STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

STATE PROJECT NO.			
C 389-2-57			
CONT	SECT	JOB	HIGHWAY
0389	02	057	SH146
DIST	COUNTY		SHEET NO.
BMT	CHAMBERS		1

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

CSJ: 0389-02-057
STATE PROJECT C 389-2-57

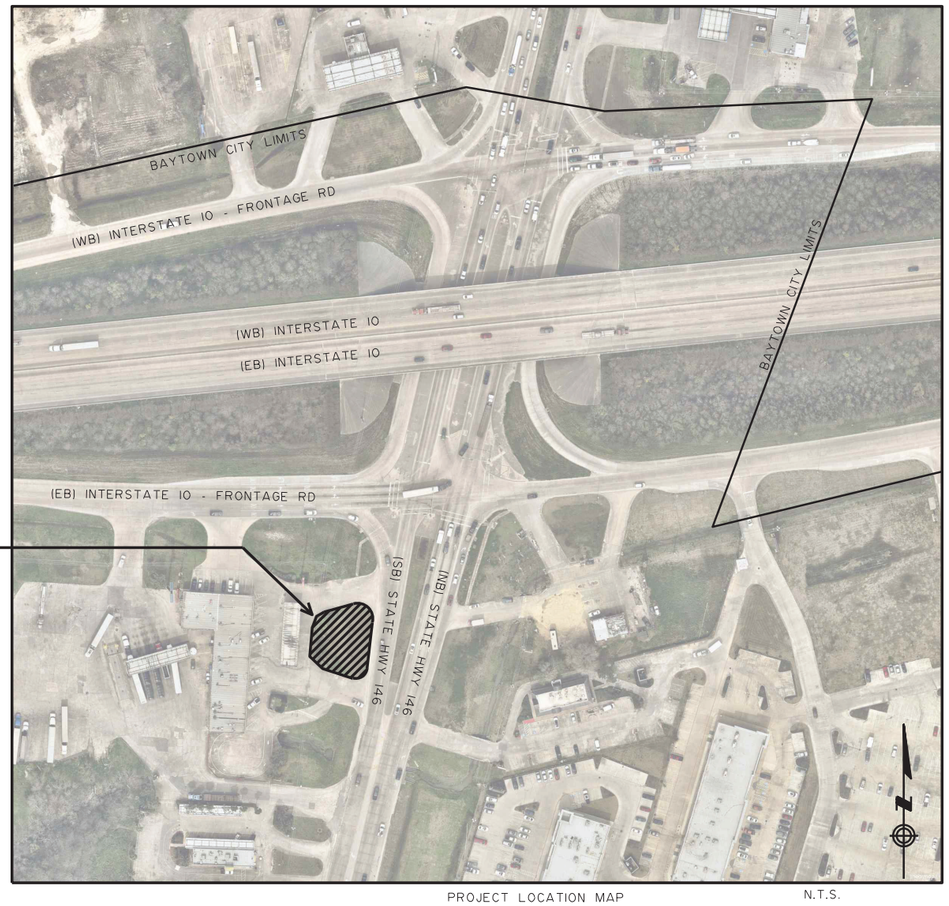
SH 146
CHAMBERS COUNTY

NET LENGTH OF PROJECT= 115.0 FT.

LIMITS: AT TEXACO TRUCKSTOP - BAYTOWN

FOR THE CONSTRUCTION OF LANDSCAPE AND SCENIC ENHANCEMENT PROJECT CONSISTING OF GATEWAY MONUMENT AND LANDSCAPE ENHANCEMENT

FINAL PLANS
LETTING DATE:
DATE CONTRACTOR BEGAN WORK:
DATE WORK WAS COMPLETED & ACCEPTED:
FINAL CONTRACT COST:
CONTRACTOR:



PROJECT LOCATION
CSJ: 0389-02-057

PROJECT LOCATION MAP N.T.S.

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

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

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

REGISTERED LANDSCAPE ARCHITECT
BRYAN PAUL JANES
2507
STATE OF TEXAS
1/14/2022

Texas Department of Transportation

SUBMITTED FOR LETTING: 3/4/2022
DocuSigned by: P.E.
DB12FD46E9F04E5...

ETTING: 3/4/2022
DocuSigned by: Adam Jack
81DC430BA99F4E4... OF TRANSPORTATION
PLANNING AND DEVELOPMENT

3/4/2022
DocuSigned by: Martin W. Goby, P.E.
578CD749506D4F0... ER

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REGISTERED LANDSCAPE ARCHITECT
BRYAN PAUL JANHSEN
2507
STATE OF TEXAS

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

NAME 1/31/2022 DATE

STATE OF TEXAS
SAMANTHA JO HARRIS
134616
LICENSED
PROFESSIONAL ENGINEER

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

P.E.
NAME 01/31/2022 DATE

STATE OF TEXAS
DANIEL W. KOSS
110037
LICENSED
PROFESSIONAL ENGINEER

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

NAME 1/31/2022 DATE

INDEX OF SHEETS

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0389	02	057	SH 146
DIST	COUNTY		SHEET NO.
BMT	CHAMBERS		2

DATE: 1/31/2022 9:56:11 AM
FILE: T:\BMTDESIGN\Projects\0389-02-057_SH146_Landscape\DGN\IndexOfSheets.dgn

GENERAL NOTES:

Contractor questions on this project are to be addressed to the following individual(s):

Name Noel Salac

Email Noel.Salac@txdot.gov

Name Tommy Bridwell

Email Tommy.Bridwell@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 Area Engineer or Assistant Area Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address: https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

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

Maintain adequate drainage throughout the limits of the project during all construction phases. Provide a weekly a list of equipment, including idle equipment, used on the project each week.

Item 000 Utilities

Consider the locations of underground utilities depicted on the plans as approximate and employ responsible care to avoid damaging, or accommodate utility facilities. Depending upon scope and magnitude of planned construction activities, advanced field confirmation by the utility owner or operator may be prudent. Where possible, protect and preserve permanent signs, markers, and designations of underground facilities. If utility damage (breaks, leaks, nicks, dents, gouges, etc.) occurs, contact the utility facility owner or operator immediately. In the event utility lines needing unforeseen adjustments are encountered during construction operations, alter operations and continue to prosecute the contract in such a manner that will allow utility adjustments to be made by others.

Item 4 Scope of Work

It is the Contractor's responsibility to field verify all drainage structure's shown in the plans.

Item 6 Control of Materials

Flammable/combustible materials must be stored at a designated location as approved.

Do not store flammable/combustible materials under or adjacent to Bridge class structures. Daily removal of these materials will be considered incidental work.

Item 7 Legal Relations and Responsibilities

Furnish all materials, labor and incidentals required to provide for traffic across the highway and for temporary ingress and egress to private property in accordance with article 7.2.4 of the standard specifications at no additional cost to the state. Maintain ingress and egress to the adjacent property at all times. Consider this work to be subsidiary to the various bid items of the contract.

No significant traffic generator events have been identified in the project limits.

Item 8 Prosecution and Progress

Compute and charge working days in accordance with Section 8.3.1.4 Standard Workweek.

Submit monthly progress schedules in accordance with 8.5.5.2.3. Failure to supply updated project schedule may result in the Engineer withholding progress (monthly) payments.

Adjoining projects may be in progress during the construction of a portion of this project. Plan and prosecute the sequence of construction and the traffic control plan with adjacent construction projects, if applicable. Manage construction of all phases to minimize disruption to traffic.

Work will not be permitted when impending bad weather or low temperatures may impair the quality of work.

No lane closures will be permitted in the SH146 south bound lanes on prior to 9:00 A.M.

HURRICANE

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

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

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

Item 100 Preparing Right of Way

When bridge demolition, tree trimming or tree/brush removal is required from February 15 to September 30, the contractor will provide a qualified biologist with a Bachelor's Degree in biology and demonstrated bird nest survey experience to conduct nesting surveys before work can begin and until vegetation work is completed to ensure compliance with the Migratory Bird Treaty Act (MBTA). See EPIC sheet for details.

Item 192 Landscape Planting

Adjust proposed planting locations as necessary to avoid existing trees as approved.

Item 421 Hydraulic Cement Concrete

Entrained air is required in all slip formed concrete (bridge rail, concrete traffic barrier, pavement, etc.), but is not required for other structural concrete. Adjust the dosage of air entraining agent for low air content as directed or allowed.

Item 502 Barricades, Signs, and Traffic Handling

Construct all work zone signs, sign supports, and barricades from material other than wood unless approved otherwise. Metal posts, if used, are to be galvanized. Aluminum signs, if used, will meet the following minimum thickness requirements:

Square Feet	Minimum Thickness
Less than 7.5	0.080 inches
7.5 to 15	0.100 inches
Greater than 15	0.125 inches

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

Use drums, or 42" as channelizing devices.

Provide construction fencing as approved at all work locations to protect pedestrian or bicycle traffic. This material and its placement will be considered subsidiary to Item 502.

Item 506 Temporary Erosion, Sedimentation, and Environmental Controls

The Contractor Force Account "SW3P Contingency" that has been established for this project is intended to be used in the event that maintenance of such controls become necessary.

Item 618 Conduit

The polymer concrete barrier box will not be paid for separately, but will be considered subsidiary to ITEM 618, "CONDUIT".

Where PVC, duct cable, and HDPE conduit 1" and larger is allowed and installed as per the Department 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.

PVC Conduit systems that snap or lock together without glue and that are UL listed to be used for bored PVC electrical applications, will be allowed for PVC Schedule 40 and PVC schedule 80 upon approval.

Place conduit under existing roadways and/or driveways as directed and in accordance with Item 476.

Cap, do not glue, open ends of conduit.

If casing is required to place bored conduit, consider the casing incidental and subsidiary to the conduit.

Ensure open trenches and excavations are filled at the end of each work day.

Leave a minimum length of 2 feet for each conductor cable in each ground box and in each pole.

When backfilling bore pits, ensure that the conduit does not become damaged during installation or due to any settling of the backfill material. Compact select backfill (use Type SM or SC) in three equal lifts to the bottom of the conduit; or if sand is used, it must be placed to a point 2 inches above the conduit. Backfill density will be equal to the existing soil. Exercise due care to prevent any material from entering the conduit.

Place conduit under existing pavement by boring unless otherwise directed. Pits for boring will not be closer than 3 feet from edge of pavement unless otherwise approved. Water jetting will not be permitted. At the close of work each day, cover all open pits and barricade for safety.

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

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

The polymer concrete barrier box will not be paid for separately, but will be considered subsidiary to ITEM 618, “CONDUIT.”

Refer to plans and specifications for type of conduit. Waterproof and tighten all couplings and connections. Bring all proposed and existing conduit into a ground box and ‘elbow’ it unless otherwise shown on the plans. Provide a bushing to protect the wire from abrasion when a conduit run terminates.

Replace sections of conduit with the size and type shown on the plans in the event the existing conduit proves unusable due to location or damage.

Secure permission from the proper authority as directed before cutting into or removing any sidewalks or curbs for installation of this Item.

The locations of conduit and ground boxes are diagrammatic and will be shifted, as directed, to accommodate field conditions.

Install conduit in an area not exceeding 2 ft. in any direction from a straight line with the depth of the conduit at least 2 ft. unless otherwise shown on the plans. Installation of the conduit by jacking or boring method will be at a depth of at least 1 ft. below the bottom of the base material of the roadway. Evidence of damage to the roadway during the jacking or boring operation will be enough grounds to stop the method being used.

Install conduit on a 2 in. sand cushion and backfill with at least 6 in. of sand. Backfill the remainder of the trench with flexible base, soil or two-sack concrete as required by the location of the conduit or as directed.

Consider all conduit elbows and rigid metal extensions required to be installed on PVC conduit systems subsidiary.

Install a non-metallic pull rope in conduit runs, which are longer than 50 ft. Installed pull ropes in conduit are for future use and will be capped using standard weather tight conduit caps as directed. Consider this work subsidiary to the pertinent Items.

Item 628 Electrical Services

Construct electrical services as shown on the ED sheets. Make all arrangements for electrical services and comply with local standards for proper installation.

Ensure the service closure is assembled by a Company shown on the prequalified Material Producers List for “Roadway Illumination and Electrical Supplies” located on the following web site:

http://www.txdot.gov/business/resources/producer-list.html

Before any UL listed electrical service assembly can be purchased or installed an electrical service data chart will have to be furnished with accurate information for that electrical services specific location. This chart is to go to the UL 508A Listed Industrial Control Panel Shop building the service enclosure.

The information to be shown on the chart will be as follows: electrical service description as per bid code, service number, service riser conduit size, service conductors number and size, main circuit breaker size, two-pole contactor size when required, panel board ampere rating (which will be a minimum of 100 amps), and branch circuit breakers identified and number of poles and size of branch circuit breakers provided.

The location of the service poles as shown are approximate. Any and all cost associated with the installation and connection of the service poles to the electrical utility company with be considered incidental to the service pole. This includes conduit, conduit fittings and electrical conductors.

Furnish and install service pole address numbers and letters. Provide type and size of letters and numbers as approved.

Provide lockable service enclosures equipped with Master #2195 padlocks with two leys for each lock.

Power provided to the locations shown for primary line extensions, connection and meter charges and other expenses by the utility company will be paid for under Force Account Work. Ensure the costs associated with these charges are approved before engaging the utility company to do the work.

Item 644 Small Roadside Sign Assemblies

Remove and stockpile all existing signs and sign posts within the project that are not to remain, at a stockpile location designated by the Engineer. Remove the signs from the posts. Replace any signs or post damaged by the Contractor at his/her entire expense. Consider this work to be subsidiary to the various bid items of the contract.

Item 6185

Shadow vehicles with TMA and high intensity rotating, flashing, oscillating or strobe lights are required. Use one TMA preceding every stationary work zone and two TMA’s for mobile operations.

Therefore, 1 total shadow vehicles with TMA will be required for this type of work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA’s needed for the project.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0389-02-057 **DISTRICT** Beaumont **COUNTY** Chambers
HIGHWAY SH 146

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0389-02-057**			
		PROJECT ID		**A00176483**			
		COUNTY		**Chambers**			
		HIGHWAY		**SH 146**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6001	PREPARING ROW	AC	0.190		0.190	
	104-6015	REMOVING CONC (SIDEWALKS)	SY	66.000		66.000	
	104-6021	REMOVING CONC (CURB)	LF	15.000		15.000	
	161-6017	COMPOST MANUF TOPSOIL (4")	SY	460.000		460.000	
	161-6023	EROSION CONTROL COMPOST (4")	SY	305.000		305.000	
	161-6024	GENERAL USE COMPOST (2")	SY	305.000		305.000	
	162-6002	BLOCK SODDING	SY	460.000		460.000	
	168-6001	VEGETATIVE WATERING	MG	112.000		112.000	
	192-6028	PLANT MATERIAL (1 GAL) (SHRUB)	EA	1,237.000		1,237.000	
	192-6063	PLANT BED PREP (TYPE I)	SY	305.000		305.000	
	193-6001	PLANT MAINTENANCE	MO	3.000		3.000	
	400-6005	CEM STABIL BKFL	CY	44.000		44.000	
	420-6071	CL C CONC (COLLAR)	EA	4.000		4.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF	142.000		142.000	
	464-6004	RC PIPE (CL III)(21 IN)	LF	16.000		16.000	
	465-6168	INLET (COMPL)(TY A)	EA	4.000		4.000	
	496-6004	REMOV STR (SET)	EA	1.000		1.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	5.000		5.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	235.000		235.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	235.000		235.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	40.000		40.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	40.000		40.000	
	529-6036	CONCRETE CURB (SPECIAL)	LF	32.000		32.000	
	531-6032	CONC SIDEWALKS (SPECIAL) (TYPE A)	SY	71.000		71.000	
	618-6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	50.000		50.000	
	620-6005	ELEC CONDR (NO.10) BARE	LF	50.000		50.000	
	620-6006	ELEC CONDR (NO.10) INSULATED	LF	100.000		100.000	
	628-6115	ELC SRV TY D 120/240 060(NS)AL(E)PS(U)	EA	1.000		1.000	
	644-6075	RELOCATE SM RD SN SUP&AM(SIGN ONLY)	EA	1.000		1.000	
	752-6007	TREE REMOVAL (18" - 24" DIA)	EA	1.000		1.000	
	752-6014	STUMP REMOVAL	EA	1.000		1.000	
	764-6008	STORM SEWER CLEANING (PIPE)(19"-24"DIA)	LF	192.000		192.000	
	1000-6011	CLEAN AND SWEEP PAVED PARKING AREAS	CYC	12.000		12.000	
	1002-6002	LANDSCAPE AMENITY (TY 1)	EA	1.000		1.000	
	1002-6003	LANDSCAPE AMENITY (TY 2)	EA	17.000		17.000	
	1002-6004	LANDSCAPE AMENITY (TY 3)	EA	1.000		1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0389-02-057 **DISTRICT** Beaumont **COUNTY** Chambers
HIGHWAY SH 146

			CONTROL SECTION JOB		**0389-02-057**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00176483**		
			COUNTY		**Chambers**		
			HIGHWAY		**SH 146**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	1006-6001	LANDSCAPE SOIL AMENDMENT (TYPE I)	SY	305.000		305.000	
	1006-6002	LANDSCAPE SOIL AMENDMENT (TYPE II)	SY	305.000		305.000	
	1006-6003	LANDSCAPE SOIL AMENDMENT (TYPE III)	SY	305.000		305.000	
	1006-6004	LANDSCAPE SOIL AMENDMENT (TYPE IV)	SY	610.000		610.000	
	1006-6005	LANDSCAPE SOIL AMENDMENT (TYPE V)	SY	305.000		305.000	
	6185-6002	TMA (STATIONARY)	DAY	5.000		5.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF QUANTITIES

BID CODE	100 6001	104 6015	104 6021	161 6017	161 6023	161 6024	162 6002	168 6001	192 6028	192 6063	193 6001	400 6005	420 6071	464 6003	464 6004	465 6168	496 6004	506 6038
DESCRIPTIONS	PREPARING ROW	REMOVING CONC (SIDEWALK)	REMOVING CONC (CURB)	COMPOST MANUF TOPSOIL (BIP)(4")	EROSION CONTROL COMPOST (4")	GENERAL USE COMPOST (2")	BLOCK SODDING	VEGETATIVE WATERING	PLANT MATERIAL (1 GAL) (SHRUB)	PLANT BED PREP (TYPE 1)	PLANT MAINTENANCE	CEM STABIL BKFL	CL C CONC (COLLAR)	RC PIPE (CL III) (18 IN)	RC PIPE (CL III) (24 IN)	INLET (COMPL) (TY A)	REMOVE STR (SET)	TEMP SEDMT CONT FENCE (INSTALL)
UNITS	AC	SY	LF	SY	SY	SY	SY	MG	EA	SY	MO	CY	EA	LF	LF	EA	EA	LF
QUANTITY	0.19	66	15	460	305	305	460	112	1237	305	3	44	2	142	16	4	1	235

BID CODE	506 6039	506 6040	506 6043	529 6036	531 6032	618 6024	620 6005	620 6006	628 6115	644 6068	752 6007	752 6014	764 6008	1000 6011	1002 6002	1002 6003	1002 6004	1006 6001
DESCRIPTIONS	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTALL) (8")	BIODEG EROSN CONT LOGS (REMOVE)	CONCRETE CURB (SPECIAL)	CONCRETE SIDEWALK (SPECIAL) (TYPE A)	CONDT (PVC) (SCH 40) (2") (BORE)	ELEC CONDR (NO.10) BARE	ELEC CONDR (NO.10) INSULATED	ELC SRV TY D 120/240 060(NS)AL (E)PS(U)	RELOCATE SM RD SN SUP&AM TY 10BWG	TREE REMOVAL (18"–24" DIA)	STUMP REMOVAL	STORM SEWER CLEANING (PIPE) (19"–24" DIA)	CLEAN AND SWEEP PAVED PARKING AREAS	LANDSCAPE AMENITY (TY 1)	LANDSCAPE AMENITY (TY 2)	LANDSCAPE AMENITY (TY 3)	LANDSCAPE SOIL AMENDMENT (TYPE I)
UNITS	LF	LF	LF	LF	SY	LF	LF	LF	EA	EA	EA	EA	LF	CYC	EA	EA	EA	SY
QUANTITY	235	40	40	32	71	50	50	100	1	1	1	1	192	12	1	17	1	305

BID CODE	1006 6002	1006 6003	1006 6004	1006 6005	6185 6002
DESCRIPTIONS	LANDSCAPE SOIL AMENDMENT (TYPE II)	LANDSCAPE SOIL AMENDMENT (TYPE III)	LANDSCAPE SOIL AMENDMENT (TYPE IV)	LANDSCAPE SOIL AMENDMENT (TYPE V)	TMA (STATIONARY) (DAY)
UNITS	SY	SY	SY	SY	DAY
QUANTITY	305	305	610	305	5

FREESE NICHOLS
10497 Town and Country Way,
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Phone - (713) 600-6800
Web - www.freese.com

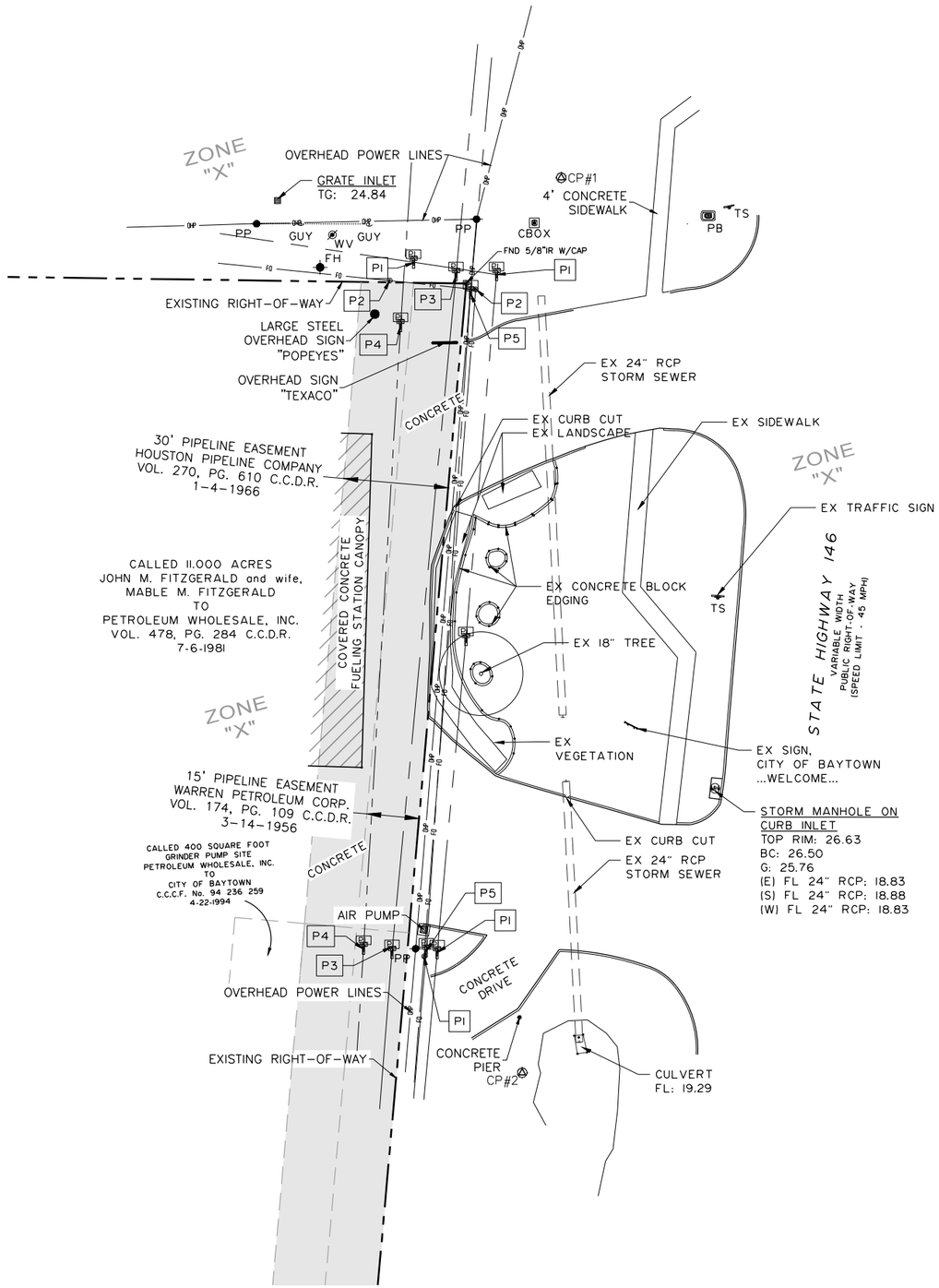
REGISTERED LANDSCAPE ARCHITECT
BRYAN PAUL JOHNSON
STATE OF TEXAS
2507

1/31/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
QUANTITY SUMMARY

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			5
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



LEGEND

CP#	CONTROL POINT SET (SIZE/TYPE NOTED)
CBOX	CABLE BOX
FH	FIRE HYDRANT
GUY	GUY WIRE
PB	POWER BOX
PL	PIPELINE MARKER
PP	POWER POLE
TS	TRAFFIC SIGN
WV	WATER VALVE
	EXISTING CONCRETE CURB
OHP	OVERHEAD POWER LINE
FO	FIBER OPTIC CABLE LINE
	EXISTING TREE

PIPELINE MARKER LIST

P1: NITROGEN GAS PIPELINE
AIR LIQUIDE
713-364-7764
1-800-364-7378

P2: CABLE ROUTE
TELEPHONE CABLE UNDERGROUND (CRITICAL CIRCUITS)
1-800-344-78377

P3: LPG PIPELINE
BUCKEYE DEVELOPMENT & LOGISTICS, LLC
1-866-514-8380

P4: GAS PIPELINE
ENERGY TRANSFER
HOUSTON PIPELINE COMPANY LP
1-800-329-1965
1-800-344-8377

P5: GAS PIPELINE
DOW PIPELINE COMPANY
1-800-223-4412

SURVEY NOTE:

THE EXISTING INFORMATION DEPICTED HEREON, PROVIDED BY SURVEY AS PREPARED BY TOTAL SURVEYORS, INC., DEER PARK, TEXAS, ON AUGUST 28, 2018.

CONTRACTOR TO VERIFY ACCURACY OF INFORMATION SHOWN AS EXISTING PRIOR TO BEGINNING CONSTRUCTION.

BASIS OF BEARINGS & COORDINATES NOTE:
THE COORDINATES AND ELEVATIONS ARE BASED UPON STATE PLANE COORDINATE SYSTEM, NAD 83, TEXAS SOUTH CENTRAL ZONE 4204, NAVD 88 ACQUIRED FROM GLOBAL POSITIONING SYSTEM OBSERVATIONS. THE COORDINATES SHOWN HEREON ARE SURFACE COORDINATES WITH AN AVERAGE COMBINED SCALE FACTOR OF 1.0000979. (SURF X CSF = GRID)

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) NOTE:
THE SURVEYOR HAS EXAMINED THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 48201C0760 N, DATED JANUARY 6TH 2017 AND HAVE DETERMINED THAT THE TRACT HEREBY SURVYED LIES WHOLLY WITHIN FEMA "OTHER AREAS" ZONEX OR AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN.

BASE FLOOD ELEVATION: N/A

THIS FLOOD STATEMENT DOES NOT IMPLY THAT THIS TRACT WILL, OR WILL NOT FLOOD, NOR DOES IT CREATE ANY LIABILITY IN SUCH EVENT ON THE PART OF THIS SURVEYOR OR COMPANY.

EXPLANATION OF FEMA ZONES:
FEMA "OTHER AREAS" ZONE X = AREAS DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN.

RESEARCH AND MAPPING OF UNDERGROUND UTILITIES IS NOT A PART OF THIS SURVEY.

THIS IS NOT A BOUNDARY SURVEY. BOUNDARY LINES SHOWN ARE AN APPROXIMATE DEPICTION OF RECORD DATA.

BENCHMARKS

HARRIS COUNTY FLOODPLAIN REFERENCE MARK NUMBER 160075

BRASS DISC STAMPED RM 160075 ON BRIDGE AT I-10 EASTBOUND FEEDER AND CEDAR BAYOU LOCATED ON SHOULDER OF SOUTHWEST CORNER OF THE BRIDGE WEST OF THE STREAM CENTERLINE IN THE CEDAR BAYOU WATERSHED.

ELEVATION: 24.37 FEET NAVD 1988, 2001 ADJUSTED

CONTROL POINTS

CP #	NORTHING	EASTING	ELEVATION	NOTES
CP1	13868723.15	3268371.21	26.22	TXDOT HIGHWAY MONUMENT
CP2	13868467.05	3268360.05	25.59	TXDOT HIGHWAY MONUMENT

0 10' 20' 40'
SCALE IN FEET

NORTH

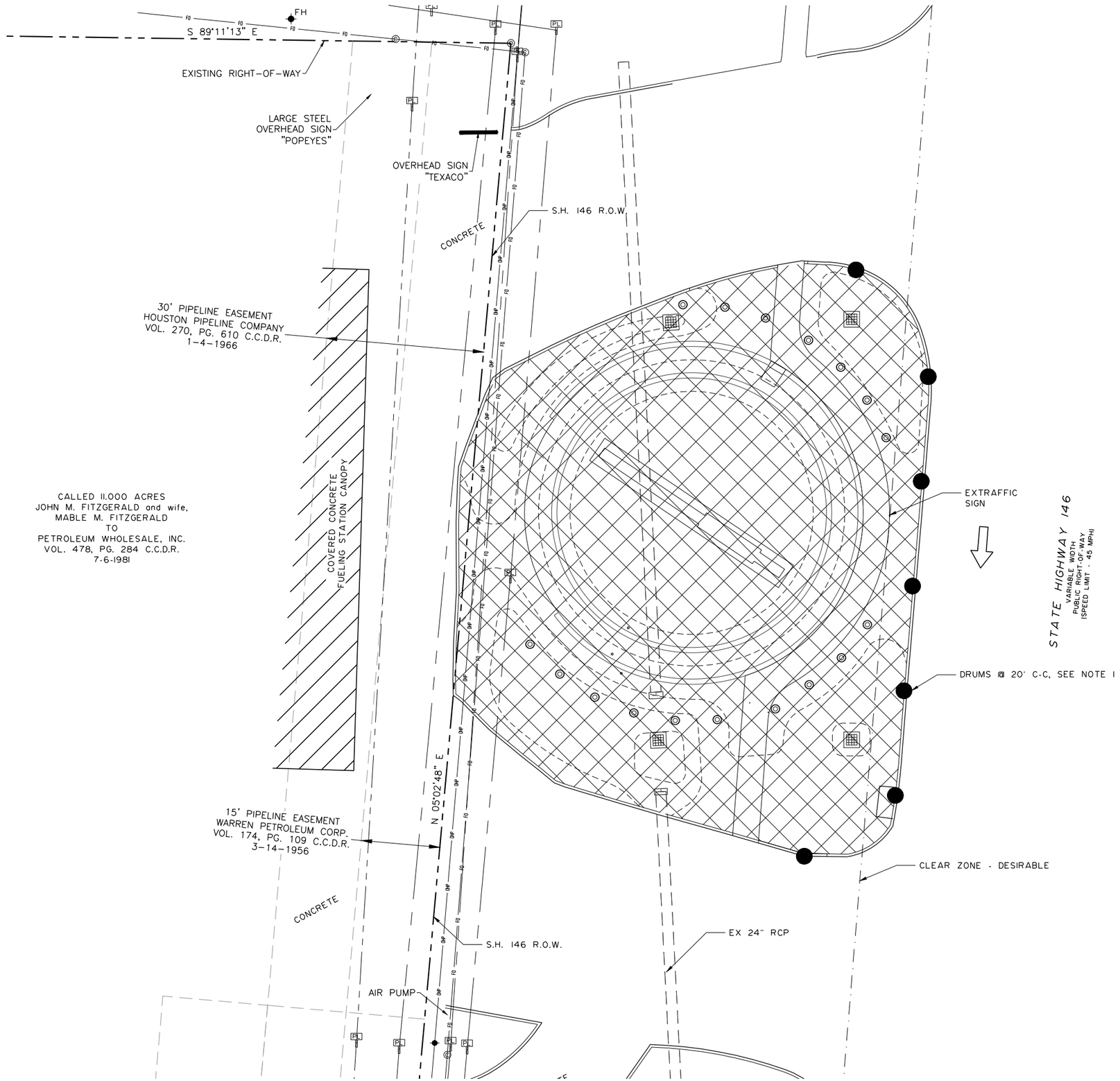
FREESE AND NICHOLS
10497 Town and Country Way,
Suite 600
Houston, Texas 77024
Phone - (713) 600-6800
Web - www.freese.com

REGISTERED LANDSCAPE ARCHITECT
JOHN PAUL FITZGERALD
2501
STATE OF TEXAS
1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
EXISTING CONDITIONS PLAN

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			6
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



LEGEND:

- WORK ZONE
- DIRECTION OF TRAFFIC
- DRUMS

NOTES:

1. PLACE DRUMS ON TOP OF CURB
2. IF LANE CLOSURES ARE REQUIRED AT ANY PORTION OF THE WORK, CONDUCT TRAFFIC CONTROL PER THE REQUIREMENTS OF TCP (1-5A)
3. NO SOUTHBOUND LANE CLOSURES ARE ALLOWED BEFORE 9:00AM.

0 10' 20'
SCALE IN FEET

NORTH

FREESE NICHOLS
10497 Town and Country Way,
Suite 600
Houston, Texas 77024
Phone - (713) 600-6800
Web - www.freese.com

REGISTERED LANDSCAPE ARCHITECT
BRYAN PAUL LANHAM
2507
STATE OF TEXAS
1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
TRAFFIC CONTROL PLAN

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			7
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	BMT	CHAMBERS		8
5-10 5-21				

DATE: 1/28/2022 11:28:32 AM
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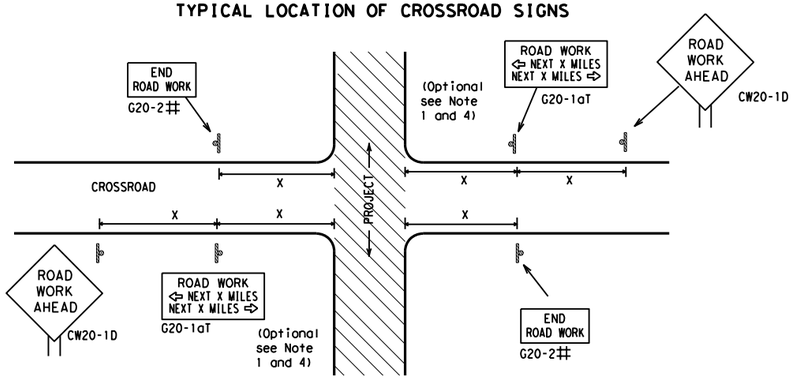
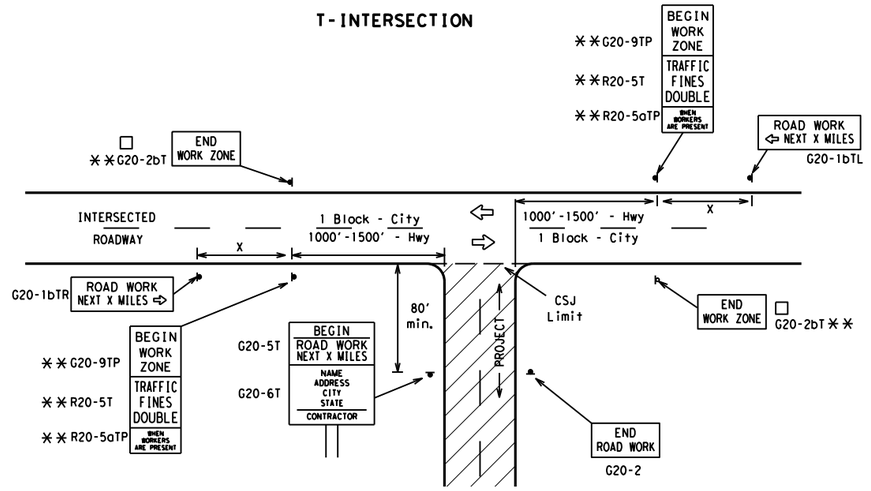
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

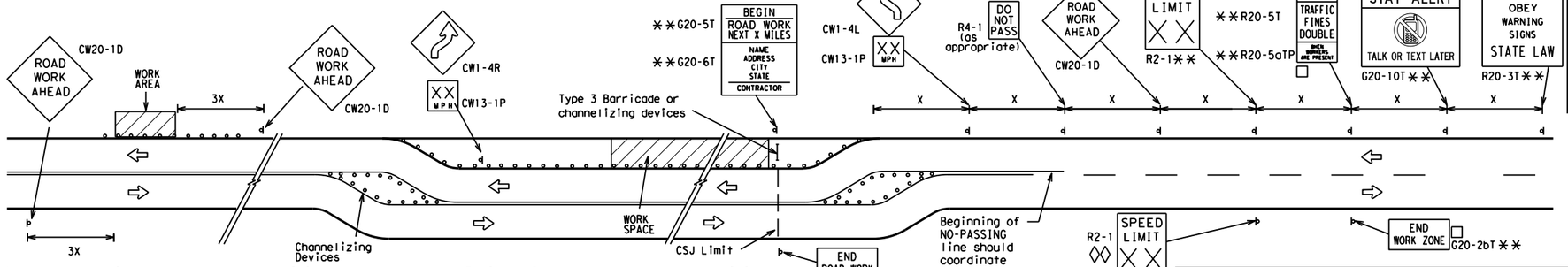
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

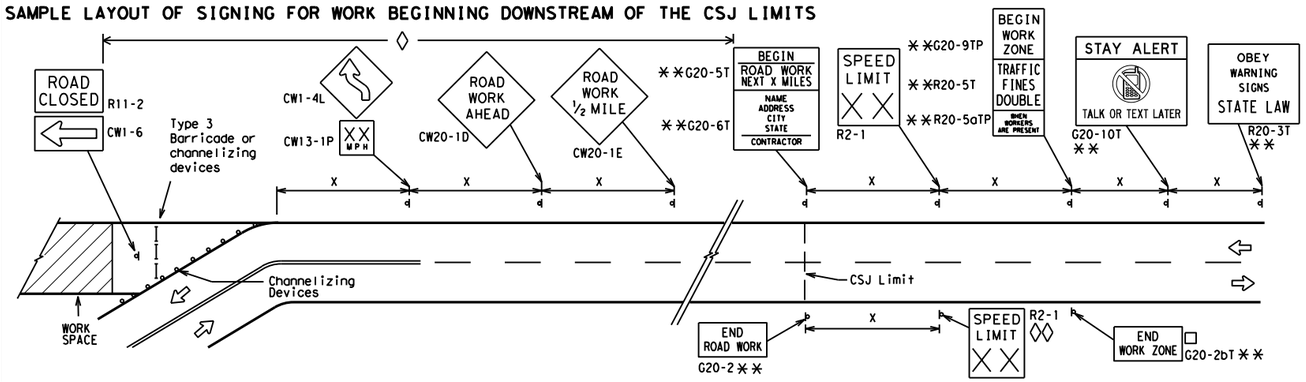
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BMT	CHAMBERS		9

DATE: 1/28/2022 11:28:35 AM
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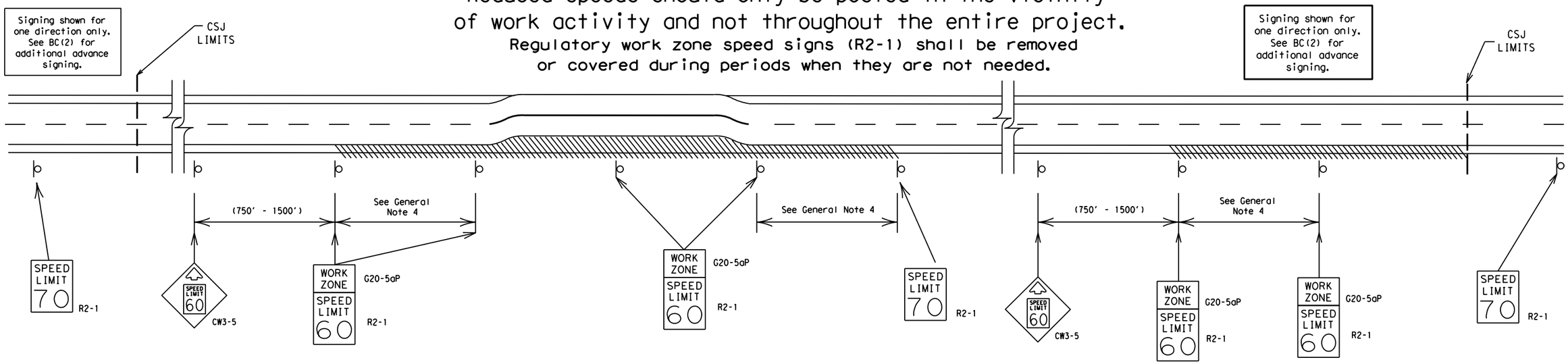
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BMT	CHAMBERS		10

DATE: 1/28/2022 11:28:36 AM
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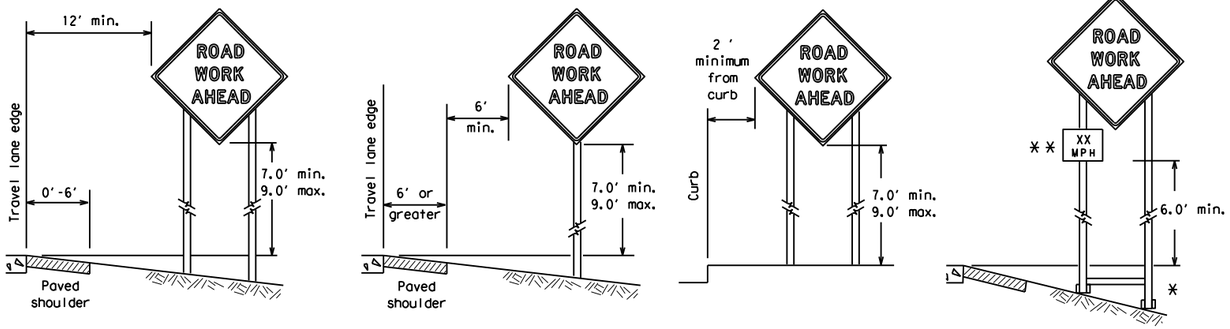
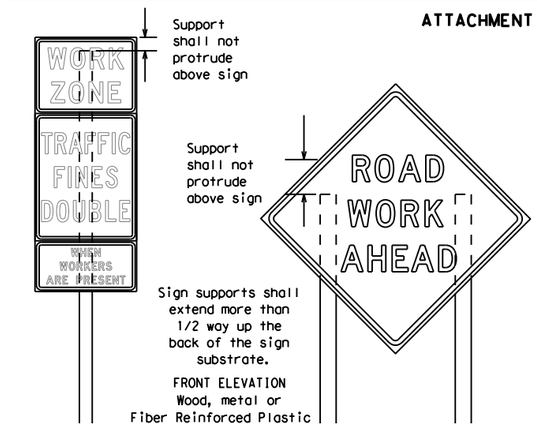
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

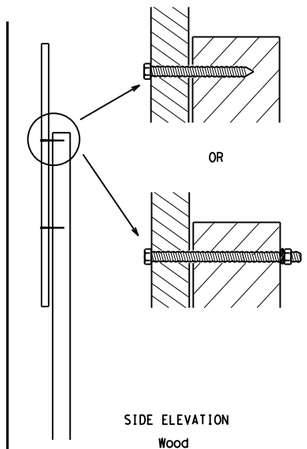


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





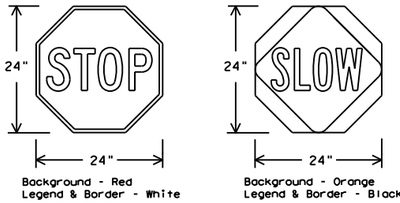
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BMT	CHAMBERS		11

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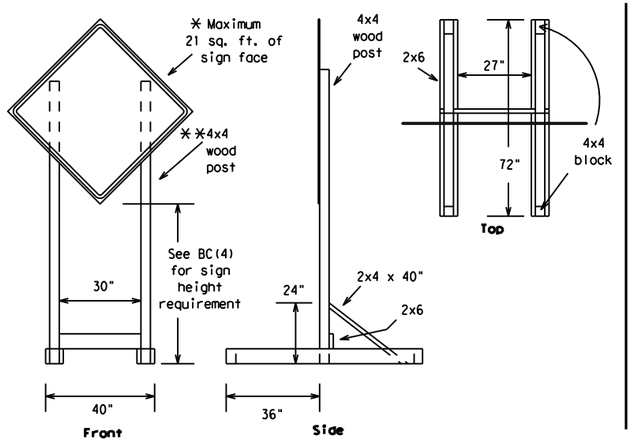
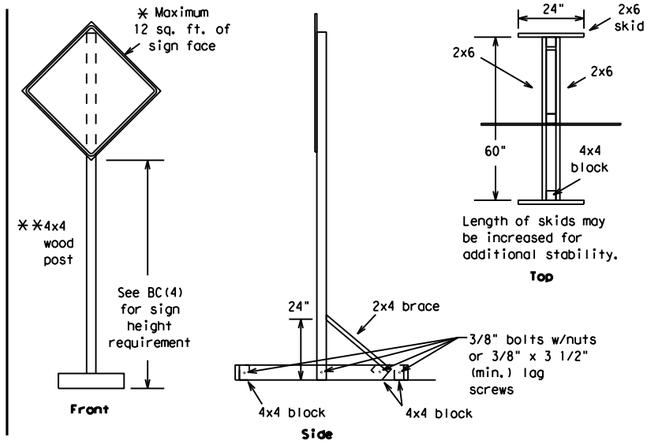
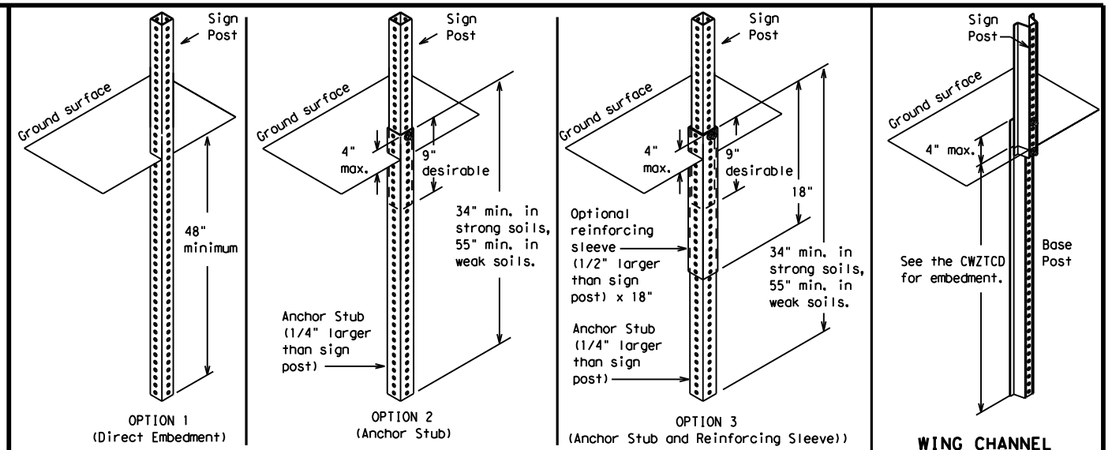




SKID MOUNTED WOOD SIGN SUPPORTS

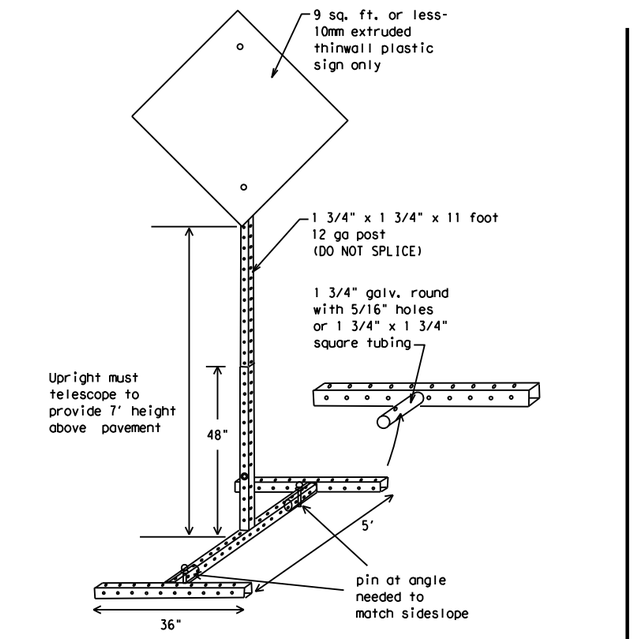
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

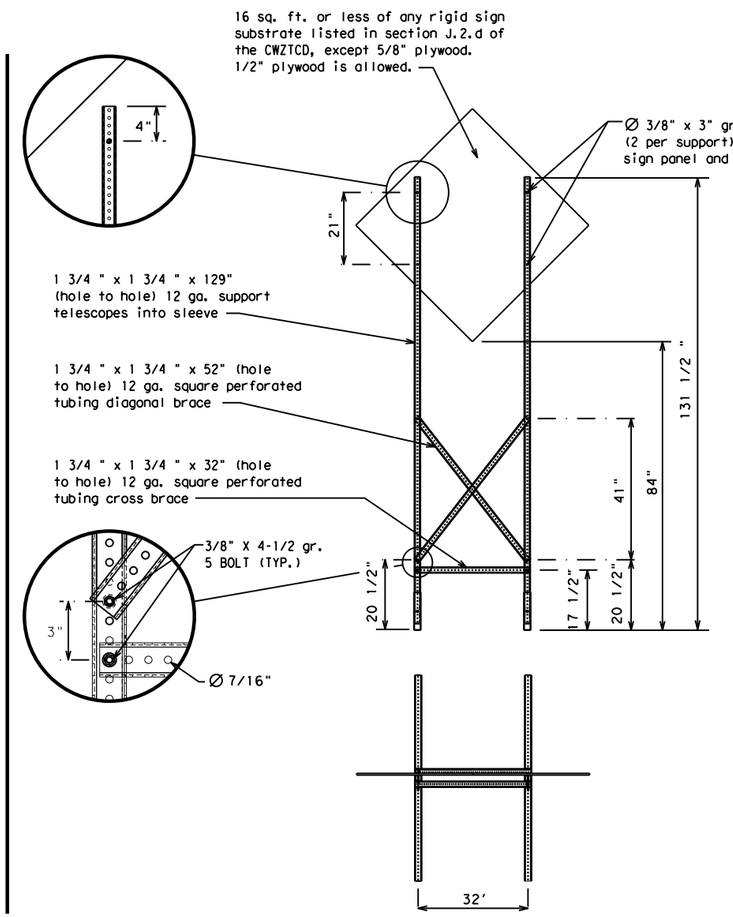


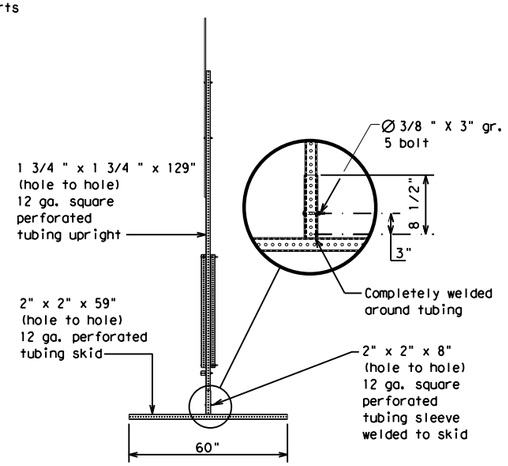
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BMT	CHAMBERS		12

DATE: 1/28/2022 11:28:48 AM
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** 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

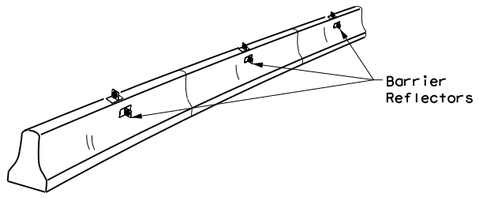
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

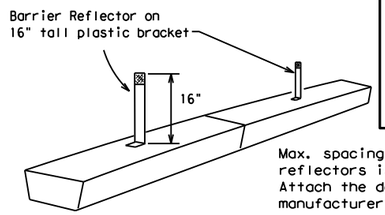
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BMT	CHAMBERS		13

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.

