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# FLORESVILLE

FEDERAL AID PROJECT  
PROJECT NO. : STP2022(749)TAPS

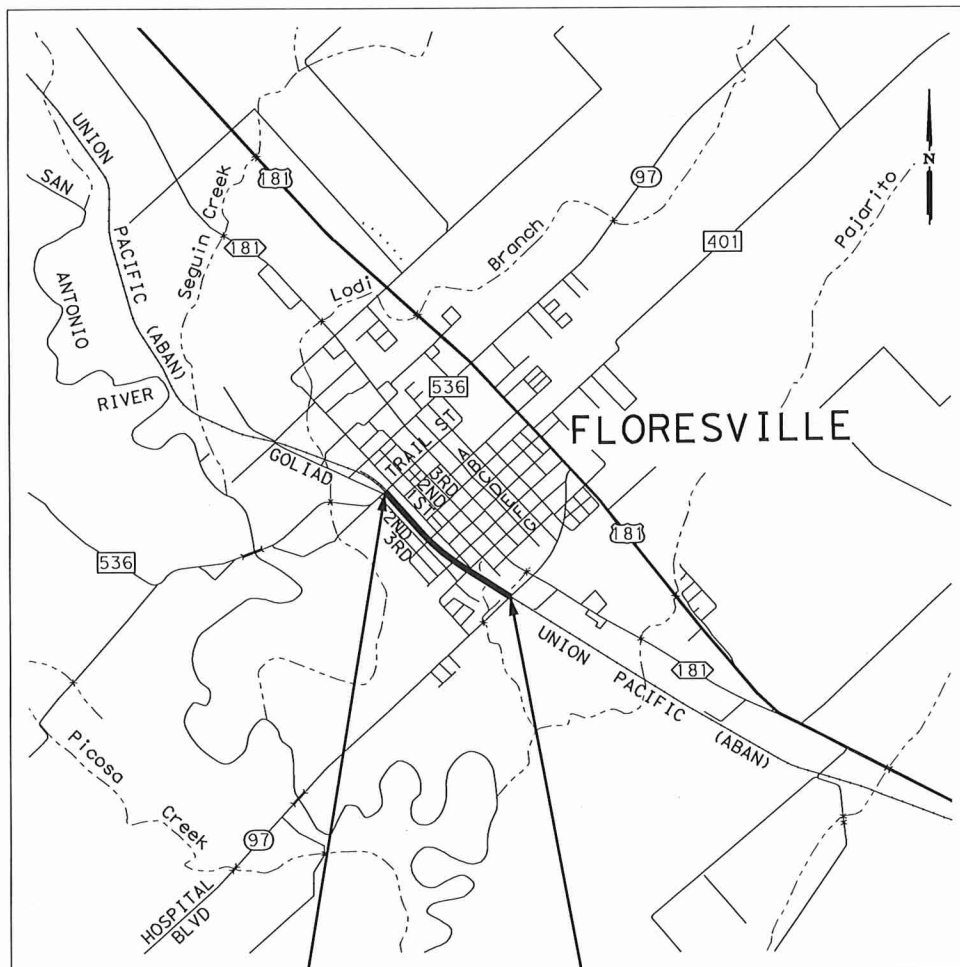
CSJ: 0915-14-048

## WILSON COUNTY HIKE AND BIKE TRAIL

LIMITS FROM: ON EL CAMINO REAL TRAIL FROM TRAIL ST  
TO: HOSPITAL BLVD (HWY 97)

NET LENGTH OF ROADWAY = 4,839.70 FT = 0.917 MI  
NET LENGTH OF BRIDGE = 0.00 FT = 0.000 MI  
NET LENGTH OF PROJECT = 4,839.70 FT = 0.917 MI

FOR WORK CONSISTING OF: HIKE AND BIKE SHARED USE PATH



BEGIN PROJECT  
STA 10+44.70

EXCEPTIONS: NONE  
EQUATIONS: NONE  
R. R. CROSSINGS: NONE

END PROJECT  
STA 58+84.40

DESIGN SPEED = 12 MPH  
AREA OF DISTURBED SOIL = 4.08 AC  
ADT: N/A

ACCESSIBILITY STANDARDS = PROWAG

REGISTERED ACCESSIBILITY SPECIALIST INSPECTION REQUIRED  
TDLR NO. TABS2023013169

### FINAL PLANS

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

### FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED  
IN ACCORDANCE WITH THE PLANS.

\_\_\_\_\_  
AREA ENGINEER P. E. DATE

TEXAS DEPARTMENT OF TRANSPORTATION

THE STANDARD SHEETS SEPCIFICALLY SHOWN WITH  
PRECEDING (\*), HAVE BEEN SELECTED BY ME OR  
UNDER MY RESPONSIBLE SUPERVISION AS BEING  
APPLICABLE TO THIS PROJECT.



### PLANS PREPARED BY:

**PAPE-DAWSON ENGINEERS**

911 CENTRAL PARKWAY NORTH | SAN ANTONIO, TEXAS 78213 | PHONE: 210.375.9000  
SUITE 400 | FAX: 210.375.9010

TEXAS BOARD OF PROFESSIONAL ENGINEERS, FIRM REGISTRATION # 470  
TEXAS BOARD OF PROFESSIONAL LAND SURVEYING, FIRM REGISTRATION # 10028800

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 5, 2022)

SUBMITTED FOR  
LETTING **DocuSigned by:** 6/2/2023  
*Richard D. Long*  
TRANSPORTATION SUPERVISOR

REVIEWED FOR  
LETTING **DocuSigned by:** 6/1/2023  
*J. R. Rogers, P.E.*  
TRANSPORTATION SUPERVISOR

RECOMMENDED FOR  
LETTING **DocuSigned by:** 6/1/2023  
*Clayton Ripps, P.E.*  
TRANSPORTATION  
PLANNING & DEVELOPMENT

APPROVED FOR  
LETTING **DocuSigned by:** 6/1/2023  
*Gina Gallegos*  
DISTRICT ENGINEER

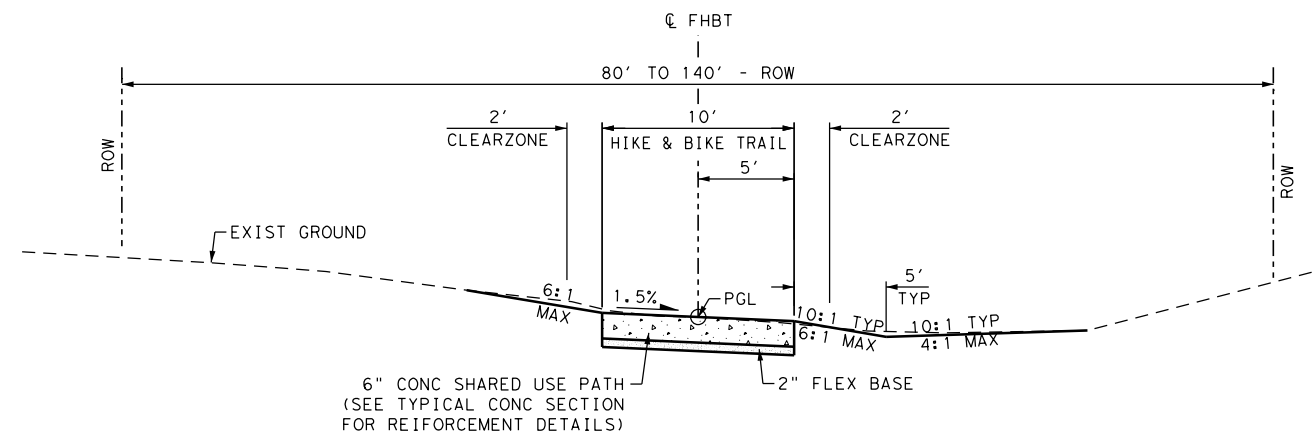
*Luigi J. ...*  
CITY MANAGER

FILE LOCATION AND NAME  
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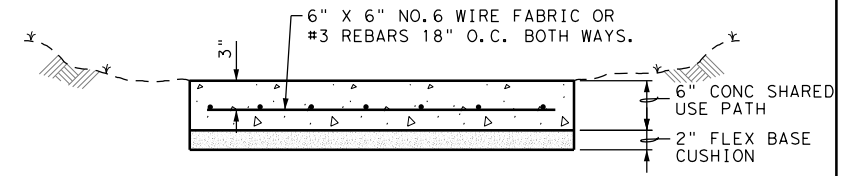
PROJ. NO. \_\_\_\_\_  
LETTING DATE \_\_\_\_\_  
COUNTY \_\_\_\_\_  
HWY. NO. \_\_\_\_\_  
DATE ACCEPTED \_\_\_\_\_

Plotted on: 5/23/2023



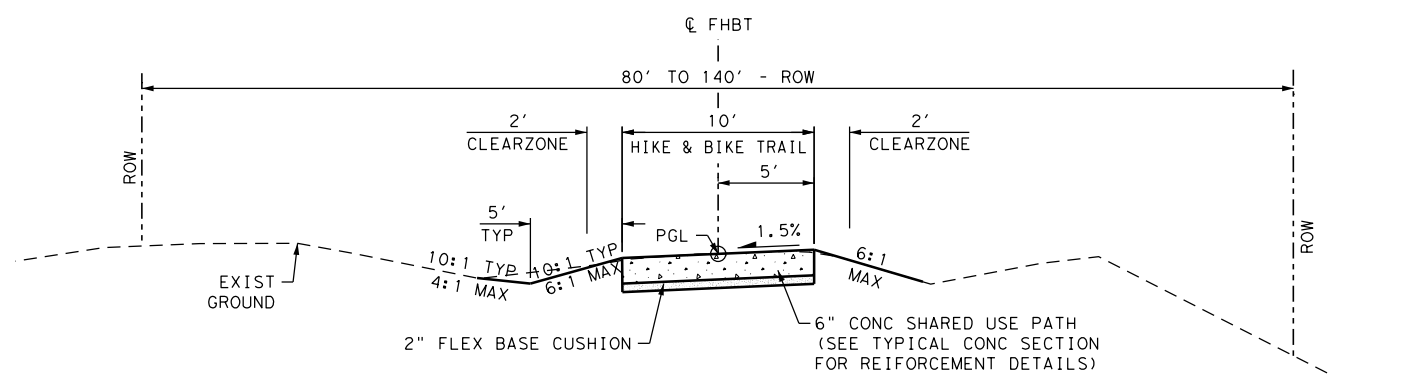
**PROPOSED HIKE & BIKE TRAIL  
TYPICAL SECTION**

STA 10+44 TO STA 12+50  
 STA 26+30 TO STA 29+64  
 STA 44+64 TO STA 58+84  
 NTS



**TYPICAL CONCRETE SECTION**

NTS  
 GROOVED JOINTS IN THE SHARED USE PATH SHALL BE AT A MAXIMUM SPACING OF 10' AND SHALL HAVE 3/4" EXPANSION JOINTS AT A MAXIMUM SPACING OF 60 FT.



**PROPOSED HIKE & BIKE TRAIL  
TYPICAL SECTION**

STA 12+50 TO STA 26+30  
 STA 29+84 TO STA 44+43  
 NTS

DESIGN



*Ernesto Garza Jr.*  
 ERNESTO GARZA JR., P.E.  
 DATE

5/23/2023

APPROVAL



*Dan Thoma*  
 DAN THOMA, P.E.  
 DATE

5/23/2023



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



HIKE & BIKE TRAIL

TYPICAL SECTIONS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			NA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	WILSON	0915	14	048	2

Design File name: P:\128\26\00\Design\Civil\General\1282600\_TY01.dgn

Control: 0915-14-048

County: Wilson

Highway: HIKE N BIKE TRL

\*\*\*\*\*GENERAL NOTES\*\*\*\*\*  
2014 Specification Book)

**--General--**

Any materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Deface traffic signs so that they will not reappear in public as signs.

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Locate and reference all manholes and valves within the construction area with station and offset or GPS. Each manhole and valve shall be identified by its owner (SAWS, CPS, etc.). No roadwork will begin until this list has been submitted. All valves and manhole covers have to be accessible at all times, therefore; temp. CTB, material stockpiles, etc. cannot be placed over these valves or covers.

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

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

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

Area Engineer  
Will Lockett  
[will.lockett@txdot.gov](mailto:will.lockett@txdot.gov)  
830-609-0707  
4102 IH 35 S., New Braunfels, Texas 78130

Contractor questions will be accepted through email, phone, and in person by the above individuals. Questions may also be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:

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

Control: 0915-14-048

Sheet 3

County: Wilson

Highway: HIKE N BIKE TRL

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

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

**--Item 5--**

**Prevention of Migratory Bird Nesting**

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

**Structures**

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

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape, or wash down all nest sites. Perform these activities daily unless the Engineer determines the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.
2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts. This work is subsidiary to the various bid items.

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

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

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at <https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design>. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Excavation within 5 feet of an existing Energy pole will require pole bracing. Contact Energy utility coordination to request pole bracing. The estimated duration for the pole bracing process is approximately 10 to 15 weeks.

**--Item 6--**

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

Steel Wrapped or Asbestos Utility Lines:

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

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

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

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

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

<https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html> for clarification on material categorization.

**--Item 7--**

The project's total disturbed area is 4.08. The disturbed area in all project locations and Contractor project specific locations (PSL's), within 1/4 mile of the project limits, will further establish the authorization requirements for storm water discharges. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any PSL's on or off the ROW. When the total area disturbed on the project and PSL's within 1/4 mile of the project exceeds 5 acres, provide a copy of the Contractor NOI for PSL's to the Engineer (to the appropriate MS4 operator when the project is on an off-state system route).

No significant traffic generators events identified.

**--Item 8--**

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

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

Create and maintain a Bar Chart schedule.

**--Item 100--**

Trim and remove brush and trees within the stations noted in the plans and as needed for construction operations. Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas to the ROW limits. 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. Trim to provide a minimum of 12 ft. vertical clearance under all trees.

Obtain approval for proposed method of tree and brush trimming and removal. Vertical flailing equipment is not allowed. Treat damaged or cut branches, roots and/or stumps of all oak trees with a commercial tree wound dressing. Disinfect all pruning tools with a solution of 70% alcohol before moving from one tree to another. Unless otherwise approved remove all resulting vegetative debris from the ROW within 24 hours. The Engineer can stop all construction operations if the dressing, cut and removal requirements are not followed.

Removal and disposal of existing abandoned utilities that were unable to be identified before letting required to support this project's construction shall be performed under the overall Preparing Right of Way. If you are uncertain whether the utility is active, contact the District Utility Section.

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**County:** Wilson

**Highway:** HIKE N BIKE TRL

**--Item 168--**

Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

**--Item 247--**

There is no minimum PI requirement for this project.

**--Item 421--**

Use an automated ticket that contains the same information as shown in the standard specification. Submit the ticket for approval prior to use. The concrete producer will contact the District Laboratory or the Engineer's Office (outside the San Antonio area) to inform TxDOT of scheduled structural concrete batching. The Engineer may suspend concrete operations if ticket information is incomplete/incorrect.

Entrained air is allowed for Class P and Class HES concrete only. Air content testing is waived for all classes of concrete.

The curing facilities and strength testing equipment is not required for this project.

Poly-fiber reinforced concrete may be used as an option, with the approval by the Engineer, for riprap, sidewalk, curb/gutter, and mow strip. Use a TxDOT approved manufacturer or producer for the poly-fiber. The poly-fibers shall be combined with the concrete in proportions as recommended by the manufacturer. A concrete mix design must be approved by the Engineer.

**--Item 500--**

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

**--Item 502--**

General

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

**Control:** 0915-14-048

**Sheet 3B**

**County:** Wilson

**Highway:** HIKE N BIKE TRL

Treat the pavement drop-offs as shown in the TCP.

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

If Nighttime work is required and work is not behind positive barrier then full Class 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

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

Access to adjoining property must be maintained at all times.

Barricades, Signs, and Traffic Control Devices

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

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

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

Cover permanent signs if not used. This is subsidiary to Item 502.

Lane and Ramp Closures and Detours

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. At least one lane must always remain open.

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For closures not listed in the TCP; the lane closures are limited to between the hours of 9 am to 4 pm, and at least one lane must remain open at all times.

**Hauling**

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

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

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

**--Item 506--**

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

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

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

**--Item 531--**

The curb ramp locations shown in the plans have considered the geometric features of the intersection, traffic signals, and the pavement markings. If anything changes during construction, the location of curb ramps must be adjusted to ensure they meet TAS requirements.

**--Item 610--**

Ballast/capacitors removed from the light assembly, will remain the property of the State. Assume all ballast/capacitors contain Polychlorinated Biphenyl (PCB), unless a notation appears on the outside of the unit that specifies it does not contain PCB's. All ballast/capacitors with PCB's shall be placed in 55 gallon open top drum in accordance with Department of Transportation (DOT) specifications. Place six (6) inches of sawdust or other absorbent material in the bottom of the drum. Furnish and place a DOT approved PCB warning label on the outside of the drum. Do not fill a drum more than ¾ of capacity. Avoid rupturing the

**Control:** 0915-14-048

**Sheet 3C**

**County:** Wilson

**Highway:** HIKE N BIKE TRL

ballast/capacitor(s). If a ballast/capacitor is ruptured, use proper procedures, specialist trained staff and personal protective equipment for the clean-up operations.

The lamps in light fixtures may contain hazardous levels of mercury, halide, and sodium vapors. Observe and comply with all federal, state, and local laws, ordinances, and regulations regarding the management of these lamps. Prevent the breakage of the lamps. At a minimum, package all lamps removed from the light fixture(s) in a container that minimizes the breakage of the lamps. Broken lamps shall be collected in a sealed plastic bag (i.e. Ziploc). Broken lamps shall be stored in separate containers from unbroken lamps. Furnish a suitable container and attach a label stating "Universal Waste Lamps" on the container. Write the date the first lamp was placed in the container on the "Universal Waste Lamp" label. Within one (1) week after the first lamp is placed in a container, notify the Engineer. The lamps and PCB containing ballast/capacitors, placed in properly labeled containers, will remain the property of the State. Place the container in an area where it is protected from damage and the elements. The Engineer will plan to collect, transport, and dispose/recycle the container. The ballast/capacitor and lamp's removal and storage are subsidiary to this item.

Stencil each illumination assembly with the circuit, light and relay service in black paint on the roadway side of the pole at a 45-degree angle. The numbers shall be in 3" tall and begin 6' from the top of the foundation. This work will be considered subsidiary to this item.

Provide and install steel, locking, theft-deterrent doors on transformer bases to protect against copper theft. Return standard t-base doors to TxDOT.

**--Item 628--**

Make all arrangements for electrical service, and compliance with local standards and practices for proper installations.

**--Item 644--**

The wedge anchor system shown on State Standard Sheet SMD (TWT) is not allowed.

Triangular Slipbase Systems with set screws are not allowed.

**--Item 666--**

Use TY II markings (vs. an acrylic or epoxy) on asphalt surfaces as the sealer for the TY I markings, unless otherwise approved by the Engineer.



CONTROLLING PROJECT ID 0915-14-048

DISTRICT San Antonio  
HIGHWAY HIKE N BIKE TRL

COUNTY Wilson

# Estimate & Quantity Sheet

CONTROL SECTION JOB				0915-14-048		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00180360			
COUNTY				Wilson			
HIGHWAY				HIKE N BIKE TRL			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	14,462.000		14,462.000	
	168-6001	VEGETATIVE WATERING	MG	229.000		229.000	
	169-6004	SOIL RETENTION BLANKETS (CL 1) (TY D)	SY	630.000		630.000	
	180-6001	WILDFLOWER SEEDING	AC	3.000		3.000	
	192-6031	PLANT MATERIAL (5 GAL) (SHRUB)	EA	68.000		68.000	
	416-6003	DRILL SHAFT (30 IN)	LF	24.000		24.000	
	432-6002	RIPRAP (CONC)(5 IN)	CY	10.000		10.000	
	462-6013	CONC BOX CULV (6 FT X 6 FT)	LF	76.000		76.000	
	462-6023	CONC BOX CULV (8 FT X 8 FT)	LF	36.000		36.000	
	466-6142	WINGWALL (FW - 0) (HW=10 FT)	EA	2.000		2.000	
	466-6155	WINGWALL (FW - 0) (HW=8 FT)	EA	2.000		2.000	
	496-6001	REMOV STR (BOX CULVERT)	EA	3.000		3.000	
	496-6005	REMOV STR (WINGWALL)	EA	4.000		4.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	4.000		4.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	60.000		60.000	
	506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	108.000		108.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	168.000		168.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	78.000		78.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	78.000		78.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	3,770.000		3,770.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	3,770.000		3,770.000	
	528-6011	LANDSCAPE PAVERS (TYPE I)	SY	66.000		66.000	
	528-6012	LANDSCAPE PAVERS (TYPE II)	SY	16.000		16.000	
	531-6003	CONC SIDEWALKS (6")	SY	5,218.000		5,218.000	
	531-6004	CURB RAMPS (TY 1)	EA	8.000		8.000	
	618-6046	CONDT (PVC) (SCH 80) (2")	LF	358.000		358.000	
	620-6007	ELEC CONDR (NO.8) BARE	LF	358.000		358.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF	715.000		715.000	
	624-6002	GROUND BOX TY A (122311)W/APRON	EA	2.000		2.000	
	628-6009	ELC SRV TY A 120/240 060(NS)SS(E)SP(O)	EA	1.000		1.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	16.000		16.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	150.000		150.000	
	666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	150.000		150.000	
	1002-6025	LANDSCAPE AMENITY (TRASH/RECYCLE BIN)	EA	4.000		4.000	
	1002-6026	LANDSCAPE AMENITY (BENCH)	EA	9.000		9.000	
	5033-6004	REMOVE & REPLACE BOLLARD	EA	25.000		25.000	



DISTRICT	COUNTY	CCSJ	SHEET
San Antonio	Wilson	0915-14-048	4



# Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0915-14-048

DISTRICT San Antonio  
HIGHWAY HIKE N BIKE TRL

COUNTY Wilson

CONTROL SECTION JOB				0915-14-048		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00180360			
COUNTY				Wilson			
HIGHWAY				HIKE N BIKE TRL			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	5158-6001	FIXED DECORATIVE BOLLARDS	EA	9.000		9.000	
	6501-6001	LED PEDESTRIAN ILLUMINATION ASSEMBLY	EA	4.000		4.000	
	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	



Plotted on: 5/23/2023

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### TRAFFIC CONTROL PLAN SEQUENCE OF WORK

1. THIS PROJECT WILL BE CONSTRUCTED IN (2) PHASES. CONTRACTOR MAY WORK ON ALL PHASES CONCURRENTLY. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.
2. PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHEREWORK IS OCCURING, AS PER THE PHASES NOTED BELOW.
3. PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC. BEGIN SURFACE CONSTRUCTION ON HIGH SIDE OF ROAD TO AVOID WATER PONDING ISSUES.
4. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC" AND ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING", OF THE STANADARD SPECIFICATIONS, AND TO THE GENERAL NOTES
5. BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

#### PHASE 1 - CULVERT REPLACEMENT

1. INSTALL ADVANCE WARNING SIGNS.
2. INSTALL TEMPORARY EROSION CONTROL MEASURES.
3. INSTALL TEMPORARY TRAFFIC CONTROL DEVICES INCLUDING SIGNAGE (USE TXDOT BC AND WZ STANDARDS IN ACCORDANCE WITH THE TMUTCD).
4. CLOSE EXISTING HIKING TRAIL AND DETOUR PEDESTRIANS AS SHOWN IN THE PLANS. CONTRACTOR IS RESPONSIBLE FOR SAFELY DETOURING PEDESTRIAN TO 1st ST.
5. CONSTRUCT DRAINAGE FEATURES AS SHOWN ON PLANS.

#### PHASE 2 - HIKE AND BIKE TRAIL

1. INSTALL ADVANCE WARNING SIGNS.
2. INSTALL TEMPORARY EROSION CONTROL MEASURES.
3. INSTALL TEMPORARY TRAFFIC CONTROL DEVICES INCLUDING SIGNAGE (USE TXDOT BC AND WZ STANDARDS IN ACCORDANCE WITH THE TMUTCD).
4. CLOSE EXISTING HIKING TRAIL AND DETOUR PEDESTRIANS AS SHOWN IN THE PLANS. CONTRACTOR IS RESPONSIBLE FOR SAFELY DETOURING PEDESTRIAN TO 1st ST.
5. CONSTRUCT ILLUMINATION, HIKE AND BIKE TRAIL, LANDSCAPING, AND STRIPING AS SHOWN IN PLANS. MAINTAIN DRIVEWAY ACCESS TO PROPERTIES AT ALL TIMES. USE TCP (1-2)-18 TO INSTALL CROSSWALK STRIPE.
6. PERFORM FINAL CLEAN-UP

DESIGN



*Ernesto Garza Jr.*  
ERNESTO GARZA JR., P.E.

5/23/2023  
DATE

APPROVAL



*Dan Thoma*  
DAN THOMA, P.E.

5/23/2023  
DATE



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



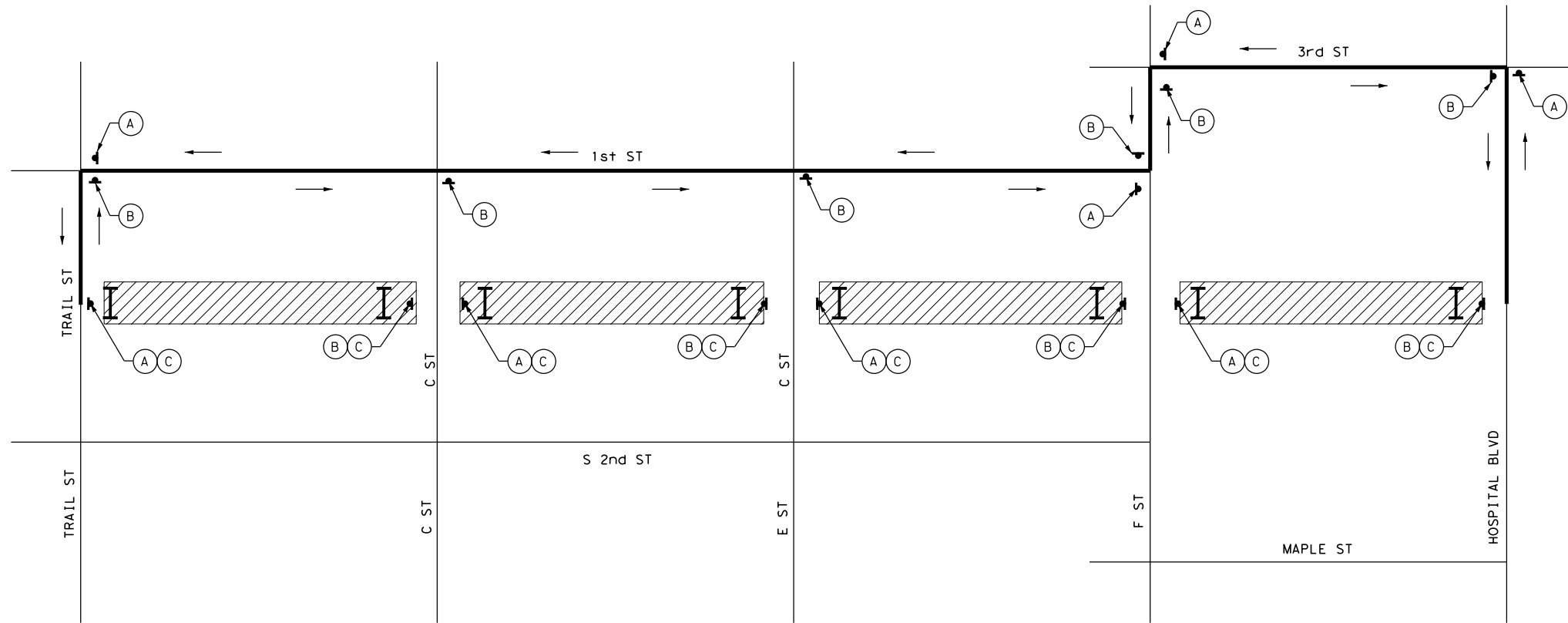
HIKE & BIKE TRAIL

TRAFFIC CONTROL PLAN  
NARRATIVE


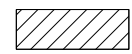








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DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	WILSON	0915	14	048	5

Plotted on: 5/23/2023

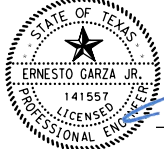
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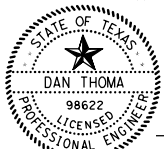


**LEGEND**

-  TY 3 BARRICADE
-  WORK ZONE
-  SIGN
-  PED ROUTE
-  M4-9bL 30"X24"
-  M4-9bR 30"X24"
-  R9-9 24"X12"
-  DETOUR
-  DETOUR
-  SIDEWALK CLOSED

NOT TO SCALE  
DESIGN

 ERNESTO GARZA JR., P.E.  
141557  
LICENCED PROFESSIONAL ENGINEER  
5/23/2023  
DATE

 DAN THOMA, P.E.  
98622  
LICENCED PROFESSIONAL ENGINEER  
5/23/2023  
DATE

**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

**FLORESVILLE**

HIKE & BIKE TRAIL

TRAFFIC CONTROL PLAN  
PEDESTRIAN DETOUR LAYOUT

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	NA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	WILSON	0915	14	048	6

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

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



**WORKER SAFETY NOTES:**

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

**COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES**

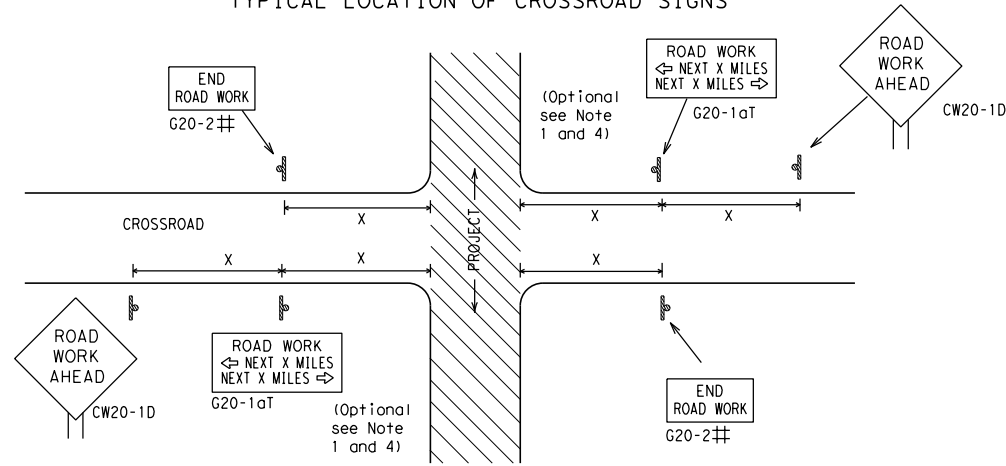
1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT <a href="http://www.txdot.gov">http://www.txdot.gov</a>
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

			
<b>BARRICADE AND CONSTRUCTION          GENERAL NOTES          AND REQUIREMENTS</b>			
<b>BC (1) - 21</b>			
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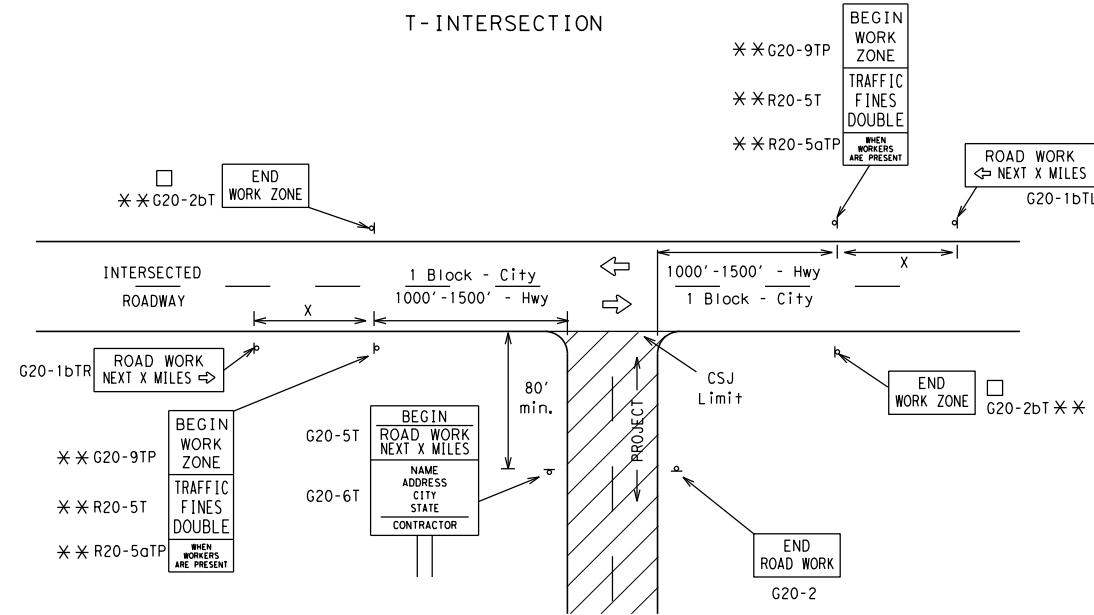
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TYPICAL LOCATION OF CROSSROAD SIGNS



- ## 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>
			80	1000 <sup>2</sup>
*			*	* <sup>3</sup>

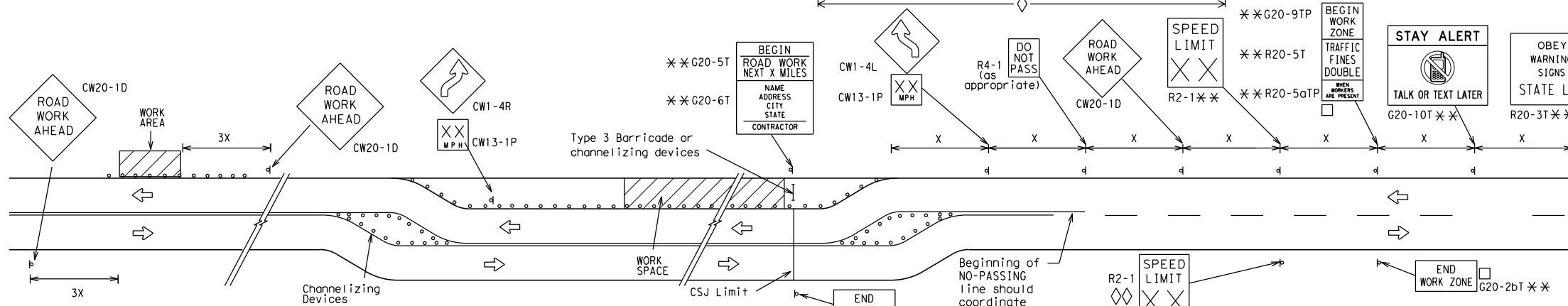
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

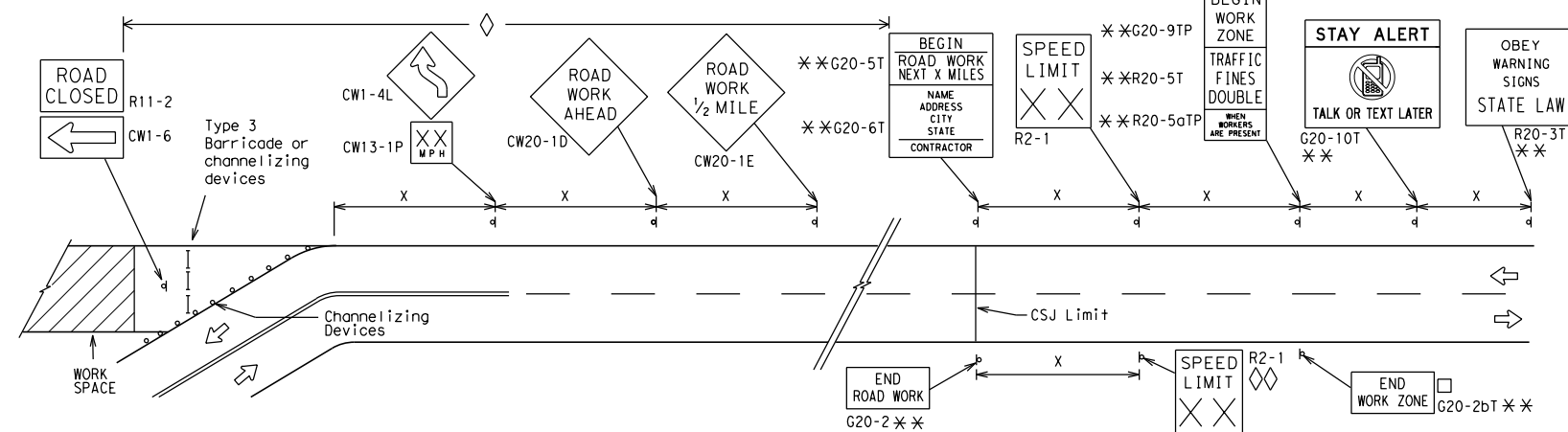
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

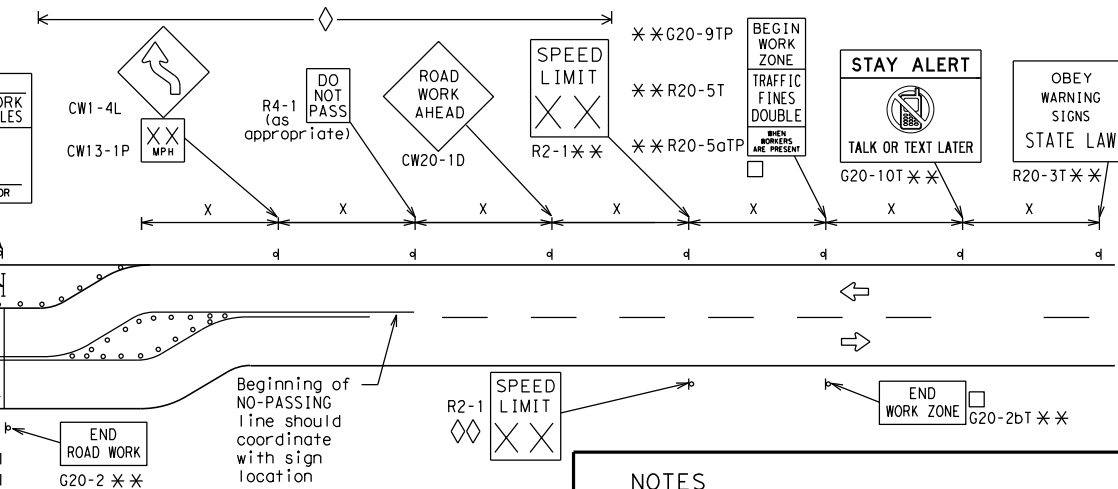


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "x" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
- CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
- Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
- Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

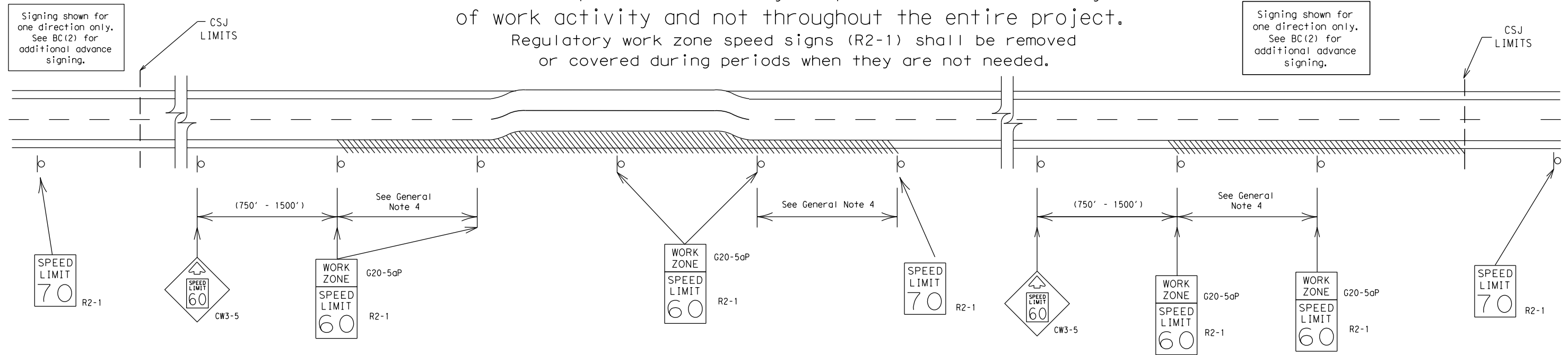
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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	SAT	WILSON	8	

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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



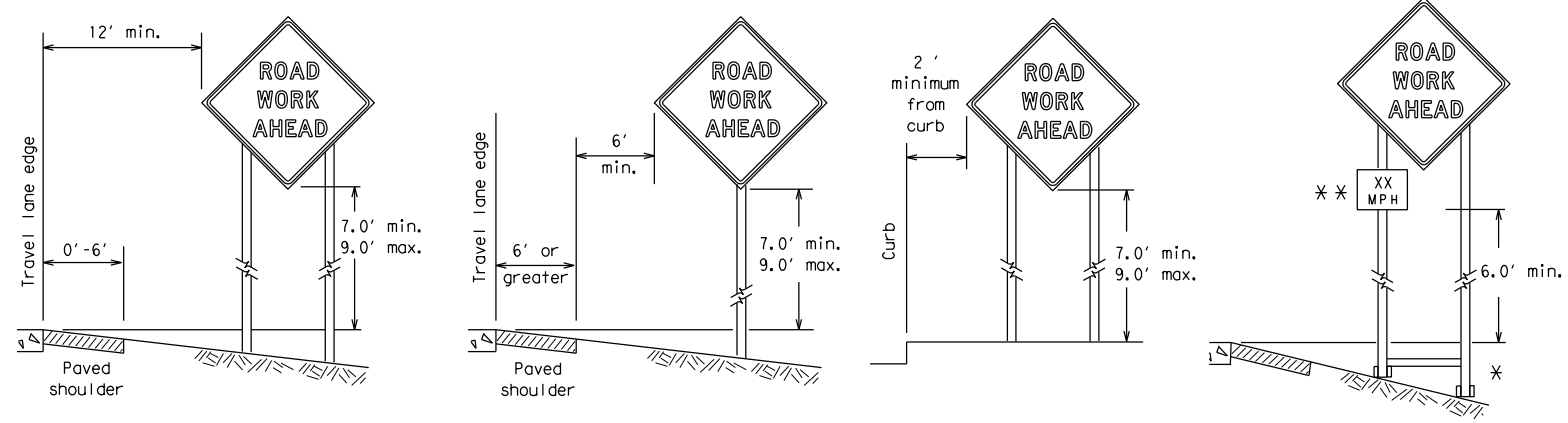
## BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 21

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9-07	8-14	DIST	COUNTY		SHEET NO.
7-13	5-21	SAT	WILSON		9

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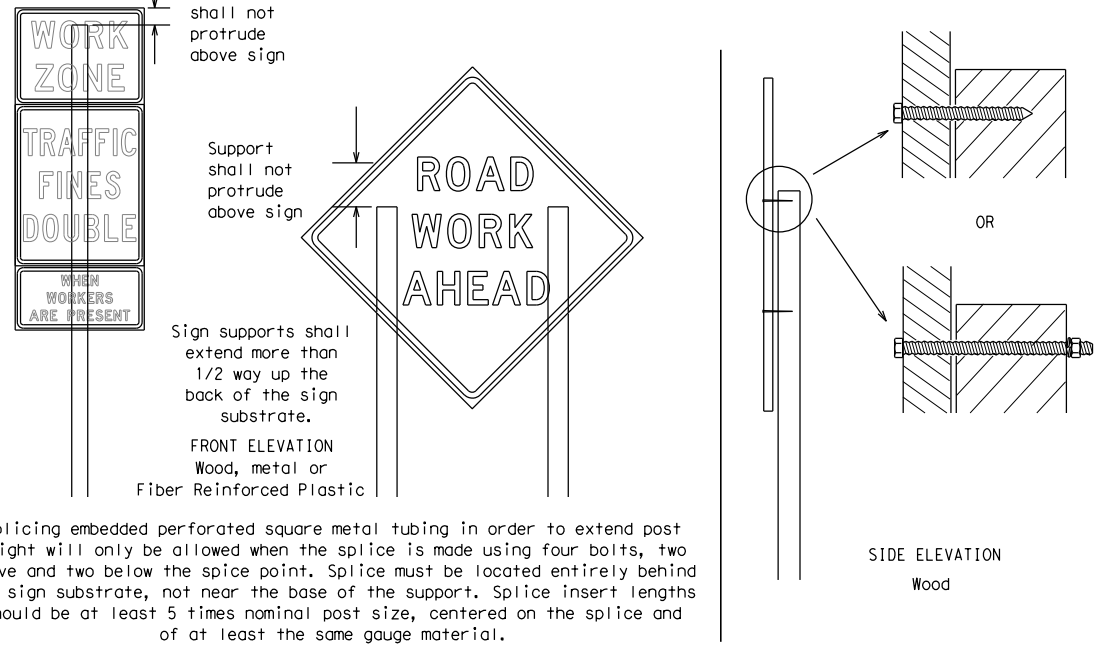
**TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS**



\* 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**

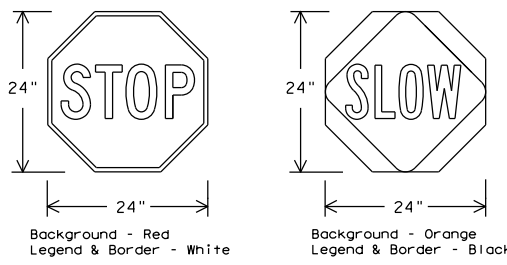
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not 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.

Texas Department of Transportation
Traffic Safety Division Standard

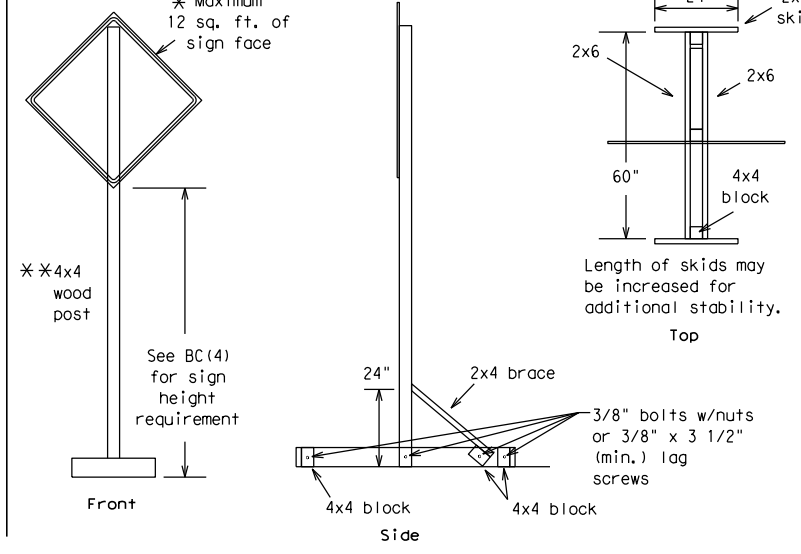
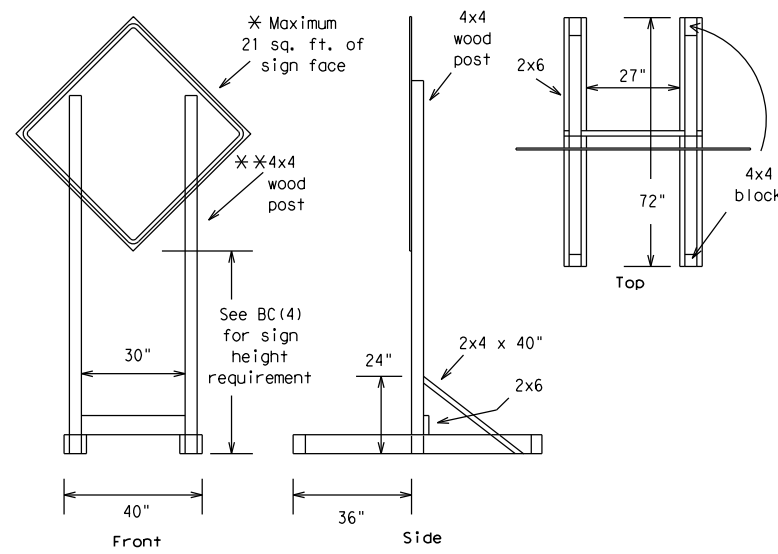
BARRICADE AND CONSTRUCTION  
TEMPORARY SIGN NOTES

BC (4) - 21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	SAT	WILSON	10	

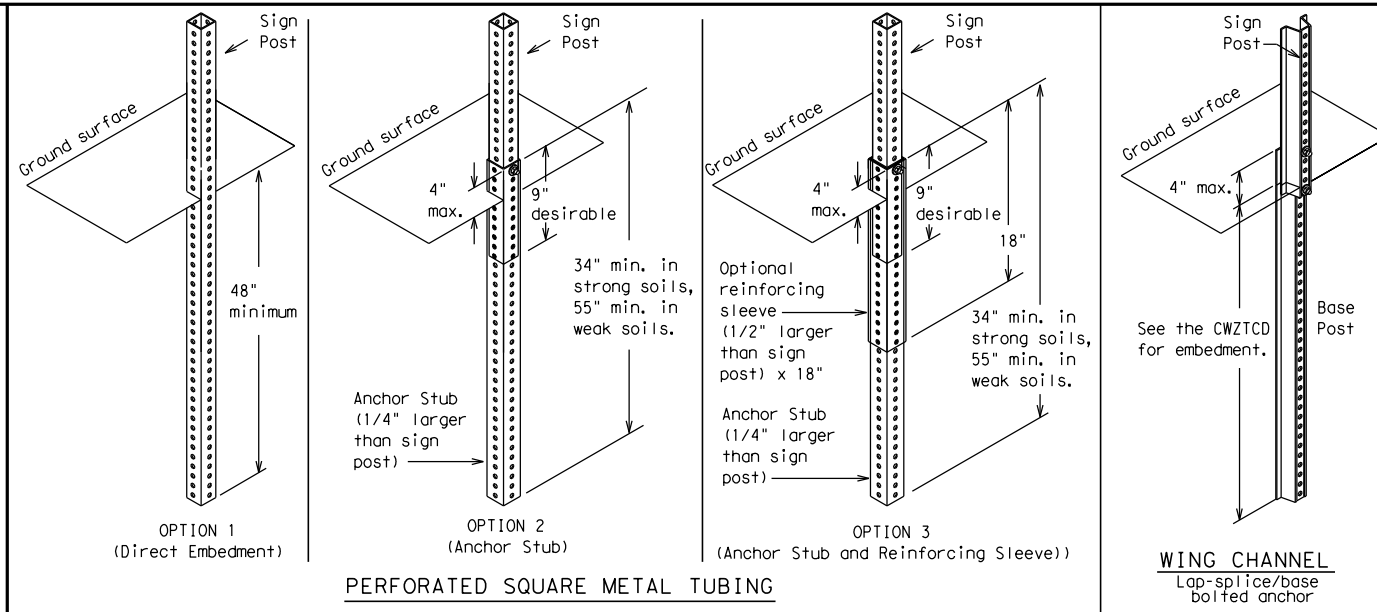
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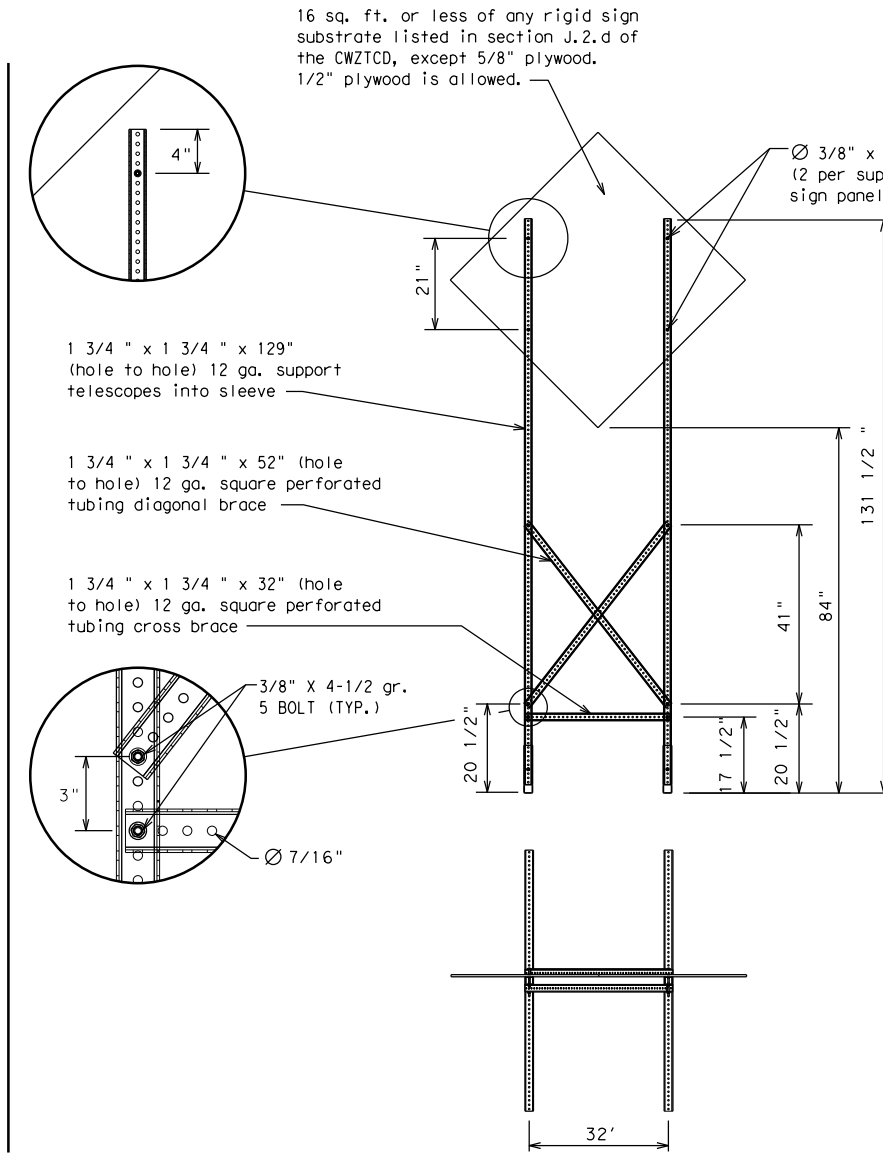
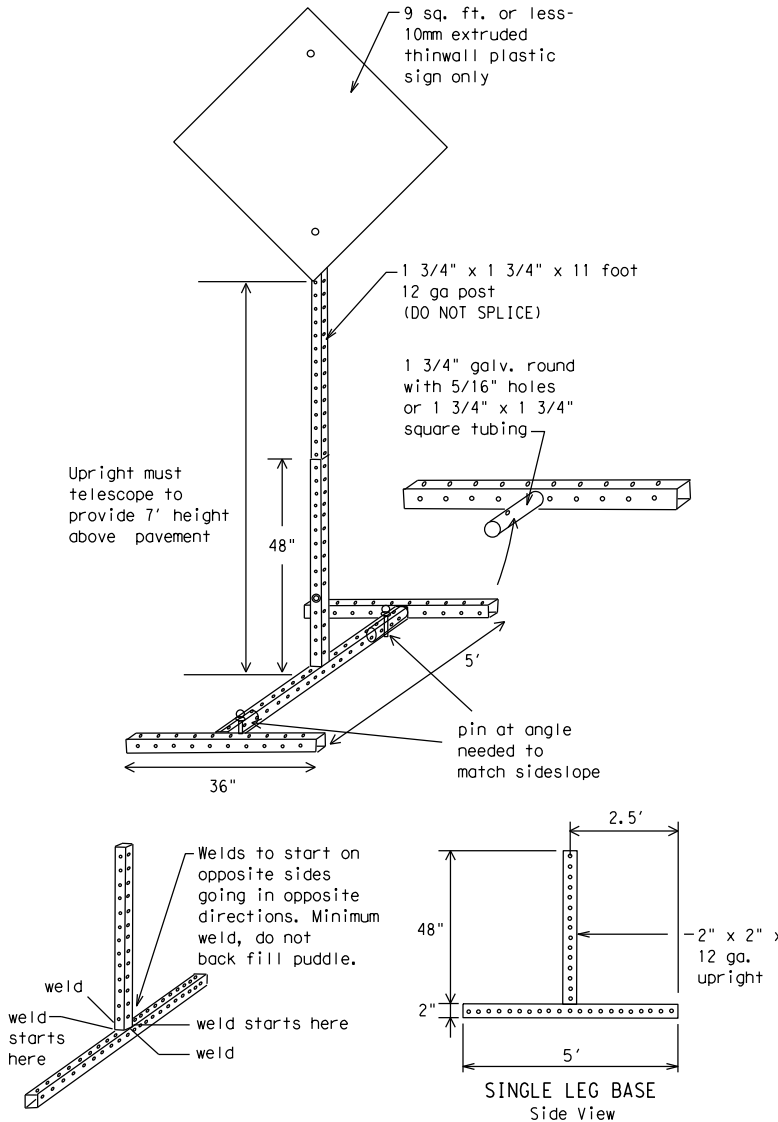
### SKID MOUNTED WOOD SIGN SUPPORTS

\* 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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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	048	NA
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	SAT	WILSON	11	

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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.

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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
Canal	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

## Phase 1: Condition Lists

### Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXX BLVD CLOSED

### Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI

\* 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
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE

### Location List

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

### Warning List

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

### \*\* Advance Notice List

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

\*\* See Application Guidelines Note 6.

## APPLICATION GUIDELINES

- 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.

SHEET 6 OF 12

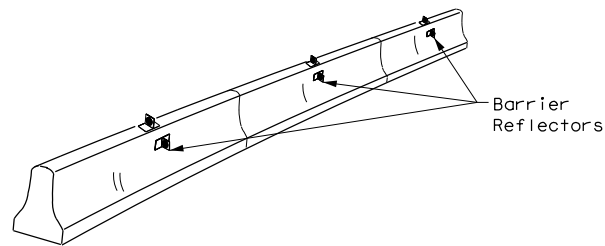
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© TxDOT	November 2002	CONT:	SECT:
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7-13	5-21	SAT:	WILSON
			SHEET NO. 12



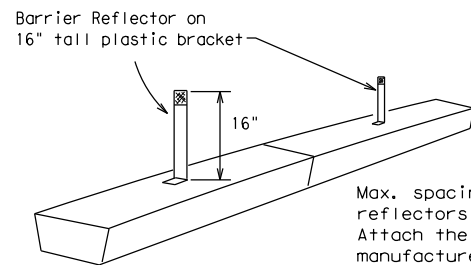
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



CONCRETE TRAFFIC BARRIER (CTB)



**LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES**

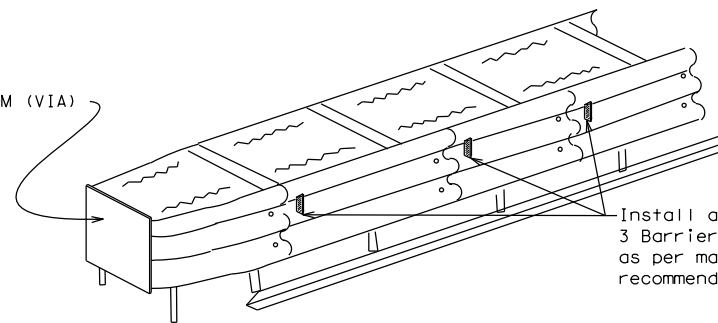
LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

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

LOW PROFILE CONCRETE BARRIER (LPCB)

- 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.

See D & OM (VIA)



Install a minimum of 3 Barrier Reflectors as per manufacturer's recommendations.

**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**

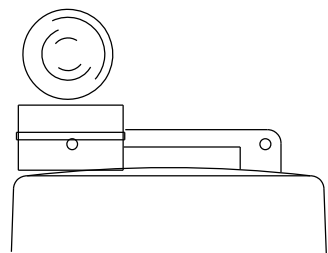
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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**

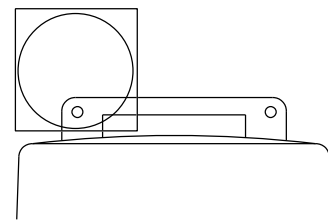
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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



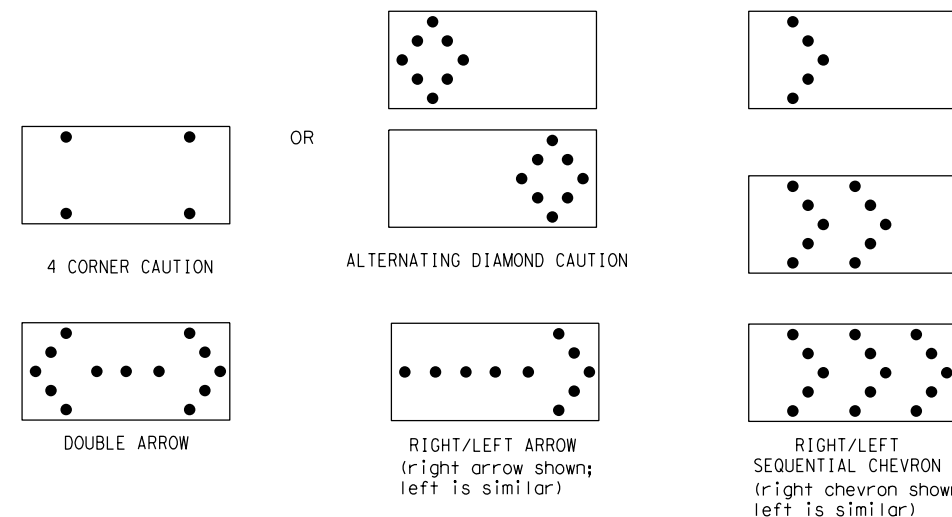
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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

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**

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©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0915	14	048	NA				
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	SAT	WILSON	13					

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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**

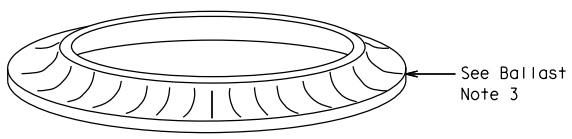
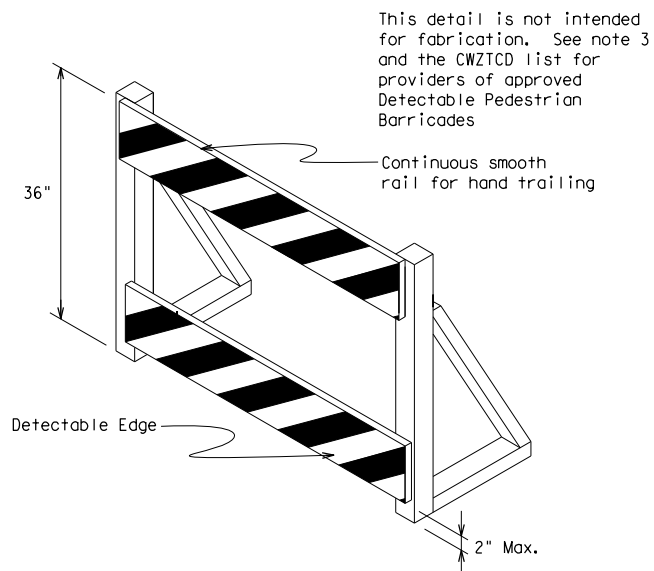
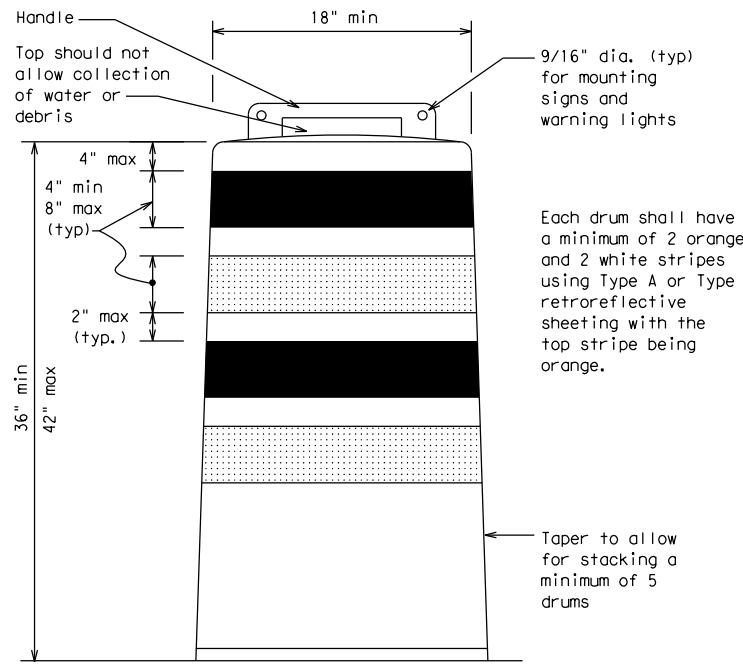
- Pre-qualified plastic drums shall meet the following requirements:
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
  - The body and base shall lock together in such a manner that the body separates from the base when impacted 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.

