FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C 465-1-59		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE PROJECT
PROJECT NO.
C 465-1-59
BEXAR COUNTY
SH 218 (PAT BOOKER) @ SL 1604

LIMITS: ON SH 218, FROM 0.16 MI NORTH WEST OF SL 1604 TO .21 MI SOUTH EAST OF SL 1604 ON IH 410, .28 MILES EAST OF US 281

NET LENGTH OF ROADWAY = 0.233 MI
NET LENGTH OF BRIDGE = 0.000 MI
NET LENGTH OF PROJECT = 0.233 MI

INDEX OF SHEETS

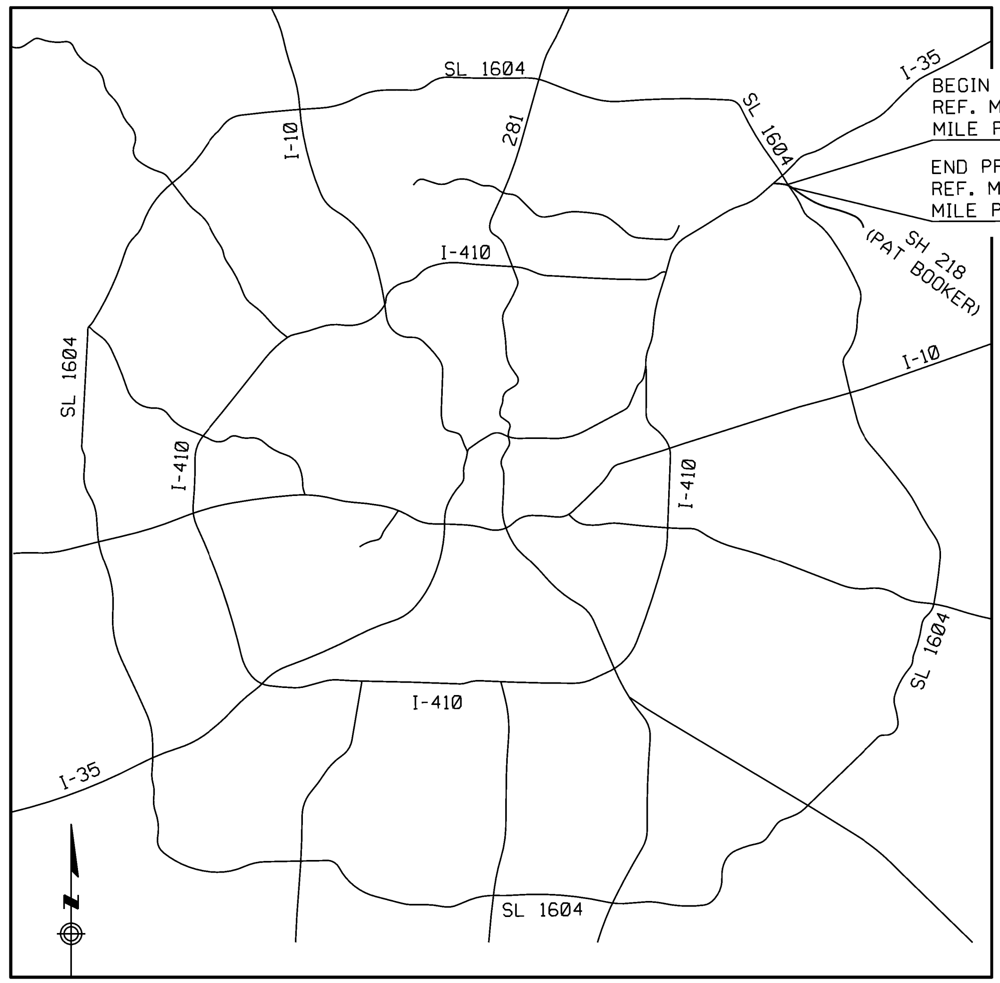
SEE SHEET 2 FOR INDEX OF SHEETS

REGISTERED LANDSCAPE ARCHITECT
HARRY N. DAWSON
1932
STATE OF TEXAS

3/20/2023

DESIGN SPEED = N/A
AREA OF DISTURBED SOIL = 1.33 ACRES
AADT: N/A
ACCESSIBILITY STANDARDS N/A

FOR WORK CONSISTING OF: LANDSCAPE PLANTING AND IRRIGATION



NOT TO SCALE

BEXAR COUNTY

EXCEPTIONS: N/A
EQUATIONS: N/A
R.R. CROSSINGS: N/A

FINAL PLANS

LETTING DATE: ____________

DATE CONTRACTOR BEGAN WORK: ____________

DATE WORK WAS ACCEPTED: ____________

FINAL CONTRACT COST: $ ____________

CONTRACTOR: ____________

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

____________ P.E. ____________
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING 3/20/2023
Harry N. Dawson
DISTRICT LANDSCAPE ARCHITECT

RECOMMENDED FOR LETTING 3/23/2023
DocuSigned by:
Clayton Ripps, P.E.
74F59A...
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

REVIEWED 3/23/2023
DocuSigned by:
DLRogerio, P.E.
F25100...
TRANSPORTATION ENGINEER SUPERVISOR

APPROVED FOR LETTING 3/23/2023
DocuSigned by:
Gina E. Gallegos, P.E.
124372CCDF604...
DISTRICT ENGINEER

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND THE SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000--008)

FILE LOCATION AND NAME
T:\Engdata\Standards\Design\TITLESHEET-2014Specs.DGN

LEVELS DISPLAYED

COUNTY BEXAR
HWY. NO. SH 218
DATE ACCEPTED
PROJ. NO. NH 2022(???)
LET DATE JUNE 2023

STATE OF TEXAS
SUMAN SHRESTHA
105162
LICENSED PROFESSIONAL ENGINEER

DocuSigned by:
Suman Shrestha
E822C2086FA04BA...
3/21/2023

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

Texas Department of Transportation

SH 218

INDEX OF SHEETS

SHEET 88 OF 80

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		03
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

**********GENERAL NOTES**********
2014 Specification Book

--General--

Contact the Engineer or the City when construction operations are within 400 feet of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Repair or replace any signal equipment damaged by construction operations. The method of repair or replacement shall be pre-approved and inspected. Depending on the type and extent of the damage, the Engineer reserves the right to perform the repair or replacement work and the Contractor will be billed for this work.

City of San Antonio: (210) 207-8642

Submit locate request for SAWS water and sewer to TXDOTlocates@saws.org.

In accordance with the Underground Facility Damage Prevention Act (One Call Bill) the phone number for a utility locator is 811. It is the Contractor's responsibility to plan for utility locators as needed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way. Call or email the TxDOT offices listed below for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages incurred to the above-mentioned utilities when working without having the utilities located prior to excavation.

For signal and ITS locates call TransGuide at 210-731-5136 or email sat_its_locates@txdot.gov for ITS locates and signal.request@txdot.gov for signal locates.

Contractor questions on this project are to be addressed to the following individual(s):
Area Engineer, Lea M. Jacobson, PE Lea.Jacobson@txdot.gov
Assistant Area Engineer, Ismael E. Solalinde, PE Ismael.Solalinde@txdot.gov

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the

controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

--Item 5--
Taper ACP placed at curb inlets, traffic inlets and slotted drains.

A horizontal boom or equivalent equipment is required for construction in the vicinity of the CPS Energy electric lines to provide vertical clearance of equipment during construction. Contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of pole bracing. The estimated duration for pole bracing is 6 to 10 weeks (or longer if temporary construction easements are required) after invoice is paid. For de-energizing or sleeving of the overhead electrical lines depicted on the plans, please contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of needed de-energization. The estimated duration for de-energizing is approximately 4 to 6 weeks (after invoice is paid) but could vary on system scenario and back feed requirements. De-energizing may not be possible in all instances or may be restricted during specific periods of time due to load demand. Contractor will be reimbursed for the invoice cost for pole bracing and/or de-energizing or sleeving through force account.

Prevention of Migratory Bird Nesting

It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, nests containing migratory birds must be avoided and no work will be performed in the nesting areas until the young birds have fledged.

Structures

Bridge and culvert construction operations cannot begin until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape, or wash down all nest sites. Perform these activities daily unless the Engineer determines

the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts. This work is subsidiary to the various bid items.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows.

Provide a non-intrusive back-up alarm system on all heavy equipment used in close proximity to residential areas. This item is subsidiary to various bid items.

Excavation within 5 feet of an existing CPS Energy pole will require pole bracing. Contact CPS Energy utility coordination to request pole bracing (Customer Engineering 210-353-4050). The estimated duration for the pole bracing process is approximately 10 to 15 weeks.

--Item 6--
Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

Steel Wrapped or Asbestos Utility Lines:

Existing steel wrapped natural gas and/or asbestos cement (AC) water lines that will no longer be in service are usually abandoned in place (AIP). However, if any of these lines have to be removed for whatever reason (in the way of other construction, to make tie-ins, etc.), comply with Item 6.

If removal of AC water lines is included in the construction contract, then notify the Engineer of proposed dates of removal of the AC water lines in accordance to Item 6. Excavate to the top of the AC water line to allow a separate contractor hired by the State to remove the AC water line. The excavation for the AC water line removal is subsidiary to the work that created the need for the removal (excavation for structures, roadway, a new line, tie-ins, etc.).

--Item 7--
The project's total disturbed area is 1.33 acres. The disturbed area in all project locations and Contractor project specific locations (PSL's), within 1/4 mile of the project limits, will further establish the authorization requirements for storm water discharges. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any PSL's on or off the ROW. When the total area disturbed on the project and PSL's within 1/4 mile of the project exceeds 5 acres, provide a copy of the Contractor NOI for PSL's to the Engineer (to the appropriate MS4 operator when the project is on an off-state system route).

Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

Roadway closures during the following key dates and/or special event are prohibited.
See the general notes under Item 502 for these dates.

--Item 8--
Working days will be computed and charged in accordance with Article 8.3.1.4: Standard Work Week.

A Special Provision to Item 8 for a delayed authorized date to begin work has been included in the contract. The reason for including the Special Provision is for material processing or contractor mobilization.

Create and maintain a Bar Chart schedule.

The baseline schedule working days will be the same as the number of working days established by the Contract.

Time charges will be suspended during the maintenance phase of Item 192 and the establishment and maintenance period of Item 193.

--Item 161--
Approximately 590 CY of existing topsoil may be salvaged and windrowed or stockpiled (as approved) for later use as Compost Manufactured Topsoil (CMT). Place erosion control measures for the stockpile and/or windrow.

--Item 192--
Plant material and planting bed locations. The Engineer may make adjustments to the plant and planting bed locations to meet field conditions. These changes are considered incidental and there will be no additional compensation.
Neither work subsoil for planting operations when moisture content is so great that excessive compaction will occur, nor when it is so dry that the clods will not break readily. Apply water if necessary. These conditions will be determined by the Engineer as planting operations begin.

It may be necessary to suspend planting operations if the Engineer determines that unusually hot, dry weather or water restrictions will affect thriving growth of plant material. If planting operations are suspended, time charges will also be suspended until the Engineer determines that planting operations can begin again. Continue to maintain previously planted plants during time suspension. No extra compensation will be allowed due to such suspensions.

Stake trees for support during the same day as planted. Ensure plants stand plumb after staking. Ensure material remains plumb and straight for all given conditions throughout the contract period. Staking method must allow trunk to sway with the wind while remaining plumb.

Begin maintenance phase of this Item when all of the plant material and other related items for the entire project are complete and in place and approved by the Engineer.

--Item 193--
Costs for water applied through the irrigation system will be subsidiary to Item 193 – Irrigation System Operation and Maintenance. See Irrigation Specifications sheet for details.

--Item 496--
Provide for the safety and health of employees and abide by all OSHA Standards and Regulations. All costs incurred for proper management, shall be subsidiary to this Item.

--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--
General

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

Avoid placing stockpiles, equipment, and other construction materials within the roadway's horizontal clear zone or at any location that will constitute a hazard and will endanger traffic. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

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

Access to adjoining property must be maintained at all times.

Barricades, Signs, and Traffic Control Devices

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance with this item.

Moving an existing sign to a temporary location is subsidiary to Item 502. Installations with permanent supports at permanent locations will be paid for under the applicable bid item(s).

Unless otherwise noted in the plans and/or as directed by the Engineer, daily shoulder closures shall be limited according to the following restrictions:

No shoulder closures will be permitted for the following dates and/or special events:
Between December 15 and January 1
Fiesta Week and Sales Tax Holidays (Bexar County Only)
Wednesday before Thanksgiving thru the Sunday after Thanksgiving
Saturday and Sunday before Memorial Day and Labor Day
Saturday or Sunday when July 4 falls on a Friday or Monday
Election days (Bexar County Only)
During major events at the AT&T Center (Spurs home games, Rodeo, concerts, etc.)
Alamodome, and/or Convention Center (Bexar County Only)
Easter weekend March 30 & 31, 2024

Hauling

The use of rubber-tired equipment will be required for moving dirt or other materials along or across pavement surfaces. Where the contractor desires to move any equipment not licensed for operation on public highways, on or across pavement, they shall protect the pavement from damage as directed/approved by the Engineer.

Throughout construction operations, the Contractor will be required to conduct their hauling operations in a manner such that vehicles will not haul over previously recompacted subgrade or compacted base material, except in short sections for dumping manipulations.

The Contractor shall keep the roadway clean and free of dirt or other materials during hauling operations. If the Contractor does not maintain a clean roadway, they shall cease all construction operations, when directed by the Engineer, to clean the roadway to the satisfaction of the Engineer.

--Item 506--
An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 556--
Coarse Aggregate Grade 3 meeting requirements of Item 421, Table 4, is acceptable for Filter Material.

For reference only: The conduit depth for illumination under the City of San Antonio streets is 36 inches.

--Item 730--
Mow 10' from newly planted bedding areas after completion of landscape installation and repeat as necessary throughout the duration of the contract for plant maintenance, or when directed. Coordinate mowing to avoid rutting or compaction of the soil when mowing where supplemental irrigation is being used. Use mowing equipment that will not adversely affect mulches that have been applied. Work performed under this item is subsidiary to mulching requirements.

--Item 734--
Perform Litter Removal once a month or as directed by the Engineer. Work performed under this item is subsidiary to plant bed maintenance.

During hurricane season (June-October), special attention should be given to remove and dispose of litter and debris from the right of way. Work performed under this item is subsidiary to plant bed maintenance.

--Item 6185--
2 shadow vehicles with TMA will be required for this project. The TMA's will be measured and paid for by the DAY for each TMA/TA set up and operational on the worksite. 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. See TMA and TA Summary sheet in the plans.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0465-01-059 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY SH 218

			CONTROL SECTION JOB		**0465-01-059**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00190504**		
			COUNTY		**Bexar**		
			HIGHWAY		**SH 218**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	110-6003	EXCAVATION (SPECIAL)	CY	590.000		590.000	
	161-6012	GENERAL USE COMPOST	CY	590.000		590.000	
	164-6001	BROADCAST SEED (PERM) (RURAL) (SANDY)	SY	1,597.000		1,597.000	
	170-6001	IRRIGATION SYSTEM	LS	1.000		1.000	
	192-6002	PLANT MATERIAL (1-GAL)	EA	9,345.000		9,345.000	
	192-6004	PLANT MATERIAL (5-GAL)	EA	2,779.000		2,779.000	
	192-6013	MULCH	SY	6,495.000		6,495.000	
	192-6015	LANDSCAPE EDGE	LF	2,290.000		2,290.000	
	192-6016	PLANT BED PREPARATION	SY	6,495.000		6,495.000	
	192-6025	PLANT MATERIAL (45 GAL) (TREE)	EA	28.000		28.000	
	193-6001	PLANT MAINTENANCE	MO	12.000		12.000	
	193-6006	VEGETATIVE WATERING	MG	2,335.000		2,335.000	
	193-6007	IRRIGATION SYSTEM OPER AND MAINT	MO	12.000		12.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	8.000		8.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	500.000		500.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	500.000		500.000	
	618-6059	CONDT (PVC) (SCH 80) (4") (BORE)	LF	968.000		968.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	2.000		2.000	
	08	CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	

$TIME$

$DATE$

SUMMARY OF LANDSCAPE ITEMS

LOCATION	110 6003	161 6012	164 6001	170 6001	192 6002	192 6004	192 6013	192 6015	192 6016	192 6025	193 6001	193 6006	193 6007	618 6059	500 6001	502 6001	6185 6005	506 6041	506 6043
	EXCAVATION (SPECIAL)	GENERAL USE COMPOST	BROADCAST SEED (PERM) (RURAL) (SANDY)	IRRIGATION SYSTEM	PLANT MATERIAL (1-GAL)	PLANT MATERIAL (5-GAL)	MULCH	LANDSCAPE EDGE	PLANT BED PREPARAT ION	PLANT MATERIAL (45 GAL) (TREE)	PLANT MAINTENANCE	VEGETATIVE WATERING	IRRIGATION SYSTEM OPER AND MAINT	COND (PVC) (SCH 80) (4")(BORE)	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	TMA (MOBILE OPERATION)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	CY	CY	SY	LS	EA	EA	SY	LF	SY	EA	MO	MG	MO	LF	LS	MO	DAY	LF	LF
PROJECT TOTALS	590	590	1597	1	9345	2779	6495	2290	6495	28	12	2335	12	968	1	8	2	500	500

$FILE$

Texas Department of Transportation

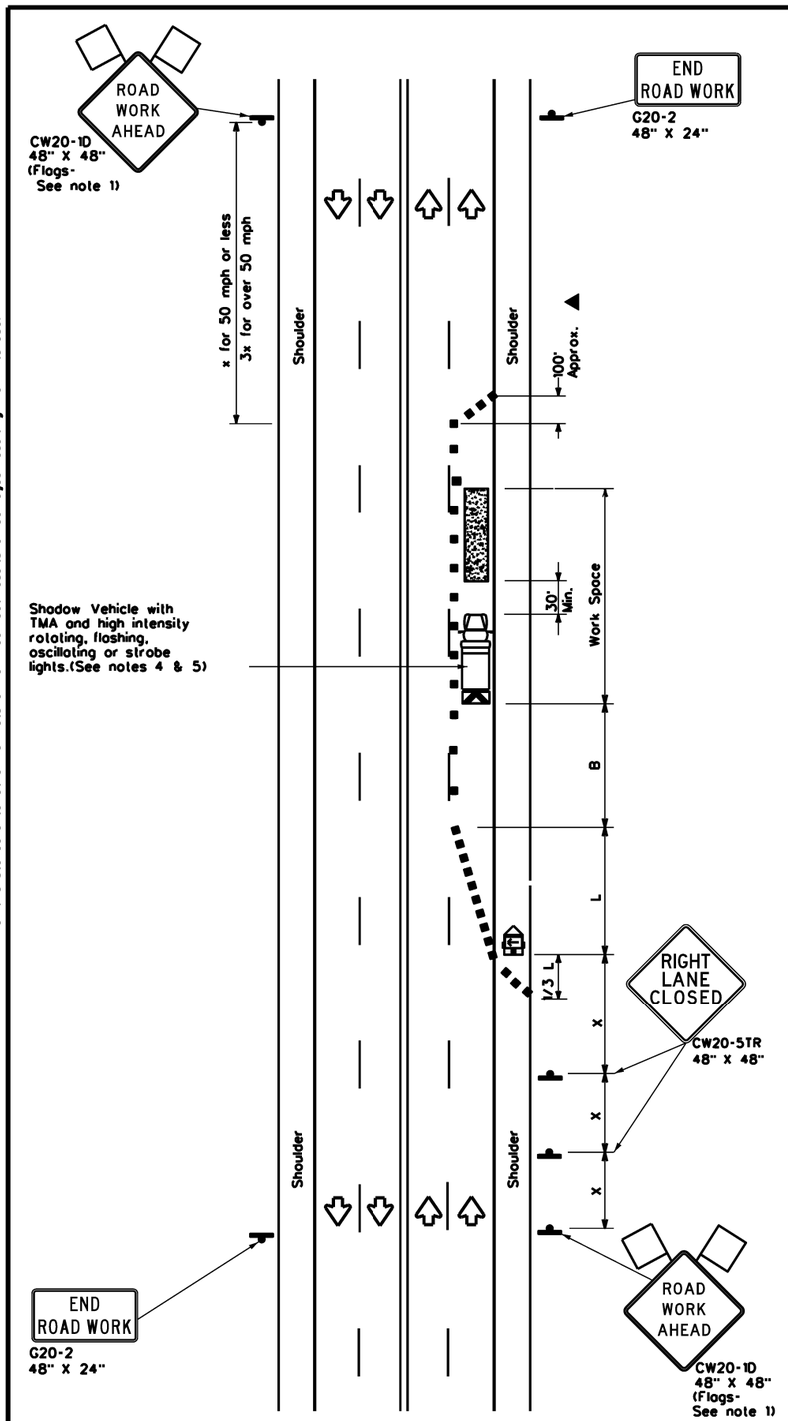
SH 218

QUANTITY SUMMARY

SHEET 1 OF 1

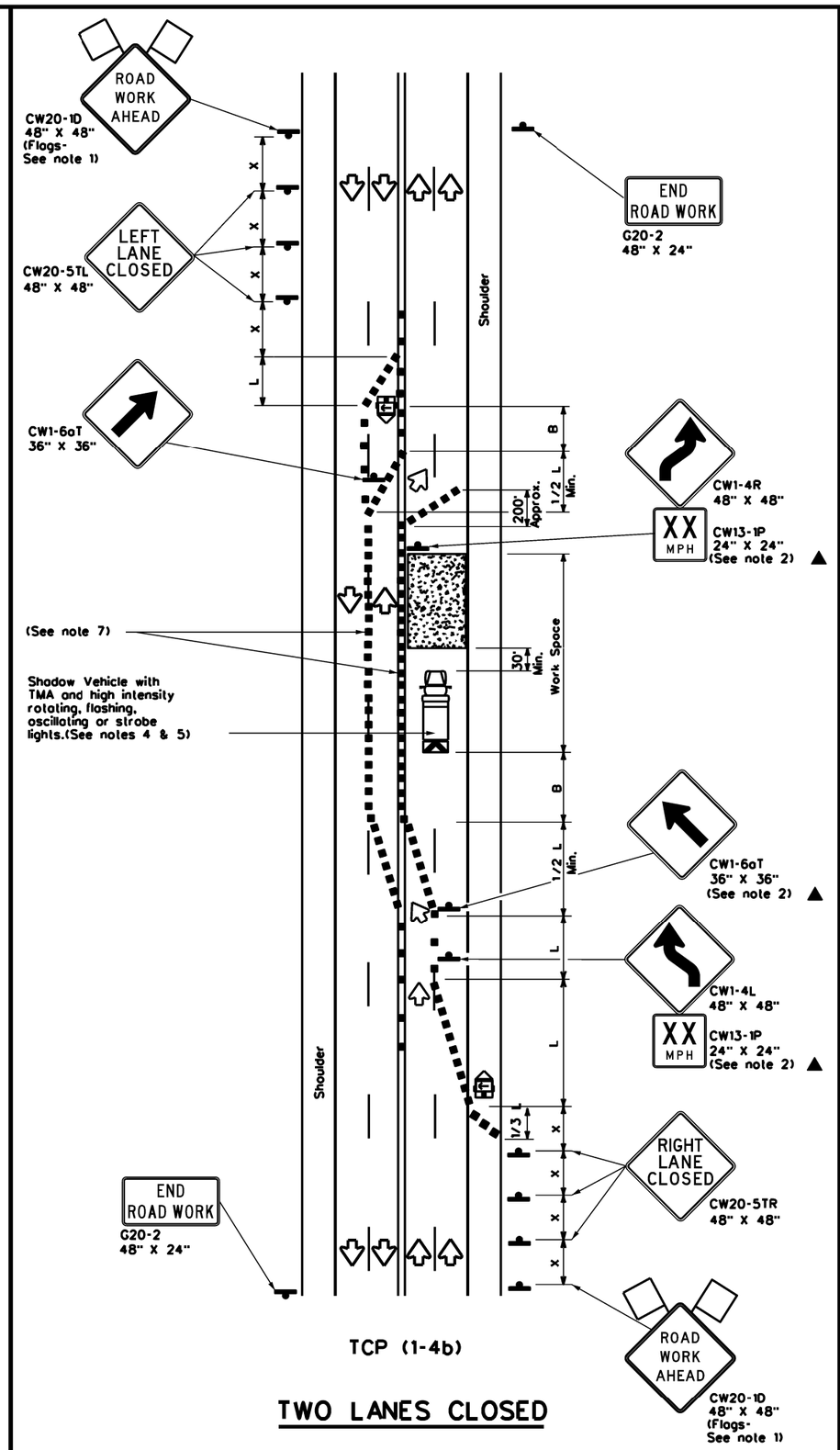
FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6			5
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

DATE:
FILE:



TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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

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

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

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

GENERAL NOTES

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

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0465	01	059	SH 218
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	SAT	BEXAR		6
1-97 2-18				