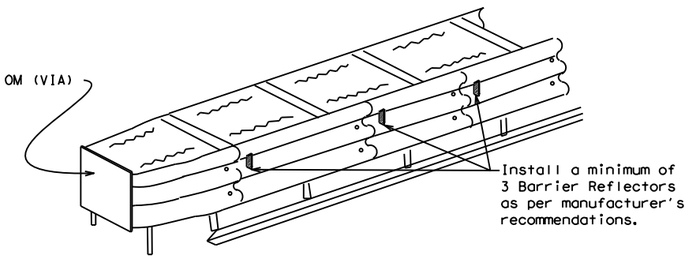


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

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)

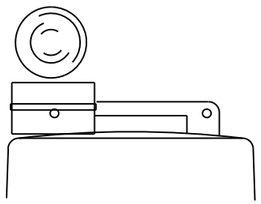


DELINEATION OF END TREATMENTS

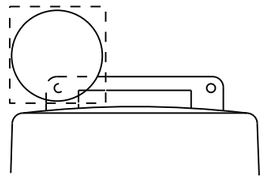
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

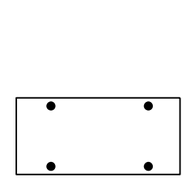
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

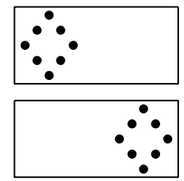
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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:

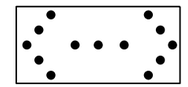


4 CORNER CAUTION

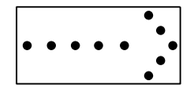
OR



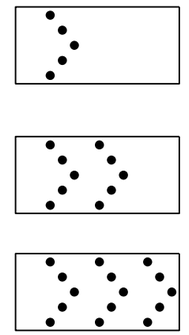
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



RIGHT/LEFT ARROW
(right arrow shown; left is similar)



RIGHT/LEFT SEQUENTIAL CHEVRON
(right chevron shown; left is similar)

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

SHEET 7 OF 12

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	0389	02	057	SH 146
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BMT	CHAMBERS		14

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

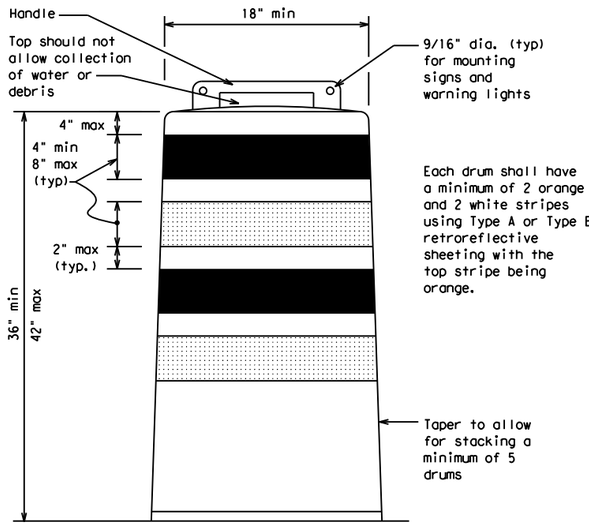
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

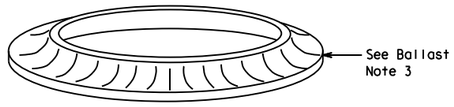
RETROREFLECTIVE SHEETING

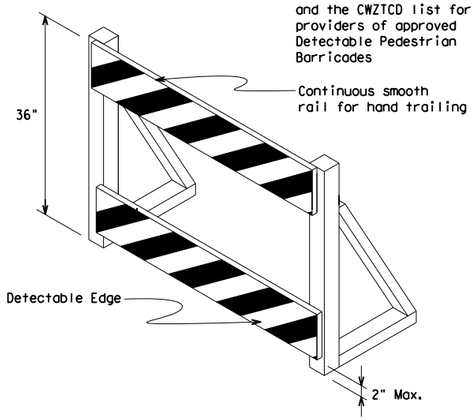
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

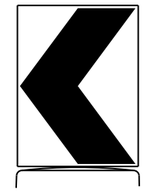




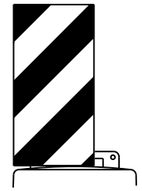


DETECTABLE PEDESTRIAN BARRICADES

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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0389	02	057	SH 146
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	BMT	CHAMBERS		15
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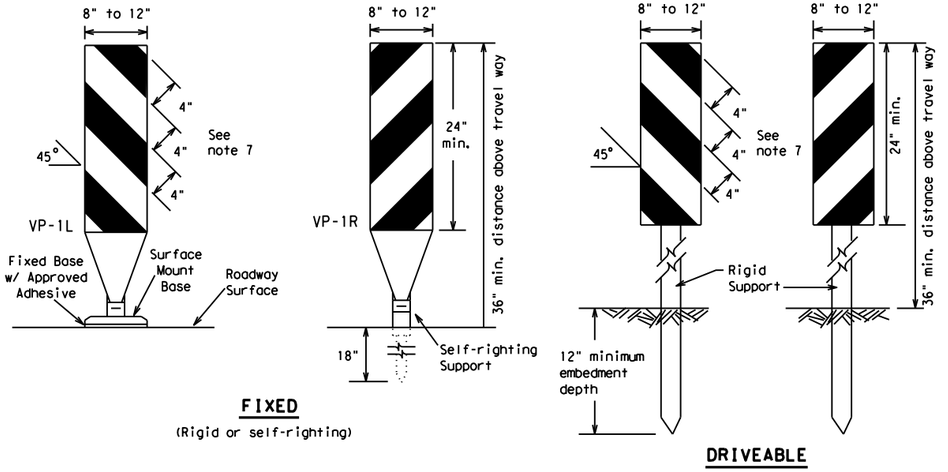
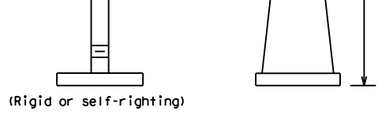


FIXED
(Rigid or self-righting)

DRIVEABLE

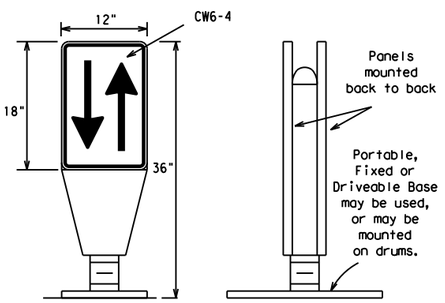


(Rigid or self-righting)

PORTABLE

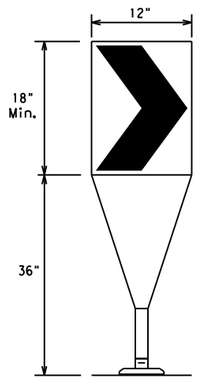
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



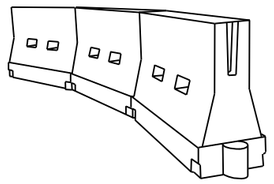
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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7-13 5-21	BMT	CHAMBERS		16

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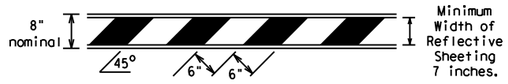
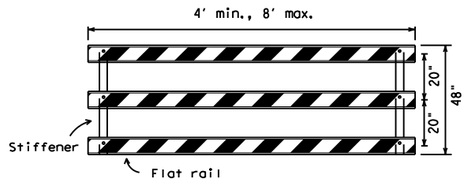
TYPE 3 BARRICADES

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.



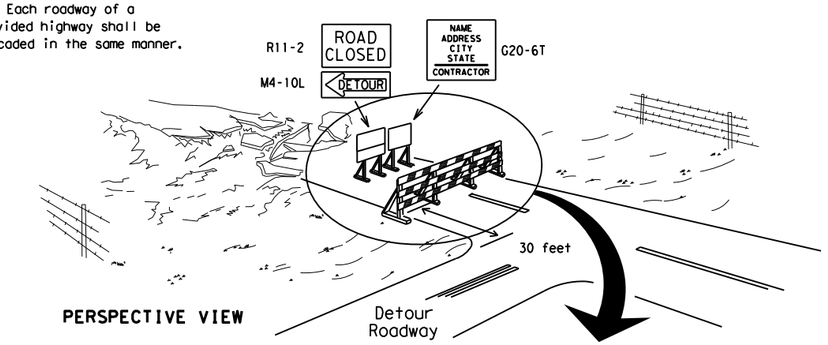
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

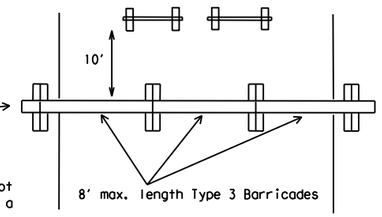
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

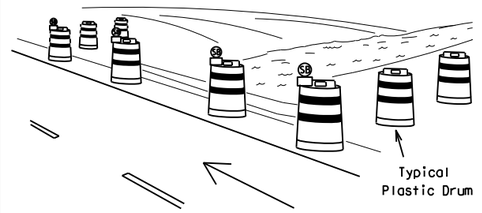
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

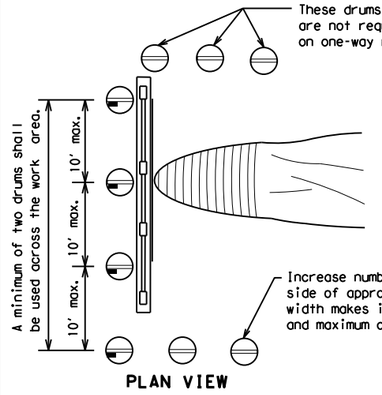
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

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

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	0389	02	057	SH 146
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BMT	CHAMBERS		17

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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.

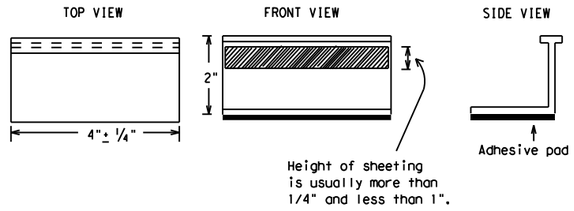
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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 2-98 9-07 5-21 1-02 7-13 11-02 8-14	0389	02	057	SH 146
	DIST	COUNTY		SHEET NO.
	BMT	CHAMBERS		18

105

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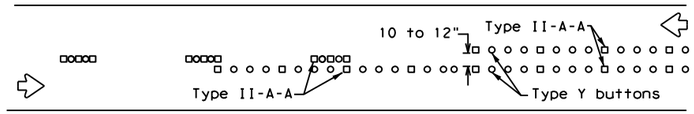
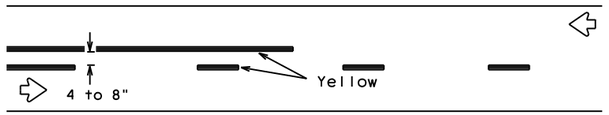
PAVEMENT MARKING PATTERNS

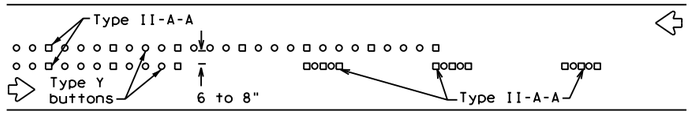
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



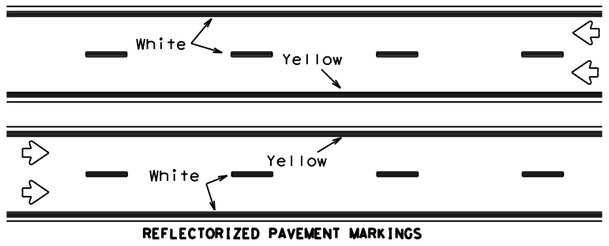
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



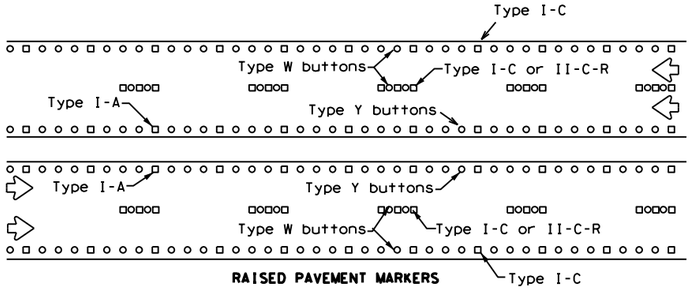
RAISED PAVEMENT MARKERS - PATTERN B

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

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



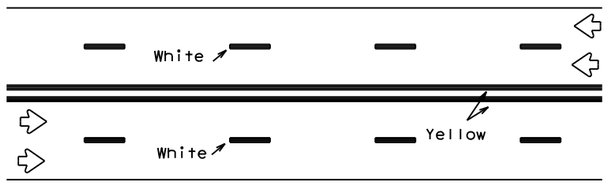
REFLECTORIZED PAVEMENT MARKINGS



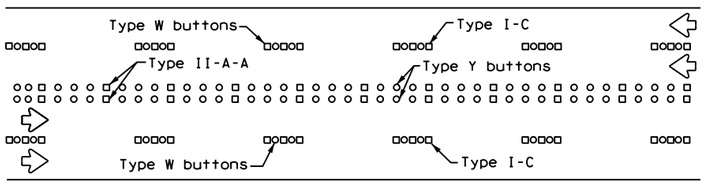
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



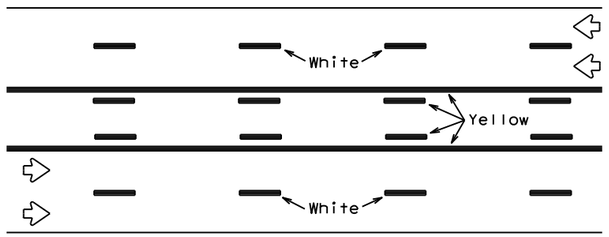
REFLECTORIZED PAVEMENT MARKINGS



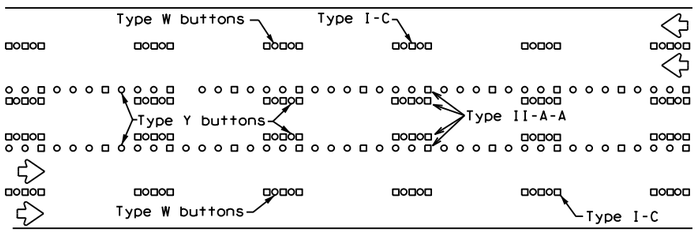
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

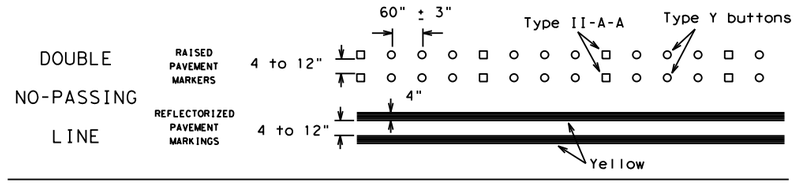
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

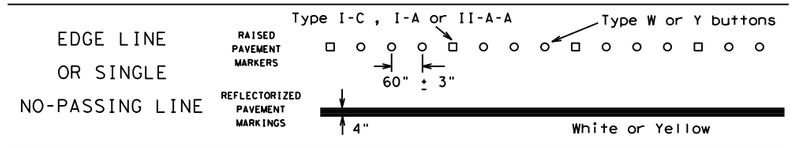
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

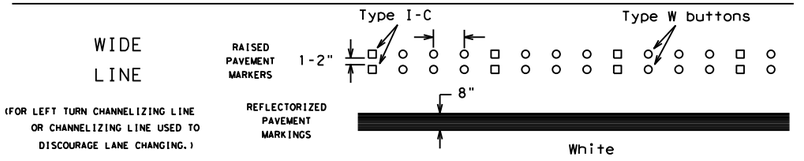


EDGE LINE OR SINGLE NO-PASSING LINE



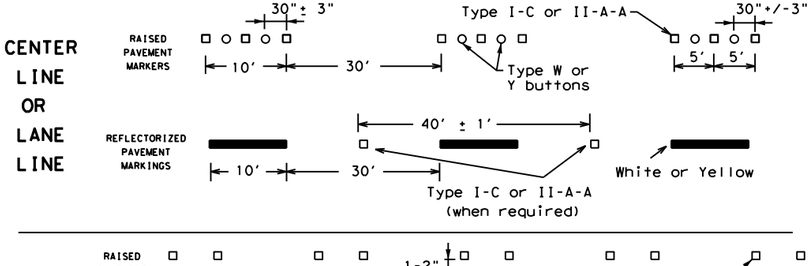
WIDE LINE

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

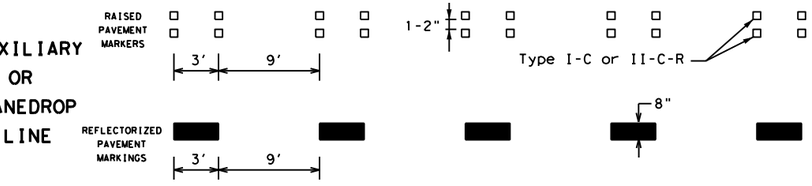


BROKEN LINES

CENTER LINE OR LANE LINE

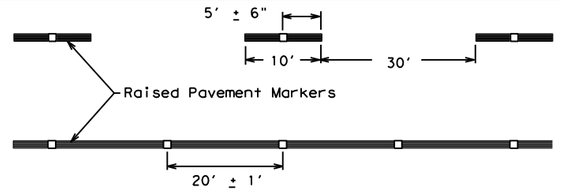


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0389	02	057	SH 146
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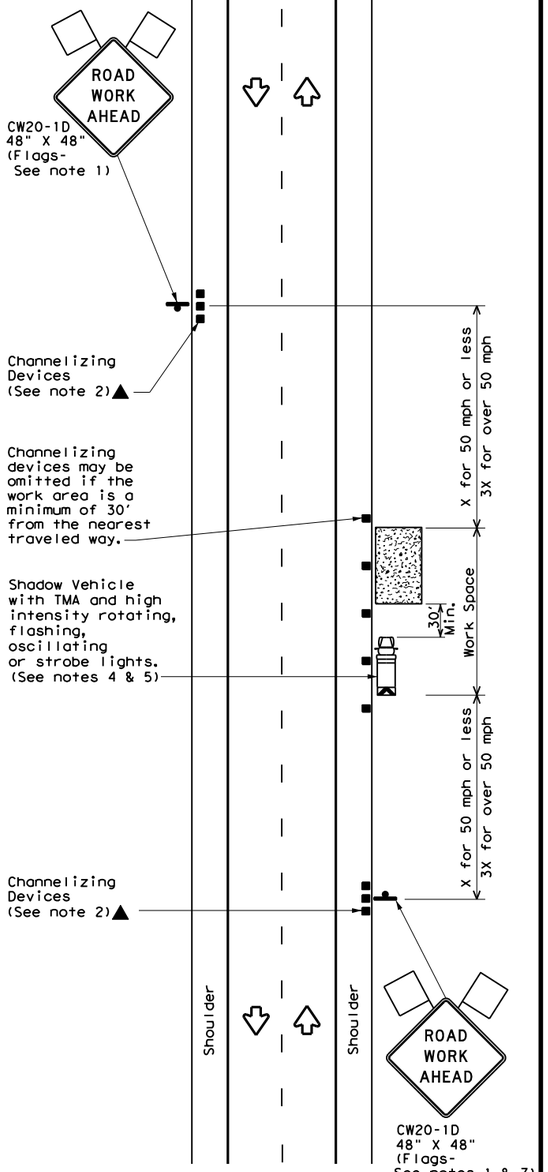
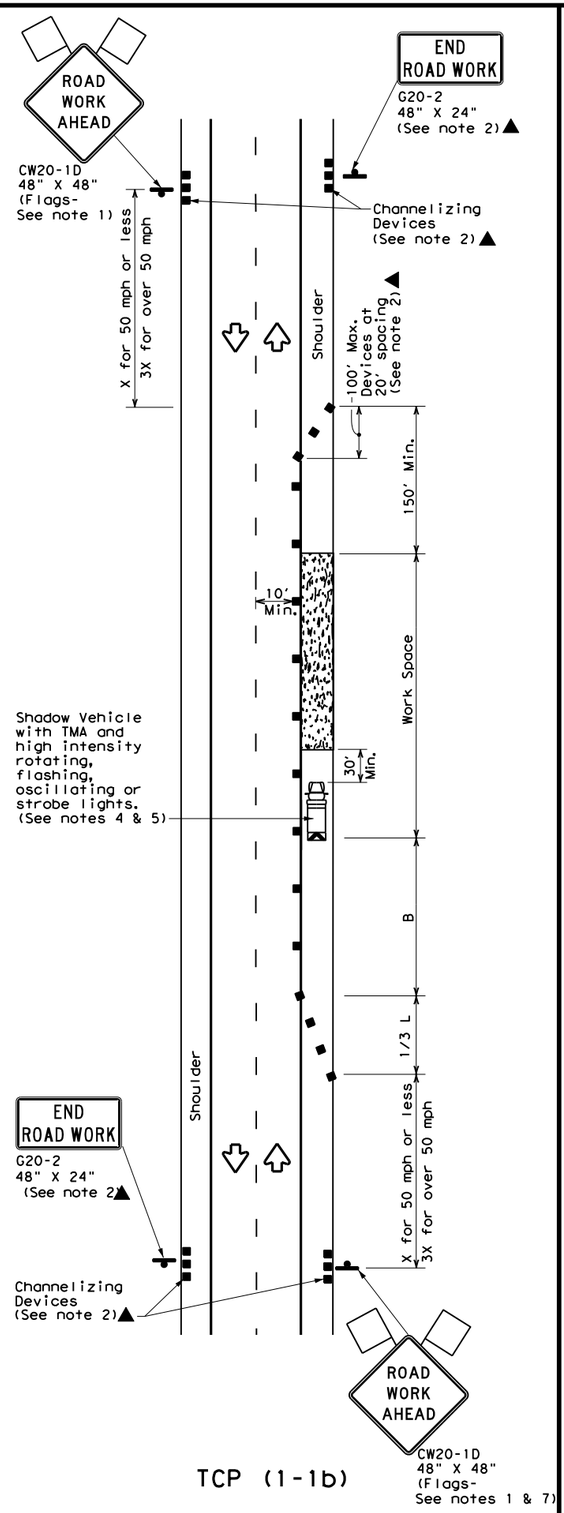


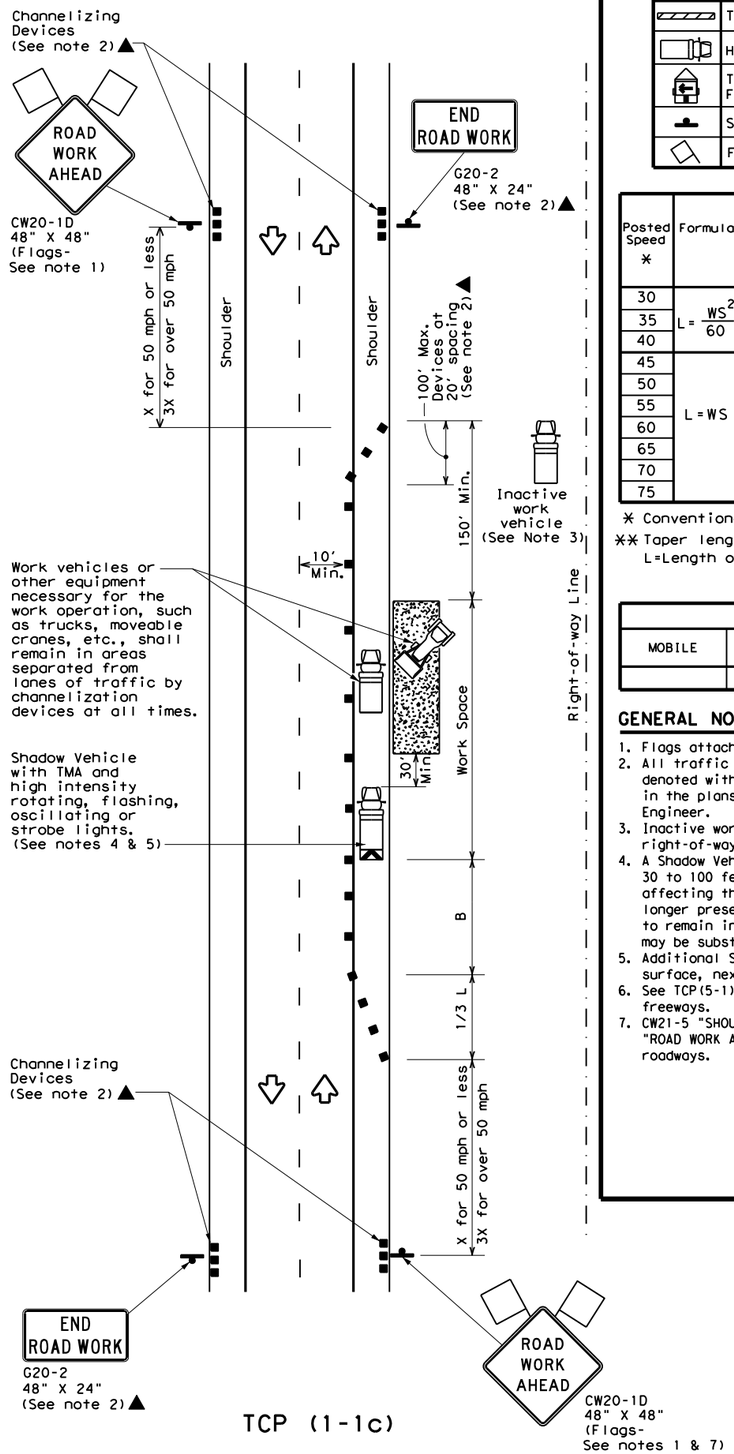
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

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1-97 2-18				

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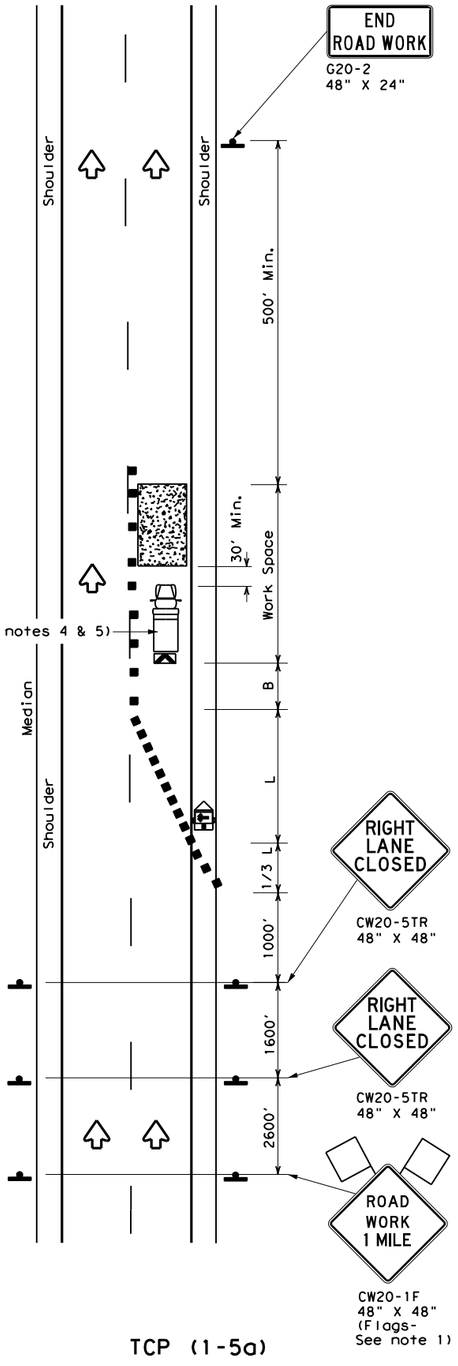
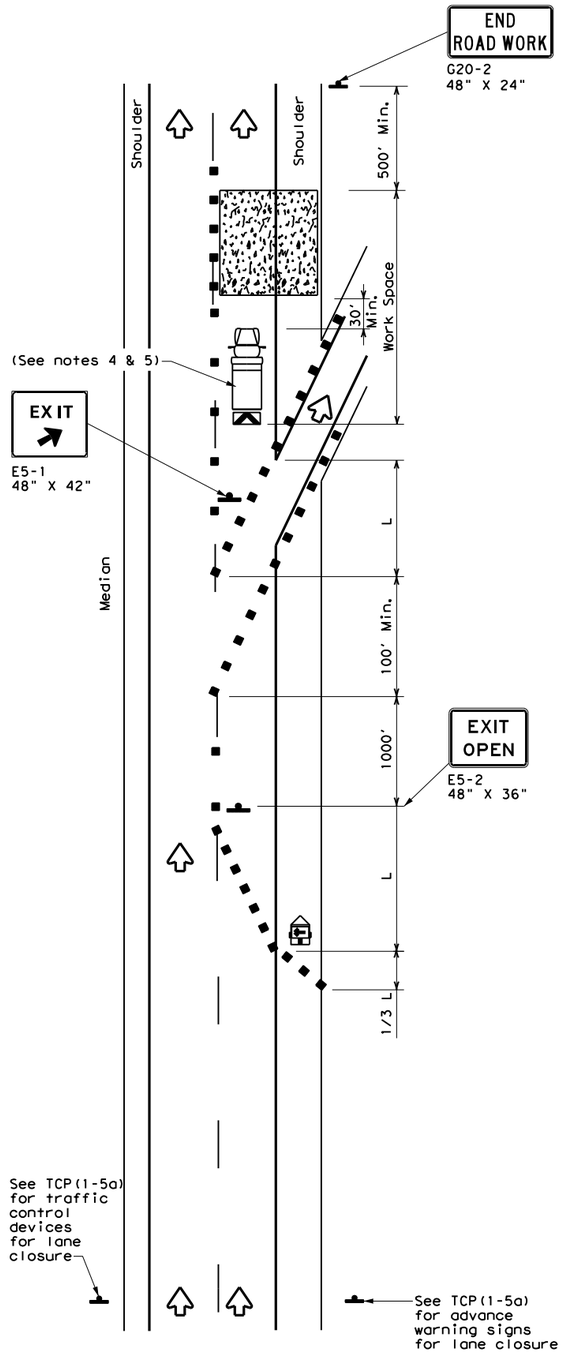


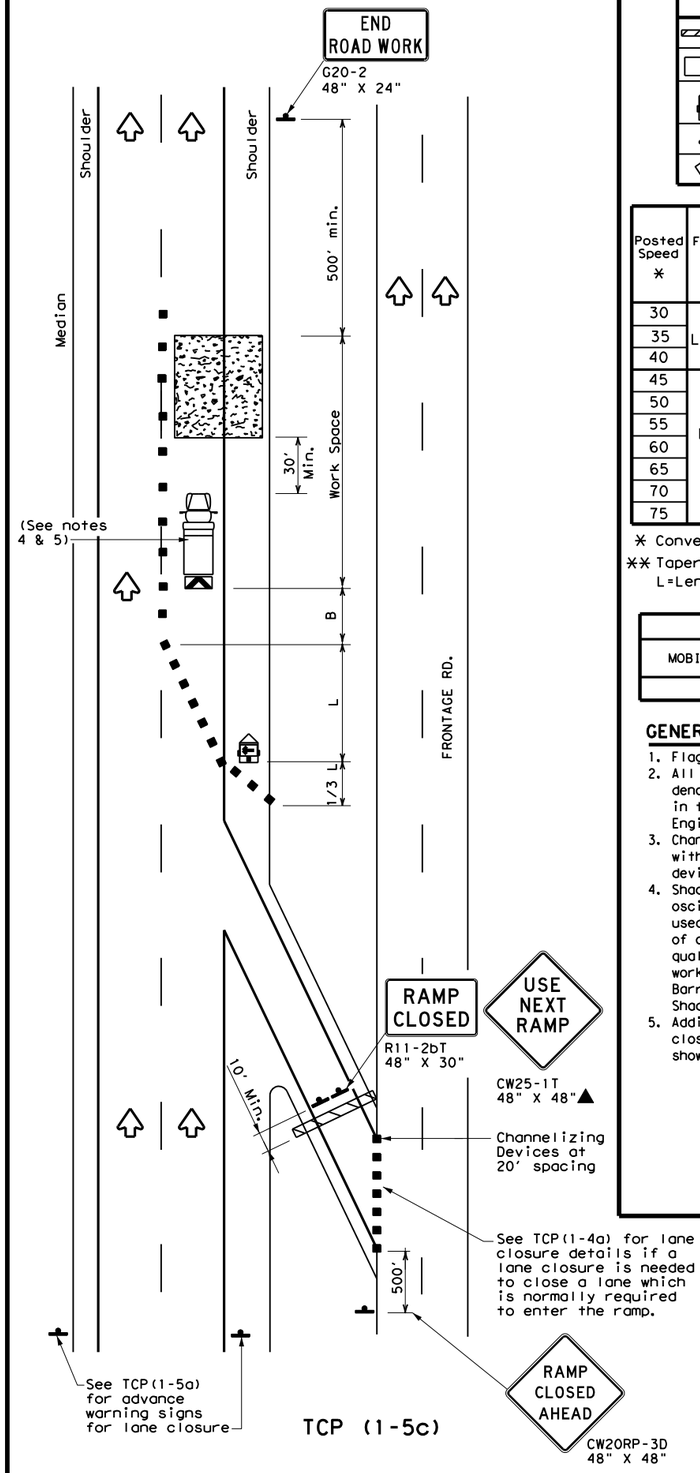
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0389	02	057	SH 146
	DIST	COUNTY		SHEET NO.
	BMT	CHAMBERS		21

DATE: 1/28/2022 11:29:10 AM
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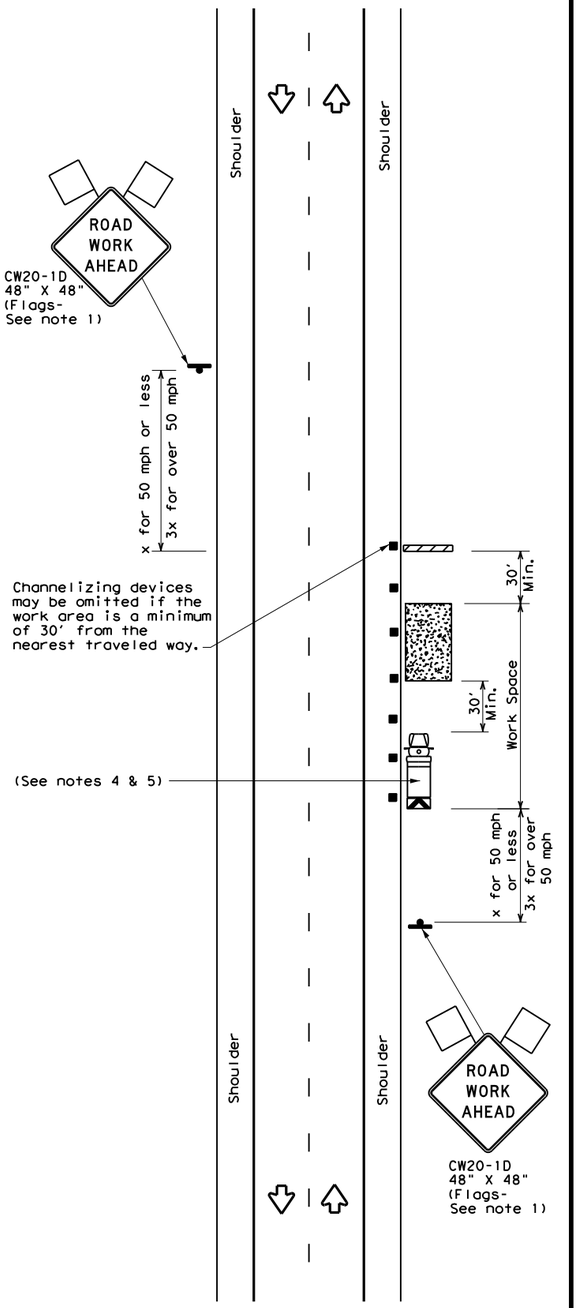
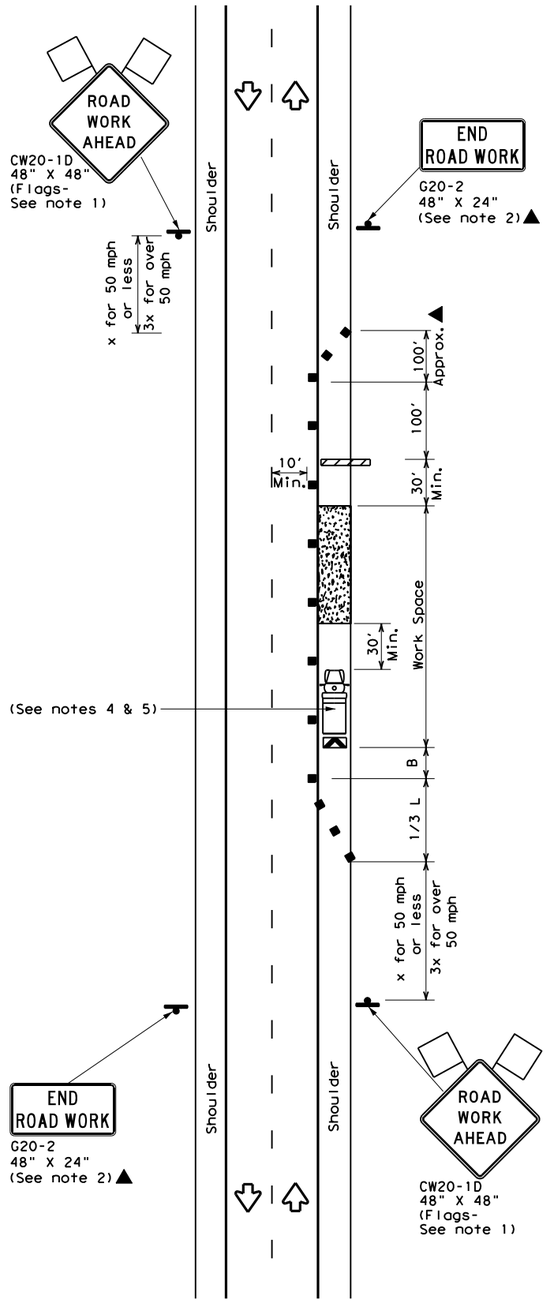


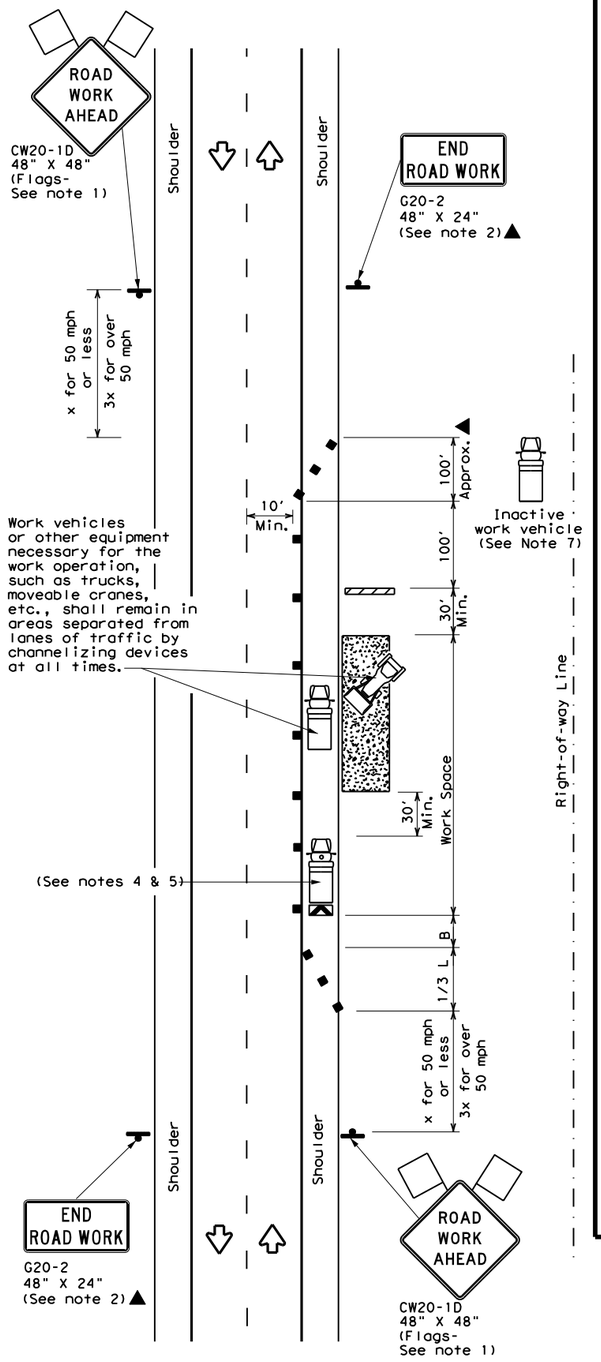
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	BMT	CHAMBERS		22
1-97 2-18				