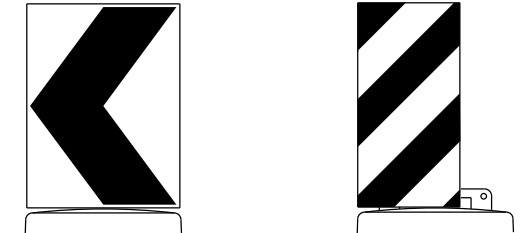
**BALLAST**

- 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

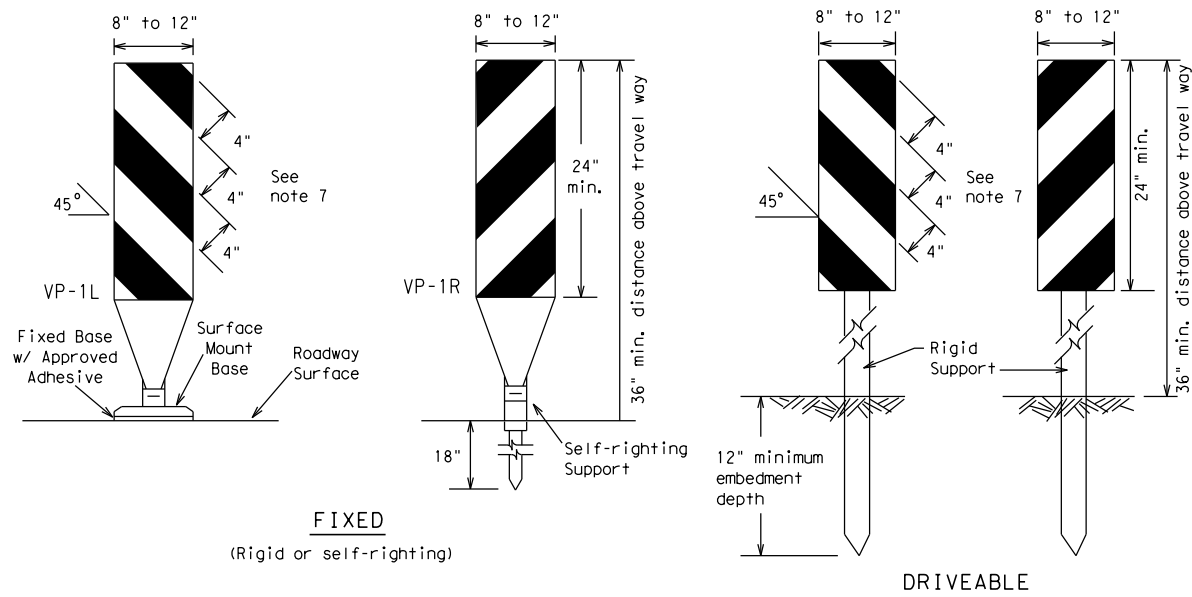


**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (8) - 21**

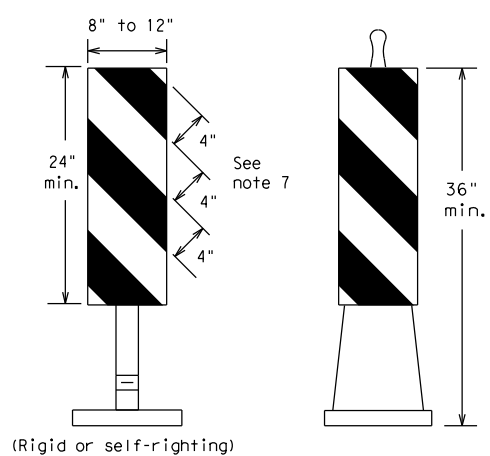
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REVISIONS		0915	14	048	NA				
4-03	8-14	DIST	COUNTY	SHEET NO.					
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**FIXED**  
(Rigid or self-righting)

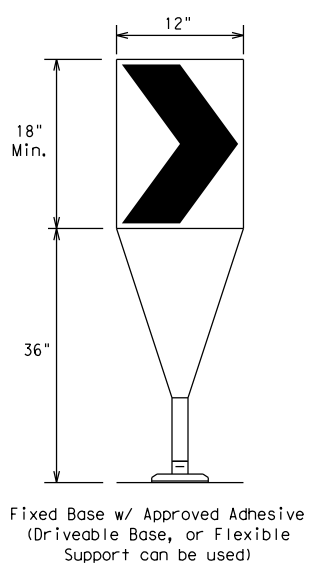
**DRIVEABLE**



**PORTABLE**

**VERTICAL PANELS (VPs)**

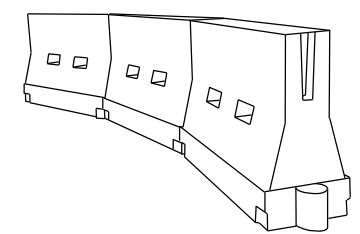
- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



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

- 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 * X			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'

\*X 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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9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	SAT	WILSON	15	

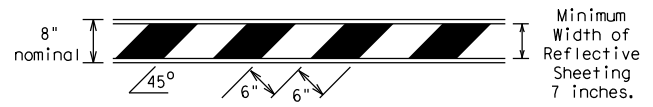
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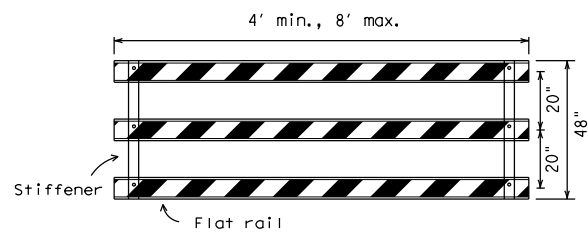
**TYPE 3 BARRICADES**

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.

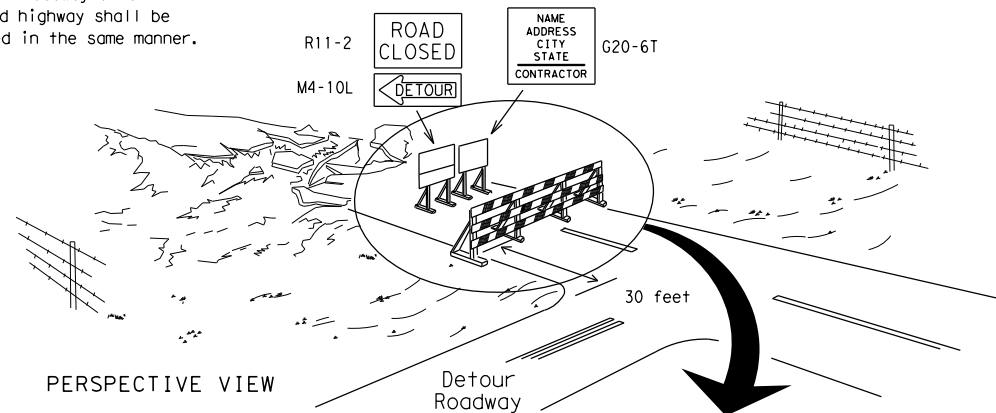


**TYPICAL STRIPING DETAIL FOR BARRICADE RAIL**



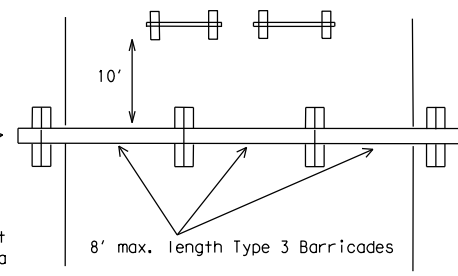
**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**

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



PERSPECTIVE VIEW

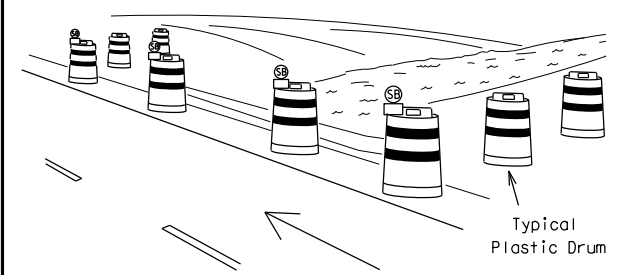
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



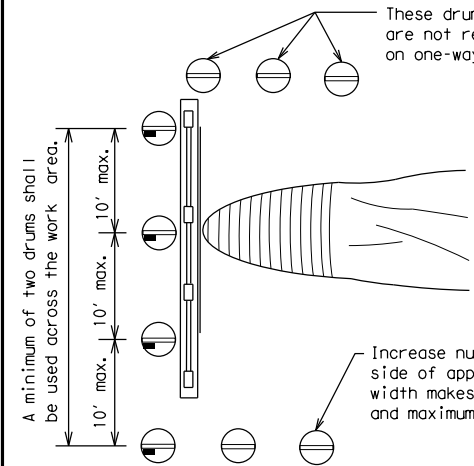
PLAN VIEW

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

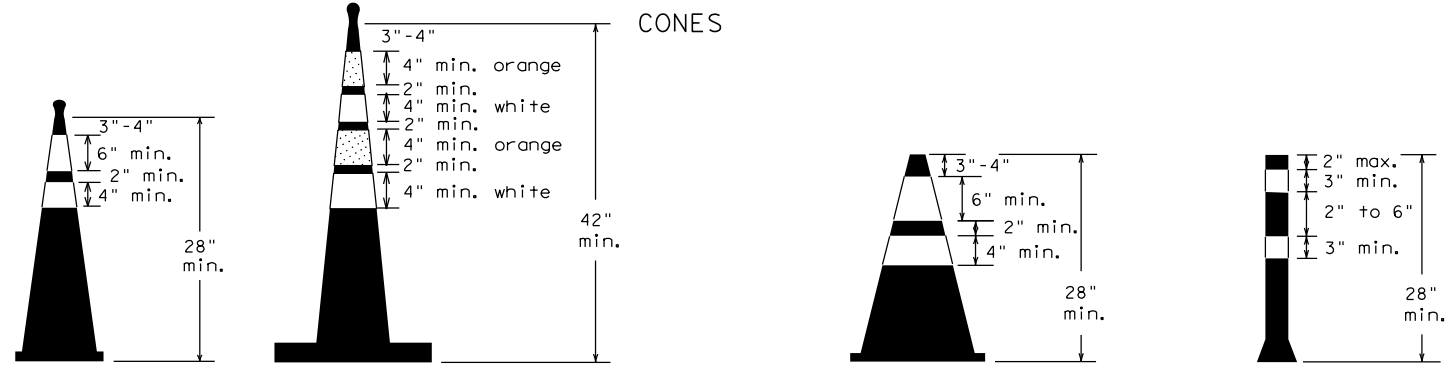


PLAN VIEW

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**



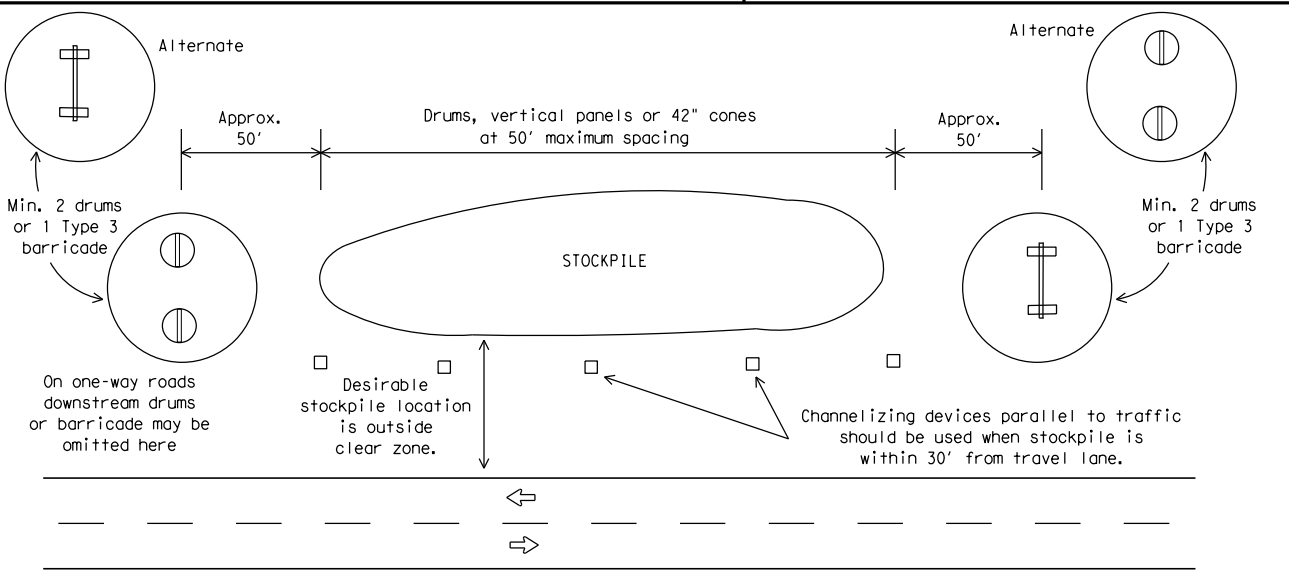
Two-Piece cones

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**

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	048	NA
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	SAT	WILSON	16	

DATE: 4/6/2023 4:03:39 PM  
FILE: P:\128\26\00\Design\Civil\Standards\TCP\bc-21.dgn

## 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.

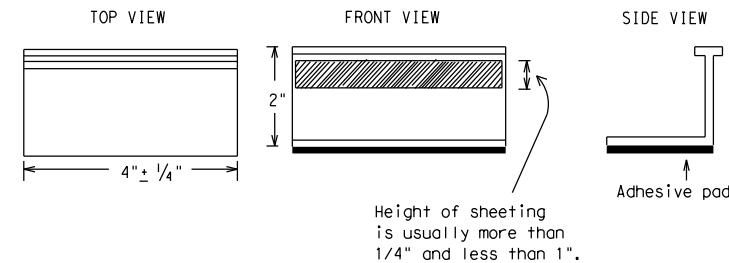
### MAINTAINING WORK ZONE PAVEMENT MARKINGS

- 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

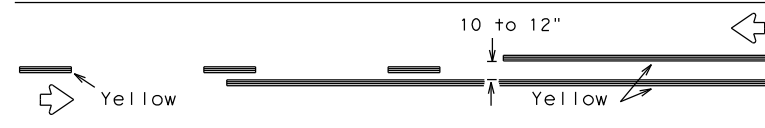
### BC(11) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	048	NA
2-98 9-07 5-21	DIST	COUNTY	SHEET NO.	
1-02 7-13	SAT	WILSON	17	
11-02 8-14				

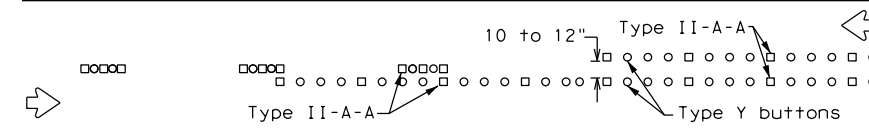
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 4/6/2023 4:03:40 PM  
 FILE: P:\128\26\00\Design\Civil\Standards\TCP\bc-21.dgn

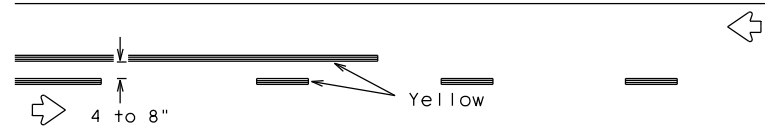
## PAVEMENT MARKING PATTERNS



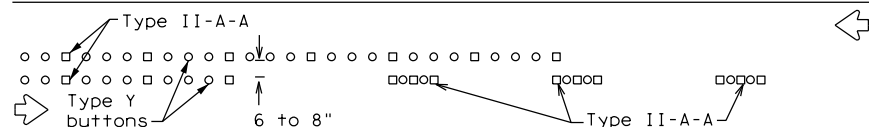
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



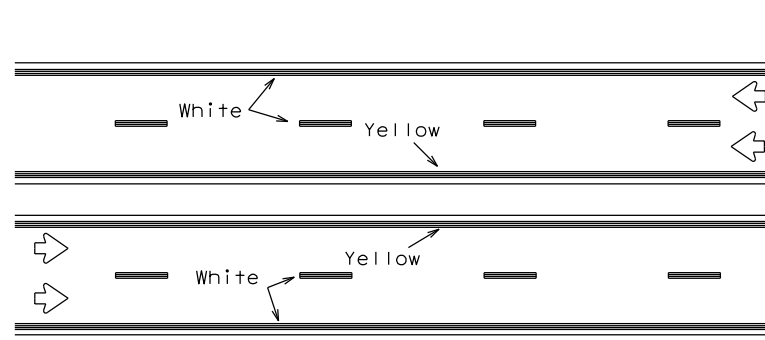
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



RAISED PAVEMENT MARKERS - PATTERN B

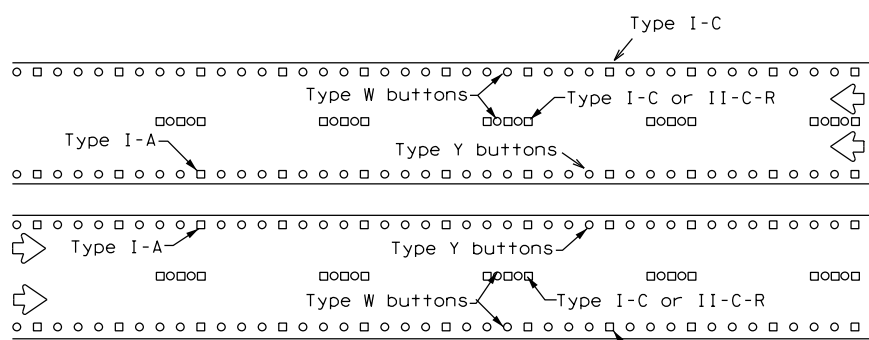
Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings.

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



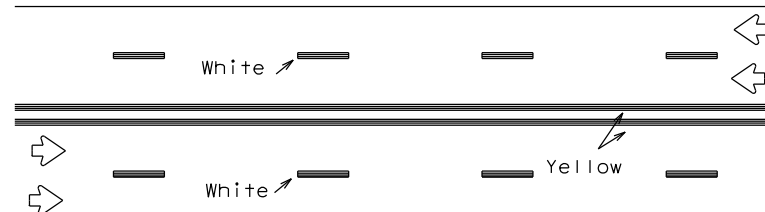
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



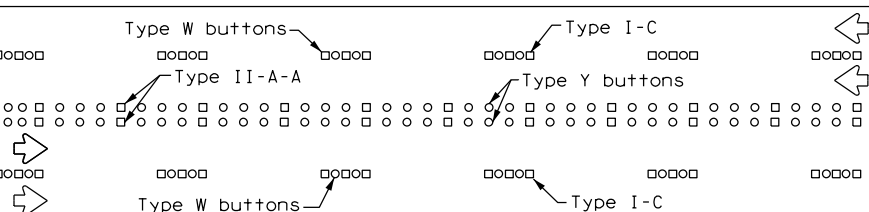
RAISED PAVEMENT MARKERS

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



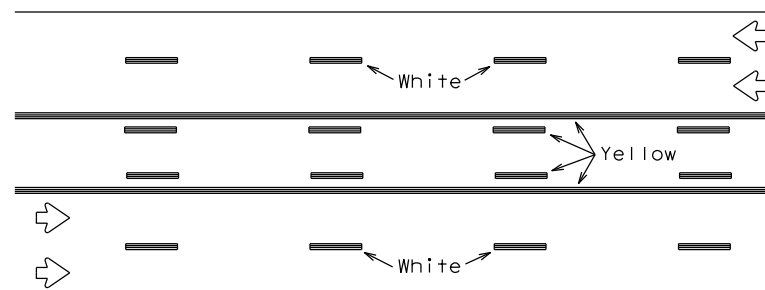
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



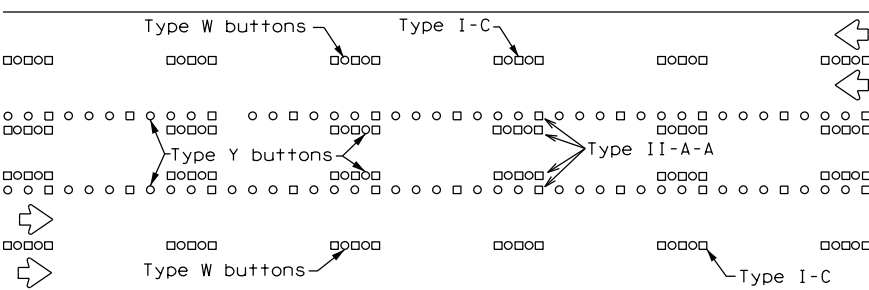
RAISED PAVEMENT MARKERS

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

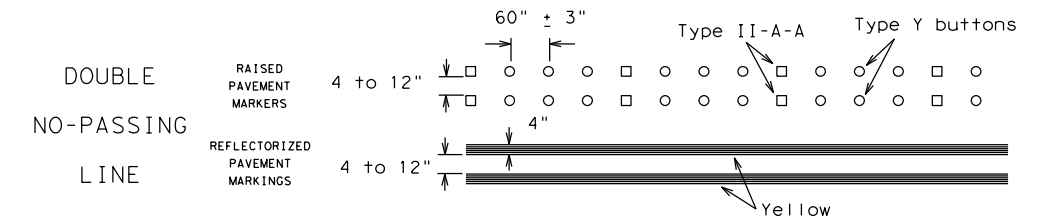
Prefabricated markings may be substituted for reflectorized pavement markings.



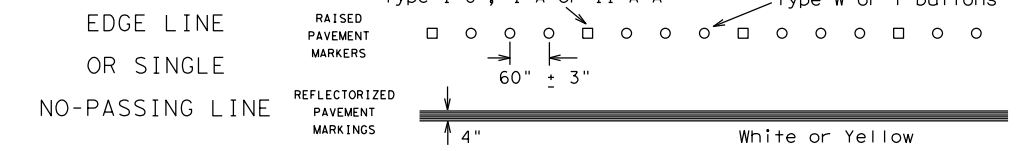
RAISED PAVEMENT MARKERS

## TWO-WAY LEFT TURN LANE

## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



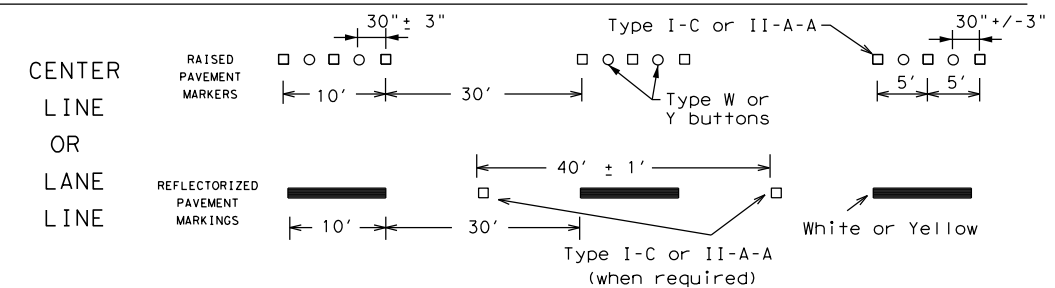
SOLID LINES



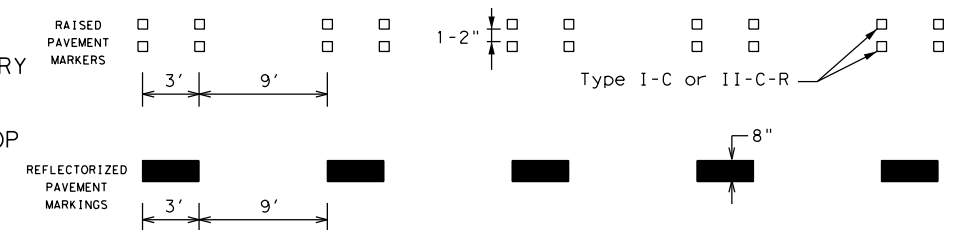
WIDE LINE



BROKEN LINES

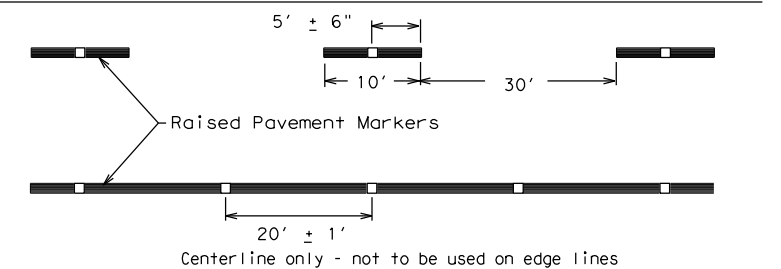


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



SHEET 12 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	048	NA
1-97 9-07 5-21	DIST	COUNTY	SHEET NO.	
2-98 7-13	SAT	WILSON	18	
11-02 8-14				

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

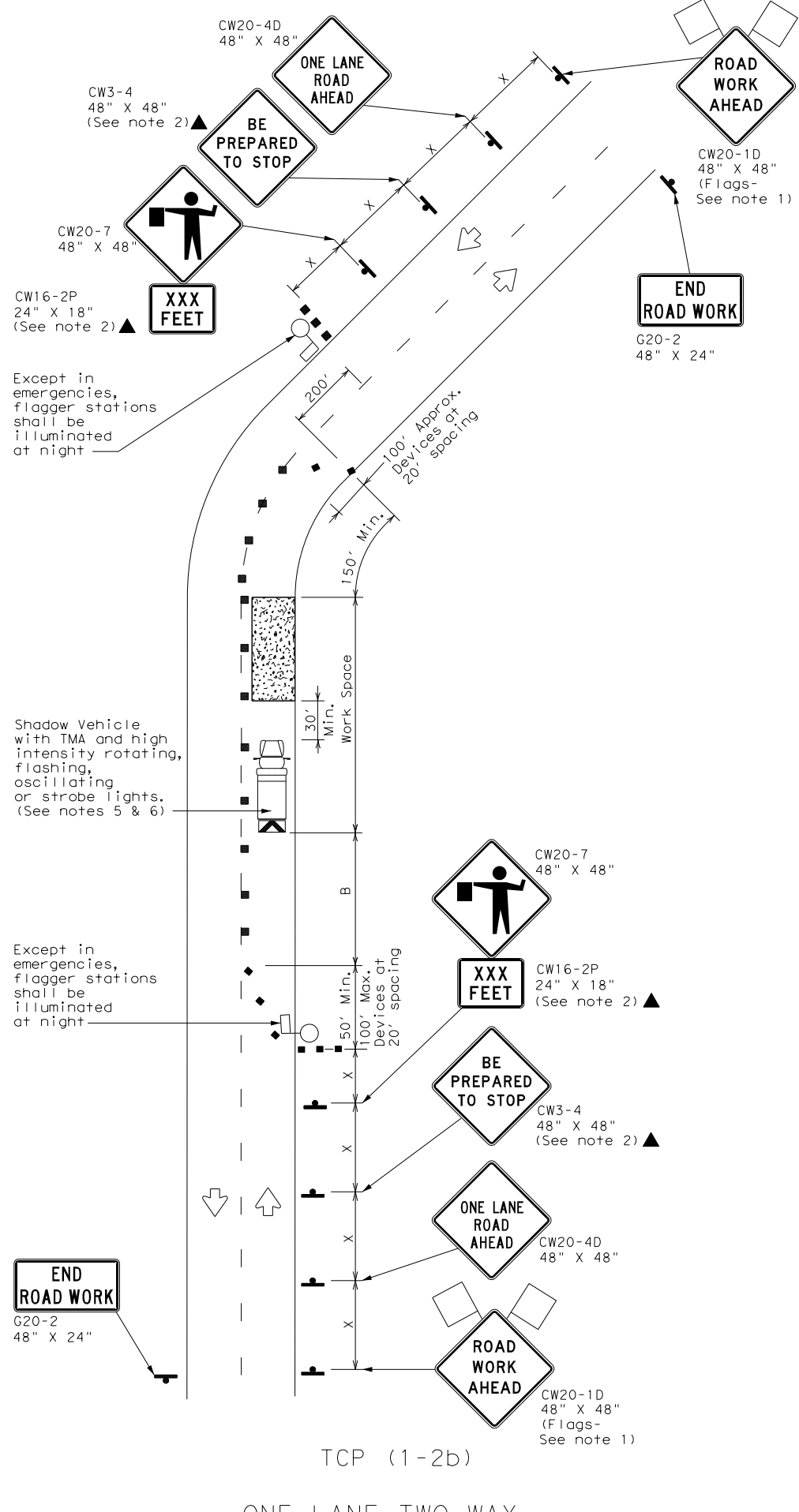
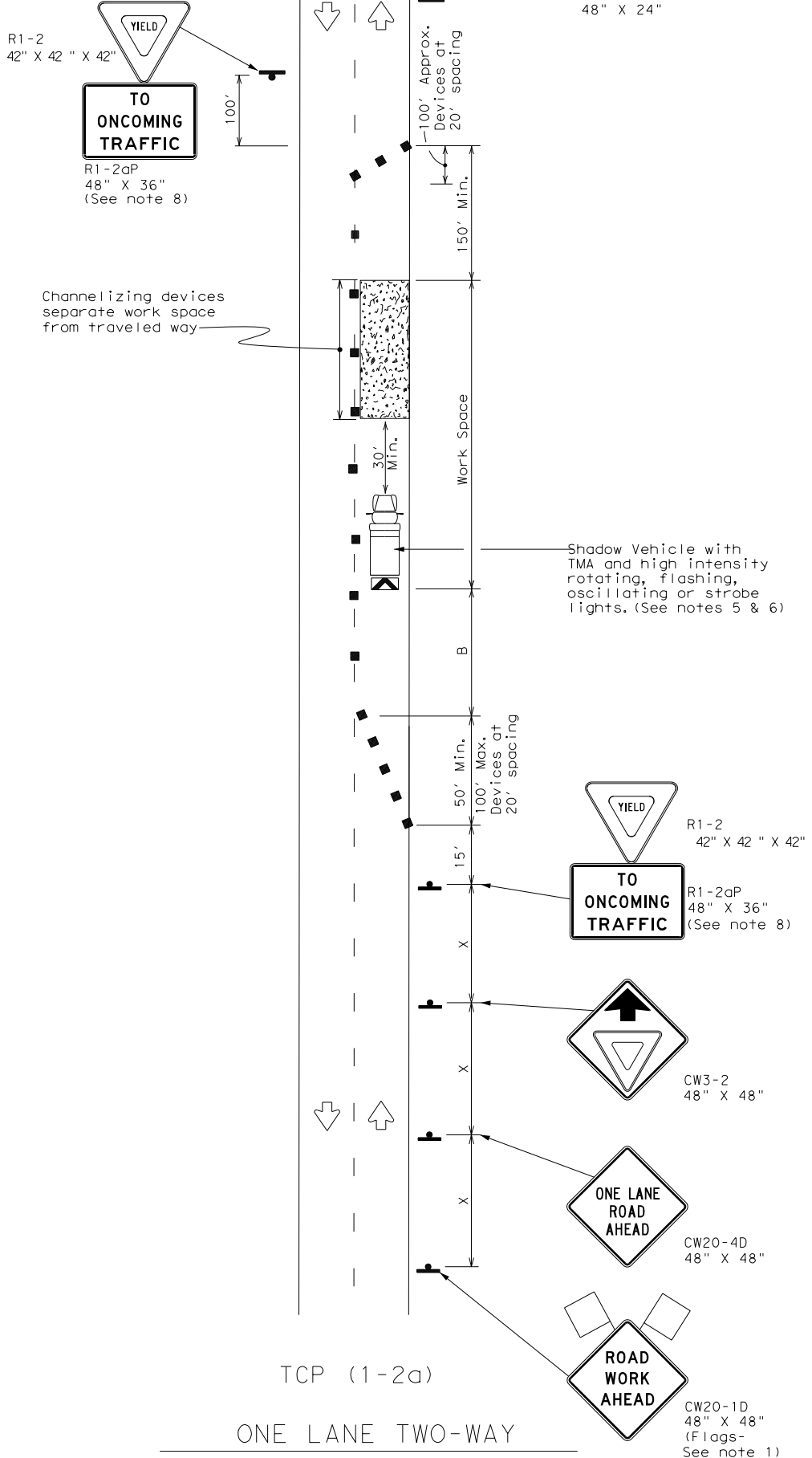
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 4/6/2023 4:03:40 PM  
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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: 5/23/2023 3:30:31 PM  
 FILE: P:\128\26\00\Design\Civil\Standards\TCP\tcp1-2-18.dgn

Warning Sign Sequence in Opposite Direction Same as Below



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 * X	Formula L = WS <sup>2</sup> / 60	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		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 CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
  - Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
  - 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 wider work spaces.
- TCP (1-2a)**
- R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
  - R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.
- TCP (1-2b)**
- 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.
  - If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
  - Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
  - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.



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

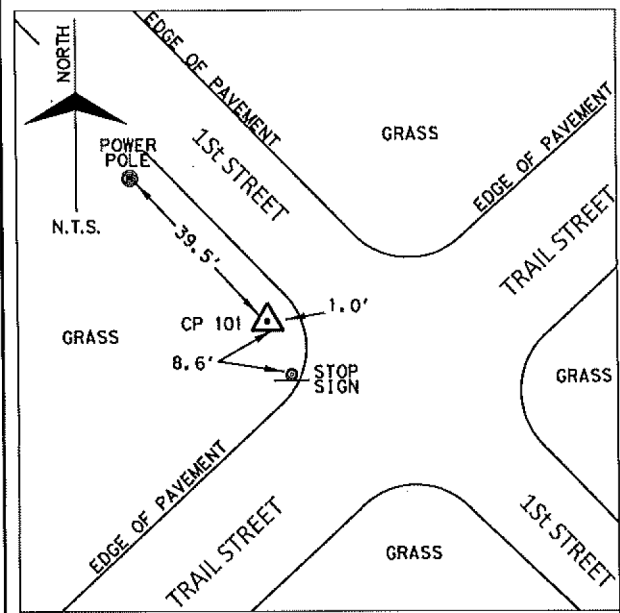
**TCP (1-2) - 18**

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CON:	SECT:	JOB:	HIGHWAY:
REVISIONS	0915	14	048	NA
4-90 4-98	DIST:	COUNTY:	SHEET NO.:	
2-94 2-12	SAT	WILSON	19	
1-97 2-18				

Plotted on 11/17/2022 9:24:26 AM

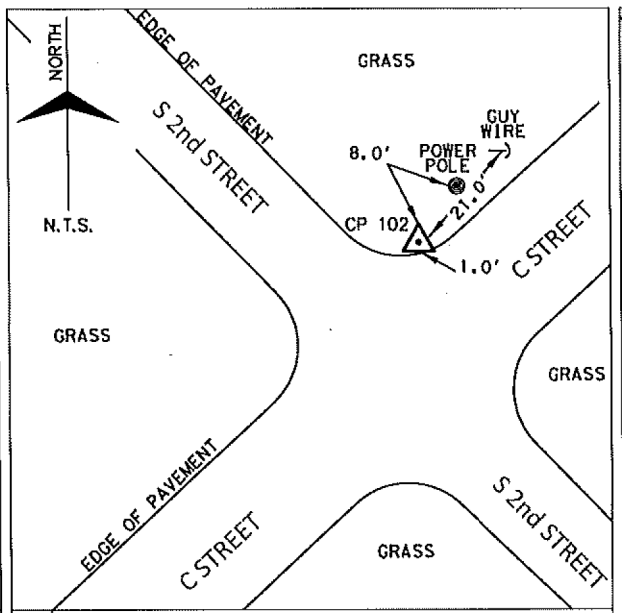
Des i qBle1 gbn tññé enpmet s v hpe l's cf s06 p h0ter h0p0tes s200210 e502k t0ch0p0c0d0100j0h0Des 0gn0B0Det0ct0y0S0ur0ey0R0g0t0p0e0T0p0e0s0M0e0t0r0c0s0t0p0h0t0i0z0n0A0G0H0Z0C0W0B0R0C0.dgn

CP-101



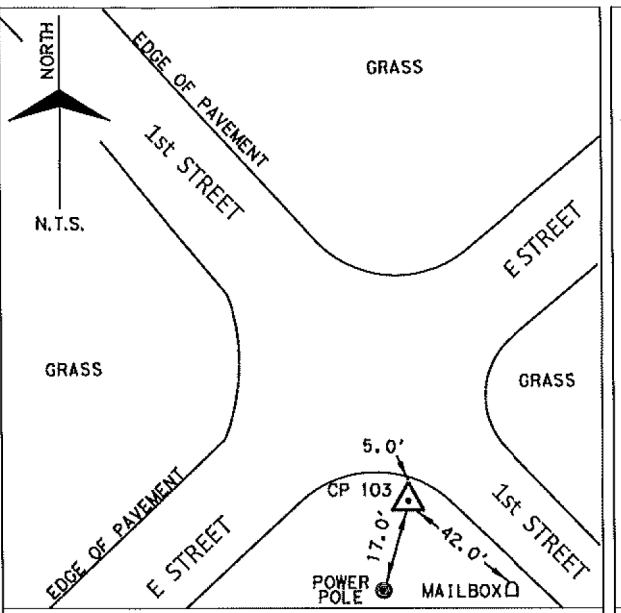
NORTHING - 13,599,848.46  
EASTING - 2,235,495.65  
ELEVATION - 400.88'  
DESCRIPTION - SET 1/2" IRON ROD WITH RED CAP STAMPED "PCI" AT THE WEST CORNER OF THE INTERSECTION OF 1st. St. AND TRAIL STREET (WEST) SIDE OF SAID TRAIL STEET.

CP-102



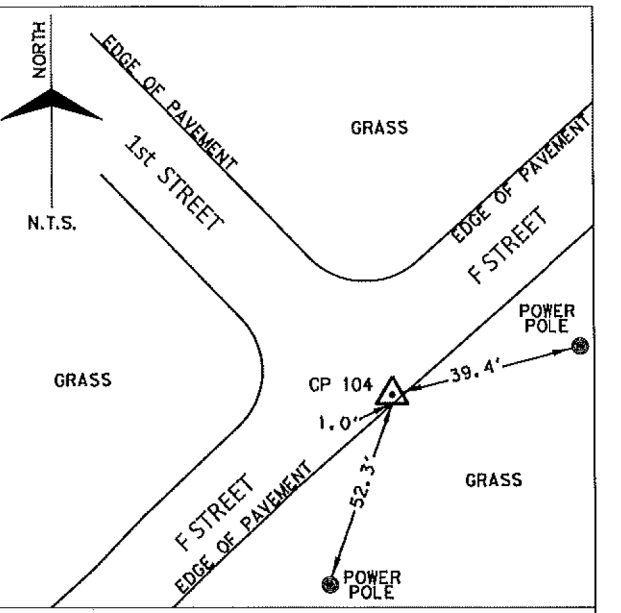
NORTHING - 13,598,109.32  
EASTING - 2,236,507.63  
ELEVATION - 402.25'  
DESCRIPTION - SET 1/2" IRON ROD WITH RED CAP STAMPED "PCI" AT THE NORTH CORNER OF THE INTERSECTION OF 2nd. St. AND C STREET.

CP-103



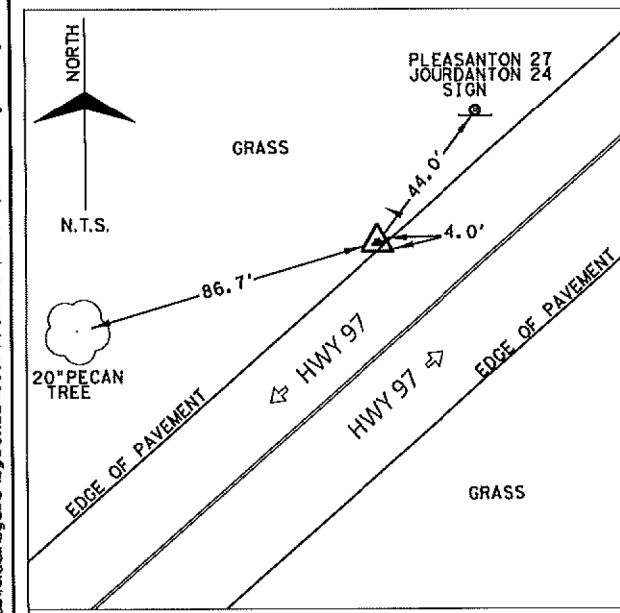
NORTHING - 13,597,680.33  
EASTING - 2,237,514.91  
ELEVATION - 394.99  
DESCRIPTION - SET 1/2" IRON ROD WITH RED CAP STAMPED "PCI" AT THE SOUTH CORNER OF THE INTERSECTION OF 1st. St. AND E STREET.

CP-104



NORTHING - 13,597,337.76  
EASTING - 2,237,847.19  
ELEVATION - 386.47'  
DESCRIPTION - SET A MAG NAIL AT THE SOUTHWEST EDGE OF PAVEMENT AT THE INTERSECTION OF 1st. St. AND F STREET.

CP-105



NORTHING - 13,596,704.11  
EASTING - 2,239,184.66  
ELEVATION - 389.08'  
DESCRIPTION - SET 1/2" IRON ROD WITH RED CAP STAMPED "PCI" AT THE WEST ROW OF HWY 97, CONTROL POINT IS 650 FEET SOUTHWEST OF THE INTERSECTION OF 3rd. St. AND HWY. 97.

- NOTES:
- HORIZONTAL DATUM
- COORDINATES AND DISTANCES ARE IN U.S. SURVEY FEET. COORDINATE VALUES ARE SURFACE VALUES DERIVED BY A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.00015
  - CONTROL FOR THIS PROJECT IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983 (NAD 83) 2011 ADJUSTMENT.
  - BEARING SOURCE AND HORIZONTAL CONTROL WAS ESTABLISHED BY REAL TIME KINEMATIC (RTK) VRS-GPS/GNSS (RTKNET) 2011. REFERENCE STATIONS (VRS):  
VRS ID: PRS333723326131  
VRS ID: PRS554697415551
- VERTICAL DATUM
- ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88), GEOID MODEL 18 (CONUS).
  - ELEVATIONS WERE ESTABLISHED THROUGH CONVENTIONAL LEVELING METHODS.
- DATE ESTABLISHED: 8/24/2022



Jeffrey Scott Hall 11-17-22  
JEFFREY SCOTT HALL  
TEXAS REGISTERED PROFESSIONAL LAND SURVEYOR  
TEXAS NO. 6907

REV. NO.	DATE	DESCRIPTION	BY

**POZNECKI CAMARILLO**  
 (210) 349-3273 6835 CALLAGHAN RD. SUITE 200 TBPE Reg. #F-483  
 (210) 349-4395 (FAX) SAN ANTONIO, TEXAS, 78228 TBPLS Reg. #100423-03  
<http://www.pozcam.com/>

**PAPE-DAWSON ENGINEERS**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10026600

**FLORESVILLE**

HIKE & BIKE TRAIL  
HORIZONTAL AND VERTICAL CONTROL

DCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK	6	TEXAS	SEE TITLE SHEET	N/A		
DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.	
CHK	SAT	WILSON	0915	14	048	20



Q FHBT

Beginning chain P\_FHBT description  
Feature: Geom\_Centerline

Point 1 N 13,599,667.89 E 2,235,313.80 Sta 10+00.00

Course from 1 to PC P\_FHBT\_3 S 45° 16' 42" E Dist 191.91

Curve Data  
\*-----\*

Curve P\_FHBT\_3  
P.I. Station 16+40.00 N 13,599,217.54 E 2,235,768.54  
Delta = 7° 19' 31" (RT)  
Degree = 0° 49' 07"  
Tangent = 448.09  
Length = 894.96  
Radius = 7,000.00  
External = 14.33  
Long Chord = 894.35  
Mid. Ord. = 14.30  
P.C. Station 11+91.91 N 13,599,532.85 E 2,235,450.15  
P.T. Station 20+86.87 N 13,598,864.22 E 2,236,044.12  
C.C. N 13,594,559.11 E 2,230,524.51  
Back = S 45° 16' 42" E  
Ahead = S 37° 57' 11" E  
Chord Bear = S 41° 36' 56" E

Course from PT P\_FHBT\_3 to PC P\_FHBT\_6 S 37° 57' 11" E Dist 701.84

Curve Data  
\*-----\*

Curve P\_FHBT\_6  
P.I. Station 33+53.78 N 13,597,865.24 E 2,236,823.29  
Delta = 19° 43' 36" (LT)  
Degree = 1° 45' 47"  
Tangent = 565.07  
Length = 1,118.95  
Radius = 3,250.00  
External = 48.76  
Long Chord = 1,113.43  
Mid. Ord. = 48.04  
P.C. Station 27+88.71 N 13,598,310.81 E 2,236,475.76  
P.T. Station 39+07.66 N 13,597,563.12 E 2,237,300.81  
C.C. N 13,600,309.60 E 2,239,038.44  
Back = S 37° 57' 11" E  
Ahead = S 57° 40' 46" E  
Chord Bear = S 47° 48' 59" E

Course from PT P\_FHBT\_6 to 2 S 57° 40' 46" E Dist 1,714.93

Point 2 N 13,596,646.23 E 2,238,750.05 Sta 56+22.59

Course from 2 to 3 S 58° 45' 18" E Dist 365.00

Point 3 N 13,596,456.90 E 2,239,062.11 Sta 59+87.59

Ending chain P\_FHBT description

Plotted on: 4/6/2023

Design File name: P:\128\26\00\Design\Civil\General\1282600\_HAD.dgn

DESIGN



*Ernesto Garza Jr.*  
ERNESTO GARZA JR., P.E.

4/6/2023  
DATE

APPROVAL



*Dan Thoma*  
DAN THOMA, P.E.

4/6/2023  
DATE



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



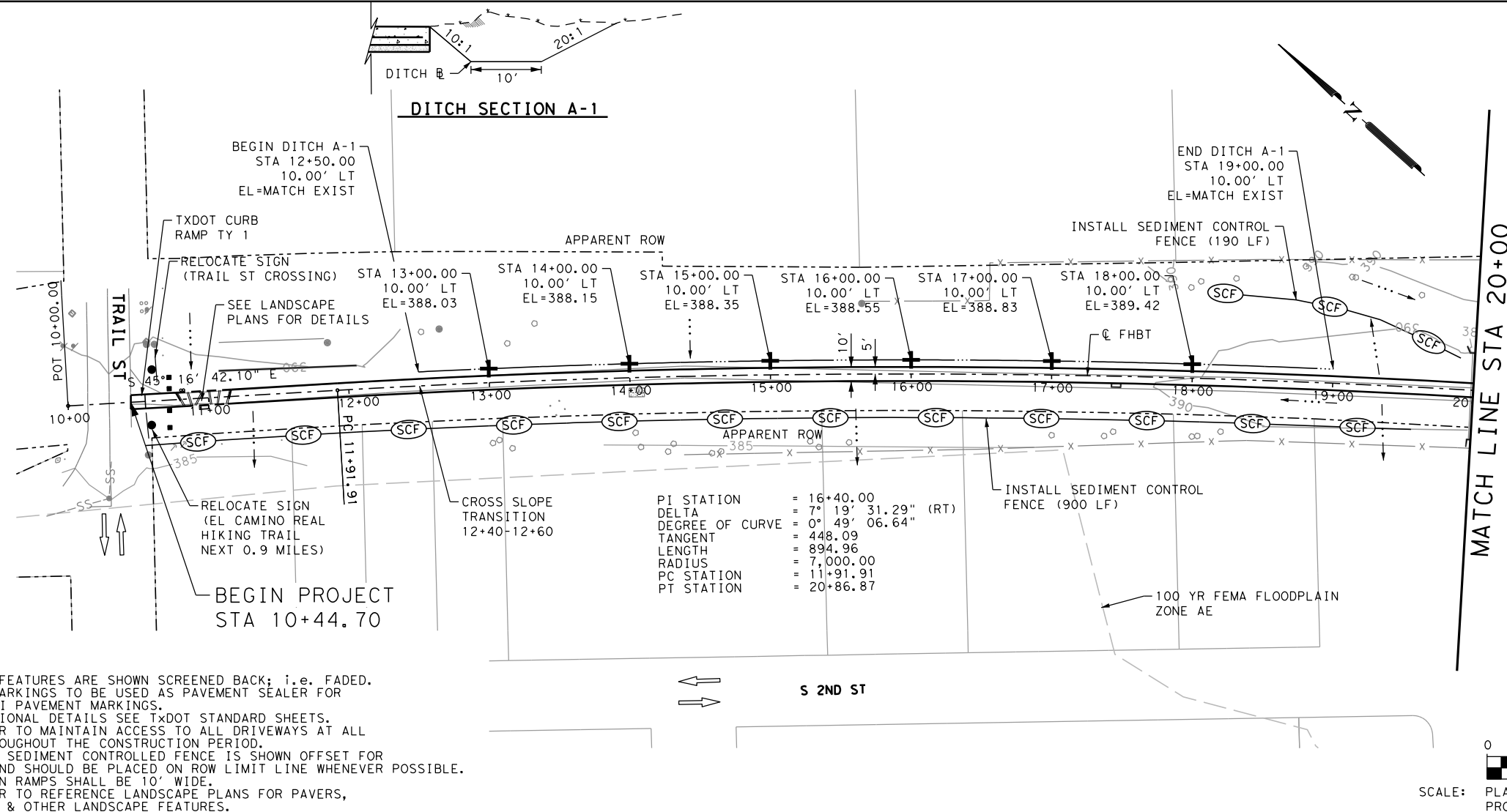
HIKE & BIKE TRAIL

HORIZONTAL ALIGNMENT  
DATA

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			NA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	WILSON	0915	14	048	21

Plotted on: 5/23/2023

Design File name: P:\128\26\00\Design\Civil\Roadway\1282600\_PP01.dgn



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	* EXCAVATION (ROADWAY)	CY	327
0132-6003	* EMBANKMENT (FINAL) (ORD COMP) (TY B)	CY	10
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	3242
0168-6001	VEGETATIVE WATERING	MG	51.0
0180-6001	WILDFLOWER SEEDING	AC	0.68
0506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	78
0506-6024	CONSTRUCTION EXITS (REMOVE)	SY	78
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1090
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1090
0528-6011	LANDSCAPE PAVERS (TYPE I)	SY	33
0528-6012	LANDSCAPE PAVERS (TYPE II)	SY	8
0531-6003	CONC SIDEWALKS (6")	SY	1050
0531-6004	CURB RAMPS (TY 1)	EA	1
0644-6068	RELOCATE SM RD SN SUP&M TY 10BWG	EA	2
1002-6025	LANDSCAPE AMENITY (TRASH/RECYCLE BIN)	EA	2
1002-6026	LANDSCAPE AMENITY (BENCH)	EA	2
5033-6004	REMOVE & REPLACE BOLLARD	EA	4

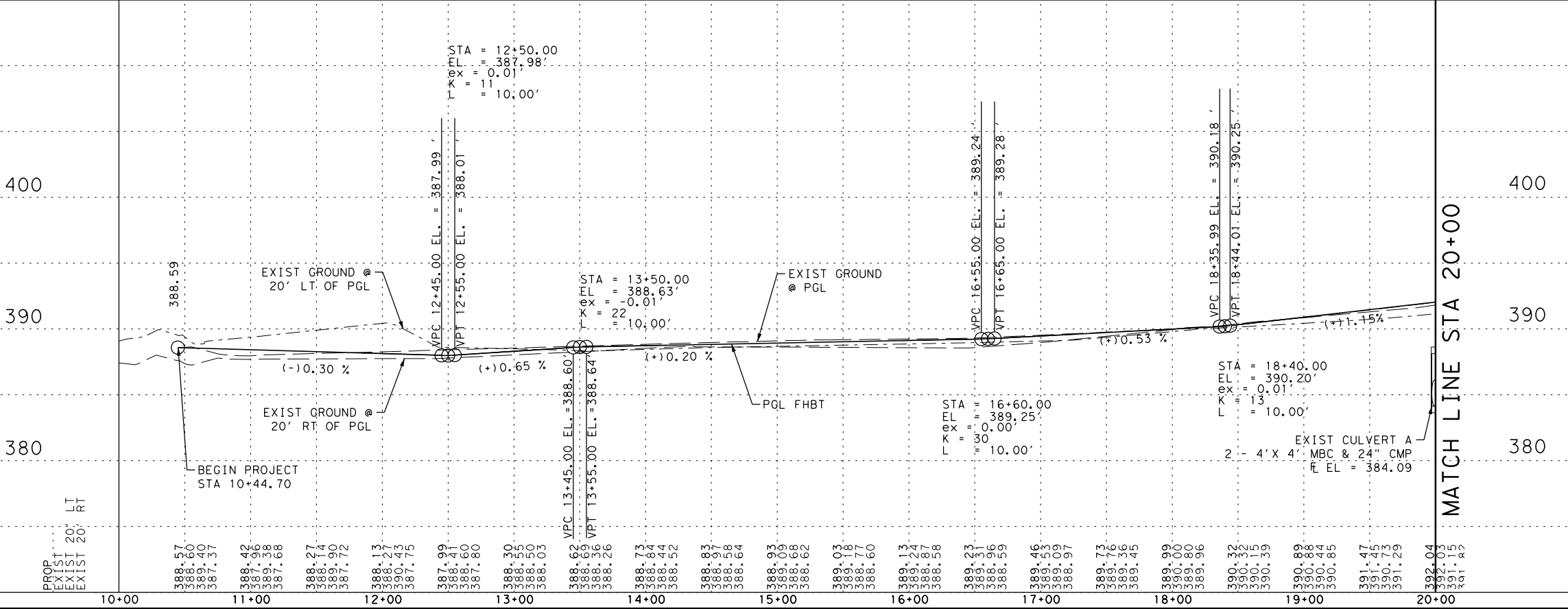
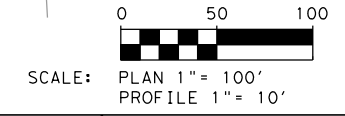
\* SUBSIDIARY TO ITEM 531, NO SEPERATE PAY ITEM

**LEGEND**

— OH E —	EXIST OVERHEAD ELECTRIC LINE	[A]	24" SLD (W) STRIPE CROSSWALK LINE
— W —	EXIST WATER LINE	(SCF)	SEDIMENT CONTROL FENCE
— X —	EXIST FENCE	(RFD2)	TYPE 2 ROCK FILTER DAM
— — — —	PROPERTY LINE	(RFD4)	TYPE 4 ROCK FILTER DAM
— ··· —	DITCH FLOW LINE	←····→	FLOW ARROW
— SS —	PROP SANITARY SEWER	●	EXIST SIGN (TO REMAIN)
— 390 —	5' CONTOURS	◀▶	SIGN TO BE RELOCATED
			TRAFFIC FLOW ARROWS

**NOTES**

- EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED.
- TYPE II MARKINGS TO BE USED AS PAVEMENT SEALER FOR ALL TYPE I PAVEMENT MARKINGS.
- FOR ADDITIONAL DETAILS SEE TxDOT STANDARD SHEETS.
- CONTRACTOR TO MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES THROUGHOUT THE CONSTRUCTION PERIOD.
- TEMPORARY SEDIMENT CONTROLLED FENCE IS SHOWN OFFSET FOR CLARITY AND SHOULD BE PLACED ON ROW LIMIT LINE WHENEVER POSSIBLE.
- PEDESTRIAN RAMPS SHALL BE 10' WIDE.
- CONTRACTOR TO REFERENCE LANDSCAPE PLANS FOR PAVERS, BOLLARDS, & OTHER LANDSCAPE FEATURES.



DESIGN

ERNESTO GARZA JR., P.E. 5/23/2023 DATE

APPROVAL

DAN THOMA, P.E. 5/23/2023 DATE

**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

**FLORESVILLE**

HIKE & BIKE TRAIL

**PLAN AND PROFILE**

BEGIN PROJECT TO STA 20+00

SHEET 1 OF 5

CHK DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
	6	TEXAS	SEE TITLE SHEET	NA		
CHK DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
	SAT	WILSON	0915	14	048	22

Plotted on: 6/29/2023

Design File name: P:\128\26\00\Design\Civil\Roadway\1282600\_PP02.dgn

ITEM	DESCRIPTION	UNIT	QTY
0110-6001	* EXCAVATION (ROADWAY)	CY	212
0132-6003	* EMBANKMENT (FINAL) (ORD COMP) (TY B)	CY	7
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	2608
0168-6001	VEGETATIVE WATERING	MG	41.0
0180-6001	WILDFLOWER SEEDING	AC	0.54
0416-6003	DRILL SHAFT (30 IN)	LF	24
0506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	36
0506-6011	ROCK FILTER DAMS (REMOVE)	LF	36
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	322
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	322
0528-6011	LANDSCAPE PAVERS (TYPE I)	SY	33
0528-6012	LANDSCAPE PAVERS (TYPE II)	SY	8
0531-6003	CONC SIDEWALKS (6")	SY	1066
0531-6004	CURB RAMP (TY 1)	EA	2
0618-6046	COND (PVC) (SCH 80) (2")	LF	358
0620-6007	ELEC CONDR (NO. 8) BARE	LF	358
0620-6008	ELEC CONDR (NO. 8) INSULATED	LF	715
0624-6002	GROUND BOX TY A (122311)W/APRON	EA	2
0628-6009	ELC SRV TY A 120/240 060 (NS) SS (E) SP (O)	EA	1
0644-6068	RELOCATE SM RD SN SUP&M TY 10BWG	EA	4
0666-6048	REFL PAV MRK TY I (W)24" (SLD) (100MIL)	LF	50
0666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	50
1002-6025	LANDSCAPE AMENITY (TRASH/RECYCLE BIN)	EA	2
1002-6026	LANDSCAPE AMENITY (BENCH)	EA	1
5033-6004	REMOVE & REPLACE BOLLARD	EA	9
6501-6001	L&D PEDESTRAIN ILLM ASSEMBLY	EA	4

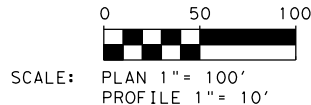
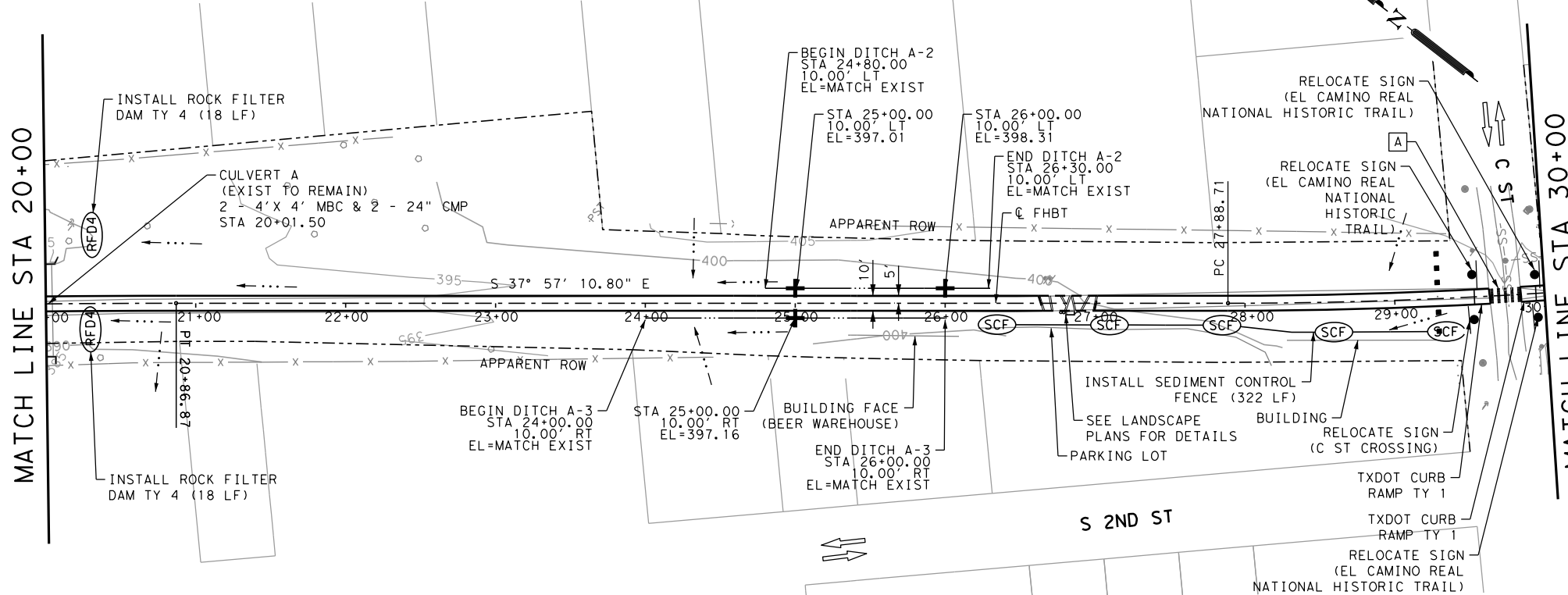
\* SUBSIDIARY TO ITEM 531, NO SEPERATE PAY ITEM.

**LEGEND**

— OH E —	EXIST OVERHEAD ELECTRIC LINE	[A]	24" SLD (W) STRIPE CROSSWALK LINE
— W —	EXIST WATER LINE	(SCF)	SEDIMENT CONTROL FENCE
— X —	EXIST FENCE	(RFD2)	TYPE 2 ROCK FILTER DAM
— ··· —	PROPERTY LINE	(RFD4)	TYPE 4 ROCK FILTER DAM
— ··· —	DITCH FLOW LINE	←····→	FLOW ARROW
— SS —	PROP SANITARY SEWER	●	EXIST SIGN (TO REMAIN)
— 390 —	5' CONTOURS	⊙	SIGN TO BE RELOCATED
		↔	TRAFFIC FLOW ARROWS

**NOTES**

- EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED.
- TYPE II MARKINGS TO BE USED AS PAVEMENT SEALER FOR ALL TYPE I PAVEMENT MARKINGS.
- FOR ADDITIONAL DETAILS SEE TxDOT STANDARD SHEETS.
- CONTRACTOR TO MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES THROUGHOUT THE CONSTRUCTION PERIOD.
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DESIGN

STATE OF TEXAS  
 ERNESTO GARZA JR.  
 141557  
 LICENSED PROFESSIONAL ENGINEER  
 6/29/2023  
 ERNESTO GARZA JR., P.E. DATE

APPROVAL

STATE OF TEXAS  
 DAN THOMA  
 98622  
 LICENSED PROFESSIONAL ENGINEER  
 6/29/2023  
 DAN THOMA, P.E. DATE

**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

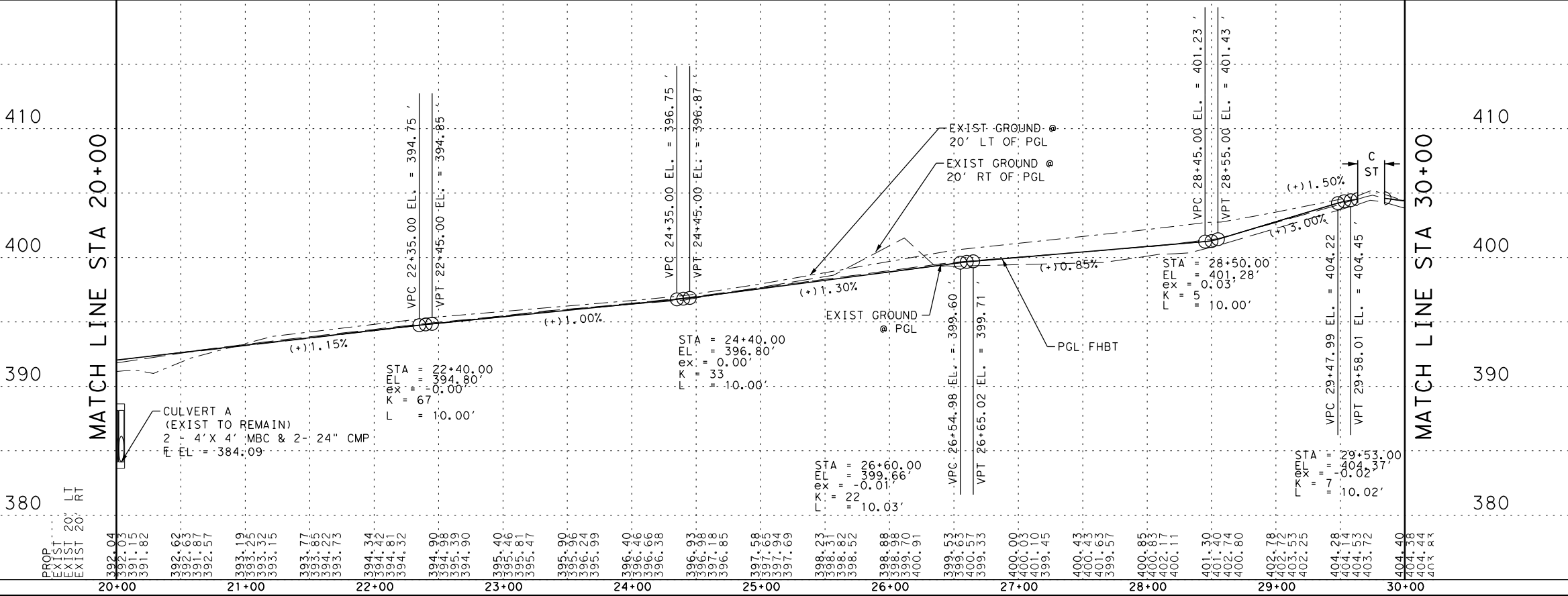
**FLORESVILLE**

HIKE & BIKE TRAIL

**PLAN AND PROFILE**

STA 20+00 TO STA 30+00

SHEET 2 OF 5



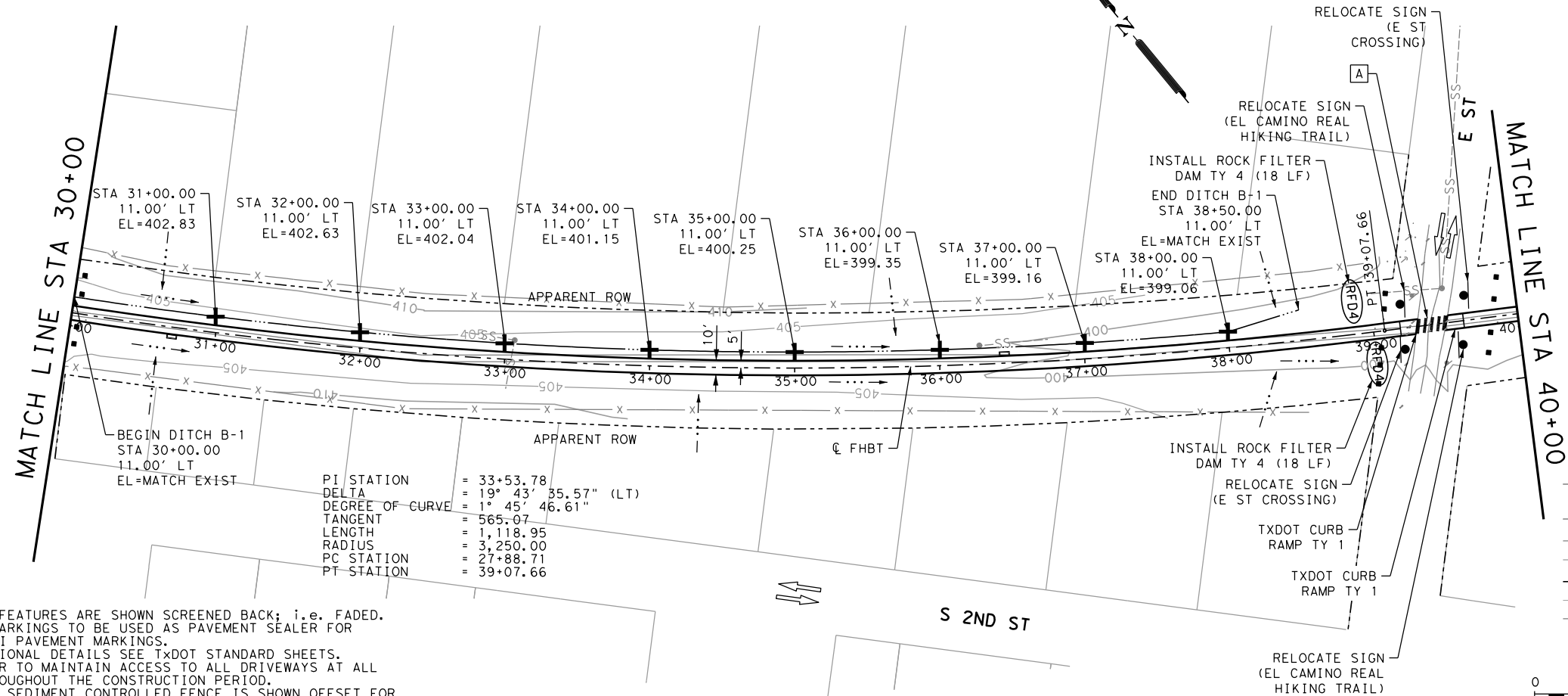
DGN#	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#:	6	TEXAS	SEE TITLE SHEET	NA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#:	SAT	WILSON	0915	14	048	23

Plotted on: 6/29/2023

Design File name: P:\12826\00\Design\Civil\Roadway\1282600\_PP03.dgn

ITEM	DESCRIPTION	UNIT	QTY
0110-6001	* EXCAVATION (ROADWAY)	CY	410
0132-6003	* EMBANKMENT (FINAL) (ORD COMP) (TY B)	CY	50
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	3444
0168-6001	VEGETATIVE WATERING	MG	54.0
0180-6001	WILDFLOWER SEEDING	AC	0.71
0506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	36
0506-6011	ROCK FILTER DAMS (REMOVE)	LF	36
0531-6003	CONC SIDEWALKS (6")	SY	1066
0531-6004	CURB RAMP (TY 1)	EA	2
0644-6068	RELOCATE SM RD SN SUP&M TY 10BWG	EA	4
0666-6048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	50
0666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	50
1002-6026	LANDSCAPE AMENITY (BENCH)	EA	2
5033-6004	REMOVE & REPLACE BOLLARD	EA	8
5158-6001	FIXED DECORATIVE BOLLARDS	EA	1

\* SUBSIDIARY TO ITEM 531, NO SEPERATE PAY ITEM.



