FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP 2023(951) HES		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	04	051	UA 90

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

INDEX OF SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT
PROJECT NO. STP 2023(951)HES
CSJ: 0025-04-051

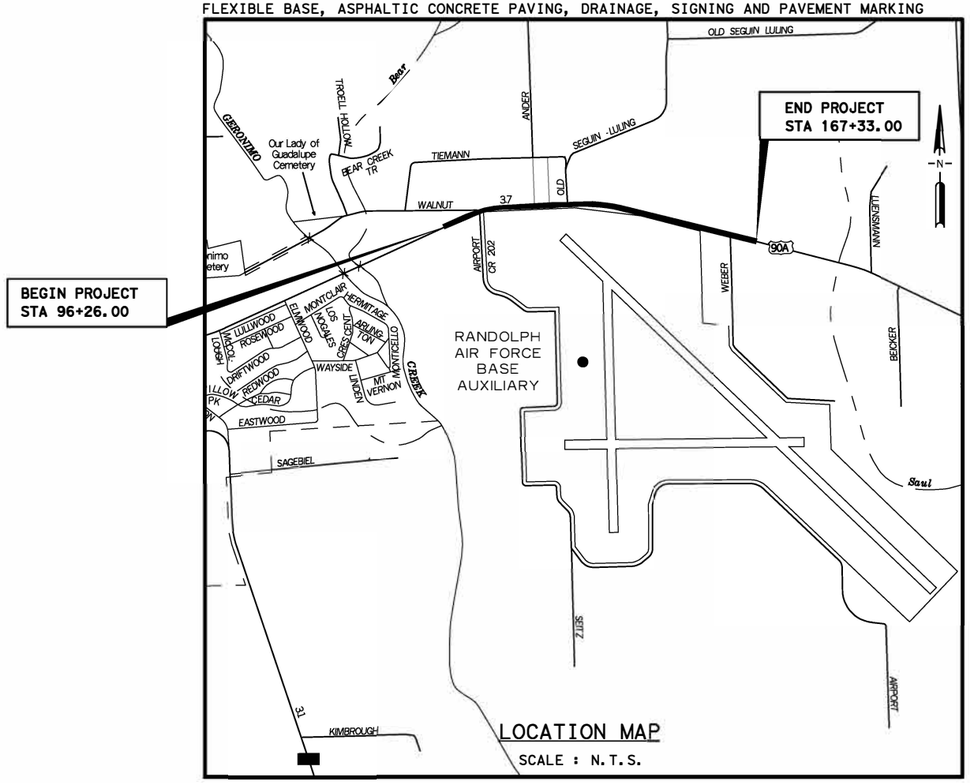
GUADALUPE COUNTY
UA 90

LIMITS FROM: 500 FT EAST OF WEBER ROAD
TO: 500 FT WEST OF CR 202 (AUX AIRPORT ROAD)

NET LENGTH OF ROADWAY = 7107.00 FT = 1.346 MI
NET LENGTH OF PROJECT = 7107.00 FT = 1.346 MI

FUNCTIONAL CLASSIFICATION-MINOR ARTERIAL
DESIGN SPEED= 40 MPH
AREA OF DISTURBED SOIL= 6 ACRES
ADT (2024): 5,700
ADT (2044): 7,800

FOR WORK CONSISTING OF: CONSTRUCTION OF CONTINUOUS TWO WAY LEFT TURN LANE, SUBGRADE, FLEXIBLE BASE, ASPHALTIC CONCRETE PAVING, DRAINAGE, SIGNING AND PAVEMENT MARKING



LOCATION MAP
SCALE : N.T.S.

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

_____ P.E. _____
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

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)

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

Texas Department of Transportation

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
738 Hwy 6 South, Suite 430
Houston, Texas 77079
(832) 619-1000
TBPE F-1640

SUBMITTED FOR LETTING DocuSigned by: 4/26/2023
Orlando Gallegos, P.E.
TRANSPORTATION ENGINEER SUPERVISOR
448D458C802A437...

RECOMMENDED FOR LETTING DocuSigned by: 4/27/2023
Clayton Ripps, P.E.
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT
74B3AA72B62D4DE...

REVIEWED FOR LETTING DocuSigned by: 4/26/2023
JCRogers, P.E.
TRANSPORTATION ENGINEER SUPERVISOR
F2910DBAA4504B9...

APPROVED FOR LETTING DocuSigned by: 4/26/2023
Gina E. Gallegos, P.E.
DISTRICT ENGINEER
124372EGDF604F3...

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

LEVELS DISPLAYED
1

COUNTY GUADALUPE PROJ. NO.
HWY. NO. UA 90 LETTING DATE
DATE ACCEPTED

SHEET NO.	DESCRIPTION
	GENERAL
1	TITLE SHEET
2	INDEX OF SHEETS
3	PROJECT LAYOUT
4-5	TYPICAL SECTIONS
6, 6A-6E	GENERAL NOTES
7, 7A-7D	ESTIMATE & QUANTITY SUMMARY
8	SUMMARY OF TRAFFIC CONTROL QUANTITIES
9	SUMMARY OF REMOVAL QUANTITIES
10	SUMMARY OF ROADWAY QUANTITIES
11	EARTHWORKS SUMMARY
12	SUMMARY OF DRAINAGE QUANTITIES
13	SUMMARY OF SIGNING & PAVEMENT MARKING QUANTITIES
14	SUMMARY OF SMALL SIGNS
14A	SUMMARY OF SMALL SIGNS
15	SUMMARY OF SWPPP QUANTITIES
	TRAFFIC CONTROL PLAN
16	SEQUENCE OF WORK
17-18	TRAFFIC CONTROL PLAN - TYPICAL SECTION
19-24	TRAFFIC CONTROL PLAN - PHASE 1
25-32	TRAFFIC CONTROL PLAN - PHASE 2
	TRAFFIC CONTROL PLAN STANDARDS
33	+ TREATMENT FOR VARIOUS EDGE CONDITIONS
34-45	+ BC(1)-21 THRU BC(12)-21
46	+ TCP(1-1)-18
47	+ TCP(1-2)-18
48	+ TCP(1-4)-18
49	+ TCP(2-1)-18
50	+ TCP(3-1)-13
51	+ TCP(3-2)-13
52	+ TCP(3-3)-14
53	+ WZ(TD)-17
54	+ WZ(STPM)-13
55	+ WZ(BRK)-13
	ROADWAY DETAILS
56	SURVEY CONTROL INDEX SHEET
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58-60	HORIZONTAL ALIGNMENT DATA SHEETS
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68	OMITTED
69-75	ROADWAY PLAN LAYOUTS
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85-86	OMITTED
	ROADWAY DETAILS STANDARDS
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97A	ROADSIDE DITCH HYDRAULIC DATA
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139	* EC(2)-16
140	* EC(3)-16
141-143	* EC(9)-16

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED BY + HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION

TYLER BARROWS, P.E. — 4/20/2023 Date

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED BY * HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION

PAUL E. BRIGHT, P.E. — 4/20/2023 Date

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TEDSI TBPE F-1640

Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

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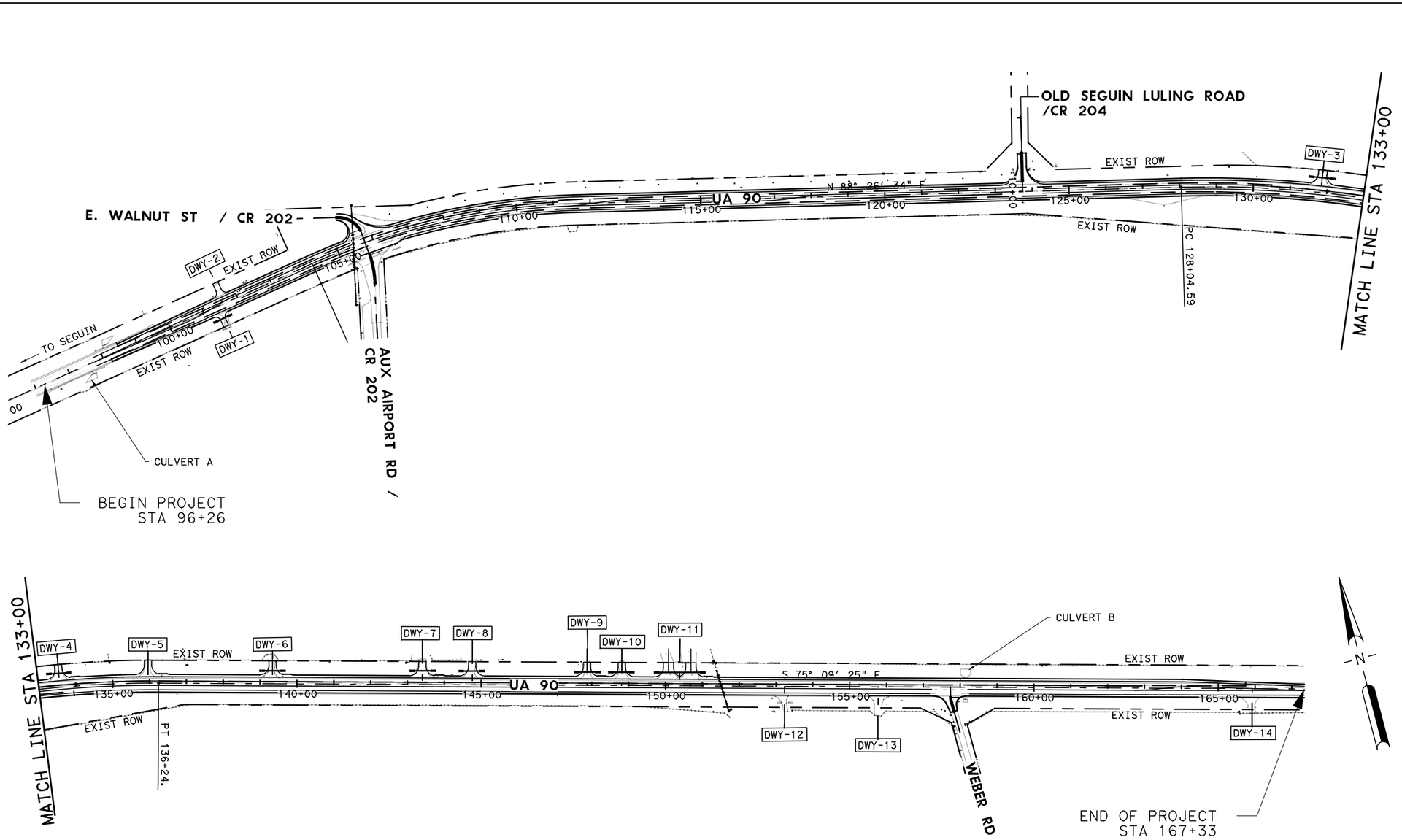

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER

4/19/2023

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Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

PROJECT LAYOUT

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
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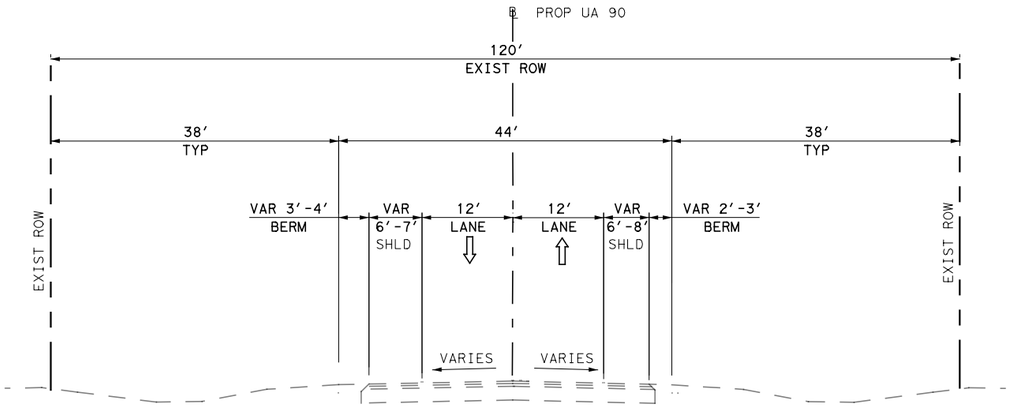
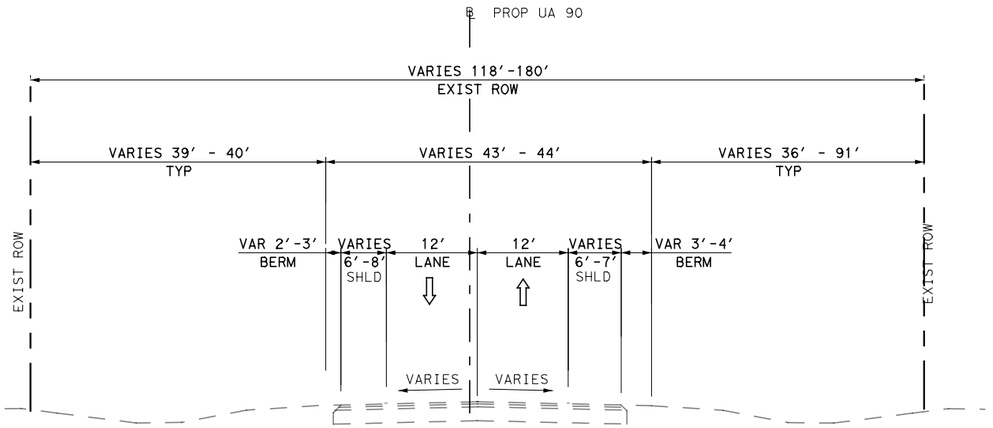
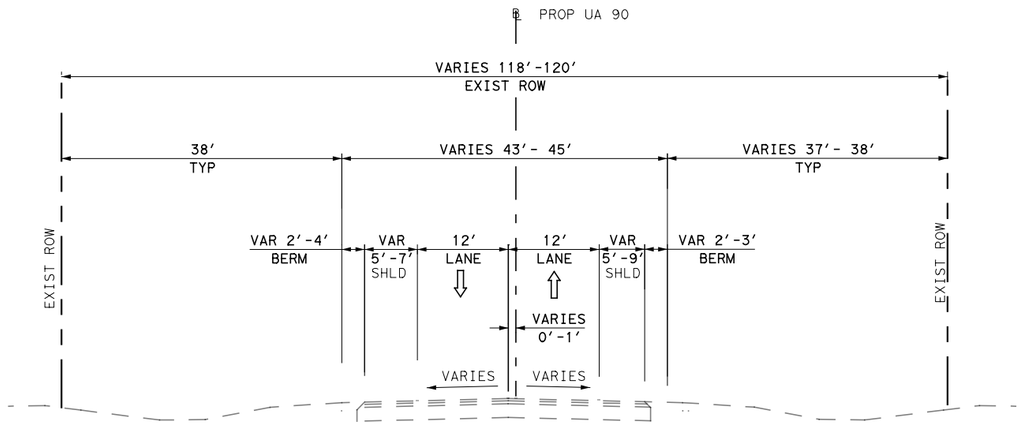


EXISTING TYPICAL SECTION
BEGIN TO STA 100+26.08



EXISTING TYPICAL SECTION
STA 100+26.08 TO STA 105+13.62
STA 108+08.25 TO END



EXISTING TYPICAL SECTION
STA 105+13.62 TO STA 108+08.25

PAUL E. BRIGHT
61108
REGISTERED
PROFESSIONAL ENGINEER
STATE OF TEXAS
4/19/2023

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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TYPICAL SECTIONS (EXISTING)

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
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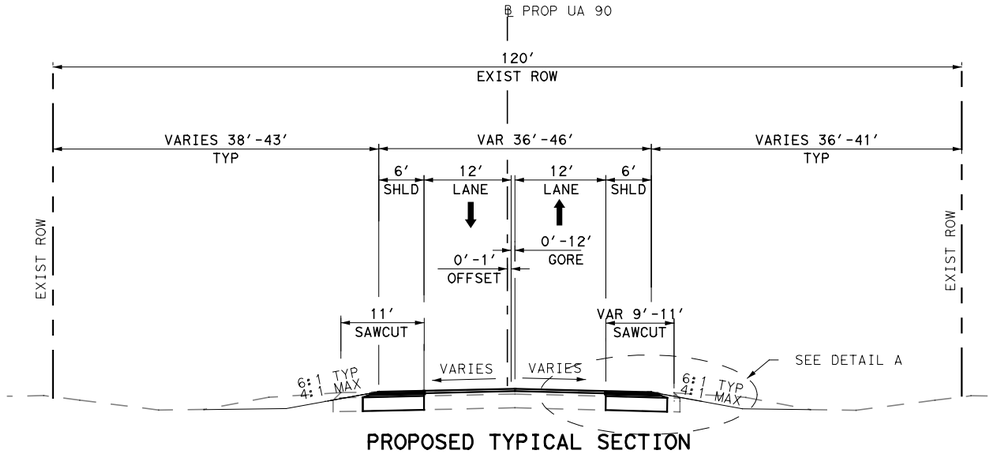
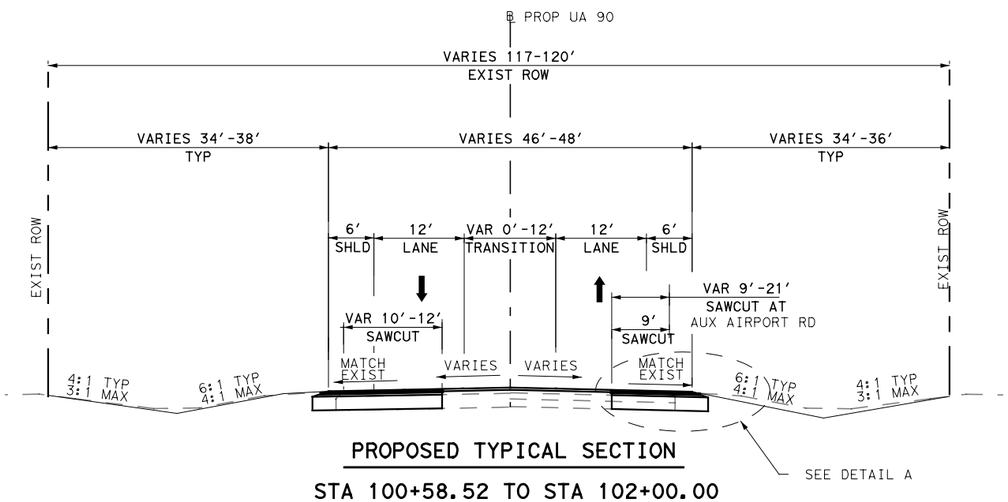


PROPOSED TYPICAL SECTION

BEGIN STA 97+76 TO STA 100+58.52

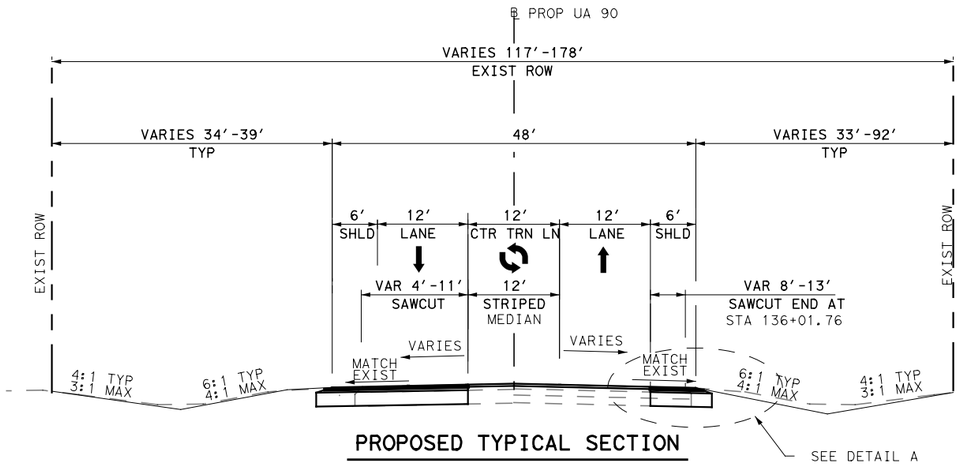


PROPOSED TYPICAL SECTION

STA 100+58.52 TO STA 102+00.00

STA 111+12.53 TO STA 112+79.46

STA 116+82.75 TO STA 118+42.01

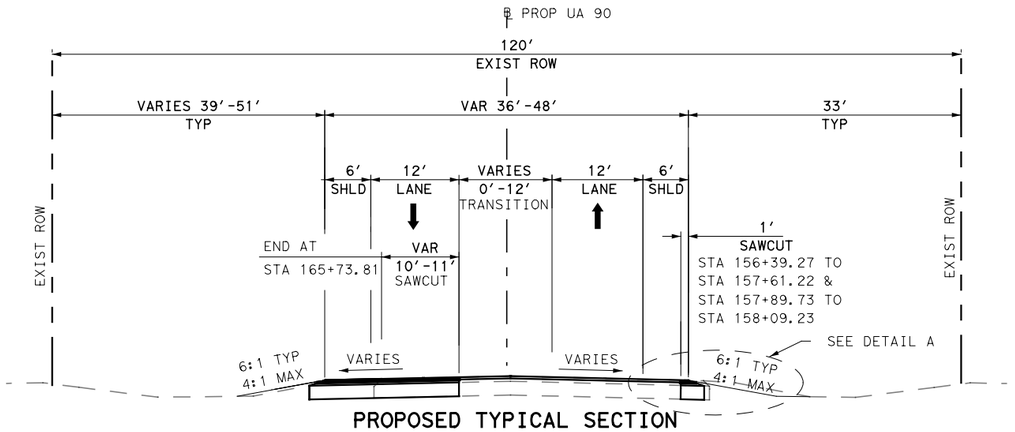


PROPOSED TYPICAL SECTION

STA 102+00.00 TO STA 111+12.53

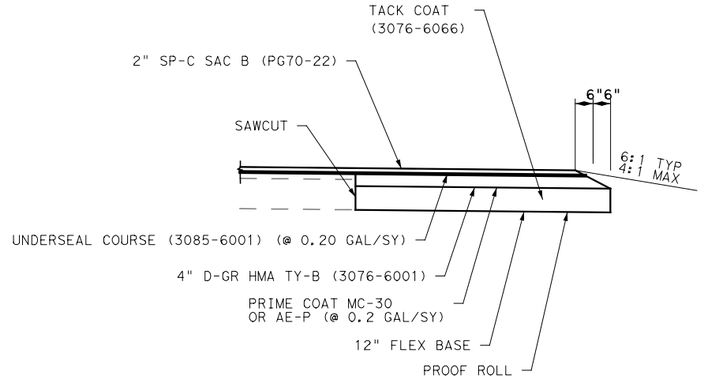
STA 112+79.46 TO STA 116+82.75

STA 118+42.01 TO STA 162+92.55



PROPOSED TYPICAL SECTION

STA 162+92.55 TO END



DETAIL A

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED
PROFESSIONAL ENGINEER

4/19/2023

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Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TYPICAL SECTIONS (PROPOSED)

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
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TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
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4/20/2023
3:20:58 PM
pw:\\tedsi-pw.bentley.com:tedsi-pw-01\Documents\Projects\2019\2019-2078-00 - TxDOT Traffic Engineering (Kimley-Horn)\Work Authorizations\2019-2078-1A - US90A Widening, Weber Road to CR 202\6.0 TEDSI Design\6.08 CAD

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

========== **Basis of Estimate** ==========

Item	Description	Rate/Area	Quant-Unit
168	Veg Watering	15.6 Gal/8,342 SY	130 MG
3085	Underseal Course	0.2 Gal/37,644 SY	7529 Gal

========== **Asphalt Concrete Pavement** ==========

Type	Location	Depth	Rate/Area	Quant-Tons
B	UA 90	4”	460 lbs/17,077 SY	3928 TONS
SP-C	UA 90	2”	230 lbs/37,644 SY	4329 TONS

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

City of San Antonio: (210) 207-8642

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.

Notify the Engineer at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals.

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.

The Contractor has the option to adjust or construct all manholes and valves to final pavement elevations prior to the final mat of HMA or after final mat of HMA. If between the final

elevation adjustment and the final mat of HMA, the manholes and valves are going to be exposed to traffic, place temporary asphalt around the manhole and valve to provide a +/- 50:1 taper. The cost of elevation adjustment and the concrete apron around the manhole and valve will be part of the manhole and valve work. The asphalt tapers are part of the HMA work.

Hurricane Evacuation

Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

The Contractor should be aware that the "City Public Service" (CPS) will be consulted by the Engineer in matters concerning the execution of the work, materials and testing related to the CPS work. As such, a CPS employee may be observing the construction and related operations as they progress.

If a sanitary sewer overflow (SSO) occurs:

1. Attempt to eliminate the source of the SSO.
2. Contain sewage from the SSO to the extent possible to prevent contamination of waterways.

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, P.E. Will.Lockett@txdot.gov
Assistant Area Engineer, Jeb S. Smith, P.E. Jeb.Smith@txdot.gov

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

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

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

The Contractor must measure the vertical clearance at each structure after the final surface of the roadway is completed and provide the vertical clearance measurement to the Engineer.

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

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.

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

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

Steel Wrapped or Asbestos Utility Lines:

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

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

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

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

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 90-day 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 Critical Path Method (CPM) schedule.

The CPM schedule shall be created and maintained using software fully compatible with Primavera Project Planner version P6 Professional R15.2 .

The road-user cost liquidated damages shall be $1,000 per day.

--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.

--Item 132—

Item	Description	Percent Retained-Sieve				LL Max	PI Max	PI Min
		3"	3/8"	#4	#40			
132	Embankment (ORD COMP)(TY C)	0	-	30-75	50-85	50	20	6

--Item 161--
Approximately 6755 CY of existing topsoil may be salvaged and windrowed or stockpiled (as approved) for later use as Compost Manufactured Topsoil (CMT). Place erosion control measures for the stockpile and/or windrow.

--Item 164--
Drill seeding of permanent grasses requires the use of approved grass seeding equipment capable of properly storing and metering the release of small seeds (such as Bermuda grass) separately from fluffy type seeds (such as bluestems). Equipment manufactured for planting grain crops is acceptable for planting temporary cool season seeds, but not for planting the permanent seed mix.

If performing a permanent seeding in an area with established temporary grass cover and mowing is performed instead of tilling, seed and fertilizer may be distributed simultaneously during "Broadcast Seeding" operations, provided each component is applied at the specified rate.

--Item 166--
Use a fertilizer with an analysis of 13-13-13 (50% of the total N must be sulfur coated urea) to apply 60 lbs of actual N per acre. This requires 460 lbs of 13-13-13 per acre or .095 lbs per SY of area.

--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 316--
Asphalt season will be year-round but meet temperature limitations specified in the standard specifications for Item 316.

Ensure that the asphalt for precoating the aggregate and the asphalt used for the surface treatment will not result in a reaction that may adversely affect the bonding of the aggregate and asphalt during the surface treatment operation.

Do not add bag house fines in the production of precoated material.

Clean all concrete curbs, islands, medians, etc. that get coated with asphalt.

--Item 320--
Construct all longitudinal ACP joints adjacent to a travel lane with a joint maker device that will create a 3:1 to 6:1 taper. For placement of 2 inches or more, the device shall provide a maximum ½ inch vertical edge. Taper outside edges (next to the grass) or backfill (shoulder-up) the same day.

Provide a material transfer device capable of providing a continuous flow of material to the paver. The material transfer device will consist of a windrow elevator or better.

When placing Item 346 mixtures, use a self-propelled wheel mounted MTV capable of receiving mix from the haul trucks, separate from the paver. It shall have a minimum storage capacity of

approximately 25 tons. It shall be equipped with a pivoting discharge conveyor and shall completely and thoroughly remix the material prior to placement. The effectiveness of the MTV's remixing ability is subject to the approval of the Engineer. In addition, the paver shall have a surge storage insert with a minimum capacity of 20 tons.

--Item 354--
Retain planed material.

Take precaution to avoid damage to existing bridge decks and armor joints. Repair any damage to the bridge decks and/or armor joints as approved. This work will not be paid directly but will be performed at the Contractor's expense.

--Item 462--
The following structures shall be cast-in-place:
Wingwall on Culvert Sta 158+14

--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.

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.

Mounting and moving the mailbox as needed for the various construction phases is subsidiary to Item 502.

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.

Temporary Rumble Strips are to be used according to WZ (RS)-22.

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.

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

At no time shall two consecutive intersecting roadways be closed at one time during construction.

At no time shall two consecutive ramps be closed at one time during construction or overlay operations.

Unless otherwise noted in the plans and/or as directed by the Engineer, daily lane closures shall be limited according to the following restrictions: M-F 9am to 4pm or as approved by the Engineer.

Nighttime: No Nighttime Lane closures unless approved by the Engineer.

(With uniformed off duty law enforcement officers)

Weekend closures when approved by the Engineer:

No lane closures will be permitted for the following dates and/or special events:
Between December 15 and January 1
Easter Weekend between March 29 and March 31, 2024
Wednesday before Thanksgiving thru the Sunday after Thanksgiving
Saturday and Sunday before Memorial Day and Labor Day
Saturday or Sunday when July 4 falls on a Friday or Monday

Hauling

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

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

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

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

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

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

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

--Item 585--
Use Surface Test Type B, pay adjustment schedule 1 to evaluate ride quality of travel lanes.

--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.

--Item 672--
Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 677--
Obtain approval before using the mechanical method for the elimination of existing thermoplastic pavement markings.

--Item 730--
Mow full-width and hand trim the right of way, including newly seeded or sodded areas, when vegetation reaches a height of 16” or when directed. Removal of brush sprouts growing within guardrail, concrete barriers or at other locations where mowing or hand trimming is done within the limits of construction is required and subsidiary to this item. Mowing may be required more often in newly sodded or seeded areas than in other parts of the project because of the supplemental irrigation these areas receive and the resulting weed growth. Coordinate mowing to avoid rutting or compaction of the soil when mowing where supplemental irrigation is being used. Use mowing equipment that will not adversely affect soil retention blankets or mulches that have been applied. Work performed under this item does not replace the mowing required when placing permanent seeding in an area that has established temporary seeding as described in Article 164.3, Construction.

--Item 734--
Perform Litter Removal once a month or as directed by the Engineer.

--Item 738--
Perform Cleaning and Sweeping Highways once a month or as directed by the Engineer.

--Item 3076, 3077, 3079, 3080, 3081, & 3082 --
Table 10 in Item 3076 and Table 11in Item 3077, Hamburg Wheel Test Requirements tested in accordance with Tex-242-F are changed for PG 64-22 or lower and PG 70-22. Minimum number of passes at 12.55 mm Rut Depth, Tested at 50 degrees C will be 5,000 and 10,000 respectively.

Submit a copy of the Tex 233-F production charts on a weekly basis. At the end of the ACP work, provide all originals.

Crushing of aggregate for hot mix and immediate use for production of the mix is not allowed. Stockpile the aggregate until enough material is available for five days of production unless prior approval is provided

Hold a pre-paving meeting one month prior to the placement of the hot mix. The date and time of pre-paving meeting should be coordinated with the Engineer prior to scheduling.

Do not use diesel or solvents as asphalt release agents in production, transportation, or construction. A list of approved asphalt release agents is available from the District Laboratory.

No more than one hot mix lot will be open for any specific type of hot mix, unless authorized. After a lot is open and the Contractor gets approval to change plants, the previous lot will be closed, and a new lot will be opened. The numbering for the lots produced at the new plant will start with No. 1. If allowed to switch back to the original or previous plant, the next lot from that plant will resume numbering sequentially from the last lot produced by that plant.

--Item 3084 & 3085 --
The minimum application rates are listed in Table UC/BC. The Engineer may adjust the application rates taking into consideration the existing pavement surface conditions.

Table UC/BC

Material	Minimum Application Rate (gal. per square yard)
TRAIL – Hot Asphalt	0.15
Spray Applied Underseal Membrane	0.20
Seal Coat – Emulsion (CHFRS-2P, CRS-2P)	0.25
Seal Coat – Asphalt (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	0.23
Aggregate for Seal Coat Options TY PB GR 4(AC) or TY B GR 4(Emulsion)	1 CY:120 SY

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0025-04-051 **DISTRICT** San Antonio **COUNTY** Guadalupe
HIGHWAY UA 90

			CONTROL SECTION JOB		**0025-04-051**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00184291**		
			COUNTY		**Guadalupe**		
			HIGHWAY		**UA 90**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	69.000		69.000	
	104-6009	REMOVING CONC (RIPRAP)	SY	53.000		53.000	
	105-6014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	13,850.000		13,850.000	
	110-6001	EXCAVATION (ROADWAY)	CY	5,702.390		5,702.390	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	3,829.140		3,829.140	
	161-6017	COMPOST MANUF TOPSOIL (4")	SY	7,134.000		7,134.000	
	164-6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	8,343.000		8,343.000	
	166-6001	FERTILIZER	AC	1.720		1.720	
	168-6001	VEGETATIVE WATERING	MG	130.000		130.000	
	216-6001	PROOF ROLLING	HR	14.000		14.000	
	247-6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	5,692.000		5,692.000	
	310-6027	PRIME COAT(MC-30 OR AE-P)	GAL	3,416.000		3,416.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	4.000		4.000	
	462-6063	CONC BOX CULV (8 FT X 4 FT)(EXTEND)	LF	4.000		4.000	
	464-6018	RC PIPE (CL IV)(24 IN)	LF	131.000		131.000	
	464-6080	RC PIPE (ARCH)(CL V)(DES 3)	LF	370.000		370.000	
	467-6270	SET (TY I)(S= 8 FT)(HW= 4 FT)(4:1) (C)	EA	2.000		2.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	6.000		6.000	
	467-6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	12.000		12.000	
	480-6001	CLEAN EXIST CULVERTS	EA	2.000		2.000	
	496-6004	REMOV STR (SET)	EA	6.000		6.000	
	496-6007	REMOV STR (PIPE)	LF	45.000		45.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	11.000		11.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	222.000		222.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	222.000		222.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,971.000		1,971.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,971.000		1,971.000	
	530-6005	DRIVEWAYS (ACP)	SY	1,376.000		1,376.000	
	560-6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	6.000		6.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	10.000		10.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	7.000		7.000	
	644-6036	IN SM RD SN SUP&AM TYS80(1)SA(U-BM)	EA	1.000		1.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	14.000		14.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	4.000		4.000	
	658-6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	4.000		4.000	
	662-6050	WK ZN PAV MRK REMOV (REFL) TY II-A-A	EA	578.125		578.125	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0025-04-051 **DISTRICT** San Antonio **COUNTY** Guadalupe
HIGHWAY UA 90

			CONTROL SECTION JOB		**0025-04-051**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00184291**		
			COUNTY		**Guadalupe**		
			HIGHWAY		**UA 90**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	23,139.000		23,139.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	23,141.000		23,141.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1,781.000		1,781.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	146.000		146.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	22.000		22.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	8.000		8.000	
	666-6156	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	EA	4.000		4.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	3,080.000		3,080.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	18,054.000		18,054.000	
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	14,942.000		14,942.000	
	672-6007	REFL PAV MRKR TY I-C	EA	94.000		94.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	809.000		809.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	29,625.000		29,625.000	
	3076-6001	D-GR HMA TY-B PG64-22	TON	3,928.000		3,928.000	
	3076-6066	TACK COAT	GAL	2,563.000		2,563.000	
	3077-6023	SP MIXESSP-CSAC-B PG70-22	TON	4,329.000		4,329.000	
	3085-6001	UNDERSEAL COURSE	GAL	7,529.000		7,529.000	
	18	LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF TRAFFIC CONTROL PLAN ITEMS					
SPEC ITEM #	502 6001	662 6050	662 6063	662 6095	677 6001
ITEM DESCRIPTION	BARRICADES, SIGNS AND TRAFFIC HANDLING	WK ZN PAV MRK REMOV (REFL) TY II-A-A	WK ZN PAV MRK REMOV (W)4"(SLD)	WK ZN PAV MRK REMOV (Y)4"(SLD)	ELIM EXT PAV MRK & MRKS (4")
UNITS	MO	EA	LF	LF	LF
TCP PHASE 1 SHEET 1 OF 6		0	16	16	32
TCP PHASE 1 SHEET 2 OF 6		54	2141	2141	4282
TCP PHASE 1 SHEET 3 OF 6		50	2004	2004	4008
TCP PHASE 1 SHEET 4 OF 6		50	2000	2000	4000
TCP PHASE 1 SHEET 5 OF 6		50	2003	2003	4006
TCP PHASE 1 SHEET 6 OF 6		15	614	614	1228
TCP PHASE 2 SHEET 1 OF 8		43	1727	1729	
TCP PHASE 2 SHEET 2 OF 8		50	1993	1993	
TCP PHASE 2 SHEET 3 OF 8		50	2000	2000	
TCP PHASE 2 SHEET 4 OF 8		50	1993	1993	
TCP PHASE 2 SHEET 5 OF 8		50	2000	2000	2773
TCP PHASE 2 SHEET 6 OF 8		50	2000	2000	4000
TCP PHASE 2 SHEET 7 OF 8		50	2000	2000	4000
TCP PHASE 2 SHEET 8 OF 8		16	648	648	1296
PROJECT TOTALS	11	579	23139	23141	29625

STATE OF TEXAS
TYLER BARROWS
147138
LICENSED
PROFESSIONAL ENGINEER

4/20/2023

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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TRAFFIC CONTROL QUANTITIES

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 3351
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	8
CONT.	SECT.	JOB	
0025	04	051	

SUMMARY OF REMOVAL ITEMS

LOCATION	104 6009	105 6014	496 6004	496 6007	644 6076	658 6060
	REMOVING CONC (RIPRAP)	REMOVING STAB BASE & ASPH PAV (7"-12")	REMOV STR (SET)	REMOV STR (PIPE)	REMOVE SM RD SN SUP&AM	REMOVE DELIN & OBJECT MARKER ASSMS
	SY	SY	EA	LF	EA	EA
SHEET 1 OF 7	0	2550	2	20	2	0
SHEET 2 OF 7	0	2135	0	0	2	0
SHEET 3 OF 7	0	2187	0	0	4	0
SHEET 4 OF 7	0	2521	0	0	2	0
SHEET 5 OF 7	0	1591	0	25	1	0
SHEET 6 OF 7	0	1798	0	0	1	0
SHEET 7 OF 7	53	1068	2	0	2	4
PROJECT TOTALS	**53**	**13850**	**4**	**45**	**14**	**4**

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Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SUMMARY OF REMOVAL QUANTITIES

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	9

SUMMARY OF ROADWAY ITEMS

LOCATION	100 6002	110 6001	132 6003	216 6001	247 6475	310 6027	464 6018	464 6080	467 6395	467 6545	530 6005	560 6003	3076 5001	3076 6066	3077 6021	3085 6001
	PREPARING ROW	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(ORD COMP)(TY B)	PROOF ROLLING	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	PRIME COAT(MC-30 OR AE-P)	RC PIPE (CL IV)(24 IN)	RC PIPE (ARCH)(CL V)(DES 3)	SET (TY II) (24 IN) (RCP) (6: 1) (P)	SET (TY II) (DES 3) (RCP) (6: 1) (P)	DRIVEWAYS (ACP)	MAILBOX INSTALL-M (TWG-POST) TY 1	D-GR HMA TY-B PG64-22	TACK COAT	SP MIXESSP-CPG70-22	UNDERSEAL COURSE
	STA	CY	CY	HR	CY	GAL	LF	LF	EA	EA	SY	EA	TON	GAL	TON	GAL
SHEET 1 OF 7	9	170	1052	2	902	541	30	0	2	0	138	0	623	406	595	1035
SHEET 2 OF 7	10	1052	483	2	876	526	0	0	0	0	0	0	604	394	613	1067
SHEET 3 OF 7	10	716	365	2	984	590	0	0	0	0	0	0	679	443	652	1134
SHEET 4 OF 7	10	1008	412	2	1063	638	101	0	4	0	361	2	734	479	614	1068
SHEET 5 OF 7	10	1435	435	2	453	272	0	150	0	6	346	2	313	204	614	1068
SHEET 6 OF 7	10	912	354	2	848	509	0	220	0	6	531	2	585	382	614	1068
SHEET 7 OF 7	10	410	727	2	566	340	0	0	0	0	0	0	391	255	627	1090
PROJECT TOTALS	**69**	**5702**	**3829**	**14**	**5692**	**3415**	**131**	**370**	**6**	**12**	**1376**	**6**	**3928**	**2562**	**4329**	**7529**

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Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SUMMARY OF
ROADWAY QUANTITIES

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	10

95% SUBMITTAL

US 90

Station Quantities

Baseline Station	Cut				Fill				Mass Ordinate
	Factor	Area	Volume	Adjusted	Factor	Area	Volume	Adjusted	
97+00.0000 R1	1.0000	13	0.00	0.00	1.0000	70	0.00	0.00	0.00
98+00.0000 R1	1.0000	4	32.44	32.44	1.0000	97	308.06	308.06	-275.62
99+00.0000 R1	1.0000	3	13.41	13.41	1.0000	48	268.33	268.33	-530.55
100+00.0000 R1	1.0000	8	21.46	21.46	1.0000	18	123.53	123.53	-632.62
101+00.0000 R1	1.0000	5	25.07	25.07	1.0000	23	76.14	76.14	-683.69
102+00.0000 R1	1.0000	7	22.33	22.33	1.0000	7	54.78	54.78	-716.13
103+00.0000 R1	1.0000	5	22.11	22.11	1.0000	31	70.76	70.76	-764.79
104+00.0000 R1	1.0000	4	16.99	16.99	1.0000	17	88.81	88.81	-836.61
105+00.0000 R1	1.0000	4	15.81	15.81	1.0000	17	61.73	61.73	-882.53
107+00.0000 R1	1.0000	41	0.00	0.00	1.0000	10	0.00	0.00	0.00
108+00.0000 R1	1.0000	52	172.72	172.72	1.0000	11	40.43	40.43	132.29
109+00.0000 R1	1.0000	33	157.92	157.92	1.0000	13	45.33	45.33	244.88
110+00.0000 R1	1.0000	29	114.62	114.62	1.0000	15	52.51	52.51	306.99
111+00.0000 R1	1.0000	20	90.37	90.37	1.0000	10	46.92	46.92	350.43
112+00.0000 R1	1.0000	21	76.47	76.47	1.0000	14	44.92	44.92	381.99
113+00.0000 R1	1.0000	18	72.59	72.59	1.0000	15	54.59	54.59	399.99
114+00.0000 R1	1.0000	22	74.13	74.13	1.0000	14	53.99	53.99	420.12
115+00.0000 R1	1.0000	29	94.36	94.36	1.0000	9	41.76	41.76	472.72
116+00.0000 R1	1.0000	23	96.15	96.15	1.0000	17	47.63	47.63	521.24
117+00.0000 R1	1.0000	32	102.26	102.26	1.0000	13	54.99	54.99	568.52
118+00.0000 R1	1.0000	24	103.94	103.94	1.0000	21	62.92	62.92	609.54
119+00.0000 R1	1.0000	25	90.40	90.40	1.0000	15	68.06	68.06	631.88
120+00.0000 R1	1.0000	29	99.16	99.16	1.0000	15	55.33	55.33	675.71
121+00.0000 R1	1.0000	24	97.15	97.15	1.0000	18	60.94	60.94	711.92
122+00.0000 R1	1.0000	25	91.06	91.06	1.0000	18	66.74	66.74	736.24
125+00.0000 R1	1.0000	29	0.00	0.00	1.0000	9	0.00	0.00	0.00
126+00.0000 R1	1.0000	32	112.51	112.51	1.0000	7	30.36	30.36	82.14
127+00.0000 R1	1.0000	34	121.36	121.36	1.0000	4	20.83	20.83	182.67
128+00.0000 R1	1.0000	26	109.84	109.84	1.0000	5	16.77	16.77	275.74
129+00.0000 R1	1.0000	19	82.04	82.04	1.0000	13	34.29	34.29	323.49
130+00.0000 R1	1.0000	15	61.65	61.65	1.0000	14	51.06	51.06	334.08
131+00.0000 R1	1.0000	17	59.22	59.22	1.0000	18	59.55	59.55	333.75
132+00.0000 R1	1.0000	28	83.99	83.99	1.0000	8	47.93	47.93	369.81
133+00.0000 R1	1.0000	28	104.48	104.48	1.0000	18	47.38	47.38	426.91
134+00.0000 R1	1.0000	43	131.08	131.08	1.0000	11	53.48	53.48	504.51
135+00.0000 R1	1.0000	38	148.94	148.94	1.0000	12	43.69	43.69	609.76
136+00.0000 R1	1.0000	22	110.53	110.53	1.0000	6	33.08	33.08	687.22
137+00.0000 R1	1.0000	41	116.57	116.57	1.0000	8	24.70	24.70	779.08
138+00.0000 R1	1.0000	45	159.39	159.39	1.0000	12	37.58	37.58	900.90
139+00.0000 R1	1.0000	50	175.58	175.58	1.0000	7	36.86	36.86	1039.62
140+00.0000 R1	1.0000	42	170.87	170.87	1.0000	13	38.38	38.38	1172.11
141+00.0000 R1	1.0000	45	162.41	162.41	1.0000	12	47.63	47.63	1286.89
142+00.0000 R1	1.0000	39	156.73	156.73	1.0000	12	44.86	44.86	1398.77
143+00.0000 R1	1.0000	38	143.95	143.95	1.0000	7	34.33	34.33	1508.39
144+00.0000 R1	1.0000	35	135.73	135.73	1.0000	12	34.54	34.54	1609.57
145+00.0000 R1	1.0000	37	133.14	133.14	1.0000	11	42.13	42.13	1700.58
146+00.0000 R1	1.0000	22	108.56	108.56	1.0000	19	55.71	55.71	1753.43
147+00.0000 R1	1.0000	27	89.08	89.08	1.0000	15	63.37	63.37	1779.14
148+00.0000 R1	1.0000	25	96.09	96.09	1.0000	6	38.16	38.16	1837.07
149+00.0000 R1	1.0000	31	104.55	104.55	1.0000	4	17.50	17.50	1924.12
150+00.0000 R1	1.0000	21	97.29	97.29	1.0000	1	9.46	9.46	2011.95
151+00.0000 R1	1.0000	15	67.65	67.65	1.0000	4	9.83	9.83	2069.77
152+00.0000 R1	1.0000	32	86.83	86.83	1.0000	12	30.22	30.22	2126.38
153+00.0000 R1	1.0000	27	108.47	108.47	1.0000	11	42.52	42.52	2192.33
154+00.0000 R1	1.0000	25	96.54	96.54	1.0000	16	48.81	48.81	2240.05
155+00.0000 R1	1.0000	23	89.20	89.20	1.0000	14	54.53	54.53	2274.72
156+00.0000 R1	1.0000	24	86.51	86.51	1.0000	13	50.28	50.28	2310.96
157+00.0000 R1	1.0000	18	78.44	78.44	1.0000	15	53.07	53.07	2336.32
158+00.0000 R1	1.0000	9	0.00	0.00	1.0000	33	0.00	0.00	0.00
159+00.0000 R1	1.0000	15	44.10	44.10	1.0000	26	109.18	109.18	-65.08
160+00.0000 R1	1.0000	19	63.02	63.02	1.0000	27	96.79	96.79	-98.86
161+00.0000 R1	1.0000	11	54.76	54.76	1.0000	26	97.19	97.19	-141.29
162+00.0000 R1	1.0000	9	35.74	35.74	1.0000	25	94.86	94.86	-200.41
163+00.0000 R1	1.0000	10	33.69	33.69	1.0000	21	85.23	85.23	-251.95
164+00.0000 R1	1.0000	11	38.67	38.67	1.0000	18	71.53	71.53	-284.81
165+00.0000 R1	1.0000	14	46.01	46.01	1.0000	13	58.01	58.01	-296.81
166+00.0000 R1	1.0000	10	42.94	42.94	1.0000	9	42.04	42.04	-295.90
167+00.0000 R1	1.0000	6	28.77	28.77	1.0000	11	37.36	37.36	-304.50
168+00.0000 R1	1.0000	6	22.52	22.52	1.0000	8	34.86	34.86	-316.84
Grand Total:			5702.35 yd^3	5702.35 yd^3			3829.13 yd^3	3289.13 yd^3	

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED
PROFESSIONAL ENGINEER
4/19/2023

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Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

EARTHWORKS SUMMARY

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6			UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	11

SUMMARY OF DRAINAGE ITEMS

LOCATION	432 6001	462 6063	467 6270	480 6001	496 6004
	RIPRAP (CONC)(4 IN)	CONC BOX CULV (8 FT X 4 FT)(EXTEND)	SET (TY I)(S= 8 FT)(HW= 4 FT)(4:1) (C)	CLEAN EXIST CULVERTS	REMOV STR (SET)
	CY	LF	EA	EA	EA
CULVERT A	0	0	0	1	0
CULVERT B	4	4	2	1	2
PROJECT TOTALS	**4**	**4**	**2**	**2**	**2**

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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SUMMARY OF
DRAINAGE QUANTITIES

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	12

SUMMARY OF SIGNING & PAVEMENT MARKING ITEMS

LOCATION	644 6001	644 6004	644 6036	658 6099	666 6036	666 6048	666 6054	666 6078	666 6156	666 6318	666 6321	666 6343	672 6007	672 6009
	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TYS80(1)SA(U-BM)	INSTL OM ASSM (OM-2Z) (WFLX) GND	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	REFL PAV MRK TY I (W)(ARROW)(100MIL)	REFL PAV MRK TY I (W)(WORD)(100MIL)	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
	EA	EA	EA	EA	LF	LF	EA	EA	EA	LF	LF	LF	EA	EA
SHEET 1 OF 7	2	0	0	0	420	74	3	3	0	0	3540	2625	22	176
SHEET 2 OF 7	1	1	0	0	414	0	1	1	0	0	3079	2000	22	174
SHEET 3 OF 7	3	2	1	0	475	36	4	2	2	100	2400	2035	25	123
SHEET 4 OF 7	0	2	0	0	0	0	4	0	0	1000	2000	2000	0	50
SHEET 5 OF 7	0	1	0	0	0	0	4	0	0	1000	2000	2000	0	52
SHEET 6 OF 7	2	0	0	0	0	0	4	0	1	980	2078	2000	0	66
SHEET 7 OF 7	2	1	0	4	472	36	2	2	1	0	2957	2282	25	168
PROJECT TOTALS	**10**	**7**	**1**	**4**	**1781**	**146**	**22**	**8**	**4**	**3080**	**18054**	**14942**	**94**	**809**

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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SUMMARY OF SIGNING & PAVEMENT MARKING QUANTITIES

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	13

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
		D3-1G	E Walnut St (DOUBLE SIDED)	42" x 8"	X							
106	1-1	R1-1	STOP	36" x 36"	X		10 BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP	24" x 12"	X							
		D3-1G	Aux Airport Rd	48" x 8"	X							
106	1-2	R1-1	STOP	36" x 36"	X		10 BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP	24" x 12"	X							
107	2-1	D21-2T	← Aux Airport Rd / E Walnut St →	90" x 24"	X		10 BWG	1	SA	T		
107	2-2	W1-2L		36" x 36"	X		10 BWG	1	SA	P		
108	3-1	D21-1aTL	← Old Seguin Luling Rd	72" x 24"	X		10 BWG	1	SA	T		
		D3-1G	Old Seguin Luling Rd (DOUBLE SIDED)	66" x 8"	X							
108	3-2	R1-1	STOP	36" x 36"	X		10 BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP	24" x 12"	X							
108	3-3	W1-7T		96"x 36"	X		SCH 80	1	SA	U	BM	
		R3-9cP	BEGIN / CENTER LANE / ONLY	24" x 8"	X							
108	3-4						10 BWG	1	SA	P		
		R3-9b		24" x 36"	X							
108	3-5	D7-7aTR	HISTORICAL MARKER 5490	48" x 48"	X		10 BWG	1	SA	T		
		R3-9dP	END / CENTER LANE / ONLY	24" x 8"	X							
108	3-6						10 BWG	1	SA	P		
		R3-9b		24" x 36"	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 1 OF 2

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0025	04	051	UA 90
4-16		DIST	COUNTY		SHEET NO.
8-16		SAT	GUADALUPE		14

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
109	4-1	D21-1aTR	Old Seguin Luling Rd →	66" x 24"	X		10 BWG	1	SA	T		
109	4-2	D7-7aTL	HISTORICAL MARKER ← 5490	48" x 48"	X		10 BWG	1	SA	T		
110	5-1	D14-4T	ADOPT A HIGHWAY NEXT 2 MILES CATERPILLAR INCORPORATED EMPLOYEES	48" x 48"	X		10 BWG	1	SA	T		
		R3-9cP	BEGIN CENTER LANE ONLY	24" x 8"	X							
111	6-1						10 BWG	1	SA	P		
		R3-9b		24" x 36"	X							
		R3-9dP	END CENTER LANE ONLY	24" x 8"	X							
111	6-2						10 BWG	1	SA	P		
		R3-9b		24" x 36"	X							
		D3-1G	Weber Rd (DOUBLE SIDED)	36" x 8"	X							
112	7-1	R1-1	STOP	36" x 36"	X		10 BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP	24" x 12"	X							
112	7-2	D7-6aTL	HISTORICAL MARKER 1 MILE ON LEFT 336	48" x 48"	X		10 BWG	1	SA	T		
		M3-4	WEST ALTERNATE 90	24" x 12"	X							
		M4-1		24" x 12"	X							
112	7-3						10 BWG	1	SA	P		
		M1-4		24" x 24"	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 2 OF 2

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
4-16 8-16	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		14A

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pw:\\tedsi-pw.bentley.com:tedsi-pw-01\Documents\Projects\2019\2019-2078-00 - TxDOT Traffic Engineering (Kimley-Horn)\Work Authorizations\2019-2078-TA - US90A Widening; Weber Road to CR 202\6.0 TEDSI Design\6.08 CADD\

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	161 6017	164 6003	166 6001	168 6001	506 6020	506 6024	506 6038	506 6039
	COMPOST MANUF TOPSOIL (4")	BROADCAST SEED (PERM) (RURAL) (CLAY)	FERTILIZER	VEGETATIVE WATERING	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	SY	SY	AC	MG	SY	SY	LF	LF
SHEET 1 OF 7	1209	1209	0.25	19	222	222	790	790
SHEET 2 OF 7	1567	1567	0.32	24	0	0	575	575
SHEET 3 OF 7	1692	1692	0.35	26	0	0	100	100
SHEET 4 OF 7	1490	1490	0.31	23	0	0	80	80
SHEET 5 OF 7	724	724	0.15	11	0	0	80	80
SHEET 6 OF 7	786	786	0.16	12	0	0	80	80
SHEET 7 OF 7	875	875	0.18	14	0	0	266	266
PROJECT TOTALS	**8342**	**8342**	**1.71**	**130**	**222**	**222**	**1971**	**1971**

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Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SUMMARY OF
SWPPP QUANTITIES

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	15

TRAFFIC CONTROL SEQUENCE OF WORK

(1) THIS PROJECT WILL BE CONSTRUCTED IN (3) PHASES. 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 OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.
(2) PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASES NOTED BELOW
(3) 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) A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

PHASE 1: - ROADWAY WIDENING (SOUTH)

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE ROADWAY WIDENING ON THE SOUTH SIDE OF UA90

(1) MOBILIZATION.
(2) INSTALL ADVANCED WARNING SIGNS, TEMPORARY SIGNS, CONSTRUCTION SIGNS, BARRICADES CHANNELIZING DEVICES, AS SHOWN ON THE TRAFFIC CONTROL PLAN.
(3) INSTALL ITEMS SHOWN ON SW3P PLAN.
(4) REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT AND PLACE WZ PAVEMENT MARKINGS
(5) SAWCUT EXISTING PAVEMENT AS SHOWN ON THE PLANS
(6) PROOF ROLL, MOISTURE CONDITION, AND COMPACT SUBGRADE
(7) PLACE FLEX BASE AND ASPHALT PAVING ON THE SOUTH SIDE OF UA90
(8) PLACE TOPSOIL, SEEDING AND RETENTION BLANKETS
(9) OPEN ALL LANES AND SHOULDERS DURING NON-WORKING HOURS

PHASE 2: - ROADWAY WIDENING (NORTH)

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE ROADWAY WIDENING ON THE NORTH SIDE OF UA90

(1) MOBILIZATION.
(2) INSTALL ADVANCED WARNING SIGNS, TEMPORARY SIGNS, CONSTRUCTION SIGNS, BARRICADES CHANNELIZING DEVICES, AS SHOWN ON THE TRAFFIC CONTROL PLAN.
(3) INSTALL ITEMS SHOWN ON SW3P PLAN.
(4) REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT AND PLACE WZ PAVEMENT MARKINGS
(5) SAWCUT EXISTING PAVEMENT AS SHOWN ON THE PLANS
(6) EXTEND CROSS CULVERT AT WEBER ROAD
(7) PROOF ROLL, MOISTURE CONDITION, AND COMPACT SUBGRADE
(8) PLACE FLEX BASE AND ASPHALT PAVING ON THE NORTH SIDE OF UA90
(9) PLACE TOPSOIL, SEEDING AND RETENTION BLANKETS
(10) OPEN ALL LANES AND SHOULDERS DURING NON-WORKING HOURS

PHASE 3: - FINAL SURFACE

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE FULL WIDTH OVERLAY, PERMANENT PAVEMENT MARKINGS, AND FINAL CLEAN-UP

(1) MOBILIZATION.
(2) INSTALL ADVANCED WARNING SIGNS, TEMPORARY SIGNS, CONSTRUCTION SIGNS, BARRICADES CHANNELIZING DEVICES, IN ACCORDANCE WITH TCP(1-4)-18.
(3) SHIFT TRAFFIC TO THE NORTH SIDE OF US 90A TO A PORTION OF THE EXISTING PAVEMENT AND TO THE NEWLY CONSTRUCTED PAVEMENT.
(4) INSTALL OVERLAY ON THE SOUTH SIDE OF US 90A.
(5) SHIFT TRAFFIC TO THE SOUTH SIDE OF US 90A TO A PORTION OF THE EXISTING PAVEMENT AND TO THE NEWLY CONSTRUCTED PAVEMENT.
(6) INSTALL OVERLAY ON THE NORTH SIDE OF US 90A.
(7) OPEN ALL LANES AND SHOULDERS DURING NON-WORKING HOURS
(8) INSTALL PERMANENT PAVEMENT MARKINGS AND SIGNS USING STANDARD MOBILE OPERATIONS
(9) PERFORM FINAL CLEAN UP
(10) REMOVE ALL SIGNS AND BARRICADES

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LICENSED
PROFESSIONAL ENGINEER
4/20/2023

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(832) 619-1000
TEDSI
TBPE F-1640

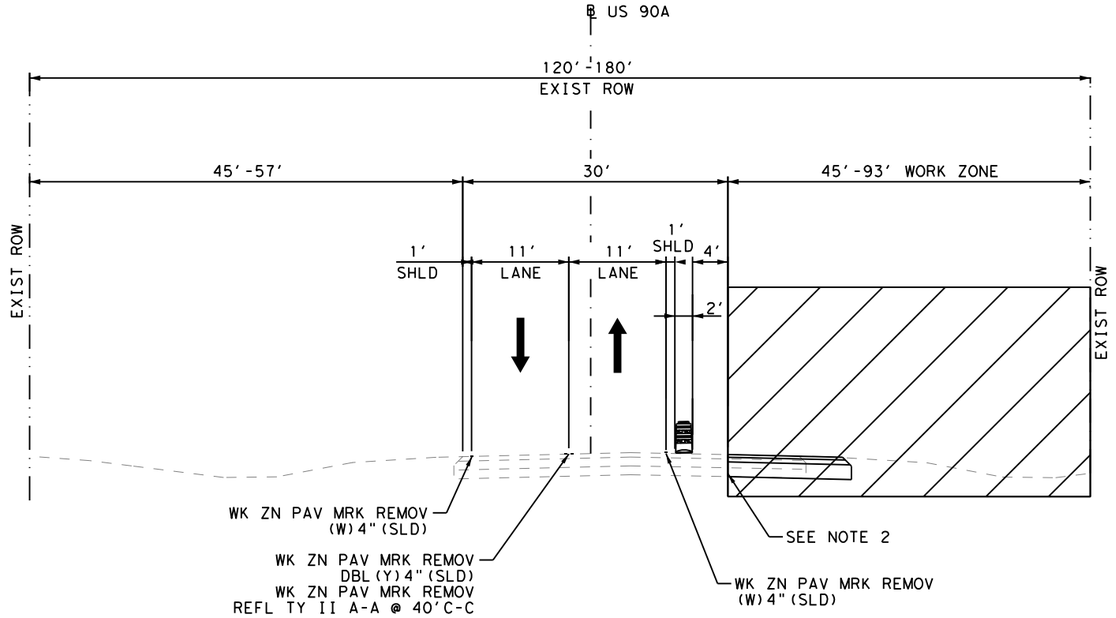
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SEQUENCE OF WORK

SHEET 1 OF 1

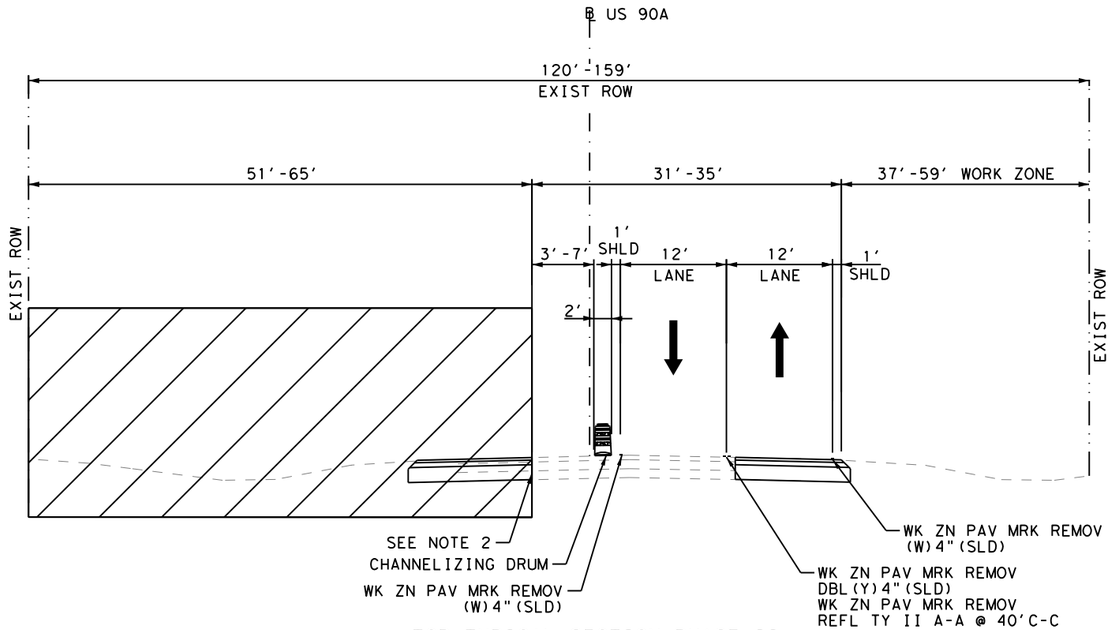
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	16
CONT.	SECT.	JOB	
0025	04	051	



TCP TYPICAL SECTION PHASE I

N.T.S.



TCP TYPICAL SECTION PHASE II

BEGIN TO STA 126+52

N.T.S.

NOTES:

1. MAINTAIN ACCESS TO DRIVEWAYS AND CROSS STREETS AT ALL TIMES
2. CONTRACTOR TO PLACE A 3:1 SAFETY SLOPE WHERE DROP OFF EXCEEDS 3"

STATE OF TEXAS
TYLER BARROWS
147138
LICENSED
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4/20/2023

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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	17
CONT.	SECT.	JOB	
0025	04	051	

FILENAME: K:\HOU_TPTO\068900602 - TEDSI FM 3351 TRF Design\CADD\Sheets\US 90A\US90A_SHEET_TCP_TYPICAL SECTION PH1&2.dgn
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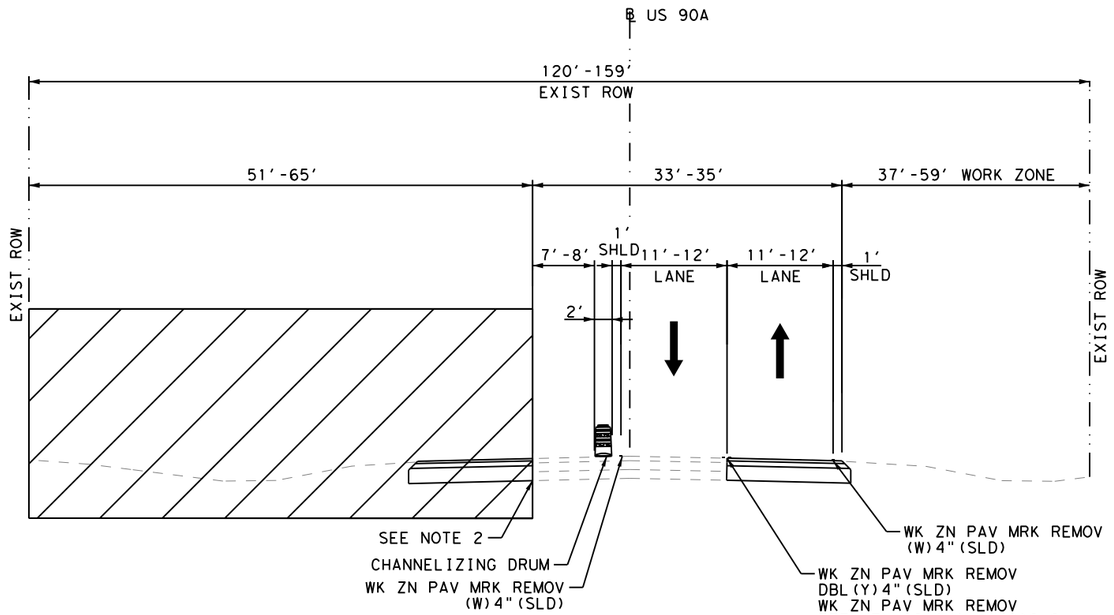
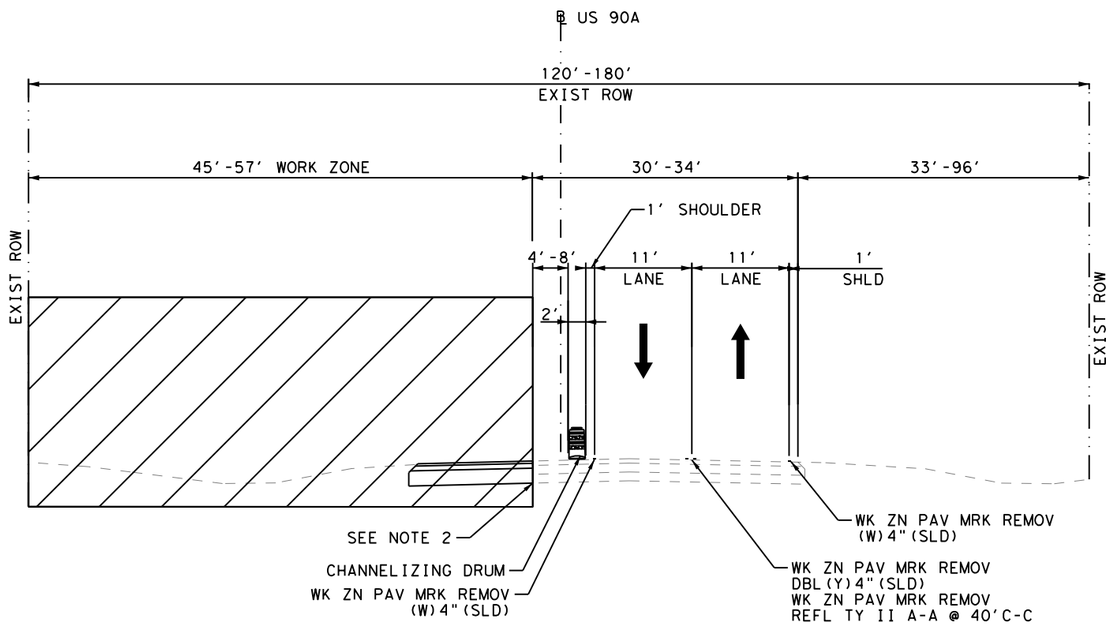


TCP TYPICAL SECTION PHASE II

STA 126+52 TO STA 127+52
N.T.S.



TCP TYPICAL SECTION PHASE II

STA 127+52 TO END PROJECT
N.T.S.

NOTES:

1. MAINTAIN ACCESS TO DRIVEWAYS AND CROSS STREETS AT ALL TIMES
2. CONTRACTOR TO PLACE A 3:1 SAFETY SLOPE WHERE DROP OFF EXCEEDS 3"

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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	18
CONT.	SECT.	JOB	
0025	04	051	

FILENAME: K:\HOU_TPTO\068900602 - TEDSI FM 3351 TRF Design\CADD\Sheets\US 90A\US90A_SHEET_TCP_TYPICAL SECTION PH2.dgn
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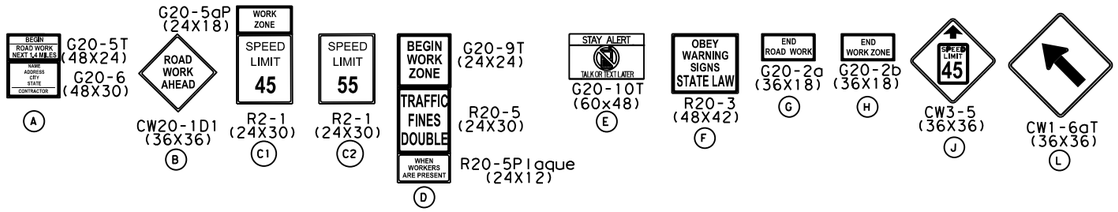
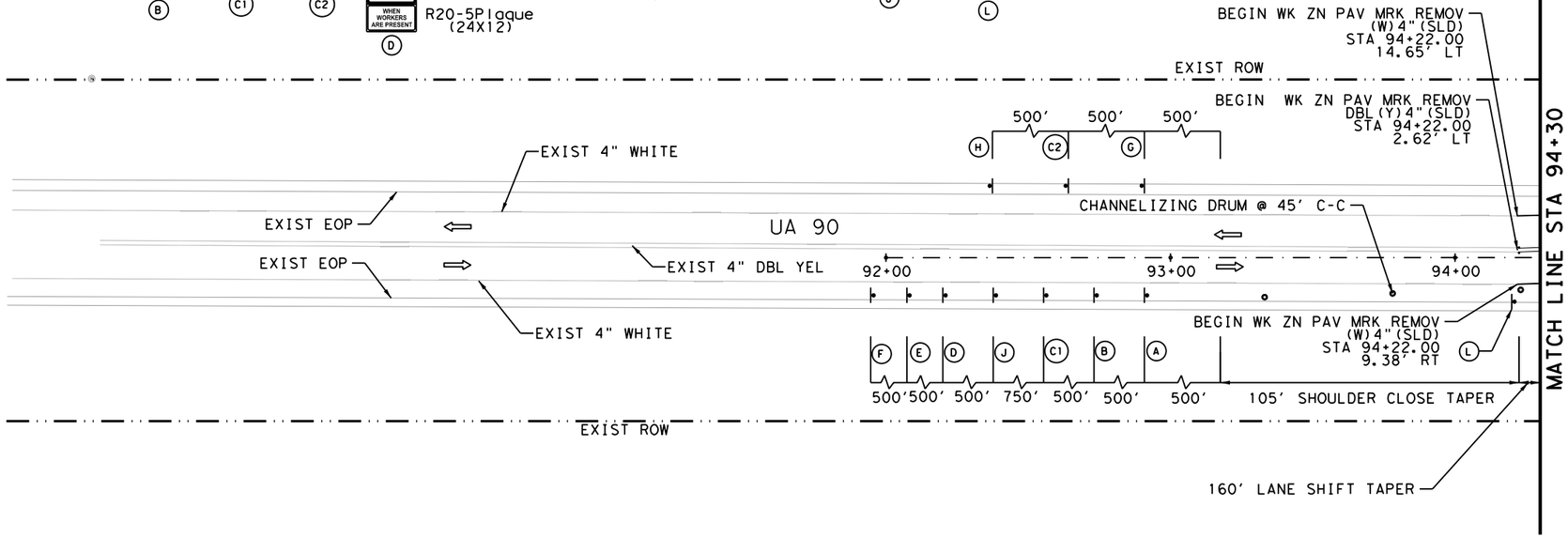
ITEM	DESCRIPTION	UNIT	QTY
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	16
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	16
677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	32





LEGEND

- TRAFFIC DIRECTION
- WORK ZONE
- PREVIOUS CONSTRUCTION
- CHANNELIZING DRUMS
- TYPE III BARRICADE

NOTES:

1. REFER TO TCP TYPICAL SECTIONS FOR MORE INFORMATION
2. MAINTAIN ACCESS TO DRIVEWAYS AND CROSS STREETS AT ALL TIMES
3. CONTRACTOR TO PLACE A 3:1 SAFETY SLOPE WHERE DROP OFF EXCEEDS 3"
4. ROAD CLOSED SIGNS TO BE MOUNTED ON TYPE III BARRICADES PERPENDICULAR TO UA 90

0' 25' 50'

SCALE 1"=50'

STATE OF TEXAS
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4/20/2023

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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TRAFFIC CONTROL PLAN
PHASE I

SHEET 1 OF 6

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	19
CONT.	SECT.	JOB	
0025	04	051	

FILENAME: K:\HOU_TPTO\068900602 - TEDSI FM 3351 TRF Design\CADD\Sheets\US 90A\US90A_SHEET_TCP_PH1_00.dgn
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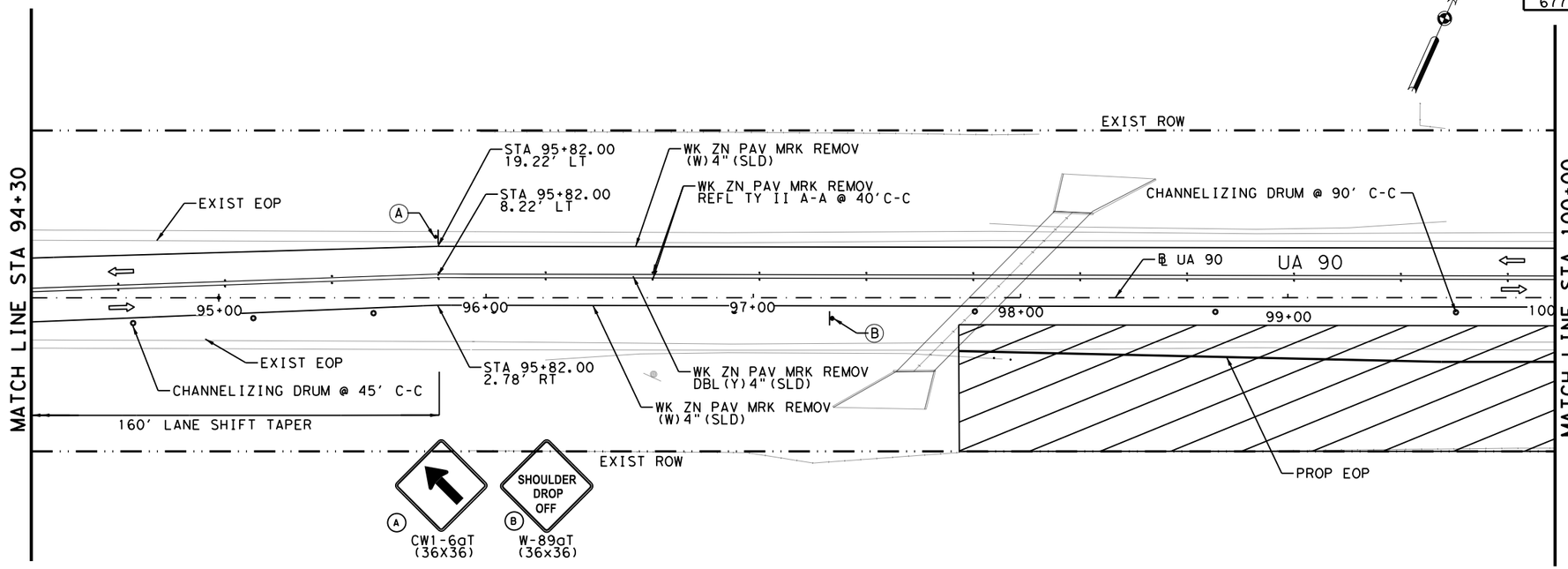
G20-5aP
(24X18)

ITEM	DESCRIPTION	UNIT	QTY
662 6050	WK ZN PAV MRK REMOV (REFL) TY II-A-A	EA	54
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	2141
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	2141
677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	4282

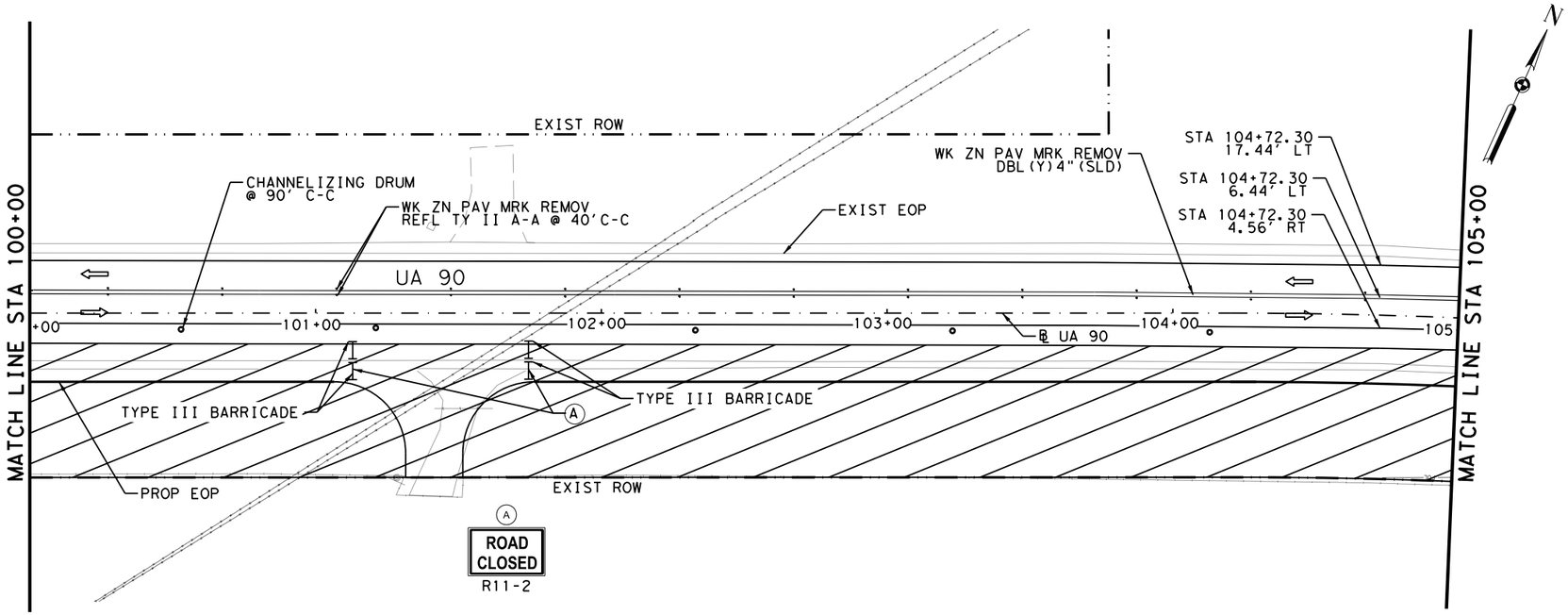


LEGEND

- TRAFFIC DIRECTION
- WORK ZONE
- PREVIOUS CONSTRUCTION
- CHANNELIZING DRUMS
- TYPE III BARRICADE

NOTES:

1. REFER TO TCP TYPICAL SECTIONS FOR MORE INFORMATION
2. MAINTAIN ACCESS TO DRIVEWAYS AND CROSS STREETS AT ALL TIMES
3. CONTRACTOR TO PLACE A 3:1 SAFETY SLOPE WHERE DROP OFF EXCEEDS 3"
4. ROAD CLOSED SIGNS TO BE MOUNTED ON TYPE III BARRICADES PERPENDICULAR TO UA 90



0' 25' 50'

SCALE 1"=50'

STATE OF TEXAS
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PROFESSIONAL ENGINEER

4/20/2023

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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TRAFFIC CONTROL PLAN
PHASE I

SHEET 2 OF 6

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	20
CONT.	SECT.	JOB	
0025	04	051	

FILENAME: K:\HOU_TPTO\068900602 - TEDSI FM 3351 TRF Design\CADD\Sheets\US 90A\US90A_SHEET_TCP_PHI_01.dgn
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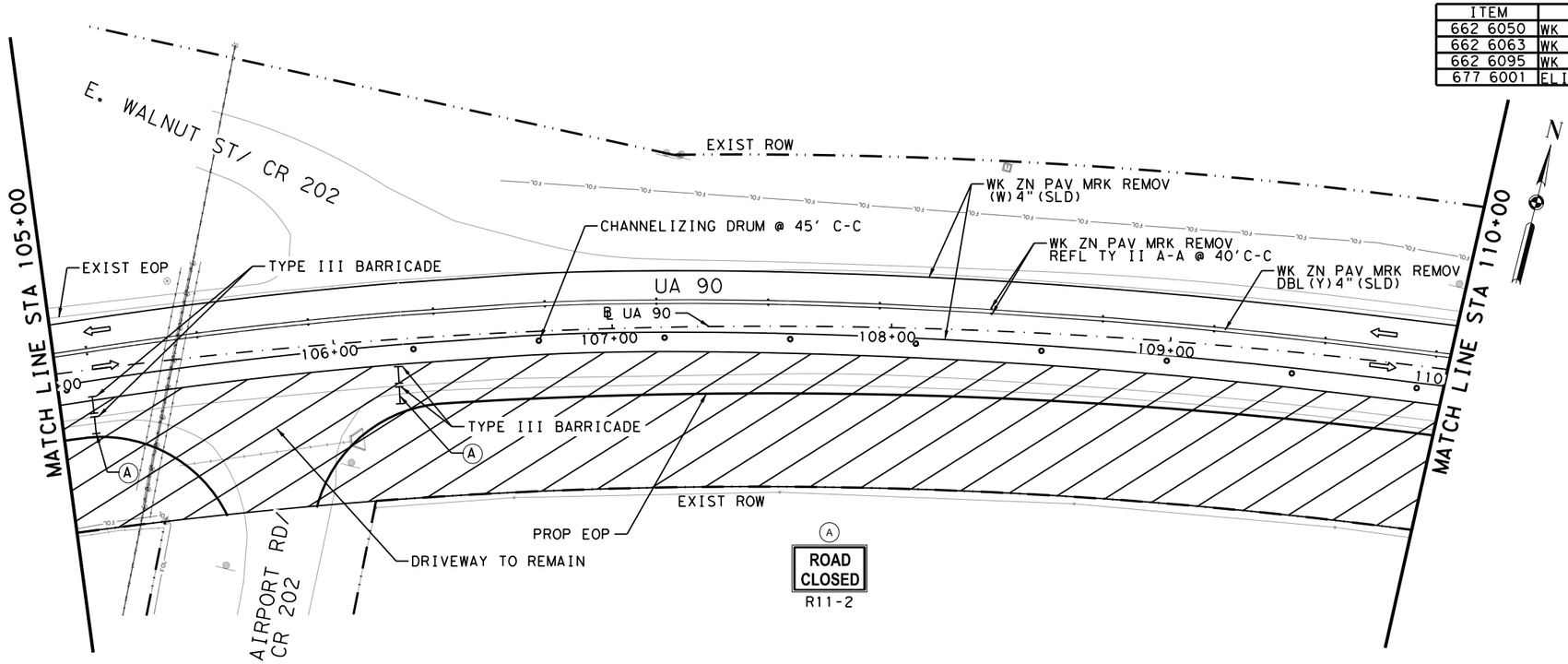
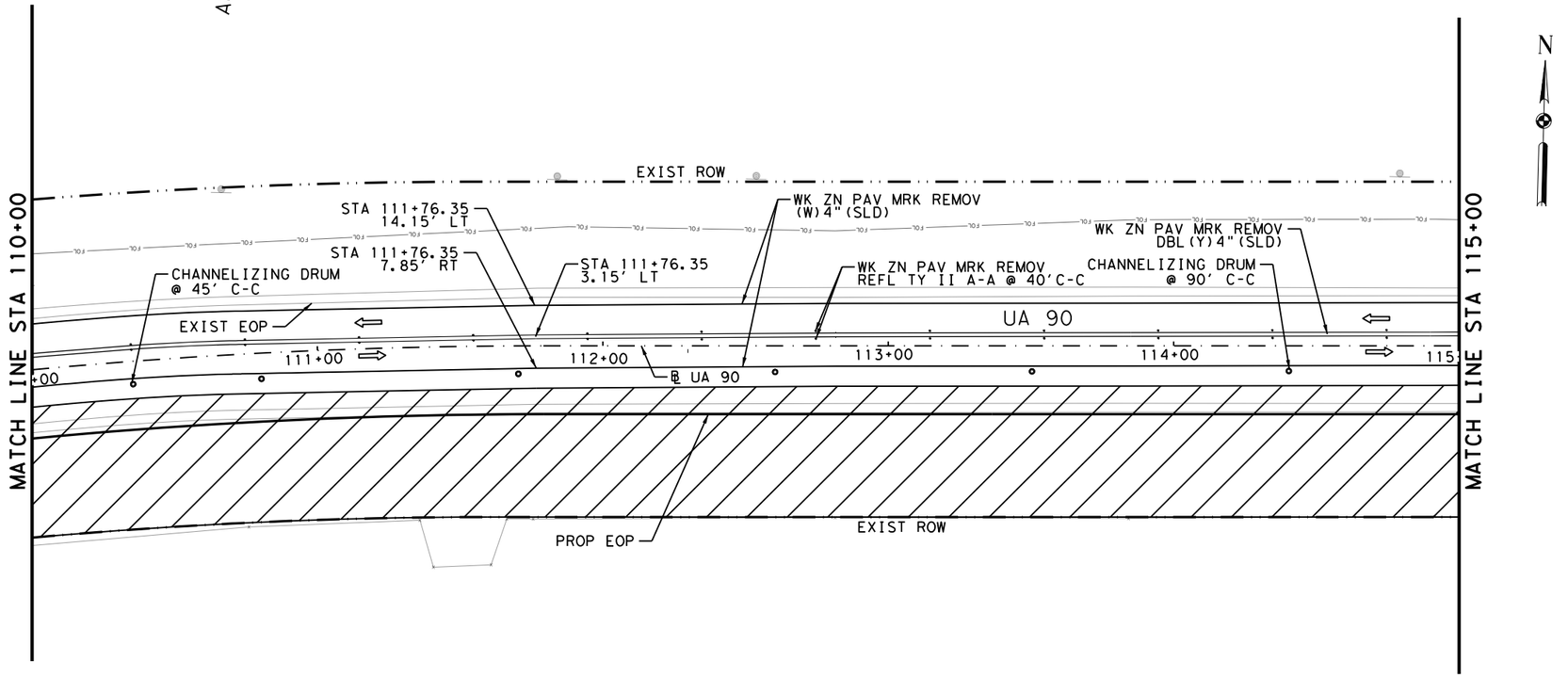
ITEM	DESCRIPTION	UNIT	QTY
662 6050	WK ZN PAV MRK REMOV (REFL) TY II-A-A	EA	50
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	2004
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	2004
677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	4008





LEGEND

- TRAFFIC DIRECTION
- WORK ZONE
- PREVIOUS CONSTRUCTION
- CHANNELIZING DRUMS
- TYPE III BARRICADE

NOTES:

1. REFER TO TCP TYPICAL SECTIONS FOR MORE INFORMATION
2. MAINTAIN ACCESS TO DRIVEWAYS AND CROSS STREETS AT ALL TIMES
3. CONTRACTOR TO PLACE A 3:1 SAFETY SLOPE WHERE DROP OFF EXCEEDS 3"
4. ROAD CLOSED SIGNS TO BE MOUNTED ON TYPE III BARRICADES PERPENDICULAR TO UA 90

0' 25' 50'

SCALE 1"=50'

STATE OF TEXAS
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147138
LICENSED PROFESSIONAL ENGINEER

4/20/2023

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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TRAFFIC CONTROL PLAN
PHASE I

SHEET 3 OF 6

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	21
CONT.	SECT.	JOB	
0025	04	051	

FILENAME: K:\HOU_TPTO\068900602 - TEDSI FM 3351 TRF Design\CADD\Sheets\US 90A\US90A_SHEET_TCP_PH1_02.dgn
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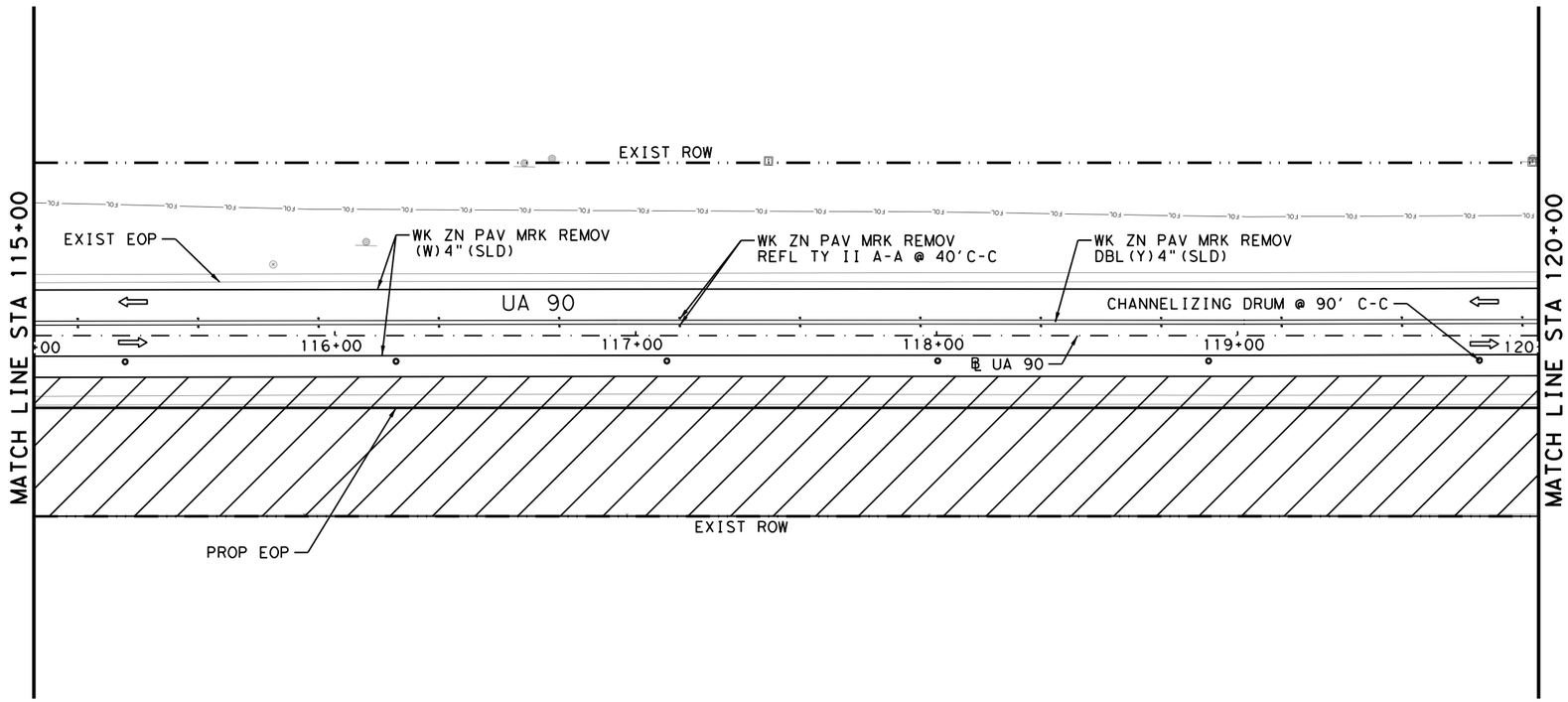
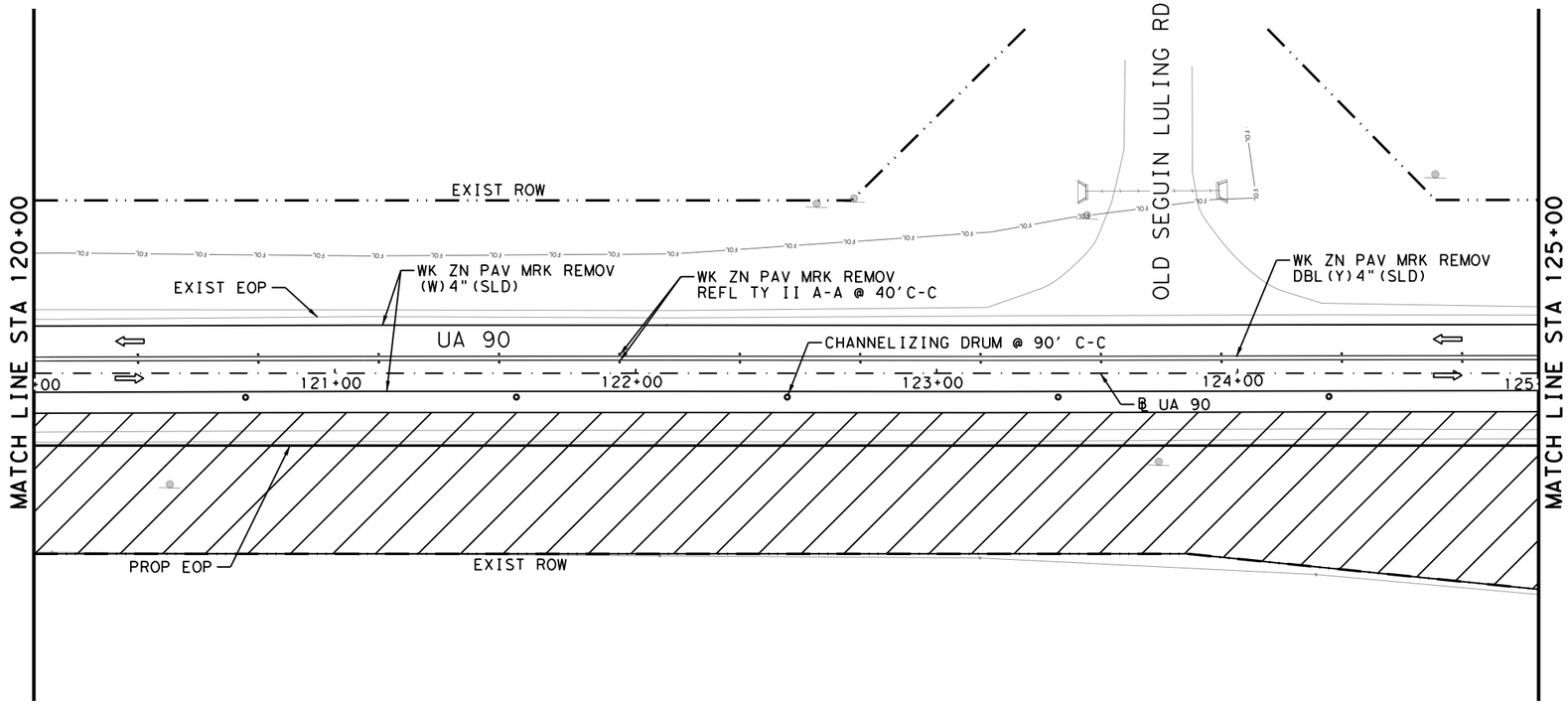
ITEM	DESCRIPTION	UNIT	QTY
662 6050	WK ZN PAV MRK REMOV (REFL) TY II-A-A	EA	50
662 6063	WK ZN PAV MRK REMOV (W)4" (SLD)	LF	2000
662 6095	WK ZN PAV MRK REMOV (Y)4" (SLD)	LF	2000
677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	4000





N

LEGEND

- TRAFFIC DIRECTION
- WORK ZONE
- PREVIOUS CONSTRUCTION
- CHANNELIZING DRUMS
- TYPE III BARRICADE

NOTES:

1. REFER TO TCP TYPICAL SECTIONS FOR MORE INFORMATION
2. MAINTAIN ACCESS TO DRIVEWAYS AND CROSS STREETS AT ALL TIMES
3. CONTRACTOR TO PLACE A 3:1 SAFETY SLOPE WHERE DROP OFF EXCEEDS 3"
4. ROAD CLOSED SIGNS TO BE MOUNTED ON TYPE III BARRICADES PERPENDICULAR TO UA 90

0' 25' 50'

SCALE 1"=50'

STATE OF TEXAS
TYLER BARROWS
147138
LICENSED
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4/20/2023

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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TRAFFIC CONTROL PLAN
PHASE I

SHEET 4 OF 6

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	22
CONT.	SECT.	JOB	
0025	04	051	