DATE:
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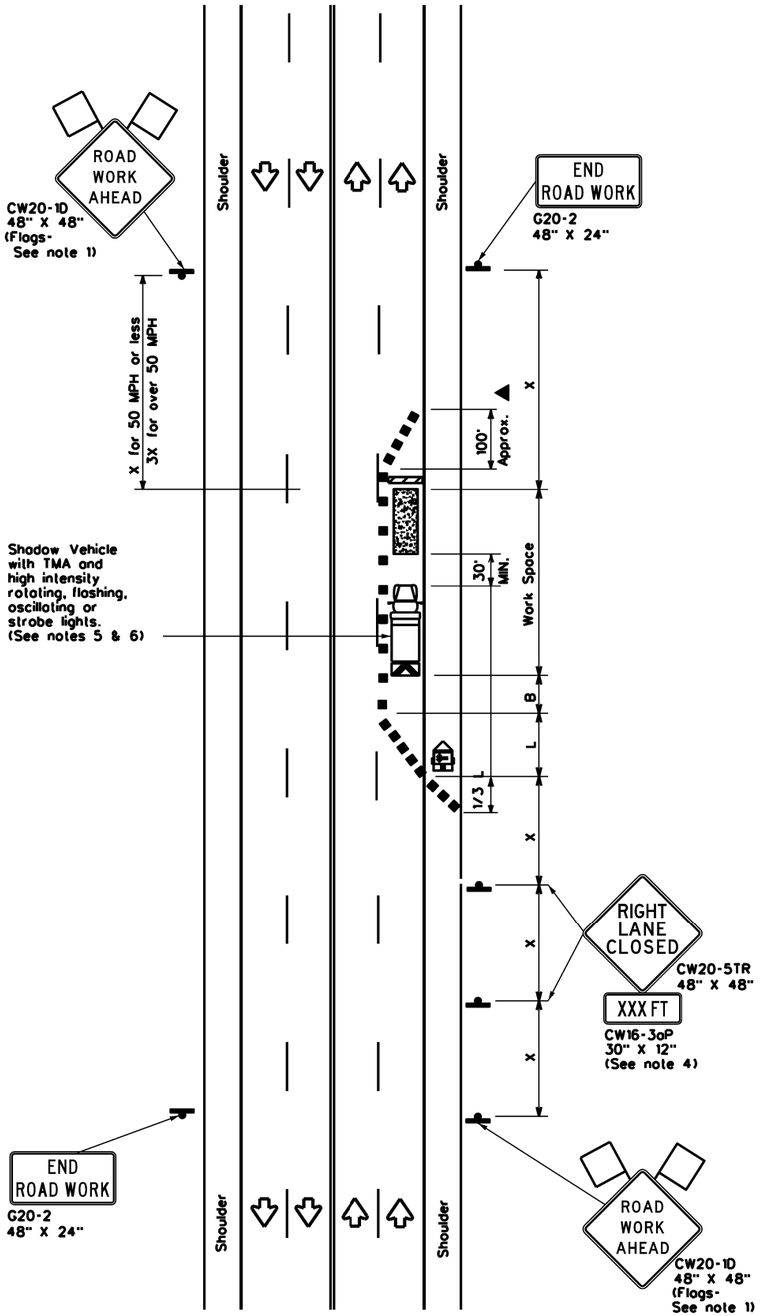
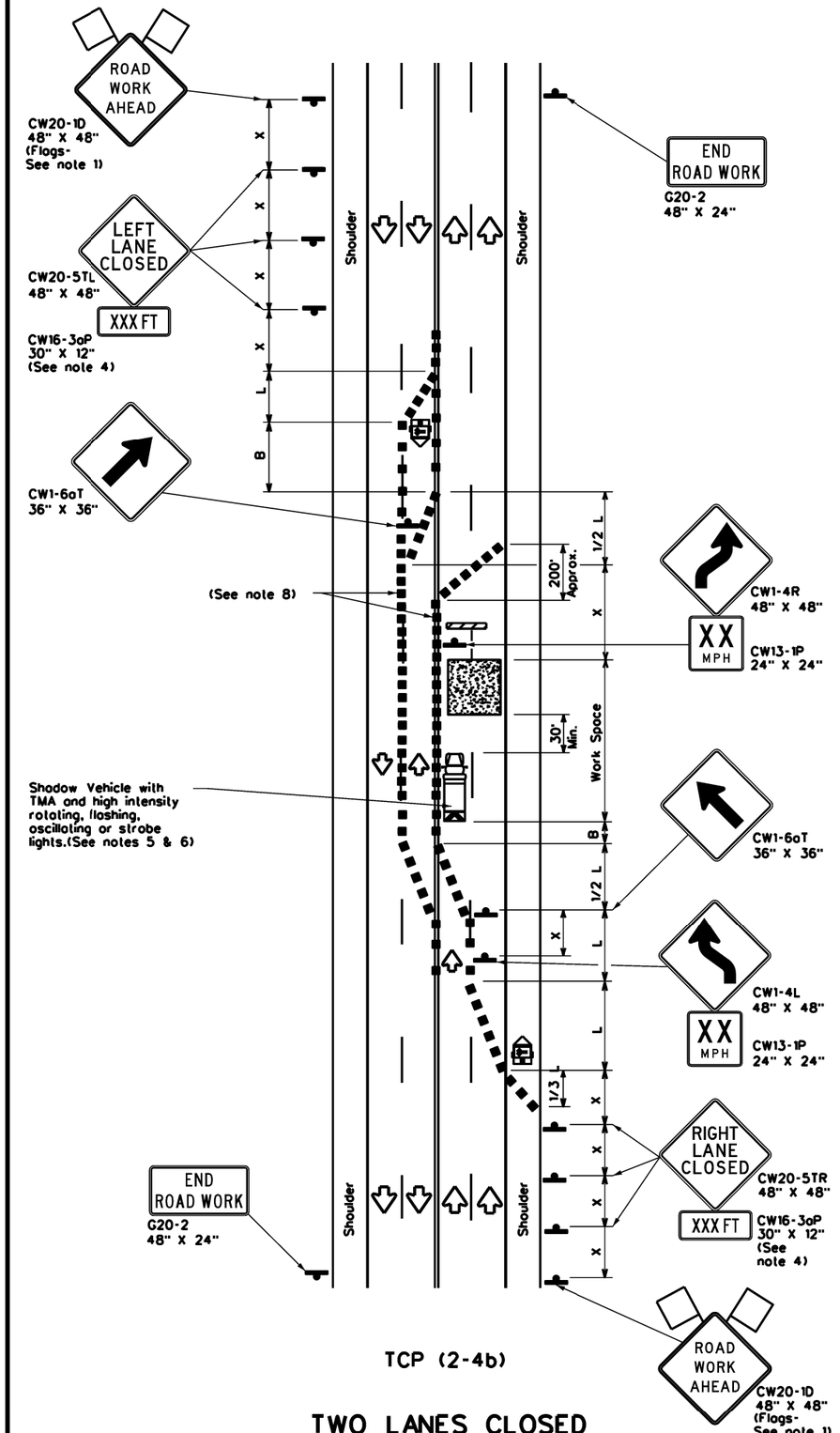


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

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

TCP (2-4b)

8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers of 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, of 1/2(S) where S is the speed in mph. This lighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0465	01	059	SH 218
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	SAT	BEXAR		7

$DATE$ $TIME$

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

(1) THIS PROJECT WILL BE CONSTRUCTED IN (1) PHASE. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.

(2) PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASES NOTED BELOW.

(3) THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC" AND ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING", OF THE STANADARD SPECIFICATIONS, AND TO THE GENERAL NOTES

(4) A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

PHASE 1

(1) THE INTENT OF THIS PHASE IS TO INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER.

(2) INSTALL EROSION CONTROL DEVICES (REFER TO SWP3).

(3) FOR EACH PLANT BED OR IRRIGATION LINE BORE, LANE CLOSURE TO BE STAGED USING TCP STANDARDS, TCP (1-4)-18 AND TCP (2-4)-18 DEPENDING ON LOCATION. SEE TRAFFIC CONTROL PLAN SHEET FOR DETAILS.

(4) WORK / WORKZONE SIGNING FOR TCP TO BE MOVED OR REMOVED ONCE WORK HAS BEEN COMPLETED AT THE PLANT BED LOCATION (OR UNLESS OTHERWISE DIRECTED BY ENGINEER.

(5) AFTER COMPLETETION OF ALL WORK, REMOVE ALL WORKZONE AND TCP SIGNING FOR PROJECT.

STATE OF TEXAS 1932

8/10/2023

Texas Department of Transportation

SH 218

TCP SEQUENCE OF WORK

1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		7A
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 21.8

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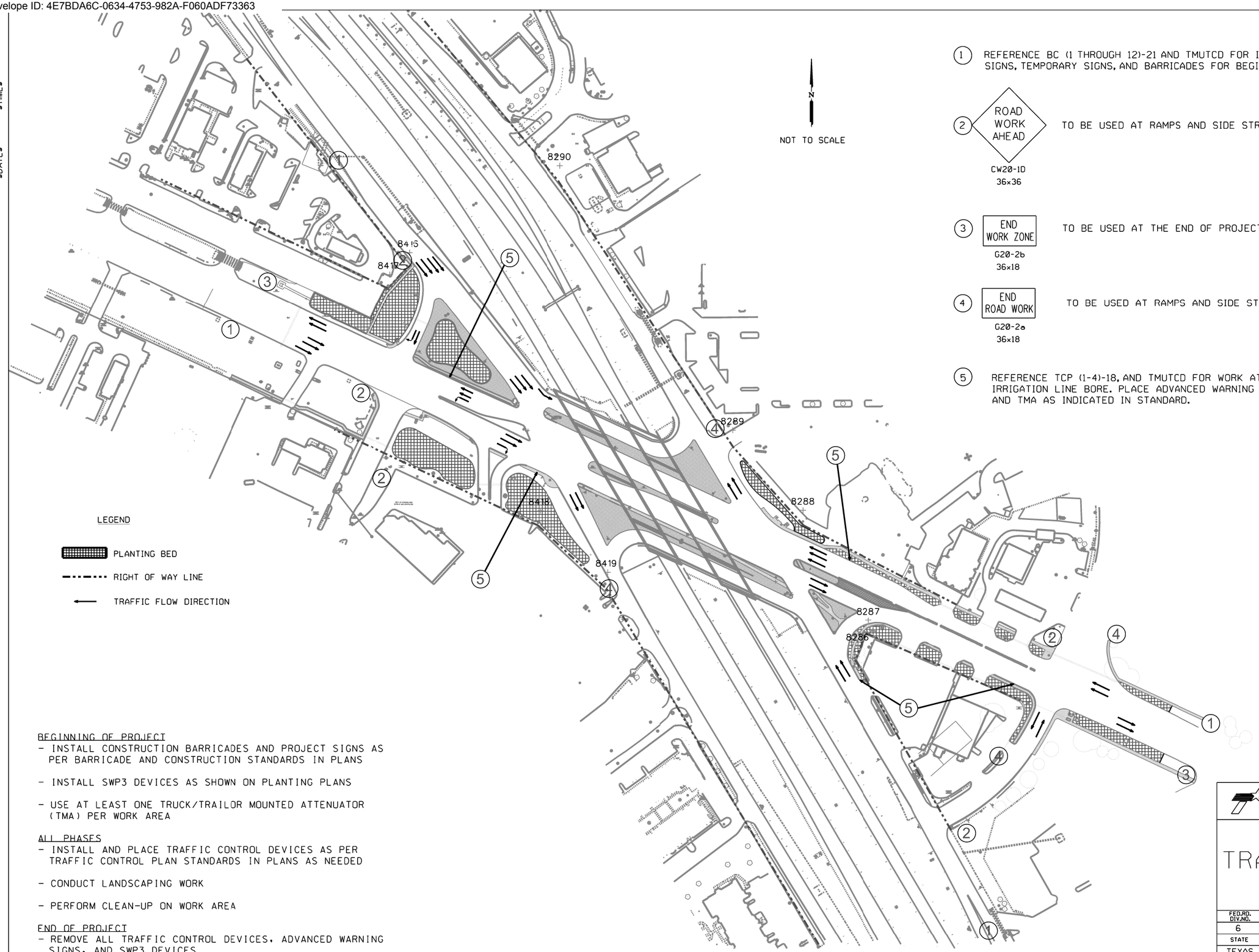

NOT TO SCALE

LEGEND

- PLANTING BED
- RIGHT OF WAY LINE
- TRAFFIC FLOW DIRECTION

1. REFERENCE BC (1 THROUGH 12)-21 AND TMUTCD FOR INSTALLATION OF ADVANCE WARNING SIGNS, TEMPORARY SIGNS, AND BARRICADES FOR BEGINNING OF PROJECT

2. ROAD WORK AHEAD — CW20-1D, 36x36 — TO BE USED AT RAMPS AND SIDE STREETS ENTERING THE WORK AREA

3. END WORK ZONE — G20-2b, 36x18 — TO BE USED AT THE END OF PROJECT

4. END ROAD WORK — G20-2a, 36x18 — TO BE USED AT RAMPS AND SIDE STREETS LEAVING THE WORK AREA

5. REFERENCE TCP (1-4)-18, AND TMUTCD FOR WORK AT EACH PLANTING BED AND IRRIGATION LINE BORE. PLACE ADVANCED WARNING SIGNS, CHANNELIZING DEVICES AND TMA AS INDICATED IN STANDARD.

STATE OF TEXAS
SUMAN SHRESTHA
105162
LICENSED PROFESSIONAL ENGINEER

DocuSigned by:
Suman Shrestha
E822C2086FA04BA...
3/23/2023

BEGINNING OF PROJECT
- INSTALL CONSTRUCTION BARRICADES AND PROJECT SIGNS AS PER BARRICADE AND CONSTRUCTION STANDARDS IN PLANS
- INSTALL SWP3 DEVICES AS SHOWN ON PLANTING PLANS
- USE AT LEAST ONE TRUCK/TRAILOR MOUNTED ATTENUATOR (TMA) PER WORK AREA

ALL PHASES
- INSTALL AND PLACE TRAFFIC CONTROL DEVICES AS PER TRAFFIC CONTROL PLAN STANDARDS IN PLANS AS NEEDED
- CONDUCT LANDSCAPING WORK
- PERFORM CLEAN-UP ON WORK AREA

END OF PROJECT
- REMOVE ALL TRAFFIC CONTROL DEVICES, ADVANCED WARNING SIGNS, AND SWP3 DEVICES

SH 218
TRAFFIC CONTROL PLAN

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		7-B
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

$FILE$

DATE:
FILE:

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

SHEET 1 OF 12

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
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REVISIONS	0465	01	059	HWY 218
4-03 7-13	DIST	COUNTY		SHEET NO.
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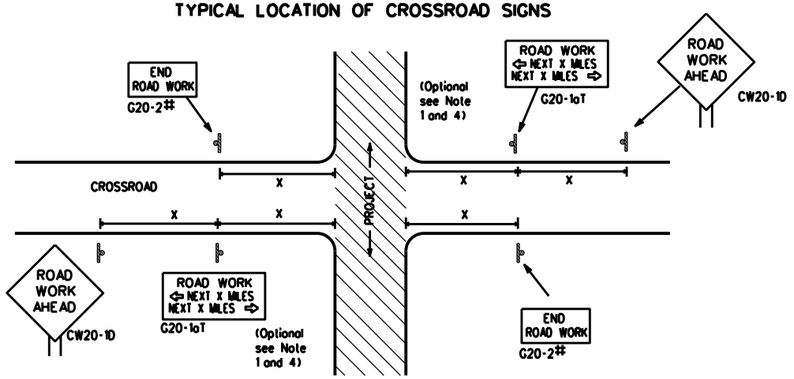
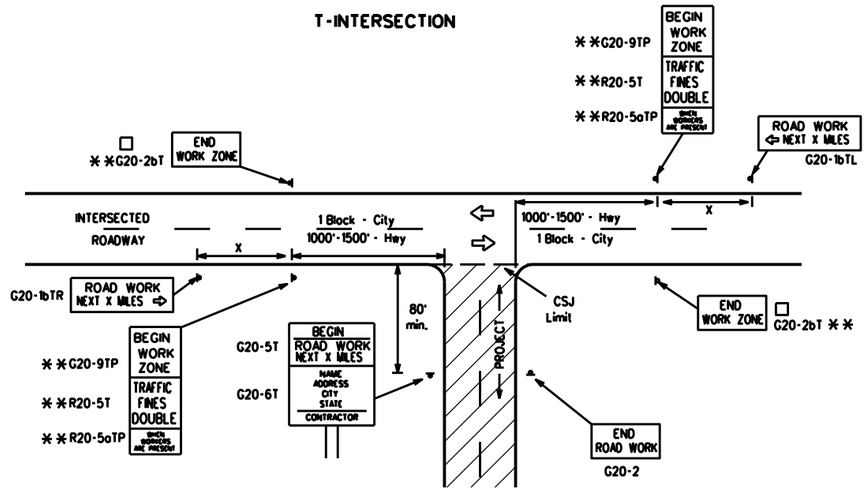
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

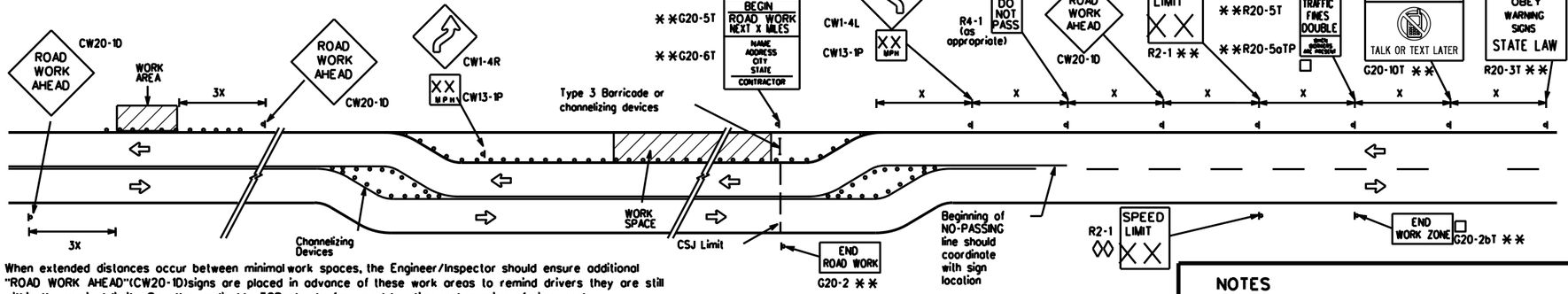
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

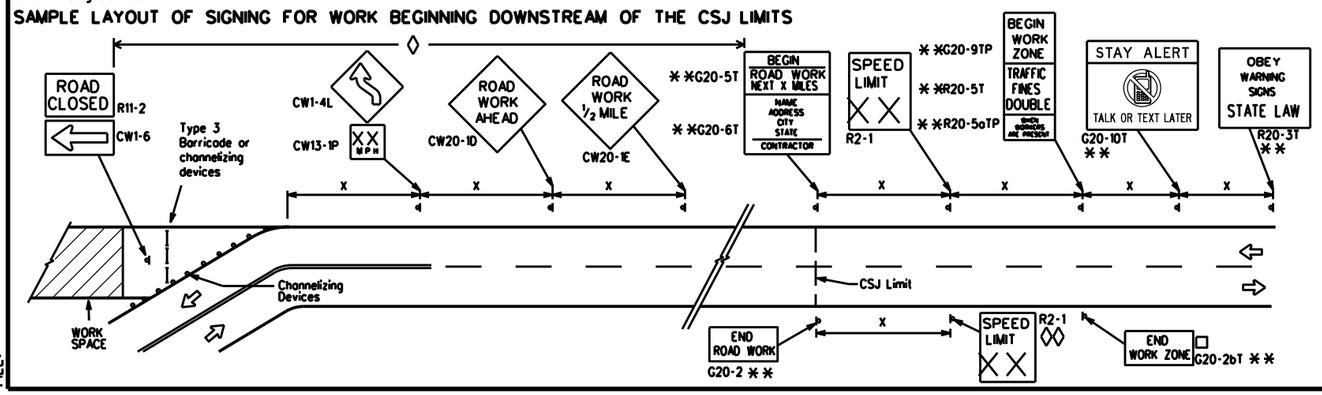
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may 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 DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT 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.

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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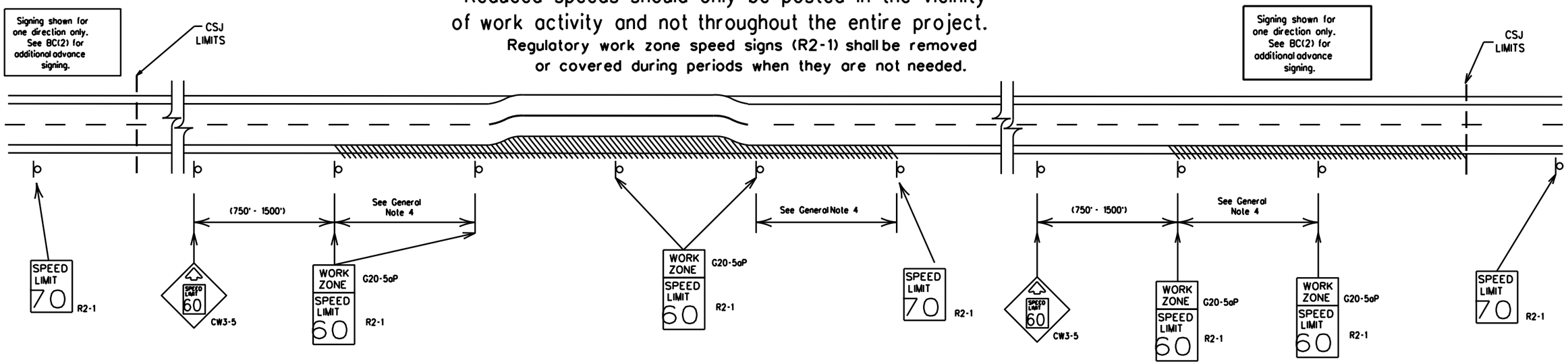
7-13 5-21	SAT	BEXAR		009

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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SHEET 3 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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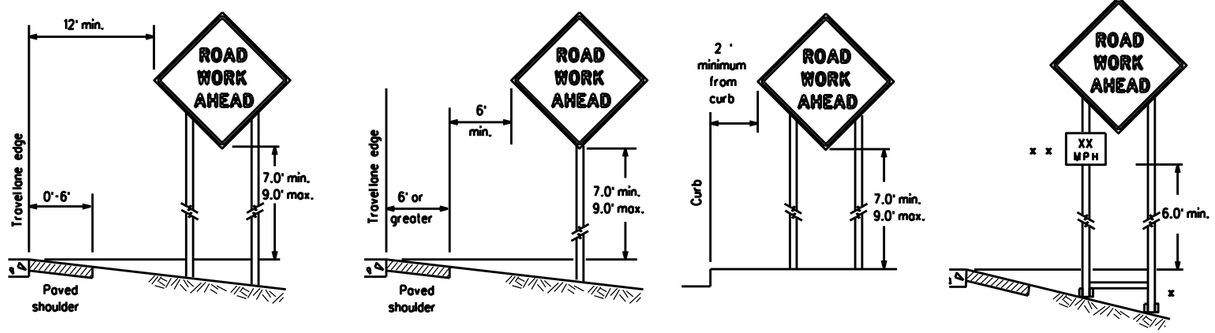
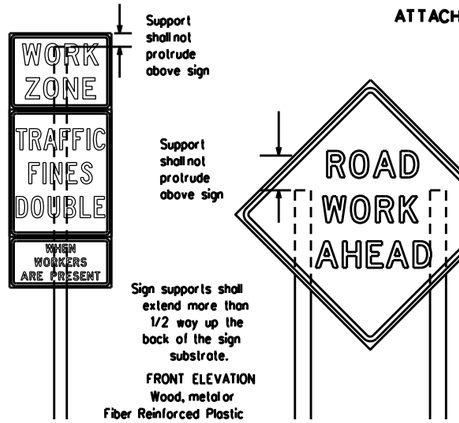
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



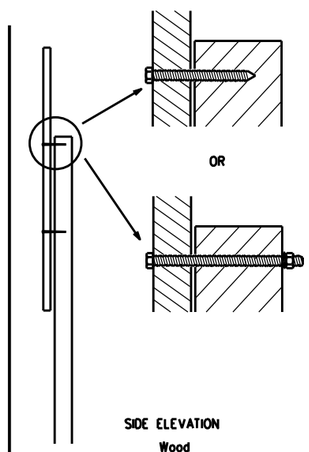
x When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



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.

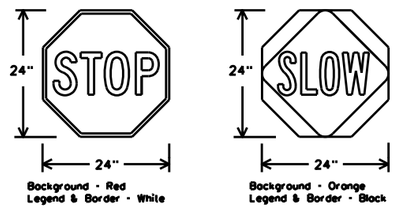


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

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 lightness 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 or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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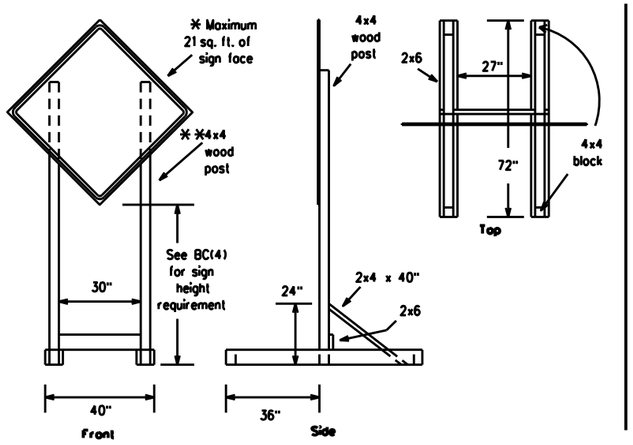
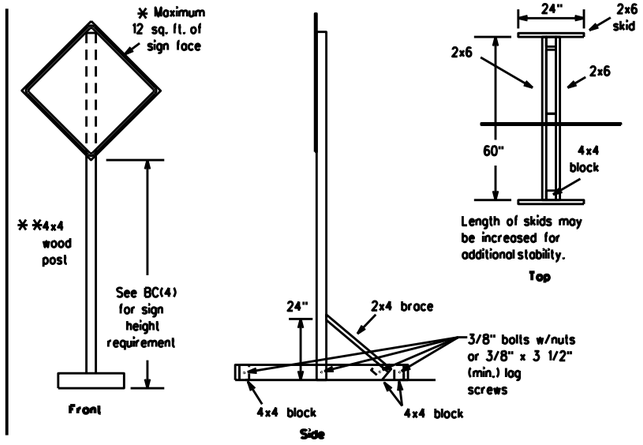
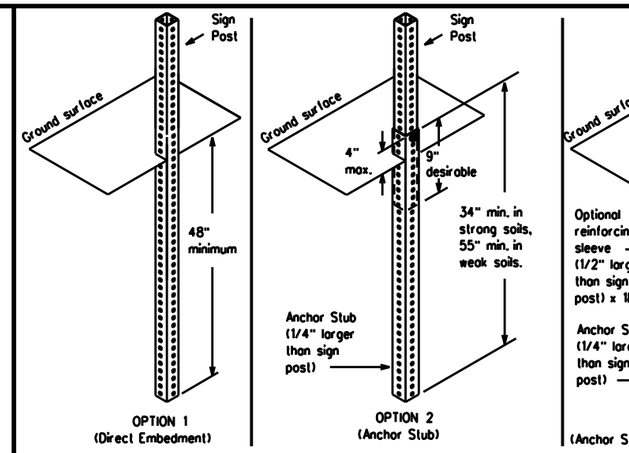


