

**INDEX OF SHEETS**

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	INDEX OF SHEETS

**STATE OF TEXAS  
DEPARTMENT OF TRANSPORTATION**

**PLANS OF PROPOSED  
STATE HIGHWAY IMPROVEMENT**

FEDERAL AID PROJECT  
PROJECT NO: F2023(173)

**VARIOUS  
DEWITT COUNTY**

NET LENGTH OF ROADWAY = 0.00 FT. = 0.00 MI.  
NET LENGTH OF BRIDGE = 0.00 FT. = 0.00 MI.  
NET LENGTH OF PROJECT = 0.00 FT. = 0.00 MI.

**CUERO**

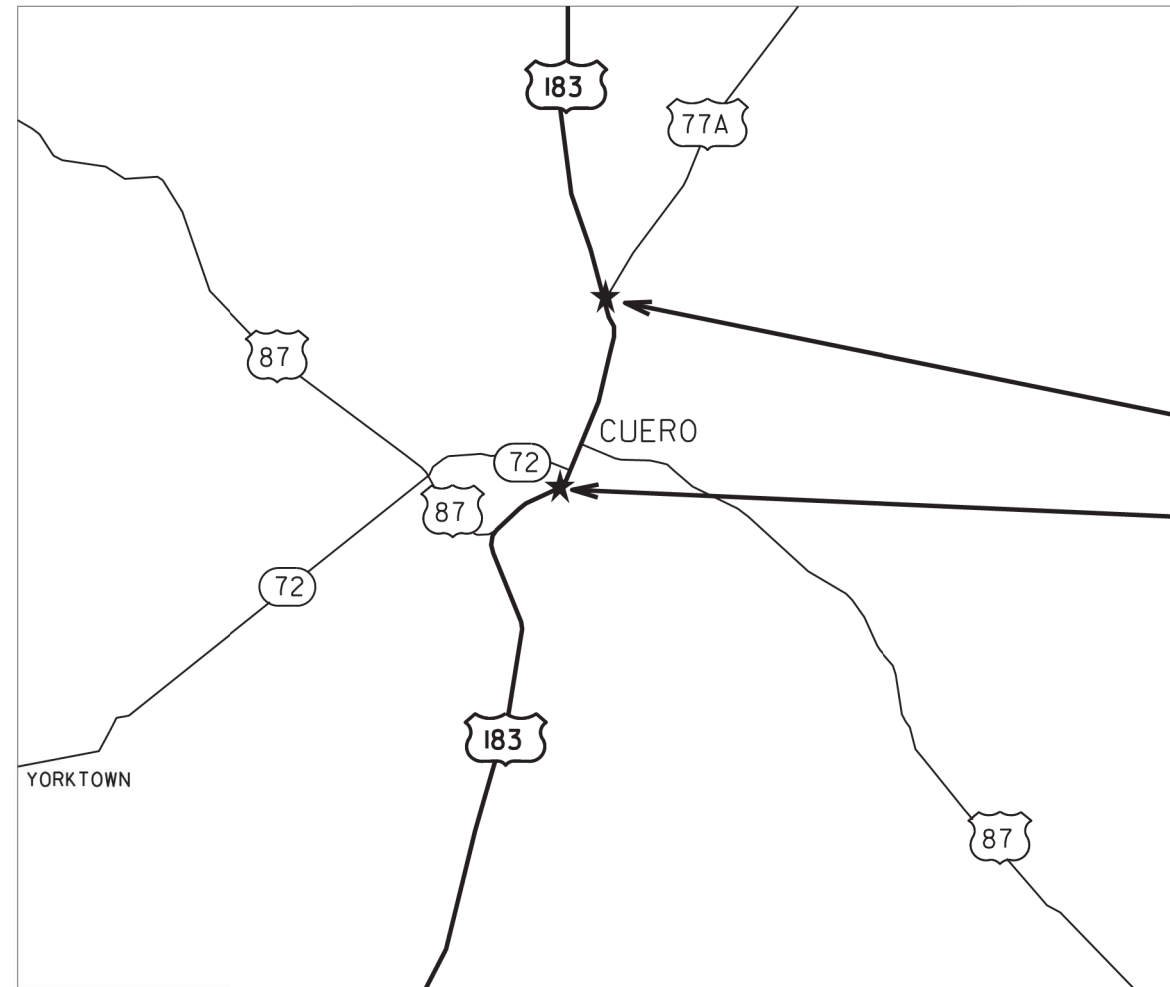
FOR THE CONSTRUCTION OF LANDSCAPE DEVELOPMENT  
CONSISTING OF LANDSCAPING IN CUERO - GCAA 2021

FEDERAL AID PROJECT NO.			
F 2023(173)			
CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY		SHEET NO.
YKM	DEWITT		1

FINAL PLANS

LETTING DATE: \_\_\_\_\_  
DATE CONTRACTOR BEGAN WORK: \_\_\_\_\_  
DATE WORK WAS COMPLETED & ACCEPTED: \_\_\_\_\_  
FINAL CONTRACT COST: \$ \_\_\_\_\_  
CONTRACTOR: \_\_\_\_\_

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



★ DENOTES PROJECT LOCATION

EXCEPTIONS: NONE  
EQUATIONS: NONE  
RAILROAD CROSSINGS: NONE



08/29/2022



SUBMITTED FOR LETTING: 8/29/2022

DocuSigned by:  
*Hilary Garnish*  
PROJECT ENGINEER

RECOMMENDED BY FOR LETTING: 8/30/2022

DocuSigned by:  
*Jeffery Vincklarek*  
DIRECTOR OF TRANSPORTATION  
PLANNING AND DEVELOPMENT

RECOMMENDED BY FOR LETTING: 8/30/2022

DocuSigned by:  
*Martin C. Horvath PE*  
PROJECT ENGINEER

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 2022).

NVA  
DATE: NVA  
FILE:

# INDEX OF SHEETS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
<b>GENERAL</b>	
1	TITLE SHEET
2	INDEX OF SHEETS
3-4	PROJECT LAYOUT
5, 5A-5B	GENERAL NOTES
6	ESTIMATE & QUANTITY SHEET
7	QUANTITY SUMMARY
<b>TRAFFIC CONTROL PLAN</b>	
## 8-19	BC (1)-21 THRU BC (12)-21
## 20	TCP (2-1)-18
## 21	TCP (2-2)-18
## 22	WZ(RS)-22
<b>BRIDGE STANDARDS</b>	
## 23	RW (SF)
## 24	RW (SFA)
<b>LANDSCAPE PLANS</b>	
25	LOCATION A1 - DEMOLITION PLAN
26	LOCATION A1 - LAYOUT PLAN
27	LOCATION A1 - GRADING PLAN
28	LOCATION A1 - PLANTING PLAN
29	LOCATION A2 - DEMOLITION PLAN
30	LOCATION A2 - LAYOUT PLAN
31	LOCATION A2 - PLANTING PLAN
32-33	LOCATION A - IRRIGATION PLAN
34	LOCATION B - DEMOLITION PLAN
35	LOCATION B - LAYOUT PLAN
36	LOCATION B - PLANTING PLAN
37	LOCATION B - IRRIGATION PLAN
38-40	MISCELLANEOUS DETAILS
41-42	LANDSCAPE DETAILS
43-44	IRRIGATION DETAILS
45	IRRIGATION SPECIFICATIONS
<b>ENVIRONMENTAL ISSUES</b>	
46	STORMWATER POLLUTION PREVENTION PLAN (SW3P)
47	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
## 48-50	EC (9)-16

CK  
 DW  
 CK  
 DN

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08/19/2022

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

DocuSigned by:  
*Hilary Garnish* 8/19/2022  
 NAME: F9BEE0CATED74A7... DATE

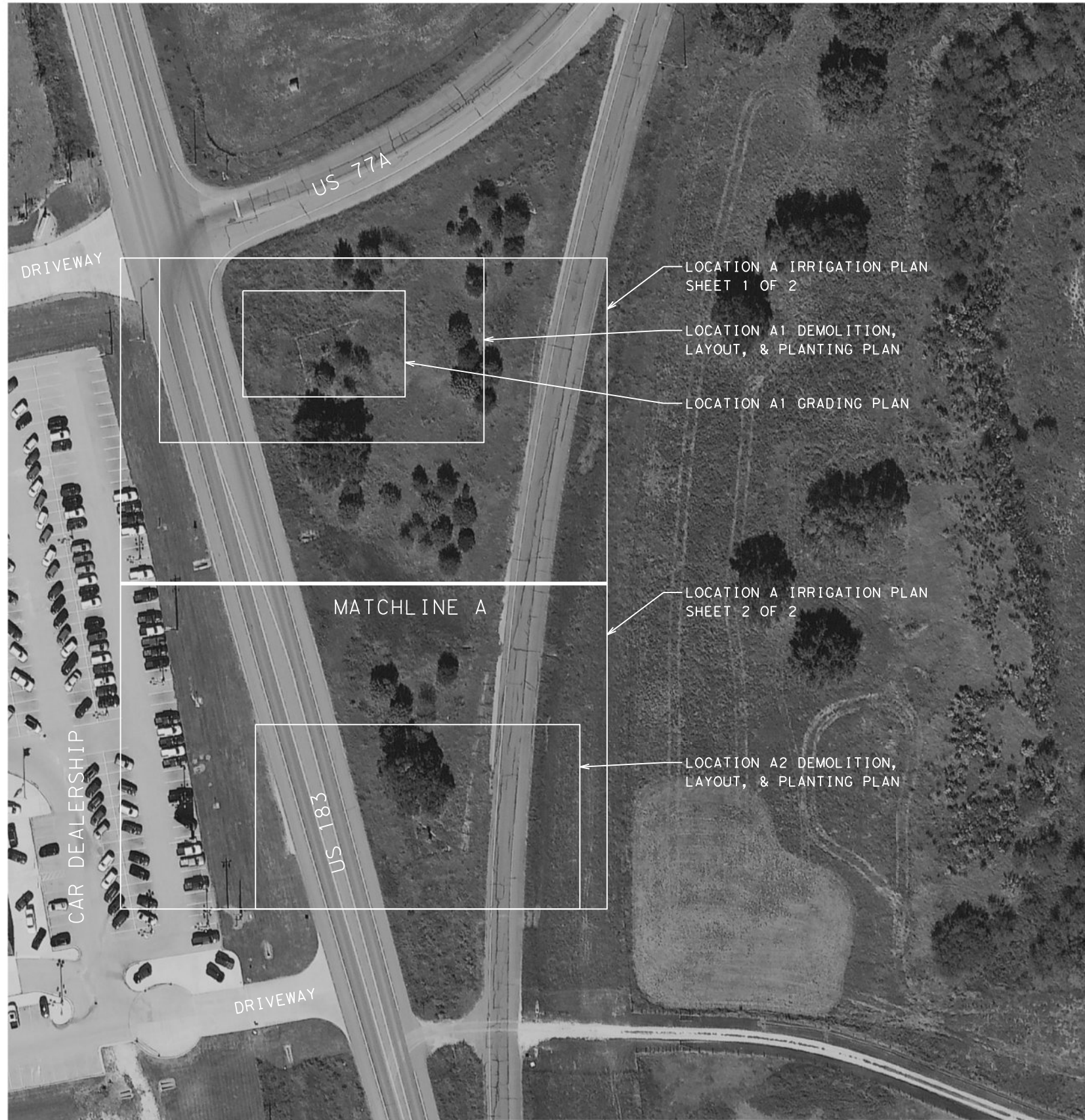
**CUERO GCAA  
INDEX OF SHEETS**



CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY		SHEET NO.
YKM	DEWITT		2

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LOCATION A



06/28/2022

**CUERO GCAA  
 PROJECT LAYOUT  
 LOCATION A**

SHEET 1 OF 2



0 50 100

SCALE: 1" = 100'

 Texas Department of Transportation		CONT	SECT	JOB	HIGHWAY
		0913	17	044	VARIOUS
		DIST	COUNTY	SHEET NO.	
		YKM	DEWITT	3	

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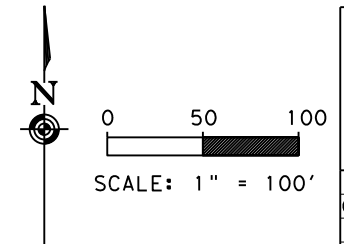
LOCATION B



06/28/2022

**CUERO GCAA  
 PROJECT LAYOUT  
 LOCATION B**

SHEET 2 OF 2



 Texas Department of Transportation			
CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY		SHEET NO.
YKM	DEWITT		4

**Project Number:**

**Sheet: 5**

**County: DeWitt**

**Control: 0913-17-044**

**Highway: Various**

**GENERAL NOTES:**

**GENERAL:**

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

Covey Morrow IV [Covey.Morrow@txdot.gov](mailto:Covey.Morrow@txdot.gov)  
McKenzie Koehne [McKenzie.Heller@txdot.gov](mailto:McKenzie.Heller@txdot.gov)

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

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:  
<https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/>

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

Do not work on the roadway before sunrise or after sunset unless otherwise approved.

Furnish a certified copy of the legal gross weight of each vehicle hauling materials by weight and certified measurements for all trucks hauling material by volume.

The contractor's attention is directed to the fact that there are certain trees within the right-of-way that are designated for preservation. Protect these trees from abuse, marring or damage during construction operations. Continual parking and/or servicing of equipment under the branches of trees designated for preservation will not be permitted.

The Department will provide the cylinder testing machine for this project. Deliver the test specimens to the engineer's curing facilities as directed.

Do not clean out concrete trucks within the right of way.

**Project Number:**

**Sheet: 5**

**County: DeWitt**

**Control: 0913-17-044**

**Highway: Various**

**ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES**

The Department has determined that a USACE Nationwide or Individual Permit is not necessary for the project since all work shall be conducted outside the USACE jurisdictional areas. Any impacts to these jurisdictional areas by the Contractor without a USACE permit will be the responsibility of the Contractor. If the Contractor deems it necessary to impact the USACE jurisdictional areas, then it becomes the Contractor's entire responsibility to consult with the USACE pertaining to the need for a Nationwide or Individual Permit. TxDOT will then hold the Contractor responsible for following all conditions of the approved permit.

No significant traffic generator events identified.

If the contractor proposes work beyond the TxDOT obtained permit limitations, the contractor is responsible for additional costs, delays, and obtaining new or revised permits prior to construction.

**ITEM 8: PROSECUTION AND PROGRESS**

Provide progress schedule as a Bar Chart.

**ITEM 110: EXCAVATION**

Remove existing vegetation, including roots and topsoil, within the grading limits to the depths shown on the plans immediately before grading operations begin within any section. Place the material in a windrow on each side of the roadbed, and replace as directed as soon as practicable. Measurement and payment will be in accordance with Item "Excavation" for cut sections.

**ITEM 132: EMBANKMENT**

Furnish Type C embankment consisting of suitable earth material such as loam, clay or other such material that will form a stable embankment and has a plasticity index of at least 15 but not more than 40.

**ITEM 162: SODDING FOR EROSION CONTROL**

Use block sodding in locations shown on the plans and as determined.

Use Prairie Buffalograss (Buchloe Dactyloides, var. Prairie) for block sodding.

**Project Number:**

**Sheet: 5A**

**County: DeWitt**

**Control: 0913-17-044**

**Highway: Various**

Peg all block sodding on slopes steeper than 3:1.

#### **ITEM 168. VEGETATIVE WATERING**

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

#### **ITEM 192 – LANDSCAPE PLANTING**

Locate all underground utilities and conduits prior to digging.

Do not work subsoil for planting operations when moisture content is so great that excessive compaction will occur, or when subsoil 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.

Remove undesirable vegetation from work zone, as directed. This work is incidental and will be considered subsidiary to Item 192.

If requested, provide tree or plant photos that show that the materials provided will meet minimum measurements and size specifications. Submit one photo per size and item. Photo will be used as the standard for all sizes.

Provide Compost that meets specifications under Item 161. Ensure that mulch and compost is free of visible debris and unsuitable materials.

Prior to backfilling bed areas, conduct water percolation tests, as shown in the plans. Contact Landscape Architect if excavated bed areas do not drain efficiently.

Water all plants within the same day of installation. Thoroughly soak root balls of large plants and trees. Set base of plant pit so that top of root ball is set slightly above grade and will not settle below grade. If top of root ball settles below grade, plant must be replanted at proper depth or replaced, without additional compensation.

**Project Number:**

**Sheet: 5A**

**County: DeWitt**

**Control: 0913-17-044**

**Highway: Various**

Stake trees for support during the same day as planted. Trees that cannot stand erect without plant supports will be rejected. Ensure trees and tall shrubs remain plumb and straight for all given conditions throughout the contract period. Staking method must allow trunk to sway with the wind while remaining plumb.

#### **Maintenance and 90-Day Warranty.**

Maintain all plants in a healthy, growing condition. Replace dead or severely damaged plants as directed.

Keep project area clean and remove all litter. Remove all trimmings and debris from project site.

Keep planting beds free of weeds and undesirable species. Do not use string trimmers or spray herbicide in planting beds or tree watering basins. Spraying herbicide is not allowed. Apply herbicide by a wicking method, only. A wicking method consists of a wick or rope soaked in herbicide attached to a handle. The wetted wick is used to wipe or brush herbicide over the weed. Do not allow herbicide to contact planted vegetation, contaminate the soil, or contact bodies of water.

Use Glyphosate, (Round-Up or approved equal), in a wicking method for weed control after plants have been installed. Follow manufacturer's directions and use properly licensed personnel.

Mow a five (5) foot border around each planting bed. Mow turf to a height of four (4) inches. Remove litter from area before mowing. Mow according to the following schedule:  
Mow every two weeks from March 1 to October 31.  
Mow once a month from November 1 to February 28.

At the end of the 90-day maintenance period of Item 192, replace all dead or damaged plants that are considered unacceptable, as directed.

#### **ITEM 502: BARRICADES, SIGNS, AND TRAFFIC HANDLING**

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.

Use WZ(RS)-22 in conjunction with TCP(2-2).

**Project Number:**

**Sheet: 5B**

**County: DeWitt**

**Control: 0913-17-044**

**Highway: Various**

Provide suitable warning lights mounted high enough to be visible from all directions on all construction equipment, including pilot vehicles, and operate warning lights when the equipment is within the right of way. Equip other equipment such as trucks, trailers, autos, etc., with emergency flashers and use emergency flashers while within the work area.

Project limit traffic control devices will not be required for this project.

**ITEM 506: TEMPORARY EROSION, SEDIMENTATION,  
AND ENVIRONMENTAL CONTROLS**

The storm water pollution prevention plan (SW3P) for this project will consist of utilizing existing vegetation. The disturbed area is less than one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7.

**ITEM 752 – TREE AND BRUSH REMOVAL**

Follow Item 752.4 Work Methods and Item 752 general notes when removing or working on or near trees and brush.

Flailing equipment is not allowed. Burning brush is not allowed in urban areas or on ROW. Use hand methods or other means of removal if doing work by mechanical methods is impractical.

Prior to begin tree pruning, send email confirmation to the Engineer that training and demonstration of work methods has been provided to the employees. All removal and pruning shall follow ANSI A300 Standards. This work is subsidiary.

Shredded vegetation may be blended, at a rate not to exceed 15 percent by volume, with Item 160 if the maximum dimension is not greater than 2 in.

Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. This work is subsidiary.

**Project Number:**

**Sheet: 5B**

**County: DeWitt**

**Control: 0913-17-044**

**Highway: Various**

**ITEM 6185: TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER  
ATTENUATOR (TA)**

Shadow vehicle(s) with TMA are set up for stationary and/or mobile operations. The contractor will be responsible for determining if operations will be ongoing at the same time to determine the total number of TMAs needed for the project.



# Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0913-17-044

DISTRICT Yoakum

COUNTY De Witt

HIGHWAY Various

CONTROL SECTION JOB				0913-17-044		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00187932			
COUNTY				De Witt			
HIGHWAY				Various			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	110-6003	EXCAVATION (SPECIAL)	CY	28.000		28.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	19.000		19.000	
	162-6002	BLOCK SODDING	SY	134.000		134.000	
	164-6001	BROADCAST SEED (PERM) (RURAL) (SANDY)	SY	255.000		255.000	
	168-6001	VEGETATIVE WATERING	MG	30.000		30.000	
	170-6006	IRRIGATION SYSTEM LOCATION A	LS	1.000		1.000	
	170-6007	IRRIGATION SYSTEM LOCATION B	LS	1.000		1.000	
	192-6002	PLANT MATERIAL (1-GAL)	EA	31.000		31.000	
	192-6003	PLANT MATERIAL (3-GAL)	EA	28.000		28.000	
	192-6004	PLANT MATERIAL (5-GAL)	EA	46.000		46.000	
	192-6014	PLANT SOIL MIX	CY	32.000		32.000	
	192-6015	LANDSCAPE EDGE	LF	353.000		353.000	
	192-6016	PLANT BED PREPARATION	SY	72.000		72.000	
	192-6024	PLANT MATERIAL (30 GAL) (TREE)	EA	6.000		6.000	
	423-6015	RETAINING WALL (SPECIAL)	SF	370.000		370.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3.000		3.000	
	752-6005	TREE REMOVAL (4" - 12" DIA)	EA	3.000		3.000	
	1005-6001	LOOSE AGGR FOR GROUND COVER (TYPE I)	CY	5.000		5.000	
	6185-6002	TMA (STATIONARY)	DAY	10.000		10.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	



## SUMMARY OF QUANTITIES

LOCATION	110 6003	132 6005	162 6002	164 6001	168 6001	170 6006	170 6007	192 6002	192 6003	192 6004	192 6014	192 6015	192 6016	192 6024	423 6015	752 6005	1005 6001	6185 6002
	EXCAVATION (SPECIAL)	EMBANKMENT (FINAL)(ORD COMP)(TY C)	BLOCK SODDING	BROADCAST SEED (PERM) (RURAL) (SANDY)	VEGETATIVE WATERING	IRRIGATION SYSTEM LOCATION A	IRRIGATION SYSTEM LOCATION B	PLANT MATERIAL (1-GAL)	PLANT MATERIAL (3-GAL)	PLANT MATERIAL (5-GAL)	PLANT SOIL MIX	LANDSCAPE EDGE	PLANT BED PREPARATION	PLANT MATERIAL (30 GAL) (TREE)	RETAINING WALL (SPECIAL)	TREE REMOVAL (4" - 12" DIA)	LOOSE AGGR FOR GROUND COVER (TYPE 1)	TMA (STATIONARY)
	CY	CY	SY	SY	MG	LS	LS	EA	EA	EA	CY	LF	SY	EA	SF	EA	CY	DAY
US 183 @ US 77A (LOCATION A)	28	19	101	255	20	1			20	41	32	265	39	6	370		3	
US 183 near CLINTON RD (LOCATION B)			33		10		1	31	8	5		88	33			3	2	
NOT SHOWN																		10
<b>PROJECT TOTALS</b>	<b>28</b>	<b>19</b>	<b>134</b>	<b>255</b>	<b>30</b>	<b>1</b>	<b>1</b>	<b>31</b>	<b>28</b>	<b>46</b>	<b>32</b>	<b>353</b>	<b>72</b>	<b>6</b>	<b>370</b>	<b>3</b>	<b>5</b>	<b>10</b>

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07/14/2022

### QUANTITY SUMMARY

CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY		SHEET NO.
YKM	DEWITT		7

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**BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:**

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

**WORKER SAFETY NOTES:**



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

**COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES**

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

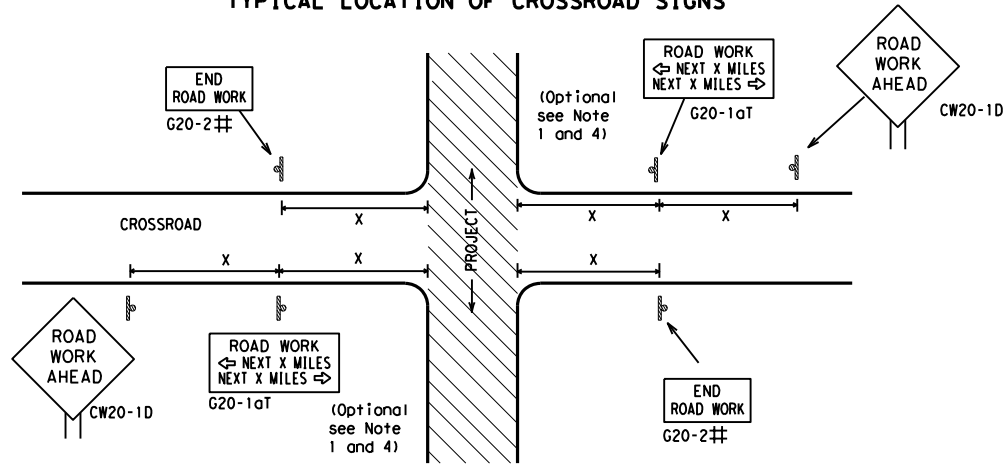
<p><b>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT</b>  <a href="http://www.txdot.gov">http://www.txdot.gov</a></p>
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS) "
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	
<p><b>BARRICADE AND CONSTRUCTION          GENERAL NOTES          AND REQUIREMENTS</b></p> <p><b>BC (1) -21</b></p>			
FILE:	bc-21.dgn	DN:	TxDOT
© TxDOT	November 2002	CK:	TxDOT
		DW:	TxDOT
		CK:	TxDOT
REVISIONS		CONT	SECT
4-03	7-13	0913	17
9-07	8-14		044
5-10	5-21		VARIOUS
		DIST	COUNTY
		YKM	DEWITT
			SHEET NO.
			8

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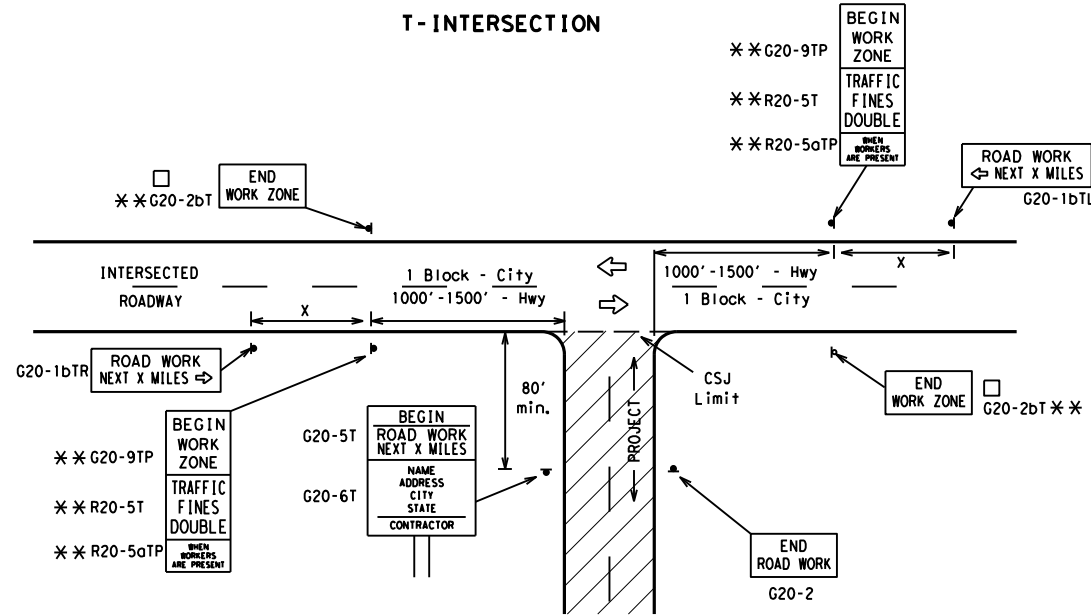
**TYPICAL LOCATION OF CROSSROAD SIGNS**



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

- 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.
- 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.
- 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.
- 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.
- Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
- 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**

- 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.
- 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<sup>1,5,6</sup>**

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 <sup>4</sup>	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500 <sup>2</sup>
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 <sup>2</sup>
			65	700 <sup>2</sup>
			70	800 <sup>2</sup>
			75	900 <sup>2</sup>
			80	1000 <sup>2</sup>
			*	* <sup>3</sup>

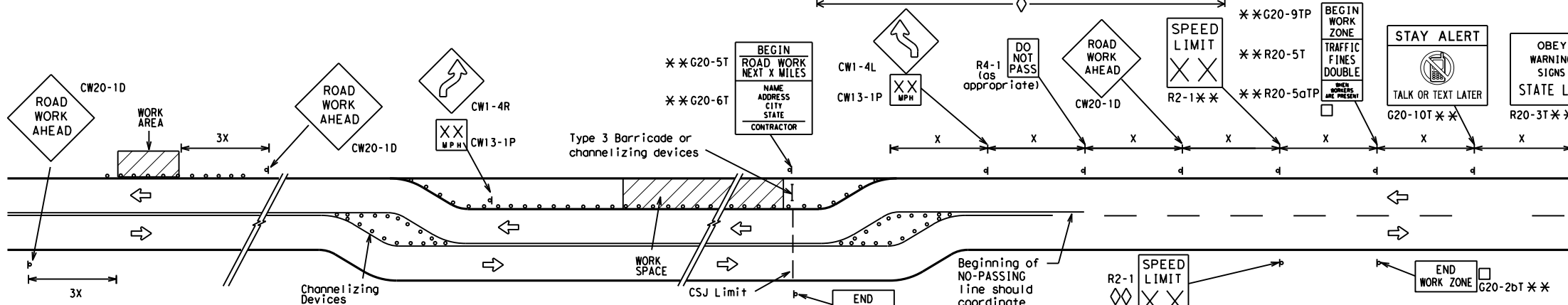
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

**GENERAL NOTES**

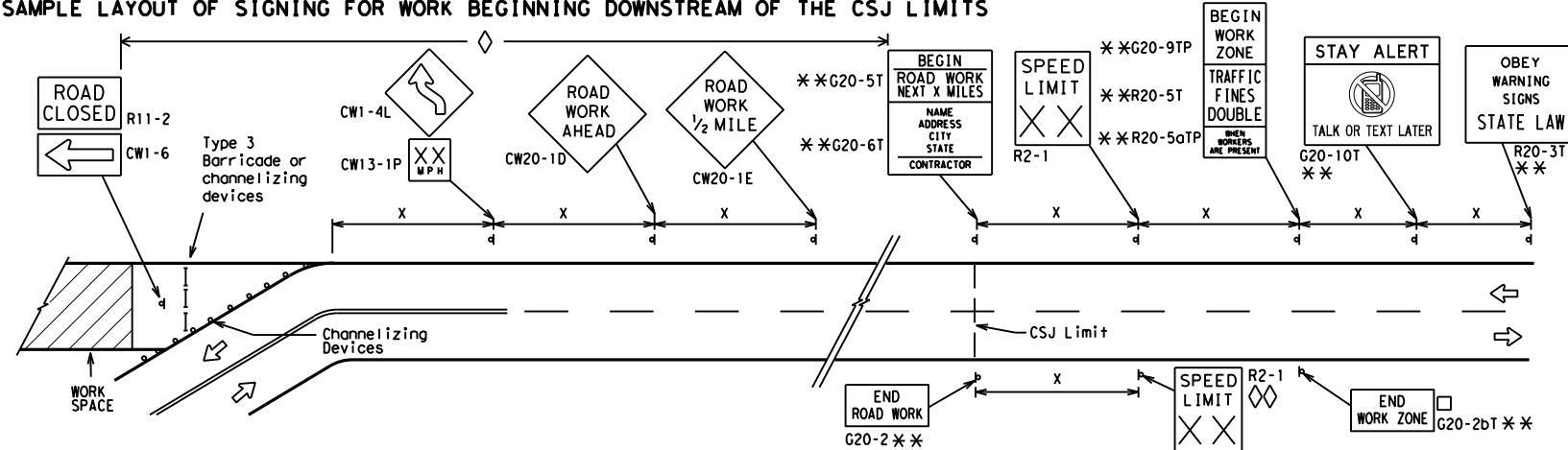
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be 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".
- Only diamond shaped warning sign sizes are indicated.
- 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**



**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.

SHEET 2 OF 12



**BARRICADE AND CONSTRUCTION PROJECT LIMIT**

**BC(2)-21**

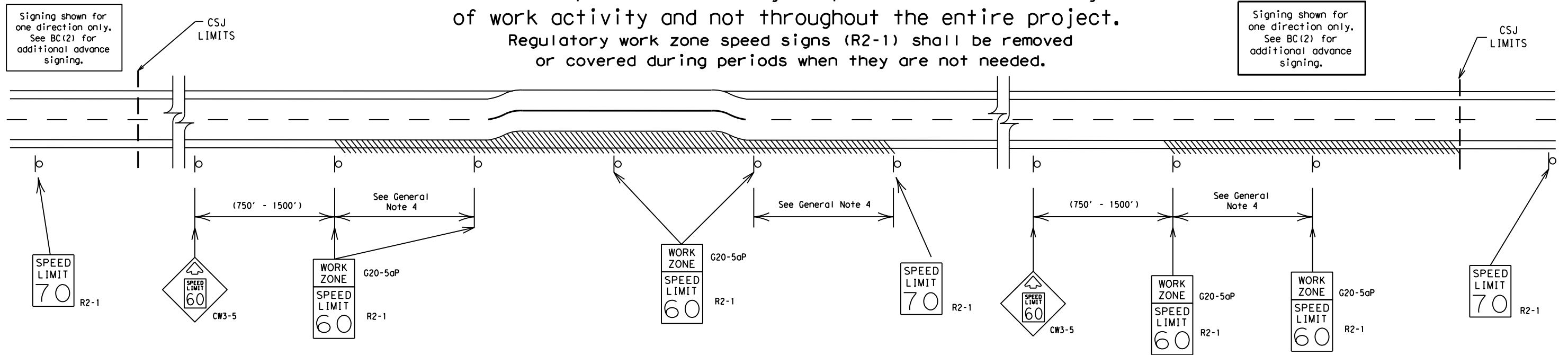
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- 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

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- 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
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- 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.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
  - Law enforcement.
  - Flagger stationed next to sign.
  - Portable changeable message sign (PCMS).
  - Low-power (drone) radar transmitter.
  - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- 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



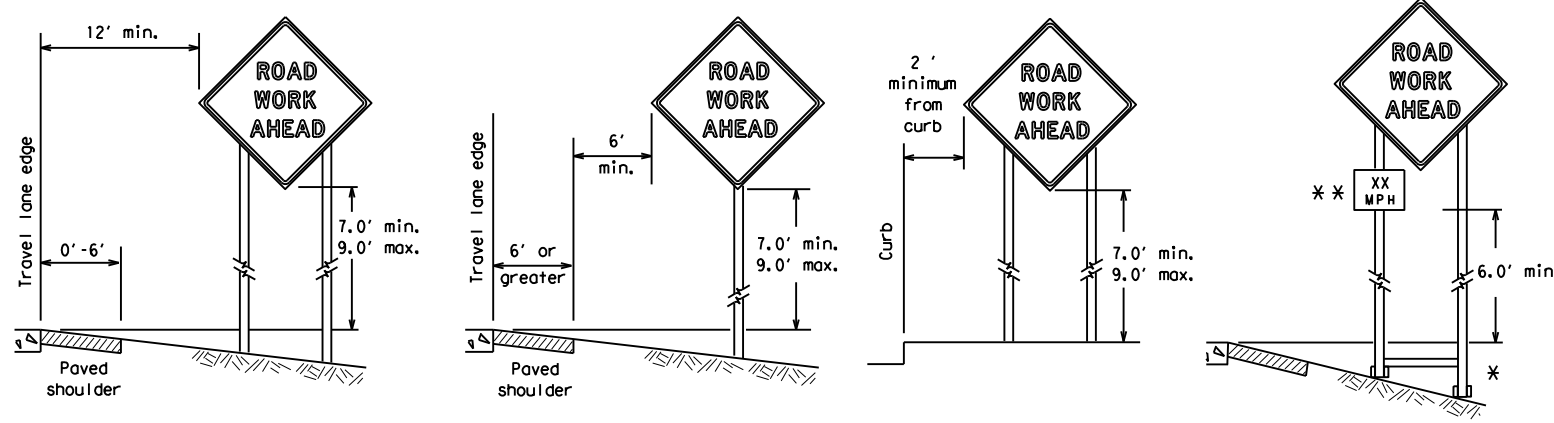
## BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 21

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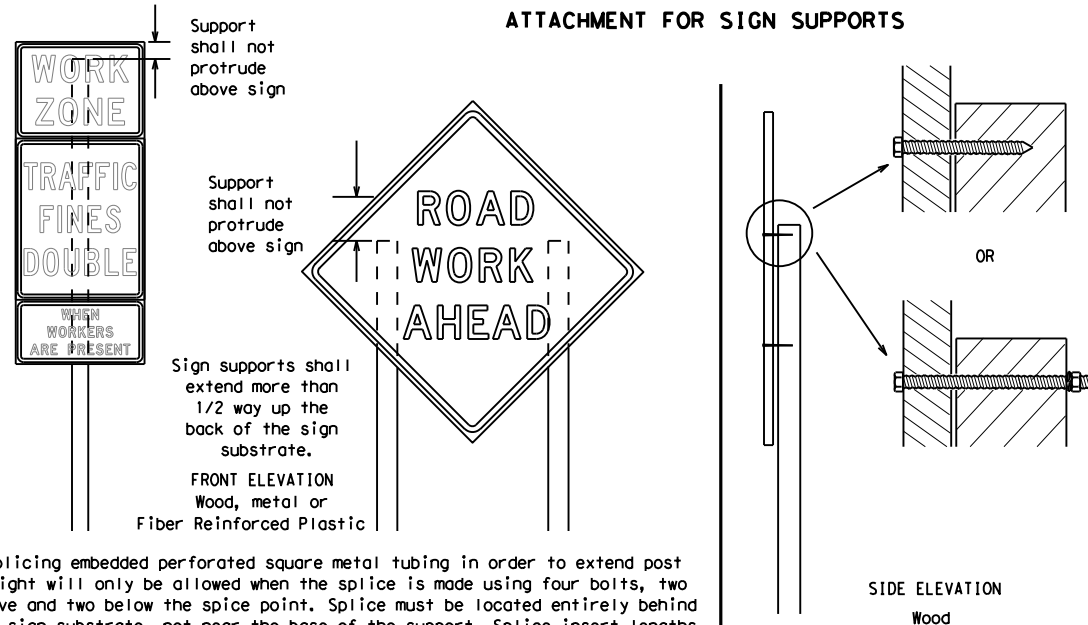
**TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS**



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

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

**ATTACHMENT FOR SIGN SUPPORTS**



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 splice 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.