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ITEM	DESCRIPTION	UNIT	QTY
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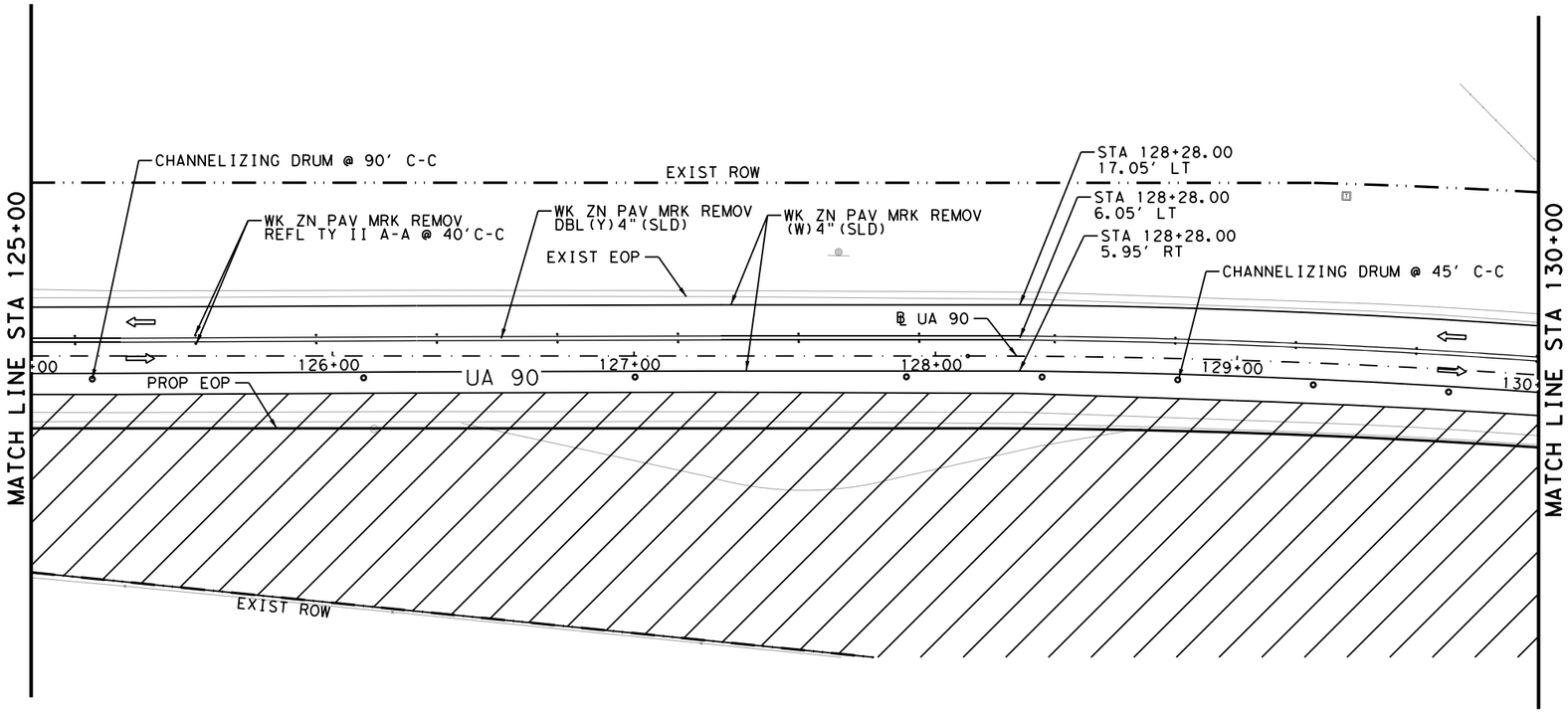
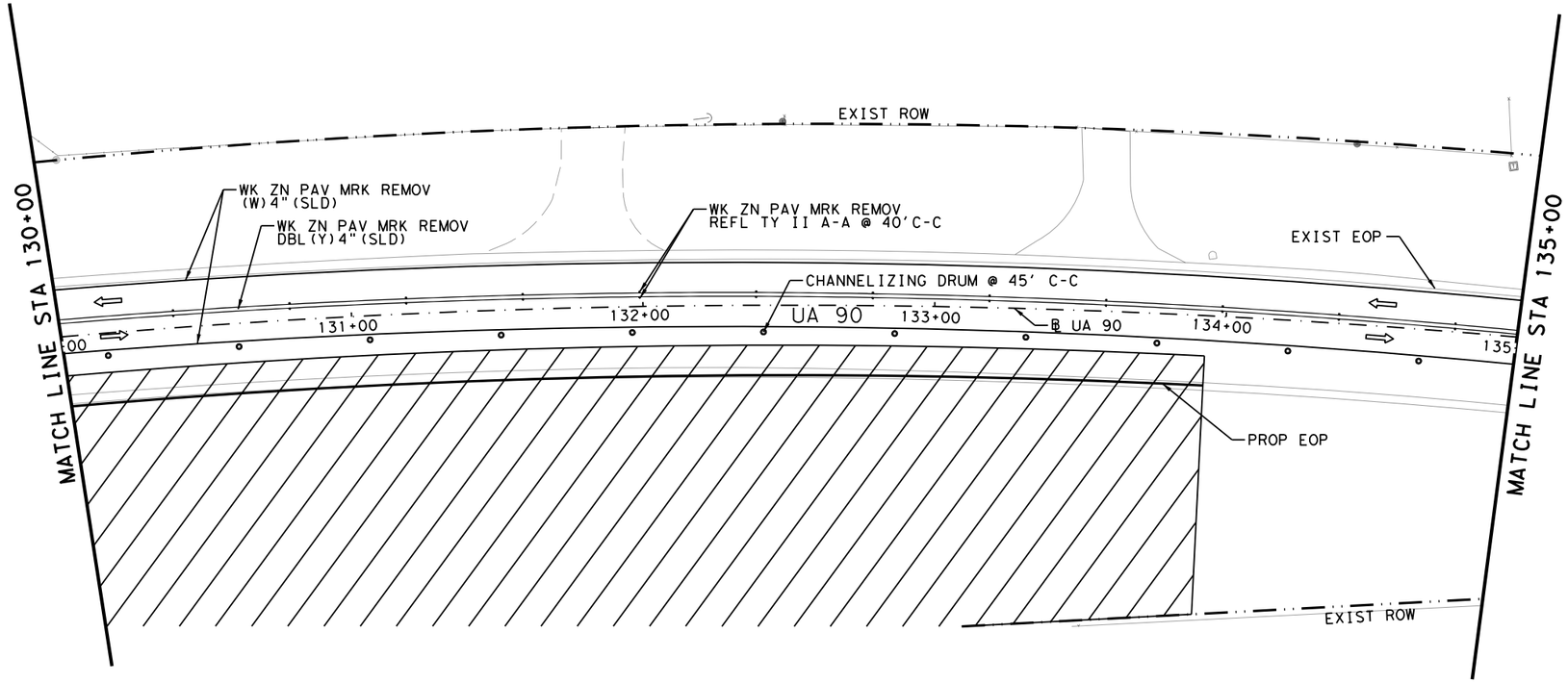
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	2003
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	2003
677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	4006





LEGEND

- TRAFFIC DIRECTION
- WORK ZONE
- PREVIOUS CONSTRUCTION
- CHANNELIZING DRUMS
- TYPE III BARRICADE

NOTES:

1. REFER TO TCP TYPICAL SECTIONS FOR MORE INFORMATION
2. MAINTAIN ACCESS TO DRIVEWAYS AND CROSS STREETS AT ALL TIMES
3. CONTRACTOR TO PLACE A 3:1 SAFETY SLOPE WHERE DROP OFF EXCEEDS 3"
4. ROAD CLOSED SIGNS TO BE MOUNTED ON TYPE III BARRICADES PERPENDICULAR TO UA 90

0' 25' 50'

SCALE 1"=50'

STATE OF TEXAS
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LICENSED
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4/20/2023

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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

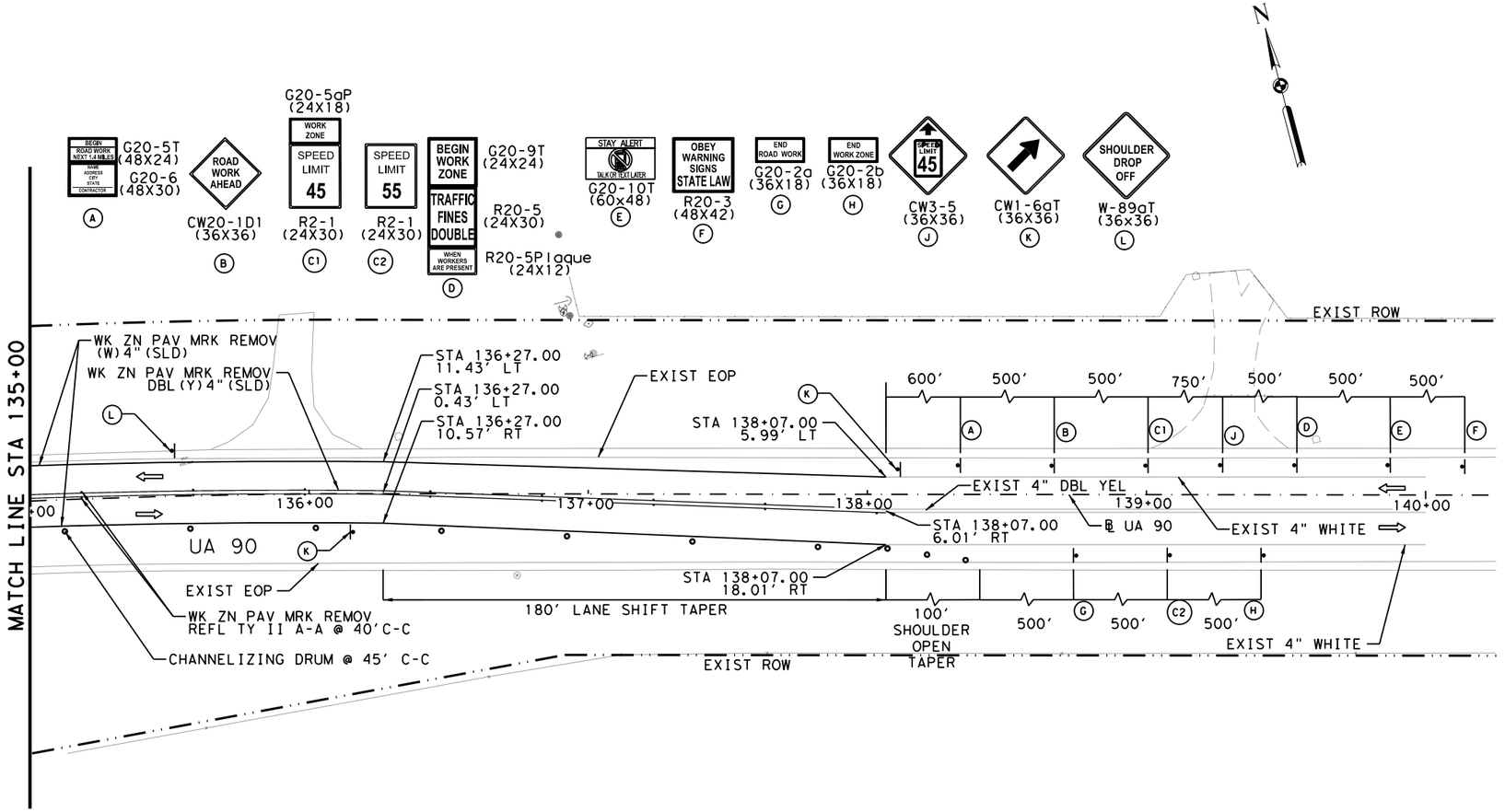
TRAFFIC CONTROL PLAN
PHASE I

SHEET 5 OF 6

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 3351
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	23
CONT.	SECT.	JOB	
0025	04	051	

FILENAME: K:\HOU_TPTO\068900602 - TEDSI FM 3351 TRF Design\CADD\Sheets\US 90A\US90A_SHEET_TCP_PH1_04.dgn
PLOTTED: 4/20/2023 10:58:04 AM

ITEM	DESCRIPTION	UNIT	QTY
662 6050	WK ZN PAV MRK REMOV (REFL) TY II-A-A	EA	15
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	614
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	614
677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	1228



LEGEND

- TRAFFIC DIRECTION
- WORK ZONE
- PREVIOUS CONSTRUCTION
- CHANNELIZING DRUMS
- TYPE III BARRICADE

NOTES:

1. REFER TO TCP TYPICAL SECTIONS FOR MORE INFORMATION
2. MAINTAIN ACCESS TO DRIVEWAYS AND CROSS STREETS AT ALL TIMES
3. CONTRACTOR TO PLACE A 3:1 SAFETY SLOPE WHERE DROP OFF EXCEEDS 3"
4. ROAD CLOSED SIGNS TO BE MOUNTED ON TYPE III BARRICADES PERPENDICULAR TO UA 90

0' 25' 50'

SCALE 1"=50'

STATE OF TEXAS
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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TRAFFIC CONTROL PLAN
PHASE I

SHEET 6 OF 6

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	24
CONT.	SECT.	JOB	
0025	04	051	

FILENAME: K:\HOU_TPTO\068900602 - TEDSI FM 3351 TRF Design\CADD\Sheets\US 90A\US90A_SHEET_TCP_PH1_05.dgn
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ITEM	DESCRIPTION	UNIT	QTY
662 6050	WK ZN PAV MRK REMOV (REFL) TY II-A-A	EA	43
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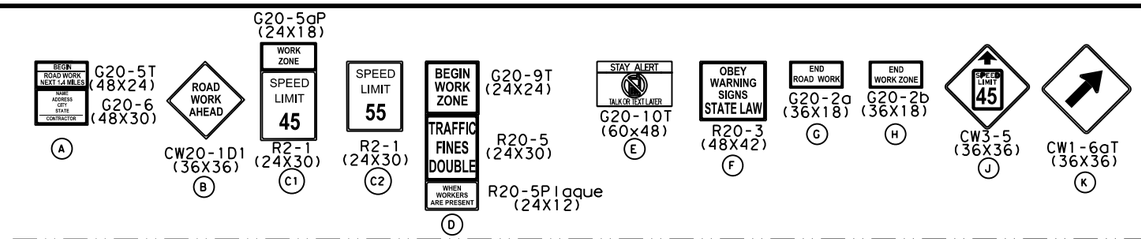
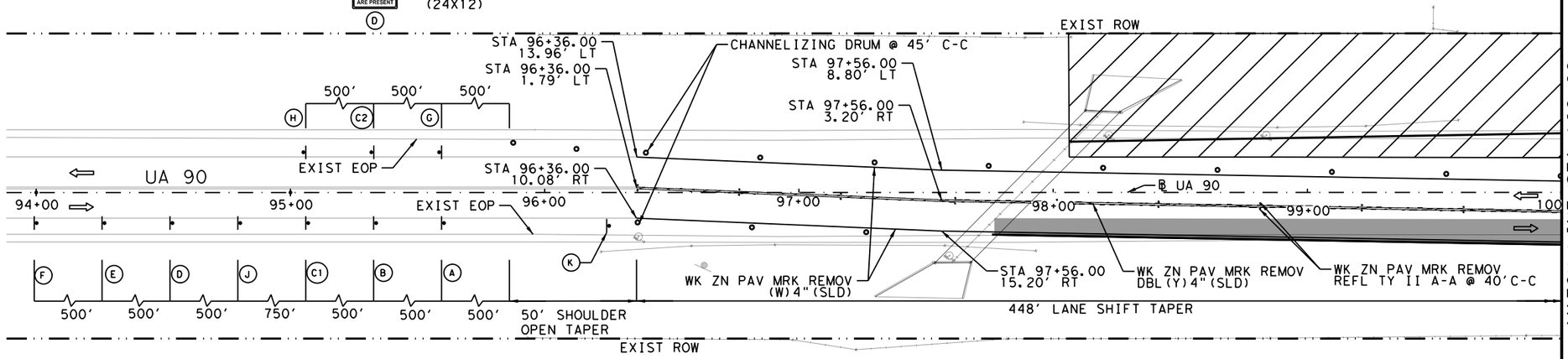
662 6095	WK ZN PAV MRK REMOV (Y)4" (SLD)	LF	1729





LEGEND

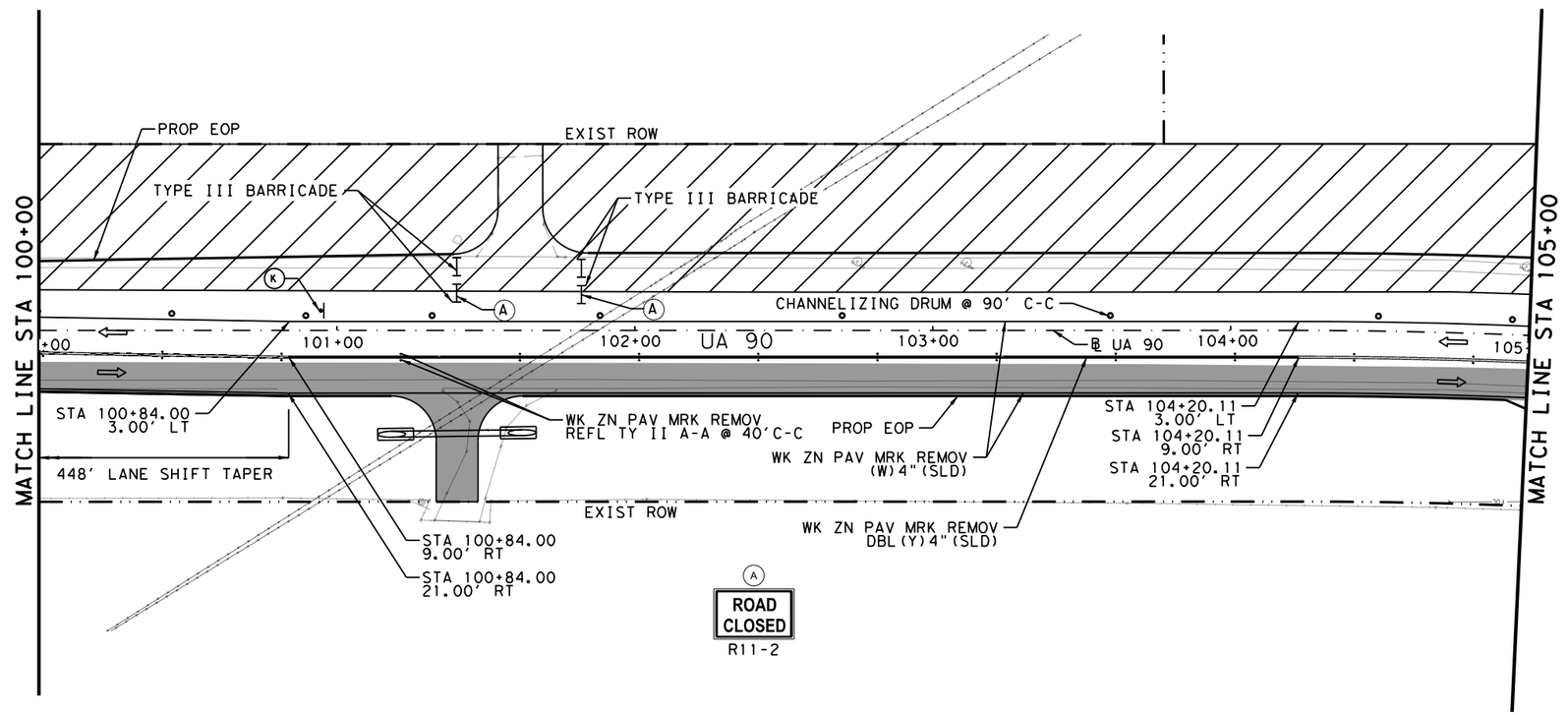
- TRAFFIC DIRECTION
- WORK ZONE
- PREVIOUS CONSTRUCTION
- CHANNELIZING DRUMS
- TYPE III BARRICADE

NOTES:

1. REFER TO TCP TYPICAL SECTIONS FOR MORE INFORMATION
2. MAINTAIN ACCESS TO DRIVEWAYS AND CROSS STREETS AT ALL TIMES
3. CONTRACTOR TO PLACE A 3:1 SAFETY SLOPE WHERE DROP OFF EXCEEDS 3"
4. ROAD CLOSED SIGNS TO BE MOUNTED ON TYPE III BARRICADES PERPENDICULAR TO UA 90

0' 25' 50'

SCALE 1"=50'



STATE OF TEXAS
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UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TRAFFIC CONTROL PLAN
PHASE II

SHEET 1 OF 8

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	25
CONT.	SECT.	JOB	
0025	04	051	

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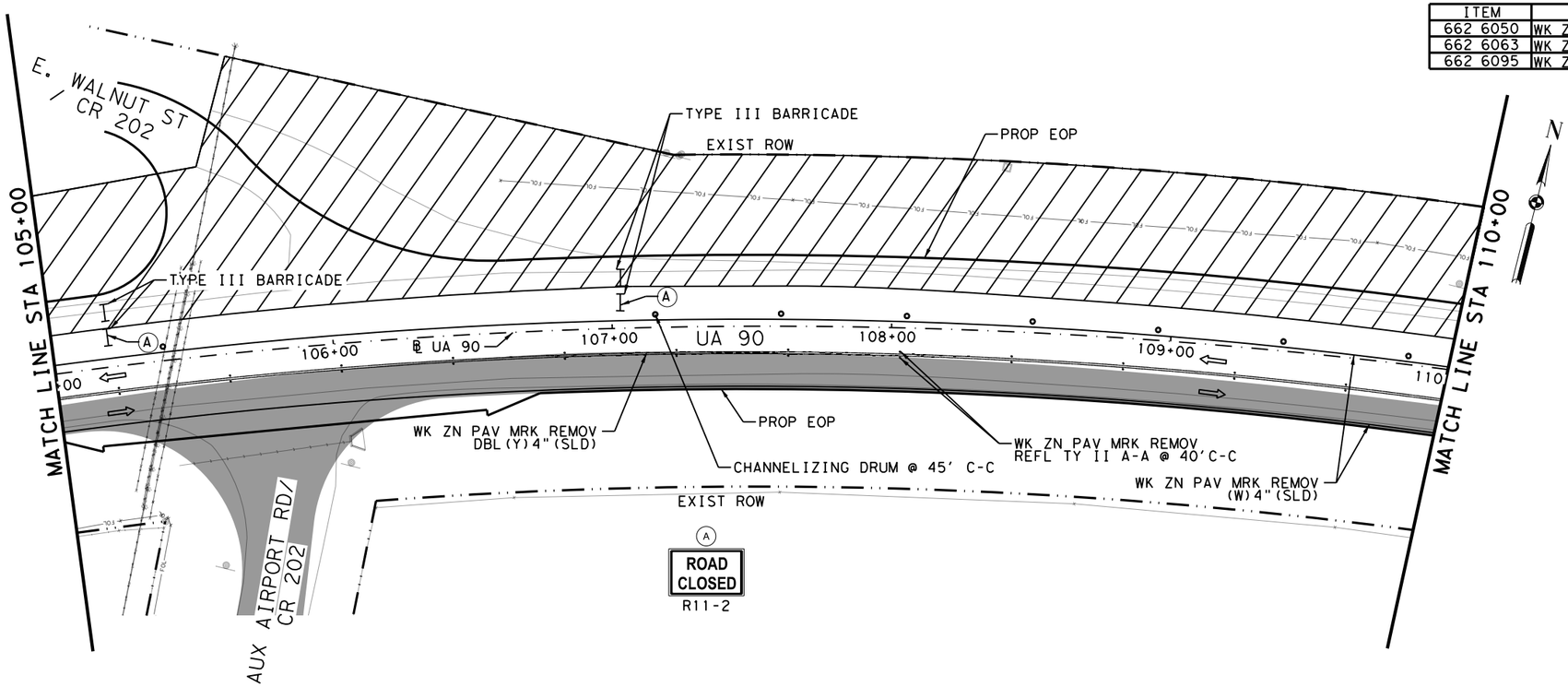
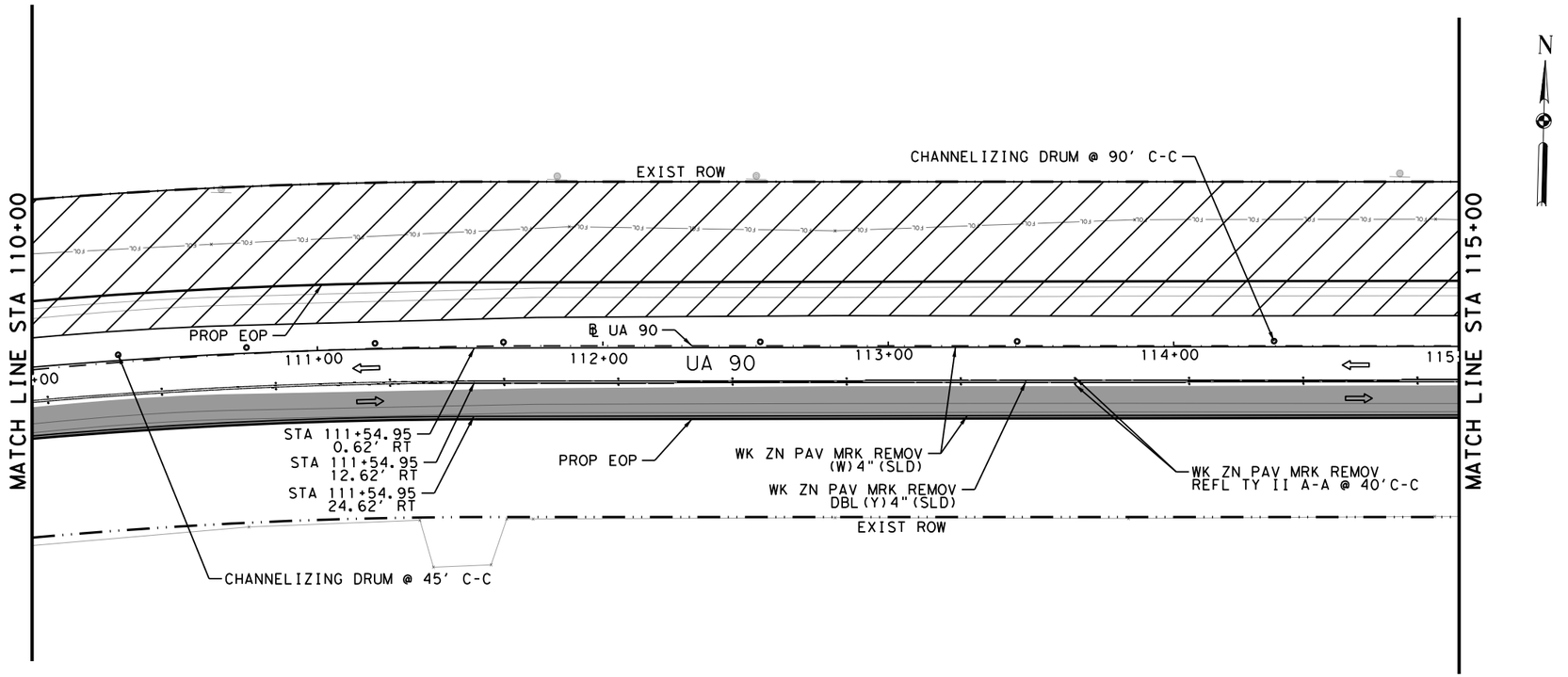
662 6050	WK ZN PAV MRK REMOV (REFL) TY II-A-A	EA	50
662 6063	WK ZN PAV MRK REMOV (W)4" (SLD)	LF	1993
662 6095	WK ZN PAV MRK REMOV (Y)4" (SLD)	LF	1993





LEGEND

- TRAFFIC DIRECTION
- WORK ZONE
- PREVIOUS CONSTRUCTION
- CHANNELIZING DRUMS
- TYPE III BARRICADE

NOTES:

1. REFER TO TCP TYPICAL SECTIONS FOR MORE INFORMATION
2. MAINTAIN ACCESS TO DRIVEWAYS AND CROSS STREETS AT ALL TIMES
3. CONTRACTOR TO PLACE A 3:1 SAFETY SLOPE WHERE DROP OFF EXCEEDS 3"
4. ROAD CLOSED SIGNS TO BE MOUNTED ON TYPE III BARRICADES PERPENDICULAR TO UA 90

0' 25' 50'

SCALE 1"=50'

STATE OF TEXAS
TYLER BARROWS
147138
LICENSED
PROFESSIONAL ENGINEER

4/20/2023

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TBPE F-1640

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

TRAFFIC CONTROL PLAN
PHASE II

SHEET 2 OF 8

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 3351
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	26
CONT.	SECT.	JOB	
0025	04	051	

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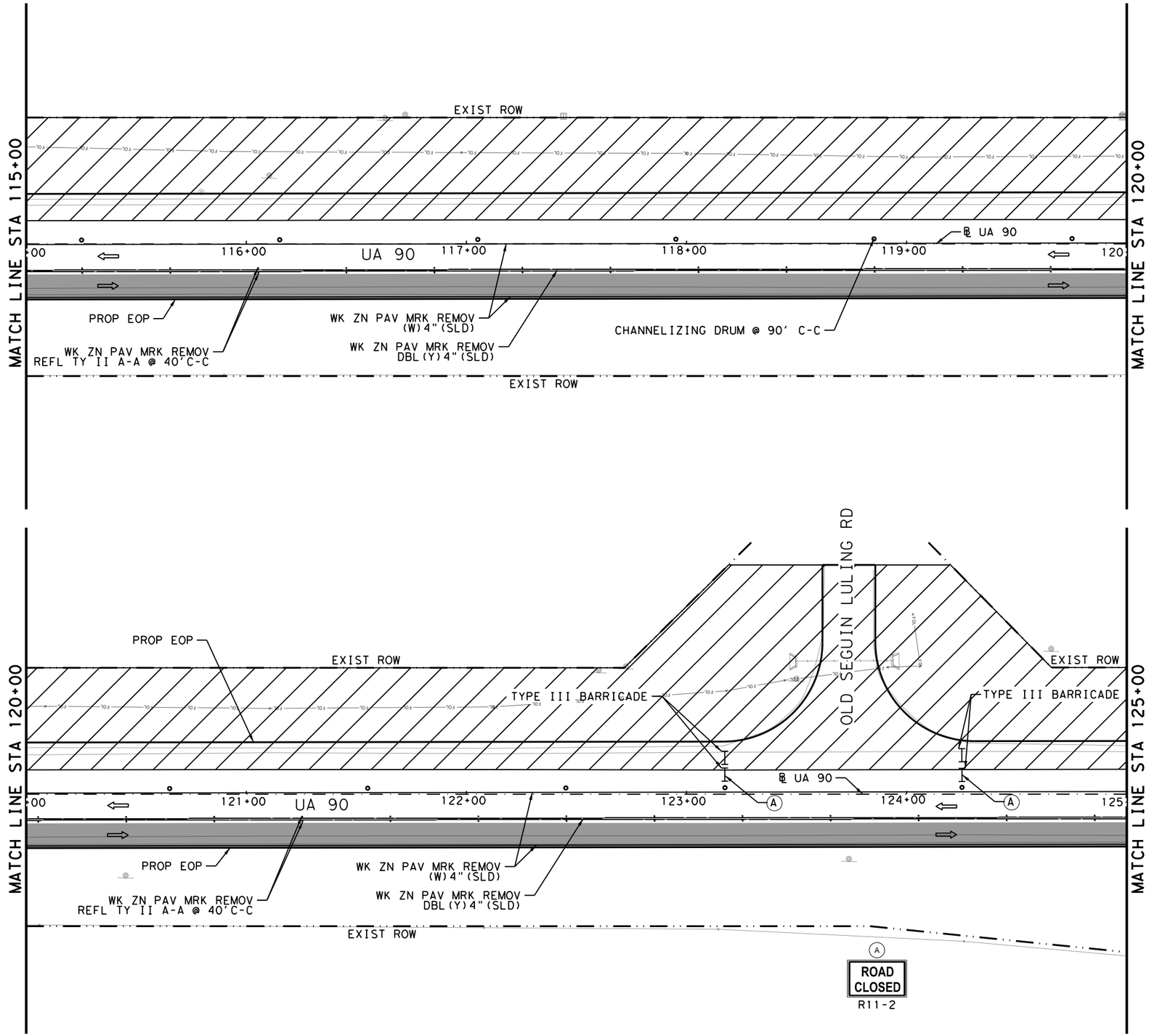

LEGEND

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- WORK ZONE
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TRAFFIC CONTROL PLAN
PHASE II

SHEET 3 OF 8

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	27
CONT.	SECT.	JOB	
0025	04	051	

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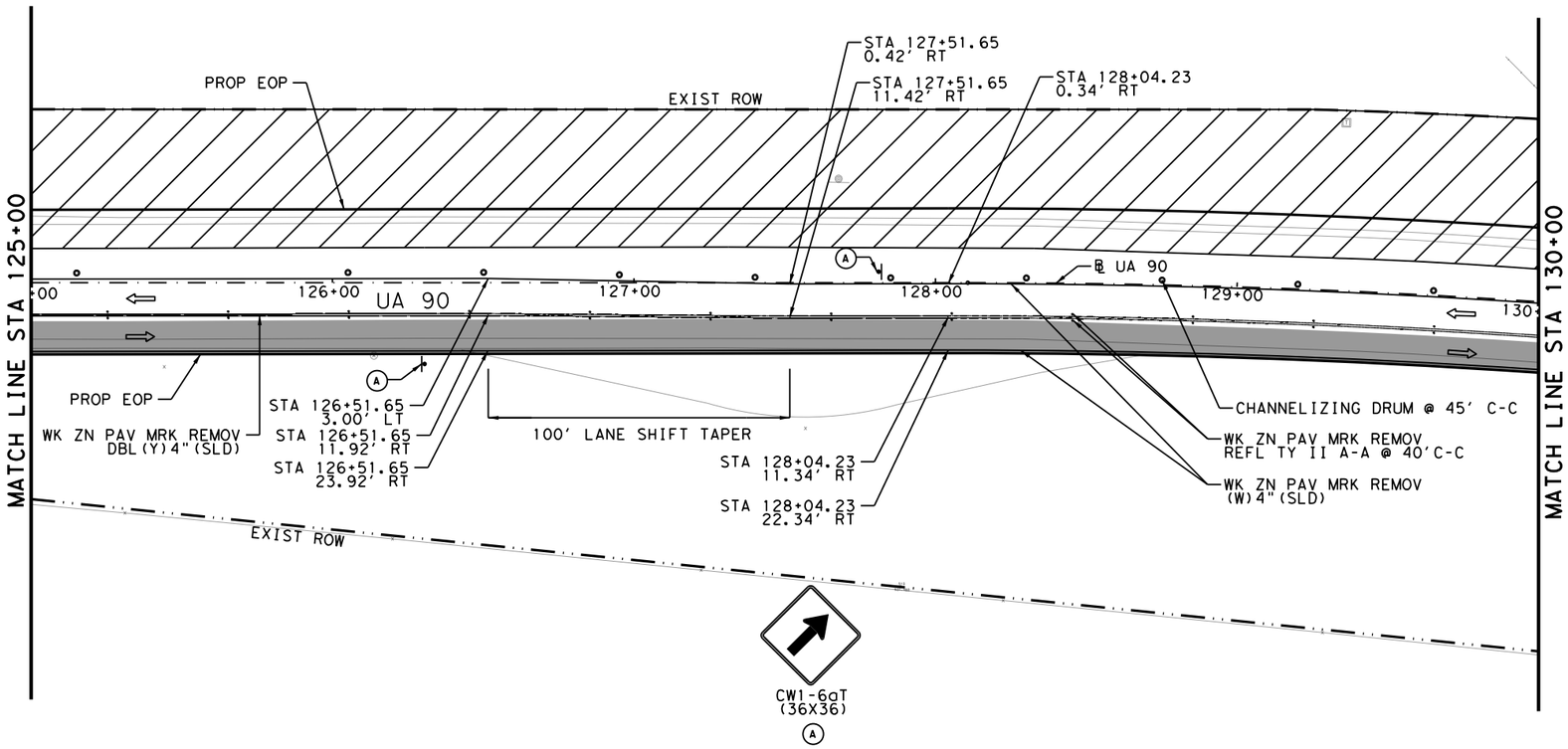
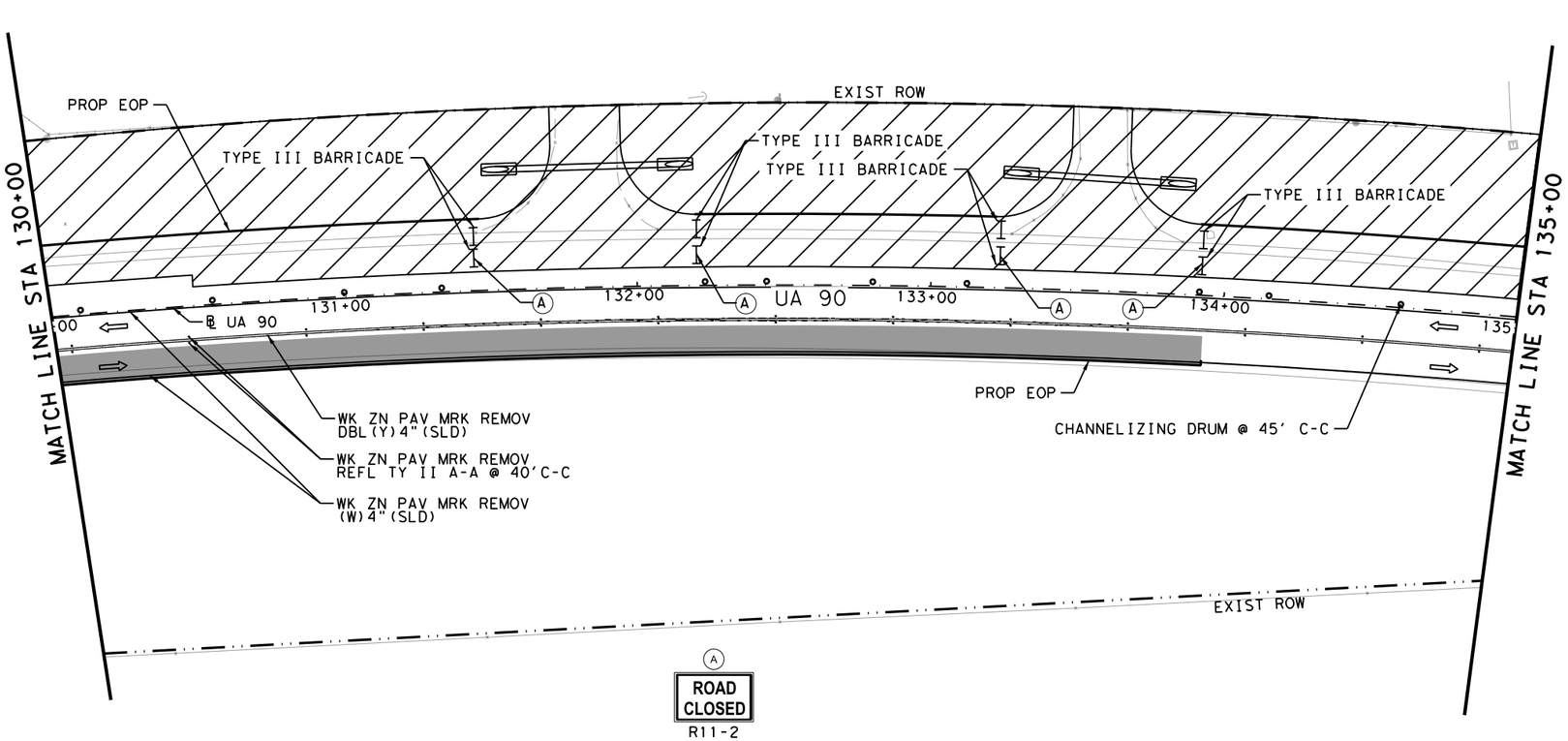
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	1993





LEGEND

- TRAFFIC DIRECTION
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TRAFFIC CONTROL PLAN
PHASE II

SHEET 4 OF 8

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	28
0025	04	051	

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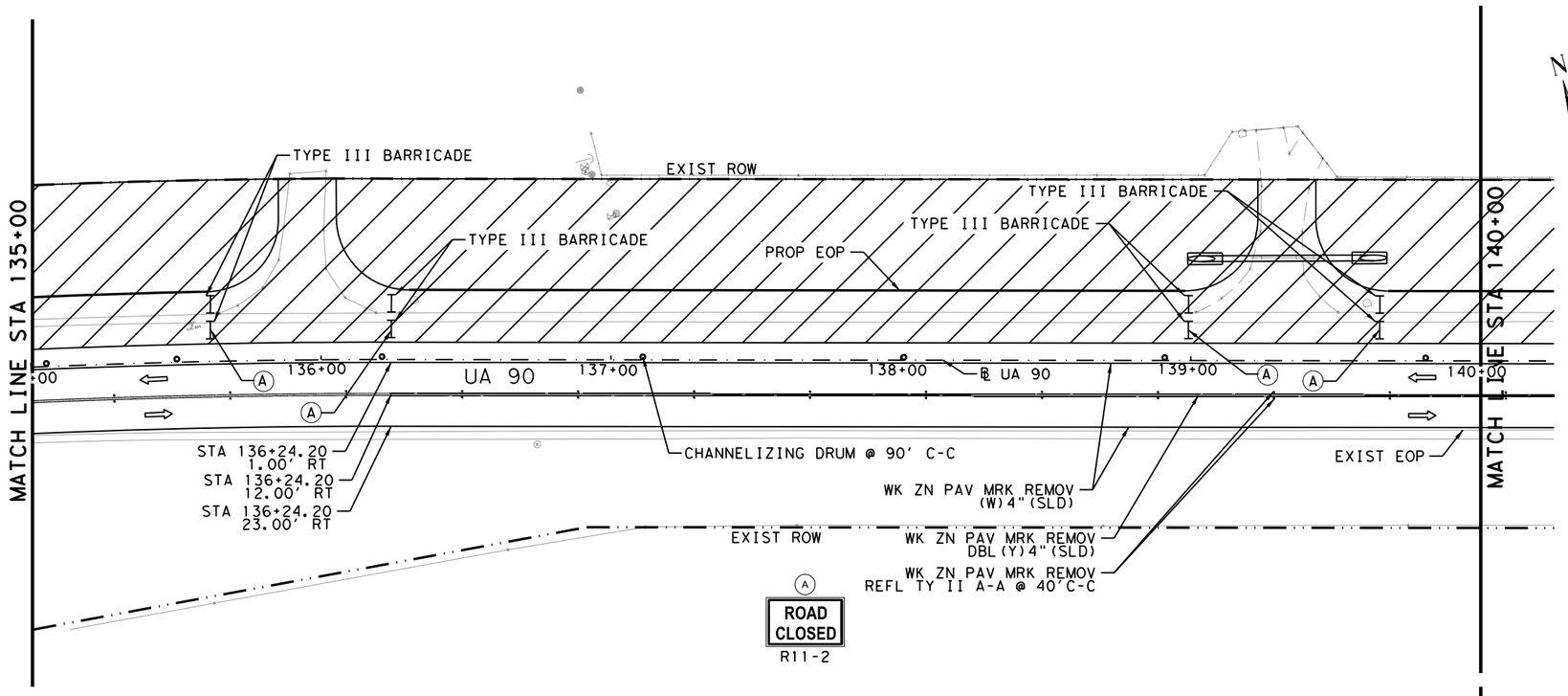
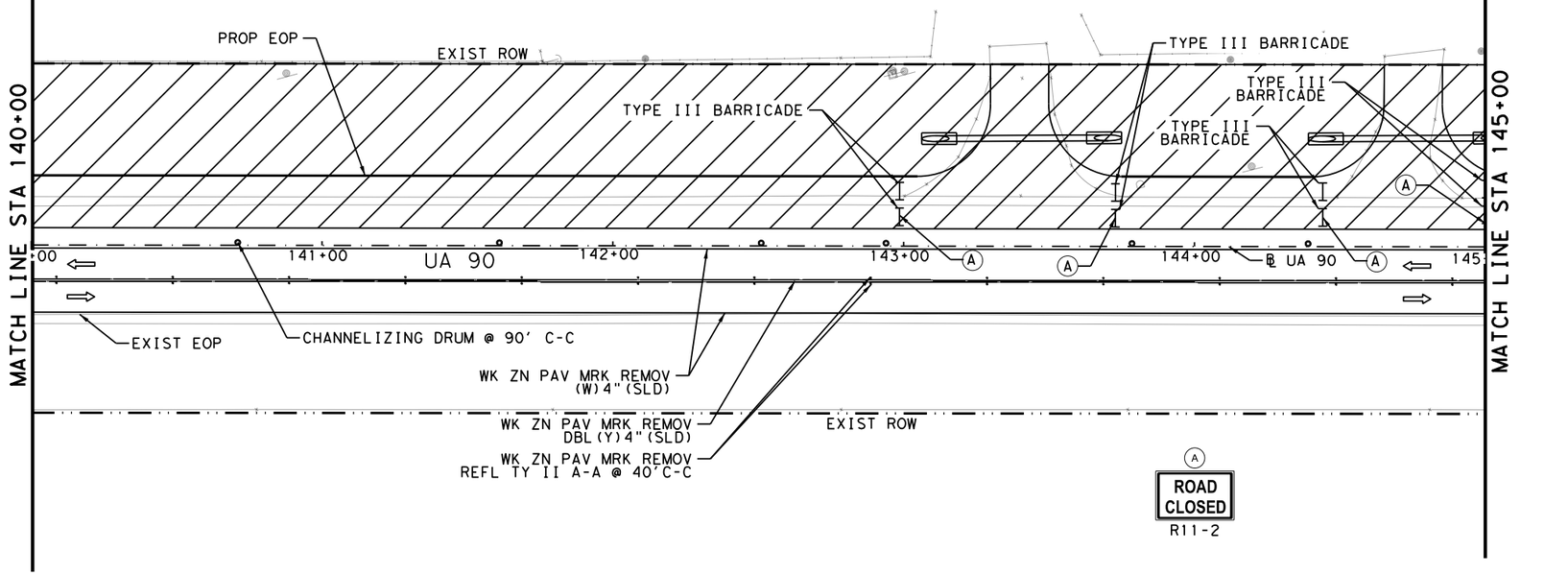
662 6063	WK ZN PAV MRK REMOV (W)4" (SLD)	LF	2000
662 6095	WK ZN PAV MRK REMOV (Y)4" (SLD)	LF	2000
677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	2773





LEGEND

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UA 90
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CR 202 TO WEBER ROAD

TRAFFIC CONTROL PLAN
PHASE II

SHEET 5 OF 8

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	29
CONT.	SECT.	JOB	
0025	04	051	

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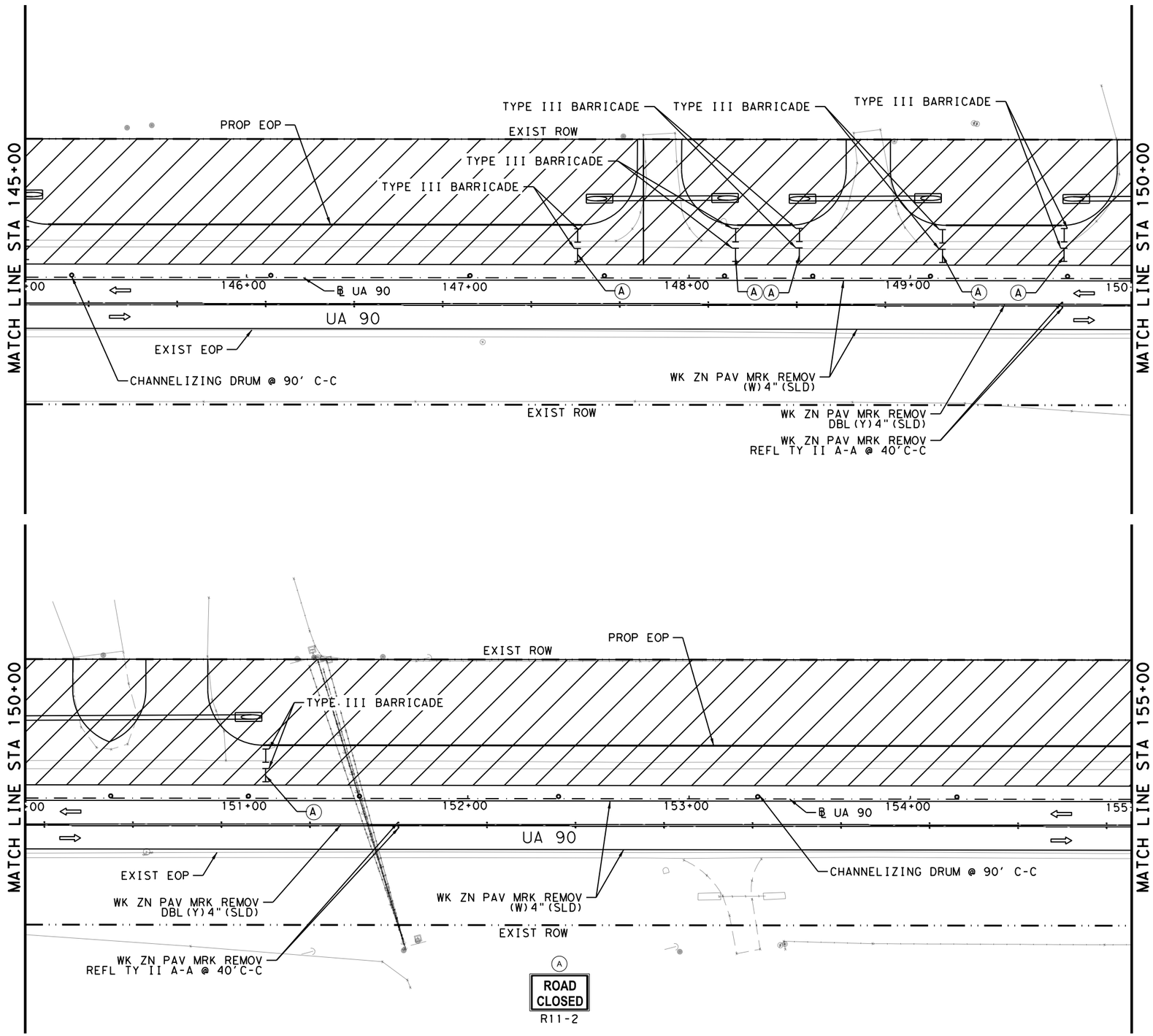
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	2000
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	2000
677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	4000



LEGEND

- TRAFFIC DIRECTION
- WORK ZONE
- PREVIOUS CONSTRUCTION
- CHANNELIZING DRUMS
- TYPE III BARRICADE

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PHASE II

SHEET 6 OF 8

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	30
CONT.	SECT.	JOB	
0025	04	051	

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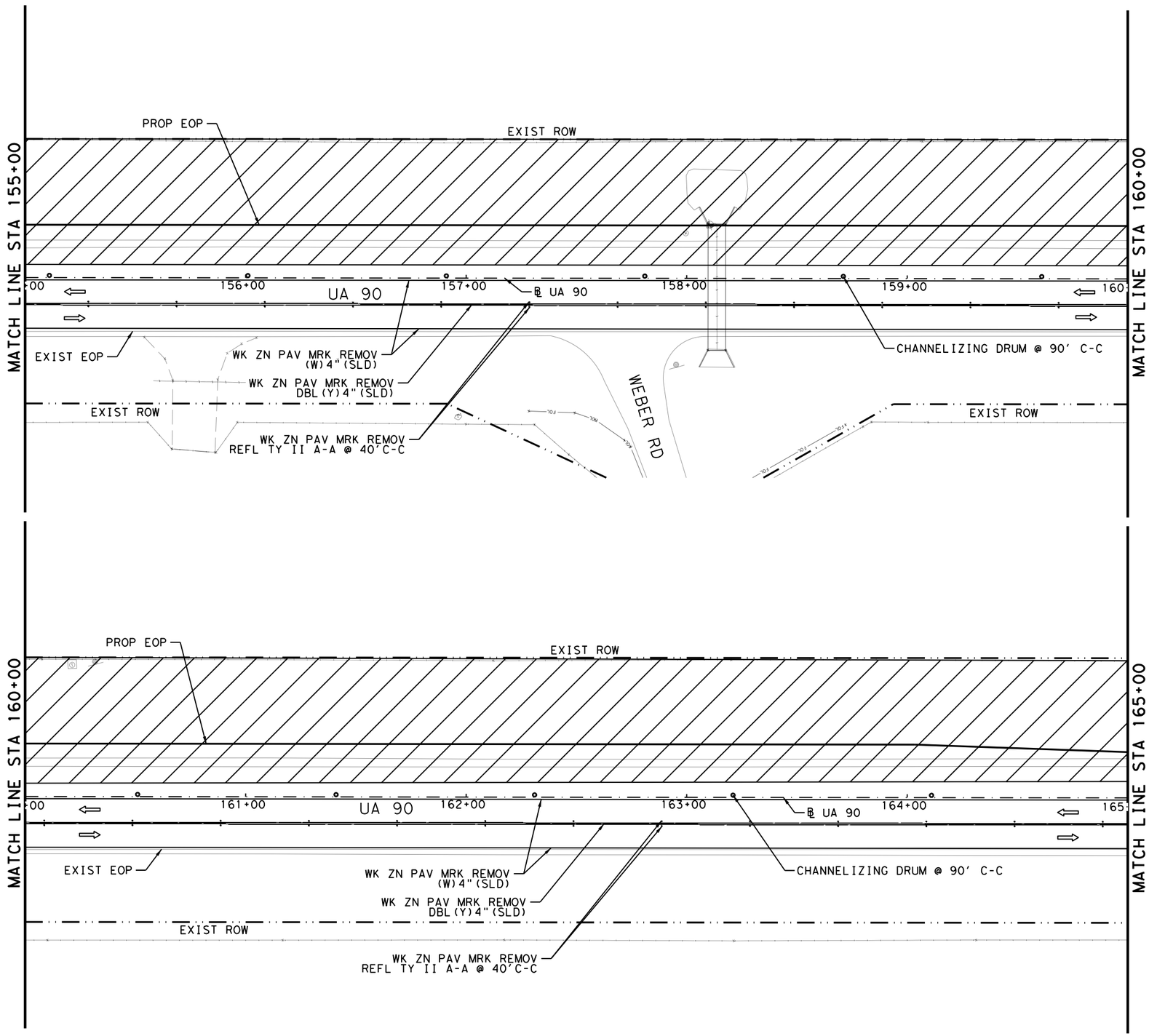
662 6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	2000
662 6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	2000
677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	4000



LEGEND

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- WORK ZONE
- PREVIOUS CONSTRUCTION
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PHASE II

SHEET 7 OF 8

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	FM 3351

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	GUADALUPE	31
CONT.	SECT.	JOB	
0025	04	051	

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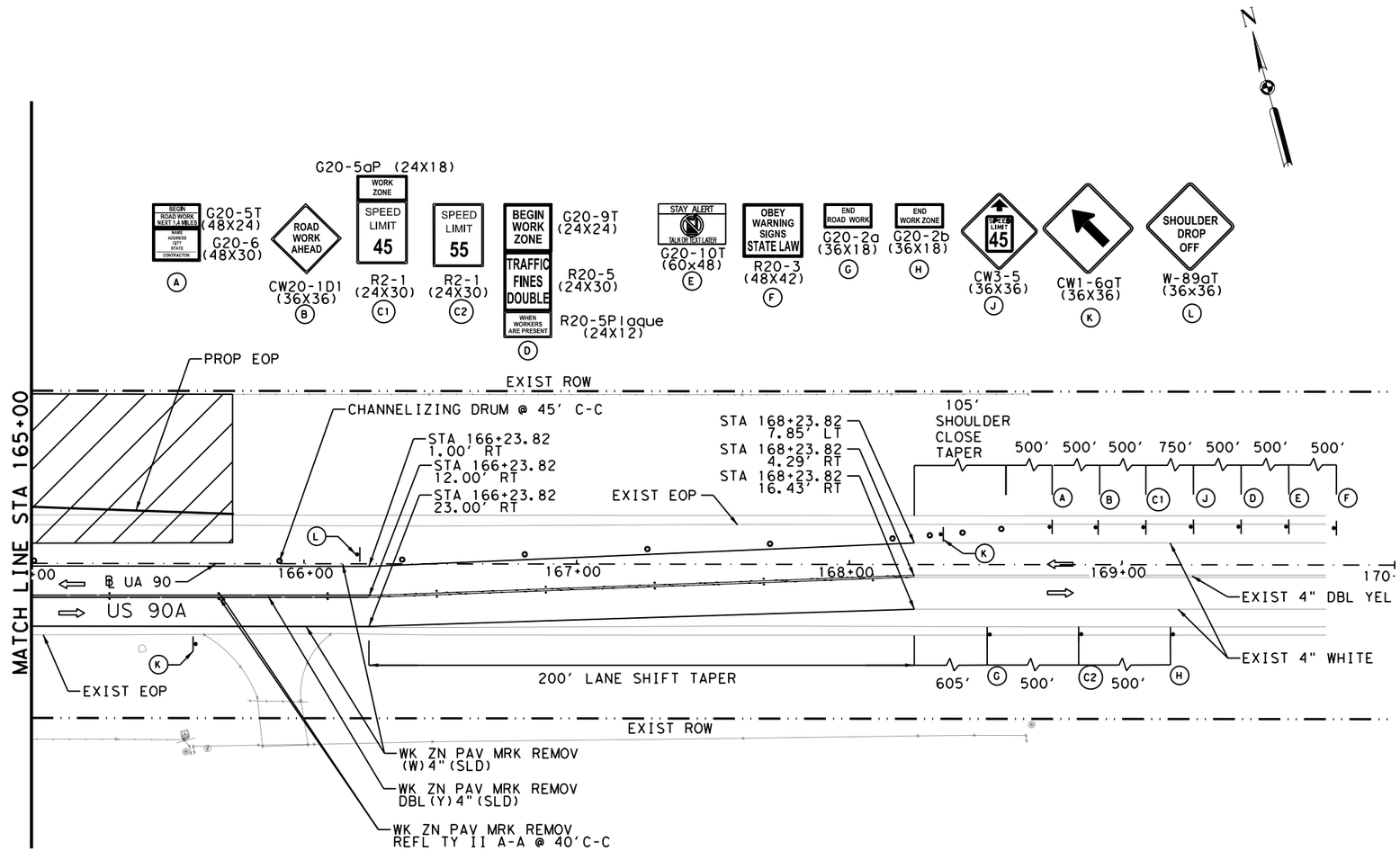
677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	1296



LEGEND

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- WORK ZONE
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TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	32
0025	04	051	

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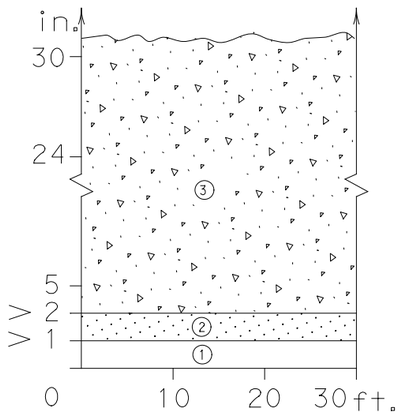
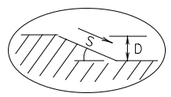
User: ktreber

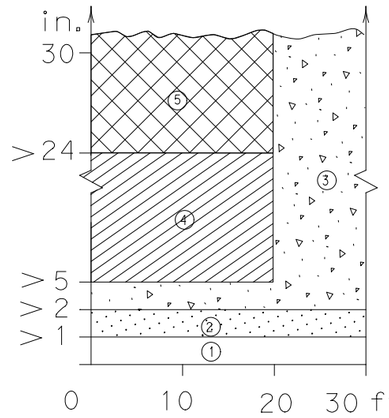
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

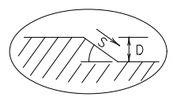


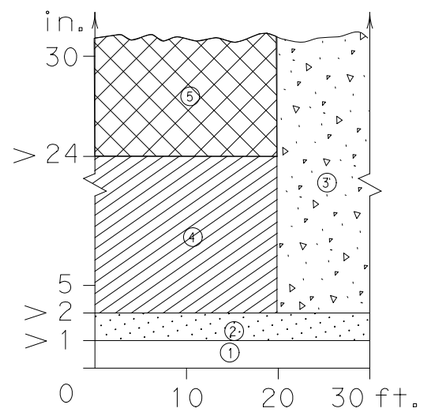
Edge Condition I
S = (3:1) (or flatter)



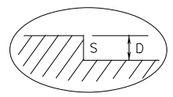


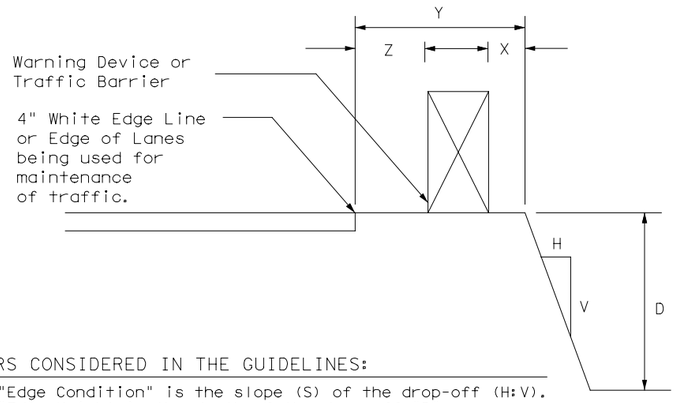
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge Condition I.
⑤	Check indications (Figure-1) for possitive barrier. Where positive barrier is not indicated, the treatment shown above for Zone-4 may be used after consideration of other applicable factors.

Edge Condition Notes:

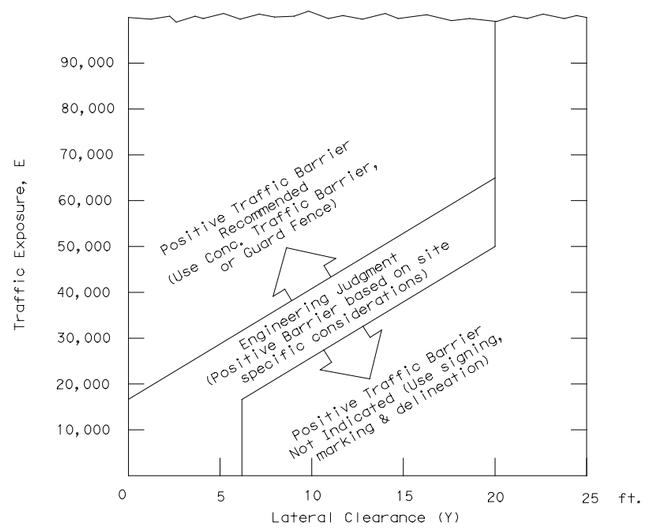
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1. E = ADT x T
   Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

THIS DOCUMENT IS FOR INTERIM REVIEW AND IS NOT INTENDED FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES.

PAUL E. BRIGHT
61108
2/1/2023
DATE

Texas Department of Transportation

Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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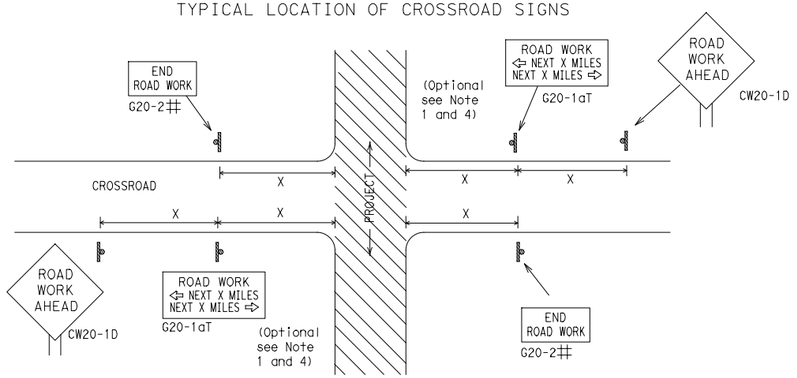
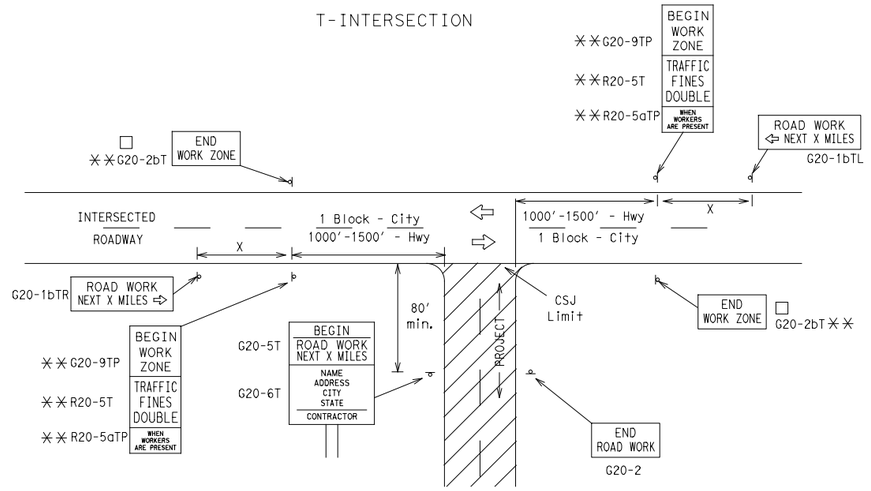
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

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

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

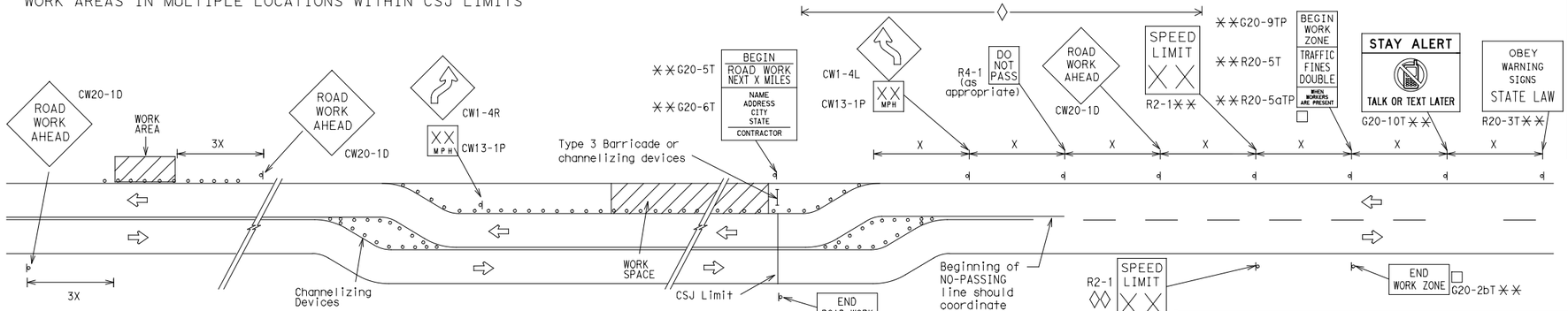
GENERAL NOTES

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

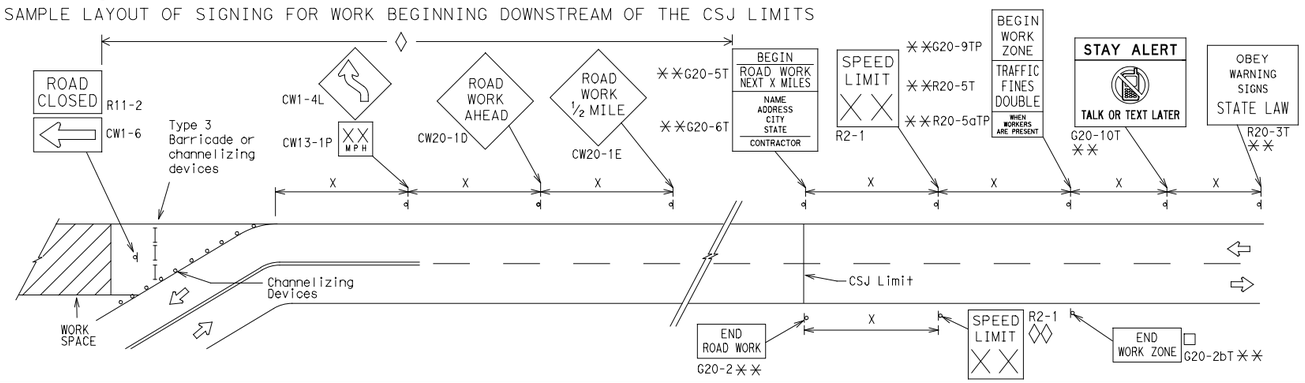
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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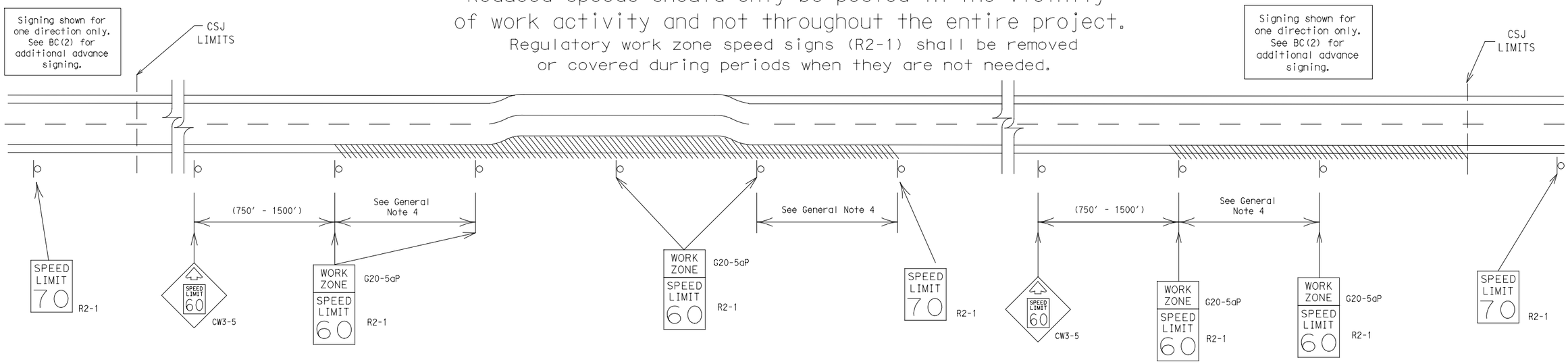
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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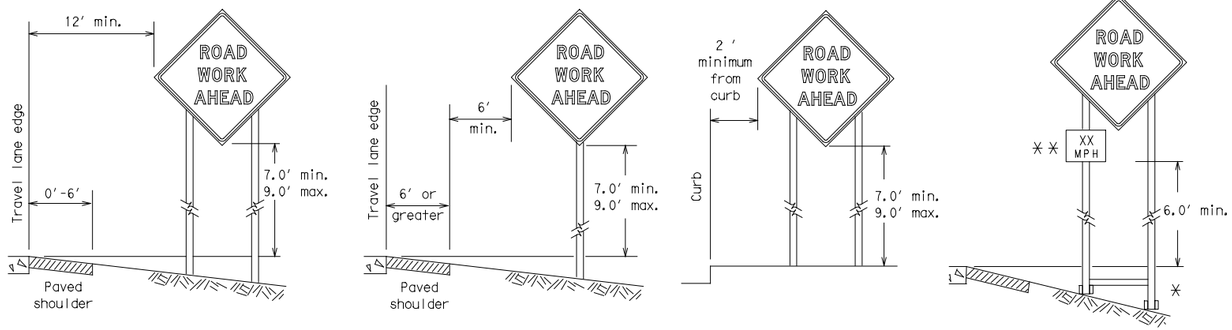
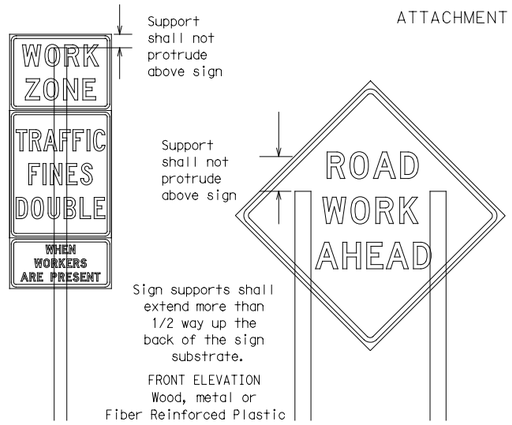
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

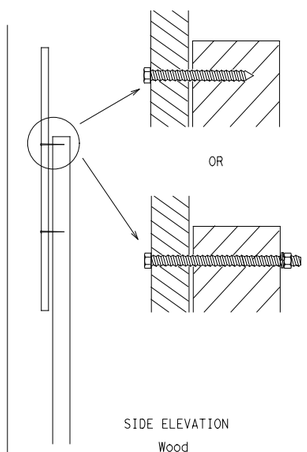


⚹ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





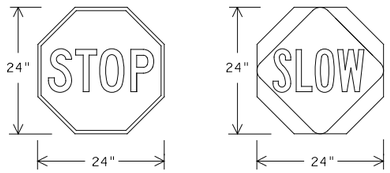
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectorized when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6′ to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets.The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height,the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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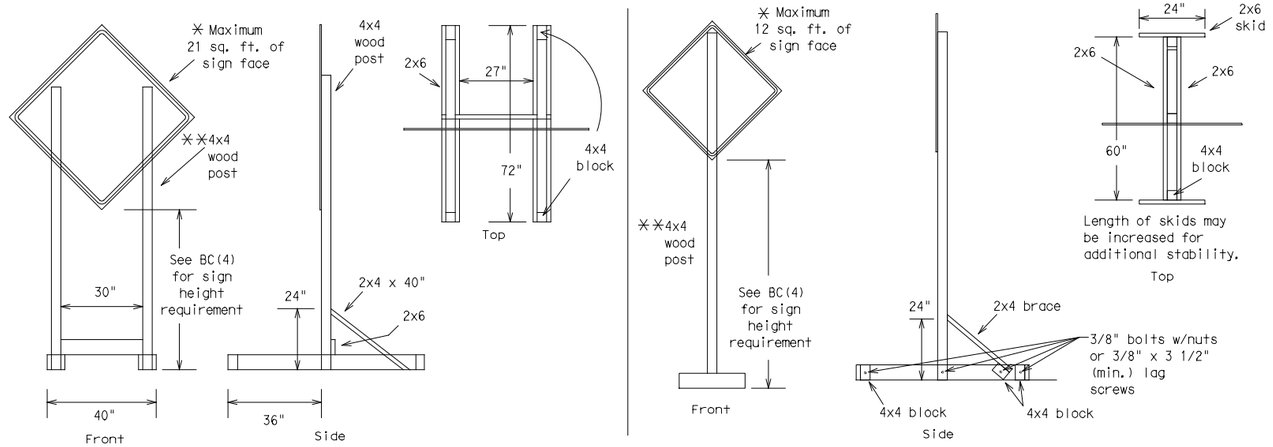
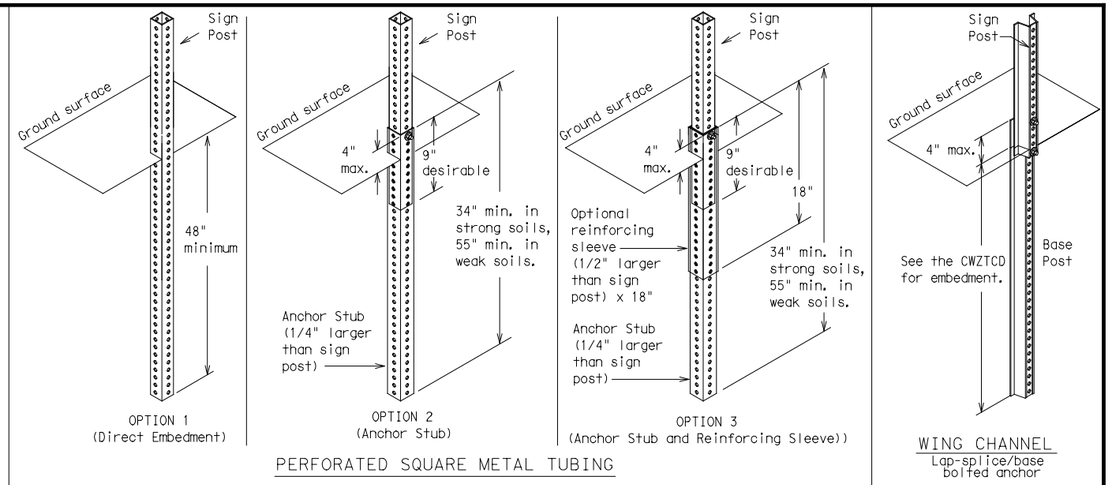


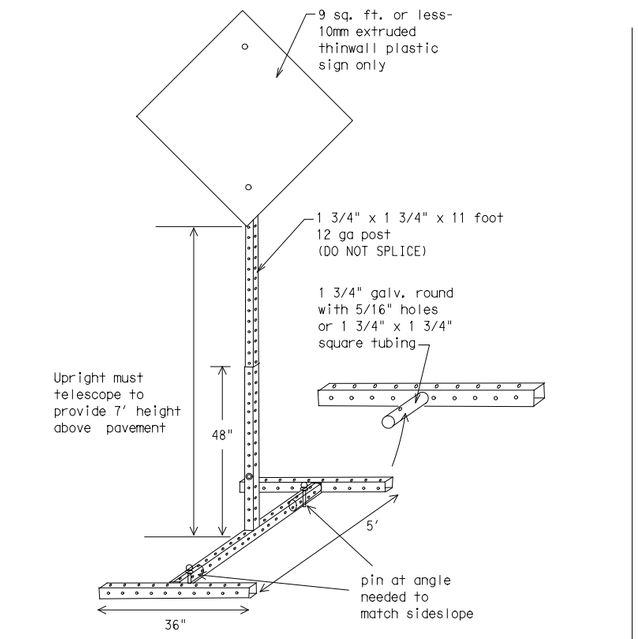
SKID MOUNTED WOOD SIGN SUPPORTS

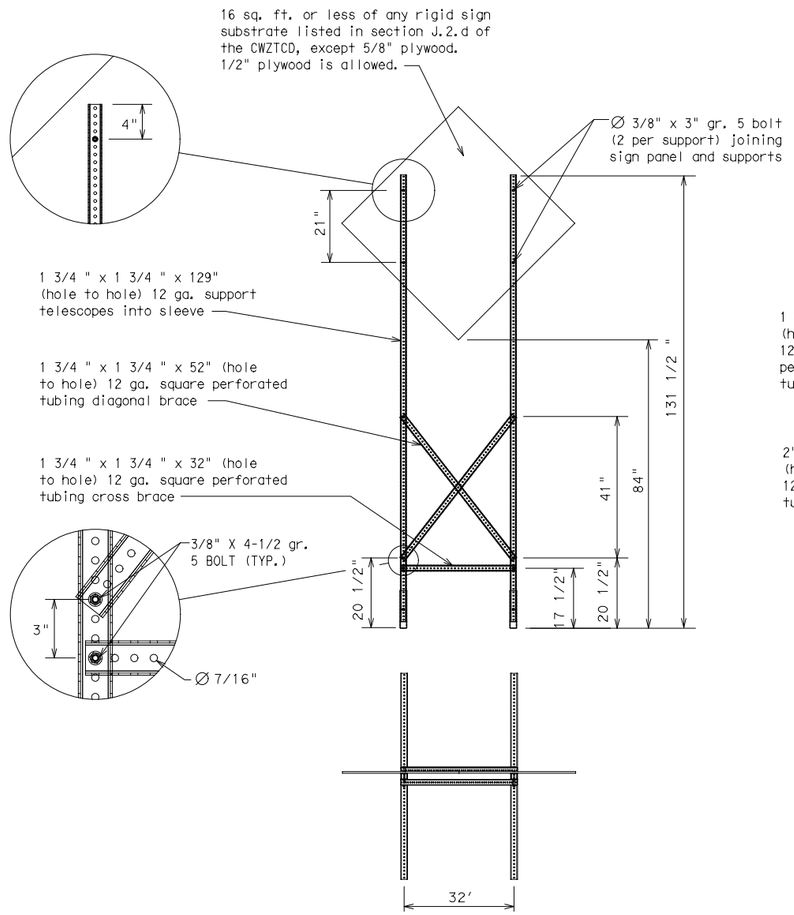
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

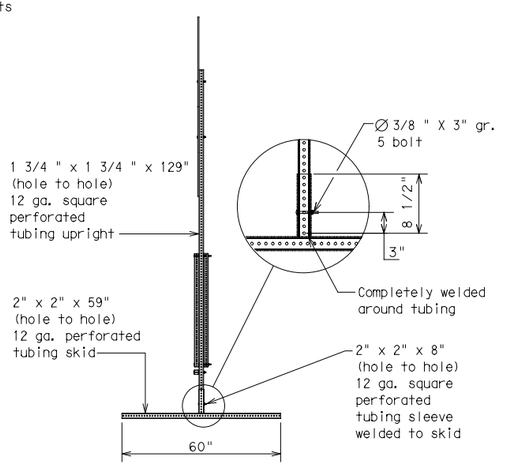


GROUND MOUNTED SIGN SUPPORTS

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.

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

⚹⚹ Advance Notice List

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

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

⚹⚹ See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

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BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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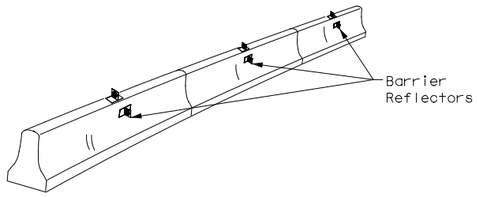
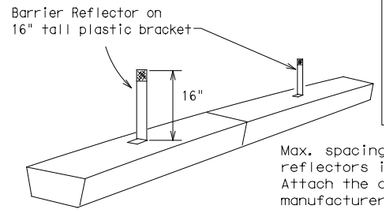
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

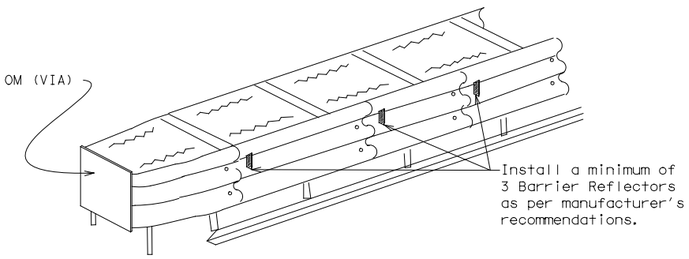


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

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.

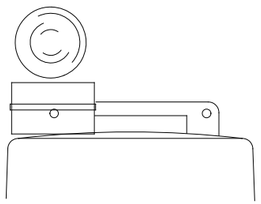


DELINEATION OF END TREATMENTS

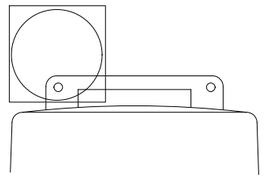
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

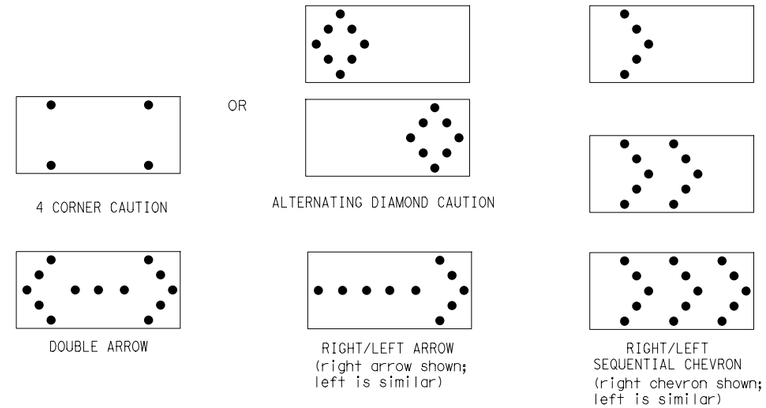
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

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

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

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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

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

BC(7)-21

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

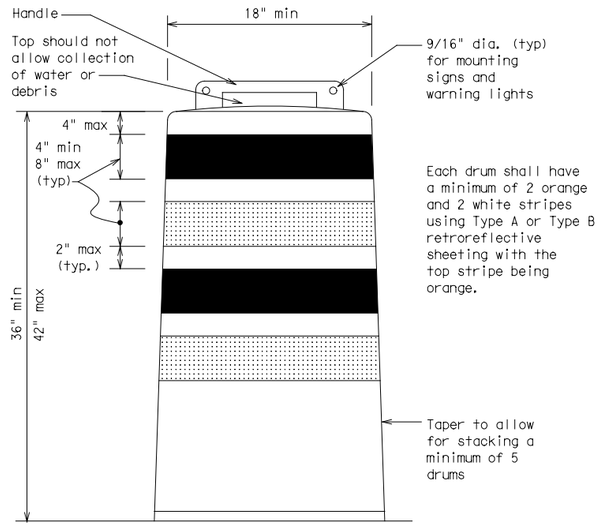
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

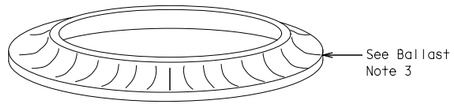
RETROREFLECTIVE SHEETING

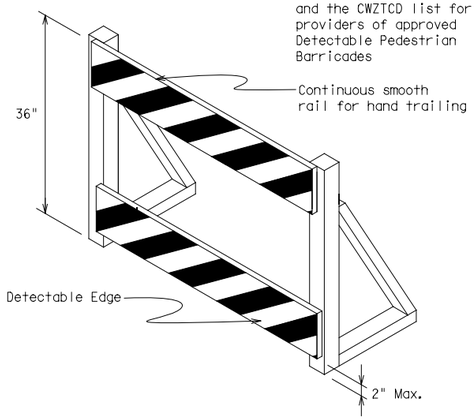
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

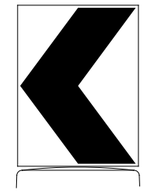




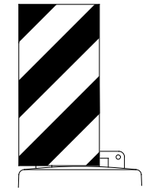


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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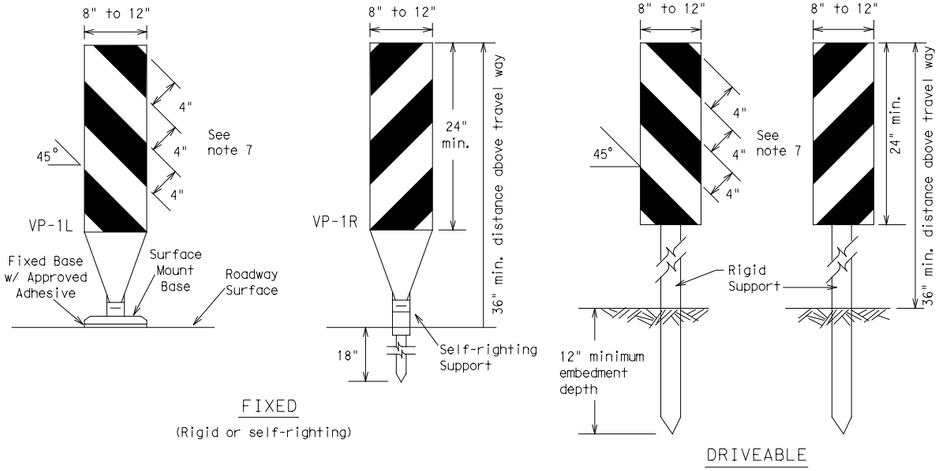
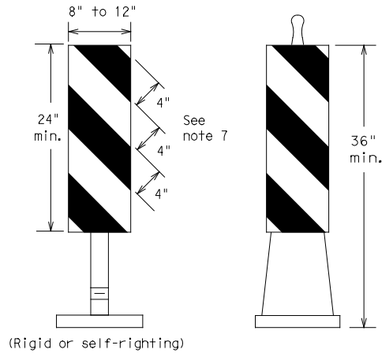


FIXED

(Rigid or self-righting)

DRIVEABLE

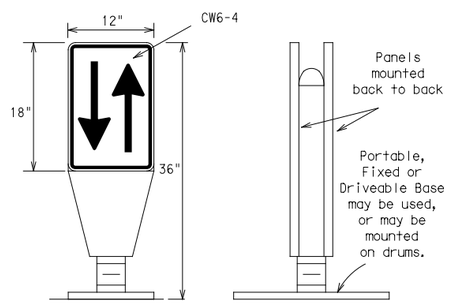


(Rigid or self-righting)

PORTABLE

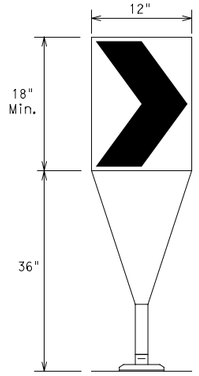
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

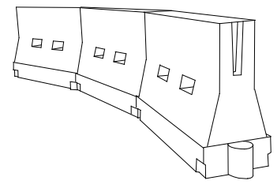
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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

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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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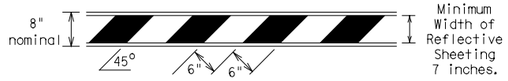
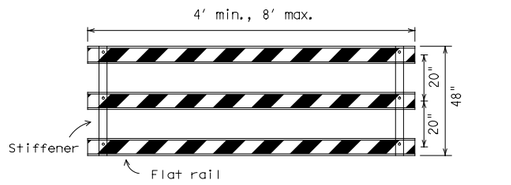
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



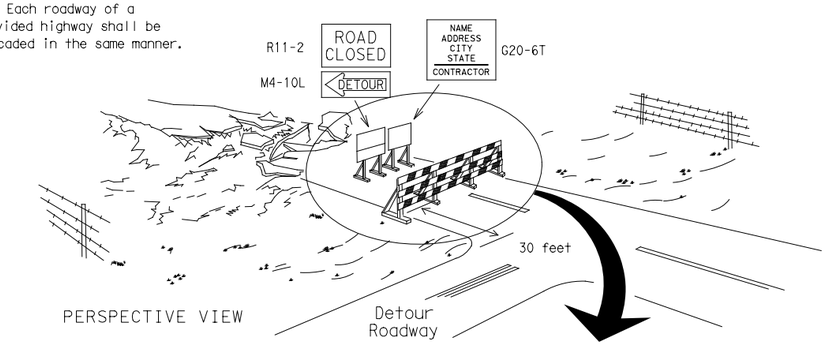
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

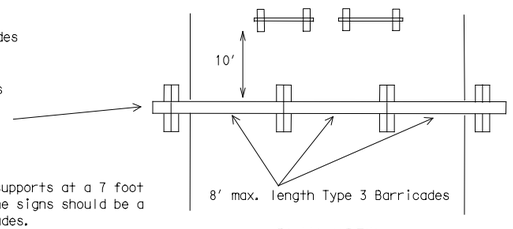
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

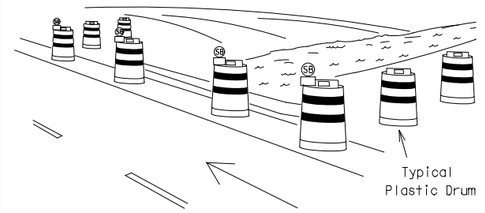
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

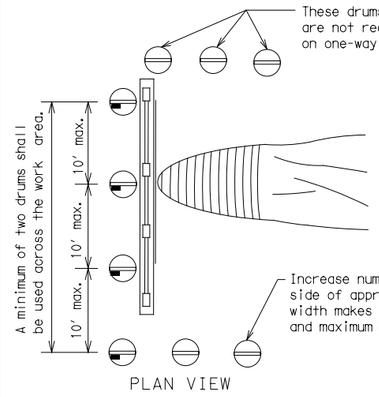
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

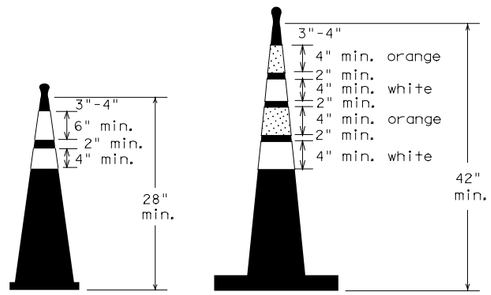
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



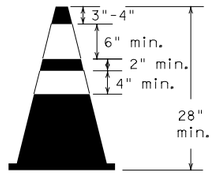
PLAN VIEW

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

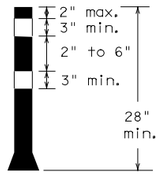
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

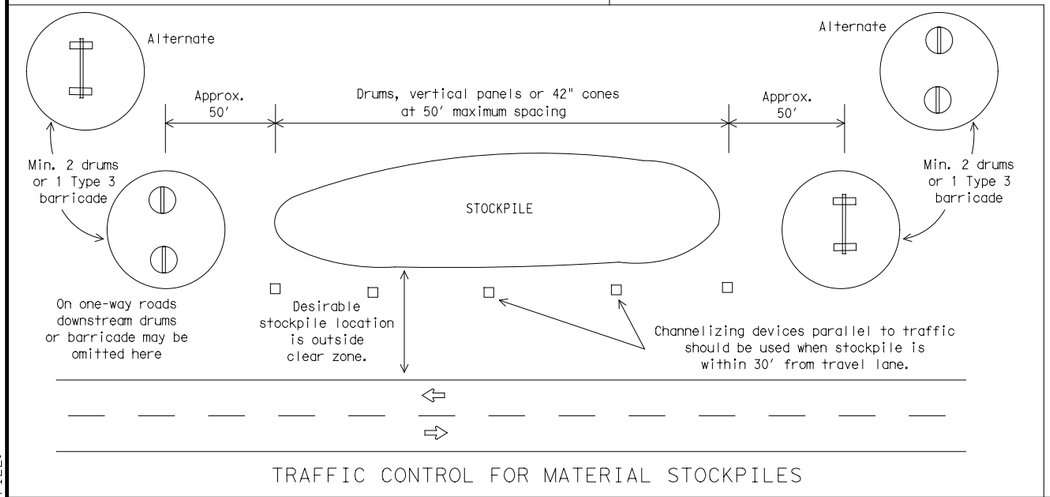


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

DATE:
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SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	GUADALUPE		43

104

DATE:
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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

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

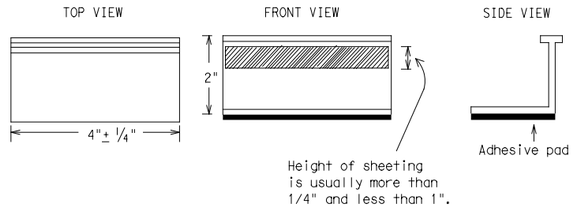
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation

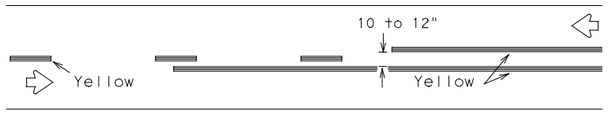
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

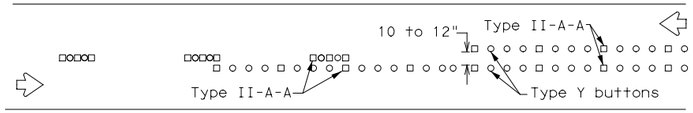
BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	0025	04	051	UA 90
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		44

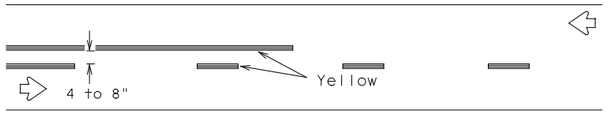
PAVEMENT MARKING PATTERNS



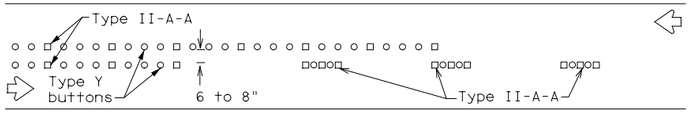
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



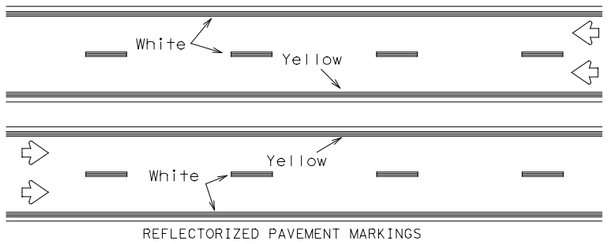
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



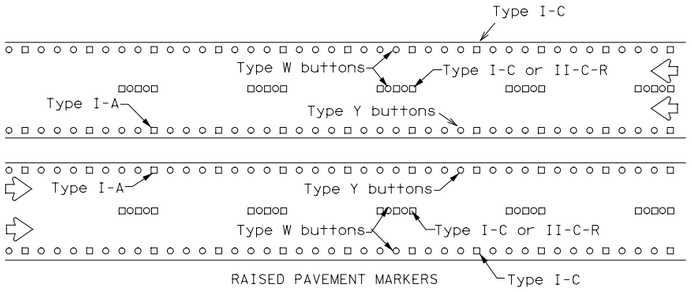
RAISED PAVEMENT MARKERS - PATTERN B

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

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



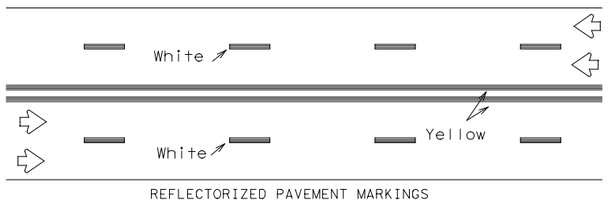
REFLECTORIZED PAVEMENT MARKINGS



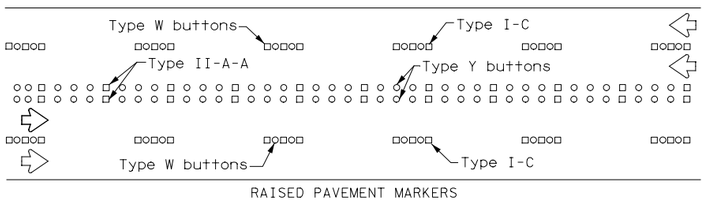
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



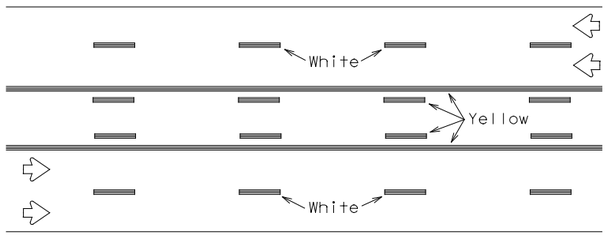
REFLECTORIZED PAVEMENT MARKINGS



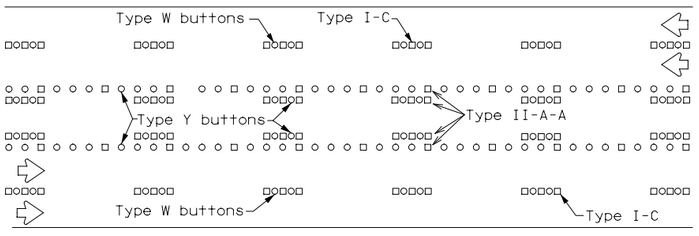
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

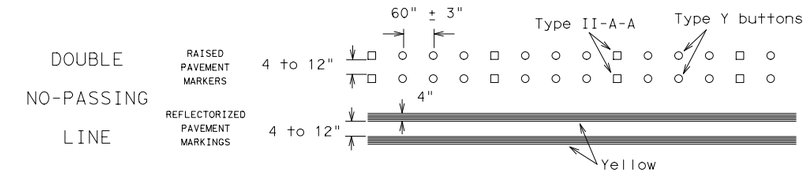
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

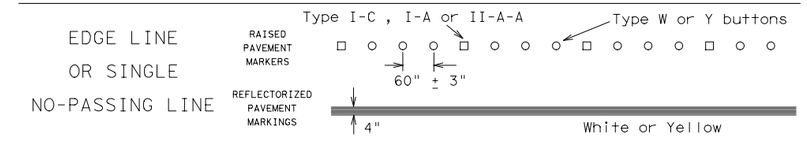
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