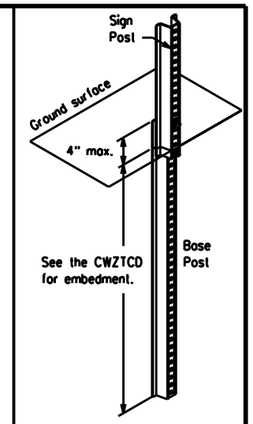


SKID MOUNTED WOOD SIGN SUPPORTS

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



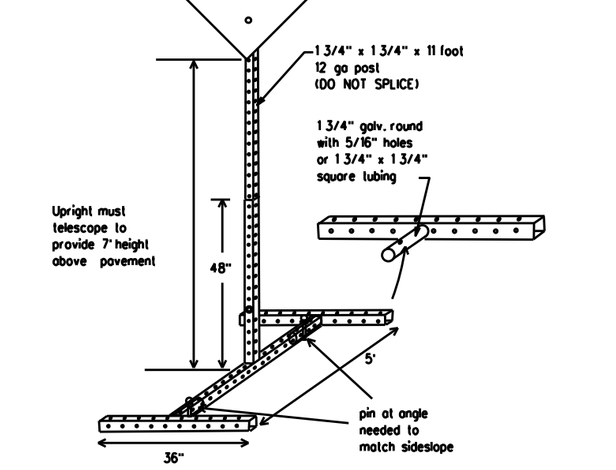
PERFORATED SQUARE METAL TUBING

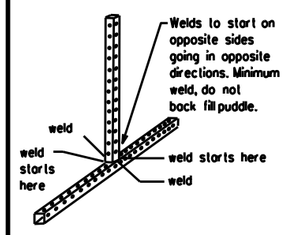


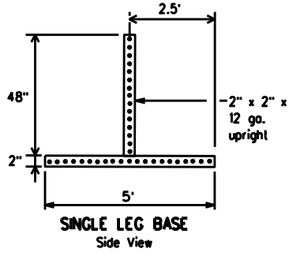
WING CHANNEL
Lap-splice/base bolted anchor

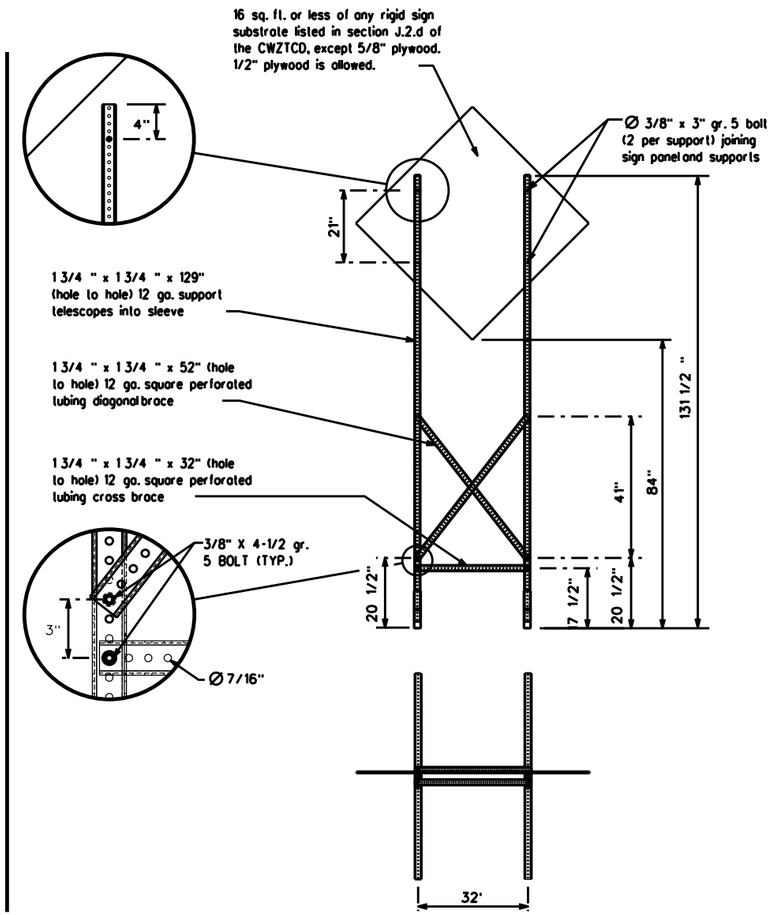
GROUND MOUNTED SIGN SUPPORTS

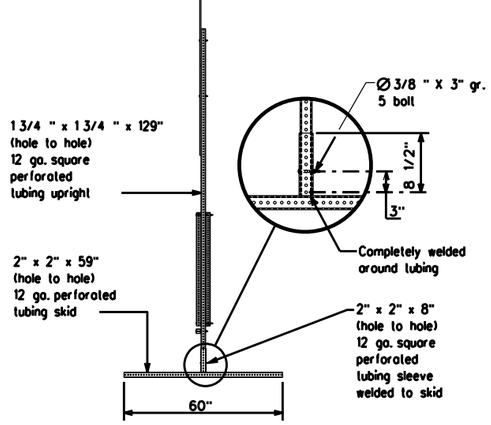
Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.











SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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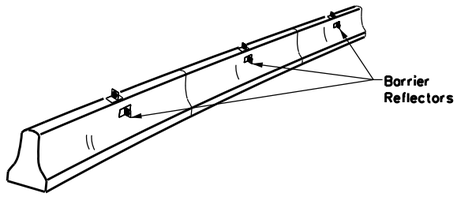
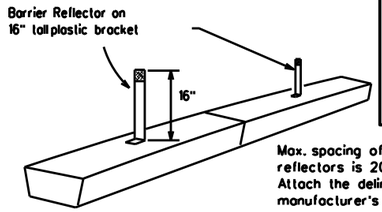
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

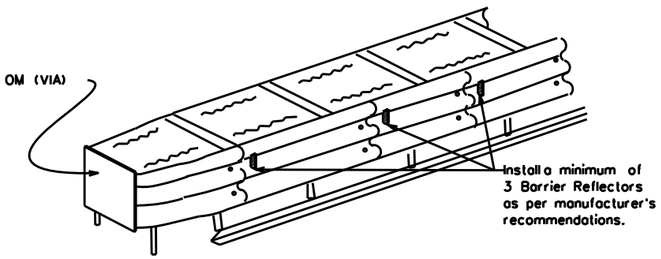


Max. spacing of barrier reflectors is 20 feet.
Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

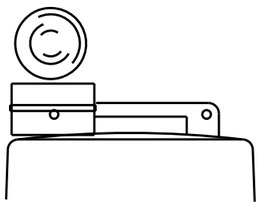


DELINEATION OF END TREATMENTS

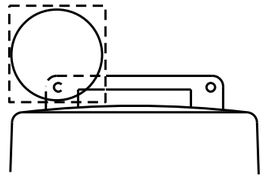
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

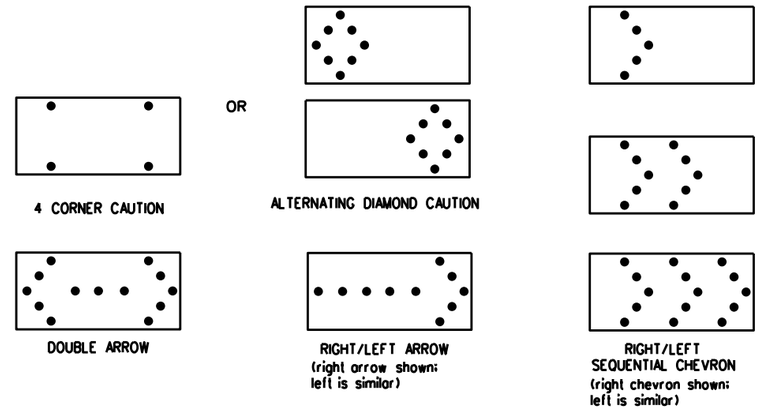
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is on 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	0465	01	059	HWY 218
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		014

101

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DATE:
FILE:

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:

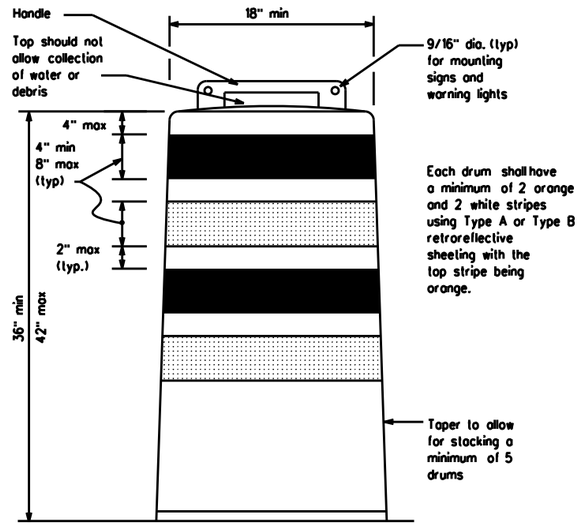
1. Plastic drums shall be a two-piece design: the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

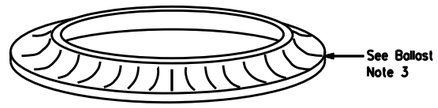
RETROREFLECTIVE SHEETING

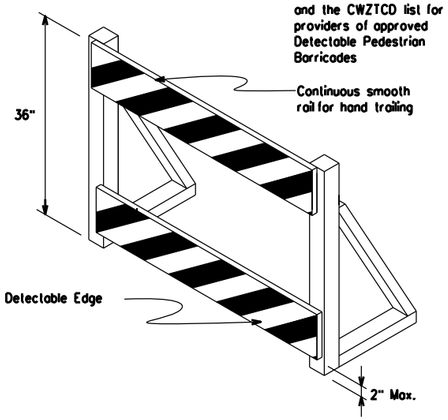
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

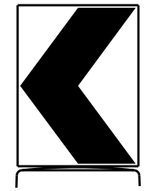




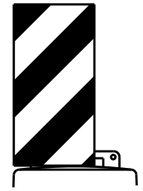


DETECTABLE PEDESTRIAN BARRICADES

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

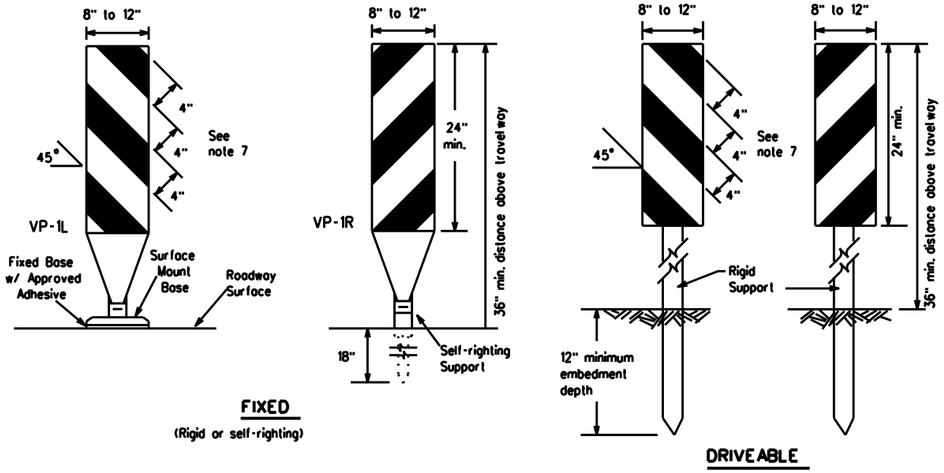
Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

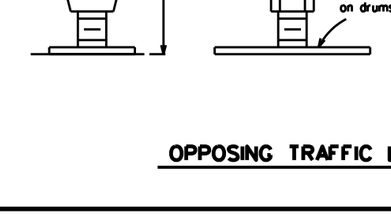
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0465	01	059	HWY 218
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	SAT	BEXAR		015
7-13				



FIXED

(Rigid or self-righting)

DRIVEABLE

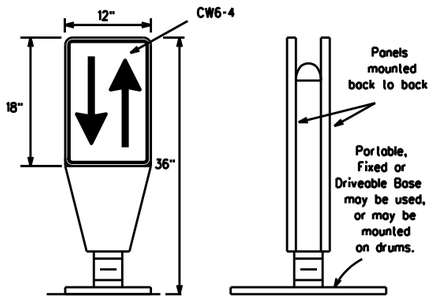


(Rigid or self-righting)

PORTABLE

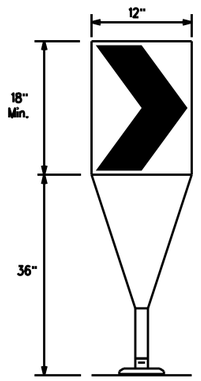
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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 or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



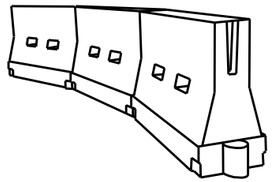
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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 or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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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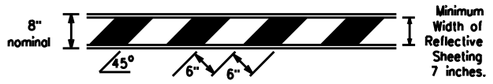
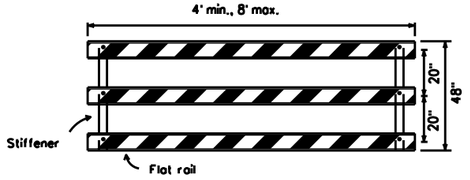
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



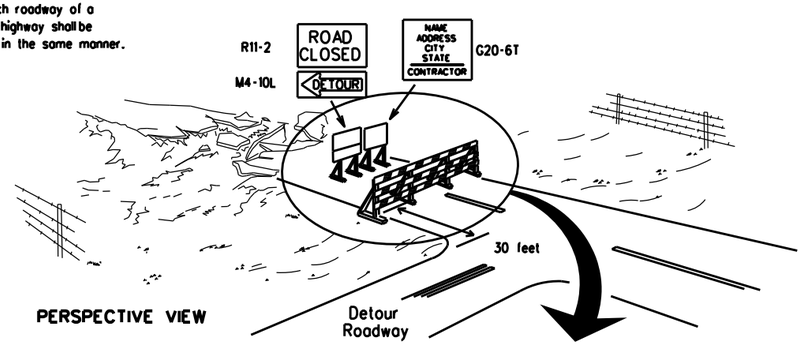
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

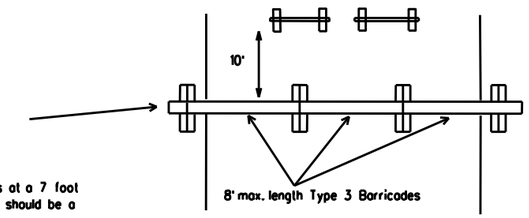
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

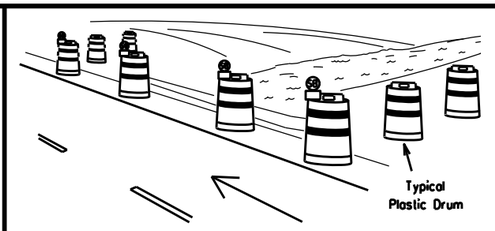
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

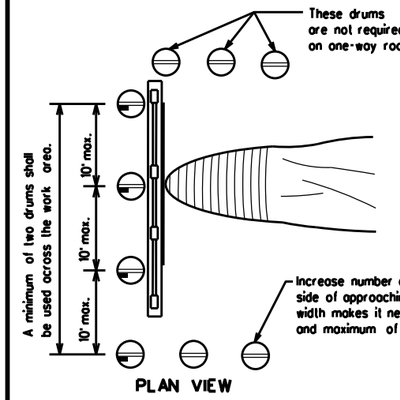
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

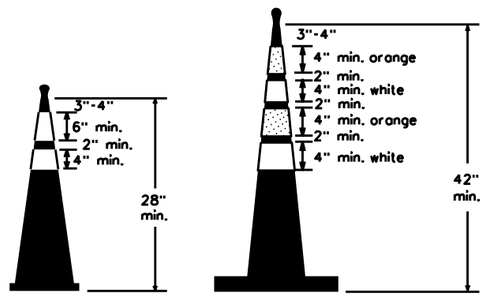
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



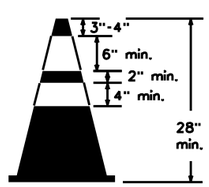
PLAN VIEW

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

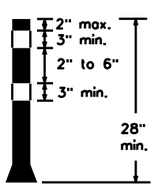
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

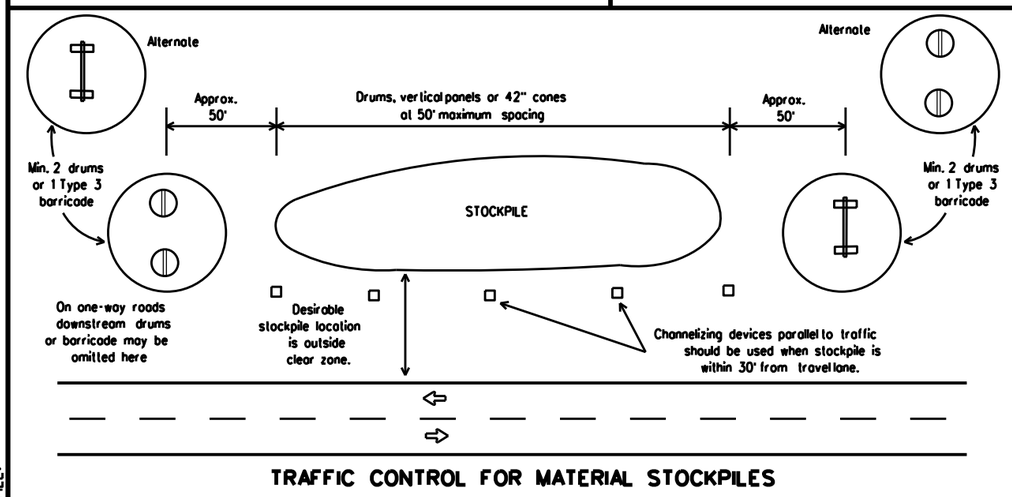


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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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.

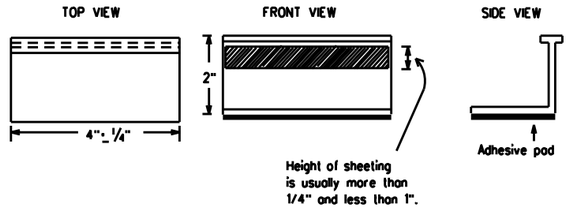
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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).

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Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

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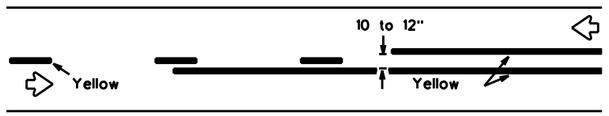
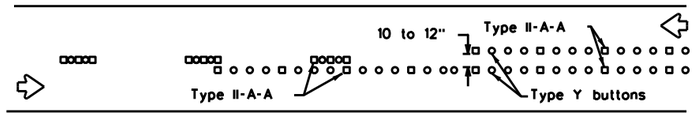
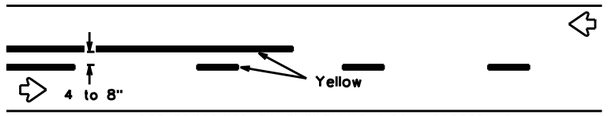
PAVEMENT MARKING PATTERNS



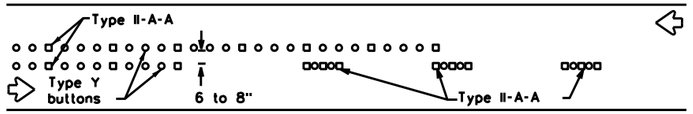
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



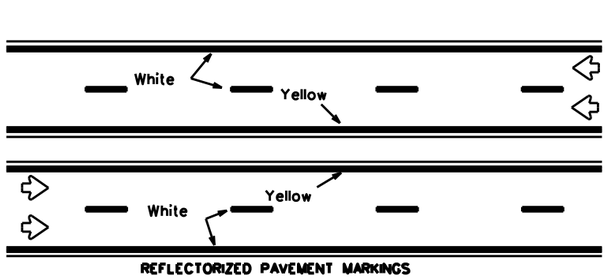
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



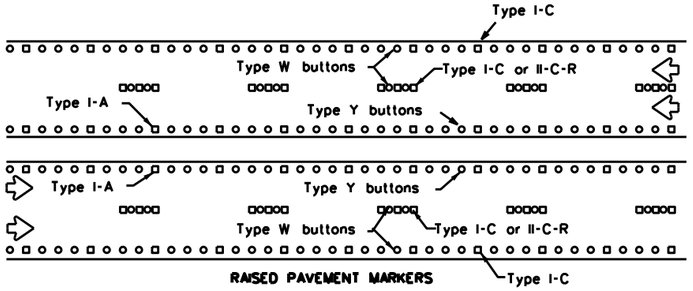
RAISED PAVEMENT MARKERS - PATTERN B

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



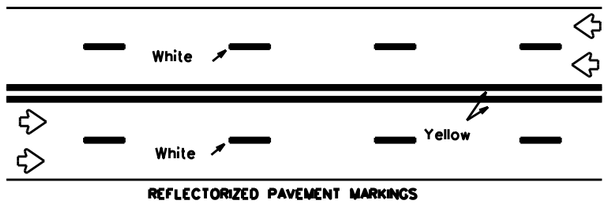
REFLECTORIZED PAVEMENT MARKINGS



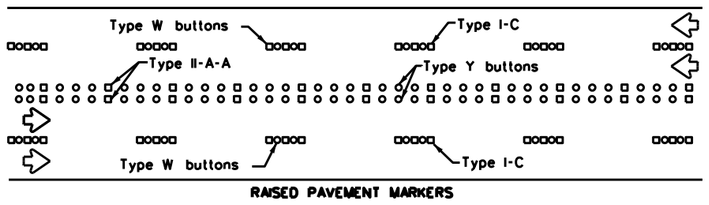
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



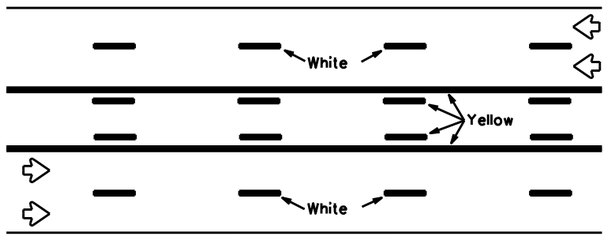
REFLECTORIZED PAVEMENT MARKINGS



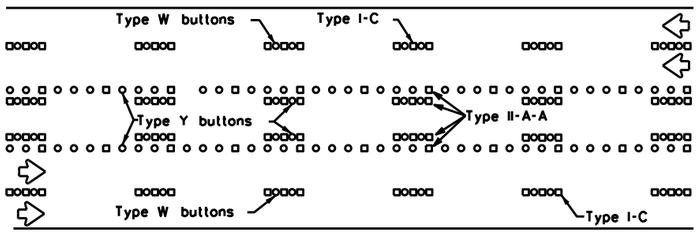
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

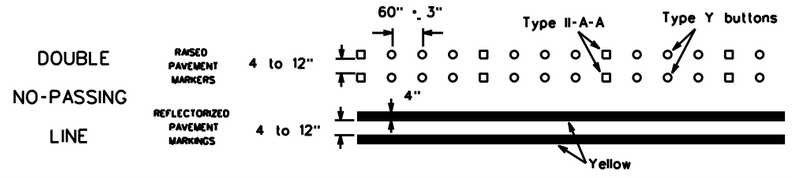
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

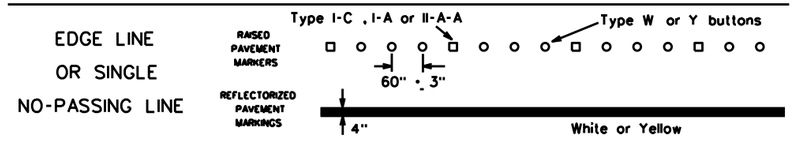
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

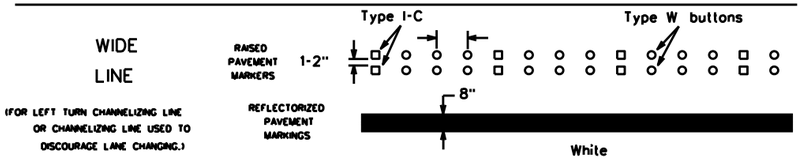


EDGE LINE OR SINGLE NO-PASSING LINE



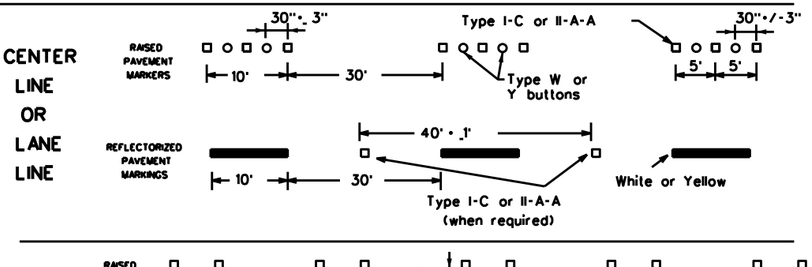
WIDE LINE

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

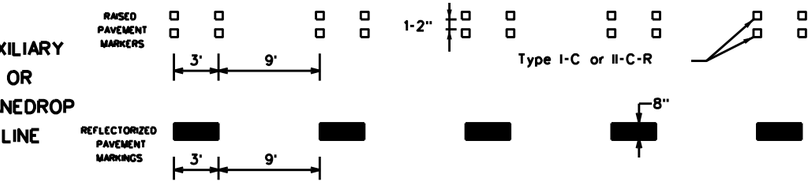


BROKEN LINES

CENTER LINE OR LANE LINE

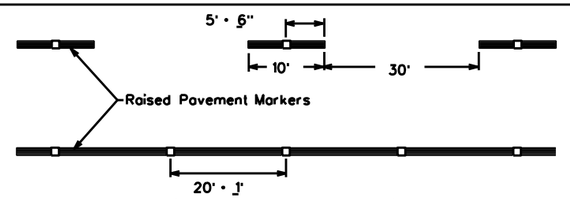


AUXILIARY OR LANEDROP LINE



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."