**GENERAL NOTES FOR WORK ZONE SIGNS**

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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)**

- 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.
  - Long-term stationary - work that occupies a location more than 3 days.
  - 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.
  - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
  - Short, duration - work that occupies a location up to 1 hour.
  - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

**SIGN MOUNTING HEIGHT**

- 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.
- 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.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- 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.
- 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**

- 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**

- 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.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- 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**

- 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).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type B<sub>FL</sub> or Type C<sub>FL</sub>, shall be used for rigid signs with orange backgrounds.

**SIGN LETTERS**

- 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**

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

**SIGN SUPPORT WEIGHTS**

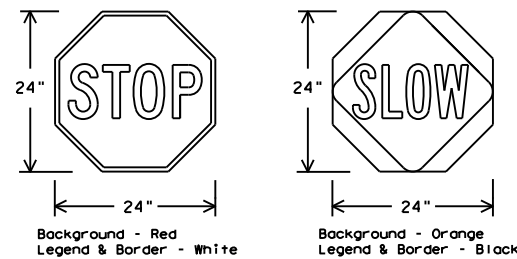
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- 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.
- 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.
- 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.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

**FLAGS ON SIGNS**

- 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.

**STOP/SLOW PADDLES**

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- STOP/SLOW paddles shall be retroreflectORIZED when used at night.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- 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 <sub>FL</sub> OR C <sub>FL</sub> 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**

- 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.
- 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.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- 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.
- 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.
- 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.

SHEET 4 OF 12



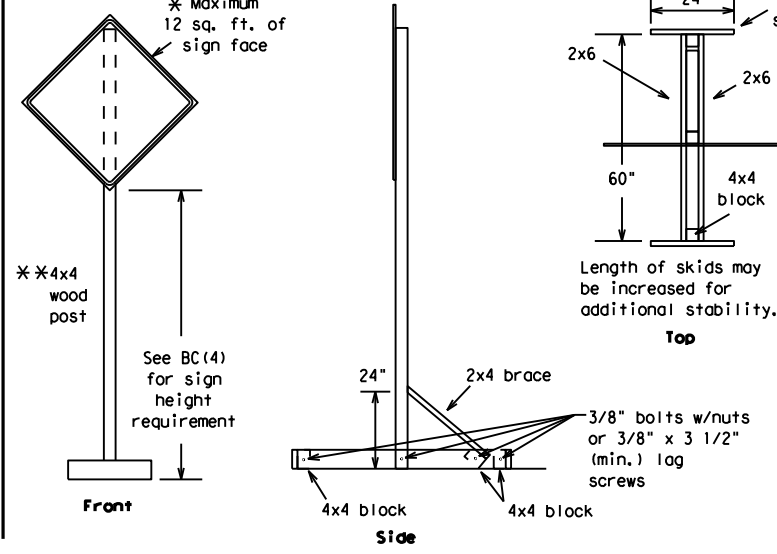
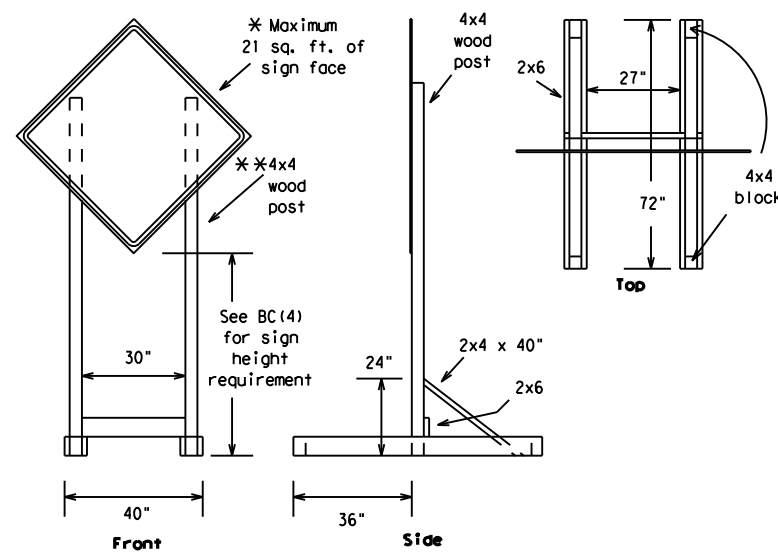
**BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES**

BC (4) -21

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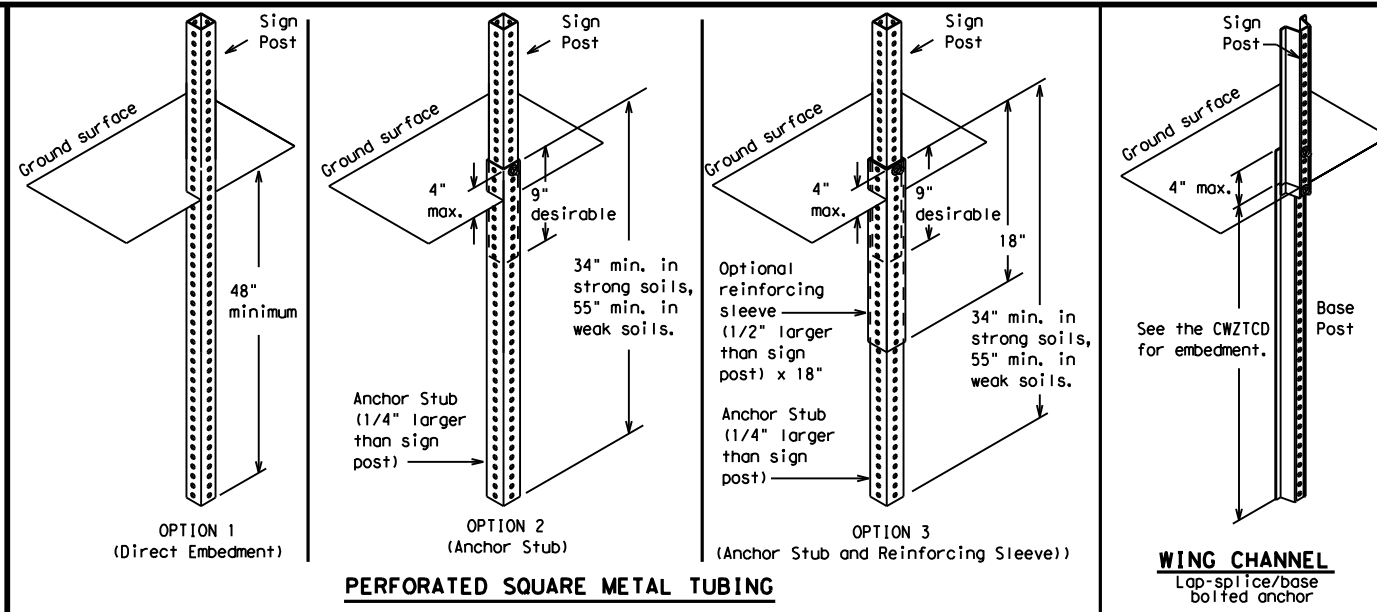
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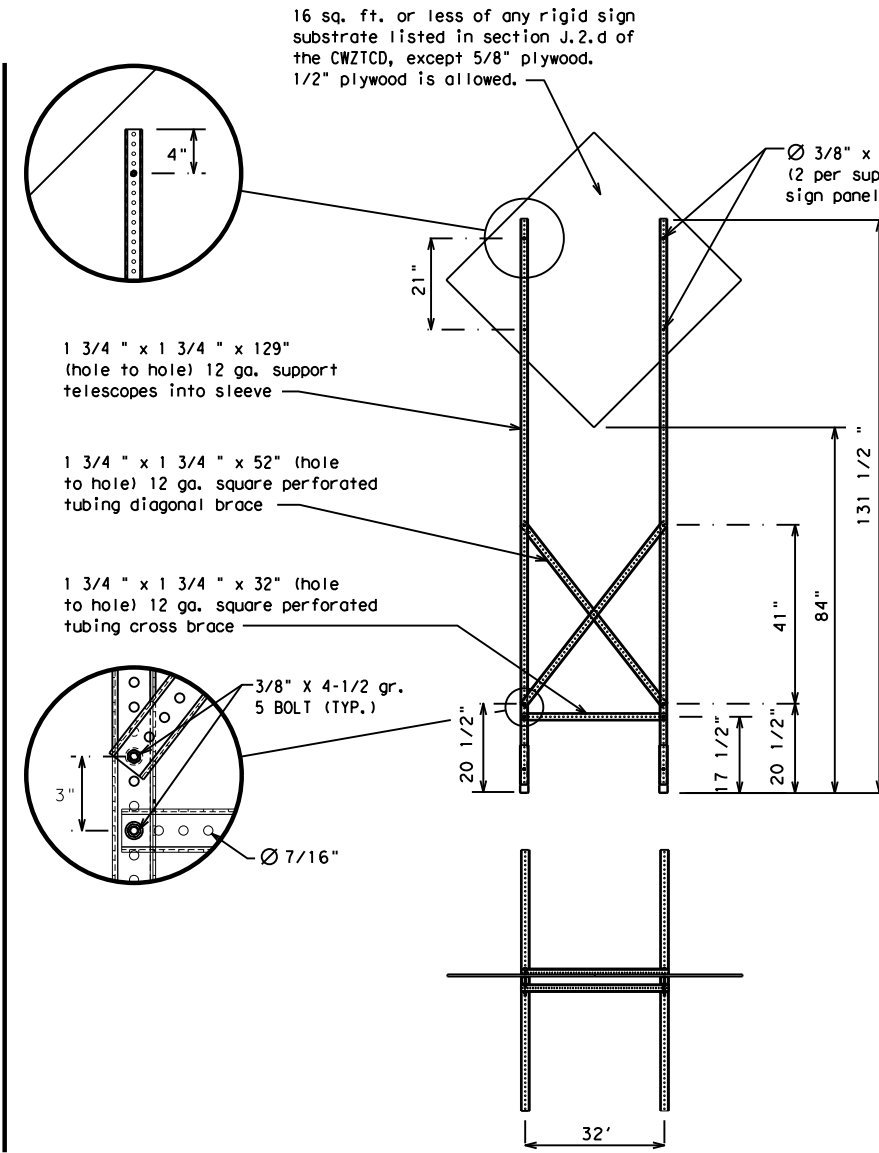
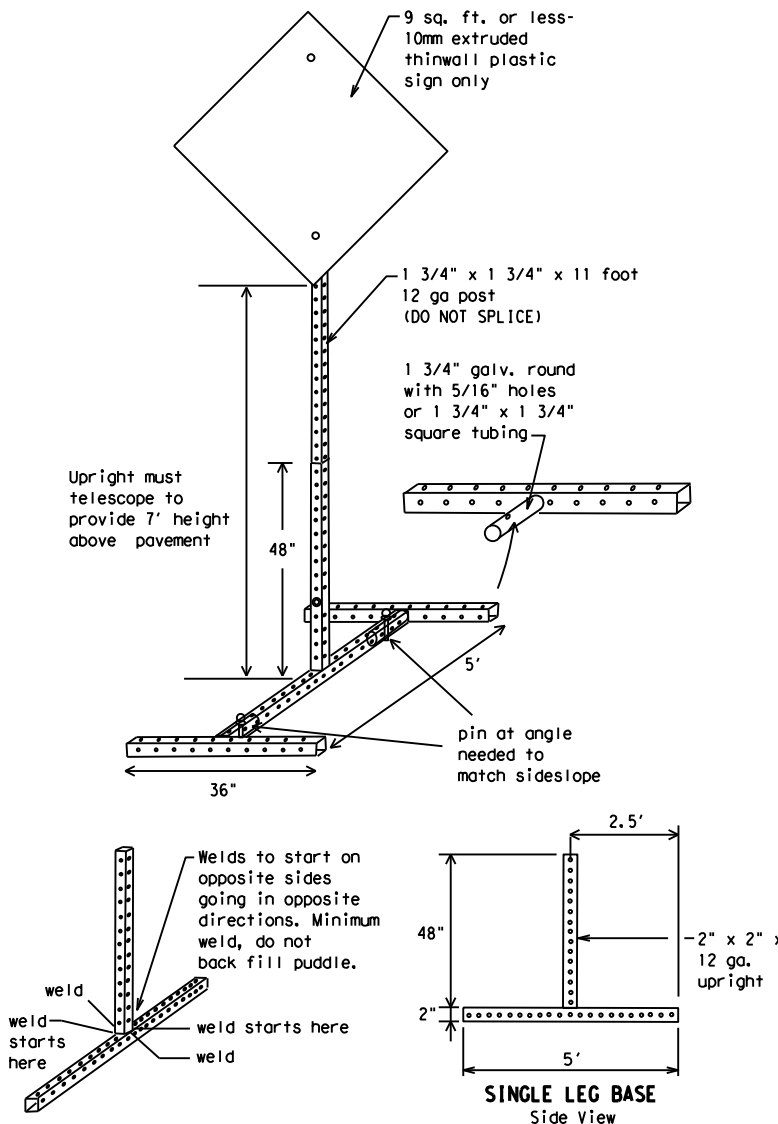
### SKID MOUNTED WOOD SIGN SUPPORTS

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



### GROUND MOUNTED SIGN SUPPORTS

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



### SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

### WEDGE ANCHORS

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

### OTHER DESIGNS

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

### GENERAL NOTES

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

- \* See BC(4) for definition of "Work Duration."
- \*\* Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
- See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



## 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

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

## PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- 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.
- 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.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- 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.
- 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.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- 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.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- 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.
- 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.
- Each line of text should be centered on the message board rather than left or right justified.
- 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.

## 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
XXXXXXXX TO XXXXXX
US XXX TO FM XXXX

### Warning List

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

### \*\* Advance Notice List

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

\*\* See Application Guidelines Note 6.

## APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- 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.
- 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

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- 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

- 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.
- 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.
- 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.
- 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.

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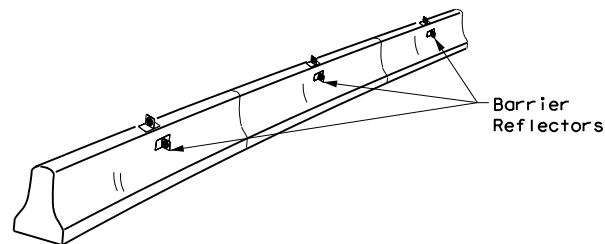
WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking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

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

<h3>BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)</h3>			
<h2>BC (6) - 21</h2>			
FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	OW: TxDOT
© TxDOT November 2002	CONT: 0913	SECT: 17	JOB: 044
REVISIONS		HIGHWAY: VARIOUS	
9-07	8-14	DIST: DEWITT	SHEET NO. 13
7-13	5-21		

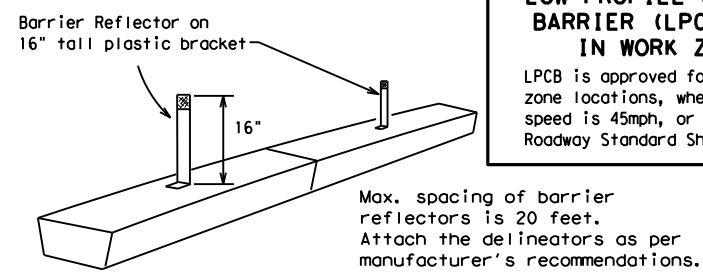
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



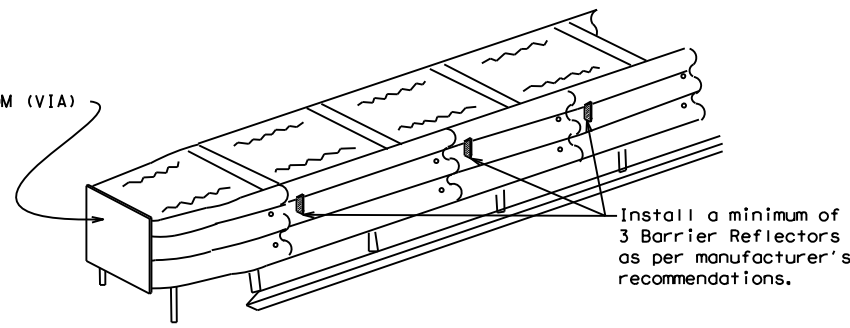
**CONCRETE TRAFFIC BARRIER (CTB)**

- 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.
- 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.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.



**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**

**WARNING LIGHTS**

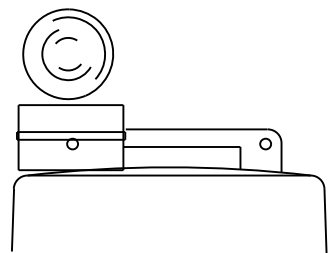
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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<sub>FL</sub> or C<sub>FL</sub> Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- 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".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- 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.
- 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.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

**WARNING LIGHTS MOUNTED ON PLASTIC DRUMS**

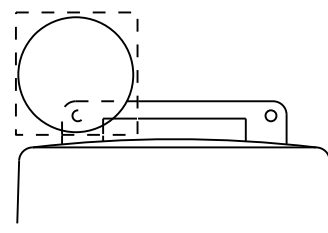
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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.
- 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.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- 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**

- 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.
- 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.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- 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.
- 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.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



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

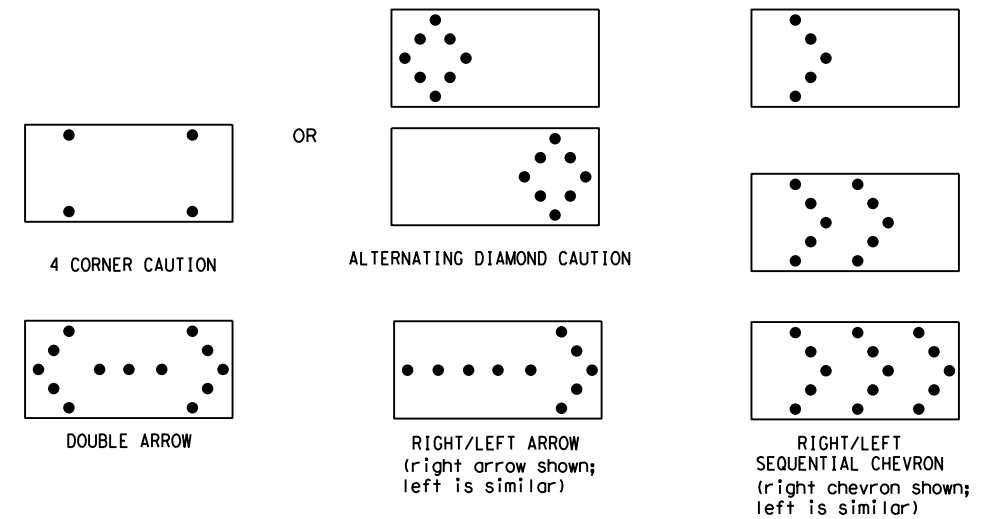


Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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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.

- 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.
- 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.
- 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.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- 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.
- 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.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- 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.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

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

**ATTENTION**  
 Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

**FLASHING ARROW BOARDS**

SHEET 7 OF 12

**TRUCK-MOUNTED ATTENUATORS**

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- 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.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



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

**BC (7) -21**

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	OW:	TxDOT	CR:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0913	17	044	VARIOUS				
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	YKM	DEWITT	14					



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**GENERAL NOTES**

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- 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.
- 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.
- 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).
- 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.
- 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:

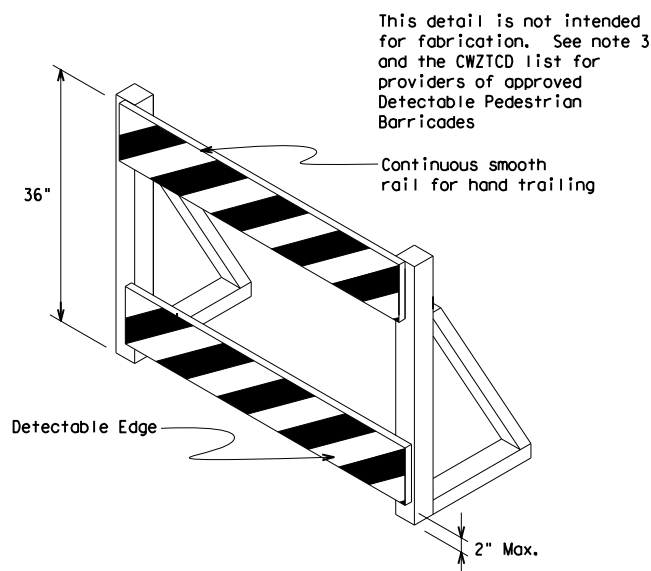
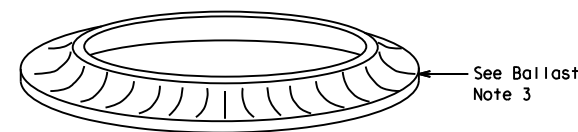
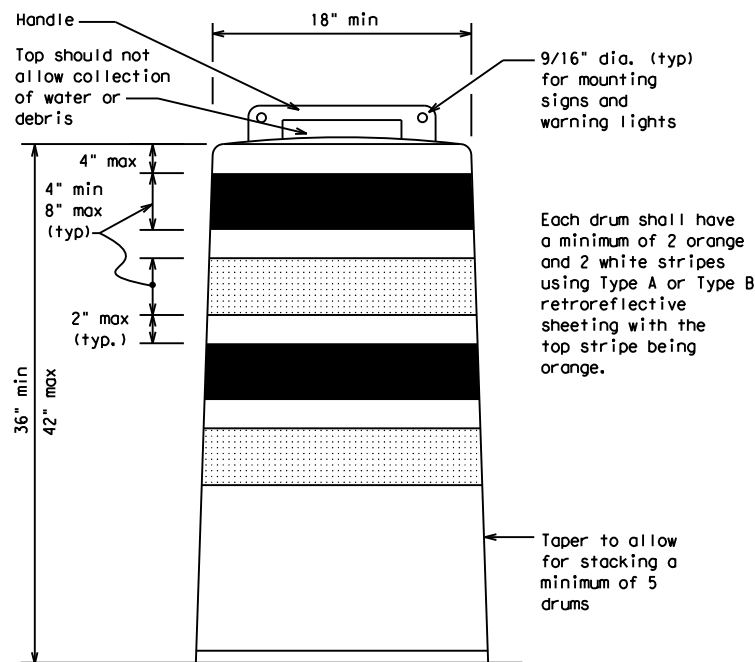
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- 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.
- 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.
- 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.
- 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.
- 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.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

**RETROREFLECTIVE SHEETING**

- 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.
- 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.

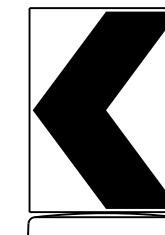
**BALLAST**

- 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.
- 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.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- 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.
- 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.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.

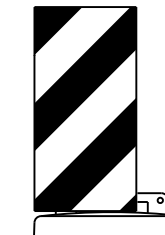


**DETECTABLE PEDESTRIAN BARRICADES**

- 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.
- 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.
- 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.
- 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.
- Warning lights shall not be attached to detectable pedestrian barricades.
- 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**

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B<sub>FL</sub> or Type C<sub>FL</sub> Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- 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.
- 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.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- 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.
- 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.

SHEET 8 OF 12



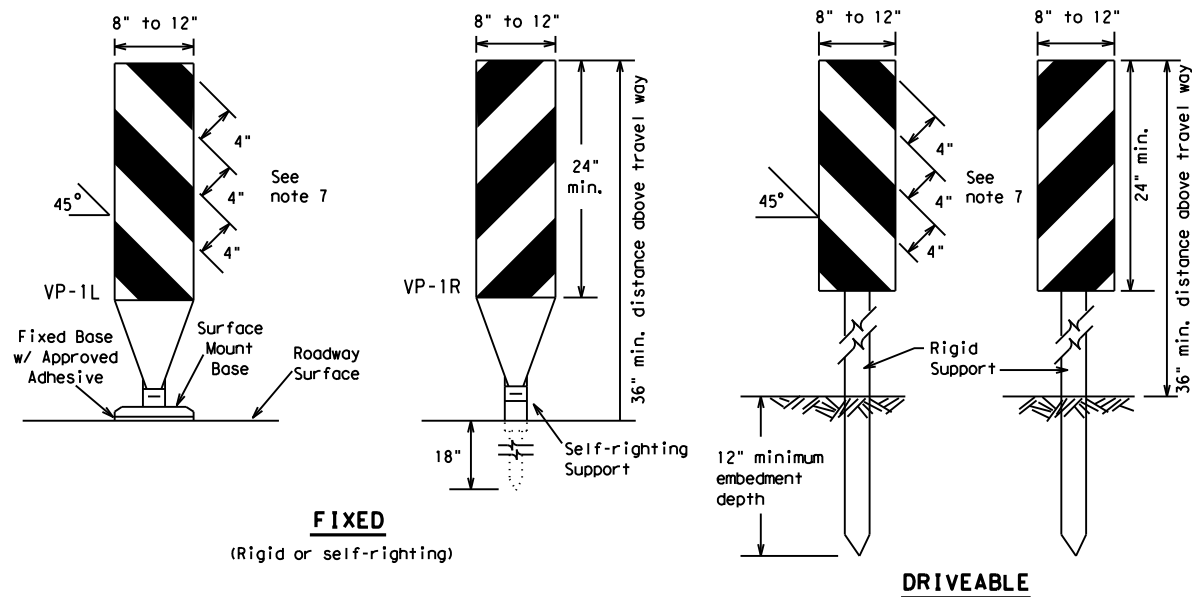
**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (8) - 21**

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CR:	TxDOT
© TxDOT	November 2002	CONT:		SECT:		JOB:		HIGHWAY:	
REVISIONS		0913	17	044	VARIOUS				
4-03	8-14								
9-07	5-21								
7-13									
		DIST:	YKM	COUNTY:	DEWITT	SHEET NO.		15	

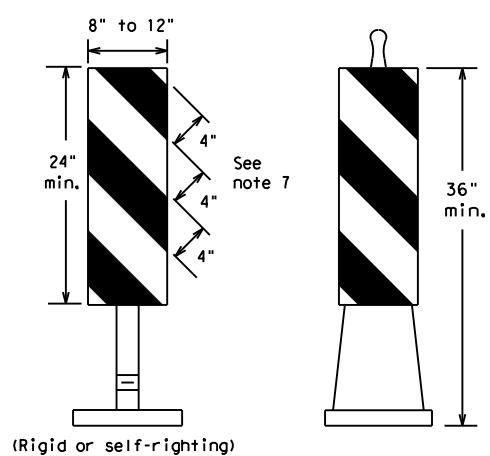
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**FIXED**  
(Rigid or self-righting)

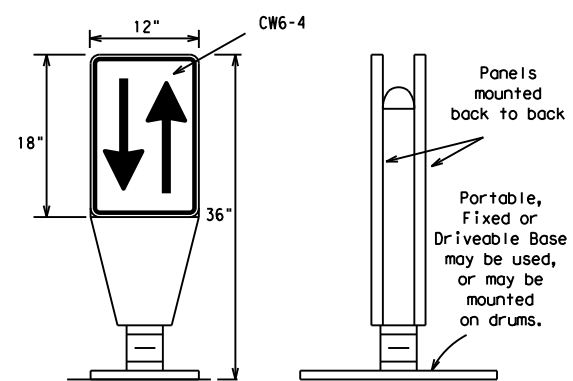
**DRIVEABLE**



**PORTABLE**

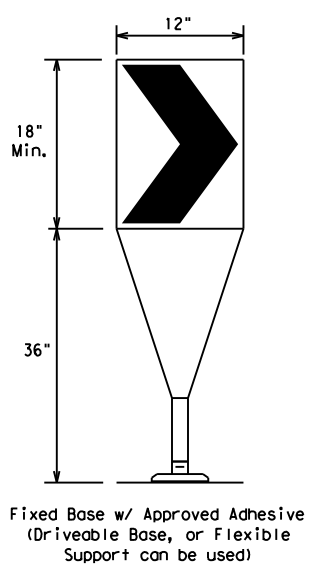
**VERTICAL PANELS (VPs)**

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- 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.
- 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.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



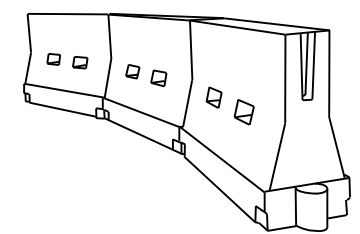
**OPPOSING TRAFFIC LANE DIVIDERS (OTLD)**

- 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.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B<sub>FL</sub> or Type C<sub>FL</sub> conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.



- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- 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.
- 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.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B<sub>FL</sub> or Type C<sub>FL</sub> conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- 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**



**LONGITUDINAL CHANNELIZING DEVICES (LCD)**

- 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.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- 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**

- 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.
- 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.
- 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.
- 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.
- 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**

**GENERAL NOTES**

- 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).
- 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.
- 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).
- 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.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- 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.
- 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.

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 = WS <sup>2</sup> / 60	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

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

**SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS**

SHEET 9 OF 12



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (9) - 21**

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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.



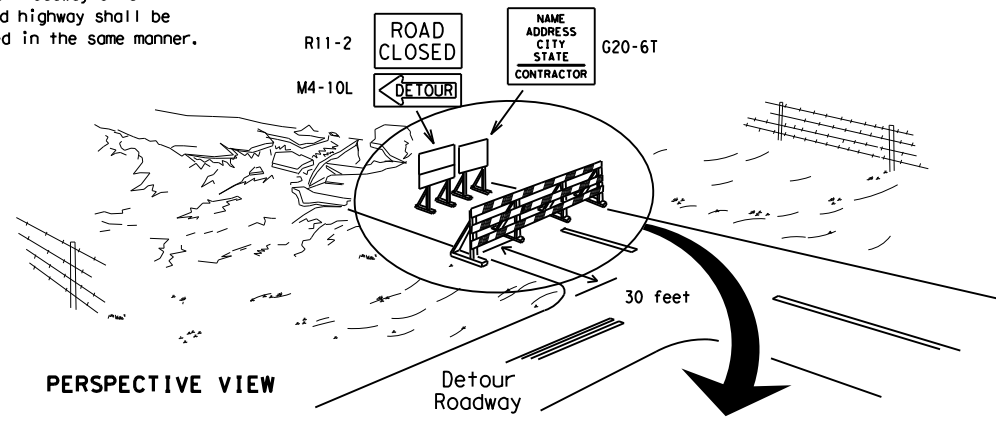
**TYPICAL STRIPING DETAIL FOR BARRICADE RAIL**



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

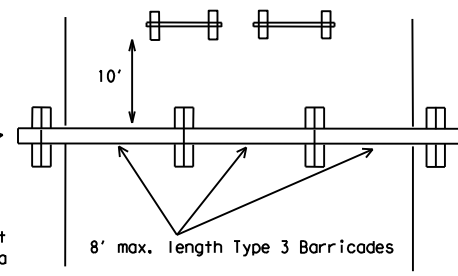
**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**

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



PERSPECTIVE VIEW

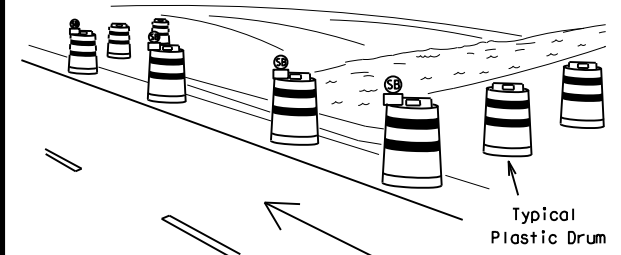
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



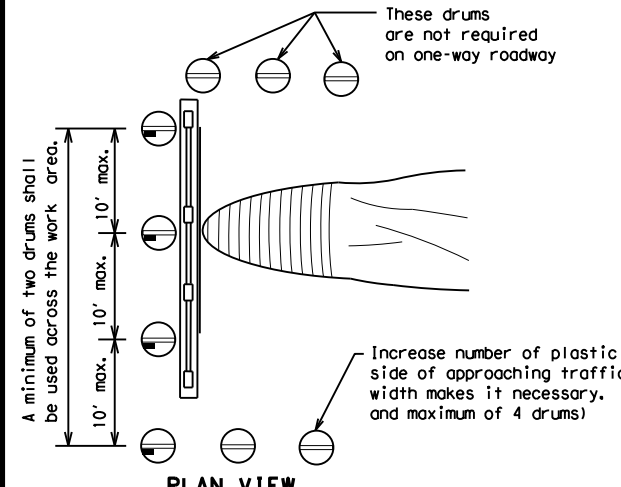
PLAN VIEW

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

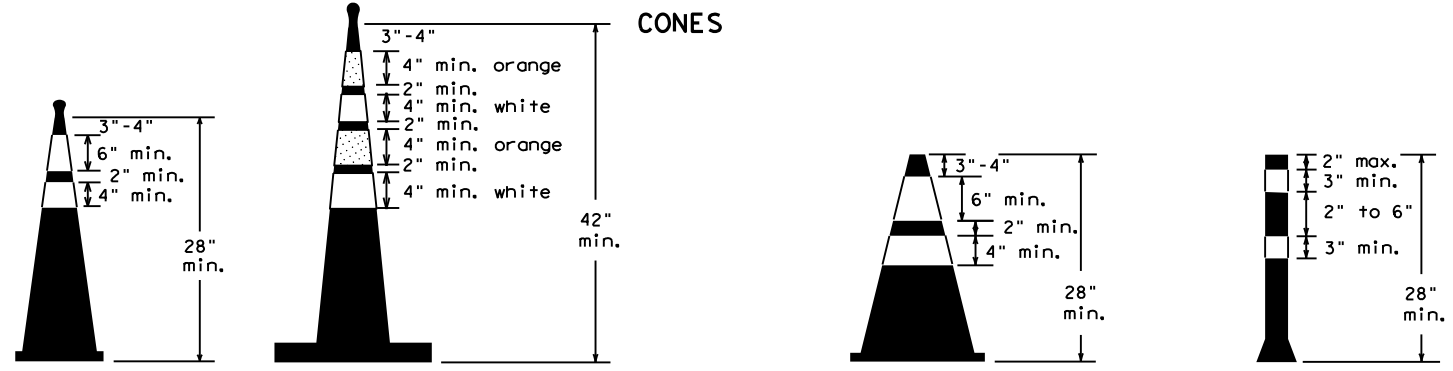


PLAN VIEW

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

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

**CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS**



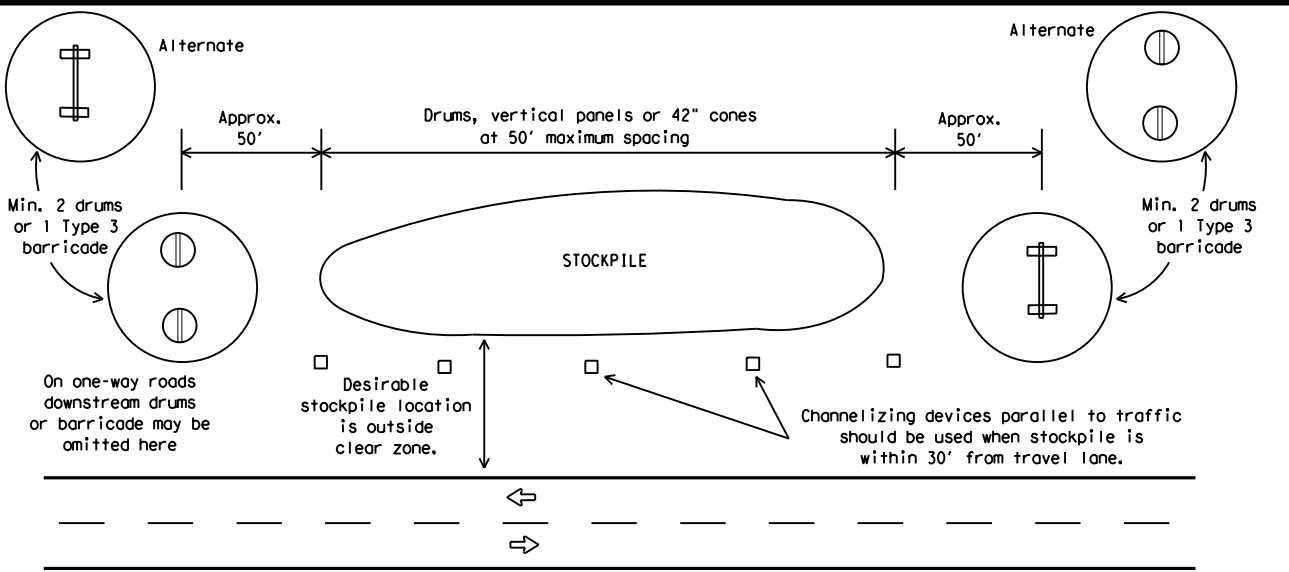
Two-Piece cones

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**



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (10) - 21**

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## WORK ZONE PAVEMENT MARKINGS

### GENERAL

- 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.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- 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).
- 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.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

### RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- 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

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

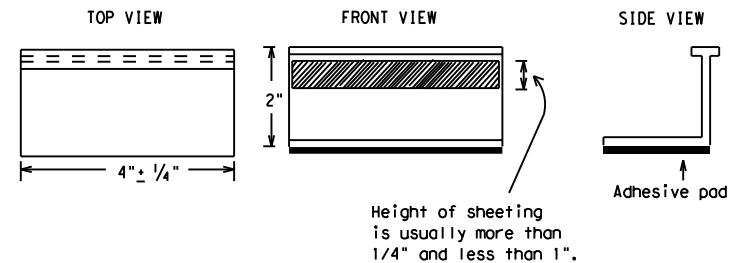
### MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- 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.
- 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.
- 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

- 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.
- 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.
- 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".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- 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.
- 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**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- 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.
  - 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.
  - 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.
- Small design variances may be noted between tab manufacturers.
- 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

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- 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).