DATE: 1/28/2022 11:29:12 AM
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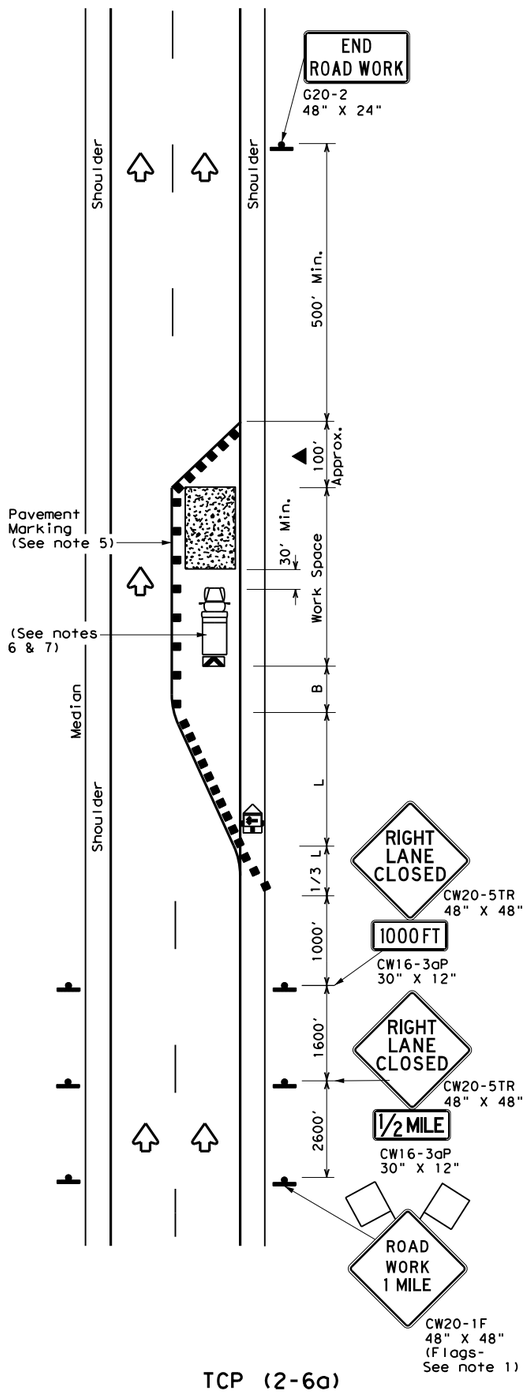
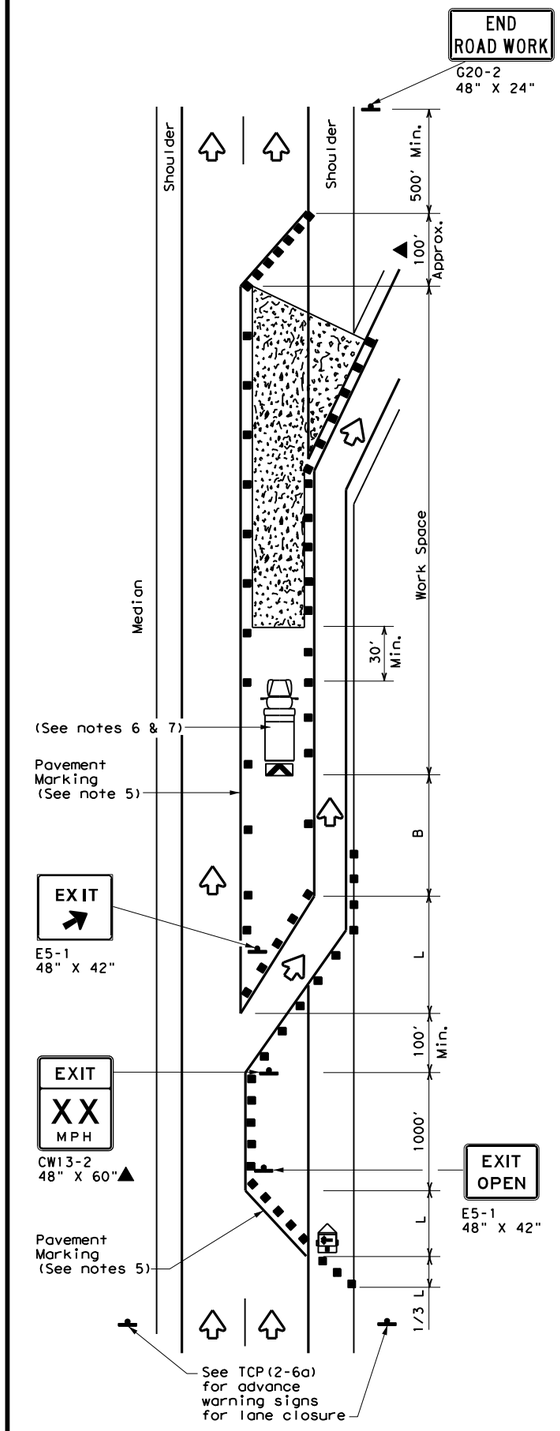


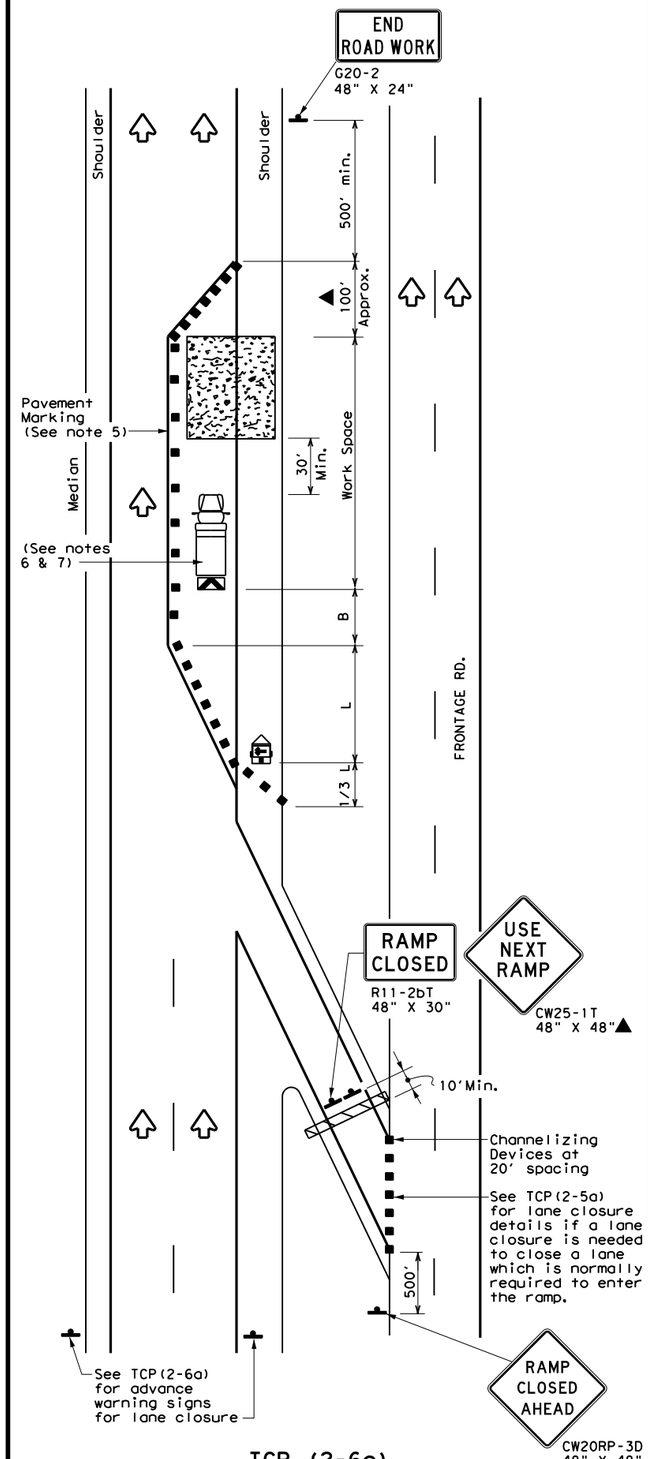
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

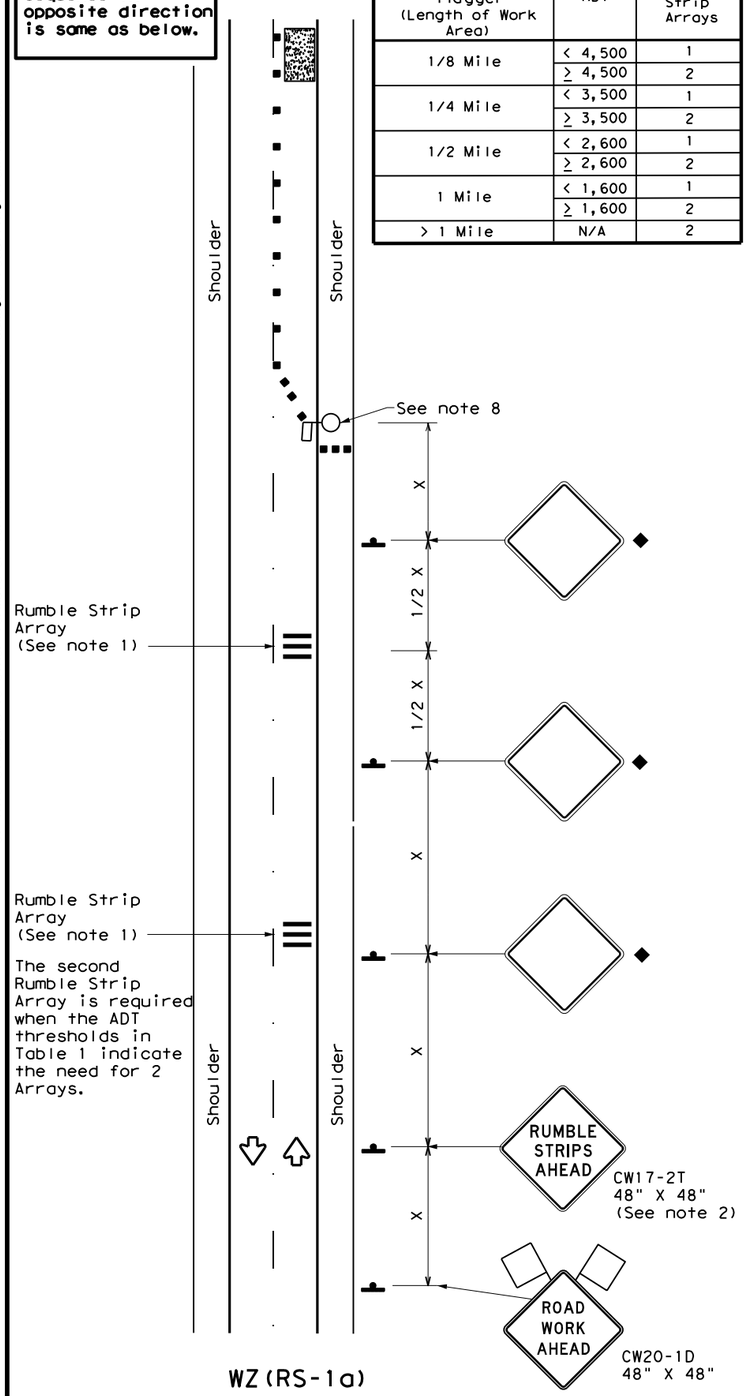
TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0389	02	057	SH 146
	DIST	COUNTY		SHEET NO.
	BMT	CHAMBERS		23

DATE:
FILE:

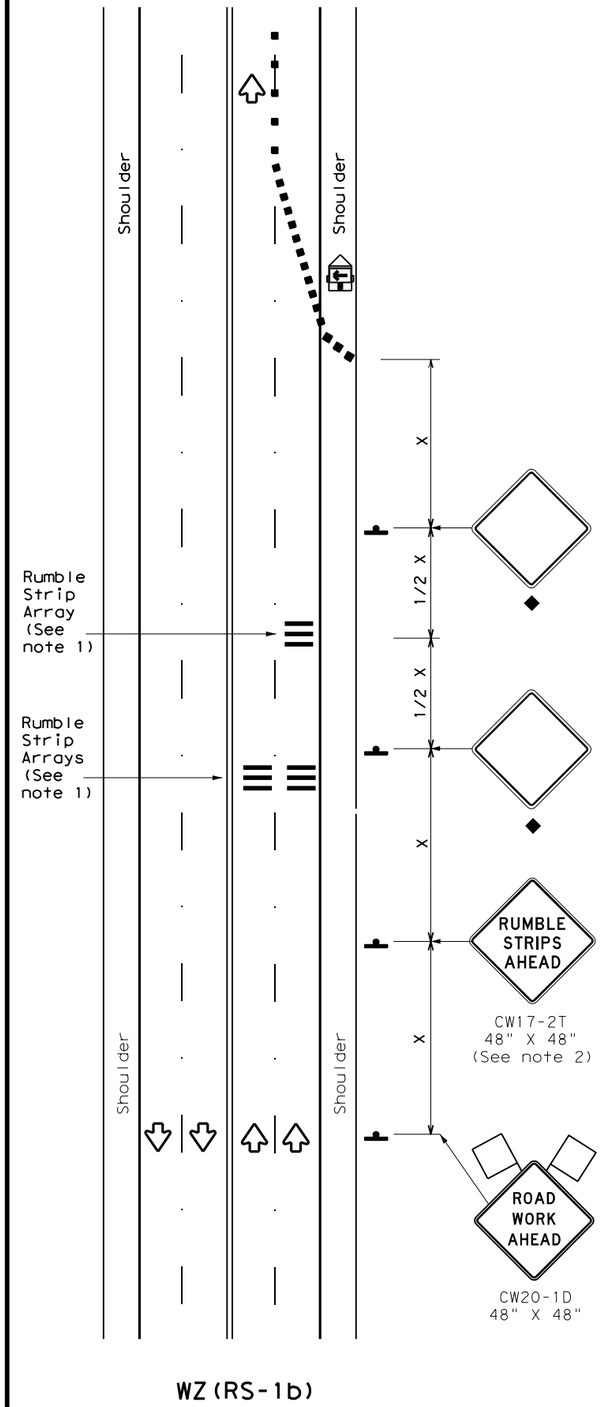
Warning sign and rumble strip sequence in opposite direction is same as below.

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



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

TABLE 2	
Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	* 35' +

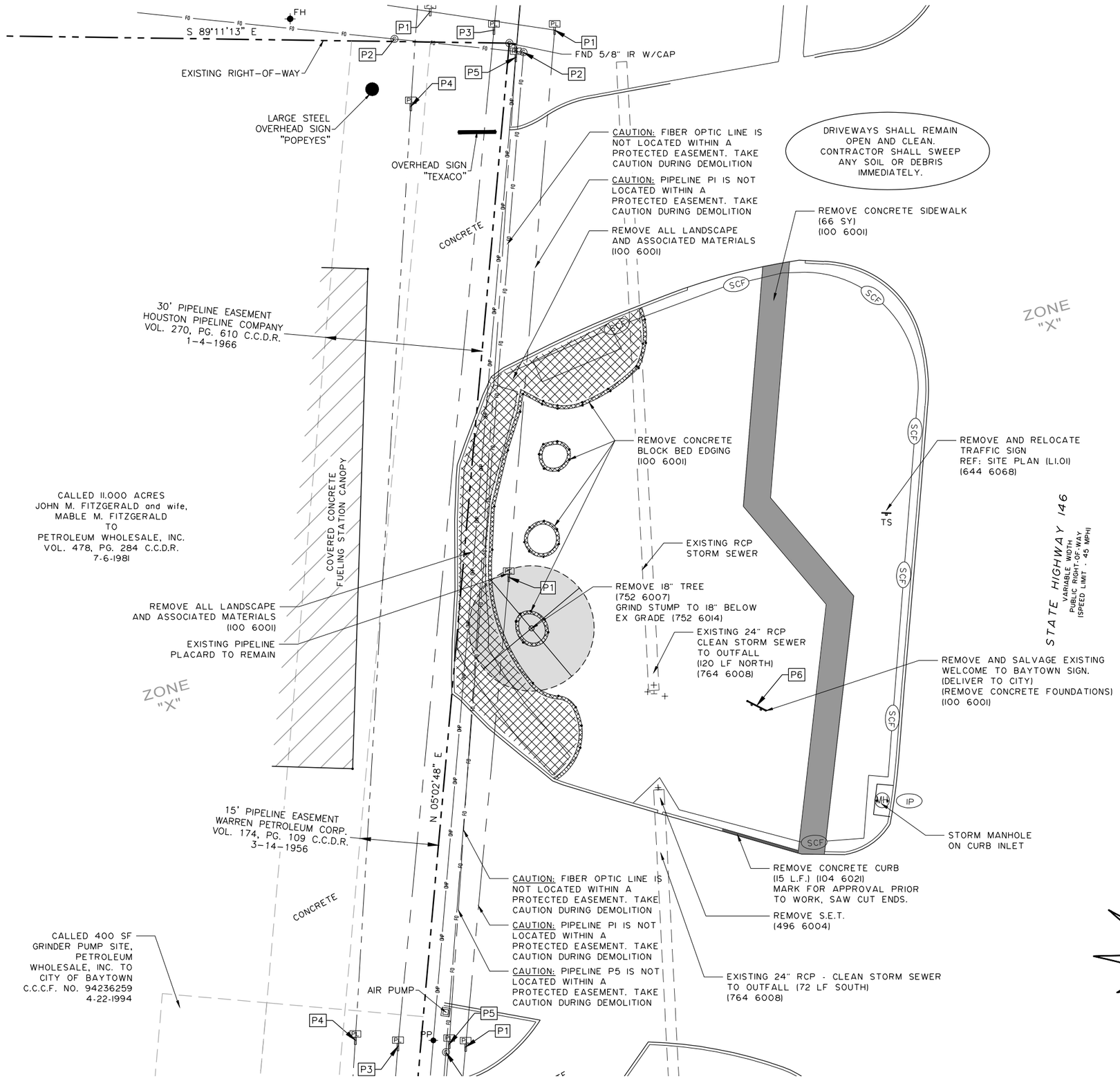
Texas Department of Transportation

Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	DIST	COUNTY		SHEET NO.



LEGEND

- REMOVE CONCRETE CURB (104 6021)
- EXISTING TREE TO BE REMOVED (752 6007)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE RE: EC (1)-16 (506 6038/6039)
- IP — INLET PROTECTION EROSION CONTROL LOG AT INLET RE: EC (9)-16 (506 6040/6043)
- REMOVE CONCRETE SIDEWALK (104 6015)
- REMOVE EXISTING LANDSCAPING (100 6001)
- REMOVE CONCRETE BLOCK BED EDGING (100 6001)

PIPELINE NOTES:

1. THE PROJECT IS LOCATED NEAR SEVERAL UNDERGROUND PIPELINES AND MUST BE PROTECTED THROUGHOUT THE CONSTRUCTION PERIOD. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING LINE LOCATE SERVICES THROUGH THE 'TEXAS 811 CALL' SYSTEM.
2. PIPELINES IN THE GENERAL VICINITY OF THE PROJECT LOCATION WILL REQUIRE NOTIFICATION PRIOR TO BEGINNING WORK. THE PIPELINE COMPANIES REQUIRING NOTIFICATION ARE LISTED ON SHEET L0.01 "PIPELINE MARKER LIST".
3. CONTRACTOR MUST NOTIFY PIPELINE COMPANIES A MINIMUM OF 48 HOURS PRIOR TO DIGGING IN THE VICINITY OF THESE LINES.
4. CONTRACTOR SHALL MAKE EVERY EFFORT TO MINIMIZE CONSTRUCTION EQUIPMENT CROSSING PIPELINES AND WHEN NECESSARY, MUST BE DONE IN ACCORDANCE WITH THE PIPELINE COMPANIES R.O.W. CONSTRUCTION GUIDELINES.
5. CONTRACTOR IS WHOLLY RESPONSIBLE FOR ANY AND ALL DAMAGE TO PIPELINE INFRASTRUCTURE. IF CONFLICTS ARE DISCOVERED IN THE FIELD, THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT IMMEDIATELY FOR FURTHER DIRECTION.
6. CONTRACTOR SHALL KEEP CONTRACT INFORMATION TO ALL PIPELINE COMPANY REPRESENTATIVES ON SITE THROUGHOUT THE CONSTRUCTION PERIOD.

NOTES:

1. REFER TO SHEET L0.01 FOR EXISTING SITE CONDITIONS INFORMATION AND LEGEND INFORMATION.
2. REFER TO SHEET L1.02 FOR LAYOUT INFORMATION.
3. REFER TO SHEET L1.03 FOR DRAINAGE AND GRADING INFORMATION.
4. PROVIDE EROSION CONTROL MEASURES AS NECESSARY.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL FRANCHISE AND CITY UTILITIES AND FOR THE LOCATION AND MARKING OF ALL EXISTING UNDERGROUND AND ABOVE GROUND UTILITIES IN THIS AREA PRIOR TO CONSTRUCTION.
6. CONTRACTOR SHALL NOT BLOCK DRIVEWAYS TO SERVICE STATION WITHOUT OWNER APPROVAL AND APPROPRIATE SAFETY MEASURES.

0 10' 20'
SCALE IN FEET

NORTH

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN THE AREA. CALL TEXAS 811 48 HOURS PRIOR TO CONSTRUCTION

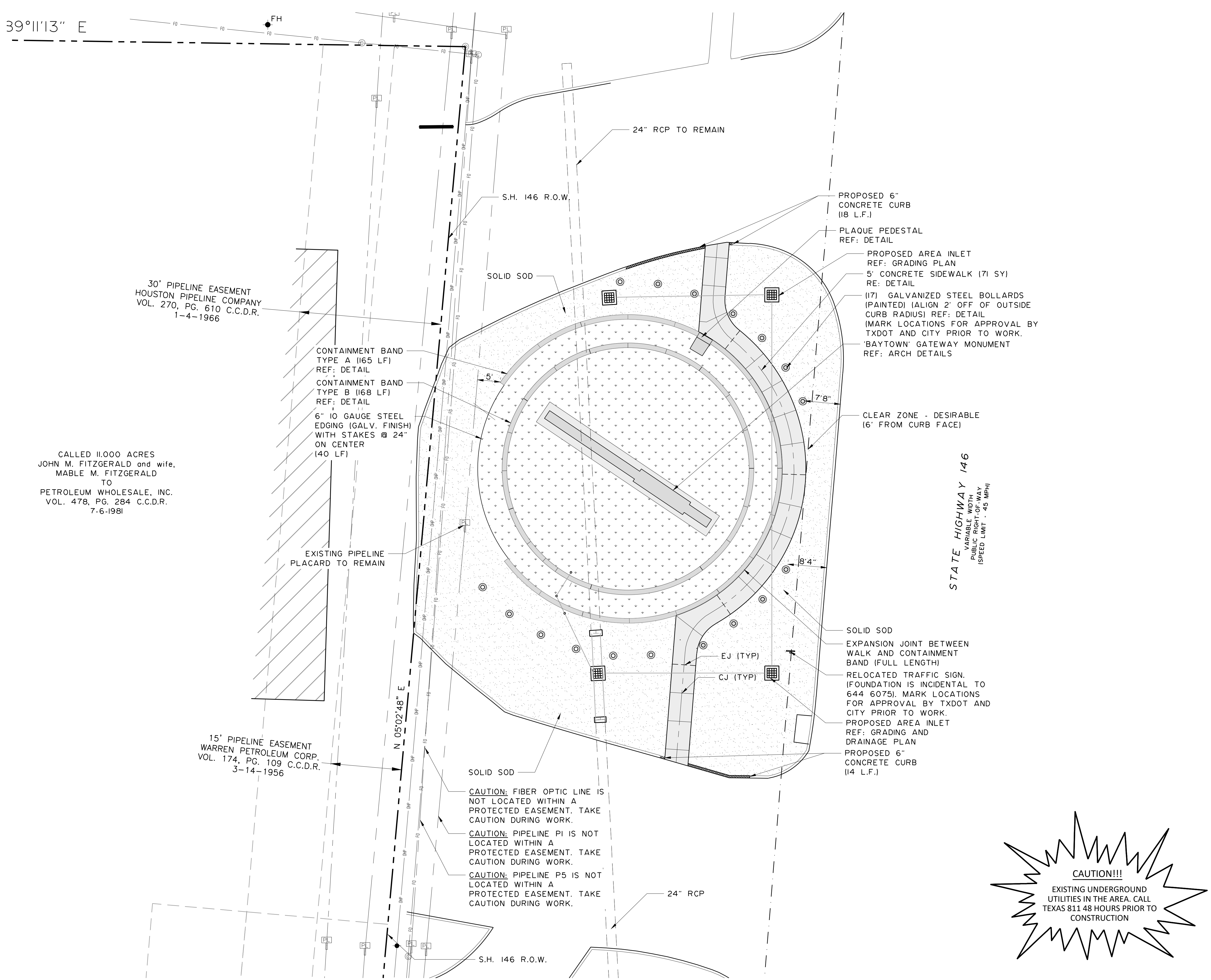
FREESE NICHOLS
10497 Town and Country Way,
Suite 600
Houston, Texas 77024
Phone - (713) 600-6800
Web - www.freese.com

REGISTERED LANDSCAPE ARCHITECT
BRYAN PAUL FANNIN
2507
STATE OF TEXAS
1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
DEMOLITION PLAN

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			25
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



LEGEND:

- SIDEWALK CENTERLINE
- TXDOT CLEAR ZONE
- EXPANSION JOINT
- CONTROL JOINT
- CONCRETE SIDEWALK (531 6032)
- NEW CURB (6" CONC) (529 6036)
- SOLID SOD - TIFWAY 419 (162 6002)
- GROUNDCOVER PLANTING (ASIAN JASMINE - 1 GAL @ 18" OCEW) (192 6028)

NOTES:

1. REFER TO SHEET L0.01 FOR EXISTING SITE CONDITIONS INFORMATION AND LEGEND INFORMATION.
2. REFER TO SHEET L1.02 FOR LAYOUT INFORMATION.
3. REFER TO SHEET L1.03 FOR DRAINAGE AND GRADING INFORMATION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL FRANCHISE AND CITY UTILITIES AND FOR THE LOCATION AND MARKING OF ALL EXISTING UNDERGROUND AND ABOVE GROUND UTILITIES IN THIS AREA PRIOR TO CONSTRUCTION.

PLANTING PLAN INCLUDED ON THIS SHEET

0 10' 20'
SCALE IN FEET
NORTH

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN THE AREA. CALL TEXAS 811 48 HOURS PRIOR TO CONSTRUCTION

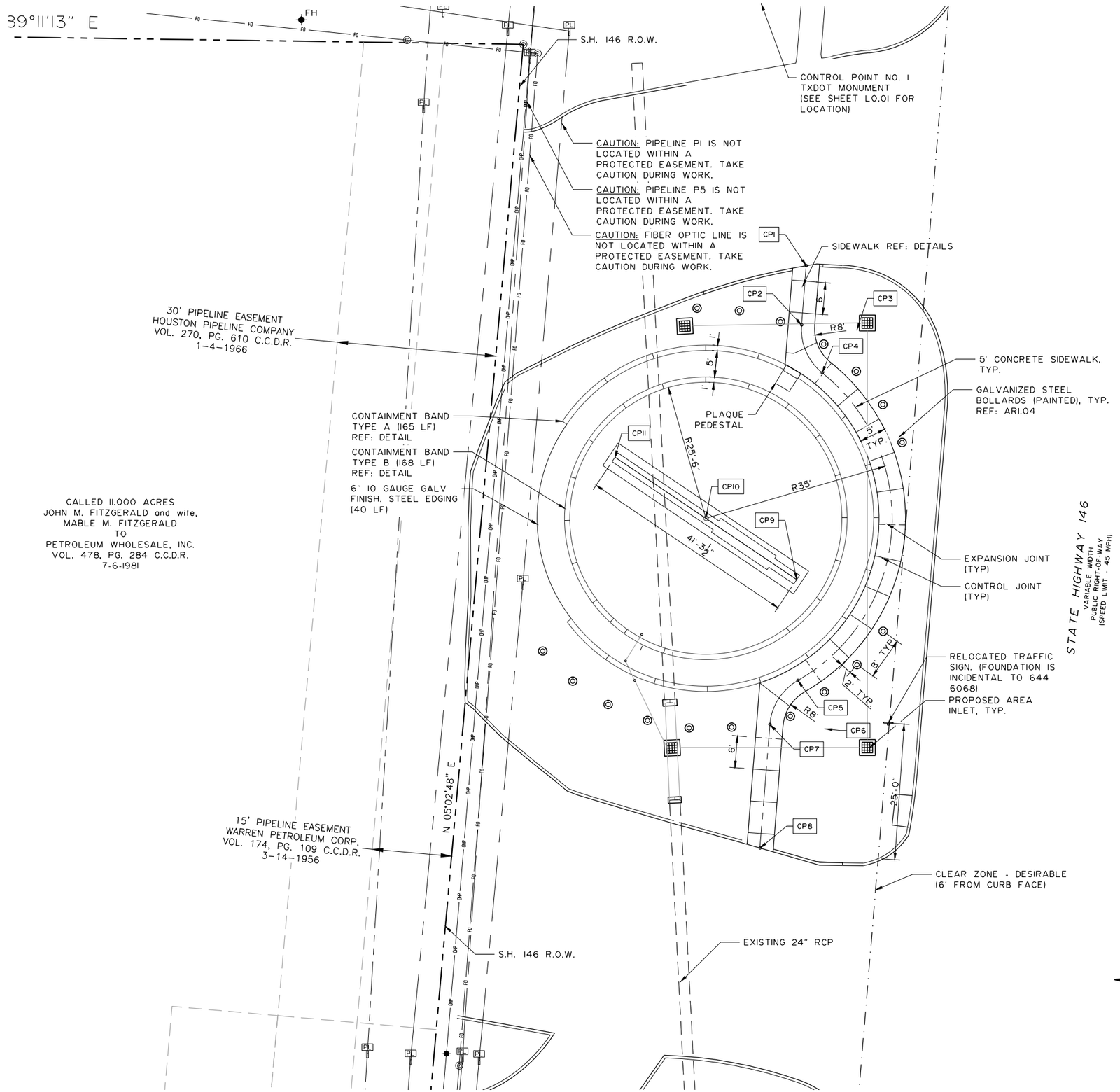
FREESE AND NICHOLS
10497 Town and Country Way, Suite 600
Houston, Texas 77024
Phone - (713) 600-6800
Web - www.freese.com

REGISTERED LANDSCAPE ARCHITECT, STATE OF TEXAS, 2501
1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
SITE PLAN

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			26
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



CONTROL POINTS			
CP #	NORTHING	EASTING	DESCRIPTION
CP1	13868651.12	3268397.36	BEGIN SIDEWALK CENTERLINE
CP2	13868639.95	3268396.47	START OF WALK RADIUS CENTERLINE
CP3	13868639.12	3268406.94	RADIUS CENTER POINT
CP4	13868630.92	3268400.38	START OF WALK RADIUS CENTERLINE
CP5	13868572.91	3268395.79	START OF WALK RADIUS CENTERLINE
CP6	13868563.78	3268400.98	RADIUS CENTER POINT
CP7	13868564.60	3268390.51	END OF WALK RADIUS CENTERLINE
CP8	13868541.33	3268388.63	END OF SIDEWALK CENTERLINE
CP9	13868591.94	3268395.56	EDGE OF MONUMENT (SE)
CP10	13868603.47	3268378.43	RADIUS CENTER POINT
CP11	13868615.00	3268361.30	EDGE OF MONUMENT (NW)

NOTE: SEE SHEET L0.01 FOR SITE SURVEY AND BENCHMARK INFORMATION

NOTES:

1. WRITTEN DIMENSIONS AND COORDINATES SHALL GOVERN OVER SCALED DRAWINGS.
2. ALL IMPROVEMENTS SHALL BE STAKED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE CITY AND TXDOT PRIOR TO CONSTRUCTION.
3. REFER TO SHEET L0.02 DEMOLITION INFORMATION.
4. ALL CONSTRUCTION WILL CONFORM TO CITY OF BAYTOWN STANDARDS AND SPECIFICATIONS, EXCEPT WHERE SUPERCEDED BY PROVISIONS HEREIN AND AS SPECIFIED.
5. ALL DIMENSIONS SHOWN ARE TO FACE OF CURB, FACE OF WALL, OR FACE OF BUILDING UNLESS OTHERWISE SPECIFIED.
6. ALL NORTHING AND EASTING COORDINATE POINTS ARE TO BE THE CENTERPOINT, CORNER INTERSECTION, CENTER OF POLE, FENCE POST OR SIGN AND ALONG THE DESIGNATED CENTERLINES
7. THE CONTRACTOR WILL COORDINATE INSTALLATION OF ALL SIGNS, PAVEMENT MARKINGS, AND OTHER TRAFFIC CONTROL DEVICES WITH OTHER CONTRACTORS ON SITE. REPLACE ALL SMALL ROADSIDE SIGNS IN ACCORDANCE WITH TXDOT STANDARDS.
8. LAYOUT AND GRADING FOR THE IMPROVEMENTS SHALL OCCUR AS INDICATED ON THE PLANS AND AS DIRECTED IN WRITING BY THE LANDSCAPE ARCHITECT WITH THE FOLLOWING GUIDELINES:
   - ALL WALKS SHALL HAVE A MINIMUM CROSS SLOPE OF 1% AND A MAXIMUM CROSS SLOPE OF 2%.
   - THE LONGITUDINAL SLOPE OF THE WALKS/TRAILS SHALL BE NO GREATER THAN 5%.
   - ALL GRADES SHALL BE FINISHED TO A SMOOTH, FLOWING CONTOUR, MAINTAINING EXISTING FLOW PATTERNS UNLESS DIRECTED OTHERWISE IN WRITING.
   - ALL ABOVE GROUND UTILITIES IN SIDEWALK SHALL BE PROTECTED AND ADJUSTED TO MATCH SIDEWALK FINISH GRADES. PROVIDE FLUSH GRADE BETWEEN THE TWO.
9. THE CONTRACTOR SHALL STAKE/MARK AND VERIFY ALL BUILDING SETBACK LINES, EASEMENT LINES, AND VISIBILITY LINES IN THE FIELD PRIOR TO CONSTRUCTION.
10. REFER TO THIS SHEET FOR COORDINATES INFORMATION.
11. REFER TO SHEET L0.02 FOR EROSION CONTROL INFORMATION.

0 10' 20'
SCALE IN FEET

NORTH

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN THE AREA. CALL TEXAS 811 48 HOURS PRIOR TO CONSTRUCTION

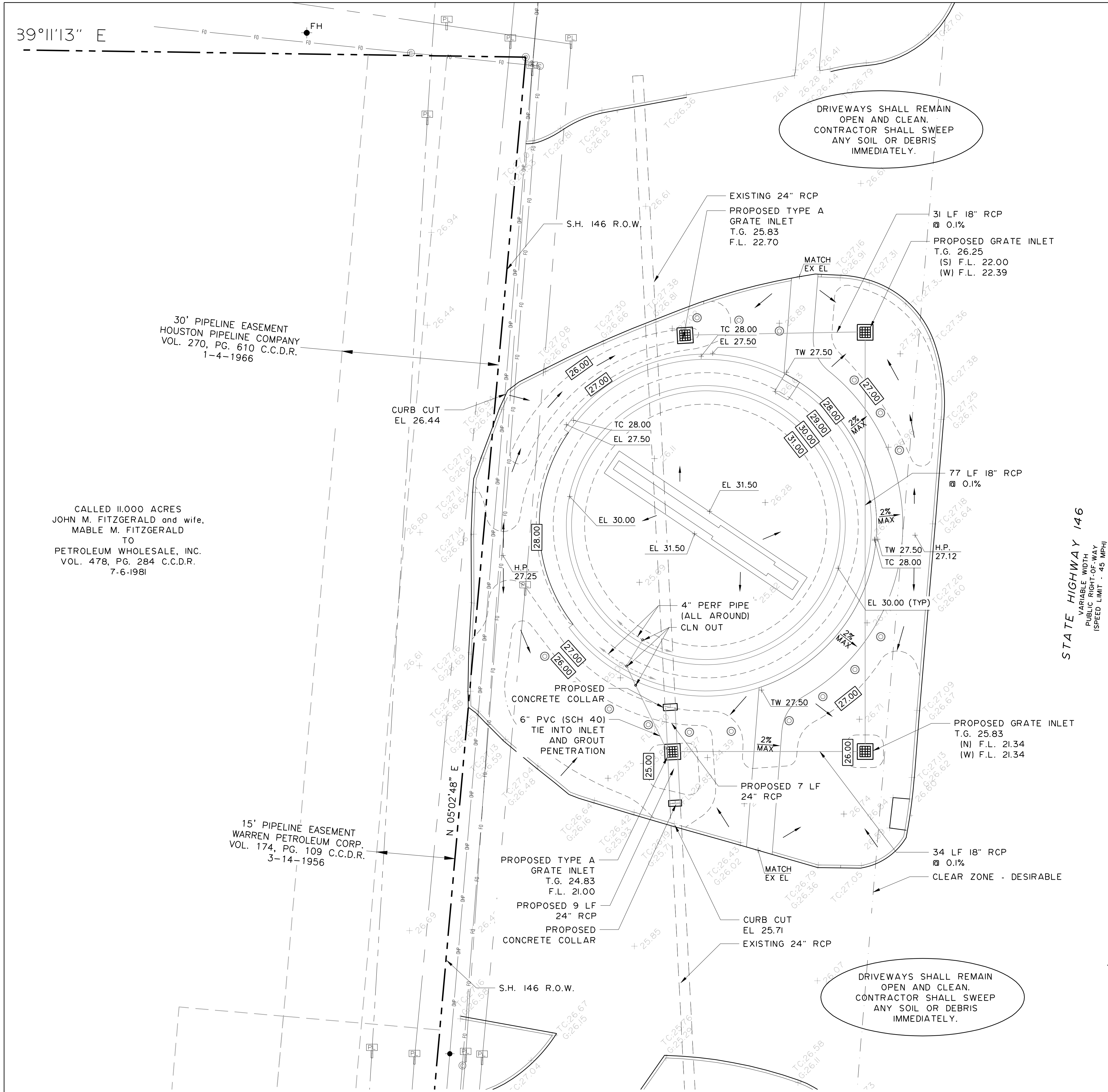
FREESE NICHOLS
10497 Town and Country Way,
Suite 600
Houston, Texas 77024
Phone - (713) 600-6800
Web - www.freese.com

REGISTERED LANDSCAPE ARCHITECT
STATE OF TEXAS
2501
1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
LAYOUT PLAN

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			27
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



LEGEND:

- EXISTING SPOT GRADE
- — — XX — — PROPOSED GRADE CONTOUR
- 570.80 FINISHED SPOT GRADE
- FLOW DIRECTION
- L.O.C. LIMITS OF CONSTRUCTION

NOTES:

1. STRIP TOPSOIL TO A DEPTH NOT TO EXCEED 6". STOCKPILE AND REDISTRIBUTE TO GRADED AREAS ONCE ROUGH GRADING OPERATIONS ARE COMPLETE. STOCKPILE AREA TO BE APPROVED BY OWNER AND LANDSCAPE ARCHITECT PRIOR TO GRADING.
2. ALL PROPOSED GRADES INDICATED ARE FINISHED GRADES. THE PROPOSED PAVING IS SHOWN TO FINISHED GRADE AND THE CONTRACTOR IS RESPONSIBLE FOR EXCAVATIONS FOR IMPROVEMENTS AS PART OF OVERALL MASS GRADING.
3. ALL LAND FORMS AND SWALES SHALL BE GRADED TO BE A SMOOTH, FLOWING, ROUNDED SURFACE PROVIDING POSITIVE DRAINAGE AND VISUAL LAND FORM CONTINUITY.
4. CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL CLEARED BRUSH, DEBRIS, ETC. FROM WITHIN THE LIMITS OF CONSTRUCTION. DISPOSE OF MATERIAL OFF SITE.
5. WHEN CLEARING FOR GRADING, THE CONTRACTOR SHALL COORDINATE TREE PRESERVATION WITH THE LANDSCAPE ARCHITECT AND OWNERS REPRESENTATIVE.
6. GRADING FOR THE IMPROVEMENTS SHALL OCCUR AS DIRECTED BY THE LANDSCAPE ARCHITECT WITH THE FOLLOWING GUIDELINES:
   - ALL WALKS SHALL HAVE A MAXIMUM CROSS SLOPE OF 2% IN THE DIRECTION OF THE DOWNHILL SIDE
   - THE LONGITUDINAL SLOPE OF THE WALKS/TRAILS SHALL BE NO GREATER THAN 5%
   - ALL GRADES SHALL BE FINISHED TO A SMOOTH, FLOWING CONTOUR, MAINTAINING EXISTING FLOW PATTERNS UNLESS DIRECTED OTHERWISE
7. REFER TO SHEET L0.01 AND L0.02 FOR SURVEY, BENCHMARKS, AND DEMOLITION.
8. REFER TO SHEET L1.01 AND L1.02 FOR SITE AND LAYOUT INFORMATION.
9. CONTRACTOR IS RESPONSIBLE FOR THE LOCATION AND MARKING OF ALL EXISTING UNDERGROUND OR ABOVE GROUND UTILITIES WITHIN THE PROJECT AREA.

AFTER CONSTRUCTION OF SUBSURFACE DRAINAGE WORK, CONTRACTOR TO PLACE 8" BIO-DEGRADABLE EROSION CONTROL LOGS AROUND INLETS. INLET PROTECTION SHALL REMAIN INTACT UNTIL TURF IS FULLY ESTABLISHED OR ACCEPTANCE BY THE OWNER. CONTRACTOR SHALL REMOVE PROTECTION BEFORE DEMOBILIZING OFF OF THE SITE. REF. SHEET EC (9)-16

0 10' 20'
SCALE IN FEET
NORTH

CAUTION!!!
EXISTING UNDERGROUND UTILITIES IN THE AREA. CALL TEXAS 811 48 HOURS PRIOR TO CONSTRUCTION

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10497 Town and Country Way,
Suite 600
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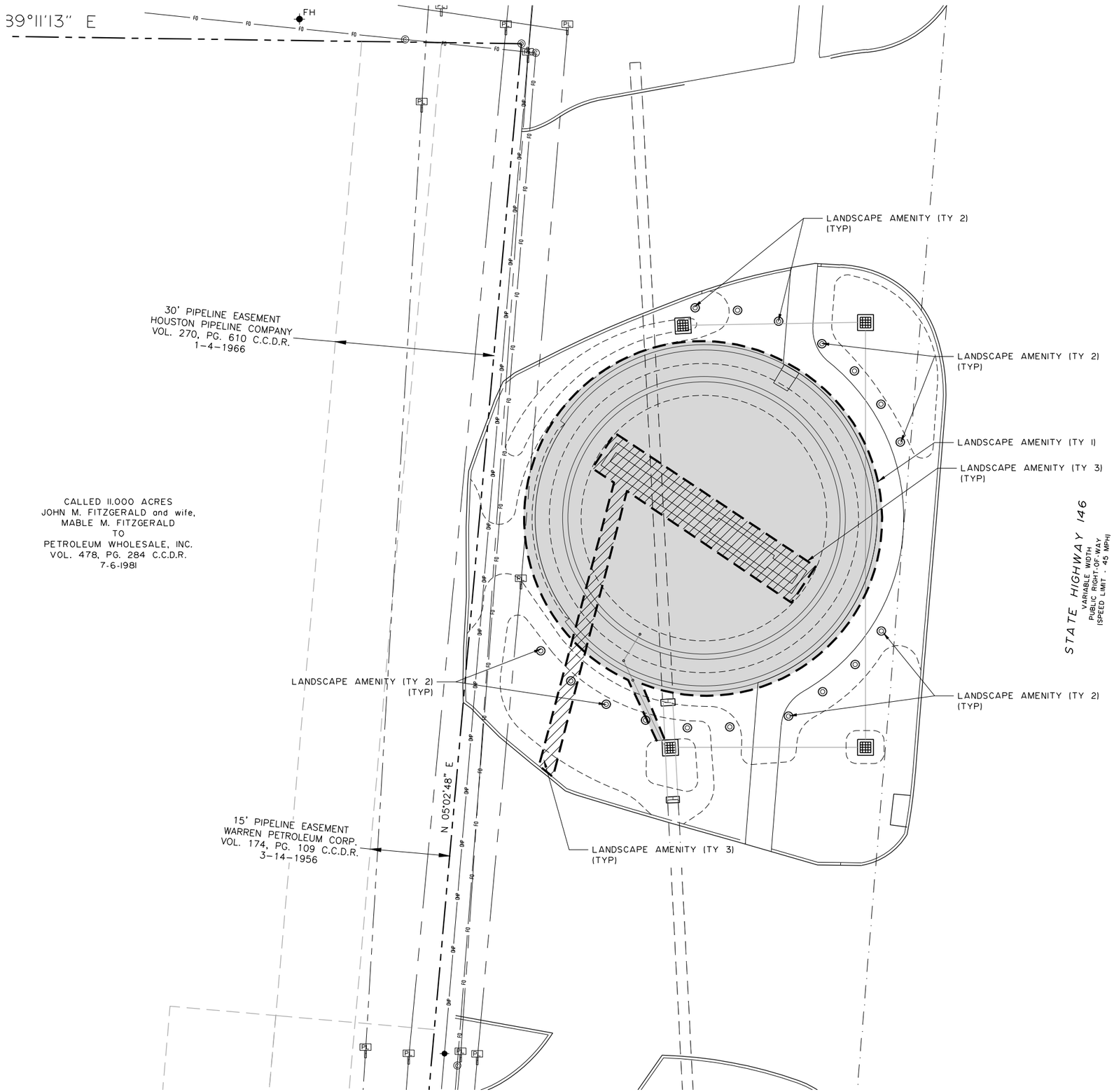
Phone - (713) 600-6800
Web - www.freese.com

REGISTERED LANDSCAPE ARCHITECT, STATE OF TEXAS, 2501
1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
GRADING PLAN

Texas Department of Transportation ®

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			28
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



LANDSCAPE AMENITY (TY 1)

THE AREA DESCRIBED ON THE PLANS AND THE FOLLOWING ITEMS ARE INCIDENTAL TO ITEM (1002 6002) LANDSCAPE AMENITY (TY 1) AND WILL NOT BE PAID SEPARATELY:

EXCAVATION, SUBGRADE PREPARATION, FORMING, REINFORCING, CONCRETE PLACEMENT AND FINISHING FOR ALL STRUCTURAL WALLS, FOUNDATIONS AND COMPONENTS, COMPLETE AND IN PLACE.

ALL CAST MASONRY UNITS, BRICK MASONRY COMPONENTS, CAST STONE MASONRY PIECES, INCLUDING TIEBACKS, HANGERS, REINFORCING, MORTAR, AND ANTI-GRAFFITI COATINGS, COMPETE AND IN PLACE.

ALL LETTERFORMS INCLUDING FABRICATION, PAINTING, AND INSTALLATION, COMPLETE AND IN PLACE.

CONCRETE CONTAINMENT BANDS TYPE A AND B, INCLUDING EXCAVATION, SUBGRADE PREPARATION, BASE AGGREGATES, FORMING, REINFORCING, CONCRETE PLACEMENT AND FINISHING. DRAINAGE COMPONENTS INCLUDING ALL PIPE, CLEANOUTS, DRAINAGE GRAVEL, GEOTEXTILE FABRICS AND CONNECTION TO PROPOSED STORM SEWER SYSTEM. FILL MATERIAL AND COMPACTION TO CONSTRUCT SLOPED BEDS, COMPLETE AND IN PLACE.