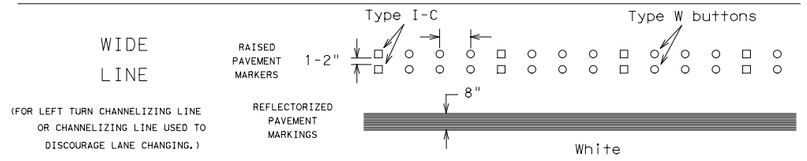


EDGE LINE OR SINGLE NO-PASSING LINE



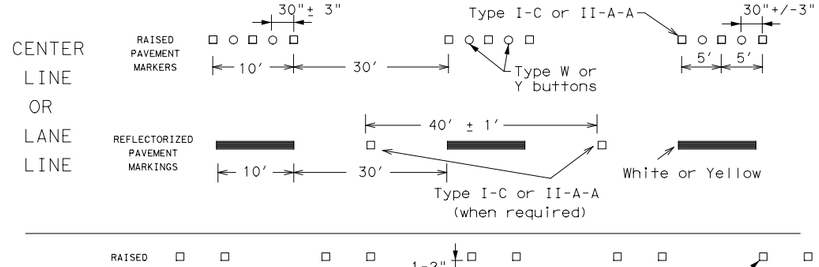
WIDE LINE

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

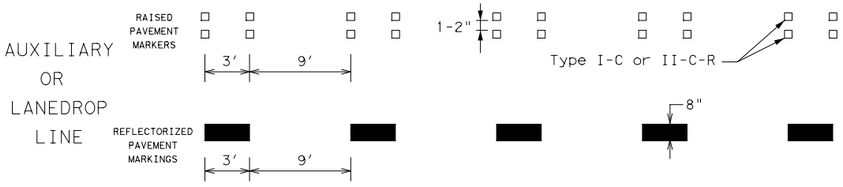


BROKEN LINES

CENTER LINE OR LANE LINE

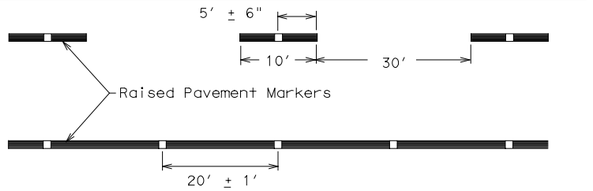


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	SAT	GUADALUPE		45

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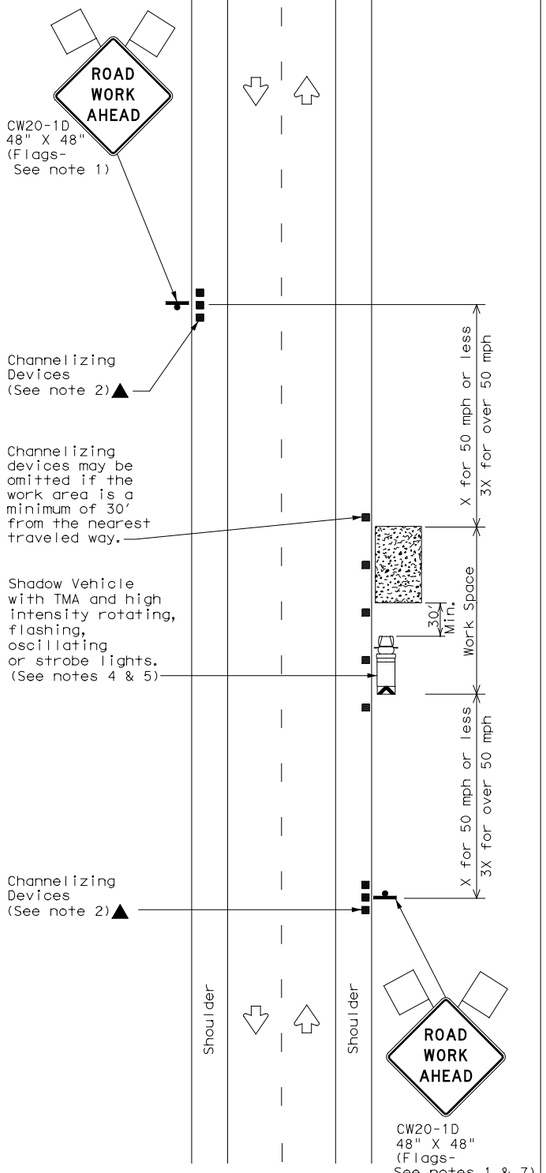
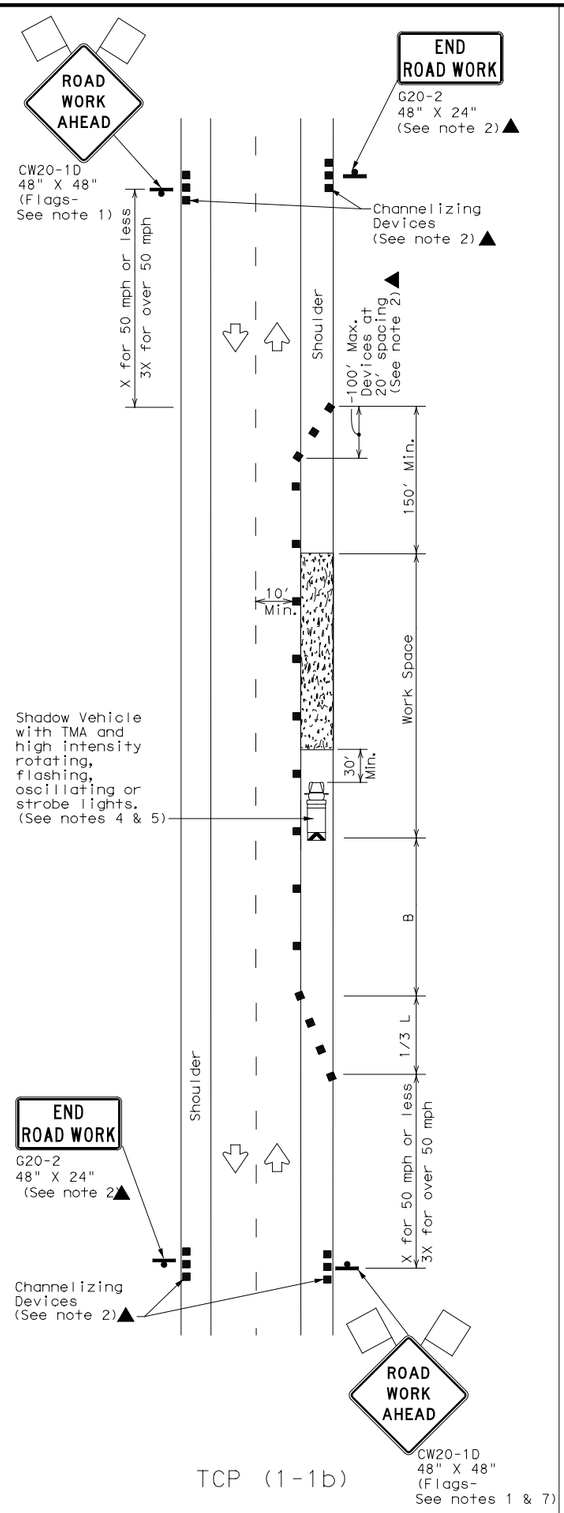


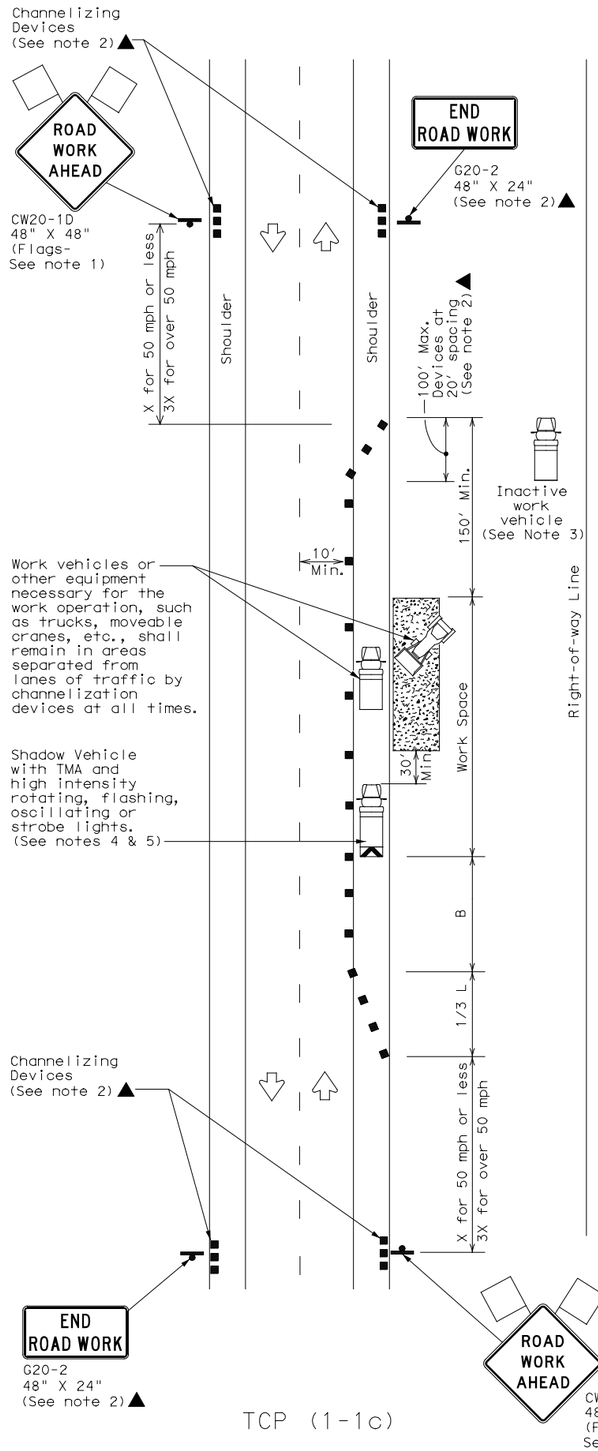
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
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REVISIONS	0025	04	051	UA 90
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	SAT	GUADALUPE		46
1-97 2-18				

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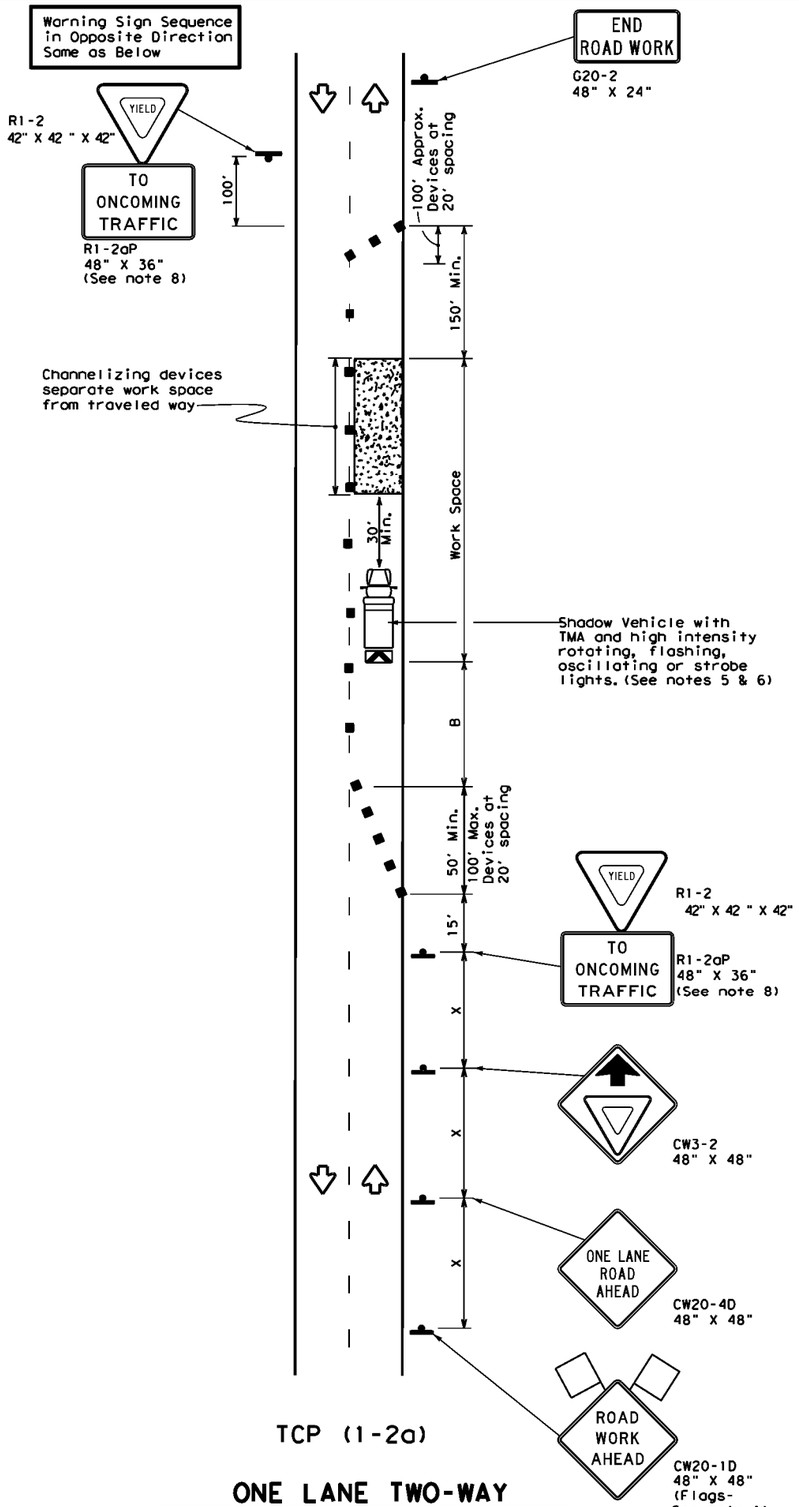
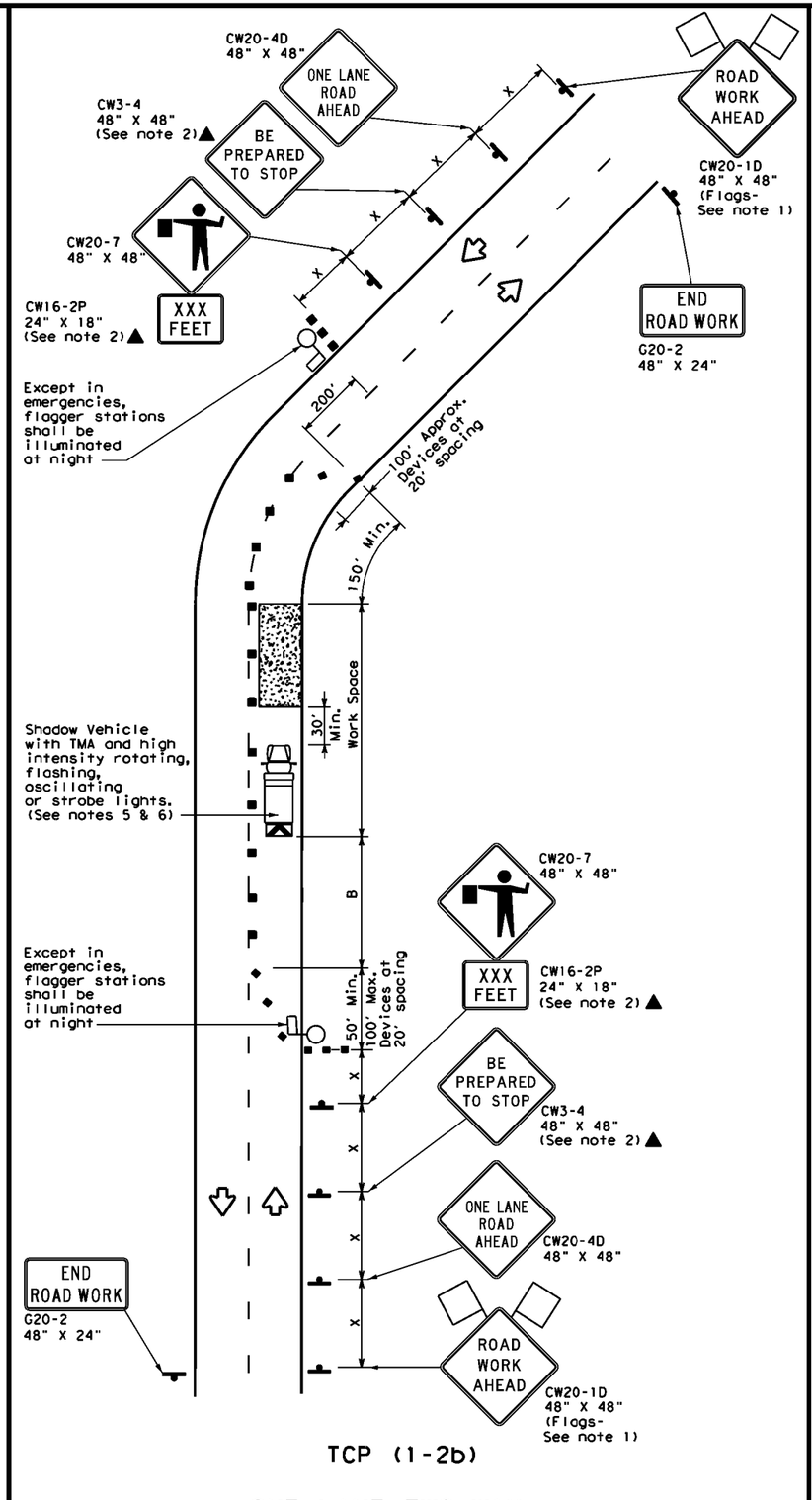


TCP (1-2a)

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



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	0025	04	051	UA 90
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		47

DATE: 2/1/2023
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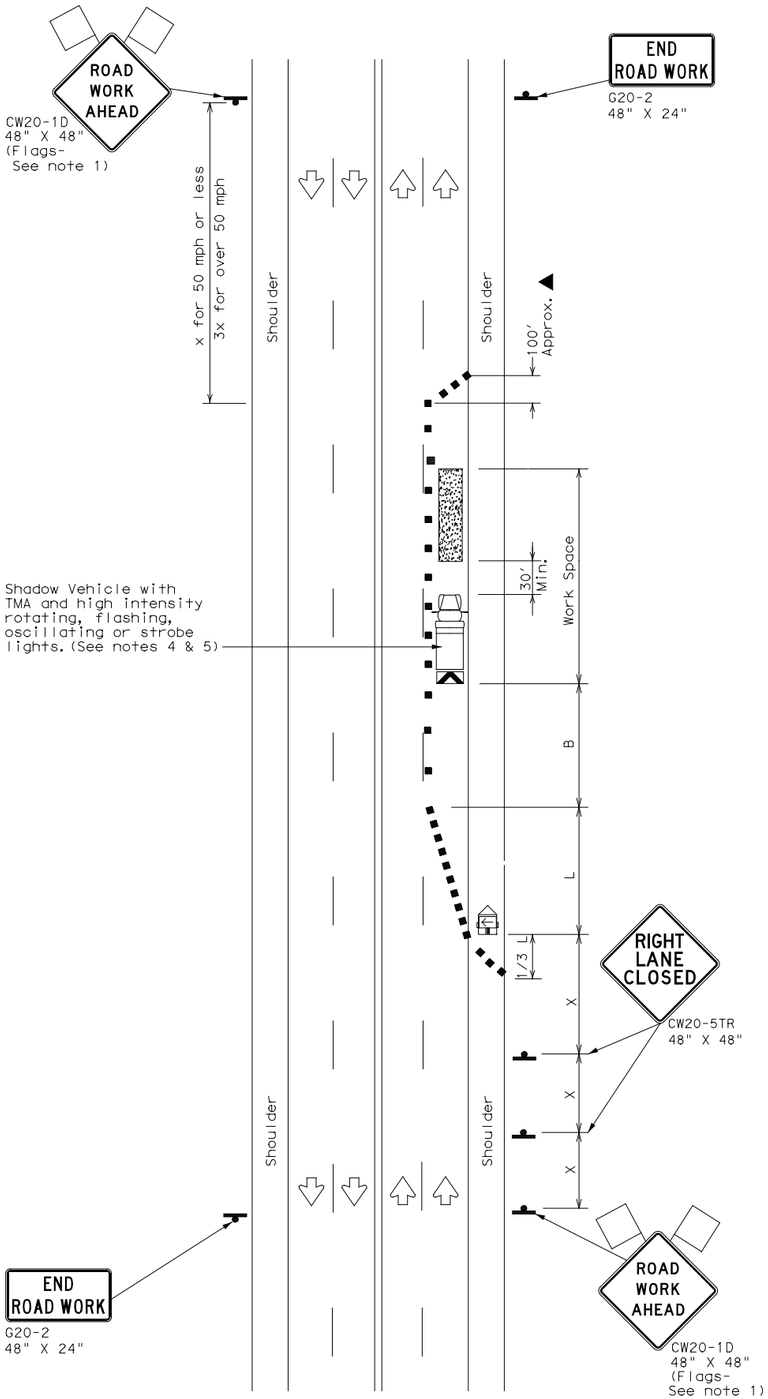
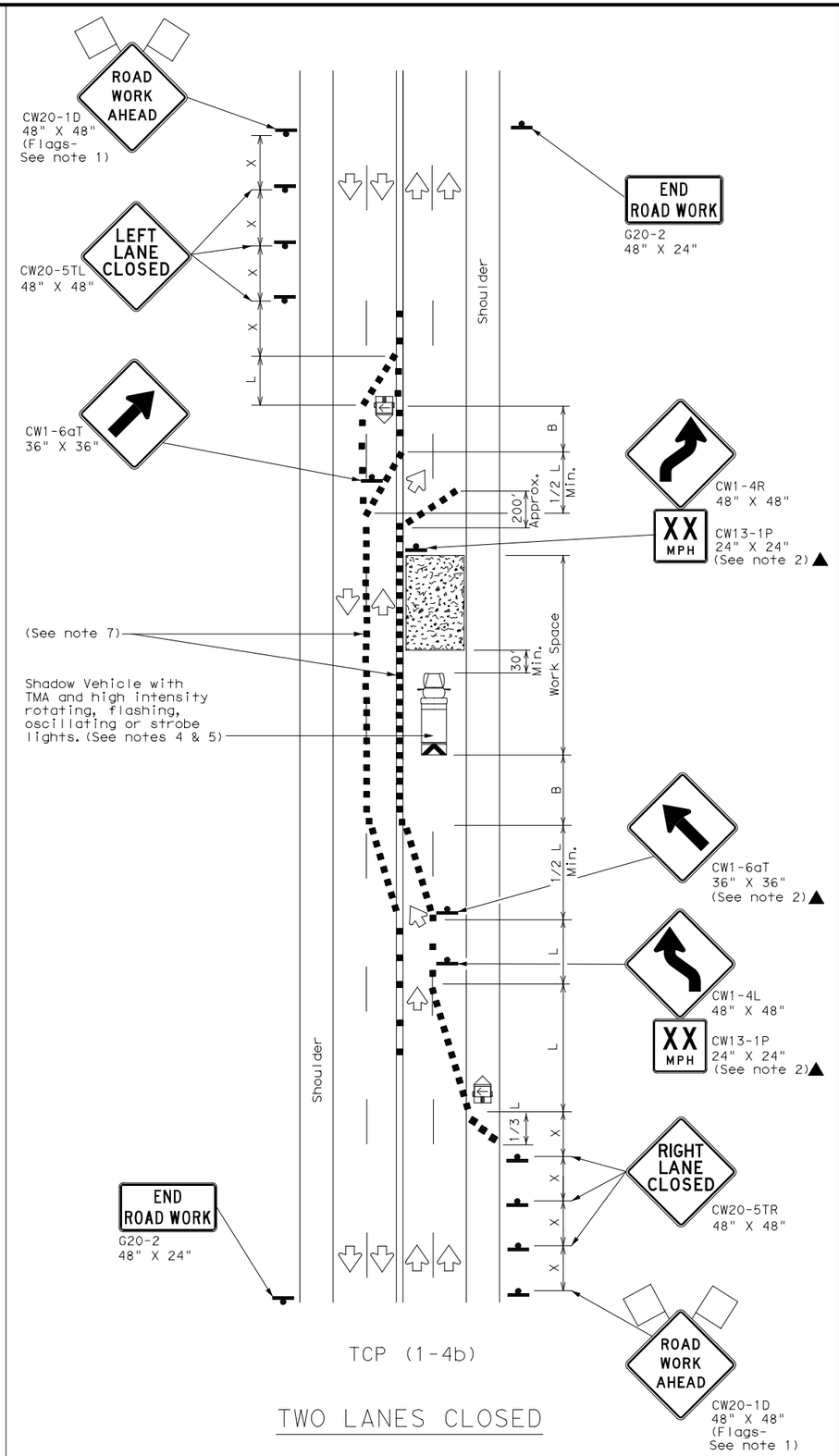


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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

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

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

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

GENERAL NOTES

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

TCP (1-4a)

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

TCP (1-4b)

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

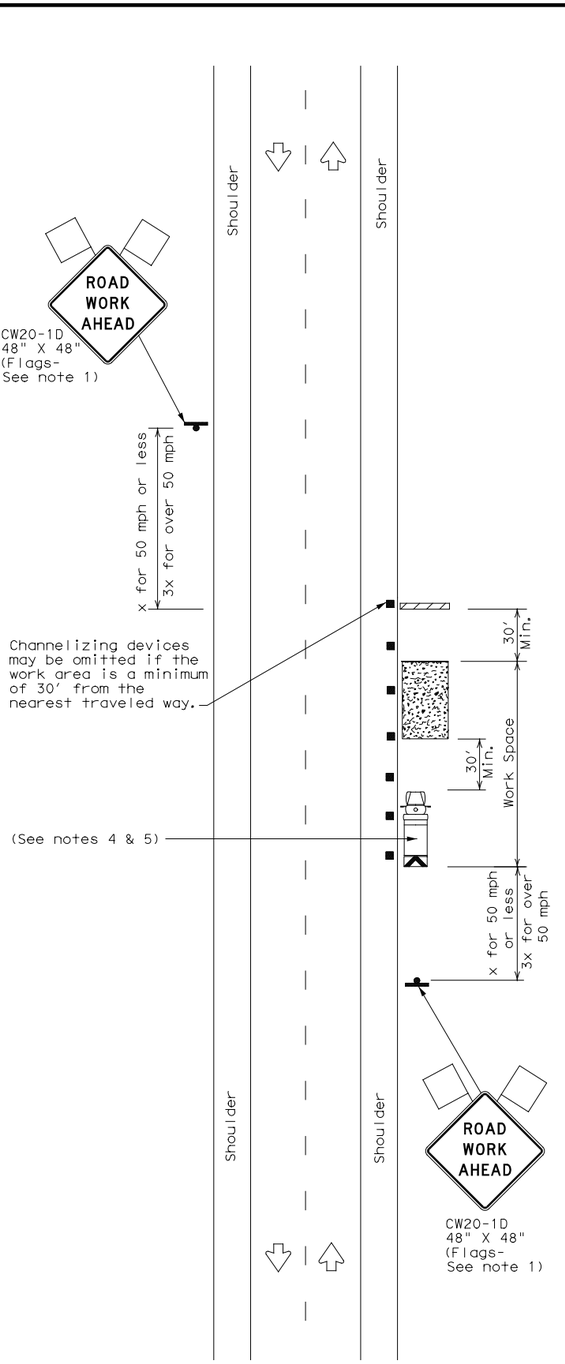
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

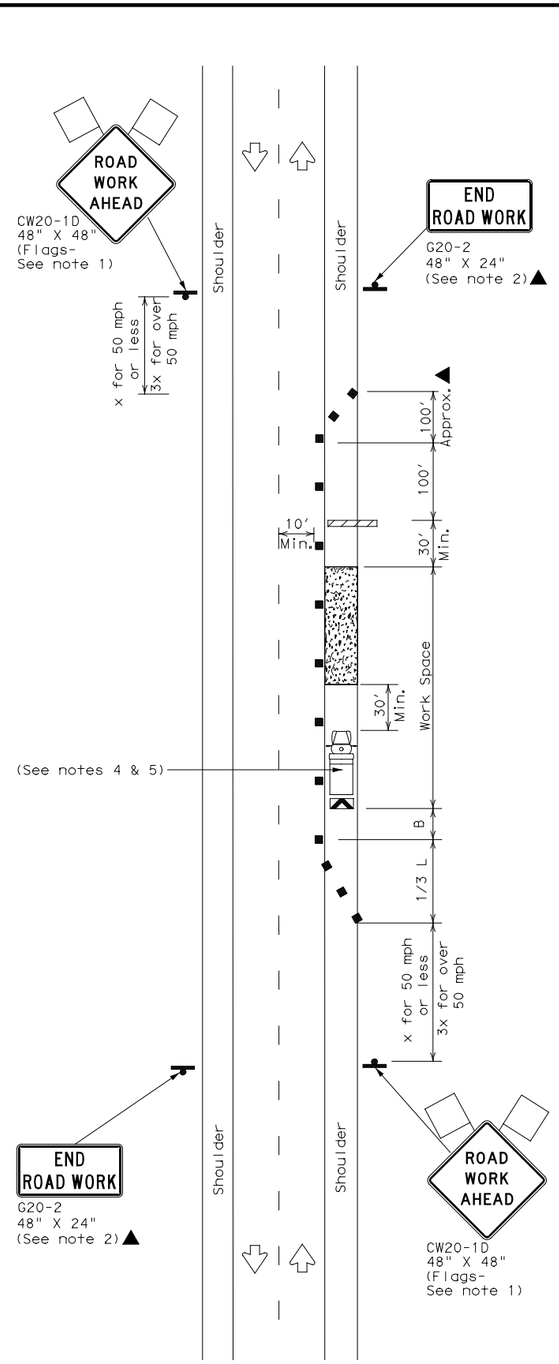
TCP (1-4)-18

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	SAT	GUADALUPE		48
1-97 2-18				



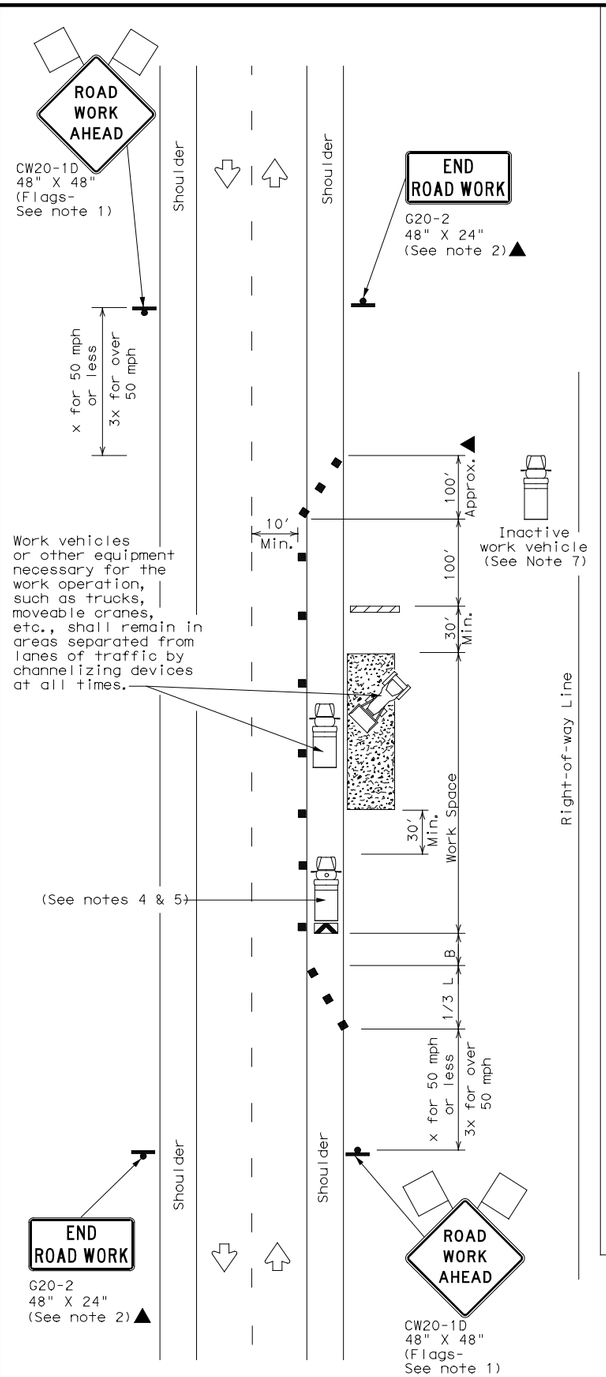
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP (2-1)-18

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
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8-95 2-12	SAT	GUADALUPE		49
1-97 2-18				

DATE:
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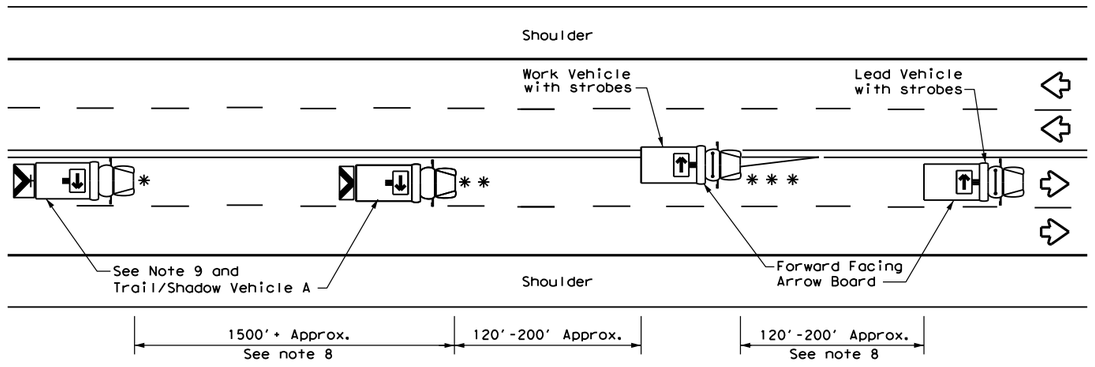
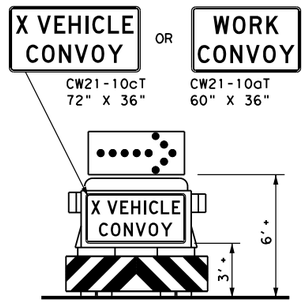


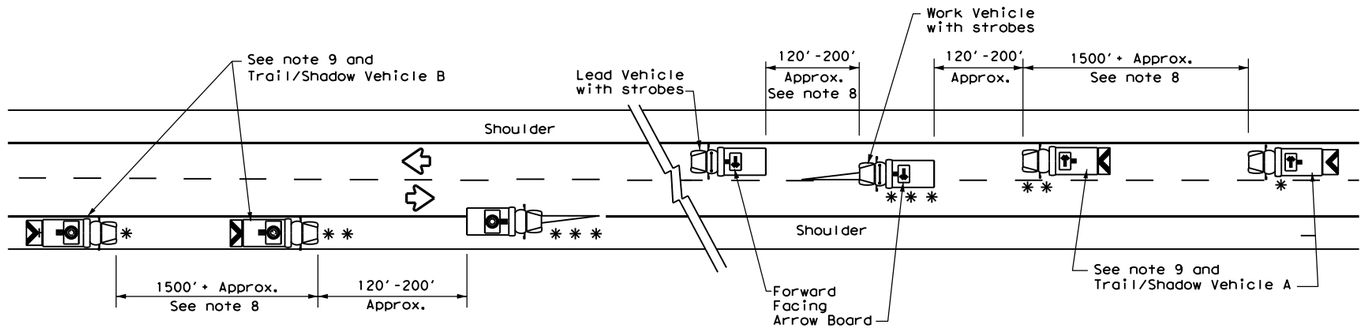
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

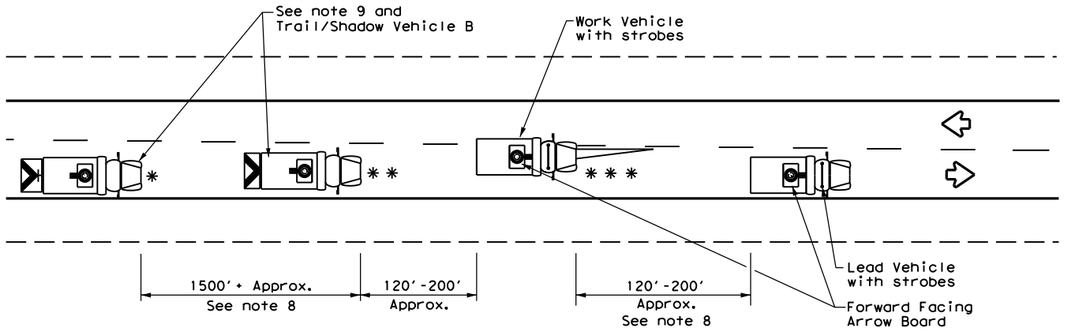


WORK ON SHOULDER

WORK ON TRAVEL LANE

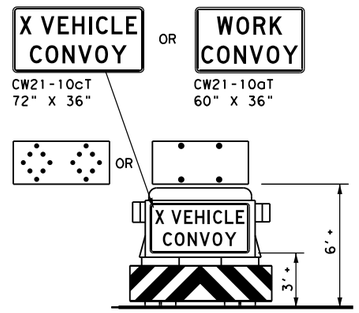
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

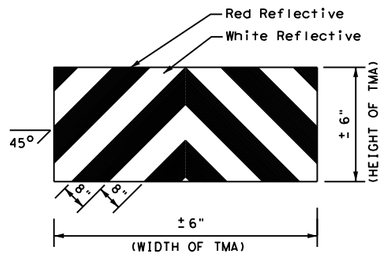
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0025	04	051	UA 90
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	SAT	GUADALUPE		50

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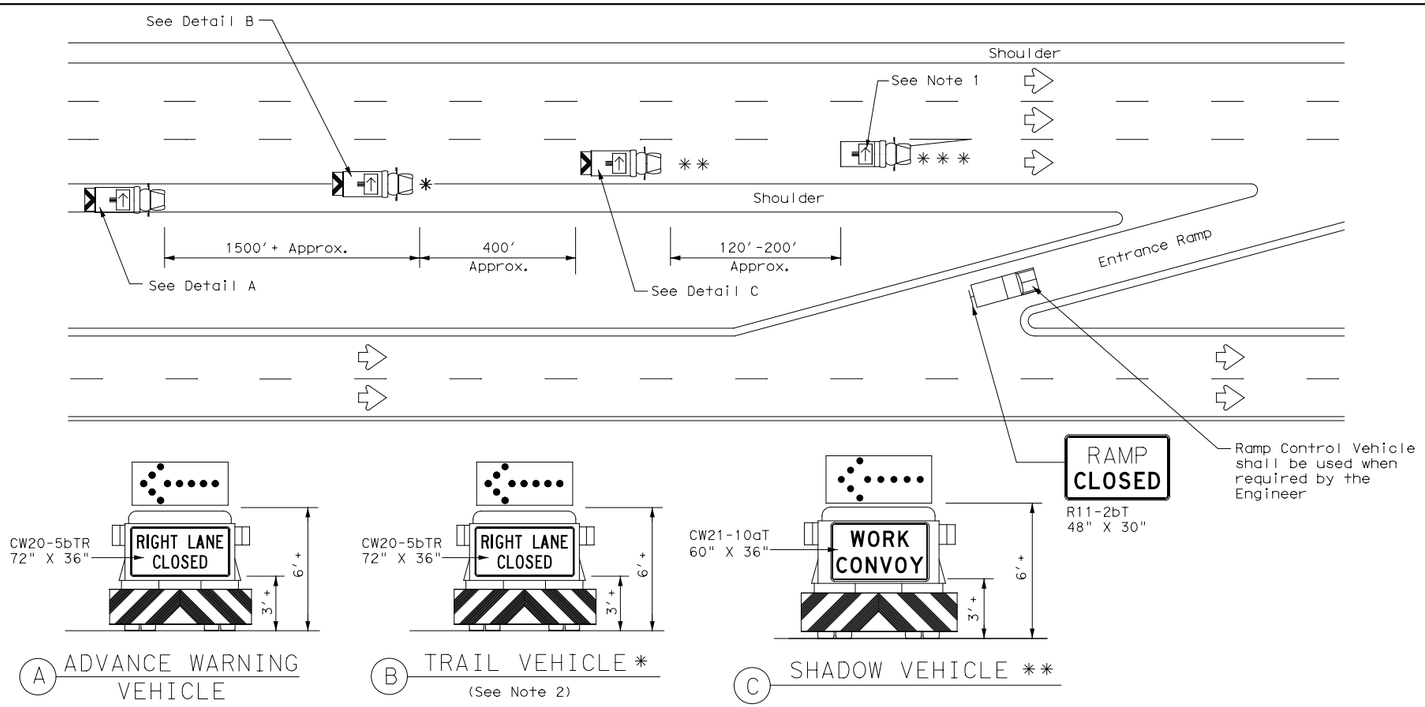
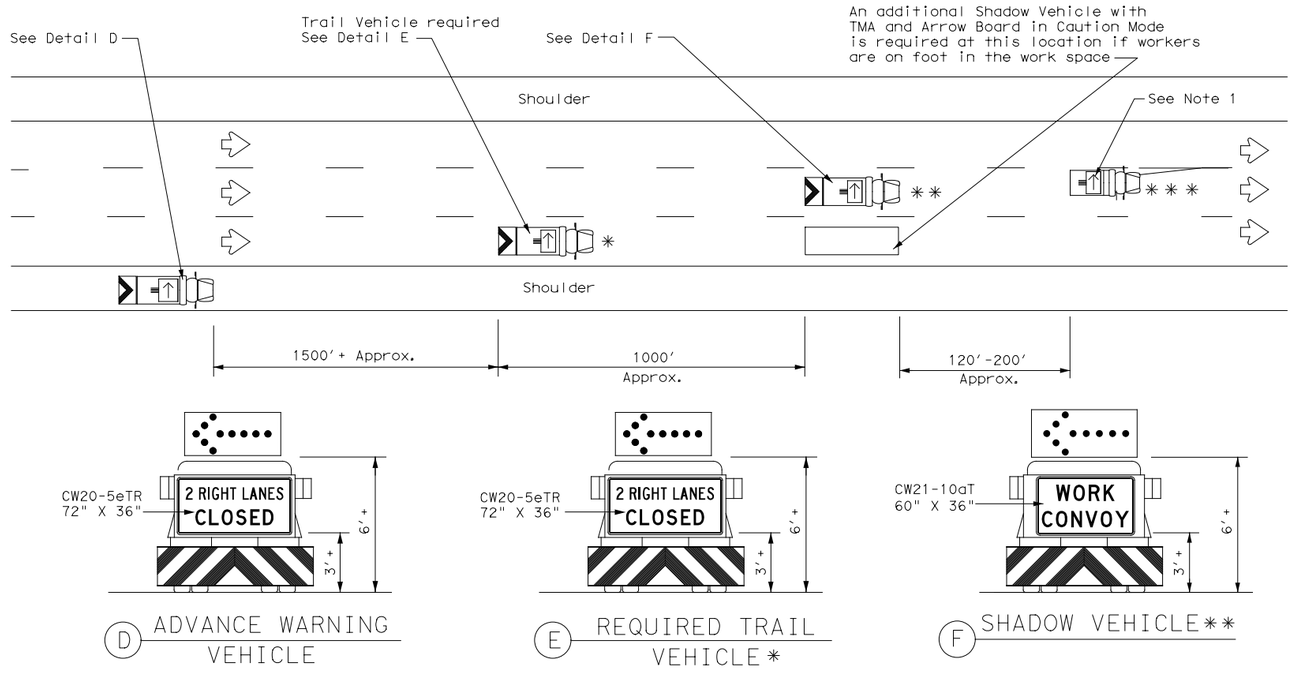


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



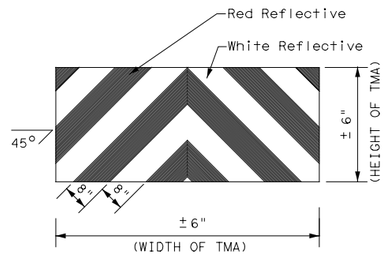
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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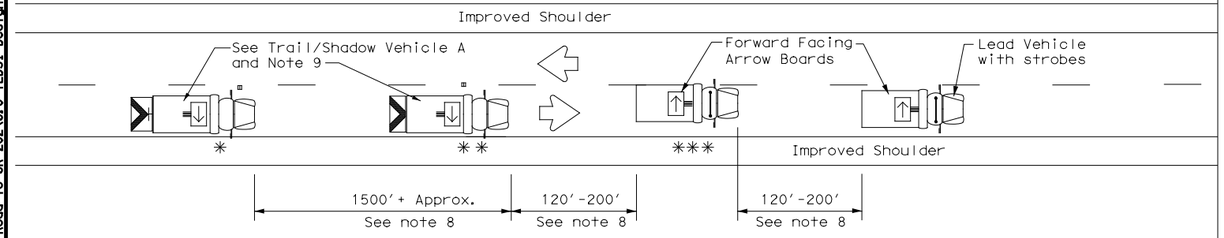
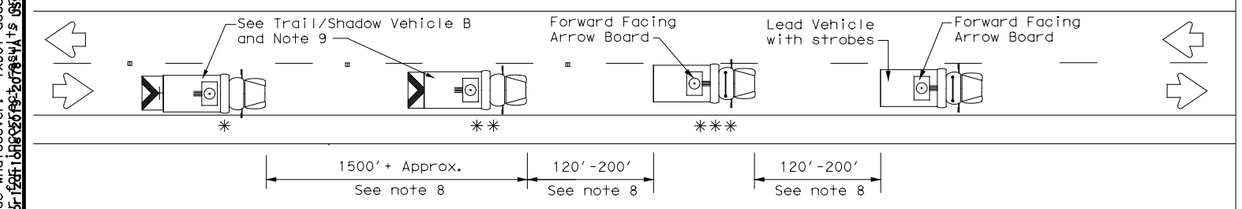
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		51



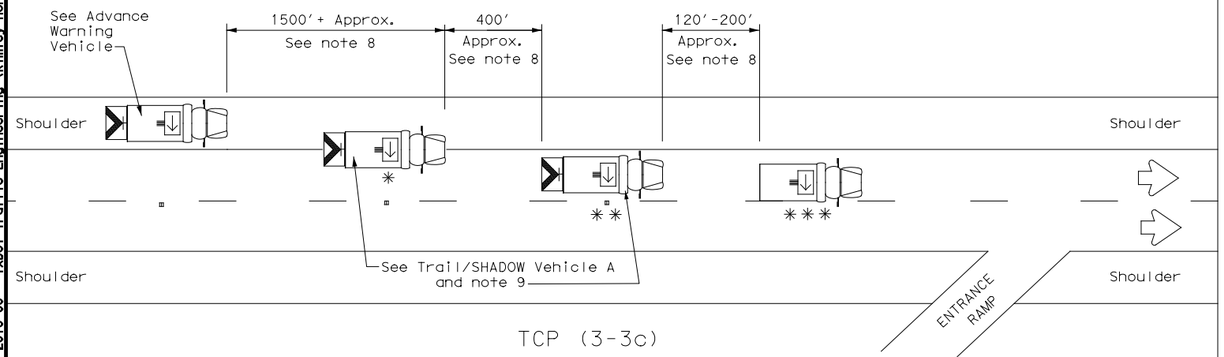
TCP (3-3a)

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



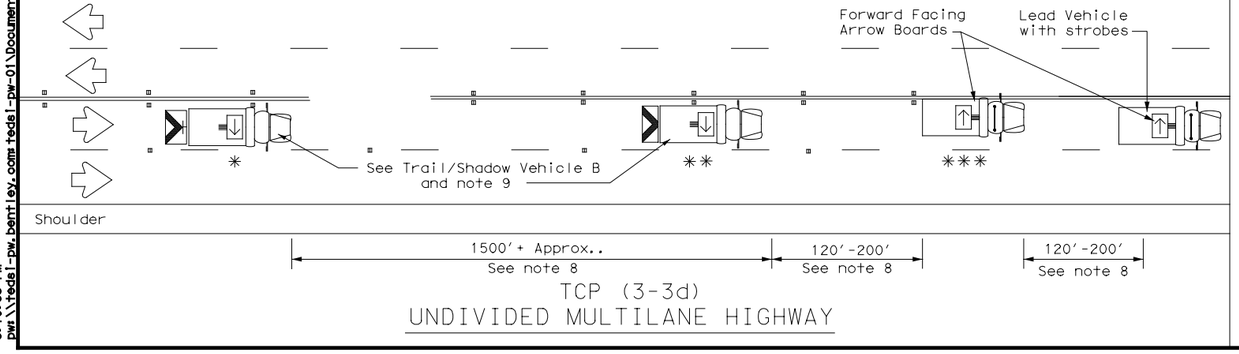
TCP (3-3b)

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



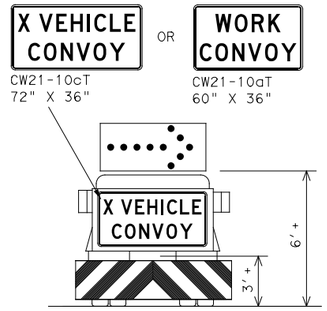
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



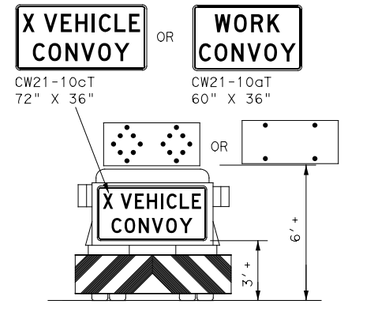
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



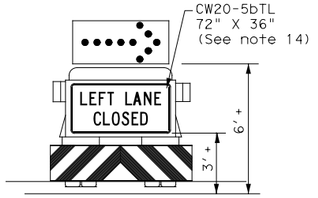
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

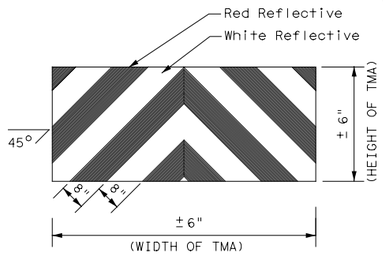


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

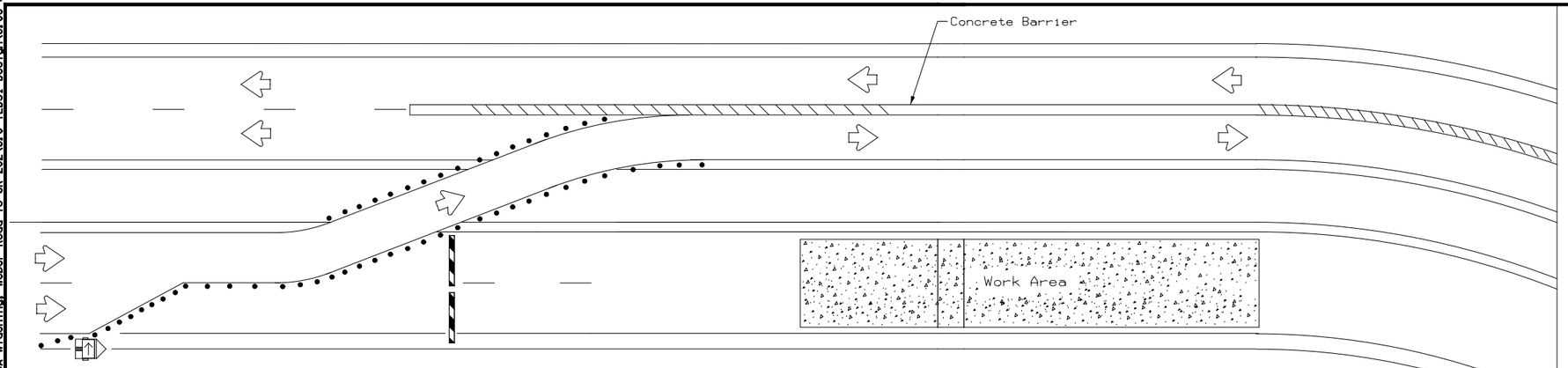
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	SAT	GUADALUPE		52
1-97 7-14				



NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

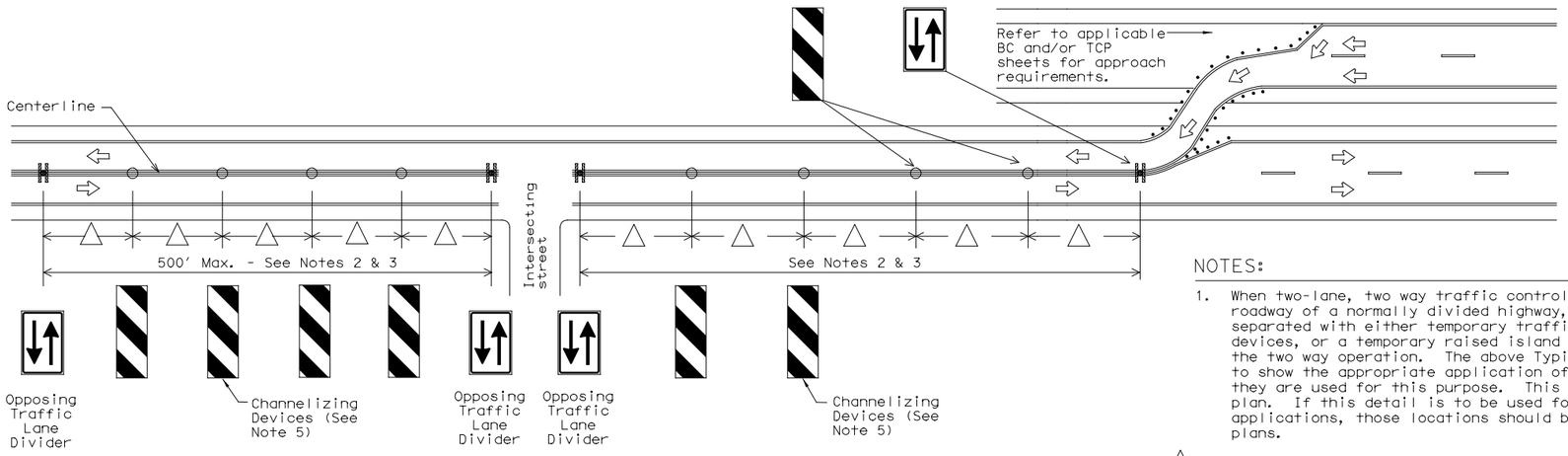
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
• • •	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
\\\\	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" CWZTCD)describes pre-qualified products and their sources and may be found at the following web address:

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



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. △ Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100′.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

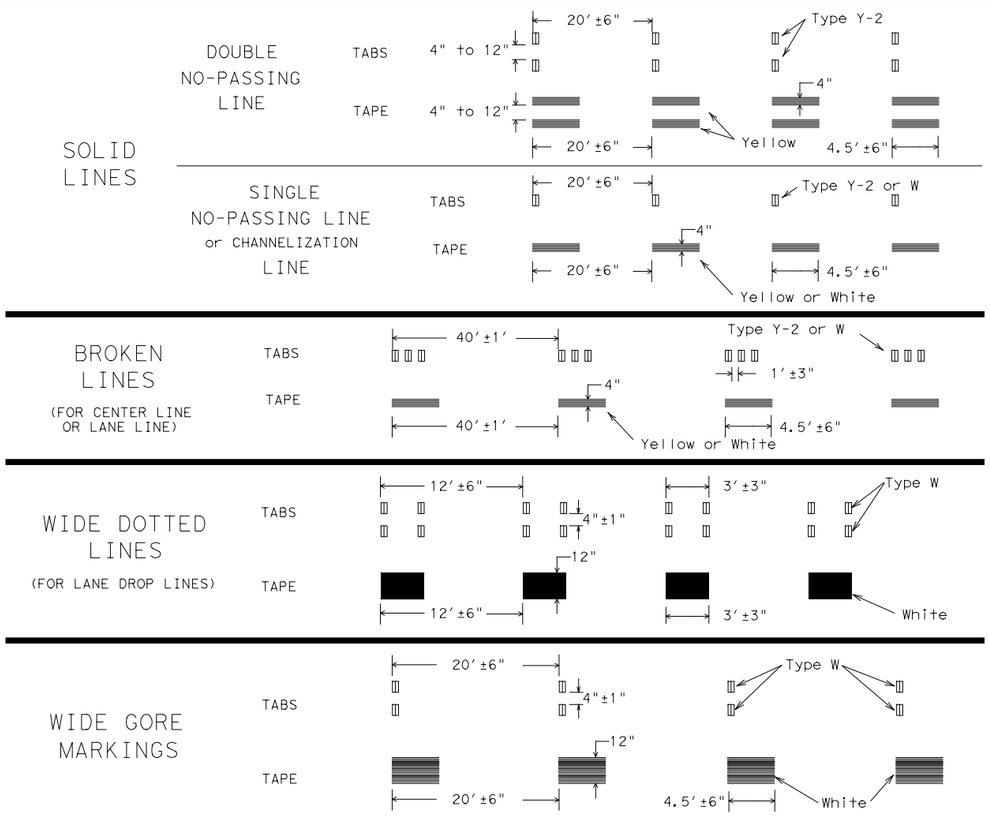
WZ(TD)-17

FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-17	0025	04	051	UA 90
4-98 3-03 7-13	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		53

110

DATE: 2/1/2023
FILE: 3:10:41 PM
pw:\\tedsl-pw.bentley.com:tedsl-pw-01\Documents\Projects\2019\2019-2078-00 - TxDOT Traffic Engineering Weber\Roadway Design\Sheets\WorkZone\wzstpm-13.dgn

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



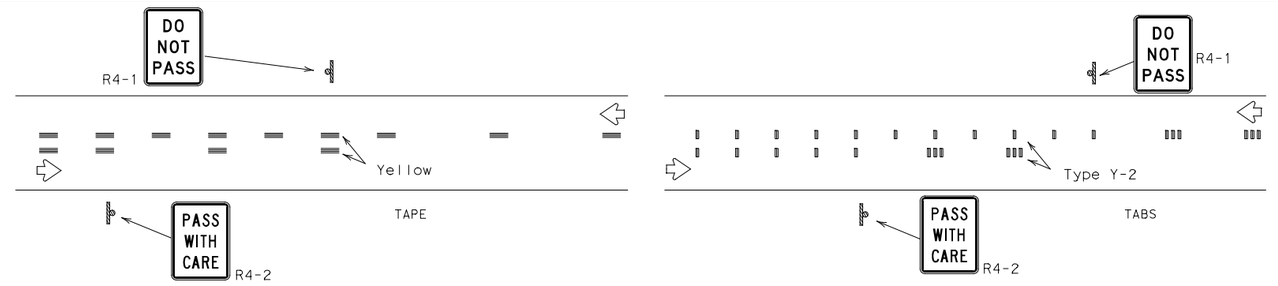
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

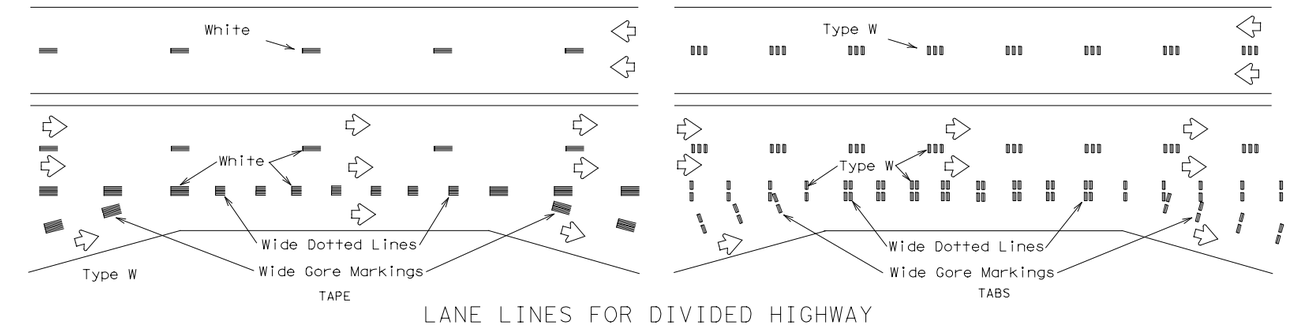
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

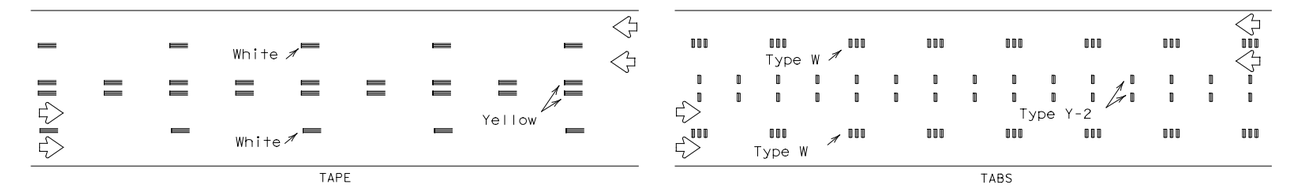
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



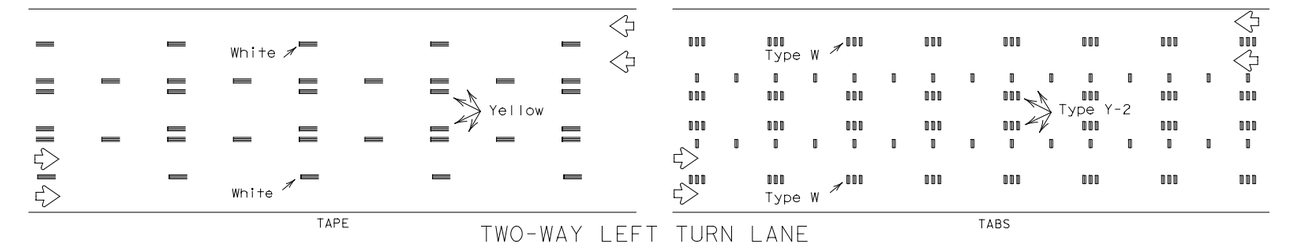
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



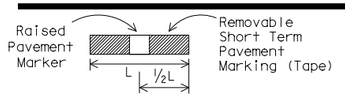
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
   http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0025	04	051	UA 90
1-97		DIST	COUNTY		SHEET NO.
3-03		SAT	GUADALUPE		54
7-13					

111

DATE: 4/2/2023
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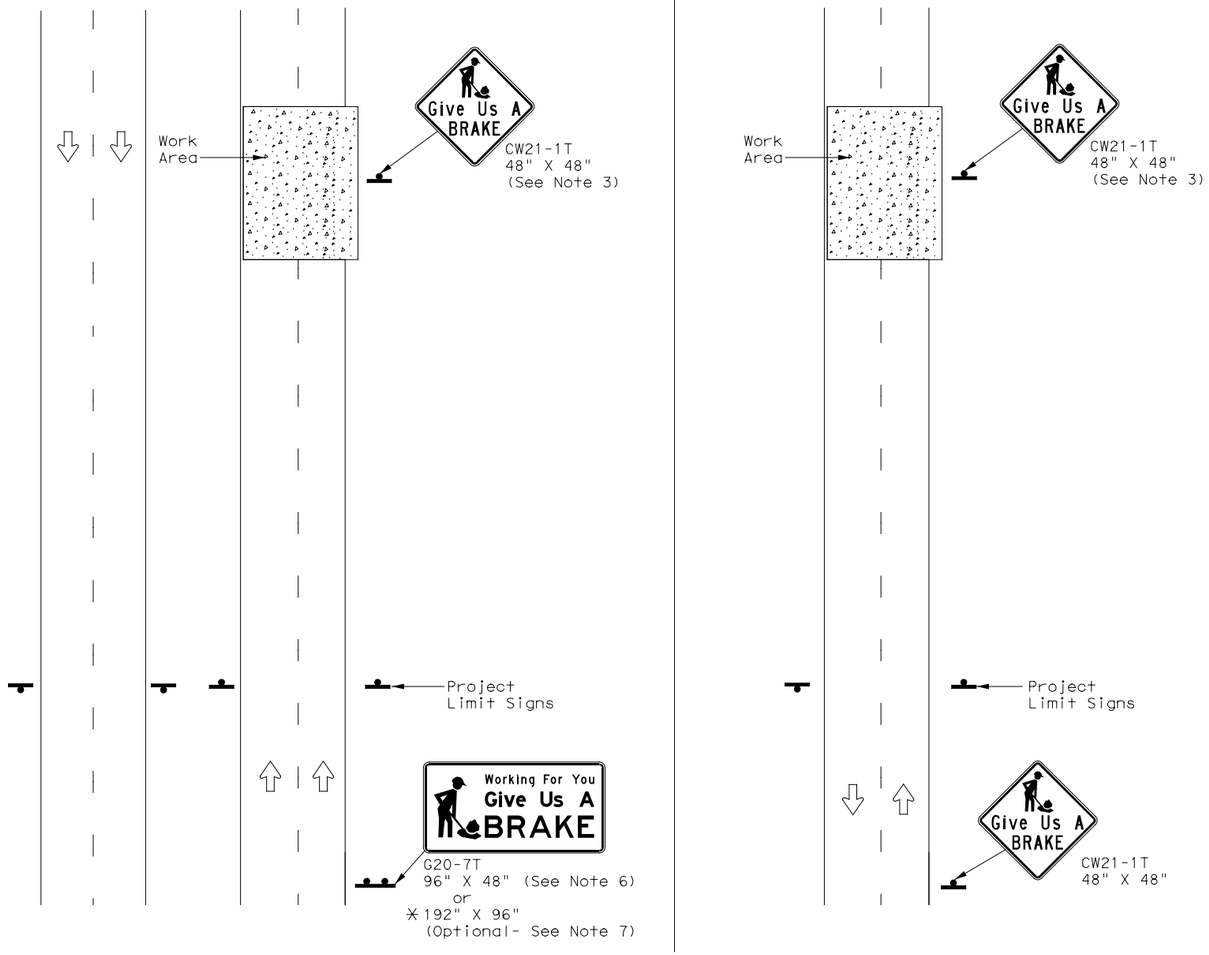

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

✳ When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS

PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
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.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
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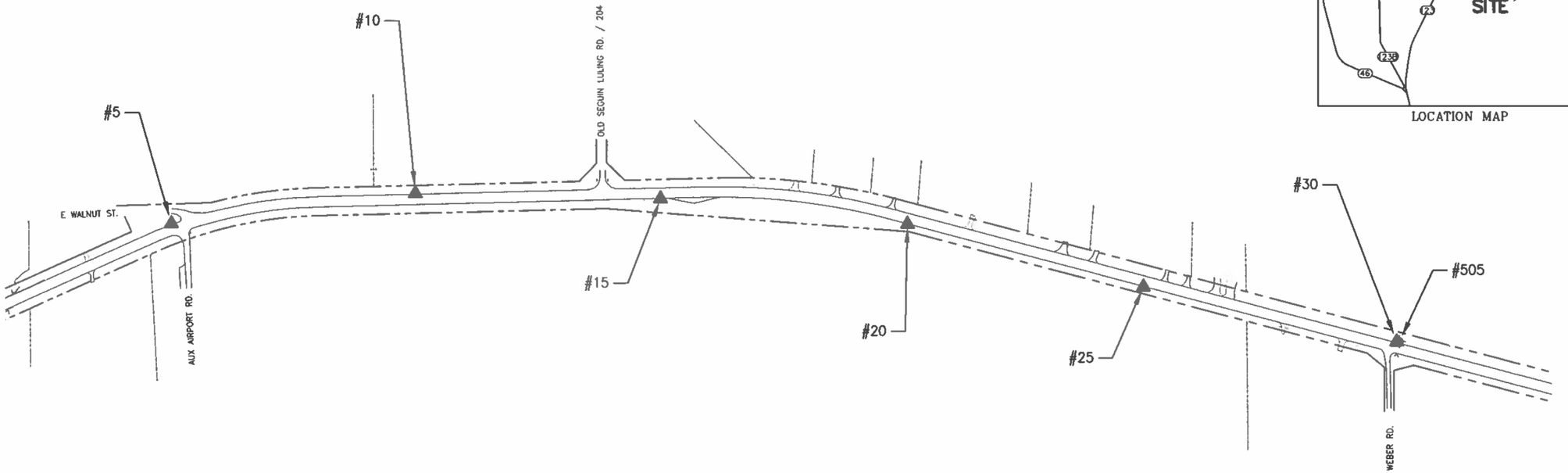
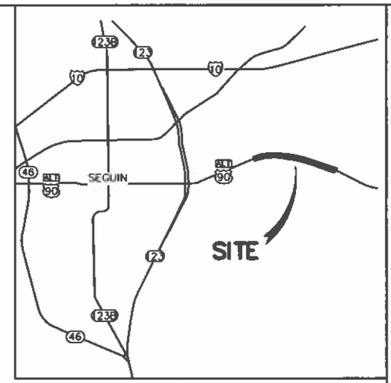
6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	SAT	GUADALUPE		55





LOCATION MAP

NOTES:

1. COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983 (NAD83), 2011 ADJUSTMENT. COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE COMBINED SCALE FACTOR OF 1.00016.

2. ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 1988). VALUES WERE ESTABLISHED BY GPS OBSERVATION USING GEOID 18.

N

NOT TO SCALE

CONTROL POINTS				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
5	13760804.90	2312256.06	523.50	TPT 1/2" W/RED BMBI CONTROL CAP
10	13760933.30	2313286.84	531.68	TPT 1/2" W/RED BMBI CONTROL CAP
15	13760912.07	2314321.94	533.19	TPT 1/2" W/RED BMBI CONTROL CAP
20	13760806.14	2315364.74	534.47	TPT 1/2" W/RED BMBI CONTROL CAP
25	13760541.91	2316362.50	527.17	TPT 1/2" W/RED BMBI CONTROL CAP
30	13760309.76	2317431.52	523.99	TPT 1/2" W/RED BMBI CONTROL CAP

BENCHMARK				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
505	13760310.7	2317443.2	533.51	BM 3"DISK ON HDW

THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PLAN SPECIFICATION AND ESTIMATE

STATE OF TEXAS
REGISTERED
MARCO A. ANDRADE
6940
PROFESSIONAL
LAND SURVEYOR
7/12/22

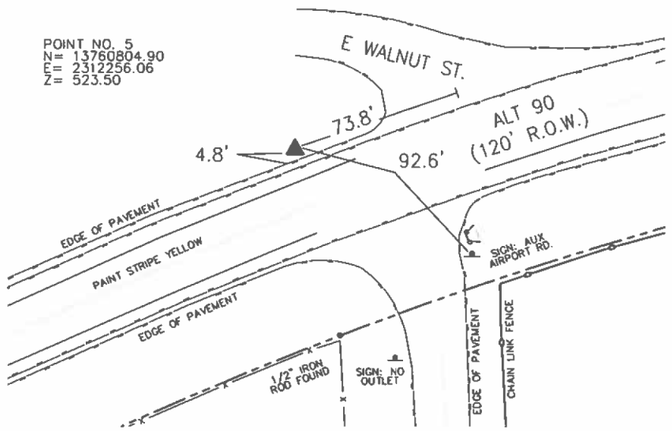
ENGINEERS & SURVEYORS
7073 San Pedro Avenue
San Antonio, Texas 78216
210/494-7223

TEXAS DEPARTMENT OF TRANSPORTATION

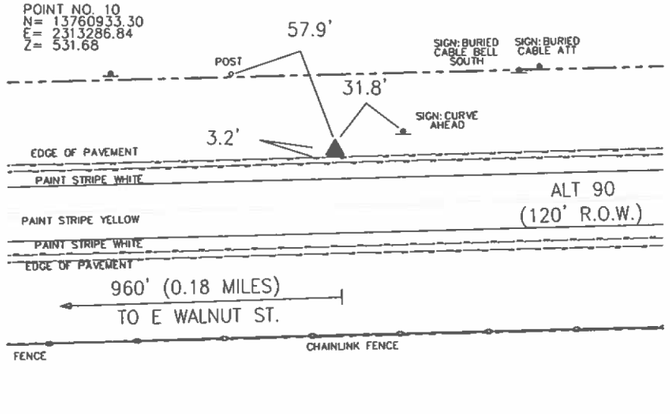
US 90 ALT
(between FM 202
& Webber Rd.)

FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
		56

STATE	DISTRICT	COUNTY	
TEXAS		GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	04	051	90 ALT



DESCRIPTION: " IRON ROD WITH RED CAP STAMPED, "B.M.B. INC. CONTROL PT." SET IN THE GROUND. LOCATED AT NORTHEAST QUADRANT OF 90 ALT. AND E. WALNUT ST.



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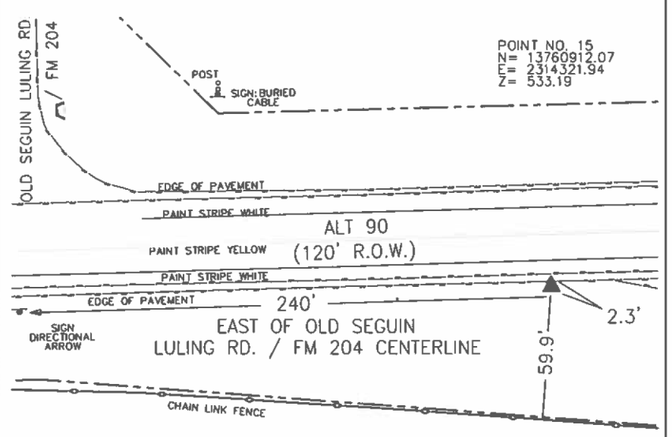


DESCRIPTION: " IRON ROD WITH RED CAP STAMPED, "B.M.B. INC. CONTROL PT." SET IN THE GROUND. LOCATED ON THE SOUTH RIGHT OF WAY OF 90 ALT, 240' EAST OF OLD SEGUIN LULING RD./FM 204 INTERSECTION.

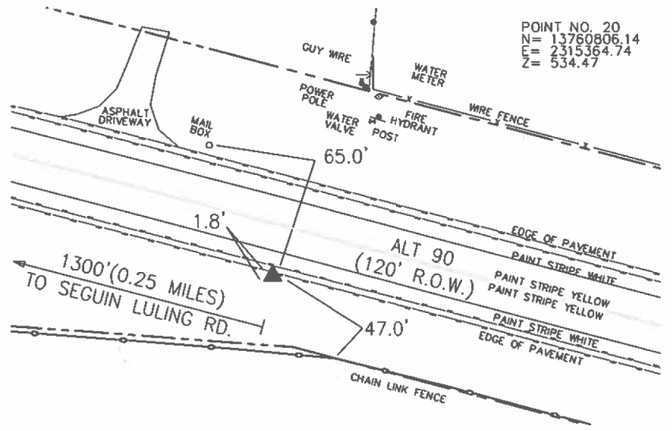
NOTES:

1. COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983 (NAD83), 2011 ADJUSTMENT. COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE COMBINED SCALE FACTOR OF 1.00016.

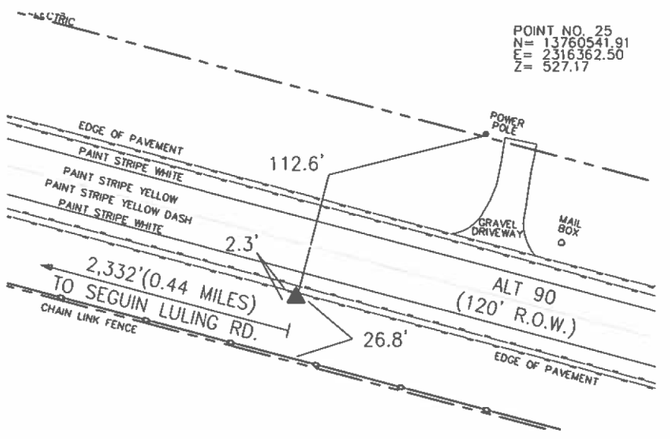
2. ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 1988), VALUES WERE ESTABLISHED BY GPS OBSERVATION USING GEOID 18.

N

NOT TO SCALE



DESCRIPTION: " IRON ROD WITH RED CAP STAMPED, "B.M.B. INC. CONTROL PT." SET IN THE GROUND. LOCATED ON THE SOUTH RIGHT OF WAY OF 90 ALT, 1,300' (0.25 MILES) EAST OF OLD SEGUIN LULING RD. /FM 204 INTERSECTION.



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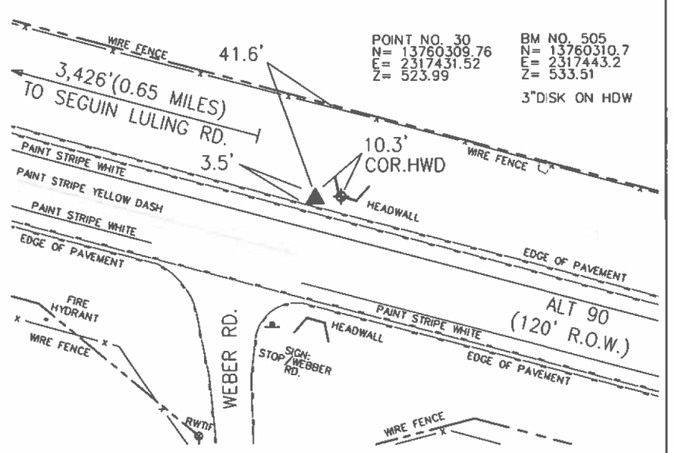

DESCRIPTION: " IRON ROD WITH RED CAP STAMPED, "B.M.B. INC. CONTROL PT." SET IN THE GROUND. LOCATED ON THE NORTH RIGHT OF WAY OF 90 ALT, 3,426' (0.65 MILES) EAST OF OLD SEGUIN LULING RD /FM 204 INTERSECTION, AT THE WEBER RD. / 90 ALT. INTERSECTION.

THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PLAN SPECIFICATION AND ESTIMATE

STATE OF TEXAS
REGISTERED
MARCO A. ANDRADE
6940
PROFESSIONAL
LAND SURVEYOR

7/12/22

ENGINEERS & SURVEYORS
7073 San Pedro Avenue
San Antonio, Texas 78216
210/494-7223

TEXAS DEPARTMENT OF TRANSPORTATION

US 90 ALT
(between FM 202
& Webber Rd.)

FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.		SHEET NO.
			57

STATE	DISTRICT	COUNTY	
TEXAS		GUADALUPE	
CONTROL	SECTION	JOB	HIGHWAY NO.
0025	04	051	90 ALT

UA 90

<* 1 Describe Chain US90A

Chain US90A contains:
 107 CUR US90A1 CUR US90A2 108

Beginning chain US90A description
==========

Point 107 N 13,760,355.5618 E 2,311,312.2655 Sta 95+00.00

Course from 107 to PC US90A1 N 65° 45′ 23.99" E Dist 922.8662

Curve Data

Curve US90A1
P.I. Station 107+93.98 N 13,760,886.8864 E 2,312,492.1288
Delta = 22° 41′ 10.22" (RT)
Degree = 3° 05′ 49.45"
Tangent = 371.1134
Length = 732.5045
Radius = 1,850.0000
External = 36.8559
Long Chord = 727.7290
Mid. Ord. = 36.1360
P.C. Station 104+22.87 N 13,760,734.5025 E 2,312,153.7439
P.T. Station 111+55.37 N 13,760,896.9711 E 2,312,863.1052
C.C. N 13,759,047.6543 E 2,312,913.3776
Back = N 65° 45′ 23.99" E
Ahead = N 88° 26′ 34.21" E
Chord Bear = N 77° 05′ 59.10" E

Course from PT US90A1 to PC US90A2 N 88° 26′ 34.21" E Dist 1,649.2218

Curve Data

Curve US90A2
P.I. Station 132+17.45 N 13,760,953.0068 E 2,314,924.4271
Delta = 16° 24′ 01.26" (RT)
Degree = 1° 59′ 59.47"
Tangent = 412.8617
Length = 820.0779
Radius = 2,865.0000
External = 29.5949
Long Chord = 817.2811
Mid. Ord. = 29.2923
P.C. Station 128+04.59 N 13,760,941.7876 E 2,314,511.7179
P.T. Station 136+24.67 N 13,760,847.2422 E 2,315,323.5119
C.C. N 13,758,077.8456 E 2,314,589.5723
Back = N 88° 26′ 34.21" E
Ahead = S 75° 09′ 24.54" E
Chord Bear = S 83° 21′ 25.16" E

Course from PT US90A2 to 108 S 75° 09′ 24.54" E Dist 3,780.2146

Point 108 N 13,759,878.8480 E 2,318,977.5829 Sta 174+04.88

==========
Ending chain US90A description

E. WALNUT / CR 202 / AUX AIRPORT ROAD

<* 2 Describe Chain CR202

Chain CR202 contains:
 151 CUR CR2021 CUR CR2022 152

Beginning chain CR202 description
==========

Point 151 N 13,760,856.5175 E 2,312,113.1807 Sta 10+00.00

Course from 151 to PC CR2021 N 88° 29′ 58.40" E Dist 108.5811

Curve Data

Curve CR2021
P.I. Station 11+59.41 N 13,760,860.6915 E 2,312,272.5313
Delta = 71° 57′ 49.69" (RT)
Degree = 81° 51′ 04.01"
Tangent = 50.8242
Length = 87.9204
Radius = 70.0000
External = 16.5049
Long Chord = 82.2542
Mid. Ord. = 13.3558
P.C. Station 11+08.58 N 13,760,859.3607 E 2,312,221.7246
P.T. Station 11+96.50 N 13,760,812.7933 E 2,312,289.5274
C.C. N 13,760,789.3847 E 2,312,223.5575
Back = N 88° 29′ 58.40" E
Ahead = S 19° 32′ 11.91" E
Chord Bear = S 55° 31′ 06.75" E

Course from PT CR2021 to PC CR2022 S 19° 32′ 11.91" E Dist 49.3348

Curve Data

Curve CR2022
P.I. Station 12+89.59 N 13,760,725.0620 E 2,312,320.6579
Delta = 16° 35′ 47.53" (RT)
Degree = 19° 05′ 54.94"
Tangent = 43.7560
Length = 86.8993
Radius = 300.0000
External = 3.1742
Long Chord = 86.5958
Mid. Ord. = 3.1410
P.C. Station 12+45.84 N 13,760,766.2988 E 2,312,306.0255
P.T. Station 13+32.74 N 13,760,681.3635 E 2,312,322.9022
C.C. N 13,760,665.9759 E 2,312,023.2971
Back = S 19° 32′ 11.91" E
Ahead = S 2° 56′ 24.38" E
Chord Bear = S 11° 14′ 18.14" E

Course from PT CR2022 to 152 S 2° 56′ 24.38" E Dist 149.0166

Point 152 N 13,760,532.5431 E 2,312,330.5456 Sta 14+81.75

==========
Ending chain CR202 description

OLD SEGUIN LULING ROAD

<* 3 Describe Chain OLD_SEGUIN

Chain OLD_SEGUIN contains:
 153 154

Beginning chain OLD_SEGUIN description
==========

Point 153 N 13,761,130.0237 E 2,314,076.2617 Sta 8+00.00

Course from 153 to 154 S 1° 28′ 22.10" E Dist 200.0000

Point 154 N 13,760,930.0897 E 2,314,081.4022 Sta 10+00.00

==========
Ending chain OLD_SEGUIN description

WEBER ROAD

<* 4 Describe Chain WEBER

Chain WEBER contains:
 155 CUR WEBER1 156

Beginning chain WEBER description
==========

Point 155 N 13,760,296.6788 E 2,317,400.9694 Sta 10+00.00

Course from 155 to PC WEBER1 S 14° 49′ 24.06" W Dist 25.1188

Curve Data

Curve WEBER1
P.I. Station 10+32.29 N 13,760,265.4672 E 2,317,392.7093
Delta = 16° 18′ 54.72" (LT)
Degree = 114° 35′ 29.61"
Tangent = 7.1673
Length = 14.2377
Radius = 50.0000
External = 0.5111
Long Chord = 14.1896
Mid. Ord. = 0.5059
P.C. Station 10+25.12 N 13,760,272.3960 E 2,317,394.5430
P.T. Station 10+39.36 N 13,760,258.3023 E 2,317,392.8959
C.C. N 13,760,259.6040 E 2,317,442.8790
Back = S 14° 49′ 24.06" W
Ahead = S 1° 29′ 30.66" E
Chord Bear = S 6° 39′ 56.70" W

Course from PT WEBER1 to 156 S 1° 29′ 30.66" E Dist 85.4815

Point 156 N 13,760,172.8498 E 2,317,395.1214 Sta 11+24.84

==========
Ending chain WEBER description

DRIVEWAY-1

<* 5 Describe Chain DW_01

Chain DW_01 contains:
 111 112

Beginning chain DW_01 description
==========

Point 111 N 13,760,618.4809 E 2,311,896.1057 Sta 10+00.00

Course from 111 to 112 S 24° 14′ 36.01" E Dist 100.0000

Point 112 N 13,760,527.3000 E 2,311,937.1670 Sta 11+00.00

==========
Ending chain DW_01 description

STATE OF TEXAS
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PROFESSIONAL ENGINEER
4/19/2023

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TBPE F-1640

Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	58

DRIVEWAY-2

<* 6 Describe Chain DW_02

Chain DW_02 contains:
119 120

Beginning chain DW_02 description

Point 119 N 13,760,718.3992 E 2,311,874.4466 Sta 9+00.00

Course from 119 to 120 S 24° 14′ 36.01" E Dist 100.0000

Point 120 N 13,760,627.2183 E 2,311,915.5078 Sta 10+00.00

Ending chain DW_02 description

DRIVEWAY-3

<* 7 Describe Chain DW_03

Chain DW_03 contains:
131 132

Beginning chain DW_03 description

Point 131 N 13,761,026.4929 E 2,314,900.5371 Sta 9+00.00

Course from 131 to 132 S 5° 47′ 20.22" W Dist 100.0000

Point 132 N 13,760,927.0029 E 2,314,890.4507 Sta 10+00.00

Ending chain DW_03 description

DRIVEWAY-4

<* 8 Describe Chain DW_04

Chain DW_04 contains:
123 124

Beginning chain DW_04 description

Point 123 N 13,761,002.0766 E 2,315,078.2322 Sta 9+00.00

Course from 123 to 124 S 9° 26′ 10.79" W Dist 100.0000

Point 124 N 13,760,903.4297 E 2,315,061.8370 Sta 10+00.00

Ending chain DW_04 description

DRIVEWAY-5

<* 9 Describe Chain DW_05

Chain DW_05 contains:
125 126

Beginning chain DW_05 description

Point 125 N 13,760,951.2632 E 2,315,320.7981 Sta 9+00.00

Course from 125 to 126 S 14° 30′ 36.79" W Dist 100.0000

Point 126 N 13,760,854.4529 E 2,315,295.7428 Sta 10+00.00

Ending chain DW_05 description

DRIVEWAY-6

<* 10 Describe Chain DW_06

Chain DW_06 contains:
127 128

Beginning chain DW_06 description

Point 127 N 13,760,864.7871 E 2,315,647.6684 Sta 9+00.00

Course from 127 to 128 S 14° 50′ 35.46" W Dist 100.0000

Point 128 N 13,760,768.1240 E 2,315,622.0509 Sta 10+00.00

Ending chain DW_06 description

DRIVEWAY-7

<* 11 Describe Chain DW_07

Chain DW_07 contains:
129 130

Beginning chain DW_07 description

Point 129 N 13,760,760.5915 E 2,316,040.8326 Sta 9+00.00

Course from 129 to 130 S 14° 50′ 35.46" W Dist 100.0000

Point 130 N 13,760,663.9285 E 2,316,015.2152 Sta 10+00.00

Ending chain DW_07 description

DRIVEWAY-8

<* 12 Describe Chain DW_08

Chain DW_08 contains:
135 136

Beginning chain DW_08 description

Point 135 N 13,760,725.9070 E 2,316,171.7087 Sta 9+00.00

Course from 135 to 136 S 14° 50′ 35.46" W Dist 100.0000

Point 136 N 13,760,629.2440 E 2,316,146.0913 Sta 10+00.00

Ending chain DW_08 description

DRIVEWAY-9

<* 13 Describe Chain DW_09

Chain DW_09 contains:
137 138

Beginning chain DW_09 description

Point 137 N 13,760,646.1365 E 2,316,472.7093 Sta 9+00.00

Course from 137 to 138 S 14° 50′ 35.46" W Dist 100.0000

Point 138 N 13,760,549.4734 E 2,316,447.0919 Sta 10+00.00

Ending chain DW_09 description

DRIVEWAY-10

<* 14 Describe Chain DW_10

Chain DW_10 contains:
139 140

Beginning chain DW_10 description

Point 139 N 13,760,621.9620 E 2,316,563.9275 Sta 9+00.00

Course from 139 to 140 S 14° 50′ 35.46" W Dist 100.0000

Point 140 N 13,760,525.2990 E 2,316,538.3100 Sta 10+00.00

Ending chain DW_10 description

DRIVEWAY-11A

<* 15 Describe Chain DW_11A

Chain DW_11A contains:
141 142

Beginning chain DW_11A description

Point 141 N 13,760,589.5591 E 2,316,686.1946 Sta 9+00.00

Course from 141 to 142 S 14° 50′ 35.46" W Dist 100.0000

Point 142 N 13,760,492.8960 E 2,316,660.5772 Sta 10+00.00

Ending chain DW_11A description

DRIVEWAY-11B

<* 16 Describe Chain DW_11B

Chain DW_11B contains:
143 144

Beginning chain DW_11B description

Point 143 N 13,760,573.9324 E 2,316,745.1591 Sta 9+00.00

Course from 143 to 144 S 14° 50′ 35.46" W Dist 100.0000

Point 144 N 13,760,477.2694 E 2,316,719.5417 Sta 10+00.00

Ending chain DW_11B description

DRIVEWAY-12

<* 17 Describe Chain DW_12

Chain DW_12 contains:
145 146

Beginning chain DW_12 description

Point 145 N 13,760,412.0546 E 2,316,965.6186 Sta 10+00.00

Course from 145 to 146 S 14° 50′ 35.46" W Dist 100.0000

Point 146 N 13,760,315.3915 E 2,316,940.0012 Sta 11+00.00

Ending chain DW_12 description

STATE OF TEXAS
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Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

HORIZONTAL ALIGNMENT DATA

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	59

DRIVEWAY-13

<* 18 Describe Chain DW_13

Chain DW_13 contains:
147 148

Beginning chain DW_13 description

Point 147 N 13,760,346.9658 E 2,317,211.2200 Sta 10+00.00

Course from 147 to 148 S 14° 50′ 35.46" W Dist 100.0000

Point 148 N 13,760,250.3027 E 2,317,185.6026 Sta 11+00.00

Ending chain DW_13 description

DRIVEWAY-14

<* 19 Describe Chain DW_14

Chain DW_14 contains:
149 150

Beginning chain DW_14 description

Point 149 N 13,760,087.0290 E 2,318,192.0473 Sta 10+00.00

Course from 149 to 150 S 14° 50′ 35.46" W Dist 100.0000

Point 150 N 13,759,990.3660 E 2,318,166.4299 Sta 11+00.00

Ending chain DW_14 description

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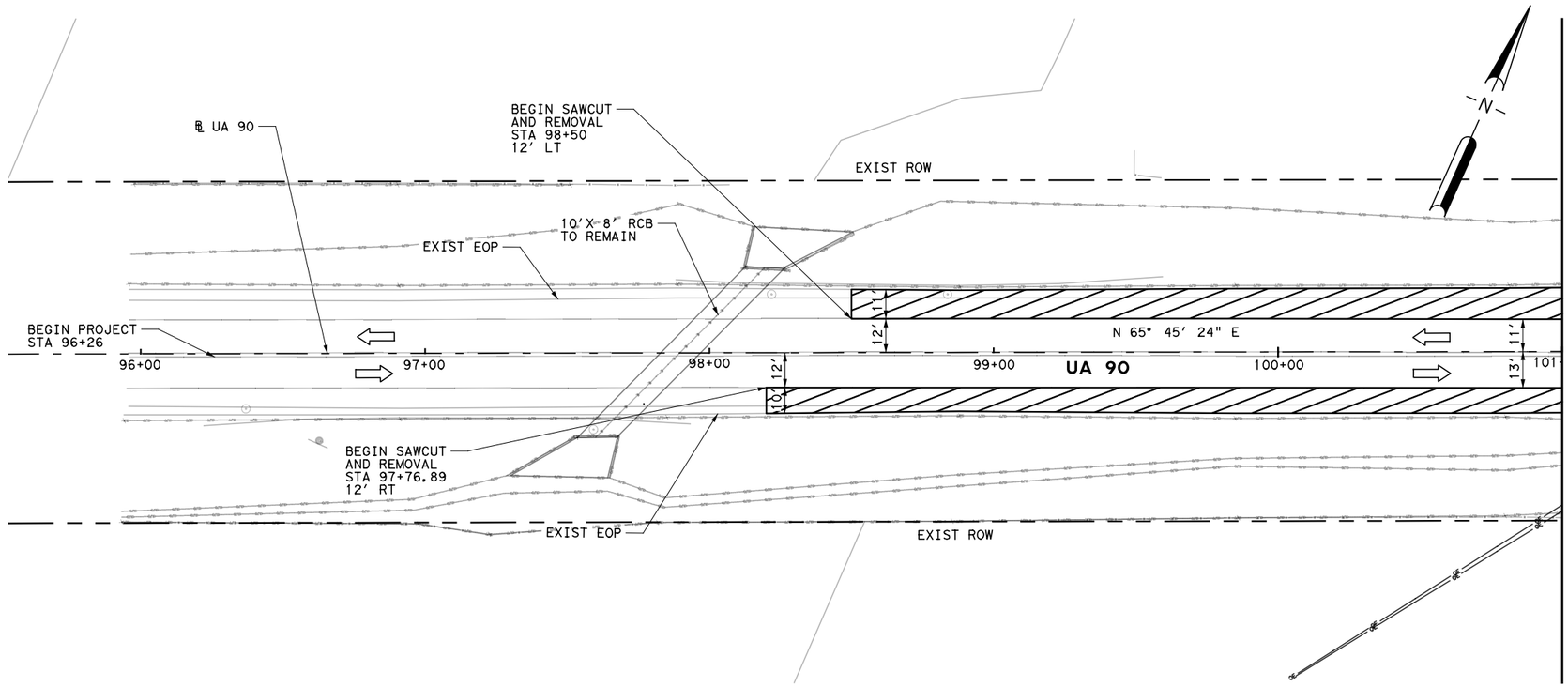
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

HORIZONTAL ALIGNMENT DATA

SHEET 3 OF 3

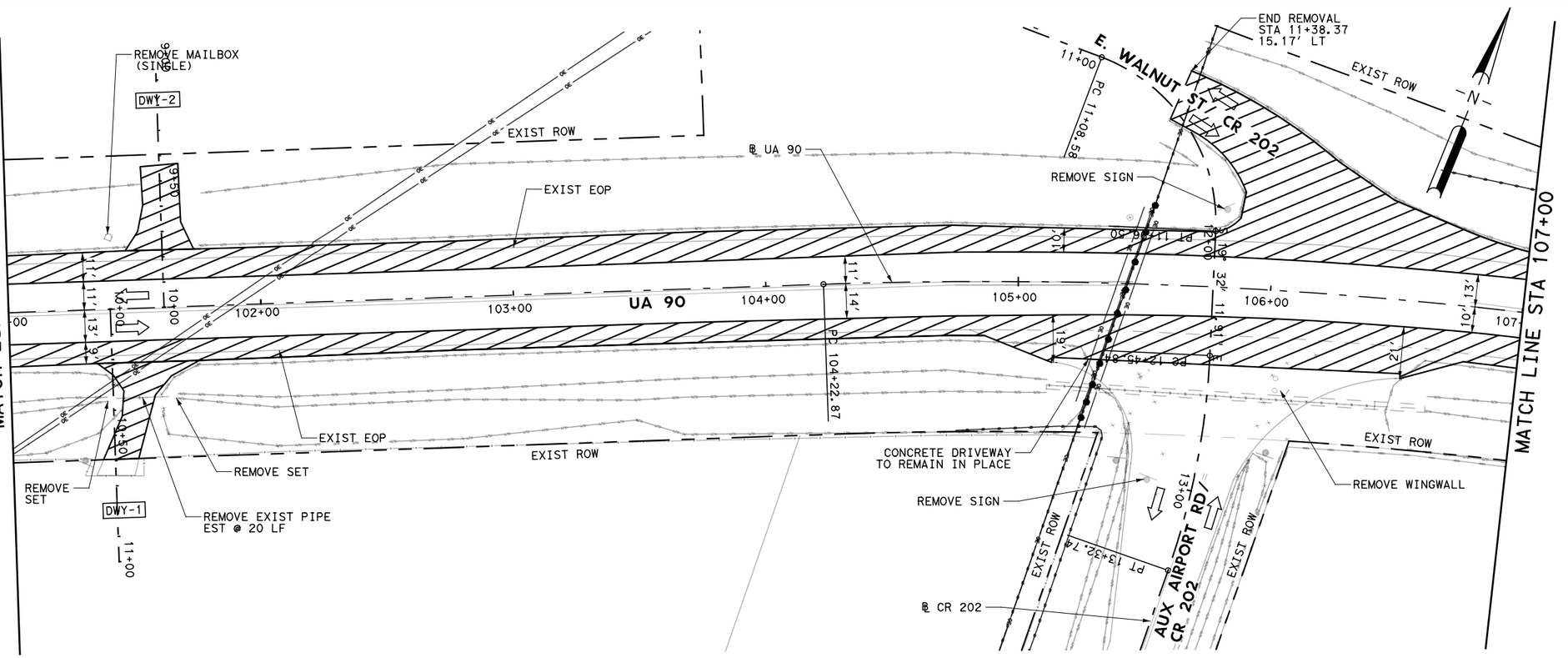
FED. RD. DIST. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	60



LEGEND

- EXIST ROW
- EXIST PVMT TO BE REMOVED
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- REMOVE/REPLACE MAILBOX
- REMOVE SIGN

ITEM	DESCRIPTION	UNIT	QUANTITY
104 6009	REMOVING CONC (RIPRAP)	SY	0
105 6014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	2550
496 6004	REMOV STR (SET)	EA	2
496 6007	REMOV STR (PIPE)	LF	20
644 6076	REMOVE SM RD SN SUP&AM	EA	2