**LEGEND**

- OH E — EXIST OVERHEAD ELECTRIC LINE
- W — EXIST WATER LINE
- X — EXIST FENCE
- — — — — PROPERTY LINE
- ····· — DITCH FLOW LINE
- SS — PROP SANITARY SEWER
- 390 — 5' CONTOURS
- [A] 24" SLD (W) STRIPE CROSSWALK LINE
- (SCF) SEDIMENT CONTROL FENCE
- (RFD2) TYPE 2 ROCK FILTER DAM
- (RFD4) TYPE 4 ROCK FILTER DAM
- ←····→ FLOW ARROW
- EXIST SIGN (TO REMAIN)
- SIGN TO BE RELOCATED
- ⇨ TRAFFIC FLOW ARROWS

**NOTES**

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PI STATION = 33+53.78  
 DELTA = 19° 43' 35.57" (LT)  
 DEGREE OF CURVE = 1° 45' 46.61"  
 TANGENT LENGTH = 565.07  
 RADIUS = 1,118.95  
 PC STATION = 3,250.00  
 PT STATION = 39+07.66



DESIGN

STATE OF TEXAS  
 ERNESTO GARZA JR.  
 141557  
 LICENSED PROFESSIONAL ENGINEER  
 6/29/2023  
 ERNESTO GARZA JR., P.E. DATE

APPROVAL

STATE OF TEXAS  
 DAN THOMA  
 98622  
 LICENSED PROFESSIONAL ENGINEER  
 6/29/2023  
 DAN THOMA, P.E. DATE

**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

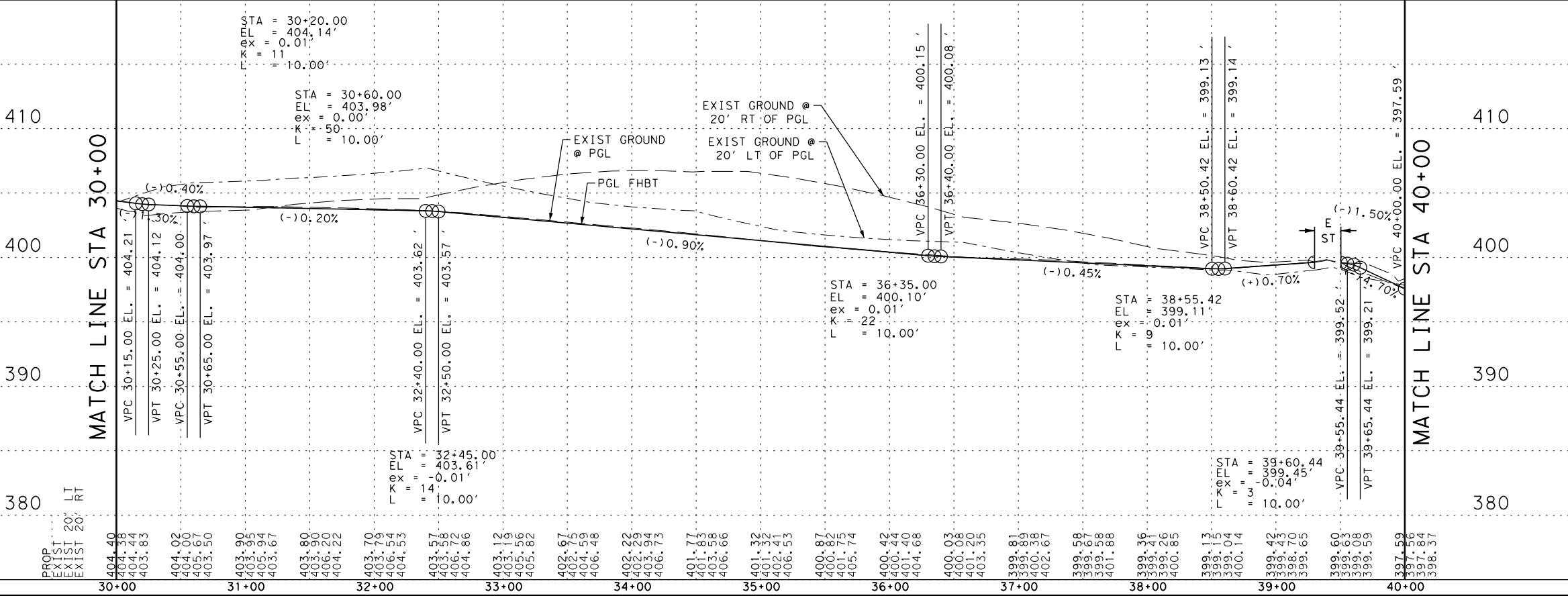
**FLORESVILLE**

HIKE & BIKE TRAIL

**PLAN AND PROFILE**

STA 30+00 TO STA 40+00

SHEET 3 OF 5



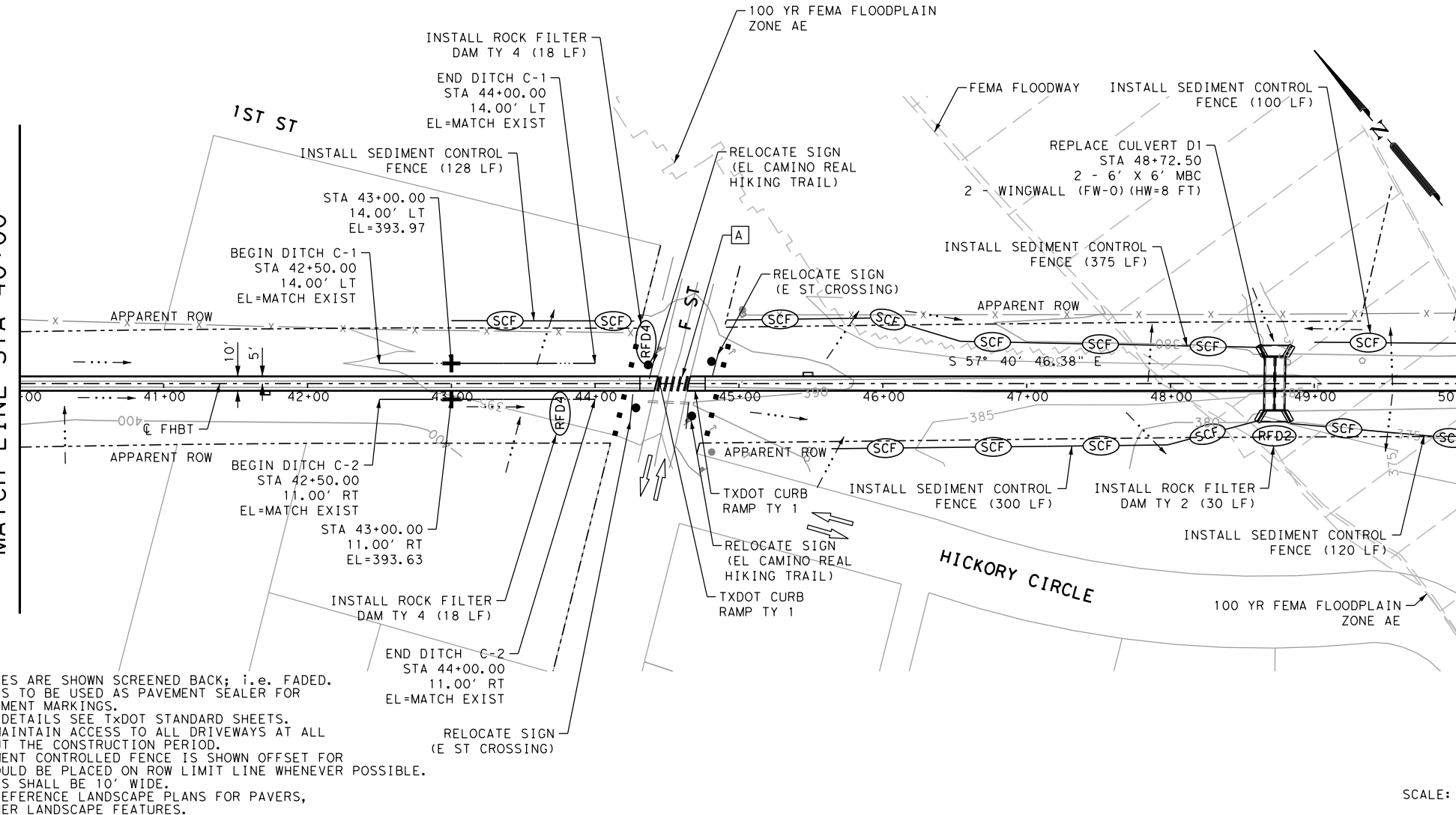
DGN#	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN#	6	TEXAS	SEE TITLE SHEET	NA		
DWG#	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG#	SAT	WILSON	0915	14	048	24

Plotted on: 6/29/2023

Design File name: P:\128\26\00\Design\Civil\Roadway\1282600\_PP04.dgn

MATCH LINE STA 40+00

MATCH LINE STA 50+00



ITEM	DESCRIPTION	UNIT	QTY
0110-6001	* EXCAVATION (ROADWAY)	CY	243
0132-6003	* EMBANKMENT (FINAL) (ORD COMP) (TY B)	CY	100
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	2770
0168-6001	VEGETATIVE WATERING	MG	45.0
0169-6004	SOIL RETENTION BLANKETS (CL 1) (TY D)	SY	320
0180-6001	WILDFLOWER SEEDING	AC	0.57
0192-6031	PLANT MATERIAL (5 GAL) (SHRUB)	EA	38
0432-6002	RIPRAP (CONC) (5 IN)	CY	6
0462-6013	CONC BOX CULV (6 FT X 6 FT)	LF	76
0466-6155	WINGWALL (FW - 0) (HW=8 FT)	EA	2
0496-6001	REMOV STR (BOX CULVERT)	EA	2
0496-6005	REMOV STR (WINGWALL)	EA	2
0506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	30
0506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	36
0506-6011	ROCK FILTER DAMS (REMOVE)	LF	66
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1023
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1023
0531-6003	CONC SIDEWALKS (6")	SY	1065
0531-6004	CURB RAMPS (TY 1)	EA	2
0644-6068	RELOCATE SM RD SN SUP&M TY 10BWG	EA	4
0666-6048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	50
0666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	50
1002-6026	LANDSCAPE AMENITY (BENCH)	EA	2
5033-6004	REMOVE & REPLACE BOLLARD	EA	4
5158-6001	FIXED DECORATIVE BOLLARDS	EA	6

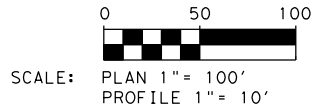
\* SUBSIDIARY TO ITEM 531, NO SEPERATE PAY ITEM.

**LEGEND**

- OH E — EXIST OVERHEAD ELECTRIC LINE
- W — EXIST WATER LINE
- X — EXIST FENCE
- — — — — PROPERTY LINE
- ····· — DITCH FLOW LINE
- SS — PROP SANITARY SEWER
- 390 — 5' CONTOURS
- [A] 24" SLD (W) STRIPE CROSSWALK LINE
- (SCF) SEDIMENT CONTROL FENCE
- (RFD2) TYPE 2 ROCK FILTER DAM
- (RFD4) TYPE 4 ROCK FILTER DAM
- ←····→ FLOW ARROW
- EXIST SIGN (TO REMAIN)
- SIGN TO BE RELOCATED
- ⇨ TRAFFIC FLOW ARROWS

**NOTES**

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DESIGN

**ERNESTO GARZA JR., P.E.**  
141557 LICENSED PROFESSIONAL ENGINEER  
6/29/2023 DATE

APPROVAL

**DAN THOMA, P.E.**  
98622 LICENSED PROFESSIONAL ENGINEER  
6/29/2023 DATE



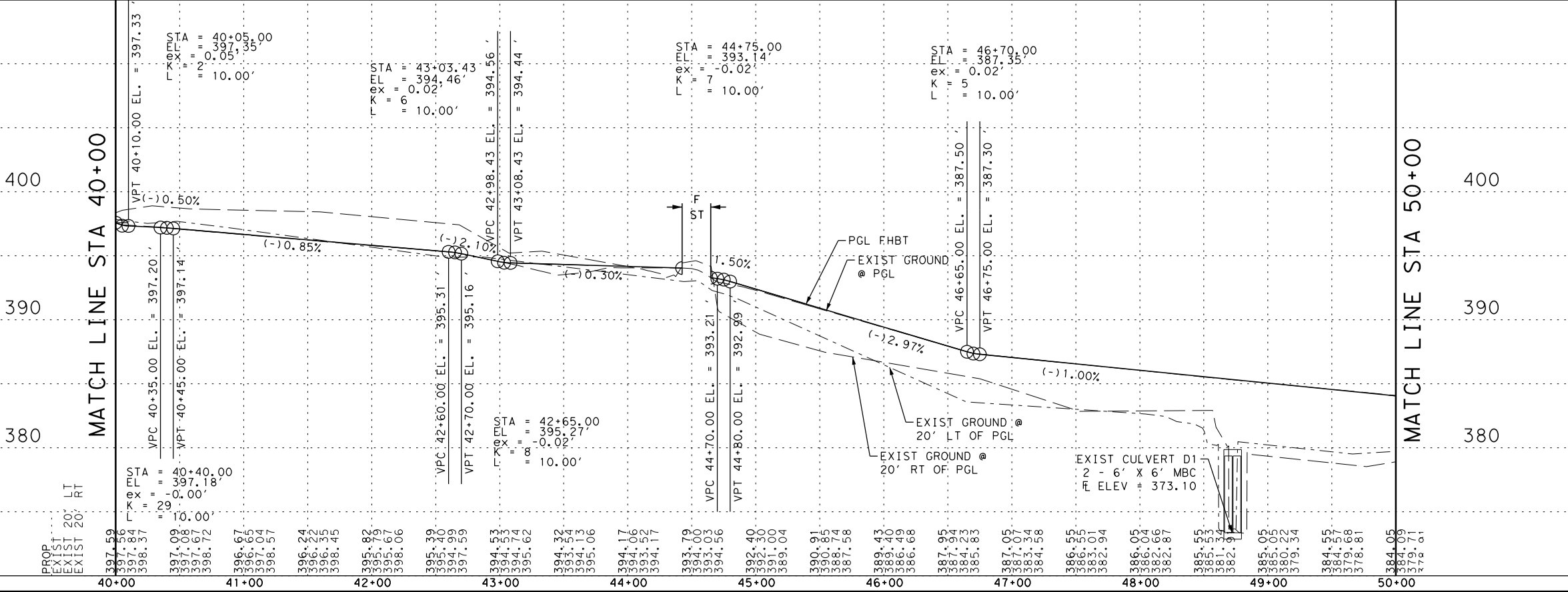
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



HIKE & BIKE TRAIL  
**PLAN AND PROFILE**

STA 40+00 TO STA 50+00

SHEET 4 OF 5



DWG:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK	6	TEXAS	SEE TITLE SHEET	NA		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK	SAT	WILSON	0915	14	048	25

Plotted on: 6/29/2023

Design File name: P:\12826\00\Design\Civil\Roadway\1282600\_PP05.dgn

ITEM	DESCRIPTION	UNIT	QTY
0110-6001	* EXCAVATION (ROADWAY)	CY	140
0132-6003	* EMBANKMENT (FINAL) (ORD COMP) (TY B)	CY	103
0160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	2398
0168-6001	VEGETATIVE WATERING	MG	38.0
0169-6004	SOIL RETENTION BLANKETS (CL 1) (TY D)	SY	310
0180-6001	WILDFLOWER SEEDING	AC	0.50
0192-6031	PLANT MATERIAL (5 GAL) (SHRUB)	EA	30
0432-6002	RIPRAP (CONC) (5 IN)	CY	4
0462-6023	CONC BOX CULV (8 FT X 8 FT)	LF	36
0466-6142	WINGWALL (FW - 0) (HW=10 FT)	EA	2
0496-6001	REMOV STR (BOX CULVERT)	EA	1
0496-6005	REMOV STR (WINGWALL)	EA	2
0506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	30
0506-6011	ROCK FILTER DAMS (REMOVE)	LF	30
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1335
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1335
0531-6003	CONC SIDEWALKS (6")	SY	971
0531-6004	CURB RAMPS (TY 1)	EA	1
0644-6068	RELOCATE SM RD SN SUP&M TY 10BWG	EA	2
1002-6026	LANDSCAPE AMENITY (BENCH)	EA	2
5158-6001	FIXED DECORATIVE BOLLARDS	EA	2

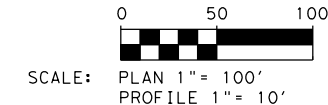
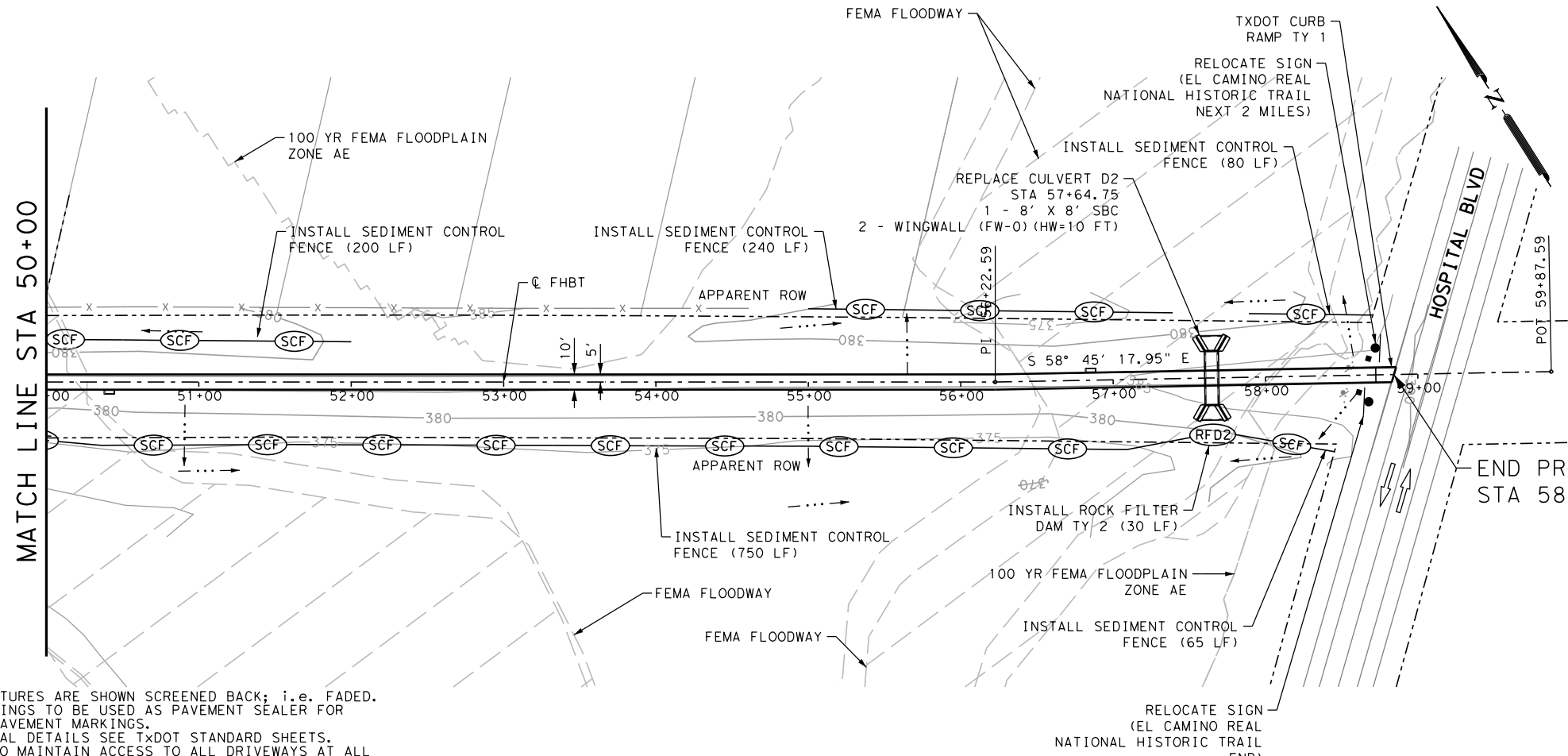
\* SUBSIDIARY TO ITEM 531, NO SEPARATE PAY ITEM.

**LEGEND**

— OH E —	EXIST OVERHEAD ELECTRIC LINE	[A]	24" SLD (W) STRIPE CROSSWALK LINE
— W —	EXIST WATER LINE	(SCF)	SEDIMENT CONTROL FENCE
— X —	EXIST FENCE	(RFD2)	TYPE 2 ROCK FILTER DAM
— — — —	PROPERTY LINE	(RFD4)	TYPE 4 ROCK FILTER DAM
— · · · —	DITCH FLOW LINE	→	FLOW ARROW
— SS —	PROP SANITARY SEWER	●	EXIST SIGN (TO REMAIN)
— 390 —	5' CONTOURS	●	SIGN TO BE RELOCATED
		↔	TRAFFIC FLOW ARROWS

**NOTES**

- EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED.
- TYPE II MARKINGS TO BE USED AS PAVEMENT SEALER FOR ALL TYPE I PAVEMENT MARKINGS.
- FOR ADDITIONAL DETAILS SEE TxDOT STANDARD SHEETS.
- CONTRACTOR TO MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES THROUGHOUT THE CONSTRUCTION PERIOD.
- TEMPORARY SEDIMENT CONTROLLED FENCE IS SHOWN OFFSET FOR CLARITY AND SHOULD BE PLACED ON ROW LIMIT LINE WHENEVER POSSIBLE.
- PEDESTRIAN RAMPS SHALL BE 10' WIDE.
- CONTRACTOR TO REFERENCE LANDSCAPE PLANS FOR PAVERS, BOLLARDS, & OTHER LANDSCAPE FEATURES.



DESIGN

ERNESTO GARZA JR., P.E. 6/29/2023 DATE

APPROVAL

DAN THOMA, P.E. 6/29/2023 DATE

**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

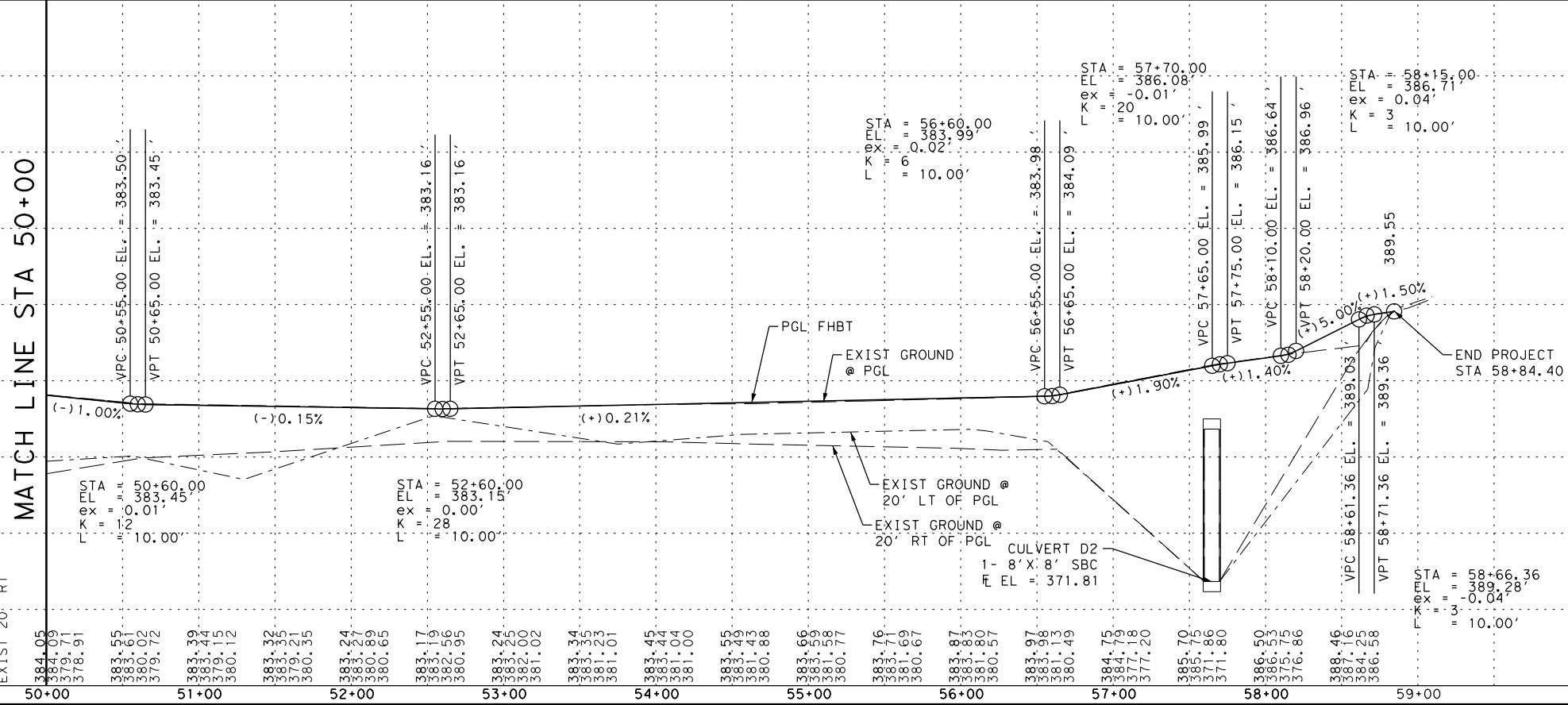
**FLORESVILLE**

HIKE & BIKE TRAIL

**PLAN AND PROFILE**

STA 50+00 TO END PROJECT

SHEET 5 OF 5



DWG:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DWG:	6	TEXAS	SEE TITLE SHEET	NA		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	WILSON	0915	14	048	26

**STORMWATER POLLUTION PREVENTION PLAN (SWP3):**

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

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

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

**1.0 SITE/PROJECT DESCRIPTION**

**1.1 PROJECT CONTROL SECTION JOB (CSJ):**  
0915-14-048

**1.2 PROJECT LIMITS:**

From: TRAIL STREET

To: HOSPITAL BLVD (SH 97)

**1.3 PROJECT COORDINATES:**

BEGIN: (Lat) 29°08'06.2"N, (Long) 98°09'54.4"W

END: (Lat) 29°07'35.0"N, (Long) 98°09'13.8"W

**1.4 TOTAL PROJECT AREA (Acres):** 4.44

**1.5 TOTAL AREA TO BE DISTURBED (Acres):** 4.08

**1.6 NATURE OF CONSTRUCTION ACTIVITY:**

CONSTRUCT CONCRETE TRAIL

**1.7 MAJOR SOIL TYPES:**

Soil Type	Description
QUEEN CITY SAND	SANDSTONE IS FINE TO MEDIAN GRAINED NON CALCAREOUS AND SILTSTONE IS FRIABLE WITH THIN INTERBEDS OF CALY AND IS SOMETIME SNADY AND SILTY.

**1.8 PROJECT SPECIFIC LOCATIONS (PSLs):**

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

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

Type	Sheet #s

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

**1.9 CONSTRUCTION ACTIVITIES:**

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

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

**1.10 POTENTIAL POLLUTANTS AND SOURCES:**

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

**1.11 RECEIVING WATERS:**

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

Tributaries	Classified Waterbody
LODI BRANCH	SAN ANTONIO RIVER
STREAM 1	SAN ANTONIO RIVER
STREAM 2	SAN ANTONIO RIVER

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

**1.12 ROLES AND RESPONSIBILITIES: CITY OF FLORESVILLE**

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

**1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR**

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

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

MS4 Entity
NA

**STORMWATER POLLUTION PREVENTION PLAN (SWP3)**



FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
6	SEE TITLE SHEET			27
STATE	STATE DIST.	COUNTY		
TEXAS	SAT	WILSON		
CONT.	SECT.	JOB	HIGHWAY NO.	
0915	14	048	NA	

**STORMWATER POLLUTION PREVENTION PLAN (SWP3):**

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

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

**2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:**

**T / P**

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

**2.2 SEDIMENT CONTROL BMPs:**

**T / P**

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

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

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

**T / P**

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

**2.3 PERMANENT CONTROLS:**

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

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

**2.4 OFFSITE VEHICLE TRACKING CONTROLS:**

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

**2.5 POLLUTION PREVENTION MEASURES:**

- Chemical Management
- Concrete and Materials Waste Management
- Debris and Trash Management
- Dust Control
- Sanitary Facilities
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

**2.6 VEGETATED BUFFER ZONES:**

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

Type	Stationing	
	From	To

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

**2.7 ALLOWABLE NON-STORMWATER DISCHARGES:**

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

**2.8 INSPECTIONS:**

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

**2.9 MAINTENANCE:**

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

**STORMWATER POLLUTION PREVENTION PLAN (SWP3)**



FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
6	SEE TITLE SHEET			28
STATE	STATE DIST.	COUNTY		
TEXAS	SAT	WILSON		
CONT.	SECT.	JOB	HIGHWAY NO.	
0915	14	048	NA	



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**I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402**

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

No Action Required     Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required:  Yes  No

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

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

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

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

- No Permit Required
- Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
- Nationwide Permit 14 - PCN Required
- Individual 404 Permit Required
- Other Nationwide Permit Required: NWP# \_\_\_\_\_

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

- 1.
- 2.
- 3.
- 4.

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

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

**III. CULTURAL RESOURCES**

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

No Action Required     Required Action

Action No.

- 1.
- 2.
- 3.
- 4.

**IV. VEGETATION RESOURCES**

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

No Action Required     Required Action

Action No.

- 1.
- 2.
- 3.
- 4.

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

No Action Required     Required Action

Action No.

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

- A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.
- B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.

- 3.
- 4.

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

**VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES**

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:

- \* Dead or distressed vegetation (not identified as normal)
- \* Trash piles, drums, canister, barrels, etc.
- \* Undesirable smells or odors
- \* Evidence of leaching or seepage of substances

Hazardous Materials or Contamination Issues Specific to this Project:

No Action Required     Required Action

Action No.

- 1.
- 2.
- 3.

Does the project involve the demolition of a span bridge?

Yes     No (No further action required)

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

**VII. OTHER ENVIRONMENTAL ISSUES**

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

No Action Required     Required Action

Action No.

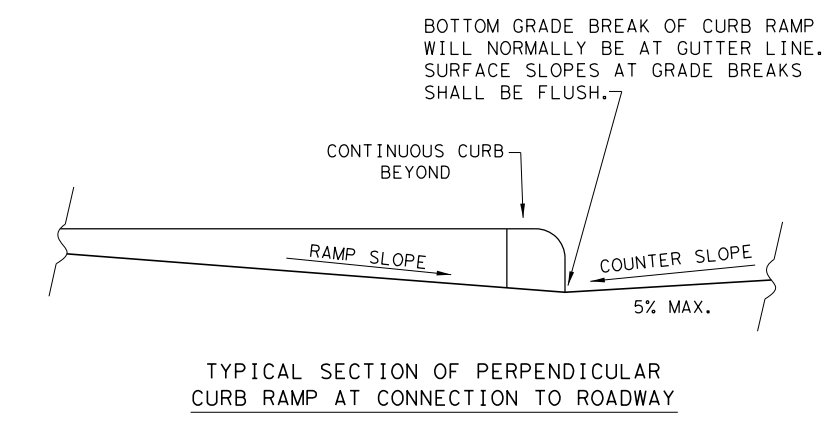
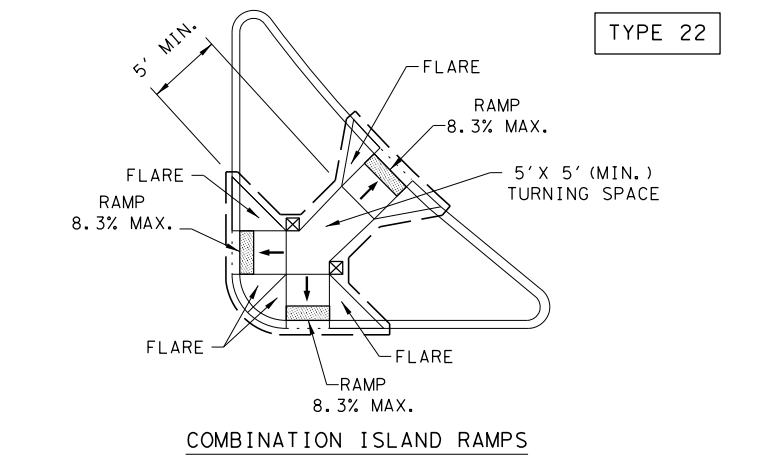
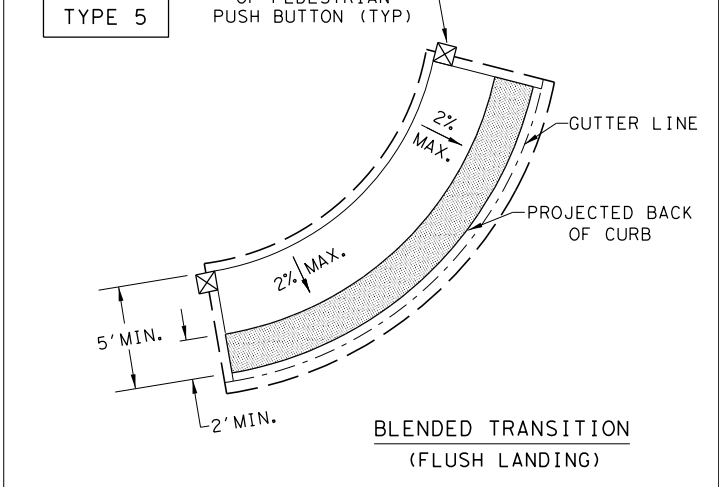
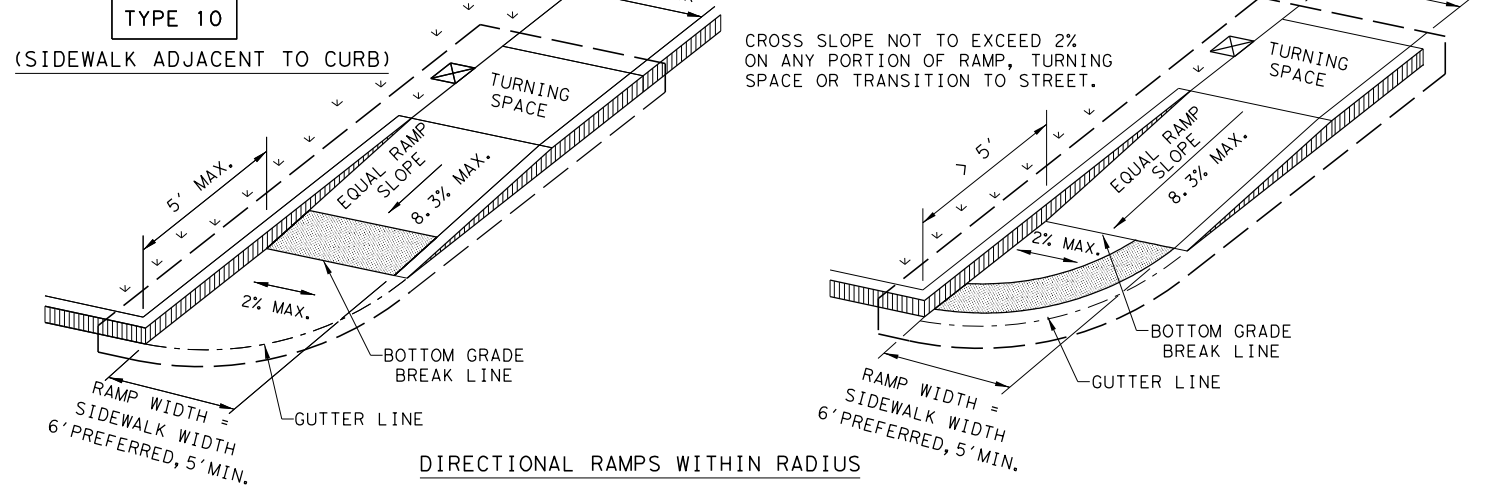
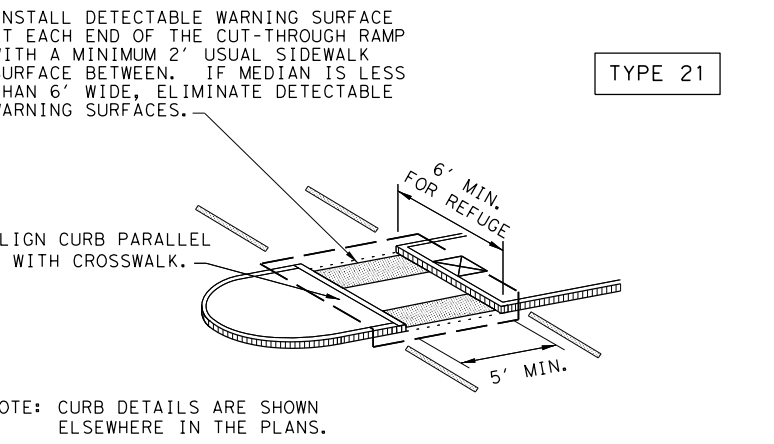
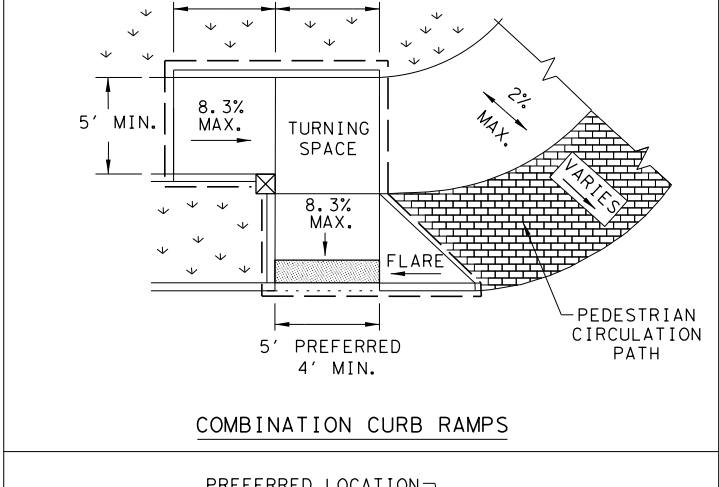
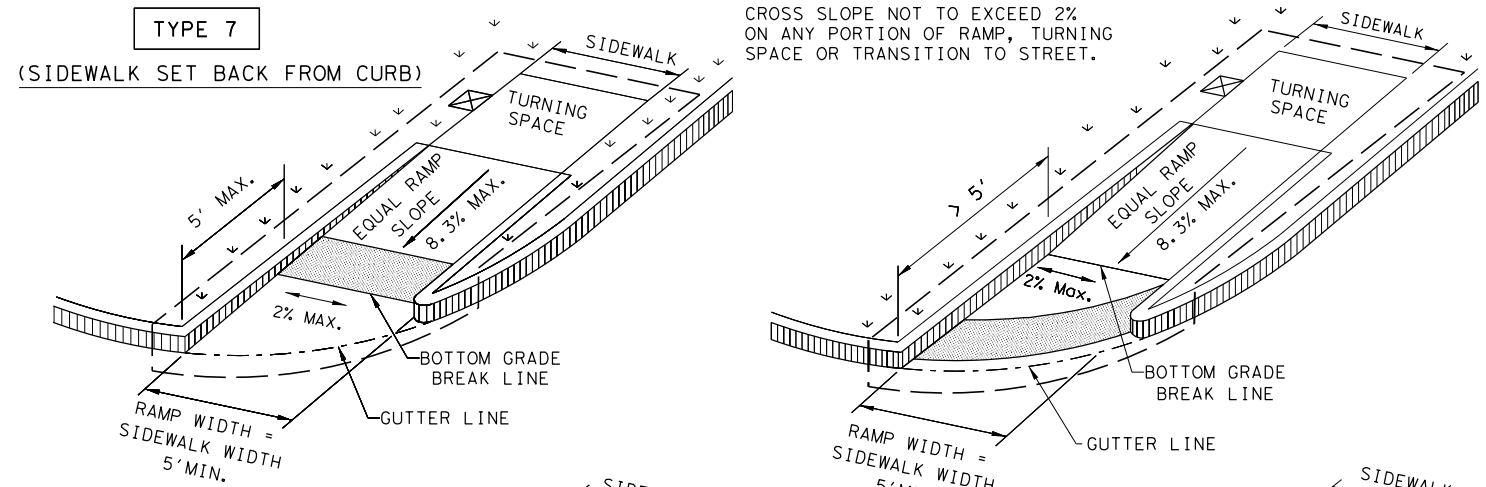
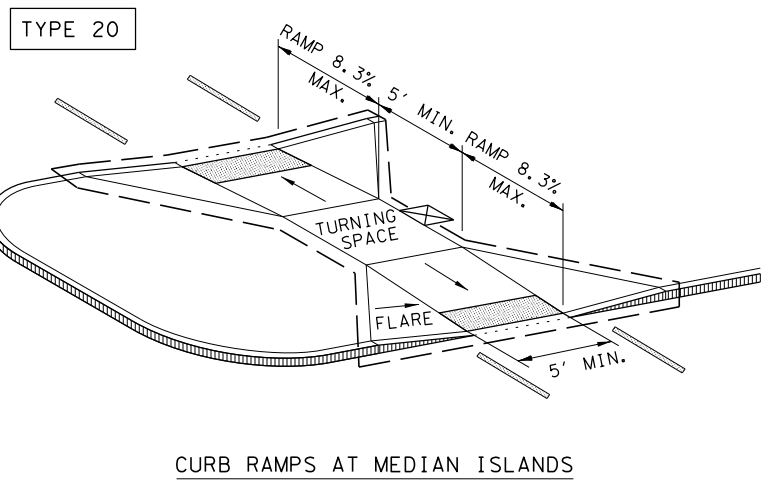
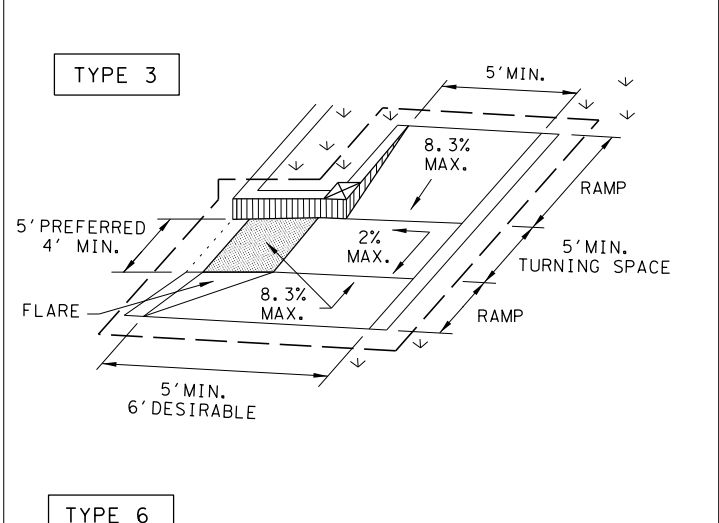
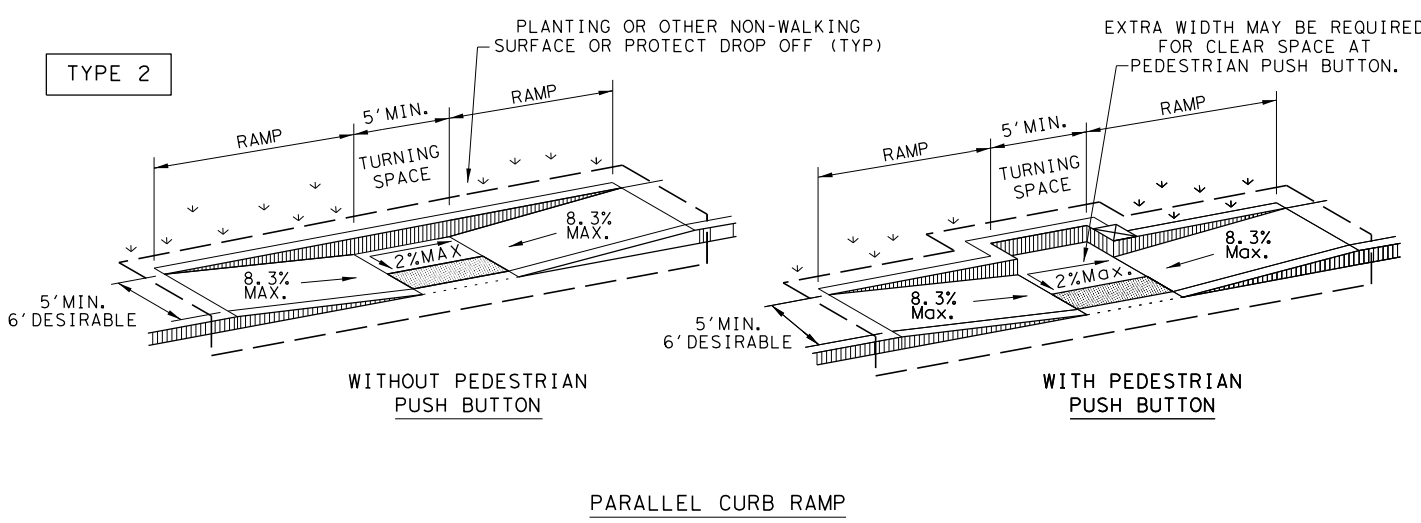
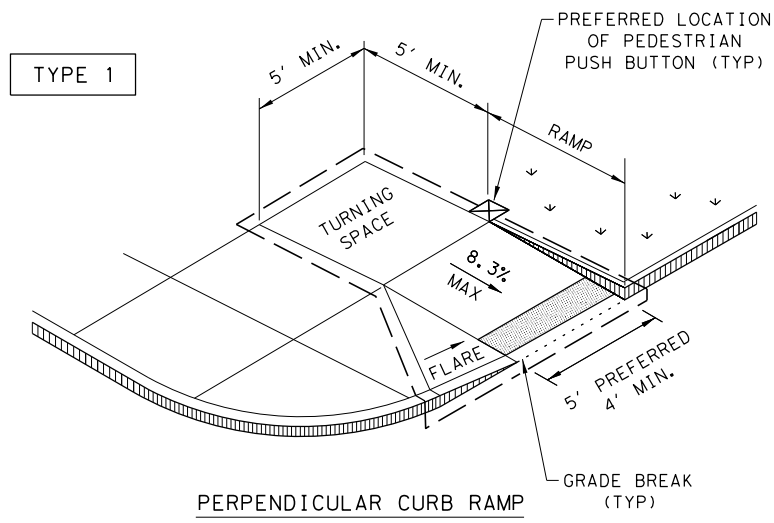
- 1.
- 2.
- 3.



**ENVIRONMENTAL PERMITS,  
ISSUES AND COMMITMENTS  
EPIC**

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
© TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	048	NA
	DIST	COUNTY	SHEET NO.	
	SAT	WILSON	29	

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**NOTES / LEGEND:**  
SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

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

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

Detectable Warning Surface: [Symbol]

Grade Break: [Symbol]

Ramp Limits of Payment: [Symbol]

Gutter Line: [Symbol]

SHEET 1 OF 4

**Design Division Standard**

## PEDESTRIAN FACILITIES CURB RAMPS

### PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISED 09, 2005	0915	14	048	NA
REVISED 06, 2012	DIST	COUNTY	SHEET NO.	
REVISED 01, 2018	SAT	WILSON	30	

DATE:  
FILE:

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DATE: FILE:

## GENERAL NOTES

### CURB RAMP

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

### DETECTABLE WARNING MATERIAL

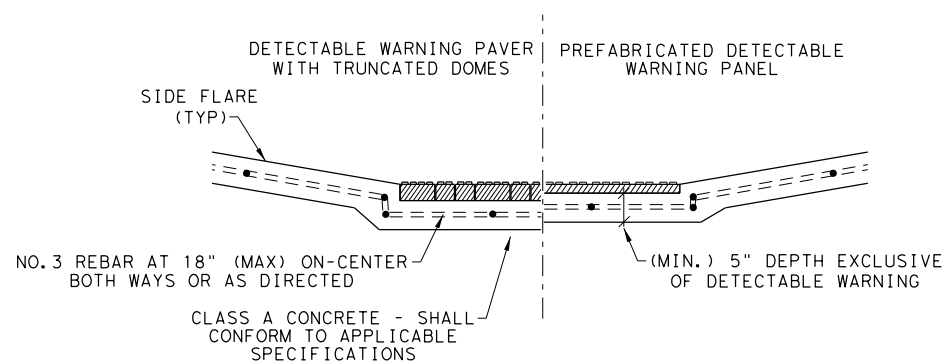
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material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

### DETECTABLE WARNING PAVERS (IF USED)

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

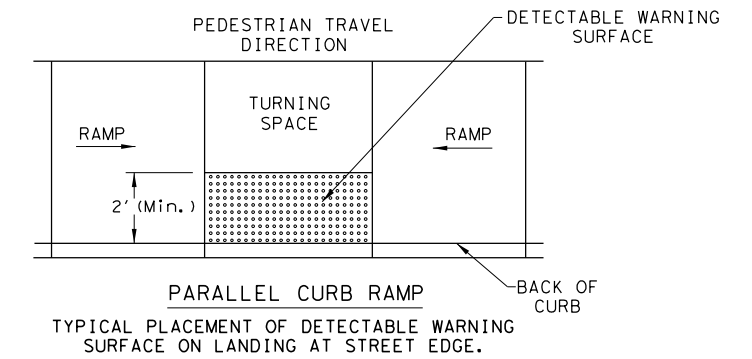
### SIDEWALKS

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

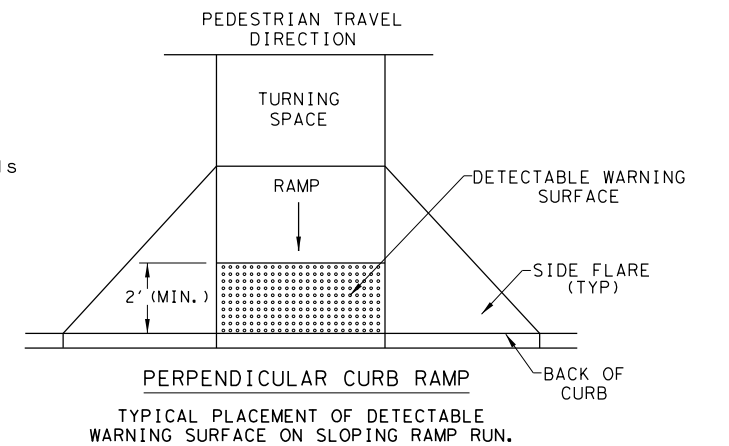


SECTION VIEW DETAIL  
CURB RAMP AT DETECTIBLE WARNINGS

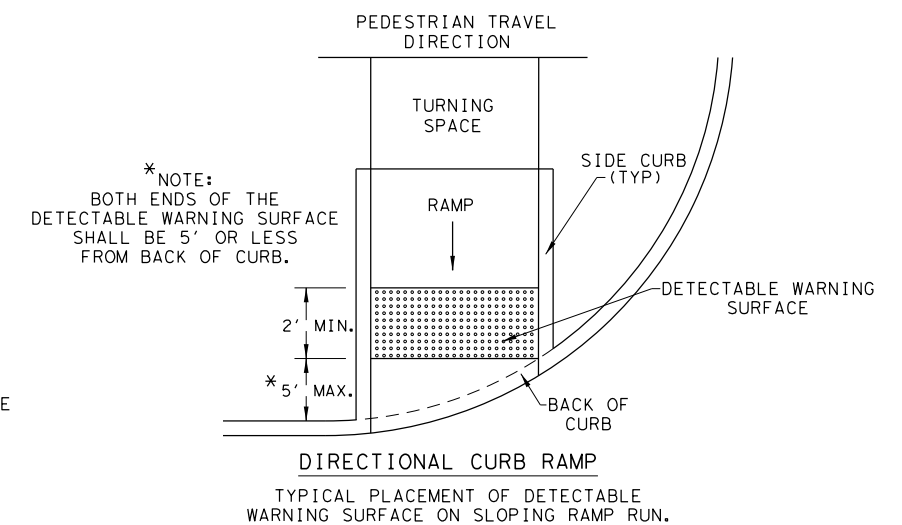
### DETECTABLE WARNING SURFACE DETAILS



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



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



\* NOTE:  
BOTH ENDS OF THE  
DETECTABLE WARNING SURFACE  
SHALL BE 5' OR LESS  
FROM BACK OF CURB.

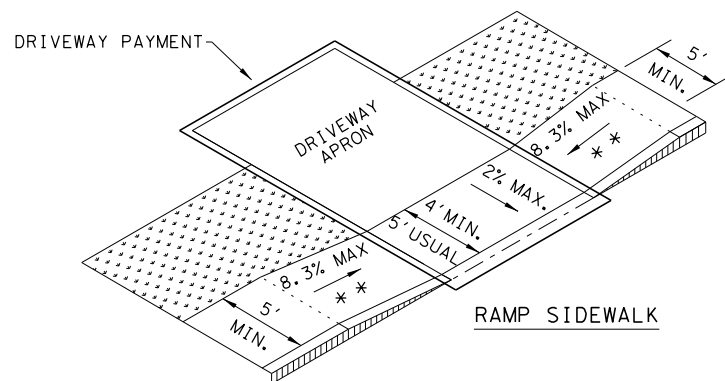
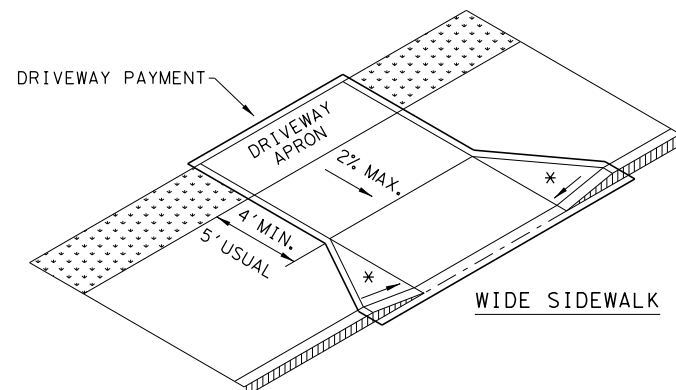
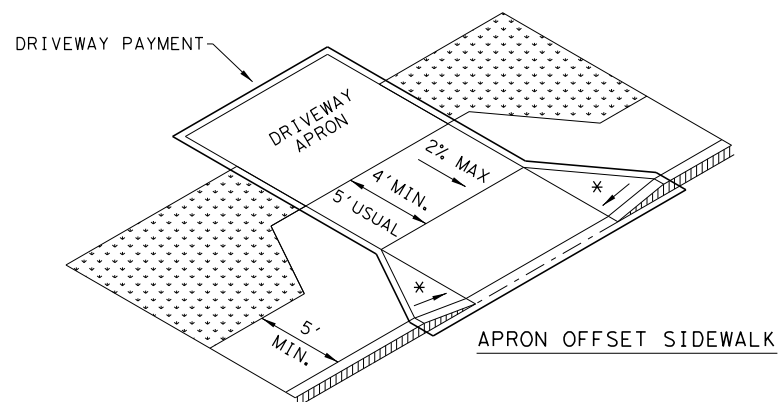
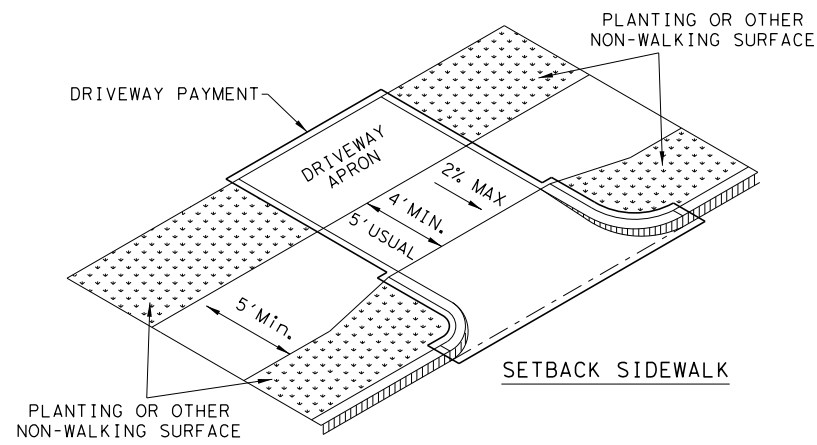
DIRECTIONAL CURB RAMP  
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

SHEET 2 OF 4

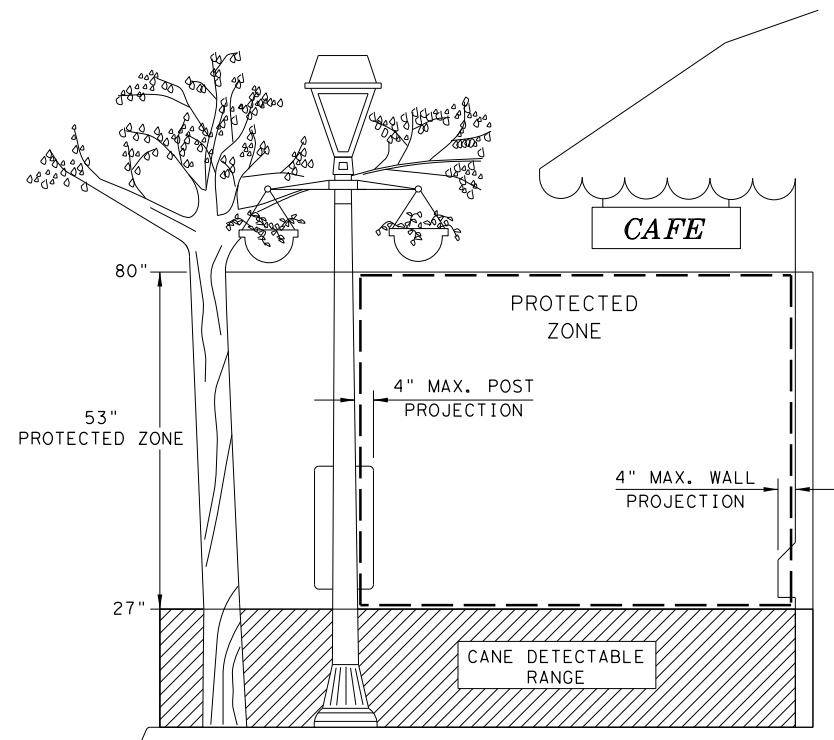
<span style="font-weight: bold; font-size: small;">Texas Department of Transportation</span>		<b>Design Division Standard</b>	
PEDESTRIAN FACILITIES CURB RAMPS			
PED-18			
FILE: ped18	DN: TxDOT	DW: VP	CK: KM
© TxDOT: MARCH, 2002	CONT	SECT	JOB
REVISIONS	0915	14	048
REVISED 08, 2005	DIST	COUNTY	SHEET NO.
REVISED 06, 2012	SAT	WILSON	31
REVISED 01, 2018			

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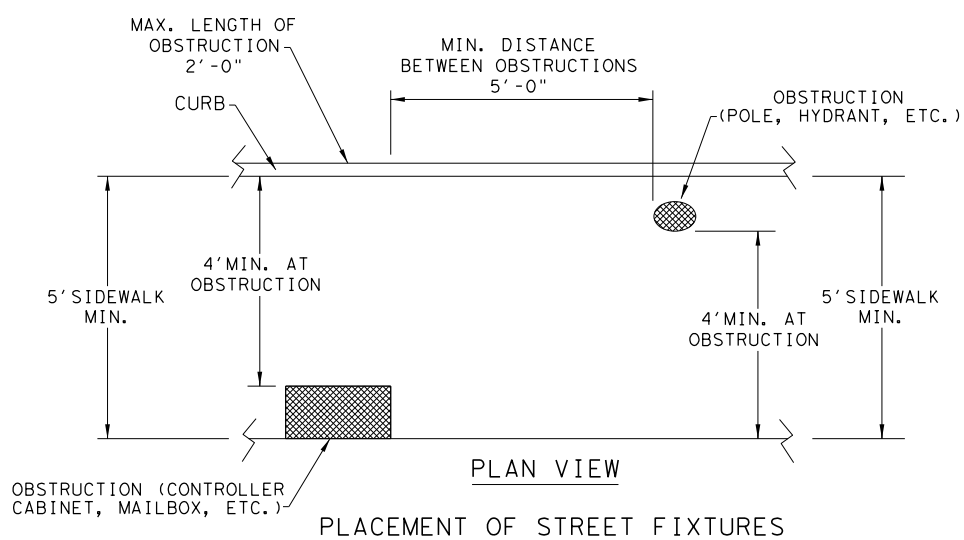
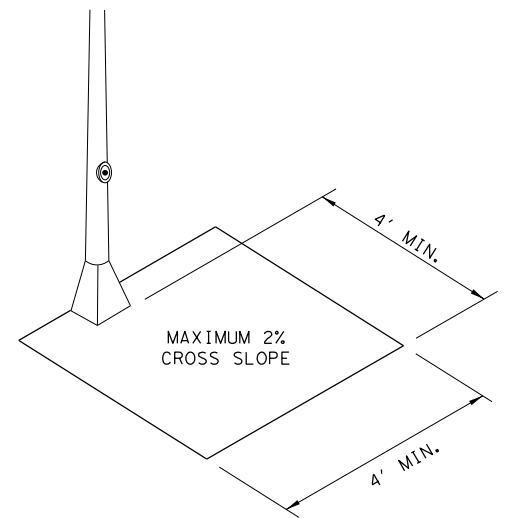
**SIDEWALK TREATMENT AT DRIVEWAYS**



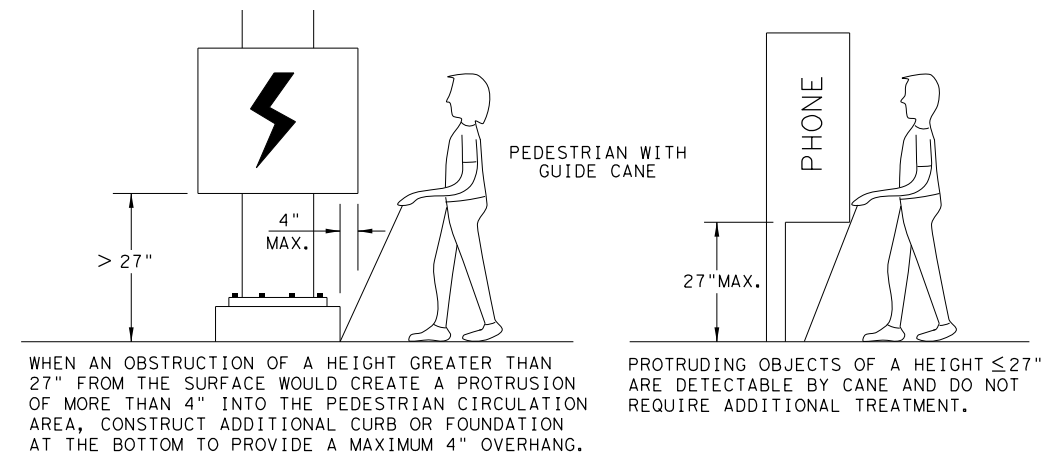
**NOTES:**  
 \* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.  
 \* \* IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.