PLAQUE PEDESTAL INCLUDING FORMING, REINFORCING, CONCRETE PLACEMENT AND FINISHING, COMPLETE AND IN PLACE.

SEE PLANS AND DETAILS FOR ADDITIONAL REQUIREMENTS

NOTE: PLANT BED PREPARATION, LANDSCAPE SOIL AMENDMENTS, COMPOST, EROSION CONTROL COMPOST, SHRUBS AND VEGETATIVE WATERING ARE PAID FOR SEPARATELY.

LANDSCAPE AMENITY (TY 2)

THE AREA DESCRIBED ON THE PLANS AND THE FOLLOWING ITEMS ARE INCIDENTAL TO ITEM (1002 6003) LANDSCAPE AMENITY (TY 2) AND WILL NOT BE PAID FOR SEPARATELY:

EXCAVATION, FORMING, REINFORCING, CONCRETE PLACEMENT AND FINISHING OF BOLLARD FOUNDATIONS, FABRICATION, FINISHING AND PAINTING OF STEEL BOLLARDS AS DETAILED, COMPLETE AND IN PLACE.

THE TOP OF EACH BOLLARD SHALL BE AT THE SAME ELEVATION. ADJUST DEPTH ACCORDINGLY.

SEE PLANS AND DETAILS FOR ADDITIONAL REQUIREMENTS

LANDSCAPE AMENITY (TY 3)

THE AREA DESCRIBED ON THE PLANS AND THE FOLLOWING ITEMS ARE INCIDENTAL TO ITEM (1002 6004) LANDSCAPE AMENITY (TY 3) AND WILL NOT BE PAID FOR SEPARATELY:

ALL LIGHT FIXTURES, ACCESSORIES, MOUNTING HARDWARE, CONDUCTORS FROM PANEL TO FIXTURES, RACEWAYS, CONDUIT (WITHIN THE LIMITS OF LANDSCAPE AMENITY (TY 1)), AND LIGHT FOUNDATIONS, COMPLETE AND IN PLACE.

NOTE: BORING AND CONDUIT UNDER THE DRIVEWAY AND SERVICE ENCLOSURE ARE PAID FOR SEPARATELY. REFER TO ELECTRICAL DRAWINGS.

SEE PLANS AND DETAILS FOR ADDITIONAL REQUIREMENTS

0 10' 20'
SCALE IN FEET

NORTH

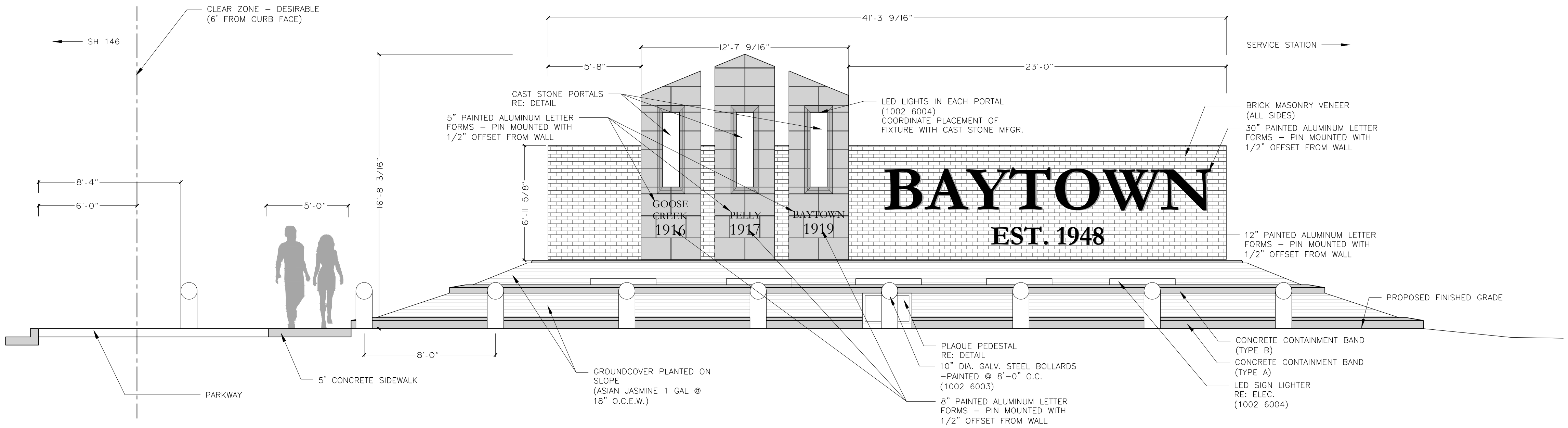
FREESE NICHOLS
10497 Town and Country Way,
Suite 600
Houston, Texas 77024
Phone - (713) 600-6800
Web - www.freese.com

REGISTERED LANDSCAPE ARCHITECT
PAUL [illegible]
2501
STATE OF TEXAS
1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
LANDSCAPE AMENITY DESCRIPTIONS

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			29
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



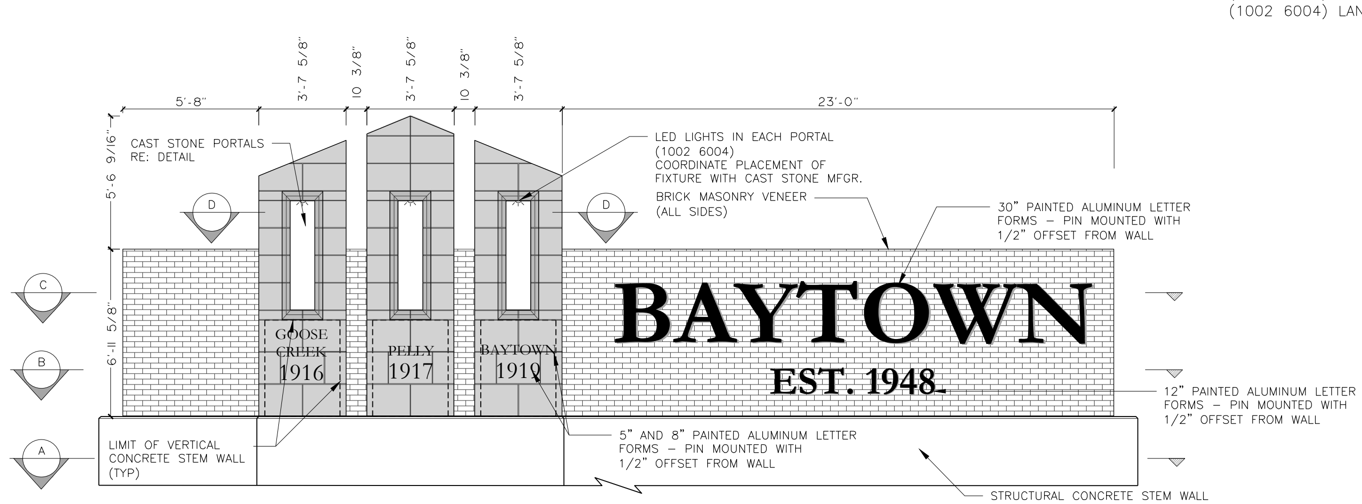
1 OVERALL PROJECT LAYOUT – NORTH ELEVATION

1/8" = 1'-0"

(1002 6002) LANDSCAPE AMENITY (TY 1)
(1002 6003) LANDSCAPE AMENITY (TY 2)
(1002 6004) LANDSCAPE AMENITY (TY 3)

LETTERFORM APPROVAL NOTES:

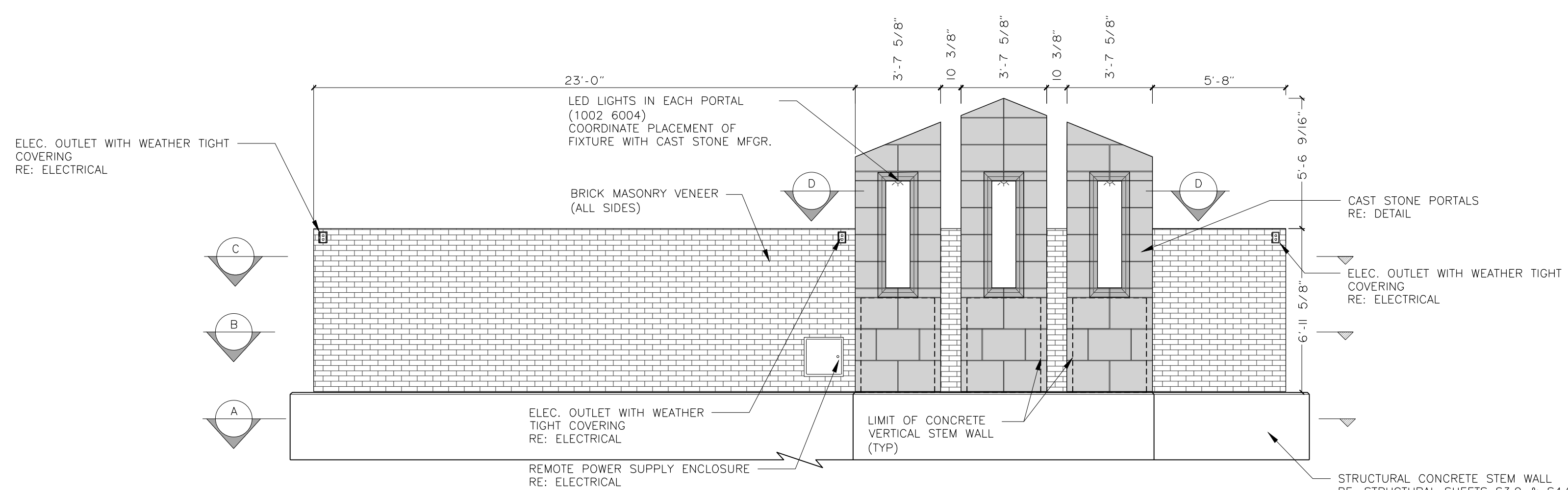
1. CONTRACTOR TO PROVIDE UP TO EIGHT (8) PAINTED 6"X6" ALUMINUM SAMPLE PANELS, BASED ON INITIAL COLOR SELECTIONS PROVIDED BY THE LANDSCAPE ARCHITECT.
2. SAMPLES SHALL BE SUBMITTED IN CONJUNCTION WITH LETTERFORM MANUFACTURER'S SHOP DRAWINGS.
3. COLORS SHALL BE SELECTED FROM THE RAL COLOR DECK.
4. SAMPLES SHALL BE UTILIZED FOR FIELD COMPARISON WITH THE MASONRY MOCK UP TO DETERMINE THE DESIRED COLOR FOR THE LETTERFORMS.
5. ONCE A COLOR(S) HAS BEEN SELECTED BY THE CITY AND TXDOT, THE CONTRACTOR SHALL HAVE FABRICATED PAINTED LETTERFORMS IN ACCORDANCE WITH SIGN NOTES – #3 (THIS SHEET) FOR FINAL CONFIRMATION.
6. THE CITY AND TXDOT, RESERVES THE RIGHT TO REQUEST ADDITIONAL PAINTED SAMPLES PRIOR TO FINAL APPROVAL.
7. THIS WORK IS INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.



2 ARCHITECTURAL MATERIALS AND DIMENSIONS – NORTH ELEVATION

1/8" = 1'-0"

(1002 6002) LANDSCAPE AMENITY (TY 1)
(1002 6004) LANDSCAPE AMENITY (TY 3)



0 1' 2' 4' 8'
1/4"=1'-0"

3 ARCHITECTURAL MATERIALS AND DIMENSIONS – SOUTH ELEVATION

1/8" = 1'-0"

(1002 6002) LANDSCAPE AMENITY (TY 1)
(1002 6004) LANDSCAPE AMENITY (TY 3)

MASONRY NOTES:

1. BRICK MADE BY ACME BRICK INC. (713-681-4651). REFERENCE SUBMITTAL NOTES. BRICK UNIT TO BE MODULAR, VELOUR TEXTURE – VILLAGE COLOR.
2. COMPLY WITH RECOMMENDED PRACTICES, BRICK INSTITUTE OF AMERICA TECH NOTES AND N.C.M.A T.E.K. BULLETINS. COMPLY WITH COLD WEATHER AND WARM WEATHER PROTECTION PROCEDURES AS RECOMMENDED IN B.I.A TECH NOTES. (GOBRICK.COM/READ-RESEARCH/TECHNICAL NOTES)
3. CLEANLY SAW CUT BRICK WHERE PORTION OF BRICK IS REQUIRED USING A SHARP BLADE, NO CHOPPING.
4. CAST STONE BASE AND CAPS TO BE EQUAL TO DRY-TAMPERED CAST STONE, AS MANUFACTURED BY SITEWORKS (281-931-1000). REFER TO DRAWINGS FOR CAST STONE DIMENSIONS. PROVIDE SAMPLE AND SHOP DRAWINGS FOR LANDSCAPE ARCHITECT APPROVAL PRIOR TO CONSTRUCTION. SHOP DRAWINGS SHALL BE PROVIDED BY THE MANUFACTURER AND ARE NOT REQUIRED TO BE SIGNED BY A LICENSED ENGINEER. CONTRACTOR TO INSPECT CAST STONE UPON DELIVERY AND REJECT ANY DAMAGED PIECES. CAST STONE THAT IS CRACKED OR CHIPPED WILL NOT BE ACCEPTED. COLOR TO BE #0508.
5. MORTAR TO BE TYPE 'S'; WATER REPELLENT TO BE 'RHEOPEL' MORTAR ADMIXTURE – ADD AT A RATE OF 16 FL. OZ PER C.F. OF MORTAR. MORTAR COLOR TO BE SELECTED BY LANDSCAPE ARCHITECT BASED ON AVAILABLE COLOR DECK.
6. MAINTAIN UNIFORM 3/8" JOINT WIDTH FOR ALL HEAD, BED, AND COLLAR JOINTS. FULL JOINTS EXCEPT AT WEEPHOLES. CAST STONE JOINTS TO BE DEEP-RAKED. BRICK JOINTS TO BE CONCAVE.
7. AFTER COMPLETION OF MASONRY WORK, APPLY UV RESISTANT, ANTI-GRAFFITI COATING TO ALL MASONRY WORK (PROSOCO SURE KLEAN BLOCK GUARD). CONTRACTOR TO SUBMIT DATA SHEET TO LANDSCAPE ARCHITECT PRIOR TO APPLICATION.

MASONRY SUBMITTALS

1. SUBMIT SAMPLES FOR TXDOT AND CITY APPROVAL PRIOR TO WORK. FOR CAST STONE, BRICK, AND MORTAR INDICATING AVAILABLE COLORS AND FINISHES.
2. CONTRACTOR TO PROVIDE A FULL SET OF SHOP DRAWINGS FOR CAST STONE PIECES. THIS SHOP DRAWING SHALL BE REVIEWED AND APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO PRODUCTION.

MOCK-UPS:

1. CONTRACTOR TO CONSTRUCT A 6'HT X 3'WD MINIMUM MOCK-UP FOR REVIEW BY LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION. MOCK UP SHOULD DEMONSTRATE ENTIRE WALL SYSTEM AND CONTAIN EXAMPLES OF BRICK, OTHER MASONRY PRODUCTS, TIES/ANCHORS AND MORTAL SELECTION AND DEMONSTRATE GENERAL APPEARANCE FOR WALLS. MOCK UP IS INCIDENTAL AND NOT PAID SEPARATELY.
2. REVISE MOCK-UP IF REQUIRED BY LANDSCAPE ARCHITECT.
3. CONTRACTOR TO MAINTAIN APPROVED MOCK-UP ON-SITE FOR REFERENCE UNTIL APPROVAL OF MASONRY WORK.
4. CONTRACTOR SHALL REMOVE MOCKUP PRIOR TO DEMOBILIZATION AFTER APPROVAL FROM THE LANDSCAPE ARCHITECT.

SIGN NOTES:

1. LETTERFORMS TO BE CONSTRUCTED OF 1/2" ALUMINUM, ROUTER CUT W/ S.S. MOUNTING PINS. SIGN MANUFACTURER TO PROVIDE A FULL SET OF SHOP DRAWINGS FROM THE SIGN FABRICATOR FOR APPROVAL PRIOR TO FABRICATION.
2. LETTERFORMS TO BE PAINTED USING AUTOMOTIVE GRADE POLYURETHANE ENAMEL PAINT. FONT TO BE GARAMOND.
3. PROVIDE 1 (ONE) FULL SIZED PAINTED LETTER OF EACH SIZE INCLUDED ON THE PROJECT TO THE LANDSCAPE ARCHITECT IN THE FORM OF A SUBMITTAL PRIOR TO FABRICATION. THIS IS INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.

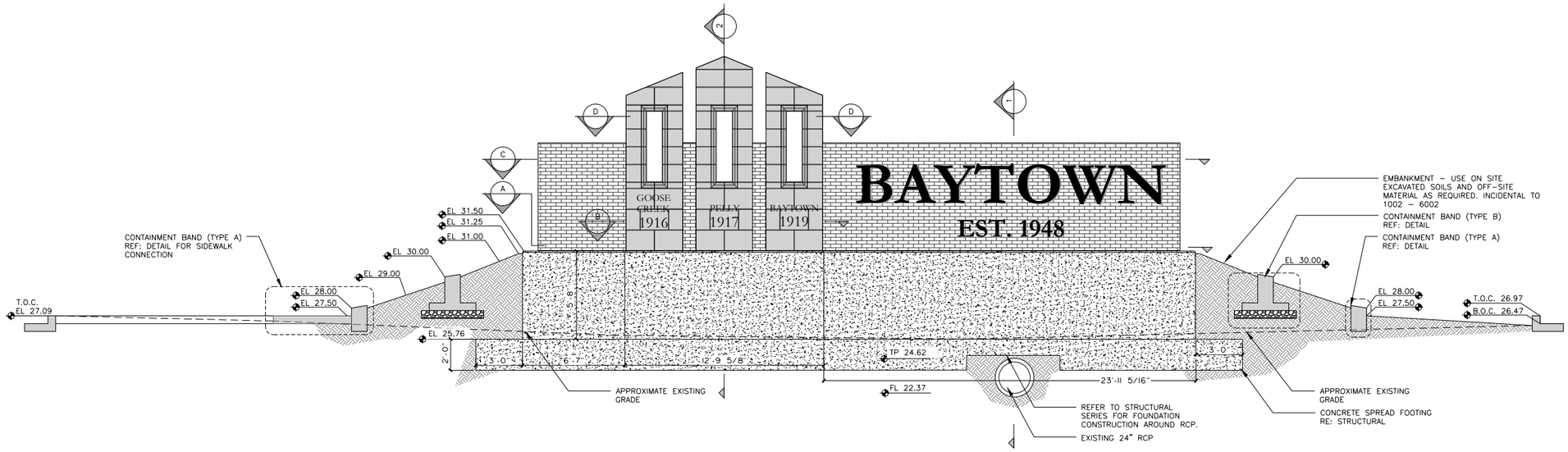
FREESE AND NICHOLS
10497 Town and Country Way,
Suite 600
Houston, Texas 77024
Phone - (713) 600-6800
Web - www.freese.com

REGISTERED LANDSCAPE ARCHITECT STATE OF TEXAS 2501
1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
ARCHITECTURAL ELEVATIONS

Texas Department of Transportation ®

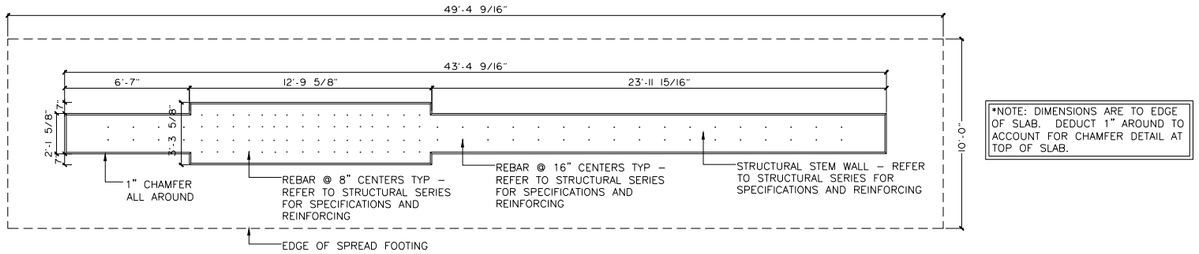
FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			30
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



1 MONUMENT SECTION

1/8" = 1'-0"

(1002 6002) LANDSCAPE AMENITY (TY 1)

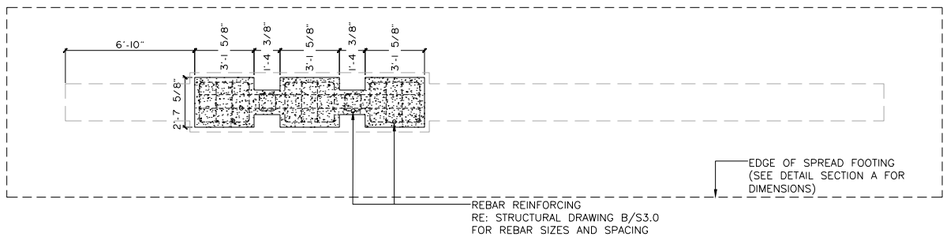


*NOTE: DIMENSIONS ARE TO EDGE OF SLAB. DEDUCT 1" AROUND TO ACCOUNT FOR CHAMFER DETAIL AT TOP OF SLAB.

2 HORIZONTAL SECTION "A"

1/8" = 1'-0"

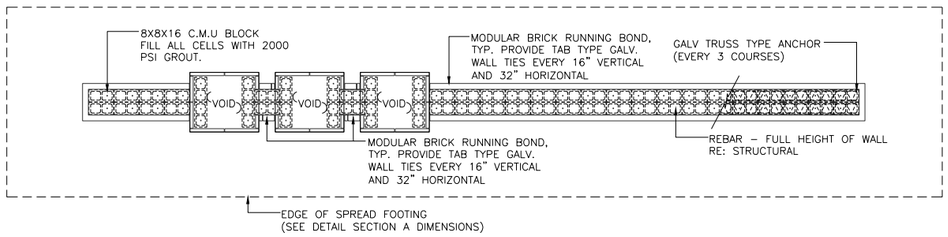
(1002 6002) LANDSCAPE AMENITY (TY 1)



3 HORIZONTAL SECTION "B"

1/8" = 1'-0"

(1002 6002) LANDSCAPE AMENITY (TY 1)



NOTE:
1. FOR CMU WALLS, PROVIDE DUR-O-WALL, 9 GAUGE GALV. TRUSS (DA 3100) (EVERY 3 COURSES).
2. FOR BRICK MASONRY, PROVIDE TAB TYPE GALV. WALL TIES EVERY 16" VERTICAL AND 32" HORIZONTAL

4 HORIZONTAL SECTION "C"

1/8" = 1'-0"

(1002 6002) LANDSCAPE AMENITY (TY 1)

0 1' 2' 4' 8'

1/4"=1'-0"

MASONRY NOTES:

1. BRICK MADE BY ACME BRICK INC. (713-681-4651). REFERENCE SUBMITTAL NOTES. BRICK UNIT TO BE MODULAR, VELOUR TEXTURE - VILLAGE COLOR.
2. COMPLY WITH RECOMMENDED PRACTICES, BRICK INSTITUTE OF AMERICA TECH NOTES AND N.C.M.A T.E.K. BULLETINS. COMPLY WITH COLD WEATHER AND WARM WEATHER PROTECTION PROCEDURES AS RECOMMENDED IN B.I.A TECH NOTES. (GOBRICK.COM/READ-RESEARCH/TECHNICAL NOTES)
3. CLEANLY SAW CUT BRICK WHERE PORTION OF BRICK IS REQUIRED USING A SHARP BLADE, NO CHOPPING.
4. CAST STONE BASE AND CAPS TO BE EQUAL TO DRY-TAMPERED CAST STONE, AS MANUFACTURED BY SITEWORKS (281-931-1000). REFER TO DRAWINGS FOR CAST STONE DIMENSIONS. PROVIDE SAMPLE AND SHOP DRAWINGS FOR LANDSCAPE ARCHITECT APPROVAL PRIOR TO CONSTRUCTION. SHOP DRAWINGS SHALL BE PROVIDED BY THE MANUFACTURER AND ARE NOT REQUIRED TO BE SIGNED BY A LICENSED ENGINEER. CONTRACTOR TO INSPECT CAST STONE UPON DELIVERY AND REJECT ANY DAMAGED PIECES. CAST STONE THAT IS CRACKED OR CHIPPED WILL NOT BE ACCEPTED. COLOR TO BE #0508.
5. MORTAR TO BE TYPE 'S'; WATER REPELLENT TO BE 'RHEOPEL' MORTAR ADMIXTURE - ADD AT A RATE OF 16 FL. OZ PER C.F. OF MORTAR. MORTAR COLOR TO BE SELECTED BY LANDSCAPE ARCHITECT BASED ON AVAILABLE COLOR DECK.
6. MAINTAIN UNIFORM 3/8" JOINT WIDTH FOR ALL HEAD, BED, AND COLLAR JOINTS. FULL JOINTS EXCEPT AT WEEPHOLES. CAST STONE JOINTS TO BE DEEP-RAKED. BRICK JOINTS TO BE CONCAVE.
7. AFTER COMPLETION OF MASONRY WORK, APPLY UV RESISTANT, ANTI-GRAFFITI COATING TO ALL MASONRY WORK (PROSOCO SURE KLEAN BLOCK GUARD). CONTRACTOR TO SUBMIT DATA SHEET TO LANDSCAPE ARCHITECT PRIOR TO APPLICATION.

MASONRY SUBMITTALS

1. SUBMIT SAMPLES FOR TXDOT AND CITY APPROVAL PRIOR TO WORK. FOR CAST STONE, BRICK, AND MORTAR INDICATING AVAILABLE COLORS AND FINISHES.
2. CONTRACTOR TO PROVIDE A FULL SET OF SHOP DRAWINGS FOR CAST STONE PIECES. THIS SHOP DRAWING SHALL BE REVIEWED AND APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO PRODUCTION.

MOCK-UPS:

1. CONTRACTOR TO CONSTRUCT A 6'HT X 3'WD MINIMUM MOCK-UP FOR REVIEW BY LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION. MOCK UP SHOULD DEMONSTRATE ENTIRE WALL SYSTEM AND CONTAIN EXAMPLES OF BRICK, OTHER MASONRY PRODUCTS, TIES/ANCHORS AND MORTAL SELECTION AND DEMONSTRATE GENERAL APPEARANCE FOR WALLS. MOCK UP IS INCIDENTAL AND NOT PAID SEPARATELY.
2. REVISE MOCK-UP IF REQUIRED BY LANDSCAPE ARCHITECT.
3. CONTRACTOR TO MAINTAIN APPROVED MOCK-UP ON-SITE FOR REFERENCE UNTIL APPROVAL OF MASONRY WORK.
4. CONTRACTOR SHALL REMOVE MOCKUP PRIOR TO DEMOBILIZATION AFTER APPROVAL FROM THE LANDSCAPE ARCHITECT.

SIGN NOTES:

1. LETTERFORMS TO BE CONSTRUCTED OF 1/2" ALUMINUM, ROUTER CUT W/ S.S. MOUNTING PINS. SIGN MANUFACTURER TO PROVIDE A FULL SET OF SHOP DRAWINGS FROM THE SIGN FABRICATOR FOR APPROVAL PRIOR TO FABRICATION.
2. LETTERFORMS TO BE PAINTED USING AUTOMOTIVE GRADE POLYURETHANE ENAMEL PAINT. FONT TO BE GARAMOND.
3. PROVIDE 1 (ONE) FULL SIZED PAINTED LETTER OF EACH SIZE INCLUDED ON THE PROJECT TO THE LANDSCAPE ARCHITECT IN THE FORM OF A SUBMITTAL PRIOR TO FABRICATION. THIS IS INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.

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Phone - (713) 600-6800
Web - www.freese.com

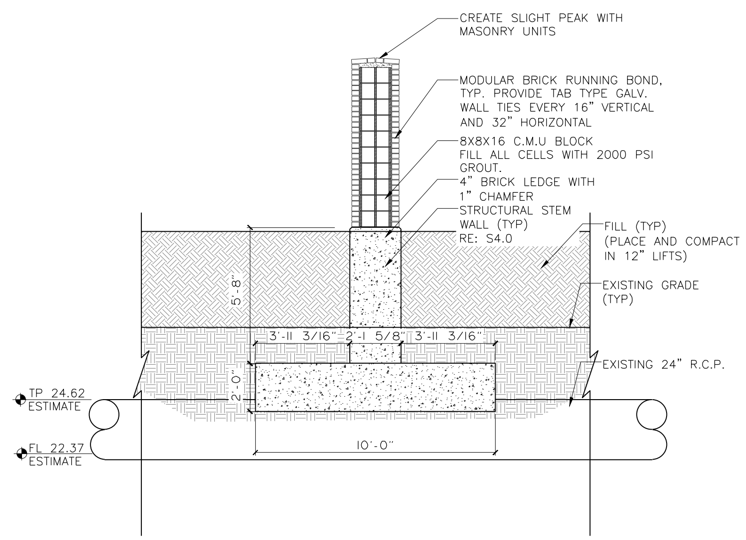
REGISTERED LANDSCAPE ARCHITECT BRYAN PAUL JANAK 2501 STATE OF TEXAS

1/14/2022

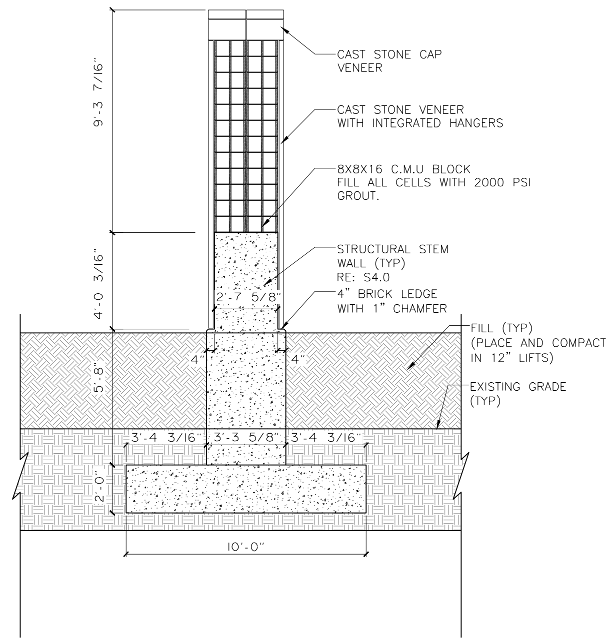
BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
ARCHITECTURAL SECTIONS

Texas Department of Transportation

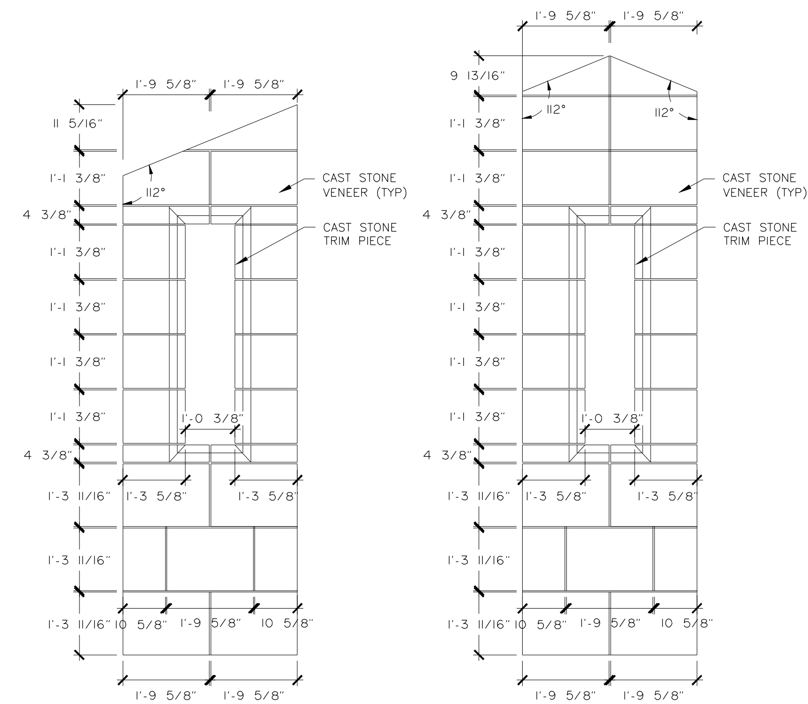
FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			31
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



1 VERTICAL SECTION "1"
1/8" = 1'-0"

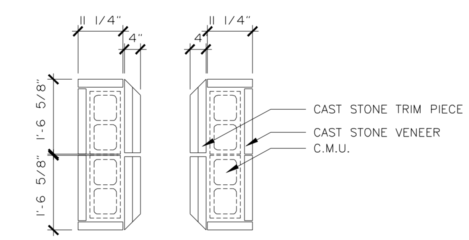


2 VERTICAL SECTION "2"
1/8" = 1'-0"

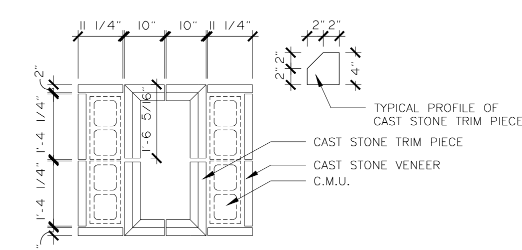


4 CAST STONE SHAPES – ELEVATION
1/4" = 1'-0"

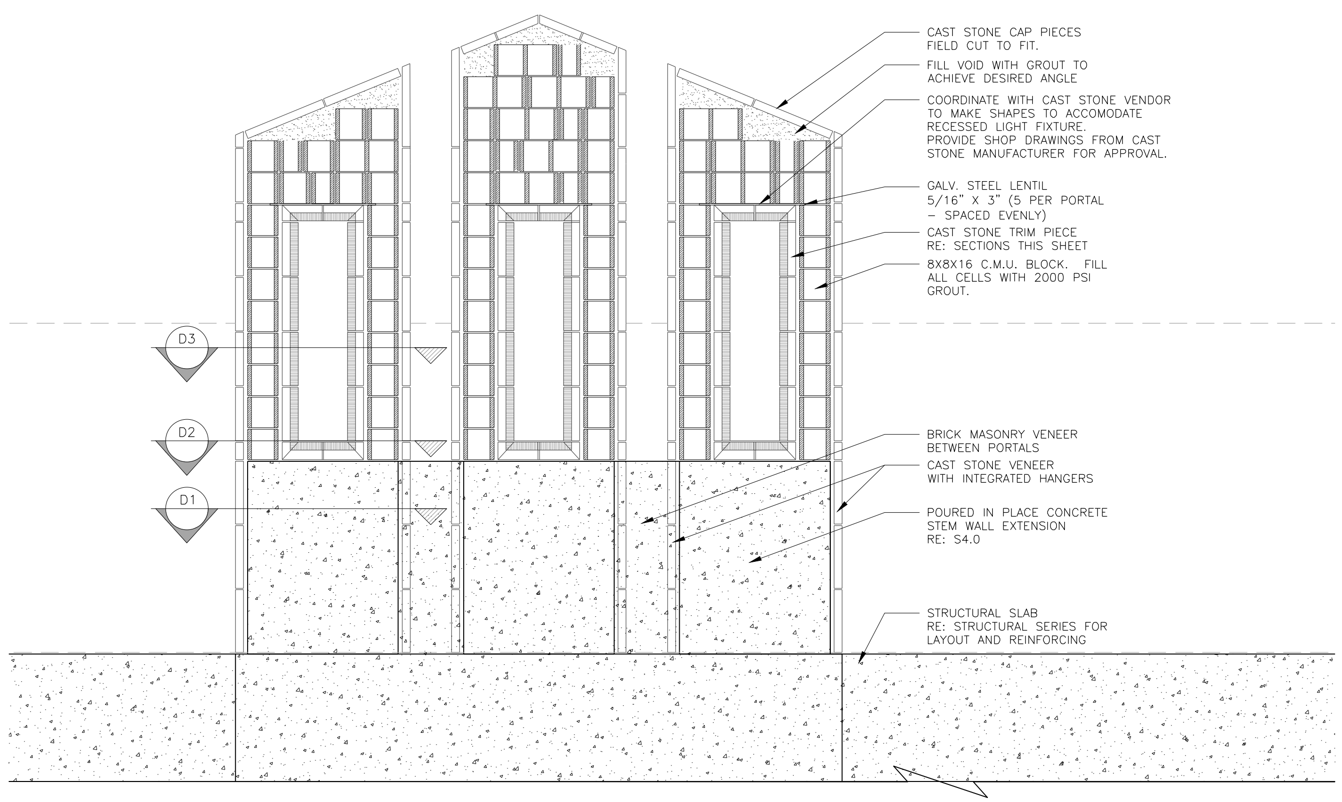
UNLESS OTHERWISE INDICATED ON THE PLANS, ALL ITEMS INCLUDED ON THIS SHEET ARE INCIDENTAL TO ITEM: (1002 6002) LANDSCAPE AMENITY (TY 1)



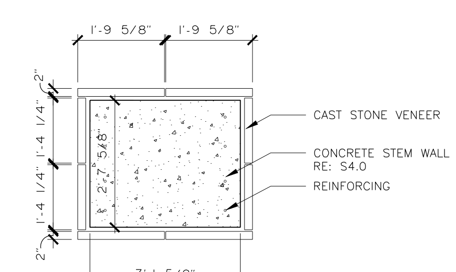
5 HORIZONTAL SECTION D3 – CAST STONE SHAPES
1/4" = 1'-0"



6 HORIZONTAL SECTION D2 – CAST STONE SHAPES
1/4" = 1'-0"



3 VERTICAL SECTION "D"
1/8" = 1'-0"



7 HORIZONTAL SECTION D1 – CAST STONE SHAPES
1/4" = 1'-0"

MASONRY NOTES:

1. BRICK MADE BY ACME BRICK INC. (713-681-4651). REFERENCE SUBMITTAL NOTES. BRICK UNIT TO BE MODULAR, VELOUR TEXTURE – VILLAGE COLOR.
2. COMPLY WITH RECOMMENDED PRACTICES, BRICK INSTITUTE OF AMERICA TECH NOTES AND N.C.M.A T.E.K. BULLETINS. COMPLY WITH COLD WEATHER AND WARM WEATHER PROTECTION PROCEDURES AS RECOMMENDED IN B.I.A TECH NOTES. (GOBRICK.COM/READ-RESEARCH/TECHNICAL NOTES)
3. CLEANLY SAW CUT BRICK WHERE PORTION OF BRICK IS REQUIRED USING A SHARP BLADE, NO CHOPPING.
4. CAST STONE BASE AND CAPS TO BE EQUAL TO DRY-TAMPERED CAST STONE, AS MANUFACTURED BY SITEWORKS (281-931-1000). REFER TO DRAWINGS FOR CAST STONE DIMENSIONS. PROVIDE SAMPLE AND SHOP DRAWINGS FOR LANDSCAPE ARCHITECT APPROVAL PRIOR TO CONSTRUCTION. SHOP DRAWINGS SHALL BE PROVIDED BY THE MANUFACTURER AND ARE NOT REQUIRED TO BE SIGNED BY A LICENSED ENGINEER. CONTRACTOR TO INSPECT CAST STONE UPON DELIVERY AND REJECT ANY DAMAGED PIECES. CAST STONE THAT IS CRACKED OR CHIPPED WILL NOT BE ACCEPTED. COLOR TO BE #0508.
5. MORTAR TO BE TYPE 'S'; WATER REPELLENT TO BE 'RHEOPEL' MORTAR ADMIXTURE – ADD AT A RATE OF 16 FL. OZ PER C.F. OF MORTAR. MORTAR COLOR TO BE SELECTED BY LANDSCAPE ARCHITECT BASED ON AVAILABLE COLOR DECK.
6. MAINTAIN UNIFORM 3/8" JOINT WIDTH FOR ALL HEAD, BED, AND COLLAR JOINTS. FULL JOINTS EXCEPT AT WEEPHOLES. CAST STONE JOINTS TO BE DEEP-RAKED. BRICK JOINTS TO BE CONCAVE.
7. AFTER COMPLETION OF MASONRY WORK, APPLY UV RESISTANT, ANTI-GRAFFITI COATING TO ALL MASONRY WORK (PROSOCO SURE KLEAN BLOCK GUARD). CONTRACTOR TO SUBMIT DATA SHEET TO LANDSCAPE ARCHITECT PRIOR TO APPLICATION.

MASONRY SUBMITTALS

1. SUBMIT SAMPLES FOR TXDOT AND CITY APPROVAL PRIOR TO WORK. FOR CAST STONE, BRICK, AND MORTAR INDICATING AVAILABLE COLORS AND FINISHES.
2. CONTRACTOR TO PROVIDE A FULL SET OF SHOP DRAWINGS FOR CAST STONE PIECES. THIS SHOP DRAWING SHALL BE REVIEWED AND APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO PRODUCTION.

MOCK-UPS:

1. CONTRACTOR TO CONSTRUCT A 6'HT X 3'WD MINIMUM MOCK-UP FOR REVIEW BY LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION. MOCK UP SHOULD DEMONSTRATE ENTIRE WALL SYSTEM AND CONTAIN EXAMPLES OF BRICK, OTHER MASONRY PRODUCTS, TIES/ANCHORS AND MORTAL SELECTION AND DEMONSTRATE GENERAL APPEARANCE FOR WALLS. MOCK UP IS INCIDENTAL AND NOT PAID SEPARATELY.
2. REVISE MOCK-UP IF REQUIRED BY LANDSCAPE ARCHITECT.
3. CONTRACTOR TO MAINTAIN APPROVED MOCK-UP ON-SITE FOR REFERENCE UNTIL APPROVAL OF MASONRY WORK.
4. CONTRACTOR SHALL REMOVE MOCKUP PRIOR TO DEMOBILIZATION AFTER APPROVAL FROM THE LANDSCAPE ARCHITECT.

SIGN NOTES:

1. LETTERFORMS TO BE CONSTRUCTED OF 1/2" ALUMINUM, ROUTER CUT W/ S.S. MOUNTING PINS. SIGN MANUFACTURER TO PROVIDE A FULL SET OF SHOP DRAWINGS FROM THE SIGN FABRICATOR FOR APPROVAL PRIOR TO FABRICATION.
2. LETTERFORMS TO BE PAINTED USING AUTOMOTIVE GRADE POLYURETHANE ENAMEL PAINT. FONT TO BE GARAMOND.
3. PROVIDE 1 (ONE) FULL SIZED PAINTED LETTER OF EACH SIZE INCLUDED ON THE PROJECT TO THE LANDSCAPE ARCHITECT IN THE FORM OF A SUBMITTAL PRIOR TO FABRICATION. THIS IS INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.

FREESE AND NICHOLS
10497 Town and Country Way,
Suite 600
Houston, Texas 77024
Phone - (713) 600-6800
Web - www.freese.com

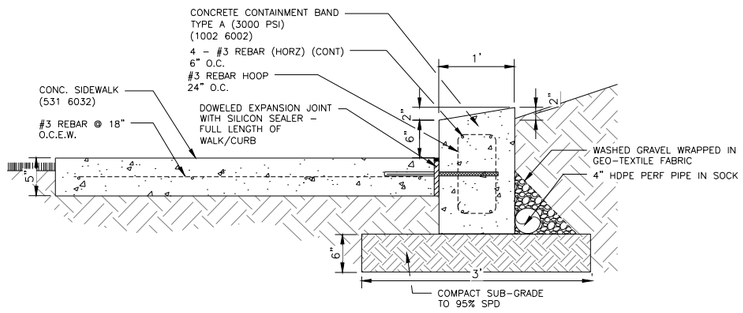
REGISTERED LANDSCAPE ARCHITECT STATE OF TEXAS
1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
ARCHITECTURAL SECTIONS

Texas Department of Transportation

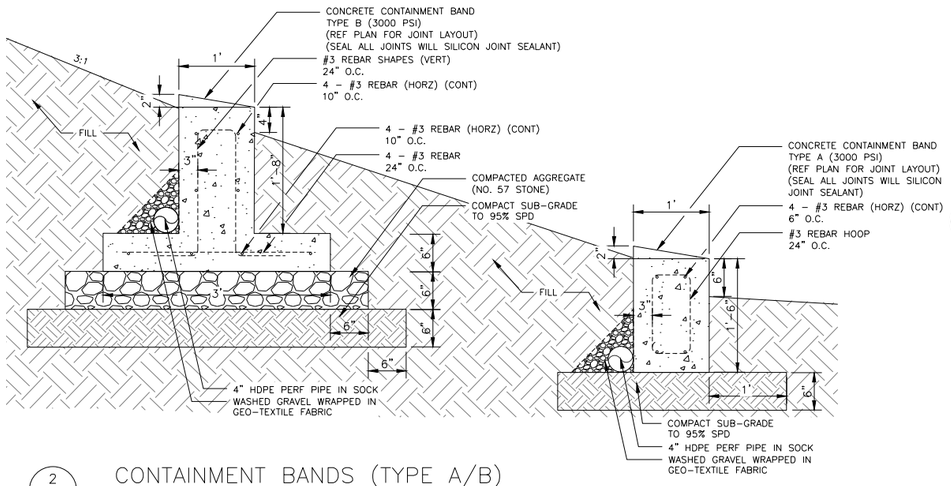
FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			32
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146

CONCRETE TESTING SHALL BE IN ACCORDANCE WITH TXDOT SPECIFICATIONS. REFER TO ITEM 421 – HYDRAULIC CEMENT CONCRETE.



1 CONTAINMENT BAND/CURB ATTACHMENT

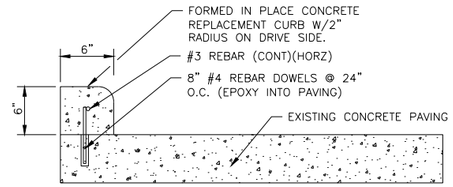
1/2"=1'–0"



2 CONTAINMENT BANDS (TYPE A/B)

1/2"=1'–0"

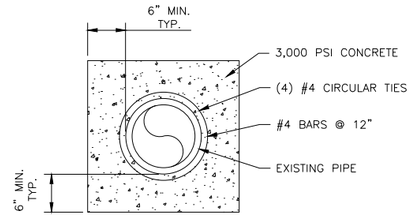
(1002 6002) LANDSCAPE AMENITY (TY 1)



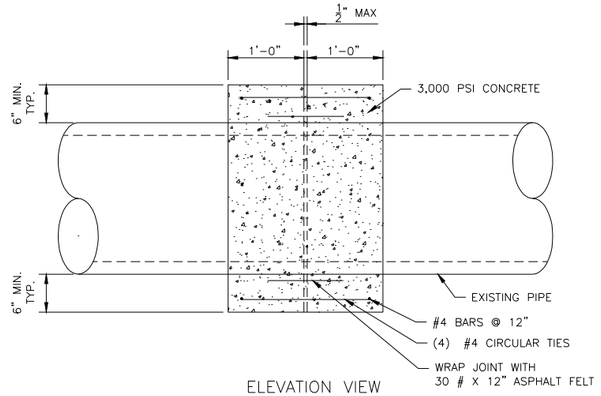
9 CONCRETE CURB (SPECIAL)

N.T.S.

