-07-067**		**0863-01-078**		**0863-03-040**	
			PROJECT ID	**A00184403**		**A00184409**		**A00184413**		**A00184398**		**A00183579**		**A00184390**	
			COUNTY	**Starr**		**Cameron**		**Cameron**		**Cameron**		**Hidalgo**		**Hidalgo**	
			HIGHWAY	**US 83**		**SH 4**		**SH 4**		**SH 48**		**FM 493**		**FM 493**	
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	684-6010	TRF SIG CBL (TY A)(12 AWG)(5 CONDR)	LF	1,545.000		860.000		1,550.000				1,330.000			
	684-6012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	800.000		945.000		850.000				845.000			
	684-6080	TRF SIG CBL (TY C)(14 AWG)(2 CONDR)	LF	1,710.000				1,430.000				1,698.000			
	686-6008	INS TRF SIG PL AM (S)STR(TY B)LUM	EA												
	686-6019	INS TRF SIG PL AM (S)STR(TY D)	EA									2.000			
	686-6020	INS TRF SIG PL AM (S)STR(TY D)LUM	EA									2.000			
	687-6001	PED POLE ASSEMBLY	EA												
	688-6001	PED DETECT PUSH BUTTON (APS)	EA	4.000		8.000		8.000				4.000			
	688-6003	PED DETECTOR CONTROLLER UNIT	EA	1.000		1.000		1.000				1.000			
	688-6004	VEH LP DETECT (SAWCUT)	LF	560.000				323.000				335.000			
	6185-6002	TMA (STATIONARY)	DAY	17.000		15.000		16.000		20.000		24.000		22.000	
	6292-6001	RVDS(PRESENCE DETECTION ONLY)	EA	4.000				4.000				4.000			
	6306-6001	VIVDS PROSR SYS	EA			1.000									
	6306-6002	VIVDS CAM ASSY FXD LNS	EA			4.000									
	6306-6007	VIVDS CABLING	LF			815.000									
	6306-6018	VIVDS CAM ASSY (REMOVE)	EA			4.000									
	6306-6020	VIVDS CABLING (REMOVE)	LF			835.000									
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS												
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS												

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1586-01-089 **DISTRICT** Pharr **COUNTY** Cameron, Hidalgo, Starr
HIGHWAY FM 493, FM 907, SH 4, SH 48, US 83

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**1586-01-089**			
		PROJECT ID		**A00183582**			
		COUNTY		**Hidalgo**			
		HIGHWAY		**FM 907**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6036	REMOVING CONC (SIDEWALK OR RAMP)	SY			50.000	
	416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF			170.000	
	416-6030	DRILL SHAFT (TRF SIG POLE) (24 IN)	LF	12.000		12.000	
	416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	52.000		112.000	
	432-6009	RIPRAP (CONC) (CL B) (4")	CY			7.000	
	500-6001	MOBILIZATION	LS	0.180		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		9.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	120.000		840.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	120.000		840.000	
	529-6024	CONC CURB (MOUNTABLE)	LF	145.000		524.000	
	531-6001	CONC SIDEWALKS (4")	SY	11.000		30.000	
	531-6004	CURB RAMPS (TY 1)	EA	4.000		26.000	
	610-6102	REPLACE LUMINAIRE W/LED (250W EQ)	EA			5.000	
	610-6214	IN RD IL (TY SA) 40T-8 (250W EQ) LED	EA			9.000	
	610-6322	IN RD IL (TY ST) 50T-12 (400W EQ) LED	EA			8.000	
	618-6016	CONDT (PVC) (SCH 40) (1")	LF	105.000		345.000	
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	1,105.000		8,165.000	
	618-6033	CONDT (PVC) (SCH 40) (4")	LF	160.000		878.000	
	618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF			731.000	
	618-6059	CONDT (PVC) (SCH 80) (4") (BORE)	LF	155.000		710.000	
	620-6002	ELEC CONDR (NO.14) INSULATED	LF	724.000		4,242.000	
	620-6007	ELEC CONDR (NO.8) BARE	LF	420.000		2,550.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	90.000		4,445.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	180.000		8,930.000	
	621-6005	TRAY CABLE (4 CONDR) (12 AWG)	LF	630.000		1,985.000	
	624-6002	GROUND BOX TY A (122311)W/APRON	EA	13.000		67.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA	1.000		5.000	
	625-6003	ZINC-COAT STL WIRE STRAND (3/8")	LF	680.000		3,240.000	
	628-6089	ELC SRV TY A 240/480 100(SS)SS(T)TP(O)	EA			2.000	
	628-6301	ELC SRV TY T 120/240 000(NS)GS(L)TS(O)	EA	1.000		2.000	
	636-6001	ALUMINUM SIGNS (TY A)	SF	47.000		244.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	2.000		4.000	
	666-6006	REFL PAV MRK TY I (W)4"(DOT)(100MIL)	LF			36.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	200.000		2,935.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	240.000		1,992.000	
	666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	500.000		610.000	
	666-6224	PAVEMENT SEALER 4"	LF	8,870.000		15,420.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1586-01-089 **DISTRICT** Pharr **COUNTY** Cameron, Hidalgo, Starr
HIGHWAY FM 493, FM 907, SH 4, SH 48, US 83

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**1586-01-089**			
		PROJECT ID		**A00183582**			
		COUNTY		**Hidalgo**			
		HIGHWAY		**FM 907**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6226	PAVEMENT SEALER 8"	LF	200.000		2,055.000	
	666-6228	PAVEMENT SEALER 12"	LF	500.000		500.000	
	666-6230	PAVEMENT SEALER 24"	LF	240.000		1,992.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF			1,330.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	2,800.000		8,135.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	150.000		660.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	5,920.000		15,250.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	2.000		29.000	
	668-6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA			5.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	2.000		26.000	
	672-6007	REFL PAV MRKR TY I-C	EA	10.000		209.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	280.000		685.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	7,470.000		8,270.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF	365.000		1,715.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF			311.000	
	677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA			21.000	
	677-6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA			2.000	
	677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA			14.000	
	678-6001	PAV SURF PREP FOR MRK (4")	LF	8,870.000		25,370.000	
	678-6004	PAV SURF PREP FOR MRK (8")	LF	200.000		2,935.000	
	678-6006	PAV SURF PREP FOR MRK (12")	LF	500.000		610.000	
	678-6008	PAV SURF PREP FOR MRK (24")	LF	240.000		1,992.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	2.000		26.000	
	678-6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA			4.000	
	678-6016	PAV SURF PREP FOR MRK (WORD)	EA	2.000		26.000	
	680-6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1.000		5.000	
	680-6004	REMOVING TRAFFIC SIGNALS	EA	1.000		4.000	
	682-6001	VEH SIG SEC (12")LED(GRN)	EA	8.000		39.000	
	682-6002	VEH SIG SEC (12")LED(GRN ARW)	EA	2.000		18.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	8.000		39.000	
	682-6004	VEH SIG SEC (12")LED(YEL ARW)	EA	4.000		25.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA	8.000		39.000	
	682-6006	VEH SIG SEC (12")LED(RED ARW)	EA	2.000		13.000	
	682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA	4.000		28.000	
	682-6049	BACKPLATE W/REFL BRDR(4 SEC)	EA	2.000		17.000	
	682-6060	BACKPLATE W/REFL BRDR(3 SEC)	EA	8.000		35.000	
	684-6007	TRF SIG CBL (TY A)(12 AWG)(2 CONDR)	LF	535.000		4,350.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1586-01-089 **DISTRICT** Pharr **COUNTY** Cameron, Hidalgo, Starr
HIGHWAY FM 493, FM 907, SH 4, SH 48, US 83

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**1586-01-089**			
		PROJECT ID		**A00183582**			
		COUNTY		**Hidalgo**			
		HIGHWAY		**FM 907**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	684-6010	TRF SIG CBL (TY A)(12 AWG)(5 CONDR)	LF	1,305.000		6,590.000	
	684-6012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	380.000		3,820.000	
	684-6080	TRF SIG CBL (TY C)(14 AWG)(2 CONDR)	LF	1,445.000		6,283.000	
	686-6008	INS TRF SIG PL AM (S)STR(TY B)LUM	EA	4.000		4.000	
	686-6019	INS TRF SIG PL AM (S)STR(TY D)	EA			2.000	
	686-6020	INS TRF SIG PL AM (S)STR(TY D)LUM	EA			2.000	
	687-6001	PED POLE ASSEMBLY	EA	2.000		2.000	
	688-6001	PED DETECT PUSH BUTTON (APS)	EA	4.000		28.000	
	688-6003	PED DETECTOR CONTROLLER UNIT	EA	1.000		5.000	
	688-6004	VEH LP DETECT (SAWCUT)	LF	209.000		1,427.000	
	6185-6002	TMA (STATIONARY)	DAY	25.000		139.000	
	6292-6001	RVDS(PRESENCE DETECTION ONLY)	EA	4.000		16.000	
	6306-6001	VIVDS PROSR SYS	EA			1.000	
	6306-6002	VIVDS CAM ASSY FXD LNS	EA			4.000	
	6306-6007	VIVDS CABLING	LF			815.000	
	6306-6018	VIVDS CAM ASSY (REMOVE)	EA			4.000	
	6306-6020	VIVDS CABLING (REMOVE)	LF			835.000	
	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	

SUMMARY TABLE OF ESTIMATED QUANTITIES LOCATIONS 1 THRU 4

ITEM	CODE	DESCRIPTION	UNIT	1 FM 907 @ MILE 17 1/2 RD CSJ 1586-01-089		2 FM 493 @ MURPHY AVE CSJ 0863-01-078		3 SH 4 @ CENTRAL AVE CSJ 0039-10-089		4 SH 4 @ FM 511 CSJ 0039-10-088		SHEET TOTALS
				EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	
104	6036	REMOVING CONC (SIDEWALK OR RAMP)	SY					50				50
416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF									
416	6030	DRILL SHAFT (TRF SIG POLE) (24 IN)	LF	12								12
416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	52		60						112
432	6009	RIPRAP (CONC) (CL B) (4")	CY									
500	6001	MOBILIZATION	LS	0.18		0.17		0.12		0.11		0.58
502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2		2		1		1		6
506	6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	120		120		120		120		480
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	120		120		120		120		480
529	6024	CONC CURB (MOUNTABLE)	LF	145						86		231
531	6001	CONC SIDEWALKS (4")	SY	11						10		21
531	6004	CURB RAMPS (TYPE 1)	EA	4		2		8		8		22
610	6102	REPLACE LUMINAIRE W/LED (250W LED)	EA							2		2
610	6214	IN RD IL (TY SA)40T-8(250W EQ) LED	EA									
610	6322	IN RD IL (TY ST)50T-12(400W EQ) LED	EA									
618	6016	CONDT (PVC)(SCH 40)(1")	LF	105		105		50				260
618	6023	CONDT (PVC)(SCH 40) (2")	LF	1,105		1,010		755				2,870
618	6033	CONDT (PVC)(SCH 40)(4")	LF	160		328		155		235		878
618	6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF			126		185				311
618	6059	CONDT (PVC)(SCH 80)(4")(BORE)	LF	155		140		220		195		710
620	6002	ELEC CONDR (NO.14)INSULATED	LF	724		1,034		746				2,504
620	6007	ELEC CONDR (NO.8) BARE	LF	420		110		375		430		1,335
620	6009	ELEC CONDR (NO.6) BARE	LF	90		110						200
620	6010	ELEC CONDR (NO.6) INSULATED	LF	180		260						440
621	6005	TRAY CABLE (4 CONDR) (12 AWG)	LF	630		310				405		1,345
624	6002	GROUND BOX TY A (122311)W/APRON	EA	13		16		18		6		53
624	6010	GROUND BOX TY D (162922)W/APRON	EA	1		1		1		1		4
624	6028	REMOVE GROUND BOX	EA									
625	6003	ZINC-COAT STEEL WIRE STRAND (3/8")	LF	680		780				740		2,200
628	6089	ELC SRV TY A 240/480 100(SS)SS(T)TP(O)	EA									
628	6301	ELC SRV TY T 120/240 000(NS)GS(L)TS(O)	EA	1		1						2
628	****	5/8 IN x 8 FT COPPER CLAD GROUND ROD	EA	2		2						4
636	6001	ALUMINUM SIGNS (TY A)	SF	47		45		53		53		198
644	6076	REMOVE SM RD SN SUP&AM	EA	2		2						4
666	6006	REFL PAV MRK TY I (W)4"(DOT)(100 MIL)	LF									
666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	200		755		400		480		1,835
666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	240		382		560		420		1,602
666	6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	500						110		610
666	6224	PAVEMENT SEALER 4"	LF	8,870		800						9,670
666	6226	PAVEMENT SEALER 8"	LF	200		755						955
666	6228	PAVEMENT SEALER 12"	LF	500								500
666	6230	PAVEMENT SEALER 24"	LF	240		382		560		420		1,602
666	6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF			400		200		100		700
666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	2,800		1,600		290		1,215		5,905
666	6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	150		280						430
666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	5,920		2,300		1,720		2,650		12,590
668	6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	2		7		4		8		21
668	6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA			2				2		4
668	6085	PREFAB PAV MRK TY C (W) (WORD)	EA	2		7		4		5		18
672	6007	REFL PAV MRKR TY I-C	EA	10		50		30		33		123
672	6009	REFL PAV MRKR TY II-A-A	EA	280		93		86		110		569
677	6001	ELIM EXT PAV MRK & MRKS (4")	LF	7,470		800						8,270
677	6003	ELIM EXT PAV MRK & MRKS (8")	LF									
677	6005	ELIM EXT PAV MRK & MRKS (12")	LF	365				290		640		1,295
677	6007	ELIM EXT PAV MRK & MRKS (24")	LF			36		130				166
677	6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA			5		8				13
677	6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA									
677	6012	ELIM EXT PAV MRK & MRKS (WORD)	EA			4		4				8
678	6001	PAV SURF PREP FOR MRK (4")	LF	8,870		4,575		2,210		3,965		19,620
678	6004	PAV SURF PREP FOR MRK (8")	LF	200		755		400		480		1,835
678	6006	PAV SURF PREP FOR MRK (12")	LF	500						110		610
678	6008	PAV SURF PREP FOR MRK (24")	LF	240		382		560		420		1,602
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	2		7		4		5		18
678	6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA			2				1		3
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	2		7		4		5		18

**** QUANTITIES SHOWN ARE FOR THE CONTRACTORS INFORMATION ONLY. THESE ITEMS ARE SUBSIDIARY TO VARIOUS OTHER ITEMS.

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Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.
QUANTITY SUMMARY SHEETS

N.T.S. SHEET 1 OF 4

DS:	CK:	CONT	SECT	JOB	HIGHWAY
		1586	01	089, ETC.	FM 907, ETC.
DW:	CK:	DIST	COUNTY		SHEET NO.
		PHR	HIDALGO, ETC.		24

SUMMARY TABLE OF ESTIMATED QUANTITIES LOCATIONS 1 THRU 4 (CONTINUED)

ITEM	CODE	DESCRIPTION	UNIT	1 FM 907 @ MILE 17 1/2 RD CSJ 1586-01-089		2 FM 493 @ MURPHY AVE CSJ 0863-01-078		3 SH 4 @ CENTRAL AVE CSJ 0039-10-089		4 SH 4 @ FM 511 CSJ 0039-10-088		SHEET TOTALS
				EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	
680	6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1		1		1		1		4
680	6004	REMOVING TRAFFIC SIGNALS	EA	1				1		1		3
680	****	REMOVAL OF EXIST. ELECTRICAL SERVICE	EA	1								1
680	****	REMOVAL OF EXIST. OVERHEAD SIGNS	EA					10		8		18
680	****	REMOVAL OF EXIST. GROUND MOUNTED CONTROLLER	EA					1		1		2
680	****	REMOVAL OF EXIST. PEDESTRIAN SIGNALS	EA					8		8		16
680	****	REMOVAL OF EXIST. PED DETECT PUSH BUTTONS	EA					8		8		16
682	6001	VEH SIG SEC (12")LED(GRN)	EA	8		8		8		7		31
682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	4		4		4		4		16
682	6003	VEH SIG SEC (12")LED(YEL)	EA	8		8		8		8		32
682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	5		8		4		5		22
682	6005	VEH SIG SEC (12")LED(RED)	EA	8		8		8		8		32
682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	3		4		2		2		11
682	6018	PED SIG SEC (LED) (COUNTDOWN)	EA	4		4		8		8		24
682	6049	BACKPLATE W/REFL BRDR(4 SEC)	EA	3		4		4		4		15
682	6050	BACKPLATE W/REFL BRDR(5 SEC)	EA									
682	6060	BACKPLATE W/REFL BRDR(3 SEC)	EA	8		8		6		6		28
684	6007	TRF SIG CBL (TY A)(12 AWG)(2 CONDR)	LF	535		535		865		1,670		3,605
684	6010	TRF SIG CBL (TY A)(12 AWG)(5 CONDR)	LF	1,305		1,330		1,550		860		5,045
684	6012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	380		845		850		945		3,020
684	6080	TRF SIG CBL (TY C)(14 AWG)(2 CONDR)	LF	1,445		1,698		1,430				4,573
686	6008	INS TRF SIG PL AM (S)STR(TY B)LUM	EA	4								4
686	6019	INS TRF SIG PL AM (S)STR(TY D)	EA			2						2
686	6020	INS TRF SIG PL AM (S)STR(TY D)LUM	EA			2						2
687	6001	PED POLE ASSEMBLY	EA	2								2
688	6001	PED DETECT PUSH BUTTON (APS)	EA	4		4		8		8		24
688	6003	PED DETECTOR CONTROLLER UNIT	EA	1		1		1		1		4
688	6004	VEH LP DETECT (SAWCUT)	LF	209		335		323				867
688	****	1/C #14 AWG LOOP WIRE (XHHW)	LF	720		1,034		746				2,500
6185	6002	TMA (STATIONARY)	DAY	25		24		16		15		80
6292	6001	RVDS (PRESENCE DETECTION ONLY)	EA	4		4		4				12
6306	6001	VIVIDS PROSR SYS	EA							1		1
6306	6002	VIVIDS CAM ASSY FXD LNS	EA							4		4
6306	6007	VIVIDS CABLING	LF							815		815
6306	6018	VIVIDS CAM ASSY (REMOVE)	EA							4		4
6306	6020	VIVIDS CABLING (REMOVE)	LF							835		835

**** QUANTITIES SHOWN ARE FOR THE CONTRACTORS INFORMATION ONLY. THESE ITEMS ARE SUBSIDIARY TO VARIOUS OTHER ITEMS.

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Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.
QUANTITY SUMMARY
SHEETS

N. T. S. SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.

DIST	COUNTY	SHEET NO.
PHR	HIDALGO, ETC.	25

SUMMARY TABLE OF ESTIMATED QUANTITIES LOCATIONS 5 THRU 7

ITEM	CODE	DESCRIPTION	UNIT	5 US 83 @ FM 3167 CSJ 0038-07-081		6 SH 48 CSJ 0220-07-067		7 FM 493 CSJ 0863-03-040		SHEET TOTALS
				EST.	FINAL	EST.	FINAL	EST.	FINAL	
104	6036	REMOVING CONC (SIDEWALK OR RAMP)								
416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF			80		90		170
416	6030	DRILL SHAFT (TRF SIG POLE) (24 IN)	LF							
416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF							
432	6009	RIPRAP (CONC) (CL B) (4")	CY			3		4		7
500	6001	MOBILIZATION	LS	0.12		0.14		0.16		0.42
502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	1		1		1		3
506	6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	120		120		120		360
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	120		120		120		360
529	6024	CONC CURB (MOUNTABLE)	LF	293						293
531	6001	CONC SIDEWALKS (4")	SY	9						9
531	6004	CURB RAMPS (TYPE 1)	EA	4						4
610	6102	REPLACE LUMINAIRE W/LED (250W LED)	EA	3						3
610	6214	IN RD IL (TY SA)40T-8(250W EQ) LED	EA					9		9
610	6322	IN RD IL (TY ST)50T-12(400W EQ) LED	EA			8				8
618	6016	CONDT (PVC)(SCH 40)(1")	LF	85						85
618	6023	CONDT (PVC)(SCH 40) (2")	LF	1,190		2,140		1,965		5,295
618	6033	CONDT (PVC)(SCH 40)(4")	LF							
618	6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	300		120				120
618	6059	CONDT (PVC)(SCH 80)(4")(BORE)	LF							
620	6002	ELEC CONDR (NO.14)INSULATED	LF	1,738						1,738
620	6007	ELEC CONDR (NO.8) BARE	LF	1,215						1,215
620	6009	ELEC CONDR (NO.6) BARE	LF			2,280		1,965		4,245
620	6010	ELEC CONDR (NO.6) INSULATED	LF			4,560		3,930		8,490
621	6005	TRAY CABLE (4 CONDR) (12 AWG)	LF	640						640
624	6002	GROUND BOX TY A (122311)W/APRON	EA	11		2		1		14
624	6010	GROUND BOX TY D (162922)W/APRON	EA	1						1
624	6028	REMOVE GROUND BOX	EA							
625	6003	ZINC-COAT STEEL WIRE STRAND (3/8")	LF	1,040						1,040
628	6089	ELC SRV TY A 240/480 100(SS)SS(T)TP(O)	EA			1		1		2
628	6301	ELC SRV TY T 120/240 000(NS)GS(L)TS(O)	EA							
628	****	5/8 IN x 8 FT COPPER CLAD GROUND ROD	EA			2		2		4
636	6001	ALUMINUM SIGNS (TY A)	SF	46						46
644	6076	REMOVE SM RD SN SUP&AM	EA							
666	6006	REFL PAV MRK TY I (W)4"(DOT)(100 MIL)	LF	36						36
666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1,100						1,100
666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	390						390
666	6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF							
666	6224	PAVEMENT SEALER 4"	LF	5,750						5,750
666	6226	PAVEMENT SEALER 8"	LF	1,100						1,100
666	6228	PAVEMENT SEALER 12"	LF							
666	6230	PAVEMENT SEALER 24"	LF	390						390
666	6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	630						630
666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	2,230						2,230
666	6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	230						230
666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	2,660						2,660
668	6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	8						8
668	6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA	1						1
668	6085	PREFAB PAV MRK TY C (W) (WORD)	EA	8						8
672	6007	REFL PAV MRKR TY I-C	EA	86						86
672	6009	REFL PAV MRKR TY II-A-A	EA	116						116
677	6001	ELIM EXT PAV MRK & MRKS (4")	LF							
677	6003	ELIM EXT PAV MRK & MRKS (8")	LF							
677	6005	ELIM EXT PAV MRK & MRKS (12")	LF	420						420
677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	145						145
677	6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	8						8
677	6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA	2						2
677	6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	6						6
678	6001	PAV SURF PREP FOR MRK (4")	LF	5,750						5,750
678	6004	PAV SURF PREP FOR MRK (8")	LF	1,100						1,100
678	6006	PAV SURF PREP FOR MRK (12")	LF							
678	6008	PAV SURF PREP FOR MRK (24")	LF	390						390
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	8						8
678	6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA	1						1
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	8						8

**** QUANTITIES SHOWN ARE FOR THE CONTRACTORS INFORMATION ONLY. THESE ITEMS ARE SUBSIDIARY TO VARIOUS OTHER ITEMS.

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Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.
QUANTITY SUMMARY SHEETS

N. T. S. SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		26

DS: ____ CK: ____
DW: ____ CK: ____

SUMMARY TABLE OF ESTIMATED QUANTITIES LOCATIONS 5 THRU 7 (CONTINUED)

ITEM	CODE	DESCRIPTION	UNIT	5 US 83 @ FM 3167 CSJ 0038-07-081		6 SH 48 CSJ 0220-07-067		7 FM 493 CSJ 0863-03-040		SHEET TOTALS
				EST.	FINAL	EST.	FINAL	EST.	FINAL	
680	6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1						1
680	6004	REMOVING TRAFFIC SIGNALS	EA	1						1
680	****	REMOVAL OF EXIST. ELECTRICAL SERVICE	EA							
680	****	REMOVAL OF EXIST. OVERHEAD SIGNS	EA	1						1
680	****	REMOVAL OF EXIST. GROUND MOUNTED CONTROLLER	EA	1						1
680	****	REMOVAL OF EXIST. PEDESTRIAN SIGNALS	EA	4						4
680	****	REMOVAL OF EXIST. PED DETECT PUSH BUTTONS	EA	4						4
682	6001	VEH SIG SEC (12")LED(GRN)	EA	7						7
682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	4						4
682	6003	VEH SIG SEC (12")LED(YEL)	EA	7						7
682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	4						4
682	6005	VEH SIG SEC (12")LED(RED)	EA	7						7
682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	2						2
682	6018	PED SIG SEC (LED)(COUNTDOWN)	EA	4						4
682	6049	BACKPLATE W/REFL BRDR(4 SEC)	EA	4						4
682	6050	BACKPLATE W/REFL BRDR(5 SEC)	EA							
682	6060	BACKPLATE W/RFEL BRDR(3 SEC)	EA	5						5
684	6007	TRF SIG CBL (TY A)(12 AWG)(2 CONDR)	LF	745						745
684	6010	TRF SIG CBL (TY A)(12 AWG)(5 CONDR)	LF	1,545						1,545
684	6012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	800						800
684	6080	TRF SIG CBL (TY C)(14 AWG)(2 CONDR)	LF	1,710						1,710
686	6008	INS TRF SIG PL AM (S)STR(TY B)LUM	EA							
686	6019	INS TRF SIG PL AM (S)STR(TY D)	EA							
686	6020	INS TRF SIG PL AM (S)STR(TY D)LUM	EA							
687	6001	PED POLE ASSEMBLY	EA							
688	6001	PED DETECT PUSH BUTTON (APS)	EA	4						4
688	6003	PED DETECTOR CONTROLLER UNIT	EA	1						1
688	6004	VEH LP DETECT (SAWCUT)	LF	560						560
688	****	1/C #14 AWG LOOP WIRE (XHHW)	LF	1,738						1,738
6185	6002	TMA (STATIONARY)	DAY	17		20		22		59
6292	6001	RVDS (PRESENCE DETECTION ONLY)	EA	4						4
6306	6001	VIVIDS PROSR SYS	EA							
6306	6002	VIVIDS CAM ASSY FXD LNS	EA							
6306	6007	VIVIDS CABLING	LF							
6306	6018	VIVIDS CAM ASSY (REMOVE)	EA							
6306	6020	VIVIDS CABLING (REMOVE)	LF							

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Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.
QUANTITY SUMMARY SHEETS

N. T. S. SHEET 4 OF 4

DS:	CK:	CONT	SECT	JOB	HIGHWAY
		1586	01	089, ETC.	FM 907, ETC.
DW:	CK:	DIST	COUNTY		SHEET NO.
		PHR	HIDALGO, ETC.		27

ELECTRICAL SERVICE DATA

Service Pole No.	Service Pole Qty.	Electrical Service Description (see ED (4)-03)	Service Conduit Size	Service Conductors No. / Size	Safety Switch Amps	Main Disconnect		Two-Pole Contactor Amps	Panelbd./ Loadcenter Amp Rating (min)	Circuit No.	Branch Ckt. Bkr. Pole / Amps	Branch Circuit Amps	KVA Load
						Switch Amp/Fuse	Ckt. Bkr. Pole / Amp						
1	1	TY T 120/240 000(NS)GS(L)TS(0)	1 ¼"	3/#4	N/A	N/A	N/A	N/A	0	TS	1P/50	5	<5.4
										LUM	2P/20	1.5	
2	1	TY T 120/240 000(NS)GS(L)TS(0)	1 ¼"	3/#4	N/A	N/A	N/A	N/A	0	TS	1P/50	5	<5.4
										LUM	2P/20	1.5	
3	1	TY A 240/480 100(SS)SS(T)TP(0)	1 ¼"	3/#4	YES	N/A	2P/60	60	100	A	2P/20	3.15	<1.6
										B	2P/20	3.15	<1.6
4	1	TY A 240/480 100(SS)SS(T)TP(0)	1 ¼"	3/#4	YES	N/A	2P/60	60	100	C	2P/20	4.16	<2

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED
PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

FM 907, ETC.
ELECTRICAL SERVICE
DATA SHEET

NOT TO SCALE SHEET 1 OF 1

DS:	CK:	CONT	SECT	JOB	HIGHWAY
DW:	CK:	1586	01	089, ETC.	FM 907, ETC.
		DIST	COUNTY		SHEET NO.
		PHR	HIDALGO, ETC.		28

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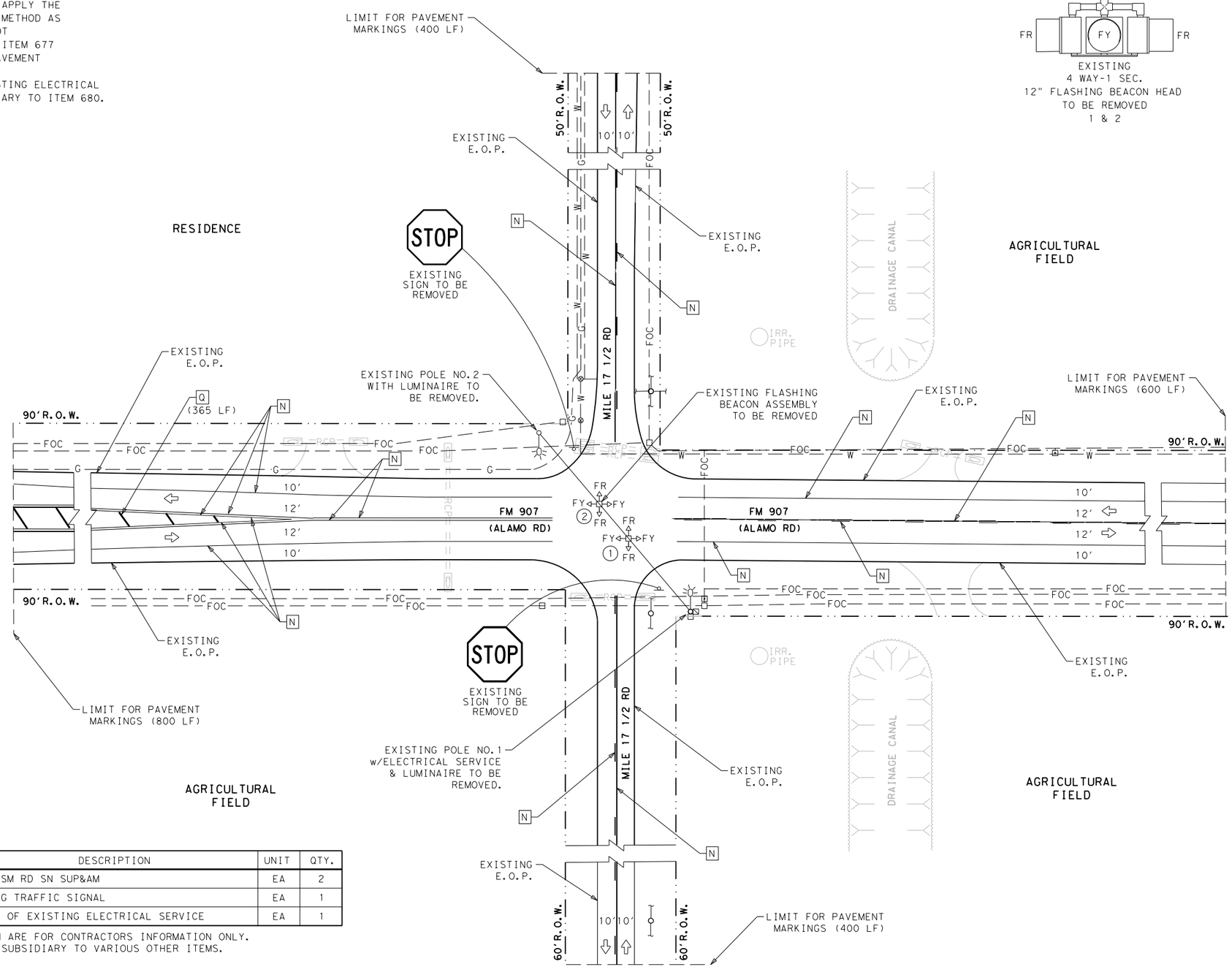
NOTES

1. WHEN REMOVING EXISTING PAVEMENT MARKINGS, SUCH AS CROSSWALKS OR PREFABRICATED SYMBOLS, APPLY THE BLASTING OR MECHANICAL METHOD AS STATED IN THE 2014 TxDOT SPECIFICATIONS MANUAL, ITEM 677 ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS.
2. THE REMOVAL OF THE EXISTING ELECTRICAL SERVICE WILL BE SUBSIDIARY TO ITEM 680.



EXISTING
4 WAY-1 SEC.
12" FLASHING BEACON HEAD
TO BE REMOVED
1 & 2

LEGEND

- EXISTING PEDESTRIAN HEADS
- EXISTING 12" SPAN WIRE MOUNTED TRAFFIC SIGNAL HEADS
- EXIST. MAST ARM ASSEMBLY W/12" HORIZONTAL SIGNAL HEADS
- EXISTING GROUND BOX TYPE A
- EXISTING FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- EXISTING LOOP DETECTOR
- EXISTING VIVDS
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT (SIZE & TYPE AS SPECIFIED)
- EXISTING BORE (SIZE & TYPE AS SPECIFIED)
- EXISTING LUMINAIRE
- EXIST. OVERHEAD SIGN
- EXIST. ANTENNA
- TRAFFIC FLOW DIRECTION
- R.O.W. - RIGHT OF WAY
- E.O.P. - EDGE OF PAVEMENT
- TYP. - TYPICAL

REMOVAL QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QTY.
644	6076	REMOVE SM RD SN SUP&AM	EA	2
680	6004	REMOVING TRAFFIC SIGNAL	EA	1
680	****	REMOVAL OF EXISTING ELECTRICAL SERVICE	EA	1

**** QUANTITIES SHOWN ARE FOR CONTRACTORS INFORMATION ONLY. THESE ITEMS ARE SUBSIDIARY TO VARIOUS OTHER ITEMS.

PAVEMENT MARKINGS REMOVAL QUANTITIES

LEGEND	ITEM	CODE	DESCRIPTION	UNIT	QTY.
N	677	6001	ELIM EXT PAV MRK & MRKS (4")	LF	7,470
Q	677	6005	ELIM EXT PAV MRK & MRKS (12")	LF	365

LOCATION 1
FM 907 @ MILE 17 1/2 RD
CSJ 1586-01-089

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 1
FM 907 @
MILE 17 1/2 RD
CONDITION LAYOUT

SCALE: 1"=60' SHEET 1 OF 1

DSn:	CKn:	CONT	SECT	JOB	HIGHWAY
		1586	01	089,ETC.	FM 907,ETC.
DWn:	CKn:	DIST	COUNTY		SHEET NO.
		PHR	HIDALGO,ETC.		29

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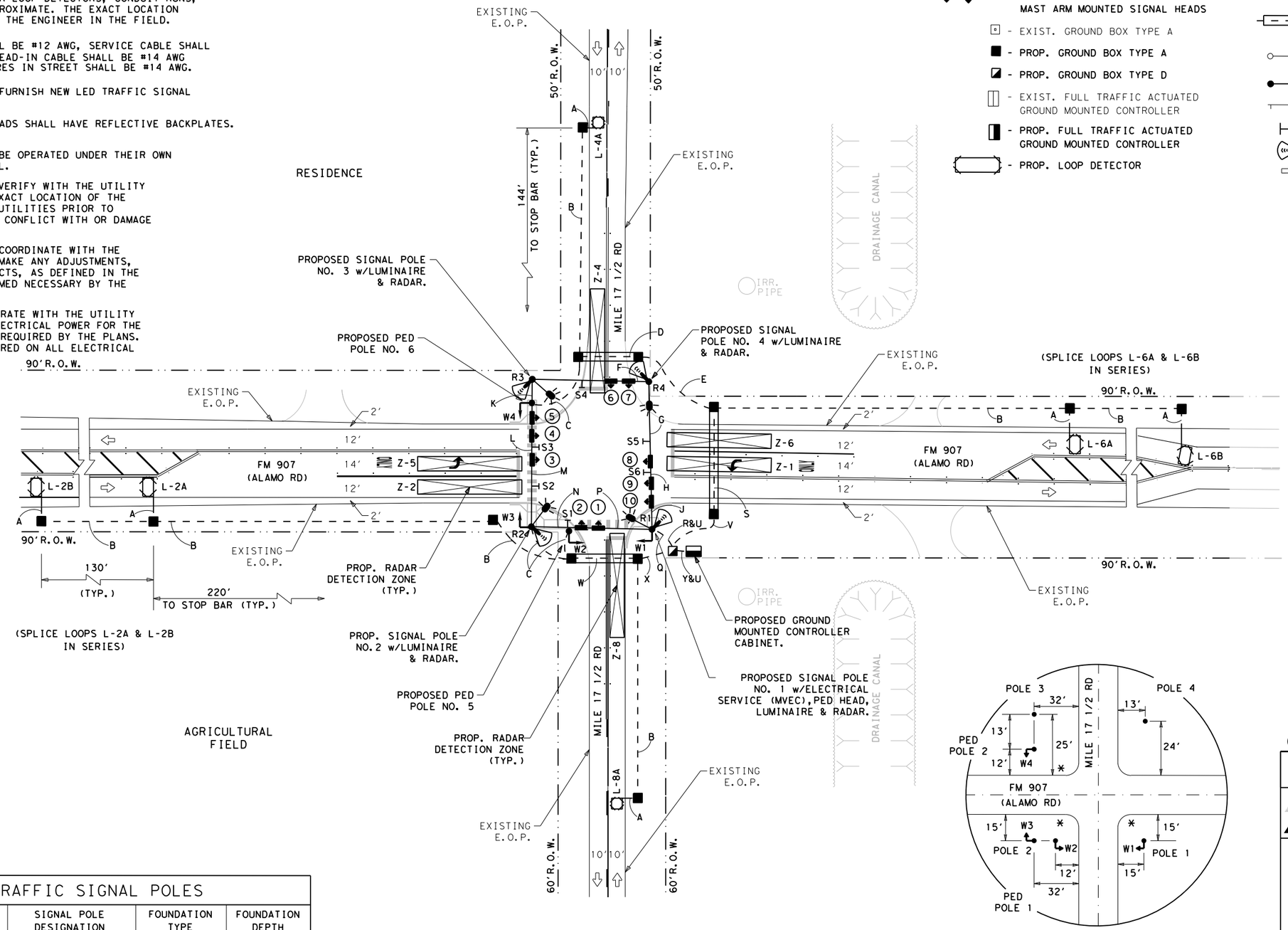
NOTES

1. THE CONTRACTOR SHALL FURNISH AND INSTALL A FULL TRAFFIC ACTUATED CONTROLLER, SIGNAL HEADS, FLASHING YELLOW ARROW (FYA) CAPABLE CONTROLLER UNIT COMPATIBLE WITH ATMS.COM, NEW CONDUIT, CABLES, SIGNS, STOP LINE RADAR DETECTION, LOOP DETECTORS, GROUND BOXES & CONTROLLER FOUNDATION.
2. THE LOCATION SHOWN FOR LOOP DETECTORS, CONDUIT RUNS, & GROUND BOXES IS APPROXIMATE. THE EXACT LOCATION WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.
3. ALL SIGNAL CABLE SHALL BE #12 AWG, SERVICE CABLE SHALL BE #6 AWG, 2/C LOOP LEAD-IN CABLE SHALL BE #14 AWG SHIELDED AND LOOP WIRES IN STREET SHALL BE #14 AWG.
4. THE CONTRACTOR SHALL FURNISH NEW LED TRAFFIC SIGNAL HEADS.
5. ALL TRAFFIC SIGNAL HEADS SHALL HAVE REFLECTIVE BACKPLATES.
6. THE LUMINAIRES SHALL BE OPERATED UNDER THEIR OWN PHOTO ELECTRIC CONTROL.
7. THE CONTRACTOR SHALL VERIFY WITH THE UTILITY COMPANIES AS TO THE EXACT LOCATION OF THE EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICT WITH OR DAMAGE TO THESE UTILITIES.
8. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO MAKE ANY ADJUSTMENTS, DUE TO UTILITY CONFLICTS, AS DEFINED IN THE SPECIFICATIONS OR DEEMED NECESSARY BY THE ENGINEER.
9. ARRANGE FOR AND COOPERATE WITH THE UTILITY COMPANY TO PROVIDE ELECTRICAL POWER FOR THE SERVICE SHOWN AND AS REQUIRED BY THE PLANS. A METER WILL BE REQUIRED ON ALL ELECTRICAL SERVICES.

LEGEND

- PROP. PEDESTRIAN HEADS
- PROP. 12" HORIZONTAL SPAN SPAN WIRE TRAFFIC SIGNAL HEADS
- PROP. 12" HORIZONTAL MAST ARM MOUNTED SIGNAL HEADS
- EXIST. GROUND BOX TYPE A
- PROP. GROUND BOX TYPE A
- PROP. GROUND BOX TYPE D
- EXIST. FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- PROP. FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- PROP. LOOP DETECTOR
- EXIST. CONDUIT (SIZE & TYPE AS SPECIFIED)
- PROP. CONDUIT (SIZE & TYPE AS SPECIFIED)
- EXIST. BORE (SIZE & TYPE AS SPECIFIED)
- PROP. BORE (SIZE & TYPE AS SPECIFIED)
- EXIST. LUMINAIRE
- PROP. LUMINAIRE
- EXIST. OVERHEAD SIGN
- PROP. OVERHEAD SIGN
- PROP. STOP LINE RADAR
- TRAFFIC FLOW DIRECTION



TRAFFIC SIGNAL POLES				
POLE NUMBER	QUANTITY	SIGNAL POLE DESIGNATION	FOUNDATION TYPE	FOUNDATION DEPTH
1, 2, 3, 4	4	SPL 30 B-100	36(TY A)	13'
5, 6	2	PEDESTAL POLE	24(TY A)	6'

PROPOSED POLE LOCATION

* PROPOSED CURB RAMPS (TY 1) w/CURB (MOUNTABLE) (SEE SHEET 32 FOR RAMP DETAILS. N.T.S.)

LOCATION 1
FM 907 @ MILE 17 1/2 RD
CSJ 1586-01-089

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 1 FM 907 @ MILE 17 1/2 RD PROPOSED LAYOUT

SCALE: 1"=60' SHEET 1 OF 2

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089, ETC.	FM 907, ETC.
	DIST	COUNTY		SHEET NO.
DW: CK:	PHR	HIDALGO, ETC.		30

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ELECTRICAL CHART

ITEM	TOTAL QTY.	RUN NUMBER / RUN LENGTH(FT)	A 65	B 1000	C 105	D 40	E 55	F 70	G 40	H 45	J 25	K 40	L 30	M 45	N 50	P 50	Q 35	R 60	S 20	U 35	V 50	W 25	X 15	Y 40
POWER	180′	1/C-#6																			2			2
		1/C-#8																						
GROUND	90′	1/C-#6 BARE																			1			1
	420′	1/C-#8 BARE			1	1	1	1	1	1	1											1	1	
SIGNAL CABLE	535′	2/C-#12			1	1	1	1	1	2	2											1	4	
	630′	4/C-#12 TRAY										1	1	1	2	2		1	1	1	4			
	1305′	5/C-#12			1	1	1	1	1	2	2		1	1	1	2	1	1	1	2	4	5	8	
	380′	7/C-#12												1	1	1			1	1	2	2	2	
	790′	RVDS CABLE										1	1	1	2	2		1	1	1	4	4	4	
LOOP	130′	1/C-#14 LOOP WIRE	2																					
	1445′	2/C-#14 (SHIELDED)		1		1	1	2	2	1	1												2	
CONDUIT	105′	1" PVC	1																					1
	1105′	2" PVC		1	1																			
		2" PVC BORE																						
	160′	4" PVC					1		1		1											1	1	
	155′	4" PVC BORE				1		1		1														
		2" RMC PIPE																						

TOTAL QUANTITIES INCLUDE QUANTITIES IN POLES.

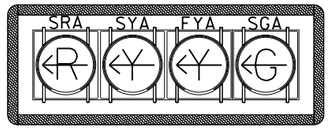
RADAR DETECTION CHART

RADAR/ DETECTION ZONE	DETECTOR RACK NO.	SETTING	FUNCTION	DELAY TIMING
R-1/Z-1, Z-6	1/2	PRESENCE	CALL & EXTEND Ø1 & Ø6	
R-2/Z-8	3	PRESENCE	CALL & EXTEND Ø8	
R-3/Z-2, Z-5	5/6	PRESENCE	CALL & EXTEND Ø2 & Ø5	
R-4/Z-4	7	PRESENCE	CALL & EXTEND Ø4	

LOOP DETECTOR CHART

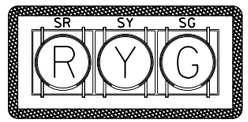
LOOP	SIZE	WIRE LENGTH	SAW CUT	AMPLIFIER NO.	SETTING	FUNCTION
L-2A	6′x10′	110′	39′	9	PRESENCE	CALL & EXTEND Ø2
L-2B	6′x10′	110′	39′	9	PRESENCE	CALL & EXTEND Ø2
L-4A	6′x6′	76′	26′	10	PRESENCE	CALL & EXTEND Ø4
L-6A	6′x10′	106′	37′	11	PRESENCE	CALL & EXTEND Ø6
L-6B	6′x10′	116′	42′	11	PRESENCE	CALL & EXTEND Ø6
L-8A	6′x6′	76′	26′	12	PRESENCE	CALL & EXTEND Ø8
TOTAL:		594′	209′			

PROPOSED 12" HORIZONTAL



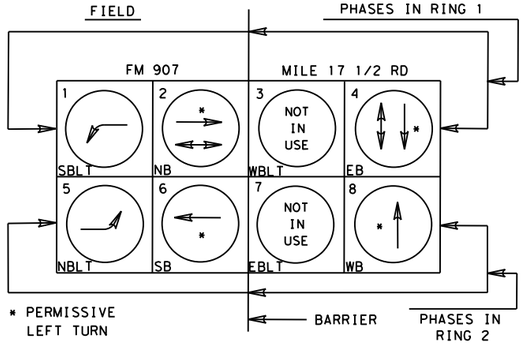
LED SIGNAL NO. 3 & 8
WITH REFLECTIVE BACKPLATES

PROPOSED 12" HORIZONTAL



LED SIGNAL NO. 1, 2, 4, 5, 6, 7, 9 & 10
WITH REFLECTIVE BACKPLATES

SIGNAL HEAD ARRANGEMENT

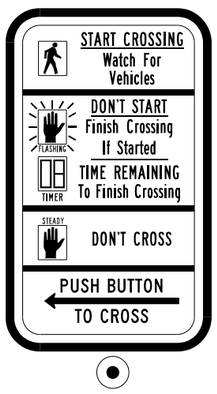


PHASING DIAGRAM

TIMING CHART

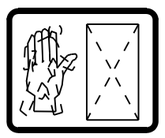
PHASE	1	2	3	4	5	6	7	8
STREET	FM 907		MILE 17 1/2 RD		FM 907		MILE 17 1/2 RD	
MOVEMENT	SBLT	NB		EB	NBLT	SB		WB
MIN. GREEN	8	15		10	8	15		10
EXTENSION	2	2		2	2	2		2
MAX. GREEN	15	40		20	15	40		20
YELLOW	5	5		3.2	5	5		3.2
ALL RED	2	2		2	2	2		2
WALK	-	7		7	-	-		-
DON'T WALK	-	13		13	-	-		-
RECALL	OFF	ON		OFF	OFF	ON		OFF
MEMORY	OFF	ON		OFF	OFF	ON		OFF

PROPOSED
9"x15"



R10-3eL SIGN WITH
PEDESTRIAN PUSH
BUTTON INSTALLED
ON SIGNAL POLES
W2 & W4

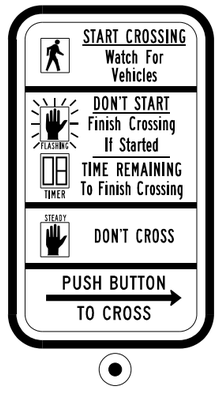
PROPOSED
18"x16"



LED PEDESTRIAN
SIGNALS WITH COUNTDOWN
W1 THRU W4

PEDESTRIAN ELEMENTS

PROPOSED
9"x15"



R10-3eR SIGN WITH
PEDESTRIAN PUSH
BUTTON INSTALLED
ON SIGNAL POLES
W1 & W3

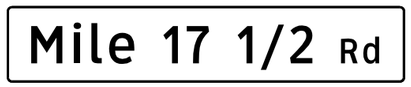
PROPOSED

D3-1G
(78"x18")
S1 & S4
(FOR SIGN DETAILS
SEE SHEET 106)

PROPOSED

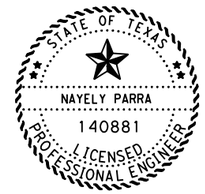
R10-17T
(36"x42")
S3 & S6

PROPOSED



D3-1G
(108"x18")
S2 & S5
(FOR SIGN DETAILS
SEE SHEET 106)

OVERHEAD SIGNS



06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

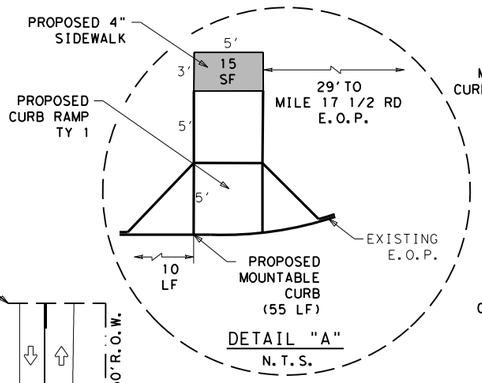
LOCATION 1
FM 907 @
MILE 17 1/2 RD
PROPOSED LAYOUT

SCALE: 1"=60′ SHEET 2 OF 2

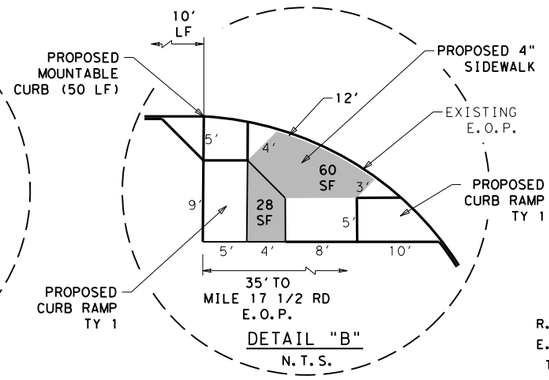
CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		31

DS: CK: DW: CK:

ITEM	CODE	DESCRIPTION	UNIT	QTY.
666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	200
666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	240
666	6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	500
666	6224	PAVEMENT SEALER 4"	LF	8,870
666	6226	PAVEMENT SEALER 8"	LF	200
666	6228	PAVEMENT SEALER 12"	LF	500
666	6230	PAVEMENT SEALER 24"	LF	240
666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	2,800
666	6312	RE PM W/RET REQ TY I (Y)4"(BKN)(100MIL)	LF	150
666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	5,920
668	6077	PREFAB PAV MRK TY C (W)(ARROW)	EA	2
668	6085	PREFAB PAV MRK TY C (W)(WORD)	EA	2
672	6007	REFL PAV MRKR TY I-C	EA	10
672	6009	REFL PAV MRK TY II-A-A	EA	280
678	6001	PAV SURF PREP FOR 4"	LF	8,870
678	6004	PAV SURF PREP FOR 8"	LF	200
678	6006	PAV SURF PREP FOR 12"	LF	500
678	6008	PAV SURF PREP FOR 24"	LF	240
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	2
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	2



DETAIL "A"
N.T.S.



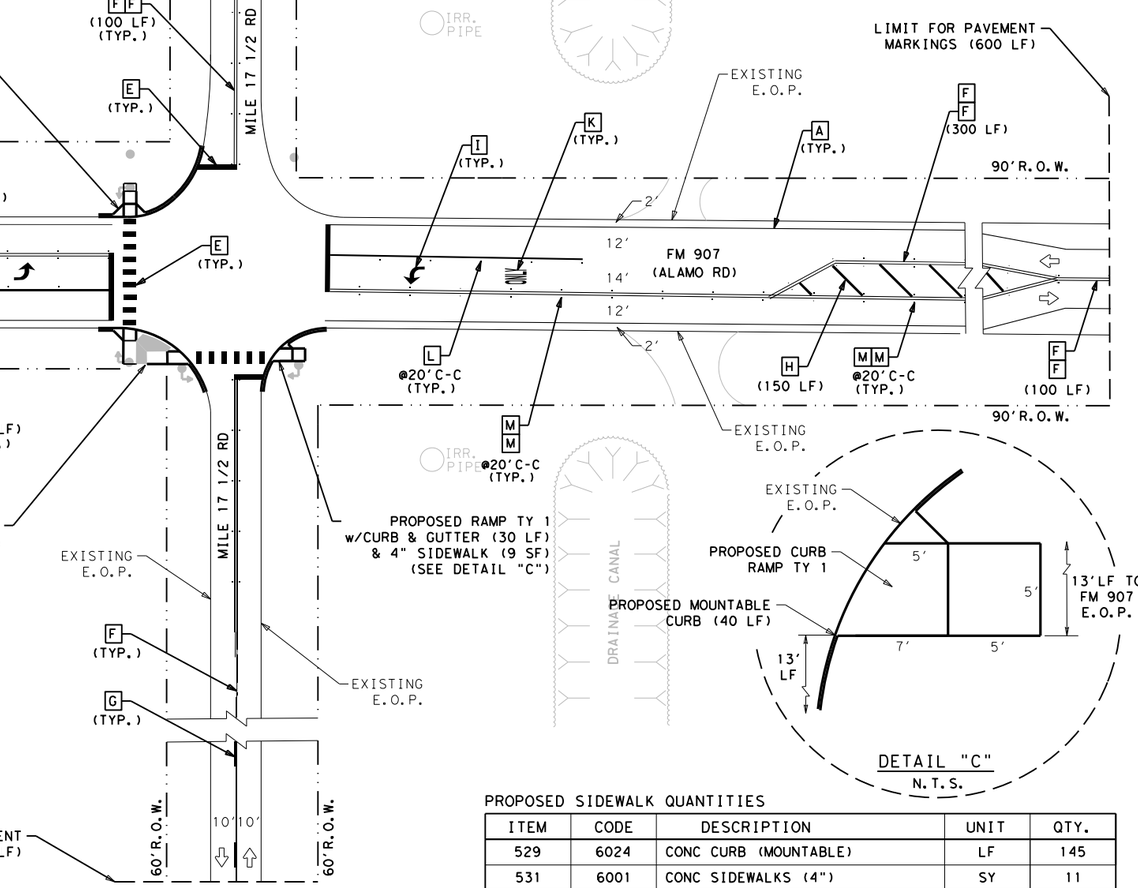
DETAIL "B"
N.T.S.

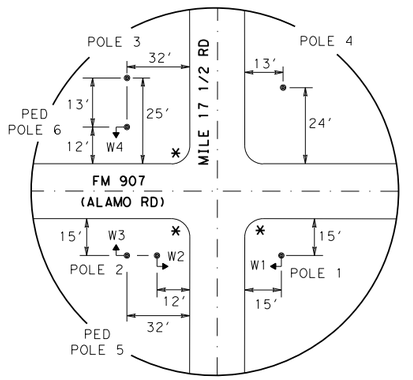
LEGEND:

- A - (W) 4" SLD
- B - (W) 4" BRK
- C - (W) 4" DOT
- D - (W) 8" SLD
- E - (W) 24" SLD
- F - (Y) 4" SLD
- G - (Y) 4" BRK
- H - (Y) 12" SLD
- I - (W) TY C (ARROW)
- J - (W) TY C (DBL ARROW)
- K - (W) TY C (WORD)
- L - REFL PAV MRK TY I-C
- M - REFL PAV MRK TY II A-A

R.O.W.- RIGHT OF WAY
E.O.P.- EDGE OF PAVEMENT
TYP. - TYPICAL
C-C - CENTER TO CENTER
@ - AT
w/ - WITH
- - - - STATION LIMITS
⇦ - TRAFFIC FLOW

NOTES
1. SEE PM(1-3)-20 & PM(4)-22 FOR STANDARD PAVEMENT MARKINGS & MARKERS PLACEMENT DETAILS.
2. ELIMINATE CONFLICTING STRIPING PRIOR TO INSTALLING PROPOSED STRIPING.
3. INSTALL PAVEMENT MARKINGS AS SHOWN ON LAYOUTS/PLANS.





PROPOSED POLE LOCATION

*PROPOSED CURB RAMP TY 1 w/CURB & GUTTER TY I (N.T.S.)

DETAIL "C"
N.T.S.

PROPOSED SIDEWALK QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QTY.
529	6024	CONC CURB (MOUNTABLE)	LF	145
531	6001	CONC SIDEWALKS (4")	SY	11
531	6004	CURB RAMPS (TY 1)	EA	4

LOCATION 1
FM 907 @ MILE 17 1/2 RD
CSJ 1586-01-089

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 1 FM 907 @ MILE 17 1/2 RD PAVEMENT MARKINGS

SCALE: 1"=60' SHEET 1 OF 1

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
DW: CK:	PHR	HIDALGO,ETC.		32

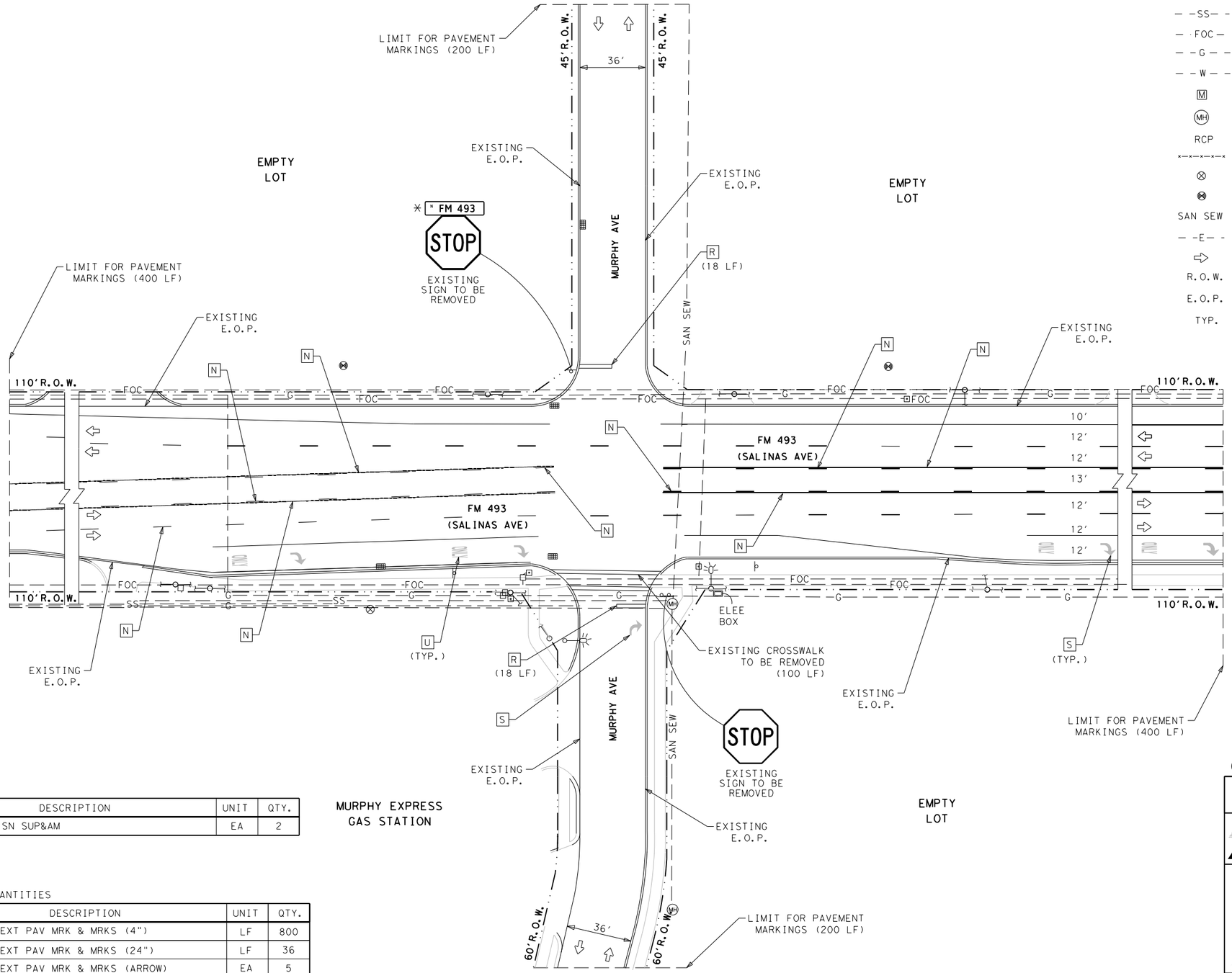
DATE: 6/30/2022 3:35:58 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\8. Traffic\Traffic Signal Layouts\Pavement Markings Layouts\LOC 1 FM

NOTES

1. WHEN REMOVING EXISTING PAVEMENT MARKINGS, SUCH AS CROSSWALKS OR PREFABRICATED SYMBOLS, APPLY THE BLASTING OR MECHANICAL METHOD AS STATEDIN THE 2014 TxDOT SPECIFICATIONS MANUAL, ITEM 677 ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS.
2. * EXISTING STREET NAME SIGNS TO BE REMOVED, INVENTORIED AND RETURNED TO THE LOCAL ENTITY.

LEGEND

- EXIST. LUMINAIRE
- EXIST. POWER POLE (PP)
- EXIST. SIGN
- SS - EXIST. STORM SEWER
- FOC - FIBER OPTIC CABLE
- G - GAS
- W - WATER
- M - WATER METER
- MH - STORM SEWER MANHOLE (MH)
- RCP - REINF. CONC. PIPE
- FENCE
- WATER VALVE
- FIRE HYDRANT
- SAN SEW - EXIST. SANITARY SEWER
- E - EXIST. UNDERGROUND ELECTRICAL
- TRAFFIC FLOW DIRECTION
- R.O.W. - RIGHT OF WAY
- E.O.P. - EDGE OF PAVEMENT
- TYP. - TYPICAL



REMOVAL QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QTY.
644	6076	REMOVE SM RD SN SUP&AM	EA	2

PAVEMENT MARKINGS REMOVAL QUANTITIES

LEGEND	ITEM	CODE	DESCRIPTION	UNIT	QTY.
N	677	6001	ELIM EXT PAV MRK & MRKS (4")	LF	800
R	677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	36
S	677	6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	5
U	677	6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	4

LOCATION 2
FM 493 @ MURPHY AVE
CSJ 0863-01-078

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 2 FM 493 @ MURPHY AVE CONDITION LAYOUT

SCALE: 1"=60' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
1586	01	089,ETC.	FM 907,ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO,ETC.		33

DS: CK: DW: CK:

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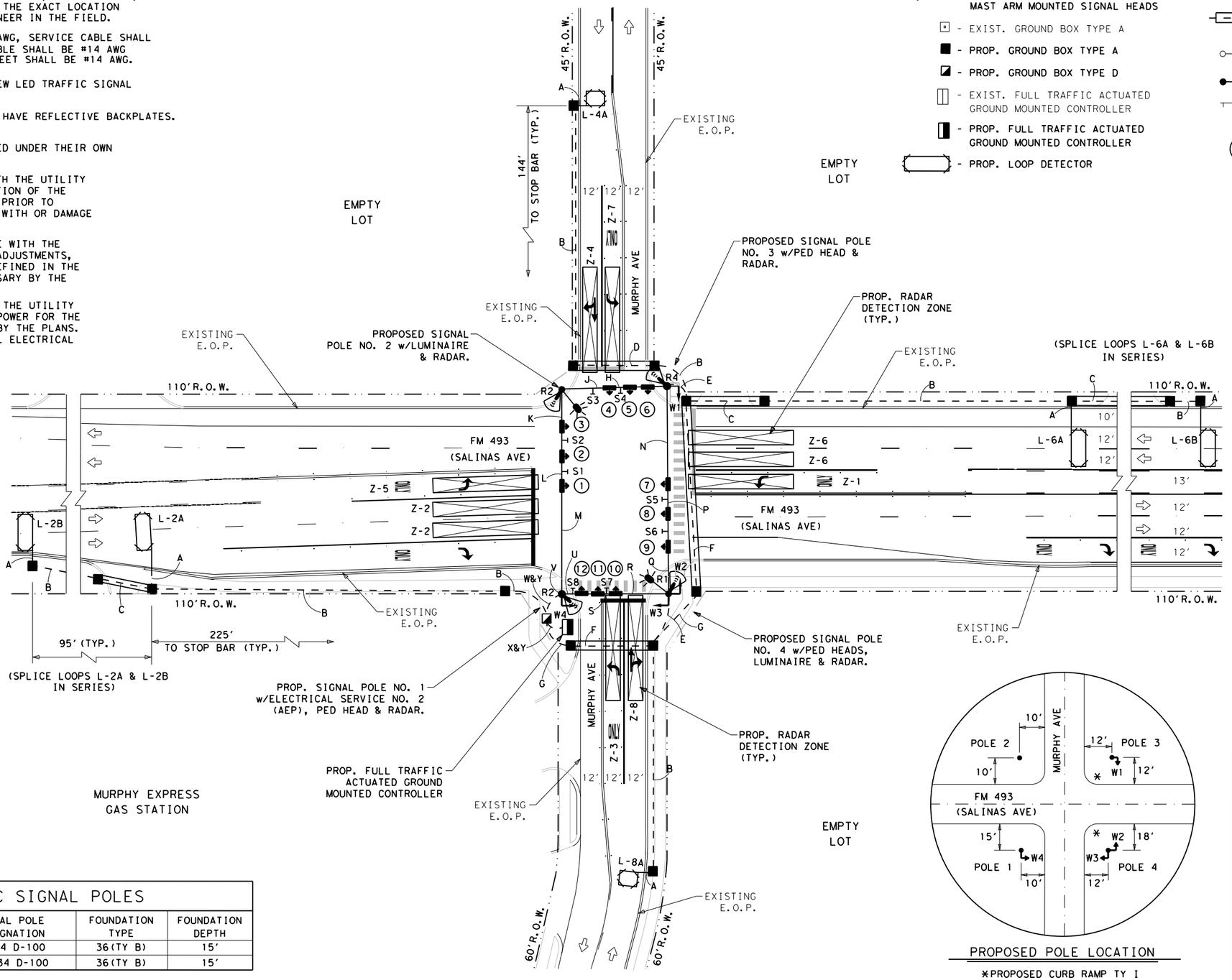
NOTES

1. THE CONTRACTOR SHALL FURNISH AND INSTALL A FULL TRAFFIC ACTUATED CONTROLLER, SIGNAL HEADS, FLASHING YELLOW ARROW (FYA) CAPABLE CONTROLLER UNIT COMPATIBLE WITH ATMS.COM, NEW CONDUIT, CABLES, SIGNS, STOP LINE RADAR DETECTION, LOOP DETECTORS, GROUND BOXES & CONTROLLER FOUNDATION.
2. THE LOCATION SHOWN FOR LOOP DETECTORS, CONDUIT RUNS, & GROUND BOXES IS APPROXIMATE. THE EXACT LOCATION WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.
3. ALL SIGNAL CABLE SHALL BE #12 AWG, SERVICE CABLE SHALL BE #6 AWG, 2/C LOOP LEAD-IN CABLE SHALL BE #14 AWG SHIELDED AND LOOP WIRES IN STREET SHALL BE #14 AWG.
4. THE CONTRACTOR SHALL FURNISH NEW LED TRAFFIC SIGNAL HEADS.
5. ALL TRAFFIC SIGNAL HEADS SHALL HAVE REFLECTIVE BACKPLATES.
6. THE LUMINAIRES SHALL BE OPERATED UNDER THEIR OWN PHOTO ELECTRIC CONTROL.
7. THE CONTRACTOR SHALL VERIFY WITH THE UTILITY COMPANIES AS TO THE EXACT LOCATION OF THE EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICT WITH OR DAMAGE TO THESE UTILITIES.
8. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO MAKE ANY ADJUSTMENTS, DUE TO UTILITY CONFLICTS, AS DEFINED IN THE SPECIFICATIONS OR DEEMED NECESSARY BY THE ENGINEER.
9. ARRANGE FOR AND COOPERATE WITH THE UTILITY COMPANY TO PROVIDE ELECTRICAL POWER FOR THE SERVICE SHOWN AND AS REQUIRED BY THE PLANS. A METER WILL BE REQUIRED ON ALL ELECTRICAL SERVICES.

LEGEND

- PROP. PEDESTRIAN HEADS
- PROP. 12" HORIZONTAL SPAN SPAN WIRE TRAFFIC SIGNAL HEADS
- PROP. 12" HORIZONTAL MAST ARM MOUNTED SIGNAL HEADS
- EXIST. GROUND BOX TYPE A
- PROP. GROUND BOX TYPE A
- PROP. GROUND BOX TYPE D
- EXIST. FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- PROP. FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- PROP. LOOP DETECTOR
- EXIST. CONDUIT (SIZE & TYPE AS SPECIFIED)
- PROP. CONDUIT (SIZE & TYPE AS SPECIFIED)
- EXIST. BORE (SIZE & TYPE AS SPECIFIED)
- PROP. BORE (SIZE & TYPE AS SPECIFIED)
- EXIST. LUMINAIRE
- PROP. LUMINAIRE
- EXIST. OVERHEAD SIGN
- PROP. OVERHEAD SIGN
- PROP. STOP LINE RADAR
- TRAFFIC FLOW DIRECTION



PROPOSED POLE LOCATION

*PROPOSED CURB RAMP TY I (SEE SHEET 36 FOR RAMP DETAILS. N.T.S.)

TRAFFIC SIGNAL POLES				
POLE NUMBER	QUANTITY	SIGNAL POLE DESIGNATION	FOUNDATION TYPE	FOUNDATION DEPTH
1, 3	2	SP 34 D-100	36(TY B)	15'
2, 4	2	SPL 34 D-100	36(TY B)	15'

LOCATION 2
FM 493 @ MURPHY AVE
CSJ 0863-01-078

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 2 FM 493 @ MURPHY AVE PROPOSED LAYOUT

SCALE: 1"=60' SHEET 1 OF 2

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089, ETC.	FM 907, ETC.
	DIST	COUNTY		SHEET NO.
DW: CK:	PHR	HIDALGO, ETC.		34

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ELECTRICAL CHART

ITEM	TOTAL QTY.	RUN NUMBER / RUN LENGTH(FT)	A 60	B 940	C 126	D 50	E 72	F 165	G 65	H 25	J 30	K 25	L 55	M 65	N 55	P 40	Q 50	R 25	S 35	U 15	V 35	W 20	X 15	Y 35	Z 65	AA 25	BB 20	CC 45
POWER	260'	1/C-#6																							2			2
		1/C-#8																										
GROUND	110'	1/C-#6 BARE																							1			1
	110'	1/C-#8 BARE							1																	1	1	
SIGNAL CABLE	535'	2/C-#12						1	1	2	1	2	2													1	2	
	310'	4/C-#12 TRAY															1	1	1			1	1	1	2			
	1330'	5/C-#12						1	1	2	1	2	2			1	1	1	2	1	1	1	2	2	4	5	6	
	845'	7/C-#12													1	1	1	2	2		1	1	1	2	4	4	4	
	990'	RVDS CABLE												1	1	1	2	2	2			1	1	1	4	4	4	
LOOP	120'	1/C-#14 LOOP WIRE	2																									
	1698'	2/C-#14 (SHIELDED)		1	1	1	1		2		2	3	3														4	
CONDUIT	105'	1" PVC	1																									1
	1010'	2" PVC		1						1																		
	126'	2" PVC BORE			1																							
	328'	4" PVC					1				1		1													1	1	
	140'	4" PVC BORE				1						1																
		2" RMC PIPE																										

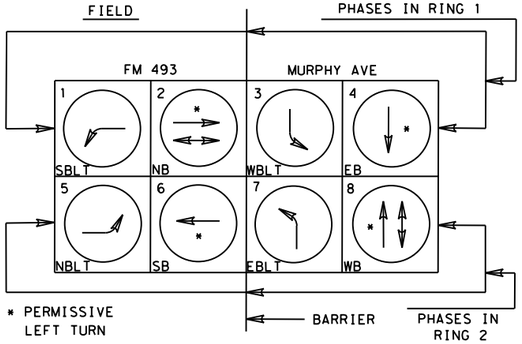
TOTAL QUANTITIES INCLUDE QUANTITIES IN POLES.

RADAR DETECTION CHART

RADAR/ DETECTION ZONE	DETECTOR RACK NO.	SETTING	FUNCTION	DELAY TIMING
R-1/Z-1, Z-6	1/2	PRESENCE	CALL & EXTEND Ø1 & Ø6	
R-2/Z-3, Z-8	3/4	PRESENCE	CALL & EXTEND Ø3 & Ø8	
R-3/Z-2, Z-5	5/6	PRESENCE	CALL & EXTEND Ø2 & Ø5	
R-4/Z-4, Z-7	7/8	PRESENCE	CALL & EXTEND Ø4 & Ø7	
TOTAL:				

LOOP DETECTOR CHART

LOOP	SIZE	WIRE LENGTH	SAW CUT	AMPLIFIER NO.	SETTING	FUNCTION
L-2A	6'x20'	186'	70'	9	PRESENCE	CALL & EXTEND Ø2
L-2B	6'x20'	160'	54'	9	PRESENCE	CALL & EXTEND Ø2
L-4A	6'x10'	108'	42'	10	PRESENCE	CALL & EXTEND Ø4
L-6A	6'x20'	186'	67'	11	PRESENCE	CALL & EXTEND Ø6
L-6B	6'x20'	166'	62'	11	PRESENCE	CALL & EXTEND Ø6
L-8A	6'x10'	108'	40'	12	PRESENCE	CALL & EXTEND Ø8
TOTAL:		914'	335'			

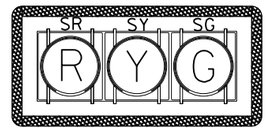


TIMING CHART

PHASE	1	2	3	4	5	6	7	8
STREET	FM 493		MURPHY AVE		FM 493		MURPHY AVE	
MOVEMENT	SBLT	NB	WBLT	EB	NBLT	SB	EBLT	WB
MIN. GREEN	8	15	8	10	8	15	8	10
EXTENSION	2	2	2	2	2	2	2	2
MAX. GREEN	15	40	15	20	15	40	15	20
YELLOW	5	5	3	3	5	5	3	3
ALL RED	2	2	2	2	2	2	2	2
WALK	-	7	-	-	-	-	-	7
DON'T WALK	-	17	-	-	-	-	-	23
RECALL	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
MEMORY	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF

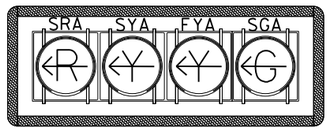
PHASING DIAGRAM

PROPOSED 12" HORIZONTAL



LED SIGNAL NO. 2, 3, 5, 6, 8, 9, 11 & 12
WITH REFLECTIVE BACKPLATES

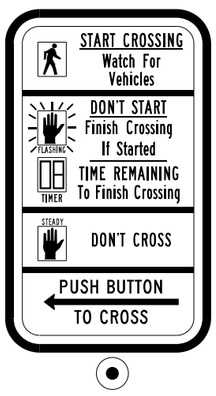
PROPOSED 12" HORIZONTAL



LED SIGNAL NO. 1, 4, 7 & 10
WITH REFLECTIVE BACKPLATES

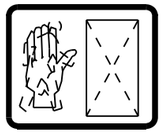
SIGNAL HEAD ARRANGEMENT

PROPOSED 9"x15"



R10-3eL SIGN WITH PEDESTRIAN PUSH BUTTON INSTALLED ON SIGNAL POLES W2 & W4

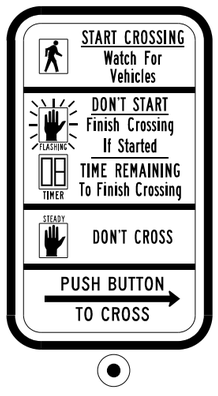
PROPOSED 18"x16"



LED PEDESTRIAN SIGNALS WITH COUNTDOWN W1 THRU W4

PEDESTRIAN ELEMENTS

PROPOSED 9"x15"

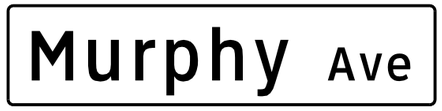


R10-3eR SIGN WITH PEDESTRIAN PUSH BUTTON INSTALLED ON SIGNAL POLES W1 & W3

PROPOSED

R10-17T
(36"x42")
S1, S4, S5 & S7

PROPOSED



D3-1G
(90"X18")
S2 & S6
(FOR SIGN DETAILS SEE SHEET 106)

PROPOSED

D3-1G
(66"X24")
S3 & S8
(FOR SIGN DETAILS SEE SHEET 106)

OVERHEAD SIGNS

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

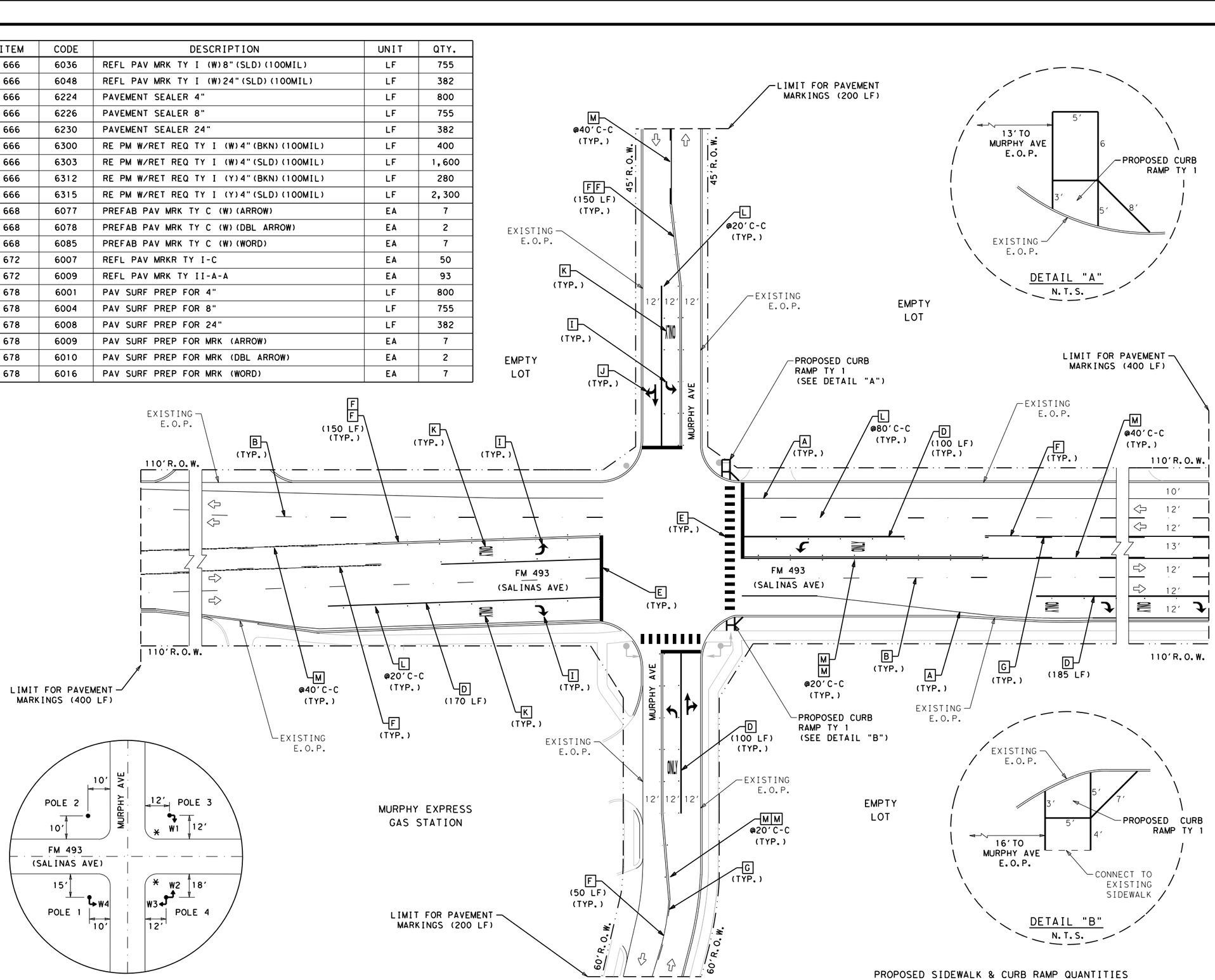
Texas Department of Transportation

LOCATION 2 FM 493 @ MURPHY AVE PROPOSED LAYOUT

SCALE: 1"=60' SHEET 2 OF 2

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089, ETC.	FM 907, ETC.
DW: CK:	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC.		35

ITEM	CODE	DESCRIPTION	UNIT	QTY.
666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	755
666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	382
666	6224	PAVEMENT SEALER 4"	LF	800
666	6226	PAVEMENT SEALER 8"	LF	755
666	6230	PAVEMENT SEALER 24"	LF	382
666	6300	RE PM W/RET REQ TY I (W)4"(BKN)(100MIL)	LF	400
666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	1,600
666	6312	RE PM W/RET REQ TY I (Y)4"(BKN)(100MIL)	LF	280
666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	2,300
668	6077	PREFAB PAV MRK TY C (W)(ARROW)	EA	7
668	6078	PREFAB PAV MRK TY C (W)(DBL ARROW)	EA	2
668	6085	PREFAB PAV MRK TY C (W)(WORD)	EA	7
672	6007	REFL PAV MRKR TY I-C	EA	50
672	6009	REFL PAV MRK TY II-A-A	EA	93
678	6001	PAV SURF PREP FOR 4"	LF	800
678	6004	PAV SURF PREP FOR 8"	LF	755
678	6008	PAV SURF PREP FOR 24"	LF	382
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	7
678	6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA	2
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	7



DETAIL "A"
N.T.S.