SHEET 11 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

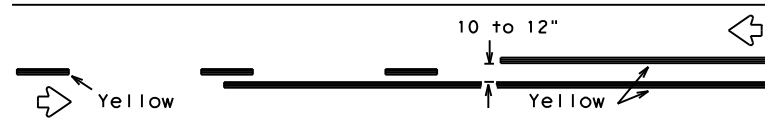
**BC(11)-21**

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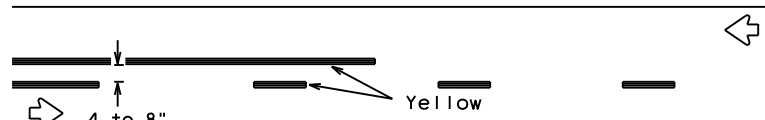
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## PAVEMENT MARKING PATTERNS

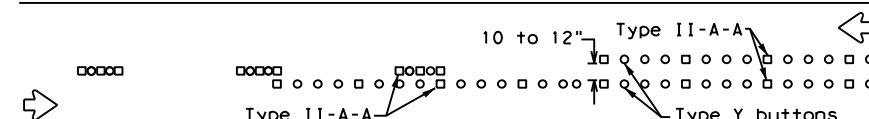


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

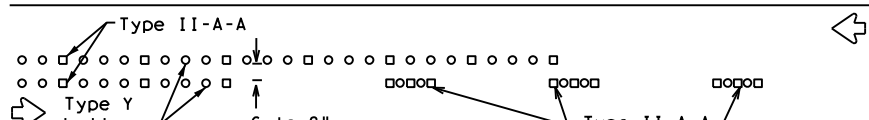


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.



RAISED PAVEMENT MARKERS - PATTERN A



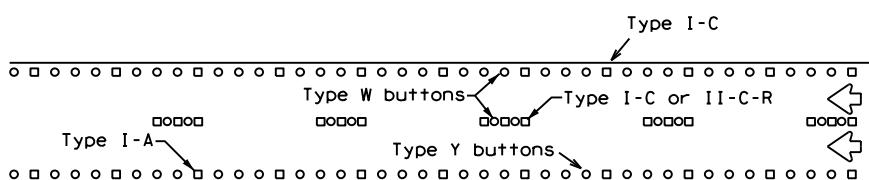
RAISED PAVEMENT MARKERS - PATTERN B

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



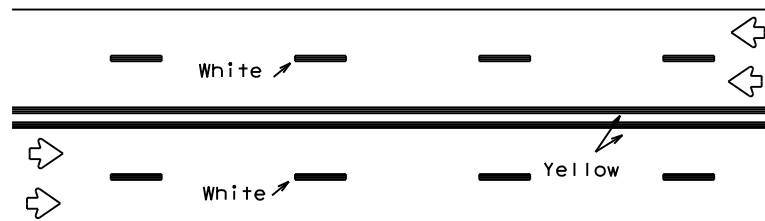
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



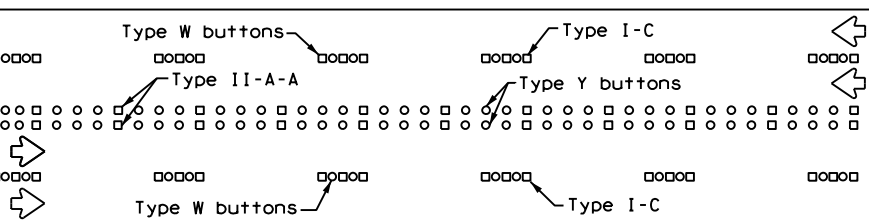
RAISED PAVEMENT MARKERS

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



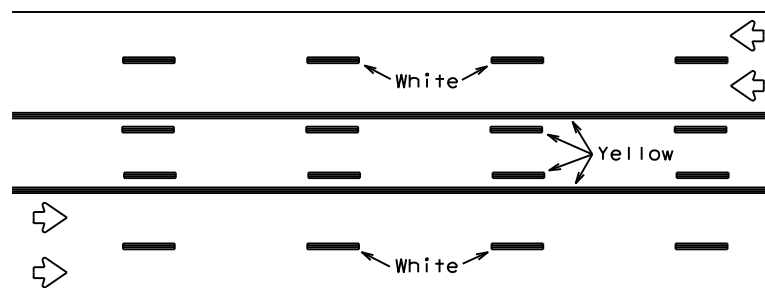
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



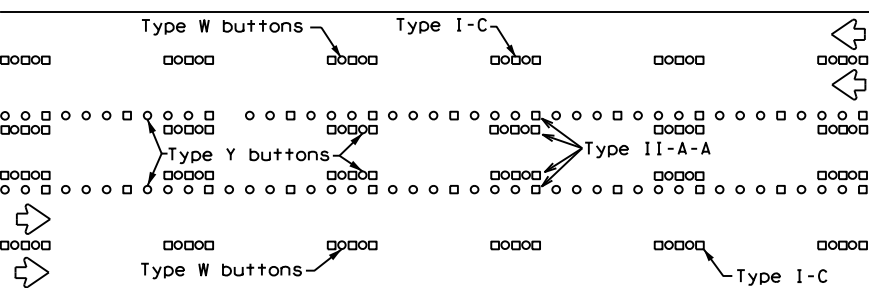
RAISED PAVEMENT MARKERS

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

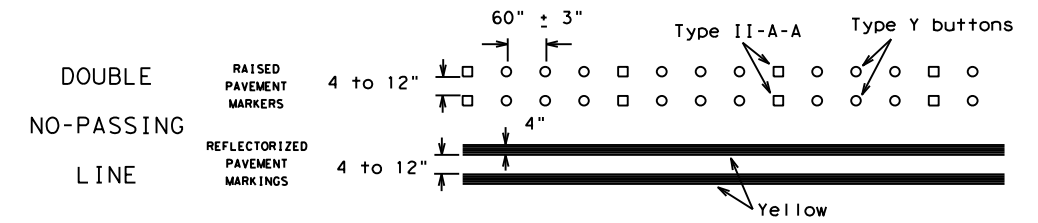
Prefabricated markings may be substituted for reflectORIZED pavement markings.



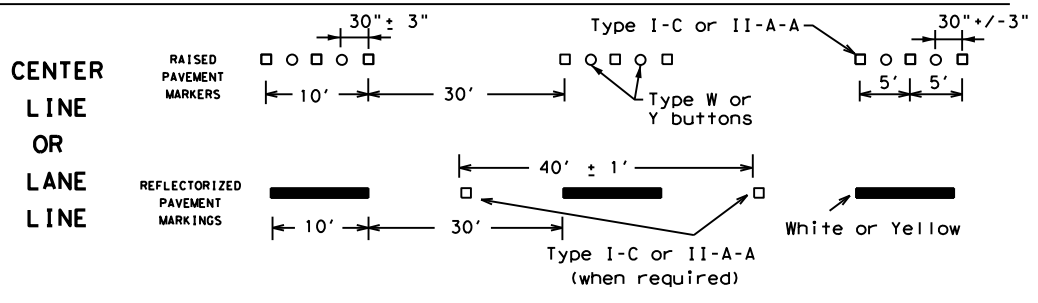
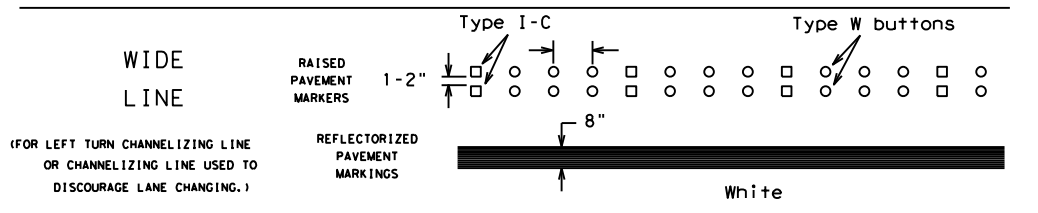
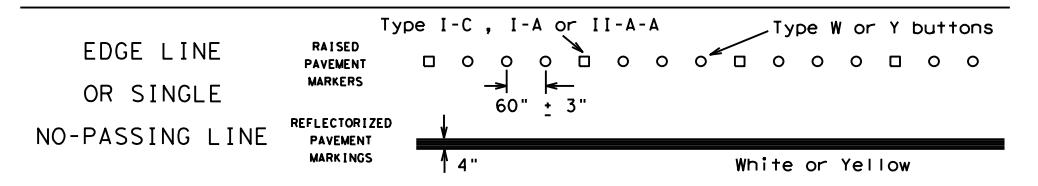
RAISED PAVEMENT MARKERS

## TWO-WAY LEFT TURN LANE

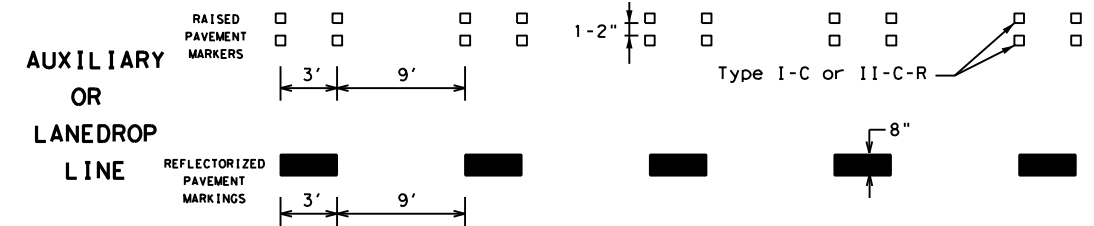
## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



### SOLID LINES

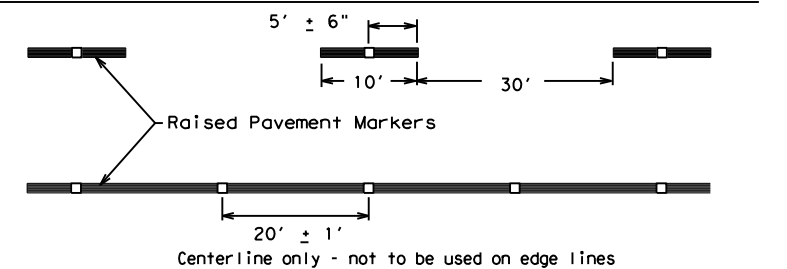


### BROKEN LINES



### 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.



SHEET 12 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

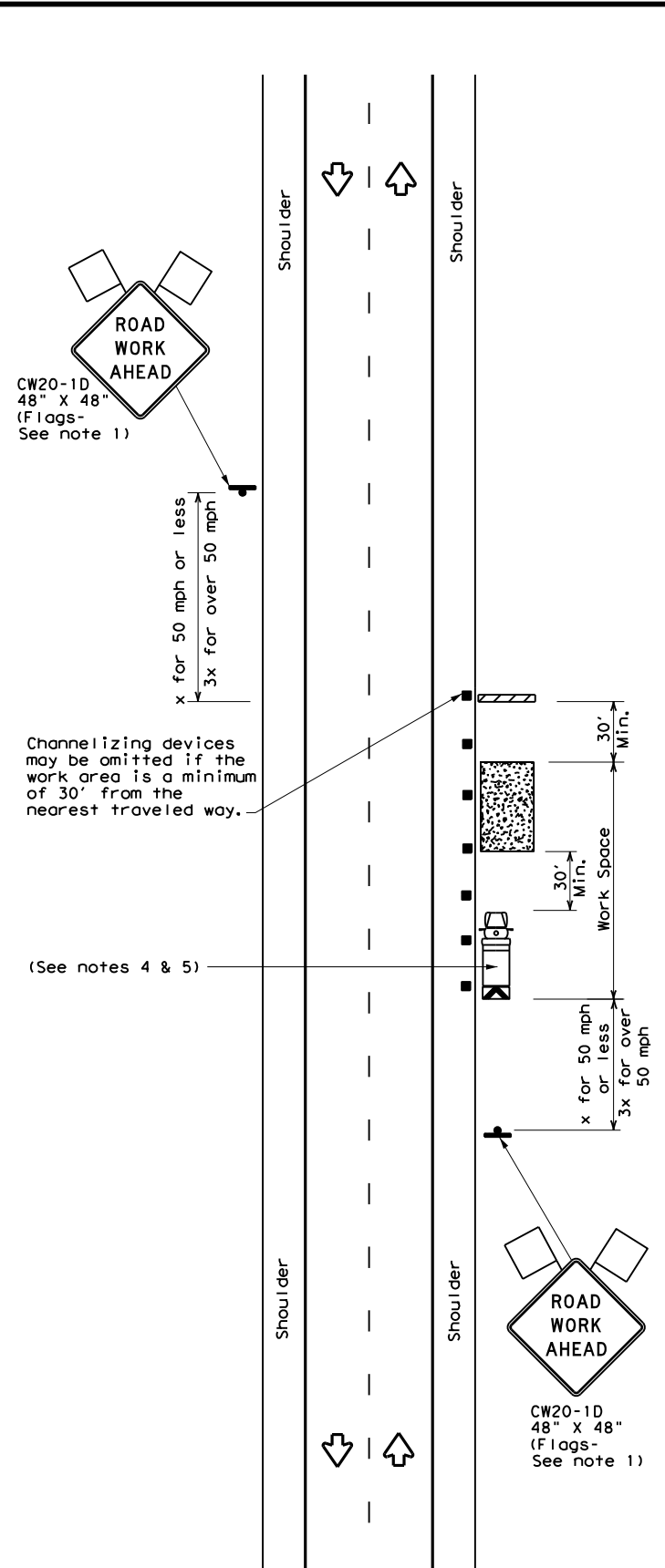
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©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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2-98 7-13	YKM	DEWITT	19	
11-02 8-14				

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DATE: FILE:

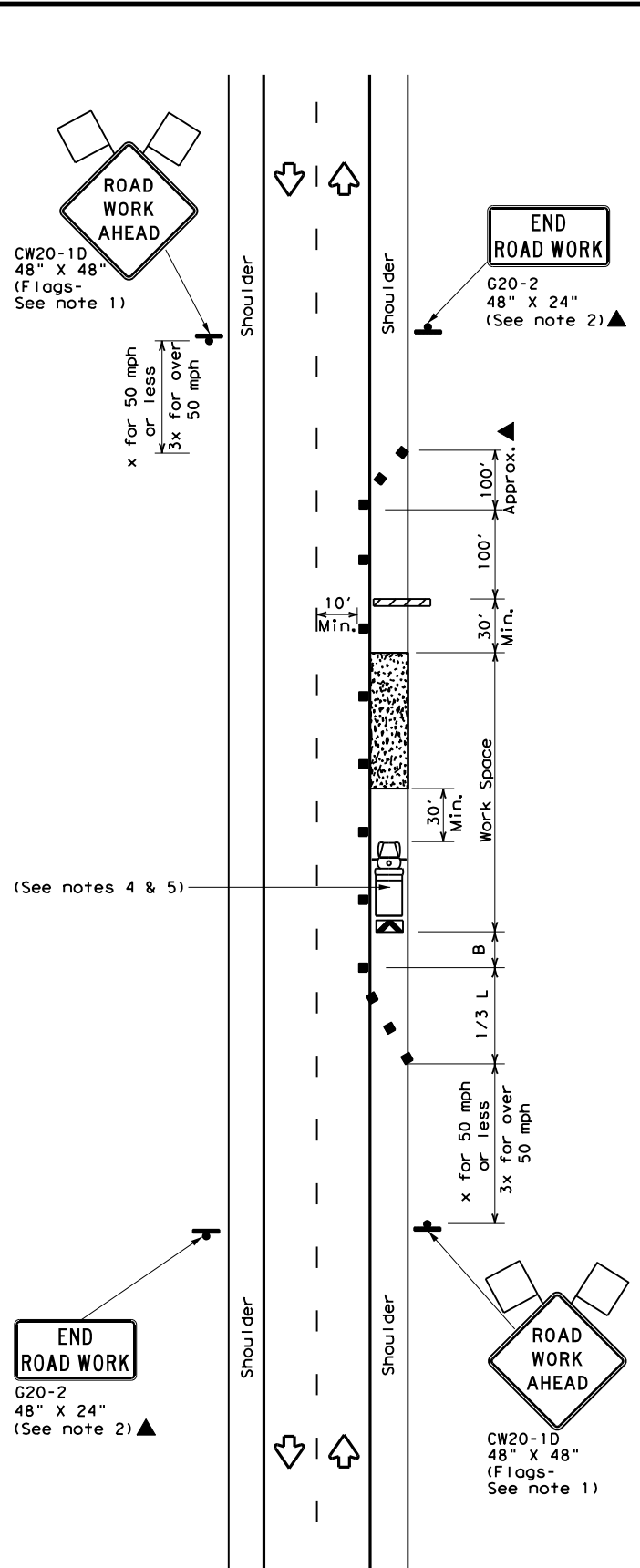
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:



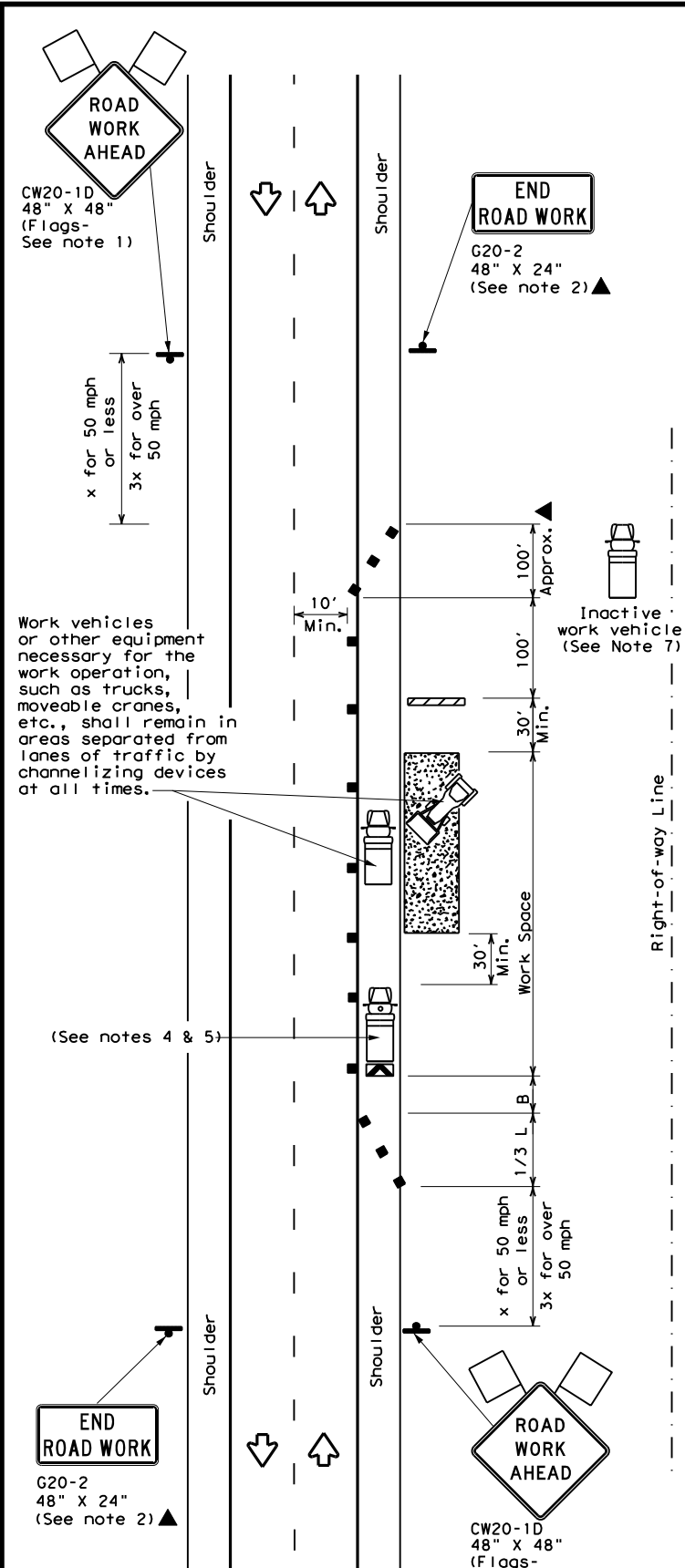
TCP (2-1a)

**WORK SPACE NEAR SHOULDER**  
Conventional Roads



TCP (2-1b)

**WORK SPACE ON SHOULDER**  
Conventional Roads



TCP (2-1c)

**WORK VEHICLES ON SHOULDER**  
Conventional Roads

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
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**

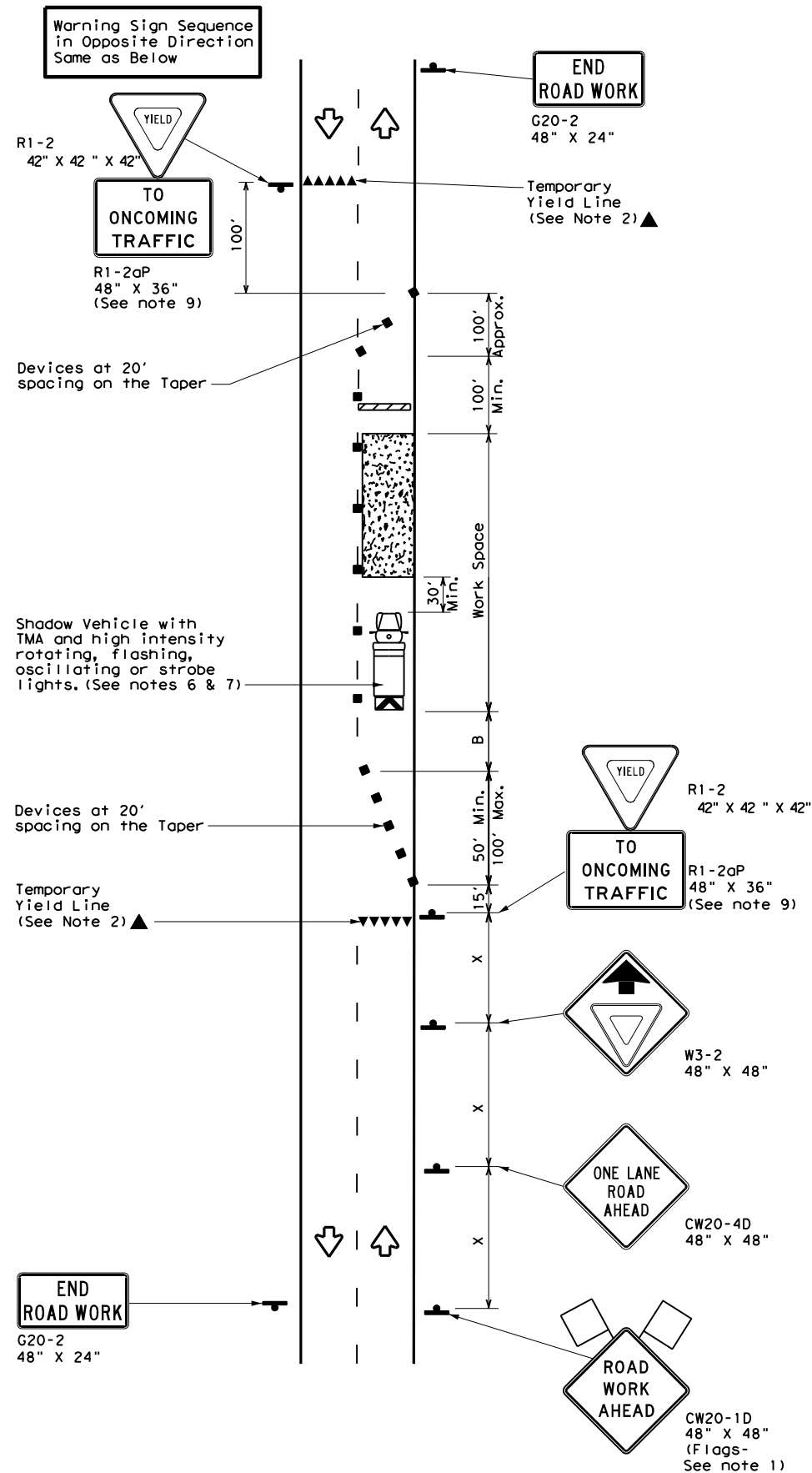
- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
- Stockpiled material should be placed a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

**TRAFFIC CONTROL PLAN**  
**CONVENTIONAL ROAD**  
**SHOULDER WORK**

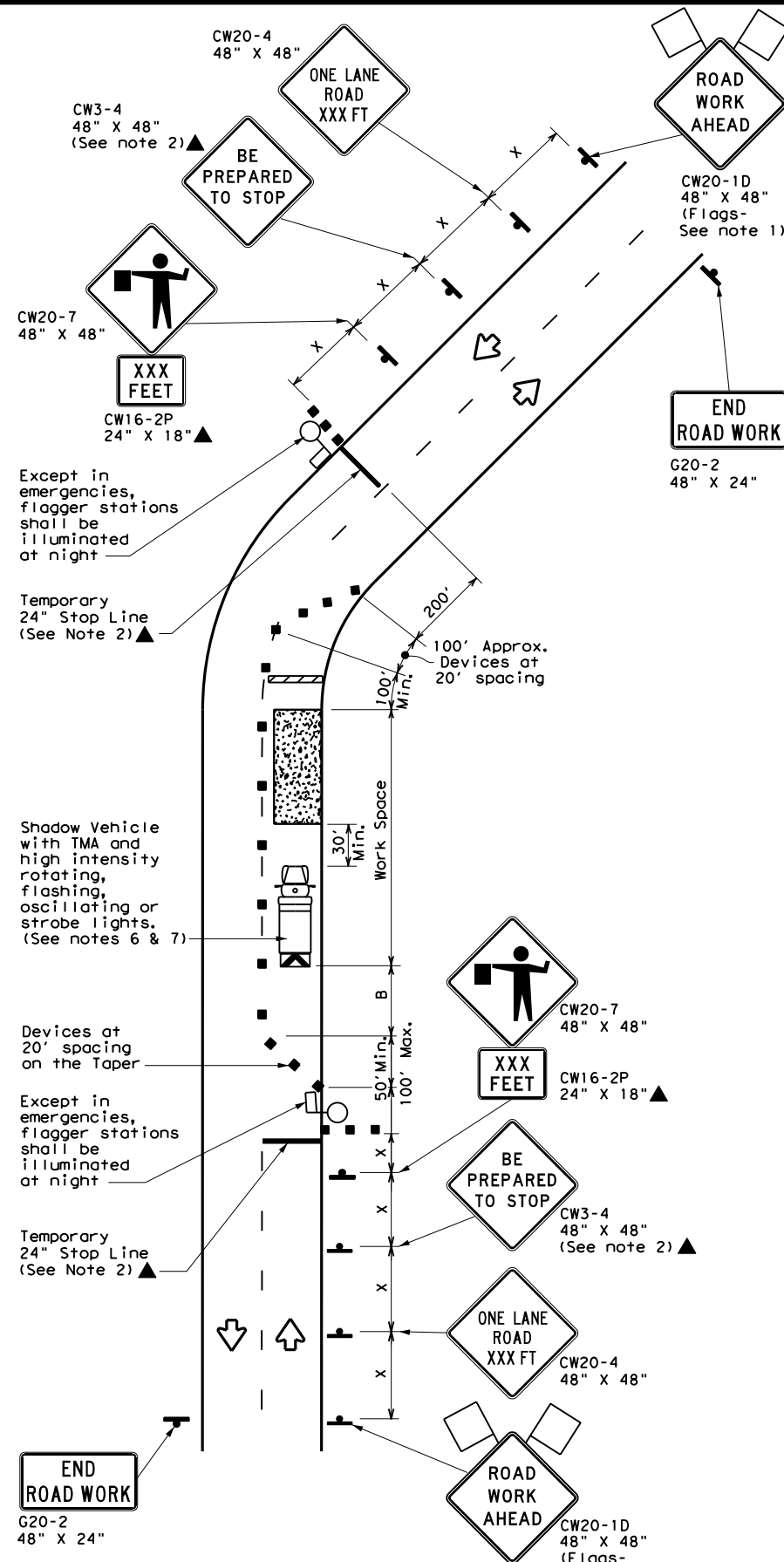
**TCP (2-1) - 18**

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	17	044	VARIOUS
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	YKM	DEWITT	20	
1-97 2-18				

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TCP (2-2a)  
2-LANE ROADWAY WITHOUT PAVED SHOULDERS  
ONE LANE TWO-WAY  
CONTROL WITH YIELD SIGNS  
(Less than 2000 ADT - See Note 9)



TCP (2-2b)  
2-LANE ROADWAY WITHOUT PAVED SHOULDERS  
ONE LANE TWO-WAY  
CONTROL WITH FLAGGERS

**LEGEND**

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

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

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

**TYPICAL USAGE**

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

**GENERAL NOTES**

- Flags attached to signs where shown, are REQUIRED.
  - 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.
  - The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
  - Flaggers should use two-way radios or other methods of communication to control traffic.
  - Length of work space should be based on the ability of flaggers to communicate.
  - 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.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-2a)**
- The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
  - The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.
- TCP (2-2b)**
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
  - If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
  - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation  
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN  
 ONE-LANE TWO-WAY  
 TRAFFIC CONTROL**

**TCP (2-2) - 18**

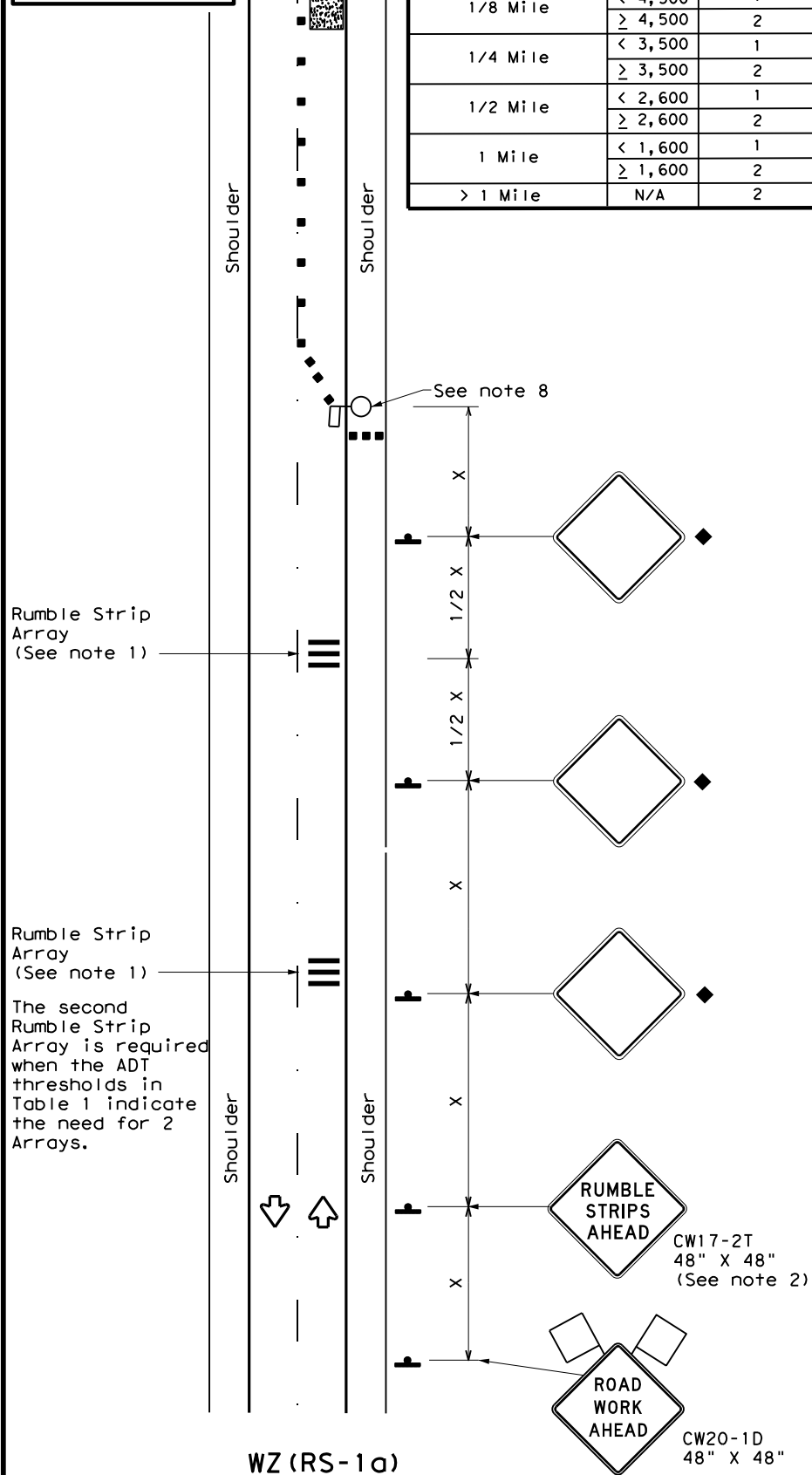
FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	17	044	VARIOUS
8-95 3-03	DIST	COUNTY	SHEET NO.	
1-97 2-12	YKM	DEWITT	21	
4-98 2-18				

DATE:  
FILE:

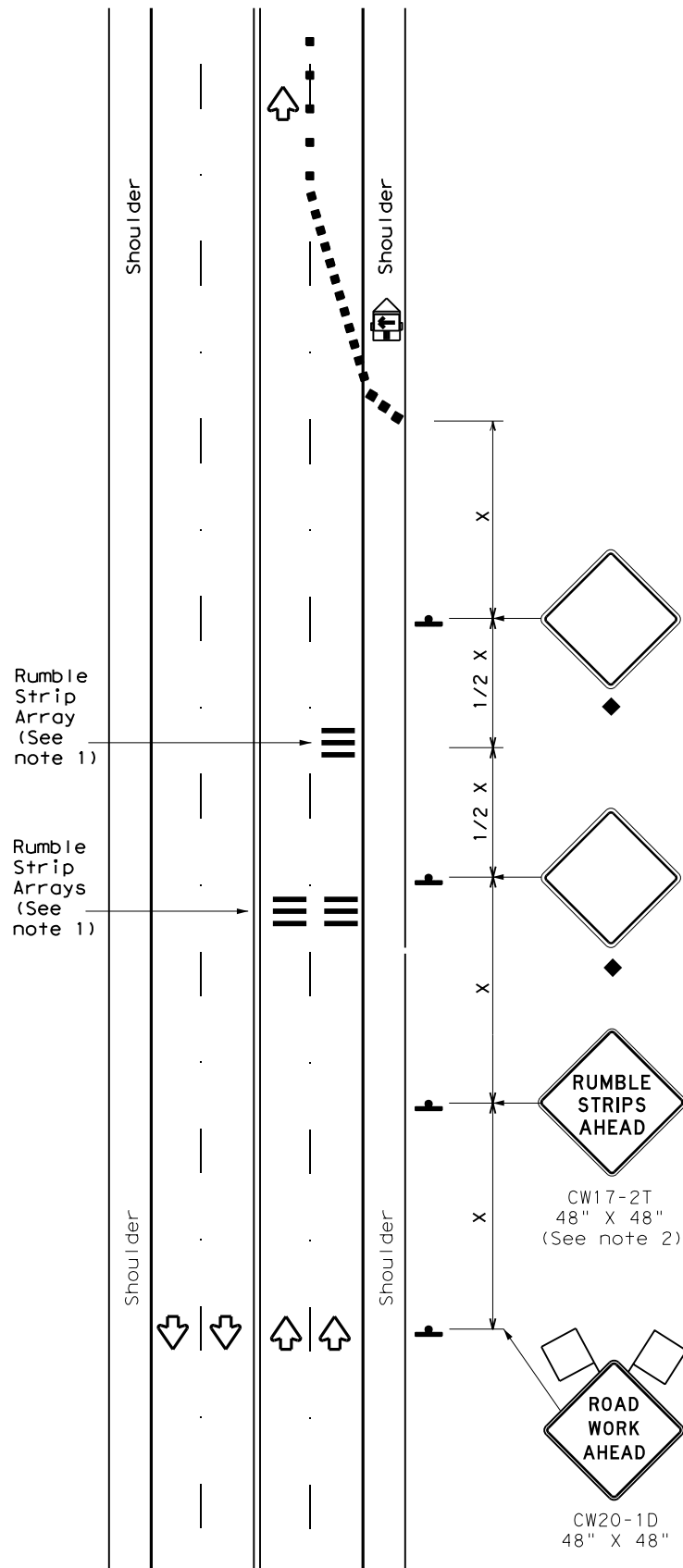
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Warning sign and rumble strip sequence in opposite direction is same as below.