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



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



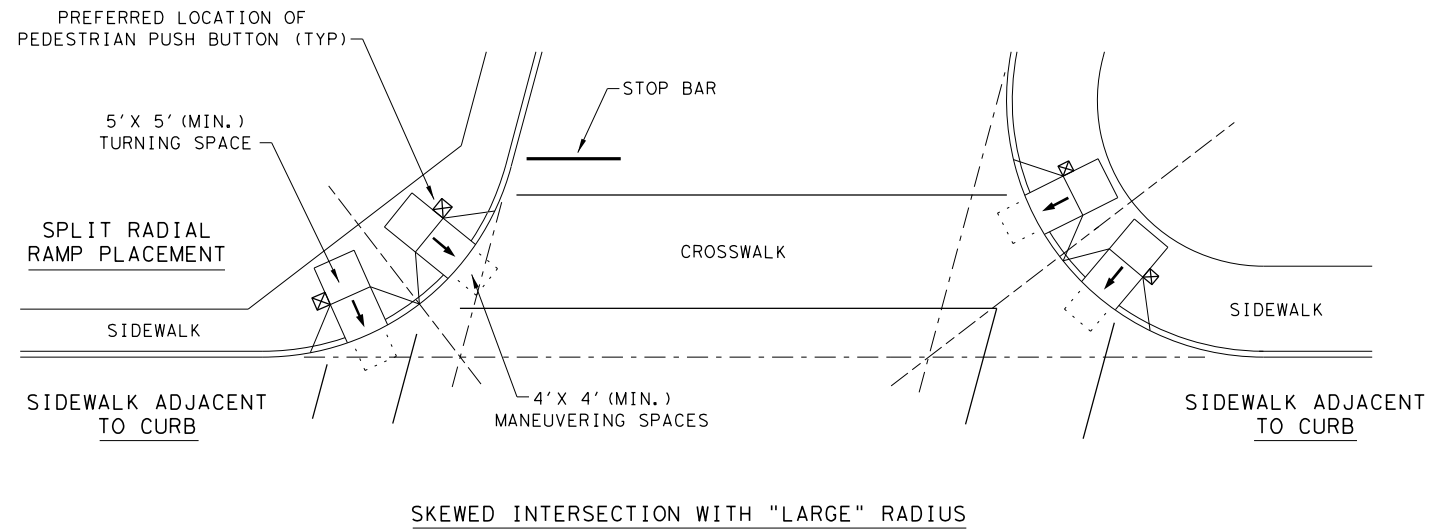
PROTRUDING OBJECTS OF A HEIGHT  $\leq 27"$  ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

		<b>Design Division Standard</b>	
<b>PEDESTRIAN FACILITIES</b> <b>CURB RAMPS</b> <b>PED-18</b>			
FILE: ped18	DN: TxDOT	DW: VP	CK: KM
© TxDOT: MARCH, 2002	CONT	SECT	JOB
REVISIONS	0915	14	048
REVISOR	DIST	COUNTY	SHEET NO.
REVISOR	SAT	WILSON	32

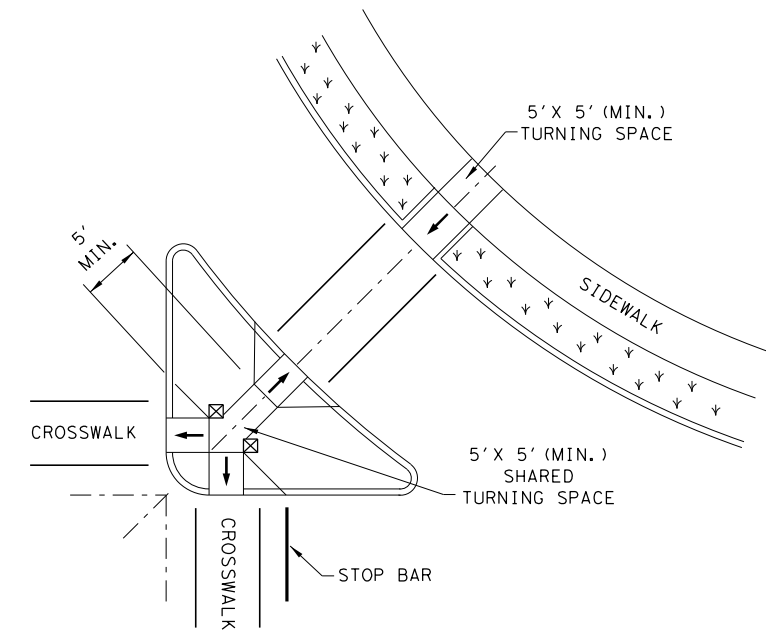
DATE:  
FILE:

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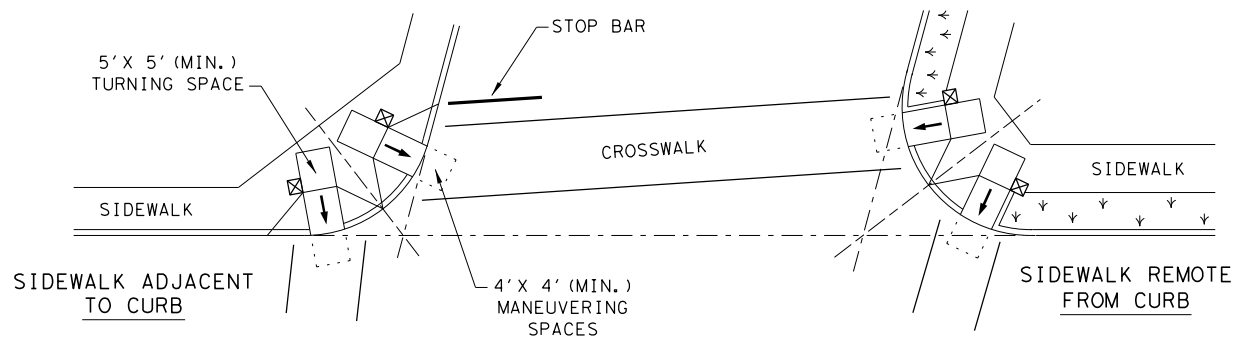
TYPICAL CROSSING LAYOUTS  
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



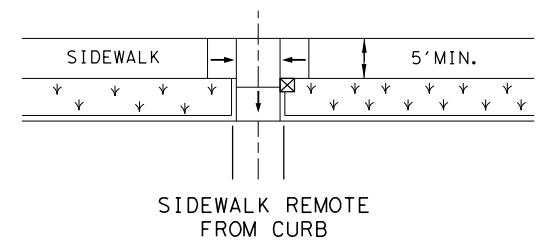
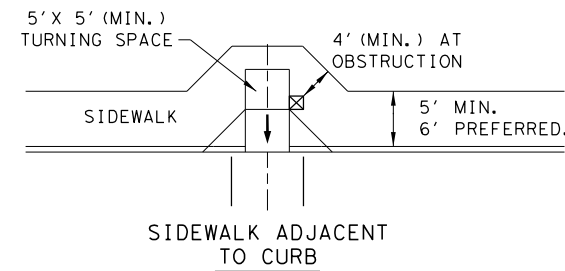
SKewed INTERSECTION WITH "LARGE" RADIUS



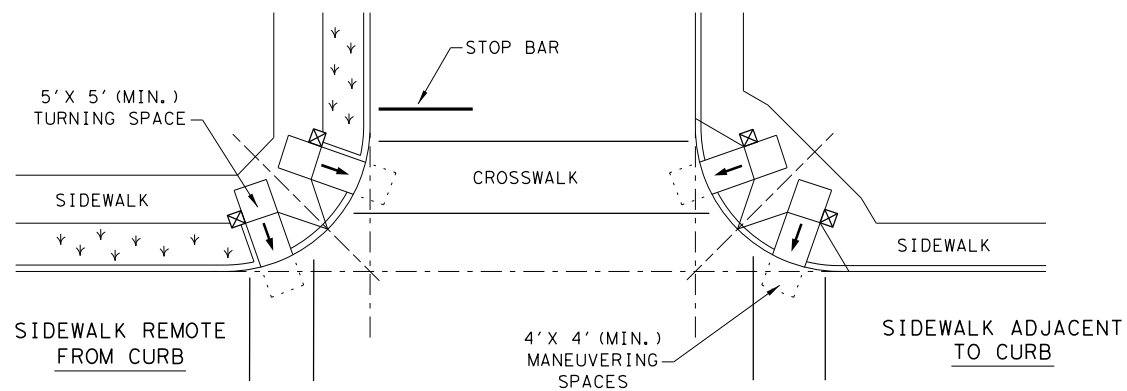
AT INTERSECTION  
W/FREE RIGHT TURN & ISLAND



SKewed INTERSECTION WITH "SMALL" RADIUS



MID-BLOCK PLACEMENT  
PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

LEGEND:

SHOWS DOWNWARD SLOPE. →

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

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

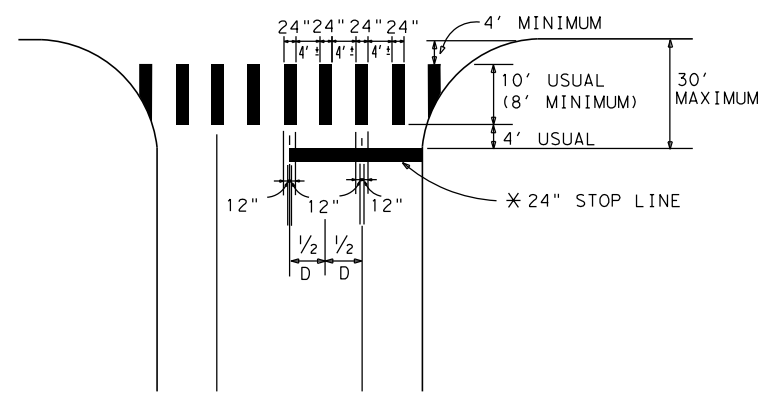
SHEET 4 OF 4



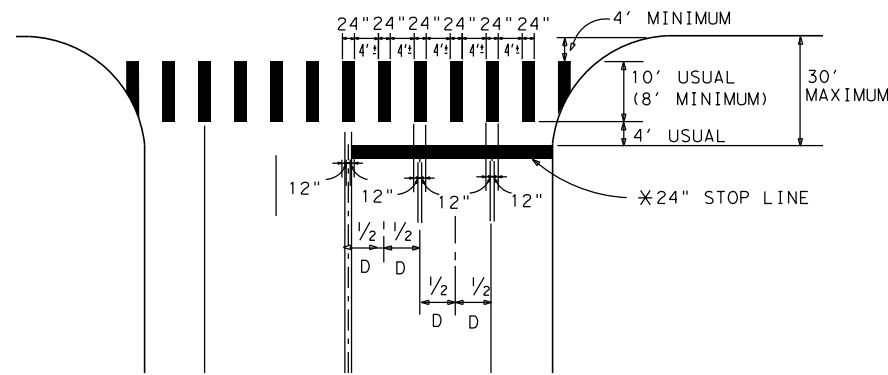
PEDESTRIAN FACILITIES  
CURB RAMPS  
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	14	048	NA
REVISED 08, 2005	DIST	COUNTY	SHEET NO.	
REVISED 06, 2012	SAT	WILSON	33	
REVISED 01, 2018				

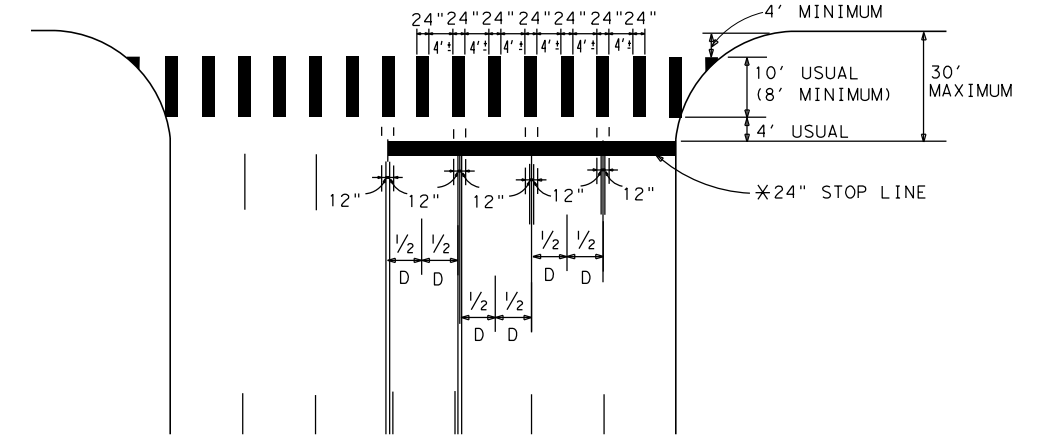
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FILE:



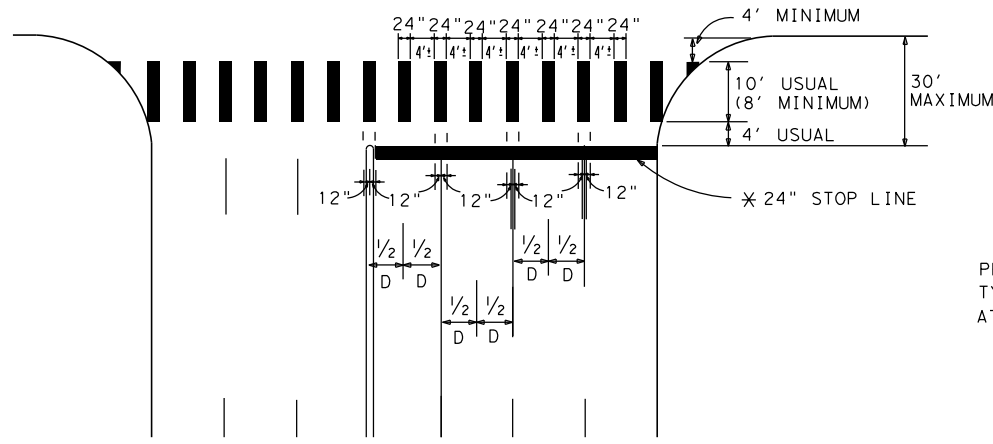
TWO LANES WITH SHOULDERS



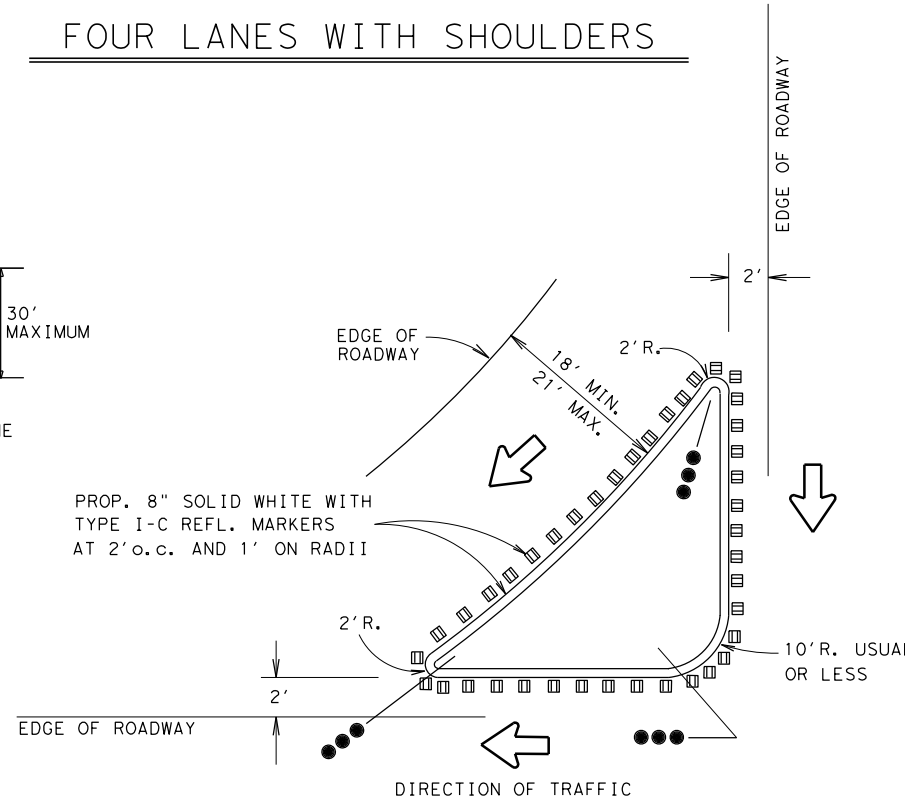
FOUR LANES WITH SHOULDERS



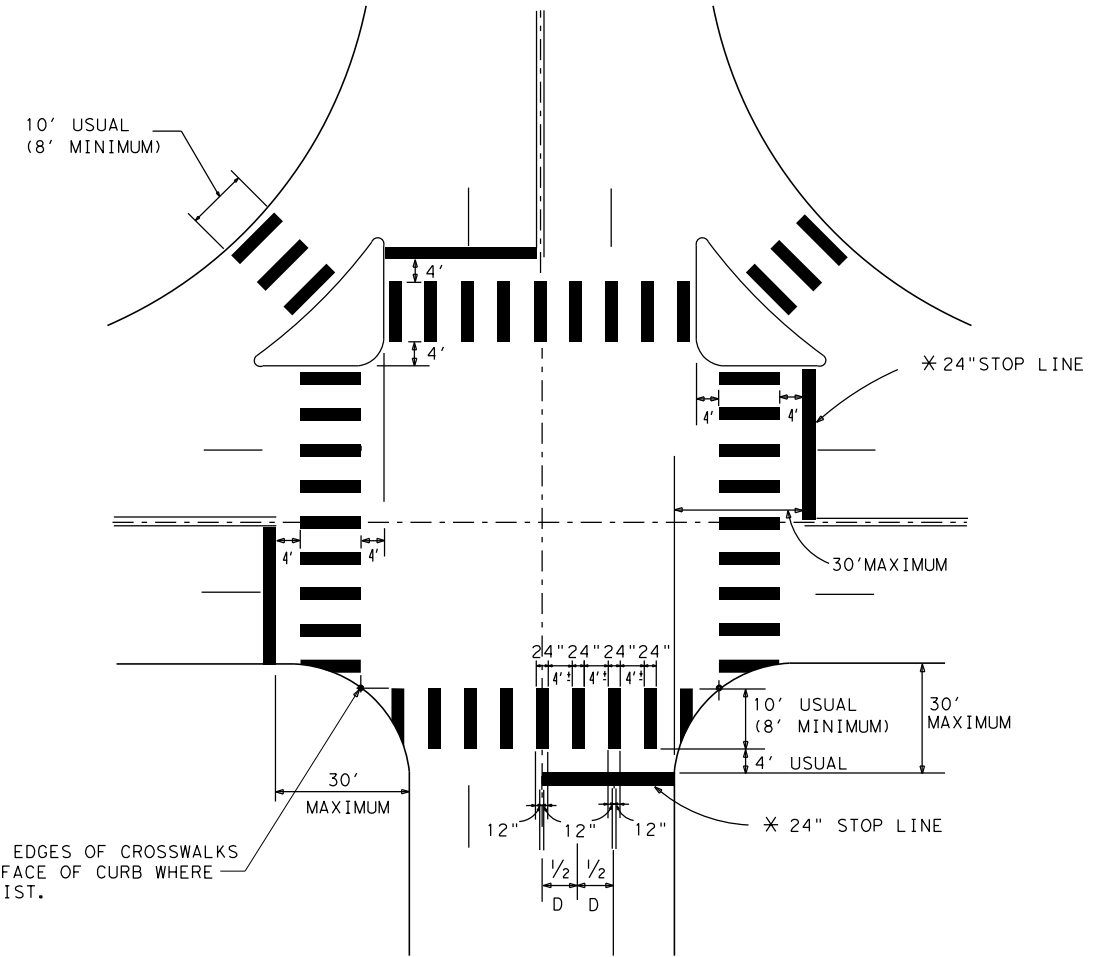
MULTI - LANES



MULTI - LANE WITH MEDIAN

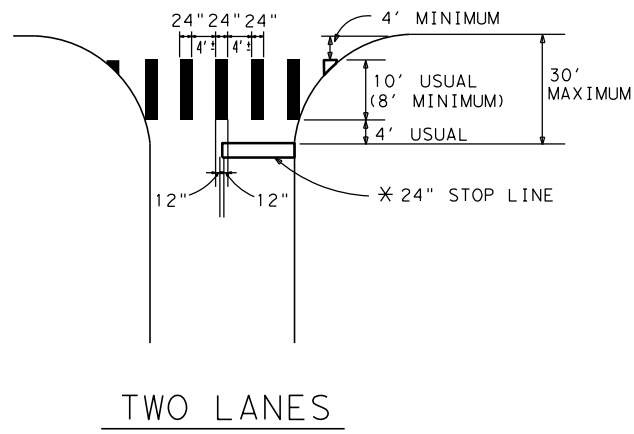


TYPICAL RIGHT TURN ISLAND WITH DELINEATION

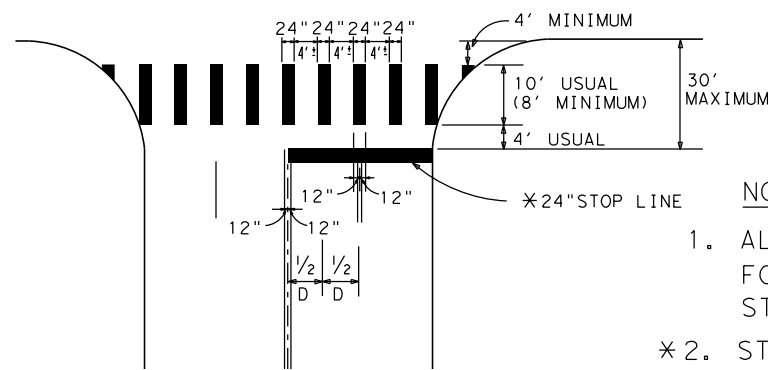


INTERSECTION WITH RIGHT - TURN ISLANDS

LEVELS DISPLAYED  
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16  
 ACC:  
 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32  
 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48  
 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63



TWO LANES



FOUR LANES

**NOTES:**

1. ALL LONGITUDINAL LINES FORMING CROSSWALK AND STOP LINES SHALL BE WHITE
- \* 2. STOP LINES AS REQUIRED ON DETAILED PAVEMENT MARKING PLANS.
3. "D" IS EQUAL TO ONE HALF THE DISTANCE.

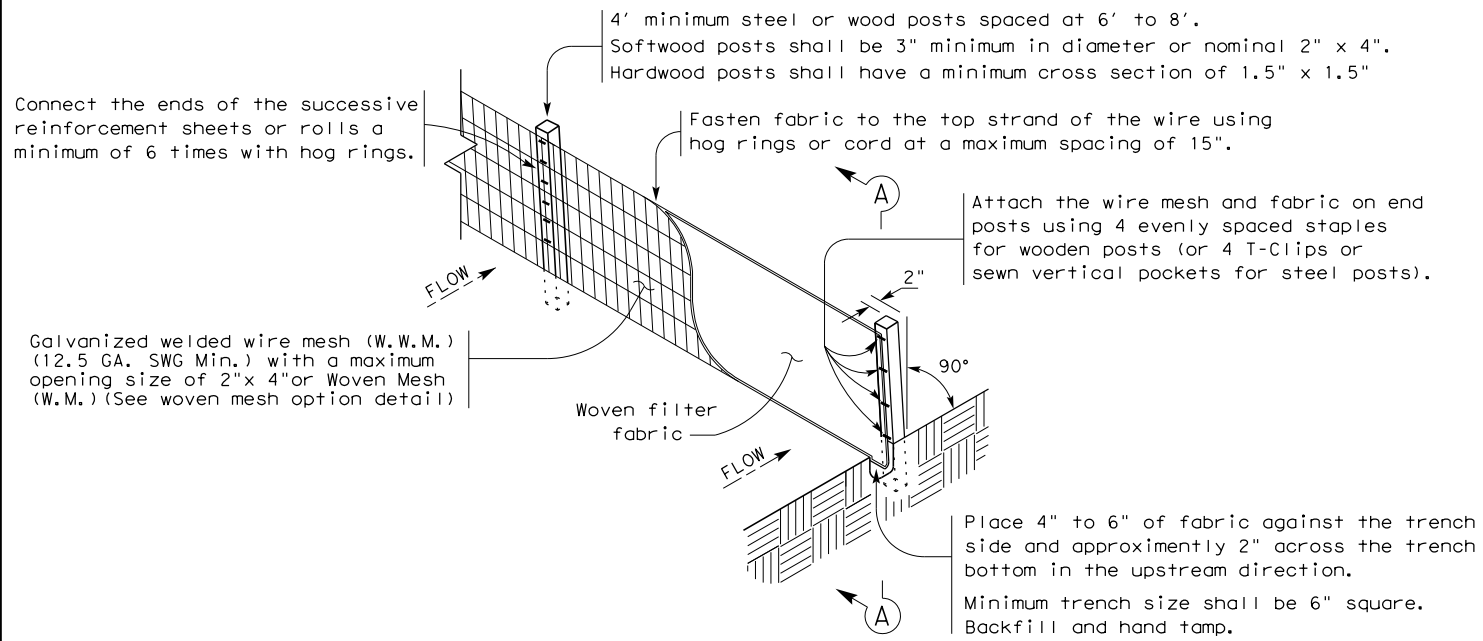
San Antonio District Standard  
**TYPICAL CROSSWALK DETAILS**

© 2006 Texas Department of Transportation  
 TCD-05

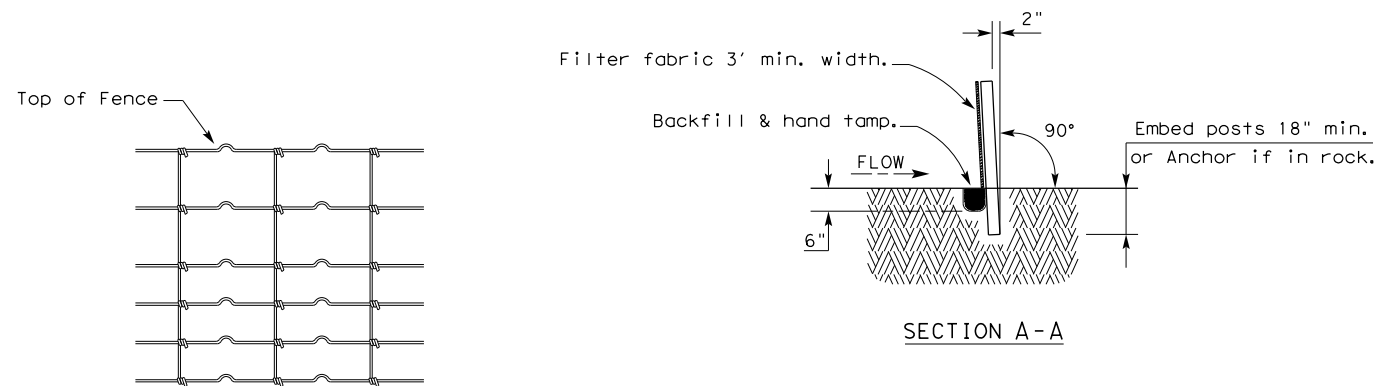
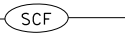
REVISIONS	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
DEC 1999	6		34
AUG 2005			
STATE	DIST.	COUNTY	
TEXAS	SAT	WILSON	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	14	048	NA

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DATE  
FILE



TEMPORARY SEDIMENT CONTROL FENCE



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

**SEDIMENT CONTROL FENCE USAGE GUIDELINES**

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

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

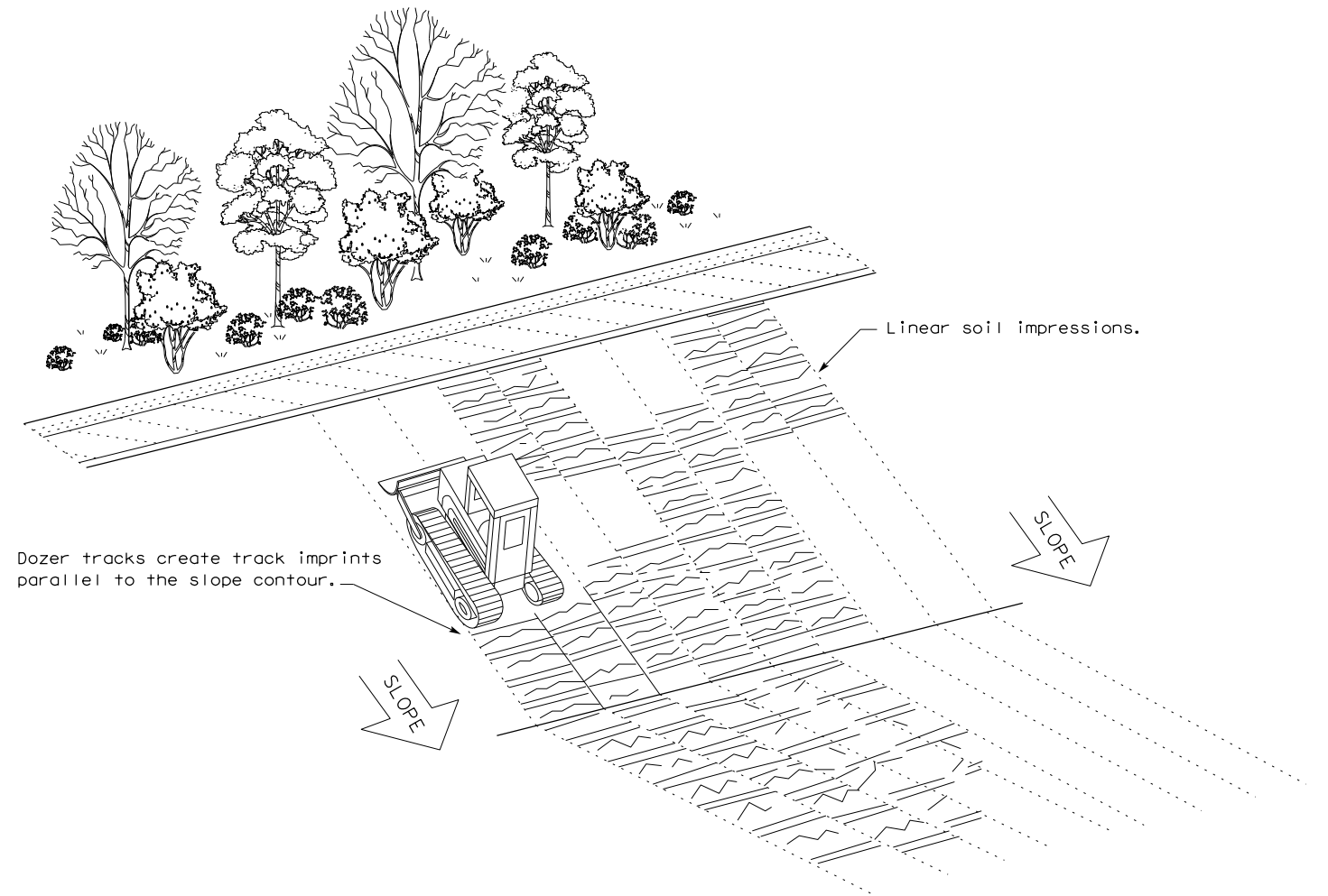
**LEGEND**

Sediment Control Fence



**GENERAL NOTES**

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

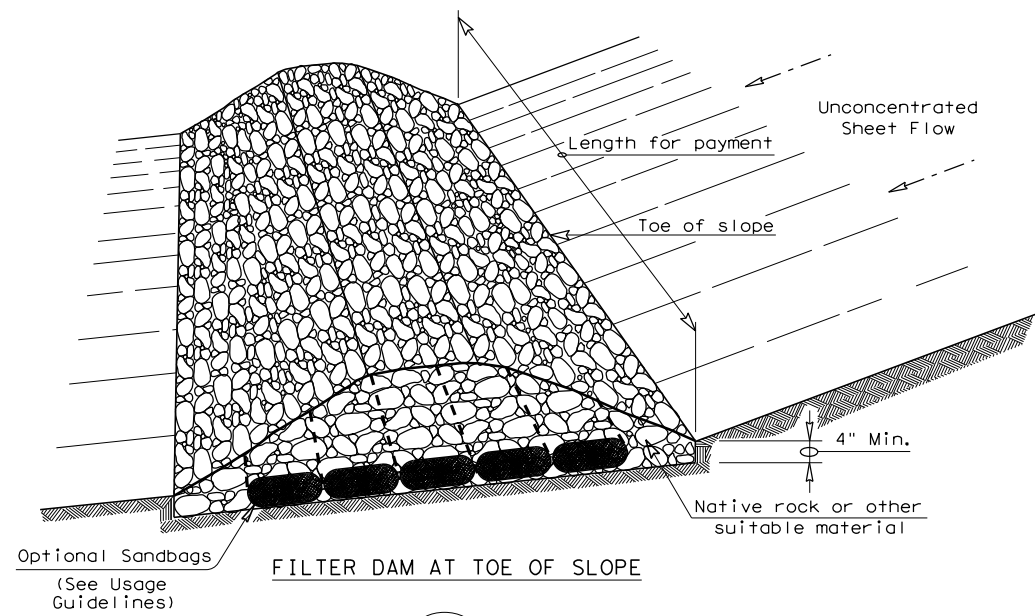


VERTICAL TRACKING

				<b>Design Division Standard</b>	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE &amp; VERTICAL TRACKING</b> <b>EC(1) - 16</b>					
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0915	14	048	NA	
	DIST	COUNTY	SHEET NO.		
	SAT	WILSON	35		

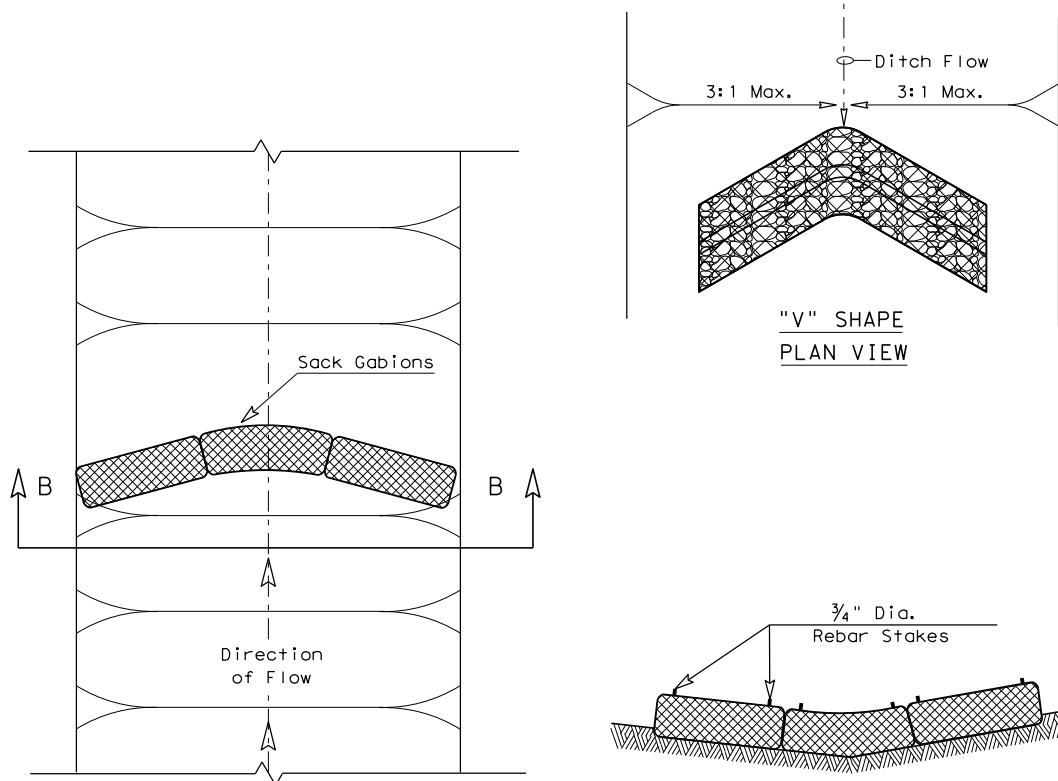
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DATE:  
FILE:



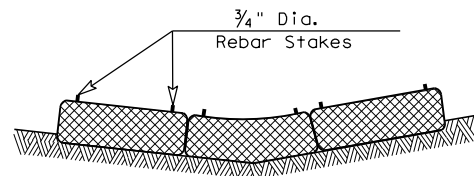
FILTER DAM AT TOE OF SLOPE

(RFD1)

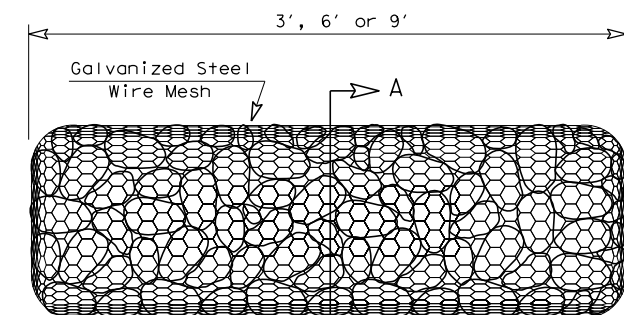


"V" SHAPE  
PLAN VIEW

PLAN VIEW

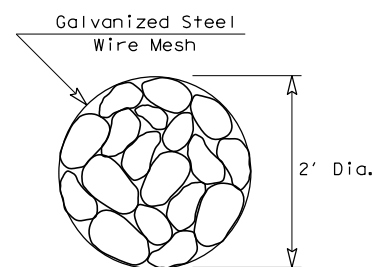


SECTION B-B

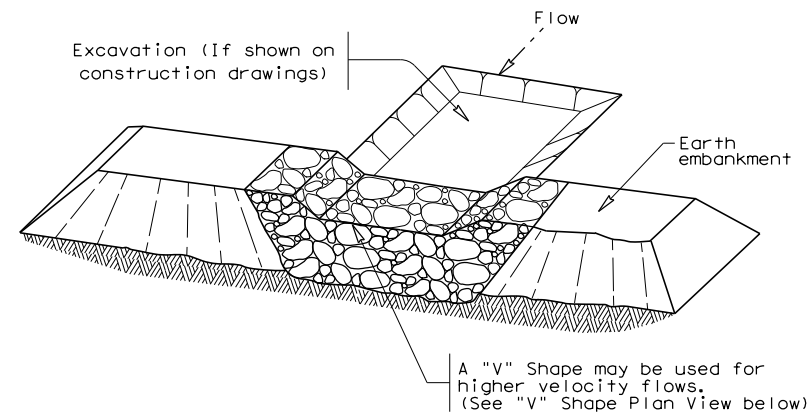


TYPE 4 (SACK GABIONS)

(RFD4)

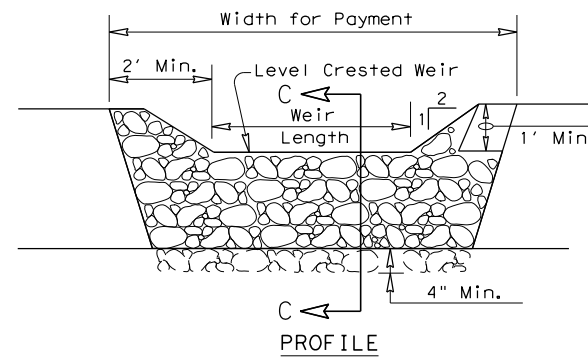


SECTION A-A

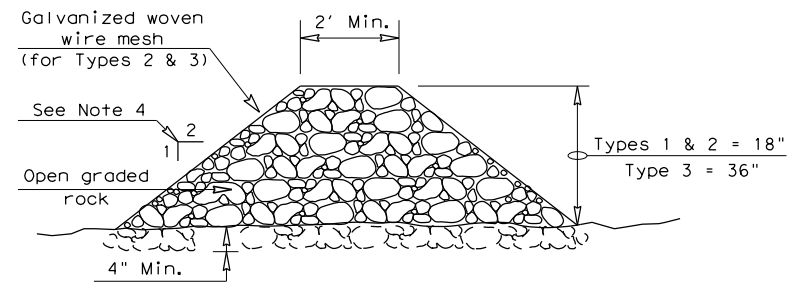


FILTER DAM AT SEDIMENT TRAP

(RFD2) OR (RFD2)



PROFILE



SECTION C-C

**ROCK FILTER DAM USAGE GUIDELINES**

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT<sup>2</sup> of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

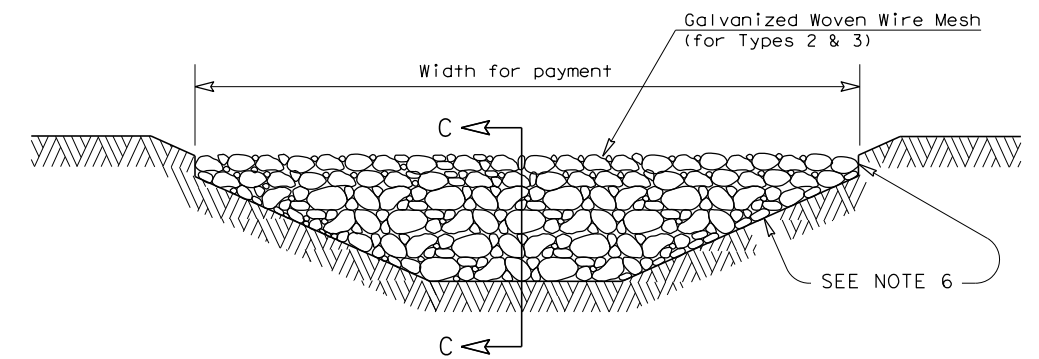
**Type 1 (18" high with no wire mesh) (3" to 6" aggregate):** Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

**Type 2 (18" high with wire mesh) (3" to 6" aggregate):** Type 2 may be used in ditches and at dike or swale outlets.

**Type 3 (36" high with wire mesh) (4" to 8" aggregate):** Type 3 may be used in stream flow and should be secured to the stream bed.

**Type 4 (Sack gabions) (3" to 6" aggregate):** Type 4 May be used in ditches and smaller channels to form an erosion control dam.

**Type 5:** Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

(RFD3) OR (RFD2) OR (RFD3)

**GENERAL NOTES**

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4".
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

**PLAN SHEET LEGEND**

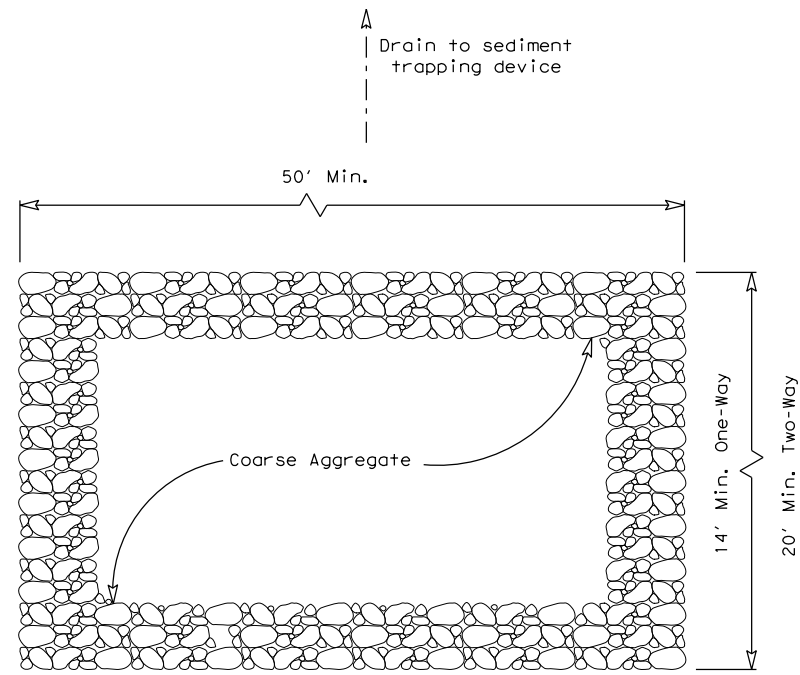
- Type 1 Rock Filter Dam (RFD1)
- Type 2 Rock Filter Dam (RFD2)
- Type 3 Rock Filter Dam (RFD3)
- Type 4 Rock Filter Dam (RFD4)

		<b>Design Division Standard</b>	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b> <b>ROCK FILTER DAMS</b> <b>EC(2)-16</b>			
FILE: ec216	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS	0915	14	048
	DIST	COUNTY	SHEET NO.
	SAT	WILSON	36

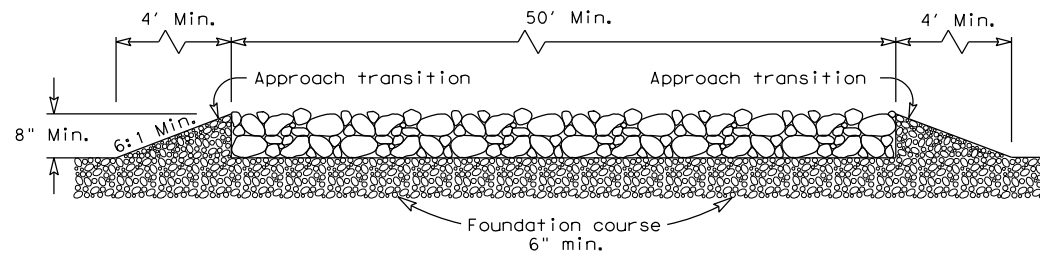


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DATE: 4/6/2023  
 FILE: P:\128\26\00\Design\Civil\Standards\SW3P\ec316.dgn



PLAN VIEW

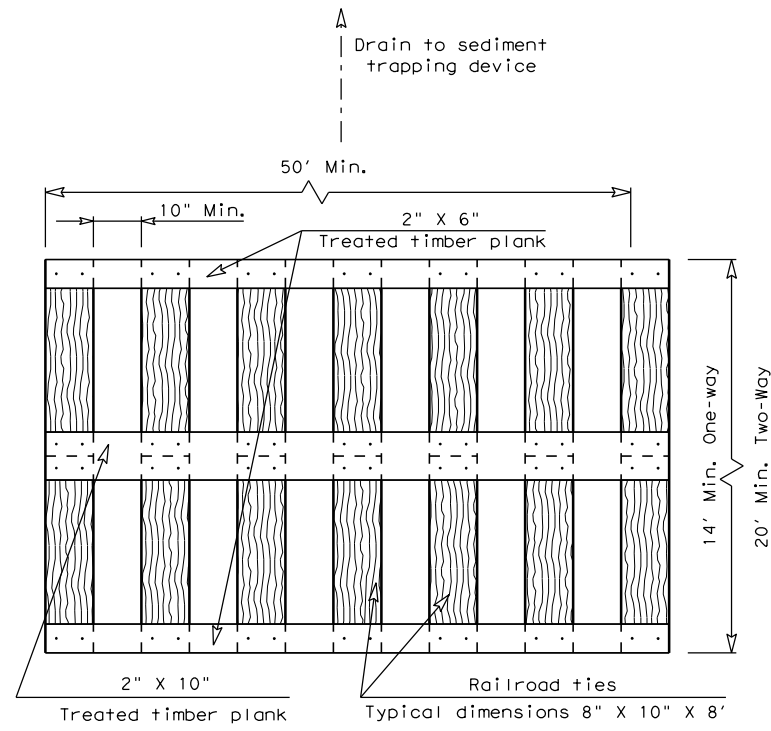


ELEVATION VIEW

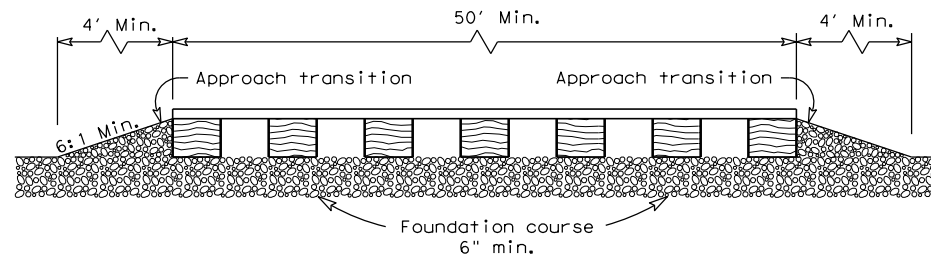
CONSTRUCTION EXIT (TYPE 1)  
 ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW

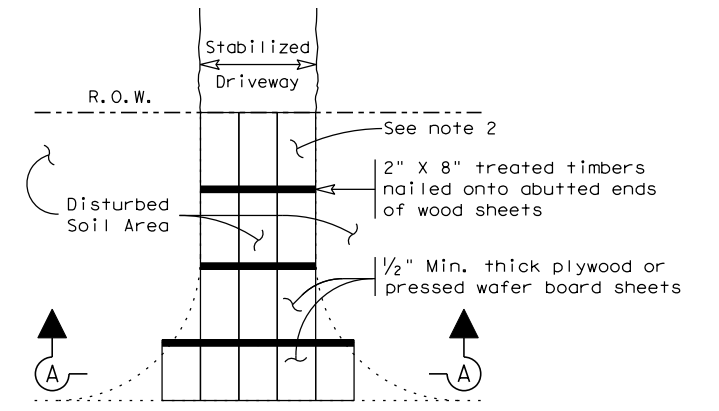


ELEVATION VIEW

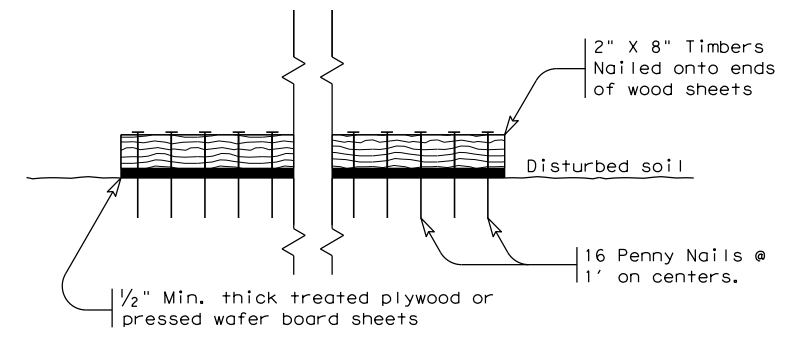
CONSTRUCTION EXIT (TYPE 2)  
 TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with 1/2" x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW



SECTION A-A  
 CONSTRUCTION EXIT (TYPE 3)  
 SHORT TERM

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

		<b>Design Division Standard</b>	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b> <b>CONSTRUCTION EXITS</b> <b>EC(3)-16</b>			
FILE: ec316	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT SECT	JOB	HIGHWAY
REVISIONS	0915 14	048	NA
DIST	COUNTY	SHEET NO.	
SAT	WILSON	37	

Plotted on: 4/6/2023

Design File name: P:\128\26\00\Design\Civil\Drainage\1282600\_EXT\_DA01.dgn

TABEL 1: STREAM 1 FLOWS

River	Reach	RS	Ex10YrFP	Ex50YrFP	Ex100YrFP	Ex500YrFP
Stream_1	1	11015	50	83	97	229
Stream_1	1	10207	337	533	613	941
Stream_1	1	7579	502	913	1098	1491
Stream_1	1	6722	531	913	1098	1656
Stream_1	1	5201	1416	2252	2621	3729
Stream_1	1	1585	1668	2799	3283	4777

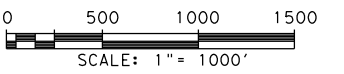
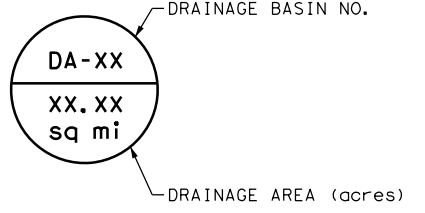
TABEL 2: STREAM 2 FLOWS

River	Reach	RS	10%AC	2%AC	1%AC	0.2%AC
Stream_2	1	2521	775	1266	1438	2135

NOTES:

- EXISTING CONTOURS WERE DEVELOPED USING LIDAR DATA FROM THE TEXAS NATURAL RESOURCES INFORMATION SYSTEM (TNRIS) WEBSITE.
- CONTOURS DISPLAYED AT 1' INTERNALS.
- EXISTING CONTOURS ARE SHOW SCREENED BACK, I.E. FADED.
- FLOODPLAIN AND FLOODWAY DEPICTED FROM FEMA MAP 489493C0295C EFF 11/26/10.
- EFFECTIVE MODELS WERE UTILIZED FROM FEMA STREAM 1 & STREAM 2 MODELS.
- HYDROLOGY DRAINAGE AREAS WERE UTILIZED FROM FEMA STREAM 1 & STREAM 2 MODELS. SEE TABLE 1 & 2.
- COORDINATION WITH FEMA FLOODPLAIN ADMINISTRATOR FOR CITY OF FLORESVILLE ON FEBRUARY 2023.
- CULVERT INVERT ELEVATIONS DIFFER FROM FEMA MODELS. FEMA UTILIZED 2010 LIDAR DATA WITH GEI003 WHILE SURVEY TOOK HARD SHOTS UTILIZING GEI012
- EXIST Q IS EQUAL TO PROP Q, SO PROJECT HAS NO ADVERSE IMPACTS

- DRAINAGE AREA BOUNDARY
- - - - - STREAM CENTERLINE
- 400— EXISTING CONTOUR
- ↖ FLOW ARROW



DESIGN

APPROVAL

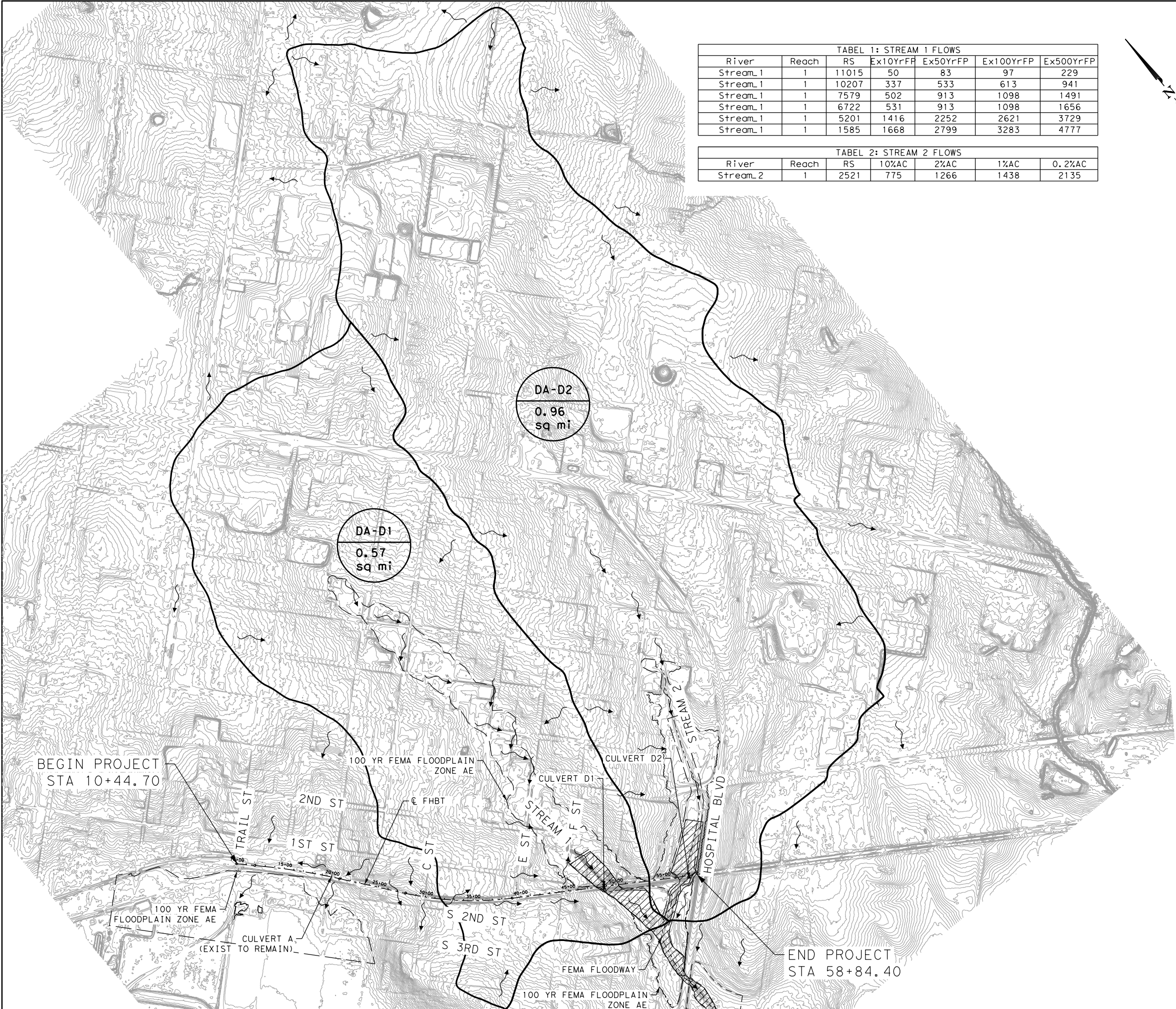
**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002880

**FLORESVILLE**

HIKE & BIKE TRAIL  
 EXTERIOR DRAINAGE  
 AREA MAP

DN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET	NA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG:	SAT	WILSON	0915	14
			048	38



Plotted on: 4/6/2023

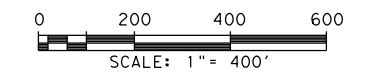
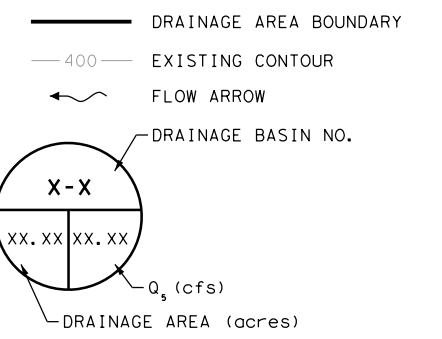
Design File name: P:\128\26\00\Design\Civil\Drainage\1282600-DA01.dgn

DITCH CALCULATIONS - RATIONAL METHOD

STA	DRAINAGE AREA	DRN AREA (AC)	C	Tc (MIN)	INTENSITIES (IN/HR)		DITCH SLOPE	FORESLOPE	BACKSLOPE	N VALUE	DITCH DEPTH (FT)	DITCH FLOW DEPTH FT (5YR)	FREEBOARD (FT)	VELOCITIES FT/S (5YR)	SHEAR STRESS LB/SF	MINIMUM DITCH VEGETATION MATERIAL
					1 5	Q 5										
12+50 LT	PROP DITCH A-1	2.45	0.51	10	6.23	7.78	0.20	10	20	0.035	0.50	0.49	0.01	0.92	0.06	Class E
25+00 LT	PROP DITCH A-2	0.66	0.50	10	6.23	2.06	1.30	10	10	0.035	0.50	0.37	0.13	1.52	0.30	Class E
24+00 RT	PROP DITCH A-3	0.12	0.40	10	6.23	0.30	1.30	10	10	0.035	0.50	0.18	0.32	0.91	0.15	Class E
30+00 LT	PROP DITCH B-1	1.77	0.48	10	6.23	5.29	0.75	6	4	0.035	1.00	0.75	0.25	1.88	0.35	Class E
42+50 LT	PROP DITCH C-1	0.28	0.58	10	6.23	1.01	0.30	10	10	0.035	0.50	0.37	0.13	0.75	0.07	Class E
42+50 RT	PROP DITCH C-2	2.16	0.52	10	6.23	7.00	0.30	6	6	0.035	1.00	0.93	0.07	1.36	0.17	Class E

NOTES:

- EXISTING 1' CONTOURS WERE DEVELOPED USING LIDAR DATA FROM THE TEXAS NATURAL RESOURCES INFORMATION SYSTEM (TNIS) WEBSITE.
- RATIONAL METHOD WAS USED TO CALCULATE TIME OF CONCENTRATION FOR AREAS SMALLER THAN 200 ACRES.
- RATIONAL METHODS REFERENCE THE TXDOT HYDRAULIC DESIGN MANUAL, SEPTEMBER 2019, USING ATLAS 14 DATA.
- FLOODPLAIN AND FLOODWAY DEPICTED FROM FEMA MAP 489493C0295C EFF 11/26/10.
- CLASS E VEGETATION ALLOWS MAX 0.35 LB/SF SHEAR STRESS



DESIGN

STATE OF TEXAS  
 ERNESTO GARZA JR.  
 141557  
 LICENSED PROFESSIONAL ENGINEER  
 ERNESTO GARZA JR., P.E. 4/6/2023 DATE

APPROVAL

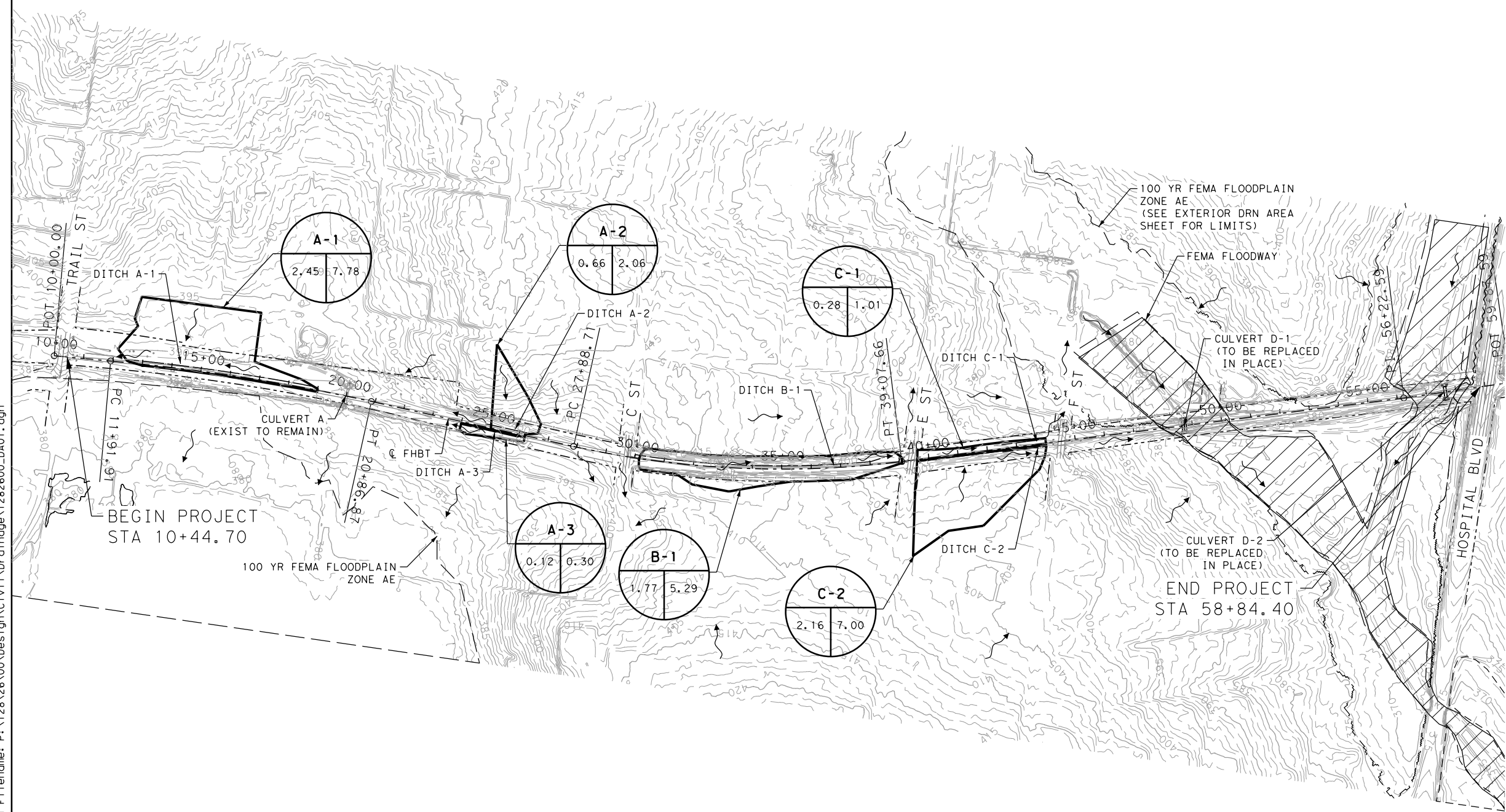
STATE OF TEXAS  
 DAN THOMA  
 98622  
 LICENSED PROFESSIONAL ENGINEER  
 DAN THOMA, P.E. 4/6/2023 DATE

**Pape-Dawson Engineers**  
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

**FLORESVILLE**

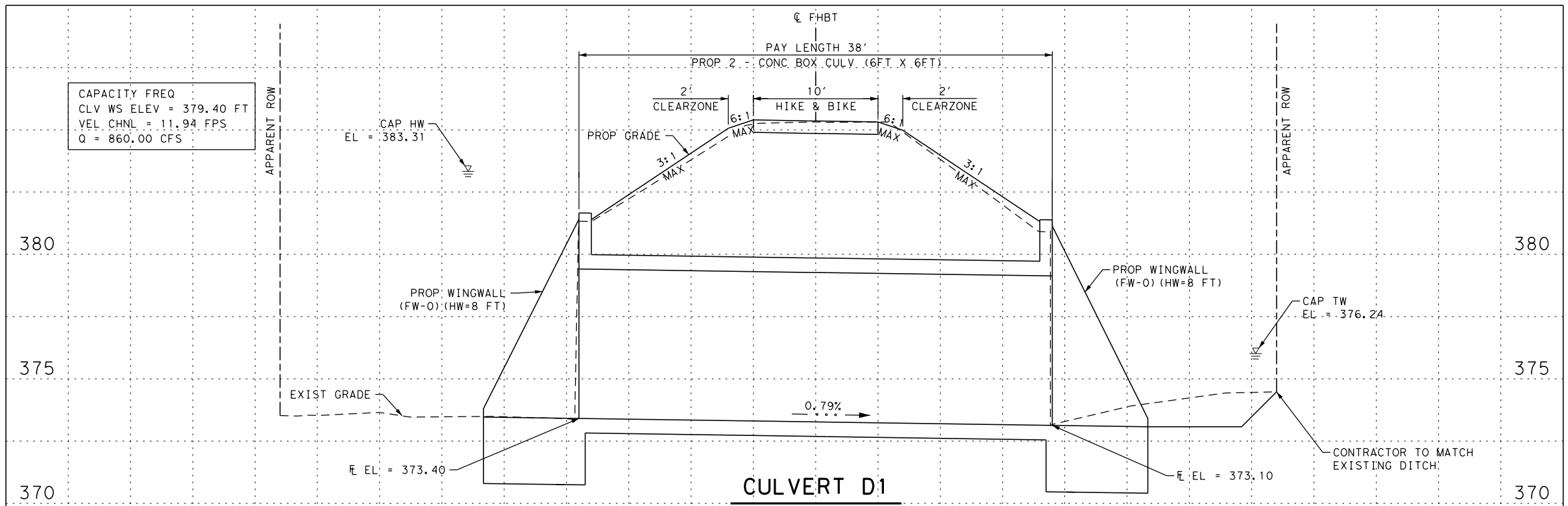
HIKE & BIKE TRAIL  
 INTERIOR  
 DRAINAGE AREA MAP

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	NA
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	WILSON	0915	14
				048
				39



Plotted on: 4/6/2023

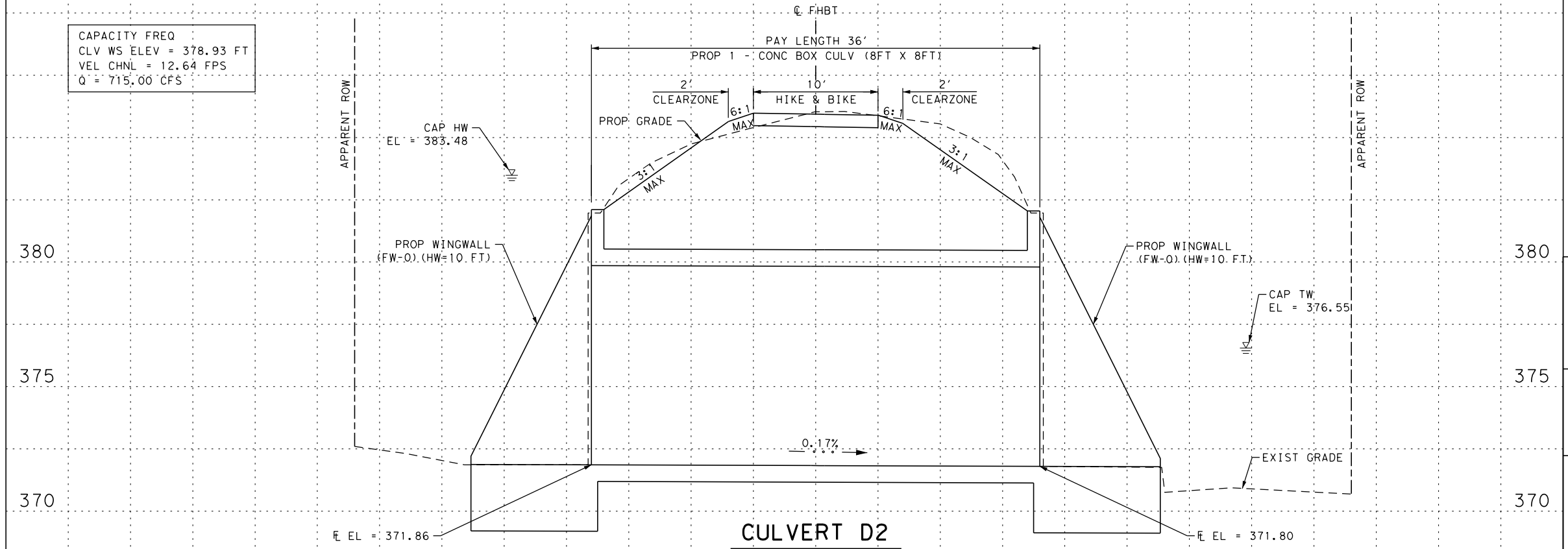
Design File name: P:\128\26\00\Design\Civil\Drainage\1282600\_Culvert\_01.dgn



CAPACITY FREQ  
CLV WS ELEV = 379.40 FT  
VEL CHNL = 11.94 FPS  
Q = 860.00 CFS

**CULVERT D1**

STA 48+72.50  
EXIST: REMOVE 2 - 6' X 6' X 38' MBC, 2 FLARED WINGWALLS  
PROP: INSTALL 2 - 6' X 6' X 38' MBC  
INSTALL 2 - WINGWALL (FW-0) (HW=8 FT) (1:1)



CAPACITY FREQ  
CLV WS ELEV = 378.93 FT  
VEL CHNL = 12.64 FPS  
Q = 715.00 CFS

**CULVERT D2**

STA 57+64.75  
EXIST: REMOVE 1 - 8' X 8' X 36' SBC, 2 FLARED WINGWALLS  
PROP: INSTALL 1 - 8' X 8' X 36' SBC  
INSTALL 2 - WINGWALL (FW-0) (HW=10 FT) (1:1)

NOTE:  
1. DESIGN Q IS BASED ON MAX Q CAPACITY OF EXIST CULVERTS.