PROPOSED POLE LOCATION

*PROPOSED CURB RAMP TY 1 (N.T.S.)

DETAIL "B"
N.T.S.

PROPOSED SIDEWALK & CURB RAMP QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QTY.
531	6004	CURB RAMPS (TYPE 1)	EA	2

LEGEND:

- A - (W) 4" SLD
- B - (W) 4" BRK
- C - (W) 4" DOT
- D - (W) 8" SLD
- E - (W) 24" SLD
- F - (Y) 4" SLD
- G - (Y) 4" BRK
- H - (Y) 12" SLD
- I - (W) TY C (ARROW)
- J - (W) TY C (DBL ARROW)
- K - (W) TY C (WORD)
- L - REFL PAV MRK TY I-C
- M - REFL PAV MRK TY II A-A

R.O.W.- RIGHT OF WAY
E.O.P.- EDGE OF PAVEMENT
TYP. - TYPICAL
C-C - CENTER TO CENTER
@ - AT
w/ - WITH
- - - - STATION LIMITS
⇦ - TRAFFIC FLOW

NOTES

1. SEE PM(1-3)-20 & PM(4)-22 FOR STANDARD PAVEMENT MARKINGS & MARKERS PLACEMENT DETAILS.
2. ELIMINATE CONFLICTING STRIPING PRIOR TO INSTALLING PROPOSED STRIPING.
3. INSTALL PAVEMENT MARKINGS AS SHOWN ON LAYOUTS/PLANS.

LOCATION 2
FM 493 @ MURPHY AVE
CSJ 0863-01-078

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED
PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 2 FM 493 @ MURPHY AVE PAVEMENT MARKINGS

SCALE: 1"=60' SHEET 1 OF 1

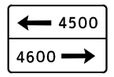
© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089,ETC.	FM 907,ETC.
DW: CK:	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		36

DATE: 6/30/2022 3:36:32 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\8. Traffic\Traffic Signal Layouts\Pavement Markings Layouts\LOC 2 FM 493 @ MURPHY AVE PAVEMENT MARKINGS.dgn

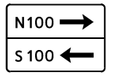
NOTES

1. ALL EXISTING CONDUIT AND BORINGS ARE TO REMAIN IN PLACE AS SHOWN.
2. WHEN REMOVING EXISTING PAVEMENT MARKINGS, SUCH AS CROSSWALKS OR PREFABRICATED SYMBOLS, APPLY THE BLASTING OR MECHANICAL METHOD AS STATED IN THE 2014 TxDOT SPECIFICATIONS MANUAL, ITEM 677 ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS.
3. THE REMOVAL OF EXISTING INTERSECTION ELEMENTS SUCH AS EXISTING OVERHEAD SIGNS, EXISTING PEDESTRIAN PUSH BUTTONS & SIGNALS WILL BE SUBSIDIARY TO ITEM 680.

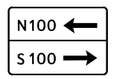
EXISTING SIGN TO REMAIN IN PLACE S4



EXISTING SIGN TO REMAIN IN PLACE S11

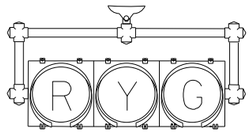


EXISTING SIGN TO REMAIN IN PLACE S7



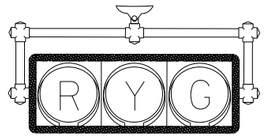
EXISTING SIGN TO REMAIN IN PLACE S14

EXISTING 12" HORIZONTAL



SIGNAL NO. 2, 7 & 9 TO BE REMOVED

EXISTING 12" HORIZONTAL



SIGNAL w/BACKPLATES NO. 4, 5 & 10 TO BE REMOVED

EXISTING 12" HORIZONTAL

SIGNAL NO. 1 & 6

EXISTING 12" HORIZONTAL

SIGNAL NO. 3 & 8 TO BE REMOVED

LEGEND

- EXISTING PEDESTRIAN HEADS
- EXISTING 12" SPAN WIRE MOUNTED TRAFFIC SIGNAL HEADS
- EXIST. MAST ARM ASSEMBLY W/12" HORIZONTAL SIGNAL HEADS
- EXISTING GROUND BOX TYPE A
- EXISTING FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- EXISTING LOOP DETECTOR
- EXISTING VIVDS
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT (SIZE & TYPE AS SPECIFIED)
- EXISTING BORE (SIZE & TYPE AS SPECIFIED)
- EXISTING LUMINAIRE
- EXIST. OVERHEAD SIGN
- EXIST. ANTENNA
- TRAFFIC FLOW DIRECTION
- R.O.W. - RIGHT OF WAY
- E.O.P. - EDGE OF PAVEMENT
- TYP. - TYPICAL

EXISTING SIGN TO REMAIN IN PLACE S2 & S9

EXISTING SIGN TO BE REMOVED S1, S5, S8 & S12

EXISTING R10-4BL SIGN & PEDESTRIAN PUSH BUTTON TO BE REMOVED W1, W7 & W8

EXISTING 18"x16"

PEDESTRIAN SIGNALS TO BE REMOVED W1 THRU W8

EXISTING R10-4BR SIGN & PEDESTRIAN PUSH BUTTON TO BE REMOVED W2, W3, W4, W5 & W6

REMOVAL QUANTITIES

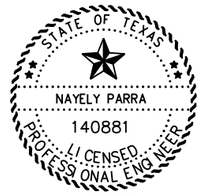
ITEM	CODE	DESCRIPTION	UNIT	QTY.
680	6004	REMOVING TRAFFIC SIGNALS	EA	1
680	****	REMOVAL OF EXISTING OVERHEAD SIGNS	EA	10
680	****	REMOVAL OF EXISTING GROUND MOUNTED CONTROLLER	EA	1
680	****	REMOVAL OF EXISTING PEDESTRIAN SIGNALS	EA	8
680	****	REMOVAL OF EXISTING PED DETECT PUSH BUTTONS	EA	8

**** QUANTITIES SHOWN ARE FOR CONTRACTORS INFORMATION ONLY. THESE ITEMS ARE SUBSIDIARY TO VARIOUS OTHER ITEMS.

PAVEMENT MARKINGS REMOVAL QUANTITIES

LEGEND	ITEM	CODE	DESCRIPTION	UNIT	QTY.
Q	677	6005	ELIM EXT PAV MRK & MRKS (12")	LF	290
R	677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	130
S	677	6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	8
U	677	6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	4

LOCATION 3
SH 4 @ CENTRAL AVE
CSJ 0039-10-089



06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 3 SH 4 @ CENTRAL AVE CONDITION LAYOUT

SCALE: 1"=60' SHEET 1 OF 1

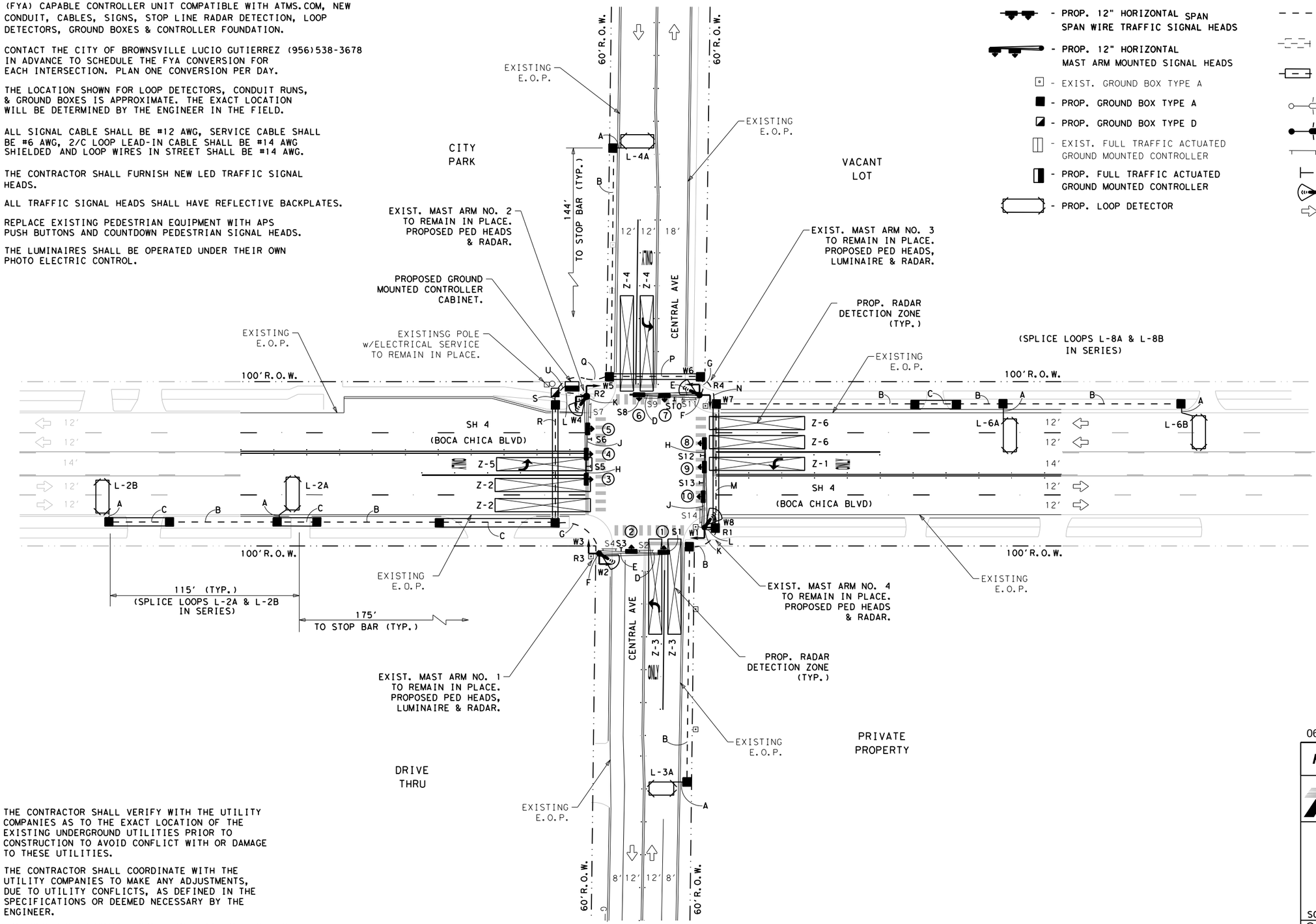
© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089, ETC.	FM 907, ETC.
DW: CK:	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC.		37

NOTES

1. THE CONTRACTOR SHALL FURNISH AND INSTALL A FULL TRAFFIC ACTUATED CONTROLLER, SIGNAL HEADS, FLASHING YELLOW ARROW (FYA) CAPABLE CONTROLLER UNIT COMPATIBLE WITH ATMS.COM, NEW CONDUIT, CABLES, SIGNS, STOP LINE RADAR DETECTION, LOOP DETECTORS, GROUND BOXES & CONTROLLER FOUNDATION.
2. CONTACT THE CITY OF BROWNSVILLE LUCIO GUTIERREZ (956)538-3678 IN ADVANCE TO SCHEDULE THE FYA CONVERSION FOR EACH INTERSECTION. PLAN ONE CONVERSION PER DAY.
3. THE LOCATION SHOWN FOR LOOP DETECTORS, CONDUIT RUNS, & GROUND BOXES IS APPROXIMATE. THE EXACT LOCATION WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.
4. ALL SIGNAL CABLE SHALL BE #12 AWG, SERVICE CABLE SHALL BE #6 AWG, 2/C LOOP LEAD-IN CABLE SHALL BE #14 AWG SHIELDED AND LOOP WIRES IN STREET SHALL BE #14 AWG.
5. THE CONTRACTOR SHALL FURNISH NEW LED TRAFFIC SIGNAL HEADS.
6. ALL TRAFFIC SIGNAL HEADS SHALL HAVE REFLECTIVE BACKPLATES.
7. REPLACE EXISTING PEDESTRIAN EQUIPMENT WITH APS PUSH BUTTONS AND COUNTDOWN PEDESTRIAN SIGNAL HEADS.
8. THE LUMINAIRES SHALL BE OPERATED UNDER THEIR OWN PHOTO ELECTRIC CONTROL.

LEGEND

- PROP. PEDESTRIAN HEADS
- PROP. 12" HORIZONTAL SPAN SPAN WIRE TRAFFIC SIGNAL HEADS
- PROP. 12" HORIZONTAL MAST ARM MOUNTED SIGNAL HEADS
- EXIST. GROUND BOX TYPE A
- PROP. GROUND BOX TYPE A
- PROP. GROUND BOX TYPE D
- EXIST. FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- PROP. FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- PROP. LOOP DETECTOR
- EXIST. CONDUIT (SIZE & TYPE AS SPECIFIED)
- PROP. CONDUIT (SIZE & TYPE AS SPECIFIED)
- EXIST. BORE (SIZE & TYPE AS SPECIFIED)
- PROP. BORE (SIZE & TYPE AS SPECIFIED)
- EXIST. LUMINAIRE
- PROP. LUMINAIRE
- EXIST. OVERHEAD SIGN
- PROP. OVERHEAD SIGN
- PROP. STOP LINE RADAR
- TRAFFIC FLOW DIRECTION



9. THE CONTRACTOR SHALL VERIFY WITH THE UTILITY COMPANIES AS TO THE EXACT LOCATION OF THE EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICT WITH OR DAMAGE TO THESE UTILITIES.
10. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO MAKE ANY ADJUSTMENTS, DUE TO UTILITY CONFLICTS, AS DEFINED IN THE SPECIFICATIONS OR DEEMED NECESSARY BY THE ENGINEER.
11. THE CONTRACTOR SHALL ENSURE THAT ALL THE TRAFFIC SIGNAL HEADS AND SIGNAL EQUIPMENT IS FULLY CONNECTED AND FUNCTIONAL AS SPECIFIED ON ITEM 680.

LOCATION 3
SH 4 @ CENTRAL AVE
CSJ 0039-10-089

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 3 SH 4 @ CENTRAL AVE PROPOSED LAYOUT

SCALE: 1"=60' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		38

DATE: 6/30/2022 3:36:55 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\8. Traffic\Traffic Signal Layouts\Proposed Layouts\LOC 3 SH 4 @ CEN

ELECTRICAL CHART

ITEM	TOTAL QTY.	RUN NUMBER	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	U
		RUN LENGTH(FT)	50	755	185	50	50	60	40	40	80	70	30	85	25	60	35	75	15	10
POWER		1/C-#6																		
		1/C-#8																		
GROUND		1/C-#6 BARE																		
	375'	1/C-#8 BARE							1				1	1	1	1	1	1	1	1
SIGNAL CABLE	865'	2/C-#12							2				2	2	2	3	3	2	2	4
		4/C-#12 TRAY																		
	1550'	5/C-#12					1	1	3		1	1	3	3	3	5	5	3	3	8
	850'	7/C-#12				1	1	1	1	1	1	1	1	1	1	2	2	1	1	4
	630'	RVDS CABLE						1	1			1	1	1	1	2	2	1	1	4
LOOP	100'	1/C-#14 LOOP WIRE	2																	
	1430'	2/C-#14 (SHIELDED)		1	1									1	2	2	3	1	1	4
CONDUIT	50'	1" PVC	1																	
	755'	2" PVC		1																
	185'	2" PVC BORE			1															
	155'	4" PVC							1				1		1		1		1	1
	220'	4" PVC BORE												1		1		1		
		2" RMC PIPE																		

TOTAL QUANTITIES INCLUDE QUANTITIES IN POLES.
*EXISTING CONDUIT TO REMAIN IN PLACE.

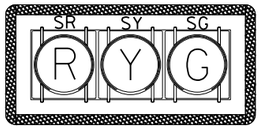
RADAR DETECTION CHART

RADAR/ DETECTION ZONE	DETECTOR RACK NO.	SETTING	FUNCTION	DELAY TIMING
R-1/Z-1, Z-6	1/2	PRESENCE	CALL & EXTEND Ø1 & Ø6	
R-2/Z-2, Z-5	3/4	PRESENCE	CALL & EXTEND Ø2 & Ø5	
R-3/Z-3	5	PRESENCE	CALL & EXTEND Ø3	
R-4/Z-4	7	PRESENCE	CALL & EXTEND Ø4	
TOTAL:				

LOOP DETECTOR CHART

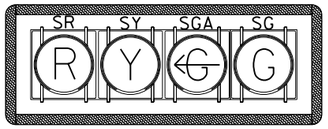
LOOP	SIZE	WIRE LENGTH	SAW CUT	AMPLIFIER NO.	SETTING	FUNCTION
L-2A	6'x20'	114'	57'	9	PRESENCE	CALL & EXTEND Ø2
L-2B	6'x20'	106'	53'	9	PRESENCE	CALL & EXTEND Ø2
L-3A	6'x15'	90'	45'	12	PRESENCE	CALL & EXTEND Ø3
L-4A	6'x20'	106'	53'	10	PRESENCE	CALL & EXTEND Ø4
L-6A	6'x20'	112'	56'	11	PRESENCE	CALL & EXTEND Ø6
L-6B	6'x20'	118'	59'	11	PRESENCE	CALL & EXTEND Ø6
TOTAL:		646'	323'			

PROPOSED 12" HORIZONTAL



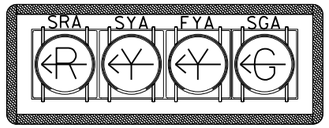
LED SIGNAL NO. 2, 4, 5, 7, 9, & 10
WITH REFLECTIVE BACKPLATES

PROPOSED 12" HORIZONTAL



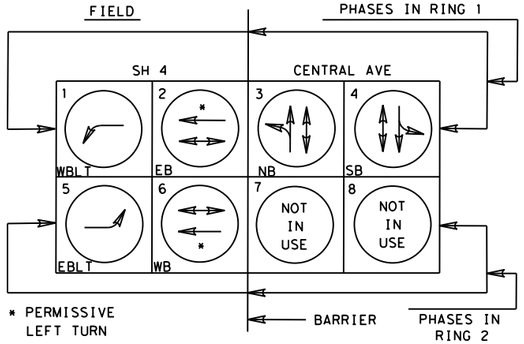
LED SIGNAL NO. 1 & 6
WITH REFLECTIVE BACKPLATES

PROPOSED 12" HORIZONTAL



LED SIGNAL NO. 3 & 8
WITH REFLECTIVE BACKPLATES

SIGNAL HEAD ARRANGEMENT



NOTE: IF EXISTING PHASING VARIES FROM THE ONE BEING PROPOSED, EXISITNG PHASING TO REMAIN. PLEASE CONTACT CITY OF BROWNSVILLE LUCIO GUTIERREZ (956)538-3678 PRIOR TO INPUTING INTO CONTROLLER.

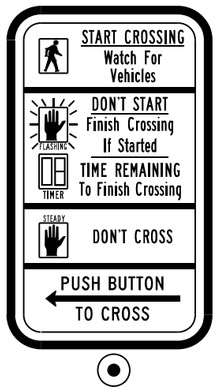
PHASING DIAGRAM

TIMING CHART

PHASE	1	2	3	4	5	6	7	8
STREET	SH 4		CENTRAL AVE		SH 4		CENTRAL AVE	
MOVEMENT								
MIN. GREEN								
EXTENSION								
MAX. GREEN								
YELLOW								
ALL RED								
WALK								
DON'T WALK								
RECALL								
MEMORY								

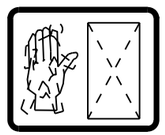
EXISTING TIMING TO REMAIN IN PLACE

PROPOSED
9"x15"



R10-3eL SIGN WITH PEDESTRIAN PUSH BUTTON INSTALLED ON SIGNAL POLES
W1, W7 & W8

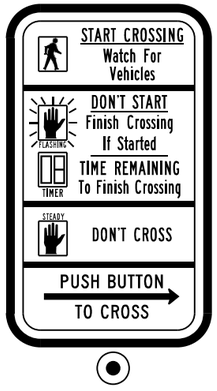
PROPOSED
18"x16"



LED PEDESTRIAN SIGNALS WITH COUNTDOWN
W1 THRU W8

PEDESTRIAN ELEMENTS

PROPOSED
9"x15"



R10-3eR SIGN WITH PEDESTRIAN PUSH BUTTON INSTALLED ON SIGNAL POLES
W2, W3, W4, W5, W6 & W8

PROPOSED

D3-1G
(90"X18")
S6 & S13
(FOR SIGN DETAILS SEE SHEET 106)

PROPOSED

D3-1G
(120"X18")
S3 & S10
(FOR SIGN DETAILS SEE SHEET 106)

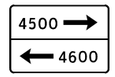
PROPOSED

R10-17T
(18"x12")
S5 & S12

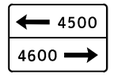
PROPOSED

R10-9T
(36"x24")
S1 & S8

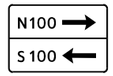
EXISTING SIGN TO REMAIN IN PLACE S2 & S9



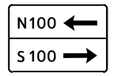
EXISTING SIGN TO REMAIN IN PLACE S4



EXISTING SIGN TO REMAIN IN PLACE S11

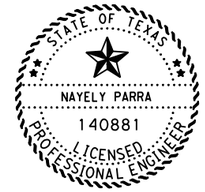


EXISTING SIGN TO REMAIN IN PLACE S7



EXISTING SIGN TO REMAIN IN PLACE S14

OVERHEAD SIGNS



06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

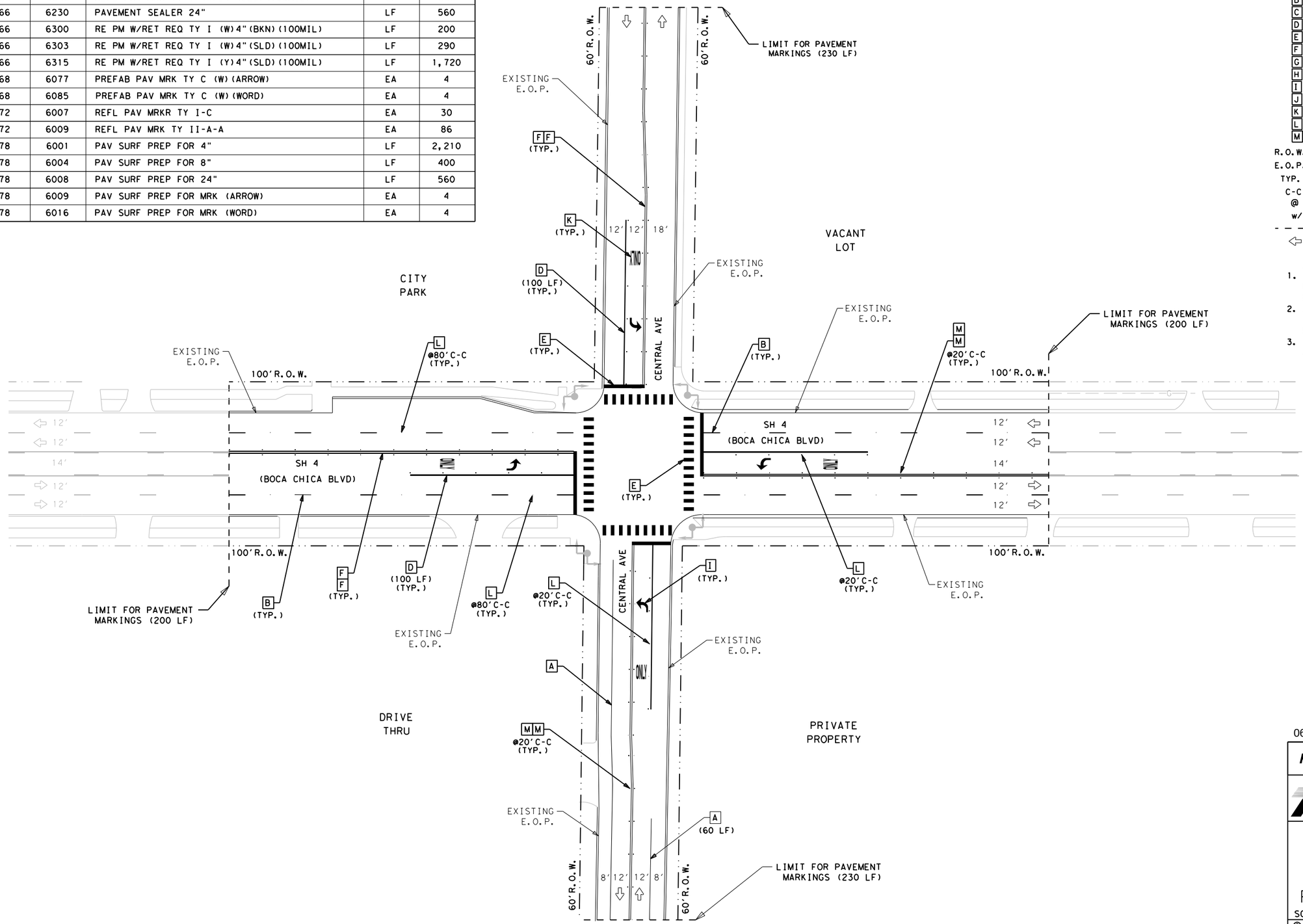
LOCATION 3
SH 4 @
CENTRAL AVE
PROPOSED LAYOUT

SCALE: 1"=60' SHEET 2 OF 2

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089, ETC.	FM 907, ETC.
DW: CK:	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC.		39

DATE: 6/30/2022 3:36:57 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\8. Traffic\Traffic Signal Layouts\Proposed Layouts\LOC 3 SH 4 @ CEN

ITEM	CODE	DESCRIPTION	UNIT	QTY.
666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	400
666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	560
666	6230	PAVEMENT SEALER 24"	LF	560
666	6300	RE PM W/RET REQ TY I (W)4"(BKN)(100MIL)	LF	200
666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	290
666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	1,720
668	6077	PREFAB PAV MRK TY C (W)(ARROW)	EA	4
668	6085	PREFAB PAV MRK TY C (W)(WORD)	EA	4
672	6007	REFL PAV MRKR TY I-C	EA	30
672	6009	REFL PAV MRK TY II-A-A	EA	86
678	6001	PAV SURF PREP FOR 4"	LF	2,210
678	6004	PAV SURF PREP FOR 8"	LF	400
678	6008	PAV SURF PREP FOR 24"	LF	560
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	4
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	4



LEGEND:

- A - (W) 4" SLD
- B - (W) 4" BRK
- C - (W) 4" DOT
- D - (W) 8" SLD
- E - (W) 24" SLD
- F - (Y) 4" SLD
- G - (Y) 4" BRK
- H - (Y) 12" SLD
- I - (W) TY C (ARROW)
- J - (W) TY C (DBL ARROW)
- K - (W) TY C (WORD)
- L - REFL PAV MRK TY I-C
- M - REFL PAV MRK TY II A-A

R.O.W.- RIGHT OF WAY
E.O.P.- EDGE OF PAVEMENT
TYP. - TYPICAL
C-C - CENTER TO CENTER
@ - AT
w/ - WITH
- - - - STATION LIMITS
⇦ - TRAFFIC FLOW

NOTES
1. SEE PM(1-3)-20 & PM(4)-22 FOR STANDARD PAVEMENT MARKINGS & MARKERS PLACEMENT DETAILS.
2. ELIMINATE CONFLICTING STRIPING PRIOR TO INSTALLING PROPOSED STRIPING.
3. INSTALL PAVEMENT MARKINGS AS SHOWN ON LAYOUTS/PLANS.

N

LOCATION 3
SH 4 @ CENTRAL AVE
CSJ 0039-10-089

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 3 SH 4 @ CENTRAL AVE PAVEMENT MARKINGS

SCALE: 1"=60' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		40

DS: CK: DW: CK:

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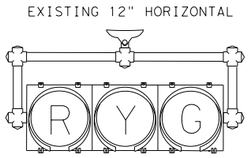
NOTES

1. ALL EXISTING CONDUIT AND BORINGS ARE TO REMAIN IN PLACE AS SHOWN.
2. WHEN REMOVING EXISTING PAVEMENT MARKINGS, SUCH AS CROSSWALKS OR PREFABRICATED SYMBOLS, APPLY THE BLASTING OR MECHANICAL METHOD AS STATED IN THE 2014 TxDOT SPECIFICATIONS MANUAL, ITEM 677 ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS.
3. THE REMOVAL OF EXISTING INTERSECTION ELEMENTS SUCH AS EXISTING OVERHEAD SIGNS, EXISTING PEDESTRIAN PUSH BUTTONS & SIGNALS WILL BE SUBSIDIARY TO ITEM 680.
4. ALL EXISTING PEDESTAL COUNTDOWN AND PUSHBUTTON WIRING TO REMAIN.

EXISTING 12" HORIZONTAL



SIGNAL NO. 7 & 9
TO BE REMOVED

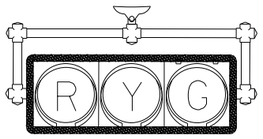
BOCA CHICA BLVD

EXISTING SIGN TO BE REMOVED S2 & S6

FM 511
INDIANA

EXISTING SIGN
TO BE REMOVED
S3 & S8

EXISTING 12" HORIZONTAL



SIGNAL w/BACKPLATES NO. 2,
4,5 & 10 TO BE REMOVED

EXISTING 12" HORIZONTAL

SIGNAL NO. 1 & 6 TO BE REMOVED

EXISTING 12" HORIZONTAL

SIGNAL w/BACKPLATES NO. 3 & 8
TO BE REMOVED

EXISTING SIGN
TO BE REMOVED
S5

PROTECTED LEFT
ON GREEN ARROW

EXISTING SIGN
TO BE REMOVED
S1, S4, & S7

EXISTING
R10-4BL SIGN &
PEDESTRIAN PUSH
BUTTON TO BE
REMOVED
W1, W2, W3, W5 & W7

EXISTING
18"x16"

PEDESTRIAN SIGNALS
TO BE REMOVED
W1 THRU W8

EXISTING
R10-4BR SIGN &
PEDESTRIAN PUSH
BUTTON TO BE
REMOVED
W4, W6 & W8

LEGEND

- EXISTING PEDESTRIAN HEADS
- EXISTING 12" SPAN WIRE MOUNTED TRAFFIC SIGNAL HEADS
- EXIST. MAST ARM ASSEMBLY W/12" HORIZONTAL SIGNAL HEADS
- EXISTING GROUND BOX TYPE A
- EXISTING FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- EXISTING LOOP DETECTOR
- EXISTING VIVDS
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT (SIZE & TYPE AS SPECIFIED)
- EXISTING BORE (SIZE & TYPE AS SPECIFIED)
- EXISTING LUMINAIRE
- EXIST. OVERHEAD SIGN
- EXIST. ANTENNA
- TRAFFIC FLOW DIRECTION
- R.O.W. - RIGHT OF WAY
- E.O.P. - EDGE OF PAVEMENT
- TYP. - TYPICAL

N

LOCATION 4
SH 4 @ FM 511
CSJ 0039-10-088

REMOVAL QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QTY.
610	6102	REPLACE LUMINAIRE W/LED (250W EQ)	EA	2
680	6004	REMOVING TRAFFIC SIGNALS	EA	1
6306	6018	VIVIDS CAM ASSY (REMOVE)	EA	4
6306	6020	VIVIDS CABLING (REMOVE)	LF	815
680	****	REMOVAL OF EXISTING OVERHEAD SIGNS	EA	8
680	****	REMOVAL OF EXISTING GROUND MOUNTED CONTROLLER	EA	1
680	****	REMOVAL OF EXISTING PEDESTRIAN SIGNALS	EA	8
680	****	REMOVAL OF EXISTING PED DETECT PUSH BUTTONS	EA	8

**** QUANTITIES SHOWN ARE FOR CONTRACTORS INFORMATION ONLY. THESE ITEMS ARE SUBSIDIARY TO VARIOUS OTHER ITEMS.

PAVEMENT MARKINGS REMOVAL QUANTITIES

LEGEND	ITEM	CODE	DESCRIPTION	UNIT	QTY.
Q	677	6005	ELIM EXT PAV MRK & MRKS (12")	LF	530
R	677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	122
S	677	6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	8
T	677	6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA	2
U	677	6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	5

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 4
SH 4 @
FM 511
CONDITION LAYOUT

SCALE: 1"=60' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		41

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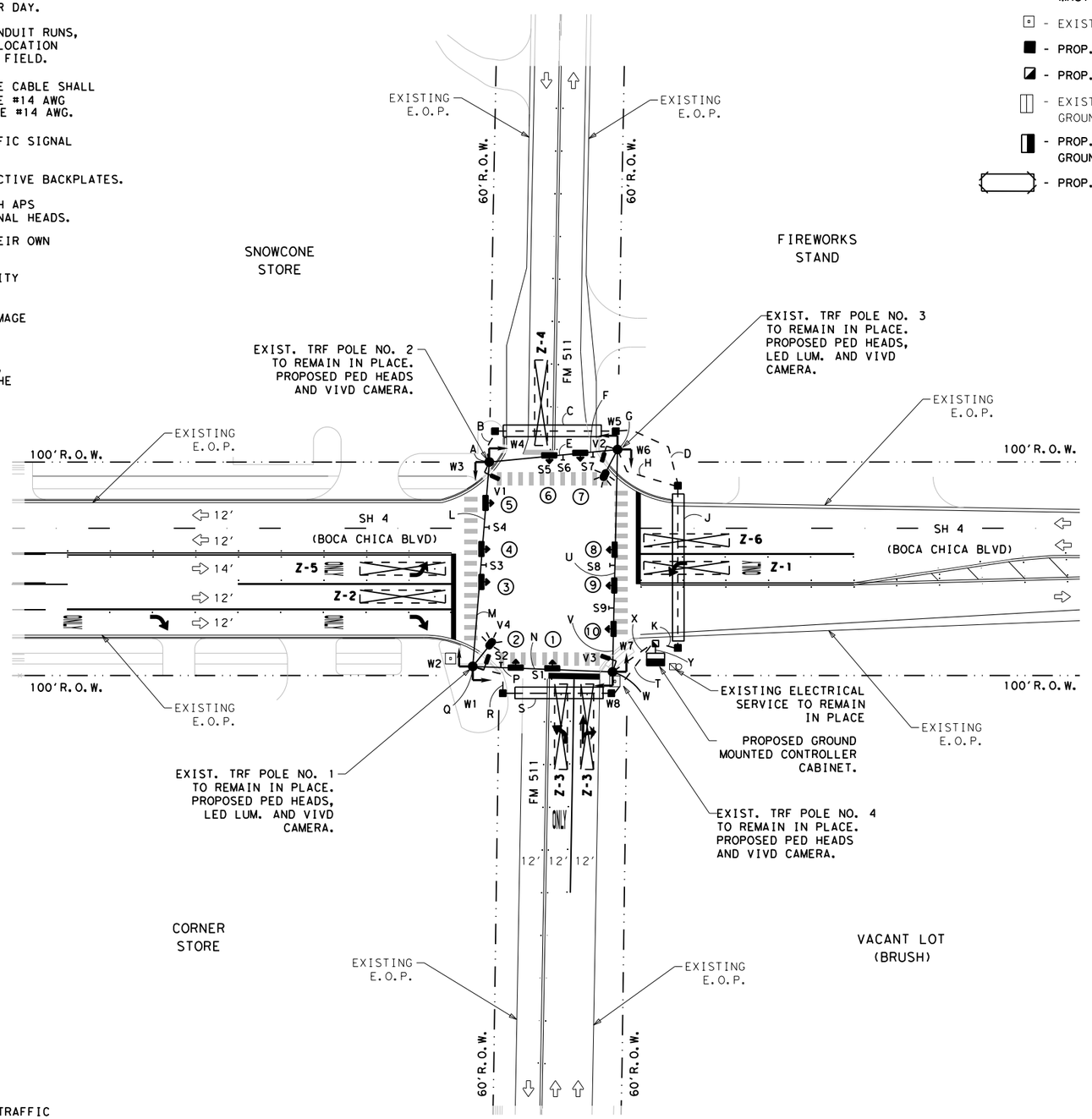
NOTES

1. THE CONTRACTOR SHALL FURNISH AND INSTALL A FULL TRAFFIC ACTUATED CONTROLLER, SIGNAL HEADS, FLASHING YELLOW ARROW (FYA) CAPABLE CONTROLLER UNIT COMPATIBLE WITH ATMS.COM, NEW CONDUIT, CABLES, SIGNS, NEW VIVD CAMERAS, GROUND BOXES & CONTROLLER FOUNDATION.
2. CONTACT THE CITY OF BROWNSVILLE LUCIO GUTIERREZ (956)538-3678 IN ADVANCE TO SCHEDULE THE FYA CONVERSION FOR EACH INTERSECTION. PLAN ONE CONVERSION PER DAY.
3. THE LOCATION SHOWN FOR LOOP DETECTORS, CONDUIT RUNS, & GROUND BOXES IS APPROXIMATE. THE EXACT LOCATION WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.
4. ALL SIGNAL CABLE SHALL BE #12 AWG, SERVICE CABLE SHALL BE #6 AWG, 2/C LOOP LEAD-IN CABLE SHALL BE #14 AWG SHIELDED AND LOOP WIRES IN STREET SHALL BE #14 AWG.
5. THE CONTRACTOR SHALL FURNISH NEW LED TRAFFIC SIGNAL HEADS.
6. ALL TRAFFIC SIGNAL HEADS SHALL HAVE REFLECTIVE BACKPLATES.
7. REPLACE EXISTING PEDESTRIAN EQUIPMENT WITH APS PUSH BUTTONS AND COUNTDOWN PEDESTRIAN SIGNAL HEADS.
8. THE LUMINAIRES SHALL BE OPERATED UNDER THEIR OWN PHOTO ELECTRIC CONTROL.
9. THE CONTRACTOR SHALL VERIFY WITH THE UTILITY COMPANIES AS TO THE EXACT LOCATION OF THE EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICT WITH OR DAMAGE TO THESE UTILITIES.
10. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO MAKE ANY ADJUSTMENTS, DUE TO UTILITY CONFLICTS, AS DEFINED IN THE SPECIFICATIONS OR DEEMED NECESSARY BY THE ENGINEER.



LEGEND

- PROP. PEDESTRIAN HEADS
- PROP. 12" HORIZONTAL SPAN SPAN WIRE TRAFFIC SIGNAL HEADS
- PROP. 12" HORIZONTAL MAST ARM MOUNTED SIGNAL HEADS
- EXIST. GROUND BOX TYPE A
- PROP. GROUND BOX TYPE A
- PROP. GROUND BOX TYPE D
- EXIST. FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- PROP. FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- PROP. LOOP DETECTOR
- EXIST. CONDUIT (SIZE & TYPE AS SPECIFIED)
- PROP. CONDUIT (SIZE & TYPE AS SPECIFIED)
- EXIST. BORE (SIZE & TYPE AS SPECIFIED)
- PROP. BORE (SIZE & TYPE AS SPECIFIED)
- EXIST. LUMINAIRE
- PROP. LUMINAIRE
- EXIST. OVERHEAD SIGN
- PROP. OVERHEAD SIGN
- PROP. VIVD CAMERA
- TRAFFIC FLOW DIRECTION

N

LOCATION 4
SH 4 @ FM 511
CSJ 0039-10-088

11. EXISTING TIMING AND PHASING SHALL REMAIN AS IS.
12. THE CONTRACTOR SHALL ENSURE THAT ALL THE TRAFFIC SIGNAL HEADS AND SIGNAL EQUIPMENT IS FULLY CONNECTED AND FUNCTIONAL AS SPECIFIED ON ITEM 680.

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 4 SH 4 @ FM 511 PROPOSED LAYOUT

SCALE: 1" = 60' SHEET 1 OF 2

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089, ETC.	FM 907, ETC.
DW: CK:	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC.		42

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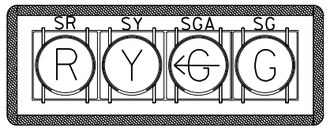
ELECTRICAL CHART

ITEM	TOTAL QTY.	RUN NUMBER / RUN LENGTH(FT)	A 35	B 20	C 60	D 50	E 20	F 25	G 60	H 40	J 80	K 15	L 25	M 60	N 20	P 25	Q 60	R 30	S 55	T 35	U 20	V 45	W 60	X 30	Y 15
POWER		1/C-#6																							
		1/C-#8																							
GROUND		1/C-#6 BARE																							
	430'	1/C-#8 BARE		1	1	1				1	1	1						1	1	1				1	1
SIGNAL CABLE	1670'	2/C-#12	2	2	2	2			2	2	4	4					2	2	2	2			2	2	4
	405'	4/C-#12 TRAY							1	1	1	1					1	1	1	1					2
	860'	5/C-#12	*	*	*	*		1,*	1,*	1,*	1,*	1,*		1,*		1,*	2,*	2,*	2,*	2,*		1,*	1,*	1,*	4,*
	945'	7/C-#12					1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	4
	835'	COAXIAL	1	1	1	1			1	1	2	2					1	1	1	1			1	1	4
LOOP		1/C-#14 LOOP WIRE																							
		2/C-#14 (SHIELDED)																							
CONDUIT		1" PVC																							
		2" PVC																							
		2" PVC BORE																							
	235'	4" PVC		1		1				1		1						1		1				1	1
	195'	4" PVC BORE			1						1								1						
		2" RMC PIPE																							

TOTAL QUANTITIES INCLUDE QUANTITIES IN POLES.

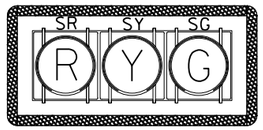
* EXISTING PEDESTRIAN SIGNAL WIRING TO REMAIN IN PLACE

PROPOSED 12" HORIZONTAL



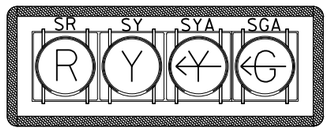
LED SIGNAL NO. 1
WITH REFLECTIVE BACKPLATES

PROPOSED 12" HORIZONTAL



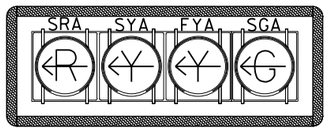
LED SIGNAL NO. 2,4,5,7,9 & 10
WITH REFLECTIVE BACKPLATES

PROPOSED 12" HORIZONTAL



LED SIGNAL NO. 6
WITH REFLECTIVE BACKPLATES

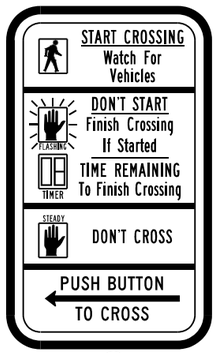
PROPOSED 12" HORIZONTAL



LED SIGNAL NO. 3 & 8
WITH REFLECTIVE BACKPLATES

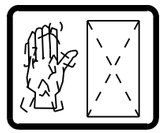
SIGNAL HEAD ARRANGEMENT

PROPOSED
9"x15"



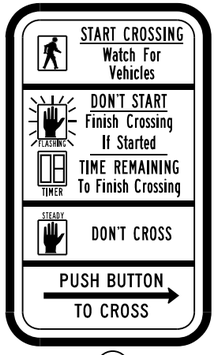
R10-3eL SIGN WITH
PEDESTRIAN PUSH
BUTTON INSTALLED
ON SIGNAL POLES
W2, W4, W6, & W8

PROPOSED
18"x16"



LED PEDESTRIAN
SIGNALS WITH COUNTDOWN
W1 THRU W8

PROPOSED
9"x15"



R10-3eR SIGN WITH
PEDESTRIAN PUSH
BUTTON INSTALLED
ON SIGNAL POLES
W1, W3, W5, & W7

PEDESTRIAN ELEMENTS

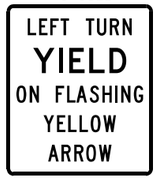
PROPOSED

R3-8BLK
(36"x30")
S5

PROPOSED

R10-9T
(36"x24")
S1

PROPOSED



R10-17T
(36"x42")
S3, S5, & S8

PROPOSED

D3-1G
(90"x18")
S4 & S9
(FOR SIGN DETAILS
SEE SHEET 107)

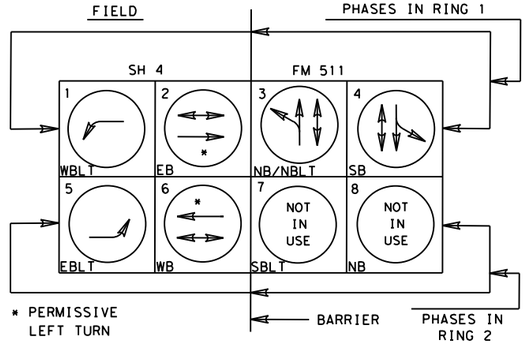
PROPOSED

D3-1G
(120"x18")
S2 & S7
(FOR SIGN DETAILS
SEE SHEET 106)

OVERHEAD SIGNS

VIVDS DETECTOR CHART

VIVD/ DETECTOR ZONE	DETECTOR RACK NO.	SETTING TASK	FUNCTION	DELAY TIMING
V1/Z-1, Z-6	1/2	PRESENCE	CALL & EXTEND Ø1 & Ø6	
V2/Z-3	3/4	PRESENCE	CALL & EXTEND Ø3	
V3/Z-2, Z-5	5/6	PRESENCE	CALL & EXTEND Ø2 & Ø5	
V4/Z-4	7/8	PRESENCE	CALL & EXTEND Ø4	

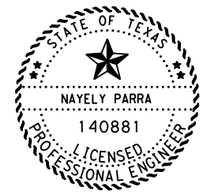


NOTE: IF EXISTING PHASING VARIES FROM THE ONE BEING PROPOSED, EXISITNG PHASING TO REMAIN. PLEASE CONTACT CITY OF BROWNSVILLE LUCIO GUTIERREZ (956)538-3678 PRIOR TO INPUTING INTO CONTROLLER.

PHASING DIAGRAM

TIMING CHART

PHASE	1	2	3	4	5	6	7	8
STREET	SH 4		FM 511		SH 4		FM 511	
MOVEMENT								
MIN. GREEN								
EXTENSION								
MAX. GREEN			EXISTING TIMING TO REMAIN IN PLACE					
YELLOW								
ALL RED								
WALK								
DON'T WALK								
RECALL								
MEMORY								



06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 4
SH 4 @
FM 511
PROPOSED LAYOUT

SCALE: 1" = 60' SHEET 2 OF 2

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089, ETC.	FM 907, ETC.
	DIST	COUNTY		SHEET NO.
DW: CK:	PHR	HIDALGO, ETC.		43

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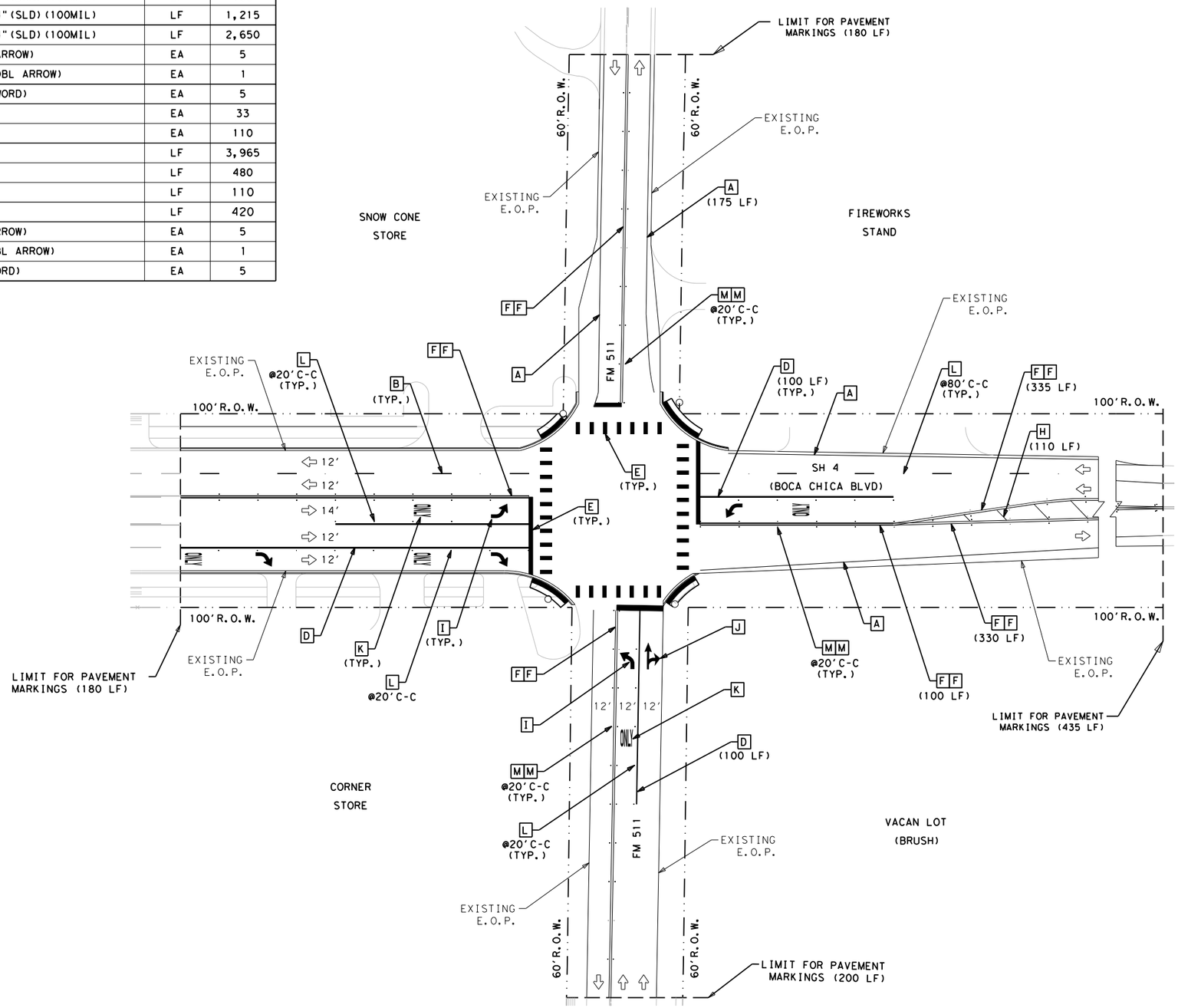
ITEM	CODE	DESCRIPTION	UNIT	QTY.
666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	480
666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	420
666	6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	110
666	6224	PAVEMENT SEALER 4"	LF	3,965
666	6226	PAVEMENT SEALER 8"	LF	480
666	6228	PAVEMENT SEALER 12"	LF	110
666	6230	PAVEMENT SEALER 24"	LF	420
666	6300	RE PM W/RET REQ TY I (W)4"(BKN)(100MIL)	LF	100
666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	1,215
666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	2,650
668	6077	PREFAB PAV MRK TY C (W)(ARROW)	EA	5
668	6078	PREFAB PAV MRK TY C (W)(DBL ARROW)	EA	1
668	6085	PREFAB PAV MRK TY C (W)(WORD)	EA	5
672	6007	REFL PAV MRKR TY I-C	EA	33
672	6009	REFL PAV MRK TY II-A-A	EA	110
678	6001	PAV SURF PREP FOR 4"	LF	3,965
678	6004	PAV SURF PREP FOR 8"	LF	480
678	6006	PAV SURF PREP FOR 12"	LF	110
678	6008	PAV SURF PREP FOR 24"	LF	420
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	5
678	6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA	1
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	5



LEGEND:

- A - (W) 4" SLD
- B - (W) 4" BRK
- C - (W) 4" DOT
- D - (W) 8" SLD
- E - (W) 24" SLD
- F - (Y) 4" SLD
- G - (Y) 4" BRK
- H - (Y) 12" SLD
- I - (W) TY C (ARROW)
- J - (W) TY C (DBL ARROW)
- K - (W) TY C (WORD)
- L - REFL PAV MRK TY I-C
- M - REFL PAV MRK TY II A-A

R.O.W.- RIGHT OF WAY
E.O.P.- EDGE OF PAVEMENT
TYP. - TYPICAL
C-C - CENTER TO CENTER
@ - AT
w/ - WITH
- — — - STATION LIMITS
⇦ - TRAFFIC FLOW

NOTES

1. SEE PM(1-3)-20 & PM(4)-22 FOR STANDARD PAVEMENT MARKINGS & MARKERS PLACEMENT DETAILS.
2. ELIMINATE CONFLICTING STRIPING PRIOR TO INSTALLING PROPOSED STRIPING.
3. INSTALL PAVEMENT MARKINGS AS SHOWN ON LAYOUTS/PLANS.

N

LOCATION 4
SH 4 @ FM 511
CSJ 0039-10-088

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 4 SH 4 @ FM 511 PAVEMENT MARKINGS

SCALE: 1" = 60' SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		44

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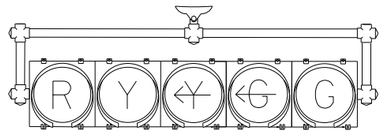
NOTES

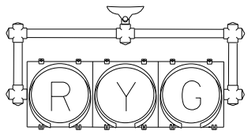
1. ALL EXISTING CONDUIT AND BORINGS ARE TO REMAIN IN PLACE AS SHOWN.
2. WHEN REMOVING EXISTING PAVEMENT MARKINGS, SUCH AS CROSSWALKS OR PREFABRICATED SYMBOLS, APPLY THE BLASTING OR MECHANICAL METHOD AS STATED IN THE 2014 TxDOT SPECIFICATIONS MANUAL, ITEM 677 ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS.
3. THE REMOVAL OF EXISTING INTERSECTION ELEMENTS SUCH AS EXISTING OVERHEAD SIGNS, EXISTING PEDESTRIAN PUSH BUTTONS & SIGNALS WILL BE SUBSIDIARY TO ITEM 680.

EXISTING 12" HORIZONTAL



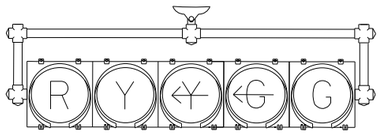
SIGNAL w/BACKLATES NO. 3 TO BE REMOVED

EXISTING 12" HORIZONTAL



SIGNAL w/BACKPLATES NO. 4, 5, 9 & 10 TO BE REMOVED

EXISTING 12" HORIZONTAL



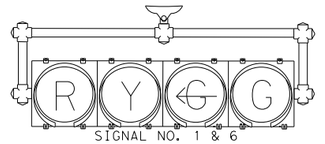
SIGNAL NO. 8 TO BE REMOVED

EXISTING BACK LOOP DETECTORS TO BE ABANDONED

PROTECTED LEFT ON GREEN ARROW

EXISTING SIGN TO BE REMOVED S1

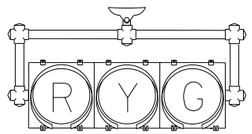
EXISTING 12" HORIZONTAL



SIGNAL NO. 1 & 6 TO BE REMOVED

LIMIT FOR PAVEMENT MARKINGS

EXISTING 12" HORIZONTAL



SIGNAL NO. 2 & 7 TO BE REMOVED

FORDYCE HIKING TRAIL

VACANT LAND

EXISTING SIGNAL POLE NO. 2 w/ELECTRICAL SERVICE TO REMAIN IN PLACE. REPLACE PED HEAD.

EXISTING GROUND MOUNTED CONTROLLER TO BE REMOVED.

EXISTING CROSSWALK TO BE REMOVED (TYP.)

EXISTING SIGNAL POLE NO. 3 TO REMAIN IN PLACE. REPLACE PED HEADS & LUMINAIRE

EXISTING BACK LOOP DETECTORS TO BE ABANDONED (TYP.)

LIMIT FOR PAVEMENT MARKINGS (500 LF)

EXISTING E.O.P.

200' R.O.W.

100' R.O.W.

CREEK

10' 12' 12' 12' 12' 8'

230 LF

FM 3167

US 83

12' 12' 13' 12' 12'

EXISTING E.O.P. (TYP.)

U (TYP.)

S (TYP.)

EXISTING SIGNAL POLE NO. 1 TO REMAIN IN PLACE. REPLACE LUMINAIRE.

EXISTING SIGNAL POLE NO. 4 TO REMAIN IN PLACE. REPLACE PED HEAD & LUMINAIRE

LIMIT FOR PAVEMENT MARKINGS (500 LF)

CITIZENS STATE BANK

STRIPES GAS STATION

32'

LEGEND

- EXISTING PEDESTRIAN HEADS
- EXISTING 12" SPAN WIRE MOUNTED TRAFFIC SIGNAL HEADS
- EXIST. MAST ARM ASSEMBLY W/12" HORIZONTAL SIGNAL HEADS
- EXISTING GROUND BOX TYPE A
- EXISTING FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- EXISTING LOOP DETECTOR
- EXISTING VIVDS
- EXISTING ELECTRICAL SERVICE
- EXISTING CONDUIT (SIZE & TYPE AS SPECIFIED)
- EXISTING BORE (SIZE & TYPE AS SPECIFIED)
- EXISTING LUMINAIRE
- EXIST. OVERHEAD SIGN
- EXIST. ANTENNA
- TRAFFIC FLOW DIRECTION
- R.O.W. - RIGHT OF WAY
- E.O.P. - EDGE OF PAVEMENT
- TYP. - TYPICAL

N

LOCATION 5
US 83 @ FM 3167
CSJ 0038-07-081

REMOVAL QUANTITIES

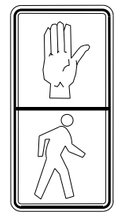
ITEM	CODE	DESCRIPTION	UNIT	QTY.
610	6102	REPLACE LUMINAIRE W/LED (250W EQ)	EA	3
680	6004	REMOVING TRAFFIC SIGNALS	EA	1
680	****	REMOVAL OF EXISTING OVERHEAD SIGNS	EA	1
680	****	REMOVAL OF EXISTING GROUND MOUNTED CONTROLLER	EA	1
680	****	REMOVAL OF EXISTING PEDESTRIAN SIGNALS	EA	4
680	****	REMOVAL OF EXISTING PED DETECT PUSH BUTTONS	EA	4

**** QUANTITIES SHOWN ARE FOR CONTRACTORS INFORMATION ONLY. THESE ITEMS ARE SUBSIDIARY TO VARIOUS OTHER ITEMS.

PAVEMENT MARKINGS REMOVAL QUANTITIES

LEGEND	ITEM	CODE	DESCRIPTION	UNIT	QTY.
Q	677	6005	ELIM EXT PAV MRK & MRKS (12")	LF	420
R	677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	145
S	677	6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	8
T	677	6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA	2
U	677	6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	6

EXISTING R10-4BL SIGN & PEDESTRIAN PUSH BUTTON TO BE REMOVED W2 & W4



PEDESTRIAN SIGNALS TO BE REMOVED W1 THRU W4

EXISTING R10-4BR SIGN & PEDESTRIAN PUSH BUTTON TO BE REMOVED W1 & W3

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 5 US 83 @ FM 3167 CONDITION LAYOUT

SCALE: 1"=60' SHEET 1 OF 1

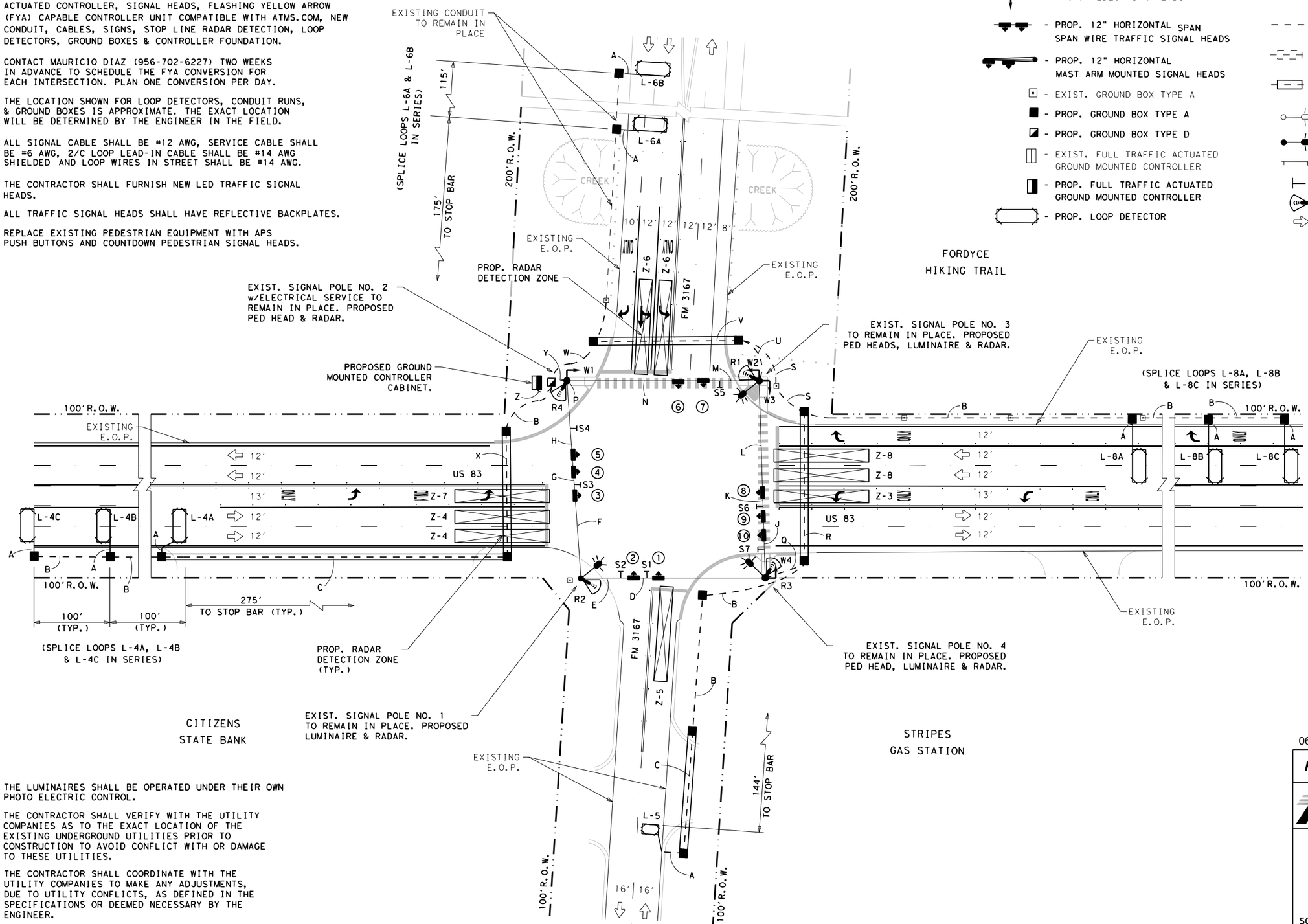
© 2022	CONT	SECT	JOB	HIGHWAY
DSn: CKn:	1586	01	089, ETC.	FM 907, ETC.
	DIST	COUNTY		SHEET NO.
DWn: CKn:	PHR	HIDALGO, ETC.		45

NOTES

1. THE CONTRACTOR SHALL FURNISH AND INSTALL A FULL TRAFFIC ACTUATED CONTROLLER, SIGNAL HEADS, FLASHING YELLOW ARROW (FYA) CAPABLE CONTROLLER UNIT COMPATIBLE WITH ATMS.COM, NEW CONDUIT, CABLES, SIGNS, STOP LINE RADAR DETECTION, LOOP DETECTORS, GROUND BOXES & CONTROLLER FOUNDATION.
2. CONTACT MAURICIO DIAZ (956-702-6227) TWO WEEKS IN ADVANCE TO SCHEDULE THE FYA CONVERSION FOR EACH INTERSECTION. PLAN ONE CONVERSION PER DAY.
3. THE LOCATION SHOWN FOR LOOP DETECTORS, CONDUIT RUNS, & GROUND BOXES IS APPROXIMATE. THE EXACT LOCATION WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.
4. ALL SIGNAL CABLE SHALL BE #12 AWG, SERVICE CABLE SHALL BE #6 AWG, 2/C LOOP LEAD-IN CABLE SHALL BE #14 AWG SHIELDED AND LOOP WIRES IN STREET SHALL BE #14 AWG.
5. THE CONTRACTOR SHALL FURNISH NEW LED TRAFFIC SIGNAL HEADS.
6. ALL TRAFFIC SIGNAL HEADS SHALL HAVE REFLECTIVE BACKPLATES.
7. REPLACE EXISTING PEDESTRIAN EQUIPMENT WITH APS PUSH BUTTONS AND COUNTDOWN PEDESTRIAN SIGNAL HEADS.

LEGEND

- PROP. PEDESTRIAN HEADS
- PROP. 12" HORIZONTAL SPAN SPAN WIRE TRAFFIC SIGNAL HEADS
- PROP. 12" HORIZONTAL MAST ARM MOUNTED SIGNAL HEADS
- EXIST. GROUND BOX TYPE A
- PROP. GROUND BOX TYPE A
- PROP. GROUND BOX TYPE D
- EXIST. FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- PROP. FULL TRAFFIC ACTUATED GROUND MOUNTED CONTROLLER
- PROP. LOOP DETECTOR
- EXIST. CONDUIT (SIZE & TYPE AS SPECIFIED)
- PROP. CONDUIT (SIZE & TYPE AS SPECIFIED)
- EXIST. BORE (SIZE & TYPE AS SPECIFIED)
- PROP. BORE (SIZE & TYPE AS SPECIFIED)
- EXIST. LUMINAIRE
- PROP. LUMINAIRE
- EXIST. OVERHEAD SIGN
- PROP. OVERHEAD SIGN
- PROP. STOP LINE RADAR
- TRAFFIC FLOW DIRECTION



8. THE LUMINAIRES SHALL BE OPERATED UNDER THEIR OWN PHOTO ELECTRIC CONTROL.
9. THE CONTRACTOR SHALL VERIFY WITH THE UTILITY COMPANIES AS TO THE EXACT LOCATION OF THE EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICT WITH OR DAMAGE TO THESE UTILITIES.
10. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO MAKE ANY ADJUSTMENTS, DUE TO UTILITY CONFLICTS, AS DEFINED IN THE SPECIFICATIONS OR DEEMED NECESSARY BY THE ENGINEER.
11. THE CONTRACTOR SHALL ENSURE THAT ALL THE TRAFFIC SIGNAL HEADS AND SIGNAL EQUIPMENT IS FULLY CONNECTED AND FUNCTIONAL AS SPECIFIED ON ITEM 680.

LOCATION 5
US 83 @ FM 3167
CSJ 0038-07-081

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 5 US 83 @ FM 3167 PROPOSED LAYOUT

SCALE: 1"=60' SHEET 1 OF 2

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089, ETC.	FM 907, ETC.
DW: CK:	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC.		46

DATE: 6/30/2022 3:38:10 PM
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ELECTRICAL CHART

ITEM	TOTAL QTY.	RUN NUMBER	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	U	V	W	X	Y	Z
		RUN LENGTH (FT)	85	1015	300	20	40	65	15	60	35	35	75	40	85	35	30	100	70	35	95	40	85	10	15
POWER		1/C-#6																							
		1/C-#8																							
GROUND		1/C-#6 BARE																							
	1215′	1/C-#8 BARE		1													1		1	1		1		1	1
SIGNAL CABLE	745′	2/C-#12															1	1	1	2	3	3		1	4
	640′	4/C-#12 TRAY						1	1	1	1	1	1	2	2	3									
	1545′	5/C-#12					1	1	1	2		1	1	1	2	4	1	1	1	2	3	3		5	8
	800′	7/C-#12				1	1	1	2	2			1	1	2	4								4	4
	775′	RVDS CABLE						1	1	1	1	1	1	2	2	4								4	4
LOOP	170′	1/C-#14 LOOP WIRE	2																						
	1710′	2/C-#14 (SHIELDED)		1														1	2		2	3	1		4
CONDUIT	85′	1" PVC	1																						
	1190′	2" PVC		1													1		1	1		1			
	300′	2" PVC BORE			1																				
	25′	4" PVC																						1	1
	280′	4" PVC BORE																1			1		1		
		2" RMC PIPE																							

TOTAL QUANTITIES INCLUDE QUANTITIES IN POLES.

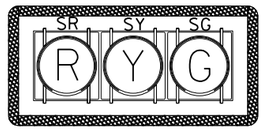
RADAR DETECTION CHART

RADAR/ DETECTION ZONE	DETECTOR RACK NO.	SETTING	FUNCTION	DELAY TIMING
R-1/Z-6	1/2	PRESENCE	CALL & EXTEND Ø6	
R-2/Z-5	3/4	PRESENCE	CALL & EXTEND Ø5	
R-3/Z-3, Z-8	5/6	PRESENCE	CALL & EXTEND Ø3 & Ø8	
R-4/Z-4, Z-7	7/8	PRESENCE	CALL & EXTEND Ø4 & Ø7	
TOTAL:				

LOOP DETECTOR CHART

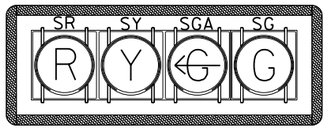
LOOP	SIZE	WIRE LENGTH	SAW CUT	AMPLIFIER NO.	SETTING	FUNCTION
L-4A	6′x20′	178′	63′	4	PRESENCE	CALL & EXTEND Ø4
L-4B	6′x20′	172′	60′	4	PRESENCE	CALL & EXTEND Ø4
L-4C	6′x20′	172′	60′	4	PRESENCE	CALL & EXTEND Ø4
L-5	6′x10′	118′	43′	5	PRESENCE	CALL & EXTEND Ø5
L-6A	6′x20′	170′	59′	6	PRESENCE	CALL & EXTEND Ø6
L-6B	6′x20′	170′	59	6	PRESENCE	CALL & EXTEND Ø6
L-8A	6′x20′	196′	72′	8	PRESENCE	CALL & EXTEND Ø8
L-8B	6′x20′	196′	72′	8	PRESENCE	CALL & EXTEND Ø8
L-8C	6′x20′	196′	72′	8	PRESENCE	CALL & EXTEND Ø8
TOTAL:		1,568′	560′			

PROPOSED 12" HORIZONTAL



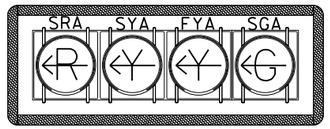
LED SIGNAL NO. 2, 4, 5, 7, 9
& 10 WITH REFLECTIVE BACKPLATES

PROPOSED 12" HORIZONTAL

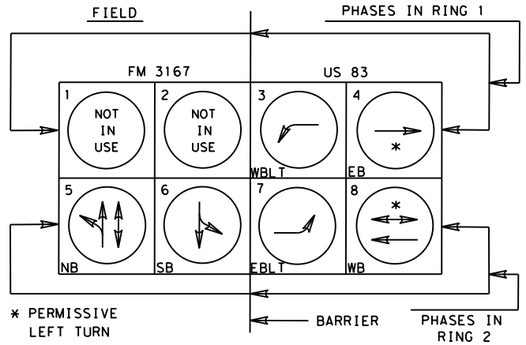


LED SIGNAL NO. 1 & 6
WITH REFLECTIVE BACKPLATES

PROPOSED 12" HORIZONTAL



LED SIGNAL NO. 3 & 8
WITH REFLECTIVE BACKPLATES



PHASING DIAGRAM

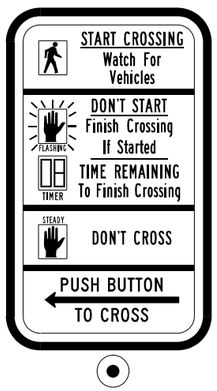
TIMING CHART

PHASE	1	2	3	4	5	6	7	8
STREET	FM 3167		US 83		FM 3167		US 83	
MOVEMENT	SBLT	NB	WBLT	EB	NB	SB	EBLT	WB
MIN. GREEN			8	15	10	10	8	15
EXTENSION			2	2	2	2	2	2
MAX. GREEN			15	40	25	25	15	40
YELLOW			4	4	4	4	5	4
ALL RED			1.9	2.1	1.8	1.8	1.7	2.1
WALK			-	-	7	-	-	7
DON'T WALK			-	-	22	-	-	20
RECALL	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
MEMORY	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON

NOTE: IF EXISTING PHASING & TIMING VARY FROM THE ONES BEING PROPOSED, EXISITNG PHASING & TIMING TO REMAIN. PLEASE CONTACT MAURICIO DIAZ (956)702-6227 PRIOR TO INPUTING INTO CONTROLLER.