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BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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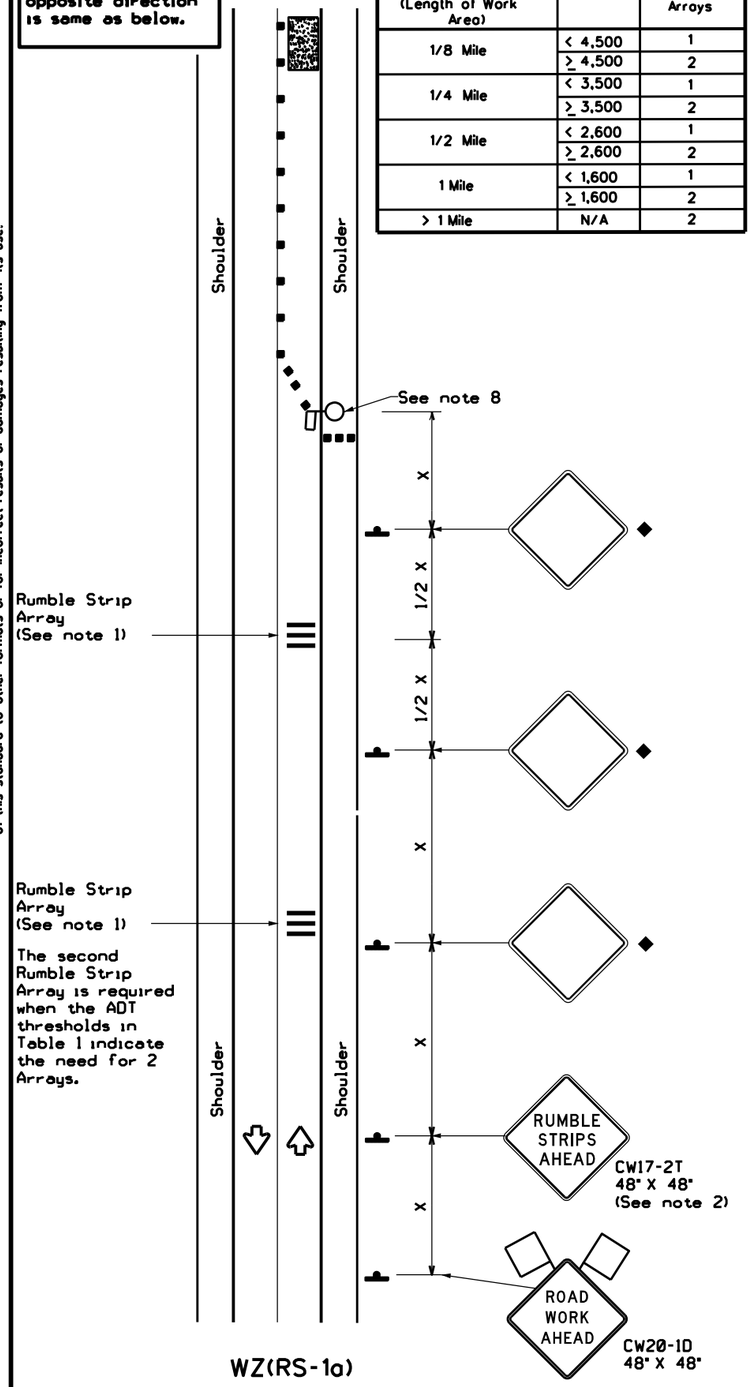
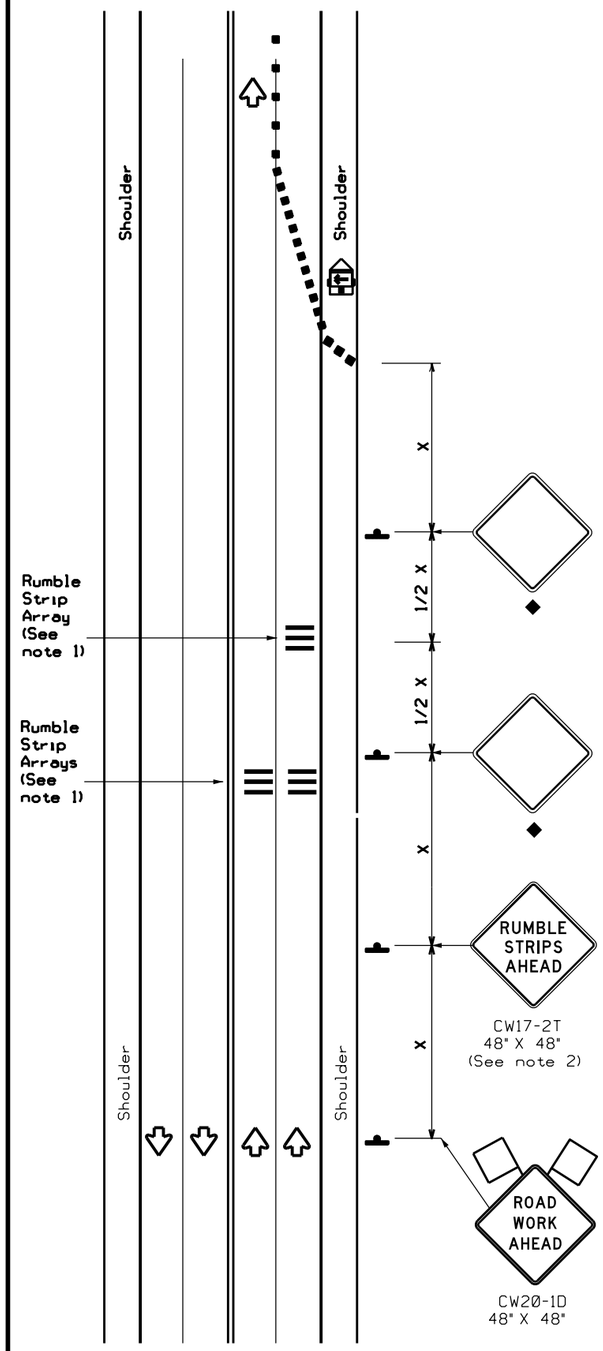
Warning sign and rumble strip sequence in opposite direction is same as below.

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'+

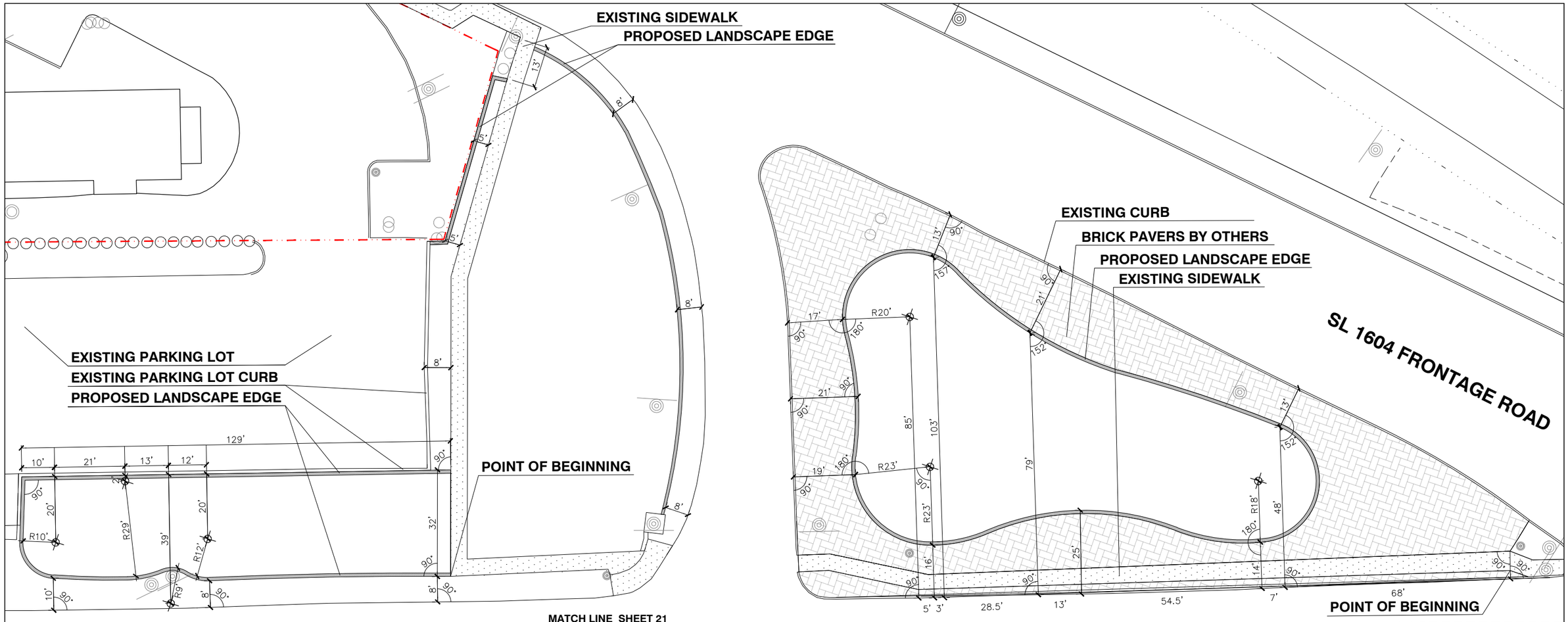
Texas Department of Transportation

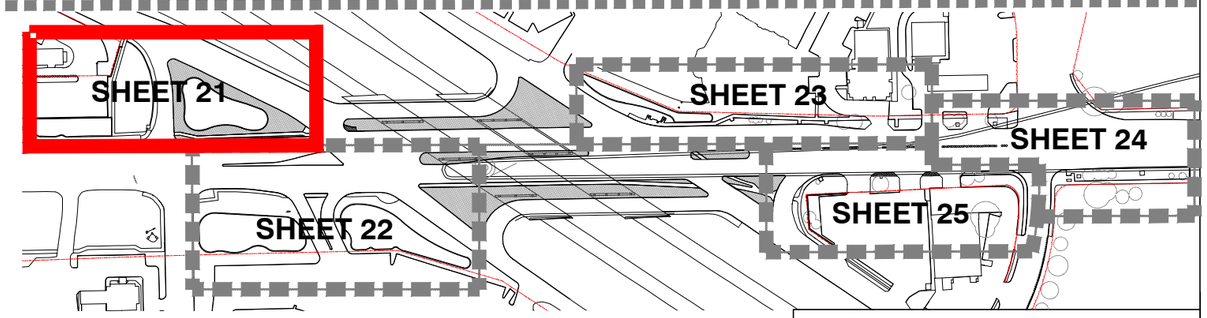
Traffic Safety Division Standard

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	0465	01	059	SH 218
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		020





LEGEND:

- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS

NOTES:

1. VARY ACCESS ROUTES ONTO AND WITHIN THE SITE TO AVOID DAMAGE TO EXISTING VEGETATION.
2. PLACE PLANTING BEDS AS SHOWN AND ACCORDING TO THE SCALE OF THE DRAWINGS.
3. ALL DIMENSIONS ARE TAKEN FROM THE EDGE OF EXISTING EDGE OF PAVEMENT OR FACE OF CURB UNLESS OTHERWISE SHOWN IN THE PLANS.
4. MARK ALL RIGHT OF WAY LIMITS IN THE FIELD PRIOR TO LAYOUT OF LANDSCAPE EDGE.
5. THE EXISTENCE AND LOCATIONS OF ALL UTILITIES SHOWN ON THE PLANS IS TAKEN FROM THE BEST RECORDS AVAILABLE AND IS NOT GUARANTEED TO BE ACCURATE OR COMPLETELY INCLUSIVE.
6. COORDINATE WITH ALL UTILITY COMPANIES TO FIELD VERIFY AND MARK SURFACE AND SUBSURFACE UTILITIES PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES.

SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

Texas Department of Transportation

SH 218

LAYOUT PLAN

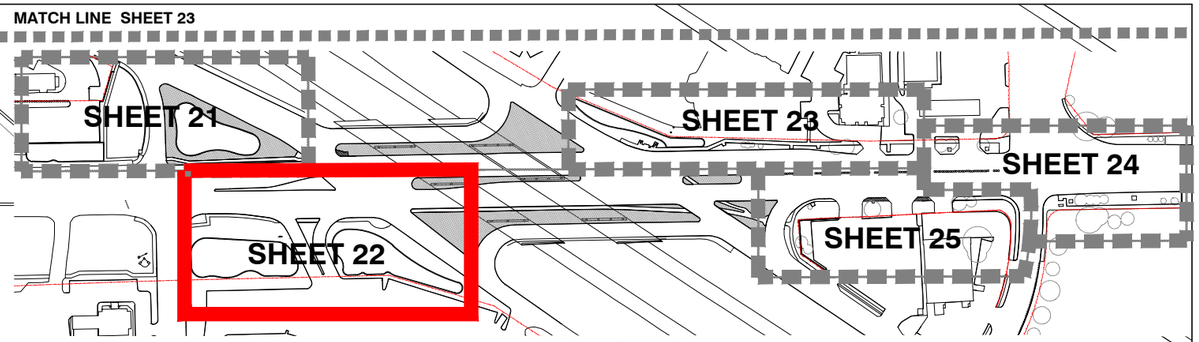
SHEET 21 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		21
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

MATCH LINE SHEET 21

MATCH LINE SHEET 22

MATCH LINE SHEET 23



EXISTING SIDEWALK

PROPOSED LANDSCAPE EDGE

SH 218 (PAT BOOKER RD.)

BRICK PAVERS BY OTHERS

EXISTING SIDEWALK

CONVERSE RD.

POINT OF BEGINNING

POINT OF BEGINNING

EXISTING PARKING LOT

PROPOSED LANDSCAPE EDGE

EXISTING PARKING LOT CURB

LEGEND:

- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS

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0 15 30

SCALE:1" = 30'-0"

N

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS

Bill Nicholson

02/23/2023

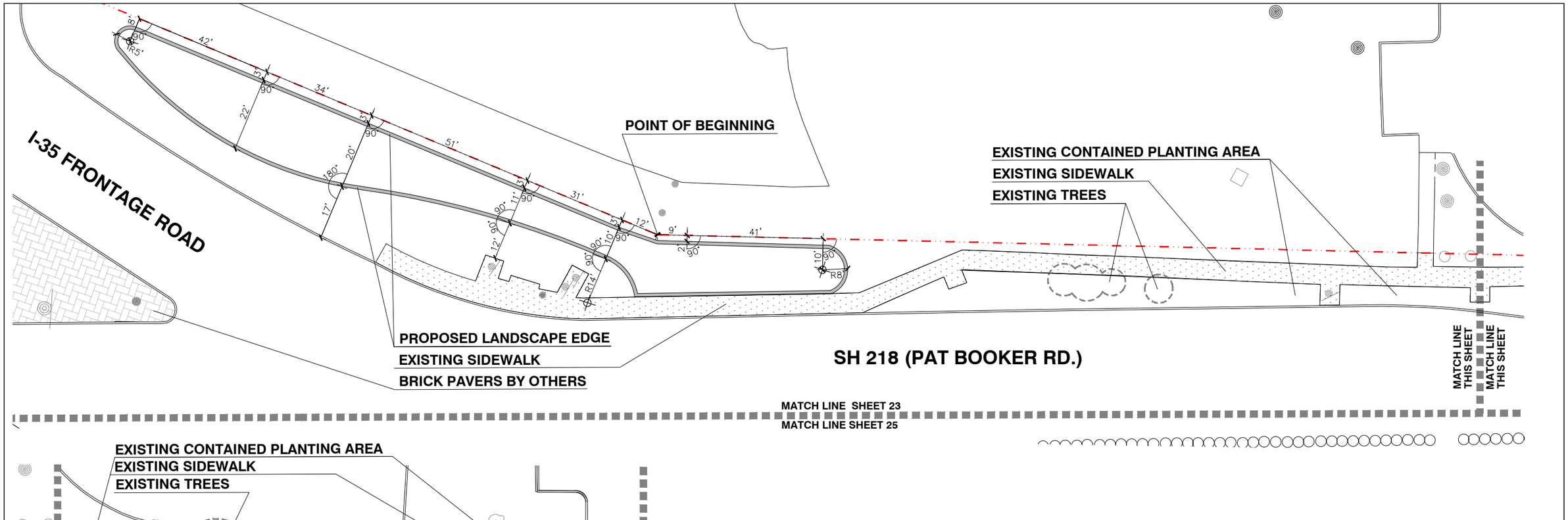
Texas Department of Transportation

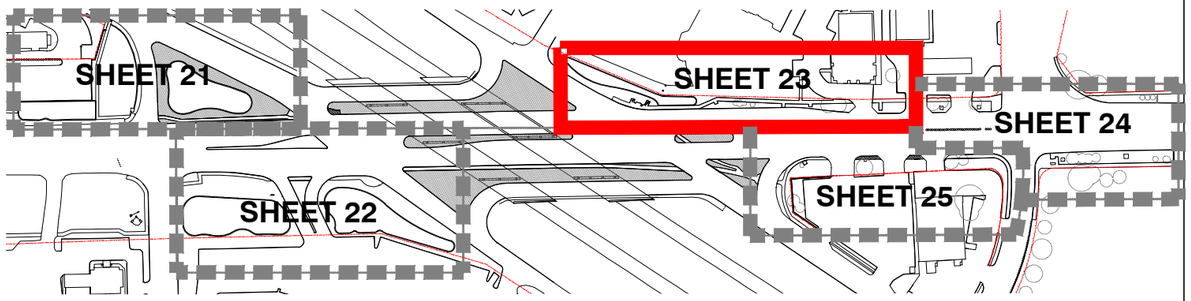
SH 218

LAYOUT PLAN

SHEET 22 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		22
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218





LEGEND:

- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
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0 15 30

SCALE:1" = 30'–0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

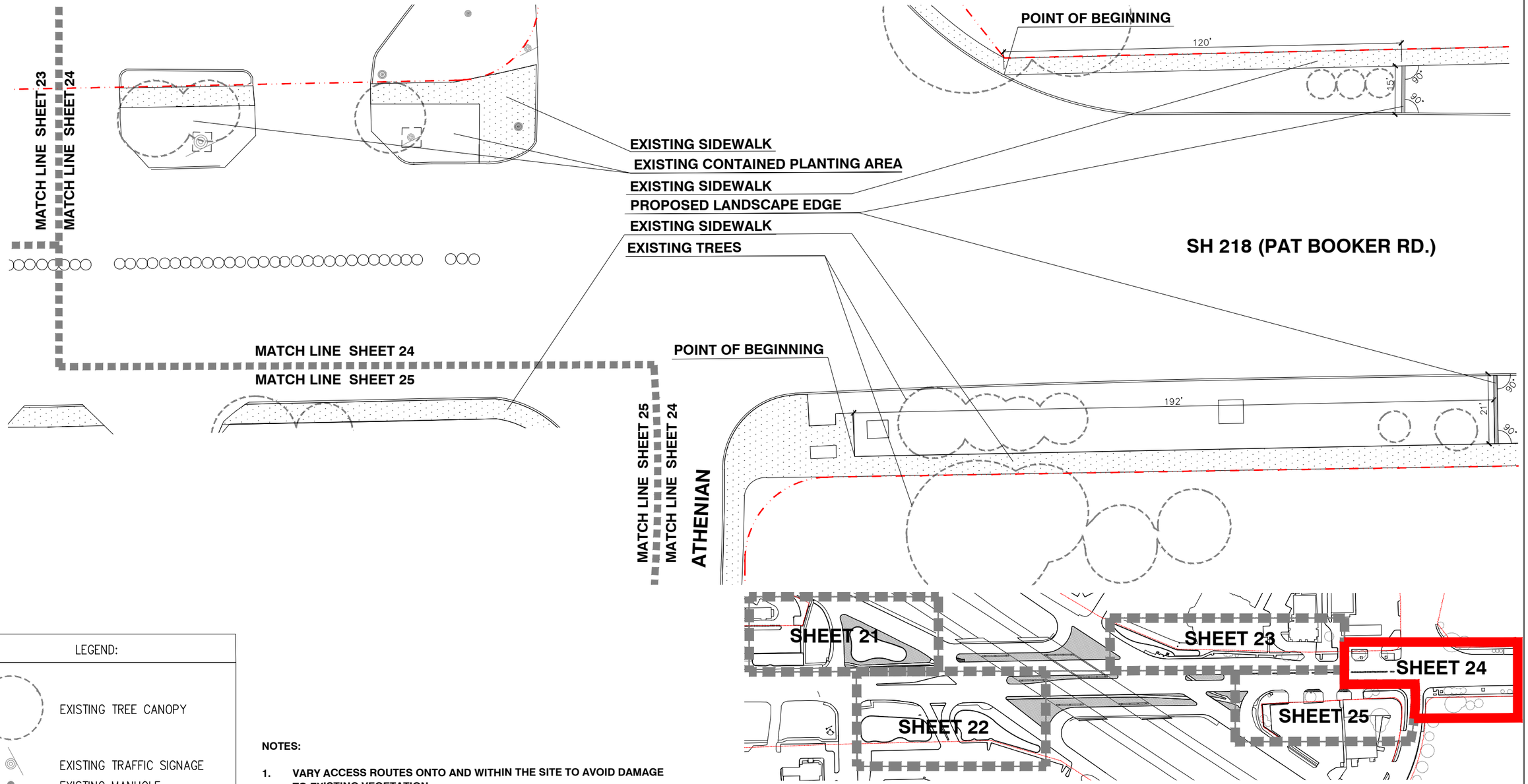
Texas Department of Transportation

SH 218

LAYOUT PLAN

SHEET 23 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		23
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218



LEGEND:

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- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
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0 15 30

SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

Texas Department of Transportation

SH 218

LAYOUT PLAN

SHEET 24 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		24
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

MATCH LINE SHEET 23
MATCH LINE SHEET 25

MATCH LINE SHEET 23
MATCH LINE SHEET 25

SH 218 (PAT BOOKER RD.)

MATCH LINE SHEET 24
MATCH LINE SHEET 25

MATCH LINE SHEET 25
MATCH LINE SHEET 24

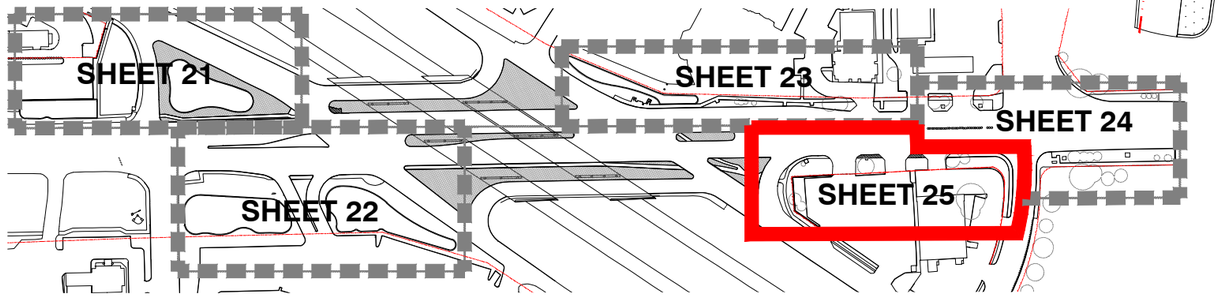
ATHENIAN

EXISTING PARKING LOT CURB
EXISTING RETAINING WALL
EXISTING CONTAINED PLANTING AREA
EXISTING CONTAINED PLANTING AREA
EXISTING CONTAINED PLANTING AREA
EXISTING PARKING LOT

EXISTING CONTAINED PLANTING AREA
EXISTING PARKING LOT CURB

EXISTING CONTAINED PLANTING AREA
EXISTING PARKING LOT CURB

SL 1604 ACCESS RD.



LEGEND:

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- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
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0 15 30
SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS
Bill Nicholson
02/23/2023

Texas Department of Transportation

SH 218

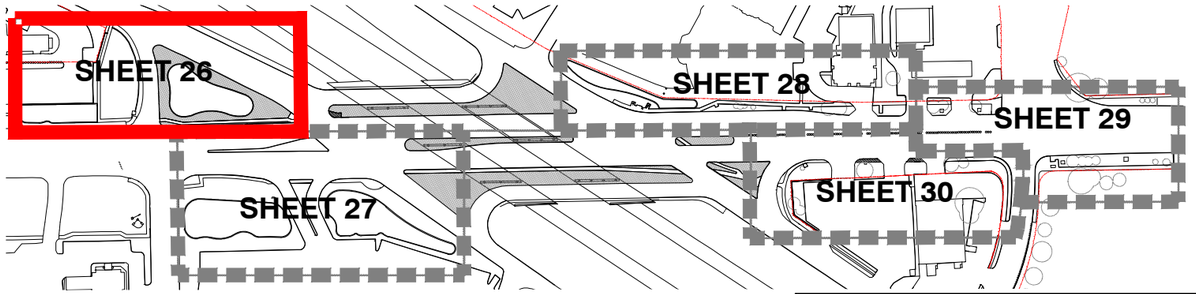
LAYOUT PLAN

SHEET 25 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		25
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

LEGEND:

- PROPOSED LIVE OAK (100-GAL.)
- PROPOSED MOUNTAIN LAUREL
- PROPOSED RED YUCCA
- PROPOSED BIG MUHLY GRASS
- C PROPOSED PURPLE CONEFLOWER
- S PROPOSED SNOW IN SUMMER
- B PROPOSED BIG BLUE LIRIOPE
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS
- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK



ESTIMATED SHEET QUANTITY		
	UNIT	QUANTITY
TREES (100-GAL.) 192 – 6027	EA	5
UNDERSTORY TREES (45-GAL.) 192 – 6025	EA	12
SHRUBS (5-GAL.) 192 – 6004	EA	942
SMALL SHRUBS / GC (1-GAL.) 192 – 6002	EA	862
LANDSCAPE EDGE 192 – 6015	LF	801
PLANT BED PREP 192 – 6016	SY	2,177
PLANT SOIL MIX 192 – 6014	CY	182
MULCH 192 – 6013	SY	2,177
BROADCAST SEED 164 – 6001	SY	629
VEGATIVE WATERING 168 – 6001	MG	0
IRRIGATION SYSTEM 170 – 6001	EA	1
BIODEG EROS CONT LOGS INSTALL 506 – 6041	EA	1
BIODEG EROS CONT LOGS REMOVE 506 – 6043	EA	1

NOTES:

1. MAINTAIN POSITIVE DRAINAGE.
2. BE ADVISED THAT DITCHES, SWALES, SLOPES, UTILITIES, AND OTHER POTENTIAL CONFLICTS BASED ON AVAILABLE INFORMATION. EXAMINE THE SITE PRIOR TO CONSTRUCTION AND REPORT AREAS OF POTENTIAL EROSION AND OTHER CONFLICTS FOR DIRECTION.
3. PRIOR TO CONSTRUCTION, PROVIDE AND SECURELY INSTALL SAFETY FENCING AROUND THE CRITICAL ROOT ZONES FOR EACH EXISTING TREE OR TREE GROUPING. THE CRITICAL ROOT ZONE LIMITS ARE MEASURED AT 1 FOOT DISTANCE FROM TRUNK FOR EVERY 1 INCH OF TRUNK DIAMETER.
4. DO NOT ALLOW ACCESS, ACTIVITIES, OR STORAGE WITHIN THE CRITICAL ROOT ZONES INCLUDING VEHICLES, EQUIPMENT, MATERIAL STOCKPILES, MECHANICAL TILLING, TRENCHING, HARMFUL CHEMICALS, PRODUCTS, INCLUDING THEIR CONTAINERS.
5. PROVIDE DRIP IRRIGATION SECURED TO THE GROUND.
6. APPLY MULCH AT SPECIFIED DEPTH TO COVER DRIP TUBING.
7. ACTUAL LOCATIONS OF EXISTING TREES MAY BE DIFFERENT THAN SHOWN. EXAMINE THE SITE TO DETERMINE ACTUAL EXISTING LOCATIONS. REPORT MAJOR DISCREPANCIES OR CONFLICTS FOR DIRECTION.