0' 25' 50'
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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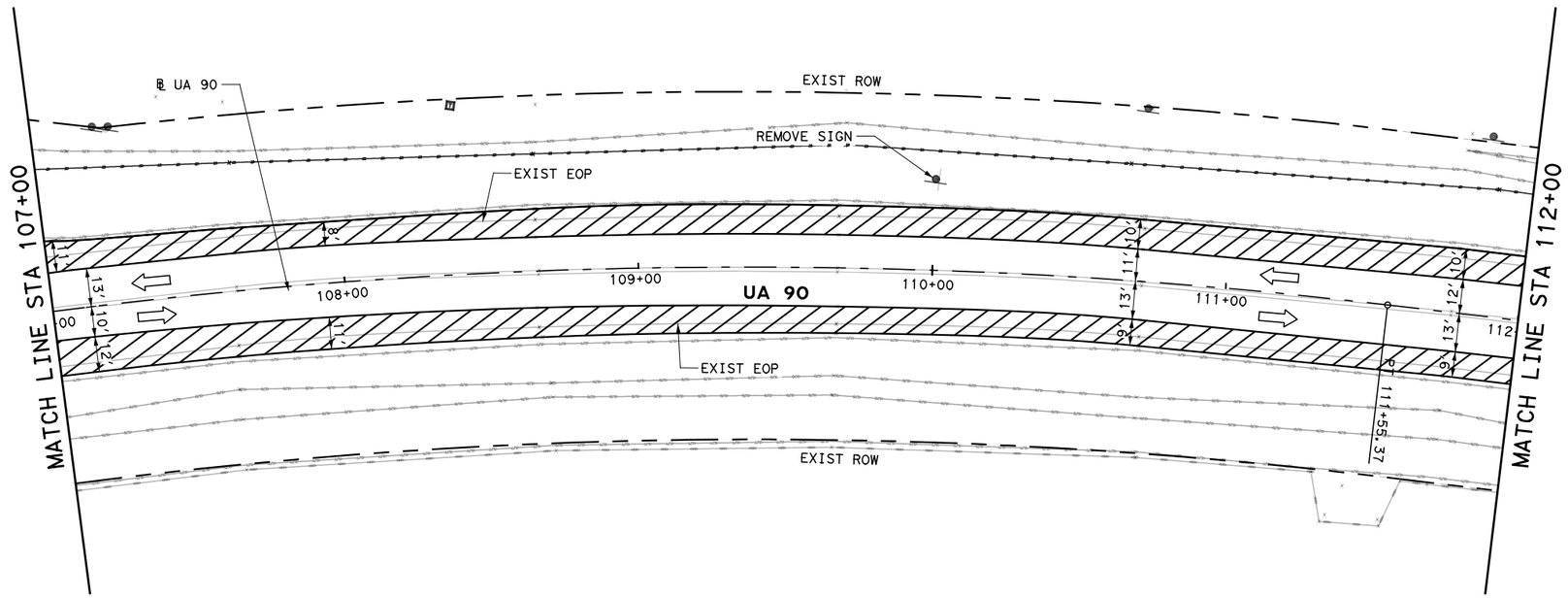
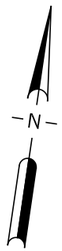
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

REMOVAL PLAN LAYOUT
BEGIN TO STA 107+00

SHEET 1 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	61

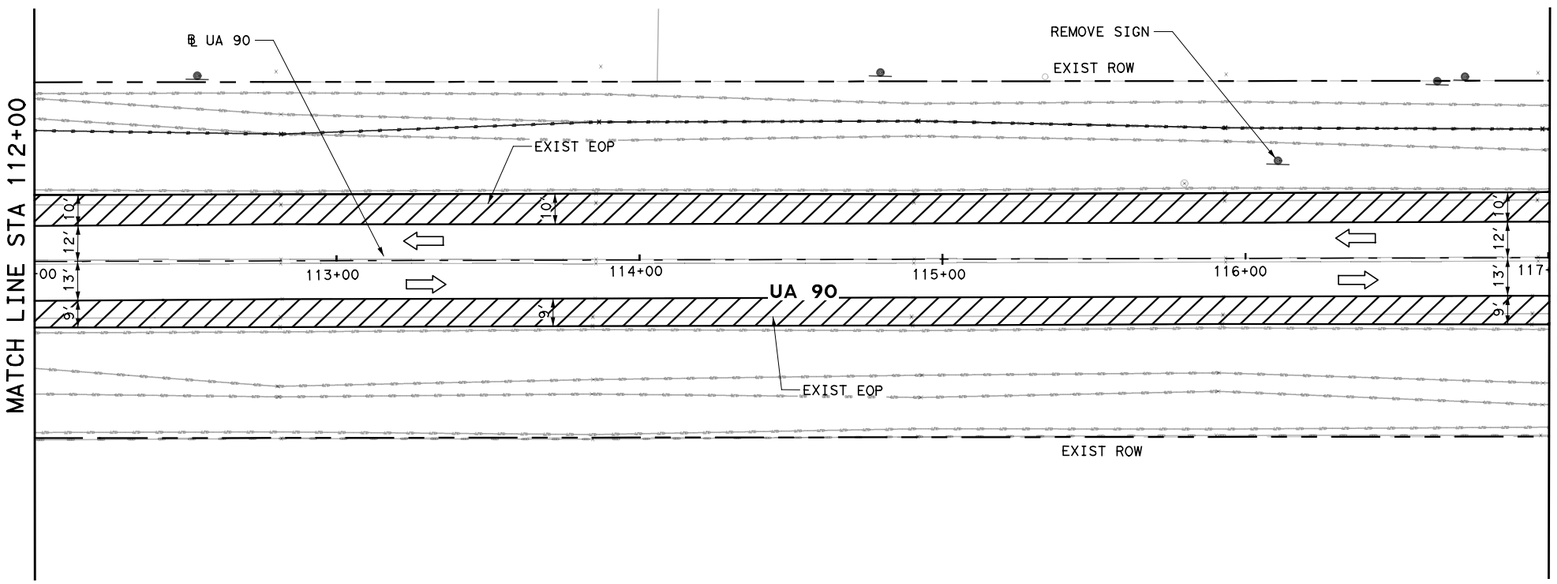


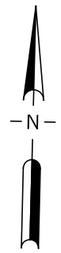


LEGEND

- EXIST ROW
- EXIST PVMT TO BE REMOVED
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- REMOVE/REPLACE MAILBOX
- REMOVE SIGN

ITEM	DESCRIPTION	UNIT	QUANTITY
104 6009	REMOVING CONC (RIPRAP)	SY	0
105 6014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	2135
496 6004	REMOV STR (SET)	EA	0
496 6007	REMOV STR (PIPE)	LF	0
644 6075	REMOVE SM RD SN SUP&AM	EA	2





0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
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4/19/2023

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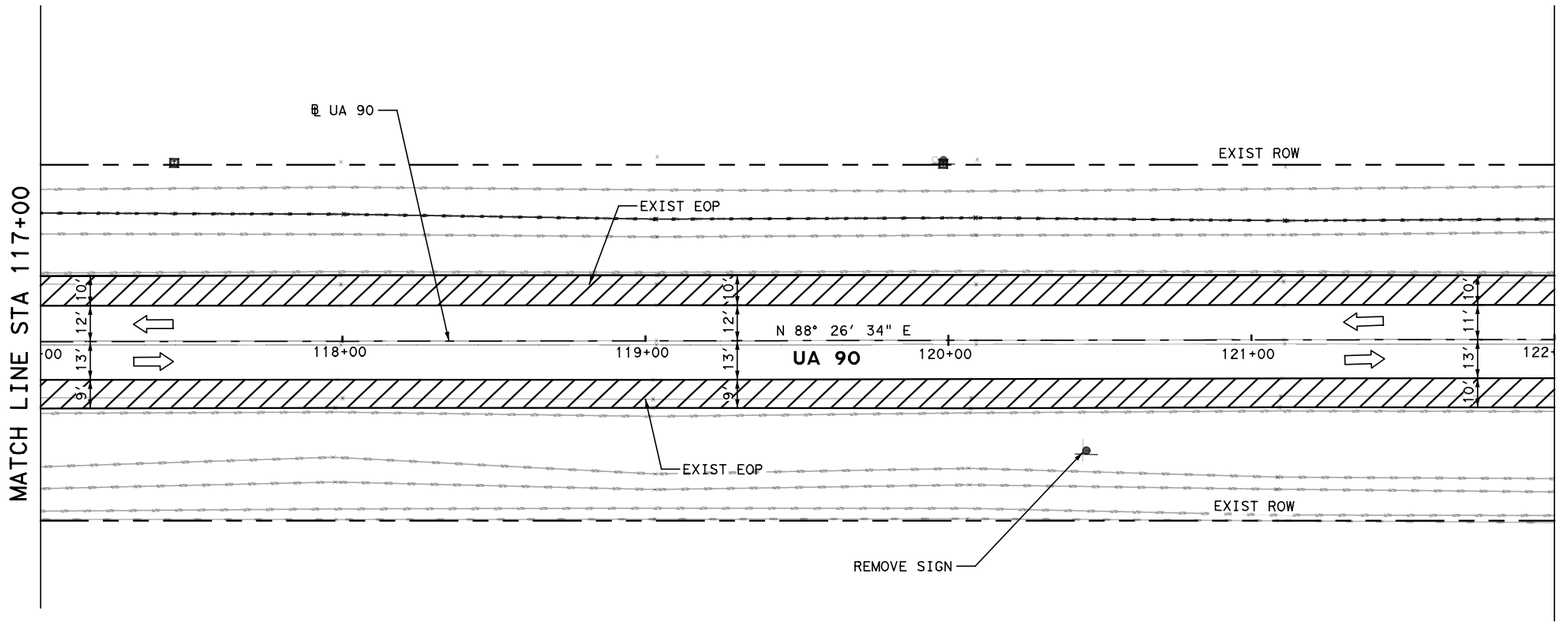
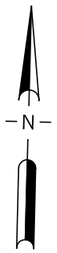
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

REMOVAL PLAN LAYOUT
STA 107+00 TO STA 117+00

SHEET 2 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	62

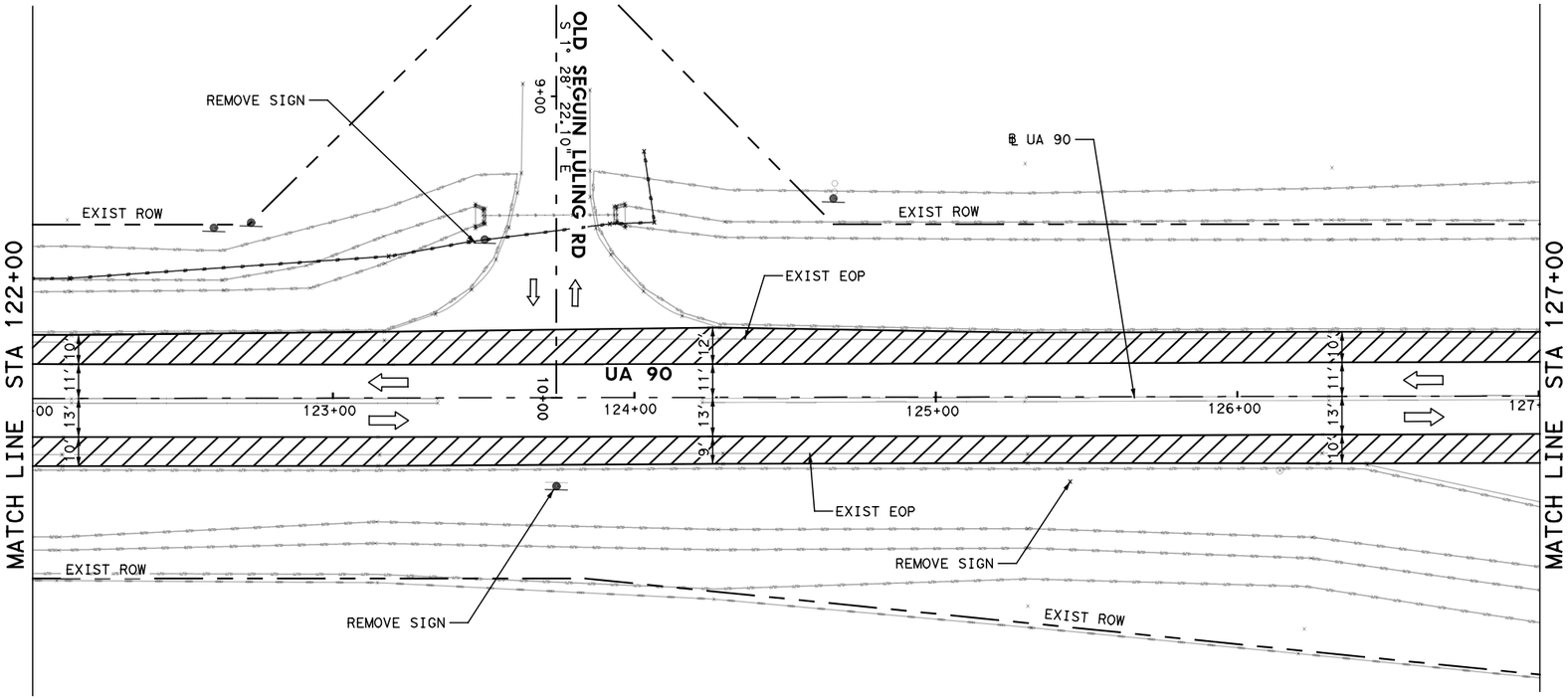


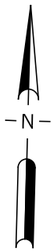


LEGEND

- EXIST ROW
- EXIST PVMT TO BE REMOVED
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- REMOVE/REPLACE MAILBOX
- REMOVE SIGN

ITEM	DESCRIPTION	UNIT	QUANTITY
104 6009	REMOVING CONC (RIPRAP)	SY	0
105 6014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	2187
496 6004	REMOV STR (SET)	EA	0
496 6007	REMOV STR (PIPE)	LF	0
644 6076	REMOVE SM RD SN SUP&AM	EA	4





0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
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PROFESSIONAL ENGINEER
4/19/2023

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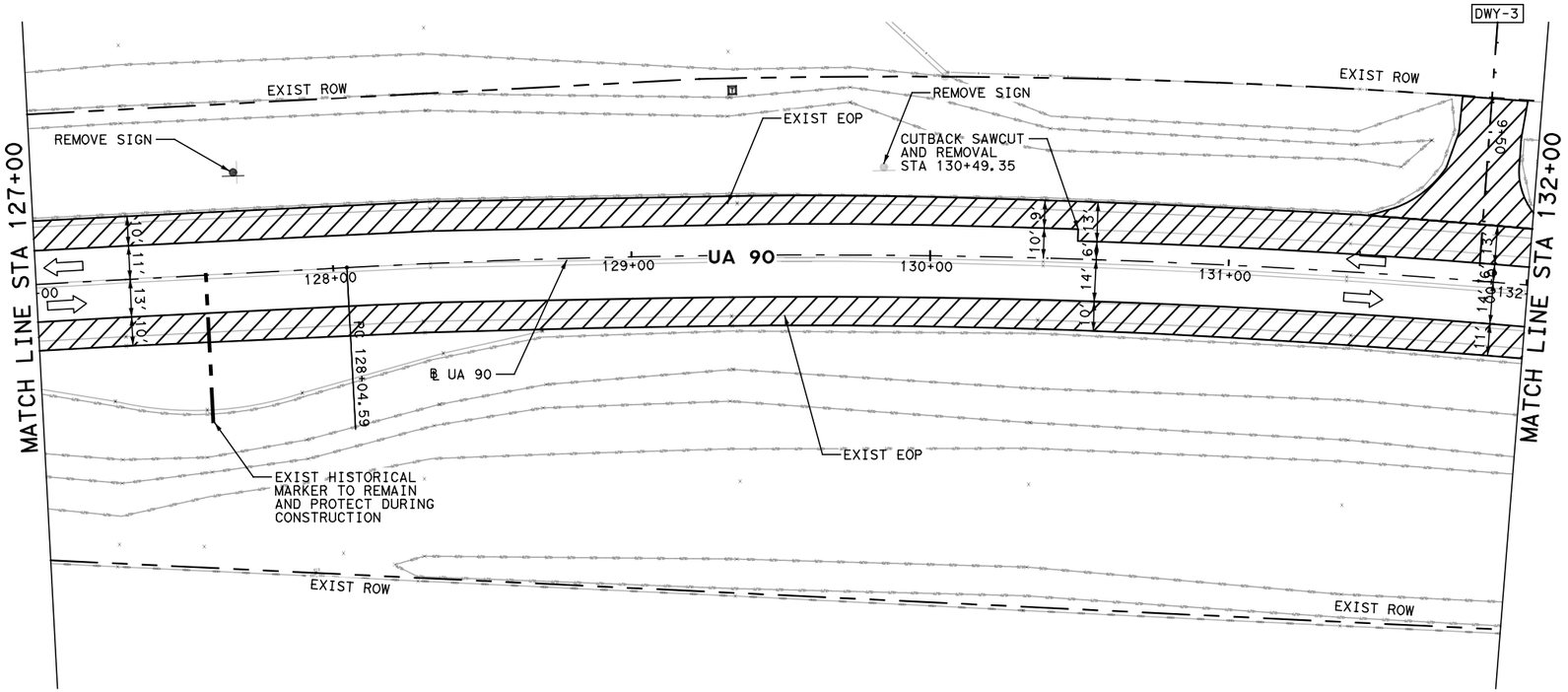
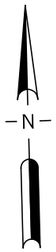
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

REMOVAL PLAN LAYOUT
STA 117+00 TO STA 127+00

SHEET 3 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	63

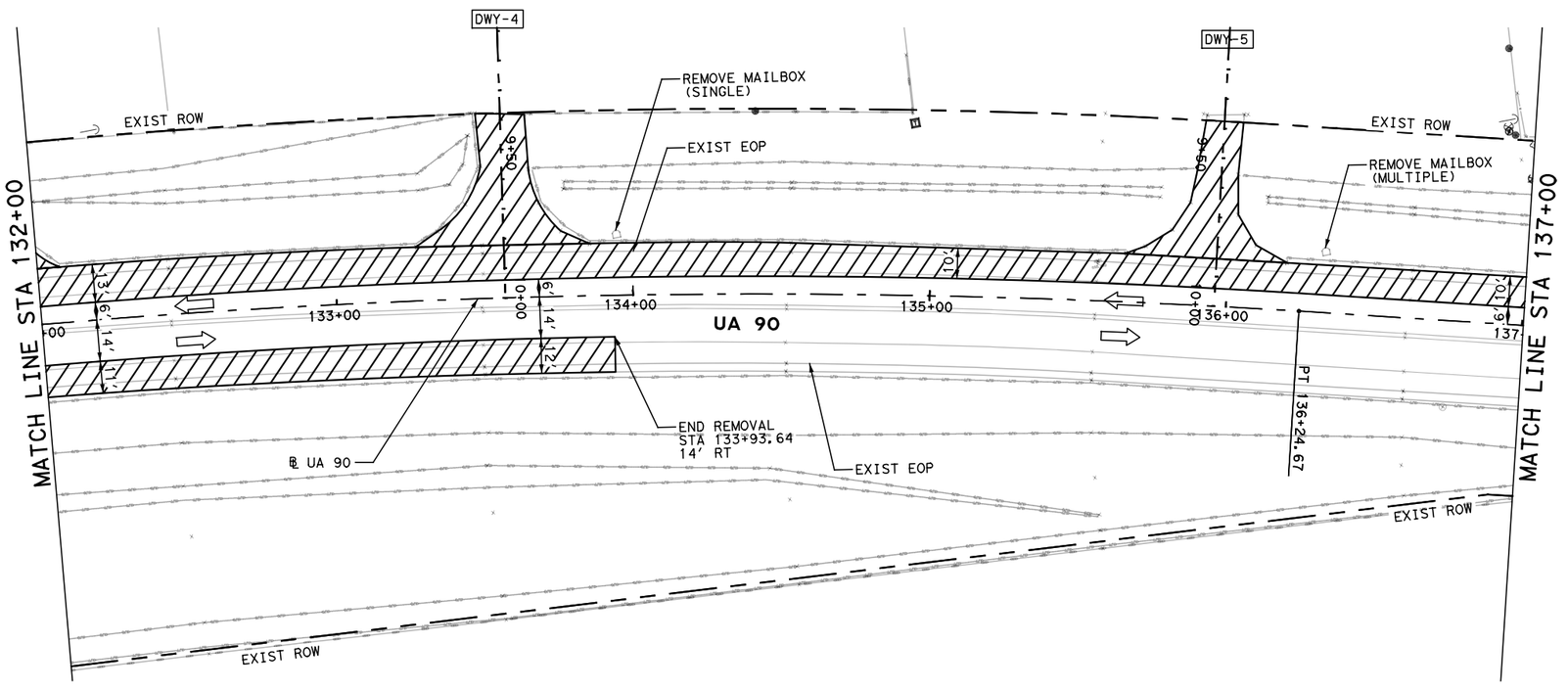




LEGEND

- EXIST ROW
- EXIST PVMT TO BE REMOVED
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- REMOVE/REPLACE MAILBOX
- REMOVE SIGN

ITEM	DESCRIPTION	UNIT	QUANTITY
104 6009	REMOVING CONC (RIPRAP)	SY	0
105 6014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	2521
496 6004	REMOV STR (SET)	EA	0
496 6007	REMOV STR (PIPE)	LF	0
644 6076	REMOVE SM RD SN SUP&AM	EA	2



0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
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4/19/2023

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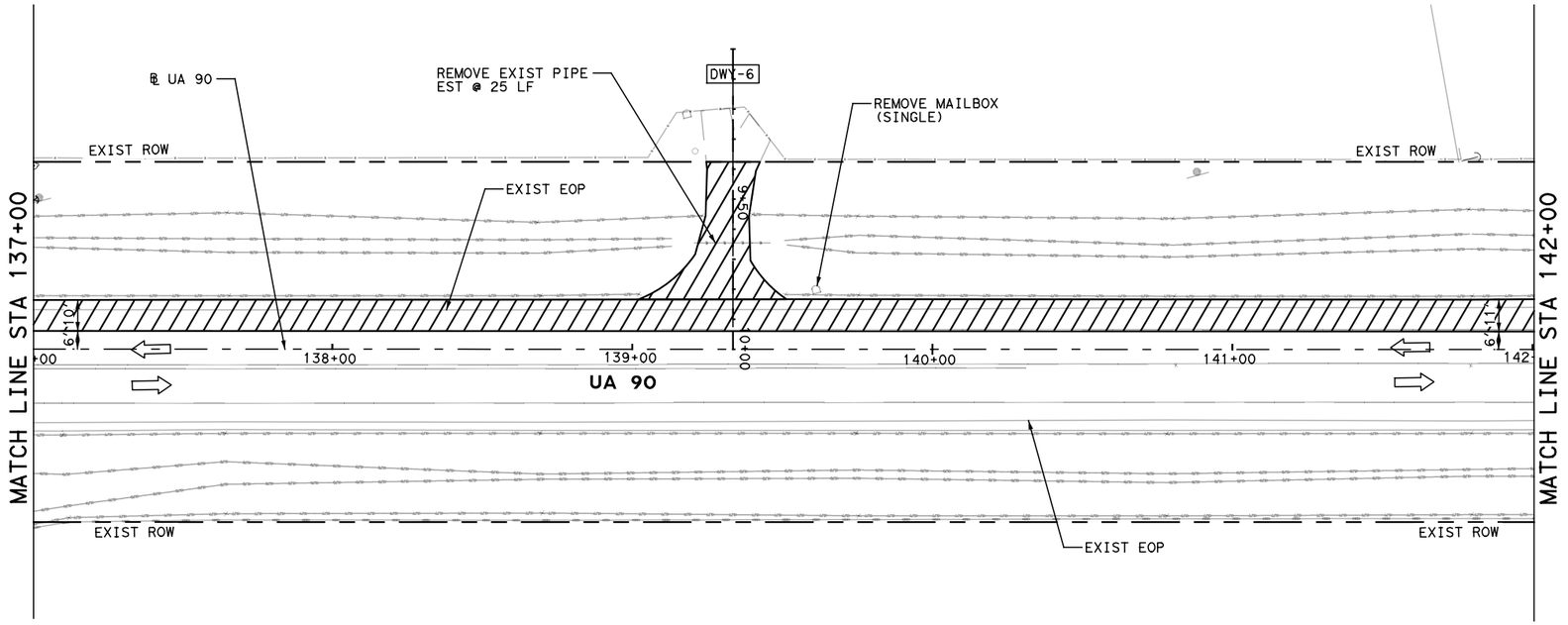
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

REMOVAL PLAN LAYOUT
STA 127+00 TO STA 137+00

SHEET 4 OF 7

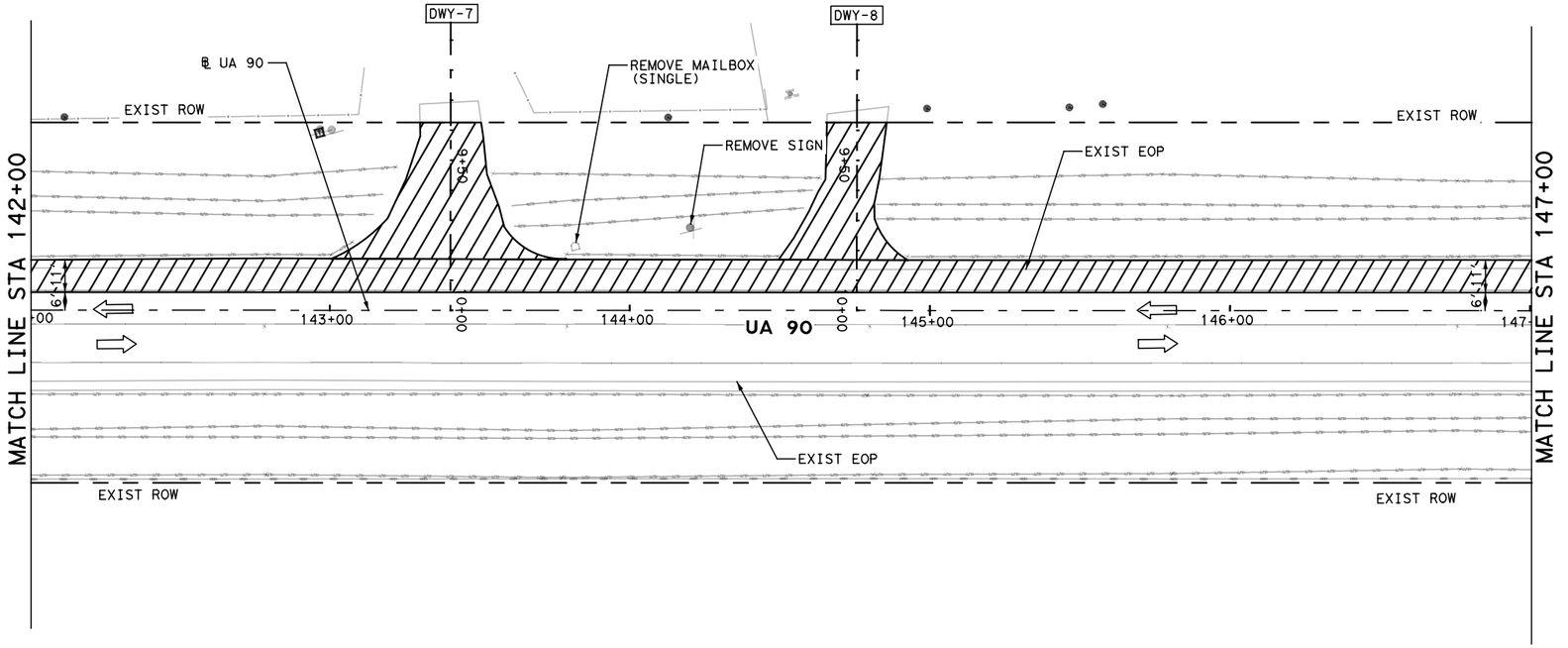
FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	64



LEGEND

- EXIST ROW
- EXIST PVMT TO BE REMOVED
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- REMOVE/REPLACE MAILBOX
- REMOVE SIGN

ITEM	DESCRIPTION	UNIT	QUANTITY
104 6009	REMOVING CONC (RIPRAP)	SY	0
105 6014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	1591
496 6004	REMOV STR (SET)	EA	0
496 6007	REMOV STR (PIPE)	LF	25
644 6076	REMOVE SM RD SN SUP&AM	EA	1



0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED
PROFESSIONAL ENGINEER
4/19/2023

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
738 Hwy 6 South, Suite 430
Houston, Texas 77079
(832) 619-1000
TBPE F-1640

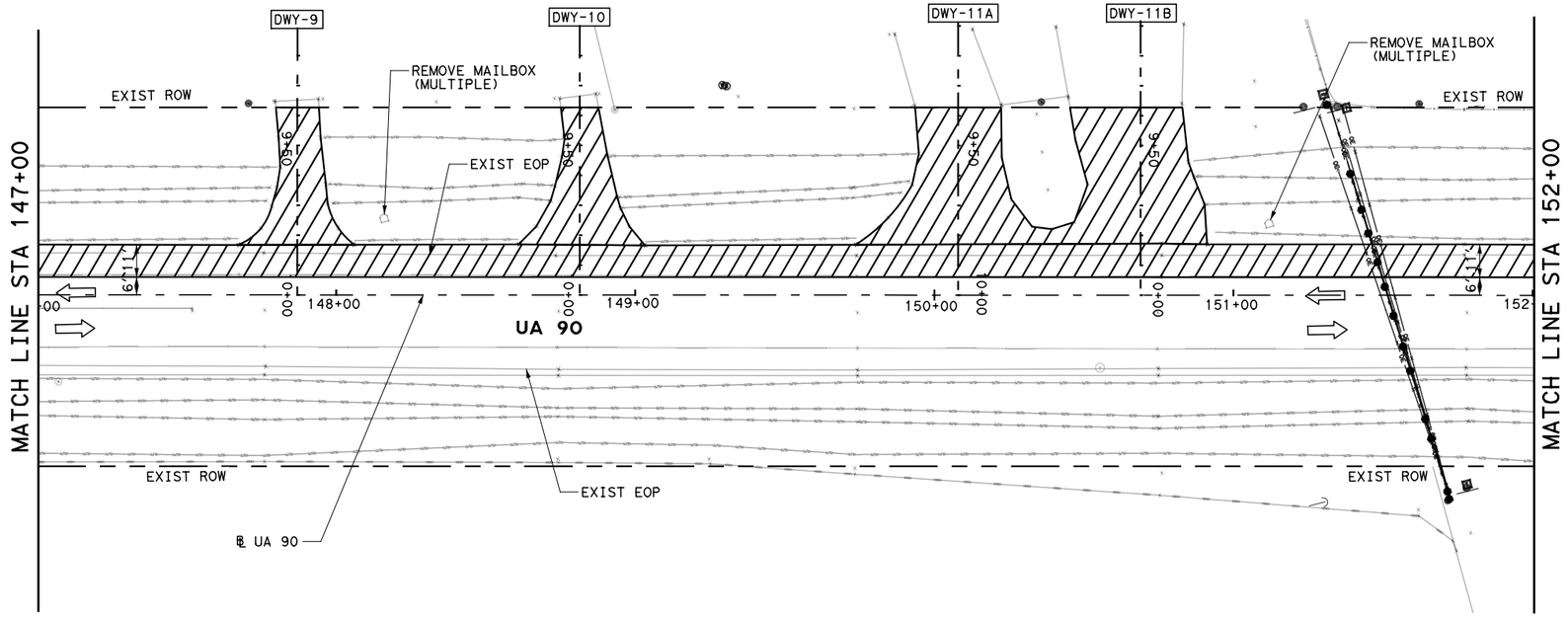
Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

REMOVAL PLAN LAYOUT
STA 137+00 TO STA 147+00

SHEET 5 OF 7

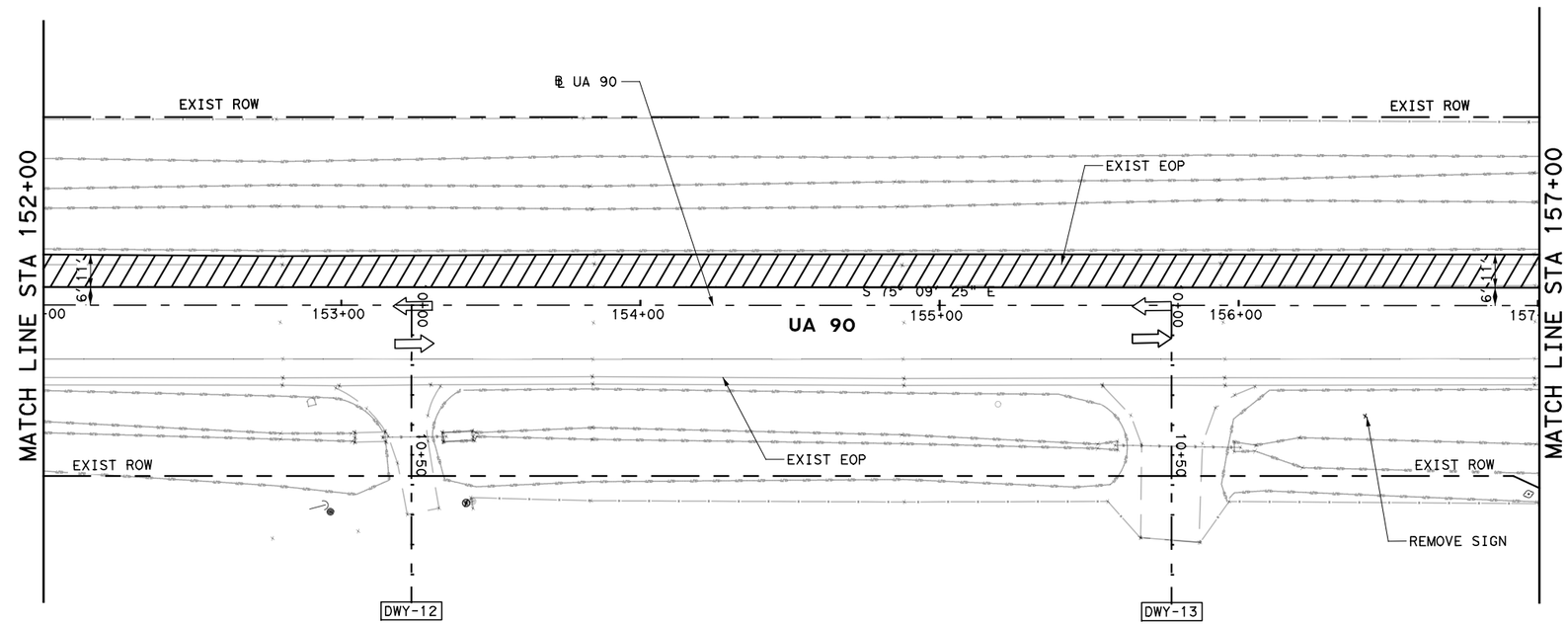
FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	65



LEGEND

- EXIST ROW
- EXIST PVMT TO BE REMOVED
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- REMOVE/REPLACE MAILBOX
- REMOVE SIGN

ITEM	DESCRIPTION	UNIT	QUANTITY
104 6009	REMOVING CONC (RIPRAP)	SY	0
105 6014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	1798
496 6004	REMOV STR (SET)	EA	0
496 6007	REMOV STR (PIPE)	LF	0
644 6076	REMOVE SM RD SN SUP&AM	EA	1



0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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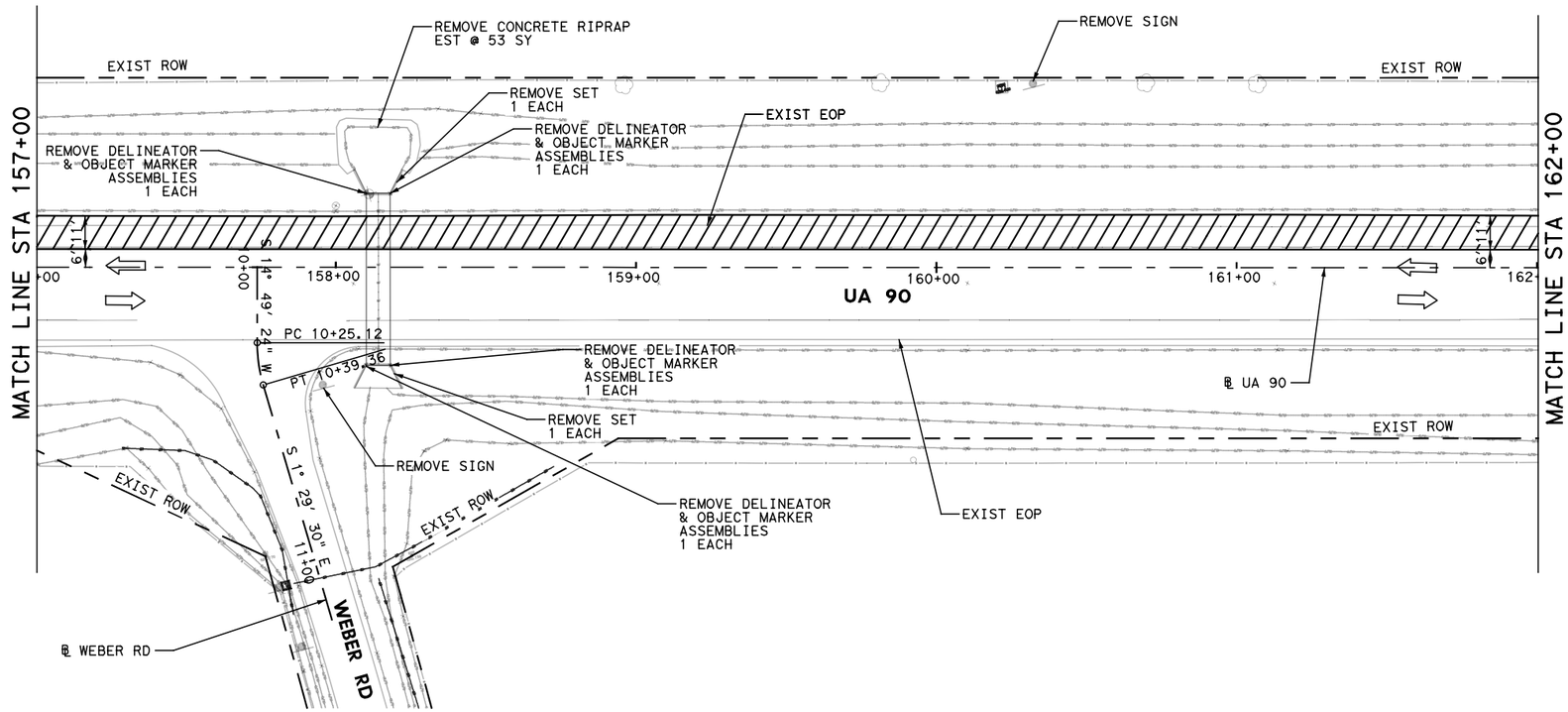
Texas Department of Transportation

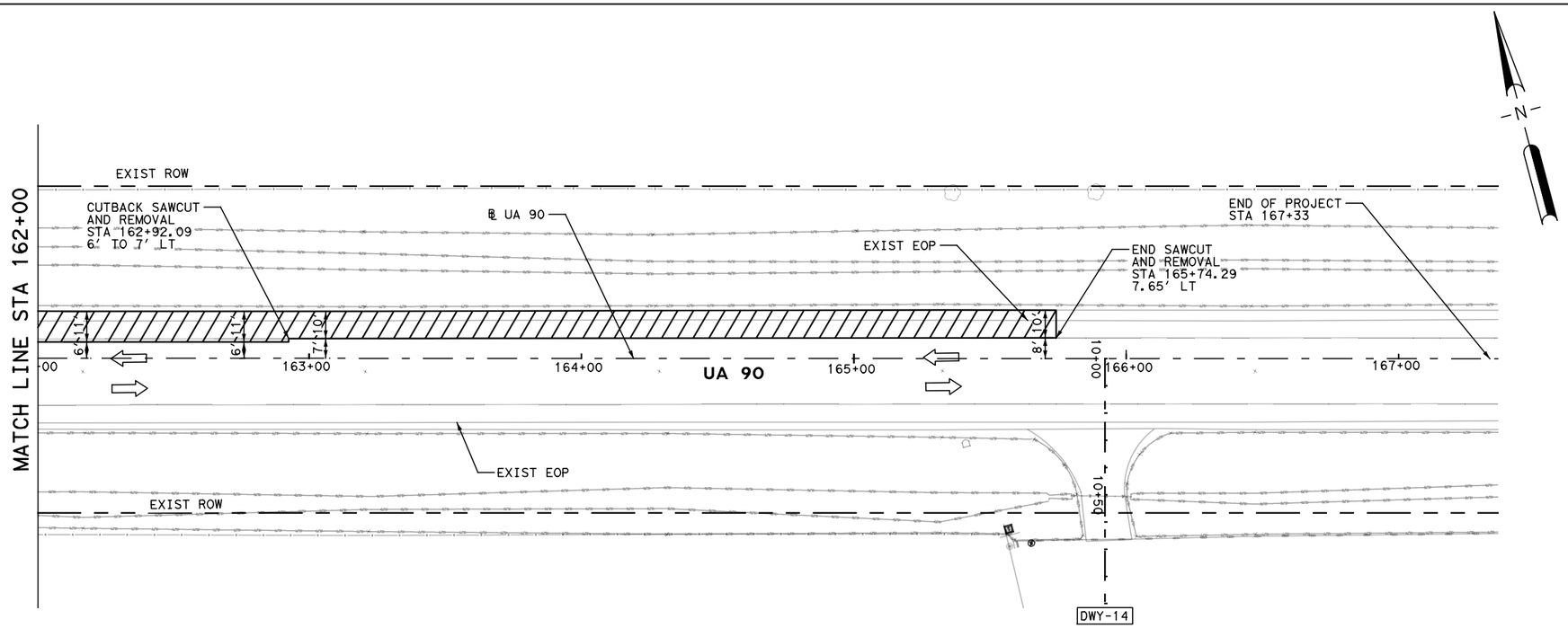
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

REMOVAL PLAN LAYOUT
STA 147+00 TO STA 157+00

SHEET 6 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	66





LEGEND

- EXIST ROW
- EXIST PVMT TO BE REMOVED
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- REMOVE/REPLACE MAILBOX
- REMOVE SIGN

ITEM	DESCRIPTION	UNIT	QUANTITY
104 6009	REMOVING CONC (RIPRAP)	SY	53
105 6014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	1068
496 6004	REMOV STR (SET)	EA	2
496 6007	REMOV STR (PIPE)	LF	0
644 6076	REMOVE SM RD SN SUP&AM	EA	2
658 6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	4

0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED
PROFESSIONAL ENGINEER
4/19/2023

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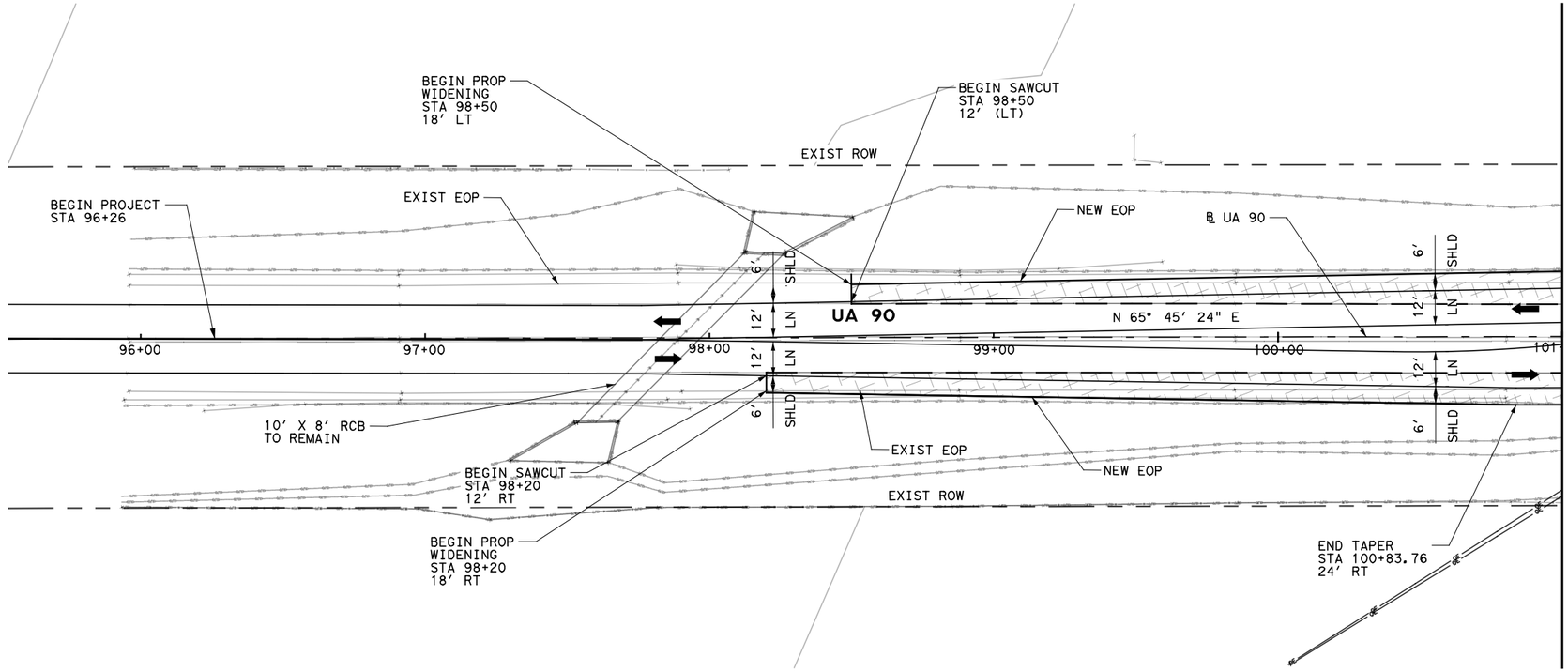
Texas Department of Transportation

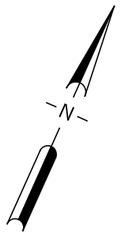
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

REMOVAL PLAN LAYOUT
STA 157+00 TO END

SHEET 7 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	67

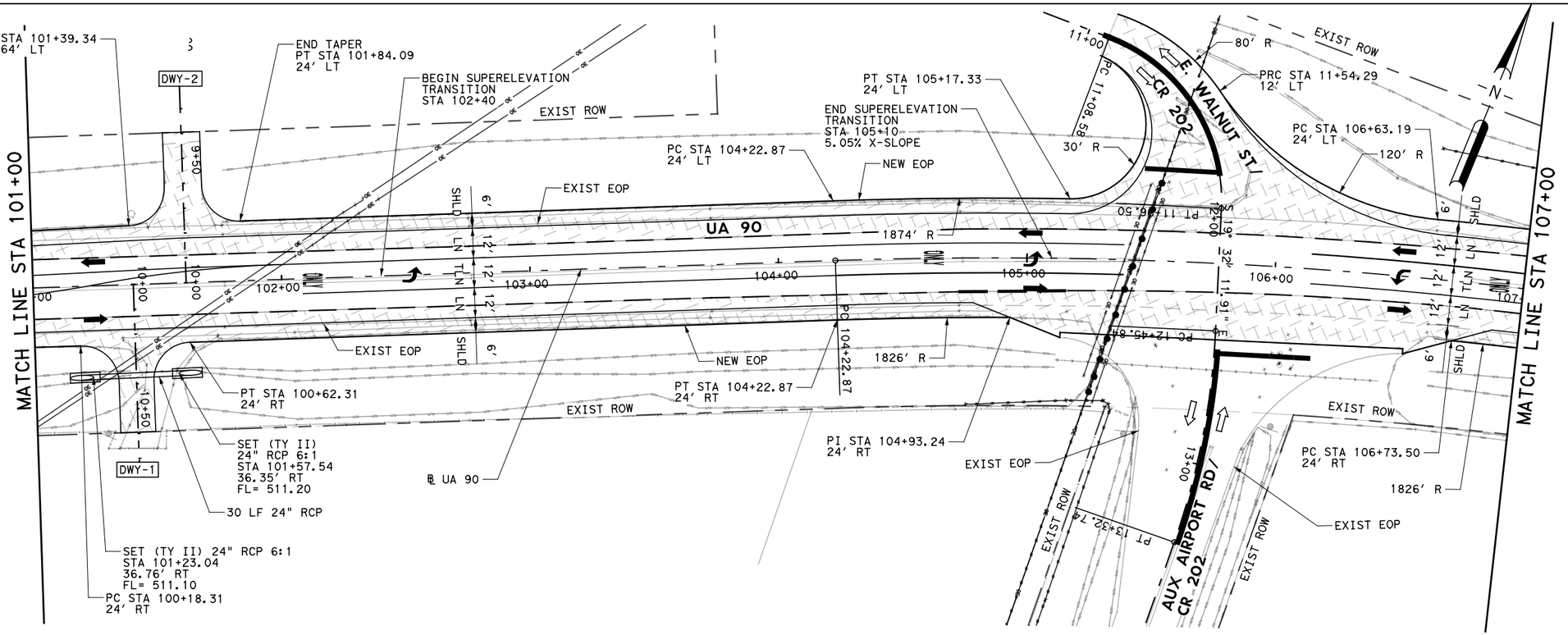


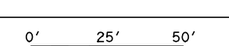


LEGEND

- EXISTING ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- PROPOSED WIDENING

ITEM	DESCRIPTION	UNIT	QUANTITY
100 6002	PREPARING ROW	STA	9
110 6001	EXCAVATION (ROADWAY)	CY	170
132 6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	1052
216 6001	PROOF ROLLING	HR	2
247 6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	902
310 6027	PRIME COAT(MC-30 OR AE-P)	GAL	541
464 6018	RC PIPE (CL IV)(24 IN)	LF	30
464 6080	RC PIPE (ARCH)(CL V)(DES 3)	LF	0
467 6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	2
467 6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	0
530 6005	DRIVEWAYS (ACP)	SY	138
560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	0
3076 6001	D-GR HMA TY-B PG64-22	TON	623
3076 6066	TACK COAT	GAL	406
3077 6021	SP MIXESSP-CPG70-22	TON	595
3085 6001	UNDERSEAL COURSE	GAL	1035





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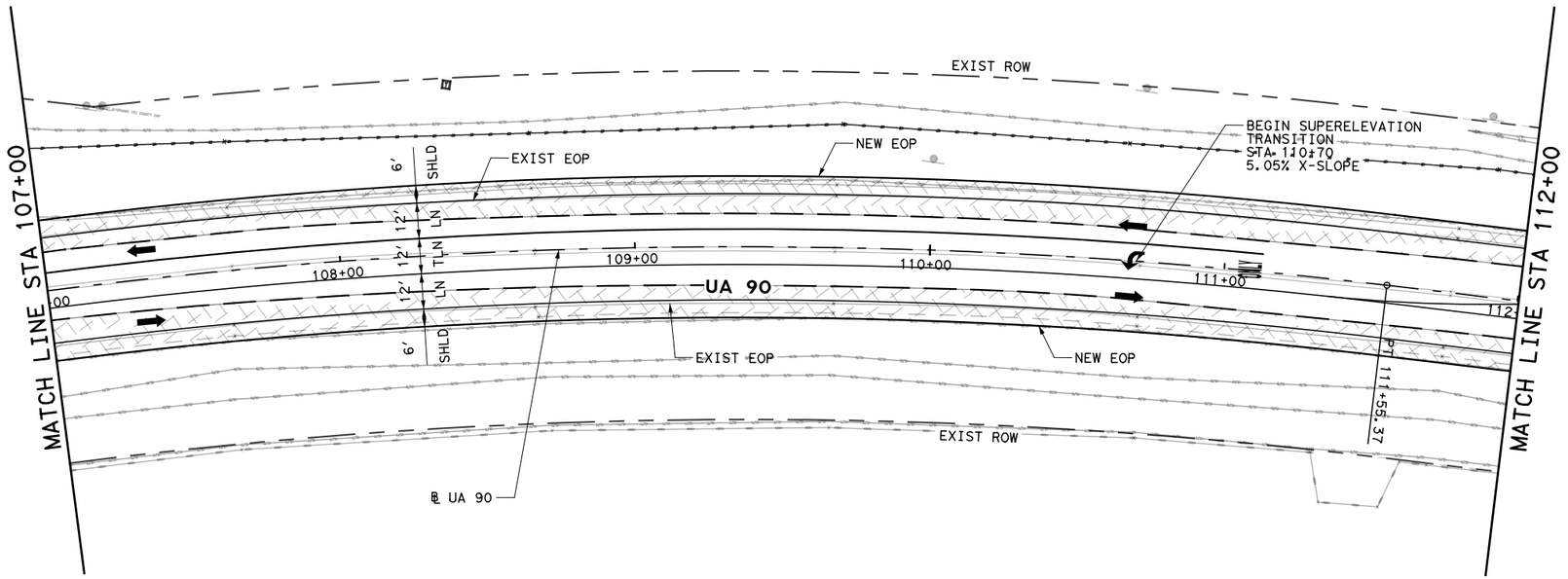
Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

ROADWAY PLAN LAYOUT
BEGIN TO STA 107+00

SHEET 1 OF 7

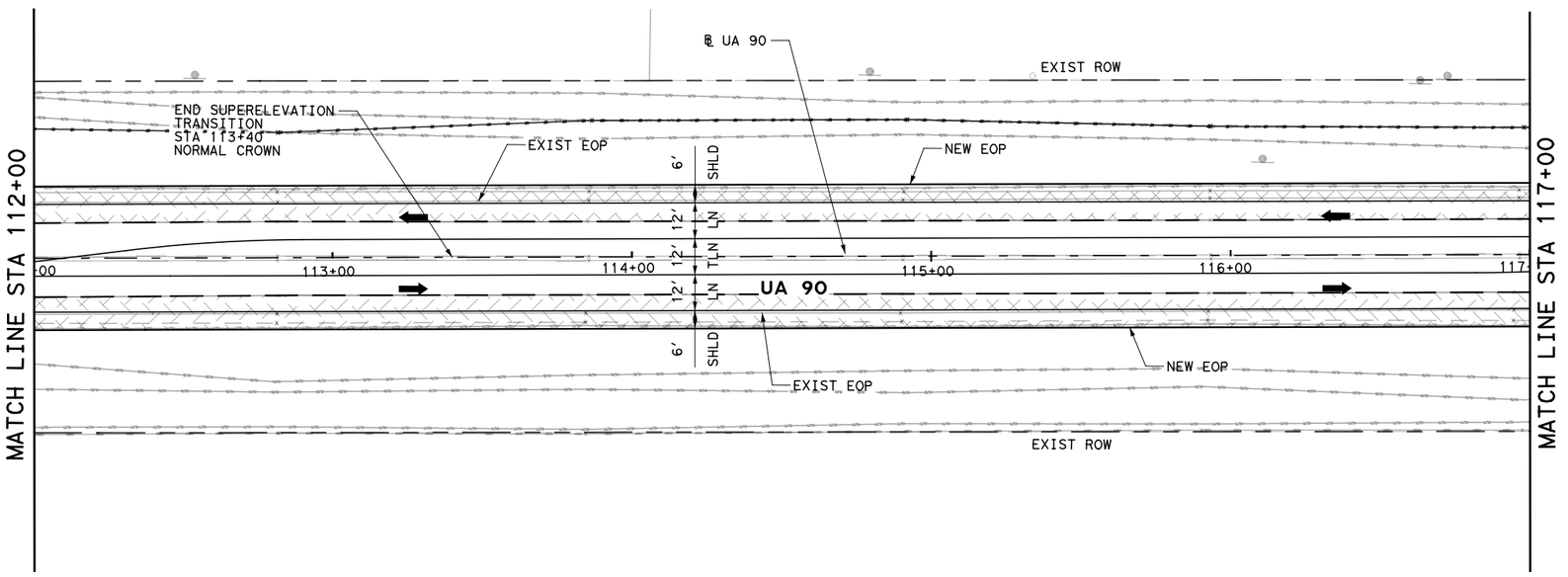
FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	69

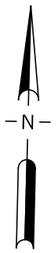


LEGEND

- EXISTING ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- PROPOSED WIDENING

ITEM	DESCRIPTION	UNIT	QUANTITY
100 6002	PREPARING ROW	STA	10
110 6001	EXCAVATION (ROADWAY)	CY	1052
132 6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	483
216 6001	PROOF ROLLING	HR	2
247 6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	876
310 6027	PRIME COAT(MC-30 OR AE-P)	GAL	526
464 6018	RC PIPE (CL IV)(24 IN)	LF	0
464 6080	RC PIPE (ARCH)(CL V)(DES 3)	LF	0
467 6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	0
467 6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	0
530 6005	DRIVEWAYS (ACP)	SY	0
560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	0
3076 6001	D-GR HMA TY-B PG64-22	TON	604
3076 6066	TACK COAT	GAL	394
3077 6021	SP MIXESSP-CPG70-22	TON	613
3085 6001	UNDERSEAL COURSE	GAL	1067





0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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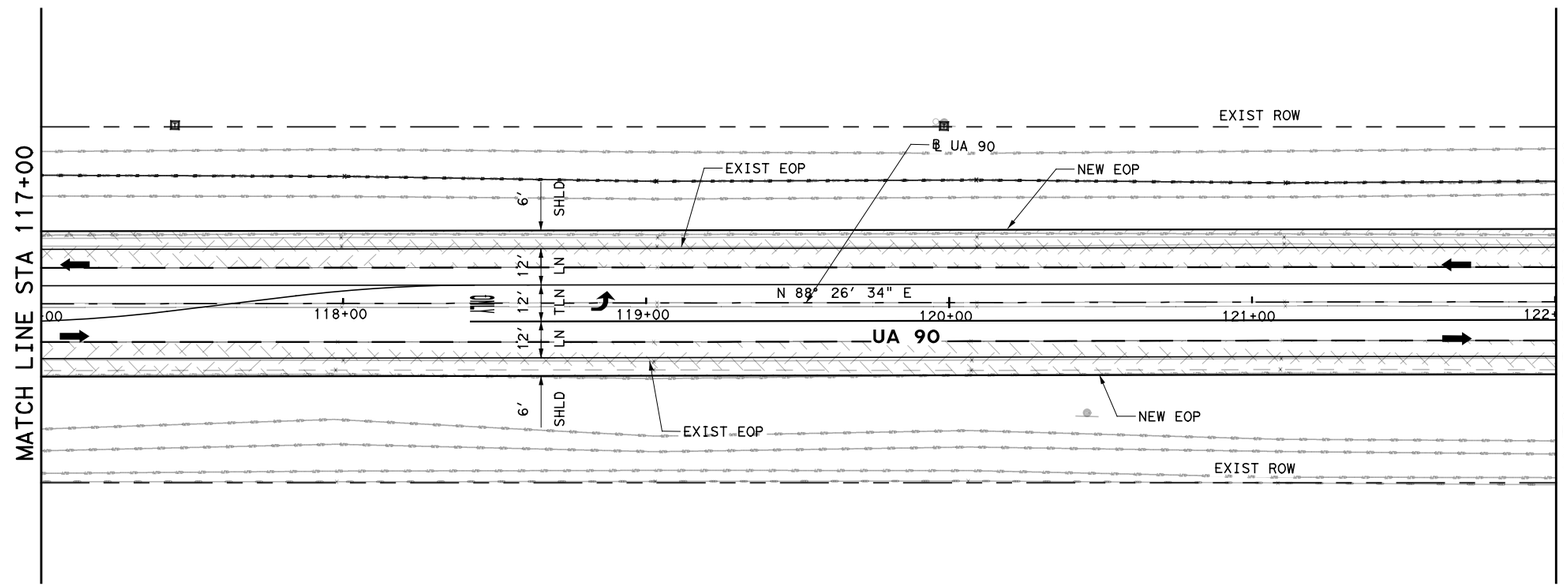
Texas Department of Transportation

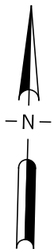
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

ROADWAY PLAN LAYOUT
STA 107+00 TO STA 117+00

SHEET 2 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	70

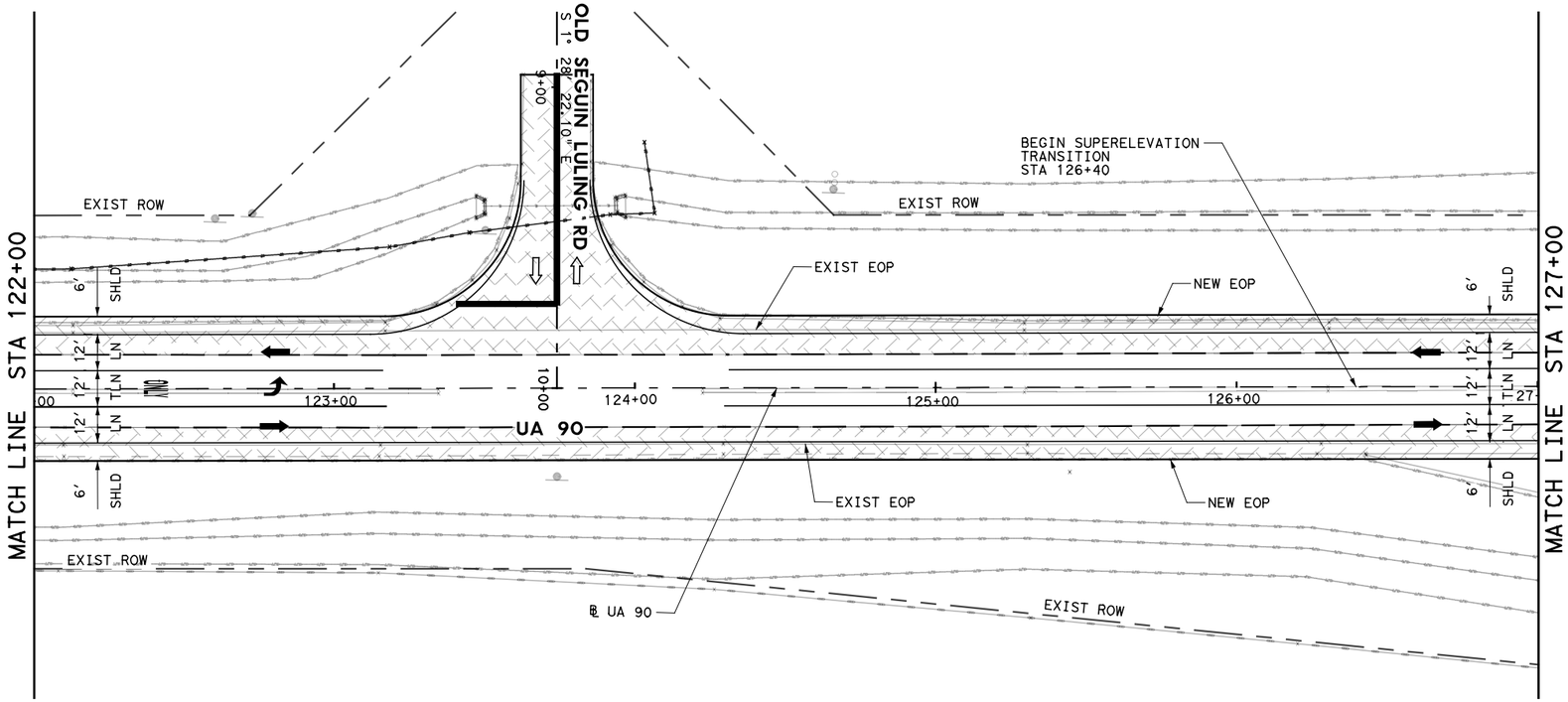


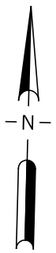


LEGEND

- EXISTING ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- PROPOSED WIDENING

ITEM	DESCRIPTION	UNIT	QUANTITY
100 6002	PREPARING ROW	STA	10
110 6001	EXCAVATION (ROADWAY)	CY	716
132 6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	365
216 6001	PROOF ROLLING	HR	2
247 6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	984
310 6027	PRIME COAT(MC-30 OR AE-P)	GAL	590
464 6018	RC PIPE (CL IV)(24 IN)	LF	0
464 6080	RC PIPE (ARCH)(CL V)(DES 3)	LF	0
467 6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	0
467 6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	0
530 6005	DRIVEWAYS (ACP)	SY	0
560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	0
3076 6001	D-GR HMA TY-B PG64-22	TON	679
3076 6066	TACK COAT	GAL	443
3077 6021	SP MIXESSP-CPG70-22	TON	652
3085 6001	UNDERSEAL COURSE	GAL	1134





0' 25' 50'
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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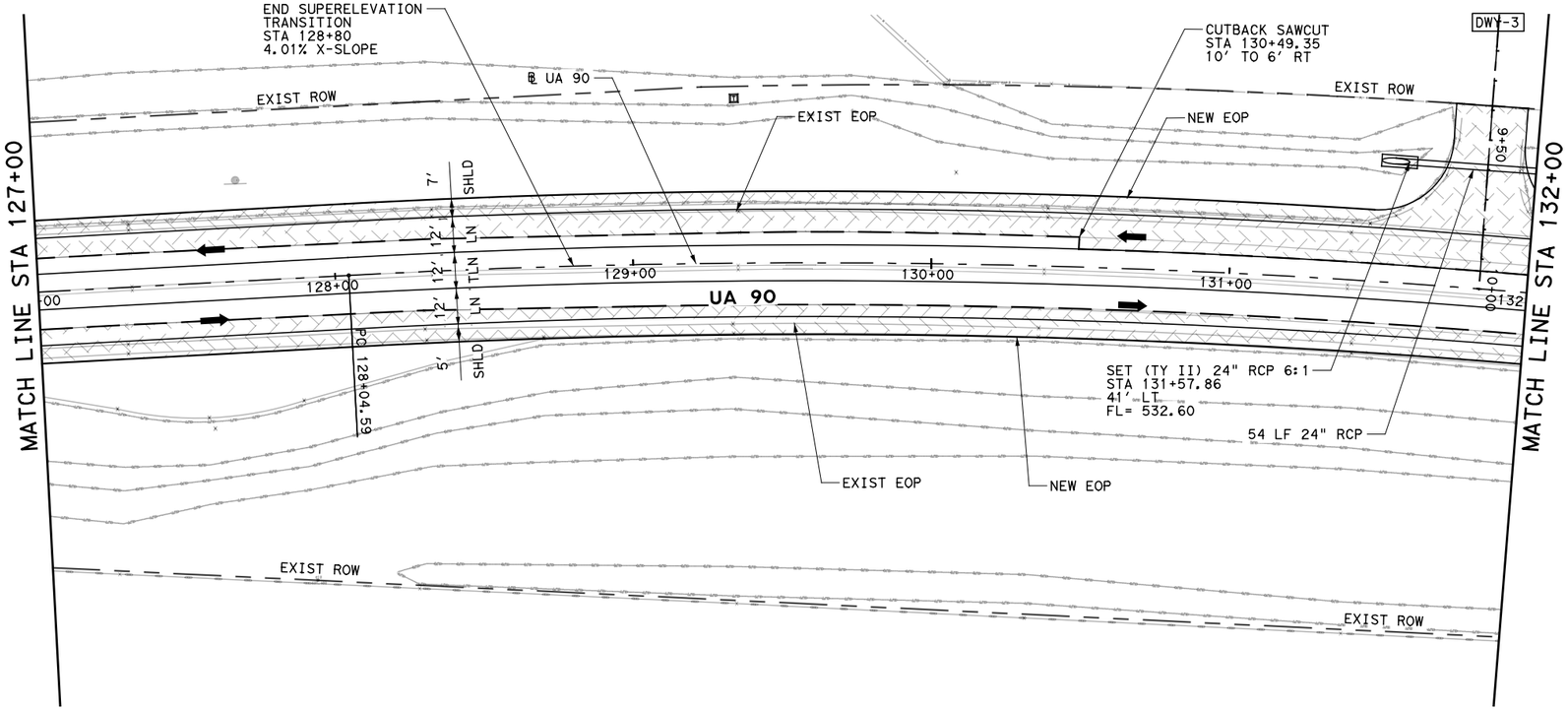
Texas Department of Transportation

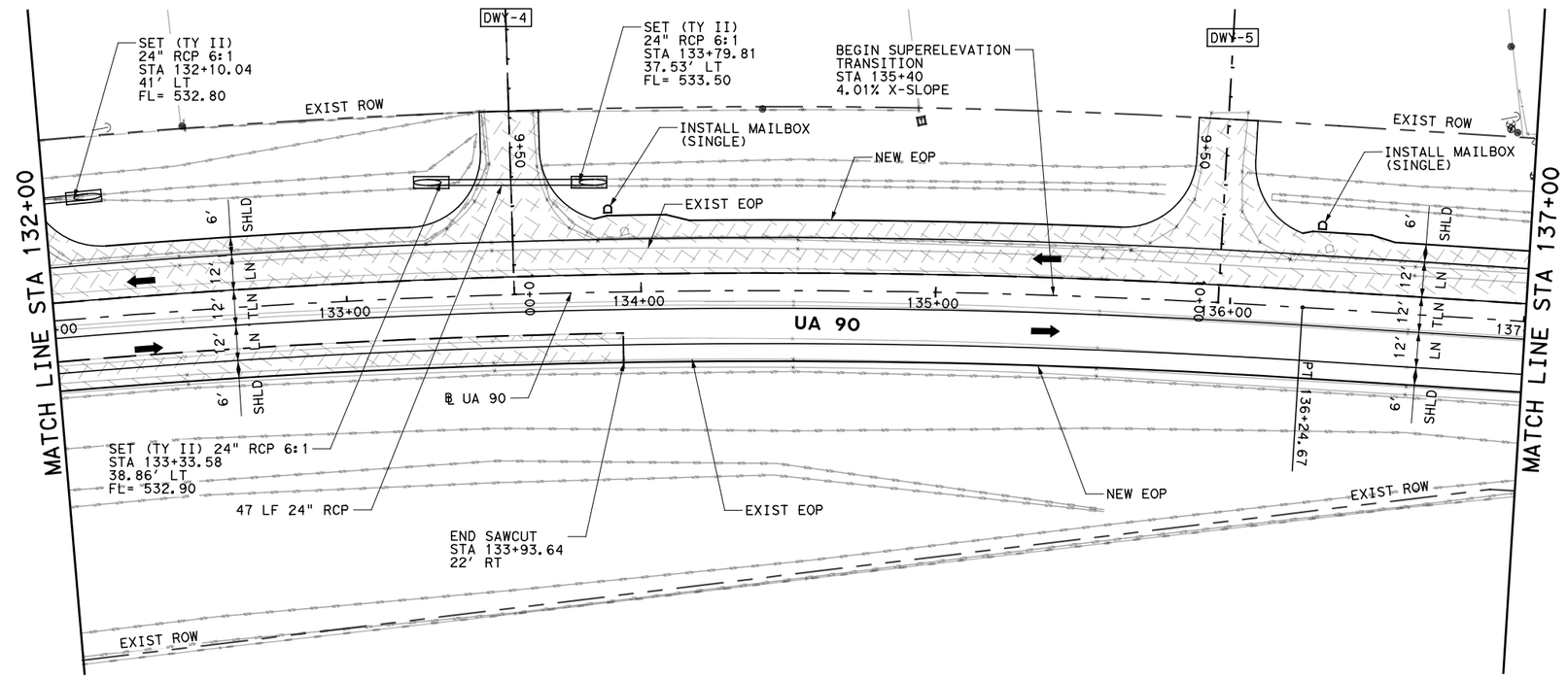
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

ROADWAY PLAN LAYOUT
STA 117+00 TO STA 127+00

SHEET 3 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	71





LEGEND

- EXISTING ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- PROPOSED WIDENING
- INSTALL MAILBOX

ITEM	DESCRIPTION	UNIT	QUANTITY
100 6002	PREPARING ROW	STA	10
110 6001	EXCAVATION (ROADWAY)	CY	1008
132 6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	412
216 6001	PROOF ROLLING	HR	2
247 6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	1063
310 6027	PRIME COAT(MC-30 OR AE-P)	GAL	638
464 6018	RC PIPE (CL IV)(24 IN)	LF	101
464 6080	RC PIPE (ARCH)(CL V)(DES 3)	LF	0
467 6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	4
467 6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	0
530 6005	DRIVEWAYS (ACP)	SY	361
560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	2
3076 6001	D-GR HMA TY-B PG64-22	TON	734
3076 6066	TACK COAT	GAL	479
3077 6021	SP MIXESSP-CPG70-22	TON	614
3085 6001	UNDERSEAL COURSE	GAL	1068

0' 25' 50'
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

ROADWAY PLAN LAYOUT
STA 127+00 TO STA 137+00

SHEET 4 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	72

4/20/2023
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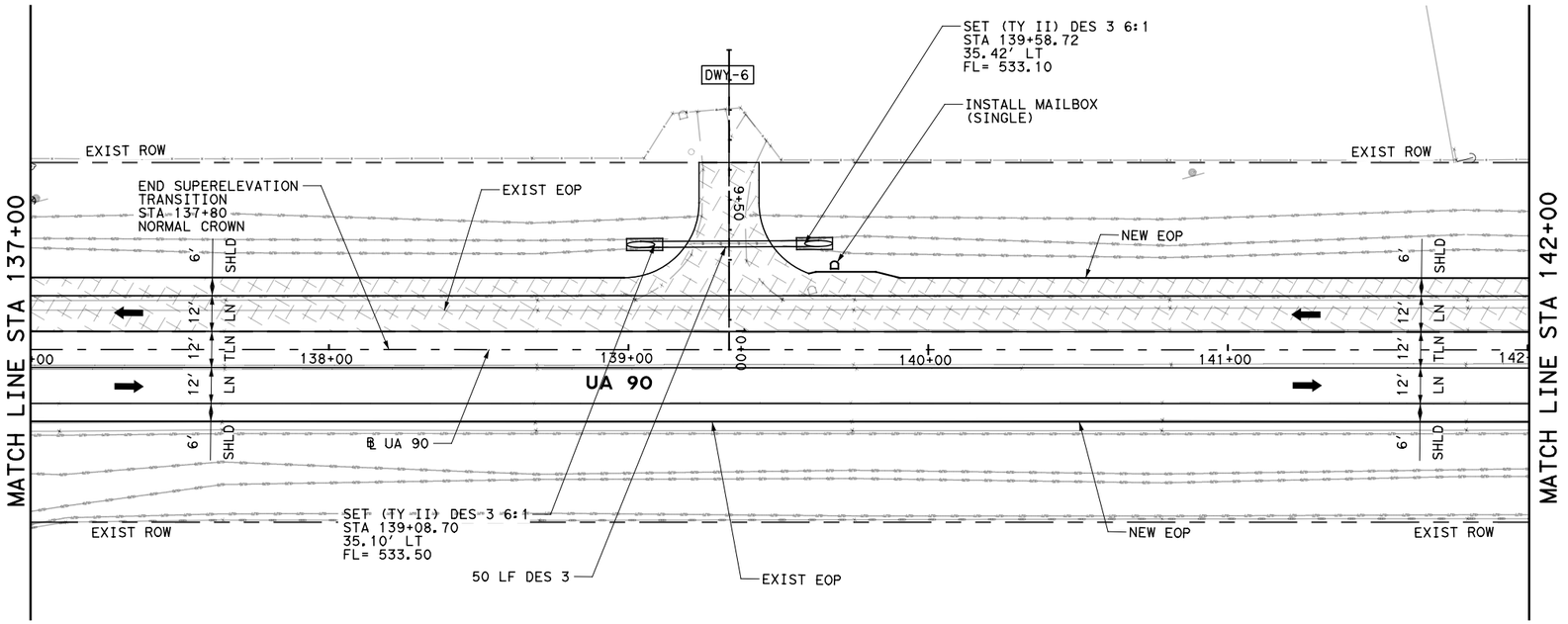
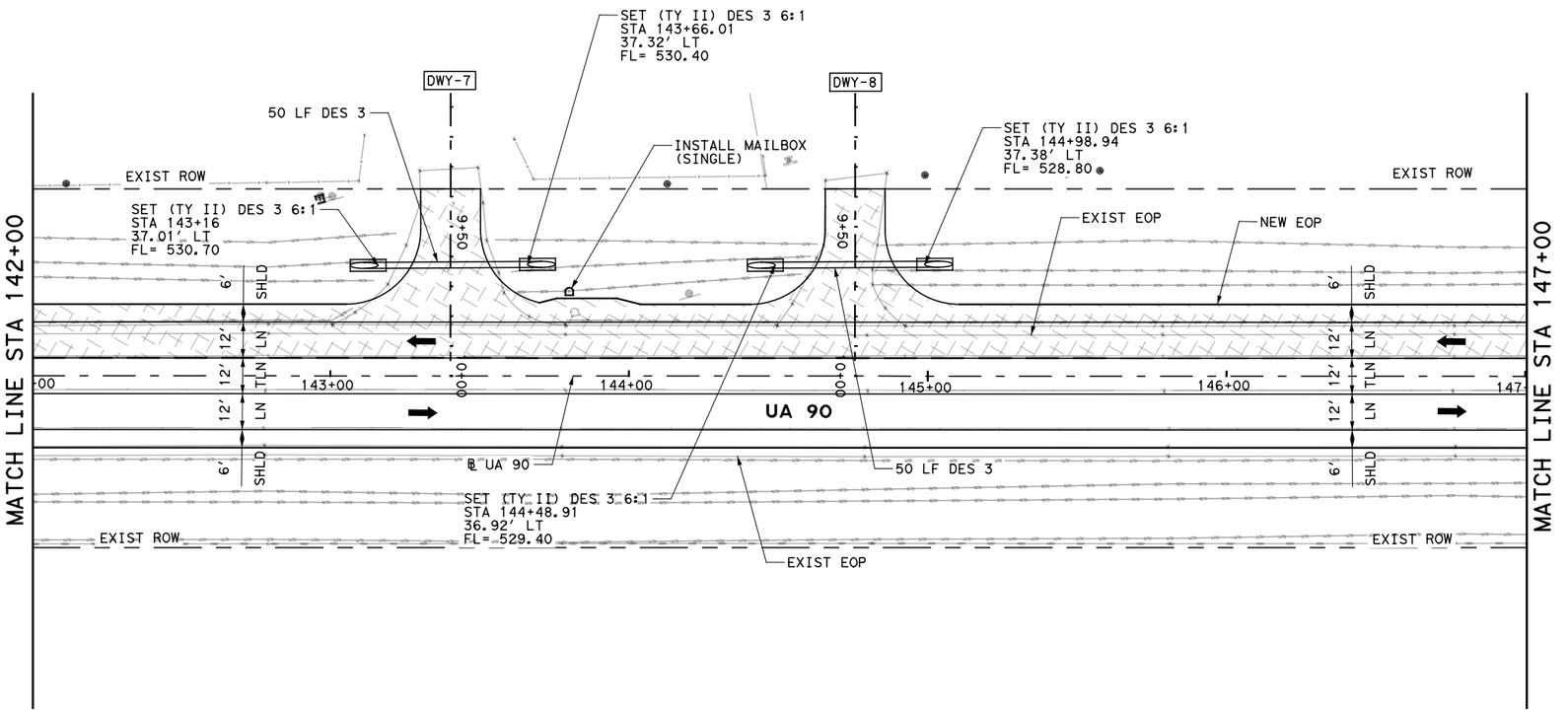


LEGEND

- EXISTING ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- PROPOSED WIDENING
- INSTALL MAILBOX

ITEM	DESCRIPTION	UNIT	QUANTITY
1006002	PREPARING ROW	STA	10
1106001	EXCAVATION (ROADWAY)	CY	1435
1326003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	435
2166001	PROOF ROLLING	HR	2
2476475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	453
3106027	PRIME COAT(MC-30 OR AE-P)	GAL	272
4646018	RC PIPE (CL IV)(24 IN)	LF	0
4646080	RC PIPE (ARCH)(CL V)(DES 3)	LF	150
4676395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	0
4676545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	6
5306005	DRIVEWAYS (ACP)	SY	346
5606003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	2
3076 6001	D-GR HMA TY-B PG64-22	TON	313
3076 6066	TACK COAT	GAL	204
3077 6021	SP MIXESSP-CPG70-22	TON	614
3086 6001	UNDERSEAL COURSE	GAL	1068



0' 25' 50'
SCALE IN FEET

STATE OF TEXAS
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4/19/2023

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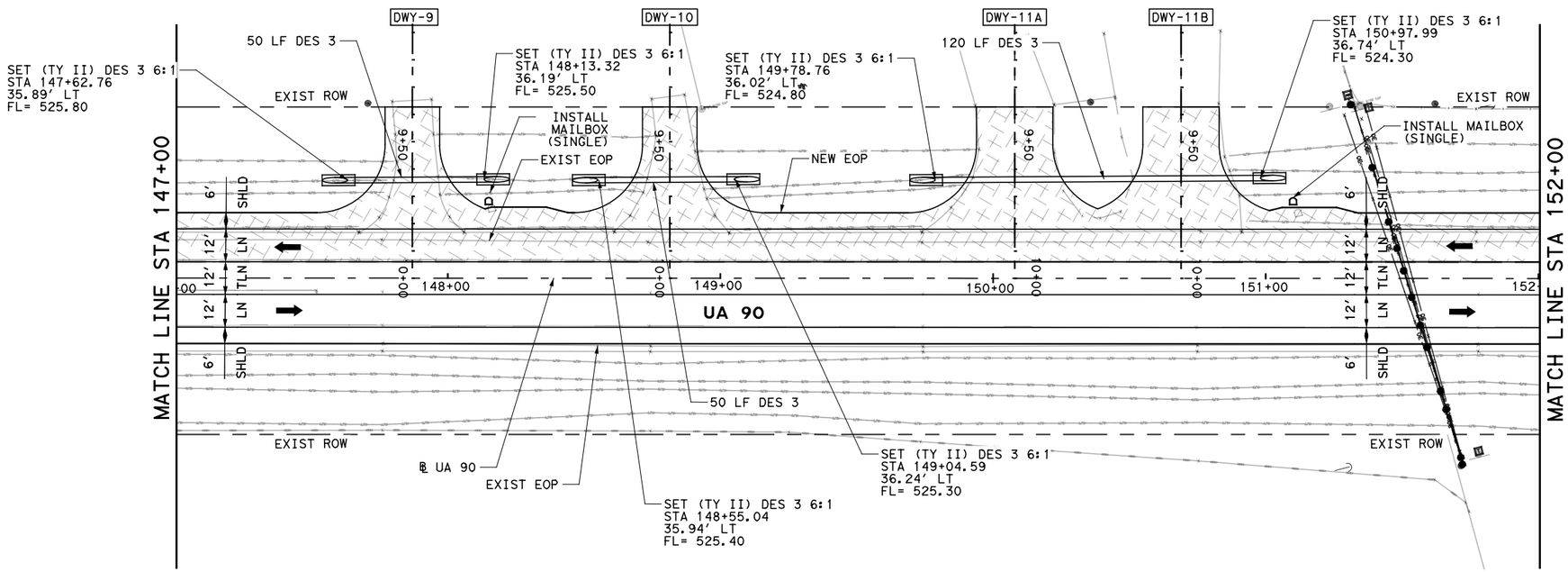
Texas Department of Transportation

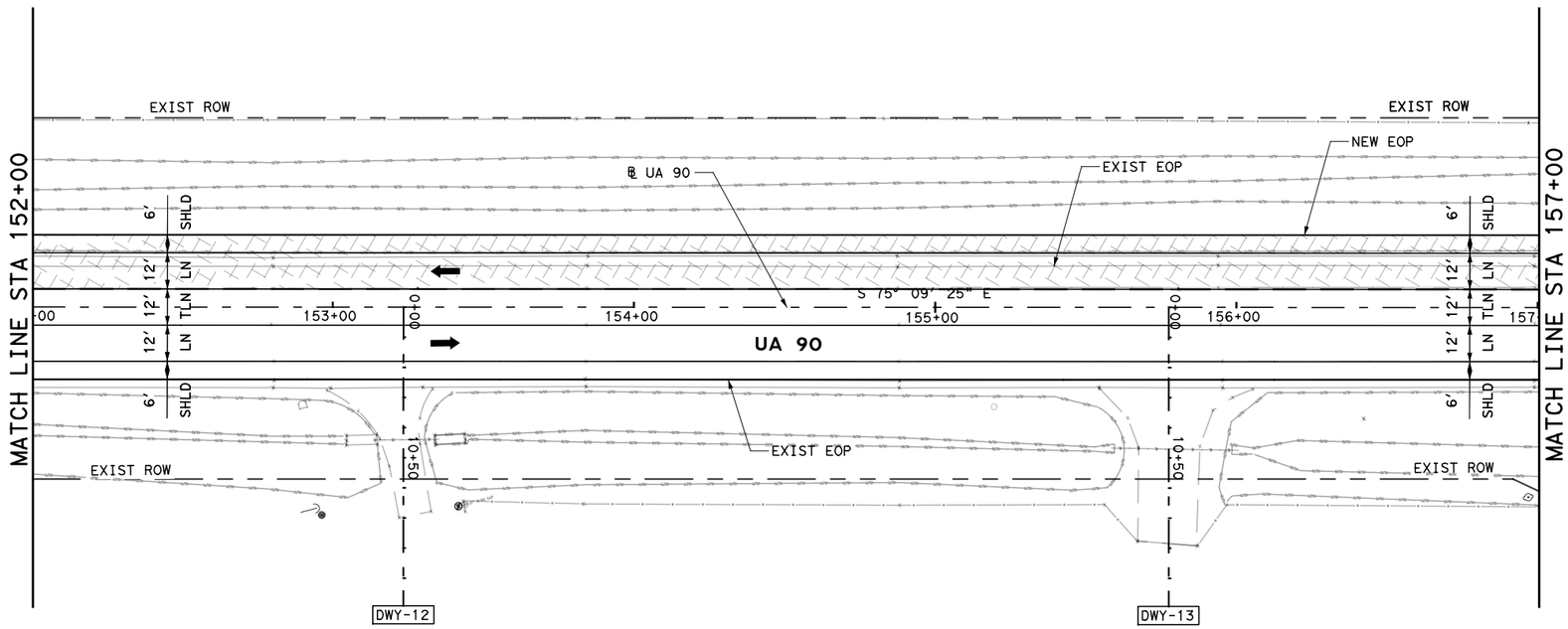
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

ROADWAY PLAN LAYOUT
STA 137+00 TO STA 147+00

SHEET 5 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	73





LEGEND

- EXISTING ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- PROPOSED WIDENING
- D — INSTALL MAILBOX

ITEM	DESCRIPTION	UNIT	QUANTITY
100 6002	PREPARING ROW	STA	10
110 6001	EXCAVATION (ROADWAY)	CY	912
132 6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	354
216 6001	PROOF ROLLING	HR	2
247 6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	648
310 6027	PRIME COAT(MC-30 OR AE-P)	GAL	508
464 6018	RC PIPE (CL IV)(24 IN)	LF	
464 6080	RC PIPE (ARCH)(CL V)(DES 3)	LF	220
467 6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	0
467 6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	6
530 6005	DRIVEWAYS (ACP)	SY	531
560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	2
3076 6001	D-GR HMA TY-B PG64-22	TON	585
3076 6066	TACK COAT	GAL	382
3077 6021	SP MIXESSP-CPG70-22	TON	614
3085 6001	UNDERSEAL COURSE	GAL	1068

0' 25' 50'
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
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4/19/2023

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Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

ROADWAY PLAN LAYOUT
STA 147+00 TO STA 157+00

SHEET 6 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	74

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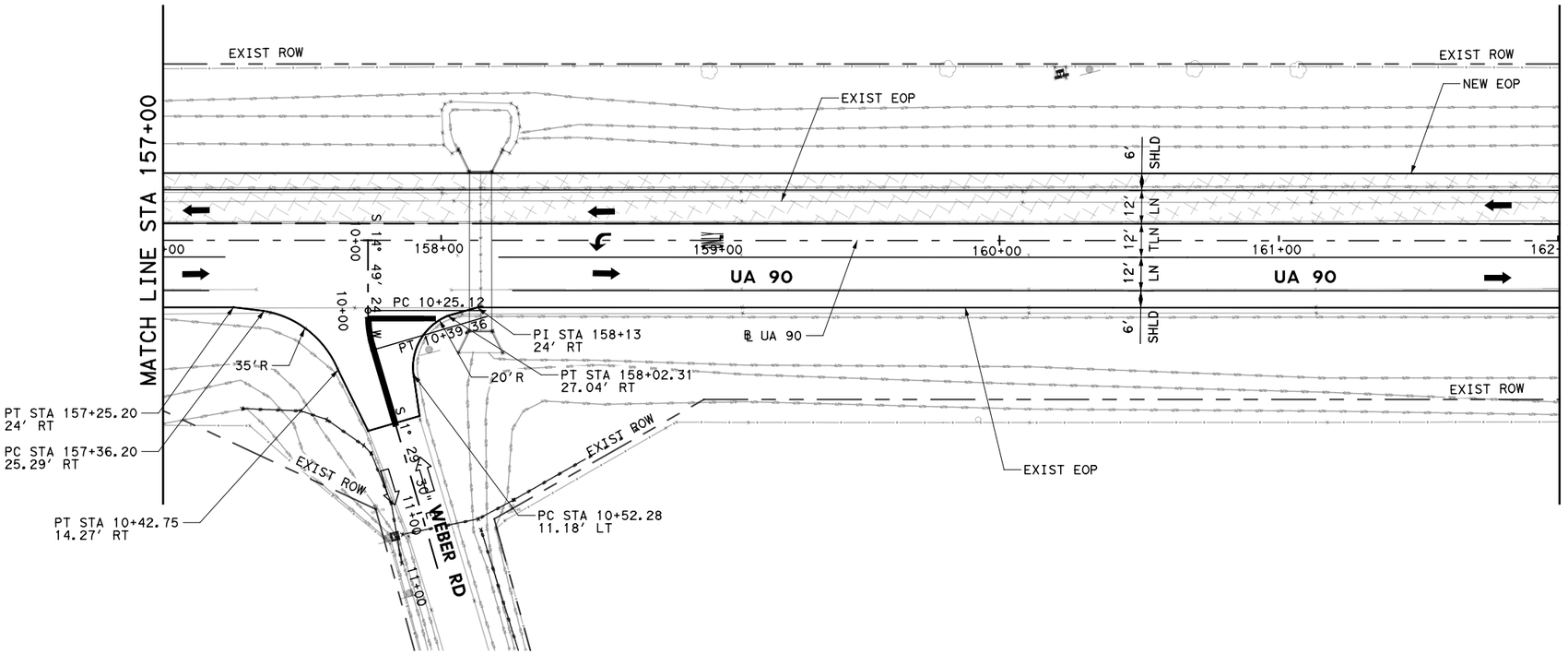
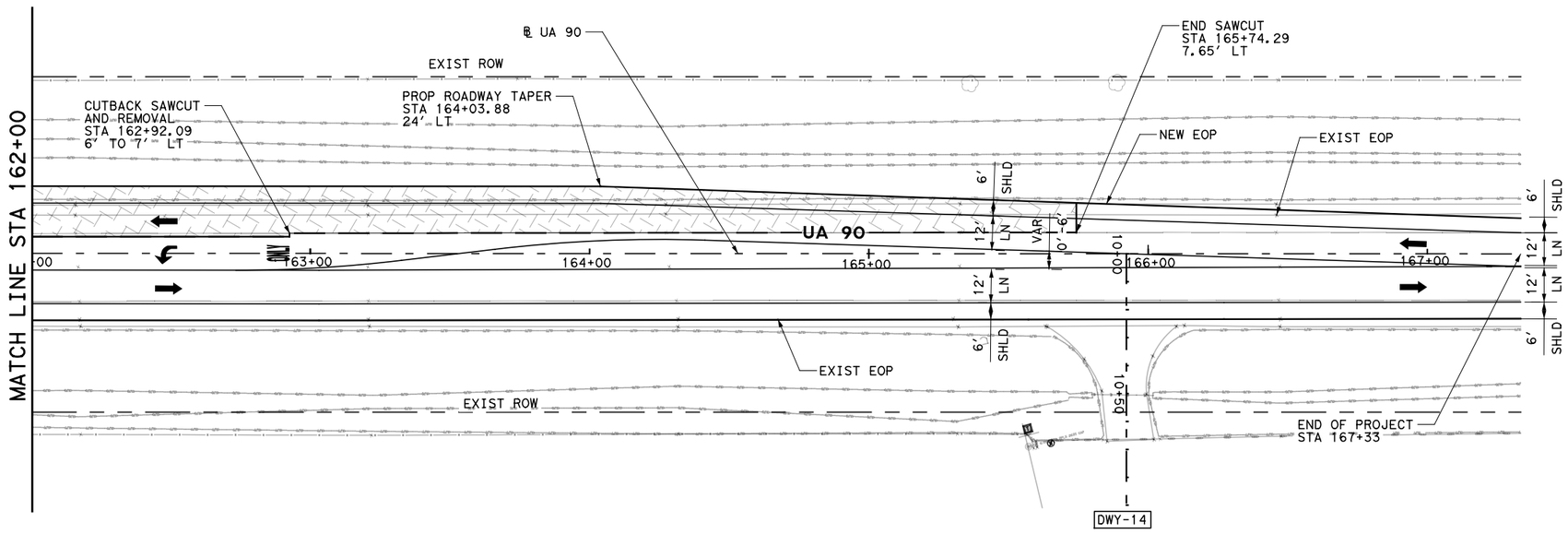


LEGEND

- EXISTING ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- PROPOSED WIDENING

ITEM	DESCRIPTION	UNIT	QUANTITY
100 6002	PREPARING ROW	STA	10
110 6001	EXCAVATION (ROADWAY)	CY	410
132 6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	727
216 6001	PROOF ROLLING	HR	2
247 6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	566
310 6027	PRIME COAT(MC-30 OR AE-P)	GAL	340
464 6018	RC PIPE (CL IV)(24 IN)	LF	0
464 6080	RC PIPE (ARCH)(CL V)(DES 3)	LF	0
467 6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	0
467 6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	0
530 6005	DRIVEWAYS (ACP)	SY	0
560 6003	MAILBOX INSTALL-M (TWG-POST) TY 1	EA	0
3076 6001	D-GR HMA TY-B PG64-22	TON	391
3076 6066	TACK COAT	GAL	255
3077 6021	SP MIXESSP-CPG70-22	TON	627
3085 6001	UNDERSEAL COURSE	GAL	1090



0' 25' 50'
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED
PROFESSIONAL ENGINEER
4/19/2023

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
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Houston, Texas 77079
(832) 619-1000
TBPE F-1640

Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

ROADWAY PLAN LAYOUT
STA 157+00 TO END

SHEET 7 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	75

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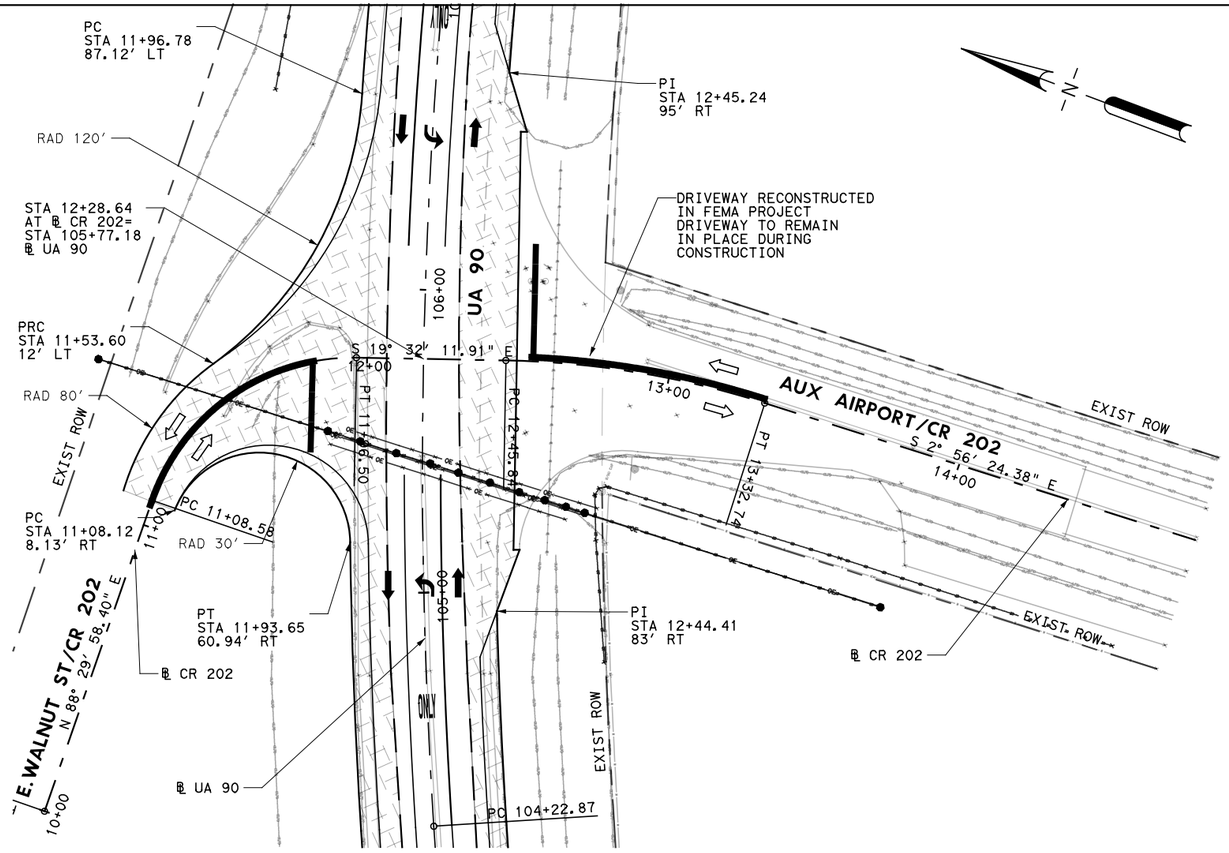

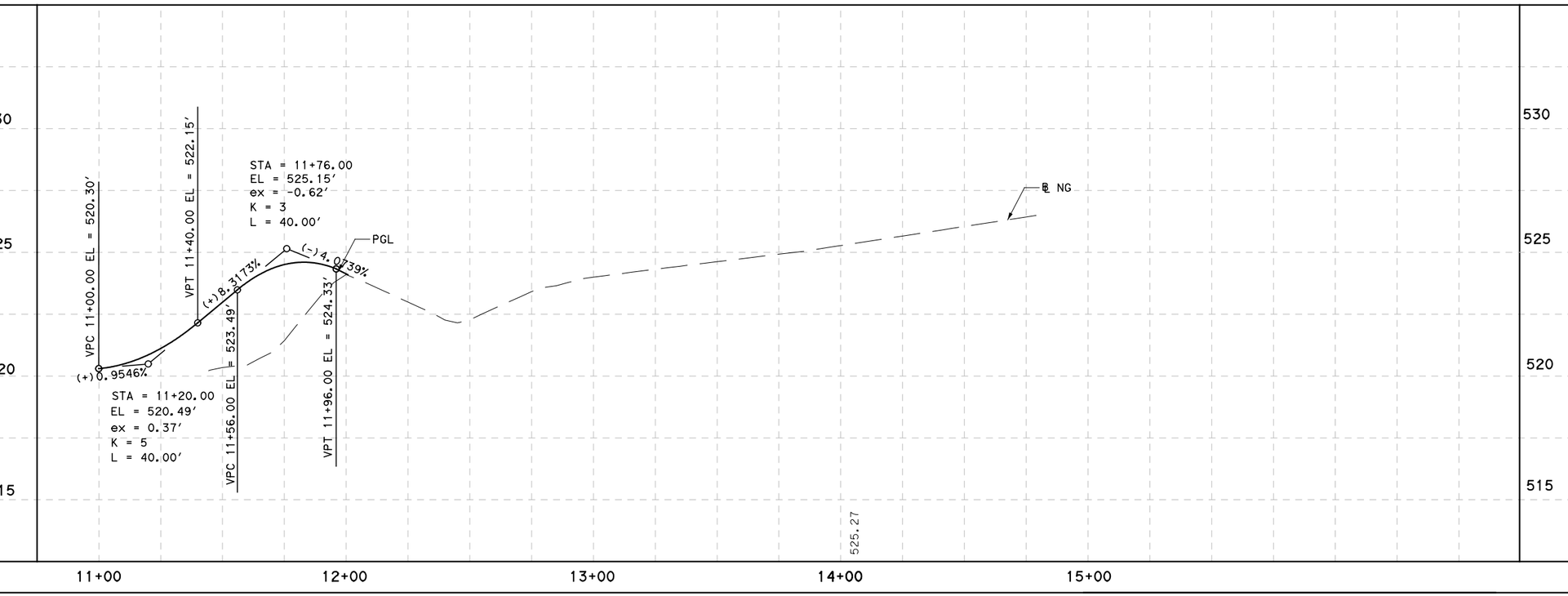

LEGEND

- EXISTING ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- PROPOSED WIDENING