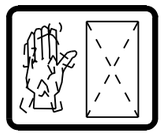
SIGNAL HEAD ARRANGEMENT

PROPOSED 9"x15"



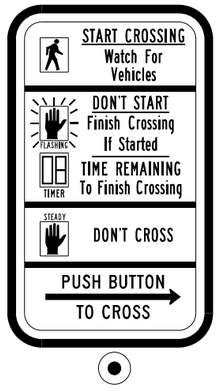
R10-3eL SIGN WITH
PEDESTRIAN PUSH
BUTTON INSTALLED
ON SIGNAL POLES
W2 & W4

PROPOSED 18"x16"



LED PEDESTRIAN
SIGNALS WITH COUNTDOWN
W1 THRU W4

PROPOSED 9"x15"



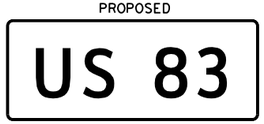
R10-3eR SIGN WITH
PEDESTRIAN PUSH
BUTTON INSTALLED
ON SIGNAL POLES
W1 & W3

PEDESTRIAN ELEMENTS

PROPOSED

D3-1G
(66"x18")
S4 & S7
(FOR SIGN DETAILS
SEE SHEET 107)

PROPOSED

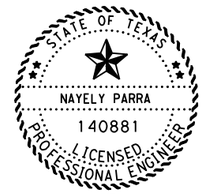


D3-1G
(48"x18")
S2 & S5
(FOR SIGN DETAILS
SEE SHEET 107)

PROPOSED

R10-17T
(36"x42")
S1, S3 & S6

OVERHEAD SIGNS



06.30.2022

Pharr District Traffic Operations

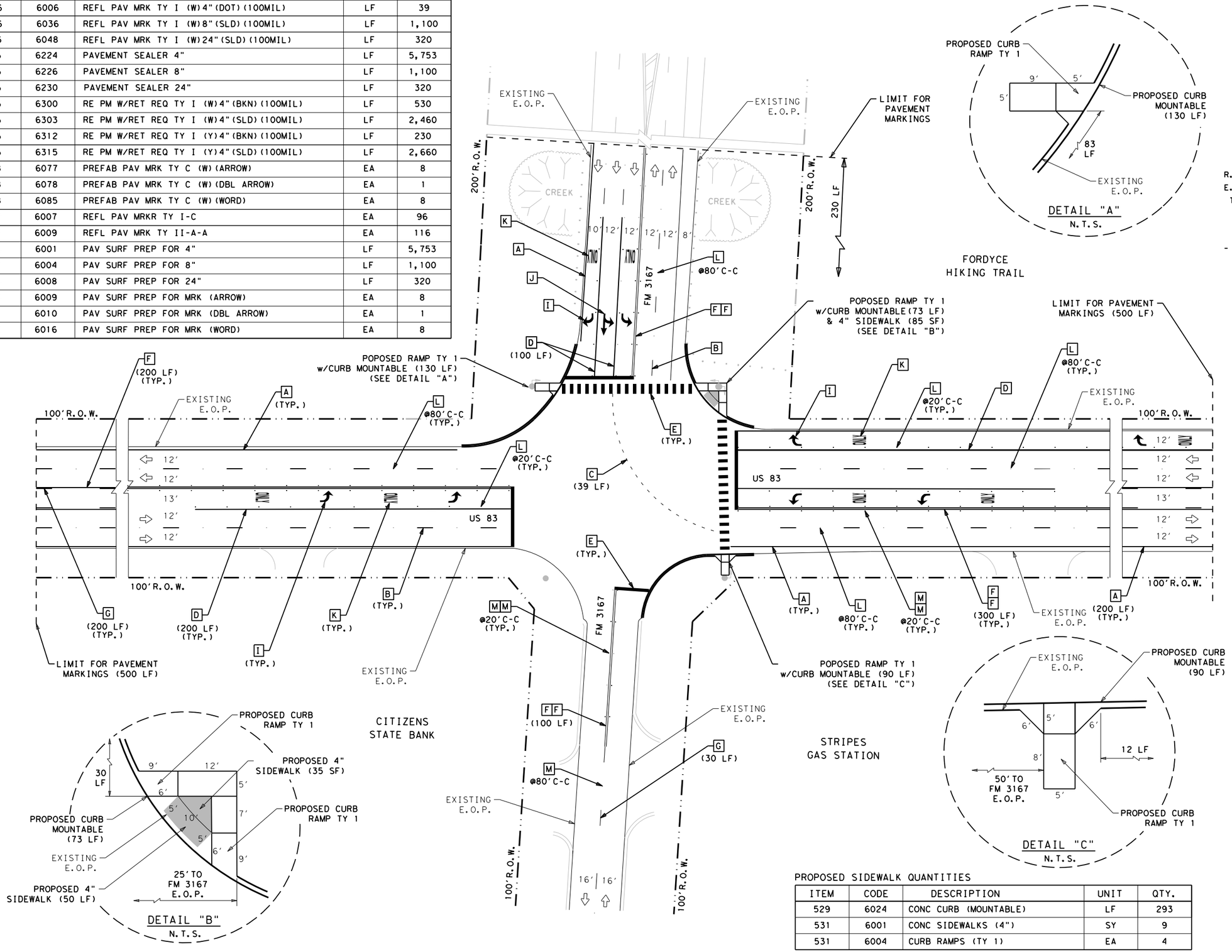
Texas Department of Transportation

LOCATION 5
US 83 @
FM 3167
PROPOSED LAYOUT

SCALE: 1"=60′ SHEET 2 OF 2

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089, ETC.	FM 907, ETC.
DW: CK:	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC.		47

ITEM	CODE	DESCRIPTION	UNIT	QTY.
666	6006	REFL PAV MRK TY I (W)4"(DOT)(100MIL)	LF	39
666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1,100
666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	320
666	6224	PAVEMENT SEALER 4"	LF	5,753
666	6226	PAVEMENT SEALER 8"	LF	1,100
666	6230	PAVEMENT SEALER 24"	LF	320
666	6300	RE PM W/RET REQ TY I (W)4"(BKN)(100MIL)	LF	530
666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	2,460
666	6312	RE PM W/RET REQ TY I (Y)4"(BKN)(100MIL)	LF	230
666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	2,660
668	6077	PREFAB PAV MRK TY C (W)(ARROW)	EA	8
668	6078	PREFAB PAV MRK TY C (W)(DBL ARROW)	EA	1
668	6085	PREFAB PAV MRK TY C (W)(WORD)	EA	8
672	6007	REFL PAV MRKR TY I-C	EA	96
672	6009	REFL PAV MRK TY II-A-A	EA	116
678	6001	PAV SURF PREP FOR 4"	LF	5,753
678	6004	PAV SURF PREP FOR 8"	LF	1,100
678	6008	PAV SURF PREP FOR 24"	LF	320
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	8
678	6010	PAV SURF PREP FOR MRK (DBL ARROW)	EA	1
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	8



LEGEND:

- A - (W) 4" SLD
- B - (W) 4" BRK
- C - (W) 4" DOT
- D - (W) 8" SLD
- E - (W) 24" SLD
- F - (Y) 4" SLD
- G - (Y) 4" BRK
- H - (Y) 12" SLD
- I - (W) TY C (ARROW)
- J - (W) TY C (DBL ARROW)
- K - (W) TY C (WORD)
- L - REFL PAV MRK TY I-C
- M - REFL PAV MRK TY II A-A

R.O.W.- RIGHT OF WAY
E.O.P.- EDGE OF PAVEMENT
TYP. - TYPICAL
C-C - CENTER TO CENTER
@ - AT
w/ - WITH
- - - - STATION LIMITS
⇦ - TRAFFIC FLOW

NOTES
1. SEE PM(1-3)-20 & PM(4)-22 FOR STANDARD PAVEMENT MARKINGS & MARKERS PLACEMENT DETAILS.
2. ELIMINATE CONFLICTING STRIPING PRIOR TO INSTALLING PROPOSED STRIPING.
3. INSTALL PAVEMENT MARKINGS AS SHOWN ON LAYOUTS/PLANS.

N

LOCATION 5
US 83 @ FM 3167
CSJ 0038-07-081

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

PROPOSED SIDEWALK QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QTY.
529	6024	CONC CURB (MOUNTABLE)	LF	293
531	6001	CONC SIDEWALKS (4")	SY	9
531	6004	CURB RAMPS (TY 1)	EA	4

Pharr District Traffic Operations

Texas Department of Transportation

LOCATION 5 US 83 @ FM 3167 PAVEMENT MARKINGS

SCALE: 1"=60' SHEET 1 OF 1

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089,ETC.	FM 907,ETC.
DW: CK:	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		48

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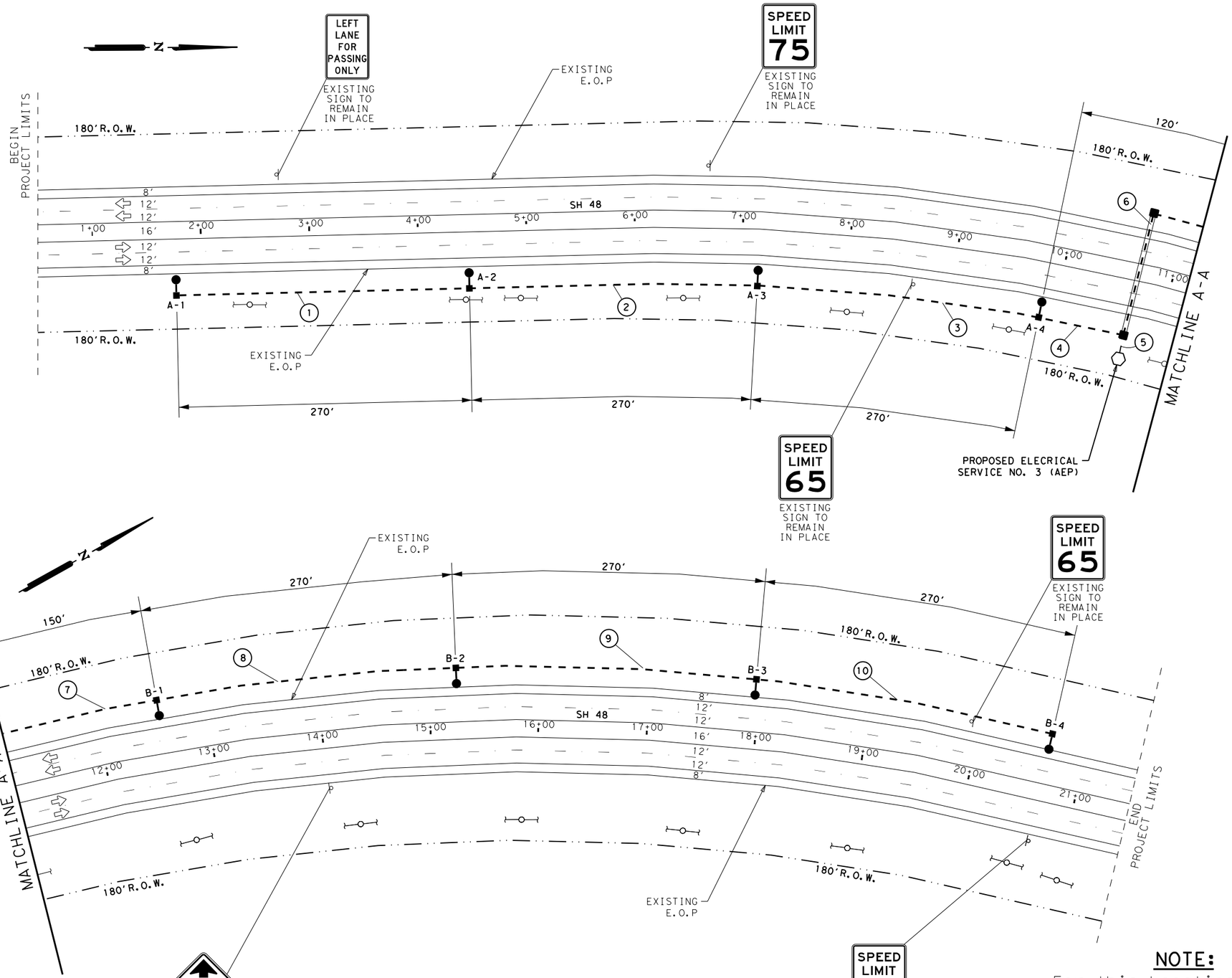

LEGEND

A-1	- DENOTES FIXTURE ID FOR RDWY ILLUM. ASSEM.
(1)	- DENOTES RUN NUMBER FOR CONDUIT AND CONDUCTOR RUNS
	- RDWY. ILLUM. ASSEM. GROUND MOUNTED (TY ST 50 T-12) (400W EQ) LED
	- ELEC SERV TY A (240/480) 060 (SS) SS (T) TP (O)
	- 2" SCH 40 PVC CONDUIT (TRENCHED)
	- 2" SCH 80 PVC CONDUIT (BORE)
	- GROUND BOX (TY A) (122311) WITH APRON FLUSH WITH GRADE
	- EXIST. LUMINAIRE
	- EXIST. POWER POLE (PP)
	- EXIST. SIGN
— —SS— —	- EXIST. STORM SEWER
— -FOC —	- FIBER OPTIC CABLE
— —G— —	- GAS
— —W— —	- WATER
M	- WATER METER
MH	- STORM SEWER MANHOLE (MH)
RCP	- REINF. CONC. PIPE
x—x—x—x—x	- FENCE
	- WATER VALVE
	- FIRE HYDRANT
SAN SEW	- EXIST. SANITARY SEWER
— —E— —	- EXIST. UNDERGROUND ELECTRICAL
	- TRAFFIC FLOW DIRECTION
R.O.W.	- RIGHT OF WAY
E.O.P.	- EDGE OF PAVEMENT
TYP.	- TYPICAL

PROPOSED SAFETY LIGHTING

SH 48
6,045 FT S. OF SH 100
TO 4,300 FT S. OF SH 100
CAMERON COUNTY
CSJ 0220-07-067

NOTE:

For this Location ONLY, Contractor shall furnish & install LED lighting fixtures with a color temperature of **3000K**. These fixtures shall abide by TxDOT's Material Specification DMS-11011 & be obtained from one of the producers/manufacturers approved on TxDOT's Material Producer List (MPL).

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED
PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Opertations

Texas Department of Transportation

LOCATION 6
SH 48
PROPOSED SAFETY LIGHTING

SCALE: 1"=100' SHEET 1 OF 2

© 2022	CONT	SECT	JOB	HIGHWAY
DS: CK:	1586	01	089, ETC.	FM 907, ETC.
	DIST	COUNTY		SHEET NO.
DW: CK:	PHR	HIDALGO, ETC.		49

DATE: 6/30/2022 3:38:37 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\8. Traffic\Safety Illumination\LOC 6 SH 48

CONDUIT AND CONDUCTOR RUNS (FEET)					
		GROUND/CONDUCTOR SIZE AND LENGTH		CONDUIT SIZE AND LENGTH	
		#6 BARE	#6 XHHW	2" PVC (SCH 40)	2" PVC (SCH 80) BORE
ITEM NO.		620	620	618	618
CIRCUIT	RUN NO.				
A	1	290	2-290	290	
A	2	290	2-290	290	
A	3	290	2-290	290	
A	4	90	2-90	90	
A&B	5	2-20	4-20	20	
B	6	120	2-120		120
B	7	290	2-290	290	
B	8	290	2-290	290	
B	9	290	2-290	290	
B	10	290	2-290	290	
TOTAL		2,280	4,560	2,140	120

ROADWAY ILLUMINATION ASSEMBLY SHEET SUMMARY					
FIXTURE	STATION	LOCATION	WATT	TYPE	STANDARD TYPE
A-1	01+76.41	15 FT RIGHT OF PAVEMENT EDGE	400	LED	(TY ST)50T-12(400W EQ) LED
A-2	04+46.41	15 FT RIGHT OF PAVEMENT EDGE	400	LED	(TY ST)50T-12(400W EQ) LED
A-3	07+16.41	15 FT RIGHT OF PAVEMENT EDGE	400	LED	(TY ST)50T-12(400W EQ) LED
A-4	09+86.41	15 FT RIGHT OF PAVEMENT EDGE	400	LED	(TY ST)50T-12(400W EQ) LED
B-1	12+56.41	15 FT LEFT OF PAVEMENT EDGE	400	LED	(TY ST)50T-12(400W EQ) LED
B-2	15+26.41	15 FT LEFT OF PAVEMENT EDGE	400	LED	(TY ST)50T-12(400W EQ) LED
B-3	17+96.41	15 FT LEFT OF PAVEMENT EDGE	400	LED	(TY ST)50T-12(400W EQ) LED
B-4	20+66.41	15 FT LEFT OF PAVEMENT EDGE	400	LED	(TY ST)50T-12(400W EQ) LED

SUMMARY OF ILLUMINATION QUANTITIES				
SHEET TOTAL				
ITEM	DESC	DESCRIPTION	UNITS	TOTAL
416	6029	DRILL SHAFT (RDWY ILL POLE)(30 IN)	LF	80
432	6009	RIPRAP (CONC)(CL B)(4")	CY	3
610	6322	IN RD IL (TY ST) 50T-12 (400W EQ) LED	EA	8
618	6023	CONDT (PVC) (SCHD 40) (2")	LF	2,140
618	6047	CONDT (PVC) (SCHD 80) (2") (BORE)	LF	120
620	6009	ELEC CONDR (NO. 6) BARE	LF	2,280
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	4,560
624	6002	GROUND BOX TY A (122311) W/APRON	EA	2
628	6089	ELEC SERV TY A (240/480) 100 (SS) SS (T) TP (O)	EA	1

NOTES

1. THE INSTALLATION OF THE SAFETY LIGHTING FOR THIS LOCATION SHALL BE CONDUCTED AND COMPLETED BETWEEN THE MONTHS OF MAY 2023 TO JULY 2023.
2. THE CONTRACTOR SHALL FURNISH & INSTALL LUMINAIRES, POLES, CONDUIT AND CIRCUIT WIRE RUNS AS SHOWN.
3. THE LOCATIONS FOR LUMINAIRE POLES IS APPROXIMATE. THE EXACT LOCATION WILL BE DETERMINED IN THE FIELD BY THE ENGINEER IN COORDINATION WITH THE PHARR DISTRICT SIGNAL SHOP.
4. FOUNDATION DEPTHS ARE 10 FEET.
5. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ANY UNDERGROUND UTILITIES BEFORE DRILLING FOR LUMINAIRE POLE FOUNDATIONS AND SERVICE POLES.
6. ALL ELECTRICAL CIRCUIT RUNS SHALL BE #6 AWG. ALL SERVICE CABLE SHALL BE #6 AWG.
7. ARRANGE FOR AND COOPERATE WITH THE UTILITY COMPANY TO PROVIDE ELECTRICAL POWER FOR THE SERVICE SHOWN AND AS REQUIRED BY THE PLANS. A METER WILL BE REQUIRED ON ALL ELECTRICAL SERVICES.

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Opertations

Texas Department of Transportation

LOCATION 6
SH 48
PROPOSED SAFETY LIGHTING

SCALE: 1"=100' SHEET 2 OF 2

© 2022		CONT	SECT	JOB	HIGHWAY
DSn:	CKn:	1586	01	089,ETC.	FM 907,ETC.
		DIST	COUNTY		SHEET NO.
DWn:	CKn:	PHR	HIDALGO,ETC.		50

DATE: 6/30/2022 3:38:39 PM
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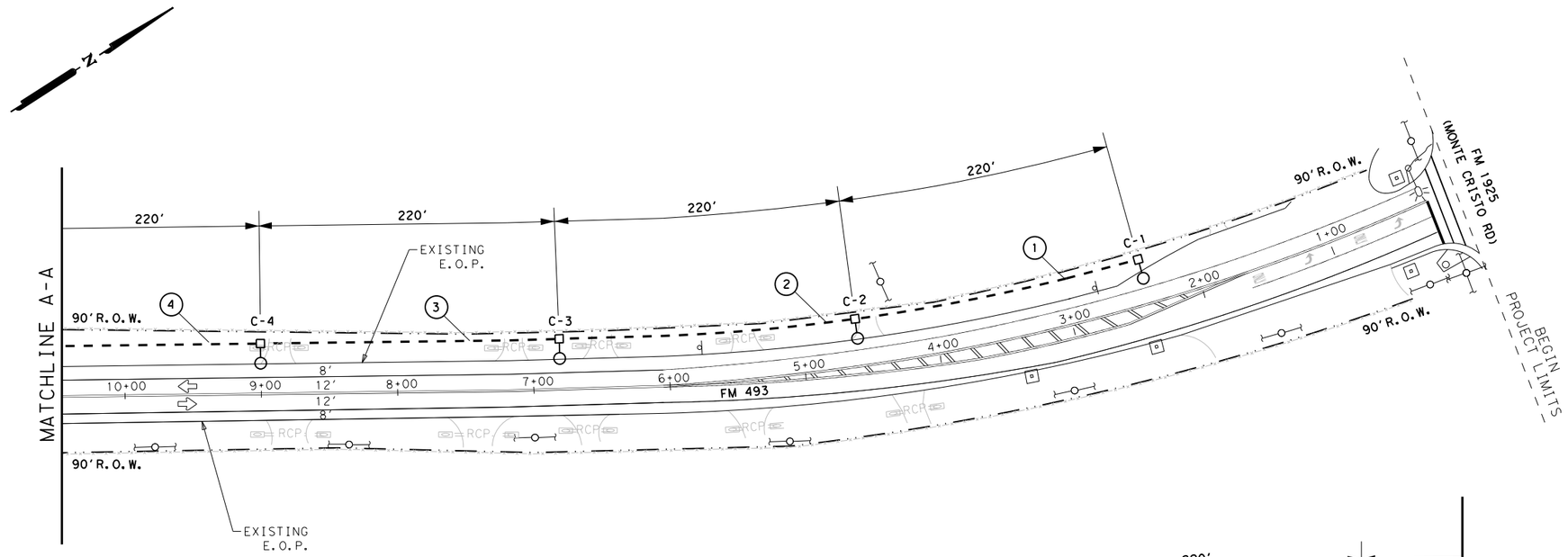

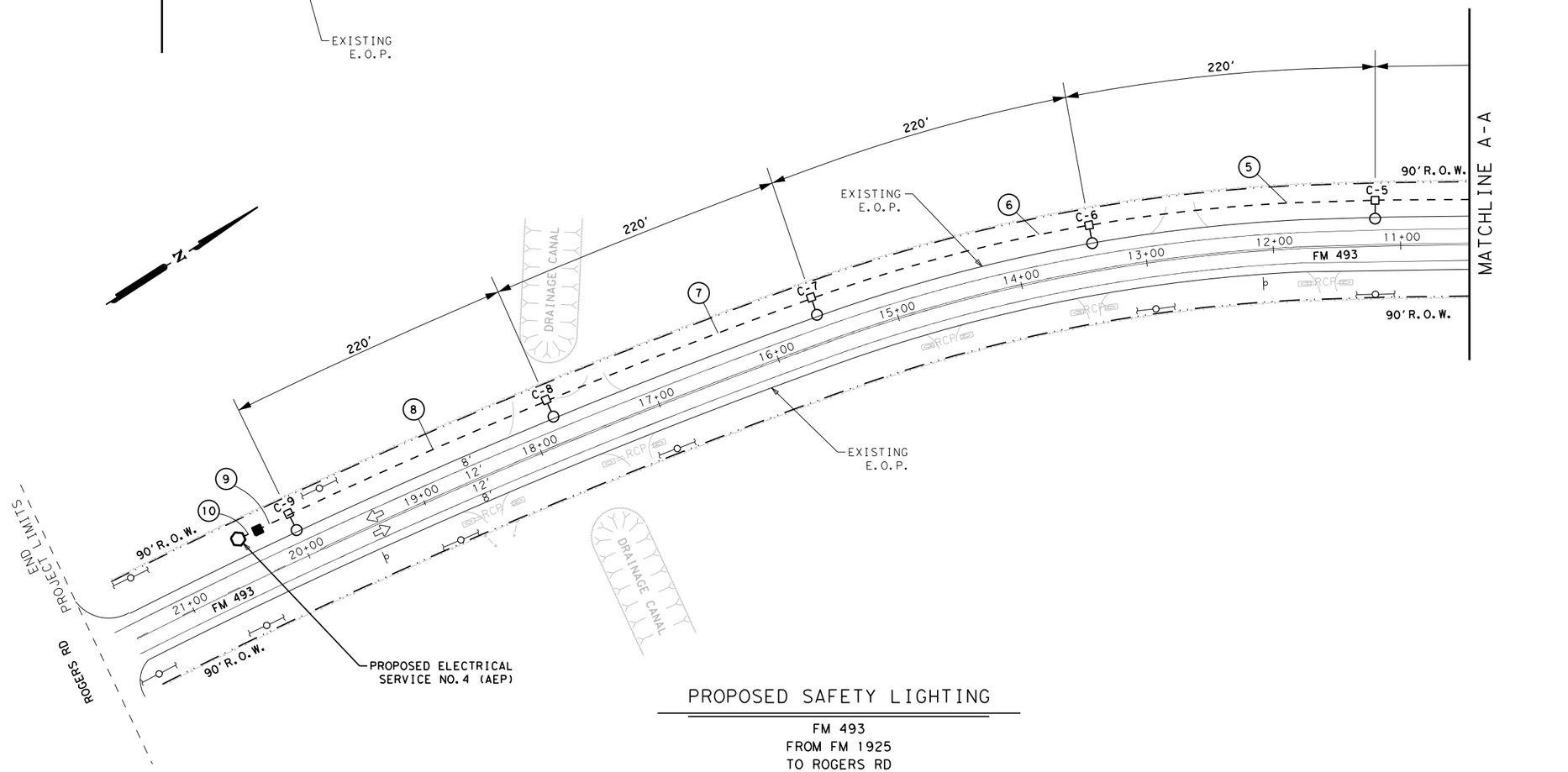

LEGEND

A-1	- DENOTES FIXTURE ID FOR RDWY ILLUM. ASSEM.
(1)	- DENOTES RUN NUMBER FOR CONDUIT AND CONDUCTOR RUNS
	- RDWY. ILLUM. ASSEM. GROUND MOUNTED (TY ST 40 T-8) (250 W) LED
	- ELEC SERV TY A (240/480) 060 (SS) SS (T) TP (O)
	- 2" SCH 40 PVC CONDUIT (TRENCHED)
	- 2" SCH 80 PVC CONDUIT (BORE)
	- GROUND BOX (TY A) (122311) WITH APRON FLUSH WITH GRADE
	- EXIST. LUMINAIRE
	- EXIST. POWER POLE (PP)
	- EXIST. SIGN
- -SS- -	- EXIST. STORM SEWER
- .FOC -	- FIBER OPTIC CABLE
- -G- -	- GAS
- -W- -	- WATER
M	- WATER METER
(MH)	- STORM SEWER MANHOLE (MH)
RCP	- REINF. CONC. PIPE
x-x-x-x-x	- FENCE
	- WATER VALVE
	- FIRE HYDRANT
SAN SEW	- EXIST. SANITARY SEWER
- -E- -	- EXIST. UNDERGROUND ELECTRICAL
	- TRAFFIC FLOW DIRECTION
R.O.W.	- RIGHT OF WAY
E.O.P.	- EDGE OF PAVEMENT
TYP.	- TYPICAL

PROPOSED SAFETY LIGHTING

FM 493
FROM FM 1925
TO ROGERS RD
HIDALGO COUNTY
CSJ 0863-03-040

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Opertations

Texas Department of Transportation

LOCATION 7
FM 493
PROPOSED SAFETY LIGHTING

SCALE: 1"=100' SHEET 1 OF 2

© 2022	CONT	SECT	JOB	HIGHWAY
DSn: CKn:	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
DWn: CKn:	PHR	HIDALGO,ETC.		51

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CONDUIT AND CONDUCTOR RUNS (FEET)				
		GROUND/CONDUCTOR SIZE AND LENGTH		CONDUIT SIZE AND LENGTH
		#6 BARE	#6 XHHW	2" PVC (SCH 40)
ITEM NO.		620	620	618
CIRCUIT	RUN NO.			
C	1	240	2-240	240
C	2	240	2-240	240
C	3	240	2-240	240
C	4	240	2-240	240
C	5	240	2-240	240
C	6	240	2-240	240
C	7	240	2-240	240
C	8	240	2-240	240
C	9	30	2-30	30
C	10	15	2-15	15
TOTAL		1,965	3,930	1,965

ROADWAY ILLUMINATION ASSEMBLY SHEET SUMMARY					
FIXTURE	STATION	LOCATION	WATT	TYPE	STANDARD TYPE
C-1	02+40	15 FT RIGHT OF PAVEMENT EDGE	250	LED	(TY ST)40T-12(400W EQ) LED
C-2	04+60	15 FT RIGHT OF PAVEMENT EDGE	250	LED	(TY ST)40T-12(400W EQ) LED
C-3	06+80	15 FT RIGHT OF PAVEMENT EDGE	250	LED	(TY ST)40T-12(400W EQ) LED
C-4	09+00	15 FT RIGHT OF PAVEMENT EDGE	250	LED	(TY ST)40T-12(400W EQ) LED
C-5	11+20	15 FT RIGHT OF PAVEMENT EDGE	250	LED	(TY ST)40T-12(400W EQ) LED
C-6	13+40	15 FT RIGHT OF PAVEMENT EDGE	250	LED	(TY ST)40T-12(400W EQ) LED
C-7	15+60	15 FT RIGHT OF PAVEMENT EDGE	250	LED	(TY ST)40T-12(400W EQ) LED
C-8	17+80	15 FT RIGHT OF PAVEMENT EDGE	250	LED	(TY ST)40T-12(400W EQ) LED
C-9	20+00	15 FT RIGHT OF PAVEMENT EDGE	250	LED	(TY ST)40T-12(400W EQ) LED

SUMMARY OF ILLUMINATION QUANTITIES				
SHEET TOTAL				
ITEM	DESC	DESCRIPTION	UNITS	TOTAL
416	6029	DRILL SHAFT (RDWY ILL POLE)(30 IN)	LF	90
432	6009	RIPRAP (CONC)(CL B)(4")	CY	4
610	6214	IN RD IL (TY SA) 40T-8 (250W EQ) LED	EA	9
618	6023	CONDT (PVC) (SCHD 40) (2")	LF	1,965
620	6009	ELEC CONDR (NO. 6) BARE	LF	1,965
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	3,930
624	6002	GROUND BOX TY A (122311) W/APRON	EA	1
628	6089	ELEC SERV TY A (240/480) 100 (SS) SS (T) TP (O)	EA	1

NOTES

1. THE CONTRACTOR SHALL FURNISH & INSTALL LUMINAIRES, POLES, CONDUIT AND CIRCUIT WIRE RUNS AS SHOWN.
2. THE LOCATIONS FOR LUMINAIRE POLES IS APPROXIMATE. THE EXACT LOCATION WILL BE DETERMINED IN THE FIELD BY THE ENGINEER IN COORDINATION WITH THE PHARR DISTRICT SIGNAL SHOP.
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Pharr District Traffic Opertations

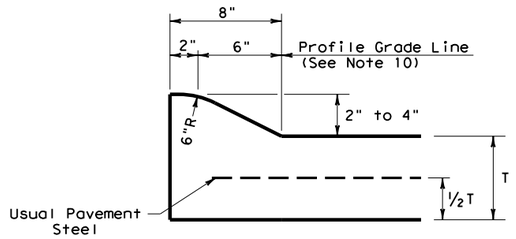
Texas Department of Transportation

LOCATION 7
FM 493
PROPOSED SAFETY LIGHTING

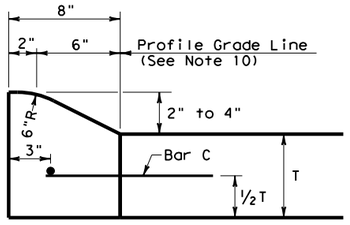
SCALE: 1"=100' SHEET 2 OF 2

© 2022	CONT	SECT	JOB	HIGHWAY
DSn: ___ CKn: ___	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
DWn: ___ CKn: ___	PHR	HIDALGO,ETC.		52

DATE:
FILE:



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



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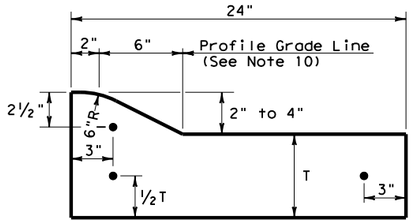
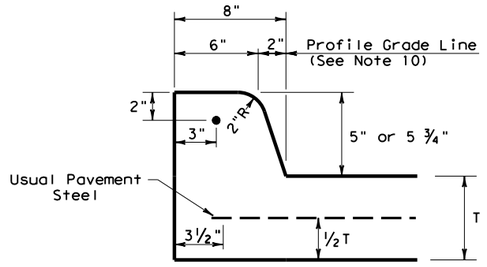
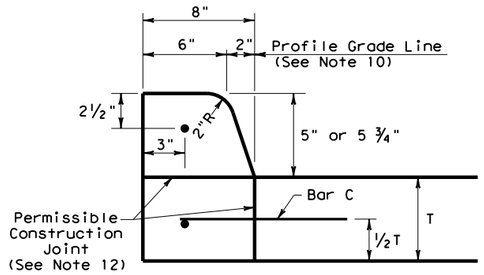
2" - 4" HEIGHT



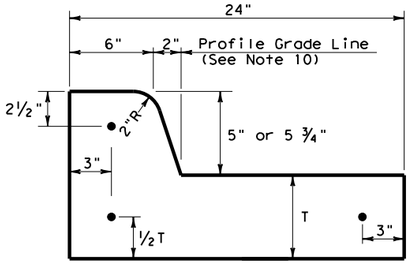
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



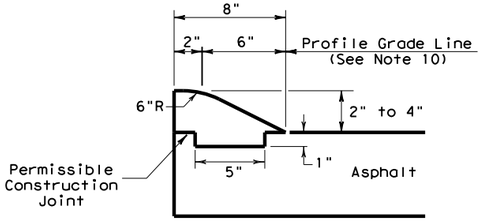
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



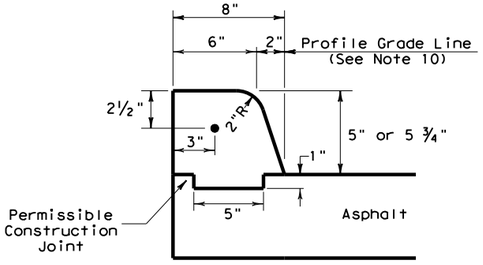
TYPE II CURB
5" - 5 ¾" HEIGHT



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



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



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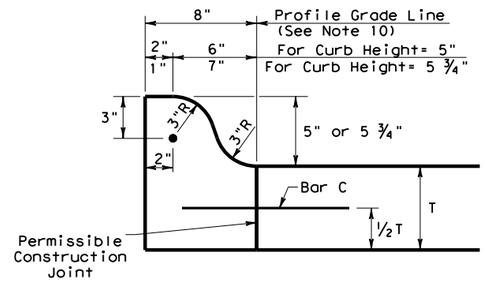
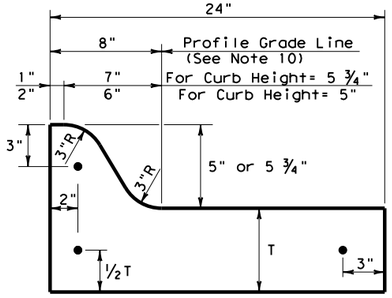
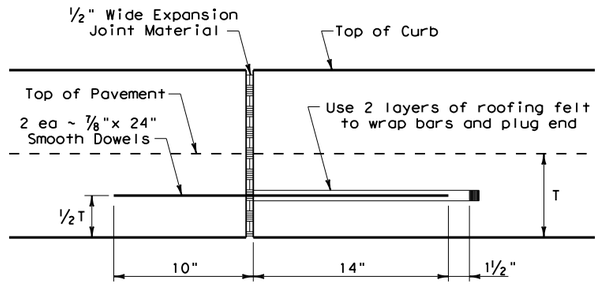
5" - 5 ¾" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

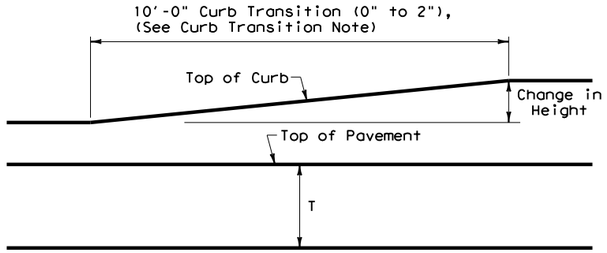


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



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.

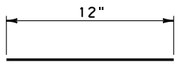


CURB TRANSITION
Note: To be paid for as Highest Curb

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 the 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 used as needed 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-21

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: SS	CK: KM
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089, ETC.	FM 907, ETC.
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC.		53

DATE: 6/30/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\13. Standards\1. RDWY\ped18.dgn

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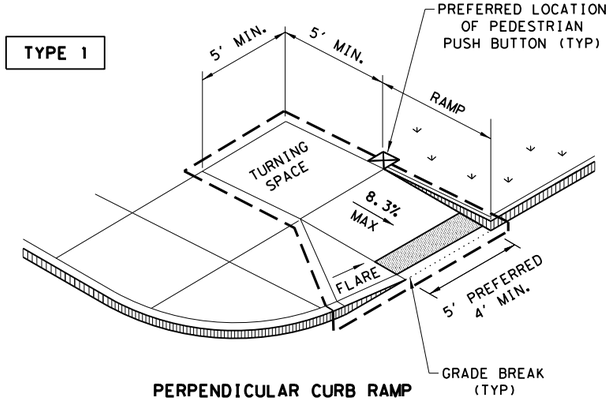
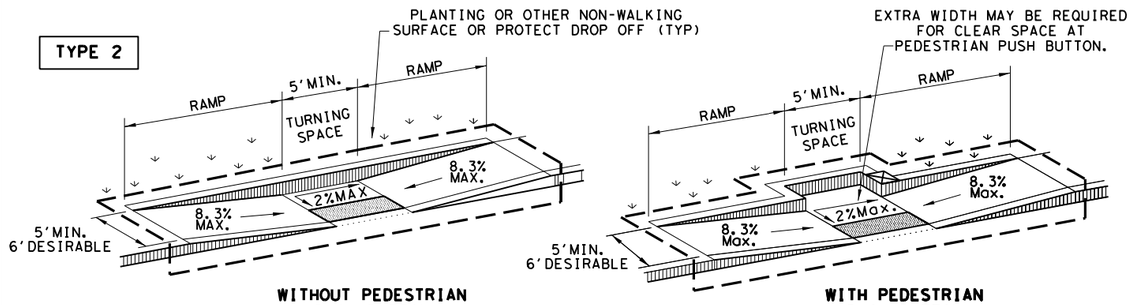


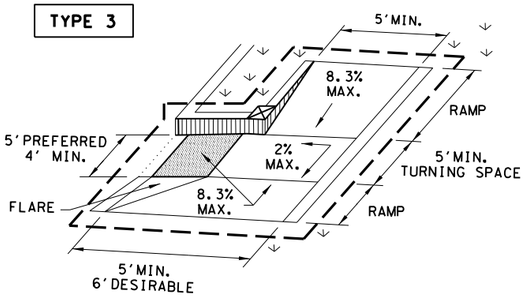
PERPENDICULAR CURB RAMP

TYPE 2



PARALLEL CURB RAMP

TYPE 3



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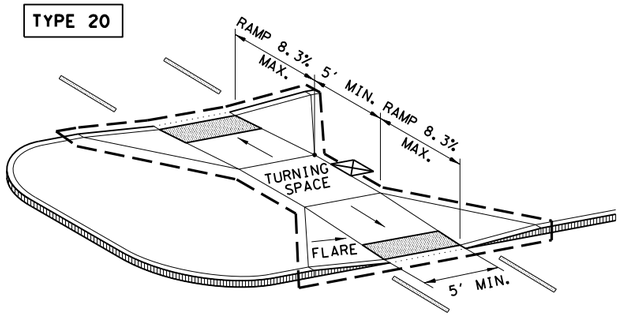
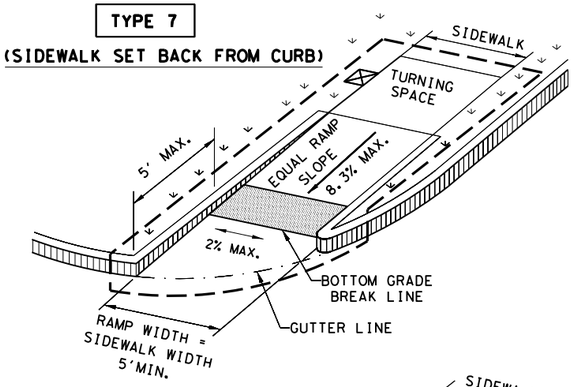
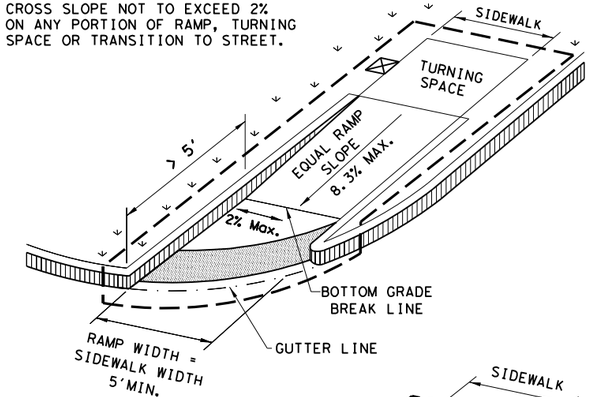


CURB RAMPS AT MEDIAN ISLANDS

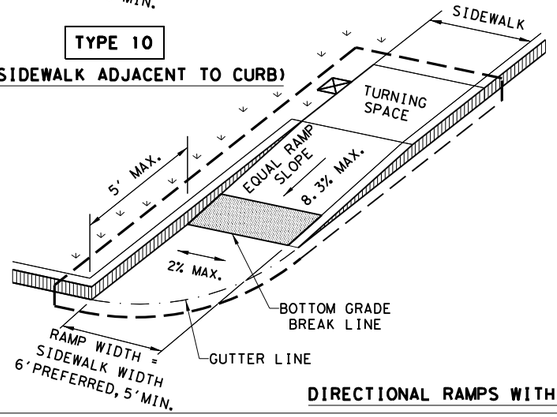
TYPE 7
(SIDEWALK SET BACK FROM CURB)



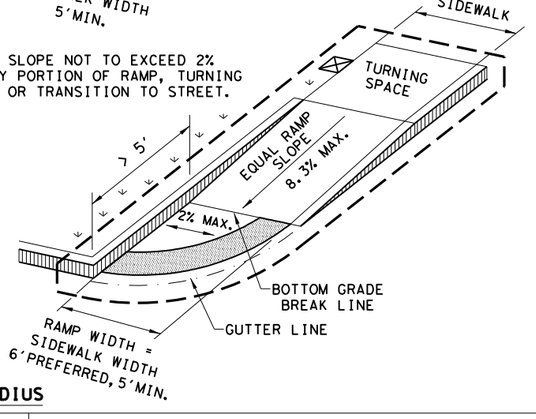
CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



TYPE 10
(SIDEWALK ADJACENT TO CURB)

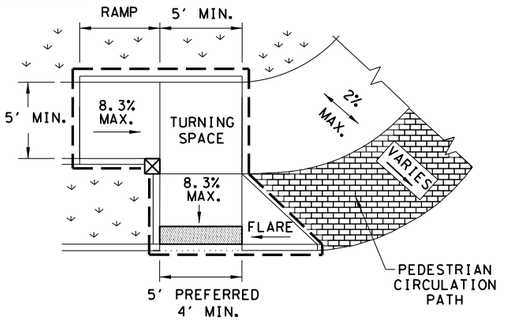


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



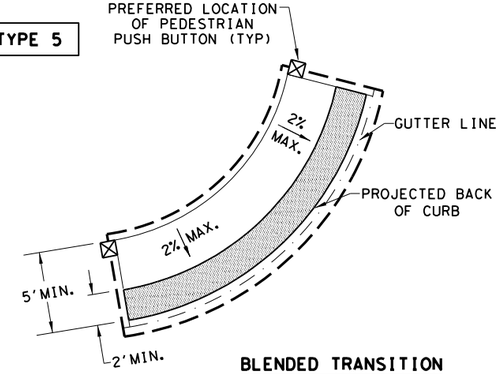
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 6



COMBINATION CURB RAMPS

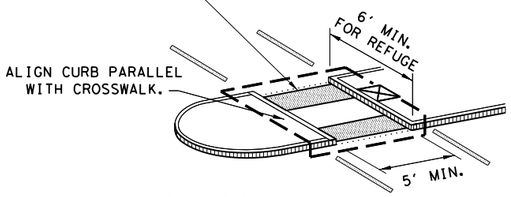
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

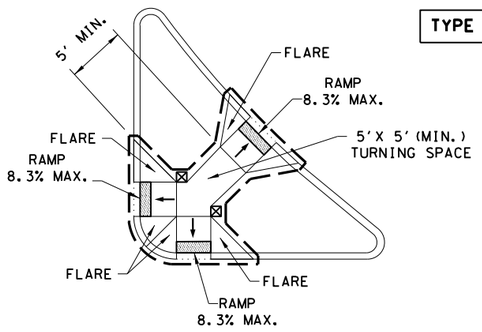
TYPE 21

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.



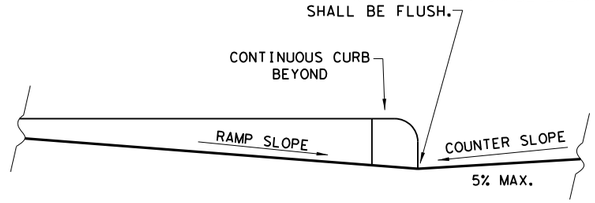
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

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

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	1586	01	089, ETC.	FM 907, ETC.
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC.		54

DATE: 6/30/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\13. Standards\1. RDWY\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 applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

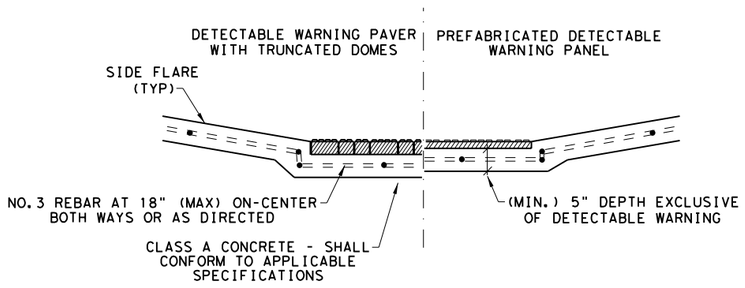
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material 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.

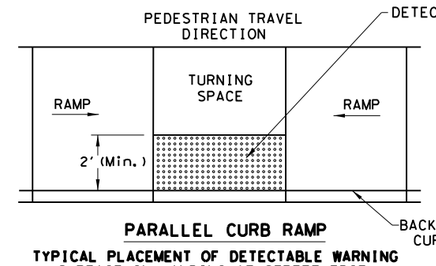
SIDEWALKS

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.

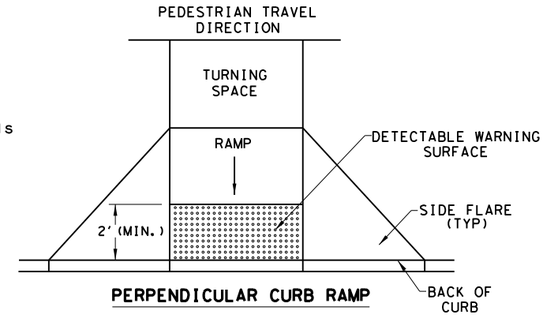


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

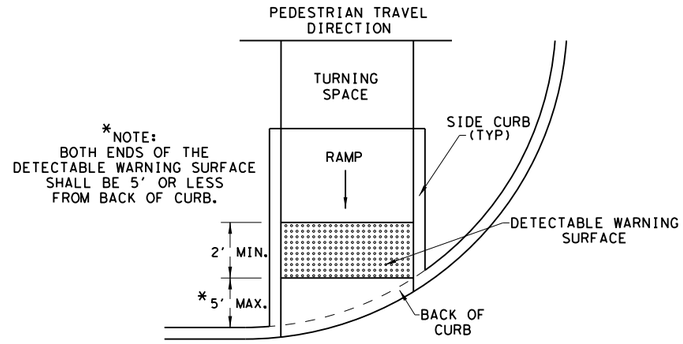
DETECTABLE WARNING SURFACE DETAILS



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.

SHEET 2 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	1586	01	089, ETC.	FM 907, ETC.	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.	
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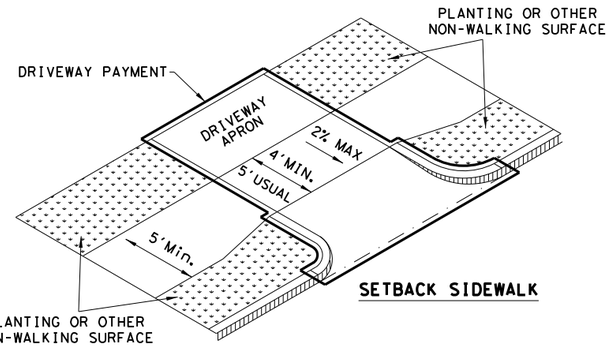
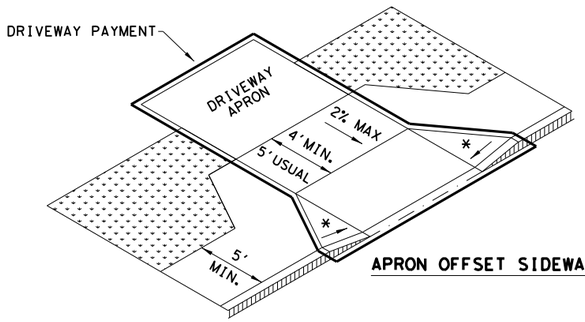
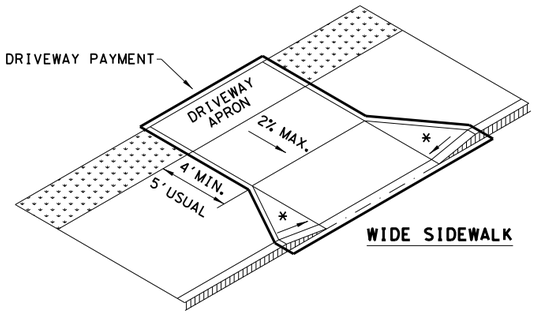
SIDEWALK TREATMENT AT DRIVEWAYS



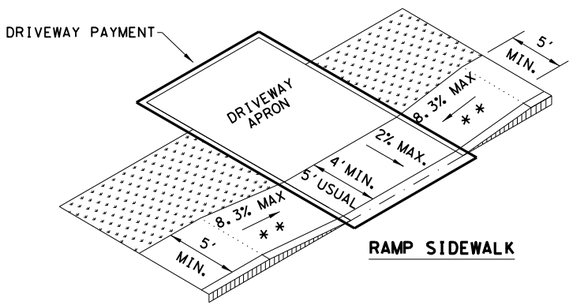
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

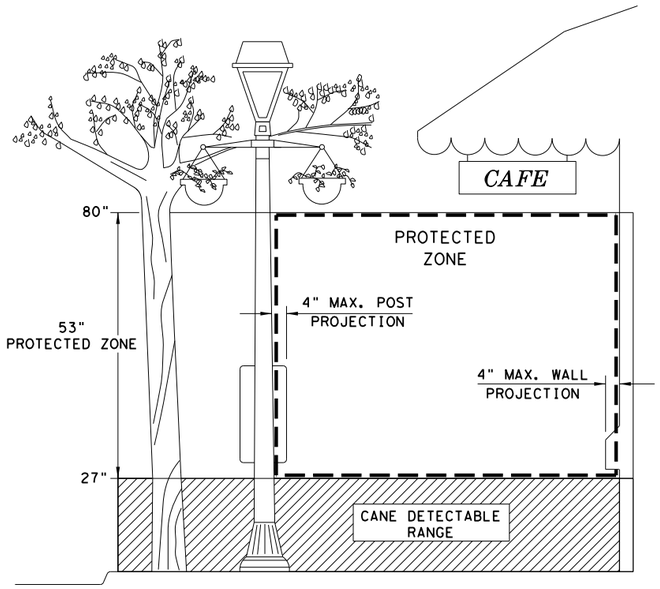


RAMP SIDEWALK

NOTES:

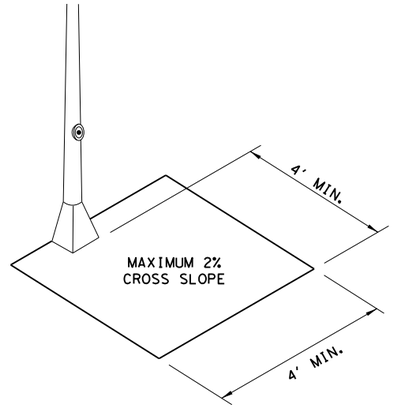
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

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

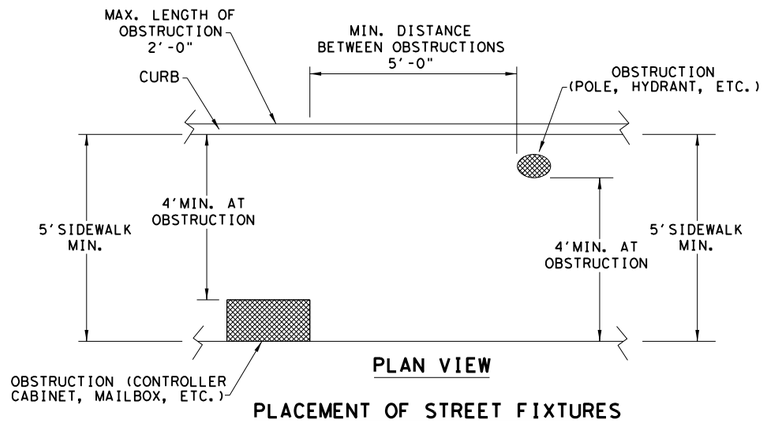


PROTECTED ZONE

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



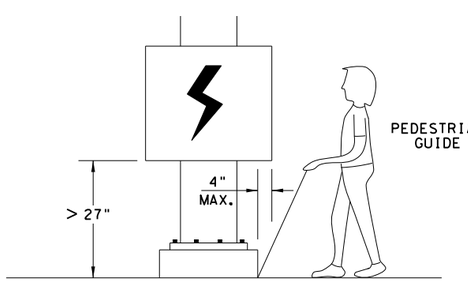
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



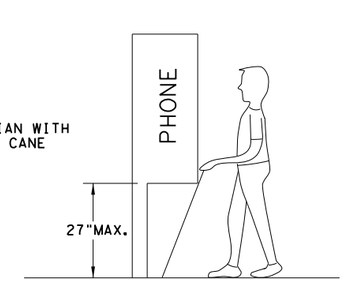
PLAN VIEW

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	
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REVISIONS	1586	01	089, ETC.	FM 907, ETC.	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.	
	PHR	HIDALGO, ETC.		56	

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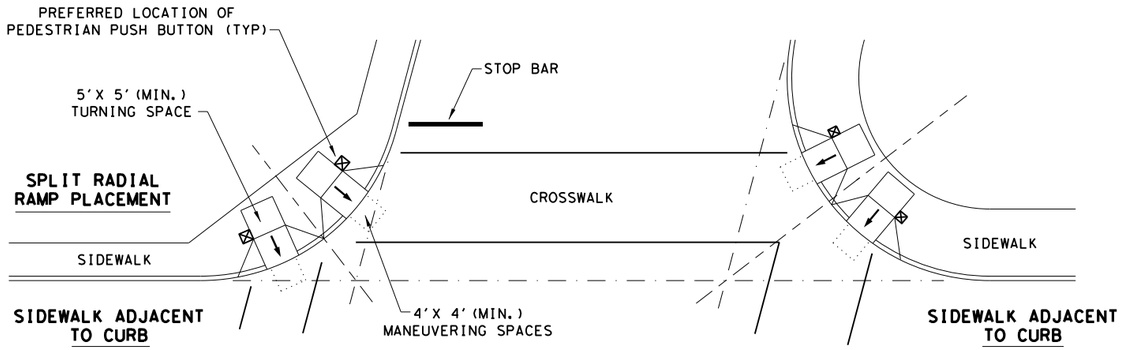
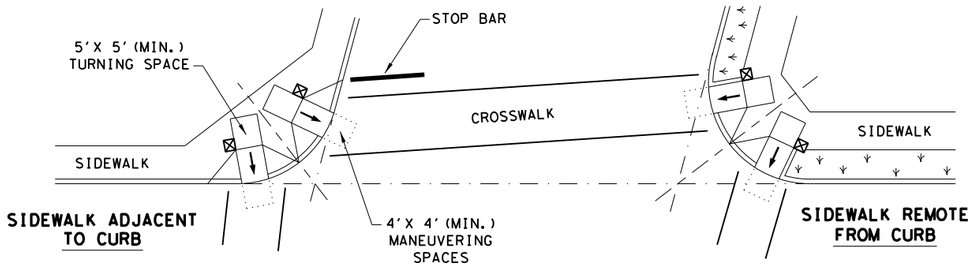
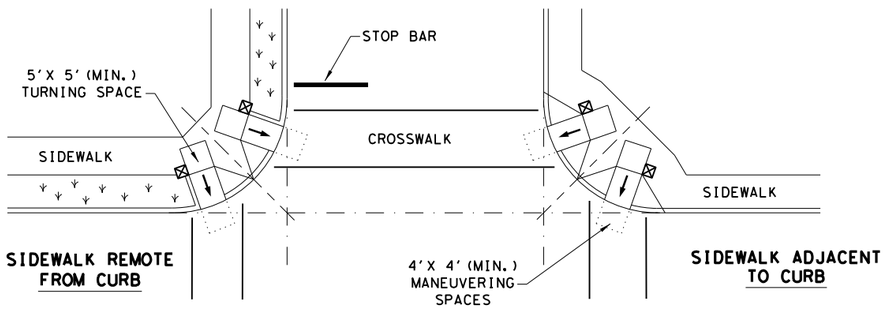
TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



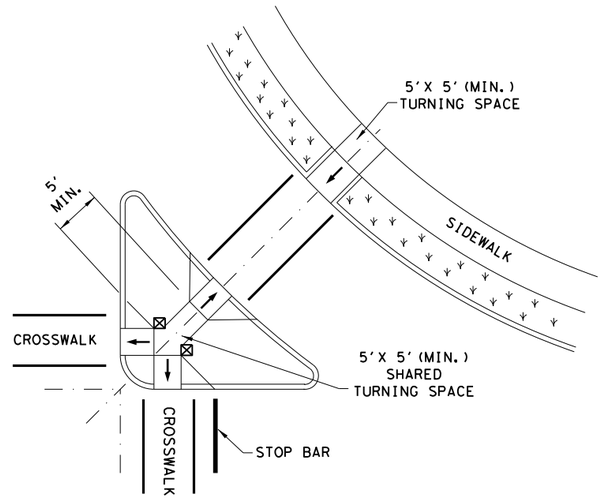
SKEWED INTERSECTION WITH "LARGE" RADIUS



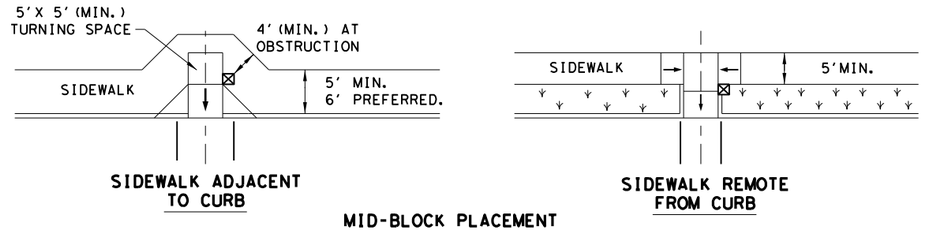
SKEWED INTERSECTION WITH "SMALL" RADIUS



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.

SHEET 4 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	
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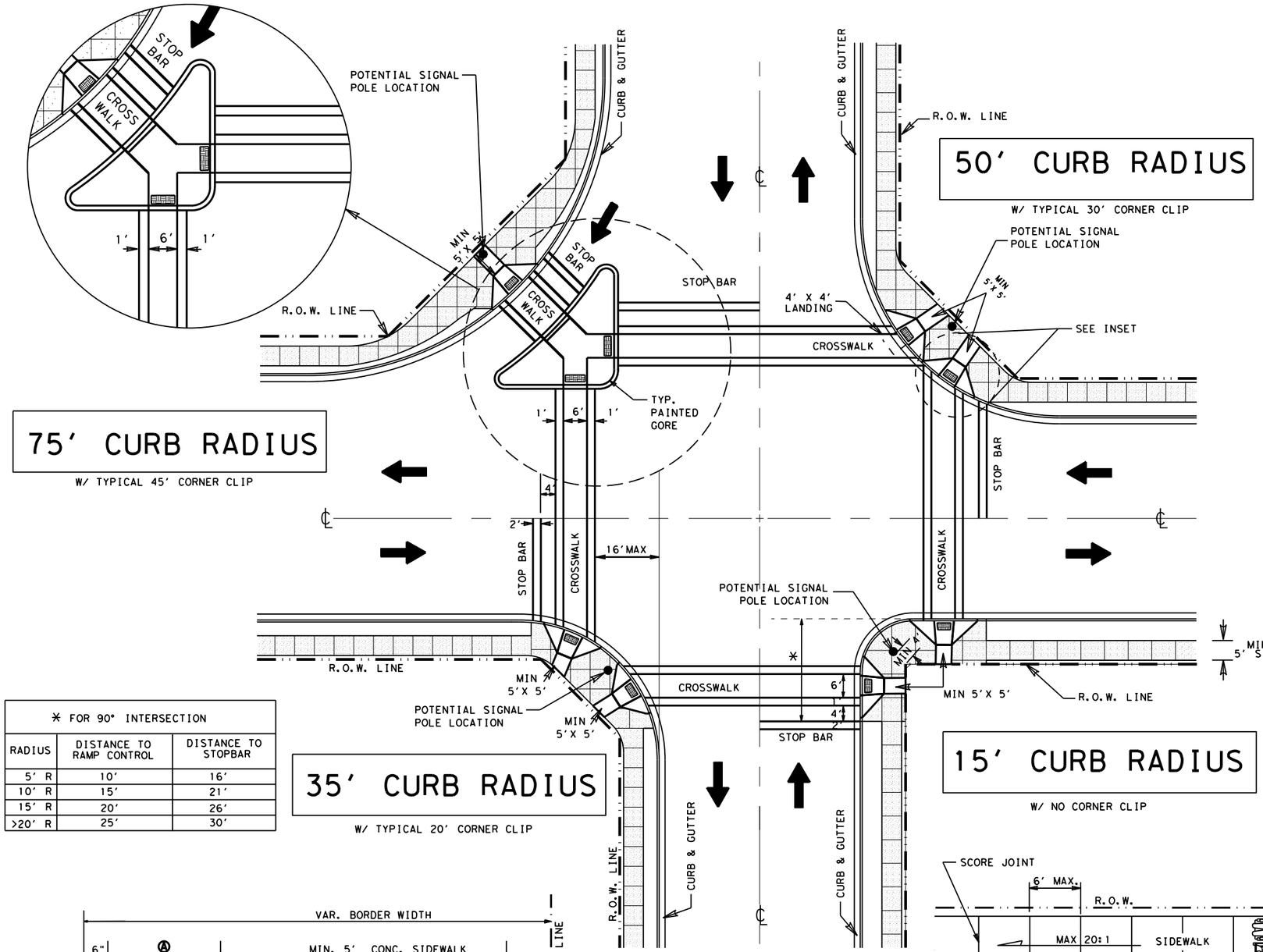
REVISIONS	1586	01	089, ETC.	FM 907, ETC.	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.	
	PHR	HIDALGO, ETC.		57	



75' CURB RADIUS

W/ TYPICAL 45' CORNER CLIP

50' CURB RADIUS

W/ TYPICAL 30' CORNER CLIP

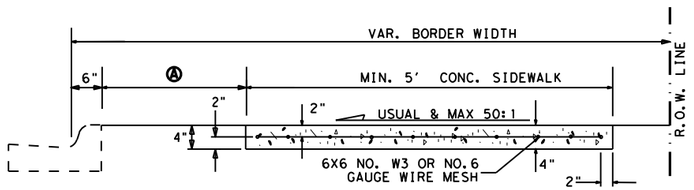
35' CURB RADIUS

W/ TYPICAL 20' CORNER CLIP

15' CURB RADIUS

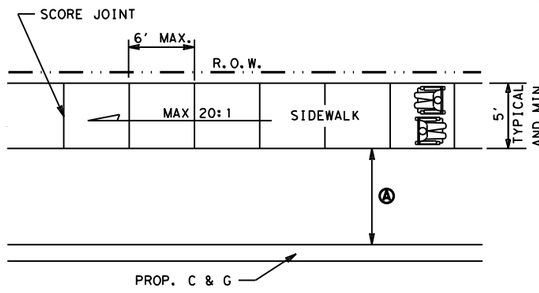
W/ NO CORNER CLIP

* FOR 90° INTERSECTION		
RADIUS	DISTANCE TO RAMP CONTROL	DISTANCE TO STOPBAR
5' R	10'	16'
10' R	15'	21'
15' R	20'	26'
>20' R	25'	30'



TYPICAL CONC. SIDEWALK

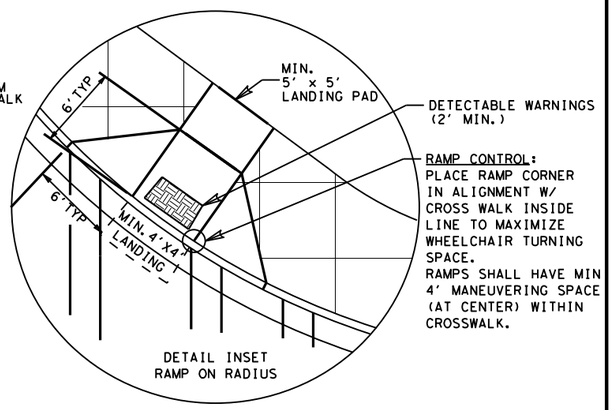
TYPICAL WHEEL CHAIR RAMP LOCATION



SCORE JOINTS 1/4" THICKNESS
EXPANSION JOINT EVERY 30'
JOINT IN CENTER OF SIDEWALK IF OVER 15' WIDE.

PLAN VIEW

MINIMUM 5' SIDEWALK



GENERAL NOTES

- ALL RAMPS SHALL HAVE A 5' x 5' LANDING PAD.
- RAMP CENTER TO BE PERPENDICULAR TO FACE OF CURB. A PERPENDICULAR RAMP MAY BE LOCATED WITHIN THE RADIUS OF A CURBLINE.
- SIDEWALK GRADE TO BE PARALLEL TO TOP OF CURB AND GUTTER UNLESS OTHERWISE SHOWN ON PLANS OR DIRECTED BY THE ENGINEER.
- SIDEWALK WIDTH AS SHOWN ELSEWHERE IN PLANS. MIN WIDTH 5'. PROVIDE DROPPED CURBS AT INTERSECTIONS. ALL CONCRETE SHALL BE CLASS "A" PROPOSED SIDEWALKS TO MATCH EXIST. SIDEWALK.
- NO VERTICAL CHANGES SHALL EXCEED 1/4" IN ELEVATION AT ADJOINING SURFACES.
- TO PROVIDE ACCESS TO PEDESTRIAN BUTTON, SIDEWALK / LANDING PAD SHALL EXTEND AND/ OR ABUT TO SIGNAL POLE CONC. FOUNDATION.
- COLOR TEXTURIZED CONCRETE SHALL BE USED TO COLOR AREAS AT RAMPS. COLOR SHALL BE " BRICK RED " AS PER L.M. SCOFIELD COMPANY STANDARDS COLOR A-26 OR EQUAL. COLOR TEXTURIZED CONCRETE SHALL BE SUBSIDIARY TO CURB RAMP ITEM

Ⓐ DESIRABLE 3' OR GREATER FOR HIGH SPEED TRAFFIC. FOR BORDER WIDTHS OF 8' OR LESS, PLACE SIDEWALK ADJACENT TO CURB.

Texas Department of Transportation

SIDEWALK & WHEELCHAIR RAMP DESIGN GUIDE

REV. 5/18 SIDEWALK.DGN

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		FILE NO.			SHEET NO.
6						58
STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	HIDALGO, ETC.	1586	01	089, ETC.	FM 907, ETC.

DATE: 6/30/2022 3:39:18 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4- Design\Plan Set\13. Standards\2. TCP\bc-21.dgn

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

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REVISIONS	1586	01	089,ETC.	FM 907,ETC.
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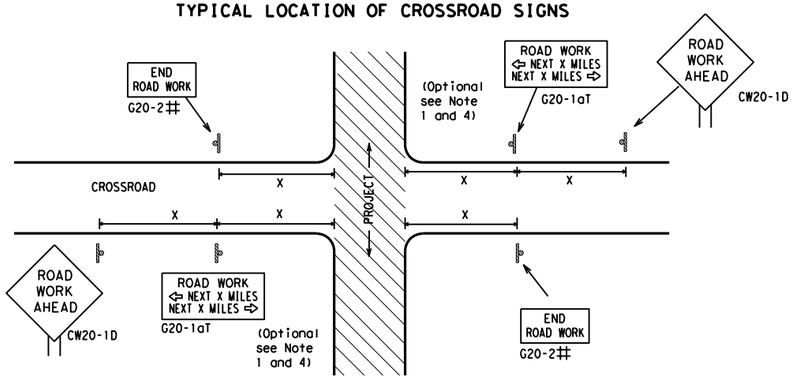
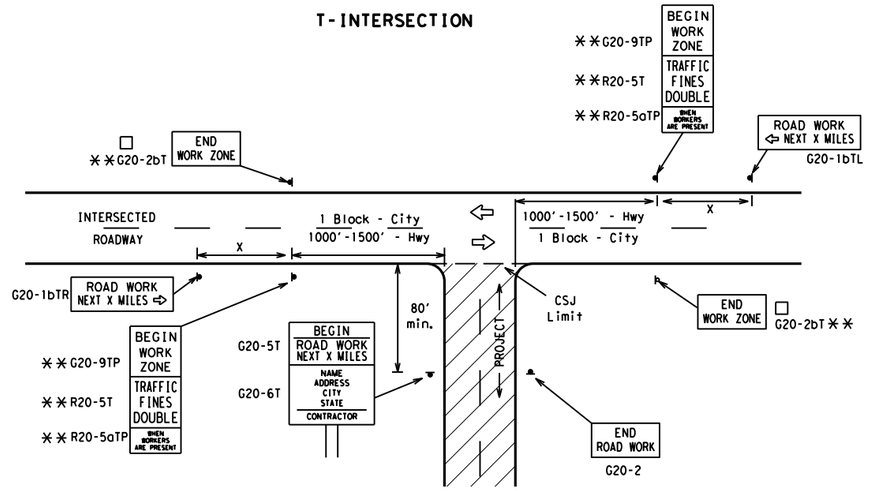
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

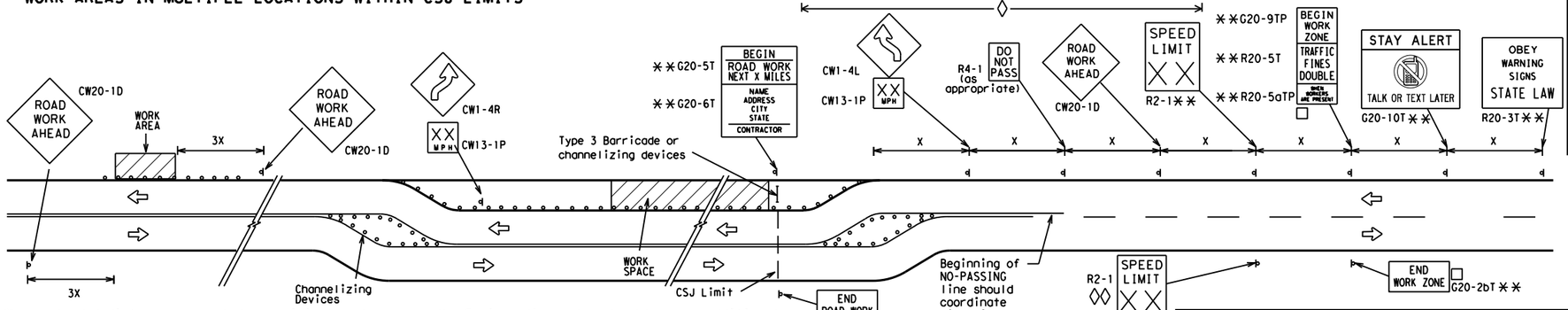
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

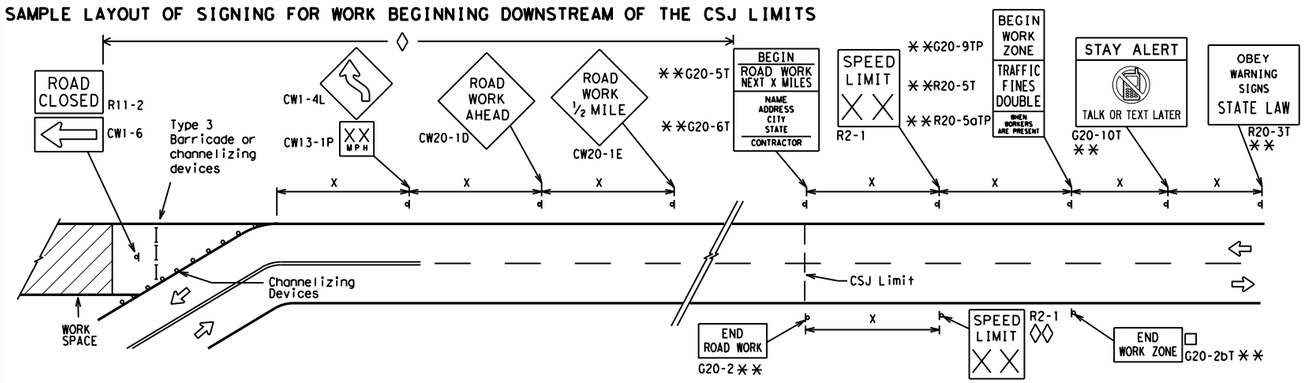
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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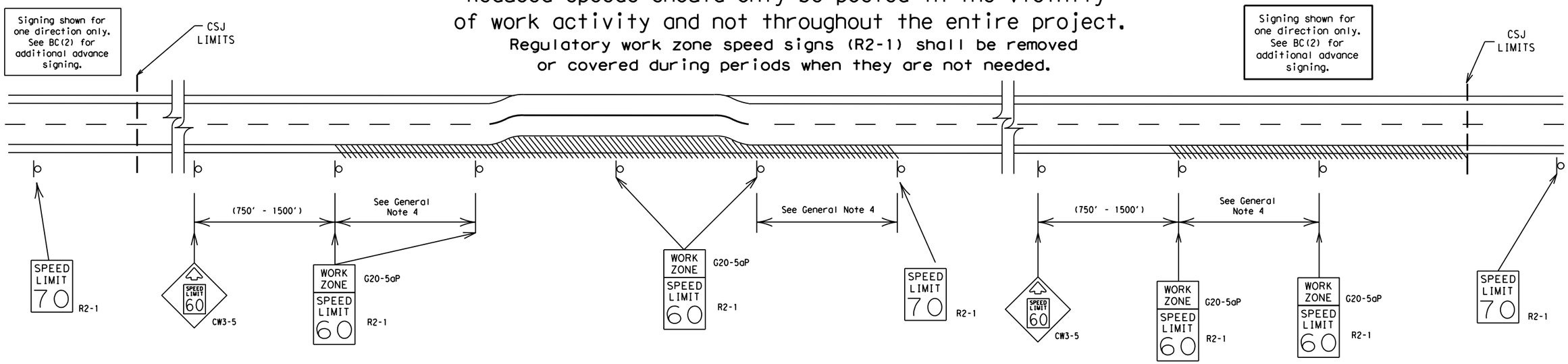
7-13 5-21	PHR	HIDALGO,ETC.		60

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.