0 15 30
SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON III
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

Texas Department of Transportation

SH 218

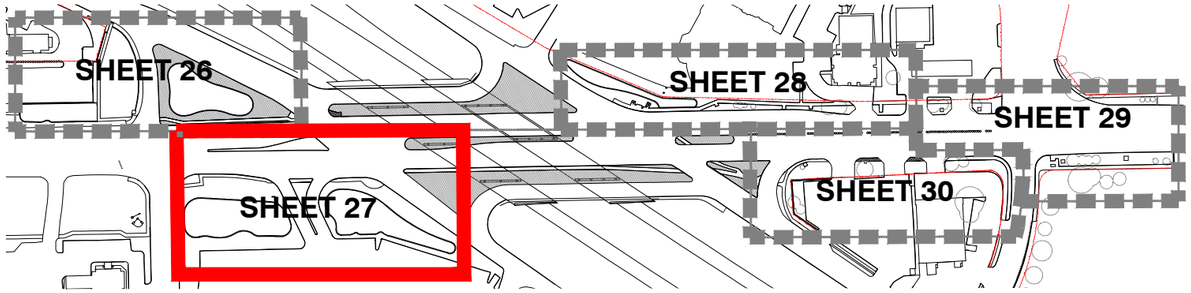
PLANTING PLAN

SHEET 26 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		26
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

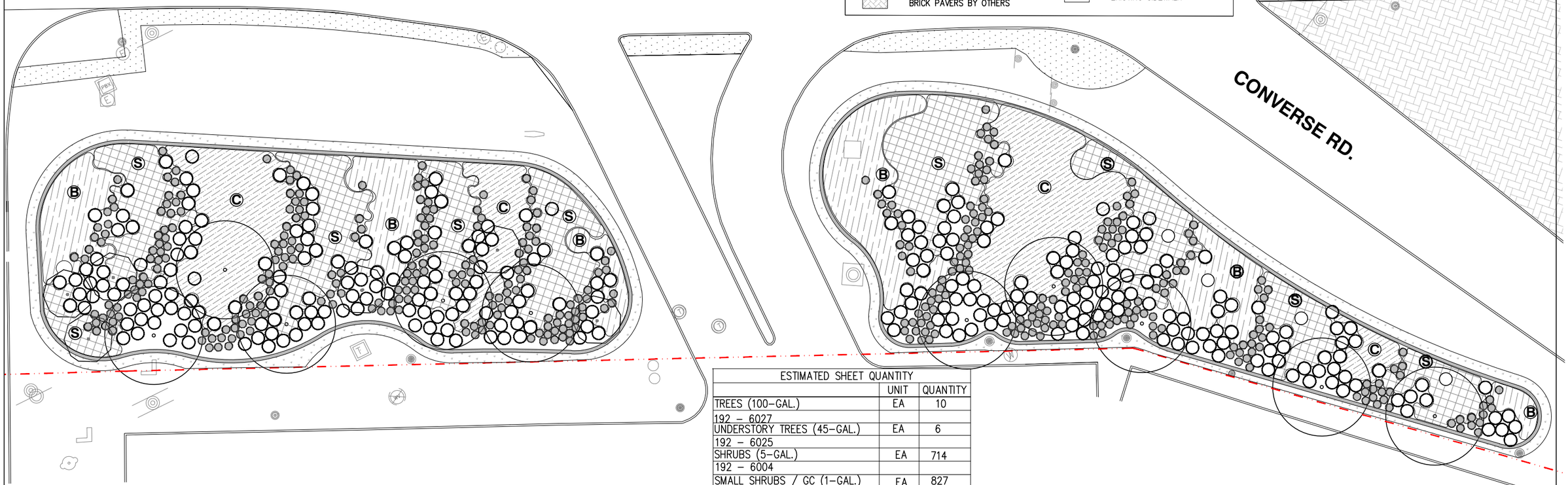
MATCH LINE SHEET 26
MATCH LINE SHEET 27

MATCH LINE SHEET 28
MATCH LINE SHEET 27



LEGEND:

- PROPOSED LIVE OAK (100-GAL.)
- PROPOSED MOUNTAIN LAUREL
- PROPOSED RED YUCCA
- PROPOSED BIG MUHLY GRASS
- C PROPOSED PURPLE CONEFLOWER
- S PROPOSED SNOW IN SUMMER
- B PROPOSED BIG BLUE LIRIOPE
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS
- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK



ESTIMATED SHEET QUANTITY		
	UNIT	QUANTITY
TREES (100-GAL.)	EA	10
192 – 6027		
UNDERSTORY TREES (45-GAL.)	EA	6
192 – 6025		
SHRUBS (5-GAL.)	EA	714
192 – 6004		
SMALL SHRUBS / GC (1-GAL.)	EA	827
192 – 6002		
LANDSCAPE EDGE	LF	964
192 – 6015		
PLANT BED PREP	SY	2,113
192 – 6016		
PLANT SOIL MIX	CY	176
192 – 6014		
MULCH	SY	2,113
192 – 6013		
BROADCAST SEED	SY	327
164 – 6001		
VEGATIVE WATERING	MG	0
168 – 6001		
IRRIGATION SYSTEM	EA	1
170 – 6001		
BIODEG EROS CONT LOGS INSTALL	LS	1
506 – 6041		
BIODEG EROS CONT LOGS REMOVE	LS	1
506 – 6043		

0 15 30

SCALE:1" = 30'-0"

NOTES:

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3. PRIOR TO CONSTRUCTION, PROVIDE AND SECURELY INSTALL SAFETY FENCING AROUND THE CRITICAL ROOT ZONES FOR EACH EXISTING TREE OR TREE GROUPING. THE CRITICAL ROOT ZONE LIMITS ARE MEASURED AT 1 FOOT DISTANCE FROM TRUNK FOR EVERY 1 INCH OF TRUNK DIAMETER.
4. DO NOT ALLOW ACCESS, ACTIVITIES, OR STORAGE WITHIN THE CRITICAL ROOT ZONES INCLUDING VEHICLES, EQUIPMENT, MATERIAL STOCKPILES, MECHANICAL TILLING, TRENCHING, HARMFUL CHEMICALS, PRODUCTS, INCLUDING THEIR CONTAINERS.
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6. APPLY MULCH AT SPECIFIED DEPTH TO COVER DRIP TUBING.
7. ACTUAL LOCATIONS OF EXISTING TREES MAY BE DIFFERENT THAN SHOWN. EXAMINE THE SITE TO DETERMINE ACTUAL EXISTING LOCATIONS. REPORT MAJOR DISCREPANCIES OR CONFLICTS FOR DIRECTION.

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

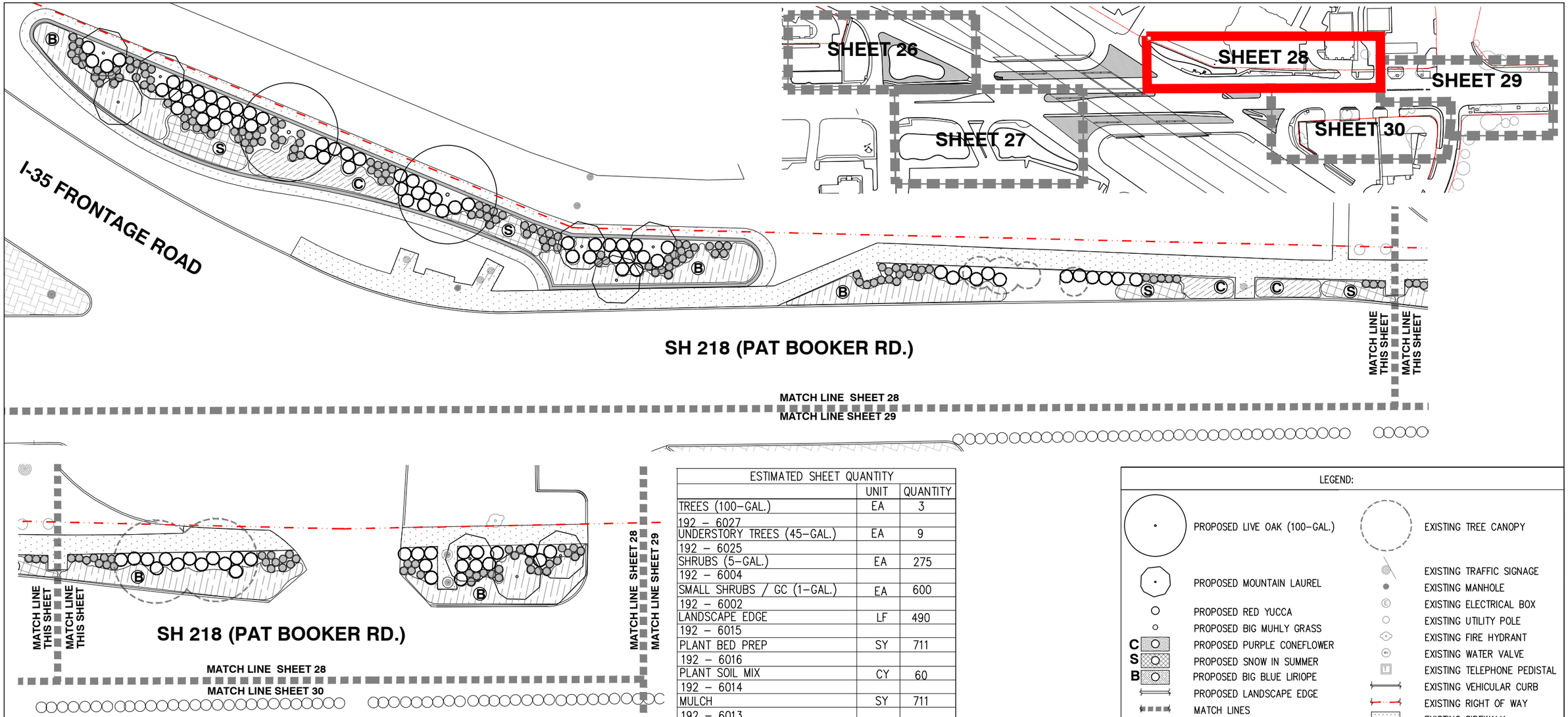
Texas Department of Transportation

SH 218

PLANTING PLAN

SHEET 27 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		27
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218



ESTIMATED SHEET QUANTITY		
	UNIT	QUANTITY
TREES (100-GAL.) 192 - 6027	EA	3
UNDERSTORY TREES (45-GAL.) 192 - 6025	EA	9
SHRUBS (5-GAL.) 192 - 6004	EA	275
SMALL SHRUBS / GC (1-GAL.) 192 - 6002	EA	600
LANDSCAPE EDGE 192 - 6015	LF	490
PLANT BED PREP 192 - 6016	SY	711
PLANT SOIL MIX 192 - 6014	CY	60
MULCH 192 - 6013	SY	711
BROADCAST SEED 164 - 6001	SY	629
VEGATIVE WATERING 168 - 6001	MG	0
IRRIGATION SYSTEM 170 - 6001	EA	1
BIODEG EROS CONT LOGS INSTALL 506 - 6041	EA	1
BIODEG EROS CONT LOGS REMOVE 506 - 6043	EA	1

LEGEND:

- PROPOSED LIVE OAK (100-GAL.)
- PROPOSED MOUNTAIN LAUREL
- PROPOSED RED YUCCA
- PROPOSED BIG MUHLY GRASS
- C — PROPOSED PURPLE CONEFLOWER
- S — PROPOSED SNOW IN SUMMER
- B — PROPOSED BIG BLUE LIRIOPE
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS
- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK

NOTES:

1. MAINTAIN POSITIVE DRAINAGE.
2. BE ADVISED THAT DITCHES, SWALES, SLOPES, UTILITIES, AND OTHER POTENTIAL CONFLICTS BASED ON AVAILABLE INFORMATION. EXAMINE THE SITE PRIOR TO CONSTRUCTION AND REPORT AREAS OF POTENTIAL EROSION AND OTHER CONFLICTS FOR DIRECTION.
3. PRIOR TO CONSTRUCTION, PROVIDE AND SECURELY INSTALL SAFETY FENCING AROUND THE CRITICAL ROOT ZONES FOR EACH EXISTING TREE OR TREE GROUPING. THE CRITICAL ROOT ZONE LIMITS ARE MEASURED AT 1 FOOT DISTANCE FROM TRUNK FOR EVERY 1 INCH OF TRUNK DIAMETER.
4. DO NOT ALLOW ACCESS, ACTIVITIES, OR STORAGE WITHIN THE CRITICAL ROOT ZONES INCLUDING VEHICLES, EQUIPMENT, MATERIAL STOCKPILES, MECHANICAL TILLING, TRENCHING, HARMFUL CHEMICALS, PRODUCTS, INCLUDING THEIR CONTAINERS.
5. PROVIDE DRIP IRRIGATION SECURED TO THE GROUND.
6. APPLY MULCH AT SPECIFIED DEPTH TO COVER DRIP TUBING.
7. ACTUAL LOCATIONS OF EXISTING TREES MAY BE DIFFERENT THAN SHOWN. EXAMINE THE SITE TO DETERMINE ACTUAL EXISTING LOCATIONS. REPORT MAJOR DISCREPANCIES OR CONFLICTS FOR DIRECTION.

0 15 30
SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

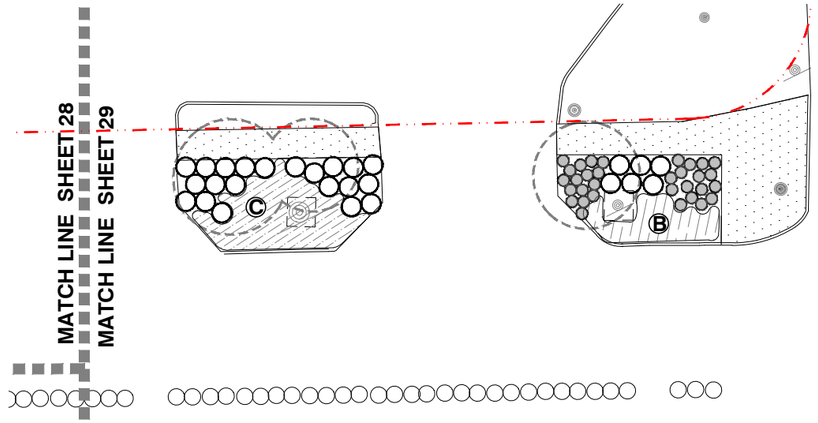
Texas Department of Transportation

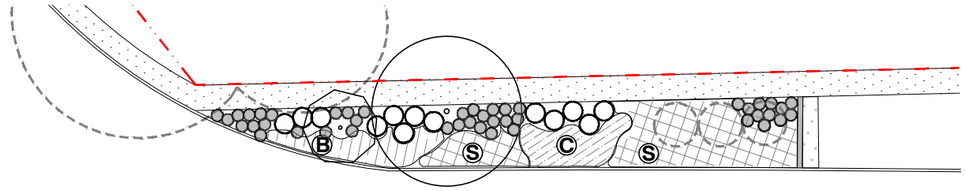
SH 218

PLANTING PLAN

SHEET 28 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		28
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218





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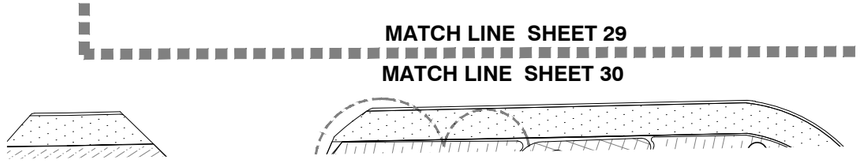

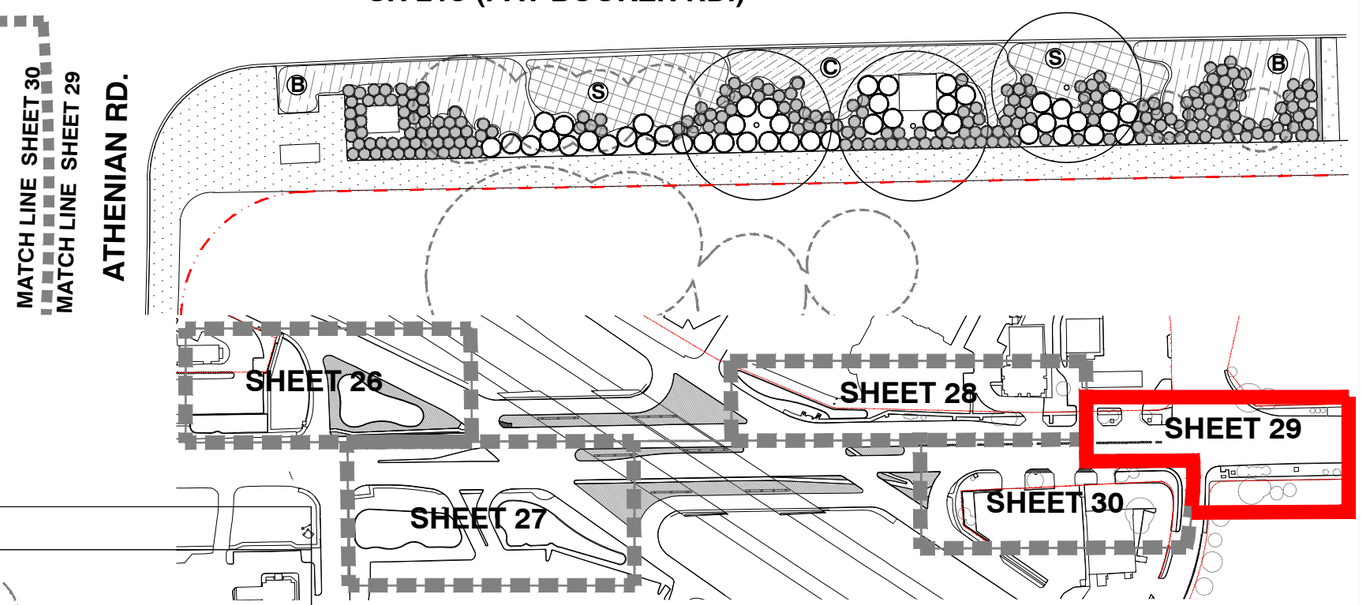

ESTIMATED SHEET QUANTITY		
	UNIT	QUANTITY
TREES (100-GAL.) 192 - 6027	EA	4
UNDERSTORY TREES (45-GAL.) 192 - 6025	EA	1
SHRUBS (5-GAL.) 192 - 6004	EA	386
SMALL SHRUBS / GC (1-GAL.) 192 - 6002	EA	1,083
LANDSCAPE EDGE 192 - 6015	LF	35
PLANT BED PREP 192 - 6016	SY	723
PLANT SOIL MIX 192 - 6014	CY	80
MULCH 192 - 6013	SY	723
BROADCAST SEED 164 - 6001	SY	12
VEGATIVE WATERING 168 - 6001	MG	0
IRRIGATION SYSTEM 170 - 6001	EA	1
BIODEG EROS CONT LOGS INSTALL 506 - 6041	EA	1
BIODEG EROS CONT LOGS REMOVE 506 - 6043	EA	1

LEGEND:

- PROPOSED LIVE OAK (100-GAL.)
- PROPOSED MOUNTAIN LAUREL
- PROPOSED RED YUCCA
- PROPOSED BIG MUHLY GRASS
- C PROPOSED PURPLE CONEFLOWER
- S PROPOSED SNOW IN SUMMER
- B PROPOSED BIG BLUE LIRIOPE
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS
- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK

0 15 30

SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON III
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

Texas Department of Transportation

SH 218

PLANTING PLAN

SHEET 29 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		29
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

MATCH LINE SHEET 28
MATCH LINE SHEET 30

MATCH LINE SHEET 28
MATCH LINE SHEET 30

SH 218 (PAT BOOKER RD.)

MATCH LINE SHEET 29
MATCH LINE SHEET 30

ATHENIAN RD.
MATCH LINE SHEET 30
MATCH LINE SHEET 29

SHEET 26
SHEET 27
SHEET 28
SHEET 29
SHEET 30

SL 1604 FRONTAGE ROAD

LEGEND:

PROPOSED LIVE OAK (100-GAL.)	EXISTING TREE CANOPY
PROPOSED MOUNTAIN LAUREL	EXISTING TRAFFIC SIGNAGE
PROPOSED RED YUCCA	EXISTING MANHOLE
PROPOSED BIG MUHLY GRASS	EXISTING ELECTRICAL BOX
C PROPOSED PURPLE CONEFLOWER	EXISTING UTILITY POLE
S PROPOSED SNOW IN SUMMER	EXISTING FIRE HYDRANT
B PROPOSED BIG BLUE LIRIOPE	EXISTING WATER VALVE
PROPOSED LANDSCAPE EDGE	EXISTING TELEPHONE PEDISTAL
MATCH LINES	EXISTING VEHICULAR CURB
BRICK PAVERS BY OTHERS	EXISTING RIGHT OF WAY
	EXISTING SIDEWALK

ESTIMATED SHEET QUANTITY		
	UNIT	QUANTITY
TREES (100-GAL.)	EA	0
192 – 6027		
UNDERSTORY TREES (45-GAL.)	EA	0
192 – 6025		
SHRUBS (5-GAL.)	EA	520
192 – 6004		
SMALL SHRUBS / GC (1-GAL.)	EA	571
192 – 6002		
LANDSCAPE EDGE	LF	0
192 – 6015		
PLANT BED PREP	SY	831
192 – 6016		
PLANT SOIL MIX	CY	92
192 – 6014		
MULCH	SY	831
192 – 6013		
BROADCAST SEED	SY	0
164 – 6001		
VEGATIVE WATERING	MG	0
168 – 6001		
IRRIGATION SYSTEM	EA	1
170 – 6001		
BIODEG EROS CONT LOGS INSTALL	EA	1
506 – 6041		
BIODEG EROS CONT LOGS REMOVE	EA	
506 – 6043		

NOTES:
1. MAINTAIN POSITIVE DRAINAGE.
2. BE ADVISED THAT DITCHES, SWALES, SLOPES, UTILITIES, AND OTHER POTENTIAL CONFLICTS BASED ON AVAILABLE INFORMATION. EXAMINE THE SITE PRIOR TO CONSTRUCTION AND REPORT AREAS OF POTENTIAL EROSION AND OTHER CONFLICTS FOR DIRECTION.
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5. PROVIDE DRIP IRRIGATION SECURED TO THE GROUND.
6. APPLY MULCH AT SPECIFIED DEPTH TO COVER DRIP TUBING.
7. ACTUAL LOCATIONS OF EXISTING TREES MAY BE DIFFERENT THAN SHOWN. EXAMINE THE SITE TO DETERMINE ACTUAL EXISTING LOCATIONS. REPORT MAJOR DISCREPANCIES OR CONFLICTS FOR DIRECTION.

0 15 30
SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON III
1848
STATE OF TEXAS
Bill Nicholson
02/23/2023

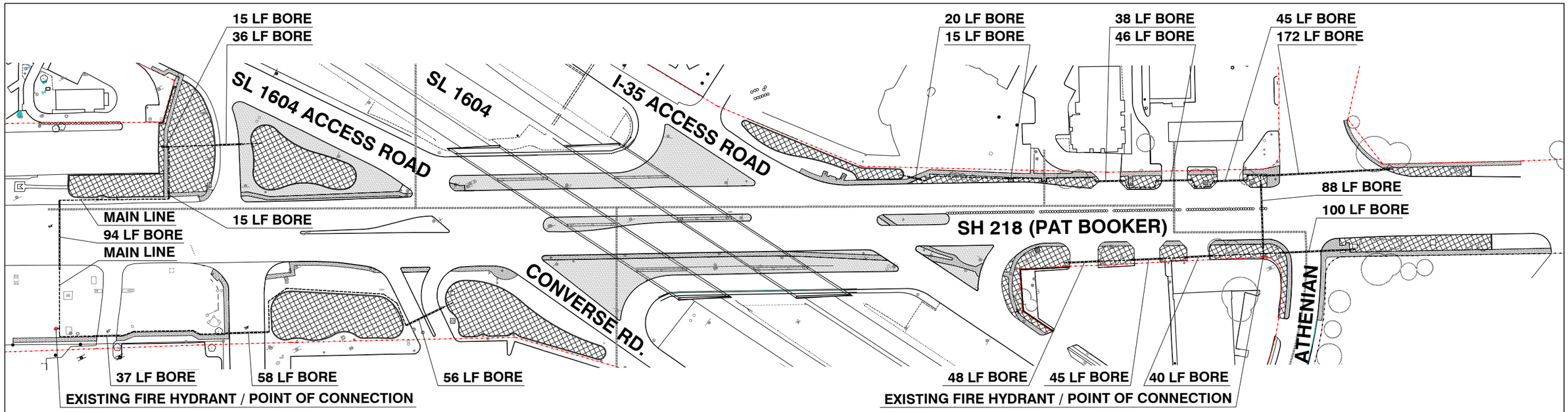
Texas Department of Transportation

SH 218

PLANTING PLAN

SHEET 30 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		30
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218



WELDING:
STEEL CASING SECTIONS SHALL BE CONNECTED BY WELDING. WELD SHALL CONFORM TO AWWA C206.

NOTE:
1. ALL PIPE JOINTS WITHIN THE CASING ARE TO BE RESTRAINED.

2. TRACING WIRE TO BE INSTALLED THROUGH ALL CASED BORINGS AND CONNECTED TO MARKING POSTS.

3. STEEL PIPE CASING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A283, GRADE B, C, OR D. ALL JOINTS SHALL BE WELDED. ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH AWWA C206, "AWWA STANDARD FOR FIELD WELDING OF STEEL WATER PIPE". COATING FOR STEEL CASING IS NOT REQUIRED.

4. STEEL PIPE CASING SHALL BE INSTALLED SYMMETRICAL ABOUT WATER MAIN CENTERLINE (TYP). PIPE CASING SHALL BE LAID TRUE TO LINE AND GRADE WITH NO BENDS OR CHANGES IN GRADE FOR THE FULL LENGTH OF THE CASING.