SCALE : H: 1" = 10'  
V: 1" = 5'

DESIGN

STATE OF TEXAS  
ERNESTO GARZA JR.  
141557  
LICENSED PROFESSIONAL ENGINEER  
4/6/2023  
DATE

APPROVAL

STATE OF TEXAS  
DAN THOMA  
98622  
LICENSED PROFESSIONAL ENGINEER  
4/6/2023  
DATE

**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

**FLORESVILLE**

HIKE & BIKE TRAIL

CULVERT PROFILE

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	NA
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	WILSON	0915	14
			048	40

Plotted on: 4/6/2023

Design File name: P:\128\26\00\Desi\g\Civil\Drawings\282600\_HD501.dgn

HEC-RAS CULVERT D1 OUTPUT EXIST Qcap, 100-YR, & 500-YR

Plan: CE\_FHBT Stream\_1 1 RS: 6356 Culv Group: Culvert #1 Profile: CE\_Qcap

Table with 4 columns: Q Culv Group (cfs), # Barrels, Q Barrel (cfs), E.G. US. (ft), W.S. US. (ft), E.G. DS (ft), W.S. DS (ft), Delta EG (ft), Delta WS (ft), E.G. IC (ft), E.G. OC (ft), Culvert Control, Culv WS Inlet (ft), Culv WS Outlet (ft), Culv Nml Depth (ft), Culv Crt Depth (ft)

Plan: CE\_FHBT Stream\_1 1 RS: 6356 Culv Group: Culvert #1 Profile: CE\_Ex100YrFP

Table with 4 columns: Q Culv Group (cfs), # Barrels, Q Barrel (cfs), E.G. US. (ft), W.S. US. (ft), E.G. DS (ft), W.S. DS (ft), Delta EG (ft), Delta WS (ft), E.G. IC (ft), E.G. OC (ft), Culvert Control, Culv WS Inlet (ft), Culv WS Outlet (ft), Culv Nml Depth (ft), Culv Crt Depth (ft)

Plan: CE\_FHBT Stream\_1 1 RS: 6356 Culv Group: Culvert #1 Profile: CE\_Ex500YrFP

Table with 4 columns: Q Culv Group (cfs), # Barrels, Q Barrel (cfs), E.G. US. (ft), W.S. US. (ft), E.G. DS (ft), W.S. DS (ft), Delta EG (ft), Delta WS (ft), E.G. IC (ft), E.G. OC (ft), Culvert Control, Culv WS Inlet (ft), Culv WS Outlet (ft), Culv Nml Depth (ft), Culv Crt Depth (ft)

HEC-RAS CULVERT D1 OUTPUT PROP Qcap, 100-YR, & 500-YR

Plan: PR\_FHBT Stream\_1 1 RS: 6356 Culv Group: Culvert #1 Profile: PR\_Qcap

Table with 4 columns: Q Culv Group (cfs), # Barrels, Q Barrel (cfs), E.G. US. (ft), W.S. US. (ft), E.G. DS (ft), W.S. DS (ft), Delta EG (ft), Delta WS (ft), E.G. IC (ft), E.G. OC (ft), Culvert Control, Culv WS Inlet (ft), Culv WS Outlet (ft), Culv Nml Depth (ft), Culv Crt Depth (ft)

Plan: PR\_FHBT Stream\_1 1 RS: 6356 Culv Group: Culvert #1 Profile: PR\_Ex100YrFP

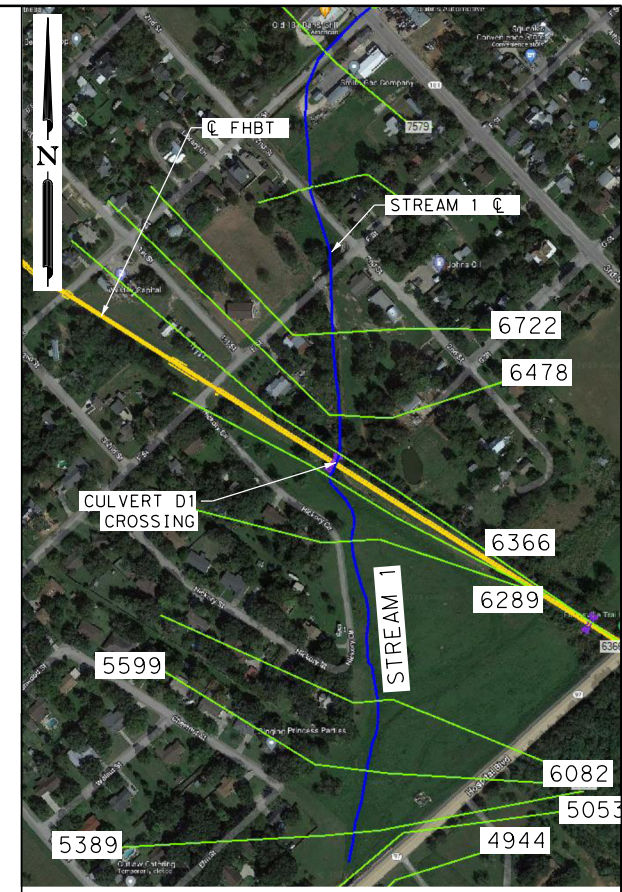
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Plan: PR\_FHBT Stream\_1 1 RS: 6356 Culv Group: Culvert #1 Profile: PR\_Ex500YrFP

Table with 4 columns: Q Culv Group (cfs), # Barrels, Q Barrel (cfs), E.G. US. (ft), W.S. US. (ft), E.G. DS (ft), W.S. DS (ft), Delta EG (ft), Delta WS (ft), E.G. IC (ft), E.G. OC (ft), Culvert Control, Culv WS Inlet (ft), Culv WS Outlet (ft), Culv Nml Depth (ft), Culv Crt Depth (ft)

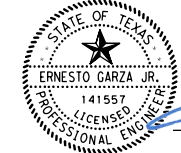
HEC-RAS Locations: User Defined CULVERT D1 HYDRAULIC DATA OUTPUT FLOODPLAIN Qcap, 100-YR, & 500-YR

Large table with 15 columns: River, Reach, River Sta, Profile, Plan, Q Total (cfs), Min Ch El (ft), W.S. Elev (ft), Crit W.S. (ft), E.G. Elev (ft), E.G. Slope (ft/ft), Vel Chnl (ft/s), Flow Area (sq ft), Top Width (ft), Froude # Chl



HEC-RAS STREAM 1 CROSS SECTION LAYOUT MAP

DESIGN



ERNESTO GARZA JR., P.E.

4/6/2023 DATE

APPROVAL



DAN THOMA, P.E.

4/6/2023 DATE



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



HIKE & BIKE TRAIL  
HYDRAULIC  
DATA SHEET  
CULVERT D1  
(STREAM 1)

NOTES:

- 1. COORDINATION WITH FEMA FLOODPLAIN ADMINISTRATOR FOR CITY OF FLORESVILLE ON FEBRUARY 2023
- 2. HYDRAULICS ANALYZED USING HEC-RAS VERSION 5.0.7 WITH STEADY FLOW ANALYSIS.
- 3. CROSS SECTION DATA IS BASED ON EXISTING FEMA MODELS.
- 4. HEC-RAS ANALYSIS SHOWED NO CHANGE TO WSE OR FLOODPLAIN INUNDATION AREA BETWEEN EXISTING AND PROPOSED MODEL FOR CULVERT CROSSING D1 AND CULVERT CROSSING D2. THEREFORE, NO ADVERSE IMPACTS ARE ANTICIPATED.
- 5. ANALYZED MODEL USING NORMAL DEPTH BOUNDARY CONDITION.

Table with 6 columns: CHK DGN#, FED. RD. DIV. NO., STATE, FEDERAL AID PROJECT NO., HIGHWAY NO., DIST., COUNTY, CONT. NO., SECT. NO., JOB NO., SHEET NO.

Plotted on: 4/6/2023

HEC-RAS CULVERT D2 OUTPUT EXIST Qcap, 100-YR, & 500-YR

Plan: CE\_FHBT Stream\_2 1 RS: 301 Culv Group: Culvert #1 Profile: CE\_Qcap. Table with 4 columns: Q Culv Group (cfs), Culv Full Len (ft), # Barrels, and various flow/depth metrics.

Plan: CE\_FHBT Stream\_2 1 RS: 301 Culv Group: Culvert #1 Profile: CE\_1%AC. Table with 4 columns: Q Culv Group (cfs), Culv Full Len (ft), # Barrels, and various flow/depth metrics.

Plan: CE\_FHBT Stream\_2 1 RS: 301 Culv Group: Culvert #1 Profile: CE\_Qcap. Table with 4 columns: Q Culv Group (cfs), Culv Full Len (ft), # Barrels, and various flow/depth metrics.

HEC-RAS CULVERT D2 OUTPUT PROP Qcap, 100-YR, & 500-YR

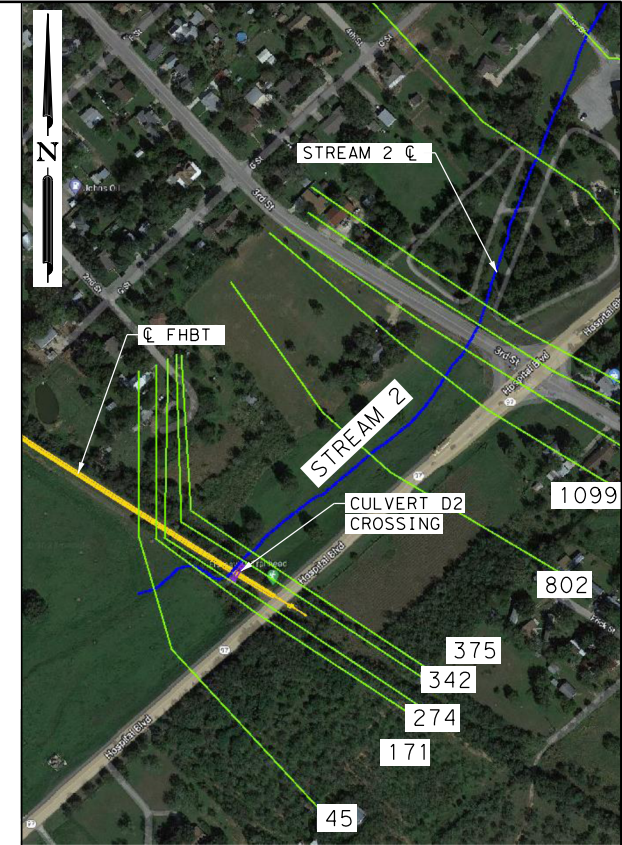
Plan: PR\_FHBT Stream\_2 1 RS: 301 Culv Group: Culvert #1 Profile: PR\_Qcap. Table with 4 columns: Q Culv Group (cfs), Culv Full Len (ft), # Barrels, and various flow/depth metrics.

Plan: PR\_FHBT Stream\_2 1 RS: 301 Culv Group: Culvert #1 Profile: PR\_1%AC. Table with 4 columns: Q Culv Group (cfs), Culv Full Len (ft), # Barrels, and various flow/depth metrics.

Plan: PR\_FHBT Stream\_2 1 RS: 301 Culv Group: Culvert #1 Profile: PR\_0.2%AC. Table with 4 columns: Q Culv Group (cfs), Culv Full Len (ft), # Barrels, and various flow/depth metrics.

CULVERT D2 HYDRAULIC DATA OUTPUT FLOODPLAIN Qcap, 100-YR, & 500-YR

Table with 14 columns: River, Reach, River Sta, Profile, Plan, Q Total (cfs), Min Chl El (ft), W.S. Elev (ft), Crit W.S. (ft), E.G. Elev (ft), E.G. Slope (ft/ft), Vel Chnl (ft/s), Flow Area (sq ft), Top Width (ft), Froude # Chl.



HEC-RAS STREAM 2 CROSS SECTION LAYOUT MAP

DESIGN



Signature of Ernesto Garza Jr., P.E. DATE: 4/6/2023

APPROVAL



Signature of Dan Thoma, P.E. DATE: 4/6/2023



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



HIKE & BIKE TRAIL  
HYDRAULIC  
DATA SHEET  
CULVERT D2  
(STREAM 2)

NOTES:

- 1. COORDINATION WITH FEMA FLOODPLAIN ADMINISTRATOR FOR CITY OF FLORESVILLE ON FEBRUARY 2023
- 2. HYDRAULICS ANALYZED USING HEC-RAS VERSION 5.0.7 WITH STEADY FLOW ANALYSIS.
- 3. CROSS SECTION DATA IS BASED ON EXISTING FEMA MODELS.
- 4. HEC-RAS ANALYSIS SHOWED NO CHANGE TO WSE OR FLOODPLAIN INUNDATION AREA BETWEEN EXISTING AND PROPOSED MODEL FOR CULVERT CROSSING D1 AND CULVERT CROSSING D2.THEREFORE, NO ADVERSE IMPACTS ARE ANTICIPATED.
- 5. ANALYZED MODEL USING NORMAL DEPTH BOUNDARY CONDITION.

Table with 5 columns: CHK, FED. RD. DIV. NO., STATE, FEDERAL AID PROJECT NO., HIGHWAY NO. and 5 columns: DIST., COUNTY, CONT. NO., SECT. NO., JOB NO., SHEET NO.

Design File name: P:\128\26\00\Design\Civil\Drawings\1282600\_HD502.dgn

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DATE: 4/6/2023 4:04:50 PM  
 FILE: P:\128\26\00\Design\Civi\Standards\Drainage\bcstsdel-20.dgn

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°, 15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (CY) (2)	Class "C" Conc (Wingwall) (CY) (3)	Total Wingwall Area (SF)
Culvert D1 - 48+72 (Lt)	2 ~ 6 x 6	5	SCP-6	FW-0	0°	1:1	7	7	1.667	8.000	7.667	4.426	8.853	N/A	N/A	2.6	0.9	4.3	75
Culvert D1 - 48+72 (Rt)	2 ~ 6 x 6	5	SCP-6	FW-0	0°	1:1	7	7	1.667	8.000	7.667	4.426	8.853	N/A	N/A	2.6	0.9	4.3	75
Culvert D2 - 57+64 (Lt)	1 ~ 8 x 8	5	SCP-8	FW-0	0°	1:1	8	8	1.583	10.000	9.667	5.581	11.162	N/A	N/A	2.4	0.5	6.4	116
Culvert D2 - 57+64 (Rt)	1 ~ 8 x 8	5	SCP-8	FW-0	0°	1:1	8	8	1.583	10.000	9.667	5.581	11.162	N/A	N/A	2.4	0.5	6.4	116

**NOTES:**

Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;  
 30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical

- Side slope at culvert for flared or straight wingwalls.
- Channel slope for parallel wingwalls.
- Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)

Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.  
 Area for four wingwalls (two structure ends) if Both.

(1) Round the wall heights shown to the nearest foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

**SPECIAL NOTE:**

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

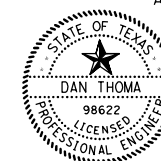
DESIGN



ERNESTO GARZA JR., P.E.

4/6/2023  
DATE

APPROVAL



DAN THOMA, P.E.

4/6/2023  
DATE

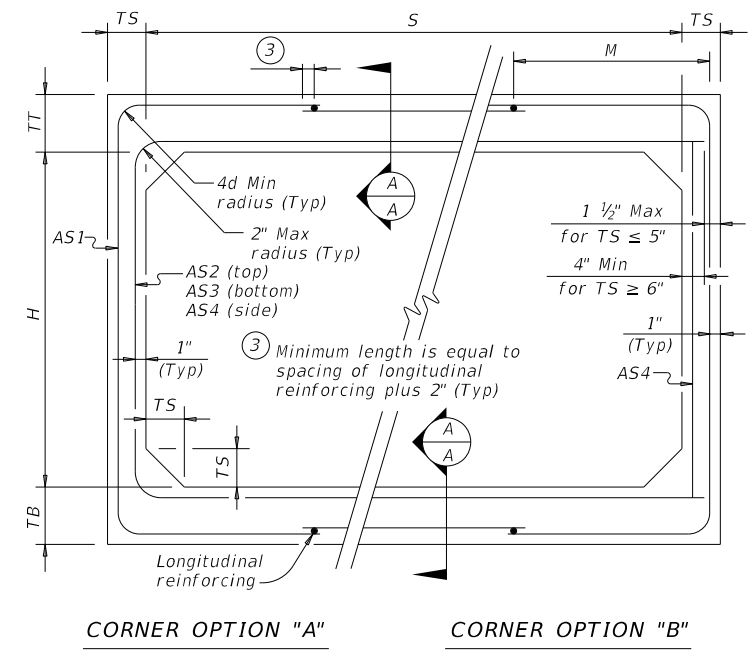
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<b>BOX CULVERT SUPPLEMENT WINGS AND END TREATMENTS</b>			
<b>BCS</b>			
FILE: bcsstdel-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
CTxDOT February 2020	CONT SECT	JOB	HIGHWAY
REVISIONS	0915 14	048	NA
	DIST	COUNTY	SHEET NO.
	SAT	WILSON	43

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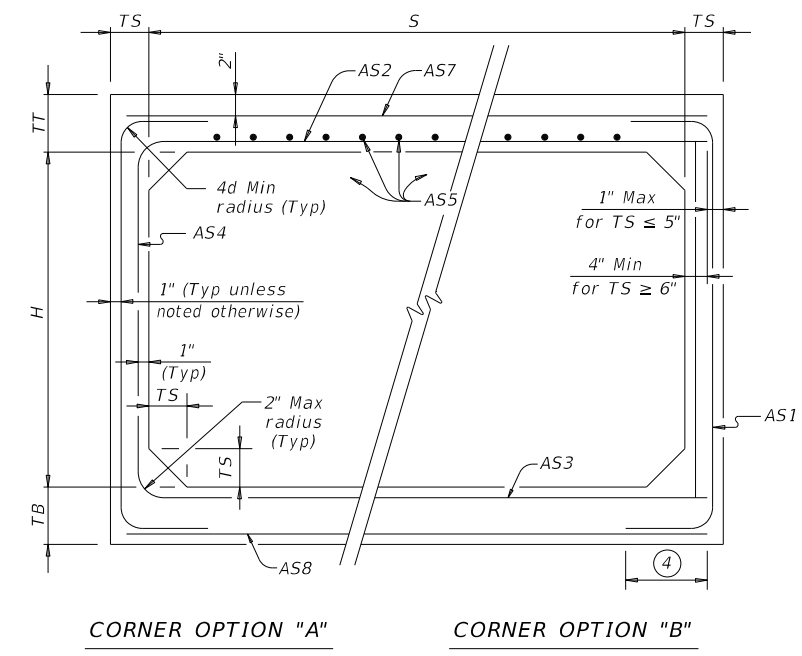
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**BOX DATA**

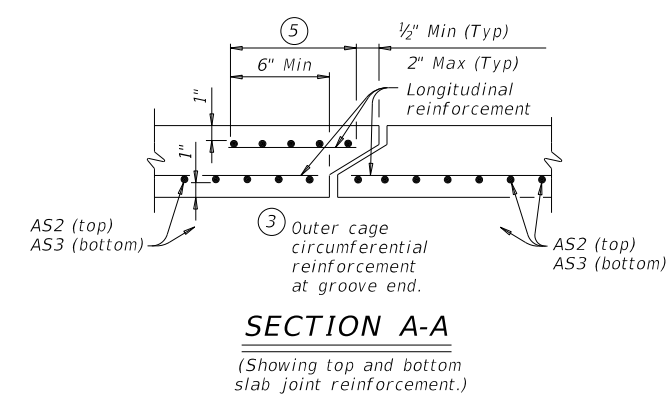
SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) <sup>②</sup>						① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	
6	2	8	7	7	< 2	-	0.23	0.27	0.19	0.17	0.19	0.17	7.2
6	2	7	7	7	2 < 3	43	0.25	0.21	0.17	0.17	-	-	6.8
6	2	7	7	7	3 - 5	43	0.20	0.17	0.17	0.17	-	-	6.8
6	2	7	7	7	10	39	0.20	0.17	0.17	0.17	-	-	6.8
6	2	7	7	7	15	39	0.26	0.20	0.20	0.17	-	-	6.8
6	2	7	7	7	20	39	0.34	0.26	0.26	0.17	-	-	6.8
6	2	7	7	7	25	39	0.43	0.32	0.32	0.17	-	-	6.8
6	2	7	7	7	30	39	0.52	0.38	0.39	0.17	-	-	6.8
6	3	8	7	7	< 2	-	0.20	0.31	0.22	0.17	0.19	0.19	7.9
6	3	7	7	7	2 < 3	43	0.21	0.24	0.19	0.17	-	-	7.5
6	3	7	7	7	3 - 5	39	0.17	0.18	0.17	0.17	-	-	7.5
6	3	7	7	7	10	39	0.17	0.18	0.19	0.17	-	-	7.5
6	3	7	7	7	15	38	0.22	0.24	0.24	0.17	-	-	7.5
6	3	7	7	7	20	38	0.28	0.31	0.31	0.17	-	-	7.5
6	3	7	7	7	25	38	0.35	0.38	0.39	0.17	-	-	7.5
6	3	7	7	7	30	38	0.42	0.46	0.46	0.17	-	-	7.5
6	4	8	7	7	< 2	-	0.19	0.34	0.25	0.17	0.19	0.19	8.6
6	4	7	7	7	2 < 3	43	0.19	0.27	0.21	0.17	-	-	8.2
6	4	7	7	7	3 - 5	39	0.17	0.21	0.19	0.17	-	-	8.2
6	4	7	7	7	10	39	0.17	0.20	0.21	0.17	-	-	8.2
6	4	7	7	7	15	38	0.18	0.27	0.27	0.17	-	-	8.2
6	4	7	7	7	20	38	0.24	0.34	0.35	0.17	-	-	8.2
6	4	7	7	7	25	38	0.29	0.43	0.42	0.17	-	-	8.2
6	4	7	7	7	30	38	0.35	0.51	0.52	0.17	-	-	8.2
6	5	8	7	7	< 2	-	0.19	0.37	0.28	0.17	0.19	0.19	9.3
6	5	7	7	7	2 < 3	43	0.17	0.30	0.24	0.17	-	-	8.9
6	5	7	7	7	3 - 5	43	0.17	0.23	0.21	0.17	-	-	8.9
6	5	7	7	7	10	39	0.17	0.22	0.23	0.17	-	-	8.9
6	5	7	7	7	15	38	0.17	0.28	0.29	0.17	-	-	8.9
6	5	7	7	7	20	38	0.20	0.37	0.38	0.17	-	-	8.9
6	5	7	7	7	25	38	0.25	0.45	0.46	0.17	-	-	8.9
6	5	7	7	7	30	38	0.30	0.54	0.55	0.17	-	-	8.9
6	6	8	7	7	< 2	-	0.19	0.38	0.30	0.17	0.19	0.19	10
6	6	7	7	7	2 < 3	52	0.17	0.32	0.26	0.17	-	-	9.6
6	6	7	7	7	3 - 5	52	0.17	0.24	0.22	0.17	-	-	9.6
6	6	7	7	7	10	43	0.17	0.23	0.24	0.17	-	-	9.6
6	6	7	7	7	15	39	0.17	0.29	0.31	0.17	-	-	9.6
6	6	7	7	7	20	39	0.18	0.38	0.39	0.17	-	-	9.6
6	6	7	7	7	25	38	0.23	0.46	0.48	0.17	-	-	9.6
6	6	7	7	7	30	38	0.27	0.55	0.57	0.17	-	-	9.6



**FILL HEIGHT 2 FT AND GREATER**



**FILL HEIGHT LESS THAN 2 FT**



**SECTION A-A**  
 (Showing top and bottom slab joint reinforcement.)

**MATERIAL NOTES:**  
 Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.  
 Provide Class H concrete (f'c = 5,000 psi).

**GENERAL NOTES:**  
 Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.  
 See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.  
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

① For box length = 8'-0"  
 ② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

HL93 LOADING

		<b>Bridge Division Standard</b>	
<b>SINGLE BOX CULVERTS PRECAST 6'-0" SPAN</b>			
<b>SCP-6</b>			
FILE: scp06sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT February 2020	CONT	SECT	JOB
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DIST	COUNTY		SHEET NO.
SAT	WILSON		44

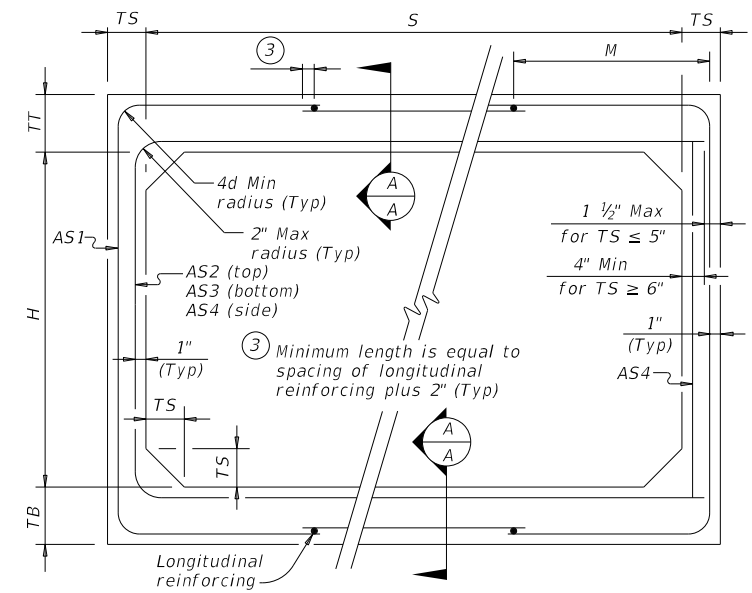


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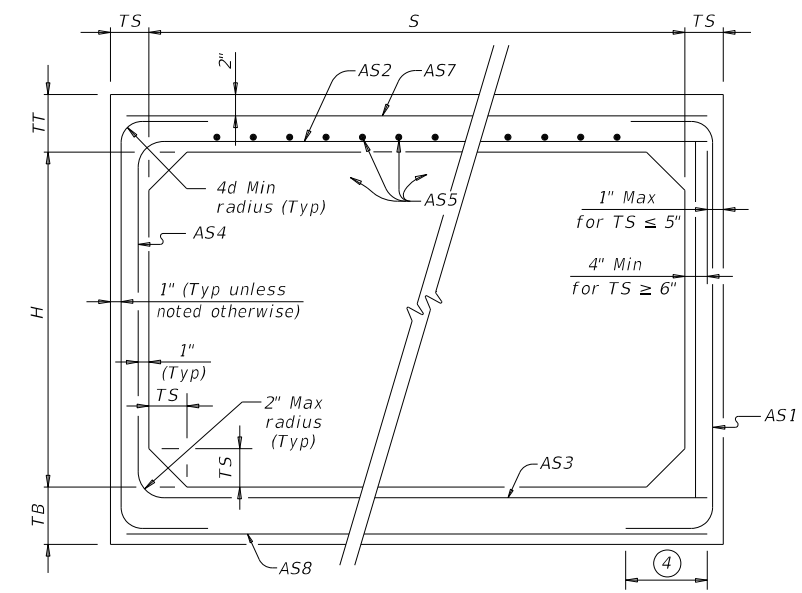
**BOX DATA**

SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) <sup>(2)</sup>							<sup>(1)</sup> Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8	
8	3	8	8	8	< 2	-	0.31	0.35	0.25	0.19	0.19	0.19	0.19	10.4
8	3	8	8	8	2 < 3	55	0.35	0.29	0.28	0.19	-	-	-	10.4
8	3	8	8	8	3 - 5	50	0.28	0.23	0.24	0.19	-	-	-	10.4
8	3	8	8	8	10	45	0.29	0.25	0.26	0.19	-	-	-	10.4
8	3	8	8	8	15	45	0.39	0.33	0.34	0.19	-	-	-	10.4
8	3	8	8	8	20	45	0.51	0.43	0.44	0.19	-	-	-	10.4
8	3	8	8	8	25	45	0.63	0.53	0.54	0.19	-	-	-	10.4
8	4	8	8	8	< 2	-	0.27	0.38	0.29	0.19	0.19	0.19	0.19	11.2
8	4	8	8	8	2 < 3	50	0.31	0.34	0.32	0.19	-	-	-	11.2
8	4	8	8	8	3 - 5	50	0.25	0.27	0.27	0.19	-	-	-	11.2
8	4	8	8	8	10	45	0.26	0.28	0.29	0.19	-	-	-	11.2
8	4	8	8	8	15	41	0.34	0.37	0.38	0.19	-	-	-	11.2
8	4	8	8	8	20	41	0.44	0.48	0.49	0.19	-	-	-	11.2
8	5	8	8	8	< 2	-	0.24	0.40	0.32	0.19	0.19	0.19	0.19	12.0
8	5	8	8	8	2 < 3	50	0.28	0.37	0.35	0.19	-	-	-	12.0
8	5	8	8	8	3 - 5	45	0.23	0.29	0.30	0.19	-	-	-	12.0
8	5	8	8	8	10	45	0.23	0.31	0.32	0.19	-	-	-	12.0
8	5	8	8	8	15	41	0.30	0.41	0.42	0.19	-	-	-	12.0
8	5	8	8	8	20	41	0.39	0.52	0.54	0.19	-	-	-	12.0
8	6	8	8	8	< 2	-	0.22	0.42	0.35	0.19	0.19	0.19	0.19	12.8
8	6	8	8	8	2 < 3	50	0.25	0.40	0.38	0.19	-	-	-	12.8
8	6	8	8	8	3 - 5	50	0.21	0.32	0.33	0.19	-	-	-	12.8
8	6	8	8	8	10	45	0.22	0.33	0.34	0.19	-	-	-	12.8
8	6	8	8	8	15	41	0.28	0.43	0.45	0.19	-	-	-	12.8
8	6	8	8	8	20	41	0.36	0.55	0.57	0.19	-	-	-	12.8
8	7	8	8	8	< 2	-	0.20	0.44	0.37	0.19	0.19	0.19	0.19	13.6
8	7	8	8	8	2 < 3	55	0.23	0.43	0.41	0.19	-	-	-	13.6
8	7	8	8	8	3 - 5	55	0.19	0.34	0.35	0.19	-	-	-	13.6
8	7	8	8	8	10	50	0.20	0.34	0.36	0.19	-	-	-	13.6
8	7	8	8	8	15	41	0.26	0.45	0.47	0.19	-	-	-	13.6
8	7	8	8	8	20	41	0.33	0.57	0.60	0.19	-	-	-	13.6
8	8	8	8	8	< 2	-	0.20	0.45	0.40	0.19	0.19	0.19	0.19	14.4
8	8	8	8	8	2 < 3	65	0.21	0.45	0.44	0.19	-	-	-	14.4
8	8	8	8	8	3 - 5	65	0.19	0.36	0.38	0.19	-	-	-	14.4
8	8	8	8	8	10	55	0.19	0.35	0.38	0.19	-	-	-	14.4
8	8	8	8	8	15	45	0.24	0.46	0.49	0.19	-	-	-	14.4
8	8	8	8	8	20	45	0.31	0.59	0.62	0.19	-	-	-	14.4



CORNER OPTION "A" CORNER OPTION "B"

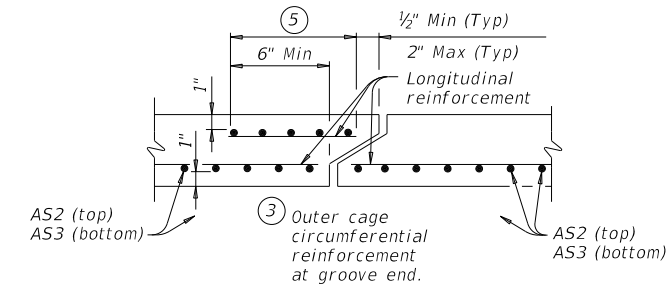
**FILL HEIGHT 2 FT AND GREATER**



CORNER OPTION "A" CORNER OPTION "B"

**FILL HEIGHT LESS THAN 2 FT**

<sup>(4)</sup> Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



**SECTION A-A**

(Showing top and bottom slab joint reinforcement.)

**MATERIAL NOTES:**  
 Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.  
 Provide Class H concrete (f'c = 5,000 psi).

**GENERAL NOTES:**  
 Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.  
 See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.  
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

<sup>(1)</sup> For box length = 8'-0"  
<sup>(2)</sup> AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

HL93 LOADING

**Texas Department of Transportation**  
 Bridge Division Standard

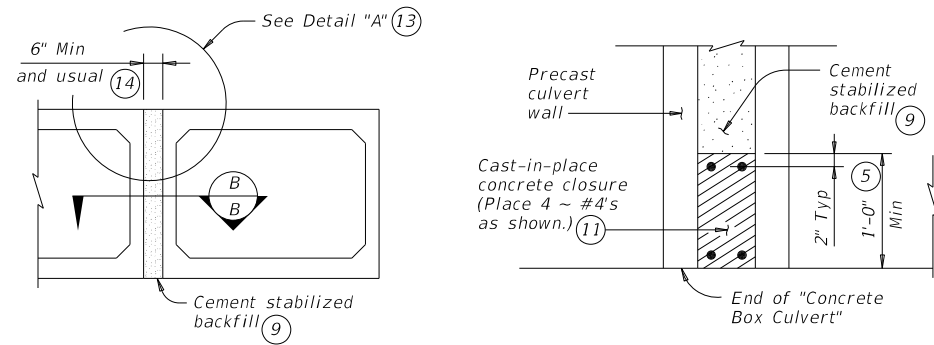
**SINGLE BOX CULVERTS  
 PRECAST  
 8'-0" SPAN**

**SCP-8**

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY		SHEET NO.	
SAT	WILSON		45	

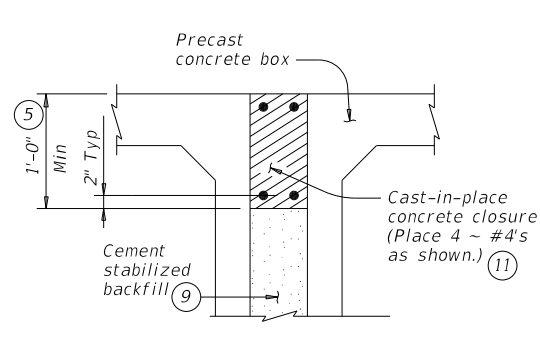
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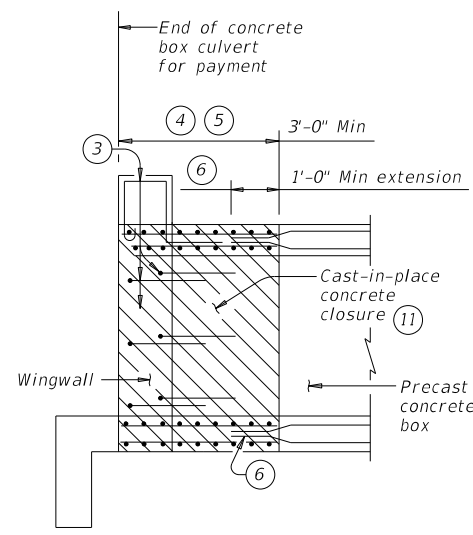


**MULTIPLE UNIT PLACEMENT**

**SECTION B-B**

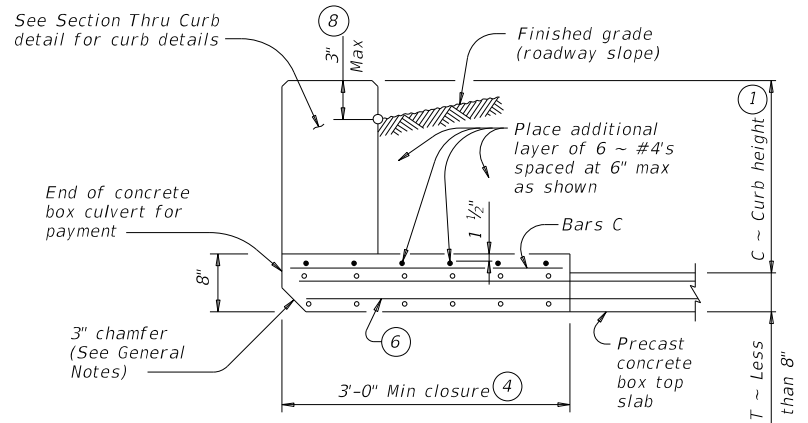


**DETAIL "A"**

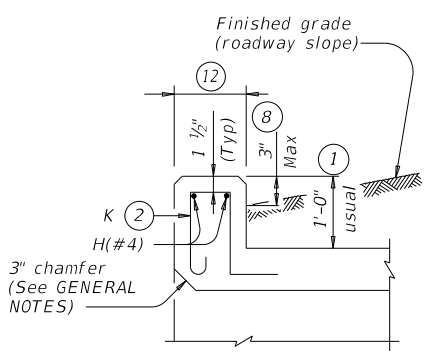


**WINGWALL CONNECTION**

(Also applies to safety end treatment.)

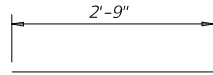


**SECTION THRU TOP SLABS LESS THAN 8"**

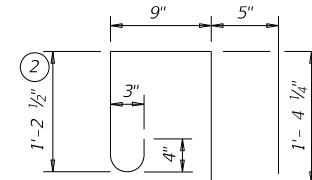


**SECTION THRU CURB**

QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



**BARS C (#4)**  
(Spa = 1'-0" Max)



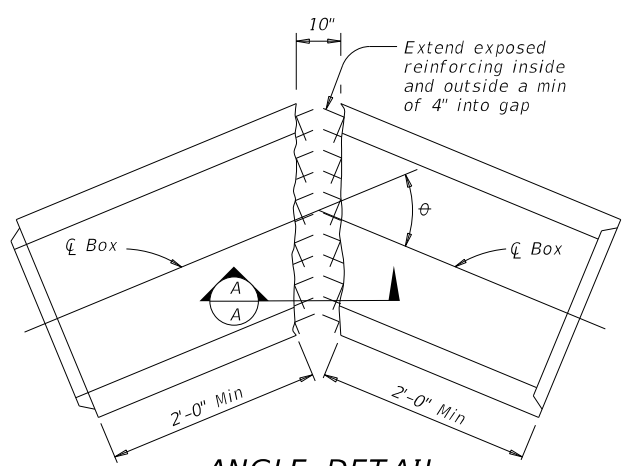
**BARS K (#4)**  
(Spa = 1'-0" Max)  
(Length = 4'-2")

- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
- Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
- Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.
- For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.
- Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).
- Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
- For vehicle safety, the following requirements must be met:
  - For structures without bridge rail, construct curbs no more than 3" above finished grade.
  - For structures with bridge rail, construct curbs flush with finished grade. Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- Cement stabilized backfill between boxes is considered part of the box culvert for payment.
- All curb concrete and reinforcing is considered part of the box culvert for payment.
- Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
- 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
- For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
- This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

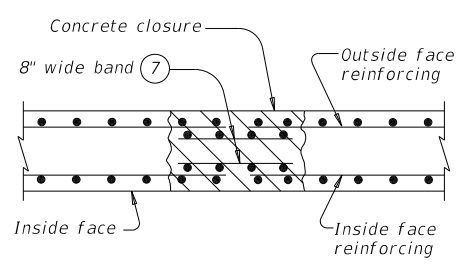
**MATERIAL NOTES:**  
 Provide Grade 60 reinforcing steel.  
 Provide ASTM A1064 welded wire reinforcement.  
 Provide Class C concrete (f'c = 3,600 psi) for the closures.  
 Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."  
 Any additional concrete required for the closures will be considered subsidiary to the box culvert.

**GENERAL NOTES:**  
 Designed according to AASHTO LRFD Bridge Design Specifications.  
 Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.  
 Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

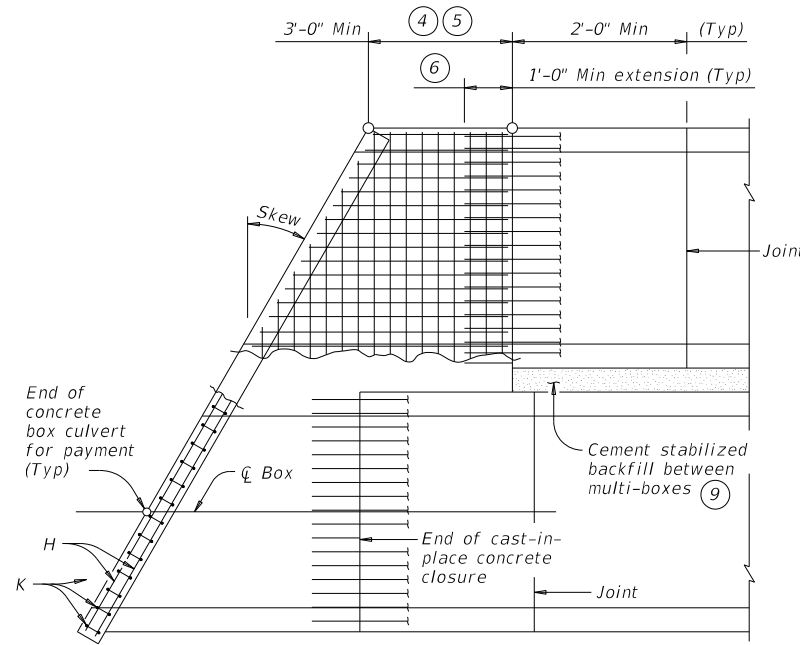
Cover dimensions are clear dimensions, unless noted otherwise.  
 Reinforcing bars dimensions are out-to-out of bars.



**ANGLE DETAIL**



**SECTION A-A**



**PLAN OF SKEWED ENDS**

(Showing multi-box placement.)

HL93 LOADING

		<b>Bridge Division Standard</b>	
<b>BOX CULVERTS PRECAST MISCELLANEOUS DETAILS</b>			
<b>SCP-MD</b>			
FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT
©TxDOT February 2020	CONV	SECT	JOB
REVISIONS	0915	14	048
	DIST	COUNTY	SHEET NO.
	SAT	WILSON	46

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: 4/6/2023 4:04:55 PM  
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**TABLE OF DIMENSIONS AND REINFORCING STEEL**  
 (Wings for one structure end)

Maximum Wingwall Height Hw	Dimensions				Variable Reinforcing				Estimated Quantities per ft of wing length (2-wings)	
	W	X	Y	Z	Bars J1		Bars J2		Reinf (Lb/Ft)	Conc (CY/Ft)
					Size	Spa	Size	Spa		
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

**TABLE OF WINGWALL REINFORCING**  
 (2-wings)

Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

**TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES**

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

**WING DIMENSION FORMULAS:**

(All values are in feet.)

$Hw = H + T + C - 0.250'$   
 $A = (Hw - 0.333') (SL)$   
 $B = (A) \text{ tangent } (30^\circ)$   
 $Lw = (A) \div \text{cosine } (30^\circ)$

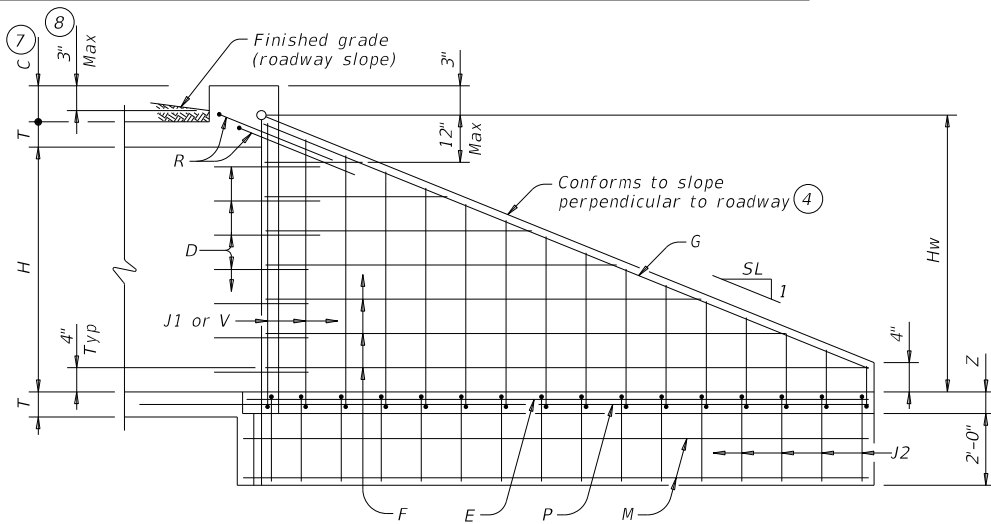
For cast-in-place culverts:  
 $Ltw = (N) (S) + (N + 1) (U)$

For precast culverts:  
 $Ltw = (N) (2U + S) + (N - 1) (0.5')$

Total wingwall area (two wings ~ SF) =  $(Hw + 0.333') (Lw)$

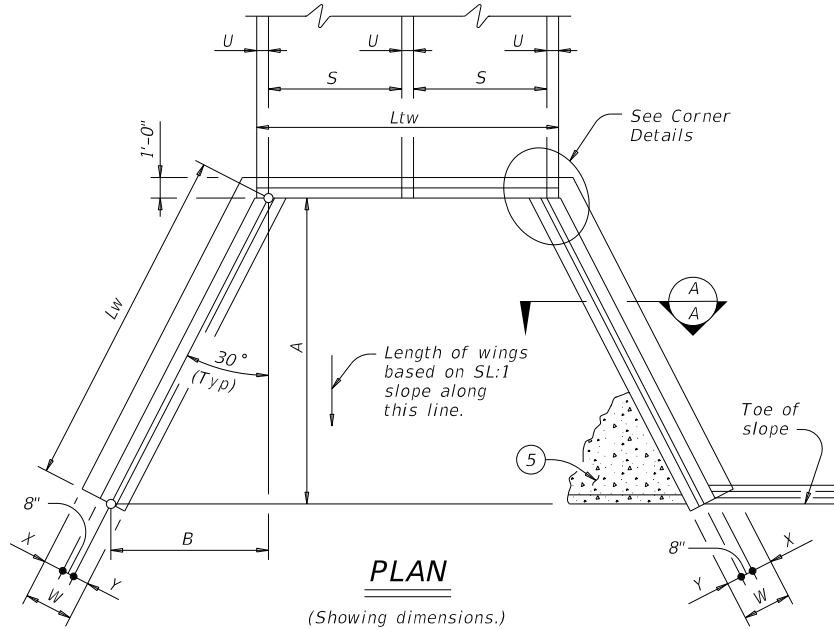
$Hw$  = Height of wingwall  
 $SL:1$  = Side slope ratio (horizontal:1 vertical)  
 $Lw$  = Length of wingwall  
 $Ltw$  = Culvert toewall length  
 $N$  = Number of culvert spans

See applicable box culvert standard sheet for H, S, T, and U values.



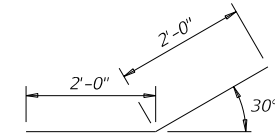
**INSIDE ELEVATION**

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

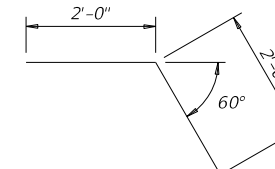


**PLAN**

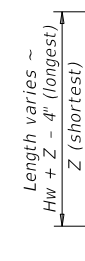
(Showing dimensions.)



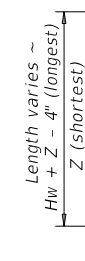
BARS D



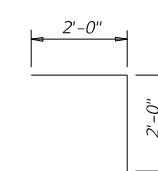
BARS R



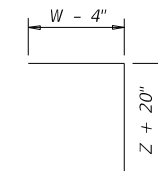
BARS J1



BARS V



BARS L



BARS J2

- Extend Bars P 3'-0" minimum into bottom slab of box culvert.
- Adjust as necessary to maintain 1 #2" clear cover and 4" minimum between bars.
- Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by Lw.
- Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.
- When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.
- At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.
- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- For vehicle safety, the following requirements must be met:
  - For structures without bridge rail, construct curbs no more than 3" above finished grade.
  - For structures with bridge rail, construct curbs flush with finished grade.
 Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

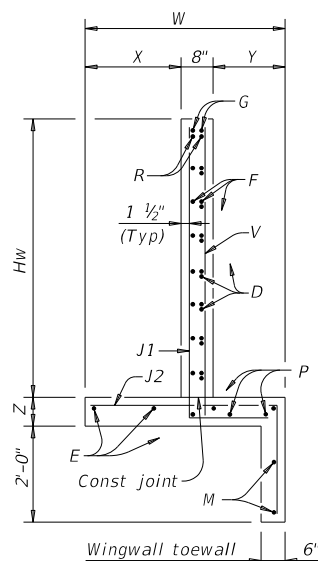
**MATERIAL NOTES:**

Provide Class C concrete (f'c=3,600 psi).  
 Provide Grade 60 reinforcing steel.  
 Provide galvanized reinforcing steel if required elsewhere in the plans.  
 In riprap concrete synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

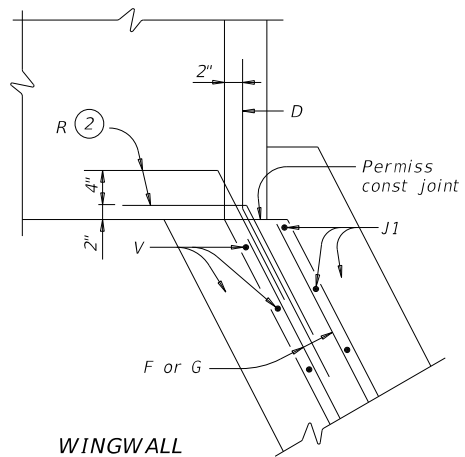
**GENERAL NOTES:**

Designed according to AASHTO LRFD Bridge Design Specifications.  
 When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.  
 See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.  
 The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

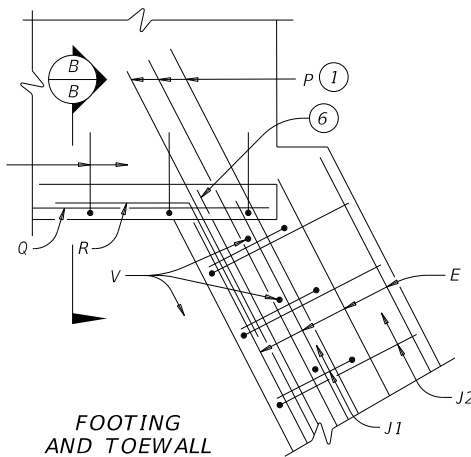
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.



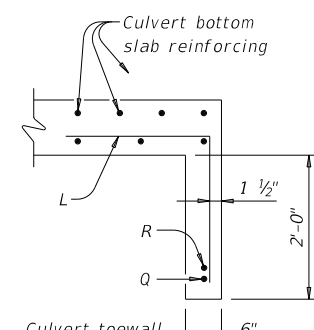
**SECTION A-A**



**WINGWALL**



**FOOTING AND TOEWALL**



**SECTION B-B**

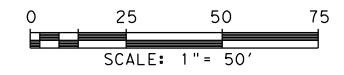
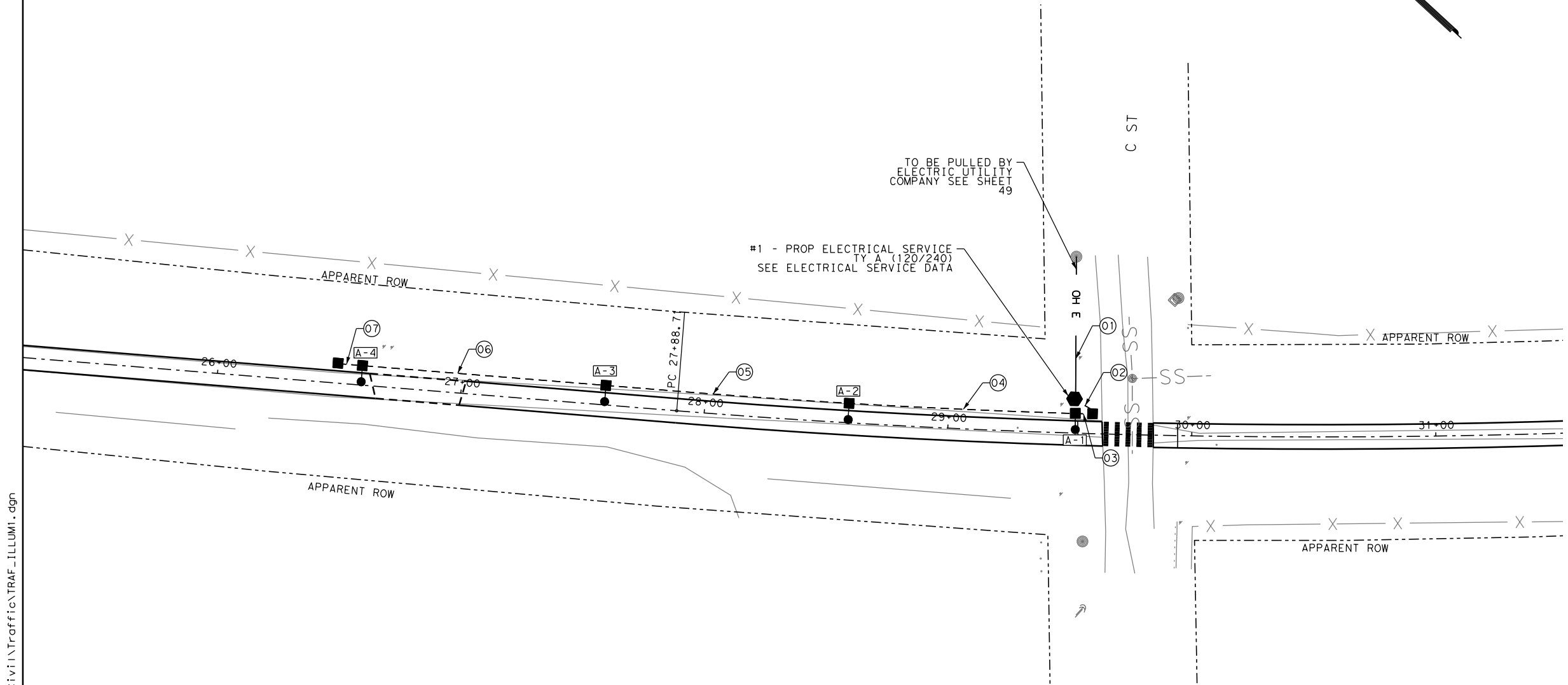
				<b>Bridge Division Standard</b>	
<b>CONCRETE WINGWALLS WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS</b>					
<b>FW-0</b>					
FILE: fw-0std-de-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT	
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0915	14	048	NA	
	DIST	COUNTY	SHEET NO.		
	SAT	WILSON		47	

Plotted on: 4/6/2023

Design File name: P:\128\26\00\Design\Civil\Traffic\TRAF\_ILLUM1.dgn

**LEGEND**

- EXISTING ROADWAY
- PROPOSED 2" CONDUIT PVC SCHD 80 (TRENCH)
- CONDUIT RUN NUMBER
- ILLUMINATION POLE LABEL
- PROPOSED SINGLE ARM ILLUMINATION ASSEMBLY
- PROPOSED GROUND BOX TY A
- PROPOSED ELECTRIC SERVICE
- OVERHEAD ELECTRIC SERVICE CONNECTION



DESIGN

STATE OF TEXAS  
JUSTIN W. CLARK  
118715  
LICENSED PROFESSIONAL ENGINEER  
4/6/2023  
DATE

APPROVAL

STATE OF TEXAS  
GILMER D. GASTON  
80472  
LICENSED PROFESSIONAL ENGINEER  
4/6/2023  
DATE

- NOTES:**
- CONTRACTOR SHALL POTHOLE POLE FOUNDATION LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
  - UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO COMMENCING EXCAVATION. ALL UTILITY LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
  - LOCATION OF ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY CITY OF FLORESVILLE PRIOR TO CONSTRUCTION.
  - LUMINAIRES ARE SHOWN FOR CLARITY PURPOSES ONLY; ORIENT THEM AS DIRECTED BY THE ENGINEER.
  - AN ADDITIONAL 2" SCHEDULE 80 PVC SHALL BE INSTALLED AT EACH POLE FOUNDATION STUBBED OUT 2' FROM THE FACE OF THE FOUNDATION. STUB OUTS SHALL BE APPROPRIATELY CAPPED BELOW GRADE FOR FUTURE USE.
  - THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF FLORESVILLE INSPECTOR FOR THEIR RECORDS.
  - NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.

**PAPE-DAWSON ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS  
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



HIKE & BIKE TRAIL  
ILLUMINATION  
LAYOUT

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	NA
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	WILSON	0915	14
			048	48

Plotted on: 6/28/2023

Design File name: P:\128\26\00\Design\Civil\Traffic\TRAF\_CONDUIT\_SCHEDULE.dgn

CONDUIT AND CONDUCTOR SCHEDULE									
CKT NO.	RUN NO.	CONDUIT			CONDUCTOR			CONDITION	
		CONDT (PVC) (SCHD 80) (2")	# COND	ELEC CONDR (NO. 8) BARE	# BARE	ELEC CONDR (NO. 8) INSULATED	# INSUL		
A	01	TO BE PULLED BY ELECTRIC UTILITY COMPANY							
A	02	10	1	10	1	10	2	PROPOSED	
A	03	10	1	10	1	10	2	PROPOSED	
A	04	95	1	95	1	95	2	PROPOSED	
A	05	100	1	100	1	100	2	PROPOSED	
A	06	100	1	100	1	100	2	PROPOSED	
A	07	10	1	10	1	10	2	PROPOSED	
TOTAL		325		325		650			
TOTAL + 10% CONTINGENCY		358		358		715			

ILLUMINATION ASSEMBLY LOCATIONS						
LIGHT NO.	STATION	BASELINE	OFFSET	POLE TYPE	LUMINAIRE TYPE	24" DRILL SHAFT LENGTH (24-A) (FEET)
A-01	29+52	FHBT	8' LT	CL-RSS ROUND POLE (16 FT)	FIXTURE TYPE CLP-BELL LED*	6
A-02	28+60	FHBT	8' LT	CL-RSS ROUND POLE (16 FT)	FIXTURE TYPE CLP-BELL LED*	6
A-03	27+60	FHBT	8' LT	CL-RSS ROUND POLE (16 FT)	FIXTURE TYPE CLP-BELL LED*	6
A-04	26+60	FHBT	8' LT	CL-RSS ROUND POLE (16 FT)	FIXTURE TYPE CLP-BELL LED*	6

\* FIXTURE TYPE: CLP-BELL LED  
 OPTIC DISTRIBUTION: TYPE 2  
 LED COLOR TEMP: 3000 K  
 125 WATTS (EACH)  
 .52 AMPS (EACH) @ 240 VOLTS

QUANTITY SUMMARY			
ITEM	DESCRIPTION	UNIT	QTY
0416-6003	DRILL SHAFT (30 IN)	LF	24
0618-6046	CONDT (PVC) (SCH 80) (2")	LF	358
0620-6007	ELEC CONDR (NO. 8) BARE	LF	358
0620-6008	ELEC CONDR (NO. 8) INSULATED	LF	715
0624-6002	GROUND BOX TY A (122311)W/APRON	EA	2
0628-6009	ELC SRV TY A 120/240 060(NS)SS(E)SP(O)	EA	1
6501-6001	LED PEDESTRAIN ILLUMINATION ASSEMBLY	EA	4

PROPOSED ELECTRIC SERVICE DATA											
Elec. Service No.	Electrical Service Description (see ED (5) - 14)	Service Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contactor Amps	Panelbd/ Loadcenter Amp Rating	Circuit No.	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
1	ELEC SERV TY A (120/240) 060 (NS) SS (E) SP (O)	3"	3/#6	N/A	2P/60	60	N/A	A	2P/15	2	0.5

DESIGN



*Justin Clark*  
 JUSTIN W. CLARK, P.E.  
 6/28/2023  
 DATE

APPROVAL



*Gilmer D. Gaston*  
 GILMER D. GASTON, P.E.  
 6/28/2023  
 DATE



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 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000  
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



HIKE & BIKE TRAIL  
 CONDUIT & CONDUCTOR  
 SCHEDULE

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	NA		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	WILSON	0915	14	048	49

NOTE: CONTRACTOR MAY USE SPEC PROVIDED OR EQUIVALENT.

CLP-BELL

Architectural LED Luminaire

CLP-BELL



**CLP-BELL** Architectural LED Luminaire, suitable for wet locations. Perfect for lighting up Commercial Exteriors, Walkways, Perimeters, School Campuses, Industrial Spaces, Parking Lots, Recreational Parks.

- Dark Sky compliant
- 10 Year /100,000 warranty.

**Features:**

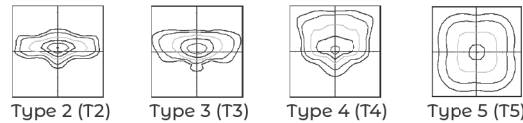
- Energy Savings: Over 66% compared to HID light sources
- Improved lumen maintenance
- Utilizes high efficient Lumiled LED's
- Operating temperatures: -30°C ~ 60°C
- Driver: Constant current, 120-277v or, 480v (Optional)
- 10Kv Surge Protector. (standard)
- 0-10V Dimming, Buttom Photo Cell or wireless controls (optional)

**Construction:**

- Housing, Heavy Gauge Spun Aluminum.
- Cast Aluminum top for additional support.
- Mounting (YM): Over 3" O.D Tenon or Pole.
- 3 Mill Powder Coat Finish.
- Clear Optic System.



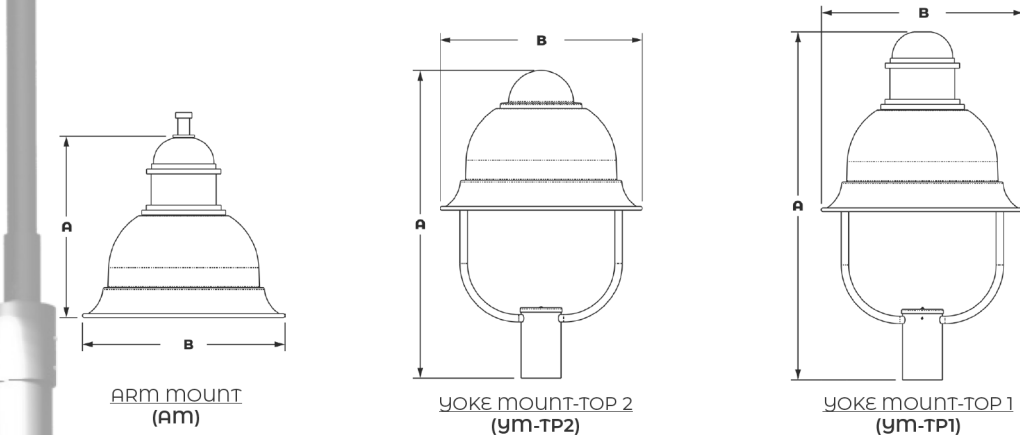
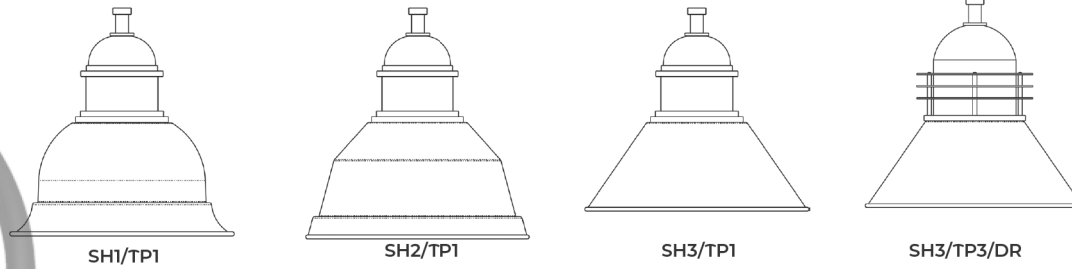
**Optic Distribution**



Example: CLP-BELL-M-TP1-SH1-AM-50CLED-30K-MV-BRZ-HSS



Cat #	Top/Shade	Mounting	Wattage	Light Dist.	Color Temp.	Voltage	Finish	Options
CLP-BELL-M (CLP-BELL-M)	<b>Tops</b>	Arm Mount (AM)	40W (40CLED)	Type 2 (T2) Type 3 (T3) Type 4 (T4) Type 5 (T5)	3000K (30K) 4000K (40K) 5000K (50K)	120-277V (MV) 480V (HV)	Black (BLK) White (WHT) Silver (SLR) Bronze (BRZ) Graphite (GPH) Custom (CST)	Occupancy Sensor (OCC) Button Photo Cell (PC) Wireless controls (WC) House Side Shield (HSS) Wattage Adjuster (WA) Decorative Rings (DR) (Top 3 Only)
	Top 1 (TP1)	Yoke Mount (YM)	50W (50CLED)					
	Top 2 (TP2)	(YOKE MOUNT ONLY) Side Slip Arm (Over 2" 3/8 Arm) (SSA)	60W (60CLED) 80W (80CLED) 100W (100CLED) 120W (120CLED) 150W (150CLED) 180W (180CLED)					
CLP-BELL-LG (CLP-BELL-L) (UP TO 180W)	Top 3 (TP3)							
	<b>Shades</b>							
	Shade 1 (SH1)							
	Shade 2 (SH2)							
	Shade 3 (SH3)							



Cat#	EPA
CLP-BELL-M-AM	1.38
CLP-BELL-M-PT1-YM	1.83
CLP-BELL-M-PT2-YM	1.59
CLP-BELL-L-AM	1.67
CLP-BELL-L-PT1-YM	2.14
CLP-BELL-L-PT2-YM	1.90

Cat#	A	B
CLP-BELL-M-AM	18"	20"
CLP-BELL-M-PT1-YM	37" 3/8	20"
CLP-BELL-M-PT2-YM	31" 7/8	20"
CLP-BELL-L-AM	20"	25"
CLP-BELL-L-PT1-YM	38" 7/8	25"
CLP-BELL-L-PT2-YM	33" 3/8	25"

Cat #	Input Power	Lumen Output	LPW	Color Temp. (CCT)	CRI	Rated Life (L70)	Input Voltage	HID Equivalent
CLP-BELL-M-40CLED	45W	5,504	122	5000K	70+	>200,000	120-277V	70W HPS
CLP-BELL-M-50CLED	55W	6,880	125	5000K	70+	>200,000	120-277V	100W MH
CLP-BELL-M-60CLED	65W	8,256	127	5000K	70+	>200,000	120-277V	150W PSMH
CLP-BELL-M-80CLED	85W	9,590	119	5000K	70+	>200,000	120-277V	175W MH
CLP-BELL-M-100CLED	105W	12,306	123	5000K	70+	>200,000	120-277V	250W PSWH
CLP-BELL-M/L-120CLED	125W	16,012	133	5000K	70+	>200,000	120-277V	310W HPS
CLP-BELL-M/L-150CLED	155W	19,098	127	5000K	70+	>200,000	120-277V	400W PSMH
CLP-BELL-L-175CLED	180W	23,429	130	5000K	70+	>200,000	120-277V	500W PSWH

Proudly Manufactured and Assembled in the USA

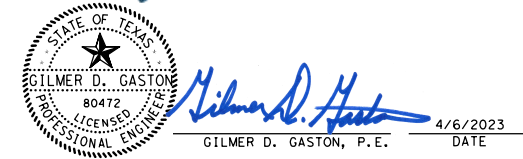
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www.crystallighting.us

Call Us: 1-562-944-0223

DESIGN



APPROVAL



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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



HIKE & BIKE TRAIL  
LUMINAIRE  
SPEC SHEET

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	NA		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	WILSON	0915	14	048	50

Plotted on: 4/6/2023

Design File name: P:\128\26\00\Design\Civil\Traffic\LUMINAR\_SPEC.dgn

NOTE: CONTRACTOR MAY USE SPEC PROVIDED OR EQUIVALENT.