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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	DIST	COUNTY		SHEET NO.
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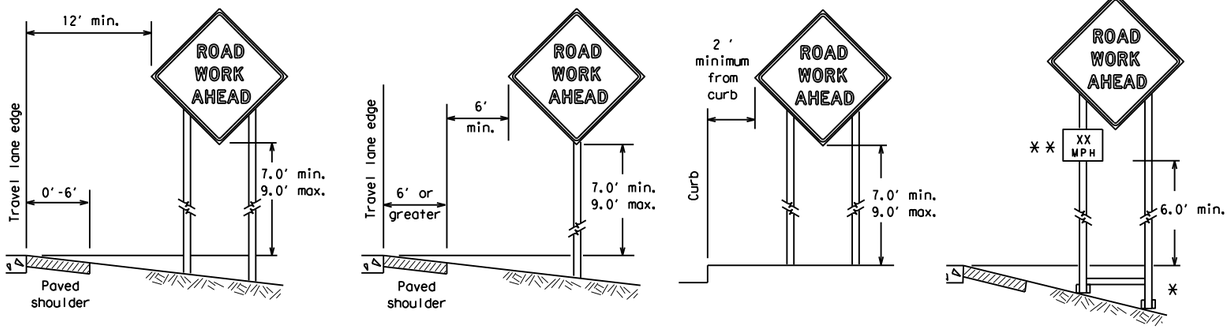
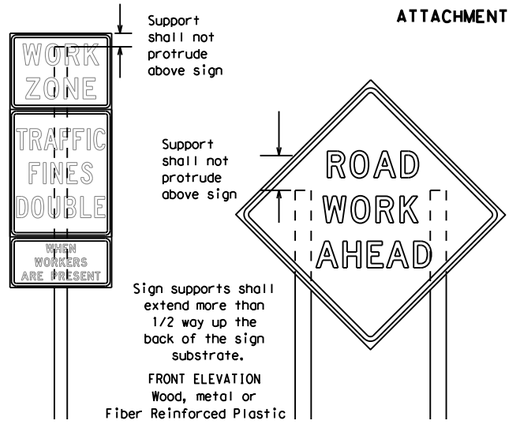
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

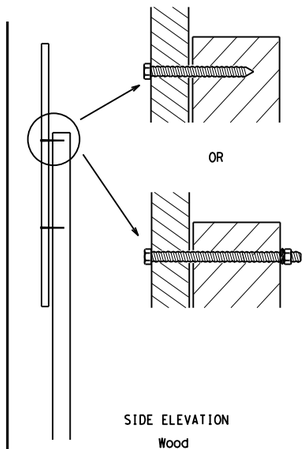


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





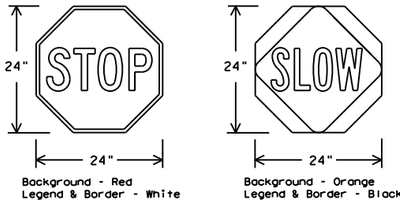
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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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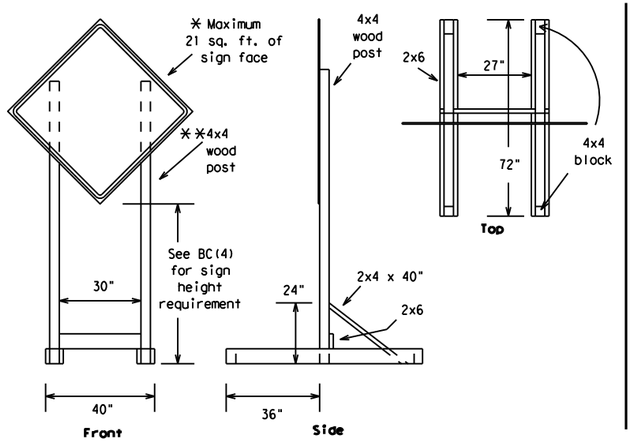
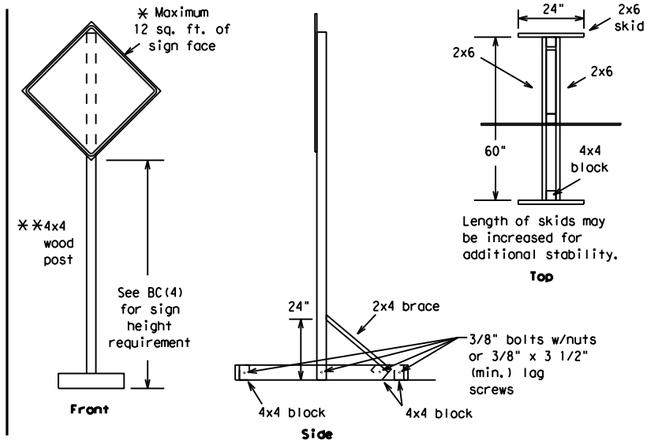
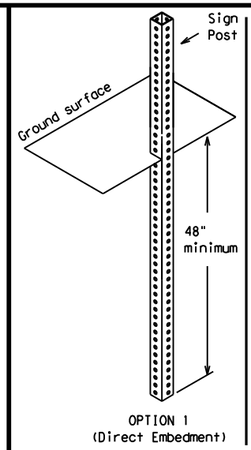
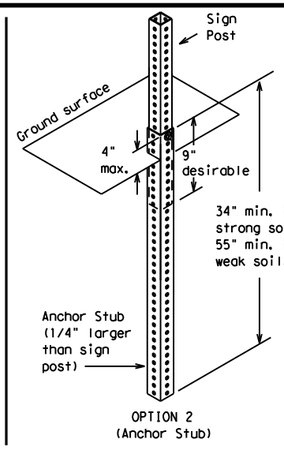


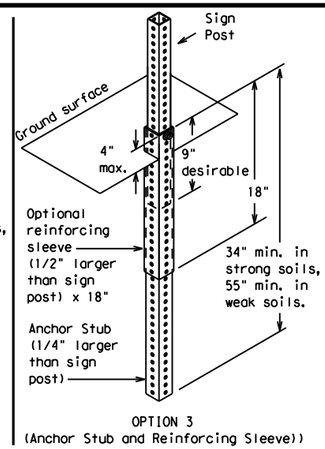


SKID MOUNTED WOOD SIGN SUPPORTS

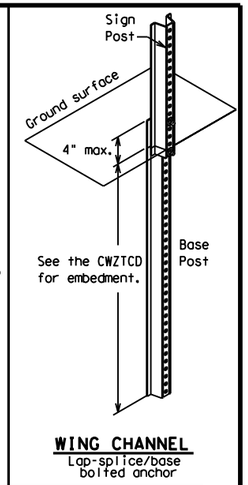
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







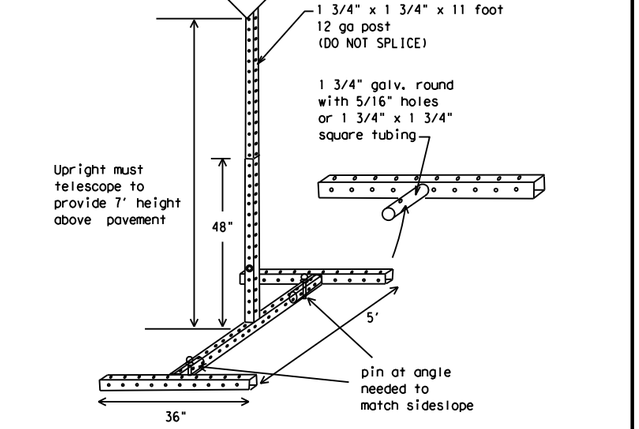
PERFORATED SQUARE METAL TUBING

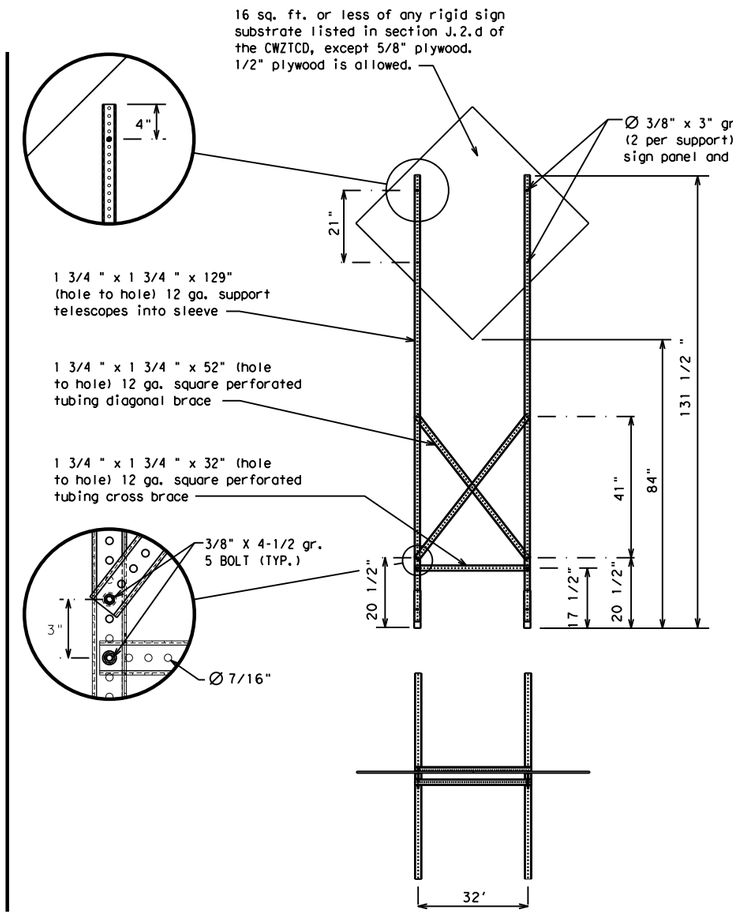


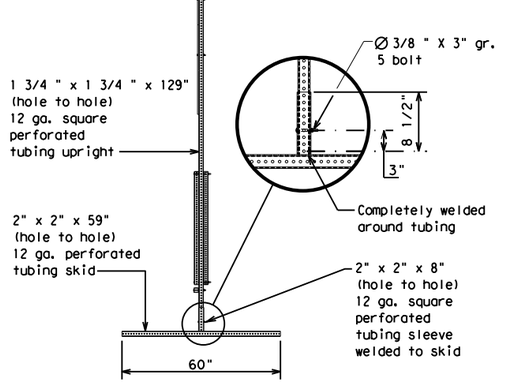
WING CHANNEL
Lap-splice/base bolted anchor

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089,ETC.	FM 907,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO,ETC.		63

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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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089,ETC.	FM 907,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO,ETC.		64

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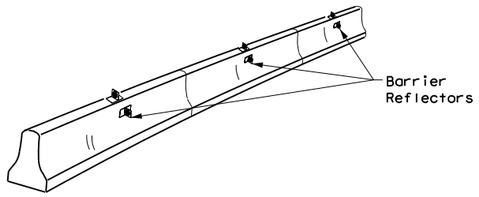
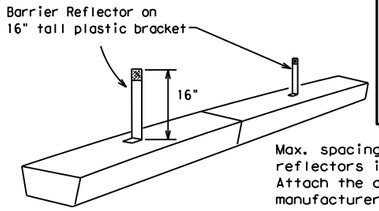
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

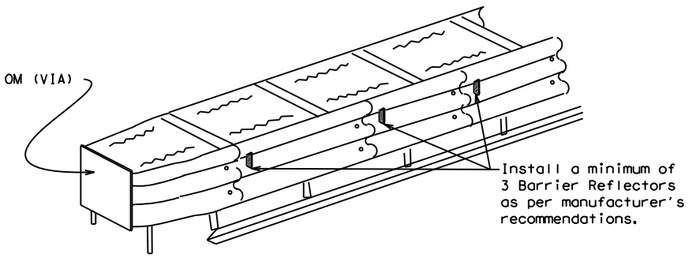


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

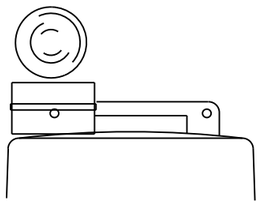


DELINEATION OF END TREATMENTS

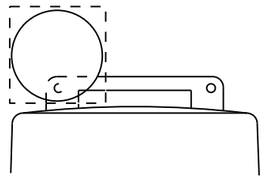
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the 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

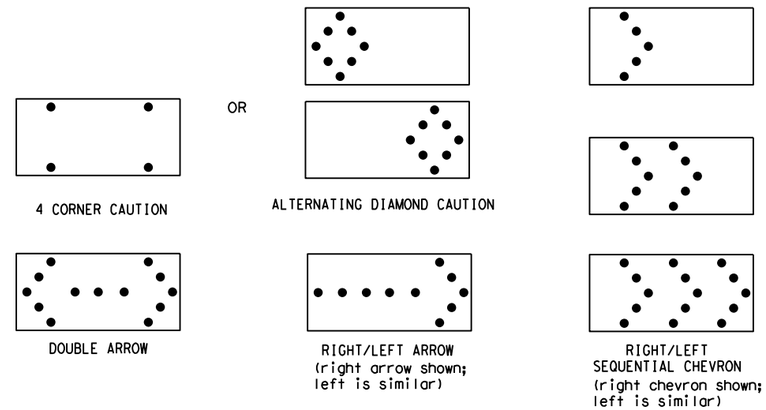
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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	1586	01	089,ETC.	FM 907,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO,ETC.		65

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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:

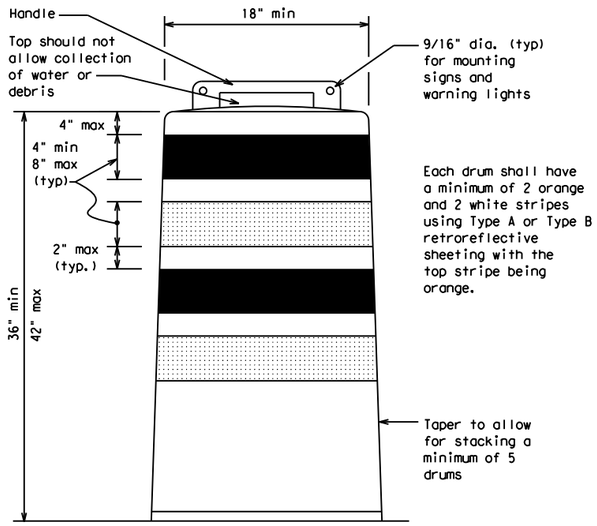
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

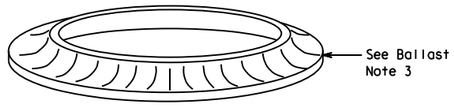
RETROREFLECTIVE SHEETING

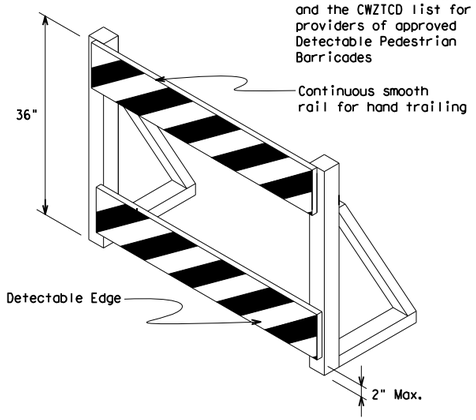
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall 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.

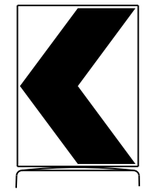




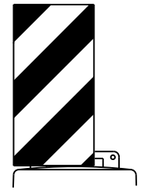


DETECTABLE PEDESTRIAN BARRICADES

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.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089,ETC.	FM 907,ETC.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	PHR	HIDALGO,ETC.		66
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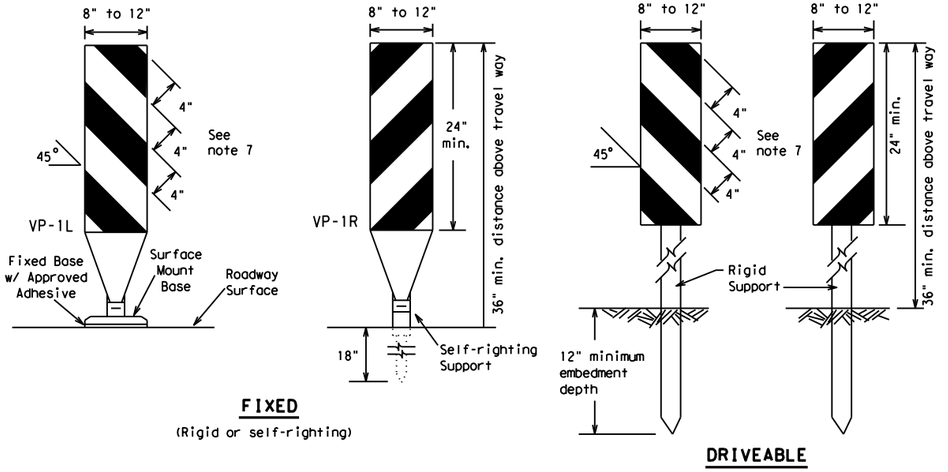
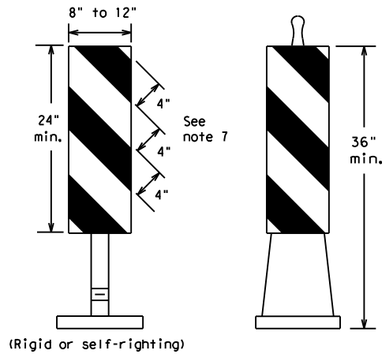


FIXED
(Rigid or self-righting)

DRIVEABLE

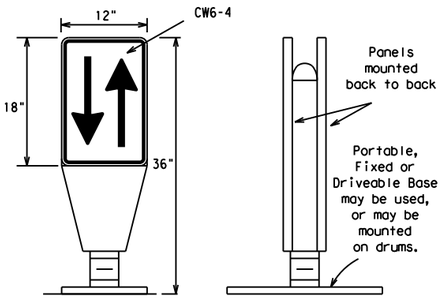


(Rigid or self-righting)

PORTABLE

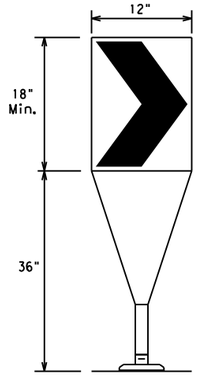
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



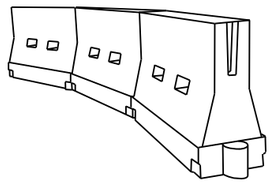
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089,ETC.	FM 907,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
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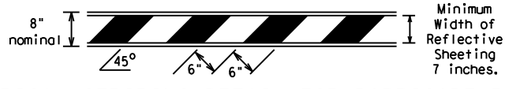
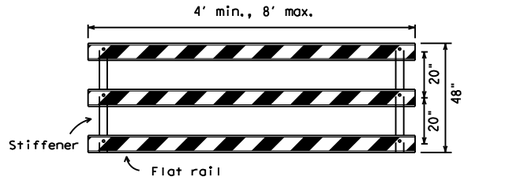
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



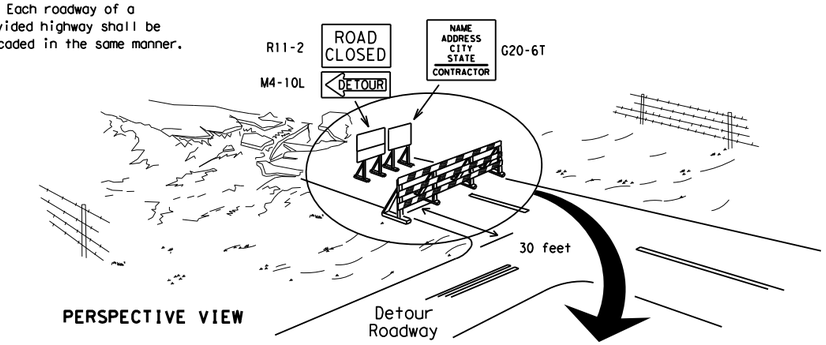
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

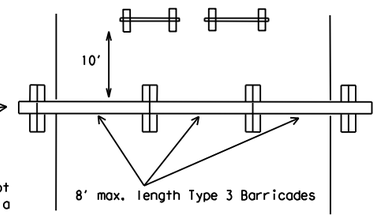
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

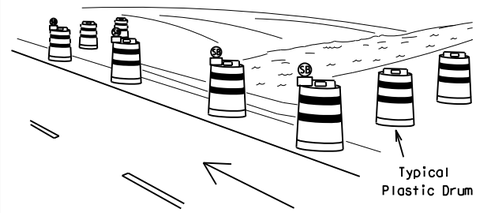
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

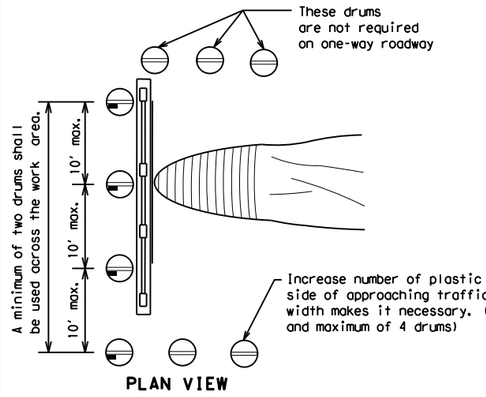
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

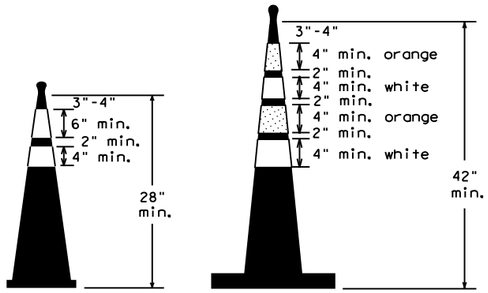
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

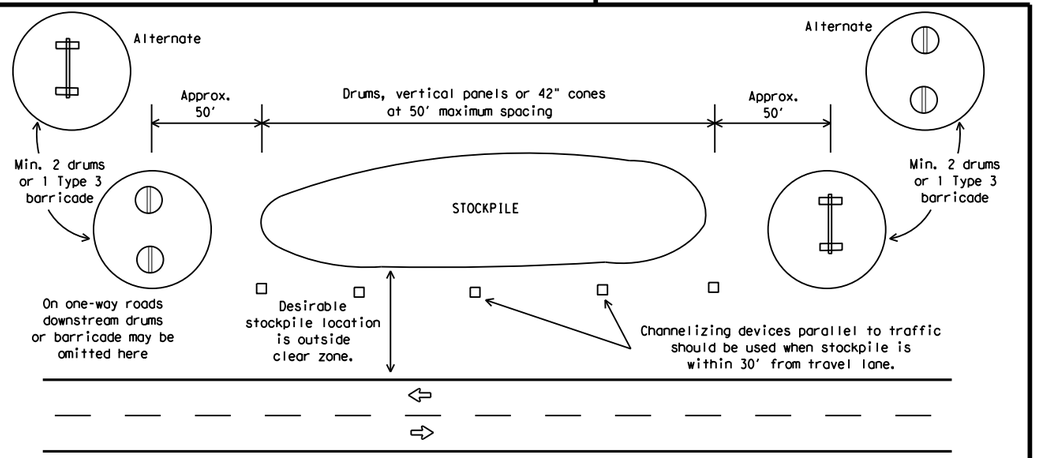
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089,ETC.	FM 907,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO,ETC.		68

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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.

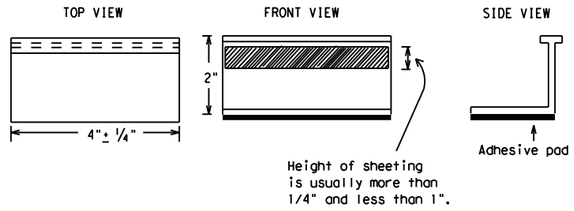
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089,ETC.	FM 907,ETC.
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	PHR	HIDALGO,ETC.		69
11-02 8-14				

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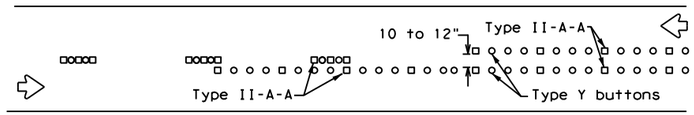
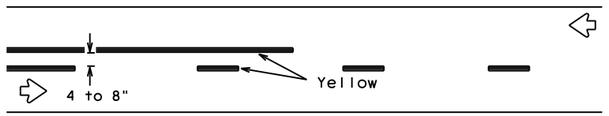
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\13. Standards\2. TCP\bc-21.dgn

PAVEMENT MARKING PATTERNS

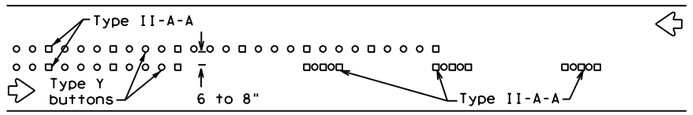
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



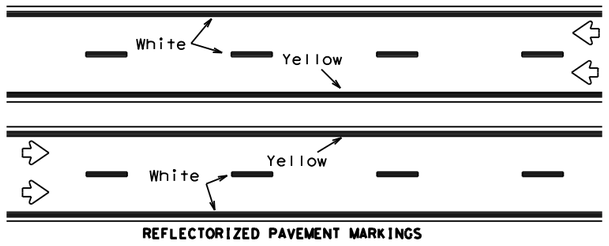
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



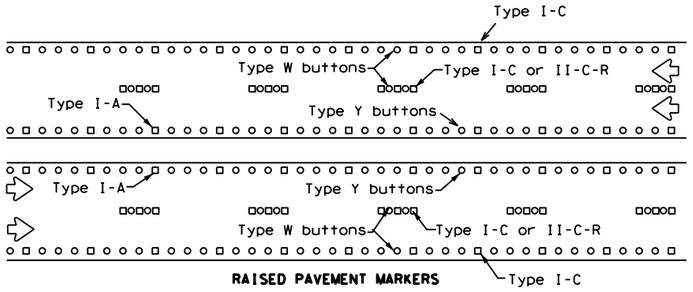
RAISED PAVEMENT MARKERS - PATTERN B

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



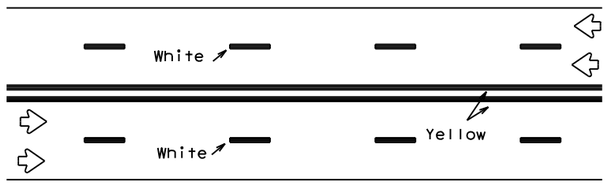
REFLECTORIZED PAVEMENT MARKINGS



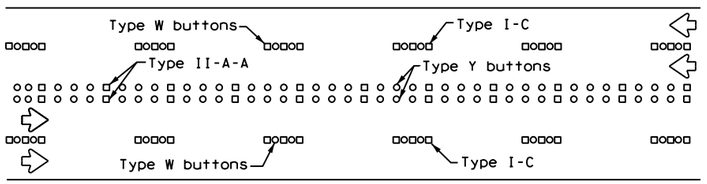
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



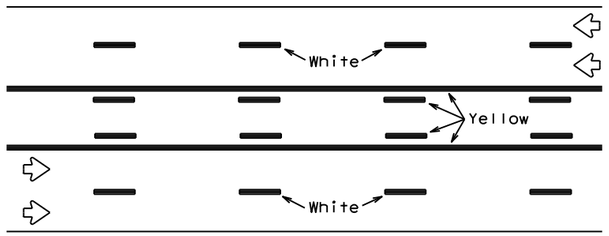
REFLECTORIZED PAVEMENT MARKINGS



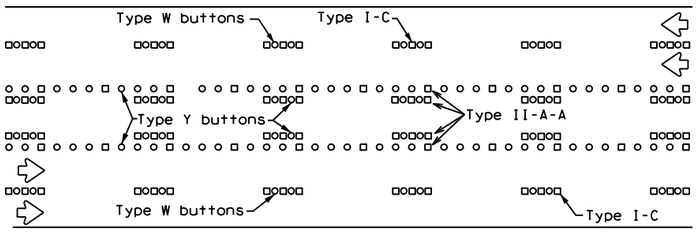
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

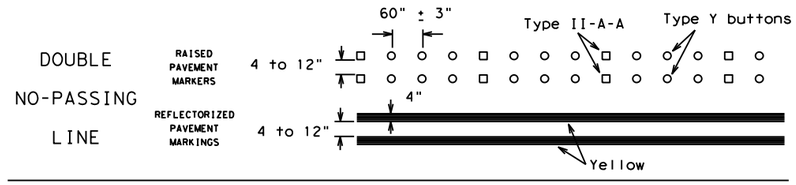
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

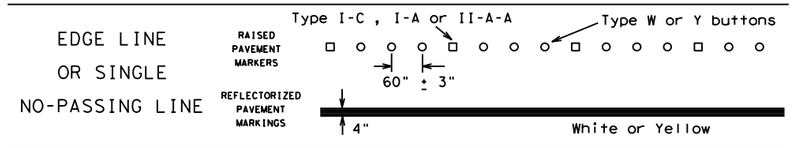
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

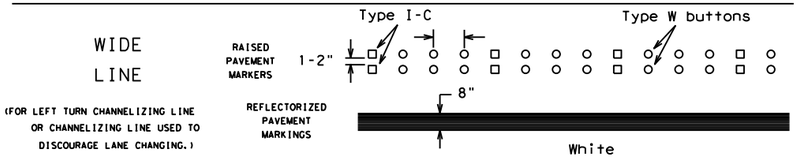


EDGE LINE OR SINGLE NO-PASSING LINE



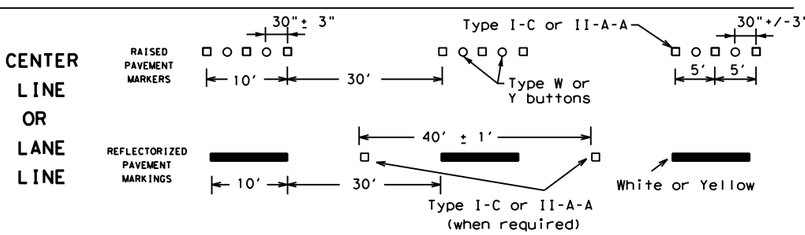
WIDE LINE

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

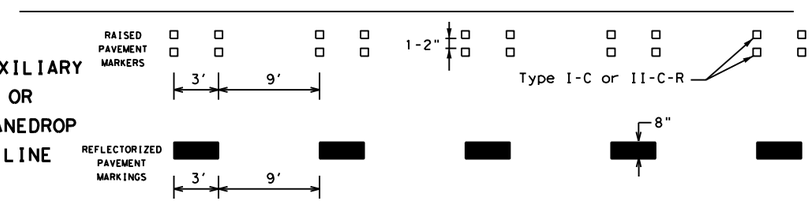


BROKEN LINES

CENTER LINE OR LANE LINE

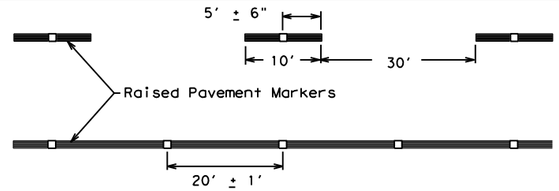


AUXILIARY OR LANEDROP LINE



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	1586	01	089,ETC.	FM 907,ETC.
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	PHR	HIDALGO,ETC.		70

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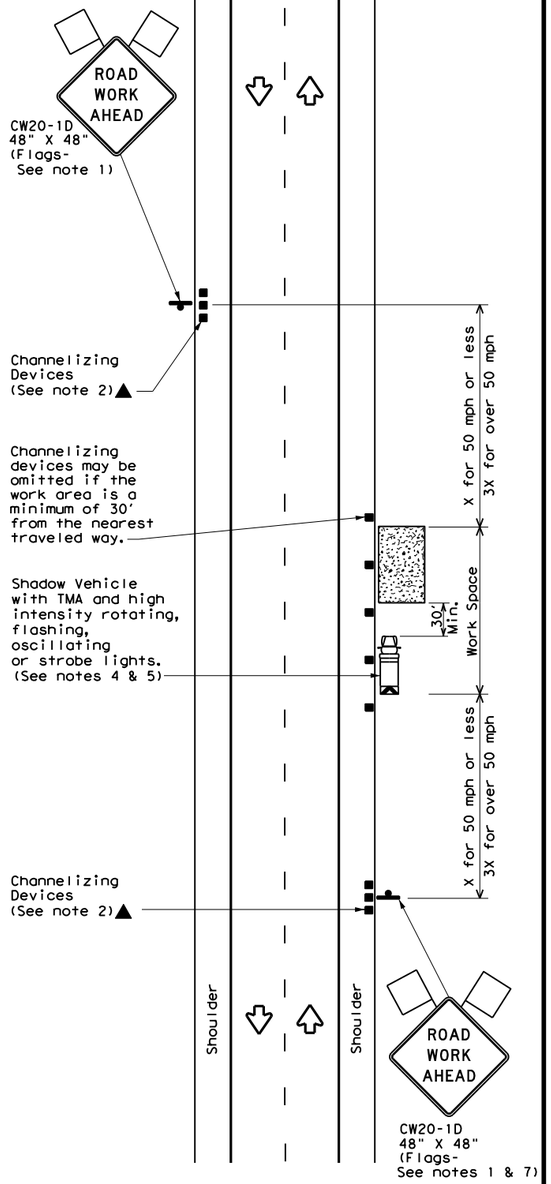
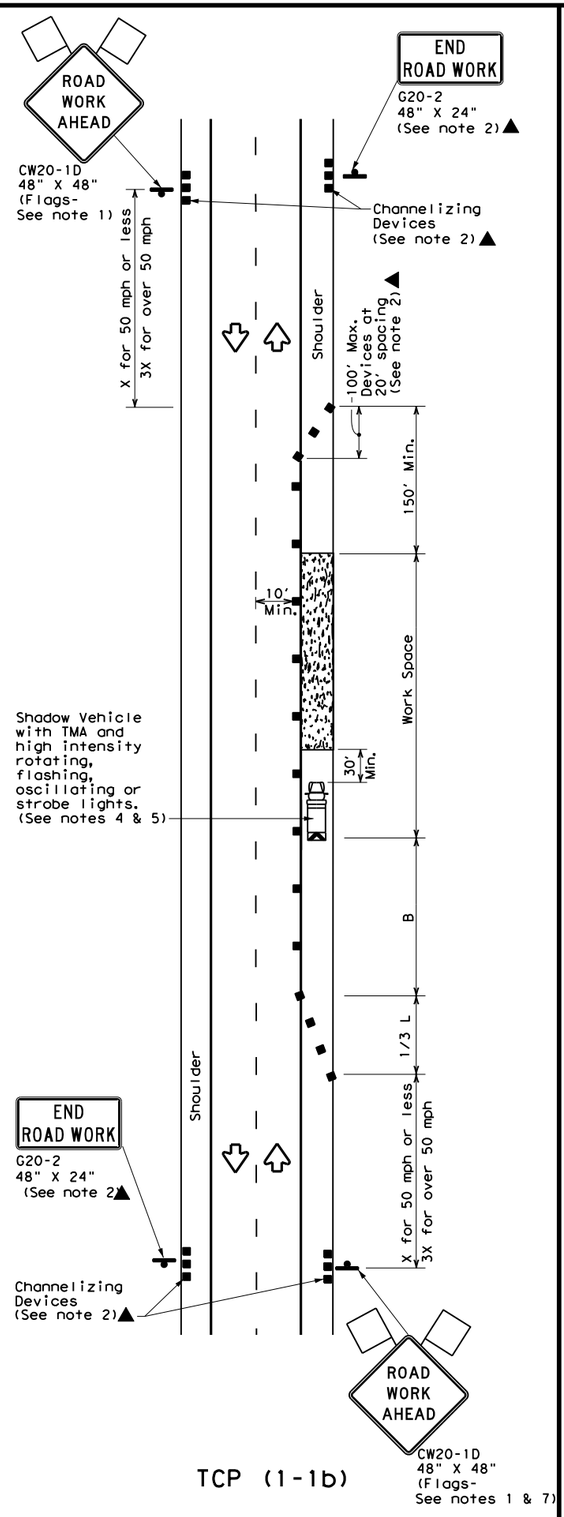


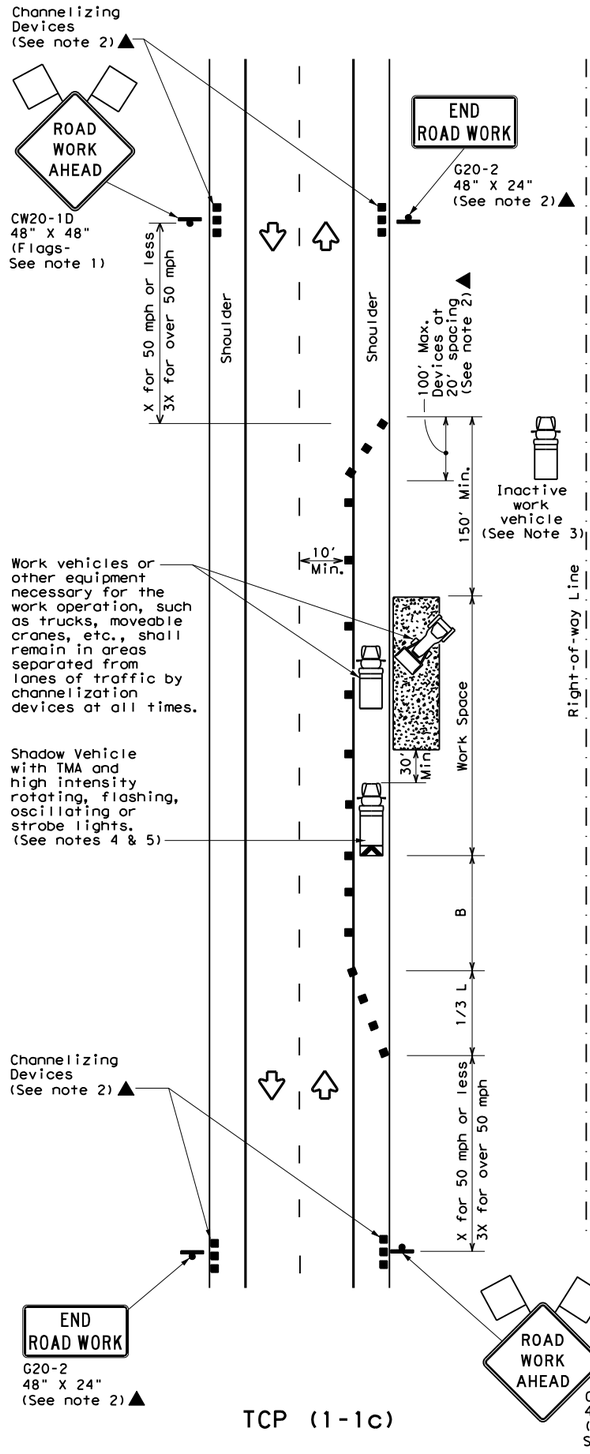
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98	1586	01	089,ETC.	FM 907,ETC.
8-95 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	PHR	HIDALGO,ETC.		71

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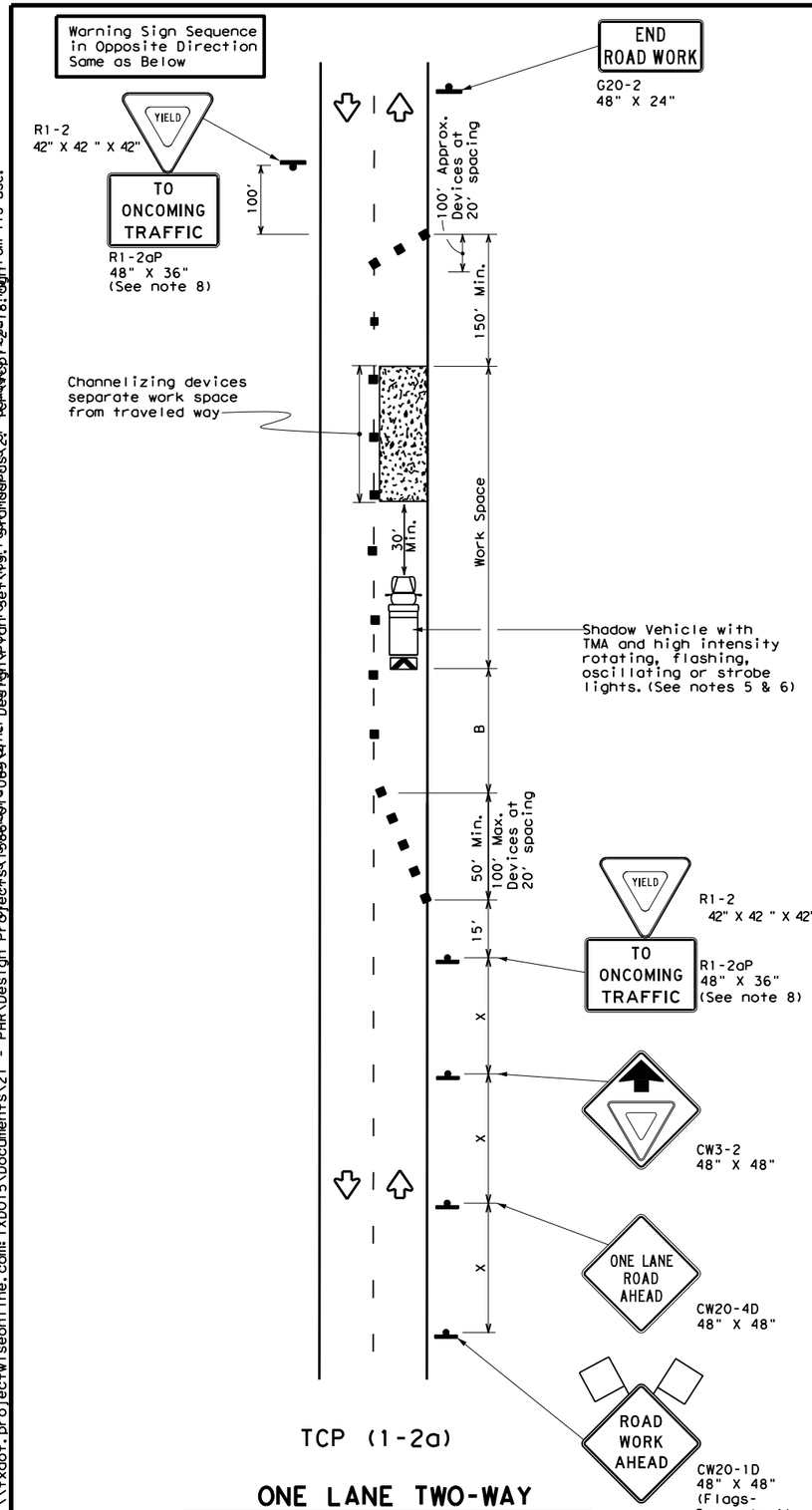
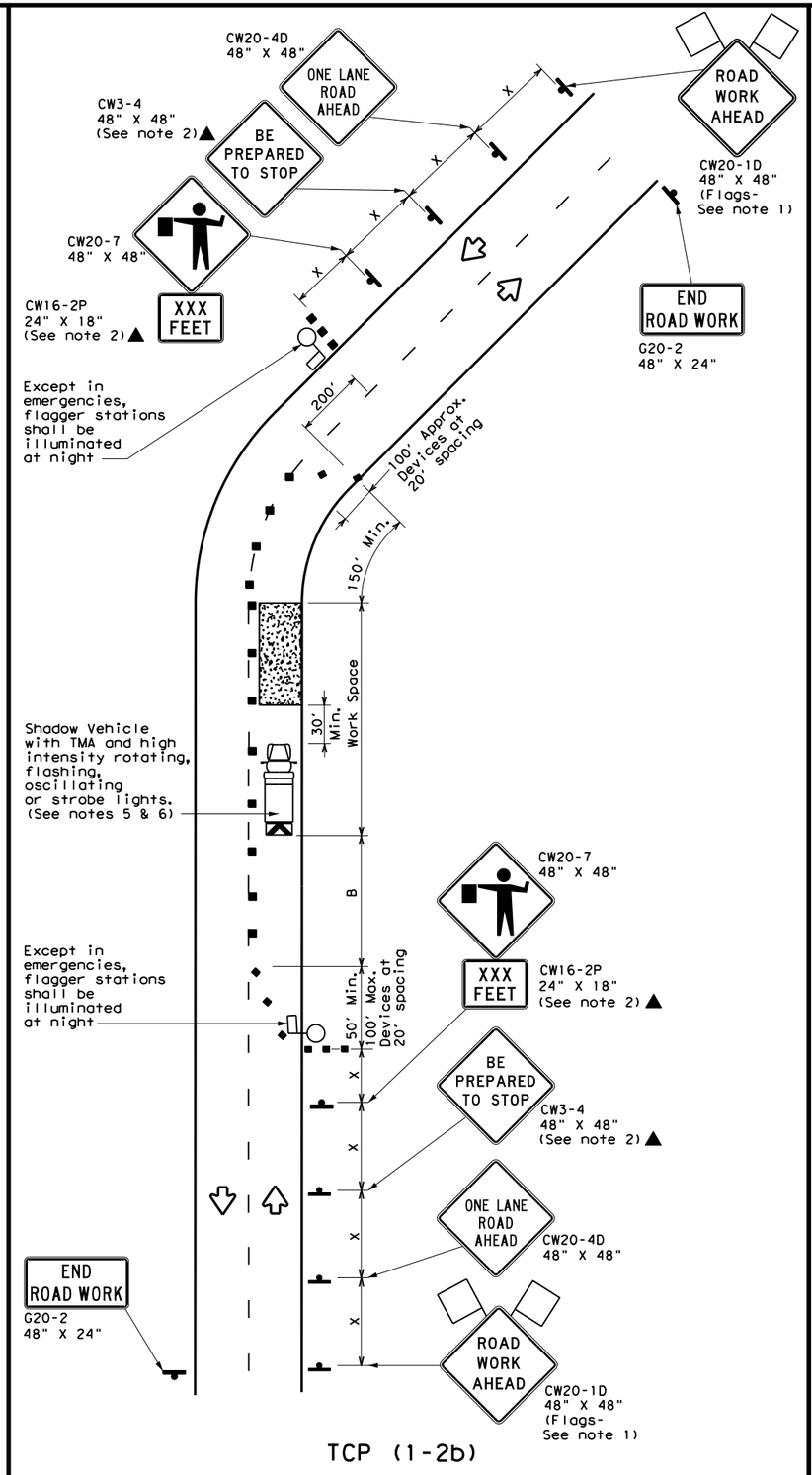


TCP (1-2a)

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



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

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

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

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

GENERAL NOTES

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

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		72

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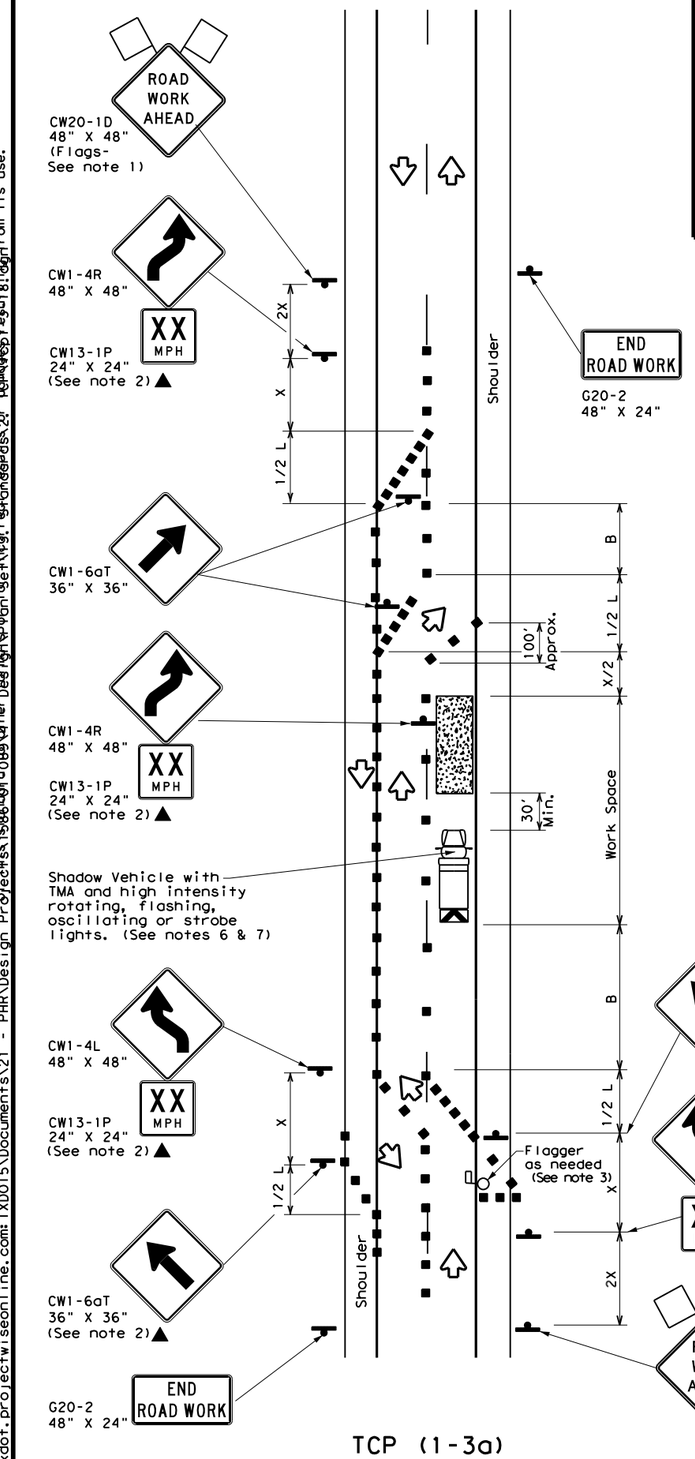
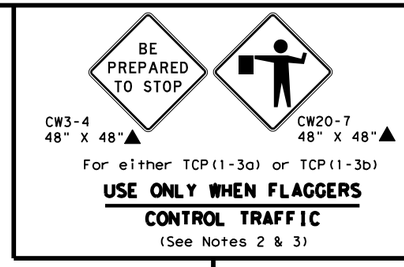


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

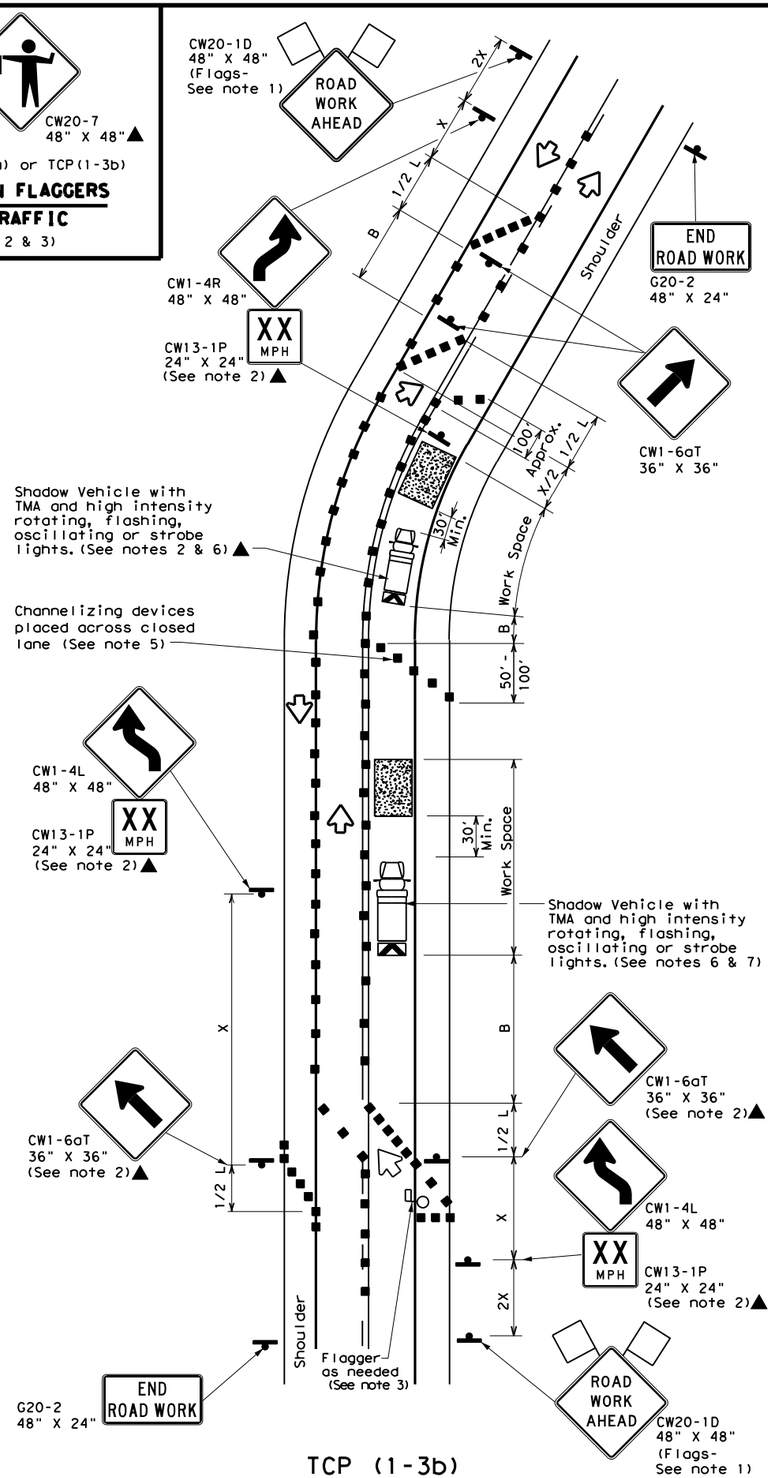
ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



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

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC

(See Notes 2 & 3)



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

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

FILE: tcp1-3-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089,ETC.	FM 907,ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	PHR	HIDALGO,ETC.		73
1-97 2-18				

153

DATE: 6/30/2022 3:39:47 PM
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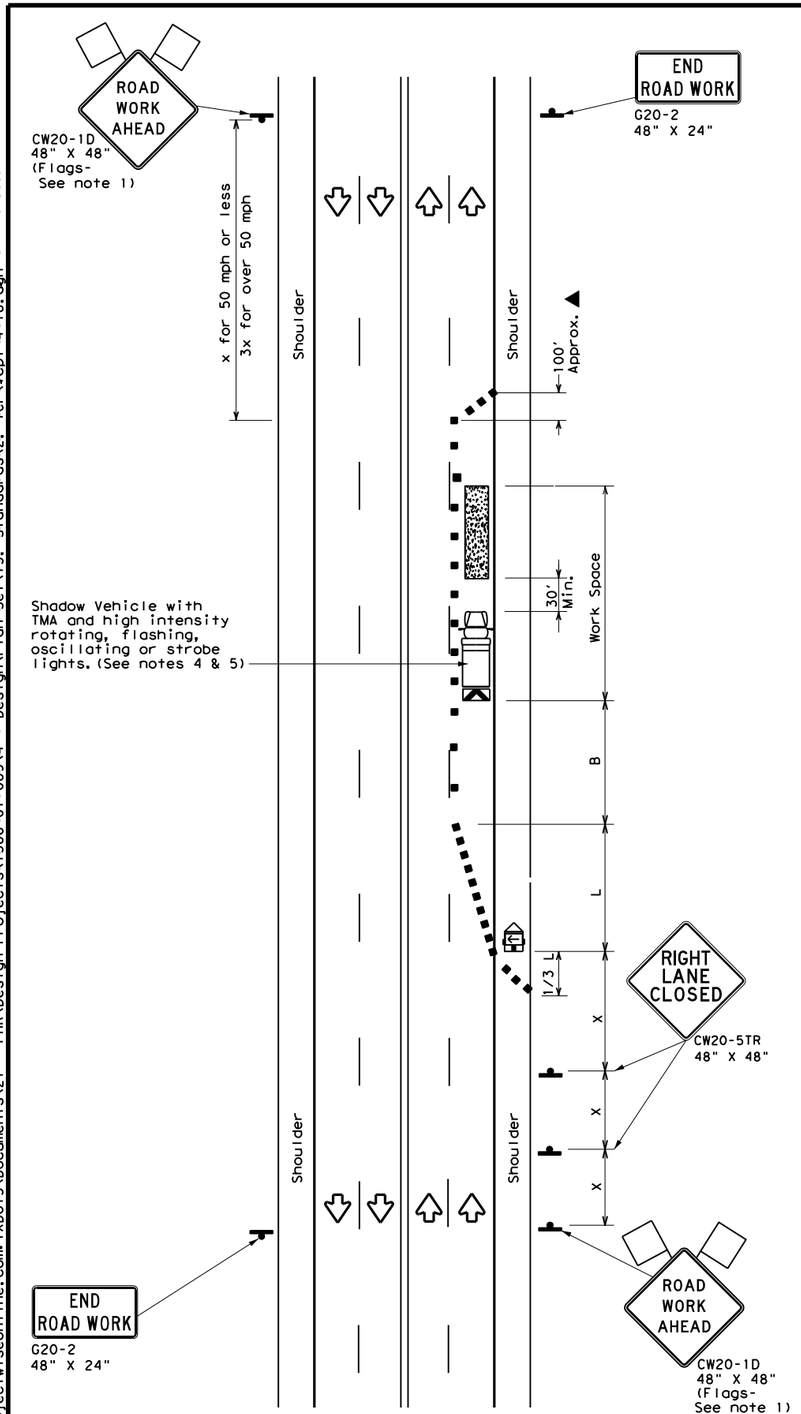
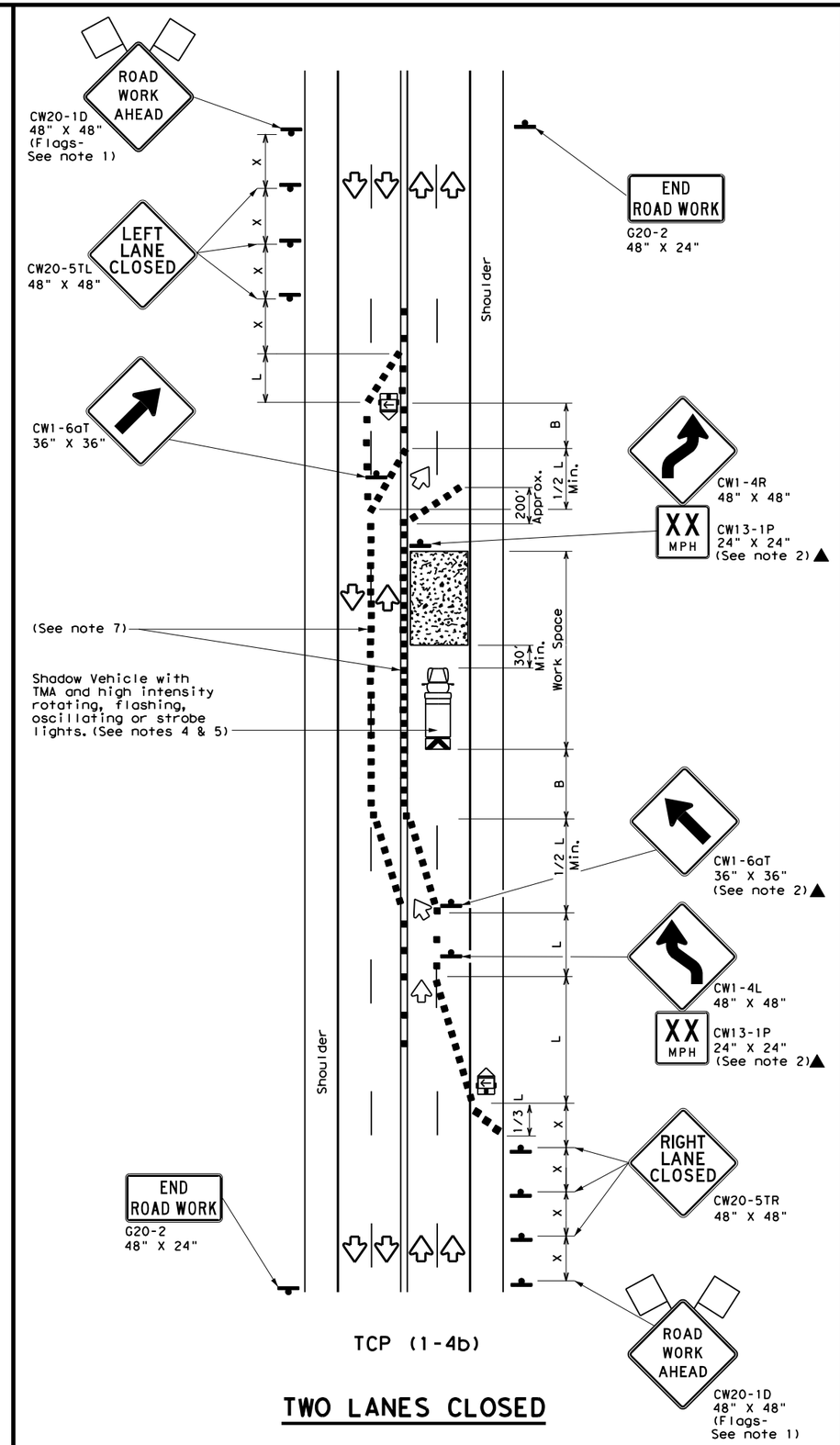


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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

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

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

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

GENERAL NOTES

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

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	PHR	HIDALGO,ETC.		74
1-97 2-18				

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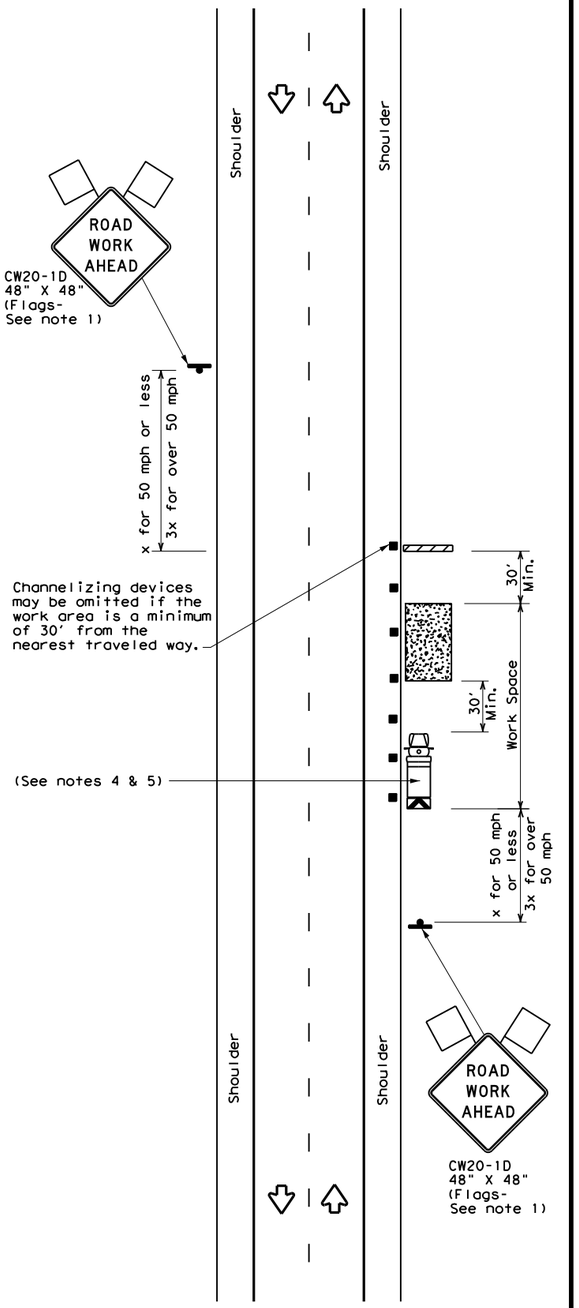
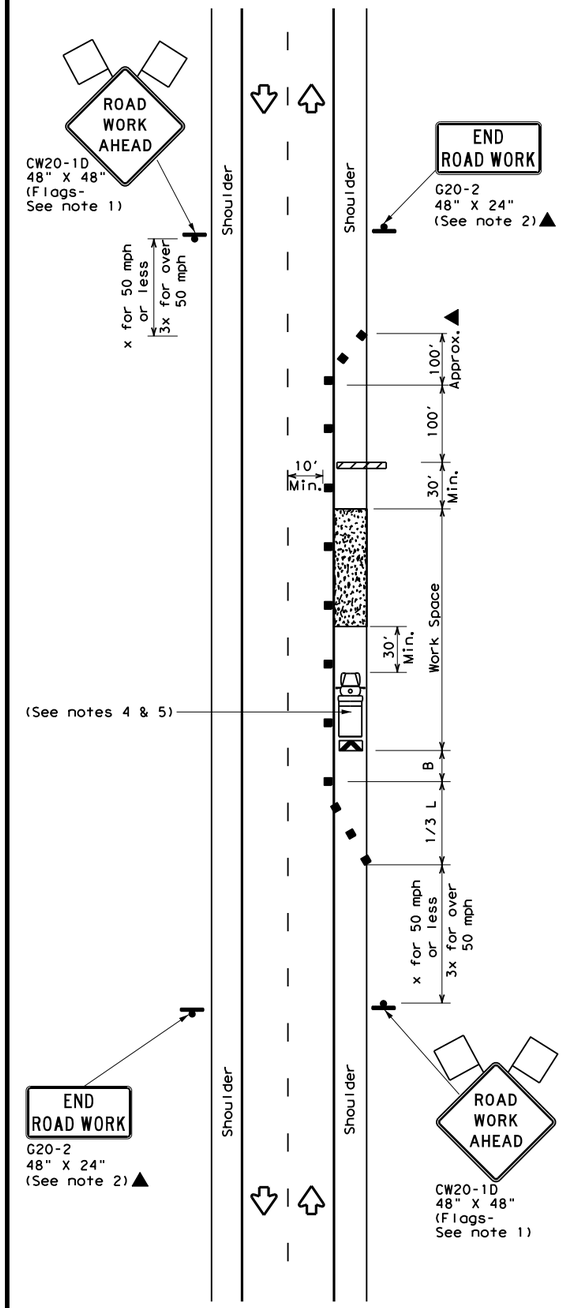


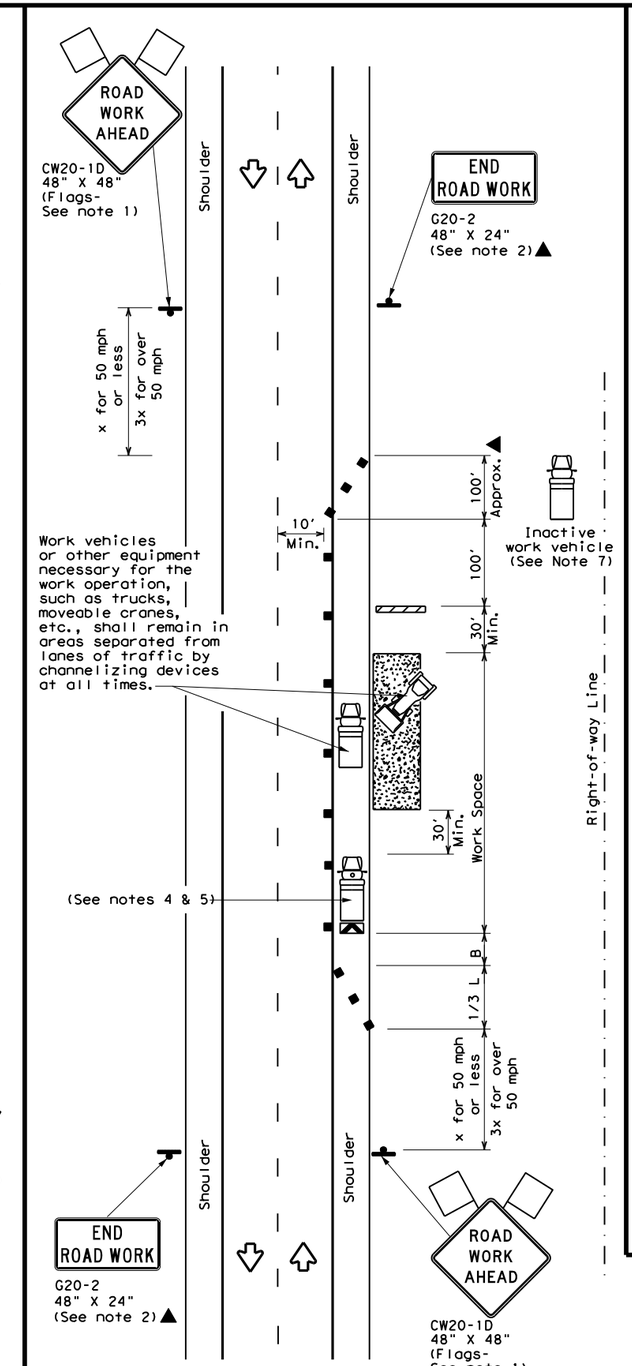
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND

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

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

* Conventional Roads Only

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

TYPICAL USAGE

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	PHR	HIDALGO,ETC.		75
1-97 2-18				

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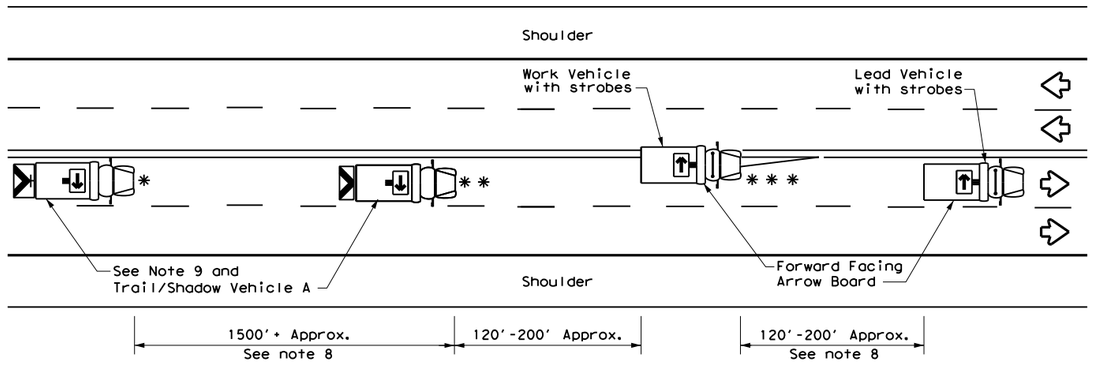
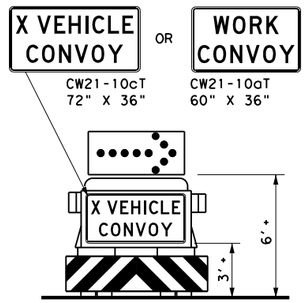


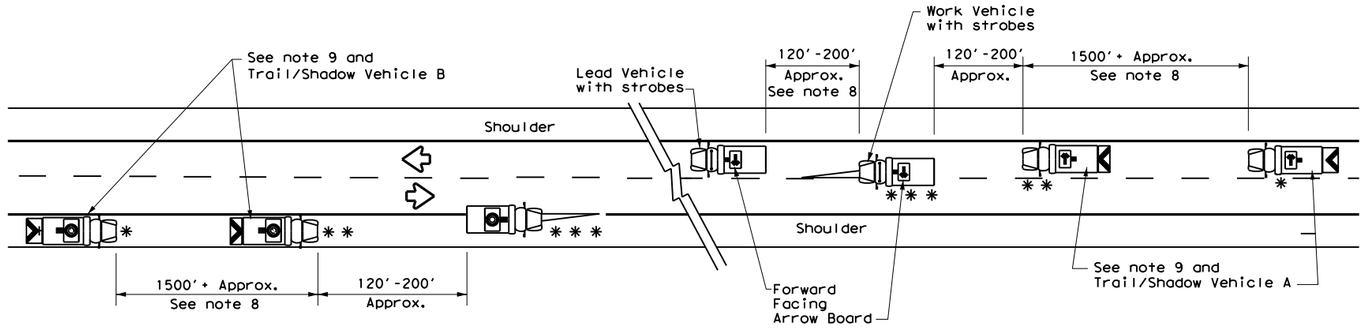
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

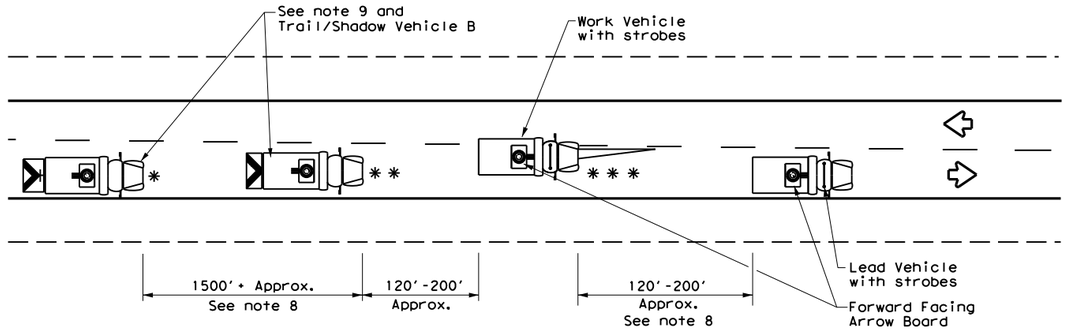


WORK ON SHOULDER

WORK ON TRAVEL LANE

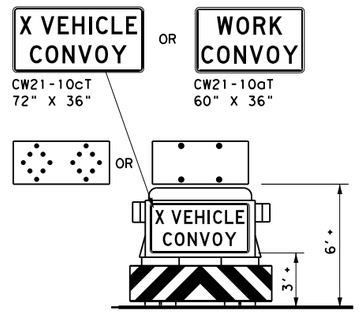
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

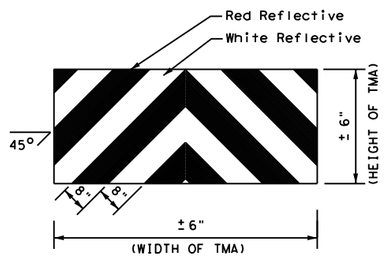
with Flashing Arrow Board in CAUTION display

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



STRIPING FOR TMA

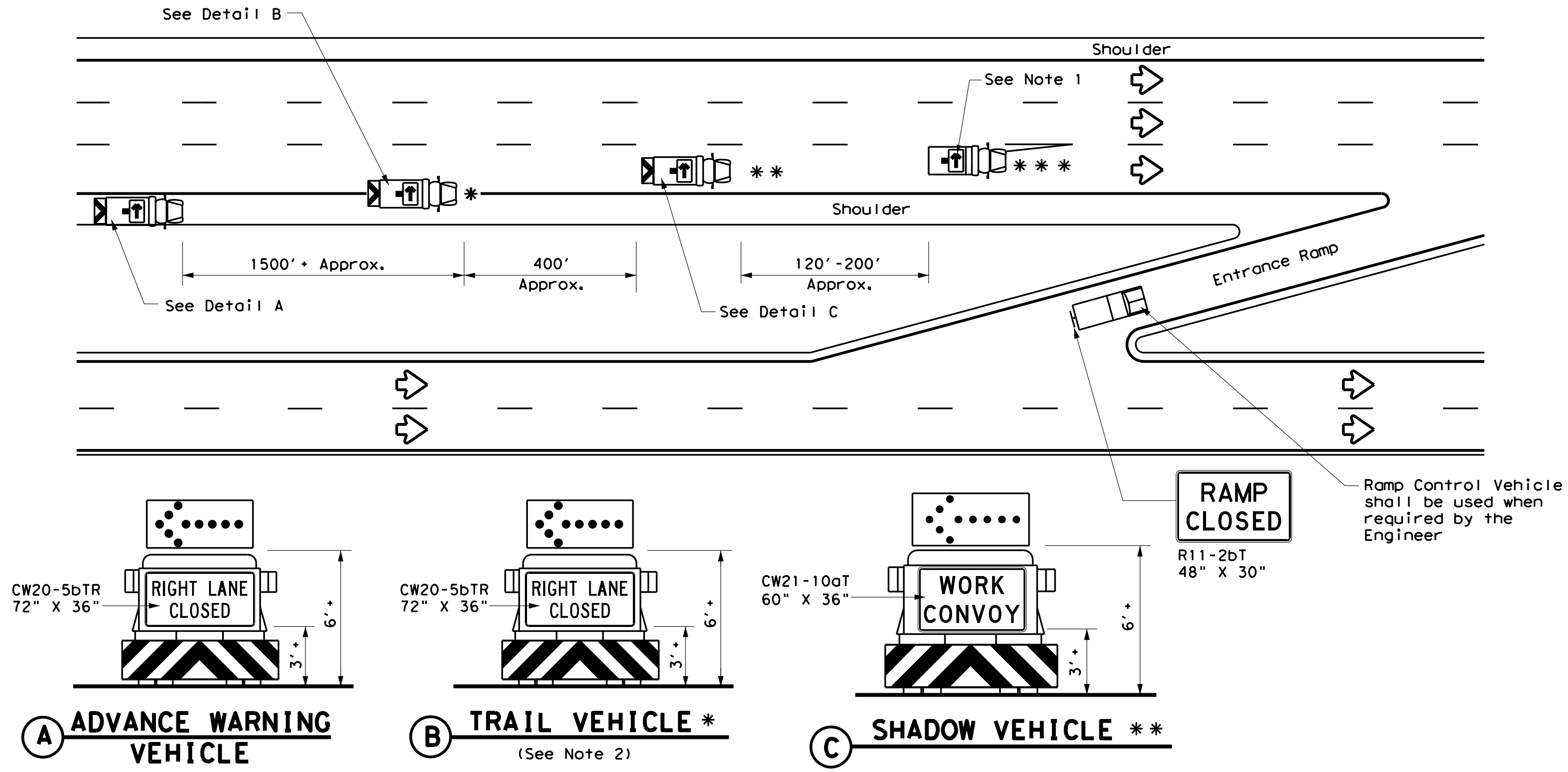
Texas Department of Transportation

Traffic Operations Division Standard

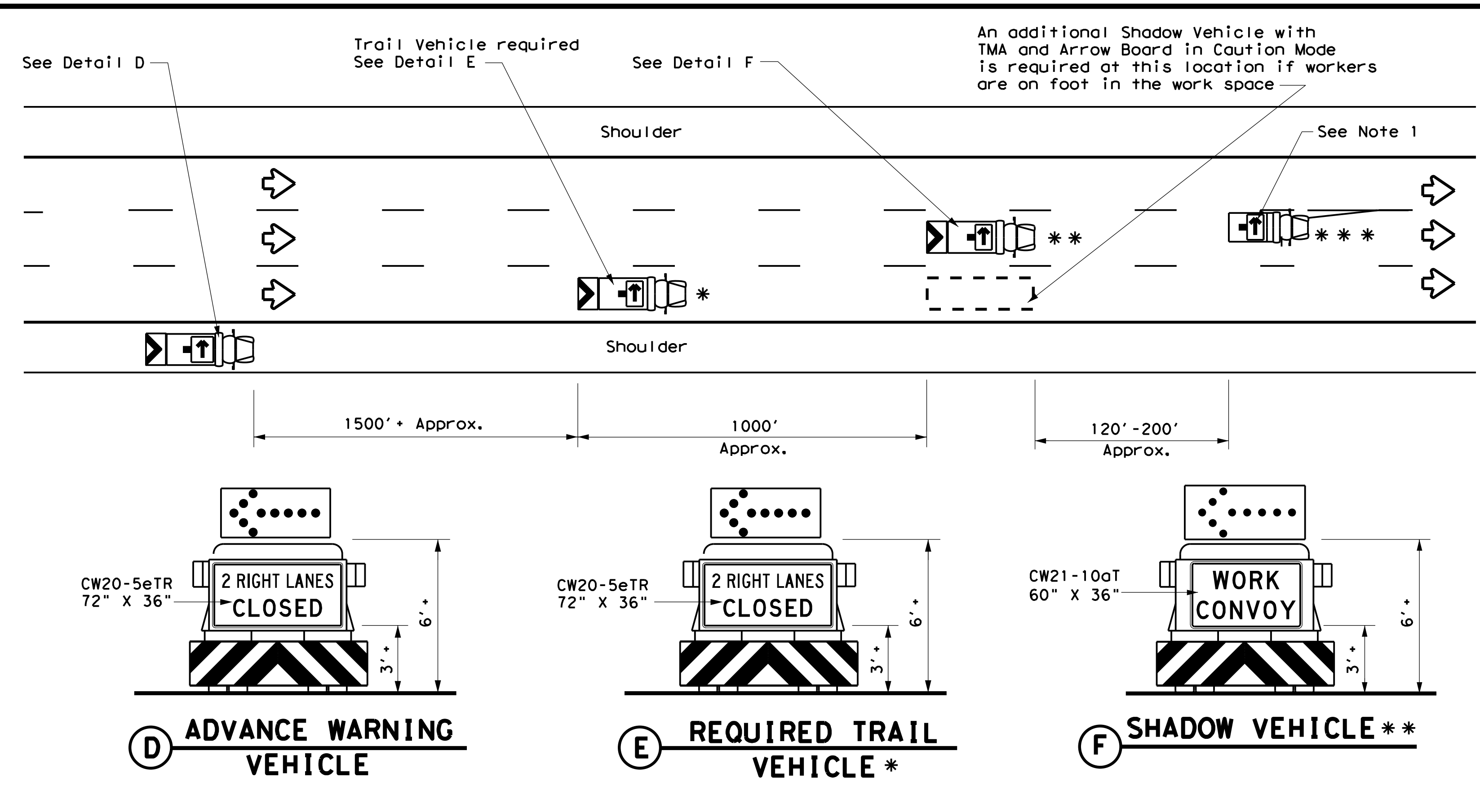
TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		76



RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

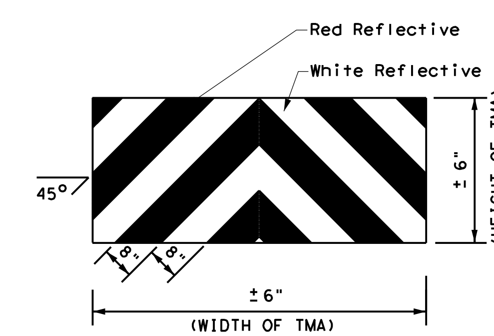
LEGEND

Symbol	Description	Arrow Board Display	
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

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

GENERAL NOTES

1. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board, must be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

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© TxDOT December 1985	CONT 1586	SECT 01	JOB 089, ETC.	HIGHWAY FM 907, ETC.
REVISIONS 2-94 4-98 8-95 7-13 1-97	DIST PHR	COUNTY HIDALGO, ETC.		SHEET NO. 77

176

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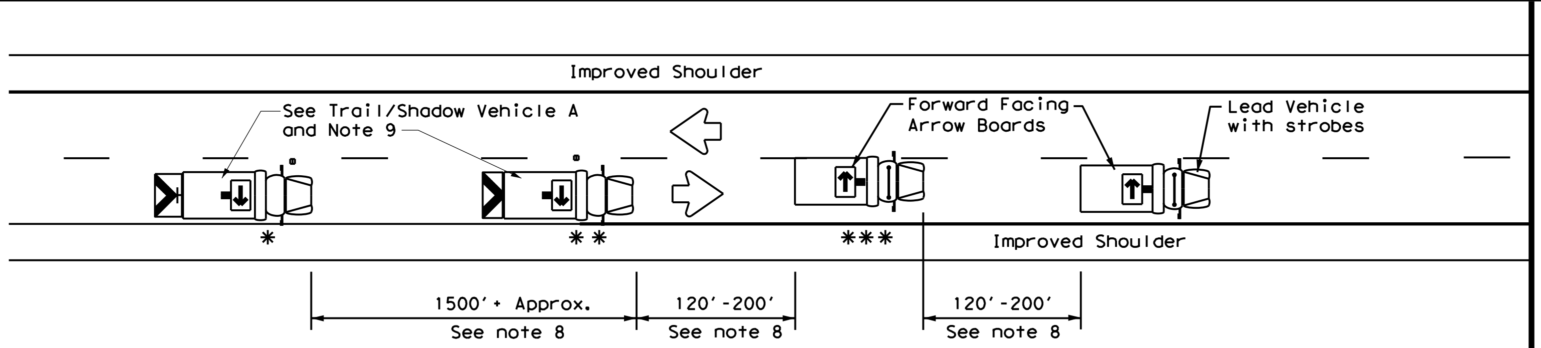
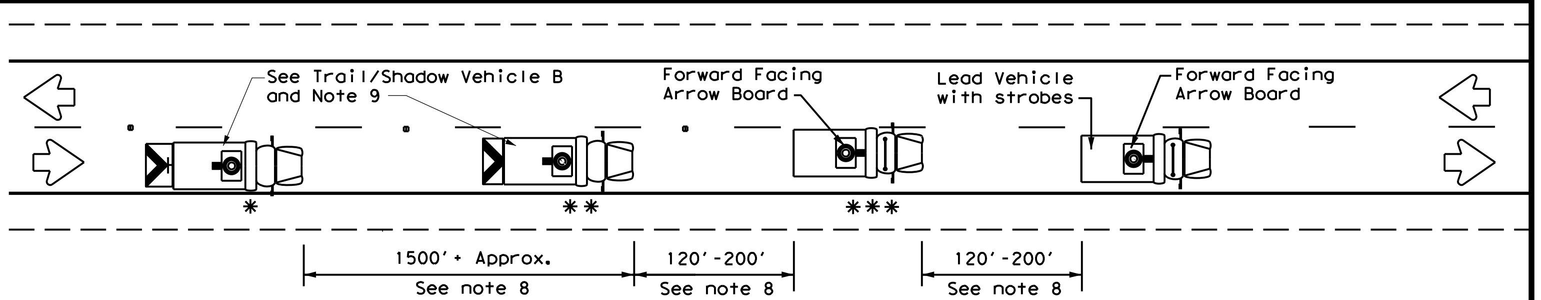
TCP (3-3a)



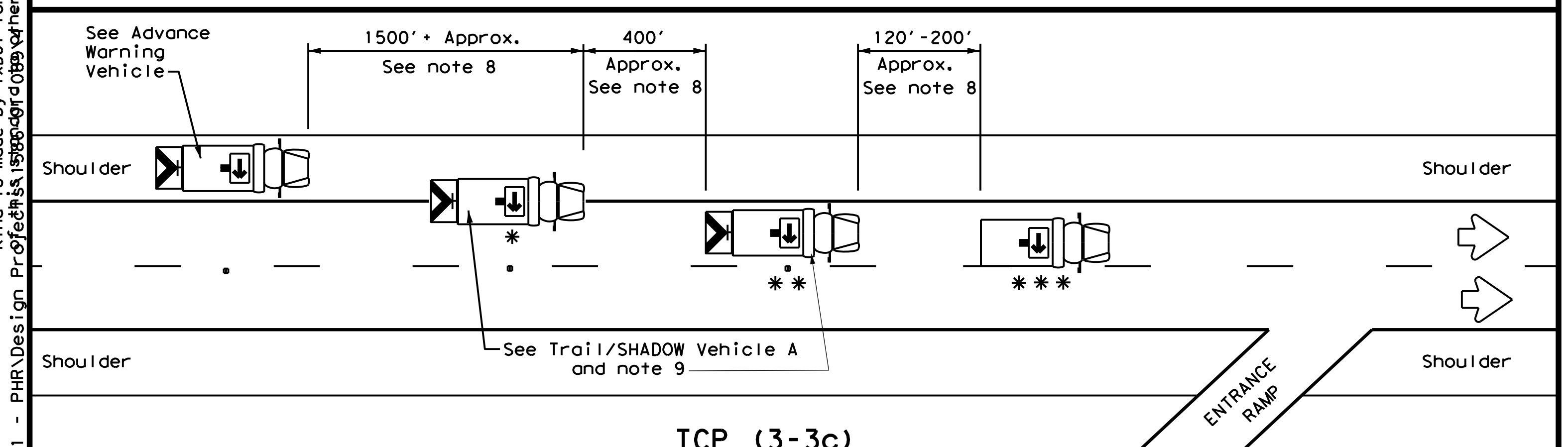
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS
(WORK ON TRAVEL LANE)



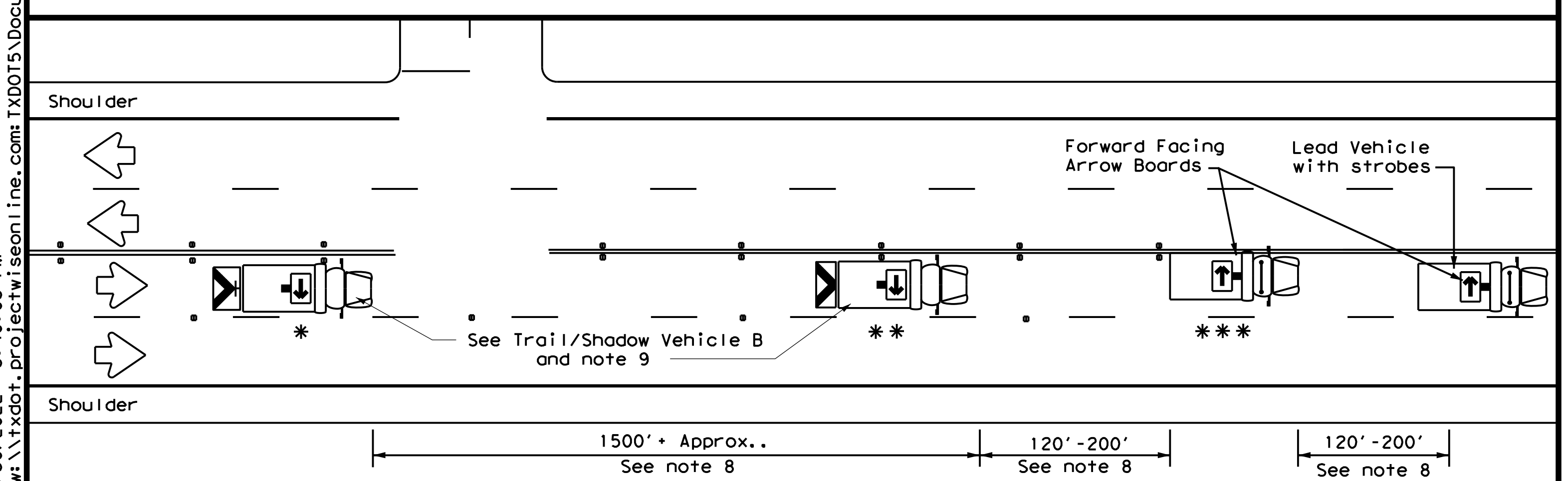
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS
(WORK ON TRAVEL LANE)



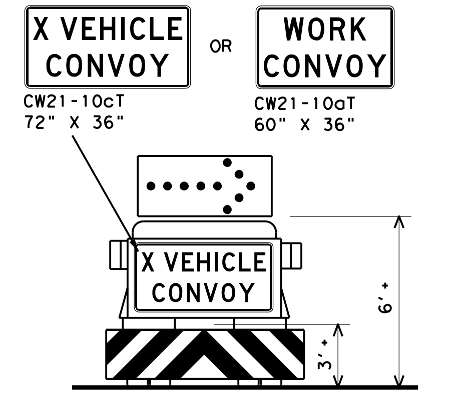
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



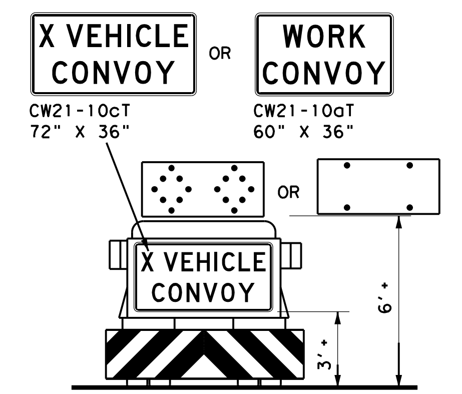
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



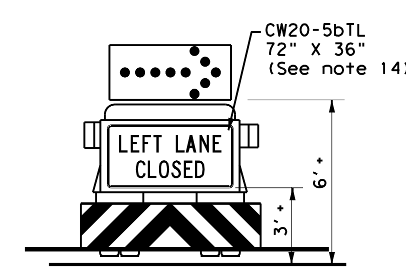
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

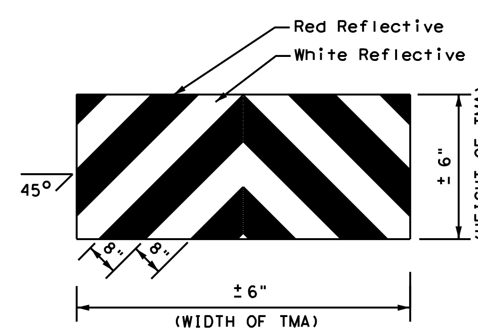


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND

Symbol	Meaning	Symbol	ARROW BOARD DISPLAY
*	Trail Vehicle		
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

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©TxDOT September 1987	CONT 1586	SECT 01	JOB 089, ETC.	HIGHWAY FM 907, ETC.
REVISIONS 2-94 4-98 8-95 7-13 1-97 7-14	DIST PHR		COUNTY HIDALGO, ETC.	SHEET NO. 78

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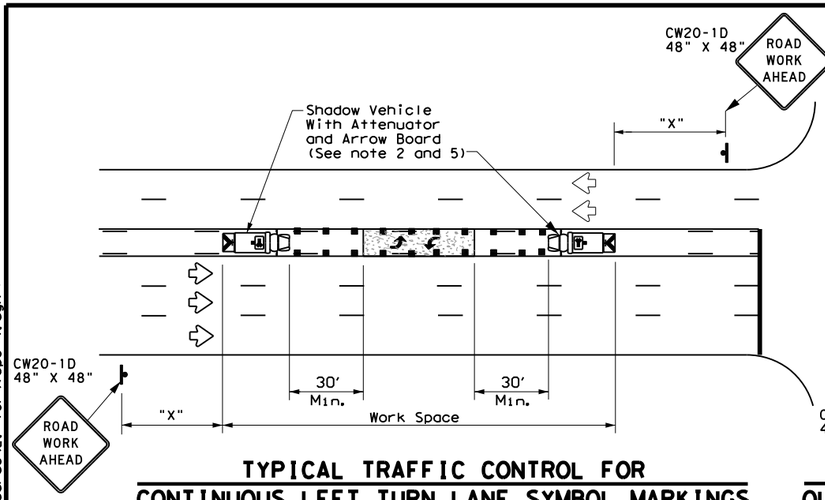
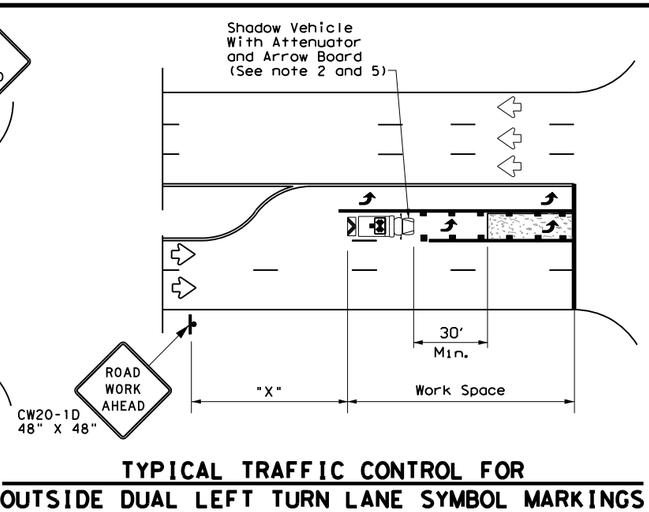
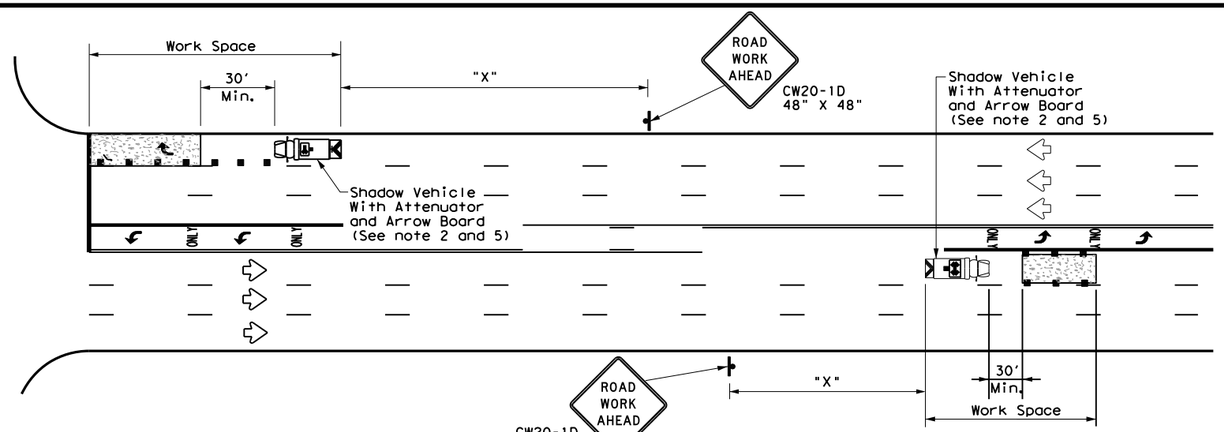


TYPICAL TRAFFIC CONTROL FOR CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

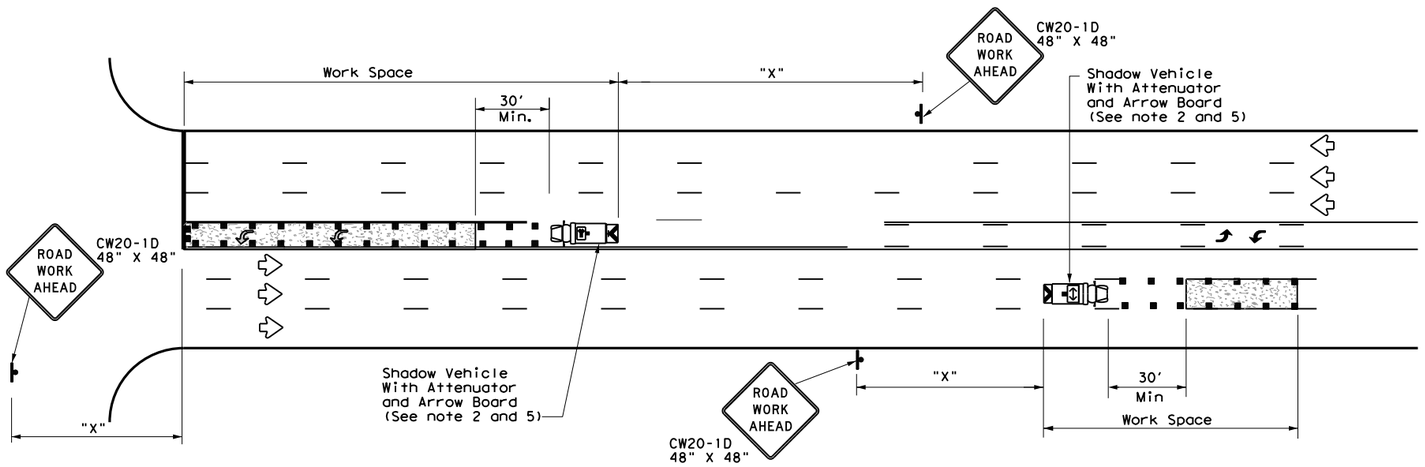


TYPICAL TRAFFIC CONTROL FOR OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR CENTER LANE MARKINGS

LEGEND

*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		Channelizing Devices

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 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'

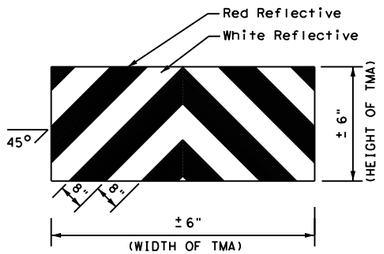
* Conventional Roads Only

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP(3-4)-13

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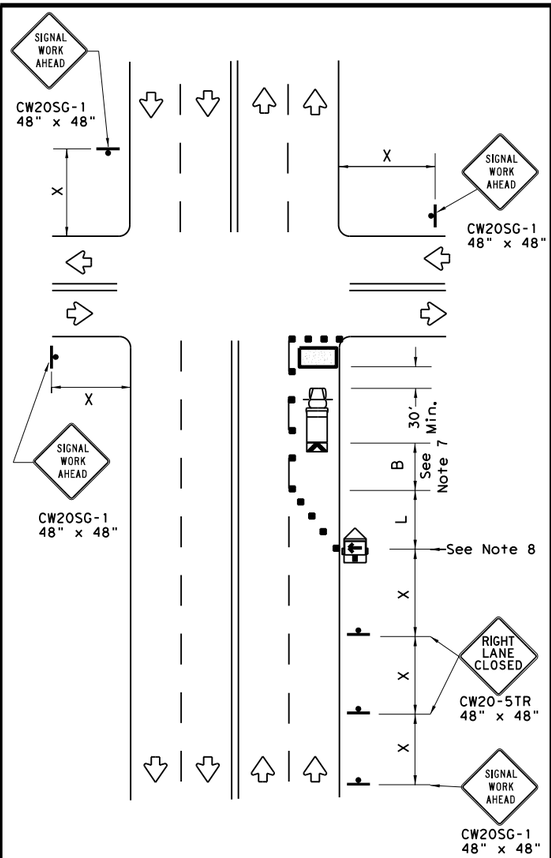
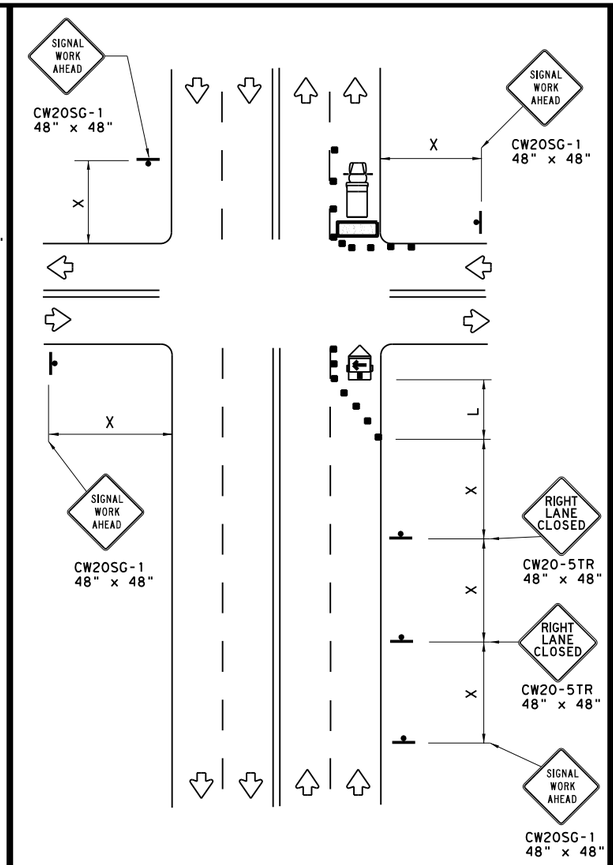


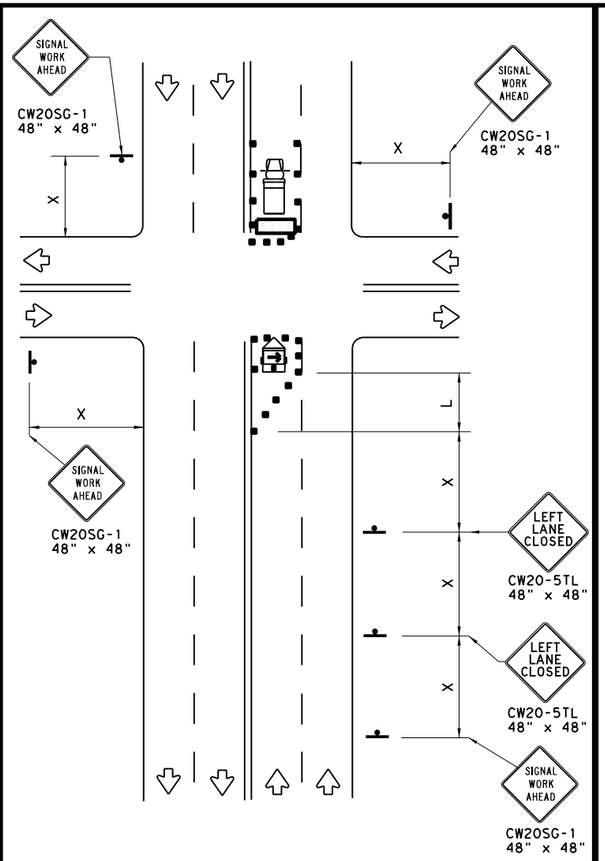
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



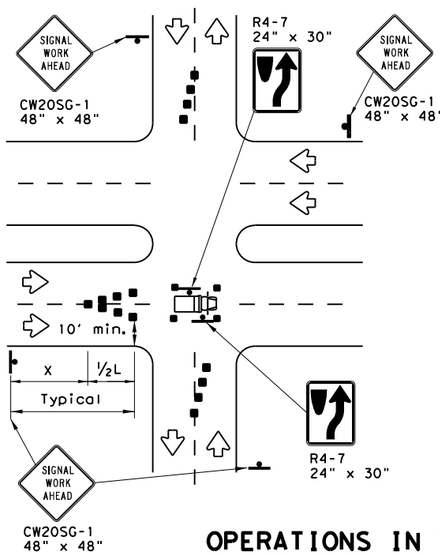
FAR SIDE RIGHT LANE CLOSURE

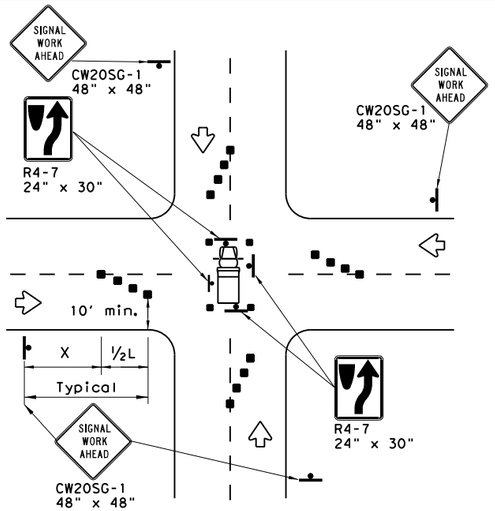
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

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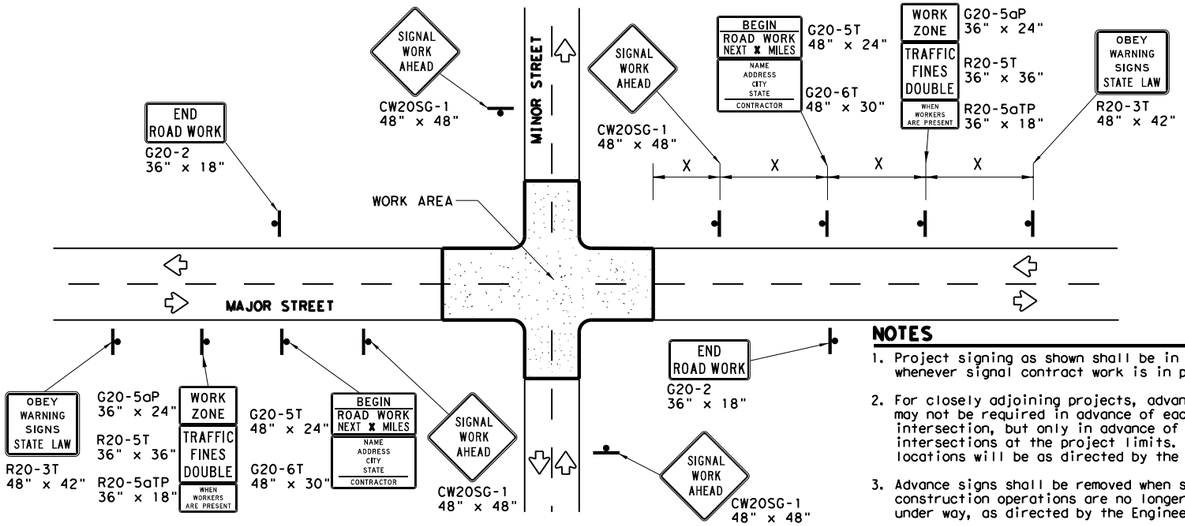


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

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

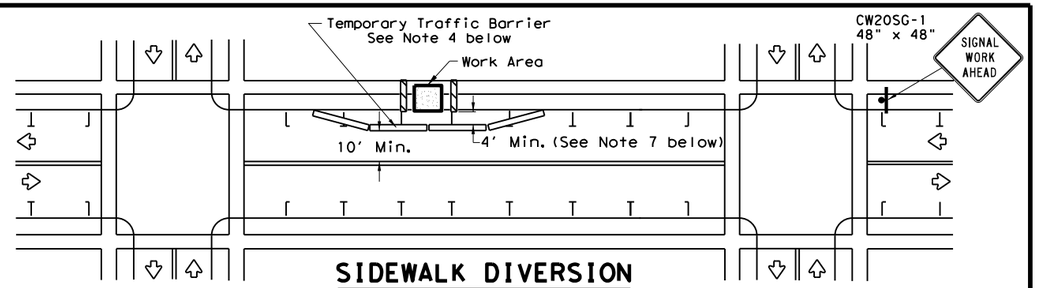
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

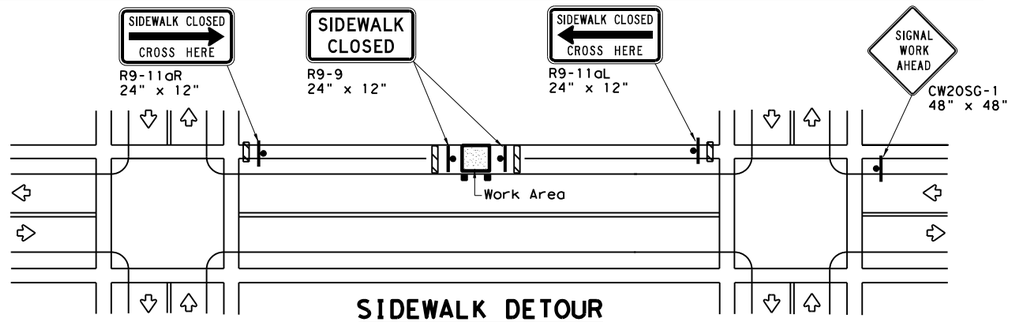
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

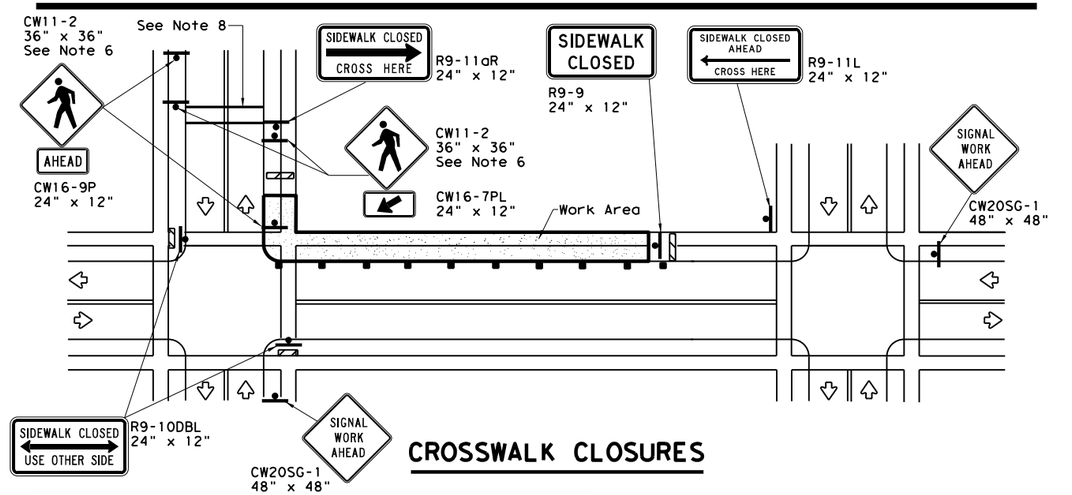
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



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
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REVISIONS	1586	01	089,ETC.	FM 907,ETC.
2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	PHR	HIDALGO,ETC.		81

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.

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Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

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© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

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

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

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

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

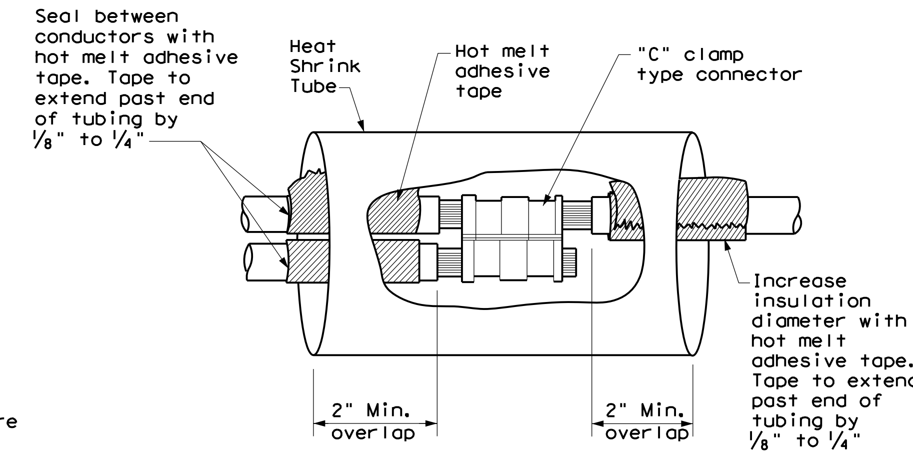
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

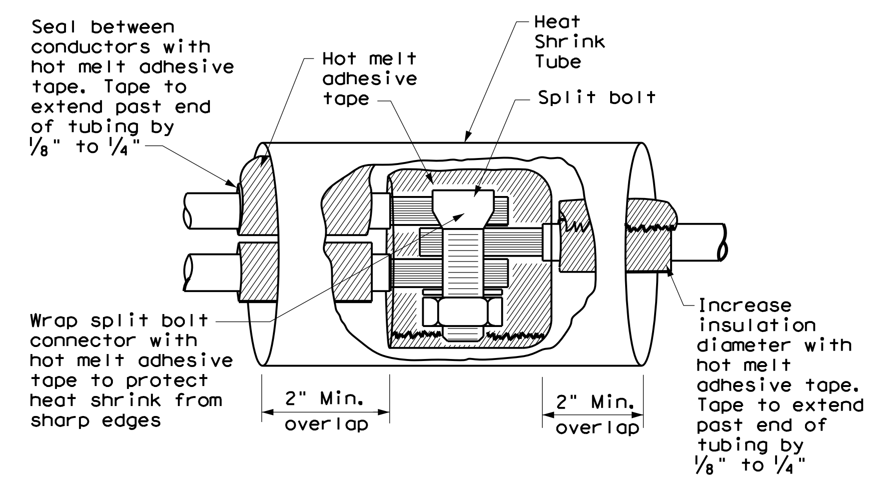
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

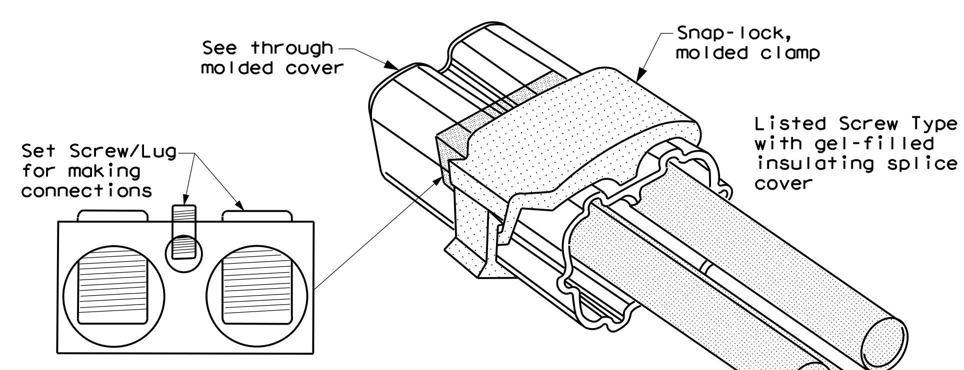
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation	Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

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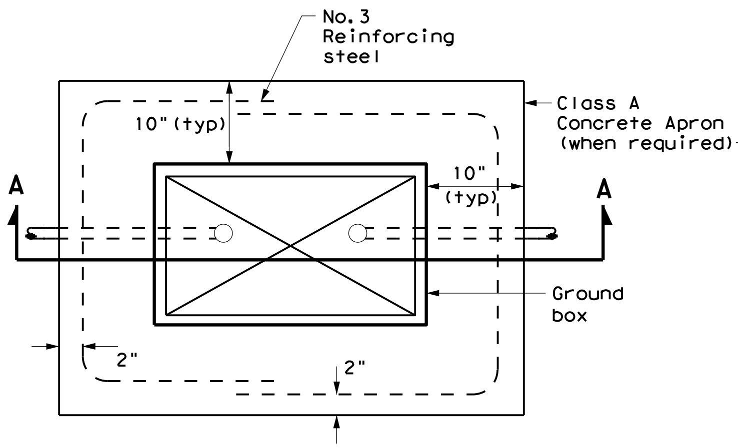
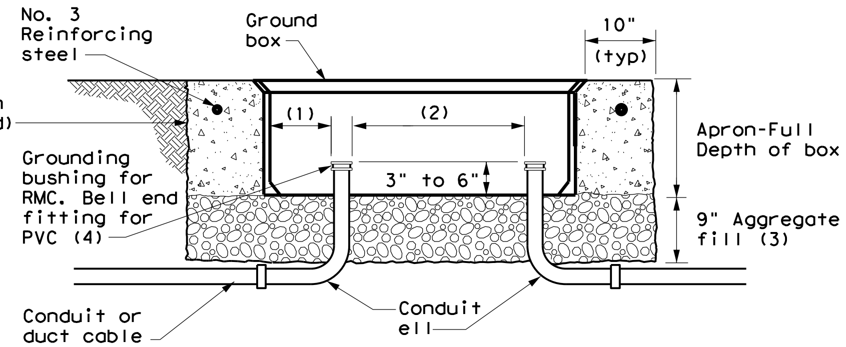


PLAN VIEW



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 BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

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

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

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

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

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

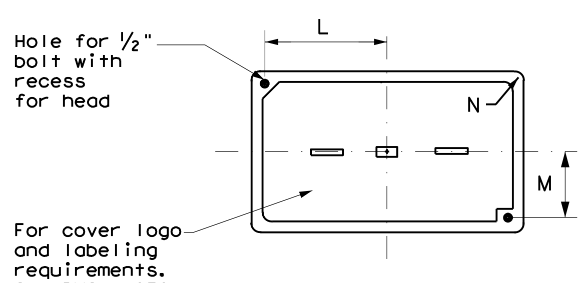
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

GROUND BOX DIMENSIONS

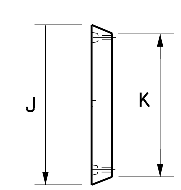
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS

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



PLAN VIEW



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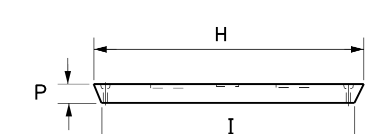

SIDE

GROUND BOX COVER

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

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REVISIONS	DIST PHR	COUNTY HIDALGO, ETC.		SHEET NO. 84

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

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

*ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

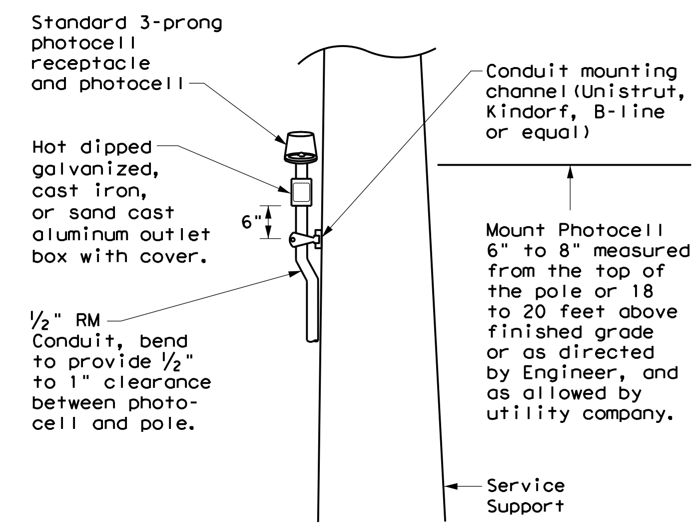
* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

- Schematic Type
- Service Voltage V / V
- Disconnect Amp Rating
  000 indicates main lug only/
  Typically Type T
- (SS)= Safety Switch Ahead of Meter-Check with Utility
  (NS)= No safety Switch Ahead of Meter-Check with Utility
- Enclosure Type
  GS= Galvanized steel("off the shelf")
  SS= Stainless steel(Custom Enclosure)See MPL
  AL= Aluminum (Custom Enclosure)See MPL
- Photocell Mounting Location
  (E)= Inside Service/Enclosure Mounted
  (T)= Top of pole
  (L)= Luminaire mounted
  (N)= None/No Photocell or Lighting Contactor Required
- Service Support Type
  GC= Granite concrete
  OC= Other concrete
  TP= Timber pole
  SP= Steel pole
  SF= Steel frame
  OT= Pole by others or paid for separately
  EX= Existing pole
  TS= Service on traffic signal pole
  PS= Pedestal Service
- O= Overhead Service Feed from Utility
  U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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	PHR		HIDALGO,ETC.	85

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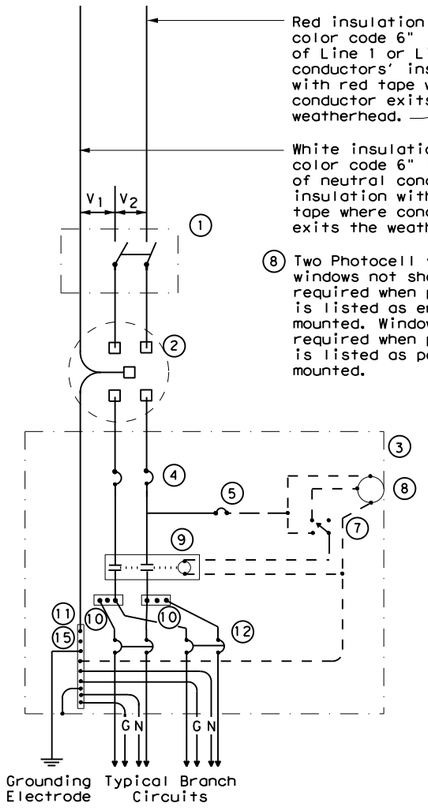
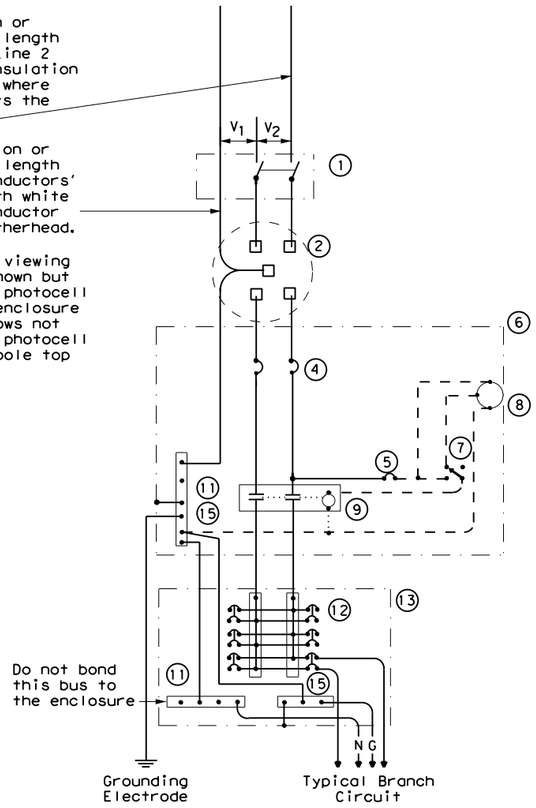
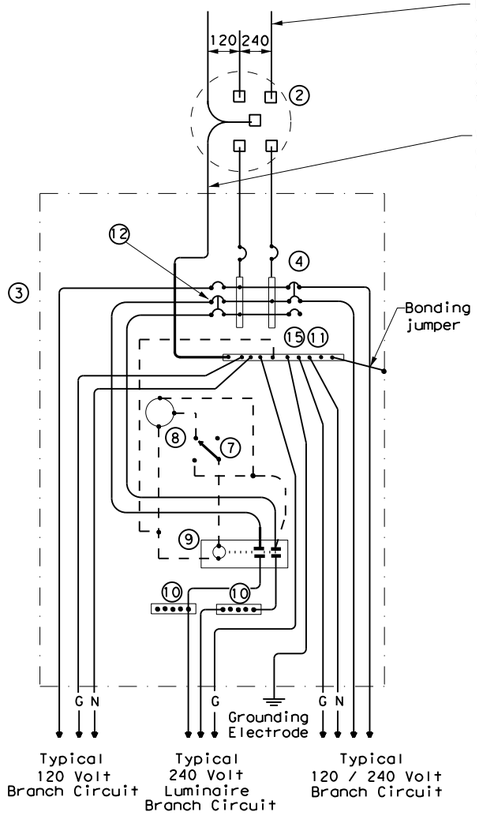


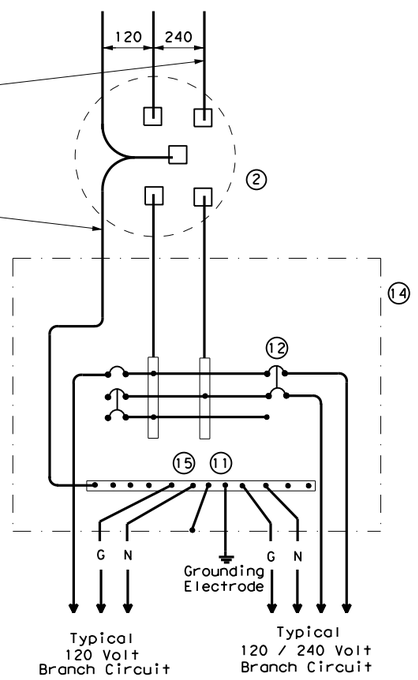
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



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



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

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

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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	PHR	HIDALGO,ETC.		86

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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.

2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.

3. Provide and install galvanized ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.

4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.

6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.

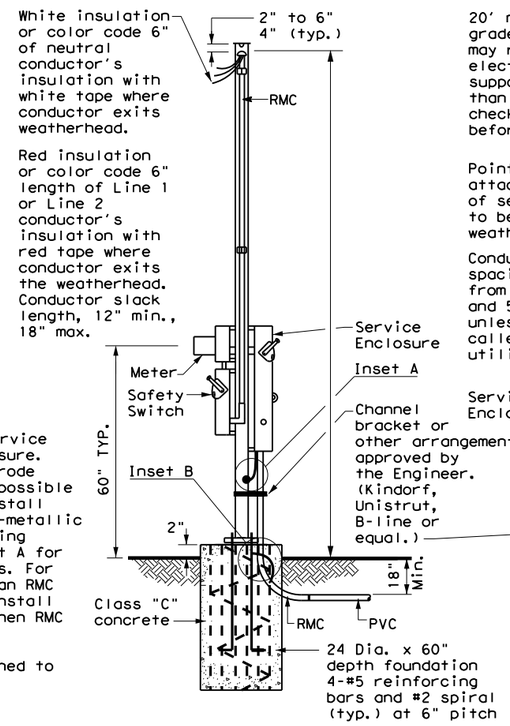
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.

8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

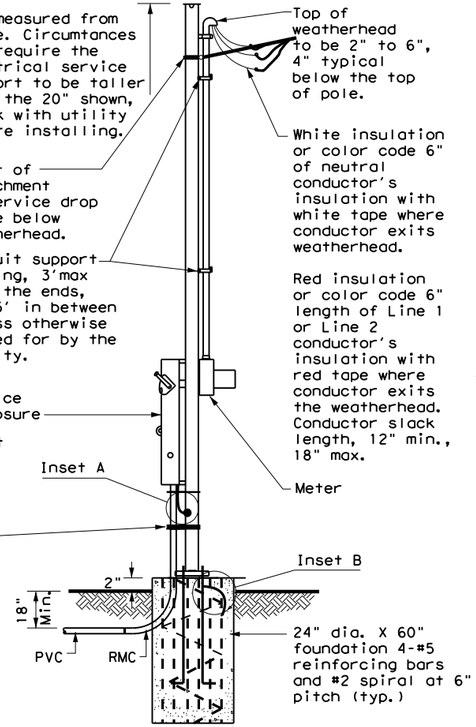
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

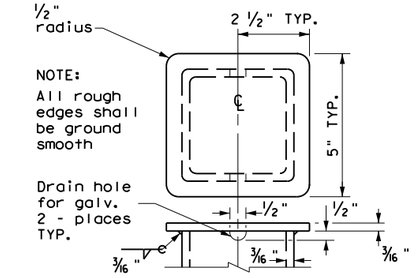


WITH SAFETY SWITCH

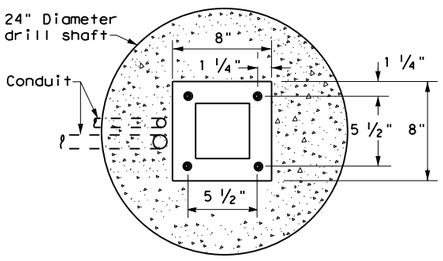


WITHOUT SAFETY SWITCH

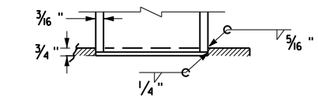
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

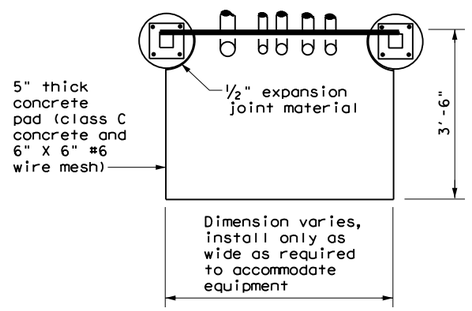


BASE PLATE DETAIL



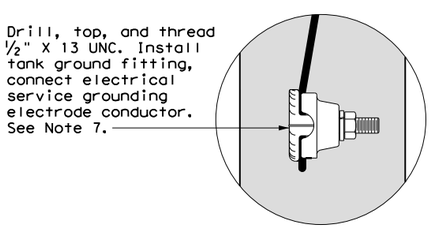
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



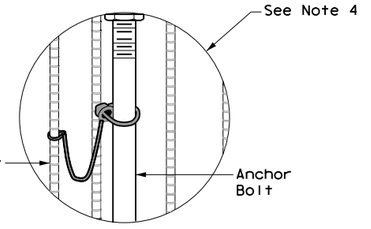
TOP VIEW

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

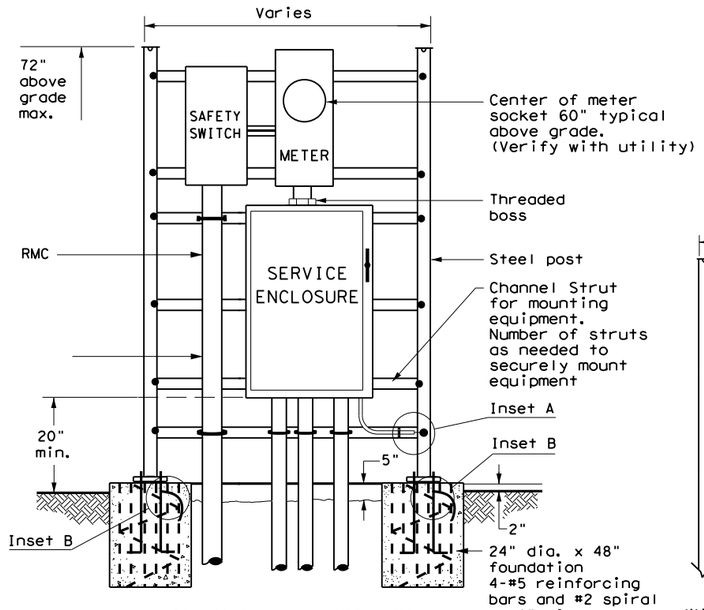


FRONT VIEW

INSET A

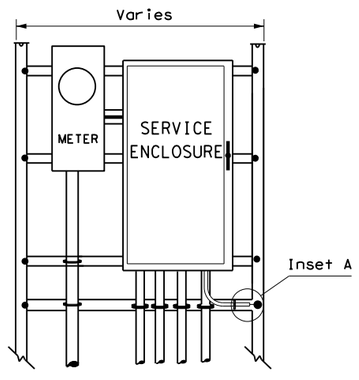


INSET B



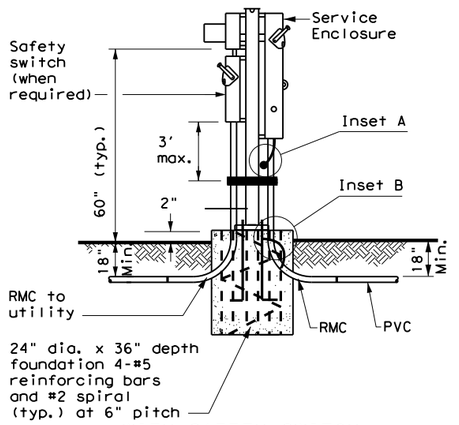
WITH SAFETY SWITCH

FRONT VIEW

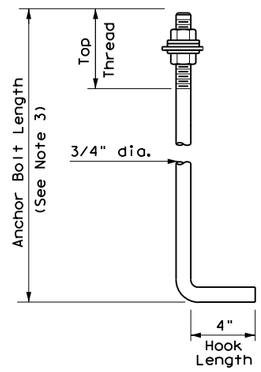


WITHOUT SAFETY SWITCH

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		87

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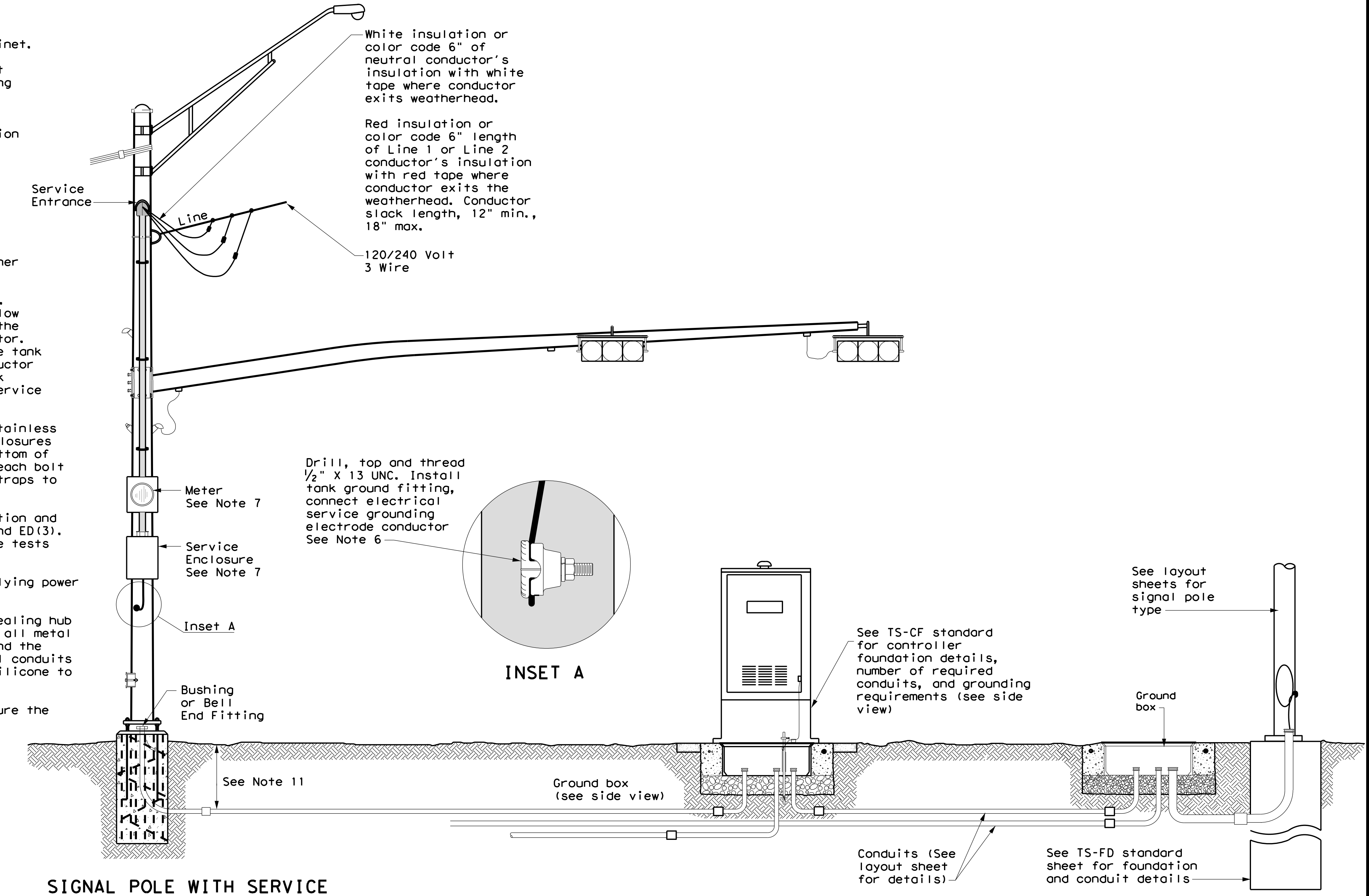
TRAFFIC SIGNAL NOTES

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".

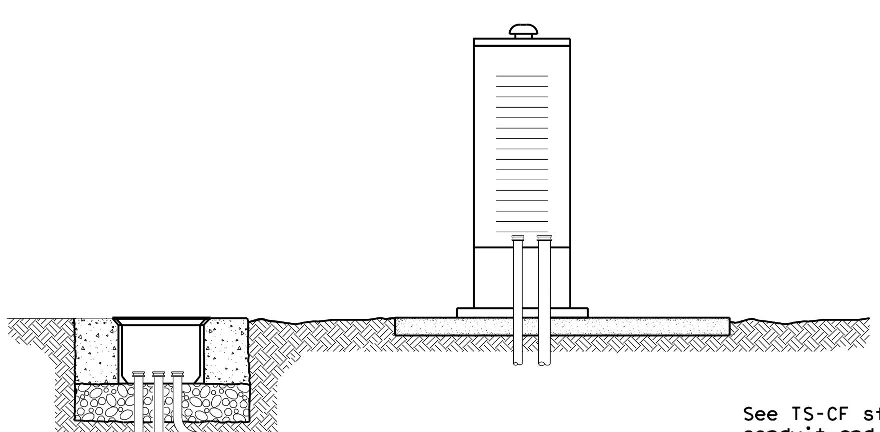


SIGNAL POLE WITH SERVICE

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.

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.

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Texas Department of Transportation — Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

FILE: ed8-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089, ETC.	FM 907, ETC.
	DIST		COUNTY	SHEET NO.
	PHR		HIDALGO, ETC.	88

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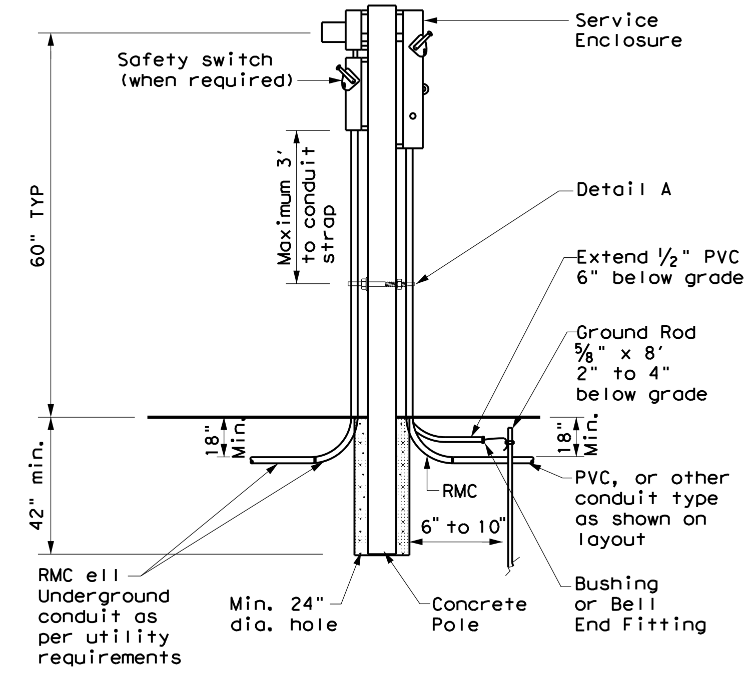
TIMBER POLE (TP) SERVICE SUPPORT NOTES

1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrial service.
3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to ⅝ in. max. depth and 1 ⅞ in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to 3 ¾ in. maximum depth, and 1½ in. to 1⅝ in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, ¼ in. minimum diameter by 1½ in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
6. When excess length must be trimmed from poles, trim from the top end only.

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

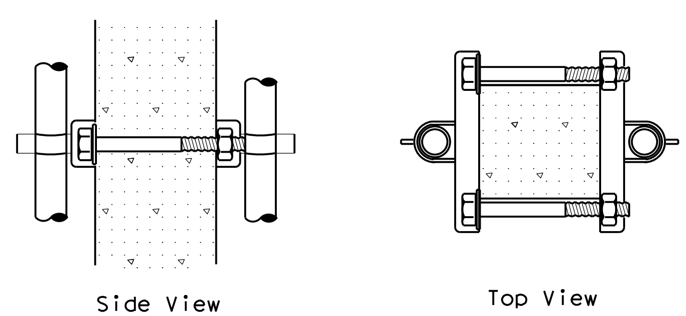
Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
5. Ensure all installation details of services are in accordance with utility company specifications.
6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the electric utility.
7. Furnish and install galvanized or stainless steel channel strut 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. 1" depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stack channel struts.
8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.



CONCRETE SERVICE SUPPORT

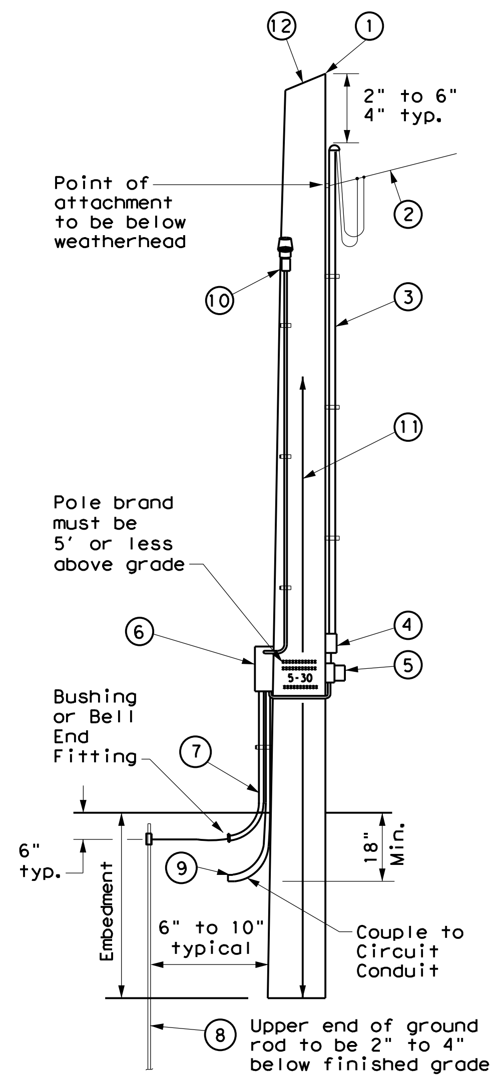
Underground (U)



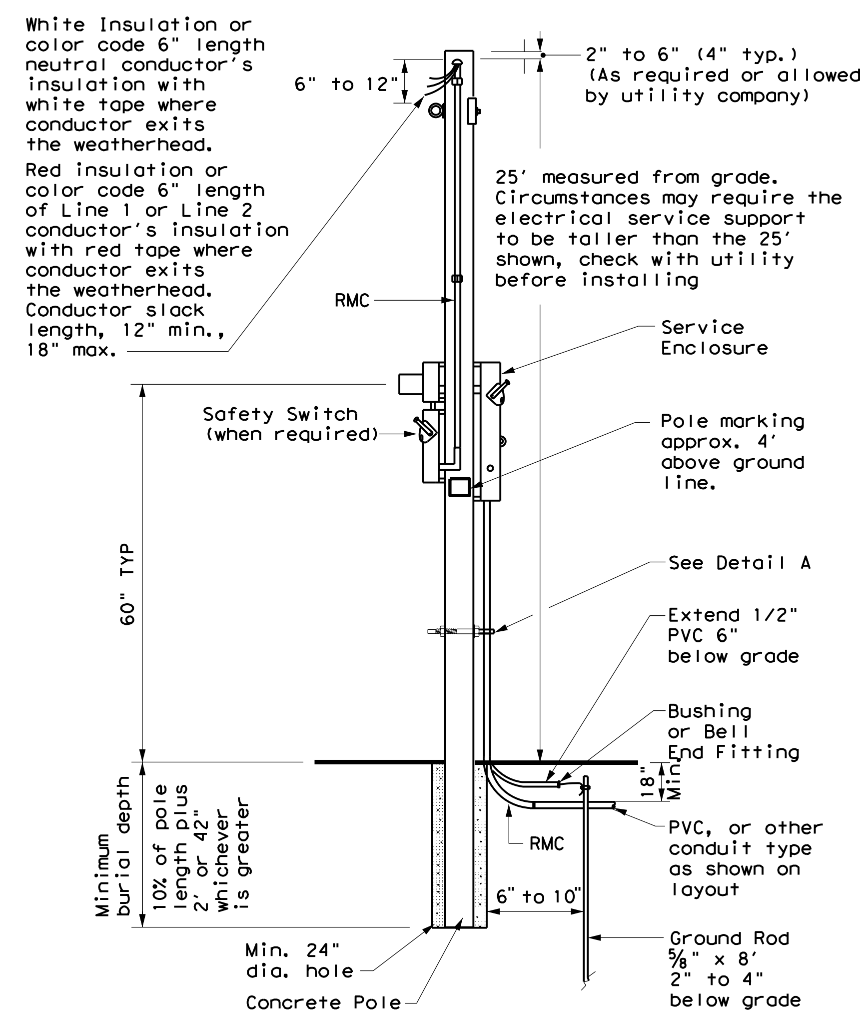
DETAIL A

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

1. Class 5 pole, height as required
2. Service drop from utility company (attached below weatherhead)
3. Service conduit (RMC) and service entrance conductors - One Red, One Black, One White (See Electrical Service Data)
4. Safety switch (when required)
5. Meter (when required)
6. Service enclosure
7. 6 AWG bare grounding electrode conductor in ½ in. PVC to ground rod - extend ½ in. PVC 6 in. underground.
8. ⅝ in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.
9. RMC same size as branch circuit conduit.
10. See pole-top mounted photocell detail on ED(5).
11. When required by the serving utility provide bare 6 AWG copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor with non-conductive material to a height of 8 ft. above finished grade.
12. When required by utility, cut top of pole at an angle to enhance rain run off.



SERVICE SUPPORT TYPE TP (O)



CONCRETE SERVICE SUPPORT

Overhead (O)

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Texas Department of Transportation

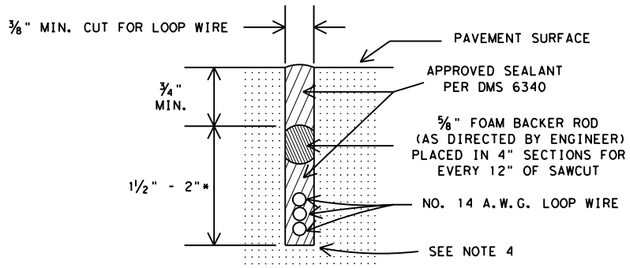
Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

ED(10)-14

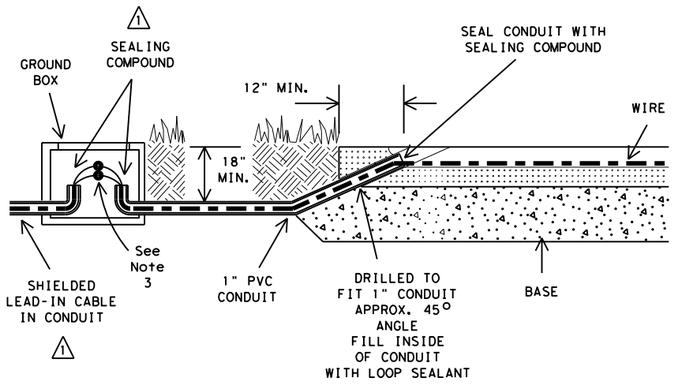
FILE: ed10-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089, ETC.	FM 907, ETC.
	DIST		COUNTY	SHEET NO.
	PHR		HIDALGO, ETC.	89

71K

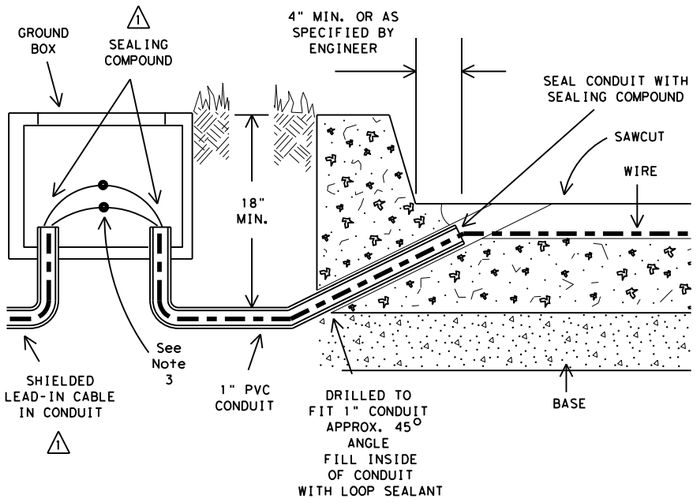


LOOP SAW CUT CROSS-SECTION

* SAWCUTS IN BRIDGE DECKS ARE TYPICALLY 1" DEPTH MAXIMUM
SAWCUTS IN BRIDGE DECKS AND ACROSS EXPANSION JOINTS
SHALL BE AS APPROVED BY ENGINEER



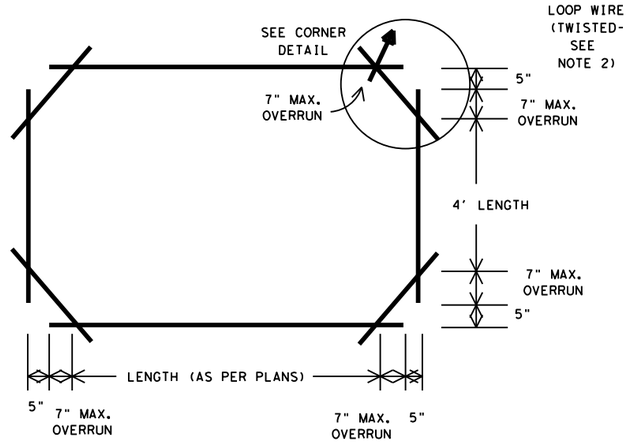
TYPICAL LEAD IN CONFIGURATION (WITHOUT CURBING)



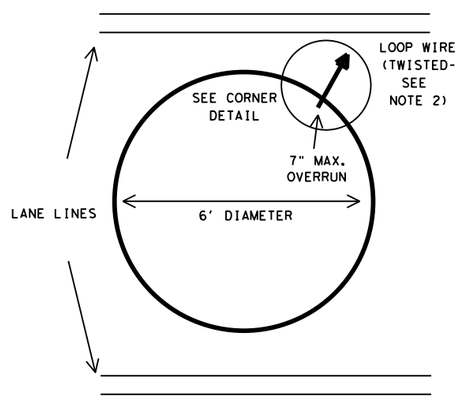
TYPICAL LEAD IN CONFIGURATION (WITH CURBING)

TYPICAL LOOP DETECTOR LAYOUTS

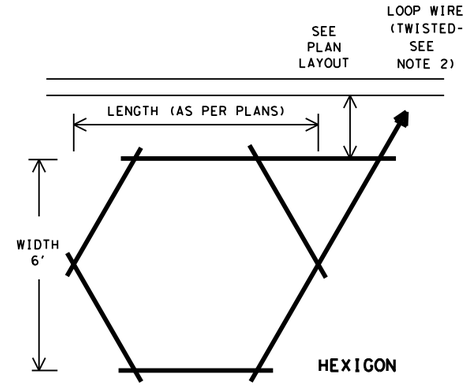
(AS SPECIFIED IN PLANS)



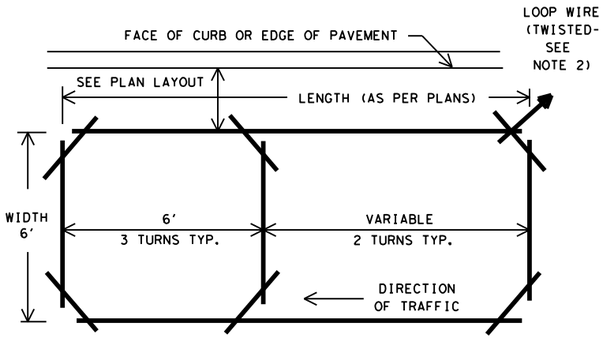
RECTANGULAR



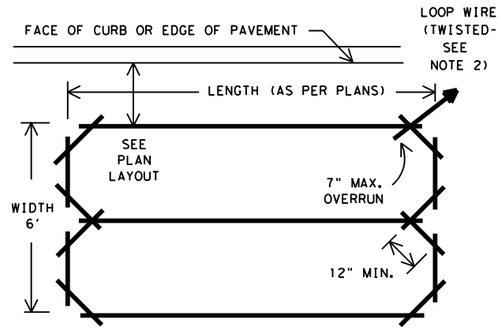
CIRCULAR



HEXIGON



POWER HEADER



QUADRAPOLE

GENERAL NOTES:

1. The pavement cut is to be made with a concrete saw to neat lines and loose material removed. The cut shall be clean and dry when the wire and sealing compound is placed.
2. Loop wire shall be 14 AWG Stranded Type XHHW. Wire from the loop to the ground box shall be twisted a minimum of 5 turns per foot. No splices shall be permitted in the loop or in the run to the ground box.
3. The home run cable from the pull box to the controller shall be IMSA 50-2 shielded cable and shall be soldered to the loop wire. The solder joints shall be sealed with Scotchcast or other method acceptable to the Engineer. The shield shall be grounded only at the controller end. Loop home run cable shall be two conductor 14 AWG shielded, Type XHHW.
4. All wire placed in the saw cut shall be sealed by fully encapsulating it in a sealant acceptable to the Engineer. Sealing compound shall be in accordance with DMS 6340.
5. The loop location, confirguration and number of turns shall be as indicated on the plans or as directed by the Engineer.

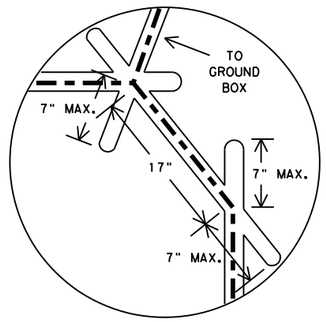
Recommended Number of Turns for Loop Detectors

LOOP PERIMETER SIZE (FT.)	NUMBER OF TURNS	APPROXIMATE LOOP SIZES INCLUDED
24' or Less	3 or 4	5' x 5', 6' x 6'
25' - 110'	2 or 3	6' x 10', 6' x 45'
110' or More	1 or 2	6' x 50' or Longer

6. A separate saw cut shall be made from each loop to the edge of pavement or as specified by the Engineer.
7. Splices between the loop lead-in cable and loop detector shall be made only in the ground box near the loop it is serving.
8. Circular loops may use prewound loops encased in continuous pvc tubing. Sawcut width may be adjusted to accommodate tubing.
9. The lead-in wire in the circular loop shall be coiled at the 3 inch drilled corner to reduce bending stress.
10. Loop duct may be used as specified by Engineer.

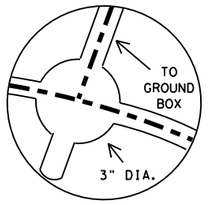
For additiohnal information refer to "Texas Traffic Signal Detector" manual, TTI Report 1163-1.