HORZ 0' 50' 100'
VERT 0' 5' 10'
SCALE: IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
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REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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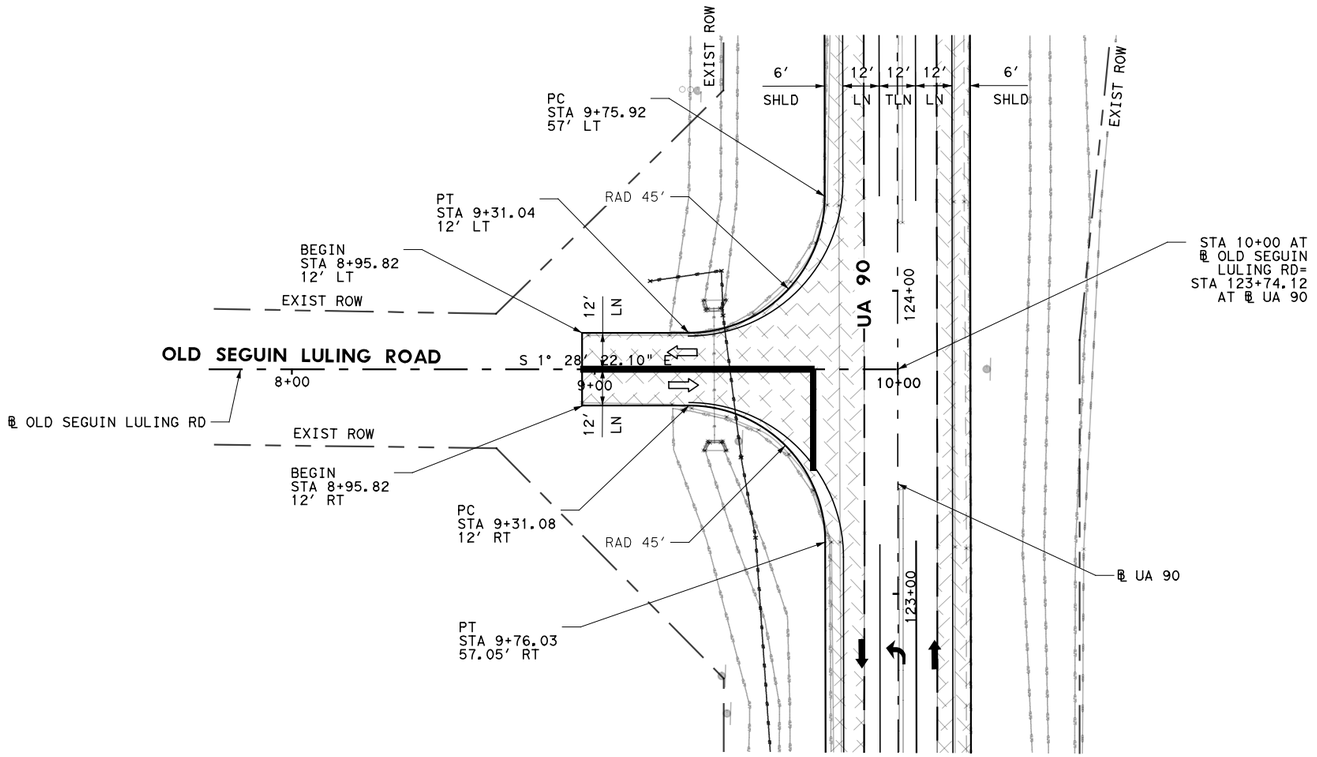
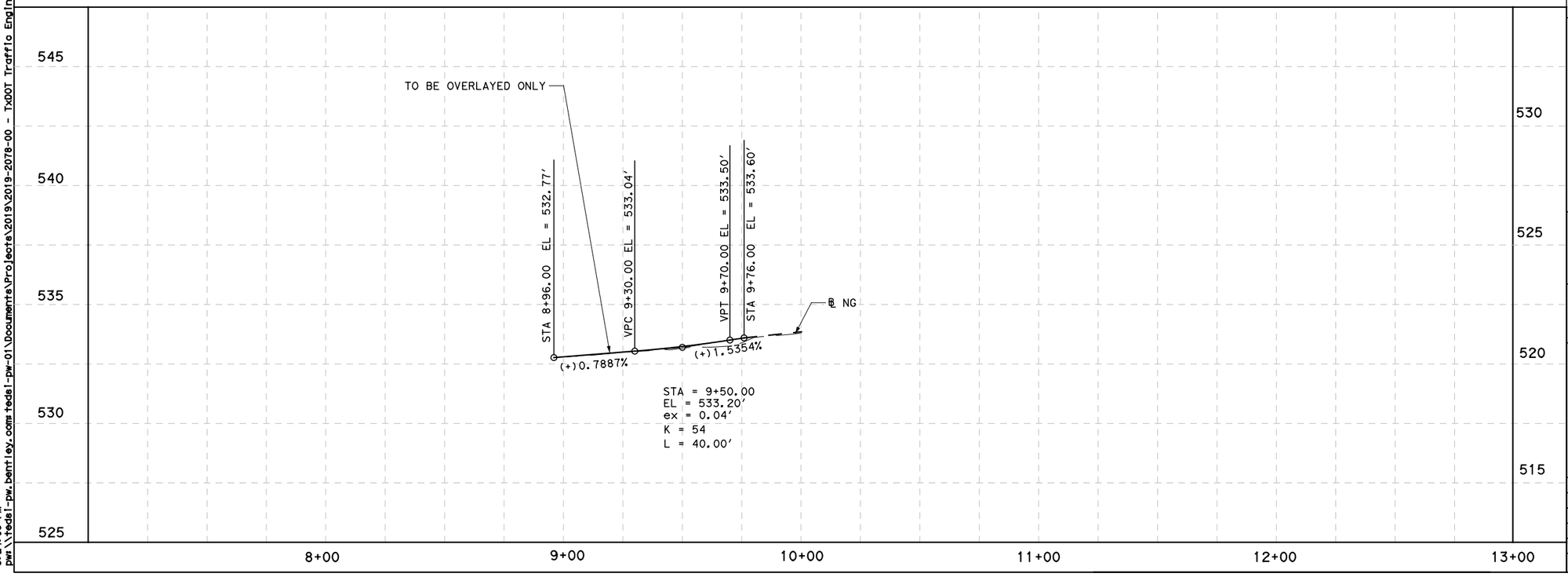
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

INTERSECTION LAYOUT
STA 10+00 TO STA 13+73.44

SHEET 1 OF 3

6			UA 90
TEXAS	SAT	GUADALUPE	
0025	04	051	76





LEGEND

- EXISTING ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- PROPOSED WIDENING

N

HORZ 0' 50' 100'
VERT 0' 5' 10'
SCALE: IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
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REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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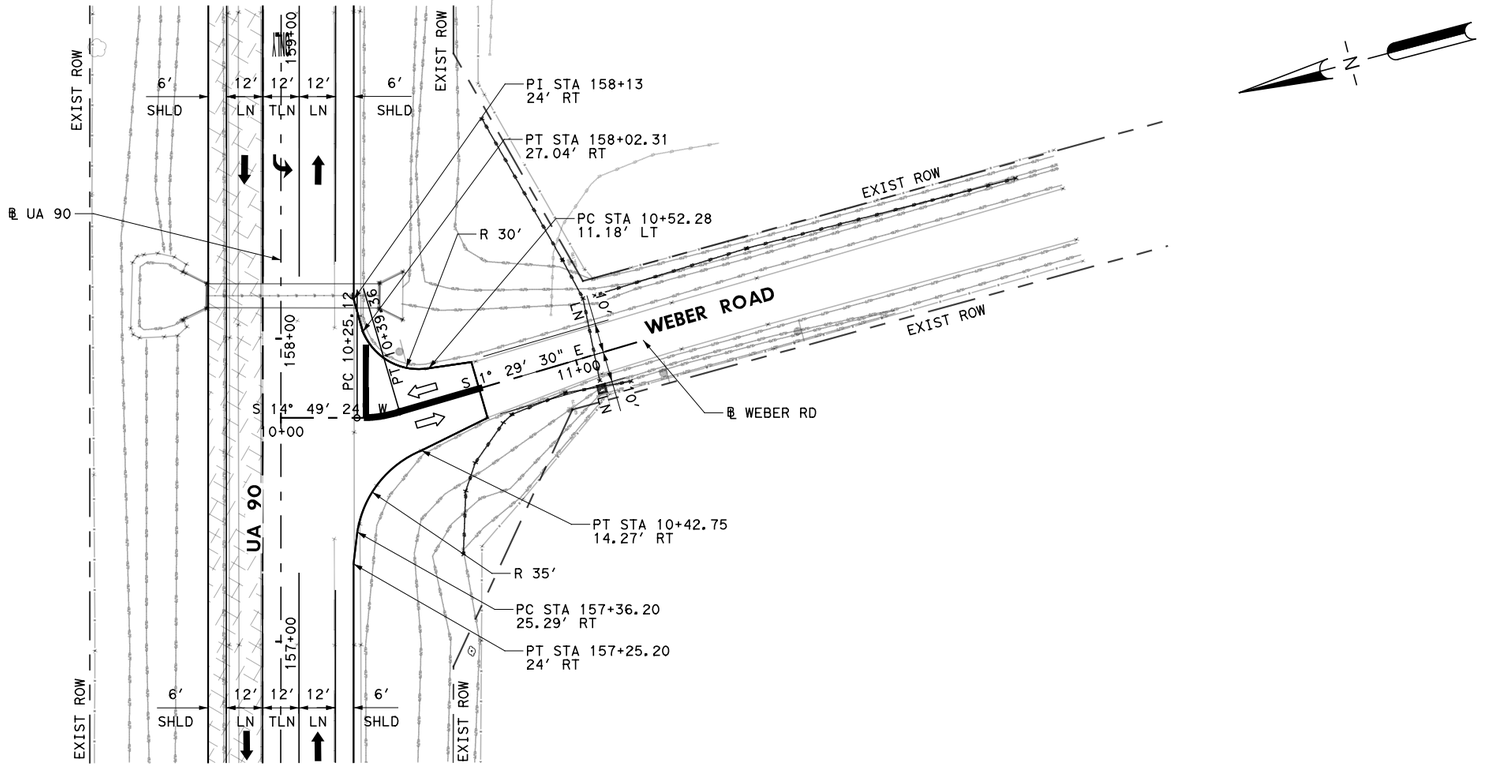
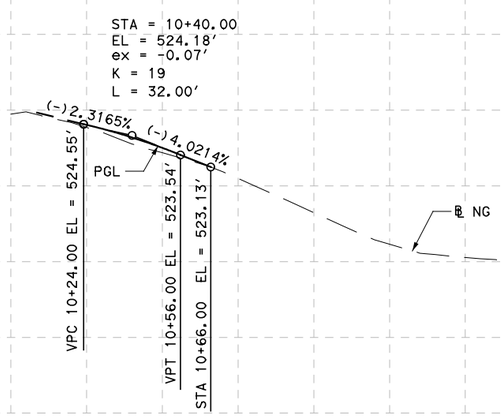
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

INTERSECTION LAYOUT
STA 10+00 TO STA 11+00

SHEET 2 OF 3

6			UA 90
TEXAS	SAT	GUADALUPE	
0025	04	051	77





LEGEND

- EXISTING ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER
- PROPOSED WIDENING

HORZ 0' 50' 100'
VERT 0' 5' 10'
SCALE: IN FEET

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4/19/2023

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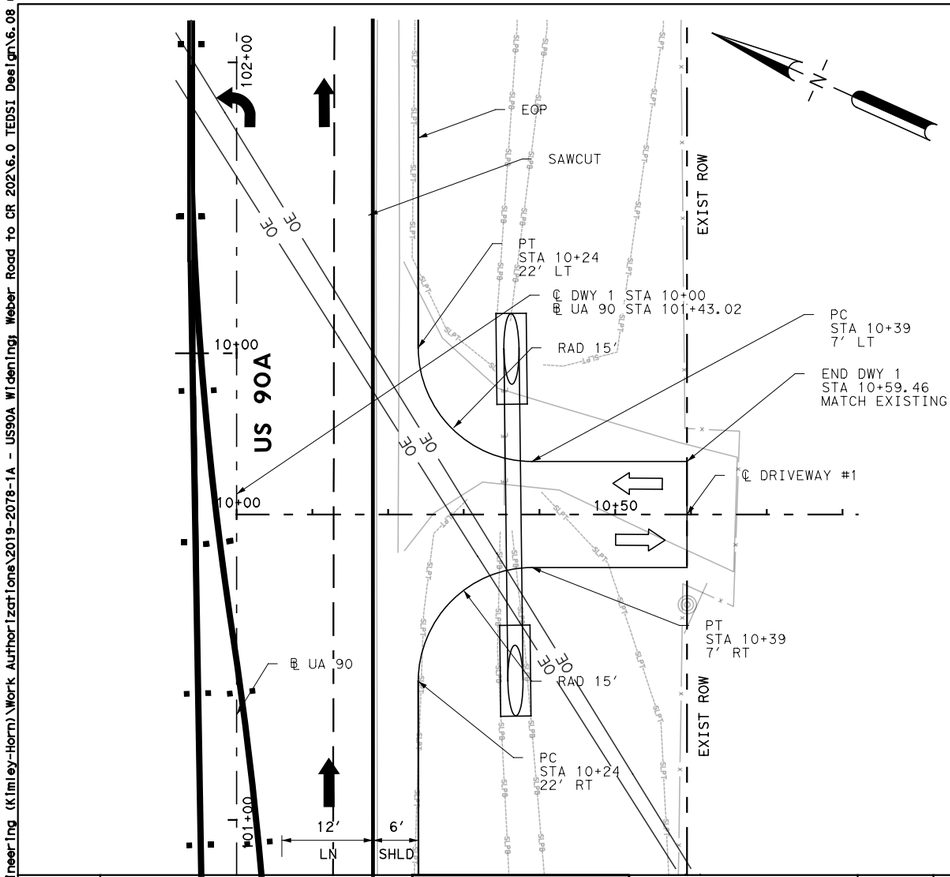
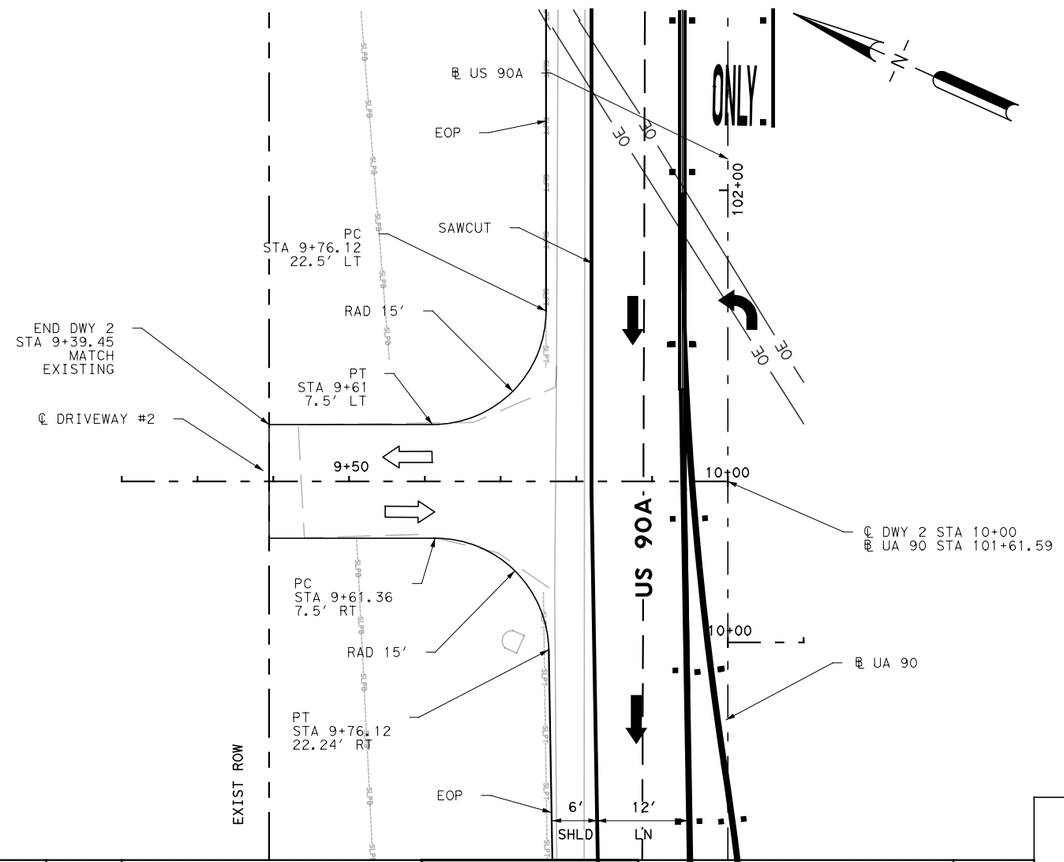
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

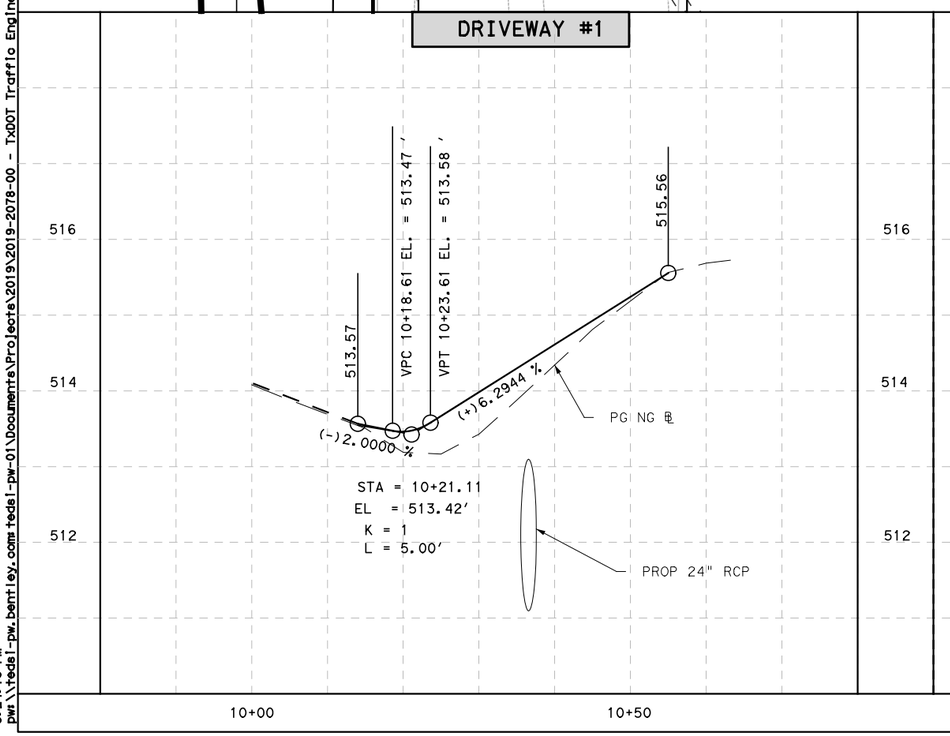
INTERSECTION LAYOUT
STA 10+00 TO STA 11+24.84

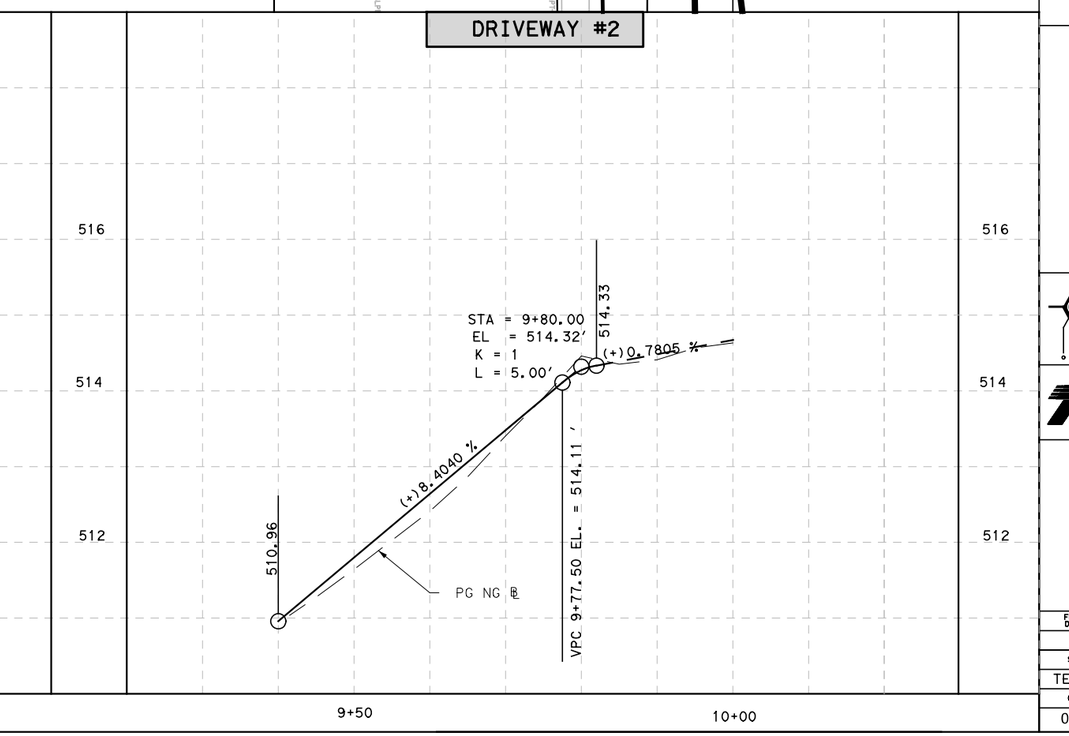
SHEET 3 OF 3

6			UA 90
TEXAS	SAT	GUADALUPE	
0025	04	051	78









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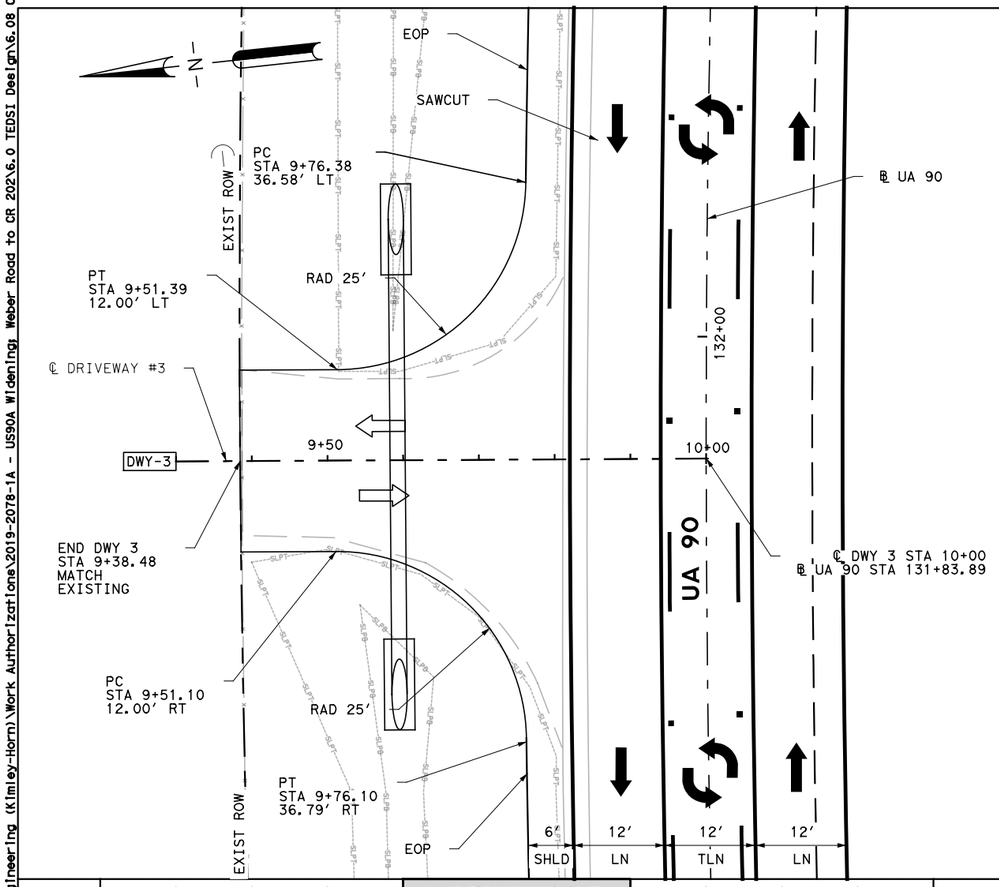
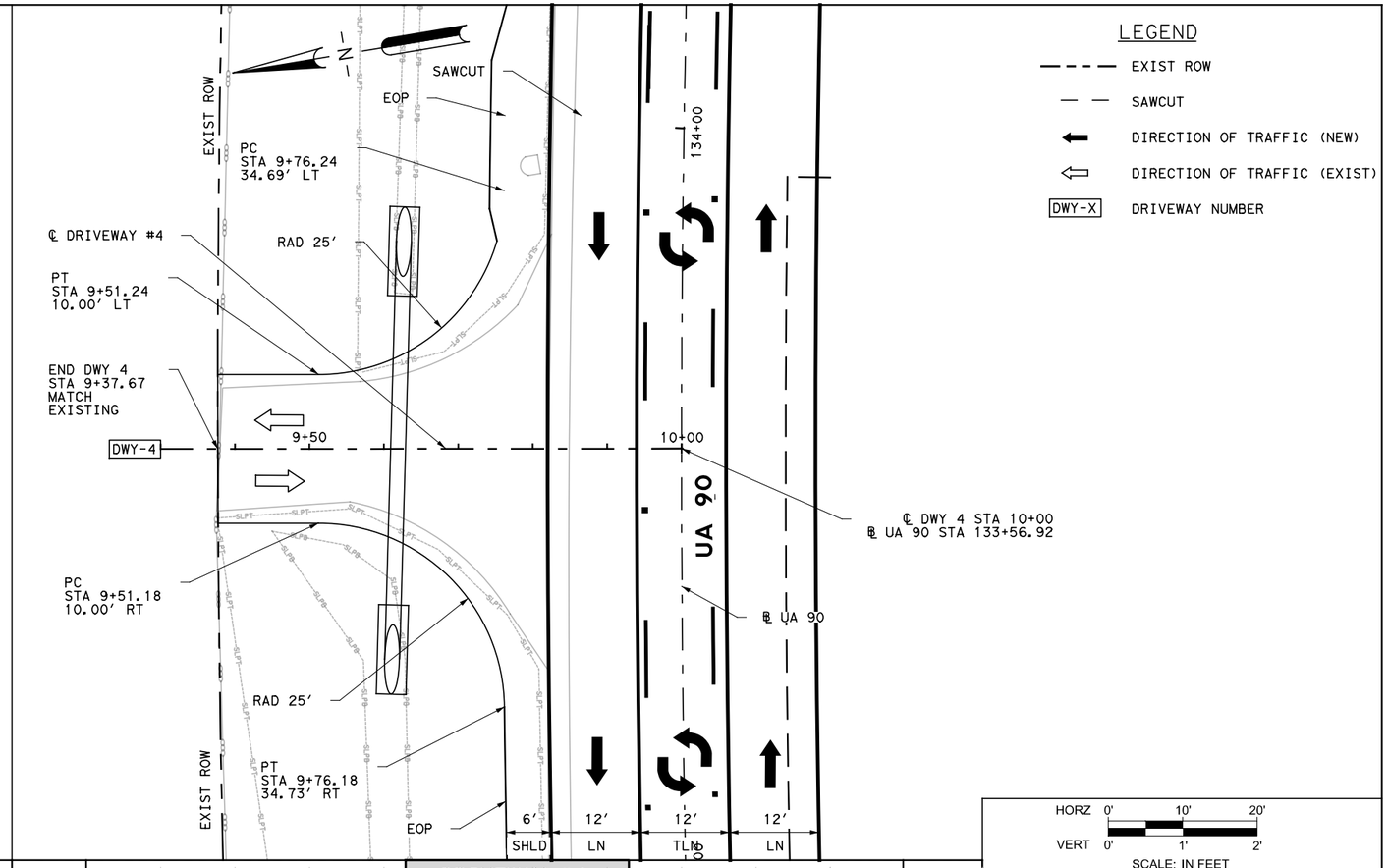
Texas Department of Transportation

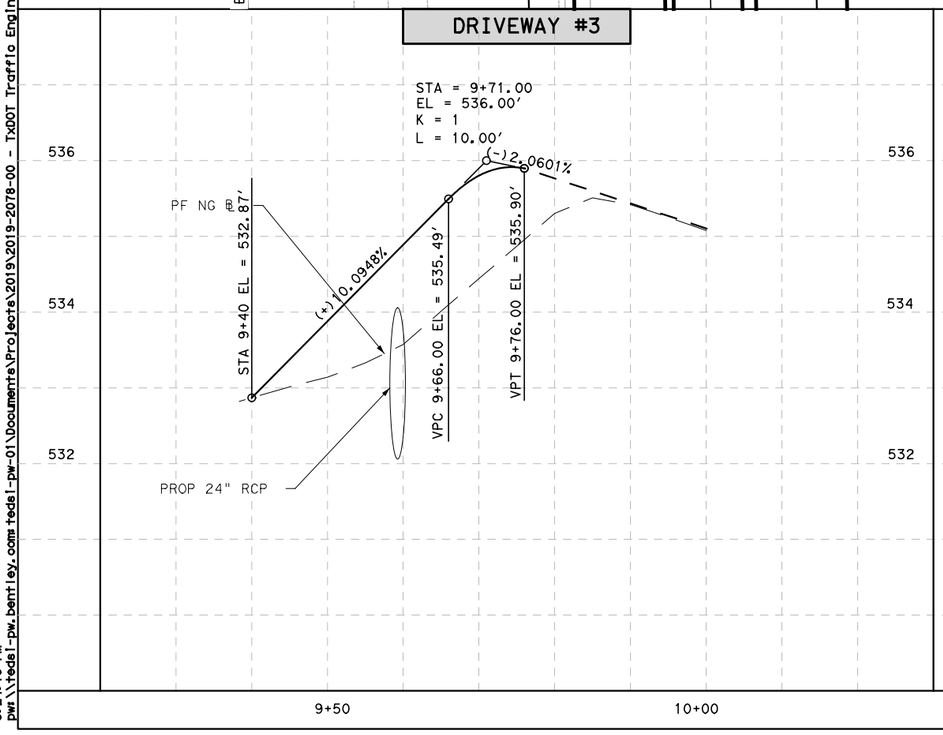
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD
DRIVEWAY
PLAN AND PROFILE

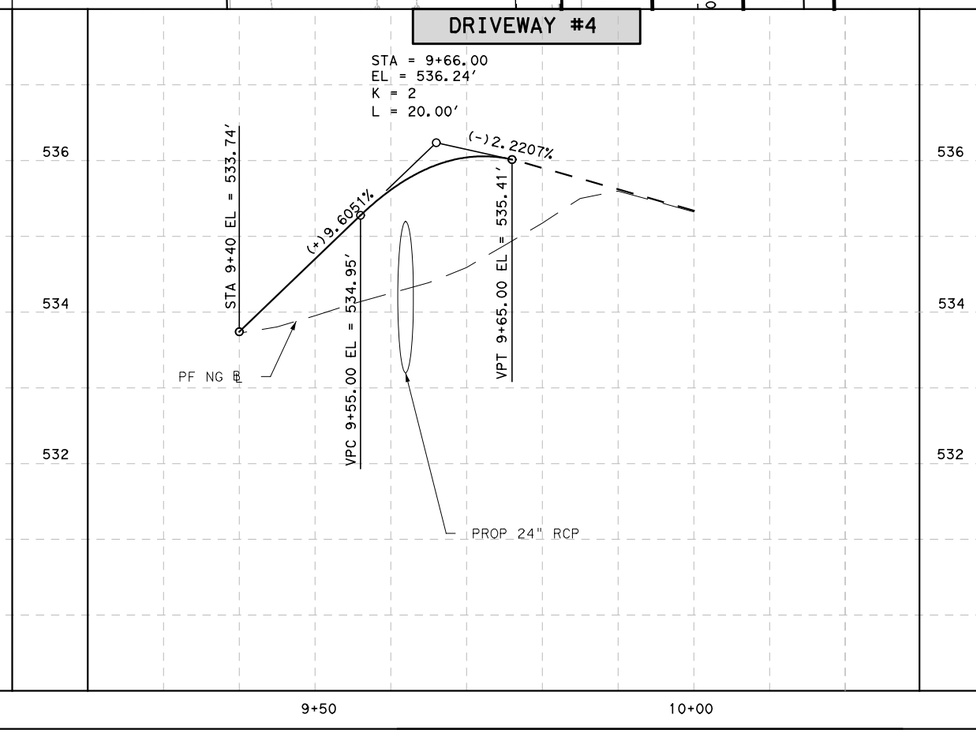
SHEET 1 OF 6

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	79









LEGEND

- EXIST ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER

HORZ 0' 10' 20'
VERT 0' 1' 2'
SCALE: IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
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4/19/2023

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Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD
DRIVEWAY
PLAN AND PROFILE

SHEET 2 OF 6

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	80

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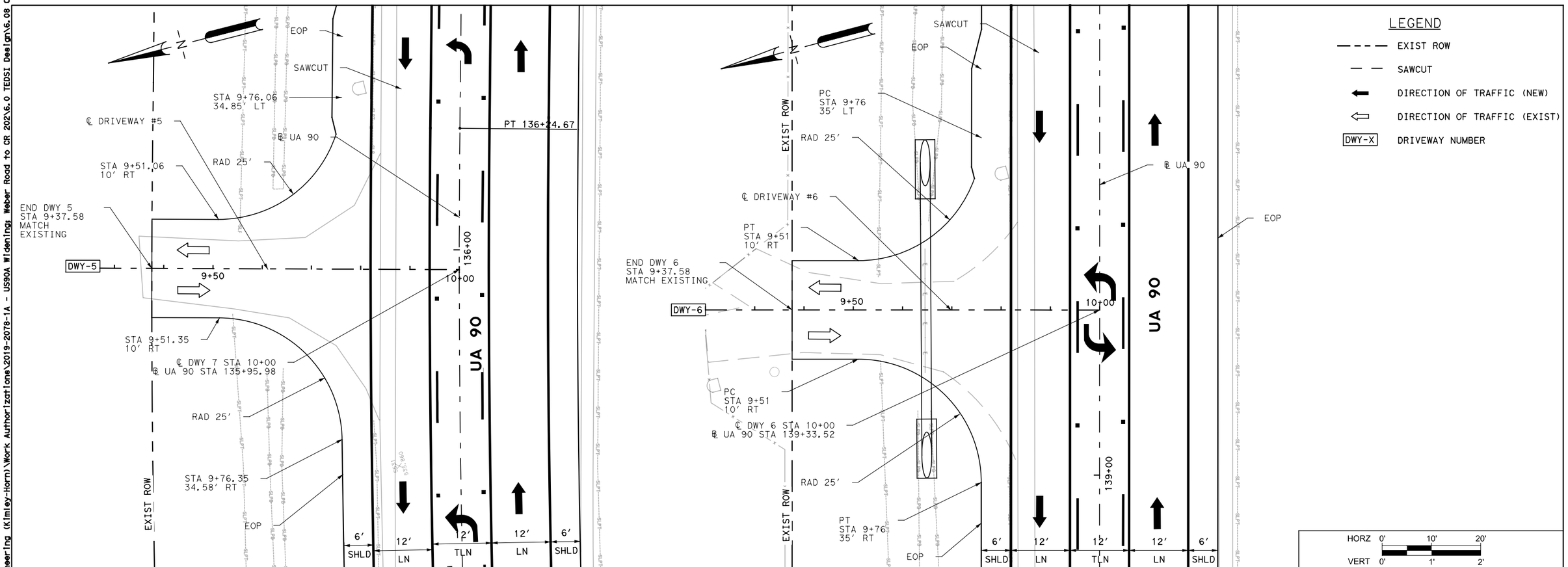
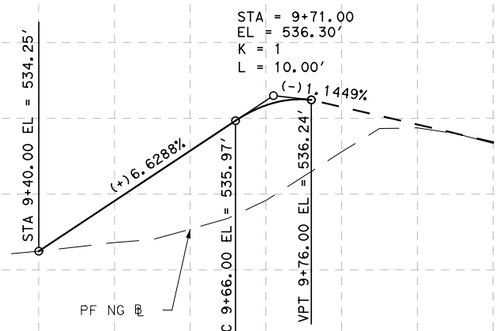
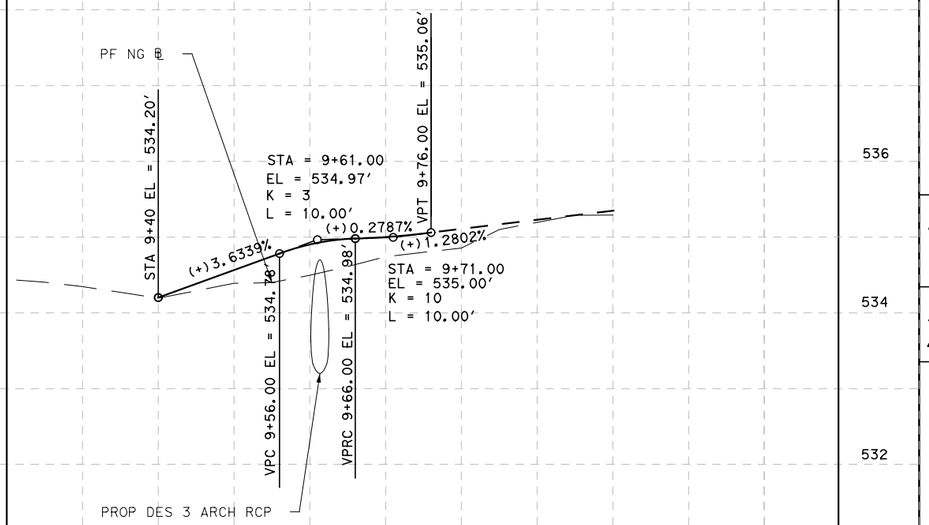


DRIVEWAY #5



DRIVEWAY #6



PAUL E. BRIGHT
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STATE OF TEXAS
4/19/2023

TEDSI INFRASTRUCTURE GROUP
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738 Hwy 6 South, Suite 430
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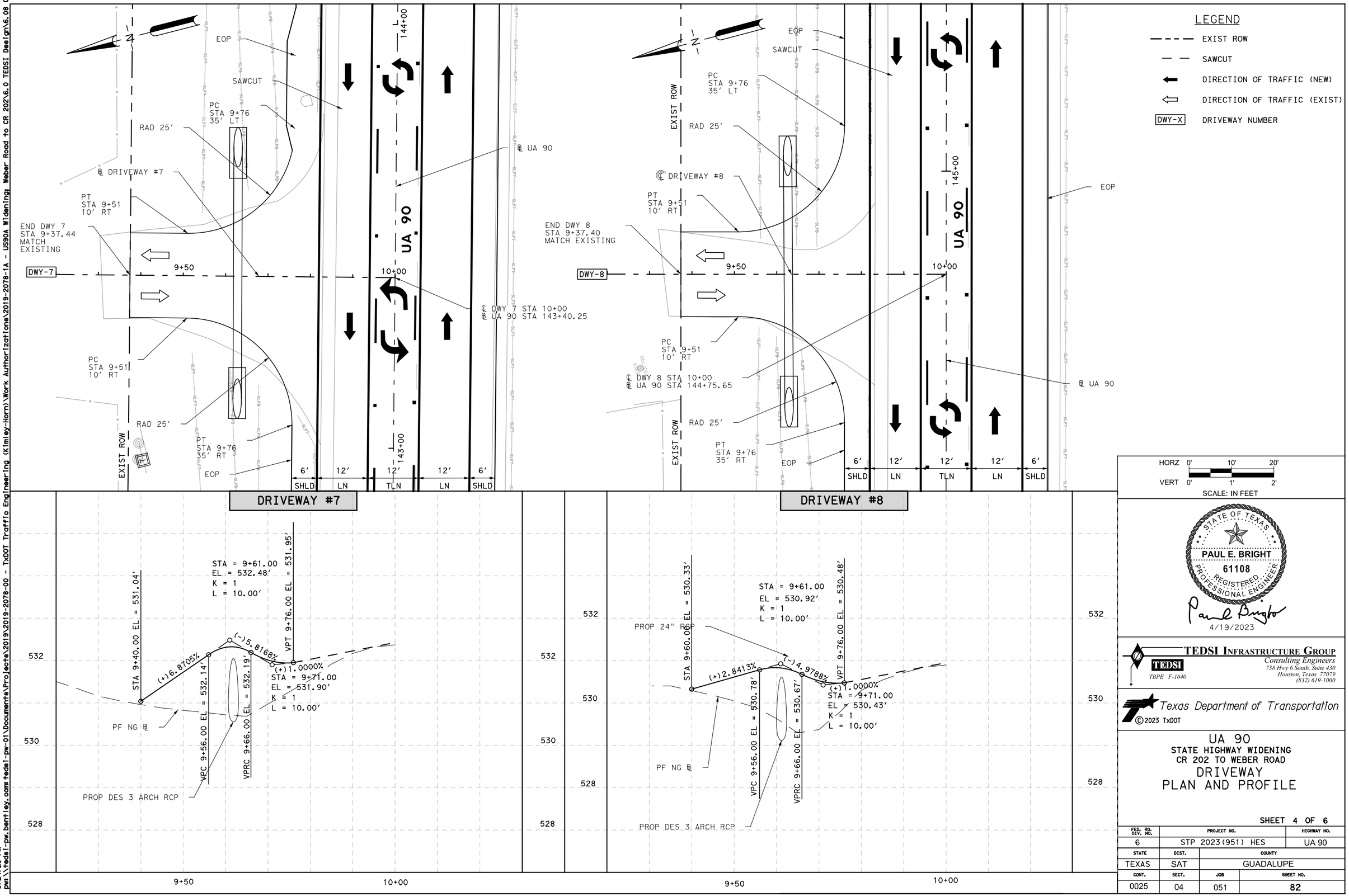
Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD
DRIVEWAY
PLAN AND PROFILE

SHEET 3 OF 6

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	81



DRIVEWAY #7

DRIVEWAY #8

LEGEND

- EXIST ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DWY-X — DRIVEWAY NUMBER

HORZ 0' 10' 20'
VERT 0' 1' 2'
SCALE: IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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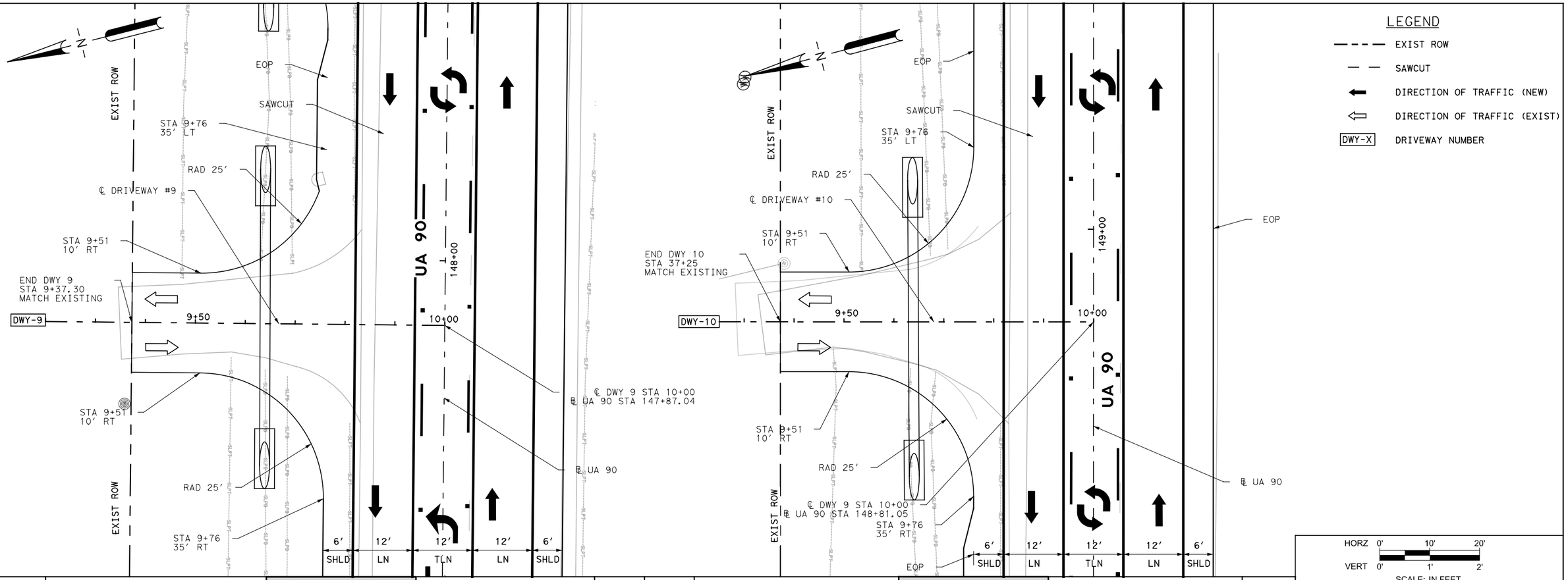
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD
DRIVEWAY
PLAN AND PROFILE

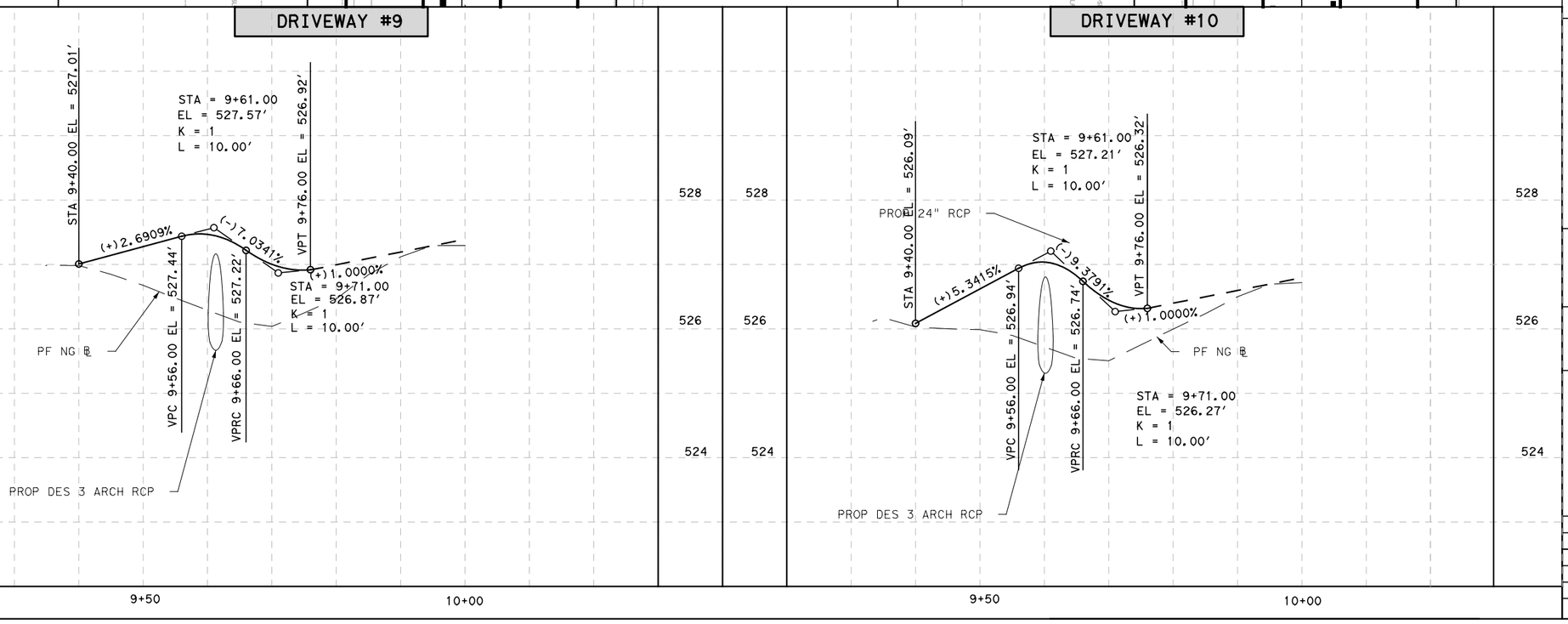
SHEET 4 OF 6

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	STP 2023(951) HES	UA 90

STATE	DIST.	COUNTY
TEXAS	SAT	GUADALUPE

CONT.	SECT.	JOB	SHEET NO.
0025	04	051	82





PAUL E. BRIGHT
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REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
4/19/2023

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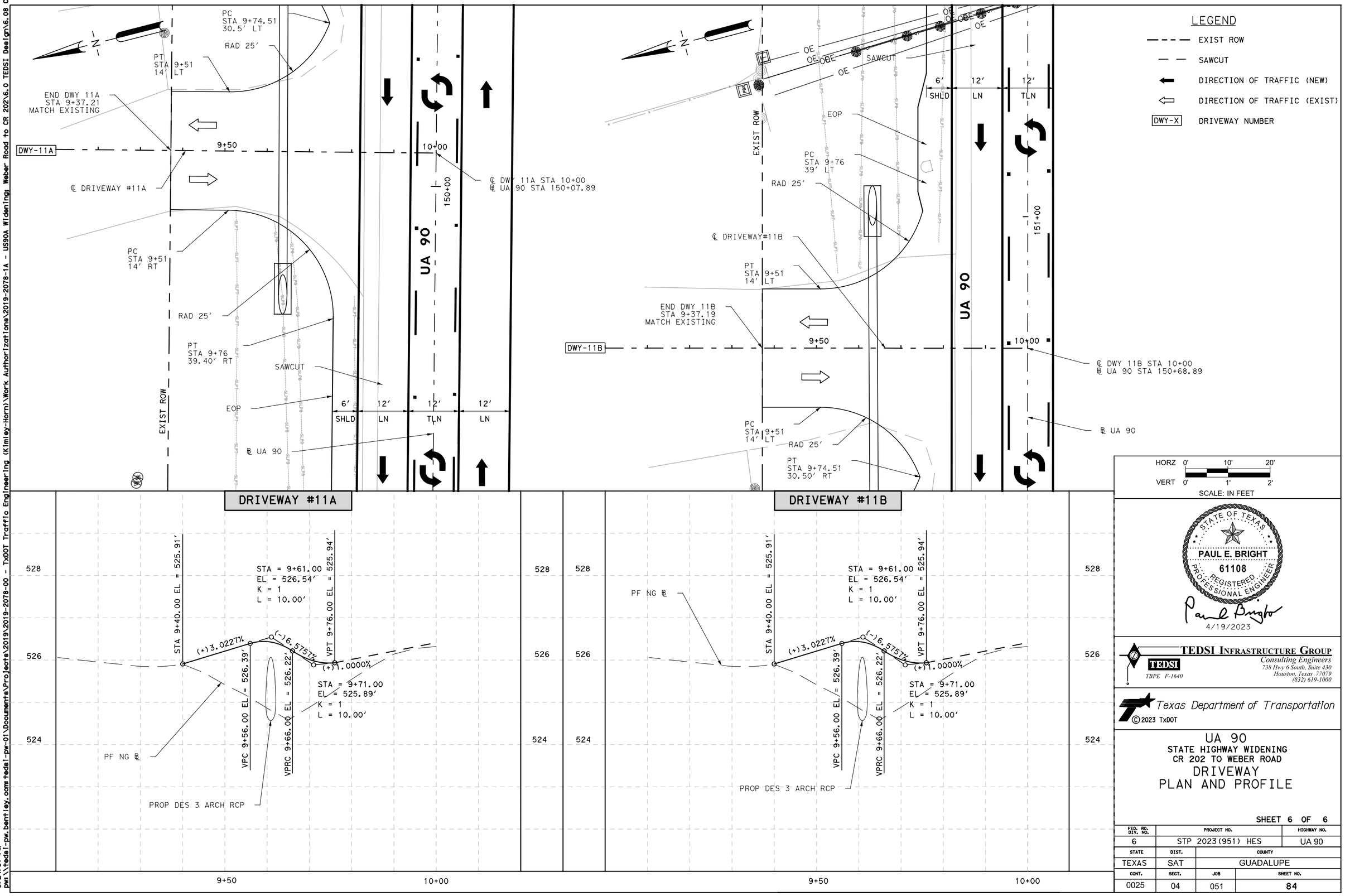
(832) 619-1000
TBPE F-1640

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD
DRIVEWAY
PLAN AND PROFILE

SHEET 5 OF 6

FED. RD. DIST. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	83



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Texas Department of Transportation

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CR 202 TO WEBER ROAD
DRIVEWAY
PLAN AND PROFILE

SHEET 6 OF 6

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	84

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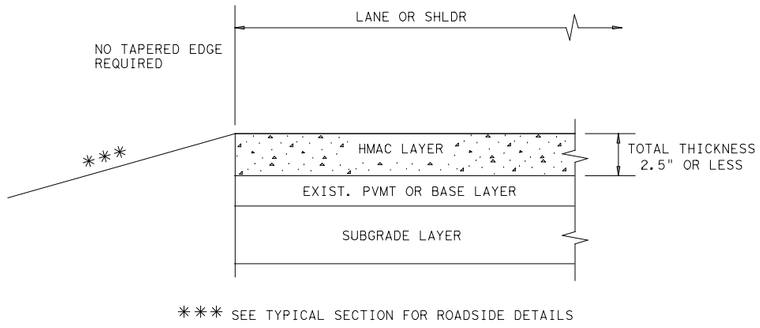
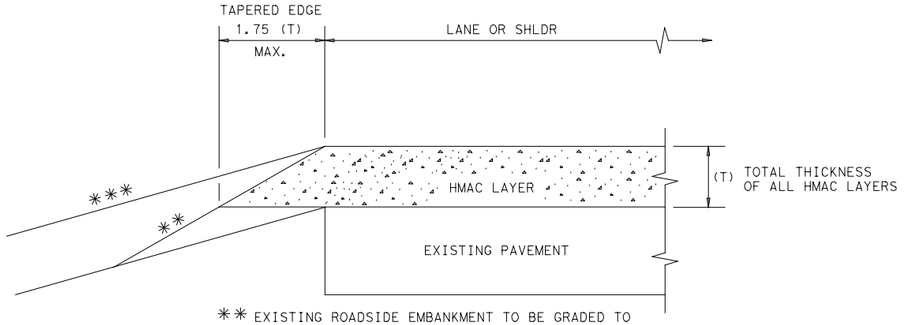


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

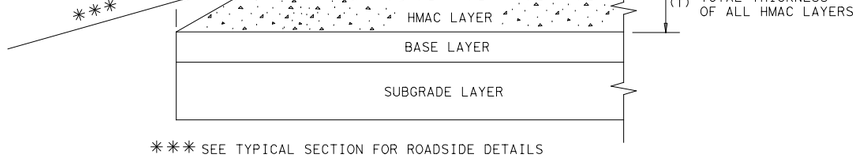
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

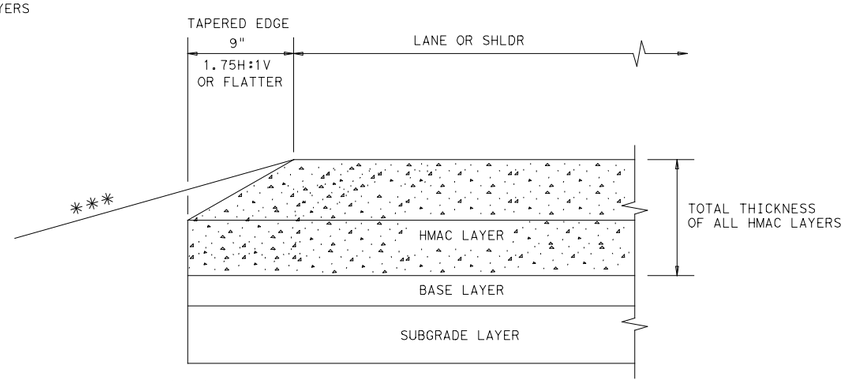
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 5" OR GREATER

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

(NOT TO SCALE)

Texas Department of Transportation | Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:
©TxDOT January 2011 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0025	04	051	UA 90
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		87

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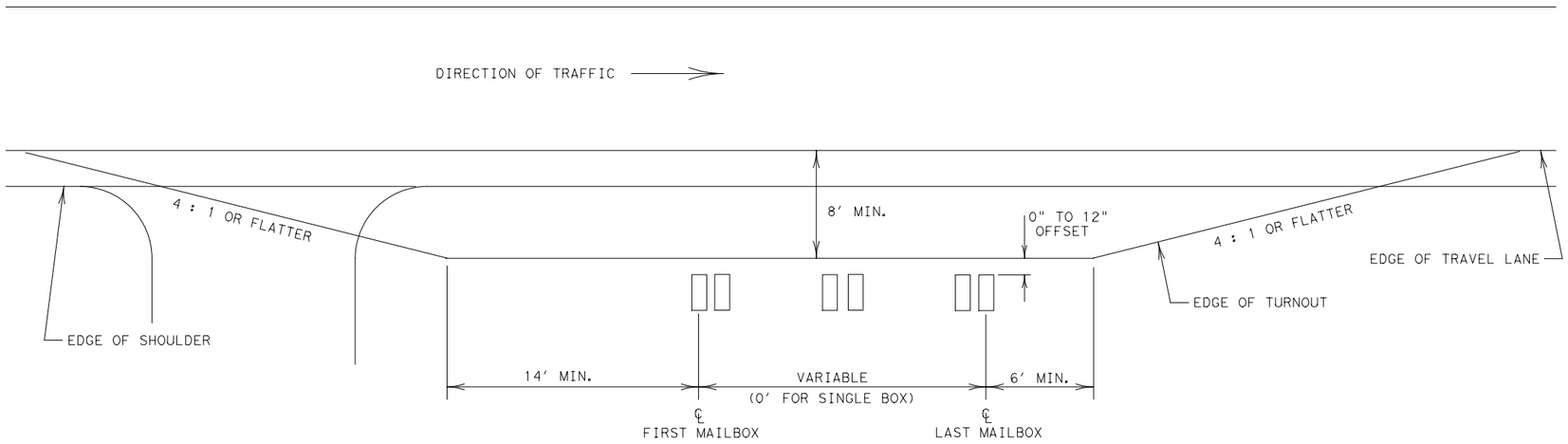
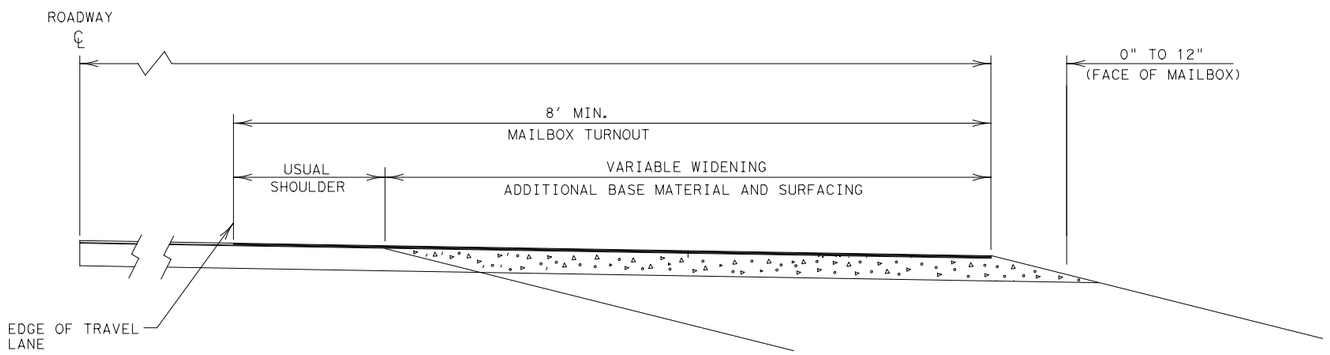
Date:
Time: 2:15 PM
File: E:\tedsi-pw.bentley.com:tedsi-pw-01\Documents\Projects\2019\2019-2078-00 - TxDOT Traffic Engineering (Kimley-Horn)\Work Authorizations\2019-2078-1A - US90A Widening, Weber Road to CR 202\6.0 TEDSI Design\6.08 CADD



PLAN



TYPICAL SECTION

SUMMARY OF MAILBOX TURNOUTS

LOACTION (STATION)	FLEX BASE	PRIME COAT	SURFACE TREATMENT	ASPHALTIC CONCRETE PAVEMENT	
133+90					
136+30					
139+60					
143+80					
148+15					
151+10					
TOTALS					

QUANTITIES INCLUDED WITH ROADWAY ITEMS

DESIGN DETAILS FOR TYPICAL MAILBOX TURNOUTS

MBTRNOUT

FILE: mbtrnout.dgn	DN: TxDOT	CK:	DW:	CK:
©TxDOT 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		88

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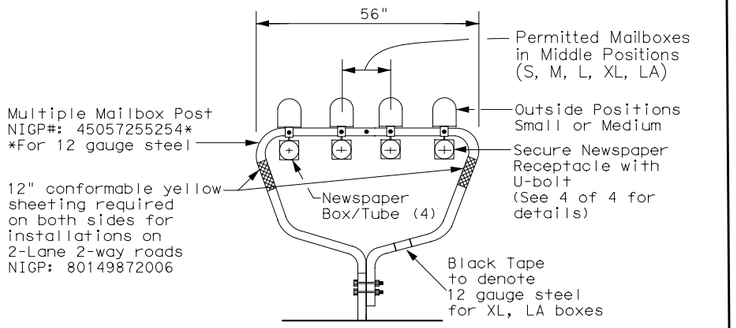
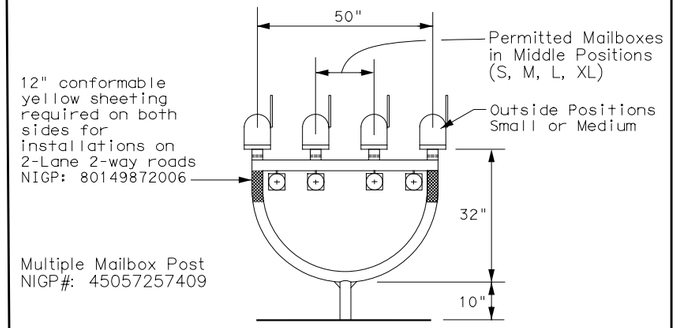
DATE:
FILE:

TYPE 1 - MULTIPLE



TYPE 4 - MULTIPLE



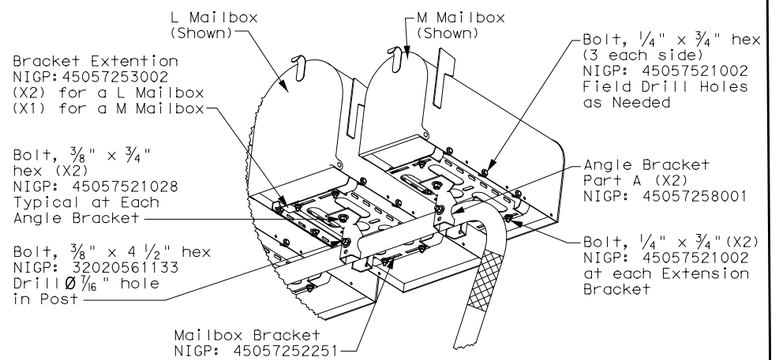
MAILBOX SIZES

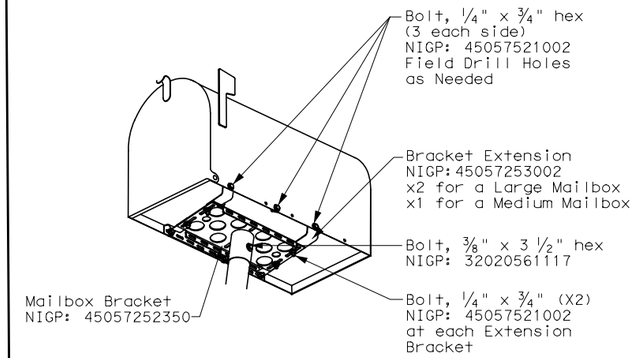
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX ** WEIGHT
	LENGTH	WIDTH	HEIGHT	
SMALL	19 ½"	6"	7"	6 LBS
MEDIUM	22 ½" *	8" *	11 ½" *	8 LBS
LARGE	23 ½"	11 ½"	13 ½"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 ½"	15"	23 LBS

* See Note 1.
** Excluding Molded Plastic on 4 X 4 Post

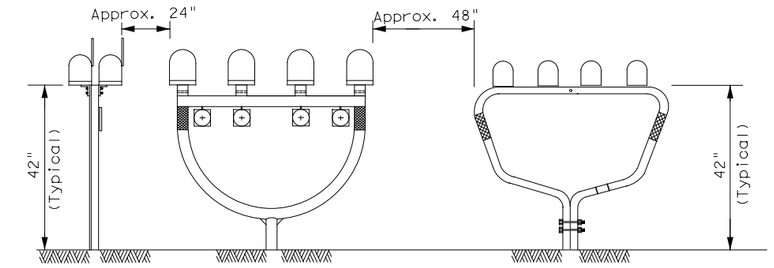
GENERAL NOTES:

1. Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
2. Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.



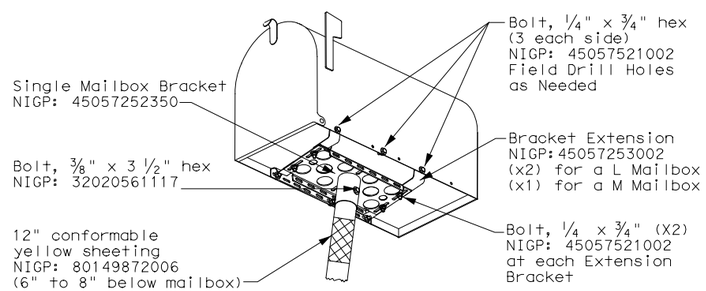


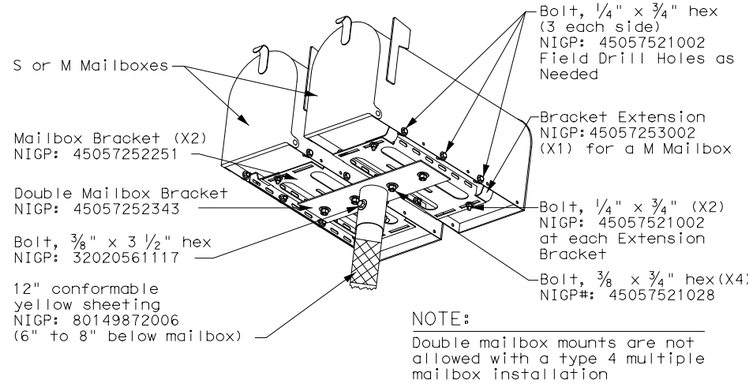
TYPICAL INSTALLATION MEASUREMENTS



NOTE:
Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Design Standard sheets PED-Pedestrian Facilities Curb Ramps.

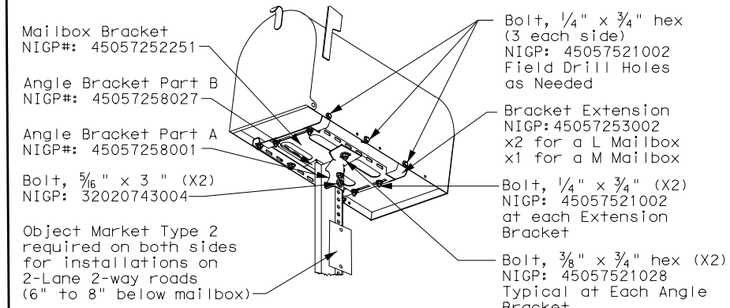
TYPE 2 and 4 - SINGLE/DOUBLE

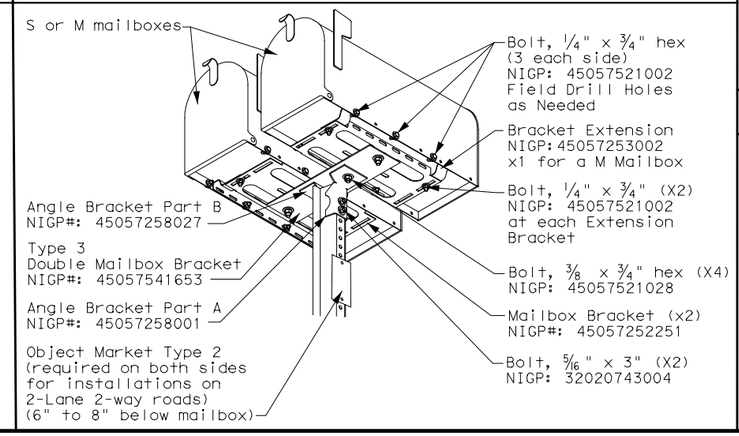




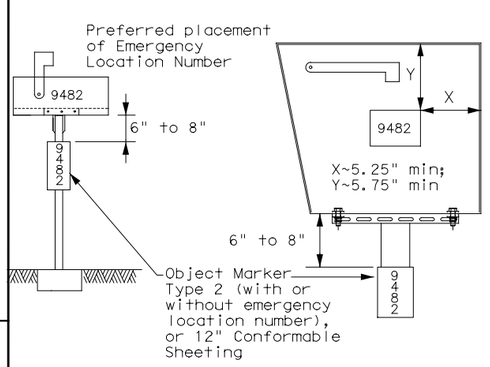
NOTE:
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

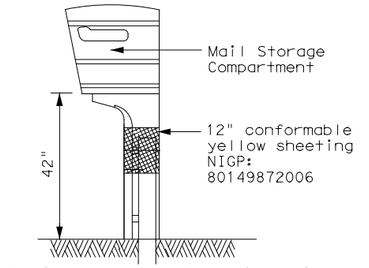


NOTES:

1. Location numbers are provided by homeowner. Minimum size 1" height.
2. Location number is typically placed on the mailbox in a contrasting color.
3. Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
4. Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
5. See 3 of 4 for Foundation details.
6. See 4 of 4 for Hardware details.

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation

Maintenance Division Standard

MAILBOX MOUNTING AND ASSEMBLY

MB(1)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0025	04	051	UA 90
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		89

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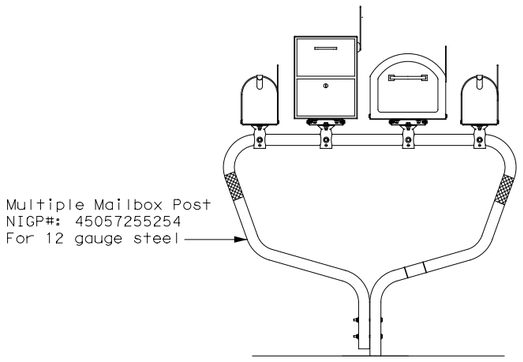
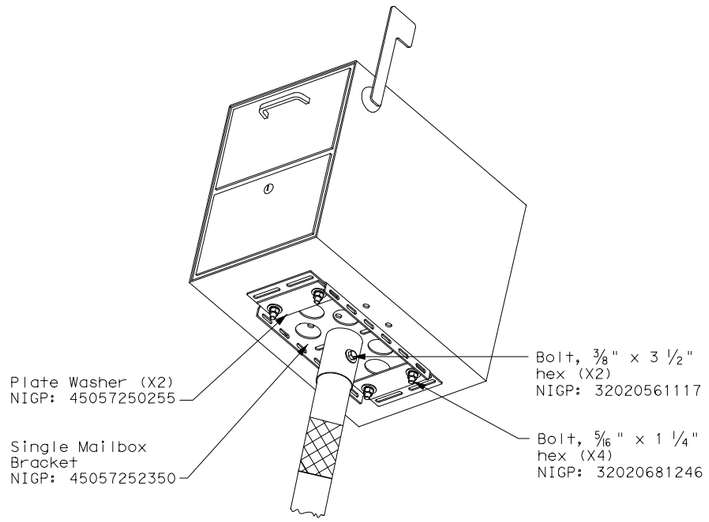
DATE:
FILE:

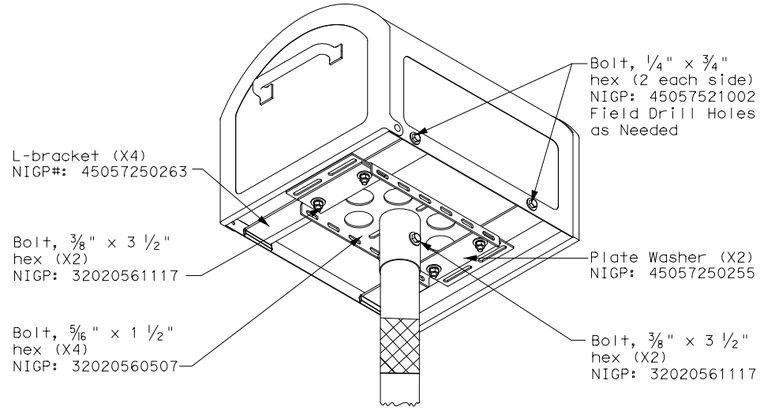
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

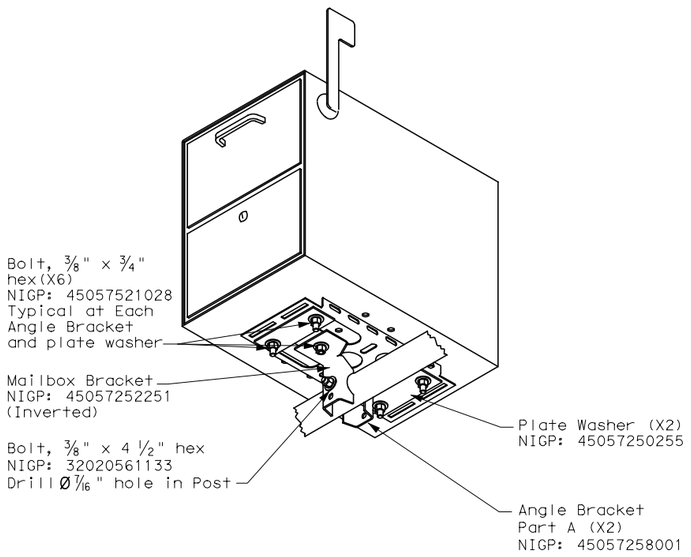


TYPE 2/4 - SINGLE XL MAILBOX

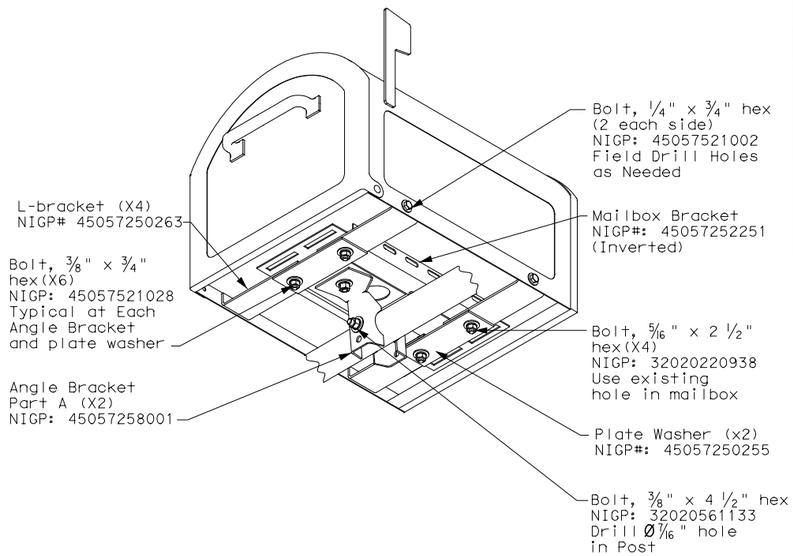


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

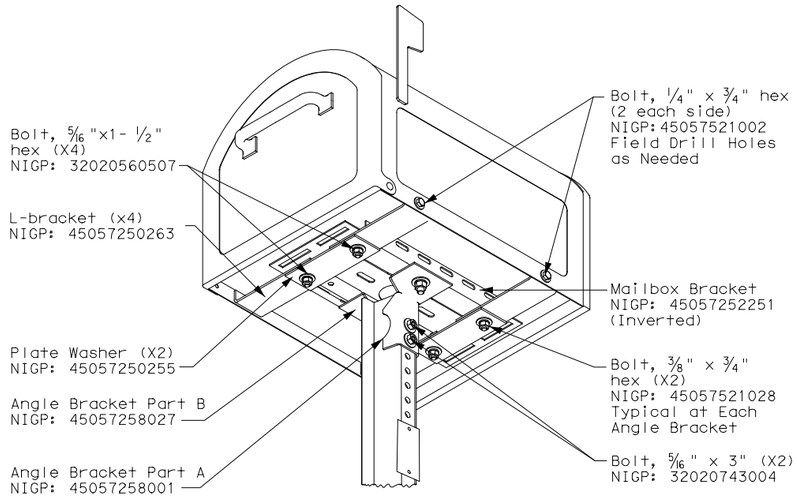
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation

Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

MB(2)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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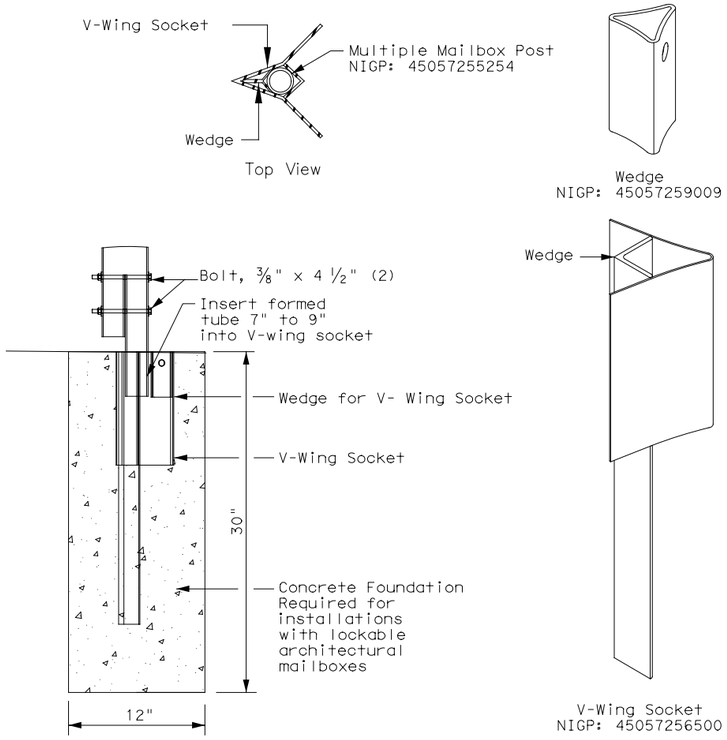
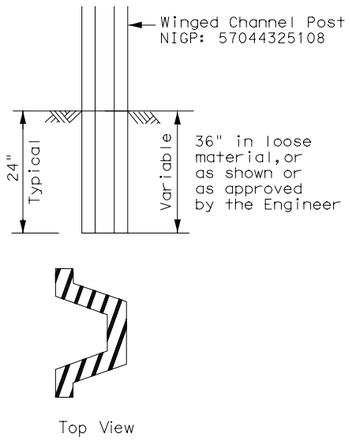
DATE:
FILE:

TYPE 1 - SUPPORT/FOUNDATION
Thin Wall Tube w/ V-LOC Anchorage

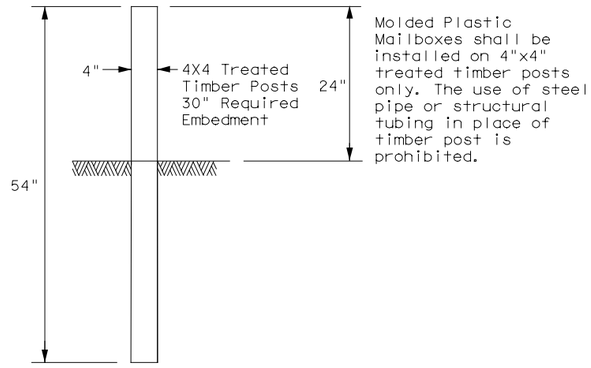


TYPE 3 - SUPPORT/FOUNDATION

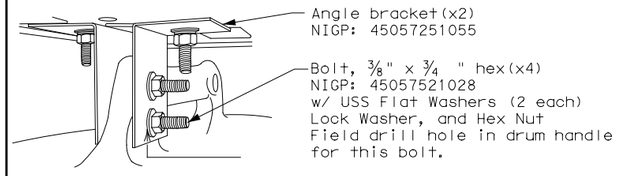


NOTES:
1. Attach Object Marker(OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT

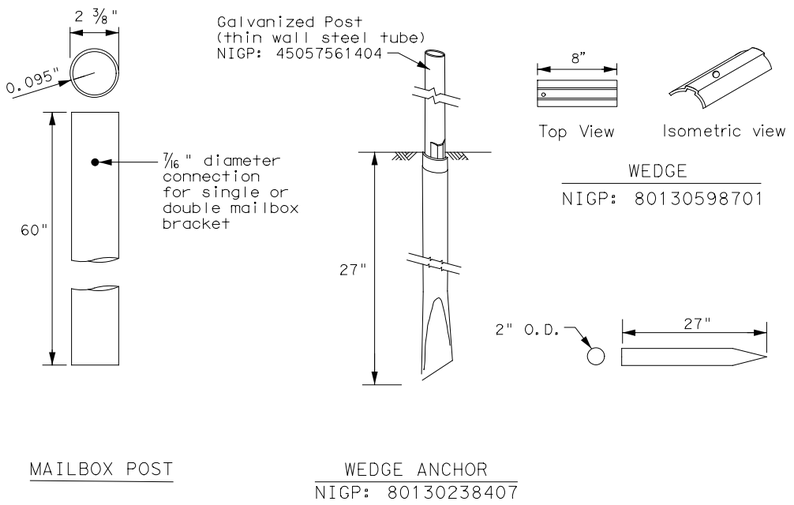


Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

NOTES:
1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

GENERAL NOTES:
1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

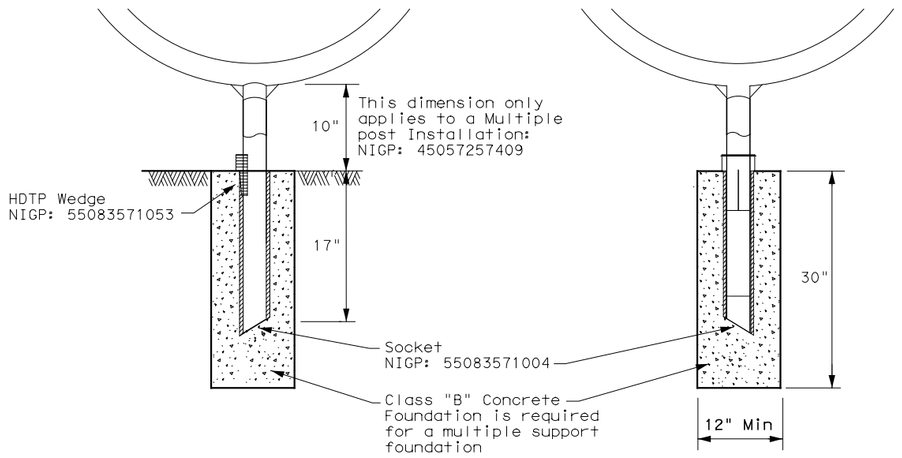
TYPE 2 - SUPPORT/FOUNDATION
Thin Wall Steel Tube w/Wedge Anchor System



MAILBOX POST

WEDGE ANCHOR
NIGP: 80130238407

TYPE 4 - SUPPORT/FOUNDATION
Whitecoated steel post NIGP: 45057561107
Multiple post NIGP: 45057257409
Recycled Rubber post (RR) NIGP: 45057561057



SHEET 3 OF 4

Texas Department of Transportation

Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

MB(3)-21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:
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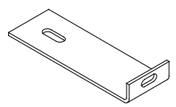
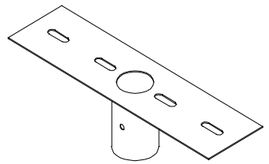
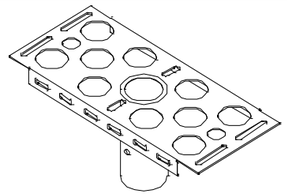
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL	Molded Plastic	S, or M
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Gavanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)	4x4 Timber	Construction Barrel
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket forXL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	None	45057251055 Angle Bracket (x2)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete	None	None



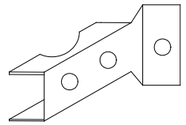
NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes



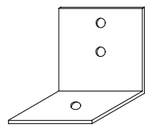
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount



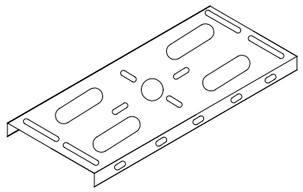
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



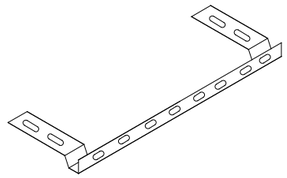
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



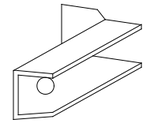
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



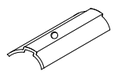
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



NIGP: 45057253002
Bracket Extension
Use 1 for a medium Mailbox
Use 2 for a Large Mailbox



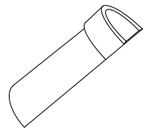
NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double



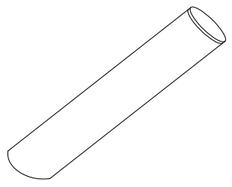
NIGP: 80130598701
Wedge for Type 2

NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes

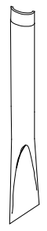
NIGP: 45057541653
Type 3 double mailbox bracket



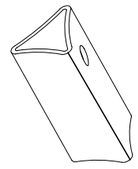
NIGP: 55083571053
Type 4 Mailbox Wedge



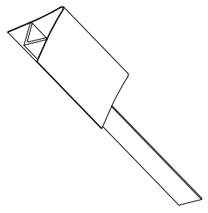
NIGP: 55083571004
Type 4 Mailbox Socket



NIGP: 80130238407
Type 2 Wedge Anchor



NIGP: 45057259009
Wedge for Type 1 V-wing Socket



NIGP: 45057256500
V-wing Socket for
Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts

NOTES:

1. Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
2. A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

BID CODES FOR CONTRACTS

MB-(X) ASSM TY (XXX) (X)

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- MP = Molded Plastic

Type of Post
- WC = Winged Channel Post
- RR = Recycled Rubber
- TWW = Thin Walled White Tubing
- TWG = Thin Walled Galvanized Tubing
- TIM = Timber

Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post

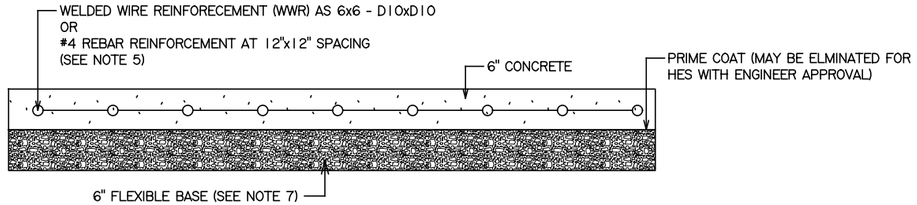
Texas Department of Transportation — Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

MB(4)-21

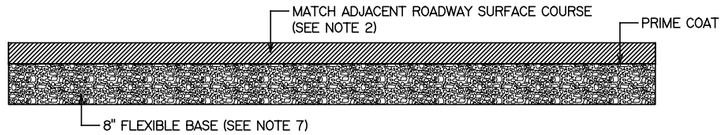
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		92

DATE:
FILE:



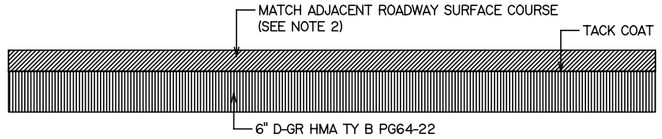
TYPICAL CONCRETE DRIVEWAY

* NOTE: STEEL SHALL BE CENTERED VERTICALLY IN CONCRETE.
PAID AS 'DRIVEWAYS CONC (HES)' OR 'DRIVEWAYS (CONC)'



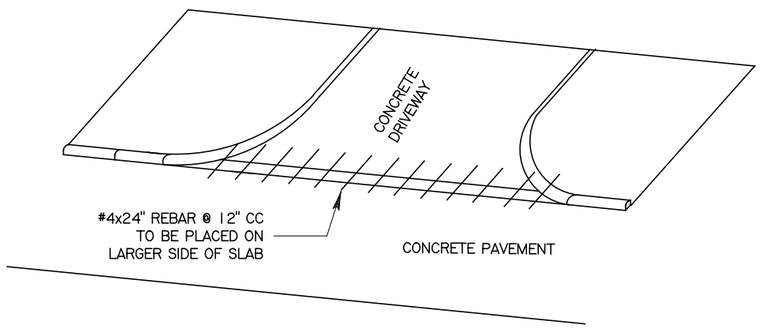
TYPICAL ROADWAY DRIVEWAY (TYPE 1)

PAID AS DRIVEWAYS ACP (TYPE 1)

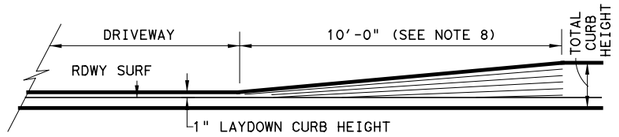


TYPICAL ROADWAY DRIVEWAY (TYPE 2)

PAID AS DRIVEWAYS ACP (TYPE 2)



TIE BAR PLACEMENT WITH CRCP



LAYDOWN CURB AT DRIVEWAYS DETAIL

NOTES:

1. USE CLASS A CONCRETE UNLESS OTHERWISE NOTED.
2. DENSE GRADED HMA MAY BE USED WHEN APPROVED BY THE ENGINEER IF THE ROADWAY SURFACE COURSE IS A PERFORMANCE MIX.
3. REFER TO PLAN SHEETS FOR GEOMETRIC DESIGN DETAILS.
4. FOR CONCRETE DRIVEWAYS, PROVIDE EXPANSION JOINT 20 FT C-C FOR WIDTH OR LENGTH OVER 25 FT.
5. FIBER REINFORCEMNT IS NOT ALLOWED.
6. MACHINE LAID HMA IS REQUIRED UNLESS OTHERWISE APPROVED BY THE ENGINEER.
7. FURNISH BASE MEETING THE REQUIREMENTS FOR ANY TYPE OF GRADE IN ACCORDANCE WITH ITEM 247. FLEXIBLE BASE COMPRESSIVE STRENGTHS ARE WAIVED. BASE IS SUBSIDIARY TO THE ITEM.
8. WHERE SIDEWALK IS PRESENT, SLOPE AND LENGTH OF CURB TRANSITION SHOULD MATCH THE SIDEWALK AND MEET ADA REQUIREMENTS.
9. IF ROOTS ARE ENCOUNTERED VERIFY WITH THE ENGINEER PRIOR TO ACCOMODATING OR REMOVING 2 IN. DIAMETER OR LARGER ROOTS. ROOT REMOVAL MUST BE IN ACCORDANCE WITH ITEM 752.4.2. ROOTS MAY REMAIN IN THE BASE. FOR IMPROVEMENTS WITHIN 6 IN. OF A ROOT, THE CONCRETE THICKNESS MAY BE REDUCED BY 1 IN. AND THE BASE INCREASED BY 1 IN. TO MINIMIZE THE IMPACT TO THE ROOTS. ADJUST BASE AND SURFACE PROFILE TO PROVIDE A 1 IN. BASE CUSHION AROUND THE ROOTS. THE SURFACE PROFILE MAY BE ADJUSTED TO THE EXTENT ALLOWED BY ADA. THIS WORK IS SUBSIDIARY.

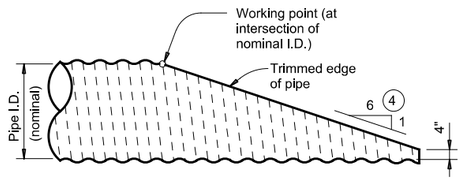
Texas Department of Transportation
San Antonio District

DRIVEWAY DETAILS

San Antonio District Standard
Sheet (1 of 1)

T:Engdata/Standards/Drivewaydetails.dgn	PREPARED BY AND FOR USE OF TxDoT.					
ORIGINAL DRAWING DATE: 8/1/2020	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #			SHEET
REVISIONS	SAT	6				93
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	GUADALUPE		0025	04	051	UA 90

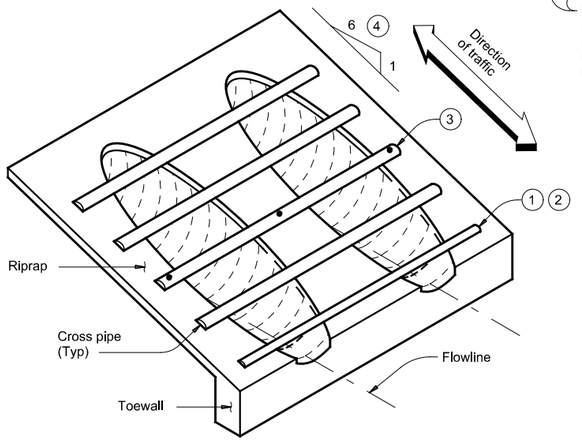
4/20/2023
DATE:
FILE: \\eds1-pw.bentley.com\eds1-pw-01\Documents\Projects\2019\2019-2078-00 - TxDOT Traffic Engineer Program - US90A Widening; Weber Road to CR 2026\0 TEDSI Design\6.08 CADD\



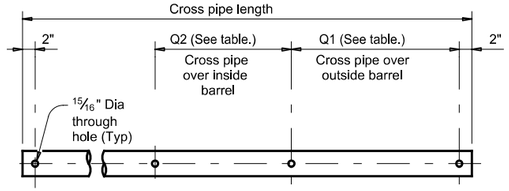
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

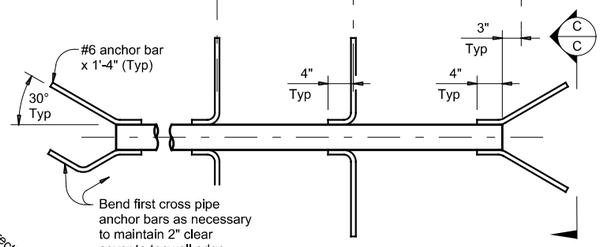
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



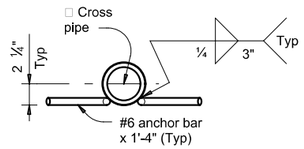
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

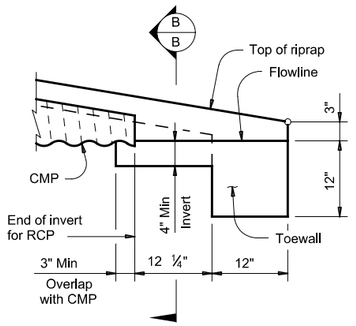


PIPE WITH ANCHOR BARS



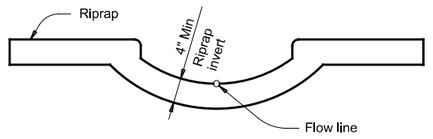
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

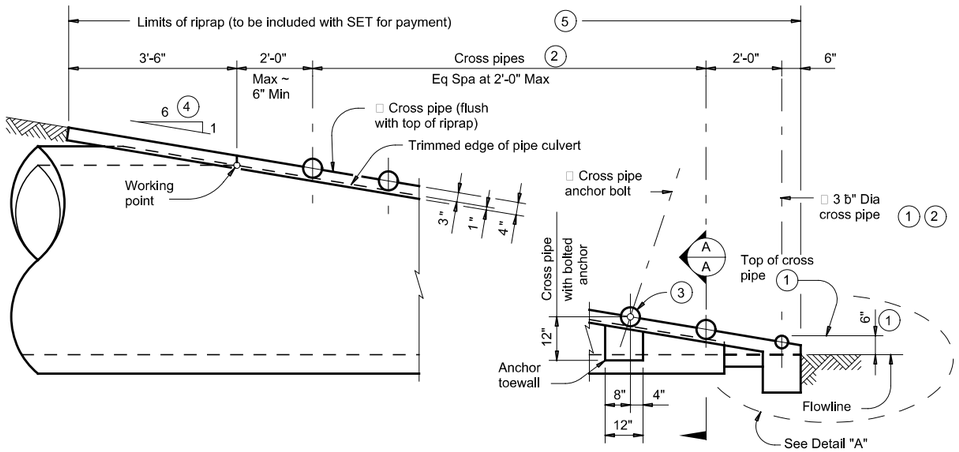
GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

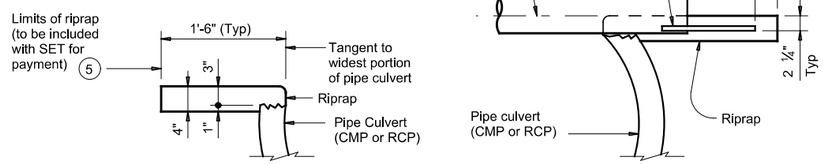
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.