CL-RSS

Round Straight Steel

CL-RSS

**Pole Shaft**

Pole shaft shall be weldable-grade, cold-rolled, commercial quality carbon steel tubing conforming to ASTM A500 Grade B. Tubing has minimum yield strength of 45,000 PSI. CL-RSS includes ground Lug welded inside opposite of Hand Hole. Options include 11 and 7 gauge.

**Base Plate**

4-Bolt Steel Plate base is manufactured from hot rolled carbon steel conforming to ASTM-A36 or equivalent (36,000 PSI). 3/4" thick Steel for poles up to 20ft and 1" thick for poles 21ft to 30ft.

**Powder Coating**

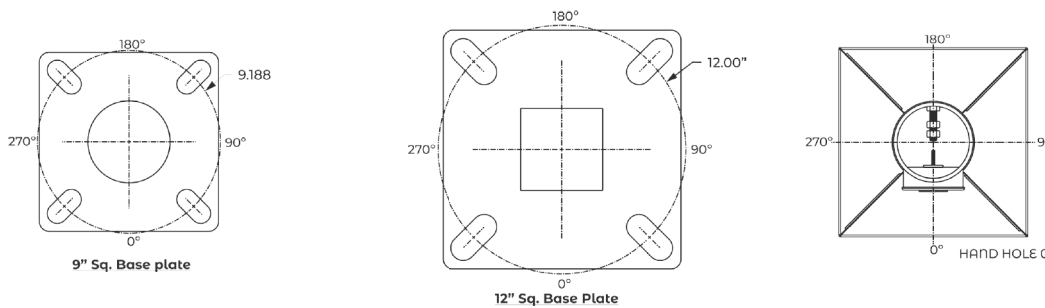
All poles are sandblast prior to painting, Powder coat is applied to a minimum of 3 millimeters and baked at 400 °F temperature. CL-RSS comes with (3) three year warranty.

**Anchor Bolts**

Anchor bolt Kit includes 4 L-Shaped Hot Dip Galvanized Bolts, each anchor bolt come with two galvanized nuts and washer per bolt, Anchor bolts meet or exceed a minimum of 36,000 PSI and conform to ASTM F1554 grade 36.

**Base Cover, Hand Hole Cover and Pole Cap**

CL-RSS come with Removable Pole Cap and Aluminum Base Cover Powder Coated to match Pole. Cast Hand Hole Cover are provided with Internal bridge support and are powder coated to match pole.



Example: CL-RSS-8-4-7G-9BP-342-D180-BRZ-T3R

Cat #	Height	Pole O.D	Thickness	Bolt Circle	Anchor bolt	Mounting	Finish	Options
Round Straight Steel (CL-RSS)	8' (8)	3"OD	.120"	8"3/16 - 10"3/16 Bolt Circle (10'-20')	3/4"x24"	Single	Bronze	Tenon
	12' (12)	(3R)	(11G)		(342)	(SGL)	(BRZ)	2" 3/8 RND
	14' (14)	4"OD	.180"		1"x36"	Double	White	(T2R)
	16' (16)	(4R)	(7G)			(D180)	(WHIT)	3" RND (T3R)
	18' (18)	5"OD				Double	Silver	3" 1/2 RND (T312R)
	20' (20)	(5R)		10" - 14" Bolt Circle (21' Over)		Double	Green	4" RND (T4R)
	22' (22)					90°	(D90)	4" 1/2 RND (T412R)
	25' (25)					Triple 90°	Black	(T412R)
	28' (28)					Triple 120°	Graphite	3" 1/2 SQ (T312S)
	30' (30)					Quad	Custom	4" 1/2 SQ (T412S)
					(QD)	Marine Grade	5" 1/2 SQ (T412S)	
							Round Base Cover (RBC)	
							GFI Provision ONLY (GFIP)	
							GFI KIT (GFIK)	

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POLE EPA											
Maximum EPA (ft) allowance											
Height	Pole Dia.	Thickness	Base Plate	Bolt Circle	Bolts	90 mph	100 mph	110 mph	120 mph	130 mph	140 mph
8'	3" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	14.2	11.2	10.4	8.6	7.2	6.0
10'	3" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	10.8	8.5	7.8	6.4	5.2	4.3
10'	4" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	20.8	16.6	15.2	12.6	10.4	8.8
12'	3" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	8.4	6.6	6.0	4.8	3.8	3.0
12'	4" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	16.6	13.0	12	9.8	8.0	6.8
14'	3" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	6.8	5.1	4.6	3.6	2.8	2.0
14'	4" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	13.4	10.4	9.6	7.6	6.2	5.1
16'	3" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	5.4	4.0	3.6	2.7	1.9	1.3
16'	4" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	11.0	8.4	7.6	6.0	4.6	3.8
18'	3" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	4.2	2.9	2.6	1.8	1.1	-
18'	4" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	9.0	6.6	6.0	4.5	3.4	2.7
20'	4" OD.	11G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	7.2	5.2	4.6	3.3	2.3	1.6
20'	5" OD.	11G	1" X 12" SQ	12"-1/2	3/4" X 24"	12.5	9.4	8.8	7.1	5.9	4.9
20'	5" OD.	7G	1" X 12" SQ	12"-1/2	1" X 36"	20.6	15.8	14.6	12.2	10.2	8.6
22'	4" OD.	7G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	15.5	10.1	9.9	6.0	5.1	3.4
22'	5" OD.	7G	1" X 12" SQ	12"-1/2	1" X 36"	19.4	14.2	13.1	11.0	9.1	7.2
25'	4" OD.	7G	3/4" X 9" SQ	9"-3/16	3/4" X 24"	3.8	2.3	1.9	.08	-	-
25'	5" OD.	11G	1" X 12" SQ	12"-1/2	1" X 36"	7.6	5.2	4.7	3.7	2.9	2.2
25'	5" OD.	7G	1" X 12" SQ	12"-1/2	1" X 36"	13.4	9.8	9.	7.4	6.0	5.0
30'	5" OD.	11G	1" X 12" SQ	12"-1/2	1" X 36"	4.0	2.1	1.8	1.2	-	-
30'	5" OD.	7G	1" X 12" SQ	12"-1/2	1" X 36"	8.6	5.8	5.2	4.0	3.2	2.4
35'	5" OD.	7G	1" X 12" SQ	12"-1/2	1" X 36"	5.0	2.6	2.2	1.5	1.0	-

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DESIGN

JUSTIN W. CLARK  
118715  
LICENSED PROFESSIONAL ENGINEER  
4/6/2023  
DATE

APPROVAL

GILMER D. GASTON  
80472  
LICENSED PROFESSIONAL ENGINEER  
4/6/2023  
DATE

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SPEC SHEET

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	NA
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	WILSON	0915	14
			JOB NO.:	SHEET NO.:
			048	51

Plotted on: 4/6/2023

Design File name: P:\28\26\00\Design\Civil\Traffic\TRAF\_POLE\_SPEC.dgn

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### GENERAL NOTES FOR ALL ELECTRICAL WORK

- The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
- Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.
- Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
- Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
- Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
- When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

### CONDUIT

#### A. MATERIALS

- Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.
- Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
- Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.


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

- Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.
- Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.
- Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.
- Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

- Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.
- When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.
- Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

#### B. CONSTRUCTION METHODS

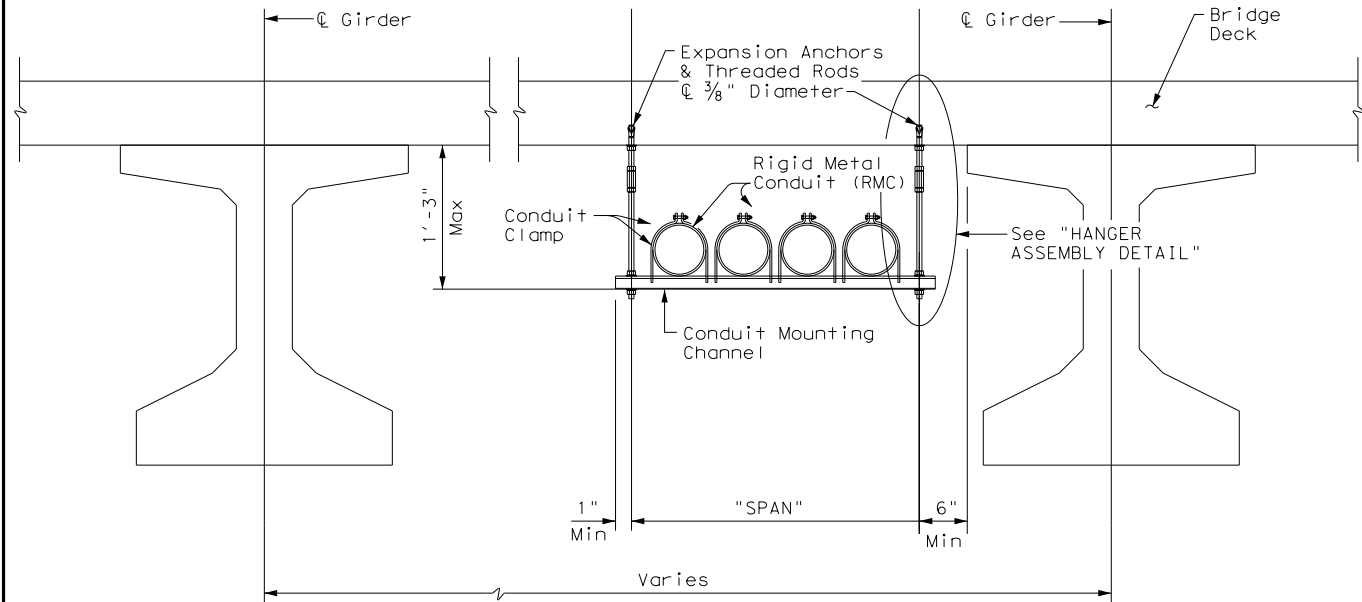
- Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.
- Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.
- Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
- Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.
- When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."
- Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
- During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
- Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.
- Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
- Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.
- At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
- Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).
- Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.
- File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

			<b>Traffic Operations Division Standard</b>		
<h2>ELECTRICAL DETAILS CONDUITS &amp; NOTES</h2>					
<h3>ED(1) - 14</h3>					
FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0915	14	048	NA
	DIST	COUNTY		SHEET NO.	
	SAT	WILSON		52	

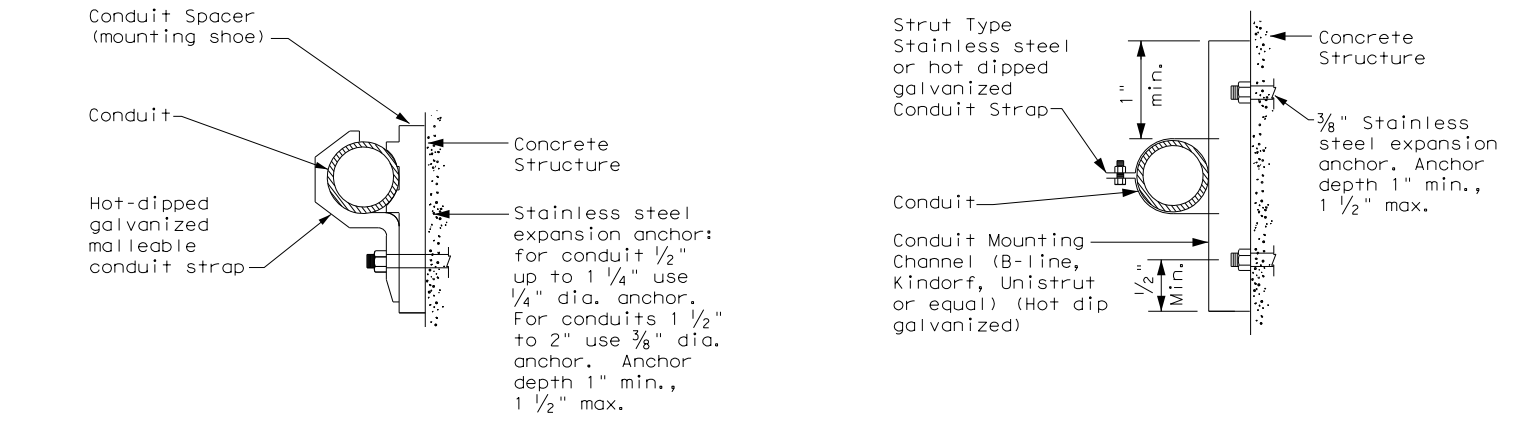


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CONDUIT HANGING DETAIL

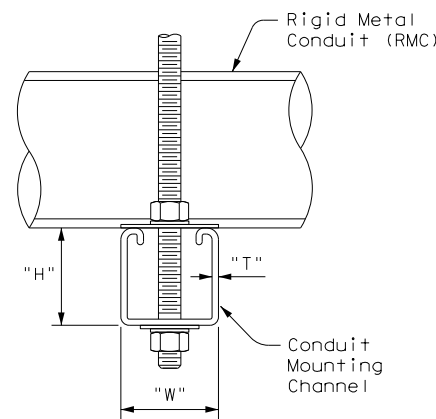


CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces  
 See ED(1)B.2

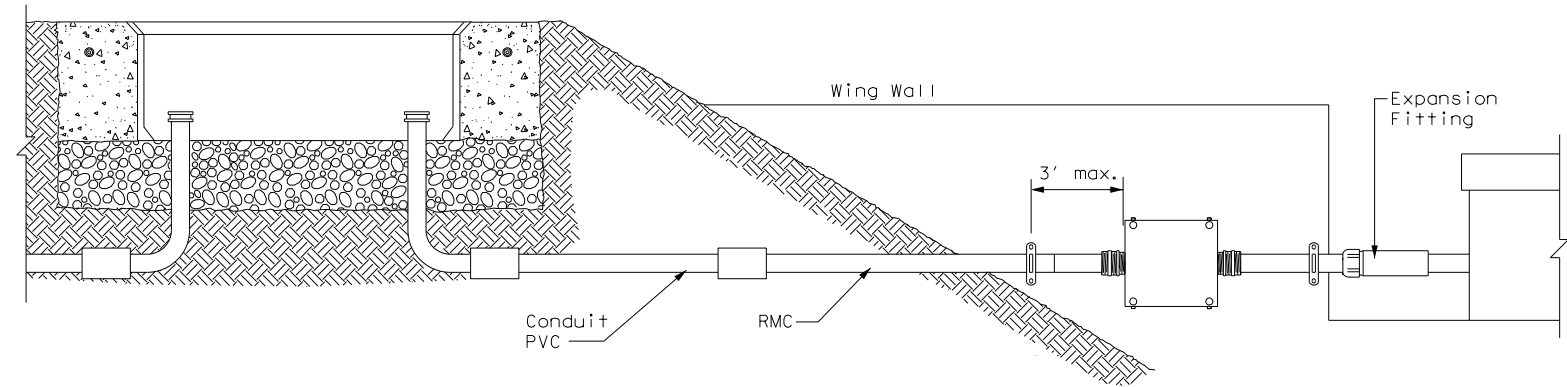
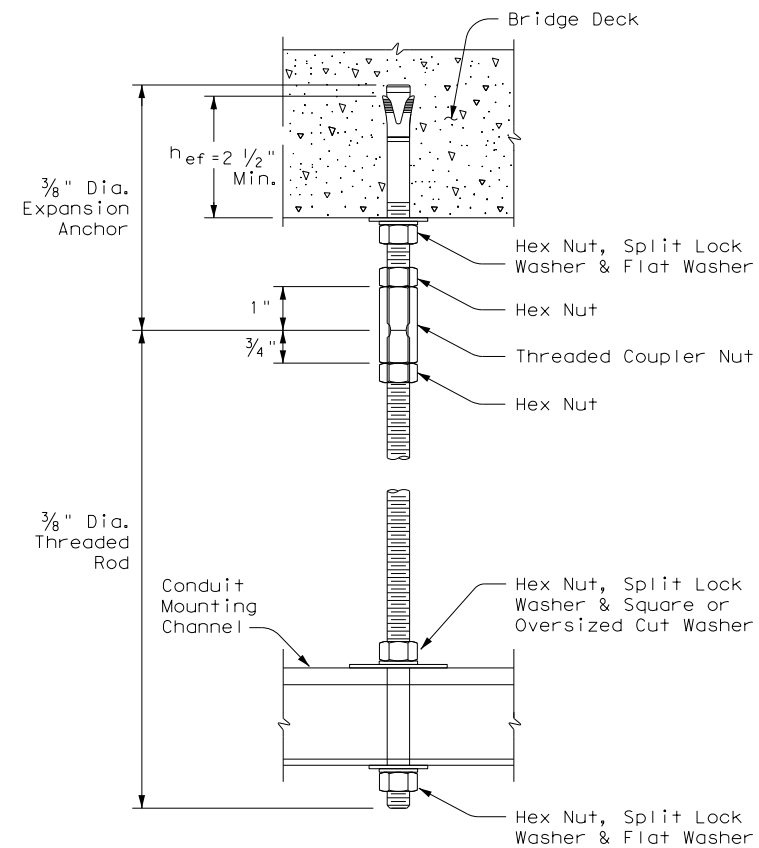
CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.



HANGER ASSEMBLY DETAIL

ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.
2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.
3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.
4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.
5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (h<sub>ef</sub>), as shown. Increase (h<sub>ef</sub>) as needed to ensure sufficient thread length for proper torquing and tightening of anchors.
6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (h<sub>ef</sub>). No lateral loads shall be introduced after conduit installation.

		<b>Traffic Operations Division Standard</b>	
<h2>ELECTRICAL DETAILS CONDUIT SUPPORTS</h2>			
<h3>ED(2) - 14</h3>			
FILE: ed2-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CONT: 0915	SECT: 14	JOB: 048
REVISIONS		HIGHWAY: NA	
DIST: SAT	COUNTY: WILSON	SHEET NO.: 53	

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

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

B. CONSTRUCTION METHODS

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

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

C. TEMPORARY WIRING

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

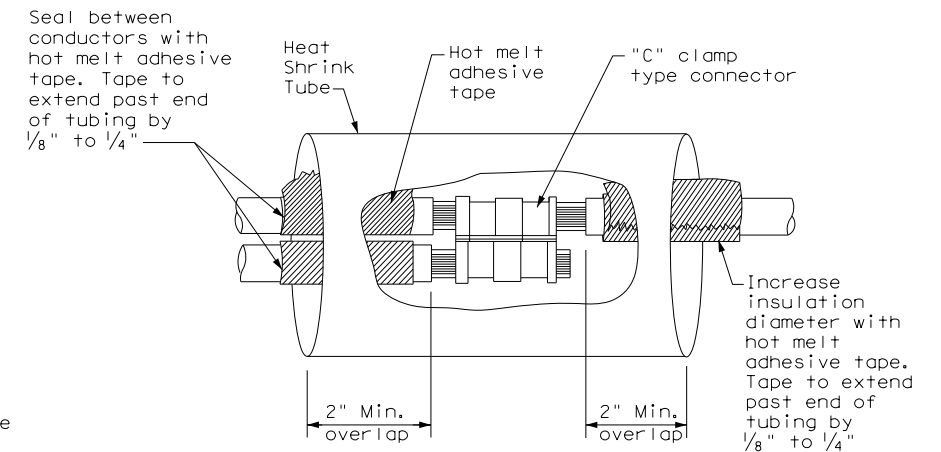
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

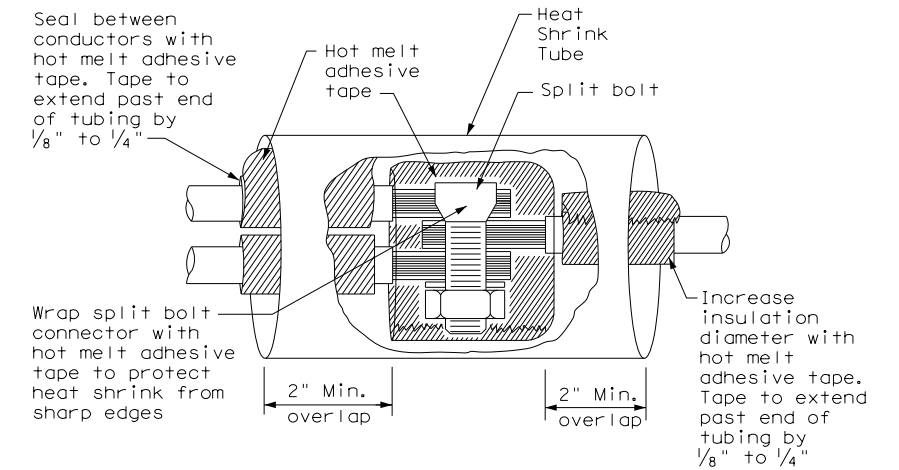
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in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

B. CONSTRUCTION METHODS

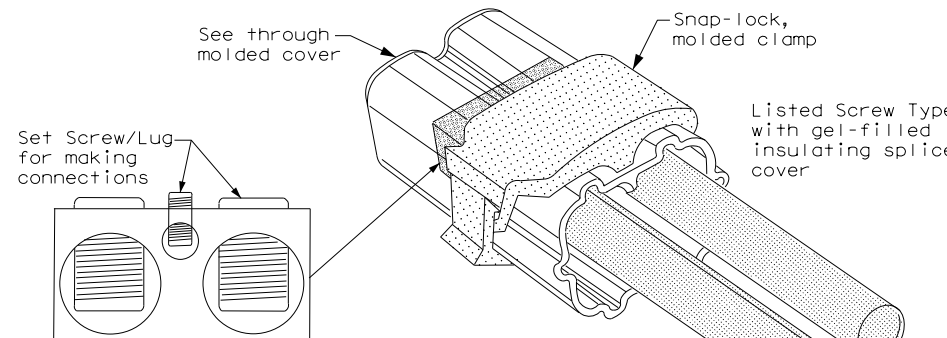
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil,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



SPLICE OPTION 1  
Compression Type



SPLICE OPTION 2  
Split Bolt Type



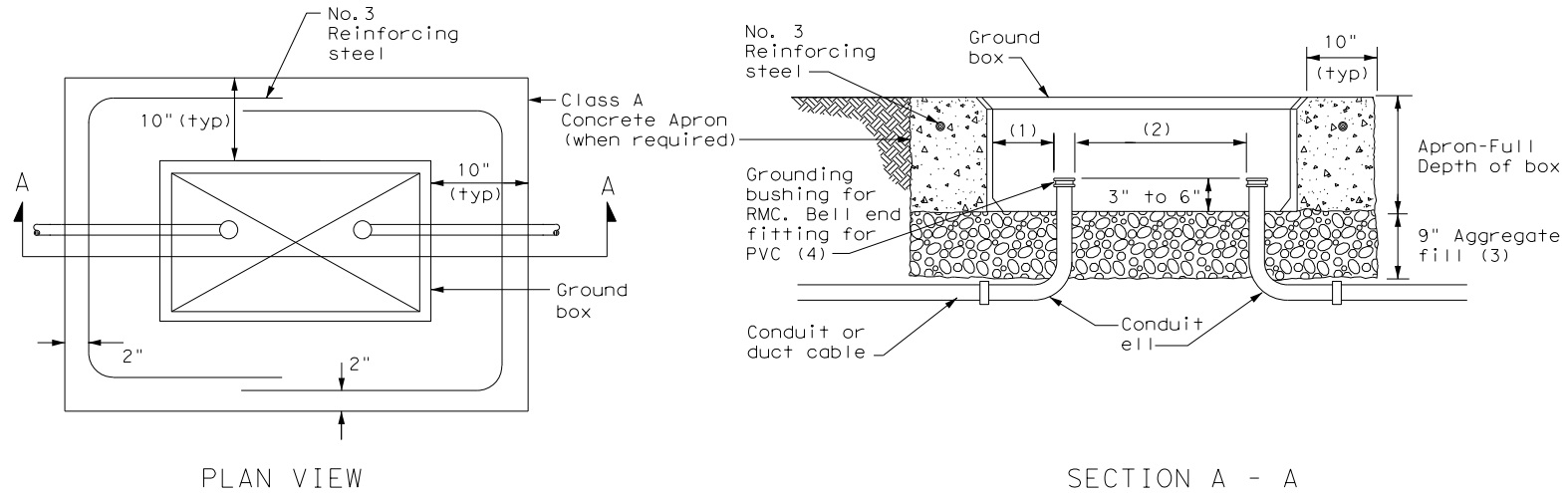
SPLICE OPTION 3  
Listed Screw Type

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<h2>ELECTRICAL DETAILS CONDUCTORS</h2>			
<h3>ED(3) - 14</h3>			
FILE: ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CON: 0915	SECT: 14	JOB: 048
REVISIONS	COUNTY: WILSON		SHEET NO.: 54

DATE: 4/6/2023 4:05:21 PM  
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APRON FOR GROUND BOX

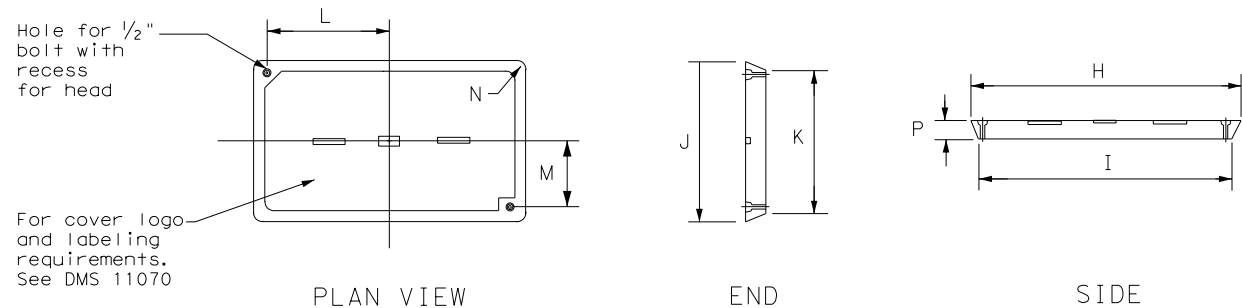
- (1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushing.
- (3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.
- (4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS

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

GROUND BOX COVER DIMENSIONS

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



GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

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

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

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.
2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.
3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.
4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.
5. Temporarily seal all conduits in the ground box until conductors are installed.
6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.
7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.
8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.
9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.
10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

				<b>Traffic Operations Division Standard</b>	
<h2>ELECTRICAL DETAILS</h2> <h3>GROUND BOXES</h3> <h4>ED(4) - 14</h4>					
FILE:	ed4-14.dgn	DN:	TxDOT	CK:	TxDOT
© TxDOT	October 2014	CONT:	0915	SECT:	14
REVISIONS		JOB:	048	HIGHWAY:	NA
DIST:		COUNTY:	WILSON	SHEET NO.:	55

ELECTRICAL SERVICES NOTES

- Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.
- Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.
- Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.
- Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
- The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.
- Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
- When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
- Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.
- All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.
- Provide rigid metal conduit (RMC) for all conduits on service, except for the 1/2 in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.
- Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.
- Ensure all mounting hardware and installation details of services conform to utility company specifications.
- For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
- When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.
- Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

- Provide threaded hub for all conduit entries into the top of enclosure.
- Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.
- Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.
- Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

- Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.
- When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

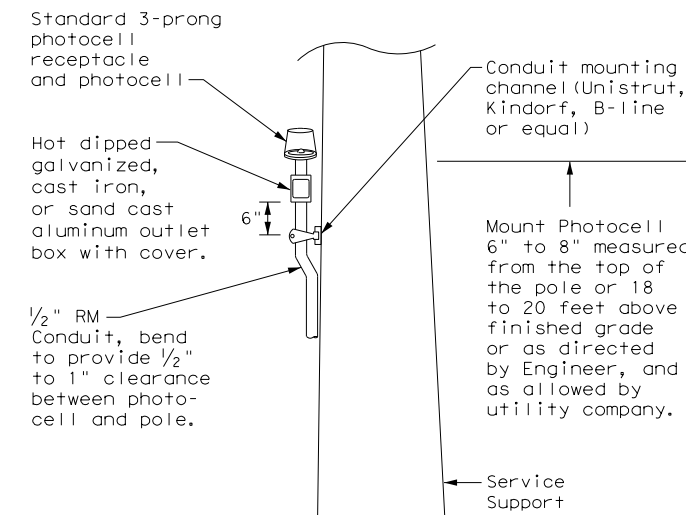
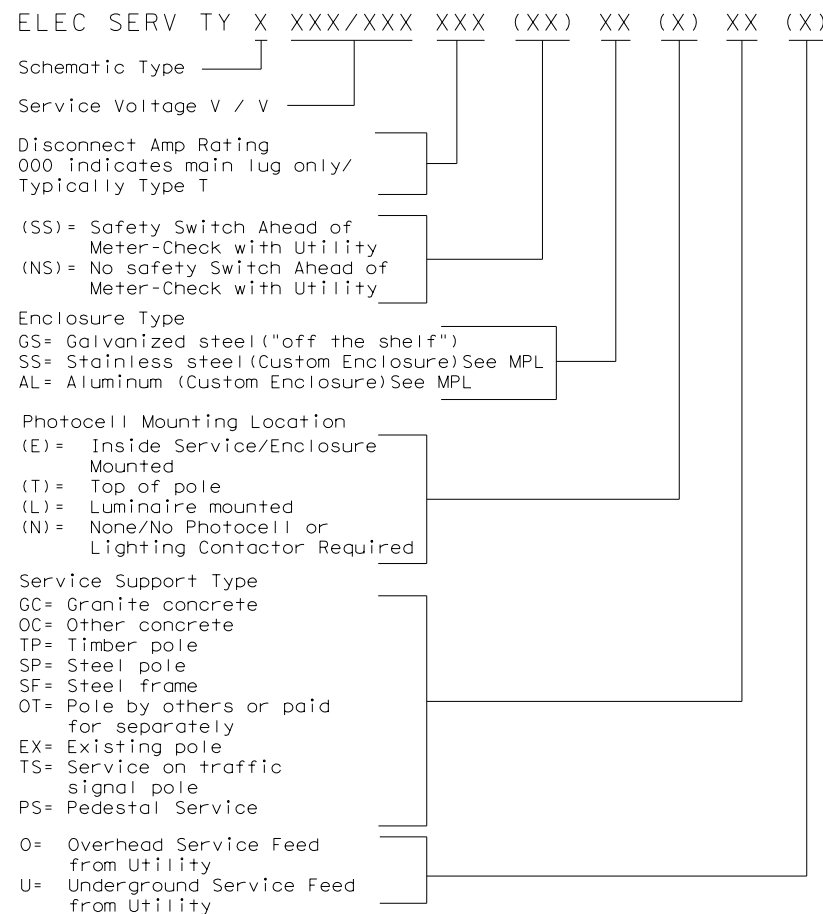
- Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

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

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

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

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE



TOP MOUNTED PHOTOCELL

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

Texas Department of Transportation  
Traffic Operations Division Standard

## ELECTRICAL DETAILS SERVICE NOTES & DATA

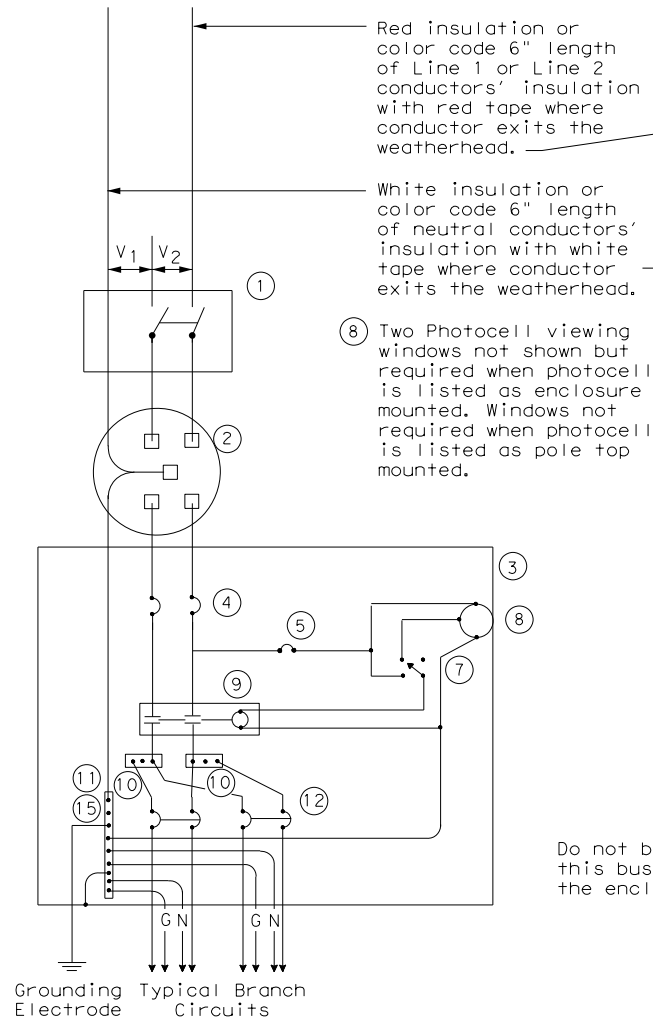
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© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS		0915	14	048	NA
	DIST	COUNTY		SHEET NO.	
	SAT	WILSON		56	

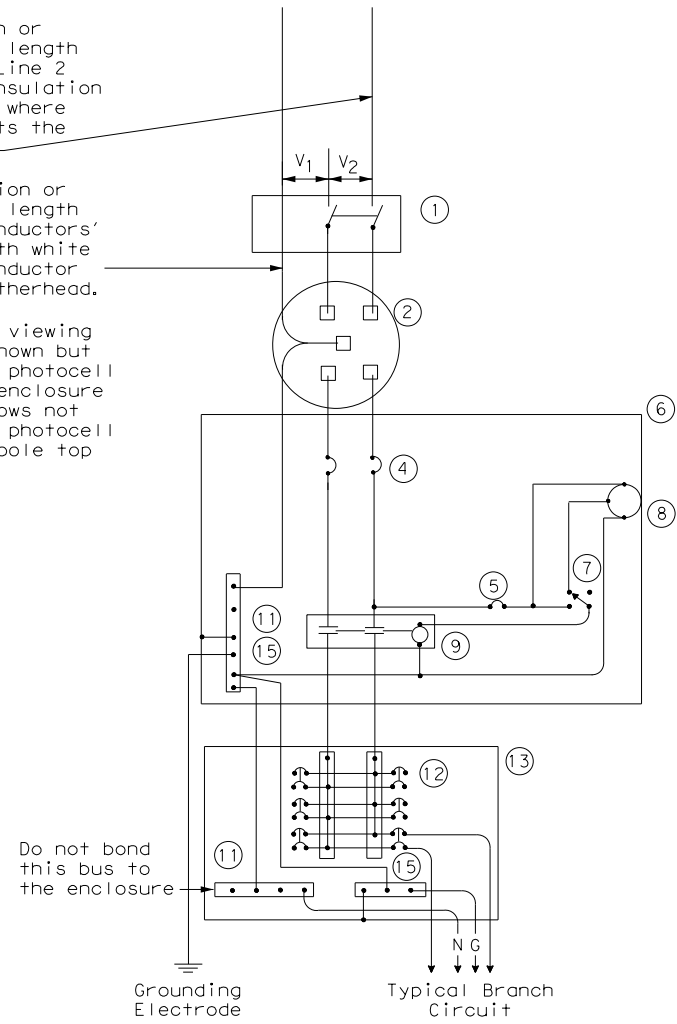
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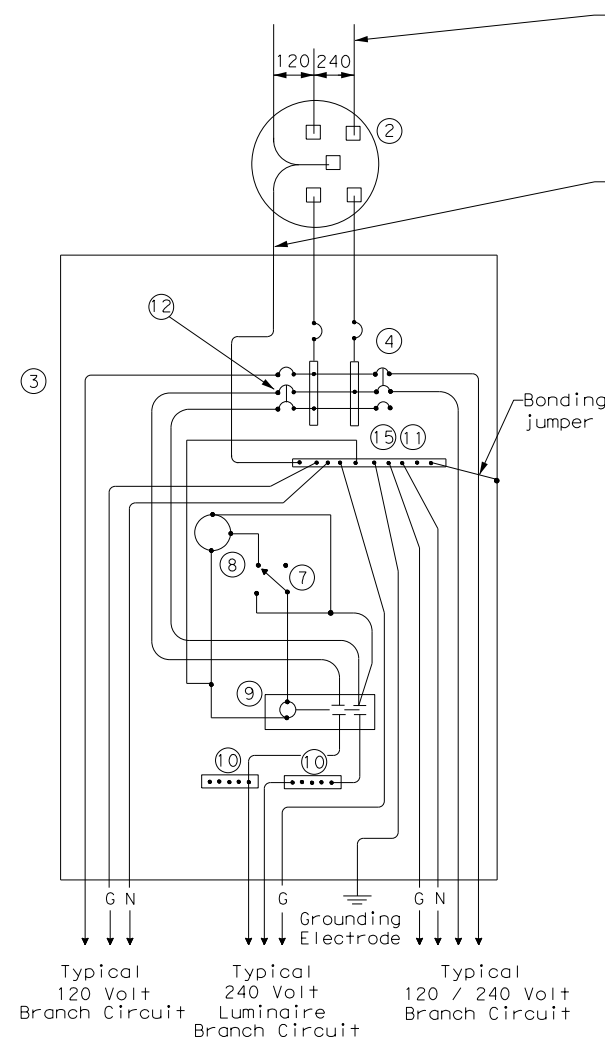
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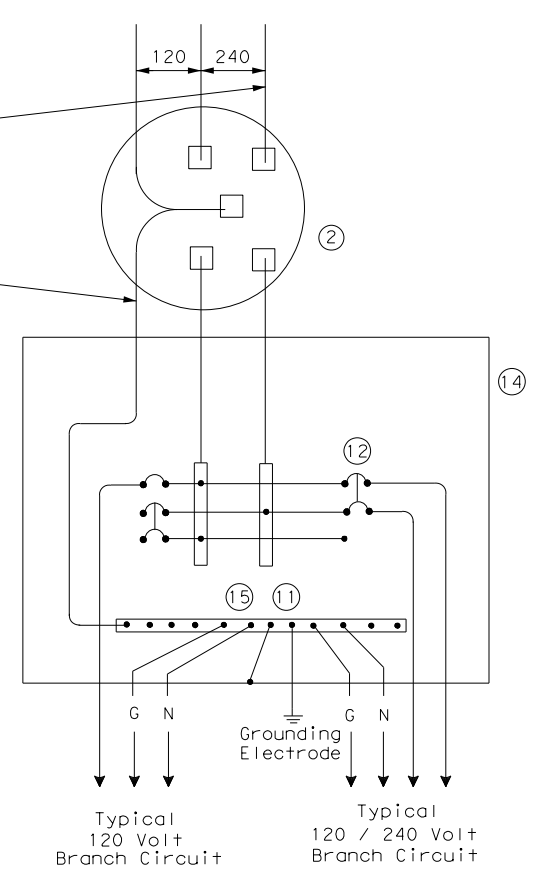
**SCHEMATIC TYPE A  
THREE WIRE**



**SCHEMATIC TYPE C  
THREE WIRE**



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



**SCHEMATIC TYPE T  
120/240 VOLTS - THREE WIRE**  
Galvanized steel - "Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

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

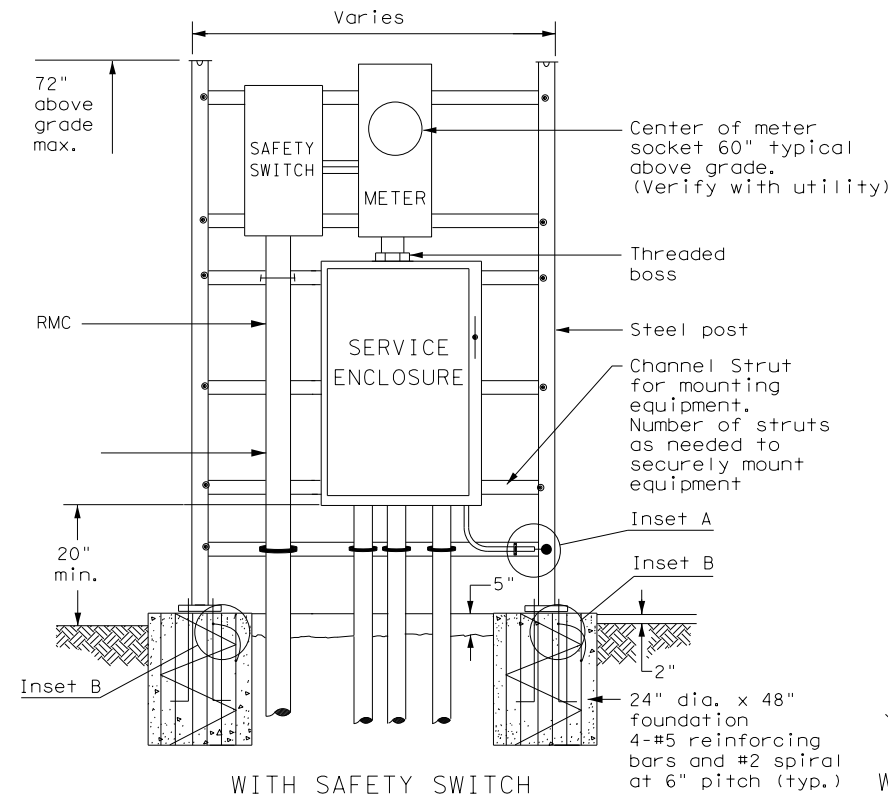
SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo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

				<b>Traffic Operations Division Standard</b>	
<b>ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES</b>					
<b>ED(6) - 14</b>					
FILE:	ed6-14.dgn	DN:	TxDOT	CK:	TxDOT
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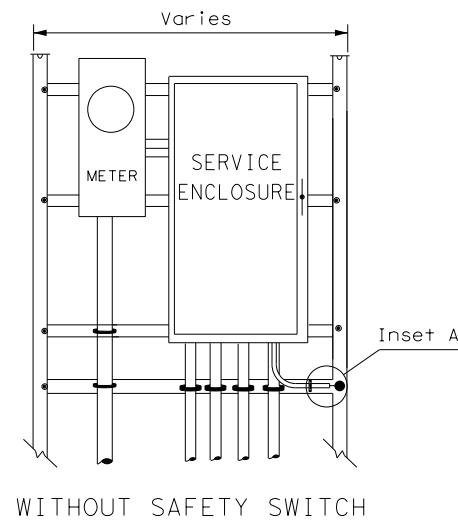
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**SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)**

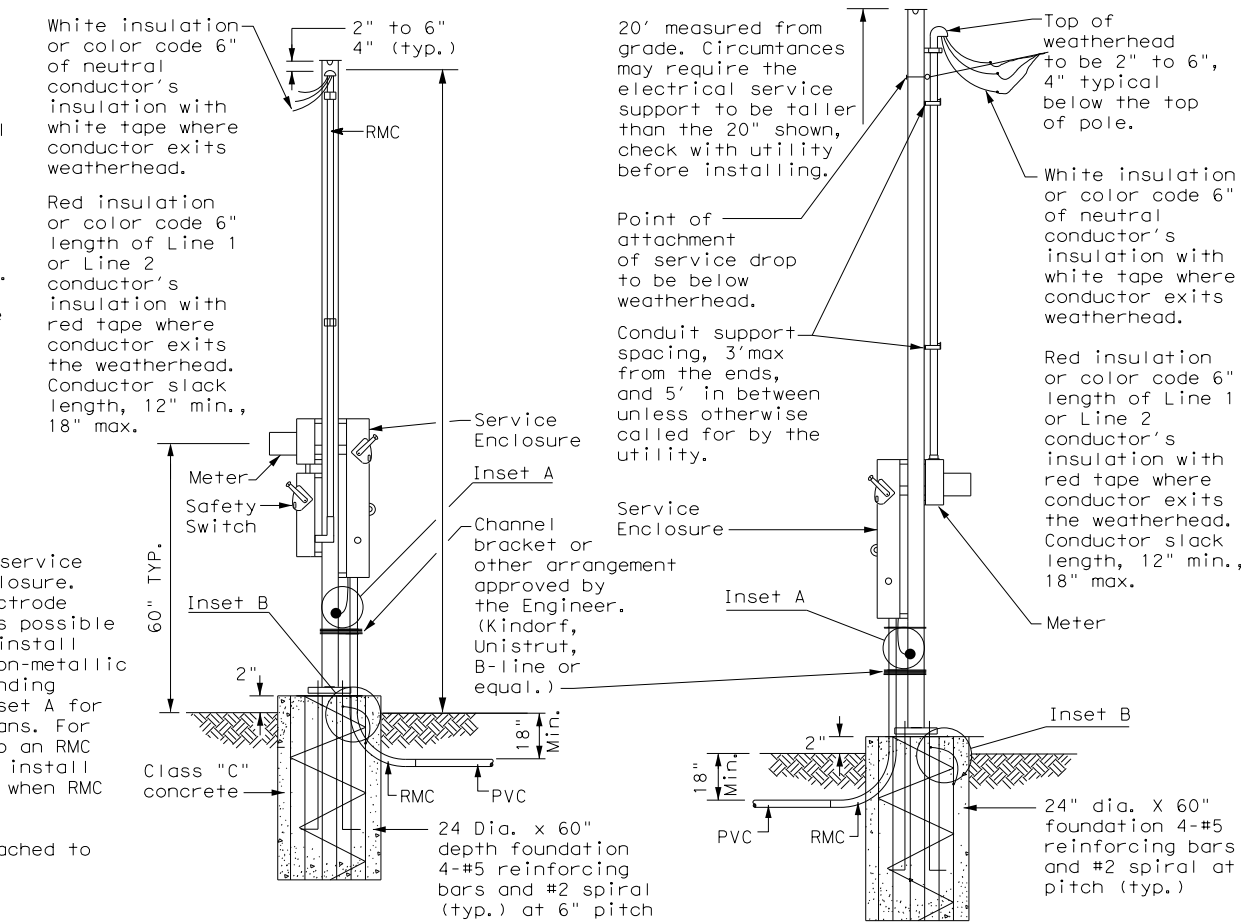
- Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 1/2 in. or 1 3/8 in. wide by 1 in. up to 3 3/4 in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.
- Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.
- Provide and install galvanized 3/4 in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized 3/4 in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 1/4 in. to 3 1/2 in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.
- Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.
- Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.
- Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.
- Drill and tap steel poles and frames for 1/2 in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.
- If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.
- Provide 1/4" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.
- Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.
- Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.



WITH SAFETY SWITCH  
FRONT VIEW  
SERVICE SUPPORT TYPE SF (U) - UNDERGROUND SERVICE

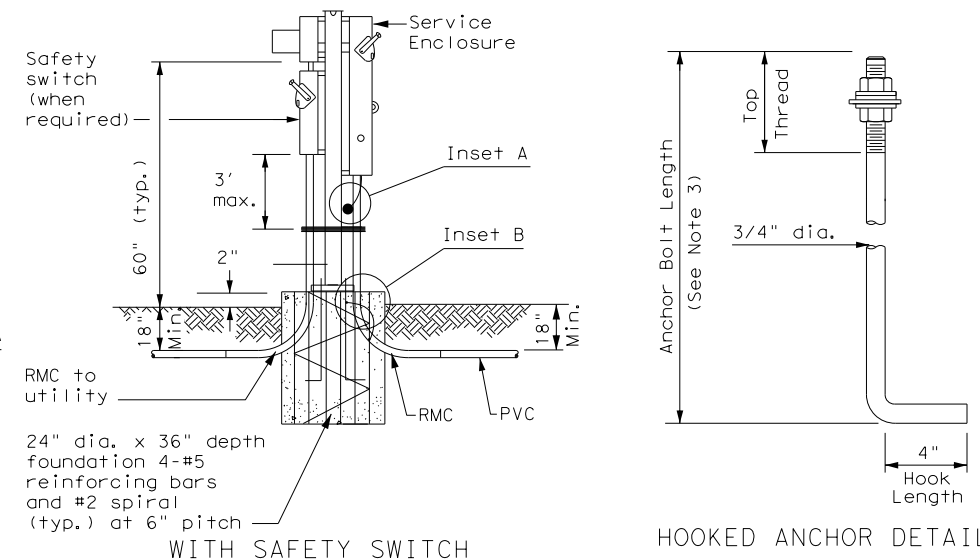
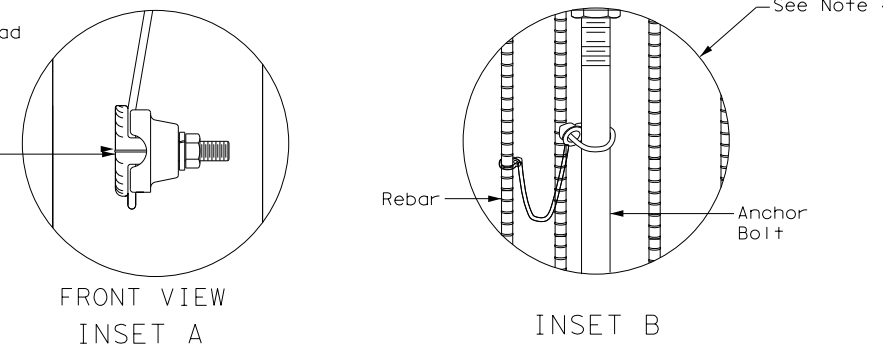


WITHOUT SAFETY SWITCH  
FRONT VIEW  
SERVICE SUPPORT TYPE SP (U) - UNDERGROUND SERVICE

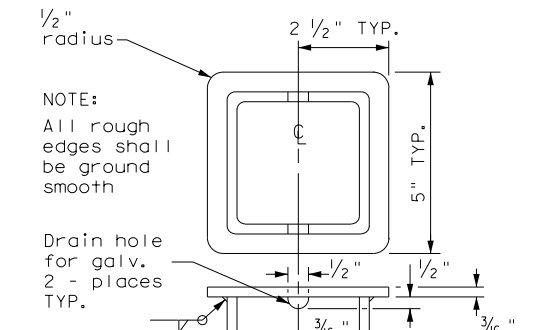


WITH SAFETY SWITCH  
WITHOUT SAFETY SWITCH  
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE

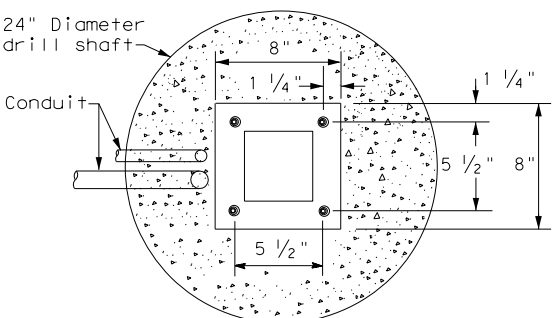
Drill, tap, and thread 1/2" X 13 UNC. Install tank ground fitting, connect electrical service grounding electrode conductor. See Note 7.



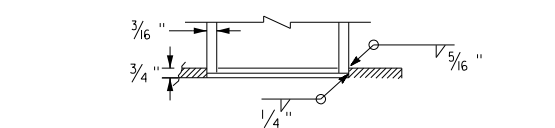
HOOKED ANCHOR DETAIL



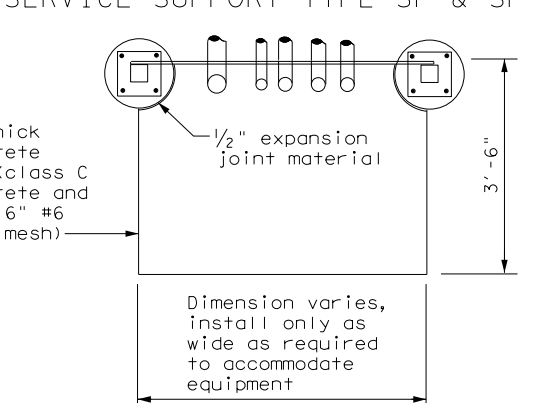
POLE TOP PLATE



BASE PLATE DETAIL



BOTTOM OF POLE



TOP VIEW  
SERVICE SUPPORT TYPE SF (O) & SF (U)

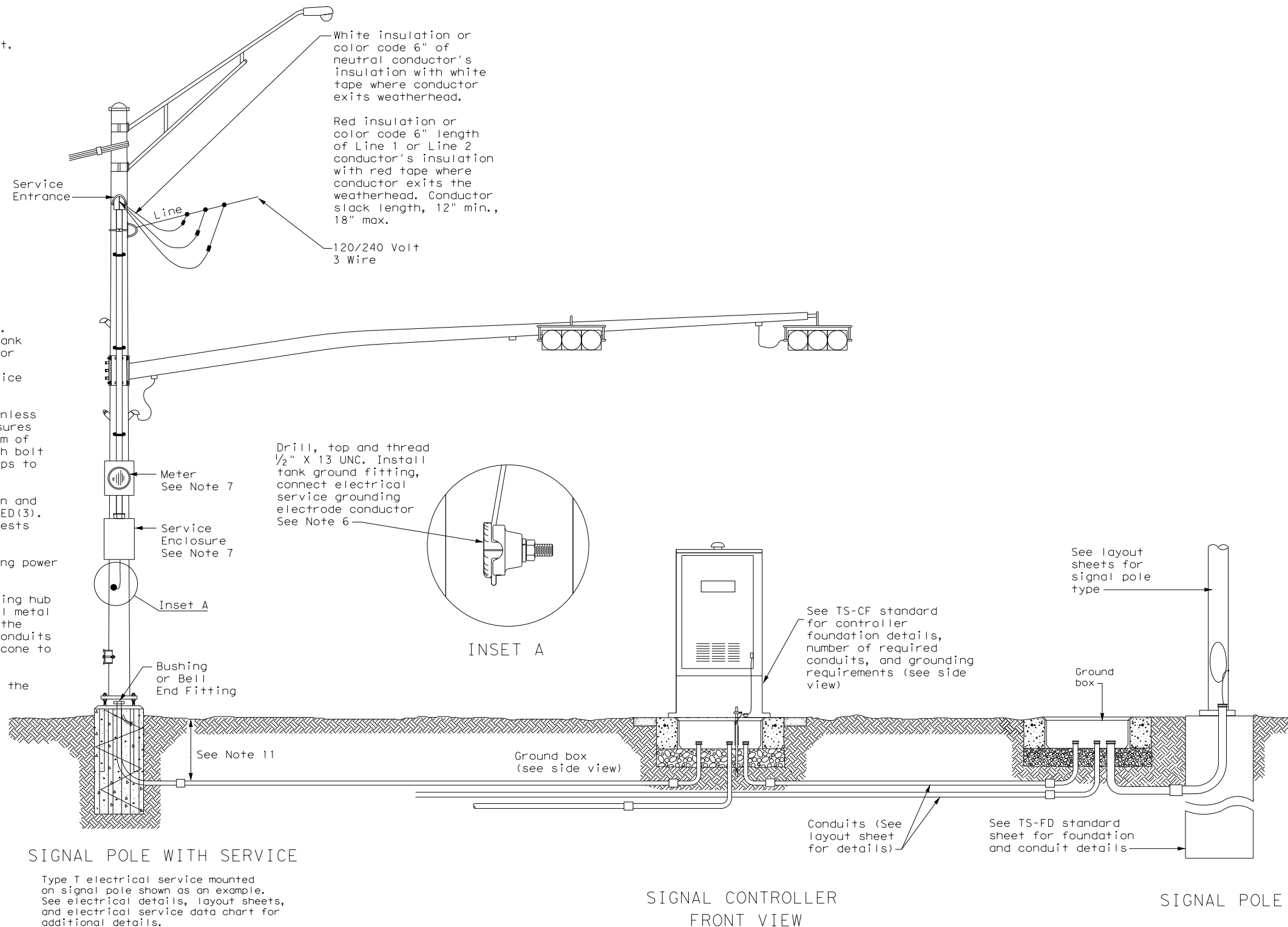
		<b>Traffic Operations Division Standard</b>	
<b>ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF &amp; SP ED(7) - 14</b>			
FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
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REVISIONS	DIST: SAT	COUNTY: WILSON	SHEET NO.: 58

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**TRAFFIC SIGNAL NOTES**

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

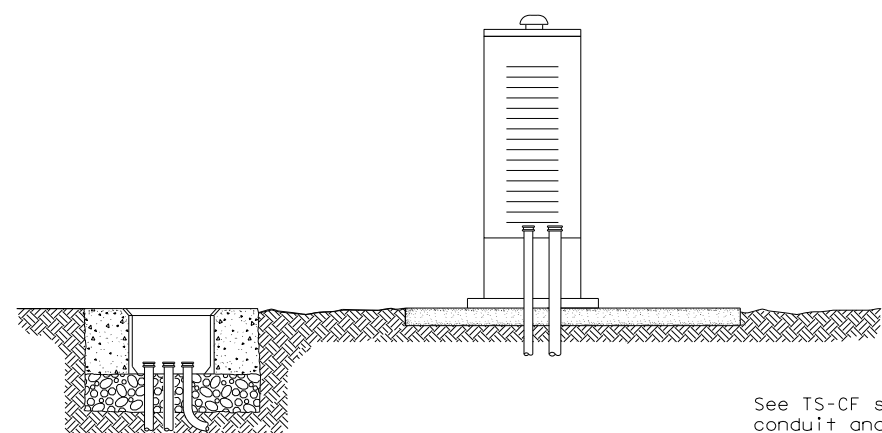


**SIGNAL POLE WITH SERVICE**

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

**SIGNAL CONTROLLER FRONT VIEW**

**SIGNAL POLE**



**SIGNAL CONTROLLER SIDE VIEW**

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

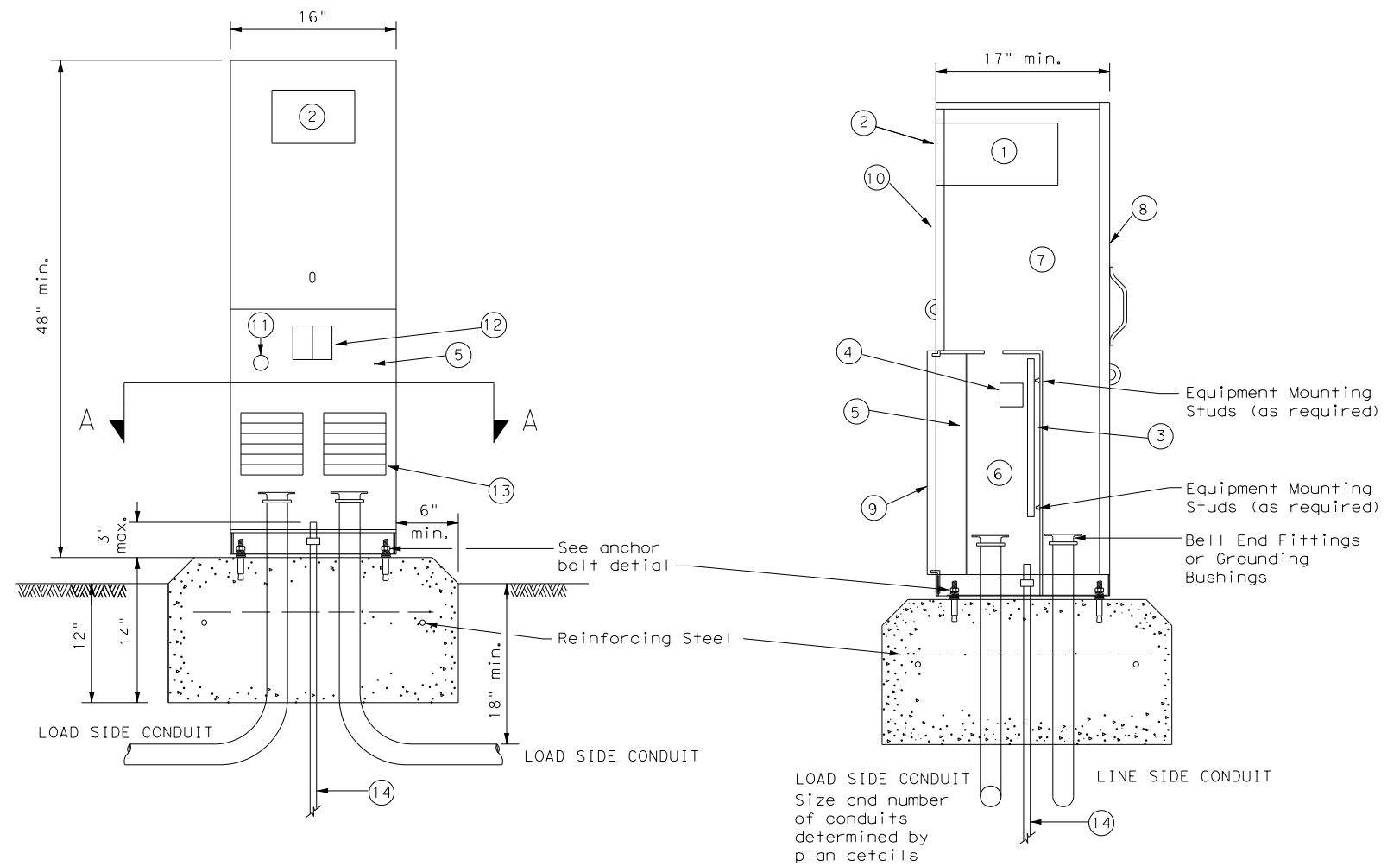
				<b>Traffic Operations Division Standard</b>	
<b>ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS</b>					
<b>ED(8) - 14</b>					
FILE:	ed8-14.dgn	DN:	TxDOT	CK:	TxDOT
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**PEDESTAL SERVICE NOTES**

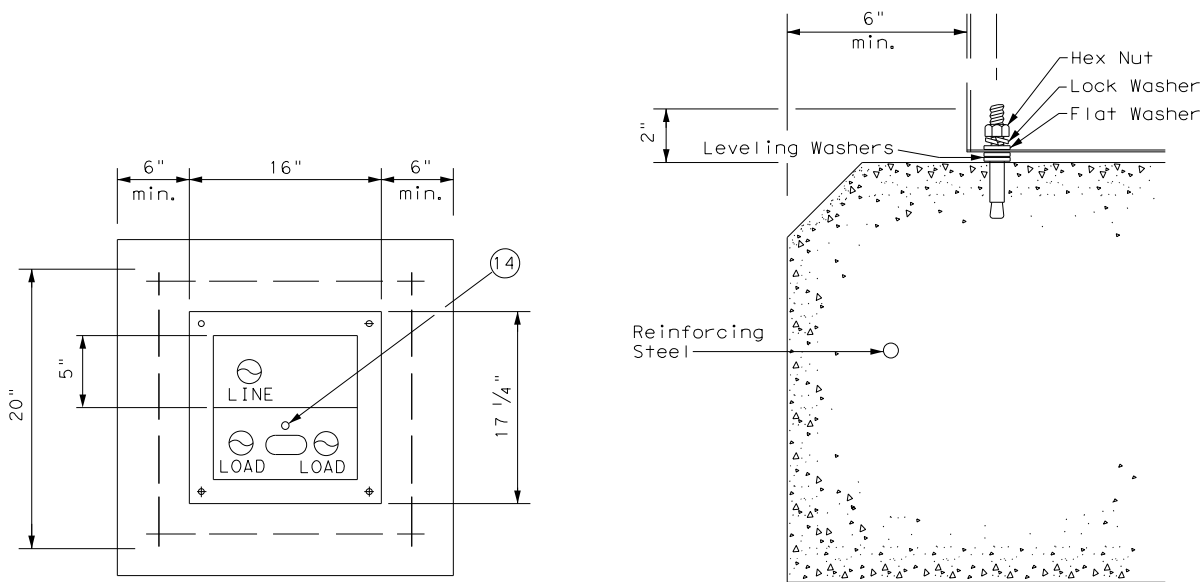
1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services." Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.
2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.
3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."
5. Install 1/2 in. X 2 1/16 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a 1/2 in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than 1/8 in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of 1/8 in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within 1/4 in. Repair rocking or movement of the service enclosure at no additional cost to the department.
7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.
8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.



**FRONT VIEW**

**SIDE VIEW**

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



**SECTION A-A**

**ANCHOR BOLT DETAIL**

**LEGEND**

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



**ELECTRICAL DETAILS  
ELECTRICAL SERVICE SUPPORT  
PEDESTAL SERVICE TYPE PS**

**ED(9) - 14**

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		DIST	COUNTY	SHEET NO.					
		SAT	WILSON	60					



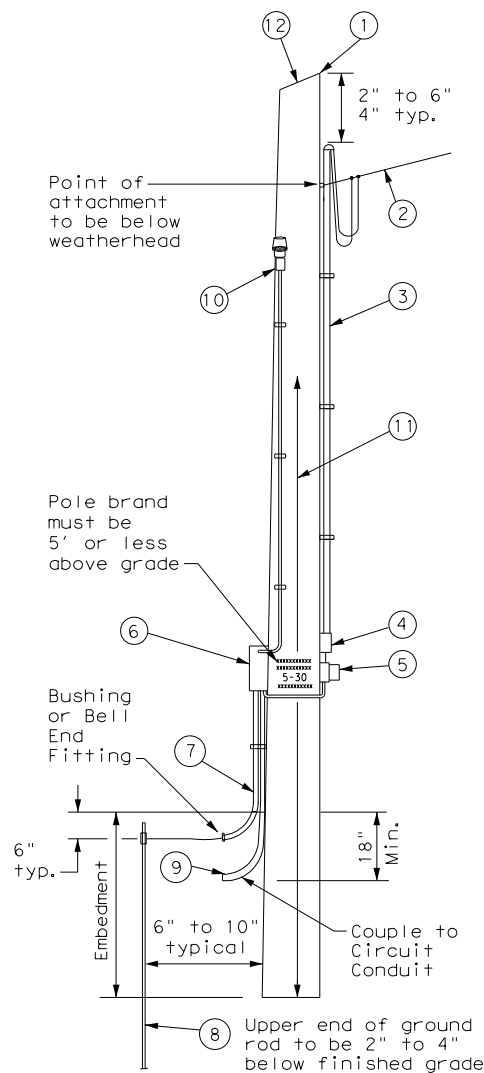
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**TIMBER POLE (TP) SERVICE SUPPORT NOTES**

1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrical service.
3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to 3/8 in. max. depth and 1 7/8 in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to 3 3/4 in. maximum depth, and 1 1/2 in. to 1 5/8 in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, 1/4 in. minimum diameter by 1 1/2 in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
6. When excess length must be trimmed from poles, trim from the top end only.