NOTES:

1. **IRRIGATION LINES SHOWN ON THE PLANS ARE DIAGRAMATIC ONLY. ROUTE LINES TO AVOID CONFLICTS, AS DIRECTED.**

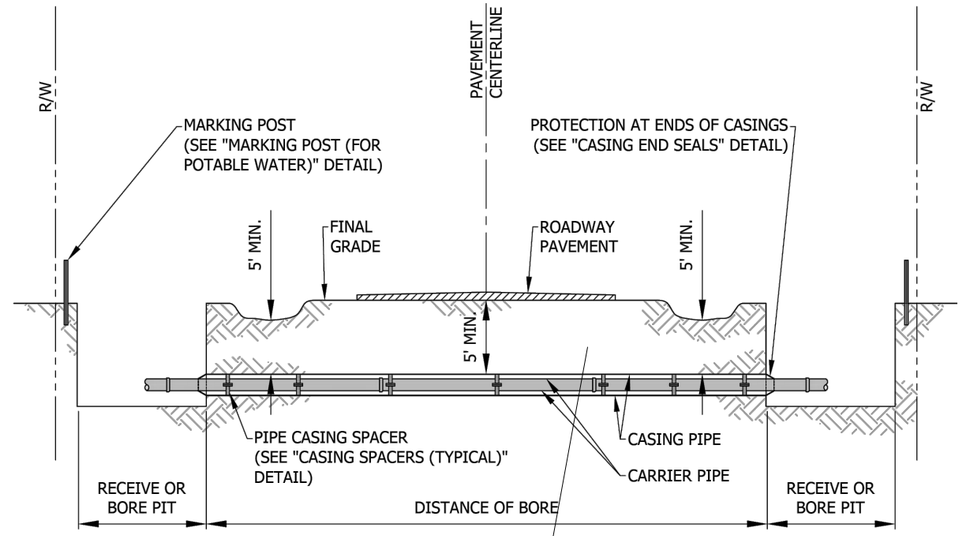
2. **PROVIDE AN IRRIGATION DESIGN FROM A LICENSED IRRIGATOR, IN ACCORDANCE WITH REQUIREMENTS SHOWN ON THE IRRIGATION DETAILS, TCEQ REQUIREMENTS AND ITEM 170 OF THE 'STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES 2014', PLANS, DETAILS, AND NOTES. SUBMIT THE IRRIGATION DESIGN FOR APPROVAL PRIOR TO INSTALLATION.**

3. **COORDINATE WITH LOCAL WATER AUTHORITY FOR ACCESS AND USE OF ADJACENT TAPS FOR TEMPORARY METERS. ALL FEES AND COSTS FOR TEMPORARY METERS, INSPECTIONS, WATER USED, IRRIGATION DESIGN , INSTALLATION, MATERIAL, EQUIPMENT, AND BORES ARE SUBSIDIARY TO ITEM 170. BE AWARE OF WATER AUTHORITY RULES AND TIME LIMITATIONS THAT APPLY TO THE USE OF TEMPORARY METERS. (SEE IRRIGATION DETAILS AND GENERAL NOTES)**

4. **EXTEND BORE CASTINGS A MINIMUM OF 5' BEHIND THE FACE OF CURB, THE SIDEWALK OR EDGE OF PAVEMENT. SEE GENERAL NOTES FOR BORE DEPTH. ALL BORES SHALL BE AT REQUIRED DEPTH PRIOR FOR FACE OF CURB, THE SIDEWALK OR EDGE OF PAVEMENT.**

LEGEND:

- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK
- PROPOSED BORE
- PROPOSED MAIN LINE
- PROPOSED IRRIGATED BED AREA
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS



BORE DETAIL
NOT TO SCALE

0 15 30
SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

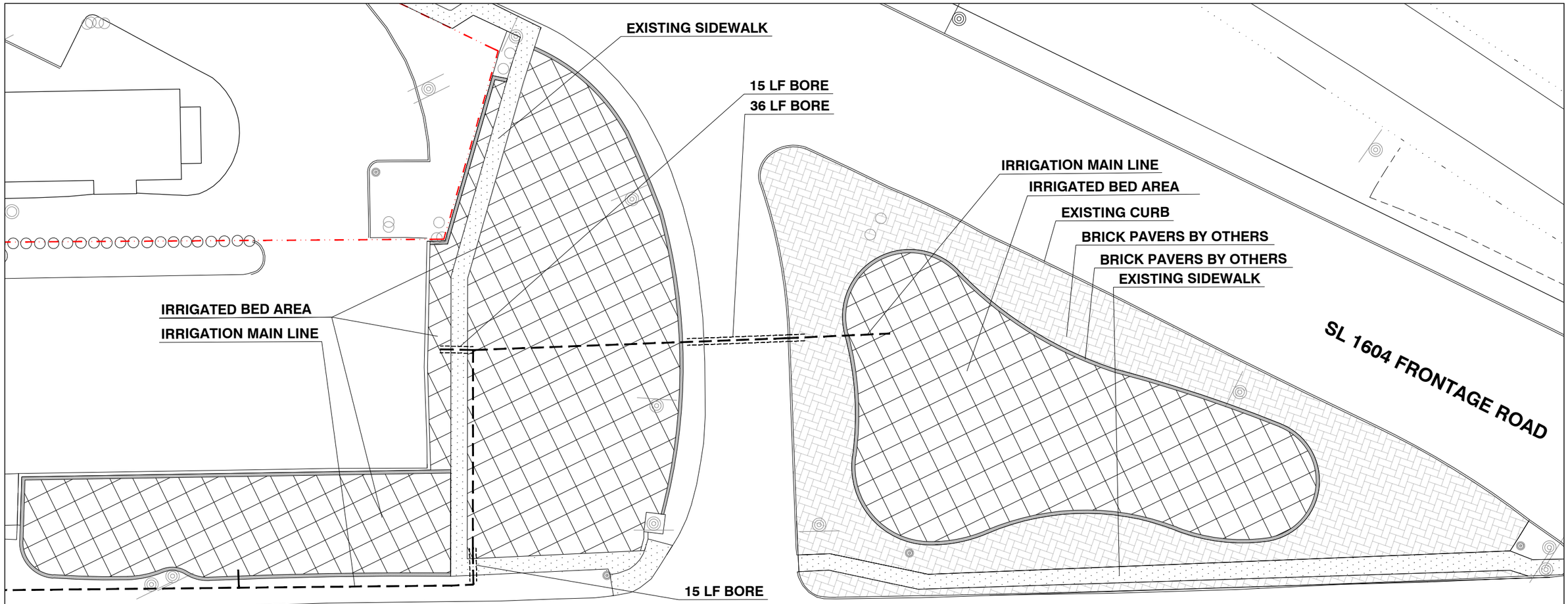
Texas Department of Transportation

SH 218

IRRIGATION PLAN

SHEET 31 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		31
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218



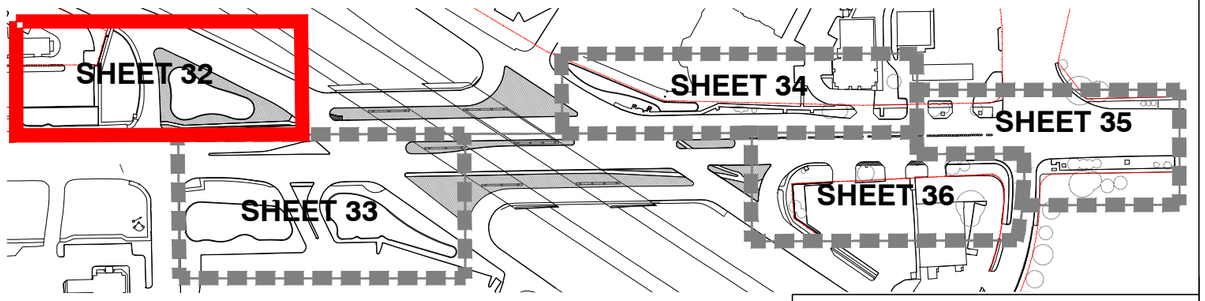
SH 218 (PAT BOOKER RD.)

NOTES:

1. IRRIGATION LINES SHOWN ON THE PLANS ARE DIAGRAMATIC ONLY. ROUTE LINES TO AVOID CONFLICTS, AS DIRECTED.
2. PROVIDE AN IRRIGATION DESIGN FROM A LICENSED IRRIGATOR, IN ACCORDANCE WITH REQUIREMENTS SHOWN ON THE IRRIGATION DETAILS, TCEQ REQUIREMENTS AND ITEM 170 OF THE 'STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES 2014', PLANS, DETAILS, AND NOTES. SUBMIT THE IRRIGATION DESIGN FOR APPROVAL PRIOR TO INSTALLATION.
3. COORDINATE WITH LOCAL WATER AUTHORITY FOR ACCESS AND USE OF ADJACENT TAPS FOR TEMPORARY METERS. ALL FEES AND COSTS FOR TEMPORARY METERS, INSPECTIONS, WATER USED, IRRIGATION DESIGN , INSTALLATION, MATERIAL, EQUIPMENT, AND BORES ARE SUBSIDIARY TO ITEM 170. BE AWARE OF WATER AUTHORITY RULES AND TIME LIMITATIONS THAT APPLY TO THE USE OF TEMPORARY METERS. (SEE IRRIGATION DETAILS AND GENERAL NOTES)
4. EXTEND BORE CASTINGS A MINIMUM OF 5' BEHIND THE FACE OF CURB, THE SIDEWALK OR EDGE OF PAVEMENT. SEE GENERAL NOTES FOR BORE DEPTH. ALL BORES SHALL BE AT REQUIRED DEPTH PRIOR FOR FACE OF CURB, THE SIDEWALK OR EDGE OF PAVEMENT.

LEGEND:

- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK
- PROPOSED BORE
- PROPOSED MAIN LINE
- PROPOSED IRRIGATED BED AREA
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS



0 15 30

SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON III
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

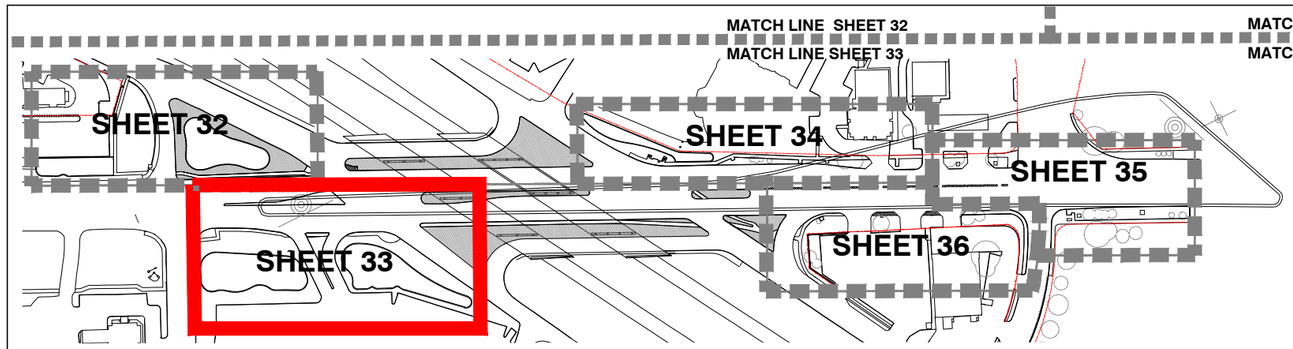
Texas Department of Transportation

SH 218

IRRIGATION PLAN

SHEET 32 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		32
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218



MATCH LINE SHEET 32
MATCH LINE SHEET 33

MATCH LINE SHEET 34
MATCH LINE SHEET 33

SH 218 (PAT BOOKER RD.)

IRRIGATION MAIN LINE
EXISTING SIDEWALK

BRICK PAVERS BY OTHERS
EXISTING SIDEWALK
BRICK PAVERS BY OTHERS
EXISTING SIDEWALK

IRRIGATED BED AREA
56 LF BORE
IRRIGATED BED AREA
IRRIGATION MAIN LINE
EXISTING SIDEWALK

CONVERSE RD.

EXISTING PARKING LOT

LEGEND:

- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK
- PROPOSED BORE
- PROPOSED MAIN LINE
- PROPOSED IRRIGATED BED AREA
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS

NOTES:

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4. EXTEND BORE CASTINGS A MINIMUM OF 5' BEHIND THE FACE OF CURB, THE SIDEWALK OR EDGE OF PAVEMENT. SEE GENERAL NOTES FOR BORE DEPTH. ALL BORES SHALL BE AT REQUIRED DEPTH PRIOR FOR FACE OF CURB, THE SIDEWALK OR EDGE OF PAVEMENT.

0 15 30
SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON III
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

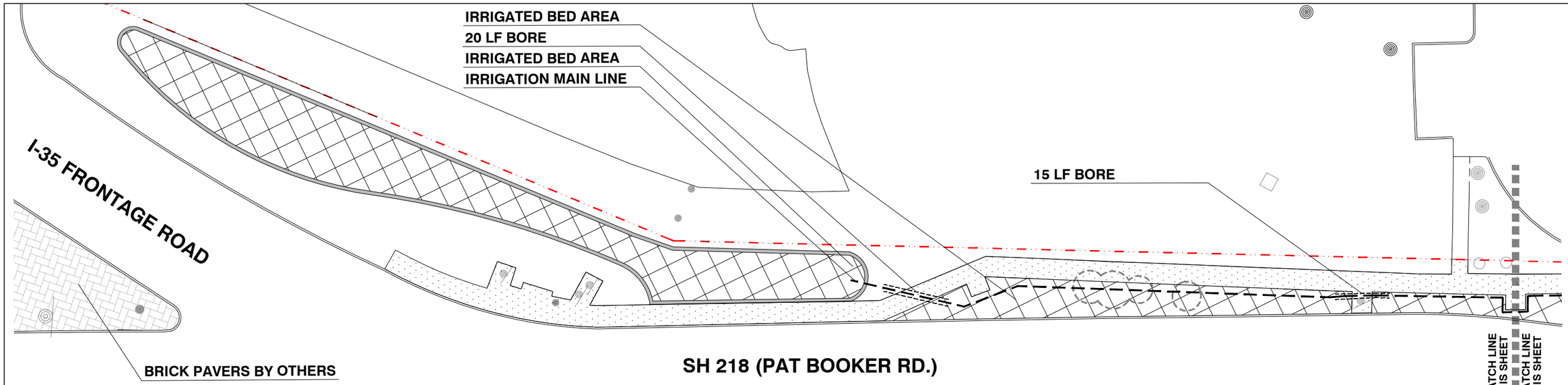
Texas Department of Transportation

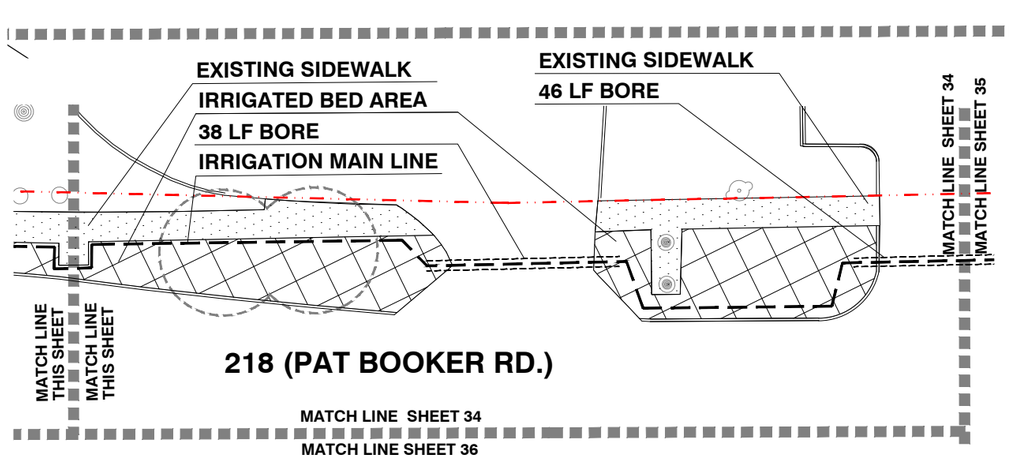
SH 218

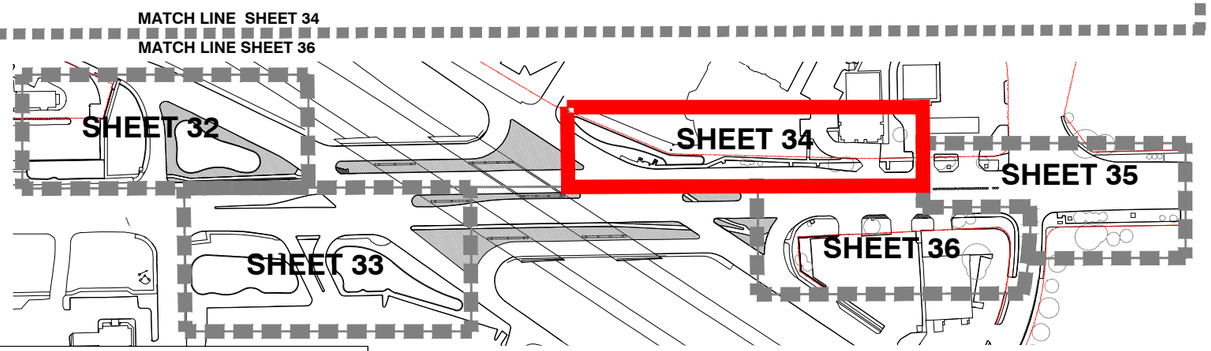
IRRIGATION PLAN

SHEET 33 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		33
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218







NOTES:

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LEGEND:

- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK
- PROPOSED BORE
- PROPOSED MAIN LINE
- PROPOSED IRRIGATED BED AREA
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS

0 15 30

SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON III
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

Texas Department of Transportation
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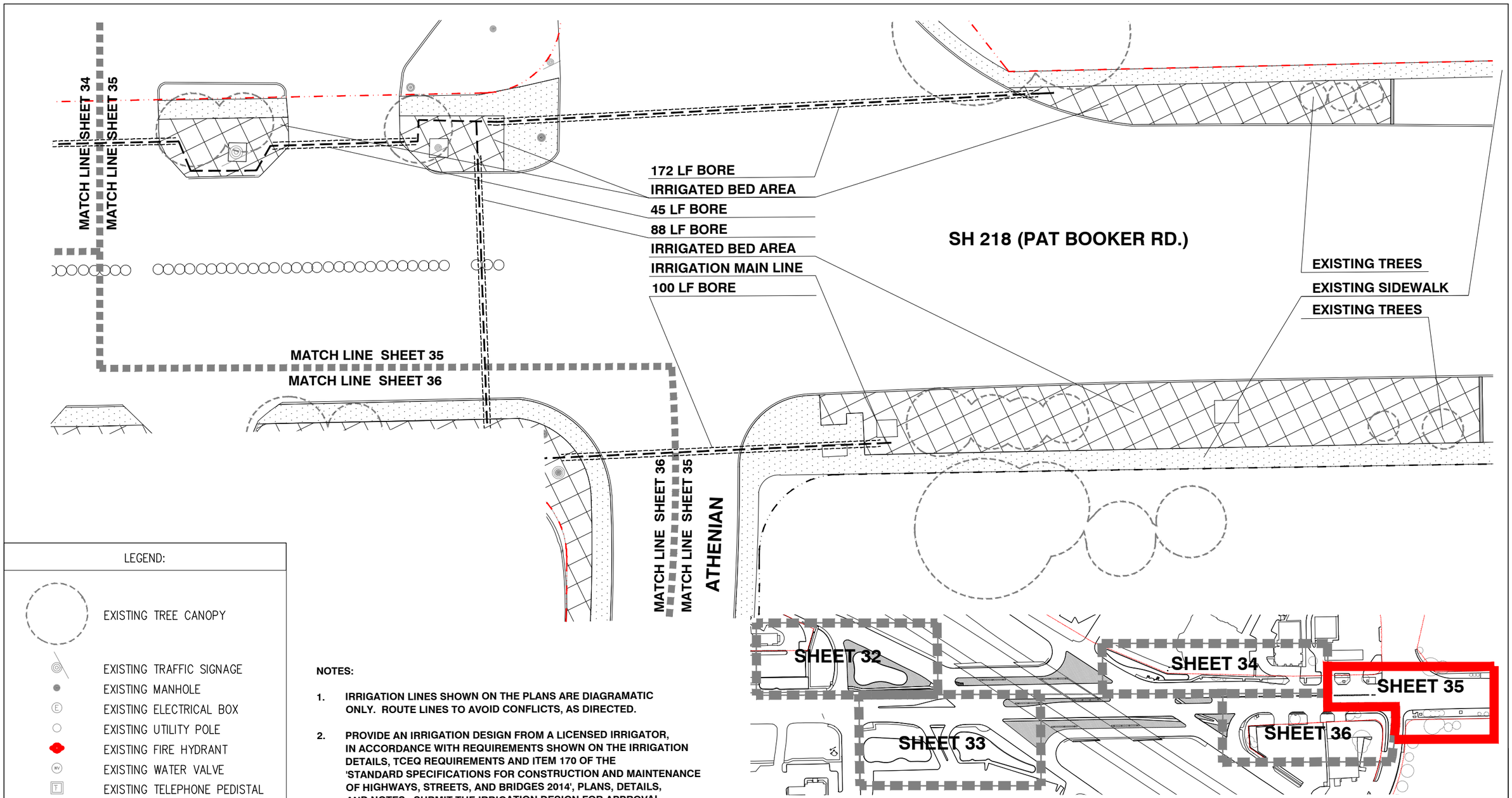
SH 218

IRRIGATION PLAN

SHEET 34 OF 37

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		34
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218



LEGEND:

- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK
- PROPOSED BORE
- PROPOSED MAIN LINE
- PROPOSED IRRIGATED BED AREA
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS

NOTES:

1. **IRRIGATION LINES SHOWN ON THE PLANS ARE DIAGRAMATIC ONLY. ROUTE LINES TO AVOID CONFLICTS, AS DIRECTED.**

2. **PROVIDE AN IRRIGATION DESIGN FROM A LICENSED IRRIGATOR, IN ACCORDANCE WITH REQUIREMENTS SHOWN ON THE IRRIGATION DETAILS, TCEQ REQUIREMENTS AND ITEM 170 OF THE 'STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES 2014', PLANS, DETAILS, AND NOTES. SUBMIT THE IRRIGATION DESIGN FOR APPROVAL PRIOR TO INSTALLATION.**

3. **COORDINATE WITH LOCAL WATER AUTHORITY FOR ACCESS AND USE OF ADJACENT TAPS FOR TEMPORARY METERS. ALL FEES AND COSTS FOR TEMPORARY METERS, INSPECTIONS, WATER USED, IRRIGATION DESIGN , INSTALLATION, MATERIAL, EQUIPMENT, AND BORES ARE SUBSIDIARY TO ITEM 170. BE AWARE OF WATER AUTHORITY RULES AND TIME LIMITATIONS THAT APPLY TO THE USE OF TEMPORARY METERS. (SEE IRRIGATION DETAILS AND GENERAL NOTES)**

4. **EXTEND BORE CASTINGS A MINIMUM OF 5' BEHIND THE FACE OF CURB, THE SIDEWALK OR EDGE OF PAVEMENT. SEE GENERAL NOTES FOR BORE DEPTH. ALL BORES SHALL BE AT REQUIRED DEPTH PRIOR FOR FACE OF CURB, THE SIDEWALK OR EDGE OF PAVEMENT.**

0 15 30

SCALE:1" = 30'-0"

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

Texas Department of Transportation

SH 218

IRRIGATION PLAN

SHEET 35 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		35
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

MATCH LINE SHEET 34

MATCH LINE SHEET 34

MATCH LINE SHEET 34
MATCH LINE SHEET 36

MATCH LINE SHEET 34

MATCH LINE SHEET 34
MATCH LINE SHEET 36

MATCH LINE SHEET 34

MATCH LINE SHEET 35

MATCH LINE SHEET 35
MATCH LINE SHEET 36

88 LF BORE

100 LF BORE

IRRIGATED BED AREA

48 LF BORE

40 LF BORE

IRRIGATED BED AREA

45 LF BORE

SH 218 (PAT BOOKER RD.)

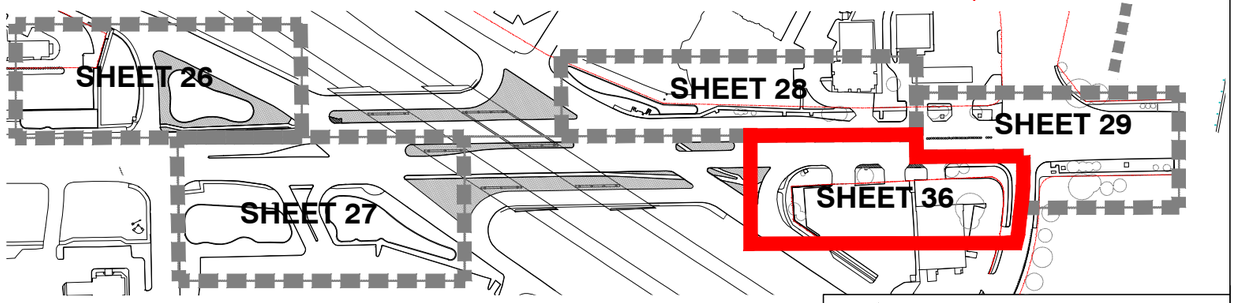
IRRIGATION MAIN LINE

EXISTING FIRE HYDRANT

MATCH LINE SHEET 36
MATCH LINE SHEET 35

ATHENIAN

SL 1604 ACCESS RD.



NOTES:

1. IRRIGATION LINES SHOWN ON THE PLANS ARE DIAGRAMATIC ONLY. ROUTE LINES TO AVOID CONFLICTS, AS DIRECTED.

2. PROVIDE AN IRRIGATION DESIGN FROM A LICENSED IRRIGATOR, IN ACCORDANCE WITH REQUIREMENTS SHOWN ON THE IRRIGATION DETAILS, TCEQ REQUIREMENTS AND ITEM 170 OF THE 'STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES 2014', PLANS, DETAILS, AND NOTES. SUBMIT THE IRRIGATION DESIGN FOR APPROVAL PRIOR TO INSTALLATION.

3. COORDINATE WITH LOCAL WATER AUTHORITY FOR ACCESS AND USE OF ADJACENT TAPS FOR TEMPORARY METERS. ALL FEES AND COSTS FOR TEMPORARY METERS, INSPECTIONS, WATER USED, IRRIGATION DESIGN , INSTALLATION, MATERIAL, EQUIPMENT, AND BORES ARE SUBSIDIARY TO ITEM 170. BE AWARE OF WATER AUTHORITY RULES AND TIME LIMITATIONS THAT APPLY TO THE USE OF TEMPORARY METERS. (SEE IRRIGATION DETAILS AND GENERAL NOTES)

4. EXTEND BORE CASTINGS A MINIMUM OF 5' BEHIND THE FACE OF CURB, THE SIDEWALK OR EDGE OF PAVEMENT. SEE GENERAL NOTES FOR BORE DEPTH. ALL BORES SHALL BE AT REQUIRED DEPTH PRIOR FOR FACE OF CURB, THE SIDEWALK OR EDGE OF PAVEMENT.