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



**RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION**



**RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY**

**GENERAL NOTES**

- 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.
- 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.
- Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
- Remove Temporary Rumble Strips before removing the advanced warning signs.
- Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
- Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
- This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
- The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
- Replace defective Temporary Rumble Strips as directed by the Engineer.
- Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

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

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS/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)

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.

Texas Department of Transportation Traffic Safety Division Standard

## TEMPORARY RUMBLE STRIPS

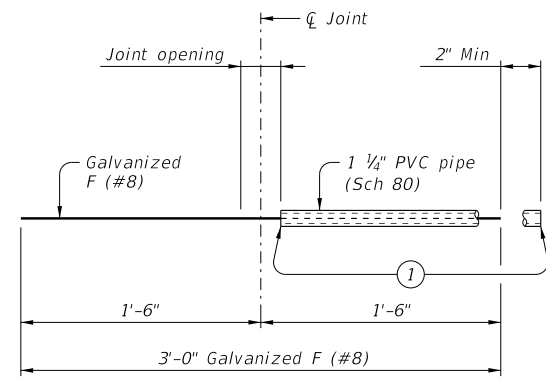
### WZ (RS) - 22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	17	044	VARIOUS
2-14 1-22	DIST	COUNTY	SHEET NO.	
4-16	YKM	DEWITT	22	

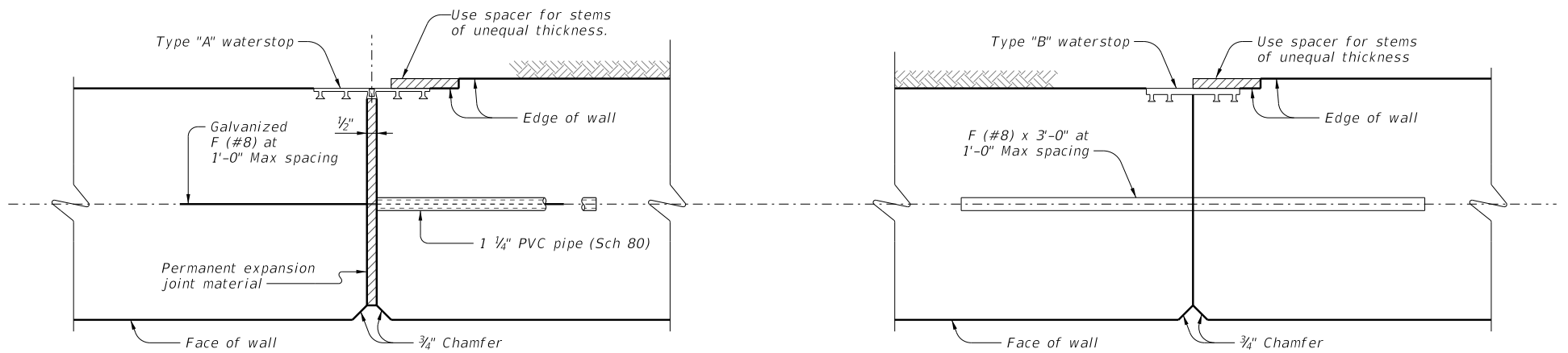
DATE: FILE:



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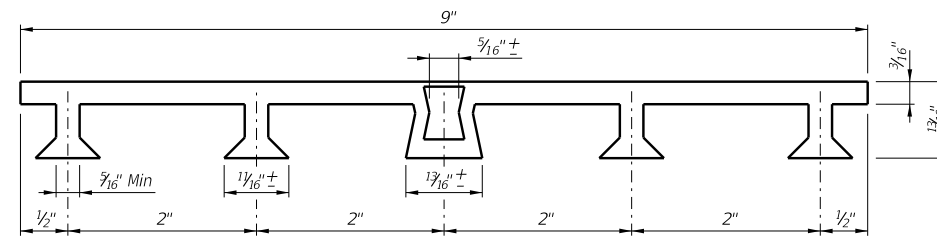


**BAR F (#8) ASSEMBLY DETAIL**



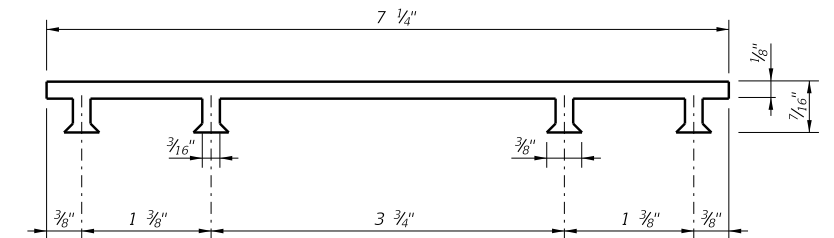
**EXPANSION JOINT**

**CONSTRUCTION JOINT**



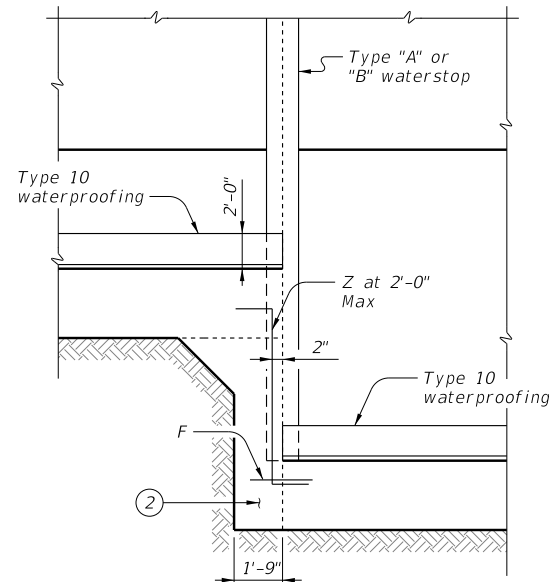
**PVC WATERSTOP TYPE "A"**

Note: Dimensions and shapes may vary slightly depending on manufacturer.

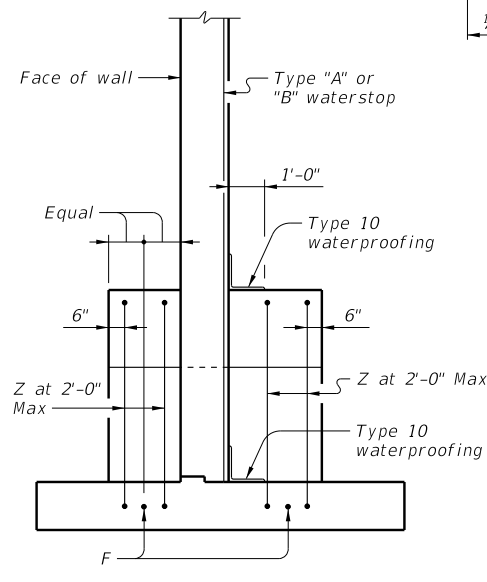


**PVC WATERSTOP TYPE "B"**

- ① Tape ends of 1 1/4" PVC Schedule 80 to prevent concrete or mortar from seeping in.
- ② Class C unreinforced concrete when difference in top of footing elevations is less than 2 feet. Omit when Dowel Bars F can be placed between adjacent footings with 4-inch cover top and bottom. Footing elevation difference not to exceed 4 feet.
- ③ Underdrain pipe to be in accordance with Item 556, "Pipe Underdrains."

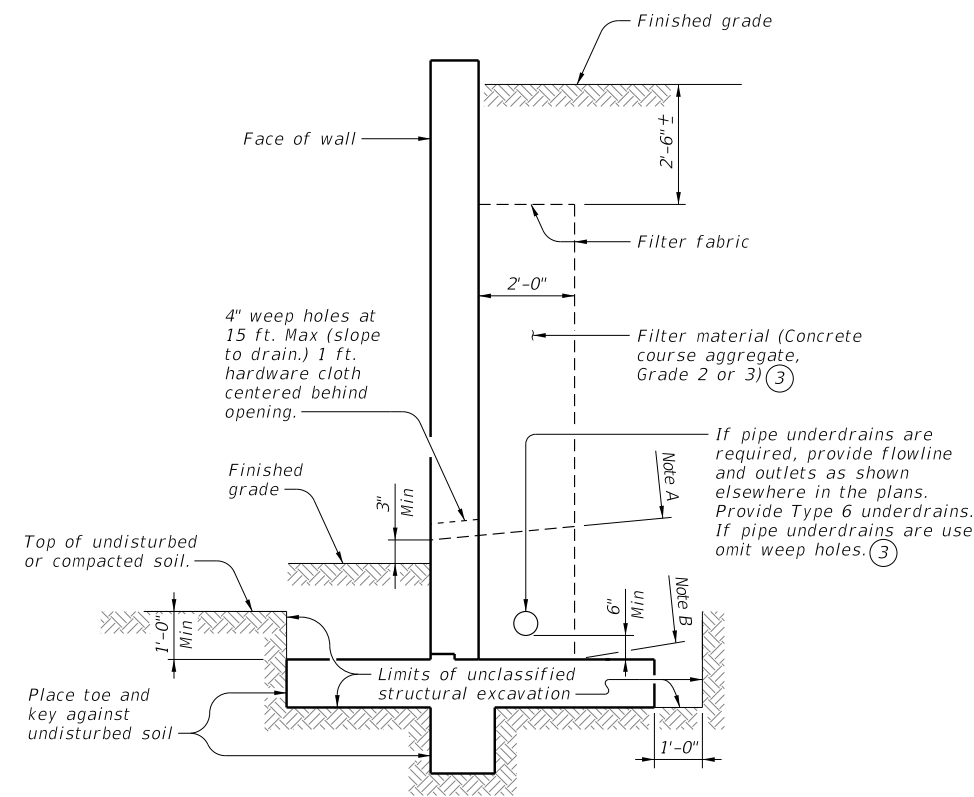


**PARTIAL ELEVATION**



**PARTIAL SECTION**

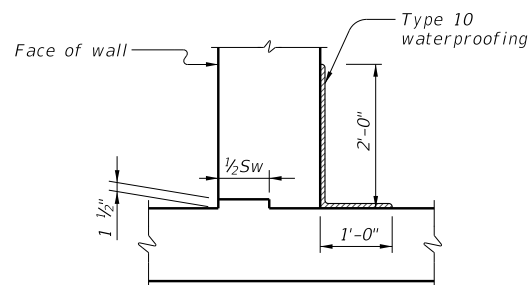
**SHOWING WATERSTOP AT FOOTING ELEVATION TRANSITION**



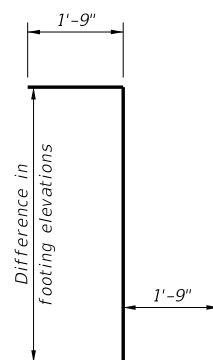
**DRAINAGE DETAILS AND EXCAVATION DIAGRAM**

Note A: Stop coarse aggregate at this level when weep holes are used.

Note B: Use coarse aggregate to here when underdrains are used.



**JOINT AND WATERSTOP DETAILS**



**BARS Z (#5)**

(Omit Bars Z when difference in top of footing elevations is less than 2 ft.)

**MATERIAL NOTES:**

Provide Class C concrete ( $f'c=3,600$  psi.)  
Provide Grade 60 reinforcing steel.

**GENERAL NOTES:**

Designed according to AASHTO LRFD Bridge Design Specifications.  
Walls are designed assuming unit weight of soil = 120 pcf and a friction angle = 30 degrees for foundation and retained soil.  
The undisturbed or compacted soil depth in front of walls must not measure less than  $K_d + F_t + 1$  foot as measured upwards from bottom of key.  
Retaining walls are detailed to be placed on grades up to 10% with level footing, with no changes in reinforcing steel. Steeper grades can be accommodated by shortening Bars A and Bars B and increasing the length of legs of Bars U by the same amount. No change in quantities will be required.  
Retaining walls may be placed on horizontal curves by adjusting lengths of Bars T and Bars H in the footing. Minor revisions to concrete quantities may be required as a result.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



**SPREAD FOOTING RETAINING WALL MISCELLANEOUS DETAILS**

**RW(SF)**

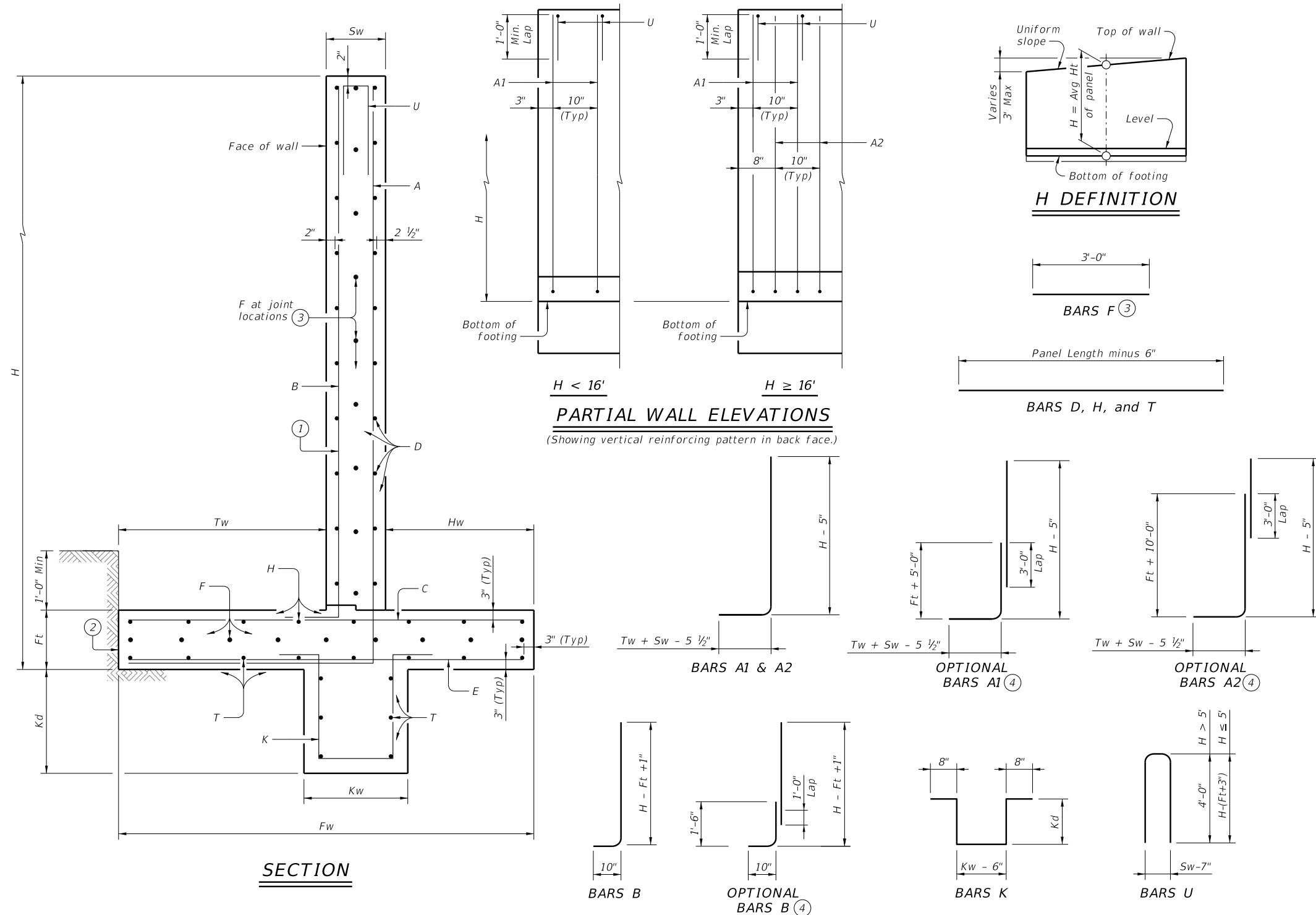
FILE: RW-SF-22.dgn	DN: TAR	CK: RLE	DW: JER	CK: TAR
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	17	044	VARIOUS
8-22: Updated underdrain requirements.	DIST	COUNTY	SHEET NO.	
	YKM	DEWITT	23	

DATE: FILE:

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DATE: FILE:

Wall Height "H" (Ft)	PROPERTIES								REINFORCING STEEL FOR ONE 32' PANEL (DESIGN A)																				QUANTITY FOR ONE 32' PANEL		Wall Height "H" (Ft)																				
	WALL DIMENSIONS							MAX SOIL PRESS T/SF	Bars A1					Bars A2					Bars B					Bars C					Bars E					Bars K					D (#5) at 12" Max.		Dowel F at 12" Max.		H (#5) at 12" Max.		T (#5) at 12" Max.		U ~ 39 #5 at 10" Max.		Conc (CY)	REINF (LB)	
	Fw	Tw	Sw	Hw	Ft	Kw	Kd		No.	Size	Spa.	Length	Weight	No.	Size	Spa.	Length	Weight	No.	Size	Spa.	Length	Weight	No.	Size	Spa.	Length	Weight	No.	Size		Spa.	Length	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight	Length	Weight							
2	1'-4"	0'-4"	1'-0"	0'-0"	0'-9"	0'-9"	0'-9"	0.164	39	#4	10"	2'-6"	66					39	#4	10"	2'-2"	57								39	#4	10"	3'-1"	81	6	198	5	41	2	66	2	66	2'-5"	99	3.4	674	2				
4	2'-5"	0'-8"	1'-0"	0'-9"	1'-0"	0'-9"	0'-9"	0.287	39	#4	10"	4'-10"	126					39	#4	10"	3'-11"	103	39	#4	10"	1'-11"	50	39	#4	10"	1'-11"	50	39	#4	10"	3'-1"	81	8	263	7	57	3	99	3	99	6'-0"	245	7.1	1173	4	
6	3'-6"	1'-2"	1'-0"	1'-4"	1'-0"	0'-9"	0'-9"	0.373	39	#4	10"	7'-4"	192					39	#4	10"	5'-11"	155	39	#4	10"	3'-0"	79	39	#4	10"	3'-0"	79	39	#4	10"	3'-1"	81	12	395	10	81	4	132	4	132	8'-5"	343	10.8	1669	6	
8	5'-1"	1'-9"	1'-0"	2'-4"	1'-0"	0'-9"	0'-9"	0.425	39	#4	10"	9'-11"	259					39	#4	10"	7'-11"	207	39	#4	10"	4'-7"	120	39	#4	10"	3'-1"	81	16	526	14	113	6	198	6	198	8'-5"	343	15.0	2165	8						
10	6'-7"	2'-3"	1'-0"	3'-4"	1'-2"	1'-0"	1'-0"	0.513	39	#4	10"	12'-5"	324					39	#4	10"	9'-9"	255	39	#4	10"	6'-1"	159	39	#4	10"	3'-10"	100	20	658	18	145	8	263	8	263	8'-5"	343	20.8	2669	10						
12	8'-4"	2'-10"	1'-1"	4'-5"	1'-4"	1'-3"	1'-3"	0.589	39	#5	10"	15'-1"	614					39	#4	10"	11'-7"	302	39	#5	10"	7'-10"	319	39	#4	10"	7'-10"	205	39	#4	10"	4'-7"	120	24	789	21	169	9	296	9	296	8'-6"	346	28.8	3456	12	
14	9'-11"	3'-5"	1'-2"	5'-4"	1'-7"	1'-6"	1'-6"	0.674	39	#6	10"	17'-9"	1040					39	#4	10"	13'-4"	348	39	#6	10"	9'-5"	553	39	#4	10"	9'-5"	246	39	#4	10"	5'-4"	139	28	920	25	201	11	362	11	362	8'-7"	350	38.5	4521	14	
16	11'-5"	4'-0"	1'-3"	6'-2"	1'-9"	1'-9"	1'-9"	0.756	39	#6	10"	20'-5"	1196	39	#4	10"	20'-5"	532	39	#4	10"	15'-2"	396	39	#6	10"	10'-11"	640	39	#4	10"	10'-11"	285	39	#4	10"	6'-1"	159	32	1052	28	225	12	395	12	395	8'-8"	353	48.5	5628	16
18	12'-8"	4'-7"	1'-4"	6'-9"	1'-9"	2'-0"	2'-0"	0.830	39	#6	10"	23'-1"	1353	39	#5	10"	23'-1"	939	39	#4	10"	17'-2"	448	39	#7	10"	12'-2"	971	39	#4	10"	12'-2"	318	39	#4	10"	6'-10"	179	36	1183	32	257	14	460	14	460	8'-9"	356	56.7	6924	18
20	14'-4"	5'-2"	1'-6"	7'-8"	2'-0"	2'-0"	2'-0"	0.910	39	#6	10"	25'-10"	1514	39	#6	10"	25'-10"	1514	39	#4	10"	18'-11"	493	39	#7	10"	13'-10"	1103	39	#4	10"	13'-10"	361	39	#4	10"	6'-10"	179	38	1249	34	273	15	493	15	493	8'-11"	363	70.8	8035	20



- Place vertical bars inside of horizontal bars (Typical both faces).
- Place footing toe against undisturbed soil.
- See Retaining Wall Miscellaneous Details (RW(SF)) standard for size.
- Optional bars splices not included in above table.

**MATERIAL NOTES:**  
 Provide Class C concrete (f'<sub>c</sub>=3,600 psi.)  
 Provide Grade 60 reinforcing steel.

**GENERAL NOTES:**  
 Designed according to AASHTO LRFD Bridge Design Specifications.  
 Walls are designed assuming unit weight of soil = 120 pcf and a friction angle = 30 degrees for foundation and retained soil.  
 See Retaining Wall Miscellaneous Details (RW(SF)) standard for details and notes not shown.  
 These details provide designs for wall heights of 2 to 20 feet. For heights not shown, round up "H" to determine wall dimensions and reinforcing. (For example, a 9-foot high wall would use the 10-foot high dimensions and reinforcing.)  
 Quantities are based on "H" being average height of panel.  
 Retaining walls are designed to be coded as follows on Retaining Wall Layout Sheets:

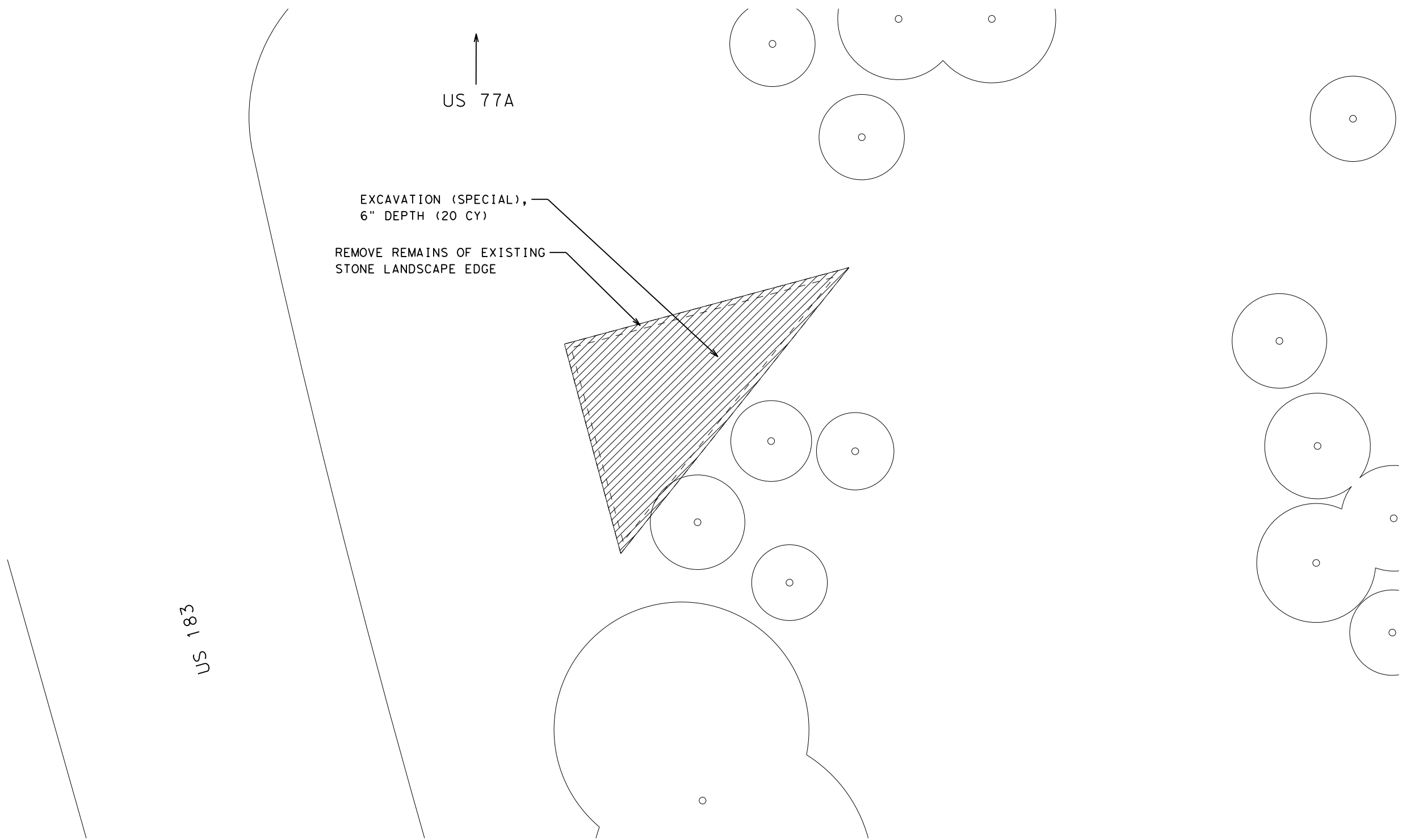
A - 15 - 32 — Panel length ~ 32 ft. is standard; 28 ft. requires special quantities.  
 — Average height (H) of panel.  
 Design A = No surcharge or slope above wall.  
 Design B = No surcharge; slopes to 3:1.  
 Design C = Traffic surcharge; no slope above wall.

Cover dimensions are clear dimensions, unless noted otherwise.  
 Reinforcing bar dimensions shown are out-to-out of bar.

		<b>Bridge Division Standard</b>	
<b>SPREAD FOOTING RETAINING WALL</b>			
<b>RW(SFA)</b>			
FILE: RW-SFA-22.dgn	DN: TAR	CK: RLE	DW: JER
REVISIONS	CONT	SECT	JOB
0913	17	044	VARIOUS
8-22: Constructability update.	DIST	COUNTY	SHEET NO.
	YKM	DEWITT	24

DATE: 6/28/2022 4:21:12 PM  
FILE: T:\DES\_LAND\Projects\YKM\Cuero\_2021\Plan Set\10\_Miscellaneous\DEMOLITION PLAN1.dgn

DW: CK: DM: CK: DW: CK:



**LEGEND**

EXISTING TREE TO REMAIN

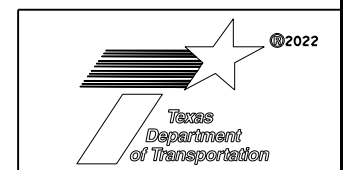
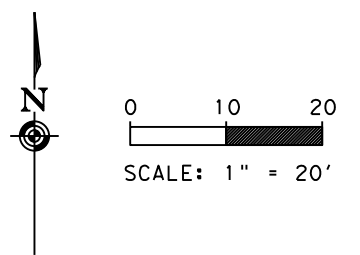
**NOTES**

1. LOCATE ALL UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. IN AREAS SHOWN ON THE PLANS, EXCAVATE AND REMOVE PLANT MATERIAL, EXISTING STONE EDGING, AND SOIL TO DEPTHS SHOWN ON THE PLANS (SUBSIDIARY TO ITEM 110-6003, EXCAVATION (SPECIAL)).
3. PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION.



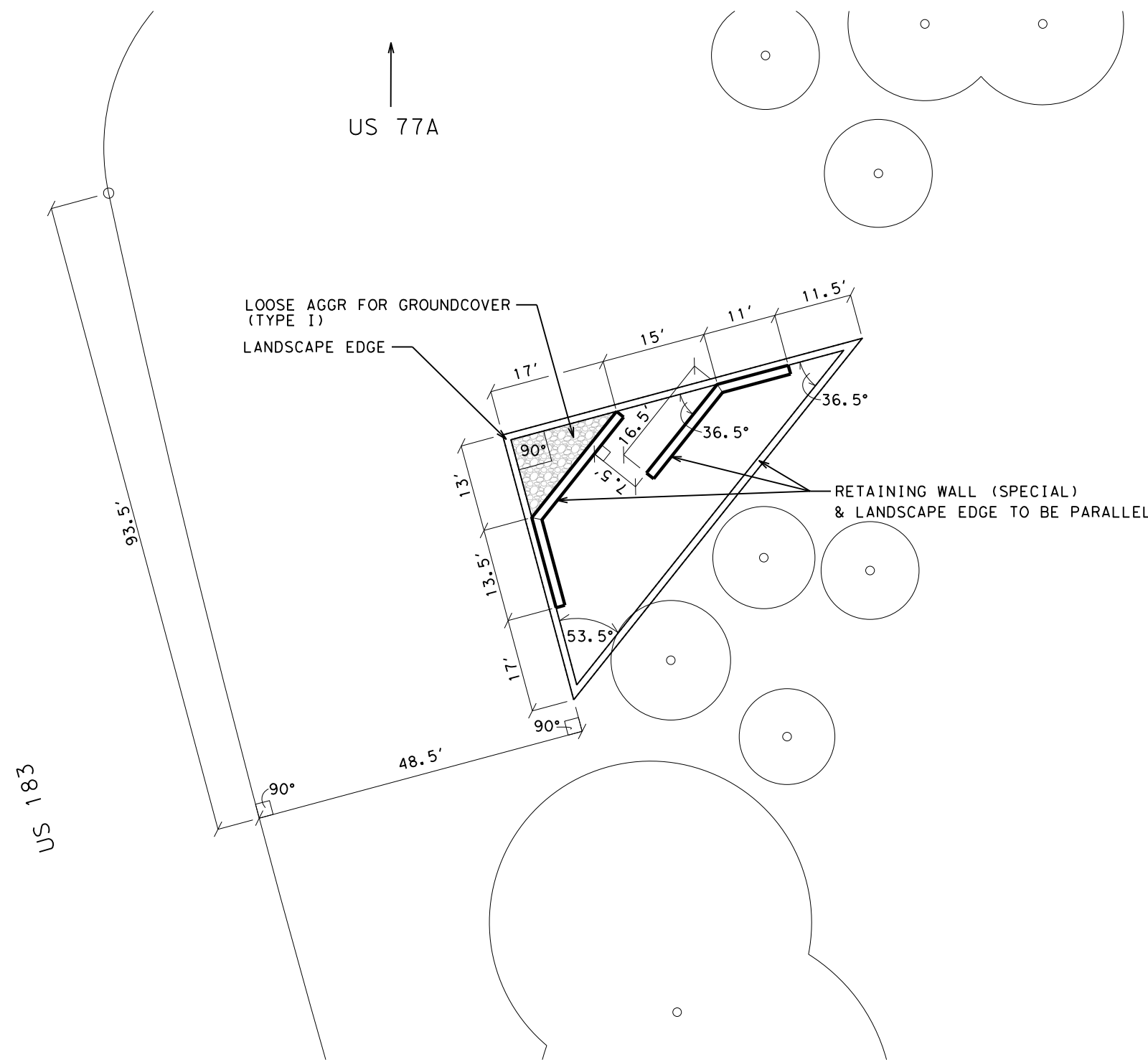
06/28/2022

**CUERO GCAA  
DEMOLITION PLAN  
LOCATION A1**

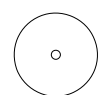



CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	25	

DATE: 6/28/2022 4:21:14 PM  
 FILE: T:\DES\_LAND\Projects\YKM\Cuero\_2021\Plan Set\10\_Miscellaneous\Layout\PLAN1.dgn



**LEGEND**

-  EXISTING TREE TO REMAIN
-  POINT OF TANGENCY

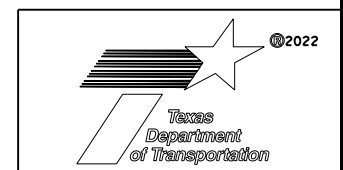
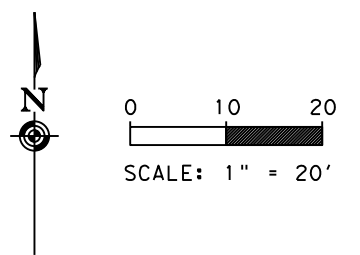
**NOTES**

1. LOCATE ALL UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. ALL MEASUREMENTS ARE APPROXIMATE, AND MUST BE APPROVED BY THE ENGINEER BEFORE BEGINNING CONSTRUCTION.
3. PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION.
4. PROPOSED BEDS AT LOCATION A ARE INTENDED TO FILL THE FOOTPRINTS OF BEDS PREVIOUSLY EXISTING WITHIN STONE EDGING (TO BE REMOVED).
5. SEE SHEETS 38 THROUGH 40 FOR RETAINING WALL (SPECIAL) DETAILS & SPECIFICATIONS.