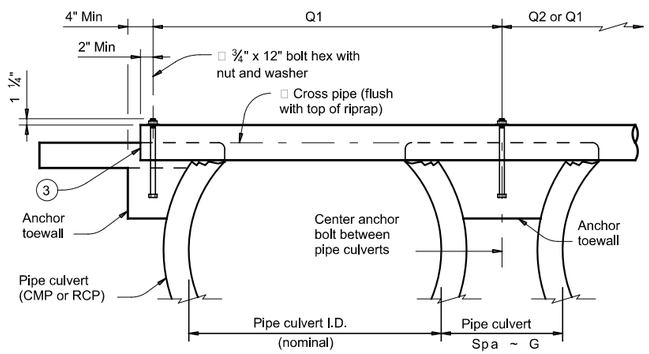
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		93A

DATE:
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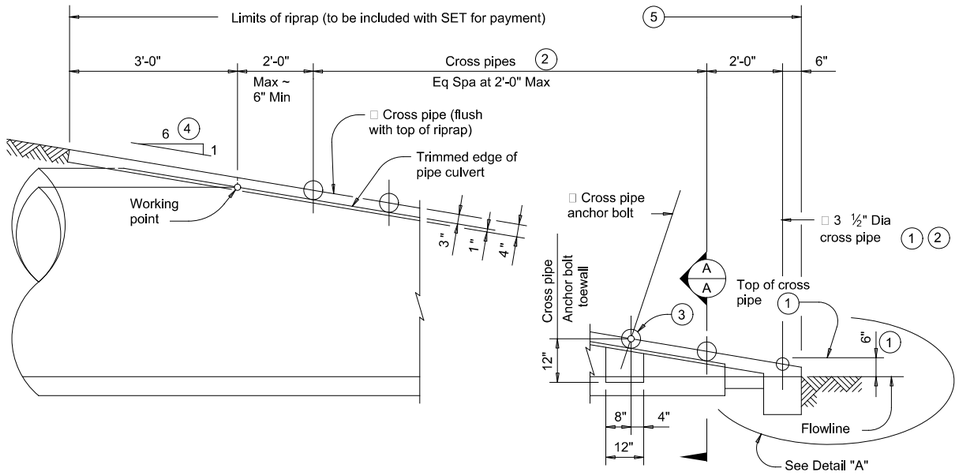


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details of corrugated metal pipe (CMP) culvert are similar. pipe runners not shown for clarity.)

CROSS PIPE LENGTHS AND REQUIRED PIPE SIZES 2

Corrugated Metal Pipe (CMP) Culverts

Design	Conc Riprap (CY) 6	Pipe Culvert Span	Pipe Culvert Rise	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
1	0.6	17"	13"	1' - 0"	N/A	2' - 8"	2' - 5"	3 or more pipe culverts	3" Std (3.500" O.D.)
2	0.7	21"	15"	1' - 2"	N/A	3' - 1"	2' - 11"		
3	0.9	28"	20"	1' - 5"	N/A	3' - 9"	3' - 9"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
4	1.0	35"	24"	1' - 8"	4' - 4"	4' - 6"	4' - 7"	All pipe culverts	4" Std (4.500" O.D.)
5	1.2	42"	29"	1' - 11"	4' - 11"	5' - 2"	5' - 5"		
6	1.4	49"	33"	2' - 2"	5' - 6"	5' - 11"	6' - 3"	All pipe culverts	5" Std (5.563" O.D.)
7	1.6	57"	38"	2' - 5"	6' - 2"	6' - 8"	7' - 2"		
8	1.8	64"	43"	2' - 10"	6' - 9"	7' - 6"	8' - 2"		
9	1.9	71"	47"	3' - 2"	7' - 4"	8' - 3"	9' - 1"		

Reinforced Concrete Pipe (RCP) Culverts

Design	Conc Riprap (CY) 6	Pipe Culvert Span	Pipe Culvert Rise	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
1	0.6	22"	13 ½"	1' - 0"	N/A	3' - 1"	2' - 10"	3 or more pipe culverts	3" Std (3.500" O.D.)
2	0.7	26"	15 ½"	1' - 2"	N/A	3' - 6"	3' - 4"		
3	0.9	28 ½"	18"	1' - 5"	N/A	3' - 10"	3' - 9 ½"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
4	1.0	36 ¼"	22 ½"	1' - 8"	4' - 5"	4' - 7"	4' - 8 ¼"	All pipe culverts	4" Std (4.500" O.D.)
5	1.2	43 ¾"	26 b"	1' - 11"	5' - 1"	5' - 4"	5' - 6 ¾"		
6	1.4	51 ƃ"	31 Ð"	2' - 2"	5' - 8"	6' - 1"	6' - 5 ¼"	All pipe culverts	5" Std (5.563" O.D.)
7	1.6	58 ½"	36"	2' - 5"	6' - 4"	6' - 10"	7' - 3 ½"		
8	1.8	65"	40"	2' - 10"	6' - 10"	7' - 7"	8' - 3"		
9	1.9	73"	45"	3' - 2"	7' - 6"	8' - 5"	9' - 3"		

1 The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

2 Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

3 Install the third Cross Pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

4 Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

5 Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap".

6 Quantities shown are for one end of one pipe culvert. For multiple Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

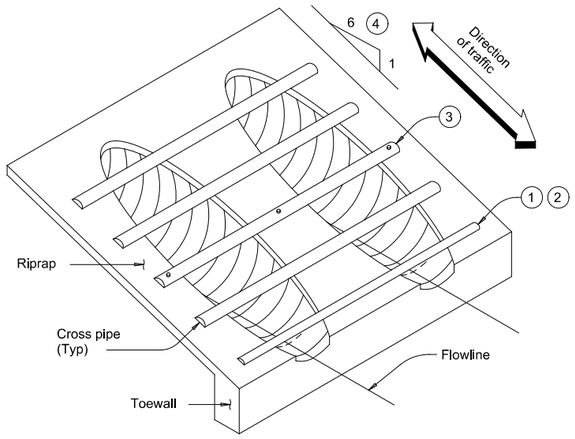
GENERAL NOTES:

Pipe runners are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

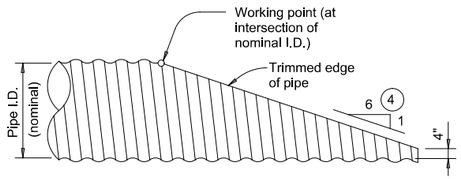
Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Pipe Runners.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the price bid for each safety end treatment.



ISOMETRIC VIEW OF TYPICAL INSTALLATION



NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details at reinforced concrete cipe (RCP) culvert are similar.)

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR DESIGN 1 TO 9
ARCH PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD-A

FILE: setppase-20.dgn	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		94

DATE:
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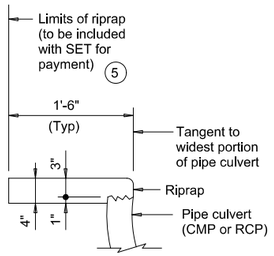
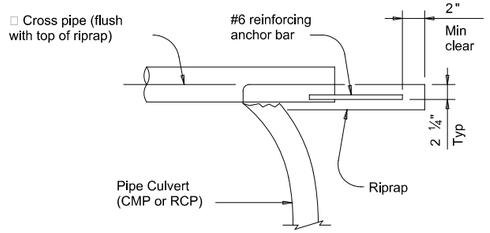
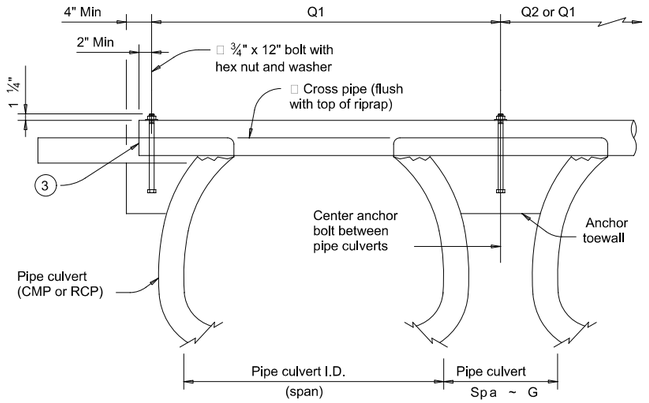


SHOWING TYPICAL PIPE CULVERT AND RIPRAP

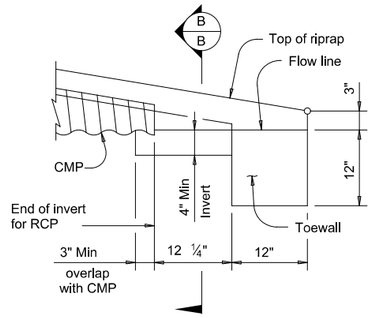


SHOWING CROSS PIPE WITH ANCHOR BAR



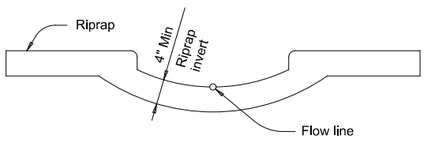
SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A



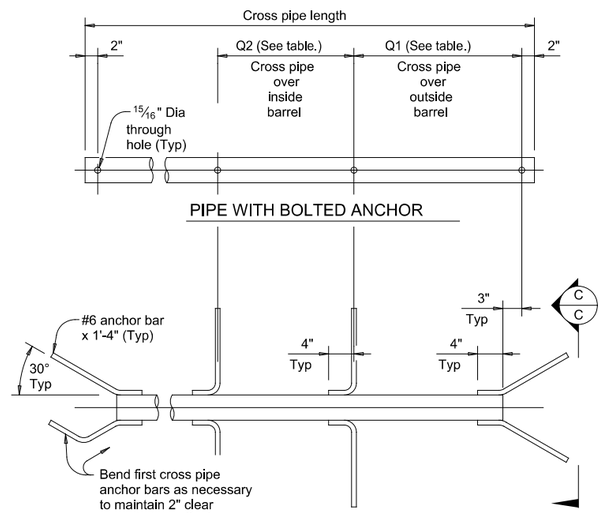
DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)

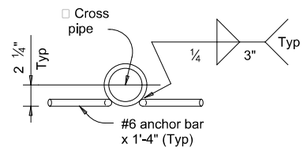


SECTION B-B

(Cross pipes not shown for clarity.)



PIPE WITH ANCHOR BARS



SECTION C-C

CROSS PIPE DETAILS

SHEET 2 OF 2

Texas Department of Transportation

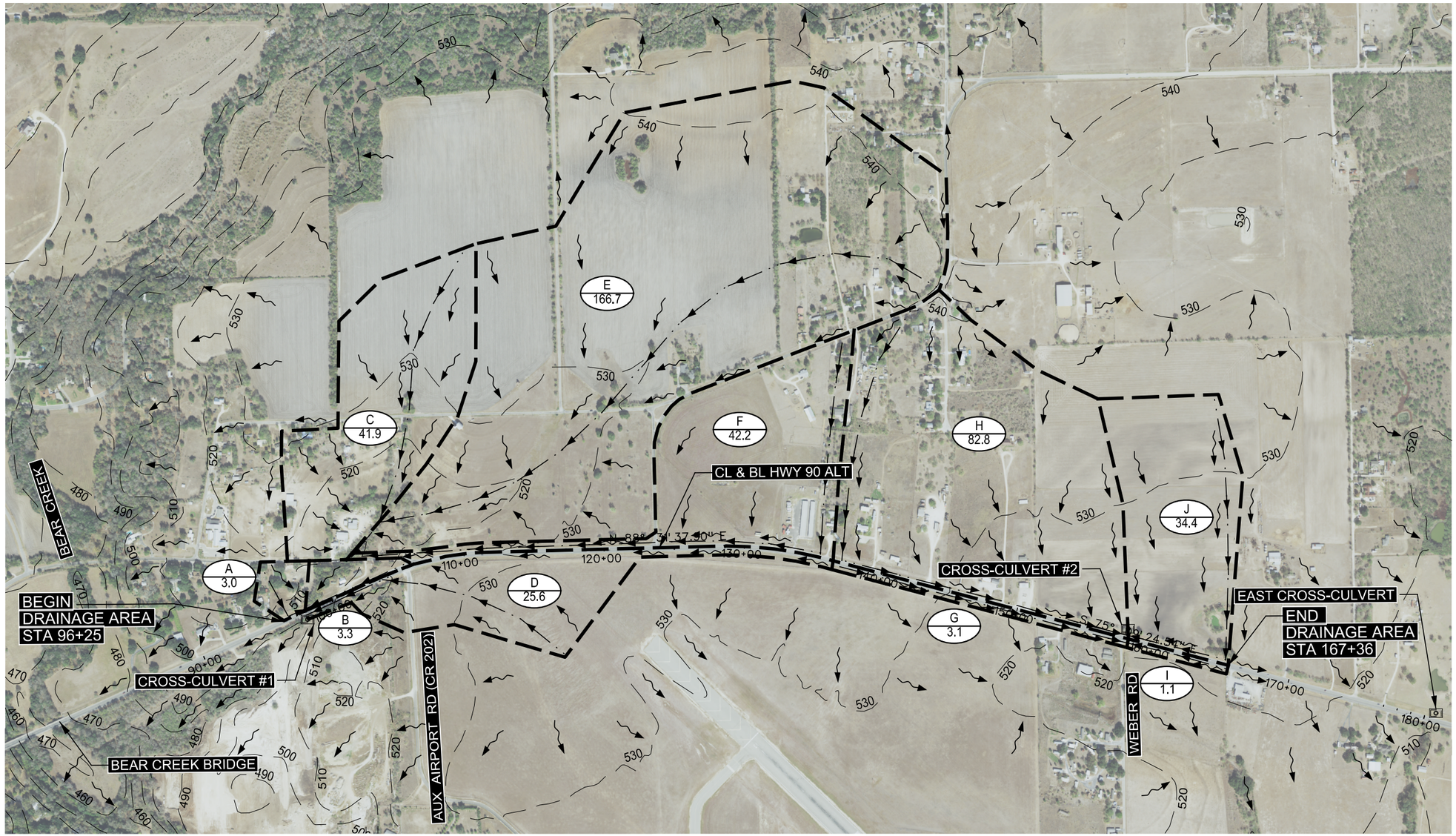
Bridge Division Standard

SAFETY END TREATMENT

FOR DESIGN 1 TO 9
ARCH PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD-A

FILE: setppase-20.dgn	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		95



NOTES:

1. TOPOGRAPHY SHOWN IS FROM THE UNITED STATES GEOLOGICAL SURVEY (USGS) WEBSITE. (CONTOURS FOR SAN ANTONIO E, TEXAS) (PUBLISHED IN 2019) CONTOURS DISPLAYED AT 10' INTERVALS.
2. THERE IS NO FEMA FLOOD PLAIN IN PROJECT LIMITS.
3. THE DA LIMITS FOR G, I & PARTS OF D FOLLOW THE SOUTHSIDE ROW/FENCE LINE.

0 800 1600
SCALE 1" = 800'

STATE OF TEXAS
EVAN ROBERTS
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4-20-23

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TBPE F-1640

Texas Department of Transportation

US 90 ALT

DRAINAGE AREA MAP

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			
6				
DN:		CONT	SECT	JOB	HIGHWAY
CK DN:		0025	04	051	US 90 ALT
DW:		DIST	COUNTY		SHEET NO.
CK DW:		SAT	GUADALUPE		96
TR:					
CK TR:					

DATE: 4/20/2023 11:33:09 AM
FILE: pw:\\tedsi-pw.bentley.com:tedsi-pw-01\Documents\Projects\2019\2019-2078-00 - TxDOT Traffic Engineering (Kimley-Horn)\Work Authorizations\2019-2078-1A - US90A Widening; Weber R

Culvert Hydraulic Data Summary Table - Culvert STA 98+00												
	Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	**Inlet Control Depth(ft)**	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
	5-year	133.8	133.8	498.7	**2.72**	1.61	1-S2n	1.74	1.77	1.74	1.71	7.7	2.06
*	10-year	161.2	161.2	499.05	**3.07**	1.87	1-S2n	1.97	2.01	1.97	1.86	8.18	2.14
	100-year	262.6	262.6	500.25	**4.27**	2.8	1-S2n	2.76	2.78	2.76	2.28	9.53	2.36

Site Data - Culvert STA 98+00		
Site Data Input Option	Culvert Invert Data	
Inlet Station	32	ft
Inlet Elevation	495.98	ft
Outlet Station	90	ft
Outlet Elevation	495.75	ft
Number of Barrels	1	
Computed Culvert Slope	0.003966	ft/ft

Culvert Data Summary - Culvert STA 98+00		
Shape	Box	
Material	Concrete	
Span	10	ft
Rise	8	ft
Embedment Depth	0	in
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge (30-75º flare) Wingwall (Ke=0.4)	
Inlet Depression	No	

Culvert Hydraulic Data Summary Table - Culvert STA 158+24												
	Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	**Outlet Control Depth(ft)**	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
	5-year	62.60	62.60	521.35	1.90	**3.22**	1-S1t	1.05	1.24	3.35	2.43	2.34	1.72
*	10-year	75.40	75.40	521.69	2.15	**3.56**	1-S1t	1.18	1.40	3.66	2.74	2.58	1.65
	100-year	122.40	122.40	522.47	2.99	**4.34**	4-FFf	1.64	1.94	4.00	3.33	3.83	1.70

Site Data - Culvert STA 158+24		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0	ft
Inlet Elevation	518.13	ft
Outlet Station	56	ft
Outlet Elevation	517.87	ft
Number of Barrels	1	
Computed Culvert Slope	0.004643	ft/ft

Culvert Data Summary - Culvert STA 158+24		
Shape	Box	
Material	Concrete	
Span	8	ft
Rise	4	ft
Embedment Depth	0	in
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge (30-75º flare) Wingwall (Ke=0.4)	
Inlet Depression	No	

NOTES

-CULVERT AND CHANNEL SLOPES ARE IN UNITS OF FT/FT.

-CULVERT COMPUTATIONS CALCULATED USING HY-8 VERSION 7.70 (April 12, 2022)

-ALL DRAINAGE FACILITIES HAVE BEEN CHECKED FOR 1% AEP IMPACT.

* DENOTES DESIGN STORM.

STATE OF TEXAS
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Texas Department of Transportation

US 90 ALT

HYDRAULIC DATA

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			
6				
DN:		CONT	SECT	JOB	HIGHWAY
CK DN:		0025	04	051	US 90 ALT
DW:		DIST	COUNTY		SHEET NO.
CK DW:		SAT	GUADALUPE		97
TR:					
CK TR:					

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Roadside Ditch Hydraulic Data Summary Table											
DA ID	Design Storm (5-yr)	Design Storm (10-yr)	Station	Q cfs	Channel Slope ft/ft	Manning's Roughne	Flow Top Width	Area of Flow sq ft	Average Velocity fps	Flow Depth ft	
D		X	102+00RT	20.4	0.0183	0.028	10.71	4.88	4.18	0.81	
D		X	103+00RT	20.4	0.0183	0.031	11.32	5.25	3.88	0.86	
D		X	108+00RT	20.4	0.0123	0.027	10.26	5.28	3.87	1.03	
D		X	119+00RT	20.4	0.0005	0.027	19.01	17.65	1.16	1.86	
F		X	108+00LT	32.4	0.0085	0.027	12.08	8.33	3.89	1.38	
F	X		110+00LT	26.9	0.0052	0.027	11.75	8.55	3.15	1.46	
F		X	111+00LT	32.4	0.0082	0.027	10.84	8.10	4.00	1.49	
F		X	112+00LT	32.4	0.0128	0.027	10.66	7.02	4.62	1.32	
F	X		113+00LT	26.9	0.0110	0.027	11.80	6.81	3.95	1.15	
F		X	115+00LT	32.4	0.0046	0.027	15.20	10.94	2.96	1.44	
F		X	119+00LT	32.4	0.0030	0.027	15.89	12.67	2.56	1.60	
F	X		125+00LT	21.0	0.0013	0.027	14.85	12.25	1.71	1.65	
F	X		126+00LT	21.0	0.0023	0.027	13.31	9.89	2.12	1.49	
F	X		127+00LT	26.9	0.0020	0.027	14.45	12.37	2.18	1.55	
F	X		128+00LT	17.2	0.0018	0.027	12.98	9.33	1.84	1.29	
F	X		129+00LT	15.3	0.0015	0.027	13.00	9.18	1.67	1.15	
F	X		130+00LT	15.3	0.0013	0.027	14.61	10.02	1.53	1.21	
F	X		131+00LT	15.3	0.0013	0.027	14.76	10.06	1.52	1.20	
F	X		132+00LT	15.3	0.0013	0.027	13.89	9.85	1.56	1.42	
F	X		136+00LT	15.3	0.0010	0.027	15.55	11.13	1.38	1.43	
H		X	141+00LT	51.1	0.0050	0.027	16.06	14.40	3.55	1.79	
H		X	154+00LT	51.1	0.0035	0.027	17.54	16.59	3.08	1.89	
J		X	159+00LT	24.3	0.0025	0.027	17.71	11.72	2.07	1.32	
J		X	160+00LT	24.3	0.0040	0.027	17.25	10.06	2.42	1.17	
J		X	161+00LT	24.3	0.0025	0.027	19.54	12.17	2.00	1.25	
J		X	162+00LT	14.1	0.0040	0.027	18.16	7.39	1.91	0.81	
J		X	163+00LT	14.1	0.0550	0.027	18.51	6.77	2.08	0.73	
J		X	164+00LT	14.1	0.0040	0.027	21.20	7.86	1.79	0.74	
J		X	165+00LT	14.1	0.0020	0.027	19.69	9.41	1.50	0.96	

Notes:

The FHWA Hydraulic Toobox - Channel Calculator program was used for the roadside ditch hydraulic analysis.

Drainage Areas A, B, C, D, E, G, H, I & J have roadside ditch capacities that meet the highest TxDOT Hydraulic Manual design storm criteria shown (10-yr) for the road functional class.

Drainage Area F has roadside ditch capacity that meets the desirable TxDOT Hydraulic Manual design storm criteria shown (5-yr) for the road functional class.

STATE OF TEXAS
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4-19-23

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Texas Department of Transportation

US 90 ALT
ROADSIDE DITCH
HYDRAULIC DATA

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			
6				
DN:	CONT	SECT	JOB	HIGHWAY
CK DN:	0025	04	051	US 90 ALT
DW:	DIST	COUNTY		SHEET NO.
CK DW:	SAT	GUADALUPE		97A
TR:				
CK TR:				

DATE: 4/19/2023 1:18:27 PM
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TIME OF CONCENTRATION CALCULATIONS (NRCS METHOD)

D.A.	TOTAL FLOW L ft	SHEET FLOW					SHALLOW CONCENTRATED FLOW UNPAVED			CHANNEL FLOW						tc CALC min	tc USED min
		Lsh ft	nol	P2 in	Ssh ft/ft	tsh hr	Lsc ft	Ssc ft/ft	tsc hr	Lch ft	n	R ft	Elevation Delta ft	Sch ft/ft	tch hr		
A	554	100	0.20	3.98	0.0284	0.1602	326	0.0284	0.0333	128	0.027	1.7637	0.640	0.0050	0.0062	11.99	11.99
B	536	50	0.20	3.98	0.0259	0.0955	100	0.0259	0.0107	386	0.027	1.7637	8.762	0.0227	0.0088	6.90	10.00
C	2777	100	0.20	3.98	0.0044	0.3384	1702	0.0069	0.3529	975	0.050	1.9608	12.357	0.0127	0.0515	44.56	44.56
D	2043	100	0.15	3.98	0.0024	0.3419	1350	0.0096	0.2373	593	0.027	1.7637	13.461	0.0227	0.0136	35.57	35.57
E	5115	100	0.20	3.98	0.0043	0.3409	4220	0.0059	0.9461	795	0.050	1.9608	5.486	0.0069	0.0569	80.64	80.64
F	5052	100	0.15	3.98	0.0036	0.2097	1601	0.0036	0.4595	3351	0.027	1.7637	10.053	0.0030	0.2109	57.67	57.67
G	2220	50	0.15	3.98	0.0043	0.1555	50	0.0043	0.0131	2120	0.027	1.7637	11.448	0.0054	0.0995	16.09	16.09
H	4228	100	0.15	3.98	0.0036	0.2907	2008	0.0036	0.5763	2120	0.027	1.7637	11.448	0.0054	0.0995	57.99	57.99
I	815	50	0.15	3.98	0.0020	0.2112	50	0.0020	0.0193	715	0.027	1.7637	1.430	0.0020	0.0551	17.14	17.14
J	2713	100	0.17	3.98	0.0063	0.2569	1898	0.0063	0.4118	715	0.027	1.7637	1.430	0.0020	0.0551	43.43	43.43

RUNOFF COEFFICIENT (RATIONAL METHOD)

D.A.	TOTAL AREA ac	RESIDENTIAL SINGLE FAMILY 0.35 ac	BUSINESS NEIGHBOR-HOOD 0.45 ac	BLACK OR LOESSIAL SOIL, 0- 3% 0.20 ac	SAND OR SANDY LOAM SOIL, 0-3% 0.17 ac	GRASS/LAWN, SANDY SOIL, FLAT 2% 0.08 ac	GRASS/LAWN, HEAVY SOIL, FLAT 2% 0.15 ac	STREETS ASPHALTIC 0.90 ac	COMPOSITE ← C
A	3.0	0.8		2.1				0.1	0.26
B	3.3	0.6		2.6				0.1	0.25
C	41.9	4.4	2.3	34.8				0.4	0.24
D	25.6					3.3	20.2	2.1	0.20
E	166.7	7.8		127.1	29.8			2.0	0.21
F	42.2	3.5	2.2	34.6				1.9	0.26
G	3.1			0.5	1.4			1.2	0.46
H	82.8	10.3		8.6	62.7			1.2	0.21
I	1.1				0.7			0.4	0.44
J	34.4			23.1	10.9			0.4	0.20

HYDROLOGIC CALCULATIONS (RATIONAL METHOD) *

D.A.	AREA ac	COMPOSITE C	tc min	I2 in/hr	I5 in/hr	I10 in/hr	I25 in/hr	I50 in/hr	I100 in/hr	Q2 cfs	Q5 cfs	Q10 cfs	Q25 cfs	Q50 cfs	Q100 cfs
A	3.0	0.26	11.99	4.33	5.72	6.79	8.22	9.31	10.44	3.3	4.4	5.2	6.3	7.2	8.0
B	3.3	0.25	10.00	4.65	6.13	7.26	8.77	9.92	11.09	3.8	5.1	6.0	7.3	8.2	9.2
C	41.9	0.24	44.56	2.15	2.89	3.48	4.29	4.92	5.61	21.6	29.1	35.0	43.1	49.5	56.4
D	25.6	0.20	35.57	2.48	3.32	3.98	4.89	5.60	6.37	12.7	17.0	20.4	25.0	28.7	32.6
E	166.7	0.21	80.64	1.43	1.95	2.36	2.94	3.39	3.89	50.1	68.3	82.6	102.9	118.7	136.2
F	42.2	0.26	57.67	1.81	2.45	2.95	3.65	4.21	4.81	19.9	26.9	32.4	40.0	46.2	52.8
G	3.1	0.46	16.09	3.81	5.05	6.01	7.30	8.29	9.32	5.4	7.2	8.6	10.4	11.8	13.3
H	82.8	0.21	57.99	1.81	2.44	2.94	3.64	4.19	4.79	31.5	42.4	51.1	63.3	72.9	83.3
I	1.1	0.44	17.14	3.70	4.91	5.84	7.10	8.07	9.08	1.8	2.4	2.8	3.4	3.9	4.4
J	34.4	0.20	43.43	2.19	2.94	3.53	4.35	5.00	5.69	15.1	20.2	24.3	29.9	34.4	39.1

NOTES

-RATIONAL METHOD USED FOR CALCULATING PEAK DISCHARGES.

-RATIONAL METHOD EQUATION: Q=CIA

-NRCS METHOD USED FOR COMPUTING TIME OF CONCENTRATION.

-INTENSITY VALUES USED ARE BASED ON IDF CURVES ATLAS 14 PRECIPITATION FREQUENCY.

-INTENSITY EQUATION: $I = \frac{b}{(Tc + d)^e}$

Guadalupe County Values: Zone 1

	(2-year)	(5-year)	(10-year)	(25-year)	(50-year)	(100-year)	(500-year)
e	0.8249	0.8042	0.7914	0.7761	0.7649	0.7534	0.7306
b	60.3031	74.7733	85.4764	99.3612	109.3143	119.4873	147.7196
d (min)	12.3622	12.4406	12.5713	12.8349	13.0464	13.4429	15.3587

-ALL HYDROLOGIC CALCULATIONS PERFORMED ARE BASED ON CURRENT DEVELOPED CONDITIONS

* DENOTES DESIGN STORM.

STATE OF TEXAS
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4-20-23

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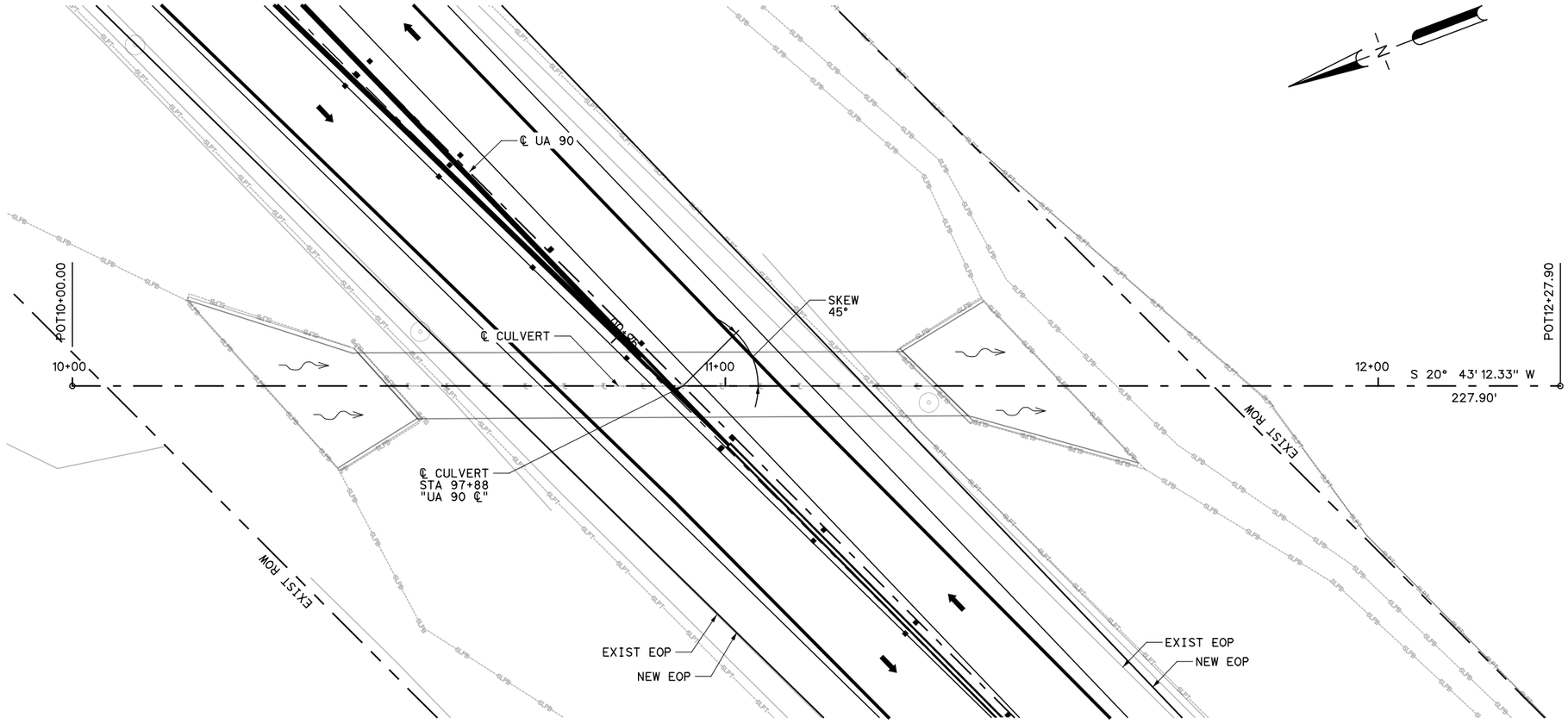
Texas Department of Transportation

US 90 ALT
HYDROLOGIC DATA

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			
6				
DN:	CONT	SECT	JOB	HIGHWAY
CK DN:	0025	04	051	US 90 ALT
DW:	DIST	COUNTY		SHEET NO.
CK DW:	SAT	GUADALUPE		98
TR:				
CK TR:				

QUANTITY SUMMARY CULVERT STA 97+88			
ITEM#	DESCRIPTION	UNIT	QTY
0480 6001	CLEAN EXIST CULVERTS	EA	1



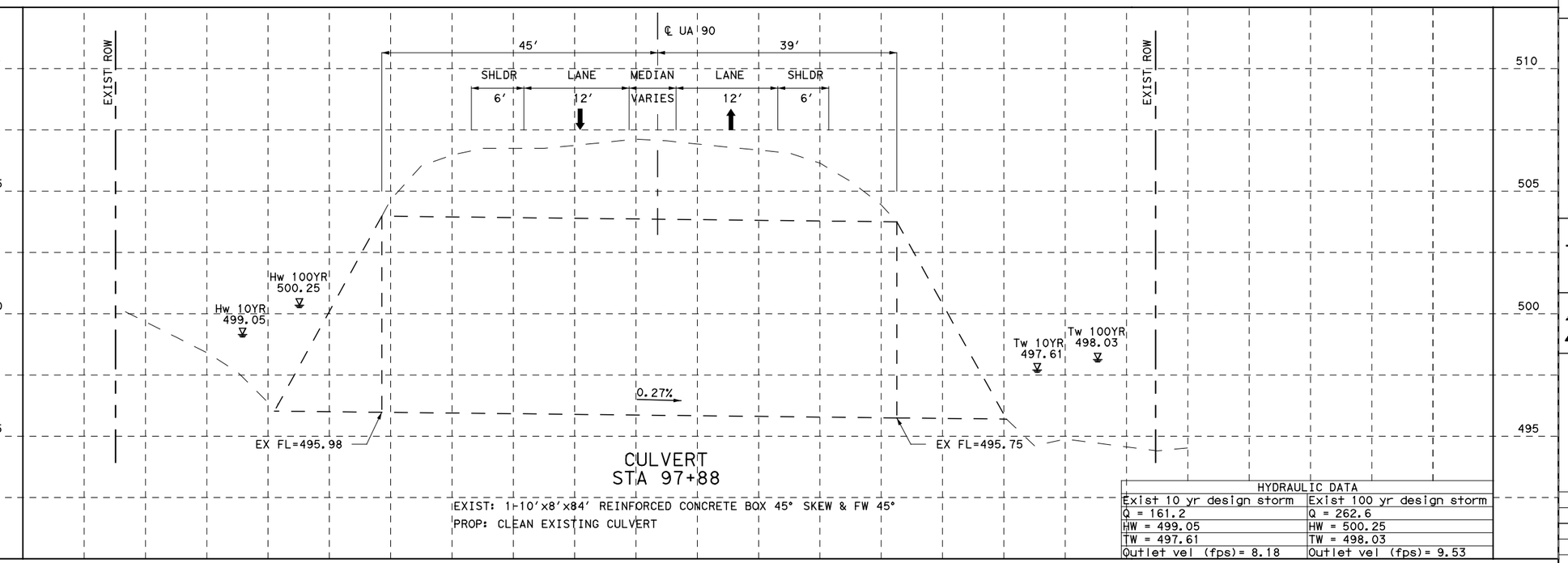
LEGEND

- EXIST ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DIRECTION OF FLOW

NOTES:

1. SEE HYDRAULIC DATA SHEETS FOR ADDITIONAL INFORMATION.
2. EXISTING UTILITIES SHOWN ARE APPROXIMATE, CONTRACTOR TO FIELD VERIFY DEPTH AND LOCATIONS PRIOR TO START OF CONSTRUCTION.
3. EXISTING STRUCTURE ALIGNMENT, GRADES AND ELEVATIONS SHALL BE VERIFIED PRIOR TO BEGINNING CONSTRUCTION.
4. UNLESS OTHERWISE NOTED, FLOW LINE OF SET SHALL BE PLACED AT THE SAME SLOPE AS THE ADJACENT PIPE OR BOX CULVERT.
5. ALL CONCRETE RIPRAP SHALL BE 5" THICK WITH 9" x 36" TOE DOWN ALL AROUND WITH #3 BARS AT 18" O.C.UNLESS OTHERWISE NOTED.

HORZ 0' 10' 20'
VERT 0' 2.5' 5'
SCALE: IN FEET



CULVERT
STA 97+88

EXIST: 1-10'x8'x84' REINFORCED CONCRETE BOX 45° SKEW & FW 45°
PROP: CLEAN EXISTING CULVERT

HYDRAULIC DATA	
Exist 10 yr design storm	Exist 100 yr design storm
Q = 161.2	Q = 262.6
HW = 499.05	HW = 500.25
TW = 497.61	TW = 498.03
Outlet vel (fps)= 8.18	Outlet vel (fps)= 9.53

STATE OF TEXAS
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4/20/2023

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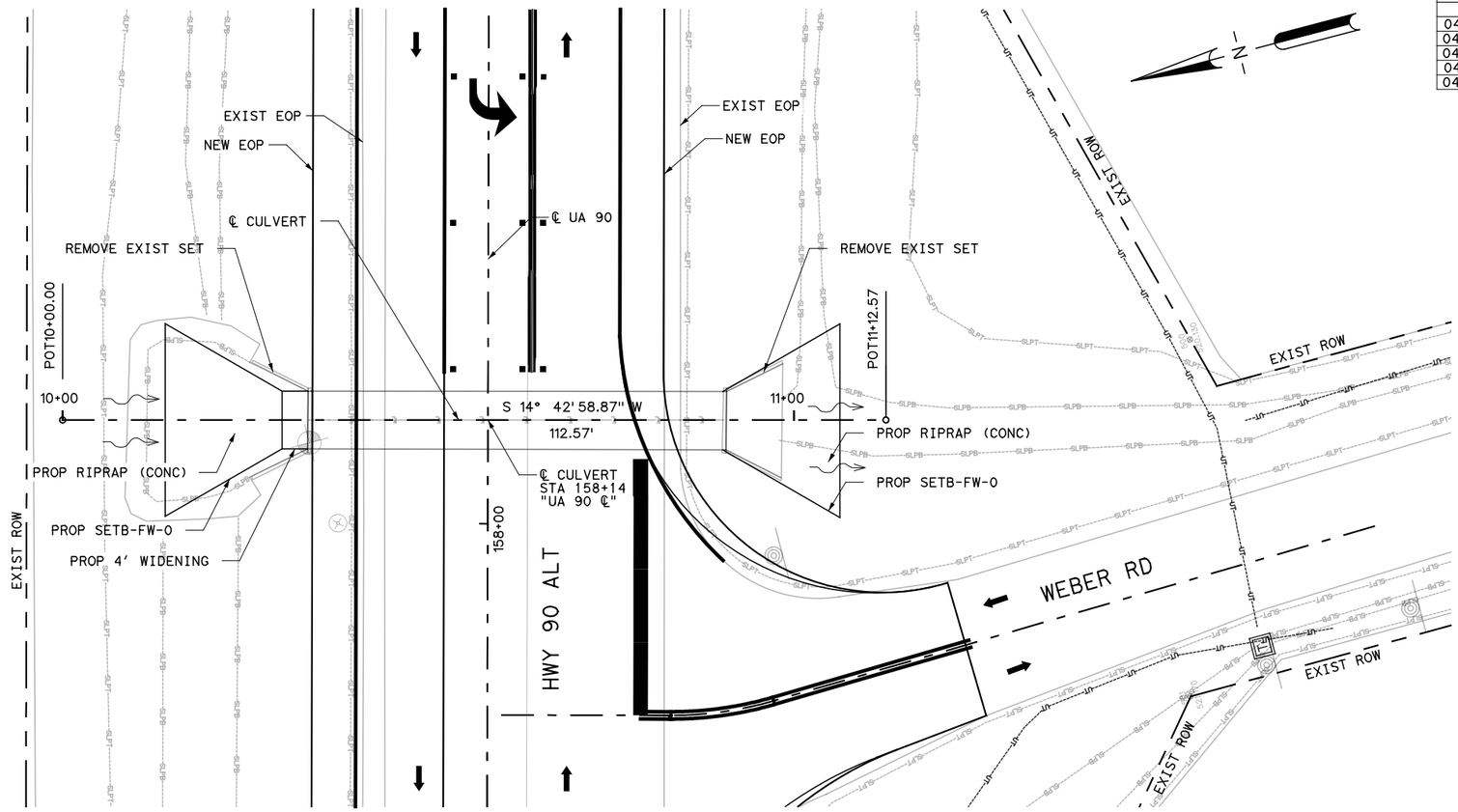
Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD
CULVERT
PLAN AND PROFILE
CULVERT STA 97+88

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	STP 2023(951) HES	UA 90
STATE	DIST.	COUNTY
TEXAS	SAT	GUADALUPE
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	99

QUANTITY SUMMARY CULVERT 158+14			
ITEM	DESCRIPTION	UNIT	QTY
0432 6001	RIPRAP (CONC)(4 IN)	CY	4
0462 6063	CONC BOX CULV (8 FT X 4 FT)(EXTEND)	LF	4
0467 6270	SET (TY I)(S= 8 FT)(HW= 4 FT)(4:1) (C)	EA	2
0480 6001	CLEAN EXIST CULVERTS	EA	1
0496 6004	REMOV STR (SET)	EA	2



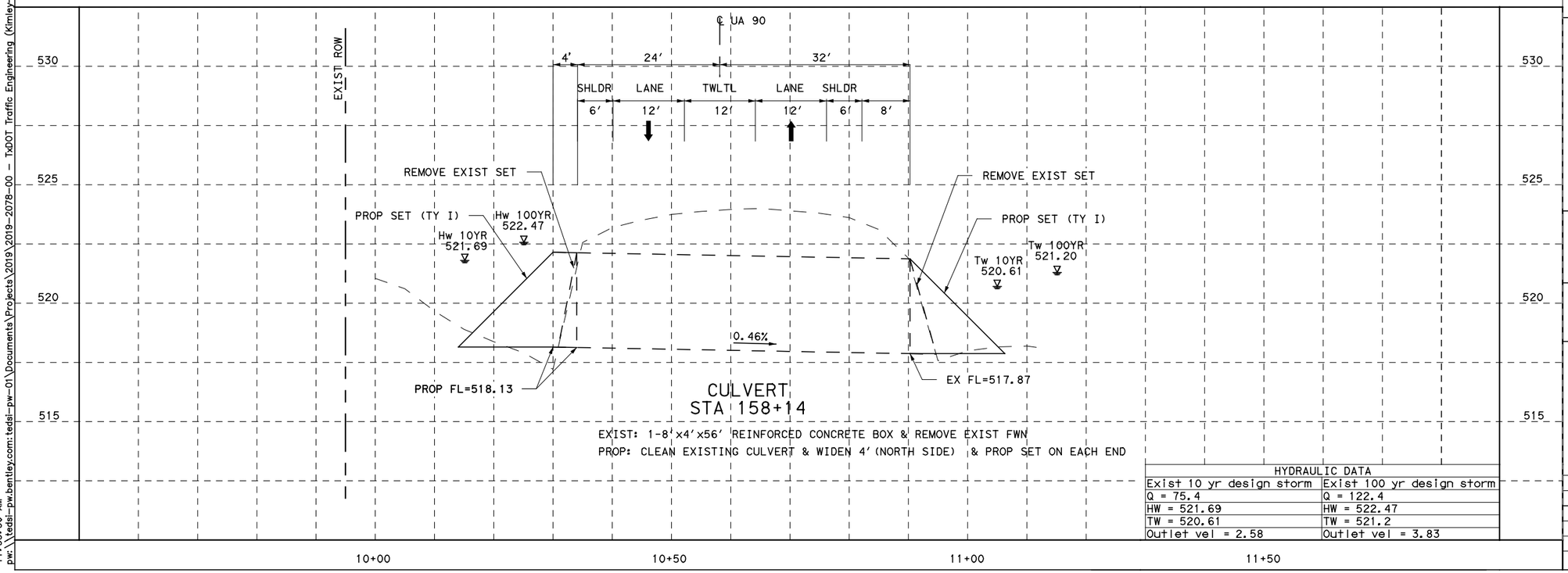
LEGEND

- EXIST ROW
- SAWCUT
- DIRECTION OF TRAFFIC (NEW)
- DIRECTION OF TRAFFIC (EXIST)
- DIRECTION OF FLOW

NOTES:

1. SEE HYDRAULIC DATA SHEETS FOR ADDITIONAL INFORMATION.
2. EXISTING UTILITIES SHOWN ARE APPROXIMATE, CONTRACTOR TO FIELD VERIFY DEPTH AND LOCATIONS PRIOR TO START OF CONSTRUCTION.
3. EXISTING STRUCTURE ALIGNMENT, GRADES AND ELEVATIONS SHALL BE VERIFIED PRIOR TO BEGINNING CONSTRUCTION.
4. UNLESS OTHERWISE NOTED, FLOW LINE OF SET SHALL BE PLACED AT THE SAME SLOPE AS THE ADJACENT PIPE OR BOX CULVERT.
5. ALL CONCRETE RIPRAP SHALL BE 5" THICK WITH 9" x 36" TOE DOWN ALL AROUND WITH #3 BARS AT 18" O.C.UNLESS OTHERWISE NOTED.

HORZ 0' 10' 20'
VERT 0' 2.5' 5'
SCALE: IN FEET



CULVERT STA 158+14

EXIST: 1-8'x4'x56' REINFORCED CONCRETE BOX & REMOVE EXIST FWN
PROP: CLEAN EXISTING CULVERT & WIDEN 4'(NORTH SIDE) & PROP SET ON EACH END

HYDRAULIC DATA	
Exist 10 yr design storm	Exist 100 yr design storm
Q = 75.4	Q = 122.4
HW = 521.69	HW = 522.47
TW = 520.61	TW = 521.2
Outlet vel = 2.58	Outlet vel = 3.83

STATE OF TEXAS
EVAN ROBERTS
86360
REGISTERED PROFESSIONAL ENGINEER

4/20/2023

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TBPE F-1640

Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD
CULVERT
PLAN AND PROFILE
CULVERT STA 158+14

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	100

Culvert Station and/or Creek Name	Description of Box Culert No.Spans ~ Span X Height	Max Fill Height (ft)	Applicable Box Culvert Standard	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope (SL:1)	T Culvert Top Slab Thick's (in)	U Culvert Wall Thick's (in)	C Estimate Curb Height (ft)	Hw Height of Wing (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 (C.Y.)	Class "C" Conc. (Curb) (CY)	Class "C" Conc. (Wing.) (CY)	Total Wingwall Area (SF)
158+14 (Both)	1~ 8' X 4'	2.3'	SCP-8	SETB-FW-0	0	4:1	8"	8"	0.250	4.667	17.333	10.007	20.015	N/A	28.015	7.6	0.2	17.6	N/A

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.

STATE OF TEXAS
EVAN ROBERTS
86360
REGISTERED
PROFESSIONAL ENGINEER

4/20/2023

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE:	bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS		0025	04	051	US 90 ALT
		DIST	COUNTY		SHEET NO.
		SAT	GUADALUPE		101

DATE: 3/30/2023 3:06:22 PM
FILE: pw:\\txdot-pw.bentley.com:txdot-pw-01\Documents\Projects\2019\2019-2078-1A - US90A Widening; Weber to Guadalupe\Design\Roadway\Drainage\Work Authorizations\2019-2078-1A - US90A Widening; Weber to Guadalupe Drainage Work Authorization.dgn

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for One Structure End)

Maximum Wingwall Height Hw (9)	Dimensions W	X	Y	Z	Variable Reinforcing Bars J1 Size	Bars J1 Spa	Bars J2 Size	Bars J2 Spa	Estimated Quantities (3) per ft of wing length (Two~Wings) Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'- 5"	1'- 0"	9"	7"	#4	1'-0"	#4	1'-0"		
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

TABLE OF WING WALL REINFORCING
(Two~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

TABLE OF ESTIMATED ANCHOR TOEWALL QUANTITIES

Bar	Size	No.	Spa
K	#4 ~	1'-0"	
N	#5 6 ~		
OL	#4 6 ~		
Reinf (Lb/Ft)			9.82
Conc (CY/Ft)			0.074

(1) Extend Bars P 3'-0" Min into bottom slab of box culvert.

(2) Adjust to fit as necessary to maintain 1 1#2" clear cover and 4" Min between bars.

(3) 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.

(4) Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.

(5) 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, 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 is not required.

(6) At Contractor's option, end the culvert toewall flush with wingwall toewall. Adjust reinforcing as needed.

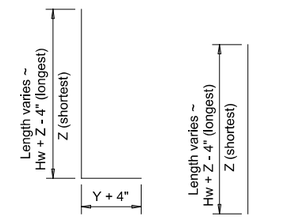
(7) 3" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extend Curb Details (ECD) standard sheet.

(8) For vehicle safety, reduce curb heights, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

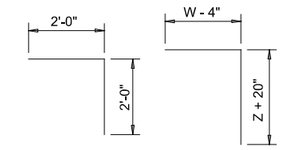
(9) See Table of Maximum Wing Heights for various slopes. Height is limited based on a 33'-6" maximum safety pipe runner length.

TABLE OF MAXIMUM WING HEIGHTS (9)

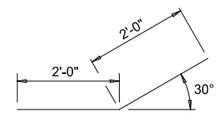
Side Slope	Hw Max
3:1	11'- 5"
4:1	8'-10"
6:1	6'- 1"



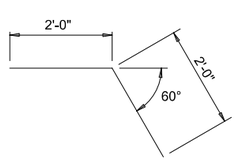
BARS J1 BARS V



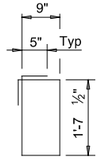
BARS L BARS J2



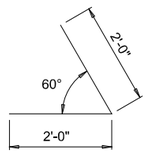
BARS D



BARS R



BARS K
(Length = 5'-5")



BARS OL

WING DIMENSION CALCULATIONS:

Hw = H + T + C - 0.250' (9)
A = (Hw - 0.333') (SL)
B = (A) (tan (30°))
Lw = (A) ÷ cos (30°))

For cast-in-place culverts:
Ltw = (N) (S) + (N + 1) (U)
For precast culverts:
Ltw = (N) (2U + S) + (N - 1) (0.500')

Lc = (Ltw) - (2U)
Atw = (Lc) + (2B)
Total Wingwall Area (two wings ~ SF)
= (Hw + 0.333') (Lw)

Hw = Height of wingwall (feet)
Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)
Ltw = Culvert toewall length (feet)
Lc = Culvert curb between wings (feet)

See applicable box culvert standard for H, S, T, and U values.
See Table of Maximum Wall Heights for limits on Hw.

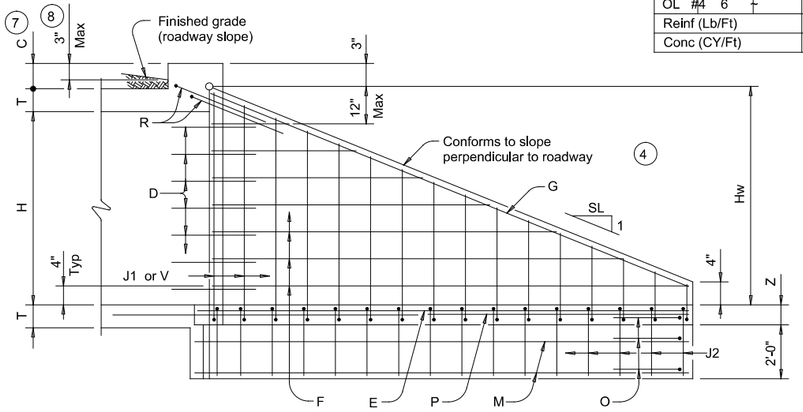
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
Provide Class "C" concrete (f'c = 3,600 psi).
Adjust reinforcing as necessary to provide a minimum clear cover of 1 ½".
Provide pipe runners and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
Provide ASTM A307 bolts and nuts.
Provide ASTM A36 steel plates.
Galvanize all steel components, except reinforcing unless required elsewhere in the plans, after fabrication.
Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".
For optional adhesive anchors, install adhesive anchorages in accordance with the manufacturer's instructions including hole size, drilling equipment and method, hole cleaning equipment and method, mixing and dispensing adhesive, and anchor insertion. Do not alter the manufacturer's mixing nozzle or dispenser. Provide anchorage rods that are clean and free of grease, oil, or any other foreign material. Demonstrate hole cleaning method to the Engineer for approval and continue the approved process for all anchorage locations. Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

GENERAL NOTES:

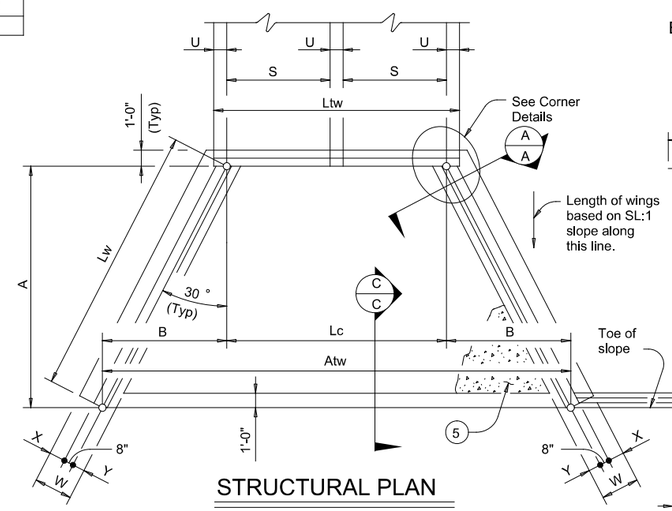
Designed according to AASHTO LRFD Bridge Design Specifications.
The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
All bolts, nuts, washers, brackets, angles, and pipe runners are considered parts of the safety end treatment for payment.
The quantities for pipe runners, reinforcing steel, and concrete, resulting from the formulas given herein are for Contractor's information only.
See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

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



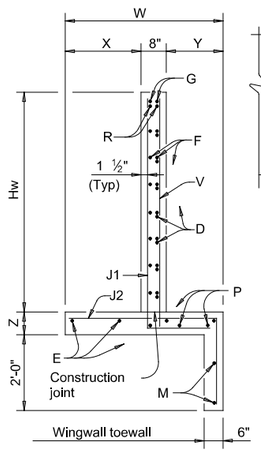
INSIDE ELEVATION OF WINGWALL

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

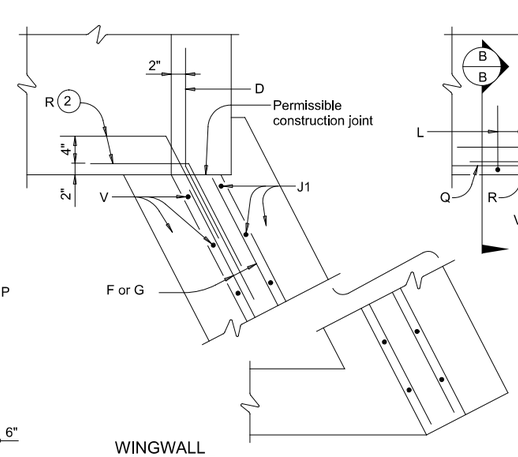


STRUCTURAL PLAN

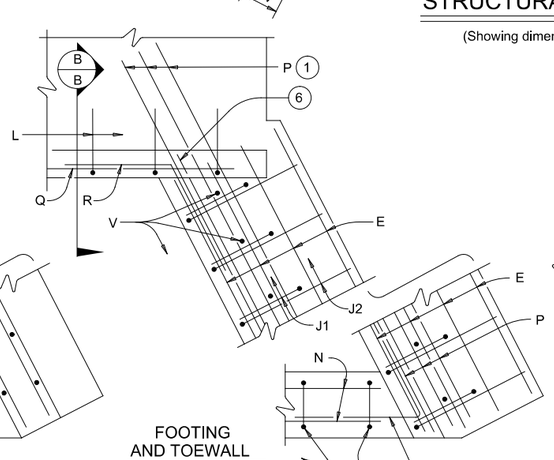
(Showing dimensions.)



SECTION A-A



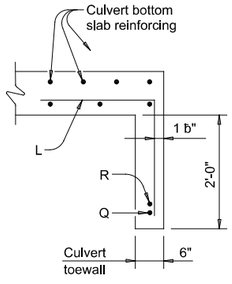
WINGWALL



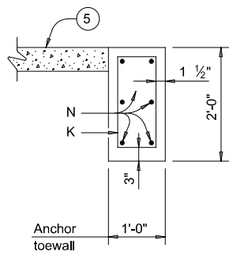
FOOTING
AND TOEWALL

CORNER DETAILS

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



SECTION B-B (5)



SECTION C-C

SHEET 1 OF 3

Texas Department of Transportation

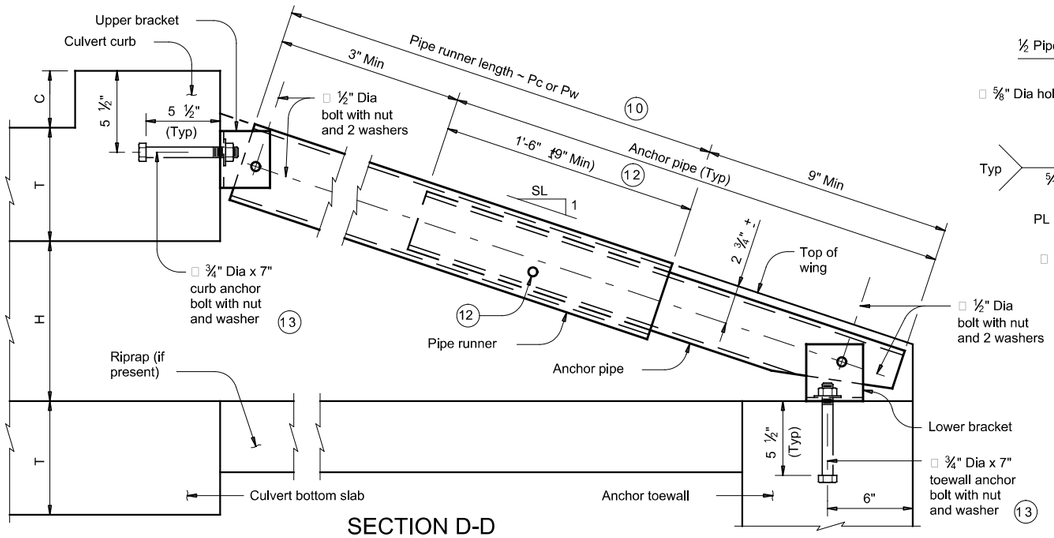
Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

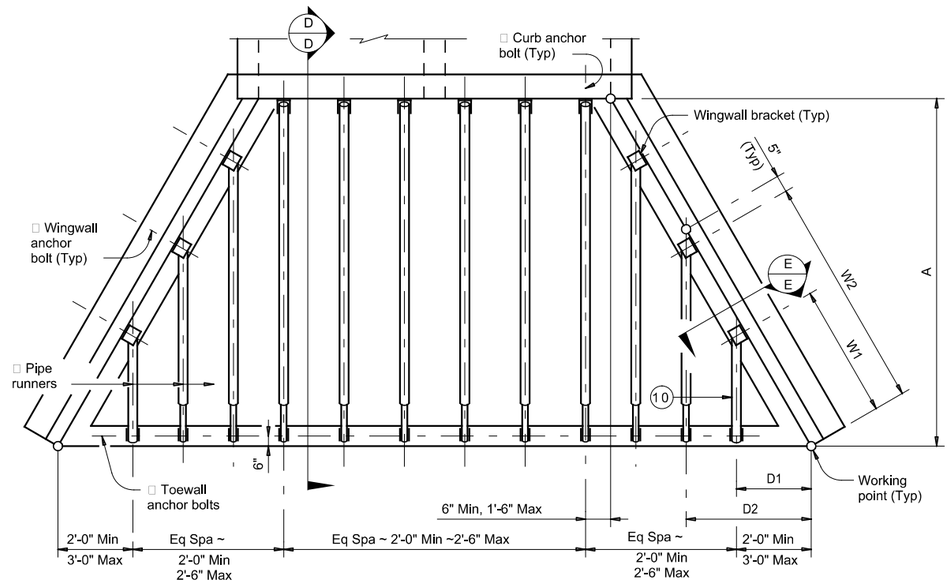
SETB-FW-0

FILE:	setbf0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS		0025	04	051	US 90 ALT
		DIST	COUNTY		SHEET NO.
		SAT	GUADALUPE		102

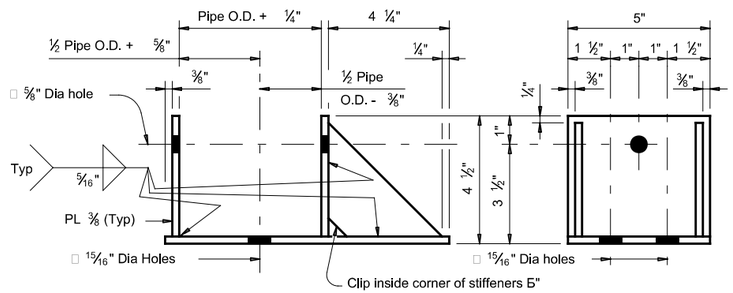


SECTION D-D

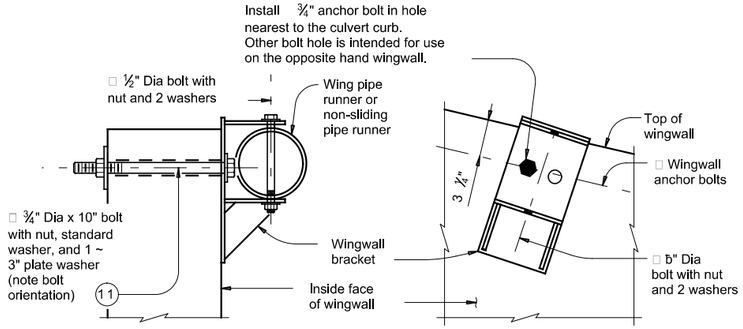
(Showing curb pipe runner. Except for upper bracket, wingwall pipe runners are similar.)



PIPE RUNNER PLAN



ELEVATION SIDE VIEW

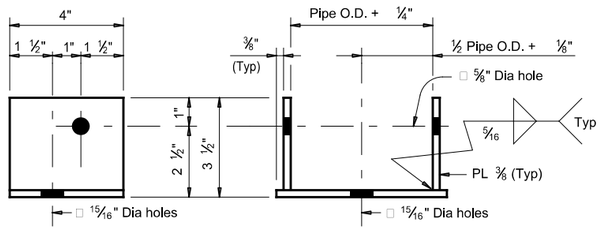


SECTION E-E (Showing installed bracket.)

ELEVATION (Showing installed bracket normal to wall. Pipe not shown for clarity.)

Note: Match wingwall bracket to the upper curb bracket size.

WINGWALL BRACKET DETAILS



SIDE VIEW ELEVATION

Note: Match upper and lower brackets, except for the brackets used with non-sliding pipe runners, to the required pipe diameters as shown in the table.

UPPER AND LOWER BRACKET DETAILS

MAXIMUM PIPE RUNNER LENGTHS AND REQUIRED PIPE RUNNER SIZES

Maximum Pipe Runner Length (Pc or Pw)	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
9'-4"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'-0"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
33'-6"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

(10) If pipe runner length (Pw) is 1'-9" or less replace the normal pipe runner and anchor pipe with a single non-sliding pipe runner. See Non-Sliding Pipe Runner Details for additional information.

(11) At Contractor's option, ⅞" diameter hole may be formed or cored drilled. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes.

(12) After installation of pipe runner, use the b" inspection hole to ensure that the lap of the anchor pipe with the pipe runner is adequate.

(13) At Contractor's option, an adhesive anchor may be used. Provide ¾" Dia adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 5 b". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.

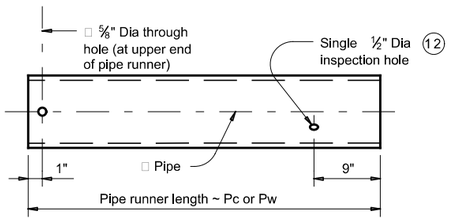
PIPE RUNNER DIMENSION CALCULATIONS:

Wn = (2.000) (Dn) - (0.416')
Pwn = (Dn) (K2) - (2.063')
Pw1 Non-Sliding Pipe Runner (If required)
= (D1) (K2) - (0.563')
Pc = (A) (K1) - (1.688')

Wn = Distance from working point to centerline anchor bolt measured along bottom inside face of wing (feet)
Dn = Distance from working point to centerline pipe runner measured along outside face of anchor toewall (feet)
Pw = Wingwall pipe runner length (feet)
Pc = Curb pipe runner length (feet)
K = Constant values for use in formulas

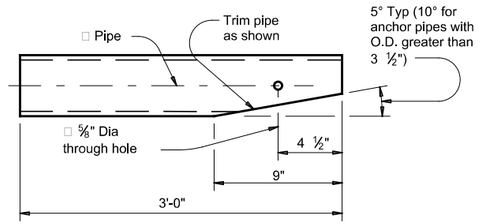
Slope SL:1	K1	K2
3:1	~ 1.054 ~	1.826
4:1	~ 1.031 ~	1.785
6:1	~ 1.014 ~	1.756

n = Wing pipe runner number

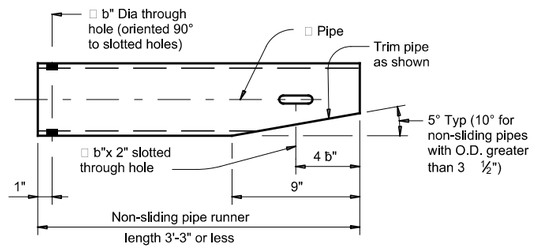


Note: Pipe diameter required for curb pipe runner is also used for wingwall pipe runner.

PIPE RUNNER DETAILS



ANCHOR PIPE DETAILS



Note: Pipe size is the same as required for curb pipe runner. Adjust the corresponding lower bracket accordingly.

NON-SLIDING PIPE RUNNER DETAILS

SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE:	setbf0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS		0025	04	051	US 90 ALT
		DIST	COUNTY		SHEET NO.
		SAT	GUADALUPE		103

DATE: 4/20/2023 11:48:50 AM
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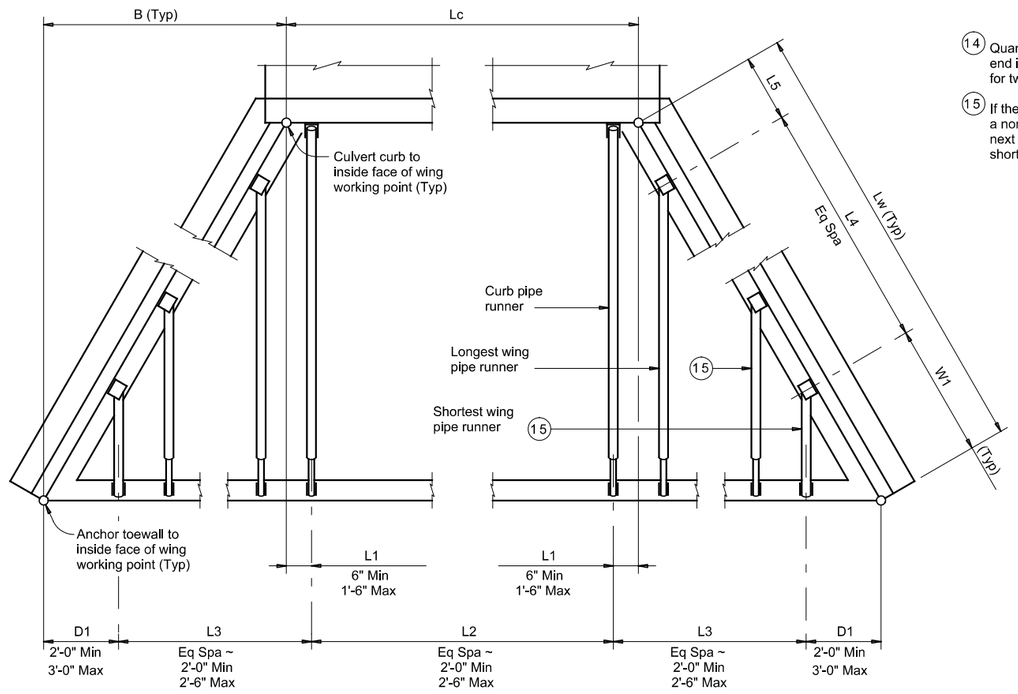
Culvert Station and/or Creek Name	Applicable Wing or End Treatment Standard	Lc	L1	L2			D1	L3			W1	L4			L5	Curb Pipe Runner (Pc)		Longest Wing Pipe Runner (Pw)	Short Pw	non-sliding pipe	Curb, wing &/or Non-Sliding Pipe		3'-0" Anchor Pipe	
				No. Spa	L2 Spa	O'all Lgth		No. Spa	L3 Spa	O'all Lgth		No. Spa	L4 Spa	O'all Lgth		No.	Lgth				Size	Total Lgth	Anchor Pipe Size	Total Lgth
158+14 (Both)	SETB-FW-0	8.000	1.500	2	2.500	5.000	2.000	4	2.377	9.507	3.583	3	4.754	14.261	2.170	3	16.188	14.229	5.750	3.000	4"	229.000	3"	54.000



PIPE RUNNER LAYOUT

(14) Quantities shown are for one structure end if Lt or Rt. Quantities shown are for two structure ends if Both.

(15) If the outermost wing pipe runner is a non-sliding pipe runner, consider the next outermost wing pipe runner as the shortest.

SPECIAL NOTE:

This tabular sheet is to be filled out by the culvert specifier and provides information for the construction details and quantities of pipe runners.

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.

Note that the tabular quantities are given for estimating purposes only. It is likely that these quantities will change due to field conditions. Therefore, all dimensions must be verified by the Contractor in the field prior to fabrication of the safety end treatment components.

STATE OF TEXAS
EVAN ROBERTS
86360
REGISTERED PROFESSIONAL ENGINEER

4/20/2023

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE:	setbf0se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS		0025	04	051	US 90 ALT
		DIST	COUNTY		SHEET NO.
		SAT	GUADALUPE		104

DATE: 4/2/2023 11:58:29 AM
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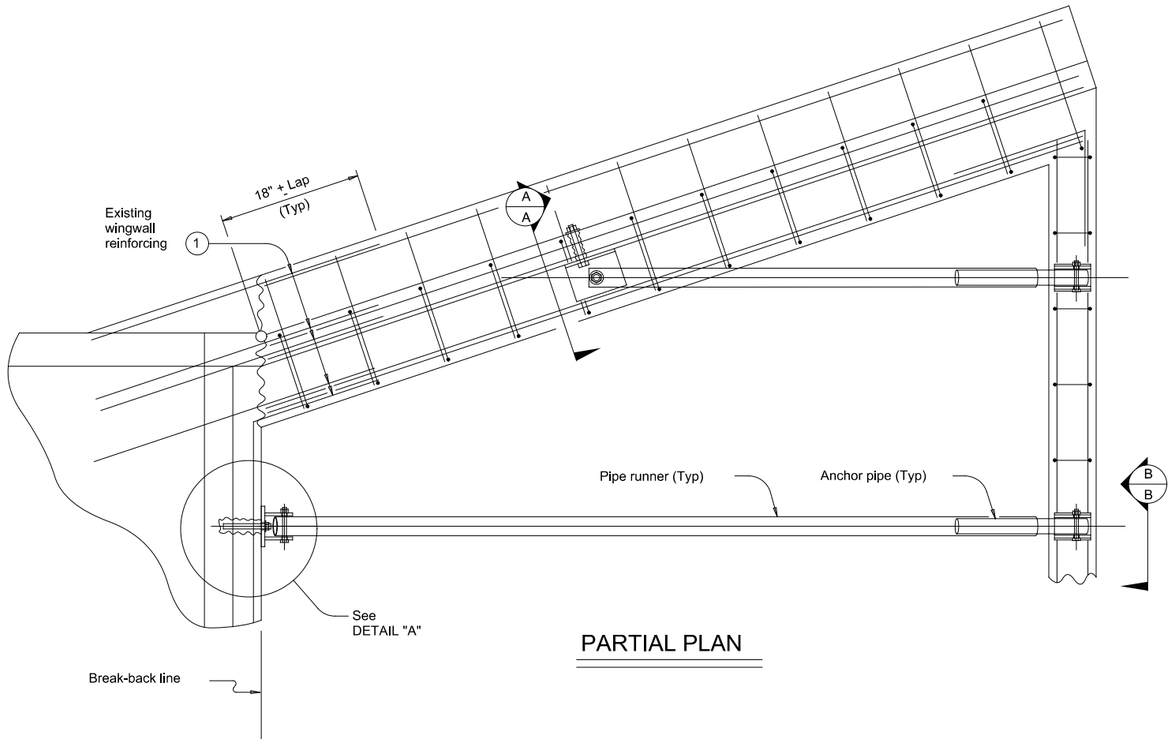
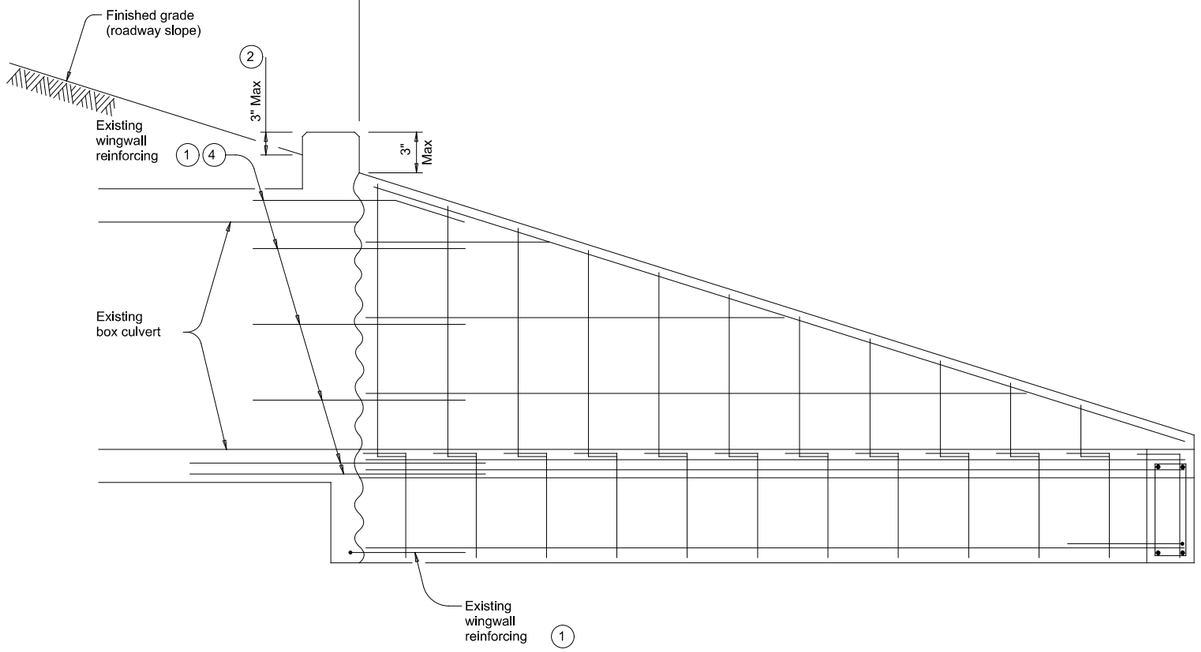
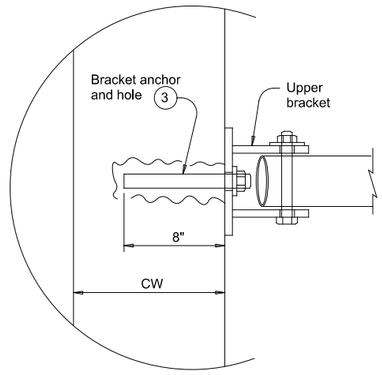


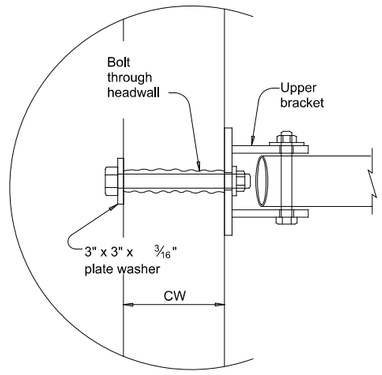
PARTIAL PLAN



ELEVATION

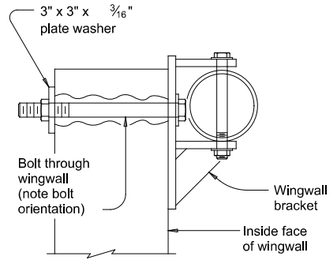


For CW greater than 8"

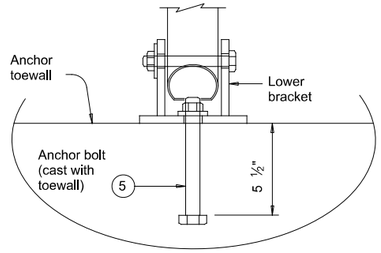


For CW 8" and less

DETAIL "A"



SECTION A-A



SECTION B-B

1. Clean and straighten existing reinforcing to lap with new reinforcing as shown. The Engineer may require additional dowels to lap with the new reinforcing if the existing reinforcing is damaged or is not suitably located to lap with new reinforcing. These additional dowels must be #5 x 2'-0".
2. For vehicle safety, reduce curb height, if necessary to provide a maximum 3" projection above finished grade. No quantity changes or additional compensation will be allowed for this work.
3. Provide ¾" Dia adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rod with one hex head nut and one hardened steel washer. Embed threaded rods into curb, wingwall, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 8". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.
4. If required, embed wingwall anchor dowels into existing box culvert using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 8".
5. At Contractor's option, adhesive anchors may be used. Provide ¾" Dia adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 8". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.

MATERIAL NOTES:

Install epoxy adhesive anchorages in accordance with the manufacturer's instructions including hole size, drilling equipment and method, hole cleaning equipment and method, mixing and dispensing epoxy, and anchor insertion. Do not alter the manufacturer's mixing nozzle or dispenser. Anchorage bars or bolts must be clean and free of grease, oil, or any other foreign material. Demonstrate hole cleaning method to the Engineer for approval and continue the approved process for all anchorage locations. Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

GENERAL NOTES:

Use these details in conjunction with the SETB standard sheets. Shorten reinforcing Bars D, M, P, and R when utilizing existing reinforcing, as shown. If required, add dowels to lap with new reinforcing, as shown. No increase or decrease to the pay quantities is permitted for these adjustments in the reinforcing steel or concrete quantities.

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

RETROFIT DETAILS FOR EXISTING BOX CULVERTS

SETBR

FILE: setbrste-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		105

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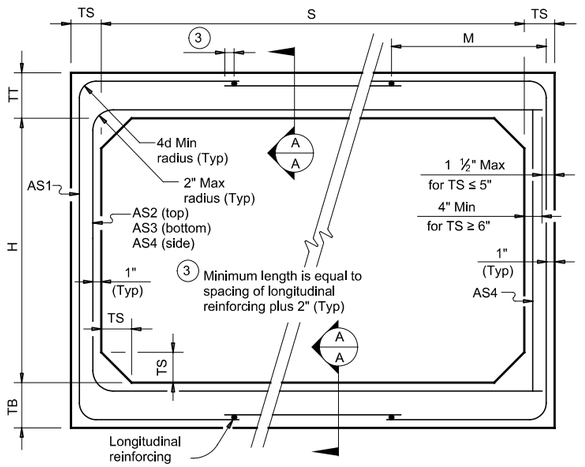
Date: 4/19/2023 10:38 PM

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
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

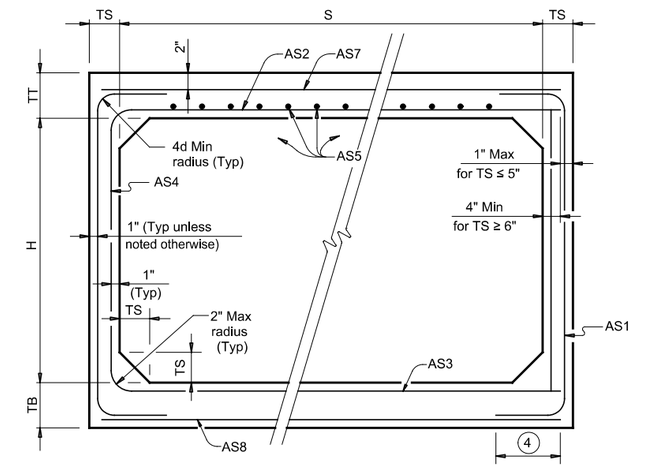
(1) For box length = 8'-0"

(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.



CORNER OPTION "A" CORNER OPTION "B"

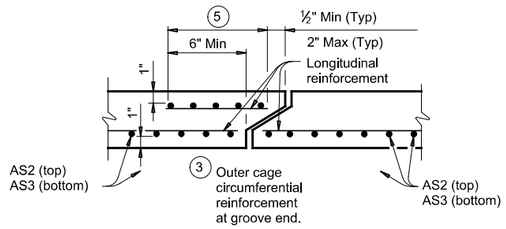
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) 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)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

8'-0" SPAN

SCP-8

FILE: scp08sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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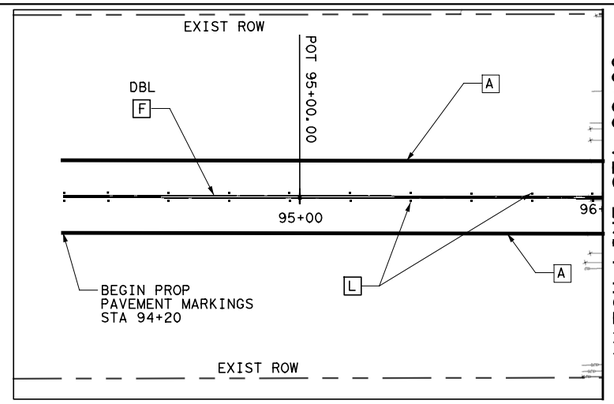
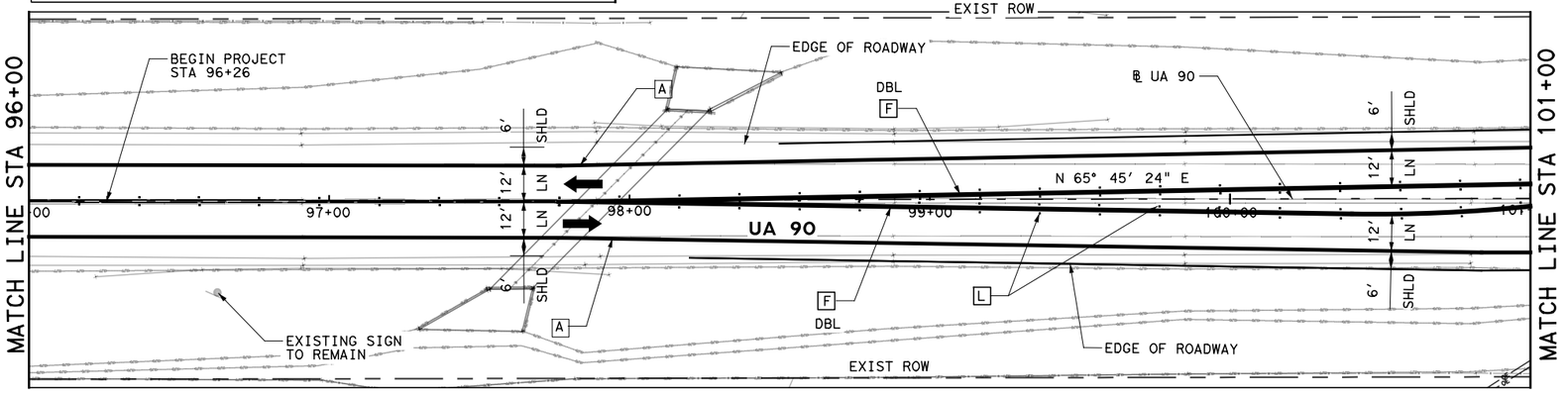
	SAT	GUADALUPE		105A





QUANTITY SUMMARY				
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6343	REF PROF PAV MRK TY I (W)6"(SLD)(100MIL)	LF	2625
B	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	420
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	3
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	3
E	0666 6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	0
F	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	3540
G	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	74
H	0666 6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	0
J	0666 6156	REFL PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	0
K	0672 6007	REFL PAV MRKR TY I-C	EA	22
L	0672 6009	REFL PAV MRKR TY II-A-A	EA	176
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	0
	0658 6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	0

LEGEND

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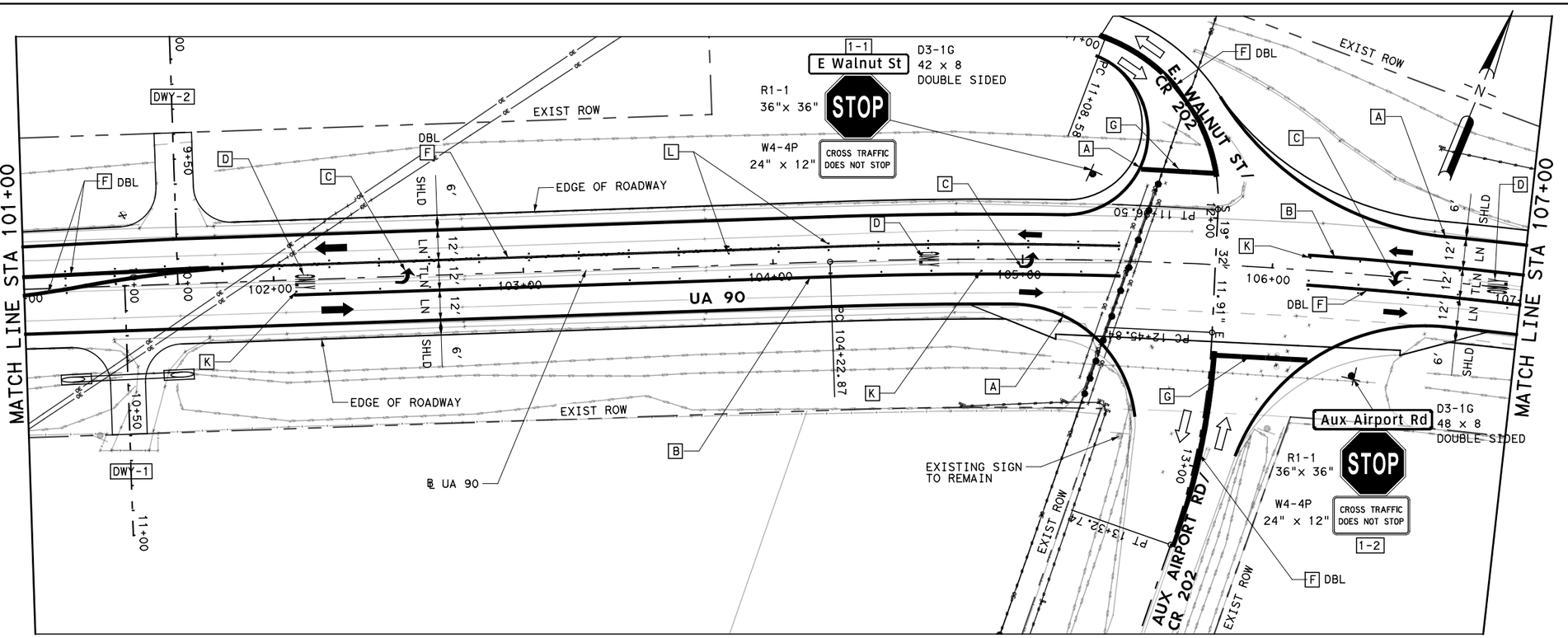
- SIGN (EXIST)
- OBJECT MRKR (2Z)(WFLX)
- DWY-X DRIVEWAY NUMBER



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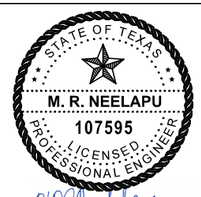


TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
738 Hwy 6 South, Suite 430
Houston, Texas 77079
(832) 619-1000
TEDSI
TBPE F-1640

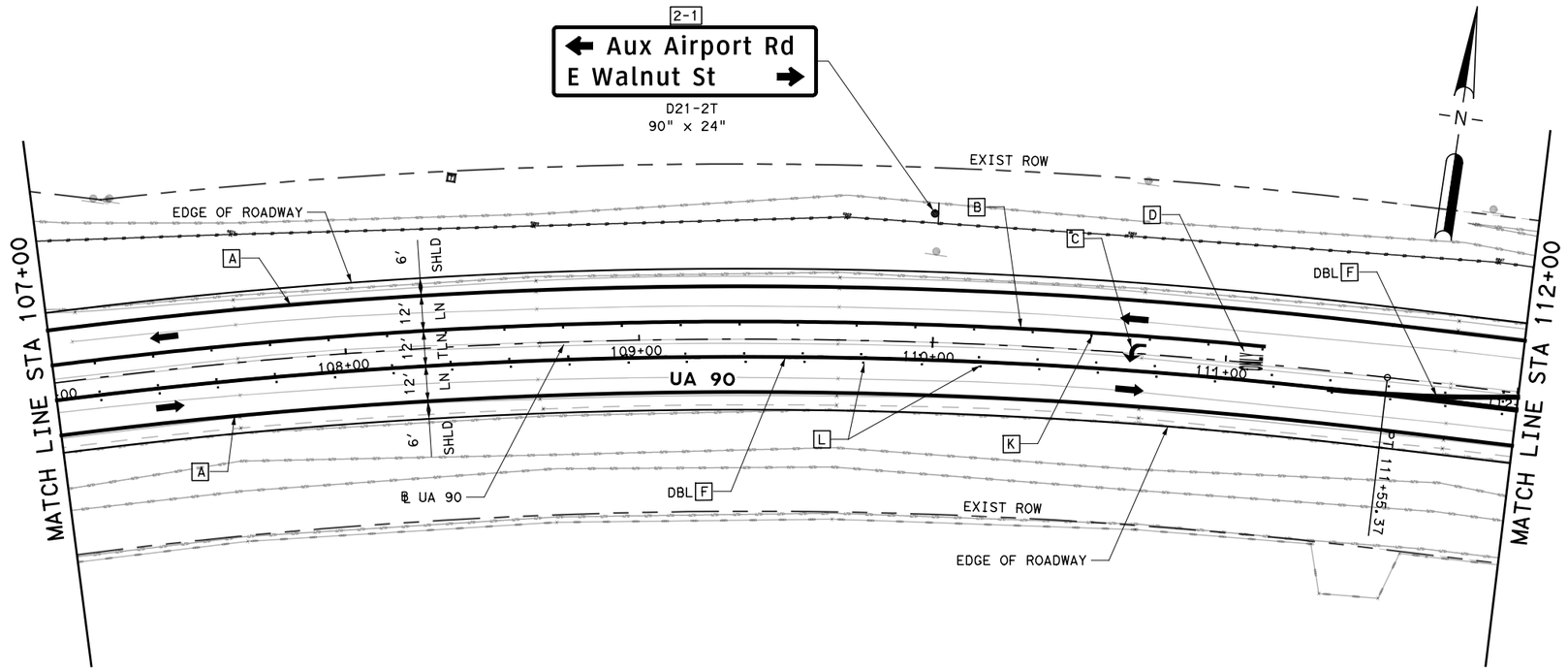
Texas Department of Transportation

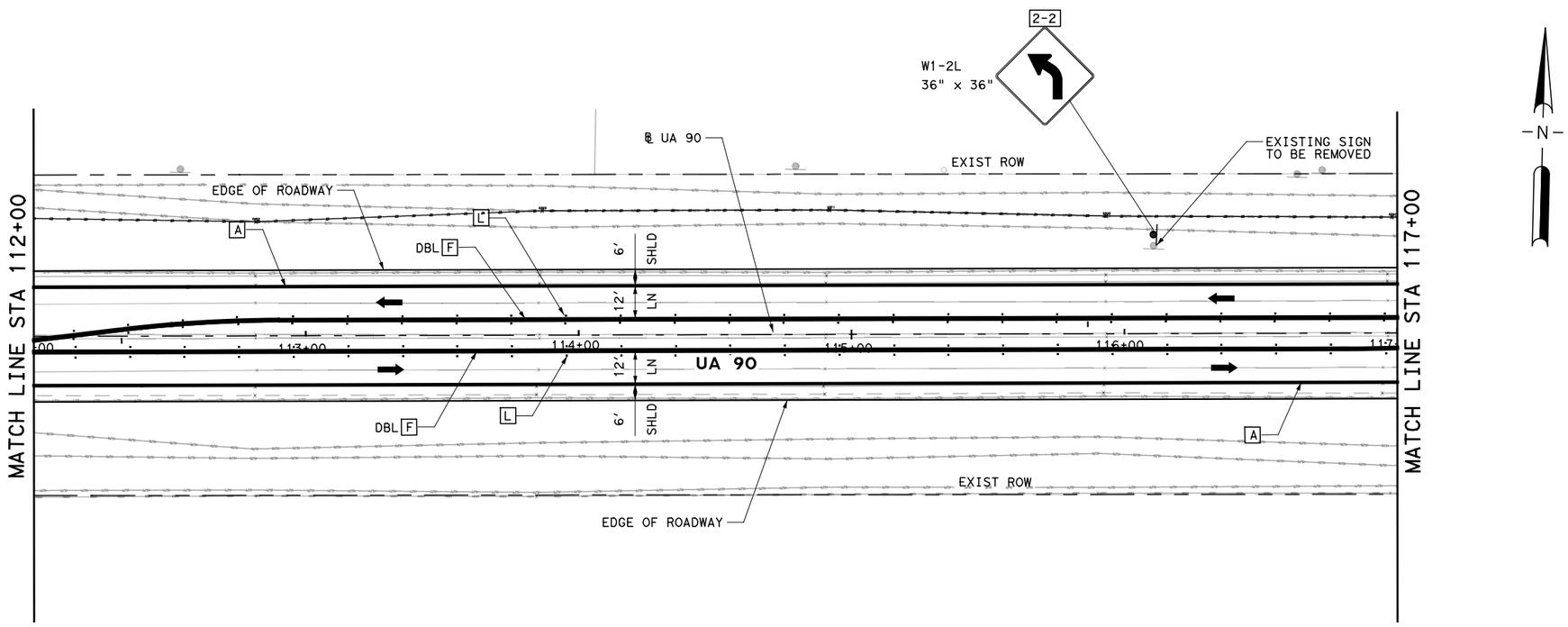
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SIGNING & PAVEMENT MARKINGS LAYOUT
BEGIN TO STA 107+00

SHEET 1 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	106





QUANTITY SUMMARY

	ITEM	DESCRIPTION	UNIT	QTY
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B	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	414
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	1
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	1
E	0666 6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	0
F	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	3079
G	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	0
H	0666 6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	0
J	0666 6156	REFL PAV MRK TY I(Y) (MED NOSE)(100MIL)	EA	0
K	0672 6007	REFL PAV MRKR TY I-C	EA	22
L	0672 6009	REFL PAV MRKR TY II-A-A	EA	174
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
	0644 6036	IN SM RD SN SUP&AM TYS80(1)SA(U-BM)	EA	0
	0658 6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	0

LEGEND

- SIGN (PROP)
- SIGN (EXIST)
- OBJECT MRKR (2Z)(WFLX)
- DWY-X DRIVEWAY NUMBER

0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
M. R. NEELAPU
107595
LICENSED
PROFESSIONAL ENGINEER
4/19/2023

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
TEDSI
TBPE F-1640
738 Hwy 6 South, Suite 430
Houston, Texas 77079
(832) 619-1000

Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SIGNING & PAVEMENT MARKINGS LAYOUT
STA 107+00 TO STA 117+00

SHEET 2 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	107

4/20/2023
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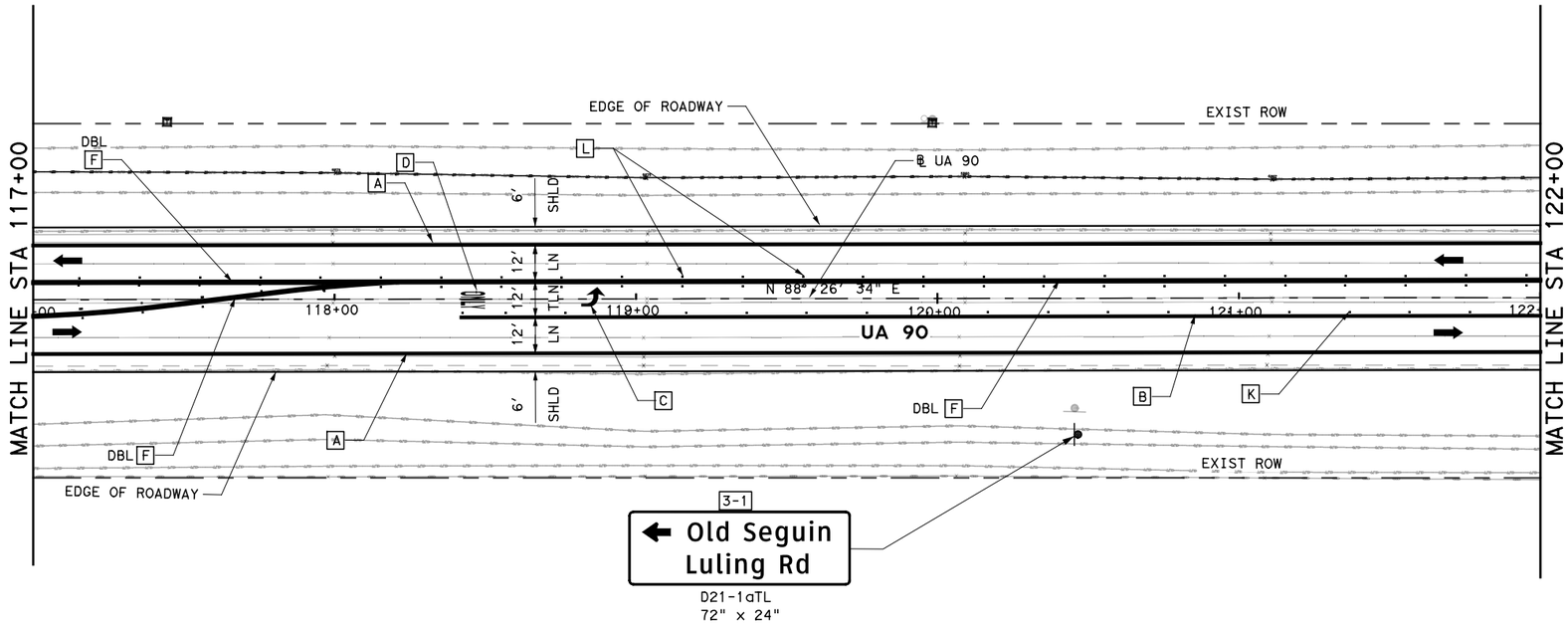