TYPICAL CORNER DETAILS

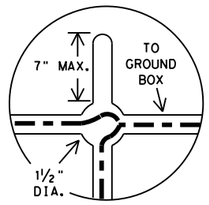


RECTANGULAR & HEXIGON LOOP
SAWCUT CORNER DETAIL

7" OVERRUN BASED ON 24" DIAMETER SAW BLADE



CIRCULAR LOOP
DRILLED CORNER DETAIL



RECTANGULAR & HEXIGON LOOP (ALT.)
DRILLED CORNER DETAIL

Texas Department of Transportation
Traffic Operations Division

LOOP DETECTOR INSTALLATION DETAILS

LD(1)-03

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

REVISIONS
2-99
1-03

CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		90

79A

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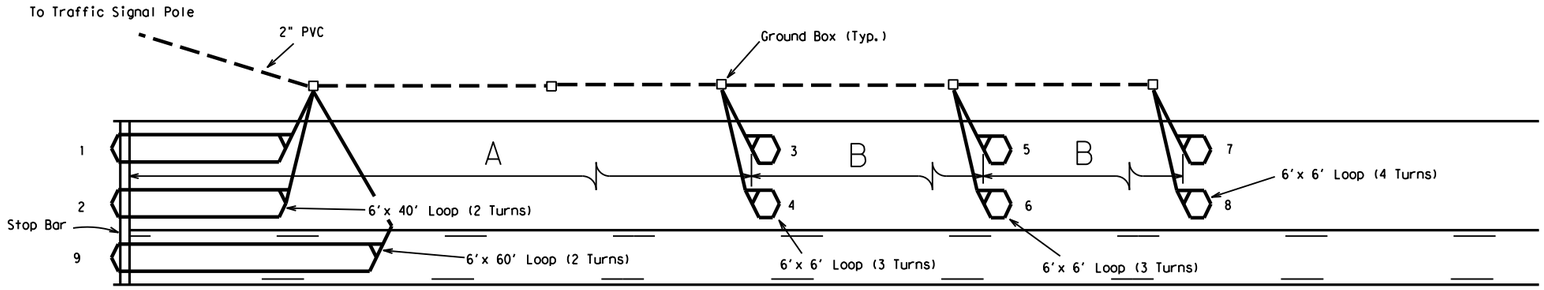
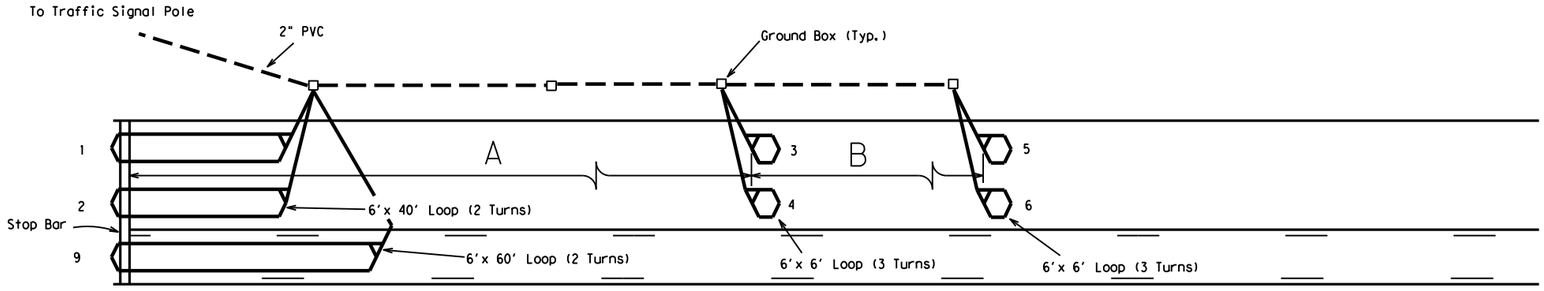
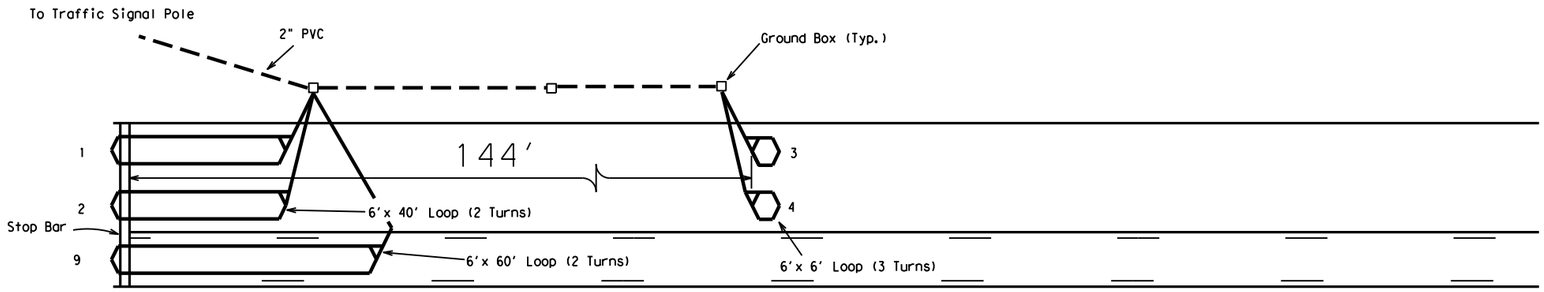


55 MPH (A=225', B=95') 60 MPH (A=275', B=100')
65 MPH (A=320', B=110') 70 MPH (A=350', B=125')



35 MPH (A=90', B=100') 40 MPH (A=110', B=130')
45 MPH (A=175', B=115') 50 MPH (A=220', B=130')



30 MPH

GENERAL NOTES:

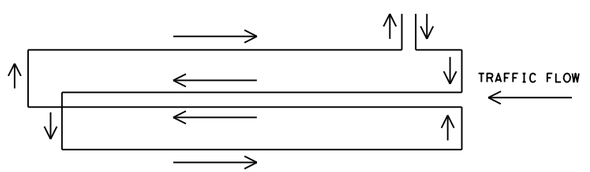
Loops 1 and 2 shall be connected to the controller cabinet by means of the same loop lead-in (2/C #14 AWG).

Loops 3 thru 6 shall be connected to the controller cabinet by means of the same loop lead-in (2/C #14 AWG).

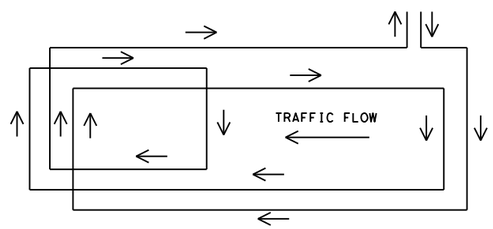
Loops 7 and 8 shall be connected to the controller cabinet by means of the same loop lead-in (2/C #14 AWG).

Loop 9 shall be connected to the controller cabinet by means of a loop lead-in (2/C #14 AWG). Loop 9 shall be placed only when a left turn lane exists.

LOOP WINDING DETAILS



QUADRAPOLE LOOP



POWER HEADER LOOP

Texas Department of Transportation
Traffic Operations Division

LOOP DETECTOR PLACEMENT DETAILS

LD(2)-03

REVISIONS

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

CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		91

79B

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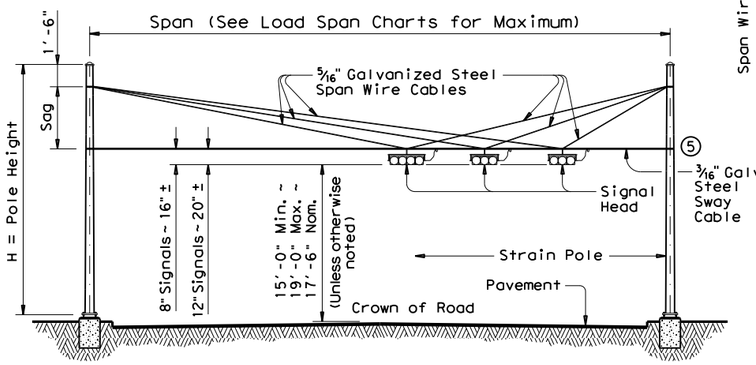
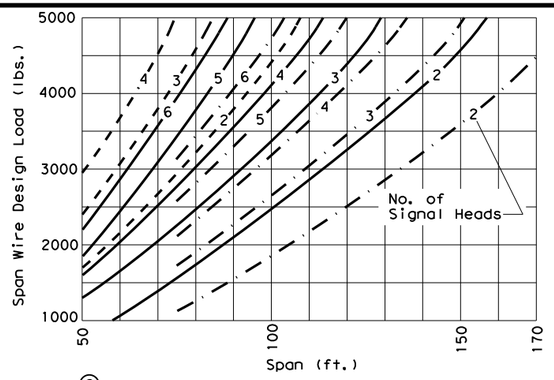
STRAIN POLE DESCRIPTION	Pole Type	Found-ation Type	Maximum Permissible Span Wire Load (lbs.)
26' Pole	A	36-A	4900
30' Pole	B	36-A	4300
30' Pole with Lum.	B	36-A	4000
30' Pole with 20' Mast Arm	C	36-B	4400
30' Pole with 24' Mast Arm	C	36-B	4000
30' Pole with 28' Mast Arm	C	36-B	3600
30' Pole with 32' Mast Arm	C	36-B	3300
30' Pole with 36' Mast Arm	C	36-B	2900
30' Pole with 20' Mast Arm & Lum.	C	36-B	4100
30' Pole with 24' Mast Arm & Lum.	C	36-B	3800
30' Pole with 28' Mast Arm & Lum.	C	36-B	3400
30' Pole with 32' Mast Arm & Lum.	C	36-B	3000
30' Pole with 36' Mast Arm & Lum.	C	36-B	2500
34' Pole	D	36-B	5200
34' Pole with Lum.	D	36-B	4900

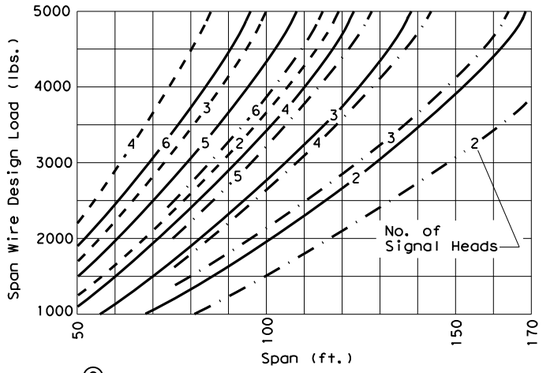
② Numbers on Load Span Charts indicate the number of signal heads on the span. The total span wire design load is based on one 5-section head and one or more additional 3-section head(s). Design wind pressures on cables are assumed as 1.6 lb/ft. Weight of span wire cables (one per signal head) is assumed as 0.65 lb/ft which includes an allowance for conductor cables and miscellaneous hardware. The effect of the sway cable on load distribution is ignored as it is assumed to break at design wind conditions. When a pole supports 2 spans, the span wire design loads for both spans should be added vectorially to determine the design load for that pole.



STRAIN POLE ELEVATIONS HORIZONTAL SIGNALS



② SIGNALS WITH 12-INCH LENS

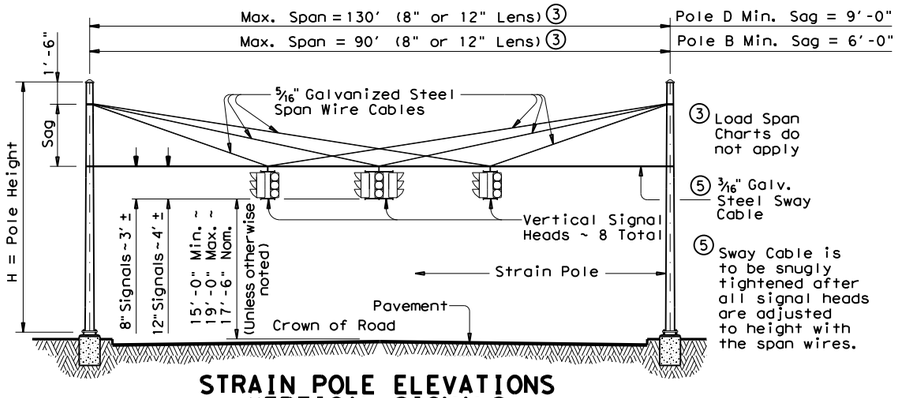


② SIGNALS WITH 8-INCH LENS

Signal Head Type	Wt. Per Head	Wind Area ◆
5-Section, 12" Lens	125 lbs	9.6 sq. ft.
5-Section, 8" Lens	70 lbs	4.8 sq. ft.
3-Section, 12" Lens	75 lbs	5.64 sq. ft.
3-Section, 8" Lens	45 lbs	3.0 sq. ft.

◆ Effective projected design wind area (actual area times drag coefficient)

- - - - - - Sag = 4'-6" (26' or 30' Pole)
——— Sag = 8'-0" (30' or 34' Pole)
— · — · — Sag = 11'-6" (34' Pole)



STRAIN POLE ELEVATIONS VERTICAL SIGNALS

(Mast arms are not used with vertical signals)

Pole Type	ROUND POLES				POLYGONAL POLES			
	D_B	D_T	④thk	H	D_B	D_T	④thk	H
	in.	in.	in.	ft.	in.	in.	in.	ft.
A	12.5	8.9	.239	26	13.0	9.0	.239	26
B	13.5	9.3	.239	30	14.0	9.0	.239	30
C	15.5	11.3	.239	30	16.0	11.0	.239	30
D	15.5	10.7	.239	34	16.0	11.0	.239	34

D_B = Pole Base O.D. D_T = Pole Top O.D. H = Pole Height

④ Thickness shown are minimum, thicker materials may be used.

SHIPPING PARTS LIST

Poles (Without Traffic Signal Arm)

Pole Type	Strain poles with Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap, 2 clamp-on simplex and 1 pipe plug.			Strain poles without Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap and 1 pipe plug.		
	Description	Designation	Quantity	Description	Designation	Quantity
A				26' Strain Pole	SP 26 A-100	
B	30' Strain Pole	SPL 30 B-100		30' Strain Pole	SP 30 B-100	
D	34' Strain Pole	SPL 34 D-100		34' Strain Pole	SP 34 D-100	

Poles (With Traffic Signal Arm)

Pole Type	Strain poles with Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap, clamp-on simplex and 3 pipe plugs.			Strain poles without Luminaire: Ship each pole with the following hardware attached: handhole at base, pole cap and 3 pipe plugs.		
	Description	Designation	Quantity	Description	Designation	Quantity
C	30' SPw/TS Arm	SPL 30 C-100		30' SPw/TS Arm	SP 30 C-100	

Traffic Signal Arms (For Type C poles)

Nominal Arm Length	Type I Arm (1 Signal): Ship each Type I Arm with the following hardware attached: 2 CGB Connectors, 1 clamp with bolts and washers		Type II Arm (2 Signals): Ship each Type II Arm with the following hardware attached: ① 1 Bracket Assembly, 3 CGB Connectors and 1 clamp with bolts and washers		Type III Arm (3 Signals): Ship each Type III Arm with the following hardware attached: ① 2 Bracket Assemblies, 4 CGB Connectors and 1 clamp with bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24 II -100			
28	28I-100		28 II -100			
32			32 II -100		32 III -100	
36			36 II -100		36 III -100	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Templates may be removed for shipment. Quantity
1 ¾"	3'-10"	
2"	4'-3"	

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

Luminaire Arms

Nominal Arm Length	Quantity
8' Arm	

① See Sheet "DMA-100"

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES STRAIN POLE ASSEMBLIES

(100 MPH WIND ZONE)

SP-100(1)-12

DN: MS	CK: JSY	DW: BR	CK: JSY

REVISIONS
6-96
1-12

CONT	SECT	JOB	HIGHWAY
1586	01	089,ETC.	FM 907,ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO,ETC.		92

121A

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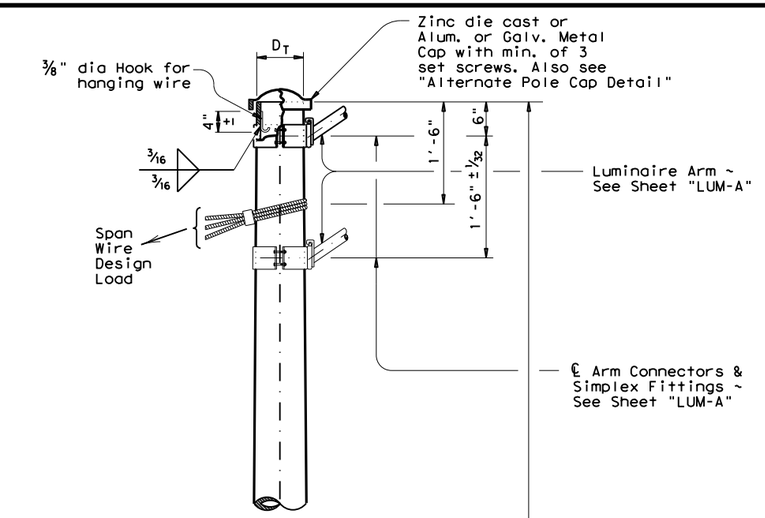
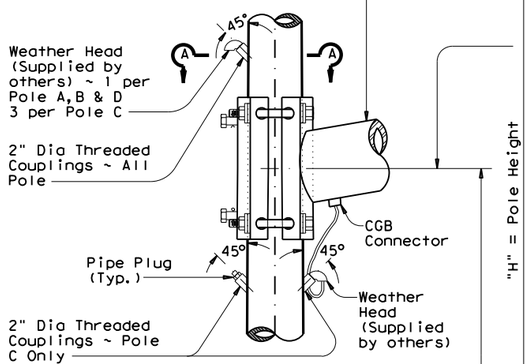
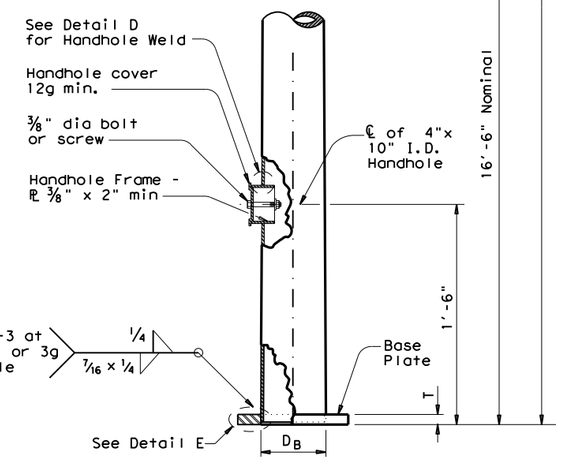


DETAIL A

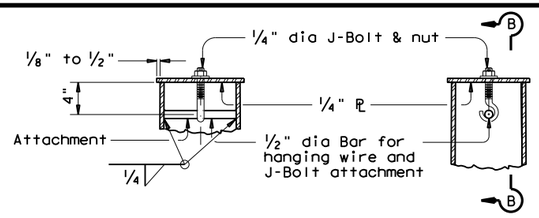


DETAIL B



DETAIL C

POLE ELEVATION



SECTION B-B

ALTERNATE POLE CAP DETAIL

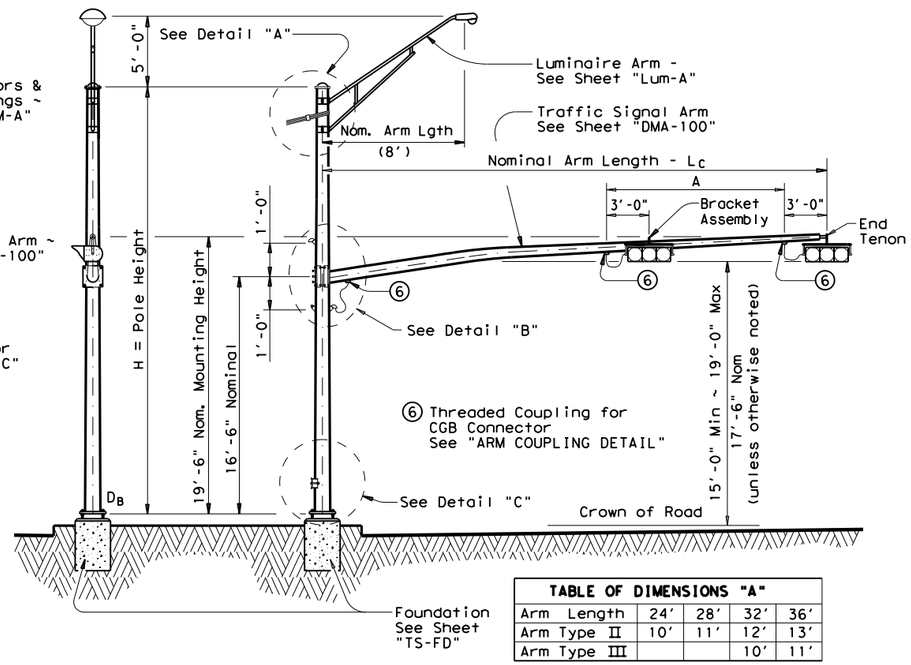
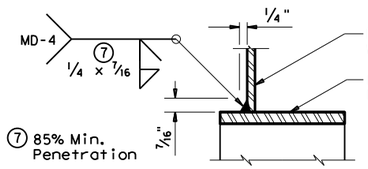
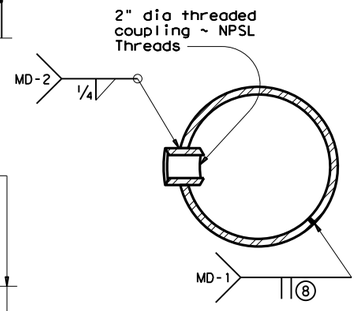


TABLE OF DIMENSIONS "A"				
Arm Length	24'	28'	32'	36'
Arm Type II	10'	11'	12'	13'
Arm Type III			10'	11'

STRUCTURE ASSEMBLY

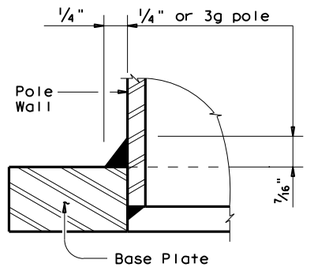


DETAIL D



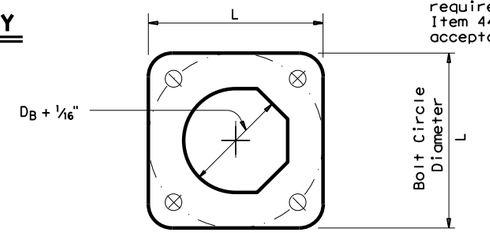
SECTION A-A

(Pole Coupling and Seam Weld Details)

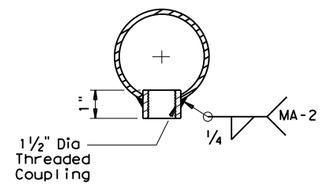


DETAIL E

⑧ 60% Min. penetration, except 100% penetration within 6" of circumferential base welds.



BASE PLATE PLAN



ARM COUPLING DETAIL

MATERIALS	
Round Shafts or Polygonal Shafts ⑨	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ⑩
Plates ⑨	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 except where noted
Pin Bolts	ASTM A325
Pipe ⑨	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Steel Cable	ASTM A475, 7 Wire Utilities Grade
Misc. Hardware	Galvanized steel or stainless steel or as noted

⑨ ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

⑩ ASTM A1011 SS Gr.50 shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 100 mph plus a 1.3 gust factor. The maximum permissible span wire design loads tabulated are calculated at a stress load of 1.4 times the basic allowable stress. A simultaneous wind on the pole, mast arm, and luminaire is also included.

See standard sheet "DMA-100" for details of clamp-on traffic signal arms, sheet "MA-C" for traffic signal arm connection details, sheet "LUM-A" for luminaire arm and connection details, and sheet "TS-FD" for anchor bolt and foundation details.

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

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

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

Foundation Type	Anchor Bolt Diameter	Bolt Hole Diameter	Bolt Circle Diameter	Base PL Dim. L x T
36-A	1 3/4"	2"	19"	19" x 1 3/4"
36-B	2"	2 1/4"	21"	21" x 2"

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES STRAIN POLE ASSEMBLIES

(100 MPH WIND ZONE)

SP-100(2)-12

REVISIONS
6-96
1-12

DN: MS	CK: JSY	DW: BR	CK: JSY
CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		93

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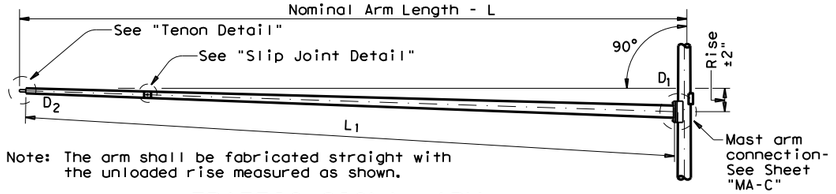
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
24	12.0	9.3	8.6	7.8	.239	13.0	10.0	9.2	8.3	.239	36-A
28	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
32	13.0	10.3	9.6	8.8	.239	14.0	11.0	10.2	9.3	.239	36-A
36	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
40	14.0	11.3	10.6	9.8	.239	16.0	13.0	12.2	11.3	.239	36-B
44	14.5	11.8	11.1	10.3	.239	16.5	13.5	12.7	11.8	.239	36-B

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

② D_2 may be increased by up to 1" for polygonal arms.



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

TRAFFIC SIGNAL ARM

(Fixed Mount)

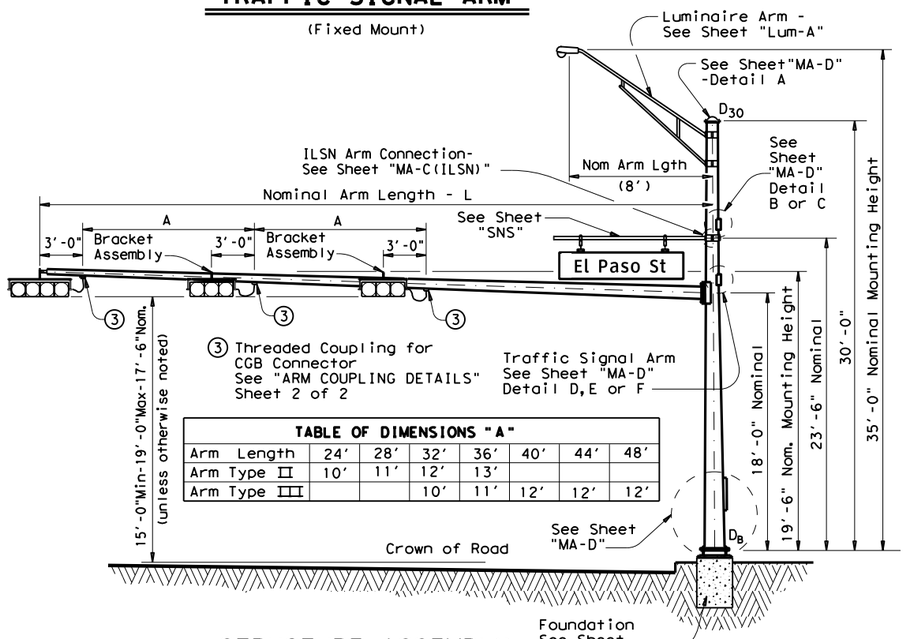


TABLE OF DIMENSIONS "A"							
Arm Length	24'	28'	32'	36'	40'	44'	48'
Arm Type II	10'	11'	12'	13'			
Arm Type III			10'	11'	12'	12'	12'

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

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

Nominal Arm Length	30' Poles With Luminaire		24' Poles With ILSN		19' Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-100		20S-100		20-100	
24	24L-100		24S-100		24-100	
28	28L-100		28S-100		28-100	
32	32L-100		32S-100		32-100	
36	36L-100		36S-100		36-100	
40	40L-100		40S-100		40-100	
44	44L-100		44S-100		44-100	

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

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	
36			36II-100		36III-100	
40					40III-100	
44					44III-100	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

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

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3'-4"	
1 ¾"	3'-10"	
2"	4'-3"	

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

Templates may be removed for shipment.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(100 MPH WIND ZONE)

SMA-100(1)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
1586	01	089,ETC.	FM 907,ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO,ETC.		94

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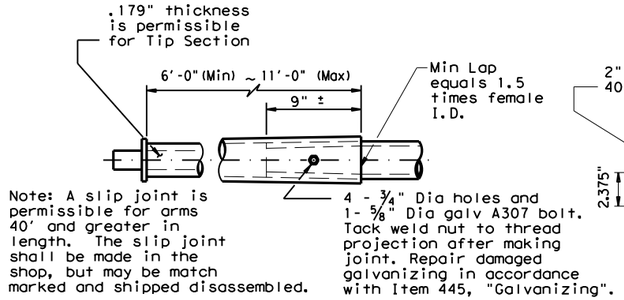
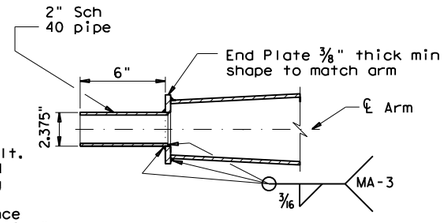


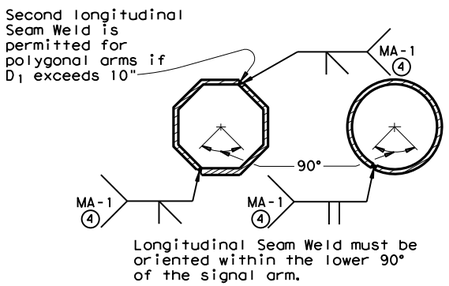
SLIP JOINT DETAIL



TENON DETAIL

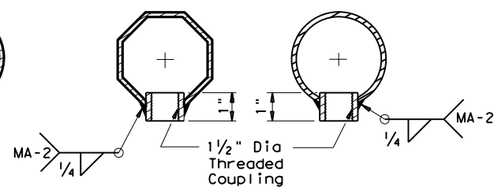
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

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



ARM COUPLING DETAILS

VIBRATION WARNING

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

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

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

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

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

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 100 mph plus a 1.3 gust factor.

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

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

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

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

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

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(100 MPH WIND ZONE)

SMA-100(2)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		95

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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.

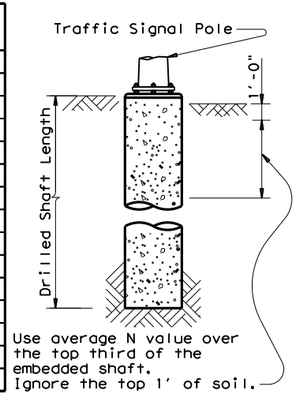
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

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
FM 907 @ MILE 17 1/2 RD	10	24-A	2	12'				
FM 907 @ MILE 17 1/2 RD	10	36-A	4			52.8		
FM 493 @ MURPHY AVE	10	36-B	4				60.8	
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'



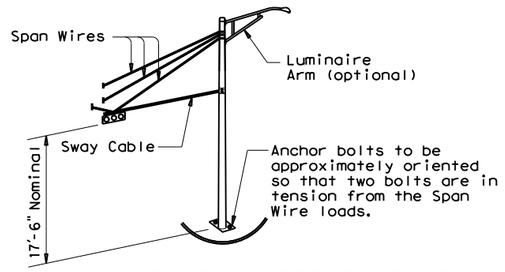
Use average N value over the top third of the embedded shaft. Ignore the top 1' of soil.

ANCHOR BOLT & TEMPLATE SIZES

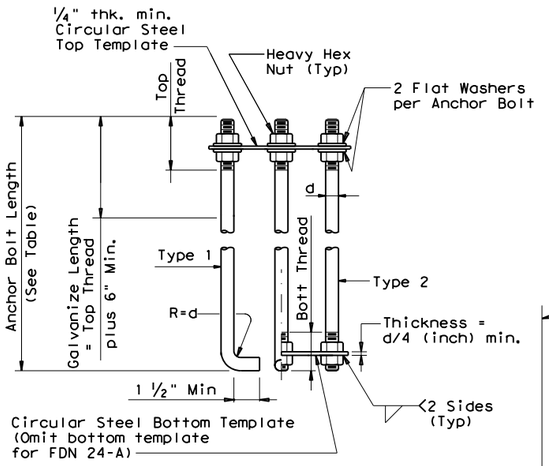
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

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.



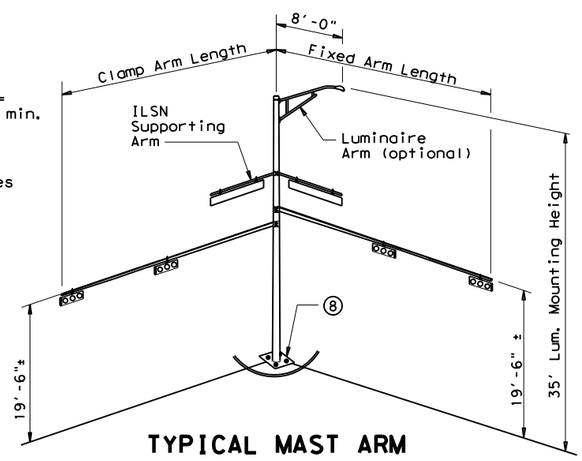
TYPICAL STRAIN POLE ASSEMBLY



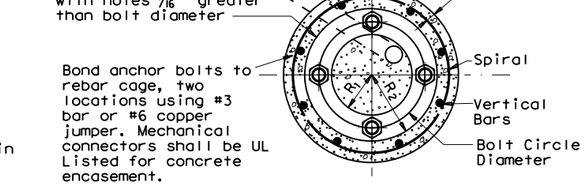
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

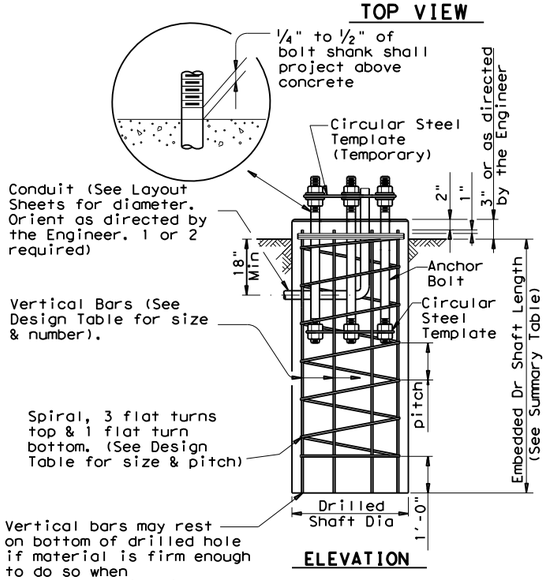
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



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	DN: MS	CK: JSY	DW: MAQ/MMF	CK: JSY/TEB
5-96 11-98 1-12	CONT	SECT	JOB	HIGHWAY
	1586	01	089, ETC.	FM 907, ETC.
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC.		96

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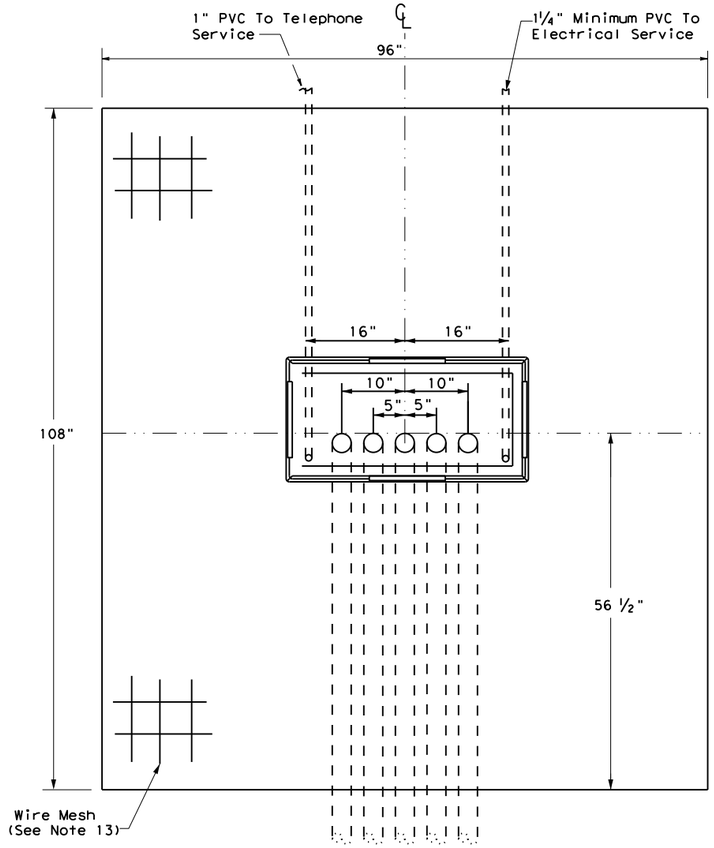
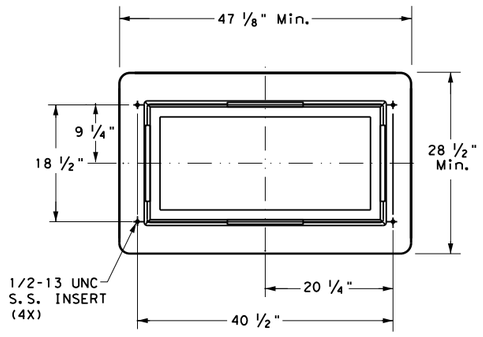
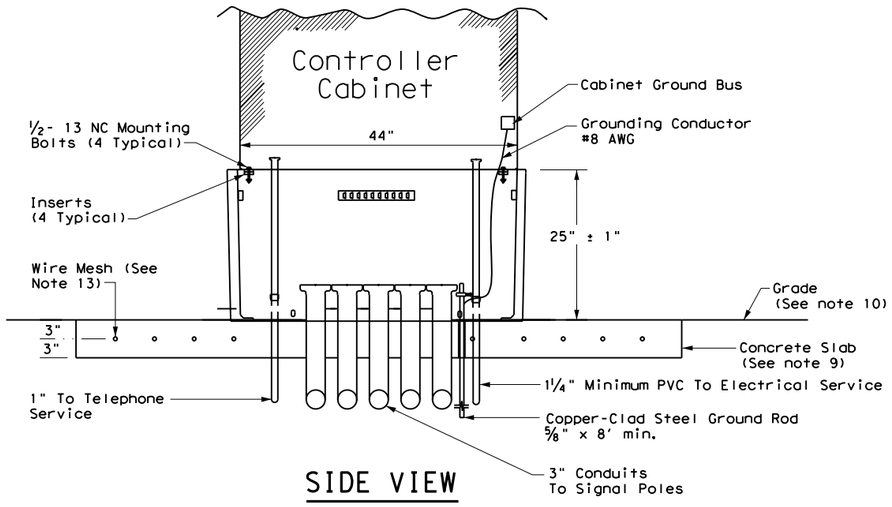


TOP VIEW



CABINET BASE



SIDE VIEW

TRAFFIC SIGNAL CONTROLLER BASE:

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

CONCRETE SLAB:

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

CONDUITS:

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

CONTROLLER CABINET:

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

PAYMENT:

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

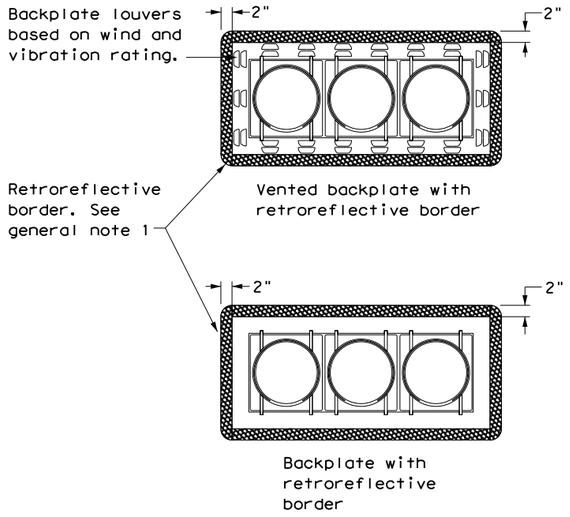
Texas Department of Transportation

Traffic Safety Division Standard

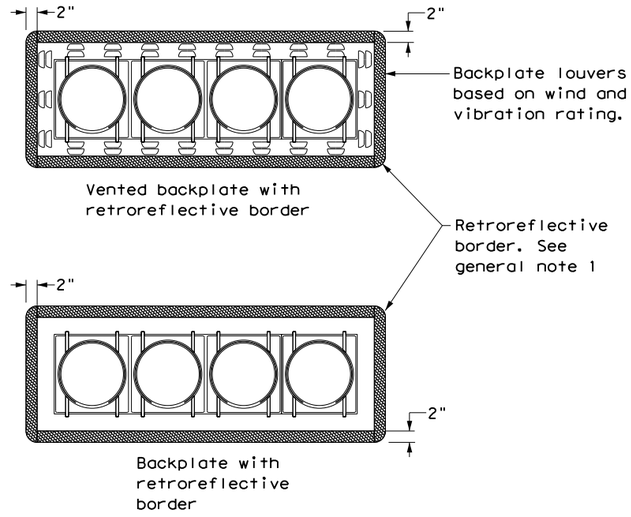
TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD
TS-CF-21

FILE: ts-cf-21.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089,ETC.	FM 907,ETC.
12-04	DIST	COUNTY		SHEET NO.
2-21	PHR	HIDALGO,ETC.		97

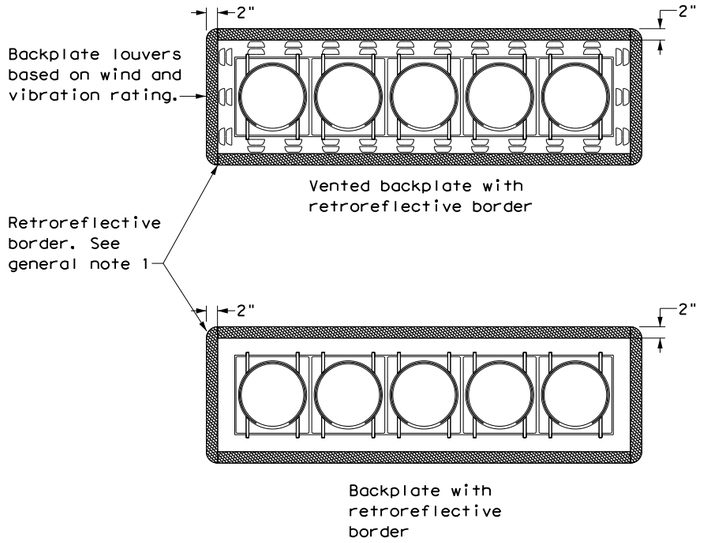
DATE: 6/30/2022 3:41:27 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089 Other Design Standards\ts-bp-20.dgn



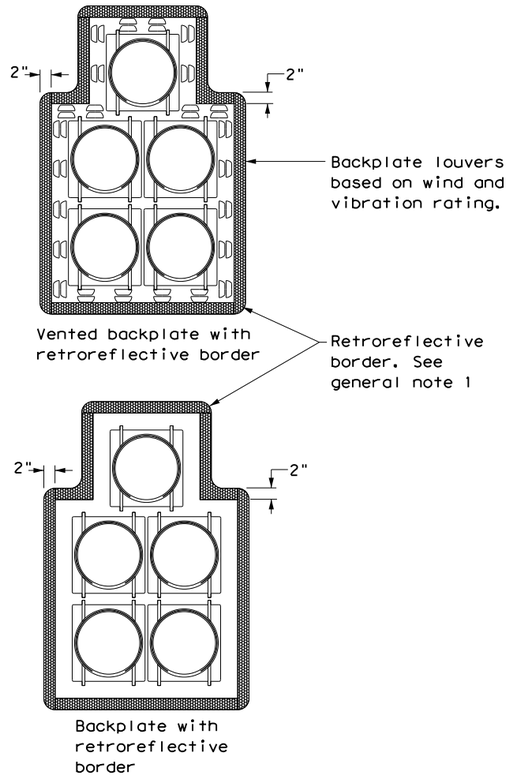
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



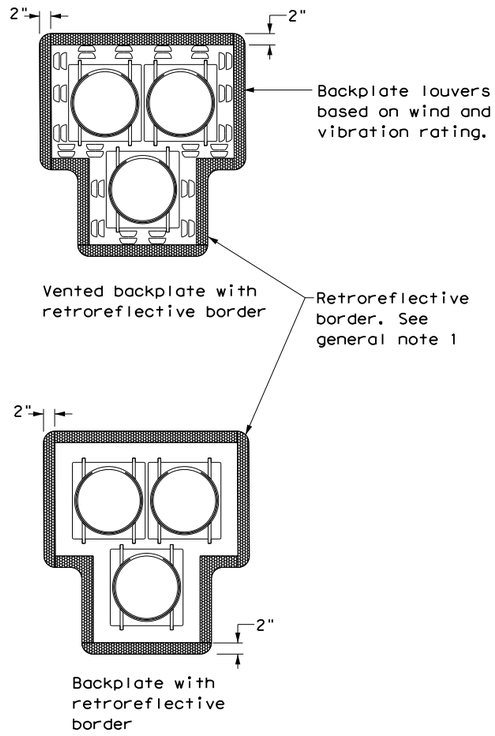
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

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

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL HEAD WITH BACKPLATE

TS-BP-20

FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		98

DATE: 6/30/2022 3:41:33 PM
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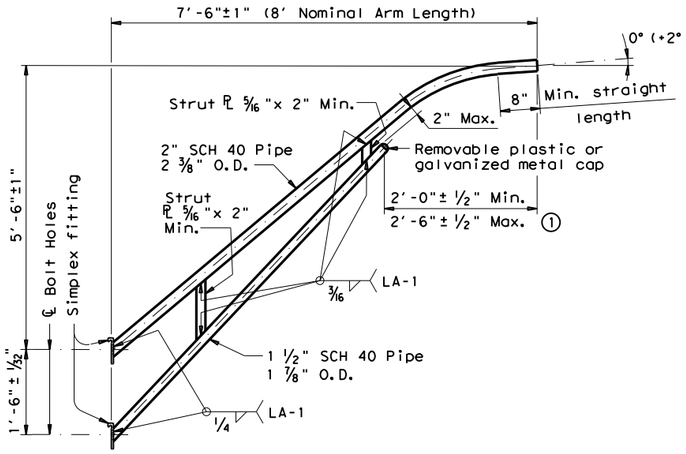
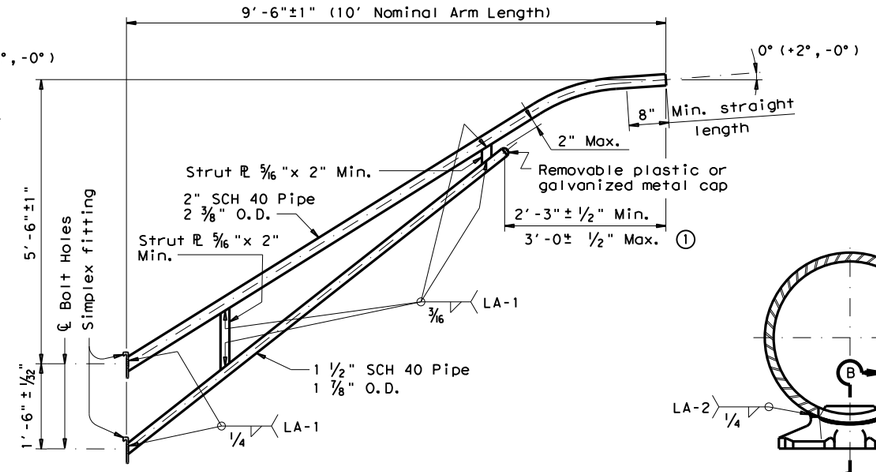


8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM

DIRECT ATTACHMENT DETAIL

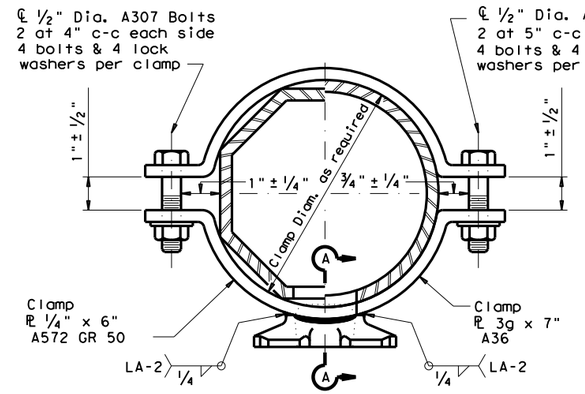
MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 (3), or A36 (Arm only)
Arm Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50 (4), or A1011 HSLAS-F Gr.50 (4)
Arm Strut Plates (2)	ASTM A36, A572 Gr.50 (4), or A588
Misc.	ASTM designations as noted

(1) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

(2) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

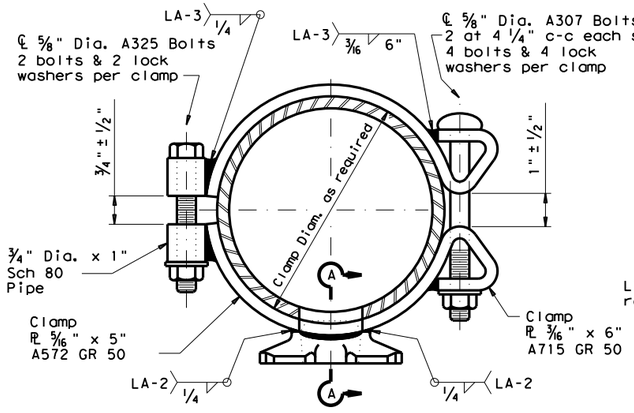
(3) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

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



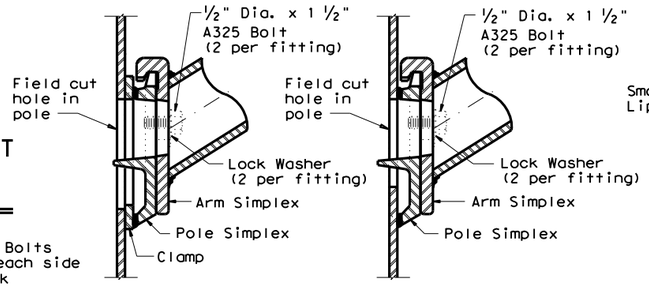
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



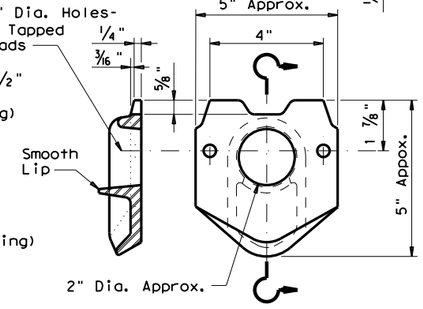
CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)

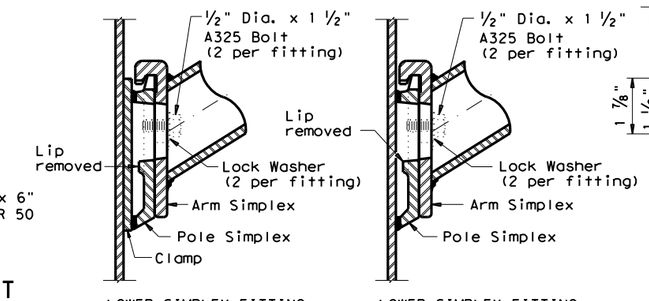


UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING



POLE SIMPLEX DETAIL

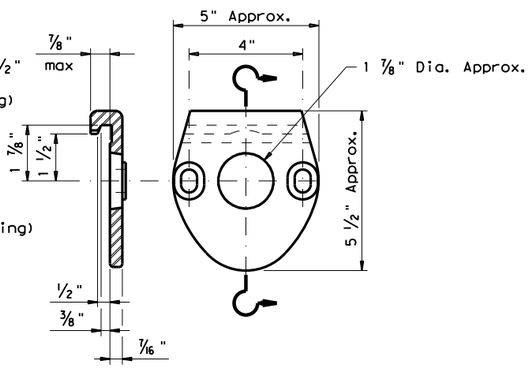


LOWER SIMPLEX FITTING

LOWER SIMPLEX FITTING

SECTON A-A

SECTON B-B



ARM SIMPLEX DETAIL

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq. ft.

Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

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

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

Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

LUM-A-12

DN: LEH	CK: JSY	DW: LTT	CK: TEB

REVISIONS
5-96
1-99
1-12

CONT	SECT	JOB	HIGHWAY
1586	01	089,ETC.	FM 907,ETC.

DIST	COUNTY	SHEET NO.
PHR	HIDALGO,ETC.	99

DATE: 6/30/2022 3:41:38 PM
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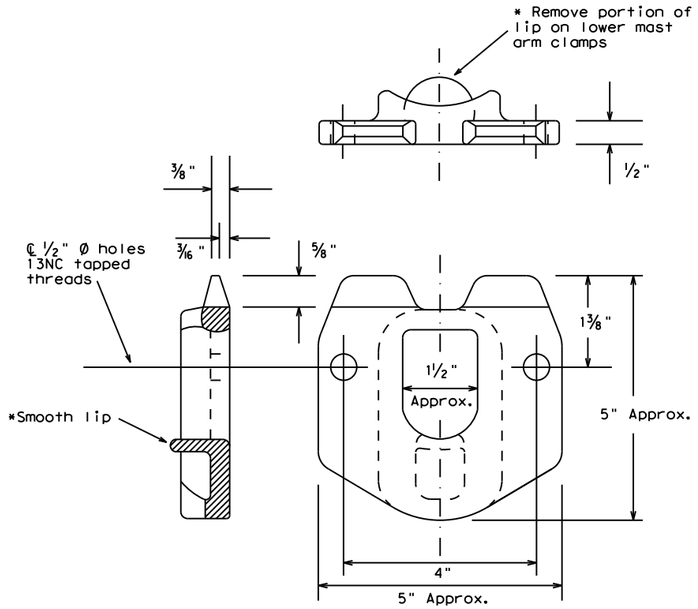
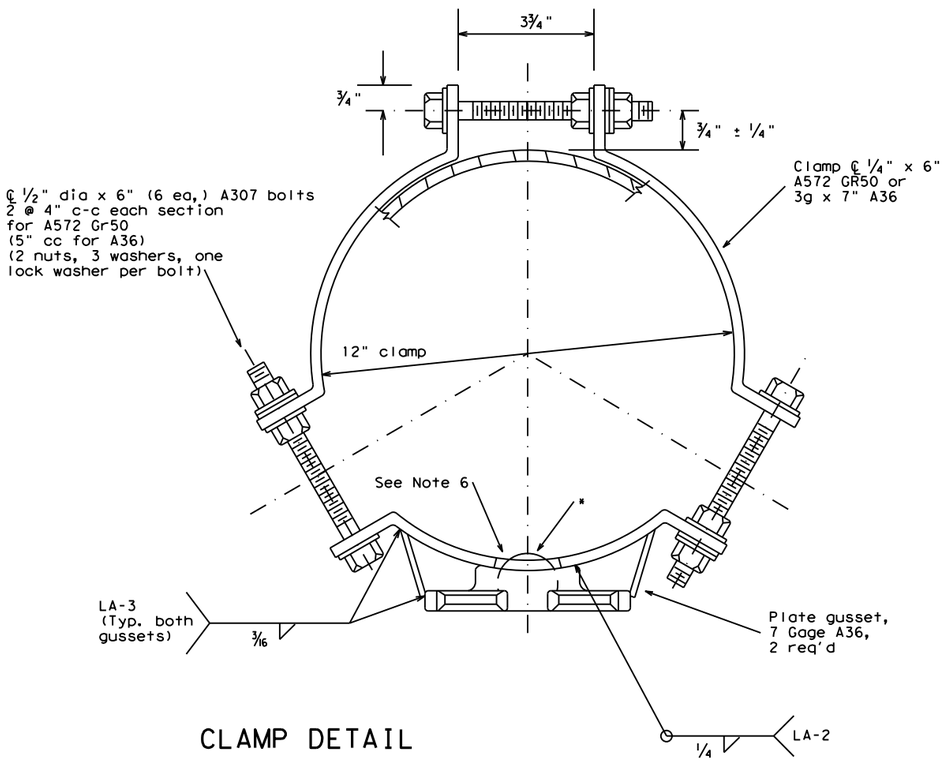


POLE SIMPLEX DETAILS



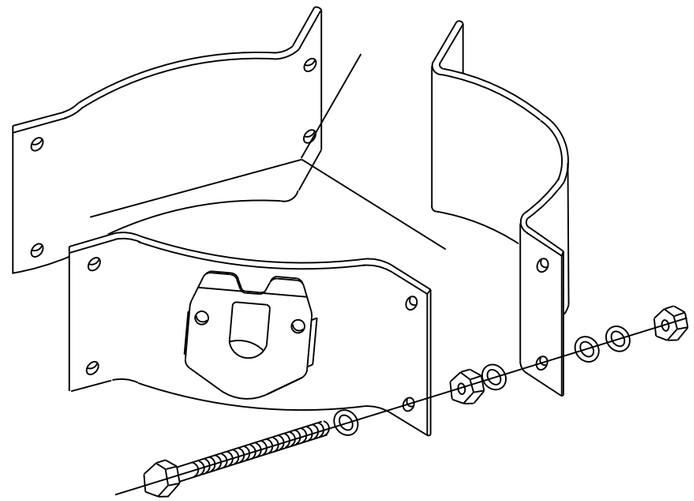
CLAMP DETAIL

OTHER MATERIALS:

1. Pole simplex shall be ASTM A27 GR65-35 or A148 GR80-50 or A576 GR1021. ASTM A576 must be suitable for forging and also meet minimum tensile of 65ksi, minimum yield of 35ksi, and a minimum elongation of 22 percent in 2 inches.
2. Welded tabs and backplates shall be ASTM A-36 steel or better.
3. Nylon insert locknuts shall conform to ASTM A563.

GENERAL NOTES:

1. Materials and fabrication shall be in accordance with Standard Sheet "MA-C" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
2. All parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing". The throat of the Simplex shall be made free of all rough or sharp edges resulting from the galvanizing process.
3. Each simplex fitting shall be supplied with 2 ASTM A325 bolts, ½in. X 1½in. and 2 lock washers. The bolts and lock washers shall be secured to the clamp with the other hardware items. The Fabricator shall ship clamp assembly together in a single package, including all bolts, nuts, and washers required for the clamp and simplex fitting.
4. Design conforms to 1994 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" and interim revisions thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Clamps are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq.ft.,12 ft. maximum arm length.
5. Each assembly shall consist of one upper piece simplex fitting having a smooth lip and one lower piece simplex fitting with the lip removed.
6. Approximately 2 in. diameter hole in upper mast arm clamp.



PROJECTION

For 8.9 - 12 inch diameter Signal Poles
(Two req'd for each mast arm)

Texas Department of Transportation
Traffic Operations Division

CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM

CFA-12

© TxDOT	DN: KAB	CK: RES	DW: FDN	CK: CAL
REVISIONS	CONT	SECT	JOB	HIGHWAY
11-99	1586	01	089,ETC.	FM 907,ETC.
1-12	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		100

ELECTRICAL SERVICE DATA

Service Pole No.	Sheet No.	Electrical Service Description (see ED (4)-03)	Service Conduit Size	Service Conductors No. / Size	Safety Switch Amps	Main Disconnect		Two-Pole Contactor Amps	Panelbd./ Loadcenter Amp Rating (min)	Circuit No.	Branch Ckt. Bkr. Pole / Amps	Branch Circuit Amps	KVA Load
						Switch Amp/Fuse	Ckt. Bkr. Pole / Amp						
1, 2	27, 31	TY T 120/240 000(NS)GS(L)TS(0)	1 ¼"	3/#4	N/A	N/A	N/A	N/A	0	TS, LUM	1P/50, 2P/50	5, 1.5	<5.4
3	46	TY A 240/480 100(SS)SS(T)TO(0)	1 ¼"	3/#4	YES	N/A	2P/60	60	100	A, B	2P/20	3.15	<1.6
4	48	TY A 240/480 100(SS)SS(T)TO(0)	1 ¼"	3/#4	YES	N/A	2P/60	60	100	C	2P/20	4.16	<2

NOTES:

ENSURE MAIN SERVICE DROP IS BELOW WEATHERHEAD.

BREAKER BOX & METER BOX SHALL BE ATTACHED TO WOOD POLE BY GALVANIZED CHANNEL (SEE DETAIL "B").

BOLT BOX TO GALVANIZED CHANNEL MOUNTED FLUSH WITH POLE.

CONDUIT SHALL BE ATTACHED TO POLE WITH H.D. 2-HOLE STRAPS AND 1½"x1/4" #8 S.S. SCREW OR LAG BOLT.

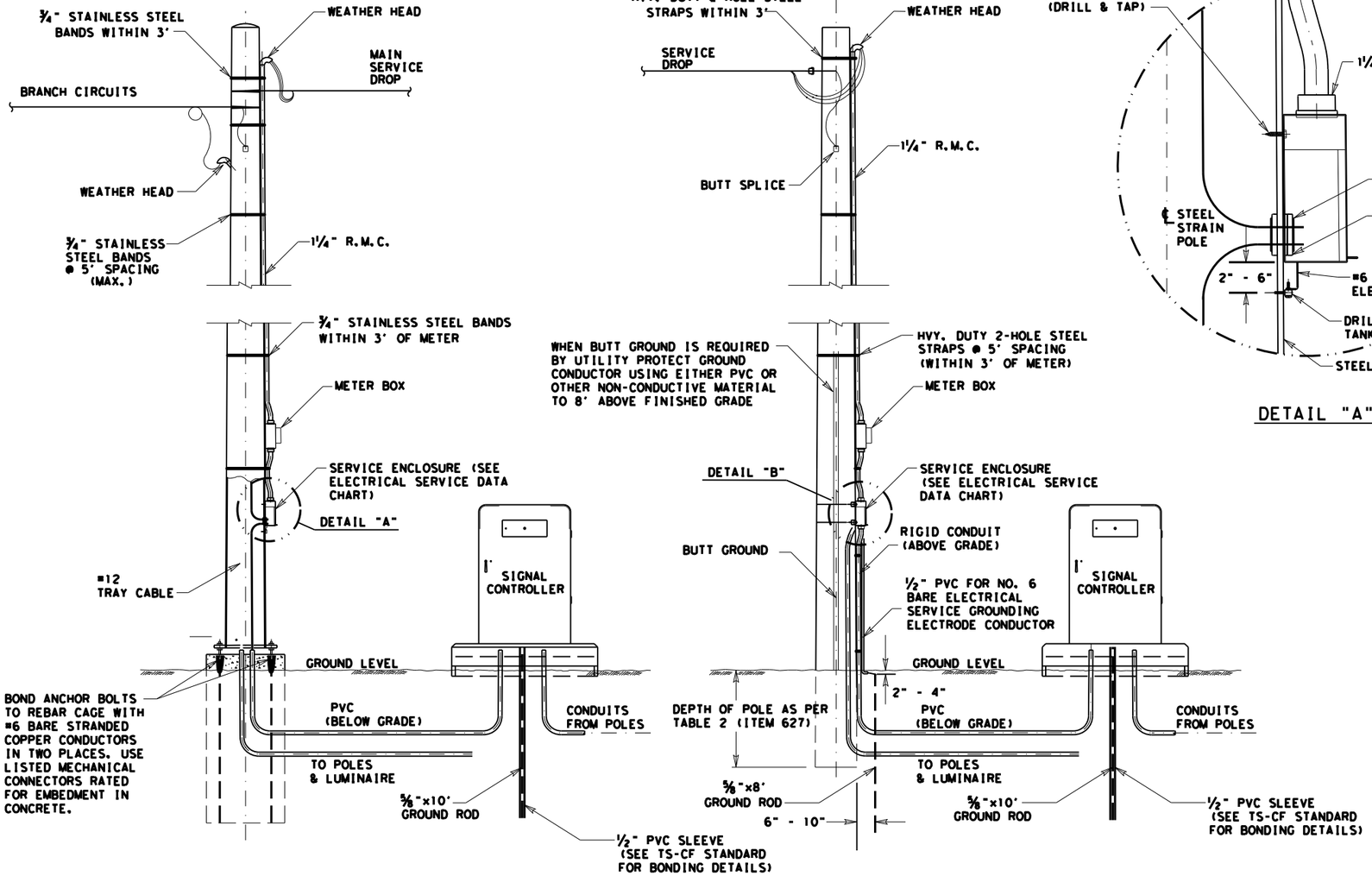
ALL EXPOSED CONDUIT SHALL BE RIGID METAL CONDUIT EXCEPT CONDUIT USED ON ELECTRICAL SERVICE GROUNDING ELECTRODE CONDUCTOR.

WHEN SERVICE IS CONNECTED WITHIN 100' OF THE CONTROLLER, NO PULL BOX SHALL BE USED.

DISTRIBUTION TO LUMINAIRE SHALL BE OUT OF THE SERVICE BREAKER BOX. EACH LUMINAIRE SHALL HAVE A SEPARATE PHOTO CONTROL.

FURNISH & INSTALL 3 PRONG WEATHERPROOF LOCKTYPE BASE WITH PHOTO CELL TO CONTROL ILLUMINATION SIGN WHICH IS ATTACHED TO TRAFFIC SIGNAL SUPPORTS. LOCKBASE & PHOTO CELL SHALL BE INSTALLED ON TRAFFIC SIGNAL POLE NEAREST CABINET.

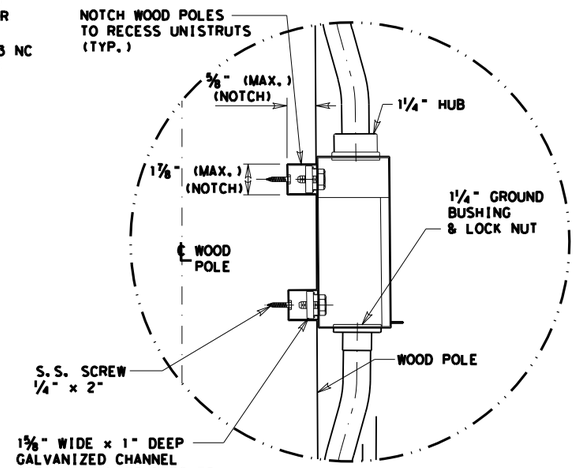
ALL CONDUIT & CONDUCTORS FROM SERVICE TO CONTROLLER CABINET SHALL BE AS PER PLANS.



STEEL STRAIN POLE

WOOD POLE

DETAIL "A"



DETAIL "B"

ELECTRICAL SERVICE

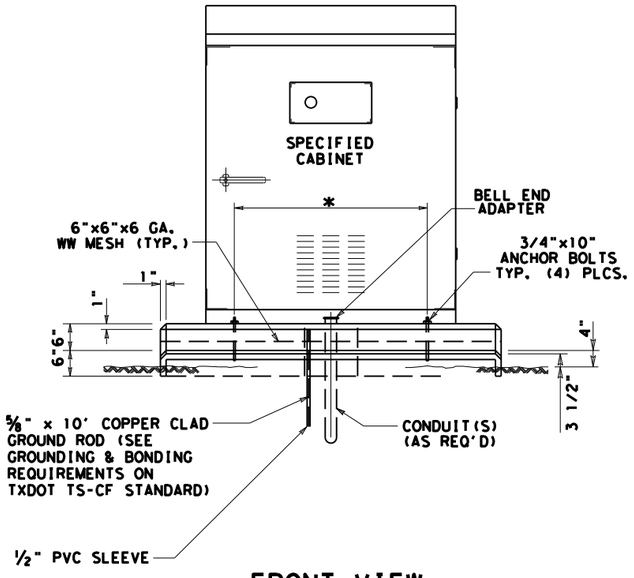
PHARR DISTRICT STANDARD

TEXAS DEPARTMENT OF TRANSPORTATION

ELECTRICAL SERVICE DESIGN WITH SIGNAL CONTROLLER

SHEET 1 OF 1

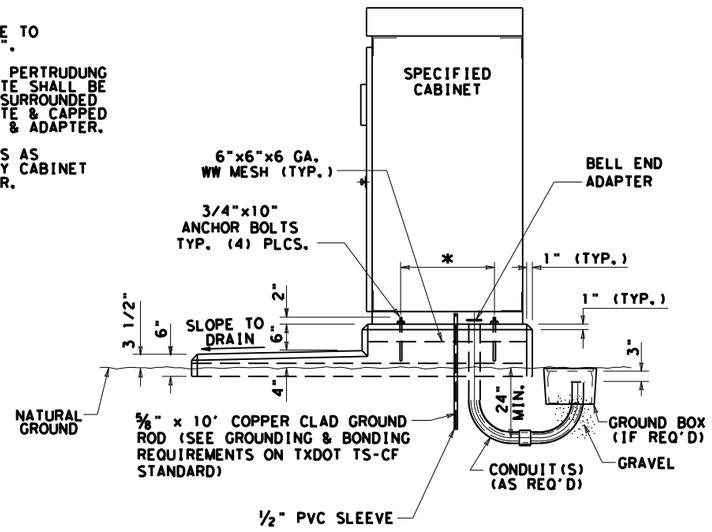
DN: OG	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
CK DN: JSL	ORIGINAL	APR. 2010	6	TEXAS		101
DW: OG		MAY 2017	STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	HIGHWAY NO.
CK DW: JSL			21	HIDALGO, ETC.	1586 / 01 / 089	FM 907, ETC.



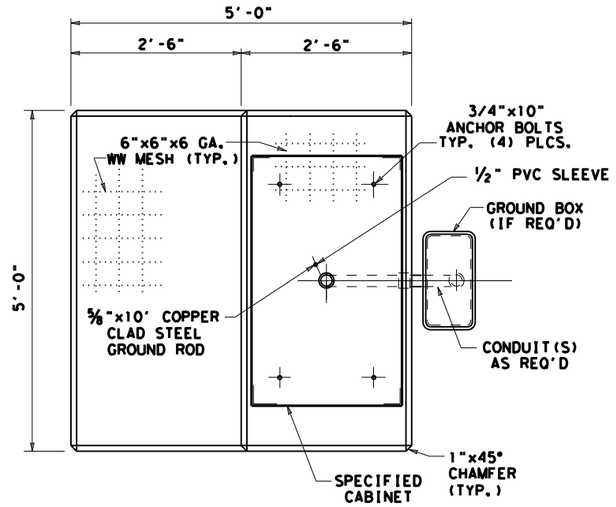
FRONT VIEW

NOTES:

1. ALL CONCRETE TO BE CLASS "A".
2. ALL CONDUIT PERTRUDUNG THRU CONCRETE SHALL BE COMPLETELY SURROUNDED WITH CONCRETE & CAPPED WITH A BELL & ADAPTER.
3. * ANCHOR BOLTS AS SPECIFIED BY CABINET MANUFACTURER.

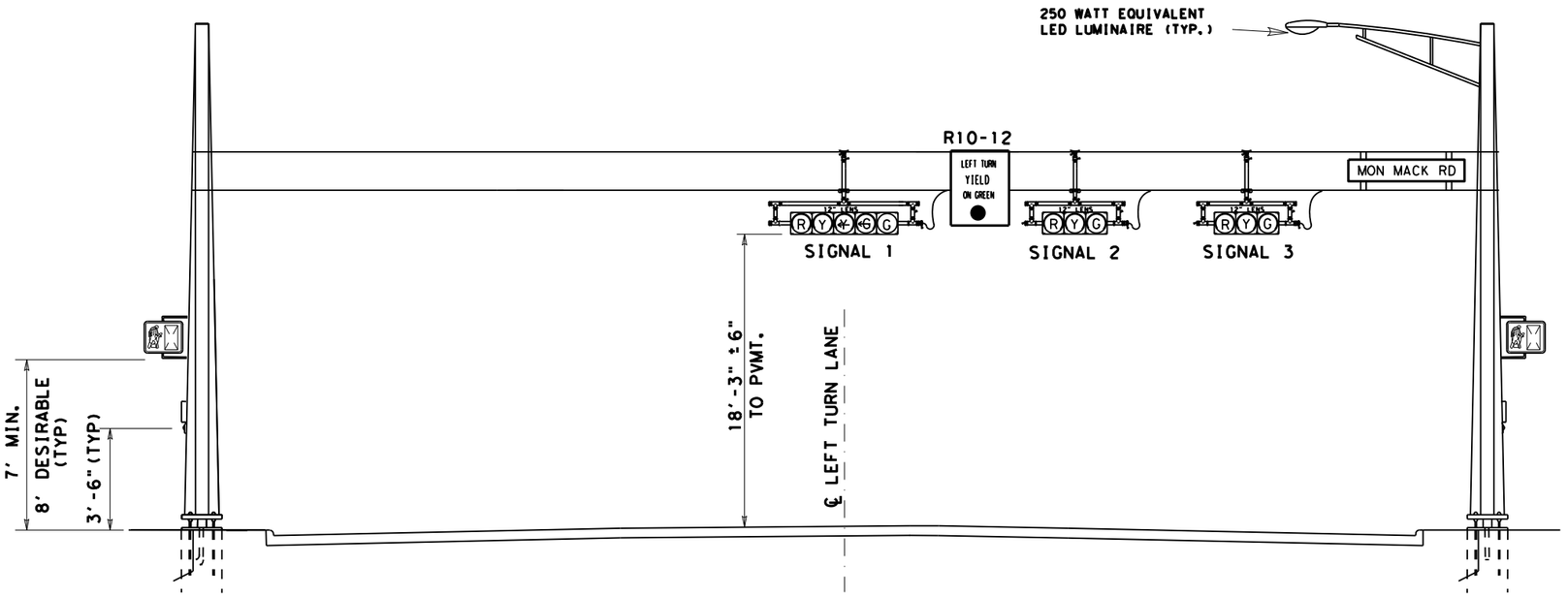


SIDE VIEW



TOP VIEW

DETAIL OF BASE MOUNT CABINET FOUNDATION



ELEVATION VIEW

DISTRICT STANDARD PLANS

TEXAS DEPARTMENT OF TRANSPORTATION

PHARR DISTRICT STANDARD

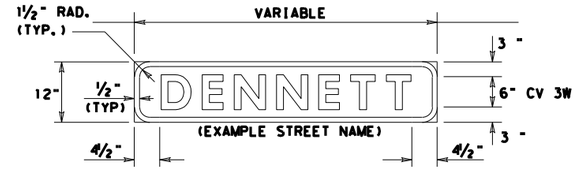
TRAFFIC SIGNAL CONSTRUCTION DETAILS

CONTROLLER FOUNDATON & LOOP DETECTOR INSTALLATION

SHEET 1 OF 3

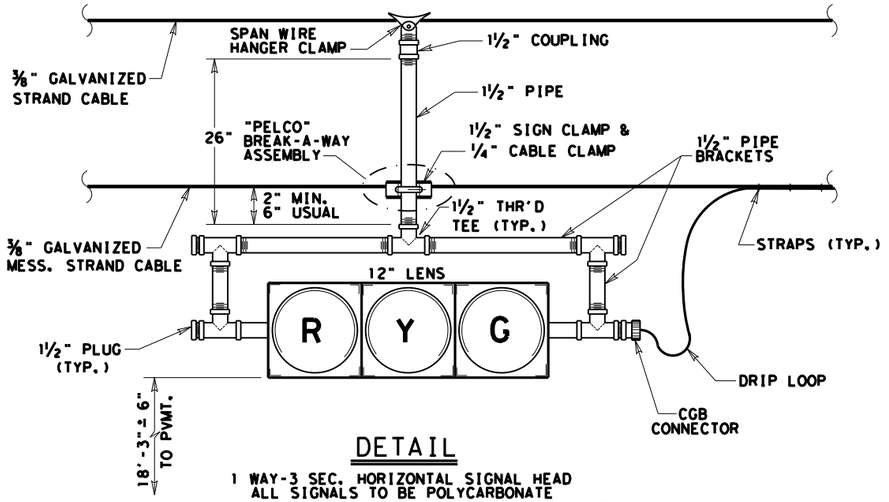
DN: GV	DRAWING	DATE	FED.RD. DIST.NO.	STATE	PROJECT NO.				SHEET NO.
CK DN: JSL	ORIGINAL	APR. 2010	6	TEXAS					102
DW: GV	REV. JUL 2015 AUG 2016 FEB 2020		STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.	
CK DW: JSL			PHARR	HIDALGO, ETC.	1586	01	089	FM 907, ETC.	

D3-1



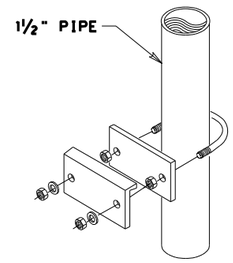
LETTERS & BORDER - WHITE (REFL)
BACKGROUND - GREEN (REFL)
MOUNT TYPE - SPAN WIRE OR MAST ARM

STREET NAME SIGN

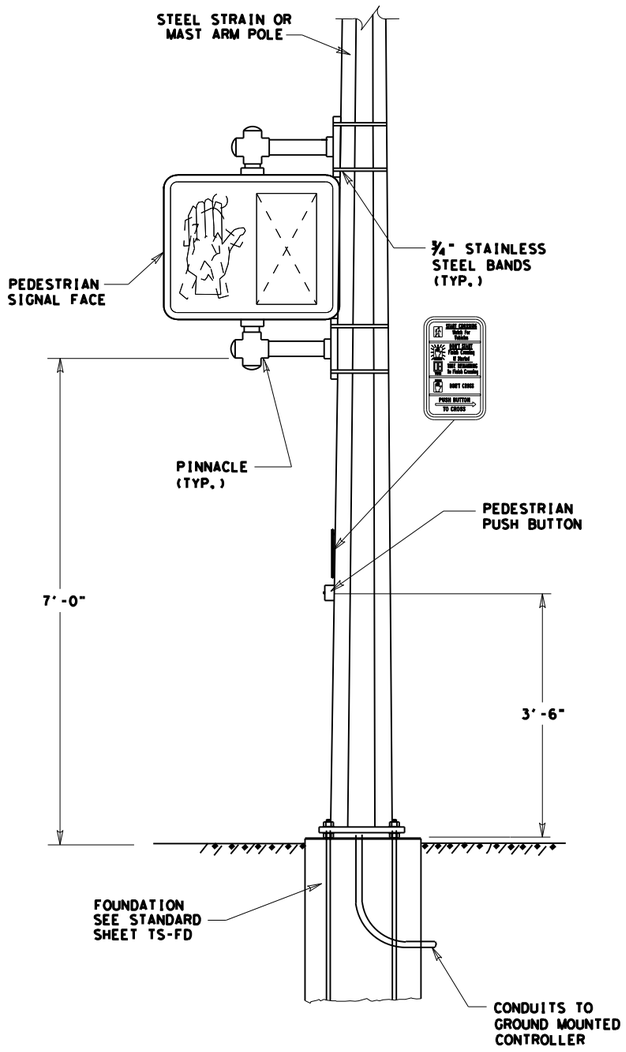


DETAIL

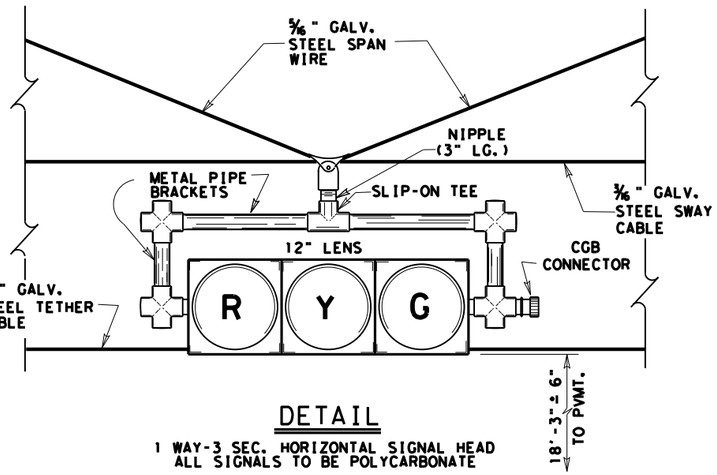
1 WAY-3 SEC. HORIZONTAL SIGNAL HEAD
ALL SIGNALS TO BE POLYCARBONATE
(TO BE USED ON SKEWED INTERSECTIONS OR WHEN SIGNAL POLES ARE NOT SQUARED TO EACH OTHER)



DETAIL-"PELCO" BREAK-A-WAY ASSEMBLY

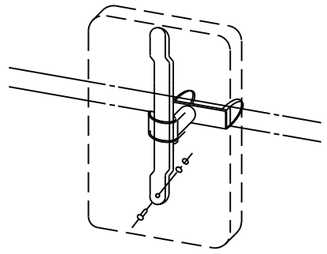


DETAIL-PEDESTRIAN SIGNALS



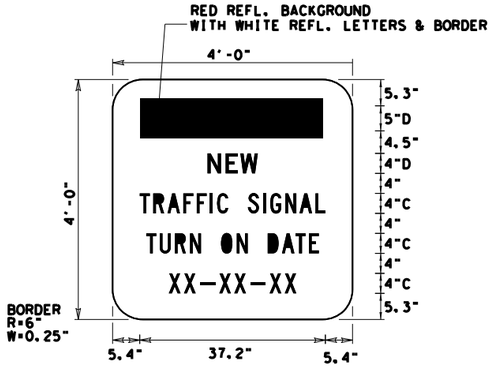
DETAIL

1 WAY-3 SEC. HORIZONTAL SIGNAL HEAD
ALL SIGNALS TO BE POLYCARBONATE

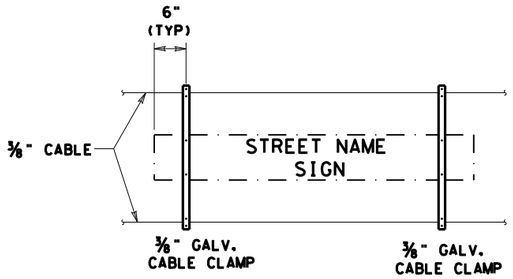


SIGN BRACKET

NOTE: THESE BRACKETS, USED IN PAIRS FOR LONGER SIGN, OR IN SINGLE UNITS FOR SMALLER SIGNS.