06/28/2022

**CUERO GCAA  
 LAYOUT PLAN  
 LOCATION A1**

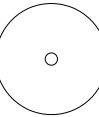




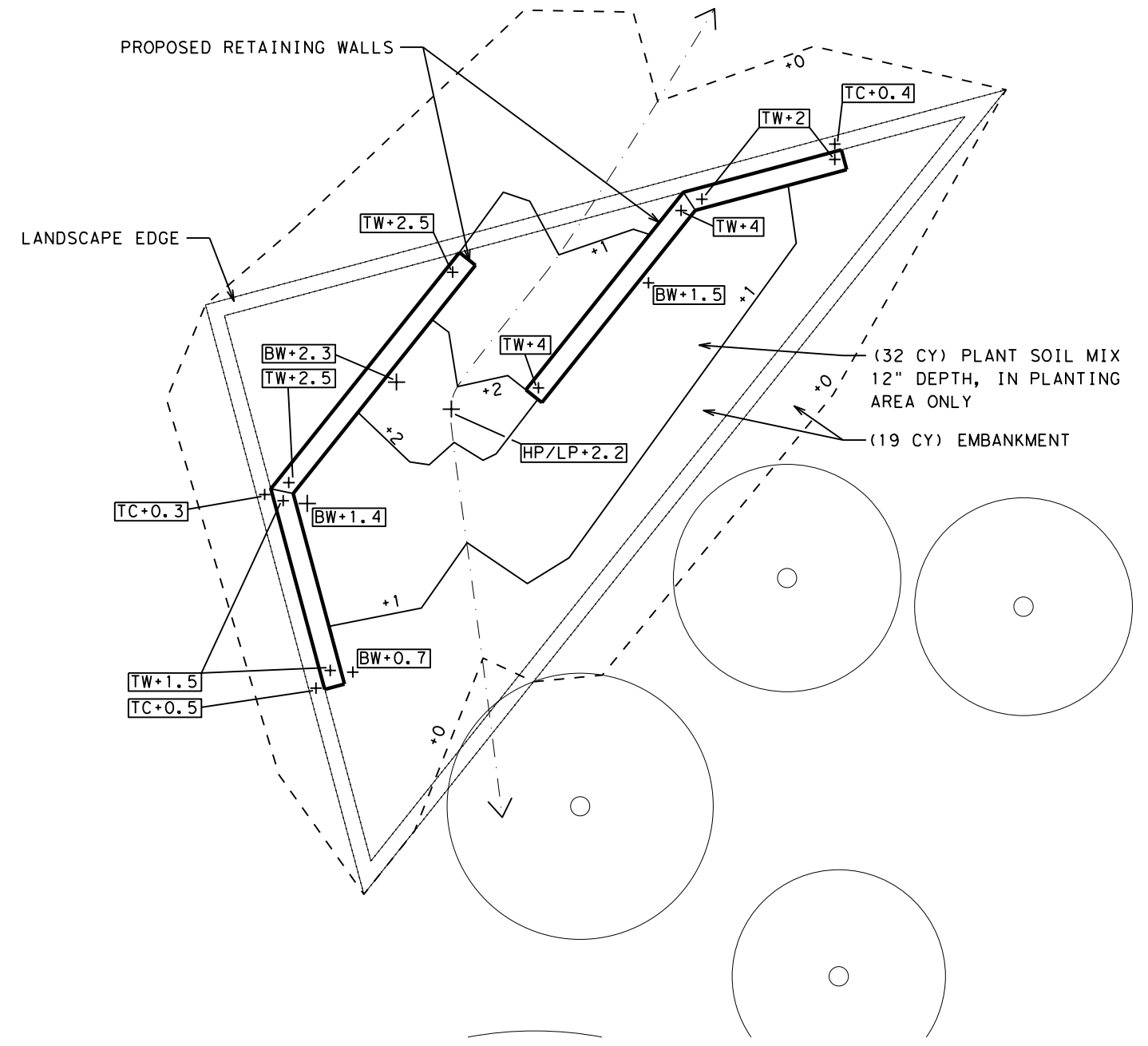
CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	26	

DWG: CJK: DMF: CJK:

↑  
US 77A

**LEGEND**

-  EXISTING TREE
-  PROPOSED CONTOURS
-  MEET EXISTING GRADE
- TW/BW TOP OF WALL/  
BOTTOM OF WALL
- TC TOP OF CURB  
(LANDSCAPE EDGE)
- HP/LP HIGH POINT/  
LOW POINT



←  
US 183

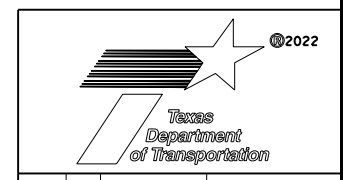
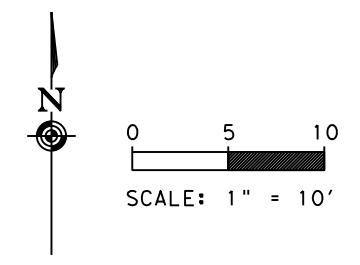
**NOTES**

1. LOCATE ALL UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION.



06/28/2022

**CUERO GCAA  
GRADING PLAN  
LOCATION A1**

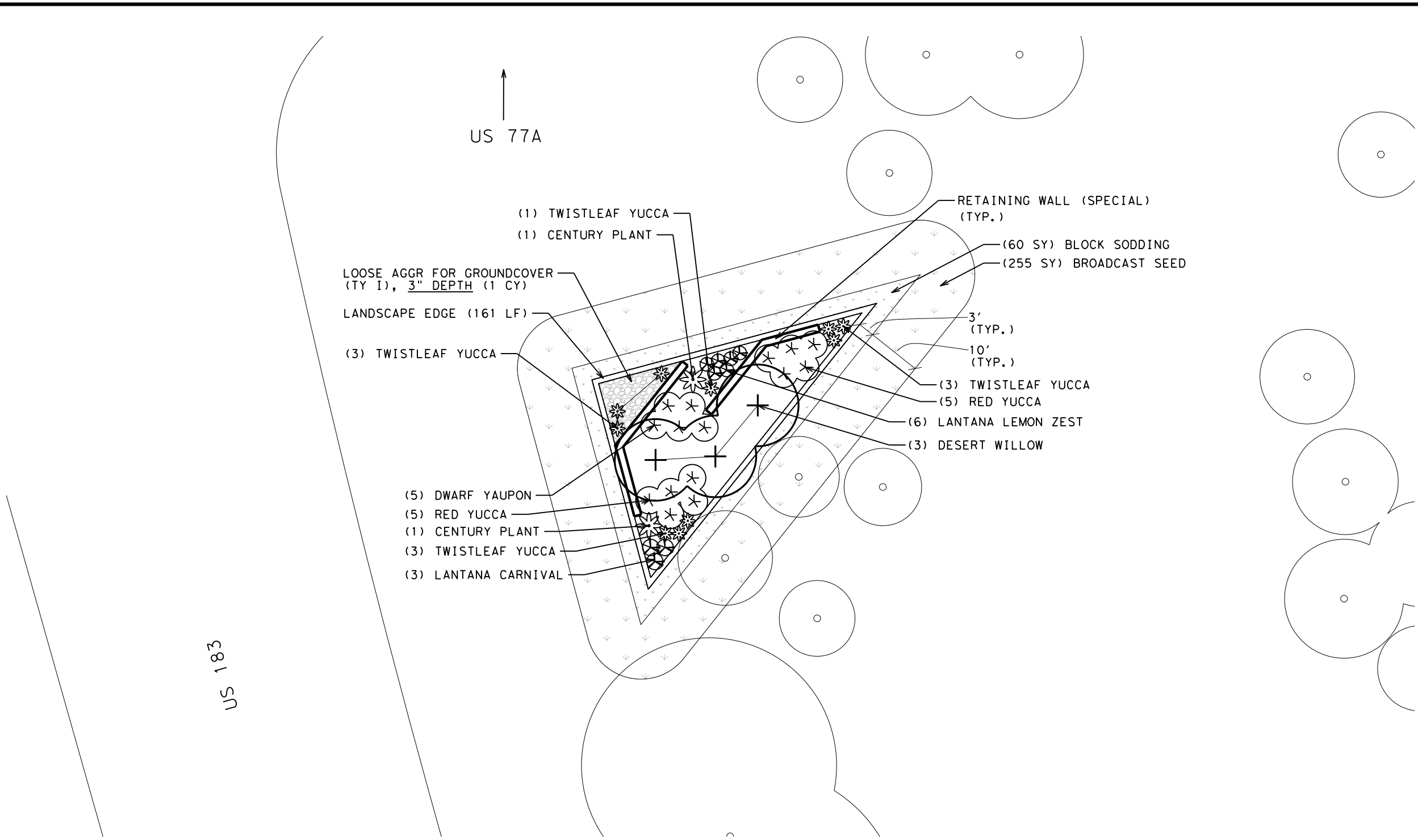


CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	27	

DATE: 6/28/2022 4:21:16 PM  
 FILE: T:\DES\_LAND\Projects\YKM\Cuero\_2021\Plan Set\10\_Miscellaneous\GRADING\_PLAN.dgn

DWG:   
 CHK:   
 DMF:   
 CKS:

DATE: 6/28/2022 4:21:18 PM   
 FILE: I:\DESIGN\Projects\YKM\Cuero\_2021\Plan Set\10\_Miscellaneous\PLANTING PLAN1.dgn



**LEGEND**



**PLANT SPECIFICATIONS**

Item	Common Name	Botanical Name	Quantity	Size	Min. Caliper	Min. Height	Min. Spread	Spacing	Notes
0192-6003	Lantana Carnival	Lantana camara 'Carnival'	3	3 GAL.		12"	12"	36" O.C.	Container grown, 'Carnival'
	Lantana Lemon Zest	Lantana camara 'Lemon Zest'	6	3 GAL.		12"	12"	24" O.C.	Container grown, 'Lemon Zest'
<b>TOTAL: 9</b>									
0192-6004	Dwarf Yaupon	Ilex vomitoria 'Nana'	5	5 GAL.		6"	12"	48" O.C.	Container grown, 'Nana'
	Red Yucca	Hesperaloe parviflora	10	5 GAL.		12"	12"	36" O.C.	Container grown
	Century plant	Agave americana	2	5 GAL.		12"	12"	48" O.C.	Container grown
	Twistleaf Yucca	Yucca rupicola	10	5 GAL.		12"	12"	36" O.C.	Container grown
<b>TOTAL: 27</b>									
0192-6024	Desert Willow	Chilopsis linearis	3	30 GAL	2"	5'	4'	as shown	Container grown

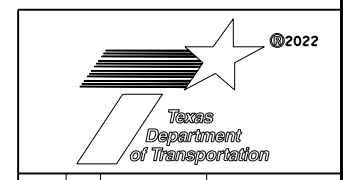
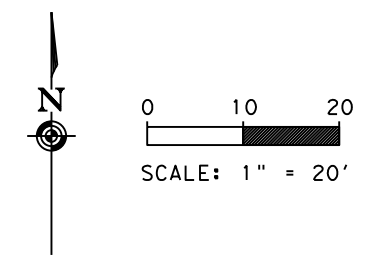
**NOTES**

1. PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION.



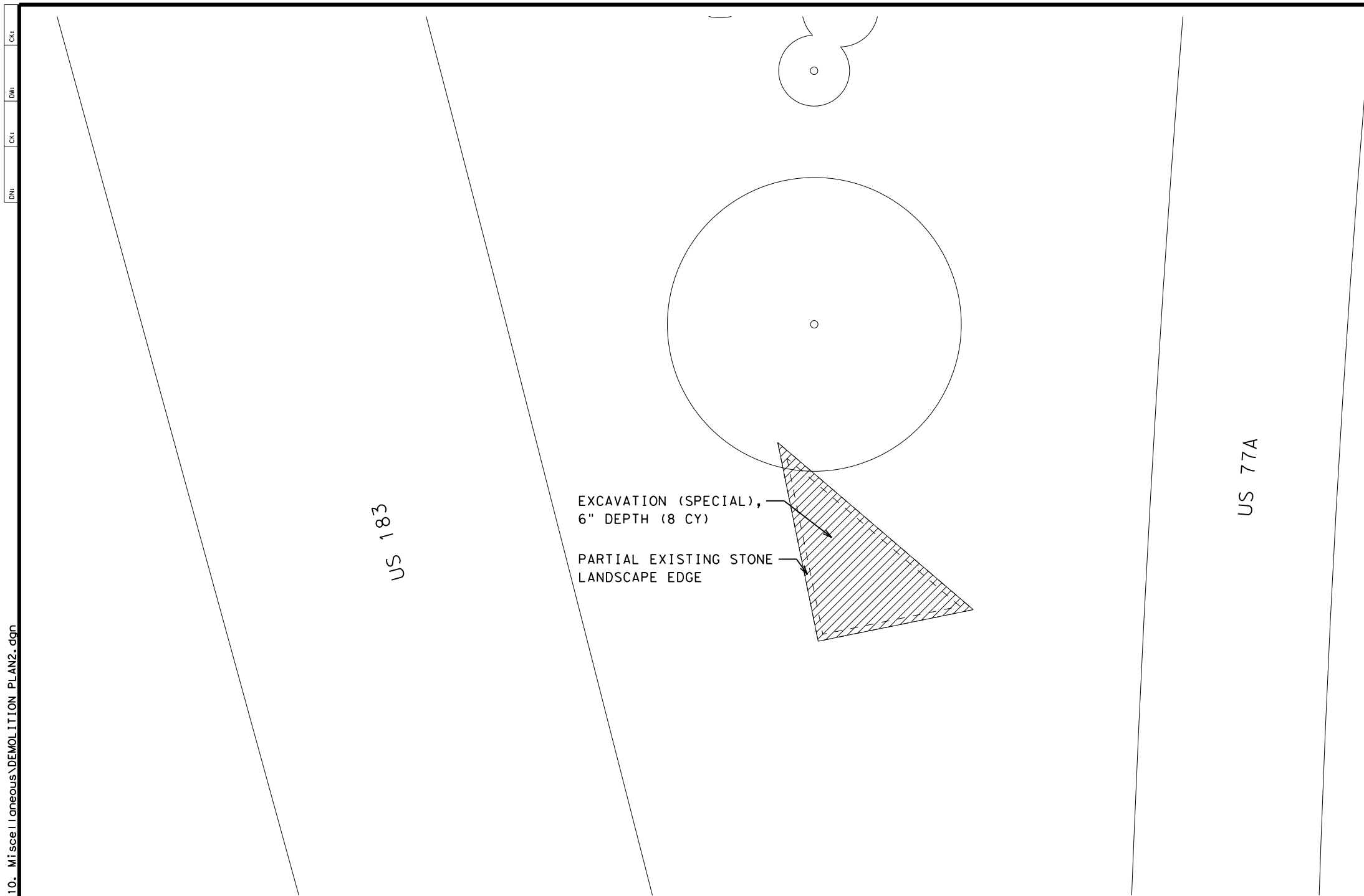
06/28/2022

**CUERO GCAA  
PLANTING PLAN  
LOCATION A1**



CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	28	

DATE: 6/28/2022 4:21:19 PM  
FILE: T:\DES\_LAND\Projects\YKM\Cuero\_2021\Plan Set\10. Miscellaneous\DEMOLITION PLAN2.dgn



**LEGEND**

○ EXISTING TREE TO REMAIN

**NOTES**

1. LOCATE ALL UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. IN AREAS SHOWN ON THE PLANS, EXCAVATE AND REMOVE PLANT MATERIAL, EXISTING STONE EDGING, AND SOIL TO DEPTHS SHOWN ON THE PLANS (SUBSIDIARY TO ITEM 110-6003, EXCAVATION (SPECIAL)).
3. PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION.

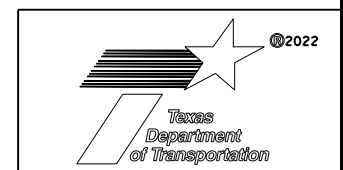


06/28/2022

**CUERO GCAA  
DEMOLITION PLAN  
LOCATION A2**



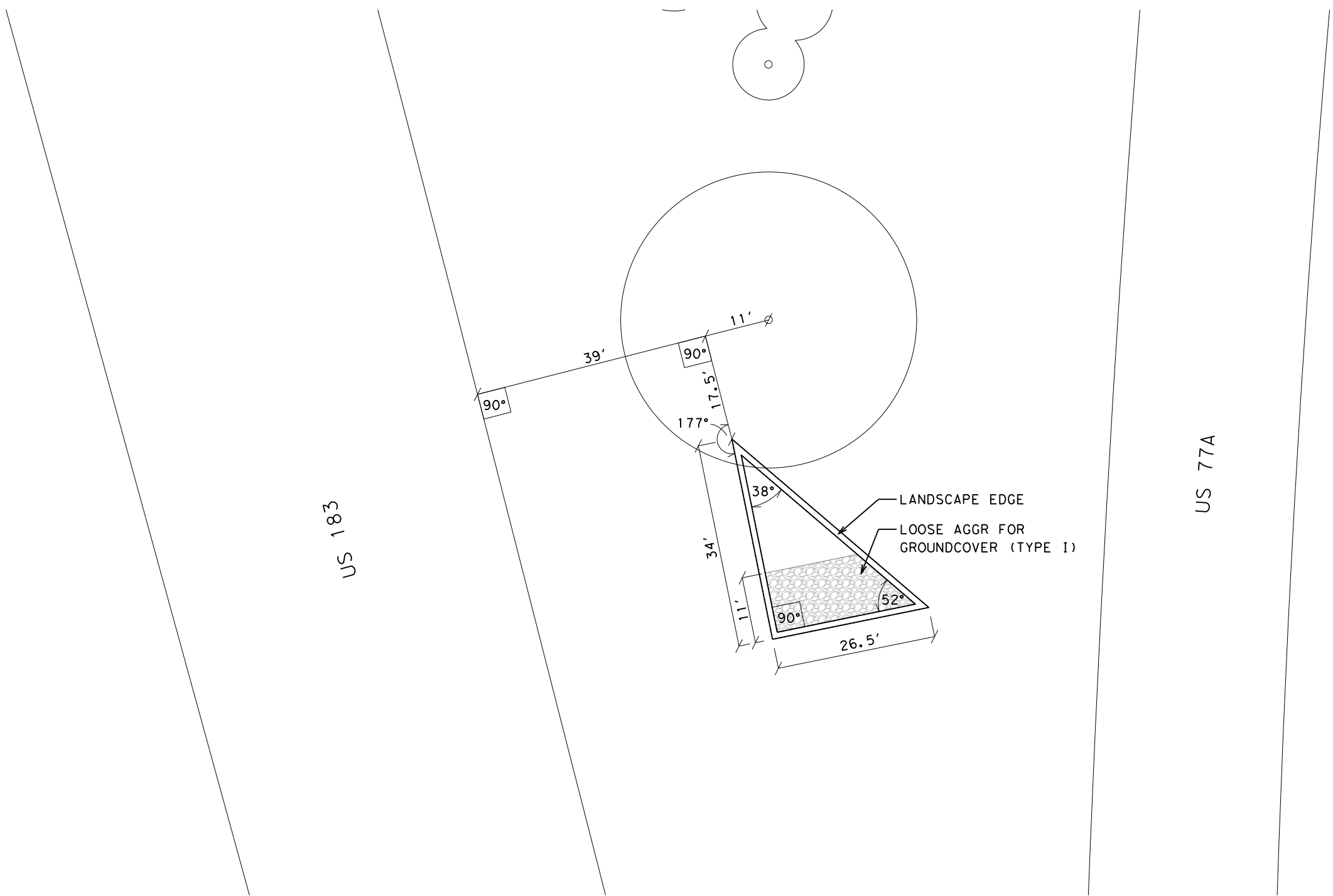
0 10 20  
SCALE: 1" = 20'



CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	29	

DATE: 6/28/2022 4:21:22 PM  
 FILE: I:\DES\_LAND\Projects\YKM\Cuero\_2021\Plan Set\10. Miscellaneous\Layout\_PLAN2.dgn

DW: C&S DM: C&S



**LEGEND**

EXISTING TREE  
TO REMAIN

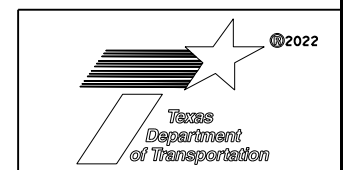
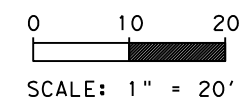
**NOTES**

1. LOCATE ALL UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. ALL MEASUREMENTS ARE APPROXIMATE, AND MUST BE APPROVED BY THE ENGINEER BEFORE BEGINNING CONSTRUCTION.
3. PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION.
4. PROPOSED BEDS AT LOCATION A ARE INTENDED TO FILL THE FOOTPRINTS OF BEDS PREVIOUSLY EXISTING WITHIN STONE EDGING (TO BE REMOVED).



06/28/2022

**CUERO GCAA  
LAYOUT PLAN  
LOCATION A2**

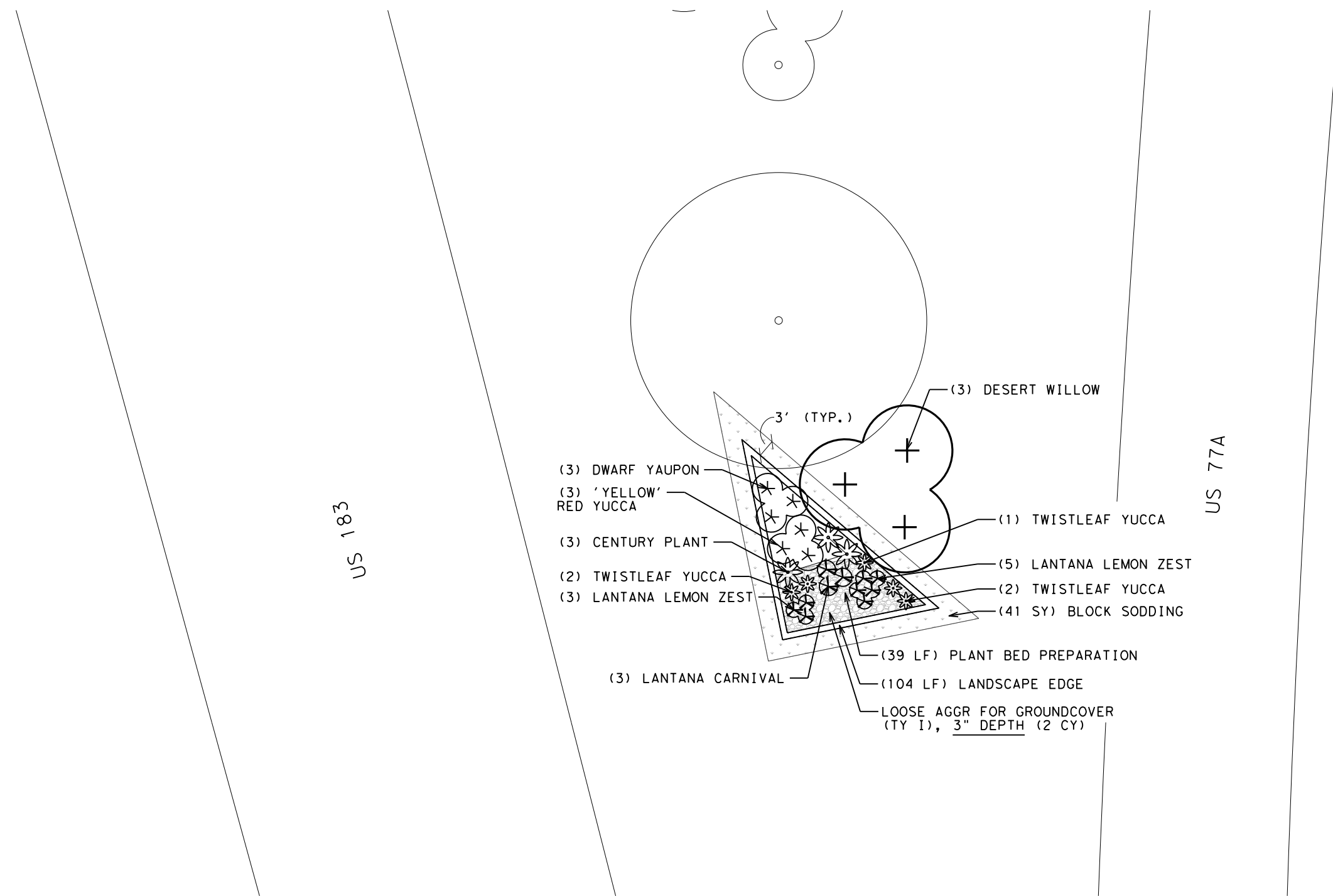


CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY		SHEET NO.
YKM	DEWITT		30



DATE: 6/28/2022 4:21:24 PM  
 FILE: I:\DESIGN\Projects\YKM\Cuero 2021\Plan Set\10. Miscellaneous\PLANTING PLAN2.dgn

DWG: C&S: DMF: C&S: C&S:



**LEGEND**



EXISTING TREE TO REMAIN

**PLANT SPECIFICATIONS**

Item	Common Name	Botanical Name	Quantity	Size	Min. Caliper	Min. Height	Min. Spread	Spacing	Notes
0192-6003	Lantana Carnival	Lantana camara 'Carnival'	3	3 GAL.		12"	12"	36" O.C.	Container grown, 'Carnival'
	Lantana Lemon Zest	Lantana camara 'Lemon Zest'	8	3 GAL.		12"	12"	24" O.C.	Container grown, 'Lemon Zest'
<b>TOTAL: 11</b>									
0192-6004	Dwarf Yaupon	Ilex vomitoria 'Nana'	3	5 GAL.		6"	12"	48" O.C.	Container grown, 'Nana'
	Red Yucca	Hesperaloe parviflora 'Yellow'	3	5 GAL.		12"	12"	36" O.C.	Container grown, 'Yellow'
	Century plant	Agave americana	3	5 GAL.		12"	12"	48" O.C.	Container grown
	Twistleaf Yucca	Yucca rupicola	5	5 GAL.		12"	12"	36" O.C.	Container grown
<b>TOTAL: 14</b>									
0192-6024	Desert Willow	Chilopsis linearis	3	30 GAL	2"	5'	4'	as shown	Container grown
<b>TOTAL: 3</b>									

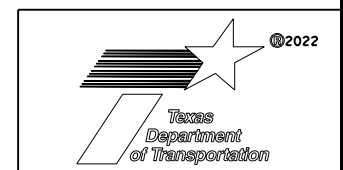
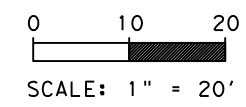
**NOTES**

- PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION.



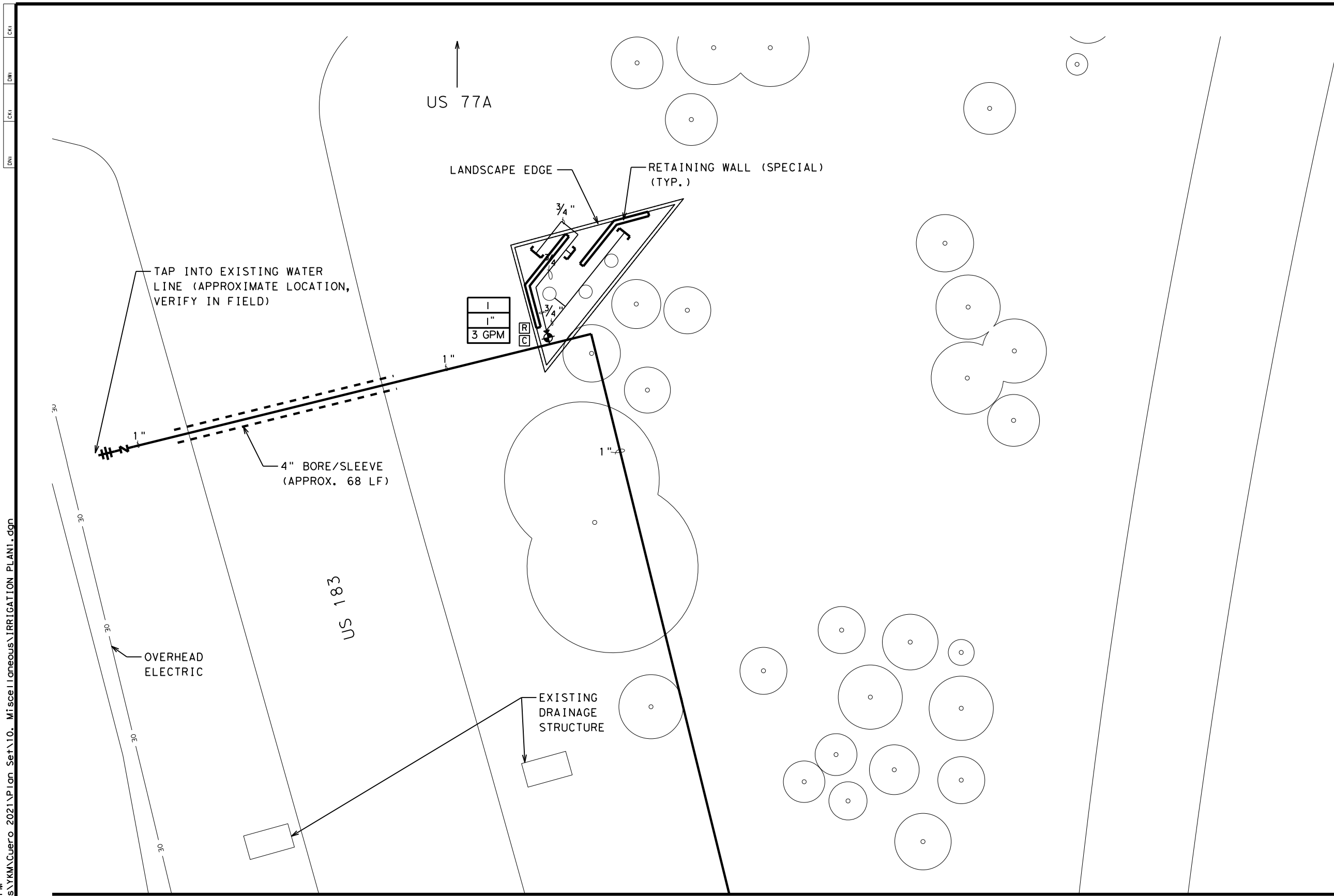
06/28/2022

**CUERO GCAA  
 PLANTING PLAN  
 LOCATION A2**



CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	31	

DATE: 6/28/2022 4:21:27 PM  
 FILE: I:\DES\_LAND\Projects\YKM\Cuero\_2021\Plan Set\10\_Miscellaneous\IRRIGATION PLAN1.dgn



**LEGEND**

- EXISTING TREE TO REMAIN
- IRRIGATION LEGEND:**
- LATERAL TO TREE DRIP
- LATERAL PIPE
- PROPOSED MAINLINE
- EXISTING MAINLINE
- DRIP VALVE ASSEMBLY WITH FILTER
- CONTROLLER
- RAIN FREEZE SENSOR
- BACKFLOW PREVENTOR
- WATER METER
- BEGIN DRIP TUBING FOR PROPOSED SHRUB AREAS
- VALVE INFO**
- ZONE 4
- SIZE 1"
- FLOW 10 GPM



06/28/2022

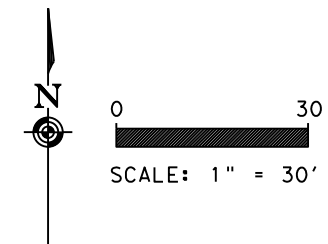
**CUERO GCAA  
 IRRIGATION PLAN  
 LOCATION A**

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	32	

**NOTES**

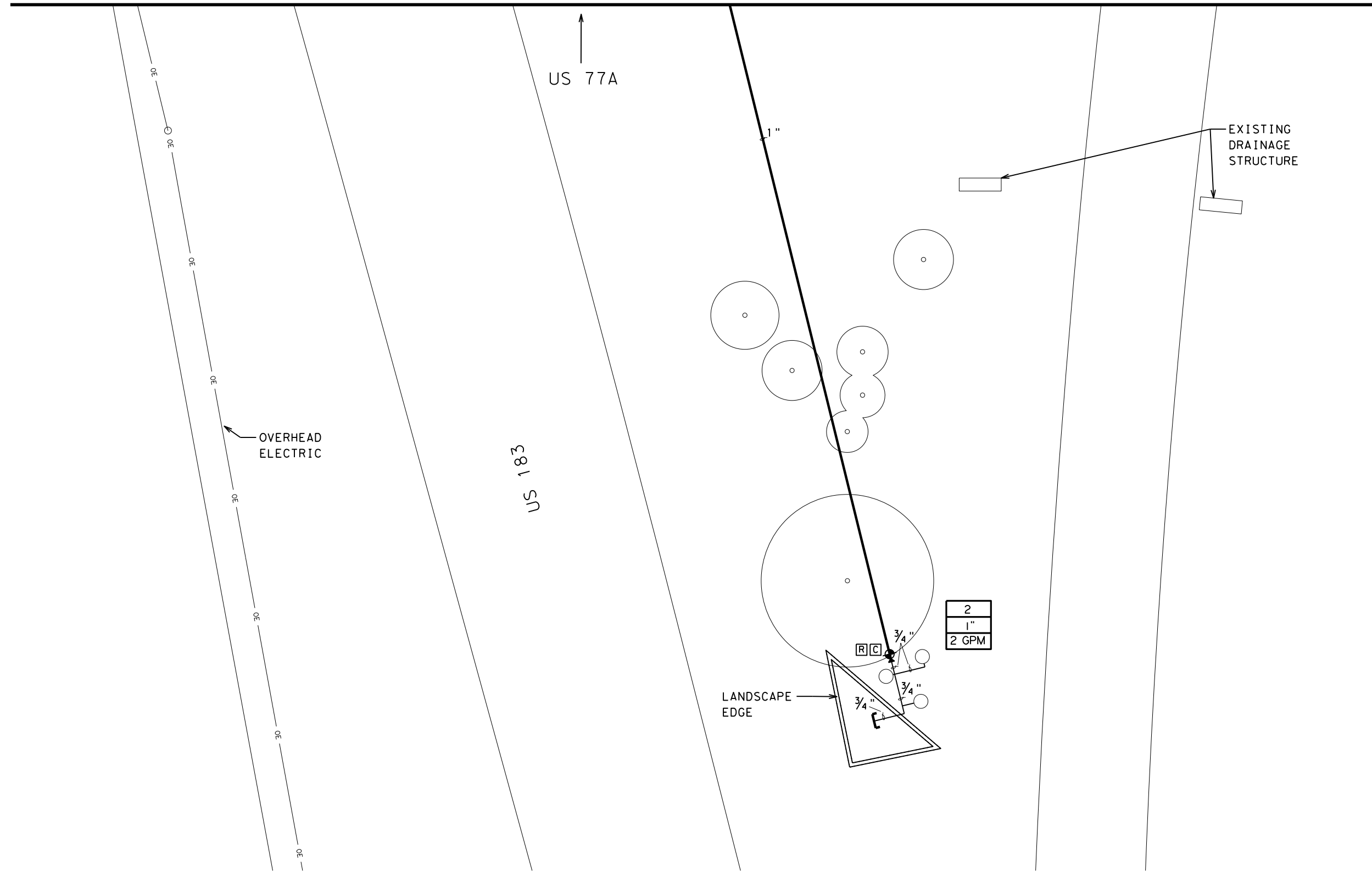
1. LOCATE ALL UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION.



DATE: 6/28/2022 4:21:29 PM  
 FILE: T:\DES\_LAND\Projects\YKM\Cuero\_2021\Plan Set\10\_Miscellaneous\IRRIGATION\_PLAN2.dgn

DN: C&S: DM: C&S:

MATCHLINE A



LEGEND

- EXISTING TREE TO REMAIN
- IRRIGATION LEGEND:**
- LATERAL TO TREE DRIP
- LATERAL PIPE
- PROPOSED MAINLINE
- EXISTING MAINLINE
- DRIP VALVE ASSEMBLY WITH FILTER
- CONTROLLER
- RAIN FREEZE SENSOR
- BACKFLOW PREVENTOR
- WATER METER
- BEGIN DRIP TUBING FOR PROPOSED SHRUB AREAS
- VALVE INFO**
- ZONE 4
- SIZE 1"
- FLOW 10 GPM

NOTES

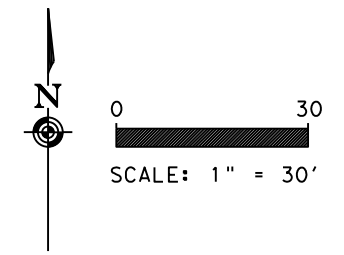
1. LOCATE ALL UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION.



06/28/2022

**CUERO GCAA  
 IRRIGATION PLAN  
 LOCATION A**

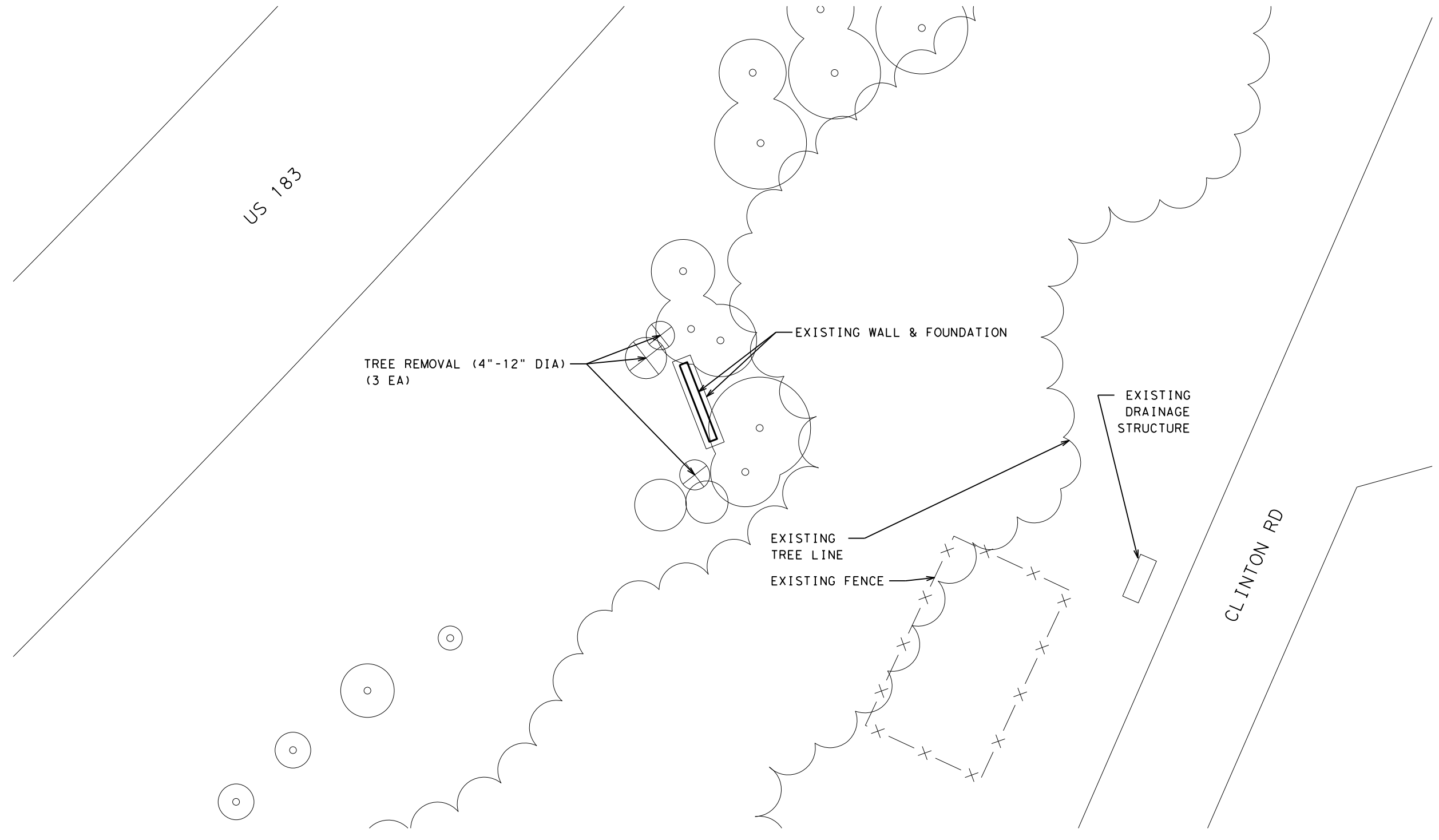
SHEET 2 OF 2



CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY		SHEET NO.
YKM	DEWITT		33

DATE: 6/28/2022 4:21:30 PM  
FILE: I:\DES\_LAND\Projects\YKM\Cuero\_2021\Plan Set\10. Miscellaneous\DEMOLITION PLAN3.dgn

DWG: C&S  
DWG: C&S  
DWG: C&S



**LEGEND**

- EXISTING TREE TO REMAIN
- EXISTING SHRUB TO REMAIN
- EXISTING SHRUB TO BE REMOVED

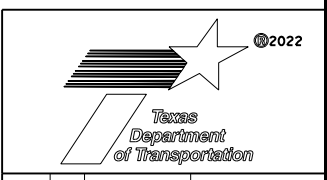
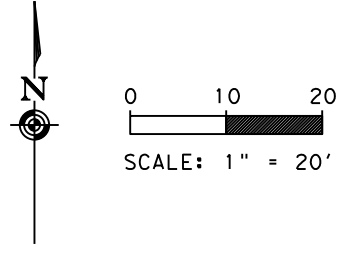
**NOTES**

1. LOCATE ALL UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION - HAND TOOLS ONLY IN CRITICAL ROOT ZONES OF EXISTING TREES AND SHRUBS TO REMAIN.
3. EXISTING TREE, SHRUB AND WALL LOCATIONS ARE APPROXIMATE, VERIFY IN FIELD.