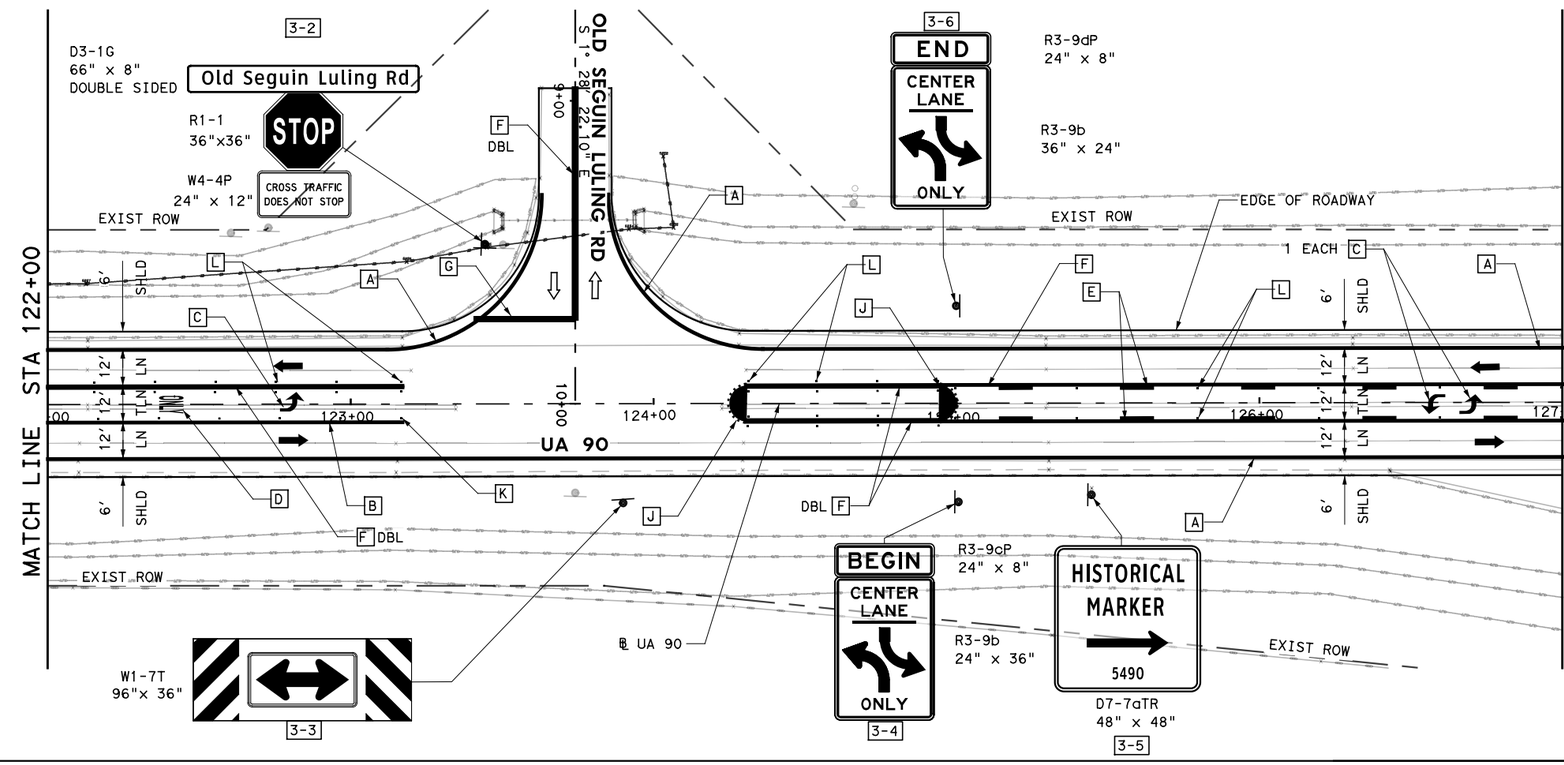

QUANTITY SUMMARY				
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6343	REF PROF PAV MRK TY I (W)6"(SLD)(100MIL)	LF	2035
B	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	475
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	4
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	2
E	0666 6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	100
F	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	2400
G	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	36
H	0666 6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	0
J	0666 6156	REFL PAV MRK TY I(Y) (MED NOSE)(100MIL)	EA	2
K	0672 6007	REFL PAV MRKR TY I-C	EA	25
L	0672 6009	REFL PAV MRKR TY II-A-A	EA	123
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	3
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
	0644 6036	IN SM RD SN SUP&AM TYS80(1)SA(U-BM)	EA	1
	0658 6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	0

LEGEND

- SIGN (PROP)
- SIGN (EXIST)
- OBJECT MRKR (2Z)(WFLX)
- DWY-X DRIVEWAY NUMBER

0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
M. R. NEELAPU
107595
LICENSED PROFESSIONAL ENGINEER
4/19/2023

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
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Houston, Texas 77079
(832) 619-1000
TEDSI TBPE F-1640

Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SIGNING & PAVEMENT MARKINGS LAYOUT
STA 117+00 TO STA 127+00

SHEET 3 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	108

4/20/2023
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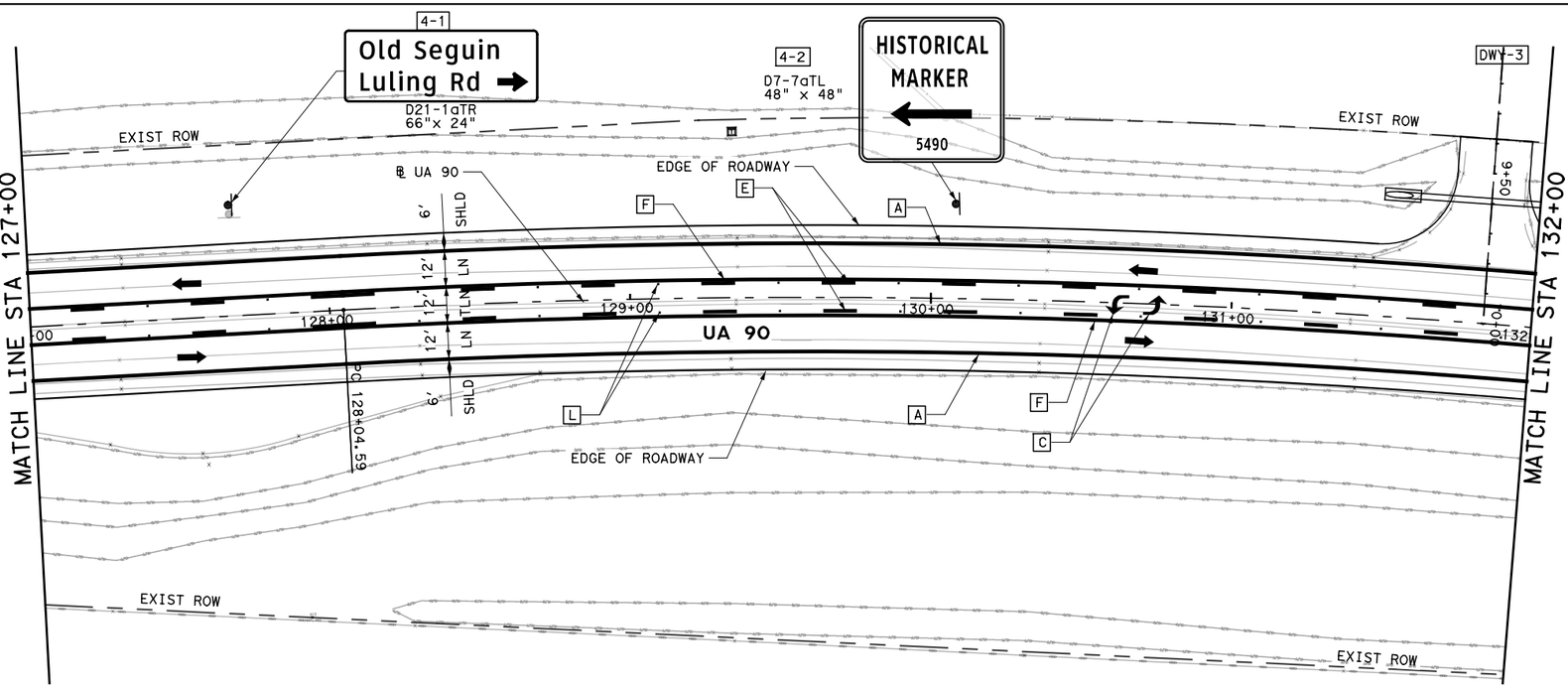
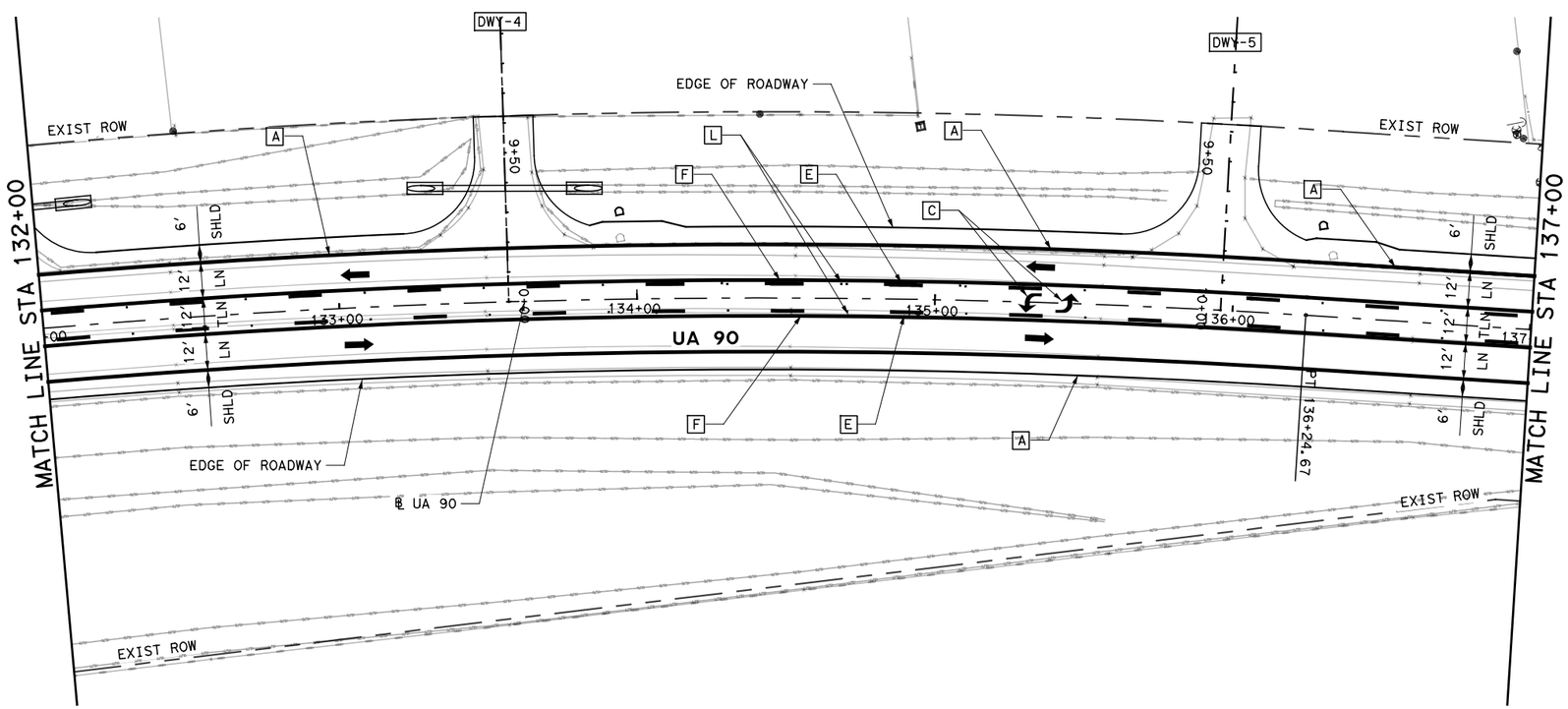


QUANTITY SUMMARY				
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6343	REF PROF PAV MRK TY I (W)6"(SLD)(100MIL)	LF	2000
B	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	0
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	4
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	0
E	0666 6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	1000
F	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	2000
G	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	0
H	0666 6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	0
J	0666 6156	REFL PAV MRK TY I(Y) (MED NOSE)(100MIL)	EA	0
K	0672 6007	REFL PAV MRKR TY I-C	EA	0
L	0672 6009	REFL PAV MRKR TY II-A-A	EA	50
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	0
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
	0644 6005	IN SM RD SN SUP&AM TY10BWG(1)SA(T-2EXT)	EA	0
	0658 6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	0



0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
M. R. NEELAPU
107595
LICENSED
PROFESSIONAL ENGINEER
4/19/2023

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
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TEDSI
TBPE F-1640

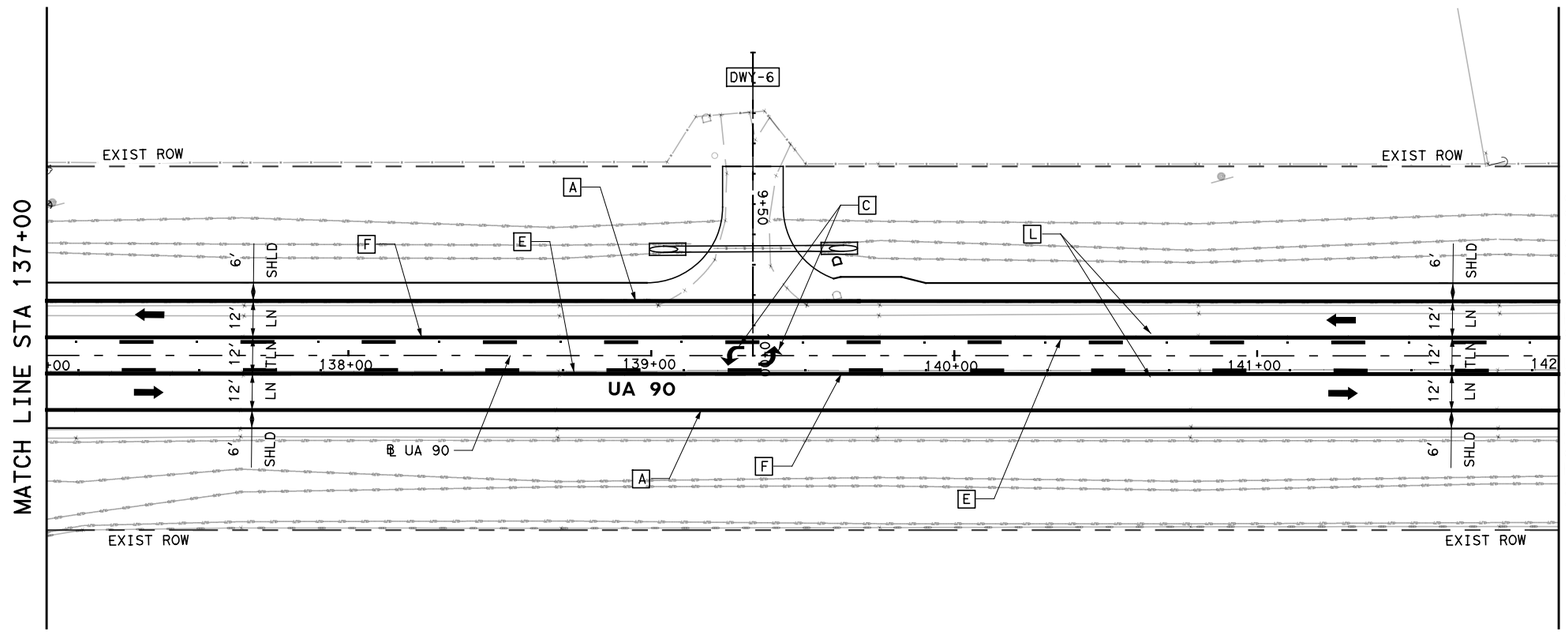
Texas Department of Transportation

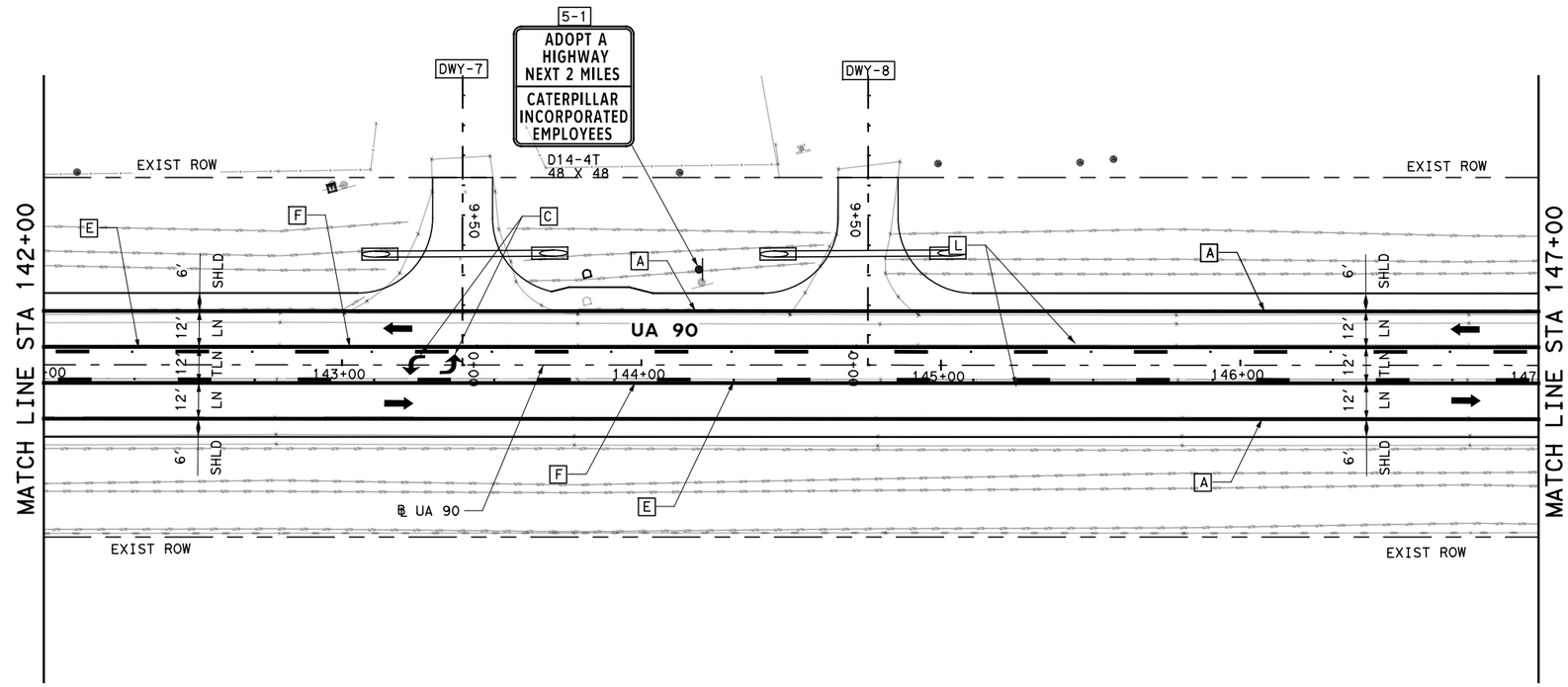
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SIGNING & PAVEMENT MARKINGS LAYOUT
STA 127+00 TO STA 137+00

SHEET 4 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	109





QUANTITY SUMMARY				
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6343	REF PROF PAV MRK TY I (W)6"(SLD)(100MIL)	LF	2000
B	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	0
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	4
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	0
E	0666 6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	1000
F	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	2000
G	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	0
H	0666 6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	0
J	0666 6156	REFL PAV MRK TY I(Y) (MED NOSE)(100MIL)	EA	0
K	0672 6007	REFL PAV MRKR TY I-C	EA	0
L	0672 6009	REFL PAV MRKR TY II-A-A	EA	52
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	0
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
	0658 6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	0

LEGEND

- SIGN (PROP)
- SIGN (EXIST)
- OBJECT MRKR (2Z)(WFLX)
- DWY-X DRIVEWAY NUMBER

0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
M. R. NEELAPU
107595
LICENSED PROFESSIONAL ENGINEER
4/19/2023

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
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Houston, Texas 77079
(832) 619-1000
TEDSI TBPE F-1640

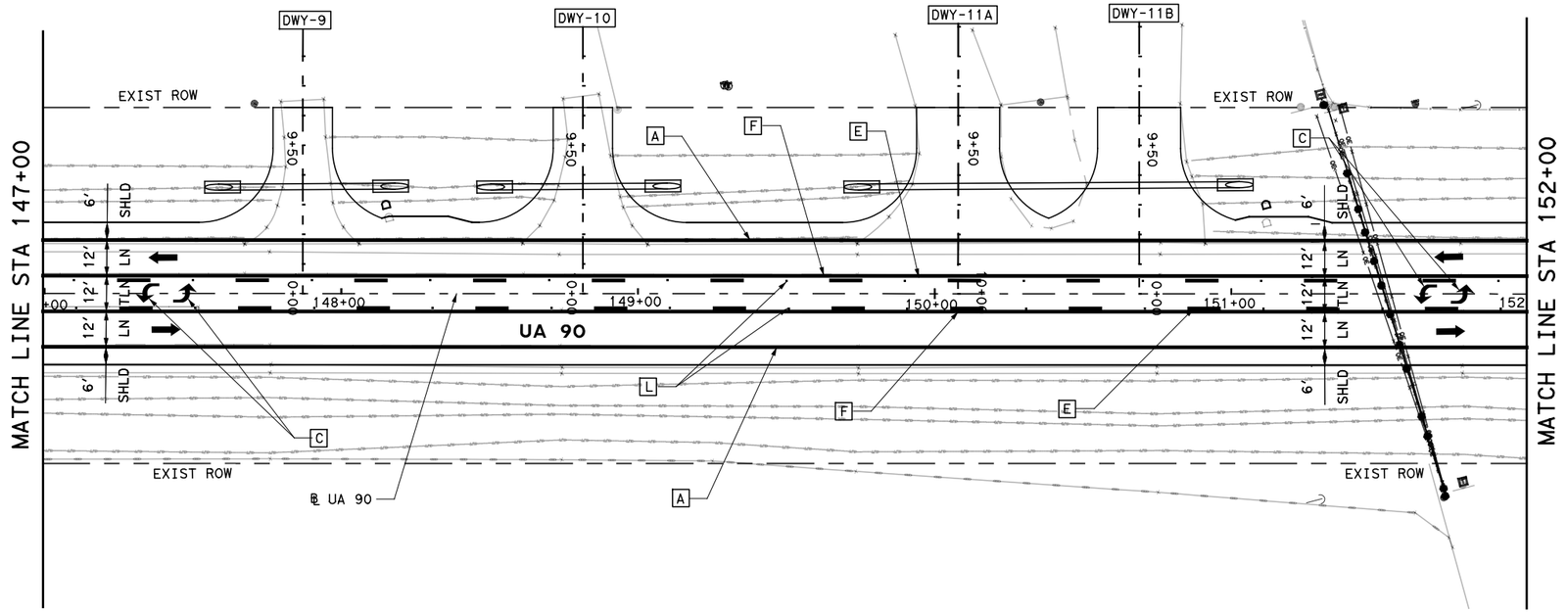
Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SIGNING & PAVEMENT MARKINGS LAYOUT
STA 137+00 TO STA 147+00

SHEET 5 OF 7

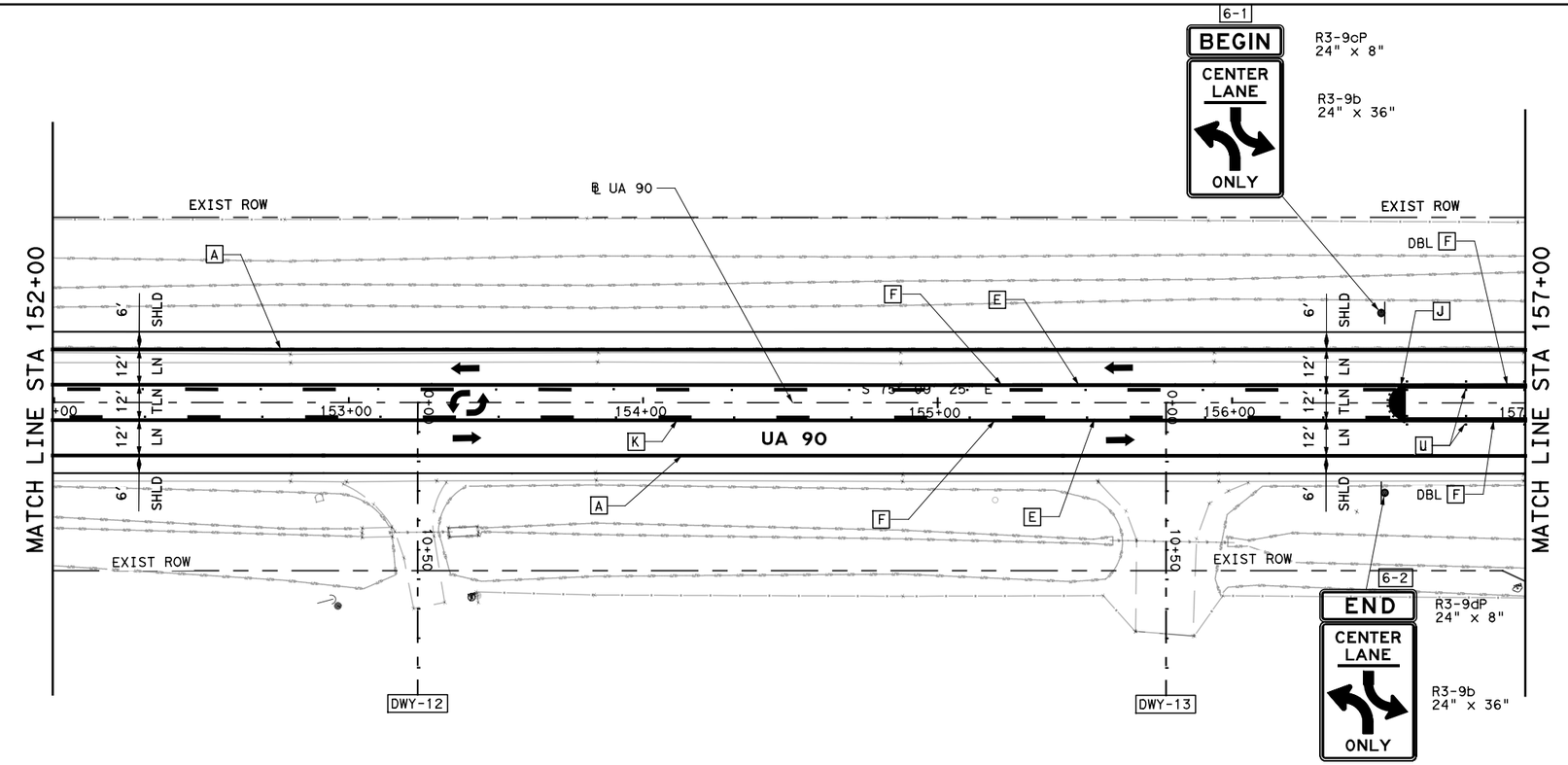
FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	110



QUANTITY SUMMARY				
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6343	REF PROF PAV MRK TY I (W)6"(SLD)(100MIL)	LF	2000
B	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	0
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	4
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	0
E	0666 6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	980
F	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	2078
G	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	0
H	0666 6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	0
J	0666 6156	REFL PAV MRK TY I(Y) (MED NOSE)(100MIL)	EA	1
K	0672 6007	REFL PAV MRKR TY I-C	EA	0
L	0672 6009	REFL PAV MRKR TY II-A-A	EA	66
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	0
	0658 6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	0

LEGEND

- SIGN (PROP)
- SIGN (EXIST)
- OBJECT MRKR (2Z)(WFLX)
- DWY-X DRIVEWAY NUMBER



0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
M. R. NEELAPU
107595
LICENSED PROFESSIONAL ENGINEER
4/19/2023

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
738 Hwy 6 South, Suite 430
Houston, Texas 77079
(832) 619-1000
TBPE F-1640

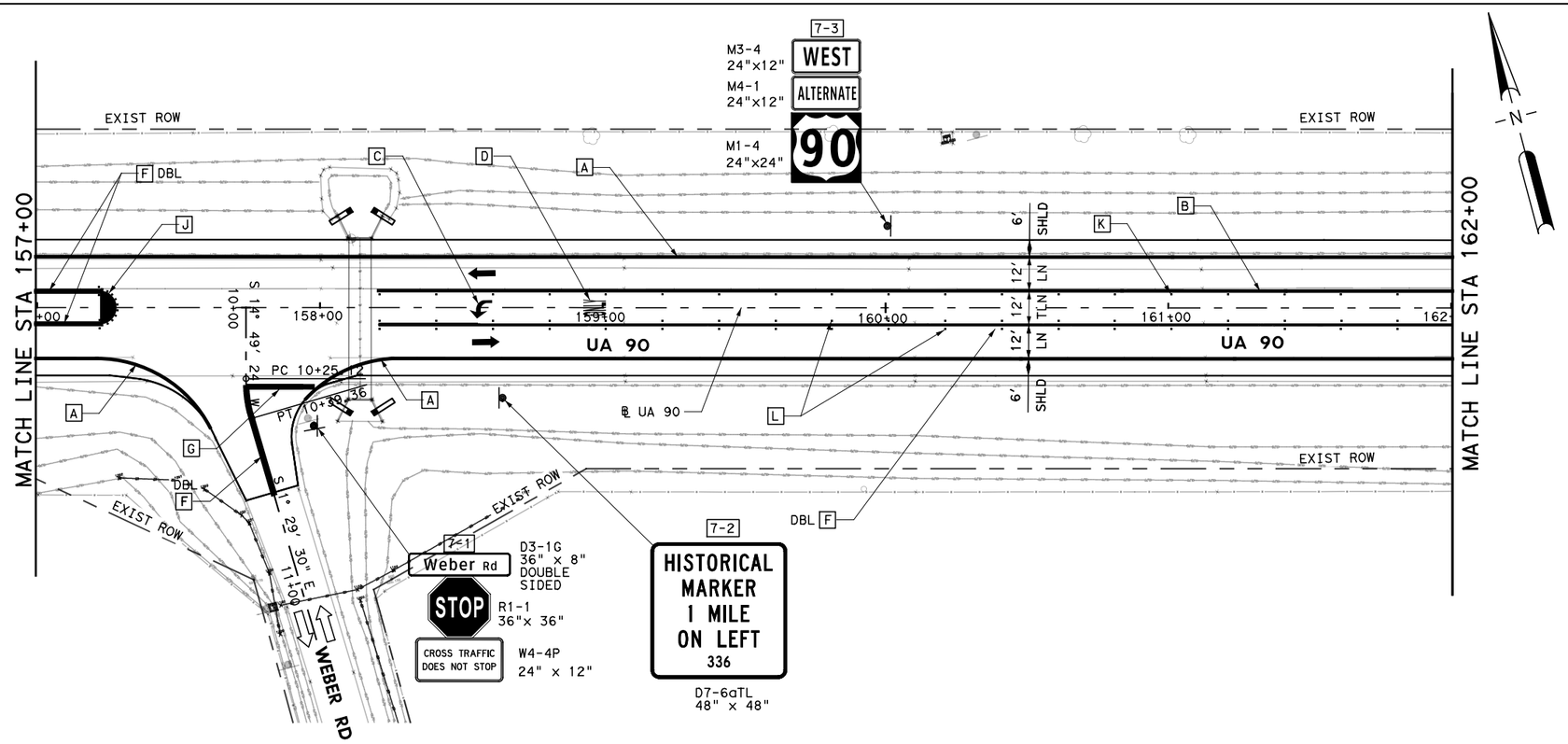
Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SIGNING & PAVEMENT MARKINGS LAYOUT
STA 147+00 TO STA 157+00

SHEET 6 OF 7

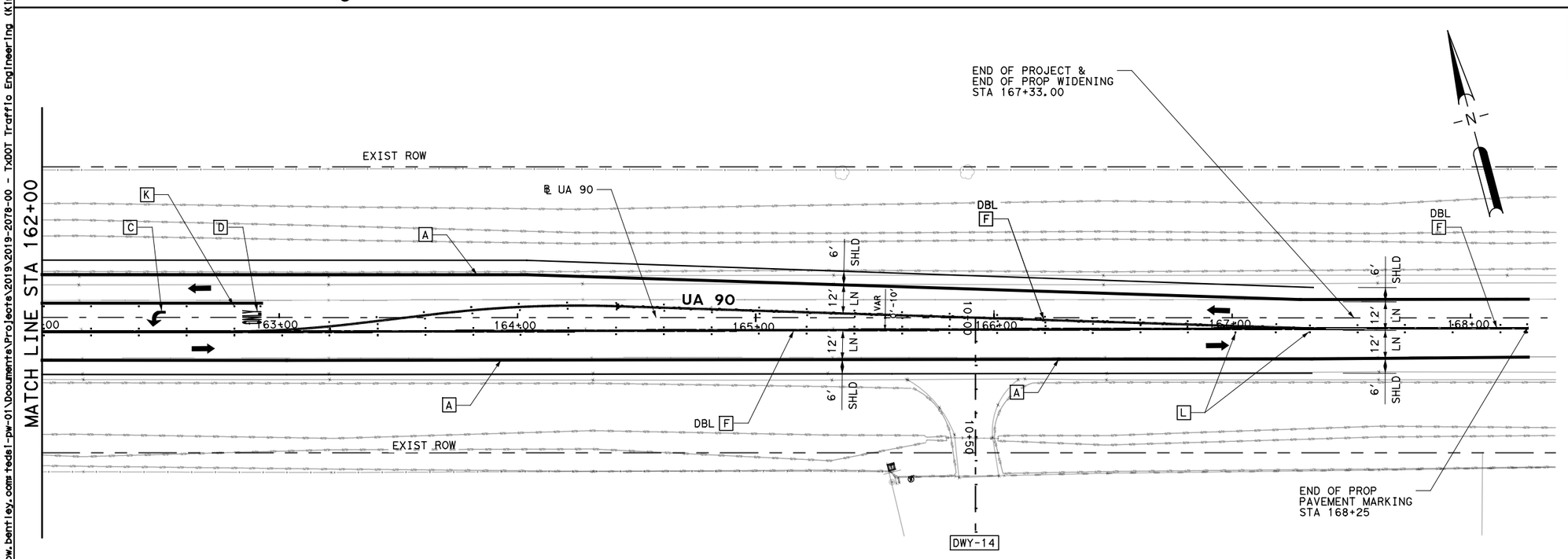
FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	111



QUANTITY SUMMARY				
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6343	REF PROF PAV MRK TY I (W)6"(SLD)(100MIL)	LF	2282
B	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	472
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	2
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	2
E	0666 6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	0
F	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	2957
G	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	36
H	0666 6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	0
J	0666 6156	REFL PAV MRK TY I(Y) (MED NOSE)(100MIL)	EA	1
K	0672 6007	REFL PAV MRKR TY I-C	EA	25
L	0672 6009	REFL PAV MRKR TY II-A-A	EA	168
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
	0658 6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	4

LEGEND

- SIGN (PROP)
- SIGN (EXIST)
- OBJECT MRKR (2Z)(WFLX)
- DWY-X DRIVEWAY NUMBER



0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
M. R. NEELAPU
107595
LICENSED
PROFESSIONAL ENGINEER
4/19/2023

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
TBPE F-1640
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Houston, Texas 77079
(832) 619-1000

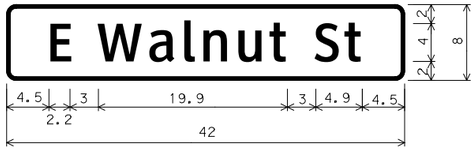
Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SIGNING & PAVEMENT MARKINGS LAYOUT
STA 157+00 TO END

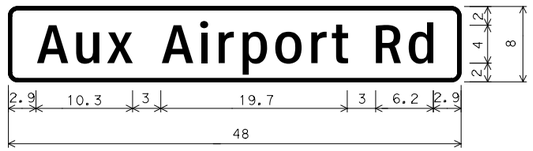
SHEET 7 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	112



1.0" Radius, 0.4" Border, White on, Green;
"E Walnut St", ClearviewHwy-3-W;

D3-1G, SIGN 1-1
SHEET 106

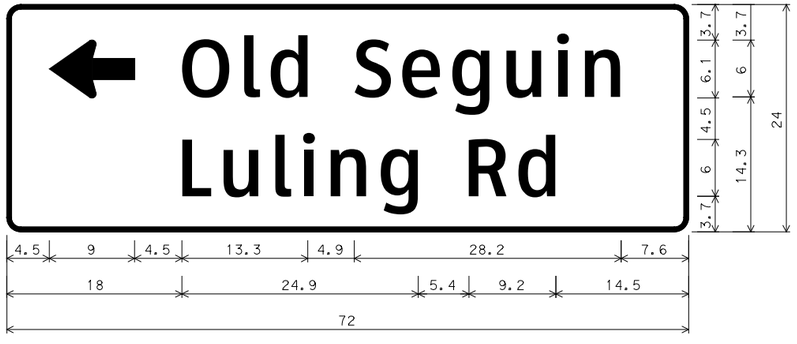


1.0" Radius, 0.4" Border, White on, Green;
"Aux Airport Rd", ClearviewHwy-3-W;

D3-1G, SIGN 1-2
SHEET 106

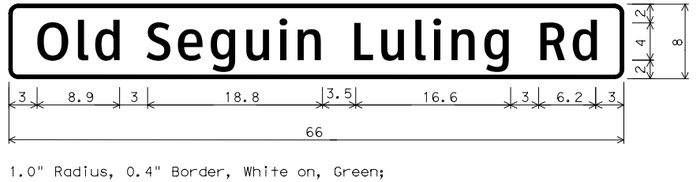
1.5" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 9.0" X 6.1" 180′; "Aux Airport Rd", ClearviewHwy-3-W;
"E Walnut St", ClearviewHwy-3-W; Standard Arrow Custom 9.0" X 6.1" 0′;

D21-2T, SIGN 2-1
SHEET 107



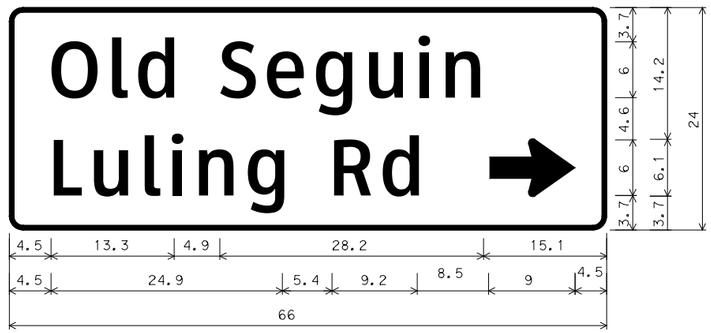
1.5" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 9.0" X 6.1" 180′;
"Old Seguin", ClearviewHwy-3-W;
"Luling Rd", ClearviewHwy-3-W;

D21-1aTL, SIGN 3-1
SHEET 108



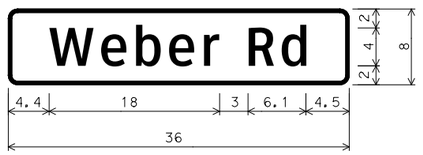
1.0" Radius, 0.4" Border, White on, Green;
"Old Seguin Luling Rd", ClearviewHwy-3-W;

D3-1G, SIGN 3-2
SHEET 108



1.5" Radius, 0.8" Border, White on, Green;
"Old Seguin", ClearviewHwy-3-W;
"Luling Rd", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 0′;

D21-1aTR, SIGN 4-1
SHEET 109



1.0" Radius, 0.4" Border, White on, Green;
"Weber Rd", ClearviewHwy-3-W;

D3-1G, SIGN 7-1
SHEET 112

STATE OF TEXAS
M. R. NEELAPU
107595
LICENSED
PROFESSIONAL ENGINEER
4/19/2023

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(832) 619-1000
TBPE F-1640

Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

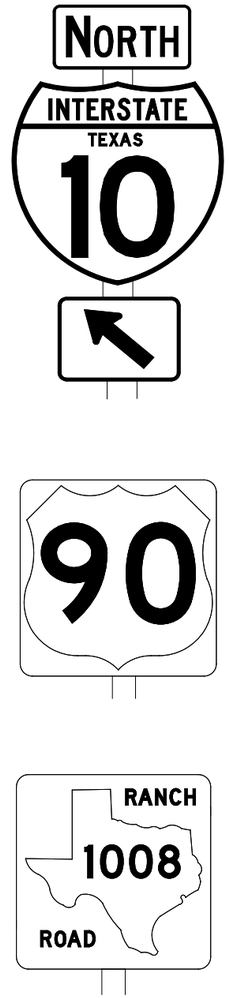
SIGNING DETAILS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	113

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

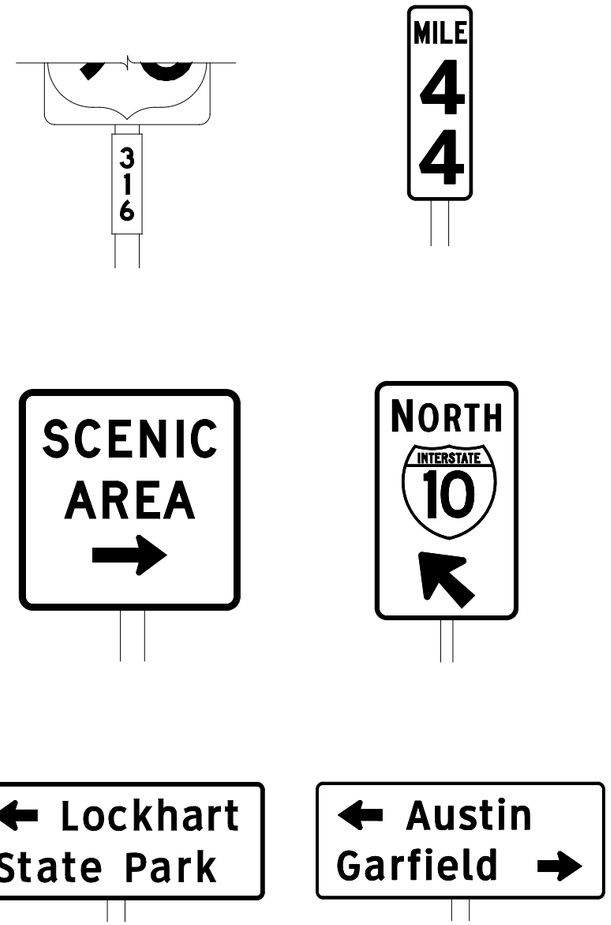
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
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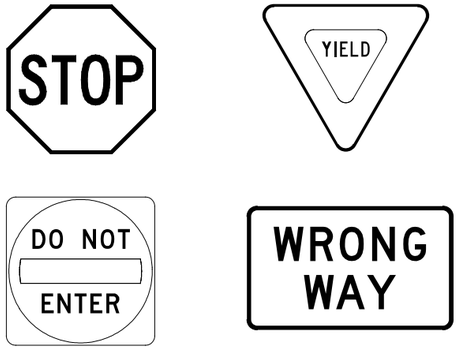
9-08	SAT	GUADALUPE		114

DATE:
FILE:

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

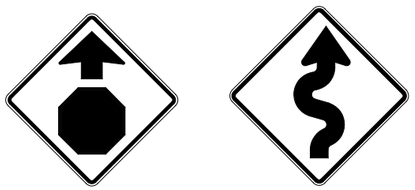
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
12-03 7-13	DIST	COUNTY		SHEET NO.
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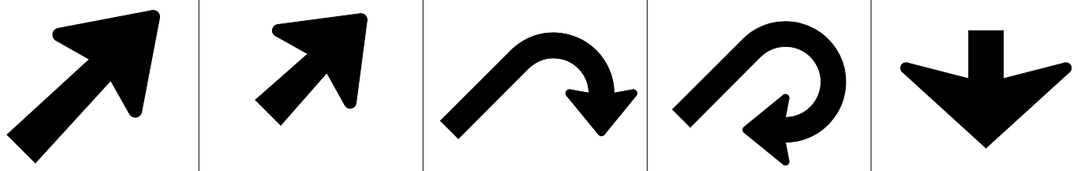
FILE:

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



Type A | Type B | E-3 | E-4 | Down Arrow

TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

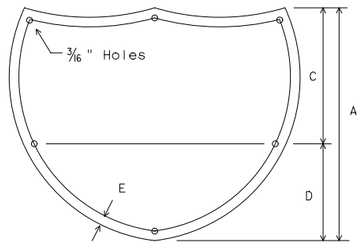
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

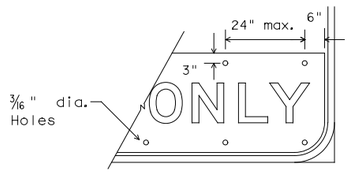
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

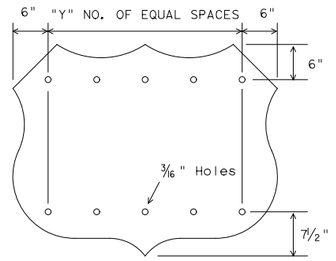


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

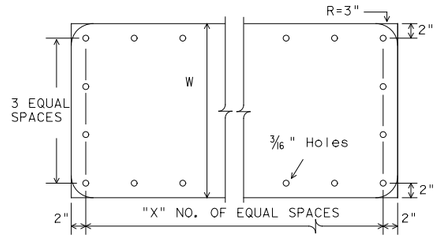


EXIT ONLY PANEL



U.S. ROUTE MARKERS

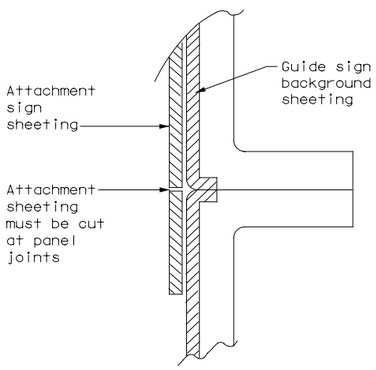
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

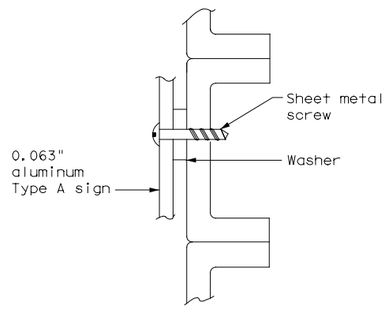
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



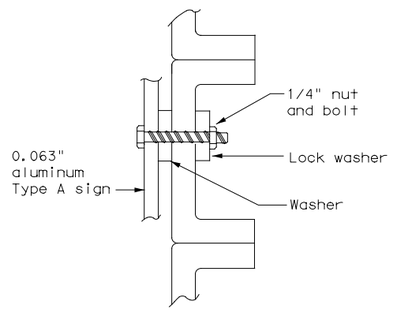
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



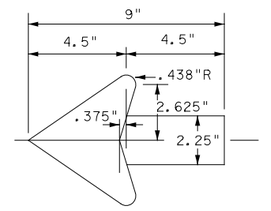
NUT/BOLT ATTACHMENT

NOTE:

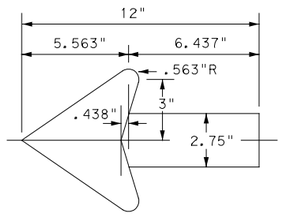
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0025	04	051	UA 90
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	SAT	GUADALUPE		116

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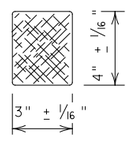
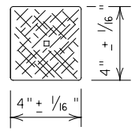
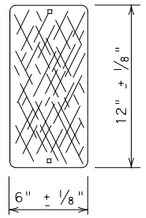
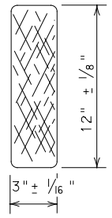
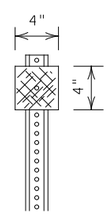
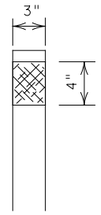
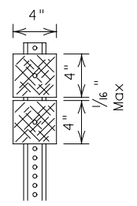
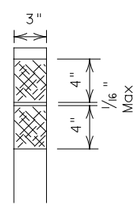
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
- S = Single
- D = Double

COLOR OF REFLECTORS
- W = White
- Y = Yellow
- R = Red

REFLECTOR UNIT SIZE
- 1 or 2

TYPE OF POST OR DELINEATOR
- WC = Wing Channel Post
- YFLX = Yellow Flexible Post
- WFLX = White Flexible Post
- BRF = Barrier Reflector

TYPE OF MOUNT
- GND = Embedded (drivable or set in concrete)
- CTB = Concrete Barrier Mount
- GF1 or GF2 = Guard Fence Attachment
- SRF = Surface Mount

DIRECTION
If Required
- BI = Bi-Directional
- BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
- 1, 2, 3, or 4

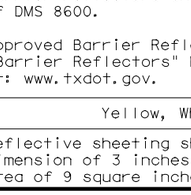
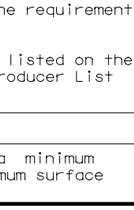
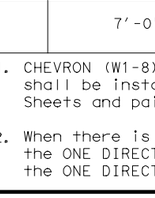
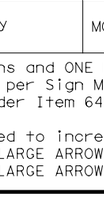
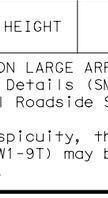
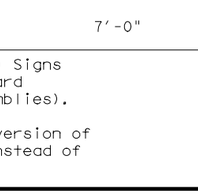
NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker only)

TYPE OF POST
- WC = Wing Channel Post
- WFLX = White Flexible Post
- TWT = Thin Walled Tubing

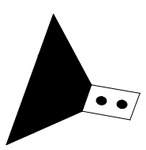
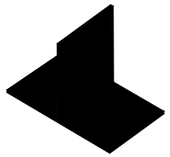
TYPE OF MOUNT
- GND = Embedded (drivable)
- SRF = Surface Mount
- WAS = Wedge Anchor Steel
- WAP = Wedge Anchor Plastic

DIRECTION
If Required
- BI = Bi-Directional

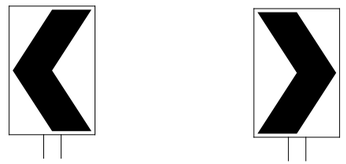
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).			

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	SAT	GUADALUPE		117

DATE:
FILE:

20A

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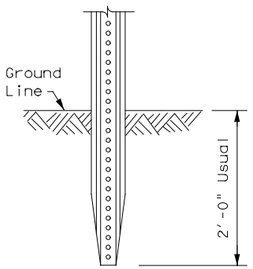
DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

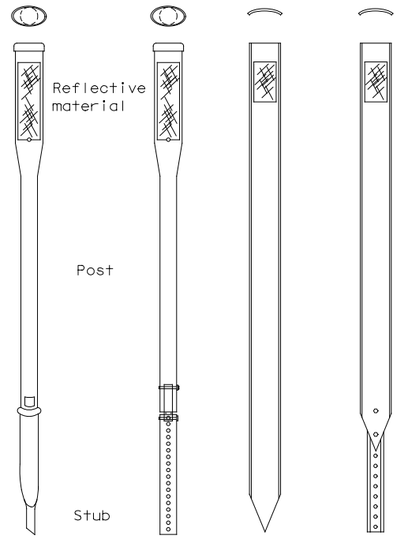


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

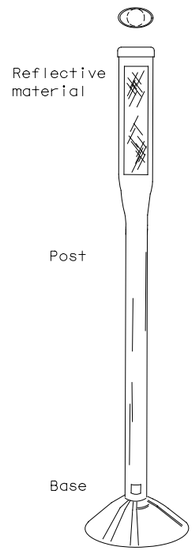
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



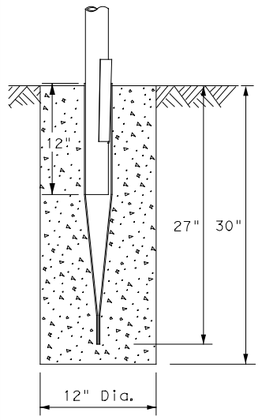
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

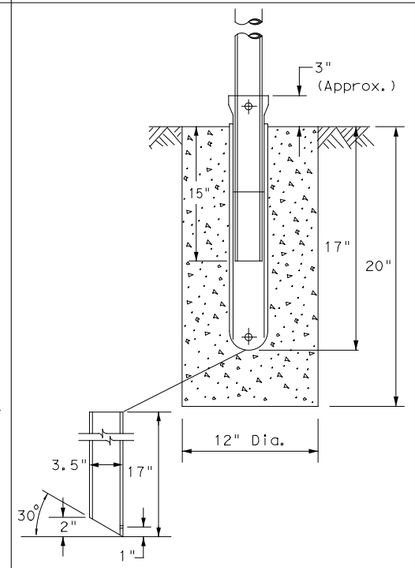
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

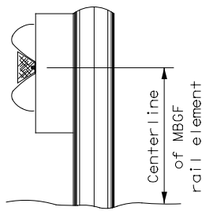
NOTE

1. Install per manufacturer's recommendations.

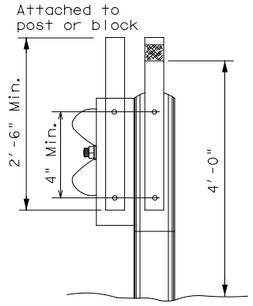
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

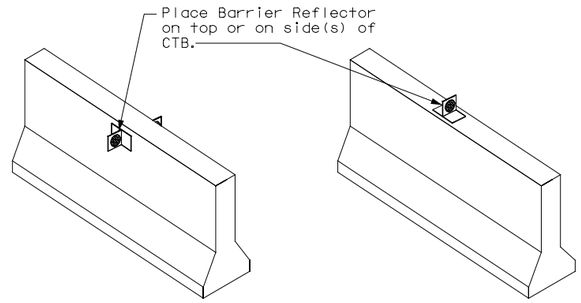
GF1



GF2



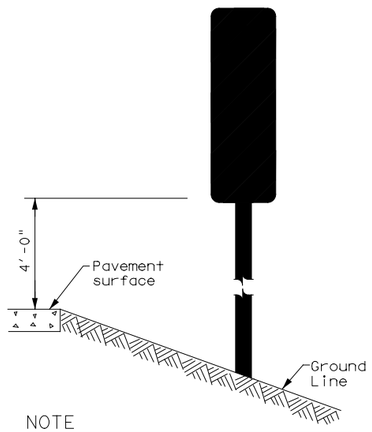
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

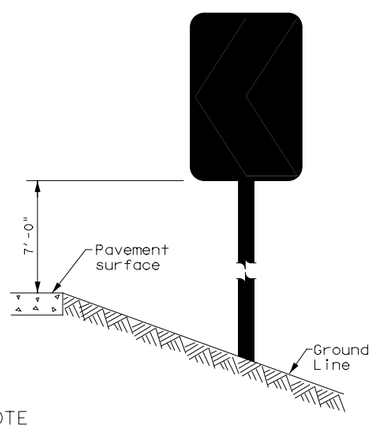
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

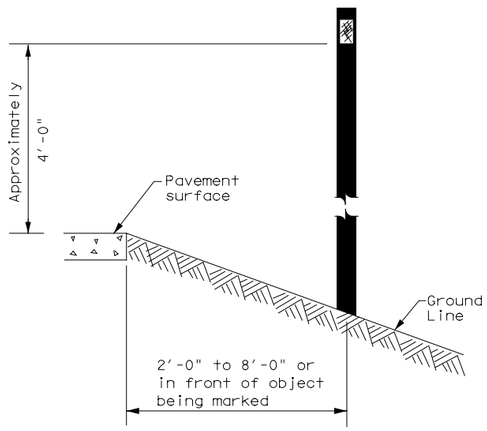
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

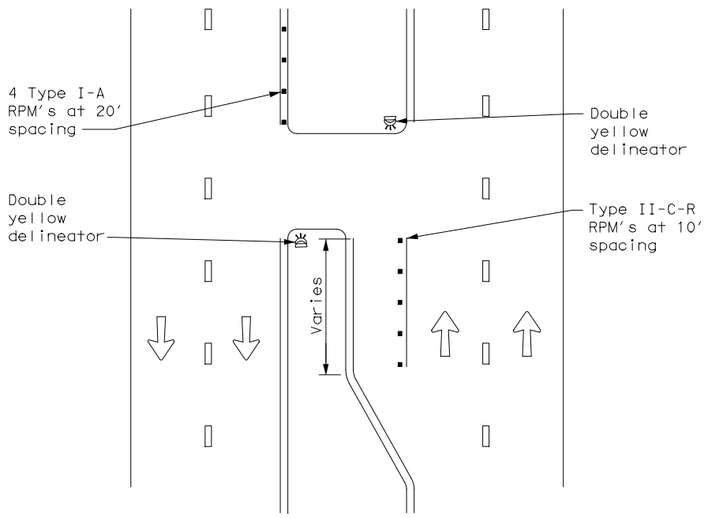
D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	SAT	GUADALUPE		118

20B

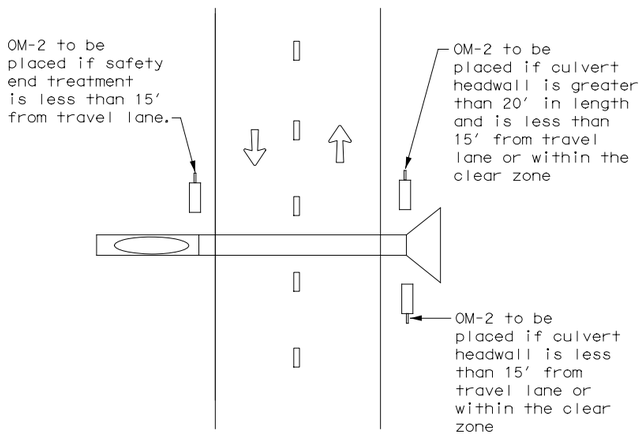
DATE:
FILE:

CROSSOVERS



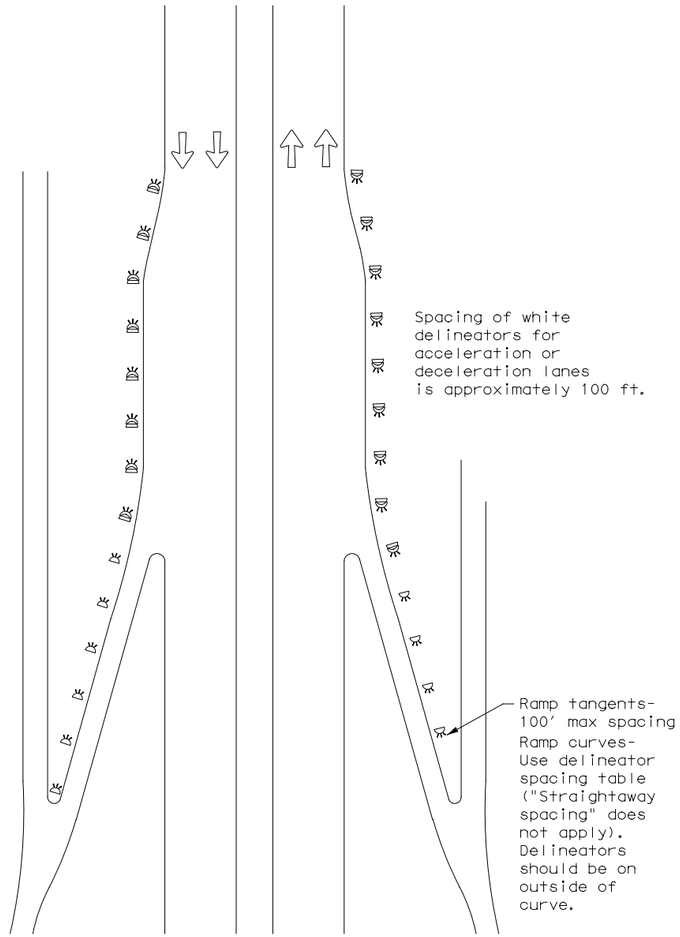
DETAIL 1

FOR CULVERTS WITHOUT MBGF



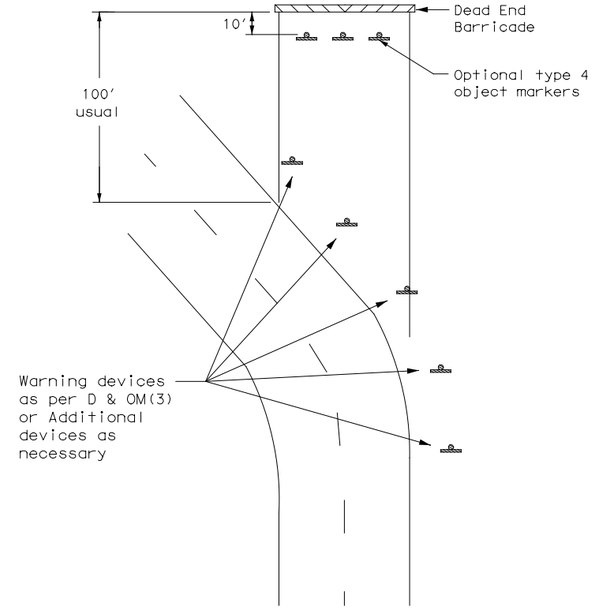
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



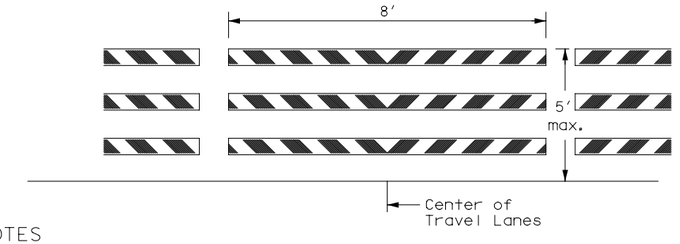
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
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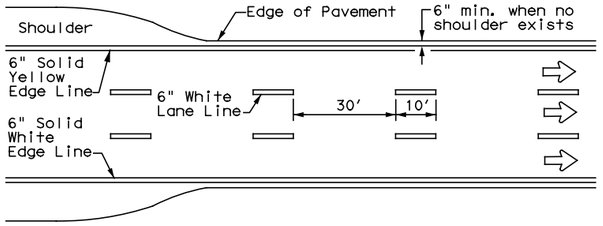
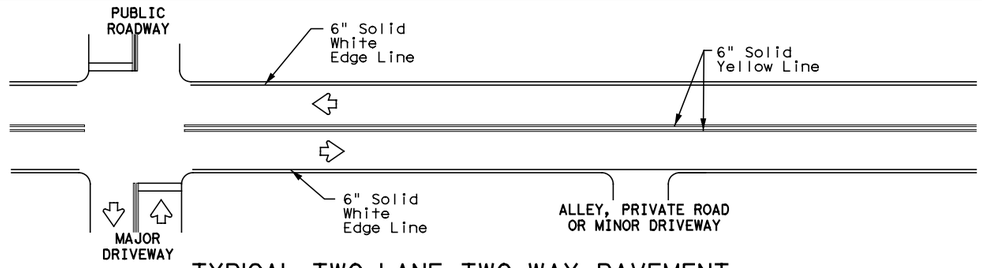
3-15	DIST	COUNTY		SHEET NO.
7-20	SAT	GUADALUPE		119

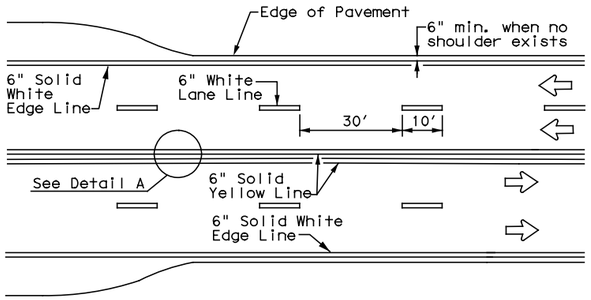
20D

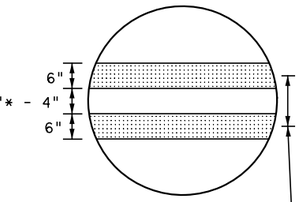


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS





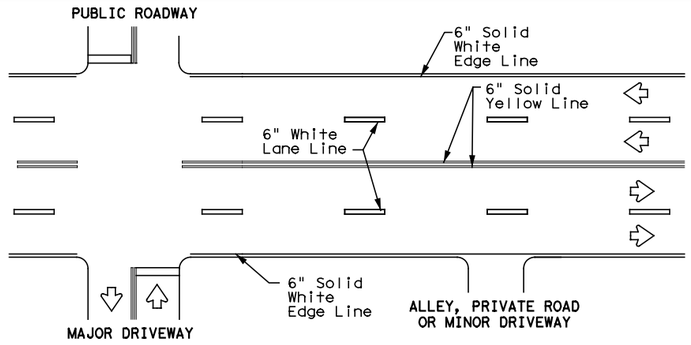
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48′ only)

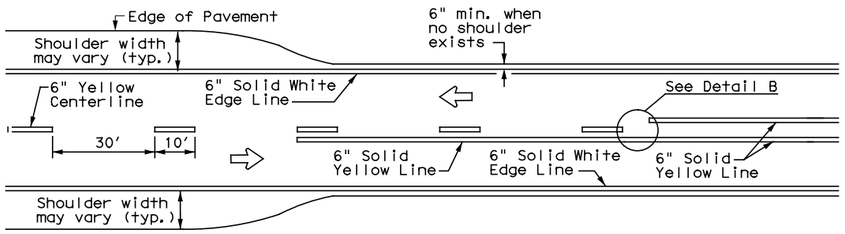
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

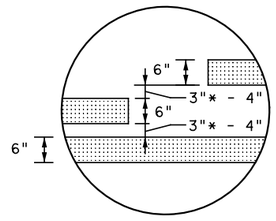
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



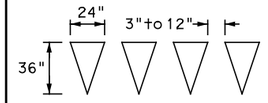
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



18" min. - 20" max.
(16" minimum for restripe projects when approved by the Engineer.)

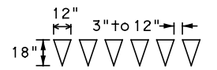
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

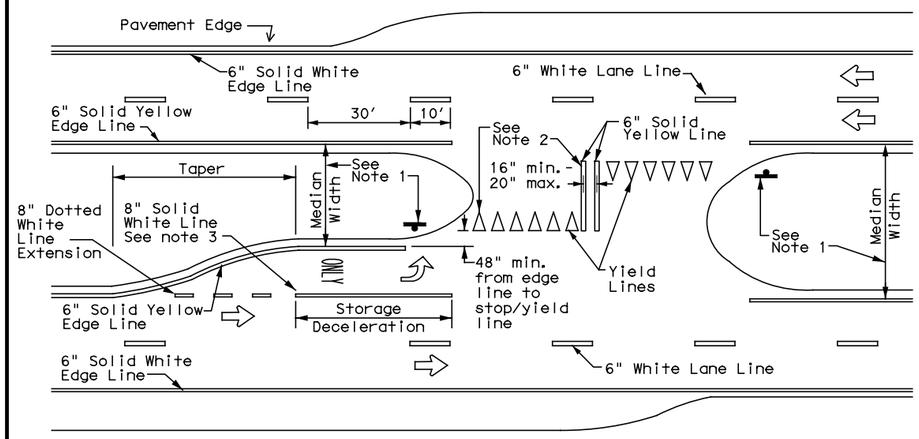


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

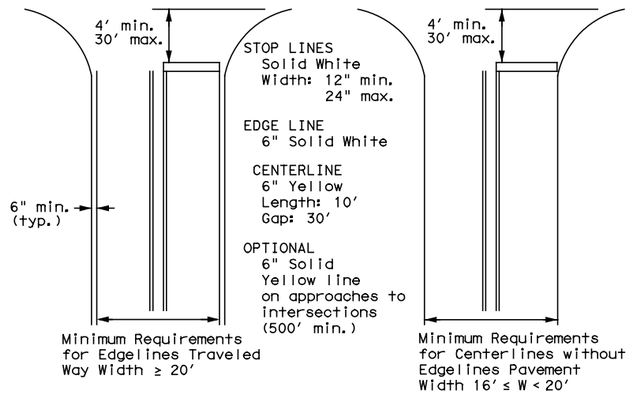
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50′ or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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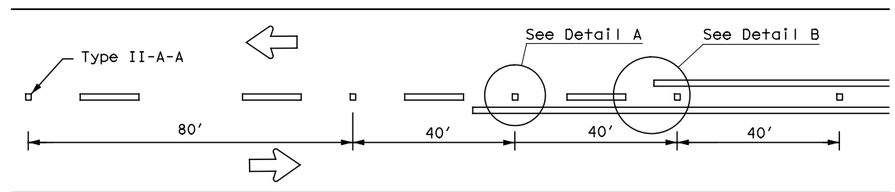
11-78 8-00 6-20	DIST	COUNTY		SHEET NO.
8-95 3-03 12-22	SAT	GUADALUPE		120
5-00 2-12				

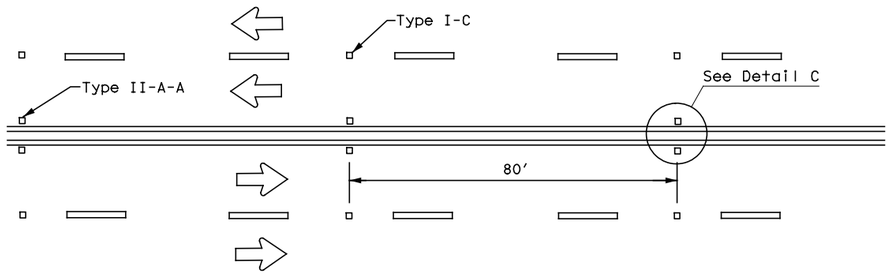
DATE:
FILE:

22A

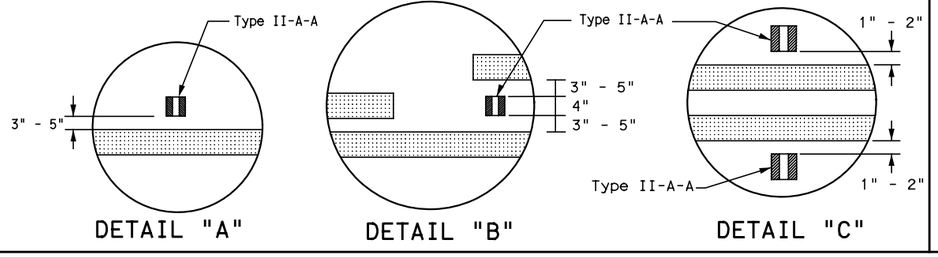
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

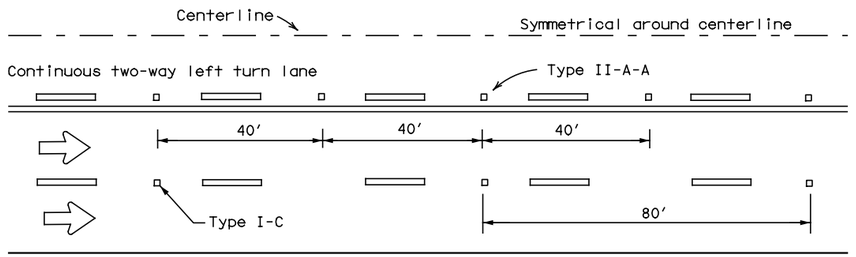


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

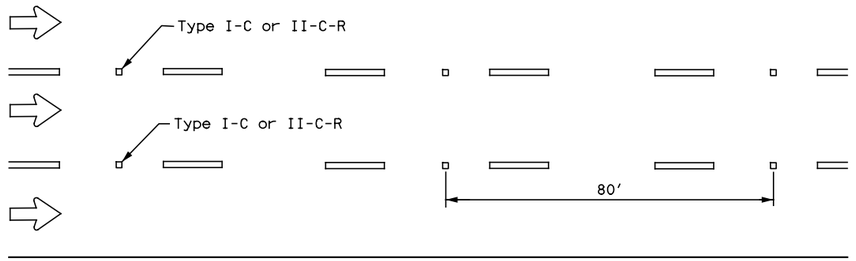


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



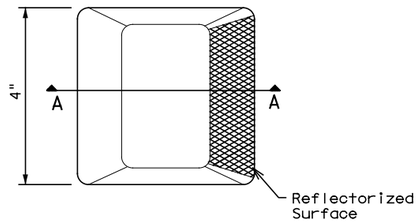
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

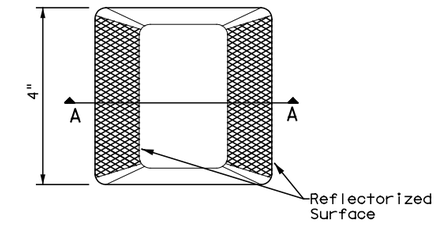
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

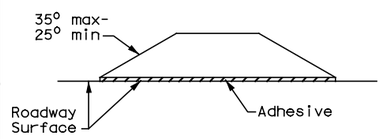
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

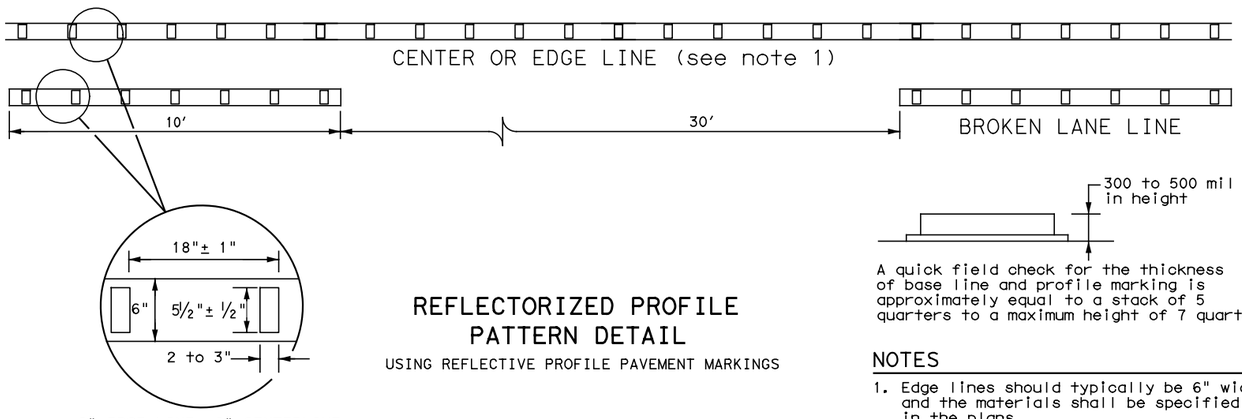


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

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©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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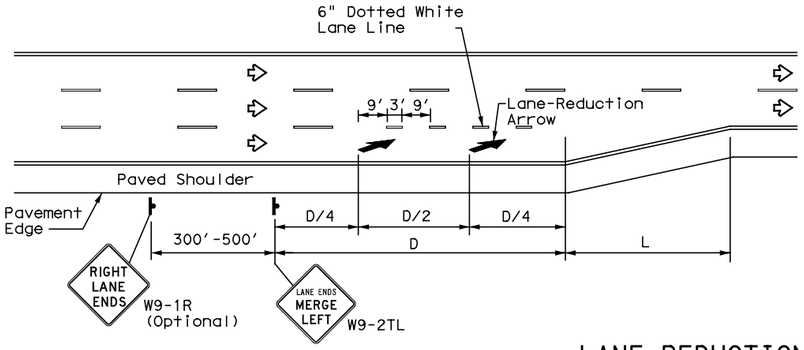
	SAT	GUADALUPE		121

22B

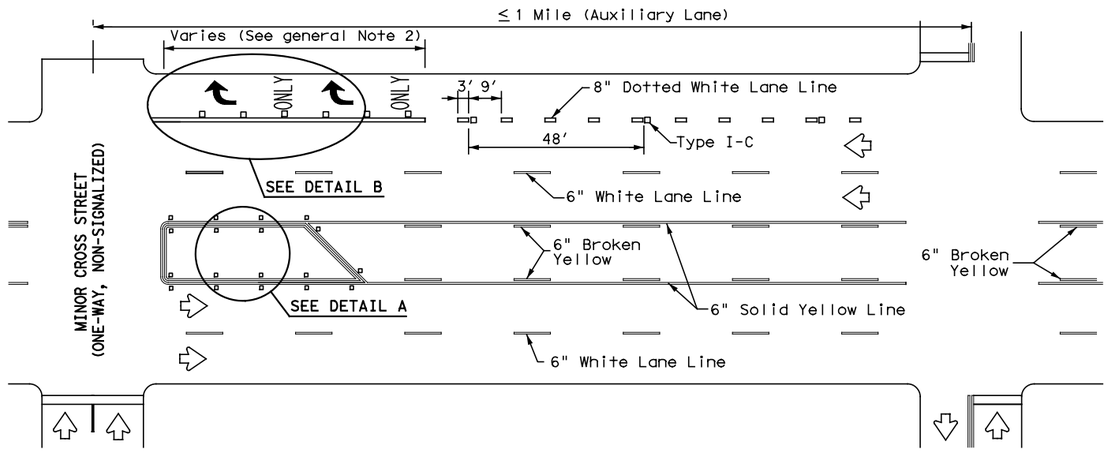


LANE REDUCTION

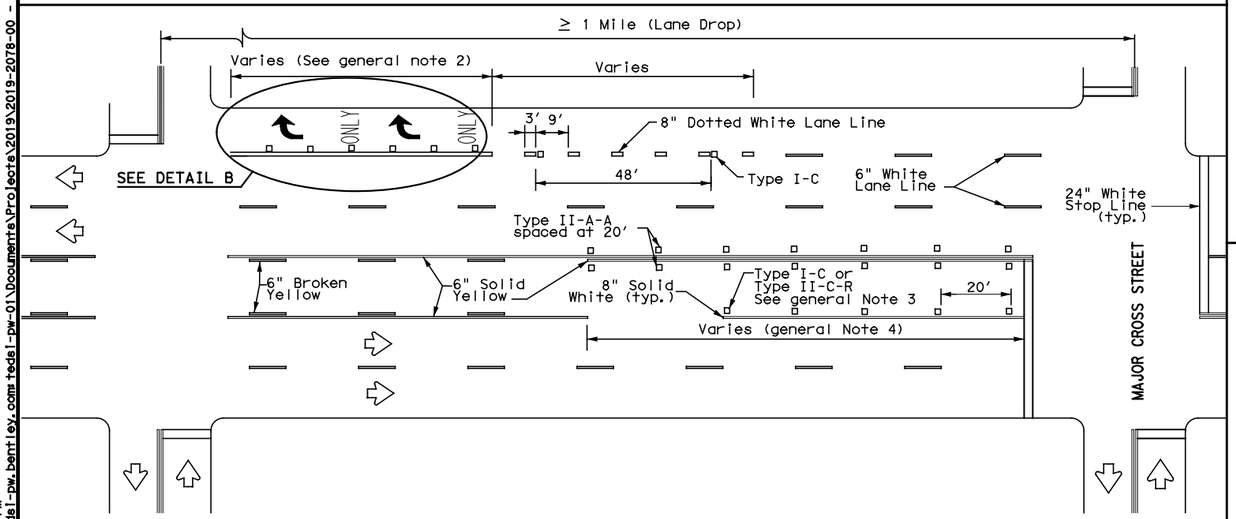
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

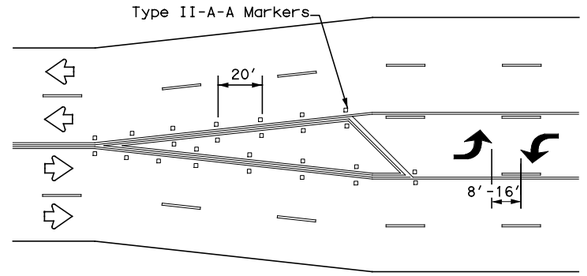
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

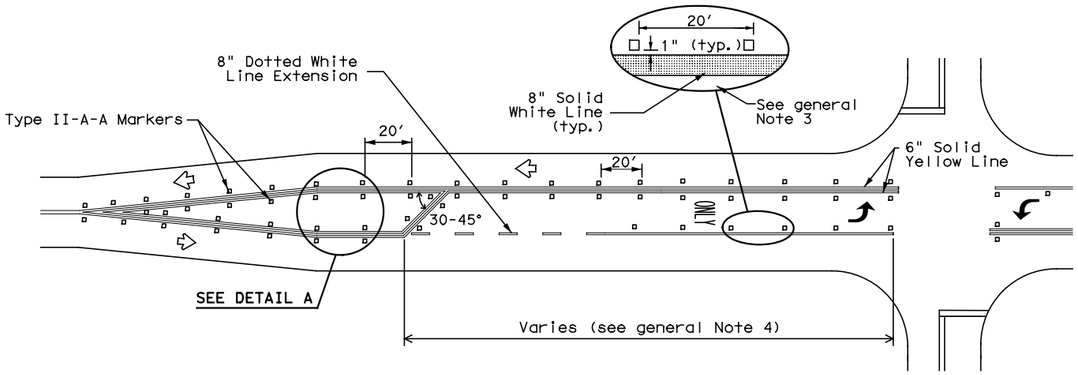
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

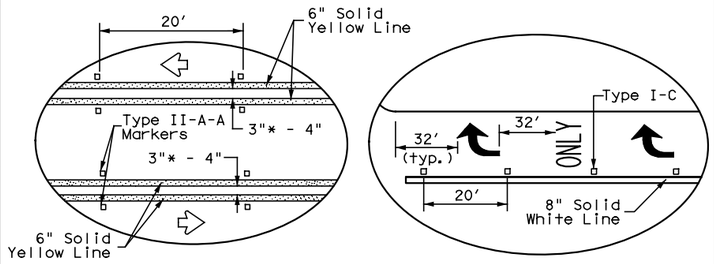
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	0025	04	051	UA 90
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		122

22C

4/19/2023
2:14:23 PM
pw:\\tedel-pw.bentley.com:tedel-pw-01\Documents\Projects\2019\2019-2078-00 - TxDOT Traffic Engineering (Kimley-Horn)\Work Authorizations\2019-2078-1A - US90A Widening, Weber Road to CR 202\6.0 TEDSI Design\6.08 CADD

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

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

Number of Posts (1 or 2)

Anchor Type

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

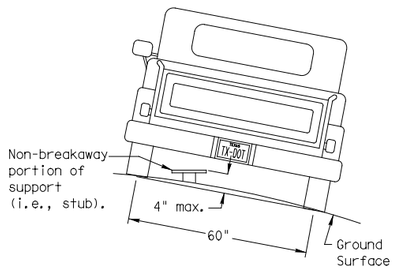
Sign Mounting Designation

- P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
- T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
- U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))

IF REQUIRED

- 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
- BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
- WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
- EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

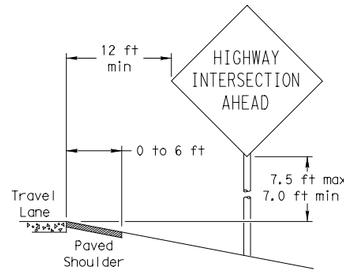
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

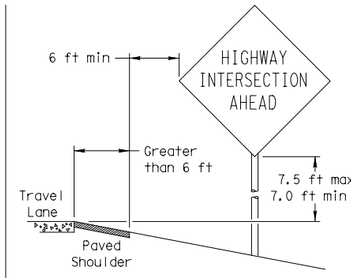
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

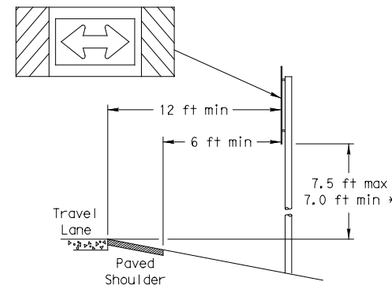
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



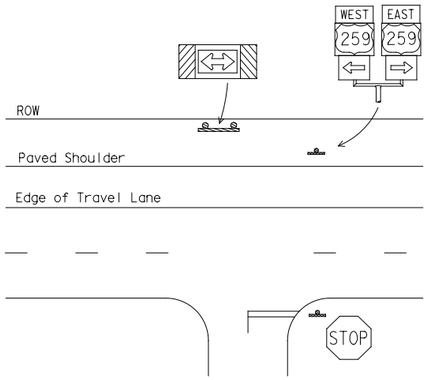
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

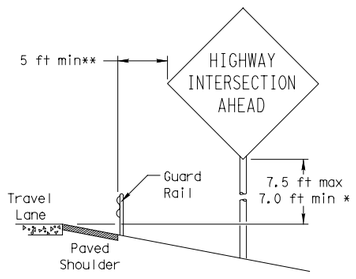
T-INTERSECTION



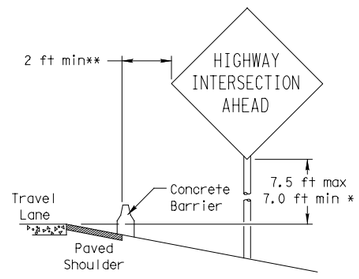
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



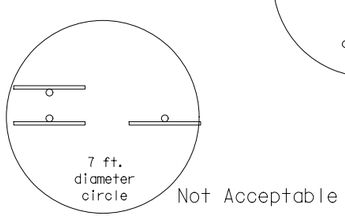
BEHIND GUARDRAIL



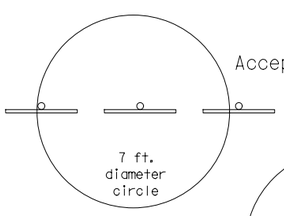
BEHIND CONCRETE BARRIER

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

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



Not Acceptable



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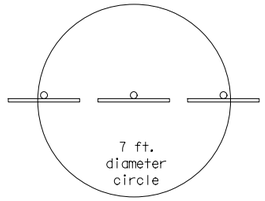
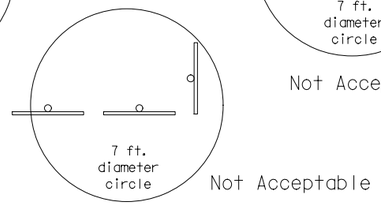


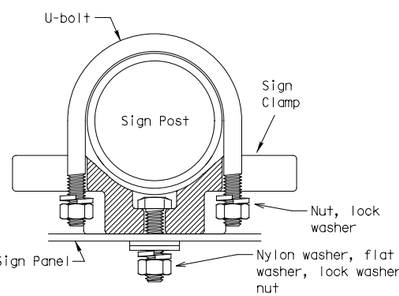
Not Acceptable



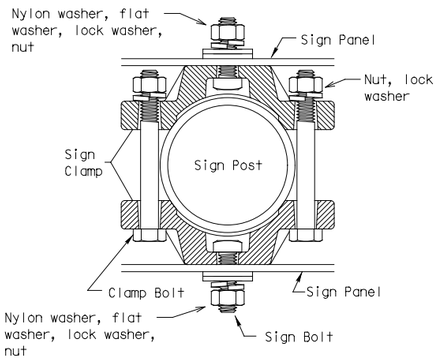
Not Acceptable

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



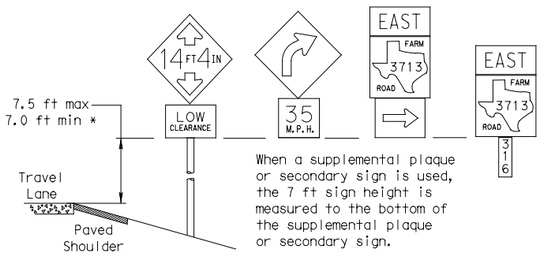
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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

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

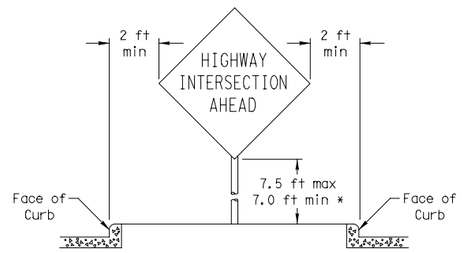
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



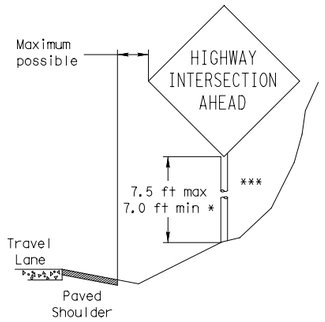
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



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

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

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

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

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

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

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

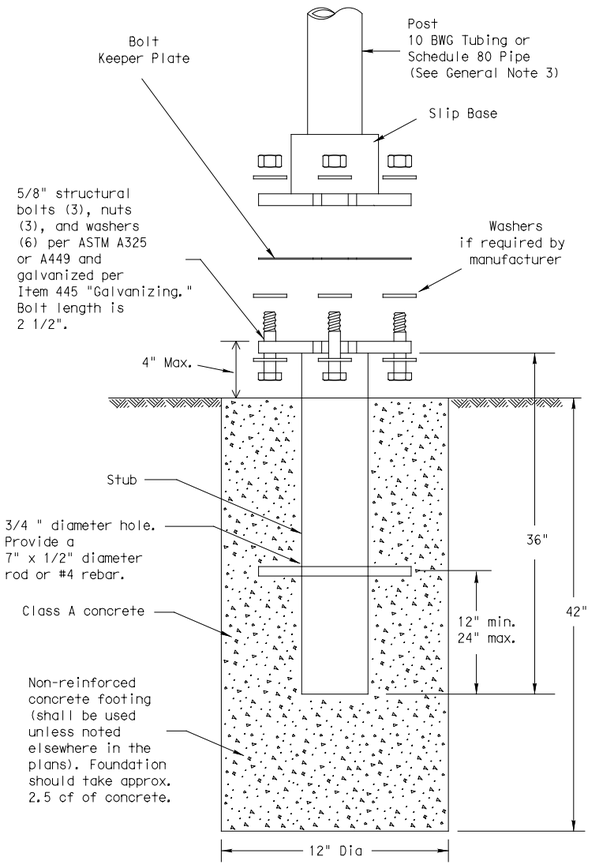
CONT	SECT	JOB	HIGHWAY
0025	04	051	UA 90

DIST	COUNTY	SHEET NO.
SAT	GUADALUPE	123

9-08 REVISIONS

DATE: 4/19/2023
FILE: pw:\\fedsl-pw.bentley.com:fedsl-pw-01\Documents\Projects\2019\2019-2078-00 - TxDOT Traffic Engineering (Kimley-Horn)\Work Authorizations\2019-2078-1A - US90A Widening, Weber Road to CR 202\6.0 TEDSI Design\6.08 CADD

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

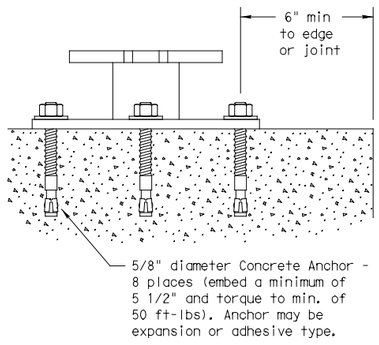
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

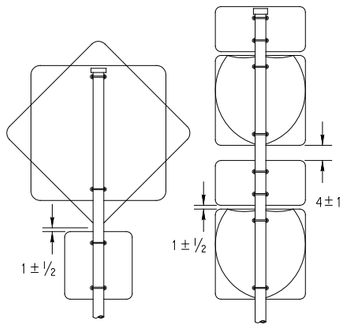
SMD(SLIP-1)-08

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

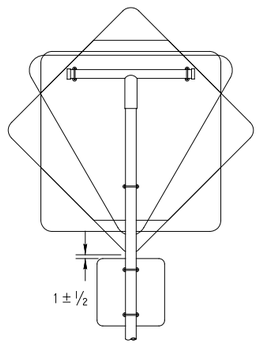
9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0025	04	051	UA 90
DIST	COUNTY		SHEET NO.
SAT	GUADALUPE		124

DATE: 4/19/2023
FILE: pw:\\tedei-pw.bentley.com:tedei-pw-01\Documents\Projects\2019\2019-2078-00 - TxDOT Traffic Engineering (Kimley-Horn)\Work Authorizations\2019-2078-1A - US90A Widening, Weber Road to CR 202\6.0 TEDSI Design\6.08 CADD\



SM RD SGN ASSM TY XXXXX(1)XX(P)



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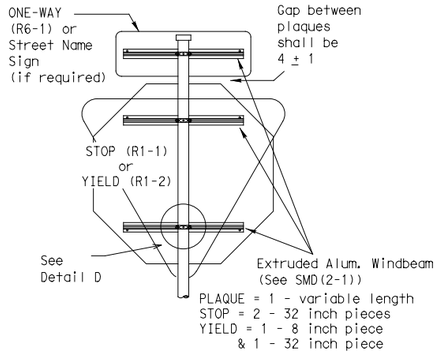
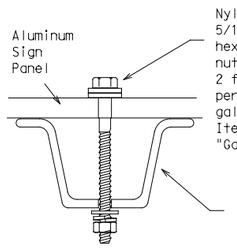
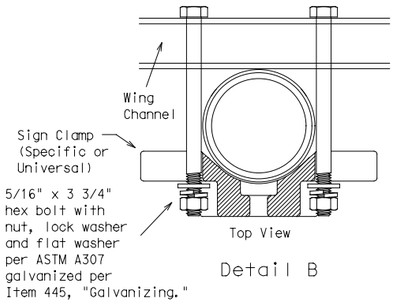


SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



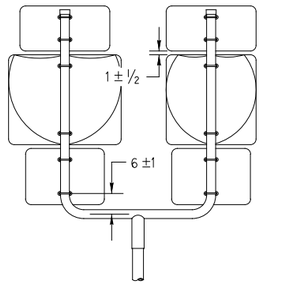
Detail B

GENERAL NOTES:

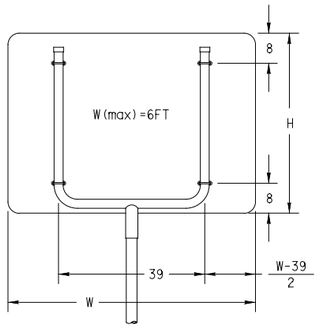
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

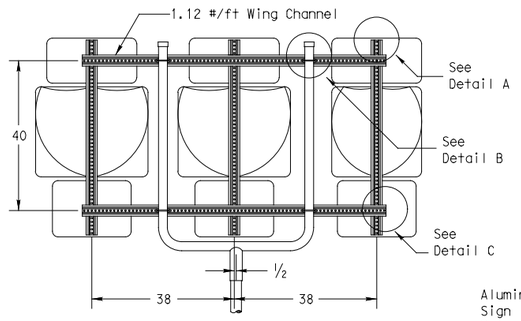
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



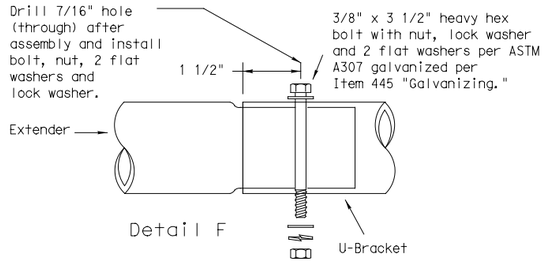
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

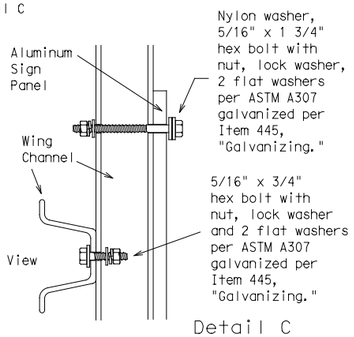


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

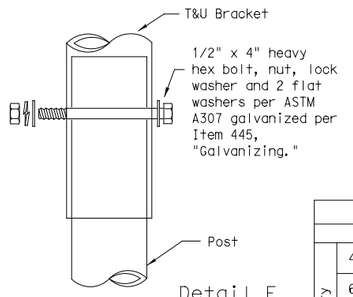


Detail F

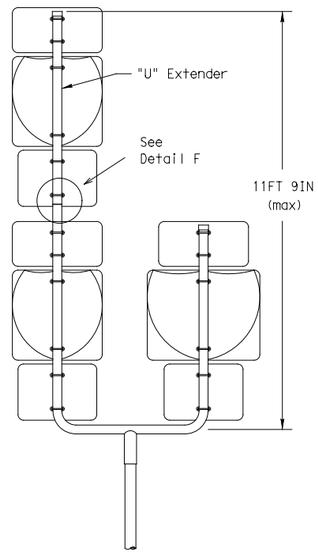
Splices shall only be allowed behind the sign substrate.