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

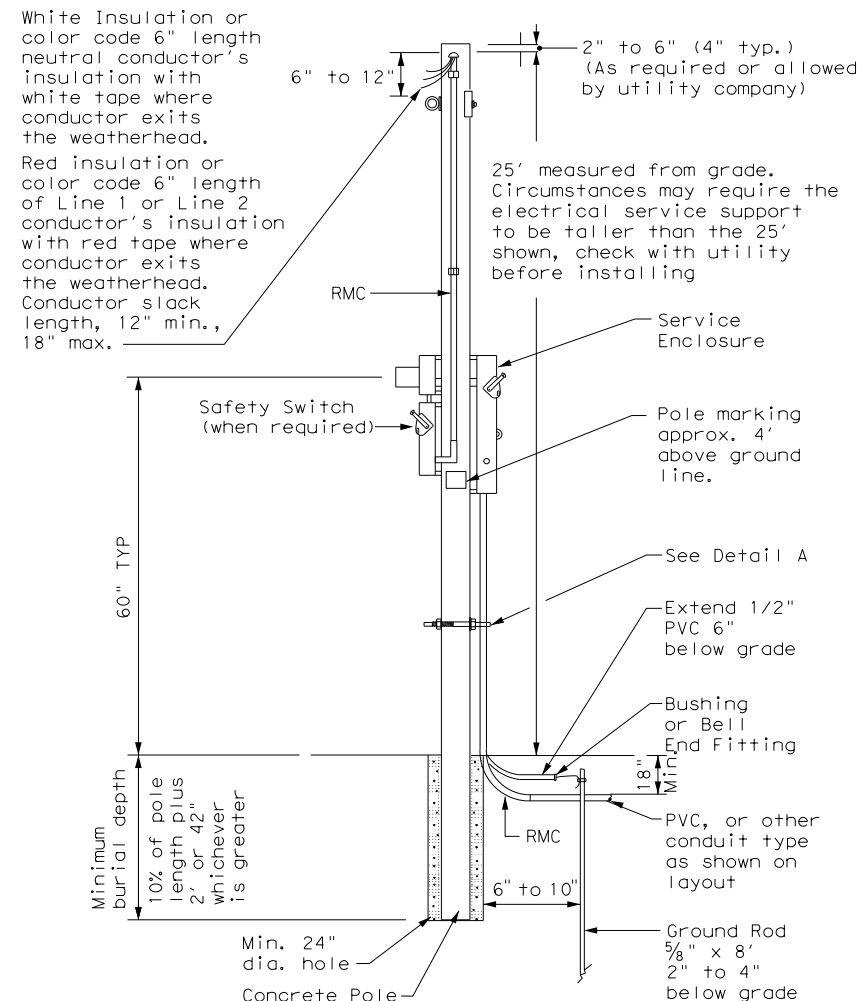


SERVICE SUPPORT TYPE TP (O)

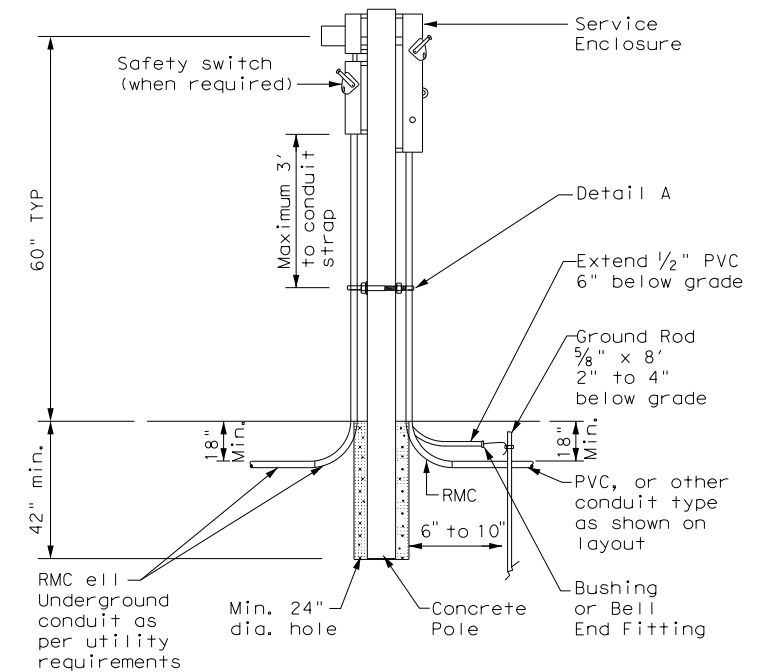
**GRANITE CONCRETE (GC) & OTHER CONCRETE (OC) NOTES**

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

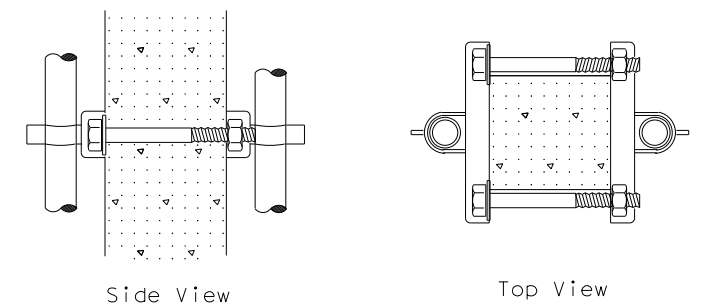
1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4"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



CONCRETE SERVICE SUPPORT Overhead (O)



CONCRETE SERVICE SUPPORT Underground (U)



DETAIL A

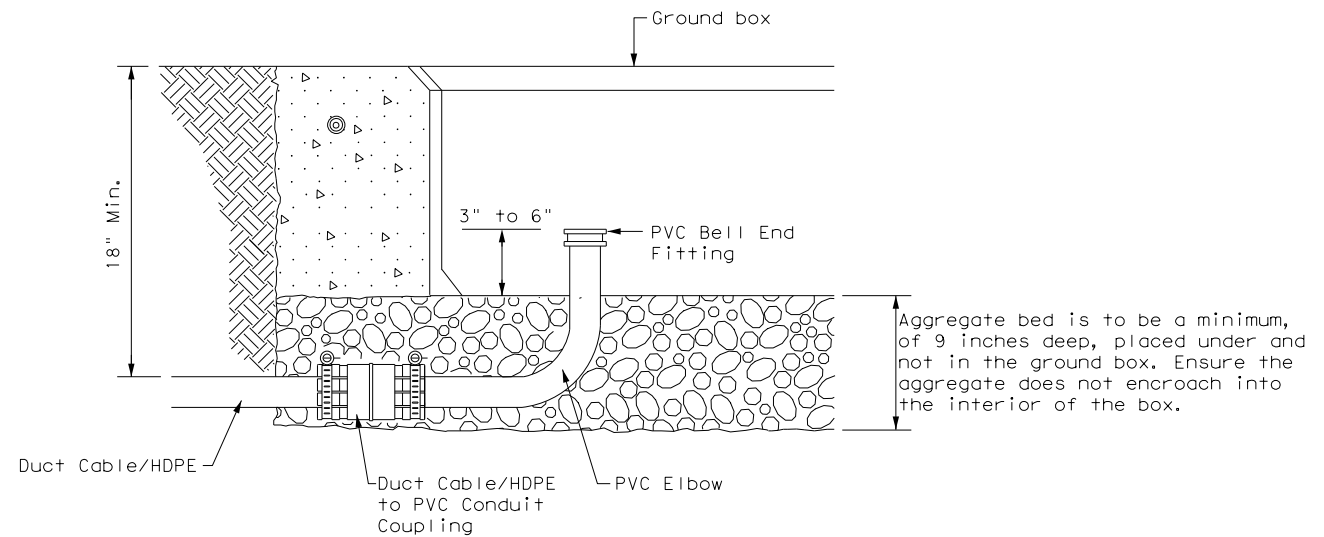
See Note 7. Before installing channel that has been cut, file sharp edges and paint with zinc-rich paint. Ensure there is no paint splatter on the pole.

		<b>Traffic Operations Division Standard</b>	
<b>ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, &amp; TP</b>			
<b>ED(10)-14</b>			
FILE: ed10-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
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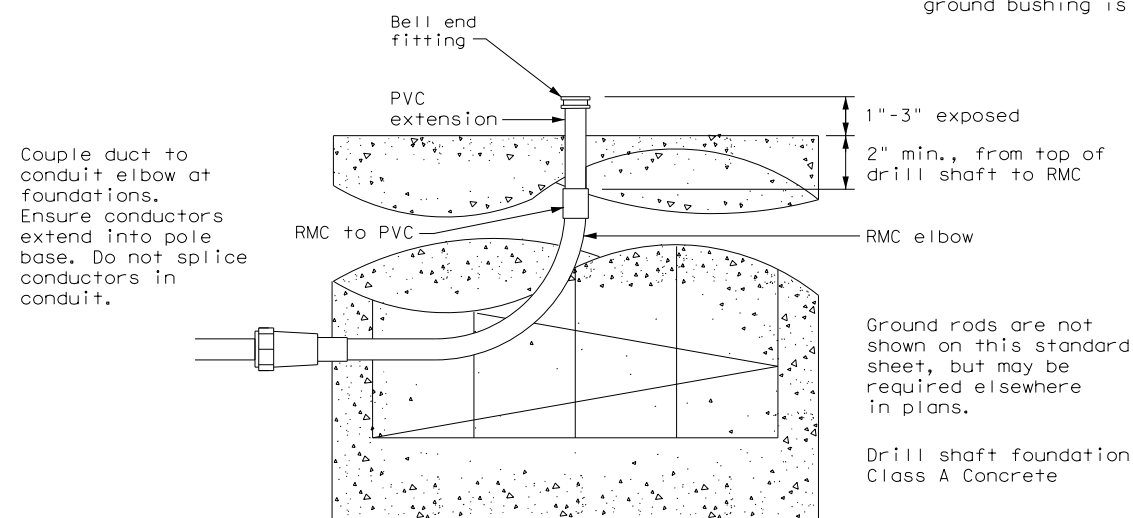
### DUCT CABLE & HDPE CONDUIT NOTES

- Provide duct cable in accordance with Departmental Material Specification (DMS) 11060 "Duct Cable" and Item 622 "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 622.
- Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS 11060 and Item 618, "Conduit." Provide HDPE as listed on the MPL on the Department web site under "Roadway Illumination and Electrical Supplies," Item 618.
- Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Bend duct cable and HDPE conduit as recommended by the manufacturer, with a minimum bending radius of 26 in. for 2 in. duct. Follow manufacturers' recommendations when handling duct cable and HDPE conduit reels and during installation of duct cable and HDPE conduit.
- Do not splice conductors within duct cable or HDPE conduit. Couple duct cable and HDPE entering a ground box or foundation to a PVC elbow. When galvanized steel RMC elbows are called for in the plans and any portion of the RMC elbow is buried less than 18" from possible contact, ground the RMC elbow.
- Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."
- When conduit casing is called for in the plans, extend duct cable or HDPE conduit through the conduit casing in one continuous length without connection to the casing.
- Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.
- Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.
- Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed coupling made of HDPE with stainless steel external banding clamps and locking rings; connected with approved electrofusion conduit couplings; or connected using an approved chemical fusion method using an epoxy or adhesive specifically designed for HDPE couplings and connectors all installed in accordance with their manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.



DUCT CABLE/HDPE AT GROUND BOX

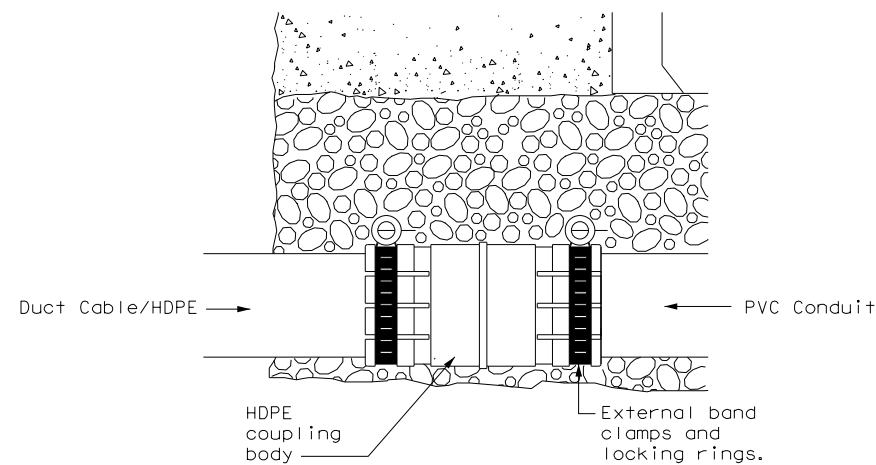
When the upper end of an RMC EII does not enter the ground box, it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18" of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.



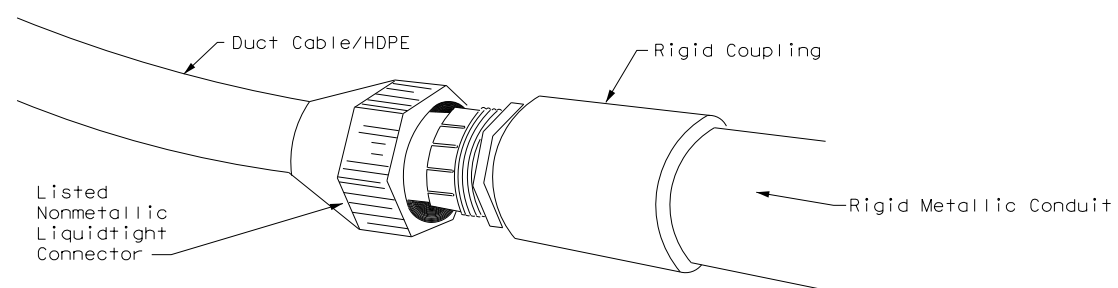
DUCT CABLE / HDPE AT FOUNDATION

Ground rods are not shown on this standard sheet, but may be required elsewhere in plans.

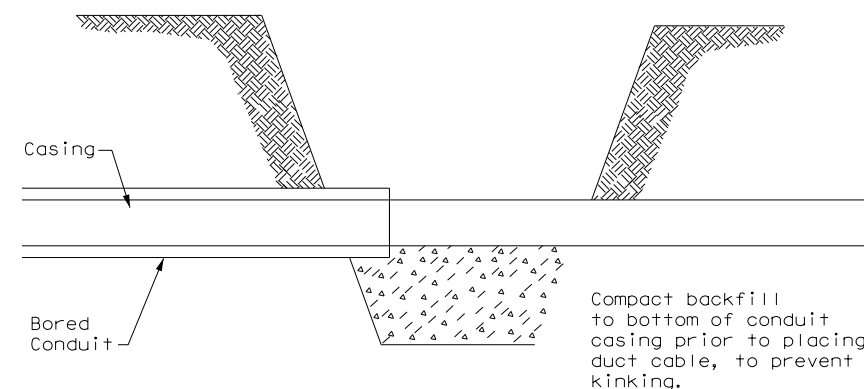
Drill shaft foundation Class A Concrete



DUCT CABLE/HDPE TO PVC



DUCT CABLE/HDPE TO RMC



BORE PIT DETAIL

				<b>Traffic Operations Division Standard</b>	
<b>ELECTRICAL DETAILS DUCT CABLE/ HDPE CONDUIT</b>					
<b>ED(11)-14</b>					
FILE: ed11-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
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REVISIONS	0915	14	048	NA	
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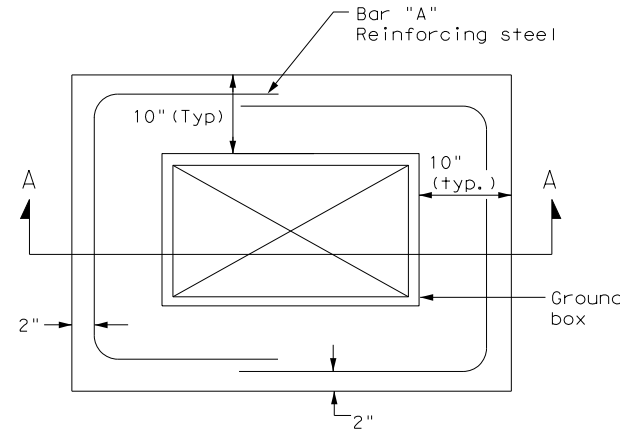
**BATTERY BOX GROUND BOXES NOTES**

**A. MATERIALS**

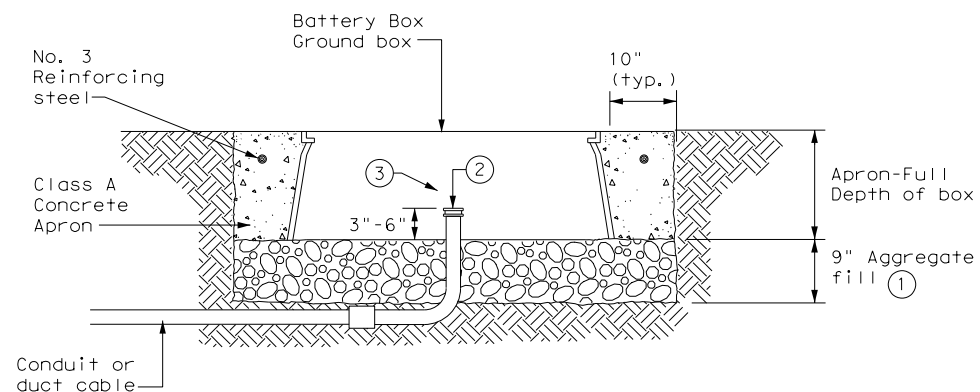
1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.
2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

**B. CONSTRUCTION METHODS**

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.
3. Cast battery box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.
4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



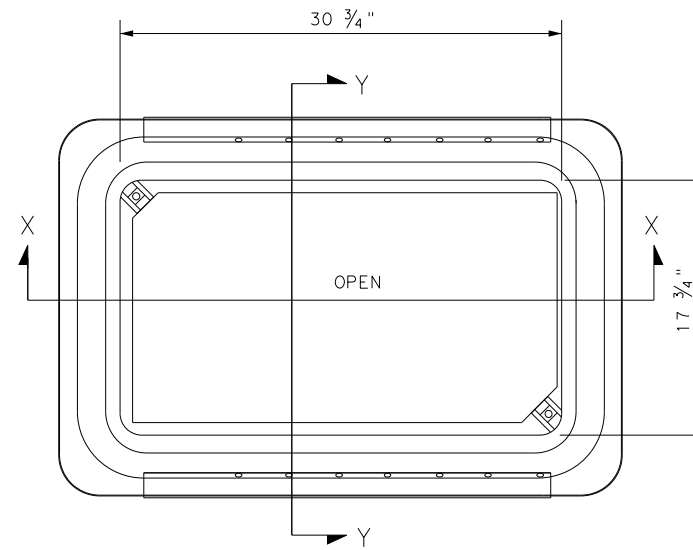
PLAN VIEW



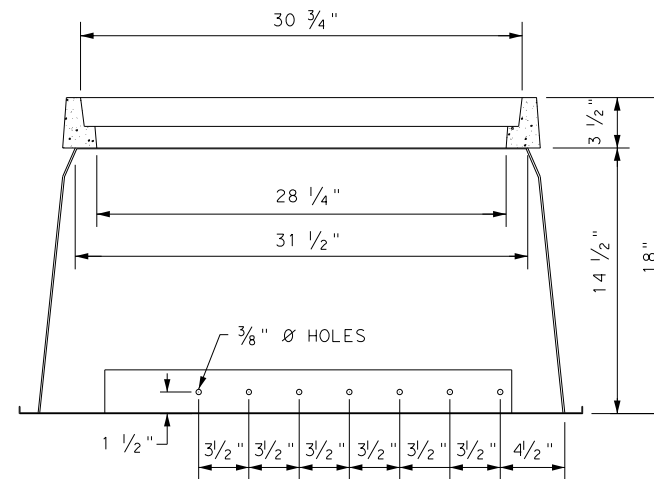
SECTION A - A

**APRON FOR BATTERY BOX GROUND BOXES**

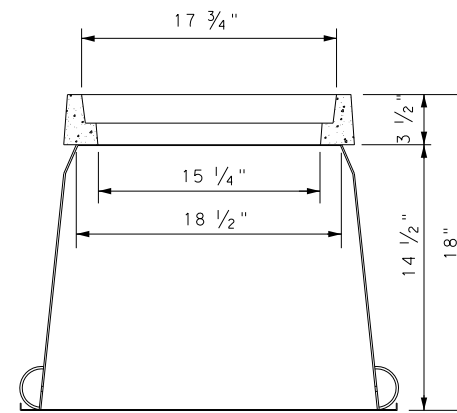
- ① Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.
- ② Install bushing or bell end fitting on the upper end of all elbows.
- ③ Install all conduits in a neat and workmanlike manner.



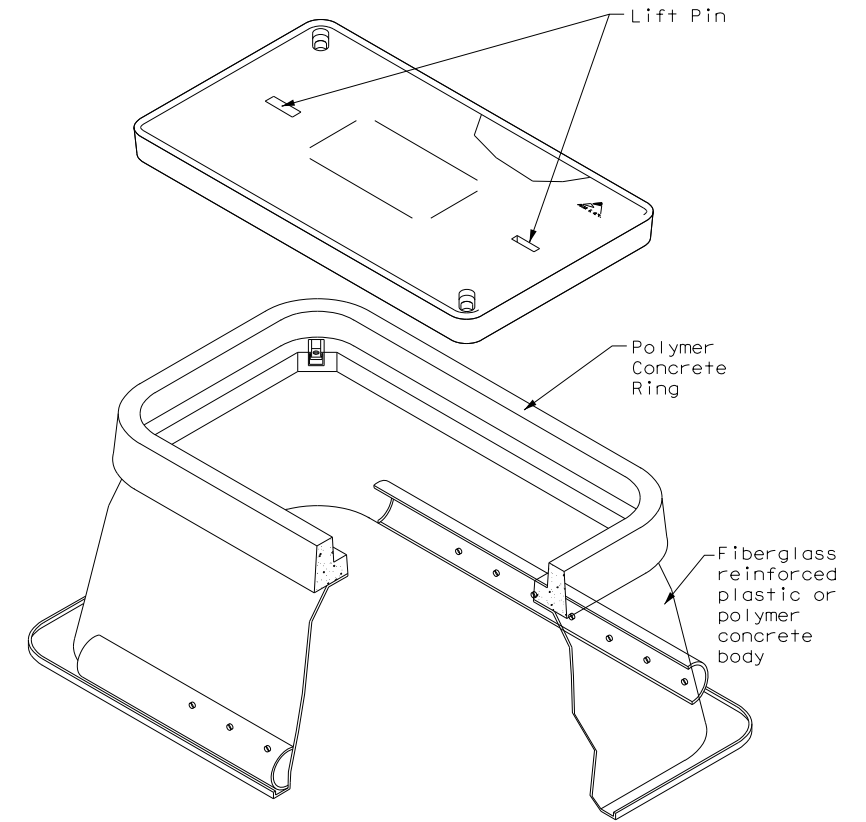
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



		<b>Traffic Operations Division Standard</b>	
<b>ELECTRICAL DETAILS BATTERY BOX GROUND BOXES</b>			
<b>ED(12)-14</b>			
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# ROADWAY ILLUMINATION ASSEMBLY NOTES

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1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.
2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.
3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.
4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.
5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.
  - a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.
  - b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, provide poles meeting the following requirements:
    - i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).
    - ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.
6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.
7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.
8. Install T-Base with following procedure:
  - a. Anchor Bolt Tightening.
    - i. Coat the threads of the anchor bolts with electrically conductive lubricant.
    - ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.
    - iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.
    - iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.
    - v. Check top of T-base for level. If not level then foundation must be leveled.
  - b. Top Bolt Procedure
    - i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

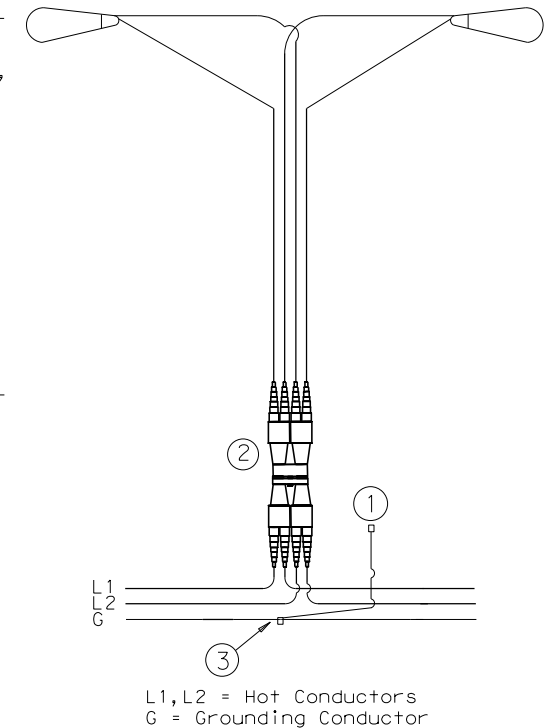
- ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."
  - iii. Tighten each nut to 150 ft-lb. using a torque wrench.
- c. Level and Plumb
  - i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.
9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).
10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.
11. Mount luminaires on arms level as shown by the luminaire level indicator.
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

## Wiring Diagram Notes:

- ① Use 1/2 in. -13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.
- ② Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.
- ③ Split Bolt or other connector.

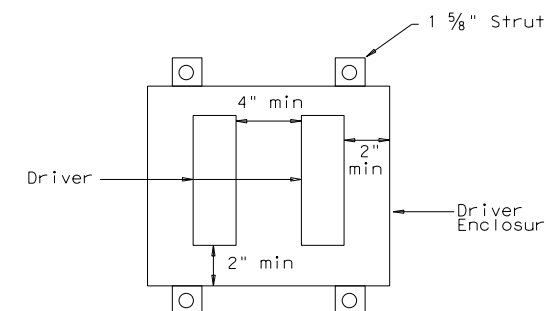
## Decorative LED Lighting Notes:

1. LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):
  - a. Provide NEMA 3R outdoor enclosure or as approved.
  - b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.
  - c. Install drivers with at least 2 inches of space from enclosure walls.
  - d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment
  - e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.
  - f. Provide remote drivers with a maximum of 100 watts
  - g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



## TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

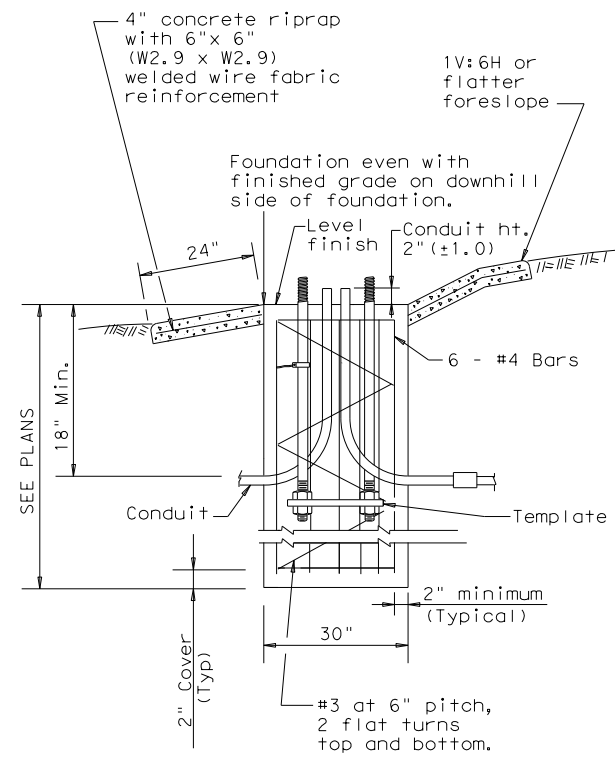


Driver Spacing In Remote Enclosure

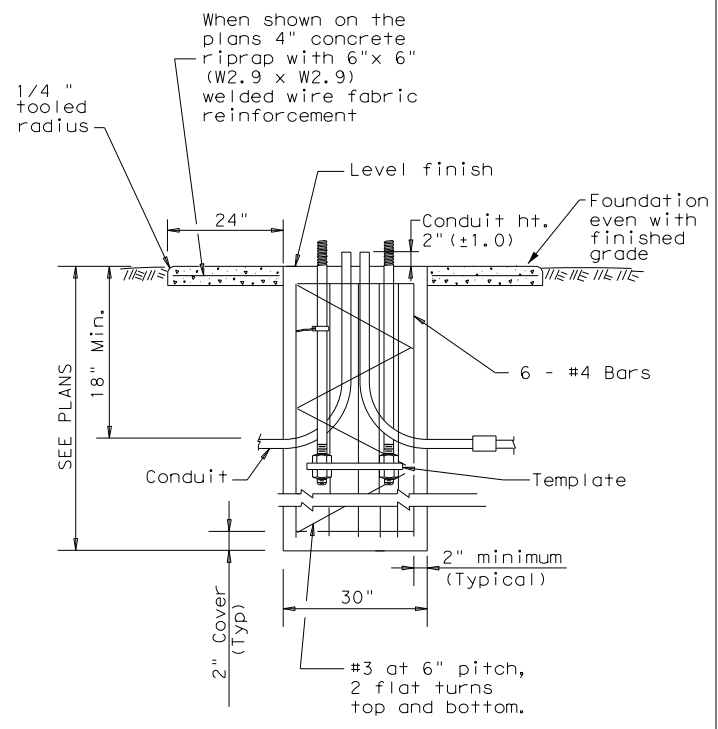
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<h2>ROADWAY ILLUMINATION DETAILS</h2> <h3>RID(1)-20</h3>					
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© TxDOT January 2007		CONT	SECT	JOB	HIGHWAY
REVISIONS		0915	14	048	NA
7-17		DIST	COUNTY		SHEET NO.
12-20		SAT	WILSON		64
72A					

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**SECTION A-A**  
SHOWING SLOPED GRADE



**SECTION A-A**  
SHOWING CONSTANT GRADE

**TABLE 1**  
ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
< 40 ft.	13 in.	14 in.	1 in. x 30 in.
40-50 ft.	15 in.	17 1/4 in.	1 1/4 in. x 30 in.

**TABLE 2**  
RECOMMENDED FOUNDATION LENGTHS (See note 1)

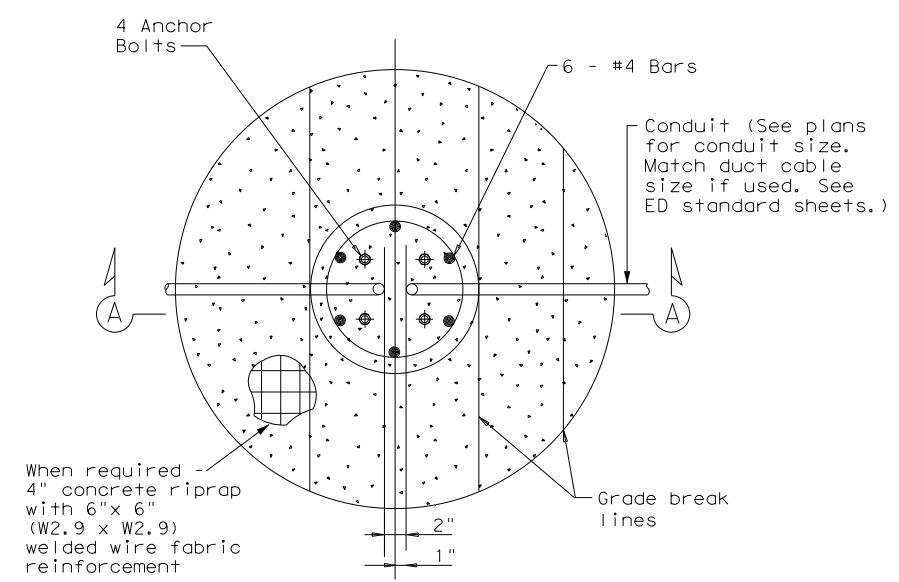
MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
< 20 ft.	6'	6'	6'
> 20 ft. to 30 ft.	8'	6'	6'
> 30 ft. to 40 ft.	8'	8'	6'
> 40 ft. to 50 ft.	10'	8'	6'

**TABLE 3**  
PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)

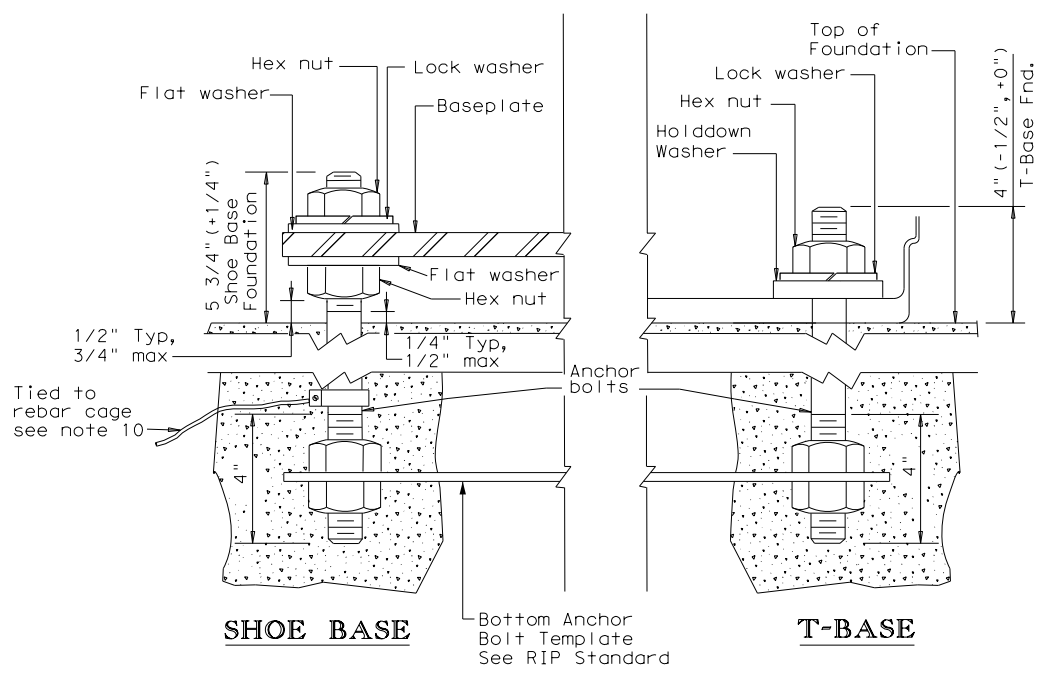
Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

**GENERAL NOTES:**

- "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
- Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
- Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
- Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the Department.
- Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
- Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
- Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
- Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
- Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
- Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
- Grade earthwork around T-base foundations even with the finished grade as shown in Section A-A to ensure proper function of the breakaway device. Use riprap on T-base foundations that are located on sloped grades, and as shown on the plans for level grades.



**FOUNDATION DETAIL**



**ANCHOR BOLT DETAIL**

**TABLE 4**  
BREAKAWAY POLE PLACEMENT (See note 6)

ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

\* or as close to ROW line as is practical  
 \*\* provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.



**ROADWAY ILLUMINATION DETAILS (RDWY ILLUM FOUNDATIONS) RID(2) - 20**

FILE: rid2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
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1-11	DIST	COUNTY	SHEET NO.	
7-17	SAT	WILSON	65	
12-20				

Plotted on: \$DATE\$

Design Filename: \$FILE\$.DWG

## MATERIALS SCHEDULE

### FLATWORK

KEY	DESCRIPTION /MODEL NUMBER	COLOR	FINISH	REMARKS
F1	STANDARD CLASS 'A' CONCRETE	STANDARD	HEAVY SANDBLAST	<ul style="list-style-type: none"> <li>CONTRACTOR TO SUBMIT PRODUCT DATA FOR CONCRETE AND BASE FOR LANDSCAPE ARCHITECT'S APPROVAL PRIOR TO INSTALLATION.</li> <li>CONTRACTOR TO PROVIDE IN PLACE MOCKUP FOR APPROVAL BY LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION</li> </ul>
F2	2" DEPTH OKLAHOMA PATIO STONE	NATURAL	NATURAL	<ul style="list-style-type: none"> <li>CONTRACTOR TO SUBMIT PRODUCT DATA FOR LANDSCAPE ARCHITECT'S APPROVAL PRIOR TO INSTALLATION.</li> <li>CONTRACTOR TO PROVIDE 5' x 5' MOCKUP FOR APPROVAL BY LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION</li> </ul>
F3	2"D X 2L X 1"W CHOPPED LIMESTONE BANDING AT TRAILHEAD GATEWAYS	BEIGE/CREAM	CHOPPED	<ul style="list-style-type: none"> <li>CONTRACTOR TO SUBMIT PRODUCT DATA FOR LANDSCAPE ARCHITECT'S APPROVAL PRIOR TO INSTALLATION.</li> <li>CONTRACTOR TO PROVIDE 5' x 5' MOCKUP FOR APPROVAL BY LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION</li> </ul>
F4	DECOMPOSED GRANITE - 1" MINUS	TANS	NATURAL	<ul style="list-style-type: none"> <li>CONTRACTOR TO SUBMIT PRODUCT SAMPLE AND DATA FOR LANDSCAPE ARCHITECT'S APPROVAL PRIOR TO INSTALLATION.</li> </ul>

### MISCELLANEOUS

C1	VICTOR STANLEY TRASH & RECYCLE: SAGE (SGE-365A) TRASH RECEPTACLE, SIDE DOOR OPENINGS WITH PERFORATED STEEL PANELS (ONE WITH TRASH LABEL AND ONE WITH BOTTLES/CANS RECYCLE LABEL AT EACH GATEWAY) OR APPROVED EQUIVALENT	BRONZE	N/A	<ul style="list-style-type: none"> <li>CONTRACTOR TO SUBMIT PRODUCT DATA AND SAMPLE FOR LANDSCAPE ARCHITECT'S APPROVAL PRIOR TO INSTALLATION</li> <li>INSTALL PER MANUFACTURER'S RECOMMENDATIONS</li> </ul>
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### VEGETATION

	WILDFLOWER SEED MIX: HYDROMULCH NATIVE AMERICAN SEED THUNDER TURF (50%) AND COMANCHE MIX (50%) OR APPROVED EQUIVALENT	N/A	N/A	<ul style="list-style-type: none"> <li>CONTRACTOR TO SUBMIT PRODUCT DATA AND SAMPLE FOR LANDSCAPE ARCHITECT'S APPROVAL PRIOR TO INSTALLATION</li> <li>INSTALL PER MANUFACTURER'S RECOMMENDATIONS</li> </ul>
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### LEGEND

E.J.	EXPANSION JOINT
EQ.	EQUAL
F.H.	FIRE HYDRANT
H.P.	HIGH POINT
L.O.C.	LIMIT OF CONSTRUCTION
P.A.	PLANTING AREA
REF.	REFERENCE
R.O.W.	RIGHT OF WAY
T.W.	TOP OF WALL
TYP.	TYPICAL
M.H.	MAN HOLE
P.P.	POWER POLE
	MATCHLINE
	RIGHT OF WAY
	EASEMENT
	CENTERLINE



Project Number: 22049

REV. NO.	DATE	DESCRIPTION	BY
REV. NO.	DATE	DESCRIPTION	BY

**LANDSCAPE ARCHITECTURE + URBAN DESIGN**

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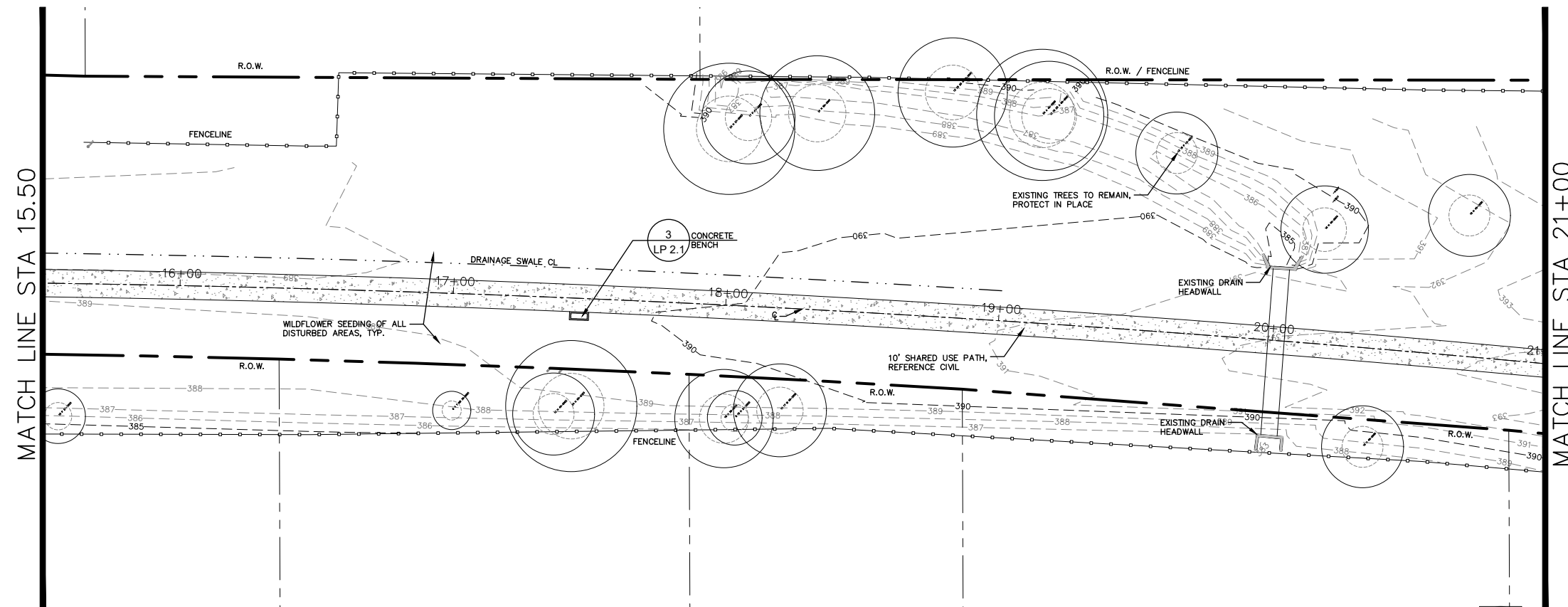
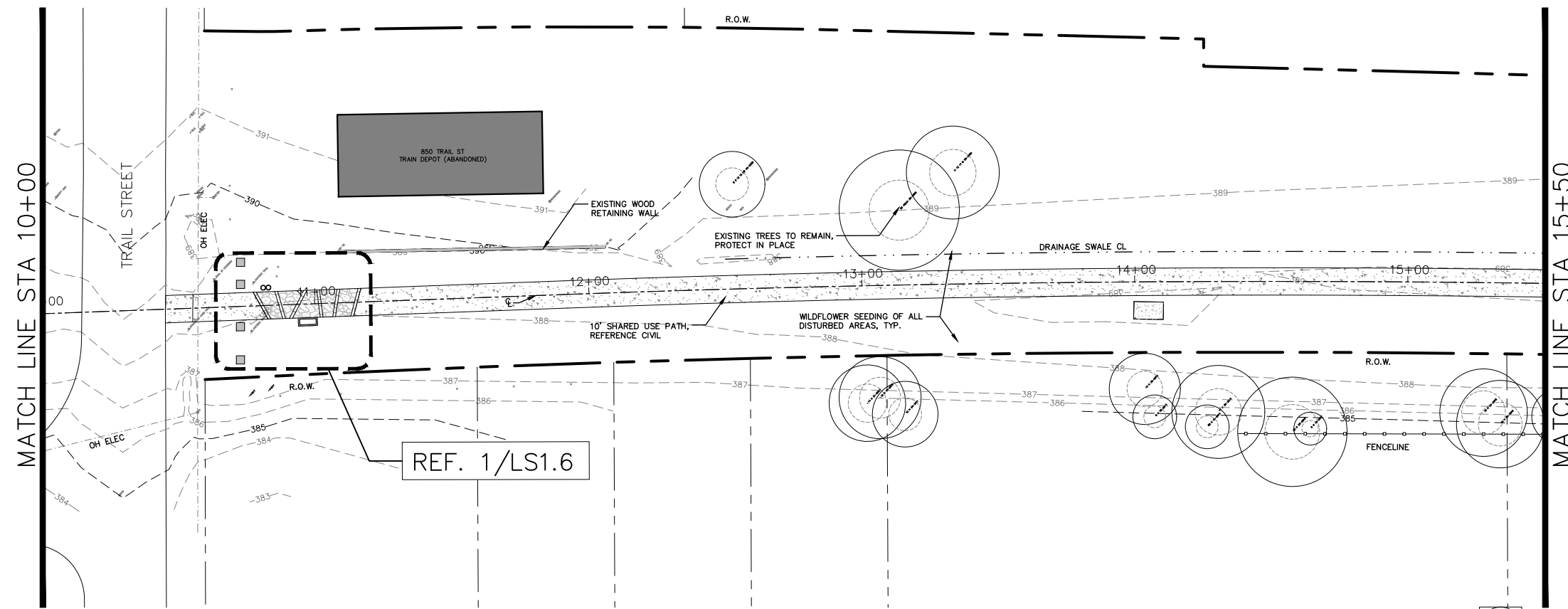


HIKE & BIKE TRAIL  
 LANDSCAPE  
 MATERIAL SCHEDULE  
 LS 1.0

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CHK DWG: CE	SAT	WILSON	0915	14
			JOB NO.	SHEET NO.
			048	66

Plotted on: \$DATE\$

Design Filename: \$FILE\$



LEGEND

- E.J. EXPANSION JOINT
- EQ. EQUAL
- F.H. FIRE HYDRANT
- H.P. HIGH POINT
- L.O.C. LIMIT OF CONSTRUCTION
- P.A. PLANTING AREA
- REF. REFERENCE
- R.O.W. RIGHT OF WAY
- T.W. TOP OF WALL
- TYP. TYPICAL
- M.H. MAN HOLE
- P.P. POWER POLE
- EXPANSION JOINT
- EQUAL
- FIRE HYDRANT
- HIGH POINT
- LIMIT OF CONSTRUCTION
- PLANTING AREA
- REFERENCE
- RIGHT OF WAY
- TOP OF WALL
- TYPICAL
- MAN HOLE
- POWER POLE
- MATCHLINE
- RIGHT OF WAY EASEMENT
- CENTERLINE



Project Number: 22049

REV. NO.	DATE	DESCRIPTION	BY
SCALE: 1"=50'			

REV. NO. DATE DESCRIPTION BY

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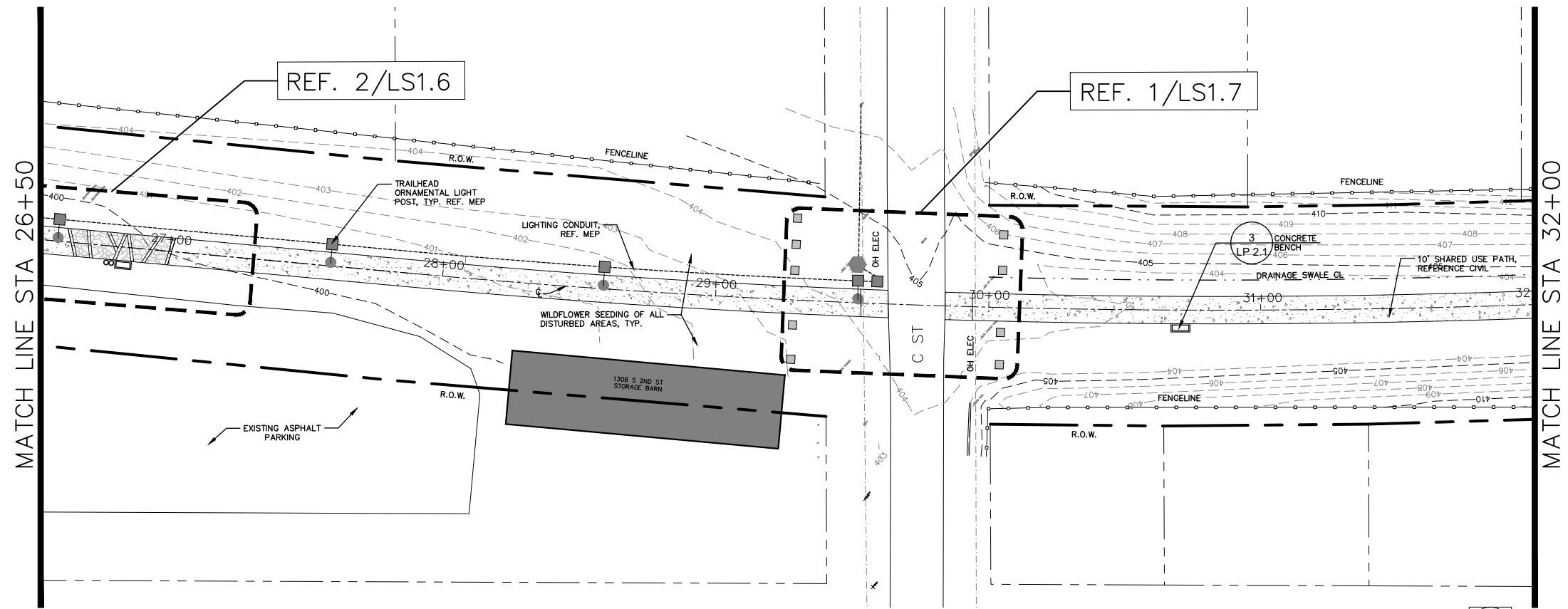
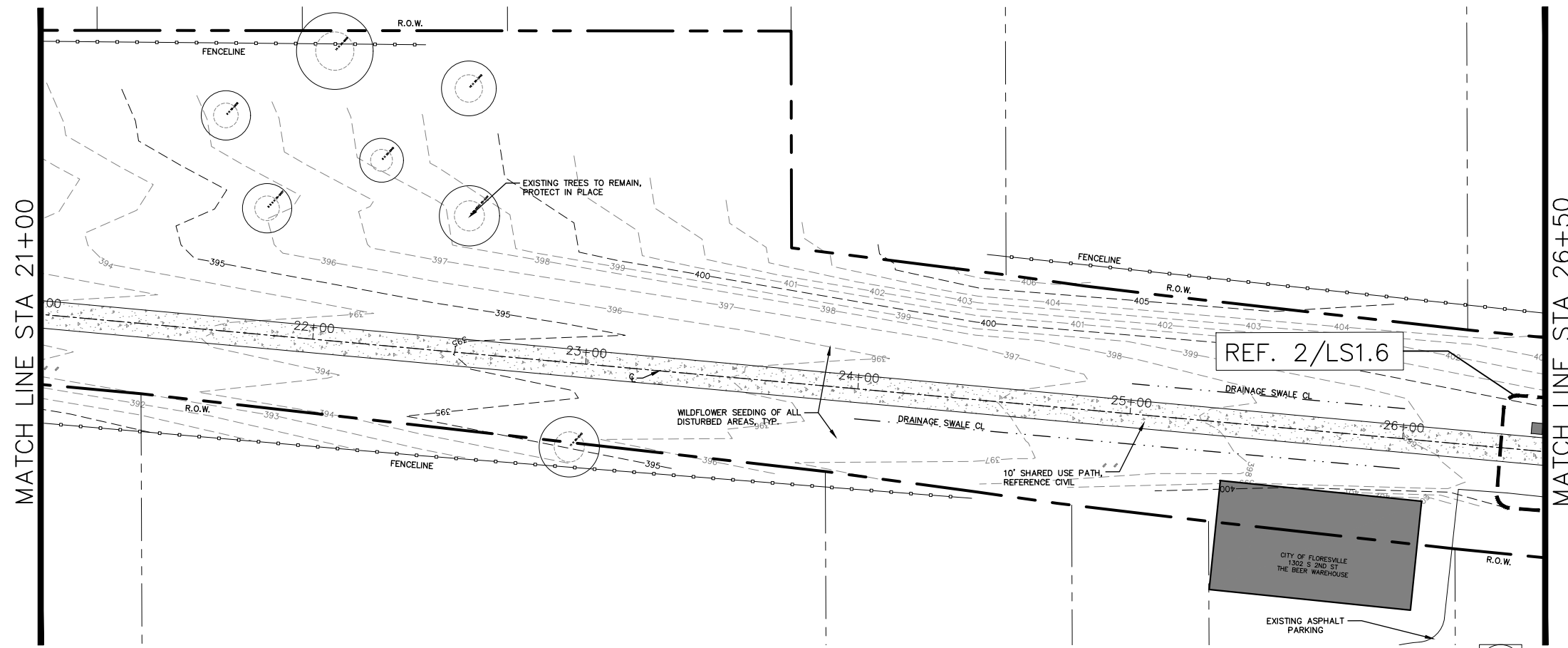


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 STA 10+00 TO STA 21+00

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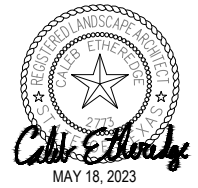
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LEGEND

E.J.	EXPANSION JOINT
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F.H.	FIRE HYDRANT
H.P.	HIGH POINT
L.O.C.	LIMIT OF CONSTRUCTION
P.A.	PLANTING AREA
REF.	REFERENCE
R.O.W.	RIGHT OF WAY
T.W.	TOP OF WALL
TYP.	TYPICAL
M.H.	MAN HOLE
P.P.	POWER POLE
	MATCHLINE
	RIGHT OF WAY
	EASEMENT
	CENTERLINE



Project Number: 22049

REV. NO.	DATE	DESCRIPTION	BY
<p>SCALE: 1"=50'</p>			

REV. NO.	DATE	DESCRIPTION	BY
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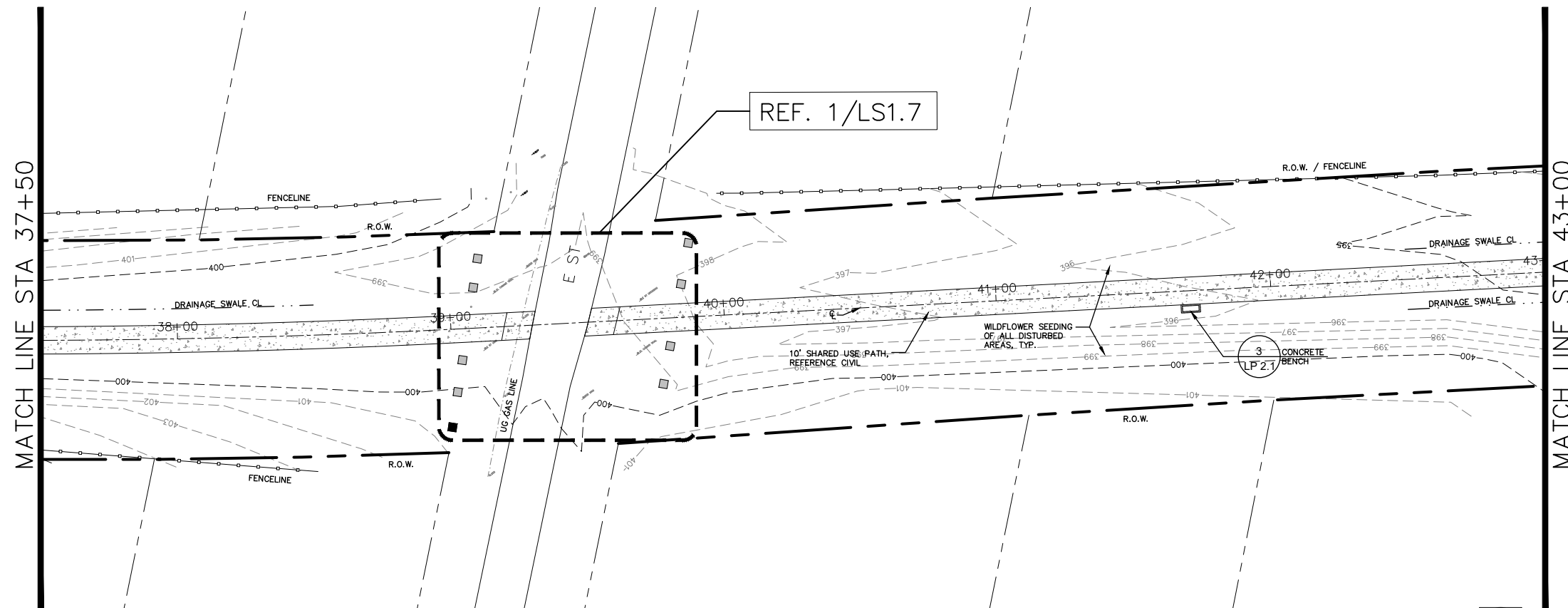
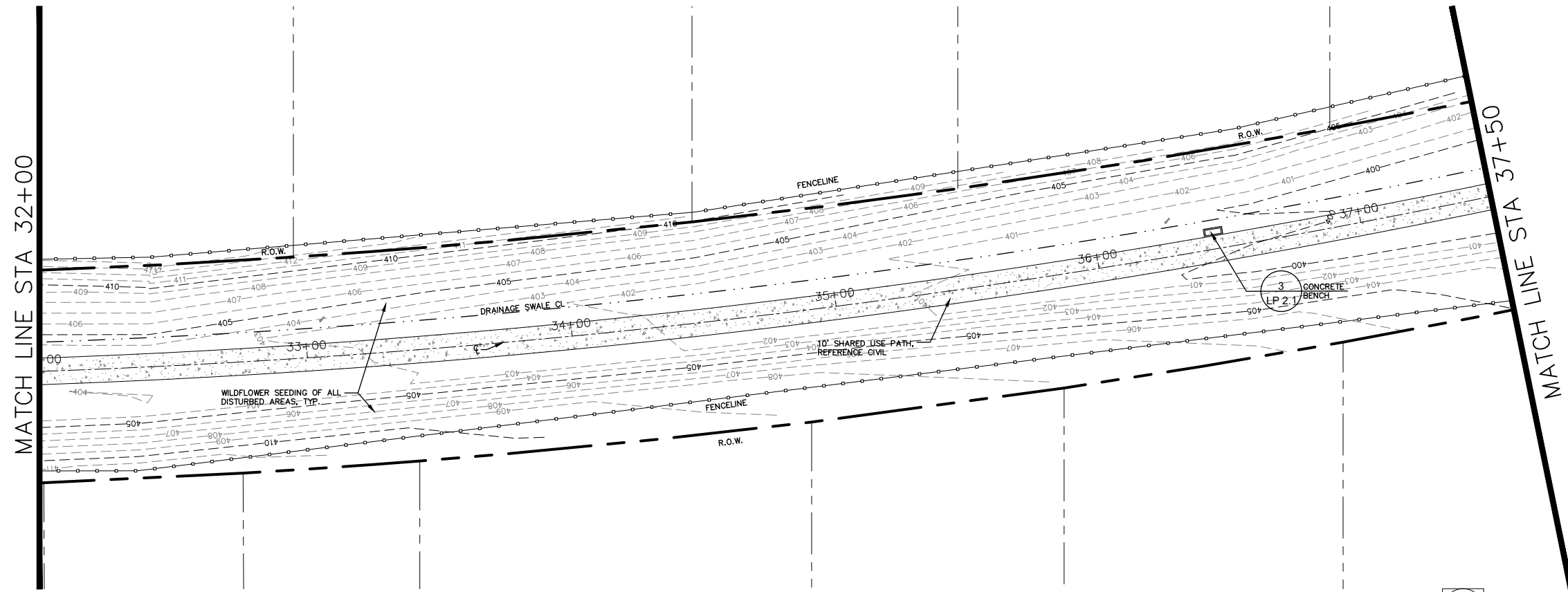
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Plotted on: \$DATE\$

Design Filename: \$FILE\$



LEGEND

- E.J. EXPANSION JOINT
- EQ. EQUAL
- F.H. FIRE HYDRANT
- H.P. HIGH POINT
- L.O.C. LIMIT OF CONSTRUCTION
- P.A. PLANTING AREA
- REF. REFERENCE
- R.O.W. RIGHT OF WAY
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- TYP. TYPICAL
- M.H. MAN HOLE
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- EXPANSION JOINT
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- FIRE HYDRANT
- HIGH POINT
- LIMIT OF CONSTRUCTION
- PLANTING AREA
- REFERENCE
- RIGHT OF WAY
- TOP OF WALL
- TYPICAL
- MAN HOLE
- POWER POLE
- MATCHLINE
- RIGHT OF WAY EASEMENT
- CENTERLINE



Project Number: 22049

REV. NO.	DATE	DESCRIPTION	BY
<p>SCALE: 1"=50'</p>			

REV. NO.	DATE	DESCRIPTION	BY
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URBAN DESIGN

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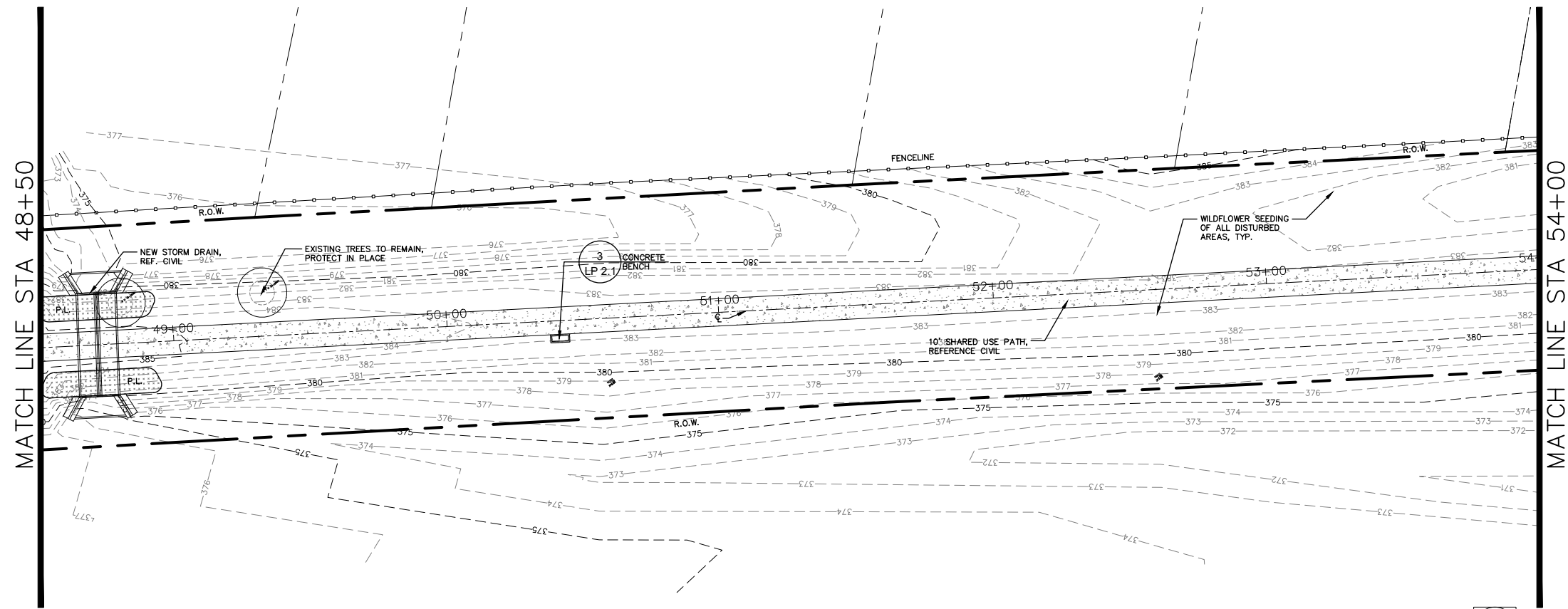
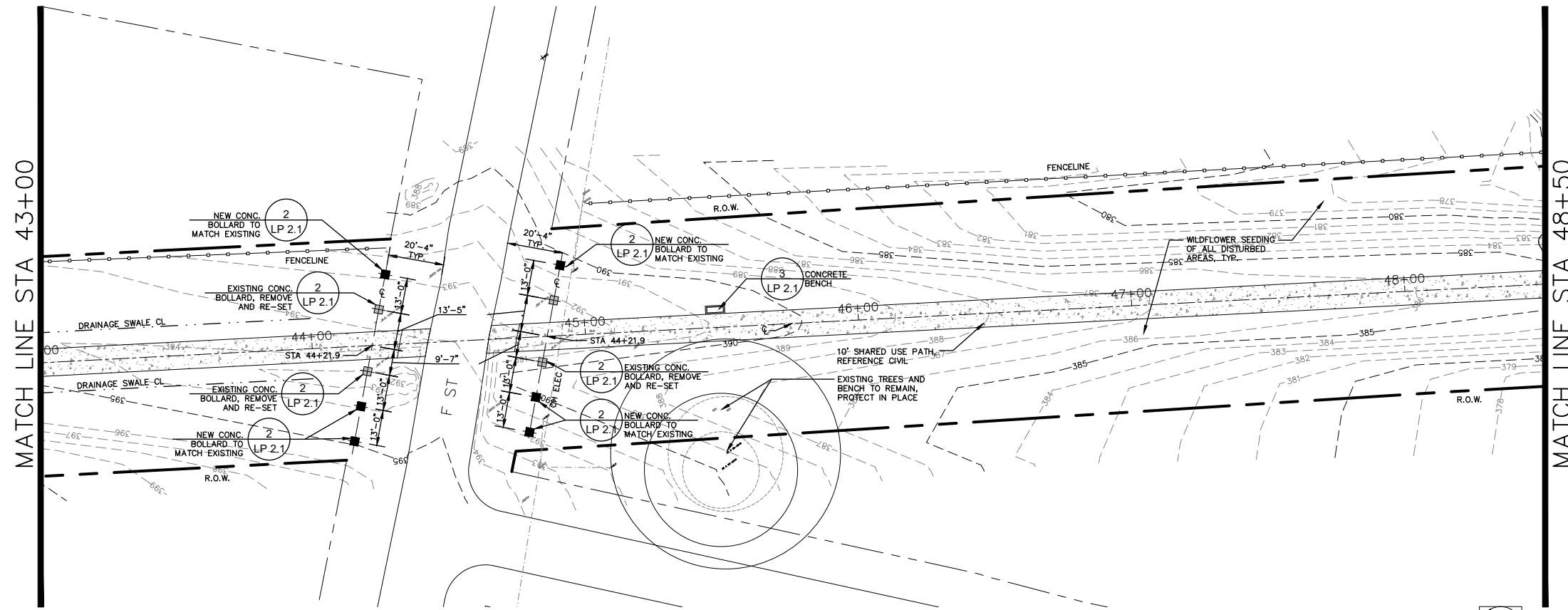
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HIKE & BIKE TRAIL  
LANDSCAPE  
PLAN  
LS 1.3  
STA 32+00 TO STA 43+00

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LEGEND

E.J.	EXPANSION JOINT
EQ.	EQUAL
F.H.	FIRE HYDRANT
H.P.	HIGH POINT
L.O.C.	LIMIT OF CONSTRUCTION
P.A.	PLANTING AREA
REF.	REFERENCE
R.O.W.	RIGHT OF WAY
T.W.	TOP OF WALL
TYP.	TYPICAL
M.H.	MAN HOLE
P.P.	POWER POLE
	MATCHLINE
	RIGHT OF WAY
	EASEMENT
	CENTERLINE



Project Number: 22049

REV. NO.	DATE	DESCRIPTION	BY
<p>SCALE: 1"=50'</p>			

REV. NO.	DATE	DESCRIPTION	BY
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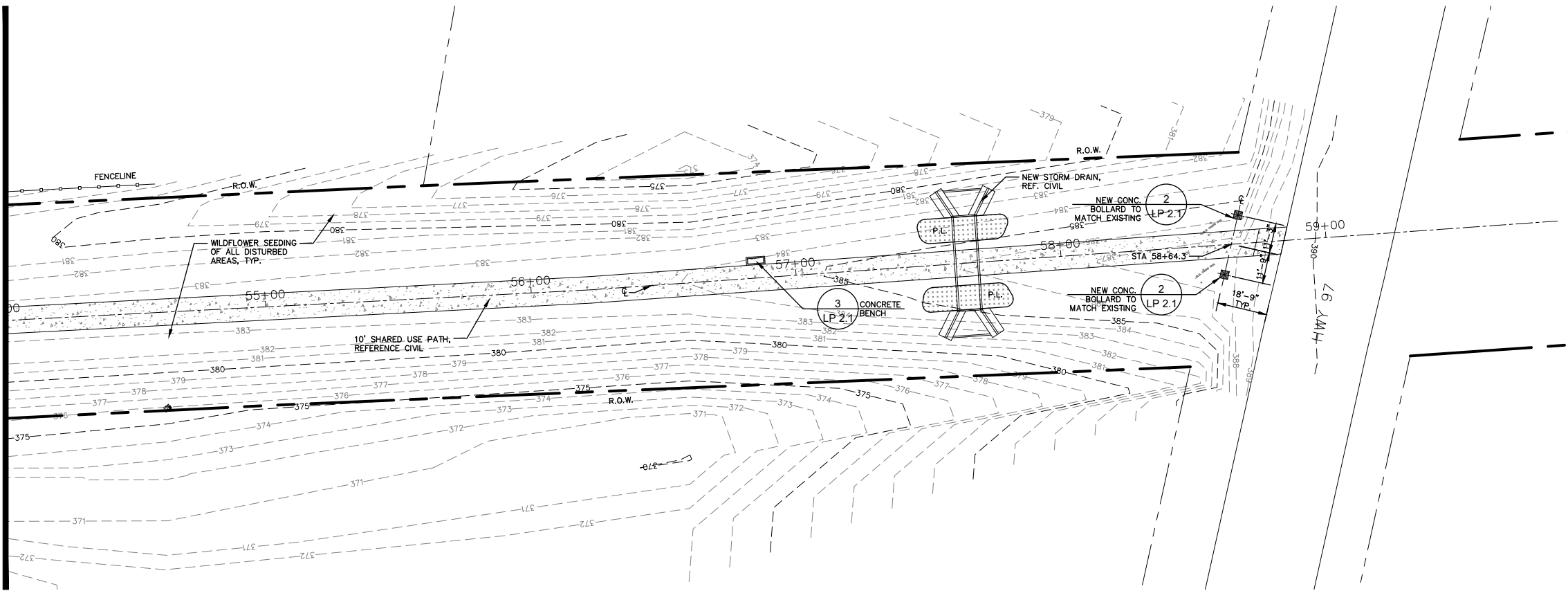
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Plotted on: \$DATE\$