LEGEND:

- EXISTING TREE CANOPY
- EXISTING TRAFFIC SIGNAGE
- EXISTING MANHOLE
- EXISTING ELECTRICAL BOX
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING TELEPHONE PEDISTAL
- EXISTING VEHICULAR CURB
- EXISTING RIGHT OF WAY
- EXISTING SIDEWALK
- PROPOSED BORE
- PROPOSED MAIN LINE
- PROPOSED IRRIGATED BED AREA
- PROPOSED LANDSCAPE EDGE
- MATCH LINES
- BRICK PAVERS BY OTHERS

0 15 30

SCALE:1" = 30'-0"

N

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

Texas Department of Transportation

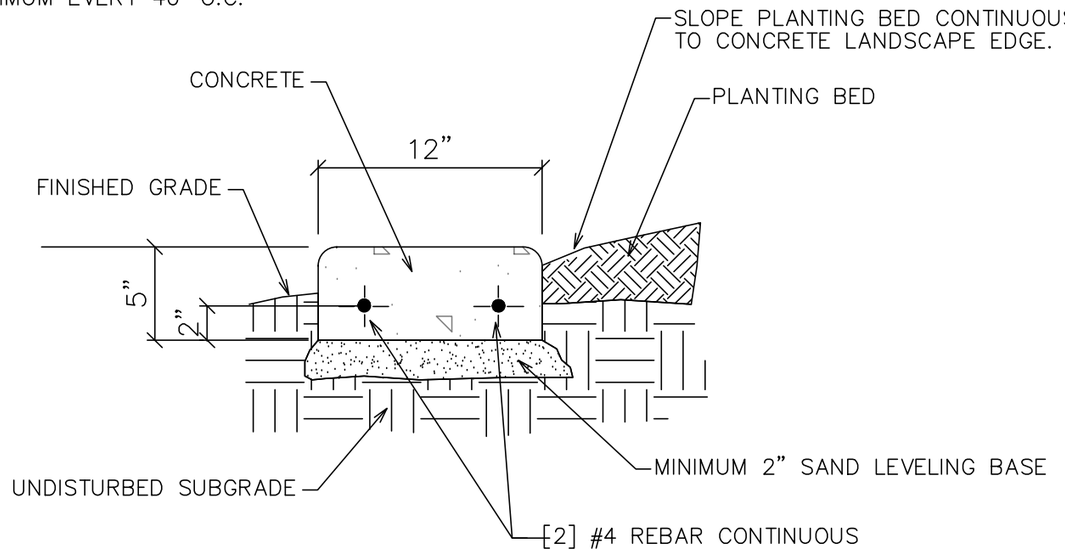
SH 218

IRRIGATION PLAN

SHEET 36 OF 47

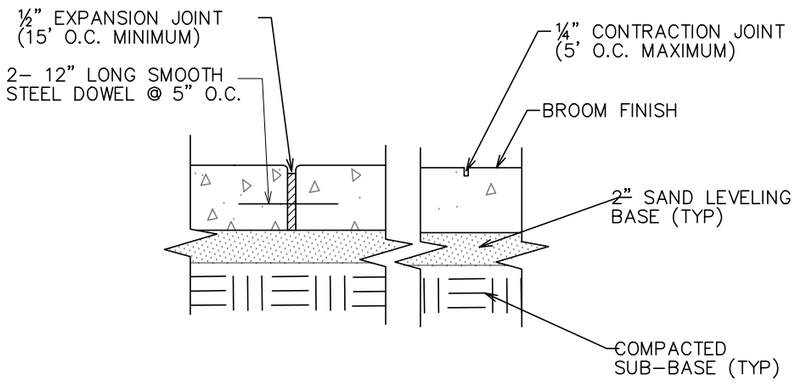
FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		36
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

NOTE:
DOWEL WITH [2] 12" LONG REBAR
@ EACH CONSTRUCTION JOINT
MINIMUM EVERY 40' O.C.



LANDSCAPE EDGE (TYPE I)

NTS



EXPANSION JOINT / CONTRACTION JOINT

SECTION

NTS

GENERAL NOTE: 1. EXPANSION JOINTS EVERY 15' MIN. (TYP.)
2. MIN. 2" COVER FOR STEEL DOWEL/REINF.

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

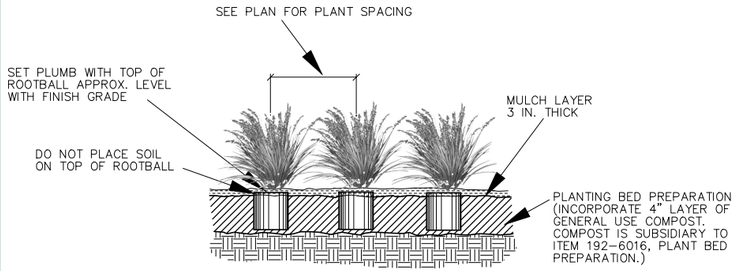
Texas Department of Transportation

SH 218

MISC. DETAILS

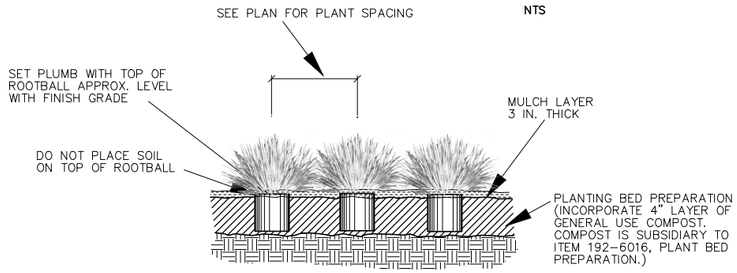
SHEET 37 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		37
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218



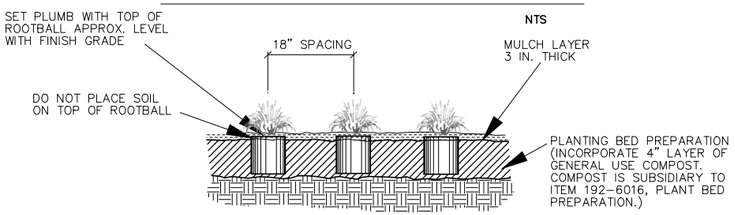
RED YUCCA PLANTING IN MASS BEDS

NTS



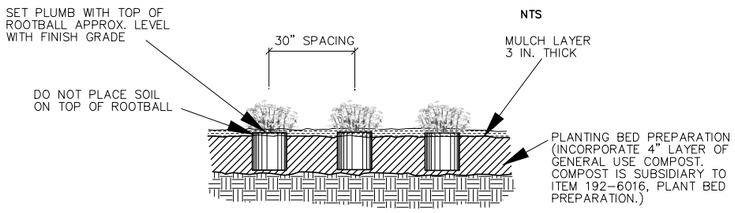
MUHLY GRASS PLANTING IN MASS BEDS

NTS



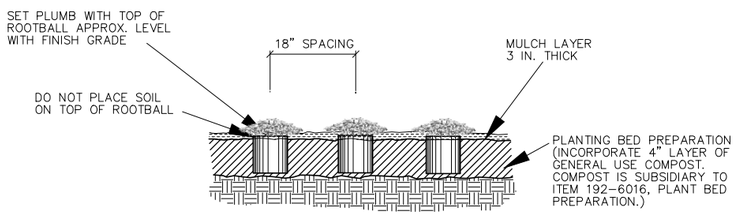
BIG BLUE LIRIOPE PLANTING IN MASS BEDS

NTS



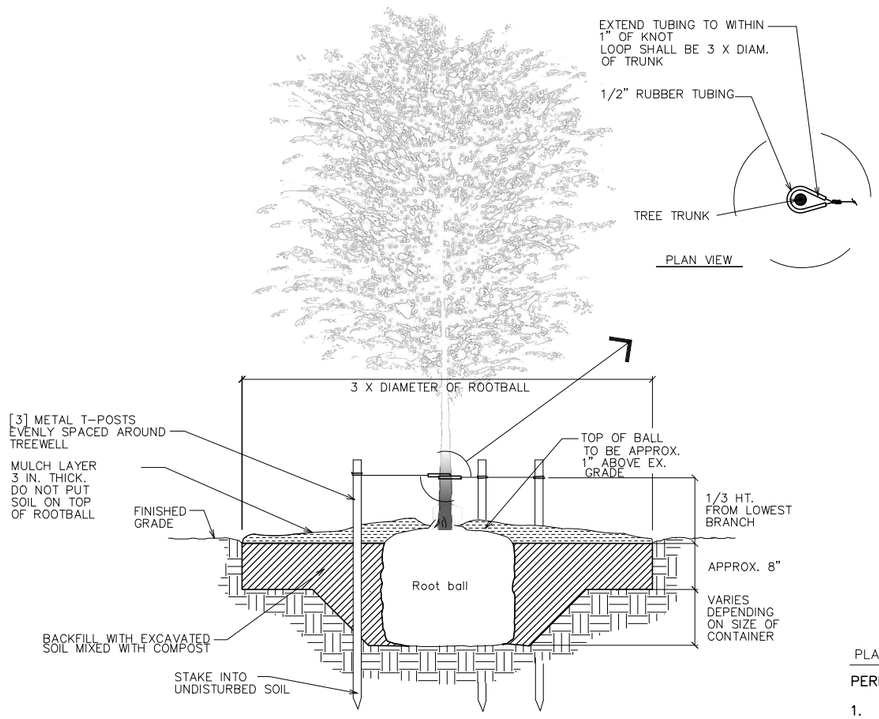
PURPLE CONEFLOWER PLANTING IN MASS BEDS

NTS



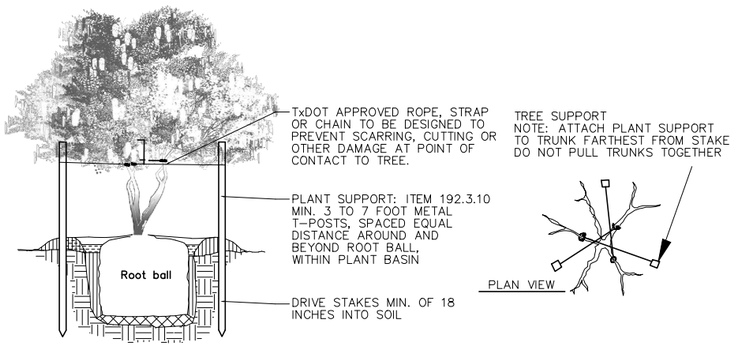
SNOW IN SUMMER PLANTING IN MASS BEDS

NTS



LIVE OAK TREE PLANTING AND STAKING

NTS



MOUNTAIN LAUREL TREE SUPPORT – MULTI-TRUNKED

NTS

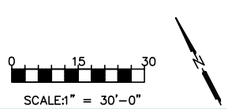
GENERAL NOTES:

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 THAT HAVE BEEN MODIFIED OR NOT SHOWN.
2. PROVIDE PLANTS NURSERY-GROWN IN CONTAINERS.
3. REJECTION OF PLANTS IN ACCORDANCE WITH ITEM 192.2.2.
4. STAKE LOCATION OF TREES IN THE FIELD IN ACCORDANCE WITH ITEM 192.3.3.
5. PROVIDE FOR THE SAFE TRANSPORTATION OF PLANTS TO THE PROJECT SITE AND THE CONDITION OF PLANTS UPON ARRIVAL.
6. DO NOT STORE PLANT MATERIAL ON HARD SURFACES OR LEAVE EXPOSED TO THE SUN.
7. PROTECT THE PLANT ROOT BALLS AND WATER REGULARLY UNTIL PLANTING.
8. IF PLANTS ARE LEFT IN STORAGE OVER THE WEEKEND OR HOLIDAY, PROVIDE A MEANS OF PERIODICALLY WATERING AND INSPECTION OF CONTAINER MOISTURE.
9. PROVIDE PLANTS THAT ARE HARDY, SYMMETRICAL, TIGHT KNIT, AND SO TRAINED OR FAVORED IN DEVELOPMENT AND APPEARANCE AS TO BE SUPERIOR IN FORM,NUMBER OF BRANCHES, AND COMPACTNESS. PLANTS SHALL BE SOUND, HEALTHY AND VIGOROUS, WELL BRANCHED, DENSELY FOLIATED WHEN IN LEAF, AND SHALL HAVE HEALTHY, WELL DEVELOPED ROOT SYSTEMS.
10. ALL GRASS PLANTINGS ARE TO BE MULCHED AFTER PLANTING TO THE DEPTH INDICATED IN THE DETAILS. PROVIDE SHREDDED HARDWOOD MULCH WITH A MINIMUM 3/8 "(NOT OVER 25% BY VOLUME) OF FINE PARTICLES AND DUST. PROVIDE MULCH FREE M
OF ANY PLASTIC, GLASS, METALS AND OTHER CONTAMINANTS (STICKS, STONES, CLAY, OR OTHER FOREIGN MATTER).

PLANTING BED PREPARATION

PERFORM PLANTING BED OPERATIONS IN THE FOLLOWING ORDER:

1. STAKE BED PREPARATION AREAS OR OTHERWISE DESIGNATE THE PROPER LOCATIONS ACCORDING TO THE PLANS. OBTAIN APPROVAL OF FINAL LOCATIONS BEFORE CONTINUING WORK UNDER THIS ITEM.
2. AFTER UNDERGROUND UTILITIES ARE LOCATED AND MARKED, TILL THE BED PREPARATION AREAS TO A DEPTH OF TWELVE (12) INCHES. TAKE SPECIAL PRECAUTION TO AVOID ANY UNDERGROUND UTILITIES WITHIN THE PROJECT AREAS AND DO NOT ALTER EXISTING DRAINAGE PATTERNS.
3. ADD 12" PLANT SOIL MIX.
4. TILL/DISC SOIL TO A SMOOTH CONSISTENCY TO A DEPTH OF TWELVE (12) INCHES.
5. AFTER PLANTING MULCH BEDS WITH SHREDDED HARDWOOD BARK MULCH TO A DEPTH OF 3".



Texas Department of Transportation

SH 218

PLANTING DETAILS

SHEET 38 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		38
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

DATE: $DATE$
FILE: $FILE$

Item	Common Name	Botanical Name	Container Size	Height	Spread	Caliper	Quantity	Notes
0192-6027	Live Oak	Quercus virginia	100 gal.	16' min.	8' min.	4.5" min.	21	Nursery grown in containers
0192-6025	Texas Mountain Laurel	Sophora secundiflora	45 gal.	10' min.	5' min.	2" min.	28	Nursery grown in containers
0192-6004	Big Muhly Grass	Lindheimer's muhly	5 gal.	20" min.	20" min.		1,098	Nursery grown in containers
	Red Yucca	Hesperaloe parviflora	5 gal.	20" min.	20" min.		1,681	Nursery grown in containers
						TOTAL:	2,779	
0192-6002	Big Blue Liriope	Liriope muscari 'Big Blue'	1 gal.	12" min.	12" min.		1,173	Nursery grown in containers
	Snow In Summer	Cerastium tomentosum	1 gal.	4" min.	12" min.		1,953	Nursery grown in containers
	Purple Cone Flower	Enchinacea purpurea	1 gal.	15" min.	12" min.		817	Nursery grown in containers
						TOTAL:	3,943	

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 THAT HAVE BEEN MODIFIED OR NOT SHOWN.
2. REJECTION OF PLANTS SHALL BE IN ACCORDANCE WITH ITEM 192.2.2.
3. BE RESPONSIBLE FOR THE SAFE TRANSPORTATION OF PLANTS TO THE PROJECT SITE, AND THEIR CONDITION UPON ARRIVAL.
4. DO NOT STORE PLANT MATERIALS ON HARD SURFACES OR LEAVE EXPOSED TO THE SUN. PROTECT THE ROOT BALLS AND WATER REGULARLY. PROVIDE A MEAN OF PERIODIC INSPECTION OF ANY PLANTS LEFT IN STORAGE OVER THE WEEKEND OR HOLIDAY.
5. PLANTS SHALL BE SOUND, HEALTHY AND VIGOROUS, WELL BRANCHED, AND DENSELY FOLIATED WHEN IN LEAF, AND SHALL HAVE HEALTHY, WELL DEVELOPED ROOT SYSTEMS.
6. ALL PLANTS SHALL BE NURSERY–GROWN IN CONTAINERS (OR CONTAINERIZED) UNLESS OTHERWISE SHOWN ON THE PLANS.
7. SEE PLANTING BED DETAIL SHEET FOR DISTINCTION BETWEEN CANOPY TREES AND UNDERSTORY TREES.
8. TREES THAT DO NOT STAND UPRIGHT WITHOUT ADDITIONAL MEASURES BEYOND THE STANDARD STAKING TECHNIQUES SHOWN WITHIN THE PLANTING AND STAKING DETAILS WILL BE REJECTED.
9. 100 GALLON, 45 GALLON, AND 5 GALLON PLANTING MATERIALS ARE NOT POSITIONED WITHIN A STANDARD CONTINUOUS TRIANGULAR GRID SPACING, REVIEW PLANTING PLANS FOR LOCATIONS.
10. GALLON PLANTING MATERIALS ARE TO BE POSITIONED WITHIN AN EVEN TRIANGULAR SPACED GRID. SPECIFIC TRIANGULAR SPACING VARIES ACCORDING TO SPECIES, PLEASE REVIEW NOTES DEPICTED WITHIN THE PLANTING PLANS FOR ADDITIONAL SPACING INFORMATION.

Spacing	Decimal Equivalent (*Spacing ÷ 12*)	Sq. Ft./Plant (*Decimal Equivalent²*)	# Plants (*Sq. Ft.* ÷ Sq. Ft./Plant)
2"	.1667	.0278	(Examples)
3"	.25	.0625	
4"	.3333	.11	
6"	.5	.25	
8"	.67	.4489	
9"	.75	.5625	
10"	.8333	.6944	200sq.ft.÷.6944=288 plants
12"	1.0	1.0	
14"	1.1667	1.36	
15"	1.25	1.56	
18"	1.5	2.25	
24"	2.0	4.0	200sq.ft.÷4.0=50 plants
30"	2.5	6.25	
3'0"	3.0	9.0	
3'6"	3.5	12.25	
4'0"	4.0	16.0	
5'0"	5.0	25.0	200sq.ft.÷25.0=8 plants

Depth

Sq. Ft. × Decimal Equivalent = Cubic Ft.
Sq. Ft. ÷ 9 = Sq. Yd.

1 acre = 43,560 ft²
640 acres = 1 mi²

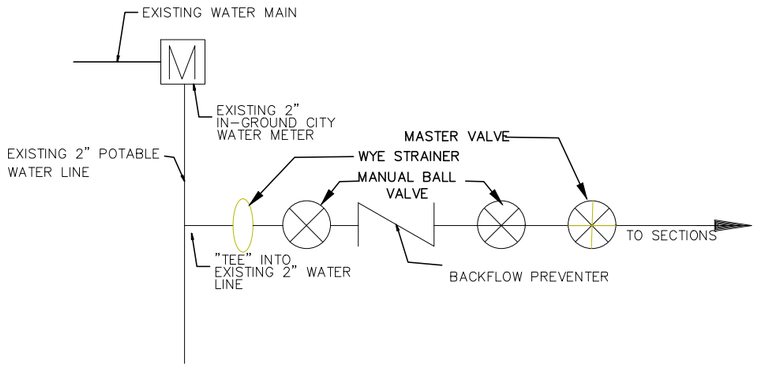
REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
1848
STATE OF TEXAS

Bill Nicholson
02/23/2023

Texas Department of Transportation

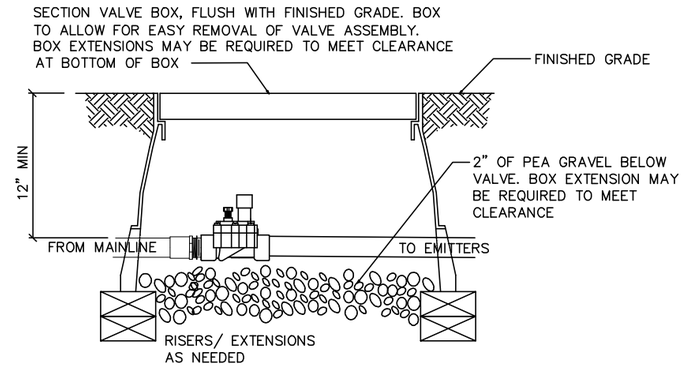
SH 218
PLANTING SPECIFICATIONS
SHEET 39 OF 47

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		39
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218



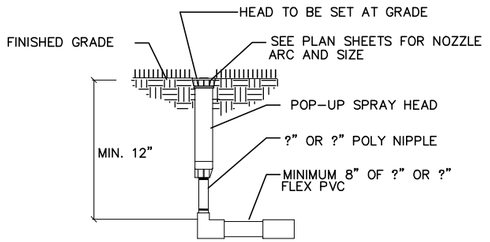
1 IRRIGATION TIE INTO EXISTING WATER LINE

NTS



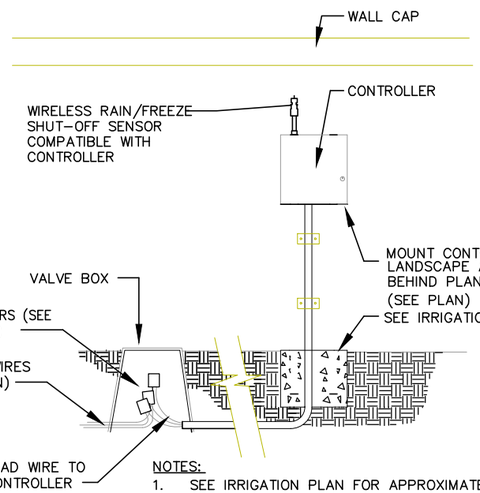
2 REMOTE CONTROL VALVE ASSEMBLY (SPRAY)

NTS



3 POP-UP SPRAY HEAD

NTS

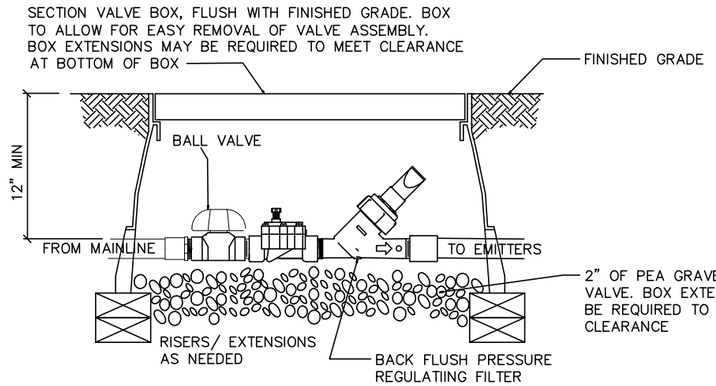


NOTES:

1. SEE IRRIGATION PLAN FOR APPROXIMATE LOCATION.
2. SUBMIT SHOP DRAWING FOR CONTROLLER WALL MOUNTING AND CONDUIT LOCATION. APPROVAL BY AREA ENGINEER BEFORE INSTALLATION.

4 CONTROLLER ON BACK OF LANDSCAPE AMENITY (TY 1) & RAIN FREEZE SENSOR

NTS



5 REMOTE CONTROL VALVE ASSEMBLY (DRIP)

NOTE: VALVES ASSEMBLY SHALL BE LOCATED NEAR THE DESIGNATED PLANTING BED AREA AS APPROVED BY ENGINEER.

NTS

DATE: $DATE$ $TIME$
FILE: $FILE$

REGISTERED LANDSCAPE ARCHITECT WILLIAM S. NICHOLSON STATE OF TEXAS 7848

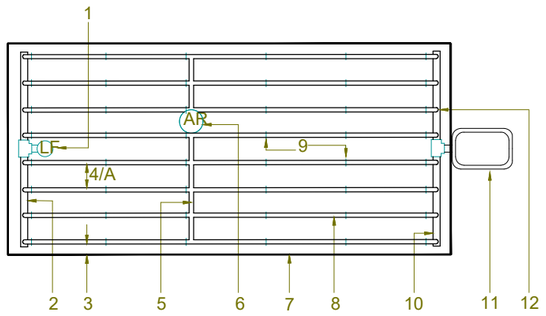
Bill Nicholson

03/18/2023

Texas Department of Transportation

SH 218
IRRIGATION
DETAILS
SHEET 40 OF 47

DRAWING DETAIL	FEDERAL AID PROJECT		SHEET NO.
6	SHOWN ON TITLE SHEET		40
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218



1- FLUSHING VALVE PLUMBED TO PVC OR POLY EXHAUST MANIFOLD.

2- PVC OR POLY EXHAUST MANIFOLD.

3- PERIMETER LATERALS SPACING- MIN. 4" - MAX. 1/2 LATERAL SPACING.

4- INTERIOR LATERAL SPACING TO BE 18" O.C.

5- BLANK TUBING MANIFOLD FOR AIR VAC RELIEF - CENTERED ON MOUND OR BERM.

6- AIR/VACUUM RELIEF VALVE - INSTALL AT HIGHEST LOCAL ELEVATION.

7- AREA PERIMETER / EGDE OF PLANTER.

8- DRIP TUBING LATERAL LINE.

9-SECURE POLY LINES WITH JUTE NET STAPLES, OR EQUAL 5' O.C.

10- PVC OR POLY SUPPLY MANIFOLD.

11-REMOTE CONTROL VALVE WITH DISC FILTER AND PRV.

12- START CONNECTION AS APPROPRIATE- SEE OTHER DETAILS.

NOTES:

A. DRIP-LINES TO BE PLACED IN PARALLEL LINES EQUALLY AND UNIFORMILY SPACED FOR ENTIRE LENGTH OF RUN. SPACE LINES AS SHOWN AND/OR NOTED ON DRAWINGS AND SPECS.

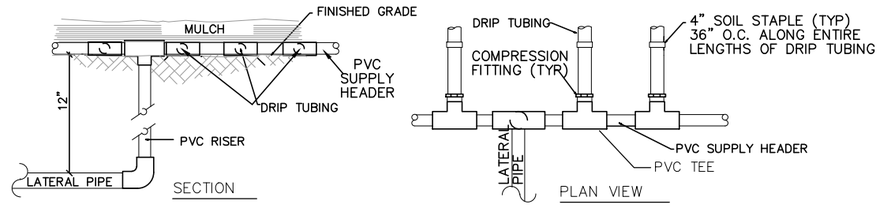
B. SEE RAINBIRD "DRIP IRRIGATION DESIGN" GUIDE FOR ADDITIONAL INFORMATION.

C. WITH STAPLES AT 5' ON CENTER PRIOR TO BACK-FILL.

D. USE CAUTION WHEN SECURING DRIP-LINE WITH STAPLES. DRIP-LINE SHALL NOT BE OBSTRUCTED OR KINKED.

1 DRIP LINE LAYOUT – TYPICAL

NTS



2 RISER DETAIL FOR SUPPLY HEADER TO DRIP TUBING IN BEDS

NTS

1 REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY

TYPICAL FOR BOTH SIDES

2 6" BRASS NIPPLE

3 RESILIENT SEATED BALL VALVE

4 BRASS ELL

5 BRASS UNION

6 PIPE WRAP

7 BRASS NIPPLE LENGTH AS REQUIRED OR AS PER LOCAL CODE

8 4" THICK CONCRETE SLAB

9 4" NIPPLE

10 PVC FEMALE ADAPTER

11 PVC MAIN TO SYSTEM

12 COMPACTED BACKFILL

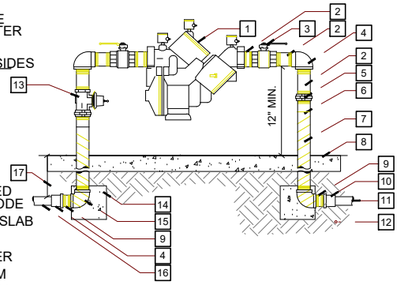
13 PRESSURE REGULATOR

14 12" X 12" THRUST BLOCK

15 COPPER FEMALE ADAPTER

16 MAIN SUPPLY LINE - TYPE `K' COPPER FROM MAIN TO R.P. ASSEMBLY

17 18" MIN. OR PER DETAIL-WHICHEVER IS MORE RESTRICTIVE



NOTE:

1. DETAIL IS FOR SIZES 3/4" TO 2" MAIN LINE ONLY
2. INSTALL UNIT AS ABOVE OR PER LOCAL CODE AND/OR WATER DISTRICT SPECIFICATION. VERIFY BEFORE INSTALLATION.
3. APPLY 1 COAT OF PIPE WRAP PRIMER THEN DOUBLE WRAP ALL EXPOSED METAL PIPING UP TO 12" ABOVE FINISH GRADE WITH 10 MIL. PIPE WRAP TAPE.