(529 6036) CONCRETE CURB (SPECIAL)



SECTION VIEW

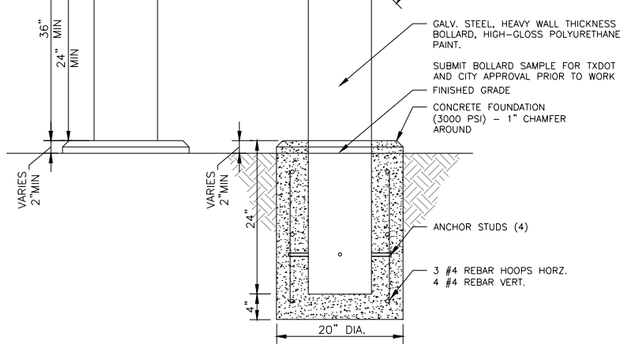


ELEVATION VIEW

8 CONCRETE COLLAR (36" AND SMALLER)

N.T.S.

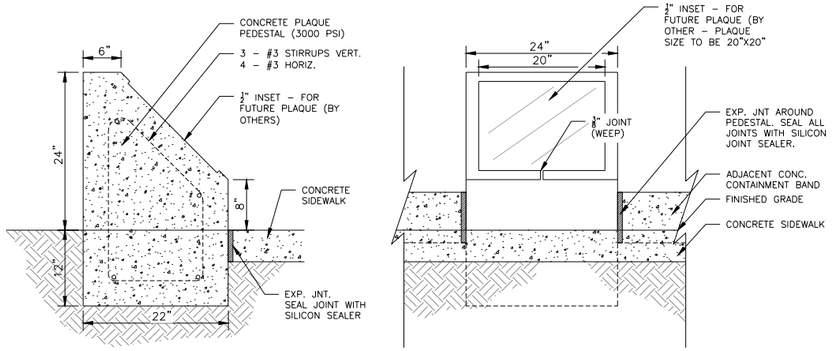
(420 6071) CL C CONC (COLLAR)



3 BOLLARD

1/2"=1'–0"

(1002 6003) LANDSCAPE AMENITY (TY 2)

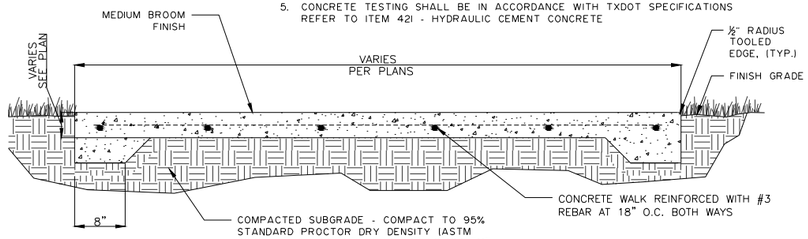


4 PLAQUE PEDESTAL

1/2"=1'–0"

(1002 6002) LANDSCAPE AMENITY (TY 1)

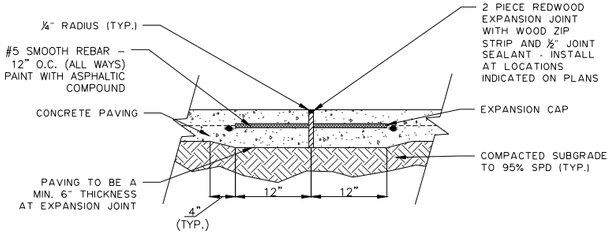
NOTES:
1. SEE GEOTECHNICAL INVESTIGATION REPORT AND SPECIFICATIONS FOR OTHER SITE REPARATION AND PAVEMENT DESIGN CONSIDERATIONS.
2. CONCRETE WALK PAVING TO BE A MIN. 3000 PSI.
3. REFER DETAIL FOR EXPANSION JOINT.
4. REFER DETAIL FOR SAW CUT JOINT.
5. CONCRETE TESTING SHALL BE IN ACCORDANCE WITH TXDOT SPECIFICATIONS REFER TO ITEM 421 - HYDRAULIC CEMENT CONCRETE



5 CONCRETE SIDEWALK PAVING

N.T.S.

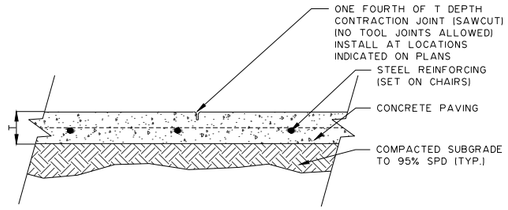
(531 6032) CONC SIDEWALKS (SPECIAL)(TYPE A)



6 EXPANSION JOINT

N.T.S.

INCIDENTAL TO (531 6032)



NOTES:
1. T=5" FOR STANDARD CONCRETE TRAIL AND CONCRETE WALK PAVING THAT IS LESS THAN 8' WIDE.
2. T=6" FOR STANDARD CONCRETE TRAIL AND CONCRETE WALK PAVING THAT IS 8' WIDE AND GREATER.

7 CONTROL JOINT

N.T.S.

INCIDENTAL TO (531 6032)

FREESE NICHOLS
10497 Town and Country Way,
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Phone - (713) 600-6800
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REGISTERED LANDSCAPE ARCHITECT – BENJAMIN PAUL JAMES – 2507 – STATE OF TEXAS

1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
SITE DETAILS

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			33
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146

GENERAL

1. THE STRUCTURAL DESIGN IS IN ACCORDANCE WITH THE CITY OF PEARLAND BUILDING CODE AND IBC CODE LATEST EDITION.
2. THE LOADS THAT HAVE BEEN USED IN THE STRUCTURAL DESIGN INCLUDE THE FOLLOWING:

   WIND LOADS:

   WIND PRESSURES IN ALL DIRECTIONS HAVE BEEN CALCULATED IN ACCORDANCE WITH CODE PROVISIONS OF THE BUILDING CODE FOR A BASIC WIND SPEED OF 150 MPH EXP. C, I=.85 WITH A 3 SECOND GUST. ALLOWABLE STRESSES HAVE BEEN INCREASED BY 1/3 FOR LOADING COMBINATION INCLUDING WIND PRESSURES.

   DEAD LOADS:

   STRUCTURAL MEMBERS.....SELF WEIGHT

   OTHER DEAD LOADS HAVE BEEN CALCULATED TO INCLUDE THE ACTUAL WEIGHT OF ALL WORK SHOWN ON THE STRUCTURAL, MECHANICAL, ELECTRICAL AND ARCHITECTURAL DRAWINGS. NO OTHER EQUIPMENT SHALL BE PLACED ON OR HUNG FROM THE ROOF SYSTEM WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER.
3. COMPLETE SHOP DRAWINGS FOR THE STRUCTURAL WORK SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO COMMENCEMENT OF CONSTRUCTION, IN ACCORDANCE WITH THE SPECIFICATIONS. SUCH REVIEW BY THE ENGINEER DOES NOT RELIEVE THE CONTRACTOR OF FULL RESPONSIBILITY FOR CORRECT FABRICATION AND CONSTRUCTION OF THE WORK IN COMPLIANCE WITH THESE DRAWINGS.
4. ANY DEVIATION FROM, ADDITION TO, SUBSTITUTION FOR, OR MODIFICATION TO THE STRUCTURE OR ANY PART OF THE STRUCTURE DETAILED ON THESE DRAWINGS SHALL BE SUBMITTED IN WRITING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS THAT ARE SUBMITTED FOR REVIEW DO NOT CONSTITUTE "IN-WRITING".
5. THE CONTRACTOR SHALL REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATIONS NOT SHOWN AND FOR EXACT LOCATIONS OF ALL ARCHITECTURAL DETAILS. THE CONTRACTOR SHALL COMPARE THE STRUCTURAL SECTIONS WITH THE ARCHITECTURAL SECTIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMPLETION OF THE SHOP DRAWINGS.
6. THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS AT THE SITE AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN THE ACTUAL CONDITIONS AND INFORMATION SHOWN ON THE DRAWINGS BEFORE PROCEEDING WITH THE WORK.
7. THE STRUCTURAL DRAWINGS ARE NOT TO BE SCALED FOR DETERMINATION OF QUANTITIES, LENGTHS, OR FIT OF MATERIALS.
8. THE STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHODS OF CONSTRUCTION UNLESS SO STATED OR NOTED. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE WORKMEN AND OTHER PERSONS DURING CONSTRUCTION.
9. THE CONTRACTOR SHALL PROVIDE TEMPORARY ERECTION BRACING AND SHORING OF ALL STRUCTURAL WORK AS REQUIRED FOR STABILITY OF THE STRUCTURE DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY CONDITION WHICH, IN HIS OPINION, MIGHT ENDANGER THE STABILITY OF THE STRUCTURE OR CAUSE DISTRESS IN THE STRUCTURE.

EARTHWORK AND FOUNDATIONS

1. THE FOUNDATION DESIGN IS BASED ON A SOIL REPORT FROM BANDY AND ASSOCIATES, INC. DATED JANUARY, 2020 REPORT NUMBER 119257. THE GENERAL CONTRACTOR SHALL PROVIDE A COPY OF THE GEOTECHNICAL REPORT TO ALL NECESSARY SUBCONTRACTORS FOR INFORMATION ONLY. THE WORK SHOULD BE MONITORED, AND IT SHOULD BE CONFIRMED THAT SOILS OF THE DESIGN BEARING CAPACITY HAVE BEEN ENCOUNTERED AND ARE SUITABLE FOR CONSTRUCTION.
2. FOOTINGS SHALL BE FOUNDED AT A MINIMUM DEPTH OF 3'-0" BELOW THE EXISTING GRADE AND SHALL HAVE AN ALLOWABLE BEARING PRESSURE OF 1800 p.s.f. THE BEARING PRESSURE CAN BE INCREASED BY 25% FOR TRANSIENT LOADS

CAST IN PLACE REINFORCED CONCRETE

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE MOST RECENT EDITION OF ACI 318 "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE."
2. MILD STEEL REINFORCING BARS SHALL CONFORM TO ASTM A-615, GRADE 60
3. MILD STEEL REINFORCEMENT AND ACCESSORIES SHALL BE DETAILED AND FABRICATED IN ACCORDANCE WITH ACI SP-66.
4. PORTLAND CEMENT SHALL BE A SINGLE BRAND CONFORMING TO ASTM C-150, TYPE 1, UNLESS OTHERWISE APPROVED. DO NOT USE FLY ASH.
5. NORMAL WEIGHT (145 PCF CONCRETE) AGGREGATES SHALL CONFORM TO ASTM C-33 AND SHALL BE FROM A SINGLE SOURCE FOR EXPOSED CONCRETE. ALL CONCRETE SHALL UTILIZE NORMAL WEIGHT AGGREGATE UNLESS NOTED OTHERWISE.
6. ALL ADDITIVES FOR AIR ENTRAINMENT, WATER REDUCTION, AND SET CONTROL SHALL BE USED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS AND PROJECT SPECIFICATIONS.
7. MIXES SHALL BE NORMAL WEIGHT AND DESIGNED TO PROVIDE CONCRETE WITH A 28 DAY COMPRESSIVE STRENGTH AS FOLLOWS:

   PIERS.....3000 PSI
   PILE CAPS.....4000 PSI
8. THE MAXIMUM NOMINAL SIZES OF COARSE AGGREGATE SHALL BE AS FOLLOWS:
   FOUNDATIONS.....1-1/2"
9. ALL EXTERIOR CONCRETE SHALL BE AIR-ENTRAINED. AIR CONTENT SHALL BE 6% +/- 1%. INTERIOR SLABS SHALL NOT HAVE AIR-ENTRAINMENT.
10. CONCRETE SLUMPS SHALL BE AS FOLLOWS:

    PIERS.....5" MAX.
11. MOISTURE CURE ALL CONCRETE WITH WET BURLAP.
12. MILD STEEL REINFORCEMENT SHALL BE PLACED AND SECURED IN ACCORDANCE WITH CRSI "RECOMMENDED PRACTICE FOR PLACING REINFORCING BARS."
13. CONCRETE PROTECTION FOR REINFORCEMENT SHALL BE AS FOLLOWS:

    PILE CAPS.....3" ALL SURFACES
14. REINFORCING BARS NO. 11 AND SMALLER SHALL BE LAP SPLICED AS INDICATED IN BAR LAP SCHEDULE, UNLESS SHOWN OTHERWISE. ALL SPLICES SHALL BE STAGGERED.
15. CONCRETE TESTING SHALL BE IN ACCORDANCE WITH TXDOT SPECIFICATIONS REFER TO ITEM 421 – HYDRAULIC CEMENT CONCRETE
16. EACH AREA OF CONCRETE WORK SHALL BE FINISHED AND CURED IN ACCORDANCE WITH THE SPECIFICATIONS.
17. DO NOT DROP CONCRETE FREELY MORE THAN SIX FEET.
18. UNLESS SPECIFIED BELOW, CONCRETE MUST REACH THE FOLLOWING PERCENTAGES OF ITS 28 DAY COMPRESSIVE STRENGTH (F'C) BEFORE FORMS MAY BE REMOVED.

    PIERS CAPS.....40 PERCENT

REINFORCED MASONRY

1. ALL REINFORCED MASONRY WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES ACI 530/ASCE 5/TMS 402.
2. ALL REINFORCED MASONRY SHALL CONFORM TO THE PROVISIONS OF ACI 530.1/ASCE 6/TMS 602 (WITH EXCEPTIONS NOTED IN THE SPECIFICATIONS). ALL WALLS AND REINFORCEMENT SHALL BE INSPECTED.
3. CONCRETE BLOCK SHALL CONFORM TO ASTM C-90, GRADE N, TYPE 1, LIGHTWEIGHT UNITS WITH A MINIMUM NET AREA COMPRESSIVE STRENGTH OF 1900 PSI, TESTED PER ASTM C-140, AND SHALL BE LAID IN RUNNING BOND, OR STACK BOND, AS INDICATED.
4. MORTAR SHALL CONFORM TO ASTM C-270, TYPE S. AGGREGATES FOR MORTAR SHALL CONFORM TO ASTM C-144. MORTAR SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 1800 PSI AT 28 DAYS.
5. GROUT SHALL CONFORM TO ASTM C-476. AGGREGATES FOR GROUT SHALL CONFORM TO ASTM C-404. GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI AT 28 DAYS.
6. MASONRY WALL CONSTRUCTION SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'm) OF 1500 PSI AT 28 DAYS.
7. BOND BEAMS SHALL BE CONSTRUCTED WITH PORTLAND CEMENT GROUT, WITH A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, AND A MAXIMUM AGGREGATE SIZE OF 3/4".
8. REINFORCING STEEL SHALL CONFORM TO ASTM A-615, GRADE 60.
9. HORIZONTAL JOINT REINFORCEMENT SHALL BE FACTORY-FABRICATED, LADDER TYPE, 9 GA, OR HEAVIER WIRE UNLESS NOTED OTHERWISE, CONFORMING TO ASTM A-82, AND BE HOT DIPPED GALVANIZED PER ASTM A-153. EXCEPT WHERE NOTED OTHERWISE, PLACE REINFORCEMENT CONTINUOUSLY AT A MAXIMUM VERTICAL SPACING OF 8" O.C. PLACE AT WIRE SHALL BE LAPPED SPLICE A MINIMUM OF 11" AT SPLICES.
10. ALL CELLS CONTAINING REINFORCING BARS, BOLTS OR OTHER METAL ANCHORS SHALL BE GROUTED SOLID. ANY CELLS AT OR BELOW FINISHED GRADE SHALL BE GROUTED SOLID, WHETHER REINFORCED OR NOT. A VERTICAL FILLED CELL OR BOND BEAM SHALL BE PLACED WHERE ANY CANOPY OR RAIN HOOD ARE PLACED. MASONRY CONTRACTOR AND GENERAL CONTRACTOR SHALL COORDINATE LOCATION OF FILLED CELLS.
11. ALL CUTTING AND FITTING OF MASONRY SHALL BE DONE BY MASONRY MECHANICS WITH MASONRY SAWS.
12. PROVIDE 3/8" THROUGH-WALL CONTROL JOINTS AT 40'-0" MAXIMUM SPACING OR AT LOCATION DETAILED ON ARCHITECTURAL DRAWINGS.

PAUL ENGINEERING INC
SOLVING AMERICAS ENGINEERING NEEDS
626 1/2 BARINGER LANE, SUITE A
WEBSTER, TEXAS 77598 Reg. No. F-5628
Ph 281.280.6072
Fax 281.280.0280

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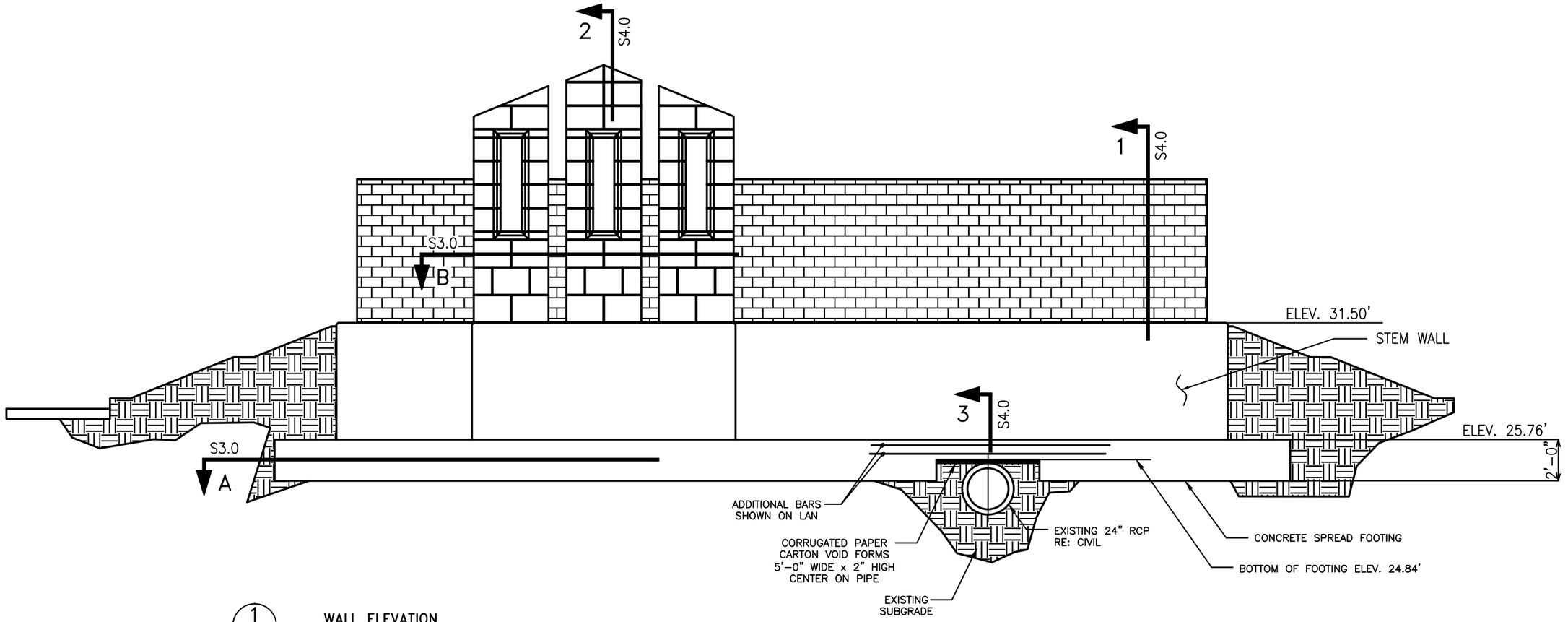
STATE OF TEXAS
DENNIS PAUL
74523
REGISTERED
PROFESSIONAL ENGINEER

1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
STRUCTURAL SPECIFICATIONS

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			34
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



1 WALL ELEVATION
N.T.S.

LANDSCAPE AMENITY (TY1)
THE AREA DESCRIBED ON THE PLANS AND THE FOLLOWING ITEMS ARE INCLUDED AS PART OF (1002 6002) LANDSCAPE AMENITY (TY1)

EXCAVATION, SUBGRADE PREPARATION, FORMING, REINFORCING, CONCRETE PLACEMENT AND FINISHING AND BACKFILL FOR ALL STRUCTURAL COMPONENTS COMPLETE AND IN PLACE

PAUL ENGINEERING INC
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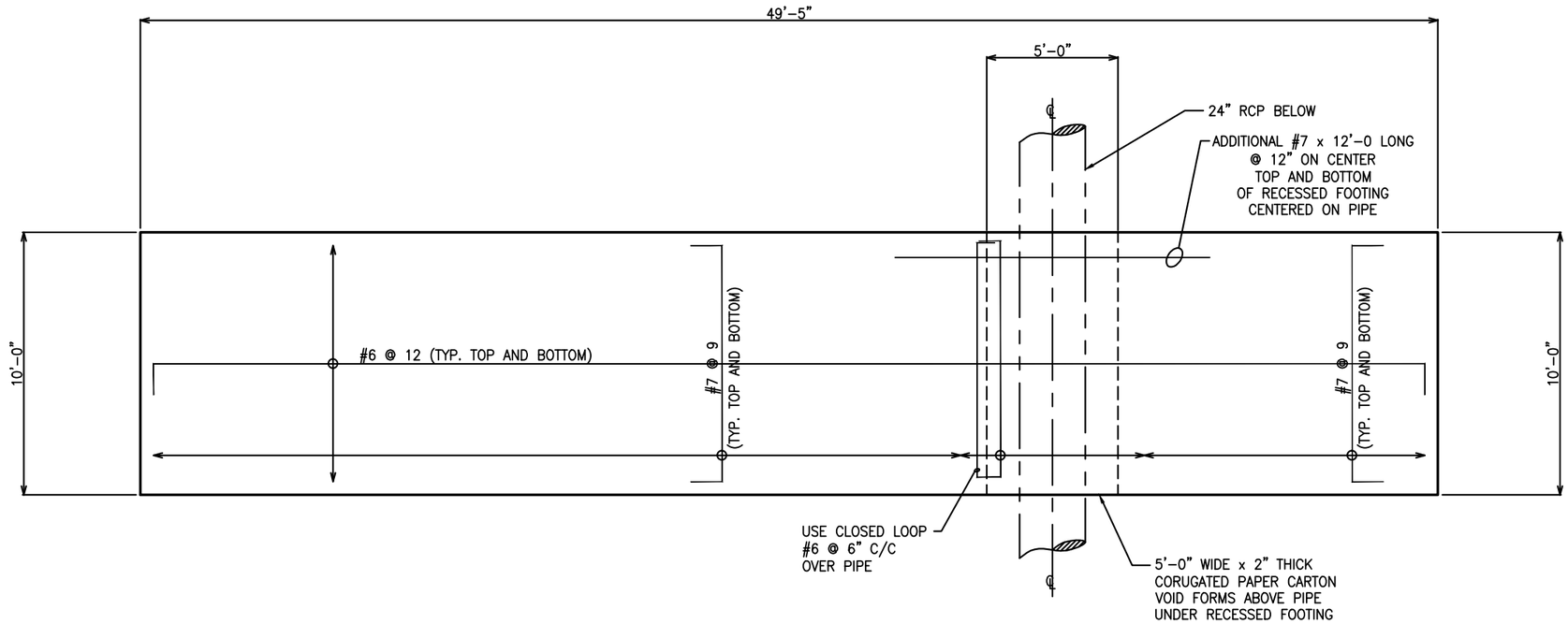
STATE OF TEXAS
DENNIS PAUL
74623
REGISTERED PROFESSIONAL ENGINEER

1/14/2022

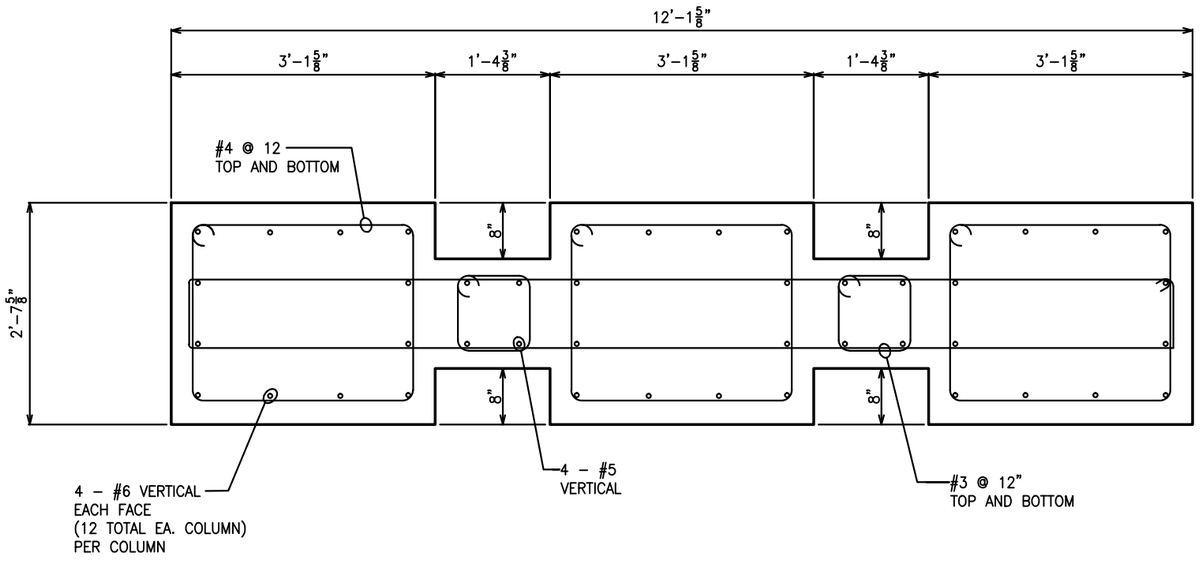
BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
STRUCTURAL SECTION
KEY

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			35
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



A MAIN FOOTING PLAN
N.T.S.



B PLAN AT CONCRETE COLUMNS
N.T.S.

LANDSCAPE AMENITY (TY1)
THE AREA DESCRIBED ON THE PLANS AND THE FOLLOWING ITEMS ARE INCLUDED AS PART OF (1002 6002) LANDSCAPE AMENITY (TY1)

EXCAVATION, SUBGRADE PREPARATION, FORMING, REINFORCING, CONCRETE PLACEMENT AND FINISHING AND BACKFILL FOR ALL STRUCTURAL COMPONENTS COMPLETE AND IN PLACE

PAUL ENGINEERING INC
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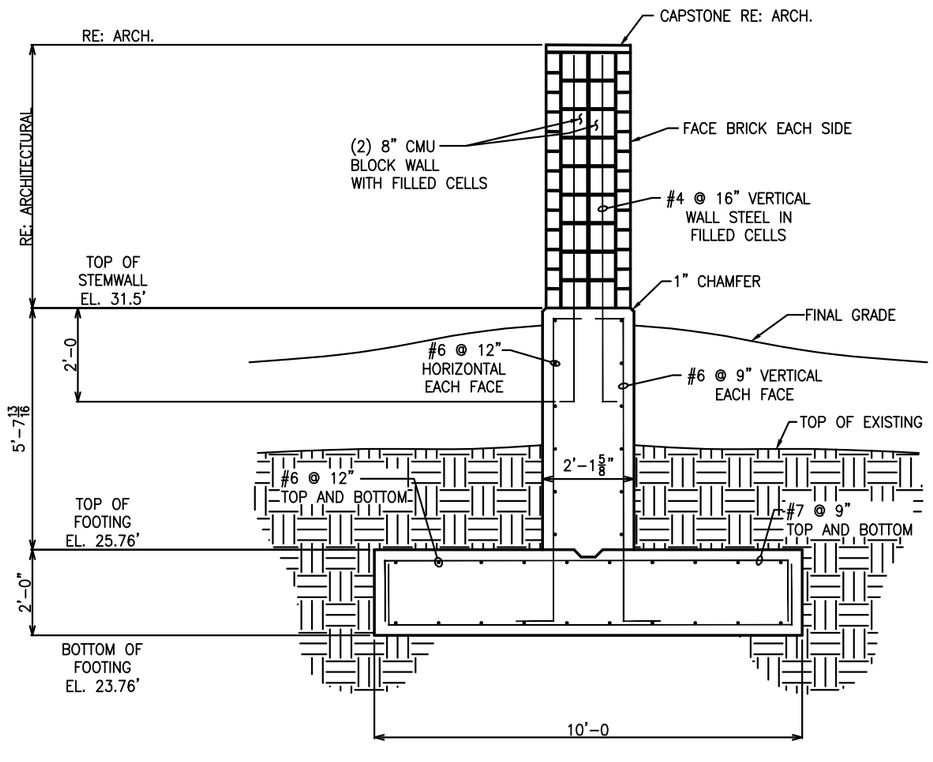
STATE OF TEXAS
DENNIS PAUL
74523
REGISTERED
PROFESSIONAL ENGINEER
1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
STRUCTURAL SECTIONS
1 OF 2

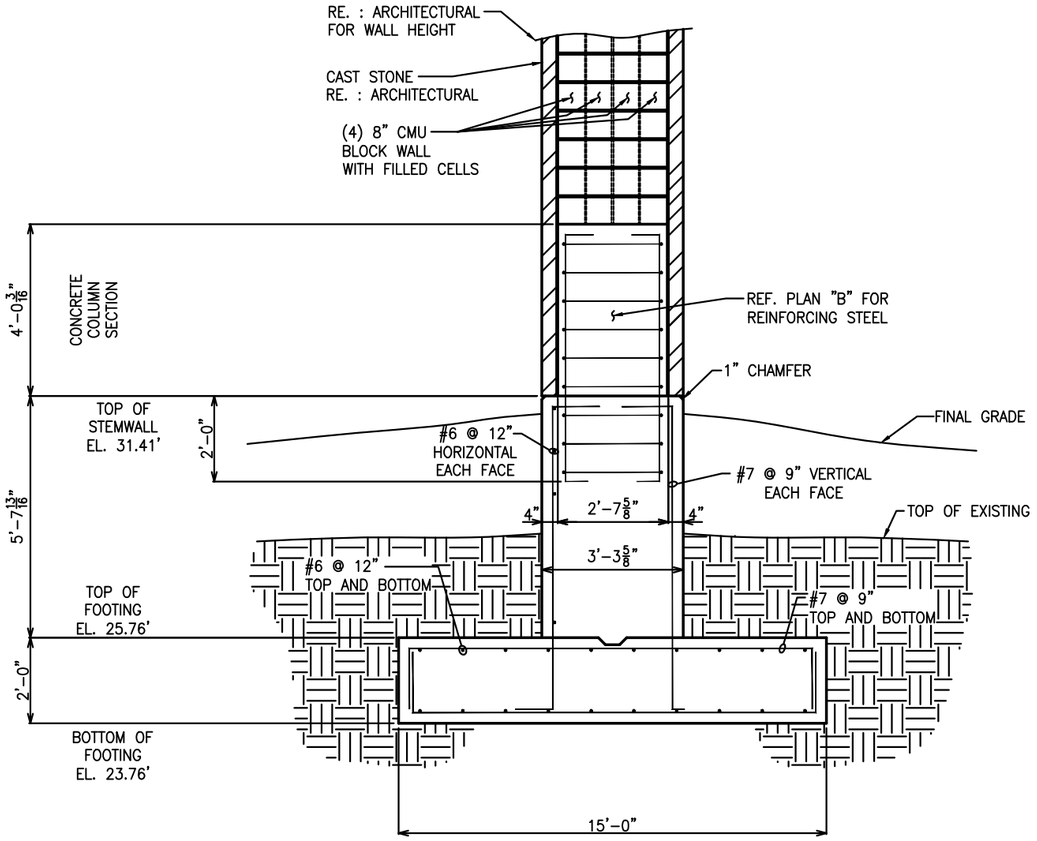
Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			36
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146



1 TYPICAL SECTION
N.T.S.

3 FOOTING AT PIPE
N.T.S.



2 SECTION AT WIDE WALL
N.T.S.

LANDSCAPE AMENITY (TY1)
THE AREA DESCRIBED ON THE PLANS AND THE FOLLOWING ITEMS ARE INCLUDED AS PART OF (1002 6002) LANDSCAPE AMENITY (TY1)

EXCAVATION, SUBGRADE PREPARATION, FORMING, REINFORCING, CONCRETE PLACEMENT AND FINISHING AND BACKFILL FOR ALL STRUCTURAL COMPONENTS COMPLETE AND IN PLACE

PAUL ENGINEERING INC
SOLVING AMERICAS ENGINEERING NEEDS
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10497 Town and Country Way,
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Houston, Texas 77024
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STATE OF TEXAS
DENNIS PAUL
74523
REGISTERED PROFESSIONAL ENGINEER
1/14/2022

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
STRUCTURAL SECTIONS
2 OF 2

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			37
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146

TYPE OF WORK — ITEMS AND REQUIREMENTS FOR EACH TYPE OF WORK

SODDING	PERMANENT SEEDING	TEMPORARY SEEDING	Reference Item 161, 162, 164, 166, 168 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown. Use latest Houston District, Special Provisions for those items indicated.		
X			**161-6017 COMPOST MANUF TOPSOIL (BIP)(4") SY**	APPLICATION RATE Item 161.2.1. Compost Manufactured Topsoil (CMT)	Item 161.2. Materials. Submit quality control (QC) documentation to the Engineer. Compost producer's STA certification must be dated to meet STA requirements (certification must be within 30 or 90 days per STA requirements). Lab analysis performed by an STA-certified lab must be dated within 30 days before delivery of the compost.
X			**162-6002 BLOCK SODDING SY**	GRASS SPECIES Item 162.2. Materials. Cynodon transvaalensis x C. dactylon (Tif419)	Item 162.2.1. Block Sod. Use block palletized or roll type sod. **REMOVE PLASTIC BACKING FROM ROLL TYPE SOD.** Place sod within 48 hours of delivery to site. No exceptions. Place sod with joints alternating on each row to prevent continuous joint lines. Peg sod as needed with wood pegs to hold sod in place. Pegging sod is subsidiary to Item 162.
			164-6066 DRILL SEEDING(PERM)(WARM OR COOL) SY Item 164.1. Description Provide and install seeding as shown on District Standard	PLANTING MONTH / SEED MIX March, April, May, June, July, August, September, October: Hulled - Bermudagrass (Cynodon dactylon) - 40.0 lbs PLS/acre Foxtail Millet (Setaria italica) - 34.0 lbs PLS/acre Green Sprangletop (Leptochloa dubia) - 4.0 lbs PLS/acre Sideoats Grama (Bouteloua curtipendula) - 3.2 lbs PLS/acre Little Bluestem (Schizachyrium scoparium) - 1.4 lbs PLS/acre November, December, January, February, Unhulled - Bermudagrass (Cynodon dactylon) - 40.0 lbs PLS/acre Oats (Avena sativa) - 72.0 lbs PLS/acre Green Sprangletop (Leptochloa dubia) - 4.0 lbs PLS/acre Sideoats Grama (Bouteloua curtipendula) - 3.2 lbs PLS/acre Little Bluestem (Schizachyrium scoparium) - 1.4 lbs PLS/acre	PLS (Pure Live Seed) Provide documentation of PLS requirements per Item 164.2.1. CONSTRUCTION. Cultivate the area to a depth of 4 inches before placing the seed unless otherwise directed. When performing permanent seeding after an established temporary seeding, cultivate the seedbed to a depth of 4 inches or mow the area before placement of the permanent seed. Plant the seed and place the straw or hay mulch after the area has been completed to lines and grades as shown on the plans. Drill Seeding. Plant seed or seed mixture uniformly over the area shown on the plans at a depth of 1/4 to 1/3 inch using a cultipacker(turfgrass) type seeder. Plant seed along the contour of the slopes. Use broadcast seeding method where site conditions prevent drill seeding method. Broadcast Seeding. Distribute the dry seed or dry seed mixture uniformly over the areas shown on the plans using hand or mechanical distribution on top of soil.
			164-6052 BROADCAST SEED(PERM)(SPECIAL MIX) SY Item 164.1. Description Provide and install seeding as shown on District Standard		
			164-6051 DRILL SEED(TEMP)(WARM OR COOL) SY Item 164.1. Description Provide and install seeding as shown on District Standard	PLANTING MONTH / SEED MIX March, April, May, June, July, August, September, October: Foxtail Millet (Setaria italica) - 34.0 lbs PLS/acre November, December, January, February, Oats (Avena sativa - 72.0 lbs PLS/acre	
			164-6009 BROADCAST SEED(TEMP)(WARM) SY Item 164.1. Description Provide and install seeding as shown on District Standard		
			162-6003 STRAW OR HAY MULCH SY	APPLICATION RATE Immediately after planting the seed or seed mixture, apply straw or hay mulch uniformly over the seeded area. Apply straw or hay mulch at 2 tons per acre. Use tacking agent with straw or hay mulch as described on this sheet.	Use straw or hay mulch in conformance with Article 162.2.5, "Mulch." Use biodegradable tacking agents only applied at a rate in accordance with manufacturer's recommendations. Use the following products or an approved equal(see note this sheet): Conweb/Contac Guar Gum, Profile Products Corporation, (307) 655-9565, Ramtec/Procol/Viscol Guar Gum, Ramtec Corporation, (800) 366-1180
			166-6001 FERTILIZER AC Item 166.2. Materials Use fertilizer as shown on District Standard	APPLICATION RATE Deliver and evenly distribute fertilizer at a rate of 4000 lbs/acre.	Use a **NON-CHEMICAL** fertilizer which meets all the following criteria: (1) BRAND NAME must be registered with the Texas State Chemist as a commercial fertilizer. (2) Meets USEPA guidelines for unrestricted use. (3) Derived from biological sources such as, but not limited to: sewage sludge, manures, vegetation, etc. (4) In granular form and essentially dust free. Submit proof of registration and nutrient source to Engineer. Use the following products or an approved equal(see note this sheet): Sigma, SIGMA AgriScience, 281-851-6749 Sustanite-standard grade, Automation Nation, Inc., 713-675-4999 Milorganite, MMSD, 800-287-9645 Agricultural Organic P/L, Ag Org, INC., 713-523-4396
X			**168-6001 VEGETATIVE WATERING MG**	APPLICATION RATE Item 168.3 Construction. 6000 gallons/acre per working day x 20 consecutive working days = 120,000 gallons total/acre	Begin watering immediately after installation of seed or sod. Replace, fertilize, and water any seed or sod in poor condition due to the failure to apply the specified amount of water within the time allowed at no expense to the Department.

SEQUENCE OF WORK

BLOCK SOD	PERMANENT SEEDING	TEMPORARY SEEDING
1. FERTILIZER 2. CULTIVATE SOIL (ITEM 162.3) 3. SOD 4. VEGETATIVE WATERING	1. FERTILIZER 2. COMPOST MANUFACTURED TOPSOIL 3. CULTIVATE SOIL (ITEMS 164.3 AND 161.3.1) 4. PERMANENT SEEDING 5. STRAW OR HAY MULCH 6. VEGETATIVE WATERING	1. FERTILIZER 2. CULTIVATE SOIL (PER ITEM 164.3) 3. TEMPORARY SEEDING 4. STRAW OR HAY MULCH 5. VEGETATIVE WATERING

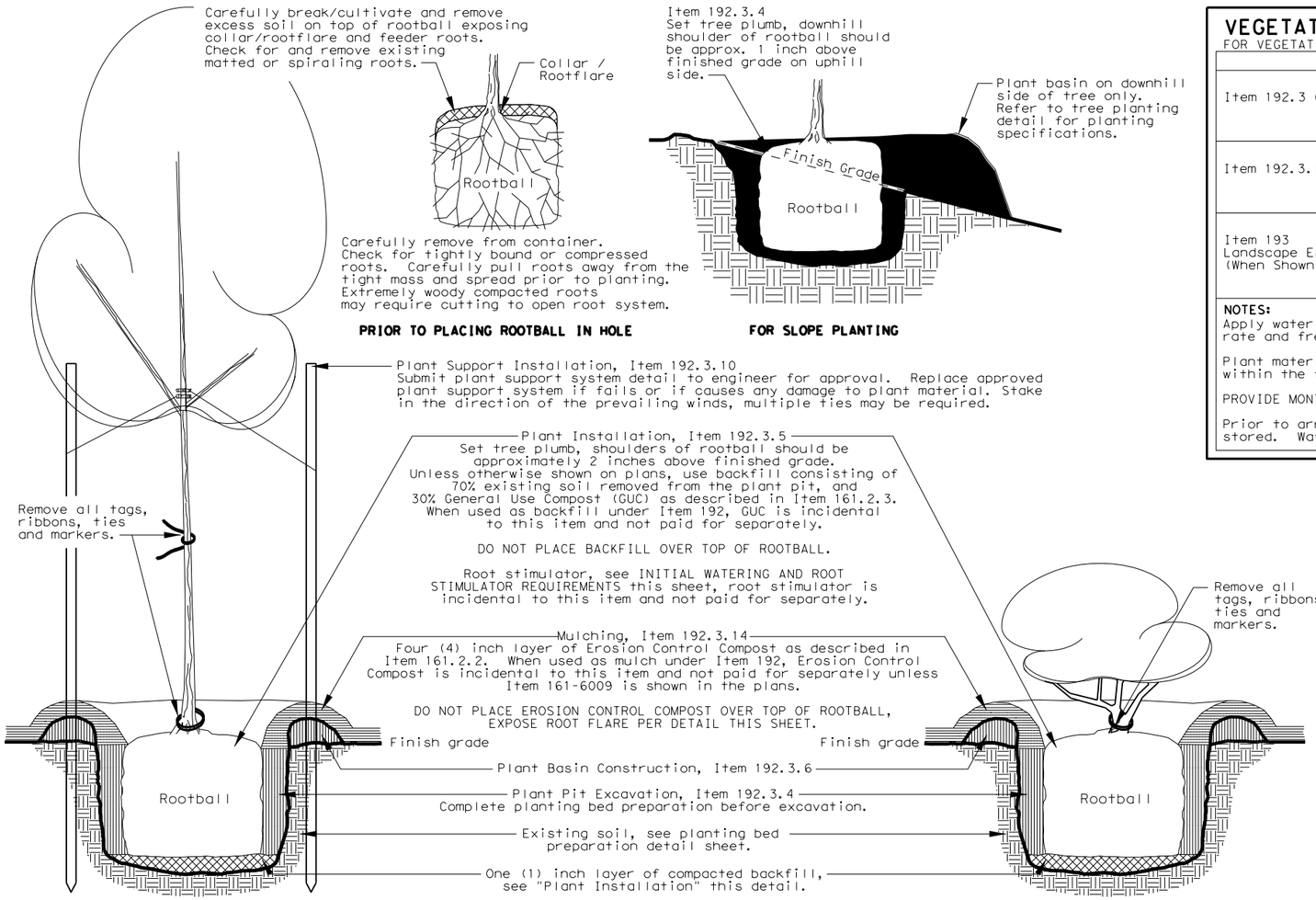
REGISTERED LANDSCAPE ARCHITECT
BRYAN PAUL JANES
2507
STATE OF TEXAS
1/14/2022

FERTILIZER, SEED, SOD, STRAW, COMPOST, AND WATER

SHEET 1 OF 1

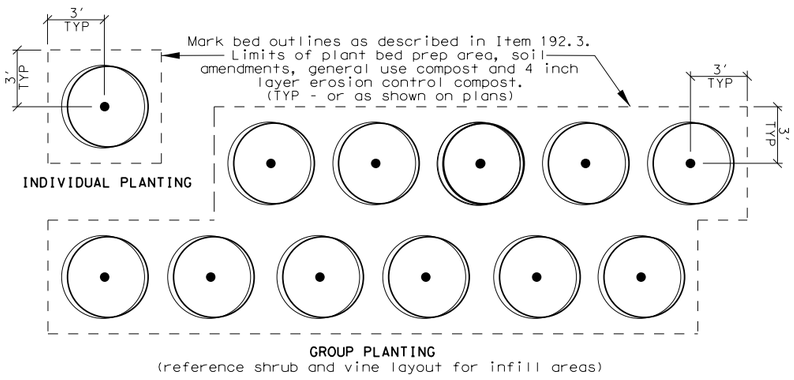
REVISIONS	FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
10/2014 UPDATED TO 2014 SPECS 3/2015 MINOR CORRECTIONS	OCT 2014	6	TEXAS				38
	ORIGINAL:	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
		12	CHAMBERS	0389	02	057	SH 146

STD K-1



TREE PLANTING DETAIL

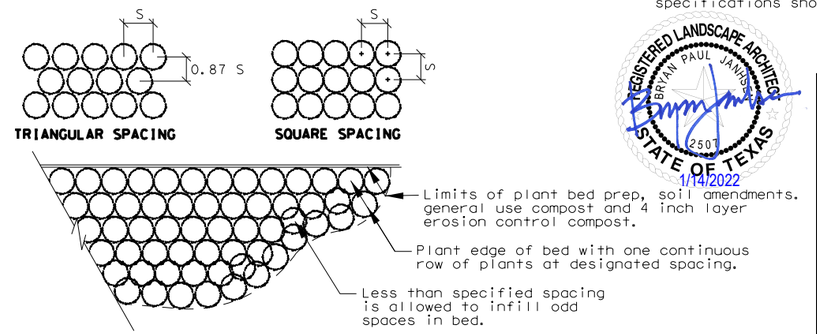
FOR PALM TREE PLANTING DETAIL SEE PLANTING AND ESTABLISHMENT SHEET 2 of 8



TREE PLACEMENT WITHIN PLANTING BED PREP AREA, LAYOUT AND SPACING SHOWN ON PLANS

SHRUB AND VINE PLANTING DETAIL

S= Spacing as indicated on the plans. Square or triangular spacing will be shown by the placement of the plants on the drawing and/or be called out in the plant label.



SHRUB AND VINE PLACEMENT WITHIN PLANTING BED PREP AREA LAYOUT AND SPACING SHOWN ON PLANS

VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES

FOR VEGETATIVE WATERING FOR PALMS ONLY SEE PLANTING AND ESTABLISHMENT SHEET 2 of 8

PHASE	ITEM DESCRIPTION	FREQUENCY	RATE / PLANT
Item 192.3 Construction	Item 192.3.7. Watering is incidental to Item 192 and is not paid for separately **See Initial Watering note**	Begin same day as planting then: 3 times per week with 1 day minimum between waterings **See Initial Watering note**	**CNTR SIZE / WATER QTY** 30 GAL = 16 gallons 15 GAL = 10 gallons 5 GAL = 4 gallons 3 GAL = 2 gallons 1 GAL = 2 gallons (1/2 X plant CNTR gallon size per plant for sizes not shown, one (1) gallon minimum) **See Initial Watering Note**
Item 192.3.15 Maintenance	Item 192.3.15.1. Watering is incidental to Item 192 and is not paid for separately		
Item 193 Landscape Establishment (When Shown In Plans)	Item 193.3.3. Watering is incidental to Item 193 and is not paid for separately	2 times per week with 2 days minimum between waterings	

NOTES:
Apply water over the rootball within the tree well only, unless otherwise shown on plans. Adjust rate and frequency to meet site conditions and weather as approved or directed by engineer.