Design Filename: \$FILE\$

MATCH LINE STA 54+00



LEGEND

E.J.	EXPANSION JOINT
EQ.	EQUAL
F.H.	FIRE HYDRANT
H.P.	HIGH POINT
L.O.C.	LIMIT OF CONSTRUCTION
P.A.	PLANTING AREA
REF.	REFERENCE
R.O.W.	RIGHT OF WAY
T.W.	TOP OF WALL
TYP.	TYPICAL
M.H.	MAN HOLE
P.P.	POWER POLE
	MATCHLINE
	RIGHT OF WAY
	EASEMENT
	CENTERLINE



Project Number: 22049

REV. NO.	DATE	DESCRIPTION	BY



REV. NO.	DATE	DESCRIPTION	BY

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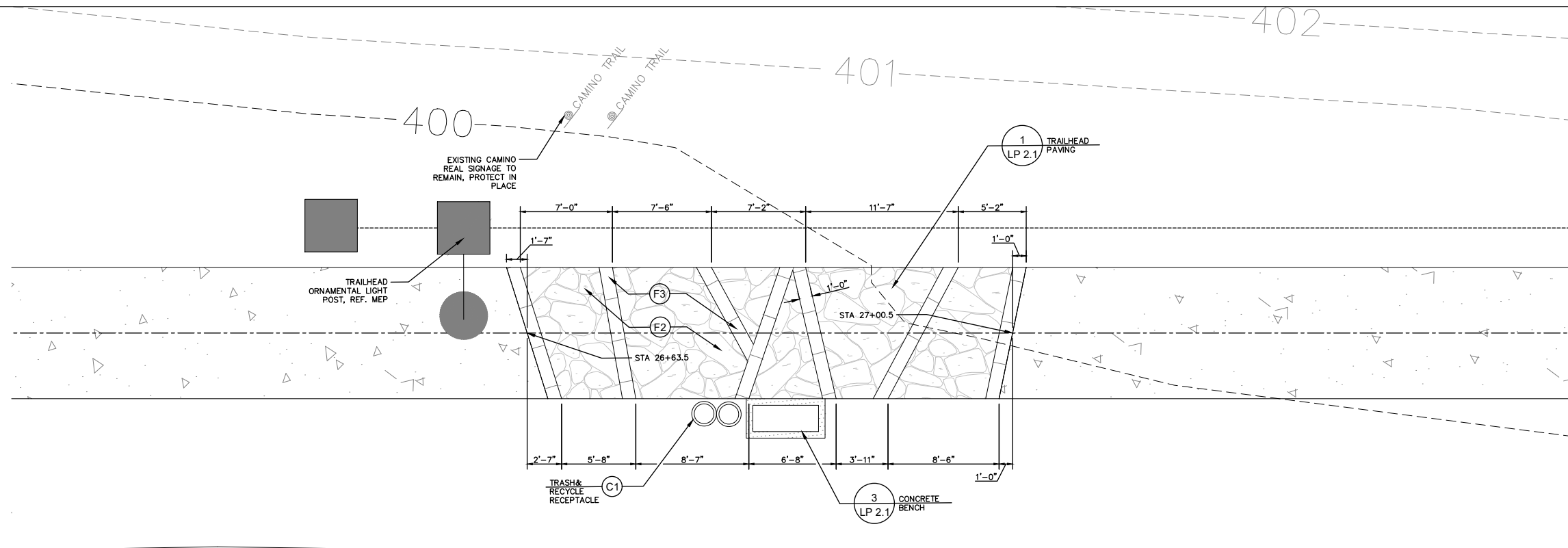


HIKE & BIKE TRAIL  
 LANDSCAPE PLAN  
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Plotted on: \$DATE\$

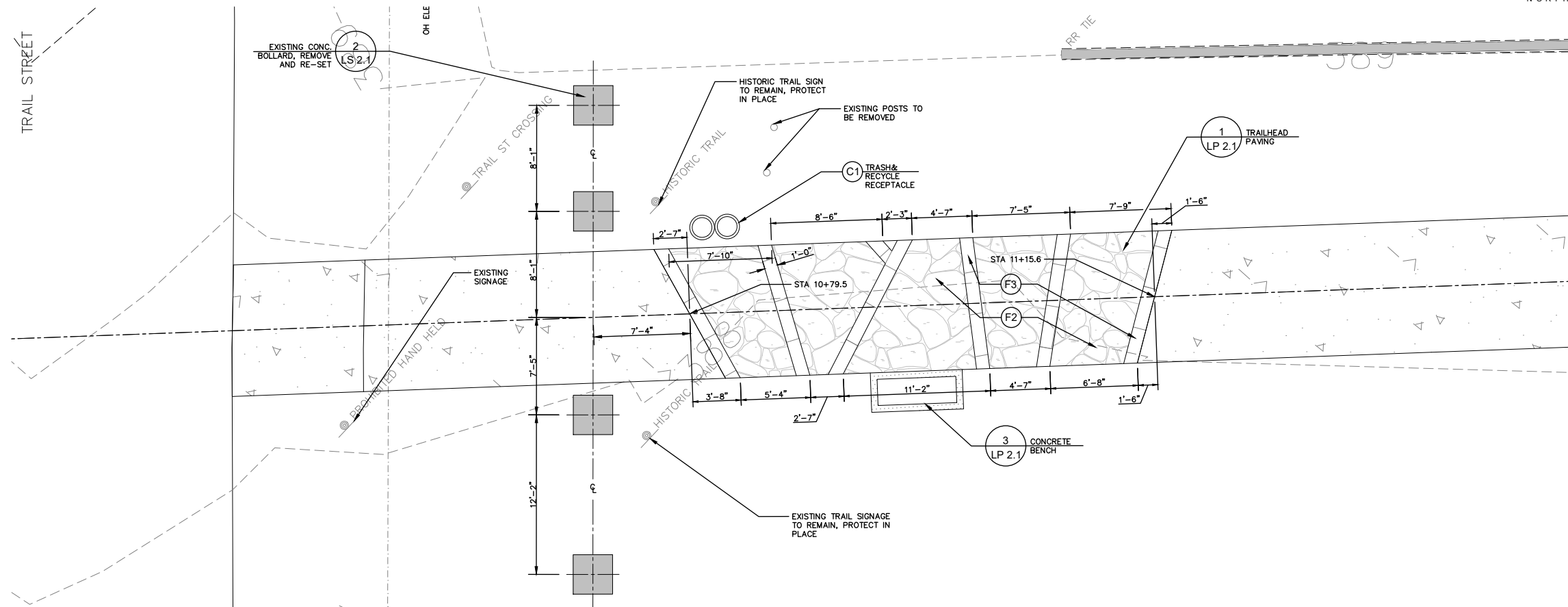
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## 2 THE BEER WAREHOUSE TRAIL GATEWAY AND SEATING

PLAN ENLARGEMENT

SCALE: 1"=10'



## 1 TRAIL STREET TRAIL GATEWAY AND SEATING

PLAN ENLARGEMENT

SCALE: 1"=10'



### LEGEND

E.J.	EXPANSION JOINT
EQ.	EQUAL
F.H.	FIRE HYDRANT
H.P.	HIGH POINT
L.O.C.	LIMIT OF CONSTRUCTION
P.A.	PLANTING AREA
REF.	REFERENCE
R.O.W.	RIGHT OF WAY
T.W.	TOP OF WALL
TYP.	TYPICAL
M.H.	MAN HOLE
P.P.	POWER POLE
---	MATCHLINE
---	RIGHT OF WAY
---	EASEMENT
---	CENTERLINE



Project Number:	22049		
REV. NO.	DATE	DESCRIPTION	BY
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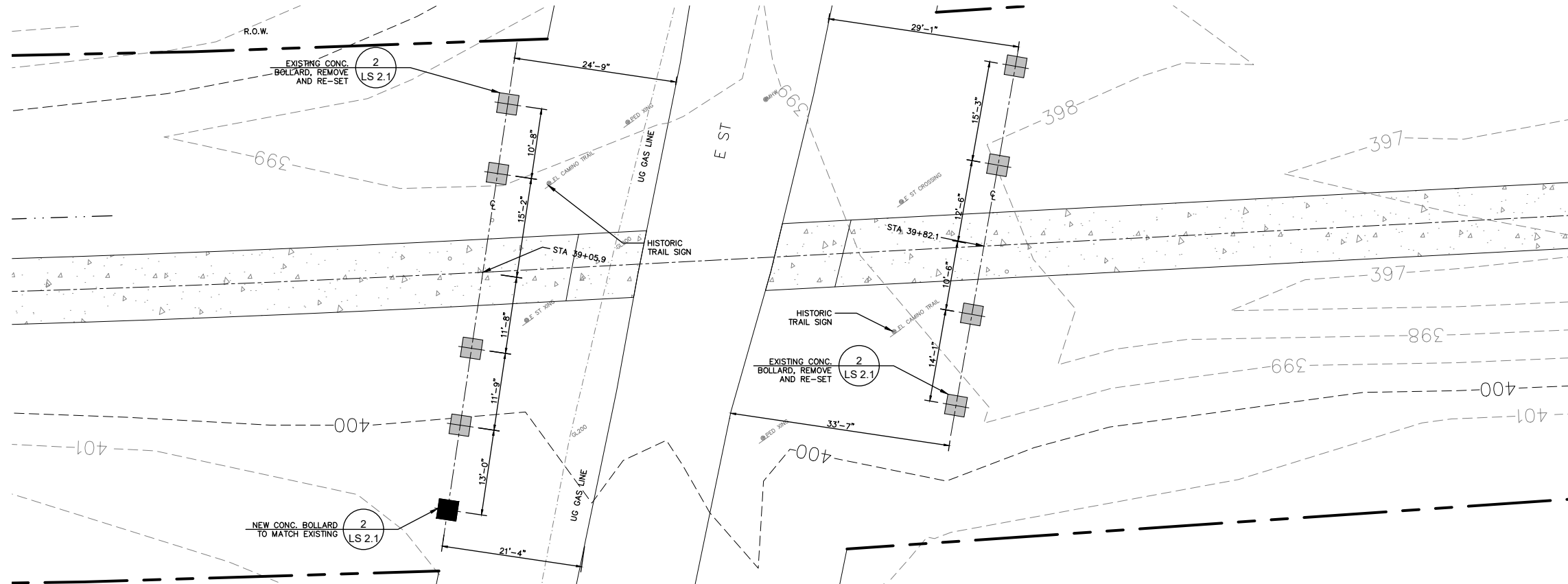
**CORAL STUDIO**  
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 O: (210) 963-7447  
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HIKE & BIKE TRAIL  
 LANDSCAPE PLAN  
 LS 1.6

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	N/A		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	WILSON	0915	14	048	72

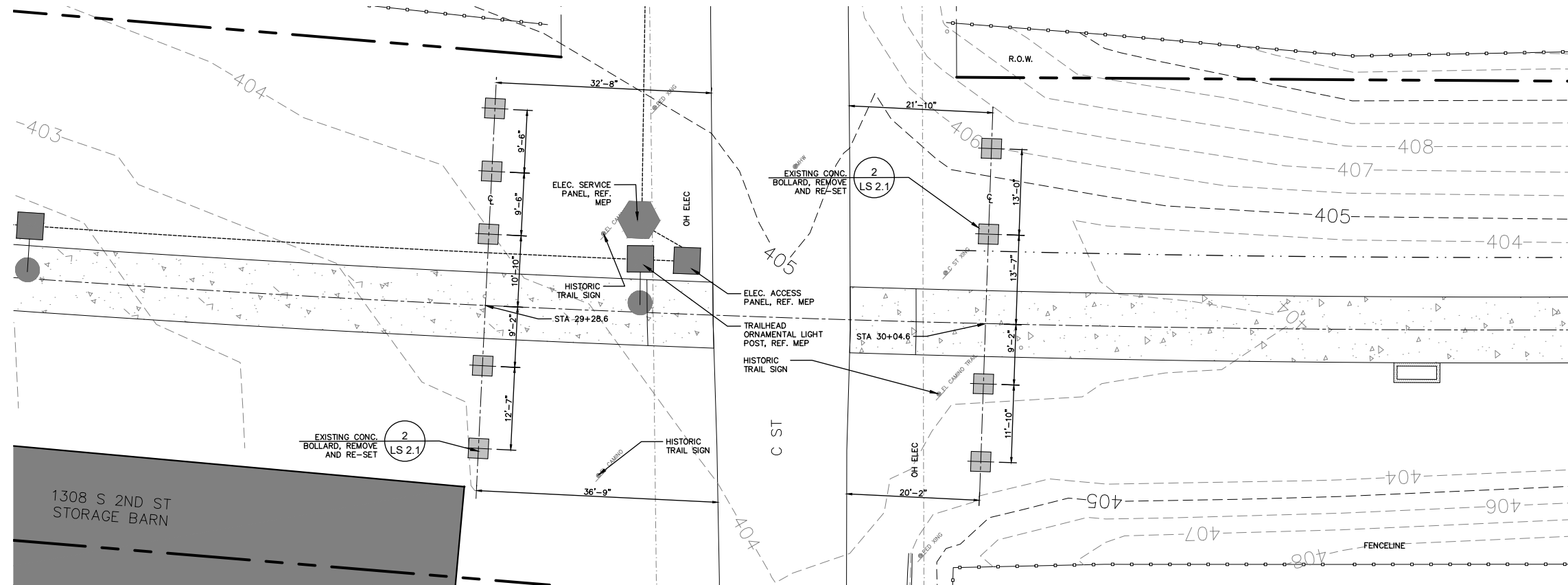
Plotted on: \$DATE\$



## 2 E-STREET TRAIL GATEWAY

PLAN ENLARGEMENT

SCALE: 1"=20'



## 1 C-STREET TRAIL GATEWAY

PLAN ENLARGEMENT

SCALE: 1"=20'



### LEGEND

E.J.	EXPANSION JOINT
EQ.	EQUAL
F.H.	FIRE HYDRANT
H.P.	HIGH POINT
L.O.C.	LIMIT OF CONSTRUCTION
P.A.	PLANTING AREA
REF.	REFERENCE
R.O.W.	RIGHT OF WAY
T.W.	TOP OF WALL
TYP.	TYPICAL
M.H.	MAN HOLE
P.P.	POWER POLE
	MATCHLINE
	RIGHT OF WAY EASEMENT
	CENTERLINE



Project Number: 22049

REV. NO.	DATE	DESCRIPTION	BY
<p>SCALE: 1"=20'</p>			

REV. NO.	DATE	DESCRIPTION	BY
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HIKE & BIKE TRAIL  
 LANDSCAPE PLAN  
 LS 1.7

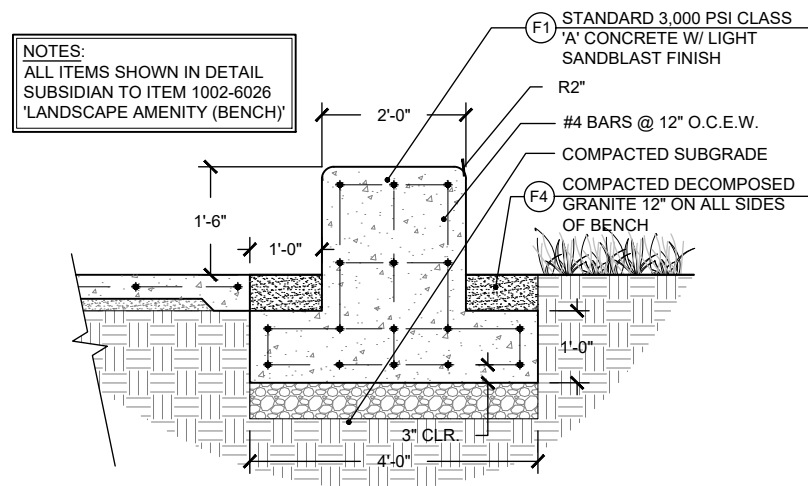
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CHK DGN:	6	TEXAS	SEE TITLE SHEET	N/A
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG:	SAT	WILSON	0915	14
				JOB NO.
				048
				SHEET NO.
				73

Design Filename: \$FILE\$



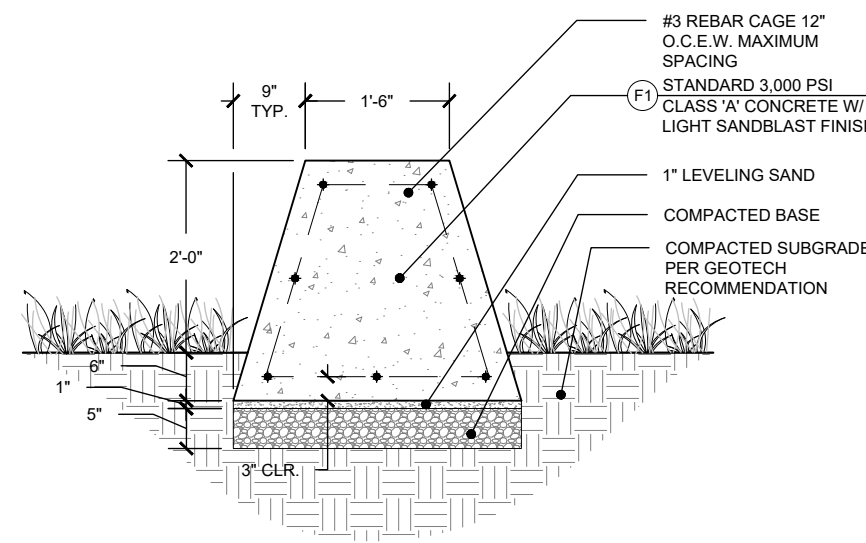
REF. IMAGE EXISTING CONC. BOLLARDS

- NOTES:**
1. ALL NEW BOLLARDS TO MATCH DIMENSIONS OF EXISTING BOLLARDS.
  2. PLACE ALL BOLLARDS (NEW OR EXISTING) AT HEIGHT OF 24" ABOVE PROPOSED FINISHED GRADE.
  3. TOP OF BLOCK TO BE LEVEL.
  4. REF. PLAN FOR BOLLARD LAYOUT AND SPACING
  5. ALL ITEMS SHOWN IN DETAIL SUBSIDIAN TO ITEMS 5033-6004 'REMOVE & RESET BOLLARD' & 5089-6001 'FIXED DECORATIVE BOLLARDS'



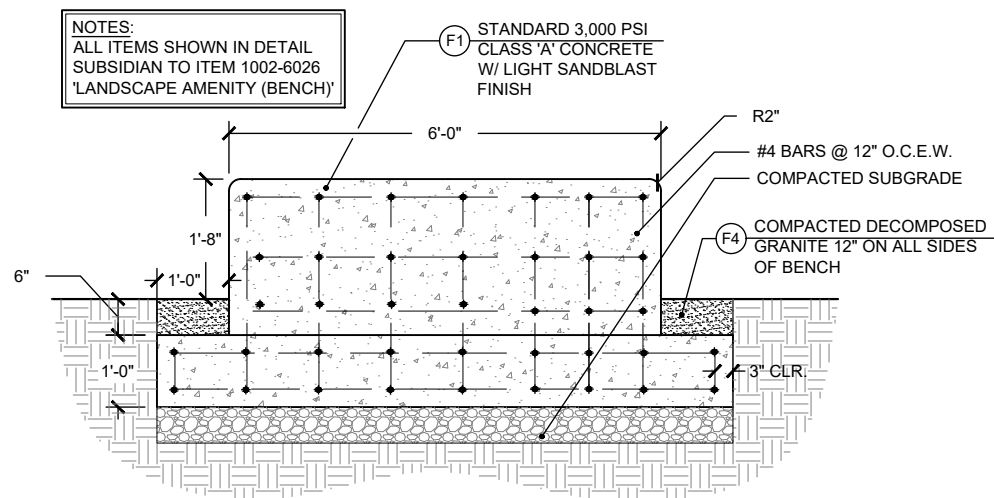
**4 CONCRETE BENCH**  
SIDE SECTION CUT

SCALE:  
1/2" = 1'-0"



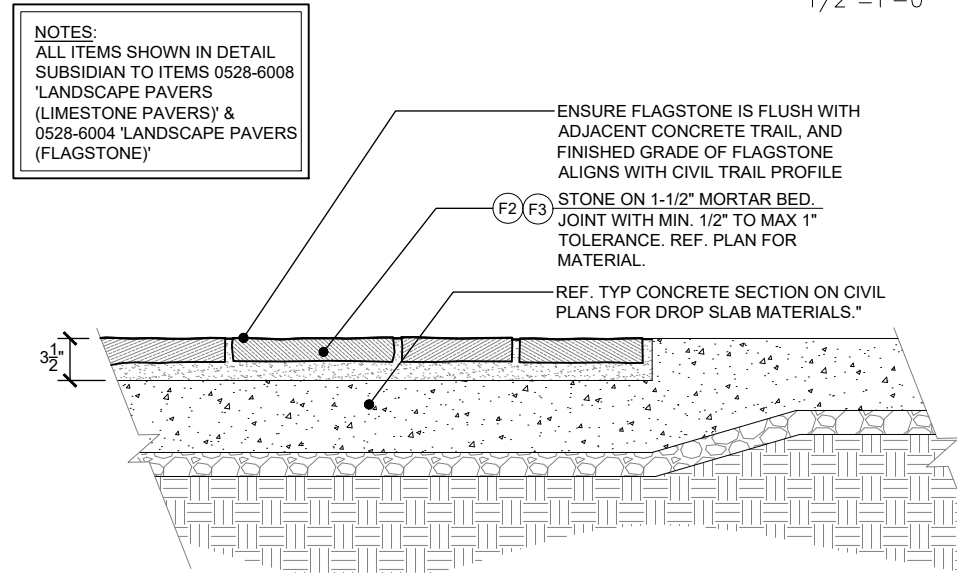
**2 ONSITE CONCRETE BOLLARD**  
SECTION CUT

SCALE:  
1/2" = 1'-0"



**3 CONCRETE BENCH**  
FRONT SECTION CUT

SCALE:  
1/2" = 1'-0"



**1 FLAGSTONE AT CONCRETE DROP SLAB**  
SECTION CUT

SCALE:  
3/4" = 1'-0"

**LEGEND**

E.J.	EXPANSION JOINT
EQ.	EQUAL
F.H.	FIRE HYDRANT
H.P.	HIGH POINT
L.O.C.	LIMIT OF CONSTRUCTION
P.A.	PLANTING AREA
REF.	REFERENCE
R.O.W.	RIGHT OF WAY
T.W.	TOP OF WALL
TYP.	TYPICAL
M.H.	MAN HOLE
P.P.	POWER POLE
---	MATCHLINE
---	RIGHT OF WAY
---	EASEMENT
---	CENTERLINE



Project Number: 22049

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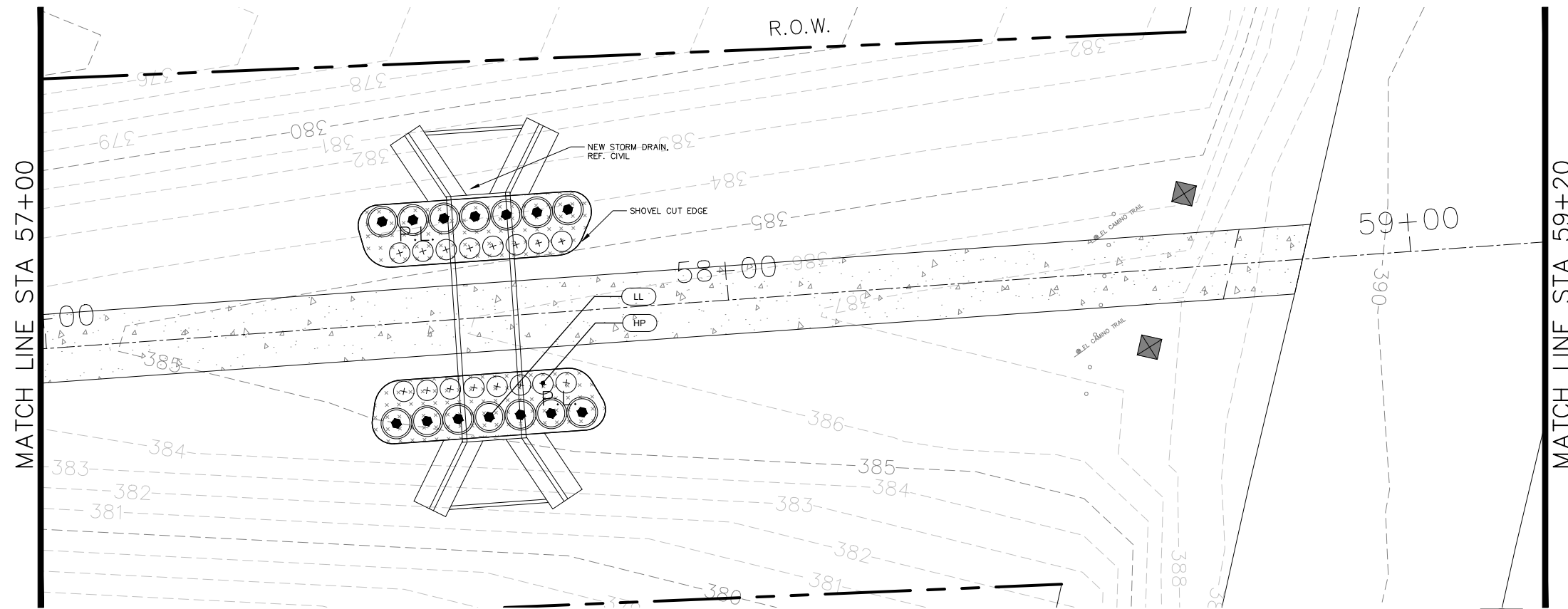
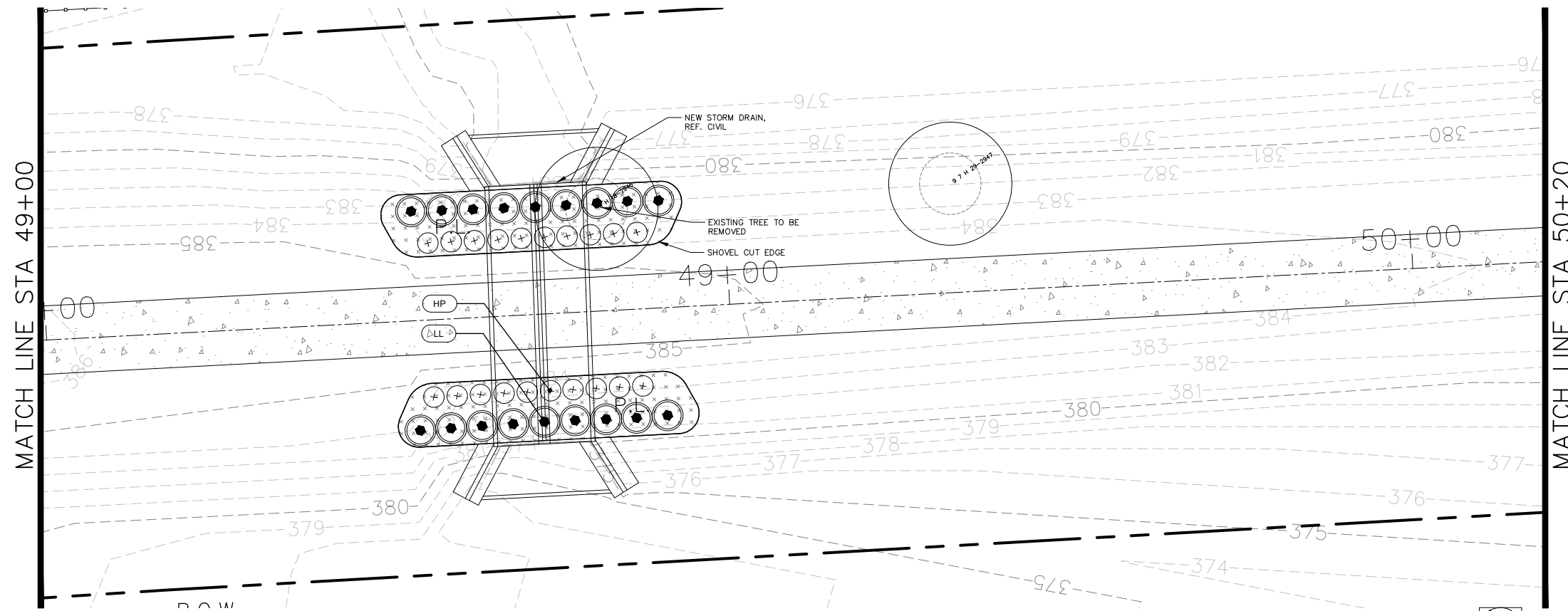


HIKE & BIKE TRAIL  
LANDSCAPE  
SITEWORK DETAILS  
LS 2.1

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET	N/A
DWG: KB	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG: CE	SAT	WILSON	0915	14
			048	74

Plotted on: \$DATE\$

Design Filename: \$FILE\$



LEGEND

E.J.	EXPANSION JOINT
EQ.	EQUAL
F.H.	FIRE HYDRANT
H.P.	HIGH POINT
L.O.C.	LIMIT OF CONSTRUCTION
P.A.	PLANTING AREA
REF.	REFERENCE
R.O.W.	RIGHT OF WAY
T.W.	TOP OF WALL
TYP.	TYPICAL
M.H.	MAN HOLE
P.P.	POWER POLE
	MATCHLINE
	RIGHT OF WAY
	EASEMENT
	CENTERLINE



Project Number: 22049

REV. NO.	DATE	DESCRIPTION	BY
<p>SCALE: 1"=20'</p>			

REV. NO.	DATE	DESCRIPTION	BY
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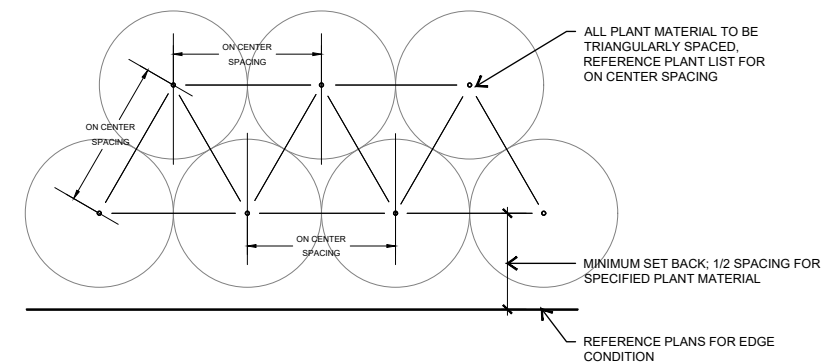
HIKE & BIKE TRAIL  
 LANDSCAPE  
 PLANTING PLAN  
 LP 1.1  
 STA 49+00 TO STA 50+20  
 STA 57+00 TO STA 59+20

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	N/A
DWG: KB	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG: CE	SAT	WILSON	0915	14
			048	75

LEGEND

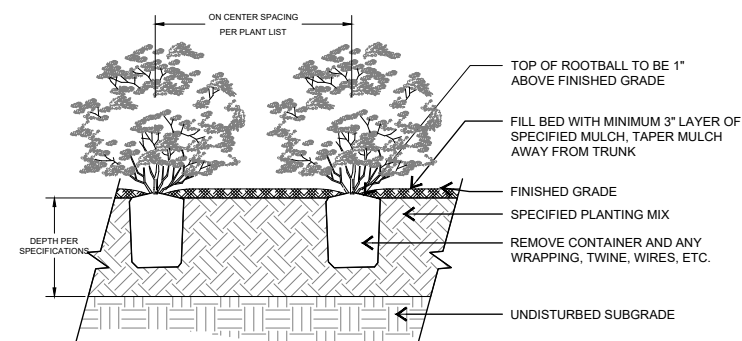
E.J.	EXPANSION JOINT
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P.P.	POWER POLE
	MATCHLINE
	RIGHT OF WAY
	EASEMENT
	CENTERLINE

PLANT LIST					
SHRUBS, ORNAMENTAL GRASSES, AND VINES					
SYMBOL	KEY	COMMON NAME	SCIENTIFIC NAME	SIZE	REMARKS
○	HP	RED YUCCA	<i>Hesperaloe parviflora</i>	5 GAL; 24" HT.; 24" SPRD.	FULL, HEALTHY FOLIAGE
⊙	LL	LYNN'S LEGACY CENIZO	<i>Leucophyllum langmaniae</i>	5 GAL; 24" HT.; 24" SPRD.	FULL, HEALTHY FOLIAGE



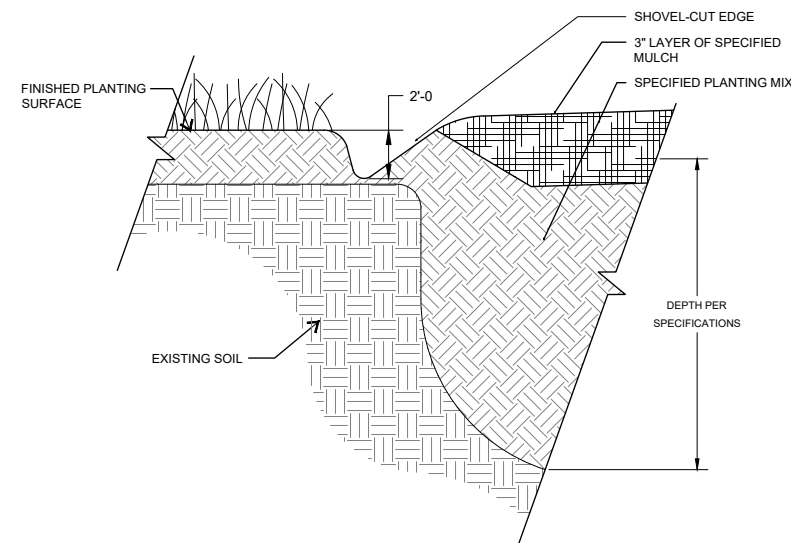
**2 PLANT SPACING**  
PLAN

SCALE:  
1/4" = 1'-0"



**1 SHRUB BED**  
SECTION CUT

SCALE:  
3/16" = 1'-0"



**3 SHOVEL CUT BED EDGE**  
SECTION CUT

SCALE:  
1/8" = 1'-0"



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LANDSCAPE  
PLANTING DETAILS  
LP 2.1

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
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DWG: KB	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG: CE	SAT	WILSON	0915	14	048	76



Plotted on: \$DATE\$

**PART 1 GENERAL NOTES:**

LANDSCAPE CONTRACTOR SHALL ACCEPT THE SITE IN ITS EXISTING CONDITION AND SHALL TIE NEW WORK TO EXISTING CONDITIONS AND CONTROLS (SUCH AS EXISTING GRADES AND WALK ELEVATIONS) AS NECESSARY TO MEET THE INTENT OF THE PLANS.

BEFORE PROCEEDING WITH ANY WORK IN AN AREA, LANDSCAPE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LAYOUTS AND SIZES AND SHALL NOTIFY LANDSCAPE ARCHITECT OF ANY DISCREPANCIES BETWEEN PLANS AND ACTUAL SITE CONDITIONS. IF ANY UTILITIES, SITE DEFECTS OR OBSTRUCTIONS ARE DISCOVERED DURING CONTRACT WHICH MAY NOT HAVE BEEN KNOWN DURING DESIGN, CONTRACTOR SHALL STOP WORK AND IMMEDIATELY NOTIFY LANDSCAPE ARCHITECT BEFORE PRECEDING. LANDSCAPE CONTRACTOR SHALL BE LIABLE FOR ALL MODIFICATIONS AND DAMAGE IF WORK PROCEEDS IN EITHER OF THE ABOVE SITUATIONS WITHOUT NOTIFYING LANDSCAPE ARCHITECT. PRIOR TO ANY EXCAVATION, LANDSCAPE CONTRACTOR SHALL CONTACT APPROPRIATE AUTHORITIES INCLUDING, BUT NOT LIMITED TO, TEXAS ONE CALL SYSTEM AT 1-800-245-4545 TO LOCATE EXISTING UNDERGROUND UTILITIES.

LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ANY DAMAGE TO ANY UTILITIES OR PROPERTY THAT MAY OCCUR IN THE EXECUTION OF HIS CONTRACT WORK. WHEN WORK REQUIRES CROSSING EXISTING WALKS OR CURBS WITH EQUIPMENT, LANDSCAPE CONTRACTOR SHALL PROVIDE APPROVED BRIDGE MATERIAL SUCH AS WOOD PLANKS AND EARTH TO PREVENT DAMAGE TO FINISHED WORK. LANDSCAPE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS THAT MAY BE WORKING ON THE SITE SIMULTANEOUSLY AND SHALL COORDINATE STAGING OF HIS WORK WITH OWNER AND LANDSCAPE ARCHITECT. ALL TRASH AND DEBRIS GENERATED FROM CONTRACT OPERATIONS SHALL BE REMOVED ON A DAILY BASIS. ALL WORK SHALL BE IN COMPLIANCE WITH ALL APPLICABLE CODES AND ORDINANCES. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR JOB SITE SAFETY IN CONJUNCTION WITH HIS CONTRACT WORK.

**REFERENCES**

- A.) AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) Z60.1 - NURSERY STOCK.
- B.) TEXAS STATE DEPARTMENT OF AGRICULTURE (TDA) - NURSERY FLORAL LICENSING PROGRAM.

**1.1 SUBMITTALS FOR REVIEW**

- A.) PRODUCT DATE: LIST OF CHEMICALS TO BE USED ON SITE.
- B.) SAMPLES:
  - 1. 1 QUART SAMPLES OF EACH SOIL AMENDMENT WITH ANALYTICAL DATA FROM A RECOGNIZED TESTING LABORATORY SHOWING MANUFACTURER'S GUARANTEED ANALYSIS.
  - 2. 1 CUBIC FOOT SAMPLES OF PREMIXED BACKFILL MIXES.
- C.) TEST RESULTS:
  - 1. PROVIDE SOIL SAMPLE TEST RESULTS INDICATING PH, FERTILITY LEVELS, AND PERCENTAGES OF SAND, SILT, AND CLAY.
  - 2. PROVIDE RECOMMENDATIONS FOR SOIL AMENDMENTS AND FERTILIZERS BASED ON SOIL ANALYSIS; FOR CONTRACT PURPOSES, USE MIXTURE SPECIFIED IN THIS SECTION.
- D.) NURSERY QUALIFICATIONS: COMPANY SPECIALIZING IN GROWING AND CULTIVATING PLANTS SPECIFIED IN THIS SECTION WITH MINIMUM THREE YEAR DOCUMENTED EXPERIENCE, AND CERTIFIED BY THE STATE OF TEXAS.
- E.) INSTALLER QUALIFICATIONS:
  - 1. COMPANY SPECIALIZING IN LANDSCAPE INSTALLATION WITH MINIMUM THREE YEARS DOCUMENTED EXPERIENCE.
  - 2. PROVIDE FULL-TIME SUPERINTENDENT ON-SITE DURING INSTALLATION.
- F.) PLANT MATERIALS:
  - 1. PLANT MATERIALS ARE SUBJECT TO EXAMINATION BY LANDSCAPE ARCHITECT AT PLACE OF GROWTH OR UPON DELIVERY TO PROJECT.

**1.2 DELIVERY, STORAGE AND HANDLING**

- A.) DELIVER FERTILIZER IN WATERPROOF BAGS SHOWING WEIGHT, GUARANTEED CHEMICAL ANALYSIS, MANUFACTURER AND BRAND NAME, AND APPROVALS OF AUTHORITIES HAVING JURISDICTION.
- B.) DELIVER PLANT MATERIAL WITH IDENTIFICATION TAG SHOWING BOTANICAL NAME AND PLANT SIZE.
- C.) DELIVER PLANT MATERIAL IMMEDIATELY PRIOR TO INSTALLATION; PLANT MATERIALS ON SAME DAY AS DELIVERED. IF PLANTING CANNOT BE ACCOMPLISHED ON SAME DAY AS DELIVERY, PROVIDE ADDITIONAL PROTECTION TO MAINTAIN PLANTS IN HEALTHY AND VIGOROUS CONDITION.
- D.) KEEP PLANT MATERIAL MOIST AND PROTECT FROM DAMAGE AND DESICCATION OF LEAVES UNTIL PLANTING.
- E.) DO NOT HANDLE PLANT MATERIALS BY STEM OR TRUNK.
- F.) KEEP CONTAINERS INTACT UNTIL JUST PRIOR TO PLANTING.

**1.3 SEQUENCING**

- A.) INSTALL TREES, SHRUBS, AND LINER STOCK PLANT MATERIALS PRIOR TO INSTALLATION OF LAWNS.

**1.4 WARRANTY**

- A.) FURNISH WRITTEN WARRANTY THAT PLANT MATERIALS WILL BE IN HEALTHY, VIGOROUS, GROWING CONDITION ONE (1) YEAR AFTER FINAL ACCEPTANCE. DAMAGE DUE TO ACTS OF GOD, VANDALISM, OR NEGLIGENCE BY OWNER IS EXCLUDED.
- B.) REPLACE DEAD, UNHEALTHY AND UNSIGHTLY PLANT MATERIALS WITHIN WARRANTY PERIOD, UPON NOTIFICATION BY OWNER OR LANDSCAPE ARCHITECT.
- C.) NOTIFY OWNER AND LANDSCAPE ARCHITECT 30 DAYS PRIOR TO EXPIRATION OF WARRANTY PERIOD AND ARRANGE FINAL ACCEPTANCE INSPECTION BY ALL PARTIES.
  - 1. REMOVE DEAD, UNHEALTHY, AND UNSIGHTLY PLANT MATERIALS.
  - 2. REMOVE GUYING AND STAKING MATERIALS.
  - 3. WARRANT REPLACEMENT PLANTS UNDER SAME PROVISIONS AND FOR SAME TIME PERIOD AS ORIGINAL PLANTS.

**1.5 MAINTENANCE**

- 1. MAINTAIN PLANT LIFE IMMEDIATELY AFTER PLACEMENT AND FOR NINETY (90 DAYS) AFTER FINAL ACCEPTANCE.
- 2. REPLACE DEAD OR DYING PLANTS WITH PLANTS OF SAME SIZE AND SPECIES SPECIFIED.
- 3. REMOVE TRASH, DEBRIS, AND LITTER, WATER, PRUNE, FERTILIZE, WEED, AND MOW. SPOT APPLY HERBICIDES, AND FUNGICIDE ONLY AS REQUIRED.
- 4. REMOVE CLIPPINGS AND DEBRIS FROM SITE PROMPTLY.
- 5. COORDINATE WITH OPERATION OF IRRIGATION SYSTEM TO ENSURE THAT PLANTS ARE ADEQUATELY WATERED. HAND WATER AREAS NOT RECEIVING ADEQUATE WATER FROM IRRIGATION SYSTEM.
- 6. RESET SETTLED PLANTS.
- 7. REAPPLY MULCH TO BARE AND THIN AREAS.

**1.6 MATERIALS**

**A.) PLANT MATERIALS:**

- 1. CERTIFIED IN ACCORDANCE WITH TDA REQUIREMENTS.
- 2. SPECIES AND SIZE AS INDICATED IN PLANT SCHEDULE. LARGER SIZE MAY BE SUBSTITUTED WITHOUT ADDITIONAL COST TO OWNER, PROVIDED ROOT BALL OR SPREAD INCREASES PROPORTIONATELY.
- 3. WHERE MATERIALS ARE PLANTED IN MASSES, PROVIDE PLANTS OF UNIFORM SIZE.
- 4. GROWN IN CLIMATIC CONDITIONS SIMILAR TO THOSE AT SITE. FREE FROM DISEASE, INSECT INFESTATIONS, DEFECTS INCLUDING WEAK OR BROKEN LIMBS, CROTCHES, AND DAMAGED TRUNKS, ROOTS OR LEAVES, SUN SCALD, FRESH BARK ABRASIONS, EXCESSIVE ABRASIONS, AND OBJECTIONABLE DISFIGUREMENTS.
- 5. EXHIBIT NORMAL GROWTH HABITS; VIGOROUS, HEALTHY, FULL, WELL-PROPORTIONED, AND SYMMETRICAL.
- 6. TREE TRUNKS TO BE STURDY AND EXHIBIT HARDENED SYSTEMS AND VIGOROUS AND FIBROUS ROOT SYSTEMS, NOT ROOT OR POT BOUND.
- 7. NOT PRUNED, TRIMMED, OR TOPPED.
- 8. CONTAINER-GROWN STOCK: GROWN IN CONTAINERS FROM SEEDING.

**B.) TOPSOIL:**

TOPSOIL SHALL BE SECURED FROM AN APPROVED OFFSITE LOCATION. IT SHALL BE FERTILE, FRIABLE, NATURAL LOAM CONTAINING A LIBERAL AMOUNT OF HUMUS AND SHALL BE CAPABLE OF SUSTAINING VIGOROUS PLANT GROWTH. IT SHALL BE FREE OF STONES, LUMPS AND CLODS OF HARD EARTH 1/2 INCH DIAMETER AND GREATER, PLANTS OR THEIR ROOTS, STICKS AND OTHER EXTRANEIOUS MATTER. UNDER NO CIRCUMSTANCES WILL TOPSOIL BE ACCEPTED UNLESS IT IS FREE OF THE FOREMENTIONED CONTAMINANTS. USE OF NON-COHESIVE SANDY LOAM SHALL NOT BE ACCEPTED.

**C.) MULCH:**

- 1. TREE BED: 3" DEPTH SHREDDED, COMPOSTED HARDWOOD BARK OF VARYING LENGTH BY NEW EARTH OR SECOND NATURE LLC, OR APPROVED SUBSTITUTE, PARTIALLY DECOMPOSED; FREE FROM STICKS, STONES, CLAY, AND GROWTH AND GERMINATION-INHIBITING INGREDIENTS.
- 2. SHRUB BED: 3" DEPTH TEXAS BLEND COBBLE BY KELLER MATERIAL OR APPROVED SUBSTITUTE.

**D.) SOIL AMENDMENTS:**

- 1. SOIL SULFUR: AGRICULTURAL GRADE SULFUR CONTAINING MINIMUM 99 PERCENT SULFUR EXPRESSED A ELEMENTAL.
- 2. IRON SULFATE: 20 PERCENT IRON EXPRESSED AS METALLIC IRON DERIVED FROM FERRIC AND FERROUS SULFATE AND 10 PERCENT SULFUR EXPRESSED AS ELEMENTAL. WHEN REQUIRED BY SOIL TESTS.
- 3. GYPSUM: AGRICULTURAL GRADE, CONTAINING MINIMUM 98 PERCENT CALCIUM SULFATE, WHEN REQUIRED BY SOIL TEST.
- 4. HERBICIDE: PRE-EMERGENT TYPE; SURFLAN OR APPROVED SUBSTITUTE.
- 5. FERTILIZER FOR TREES AT PLANTING: AGSAFE 20-10-5 PLANTING TABLETS PER LABEL INSTRUCTIONS
- 6. FERTILIZER FOR LAWN: PLANT HEALTH CARE GROUP "PHC FOR TURF 15-1-6" OR APPROVED EQUAL ORGANIC FERTILIZER APPLIED AT A RATE OF SEVEN (7) POUNDS PER 1,000 SQUARE FEET.
- 7. FERTILIZER FOR PLANTER BED MIX: MEDINA 4-2-3 GRANULAR ORGANIC FERTILIZER APPLIED PER LABEL INSTRUCTIONS

**H.) TURF:**

- 1. ALL SEED USED SHALL BE HIGH QUALITY, EXTRA FANCY, TREATED LAWN TYPE SEED AT 98% PURITY AND 85% GERMINATION, AND SHALL BE FURNISHED IN SEALED STANDARD CONTAINERS WITH SIGNED COPIES OF A STATEMENT FROM THE VENDOR CERTIFYING THAT EACH CONTAINER OF SEED DELIVERED IS FULLY LABELED IN ACCORDANCE WITH THE TEXAS STATE AGRICULTURAL CODE AND IS EQUAL TO OR BETTER THAN THE REQUIREMENT OF THESE SPECIFICATIONS. LAWN SEED TO BE FREE OF WEEDS OR NOXIOUS GRASS SEEDS.
- 2. SEED WHICH HAS BECOME WET, MOLDY OR OTHERWISE DAMAGED IN TRANSIT OR STORAGE WILL NOT BE ACCEPTED.
- 3. GRASS SEED SCHEDULE:
  - A. BERMUDA 419 SEED:
  - B. APRIL 15- SEPTEMBER 15 SHALL BE BERMUDA.
  - C. SEPTEMBER 15- APRIL 15 SHALL BE ANNUAL RYE GRASS.
- 4. "HYDRO-MULCH" AS MANUFACTURED BY CONWED, OR APPROVAL EQUAL.
- 5. THE HYDO-MULCH SHALL BE COMPOSED OF WOOD CELLULOSE FIBER AND CONTAIN NO GERMINATION OR GROWTH-INHIBITING FACTORS.
- 6. HYRO-SEEDING ADDITIVE (BINDER): ECOLOGY 'CONTROL-M BINDER' ORGANIC SEEDING ADDITIVE.
- 7. SOD: PROVIDE FULL, DARK GREEN, UNIFORM, STRONGLY ROOTED SOD IN 16" X 24" STRIPS FREE FROM WEEDS, UNDESIRABLE GRASSES, DISEASES AND PESTS. SOD SHALL BE CUT FROM THE FIELD NO LONGER THAN 48 HOURS BEFORE PLANTING. ROOTS OF SOD SHALL BE KEPT MOIST.
- 8. BRACING: TREE ANCHORS SHALL BE AS PER DETAILS.
- 9. TREE PAINT: MORRISON TREE SEAL, CABORT TREE PAINT, OR OTHER PRODUCT APPROVED BY LANDSCAPE ARCHITECT.
- 10. PLANTER BED EDGING SHALL BE 3/16"X 4" STEEL EDGING WITH MANUFACTURERS STANDARD GREEN FINISH.

**F.) MIXES:**

- 1. PLANT BED MIX:
  - PLANT BED MIX SHALL BE NEW EARTH OR SECOND NATURE'S 4 WAY MIX AS PRODUCED BY NEW EARTH OR SECOND NATURE LLC PH. 210-661-5180 OR APPROVED SUBSTITUTE. DOCUMENTATION OF PURCHASE OF ONE OF THESE SPECIFIC MIXES SHALL BE SUBMITTED TO LANDSCAPE ARCHITECT. IF EQUAL IS PROPOSED, CONTRACTOR SHALL SUBMIT SAMPLE AND COMPLETE ANALYSIS WITH TEST RESULTS AND METHOD OF PRODUCTION FOR EVALUATION AS AN EQUAL SUBSTITUTE.
  - 6" DEPTH SHALL BE MINIMUM APPLICATION IN ALL BED AREAS AND 8" MIN. IN ALL SHRUB PIT PLANTING AREAS.
- 2. SOD/HYDROMULCH AREAS:
  - 4" MIN. OF ENRICHED TOPSOIL FROM NEW EARTH OR SECOND NATURE, URBAN SOILS, OR APPROVED EQUAL

**LEGEND**

E.J.	EXPANSION JOINT
EQ.	EQUAL
F.H.	FIRE HYDRANT
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P.A.	PLANTING AREA
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Project Number: 22049

REV. NO.	DATE	DESCRIPTION	BY

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REV. NO.	DATE	DESCRIPTION	BY

LANDSCAPE ARCHITECTURE + URBAN DESIGN

1432 S ST MARY'S ST, SAN ANTONIO, TX 78210  
 O: (210) 963-7447  
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HIKE & BIKE TRAIL  
 LANDSCAPE  
 PLANTING SPECS  
 LP 2.2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET	N/A
DWG: KB	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG: CE	SAT	WILSON	0915	14
			048	77

Design Filename: \$FILE\$

Plotted on: \$DATE\$

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PART 2 EXECUTION:

2.1 PREPARATION

UNLESS SHOWN OTHERWISE ON THE PLANS LANDSCAPE CONTRACTOR SHALL RECEIVE THE SITE AT APPROXIMATELY FINISH GRADE LESS ANY SETTLEMENT THAT MAY HAVE OCCURRED SINCE SITE CONSTRUCTION AND BACKFILLING. THIS GRADE SHALL BE RAKED TO REMOVE ALL DEBRIS INCLUDING STICKS, CLOUDS, AND STONES AND SHALL BE FINE GRADED TO ELIMINATE ALL HUMPS, RUTS, DEPRESSIONS AND ABRUPT CHANGES IN GRADE AND ANY AREA THAT COULD CAUSE WATER TO POND.

- A.) PRIOR TO PLANTING IF VEGETATION IS GROWING IN PLANTING/LAWN AREA, APPLY HERBICIDE AT RATES RECOMMENDED BY MANUFACTURER. ALLOW TO DIE, AND THEN GRUB OUT ROOTS TO MINIMUM 1/2 INCH DEPTH.
B.) MARK LOCATION OF TREES AND OUTLINES OF PLANT BEDS USING COLORED WOOD STAKES OR FLAGS PRIOR TO BEGINNING PLANTING; OBTAIN LANDSCAPE ARCHITECT'S APPROVAL PRIOR TO PROCEEDING.

2.2 PLANTING TREES AND SHRUBS

- A.) REMOVE CONTAINERS WITHOUT DAMAGE TO ROOTS.
B.) REMOVE BOTTOM OF PLANT BOXES PRIOR TO PLACING PLANTS; REMOVE SIDES AFTER PLACEMENT AND PARTIAL BACKFILLING. PREVENT DAMAGE TO ROOTS.
C.) REMOVE UPPER THIRD OF BURLAP FROM BALLED AND BURLAP TREES AFTER PLACEMENT.
D.) PLACE PLANT UPRIGHT AND PLUMB IN CENTER OF HOLE. PULL ANY WEEDS GROWING IN TREE BALL AND EXPOSE ROOT FLARE (THIS WILL BE THE TOP MOST IDENTIFIABLE ROOT), REMOVE ANY GIRDLING ROOTS AND SET PLANT SO THAT ROOT FLARE IS 1" ABOVE FINISH GRADE. ORIENT PLANTS FOR BEST APPEARANCE. BACKFILL THE BOTTOM 1/3 OF THE EXCAVATION WITH SOIL CUT FROM EXCAVATION OF PIT AND THOROUGHLY WATER THIS SOIL TO SETTLE IN. BACKFILL THE REMAINDER OF THE EXCAVATION WITH A 50/50 MIX OF PLANT BED MIX AND NATIVE SOIL EXCAVATED FROM THE PIT. IN BACKFILL MANUFACTURERS DIRECTION AND APPLICATION RATES. LIGHTLY TAMP AND WATER SOIL TO REMOVE ALL AIR POCKETS. FOR PLANTS OUTSIDE OF PLANTING BEDS, CONSTRUCT 3 INCH HIGH WATER CONTAINMENT RING AROUND PLANT. SPREAD MULCH TO MINIMUM 4 INCH DEPTH OVER PLANT BASIN.
E.) ADJUST PLANT HEIGHT IF SETTLEMENT OCCURS AFTER BACKFILL AND STAKE AS DETAILED.
1. TWO TO THREE WEEKS FOLLOWING PLANTING, INJECT PLANT HEALTH CARE INJECTABLE INOCULATE AROUND ROOT BALL FOLLOWING MANUFACTURER'S DIRECTIONS AND APPLICATION RATES. CONTACT LANDSCAPE ARCHITECT TO OBSERVE THIS OPERATION.
F.) TRIM PLANTS TO REMOVE DEAD AND INJURED BRANCHES ONLY. TREAT CUTS OVER 3/4 INCH DIAMETER WITH TREE PAINT.
G.) BRACE PLANTS OVER 65 GALLONS SIZE IMMEDIATELY AFTER PAINTING:
1. FOR TREES 2" CAL. AND GREATER PROVIDE STAKING AS DETAILED. POSITION TO PREVENT HAZARDS TO PEDESTRIANS.
2. DO NOT RESTRICT PLANT MOVEMENT UNDER LIGHT WIND LOADS OR DAMAGE BARK.

2.3 PLANT BEDS (PLANTING MASS SHRUBS, GROUNDCOVERS), AND ANNUALS (SEE DETAILS)

- A.) EXCAVATE PLANT BED TO DEPTH AS DETAILED ON PLANS.
B.) BACKFILL WITH SPECIFIED 4-WAY MIX AND FERTILIZER AS SPECIFIED FOLLOWING MANUFACTURERS INSTRUCTIONS.
C.) INSTALL METAL EDGINGS TO SEPARATE ALL PLANTER BEDS FROM TURF AND AT LOCATIONS INDICATED ON PLANS.
D.) PLACE PLANTS IN STRAIGHT, EVENLY SPACED ROWS AT SPACING INDICATED ON DRAWINGS, TO UNIFORMLY FILL BEDS. USE TRIANGULAR SPACING METHOD UNLESS OTHERWISE INDICATED.
E.) WATER PLANTS THOROUGHLY IMMEDIATELY AFTER PLANTING. REPAIR SETTLED AREAS.
F.) ADJUST FINAL GRADES TO 1/2 INCH BELOW ADJACENT PAVING CURBS.
G.) SPREAD MULCH TO MINIMUM 4 INCH DEPTH OVER PLANT BEDS AS DETAILED.

2.4 CLEANING AND ADJUSTING

- A.) REMOVE PLANT CONTAINERS, TRASH, RUBBISH, AND EXCESS SOILS FROM SITE DAILY AND AT COMPLETION OF TREE, SHRUBS AND GROUNDCOVER PLANTING.
B.) REPAIR RUTS, HOLES AND SCARS IN GROWING SURFACE.

2.4 LAWN APPLICATION (AT COMPLETION OF TREE, SHRUB AND GROUNDCOVER PLANTINGS)

A.) COORDINATION:

- 1. HYDROMULCH AND SOD AFTER TREE, SHRUB AND GROUNDCOVER INSTALLATION IS COMPLETE.
1. CONTRACTOR TO COORDINATE WITH IRRIGATION CONTRACTOR TO INSURE FUNCTIONAL IRRIGATION SYSTEM PRIOR TO ANY LAWN INSTALLATION.

B.) PREPARATION:

- 1. PRE-PLANT WEED CONTROL: IF WEEDS EXIST WITHIN PROPOSED LANDSCAPE AREAS AT THE BEGINNING OF WORK, SPRAY WITH VINEGAR AND ORANGE OIL SOLUTION, AS RECOMMENDED AND APPLIED BY AN APPROVED LICENSED APPLICATOR. CLEAR AND REMOVE THESE EXISTING WEEDS UPON SOLUTION'S COMPLETED ACTION BY GRUBBING OFF ALL PLANTS AT LEAST 1/2"-1" BELOW THE SURFACE OF THE SOIL.
2. CONTRACTOR TO SCARIFY GROUND SURFACE TO A MINIMUM 2" DEPTH FOR ALL GRASSES AND REMOVE ALL STICKS, TRASH, ROCKS AND OTHER DEBRIS AND DISPOSE OFF SITE.
3. IF EXISTING SOIL IN AN AREA IS FOUND TO BE CONTAMINATED OR OTHERWISE UNSUITABLE, CONTRACTOR SHALL PROVIDE COST PER CUBIC YARD TO REPLACE WITH SOIL SUITABLE FOR TURF.
4. CONTRACTOR TO RAKE ENTIRE AREA, LEVELING ANY IMPERFECTIONS IN THE GRADE. LANDSCAPE CONTRACTOR TO ENSURE THAT THERE WILL BE POSITIVE DRAINAGE AND NO PONDING ON SITE. FINISHED GRADE OF LAWN AREAS TO BE 1/2" BELOW TOP OF CURBS, SIDEWALKS AND OTHER PAVEMENTS. REMOVE ANY LARGE (GREATER THAN 1") DIRT CLOUDS, ROCKS, AND TRASH AND PREPARE A SMOOTH, LEVEL, LOOSE AND COARSE SURFACE. LANDSCAPE ARCHITECT TO APPROVE FINE GRADING PRIOR TO ANY LAWN INSTALLATION. LAWN BED SHALL BE MOIST (BUT NOT MUDDY) TO RECEIVE SEED AND SOD.

C.) HYDROMULCH APPLICATION:

- 1. FOR ALL HYDROMULCH AREAS, INSTALL SOD STRIPS OF TURF ADJACENT TO FINISH PAVING AND CURBS AND AS SHOWN ON PLANS.
2. LAWN AREAS TO BE SEEDED IMMEDIATELY AFTER PREPARATION OF THE BED. APPLY A UNIFORM COAT OF HYDROMULCH AT THE RATES SPECIFIED BELOW:

A.

- 1). REFERENCE PLANS
2). ANNUAL RYE GRASS -8 LBS./1,000 S.F.

B.

WOOD CELLULOSE FIBER MULCH - 60 LBS./1,000 S.F.

C.

FERTILIZER: "PHC FOR TURF" AT A RATE OF SEVEN (7) POUNDS PER 1,000 SQUARE FEET.

D.

INCORPORATE A TACKIFIER WITH MULCH CAP. DELAY IRRIGATION 8 HOURS TO PERMIT TACKIFIER TO SET.

3.

SEED AREAS WITHIN SEEDING LIMITS INDICATED ON THE PLAN AND AREAS DISTURBED BY CONSTRUCTION OPERATIONS.

4.

PROTECT EXISTING UTILITIES (INCLUDING IRRIGATION SYSTEM), PLANTING, PAVING, FENCING, AND OTHER SITE AMENITIES FROM DAMAGE CAUSED BY HYDROMULCHING OPERATION.

5.

IMMEDIATELY FOLLOWING APPLICATION OF HYDROMULCH, THE CONTRACTOR SHALL WASH EXCESS HYDROMULCHING MATERIAL FROM PREVIOUSLY PLANTED MATERIAL, ARCHITECTURAL FEATURES, ETC.. CARE SHALL BE EXERCISED TO AVOID WASHING OR ERODING MULCH MATERIALS FROM LAWN AREA.

6.

UPON ESTABLISHMENT OF LAWN, APPLY A POST EMERGENT HERBICIDE FOR CONTROL OF NUT GRASS AND WEEDS. FERTILIZE AT 45 DAY INTERVALS WITH SPECIFIED PLANT HEALTH GROUP'S FERTILIZER AT A RATE OF SEVEN (7) POUNDS PER 1,000 SQUARE FEET DURING AT 45 DAY INTERVALS DURING THE 90 DAY MAINTENANCE PERIOD.

7.

SHOULD LAWN AREAS BE SEEDED WITH ANNUAL RYE GRASS THE CONTRACTOR SHALL RETURN TO THE SITE BETWEEN APRIL 15 AND MAY 15 TO RE-PREPARE SEED BED AND HYDROMULCH WITH BERMUDA SEED IN ORDER TO ESTABLISH A PERMANENT TURF COVER IN ALL LAWN AREAS.

D.) SOD INSTALLATION:

1.

INCORPORATE SPECIFIED LAWN FERTILIZER AT SEVEN (7) POUNDS PER 1000 SQUARE FEET OF LAWN AREA FOR SOD.

2.

IF WEEDS EXIST WITHIN PROPOSED LANDSCAPE AREAS AT THE BEGINNING OF WORK, SPRAY WITH VINEGAR AND ORANGE OIL SOLUTION, AS RECOMMENDED AND APPLIED BY AN APPROVED LICENSED APPLICATOR. CLEAR AND REMOVE THESE EXISTING WEEDS UPON SOLUTION'S COMPLETED ACTION BY GRUBBING OFF ALL PLANTS AT LEAST 1/2"-1" BELOW THE SURFACE OF THE SOIL.

3.

LAY SOD WITHIN 24 HOURS FROM TIME OF STRIPPING.

2.

LAY SOD TO FORM SOLID MASS WITH TIGHTLY FITTED JOINTS. BUTT ENDS AND SIDES OF SOD STRIPS. STAGGER STRIPS TO OFFSET JOINTS IN ADJACENT COURSES. WORK SIFTED SOIL INTO MINOR CRACKS BETWEEN PIECES OF SOD; REMOVE EXCESS SOD TO AVOID SMOTHERING ADJACENT GRASS.

5.

SOD PADS SHALL BE OF FULLEST SIZE POSSIBLE-NO SOD SLIVERS WILL BE PERMITTED.

6.

FINISHED GRADE OF NEW SOD SHALL BE FLUSH WITH ADJACENT LAWN AND PAVEMENT. ENSURE POSITIVE DRAINAGE.

7.

ROLL ENTIRE SODDED AREA WITH SOD ROLLER. WATER SOD THOROUGHLY.

2.5 ACCEPTANCE

A.)

PRIOR TO SCHEDULING A SUBSTANTIAL COMPLETION INSPECTION LANDSCAPE CONTRACTOR SHALL THOROUGHLY CLEAN SITE OF ALL DEBRIS AND TRASH AND REPAIR ANY DAMAGE TO FINISH GRADE. WHEN LANDSCAPE WORK IS COMPLETE A SUBSTANTIAL COMPLETION INSPECTION WILL BE HELD. FOLLOWING COMPLETION OF ANY PUNCH LIST ITEMS GENERATED FROM THE SUBSTANTIAL COMPLETION INSPECTION A FINAL INSPECTION WILL BE HELD AND IF FOUND ACCEPTABLE A CERTIFICATE OF FINAL ACCEPTANCE WILL BE ISSUED.

B.)

LANDSCAPE CONTRACTOR SHALL CONTINUE MAINTENANCE UNTIL FINAL ACCEPTANCE AT WHICH TIME THE SPECIFIED MAINTENANCE PERIOD WILL BEGIN.

LEGEND

Table with 2 columns: Symbol/Code and Description. Includes symbols for Expansion Joint, Equal, Fire Hydrant, High Point, Limit of Construction, Planting Area, Reference, Right of Way, Top of Wall, Typical, Man Hole, Power Pole, Matchline, Right of Way, Easement, and Centerline.



MAY 18, 2023

Project Number: 22049

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Table with 6 columns: DGN, CHK DGN, DWG, DIST, COUNTY, CONT. NO., SECT. NO., JOB NO., SHEET NO. Includes values for Texas, Wilson County, and sheet number 78.