3 RP BACKFLOW ASSEMBLY

N.T.S.

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON II
STATE OF TEXAS
7846

Bill Nicholson
03/18/2023

Texas Department of Transportation
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SH 218
IRRIGATION
DETAILS
SHEET 58 OF 80

CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

DIST.	COUNTY	SHEET NO.
SAT	BEXAR	
FEDERAL AID PROJECT		
SHOWN ON TITLE SHEET		41

CKD:
DWN:
CK:
DWN:

DATE: $DATE$ $TIME$
FILE: $FILE$

CHK
DWN
CHK
DWN

GENERAL IRRIGATION NOTES:

1. Contractor shall be responsible for referencing Item 170 of the Texas Standard specifications for Construction of Highways, Streets and Bridges 2004 for specifications, dimensions, volumes and measurements that have been modified or not shown.
2. The contactor shall be responsible for obtaining all permits, licenses, tests, and/or approvals, paying any fees (including impact fees) and deposits and installing or arranging for all water meters and taps for installation and operation as applicable. Deposits will not be refunded. Water meter is existing on site and shall remain operational during the project. The contractor shall tie into existing potable line for proposed irrigation system.
3. Backflow preventors shall be provided and installed by the contractor. Connection shall be made by a licensed plumber, provided by the contractor. The contractor shall be responsible for all charges, fees, tests, and coordination for any backflow preventer testing, at installation or annual inspection, required by local entity through all phases of the contract.
4. The drawings are diagramatic of the work to be performed. Changes may be required due to varying conditions or as directed by the engineer.
5. Contractor shall verify location of any underground utilities with appropriate agencies. Underground utilities (if shown) on the plans are approximate.
6. See IRRIGATION DETAILS AND MATERIALS CHART for materials specifications, sizes, and requirements.

CONSTRUCTION METHODS:

1. The contractor shall investigate the site conditions affecting the work and shall furnish offsets, fittings, and sleeves as may be required to meet site conditions.
2. All irrigation valves, mainlines, quick coupler valves, dripline, etc., shall be located for approval by the engineer prior to installation.
3. Deviations in the piping as shown on the plans shall be permitted with approval, in writing, from the engineer.
4. Care shall be exercised when excavating near trees. No mechanical trenching shall be permitted below the canopy of existing trees. Contractor shall adjust trench path and/or excavate by hand to avoid damage to existing tree root system.
5. Any underground utilities, high mast wiring, and CTMS wiring shown on plans are approximate locations only and shall not relieve contractor's responsibility of coordinating with appropriate authorities to locate underground utilities, wiring and any structure.
6. Dig trenches straight and support pipe continuously on bottom of trench. Install pipe to an even grade. Trench bottom shall be clean and smooth with all organic debris and sharp objects removed. Pipe shall be snaked in trench, to allow for expansion and contraction. For public safety, plastic construction fencing, minimum 4 feet high, shall be used around open excavations.
7. Boring and sleeve requirements. Boring and sleeve locations shall be staked for engineer's approval. Boring depth shall be at 24" below pavement. All borings and sleeves shall be continuous and shall extend the full width of the pavement and 5 feet on each side thereof. Boring and sleeves shall be incidental to irrigation system. Bore encasement pipe must be installed same day as boring.
8. PVC casing(s) for bores and sleeves shall consist of SCH 80 smooth wall pipe with welded joints and seams, and shall be continuous. The size of bore shall not exceed the diameter of casing(s) required by the plans by more than 1 inch.
9. Pipe shall not be installed when air temperature is below 40 degrees fahrenheit. Plastic pipe shall be cut in a manner that will insure a square cut. Burrs at cut ends shall be removed prior to installation so that a smooth unobstructed flow will be obtained.
10. All water lines, valves, and sprinkler bodies shall be thoroughly flushed before installing dripline or sprinkler nozzles.
11. Control wire and wire connections shall be as described on IRRIGATION MATERIALS SPECIFICATIONS CHART. All wire connections and splices shall be made in ground boxes.
12. Compaction of the pipe trenches must be sufficient to limit short term settling of the backfill to no more than 1 inch. The contractor shall correct settling greater than this without additional compensation.
13. Master valve controller must be set to open while section valves are operating.

IRRIGATION MATERIALS SPECIFICATIONS

DESCRIPTION	* EXAMPLE OR EQUAL	SIZE	APPROXIMATE QUANTITIES FOR INFORMATIONAL PURPOSE ONLY
WATER METER	PER LOCAL CODE	Existing	AS NEEDED
REMOTE CONTROL DRIP VALVE	XCZ 100 PRF	1"	AS NEEDED
DRIPLINE TUBING WITH DUAL OUTLET PORTS	RAINBIRD DRIPLINE XFD-06-18-500	0.6 GAL./HR, 18 inch EMITTER SPACING	AS NEEDED (SPACE DRIPLINE ON 18" CENTERS)
POP-UP ROTORY OR SPRAY HEAD	HUNTER PRO-SPRAY PRS30	6"	AS NEEDED
CONTROLLER SPECIFICATION	HUNTER I-CORE	EXPANDABLE TO MIN. 20 STATIONS	AS NEEDED
BACKFLOW PREVENTER	RPZ	1"	AS NEEDED
MASTER VALVE & SECTION VALVES	RAINBIRD 100 PEB	1"	AS NEEDED
WYE STRAINER		1"	AS NEEDED
PVC SCH 80 BORE CASING Pressure rated with slip type solvent welded joints		6"	AS NEEDED
PVC SCH 40 MAINLINE Pressure rated with twin gasket couplings and fittings or slip type solvent welded joints		1½"	AS NEEDED
PVC CLASS 200 LATERALS AND HEADERS		3/4"	AS NEEDED
ABOVE GROUND PIPE INCLUDING BURIED RISERS AND SWING-JOINT COMPONENTS shall be PVC SCH 80 pipe rated for direct sunlight exposure			AS NEEDED
FITTINGS All fittings incorporated into system shall be of the same type, size and class material as the pipe			AS NEEDED
CONTROL WIRE All low voltage control wire shall be color coded. Wire sizes shall conform to the controller manufacturer specifications for maximum distances for specific wire sizes. All wire shall be specifically manufactured for direct burial. All wire connections and spliced shall be made in ground boxes. The splice shall be completely waterproof and shall be completely encapsulated within a King Safety Sealed Irrigation Connector/Splice enclusure or an approved equal		14 GA.	AS NEEDED
SOLVENT CEMENT Solvent cement shall be the type recommended by the pipe manufacturer			AS NEEDED
VALVE BOXES Boxes for section valves, below-ground backflow preventors, and quick coupling valves shall be as shown on detail sheet		BOX SIZE SHALL BE MIN. 10" AND ALLOW FOR EASY REMOVAL OF VALVE, ETC.	AS NEEDED
VALVE BOX RISERS		BOX RISER SHALL EXTEND BELOW VALVES AS SHOWN ON DETAIL SHEET	
RAIN/FREEZE SENSORS/ASSEMBLY	WIRELESS RAIN/FREEZE SENSOR		2 TOTAL INSTALLED AS PER DETAIL SHEET AT CONTROLLER

* REFERENCE TO MANUFACTURER'S TRADE NAME OR CATALOG NUMBER IS FOR THE PURPOSE OF IDENTIFICATION ONLY, CONTRACTOR SHALL BE PERMITTED TO FURNISH LIKE MATERIALS OF OTHER MANUFACTURERS PROVIDED THEY ARE OF EQUAL QUALITY AND COMPLY WITH SPECIFICATIONS FOR THIS PROJECT AND ARE APPROVED BY THE ENGINEER.

GUARANTEE AND ACCEPTANCE:

1. Maintenance period. The irrigation system shall be inspected concurrently with, and subject to the same establishment/maintenance requirement periods under Items 192 and 193 (if used). During the installation, establishment, and maintenance, contractor shall perform the following activities as a minimum and to the satisfaction of the engineer:
   A) Install and maintain the controller program to insure the proper distribution of water (includes replacement of any batteries).
   B) Inspect, repair, and/or replace any equipment that is found defective
2. As-built drawings. Upon completion of the required maintenance period, the engineer will make an inspection of the project. The contractor shall furnish the engineer a set of as-built drawings on reproducible 11x17 film base sheets. The engineer will check base sheets to be sure they are a true record of the project conditions and will direct the contractor to correct any errors that are found. The drawings shall show all valve locations by triangulation from a fixed object and any change to sprinkler head location from a fixed object and any change to sprinkler head location and rerouting of main and lateral lines (changes of this nature shall be approved by the engineer prior to installation).
3. Operating and maintenance data. The contractor shall provide instructions covering full operation, care and maintenance of the equipment, including a schedule showing length of time each valve is to be open to provide determined amount of water, and instruct the state's designated personnel in proper operation of the system.
4. Test. Testing of the system for leakage shall be in accordance with Item 170. The contractor shall also test and assure the proper electrical working order of the system to the satisfaction of the engineer.

REGISTERED LANDSCAPE ARCHITECT
WILLIAM S. NICHOLSON
7848
STATE OF TEXAS
Bill Nicholson
03/18/2023

DATE: $DATE$ $TIME$
FILE: $FILE$

Texas Department of Transportation

SH 218
IRRIGATION SPECIFICATIONS
SHEET 68 OF 80

CONT. SECT. JOB	DIST.	COUNTY	SHEET NO.
6	SHOWN ON TITLE SHEET		42
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0465 - 01 - 059

1.2 PROJECT LIMITS:
From: At LP 1604

To: .

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 29.5613122 ,(Long) -98.3290295

END: (Lat) 29.5598585 ,(Long) -98.3255147

1.4 TOTAL PROJECT AREA (Acres): 6 AC (incl. roadway & fuel station)

1.5 TOTAL AREA TO BE DISTURBED (Acres): 1.33

1.6 NATURE OF CONSTRUCTION ACTIVITY:
INSTALL LANDSCAPE & IRRIGATION

1.7 MAJOR SOIL TYPES:

Soil Type	Description
STEPHEN SILTY CLAY	1 TO 4 PERCENT SLOPES
EDDY GRAVELY CLAY LOAM	1 TO 8 PERCENT SLOPES

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

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

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

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

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

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

Tributaries	Classified Waterbody
(*)1902B: SALITRILLO CREEK	FRESHWATER STREAM
(*)1902A: MARTINEZ CREEK	FRESHWATER STREAM
(*) 1902: LOWER CIBOLO CREEK	FRESHWATER STREAM
(*) 1901: LOWER SAN ANTONIO RIVER	FRESHWATER STREAM

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- ☒ Development of plans and specifications
- ☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- ☒ Post Construction Site Notice
- ☒ Submit NOI/CSN to local MS4
- ☒ Perform SWP3 inspections
- ☒ Maintain SWP3 records and update to reflect daily operations
- ☒ Complete and submit Notice of Termination to TCEQ
- ☒ Maintain SWP3 records for 3 years
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- ☒ Day To Day Operational Control
- ☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- ☒ Post Construction Site Notice
- ☒ Submit NOI/CSN to local MS4
- ☒ Maintain schedule of major construction activities
- ☒ Install, maintain and modify BMPs
- ☒ Complete and submit Notice of Termination to TCEQ
- ☒ Maintain SWP3 records for 3 years
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity

X

X

REGISTERED LANDSCAPE ARCHITECT
HARRY N. DAWSON
1932
STATE OF TEXAS

3/21/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			043
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

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

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - X Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

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

2.5 POLLUTION PREVENTION MEASURES:

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

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

X

X

REGISTERED LANDSCAPE ARCHITECT
HARRY N. DAWSON
1932
STATE OF TEXAS

3/21/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			043A
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0465	01	059	SH 218

I. STORMWATER POLLUTION PREVENTION–CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ 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 Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: Yes ☐ No ■

Note: If amount of soil disturbance changes, permit requirements may change.

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

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

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

■ No Permit Required

☐ Nationwide Permit (NWP) 14 – Pre–construction Notice (PCN) not Required

☐ Nationwide Permit 14 – PCN Required

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices (BMPs) planned to control erosion, sedimentation and post–project total suspended solids (TSS).

1.

2.

3.

4.

401 Best Management Practices: (Not applicable if no USACE permit)

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	☐ Sedimentation Chambers
		☐ Grassy Swales

III. CULTURAL RESOURCES

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

■ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

■ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

☐ No Action Required ■ Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.
3.
4.

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

Hazardous Materials or Contamination Issues Specific to this Project:

■ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Does the project involve the demolition of a span bridge?

☐ Yes ■ No (No further action required)

If "Yes", a pre– demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

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

■ No Action Required ☐ Required Action

Action No.

1.

2.

3.

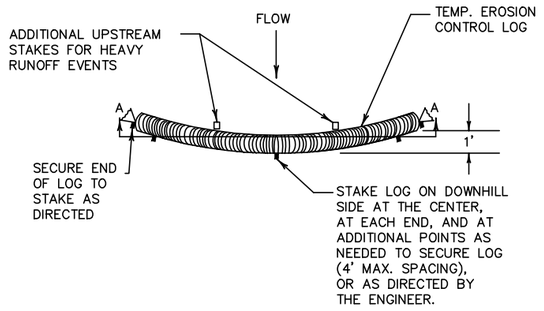
Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL_PERMITS, ISSUES_AND_COMMITMENTS

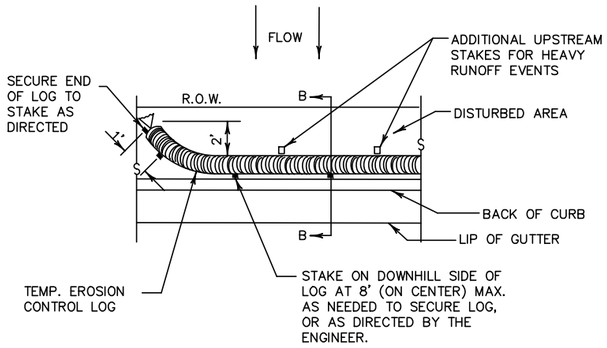
EPIC

FILE: epic_2015–10–09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: WN	CK: ??
©TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0465	01	059	SH 218
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		44

DATE:
FILE:



PLAN VIEW



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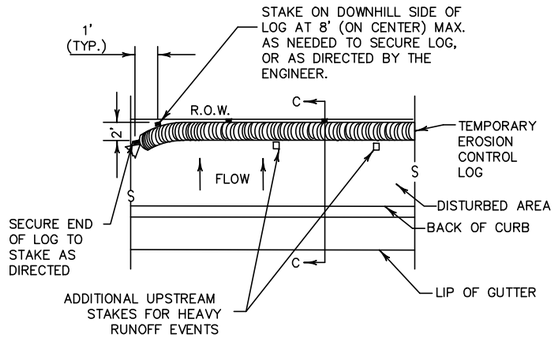

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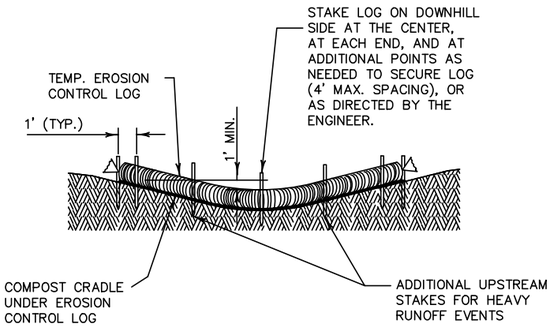
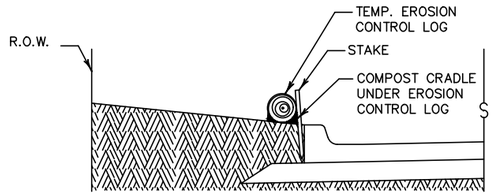


SECTION A–A

EROSION CONTROL LOG DAM

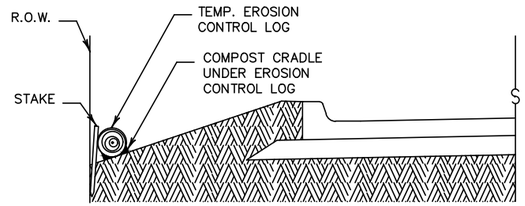
CL–D



SECTION B–B

EROSION CONTROL LOG AT BACK OF CURB

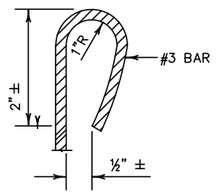
CL–BOC



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

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:

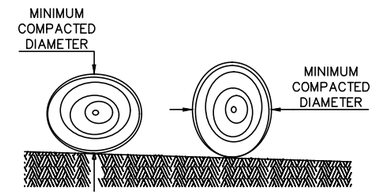
1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows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

GENERAL NOTES:

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

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	0465	01	059	SH 218			
	DIST	COUNTY		SHEET NO.			
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DATE:
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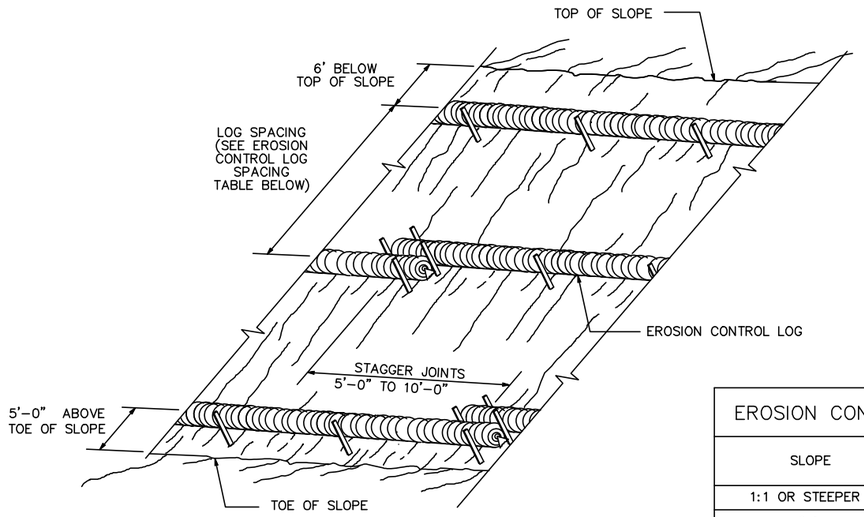
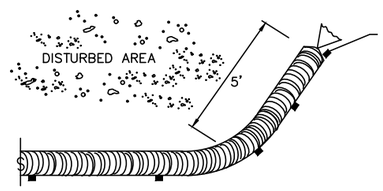


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

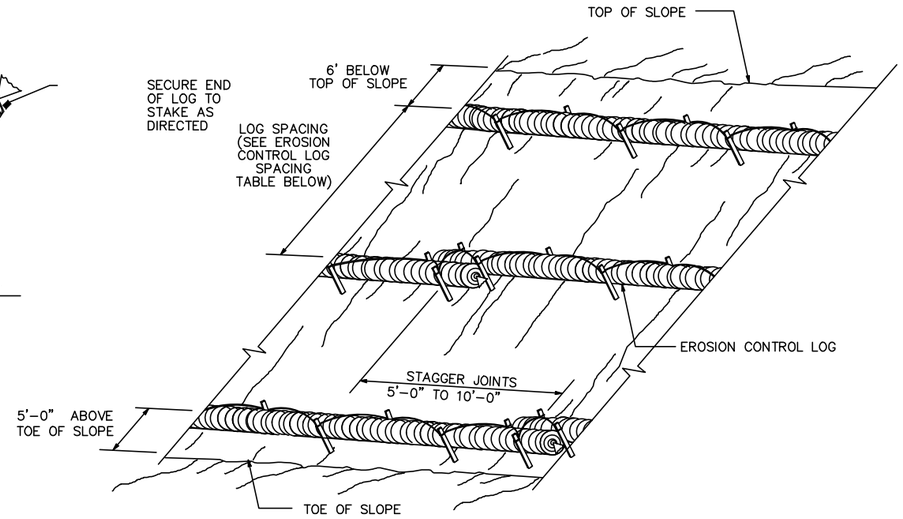
CL-SST



END SECTION RAP DETAIL

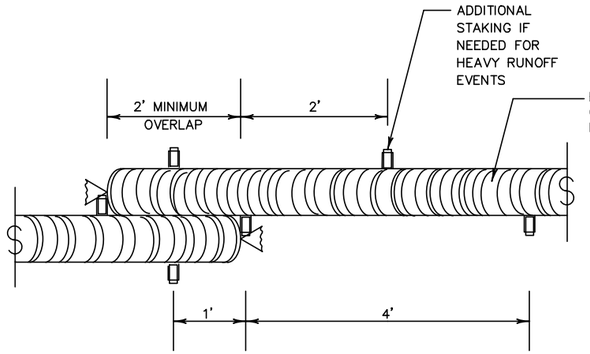
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

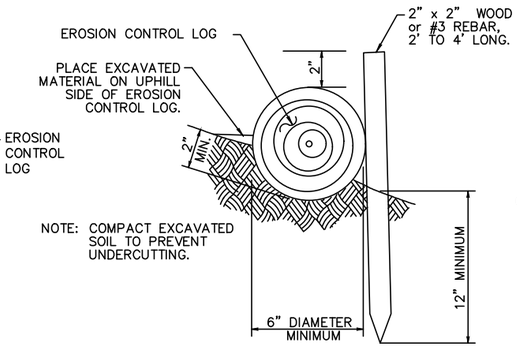
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS–ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS– ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

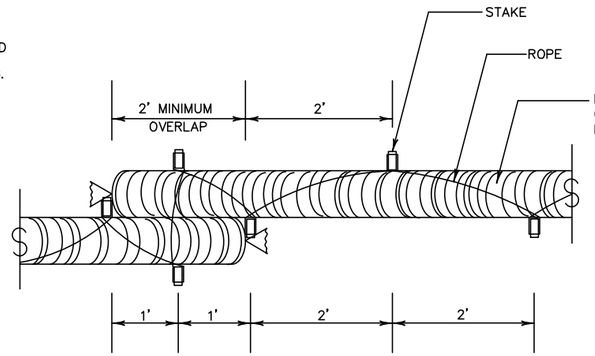


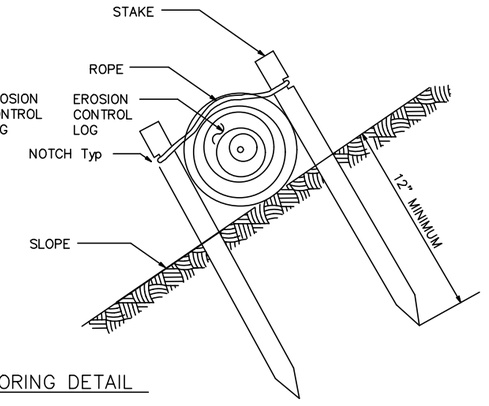


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

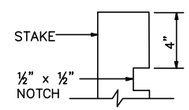
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)–16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0465	01	059	SH 218
	DIST	COUNTY		SHEET NO.
	15	BEXAR		46

DATE:
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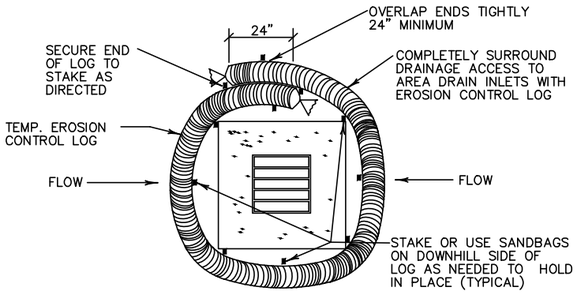
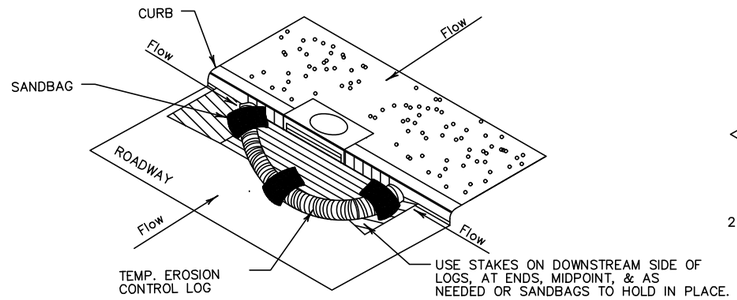


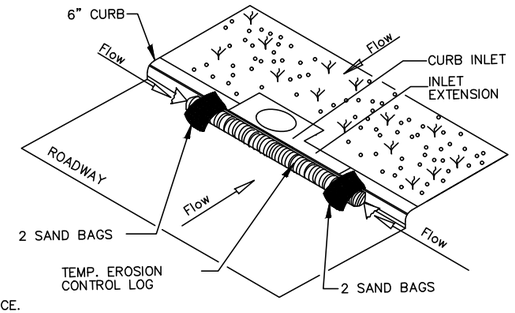
EROSION CONTROL LOG AT DROP INLET

CL–DI



EROSION CONTROL LOG AT CURB INLET

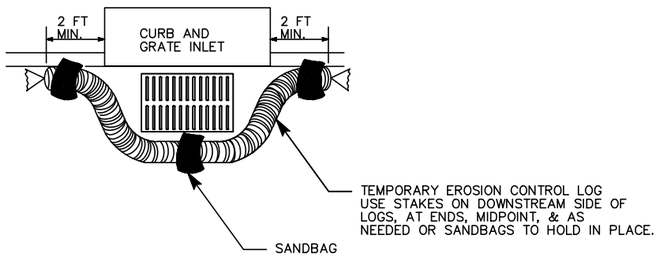
CL–CI



EROSION CONTROL LOG AT CURB INLET

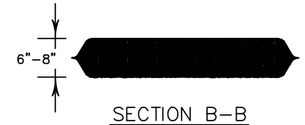
CL–CI

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.

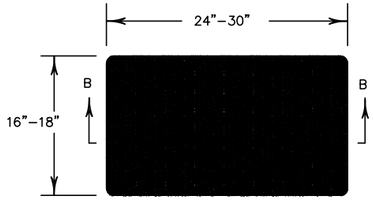


EROSION CONTROL LOG AT CURB & GRADE INLET

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
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REVISIONS	0465	01	059	SH 218
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