Plant material in poor condition due to the failure to apply the specified amount of water within the time allowed or overwatering will be replaced at contractor's expense.

PROVIDE MONTHLY METER READINGS OF WATER APPLIED.

Prior to arrival at project or storage area, provide watering plan(s) of plants to be installed or stored. Watering plan(s) must be approved by engineer prior to delivery to project or storage area.

INITIAL WATERING AND ROOT STIMULATOR REQUIREMENTS

PHASE	Item 192.3 Construction. Initial watering.
ITEM DESCRIPTION	Item 192.3.5. Plant Installation. Root stimulator material is incidental to Item 192 and is not paid for separately.
MATERIALS and SOLUTION	Two (2) ounces of root stimulator concentrate per one (1) gallon water. Root stimulator must be commercially available and labeled as an all organic/non-chemical liquid concentrate Bio-Stimulant and Root Stimulator. Use the following product or an approved equal: Super Seaweed, San Jacinto Environmental Supplies, 713-957-0909.
FREQUENCY and RATE	At the time of planting, provide initial watering at rate shown in Vegetative Watering Schedule this sheet. Use root stimulator solution for initial watering.

GENERAL NOTES:

1. Reference Item 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014 for specifications, dimensions, volumes, and measurements not shown.
2. Reference Item 192.3, mark plant locations and bed outlines.
3. Verify that all planting meets the following clear zone minimum distance requirements from the edge of the travel lane: Trees: 32' unless protected by a barrier, Shrubs: 16' unless protected by a barrier, Groundcovers and vines: no minimum distance. Engineer has final authority over all clear zone related issues.
4. Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS power supply, lighting, signal wires and detectors, gas, electric, telephone, fiber optics, etc.
5. Locate and stake existing ground boxes, inlets, culverts, manholes, etc. within the project area with a 4' wooden stake painted orange. Maintain the stakes in place for duration of the contract. Remove stakes when directed by engineer.
6. Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
7. Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.

REGISTERED LANDSCAPE ARCHITECT BRYAN PAUL JANES 2507 STATE OF TEXAS
1/14/2022

Texas Department of Transportation

PLANTING AND ESTABLISHMENT

SHEET 1 of 8

Details not to scale TREE & SHRUB

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				39
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	12	CHAMBERS	0389	02	057	SH 146

STD K-4

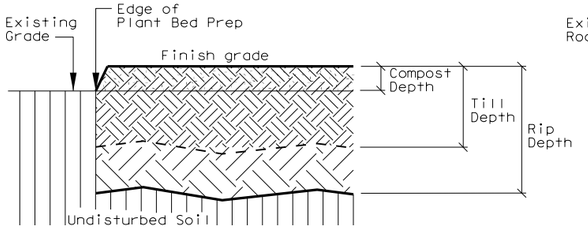
TYPE OF WORK

ITEMS AND REQUIREMENTS FOR EACH TYPE OF WORK

192-6063 PLANT BED PREP (TYPE I) SY	192-6064 PLANT BED PREP (TYPE II) SY	192-6065 PLANT BED PREP (TYPE III) SY	192-6066 PLANT BED PREP (TYPE IV) SY	Reference Item 161, 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown. Reference Special Specification Item 1006.		
X				**161-6012 GENERAL USE COMPOST CY**	APPLICATION RATE Item 161.2.3. General Use Compost. Apply 2 in. uniform layer over bed preparation area.	Item 161.2. Materials. Compost producer's STA certification must be dated to meet STA requirements (certification must be within 30 or 90 days). Lab analysis performed by an STA-certified lab must be dated within 30 days before delivery of the compost.
X				**1006-6001 LANDSCAPE SOIL AMENDMENT (TYPE I) SY**	APPLICATION RATE Apply 0.30 lbs/SY. Each application is paid for separately. See timeline for multiple applications.	Use a non-chemical fertilizer with the following requirements: (1) Is OMRI Listed or certified by Washington State Department of Agriculture meeting USDA National Organic Program Rules, provide current certification. (2) Is registered with Texas State Chemist as a commercial fertilizer. (3) Meets USEPA guidelines for unrestricted use. (4) Derived from the following biological source: processed poultry manure. (5) Contains 3.0% nitrogen and 2.2% of nitrogen is water insoluble, 4% phosphate, 3% soluble potash, 10% calcium. (6) Use the following product or an approved equal: Plant Vigor 3-4-3 Plus 10% Calcium manufactured by Natural Resources Group, Inc., Tomball, Texas 800-279-9567.
X				**1006-6002 LANDSCAPE SOIL AMENDMENT (TYPE II) SY**	APPLICATION RATE Apply 0.25 lbs/SY.	Humate containing 2.25% iron in the raw material and greater than 45% humic acid, dextrose 2.5% to 5% on weight basis. Pelletized humate without added binders and pass #16 mesh. Use the following product or an approved equal: San Jacinto Humate, San Jacinto Environmental Supplies, 713-957-0909.
X				**1006-6003 LANDSCAPE SOIL AMENDMENT (TYPE III) SY**	See PLANTING AND ESTABLISHMENT SHEET 5 of 8 For Requirements	
X				**1006-6004 LANDSCAPE SOIL AMENDMENT (TYPE IV) SY**	See PLANTING AND ESTABLISHMENT SHEET 5 of 8 For Requirements	
X				**1006-6005 LANDSCAPE SOIL AMENDMENT (TYPE V) SY**	APPLICATION RATE Apply 0.30 lbs/SY. Each application is paid for separately. See timeline for multiple applications.	Use a non-chemical fertilizer with the following requirements: (1) Is OMRI Listed or certified by Washington State Department of Agriculture meeting USDA National Organic Program Rules, provide current certification. (2) Is registered with Texas State Chemist as a commercial fertilizer. (3) Meets USEPA guidelines for unrestricted use. (4) Derived from the following biological source: worm castings. (5) Contains 0.02% humic acid derived from humate, 1.0% nitrogen and 0.9% of nitrogen is water insoluble, 0.5% phosphate, 0.2% soluble potash, 1.0% calcium, 0.02% iron. (6) Use the following product or an approved equal: Black Castings manufactured by Vermi-Technology Unlimited available from Earth's Outlet 866-504-1139.
				RIPPING/TRENCHING Incidental to Item 192 Plant Bed Preparation.	RIP/TRENCH DEPTH Rip/Trench to a depth of 18 inches (+/- 2"). Distance between each rip/trench is 24 inches.	
X				**ROTOR TILLING** Incidental to Item 192 Plant Bed Preparation.	ROTOR TILL DEPTH After application of compost and amendments and rip/trench (when required), rotor till to a depth of 8 inches (+/- 2").	
				HERBICIDE and MOWING Incidental to Item 192 Plant Bed Preparation. Scalp mow 15 days after final herbicide treatment.	APPLICATION RATE Prior to all other work, apply two applications of an approved herbicide with 15 days between the applications. Apply herbicide during weather conditions and at a rate per manufacturer's recommendations.	

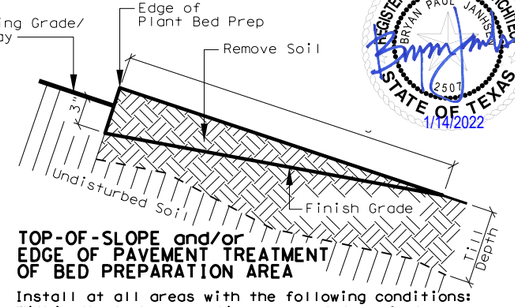
GENERAL BED PREPARATION NOTES:

1. Reference Item 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements not shown.
2. Reference Item 192.3 mark plant locations and bed outlines.
3. Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS power supply, lighting, signal wires and detectors, gas, electric, telephone, fiber optics, etc.
4. Locate and stake existing ground boxes, inlets, culverts, manholes, etc. within the project area with a 4' wooden stake painted orange. Maintain the stakes in place for duration of the project. Remove stakes when directed by engineer.
5. Repair any damage within right of way caused by contractor at no additional expense to the Department.
6. Provide a 1000 SF "mock up" of soil amendment, general use compost, and bed preparation complete and in place within an approved area for approval by engineer.
7. Pick-up litter prior to scalp mow and bed preparation.
8. All concrete, steel, trash, and other debris uncovered during bed preparation work which the engineer determines as detrimental to the project will become the responsibility of the contractor and disposed of in an approved manner. Debris removal will occur daily and will be incidental to bed preparation and will not be paid for separately.
9. Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
10. Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.
11. Clean and clear bed prep areas and nearby inlets of existing tall vegetation and any piles or layers of dead grass and weeds caused by drought or mowing operations by others.



PLANTING BED PREPARATION SECTION

SEE ITEMS AND REQUIREMENTS THIS SHEET FOR DIMENSIONS, RATES, AND SPECIFICATIONS
(See Top-of-Slope detail this sheet when applicable)



TOP-OF-SLOPE and/or EDGE OF PAVEMENT TREATMENT OF BED PREPARATION AREA

Install at all areas with the following conditions:
Within the bed preparation areas at top-of-slope (adjacent to shoulder sections and areas with slotted barrier/curb) and/or at edge of roadway, remove tilled or untilled (TYPE IV) soil as shown. Evenly distribute removed soil in a thin layer over adjacent existing tilled or untilled (TYPE IV) soil being careful not to create a mound. This work is incidental to Item 192 Plant Bed Prep Preparation.

REGISTERED LANDSCAPE ARCHITECT
BRYAN PAUL JAMISON
2507
STATE OF TEXAS
1/14/2022

Texas Department of Transportation

PLANTING AND ESTABLISHMENT

SHEET 4 of 8

Details not to scale BED PREPARATION

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				40
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	12	CHAMBERS	0389	02	057	SH 146

STD K-4

USE COMPOST TEA OR EXTRACT AS SHOWN ON THIS SHEET

COMPOST EXTRACT

ITEM 1006-6003 LANDSCAPE SOIL AMENDMENT (TYPE III) and
ITEM 1006-6004 LANDSCAPE SOIL AMENDMENT (TYPE IV) requirements.

MATERIALS REQUIREMENTS

Compost for use in liquid compost/extract must contain the following (per gram dry weight of compost):
1. Test within range of Soil Food Web standards using a full bio-assay to include the following:
   a) 15-25 micrograms of active bacteria,
   b) 100- 3000 micrograms total bacterial biomass,
   c) 15-25 micrograms active fungal biomass,
   d) 100-300 micrograms total fungal biomass,
   e) 10,000 each of flagellates and amoebae,
   f) 20-100 ciliates, and
   g) 20 to 30 beneficial nematodes.
2. Meet the Solvita Compost Maturity test of 6.0 or higher.

Liquid compost/extract must contain the following (per gram dry weight):
1. 150-3000 micrograms total bacterial biomass,
2. 2-20 micrograms total fungal biomass,
3. 1000 each of flagellates and amoebae,
4. 20-50 ciliates, and
5. 2-10 beneficial nematodes.

Liquid compost must be verified, with time and date, for content to have minimum activity and meet minimum standards as specified above using a 100x and 400x microscope with camera attachment by a Soil Foodweb Certified Advisor or their representative. This verification must be within 30 minutes of material leaving premises on the day of manufacture. Picture will be kept on file for each 500 gallons manufactured.

Liquid compost/extract additives include the following:
1. Mycorrhizal fungi endo/ecto blend sourced with a minimum potency of 100,000 propagules per pound with NO Tricoderma included in the innoculum.
2. Humate, low sodium, naturally processed 70% humate that has been liquefied to 12% humic-fulvic as available from Mesa Verde Resources at 877-418-8776 or approved equal.
3. Fulvic acid derived from natural shale ore as available from Sustainable Growth Texas at 936-232-5738 or approved equal.
4. Soluble kelp seaweed, dehydrated liquid extract made from the seaplant Ascophyllum nodosom as available from Sustainable Growth Texas at 936-232-5738, or approved equal.
5. Naturally derived blackstrap non-sulfured molasses (for foliar application only).

Liquid compost/extract with additives solution must sit on air for 3-4 hours and monitored every 1/2 hour with a Dissolved Oxygen Meter to assure the material does not drop below 6ppm oxygen content during full activation period.

EQUIPMENT REQUIREMENTS

For each batch use a delivery tank verified for overall cleanliness, to be free of residue, soil, compost or stains. Tank shall then be rinsed with clean non-chlorinated or non-chloramines treated well water before filling with Liquid Compost. All equipment used for application of liquid compost must have never been used or will not be used with any non organic conventional inorganic fertilizers or chemical herbicides or pesticides, owner must submit written verification to this.

Tank shall be equipped with two, 2 inch quick coupler type fittings capable of coupling, without leaks. All lines and fittings should have quick couplers at every junction. Ninety (90) degree bend fittings should be avoided for quick clean out and verification of cleanliness.

Delivery tank must be equipped with an operating circulation pump of a low velocity, high volume pump of diaphragm or centrifugal design.

Injectors capable of penetrating four (4) inches into soil and/or root balls as manufactured by LESCO Deeproot Feeder at 713-466-6730 or approved equal.

Delivery tank must be equipped with an operating aeration system.

Dissolved oxygen meter.

TRANSPORT, STORAGE AND APPLICATION REQUIREMENTS

Liquid compost/extract with additives solution must be circulated for five (5) minutes per five hundred (500) gallons of material every three (3) hours. Liquid compost/extract with additives solution must be continuously aerated from time of manufacture through complete application. All solution must be applied within 24 hours, or new material must be sourced. Materials not applied within 24 hours is not allowed.

CONSTRUCTION METHODS AND APPLICATION RATES

1006-6003 LANDSCAPE SOIL AMENDMENT (TYPE III) SY
Installation date: Install root injection 14 calendar days minimum to 30 calendar days maximum after plant installation.
Limits: Each injected tree and woody shrub equals one square yard of Landscape Soil Amendment (Type III).
Inject 1/2 gallon liquid compost/extract with additives solution four (4) inches into the root zone and/or rootball of each tree and woody shrub only. Mix additives with liquid compost/extract using the following rates:
1. Mycorrhizal fungi endo/ecto blend: 30 lbs per 500 gallons of liquid compost/extract,
2. Humate: 30 lbs per 500 gallons of liquid compost/extract,
3. Fulvic acid: 32 oz per 500 gallons of liquid compost/extract,
4. Soluble kelp seaweed: 2 lbs per 500 gallons of liquid compost/extract.

1006-6004 LANDSCAPE SOIL AMENDMENT (TYPE IV) SY
Installation date: Install first foliar application 30 calendar days minimum to 60 calendars days maximum after root injection described on this sheet. Additional foliar applications as described on following sheets.
Limits/measurement: Each SY of foliar spray equals each tree or woody shrub. Spray foliar application over all trees and woody shrubs.
Solution must be sprayed targeting the full surface of the plant including leaves (top and bottom), limbs and trunk.
Spray foliar application at the following rates:
1. Liquid compost/extract: 500 gallons per acre,
2. Humate: 2 lbs per acre,
3. Fulvic acid: 32 oz per acre,
4. Soluble kelp seaweed: 2 lbs per acre,
5. Blackstrap molasses: 16 oz per acre.

Soil Foodweb Certified Advisor:

Sustainable Growth Texas
103 Sherbrook Circle
Conroe, TX 77385
936-232-5738
sustainablegrowthtexas.com

Soil Foodweb Oregon, LLC
728 SW Wake Robin Ave.
Corvallis, Oregon 97333-1612
541-752-5066
soilfoodweb.com

Soil Foodweb New York, Inc.
555-7 Hallock Ave.
Port Jefferson Station, NY 11776
631-474-8848
soilfoodwebny.com

COMPOST TEA

ITEM 1006-6003 LANDSCAPE SOIL AMENDMENT (TYPE III) and
ITEM 1006-6004 LANDSCAPE SOIL AMENDMENT (TYPE IV) requirements.

MATERIALS REQUIREMENTS

Compost for use in liquid compost tea must contain the following (per gram dry weight of compost):
Test within range of Soil Food Web standards using a full bio-assay to include the following:
   a) 15-25 micrograms of active bacteria,
   b) 100- 300 micrograms total bacterial biomass,
   c) 15-25 micrograms active fungal biomass,
   d) 100-300 micrograms total fungal biomass,
   e) 10,000 each of flagellates and amoebae,
   f) Less than 50 ciliates, and
   g) No root feeding nematodes present.

Actively aerated compost tea must contain the following per milliliter as applied (measured after having passed through the actual application apparatus):
1. Meet the minimum desired ranges by Soil Food Web for:
   a. Active bacteria 10-150
   b. Total bacteria 150-3000
   c. Active Fungi 2-10
   d. Total Fungi 2-20
   e. Flagellages and amoebae 2000 combined
   f. Ciliates 50 or less
   g. No root feeding nematodes present

Tea is to be tested from application device a minimum once per month during each application cycle. Each batch of actively aerated compost tea must be qualitatively assessed using light microscope methods as established by Soil Food Web. Photographs of microscopy must be kept on file with a qualitative assay report.

If the following additives are used in tea brewing to meet the minimum biological standards, the additives must meet these standards.
   a) Fish Hydrolysate - certified organic manufacturers documentation verifying no oil extraction has occurred.
   b) Kelp - must be certified organic soluble extract.
   c) Humic Acid - certified organic water extracted.
   d) Molasses - certified organic blackstrap molasses.

Actively aerated compost tea must maintain dissolved oxygen level above 6 mg/l until application. Use a dissolved oxygen meter to monitor.

EQUIPMENT REQUIREMENTS

For each batch use a delivery tank verified for overall cleanliness, to be free of residue, soil, compost or stains. Tank shall then be rinsed with clean non-chlorinated or non-chloramines treated well water before filling with Liquid Compost Tea. All equipment used for application of liquid compost must have never been used or will not be used with any non organic conventional inorganic fertilizers or chemical herbicides or pesticides, owner must submit written verification to this nature.

Application pump must be high volume (greater than 3.0 gpm) and low pressure (less than 60 psi). Application pump must be a diaphragm type pump. Foliar application device must be capable of adequately covering front and backs of leaves. Foliar application device shall be Gunjet AA18-AL or approved equal.

Delivery tank must be equipped with an operating aeration system capable of maintaining 6 mg/l oxygen content.

Injectors capable of penetrating four (4) inches into soil and/or root balls as manufactured by LESCO Deeproot Feeder at 713-466-6730 or approved equal.

Dissolved oxygen meter.

TRANSPORT, STORAGE AND APPLICATION REQUIREMENTS

Actively aerated compost tea must be continuously aerated from time of manufacture through complete application. Materials not applied within 24 hours are not allowed.

CONSTRUCTION METHODS AND APPLICATION RATES

1006-6003 LANDSCAPE SOIL AMENDMENT (TYPE III) SY
Installation date: Install root injection 14 calendar days minimum to 30 calendar days maximum after plant installation.
Limits: Each injected tree and woody shrub equals one square yard of Landscape Soil Amendment (Type III).
Inject 1/2 gallon liquid compost tea with additives solution four (4) inches into the root zone and/or rootball of each tree and woody shrub only. Mix additives with compost tea using the following rates:
1. 8 ox/ Fish Hydrolysate per gallon.

1006-6004 LANDSCAPE SOIL AMENDMENT (TYPE IV) SY
Installation date: Install first foliar application 30 calendar days minimum to 60 calendar maximum after root injection described on this sheet. Additional foliar applications as described on following sheets.
Limits/measurement: Each SY of foliar spray equals each tree or woody shrub. Spray foliar application over all trees and woody shrubs.
Solution must be sprayed targeting the full surface of the plant including leaves (top and bottom), limbs and trunk.
Spray foliar application at the following rate:
1. Liquid compost tea: 500 gallons per acre.

Soil Foodweb Certified Advisor:

Sustainable Growth Texas
103 Sherbrook Circle
Conroe, TX 77385
936-232-5738
sustainablegrowthtexas.com

Soil Foodweb New York, Inc.
555-7 Hallock Ave.
Port Jefferson Station, NY 11776
631-474-8848
soilfoodwebny.com

Soil Foodweb Oregon, LLC
728 SW Wake Robin Ave.
Corvallis, Oregon 97333-1612
541-752-5066
oregonfoodweb.com

REGISTERED LANDSCAPE ARCHITECT
BRYAN PAUL JANNSEN
2507
STATE OF TEXAS
1/14/2022

Texas Department of Transportation

PLANTING AND ESTABLISHMENT

SHEET 5 of 8

Details not to scale COMPOST TEA/EXTRACT

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				41
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	12	CHAMBERS	0389	02	057	SH 146

ITEM 192 LANDSCAPE PLANTING MAINTENANCE REQUIREMENTS

After completion of the project installation, as shown in the plans and approved by the engineer, begin maintenance activities for a period of 90 calendar days as described in ITEM 192.3.15.
Payment in accordance with ITEM 192.5. is subject to completion of all scheduled maintenance activities, timeline may also be suspended for failure to complete scheduled maintenance activities.
All maintenance work is incidental and is not paid for separately unless otherwise shown on plans.
Reference Item 170 and 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown.
Notify engineer prior to each site visit, determination of the completeness of work will be done in the presence of the engineer same day as work activity.

DESCRIPTION OF WORK	TIMELINE (Days) 0 30 60 90											
	1 Thru 7	8 Thru 15	16 Thru 22	23 Thru 30	31 Thru 37	38 Thru 45	46 Thru 52	53 Thru 60	61 Thru 67	68 Thru 75	76 Thru 82	83 Thru 90
192.3.15.1. **WATERING** (See PLANTING AND ESTABLISHMENT SHEET 1 OF 6, VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES) and/or (See PLANTING AND ESTABLISHMENT SHEET 2 OF 6 VEGETATIVE WATERING SCHEDULE FOR PALMS ONLY)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
192.3.15.2. **MOWING, TRIMMING, AND EDGING** (From back of curb, retaining wall, barrier, and riprap to bed preparation areas, otherwise 6' width around outside edge of bed preparation areas, around and between planting bed preparation areas, including areas around any structures within the outer limits adjacent to the roadway) DO NOT MOW, TRIM, OR EDGE WITHIN 3' of ANY TREE		✓		✓		✓		✓		✓		✓
192.3.15.3. **PLANT BASIN, BED, AND WORKSITE MAINTENANCE** (Includes keeping all inlets within or near the bed preparation areas free of compost. Maintain bed preparation areas as shown below and reshape beds every 30 days or as site conditions and weather require. If no requirement is selected, maintain per Item 192.3.15.3)												
WEED CONTROL REQUIREMENT												
☑ Maintain weed-free per Item 192.3.15.3. Cord trimmers are not allowed. Replace damaged plants per Item 192.15.9. INVASIVE VINES MUST BE CHEMICALLY TREATED, NOT MANUALLY REMOVED.		✓		✓		✓		✓		✓		✓
☐ Maintain grasses and weeds at 24" maximum height. Eradicate all vines regardless of height, VINES MUST BE CHEMICALLY TREATED, NOT MANUALLY REMOVED. Eradicate invasive shrubs and trees as directed. Method must be either a spot-treatment chemical application such as a wick applicator or manual hand pulling of weeds. Hand-pull previously treated dead plants over 24" tall.												
192.3.15.4. **PLANT SUPPORTS** (Remove plant stakes and all appurtenances within last 10 days of this schedule unless this Item 192 maintenance period is followed by Item 193 establishment period, unless otherwise directed by engineer)												
192.3.15.5. **PRUNING** (Includes palm plant material and dead, diseased, or damaged palm fronds.)												
192.3.15.6. **INSECT, DISEASE, AND ANIMAL INSPECTION AND TREATMENT** (Exterminate all active ant colonies in bed preparation areas)		✓		✓		✓		✓		✓		✓
192.3.15.7. **LITTER AND DEBRIS COLLECTION AND DISPOSAL** (Includes planting bed preparation areas and designated mowing limits. In addition, keep all inlets within or near planting bed preparation areas free of debris and litter)		✓		✓		✓		✓		✓		✓
192.3.15.8. **TREE TRUNK WRAP AND PROTECTION GUARD REMOVAL AND DISPOSAL** (Not applicable)												
192.3.15.9. **PLANT REPLACEMENT***				✓				✓				✓
1006-6004 **SOIL AMENDMENT (TYPE IV)** (PLANTING AND ESTABLISHMENT SHEETS 4 AND 5 of 8, each application will be paid for separately)				✓								✓
1006-6005 **SOIL AMENDMENT (TYPE V)** (PLANTING AND ESTABLISHMENT SHEETS 4 AND 5 of 8, each application will be paid for separately)												✓
IRRIGATION SYSTEM (Only when Item 170 Irrigation System or a temporary irrigation system is part of the contract, see IRRIGATION DETAILS AND MATERIALS SHEET 1 OF 3, GUARANTEE AND ACCEPTANCE)												

* Remove any materials damaged by actions described in Item 7.18.1. Removal and disposal of damaged materials is incidental to Item 192. Contract er may be reimbursed for plant replacement in accordance with Item 7.18.1. Theft is not a reimbursable repair.

✓ = Work required during defined period of timeline. All work must be completed for entire project.

NOTES:
1. Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
2. Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.

REGISTERED LANDSCAPE ARCHITECT BRYAN PAUL JAMES 2507 STATE OF TEXAS 1/14/2022

Texas Department of Transportation

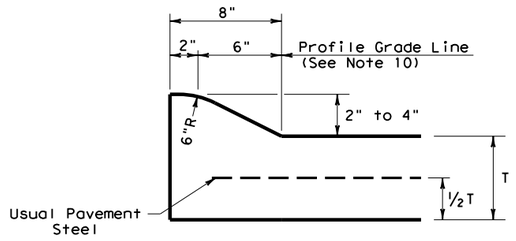
PLANTING AND ESTABLISHMENT

SHEET 7 OF 8

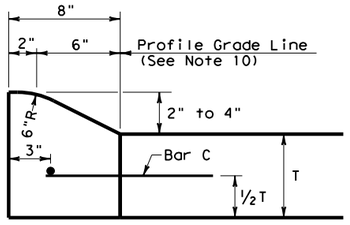
MAINTENANCE

FILE:	FED DIV	STATE	PROJECT NUMBER			SHEET
	6	TEXAS				42
REVISIONS: FEB 2015 for 2014 specs	DIST	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	12	CHAMBERS	0389	02	057	SH 146

DATE:
FILE:



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



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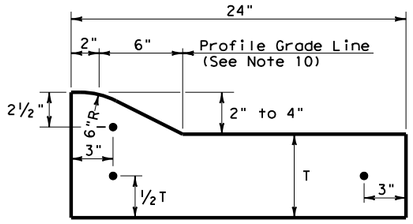
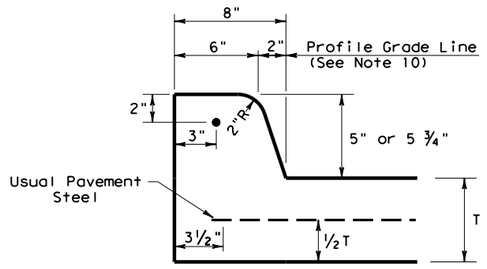
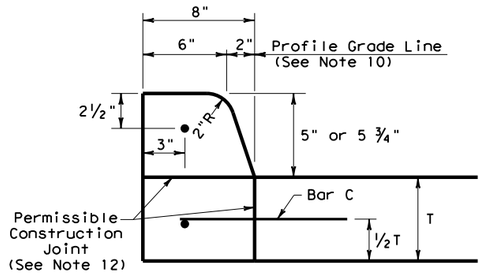
2" - 4" HEIGHT



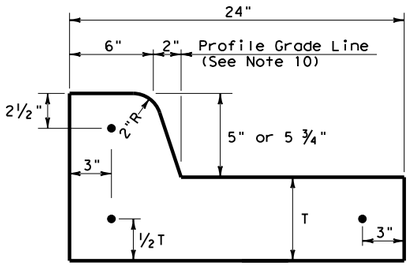
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



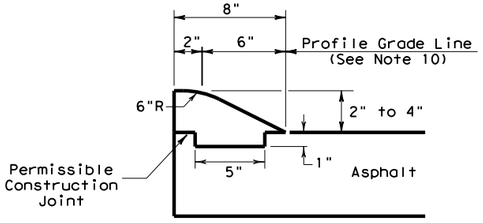
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



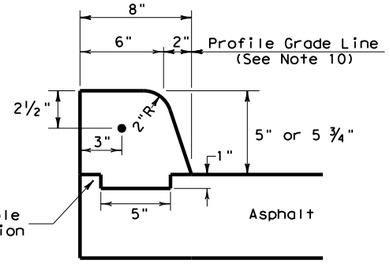
TYPE II CURB
5" - 5 ¾" HEIGHT



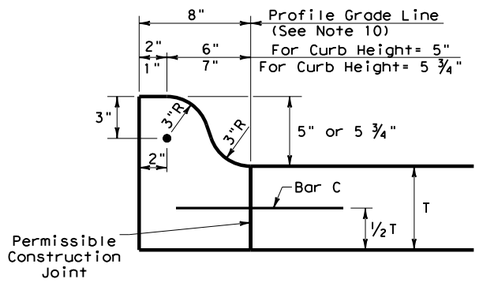
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



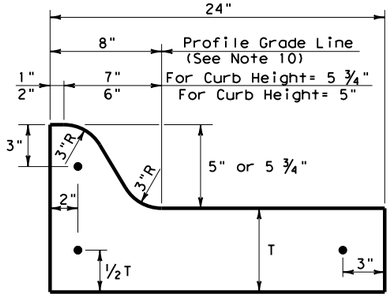
TYPE III CURB (KEYED)
2" - 4" HEIGHT



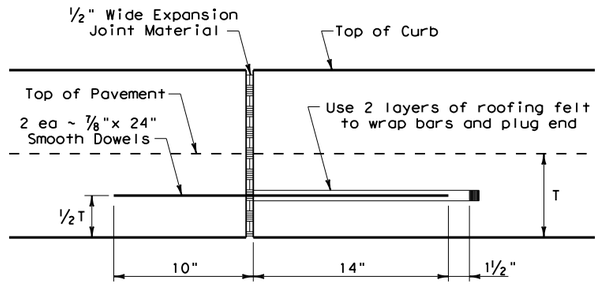
TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

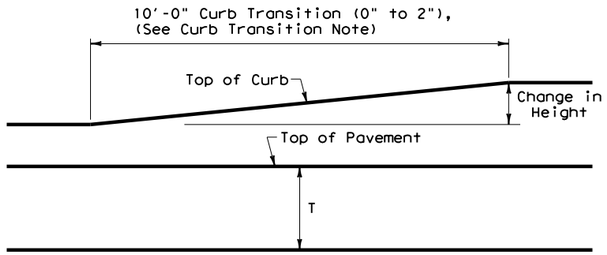


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

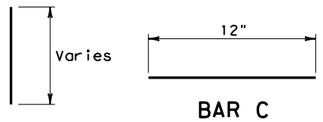
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



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

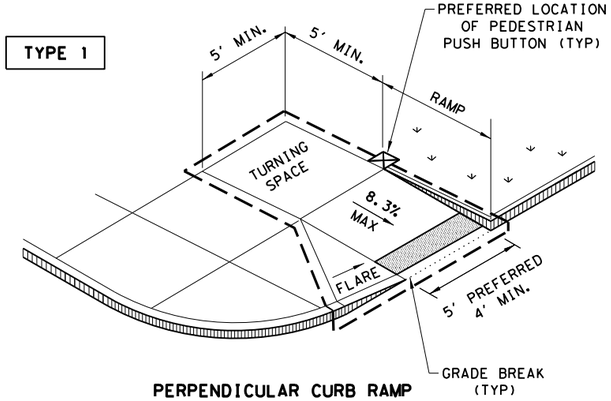
CONCRETE CURB AND CURB AND GUTTER

CCCG-21

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: SS	CK: KM
©TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	038902	057		SH 146
	DIST	COUNTY		SHEET NO.
	BMT	CHAMBERS		43

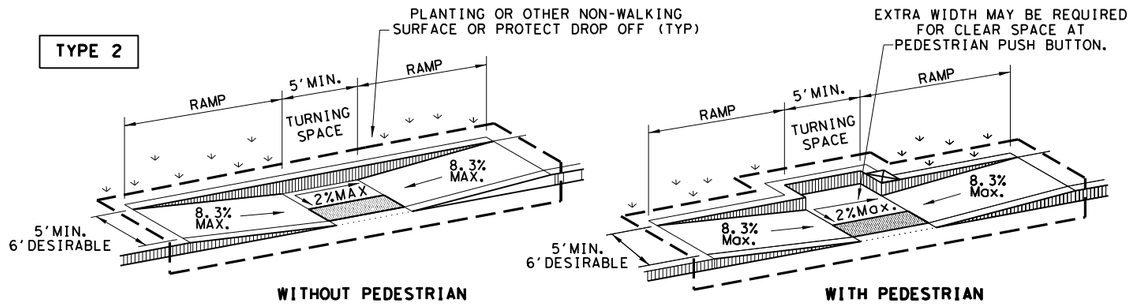
DATE: 1/28/2022
FILE: T:\BMTDESGN\Projects\0389-02-057_SH146_Landscape\DGN\Standards\ped18.dgn

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

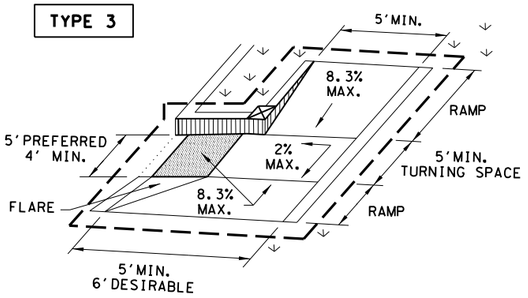


WITHOUT PEDESTRIAN PUSH BUTTON

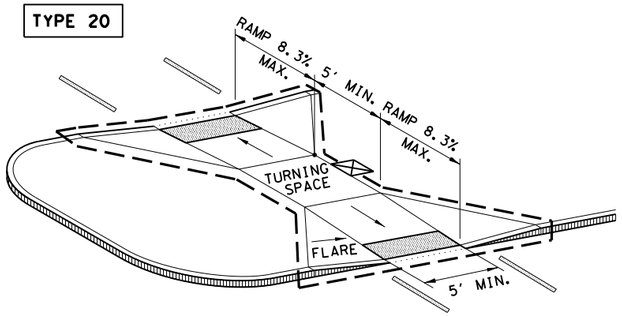
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

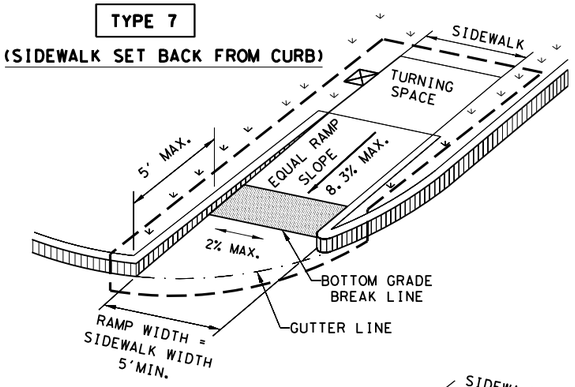


TYPE 20

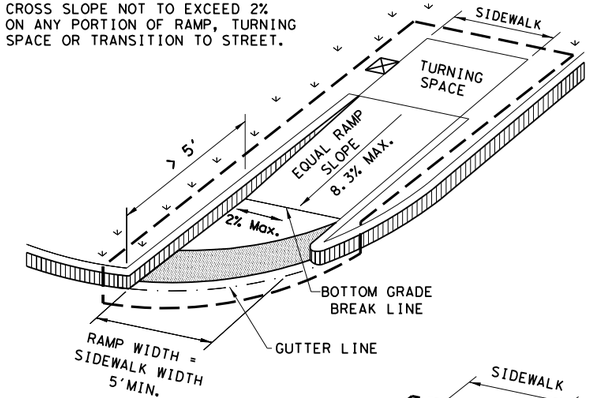


CURB RAMPS AT MEDIAN ISLANDS

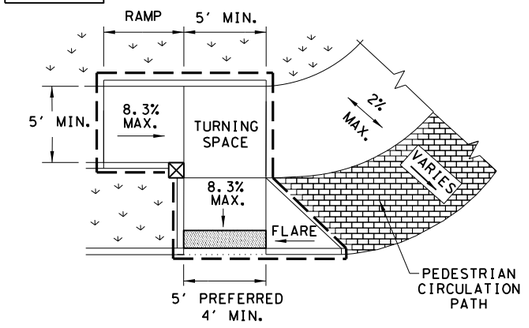
TYPE 7
(SIDEWALK SET BACK FROM CURB)



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

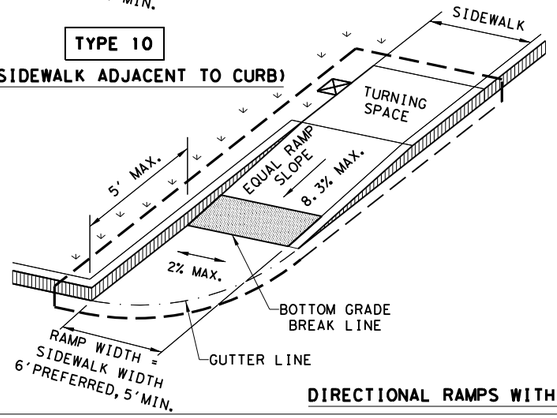


TYPE 6

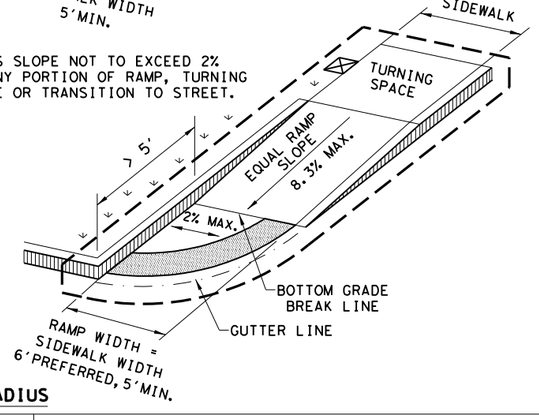


COMBINATION CURB RAMPS

TYPE 10
(SIDEWALK ADJACENT TO CURB)

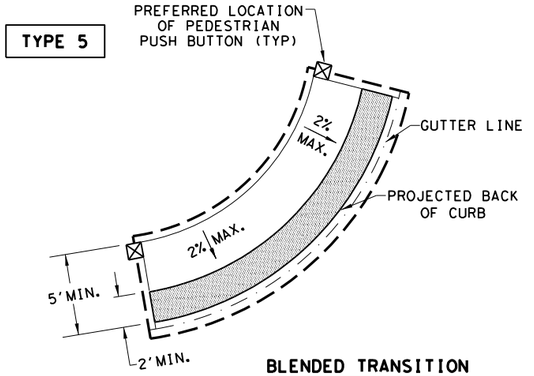


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

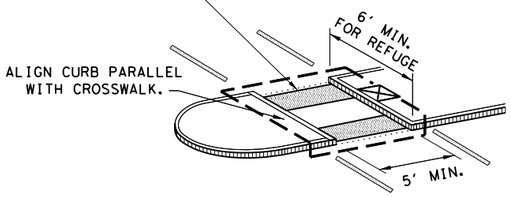
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

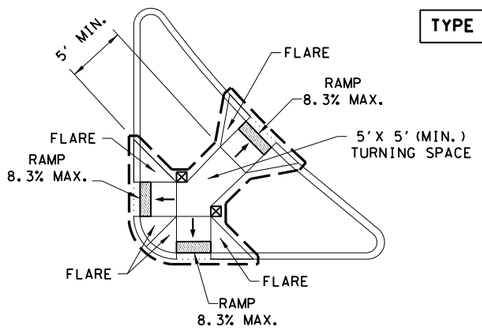
TYPE 21

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



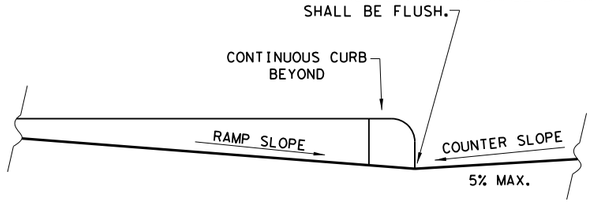
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

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



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

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

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

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	BMT	CHAMBERS		44

DATE: 1/28/2022
FILE: T:\BMTDESGN\Projects\0389-02-057_SH146_Landscape\DGN\Standards\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

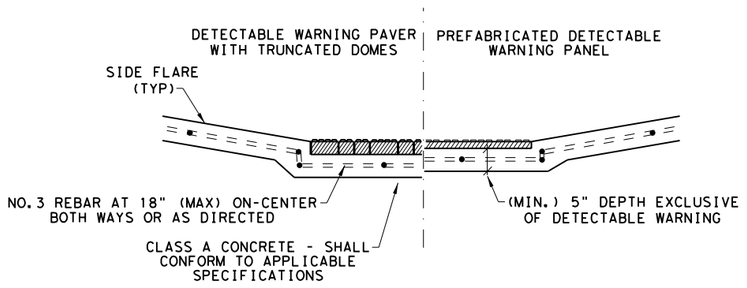
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material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

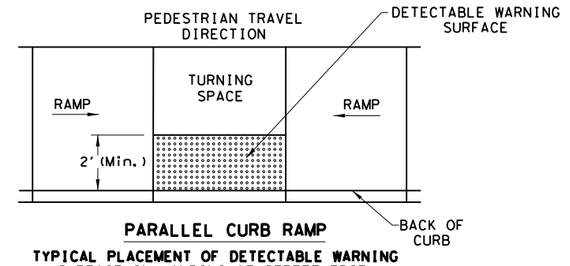
SIDEWALKS

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.