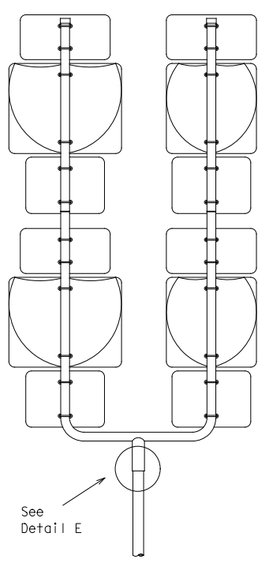
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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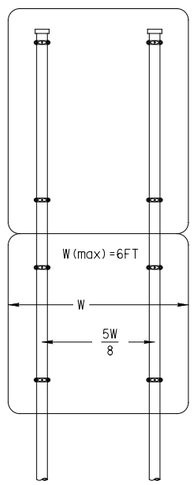
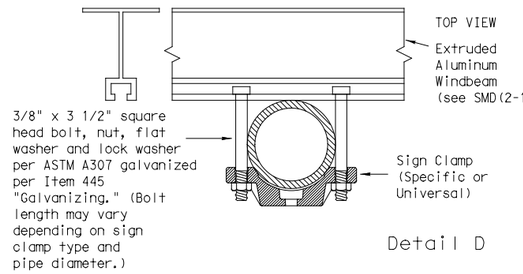
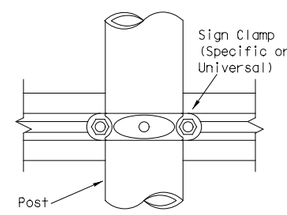


SM RD SGN ASSYM TY XXXXX(2)XX(P)

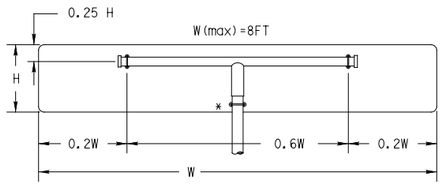
SIDE VIEW



Detail D



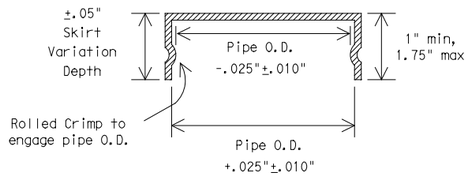
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

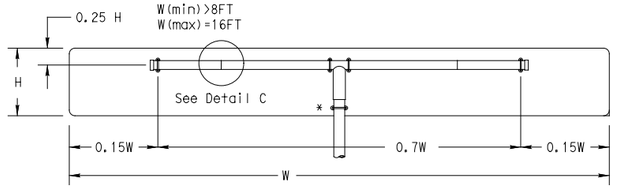
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

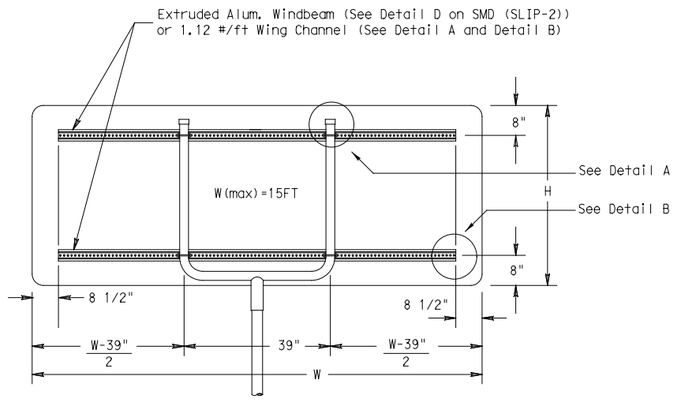
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0025	04	051	UA 90
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		125

26C

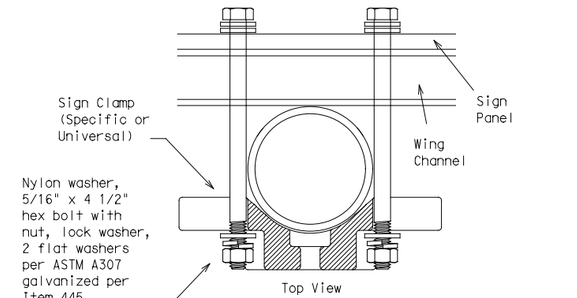
DATE: 4/19/2023
FILE: pw:\\fedsl-pw.bentley.com:fedsl-pw-01\Documents\Projects\2019\2019-2078-00 - TxDOT Traffic Engineering (Kimley-Horn)\Work Authorizations\2019-2078-1A - US90A Widening, Weber Road to CR 202\6.0 TEDSI Design\6.08 CADD



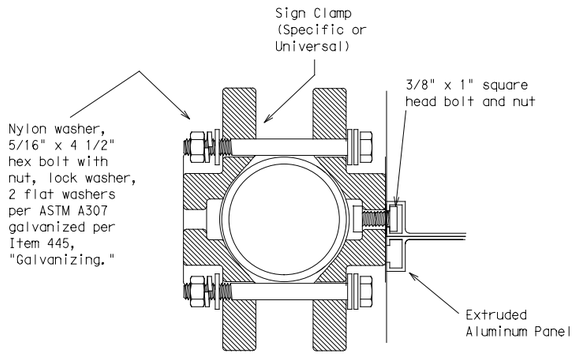
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



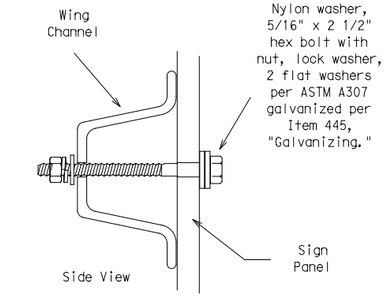
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



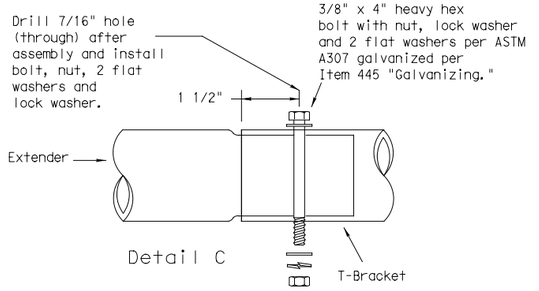
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

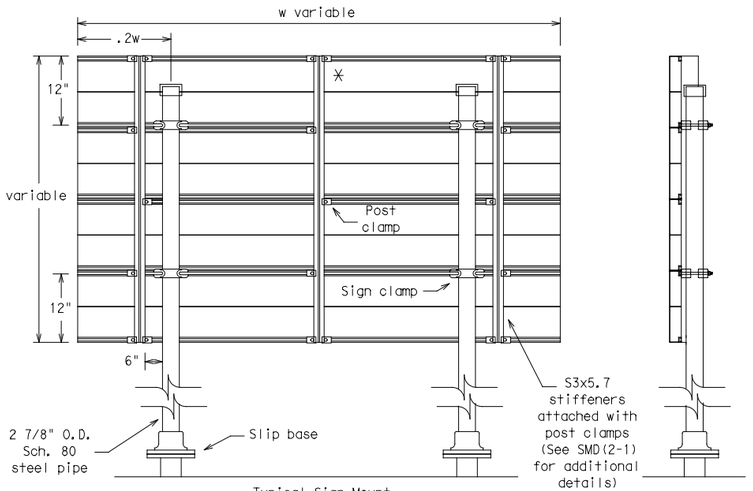


Detail B



Detail C

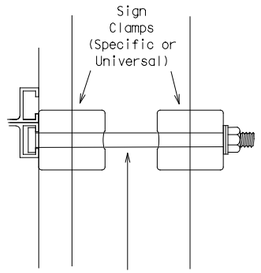
Splices shall only be allowed behind the sign substrate.



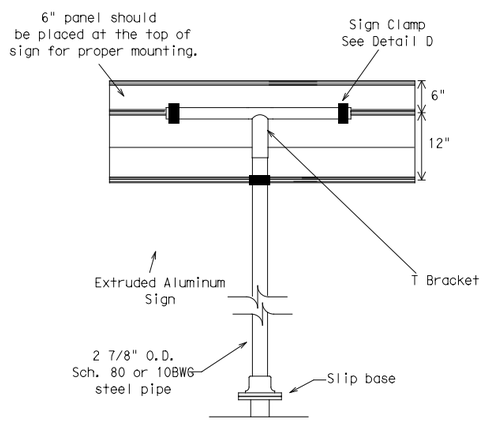
Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

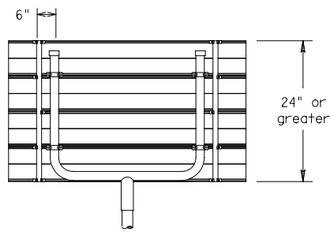
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

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

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0025	04	051	UA 90
DIST	COUNTY		SHEET NO.
SAT	GUADALUPE		126

26D

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):
0025-04-051

1.2 PROJECT LIMITS:
From: 500 WEST OF CR 202

To: 500 EAST OF WEBER RD

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 29° 34′ 30" ,(Long) 97° 55′ 20"

END: (Lat) 29° 34′ 26" ,(Long) 97° 54′ 02"

1.4 TOTAL PROJECT AREA (Acres): 20

1.5 TOTAL AREA TO BE DISTURBED (Acres): 6

1.6 NATURE OF CONSTRUCTION ACTIVITY:
EXCAVATION, EMBANKMENT, GRADING, ASPHALT PAVEMENT

1.7 MAJOR SOIL TYPES:

Soil Type	Description

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

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

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

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

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

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

MS4 Entity

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			127
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	04	051	UA 90

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- [x] [x] Protection of Existing Vegetation
- [x] [x] Vegetated Buffer Zones
- [ ] [ ] Soil Retention Blankets
- [ ] [ ] Geotextiles
- [ ] [ ] Mulching/ Hydromulching
- [ ] [ ] Soil Surface Treatments
- [x] [ ] Temporary Seeding
- [ ] [x] Permanent Planting, Sodding or Seeding
- [ ] [ ] Biodegradable Erosion Control Logs
- [x] [ ] 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
- [x] [ ] Rock Filter Dams/ Rock Check Dams
- [ ] [ ] Sandbag Berms
- [x] [ ] Sediment Control Fence
- [x] [ ] Stabilized Construction Exit
- [ ] [ ] Floating Turbidity Barrier
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Vegetated Filter Strips
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

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

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

T / P

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

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

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

2.5 POLLUTION PREVENTION MEASURES:

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

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 INSPECTIONS:

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

2.9 MAINTENANCE:

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

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			128
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	HIGHWAY NO.
0025	04	051	UA 90

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

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

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

☒ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

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

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☒ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ 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. PLACE ORANGE SAFETY FENCING AROUND HISTORICAL MARKER AT STA 127+50
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.
2.
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 immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

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

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

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

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0025	04	051	UA 90
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY		SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	SAT	GUADALUPE		129

STORM WATER POLLUTION PREVENTION PLAN (SW3P) NOTES:

1. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION.

2. CONSTRUCTION ENTRANCE/EXIT LOCATION, CONCRETE WASHOUT PIT, AND CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE YARD TO BE DETERMINED IN THE FIELD AND APPROVED BY TXDOT.

3. STORM WATER POLLUTION PREVENTION CONTROLS MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED EFFECT. ALL MODIFICATIONS ARE TO BE NOTED ON THE APPROPRIATE INSPECTION FORM, SIGNED, DATED, AND APPROVED BY TXDOT.

4. ALL STORM WATER POLLUTION PREVENTION CONTROLS ARE TO BE MAINTAINED ACCORDING TO THE SW3P SHEETS AND KEPT IN WORKING CONDITIONS AT ALL TIMES.

5. IF SIGNIFICANT CONTAMINATION IS ENCOUNTERED BASED ON ODORS, VISUAL EVIDENCE, OR VAPOR MONITORING, IMMEDIATELY CONTACT THE ENGINEER. THE ENGINEER MAY SUSPEND WORK WHOLLY OR IN PARTS TO DETERMINE THE COORDINATION/MANAGEMENT FOR THE TESTING, REMOVAL, AND DISPOSAL OF HAZARDOUS MATERIALS THAT MIGHT BE NECESSARY ACCORDING TO ALL APPLICABLE RULES, LAWS, AND REGULATIONS.

6. FOR A COMPLETE LISTING OF TEMPORARY STORM WATER POLLUTION PREVENTION CONTROLS, REFER TO THE STORM WATER POLLUTION PREVENTION PLAN.

7. THIS PROJECT CONTAINS ROADWAY WIDENING. CONSTRUCTION WILL OCCUR IMMEDIATELY ADJACENT TO THE EXISTING PAVEMENT AREAS. CONSEQUENTLY, ACCESS TO THE CONSTRUCTION SITE MAY OCCUR ALONG THE LENGTH OF THE EXISTING PAVEMENT AREAS AS NEEDED IN ACCORDANCE WITH THE CONTRACTOR'S CONSTRUCTION SEQUENCE AND TRAFFIC CONTROL PLAN. AS SUCH, ALL TEMPORARY STORM WATER POLLUTION PREVENTION CONTROLS SHALL BE CLEARLY MARKED TO MAKE THEM VISIBLE AT ALL TIMES.

8. AS SOON AS PRACTICAL, ALL DISTURBED SOIL THAT WILL NOT BE COVERED BY IMPERVIOUS COVER SUCH AS PARKWAY AREAS, EASEMENT AREAS, EMBANKMENT SLOPE, ETC. WILL BE STABILIZED PER APPLICABLE PROJECT SPECIFICATIONS.

9. BEST MANAGEMENT PRACTICES MAY BE INSTALLED IN STAGES TO COINCIDE WITH THE DISTURBANCE OF UPGRADIENT AREAS AND TO COINCIDE WITH CONSTRUCTION PHASING AND TRAFFIC CONTROL SEQUENCE. ADDITIONAL TEMPORARY BMP'S MAY BE REQUIRED DEPENDING ON CONTRACTOR'S CONSTRUCTION SEQUENCE. CONTRACTOR SHALL ADD TEMPORARY BMP'S TO MAINTAIN COMPLIANCE, SUCH ADDITIONS SHALL BE DOCUMENTED ON THE STORM WATER POLLUTION PREVENTION PLAN SHEETS.

10. BEST MANAGEMENT PRACTICES MAY BE REMOVED IN STAGES ONCE THE WATERSHED FOR THE PORTION CONTROLLED BY THE BMPs HAS BEEN STABILIZED IN ACCORDANCE WITH TCEQ TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM (TPDES).

11. UPON COMPLETION OF THE PROJECT, INCLUDING SITE STABILIZATION, AND BEFORE FINAL PAYMENT IS ISSUED, CONTRACTOR SHALL REMOVE ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES, INCLUDING ROCK BERMS IN DRAINAGE FEATURES THAT MAY CAUSE LONG-TERM IMPACT TO DRAINAGE OPERATION.

12. PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR SHALL COORDINATE PLACEMENT OF TEMPORARY BMPs WITHIN THE RIGHT-OF-WAY WITH TXDOT.

13. WHEN ANY ABANDONED WELL IS ENCOUNTERED, CEASE CONSTRUCTION OPERATIONS IN THIS AREA AND NOTIFY THE ENGINEER WHO WILL COORDINATE THE PROPER VOID MITIGATION AND PLUGGING PROCEDURES WITH THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ).

14. PLUG ANY DRILL HOLES RESULTING FROM CORE SAMPLING ON-SITE OR DOWN GRADIENT OF THE SITE, WITH CONCRETE FROM THE BOTTOM OF THE HOLE TO THE TOP OF THE HOLE SO THAT WATER AND CONTAMINANTS ARE NOT ALLOWED TO ENTER THE SUBSURFACE ENVIRONMENT.

15. MAINTAIN VEHICLES AT DESIGNATED MAINTENANCE SITE UNLESS OTHERWISE APPROVED.
ITEMS.

16. TRANSPORT ANY SOILS CONTAMINATED DURING CONSTRUCTION OF THE PROPOSED PROJECT AWAY FROM THE SITE AND PROPERLY DISPOSE OF OFF-SITE. COLLECT WASTEWATER GENERATED ON-SITE. TRANSPORT AND DISPOSE OF OFF-SITE IN A PROPER MANNER. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO THE PERTINENT

17. SUSPEND ALL ACTIVITIES NEAR ANY SIGNIFICANT RECHARGE FEATURES SUCH AS SINKHOLES, CAVES, OR ANY OTHER SUBTERRANEAN OPENINGS THAT ARE DISCOVERED DURING CONSTRUCTION OR CORE SAMPLING. DO NOT PROCEED UNTIL THE DESIGNATED GEOLOGIST OR TCEQ REPRESENTATIVE IS PRESENT TO EVALUATE AND APPROVE REMEDIAL OR VOID MITIGATION.

18. LOCATE ABOVE GROUND STORAGE TANKS KEPT ON-SITE FOR CONSTRUCTION PURPOSES OVER BERMED IMPERVIOUS LINERS TO PREVENT ANY LEAKAGE INTO UNDERLYING SOILS. ADDITIONALLY, THE CONTAINMENT SHALL BE SIZED TO CAPTURE 150% OF THE TOTAL VOLUME OF FLUIDS STORED ON-SITE WITHIN THE STORAGE AREA.

19. FOR ALL WORK OVER OR NEAR BODIES OF WATER (LAKES, RIVERS, PONDS, CREEKS, STREAMS, ETC.) KEEP ON HAND SYNTHETIC ABSORBENT BOOMS (PETROLEUM SORBENT BOOMS, PETROLEUM SOCKS, ABSORBENT SOCKS, ETC.) AND ABSORBENT PADS (EVERSOAK SORBENTS, INDUSTRIAL SPILLED PETROLEUM PRODUCTS, IN ENOUGH QUANTITY TO MITIGATE A PETROLEUM-TYPE SPILL DUE TO CONSTRUCTION.

20. CONTRACTOR TO ENSURE TREE AND SHRUB REMOVAL OCCURS OUTSIDE OF GOLDEN-CHEEKED WARBLER BREEDING SEASON. TREE REMOVAL SHALL BE COMPLETED BETWEEN SEPTEMBER 15 AND MARCH 1.

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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TEDSI
TBPE F-1640

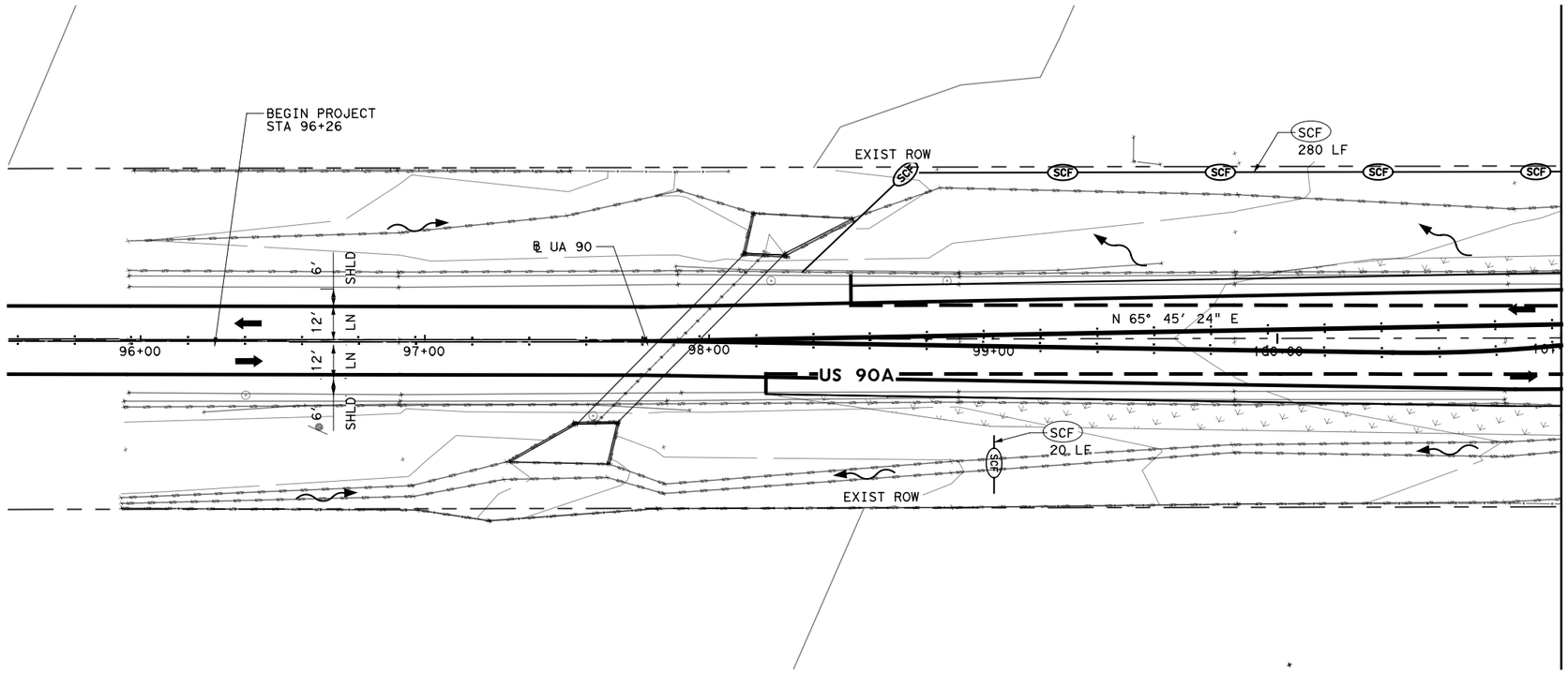
Texas Department of Transportation

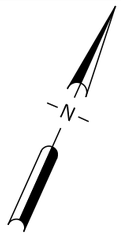
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SW3P NOTES

SHEET 1 OF 1

FED. RD. DIST. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	130





LEGEND

- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- FLOW DIRECTION
- AREA OF TOPSOIL, SEED, FERTILIZER, WATERING

ITEM	DESCRIPTION	UNIT	QUANTITY
161 6017	COMPOST MANUF TOPSOIL (4")	SY	1209
164 6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	1209
166 6001	FERTILIZER	AC	0.25
168 6001	VEGETATIVE WATERING	MG	19
506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	222
506 6024	CONSTRUCTION EXITS (REMOVE)	SY	222
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	790
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	790

NOTES:

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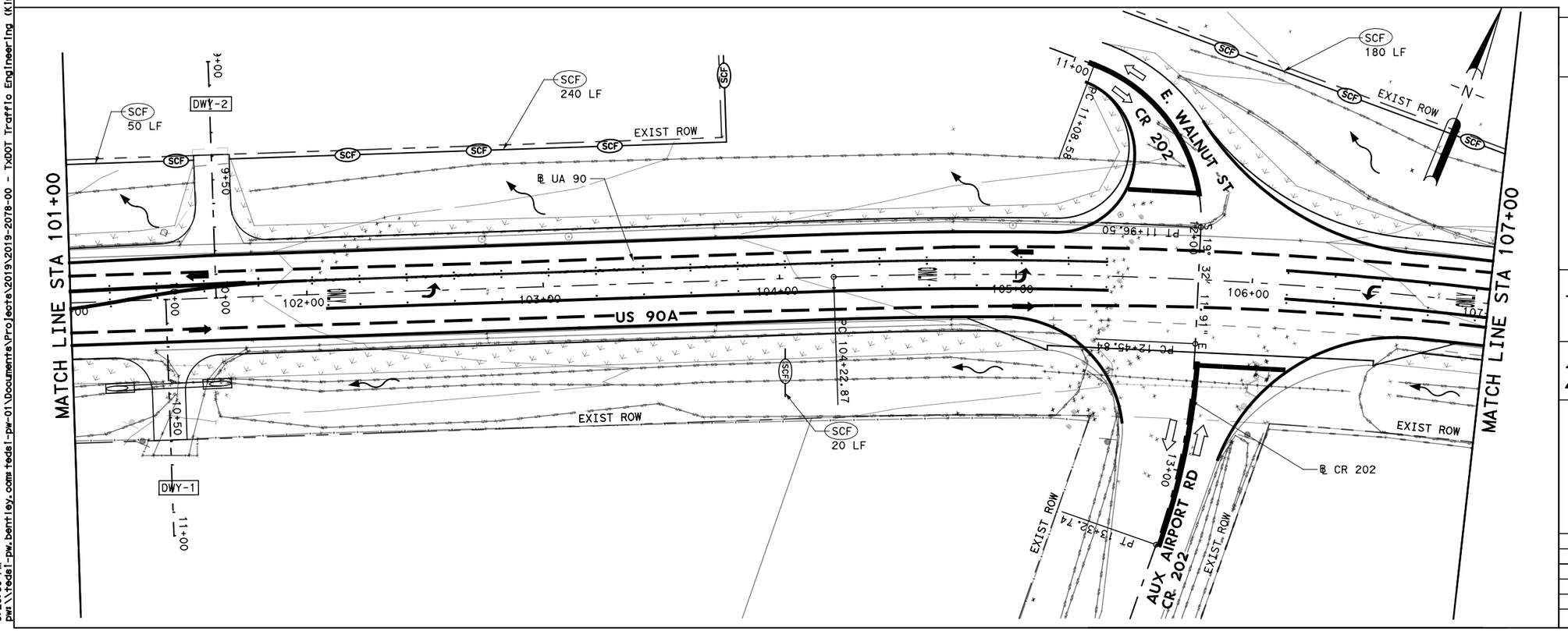
2. LOCATIONS SHOWN FOR SEDIMENT CONTROL FENCES ARE APPROXIMATE. NO SEDIMENT FENCE SHALL BE PLACED OUTSIDE ROW OR ON PAVEMENT.
3. THE LOCATIONS FOR CONSTRUCTION EXITS WILL BE IDENTIFIED BY THE ENGINEER.
4. MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES DURING CONSTRUCTION.



0' 25' 50'
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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(832) 619-1000
TEDSI
TBPE F-1640

Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SW3P LAYOUT
BEGIN TO STA 107+00

SHEET 1 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	131

4/20/2023
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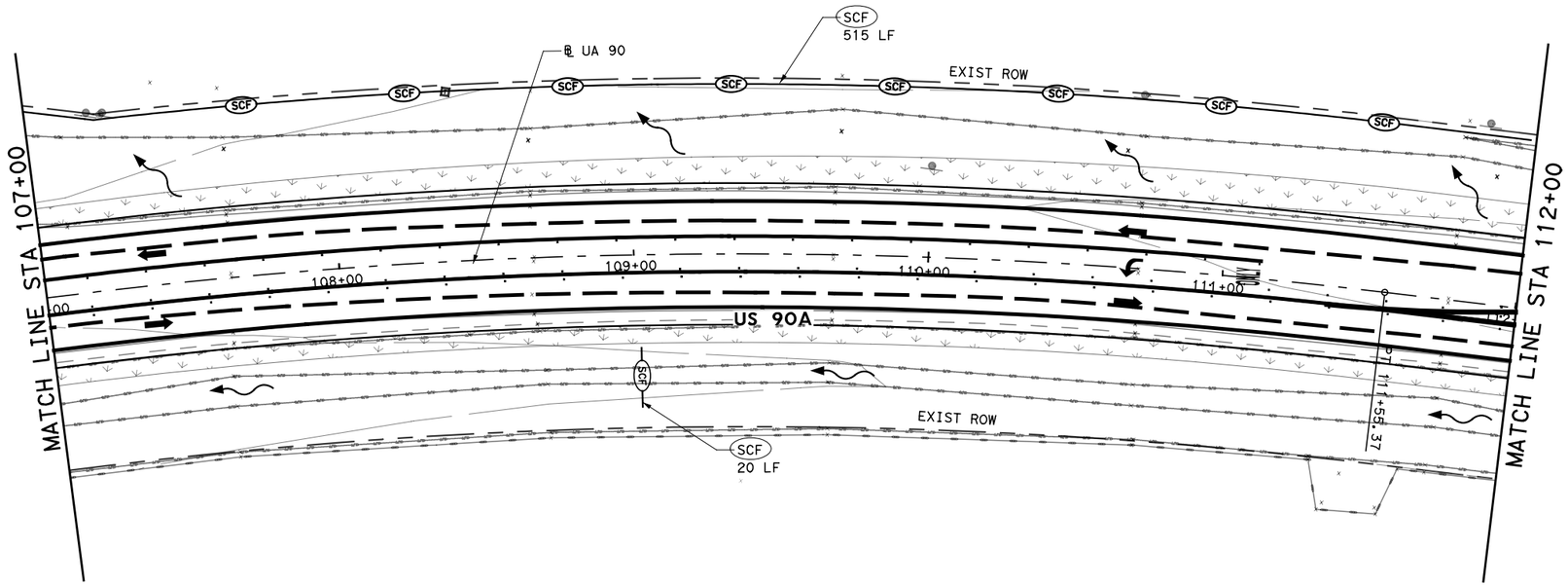

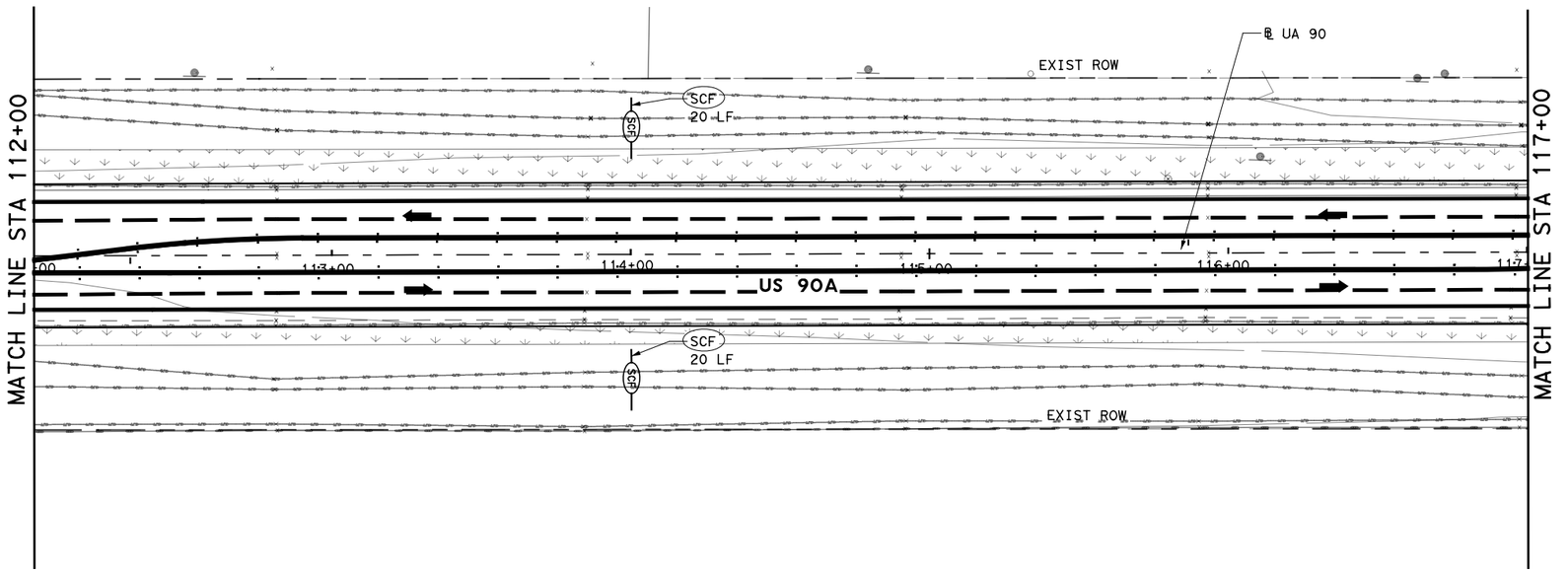

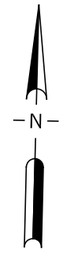

LEGEND

- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- FLOW DIRECTION
- AREA OF TOPSOIL, SEED, FERTILIZER, WATERING

ITEM	DESCRIPTION	UNIT	QUANTITY
161 6017	COMPOST MANUF TOPSOIL (4")	SY	1567
164 6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	1567
166 6001	FERTILIZER	AC	0.32
168 6001	VEGETATIVE WATERING	MG	26
506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	0
506 6024	CONSTRUCTION EXITS (REMOVE)	SY	0
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	575
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	575

NOTES:

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3. THE LOCATIONS FOR CONSTRUCTION EXITS WILL BE IDENTIFIED BY THE ENGINEER.
4. MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES DURING CONSTRUCTION.

0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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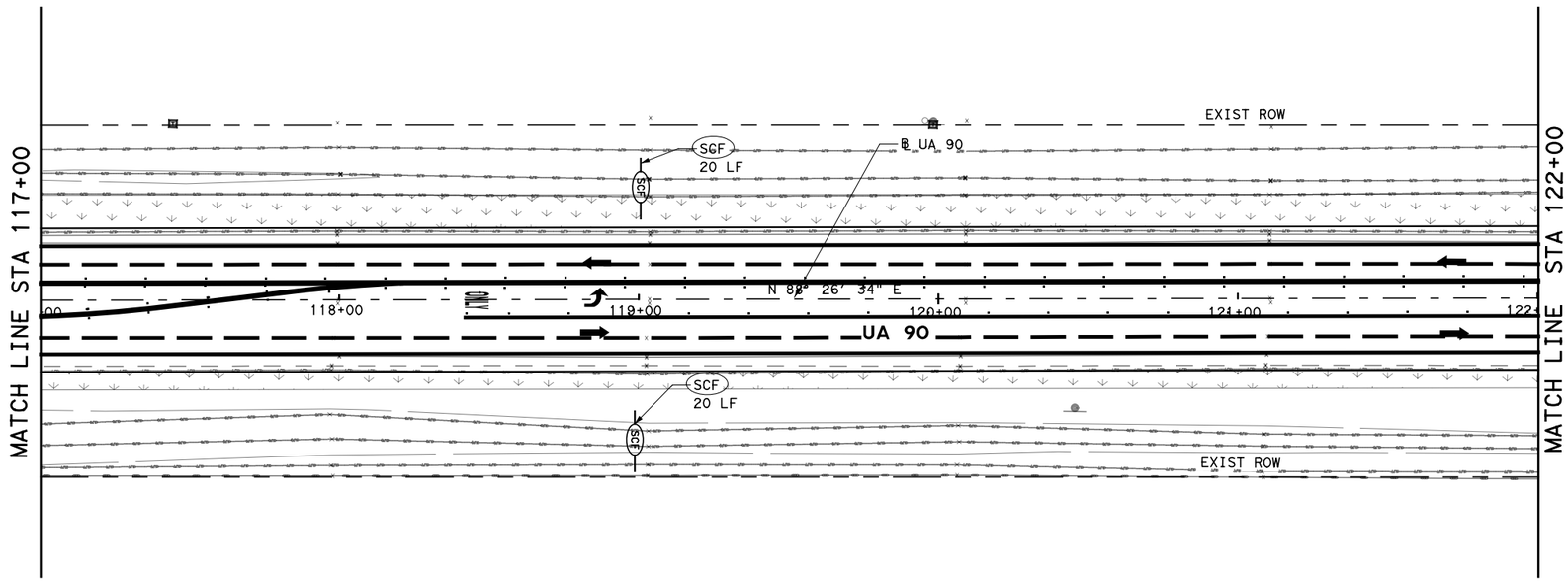
Texas Department of Transportation

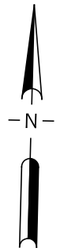
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SW3P LAYOUT
STA 107+00 TO STA 117+00

SHEET 2 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	132





LEGEND

- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- FLOW DIRECTION
- AREA OF TOPSOIL, SEED, FERTILIZER, WATERING

ITEM	DESCRIPTION	UNIT	QUANTITY
161 6017	COMPOST MANUF TOPSOIL (4")	SY	1692
164 6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	1692
166 6001	FERTILIZER	AC	0.35
168 6001	VEGETATIVE WATERING	MG	26
506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	0
506 6024	CONSTRUCTION EXITS (REMOVE)	SY	0
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100

NOTES:

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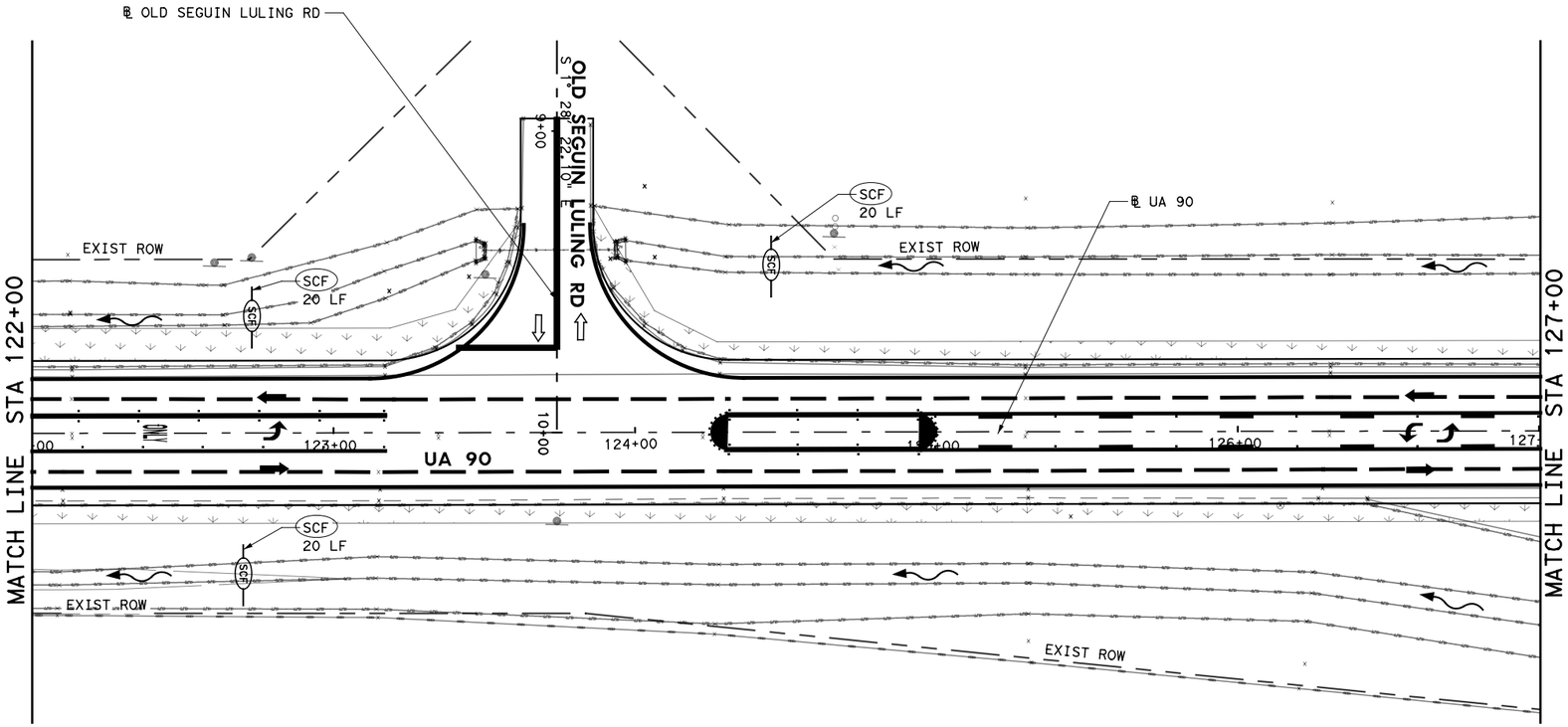

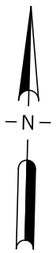

0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

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TEDSI TBPE F-1640

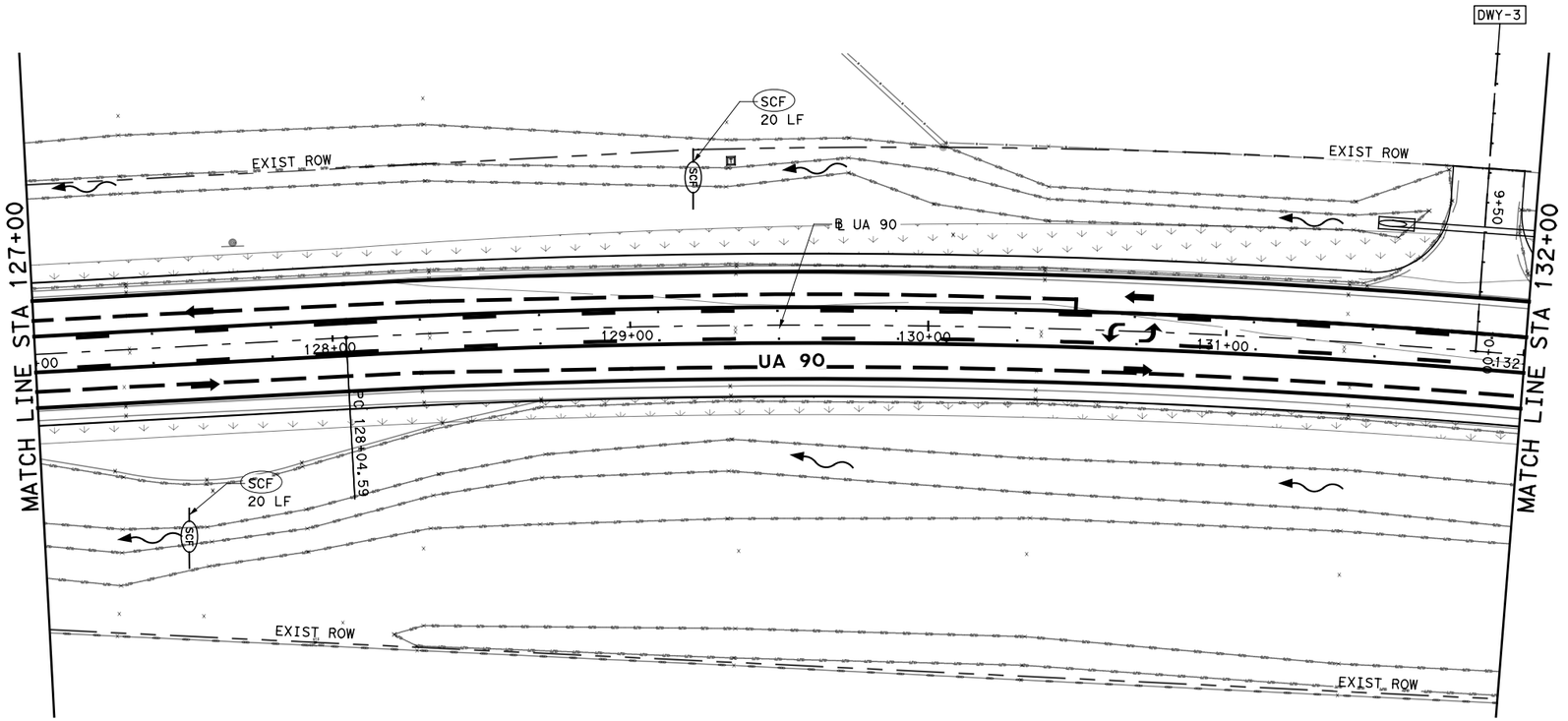
Texas Department of Transportation

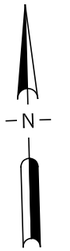
UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SW3P LAYOUT
STA 117+00 TO STA 127+00

SHEET 3 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	133





LEGEND

- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- FLOW DIRECTION
- AREA OF TOPSOIL, SEED, FERTILIZER, WATERING

ITEM	DESCRIPTION	UNIT	QUANTITY
161 6017	COMPOST MANUF TOPSOIL (4")	SY	1490
164 6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	1490
166 6001	FERTILIZER	AC	0.35
168 6001	VEGETATIVE WATERING	MG	23
506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	0
506 6024	CONSTRUCTION EXITS (REMOVE)	SY	0
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	80
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	80

NOTES:

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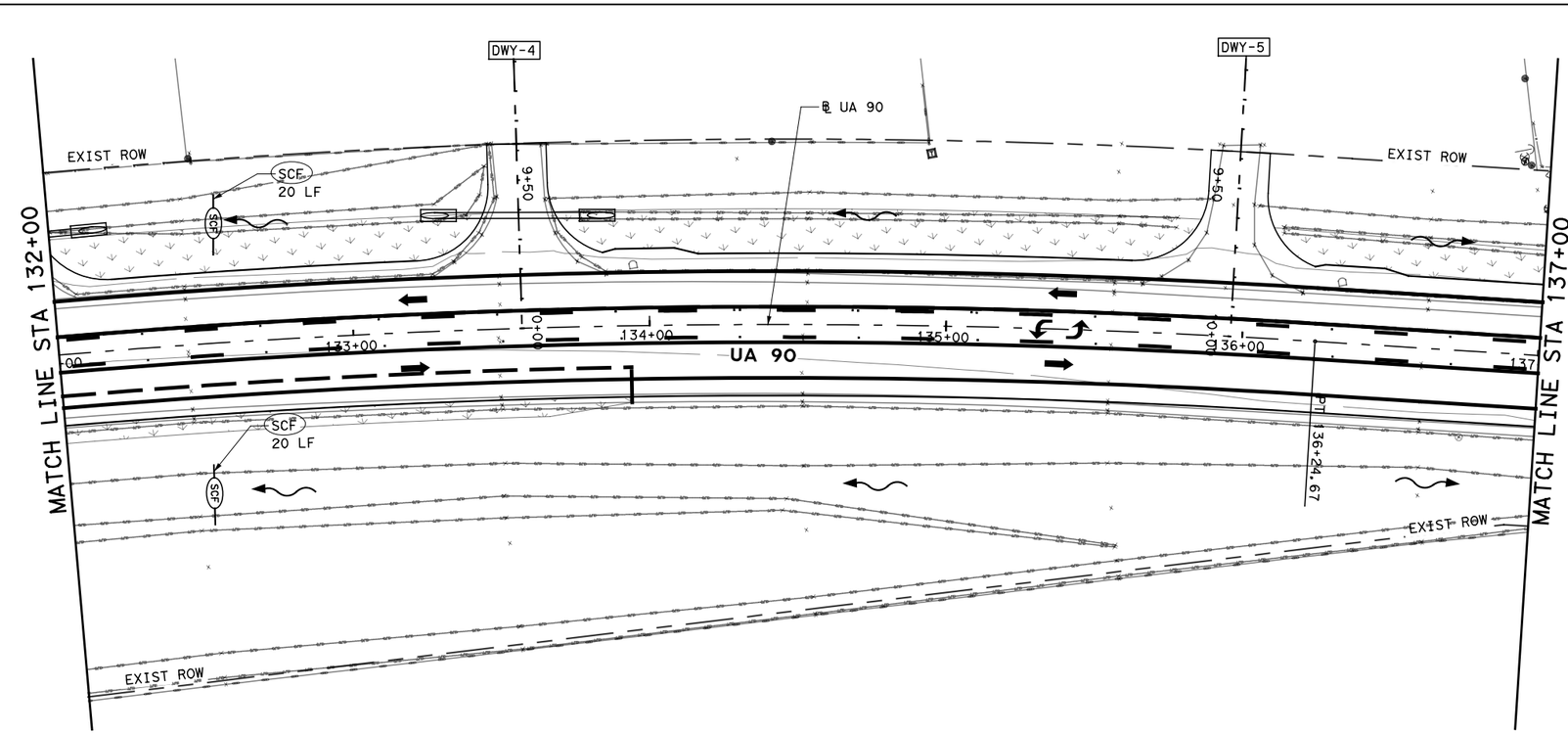
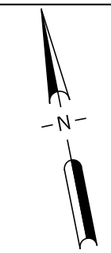
4. MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES DURING CONSTRUCTION.





0' 25' 50'
SCALE IN FEET

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TEDSI
TBPE F-1640

Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SW3P LAYOUT
STA 127+00 TO STA 137+00

SHEET 4 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	134

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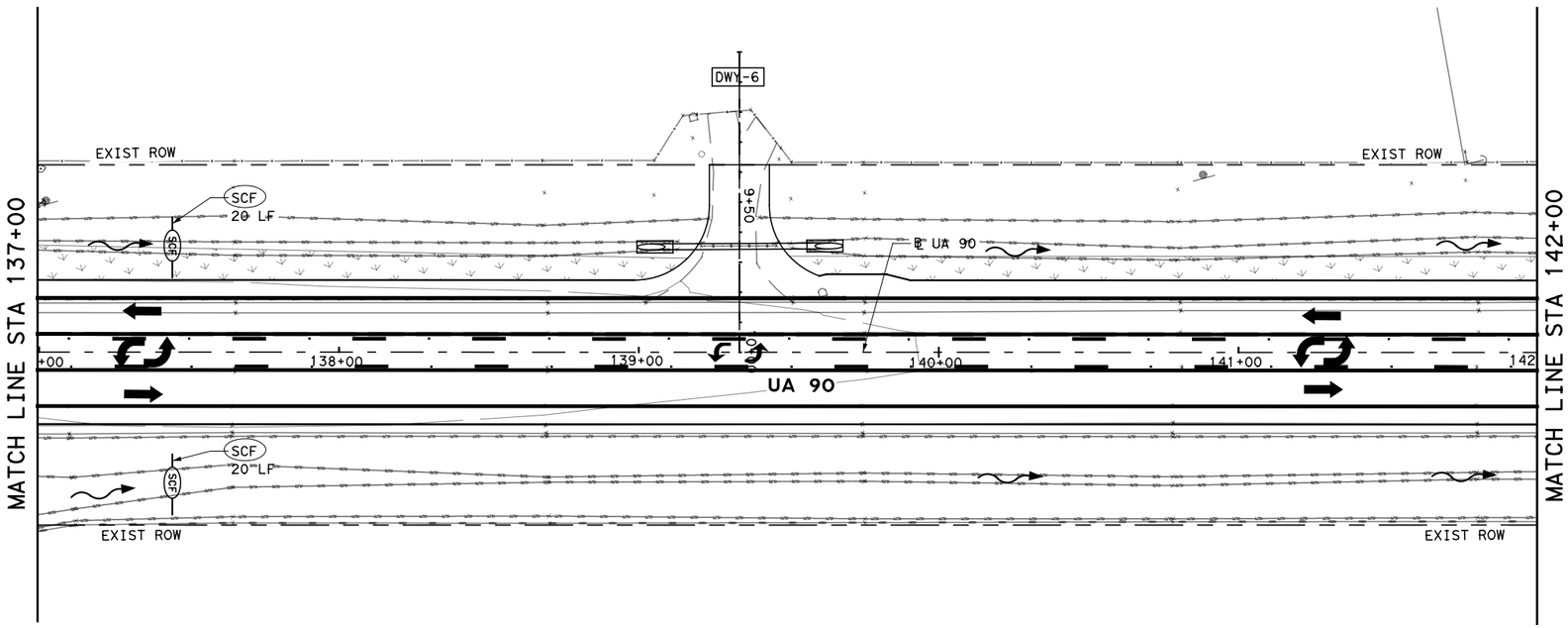


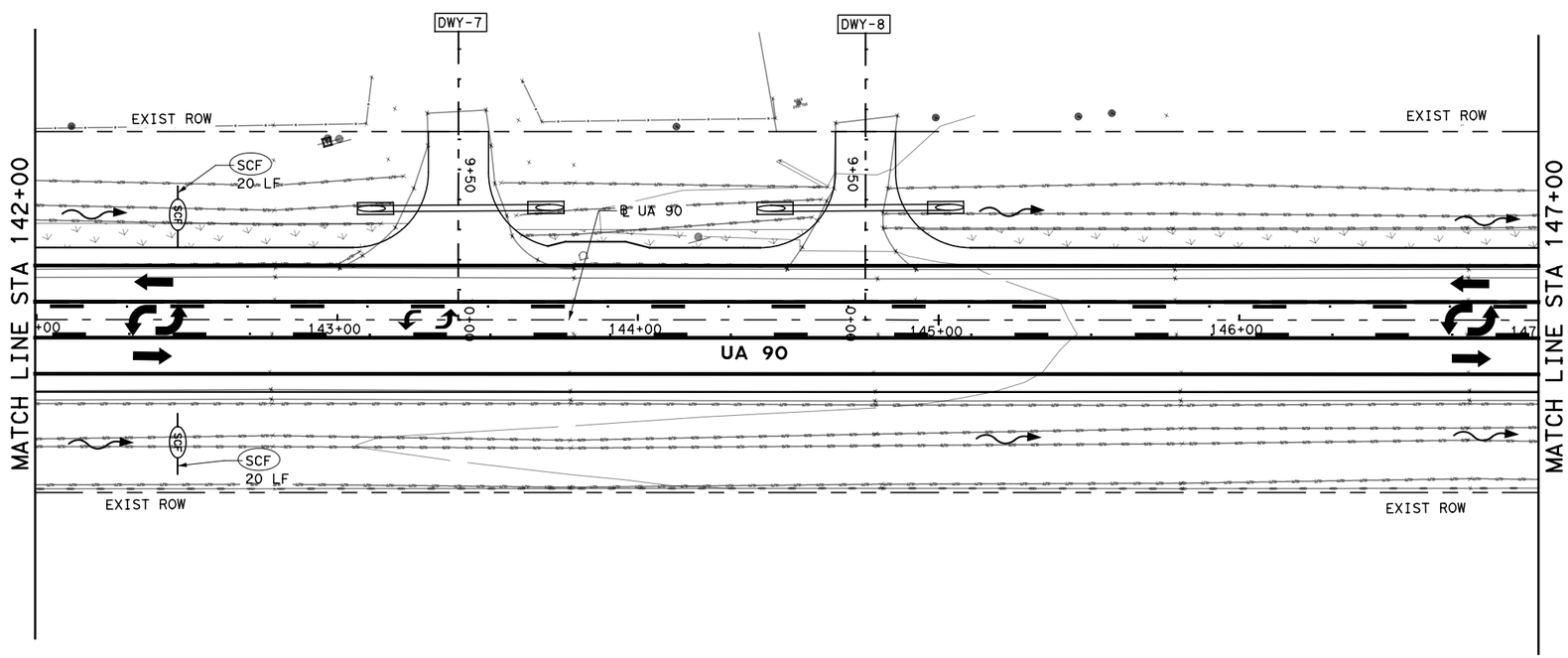
LEGEND

- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- FLOW DIRECTION
- AREA OF TOPSOIL, SEED, FERTILIZER, WATERING

ITEM	DESCRIPTION	UNIT	QUANTITY
161 6017	COMPOST MANUF TOPSOIL (4")	SY	724
164 6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	724
166 6001	FERTILIZER	AC	0.15
168 6001	VEGETATIVE WATERING	MG	11
506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	0
506 6024	CONSTRUCTION EXITS (REMOVE)	SY	0
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	80
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	80

NOTES:

1. UNLESS OTHERWISE NOTED ON THE PLANS ALL TEMPORARY EROSION CONTROL MEASURES SHALL REMAIN IN PLACE THROUGH OUT CONSTRUCTION.
2. LOCATIONS SHOWN FOR SEDIMENT CONTROL FENCES ARE APPROXIMATE. NO SEDIMENT FENCE SHALL BE PLACED OUTSIDE ROW OR ON PAVEMENT.
3. THE LOCATIONS FOR CONSTRUCTION EXITS WILL BE IDENTIFIED BY THE ENGINEER.
4. MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES DURING CONSTRUCTION.



0' 25' 50'
SCALE IN FEET

4/19/2023

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
738 Hwy 6 South, Suite 430
Houston, Texas 77079
(832) 619-1000
TEDSI
TBPE F-1640

Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SW3P LAYOUT
STA 137+00 TO STA 147+00

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	135

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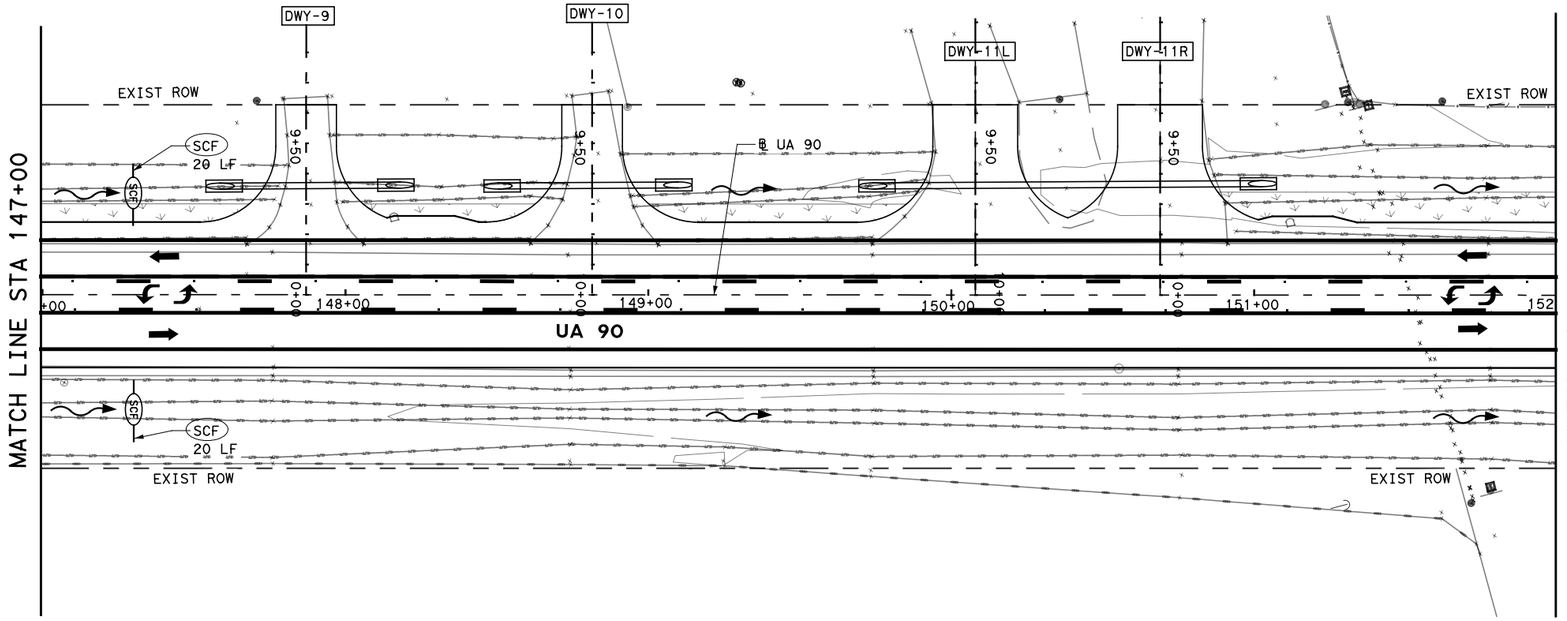

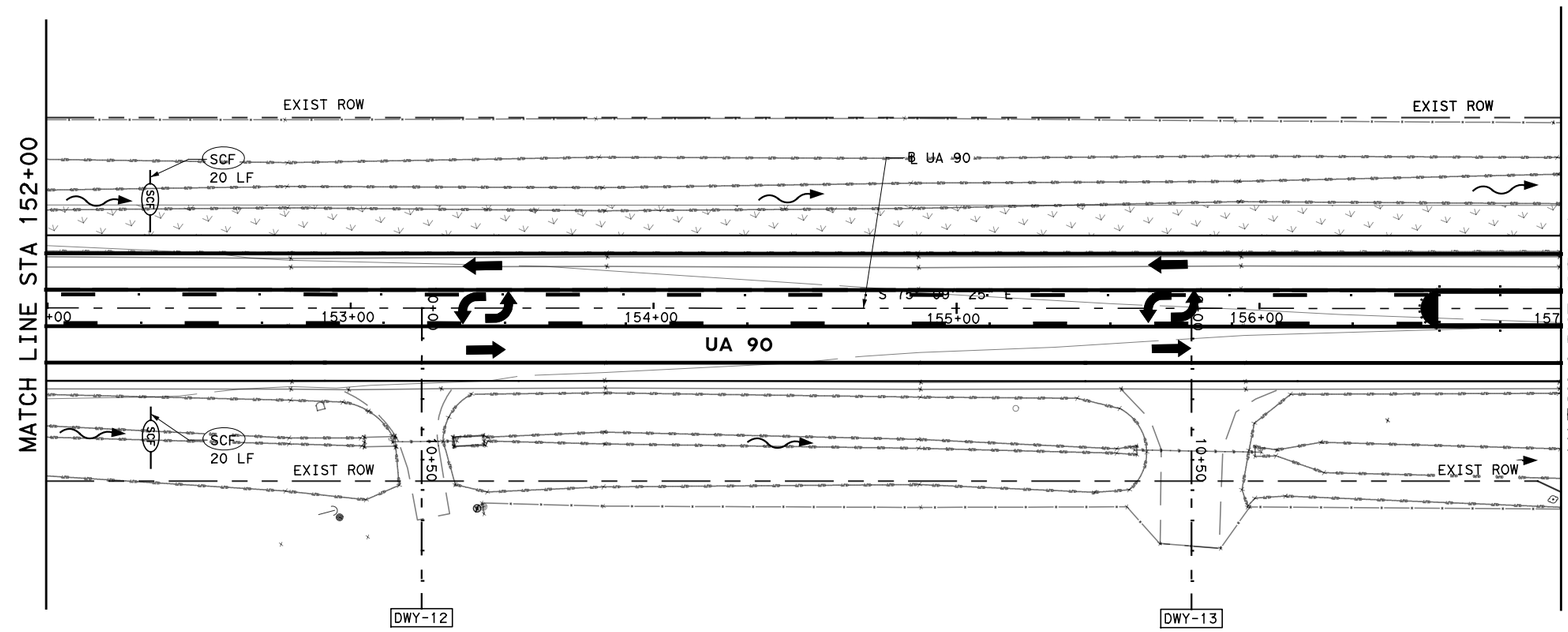

LEGEND

- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- FLOW DIRECTION
- AREA OF TOPSOIL, SEED, FERTILIZER, WATERING

ITEM	DESCRIPTION	UNIT	QUANTITY
161 6017	COMPOST MANUF TOPSOIL (4")	SY	786
164 6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	786
166 6001	FERTILIZER	AC	0.16
168 6001	VEGETATIVE WATERING	MG	12
506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	0
506 6024	CONSTRUCTION EXITS (REMOVE)	SY	0
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	80
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	80

NOTES:

1. UNLESS OTHERWISE NOTED ON THE PLANS ALL TEMPORARY EROSION CONTROL MEASURES SHALL REMAIN IN PLACE THROUGH OUT CONSTRUCTION.
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3. THE LOCATIONS FOR CONSTRUCTION EXITS WILL BE IDENTIFIED BY THE ENGINEER.
4. MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES DURING CONSTRUCTION.

0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED PROFESSIONAL ENGINEER
4/19/2023

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
738 Hwy 6 South, Suite 430
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(832) 619-1000
TEDSI
TBPE F-1640

Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SW3P LAYOUT

STA 147+00 TO STA 157+00

SHEET 6 OF 7

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
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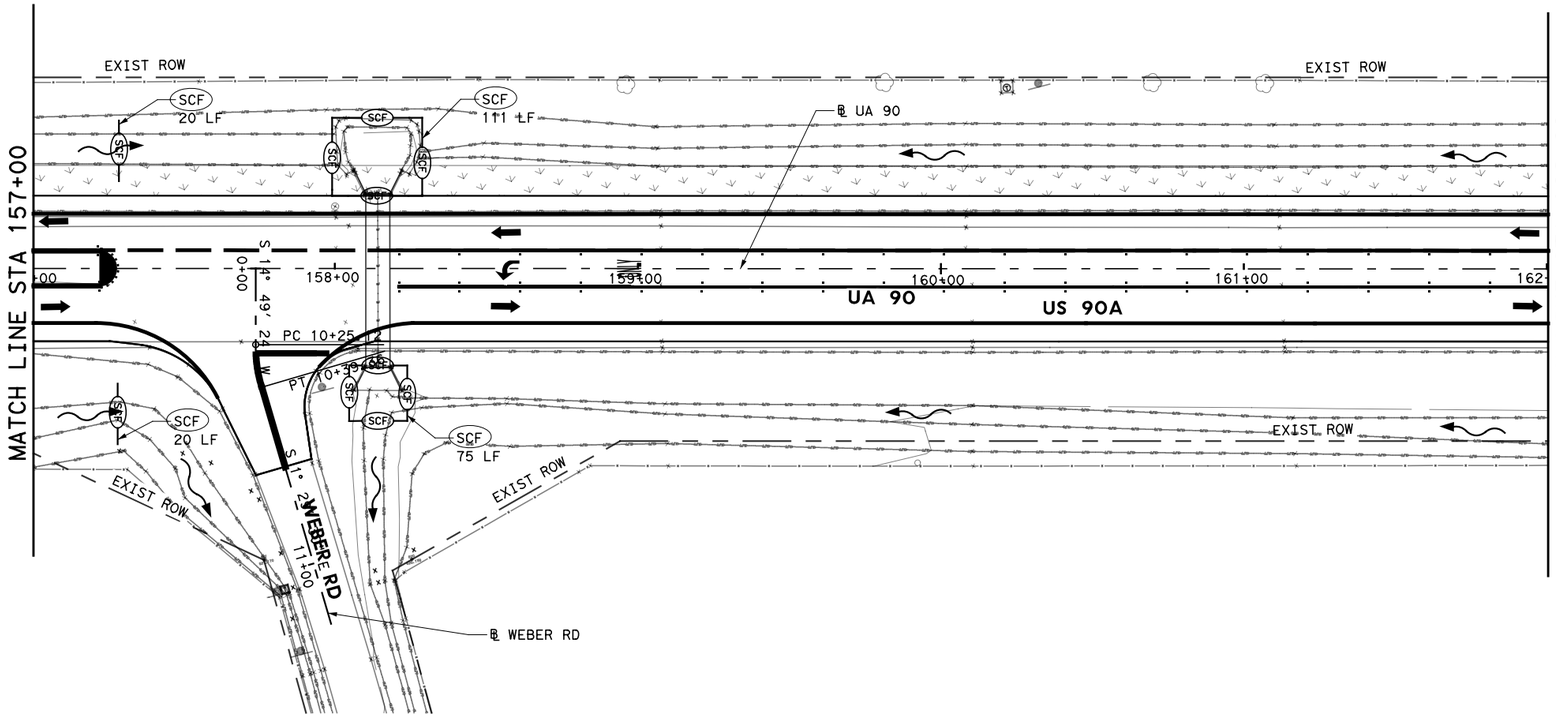

LEGEND

- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- FLOW DIRECTION
- AREA OF TOPSOIL, SEED, FERTILIZER, WATERING

ITEM	DESCRIPTION	UNIT	QUANTITY
161 6017	COMPOST MANUF TOPSOIL (4")	SY	875
164 6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	875
166 6001	FERTILIZER	AC	0.18
168 6001	VEGETATIVE WATERING	MG	14
506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	0
506 6024	CONSTRUCTION EXITS (REMOVE)	SY	0
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	266
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	266

NOTES:

1. UNLESS OTHERWISE NOTED ON THE PLANS ALL TEMPORARY EROSION CONTROL MEASURES SHALL REMAIN IN PLACE THROUGH OUT CONSTRUCTION.
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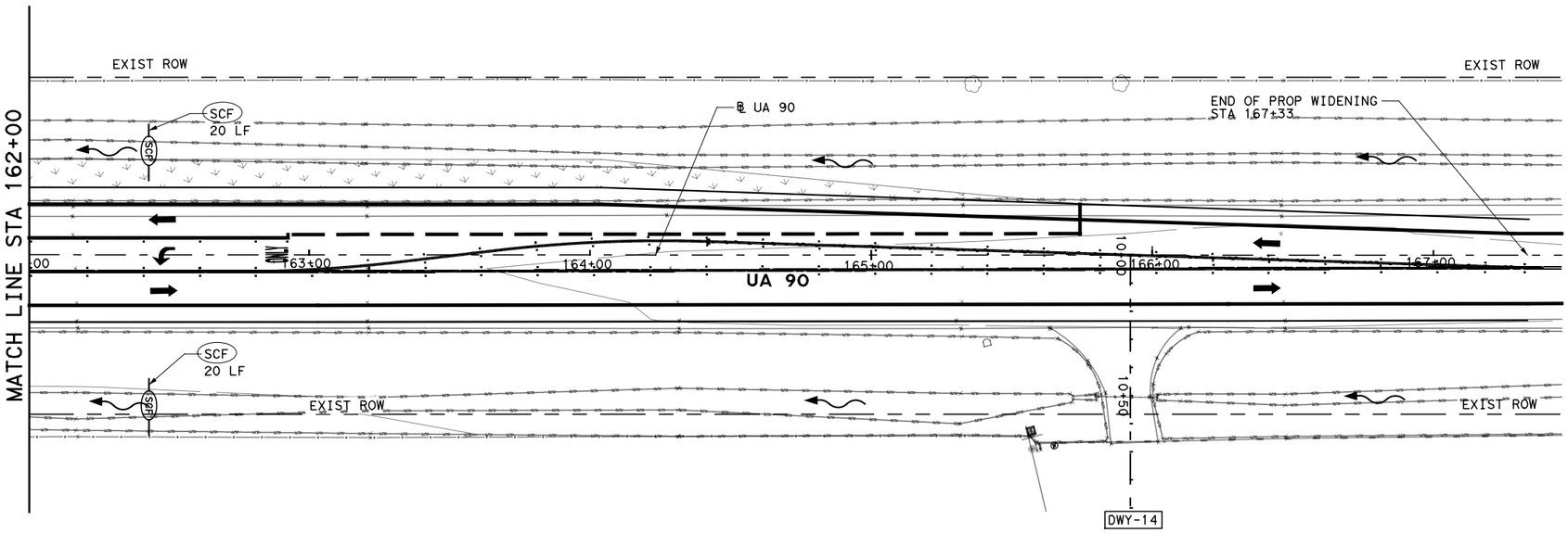

0′ 25′ 50′
SCALE IN FEET

STATE OF TEXAS
PAUL E. BRIGHT
61108
REGISTERED
PROFESSIONAL ENGINEER
4/19/2023

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
738 Hwy 6 South, Suite 430
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(832) 619-1000
TBPE F-1640

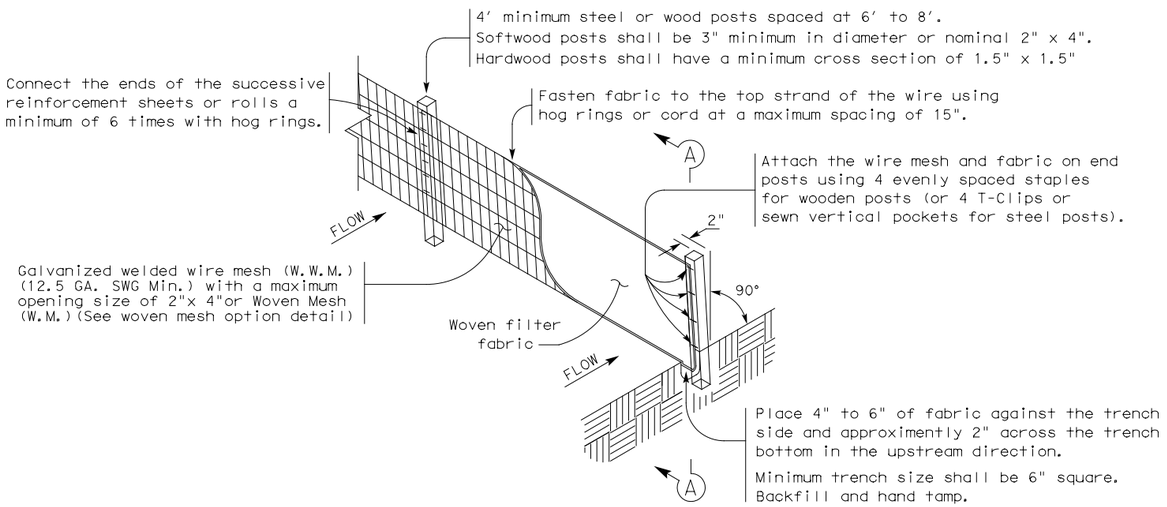
Texas Department of Transportation

UA 90
STATE HIGHWAY WIDENING
CR 202 TO WEBER ROAD

SW3P LAYOUT
STA 157+00 TO END

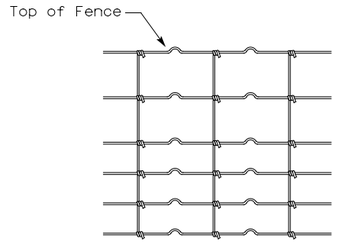
SHEET 7 OF 7

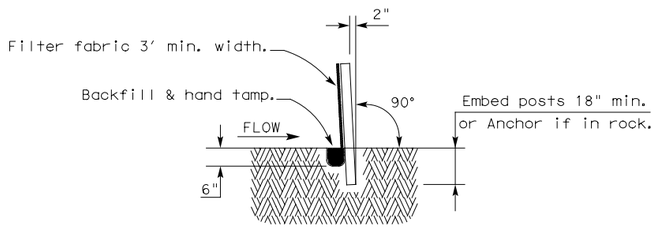
FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	STP 2023(951) HES		UA 90
STATE	DIST.	COUNTY	
TEXAS	SAT	GUADALUPE	
CONT.	SECT.	JOB	SHEET NO.
0025	04	051	137



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

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^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

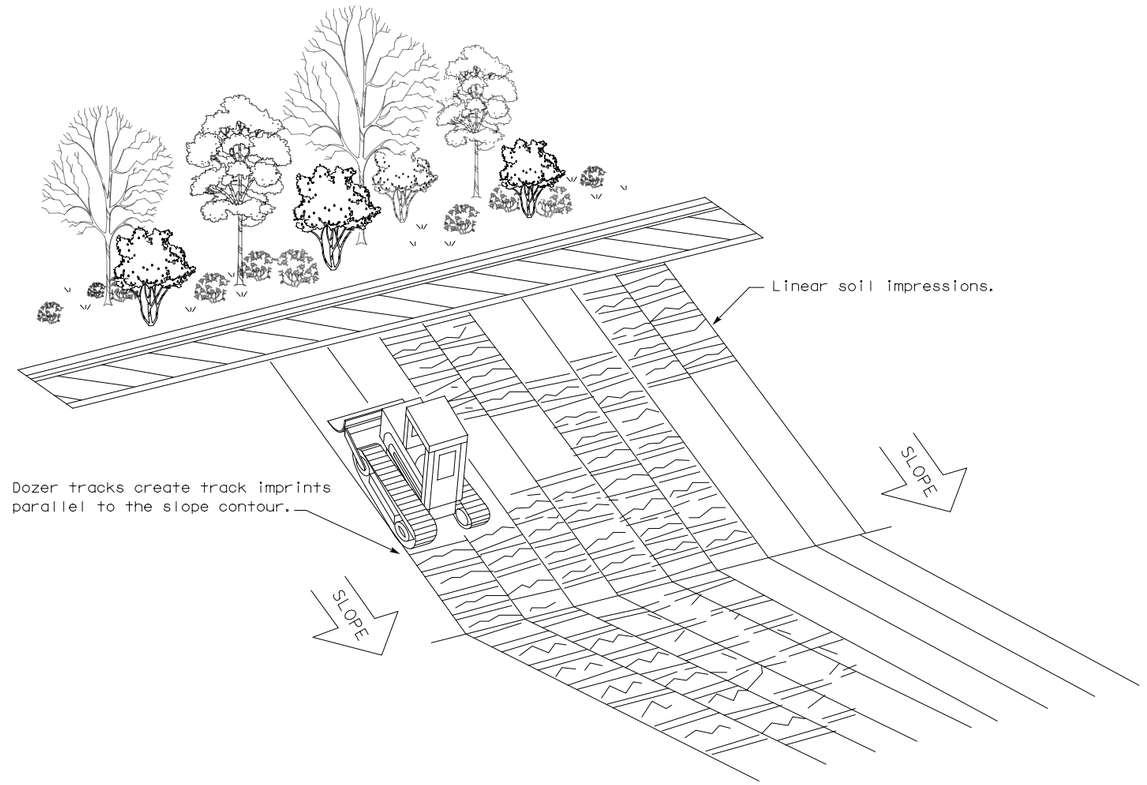
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0025	04	051		UA 90	
	DIST	COUNTY			SHEET NO.	
	SAT	GUADALUPE			138	

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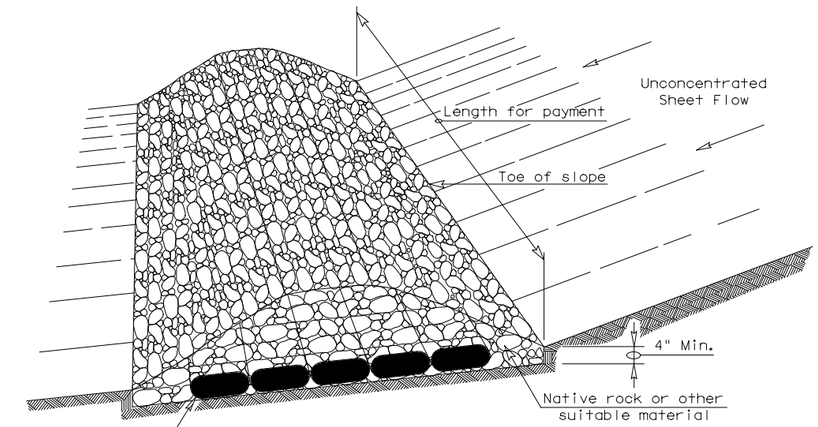
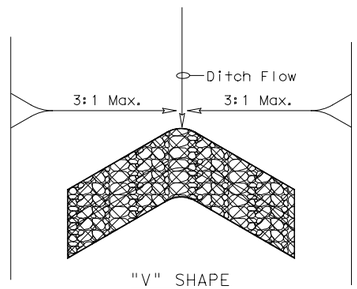
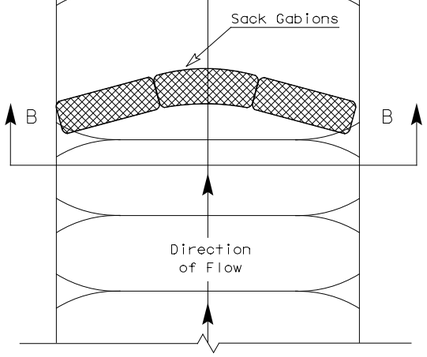


FILTER DAM AT TOE OF SLOPE

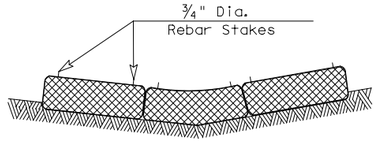
RFD1



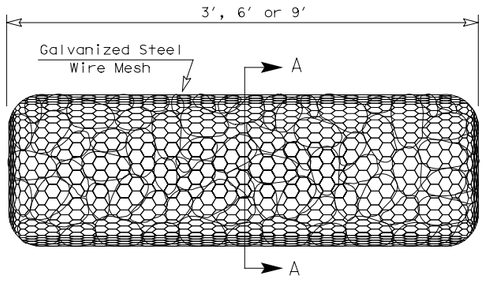
"V" SHAPE
PLAN VIEW



PLAN VIEW

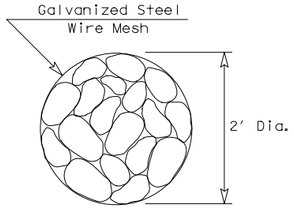


SECTION B-B

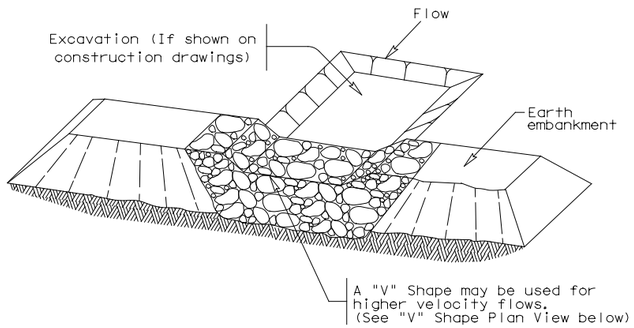


TYPE 4 (SACK GABIONS)

RFD4

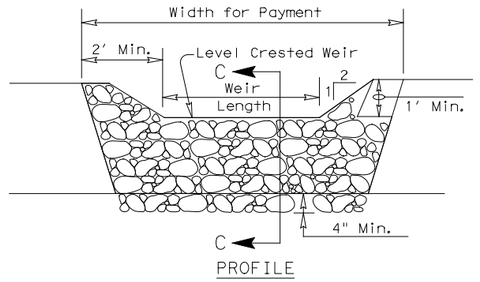


SECTION A-A

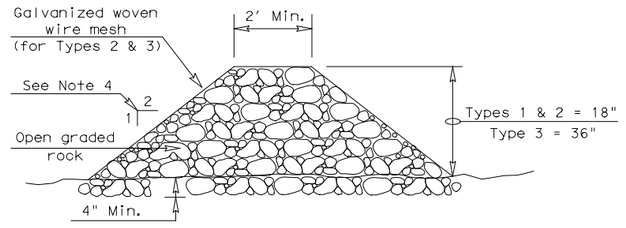


FILTER DAM AT SEDIMENT TRAP

RFD1 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^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

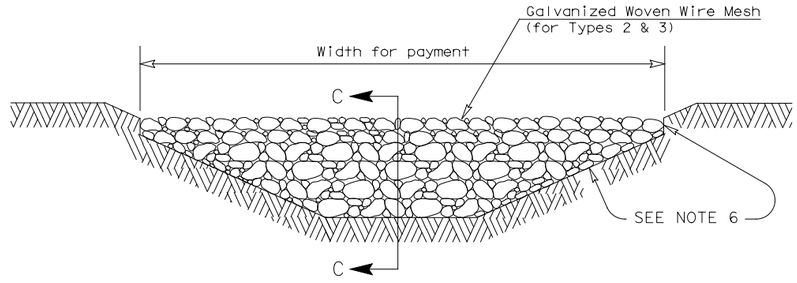
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 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

RFD1 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 ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
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

Texas Department of Transportation | Design Division Standard

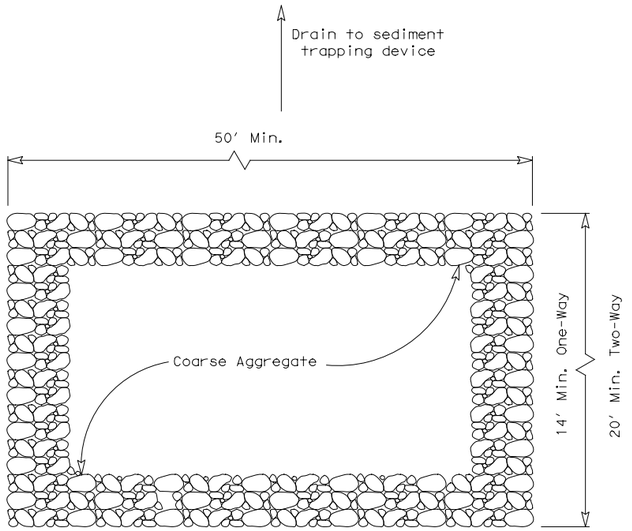
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

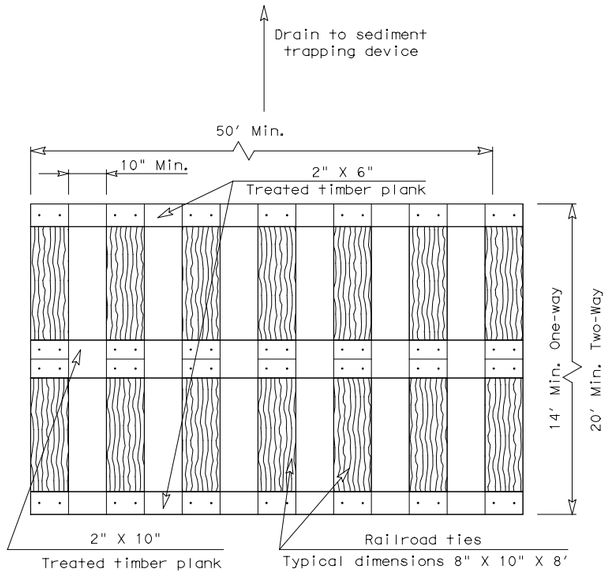
EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		139

DATE: 4/19/2023
FILE: pw:\\tedsl-pw.bentley.com:tedsl-pw-01\Documents\Projects\2019\2019-2078-00 - TxDOT Traffic Engineering (Kimley-Horn)\Work Authorizations\2019-2078-1A - US90A Widening, Weber Road to CR 202\6.0 TEDSI Design\6.08 CADD\



PLAN VIEW



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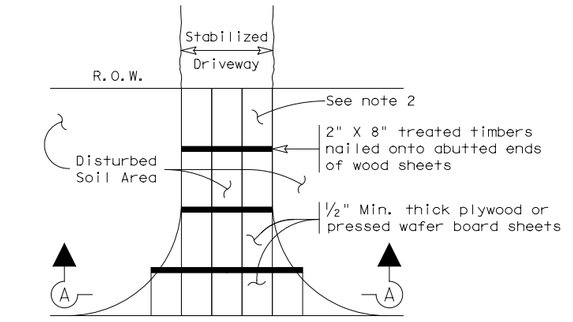
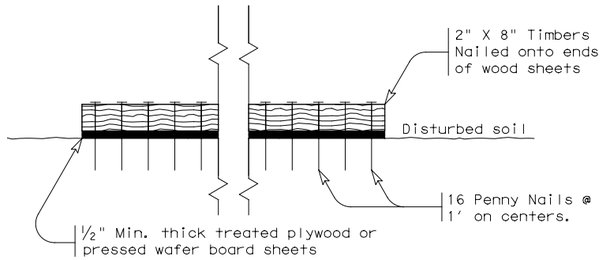


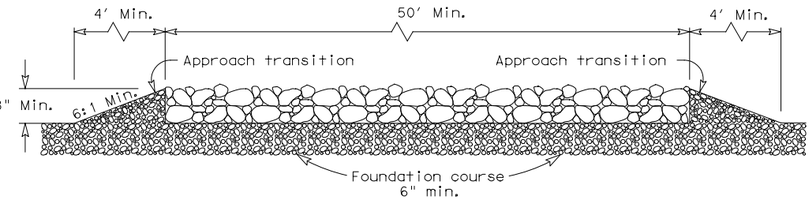
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM



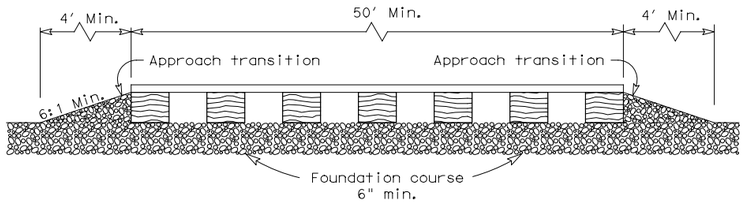
ELEVATION VIEW

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 materialas 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.



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 ½"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.

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.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		140

DATE: 4/19/2023
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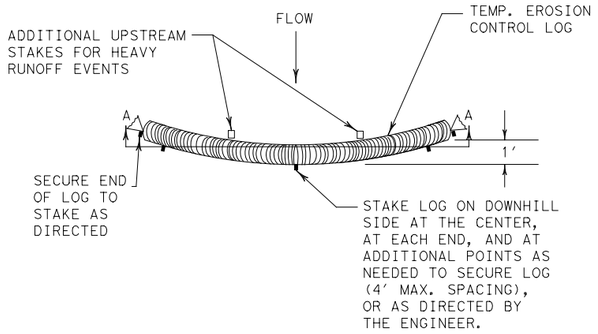
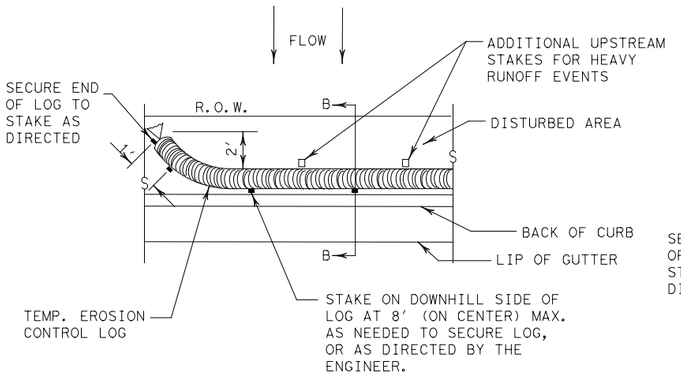
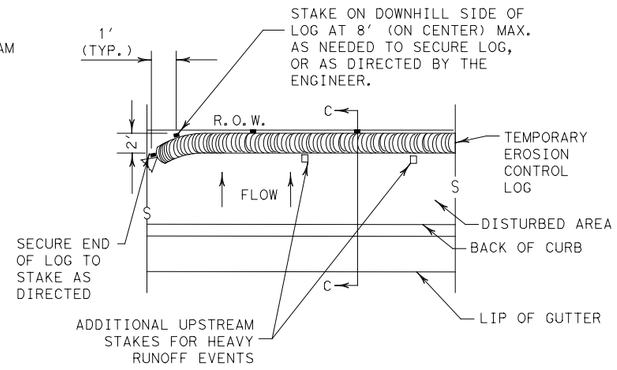


PLAN VIEW



PLAN VIEW



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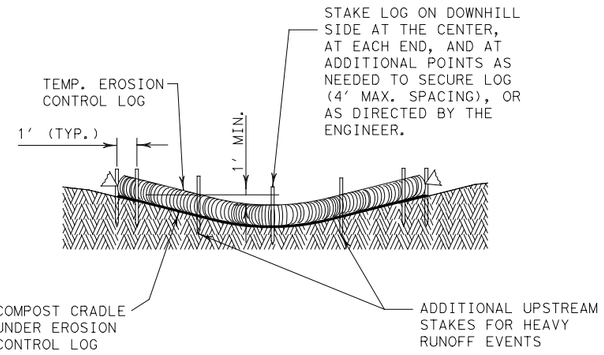
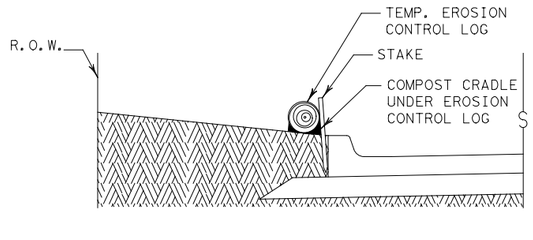


SECTION A-A

EROSION CONTROL LOG DAM

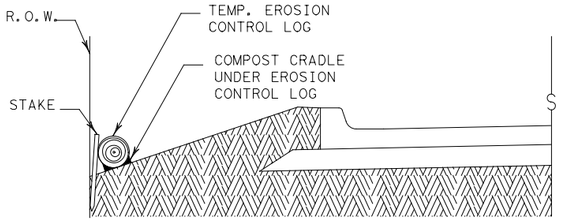
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

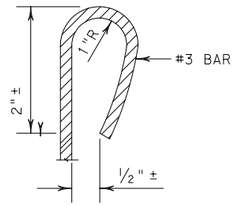
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

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

GENERAL NOTES:

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

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

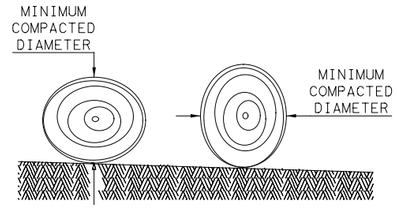
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

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

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

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SHEET 1 OF 3

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0025	04	051		UA 90		
	DIST	COUNTY			SHEET NO.		
	SAT	GUADALUPE			141		

DATE:
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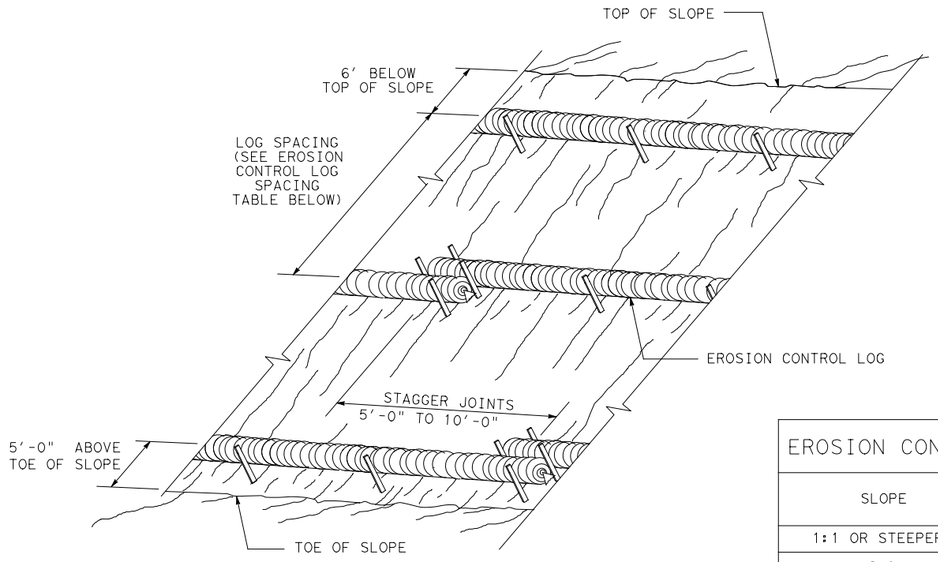
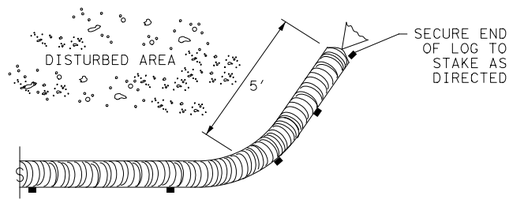


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

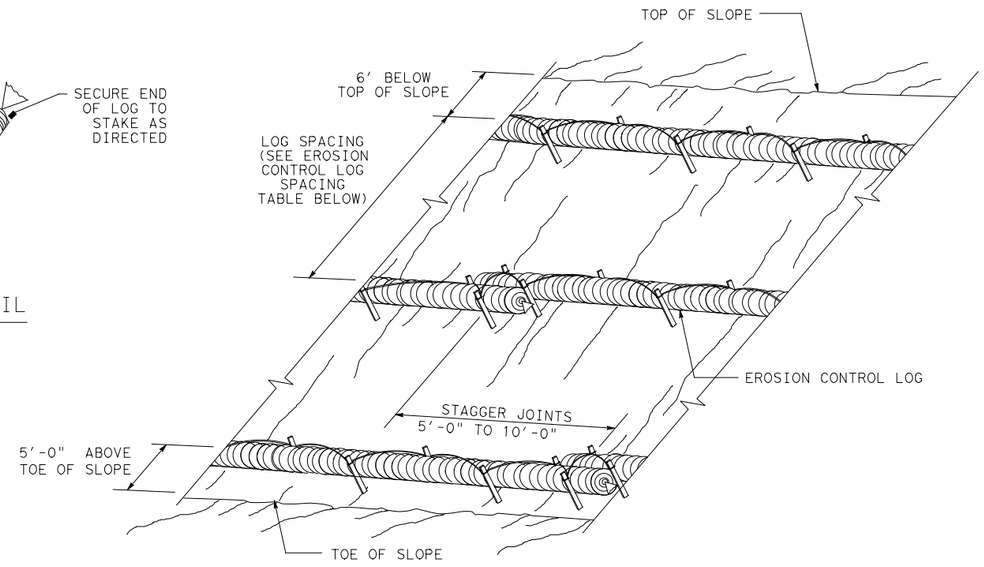
CL-SST



END SECTION RAP DETAIL

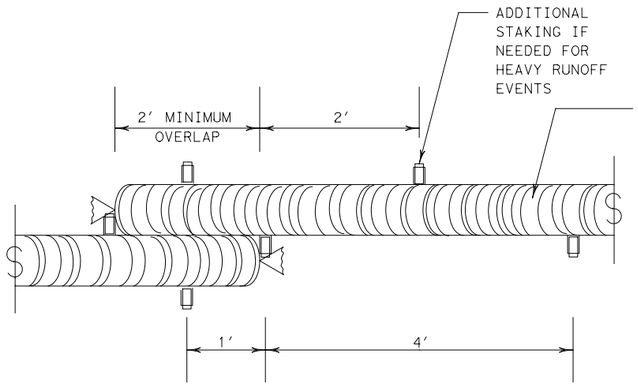
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5′	10′	15′	20′
2:1	10′	20′	30′	40′
3:1	15′	30′	45′	60′
4:1 OR FLATTER	20′	40′	60′	80′

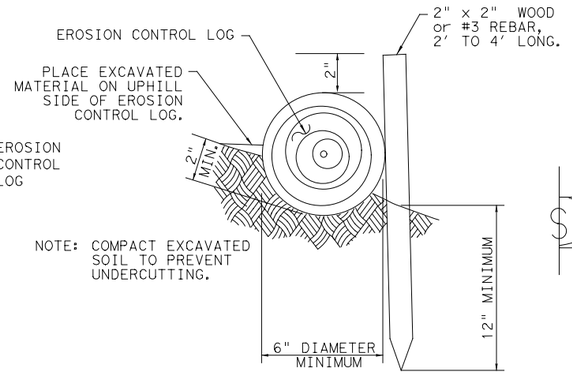
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

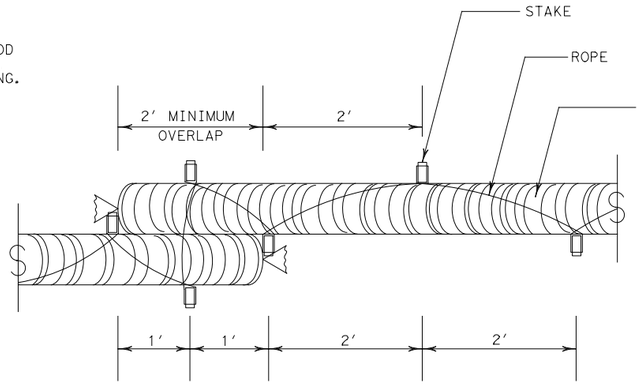


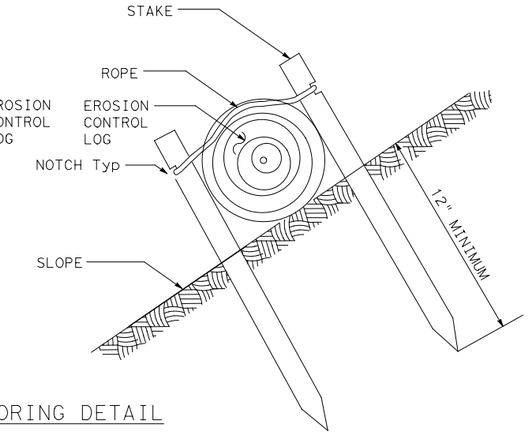


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

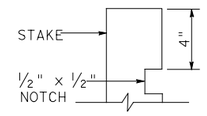
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation

Design Division Standard

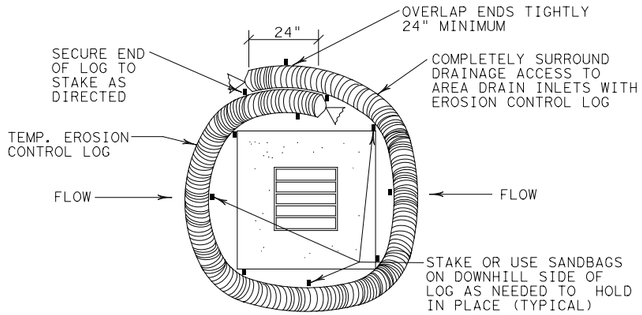
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

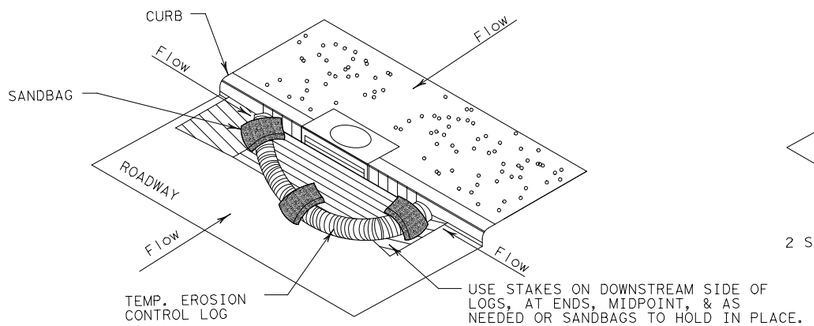
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0025	04	051	UA 90
	DIST	COUNTY		SHEET NO.
	SAT	GUADALUPE		142

DATE:
FILE:



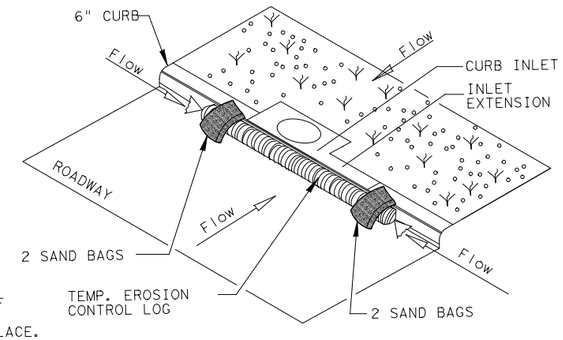
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

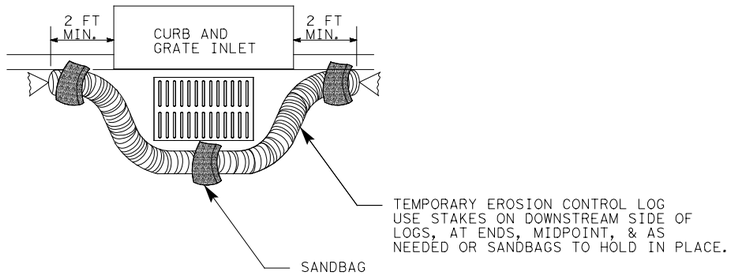
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

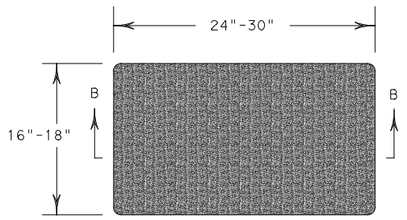
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0025	04	051		UA 90		
	DIST	COUNTY			SHEET NO.		
	SAT	GUADALUPE			143		