06/28/2022

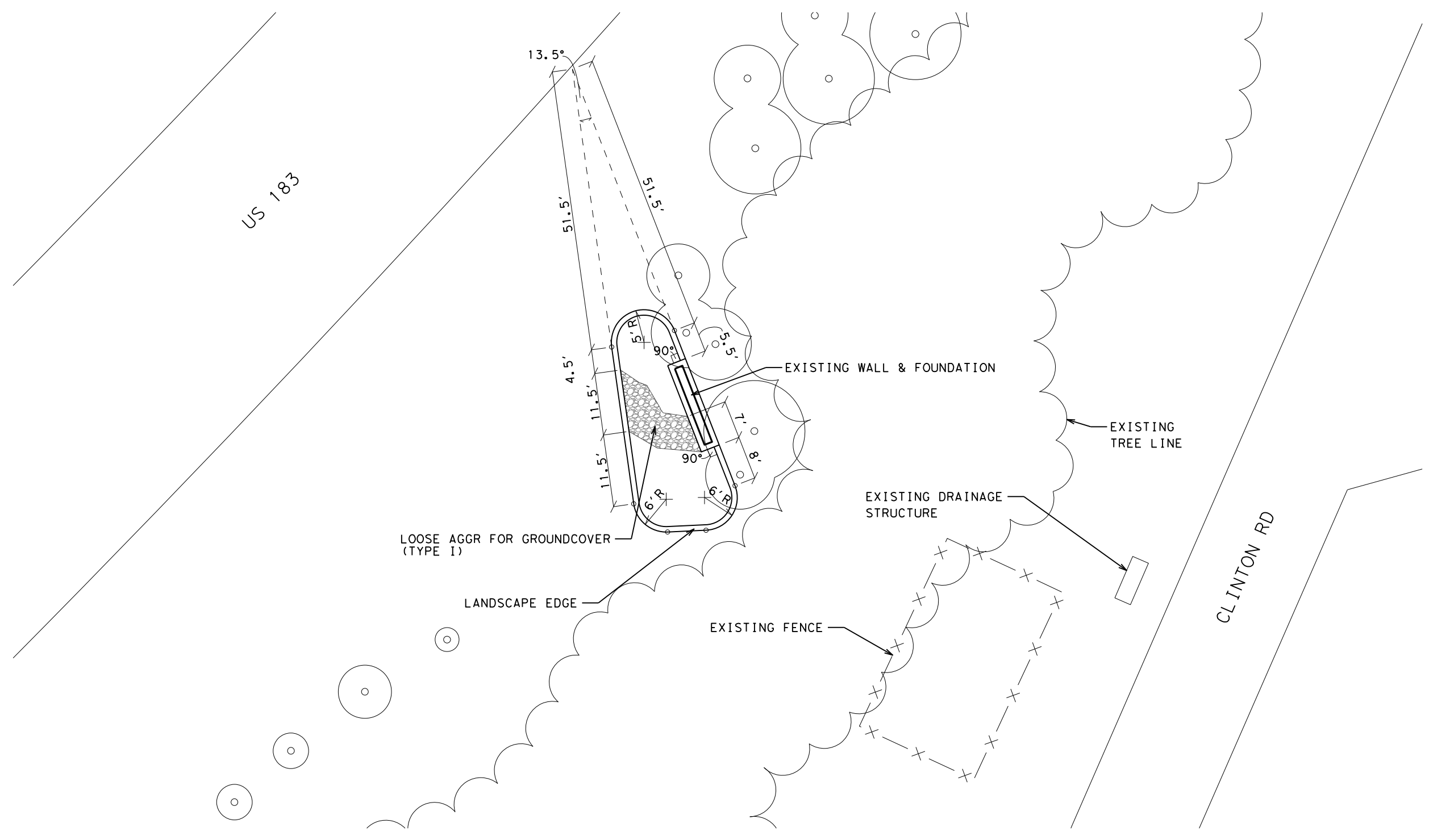
**CUERO GCAA  
DEMOLITION PLAN  
LOCATION B**



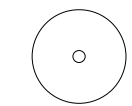


CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	34	

DATE: 6/28/2022 4:21:32 PM  
 FILE: T:\DES\_LAND\Projects\YKM\Cuero\_2021\Plan Set\10. Miscellaneous\LAYOUT\_PLAN3.dgn

DN:  
 CK:  
 DW:  
 CK:



**LEGEND**

-  EXISTING TREE TO REMAIN
-  POINT OF TANGENCY
-  ARC CENTER POINT

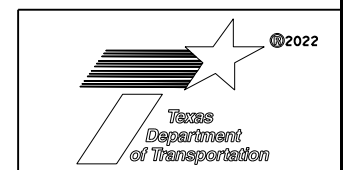
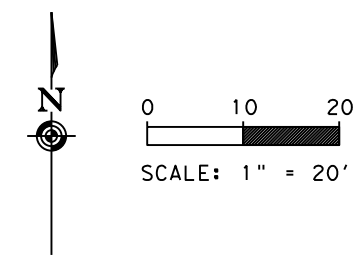
**NOTES**

1. LOCATE ALL UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION - HAND TOOLS ONLY IN CRITICAL ROOT ZONES OF EXISTING TREES AND SHRUBS TO REMAIN.
3. ALL MEASUREMENTS ARE APPROXIMATE, AND MUST BE APPROVED BY THE ENGINEER BEFORE BEGINNING CONSTRUCTION.



06/28/2022

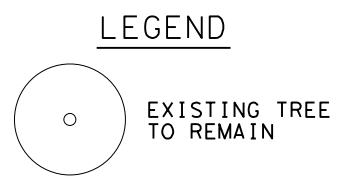
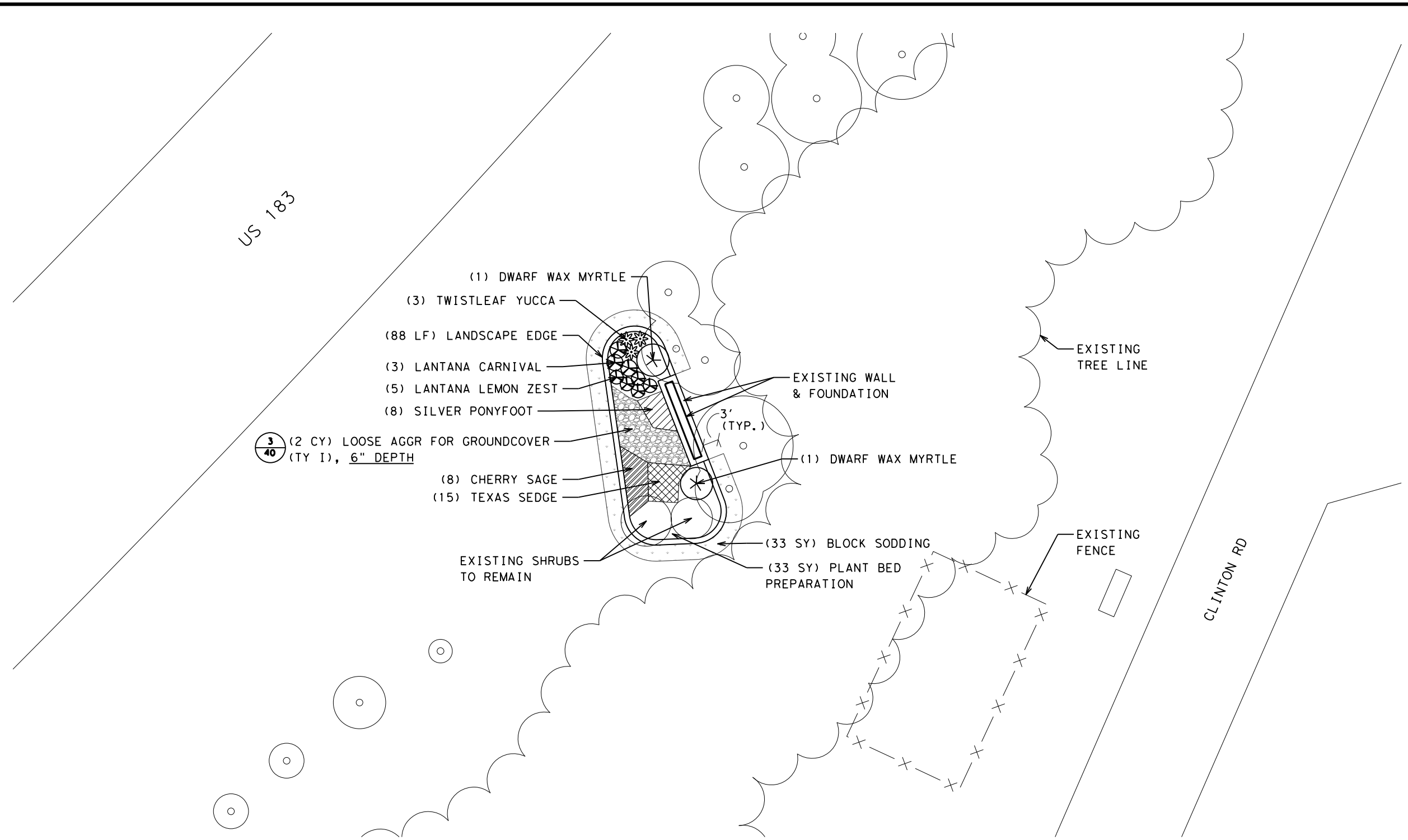
**CUERO GCAA  
 LAYOUT PLAN  
 LOCATION B**



CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	35	

DWG:   
 CHK:   
 DWF:   
 C&C:

DATE: 6/28/2022 4:21:34 PM   
 FILE: I:\DESIGN\Projects\YKM\Cuero\_2021\Plan\_Set\10\_Miscellaneous\PLANTING\_PLAN3.dgn



- (1) DWARF WAX MYRTLE
- (3) TWISTLEAF YUCCA
- (88 LF) LANDSCAPE EDGE
- (3) LANTANA CARNIVAL
- (5) LANTANA LEMON ZEST
- (8) SILVER PONYFOOT
- (2 CY) LOOSE AGGR FOR GROUNDCOVER (TY I), 6" DEPTH
- (8) CHERRY SAGE
- (15) TEXAS SEDGE
- EXISTING SHRUBS TO REMAIN
- (33 SY) BLOCK SODDING
- (33 SY) PLANT BED PREPARATION
- EXISTING WALL & FOUNDATION
- 3' (TYP.)
- EXISTING TREE LINE
- EXISTING FENCE
- CLINTON RD
- US 183

**PLANT SPECIFICATIONS**

Item	Common Name	Botanical Name	Quantity	Size	Min. Height	Min. Spread	Spacing	Notes
0192-6002	Silver Ponyfoot	Dichondra argentea	8	1 GAL.	6"	6"	18" O.C.	Container grown
	Cherry Sage	Salvia greggii	8	1 GAL.	6"	6"	24" O.C.	Container grown, pink flower
	Texas Sedge	Carex texensis	15	1 GAL.	6"	6"	18" O.C.	Container grown
<b>TOTAL: 31</b>								
0192-6003	Lantana Carnival	Lantana camara 'Carnival'	3	3 GAL.	12"	12"	36" O.C.	Container grown, 'Carnival'
	Lantana Lemon Zest	Lantana camara 'Lemon Zest'	5	3 GAL.	12"	12"	24" O.C.	Container grown, 'Lemon Zest'
<b>TOTAL: 8</b>								
0192-6004	Twistleaf Yucca	Yucca rupicola	3	5 GAL.	12"	12"	36" O.C.	Container grown
	Dwarf Wax Myrtle	Myrica cerifera 'Don's Dwarf'	2	5 GAL.	12"	12"	5' O.C.	Container grown, 'Don's Dwarf'
<b>TOTAL: 5</b>								

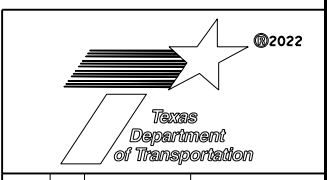
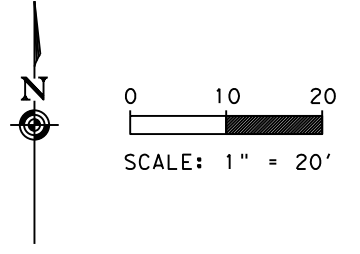
**NOTES**

- PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION - HAND TOOLS ONLY IN CRITICAL ROOT ZONES OF EXISTING TREES AND SHRUBS TO REMAIN.



06/28/2022

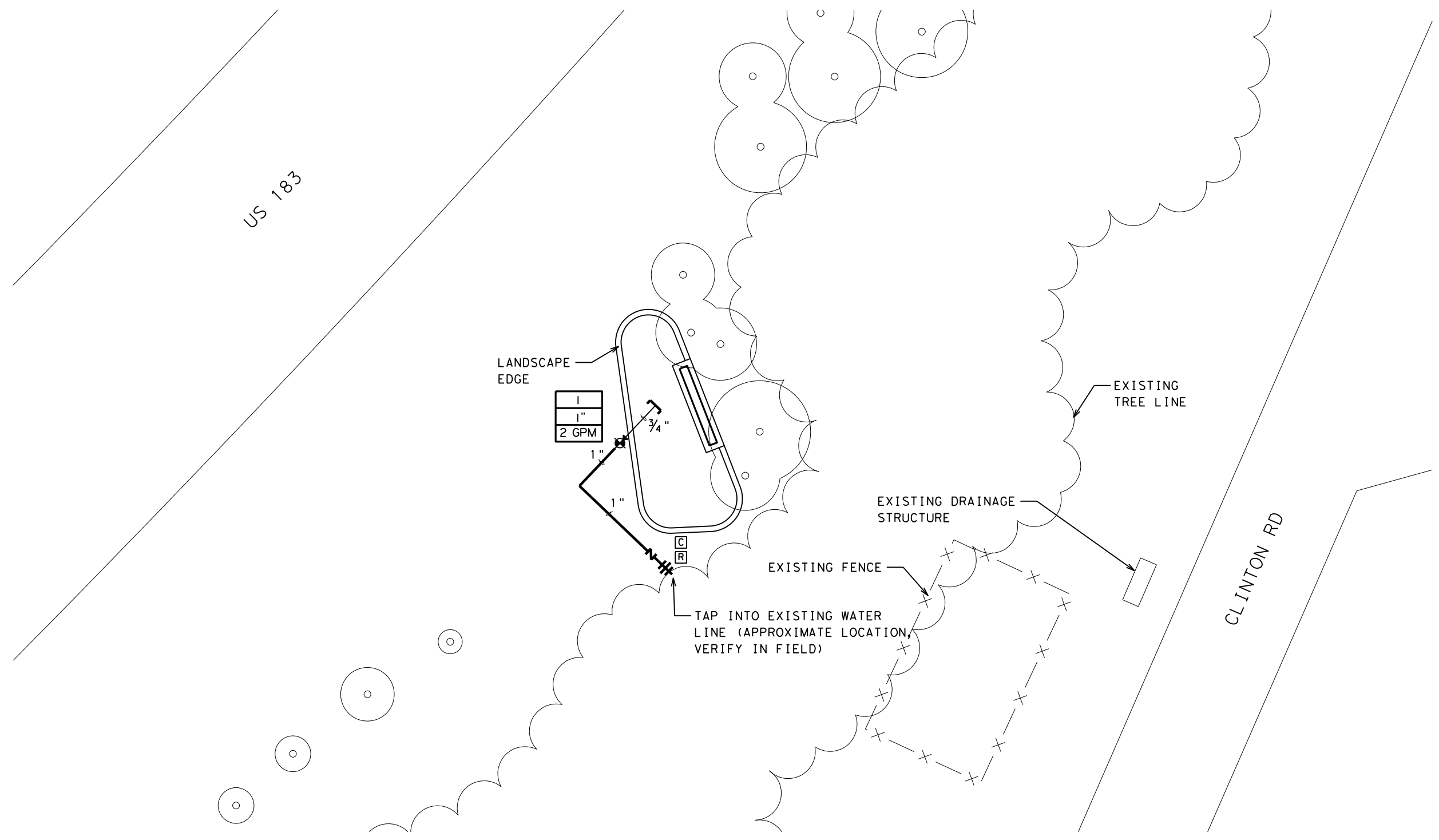
**CUERO GCAA  
PLANTING PLAN  
LOCATION B**



CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	36	

DATE: 6/28/2022 4:21:36 PM  
 FILE: I:\DES\_LAND\Projects\YKM\Cuero\_2021\Plan Set\10. Miscellaneous\IRRIGATION PLAN3.dgn

DW: CK: DM: CK: CK:



**LEGEND**

- EXISTING TREE TO REMAIN
- IRRIGATION LEGEND:**
- DRIP ZONE
- LATERAL PIPE
- PROPOSED MAINLINE
- EXISTING MAINLINE
- DRIP VALVE ASSEMBLY WITH FILTER
- CONTROLLER
- RAIN FREEZE SENSOR
- BACKFLOW PREVENTOR
- WATER METER
- BEGIN DRIP TUBING FOR PROPOSED SHRUB AREAS
- VALVE INFO**
- ZONE 4
- SIZE 1"
- FLOW 10 GPM

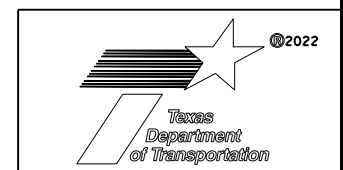
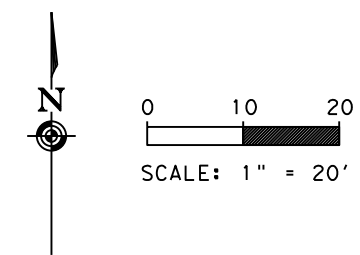
**NOTES**

1. LOCATE ALL UTILITIES BEFORE BEGINNING CONSTRUCTION.
2. PROTECT EXISTING TREES TO REMAIN FROM DAMAGE DURING CONSTRUCTION.



06/28/2022

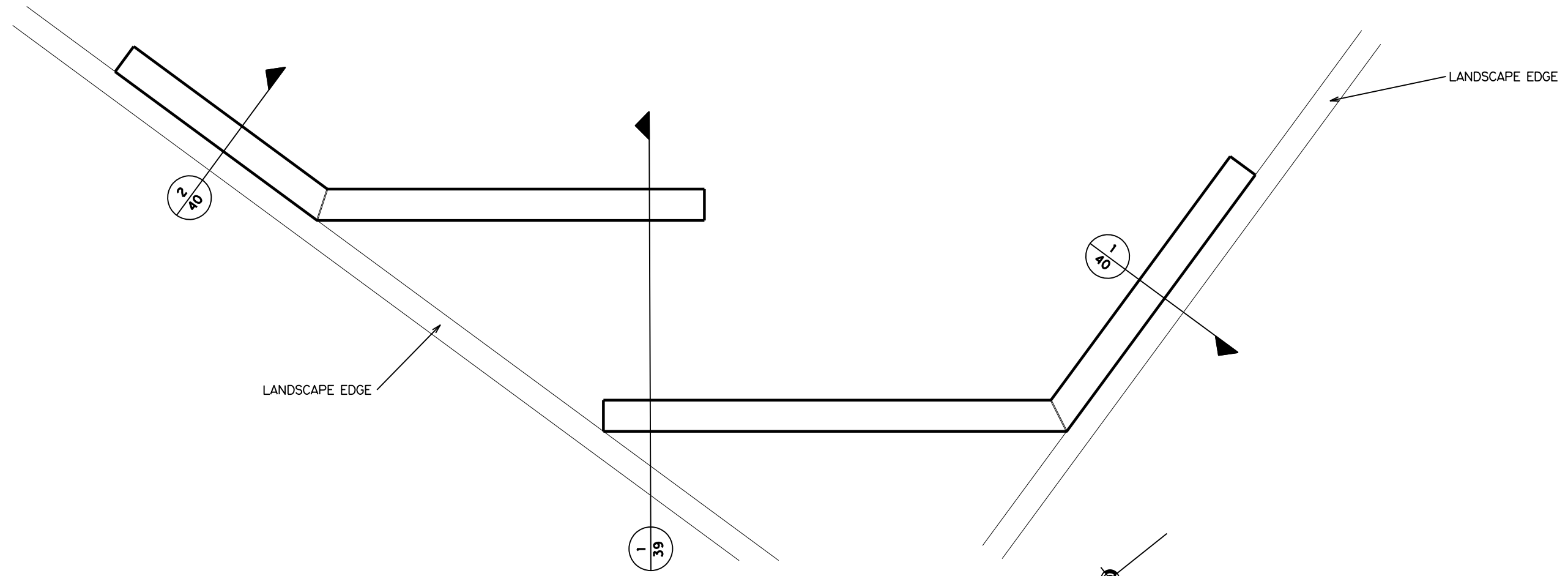
**CUERO GCAA  
 IRRIGATION PLAN  
 LOCATION B**



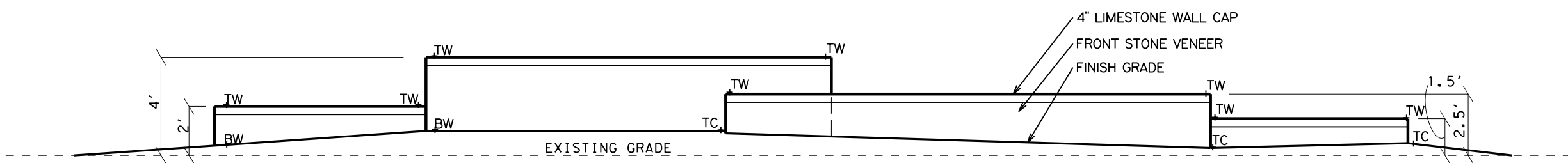
CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	37	

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DN:  
 CK:  
 DW:  
 CK:



**1**  
**38** RETAINING WALL (SPECIAL) PLAN VIEW  
 ITEM 423-6015 1" = 5'

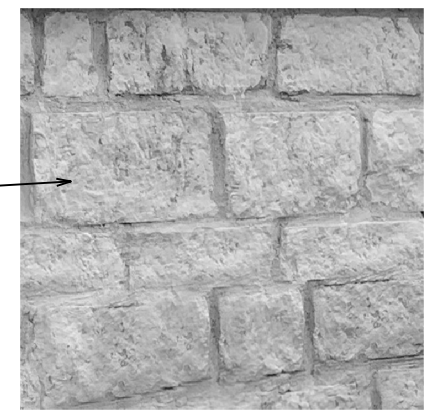


**2**  
**38** RETAINING WALL (SPECIAL) FACE ELEVATION  
 ITEM 423-6015 1" = 5'

**NOTES:**

1. SEE LOCATION A - GRADING PLAN FOR GRADES AT TOP AND BOTTOM OF RETAINING WALLS.
2. SEE SHEET 39 FOR RETAINING WALL (SPECIAL) NOTES.

MATCH FRONT STONE VENEER TO FREESTANDING WALL IN MEMORIAL PARK ON US 87, ACROSS FROM CUERO HIGH SCHOOL



**3**  
**38** RETAINING WALL (SPECIAL) FRONT STONE VENEER  
 ITEM 423-6015 NOT TO SCALE



*Hilary Garnish*  
 06/28/2022

CUERO GCAA  
 MISCELLANEOUS  
 DETAILS

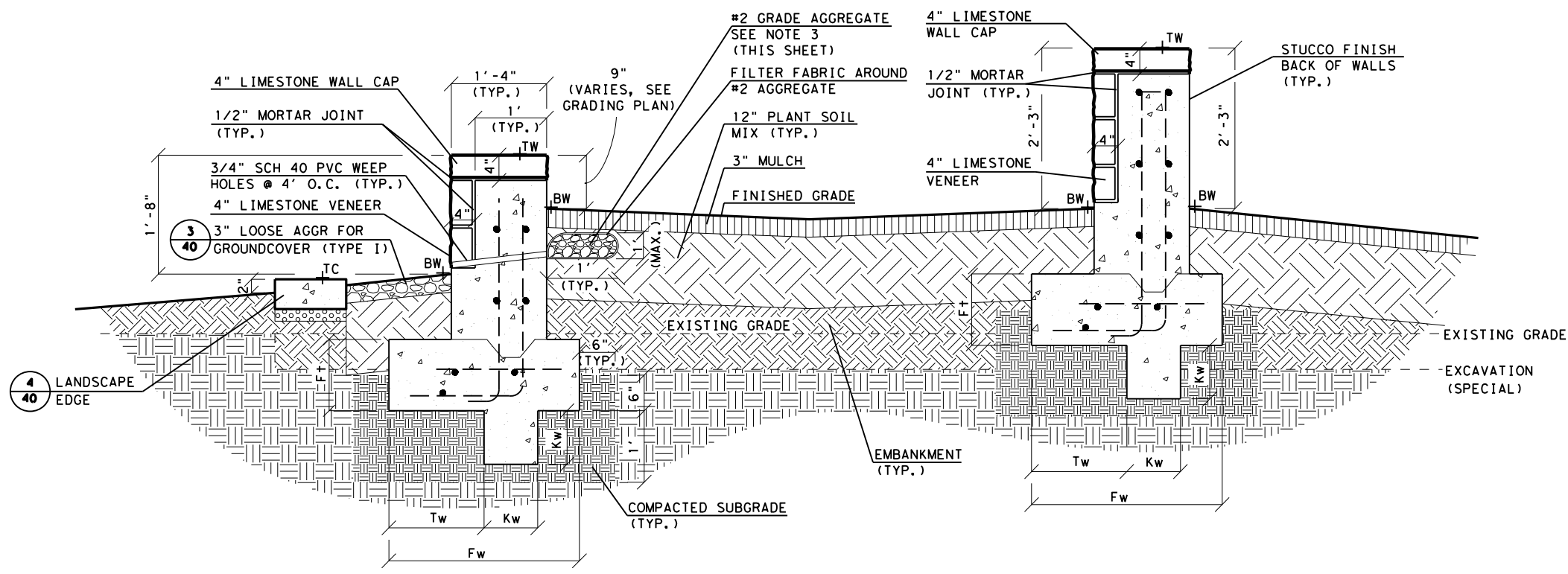
SHEET 1 OF 3



CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	38	



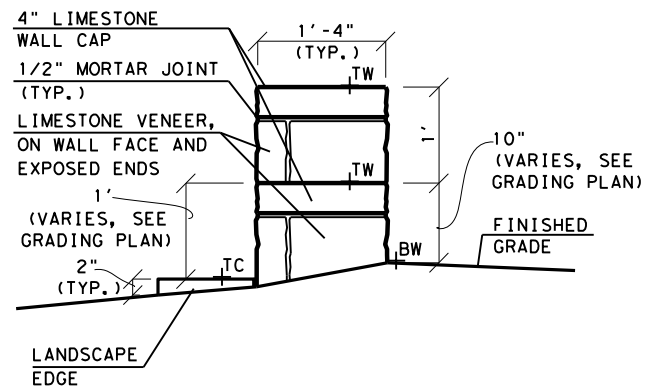
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**1**  
**39** RETAINING WALL (SPECIAL) SECTION  
 ITEM 423-6015

SCALE: 1/2"=1'

- RETAINING WALL (SPECIAL) NOTES:**
1. REINFORCEMENT CALLOUTS ARE NOT SHOWN FOR CLARITY. SEE RETAINING WALLS - RW (SFA) FOR REINFORCEMENT.
  2. SEE RW (SF) FOR DETAILS ON KEY AND WATER STOP.
  3. PLACE 1'x1'x1' MAX WRAPPED AGGREGATE @ 3/4" WEEP HOLES. #2 GRADE AGGREGATE & FILTER FABRIC SUBSIDIARY TO ITEM 423-6015, RETAINING WALL (SPECIAL).
  4. LIMESTONE WALL CAP TO APPEAR AS SINGLE UNIFORM PIECE FOR EACH WALL. CUT AS NECESSARY TO MAINTAIN UNIFORM 1/2" JOINT.
  5. PLACE 1/2" EXPANSION JOINTS AT WALL TURNS.
  6. DRILL 3/4" DIA. HOLE THRU LIMESTONE VENEER @ WEEP HOLES WHEN NECESSARY.
  7. WALL HEIGHTS VARY - SEE LOCATION A GRADING PLAN FOR HEIGHTS AT TOP AND BOTTOM OF WALLS.
  8. PROVIDE SAMPLES AND MINIMUM 3'x3' MOCK-UP OF RETAINING WALL (SPECIAL), INCLUDING LIMESTONE WALL CAP, LIMESTONE VENEER, MORTAR, AND STUCCO, FOR APPROVAL BY THE ENGINEER PRIOR TO BEGINNING CONSTRUCTION OF WALLS.



**2**  
**39** RETAINING WALL (SPECIAL)  
 END ELEVATION (TYP.)  
 ITEM 423-6015

SCALE: 1/2"=1'

423-6015 RETAINING WALL (SPECIAL) - SCHEDULE OF MATERIALS AND FINISHES			
DESCR.	SPECIFICATIONS/FINISH	COLOR	EXAMPLE OR EQUAL
* FRONT STONE VENEER	LIMESTONE VARYING SHAPES AND SIZE WITH NOMINAL THICKNESS OF 4" MIN. & 8" SQUARE MIN.	LIGHT BEIGE	ROCK HAUS STONE OR APPROVED EQUAL, GERMAN SMEAR GROUT FINISH. PROVIDE SAMPLES AND 3'X3' WALL MOCK-UP FOR
* 4" LIMESTONE WALL CAP	LIMESTONE-SAWCUT ON TOP, BOTTOM, & ENDS. SIDES (FACING FRONT AND BACK) ROUGH 4" NOMINAL THICKNESS X 1'-4" WIDE AT LENGTHS MIN. 8" AND 1'-8"	LIGHT BEIGE	ROCK HAUS STONE OR APPROVED EQUAL. PROVIDE SAMPLES AND 3'X3' WALL MOCK-UP FOR APPROVAL BEFORE INSTALLATION.
* STUCCO	STUCCO SMOOTH/ROUGH (BACK ELEVATION)	LIGHT BEIGE	PROVIDE SAMPLES AND 3'X3' WALL MOCK-UP FOR APPROVAL BEFORE INSTALLATION.
* CAST-IN-PLACE CONCRETE	EXPOSED SURFACE TO BE SMOOTH FINISH/EVEN	N/A	PROVIDE SAMPLES AND 3'X3' WALL MOCK-UP FOR APPROVAL BEFORE INSTALLATION.
* REBAR	#4	N/A	
* MORTAR	1/2" TYPICAL WITH GERMAN SMEAR FINISH (FRONT ELEVATION) ON STONE VENEER	WHITE	PROVIDE SAMPLES AND 3'X3' WALL MOCK-UP FOR APPROVAL BEFORE INSTALLATION.
DESCR.	SPECIFICATIONS/FINISH	APPROX. QUANTITY	
* 0740-6005	ANTI-GRAFFITI COATING (PERMANENT - TY III) SUBSIDIARY TO ITEM 423-6015. APPLY TO FRONT, TOP, AND ENDS OF	176 SF	

\* SUBSIDIARY TO ITEM 423-6015



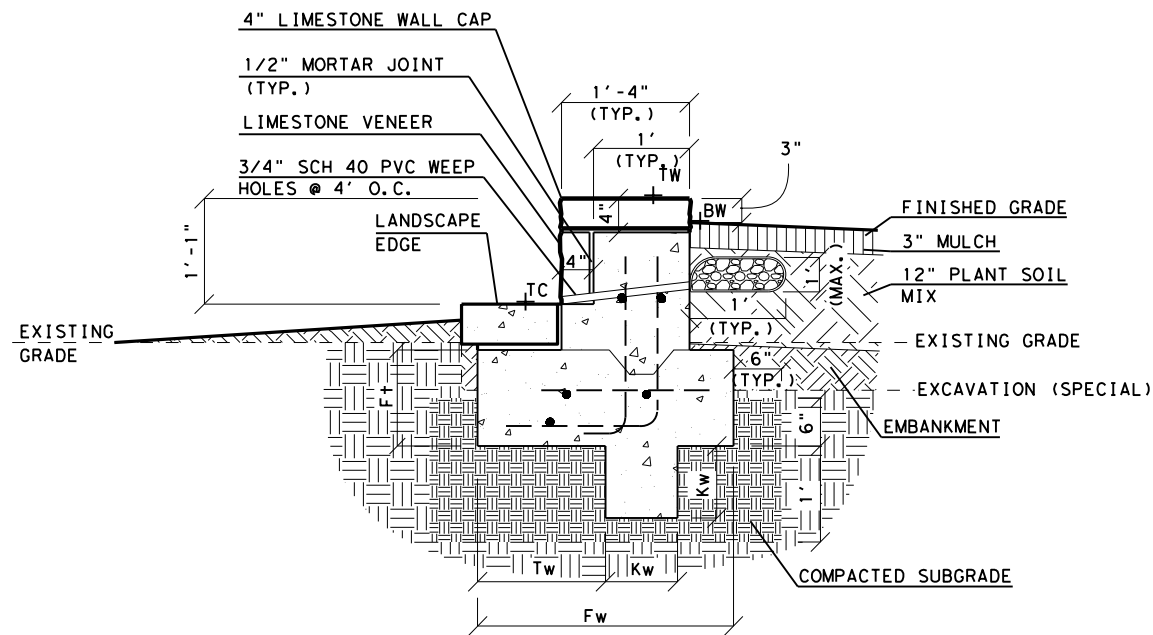
06/28/2022

CUERO GCAA  
 MISCELLANEOUS  
 DETAILS

SHEET 2 OF 3

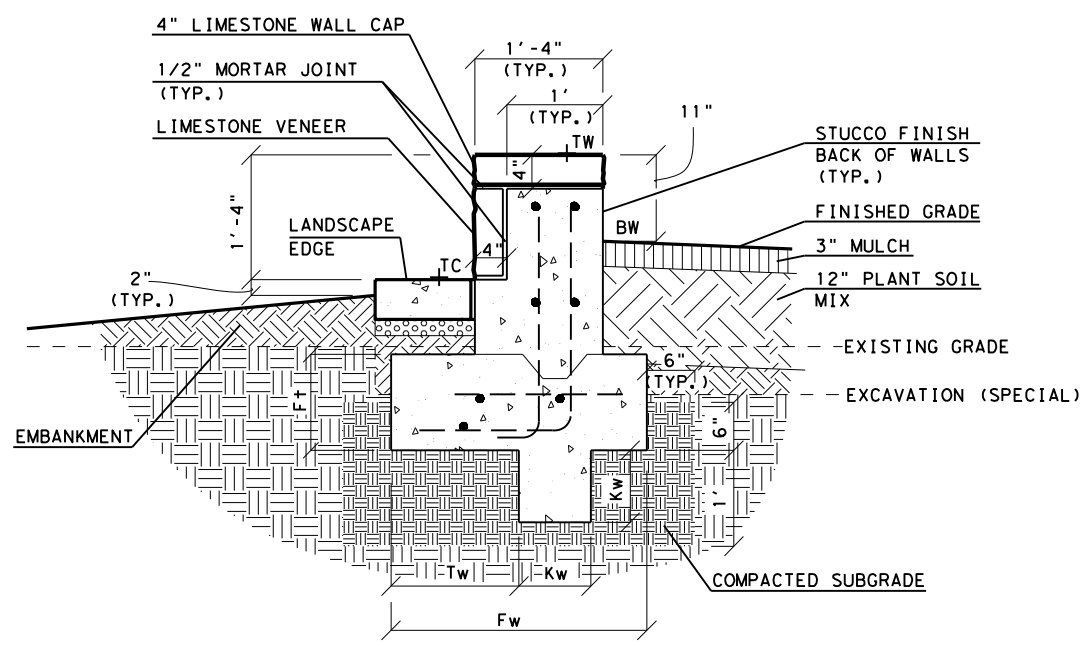
CONT	SECT	JOB	HIGHWAY
0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	39	

DWG:   
 CHK:   
 DWF:   
 C&E:

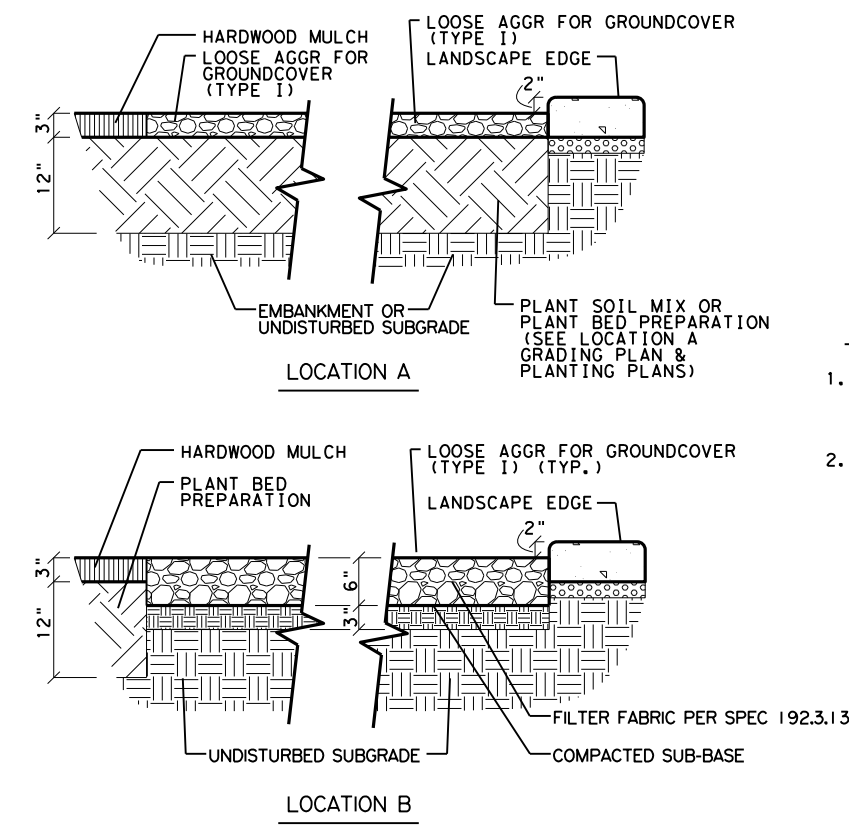


**1** RETAINING WALL (SPECIAL) SECTION  
**40** ITEM 423-6015  
 SCALE: 1/2"=1'

NOTES:  
 1. SEE SHEET 39 FOR RETAINING WALL (SPECIAL) NOTES.