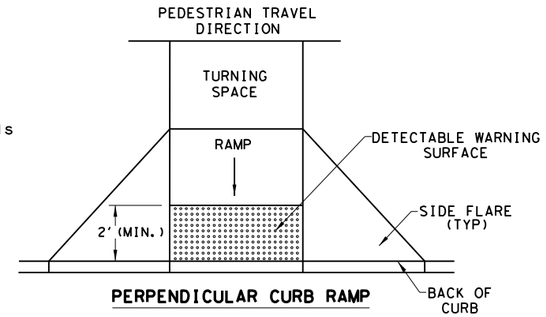


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

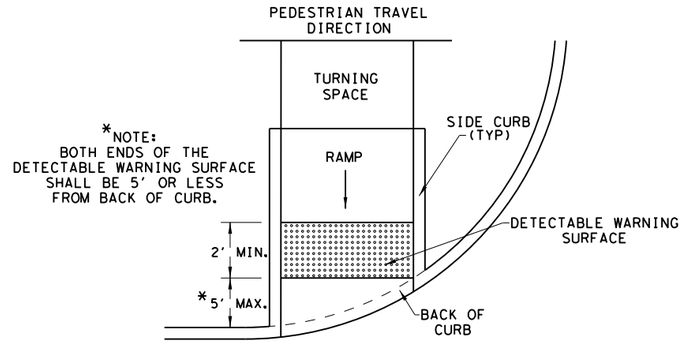
DETECTABLE WARNING SURFACE DETAILS



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

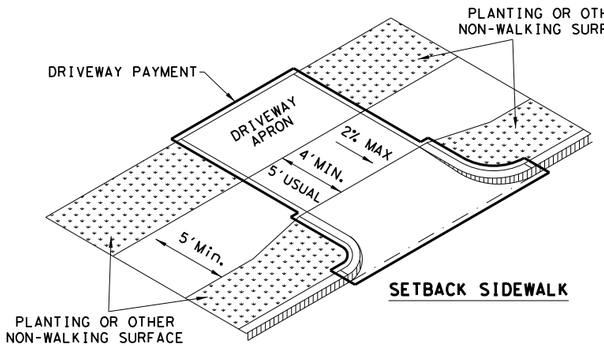
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

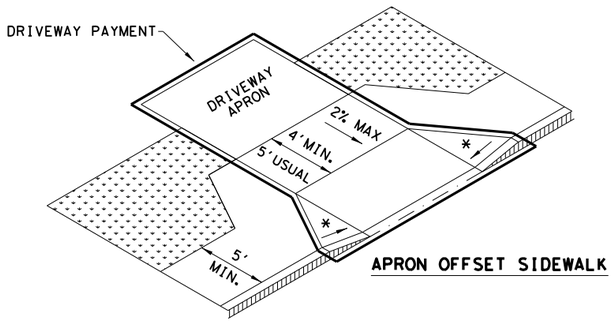
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0389	02	057		SH 146
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY			SHEET NO.
	BMT	CHAMBERS			45

DATE: 1/28/2022
FILE: T:\BMTDESGN\Projects\0389-02-057_SH146_Landscape\DGN\Standards\ped18.dgn

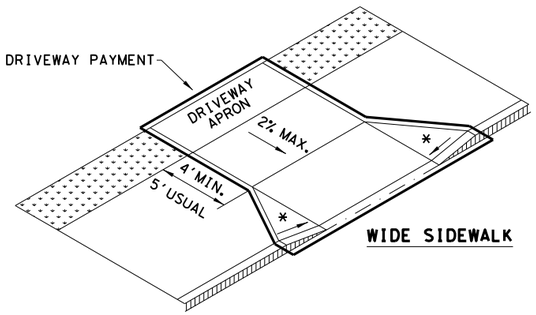
SIDEWALK TREATMENT AT DRIVEWAYS



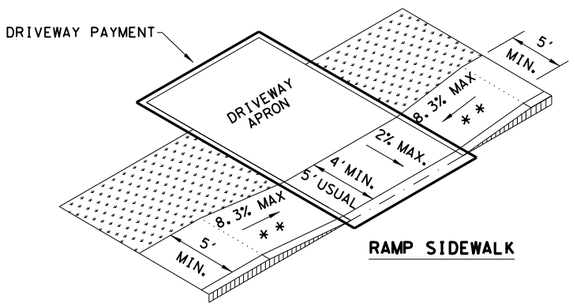
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

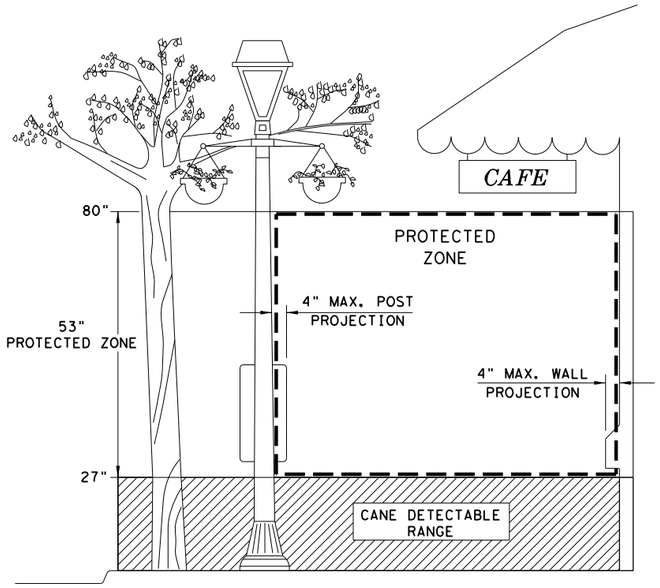


RAMP SIDEWALK

NOTES:

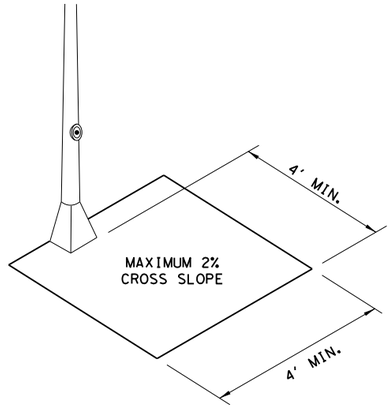
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

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

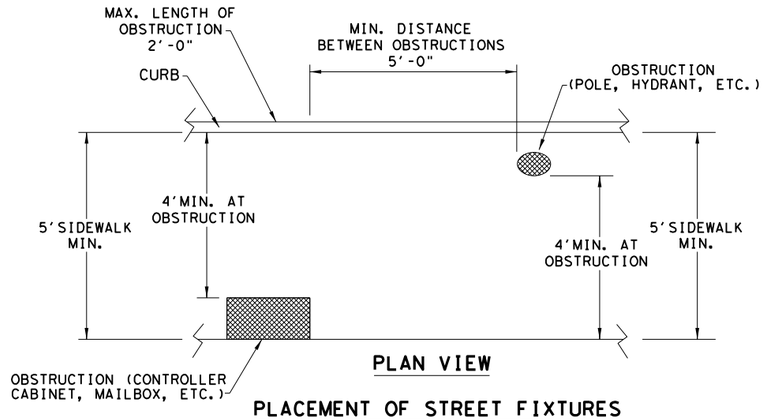


PROTECTED ZONE

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



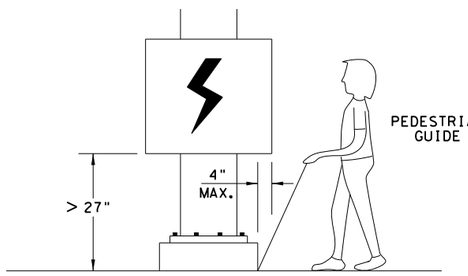
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



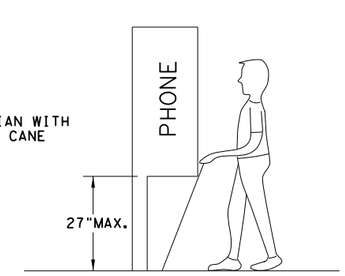
PLAN VIEW

PLACEMENT OF STREET FIXTURES

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



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



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

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

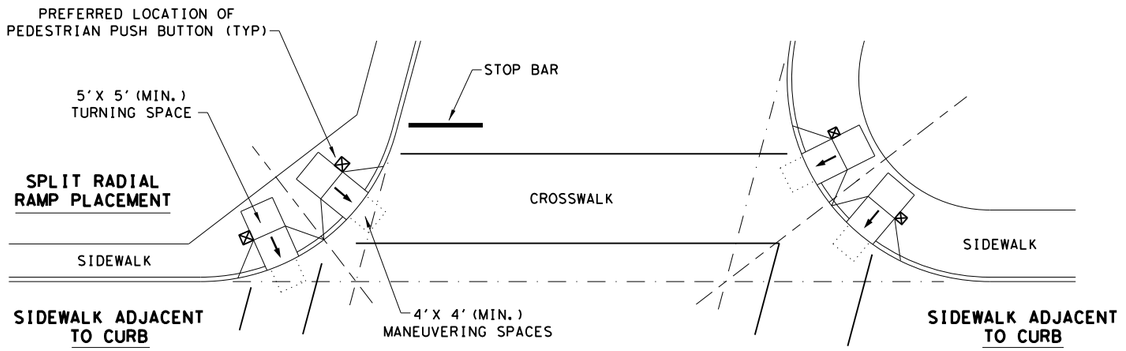
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0389	02	057	SH 146	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.	
	BMT	CHAMBERS		46	

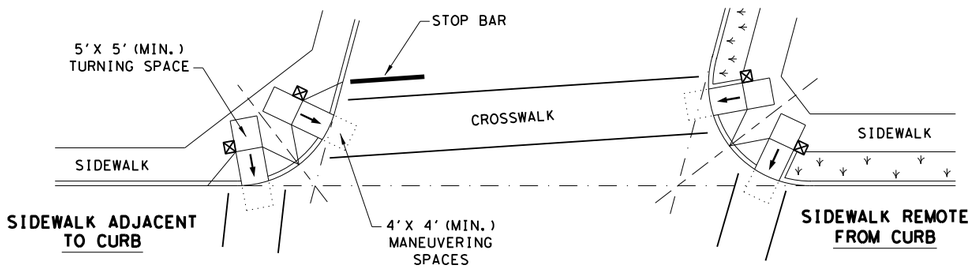
DATE: 1/28/2022
FILE: T:\BMTDESGN\Projects\0389-02-057_SH146_Landscape\DGN\Standards\ped18.dgn

TYPICAL CROSSING LAYOUTS

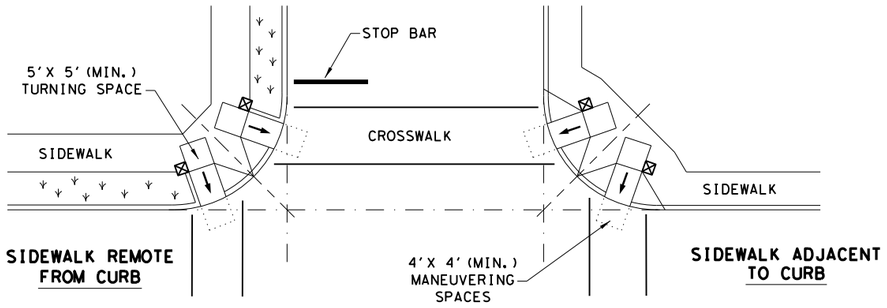
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



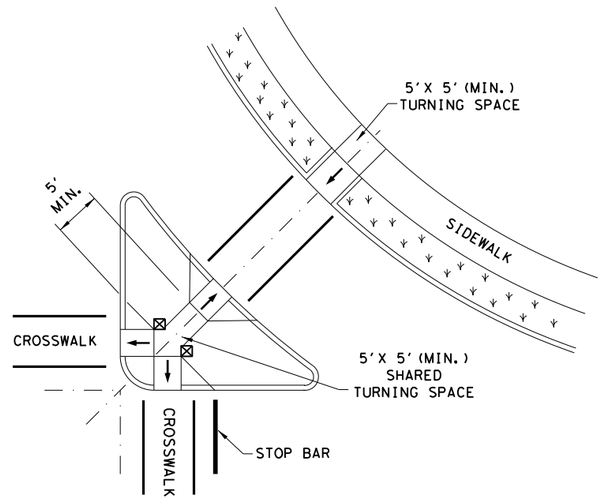
SKEWED INTERSECTION WITH "LARGE" RADIUS



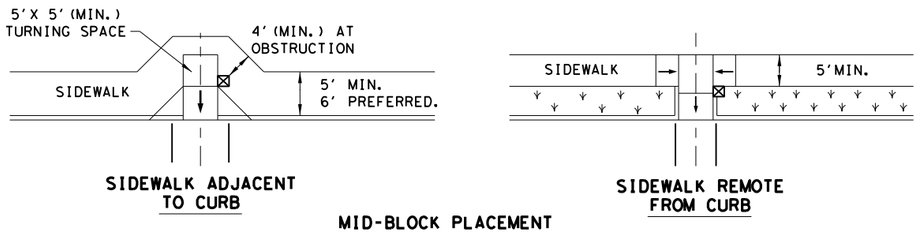
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

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

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

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	BMT	CHAMBERS		47

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

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

Number of Posts (1 or 2)

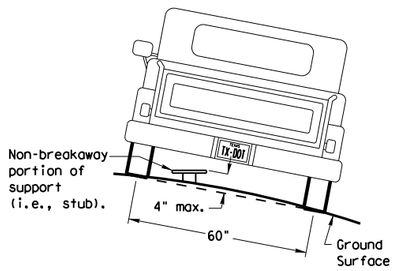
Anchor Type

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

Sign Mounting Designation

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

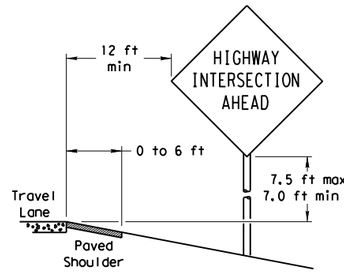
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

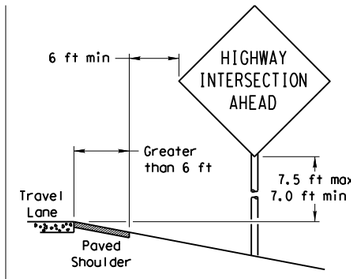
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

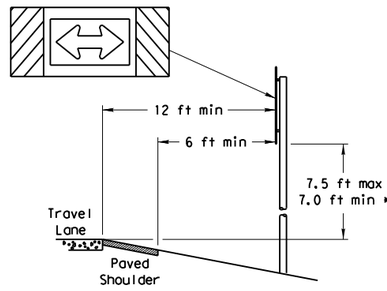
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



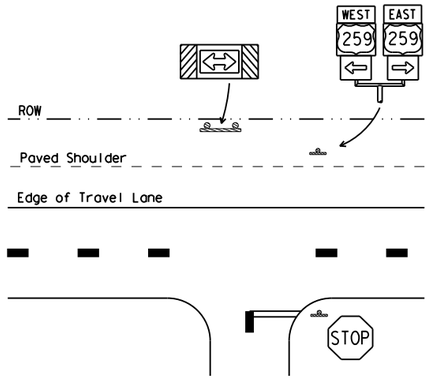
GREATER THAN 6 FT. WIDE

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.

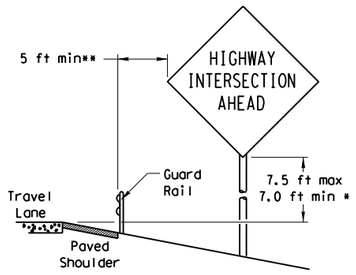
T-INTERSECTION



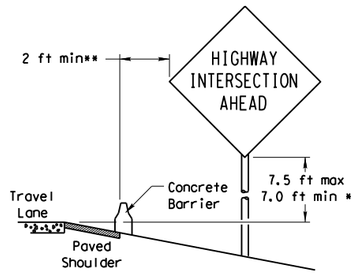
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

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

* 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

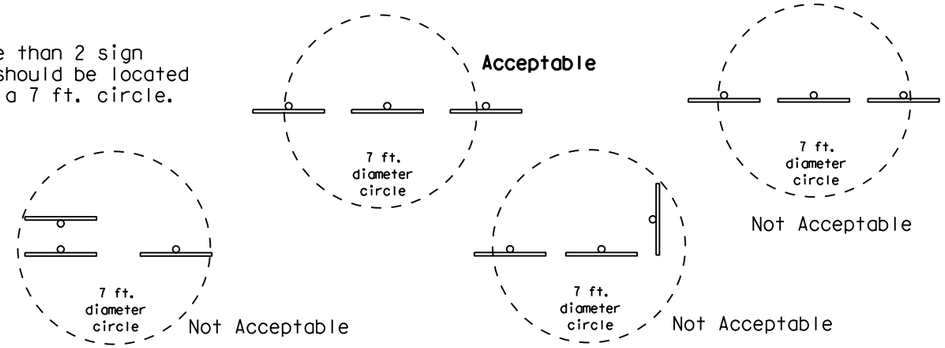
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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.

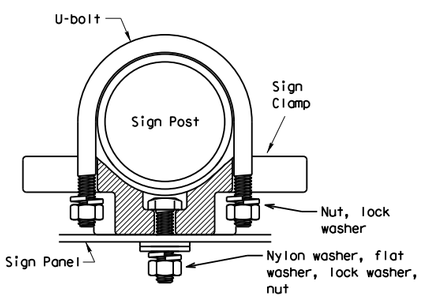
The website address is:
http://www.txdot.gov/publications/traffic.htm

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

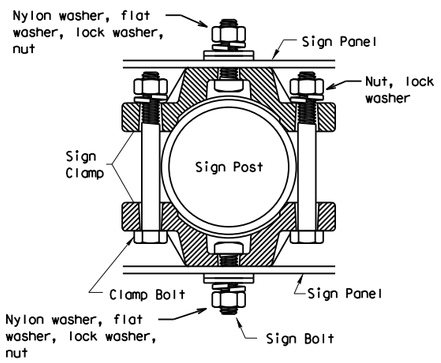


TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



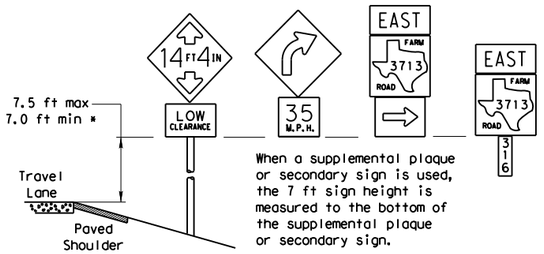
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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

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

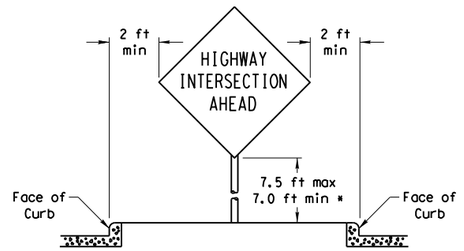
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



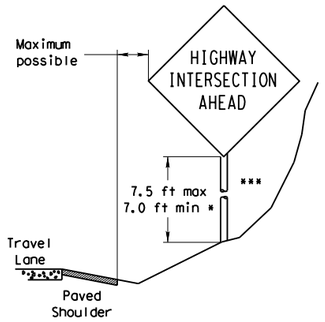
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



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

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

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS
9-08

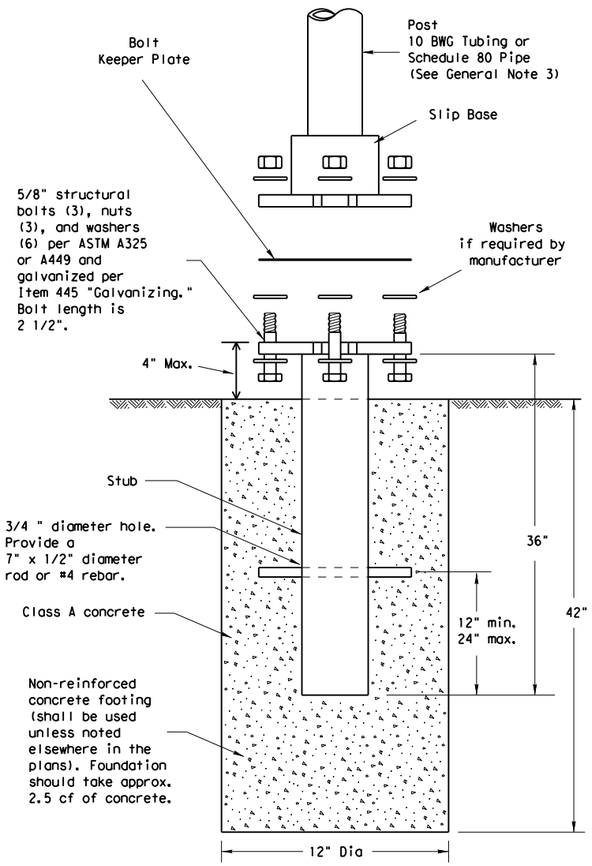
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0389	02	057	SH 146

DIST	COUNTY	SHEET NO.
BMT	CHAMBERS	48

DATE: 1/28/2022 11:29:28 AM
FILE: T:\BMTDESGN\Projects\0389-02-057*SH146*Landscape\DGN\Standards\smdgen.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.

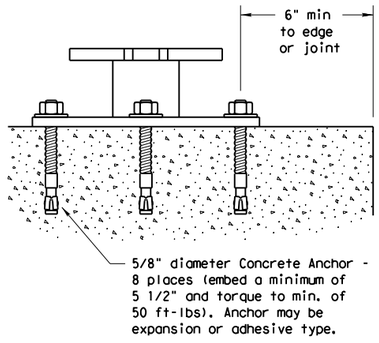
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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

©TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0389	02	057	SH 146
	DIST	COUNTY		SHEET NO.
	BMT	CHAMBERS		49

DATE: 1/28/2022 11:29:30 AM
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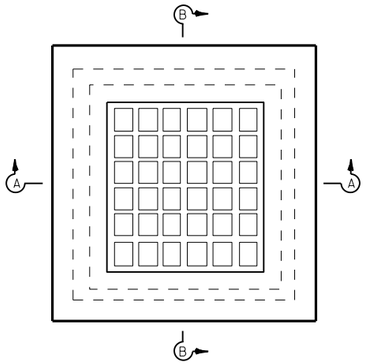
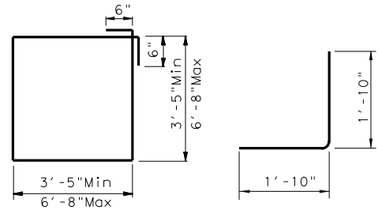
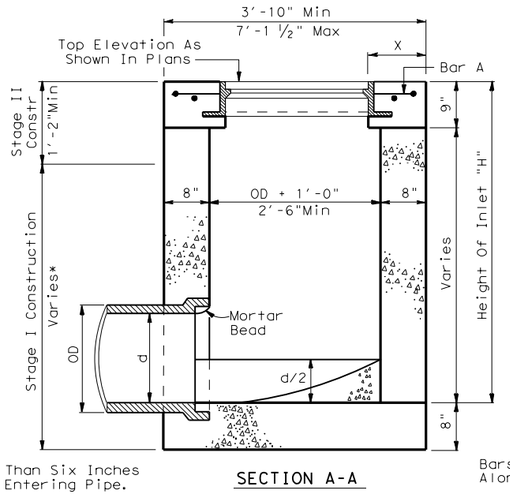


PLAN



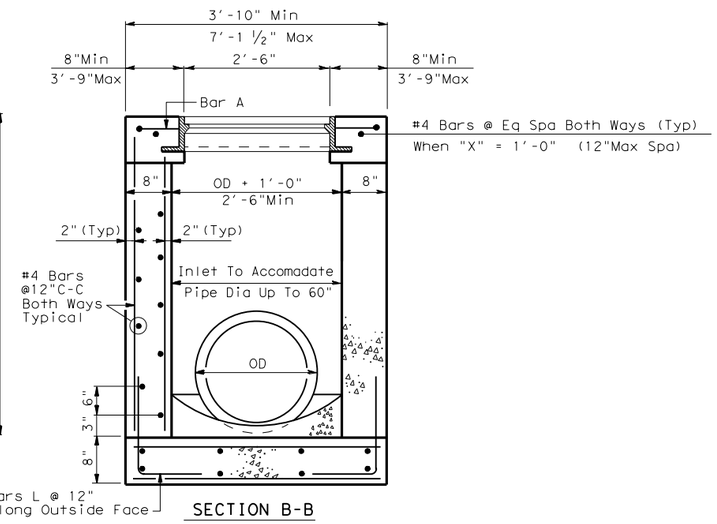
BAR A (#4)

BAR L (#4)



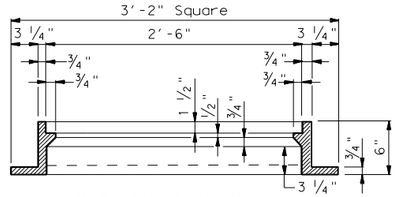
* But Not Less Than Six Inches
Over Highest Entering Pipe.

SECTION A-A

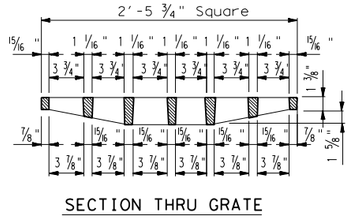


SECTION B-B

TYPE A INLET



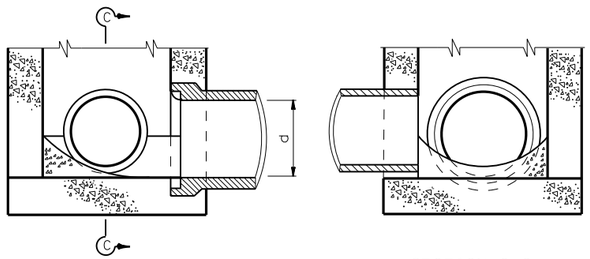
SECTION THRU FRAME



SECTION THRU GRATE

FRAME AND GRATE

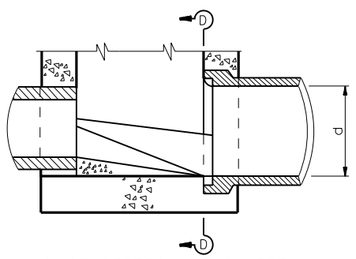
Neenah No. R3418-A
EJIW No. V-4880-1



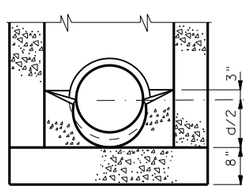
PART SECTION AT INVERT

SECTION C-C

Showing Shaping Of Invert, Pipe Entering From Adjacent Sides



PART SECTION AT INVERT



SECTION D-D

Showing Shaping Of Invert, Pipe Entering From Opposite Sides

GENERAL NOTES:

Where Size Of Pipes Passing Thru Inlet Exceeds 30" Increase Inside Width To Outside Diameter Of Pipe Plus 1'-0" (OD + 1'-0").

See Standard or Detail Sheet For Excavation and Backfill Diagrams.

Inlets Shall Be Built To Stage I And Finished After All Grading Operations Are Substantially Completed.

Frames And Grates May Be Gray Cast Iron.

Shop Drawings Will Be Required For Precast Construction Of Inlets.

NOT FOR TRAFFIC LOADS

REGISTERED LANDSCAPE ARCHITECT
BRYAN PAUL JANIS
2507
STATE OF TEXAS
1/14/2022

d = Diameter

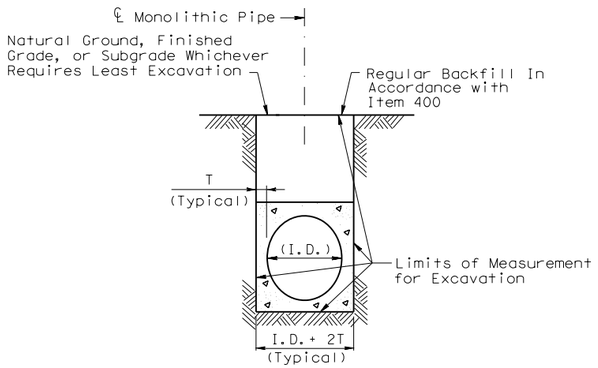
Texas Department of Transportation

INLET TYPE A

HIL-A

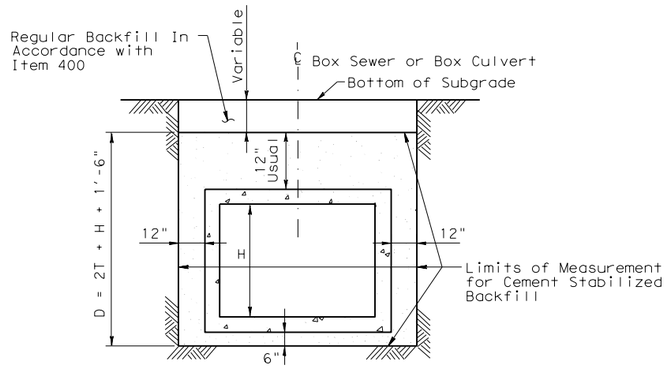
FILE: STDD4.DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	STD:	
© TxDOT 2014	DIST	FED REG	PROJECT NO.			SHEET
REVISIONS	HOUS	6				50
9/30/2016: Removed Manhole Steps	COUNTY			CONTROL	SECT	JOB	HIGHWAY
	CHAMBERS			0389	02	057	SH146

STDD4.DGN



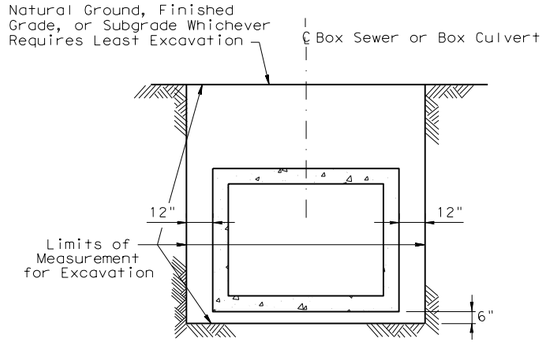
EXCAVATION DETAIL

MONOLITHIC PIPE
IN A PAVED OR GRADED AREA



BACKFILL DETAIL

BOX CULVERTS
IN A GRADED OR PAVED AREA
INCLUDING DETOURS *



EXCAVATION DETAIL

BOX CULVERTS
IN A GRADED AREA

REINFORCED CONCRETE PIPE

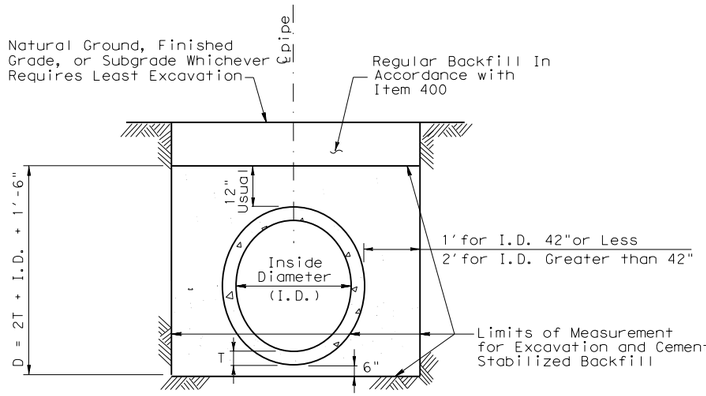
EXCAVATION AND BACKFILL QUANTITIES

PIPE DIA. IN.	T FT.	CULVERT OR SEWER EXCAVATION IN A PAVED OR GRADED AREA C.Y. PER L.F. PER FT. OF DEPTH	CEMENT STABILIZED BACKFILL IN A PAVED OR GRADED AREA C.Y. PER L.F. OF PIPE
18	0.19	0.144	0.383
24	0.23	0.165	0.478
30	0.29	0.188	0.586
36	0.33	0.210	0.692
42	0.38	0.231	0.808
48	0.42	0.327	1.394
54	0.46	0.349	1.560
60	0.50	0.370	1.731
66	0.54	0.392	1.907
72	0.58	0.414	2.088
78	0.62	0.435	2.275
84	0.67	0.457	2.474

MONOLITHIC PIPE

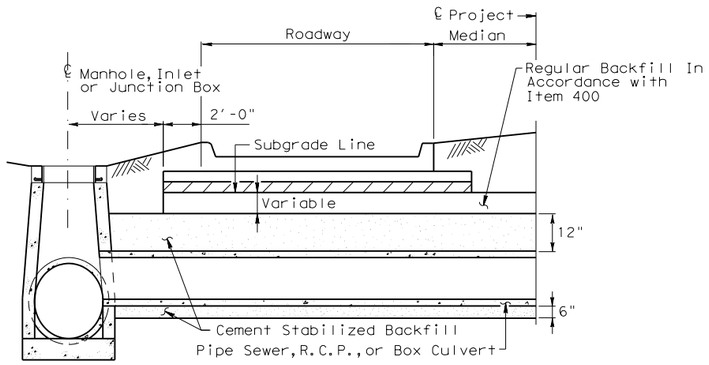
EXCAVATION QUANTITIES

PIPE DIA. IN.	T FT.	EXCAVATION C.Y. PER L.F. PER FT. OF DEPTH
36	0.417	0.142
42	0.458	0.164
48	0.458	0.182
54	0.500	0.204
60	0.583	0.228
66	0.583	0.247
72	0.625	0.269
78	0.625	0.287
84	0.625	0.306



EXCAVATION & BACKFILL DETAIL

REINFORCED CONCRETE PIPE
IN A GRADED OR PAVED AREA
INCLUDING DETOURS



BACKFILL DETAIL

AT MANHOLE, INLET OR JUNCTION BOX

NOTE:

Cement stabilized backfill may be omitted in private driveways as indicated elsewhere in the plans.

Rubber gaskets shall be required for all joints on proposed cross drainage, pipe culverts and proposed storm sewer systems, unless otherwise shown in the plans.

* Backfill with cement stabilized material will be required for all structures under detours unless noted otherwise in the General Notes.

D = Depth
H = Height
T = Thickness
R = Radius
Dia = Diameter

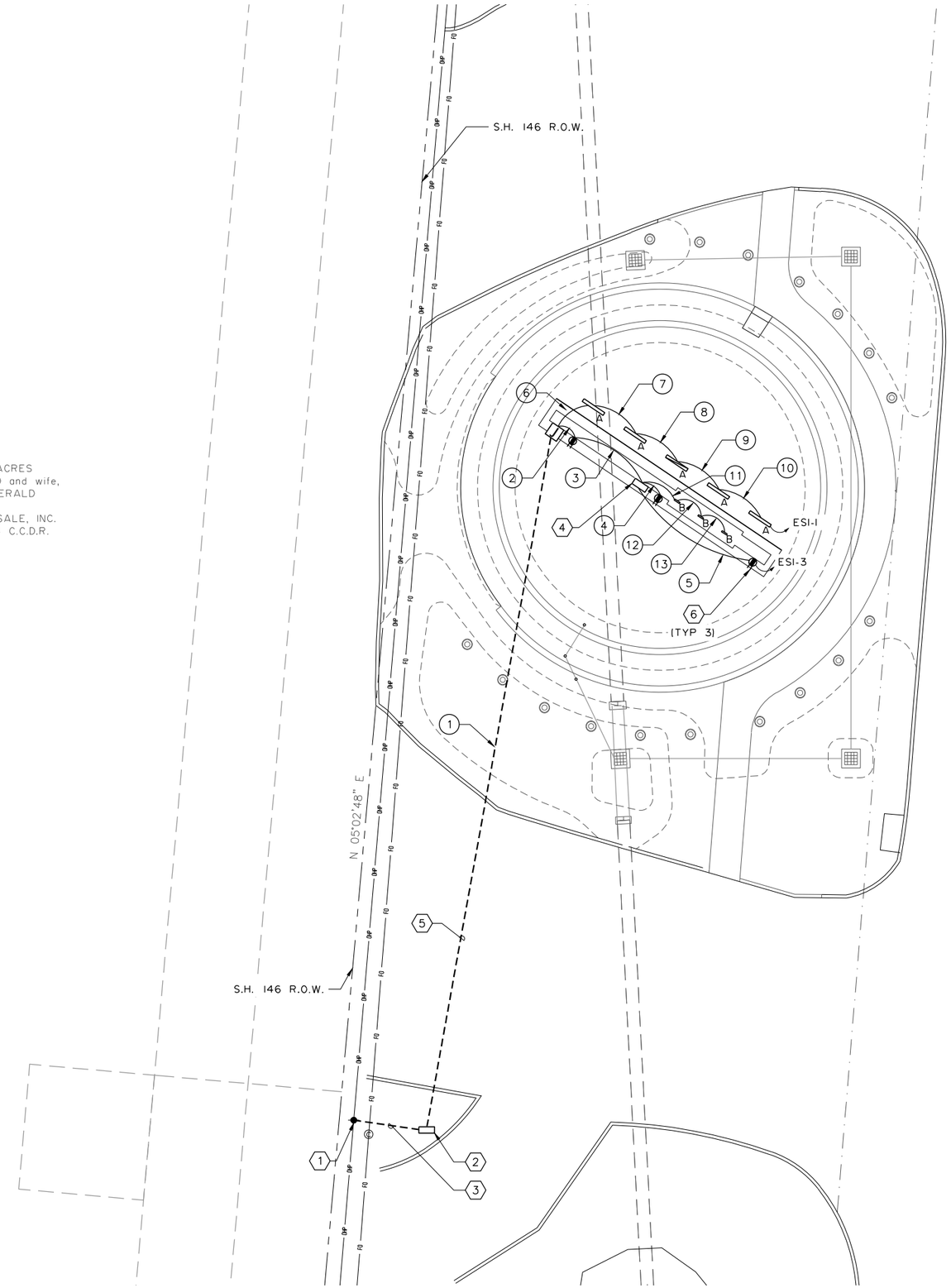
REGISTERED LANDSCAPE ARCHITECT
BRYAN PAUL JANISCH
2507
STATE OF TEXAS
1/14/2022

Texas Department of Transportation

EXCAVATION AND BACKFILL DIAGRAMS

E&BD

FILE: STDE1.DGN	DN: TxDot	CK: TxDot	DW: TxDot	CK: TxDot
© TxDOT FEB 2010	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS REVISED 11/05 REVISED 2/2010 Added note to Table 1, Sht 2 of 2. REVISED 6/12 REVISED 9/14	HOUSTON	6		51
	COUNTY		CONTROL SECT JOB	HIGHWAY
	CHAMBERS		0389 02 057	SH146



CALLED 11.000 ACRES
JOHN M. FITZGERALD and wife,
MABLE M. FITZGERALD
TO
PETROLEUM WHOLESALE, INC.
VOL. 478, PG. 284 C.C.D.R.
7-6-1981

STATE HIGHWAY 146
VARIABLE WIDTH
PUBLIC RIGHT-OF-WAY
(SPEED LIMIT - 45 MPH)

GENERAL NOTES:

1. CONTRACTOR IS TO UPSIZE CIRCUIT CONDUCTORS FOR LIGHTING OR BRANCH POWER CIRCUITS LONGER THAN 100FT TO ACCOUNT FOR VOLTAGE DROP.
2. REFER TO ARCHITECTURAL ELEVATIONS AND SECTIONS FOR EXACT LIGHT FIXTURE LOCATIONS. MARK LOCATIONS FOR TXDOT AND CITY APPROVAL PRIOR TO WORK.
3. CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION, FEES, INSPECTIONS, AND COSTS FOR INSTALLATION.
4. ELECTRICAL METER USAGE BILLING WILL BE THE RESPONSIBILITY OF CITY OF BAYTOWN. CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH CITY AND UTILITY PROVIDER.
5. CONTRACTOR IS RESPONSIBLE FOR PRODUCING AND PROVIDING AS-BUILT CONSTRUCTION DRAWINGS FOR TXDOT AND CITY.
6. ALL CONDUIT MUST BE CONCEALED BELOW GRADE OR WITHIN STRUCTURE. SURFACE MOUNT CONDUIT IS NOT ACCEPTABLE. ALL BOXES AND ENCLOSURE ARE TO BE RECESSED AND FLUSH WITH FINAL SURFACE.
7. ALL ELECTRICAL FIXTURES, LIGHT FIXTURES, CONDUIT, CONDUCTORS, AND OTHER ASSOCIATED DESIGN COMPONENTS INTEGRAL TO GATEWAY SHALL BE CONSIDERED INCIDENTAL TO LANDSCAPE AMENITIES. ELECTRICAL CONDUIT, CONDUCTORS, SERVICES, AND ENCLOSURES THAT ARE SEPARATE FROM THE GATEWAY SHALL BE PROVIDED BY THE CONTRACTOR UNDER THEIR TXDOT STANDARD BID QUANTITIES. REFER TO SHEET LI.04.

KEY NOTES: "⬡"

1. ELECTRICAL POINT OF CONNECTION, UTILITY TERMINAL POWER POLE WITH TRANSFORMER. EXACT LOCATION SHALL BE APPROVED BY CENTERPOINT ENERGY PRIOR TO CONSTRUCTION.
2. NEW ELECTRICAL METER AND POWER PANEL "ESI". CONTRACTOR SHALL UTILIZE AN EXTERIOR RATED NEMA 3R POWER PEDESTAL SYSTEM WITH INTEGRATED METER, PANEL, CONTACTOR AND PHOTOCELL. PAINT TO MATCH BRICK COLOR.
3. ELECTRICAL UTILITY SECONDARY UNDERGROUND FEEDER TO UTILITY METER AND PANEL. CONDUIT AND CONDUCTOR SIZING. PER TABLE 300.5 NEC CODE, CONDUIT DEPTH SHALL BE AT LEAST 24" UNDER THE DRIVEWAY.
4. REMOTE POWER SUPPLY ENCLOSURE, RE: WIRING DIAGRAM SHEET E2.00.
5. 2"C BORE UNDER DRIVEWAY FOR ELECTRICAL SERVICE TO GATEWAY.
6. PROVIDE 20A, GFCI DUPLEX RECEPTACLE WITH LOCKABLE, WEATHER RATED WHILE IN USE ENCLOSURE. ENCLOSURE MUST BE WIREMOLD XB814C520BK OR APPROVED EQUAL. INSTALL ENCLOSURE PER MANUFACTURERS RECOMMENDATIONS. THE RECEPTACLE, ENCLOSURE, AND RELATED EQUIPMENT ARE INCIDENTAL TO THE LANDSCAPE AMENITIES AND NOT PAID SEPARATELY.

0 10' 20'
SCALE IN FEET

NORTH

FREESE NICHOLS
10497 Town and Country Way,
Suite 600
Houston, Texas 77024
Phone - (713) 600-6800
Web - www.freese.com

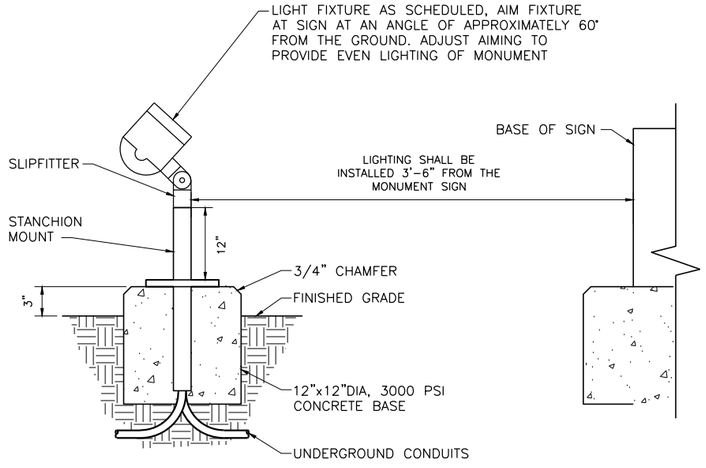
01/14/2022

STATE OF TEXAS
DANIEL W. KOSS
110037
LICENSED
PROFESSIONAL ENGINEER

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
ELECTRICAL SITE PLAN
SHEET 14 OF 25

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			52
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146

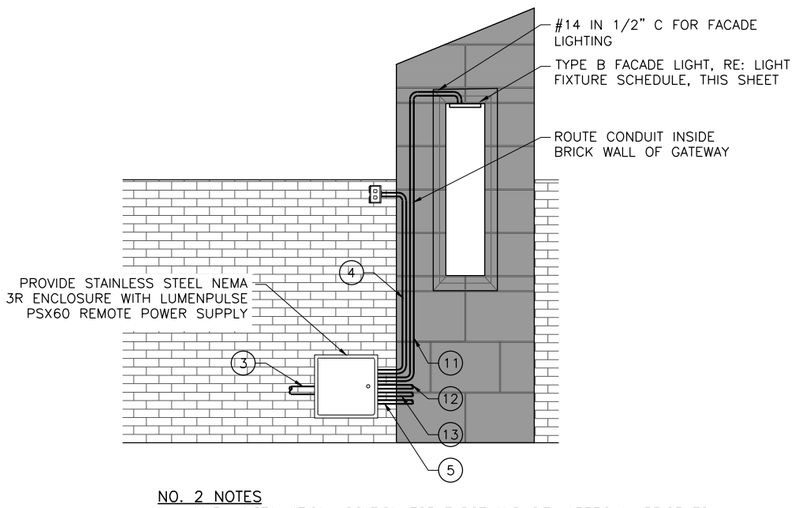


NO.1 NOTES

1. SUBMIT SAMPLE FOR TXDOT AND CITY APPROVAL PRIOR TO WORK.

1 – GROUND FLOOD LIGHT

NOT TO SCALE



NO. 2 NOTES

1. MARK INSTALLATION LOCATION FOR TXDOT AND CITY APPROVAL PRIOR TO WORK
2. SUBMIT SAMPLE FOR TXDOT AND CITY APPROVAL PRIOR TO WORK.

2 – LOW VOLTAGE WIRING RISER

NOT TO SCALE

GENERAL NOTES:

I. ALL ELECTRICAL FIXTURES, LIGHT FIXTURES, CONDUIT, CONDUCTORS, AND OTHER ASSOCIATED DESIGN COMPONENTS INTEGRAL TO GATEWAY SHALL BE CONSIDERED INCIDENTAL TO LANDSCAPE AMENITIES. ELECTRICAL CONDUIT, CONDUCTORS, SERVICES, AND ENCLOSURES THAT ARE SEPARATE FROM THE GATEWAY SHALL BE PROVIDED BY THE CONTRACTOR UNDER THEIR TXDOT STANDARD BID QUANTITIES. REFER TO SHEET LI.04.

ELEC. SERVICE NO.	SHEET NO.	ELECTRICAL SERVICE DESCRIPTION (SEE ED (4) & (5) -03)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CIRCUIT BREAKER POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBOARD LOAD CENTER AMP RATING	CIRCUIT NO.	BRANCH CIRCUIT BREAKER POLE/AMP	BRANCH CIRCUIT	KVA LOAD
1	14	ELC SRV TY D 120/240 060 NS AL E PS U	4		60	2P/60A		60				
									1 GROUND MOUNTED LIGHTS	1P/20A	0.88	106
									3 FAÇADE LIGHTING AND SIGN RECEPTACLES	1P/20A	4.69	563

ES01 - SUMMARY OF CONDUIT AND CONDUCTORS														
SHEET NO.	RUN NO.	RUN LENGTH	CIRCUIT	CONDUIT TYPE	CONDUIT									
					2 IN. PVC SCH 40 (BORE)	2 IN. PVC SCH 40	1 IN. PVC SCH 40	1/2 IN. PVC SCH 40	ELEC CONDR (NO. 10) BARE		ELEC CONDR (NO. 10) INSULATED		ELEC CONDR (NO. 14) INSULATED	
									QA	LENGTH	QA	LENGTH	QA	LENGTH
14 of 25	1	120.0	ES1-1, ES1-3	T	120	0	0	0	1	120	2	240	0	0
14 of 25	2	2.2	ES1-3	T	0	0	2.2	0	1	2.2	1	2.2	0	0
14 of 25	3	12.3	ES1-3	T	0	0	12.3	0	1	12.3	1	12.3	0	0
14 of 25	4	2.9	ES1-3	T	0	0	2.9	0	1	2.9	1	2.9	0	0
14 of 25	5	18.0	ES1-3	T	0	0	18	0	1	18	1	18	0	0
14 of 25	6	5.7	ES1-1	T	0	0	5.7	0	1	5.7	1	5.7	0	0
14 of 25	7	8.1	ES1-1	T	0	0	8.1	0	1	8.1	1	8.1	0	0
14 of 25	8	8.1	ES1-1	T	0	0	8.1	0	1	8.1	1	8.1	0	0
14 of 25	9	8.1	ES1-1	T	0	0	8.1	0	1	8.1	1	8.1	0	0
14 of 25	10	8.1	ES1-1	T	0	0	8.1	0	1	8.1	1	8.1	0	0
14 of 25	11	4.6	ES1-3	T	0	0	0	4.6	0	0	0	0	1	4.6
14 of 25	12	3.2	ES1-3	T	0	0	0	3.2	0	0	0	0	1	3.2
14 of 25	13	3.2	ES1-3	T	0	0	0	3.2	0	0	0	0	1	3.2
				TOTALS	120	0	73.5	11	10	193.5	11	313.5	3	11

LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER	CATALOG NO.	VOLT.	DESCRIPTION	INPUT WATTS
A	HYDREL	4750L 4FT 500 LMF 30K MVOLT WWD KM SMSA12 ZT CR BL	120	CORROSION RESISTANT GROUND MOUNTED LINEAR LED LIGHTS WITH 0-10V DIMMING, MOUNTED ON MANUFACTURERS' 12" STANCHION, WITH BLACK FINISH	21.1
B	LUMENPULSE	LOGR RO 50FT 24V 12 30K WW UMPR NO CRC	24	LIGHT FIXTURE: CORROSION RESISTANT FAÇADE LED LIGHTS REMOTE POWER SUPPLY: LUMENPULSE PSX60	7.5

LIGHTING FIXTURE SCHEDULE NOTES:

1. LIGHT FIXTURES PROVIDED SHALL BE APPROVED EQUAL TO THE FIXTURE INDICATED IN THE SCHEDULE ABOVE.
2. FIXTURE MODEL NUMBERS ARE USED TO ESTABLISH MINIMUM QUALITY AND PERFORMANCE STANDARDS AND NOT TO ESTABLISH MOUNTING TYPE. MOUNTING REQUIREMENTS MAY VARY FOR THE SAME TYPE OF FIXTURE THROUGHOUT THE PROJECT. CONTRACTOR SHALL VERIFY INSTALLATION LOCATION AND PROVIDE APPROPRIATE MOUNTING HARDWARE FIXTURE TYPE DESIGN FOR EACH LOCATION.
3. SUBMIT SAMPLES OF ALL FIXTURES FOR TXDOT AND CITY APPROVAL PRIOR TO WORK.

0 10' 20'
SCALE IN FEET

NORTH

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10497 Town and Country Way,
Suite 600
Houston, Texas 77024
Phone - (713) 600-6800
Web - www.freese.com

01/14/2022

STATE OF TEXAS
DANIEL W. KOSS
110037
LICENSED PROFESSIONAL ENGINEER

BAYTOWN GATEWAY @ SH 146
CHAMBERS COUNTY
ELECTRICAL DETAILS
SHEET 15 OF 25

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			53
STATE	DIST.	COUNTY	
TEXAS	BMT	CHAMBERS	
CONT.	SECT.	JOB	HIGHWAY NO.
0389	02	057	SH 146

DATE: 1/28/2022 11:59:13 AM
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GENERAL NOTES FOR ALL ELECTRICAL WORK

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

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

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

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

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

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

CONDUIT

A. MATERIALS

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

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

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

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

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

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

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

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

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

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

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

B. CONSTRUCTION METHODS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

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

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

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

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

B. CONSTRUCTION METHODS

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

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

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

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

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

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

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

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

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

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

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

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

C. TEMPORARY WIRING

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

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

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

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

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

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

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

B. CONSTRUCTION METHODS

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

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

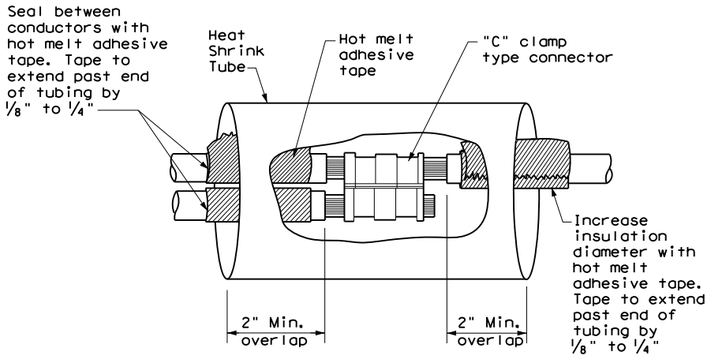
3. Install ground rods so the imprinted part number is at the upper end of the rod.