SPECIAL SIGN DETAIL



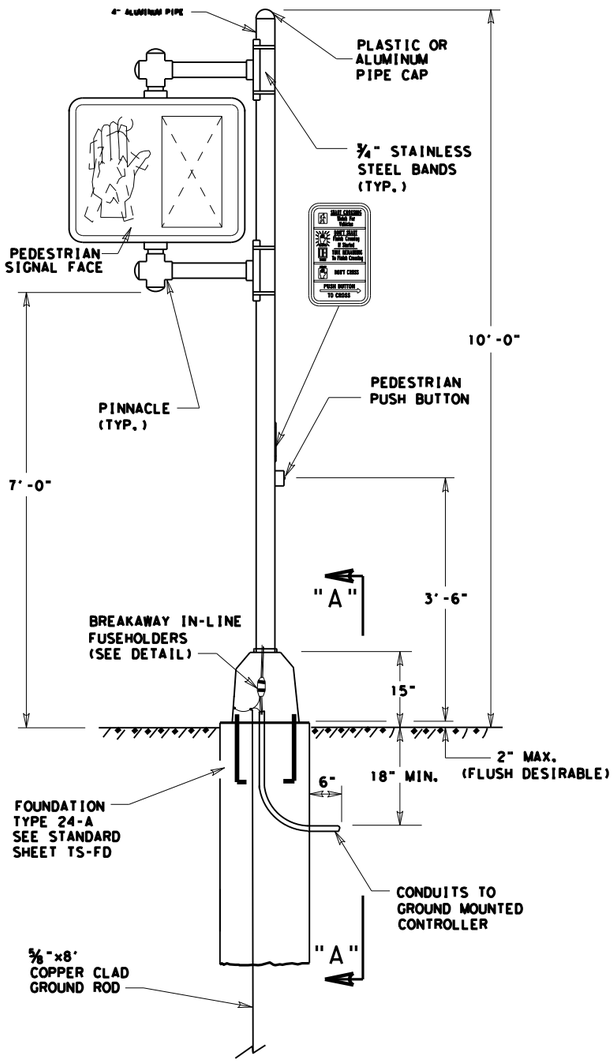
STREET NAME SIGN MOUNTING DETAIL

DISTRICT STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
PHARR DISTRICT STANDARD

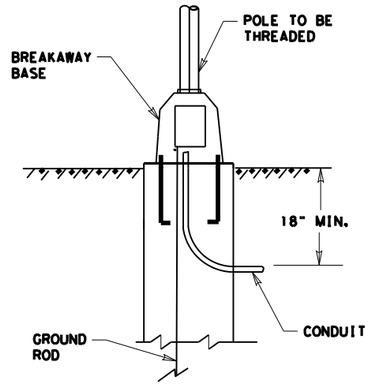
TRAFFIC SIGNAL CONSTRUCTION DETAILS
MISCELLANEOUS DETAILS

SHEET 2 OF 3

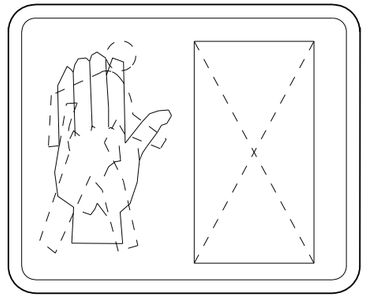
DN: OG	DRAWING	DATE	FED.RD. DIV.NO.	STATE	PROJECT NO.	SHEET NO.
CK DN: JSL	ORIGINAL	APRIL, 2010	6	TEXAS		103
DW: OG	REV.	MAY 2016 AUG 2016	STATE DIST.NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	HIGHWAY NO.
CK DW: JSL			PHARR	HIDALGO, ETC.	1586 / 01 / 089	FM 907, ETC.



PEDESTAL POLE DETAIL



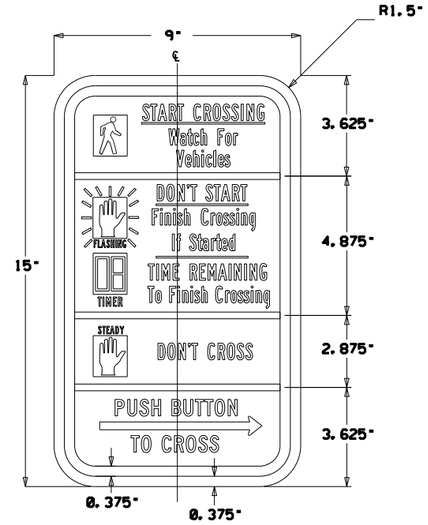
SECTION "A A"

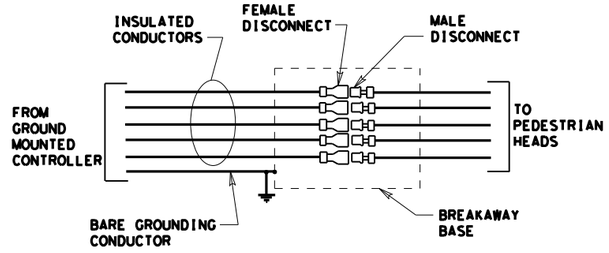


18"x16" LED PEDESTRIAN SIGNAL HEAD w/COUNTDOWN

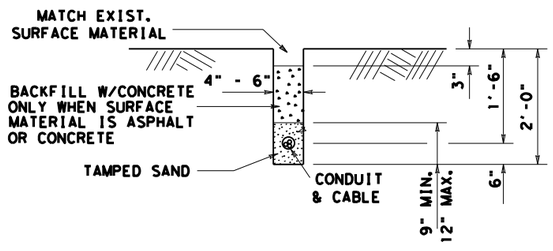
- LEGEND:
  BLACK
- BACKGROUND:
  WHITE (RETROREFLECTIVE)
- 08. HAND SYMBOL:
  ORANGE (RETROREFLECTIVE)
  ON BLACK
- PEDESTRIAN SYMBOL:
  WHITE (RETROREFLECTIVE)
  ON BLACK

NOTE:
REFER TO THE STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD) FOR MORE DETAILS AND DIMENSIONS REGARDING SIGN R10-3e



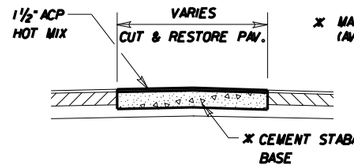


BREAKAWAY IN-LINE FUSEHOLDERS



NOTE:
ALL TRENCHES ARE TO BE MADE ONLY PARALLEL TO THE STREET. ALL CONDUIT RUNS CROSSING THE STREET SHALL BE PUSHED AND NO CUTS MADE IN THE SURFACE.

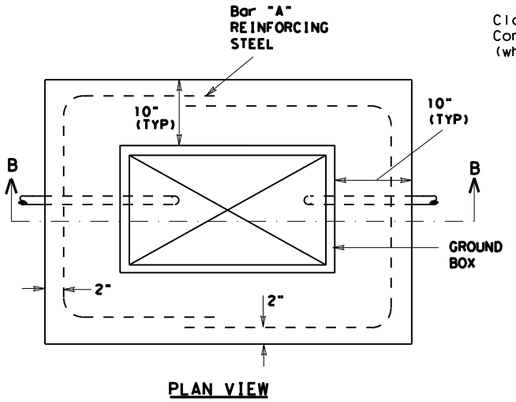
DETAIL - TRENCH LAY CONDUIT

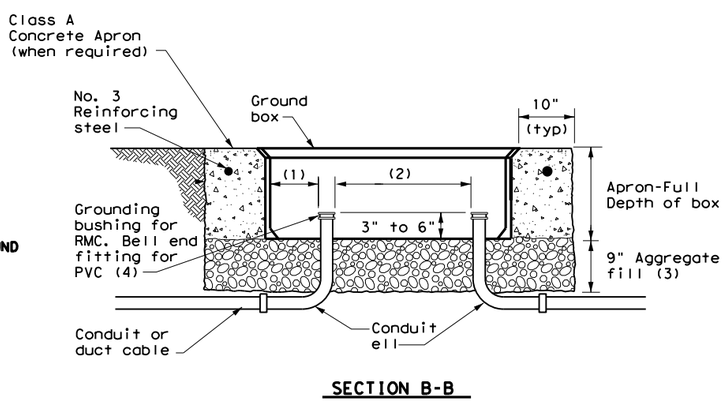


DETAIL - CUT AND RESTORE PAVEMENT

NOTES:

1. BREAKAWAY ELECTRICAL QUICK-DISCONNECTS SHALL BE WATERTIGHT BUSSMANN HEB SERIES OR EQUAL.
2. DRILL POLE FOR WIRE ENTRY. USE BUSHING OR RUBBER GROMMET TO PROTECT CONDUCTORS.
3. POLE SHAFT SHALL BE ONE PIECE SCHEDULE 40 ALUMINUM PIPE, ASTM B429 OR B221 (ALLOY 6601-T6), DO NOT USE ALUMINUM CONDUIT.





APRON FOR GROUND BOXES

(Where required)

DISTRICT STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
PHARR DISTRICT STANDARD

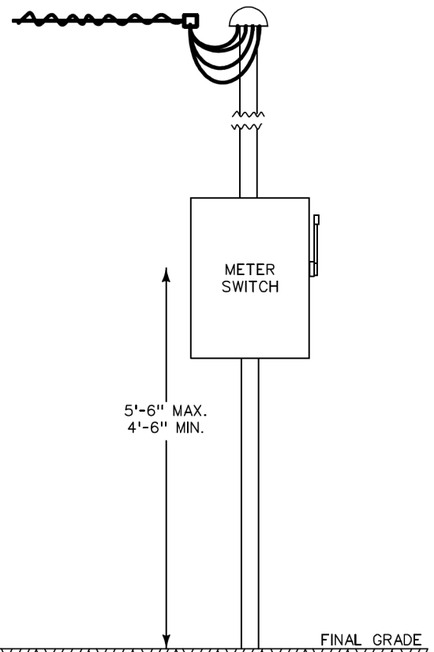
TRAFFIC SIGNAL CONSTRUCTION DETAILS

MISCELLANEOUS DETAILS

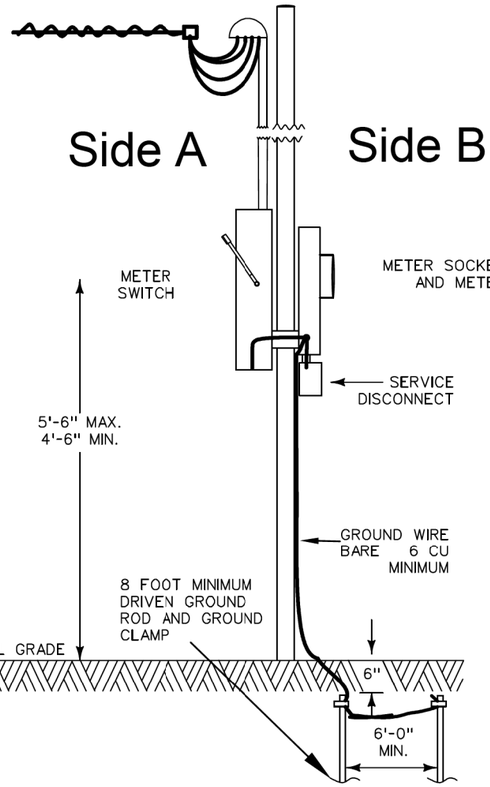
SHEET 3 OF 3

DN: OG	DRAWING	DATE	FED.RD. DIV.NO.	STATE	PROJECT NO.	SHEET NO.
CK DN: JSL	ORIGINAL	APR. 2010	6	TEXAS		104
DW: OG	REV. JUL. 2015 MAY 2016 AUG 2016 APR 2017	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
CK DW: JSL		PHARR	HIDALGO, ETC.	1586	01	089	FM 907, ETC.

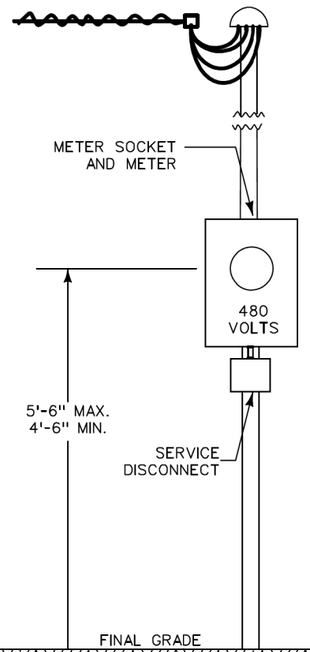
Side A



480V DELTA OR 277/480V WYE, 200A & SELF CONTAINED METERING WITH METER DISCONECT



Side B



NOTES:

METER SWITCH SHALL BE NON-FUSED, WITH A MIN RATING OF 200 AMPS, 600 VOLTS, UL LISTED, TYPE 3R FOR NON-CORROSIVE, TYPE 4X FOR CORROSIVE ENVIRONMENTS.

AEP TEXAS
An AEP Company

Pharr District Traffic Operations

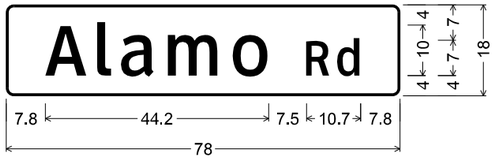
Texas Department of Transportation

240/480 AEP's SAFETY SWITCH ELECTRICAL SERVICE REQUIREMENTS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
1586	01	089, ETC.	FM 907, ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO, ETC.		105

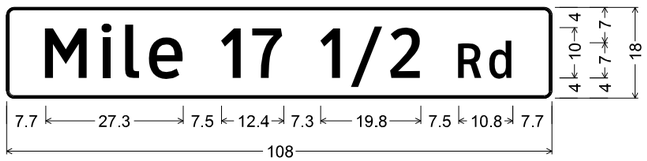
DATE: 6/30/2022 3:42:00 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Master Design Files\AEP



D3-1G(7) 10in;
1.5" Radius, 0.5" Border, White on Green;
"Alamo", ClearviewHwy-3-W;
"Rd", ClearviewHwy-3-W;
Table of letter and object lefts

A	l	a	m	o	R	d
7.8	18.2	22.9	32.2	45.0	59.5	65.6

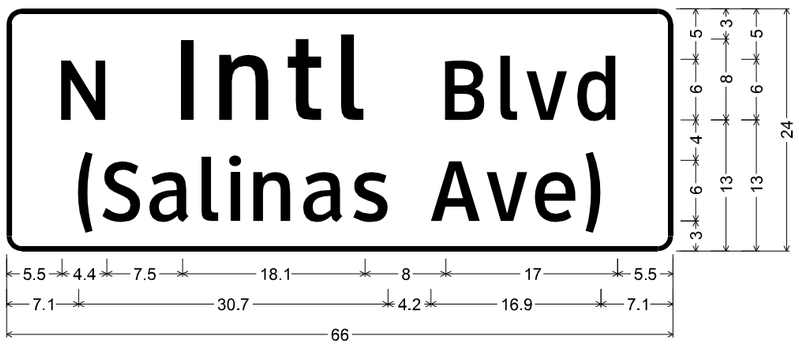
LOCATION 1
PAGE 31



D3-1G(7) 10in;
1.5" Radius, 0.5" Border, White on Green;
"Mile 17 1/2", ClearviewHwy-3-W; "Rd", ClearviewHwy-3-W;
Table of letter and object lefts

M	i	l	e	1	7	1	/	2	R	d
7.7	18.8	23.6	28.3	42.5	48.7	62.2	68.3	75.9	89.5	95.7

LOCATION 1
PAGE 31

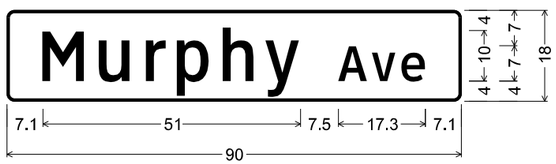


1.5" Radius, 0.5" Border, White on Green;
"N", ClearviewHwy-3-W; "Intl", ClearviewHwy-3-W; "Blvd", ClearviewHwy-3-W;
"(Salinas Ave)", ClearviewHwy-3-W 75% spacing;
Table of letter and object lefts

N	l	n	t	l	B	l	v	d
5.5	17.4	21.2	27.9	33.2	43.5	49.0	51.5	56.6

(	S	a	l	i	n	a	s	A	v	e	)
7.1	9.4	14.2	19.4	22.0	24.5	29.4	34.3	42.0	47.6	52.4	57.4

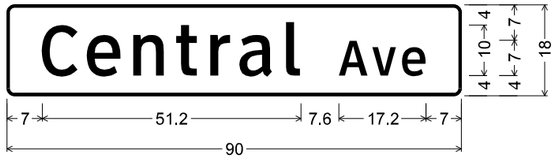
LOCATION 2
PAGE 35



D3-1G(7) 10in;
1.5" Radius, 0.5" Border, White on Green;
"Murphy", ClearviewHwy-3-W;
"Ave", ClearviewHwy-3-W;
Table of letter and object lefts

M	u	r	p	h	y	A	v	e
7.1	18.3	27.5	33.8	42.9	51.2	65.6	72.3	78.2

LOCATION 2
PAGE 35



D3-1G(7) 10in;
1.5" Radius, 0.5" Border, White on Green;
"Central", ClearviewHwy-3-W;
"Ave", ClearviewHwy-3-W;
Table of letter and object lefts

C	e	n	t	r	a	l	A	v	e
7.0	15.9	25.1	33.5	40.2	46.2	55.4	65.8	72.4	78.3

LOCATION 3
PAGE 39

D3-1G(7) 10in;
1.5" Radius, 0.5" Border, White on Green;
"Boca Chica", ClearviewHwy-3-W; "Blvd", ClearviewHwy-3-W;
Table of letter and object lefts

B	o	c	a	C	h	i	c	a	B	l	v	d
7.3	16.1	25.2	33.1	47.9	57.3	66.3	70.8	78.6	92.8	99.2	102.2	108.1

LOCATION 3 & 4
PAGE 39 & 43

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED
PROFESSIONAL ENGINEER

06.30.2022

Pharr District Traffic Opertations

Texas Department of Transportation

FM 907, ETC.

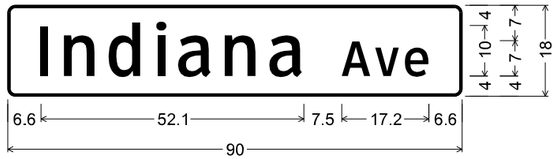
SIGN DETAIL SHEETS

SCALE: 1"=60' SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
1586	01	089,ETC.	FM 907,ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO,ETC.		106

DS: CK: DW: CK:

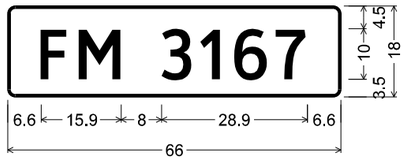
DATE: 6/30/2022 3:42:21 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\8. Traffic\Overhead Signs\Sign Detail Sheets



D3-1G(7) 10in;
1.5" Radius, 0.5" Border, White on Green;
"Indiana", ClearviewHwy-3-W;
"Ave", ClearviewHwy-3-W;
Table of letter and object lefts

I	n	d	i	a	n	a	A	v	e
6.6	11.3	20.1	29.4	33.9	43.1	52.0	66.2	72.8	78.8

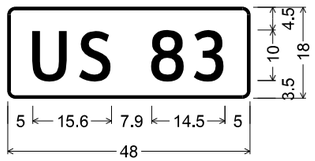
LOCATION 4
PAGE 43



D3-1G(7) 10in;
1.5" Radius, 0.5" Border, White on Green;
"FM 3167", ClearviewHwy-3-W;
Table of letter and object lefts

F	M	3	1	6	7
6.6	14.2	30.5	38.2	44.9	53.1

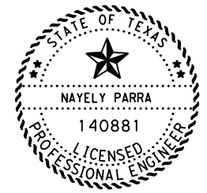
LOCATION 5
PAGE 47



D3-1G(7) 10in;
1.5" Radius, 0.5" Border, White on Green;
"US 83", ClearviewHwy-3-W;
Table of letter and object lefts

U	S	8	3
5.0	14.1	28.5	36.9

LOCATION 5
PAGE 47



06.30.2022

Pharr District Traffic Opertations

Texas Department of Transportation

FM 907, ETC.

SIGN DETAIL SHEETS

SCALE: 1"=60' SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
1586	01	089,ETC.	FM 907,ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO,ETC.		107

DES: ____ CK: ____
DW: ____ CK: ____

DATE: 6/30/2022 3:42:23 PM
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DATE: 6/30/2022 3:42:36 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\13. Standards\4. SIGNING\smdgen.dgn

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

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

Number of Posts (1 or 2)

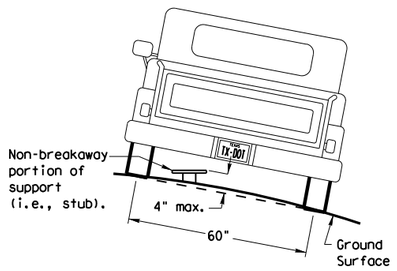
Anchor Type

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

Sign Mounting Designation

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

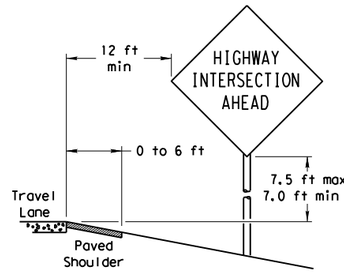
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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

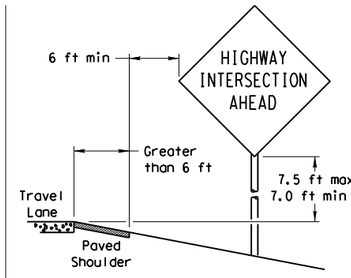
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

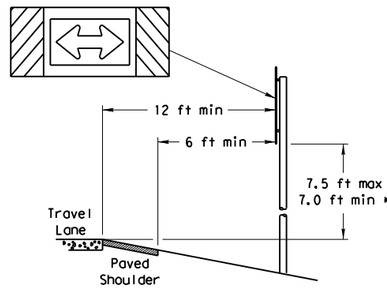
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



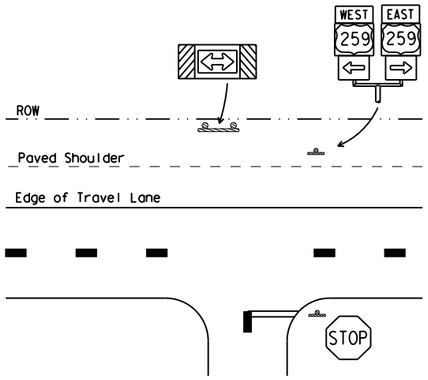
GREATER THAN 6 FT. WIDE

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.

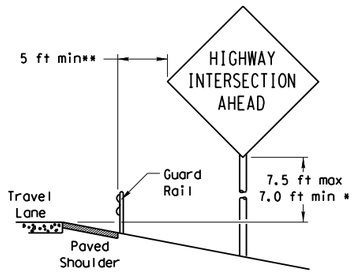
T-INTERSECTION



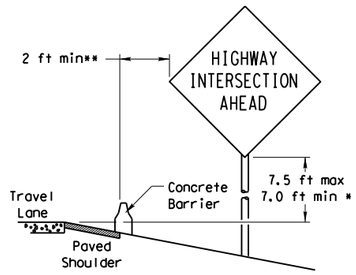
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



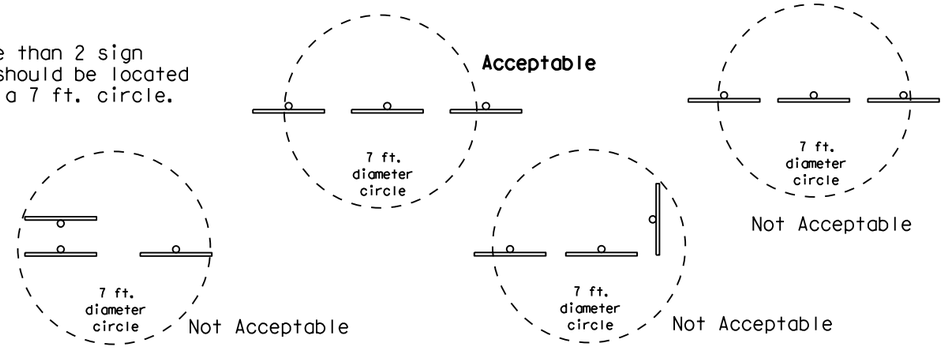
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

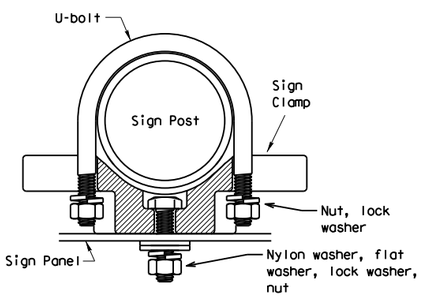
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

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



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

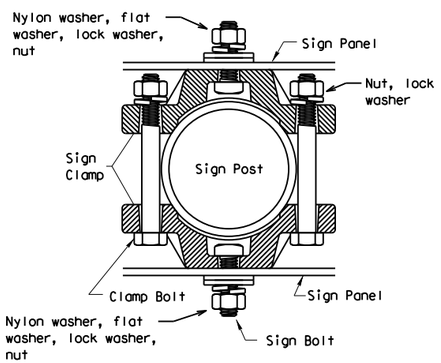


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

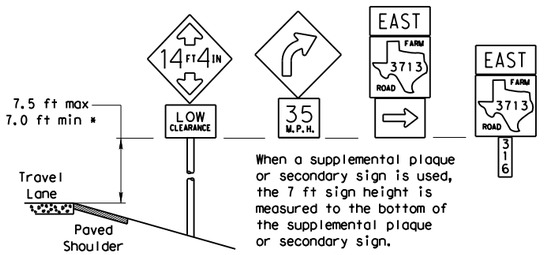
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



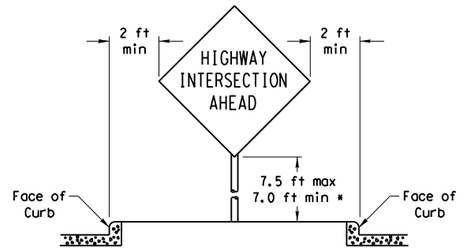
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



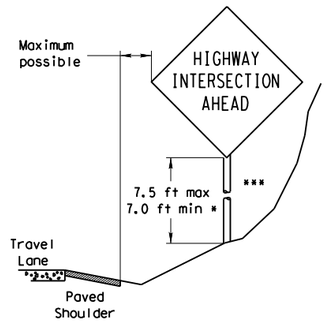
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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

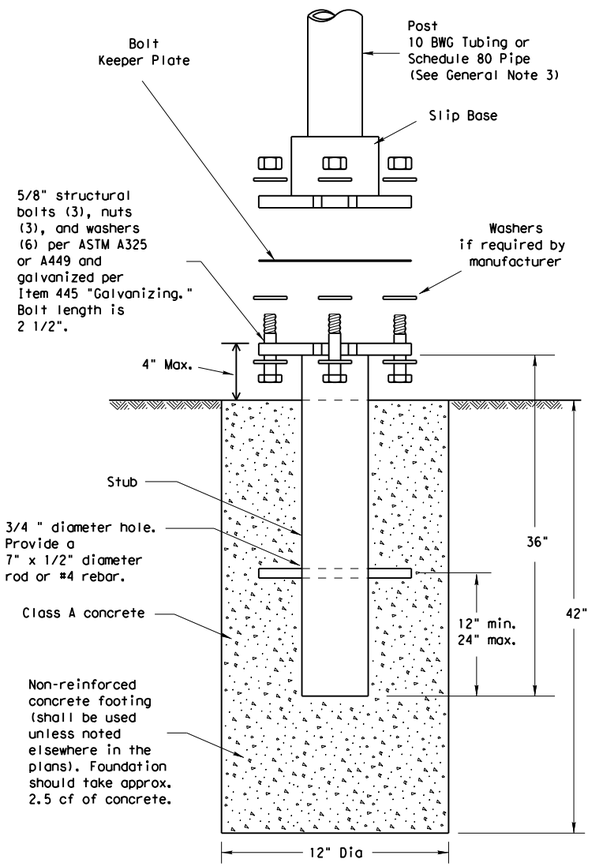
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		108

DATE: 6/30/2022 3:42:40 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\21 - PHR\Design Projects\1586-01-089\4 - Design\Plan Set\13. Standards\4. SIGNING\smdsl.dgn

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.

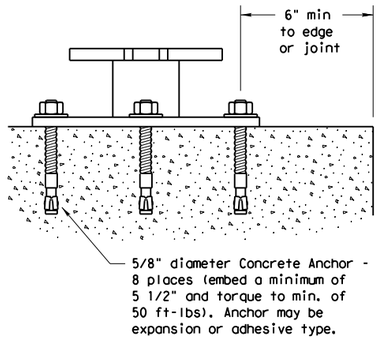
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		109

DATE: 6/30/2022 3:42:44 PM
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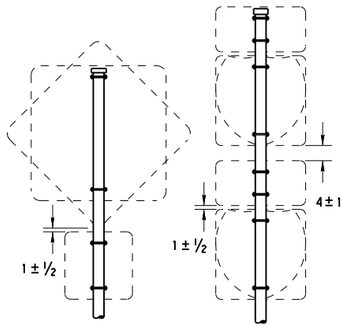
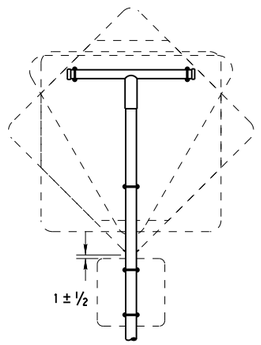


SM RD SGN ASSM TY XXXXX(1)XX(P)



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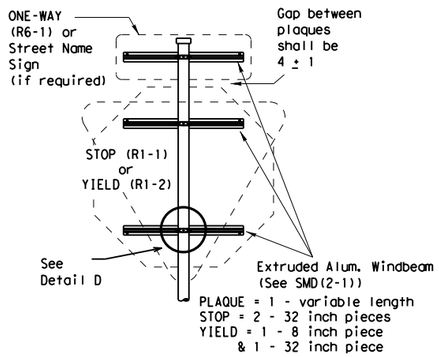
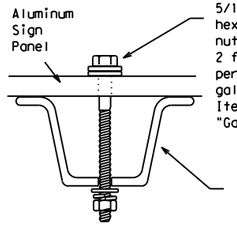
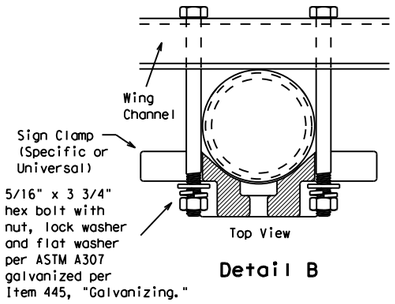


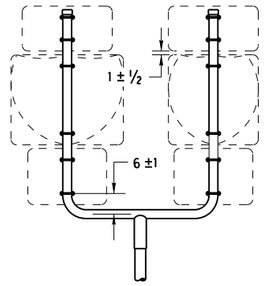
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



Detail B



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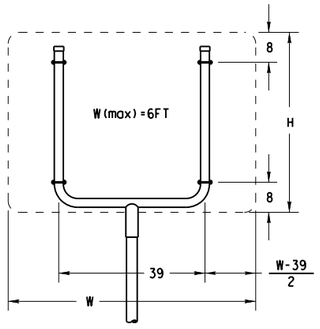

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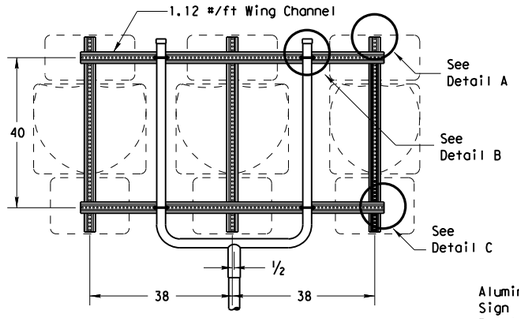
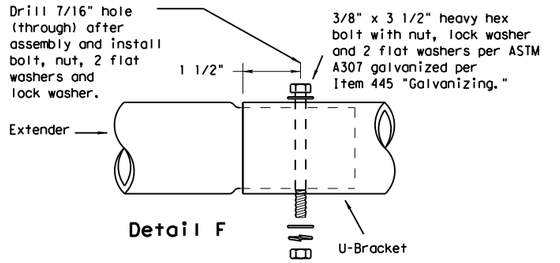
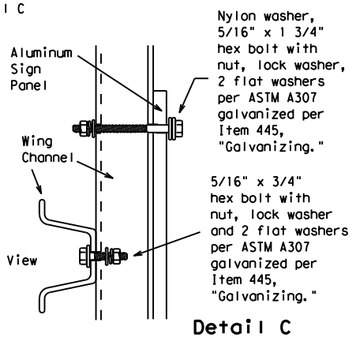


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

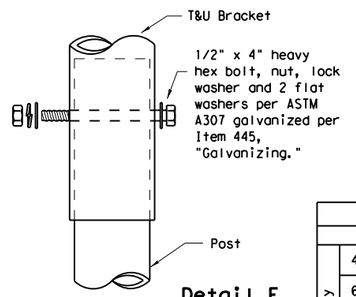


Detail F

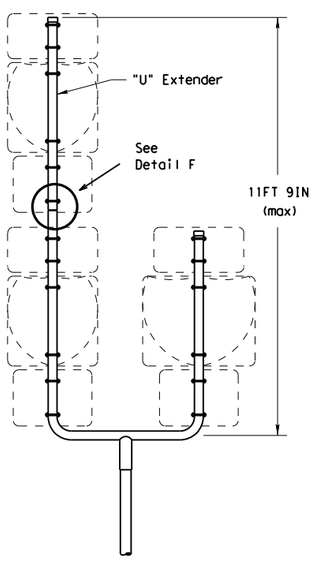
Splices shall only be allowed behind the sign substrate.



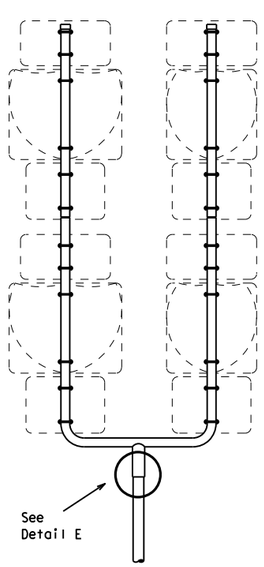
Detail C



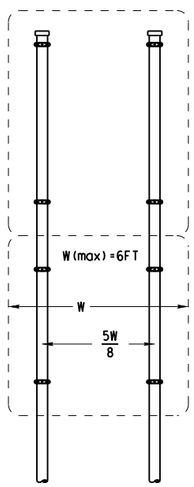
Detail E



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

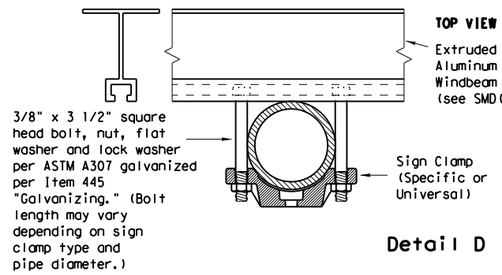


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

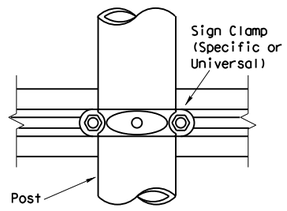


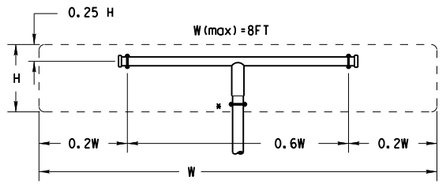
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

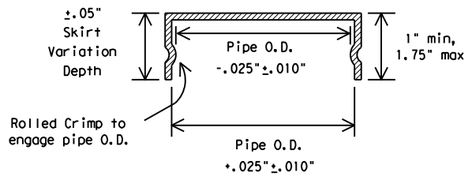




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

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.

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.

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-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
1586	01	089,ETC.	FM 907,ETC.
DIST	COUNTY		SHEET NO.
PHR	HIDALGO,ETC.		110

9-08 REVISIONS

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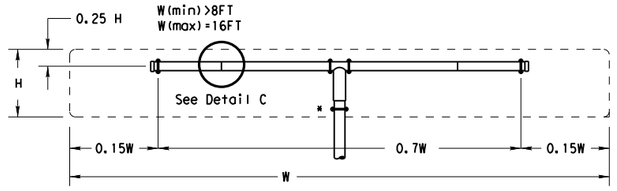
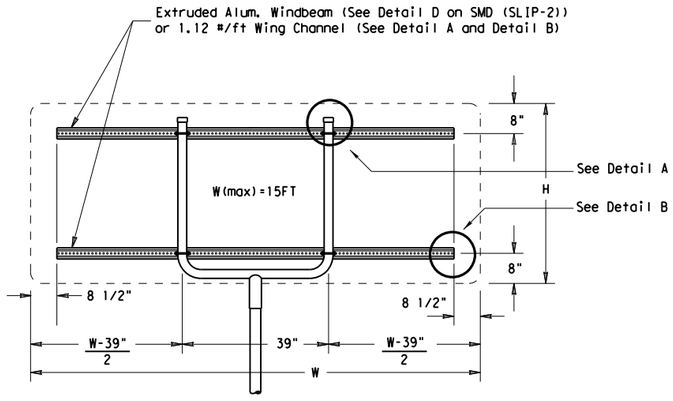
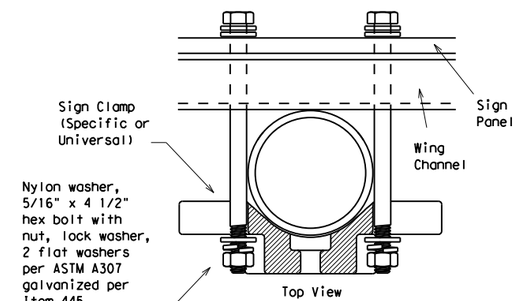


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)

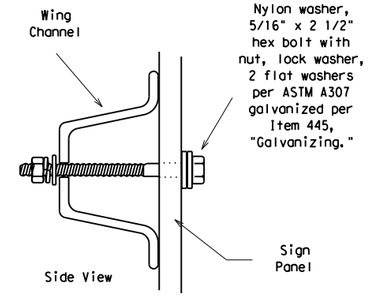


SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

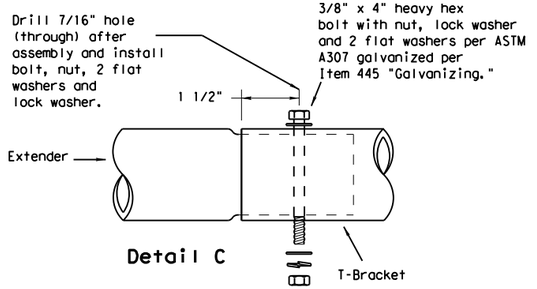


Top View

Detail A



Detail B



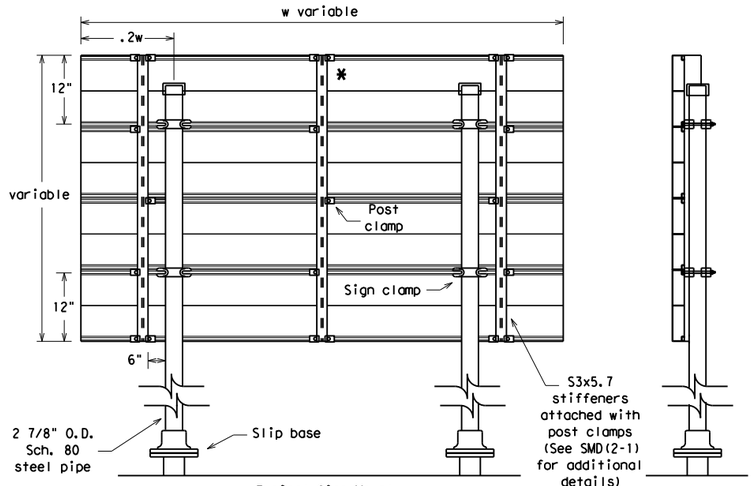
Detail C

Splices shall only be allowed behind the sign substrate.

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

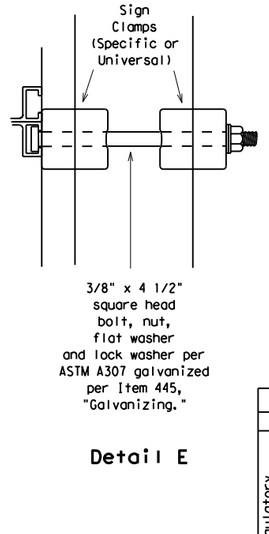
1. See table above.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to 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.



Typical Sign Mount

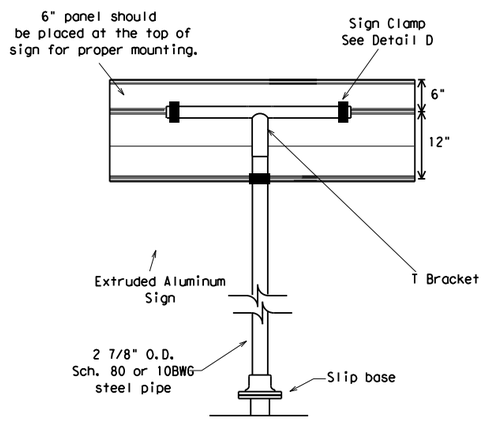
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

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

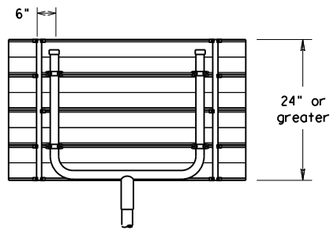


Detail E

See Detail E
for clamp installation



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

Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

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
9-08

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

CONT	SECT	JOB	HIGHWAY
1586	01	089,ETC.	FM 907,ETC.

DIST	COUNTY	SHEET NO.
PHR	HIDALGO,ETC.	111

DATE: 6/30/2022 3:42:52 PM
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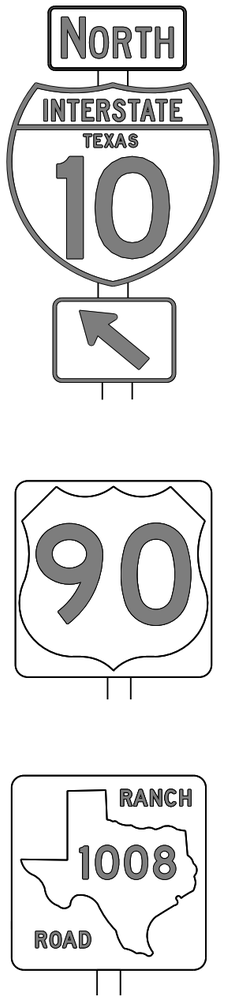
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

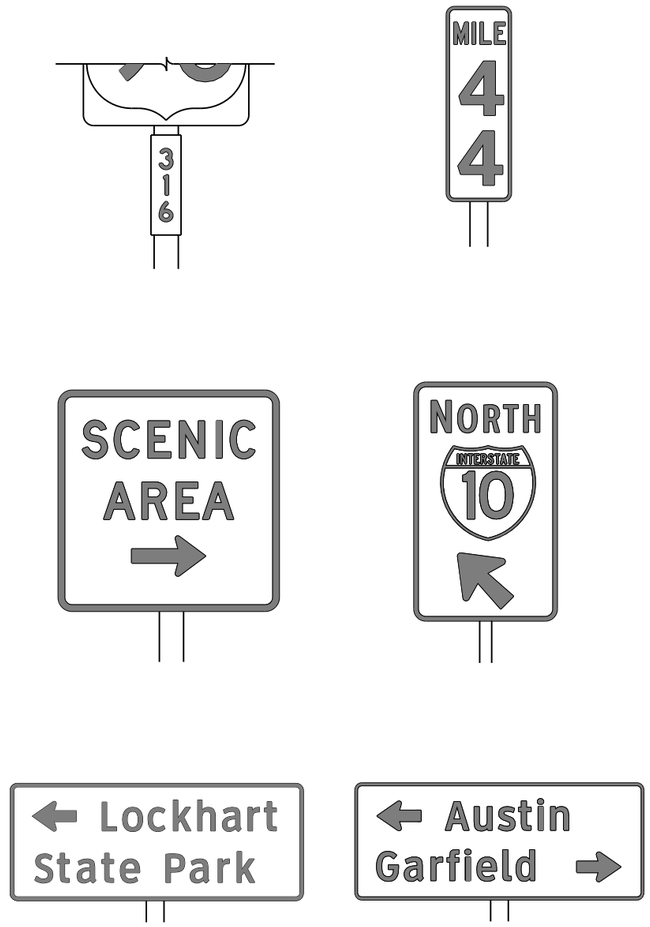
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

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

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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

http://www.txdot.gov/

Texas Department of Transportation

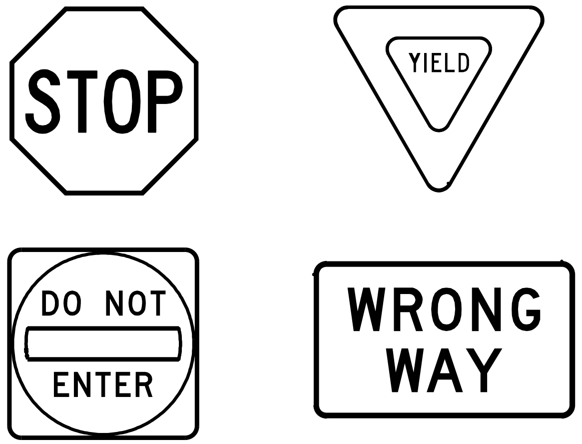
Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089,ETC.	FM 907,ETC.
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	PHR	HIDALGO,ETC.		112

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS
(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

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

GENERAL NOTES

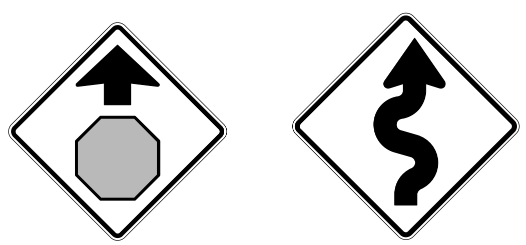
1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway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

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.
http://www.txdot.gov/

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089, ETC.	FM 907, ETC.
12-03 7-13 9-08	DIST		COUNTY	SHEET NO.
	PHR		HIDALGO, ETC.	113

DATE: 6/30/2022 3:43:00 PM
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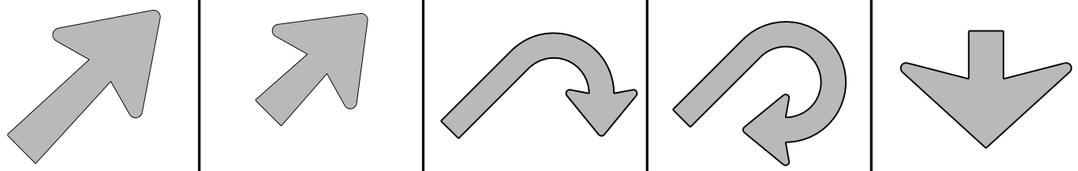
ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

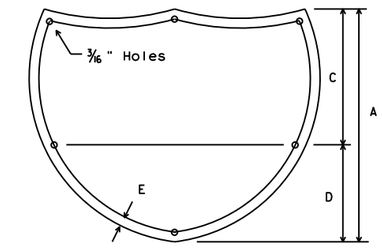
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

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

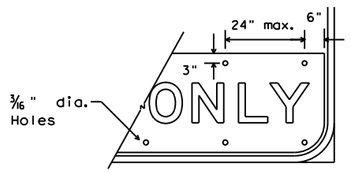
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

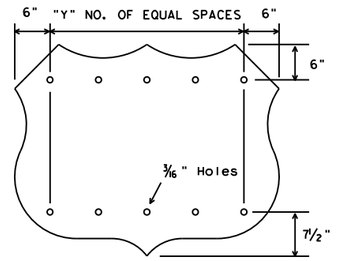


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

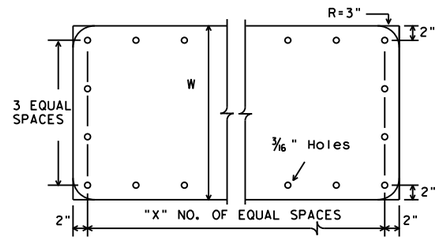


EXIT ONLY PANEL



U.S. ROUTE MARKERS

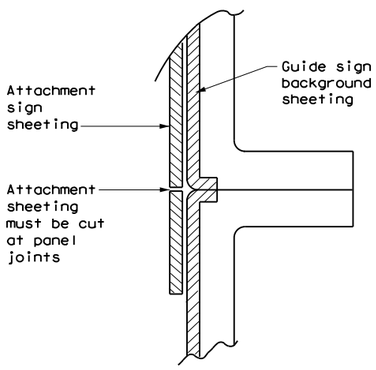
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

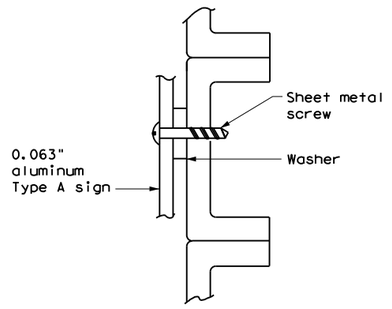
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



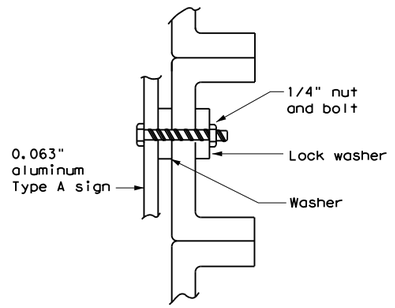
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



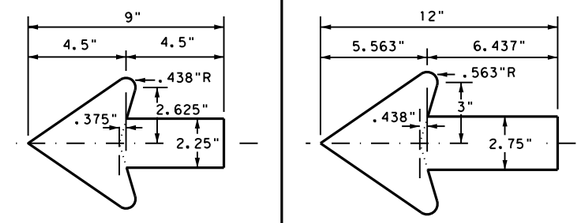
NUT/BOLT ATTACHMENT

NOTE:

Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.

Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089,ETC.	FM 907,ETC.
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		114

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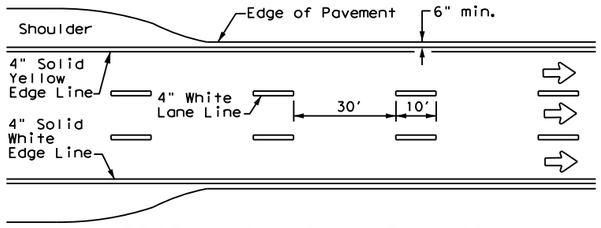
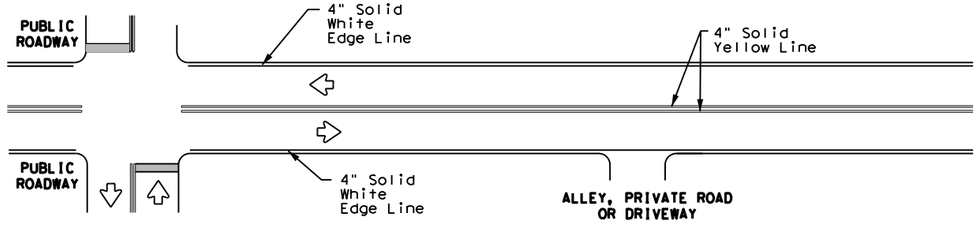
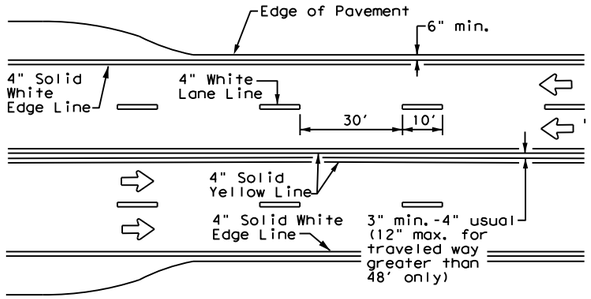


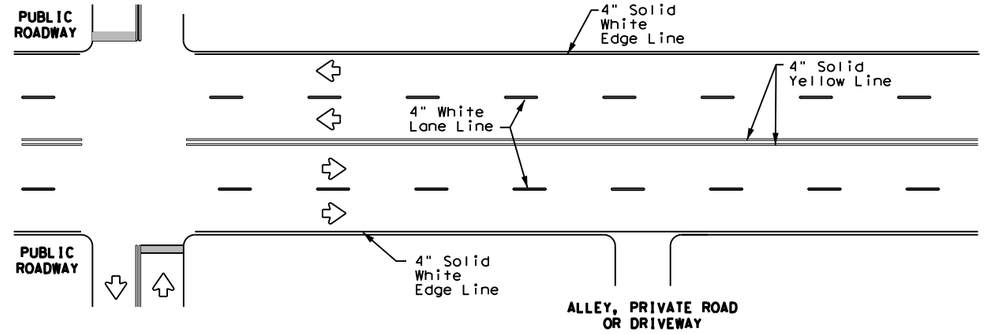
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



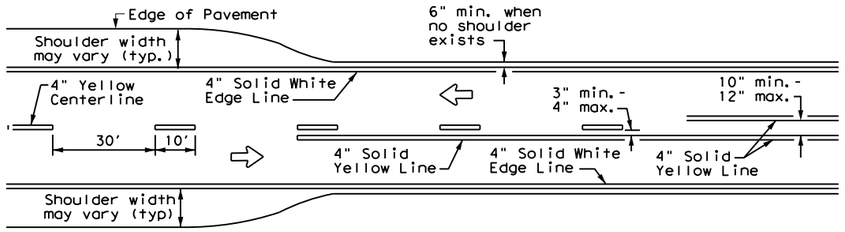
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



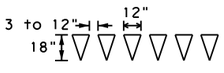
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



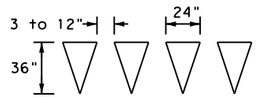
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

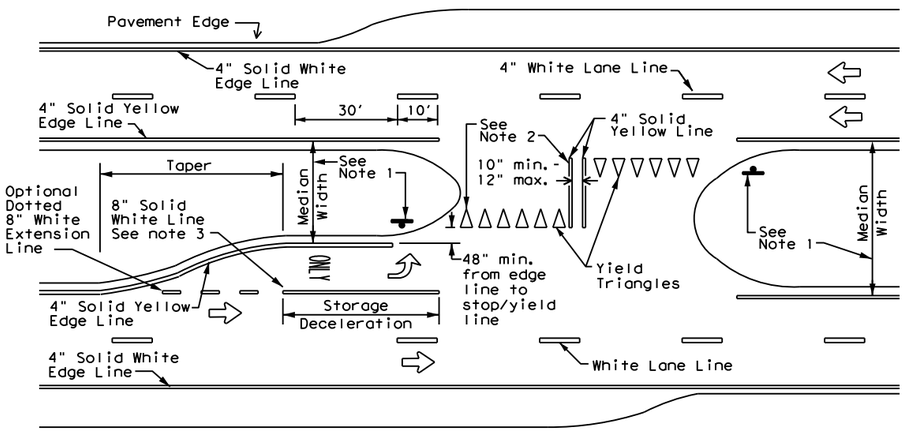


For posted speed on road being marked equal to or less than 40 MPH.



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

YIELD LINES



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 are optional as determined by the Engineer.

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

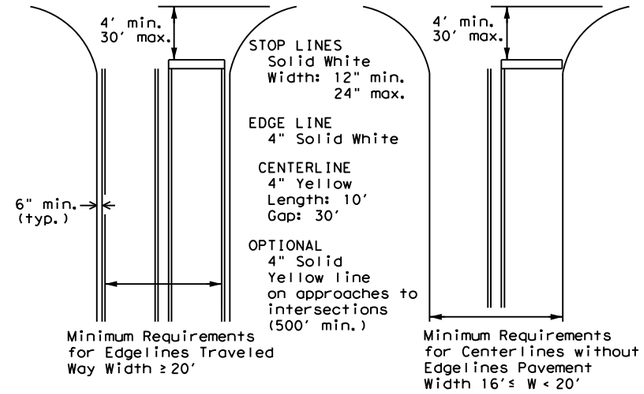
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines 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 inside of edgeline to the inside of edgeline 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.



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

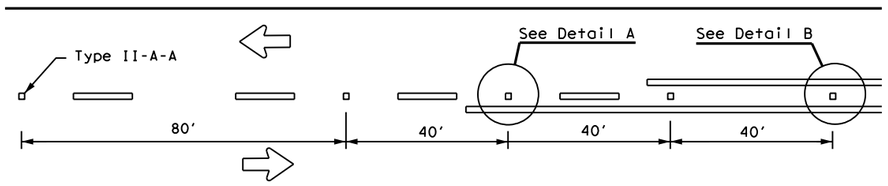
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

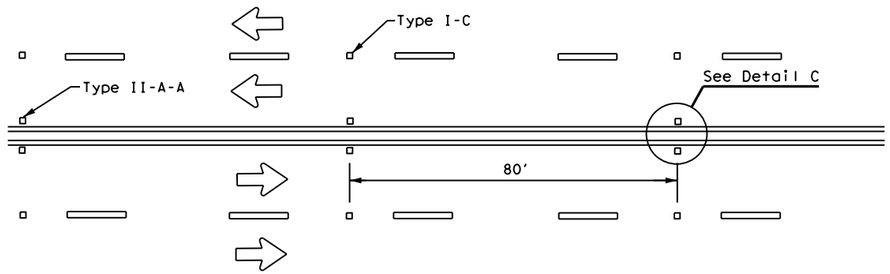
FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	1586	01	089, ETC.	FM 907, ETC.
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	PHR	HIDALGO, ETC.		115

22A

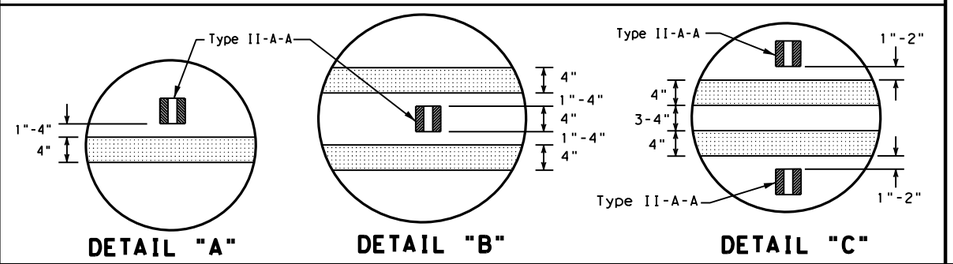
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



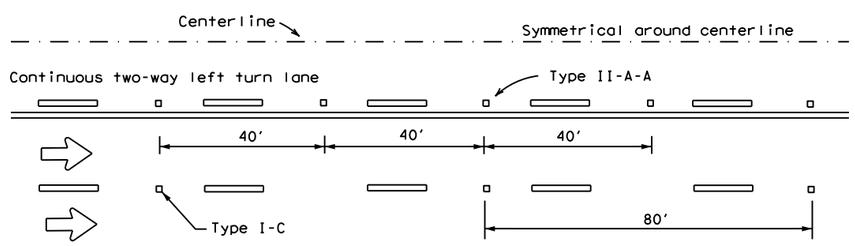
CENTERLINE FOR ALL TWO LANE ROADWAYS



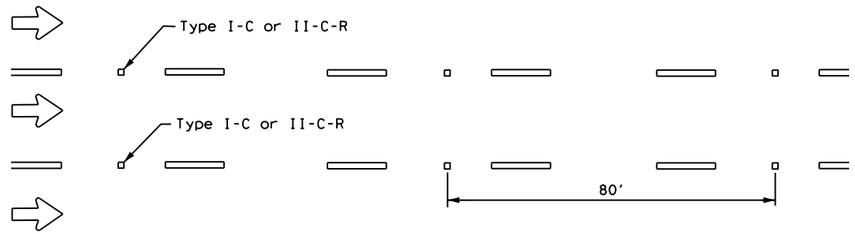
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

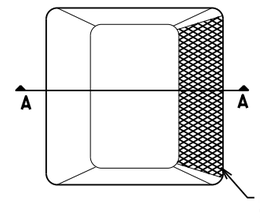


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

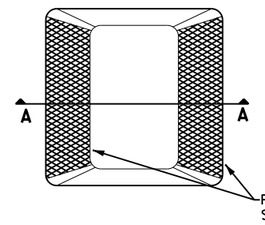
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

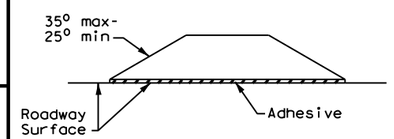
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

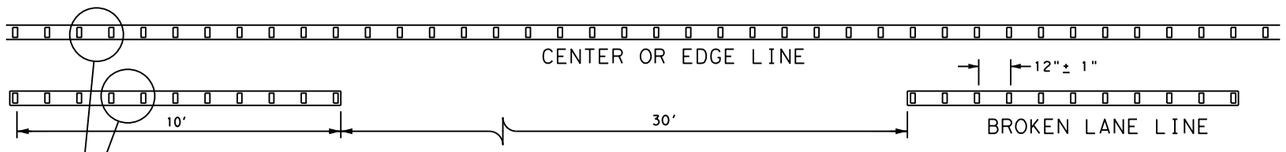


Type II (Top View)



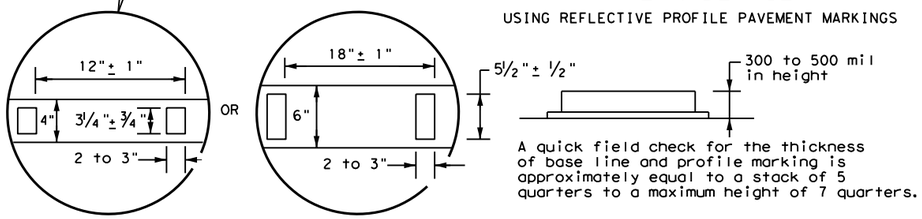
SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

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.

NOTE

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 in 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.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10 5-00 2-12 8-00 6-20	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		116

22B

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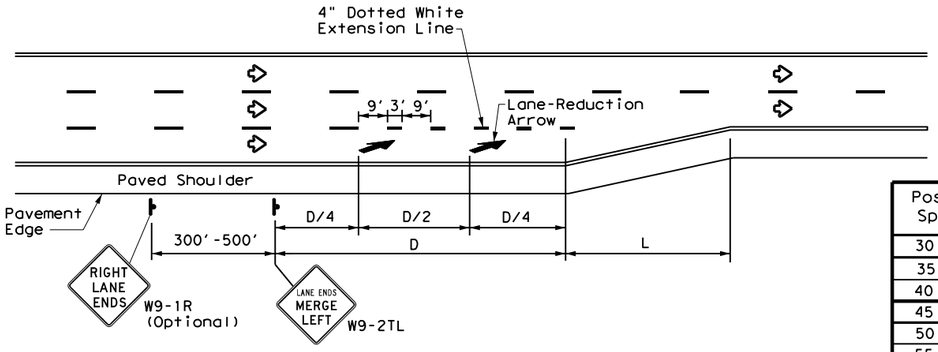
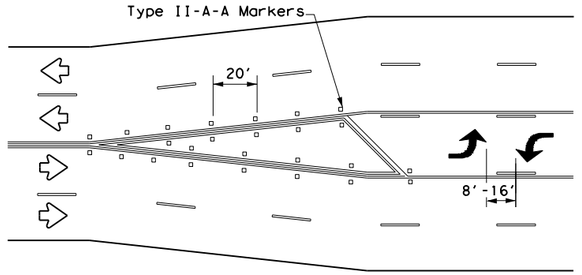


LANE REDUCTION

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	

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 W9-1R "RIGHT LANE ENDS" 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.



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.

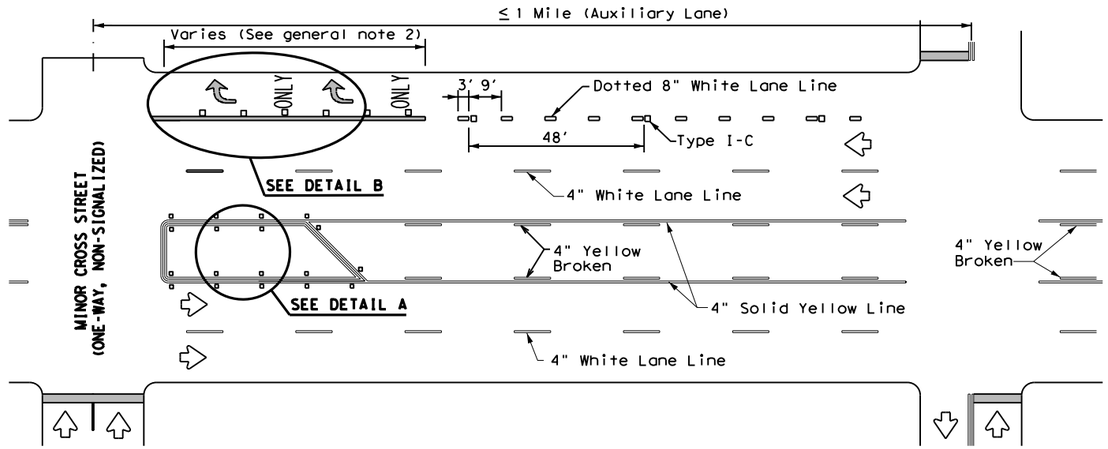
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

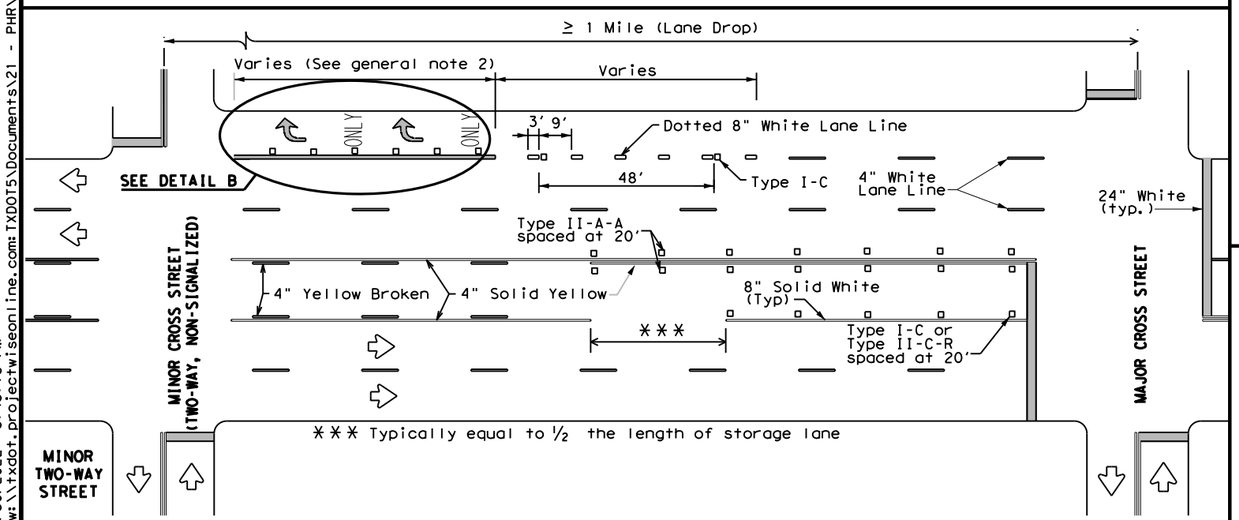
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn 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.

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

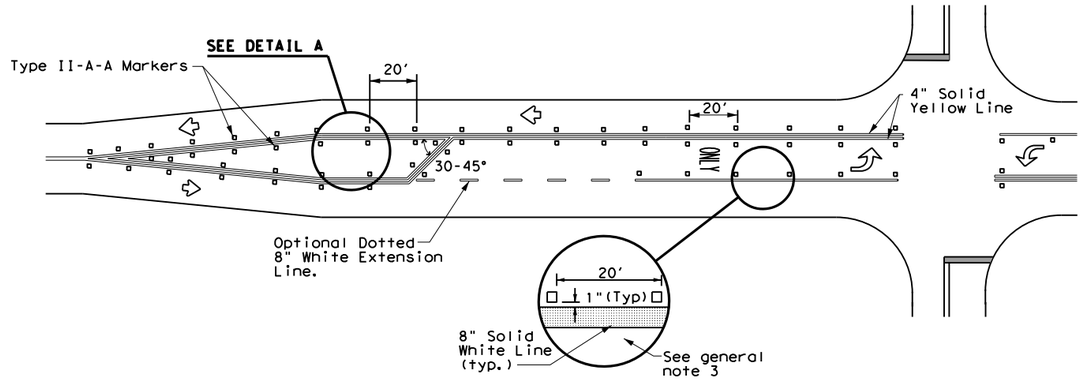
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



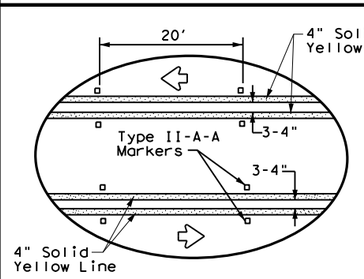
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



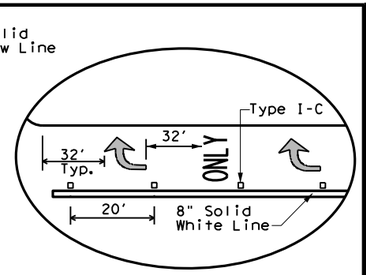
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A



DETAIL B

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
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8-00 2-12	PHR	HIDALGO,ETC.		117
3-03 6-20				

220

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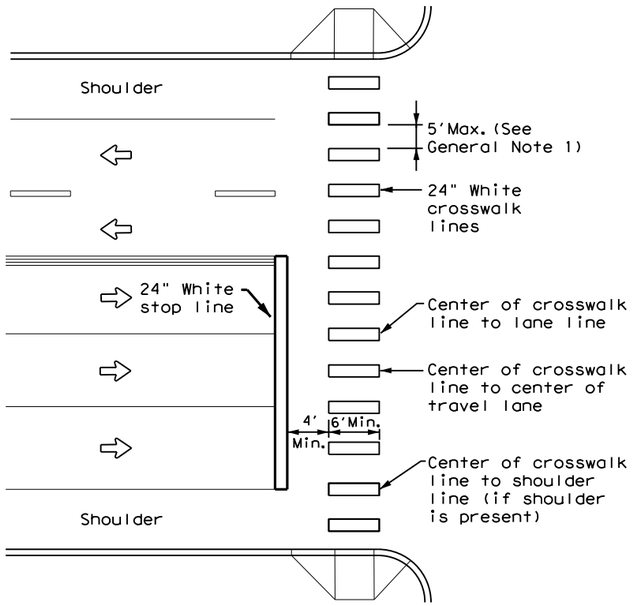


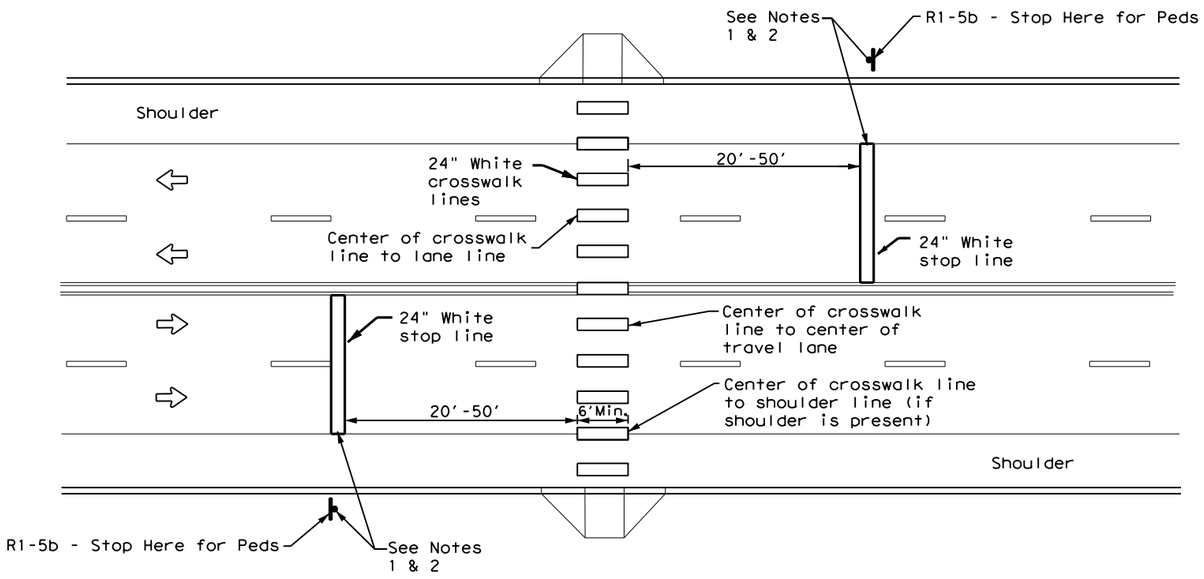
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

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" signs at unsignalized mid block cross walks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22

FILE: pm4-22.dgn	DN:	CK:	DW:	CK:
© TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
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	PHR	HIDALGO,ETC.		118

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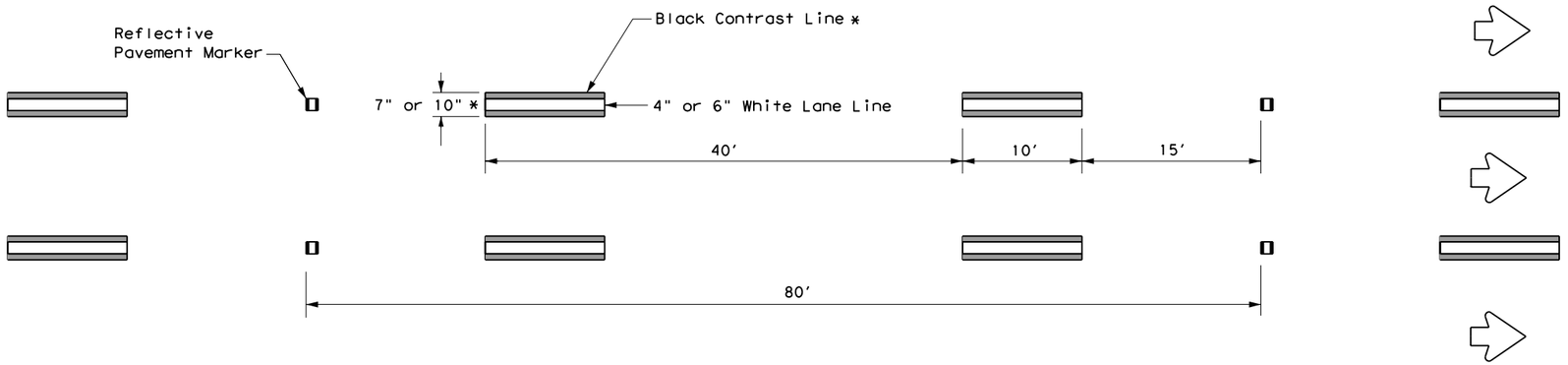
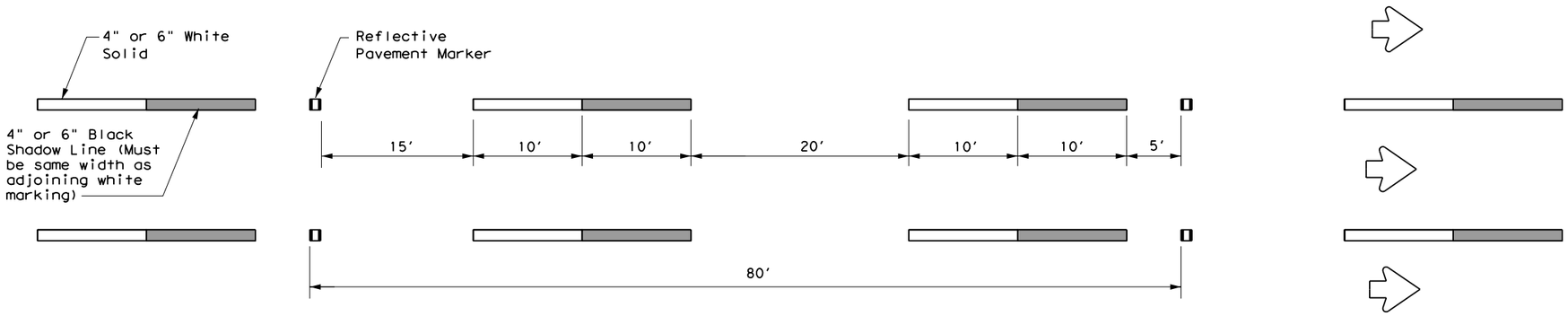


CONTRAST LANE LINE DESIGN

* See contrast line dimensions table for width of black line.

CONTRAST LINE DIMENSIONS		
White	Black (per side)	Total Width
4"	1.5"	7"
6"	2"	10"



SHADOW LANE LINE DESIGN

GENERAL NOTES

1. Contrast and Shadow markings may only be used on concrete pavements.
2. Contrast and Shadow markings shall not be used on edge lines.
3. Contrast lane lines shall be permanent prefabricated pavement markings meeting DMS 8240.
4. Shadow lane line designs shall be a liquid markings system approved by TxDOT.
5. All raised reflective pavement markers placed in broken lines shall be placed in line with and midway between the white stripes.
6. See PM(2) for raised reflective pavement markings installation details.

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.

Texas Department of Transportation

Traffic Operations Division Standard

CONTRAST AND SHADOW PAVEMENT MARKINGS

CPM(1)-14

FILE: CPM(1)14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089, ETC.	FM 907, ETC.
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC.		119

22N

ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.

2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC),TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA),and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.

4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.

5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.

   a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.

   b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, provide poles meeting the following requirements:

      i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).

      ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.

6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.

7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.

8. Install T-Base with following procedure:

   a. Anchor Bolt Tightening.

      i. Coat the threads of the anchor bolts with electrically conductive lubricant.

      ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.

      iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.

      iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.

      v. Check top of T-base for level. If not level then foundation must be leveled.

   b. Top Bolt Procedure

      i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

      ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."

      iii. Tighten each nut to 150 ft-lb. using a torque wrench.

   c. Level and Plumb

      i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.

9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).

10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.

11. Mount luminaires on arms level as shown by the luminaire level indicator.

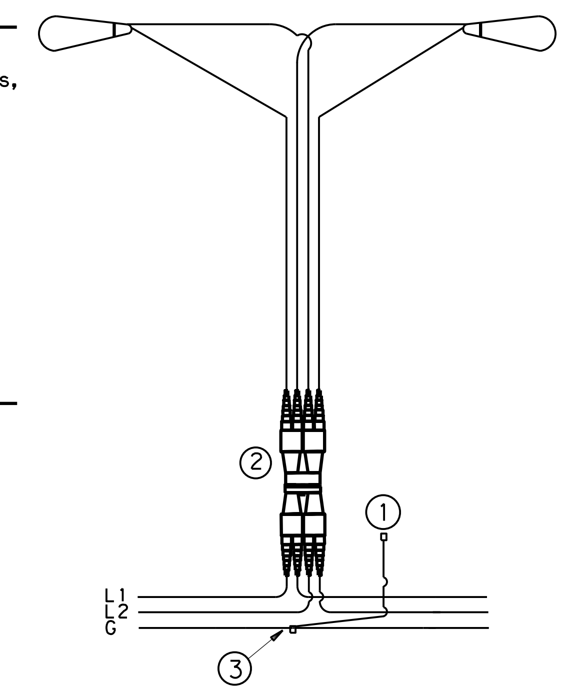
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

(1) Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.

(2) Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.

(3) Split Bolt or other connector.



TYPICAL WIRING DIAGRAM

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

Decorative LED Lighting Notes:

1. LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):

   a. Provide NEMA 3R outdoor enclosure or as approved.

   b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.

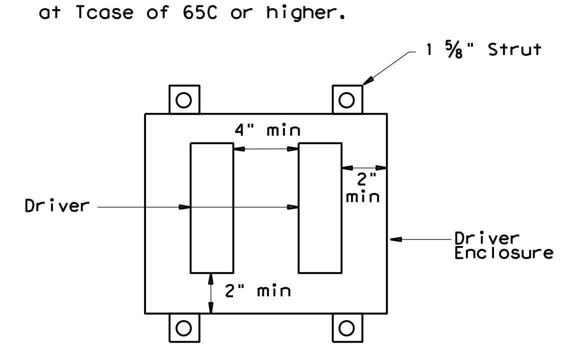
   c. Install drivers with at least 2 inches of space from enclosure walls.

   d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment

   e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.

   f. Provide remote drivers with a maximum of 100 watts

   g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



Driver Spacing In Remote Enclosure

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS

RID(1)-20

FILE: rid1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089, ETC.	FM 907, ETC.
7-17 12-20	DIST		COUNTY	SHEET NO.
	PHR		HIDALGO, ETC.	120

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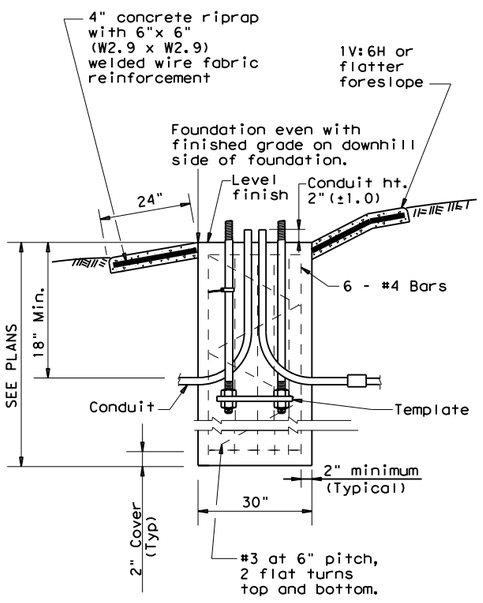
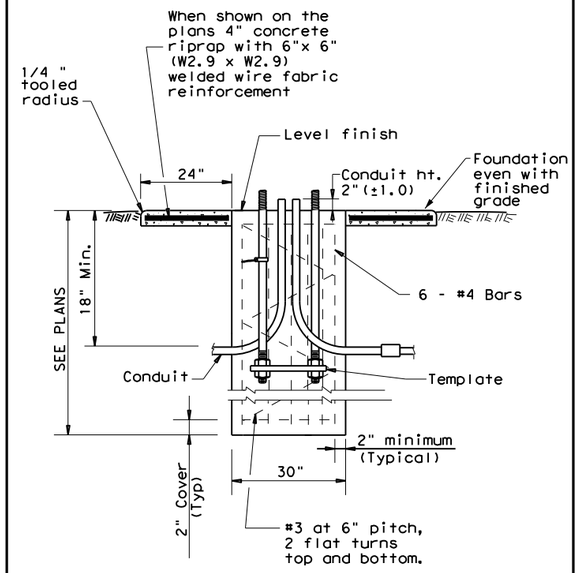


SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE

TABLE 1

ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1in. x 30in.
40-50 ft.	15 in.	17 ¼in.	1 ¼in. x 30in.

TABLE 2

RECOMMENDED FOUNDATION LENGTHS (See note 1)

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

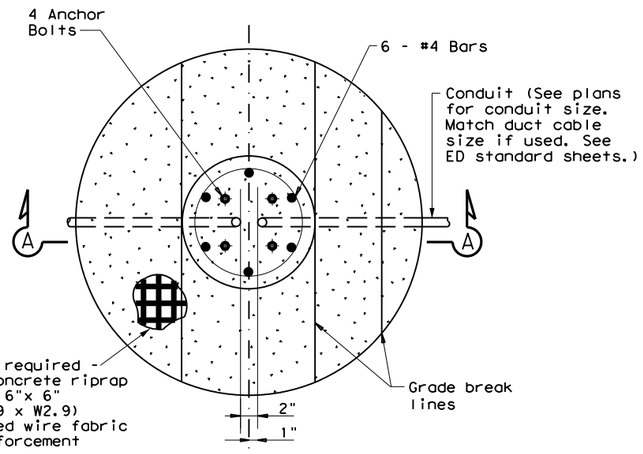
TABLE 3

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

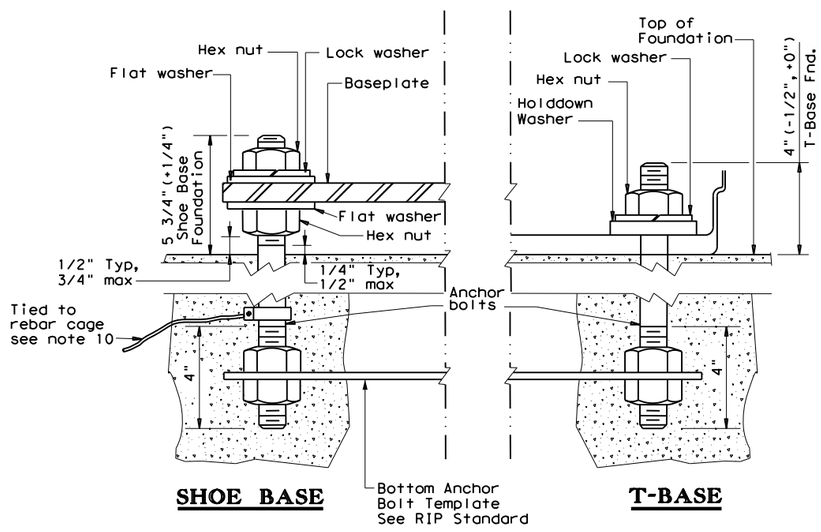
Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

GENERAL NOTES:

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



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

TABLE 4

BREAKAWAY POLE PLACEMENT (See note 6)

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

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.

Texas Department of Transportation

Traffic Safety Division Standard

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

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	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		121

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SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS

Nominal Mounting Ht. (ft)	Shoe Base Designation Pole	A1	A2	Luminaire	Quantity	T-Base Designation Pole	A1	A2	Luminaire	Quantity	CSB/SSCB Mounted Designation Pole	A1	A2	Luminaire	Quantity
20	(Type SA 20 S - 4)			(150W EQ) LED		(Type SA 20 T - 4)			(150W EQ) LED						
	(Type SA 20 S - 4 - 4)			(150W EQ) LED		(Type SA 20 T - 4 - 4)			(150W EQ) LED						
30	(Type SA 30 S - 4)			(250W EQ) LED		(Type SA 30 T - 4)			(250W EQ) LED		(Type SP 28 S - 4)			(250W EQ) LED	
	(Type SA 30 S - 4 - 4)			(250W EQ) LED		(Type SA 30 T - 4 - 4)			(250W EQ) LED		(Type SP 28 S - 4 - 4)			(250W EQ) LED	
	(Type SA 30 S - 8)			(250W EQ) LED		(Type SA 30 T - 8)			(250W EQ) LED		(Type SP 28 S - 8)			(250W EQ) LED	
	(Type SA 30 S - 8 - 8)			(250W EQ) LED		(Type SA 30 T - 8 - 8)			(250W EQ) LED		(Type SP 28 S - 8 - 8)			(250W EQ) LED	
40	(Type SA 40 S - 4)			(250W EQ) LED		(Type SA 40 T - 4)			(250W EQ) LED		(Type SP 38 S - 4)			(250W EQ) LED	
	(Type SA 40 S - 4 - 4)			(250W EQ) LED		(Type SA 40 T - 4 - 4)			(250W EQ) LED		(Type SP 38 S - 4 - 4)			(250W EQ) LED	
	(Type SA 40 S - 8)			(250W EQ) LED		(Type SA 40 T - 8)			(250W EQ) LED		(Type SP 38 S - 8)			(250W EQ) LED	
	(Type SA 40 S - 8 - 8)			(250W EQ) LED		(Type SA 40 T - 8 - 8)			(250W EQ) LED		(Type SP 38 S - 8 - 8)			(250W EQ) LED	
	(Type SA 40 S - 10)			(250W EQ) LED		(Type SA 40 T - 10)			(250W EQ) LED		(Type SP 38 S - 10)			(250W EQ) LED	
	(Type SA 40 S - 10 - 10)			(250W EQ) LED		(Type SA 40 T - 10 - 10)			(250W EQ) LED		(Type SP 38 S - 10 - 10)			(250W EQ) LED	
	(Type SA 40 S - 12)			(250W EQ) LED		(Type SA 40 T - 12)			(250W EQ) LED		(Type SP 38 S - 12)			(250W EQ) LED	
	(Type SA 40 S - 12 - 12)			(250W EQ) LED		(Type SA 40 T - 12 - 12)			(250W EQ) LED		(Type SP 38 S - 12 - 12)			(250W EQ) LED	
50	(Type SA 50 S - 4)			(400W EQ) LED		(Type SA 50 T - 4)			(400W EQ) LED		(Type SP 48 S - 4)			(400W EQ) LED	
	(Type SA 50 S - 4 - 4)			(400W EQ) LED		(Type SA 50 T - 4 - 4)			(400W EQ) LED		(Type SP 48 S - 4 - 4)			(400W EQ) LED	
	(Type SA 50 S - 8)			(400W EQ) LED		(Type SA 50 T - 8)			(400W EQ) LED		(Type SP 48 S - 8)			(400W EQ) LED	
	(Type SA 50 S - 8 - 8)			(400W EQ) LED		(Type SA 50 T - 8 - 8)			(400W EQ) LED		(Type SP 48 S - 8 - 8)			(400W EQ) LED	
	(Type SA 50 S - 10)			(400W EQ) LED		(Type SA 50 T - 10)			(400W EQ) LED		(Type SP 48 S - 10)			(400W EQ) LED	
	(Type SA 50 S - 10 - 10)			(400W EQ) LED		(Type SA 50 T - 10 - 10)			(400W EQ) LED		(Type SP 48 S - 10 - 10)			(400W EQ) LED	
	(Type SA 50 S - 12)			(400W EQ) LED		(Type SA 50 T - 12)			(400W EQ) LED		(Type SP 48 S - 12)			(400W EQ) LED	
	(Type SA 50 S - 12 - 12)			(400W EQ) LED		(Type SA 50 T - 12 - 12)			(400W EQ) LED		(Type SP 48 S - 12 - 12)			(400W EQ) LED	

OTHER Designation Pole	A1	A2	Luminaire	Quantity

GENERAL NOTES:

1. All work, materials and services not shown on the plans which may be necessary for complete and proper construction shall be performed, furnished and installed by the Contractor. Faulty fabrication or poor workmanship in any material, equipment or installation will be considered justification for rejection. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the Department such warranties or guarantees.

2. The location of poles and fixtures are diagrammatic only and may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Standard Steel Pole Designs. Steel poles fabricated in accordance with the details and dimensions shown herein, shall be considered standard designs. Submission of shop drawings and design calculations for standard designs is not required.

4. Optional Steel Pole Designs. Multi-sided steel poles may be allowed as optional designs, if steel poles are permitted or required, pending approval by the Department as outlined below.

   a. Shop Drawings. Optional designs require submission of shop drawings and design calculations bearing the seal of an engineer licensed in the State of Texas, in accordance with Item 441, "Steel Structures." The Department may elect to pre-approve some shop drawings for optionally designed poles. Submission of shop drawings and design calculations is not required for structures fabricated in accordance with the details of shop drawings on the pre-approved list maintained by the TxDOT Traffic Operations Division. Any deviation from the pre-approved shop drawings will require submission of shop drawings of the complete assembly and design calculations as described above.
   b. Structural Support Design for Luminaires. Lighting support structures shall be designed for a 25 year design life in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. All poles shall be designed for 110 mph 3-second gust wind speeds. The Gust Factor, G, and Wind Importance Factor, Ir, shall be applied as per the AASHTO Specifications assuming a 25-year design life. The design wind pressure for hurricane wind velocities greater than 100 mph shall not be less than the design wind pressure using 100 mph with the non-hurricane Wind Importance Factor, Ir, value. For transformer base poles, fabricator shall include transformer base and connecting hardware in design calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.
   c. Mast Arm Attachments. All poles and attachments shall be structurally designed to support two 12-foot mast arms and luminaires. Poles shall be supplied with mast arm combinations as shown in the plans. All mast arms shall be designed for a 60-pound luminaire having an effective projected area of 1.6 square feet.
   d. Anchor Bolt Assembly. Anchor bolt assemblies for optionally designed poles shall be the same as those shown herein.

5. Aluminum Pole Designs. Aluminum pole designs may be allowed, if aluminum poles are permitted or required, pending approval by the Department as outlined below.

   a. Meet all of the requirements stated above for optional steel pole designs and the following:
      1. Aluminum poles shall be fabricated in accordance with "Structural Welding Code-Aluminum" AWS D1.2.
      2. Aluminum pole designs shall use the same anchor bolt assembly and be subject to the same geometric restraints and other requirements for steel poles specified herein.
      3. Aluminum poles shall be equipped with vibration mitigation devices, as approved by the engineer.
      4. Pole components shall be constructed using the following material:
         Shaft: ASTM B221 or B241 Alloy 6063-T6, ASTM B209 Alloy 5086-H34, ASTM B221 Alloy 6005-T5.
         Base Flange: ASTM B26 Alloy 356.0-T6 or ASTM B108 Alloy 356.0-T6 (Yield strength test required).
         Mast Arm Fitting: ASTM B209 Alloy 6061-T6 or ASTM B221 Alloy 6005-T5.
         Mast Arms: ASTM B241 Alloy 6061-T6 or Alloy 6063-T6.
         Pole Cap: ASTM B209 Alloy 5086-H32 or ASTM B108 or B26 Alloy 356.0-T6.
         Bolts: Stainless Steel AISI 300 series. Bolts threading into aluminum threads shall be treated with anti-seize compound, Never-Seez Compound, Permatex 133K or equal.

6. Special Designs. Poles with architectural treatments shall meet the requirements shown elsewhere in the plans.

7. Luminaire Mounting Height. Actual luminaire mounting height shall be the nominal mounting height given on RIP(2) for all pole-arm combinations except for poles with 4 ft. luminaire arms, which shall be 3'-0" lower than the nominal height, unless otherwise shown or directed.

EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS

(TYPE SA 50 T - X - X) (400W EQ) LED

- SA: Pole and mast arm may be steel or aluminum.
- ST: Pole and mast arm must be steel.
- AL: Pole and mast arm must be aluminum.
- SP: Special (ovalized) steel or aluminum pole for installing on CSB or SSCB. See standard sheet CSB (4), or SSCB (4).

Two numerical digits denote nominal mounting height in feet.

Next letter denotes type of base, (S-Shoe Base, T-Transformer Base, or B-Bridge/Ret.Wall Mount)

First number denotes length of mast arm in feet.

Use of second mast arm is indicated by second dashed number which denotes length in feet.

Luminaire rating in watts (i.e. 400W). Equivalent wattage LED fixtures will include EQ (i.e. 400W EQ)

Last letters indicate light source (S - High Pressure Sodium; LED - LED luminaire)

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ROADWAY ILLUMINATION POLES

RIP(1)-19

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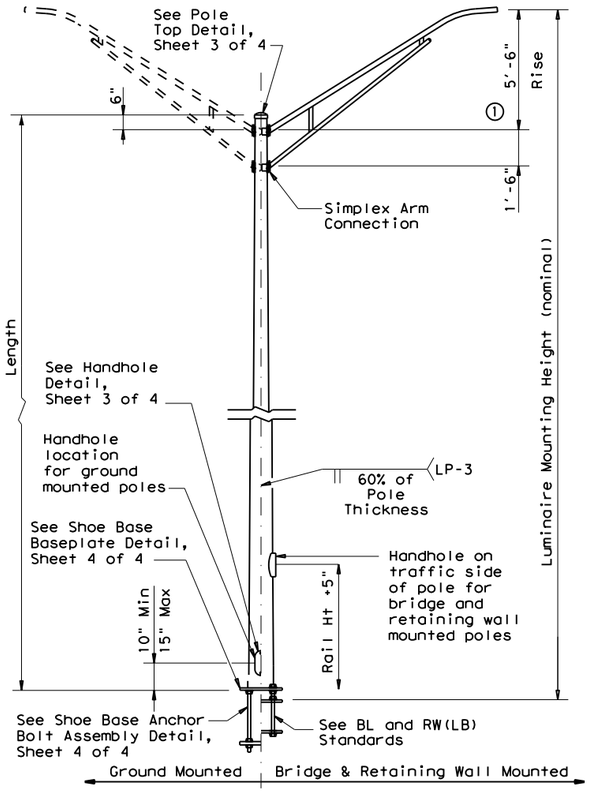
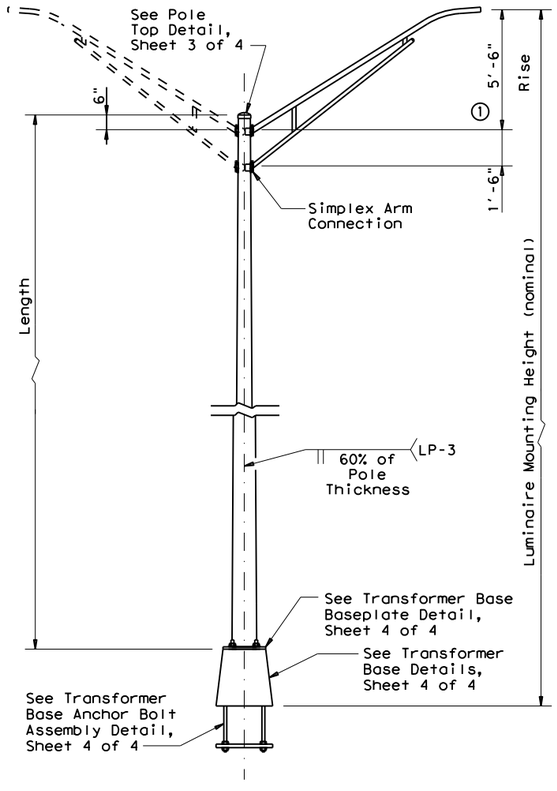


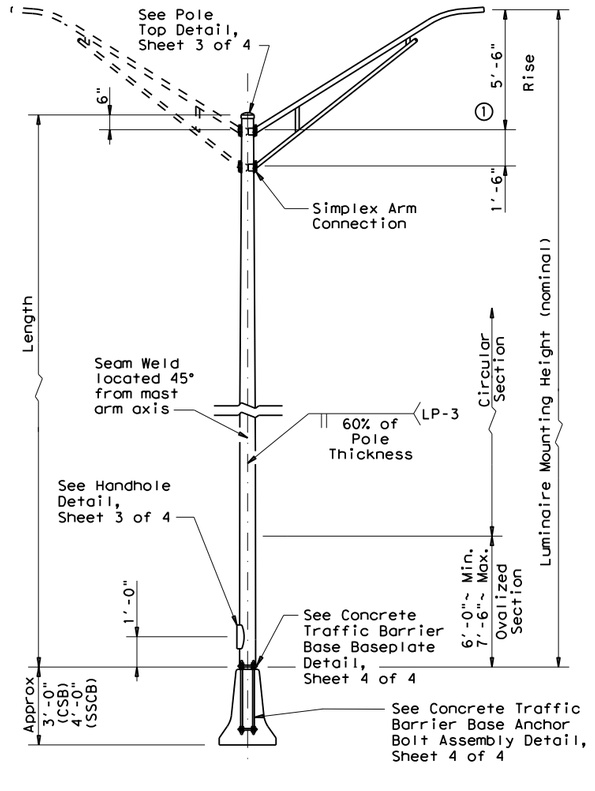
SHOE BASE POLE

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



TRANSFORMER BASE POLE

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



CONCRETE TRAFFIC BARRIER BASE POLE

CONCRETE TRAFFIC BARRIER BASE POLE (CSB/SSCB)						
Luminaire Mounting Height (Nominal) (ft)	Base ② Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)	
					About ℄ of Rail	Perp. to Rail
28.00	9.00	5.78	23.00	0.1196	10.3	13.2
38.00	9.00	4.38	33.00	0.1196	16.6	20.8
48.00	10.50	4.48	43.00	0.1345	25.1	30.5

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

NOTES:

① 2'-6" rise for 4 ft. luminaire arms.

② Before ovalized as shown on Concrete Traffic Barrier Base Baseplate details, Sheet 4 of 4.

③ A1011 SS Gr 50 may be used instead of HSLAS, provided the material meets the elongation requirements for HSLAS.

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

GENERAL NOTES:

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

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Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(2)-19

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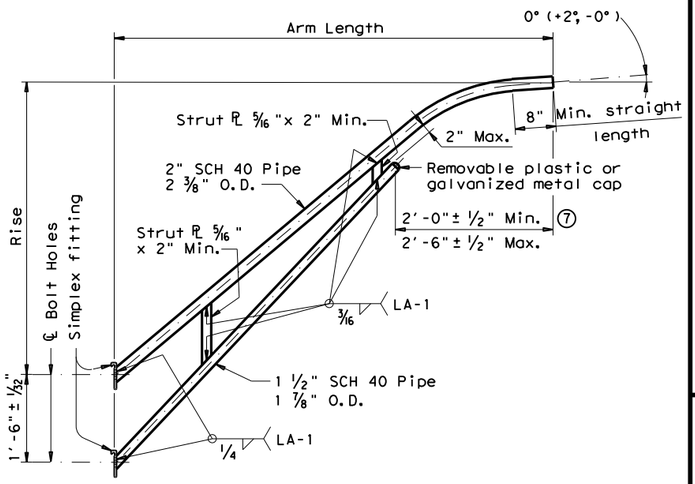
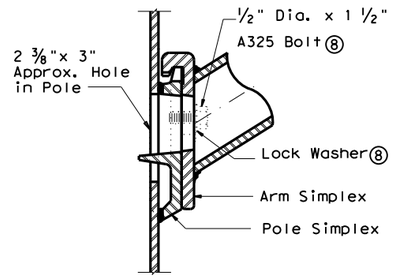


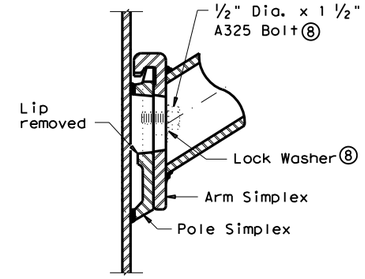
LUMINAIRE ARM

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

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

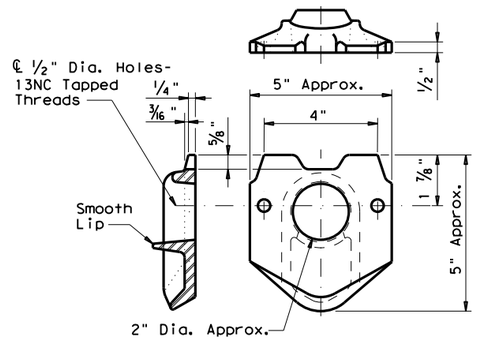


UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

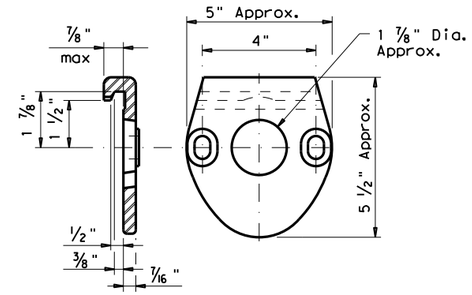


LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

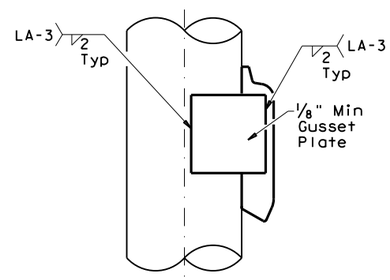
SECTION B-B



POLE SIMPLEX DETAIL ⑨



ARM SIMPLEX DETAIL ⑨



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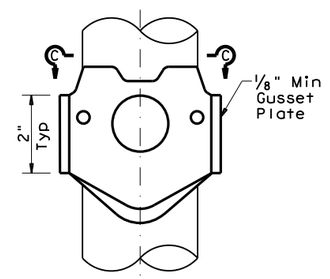
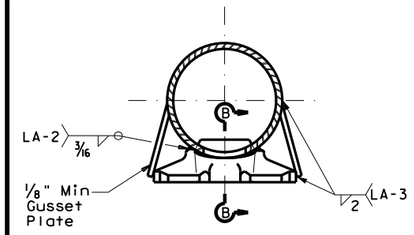
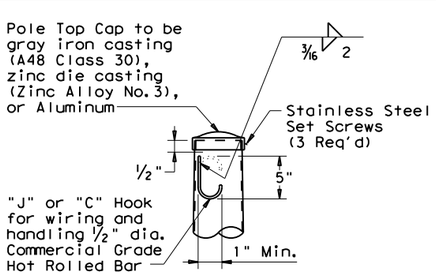


ELEVATION

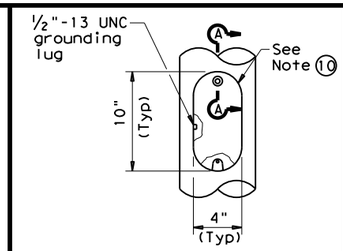


SECTION C-C

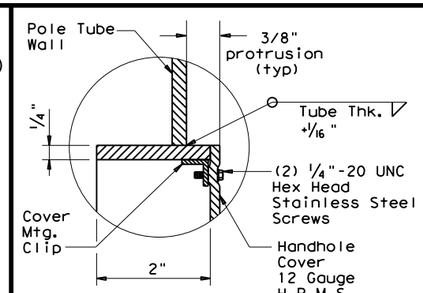
SIMPLEX ATTACHMENT DETAIL



POLE TOP



ELEVATION



SECTION A-A

HANDHOLE

NOTES:

④ Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

⑤ A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

⑥ A572, A1008 HSLAS-F, and A1011 HSLAS-F materials may have higher yield strengths but shall not have less elongation than the grade indicated.

⑦ Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

⑧ Each pole simplex fitting shall be supplied with 2 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans.

⑨ Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.

⑩ A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

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

Texas Department of Transportation

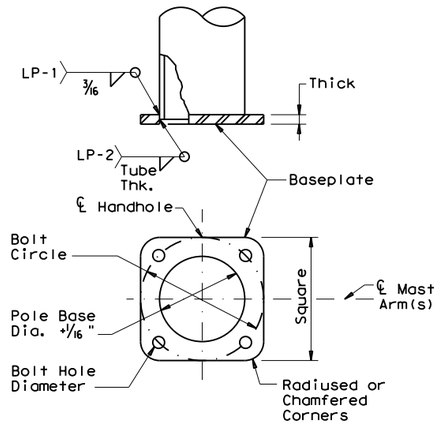
Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(3)-19

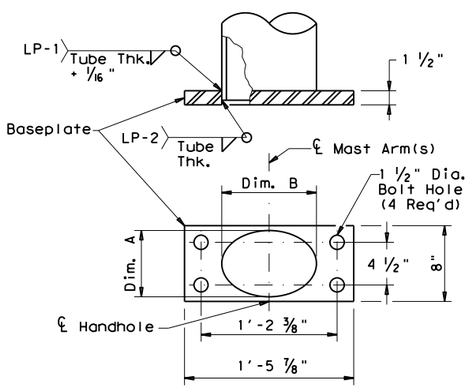
FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	1586	01	089, ETC.	FM 907, ETC.
7-17	DIST	COUNTY		SHEET NO.
12-19	PHR	HIDALGO, ETC.		124

73C



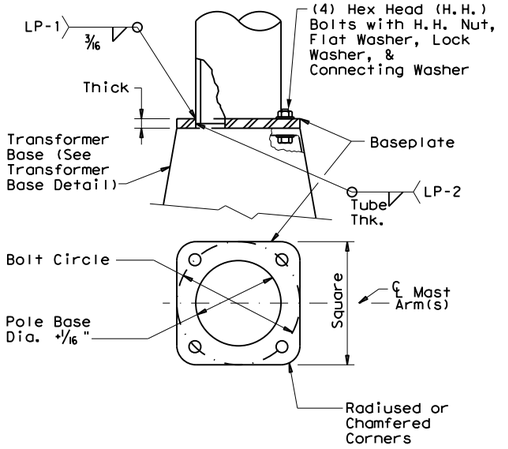
SHOE BASE BASEPLATE

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



CONCRETE TRAFFIC BARRIER BASE BASEPLATE

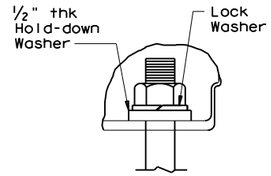
CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE			
MOUNTING HEIGHTS (nominal)	POLE DIA.(12)	DIM. A	DIM. B
28' - 38'	9"	7" ± 1/4"	10" ± 1/4"
48'	10 1/2"	7" ± 1/4"	13" ± 1/4"



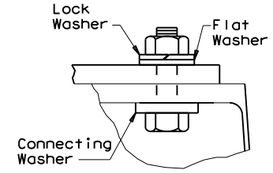
TRANSFORMER BASE BASEPLATE

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

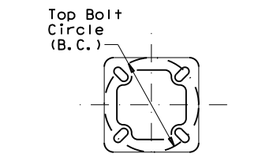
TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



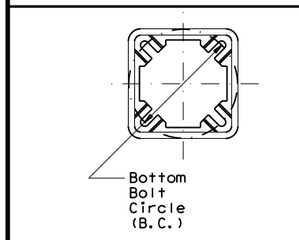
DETAIL A



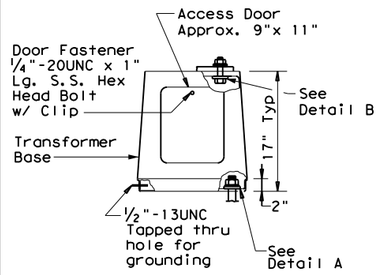
DETAIL B



TOP PLAN



BOTTOM PLAN



ELEVATION

TRANSFORMER BASE DETAILS

GENERAL NOTES:

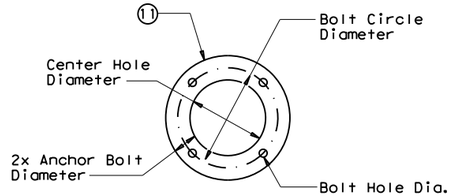
1. For mounting heights between those shown in the table, use the values in the table for the larger mounting height.
2. All breakaway bases shall meet the breakaway requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition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

NOTES:

(11) Anchor Bolt Templates do not need to be galvanized.

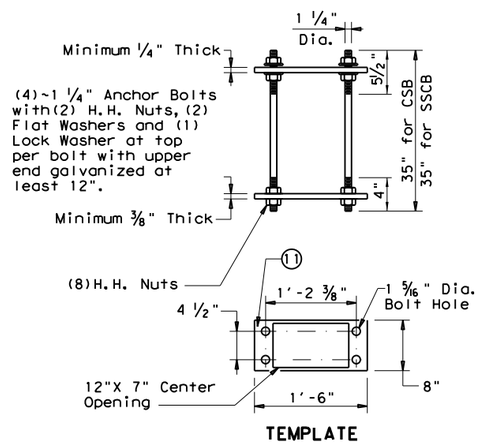
(12) Pole diameter before ovalized.

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



SHOE BASE ANCHOR BOLT ASSEMBLY

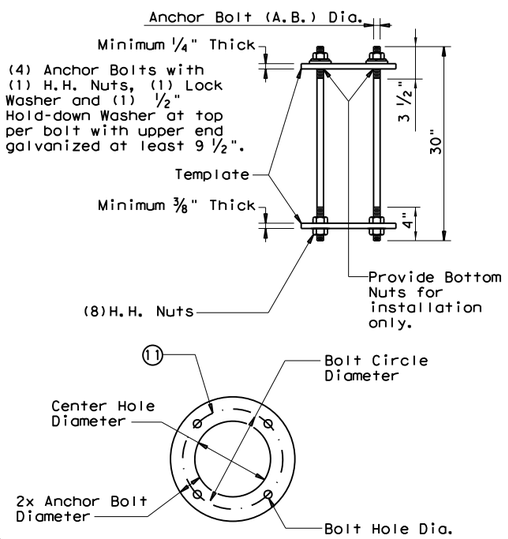
SHOE BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20'-39'	1"	13"	11"	1 1/16"
40'-50'	1 1/4"	15"	12 1/2"	1 5/16"



TEMPLATE

CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

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



TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

SHEET 4 OF 4

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(4)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS 7-17 12-19	1586	01	089,ETC.	FM 907,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO,ETC.		125

730

SITE DESCRIPTION

PROJECT LIMITS:
Various Locations. Same as stated on the Title Sheet

PROJECT SITE MAPS:
**Project Location Map: Title Sheet (Sheet 1)*

PROJECT DESCRIPTION: *For the construction of non-freeway facilities consisting of the installation highway traffic signals, safety lighting, and improvements to traffic signals.*

MAJOR SOIL DISTURBING ACTIVITIES:
Drill shafts for the installation of flashing beacon and illumination poles

TOTAL PROJECT AREA: *< 1 Acre*

TOTAL AREA TO BE DISTURBED: *< 1 Acre*

WEIGHTED RUNOFF COEFFICIENT:
Before Construction: N/A
After Construction: N/A

EXISTING CONDITION OF SOIL & VEGETATIVE
Area of existing grass/dirt

NAME OF RECEIVING WATERS:
Ditches and curb and gutters that go to an outfall

ENDANGERED SPECIES, DESIGNATED CRITICAL HABITAT AND HISTORICAL PROPERTY:

A. *No Endangered Species. Designated Critical Habitat or Historic Property has been found on this project site.*

or

B. *(Statement of What) has been found on this project site. (These stated name/names of found species and/or conditions must be same as stated within the project EPIC sheet, Sections - III, IV & V if any such is determined to exist within the limits of the project and/or adjacent properties and surrounding areas.)*

Note: Designer shall supply statement A. or B. only.

The documentation satisfying TPDES Construction General Permit eligibility pertaining to the existence or of any protective action taken with regards to endangered species or designated critical habitat or historical property in this project area is contained in the project's Environmental Impact Study and can be viewed under the State Open Records Act at the address shown below:

TEXAS DEPARTMENT OF TRANSPORTATION
PHARR DISTRICT HEADQUARTERS
ATTN: ENVIRONMENTAL COORDINATOR
600 W. INTERSTATE 2
PHARR, TX 78577
PHONE: 956-702-6100

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

___ TEMPORARY SEEDING
___ MULCHING (Hay or Straw)
___ BUFFER ZONES
___ PLANTING
___ SEEDING
___ SODDING
___ OTHER: (Specify Practice)

___ PRESERVATION OF NATURAL RESOURCES
___ FLEXIBLE CHANNEL LINER
___ RIGID CHANNEL LINER
___ SOIL RETENTION BLANKET
___ COMPOST MANUFACTURED COMPOST
T BIODEGRADABLE EROSION CONTROL SOCKS

STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

___ SILT FENCES
T BIODEGRADABLE EROSION CONTROL SOCKS
___ HAY BALES
___ ROCK FILTER DAMS
___ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
___ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
___ DIVERSION DIKE AND SWALE COMBINATIONS
___ PIPE SLOPE DRAINS
___ PAVED FLUMES
___ ROCK BEDDING AT CONSTRUCTION EXIT
___ TIMBER MATTING AT CONSTRUCTION EXIT
___ PIPE MATTING OR EQUAL AT CONSTRUCTION EXIT
___ CHANNEL LINERS
___ SEDIMENT TRAPS
___ SEDIMENT BASINS
___ STORM INLET SEDIMENT TRAP
___ STONE OUTLET STRUCTURES
___ CURBS AND GUTTERS
___ STORM SEWERS
___ VELOCITY CONTROL DEVICES
___ OTHER: (Specify Practice)

STORM WATER MANAGEMENT: *Erosion logs should be placed across the entrances of storm sewers, but do not completely cover the openings, so that water can still enter the storm sewers (as per standards).*

STORM WATER MANAGEMENT ACTIVITIES: *Install Erosion Control Logs if necessary.*

NON-STORM WATER MANAGEMENT DISCHARGES:
Non-storm water discharges should be filtered, or held in retention basins, before being allowed to mix with storm water. These discharges consist of non-polluted ground water, spring water, foundation and/or footing drain water; and water used for dust control, pavement washing and vehicle wastewater containing no detergents.

OTHER REQUIREMENTS & PRACTICES

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: *All erosion and sediment controls will be maintained in good working order. If a repair is necessary, it will be done at the earliest date possible, but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. The areas adjacent to creeks and drainage ways shall have priority followed by devices protecting storm sewer inlets.*

INSPECTION: *For areas of the construction site that have not been finally stabilized, area used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every fourteen (14) calendar days and within twenty-four (24) hours of the end of a storm event 0.5 inches or greater.*

WASTE MATERIALS: *All waste materials will be collected and stored in a securely lidded dumpster. All trash and construction debris from the site will be deposited as necessary at a local dump. No construction waste material will be buried on site.*

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): *At a minimum, any products in the following categories to be hazardous: Paints, Acids for cleaning masonry surfaces, Cleaning Solvents, Asphalt products, Chemical additives for soil stabilization, or Concrete curing compounds and additives. In the event of a spill which may be hazardous, the spill Coordinator should be contacted immediately. Emptying of excess concrete should not be allowed on site. Likewise, washout of concrete trucks should not be performed on site. These discharges are considered non-allowable non-storm water discharges. Concrete trucks should never be allowed to dump into storm drains or sanitary sewers.*

SANITARY WASTE: *All sanitary waste will be collected from the portable units as necessary or as required by local regulation by a licensed sanitary waste management contractor.*

OFFSITE VEHICLE TRACKING: *The Contractor shall be rquired, on a regular basis or as may be directed by the Engineer, to dampen haul roads for dust control, stabilize construction entrances and to remove excess dirt from the roadway.*

MANAGEMENT PRACTICES: *(Example Below - May be used as applicable, revised or expanded):*

1. *Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body or stream bed.*
2. *Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants.*
3. *All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, or debris or other obstructions placed during construction operations that are not a part of the finished work.*

OTHER: *Contractor shall adhere to the following:*

1. *Construction Materials List of materials stored on job site to be provided by Contractor.*
2. *The project SW3P File shall be located at the project field office or within the Contractor's mobile office at all times and shall contain the N.O.I., CGP, Signature Authorization, Certification/Qualification Statements, Inspection Reports, Required Maps, and the TPDES Permit, Part II. This File to be persented to authorized State and Federal Agents upon request.*

STATE OF TEXAS
NAYELY PARRA
140881
LICENSED PROFESSIONAL ENGINEER

07.05.2022 , P.E.
Signature of Registrant & Date

Texas Department of Transportation

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

REV. 2-20-14 SW3P.DGN

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		126

STATE	DIST.	COUNTY
TEXAS	PHARR	HIDALGO, ETC.

CONT.	SECT.	JOB	HIGHWAY NO.
1586	01	089,ETC.	FM 907, ETC.

During the planning phase of project development, the following Environmental Permits, Issues and Commitments have been developed during coordination with resource agencies, local governmental entities and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities as additional environmental clearances may be required.

I. Clean Water Act, Section 402; Stormwater Pollution Prevention

Action Items Required : ☐ No Action Required

1. ☒ The contractor must implement the SW3P by installing Best Management Practices (BMPs) as indicated in the construction plans and maintained appropriately throughout construction. BMPs must be in place prior to the start of construction. The SW3P may need to be revised as necessary as construction progresses.

2. ☒ For all construction PSL's off the ROW, the contractor must certify compliance with all applicable laws, rules and regulations pertaining to the preservation of cultural resources, natural resources and the environment.

3. ☒ Based on the acreage of impact, select the appropriate box below:

   ☒ This project will disturb less than 1 acre of soil and is not part of a larger common plan of development; therefore, a NOI and TPDES Site Notice are not required for this project.

   or

   ☐ This project will disturb equal to or more than 1 acre of soil but less than 5 acres; therefore a NOI is not required but a TPDES Site Notice is required. The Construction Site Notice (CSN) is required to be posted at the construction site in a publicly accessible location for review by the public, TCEQ, EPA and other Inspectors.

   or

   ☐ This project will disturb equal to or more than 5 acres of soil and will require a NOI and TPDES Site Notice. The NOI and Site Notice are required to be posted at the construction site in a publicly accessible location.

4. ☒ Need to address MS4 requirements (Cameron & Hidalgo Counties only) ☐ MS4 requirements not needed

II. Clean Water Act, Sections 401 and 404 Compliance

Action Items Rquired : ☐ No Action Required

1. ☒ Filling, dredging or excavating in any water bodies, rivers, creeks, streams, wetlands or wet areas is prohibited unless specified in the USACE permit and approved by the Engineer. The contractor shall adhere to all agreements, mitigation plans, and BMPs required by the NWP as regulated by the USACE.

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

   ☒ No Permit Required

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

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

   ☐ Individual 404 Permit Required

   ☐ Other Nationwide Permit Required: NWP#_____

2. ☐ The contractor is responsible for obtaining new or revised Section 404 permit(s) for Contractor initiated changes in construction methods that change Impacts To Waters Of The U.S., including wetlands. The Contractor will ensure that the water quality of the State will be maintained and not degraded.

3. ☒ Best Management Practices for applicable Section 401 General Conditions:

General Condition 12 - Categories I and II BMPs required

Category I (Erosion Control)

☐ Temporary Vegetation	☐ Interceptor Swale	☐ Mulch Filter Berms and/or Socks
☐ Blankets, Matting	☐ Diversion Dike	☒ Compost Filter Berms and/or Socks
☐ Mulch	☐ Erosion Control Compost	☐ Compost Blankets
☐ Sodding		

Category II (Sedimentation Control)

☐ Silt Fence	☐ Hay (Straw) Bale Dike	☐ Mulch Filter Berms and/or Socks
☐ Rock Berm	☐ Brush Berms	☒ Compost Filter Berms and/or Socks
☐ Triangular Filter Dike	☐ Sediment Basins	☐ Stone Outlet Sediment Traps
☐ Sand Bag Berm	☐ Erosion Control Compost	

General Condition 21 - Category III BMPs required

Category III (Post-Construction TSS Control)

☐ Vegetative Filter Strips	☐ Wet Basins	☐ Mulch Filter Berms and/or Socks
☐ Retention/Irrigation	☐ Grassy Swales	☐ Compost Filter Berms and/or Socks
☐ Extended Detention Basin	☐ Vegetation-Lined Ditches	☐ Sand Filter Systems
☐ Constructed Wetlands	☐ Erosion Control Compost	☐ Sedimentation Chambers

II. Clean Water Act, Sections 401 and 404 Compliance - Continued:

4. ☐ The Contractor's designated and qualified Contractor Responsible Person Environmental (CRPe) will monitor the project site daily to ensue compliance with SW3P and TPDES General Permit TXR 150000. Daily Monitoring Reports shall be provided to TxDOT within 48 hours, in accordance with Item 506.3.1.

5. ☐ Other Project Specific Actions:

III. Cultural Resources

Action Items Required : ☒ No Action Required

1. ☐ Refer to the 2014 TxDOT Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges, Item 7.7.1., 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.

2. ☐ Other Project Specific Actions:

IV. Vegetation Resources

Action Items Required : ☒ No Action Required

1. ☐ In accordance with the 2014 TxDOT Standard Specifications; Item 164 - Seeding For Erosion Control; provide and install temporary or permanent seeding for erosion control as shown on the plans or as directed by the Engineer for all seeding and replanting of right of way where possible. (Required for Urban Settings)

2. ☐ In accordance with Executive Order 13112 on invasive species and the Executive Memorandum on Beneficial Landscaping, native species of plants shall be used for all seeding and replanting of right of way where possible for rural roadways. (Required for Rural Settings)

3. ☐ Preserve vegetation where possible throughout the project and minimize clearing, grubbing and excavation within stream banks, bed and approach sections.

4. ☐ Other Project Specific Actions:

Pharr District Contact No. 956-702-6100 Revised 01/30/2017

List of Abbreviations

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Texas Department of Transportation

PHARR DISTRICT

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6			FM 907, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	PHR	HIDALGO, ETC.	SHEET NO.
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V. Federal Listed, and Proposed Threatened and Endangered Species, Critical Habitat, State Listed Species, Candidate Species and Migratory Birds

Action Items Required : ☐ No Action Required

1. ☒ Under the Migratory Bird Treaty Act (MBTA) of 1918, codified at 16 U.S.C. § 703-712 and as enforced by the USFWS, the proposed construction work will not remove active nests from bridges, trees, ground and other structures during migratory bird nesting season, (February 1st. through October 1st.). If the Contractor needs to perform work within the right of way during nesting season, a qualified Biologist shall conduct a survey to determine if active nests are present. If present, the Contractor shall maintain a buffer zone around the nest(s) as directed by the Biologist. The buffer zone will be protected from clearing and disturbance until such time as the Biologist has determined that the nest(s) is no longer active. Prior to the nesting season, existing bridges and culverts should be treated against migratory bird nesting by utilizing Bird Exclusion Methods. Bird Exclusion Methods should be monitored and maintained throughout the nesting season. Refer to Standard Bird Exclusion Details.

2. ☒ There is the potential for the presence of state-listed species & species of concern in the project area and state law prohibits the taking (incidental or otherwise) of state-listed species. Taking is defined as the collection, hooking, hunting, netting, shooting, or share by any means or devices. If any listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately.

3. ☒ Other Project Specific Actions:

   To prevent impact to red knot or piping plover, construction of the proposed safety lighting at Location 6: CSJ No. 0200-07-067 SHALL be conducted between the months of May 2023 to July 2023.

   Contractors will be advised of potential occurrence of the following species within the project area and to avoid harming if encountered:

   - Texas Indigo Snake (Drymarchon melanurus erebennus)
   - Texas Horned Lizard (Phrynosoma cornutum)
   - Texas Tortoise (Gopherus berlandieri)
   - Sheep Frog (Hypopachus variolosus)
   - Ocelot (Leopardus pardalis)

VI. Hazardous Materials on Contamination Issues

Action Items Required : ☐ No Action Required

General (applies to all projects):

Comply with the Hazard Communication Act (HCA) 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 HCA.

Maintain an adequate supply of on-site spill response materials as indicated in the MSDS. In the event of a spill, take immediate action to mitigate the spill as indicated in the MSDS and in accordance with safe work practices. Contact the TxDOT Pharr 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 (identified as not normal)
- Trash piles, drums, canisters, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of contaminant substances

Any other evidence indicating possible hazardous materials or contamination discovered on site.

1. ☒ If potentially hazardous material and/or contaminated media (i.e.: soil, groundwater, surface water, sediment, building materials) are unexpectedly encountered during construction, assure that such materials and contamination are handled according to applicable federal and state regulations, cease work in the immediate area and contact the Engineer immediately.

VI. Hazardous Materials on Contamination Issues - Continued:

2. 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 required.
   If "Yes", then TxDOT is responsible for completing an asbestos assessment/inspection.

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

   ☐ Yes ☐ No

   If "Yes", then TxDOT must retain a Texas Department of State Health Services (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 abatement activities and/or demolition.

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

4. ☐ The Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and an Asbestos Consultant in order to minimize construction delays and subsequent claims.

VII. Other Environmental Issues

Action Items Required : ☐ No Action Required

1. ☒ Noise

   Contractor shall make every reasonable effort to minimize construction noise through abatement measures such as work hour controls and proper maintenance of equipment mufflers.

2. ☒ Air

   Contractor shall practice common dust control techniques such as surface chemical treatment or watering of unpaved road surfaces and vehicle speed reduction shall be implemented to minimize and prevent airborne dust during construction.

   Contractor should minimize MSAT by utilizing measures to encourage use of EPA required cleaner diesel fuels, limits on idling, increase use of cleaner burning diesel engines, and other emission limitation techniques, as appropriate.

3. ☒ Lighting

   For Location 6 - SH 48 CSJ No. 0200-07-067 Contractor shall install wildlife friendly lighting fixtures with warm (yellowish white) color temperatures of 3000K (Kelvin). This safety measure will have low impact on wildlife, and still provide good visibility to the drivers.

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PHARR DISTRICT

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TPWD BMPs

The Programmatic Agreement defines Best Management Practices (BMPs) to be implemented by Texas Department of Transportation (TxDOT) per §2.213 (Programmatic Agreements) of the 2017 Memorandum of Understanding (MOU) between TxDOT and Texas Parks and Wildlife Department (TPWD). These BMPs are measures that TxDOT and TPWD agree will result in avoidance and minimization of potential impacts to natural resources and in some cases apply to particular types of TxDOT projects.

The purpose of this section is to provide BMPs to minimize impacts to species or groups of species. Implementation of these BMPs by TxDOT eliminates the need for coordination under §2.206(1)of the MOU, except as noted.

Due diligence should be used to avoid killing or harming any wildlife species in the implementation of TxDOT projects.

☒ Bird BMPs (Required)

In addition to complying with the Migratory Bird Treaty Act (MBTA) perform the following BMPs:

- ☒ Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed.
- ☒ Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season.
- ☒ Avoid the removal of unoccupied, inactive nests, as practicable.
- ☐ Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair.
- ☒ Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

☐ Bald Eagle *(Haliaeetus leucocephalus)*

- ☐ Bird BMPs and Bald and Golden Eagle Protection Act compliance

☐ Reddish Egret *(Egretta rufescens)* or
☐ White-faced Ibis *(Plegadis chihi)*

- ☐ Bird BMPs unless project is within 300 meters (984 feet)of a known colonial water bird rookery then coordinate with TPWD.

☐ Rookeries (Recommendations)

In general, nesting dates for herons and egrets range from early February to late August in Texas, depending on the species. Great Blue Herons (GBHE) are usually the first to nest. When GBHE get disrupted from the nest and abandon nesting, then the other species of herons and egrets may not attempt to nest at the colony that year. Breeding dates for rookery species are approximately as follows:

Species	Dates
Cattle Egret	Early April to late October
Little Blue Heron	Late March to late July
Snowy Egret	Late March to early August
Great Egret	Early March to early August
Black-crowned Night Heron	Early February to late July
Great Blue Heron	February to late August

☐ Rookeries (Recommendations) (Continued)

- ☐ Vegetation clearing in a primary buffer area of 300 meters (984 feet) from a heronry periphery should be avoided. Utilizing areas that have already been cleared within this buffer area may be acceptable depending on site-specific characteristics. Additionally, human foot-traffic or machinery use should not occur within this buffer area during the nesting season.
- ☐ Clearing activities or construction using heavy machinery in a secondary buffer area of 1,000 meters (3,281 feet) from the heronry periphery should be avoided during the breeding season (courting and nesting).

☐ Bat BMPs (Required)

To determine the appropriate BMP to avoid or minimize impacts to bats, review the habitat description for the species of interest on the TPWD Rare, Threatened, and Endangered Species of Texas by County List or other trusted resources. All bat surveys and other activities that include direct contact with bats shall comply with TPWD' recommended white-nose syndrome protocols located on the TPWD Wildlife Habitat Assessment Program website under "Project Design and Construction".

The following survey and exclusion protocols should be followed prior to commencement of construction activities. For the purposes of this document, structures are defined as bridges, culverts (concrete or metal), wells, and buildings.

- ☐ For activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist will perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before project letting.
- ☐ For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats.
- ☐ If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction.
- ☐ Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F and minimum daytime temperatures are above 70°F. Prior to exclusion, ensure that alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, installation of alternate roosts is recommended to replace the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area. See Additional Bat BMPs (Recommendations) for recommended acceptable methods for excluding bats from structures.
- ☐ If feature(s) used by bats are removed as a result of construction, replacement structures should incorporate bat-friendly design or artificial roosts should be constructed to replace these features, as practicable.
- ☐ Conversion of property containing cave or cliff features to transportation purposes should be avoided where feasible.

☐ Bat BMPs (Required)(Continued)

- ☐ Avoid unnecessary removal of dead fronds on native and ornamental palm trees in south Texas (Cameron, Hidalgo, Willacy, Kenedy, Brooks, Kleberg, Nueces, and San Patricio counties) from April 1st through October 31st. If removal of dead fronds is necessary at other times of the year, limit frond removal to extended warm periods (nighttime temperatures: 55°F for at least two consecutive nights), so bats can move away from the disturbance and find new roosts.
- ☐ Large hollow trees, snags (dead standing trees), and trees with shaggy bark should be surveyed for colonies and, if found, should not be disturbed until the bats are no longer occupying these features. Post-occupancy surveys should be conducted by a qualified biologist prior to tree removal from the landscape.
- ☐ Retain mature, large diameter hardwood forest species and native/ornamental palm trees where feasible.
- ☐ In all instances, avoid harm or death to bats. Bats should only be handled as a last resort and after communication with TPWD.

☐ Mexican Long-tongues Bat *(Choeronycteris mexicana)*

- ☐ Avoid unnecessary impacts to cacti and agave species.
- ☐ Bat BMPs.

☐ Additional Bat BMPs (Recommendations)

- ☐ Bat surveys of structures should include visual inspections of structural fissures (cracked or spalled concrete, damaged or split beams, split or damaged timber railings), crevices (expansion joints, space between parallel beams, spaces above supports piers), and alternative structures (drainage pipes, bolt cavities, open sections between support beams, swallow nests) for the presence of bats.
- ☐ Before excluding bats from any occupied structure, bat species, weather, temperature, season, and geographic location must be incorporated into any exclusion plans to avoid unnecessary harm or death to bats. Winter exclusion must entail a survey to confirm either, 1) bats are absent or 2) present but active (i.e. continuously active - not intermittently active due to arousals from hibernation).
- ☐ Avoid using materials that degrade quickly, like paper, steel wool or rags, to close holes.
- ☐ Avoid using products or making structural modifications that may block natural ventilation, like hanging plastic sheeting over an active roost entrance, thereby altering roost microclimate.
- ☐ Avoid using chemical and ultrasonic repellents.
- ☐ Avoid use of silicone, polyurethane or similar non-water-based caulk products.
- ☐ Avoid use of expandable foam products at occupied sites.
- ☐ Avoid the use of flexible netting attached with duct tape.

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PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
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☐ Additional Bat BMPs (Recommendations) (Continued)

- ☐ In order to avoid entombing bats, exclusion activities should be only implemented by a qualified individual. A qualified individual or company should possess at least the following minimum qualifications:
  - Experience in bat exclusion (the individual, not just the company).
  - Proof of rabies pre-exposure vaccinations.
  - Demonstrated knowledge of the relevant bat species, including maternity season date range and habitat requirements.
  - Demonstrated knowledge of rabies and histoplasmosis in relation to bat roosts.
- ☐ Contact TPWD for additional resources and information to assist in executing successful bat exclusions that will avoid unnecessary harm or death in bats.

☐ Fossorial Mammal BMPs (Required)

- ☐ If black-tailed prairie dog (BTPD) burrows or pocket gopher mounds are to be excavated/directly impacted coordinate with TPWD WHAB.
- ☐ When a construction zone is adjacent to active BTPD burrows or pocket gopher mounds, erect barriers to discourage individuals moving through or into the construction area.
- ☐ When seeding or revegetation is planned in an area adjacent to BTPD burrows or pocket gopher mounds, a vegetative barrier should be considered in the planting to discourage dispersal into the ROW.

☐ Coues' Rice Rat *(Oryzomys couesi)*

- ☐ Minimize impacts to wetland, Resaca, oxbow lakes, and marsh habitats.
- ☐ Contractors will be advised of potential occurrence in the project area and to avoid harming the species if encountered.
- ☐ Water Quality BMPs.

☐ Plains Spotted Skunk *(Spilogale putorius interrupto)* or
☐ Swift Fox *(Vulpes velox)*

- ☐ Contractor will be advised of potential occurrence in the project area and to avoid harming the species if encountered and to avoid unnecessary impacts to dens.

☐ White nosed Coati *(Nasua narica)*/
☐ Yellow nosed Cotton Rat *(Sigmodon ochrognathus)*

- ☐ Contractors will be advised of potential occurrence in the project area and to avoid harming the species if encountered.

☒ Terrestrial Reptile BMPs (Required)

- ☐ Apply hydro mulching and/or hydro seeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydro mulching and/or hydro seeding are not feasible due to site conditions, utilize erosion control blankets or mats that contain no netting or contain loosely woven, natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable.
- ☒ For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1 :1) in areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling.
- ☒ Inform contractors that if reptiles are found on project site allow species to safely leave the project area.
- ☐ Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter where feasible.
- ☒ Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.

☒ Texas Tortoise *(Gopherus berlandieri)*

- ☒ Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.
- ☒ Utility trenches should be covered overnight or visually inspected before filling to avoid burial of the species.
- ☒ Terrestrial Reptile BMPs.

☒ Texas Horned Lizard *(Phrynosoma cornutum)*

- ☒ Avoid harvester ant mounds in the selection of Project Specific Locations (PSLs) where feasible.
- ☐ Terrestrial Reptile BMPs.

☐ Additional Reptile BMPs (Recommendations)

- ☐ Due to increased activity (mating) of reptiles during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (April-May) season. Also, timing ground disturbing activities before October when reptiles become less active and may be using burrows in the project area is also encouraged.
- ☐ When designing roadways with curbs, consider using Type I or Type III curbs to provide a gentle slope to enable turtles and small animals to get out of roadways.
- ☐ If Texas Tortoises are present in a project area, they should be removed from the area. After removal of the tortoises, the area that will be disturbed during active construction and project specific locations should be fenced off to exclude tortoises and other reptiles. The exclusion fence should be constructed and maintained as follows:
  a. The exclusion fence should be constructed with metal flashing or drift fence material.
  b. Rolled erosion control mesh material should not be used.
  c. The exclusion fence should be buried at least 6 inches deep and be at least 24 inches high.
  d. The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated.

☐ Amphibian and Aquatic Reptile BMPs (Required)

Unless absence of the species can be demonstrated, assume presence in suitable habitat and implement the following BMPs. Absence can only be demonstrated using TPWD-approved survey efforts (contact TPWD for minimum survey protocols for species and project site conditions).

- ☐ For projects within one mile of a known occupied location or observation of the species recorded from 1980 until the current year and suitable habitat is present, coordinate with TPWD.
- ☐ For new location roadway projects, coordinate with TPWD.
- ☐ For projects within existing right-of-way (ROW) when work is in water or will permanently impact a water feature and potential habitat exists for the target species complete the following:
  a) Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.
  b) Minimize impacts to wetland, temporary and permanent open water features, including depressions, and riverine habitats.
  c) Maintain hydrologic regime and connections between wetlands and other aquatic features.

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☐ Amphibian and Aquatic Reptile BMPs (Continued)

  d) Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species.
  e) Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydromulching and/or hydroseeding are not feasible due to site conditions, using erosion control blankets or mats that contain no netting, or only contain loosely woven natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable.
  f) Project specific locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features.
  g) When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and overwinter sites (e.g., brush and debris piles, crayfish burrows) where feasible.
  h) Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter, which may be refugia for terrestrial amphibians, where feasible.
  i) If gutters and curbs are part of the roadway design, where feasible install gutters that do not include the side box inlet and include sloped (i.e. mountable) curbs to allow small animals to leave roadway. If this modification to the entire curb system is not possible, install sections of sloped curb on either side of the storm water drain for several feet to allow small animals to leave the roadway. Priority areas for these design recommendations are those with nearby wetlands or other aquatic features.

- ☐ For projects that require acquisition of additional ROW and work within that new ROW is in water or will permanently impact a water feature, implement a) - i) above plus j) -l) below, where applicable:
  j) For sections of roadway adjacent to wetlands or other aquatic features, install wildlife barriers that prevent climbing. Barriers should terminate at culvert openings in order to funnel animals under the road. The barriers should be of the same length as the adjacent feature or 80 feet long in each direction, or whichever is the lesser of the two.
  k) For culvert extensions and culvert replacement/installation, incorporate measures to funnel animals toward culverts such as concrete wingwalls and barrier walls with overhangs.
  l) When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of terrestrial or aquatic wildlife through the water feature. Where feasible, biotechnical streambank stabilization methods using live native vegetation or a combination of vegetative and structural materials should be used.

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EPIC SHEET SUPPLEMENTALS

TPWD BMPs

SHEET 2 OF 3

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☒ Sheep Frog *(Hypopachus variolosus)*

- ☒ Minimize disturbance to burrows or downed woody debris.
- ☒ Water Quality BMPs.
- ☒ Amphibian BMPs.

☐ South Texas Siren (Large Form) *(Siren sp 1)*

- ☐ Minimize impacts to warm, shallow waters with vegetative cover such as ponds and ditches.
- ☐ Water Quality BMPs.
- ☐ Amphibian BMPs.

☐ Freshwater Mussel BMPs (Required)

- ☐ When work is in the water; survey project footprints for state listed species where appropriate habitat exists.
- ☐ When work is in the water and mussels are discovered during surveys; relocate state listed and SGCN mussels under TPWD authorization and implement Water Quality BMPs.
- ☐ When work is adjacent to the water; Water Quality BMPs implemented as part of the SWPPP for a construction general permit or any conditions of the Section 401 water quality certification for the project will be implemented.

☐ Fish BMPs (Required)

- ☐ For projects within the range of a SGCN or State-Listed fish and work is adjacent to water: Use Water Quality BMPs. No TPWD Coordination required.
- ☐ For projects within the range of a SGCN or State-Listed fish, and work is in the water: TPWD coordination is required.

☐ Water Quality BMPs (Required)

In addition to BMPs required for a TCEQ Storm Water Pollution Prevention Plan and/or Section 401 water quality permit:

- ☐ Minimize the use of equipment in streams and riparian areas during construction. When possible, equipment access should be from banks, bridge decks, or barges.
- ☐ When temporary stream crossings are unavoidable, remove stream crossings once they are no longer needed and stabilize banks and soils around the crossing.

☐ Additional Water Quality BMPs (Recommendations)

- ☐ Wet-Bottomed detention ponds are recommended to benefit wildlife and downstream water quality. Consider potential wildlife-vehicle interactions when siting detention ponds.
- ☐ Rubbish found near bridges on TxDOT ROW should be removed and disposed of properly to minimize the risk of pollution. Rubbish does not include brush piles or snags.

☐ Aquatic Mitigation (Recommendations)

- ☐ In-kind compensatory mitigation should be considered for all unavoidable impacts to aquatic resources including, but not limited to streams, wetlands, oysters, seagrass and mudflats, regardless of their jurisdictional status.
- ☐ Compensatory mitigation plans should be developed in consultation with TPWD Transportation Conservation Coordinator.

☐ Stream Crossings (Recommendations)

- ☐ Use spanning bridges rather than culverts when feasible.
- ☐ If using a culvert, staggered culverts that concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended.
- ☐ Bottomless culverts are recommended to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended.
- ☐ Avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation.
- ☐ Incorporate bat-friendly design into bridges and culverts.
- ☐ Design bridges for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road.
- ☐ A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. For culverts, incorporation of an artificial ledge inside the culvert on one or both sides for use by terrestrial wildlife is recommended.
- ☐ Riparian buffer zones should remain undisturbed where possible.

☐ Vegetation BMPs (Recommendations)

- ☐ Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided to the greatest extent practicable. Wherever practicable, impacted vegetation should be replaced with in-kind on-site replacement/restoration of native vegetation.
- ☐ To minimize adverse effects, activities should be planned to preserve mature trees, particularly acorn, nut or berry producing varieties. These types of vegetation have high value to wildlife as food and cover.
- ☐ It is strongly recommended that trees greater than 12 inches in diameter at breast height (dbh) that are removed be replaced. TPWD's experience indicates that for ecologically effective replacement, a ratio of three trees for every one (3:1) lost should be provided to the extent practicable either on-site or off-site. Trees less than 12 inches dbh should be replaced at a 1:1 ratio.
- ☐ Replacement trees should be of equal or better wildlife quality than those removed and be regionally adapted native species.
- ☐ When trees are planted, a maintenance plan that ensures at least an 85 percent survival rate after three (3) years should be developed for the replacement trees.
- ☐ The use of any non-native vegetation in landscaping and revegetation is discouraged. Locally adapted native species should be used.
- ☐ The use of seed mix that contains seeds from only locally adapted native species is recommended.
- ☐ Avoid vegetation clearing activities during the general bird nesting season, March through August, to minimize adverse impacts to birds.

☐ Invasive Species BMPs (Recommendations)

- ☐ For all work in waters listed in the distribution of Zebra mussels on http://texasinvasives .org/ as well as those waters specified in 31 TAC §57.972 and any TPWD emergency orders regarding prevention of the spread of Zebra mussels all machinery, equipment, or vehicles coming in contact with such waters should follow clean/drain/dry protocols to prevent the potential spread of invasive Zebra mussels.
- ☐ Care should be taken to avoid the spread of aquatic invasive plants (such as Giant Salvinia, Hydrilla, Hyacinth, Watermilfoil, Water Lettuce, and Alligatorweed) from infested water bodies into areas not currently infested. All machinery/equipment/vehicles coming in contact with waters containing aquatic invasive plant species should follow clean/drain/dry protocols to prevent the potential spread of invasive plants.
- ☐ Colonization by invasive plants should be actively prevented on disturbed sites in terrestrial habitats. Vegetation management should include removing invasive species as soon as practical while allowing the existing native plants to revegetate the disturbed areas. If using hay bales for sediment control, use locally grown weed-free hay to prevent the spread of invasive species. Leave the hay bales in place and allow them to break down, as this acts as mulch assisting in revegetation.

☐ Wildlife Crossings (Recommendations)

- ☐ Design roadways on new location to incorporate wildlife crossings, particularly in areas that bisect wildlife travel corridors or seasonal movement routes.
- ☐ Consider using cable median barrier instead of concrete traffic barrier when feasible to increase permeability for animals encountering barriers.

Pharr District Contact No. 956-702-6100

Revised 07/12/2017

Date Printed: X-X-XX

List of Abbreviations

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

Texas Department of Transportation

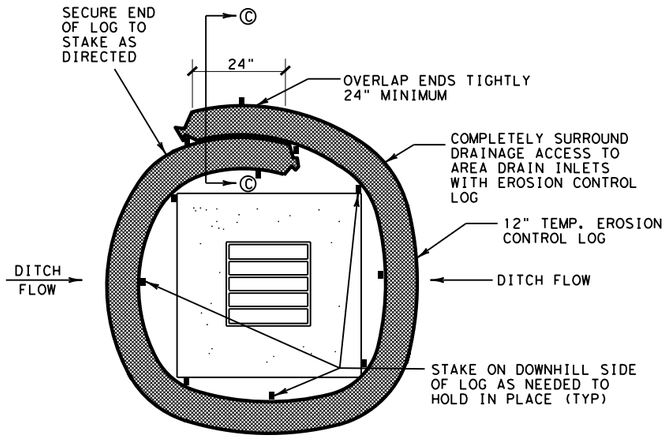
PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

SHEET 3 OF 3

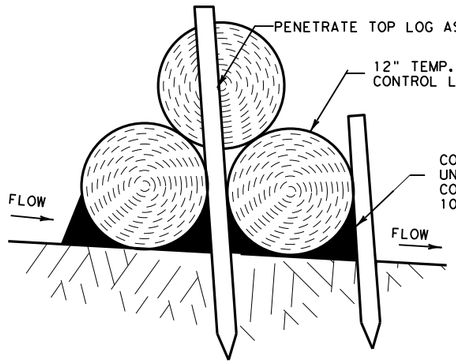
FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6			FM 907, ETC.
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PHR	HIDALGO, ETC.	
CONTROL	SECTION	JOB	
1586	01	089, ETC.	131



DROP INLET SEDIMENT TRAP

NTS

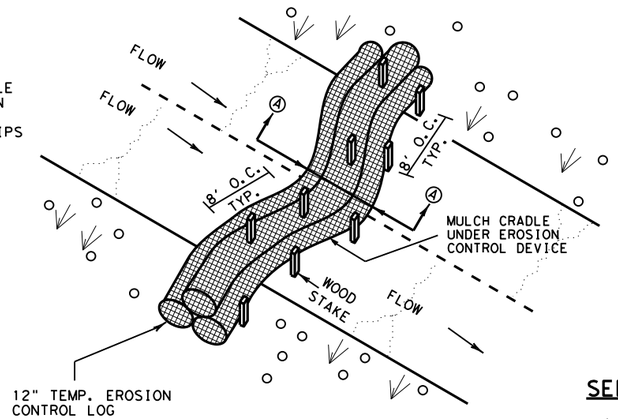
DI-ST



SECTION A-A

DITCH LINE SEDIMENT TRAP A-A

DL-ST



DITCH LINE SEDIMENT TRAP

DL-ST

PLANS SHEET LEGEND

DI-ST — DROP INLET SEDIMENT TRAP

DL-ST — DITCH LINE SEDIMENT TRAP

BOCI-ST — BACK OF CURB INLET SEDIMENT TRAP

ROW-ST — RIGHT OF WAY SEDIMENT TRAP

CI-ST — CURB INLET SEDIMENT TRAP

SEDIMENT BASIN & TRAP USAGE GUIDELINES

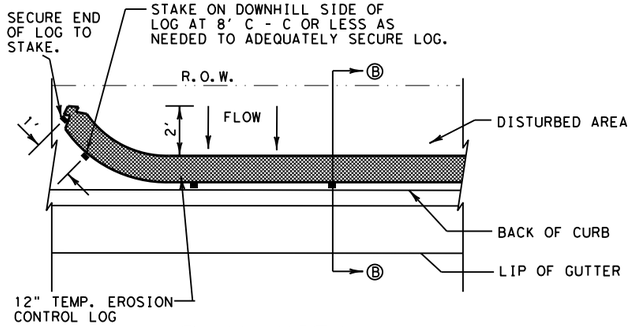
A sediment trap may be used to precipitate sediment out of runoff draining from an unstabilized area.

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).

Sediment traps should be placed in the following locations:

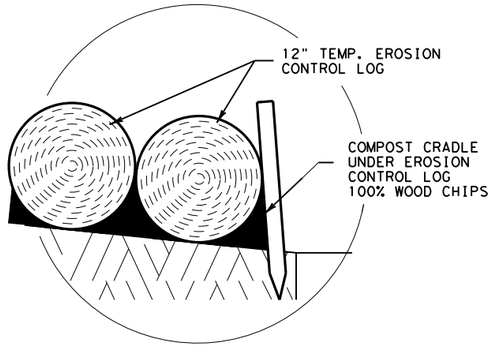
1. Immediately preceding drain inlets
2. Just before the drainage enters a water course
3. Just before the drainage leaves the right of way
4. Just before the drainage leaves the construction limits where drainage flows away from the project

The trap should be cleaned when the capacity has been reduced by ½ or the sediment has accumulated to a depth of 1', whichever is less. Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for seperately.



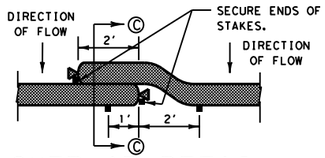
PLAN VIEW

NTS



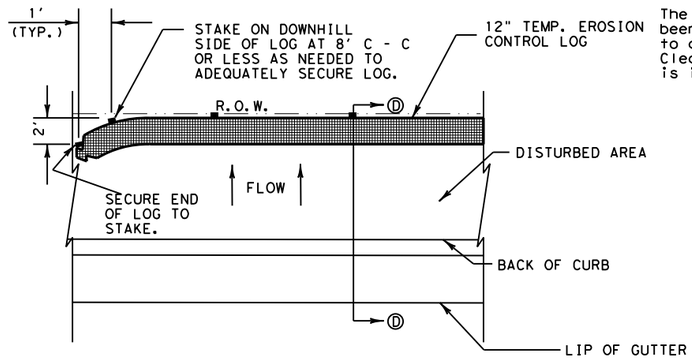
SECTION C-C

OVERLAP WITH COMPOST CRADLE



OVERLAP DETAIL PLAN VIEW

NTS

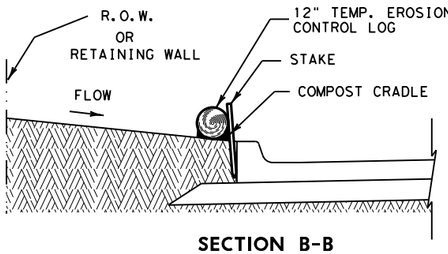


PLAN VIEW

NTS

GENERAL NOTES

1. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED. MAXIMUM LENGTH OF LOGS SHALL BE 30' FOR 12" DIAMETER LOGS.
2. 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.
3. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE WITHOUT EXCESSIVE DEFORMATION.
4. STAKES SHALL BE 2" X 2" WOOD 4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG.
5. COMPOST CRADLE MATERIAL IS INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.

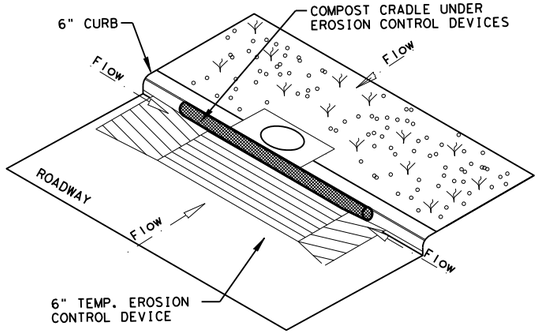


SECTION B-B

BACK OF CURB INLET SEDIMENT TRAP

NTS

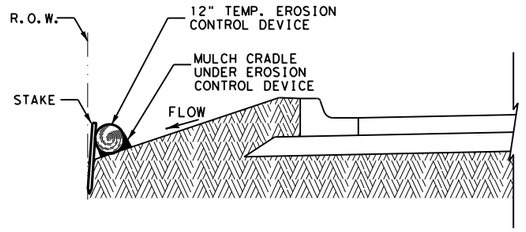
BOCI-ST



CURB INLET SEDIMENT TRAP

NTS

CI-ST



SECTION D-D

RIGHT-OF-WAY SEDIMENT TRAP

NTS

ROW-ST

PHARR DISTRICT STANDARD

Texas Department of Transportation

TEMPORARY EROSION CONTROL LOGS TECL-17 (PHR)

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6			FM 907, ETC.
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	PHARR	HIDALGO, ETC.	132
CONTROL	SECTION	JOB	
1586	01	089, ETC.	

LEVELS DISPLAYED

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	