**2** RETAINING WALL (SPECIAL) SECTION  
**40** ITEM 423-6015  
 SCALE: 1/2"=1'

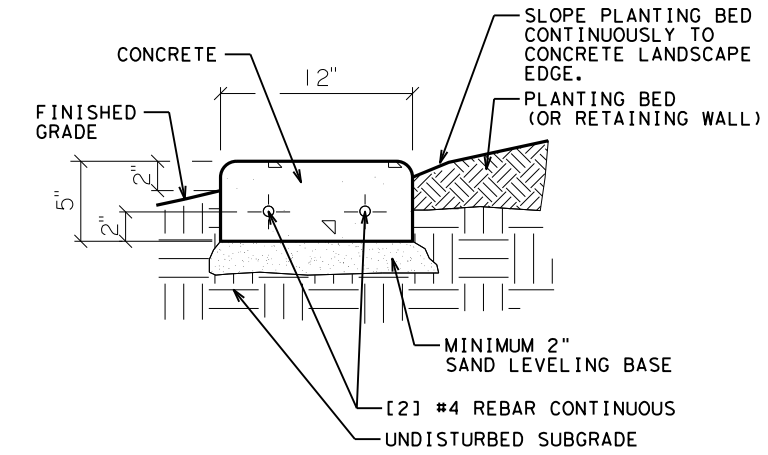


NOTES:  
 1. ALL LOOSE AGGR FOR GROUNDCOVER (TYPE I) SHALL BE PAID FOR UNDER ITEM 1005-6001.  
 2. ALL HARDWOOD MULCH IS SUBSIDIARY TO ITEM 192.

1005-6001 LOOSE AGGR FOR GROUNDCOVER - SCHEDULE OF MATERIALS AND FINISHES			
ITEM	DESCRIPTION	SPEC. OR FINISH	EXAMPLE OR EQUAL
1005-6001	LOOSE AGGR FOR GROUNDCOVER (TYPE I)	GUADALUPE RIVER ROCK, 2-4"	COLLIER MATERIALS OR APPROVED EQUAL

**3** LOOSE AGGR FOR GROUNDCOVER (TYPE I)  
**40** 1005-6001  
 SCALE: 1/2"=1'

NOTES:  
 1. DOWEL WITH [2] 12" LONG REBAR @ EACH CONSTRUCTION JOINT MINIMUM EVERY 40' O.C.  
 2. LEVELING BASE SUBSIDIARY TO ITEM 192. PRICE SHOULD INCLUDE EXCAVATION, LEVELING BASE, CONCRETE, AND STEEL.



**4** LANDSCAPE EDGE  
**40**  
 SCALE: 1"=1'



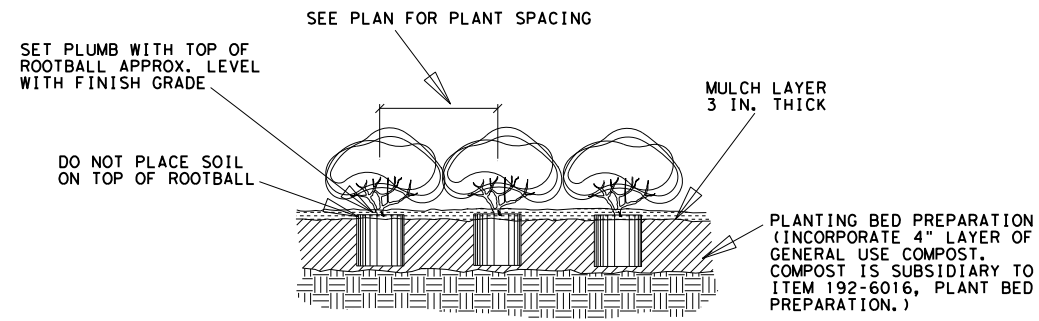
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CUERO GCAA  
 MISCELLANEOUS  
 DETAILS

SHEET 3 OF 3

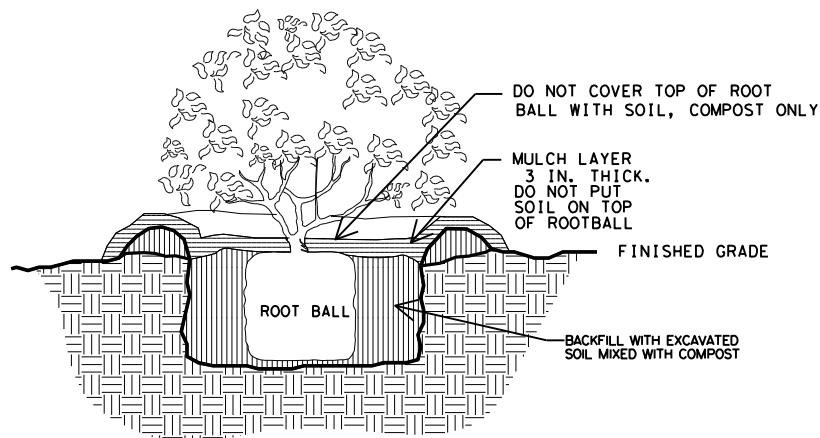
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0913	17	044	VARIOUS
DIST	COUNTY	SHEET NO.	
YKM	DEWITT	40	

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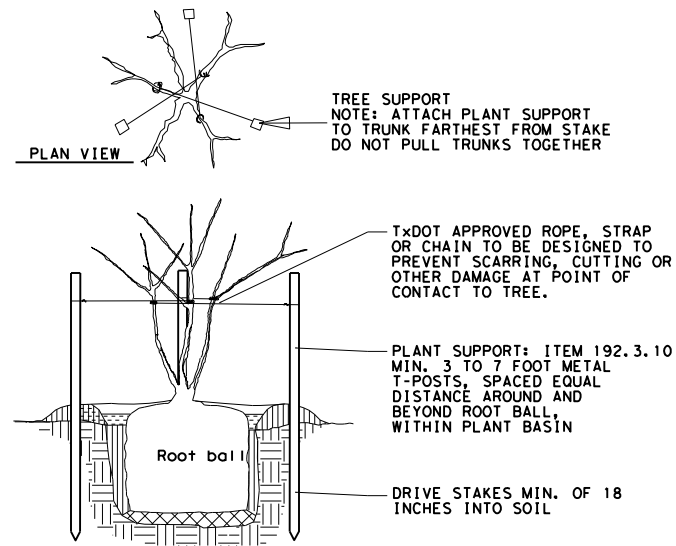
**SHRUB PLANTING IN MASS BEDS**

NTS



**SHRUB AND GROUNDCOVER PLANTING**

NTS



**TREE SUPPORT - MULTI-TRUNKED**

NTS

**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. PROVIDE & INSTALL 4" GENERAL USE COMPOST (SUBSIDIARY TO ITEM 192-6016) & 8" TOPSOIL (ITEM 192-6014) IN ALL PLANTING AREAS.
4. TILL/DISC SOIL TO A SMOOTH CONSISTENCY TO A DEPTH OF TWELVE (12) INCHES.
5. AFTER PLANTING, MULCH BEDS WITH HARDWOOD MULCH (SUBSIDIARY TO ITEM 192) OR LOOSE AGGR FOR GROUNDCOVER (TYPE I) (PAID FOR UNDER ITEM 1005-6001) TO A DEPTH OF 3". SEE PLANS FOR MULCH AND LOOSE AGGREGATE FOR GROUNDCOVER (TYPE I) LOCATIONS.

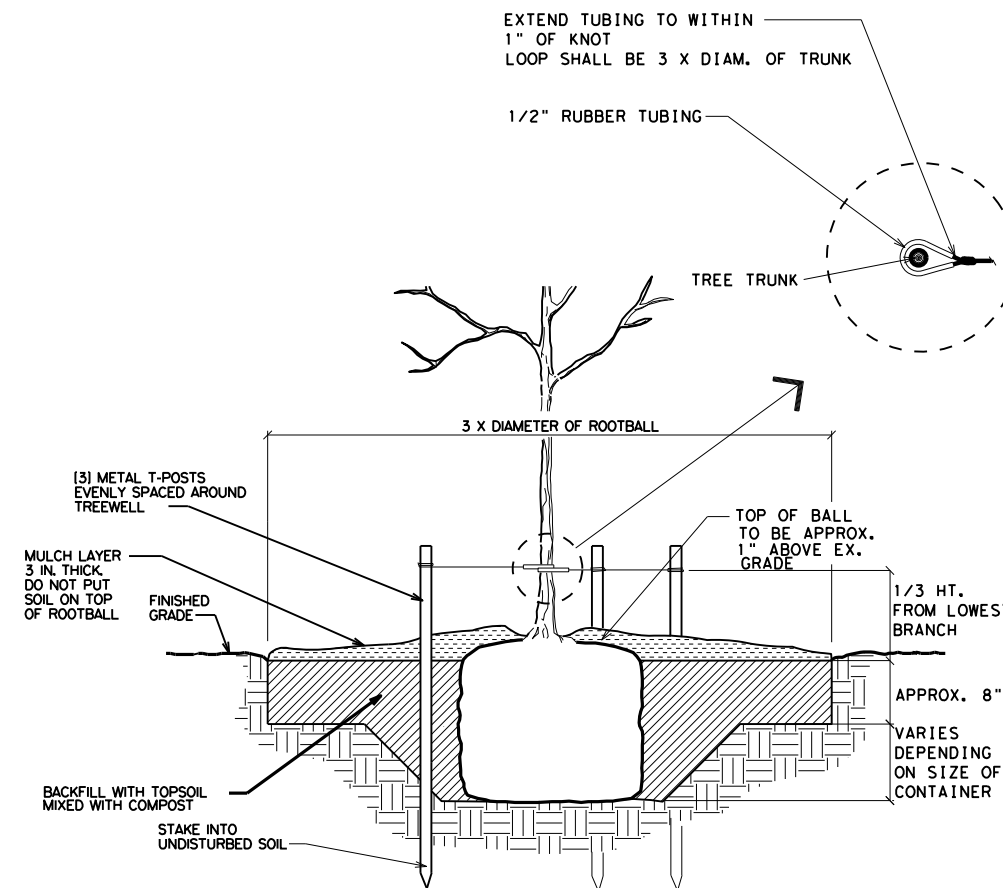
**PLANT SOIL MIX (LOCATION A1 ONLY)**

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 EXCAVATION IS COMPLETED AND EMBANKMENT INSTALLED (WHERE APPLICABLE), SPREAD PLANT SOIL MIX IN AREAS SHOWN ON PLANS TO A DEPTH OF 12". ENSURE SMOOTH CONSISTENCY.
3. AFTER PLANTING, MULCH BEDS WITH HARDWOOD MULCH (SUBSIDIARY TO ITEM 192) OR LOOSE AGGR FOR GROUNDCOVER (TYPE I) (PAID FOR UNDER ITEM 1005-6001) TO A DEPTH OF 3". SEE PLANS FOR MULCH AND LOOSE AGGREGATE FOR GROUNDCOVER (TYPE I) LOCATIONS.

**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 PLANTING AREAS TO BE MULCHED AFTER PLANTING TO THE DEPTH INDICATED IN THE DETAILS. PROVIDE HARDWOOD MULCH WITH A MINIMUM 3/8" (NOT OVER 25% BY VOLUME) OF FINE PARTICLES AND DUST, OR LOOSE AGGR FOR GROUNDCOVER (TYPE I) (SEE PLANS). PROVIDE MULCH FREE OF ANY PLASTIC, GLASS, METALS AND OTHER CONTAMINANTS (STICKS, STONES (IF HARDWOOD MULCH), CLAY, OR OTHER FOREIGN MATTER).



**TREE PLANTING AND STAKING**

NTS



06/28/2022

**PLANTING AND ESTABLISHMENT  
LANDSCAPE DETAILS  
(SHEET 1 of 2)**



FILE#							SHEET
ORIG DATE:							41
REVISIONS	DISTRICT	COUNTY	CONTROL	SECT	JOB	HIGHWAY	
	YKM	DEWITT	0913	17	044	VARIOUS	

WATERING SCHEDULE FOR AREAS WITH IRRIGATION SYSTEM		
ITEM DESCRIPTION	PHASE	FREQUENCY / RATE
SHRUBS	Construction/installation operations, Item 192.3	SEE IRRIGATION SCHEDULE, IRRIGATION DETAILS SHEET 2 OF 2
	90-day Maintenance period, Item 192.3	
TREES	Construction/installation operations, Item 192.3	SEE IRRIGATION SCHEDULE, IRRIGATION DETAILS SHEET 2 OF 2
	90-day Maintenance period, Item 192.3	
<p><b>NOTES:</b></p> <p>Provide water necessary to meet the quality and schedule shown above. Water required for construction/installation operations &amp; 90-day Maintenance period water required is subsidiary to Item 192 and will not be paid for separately.</p> <p>Rate and frequency may be adjusted to meet site conditions and weather as approved or directed by engineer.</p> <p>Refer to Item 168.2 for water quality information.</p> <p>At the time of installation all plants are to be watered manually the same day as planting at a rate and frequency shown above.</p> <p>Stressed plant material will be rejected according to Item 192.2.2 and replaced.</p>		

**PLANT SPECIFICATIONS**

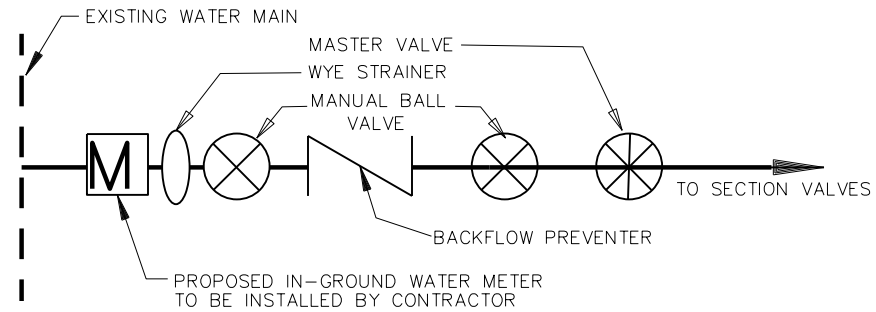
Item	Common Name	Botanical Name	Quantity	Size	Min. Caliper	Min. Height	Min. Spread	Spacing	Notes
0192-6002	Silver Ponyfoot	Dichondra argentea	8	1 GAL.		6"	6"	18" O.C.	Container grown
	Cherry Sage	Salvia greggii	8	1 GAL.		6"	6"	24" O.C.	Container grown, pink flower
	Texas Sedge	Carex texensis	15	1 GAL.		6"	6"	18" O.C.	Container grown
<b>TOTAL: 31</b>									
0192-6003	Lantana Carnival	Lantana camara 'Carnival'	9	3 GAL.		12"	12"	30" O.C.	Container grown, 'Carnival'
	Lantana Lemon Zest	Lantana camara 'Lemon Zest'	19	3 GAL.		12"	12"	30" O.C.	Container grown, 'Lemon Zest'
<b>TOTAL: 28</b>									
0192-6004	Dwarf Yaupon	Ilex vomitoria 'Nana'	8	5 GAL.		6"	12"	48" O.C.	Container grown, 'Nana'
	Red Yucca	Hesperaloe parviflora	10	5 GAL.		12"	12"	36" O.C.	Container grown
	Red Yucca	Hesperaloe parviflora 'Yellow'	3	5 GAL.		12"	12"	36" O.C.	Container grown, 'Yellow'
	Century plant	Agave americana	5	5 GAL.		12"	12"	as shown	Container grown
	Twistleaf Yucca	Yucca rupicola	18	5 GAL.		12"	12"	36" O.C.	Container grown
	Dwarf Wax Myrtle	Myrica cerifera 'Don's Dwarf'	2	5 GAL.		12"	12"	5' O.C.	Container grown, 'Don's Dwarf'
<b>TOTAL: 46</b>									
0192-6024	Desert Willow	Chilopsis linearis	6	30 GAL	2"	5'	4'	as shown	Container grown
<b>TOTAL: 6</b>									



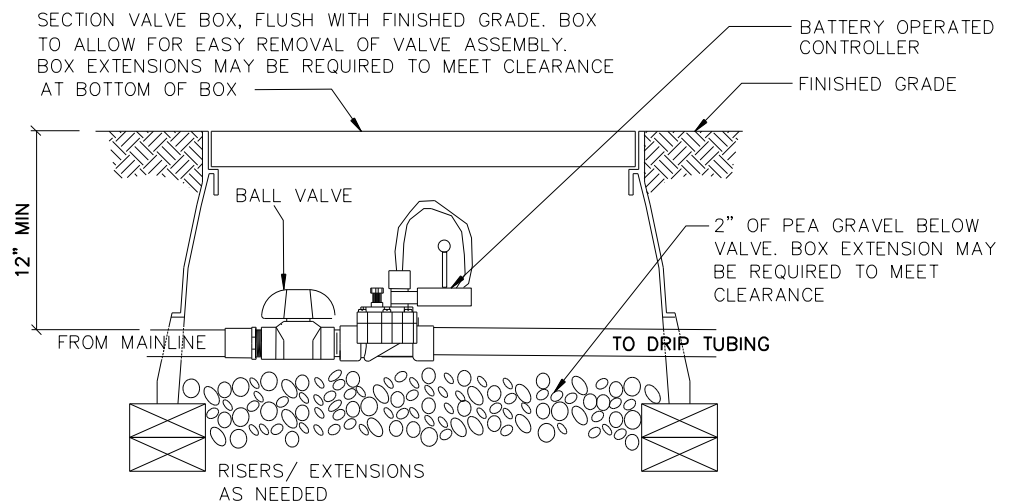
06/28/2022

**PLANTING AND ESTABLISHMENT  
LANDSCAPE DETAILS  
(SHEET 2 of 2)**

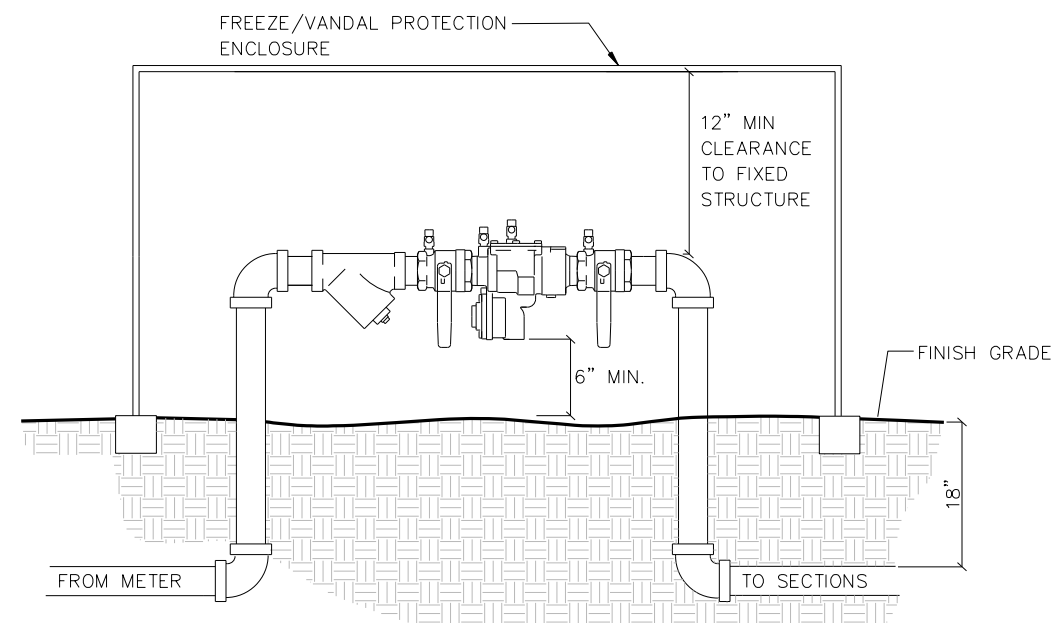
© 2022			
FILE#		SHEET	
ORIG DATE:		42	
REVISIONS	DISTRICT	COUNTY	CONTROL SECT JOB HIGHWAY
	YKM	DEWITT	0913 17 044 VARIOUS



**1** TYPICAL TAP AND METER ASSEMBLY NTS

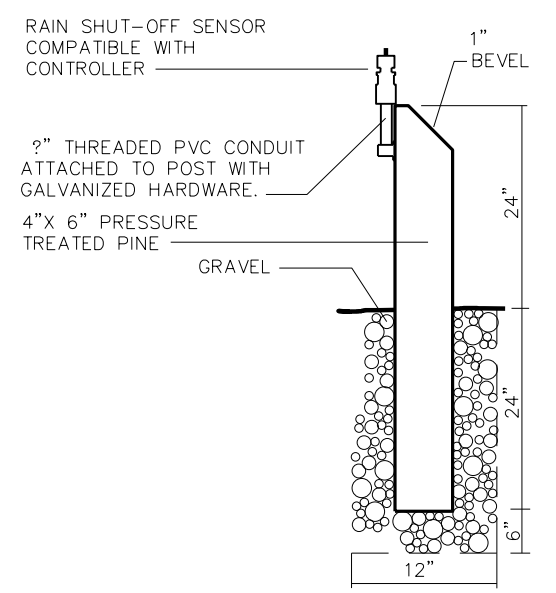


**4** REMOTE CONTROL VALVE ASSEMBLY NTS  
 NOTE: VALVES ASSEMBLY SHALL BE LOCATED NEAR THE DESIGNATED PLANTING AREAS AS APPROVED BY ENGINEER.



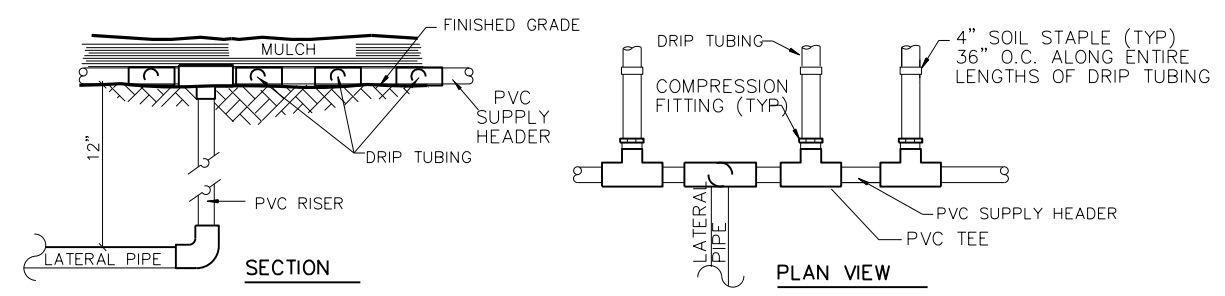
**2** RPZ BACKFLOW PREVENTER NTS

NOTE: TYPE OF BACKFLOW PREVENTER PER LOCAL CODE. LOCAL CODE SHALL HAVE PRECEDENT OVER THIS DETAIL.



**5** RAIN SENSOR NTS  
 SECTION

PLACE RAIN SENSOR POST AS DIRECTED. DO NOT EXCEED MAXIMUM WIRE DISTANCE LIMITS FROM CONTROLLER TO SENSOR.



**3** RISER DETAIL FOR SUPPLY HEADER TO DRIP TUBING IN BEDS NTS

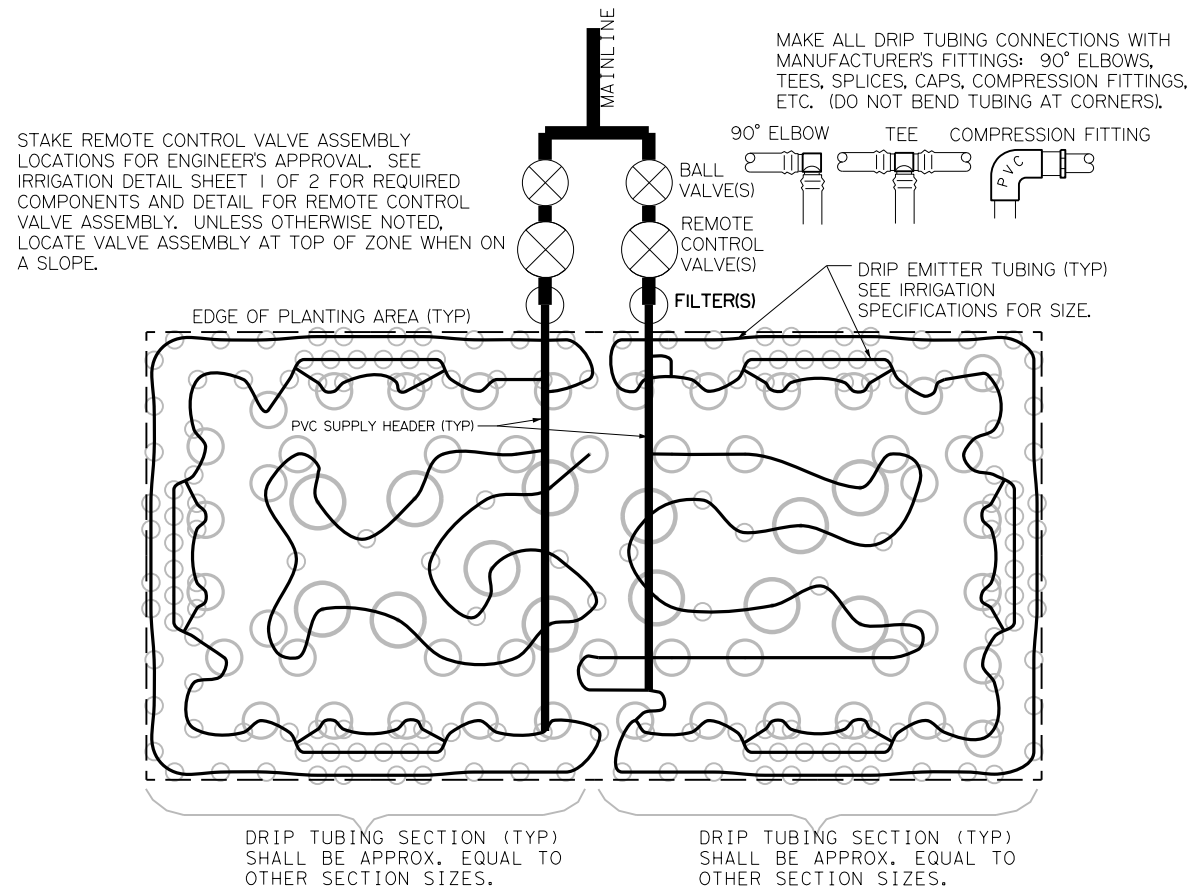


06/28/2022

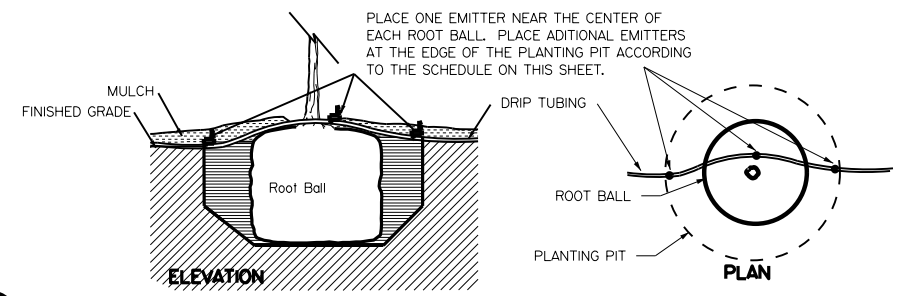
IRRIGATION DETAILS  
 (SHEET 1 OF 2)

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 Design Division (Landscape Design and Enhancement)

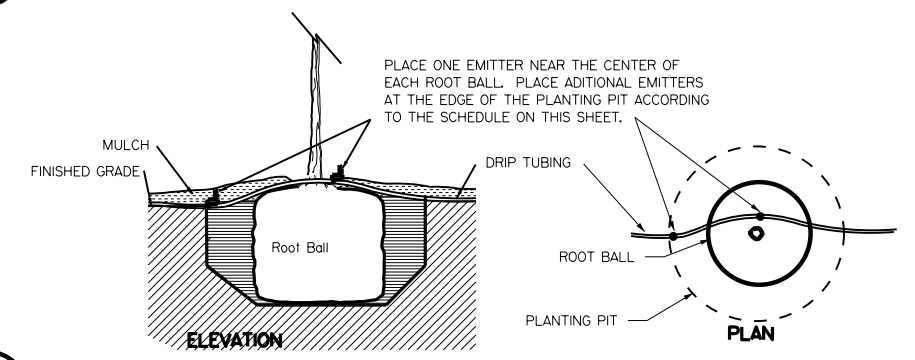
FILE#	PROJECT NUMBER					
ORIG DATE#	SEE TITLE SHEET					43
REVISIONS	DISTRICT	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	YKM	DEWITT	0913	17	044	VARIOUS



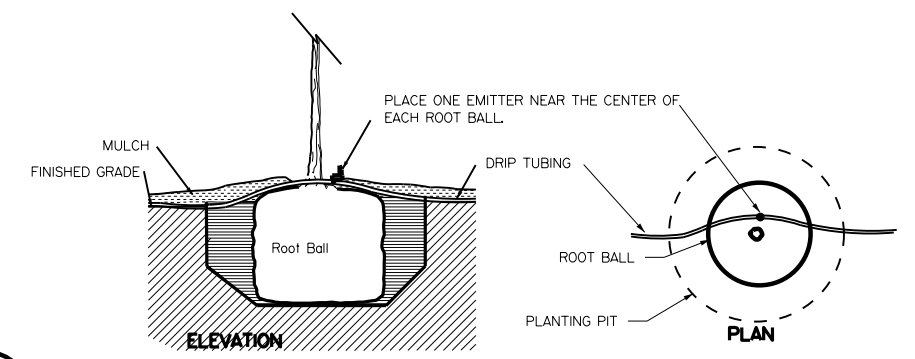
**1** DRIP TUBING LAYOUT WITH REMOTE CONTROL VALVE ASSEMBLY NTS



**2** INDIVIDUAL EMITTER PLACEMENT - #30 CONTAINER



**3** INDIVIDUAL EMITTER PLACEMENT - #5 CONTAINER



**4** INDIVIDUAL EMITTER PLACEMENT - #1 & #3 CONTAINER

EMITTER PLACEMENT SCHEDULE		
PLANT CONTAINER SIZE	EMITTER	
	QTY	NOMINAL FLOW
#30 CONTAINER	3	2 GPH
#5 CONTAINER	2	2 GPH
#3 CONTAINER	1	2 GPH

IRRIGATION SCHEDULE *		
WEEK AFTER PLANTING	IRRIGATION INTERVAL	RUN TIME
1 THRU 6	2 DAYS	45 MINUTES
7 THRU 12	3 DAYS	45 MINUTES
13 THRU 104	4 DAYS	45 MINUTES
105 THRU 156	AS NEEDED	AS NEEDED

\* IRRIGATION SCHEDULE IS SUGGESTED BASELINE STARTING SCHEDULE. BE RESPONSIBLE FOR MONITORING PLANT MATERIAL TO ENSURE IT RECEIVES ADEQUATE MOISTURE FOR THRIVING GROWTH AND ADJUST SCHEDULE ACCORDINGLY.



06/28/2022

IRRIGATION DETAILS  
(2 OF 2 SHEET)

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Design Division (Landscape Design and Enhancement)

FILE:	PROJECT NUMBER					
ORIG DATE:	SEE TITLE SHEET					
REVISIONS	DISTRICT	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	YKM	DEWITT	0913	17	044	VARIOUS

**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 contractor 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 meters are existing on site and shall remain operational during the project. The contractor shall tie into existing irrigation mainline and the remaining portion of the irrigation system shall remain operational and turned on through all phases of the contract to ensure plants receive required watering.
3. Backflow preventers are also existing, but shall be replaced if not operating properly, as required by engineer. 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 diagrammatic 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 4 feet on each side thereof. Bores and sleeves shall be stubbed up vertically to be visible after grading and other work. Boring and sleeves shall be incidental to irrigation system. Bore encasement pipe must be installed same day as boring. 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.
8. 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.
9. All water lines, valves, and sprinkler bodies shall be thoroughly flushed before installing dripline or sprinkler nozzles.
10. 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.
11. 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.

**IRRIGATION MATERIALS SPECIFICATIONS**

DESCRIPTION	* EXAMPLE OR EQUAL	SIZE	APPROXIMATE QUANTITIES FOR INFORMATIONAL PURPOSE ONLY	
			IRRIGATION SYSTEM (LOCATION A)	IRRIGATION SYSTEM (LOCATION B)
WATER METER	PER LOCAL CODE	1"	1	1
REMOTE CONTROL DRIP VALVE	XCZ 100 PRF	1"	2	1
CONTROLLER SPECIFICATION	HUNTER NODE	ONE STATION	2	1
BACKFLOW PREVENTER	DOUBLE CHECK	1"	1	1
DRIPLINE TUBING	RAINBIRD XF SERIES BLANK TUBING XFD500		AS NEEDED	AS NEEDED
POINT SOURCE DRIP EMITTERS	HUNTER HE-20-B	0.6 GAL./HR	AS NEEDED	AS NEEDED
WYE STRAINER		1"	1	1
PVC SCH 80 CASING Pressure rated with slip type solvent welded joints		4"	AS NEEDED	AS NEEDED
PVC SCH 40 MAINLINE Pressure rated with twin gasket couplings and fittings or slip type solvent welded joints		1"	AS NEEDED	AS NEEDED
PVC CLASS 200 LATERALS AND HEADERS		3/4"	AS NEEDED	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	AS NEEDED
FITTINGS All fittings incorporated into system shall be of the same type, size and class material as the pipe			AS NEEDED	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 splices 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 enclosure or an approved equal		14 GA.	AS NEEDED	AS NEEDED
SOLVENT CEMENT Solvent cement shall be the type recommended by the pipe manufacturer			AS NEEDED	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.	QUANTITY AS REQUIRED FOR SECTION VALVES, BELOW GROUND BACKFLOW PREVENTORS, QUICK COUPLING VALVES AND ANY ACCESSORIES	
VALVE BOX RISERS		BOX RISER SHALL EXTEND BELOW VALVES AS SHOWN ON DETAIL SHEET	QUANTITY AS REQUIRED FOR SECTION VALVES, BELOW GROUND BACKFLOW PREVENTORS, QUICK COUPLING VALVES AND ANY ACCESSORIES	
RAIN/FREEZE SENSORS/ASSEMBLY	WIRELESS RAIN/FREEZE SENSOR		2 TOTAL INSTALLED AS PER DETAIL SHEET AT MASTER VALVE	

\* 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.



06/28/2022

**IRRIGATION SPECIFICATIONS**



FILE#	PROJECT NUMBER					
ORIG DATE#	SEE TITLE SHEET					45
REVISIONS	DISTRICT	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	YKM	DEWITT	0913	17	044	VARIOUS

**SITE DESCRIPTION**

PROJECT LIMITS: From US 183 @ US 77A to Clinton Rd

PROJECT DESCRIPTION: Landscape Development consisting of Landscaping in Cuero - GCAA 2021

MAJOR SOIL DISTURBING ACTIVITIES: Major soil disturbing activities may include but are not limited to: Excavation, fill behind retaining walls, final grading and placement of topsoil and the following: installation of retaining walls, planting, and irrigation systems.