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

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

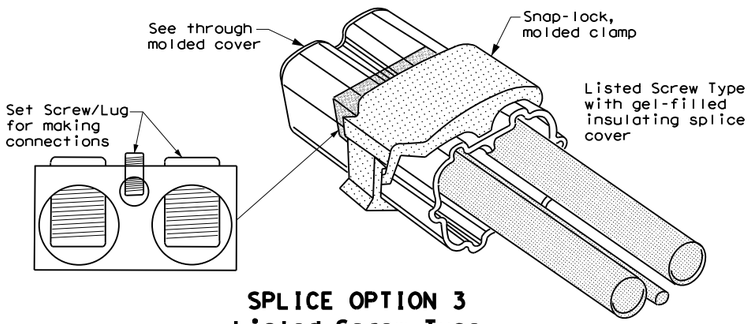
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

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



SPLICE OPTION 1
Compression Type

SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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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	

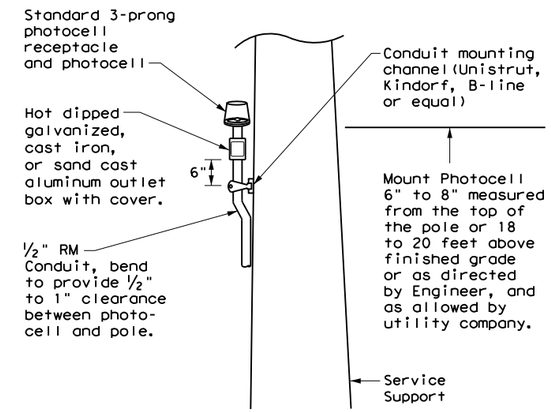
* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** 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

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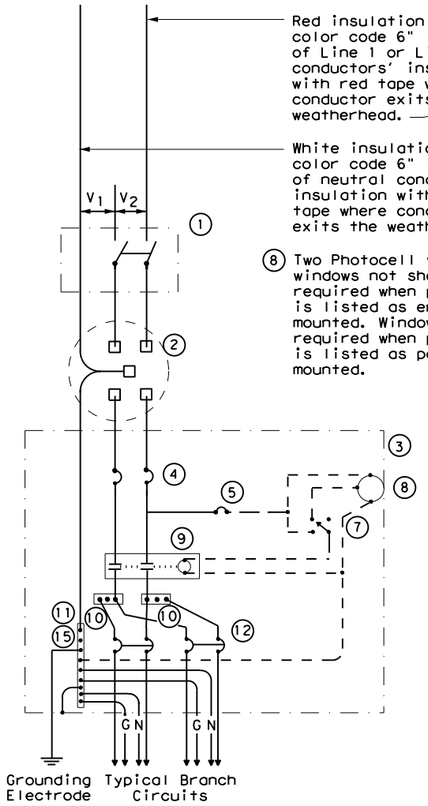
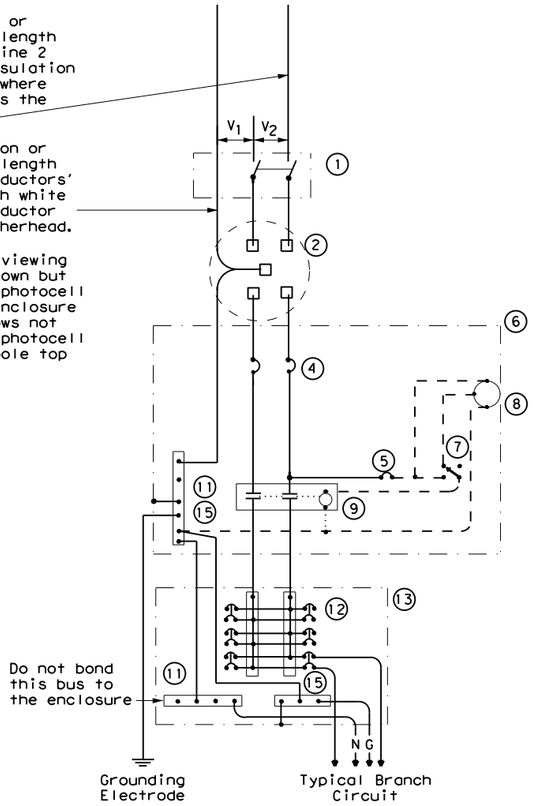
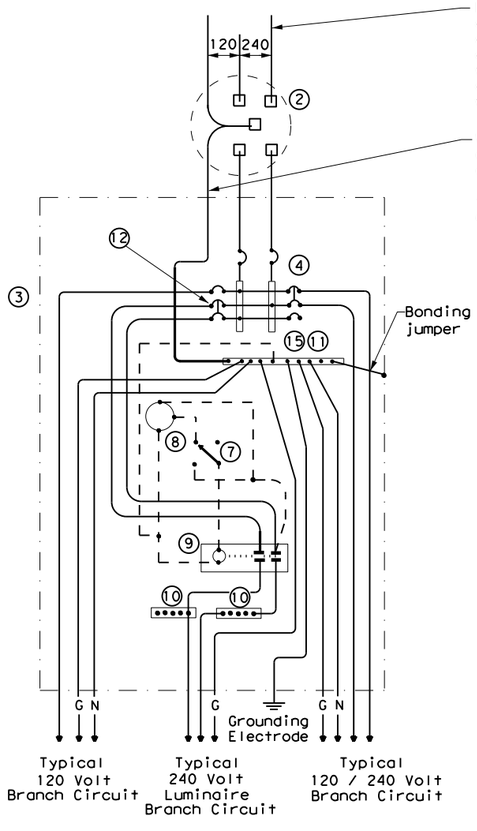


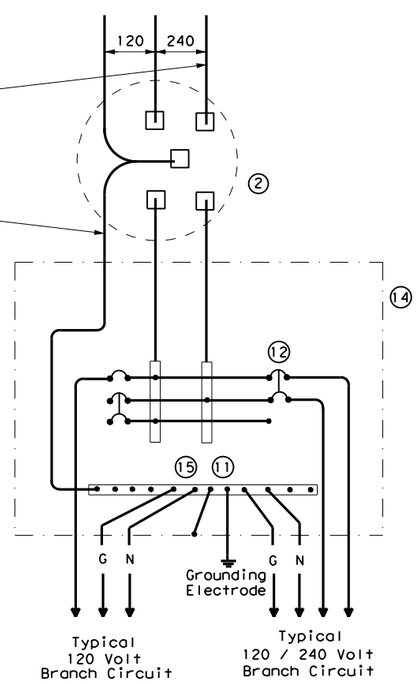
SCHEMATIC TYPE A
THREE WIRE



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
REVISIONS	0389	02	057	SH 146
	DIST	COUNTY		SHEET NO.
	BMT	CHAMBERS		57

71F

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PEDESTAL SERVICE NOTES

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services. "Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.

2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.

3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.

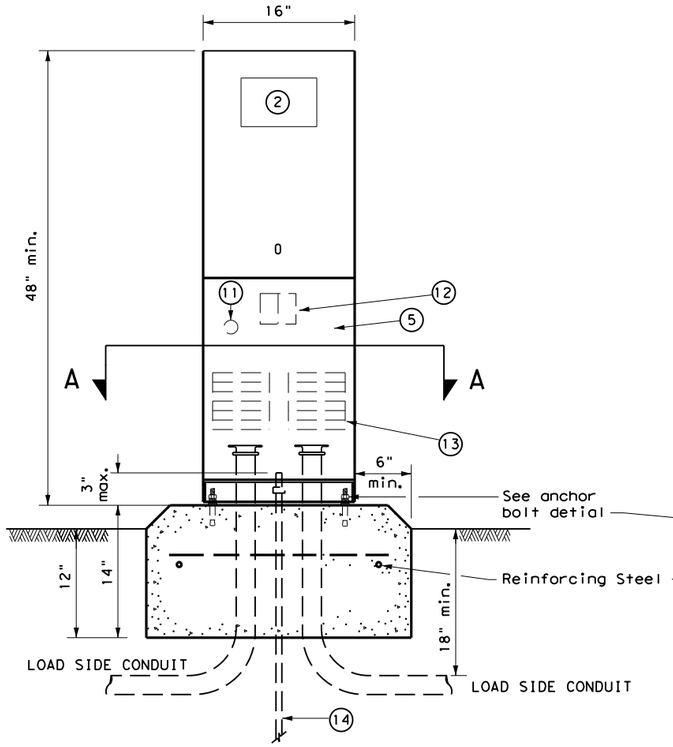
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 ⅛ in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within ¼ in. Repair rocking or movement of the service enclosure at no additional cost to the department.

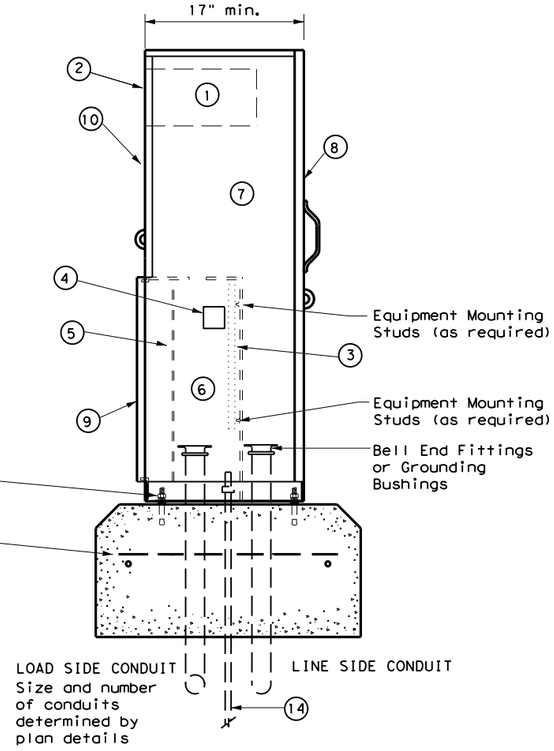
7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.

8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.

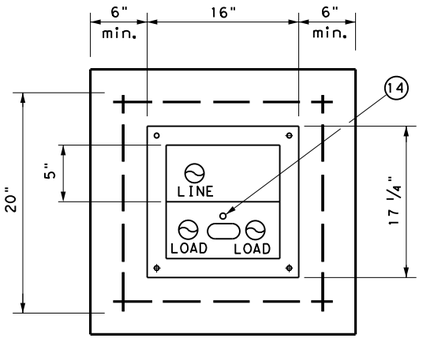


FRONT VIEW

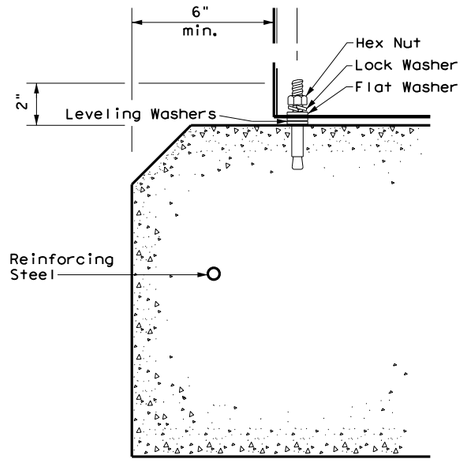
TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SIDE VIEW



SECTION A-A



ANCHOR BOLT DETAIL

LEGEND	
1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access
11	Control Station (H-O-A Switch)
12	Main Disconnect
13	Branch Circuit Breakers
14	Copper Clad Ground Rod - 5/8" X 10'

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS
ED(9)-14

FILE: ed9-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
	DIST	COUNTY		SHEET NO.
	BMT	CHAMBERS		58

71J

SITE DESCRIPTION

Notes:

(1) The Site Description is accomplished using various sheets, each revealing separate details. This Index Sheet's purpose is to point the user to the appropriate location where the information required by the TPDES CGP can be found.

(2) The project limits shown on the Title Sheet and limits of TxDOT Right Of Way shall also be the limits of coverage of the SW3P.

NATURE OF ACTIVITY: Landscaping & Scenic Enhancement

INTENDED SEQUENCE OF MAJOR SOIL DISTURBING ACTIVITIES: See Sequence of Work

TOTAL AREA OF SITE: 0.2 AC AREA TO BE DISTURBED: 0.2 AC

If area of disturbance can be expected to exceed 1.0 acres, Beaumont District Standard SW3P-B should be included in the plans.

PRE-CONSTRUCTION RUNOFF CO-EFFICIENT: 0.10

POST-CONSTRUCTION RUNOFF CO-EFFICIENT: 0.10

EXISTING SOIL DESCRIPTION: Soil Description

GENERAL LOCATION MAP: See Title Sheet

RECEIVING WATERS: SEGMENT NUMBER 0901

SEGMENT NAME Cedar Bayou Tidal

LOCATION OF WETLAND OR SPECIAL AQUATIC SITES: See EPIC

DRAINAGE PATTERNS: Overland to storm sewer, from storm sewer to ditch, from ditch to bayou.

TYPICAL AREAS OF SOIL DISTURBANCE: Existing grassy area between road and parking lot, between driveways

TYPICAL AREAS WHICH WILL NOT BE DISTURBED: Away from the work area

LOCATION OF OFF-SITE SURFACE RECEIVING WATERS: Cedar Bayou Tidal

LOCATIONS WHERE STABILIZATION PRACTICES WILL OCCUR: See Demolition Layout

LOCATIONS OF OFF-SITE STORAGE OF MATERIALS AND EQUIPMENT, WASTE, BORROW; OR DEDICATED MATERIAL PROCESSING PLANTS: To be determined by Contractor.

LOCATIONS WHERE STORM WATER DISCHARGES TO SURFACE WATERS: Cedar Bayou Tidal

01/28/2022

LOCATION OF POLLUTION CONTROL MEASURES: See Demolition Layout

CONTROLS

SOIL STABILIZATION PRACTICES

INTERIM:

____	TEMPORARY SEEDING	X	PRESERVATION OF NATURAL RESOURCES
____	MULCHING (Hay or Straw)	____	FLEXIBLE CHANNEL LINER
____	BUFFER ZONES	____	OTHER

PERMANENT:

____	SEEDING	____	RETENTION BLANKET
X	BLOCK SOD	____	CHANNEL LINER
____	OTHER		

STRUCTURAL PRACTICES (T/P)*

T	SILT FENCE	____	PAVED FLUMES
____	HAY BALES	____	ROCK BEDDING AT CONSTRUCTION EXIT
____	ROCK BERMS	____	TIMBER MATTING AT CONSTRUCTION EXIT
____	PIPE SLOPE DRAINS	____	SEDIMENT TRAPS
____	CHANNEL LINERS	____	SEDIMENT BASINS
P	STORM SEWERS	____	CURB and GUTTER
____	STORM INLET SEDIMENT TRAP	____	VELOCITY CONTROL DEVICES
____	STONE OUTLET STRUCTURES	T	EROSION CONTROL LOGS
____	DIVERSION, INTERCEPTOR, or PERIMETER SWALES		
____	DIVERSION, INTERCEPTOR, or PERIMETER DIKES		

* T means Temporary - P means Permanent

PERMANENT POST CONSTRUCTION TSS CONTROLS

____ RETENTION / IRRIGATION

____ EXTENDED DETENTION BASINS

____ VEGETATIVE FILTER STRIPS / VEGETATIVE SWALES

____ CONSTRUCTED WETLANDS

____ WET BASINS

OTHER CONTROLS

____ WATERING FOR DUST CONTROLS

____ SEDIMENT REMOVAL FROM ROADWAY (SWEEPING)

____ LOADED TRUCKS WILL BE COVERED WITH TARP

The above indicated practices are proposed to control pollutants in storm water discharges. These practices are based on information contained in TxDOT Storm Water Management Guidelines. The Schedule of implementation of these practices will be based on the intended Sequence of Major Soil Disturbing Activities. Stabilization measures shall be initiated no later than 14 days after construction activity of that portion of the site has temporarily or permanently ceased.

Describe construction and waste materials expected to be stored on site and proposed controls to reduce pollutants from these materials (include storage practices spill prevention and response. To be determined by Contractor.

Describe pollutant sources from areas other than construction and measures implemented at those sites to minimize pollutant discharges. All waste material will be disposed of in accordance with all State Laws and Regulations. No construction waste will be buried on sites.

Describe measures necessary to protect listed endangered or threatened species, or critical habitat. See EPIC

INFORMATION

MAINTENANCE:

All erosion and sediment control and other protective measures identified in the SW3P must be maintained in effective operating conditions. If site inspections required by this permit identify BMP's that are not operating effectively, maintenance shall be performed before the next anticipated storm event, or as necessary to maintain the continued effectiveness of storm water controls. If maintenance prior to the next anticipated storm event is unpracticable, maintenance must be scheduled and accomplished as soon as practical.

INSPECTION:

Qualified personnel shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site.

Inspection Cycle Option:

- ☐ 1. At least every 14 calendar days or within 24 hrs after 0.5 inches or more of rainfall.
- ☒ 2. At least every 7 calendar days.
- ☐ 3. At least monthly(Engineer & DEQC approved revision to SW3P required).

a). Disturbed areas that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion control measures identified on the SW3P shall be observed to ensure that they are operating correctly. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking. Sediments must be removed from sediment control structures no later than the time that the design capacity has been reduced by 50%.

b). Based on the result of the inspection, the SW3P shall be revised to include (show on Site Map) additional or modified BMP's designed to correct the observed deficiency. Revisions to the SW3P must be completed within seven (7) calendar days following the inspection.

c). A report summarizing the scope, date, name and qualifications of inspector, and major observations relating to the implementation of the SW3P shall be produced and retained as part of the SW3P for 3 years from date of final stabilization.

d). The following records must be maintained and either attached to or referenced in the SW3P, and made readily available upon request to the parties in Part III.D.1 of the CGP: 1). The dates when major grading activities occur; 2). The dates when construction activities temporarily or permanently cease on a portion of the site and; 3). The dates when stabilization measures are initiated.

INSPECTOR PAPERWORK CHECKLIST:

- ☐ Contact Form (1)
- ☐ Notice of Intent (1)(2)
- ☐ SW3P Certification Statement (signed by AE) (2)
- ☐ Delegation of Signature Authority (all Inspectors signing reports) (2)(3)
- ☐ TPDES General Permit (2)(3)
- ☐ Environmental Document (2)
- ☐ Inspection and Maintenance Report (2)(3)
- ☐ Notice of Termination (2)
- ☐ SW3P Plan (2)(3)
- ☐ Inspector Qualification Form (2)(3)
- ☐ Project Diary(2)(3)

(1) The information should be displayed on the Project Bulletin Board.
(2) The information should be a part of the permanent SW3P file maintained at the Area Office.
(3) The information should be maintained at the Field Office.

STORM WATER POLLUTION PREVENTION PLAN is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or storm water management site plans or site permits approved by State, Tribal or local officials (i.e. MS4 Permits).

Any reportable quantity of Hazardous Material release must be reported to the National Response Center at 1-800-424-8802. In addition the Beaumont District "Hazardous Material Spill Information Form" must be completed and mailed to the EPA Regional Office in Dallas, Tx.

A copy of the Construction General Permit is part of the SW3P.

STATE OF TEXAS
SAMANTHA JO HARRIS
134616
LICENSED
PROFESSIONAL ENGINEER

P.E.

Texas Department of Transportation
BEAUMONT DISTRICT

SW3P INDEX
(SW3P-I)

REVISIONS	FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
05/22/02 VW 11/08/02 VW 03/06/03 VW 06/11/04 VW 09/15/15 MV	6	PRJ		59
	STATE	STATE DIST. NO.	COUNTY	
	TEXAS	BMT	CHAMBERS	
	CONT.	SECT.	JOB	HIGHWAY NO.
	0389	02	057	SH 146

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1. TxDOT - Beaumont District

2. City of Baytown

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or as required by the Engineer.
3. The project is estimated to involve less than one acre of soil disturbance. In the event the project disturbance acreage becomes equal to or greater than one acre, the CGP is applicable. Contact TxDOT project inspector for coordination with DEQC for necessary action.
4. Take measures to prevent construction materials and debris including, but not limited to wastewater (i.e., cooling liquid, etc.) associated with concrete removal from entering any inlets, ditches, or waterways.

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

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

The Contractor must adhere to all of the terms and conditions, including Regional conditions for the State of Texas, associated with the following permit(s):

☒ No Permit Required

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

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

☐ Individual 404 Permit Required: Permit # _____

☐ Other Nationwide Permit Required: NWP# _____

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

1. Maintain a neat and clean worksite next to the water and do not allow any debris to fall into the water.
2. Comply with "Work In or Near Waters/Wetlands Regulatory Requirements and Best Management Practices" section found in the Beaumont District Environmental Field Guide.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

☐ No Action Required ☒ Required Action

Action No.

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

IV. VEGETATION RESOURCES

☐ No Action Required ☒ Required Action

Action No.

1. No tree or vegetation removal/trimming of any kind is allowed. Exceptions are allowed for landscaping, mowed and maintained grass.

2. Comply with "Vegetation and Habitat Impacts: Regulatory Requirements and Best Management Practices" section found in the Beaumont District Environmental Field Guide.

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

☐ No Action Required ☒ Required Action

Action No.

1. If any animal enters the work area, do not harm, harass, or attempt to handle; let the animal leave on its own.
2. If caves or sinkholes are discovered on site, cease work in the area and contact the TxDOT Inspector or DEQC for guidance.
3. Comply with "Wildlife: Regulatory Requirements and Best Management Practices" section found in the Beaumont District Environmental Field Guide.
4. Contractor shall maintain compliance with the Migratory Bird Treaty Act (MBTA) and TPW Code Section 64.002. The full TxDOT MBTA guidance may be found here: https://ftp.txdot.gov/pub/txdot-info/env/toolkit/350-01-gui.pdf
5. Roadside Appurtenance Maintenance Program BMPs from the Maintenance EA Best Management Practices Summary Report shall be reviewed and implemented where appropriate.
6. Maintenance Enhancement Maintenance Program BMPs from the Maintenance EA Best Management Practices Summary Report shall be reviewed and implemented where appropriate.

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

☐ No Action Required ☒ Required Action

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances
* Any other evidence indicating possible hazardous materials or contamination discovered on site.

List below any bridge class structure(s), not including box culverts, being replaced, rehabilitated, removed, extended or modified as part of this project, or state "None", if applicable.
If "None", then no further action is required. Otherwise TxDOT is responsible for completing asbestos assessment/inspection and evaluation for presence of lead.

Provide results below:

Structure Location	PSN	Element	Lead	Asbestos
None				

If Asbestos is present, then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary.

If Asbestos is not present, then TxDOT is still required to notify DSHS prior to any scheduled demolition.

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

Hazardous Materials or Contamination Issues Specific to this Project:

Action No.

1. Comply with TxDOT Standard Specification 7.12 and Special Provision 006-012 if evidence of hazardous materials or contamination is noted during construction.
2. Notify TxDOT Inspector or DEQC of any hazardous materials spills including fuel, hydraulic fluid, etc.

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☒ Required Action

Action No.

1. Comply with "General Construction" section found in the Beaumont District Environmental Field Guide.

Jason Hightower
APPROVED BY

02/14/2022
DATE

DISTRICT ENVIRONMENTAL DEPARTMENT

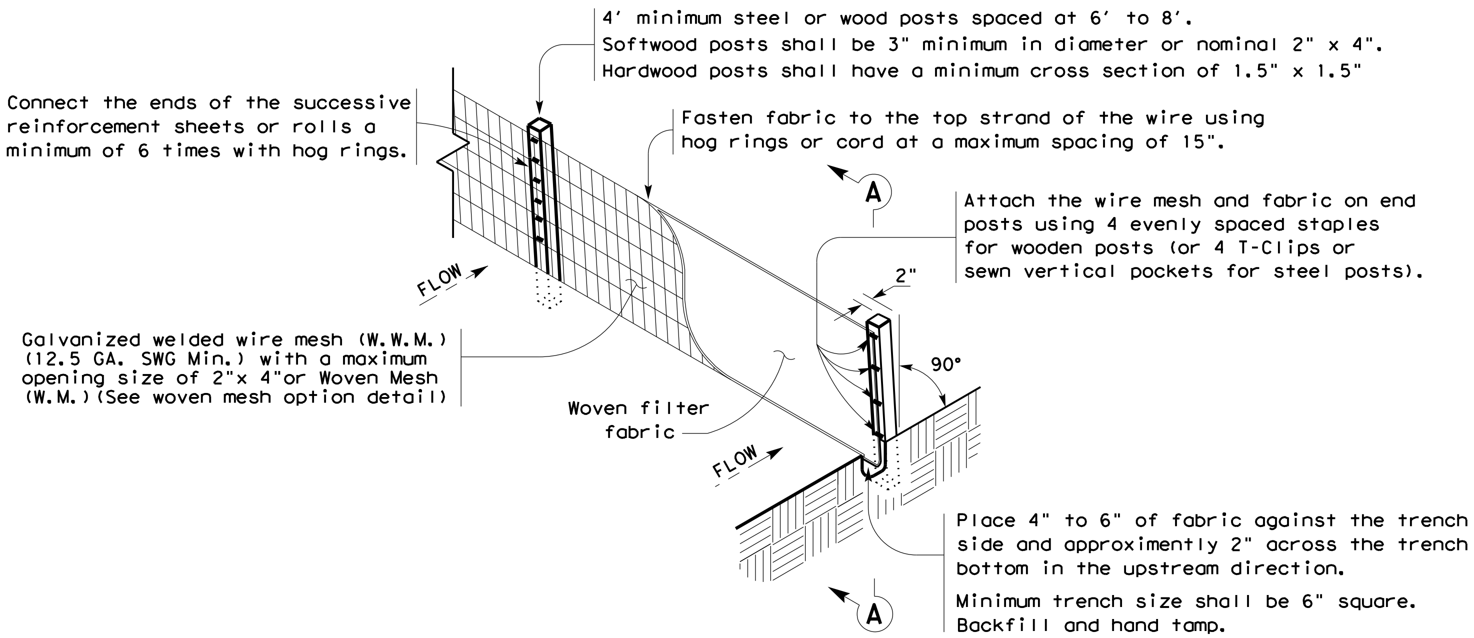
Texas Department of Transportation

Beaumont District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

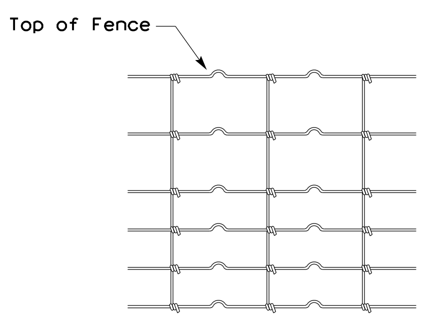
EPIC

FILE: epic.dgn	DN: TxDOT	CK: AM	DW: VP	CK: AR
©TxDOT February 2019	CONT	SECT	JOB	HIGHWAY
	0389	02	057	SH 146
	DIST	COUNTY		SHEET NO.
	BMT	CHAMBERS		60



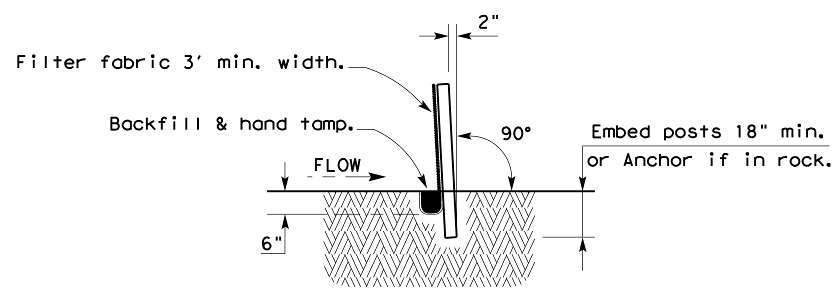
TEMPORARY SEDIMENT CONTROL FENCE

SCF



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.



SECTION A-A

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

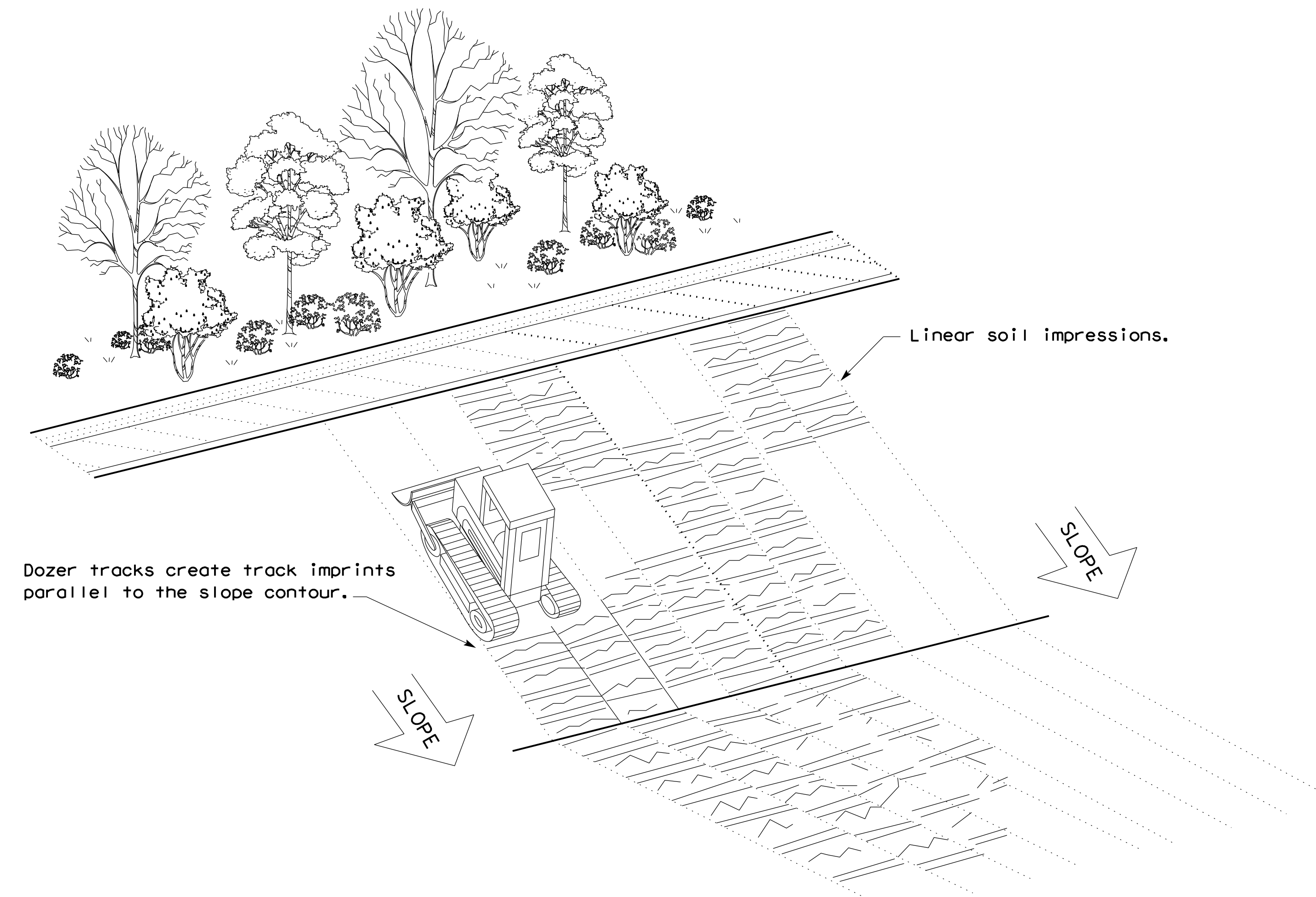
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
	DIST		COUNTY	SHEET NO.
	BMT		CHAMBERS	61

DATE: 1/28/2022
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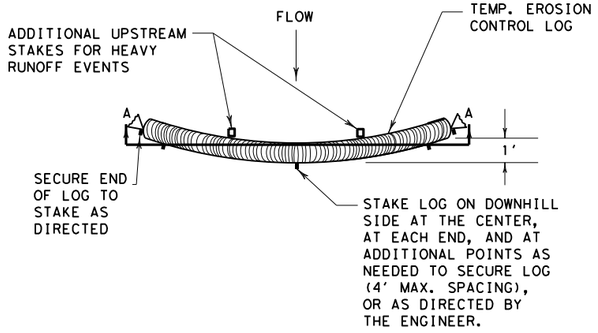
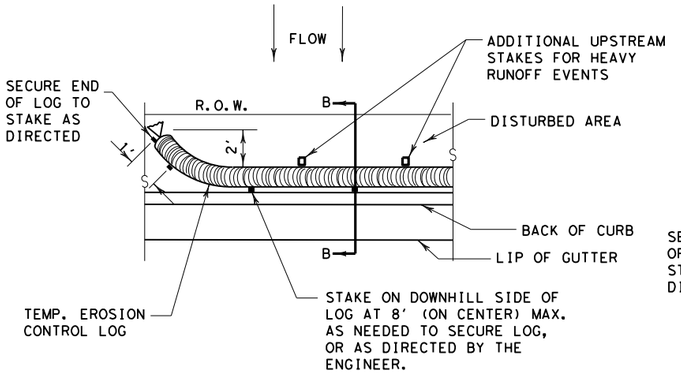
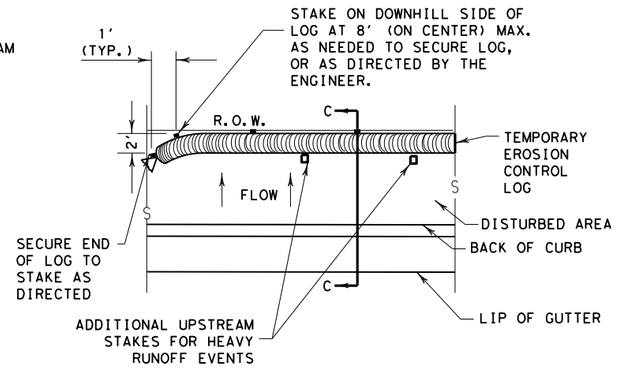


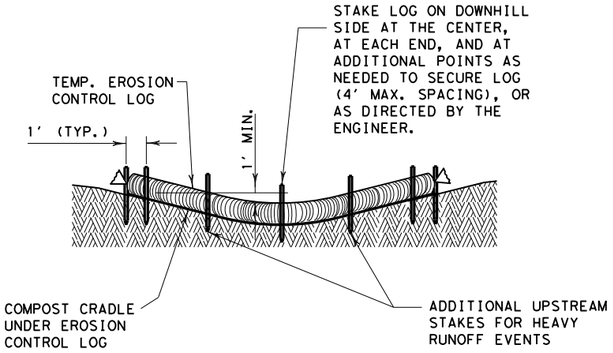
PLAN VIEW



PLAN VIEW



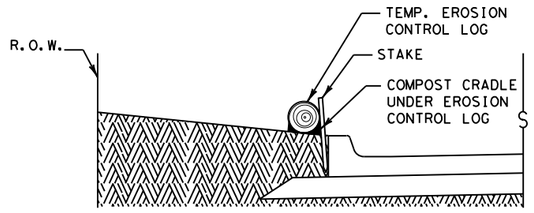
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

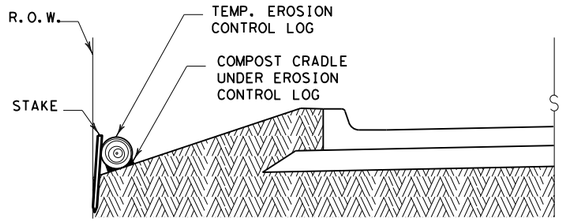
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

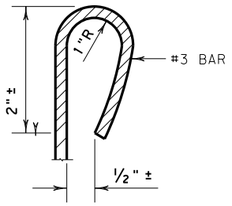
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

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

GENERAL NOTES:

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

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

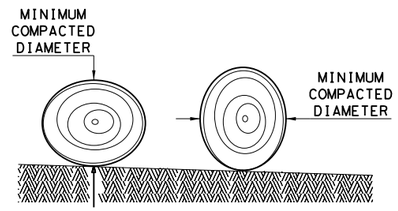
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

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

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

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SHEET 1 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0389	02	057		SH 146		
	DIST	COUNTY				SHEET NO.	
	BMT	CHAMBERS				62	

DATE: 1/28/2022
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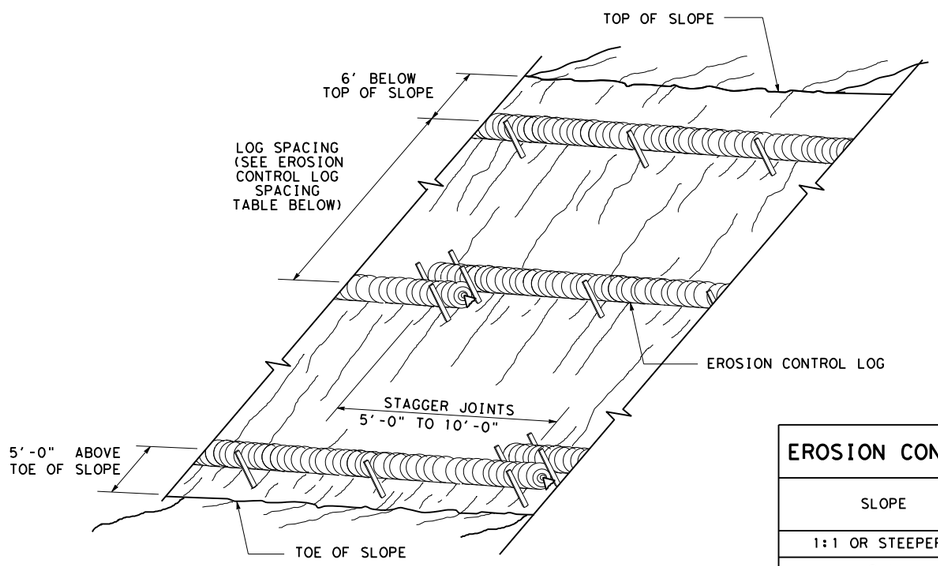
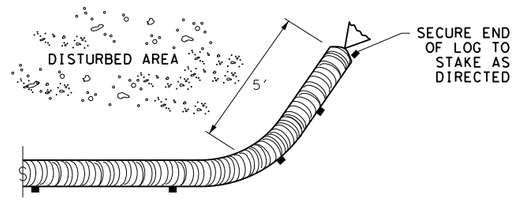


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

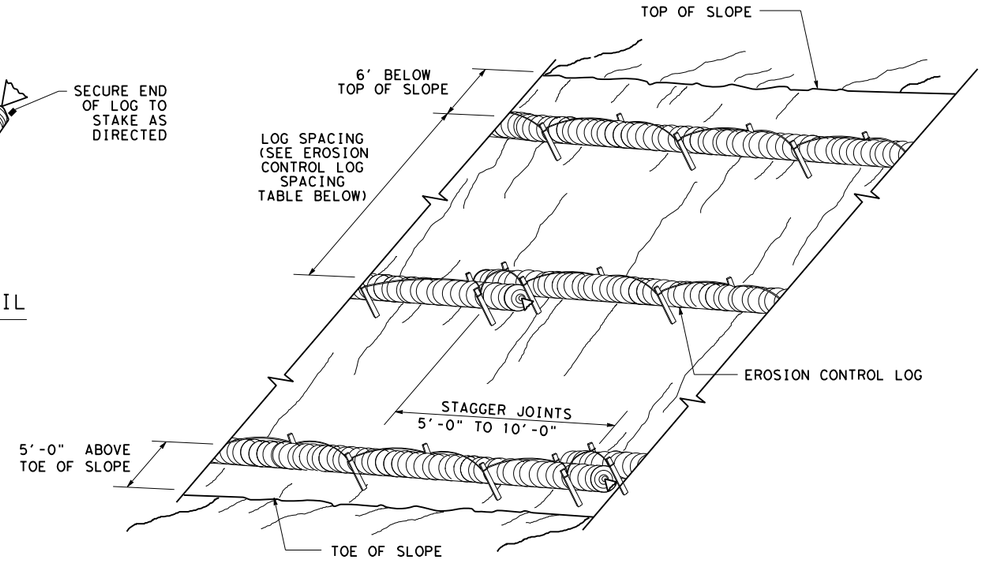
CL-SST



END SECTION RAP DETAIL

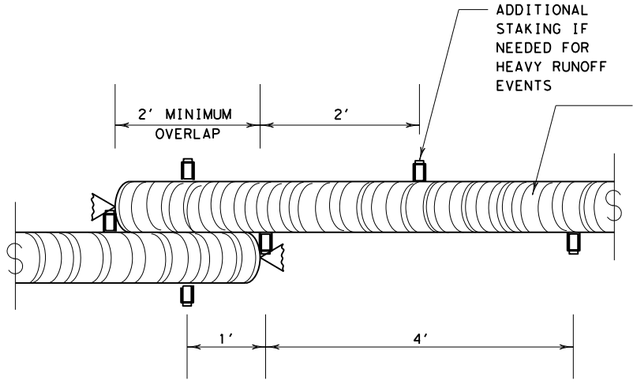
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

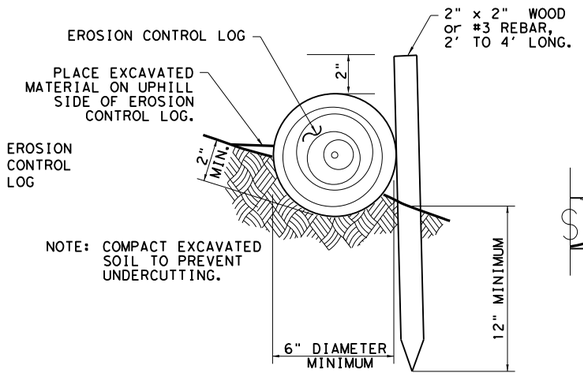
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

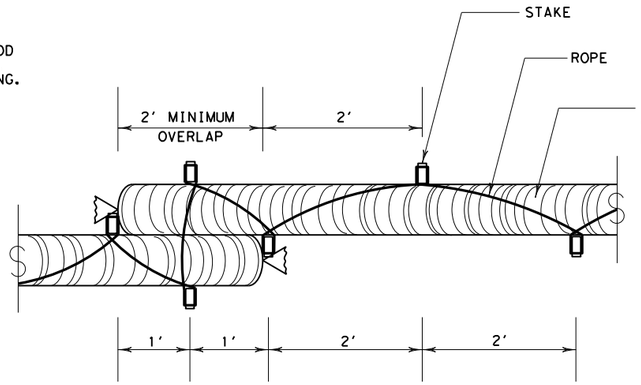


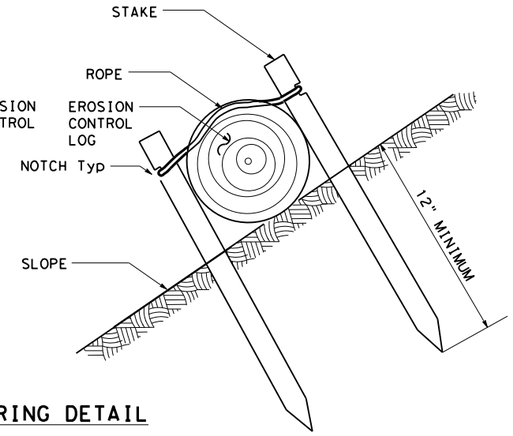


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

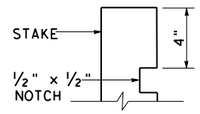
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

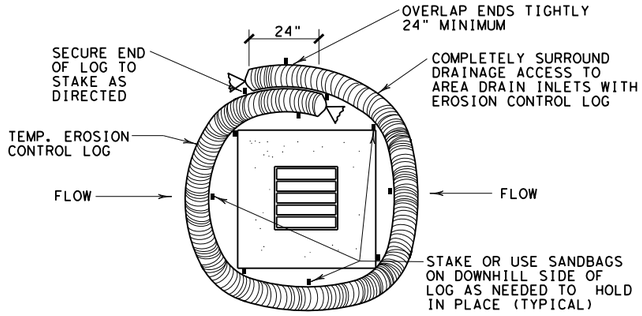
Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

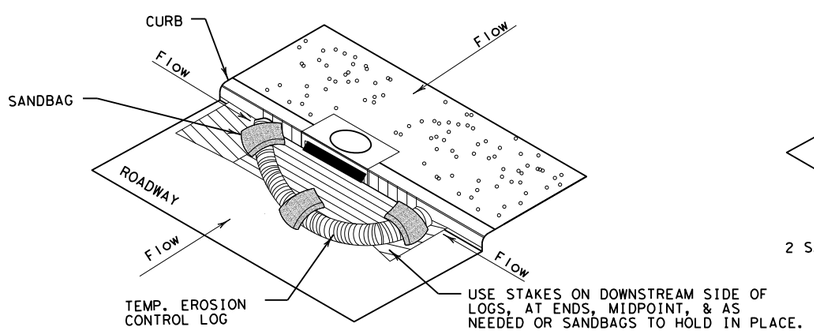
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0389	02	057	SH 146
	DIST	COUNTY		SHEET NO.
	BMT	CHAMBERS		63

DATE: 1/28/2022
FILE: T:\BMTDESGN\Projects\0389-02-057_SH146_Landscape\DGN\Standards\ec916.dgn



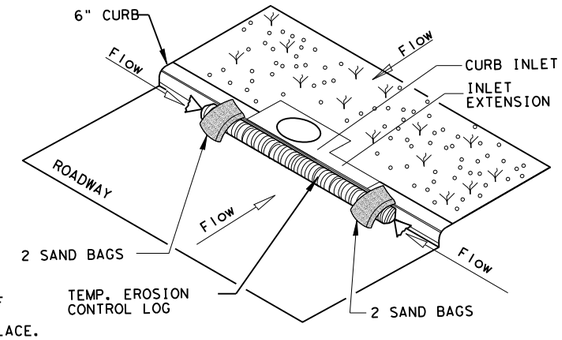
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

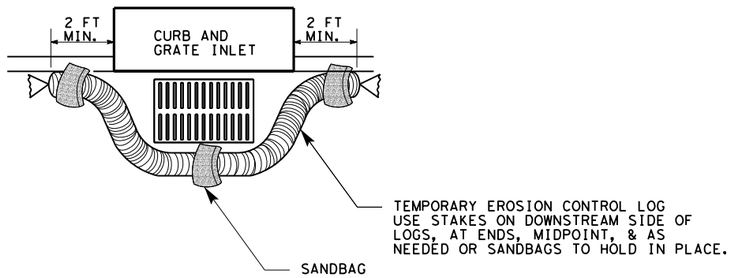
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

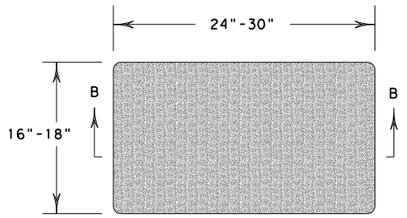
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0389	02	057		SH 146	
	DIST	COUNTY				SHEET NO.
	BMT	CHAMBERS				64