Storm Water Pollution Prevention Plans (SW3P) are a part of a project's construction plans and the construction plans contain information that supplements a project SW3P; project plans provide information on changes in elevations, the locations where dirt has been removed and where dirt has been added, on construction sequencing and scheduling and other data that may be important to a full understanding of TCEQ storm water requirements and the project SW3P.

TOTAL PROJECT AREA: Approximately 3 acres.

TOTAL AREA TO BE DISTURBED: Approximately 0.13 acres.

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: The existing soils are as follows:  
CrA - Crockett fine sandy loam, 0 to 1 percent slopes  
CuB - Cuero sandy clay loam, 0 to 2 percent slopes  
To - Trinity clay, occasionally flooded

Grass slopes, ditches, trees, and brush; 90%

NAME OF RECEIVING WATERS: Guadalupe River below San Marcos River (segment No. 1803)

**SOIL STABILIZATION PRACTICES:**

- TEMPORARY SEEDING
- PERMANENT PLANTING, SODDING, OR SEEDING
- MULCHING
- SOIL RETENTION BLANKET
- BUFFER ZONES
- OTHER

NOTE: Stabilization measures must be initiated immediately in portions of the site where construction activities have temporarily ceased and will not resume for a period exceeding 14 calendar days. Stabilization measures that provide a protective cover must be initiated immediately in portions of the site where construction activities have permanently ceased.

**STRUCTURAL PRACTICES:**

- SILT FENCES
- HAY BALES
- SANDBAGS
- DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- DIVERSION DIKE AND SWALE COMBINATIONS
- ROCK FILTER DAMS
- PAVED FLUMES/RIPRAP
- ROCK BEDDING AT CONSTRUCTION EXIT
- TIMBER MATTING AT CONSTRUCTION EXIT
- CHANNEL LINERS
- SEDIMENT TRAPS/BASINS
- GABIONS
- STORM INLET SEDIMENT TRAP
- STONE OUTLET STRUCTURES
- CURBS AND GUTTERS
- STORM SEWERS
- VELOCITY CONTROL DEVICES
- BIODEGRADABLE EROSION CONTROL LOGS

OTHER: \_\_\_\_\_

**NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:**

The order of activities will be as follows:

1. Install Temporary Erosion Control Logs.
2. Construction activities begin.
3. Install sod and seed as shown on plans.
4. Remove Temporary Erosion Control Logs.

Contractor-generated schedules are incorporated into the projects SW3P by reference.

For construction projects, the Yoakum District of the Texas Department of Transportation uses SiteManager, a computer based construction record-keeping system. Documentation describing major grading activities, temporary or permanent cessation of construction, and stabilization measures is a part of this system and is incorporated by reference into this SW3P.

For RMC/Maintenance projects, documentation describing major grading activities, temporary or permanent cessation of construction, and stabilization measures is recorded in a project diary, and is incorporated by reference into this SW3P.

**STORM WATER MANAGEMENT:** Storm Water Drainage will be provided by grass "flat bottom & V bottom" ditches. This system will carry drainage within the right of way to lows in the highway where cross drainage occurs. The cross drainage structures will be protected with structural practices as indicated above.

Sediment control devices will remain in place until at least 70% regrowth of vegetation has occurred. At this time the new vegetation will act as a filter strip for post construction TSS control upon removal of the device.

A site (visual & odor) assessment of water quality leaving the project site; water quality leaving the construction site has been of good quality, with no visually apparent sediments, litter, fertilizers, or surfactants. The water has no petroleum or other odor. Even so, it might be expected that some sediment and litter will escape the project site and that petroleum products leaking from motor vehicles that travel through the site may lower the quality of runoff water.

**EROSION AND SEDIMENT CONTROLS**

**OTHER EROSION AND SEDIMENT CONTROLS:**

MAINTENANCE: All erosion and sediment controls will be maintained in good working order. If a repair is necessary, it will be done at the earliest date possible, but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. The areas adjacent to creeks and drainage ways shall have priority followed by devices protecting storm sewer inlets. Sediment must be removed from control measures when the design capacity is reduced by 50 percent. If sediment escapes the construction site, off site accumulation of sediment must be removed at a frequency to minimize off-site impacts.

INSPECTION: An inspection will be performed by a TxDOT inspector at least every 7 calendar days. An Inspection and Maintenance Report will be made per each inspection. Based on the inspection results, the controls shall be revised per the inspection report.

WASTE MATERIALS: The contractor shall adequately store all construction waste materials to prevent these materials from becoming pollutants and to minimize pollutant discharges from the storage locations. No construction waste material will be buried on site. Litter and construction chemicals shall be properly contained and prevented from becoming a pollutant in storm water discharge.

Potential pollutants will primarily be from the sediments leaving the project right-of-way and petroleum products. Principal sources of pollution will be disturbed soil from grading and excavating and other roadway construction activities, litter and debris from construction activities, gasoline, oil, and grease from asphalt distributor vehicles, scrapers, trucks, rollers, compactors, and fuel trucks during daily, routine operations.

The contractor will maintain a clean, orderly construction site. Construction waste including trash, rubble, scrap and vegetation shall be disposed of in lidded dumpsters or in a manner approved by the Project Engineer. Disposal methods must meet Federal, State, and Local waste management guidelines. No construction waste will be buried or burned on site. Spills disposal, material storage, and material resulting from the destruction of existing roads and structures shall be stored in areas approved by the Project Engineer and protected from runoff. All waterways shall be cleared of temporary embankment, temporary bridges, matting, false work piling, debris, or other obstructions placed during construction operations, that are not part of the finished work, as soon as practicable. All excess soil generated by the construction will be collected and disposed of by the contractor. Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body, or stream bed.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): At a minimum, any product in the following categories are considered to be hazardous: Paints, Acids for cleaning masonry surfaces, Cleaning Solvents, Asphalt Products, Chemical Additives for soil stabilization, or Concrete Curing Compounds and additives. In event of a spill which may be hazardous, the Spill Coordinator should be contacted immediately.

SANITARY WASTE: All sanitary waste will be collected from the portable units as necessary or as required by local regulation by a licensed sanitary waste management contractor.

**OFFSITE VEHICLE TRACKING:**

- HAUL ROADS DAMPENED FOR DUST CONTROL
- LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- EXCESS DIRT ON ROAD REMOVED DAILY
- STABILIZED CONSTRUCTION ENTRANCE

OTHER: \_\_\_\_\_

REMARKS: Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, waterbody or streambed.

On and off site project specific locations including borrow pits and equipment staging areas are under the control of the contractor. The contractor will be obligated to comply with the requirements of the construction general permit.

All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.

**TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)**



FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.	
6	SEE TITLE SHEET	46	
STATE	DIST.	COUNTY	
TEXAS	YKM	DEWITT	
CONT.	SECT.	JOB	HIGHWAY NO.
0913	17	044	VARIOUS



**I. STORMWATER POLLUTION PREVENTION**

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit is required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506. If applicable list MS4 operator that may receive discharges from this project. MS4 operator should be notified prior to construction activities.

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

Comply with the SW3P and revise when necessary to control pollution or as required by the Engineer.

Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA, or other inspectors.

When Contractor project specific locations (PSL) increase disturbed soil area to 5 acres or more, submit Notice of Intent (NOI) to TCEQ and Engineer.

MS4 Operator(s):

No Additional Comments

**II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS**

United States Army Corps of Engineers (USACE) Permit is required for filling, dredging, excavating or other work in water bodies, rivers, creeks, streams, wetlands or wet areas. The Contractor must adhere to all of the terms and general conditions associated with the following permit(s). If additional work not represented in the plans is required, contact the Engineer immediately.

No USACE Permit Required

Work is authorized by the USACE under a Nationwide Permit \_\_\_\_\_ without a Pre-Construction Notification (PCN). Project specific permit was not issued by USACE, therefore is not in the plan set.

Work is authorized by the USACE under a Nationwide Permit \_\_\_\_\_ with a Pre-Construction Notification (PCN). The project specific permit issued by the USACE is included in the plan set.

Work is authorized by the USACE under a Individual Permit (IP). The project specific permit issued by the USACE is included in the plan set.

Work would be authorized by the USACE. The project specific permit issued by the USACE or Nationwide Permit will be provided to the contractor.

United States Coast Guard (USCG) Permit is required for projects that involve the construction or modification (including changes to lighting) of a bridge or causeway across a water body determined to be navigable by the United States Coast Guard (USCG) under Section 9 of the Rivers and Harbors Act. If additional work not represented in the plans is required, contact the Engineer immediately.

No United States Coast Guard (USCG) Coordination Required

United States Coast Guard (USCG) Permit

United States Coast Guard (USCG) Exemption

Best Management Practices

<b>Erosion</b>	<b>Sedimentation</b>	<b>Post Construction TSS</b>
<input checked="" type="checkbox"/> Mulch	<input type="checkbox"/> Silt Fence	<input checked="" type="checkbox"/> Vegetative Filter Strips
<input checked="" type="checkbox"/> Compost Filter Berm/Socks	<input type="checkbox"/> Rock Filter Dam	<input type="checkbox"/> Vegetation Lined Ditches
<input checked="" type="checkbox"/> Sodding	<input checked="" type="checkbox"/> Compost Filter Berm/Socks	<input type="checkbox"/> Grassy Swales

No Additional Comments

**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 area and contact the Engineer immediately.

No Additional Comments

**IV. VEGETATION RESOURCES**

Preserve native vegetation to the extent practical. Refer to TxDOT Standard Specifications 162, 164, 192, 193, 506, 730, 751, and 752 in order to comply with requirements for invasive species, beneficial landscaping and tree/brush removal.

No Additional Comments

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

If any of the listed species below are observed, cease work in the area, do not disturb species or habitat and contact the Engineer immediately.

The work may not remove active nests (from bridges, structures, or vegetation adjacent to the roadway, etc.) during nesting season (February 15 to October 1). If removal of structures or vegetation is necessary during the nesting season, the Contractor shall conduct a bird survey no more than 3 days in advance of the clearing/demolish start date. All bird surveys shall be conducted by a Field Biologist and adhere to the guidance document "Avoiding Migratory Birds and Handling Potential Violations" found in the TxDOT Environmental Compliance Toolkits at the time of the survey. (See below for Field Biologist and Ornithologist qualifications)

No Additional Comments

Field Biologist, Ornithologist – a field biologist is defined as an individual qualified to perform field investigations, presence/absence surveys and habitat surveys for protected avian species or species of concern. A mandatory bachelor's degree in biology or a related science is required. At a minimum, the Field Biologist, Ornithologist, shall have completed and reported a minimum of three presence/absence and habitat surveys for protected avian species in the past five years. A minimum of three projects must have been conducted in Texas. Surveys shall have been performed for documentation of species in accordance with a protocol approved by USFWS or TPWD, or following generally accepted methodologies.

**VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES**

Refer to TxDOT Standard Specifications in the event potentially contaminated materials are observed, such as dead or distressed vegetation, trash disposal areas, drums, canisters, barrels, leaching or seepage of substances, unusual smells or odors, or stained soil, cease work in the area and contact the Engineer immediately.


Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)? Yes  No

No further action required.

No Additional Comments

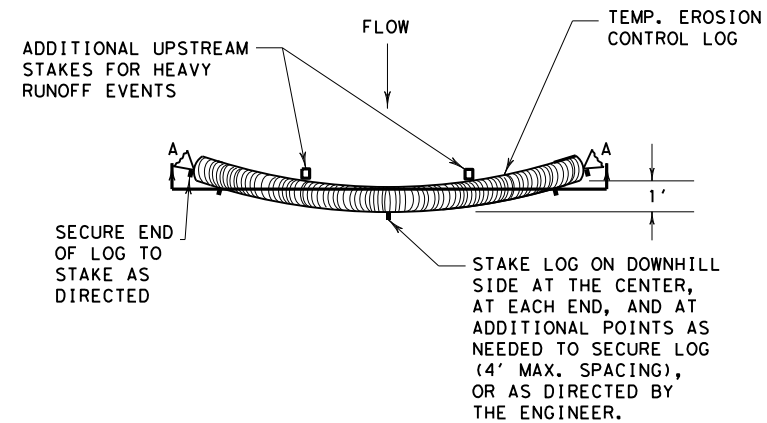
**VII. GENERAL NOTES**

TxDOT has determined that a USACE Nationwide or Individual Permit is not necessary for the project since all work shall be conducted outside the USACE jurisdictional areas. Any impacts to these jurisdictional areas by the contractor without a USACE permit will be the responsibility of the contractor. If the contractor deems it necessary to impact the USACE jurisdictional areas, then it becomes the contractor's entire responsibility to consult with the USACE pertaining to the need for a Nationwide or Individual Permit. TxDOT will then hold the contractor responsible for following all conditions of the approved Permit.

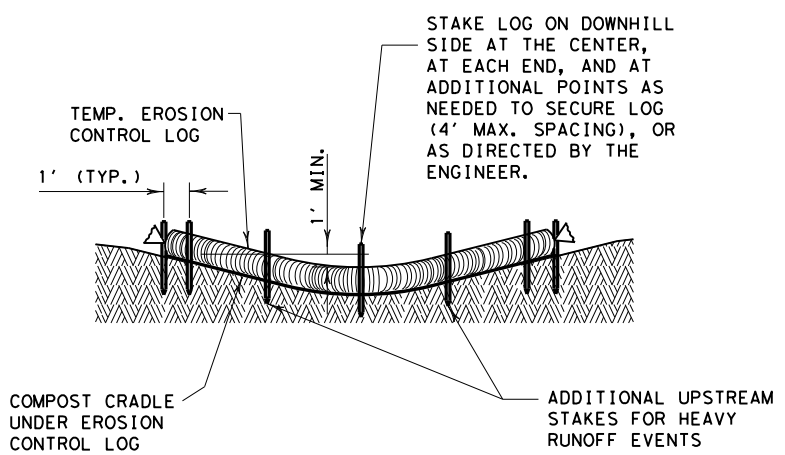
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<b>ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS</b>		
<b>EPIC</b>		
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© TxDOT: March 2017	CONT SECT	JOB HIGHWAY
REVISIONS		
0913	17	044 VARIOUS
DIST	COUNTY	SHEET NO.
YKM	DEWITT	47

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DATE: FILE:



PLAN VIEW



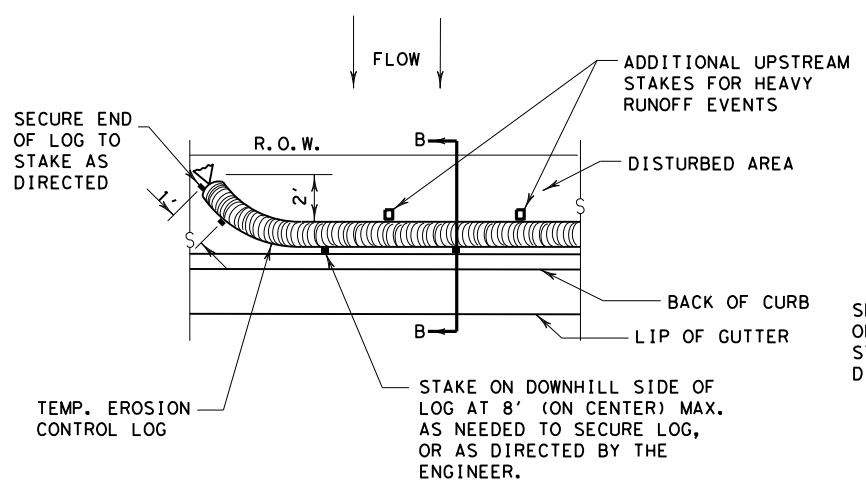
SECTION A-A

EROSION CONTROL LOG DAM

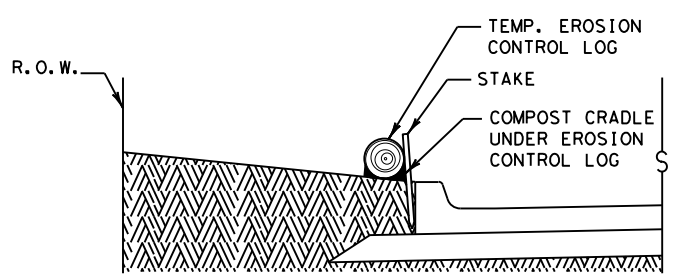
CL-D

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



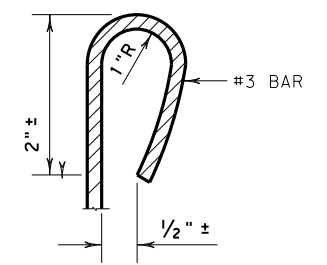
PLAN VIEW



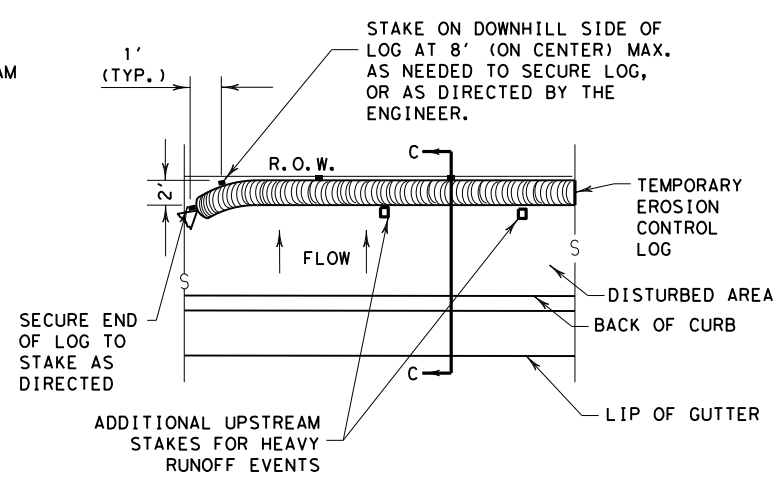
SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

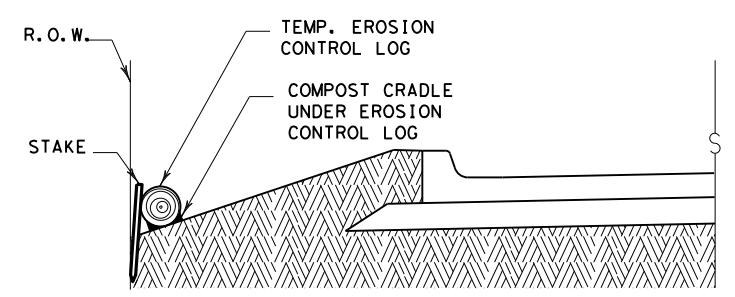
CL-BOC



REBAR STAKE DETAIL



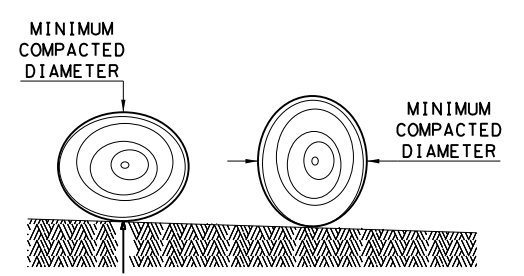
PLAN VIEW



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

**SEDIMENT BASIN & TRAP USAGE GUIDELINES**

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

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

Control logs should be placed in the following locations:

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

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

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

**GENERAL NOTES:**

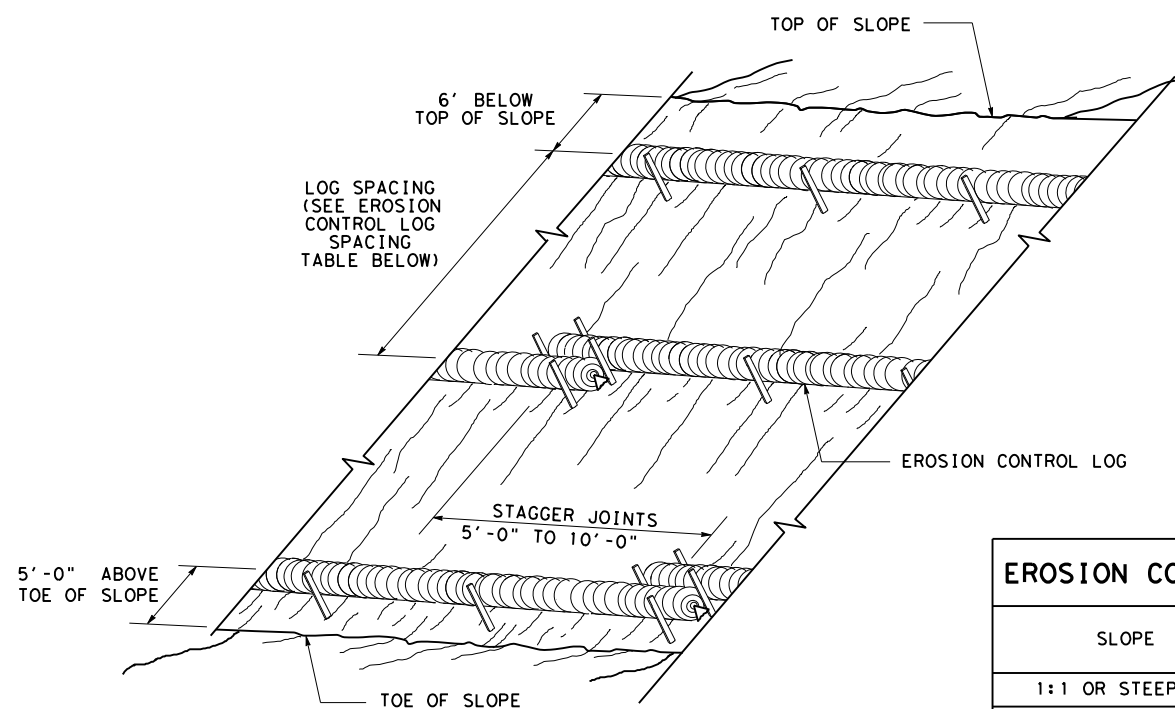
1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE 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.

SHEET 1 OF 3

		<i>Design Division Standard</i>		
<p><b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b></p> <p><b>EROSION CONTROL LOG</b></p> <p><b>EC (9) - 16</b></p>				
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	17	044	VARIOUS
	DIST	COUNTY	SHEET NO.	
	YKM	DEWITT	48	

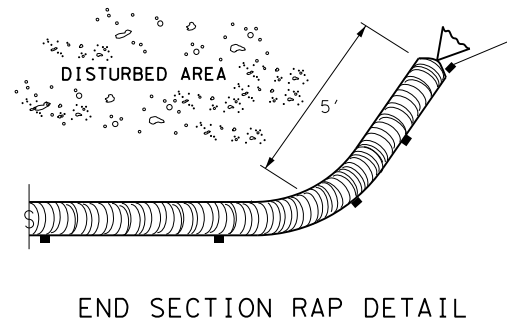
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DATE: FILE:



**EROSION CONTROL LOGS ON SLOPES  
STAKE AND TRENCHING ANCHORING**

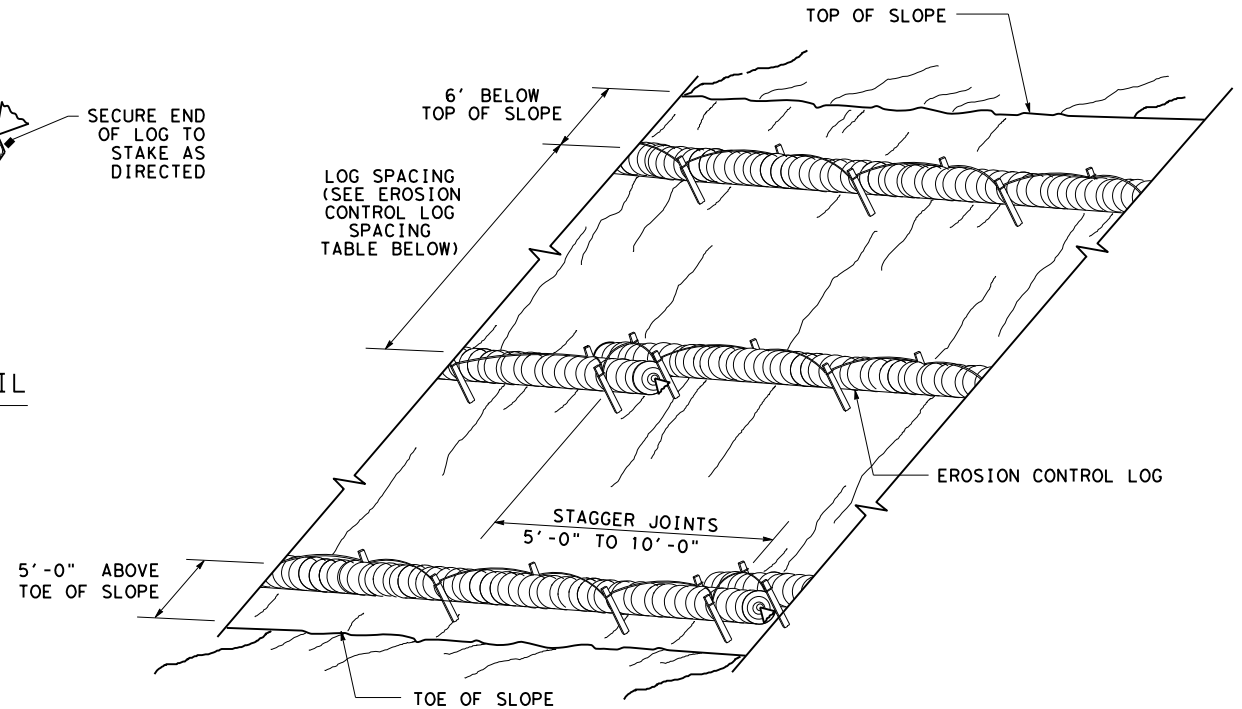
CL-SST



**END SECTION RAP DETAIL**

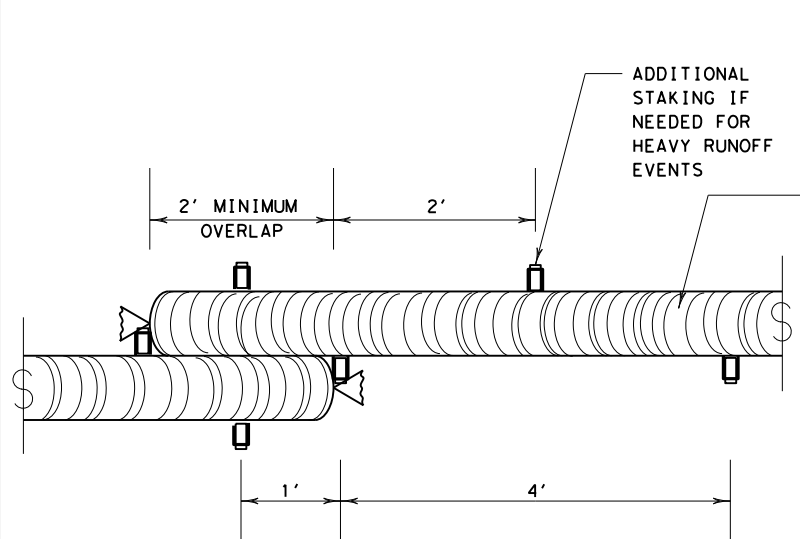
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

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



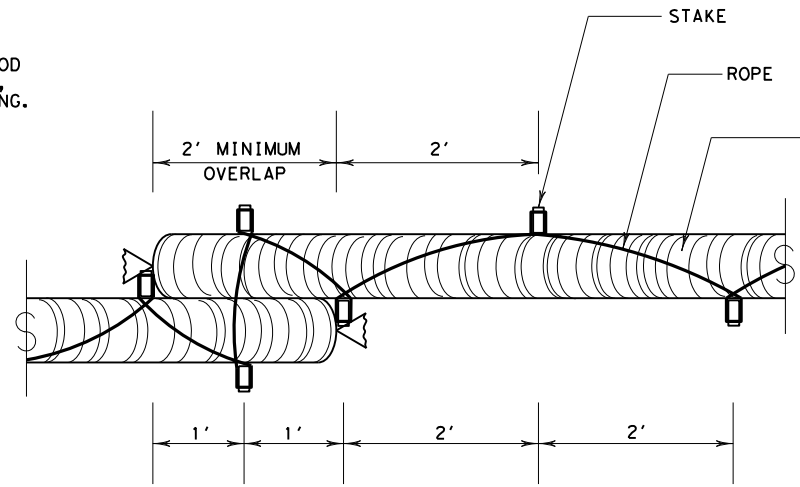
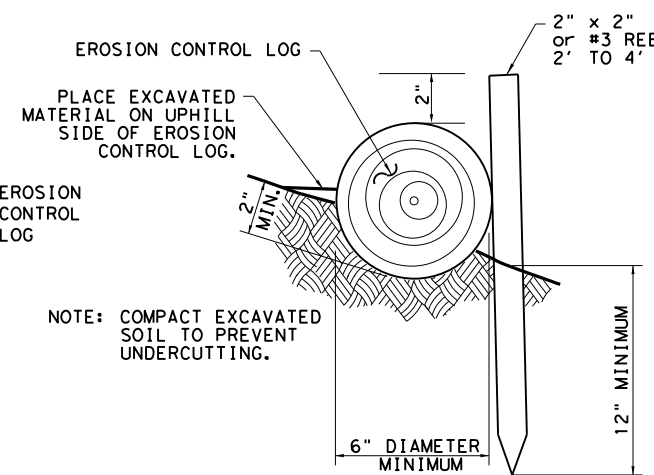
**EROSION CONTROL LOGS ON SLOPES  
STAKE AND LASHING ANCHORING**

CL-SSL



**STAKE AND TRENCHING ANCHORING DETAIL**

CL-SST

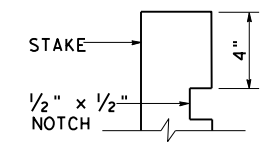


**STAKE AND LASHING ANCHORING DETAIL**

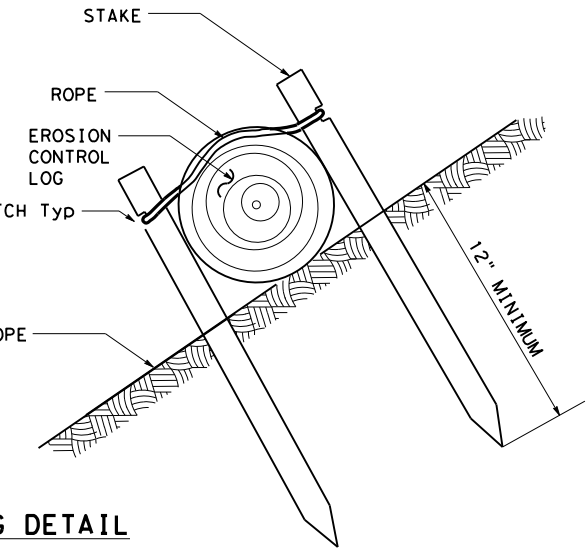
CL-SSL

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

**TRENCH DEPTH TABLE**



**STAKE NOTCH DETAIL**



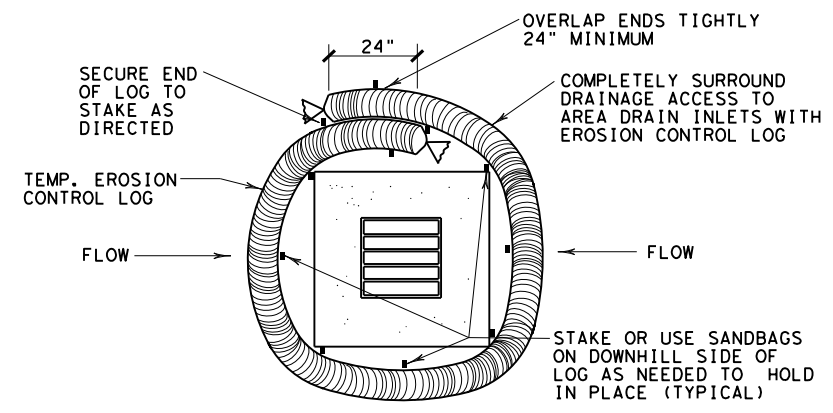
SHEET 2 OF 3

Design Division Standard

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

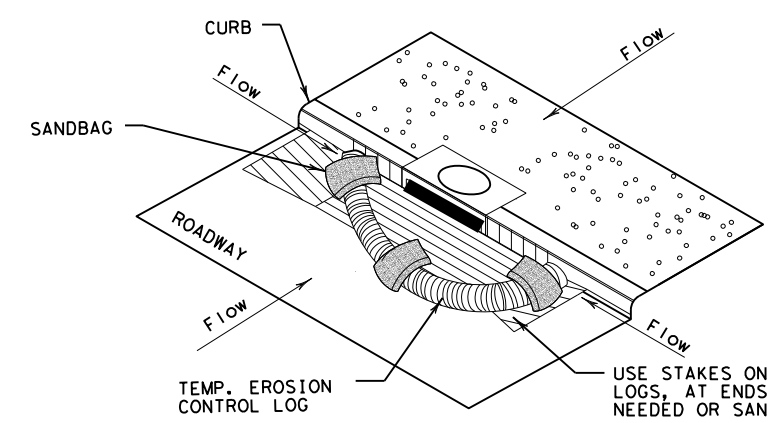
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0913	17	044	VARIOUS
	DIST	COUNTY	SHEET NO.	
	YKM	DEWITT	49	

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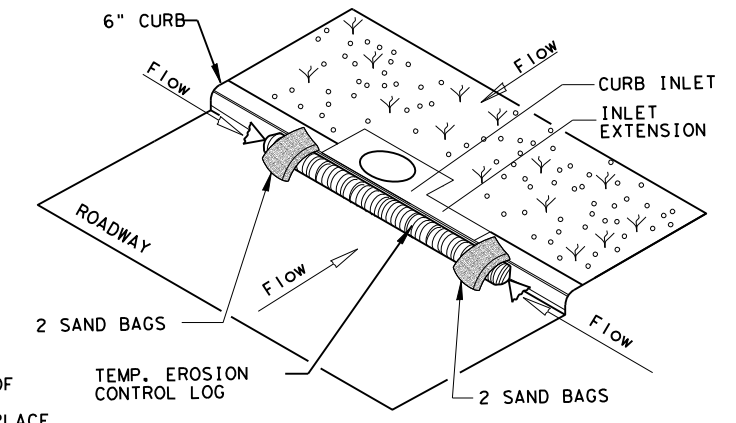
**EROSION CONTROL LOG AT DROP INLET**

CL-DI



**EROSION CONTROL LOG AT CURB INLET**

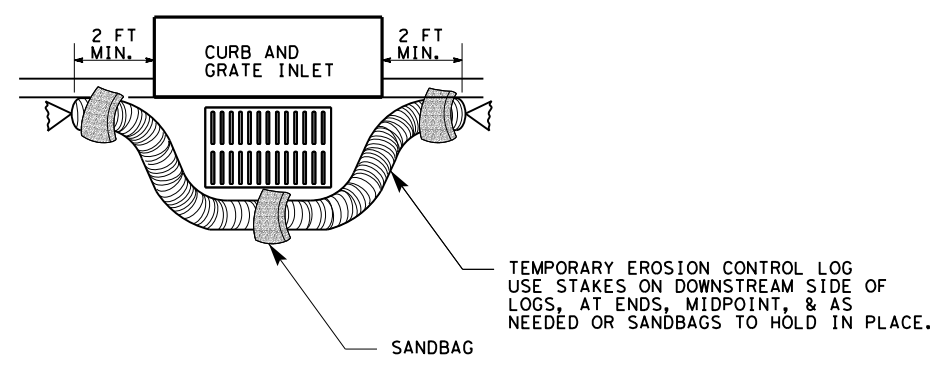
CL-CI



**EROSION CONTROL LOG AT CURB INLET**

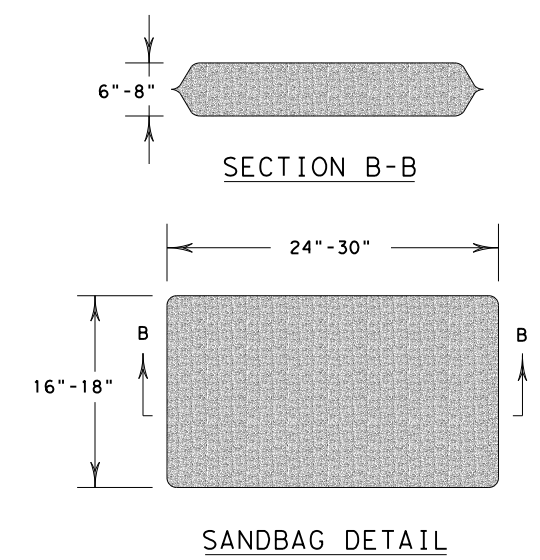
CL-CI

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



SHEET 3 OF 3

		<i>Design Division Standard</i>	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b> <b>EROSION CONTROL LOG</b> <b>EC (9) - 16</b>			
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT
© TxDOT: JULY 2016	CONT: 0913	SECT: 17	JOB: 044
REVISIONS	DIST: YKM		COUNTY: DEWITT
			SHEET NO. 50

DATE:  
FILE: