COUNTY SMITH PROJ. NO. 0606-07-007
HWY. NO. PR 16 LETTING DATE AUGUST 2021
DATE ACCEPTED

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	SUPPLEMENTAL INDEX OF SHEETS

FINAL PLANS

DATE CONTRACT LETTING: _____
DATE CONTRACTOR BEGAN WORK: _____
DATE WORK COMPLETED & ACCEPTED: _____
CONTRACTOR: _____
USED ____ OF ____ ALLOTTED DAYS _____
FINAL CONTRACT COST : $ _____

FINAL AS BUILT PLANS

THE CONSTRUCTION WAS PERFORMED UNDER MY SUPERVISION IN ACCORDANCE WITH THE PLANS AND CONTRACT

_____ DATE

_____ AREA ENGINEER

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

PROJECT NO. C 606-1-7

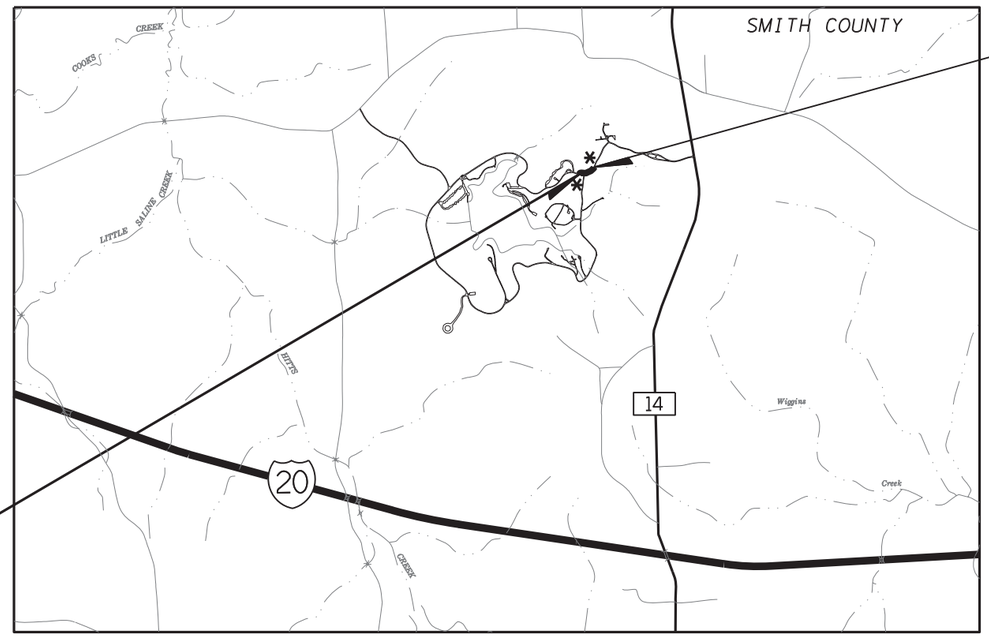
NET LENGTH OF PROJECT =

PR ROADWAY	789.19 FEET	=	0.149 MILES
PW ROADWAY	648.00 FEET	=	0.123 MILES
BRIDGE	100.00 FEET	=	0.019 MILES
TOTAL	1537.19 FEET	=	0.291 MILES

SMITH COUNTY
TYLER STATE PARK

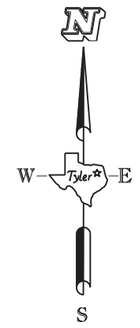
FROM PARK MAINT RD IN TYLER ST PARK, SW TO CEDAR POINT CAMPING AREA EXIT

FOR THE CONSTRUCTION OF TEXAS PARK AND WILDLIFE
CONSISTING OF GRADING, HMAC PAVEMENT, BRIDGE, AND RETAINING WALLS



BEGIN PROJECT
CSJ: 0606-01-007
STA: 17+48.00
REF MRK: 282 +00.682

END PROJECT
CSJ: 0606-01-007
STA: 10+00.00
REF MRK: 282 +00.540



Texas Department of Transportation®

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C 606-1-7		1
STATE	DIST.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
0606	01	007	PR 16

TITLE/100

FUNCTIONAL CLASSIFICATION = RURAL MINOR COLLECTOR
DESIGN SPEED = 20 MPH
A.D.T. (2019) = 383
A.D.T. (2039) = 628

Registered Accessibility Specialist (RAS) Inspection Required

TDLR No. TABS2021017054

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

* SIGN IN ACCORDANCE WITH THE BC STANDARDS SHEETS AND PART 6 OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

NO EXCEPTIONS
NO EQUATIONS
NO R.R. CROSSINGS

NOT TO SCALE

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING: 6/2/2021

DocuSigned by: Gilbert Arteaga BF88CB5DCDAE4E8...
DISTRICT DESIGN ENGINEER

APPROVED FOR LETTING: 6/2/2021

DocuSigned by: Vernon M. Will 6149184A8C65461...
DISTRICT ENGINEER

GENERAL

	SHEET NO.	DESCRIPTION
	1	TITLE SHEET
	2	SUPPLEMENTAL INDEX OF SHEETS
	3	PROJECT LAYOUT
	4-7	TYPICAL SECTIONS
	8,8A-8I	GENERAL NOTES
	9,9A	ESTIMATE AND QUANTITY SHEET
	10-15	QUANTITY SUMMARY
	16-17	SUMMARY OF SMALL SIGNS

TRAFFIC CONTROL PLAN

	SHEET NO.	DESCRIPTION
	18	SEQUENCE OF WORK
		STANDARDS
*	19-30	BC(1)-14 THRU BC(12)-14
*	31	TCP(1-1)-18
*	32	TCP(1-2)-18

ROADWAY DETAILS

	SHEET NO.	DESCRIPTION
	33	SURVEY CONTROL DATA
	34	ALIGNMENT DATA
	35-38	PLAN & PROFILE
	39	PAVING PLAN ADDITIONAL PARKING AREAS
	40-41	MISCELLANEOUS DETAILS
		STANDARDS
*	42	CCCG-21
*	43-46	PED-18
*	47-49	PRD-13
*	50	GF(31)-19
*	51	GF(31)TRTL2-19
*	52	GF(31)MS-19
*	53	SGT(10S)31-16
*	54	SGT(11S)31-18
*	55	SGT(12S)31-18
	56	OMITTED
	57	OMITTED
	58	OMITTED

DRAINAGE ITEMS

	SHEET NO.	DESCRIPTION
	59	HYDRAULIC DATA SHEET
	60	DRAINAGE AREA MAP

RETAINING WALL ITEMS

	SHEET NO.	DESCRIPTION
	61-68	RETAINING WALL PLAN & PROFILE
		STANDARDS
**	69	RW(EM)
**	70	RW(CB)(MOD)

BRIDGE ITEMS

	SHEET NO.	DESCRIPTION
	71	BRIDGE LAYOUT
	72-74	BORING LOGS
	75	ESTIMATED QUANTITIES AND BEARING SEAT ELEVATION
		STANDARDS
***	76	ABUTMENT NO. 1 OR 2
***	77	CSAB(MOD)
***	78-79	TRAFFIC RAIL TYPE T2P(MOD)
***	80	BAS-A
***	81	CRR
***	82-83	FD
***	84-85	IGD
***	86-88	IGEB
***	89-90	IGMS
***	91-92	IGSD-30
***	93	IGTS
***	94-95	MEBR(C)
***	96-99	PCP
***	100	PCP-FAB
***	101-102	PMDF
***	103	SEJ-B
***	104-105	SIG-30
**	105A-105B	SRR
***	106-109	TYPE T2P

TRAFFIC ITEMS

	SHEET NO.	DESCRIPTION
	110	SIGNING & PAVEMENT MARKING LAYOUT
	SHEET NO.	STANDARDS
*	111	PM(1)-20
*	112	PM(2)-20
*	113	PM(4)-20(MOD)
*	114	SMD(GEN)-08
*	115	SMD(TWT)-08
*	116	TSR(4)-13

ENVIRONMENTAL ISSUES

	SHEET NO.	DESCRIPTION
	117	SW3P LAYOUT
	118	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)
	119	STORM WATER POLLUTION PREVENTION PLAN (SW3P)
		STANDARDS
*	120	EC(1)-16
*	121	EC(2)-16
*	122	EC(3)-16
*	123-125	EC(9)-16

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

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

ROLANDO MENDEZ, P.E. — 05/27/2021
ROLANDO MENDEZ — DATE

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

STATE OF TEXAS
CHUN HO LEE
124680
LICENSED
PROFESSIONAL ENGINEER

RW ENGINEER, P.E. — 05/27/2021
RW ENGINEER — DATE

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

STATE OF TEXAS
LAURA M. ORTIZ
137207
LICENSED
PROFESSIONAL ENGINEER

BRIDGE ENGINEER, P.E. — 5/27/2021
BRIDGE ENGINEER — DATE

PARK ROAD 16
SUPPLEMENTAL
INDEX OF SHEETS

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		2

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0 25 50

SCALE: 1" = 50' H

BEGIN
PR STA 10+00.00

END
PR STA 17+06.06

BEGIN
UTRUN STA 10+00.00

END PROJECT
PW STA 17+48.00

BEGIN PROJECT
PW STA 10+11.62

END
UTURN STA 10+92.25

LIMITS OF CONSTRUCTION

PW

PR 16

PARK ROAD 16

UTURN

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

06/15/2021

PARK ROAD 16
PROJECT LAYOUT

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		3

DATE: 5/11/2021 10:52:04 AM
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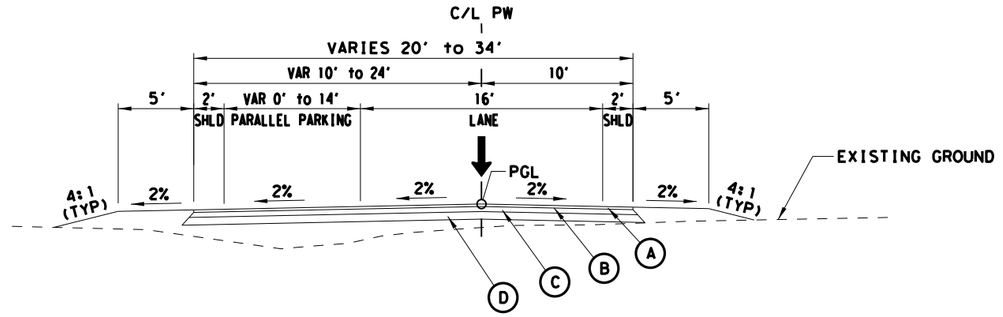

PROPOSED TYPICAL SECTION

(1)

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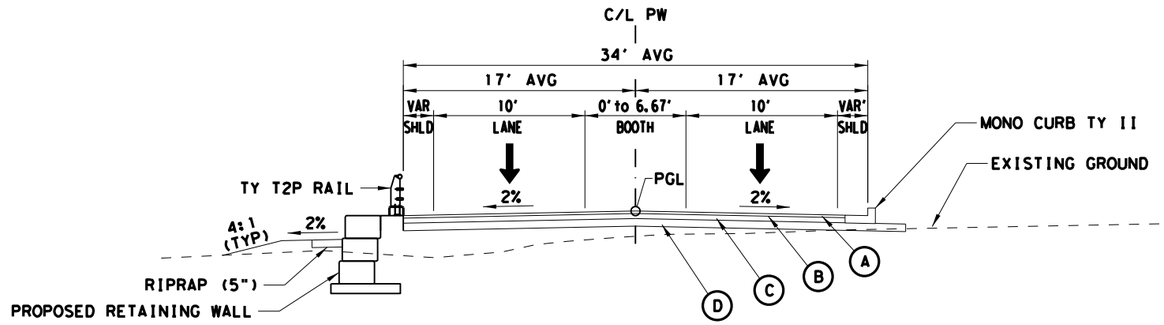
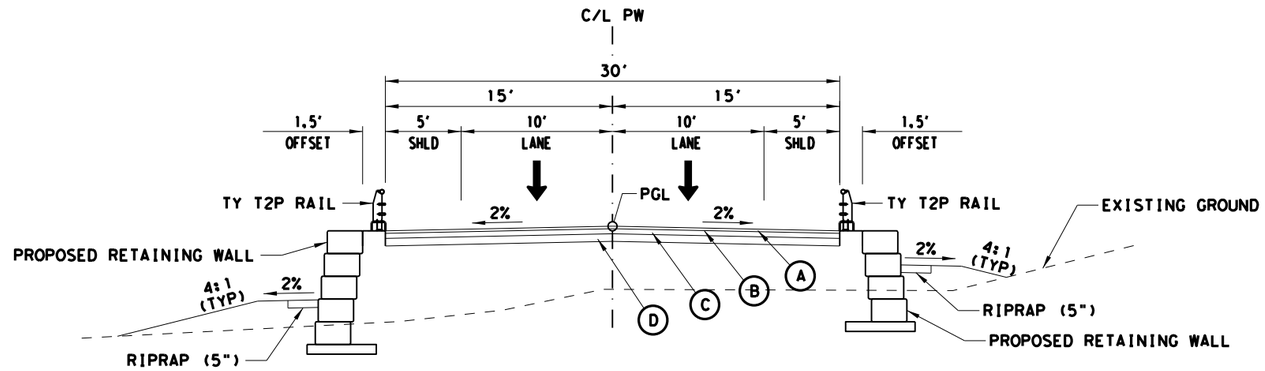


PROPOSED TYPICAL SECTION

(2)

(PW) STA 11+00.00 TO STA 11+94.23



PROPOSED TYPICAL SECTION

(3)

(PW) STA 11+94.23 TO STA 13+32.12
(PW) STA 14+32.12 TO STA 14+81.00

LEGEND

- (A) 2" TY D HMAC
- (B) OCST
- (C) 4" TY C HMAC
- (D) 6" CEMENT TREATED SUBGRADE

0 5 10

SCALE: 1" = 10' H

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED PROFESSIONAL ENGINEER

05/25/2021

PARK ROAD 16
TYPICAL SECTIONS

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		4

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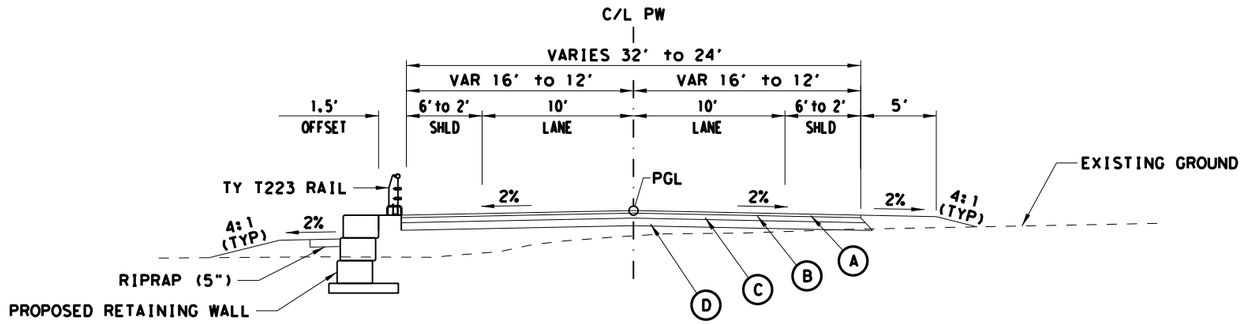


PROPOSED TYPICAL SECTION

④

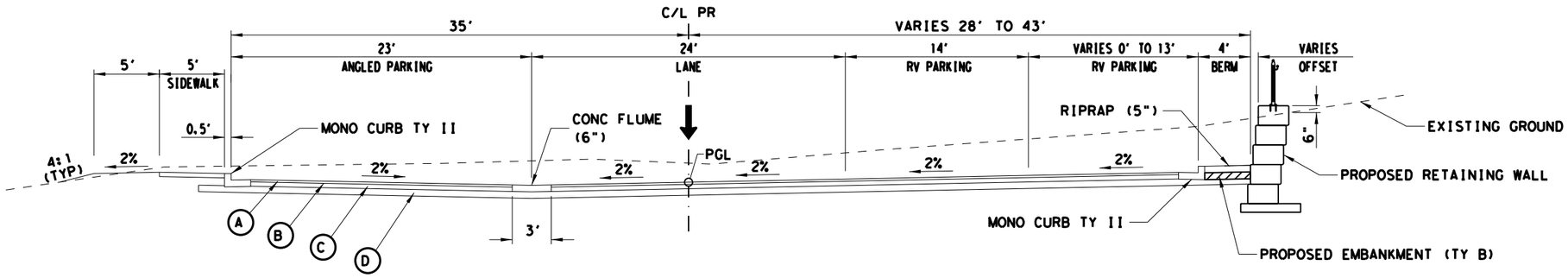
(PW) STA 14+81.00 TO STA 16+25.00

LEGEND

- (A) 2" TY D HMAC
- (B) OCST
- (C) 4" TY C HMAC
- (D) 6" CEMENT TREATED SUBGRADE

0 5 10

SCALE: 1" = 10' H



PROPOSED TYPICAL SECTION

⑤

(PR) STA 10+94.31 TO STA 14+59.70

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

05/25/2021

PARK ROAD 16
TYPICAL SECTIONS

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		5

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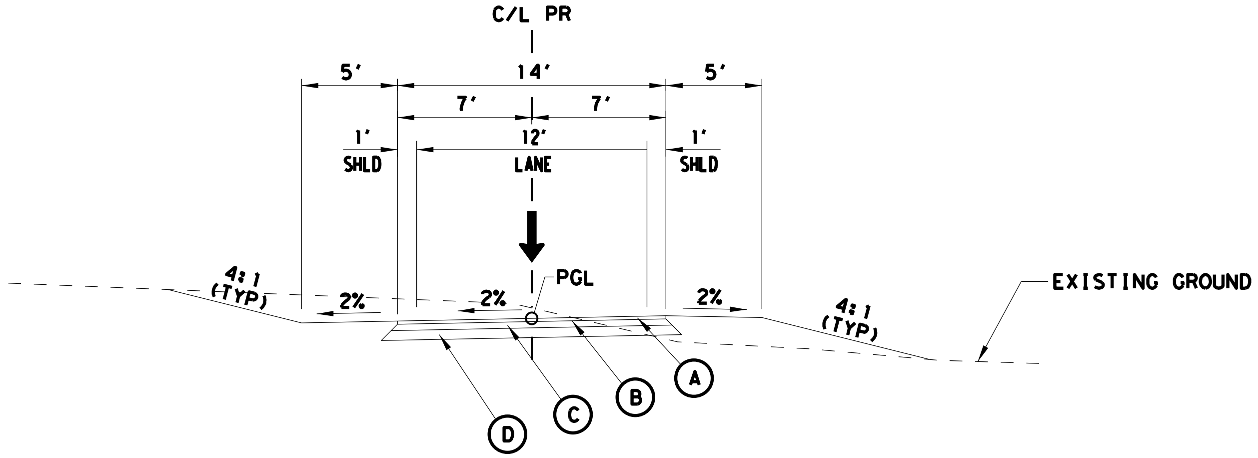
LEGEND

(A) 2" TY D HMAC

(B) OCST

(C) 4" TY C HMAC

(D) 6" CEMENT TREATED SUBGRADE



PROPOSED TYPICAL SECTION
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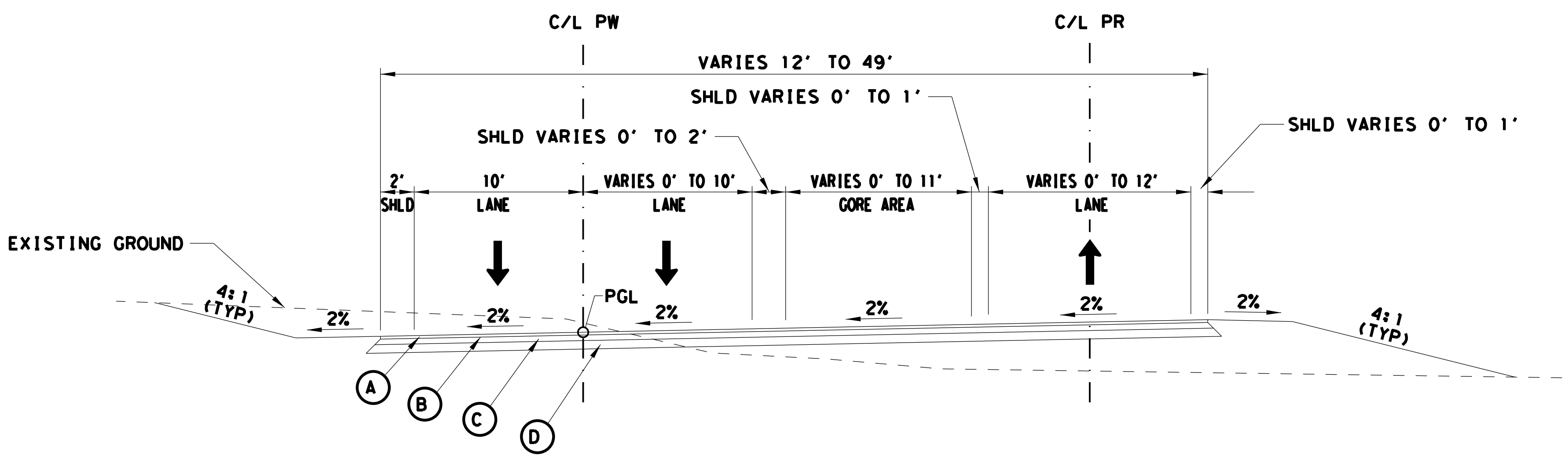
0 5 10
SCALE: 1" = 10' H



PROPOSED TYPICAL SECTION
7
(PW) STA 16+25.00 TO STA 17+48.00
(PR) STA 15+65.48 TO STA 17+06.06

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

05/25/2021

PARK ROAD 16
TYPICAL SECTIONS

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST		COUNTY	SHEET NO.
TYL		SMITH	6

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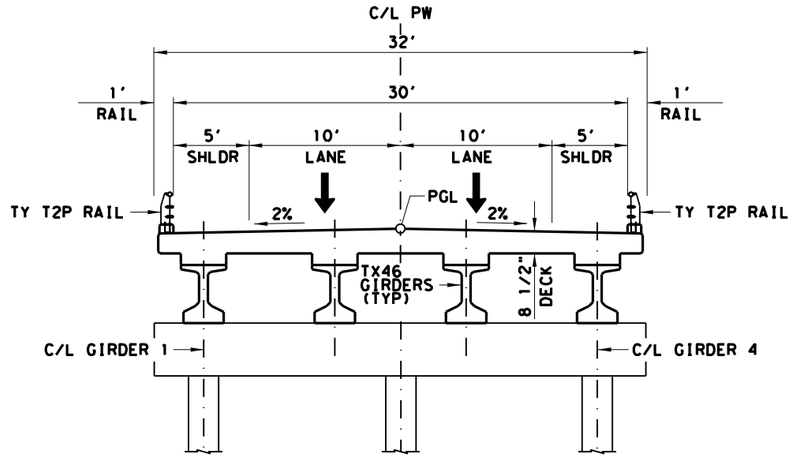
LEGEND

(A) 2" TY D HMAC

(B) OCST

(C) 4" TY C HMAC

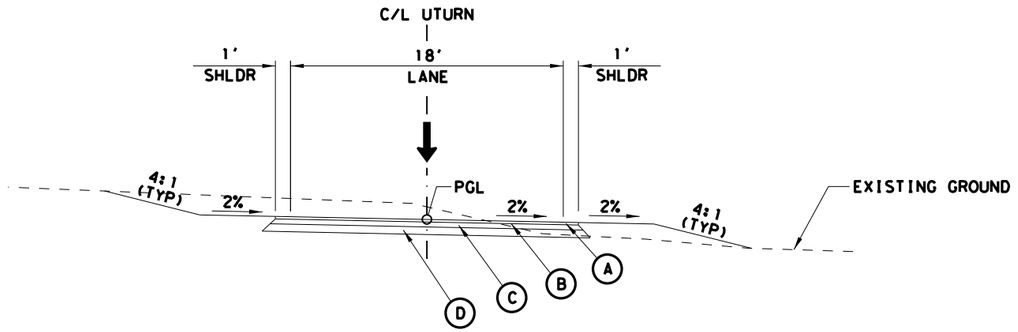
(D) 6" CEMENT TREATED SUBGRADE



PROPOSED TYPICAL SECTION

(8)

(PW) STA 13+32.12 TO STA 14+32.12



PROPOSED TYPICAL SECTION

(9)

(UTURN) STA 10+00.00 TO STA 10+83.13

0 5 10

SCALE: 1" = 10' H

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED PROFESSIONAL ENGINEER

05/25/2021

PARK ROAD 16
TYPICAL SECTIONS

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		7

DATE: 5/11/2021 10:52:22 AM
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GENERAL NOTES:

GENERAL.

Contractor questions on this project are to be addressed to the following individuals:

Paul Schneider, P.E.	Paul.Schneider@txdot.gov
Travis Singleton, P.E.	Travis.Singleton@txdot.gov

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

All Contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

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

For this Contract, the following standard sheets have been modified:

RW(CB)(MOD), CSAB(MOD), TRAFFIC RAIL TYPE T2P(MOD), PM (4)-20(MOD)

All stockpiles within TPWD right of way, must not exceed 12 ft. in height and must have 3:1 slopes unless otherwise directed. Place stockpiles in a manner that will be outside the horizontal clear zone, will not obstruct traffic or sight distance, and will not interfere with roadway drainage.

Do not haul with loaded scrapers on the surfaced areas of any park roadway except as approved.

Remove all vegetation from pavement edges, intersections, and driveways prior to planing operations, seal coat, or ACP operations. This work will not be paid for directly, but will be subsidiary to the bid items of the Contract.

ATTN: Provide a 20-ft. length per 1-in. depth temporary taper at all transverse joints in the travel lane before opening to traffic. This work will not be paid for directly, but will be subsidiary to the bid items of the Contract.

Project Number: **Sheet 8**

County: SMITH **Control:** 0606-01-007

Highway: PR 16

TPWD GENERAL NOTES.

Coordinate with the Texas Parks and Wildlife Department and adjust construction efforts with the daily operations of the park. Establishment of any material or equipment staging or storage areas other than those shown on the plans must be approved by the Engineer and the park superintendent prior to the start of work and thereafter if a change of location becomes necessary. As part of this coordination the Contractor will be required to:

a. Hold a weekly meeting with a TxDOT representative, the park superintendent, and the Contractor's superintendent to review and discuss the construction work and traffic control procedures planned for the following two-week period.

b. Ensure that any request to sequence work in a manner different than shown in the sequence of work must be obtained by written approval of the Engineer and the park superintendent.

c. Provide written notification to both the Engineer and the park superintendent at least two weeks prior to opening up any new construction locations within the park.

d. Prior to the start of construction, delineate the limits of the work area with stakes and flagging to identify where non-work areas begin so that damage to adjacent park property by construction equipment and other vehicles is avoided.

e. Obtain written approval of both the Engineer and the park superintendent before working on weekends or major holidays.

f. Mitigate or replace unnecessary damage to trees or shrubs within and adjacent to the limits of construction. Replace or mitigate damaged trees or shrubs with like size and types of trees or shrubs damaged. Final determination of the replacement or mitigation requirements will be determined by the Engineer. All cost associated with the replacement or mitigation cost will be the responsibility of the Contractor.

g. Repair or replace any unnecessary damage to arbors or utilities within and adjacent to the limits of construction. Any replacement cost will be the responsibility of the Contractor.

h. To minimize erosion, the area of soil disturbance should only be as large as necessary to do the project and to provide access for the equipment to do the work. Avoid the removal of vegetation until the project is ready to begin.

i. Should cultural deposits or features be encountered, stop work in the immediate area and call the TPWD cultural resources coordinator Rich Mahoney at 903-258-0828. Work may resume in the area of the find once TPWD has recorded and evaluated the cultural deposit or feature.

j. Prior to cutting and removal, trees shall be marked and approved by TPWD for stockpile. Approved trees shall be cut into 16 ft. lengths. Trees designated for stockpile should be hauled and placed in the maintenance yard within the park per staff direction. Trees not designated for stockpile will become the property of the Contractor and must be removed from the park. Tree stockpiling, removal, and disposal is subsidiary to Item 100.

Abandon or remove existing trees within the proposed retaining wall footprint as directed by the Park Management. Remove tree stems and roots to at least 2 ft. below existing ground surface. Backfill holes and replace any disturbed or loose soils due to tree removal with compacted select fill in accordance with Item 423.

LITTER PICKUP

Collect and properly dispose of all litter deposited by construction operations or the traveling public from within the right of way as directed. This includes cans, bottles, paper, plastic items, metal scraps, lumber, etc. Do not dump or stockpile collected litter on Department property.

ITEM 4. SCOPE OF WORK

Upon completion of the work and before final acceptance, remove all foreign material, stains, and marks from all surfaces. Remove foreign materials from the State Park property for disposal. Sandblast clean concrete surfaces as directed. Clean existing concrete structures that are marked or stained by the Contractor's operations. This work will not be paid for directly, but will be subsidiary to the bid items of the Contract.

During final clean up, remove all foreign material that has accumulated at bridge abutments and bent caps as approved. All work and equipment involved in the removal of this material is subsidiary to the bid items of the Contract.

ITEM 5. CONTROL OF THE WORK

Project may require adjustment of TPWD water lines and underground electric lines. Coordinate utility adjustments with Derin Depalermo of TPWD (903-597-5338) when conflicts are encountered. Work must be approved by the TPWD inspector prior to moving forward with construction activities above the adjusted utilities. Payment for adjusting TPWD utilities will be paid under force account.

Derin Depalermo, TPWD Park Superintendent
Office: 903-597-5338
Cell: 903-780-5779
Location: 789 Park Road 16
Tyler, Texas 75706

Project Number: **Sheet 8A**

County: SMITH **Control:** 0606-01-007

Highway: PR 16

If utility lines need adjustments during construction operations, modify operations and continue the work in a manner that will allow others to make the utility adjustments. Additional working time may be allowed for delays caused by these utility adjustments.

Place and maintain construction hubs near the right of way line in accordance with Article 5.9., "Construction Surveying" on both sides of the roadway until the final item of work is complete.

Establish proposed centerlines throughout the project from control points and alignment data as shown on the plans.

Use "Method C" for construction surveying in accordance with Section 5.9.3.

Refer to the horizontal and vertical alignment data summaries for satellite-control point information.

Maintain and re-establish the centerline stations throughout each project as required for each phase of work.

Utility locations shown on the plans are approximate. Contact utilities in accordance with Article 5.6., "Cooperating With Utilities."

Verify survey control for accuracy before beginning construction.

Notify the Engineer if there are conflicts with survey control accuracy.

Before beginning work, profile the centerline of the existing roadway. Set horizontal and vertical control points to provide for the required thickness of materials.

"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."

ITEM 7. LEGAL RELATIONS AND RESPONSIBILITIES

Do not initiate activities in a project specific location (PSL) associated with a U.S. Army Corps of Engineers (COE) permit area that has not been previously evaluated by the COE as part of the permit review of this project. Such activities include haul roads, equipment staging areas, borrow pits, and disposal sites. "Associated," defined here, means "materials are delivered to or from the PSL." The permit area includes all waters of the U.S. or associated wetlands affected by

activities associated with this project. Special restrictions may be required for this work. The Contractor is responsible for all consultations with the COE regarding activities (including PSL) that have not been previously evaluated by the COE. Provide the Department with a copy of all consultations or approvals from the COE before initiating activities.

Proceed with activities in PSL that do not affect a COE permit area if Contractor determines that the PSL is non-jurisdictional or proper COE clearances have been obtained in jurisdictional areas or have been previously evaluated by the COE as part of the permit review of this project. The Contractor is responsible for documenting his determination that his activities do not affect a COE permit area. Maintain copies of determination for review by the Department or any regulatory agency.

Concrete truck drivers and concrete pump operators are required to wash out only in designated areas specifically constructed for eliminating run-off. Dispose of materials in accordance with federal, state, and local requirements.

Placement of any fill material within the channel is not allowed. A temporary crossing must clear span from channel bank to channel bank.

Maintain positive drainage for permanent and temporary work for the duration of the project. The Contractor will be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work will be subsidiary to various bid items.

The total disturbed area for this project is 2.83 acres. The disturbed area in this project and the Contractor Project Specific Locations (PSL's) within 1 mile of the project limits for the Contract 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 Contractor PSL for construction support activities on or off the ROW. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceed 5 acres, before disturbance, provide a copy of the Contractor NOI for PSLs on the ROW and within 1 mile of the project limits to the Engineer and to any local government that operates a Municipal Separate Storm Sewer System (MSSS).

No significant traffic generator events identified.

ITEM 8. PROSECUTION AND PROGRESS

Prepare the progress schedule as a bar chart.

Project Number: **Sheet 8B**

County: SMITH **Control:** 0606-01-007

Highway: PR 16

ITEM 9. MEASUREMENT & PAYMENT

In accordance with Article 9.1., "Measurement of Quantities," furnish the tare and maximum gross weights as well as the volume capacity of all vehicles, trucks, truck-tractors, trailers, semi-trailers, or combination of such vehicles used to deliver materials for this Contract. Also, furnish calculations supporting these weights and capacities. Provide all measurements required for pay a minimum of 2 days before the trucks are used.

ITEM 100. PREPARING RIGHT OF WAY

Perform work as necessary off the right of way on temporary or drainage easements and at those locations where improvements have been taken or partially taken by right of way acquisition. Review these locations with the Area Engineer. The cost of this work will be included in the unit price bid for this Item.

Burning will not be permitted within the right-of-way.

ITEM 104. REMOVING CONCRETE

Blasting will not be permitted on this project.

ITEM 105. REMOVING TREATED & UNTREATED BASE & ASPHALT PAVEMENT

The stockpile site for salvageable material is located at Tyler State Park Maintenance Yard.

ITEMS 110 & 132. EXCAVATION & EMBANKMENT

Before Contract letting, prospective bidders may review the earthwork cross-sections at the Area Engineer's office. The computer data is for non-construction purposes only and is the prospective bidder's responsibility to validate the data with the accompanying plans, specifications, and estimates for this Contract.

Excavation and embankment for driveways, intersections, mailbox turnouts and crossovers will not be paid for directly, but will be subsidiary to the various bid items unless otherwise shown on the plans.

In a cut section, if the soil encountered in the subgrade is unsuitable for reasons other than excess moisture, this material will be declared "waste" and the Contractor will be required to undercut for a minimum depth of 1 ft. and a maximum depth as determined and replaced with a material having a plasticity index of 6 to 18. This required undercutting will be paid for under Item 110, "Excavation."

When excavation is required to adjust stream flow lines at culvert ends, flatten the side slopes of channels and the backslopes of parallel ditches to the maximum extent possible within the existing right of way and channel easements.

ITEM 132. EMBANKMENT

Furnish Type C embankment consisting of suitable earth material (rock, loam, clay, or other approved materials) that will form a stable embankment. The top 2 ft. of embankment material should have a plasticity index between 6 and 18.

ITEM 150. BLADING

Any required mowing and pulverizing before blading will not be paid for directly, but will be subsidiary to Item 150.

Use blading to finish slopes after placement of the ACP surface and use blading to reshape unimproved driveways as directed.

Compact blading material as directed.

ITEM 162. SODDING FOR EROSION CONTROL

Use Centipede block sod for permanent erosion coverage. Ensure temperature is at least 70 degrees, and no further freeze is anticipated.

Blade and rake smooth the area before laying block sod. Entire disturbed areas shall be covered with sod, unless approved by engineer. Remove 1 in. of soil along paved edges and curb lines before laying sod and dress the slope to match all exposed edges after placing the sod. Fertilize the ground with a slow-release homogeneous coated fertilizer at a rate of 1 lb. per 9 sq. yd. before installation of the sod.

ITEM 164. SEEDING FOR EROSION CONTROL

The rates, types of seed, asphalt, and locations for the broadcast seed items will be determined if temporary erosion control is needed.

The season and seed mixture for “Broadcast Seeding (Temporary Erosion Control) (Cool Season)” and “Broadcast Seeding (Temporary Erosion Control) (Warm Season)” is specified below:

Cool Season - September 1 thru November 30
Warm Season - May 15 thru August 31

Project Number: **Sheet 8C**

County: SMITH **Control:** 0606-01-007

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Permanent Planting
(Season: May to June)
Centipede Block Sod

Temporary Seeding for Erosion Control	
Warm Season	
(Season: May 15 to August 31)	
Green Sprangletop	2.0
Sideoats Grama (Haskell)	3.0
Cool Season	
(Season: September 1 to November 30)	
Cereal rye (elbon)	15

Districts and Planting dates	Clay Soils Species	Rates (lb. PLS/acre)	Sandy Soils Species	Rates (lb. PLS/acre)
TYLER	Centipede Block Sod	NA	Centipede Block Sod	NA

Districts and Planting dates	Clay Soils Species	Rates (lb. PLS/acre)	Sandy Soils Species	Rates (lb. PLS/acre)
TYLER	Green Sprangletop	2.0	Green Sprangletop	2.0
	Sideoats Grama (Haskell)	3.0	Side oats (Haskell)	3.0
Add for cool season (Oct-Feb)	Cereal rye (elbon)	15	Cereal rye (elbon)	15

Place topsoil before temporary seeding unless otherwise directed.

Do not use Bahiagrass.

Use additional temporary seeding if permanent seeding is placed outside the optimum growing season shown for this Item as directed.

ITEM 166. FERTILIZER

Place fertilizer at the rate of 1 lb. per 9 sq. yd. on areas prepared for seeding.

Place fertilizer at the rate of 1 lb. per 9 sq. yd. on areas prepared for block sod.

ITEM 168. VEGETATIVE WATERING

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

ITEM 204. SPRINKLING

Apply water for dust control as directed. When dust control is not being maintained, cease operations until proper resources have been utilized to adequately minimize dust during earthwork, base construction. This Item will not be paid directly, but will be subsidiary to pertinent Items.

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ITEM 316. SEAL COAT

Protect all existing bridges, curbs, and other exposed concrete surfaces from asphaltic materials by any acceptable method. Removal of excessive asphaltic materials deposited on these surfaces will be at the Contractor's expense.

During surface treatment application, if existing conditions warrant, vary the lane widths, transitions, and intersection areas as directed.

Perform rolling as directed with equipment complying with Section 210.2.4.2, "Medium Pneumatic Tire." This work will not be paid for directly, but will be subsidiary to pertinent Items.

Do not apply asphalt later than 1 hour before sunset unless otherwise approved.

The Engineer will approve stockpile sites for materials. Locate stockpile site a minimum of 30 ft. from the roadway unless otherwise authorized. Place stockpiles in a manner that will not interfere with access from abutting property and will not obstruct traffic or sight distance. Avoid stockpiling at intersections. Notify the Engineer at least 5 working days prior to stockpiling material to secure approval of the site. The Engineer may approve stockpiling of materials closer than 30 ft. from the travelway if adequate barricades and devices are furnished and approved. Keep stockpile clear of debris and vegetative growth as approved.

Keep the material pushed into one pile at each stockpile location. Upon completion of each reference project, provide stockpile sites that are clear of debris and dressed in a manner as approved.

Clearly sign stockpile locations with Contractor's name & project name, as approved. This will not be paid for directly, but is subsidiary to Item 316.

Provide aggregate for shoulders and mainlanes from the same source unless otherwise directed.

Place surface treatments between May 1 and August 31 unless otherwise directed.

The rates shown on the plans for asphalt and aggregate are for estimating purposes only. The rates may be varied as directed.

ITEM 320. EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT

Provide either a material transfer vehicle or material transfer paver for the surface course of this project as approved.

ITEM 403. TEMPORARY SPECIAL SHORING

Use mats during placement and removal of temporary special shoring to avoid damage to the pavement structure.

Do not allow shoring to project more than 4-in above natural ground elevation unless otherwise approved.

ITEMS 420 & 427. CONCRETE SUBSTRUCTURES & SURFACE FINISHES FOR CONCRETE

Provide an ordinary surface finish to the following elements: Surface Area II.

ITEM 422. CONCRETE SUPERSTRUCTURES

Once bridge beams/girders are in place, provide the Engineer in an acceptable electronic format, finished slab elevations, bottom of slab elevations with and without deflection, beam/girder field shot profiles, and the required calculated grading for the panels or PMD forms if used. Include elevations on each beam/girder across each span at 1/4, 1/2, and 3/4 points as well as at the beginning and ending of each span. Depending on conditions the Engineer may require each beam/girder edge to be included. Provide this information to the Engineer a minimum of 7 days prior to placing bridge slab concrete. Costs associated with this work will be subsidiary to pertinent Items.

ITEM 423. RETAINING WALLS

Use the approved Concrete Block retaining wall systems listed at:
http://www.txdot.gov/inside-txdot/division/bridge/approved-systems/retaining-system.html

Fasten the top block to the wall with a construction adhesive. Use a manufacturer's recommended adhesive as approved by the Engineer.

Provide the following surface finishes to all permanent walls in accordance with Item 427:

(1) Redi-Rock Ledgestone finish or approved equivalent.
(2) Redi-Rock or approved equivalent custom coloring application to match proposed headquarters building "San Saba" Masonry Color.
(3) Provide mock-up sample indicating color, size and finish to state park personnel for approval.
(4) See RW(CB)(MOD) plan sheet for stone size details.

Stairway at Retaining Wall #1 must match retaining wall aesthetics in material, finish and color. Submit any deviations to park staff and the Engineer for approval. The stone stair steps should

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have a width of 15 inches, and a minimum height of 6 inches. Total height of the stairs must match finish grade of adjacent retaining wall height at location indicated on the plan layout. The forward inclination of each step should be 3:1 H:V, or flatter. Shop drawings should be submitted and approved by the Engineer prior to construction. Stone stairs will be subsidiary to Item 423.

Before temporary or permanent retaining wall and associated work begins, but after the required working drawings have been approved, schedule and attend a pre-work meeting with the Engineer for discussion of the proposed work and requirements.

ITEM 432. RIPRAP

Locations and quantities may be varied as directed by the Engineer to accommodate field conditions.

ITEM 450. RAILING

Apply an appearance coat to the metal surface components of the T2P (MOD) railing as indicated in Item 445 and Item 450. Stain the galvanizing items (Bridge Rail TY T2P, Retaining Wall Rail TY T2P, MBGF, etc.) a rustic brown using Natina Steel Solution or Engineer approved equivalent. Film-forming products are not allowed. Apply the Natina Steel Solution in accordance with the manufacturer's recommendations. Treat a sample item with the product and obtain Engineer approval for the finish prior to proceeding with the work.
Apply appearance coat to bolts, anchor rods, and similar hardware after installation

Provide color mock-up example for park selection prior to performing work and ordering associated material.

Appearance coat of bridge and retaining wall rail type T2P subsidiary to Item 450.

ITEM 502. BARRICADES, SIGNS, AND TRAFFIC HANDLING

The traffic control plan for this Contract consists of: the installation and maintenance of warning signs and other traffic control devices shown on the plans; specification data, which may be included in the general notes; applicable provisions of the Texas Manual on Uniform Traffic Control Devices (TMUTCD); traffic control plan sheets included on the plans; standard BC sheets; Compliant Work Zone Traffic Control Device List, and Item 502 of the standard specifications.

Use ground-mounted sign mounts with two posts for all temporary work zone signs unless otherwise directed.

Inspect and correct deficiencies each day throughout the duration of the Contract. In accordance with Article 502.4., “Payment,” no payment will be made for the month if the Contractor fails to provide or properly maintain signs and devices in compliance with Contract requirements. Temporary warning signs that are visible when conditions do not apply will be considered improper maintenance of signs.

Provide at least one employee on call nights and weekends (or any other time that work is not in progress) for maintenance of signs and traffic control devices. This employee must have an address and telephone number near the project, as approved. Notify the Engineer in writing of the name, address, and telephone number of this employee. The Engineer will furnish this information to local law enforcement officials.

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 30 minutes.

Sign all roads intersecting the project in accordance with current BC standards.

Refer to the traffic control plan sheets for traffic handling through the work area. Contractor may vary the signing arrangement and spacing as necessary to fit field conditions; however, any proposed changes in the traffic control plan must be approved before implementation.

When the sequence of work is shown on the plans, the Contractor may submit an alternate proposal for approval. Submit in writing all proposed variations and revisions.

High-visibility safety apparel is required for workers in accordance with the General Notes on current BC standards.

Place and maintain signs, channelizing devices, and flaggers to direct and route traffic at any location and for any period of time as may be required or directed.

When operations require a lane closure, provide cones, vertical panels, drums, signs, flaggers, and flashing arrow panels as necessary to route traffic around the closed lane as shown on the plans and as directed. Lane closures will be limited to one specific lane as directed.

Lane closures will not be allowed before 9 A.M. unless otherwise directed.

Unless otherwise approved, lane closures for minor or major construction operations will not be allowed on Good Friday, Easter weekend, Memorial Day, Memorial Day weekend, July 4th, Labor Day, Labor Day weekend, Thanksgiving Day thru Sunday, Christmas Eve, Christmas Day, New Year’s Eve, New Year’s Day, or on any other high traffic days or holidays as determined.

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Erect R4-1 (Do Not Pass) and R4-2 (Pass With Care) signs to mark existing no-passing zones as directed. (These signs will not be required if these zones will not be eliminated during construction.)

Maintain existing roadside signs within this project’s limits during this Contract. In order to accommodate the grading or other operations, temporarily relocate these signs in accordance with the TMUTCD as directed. Use ground-mounted sign mounts with two posts for all relocated signs unless otherwise directed. This work will not be paid for directly, but will be subsidiary to Item 502.

Provide truck-mounted attenuators (TMA) as shown on the appropriate traffic control plan sheets. Provide a letter certifying that all TMA used on this project meet NCHRP 350 or AASHTO Manual for Assessing Safety Hardware (MASH) requirements.

Regulate all construction activities and equipment to minimize inconvenience to the traveling public. At points where it is necessary for trucks to stop, load, or unload, provide warning signs and flaggers to protect the traveling public.

The pavement must be entirely open to traffic each night. Remove or clearly barricade all material stockpiles, equipment left overnight, or any obstruction within 30 ft. of a travelway as approved.

The Contractor Force Account “Safety Contingency” is intended to be used for work zone enhancements that could not be foreseen in the project planning and design stage for the purpose of improving the effectiveness of the Traffic Control Plan. 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.

When excavation is required next to a travel lane carrying traffic and widening is not completed by the end of the day’s operation, place sufficient backfill against the edge of the travel lane in order to provide a 3:1 slope, unless otherwise permitted on the plans. Provide backfill containing a durable crushed stone type of flexible base or other materials as approved. When work resumes on this excavated area, carefully remove and dispose of the backfill material. Materials and labor for this work will not be paid for directly, but will be subsidiary to the various bid items of the Contract.

Refer to the traffic control details for surfacing operations shown on the plans. Install signs as required by this standard or plan sheet. Keep signs in place until after completion of the surface course operation and until placement of the standard pavement markings. Place standard pavement markings within 7 days of surface treatment application. The placement of acceptable permanent pavement markings and the completion of the final cleanup will be considered a part of the surface course operation. These signs are in addition to the signs and barricades that may

be required on standard BC sheets. Short-term stationary/short duration portable signs will be required during the removal of the temporary pavement markings.

All work required by these general notes, except as provided for by Item 502, will not be paid for directly, but will be subsidiary to Item 502 unless otherwise shown on the plans.

ITEM 504. FIELD OFFICE AND LABORATORY

Provide a facility at the asphalt concrete pavement plant for use by the Engineer as a laboratory. This is an existing requirement of Item 6, Article 5, "Plant Inspection and Testing," of the Standard Specifications. Provide a facility meeting the requirements of Item 504. At a minimum meet the requirements of 504.2.2.4, "Ty D Structure (Asphalt Mix Control Laboratory)" and 504.2.2.4.1, "Asphalt Content by Ignition Method." In addition, provide the following: At least one exterior door opening with a 48-in. minimum width. If steps are required to gain access to the facility's 48-in. door, provide a landing dock with minimum dimensions of 60 in. wide by 60 in. deep. The strong floor and landing of the facility should support the weight of all equipment and personnel providing a stable, essentially zero deflection during testing operations, acceptable to the Engineer. This facility will be required of all projects with plant produced asphalt concrete pavement.

No direct payment will be made for Engineer field labs. All construction, maintenance, utilities, custodial services, security, and permits necessary to establish and maintain readiness of this facility is the responsibility of the Contractor. This building/facility is required by the standard specifications and is considered a standard part of any asphalt concrete pavement plant producing materials for Department projects.

Furnish a Superpave Gyratory Compactor calibrated in accordance with Tex-241-F for molding production samples. The Superpave Gyratory Compactor will not be paid for directly, but will be subsidiary to the asphalt concrete pavement Items of work.

ITEM 506. TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

Remove dirt, silt, rocks, debris, and other foreign matter that accumulates in all structures due to project erosion and Contractor's operations. Keep stream channels open at all times. This work will not be paid for directly, but will be subsidiary to this Item.

The total disturbed area for this project is 2.83 acres. The disturbed area in this project, all project locations in the Contract, and Contractor project specific locations (PSLs) within 1 mile of the project limits for the Contract, will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water

Project Number: **Sheet 8G**

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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 Contractor PSLs for the construction support activities on or off right of way. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, before disturbance, provide a copy of the Contractor NOI for PSLs on the right of way to the Engineer (to the appropriate MS4 operator when on an off-State system route).

The Engineer will provide copies of documents to meet TxDOT's posting requirements. Laminate, post, and maintain these documents at the project limits and at major roadways intersecting the project as directed. Post required Contractor documents in the same manner and location. This work will be subsidiary to Item 506.

ITEM 529. CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER

Provide steel reinforcement for all curb and curb and gutter unless otherwise directed.

ITEM 531. SIDEWALKS

Provide steel reinforcement for all sidewalks unless otherwise directed.

ITEM 540. METAL BEAM GUARD FENCE

All work involved in placement of timber posts in soil cement riprap must be included in the price bid for Item 540.

Do not paint treated timber posts.

Use round wood posts on all metal beam guard fence except where steel posts are required in accordance with "Low Fill Culvert Post Mounting" details shown on standard sheet MBGF.

ITEMS 540 & 542. METAL BEAM GUARD FENCE & REMOVING METAL BEAM GUARD FENCE

Regardless of when the Contractor installs proposed MBGF, set the rail height to account for any subsequent surfacing work in order to be in accordance with standard MBGF upon completion of the Contract.

ITEM 556. PIPE UNDERDRAINS

Change location and quantities to fit field conditions as directed.

Cover the pipe with a factory installed filter screen as approved.

ITEM 585. RIDE QUALITY FOR PAVEMENT SURFACES

Use Surface Test Type A to evaluate ride quality of travel lanes in accordance with Item 585, "Ride Quality for Pavement Surfaces."

ITEM 644. SMALL ROADSIDE SIGN ASSEMBLIES

Sign types for which details are not shown on the plans must conform to "Standard Highway Sign Designs for Texas," latest edition.

Before construction begins, locate all Texas Reference Marker (TRM) signs and Adopt-a-Highway signs using survey control methods for accuracy. Provide the survey data to the Engineer. If either type of sign is relocated during construction activities, survey the sign location and notify the Engineer before placement of the permanent sign.

Stake all sign locations for approval prior to placement.

ITEM 662. WORK ZONE PAVEMENT MARKINGS

For this project, Contractor may use paint and beads for work zone pavement markings (non-removable).

Dispose of all empty paint containers and unused paint in accordance with federal, state, and local requirements.

Do not use foil backed pavement markings as removable work zone pavement markings. Removable work zone pavement markings must be pliant polymer detour grade (removable) material or other markings that can be obliterated or removed to the satisfaction of the Engineer.

Use tape for short-term removable pavement markings on hot mix & PFC surfacing applications.

Tabs may be used before surface treatment application.

ITEM 666. RETROREFLECTORIZED PAVEMENT MARKINGS

Use the spray method for application of the thermoplastic compound for lane lines, barrier lines, edge lines and channelizing lines.

In high traffic volume areas, do not begin work before 9 A.M. and do not continue work after 4 P.M. unless otherwise approved. In other areas, the Engineer will approve and direct the time of work.

Project Number: **Sheet 8H**

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Extrude hot to the pavement surface thermoplastic compound for arrows, stop lines, yield triangles, transverse lines, crosswalk lines, words and symbols.

For lengths greater than 300-ft, provide guide markings that will not leave a permanent mark on the roadway. Have the guide marking material and equipment used for placement approved prior to use. Provide adequate notification for approval of the guide markings prior to placement of the permanent pavement markings.

Provide a crew experienced in the work of installing pilot guideline markings and in the necessary traffic control. Supply all the equipment, personnel, traffic control, and materials necessary for the placement of pilot guideline markings as directed. All work will be in conformance with Part 6 of the TMUTCD.

Correct deficiencies in the alignment of pavement markings at Contractor's expense, as directed. Use a strip seal with aggregate and asphalt types and rates as directed to eliminate the deficient pavement markings.

ITEM 672. RAISED PAVEMENT MARKERS

Provide dispensing equipment such that the bituminous material can be directly applied from the melting pot to the pavement surface without secondary handling. Dispensing material from the melting pot into a separate container and then to the pavement surface will not be permitted. Intermittent agitation of the bituminous material will be by a method approved by the Engineer to ensure even heat distribution and must be such that the adhesive is agitated at approved and consistent intervals.

ITEM 677. ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS

Unless otherwise directed, utilize Surface Treatment Method for removal on asphaltic surfaces. The Engineer will approve materials and rates prior to use.
Furnish a high-pressure water blasting system for removing paint, thermoplastic, epoxy and preformed tape material from the following surfaces without causing any grooves or trenching of the surface: asphalt, concrete, permeable friction course, grooved asphalt and grooved concrete.

Use a high-pressure water blasting system that consists of a vacuum recovery system that must provide for a nearly dry surface eliminating the possibility of uncontained run-off blasting water or debris, or the need for any secondary clean-up vehicles or operations.

All components required for the complete operation of the water blasting system (ultra-high-pressure pump, vacuum system, clean water supply, vacuum recovery storage, primary truck-mounted and optional secondary tractor-mounted blasting components)

must be mounted and transported on a single, fully self-contained and supporting single truck chassis, thereby eliminating the need for any additional water, vacuum or other transport vehicles.

ITEM 3077. SUPERPAVE MIXTURES

When using crushed gravel as a coarse aggregate for ACP, use 1% lime as an antistripping agent.

Provide coarse aggregate for the final surface course from the same source or blended sources unless otherwise directed.

Give the State inspector at the spreading and finishing machine one weight ticket for each load of material. When directed, weigh asphaltic concrete loads on public scales to ensure the proper weight of material.

For materials paid for by the ton, provide a summary spreadsheet in accordance with Article 520.2, “Equipment.”

Provide Class A coarse aggregate for the surface as listed in the Department’s *Bituminous Rated Source Quality Catalog* (BRSQC).

Use an electrical impedance (non-nuclear) measurement gauge to determine mat segregation and joint density for Part V and Part VIII of test procedure Tex-207-F. Do not use nuclear density gauges or thin lift gauges for segregation or joint density determinations. Data reporting for mat segregation and joint density must be performed on Department templates.

All RAP used on this project must be fractionated. If an existing mix design is submitted for use as Warm Mix Asphalt (WMA), then a new trial batch with passing Hamburg Wheel test results is required.

Apply a tack coat with a rate of 0.10 gal/sy of residual asphalt between each layer of ACP pavement unless otherwise directed.

On Table 1, under 3077.2.1.3, the Sand equivalent, % Min is voided and not replaced. The minimum percent for the sand equivalent must be 45 for the combined aggregate.

CONTROLLING PROJECT ID 0606-01-007 **DISTRICT** Tyler **COUNTY** Smith
HIGHWAY PR 16

							TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0606-01-007**			
			PROJECT ID					
			COUNTY		**Smith**			
			HIGHWAY		**PR 16**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL		
	100-6001	PREPARING ROW		AC	2.830		2.830	
	110-6001	EXCAVATION (ROADWAY)		CY	7,442.000		7,442.000	
	132-6006	EMBANKMENT (FINAL)(DENS CONT)(TY C)		CY	4,999.000		4,999.000	
	150-6002	BLADING		HR	120.000		120.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")		SY	4,627.000		4,627.000	
	162-6002	BLOCK SODDING		SY	4,627.000		4,627.000	
	164-6055	BONDED FBR MTRX SEED (TEMP)(WARM)		SY	2,314.000		2,314.000	
	164-6056	BONDED FBR MTRX SEED (TEMP)(COOL)		SY	2,314.000		2,314.000	
	168-6001	VEGETATIVE WATERING		MG	103.000		103.000	
	260-6001	LIME (HYDRATED LIME (DRY))		TON	69.000		69.000	
	275-6001	CEMENT		TON	69.000		69.000	
	275-6019	CEMENT TREAT (SUBGRADE)(6")		SY	6,711.000		6,711.000	
	316-6406	ASPH (AC-20XP, AC-10-2TR, OR AC-20-5TR)		GAL	3,009.000		3,009.000	
	316-6407	AGGR (TY-PD GR-3 OR TY-PL GR-3)		CY	72.000		72.000	
	400-6005	CEM STABIL BKFL		CY	56.000		56.000	
	403-6001	TEMPORARY SPL SHORING		SF	3,171.000		3,171.000	
	416-6004	DRILL SHAFT (36 IN)		LF	244.000		244.000	
	420-6014	CL C CONC (ABUT)(HPC)		CY	30.800		30.800	
	420-6066	CL C CONC (RAIL FOUNDATION)		CY	184.000		184.000	
	422-6001	REINF CONC SLAB		SF	3,200.000		3,200.000	
	422-6015	APPROACH SLAB		CY	51.400		51.400	
	423-6004	RETAINING WALL (CONC BLOCK)		SF	10,098.000		10,098.000	
	425-6038	PRESTR CONC GIRDER (TX46)		LF	398.000		398.000	
	432-6008	RIPRAP (CONC)(CL B)(RR8&RR9)		CY	6.000		6.000	
	432-6024	RIPRAP (STONE COMMON)(DRY)(12 IN)		CY	15.000		15.000	
	432-6031	RIPRAP (STONE PROTECTION)(12 IN)		CY	65.000		65.000	
	432-6044	RIPRAP (CONC)(FLUME)		CY	20.000		20.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)		CY	12.000		12.000	
	432-6046	RIPRAP (MOW STRIP)(5 IN)		CY	44.000		44.000	
	450-6051	RAIL (HANDRAIL)(TY E)		LF	482.000		482.000	
	450-6099	RAIL (TY T2P)		LF	812.000		812.000	
	454-6020	SEALED EXPANSION JOINT (4 IN) (SEJ - B)		LF	61.000		61.000	
	500-6001	MOBILIZATION		LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	6.000		6.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)		LF	480.000		480.000	
	506-6011	ROCK FILTER DAMS (REMOVE)		LF	480.000		480.000	
	506-6029	EARTHWORK (EROSN & SEDMT CONT, IN VEH)		CY	450.000		450.000	

TxDOTCONNECT

ESTIMATE AND QUANTITY SHEET

DISTRICT	COUNTY	CCSJ	SHEET
Tyler	Smith	0606-01-007	9

CONTROLLING PROJECT ID 0606-01-007 **DISTRICT** Tyler **COUNTY** Smith
HIGHWAY PR 16

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0606-01-007**			
		PROJECT ID					
		COUNTY		**Smith**			
		HIGHWAY		**PR 16**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	506-6030	BACKHOE WORK (EROSION & SEDMT CONT)	HR	250.000		250.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	4,500.000		4,500.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	4,500.000		4,500.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	420.000		420.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	420.000		420.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF	1,126.000		1,126.000	
	531-6002	CONC SIDEWALKS (5")	SY	430.000		430.000	
	531-6005	CURB RAMPS (TY 2)	EA	2.000		2.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	170.000		170.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	2.000		2.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2.000		2.000	
	644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA	16.000		16.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	6.000		6.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	10.000		10.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	2,758.000		2,758.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	706.000		706.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	960.000		960.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	86.000		86.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	172.000		172.000	
	666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	220.000		220.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	120.000		120.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	3,210.000		3,210.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	1,030.000		1,030.000	
	668-6113	PRE PM TY C(ACC PRK)(BL&WH)(W/BORDR)LG	EA	5.000		5.000	
	672-6007	REFL PAV MRKR TY I-C	EA	16.000		16.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	6.000		6.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	12.000		12.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	1,200.000		1,200.000	
	3077-6011	SP MIXESSP-CPG64-22	TON	1,576.000		1,576.000	
	3077-6042	SP MIXESSP-DSAC-A PG64-22	TON	788.000		788.000	
	3077-6075	TACK COAT	GAL	417.000		417.000	
	08	EROSION CONTROL MAINTENANCE (NON-PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY (NON-PART)	LS	1.000		1.000	

ESTIMATE AND QUANTITY SHEET

DISTRICT	COUNTY	CCSJ	SHEET
Tyler	Smith	0606-01-007	9A

BASIS OF ESTIMATE

ITEM	DESCRIPTION	RATE	PR 16-UTURN AMOUNT	PW AMOUNT	EX PR 16 AMOUNT	ADD'L AREAS AMOUNT	UNIT	PR 16-UTURN QUANTITY	PW QUANTITY	EX PR 16 QUANTITY	ADD'L AREAS QUANTITY	PROJECT TOTAL	PAY UNIT
[1] 166	FERTILIZER	1 LB/9 SY	3508	3324	822	1600	SY					1	TON
168	VEGETATIVE WATERING	11 GAL/SY	3508	3324	822	1600	SY	39	37	9	18	103	MG
260	LIME (HYDRATED LIME (DRY)) (5%)(120 LB/CF)	41.4 LB/SY	1858	1115		382	SY	38	23		8	69	TON
275	CEMENT (5%)(120 LB/CF)	41.4 LB/SY	1858	1115		382	SY	38	23		8	69	TON
275	CEMENT TREAT (SUBGRADE) (6")		3716	2231		764	SY					6711	SY
316	ASPH (AC-20XP, AC-10-2TR, OR AC-20-5TR)	0.42 GAL/SY	3716	2231	452	764	SY	1561	937	190	321	3009	GAL
316	AGGR (TY-PD GR-3 OR TY-PL GR-3)	1 CY/100 SY	3716	2231	452	764	SY	37	22	5	8	72	CY
3077	SUPERPAVE MIXTURES SP-C PG 64-22 (BASE) (4")	440 LB/SY	3716	2231	452	764	SY	818	491	99	168	1576	TON
3077	SUPERPAVE MIXTURES SP-D SAC-A PG 64-22 (SURFACE) (2")	220 LB/SY	3716	2231	452	764	SY	409	245	50	84	788	TON
3077	TACK COAT	0.1 GAL/SY	3716	2231	452	764	SY	372	223	45	76	417	GAL
500	MOBILIZATION		1				LS					1	LS
502	BARRICADES, SIGNS AND TRAFFIC HANDLING						MO	1	2	2	1	6	MO

[1] FOR INFORMATION ONLY

ROADWAY SUMMARY

LOCATION	ITEM 110 EXCAVATION (ROADWAY) CY	ITEM 132 EMBANKMENT (FINAL) (DENS CONT) (TY C) CY	ITEM 150 [2] BLADING HR	ITEM 260 [1] LIME (HYDRATED LIME (DRY)) SY	ITEM 275 [1] CEMENT SY	ITEM 275 [1] CEMENT TREAT (SUBGRADE) (6") SY	ITEM 316 [1] OCST SY	ITEM 3077 [1] SUPERPAVE MIXTURES SP-C PG 64-22 (4") SY	ITEM 3077 [1] SUPERPAVE MIXTURES SP-D SAC-A PG 64-22 (2") SY	ITEM 529 CONCRETE CURB & GUTTER (TY II) LF	ITEM 531 CURB RAMPS (TY 2) EA	ITEM 531 CONCRETE SIDEWALKS (5") SY
PR 16												
STA 10+00 TO STA 17+06	5775	136	50	1766	1766	3531	3531	3531	3531	1047	2	250
UTURN				92	92	185	185	185	185			
CURB ISLANDS		15										90
AREA IN FRONT OF RETAINING WALL		29										
PR 16 SUBTOTALS	**5775**	**180**	**50**	**1858**	**1858**	**3716**	**3716**	**3716**	**3716**	**1047**	**2**	**340**
PW												
STA 10+00 TO STA 17+48	1432	4010	50	1115	1115	2231	2231	2231	2231	79		0
FROM MBGF SUMMARY		10	10									
PW SUBTOTALS	**1432**	**4020**	**60**	**1115**	**1115**	**2231**	**2231**	**2231**	**2231**	**79**	**0**	**0**
EX PR 16												
STA 15+90 TO STA 17+75	115	220	10				452	452	452			
EX PR 16 SUBTOTALS	**115**	**220**	**10**	**0**	**0**	**0**	**452**	**452**	**452**	**0**	**0**	**0**
ADDITIONAL PARKING AREAS												
FROM TAB OF SURF AREAS	120	580	10	382	382	764	764	764	764			90
ADDITIONAL PARKING AREAS SUBTOTALS	**120**	**580**	**10**	**382**	**382**	**764**	**764**	**764**	**764**	**0**	**0**	**90**
PROJECT TOTALS	**7442**	**4999**	**120**	**3356**	**3356**	**6711**	**7163**	**7163**	**7163**	**1126**	**2**	**430**

[1] QUANTITY INCLUDED IN BASIS OF ESTIMATE

[2] SEE MISC DETAILS FOR LIMITS OF PAY.

PARK ROAD 16
QUANTITY SUMMARY

SHEET 1 OF 6

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		10

DATE: 6/16/2021 9:09:02 AM
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TABULATION OF SURFACE AREAS

	FROM	TO	LENGTH	ITEM 316 [1] OCST		ITEM 275 [1] CEMENT TREAT SUBGRADE		ITEM 3077 [1] SUPERPAVE MIXTURES SP-C PG 64-22 (BASE)		ITEM 3077 [1] SUPERPAVE MIXTURES SP-D SAC-A PG 64-22 (SURFACE)		ITEM 3077 [1] TACK COAT	REMARKS
	STA	STA	FT	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	AREA (SY)	
	PR 16												
	10+94.31	14+59.70	365	71	2883	71	2883	71	2883	71	2883	2883	
	14+59.70	15+65.48	106	14	165	14	165	14	165	14	165	165	
	15+65.48	17+06.06	141	31	484	31	484	31	484	31	484	484	
	PR 16 SUBTOTALS				**3531**		**3531**		**3531**		**3531**	**3531**	
	UTURN												
	10+00.00	10+83.13	83	20	185	20	185	20	185	20	185	185	
	UTURN SUBTOTALS				**185**		**185**		**185**		**185**	**185**	
	PW												
	10+00.00	11+00.00	100	34	378	34	378	34	378	34	378	378	
	11+00.00	11+94.23	94	31	325	31	325	31	325	31	325	325	
	11+94.23	13+32.12	138	30	460	30	460	30	460	30	460	460	
	14+32.12	14+82.12	50	30	167	30	167	30	167	30	167	167	
	14+82.12	16+05.43	123	30	411	30	411	30	411	30	411	411	
	16+05.43	17+48.00	143	31	491	31	491	31	491	31	491	491	
	PW SUBTOTALS				**2231**		**2231**		**2231**		**2231**	**2231**	
	EX PR 16												
	15+90.00	17+75.00	185	22	452			22	452	22	452	452	
	EX PR 16 SUBTOTAL				**452**		**0**		**452**		**452**	**452**	
	ADDITIONAL PARKING AREAS												
[2]	12+80.00	13+60.00	80	23	204	23	204	23	204	23	204	204	
[2]	13+78.00	14+58.00	80	23	204	23	204	23	204	23	204	204	
[2]	13+80.00	15+80.00	200	16	356	16	356	16	356	16	356	356	
	ADDITIONAL PARKING AREAS SUBTOTALS				**764**		**764**		**764**		**764**	**764**	
	PROJECT TOTAL				**6979**		**6526**		**6979**		**6979**	**6979**	

[1] QUANTITIES INCLUDED IN BASIS OF ESTIMATE.

[2] STA FROM EXISTING PR 16 ROADWAY ALIGNMENT.

PARK ROAD 16
QUANTITY SUMMARY

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		11

SUMMARY OF EARTHWORK QUANTITIES

PR 16 STATION TO STATION	ITEM 110 [1] EXCAVATION (ROADWAY) CY	ITEM 132 [1] EMBANKMENT (FINAL) (DENS CONT) (TY C) CY	MASS ORDINATE CY
10+22	0.0	0.0	0.0
10+50	100.5	0.0	100.5
11+00	441.3	0.0	541.8
11+50	825.8	0.0	1367.6
12+00	1008.9	0.0	2376.5
12+50	938.1	0.0	3314.6
13+00	742.7	3.9	4053.3
13+50	556.7	7.5	4602.5
14+00	519.3	3.6	5118.2
14+50	372.2	0.0	5490.4
15+00	174.1	1.2	5663.3
15+50	82.1	65.2	5680.2
15+65	12.9	54.2	5638.9
SUBTOTALS	**5774.5**	**135.6**	

[1] QUANTITY INCLUDED IN ROADWAY SUMMARY

SUMMARY OF EARTHWORK QUANTITIES

PW STATION TO STATION	ITEM 110 [1] EXCAVATION (ROADWAY) CY	ITEM 132 [1] EMBANKMENT (FINAL) (DENS CONT) (TY C) CY	MASS ORDINATE CY
10+12	0.0	0.0	0.0
10+50	60.9	0	60.8
11+00	521.2	45.8	536.2
11+50	499.4	167.4	868.2
12+00	23.1	260.0	631.3
12+50	30.7	502.1	159.9
13+00	31.7	647.4	-455.9
13+32.12	18.9	455.3	-892.3
13+50	0.0	0.0	-892.3
14+00	0.0	0.0	-892.3
14+32.12	0.0	0.0	-892.3
14+50	6.3	259.4	-1145.4
15+00	23.7	720.5	-1842.3
15+50	12.2	460.8	-2290.8
16+00	64.4	300.1	-2526.5
16+50	76.1	156.6	-2607.0
17+00	35.0	30.7	-2602.7
17+48	28.6	3.4	-2577.5
SUBTOTALS	**1432.2**	**4009.5**	

[1] QUANTITY INCLUDED IN ROADWAY SUMMARY

SUMMARY OF EARTHWORK QUANTITIES

EX PR 16 STATION TO STATION	ITEM 110 [1] EXCAVATION (ROADWAY) CY	ITEM 132 [1] EMBANKMENT (FINAL) (DENS CONT) (TY C) CY	MASS ORDINATE CY
12+80	0.0	0.0	0.0
13+00	3.4	7.1	-3.7
16+50	9.2	69.6	-64.0
14+00	20.3	75.1	-118.8
14+50	39.2	25.2	-104.8
15+00	28.5	8.7	-85.1
15+50	9.4	23.8	-99.5
15+80	5.4	10.2	-104.4
SUBTOTALS	**115.4**	**219.7**	

[1] QUANTITY INCLUDED IN ROADWAY SUMMARY

SUMMARY OF EARTHWORK QUANTITIES

ADD'L PARKING AREAS STATION TO STATION	ITEM 110 [1] EXCAVATION (ROADWAY) CY	ITEM 132 [1] EMBANKMENT (FINAL) (DENS CONT) (TY C) CY	MASS ORDINATE CY
13+00	0.0	0.0	0.0
13+50	0.0	226.9	0.0
14+00	22.8	238.0	-215.2
14+50	60.1	50.3	-205.4
15+00	37.3	17.5	-185.6
15+50	0.0	47.6	-233.1
SUBTOTALS	**120.2**	**580.3**	

[1] QUANTITY INCLUDED IN ROADWAY SUMMARY

PREP ROW

LOCATION STA	LOCATION STA	DESCRIPTION	ITEM 100 PREP ROW AC
PR 16			
10+00.00	17+06.06	TREE TRIMMING, REMOVAL, & GRUBBING	1.00
PW			
10+00.00	17+48.06	TREE TRIMMING, REMOVAL, & GRUBBING	1.33
ADDITIONAL PARKING AREAS			
12+80.00	15+80.00	TREE TRIMMING, REMOVAL, & GRUBBING	0.50
PROJECT TOTALS			**2.83**

NOTE: SEE PROJECT LAYOUT SHEETS FOR LOCATION OF TREE REMOVAL

PARK ROAD 16
QUANTITY SUMMARY

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		12

SUMMARY OF WORK ZONE PAVEMENT MARKINGS

LOCATION		ITEM 662	ITEM 662
		WK ZN PAV MRK NON RMV (W)(4")(SLD)	WK ZN PAV MRK NON RMV (Y)(4")(SLD)
STA	STA	LF	LF
PR 16			
10+00	17+06	1412	706
UTURN			
10+00	10+92.25		
PW			
10+00	17+48	1346	
ADDITIONAL PARKING AREAS			
AS SHOWN ON PLANS			
PROJECT TOTAL		2758	706

NOTE: MULTIPLE MOVE-INS WILL BE REQUIRED TO MAINTAIN ADEQUATE STRIPING.

SMALL SIGN TABULATION

LOCATION	ITEM 644
	INSTALL SM RD SN SUP & AM TY TWT(1) WS(P)
	EA
PR 16	8
UTURN	2
PW	4
ADDITIONAL PARKING AREAS	2
TOTALS	16

SUMMARY OF PERMANENT PAVEMENT MARKINGS

STATION		ITEM 666	ITEM 666	ITEM 666	ITEM 666	ITEM 666	ITEM 666	ITEM 666	ITEM 668	ITEM 672	ITEM 672	ITEM 672	ITEM 677
		REFL PAV MRK TY I (W)8"(SLD)(100 MIL)	REFL PAV MRK TY I (W)12"(SLD)(100 MIL)	RE PM W/RET REQ TY I (W)4"(SLD)(100 MIL)	RE PM W/RET REQ TY I (W)4"(BRK)(100 MIL)	RE PM W/RET REQ TY I (W)24"(SLD)(100 MIL)	RE PM W/RET REQ TY I (Y)4"(SLD)(100 MIL)	REFL PAV MRK TY I (Y)12"(SLD)(100 MIL)	PRE PM TY C (ACC PRK) (BL&WH) (W/BORDR) LG	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R	REFL PAV MRKR TY I-C	ELIM EXT PAV MRK & MRKS (4")
FROM	TO	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	LF
PR 16													
10+00	17+06	700		1120		122	880	40	3				
UTURN													
10+00	10+92.25		86	190			150	180					
PW													
10+00	17+48	130		1350	120	50				6	12	16	
ADDITIONAL PARKING AREAS													
AS SHOWN IN PLANS		130		550					2				1200
PROJECT TOTAL		960	86	3210	120	172	1030	220	5	6	12	16	1200

PARK ROAD 16
QUANTITY SUMMARY

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		13

DATE: 6/17/2021 7:55:45 AM
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SUMMARY OF VEGETATION

LOCATION		ITEM 160	ITEM 162	ITEM 164		ITEM 168
		FURNISHING & PLACING TOPSOIL (4")	BLOCK SODDING	BOND FBR MTRX SEED (TEMP) (WARM)	BOND FBR MTRX SEED (TEMP) (COOL)	[1] VEGETATIVE WATERING
STA	STA	SY	SY	SY	SY	SY
PR 16						
10+00	17+06.06	1569	1569	785	785	3138
PR 16 SUBTOTALS		**1569**	**1569**	**785**	**785**	**3138**
UTURN						
10+00.00	10+83.13	185	185	92	92	369
UTURN SUBTOTALS		**185**	**185**	**92**	**92**	**369**
PW						
10+00	17+48	1662	1662	831	831	3324
AT MBGF		0	0	0	0	0
PW SUBTOTALS		**1662**	**1662**	**831**	**831**	**3324**
EX PR 16						
15+90.00	17+75.00	411	411	206	206	822
EX PR 16 SUBTOTALS		**411**	**411**	**206**	**206**	**822**
ADD'L PARKING AREAS						
12+80.00	13+60.00	178	**178**	89	89	356
13+78.00	14+58.00	178	**178**	89	89	356
13+80.00	15+80.00	444	**444**	222	222	889
ADD'L PARKING AREAS SUBTOTALS		**800**	**800**	**400**	**400**	**1600**
PROJECT TOTALS		**4627**	**4627**	**2314**	**2314**	**9254**

NOTE: MULTIPLE MOVE-INS WILL BE REQUIRED TO MAINTAIN ADEQUATE VEGETATION IN COMPLIANCE WITH THE CONSTRUCTION GENERAL PERMIT
[1] QUANTITY INCLUDED IN BASIS OF ESTIMATE.

EROSION CONTROL SUMMARY

LOCATION	ITEM 506							
	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	EARTHWORK (EROSN & SEDMT CONT, IN VEH)	BACKHOE WORK (EROSION & SEDMT CONT)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL)(12")	BIODEG EROSN CONT LOGS (REMOVE)
	LF	LF	CY	HR	LF	LF	LF	LF
PW								
FROM SW3P LAYOUTS	360	360			2070	2070		
AS DIRECTED			200	100			200	200
PW SUBTOTALS	**360**	**360**	**200**	**100**	**2070**	**2070**	**200**	**200**
PR 16								
FROM SW3P LAYOUTS	120	120			510	510		
AS DIRECTED			200	100			200	200
PR 16 SUBTOTALS	**120**	**120**	**200**	**100**	**510**	**510**	**200**	**200**
ADD'L PARKING AREAS								
FROM SW3P LAYOUTS					1920	1920		
AS DIRECTED			50	50			20	20
ADD'L PARKING AREAS SUBTOTALS	**0**	**0**	**50**	**50**	**1920**	**1920**	**20**	**20**
PROJECT TOTALS	**480**	**480**	**450**	**250**	**4500**	**4500**	**420**	**420**

NOTE: MULTIPLE MOVE-INS WILL BE REQUIRED TO MAINTAIN ADEQUATE VEGETATION IN COMPLIANCE WITH THE CONSTRUCTION GENERAL PERMIT.

PARK ROAD 16
QUANTITY SUMMARY

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		14

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METAL BEAM GUARD FENCE SUMMARY

LOCATION	ITEM 132	ITEM 432	ITEM 540		ITEM 544	ITEM 658	
	[1] EMBANKMENT (VEHICLE) (ORD COMP) (TY C) CY	RIPRAP (MOW STRIP) (4 IN) CY	MTL W-BEAM GD FEN (TIM POST) LF	MTL BEAM GD FEN TRANS (THRIE-BEAM) EA	GUARDRAIL END TREATMENT (INSTALL) EA	INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2(BI) EA	INSTL DEL ASSM (D-SW) SZ (BRF)CTB(BI) EA
PW							
STA 14+81.00 RT TO STA 15+66.00 RT	5	6	85	1	1	5	3
STA 16+25.00 LT TO STA 17+10.00 LT	5	6	85	1	1	5	3
TOTALS	**10**	**12**	**170**	**2**	**2**	**10**	**6**

[1] QUANTITY INCLUDED IN PERTINENT SUMMARY

RIPRAP SUMMARY

LOCATION	ITEM 432	
	RIPRAP (CONC) (FLUME) CY	RIPRAP (STONE COMMON) (DRY) (12 IN) CY
PR 16		
STA 11+00 LT TO STA 14+60 LT	20	
STA 14+60 LT		15
PROJECT TOTALS	**20**	**15**

RETAINING WALL SUMMARY

	ITEM 403	ITEM 420	ITEM 423	ITEM 432	ITEM 450	ITEM 450	REMARKS
	TEMPORARY SPL SHORING SF	[1] CL C CONC (RAIL FOUNDATION) CY	RETAINING WALL (CONC BLOCK) SF	RIPRAP (MOW STRIP) (5 IN) CY	RAIL (HANDRAIL) (TY E) LF	TYPE T2P RAIL LF	
Retaining Wall #1	3015		3015	24	446		
Retaining Wall #1	78		78		18		
Retaining Wall #1	78		78		18		
Retaining Wall #2A		70	2082	5.9		232	
Retaining Wall #2B			623	1			
Retaining Wall #2C		41	1091	4		138	
Retaining Wall #3A		15	442	1.7		49	
Retaining Wall #3B			425	1.2			
Retaining Wall #3C		58	2264	6.4		193	
TOTALS	**3171**	**184**	**10098**	**44**	**482**	**612**	

[1] THIS ITEM REFERS TO THE RAIL ANCHORAGE CURB & MOMENT SLAB FOR THE ROADWAY PORTION OF THE T2P RAIL INSTALLATION.

BID CODE / *BID ITEM DESCRIPTION* / *BRIDGE ELEMENT*	*0400 6005* CEM STABIL BKFL CY	*0416 6004* DRILL SHAFT (36 IN) LF	*0420 6014* CL C CONC (ABUT)(HPC) CY	*0422 6001* REINF CONC SLAB SF	*0422 6015* APPROACH SLAB CY	*0425 6038* PRESTR CONC GIRDER (TX46) LF	*0432 6008* RIPRAP (CONC)(CL B)(RR8&RR9) CY	*0432 6031* RIPRAP (STONE PROTECTION)(12 IN) CY	*0450 6099* RAIL (TY T2P) LF	*0454 6020* SEALED EXPANSION JOINT (4 IN) (SEJ - B) LF
2 - ABUTMENTS	*56*	*244*	*30.8*		*51.4*		*6*	*65*		
1 - 100.00' PRESTRESSED CONC. I-GIRDER SPAN				*3200*		*398.00*			*200.0*	*61*
OVERALL TOTALS:	*56*	*244*	*30.8*	*3200*	*51.4*	*398.00*	*6*	*65*	*200.0*	*61*

PARK ROAD 16
QUANTITY SUMMARY

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		15

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SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	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
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
110	1	R1-1	STOP	36X36			TWT	1	WS	P		
110	2	R6-11 R1-1	ONE WAY STOP	36X12 36X36			TWT	1	WS	P		
110	3	R1-1	STOP	36X36			TWT	1	WS	P		
110	4	R1-2	YIELD	36X36X36			TWT	1	WS	P		
110	5	R2-1	SPEED LIMIT 25	30X36			TWT	1	WS	P		
110	6	R6-11	ONE WAY	36X12			TWT	1	WS	P		
110	7	R7-11T DBL	PARALLEL PARKING	12X18			TWT	1	WS	P		
110	8	R5-1	DO NOT ENTER	36X36			TWT	1	WS	P		
110	9	R7-11T DBL	PARALLEL PARKING	12X18			TWT	1	WS	P		
110	10	R7-8T	RESERVED PARKING	12X18			TWT	1	WS	P		
110	11	R7-8T R7-8P	RESERVED PARKING VAN ACCESIBLE	12X18 12X6			TWT	1	WS	P		
110	12	R7-8T	RESERVED PARKING	12X18			TWT	1	WS	P		

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		0606	01	007	PARK ROAD
4-16		DIST	COUNTY		SHEET NO.
8-16		TYL	SMITH		16

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DATE: 6/17/2021 7:56:50 AM
FILE: c:\txdot\pw_online\txdot3\mark.cincar\dms75030\PR16_GEN_SUM_SMSGNS_OP.dgn

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
			WATCH									
110	13	W8-13T	FOR ICE ON BRIDGE	36X36			TWT	1	WS	P		
110	14	R6-11	ONE WAY	36X12			TWT	1	WS	P		
110	15	R7-8T	RESERVED PARKING	12X18			TWT	1	WS	P		
		R7-8T	RESERVED	12X18								
110	16		PARKING				TWT	1	WS	P		
		R7-8P	VAN	12X6								
			ACCESIBLE									

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		0606	01	007	PARK ROAD
4-16		DIST	COUNTY		SHEET NO.
8-16		TYL	SMITH		17

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CK:
DW:
CK:
DN:

PR 16
CONSTRUCTION SEQUENCE

1. INSTALL PROJECT SIGNS.
2. PLACE SW3P MEASURES AS THE PROJECT PROGRESSES.
3. PREP ROW
4. CONSTRUCT ROADWAY & RETAINING WALL
   PLACE TOP SOIL AND SEED
   AS SHOWN IN THE PLANS.
5. PERFORM FINAL CLEAN-UP.
6. REMOVE PROJECT SIGNS.

PW
CONSTRUCTION SEQUENCE

1. INSTALL PROJECT SIGNS.
2. PLACE SW3P MEASURES AS THE PROJECT PROGRESSES.
3. PREP ROW
4. CONSTRUCT BRIDGE & RETAINING WALL
5. CONSTRUCT ROADWAY
   PLACE TOP SOIL AND SEED
   AS SHOWN IN THE PLANS.
6. PERFORM FINAL CLEAN-UP.
7. REMOVE PROJECT SIGNS.

NOTE: ALLOW TRAFFIC IN AND OUT OF THE PARK DURING CONSTRUCTION OF THIS PROJECT. MBGF WORK TO BE CONCURRENT WITH OTHER WORK. WORK AT ONLY ONE MBGF LOCATION AT A TIME, UNLESS OTHERWISE APPROVED.

05/17/2021

PARK ROAD 16
CONSTRUCTION SEQUENCE

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		18

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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. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

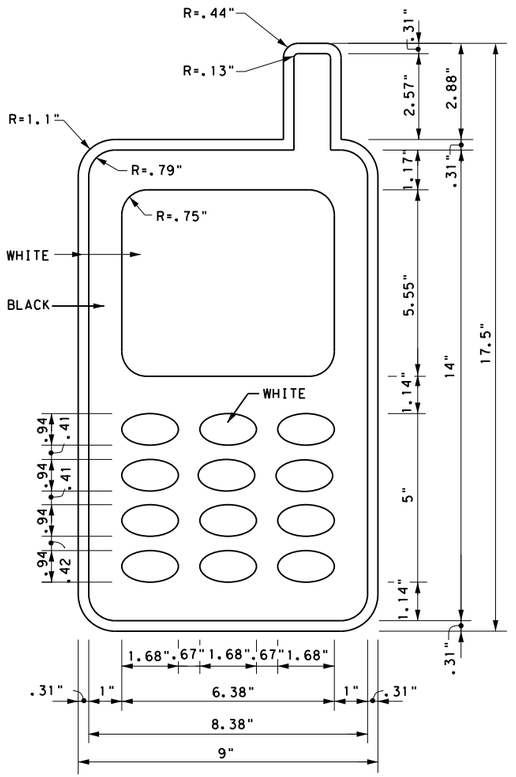
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

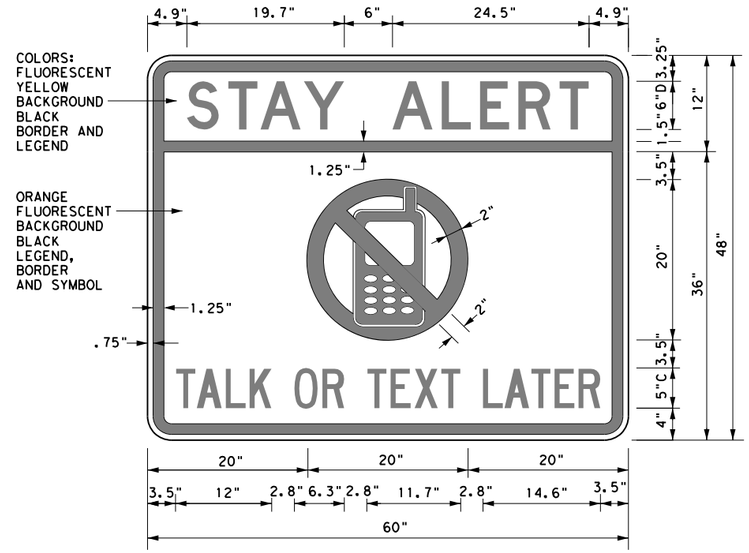
12. The Engineer has the final decision on the location of all traffic control devices.

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 APPAREL 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.





3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

SIGN DETAIL (G20-10T)

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	TYL	SMITH		19

DATE: 5/11/2021 10:54:57 AM
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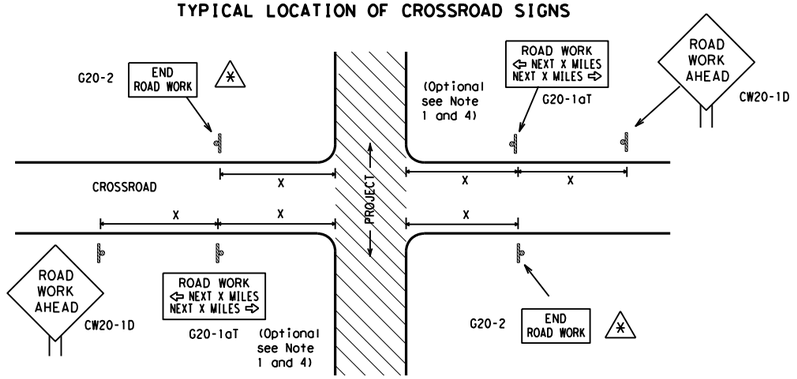
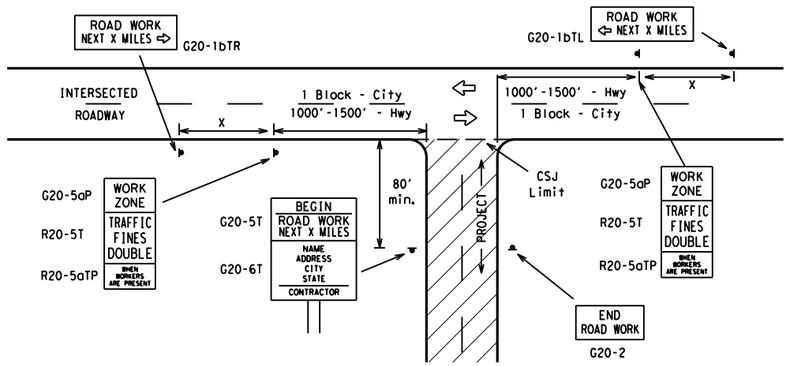
TYPICAL LOCATION OF CROSSROAD SIGNS



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

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. 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]

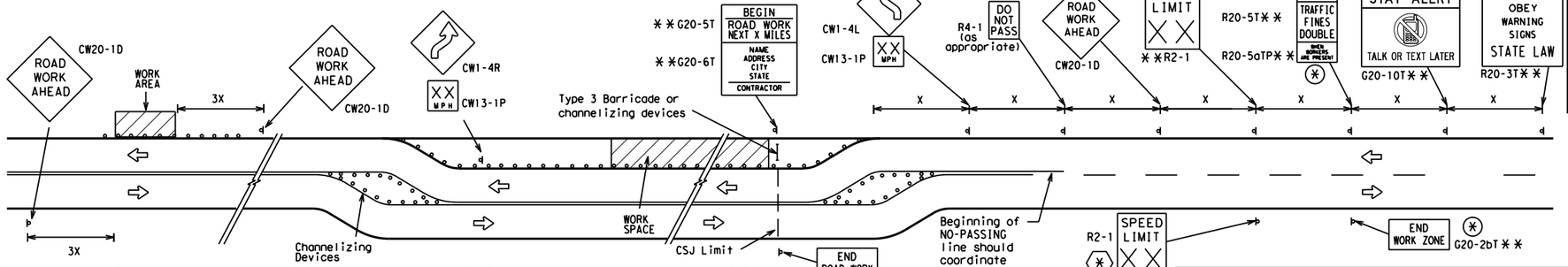
✱ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

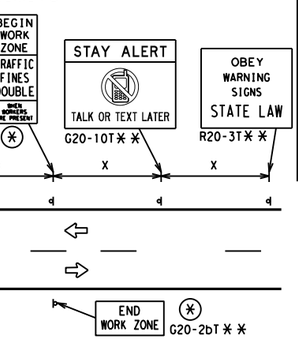
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer. 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

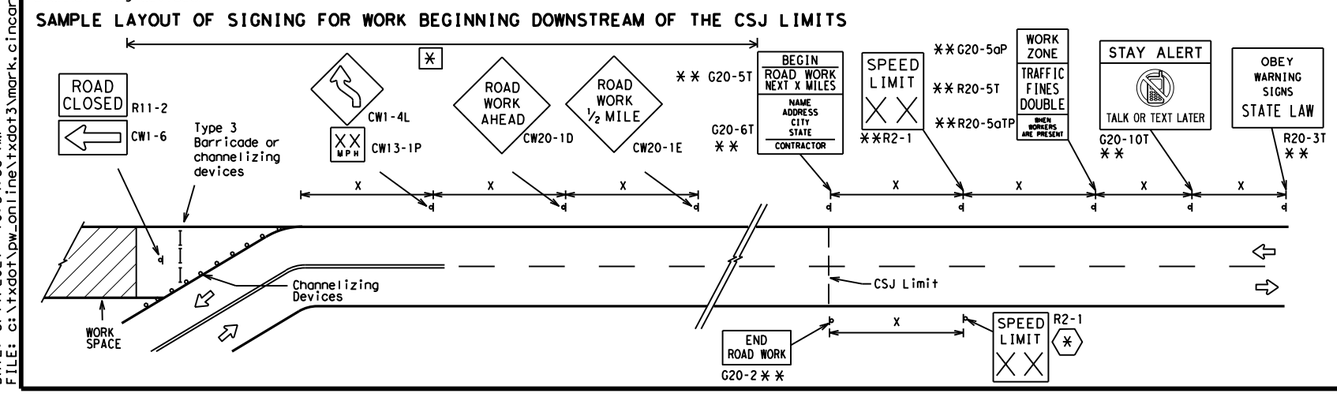


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

✱✱ Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

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

(✱) Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0606	01	007	PARK ROAD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	TYL	SMITH		20

DATE: 5/11/2021 10:54:58 AM
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DATE: 5/11/2021 10:54:58 AM
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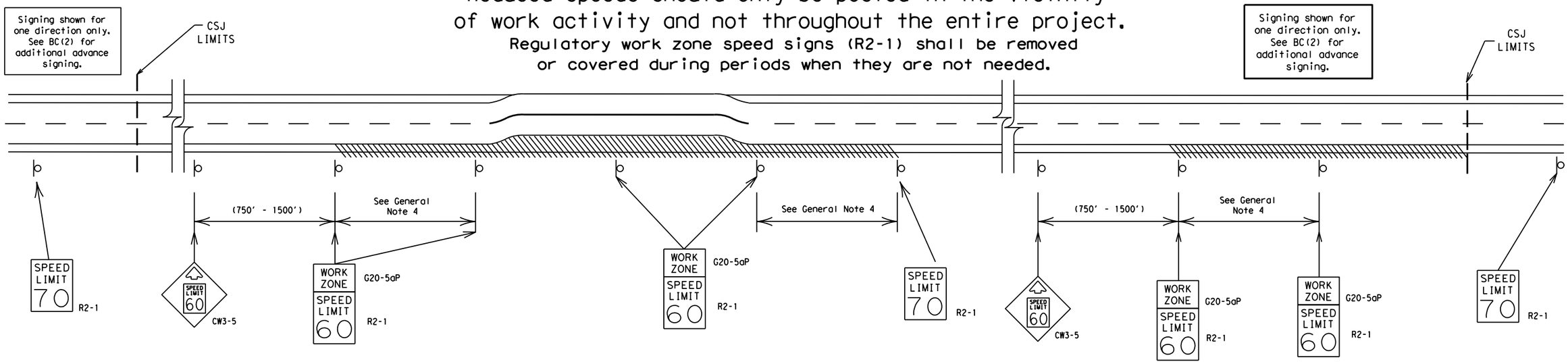
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

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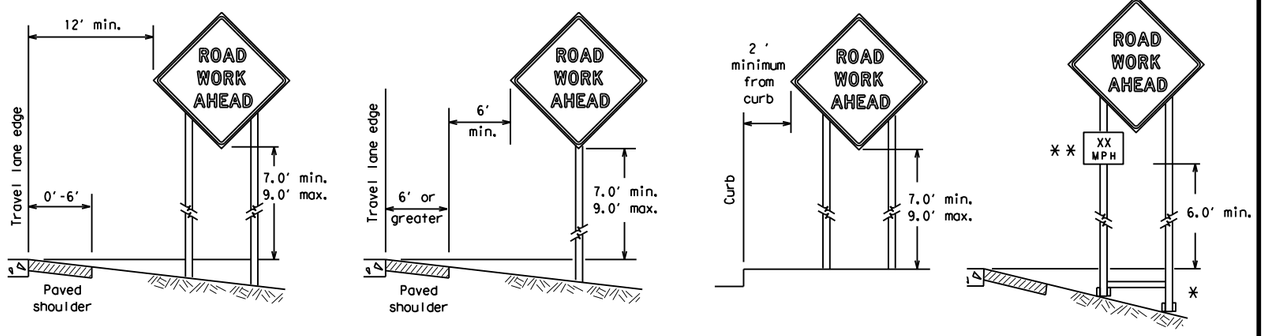
REVISIONS 9-07 8-14 7-13	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		21

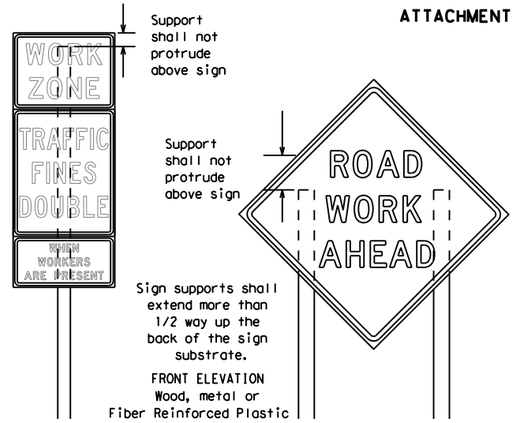
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

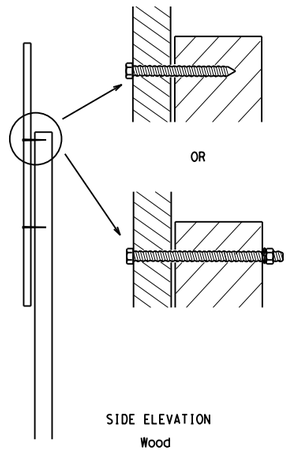


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





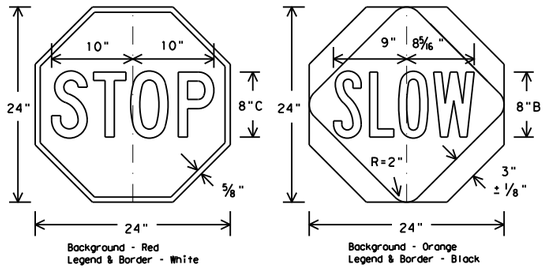
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
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.



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, 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.
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 sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards 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). 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.

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	TYL	SMITH		22

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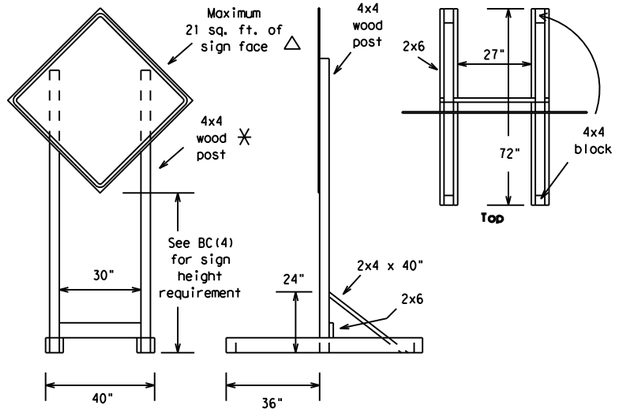
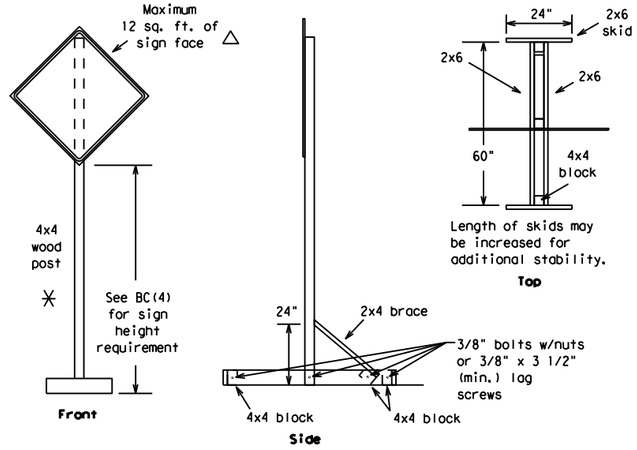
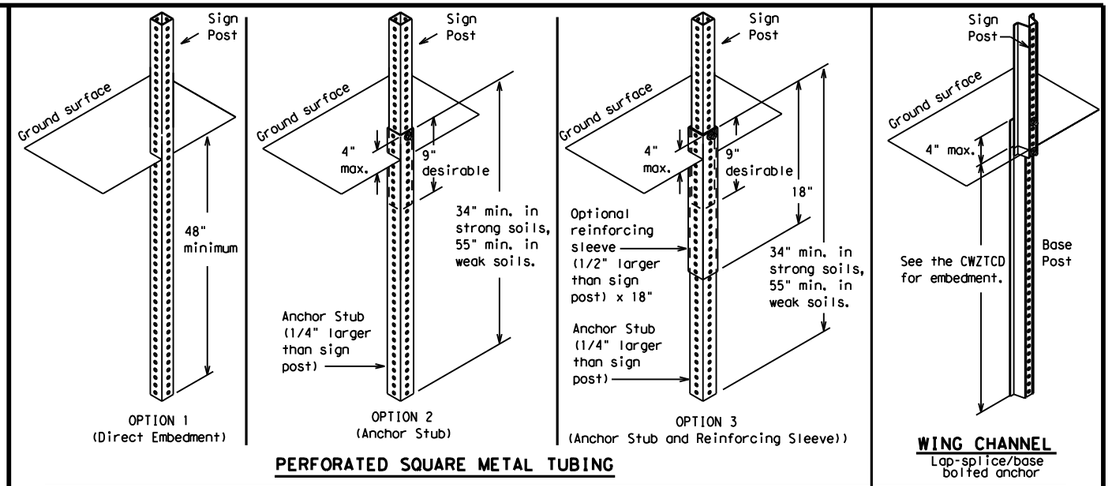




SKID MOUNTED WOOD SIGN SUPPORTS

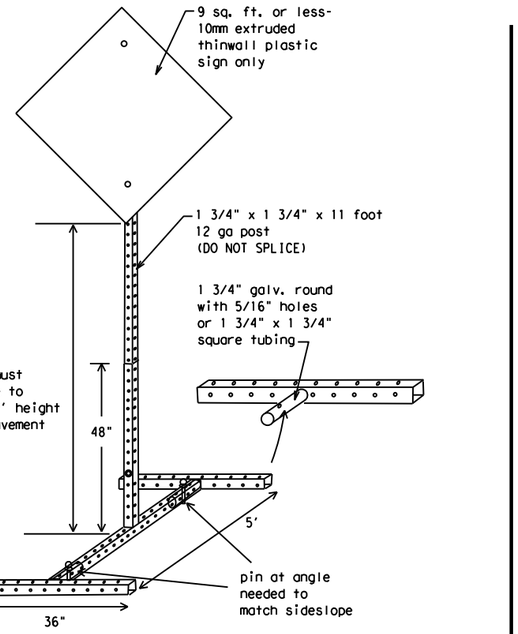
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

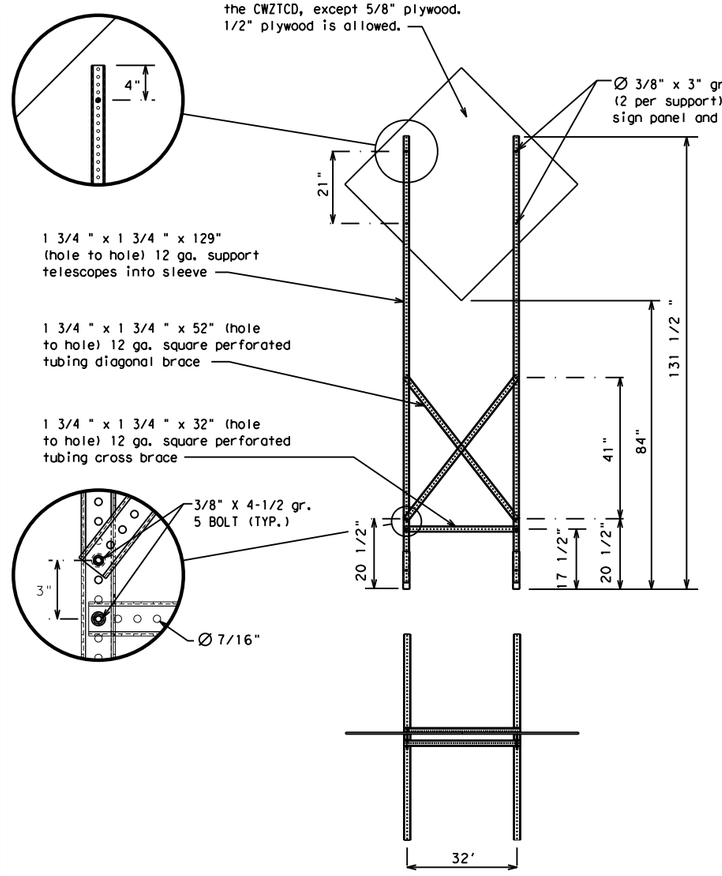


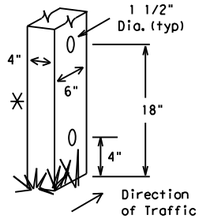
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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

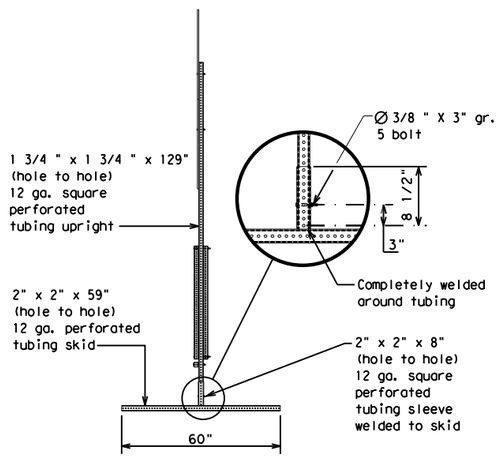






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

SHEET 5 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	TYL	SMITH		23

SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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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 *

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

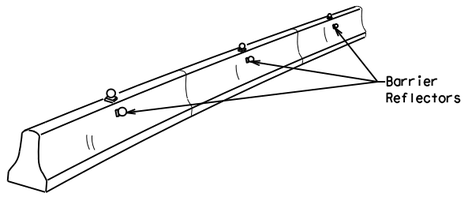
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	TYL	SMITH		24

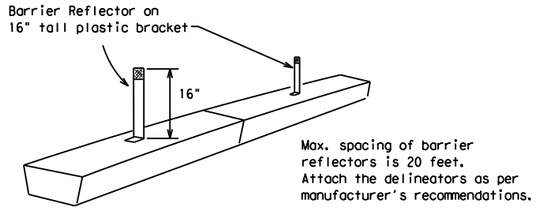
100

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.

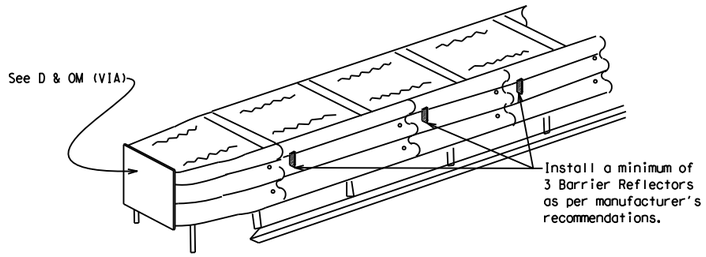


CONCRETE TRAFFIC BARRIER (CTB)

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.



LOW PROFILE CONCRETE BARRIER (LPCB)

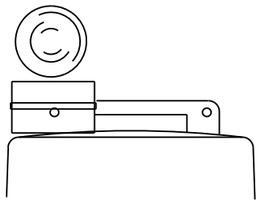


DELINEATION OF END TREATMENTS

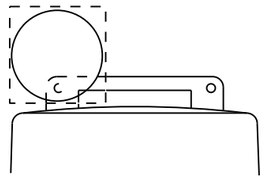
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. 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

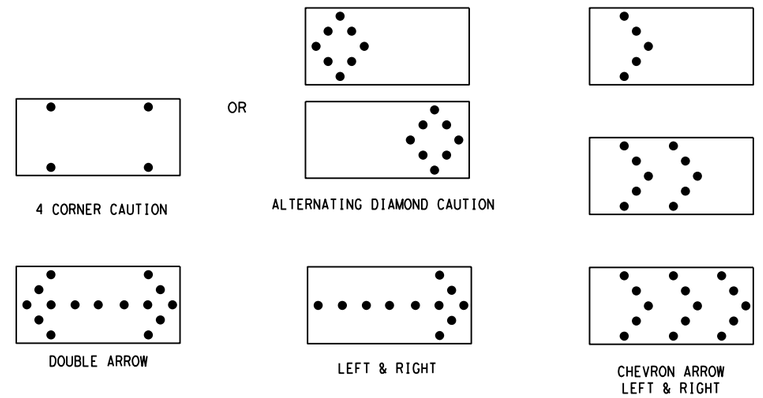
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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



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 National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	TYL	SMITH		25

101

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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:

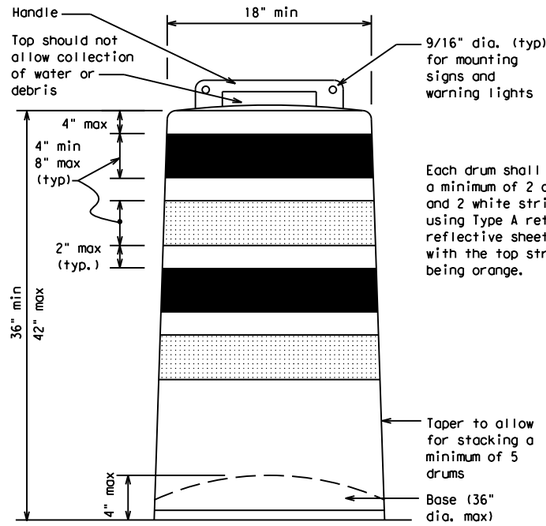
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

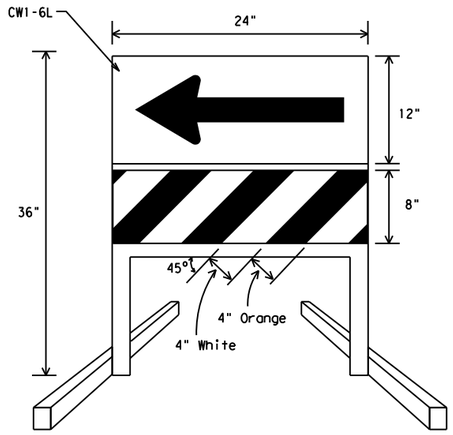
RETROREFLECTIVE SHEETING

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 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

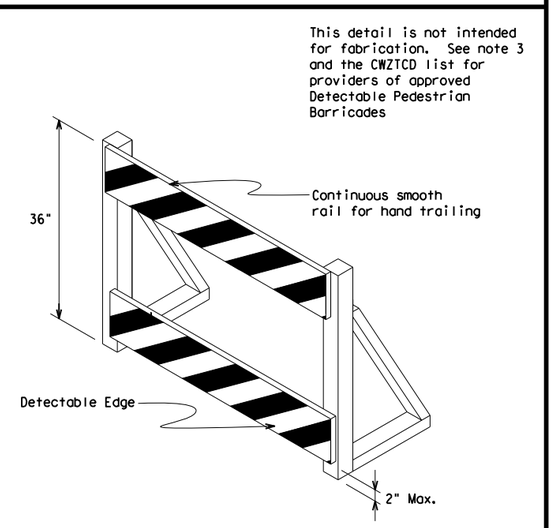
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other 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.





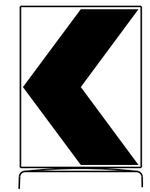
DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

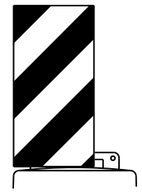


DETECTABLE PEDESTRIAN BARRICADES

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.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
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 for Buildings and Facilities (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 may 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 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.

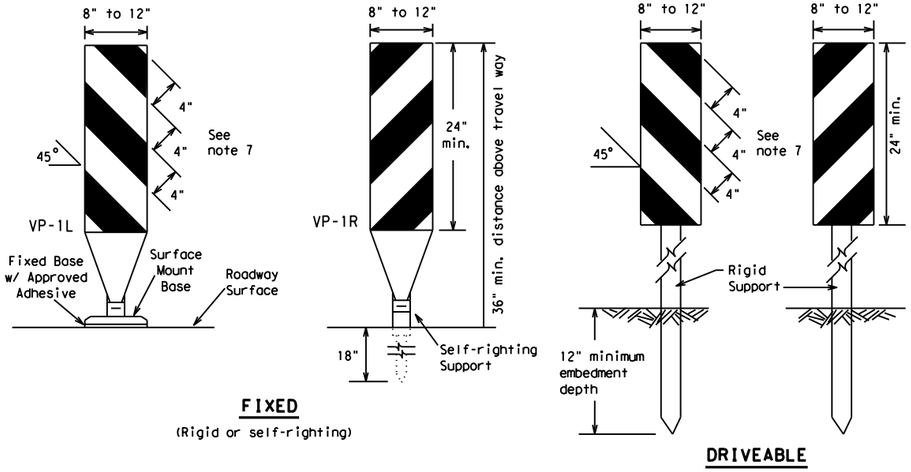
Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

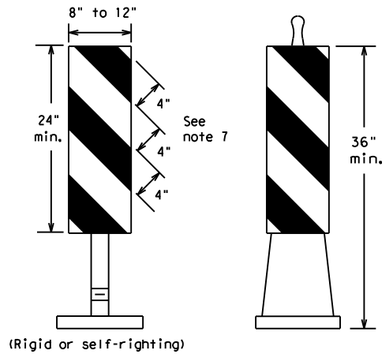
BC(8)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	TYL	SMITH		26



FIXED
(Rigid or self-righting)

DRIVEABLE

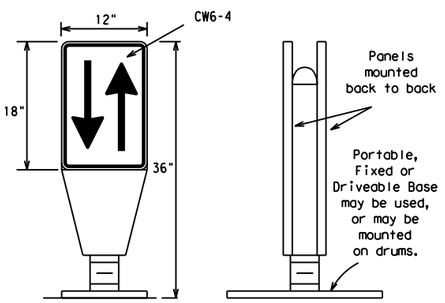


(Rigid or self-righting)

PORTABLE

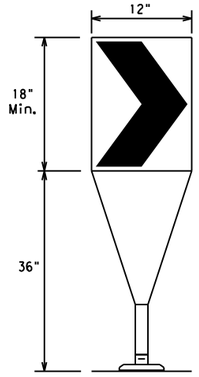
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of 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 conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



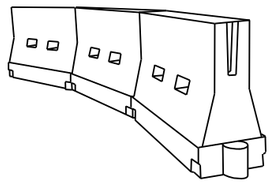
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed 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 NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		27

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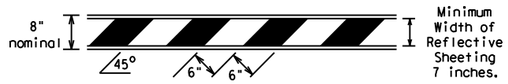
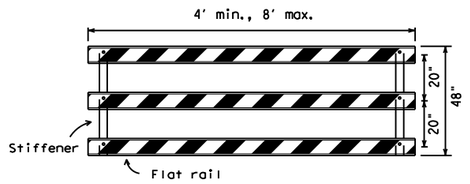
TYPE 3 BARRICADES

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 conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



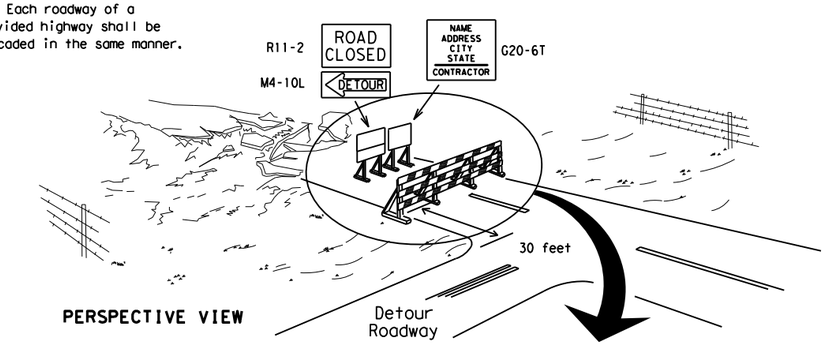
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

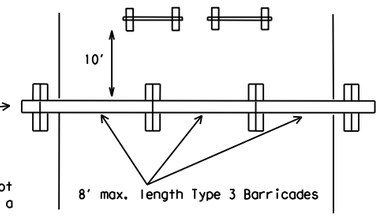
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

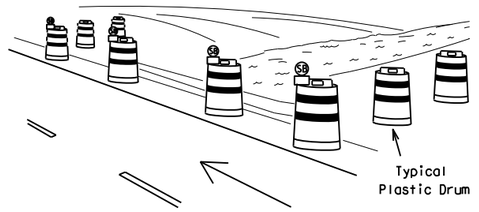
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

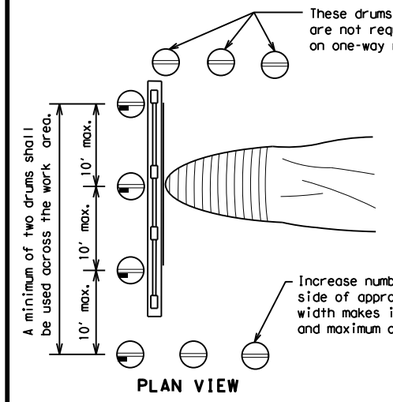
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

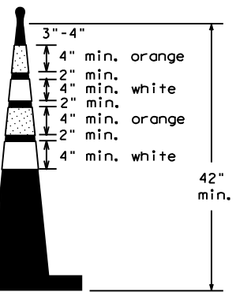
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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

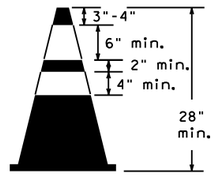
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

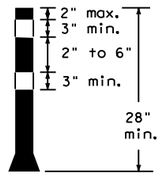


CONES

Two-Piece cones



One-Piece cones

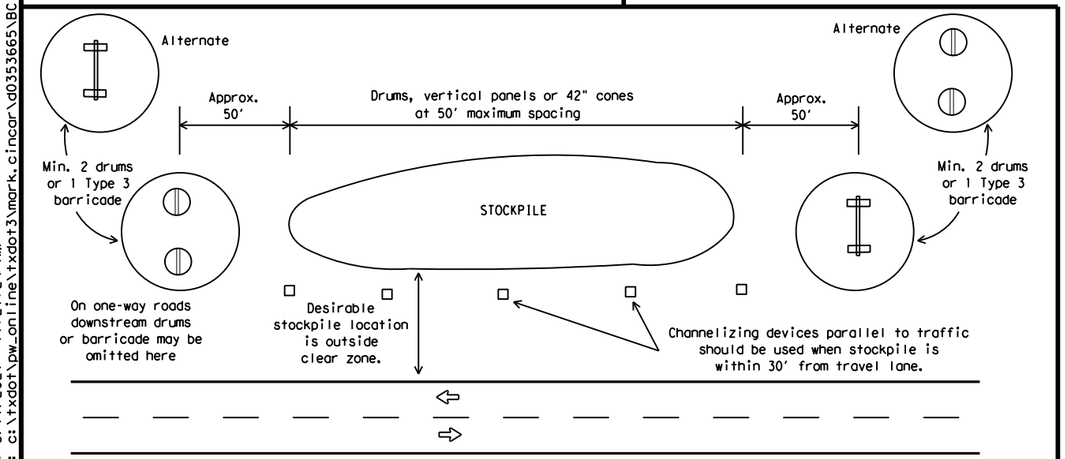


Tubular Marker

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

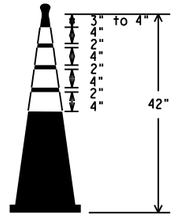
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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 used at night 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.
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

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

Texas Department of Transportation

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	TYL	SMITH		28

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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.

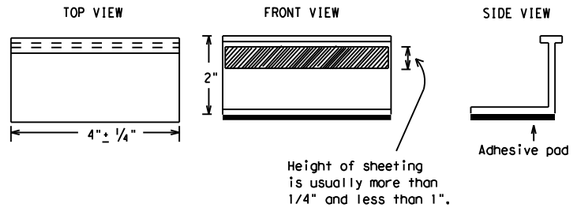
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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 Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

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2-98 9-07	DIST	COUNTY		SHEET NO.
1-02 7-13	TYL	SMITH		29
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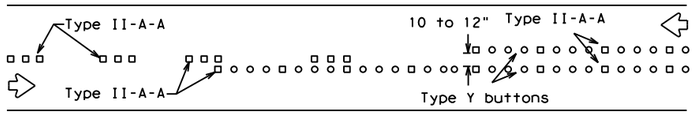
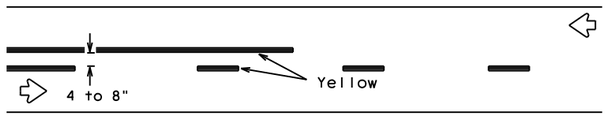
PAVEMENT MARKING PATTERNS

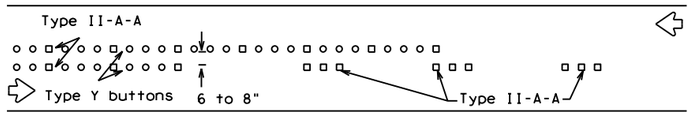
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



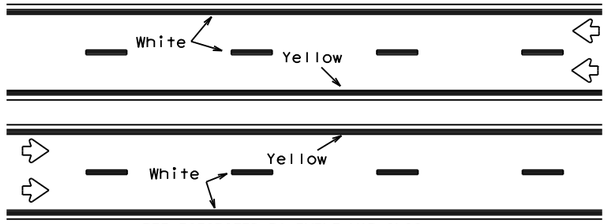
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



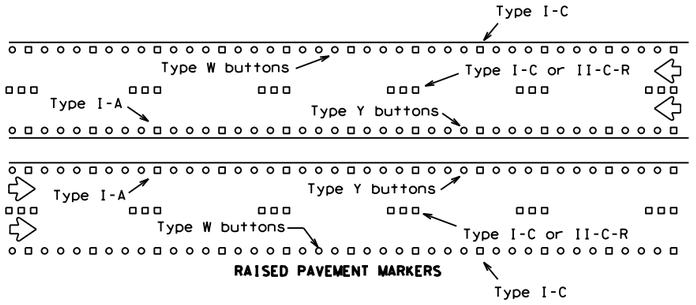
RAISED PAVEMENT MARKERS - PATTERN B

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

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



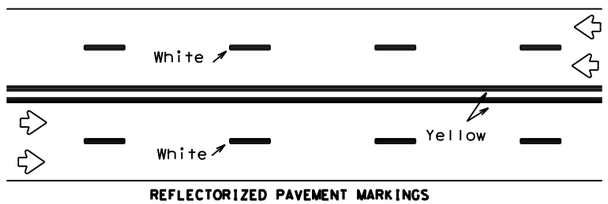
REFLECTORIZED PAVEMENT MARKINGS



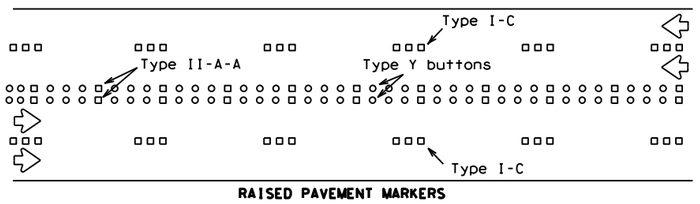
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



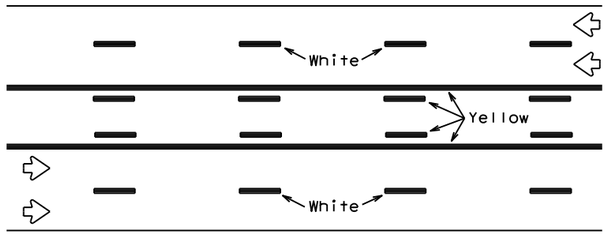
REFLECTORIZED PAVEMENT MARKINGS



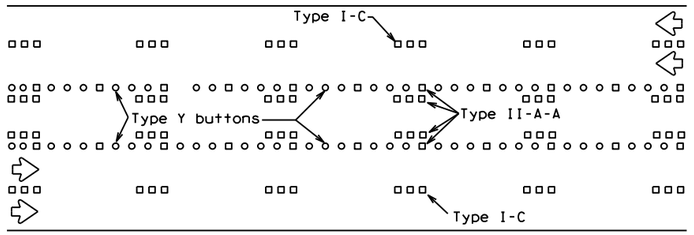
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

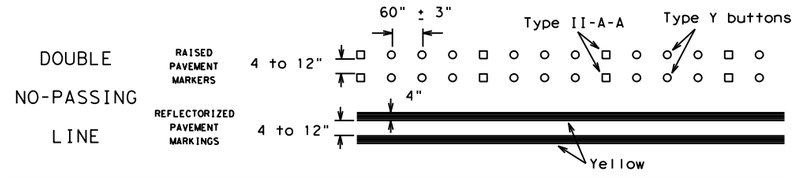
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

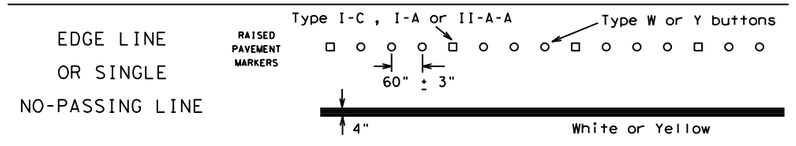
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

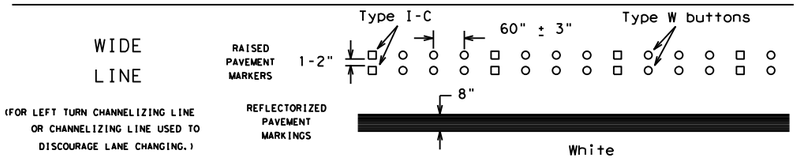


EDGE LINE OR SINGLE NO-PASSING LINE



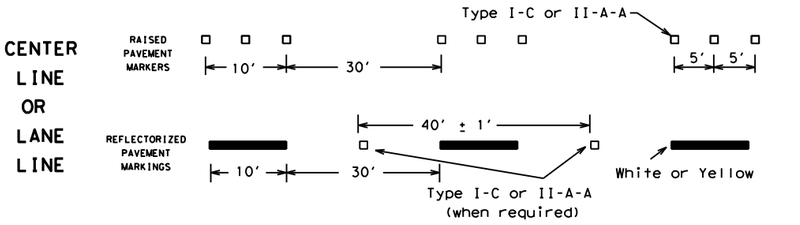
WIDE LINE

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

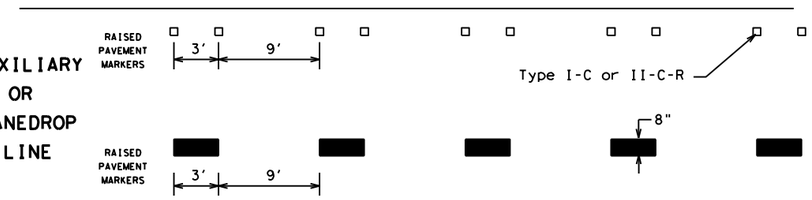


BROKEN LINES

CENTER LINE OR LANE LINE

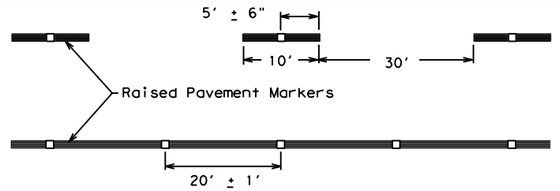


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Operations Division Standard

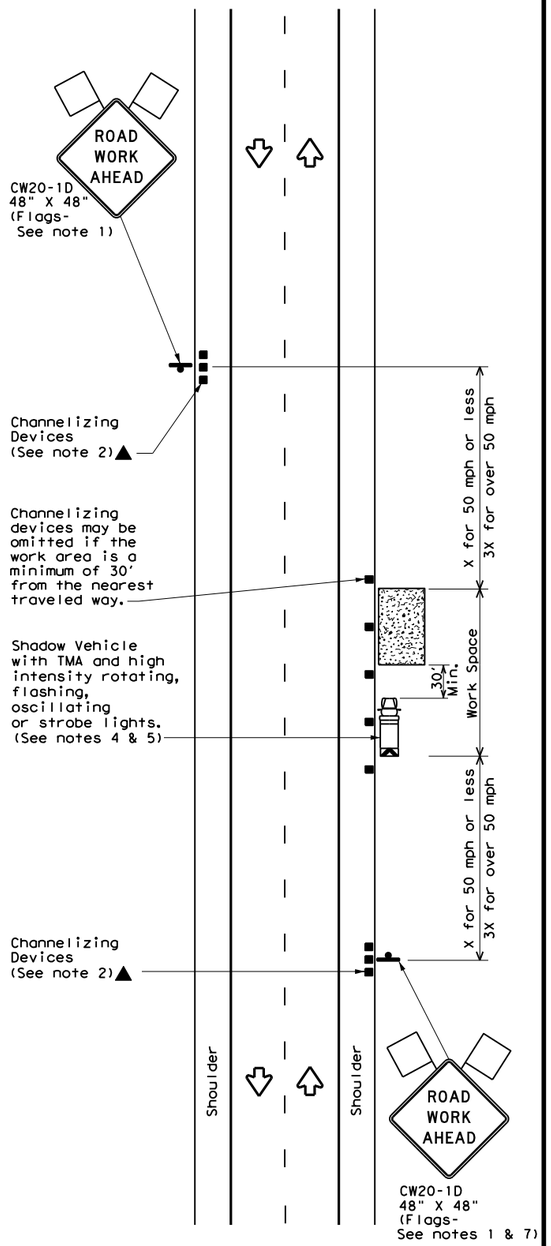
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
1-97 9-07	DIST	COUNTY		SHEET NO.
2-98 7-13	TYL	SMITH		30
11-02 8-14				

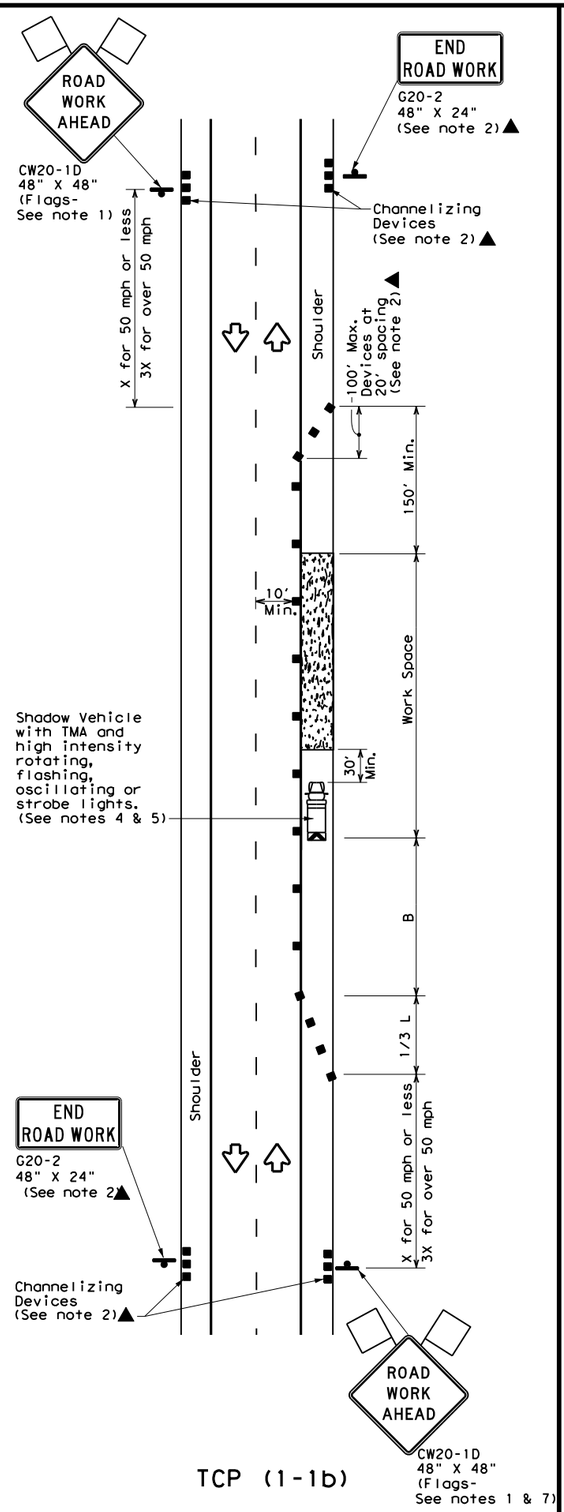
106

DATE: 5/11/2021 11:22:10 AM
FILE: c:\txdot\pw_online\txdot3\mark.cincar\d0353665\TCP(1-1)-18.dgn



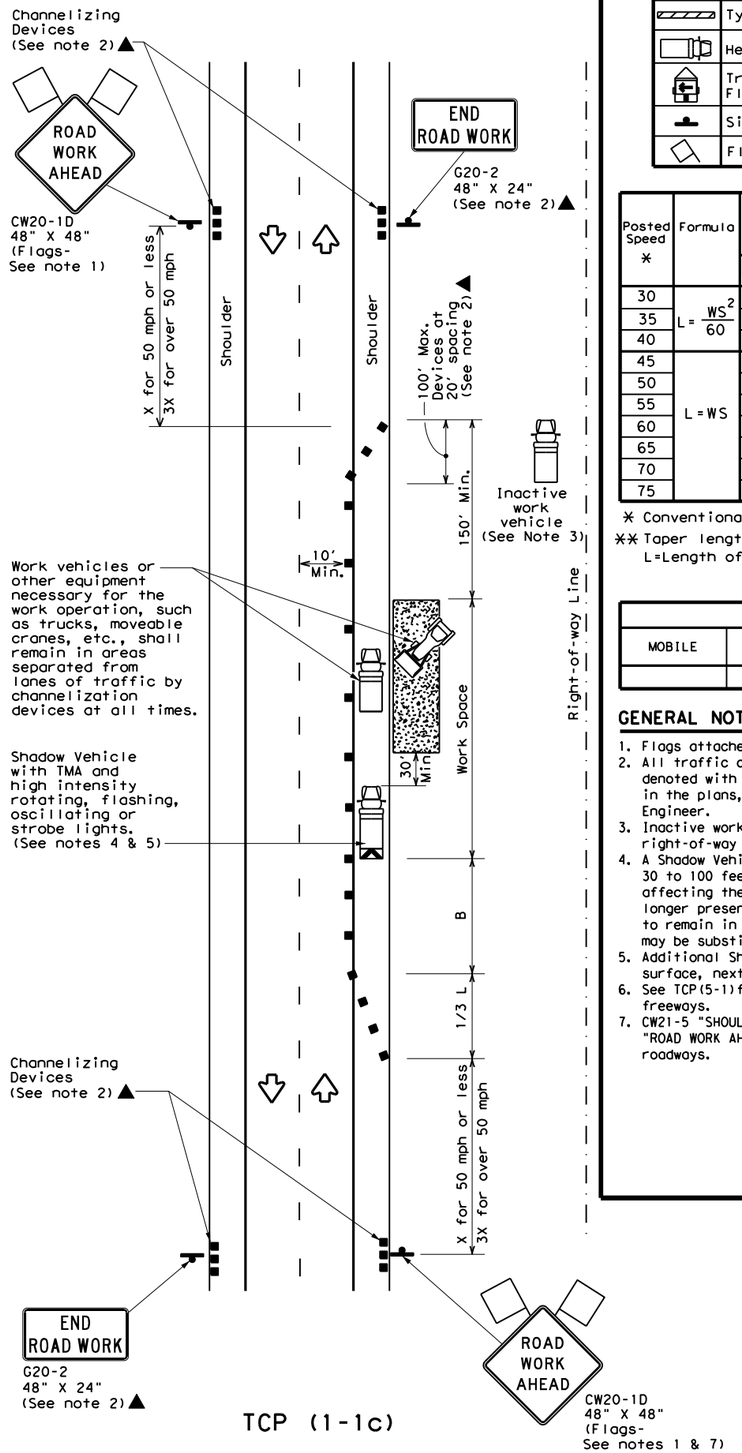
TCP (1-1a)

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:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98	0606	01	007	PARK ROAD
8-95 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	TYL	SMITH		31

DATE: 5/11/2021 11:22:28 AM
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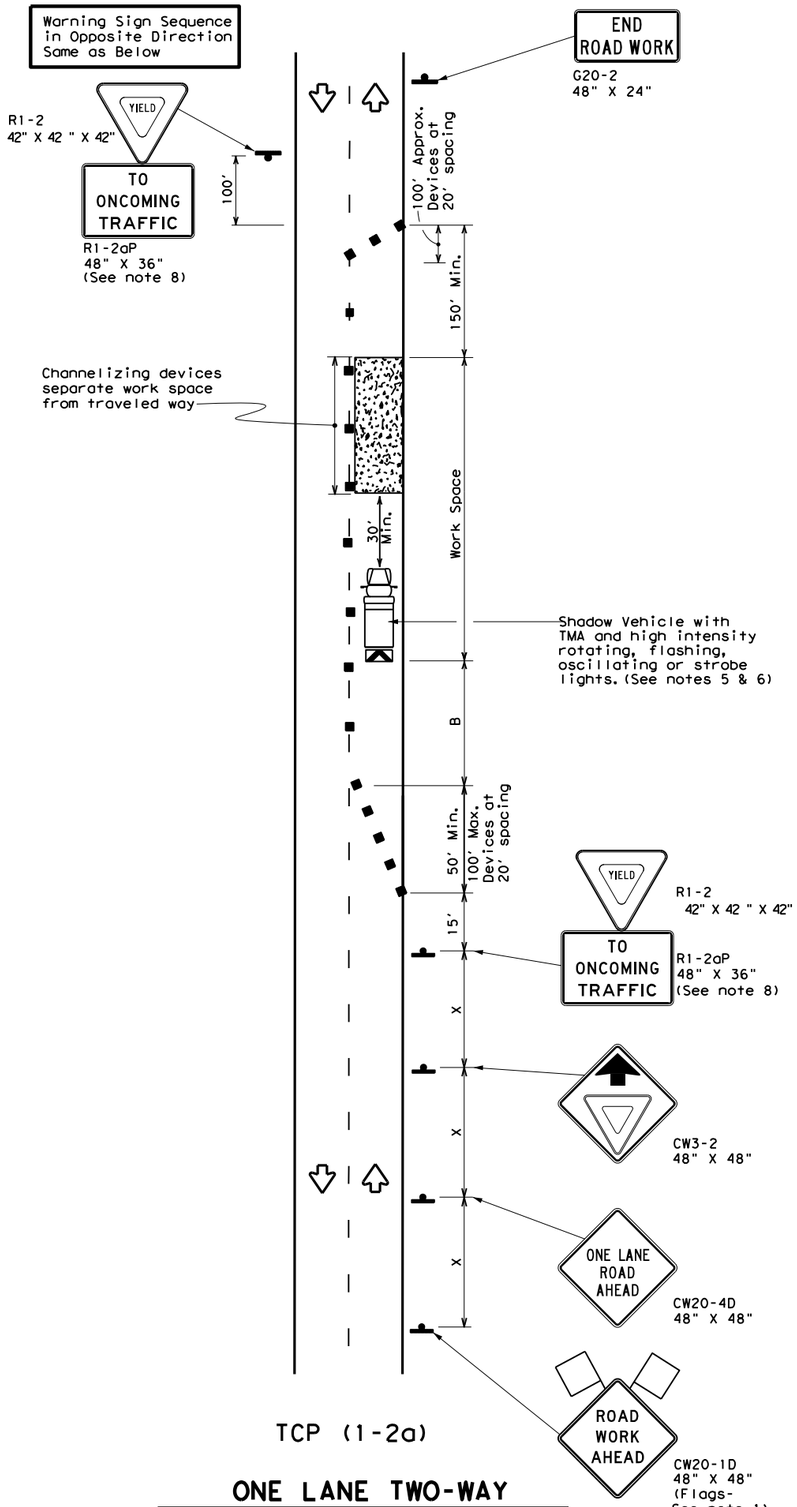
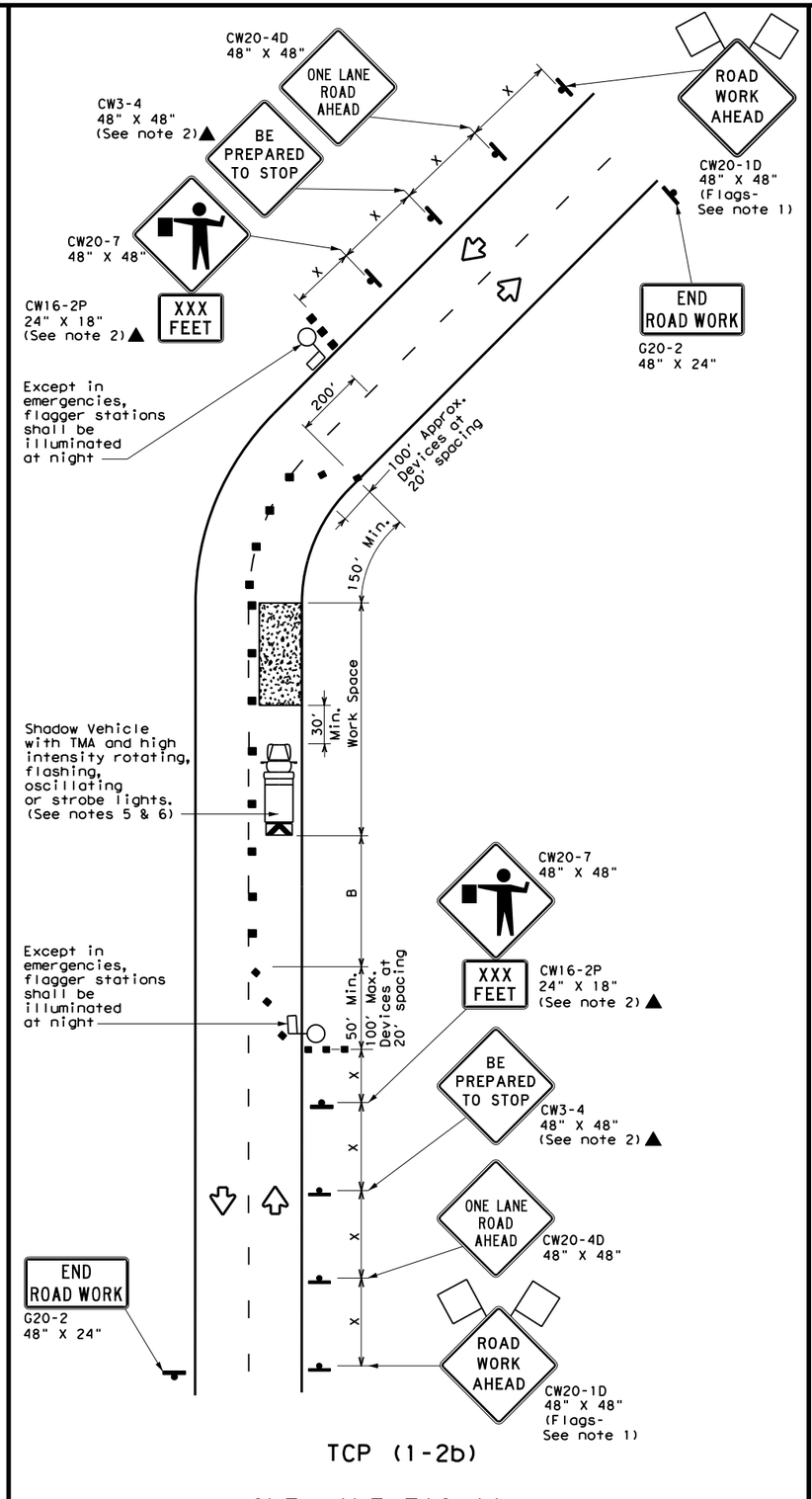


TCP (1-2a)

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

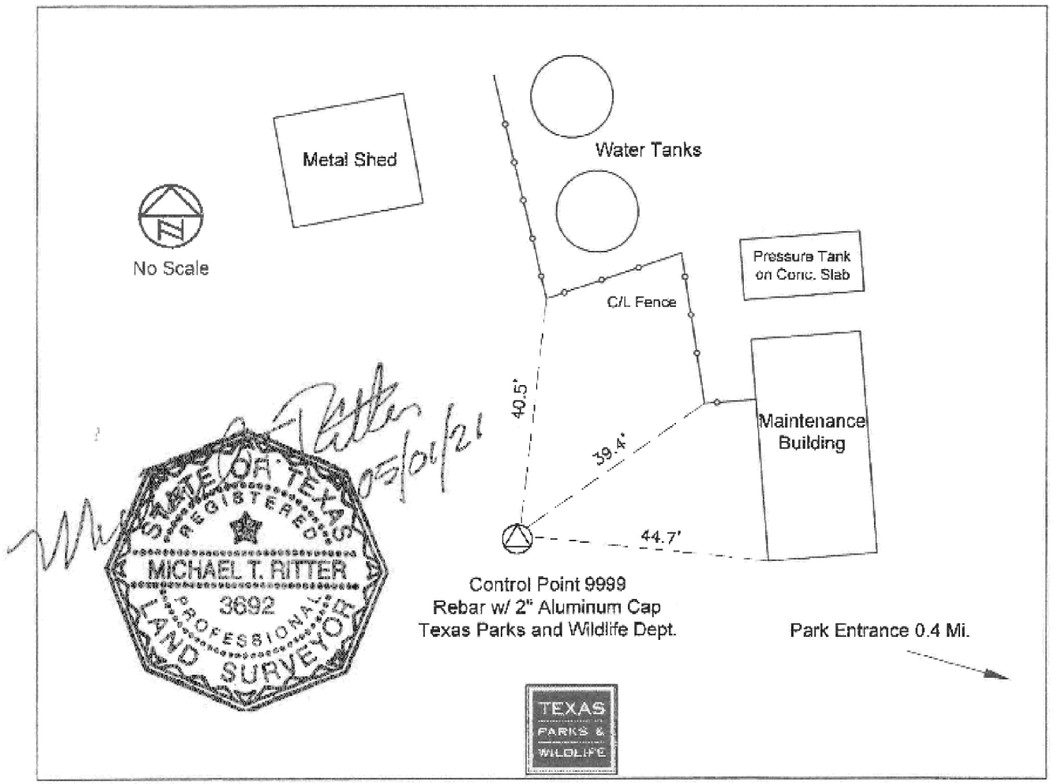
TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98	0606	01	007	PARK ROAD
2-94 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	TYL	SMITH		32

Highway / Location	**Tyler State Park**				Station Name
TxDOT CSJ No.	**0606-01-007**				**9999**
County	**Smith**	State	**Texas**	Established By	**Texas Parks & Wildlife Dept.**
TxDOT Survey Level				Date Established	**April, 2015 (Multi Session)**
Intervisible Stations	**N/A**			Survey Method Hz.	**Static GPS / OPUS Solutions**
Unit of Measure	**U.S. Survey Feet**			Survey Method Vt.	**Differential Leveling**
Hz. Datum	**NAD 83**			Vt. Datum	**NGVD 29**
Hz. Adjustment	**2011 (Epoch 2010)**			Vt. Adjustment	**N/A**
Projection Zone	**Texas North Central**			Geoid Model	**N/A**
Monument(s) Held Hz	**NGS OPUS Baseline Solutions**				
Monument(s) Held Vt	**Wm. Stackhouse Park Control Monumentation of 1972**				

Geodetic Position		Grid Coordinates		Surface Coordinates	
Lat	**32° 29' 01.18946"**	North	**6,874,054.67**	North	**N/A**
Long	**95° 17' 11.98015"**	East	**2,959,190.03**	East	**N/A**
Elevation in US Survey Feet		**595.25**			
TxDOT Surface Adjustment Factor		**N/A**			
Mapping Angle	**01° 45' 09.13"**	Scale Factor	**0.99992141**	Combined Factor	**0.99989708**
Mark Logo	**Texas Parks and Wildlife Department**			Stamping	**Survey Control** △
Type of Marker	**1/2" Rebar with Aluminum Cap**				

Station Sketch



Texas Parks and Wildlife Department
Surveying Section
4200 Smith School Road
Austin, Texas 78744
(512) 389-8098

PARK ROAD 16
SURVEY CONTROL DATA

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		33

Project: Tyler State Park
Subject:
Job No. TSP Operator: MC
Date: Tuesday September 15, 2020 9:09 am

SYSTEM FIX 4 ASEC 2 BEAR PRI 0 RED NE STA 2 FILE: 'PW16'

* 1 DESCRIBE CHAIN BRIDGE_ROAD

Chain BRIDGE_ROAD contains:
1 CUR BRIDGE_ROAD_3 CUR BRIDGE_ROAD_6 CUR BRIDGE_ROAD_9 CUR BRIDGE_ROAD_12 2

Beginning chain BRIDGE_ROAD description
==========

Point 1 N 6,873,061.8174 E 2,958,214.5125 Sta 10+00.00

Course from 1 to PC BRIDGE_ROAD_3 N 18° 57' 31.60" E Dist 28.9183

Curve Data
———
Curve BRIDGE_ROAD_3
P.I. Station 10+54.64 N 6,873,113.4966 E 2,958,232.2655
Delta = 14° 48' 19.20" (RT)
Degree = 28° 56' 13.55"
Tangent = 25.7252
Length = 51.1638
Radius = 198.0011
External = 1.6642
Long Chord = 51.0216
Mid. Ord. = 1.6503
P.C. Station 10+28.92 N 6,873,089.1669 E 2,958,223.9077
P.T. Station 10+80.08 N 6,873,134.8829 E 2,958,246.5630
C.C. N 6,873,024.8388 E 2,958,411.1678
Back = N 18° 57' 31.60" E
Ahead = N 33° 45' 50.80" E
Chord Bear = N 26° 21' 41.20" E

Course from PT BRIDGE_ROAD_3 to PC BRIDGE_ROAD_6 N 33° 45' 50.80" E Dist 145.9947

Curve Data
———
Curve BRIDGE_ROAD_6
P.I. Station 12+53.45 N 6,873,279.0074 E 2,958,342.9152
Delta = 28° 41' 51.05" (RT)
Degree = 53° 32' 51.53"
Tangent = 27.3709
Length = 53.5925
Radius = 106.9996
External = 3.4453
Long Chord = 53.0340
Mid. Ord. = 3.3378
P.C. Station 12+26.08 N 6,873,256.2531 E 2,958,327.7032
P.T. Station 12+79.67 N 6,873,291.6621 E 2,958,367.1850
C.C. N 6,873,196.7854 E 2,958,416.6555
Back = N 33° 45' 50.80" E
Ahead = N 62° 27' 41.85" E
Chord Bear = N 48° 06' 46.32" E

Course from PT BRIDGE_ROAD_6 to PC BRIDGE_ROAD_9 N 62° 27' 41.85" E Dist 190.2634

Curve Data
———
Curve BRIDGE_ROAD_9
P.I. Station 14+95.27 N 6,873,391.3434 E 2,958,558.3584
Delta = 26° 38' 39.12" (RT)
Degree = 53° 32' 50.85"
Tangent = 25.3373
Length = 49.7581
Radius = 107.0000
External = 2.9590
Long Chord = 49.3110
Mid. Ord. = 2.8794
P.C. Station 14+69.93 N 6,873,379.6289 E 2,958,535.8918
P.T. Station 15+19.69 N 6,873,391.7389 E 2,958,583.6926
C.C. N 6,873,284.7519 E 2,958,585.3624
Back = N 62° 27' 41.85" E
Ahead = N 89° 06' 20.97" E
Chord Bear = N 75° 47' 01.41" E

Course from PT BRIDGE_ROAD_9 to PC BRIDGE_ROAD_12 N 89° 06' 20.97" E Dist 37.0883

CONTINUED PW 16 CHAIN BRIDGE_ROAD

Curve Data
———
Curve BRIDGE_ROAD_12
P.I. Station 16+60.59 N 6,873,393.9376 E 2,958,724.5722
Delta = 55° 20' 04.95" (LT)
Degree = 28° 56' 14.13"
Tangent = 103.8085
Length = 191.2230
Radius = 198.0000
External = 25.5625
Long Chord = 183.8777
Mid. Ord. = 22.6397
P.C. Station 15+56.78 N 6,873,392.3176 E 2,958,620.7764
P.T. Station 17+48.00 N 6,873,480.2300 E 2,958,782.2769
C.C. N 6,873,590.2935 E 2,958,617.6865
Back = N 89° 06' 20.97" E
Ahead = N 33° 46' 16.02" E
Chord Bear = N 61° 26' 18.50" E

Course from PT BRIDGE_ROAD_12 to 2 N 33° 46' 16.02" E Dist 117.0356

Point 2 N 6,873,577.5175 E 2,958,847.3343 Sta 18+65.04

==========
Ending chain BRIDGE_ROAD description

Project: Tyler State Park
Subject:
Job No. TSP Operator: MC
Date: Tuesday September 15, 2020 9:27 am

SYSTEM FIX 4 ASEC 2 BEAR PRI 0 RED NE STA 2 FILE: 'UTURN'

* 1 DESCRIBE CHAIN U_TURN

Chain U_TURN contains:
CUR U_TURN_1 5

Beginning chain U_TURN description
==========

Curve Data
———
Curve U_TURN_1
P.I. Station 10+23.30 N 6,873,322.5071 E 2,958,633.3256
Delta = 75° 39' 59.57" (RT)
Degree = 190° 59' 09.34"
Tangent = 23.2983
Length = 39.6189
Radius = 30.0000
External = 7.9844
Long Chord = 36.8019
Mid. Ord. = 6.3060
P.C. Station 10+00.00 N 6,873,303.1073 E 2,958,620.4238
P.T. Station 10+39.62 N 6,873,314.8097 E 2,958,655.3156
C.C. N 6,873,286.4943 E 2,958,645.4040
Back = N 33° 37' 32.64" E
Ahead = S 70° 42' 27.80" E
Chord Bear = N 71° 27' 32.42" E

Course from PT U_TURN_1 to 5 S 70° 42' 27.80" E Dist 52.6342

Point 5 N 6,873,297.4200 E 2,958,704.9942 Sta 10+92.25

==========
Ending chain U_TURN description

Project: Tyler State Park
Subject:
Job No. TSP Operator: MC
Date: Tuesday September 15, 2020 9:22 am

SYSTEM FIX 4 ASEC 2 BEAR PRI 0 RED NE STA 2 FILE: 'PR16'

* 1 DESCRIBE CHAIN PARKING_AREA

Chain PARKING_AREA contains:
3 CUR PARKING_AREA_3 CUR PARKING_AREA_6 CUR PARKING_AREA_9 4

Beginning chain PARKING_AREA description
==========

Point 3 N 6,873,153.8911 E 2,958,259.2707 Sta 10+00.00

Course from 3 to PC PARKING_AREA_3 S 56° 14' 09.20" E Dist 27.0097

Curve Data
———
Curve PARKING_AREA_3
P.I. Station 12+39.52 N 6,873,020.7701 E 2,958,458.3942
Delta = 94° 02' 58.79" (LT)
Degree = 28° 56' 14.15"
Tangent = 212.5136
Length = 325.0123
Radius = 198.0000
External = 92.4583
Long Chord = 289.7331
Mid. Ord. = 63.0271
P.C. Station 10+27.01 N 6,873,138.8798 E 2,958,281.7247
P.T. Station 13+52.02 N 6,873,205.3395 E 2,958,563.7324
C.C. N 6,873,303.4837 E 2,958,391.7681
Back = S 56° 14' 09.20" E
Ahead = N 29° 42' 52.01" E
Chord Bear = N 76° 44' 21.40" E

Course from PT PARKING_AREA_3 to PC PARKING_AREA_6 N 29° 42' 52.01" E Dist 90.2981

Curve Data
———
Curve PARKING_AREA_6
P.I. Station 14+99.65 N 6,873,333.5517 E 2,958,636.9062
Delta = 19° 32' 07.11" (RT)
Degree = 17° 12' 21.32"
Tangent = 57.3256
Length = 113.5383
Radius = 333.0003
External = 4.8982
Long Chord = 112.9891
Mid. Ord. = 4.8272
P.C. Station 14+42.32 N 6,873,283.7640 E 2,958,608.4912
P.T. Station 15+55.86 N 6,873,370.9717 E 2,958,680.3338
C.C. N 6,873,118.7032 E 2,958,897.7041
Back = N 29° 42' 52.01" E
Ahead = N 49° 14' 59.12" E
Chord Bear = N 39° 28' 55.56" E

Course from PT PARKING_AREA_6 to PC PARKING_AREA_9 N 49° 14' 59.12" E Dist 44.7006

Curve Data
———
Curve PARKING_AREA_9
P.I. Station 16+45.82 N 6,873,429.6921 E 2,958,748.4817
Delta = 15° 28' 43.10" (LT)
Degree = 17° 12' 21.35"
Tangent = 45.2561
Length = 89.9611
Radius = 333.0002
External = 3.0612
Long Chord = 89.6877
Mid. Ord. = 3.0333
P.C. Station 16+00.56 N 6,873,400.1506 E 2,958,714.1973
P.T. Station 16+90.52 N 6,873,467.3119 E 2,958,773.6385
C.C. N 6,873,652.4189 E 2,958,496.8272
Back = N 49° 14' 59.12" E
Ahead = N 33° 46' 16.02" E
Chord Bear = N 41° 30' 37.57" E

Course from PT PARKING_AREA_9 to 4 N 33° 46' 16.02" E Dist 15.5403

Point 4 N 6,873,480.2300 E 2,958,782.2769 Sta 17+06.06

==========
Ending chain PARKING_AREA description

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER
05/17/2021

PARK ROAD 16
ALIGNMENT DATA

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		34

DATE: 5/11/2021 10:57:27 AM
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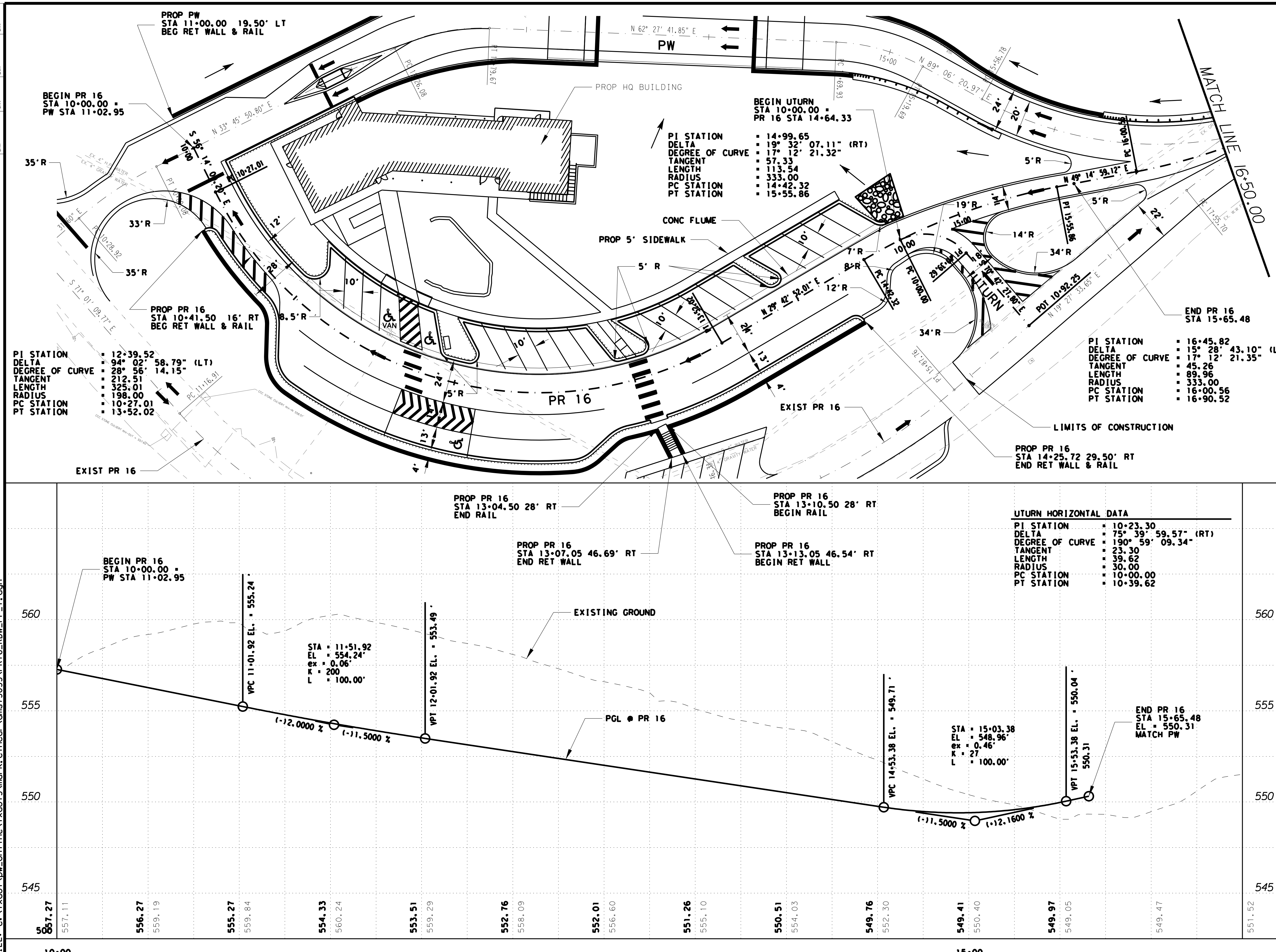
PROP PW
STA 11+00.00 19.50' LT
BEG RET WALL & RAIL
PW
N 62° 27' 41.85" E
PROP HQ BUILDING
BEGIN PR 16
STA 10+00.00 =
PW STA 11+02.95
BEGIN UTURN
STA 10+00.00 =
PR 16 STA 14+64.33
PI STATION = 14+99.65
DELTA = 19° 32' 07.11" (RT)
DEGREE OF CURVE = 17° 12' 21.32"
TANGENT = 57.33
LENGTH = 113.54
RADIUS = 333.00
PC STATION = 14+42.32
PT STATION = 15+55.86
MATCH LINE 16+50.00
N 89° 06' 20.97" E
N 49° 14' 59.12" E
N 33° 45' 50.80" E
CONC FLUME
PROP 5' SIDEWALK
35'R
33'R
35'R
5'R
19'R
14'R
34'R
34'R
7'R
8'R
12'R
8.5'R
5'R
UTURN
POT 10+92.25
N 19° 27' 33.65" E
S 71° 01' 09.77" E
N 29° 42' 52.01" E
PROP PR 16
STA 10+41.50 16' RT
BEG RET WALL & RAIL
PI STATION = 12+39.52
DELTA = 94° 02' 58.79" (LT)
DEGREE OF CURVE = 28° 56' 14.15"
TANGENT = 212.51
LENGTH = 325.01
RADIUS = 198.00
PC STATION = 10+27.01
PT STATION = 13+52.02
PR 16
EXIST PR 16
EXIST PR 16
END PR 16
STA 15+65.48
PI STATION = 16+45.82
DELTA = 15° 28' 43.10" (LT)
DEGREE OF CURVE = 17° 12' 21.35"
TANGENT = 45.26
LENGTH = 89.96
RADIUS = 333.00
PC STATION = 16+00.56
PT STATION = 16+90.52
LIMITS OF CONSTRUCTION
PROP PR 16
STA 14+25.72 29.50' RT
END RET WALL & RAIL
LEGEND
DIRECTION OF FLOW
RETAINING WALL
0 25 50
SCALE: 1" = 50' H
1" = 5' V
PROP PR 16
STA 13+04.50 28' RT
END RAIL
PROP PR 16
STA 13+10.50 28' RT
BEGIN RAIL
PROP PR 16
STA 13+07.05 46.69' RT
END RET WALL
PROP PR 16
STA 13+13.05 46.54' RT
BEGIN RET WALL
UTURN HORIZONTAL DATA
PI STATION = 10+23.30
DELTA = 75° 39' 59.57" (RT)
DEGREE OF CURVE = 190° 59' 09.34"
TANGENT = 23.30
LENGTH = 39.62
RADIUS = 30.00
PC STATION = 10+00.00
PT STATION = 10+39.62
BEGIN PR 16
STA 10+00.00 =
PW STA 11+02.95
VPC 11+01.92 EL. = 555.24
STA = 11+51.92
EL = 554.24'
ex = 0.06'
K = 200
L = 100.00'
VPT 12+01.92 EL. = 553.49
EXISTING GROUND
(-12.0000 %
(-11.5000 %
PGL @ PR 16
VPC 14+53.38 EL. = 549.71
STA = 15+03.38
EL = 548.96'
ex = 0.46'
K = 27
L = 100.00'
VPT 15+53.38 EL. = 550.04
550.31
END PR 16
STA 15+65.48
EL = 550.31
MATCH PW
(-11.5000 %
(+12.1600 %
560
555
550
545
557.27 557.11
556.27 559.19
555.27 559.84
554.33 560.24
553.51 559.29
552.76 558.09
552.01 556.60
551.26 555.10
550.51 554.03
549.76 552.30
549.41 550.40
549.97 549.05
549.47
551.52
10+00
15+00

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

05/17/2021

PARK ROAD 16
PLAN & PROFILE
PR 16
STA 10+00.00 TO
STA 15+65.48

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST		COUNTY	SHEET NO.
TYL		SMITH	35

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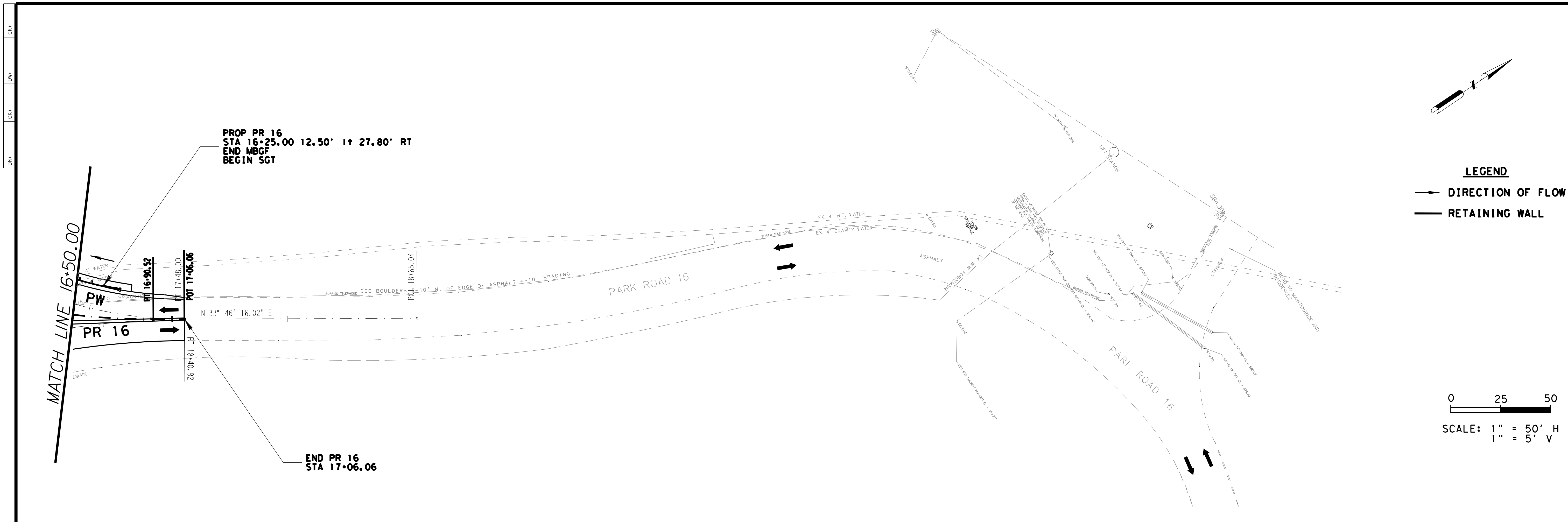

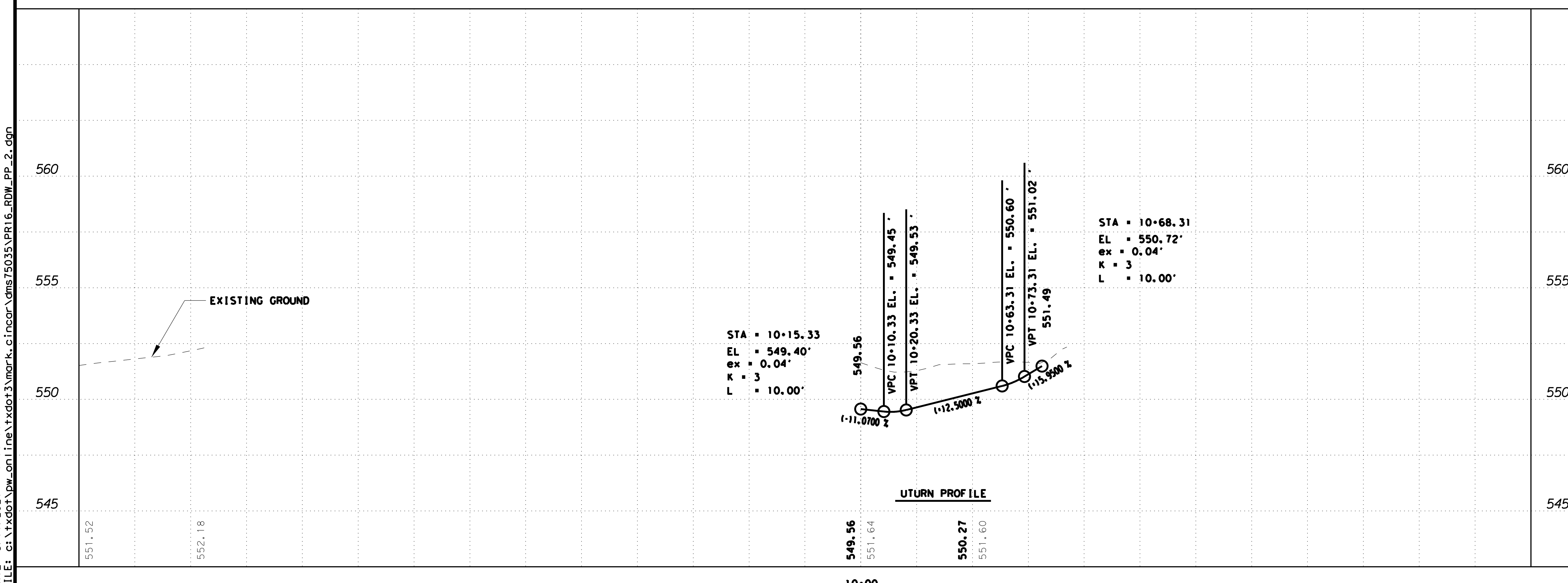

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

05/17/2021

PARK ROAD 16
PLAN & PROFILE
PR 16
STA 16+50 TO STA 17+06.06

Texas Department of Transportation

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		36

DATE: 5/11/2021 10:58:08 AM
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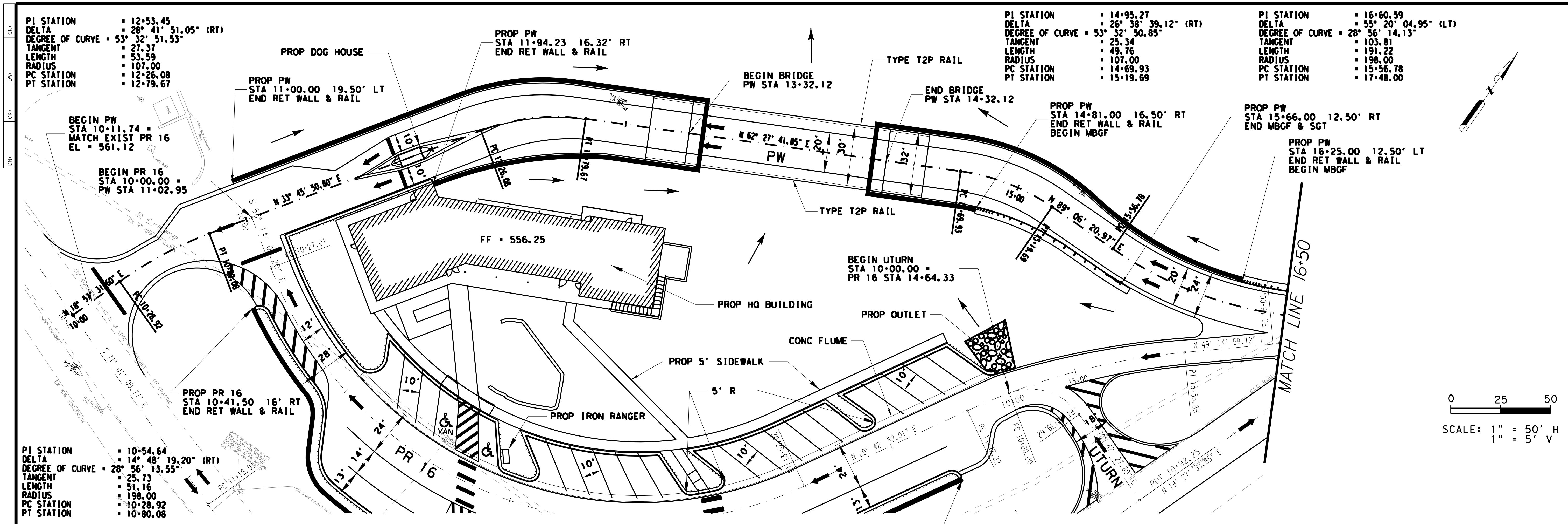
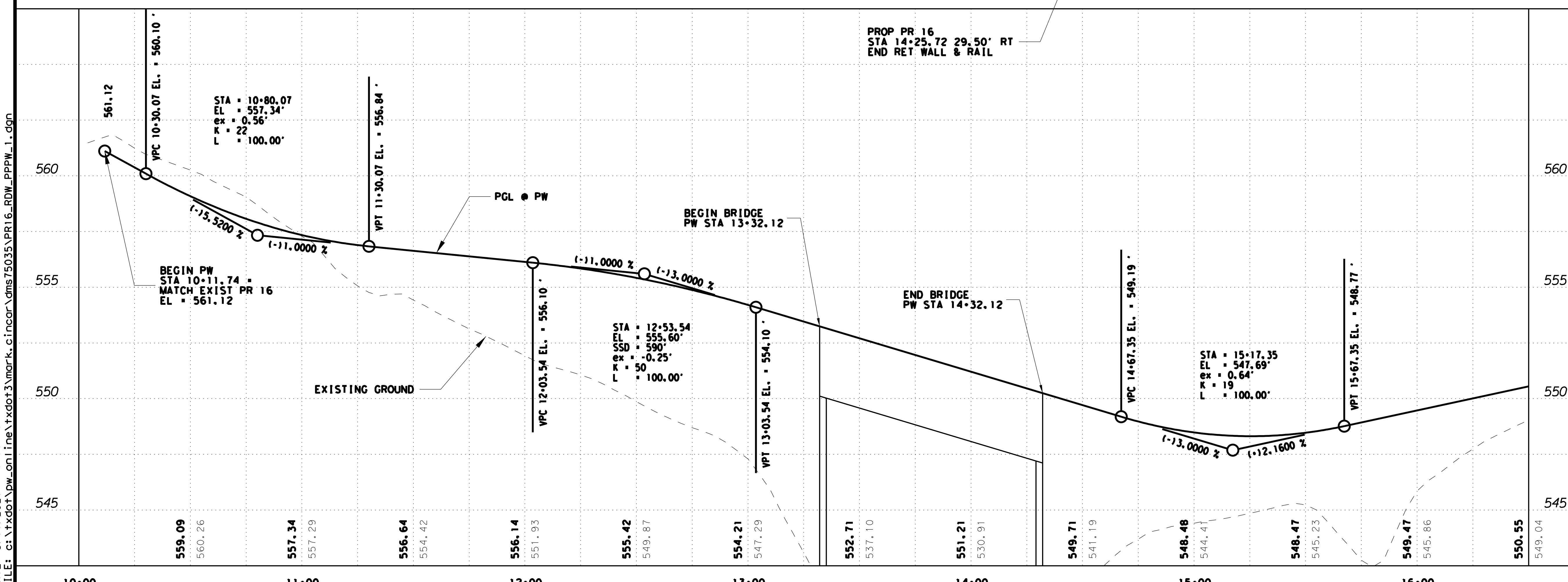

PI STATION = 12+53.45
DELTA = 28° 41' 51.05" (RT)
DEGREE OF CURVE = 53° 32' 51.53"
TANGENT = 27.37
LENGTH = 53.59
RADIUS = 107.00
PC STATION = 12+26.08
PT STATION = 12+79.67
PROP DOG HOUSE
PROP PW
STA 11+94.23 16.32' RT
END RET WALL & RAIL
PROP PW
STA 11+00.00 19.50' LT
END RET WALL & RAIL
BEGIN PW
STA 10+11.74 =
MATCH EXIST PR 16
EL = 561.12
BEGIN PR 16
STA 10+00.00 =
PW STA 11+02.95
BEGIN BRIDGE
PW STA 13+32.12
TYPE T2P RAIL
END BRIDGE
PW STA 14+32.12
PI STATION = 14+95.27
DELTA = 26° 38' 39.12" (RT)
DEGREE OF CURVE = 53° 32' 50.85"
TANGENT = 25.34
LENGTH = 49.76
RADIUS = 107.00
PC STATION = 14+69.93
PT STATION = 15+19.69
PI STATION = 16+60.59
DELTA = 55° 20' 04.95" (LT)
DEGREE OF CURVE = 28° 56' 14.13"
TANGENT = 103.81
LENGTH = 191.22
RADIUS = 198.00
PC STATION = 15+56.78
PT STATION = 17+48.00
PROP PW
STA 14+81.00 16.50' RT
END RET WALL & RAIL
BEGIN MBGF
PROP PW
STA 15+66.00 12.50' RT
END MBGF & SGT
PROP PW
STA 16+25.00 12.50' LT
END RET WALL & RAIL
BEGIN MBGF
PW
N 62° 27' 41.85" E
N 33° 45' 50.80" E
N 89° 06' 20.97" E
TYPE T2P RAIL
FF = 556.25
PROP HQ BUILDING
BEGIN UTURN
STA 10+00.00 =
PR 16 STA 14+64.33
PROP OUTLET
CONC FLUME
PROP 5' SIDEWALK
5' R
PROP IRON RANGER
PROP PR 16
STA 10+41.50 16' RT
END RET WALL & RAIL
PI STATION = 10+54.64
DELTA = 14° 48' 19.20" (RT)
DEGREE OF CURVE = 28° 56' 13.55"
TANGENT = 25.73
LENGTH = 51.16
RADIUS = 198.00
PC STATION = 10+28.92
PT STATION = 10+80.08
PR 16
UTURN
N 29° 42' 52.01" E
N 49° 14' 59.12" E
N 19° 27' 33.65" E
POT 10+92.25
VAN
MATCH LINE 16+50
PROP PR 16
STA 14+25.72 29.50' RT
END RET WALL & RAIL
0 25 50
SCALE: 1" = 50' H
1" = 5' V


560
555
550
545
561.12
VPC 10+30.07 EL. = 560.10'
STA = 10+80.07
EL = 557.34'
ex = 0.56'
K = 22
L = 100.00'
VPT 11+30.07 EL. = 556.84'
PGL @ PW
(-)5.5200 %
(-)1.0000 %
BEGIN PW
STA 10+11.74 =
MATCH EXIST PR 16
EL = 561.12
BEGIN BRIDGE
PW STA 13+32.12
(-)1.0000 %
(-)3.0000 %
VPC 12+03.54 EL. = 556.10'
STA = 12+53.54
EL = 555.60'
SSD = 590'
ex = -0.25'
K = 50
L = 100.00'
VPT 13+03.54 EL. = 554.10'
EXISTING GROUND
END BRIDGE
PW STA 14+32.12
VPC 14+67.35 EL. = 549.19'
STA = 15+17.35
EL = 547.69'
ex = 0.64'
K = 19
L = 100.00'
VPT 15+67.35 EL. = 548.77'
(-)3.0000 %
(+)2.1600 %
559.09 560.26
557.34 557.29
556.64 554.42
556.14 551.93
555.42 549.87
554.21 547.29
552.71 537.10
551.21 530.91
549.71 541.19
548.48 544.41
548.47 545.23
549.47 545.86
550.55 549.04
10+00
11+00
12+00
13+00
14+00
15+00
16+00

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ROLANDO MENDEZ
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PROFESSIONAL ENGINEER

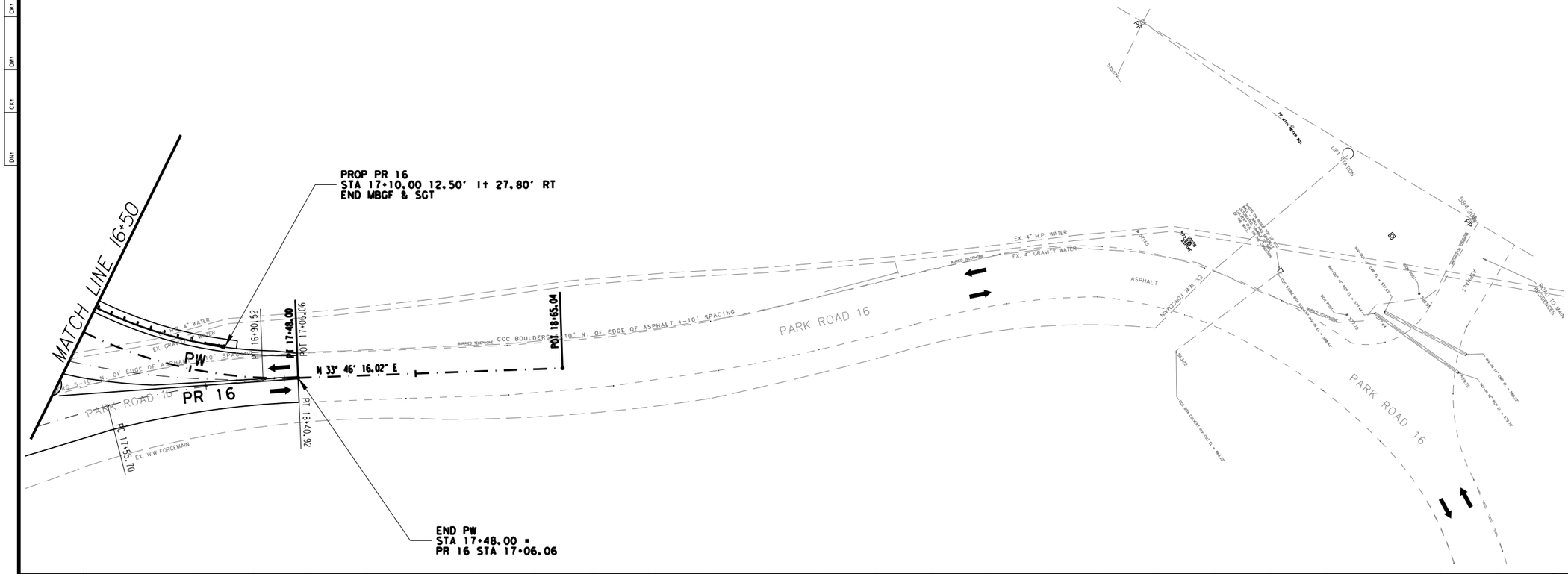
05/17/2021

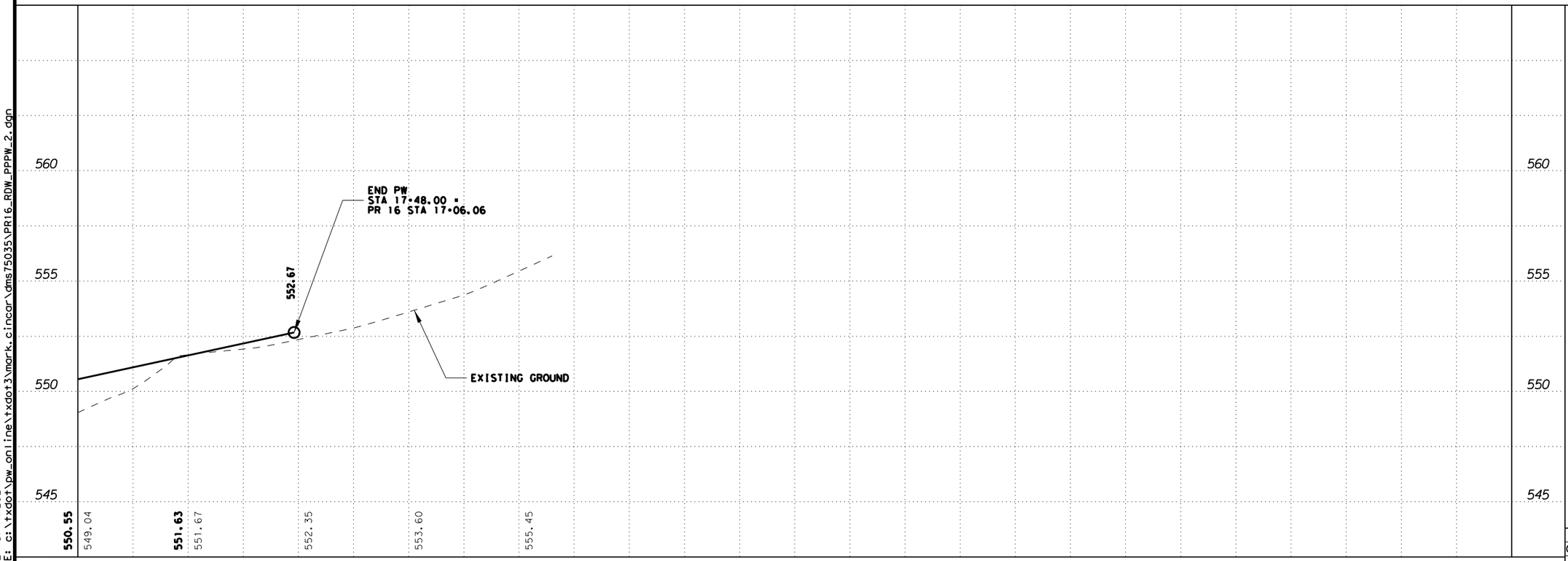
PARK ROAD 16
PLAN & PROFILE
PW
STA 10+00 TO STA 16+50

 Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST		COUNTY	SHEET NO.
TYL		SMITH	37

CK:
DW:
CK:
DN:





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STATE OF TEXAS
ROLANDO MENDEZ
131701
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PROFESSIONAL ENGINEER

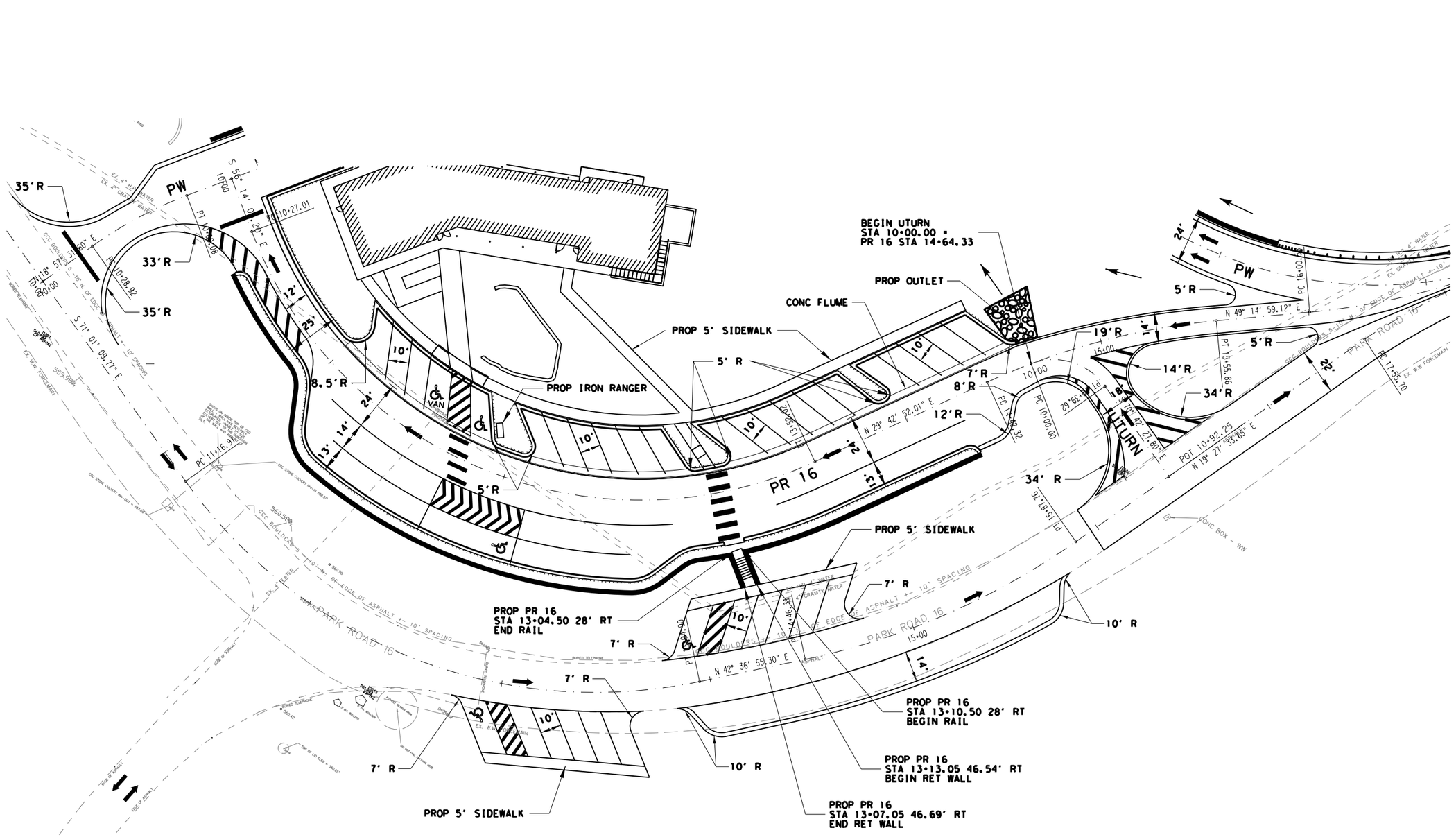
05/17/2021

PARK ROAD 16
PLAN & PROFILE
PW
STA 16+50 TO
STA 17+48.00

Texas Department of Transportation

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		38



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PROFESSIONAL ENGINEER

06/17/2021

PARK ROAD 16
PAVING PLAN
ADDITIONAL
PARKING AREAS

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		39

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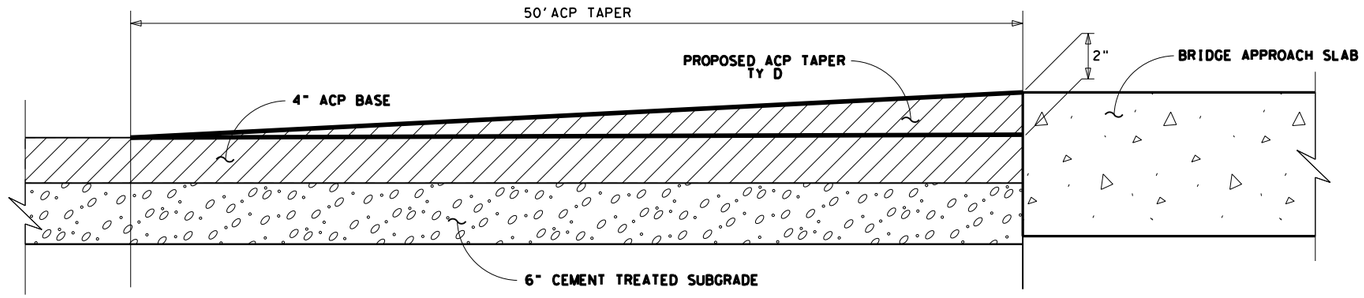
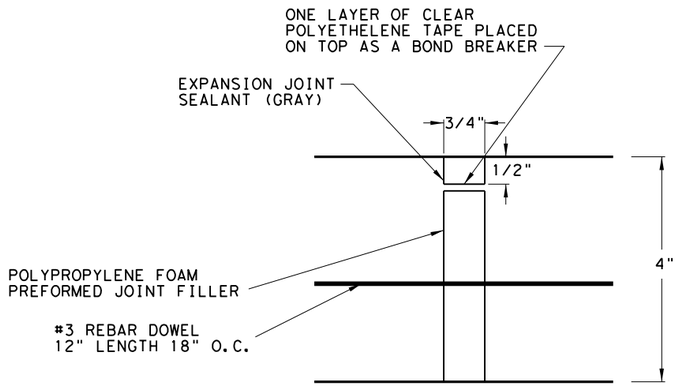
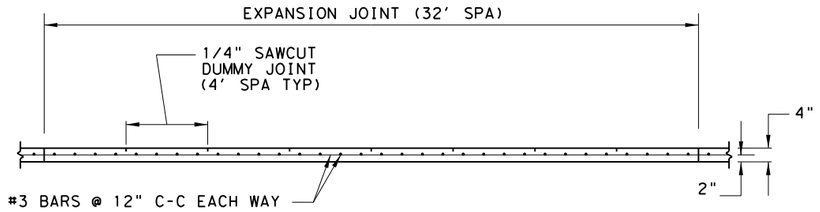


TEMPORARY TAPER AT BRIDGE ENDS



EXPANSION JOINT DETAIL

NTS



SIDEWALK DETAILS

NTS

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131701
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05/17/2021

PARK ROAD 16
MISCELLANEOUS DETAILS

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		40

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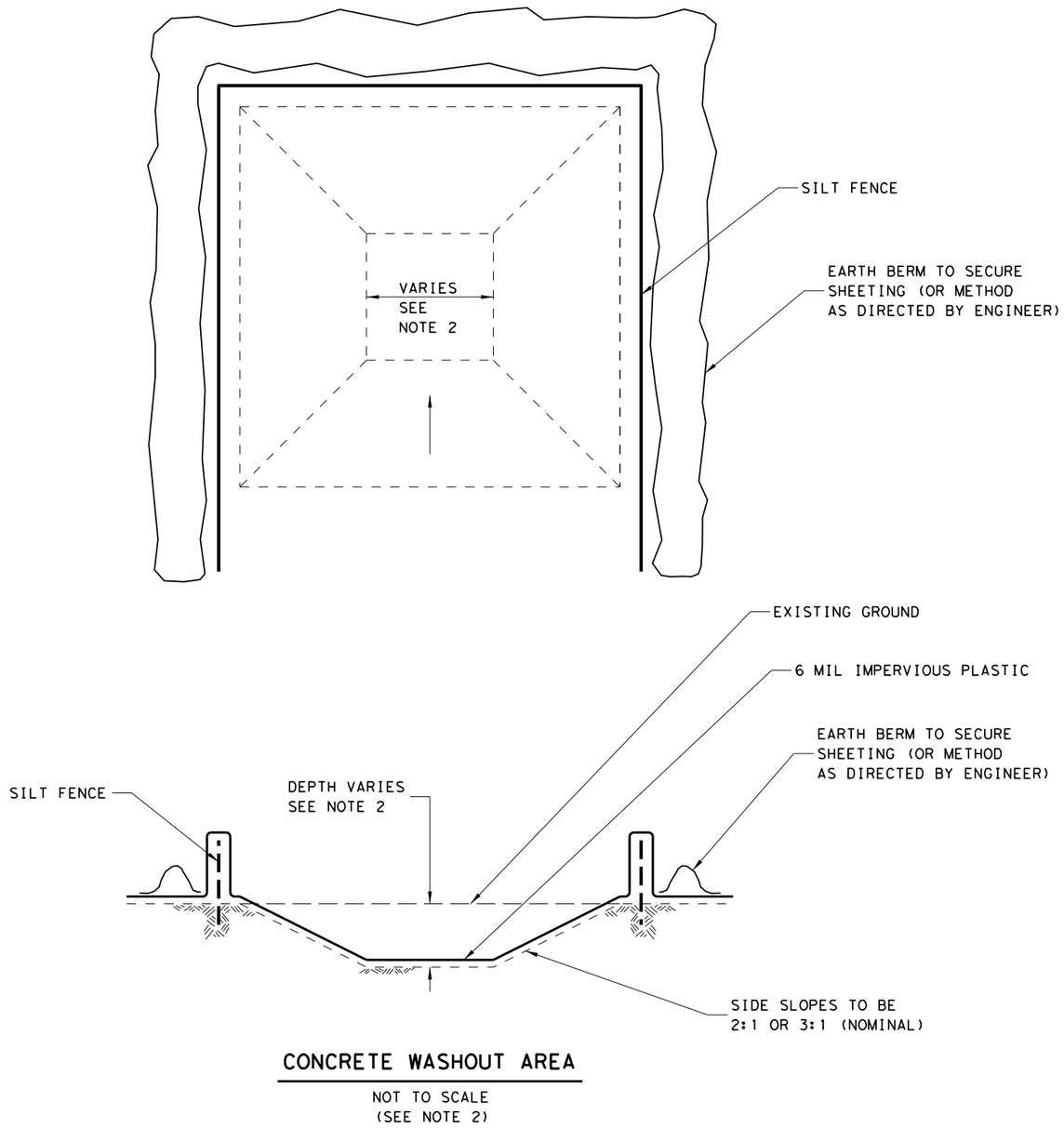
CK:
DN:



CONCRETE WASHOUT AREA

NOT TO SCALE
(SEE NOTE 2)

NOTES

1. CONCRETE WASHOUT AREA(S) SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE. THE CONCRETE WASHOUT AREA SHALL BE ENTIRELY SELF-CONTAINED.

2. THE CONTRACTOR SHALL SUBMIT THE DESIGN, LOCATION AND SIZING OF OF THE CONCRETE WASHOUT AREA(S) WITH THE PROJECT'S EROSION AND SEDIMENTATION CONTROL PLAN AND SHALL BE APPROVED BY THE ENGINEER.

LOCATION: WASHOUT AREA(S) ARE TO BE LOCATED AT LEAST 50 FEET FROM ANY STREAM, WETLAND, STORM DRAINS, OR OTHER SENSITIVE RESOURCE. THE FLOOD CONTINGENCY PLAN MUST ADDRESS THE CONCRETE WASHOUT IF THE WASHOUT IS TO BE LOCATED WITHIN THE FLOODPLAN.

SIZE: THE WASHOUT MUST HAVE SUFFICIENT VOLUME TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS INCLUDING, BUT NOT LIMITED TO, OPERATIONS ASSOCIATED WITH GROUT AND MORTAR.

3. SURFACE DISCHARGE IS UNACCEPTABLE, THERFORE EARTH BERM OR OTHER CONTROL MEASURES, AS APPROVED BY THE ENGINEER, SHOULD BE USED AROUND THE PERIMETER OF THE CONCRETE WASHOUT AREA FOR CONTAINMENT.

4. SIGNS SHOULD BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CONCRETE AREA(S) AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS. WASHOUT AREA(S) SHOULD BE FLAGGED WITH SAFETY FENCING OR OTHER APPROVED METHOD.

5. CONCRETE WASH-OUT AREAS SHALL BE LINED WITH IMPERVIOUS PLASTIC WITH A MINIMUM THICKNESS OF 6 MILS AND BE REPLACED IF DAMAGED DURING CLEAN-OUT OF HARDENED CONCRETE FROM THE WASH-OUT AREA.

6. WASHOUT AREA(S) ARE TO BE INSPECTED AT LEAST ONCE A WEEK FOR STRUCTURAL INTEGRITY, ADEQUATE HOLDING CAPACITY AND CHECKED FOR LEAKS, TEARS, OR OVERFLOWS. (AS DIRECTED BY THE CONSTRUCTION SITE ENVIRONMENTAL INSPECTION REPORT) WASHOUT AREA(S) SHOULD BE CHECKED AFTER HEAVY RAINS.

7. HARDENED CONCRETE WASTE SHOULD BE REMOVED AND DISPOSED OF WHEN THE WASTE HAS ACCUMULATED TO HALF OF THE CONCRETE WASHOUT'S HEIGHT. THE WASTE CAN BE STORED AT AN UPLAND LOCATION, AS APPROVED BY THE ENGINEER. ALL CONCRETE WASTE SHALL BE DISPOSED OF IN A MANNER CONSISTENT WITH ALL APPLICABLE LAWS, REGULATIONS, AND GUIDELINES.

8. PAYMENT FOR THIS ITEM IS TO BE INCLUDED UNDER THE GENERAL COST OF THE WORK FOR THE PROJECT, INCLUDING SITE RESTORATION.

STATE OF TEXAS
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PROFESSIONAL ENGINEER

05/17/2021

PARK ROAD 16 MISCELLANEOUS DETAILS

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		41

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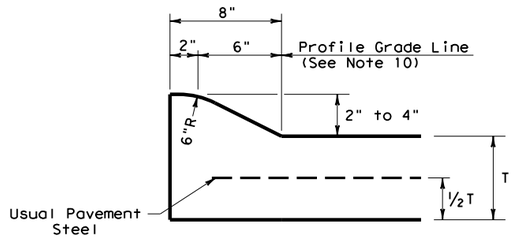
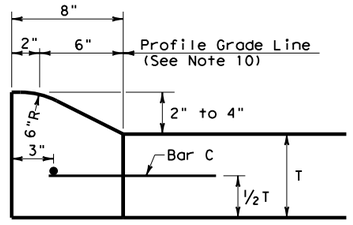
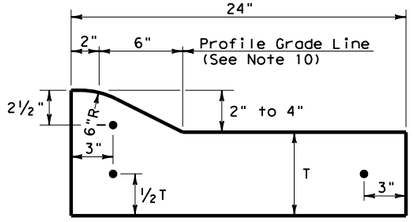


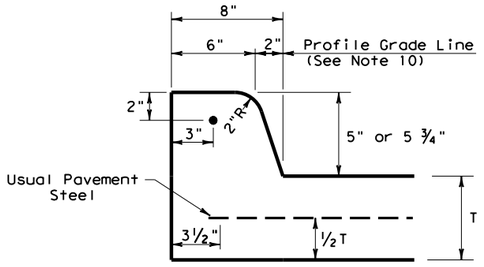
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



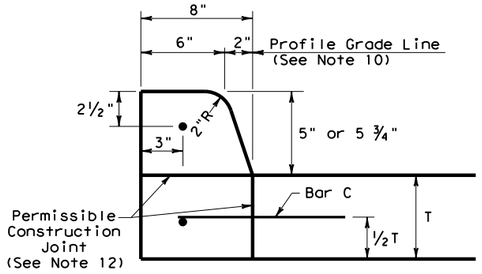
TYPE I CURB
2" - 4" HEIGHT



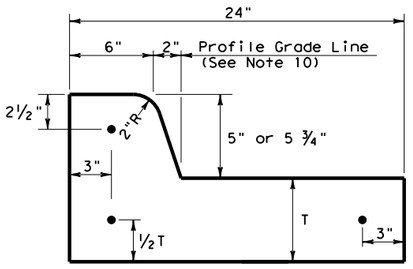
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



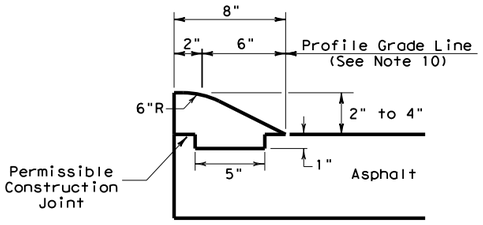
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



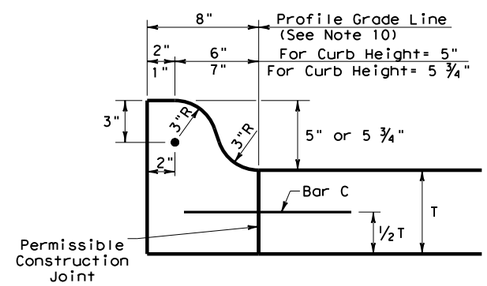
TYPE II CURB
5" - 5 ¾" HEIGHT



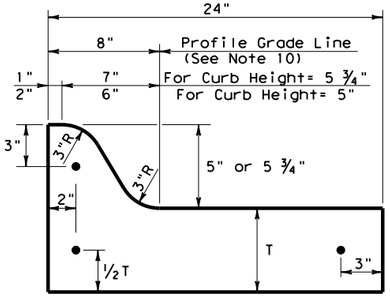
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



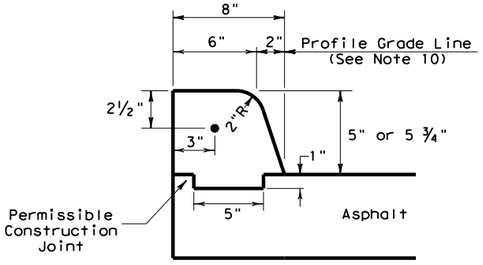
TYPE III CURB (KEYED)
2" - 4" HEIGHT



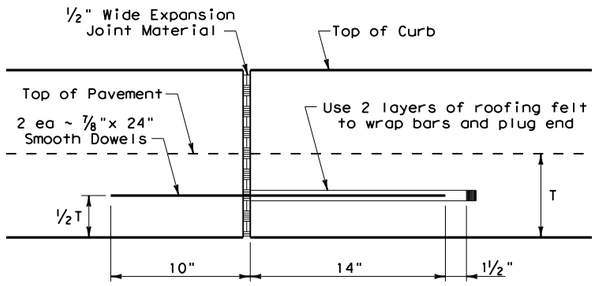
TYPE IIa CURB
5" - 5 ¾" HEIGHT



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

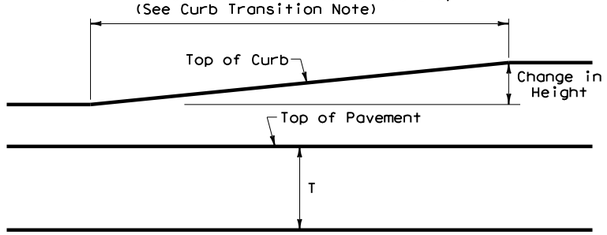


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

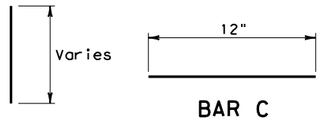
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and the grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B used as needed to support curb reinforcing steel during concrete placement.



BAR B

BAR C

Texas Department of Transportation

Design Division Standard

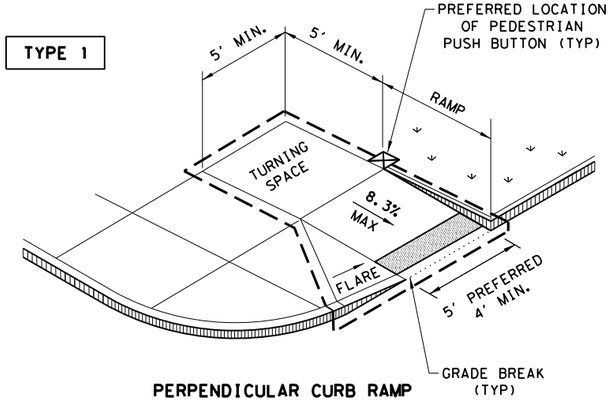
CONCRETE CURB AND CURB AND GUTTER

CCCG-21

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: SS	CK: KM
© TxDOT: FEBRUARY 2021 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		42

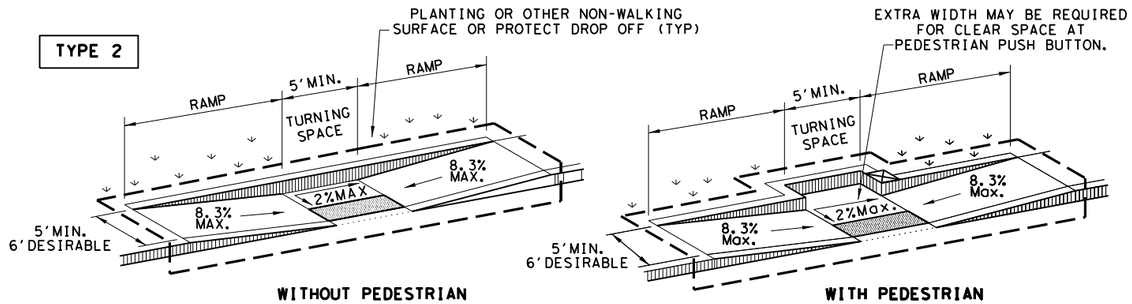
DATE: 5/11/2021
FILE: c:\txdot\pw_online\txdot3\mark.cinoar\d0353664\PED-18.dgn

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

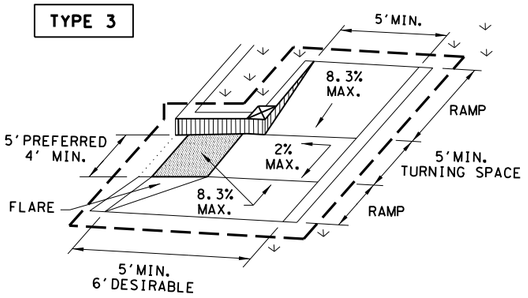


WITHOUT PEDESTRIAN PUSH BUTTON

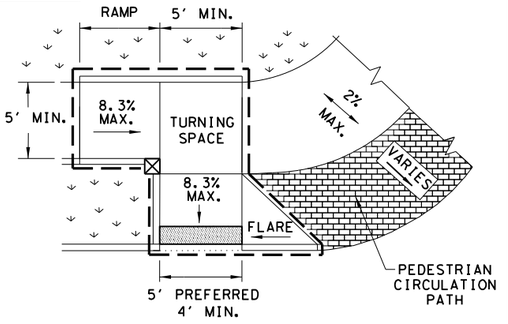
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

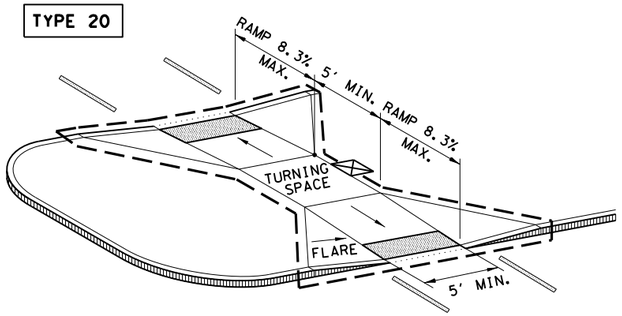


TYPE 6



COMBINATION CURB RAMPS

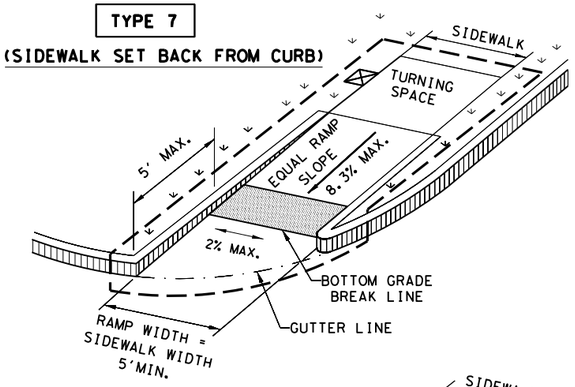
TYPE 20



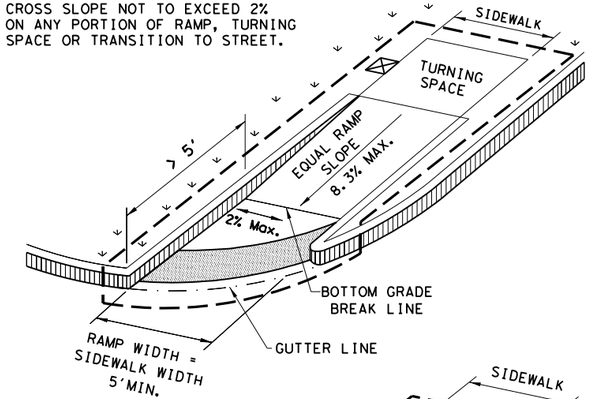
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

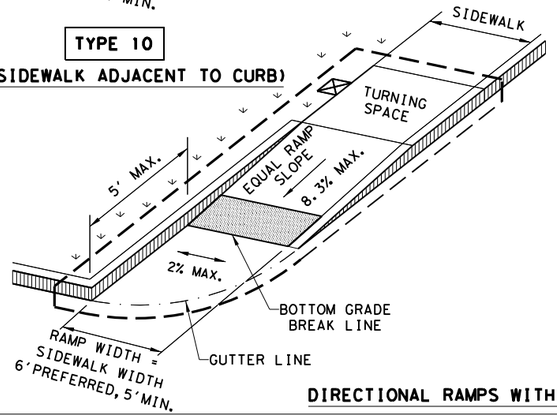


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

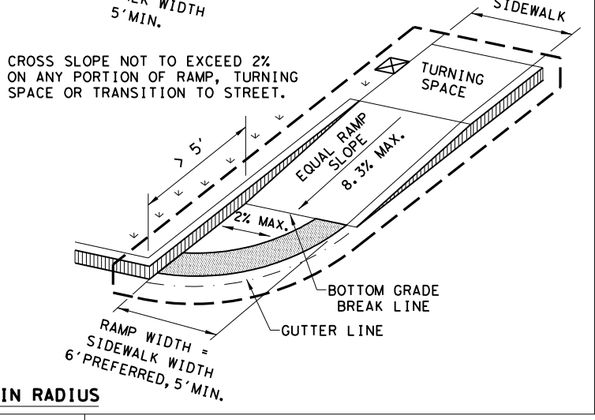


TYPE 10

(SIDEWALK ADJACENT TO CURB)

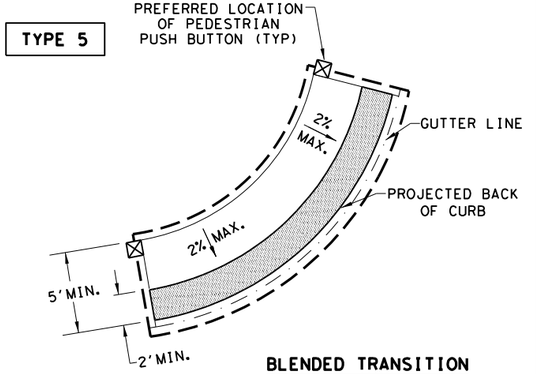


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

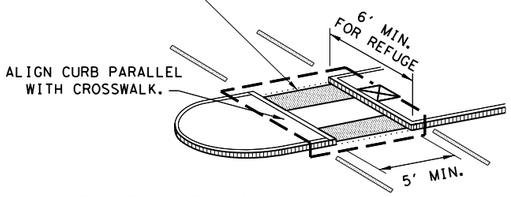
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

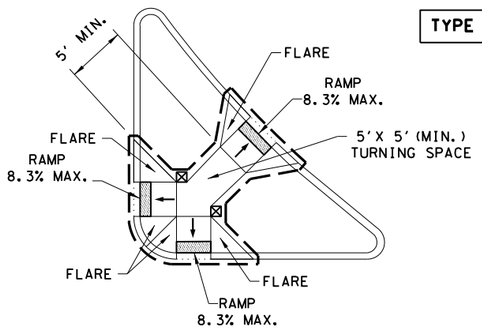
TYPE 21

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



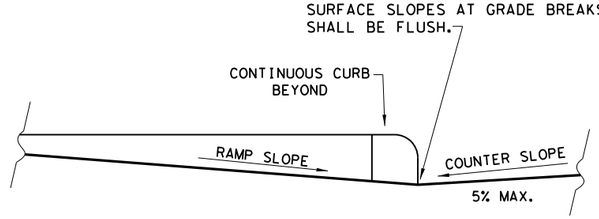
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

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



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

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

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

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	TYL	SMITH		43

DATE: 5/11/2021
FILE: c:\txdot\pw_online\txdot3\mark.cincar\d0353664\PED-18.dgn

GENERAL NOTES

CURB RAMPS

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

DETECTABLE WARNING MATERIAL

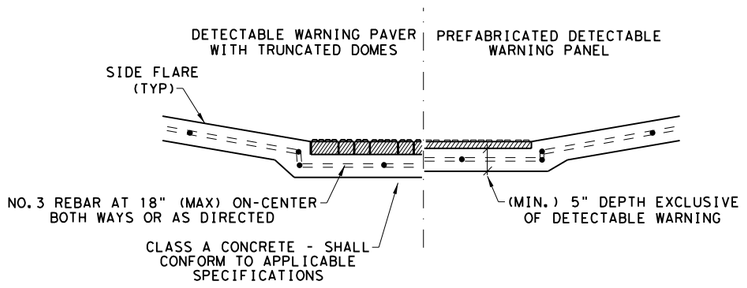
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material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

DETECTABLE WARNING PAVERS (IF USED)

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

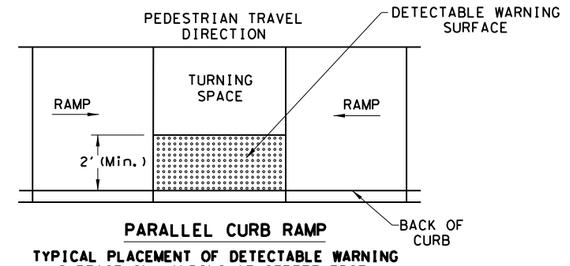
SIDEWALKS

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

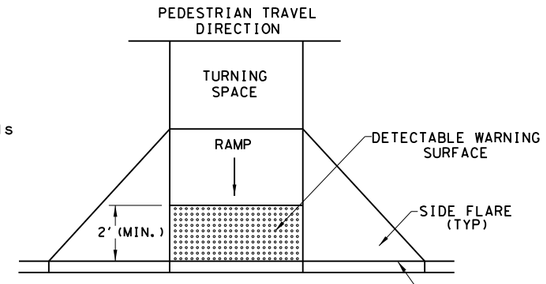


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

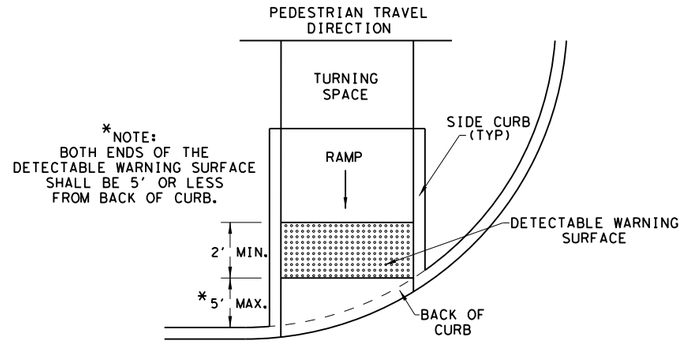
DETECTABLE WARNING SURFACE DETAILS



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



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



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

Texas Department of Transportation | Design Division Standard

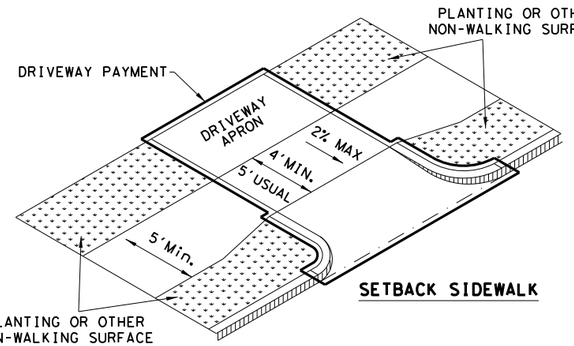
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

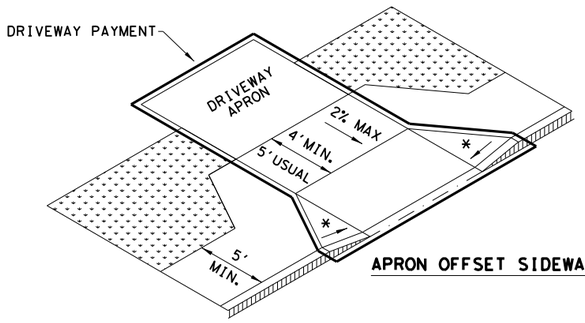
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0606	01	007		PARK ROAD
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	TYL	SMITH			44

DATE: 5/11/2021
FILE: c:\txdot\pw_online\txdot3\mark.cincar\d0353664\PED-18.dgn

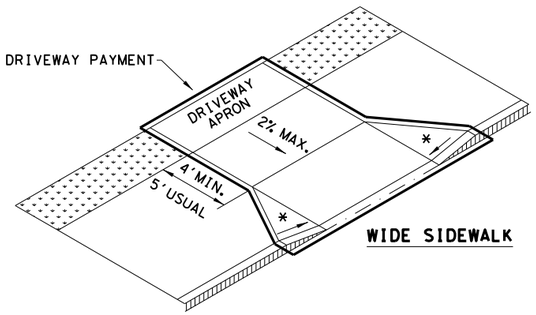
SIDEWALK TREATMENT AT DRIVEWAYS



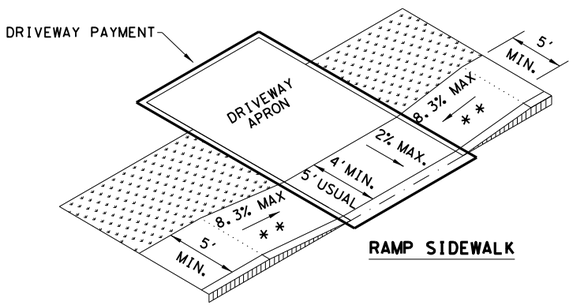
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

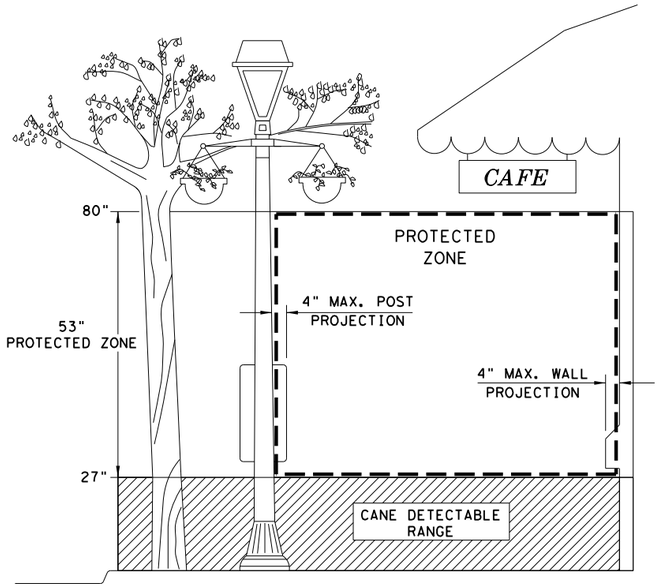


RAMP SIDEWALK

NOTES:

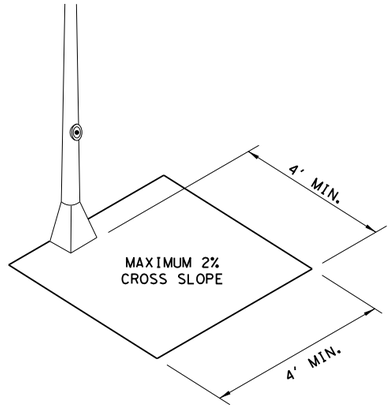
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

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

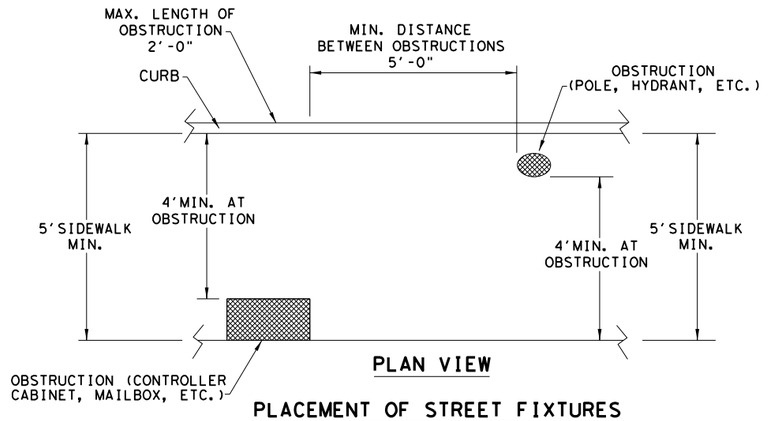


PROTECTED ZONE

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



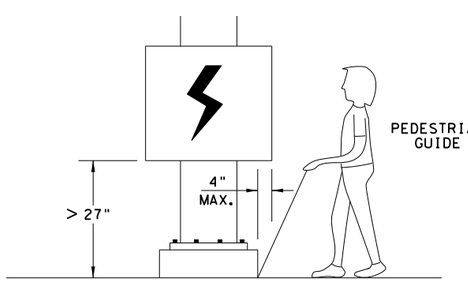
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



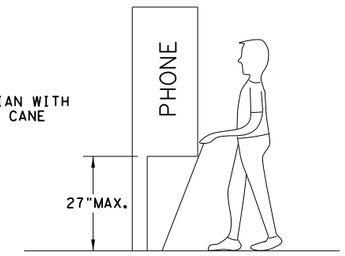
PLAN VIEW

PLACEMENT OF STREET FIXTURES

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



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



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

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

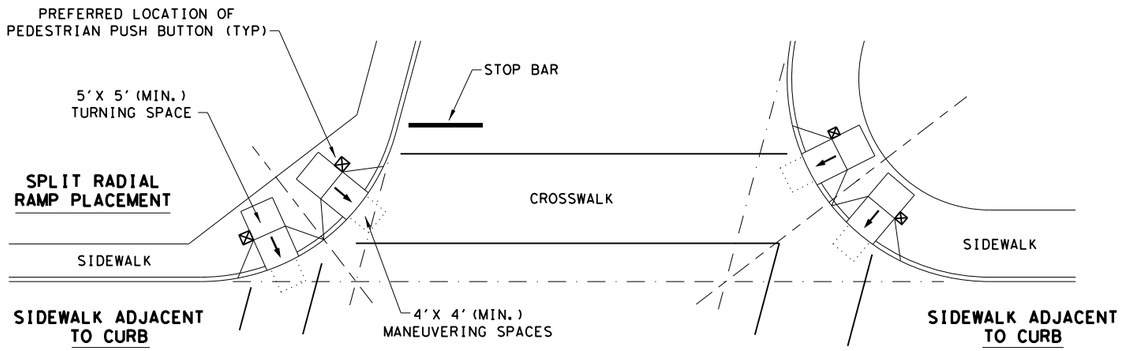
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0606	01	007	PARK ROAD	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.	
	TYL	SMITH		45	

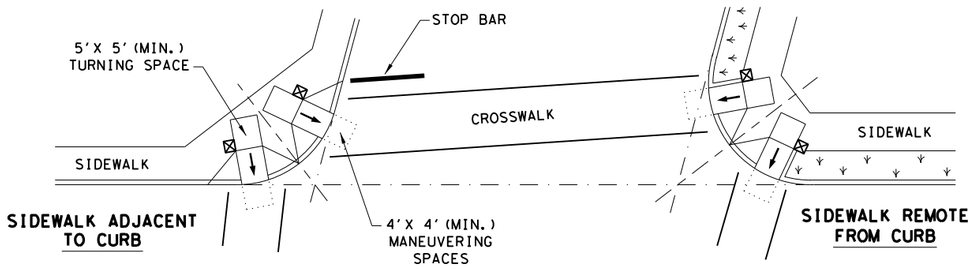
DATE: 5/11/2021
FILE: c:\txdot\pw_online\txdot3\mark.cincar\d0353664\PED-18.dgn

TYPICAL CROSSING LAYOUTS

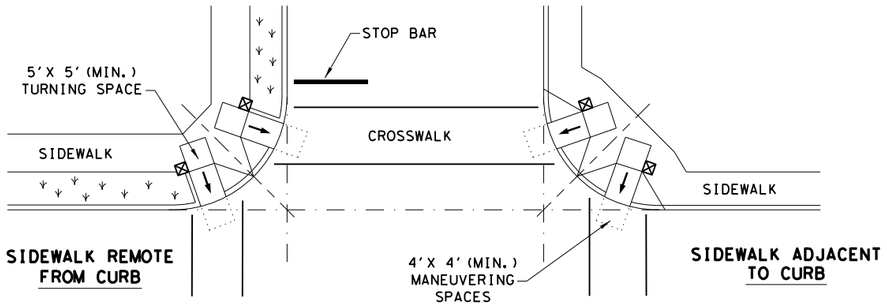
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



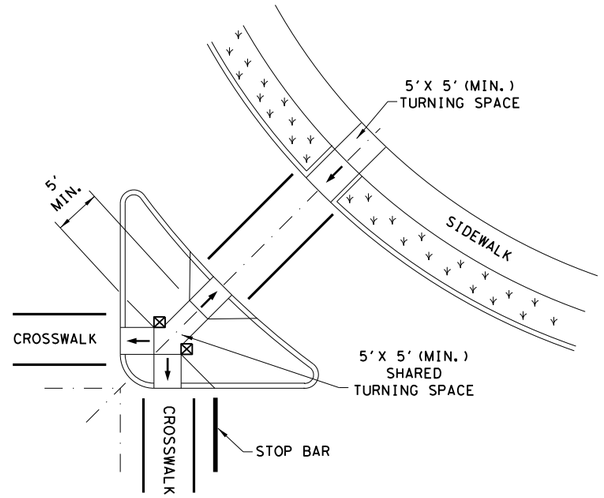
SKEWED INTERSECTION WITH "LARGE" RADIUS



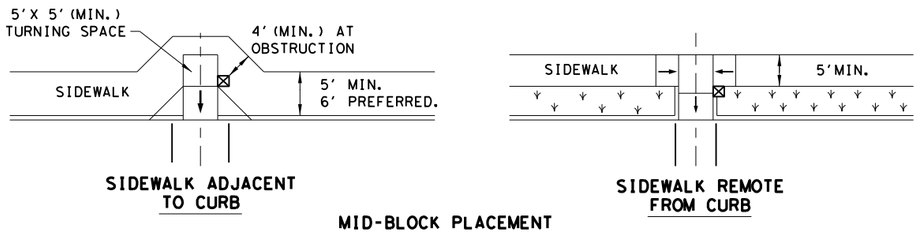
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

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

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

Texas Department of Transportation

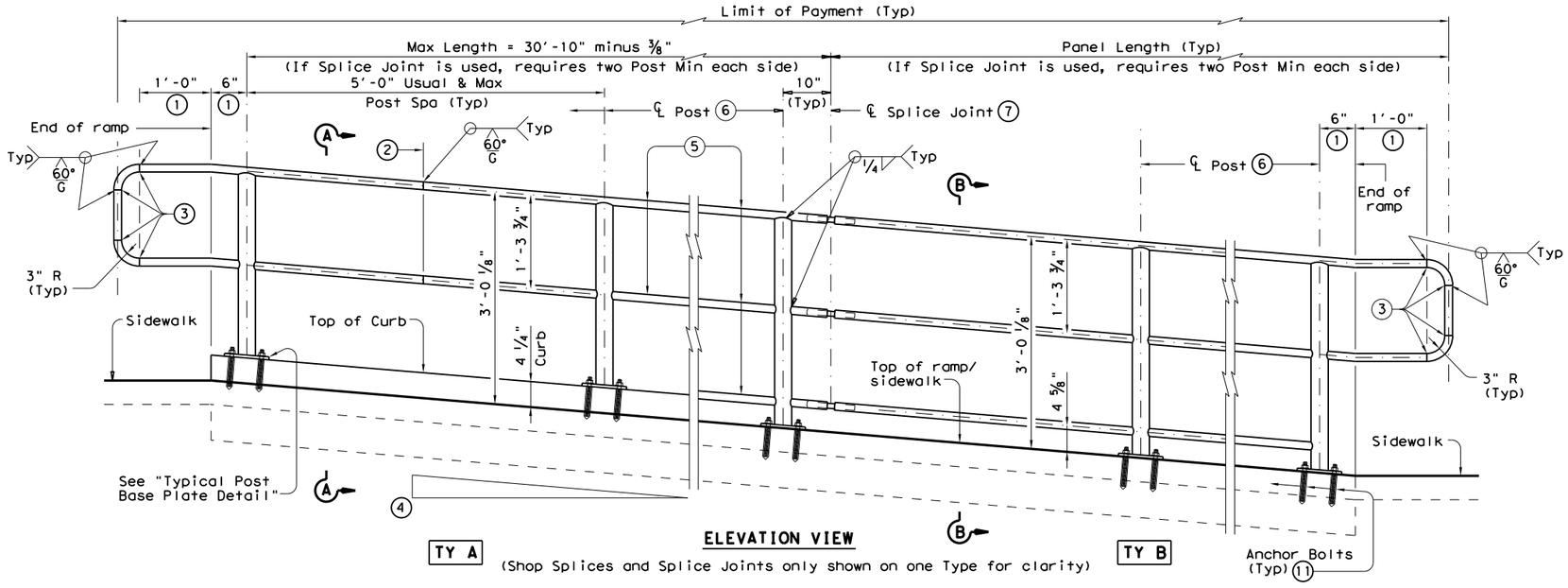
Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

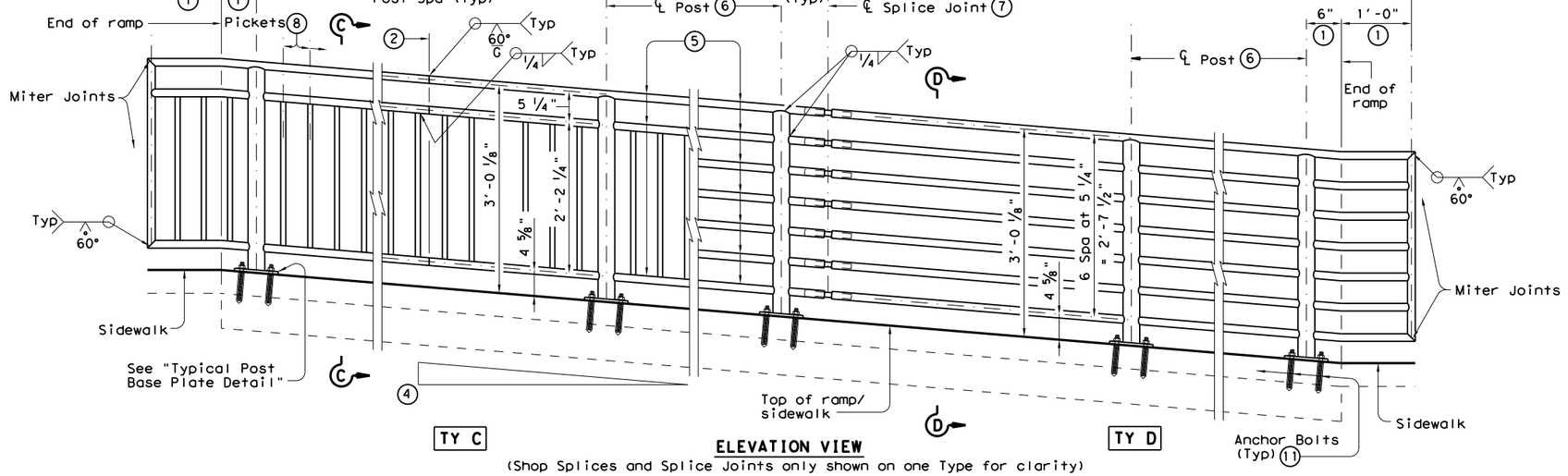
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	TYL	SMITH		46

DATE: 5/11/2021
FILE: c:\txdot\pw_online\txdot3\mark.cinoar\d0353664\PRD-13.dgn



ELEVATION VIEW

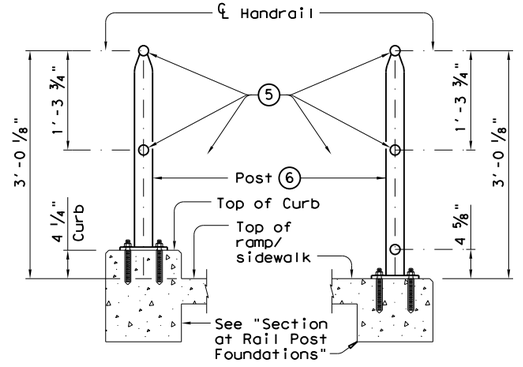
(Shop Splices and Splice Joints only shown on one Type for clarity)



ELEVATION VIEW

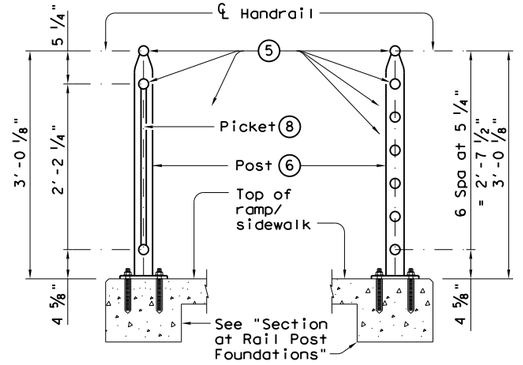
(Shop Splices and Splice Joints only shown on one Type for clarity)

RECOMMENDED USAGE (9) (10)	
Dropoff Height/ Condition	Recommended Rail Options
<30" dropoff	TY A, TY B, TY C, or TY D
≥ 30" dropoff, or along Bike Path	TY E or TY F



SECTION A-A
(Showing Handrail **TY A**)

SECTION B-B
(Showing Handrail **TY B**)



SECTION C-C
(Showing Handrail **TY C**)

SECTION D-D
(Showing Handrail **TY D**)

1. Parallel to ground.
2. One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
3. Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
4. See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
5. 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.
6. 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
7. See "Handrail Fabrication Details" for Splice Joints.
8. ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.
9. When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.
10. Not to be used on bridges.
11. See "General Notes" for anchor bolt information.

SHEET 1 OF 3

Texas Department of Transportation

Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT Decmeber 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED MAY, 2013 (VP)	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		47

DATE: 5/11/2021
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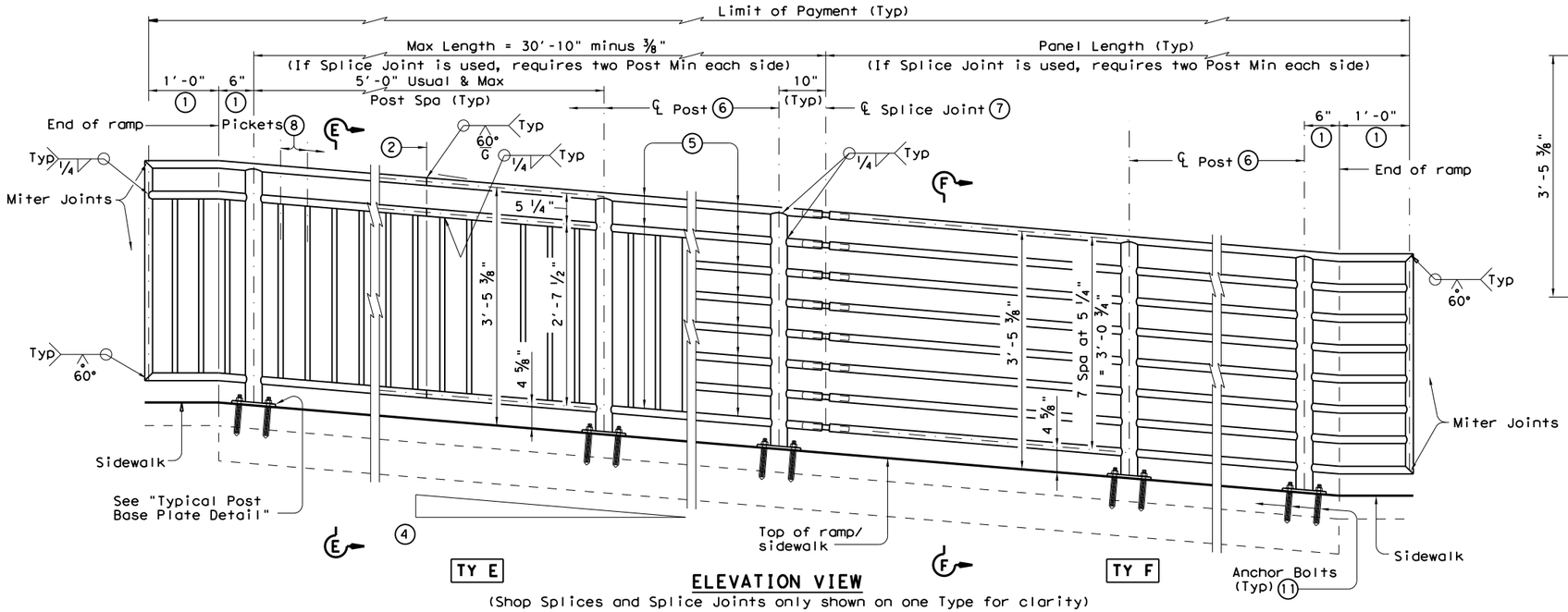
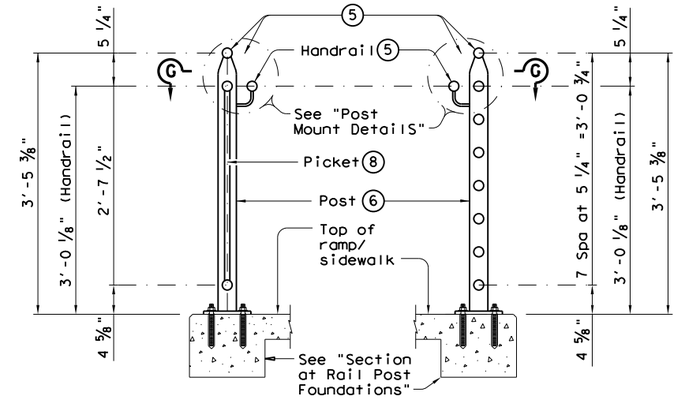
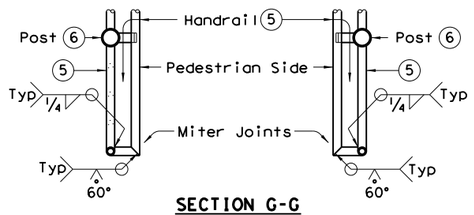


ELEVATION VIEW
(Shop Splices and Splice Joints only shown on one Type for clarity)

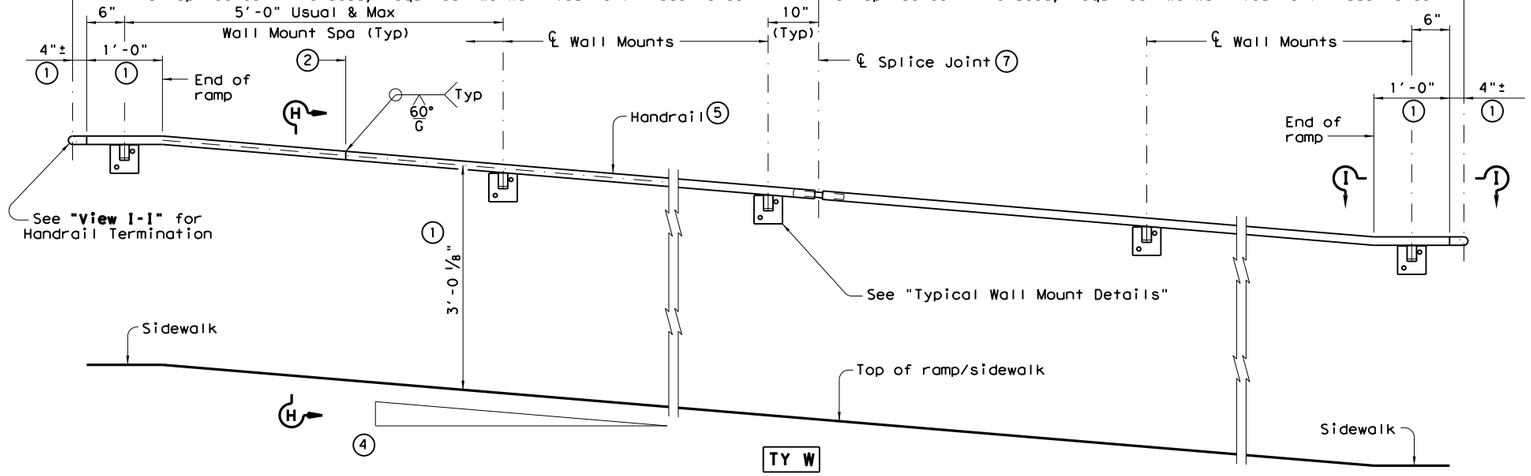


SECTION E-E
(Showing Handrail **TY E**)

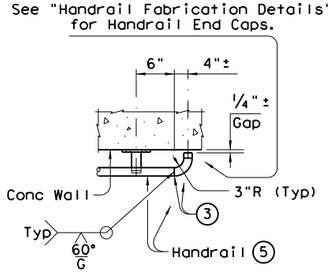
SECTION F-F
(Showing Handrail **TY F**)



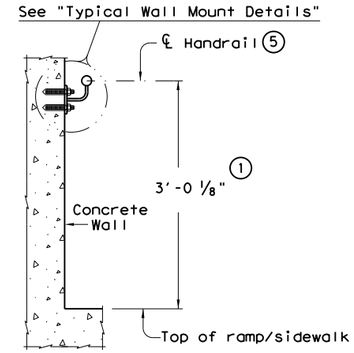
SECTION G-G
(Showing Handrail Termination)



ELEVATION VIEW



VIEW I-I
(Showing Handrail Termination)



SECTION H-H
(Showing Handrail **TY W**)

1. Parallel to ground.
2. One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
3. Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
4. See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
5. 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.
6. 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
7. See "Handrail Fabrication Details" for Splice Joints.
8. ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.
11. See "General Notes" for anchor bolt information.

Texas Department of Transportation | Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED MAY, 2013 (VP)	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		48

DATE: 5/11/2021
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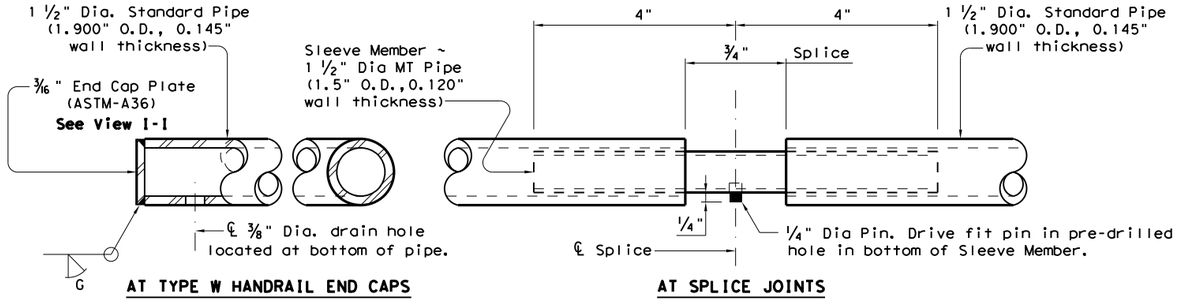
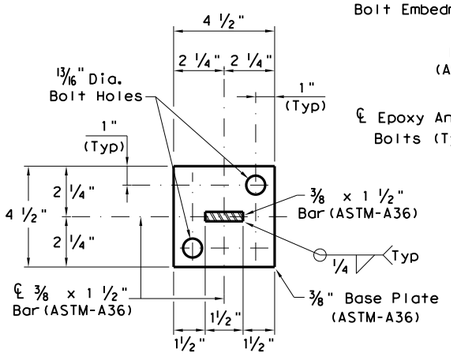


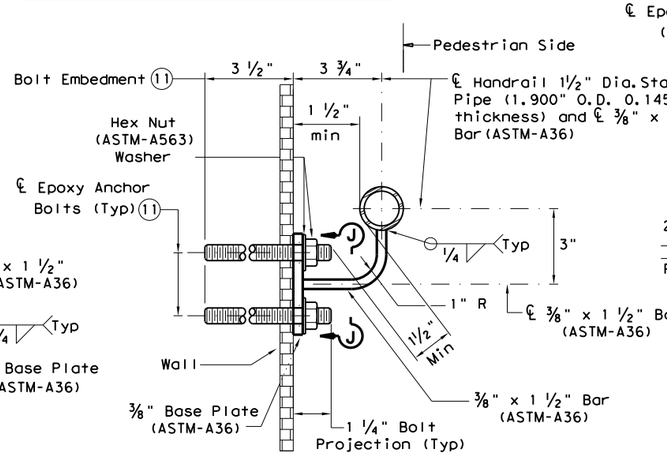
AT TYPE W HANDRAIL END CAPS

AT SPLICE JOINTS

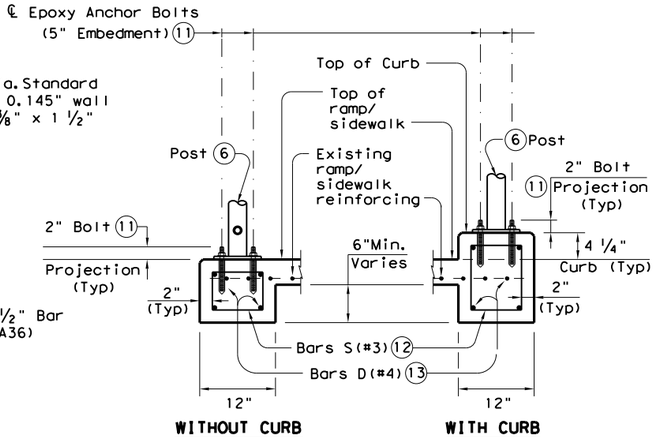
HANDRAIL FABRICATION DETAILS



SECTION J-J
(Anchor Bolts not shown for clarity)



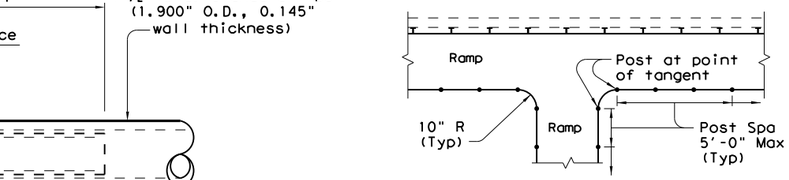
SECTION AT WALL MOUNT



WITHOUT CURB

WITH CURB

SECTION AT RAIL POST FOUNDATIONS



RAMP INTERSECTION

MULTI-LEVEL RAMP

SINGLE-LEVEL RAMP

PLAN SHOWING RAIL AT RAMP CONDITIONS

GENERAL NOTES

Designed according to ADAAG, Texas Accessibility Standards, Uniform Building Code, and AASHTO LRFD Specifications.

Handrail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Pipe will conform to ASTM-A53 Grade B or A500 Grade B. Steel plates and steel bars will conform to ASTM-A36. Mechanical tubing (MT) will conform to ASTM A513 Grade 1015 or higher. Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks". All reinforcing steel must be Grade 60. Bar laps, where required, will be as follows: Uncoated ~ #4 = 1'-5" Epoxy coated ~ #4 = 2'-1"

When the plans require painted steel, follow the requirements for painting galvanized steel in Item 446, "Cleaning and Painting Steel". Sleeve Members will receive galvanization and only get field painted after installation unless directed otherwise by Engineer.

Epoxy Anchor bolts for wall mount and post base plate will be ⅝" Dia. ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. ⅝" Dia. threaded rod embedment depth for wall mounts is 3 ½" and embedment depth for post base plate is 5".

Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

At the contractor's option the post base plate anchor bolts may be cast with the Ramp/Sidewalk (See Cast-in-Place Anchor Bolt Options).

Optional cast-in-place anchor bolts will be ⅝" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

Handrails and any wall or other surface adjacent to them will be free of any sharp or abrasive elements.

Submit shop drawings to the Engineer unless otherwise noted. For curved handrail applications, fabricate the handrail to the curve if radius is less than 600 ft. Shop drawings are required when rail is fabricated to the curve.

For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation.

Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

Payment for concrete sidewalks or curb ramps will be paid for in accordance with Item 531 "Sidewalks".

Payment for all items shown is to be included in unit price bid in accordance with Item 450 "Railing" of the type specified.

All exposed edges will be rounded or chamfered to approximately ⅛" by grinding.

TYPICAL WALL MOUNT DETAILS

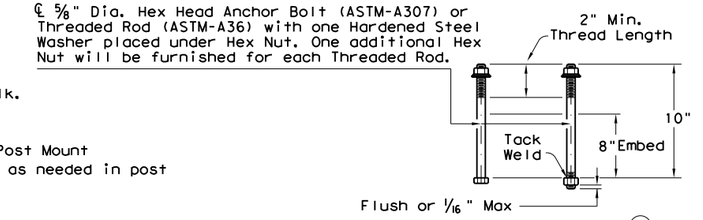
(5) 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

(6) 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit the diamenter of top rail. Provide holes as needed in post for galvanizing drainage and venting.

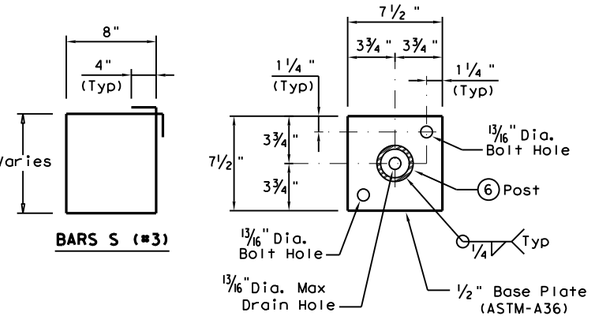
(11) See "General Notes" for anchor bolt information.

(12) Bars S(#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).

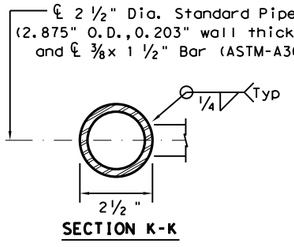
(13) Provide 1 ½" end cover to Bars D(#4) from outside edge of overall length of Ramp/Sidewalk.



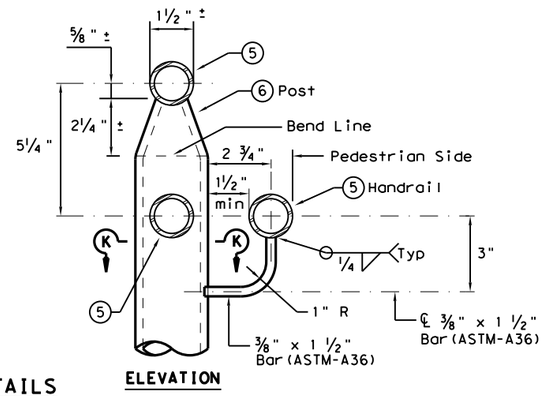
CAST-IN-PLACE ANCHOR BOLT OPTIONS
(Used for Post Base Plate only)



TYPICAL POST BASE PLATE DETAIL



SECTION K-K



ELEVATION

POST MOUNT DETAILS

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
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REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET NO.
	TYL	SMITH		49

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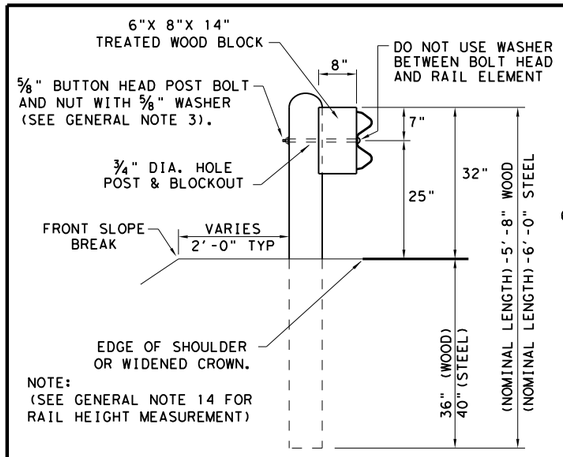
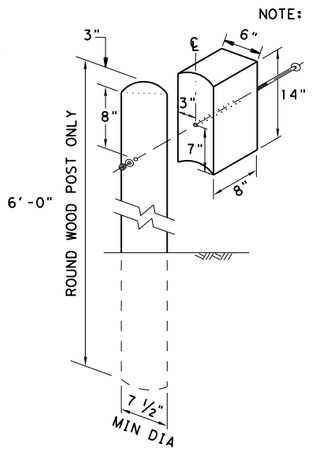
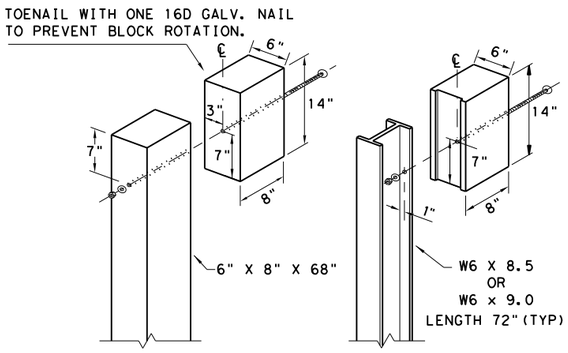


TYPICAL POST PLACEMENT



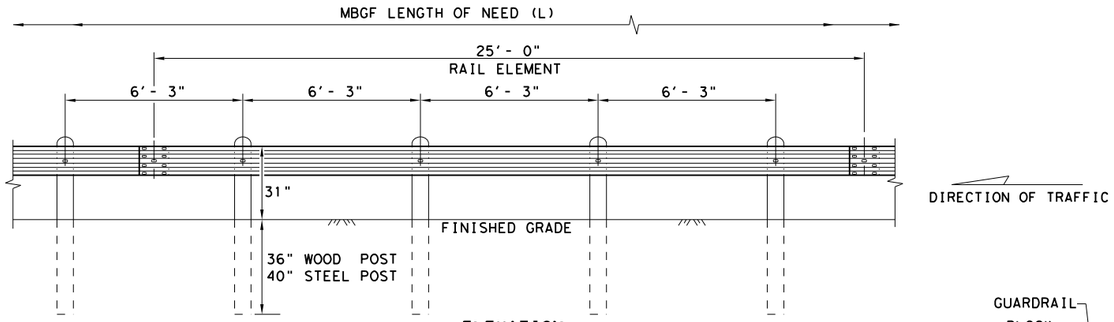
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

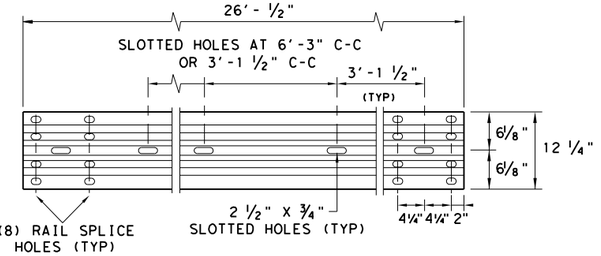
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



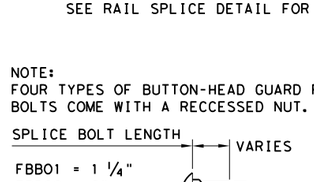
ELEVATION
MID-SPAN RAIL SPLICE

SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



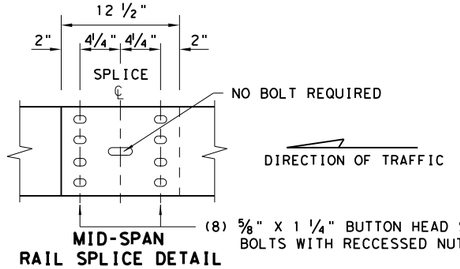
ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.



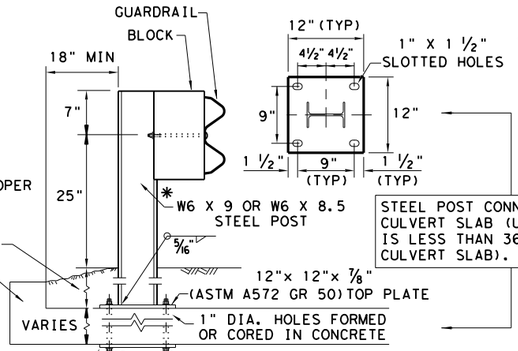
BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.



* POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		50

DATE: 5/11/2021 11:01:31 AM
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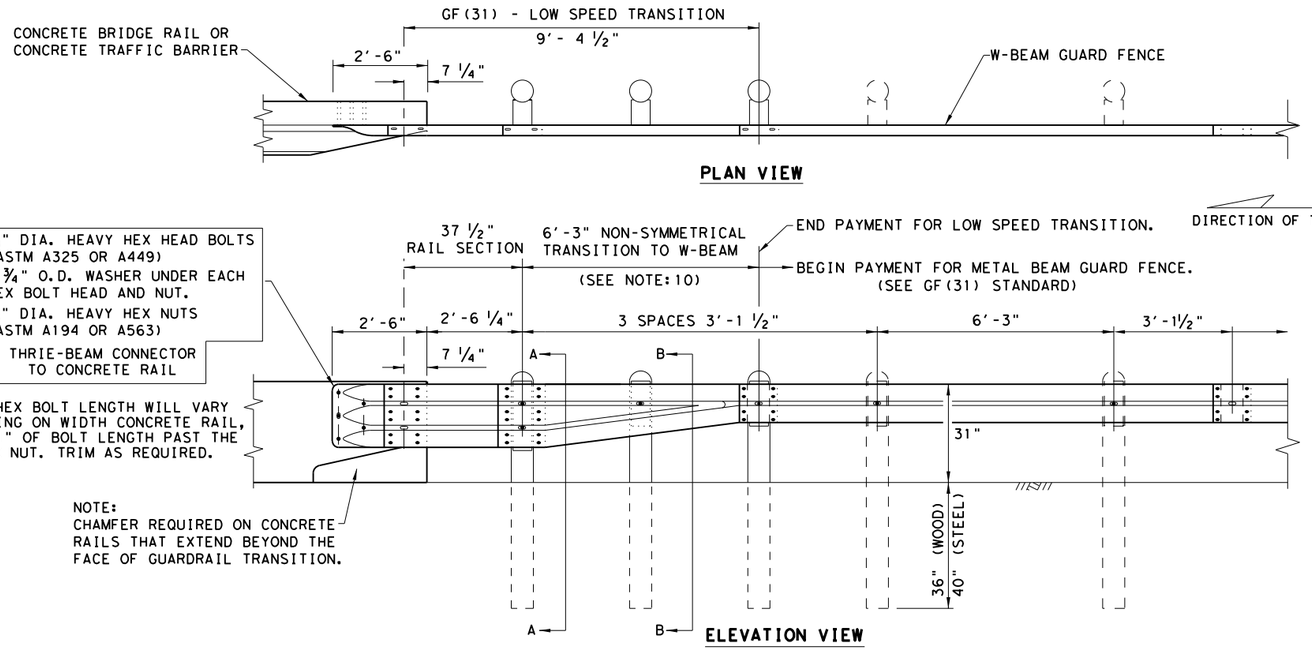
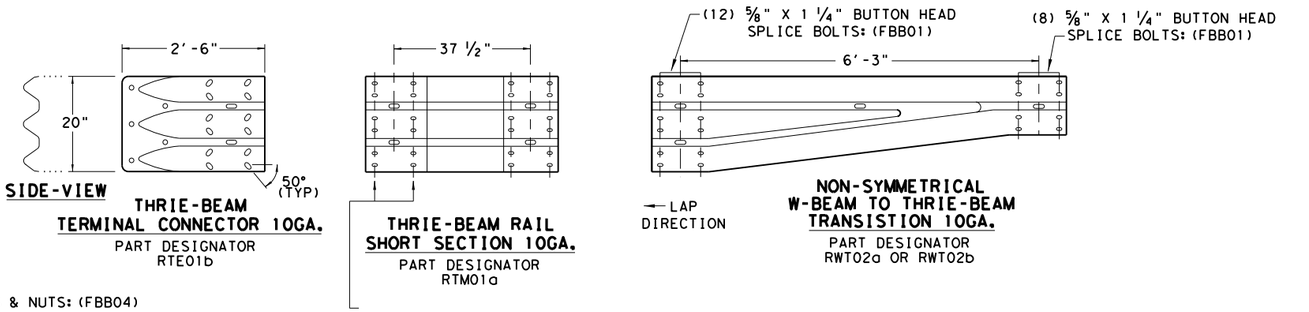


GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REFER TO GF(31)STANDARD SHEET.
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS.
3. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM BOLT LENGTH TO MEET REQUIRED LENGTH.
5. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
6. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
7. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
8. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT, MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
9. REFER TO GF(31)STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
10. FOR ROUND WOOD POSTS SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE TRANSITION.



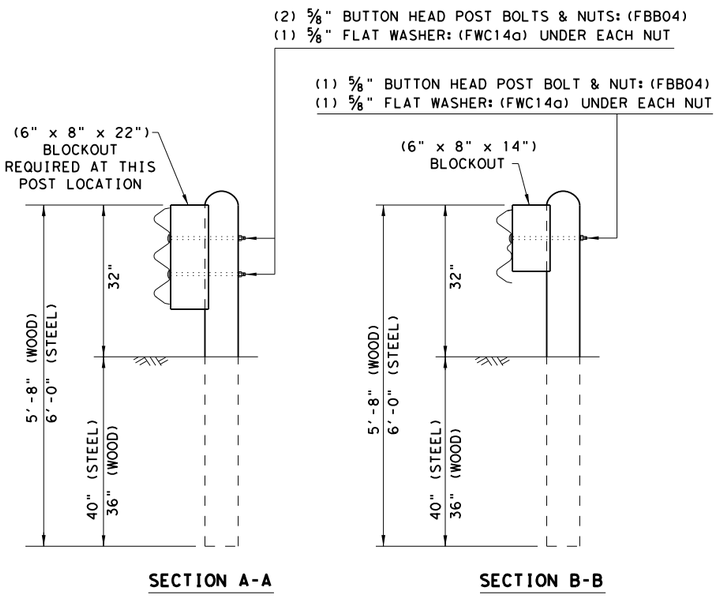
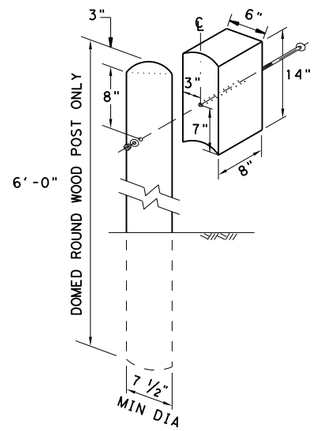
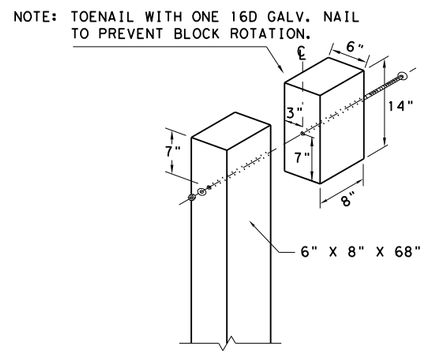
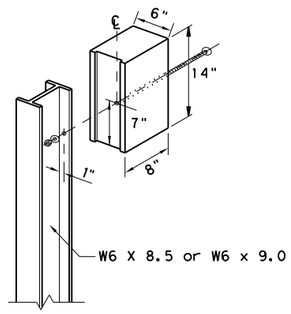


PLATE WASHER INSTRUCTIONS

BRIDGE APPROACH - UPSTREAM: THE SHORT RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.







NOTE: * "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

LOW-SPEED TRANSITION

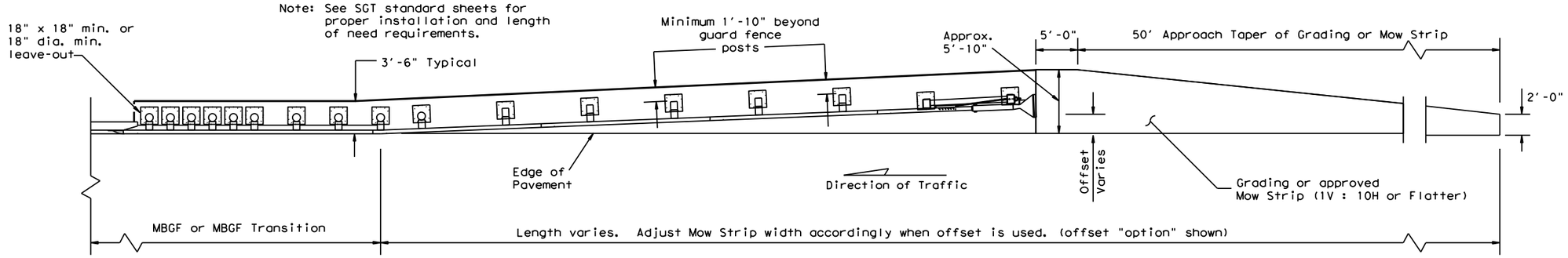
Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-2 MASH COMPLIANT

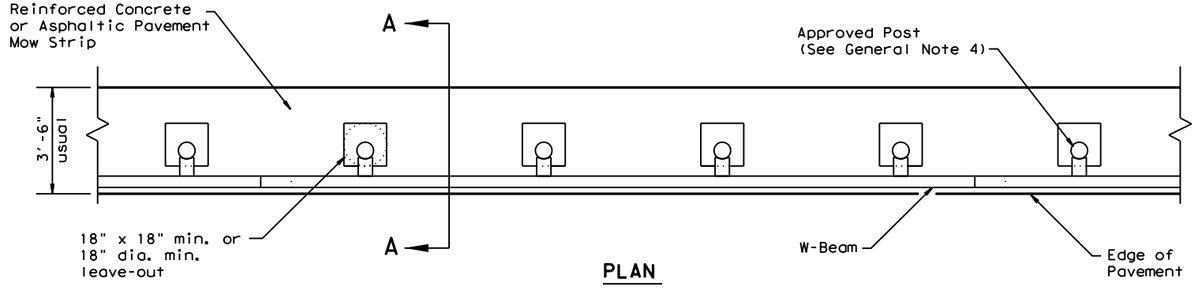
GF(31)TR TL2-19

FILE: gf31tr tl219.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		51

DATE: 5/11/2021
FILE: c:\txdot\pw_online\txdot3\mark.cincar\d0353664\GF(31)MS-19.dgn

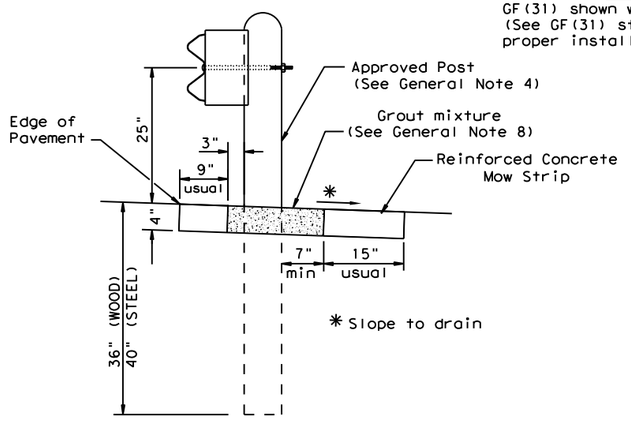


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



PLAN

GF(31) shown with Mow Strip
(See GF(31) standard sheet for proper installation)

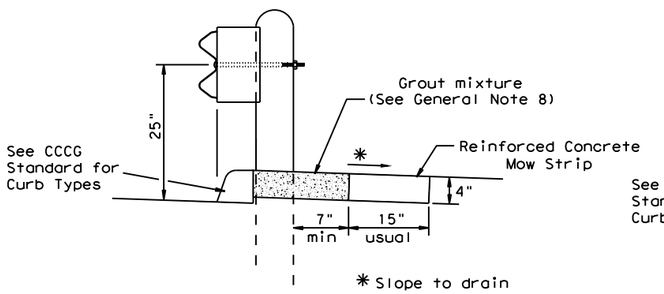


SECTION A-A

Typical

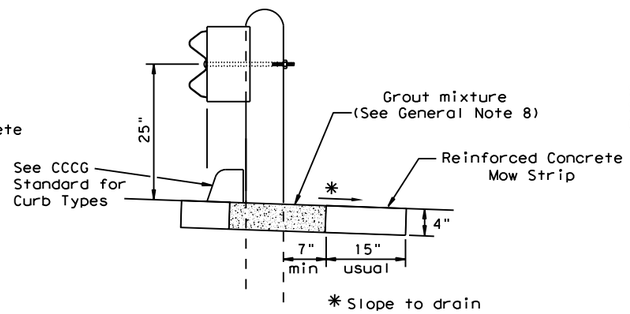
MOW STRIP DETAIL

Reinforced Concrete Mow Strip
with 18" x 18" Square or
18" Dia. minimum leave-out.



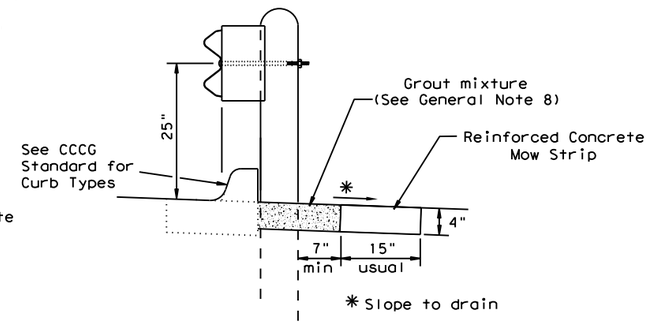
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		52

DATE: 5/11/2021
FILE: c:\txdot\pw_online\txdot3\mark.cincar\d0353664\SGT(10S)(31)-16.dgn

NOTE: STEEL I-BEAM POST W6 X 8.5 (6'-0") PN: 533G
STANDARD WOOD BLOCKOUTS (6"X8"X14") PN: 4076B
AT (POSTS 2 THRU 8)

⅝" X 10" HGR BOLT PN: 3500G
⅝" HGR NUT PN: 3340G

LINE AT THE BACK OF POST #2 THRU #8

FROM THE CENTERLINE OF POST(1) & POST(0)

ANCHOR PADDLE PN: 15204A

ANGLE STRUT PN: 15202G

16"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(1) POST(0)

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

BEGIN LENGTH OF NEED

MASH TEST LEVEL 3 (TL-3) LENGTH OF SoftStop TERMINAL (50'-9 ½")

PLAN VIEW

TRAFFIC FLOW

50'-9 ½" STANDARD INSTALLATION LENGTH (MASH TL-3 SoftStop)

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼" 3'-1 ½" 6'-3" 6'-3"

ANCHOR RAIL WITH SLOTS - (THREADED THRU HEAD)
SEE SoftStop MANUAL FOR COMPLETE DETAILS

MIDDLE SLOT CUTOUT (1) 1 ¾" X 6'-10 ¼"

OUTSIDE SLOTS CUTOUT (2)1½" X 6'-9 ⅝"

SoftStop FACE SEE GN(3) & NOTE:B

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

25'-0" DOWNSTREAM W-BEAM GUARDRAIL PN: 61G

SoftStop ANCHOR RAIL (12GA) PN: 15215G

3'-1 ½"(+/-) 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 5'-8" 4'-7"

SEE NOTE:C

ANCHOR PADDLE PN: 15204A

END OF ANCHOR RAIL PN: 15215G

SEE NOTE: A

POST 32" HEIGHT

31" RAIL HEIGHT

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

31" RAIL HEIGHT

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

13/16" DIA. YIELDING HOLES

13/16" DIA. YIELDING HOLES

SEE DETAIL 3

6'-1⅜"

(8) ⅝"x 1-¼" GR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST 40" DEPTH (TYP 1-8)

(8) ⅝"x 1-¼" HGR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(2) 6'-0" (SYTP) PN: 15000G POST(1) 4'-9 ½" SYTP PN: 15203G POST(0) 6'-5 ⅜" PN: 15205A

B B A A

ELEVATION VIEW

HARDWARE FOR POST(2) THRU POST(8)
(1) ⅝"x 10" HGR BOLT PN: 3500G
(1) ⅝" HGR HEX NUT PN: 3340G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

4" X 7 ½" X 14" BLOCKOUT COMPOSITE PN: 6777B

6" X 8" X 14" BLOCKOUT WOOD PN: 4076B

NOTE: DO NOT BOLT ANCHOR RAIL TO POST(2)

8" 6" 14"

⅝" HGR NUT PN: 3340G

⅝" X 10" HGR POST BOLT PN: 3500G

13/16" DIAMETER YIELDING HOLES LOCATED IN FLANGES

FINISHED GRADE

(HOLES APROXIMATELY CENTERED AT FINISHED GRADE)

ISOMETRIC VIEW POST(1 & 2)

W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

(1) ⅝" x 1 ¾" HEX HD BOLT PN 3391G

ANGLE STRUT PN: 15202G

(2) ⅝" WASHERS PN 4372G

(1) ⅝" HGR HEX NUT PN 3340G

DETAIL 1

SHOWN AT POST(1) NEAR GROUND

(1) ⅝" HEX NUT

(1) ⅝" x 1-½" HEX HD BOLT-GR-5 PN: 105286

(2) ⅝" ROUND WASHERS PN: 3240G

DETAIL 2

SHOWN AT POST(1)

ANCHOR KEEPER PLATE (24 GA) PN: 15207G

ANCHOR PLATE WASHER ½" THICK PN: 15206G

1" ROUND WASHER F463 PN: 4902G

(2) ⅝" x 2 ½" HEX HD BOLT GR-5 PN: 105285G

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR.DH PN: 3245G

1" NUT PN: 3908G SHALL BE SECURELY TIGHTENED AFTER FINAL ASSEMBLY, BUT NOT DEFORMING THE KEEPER PLATE.

W-BEAM FLATTENED (4 PLIES)

ANGLE STRUT PN: 15202G

SEE NOTE: A

(2) ¾" x 2 ½" HEX BOLT (TYP) PN: 3717G

(4) ¾" FLAT WASHER (TYP) PN: 3701G

(2) ¾" HEX NUT (TYP) PN: 3704G

6'-1 ⅜" POST DEPTH

(2) ANCHOR POST ANGLE PN: 15201G

DETAIL 3 AT POST(0)

6'-5 ⅜" (W6 X 15) I-BEAM POST PN: 15205A

TRAFFIC FLOW

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

LINE POST (3, 4, 5, 6, 7 & 8)

FINISHED GRADE

SECTION VIEW B-B

6'-0" (W6 X 8.5) I-BEAM POST PN: 533G

6" X 8" X 14" BLOCKOUT WOOD

W-BEAM RAIL 25'-0"

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

POST(2)

FINISHED GRADE

SECTION VIEW A-A

6'-0" (W6 X 8.5) (SYTP) I-BEAM POST PN: 15000G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

POST 17"- ½" HEIGHT

4'-9 ½"

13/16" DIA. YIELDING HOLES

40"

POST(1)

FRONT VIEW POST(1)

4'-9 ½" (W6 X 8.5) (SYTP) I-BEAM POST PN: 15203G

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

2'-0"

STANDARD MBGF

EDGE OF PAVEMENT

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

2'-0" MAX. RAIL OFFSET

APPROACH GRADING (1V:10H OR FLATTER) SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374. 2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN: 620237B
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN: 61G ANCHOR RAIL 25'-0" PN: 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅜")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR.DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE:B

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SoftStop END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP		
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0606	01	007	PARK ROAD		
	DIST	COUNTY		SHEET NO.		
	TYL	SMITH		53		

DATE: 5/11/2021
FILE: c:\txdot\pw_online\txdot3\mark.cincar\d0353664\SGT(11S)31-18.dgn

(SEE GN NOTE 15)
STANDARD 31" MBGF

ITEM (6)
INNER SIDE SLIDER
(ISS) PANEL FOR RAIL 3

FIELD-SIDE
(RAIL 3)

NOTE:
RECESSED HEX NUTS FACING
TRAFFIC-SIDE **SEE DETAIL (C)**

REFERENCE LINE USED TO INSTALL
LINE POST(9) THRU POST(2)

POST 1 OFFSET DISTANCE MEASURED
7-⅝" FROM REFERENCE LINE

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

NO BLOCKOUT
AT (POST 1)

RAIL 4 RAIL 3 RAIL 2 RAIL 1

CABLES

ITEM (5)
TRAFFIC SIDE SLIDER
(TSS) PANEL FOR RAIL 2

NOTES:
1. ITEM (12) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).

PLAN VIEW

NOTE: SECURE THE (TSS) PANEL TO OUTSIDE OF RAIL 2 WITH THE PANEL ARROWS POINTING TOWARDS THE HEAD.

INSTALL GUARD FENCE RECESSED
HEX NUTS ON TRAFFIC-SIDE

MBGF
RAIL 2

MBGF
RAIL 1

DETAIL (C)

TRAFFIC FLOW

END PAYMENT (SGT) BY EACH

DO NOT BOLT
RAIL TO POST 6

BEGIN LENGTH OF NEED

INSTALLATION LENGTH 55'- ½"

49'-8 9/16"

ITEM (25)
MAX-TENSION HEAD
SEE DETAIL (A)

6'-3" 6'-3" 6'-3" 6'-¾" 6'-3" 6'-3" 6'-3" 37½" 5'-3 11/16"

RAIL
HEIGHT
31"

ARROWS

DETAIL (D)

RAIL
HEIGHT
31"

HEAD
HEIGHT

DETAIL (B)

ITEM (13) RAIL 4 ITEM (13) RAIL 3 ITEM (13) RAIL 2 ITEM (13) RAIL 1

FINISHED
GRADE

CABLES

FINISHED
GRADE

ITEM (10)
CABLE
ASSEMBLY

ITEM (2)
GROUNDSTRUT

32-¼"

68-⅛"

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2

POST 1
ITEM (4)
I-BEAM
W6 X 9

NO BLOCKOUT
AT (POST 1)

SOIL
ANCHOR POST
ITEM (1)

(8) X-LITE LINE POST - ITEM (11)

ELEVATION VIEW

A

A

TSS PANEL
GALVANIZED
ITEM (5)

RSS PLATE
GALVANIZED
ITEM (8)

INSTALL THE TSS AND RSS
WITH THE ARROWS POINTING
TOWARDS THE MAX-HEAD

TSS PANEL AND RSS PLATE
DETAIL (D)

HEAD
HEIGHT
32-¼"

TOP OF POST

31-⅞"

FINISHED
GRADE

40-⅛"

68-⅛"
ANCHOR POST
DEPTH

ITEM (1)
ANCHOR

ITEM (11)
LINE POSTS
2 THRU 9
(NOTE: ITEM (4) POST 1 (NOT SHOWN),
TO BE INSTALLED AT SAME DEPTH
AS LINE POSTS.)

SOIL ANCHOR, POST 1
& LINE POST 2 THRU 9

SECTION VIEW A-A

NOTE:
USE THE MASH APPROVED
X-TENSION CABLE ASSEMBLY.

7 5/16"

2 1/8"

UPPER CABLE
(BACK SIDE)

LOWER CABLE
(TRAFFIC SIDE)

DETAIL (B)

CABLE
FRICTION PLATE
HEAD UNIT
ITEM (9)

NOTE:
INSTALL ⅝" RECESSED HEX
NUTS ON TRAFFIC SIDE.

ITEM (24)
ITEM (21)

ITEM (20)
8X

ITEM (17)
8X

ITEM (23)
6X
3 SCREWS
EACH SIDE

(RAIL 1)

ITEM (22)
BRACKET
SHIPPED FLAT

ITEM (3)

ITEM (16)
4X

* ITEM (25)
HIGH INTENSITY
REFLECTIVE SHEETING

NOTE: DELINEATION MARKER IN
ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD
TO GUARD FENCE (RAIL1)

DETAIL (A)

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

STANDARD
MBGF

2'-0"

EDGE OF PAVEMENT

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

2'-0" MAX.
RAIL OFFSET

APPROACH GRADING
(1V:10H OR FLATTER)
SEE PRODUCT ASSEMBLY MANUAL
FOR ADDITIONAL GUIDANCE.

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT
USED FOR ALL TANGENT TYPE END TREATMENTS.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	⅝" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	¼" X ¾" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
* 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
** 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
** 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25'GUARD FENCE PANELS

Texas Department of Transportation

Design Division Standard

MAX-TENSION END TERMINAL
MASH - TL-3
SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		54

DATE: 5/11/2021
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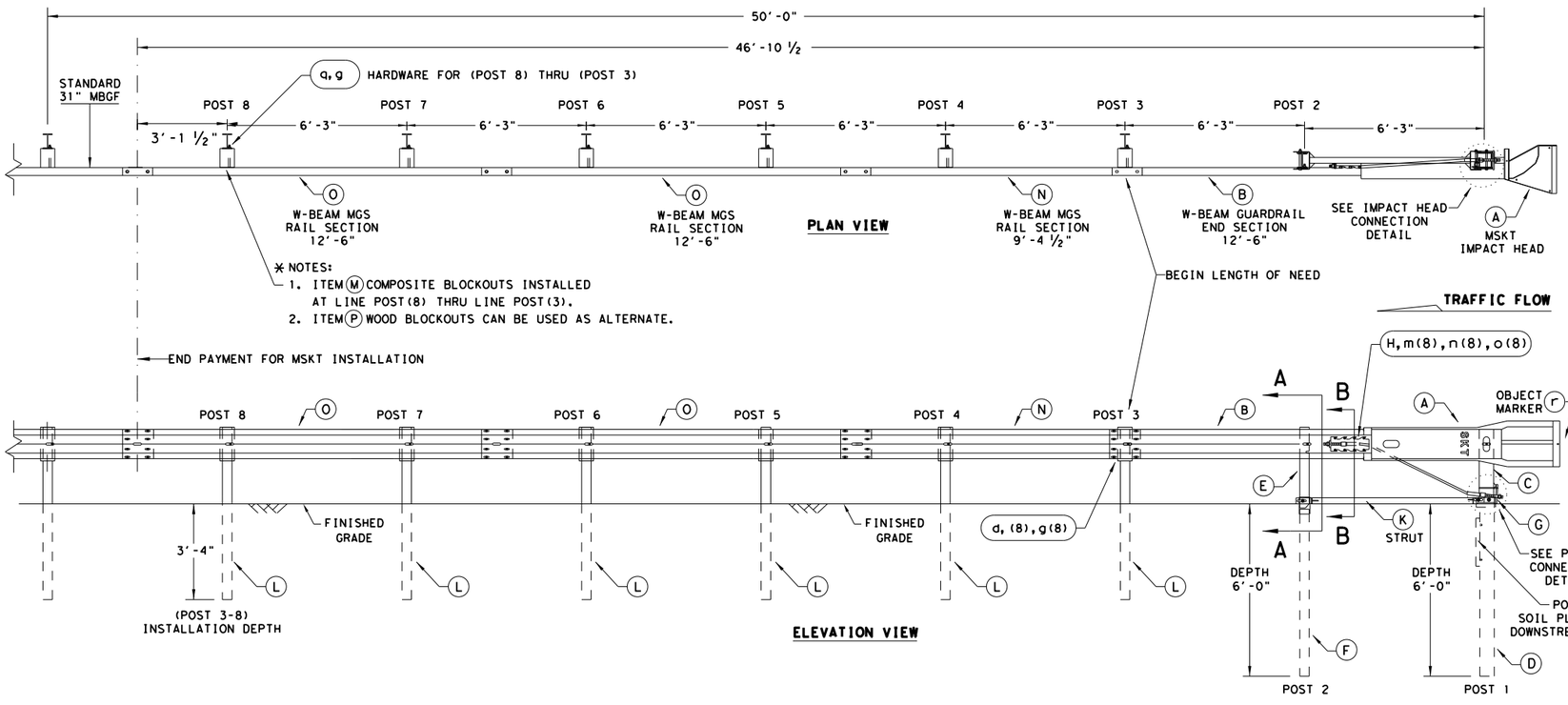


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

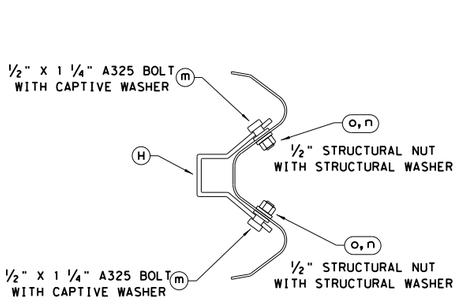
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

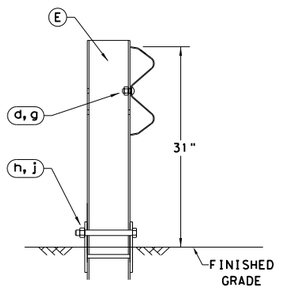
ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X ⅛" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 ½")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x ⅜" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: *

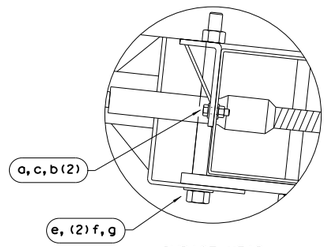
ALTERNATIVE ITEMS NOT SHOWN. **
* ITEM(P) 8" WOOD-BLOCKOUT
** ITEM(Q) 25'GUARD FENCE PANEL



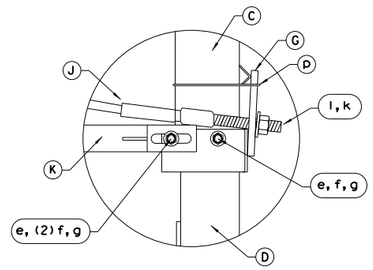
SECTION B-B
ANCHOR BRACKET



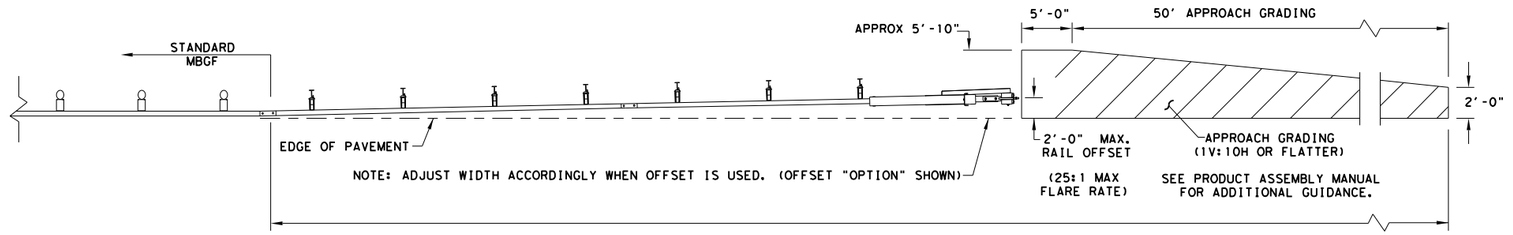
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

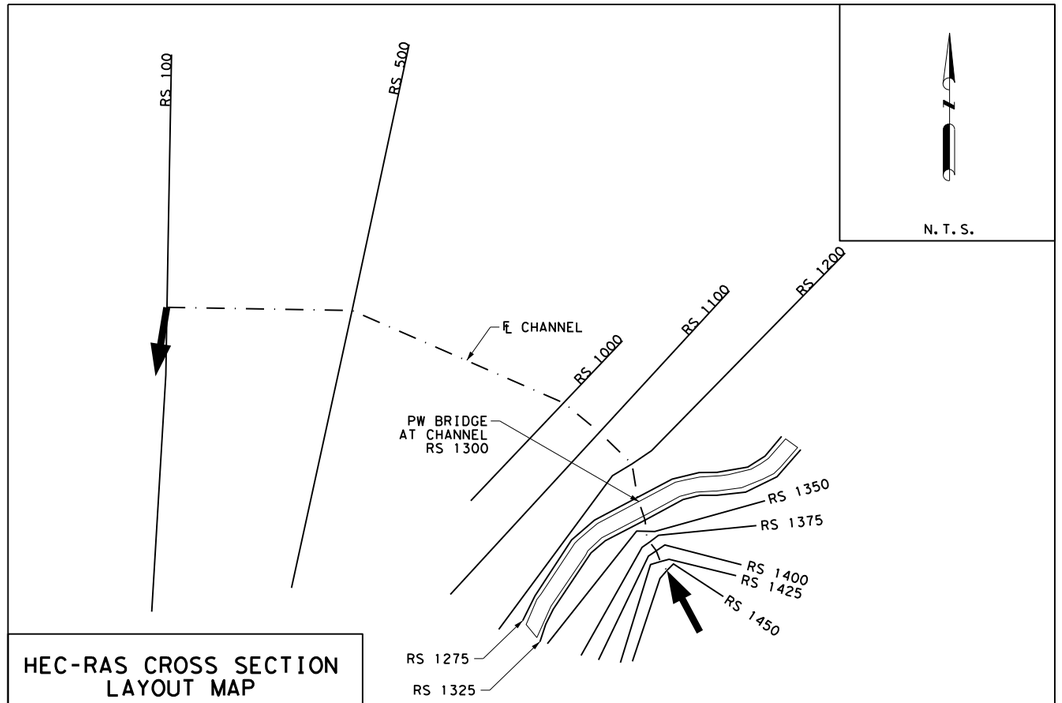
NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0606	01	007	PARK ROAD	
	DIST	COUNTY		SHEET NO.	
	TYL	SMITH		55	



HEC-RAS CROSS SECTION LAYOUT MAP

HEC-RAS RIVER STA	DOWNSTREAM REACH LENGTH (FT)	DESIGN FREQUENCY 25-YR						CHECK FREQUENCY 100-YR					
		FLOWS (CFS)	COMPUTED WATER SURFACE ELEVATIONS (FT)			VELOCITIES (FPS)		FLOWS (CFS)	COMPUTED WATER SURFACE ELEVATIONS (FT)			VELOCITIES (FPS)	
			EXIST	PROP	DIFFERENCE	EXIST	PROP		EXIST	PROP	DIFFERENCE	EXIST	PROP
100	0	10.42	477.41	477.41	0.00	6.31	6.31	15.21	477.81	477.81	0.00	6.73	6.73
500	400	10.42	482.48	482.48	0.00	0.32	0.32	15.21	483.08	483.08	0.00	0.39	0.39
1000	500	10.42	504.60	504.60	0.00	3.13	3.13	15.21	504.70	504.70	0.00	3.39	3.39
1100	100	10.42	509.21	509.21	0.00	2.86	2.86	15.21	509.29	509.29	0.00	3.17	3.17
1200	100	10.42	512.44	512.44	0.00	3.15	3.15	15.21	512.54	512.54	0.00	3.65	3.64
1275	75	10.42	521.68	521.68	0.00	4.11	4.11	15.21	521.84	521.84	0.00	4.47	4.47
PW BRIDGE (HEC-RAS STA 1300)													
1325	50	10.42	529.33	529.70	-0.37	4.24	2.33	15.21	529.50	529.91	-0.41	4.55	2.60
1350	25	10.42	533.53	533.53	0.00	4.20	4.20	15.21	533.71	533.71	0.00	4.47	4.47
1375	25	10.42	538.04	538.04	0.00	4.24	4.24	15.21	538.22	538.22	0.00	4.57	4.57
1400	25	10.42	542.45	542.45	0.00	3.72	3.72	15.21	542.60	542.60	0.00	3.92	3.92
1425	25	10.42	547.86	547.86	0.00	3.63	3.63	15.21	547.99	547.99	0.00	3.93	3.93
1450	25	10.42	550.94	550.94	0.00	2.62	2.62	15.21	551.00	551.00	0.00	2.92	2.92

SCOUR ANALYSIS RESULTS (1.00% AEP)			
INPUT DATA	LEFT	CHANNEL	RIGHT
AVERAGE DEPTH (FT)		0.61	
APPROACH VELOCITY (FPS)		4.47	
BR AVERAGE DEPTH (FT)		0.63	
BR OPENING FLOW (CFS)		15.21	
BR TOP WD (FT)		5.41	
GRAIN SIZE D_{50} (MM)		0.10	
APPROACH FLOW (CFS)		15.21	
APPROACH TOP WD (FT)		5.58	
K1 COEFFICIENT		0.690	
RESULTS	LEFT	CHANNEL	RIGHT
SCOUR DEPTH Ys (FT)		0.00	
CRITICAL VELOCITY (FPS)		0.71	
EQUATION		LIVE	

SCOUR ANALYSIS RESULTS

NO CONTRACTION SCOUR COMPUTED IN THE MAIN CHANNEL.

ABUTMENT SCOUR RESULTS ARE NOT REPORTED AS RECOMMENDED IN THE TXDOT GEOTECHNICAL MANUAL.

THE ABUTMENTS OF THE PROPOSED BRIDGE WILL BE PROTECTED WITH ROCK RIPRAP TO REDUCE THE RISK OF SCOUR.

HYDRAULIC METHOD

WATER SURFACE ELEVATIONS COMPUTED USING A HEC-RAS (v.5.0.7) MODEL CREATED FOR PR 16 CHANNEL, FILE: "ProposedPWBridge.PRJ". THE PROJECT HEC-RAS MODEL WAS DEVELOPED USING SURVEYED CROSS SECTIONS, USGS TOPOGRAPHY, AERIALS, FIELD INVESTIGATION, AND PROPOSED BRIDGE LAYOUT.

EXISTING CONDITION WATER SURFACE ELEVATIONS COMPUTED FROM HEC-RAS MODEL PLAN "EXISTING CONDITIONS" NAMED "ExistingConditions.P01".

PROPOSED CONDITION WATER SURFACE ELEVATIONS COMPUTED FROM HEC-RAS MODEL PLAN "PROPOSED CONDITIONS" NAMED "ProposedPWBridge.P02".

HYDROLOGIC METHOD

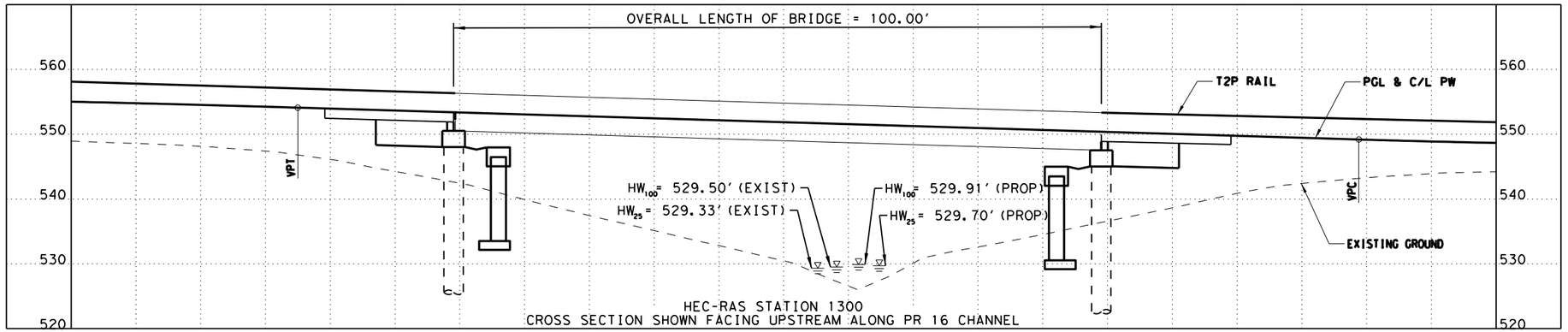
FLOWS WERE COMPUTED USING RATIONAL METHOD AND WERE CHECKED USING THE WINTR-55 SMALL WATERSHED HYDROLOGY PROGRAM.
SEE DRAINAGE AREA MAP SHEET FOR HYDROLOGIC DATA.

SCOUR ANALYSIS METHOD

BRIDGE SCOUR ANALYSIS WAS PERFORMED USING THE METHODOLOGIES AND PROCEDURES OUTLINED IN THE TXDOT HYDRAULIC DESIGN MANUAL, TXDOT GEOTECHNICAL MANUAL, AND FHWA HEC-18.

NOTES:

1. PROPOSED BRIDGE IS LOCATED AT HEC-RAS STA 1300. UPSTREAM CROSS SECTION IS AT HEC-RAS STA 1325 & DOWNSTREAM CROSS SECTION IS AT HEC-RAS STA 1275.
2. PROPOSED BRIDGE WIDTH IS 32'-0".
3. PROPOSED BRIDGE LENGTH IS 100 FEET.
4. PROPOSED BRIDGE OPENING IS 1428.70 SF NO EXISTING BRIDGE PRESENT
5. CHANNEL IS IDENTIFIED ON FEMA FIRM PANEL 0250C, DATED SEPTEMBER 26, 2008. PW RD CROSSES A MINIMAL FLOOD HAZARD AREA WITH A ZONE "X" DESIGNATION. COORDINATION WITH THE SMITH COUNTY FLOODPLAIN ADMINISTRATOR CONDUCTED ON APRIL 14, 2021.



STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

05/17/2021

PARK ROAD 16
HYDRAULIC DATA SHEET

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		59

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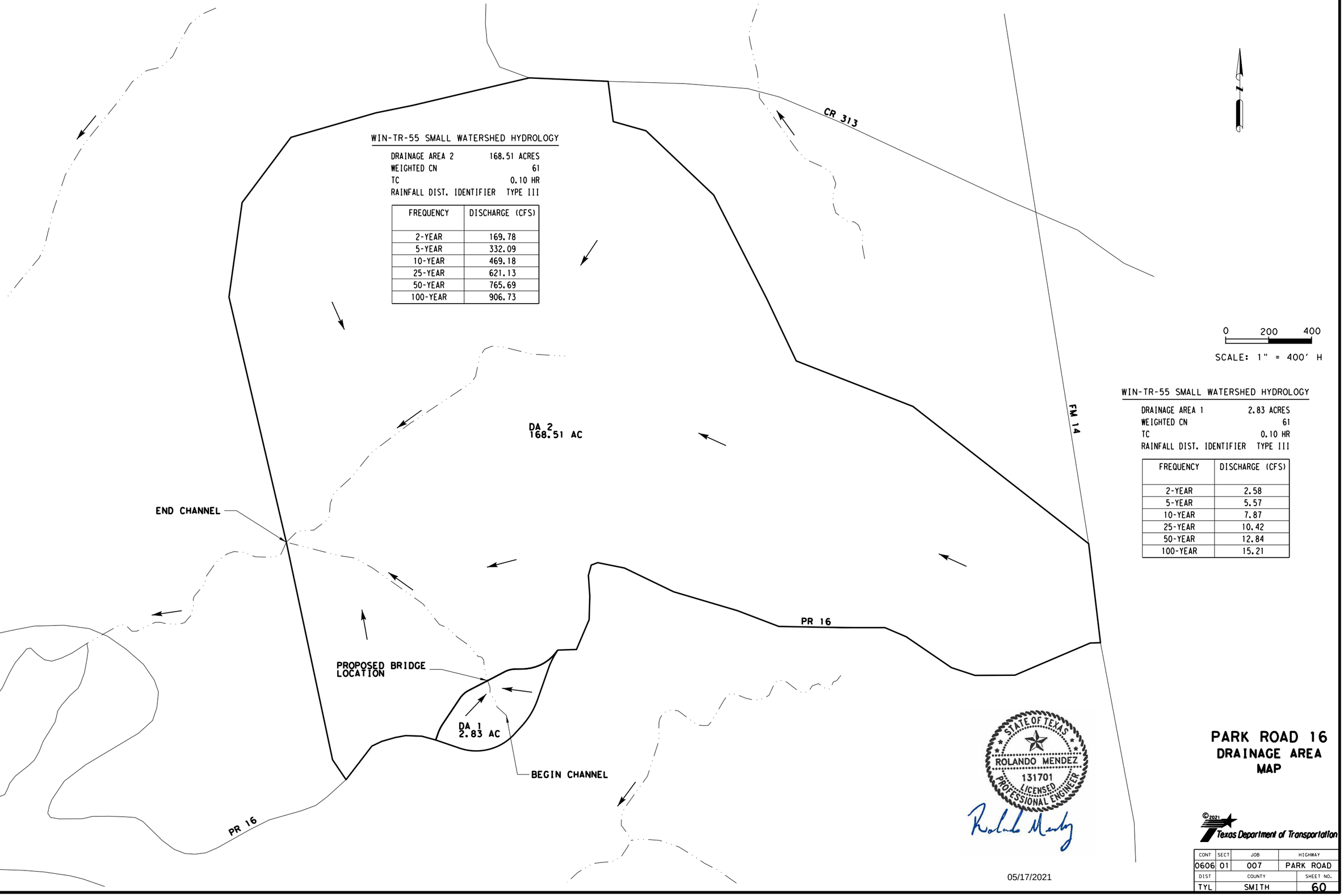

WIN-TR-55 SMALL WATERSHED HYDROLOGY

DRAINAGE AREA 2	168.51 ACRES
WEIGHTED CN	61
TC	0.10 HR
RAINFALL DIST. IDENTIFIER	TYPE III

FREQUENCY	DISCHARGE (CFS)
2-YEAR	169.78
5-YEAR	332.09
10-YEAR	469.18
25-YEAR	621.13
50-YEAR	765.69
100-YEAR	906.73

WIN-TR-55 SMALL WATERSHED HYDROLOGY

DRAINAGE AREA 1	2.83 ACRES
WEIGHTED CN	61
TC	0.10 HR
RAINFALL DIST. IDENTIFIER	TYPE III

FREQUENCY	DISCHARGE (CFS)
2-YEAR	2.58
5-YEAR	5.57
10-YEAR	7.87
25-YEAR	10.42
50-YEAR	12.84
100-YEAR	15.21

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

05/17/2021

PARK ROAD 16
DRAINAGE AREA MAP

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		60

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LENGTH	= 54.14	LENGTH	= 13.59	LENGTH	= 15.23	LENGTH	= 11.59
RADIUS	= 33.13	RADIUS	= 17.00	RADIUS	= 23.00	RADIUS	= 12.00
PC STATION	= 1+00.00	PC STATION	= 2+05.67	PC STATION	= 4+25.24	PC STATION	= 6+17.22
PT STATION	= 1+54.14	PT STATION	= 2+19.27	PT STATION	= 4+40.47	PT STATION	= 6+28.81
PI STATION	= 1+80.52	PI STATION	= 2+48.50	PI STATION	= 4+58.10	PI STATION	= 6+41.81
LENGTH	= 50.54	LENGTH	= 22.68	LENGTH	= 8.81	LENGTH	= 8.09
RADIUS	= 213.00	RADIUS	= 23.00	RADIUS	= 17.00	RADIUS	= 8.00
PC STATION	= 1+55.14	PC STATION	= 2+36.14	PC STATION	= 4+53.59	PC STATION	= 6+37.38
PT STATION	= 2+05.67	PT STATION	= 2+58.82	PT STATION	= 4+62.40	PT STATION	= 6+45.47
		PI STATION	= 3+45.51	PI STATION	= 4+97.89		
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		RADIUS	= 241.00	RADIUS	= 227.00		
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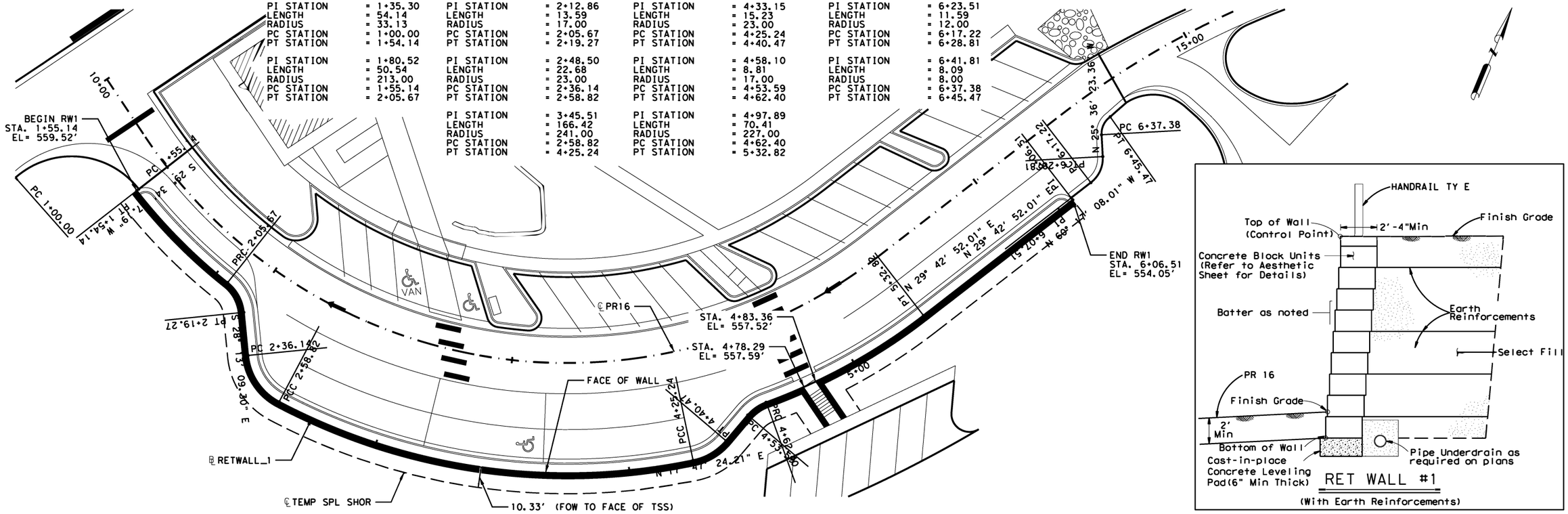
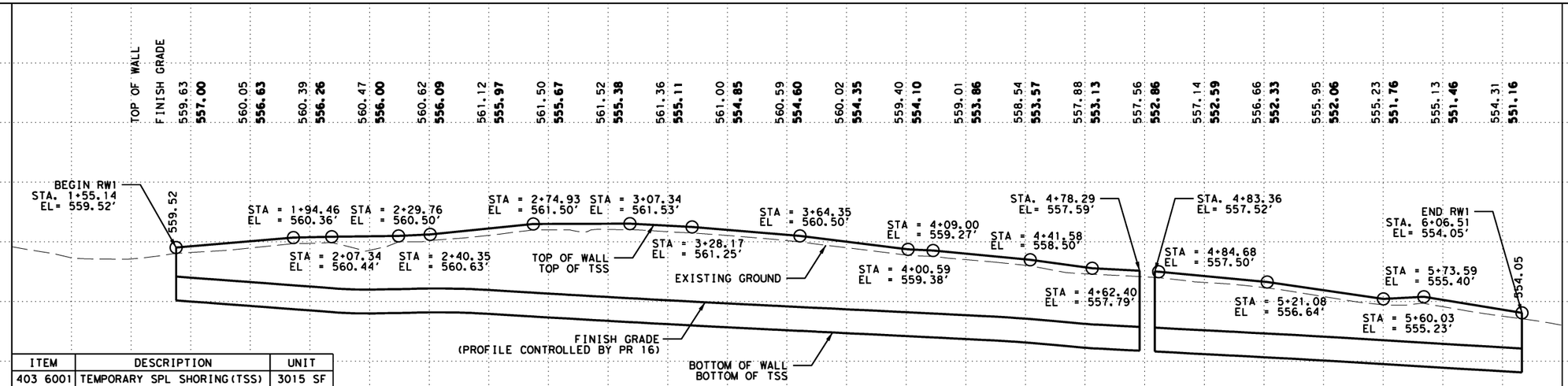
		PT STATION	= 4+25.24	PT STATION	= 5+32.82		



RET WALL #1

(With Earth Reinforcements)



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551.13	557.33	
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550.59	556.60	
550.33	556.17	
550.06	555.42	
549.76	554.73	
549.46	554.57	
549.16	553.78	

ITEM	DESCRIPTION	UNIT
403 6001	TEMPORARY SPL SHORING (TSS)	3015 SF
423 6004	RETAINING WALL (CONC BLOCK)	3015 SF
432 6002	RIPRAP (MOW STRIP) (5 IN)	24 CY
450 6051	RAIL (HANDRAIL) (TY E)	446 LF

NOTE: BOTTOM OF WALL SHALL BE EMBEDDED 2' BELOW FINAL SURFACE

0 20 40

SCALE: 1" = 40' H
1" = 10' V

STATE OF TEXAS
C. TAYLOR MANSFIELD
119144
LICENSED
PROFESSIONAL ENGINEER

05/17/2021

C. Taylor Mansfield

PR 16 RETAINING WALL #1 PLAN & PROFILE

Texas Department of Transportation

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		61

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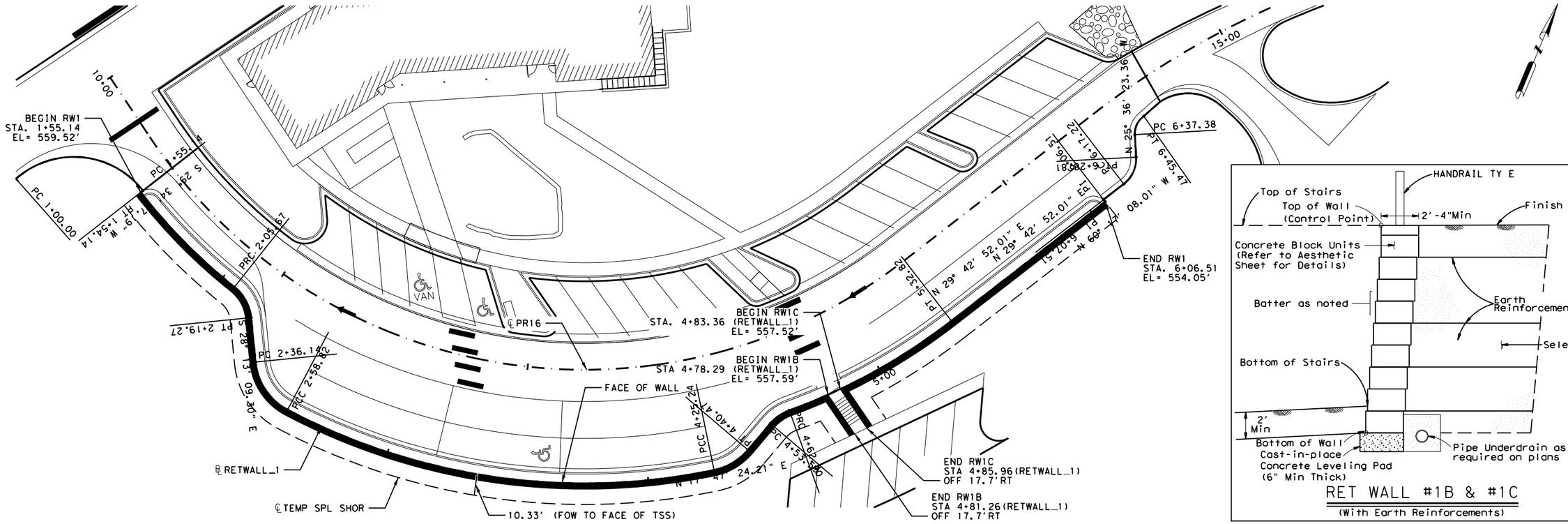
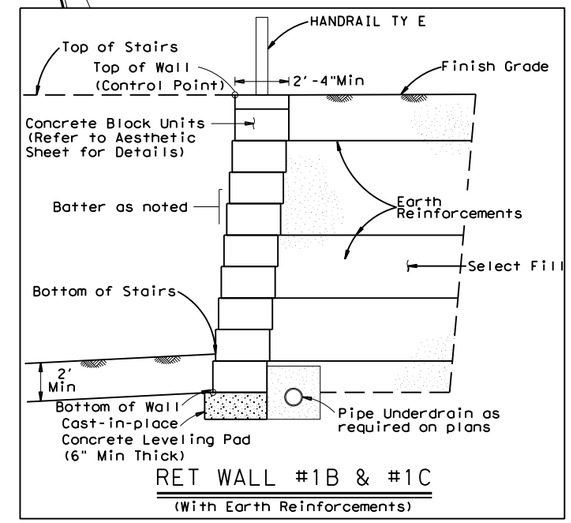
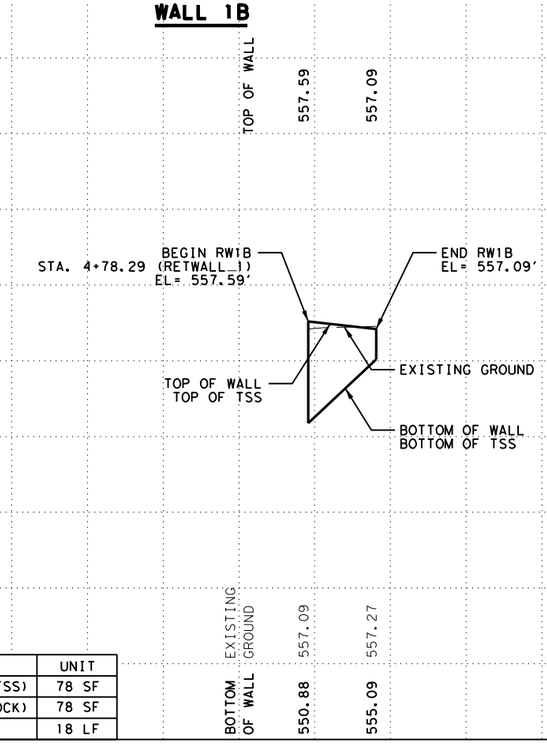




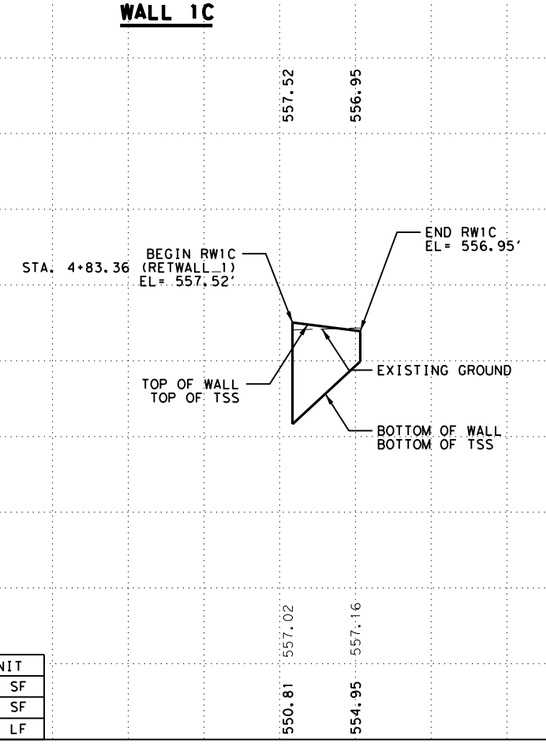
RET WALL #1B & #1C
(With Earth Reinforcements)

WALL 1B



ITEM	DESCRIPTION	UNIT
403 6001	TEMPORARY SPL SHORING(TSS)	78 SF
423 6004	RETAINING WALL(CONC BLOCK)	78 SF
450 6051	RAIL(HANDRAIL)(TY E)	18 LF

WALL 1C



ITEM	DESCRIPTION	UNIT
403 6001	TEMPORARY SPL SHORING(TSS)	78 SF
423 6004	RETAINING WALL(CONC BLOCK)	78 SF
450 6051	RAIL(HANDRAIL)(TY E)	18 LF

0 20 40

SCALE: 1" = 40' H
1" = 10' V

STATE OF TEXAS
C. TAYLOR MANSFIELD
119144
LICENSED
PROFESSIONAL ENGINEER

05/12/2021

C. Taylor Mansfield

PR 16 RETAINING WALL #1B & #1C PLAN & PROFILE

Texas Department of Transportation

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		62

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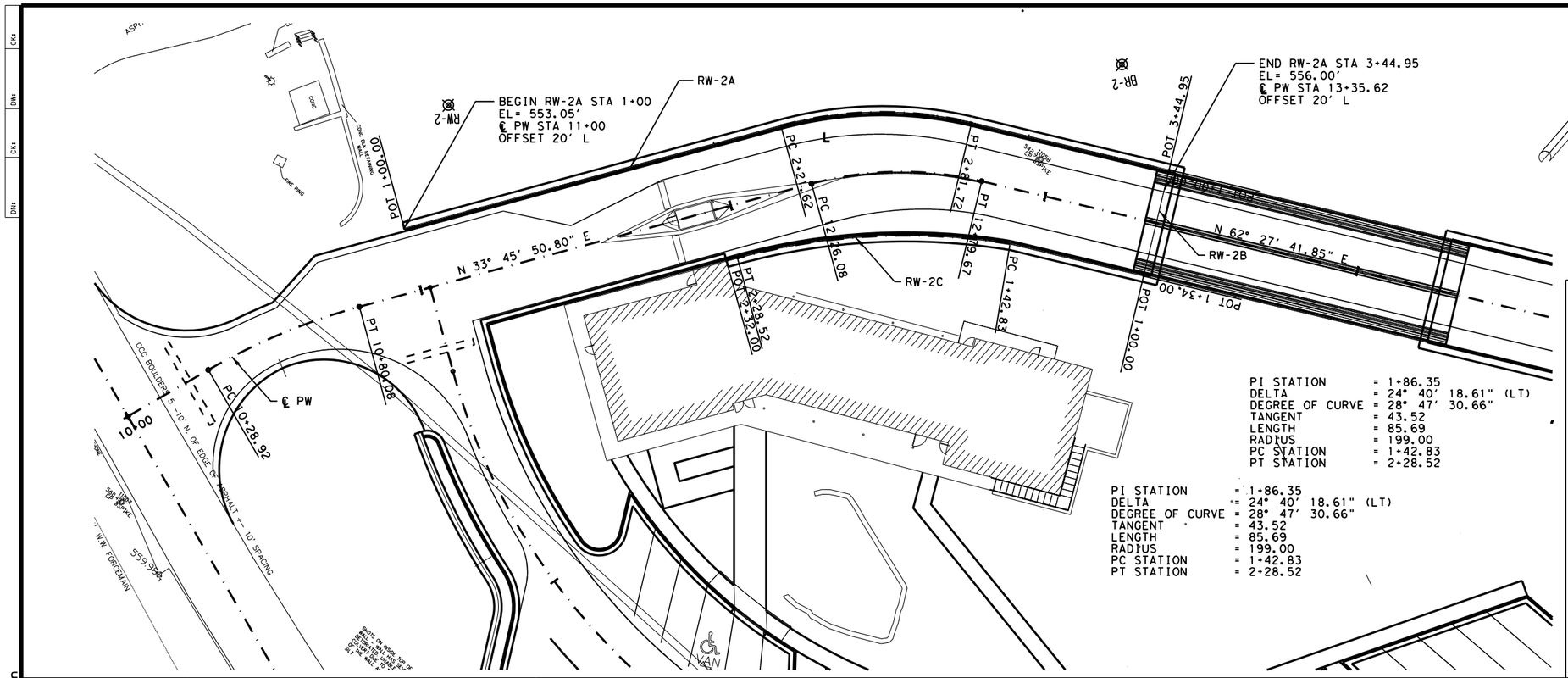
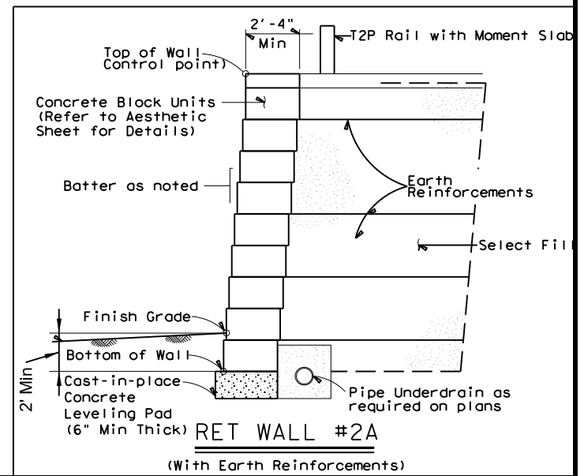


PLAN LEGEND

- ℄ ROAD
- RETAINING WALL
- B-2 SOIL PROFILE BORE HOLE



RET WALL #2A
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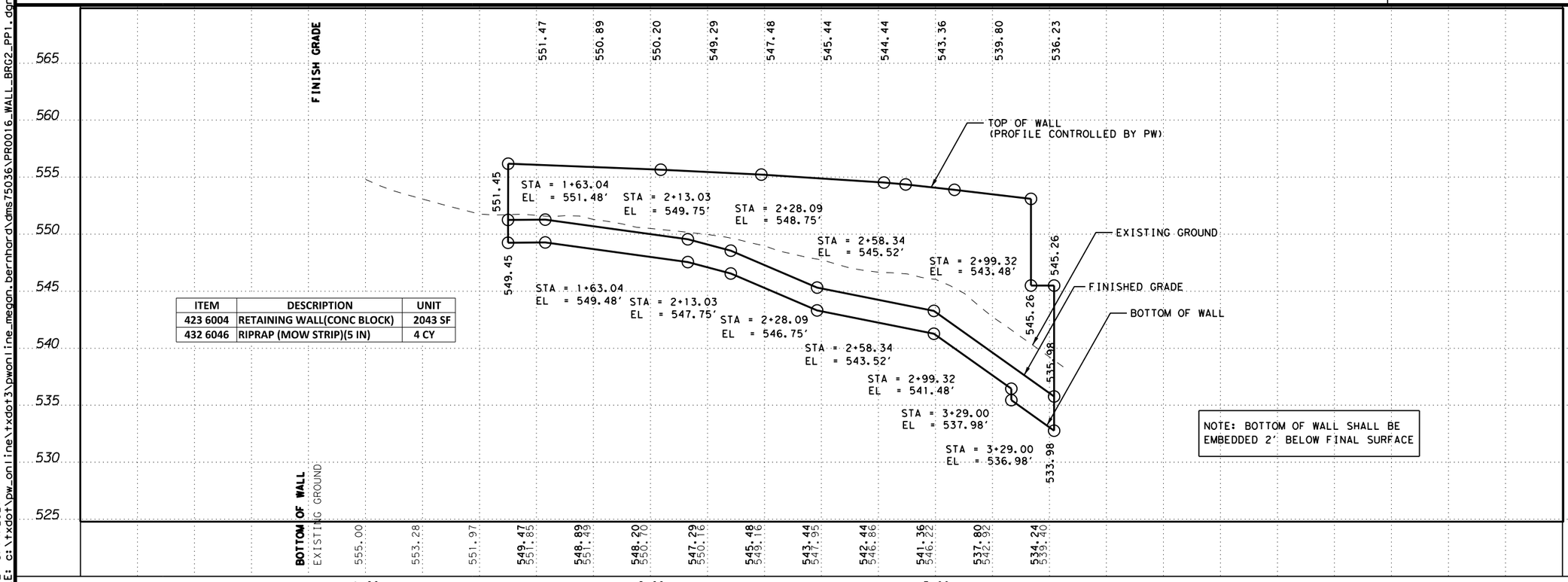

ITEM	DESCRIPTION	UNIT
423 6004	RETAINING WALL(CONC BLOCK)	2043 SF
432 6046	RIPRAP (MOW STRIP)(5 IN)	4 CY

0 20 40

SCALE: 1" = 40' H
1" = 10' V

STATE OF TEXAS
MEGAN LEIGH BERNHARD
139771
LICENSED PROFESSIONAL ENGINEER
5/12/2021

PR 16 RETAINING WALL #2A PLAN & PROFILE

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		63

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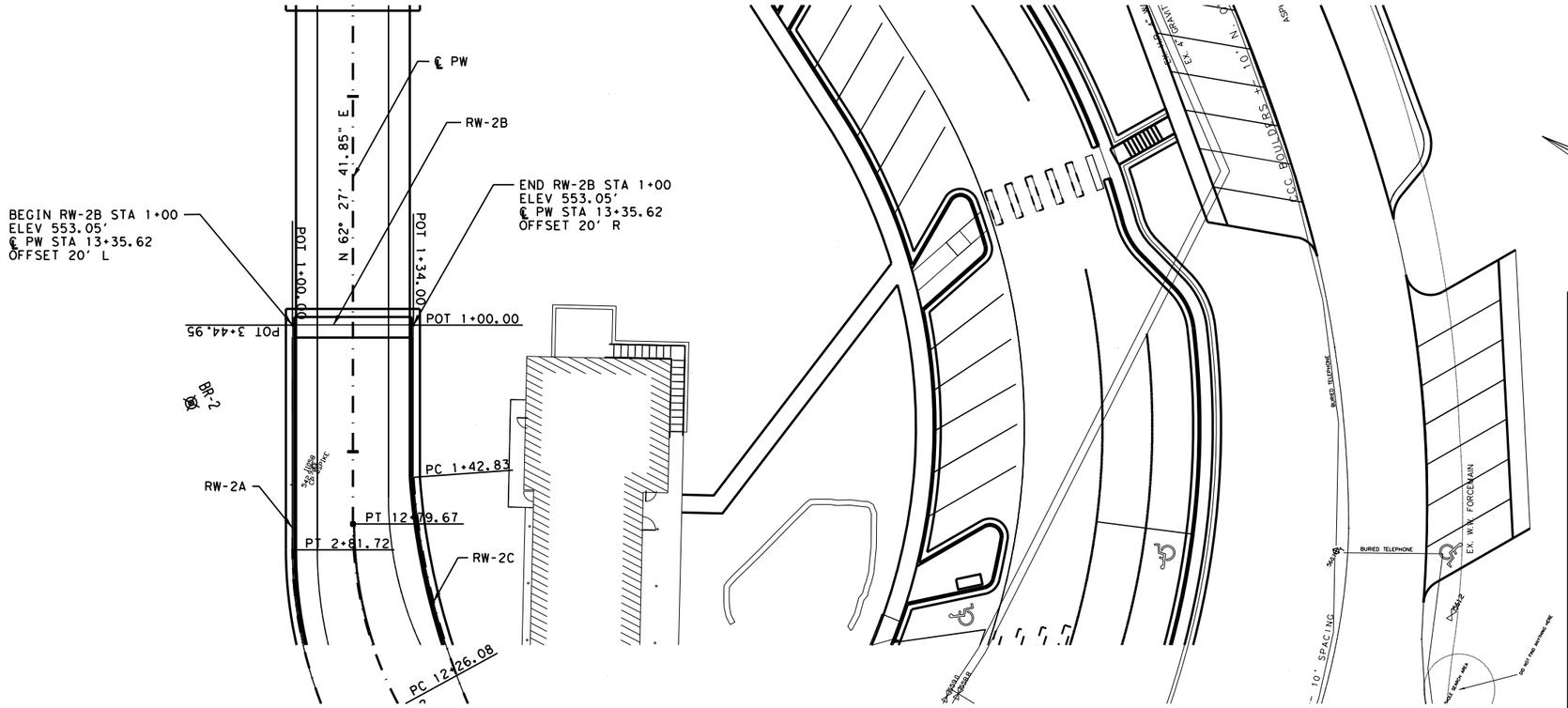
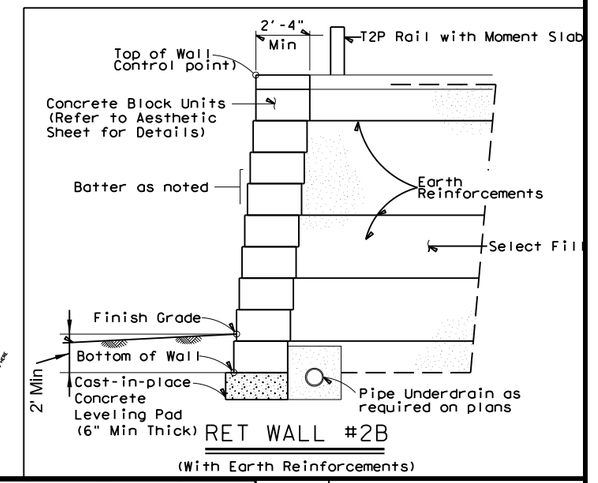


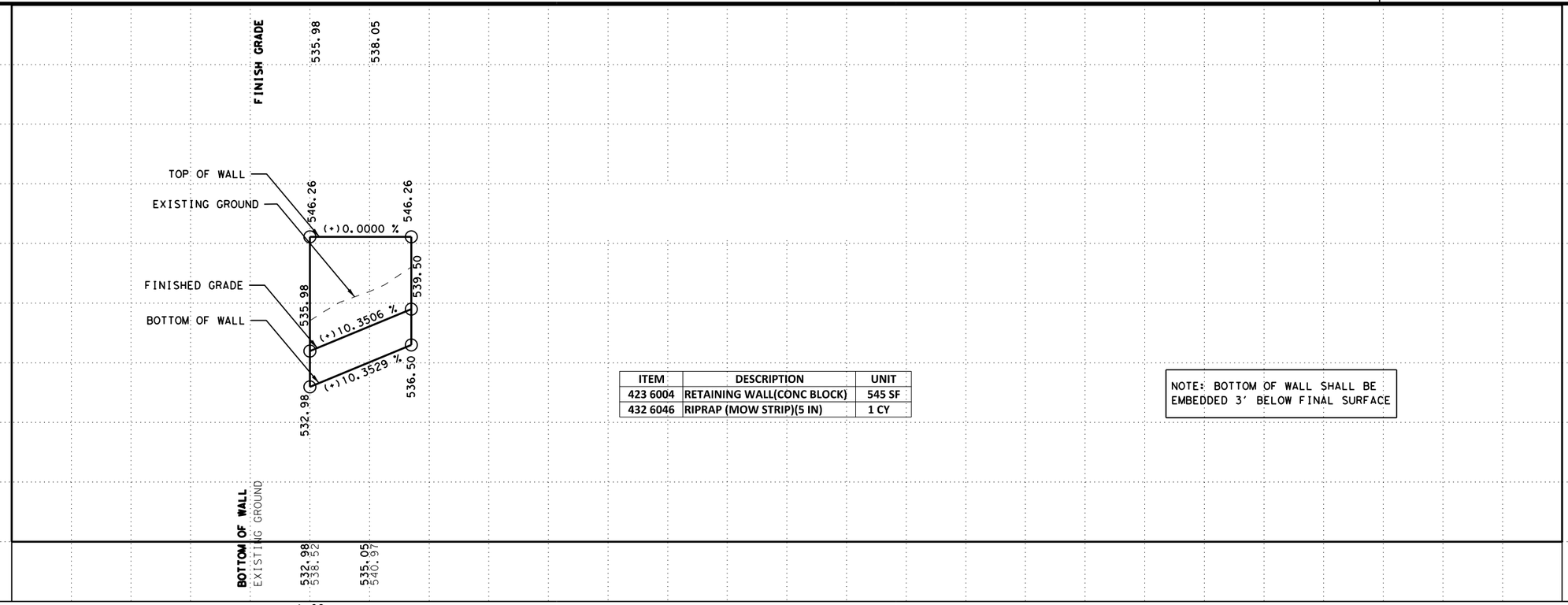
PLAN LEGEND

- ℄ ROAD
- B RETAINING WALL
- B-2 SOIL PROFILE BORE HOLE



RET WALL #2B

(With Earth Reinforcements)



ITEM	DESCRIPTION	UNIT
423 6004	RETAINING WALL(CONC BLOCK)	545 SF
432 6046	RIPRAP (MOW STRIP)(5 IN)	1 CY

NOTE: BOTTOM OF WALL SHALL BE EMBEDDED 3' BELOW FINAL SURFACE

0 20 40

SCALE: 1" = 40' H
1" = 10' V

STATE OF TEXAS
MEGAN LEIGH BERNHARD
139771
LICENSED PROFESSIONAL ENGINEER

5/12/2021

PR 16 RETAINING WALL #2B PLAN & PROFILE

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CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		64

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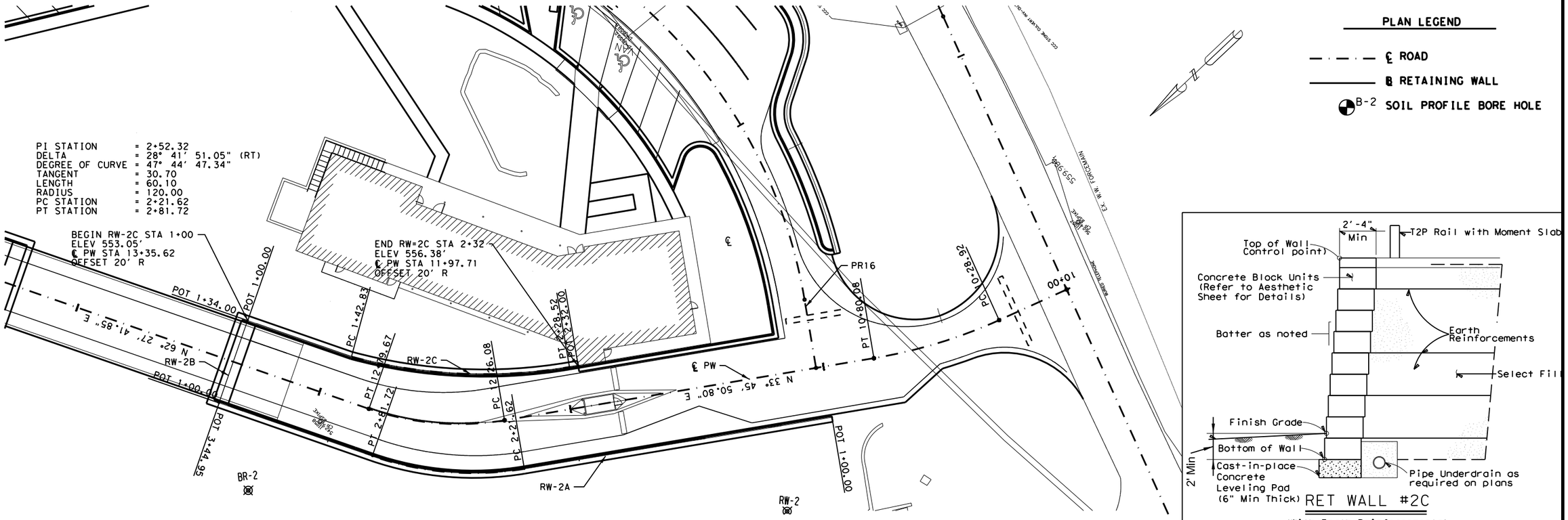

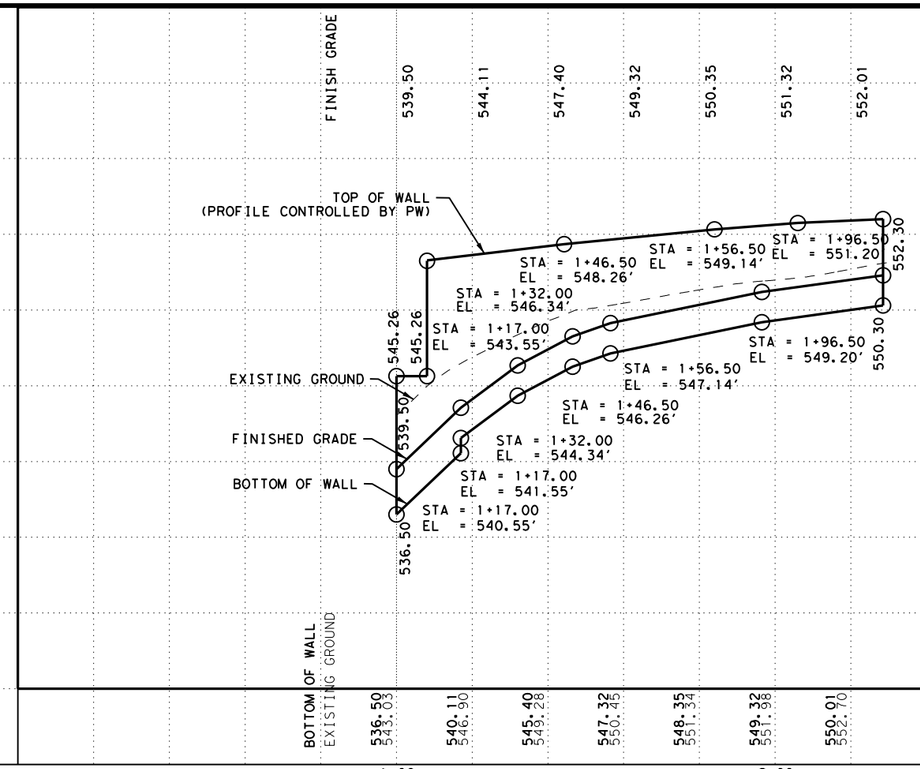

ITEM	DESCRIPTION	UNIT
423 6004	RETAINING WALL(CONC BLOCK)	1053 SF
432 6046	RIPRAP (MOW STRIP)(5 IN)	4 CY

NOTE: BOTTOM OF WALL SHALL BE EMBEDDED 2' BELOW FINAL SURFACE

0 20 40

SCALE: 1" = 40' H
1" = 10' V

STATE OF TEXAS
MEGAN LEIGH BERNHARD
139771
LICENSED PROFESSIONAL ENGINEER

5/12/2021

PR 16 RETAINING WALL #2C PLAN & PROFILE

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CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		65

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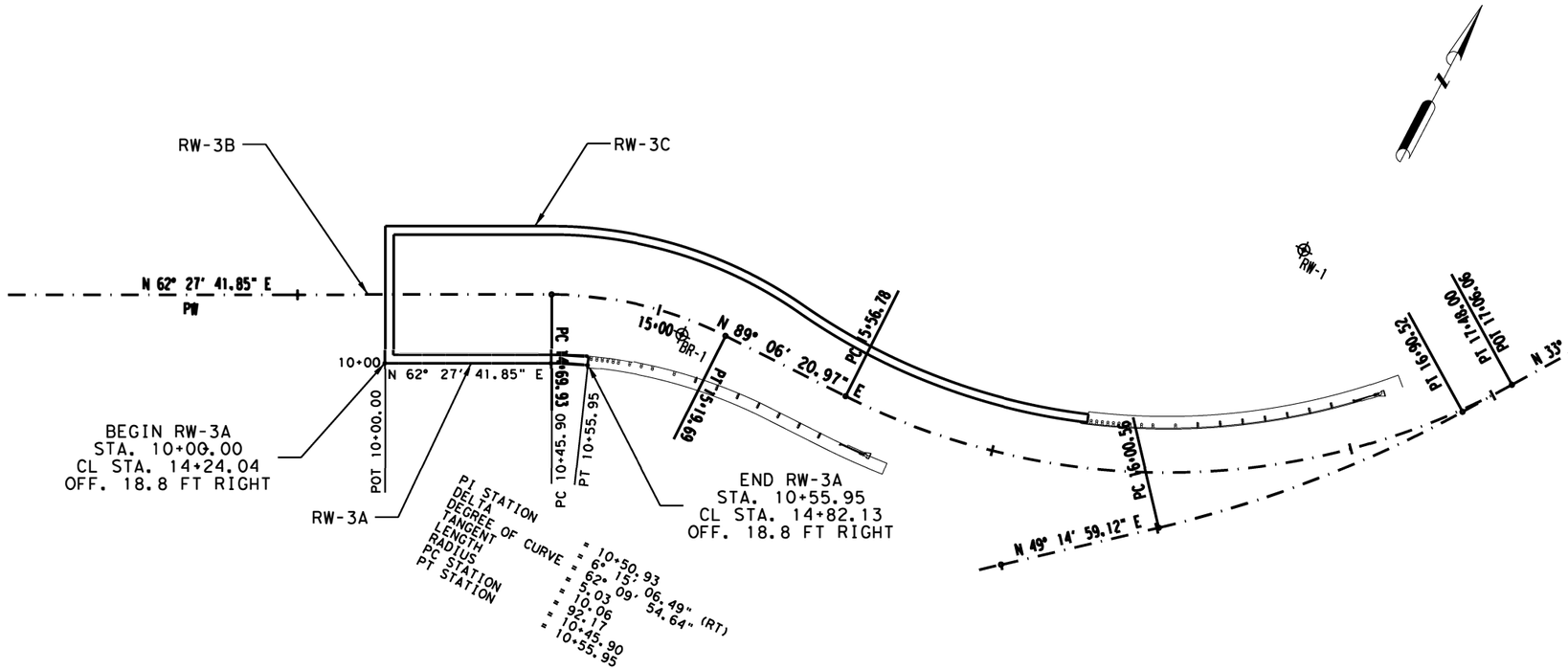

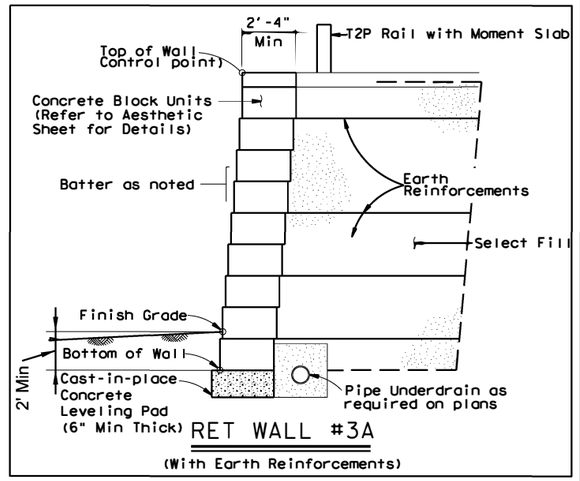

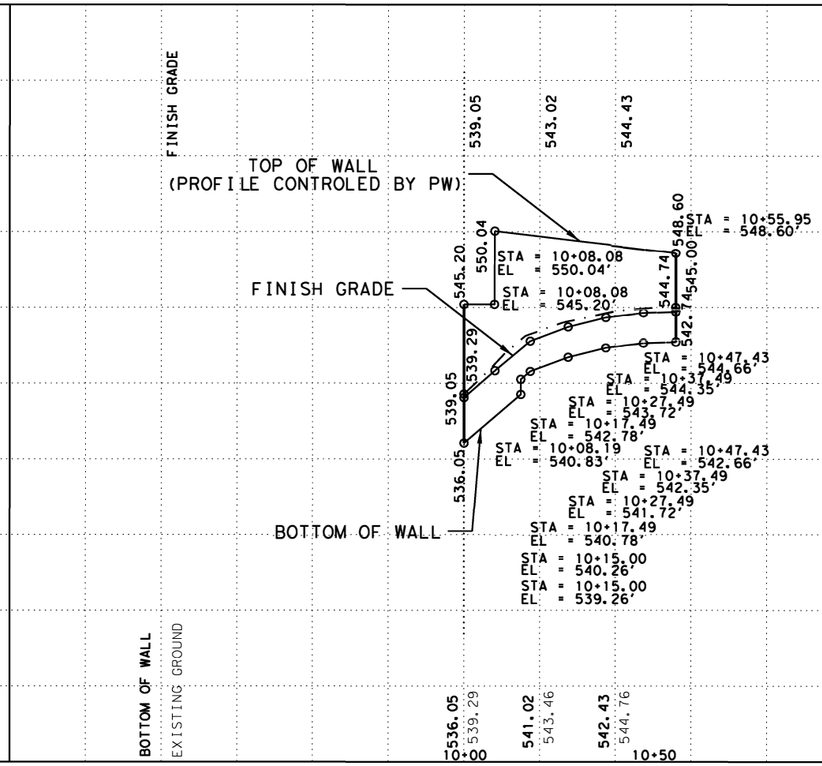

ITEM	DESCRIPTION	UNIT
423 6004	RETAINING WALL(CONC BLOCK)	442 SF
432 6046	RIPRAP (MOW STRIP)(5 IN)	1.7 CY

NOTE: BOTTOM OF WALL SHALL BE EMBEDDED 3' BELOW FINAL SURFACE WITHIN 15' FROM THE BEGINING AND 2' BELOW FINAL SURFACE FOR THE REST

0 20 40

SCALE: 1" = 40' H
1" = 10' V

STATE OF TEXAS
MOJTABA RANJBAR
110222
LICENSED
PROFESSIONAL ENGINEER

Mojtaba Ranjbar, P.E.

05/14/2021

PR 16 RETAINING WALL #3A PLAN & PROFILE

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		66

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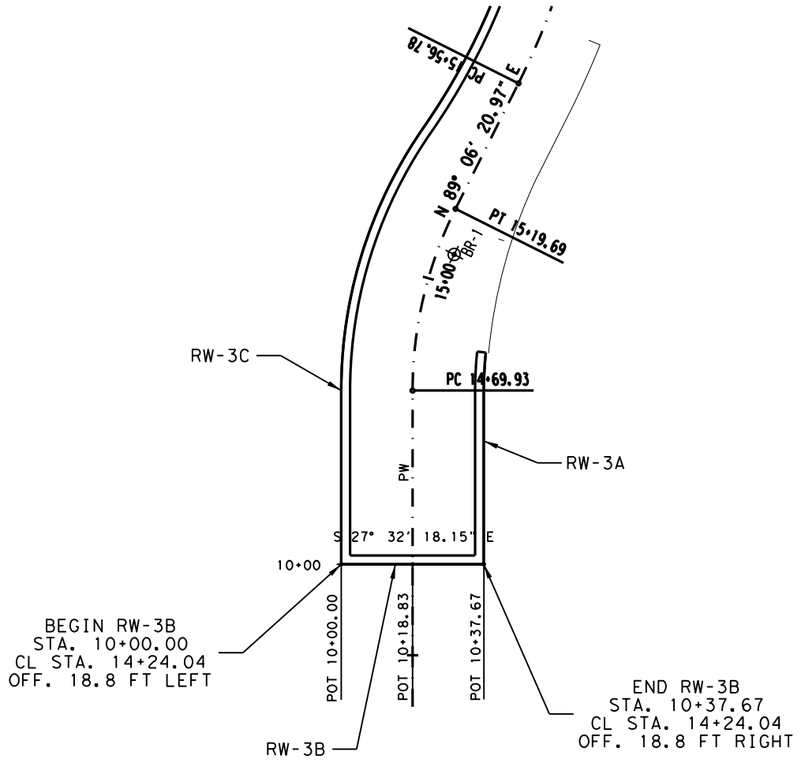
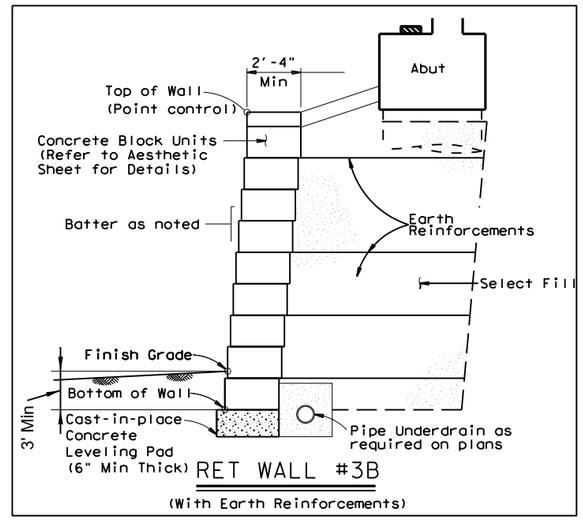
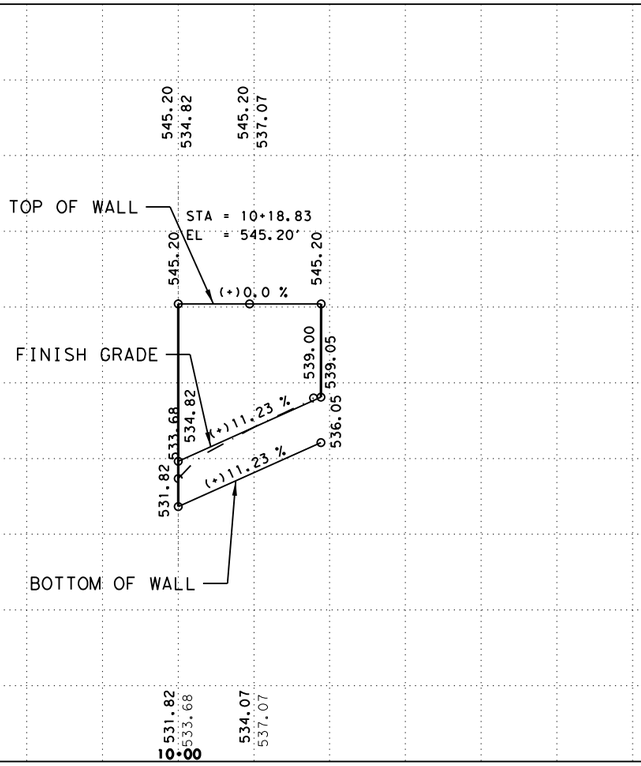




RET WALL #3B
(With Earth Reinforcements)



ITEM	DESCRIPTION	UNIT
423 6004	RETAINING WALL(CONC BLOCK)	425 SF
432 6046	RIPRAP (MOW STRIP)(5 IN)	1.2 CY

NOTE: BOTTOM OF WALL SHALL BE EMBEDDED 3' BELOW FINAL SURFACE

0 20 40

SCALE: 1" = 40' H
1" = 10' V

STATE OF TEXAS
MOJTABA RANJBAR
110222
LICENSED
PROFESSIONAL ENGINEER

Mojtaba Ranjbar, P.E.

05/12/2021

PR 16 RETAINING WALL #3B PLAN & PROFILE

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		67

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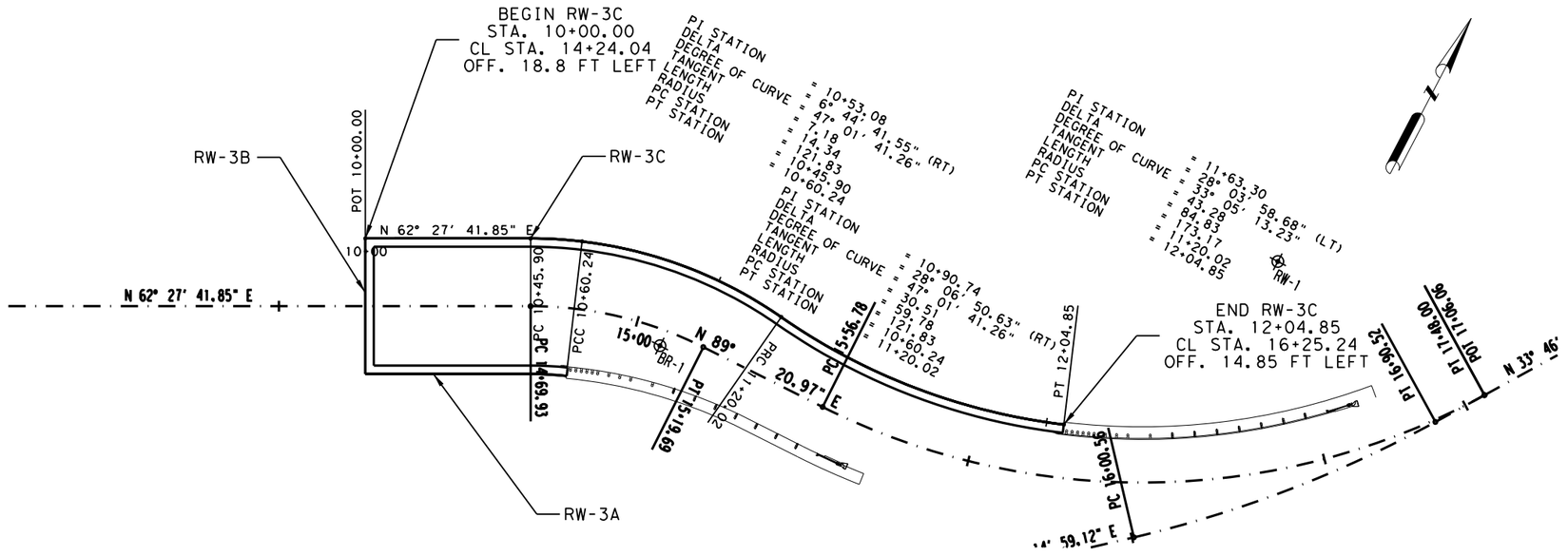

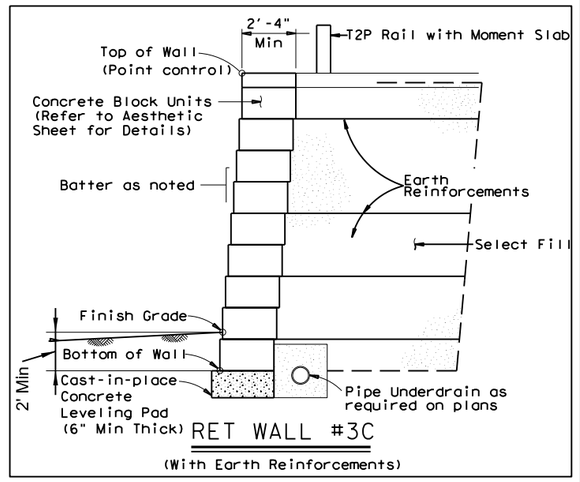

RET WALL #3C
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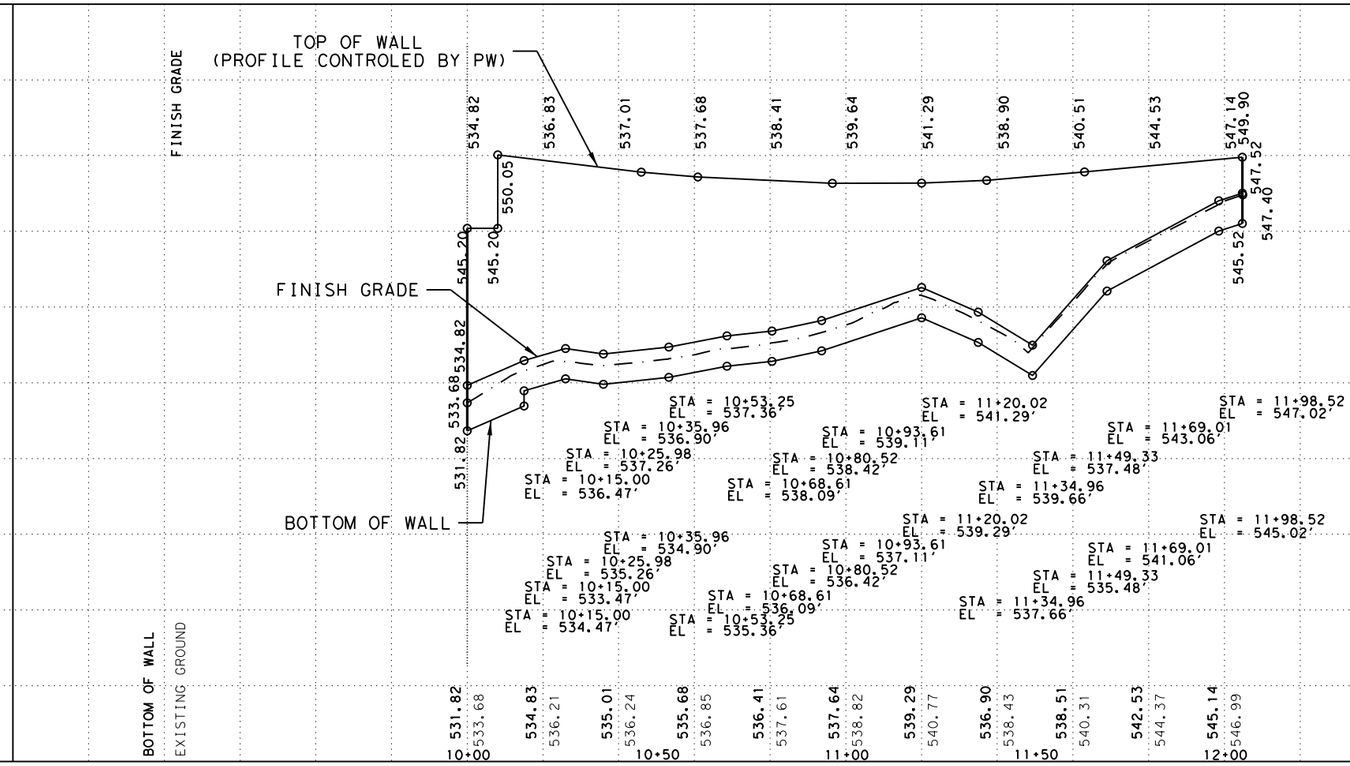

ITEM	DESCRIPTION	UNIT
423 6004	RETAINING WALL(CONC BLOCK)	2264 SF
432 6046	RIPRAP (MOW STRIP)(5 IN)	6.4 CY

NOTE: BOTTOM OF WALL SHALL BE EMBEDDED 3' BELOW FINAL SURFACE WITHIN 15' FROM THE BEGINING AND 2' BELOW FINAL SURFACE FOR THE REST

0 20 40

SCALE: 1" = 40' H
1" = 10' V

STATE OF TEXAS
MOJTABA RANJBAR
110222
LICENSED
PROFESSIONAL ENGINEER

Mojtaba Ranjbar, P.E.

05/14/2021

PR 16
RETAINING WALL #3C
PLAN & PROFILE

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CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		68

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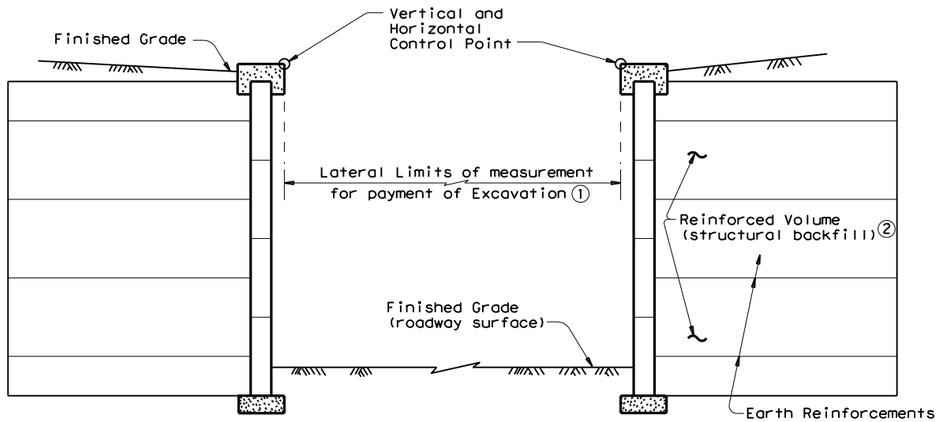
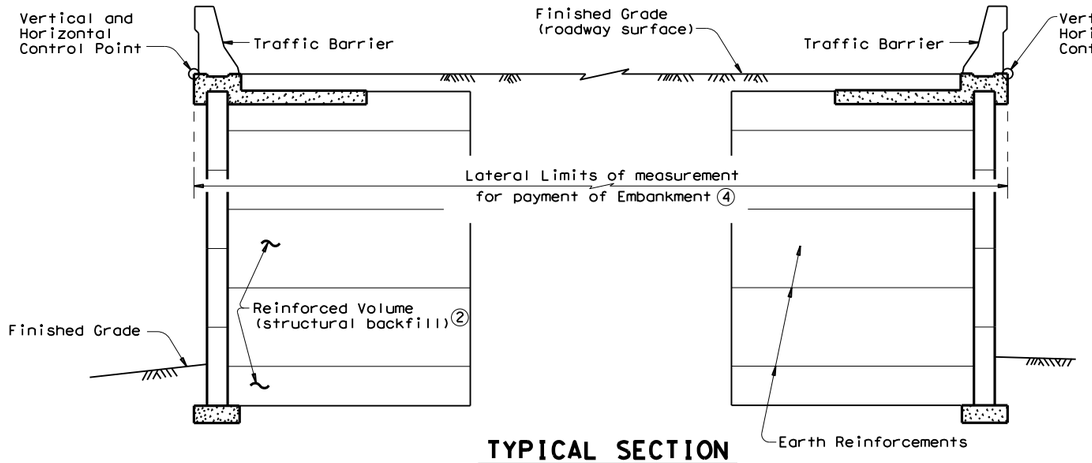


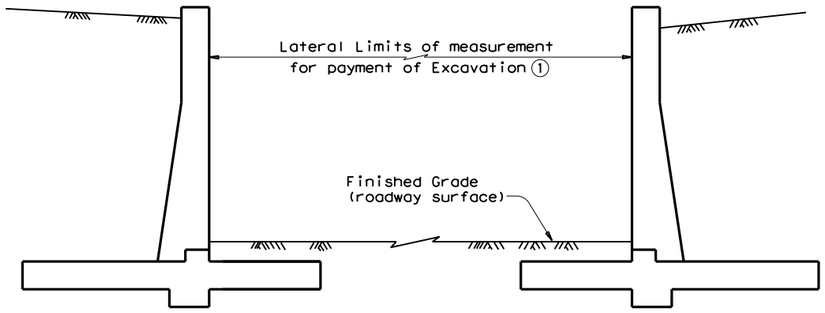
TYPICAL SECTION

Excavation Between MSE Retaining Walls ③



TYPICAL SECTION

Embankment Between MSE Retaining Walls ③



TYPICAL SECTION

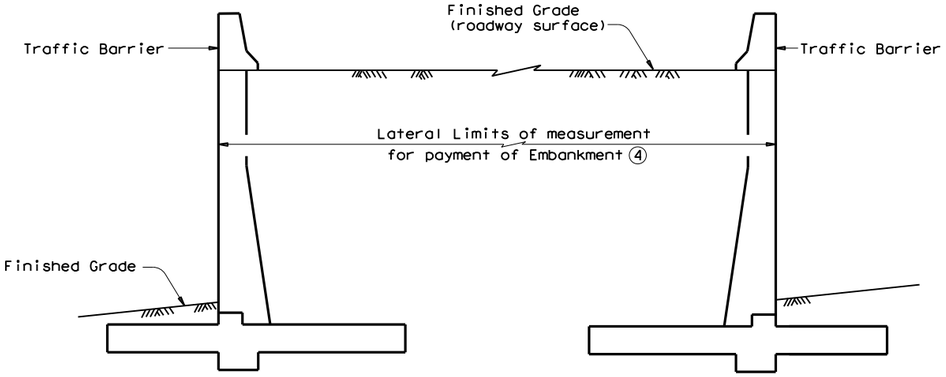
Excavation Between Conventional Retaining Walls

① Only the Excavation above the proposed subgrade elevation will be measured for payment.

② Meeting requirements of Retaining-Wall Item.

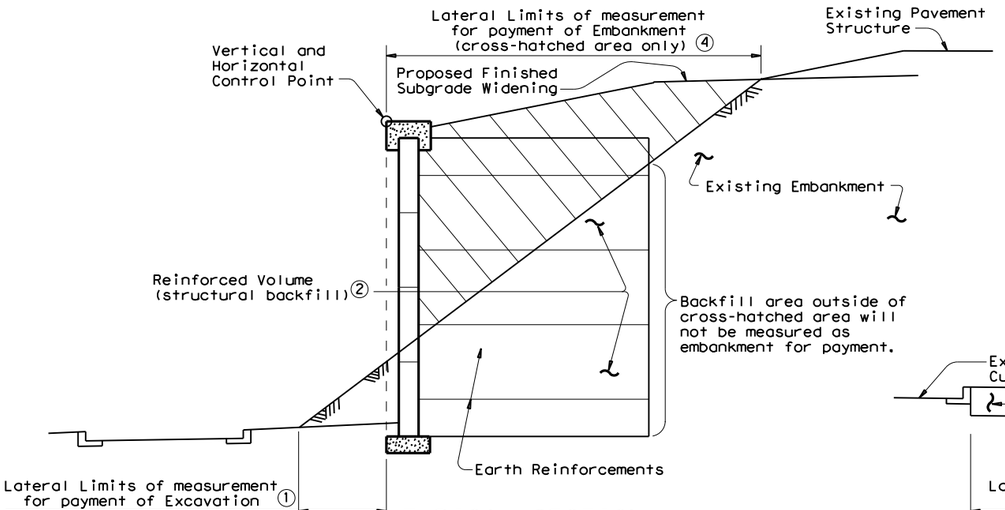
③ Earthwork measurement with other designs of retaining walls will be made to the outside finished face in the same manner.

④ Only the Embankment above the existing ground line will be measured for payment.



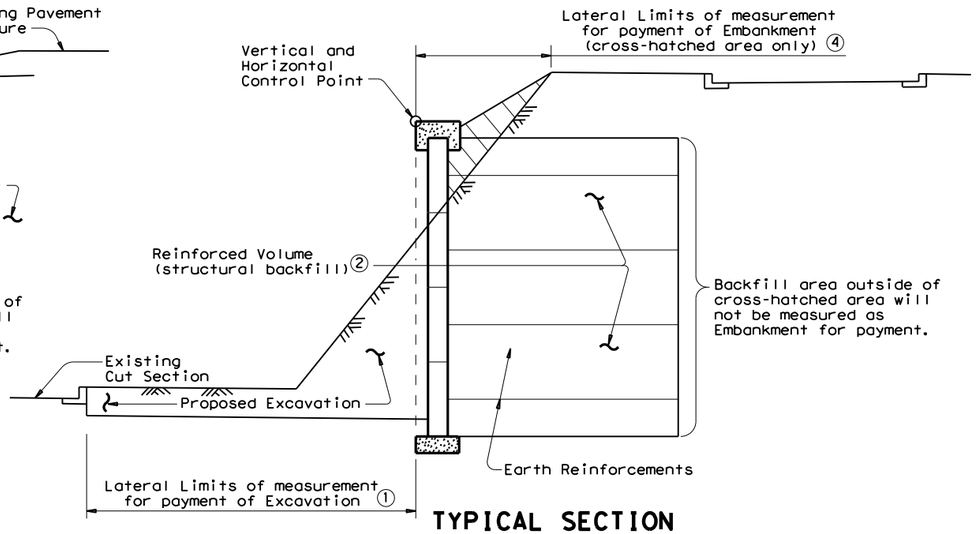
TYPICAL SECTION

Embankment Between Conventional Retaining Walls



TYPICAL SECTION

Widening Embankment with MSE Retaining Walls ③



TYPICAL SECTION

Widening Cut Section with MSE Retaining Walls ③

Texas Department of Transportation

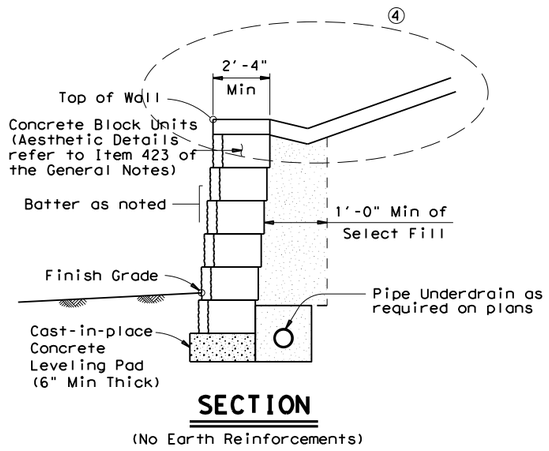
Bridge Division Standard

EARTHWORK MEASUREMENT AT RETAINING WALLS

RW(EM)

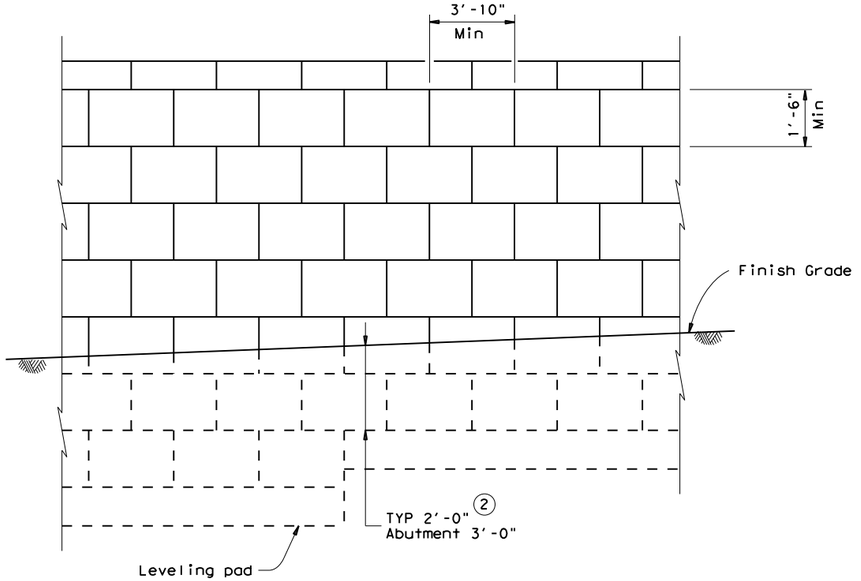
FILE: rwstde12.dgn	DN: TxDOT	CK: TxDOT	DW: BWH	CK: JMH
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		69

DATE:
FILE:

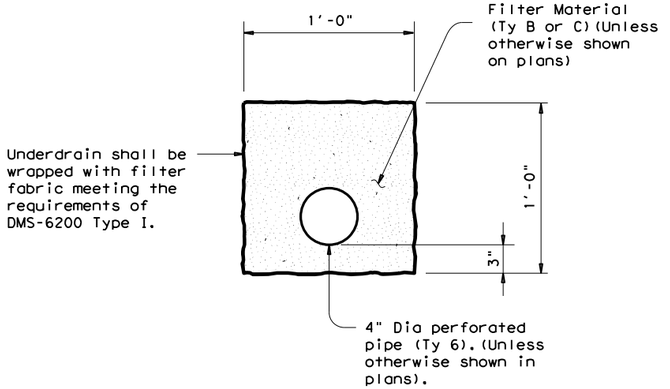


SECTION

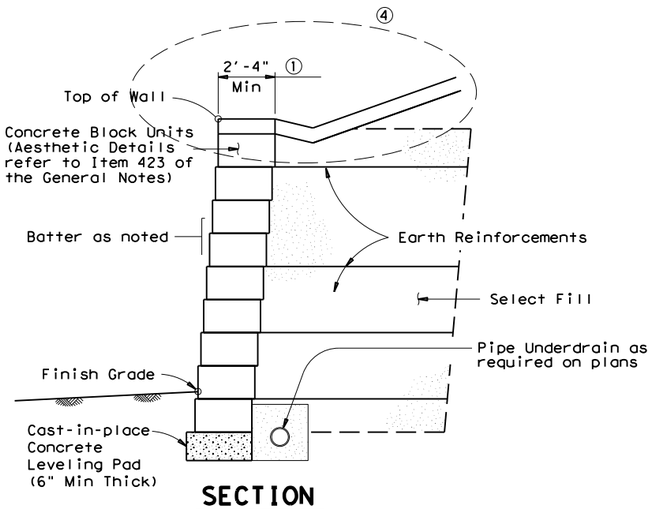
(No Earth Reinforcements)



TYPICAL ELEVATION



UNDERDRAIN DETAIL



SECTION

(With Earth Reinforcements)

① For systems utilizing continuous structural pins passing thru a minimum of 3 block layers, the minimum block depth shall be 8". The maximum vertical spacing of primary reinforcement on these systems shall be 24", and intermediate reinforcement will not be required.

② Unless noted elsewhere in the plans, typical 2'-0" minimum cover and 3'-0" minimum cover at bridge abutments shall be provided from the top of leveling pad to finish grade. Refer to Retaining Wall Plan & Profile Sheets for the limits.

③ For walls which are designated as landscape walls and are less than 6' tall, the following modifications to the design criteria will be allowed:

Factor of safety in sliding > 1.2.
Factor of safety in overturning > 1.5.
Connection strength factor of safety of 1.0 at ¾" strain.
Minimum earth reinforcement length of 4'.

The above modified criteria does not apply to walls over 6' tall regardless of designation.

④ Refer to representative railing details and concrete riprap details for retaining wall associated with bridge and pedestrian railing at parking lot.

EARTH REINFORCEMENTS:

Walls may be constructed without earth reinforcements if all stability criteria are met with the blocks alone. If all stability criteria are not satisfied, earth reinforcements shall be provided.

The long term design strength (LTDS) of earth reinforcement shall be calculated in accordance with current AASHTO Standard and Interim Specifications.

Soil-geogrid pullout coefficient values shall be determined in accordance with Geosynthetics Research Institute (GRI) Method GG-5, "Guidelines for Evaluating Geogrid Pullout".

For the combination of concrete block and geogrid chosen, connection strength data shall be provided. The allowable connection load shall be limited to the connection strength developed at ¾" displacement, divided by a 1.5 safety factor. ③

For internal stability calculations, the failure plane will be assumed to originate at the back of the concrete blocks.

The factor of safety against pullout of the earth reinforcements shall be determined from test data evaluated at ¾" strain.

The maximum vertical spacing of primary earth reinforcement layers shall be 40 inches. ①
The minimum length of primary earth reinforcements shall be 8 feet, measured from the front of the blocks. ③

A layer of intermediate reinforcement shall be provided between primary reinforcements when the spacing between primary layers exceeds twice the horizontal depth of the concrete block unit. Intermediate reinforcement shall have a minimum length of 4 feet, and shall provide local stability for the concrete block units. ①

STABILITY CRITERIA:

Factor of safety in sliding along the base of the structure shall be greater than or equal to 1.5. ③

Factor of safety in overturning shall be greater than or equal to 2.0. ③

The base pressure resultant shall fall within the middle third of the retaining wall.

DESIGN PARAMETERS:

Structure shall be based on the following design parameters:

Random Backfill: Unit weight = 120 pcf.
(Embankment or Existing Soils) ø = 30° c = 0 psf
Select Backfill: Unit weight = 120 pcf
ø = 34° c = 0 psf

GENERAL NOTES:

Sections and Typical Elevation shown are for informational purposes only. Specific geometry is to be determined based on wall layouts and other plan information.

Unless otherwise shown in the plans, wall batter shall be a maximum of 3" per foot. Blocks shall be placed horizontally, and a positive means of obtaining batter such as pins, keyways, or concrete lips shall be provided.

STATE OF TEXAS
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124680
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PROFESSIONAL ENGINEER

05/21/2021

Texas Department of Transportation

Bridge Division Standard

CONCRETE BLOCK RETAINING WALL

RW(CB)(MOD)

FILE: rwstde02.dgn	DN: CHL	CK: RE	DW: GHO	CK: CHL
©TxDOT May 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK RD 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		070

DESIGN SPEED = 20 MPH
FUNCTION CLASS = MINOR COLLECTOR
2019 ADT = 383
2039 ADT = 628
PROP NBI NO: 10-212-0-PW10-00-001

TEST HOLE NO. RW-2
(OFF OF THIS SHEET)
STA 11+23.33
OFFSET 53.32' LT
ELEV 550.0'

TEST HOLE NO. BR2
STA 13+13+.70
OFFSET 45.49' LT
ELEV 535.0'

TEST HOLE NO. RW-1
(OFF OF THIS SHEET)
STA 17+02.11
OFFSET 56.38' LT
ELEV 549.0'

TEST HOLE NO. BR1
STA 15+08.27
OFFSET 4.46' RT
ELEV 543.0'

BEGIN BRIDGE
FACE OF BKWL
℄ ABUT #1
STA 13+32.12
EL= 553.24'

END BRIDGE
FACE OF BKWL
℄ ABUT #2
STA 14+32.12
EL= 550.24'

20' BAS-A
RW2A
RW3C
RR9 (TYP)
PROPOSED CONCRETE BLOCK RETAINING WALL
MOMENT SLAB
℄ GIRDER #1
FACE OF T2P RAIL
℄ PR 16 & PGL
FLOW
5'-0" (TYP)
2%
1'-0"
5' SHDR
10' LANE
16'
32' OVERALL
30' ROADWAY
13+00
14+00
90°0'0" (TYP)
N 62° 27'41.85" E
S 27°32'18.15" E (TYP)
℄ GIRDER #4
BACK FACE OF RW2B WALL
SEJ-B(4")
BACK FACE OF RW3B WALL
CSAB(MOD) (OPT 2)
RW2C
RW3A
PROP MBGF
MOMENT SLAB (REFER TO TRAFFIC RAIL TYPE T2P MOUNTING DETAILS OFF BRIDGE SHEETS)
FACE OF T2P RAIL (TYP)
PROPOSED CONCRETE BLOCK RETAINING WALL

HORIZONTAL CURVE DATA
PI STA = 12+53.45
DELTA = 28°41'51.05"(RT)
DEGREE = 53°32'51.53"
LENGTH = 53.5925
RADIUS = 106.9996'
PC STA = 12+26.08
PT STA = 12+79.67
BACK BRNG = N 33° 45'50.80"E
AHEAD BRNG = N 62° 27'41.85" E

HORIZONTAL CURVE DATA
PI STA = 14+95.27
DELTA = 26°38'39.12"(RT)
DEGREE = 53°32'50.85"
LENGTH = 49.7581
RADIUS = 107.00'
PC STA = 14+69.93
PT STA = 15+19.69
BACK BRNG = N 62°27'41.85" E
AHEAD BRNG = N 89°06'20.97" E

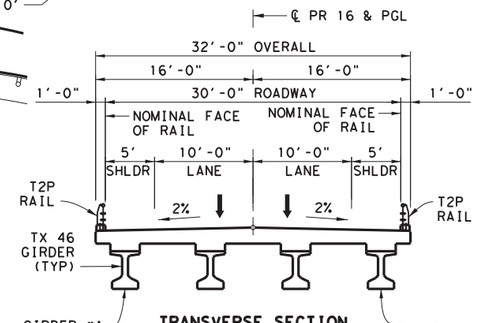
PLAN

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2017, 8TH EDITION.
ELEVATIONS SHOWN ARE AT PROFILE GRADE LINE UNLESS OTHERWISE NOTED.
CONCRETE BEAM END CONDITION: "D"-DENOTES DOWEL.
CONTRACTOR IS RESPONSIBLE FOR LOCATION AND VERIFYING ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION.
TEST HOLE LOCATIONS ARE APPROXIMATE. SEE TEST HOLE PROFILE SHEETS FOR BORE LOG DATA.
ALL ABUTMENTS ARE ALONG S 27°32'18.15" E. VERIFY ALL DIMENSIONS AND ELEVATIONS IN THE FIELD.

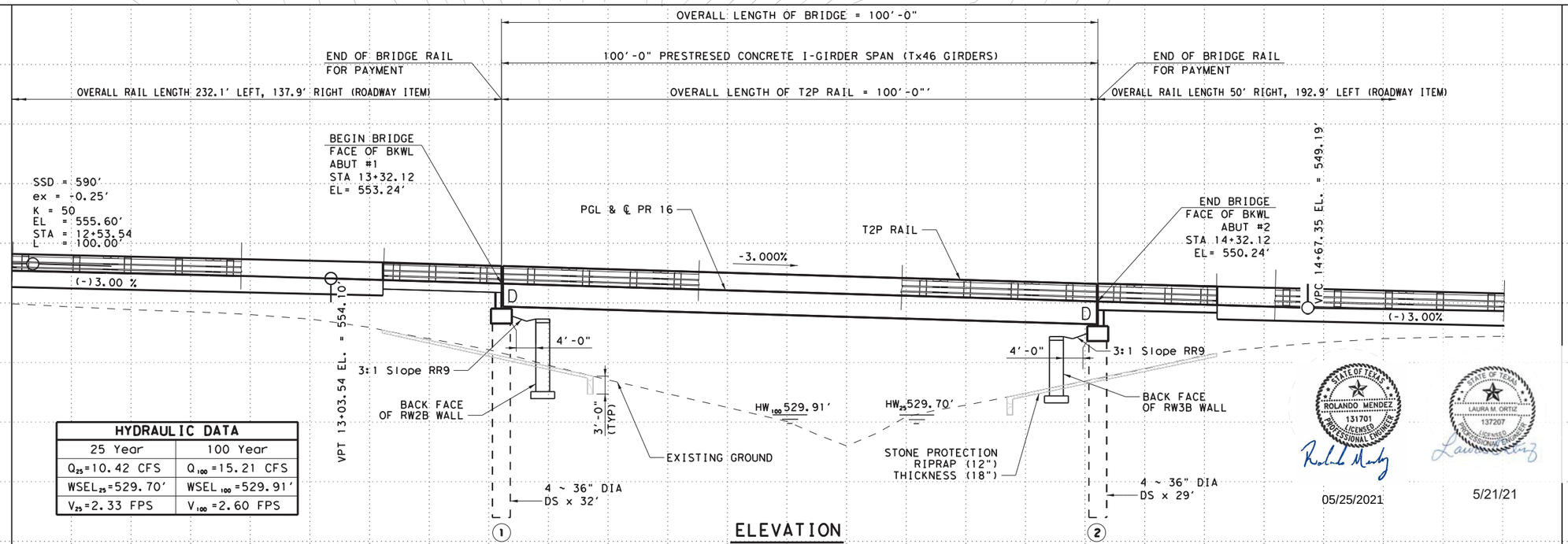
FOUNDATION NOTES:

THE CONTRACTOR'S ATTENTION IS DIRECTED TO POTENTIAL WATER BEARING SAND SHOWN IN THE BORING LOGS (REFER TO ALL BORING LOG SHEETS 81 TO 83). PROVIDE PROPER INSTALLATION METHOD TO THE REQUIRED PENETRATION DEPTH FOR THE DRILLED SHAFT FOUNDATIONS. IT IS THE CONTRACTOR SOLE RESPONSIBILITY TO MAINTAIN THE STABILITY OF DRILLED SHAFT HOLE.
FOUND DRILLED SHAFT AT THE ELEVATION SHOWN OR DEEPER TO OBTAIN A MINIMUM 3 DIAMETER PENETRATION INTO THE SOUND SANDSTONE LAYER. SECURE AND DISPOSE ALL CUTTINGS AS APPROVED BY THE PARK MANAGEMENT.



TRANSVERSE SECTION

OVERALL LENGTH OF BRIDGE = 100'-0"
END OF BRIDGE RAIL FOR PAYMENT
100'-0" PRESTRESED CONCRETE I-GIRDER SPAN (Tx46 GIRDERS)
END OF BRIDGE RAIL FOR PAYMENT
OVERALL RAIL LENGTH 232.1' LEFT, 137.9' RIGHT (ROADWAY ITEM)
OVERALL LENGTH OF T2P RAIL = 100'-0"'
OVERALL RAIL LENGTH 50' RIGHT, 192.9' LEFT (ROADWAY ITEM)



ELEVATION

HYDRAULIC DATA	
25 Year	100 Year
Q_{25} =10.42 CFS	Q_{100} =15.21 CFS
$WSEL_{25}$ =529.70'	$WSEL_{100}$ =529.91'
V_{25} =2.33 FPS	V_{100} =2.60 FPS

555.22	**554.75**	**554.21**	**553.61**	**553.01**	**552.41**	**551.81**	**551.21**	**550.61**	**550.01**	**549.41**	ROADWAY DESIGN
549.34	548.53	547.29	544.00	539.55	534.79	530.11	530.91	534.84	538.93	542.54	BRIDGE DESIGN
13+00					14+00					15+00	

STATE OF TEXAS
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124680
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05/21/2021

FOUNDATION DESIGN

0 10 20
SCALE: 1" = 20' H
1" = 20' V

TRIBUTARY OF HITTS CREEK BRIDGE

BRIDGE LAYOUT

HL93 LOADING SHEET 1 OF 1

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED PROFESSIONAL ENGINEER
05/25/2021

STATE OF TEXAS
LAURA M. ORTIZ
137207
LICENSED PROFESSIONAL ENGINEER
5/21/21

®2019
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0606	01	007	PR 16
DIST	COUNTY		SHEET NO.
TYL	SMITH		71

DATE: 05/19/2021 03:11 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\10 - TYL\Design Projects\0606010074 - Design\Bridge\PR16 State Park Bridge\8154ly01.dgn

DN: LMG | CK: LXG | DW: JEB | CK: LMG

DRILLING LOG

WinCore Version 3.3	County	Smith	Hole	BR1	District	Tyler
	Highway	Park Rd 16	Structure	Bridge	Date	9/29/20
	CSJ	0606-01-007	Station	15+08.27	Grnd. Elev.	543.00 ft
			Offset	4.46' RT	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SAND, compact; orange, red, dark brown; some clay; few ironstone fragments (SC)			18.8	20	0		1' P.P. = 4.5+
										1-2.5' SPT MOD = 4,5,4
						25	47	18		2.5' %Passing No. 200 Sieve = 39.2
				0	18.9	23.1			115.3	4' P.P. = 4.5+
										5' P.P. = 4.5+
5		28 (6) 36 (6)								
										7' P.P. = 4.5+
										7-8.5' SPT MOD = 12,18,25
						22	43	12		8.5-9.9' SPT MOD = 21,32,50=5.
										8.5' %Passing #4=87.6, #40=80 #200=32.9
10		26 (6) 22 (6)								D50 = 0.132 mm
						31.6	63	41		14' %Passing No. 200 Sieve = 55.6
529.				9	23.9	30.9			91.9	15' P.P. = 4.5+
15		14 (6) 16 (6)	SHALE, moderately weathered; very soft; brown; occasional sandstone seams							
										attempted to core very weakly
523.	20	50 (1.25) 50 (1.5)								0% recovery; abandoned further attempts to
			SANDSTONE, very weakly cemented; hard to very hard; light gray, yellow, light brown							
25		50 (0.75) 50 (0.5)								25-25.8' SPT MOD = 43,50=4.0in.
30		50 (2) 50 (0.5)								30-31' SPT MOD = 37,50=5.75in.
35		50 (2.5) 50 (0.5)								35-35.9' SPT MOD = 43,50=5.0in.
40		50 (0.25) 50 (0)								40-40.3' SPT MOD = 50=4.0in.

Remarks: GPS Coordinates: N32.481880, W95.288728 - water introduced at 20 feet for wash rotary - SPT MOD = SPT test run using a 170 lbs hammer with a 24in. drop height

The ground water elevation was not determined during the course of this boring.

Driller: Octavio Herrera (D&S) **Logger: Sean Gallagher (LCA)** **Organization: D&S Engineering Labs, LLC**

T:\DES_GEOT\DRILLING CONTRACTS\2016 - 2018 Drilling Contracts\D&S\WA5 issued Dec 2019\WA#5-4 PAR Off Sys Brg and TYL Park Rd Brg\TYL Park Rd 16 Bridge 0606-01-007\Reports\g16-3002-5-4 tyler.clg

DRILLING LOG

WinCore Version 3.3	County	Smith	Hole	BR1	District	Tyler
	Highway	Park Rd 16	Structure	Bridge	Date	9/29/20
	CSJ	0606-01-007	Station	15+08.27	Grnd. Elev.	543.00 ft
			Offset	4.46' RT	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SANDSTONE, very weakly cemented; hard to very hard; light gray, yellow, light brown							
45		50 (2.25) 50 (0.25)								45-46.4' SPT MOD = 28,36,50=5.0in.
50		50 (2) 50 (0.5)								50-51.5' SPT MOD = 33,45,50
55		50 (2) 50 (0.25)								55-56.5' SPT MOD = 21,38,50=5.3in.
60		50 (2) 50 (0.75)								60-61.5' SPT MOD = 36,46,33
65		50 (2.25) 50 (0.5)								65-66.5' SPT MOD = 26,25,44
70		50 (1.5) 50 (1.25)								70-71.2' SPT MOD = 20,40,50=3.0in.
471.8										
75										
80										

Remarks: GPS Coordinates: N32.481880, W95.288728 - water introduced at 20 feet for wash rotary - SPT MOD = SPT test run using a 170 lbs hammer with a 24in. drop height

The ground water elevation was not determined during the course of this boring.

Driller: Octavio Herrera (D&S) **Logger: Sean Gallagher (LCA)** **Organization: D&S Engineering Labs, LLC**

T:\DES_GEOT\DRILLING CONTRACTS\2016 - 2018 Drilling Contracts\D&S\WA5 issued Dec 2019\WA#5-4 PAR Off Sys Brg and TYL Park Rd Brg\TYL Park Rd 16 Bridge 0606-01-007\Reports\g16-3002-5-4 tyler.clg

NOTE: This sheet is a reproduction of drilling logs obtained by D&S Engineering Labs, LLC., under TxDOT Contract Number 88-7IDP5044, WA#5-4, and performed under the supervision of Mr. Mark Thomas, P.E. Texas Seal No. 103791.

STATE OF TEXAS
CHUN HO LEE
124680
LICENSED
PROFESSIONAL ENGINEER

05/20/2021

SHEET 1 OF 3

Texas Department of Transportation — Bridge Division

BORING LOGS
TRIBUTARY OF HITTS CREEK
BRIDGE

FILE: PR0016_BRG_BORING_8154bd01.dgn	DN: LMO	CK: LXG	DW: JEB	CK: LMO
©TxDOT MARCH 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		72

DATE: 4/8/2021 6:08:34 PM
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DRILLING LOG

WinCore Version 3.3	County	Smith	Hole	BR2	District	Tyler
	Highway	Park Rd 16	Structure	Bridge	Date	9/30/20
	CSJ	0606-01-007	Station	13+13.70	Grnd. Elev.	535.00 ft
			Offset	45.49'LT	GW Elev.	477.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	LL	PI	Wet Den. (pcf)	Additional Remarks
533.			CLAY, soft; red, dark brown; some sand; few ironstone fragments and iron oxide stains (CL)							0' %Passing No. 200 Sieve = 39.0 2' P.P. = 3.0 3' P.P. = 4.5+
			SHALE, moderately to highly weathered; very soft; light gray, yellow brown	0	23.4	34.9				4' P.P. = 4.5+
				0	53	24.3	77	49	97.2	4' %Passing No. 200 Sieve = 86.7 5' P.P. = 4.5+
529.5		16 (6) 50 (3.75)	SANDSTONE, very weakly to weakly cemented; hard to very hard; light gray, red, orange, yellow brown, dark brown							6-7.4' SPT MOD = 31,41,50=3.5in.
		50 (1.5) 50 (0.5)								
		50 (1.5) 50 (0.75)								15-16.5' SPT MOD = 31,33,37 15' %Passing #4=100, #40=99 #200=25.8 D50 = 0.091 mm
		50 (0.5) 50 (0.25)								20-20.9' SPT MOD = 30,50=5.0in.
		50 (0.75) 50 (0.25)								25-25.9' SPT MOD = 32,50=5.0in.
		50 (1.5) 50 (1)								30-31.3' SPT MOD = 19,38,50=4.0in.
		50 (1.5) 50 (1)								35-36.5' SPT MOD = 17,36,42
		50 (1.5) 50 (0.5)								40-41.4' SPT MOD = 23,43,50=4.75in.

Remarks: GPS Coordinates: N32.481790, W95.289369 - seepage at 58 feet during drilling - water introduced at 65 feet for wash rotary
- SPT MOD = SPT test run using a 170 lbs hammer with a 24in. drop height

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Octavio Herrera (D&S) **Logger: Claude Brown (LCA)** **Organization: D&S Engineering Labs, LLC**

T:\DES_GEOT\DRILLING CONTRACTS\2016 - 2018 Drilling Contracts\D&S\WA5 issued Dec 2019\WA#5-4 PAR Off Sys Brg and TYL Park Rd Brg\TYL Park Rd 16 Bridge 0606-01-007\Reports\g16-3002-5-4 tyler.clg

DRILLING LOG

WinCore Version 3.3	County	Smith	Hole	BR2	District	Tyler
	Highway	Park Rd 16	Structure	Bridge	Date	9/30/20
	CSJ	0606-01-007	Station	13+13.70	Grnd. Elev.	535.00 ft
			Offset	45.49'LT	GW Elev.	477.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SANDSTONE, very weakly to weakly cemented; hard to very hard; light gray, red, orange, yellow brown, dark brown							
45		50 (1) 50 (0.75)								45-46.5' SPT MOD = 32,48,49
50		50 (1.75) 50 (1)								50-51.5' SPT MOD = 16,28,50=5.75in.
55		50 (1.75) 50 (1)								55-56.5' SPT MOD = 32,38,32
60		50 (1) 50 (0.125)								60-61.5' SPT MOD = 42,38,50=6.0in.
65		50 (1.5) 50 (1.25)								65-66.5' SPT MOD = 14,15,15
70		50 (2) 50 (1)								70-71.4' SPT MOD = 15,43,50=5.0in.
463.6										
75										
80										

Remarks: GPS Coordinates: N32.481790, W95.289369 - seepage at 58 feet during drilling - water introduced at 65 feet for wash rotary
- SPT MOD = SPT test run using a 170 lbs hammer with a 24in. drop height

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Octavio Herrera (D&S) **Logger: Claude Brown (LCA)** **Organization: D&S Engineering Labs, LLC**

T:\DES_GEOT\DRILLING CONTRACTS\2016 - 2018 Drilling Contracts\D&S\WA5 issued Dec 2019\WA#5-4 PAR Off Sys Brg and TYL Park Rd Brg\TYL Park Rd 16 Bridge 0606-01-007\Reports\g16-3002-5-4 tyler.clg

NOTE: This sheet is a reproduction of drilling logs obtained by D&S Engineering Labs, LLC., under TxDOT Contract Number 88-7IDP5044, WA#5-4, and performed under the supervision of Mr. Mark Thomas, P.E. Texas Seal No. 103791.

STATE OF TEXAS
CHUN HO LEE
124680
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05/20/2021

Texas Department of Transportation — Bridge Division

BORING LOGS
TRIBUTARY OF HITTS CREEK
BRIDGE

FILE: PR0016_BRG_BORING_8154bd01.dgn	DN: LMO	CK: LXG	DW: JEB	CK: LMO
©TxDOT MARCH 2021 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		73

DATE: 4/8/2021 6:08:34 PM
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DRILLING LOG

WinCore Version 3.3	County	Smith	Hole	RW1	District	Tyler
	Highway	Park Rd 16	Structure	Bridge	Date	9/28/20
	CSJ	0606-01-007	Station	17+02.11	Grnd. Elev.	549.00 ft
			Offset	56.38'LT	GW Elev.	526.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, very soft to soft; red, dark brown; some sand (CL)							2' P.P. = 4.5+
										2' %Passing No. 200 Sieve = 68
				0	32.8	23.6	34	19	126.6	3' P.P. = 4.5+
546.						26.8				
			SAND, slightly compact to dense; red, dark brown; some clay; few ironstone fragments and iron oxide stains (SC)	0	40.6	24				4' P.P. = 4.5+
5		17 (6) 18 (6)								5' P.P. = 4.5+
										6' %Passing No. 200 Sieve = 43
				0	106	17.5	39	16		7' P.P. = 4.5+
						18.3				
										8' P.P. = 4.5+
				0	44.4	18.3			124.6	9' P.P. = 4.5+
10		16 (6) 17 (6)								10' P.P. = 4.5+
						24.8	43	27		14' %Passing No. 200 Sieve = 20.3
										15' P.P. = 1.0
15		30 (6) 30 (6)								
										20' P.P. = NT
20		50 (2.5) 50 (2.5)								
526.			SHALE, slightly to moderately weathered; very soft; dark gray, brown; occasional sandstone seams							25' P.P. = 4.5+
25		25 (6) 34 (6)								
520.5			SANDSTONE, very weakly cemented; hard; red, light gray							30' P.P. = NT
30		50 (2) 50 (0.25)								30-30.9' SPT MOD = 50,50=4.75in.
517.5										
35										
40										

Remarks: GPS Coordinates: N32.482143, W95.288260 - seepage at 23 feet during drilling - SPT MOD = SPT test run using a 170 lbs hammer with a 24in. drop height

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Octavio Herrera (D&S) **Logger: Sean Gallagher (LCA)** **Organization: D&S Engineering Labs, LLC**

T:\DES_GEOT\DRILLING CONTRACTS\2016 - 2018 Drilling Contracts\D&S\WA5 issued Dec 2019\WA#5-4 PAR Off Sys Brg and TYL Park Rd Brg\TYL Park Rd 16 Bridge 0606-01-007\Reports\g16-3002-5-4 tyler.clg

DRILLING LOG

WinCore Version 3.3	County	Smith	Hole	RW2	District	Tyler
	Highway	Park Rd 16	Structure	Bridge	Date	9/28/20
	CSJ	0606-01-007	Station	11+23.33	Grnd. Elev.	550.00 ft
			Offset	53.32LT'	GW Elev.	540.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SAND, loose; dark brown, red, orange; some clay; few ironstone fragments and iron oxide stains (SC)							0' %Passing No. 200 Sieve = 27.5
										2-3.5' SPT MOD = 4,3,3
										3.5' %Passing No. 200 Sieve = 73.7
546.5				0	23.4	34.9	77	44	82.9	5' P.P. = 4.5+
			CLAY, stiff to very stiff; dark brown, red, orange; some sand; few iron oxide stains (CH)							
5		18 (6) 24 (6)								7' P.P. = 2.25
										8' P.P. = 3.5
										8' %Passing No. 200 Sieve = 31
542.			SAND, slightly compact to very dense; dark brown, red, orange; some clay; few ironstone fragments and iron oxide stains (SC)			27.1	31	12		10' P.P. = 3.0
10		18 (6) 16 (6)								
										15' P.P. = 2.25
15		32 (6) 50 (4)								
										20' P.P. = 2.0
20		50 (1) 50 (0.5)								
527.5			SHALE, slightly to moderately weathered; very soft to hard; brown, dark gray; occasional sandstone seams							25' P.P. = 3.75
25		18 (6) 20 (6)								
519.8		50 (1.75) 50 (0.75)								30' P.P. = 4.5+
30										
35										
40										

Remarks: GPS Coordinates: N32.481398, W95.289870 - seepage at 10 feet during drilling - SPT MOD = SPT test run using a 170 lbs hammer with a 24in. drop height

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Octavio Herrera (D&S) **Logger: Sean Gallagher (LCA)** **Organization: D&S Engineering Labs, LLC**

T:\DES_GEOT\DRILLING CONTRACTS\2016 - 2018 Drilling Contracts\D&S\WA5 issued Dec 2019\WA#5-4 PAR Off Sys Brg and TYL Park Rd Brg\TYL Park Rd 16 Bridge 0606-01-007\Reports\g16-3002-5-4 tyler.clg

NOTE: This sheet is a reproduction of drilling logs obtained by D&S Engineering Labs, LLC., under TxDOT Contract Number 88-7IDP5044, WA#5-4, and performed under the supervision of Mr. Mark Thomas, P.E. Texas Seal No. 103791.

STATE OF TEXAS
CHUN HO LEE
124680
LICENSED PROFESSIONAL ENGINEER

05/20/2021

Texas Department of Transportation — Bridge Division

BORING LOGS
TRIBUTARY OF HITTS CREEK BRIDGE

FILE: PR0016_BRG_BORING_8154bd01.dgn	DN: LMO	CK: LXG	DW: JEB	CK: LMO
©TxDOT MARCH 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		74

DATE: 4/8/2021 6:08:34 PM
FILE: pw:\\txdot.projectwiseonline.com:TxDOT3\Documents\10 - TYL\Design Projects\06601007\4 - Design\Plan Set\7. Bridge\PR0016_BRG_BORING_8154bd01.dgn

SUMMARY OF ESTIMATED QUANTITIES

BID CODE	0400 6005	0416 6004	0420 6014	0422 6001	0422 6015	0425 6038	0432 6008	0432 6031	0450 6099	0454 6020
BID ITEM DESCRIPTION / BRIDGE ELEMENT	CEM STABIL BKFL	DRILL SHAFT (36 IN)	CL C CONC (ABUT)(HPC)	REINF CONC SLAB	APPROACH SLAB (1)	PRESTR CONC GIRDER (TX46)	RIPRAP (CONC)(CL B)(RR8&RR9)	RIPRAP (STONE PROTECTION)(12 IN)	RAIL (TY T2P) (2)	SEALED EXPANSION JOINT (4 IN) (SEJ - B)
	CY	LF	CY	SF	CY	LF	CY	CY	LF	LF
2 - ABUTMENTS	56	244	30.8		51.4		6	65		
1 - 100.00' PRESTRESSED CONC. I-GIRDER SPAN				3200		398.00			200.0	61
OVERALL TOTALS:	56	244	30.8	3200	51.4	398.00	6	65	200.0	61

BEARING SEAT ELEVATIONS (FT)

	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4
ABUT 1 (FWD)	547.888	548.061	548.061	547.888
	GIRDER1	GIRDER 2	GIRDER 3	GIRDER 4
ABUT 2 (BK)	544.948	545.121	545.121	544.948

(1) The width of approach slab is 32'-0".

(2) Only bridge railing is included in this bid. The rest of the railing will be considered a roadway item.

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5/20/21

Texas Department of Transportation | Bridge Division

ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS

TRIBUTARY OF HITTS CREEK BRIDGE

FILE: PR0016_BRG_8154eq01.dgn	DN: LMO	CK: LXG	DW: JEB	CK: LMO
©TxDOT MARCH 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		75

DATE: 2/8/2021 3:29:03 PM
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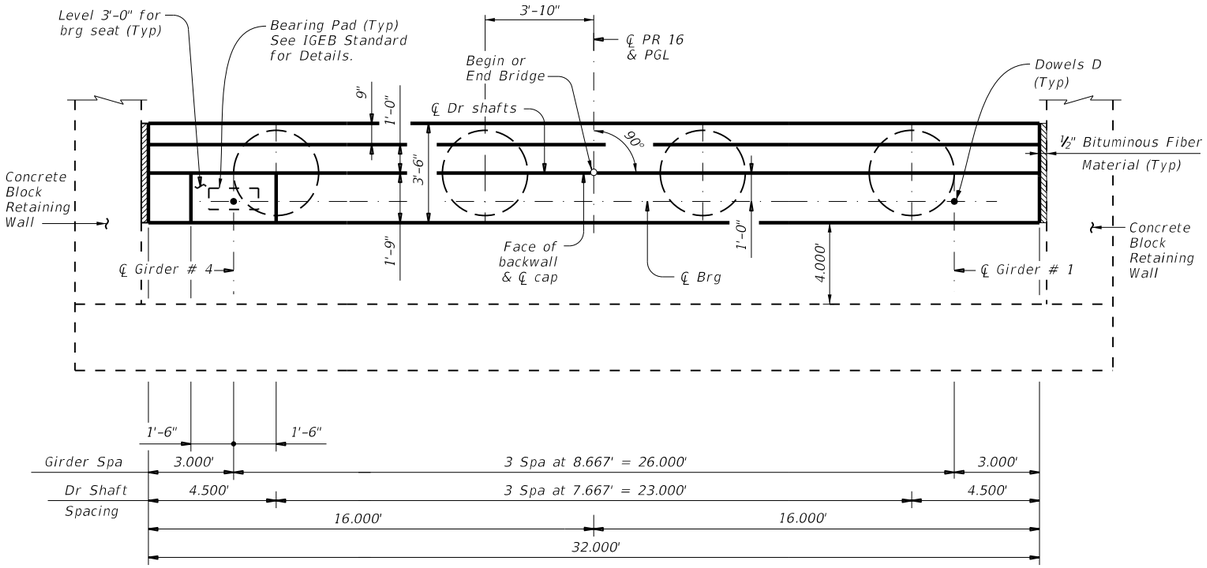
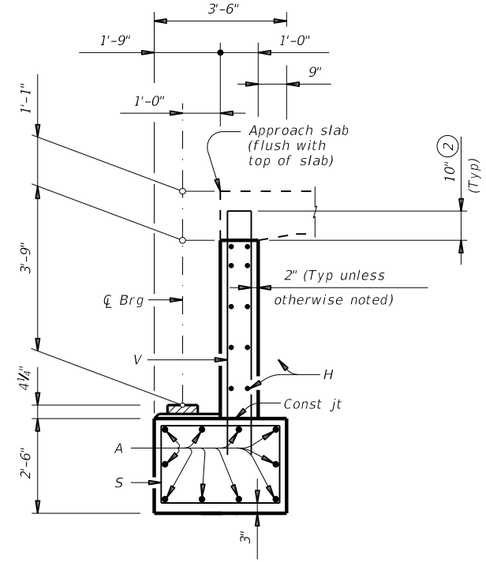


PLAN

(Showing Abutment No. 1; Abutment No. 2 symmetrical by opposite hand)



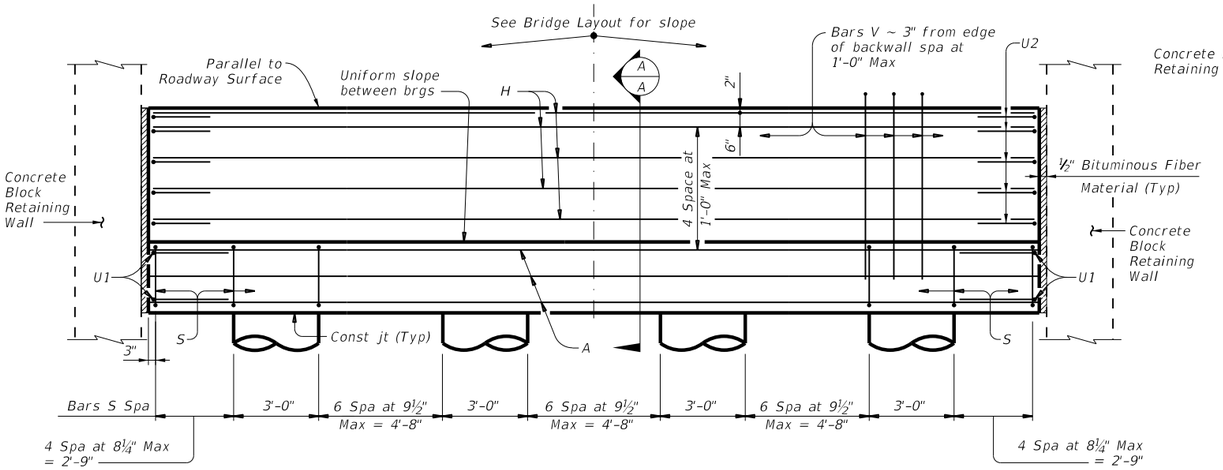
SECTION A-A

TABLE OF ESTIMATED QUANTITIES (1)

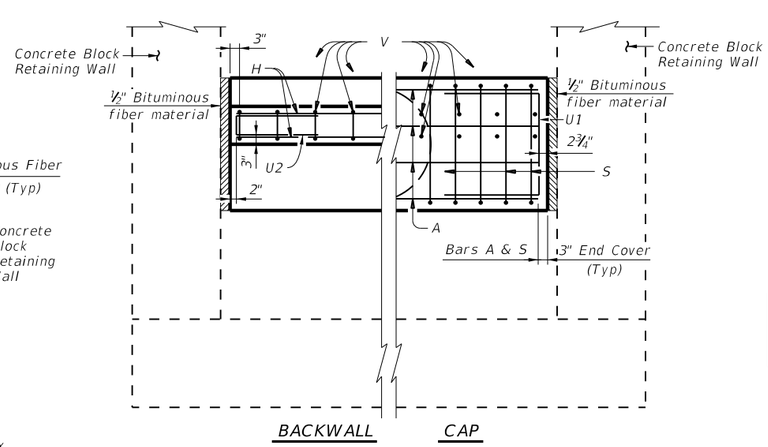
Bar	No.	Size	Length	Weight
A	10	#11	31'-8"	1,682
D	2	#9	1'-8"	11
H	10	#6	31'-8"	476
S	31	#5	11'-6"	372
U1	4	#6	8'-1"	49
U2	10	#5	4'-7"	48
V	33	#5	14'-5"	496
Reinforcing Steel			Lb	3,134
Class "C" Concrete (HPC)			CY	15.4

(1) Quantities shown are one abutment only.

(2) Increase as required to maintain 3" from finished grade.



ELEVATION



CORNER DETAILS

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 8th Edition (2017).

See Bridge Layout for foundation type, size and length.

See Common Foundation Details (FD) standard sheet for all foundation details and notes.

See Traffic Rail T2P Mounting Details Off Bridge sheet for rail anchorage in approach slab.

Calculated Foundation Loads = 90 tons/ Dr Sh

See Sealed Expansion Joint (SEJ-B) standard for expansion joint details.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

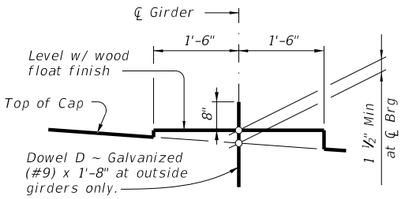
MATERIAL NOTES:

Provide Class C concrete (HPC) (f'c = 3,600 psi).

Provide Grade 60 reinforcing steel.

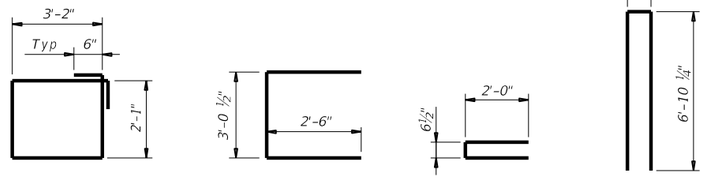
Galvanize dowel bars D.

HL93 LOADING



BEARING SEAT DETAIL

(Remove all loose material and clean the bearing surface before placing the bearing pad)



BARS S BARS U1 BARS U2 BARS V

STATE OF TEXAS
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5/20/21

Texas Department of Transportation | Bridge Division

ABUTMENT NO. 1 OR 2

TRIBUTARY OF HITTS CREEK BRIDGE

FILE: PR0016_BRG_8154ab01.dgn	DN: LMO	CK: LXG	DW: LH/JEB	CK: LMO
©TxDOT MARCH 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		76

DATE: 1/14/2021 4:27:23 PM
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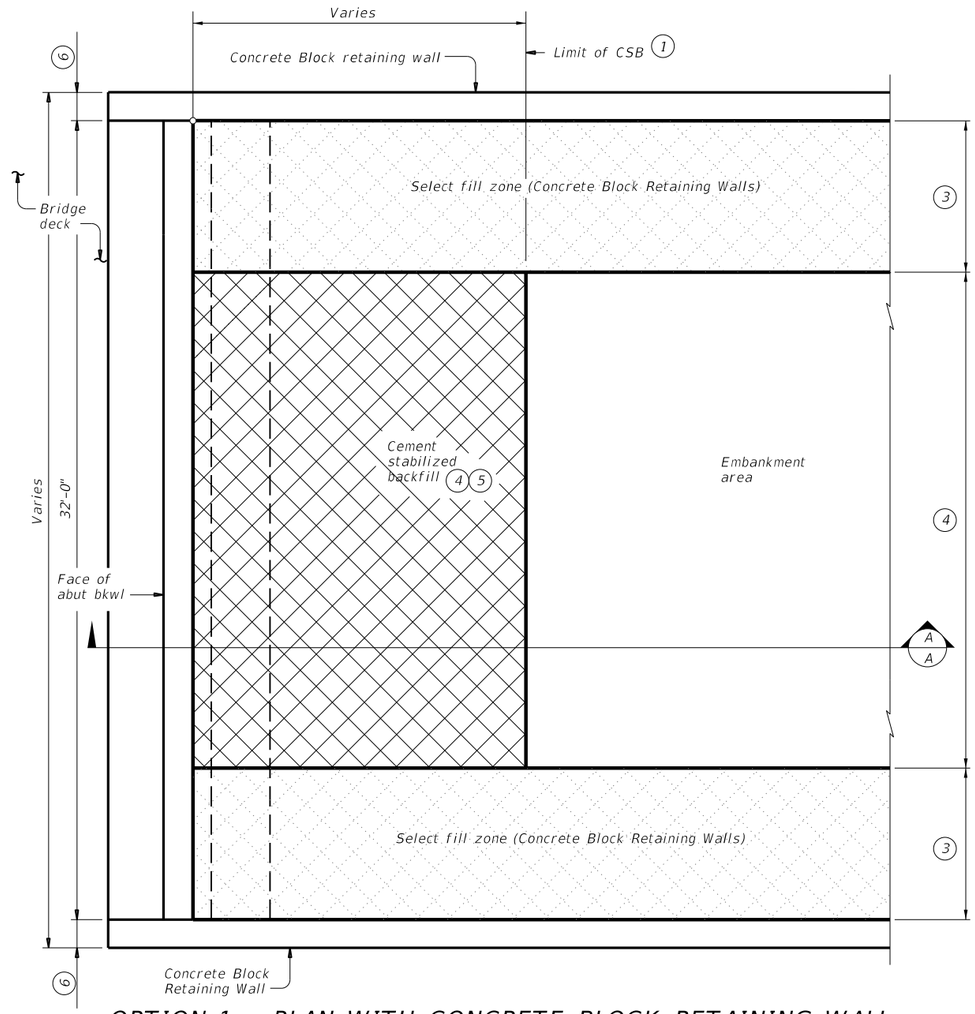
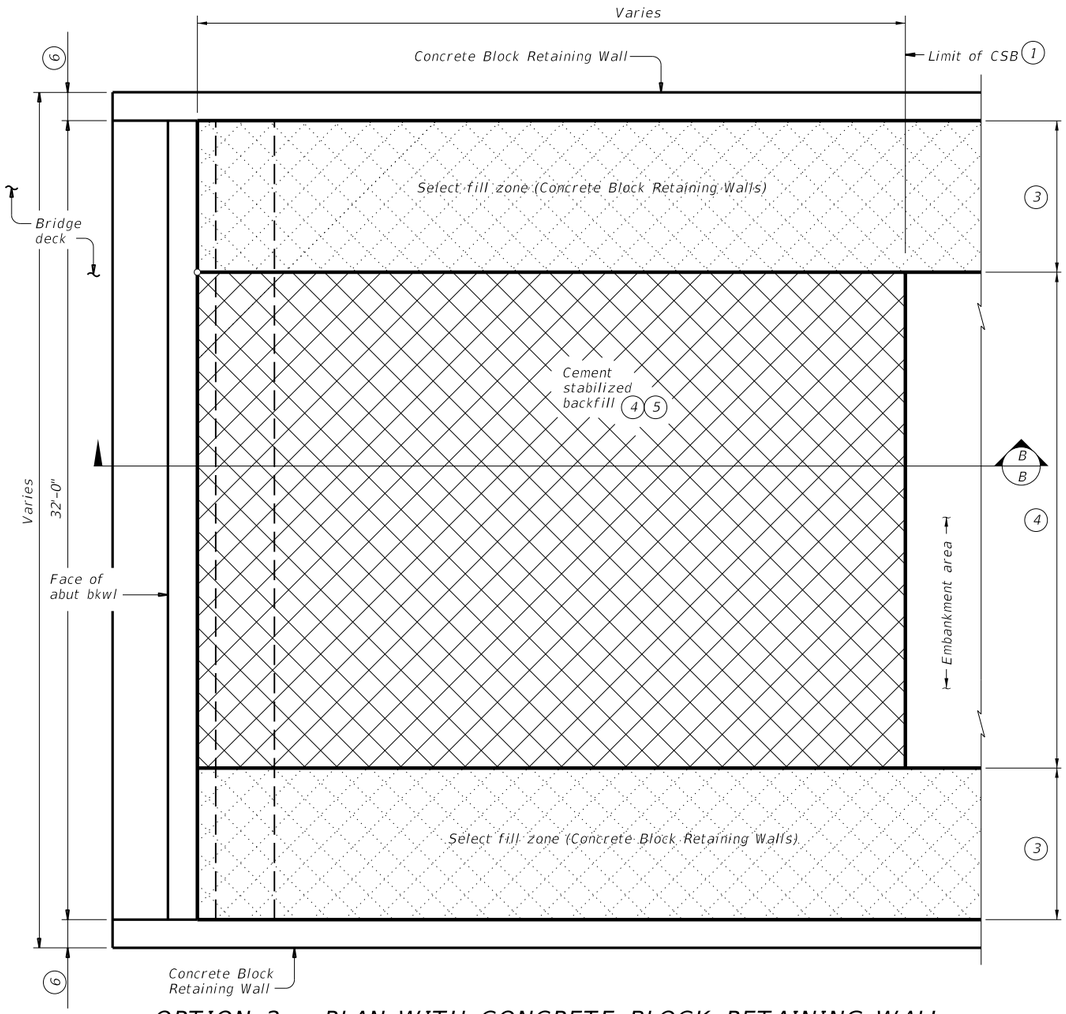
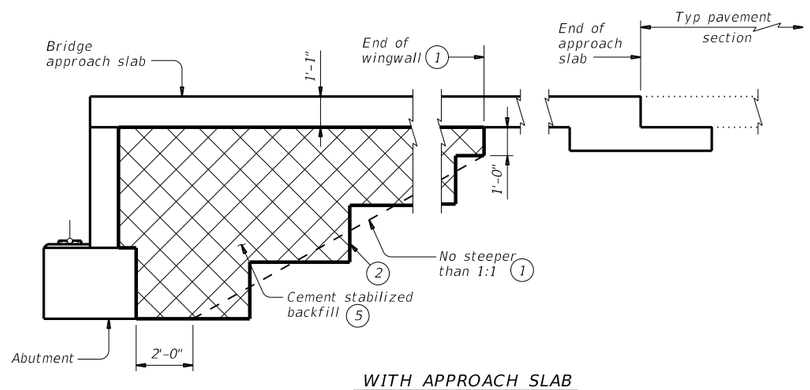


OPTION 1 ~ PLAN WITH CONCRETE BLOCK RETAINING WALL



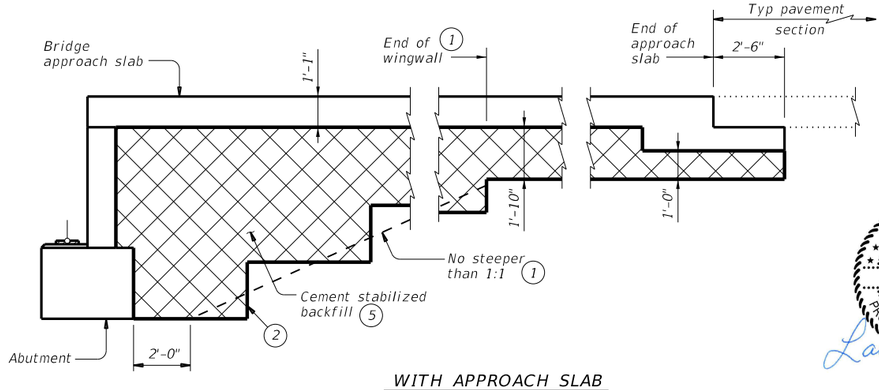
OPTION 2 ~ PLAN WITH CONCRETE BLOCK RETAINING WALL

1. There is not wingwall, extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
2. Bench backfill as shown with 12" (approximate) bench depths.
3. Where Concrete Block Retaining Walls are present, adjust CSB limits to accommodate the select fill zone. See Concrete Block Retaining Wall details for additional information.
4. When distance between select fill zones is less than 5'-0", Concrete Block Retaining Wall select fill may be substituted for cement stabilized backfill with approval from the Engineer.
5. If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
   a). If flowable backfill is to be placed over Concrete Block Retaining Wall backfill then a filter fabric will be placed over the Concrete Block Retaining Wall backfill prior to placement of the flowable fill; and
   b). Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).
6. See Concrete Block Retaining Wall. Refer RW(CB)(MOD)



WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SECTION A-A



WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SECTION B-B

STATE OF TEXAS
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5/20/21

Texas Department of Transportation

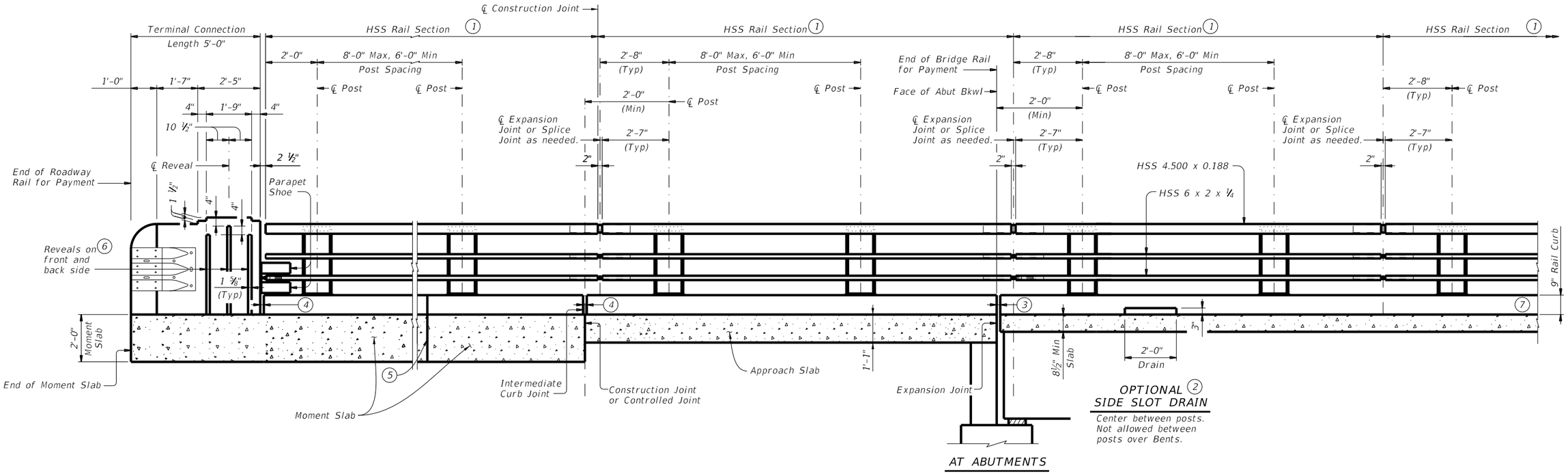
Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB (MOD)

FILE: PR0016_BRG_8154mi03.dgn	DN: LMO	CK: LXG	DW: JEB	CK: LMO
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PR 16
04-21: To accommodate Concrete Block Retaining Wall.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		77



ROADWAY ELEVATION OF T2P RAIL

(1) HSS rail sections must have at least two posts but not more than four.

(2) Drains may be used where shown elsewhere on the plans or as directed by the Engineer.

(3) Same as slab joint opening. (4" Max Expansion Joint).

(4) ¼" Min, ¾" Max.

(5) Add construction joints as needed in moment slab. Minimum length between joints is 100 ft.

(6) See Reveal Section on Type T2P standard sheets.

(7) Increase 2" for structures with overlay.

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TRAFFIC RAIL TYPE T2P MOUNTING DETAILS OFF BRIDGE

TYPE T2P (MOD)

FILE: PR0016_BRG_8154mi02.dgn	DN: LMO	CK: LXG	DW: JEB	CK: LMO
©TxDOT MARCH 2021	CONT	SECT	JOB	HIGHWAY
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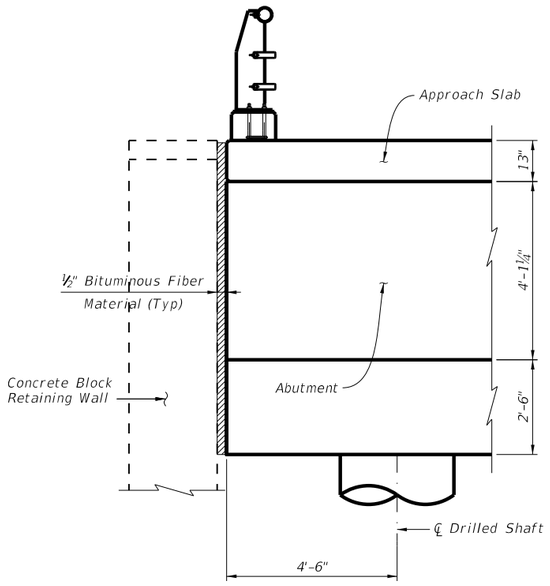
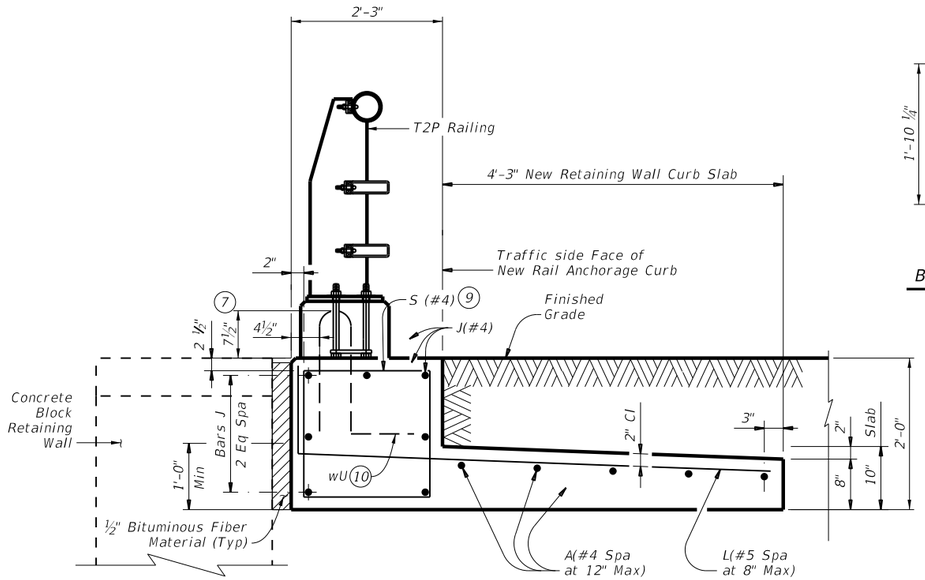
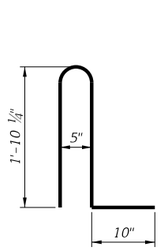
04-21: To accommodate railing attachment beyond bridge.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		78



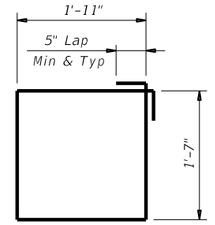
ELEVATION AT ABUTMENT CAP



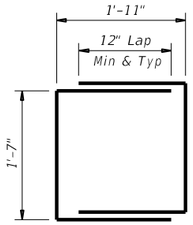
TYPICAL SECTION THRU TRAFFIC RAIL ON MOMENT SLAB ~ PARALLEL TO CONCRETE BLOCK RETAINING WALLS



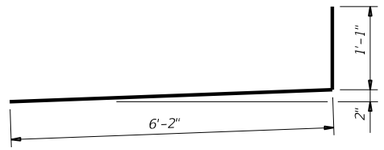
BARS wU (#5)



BARS S (#4)



OPTIONAL BARS S (#4)



BARS L (#5)

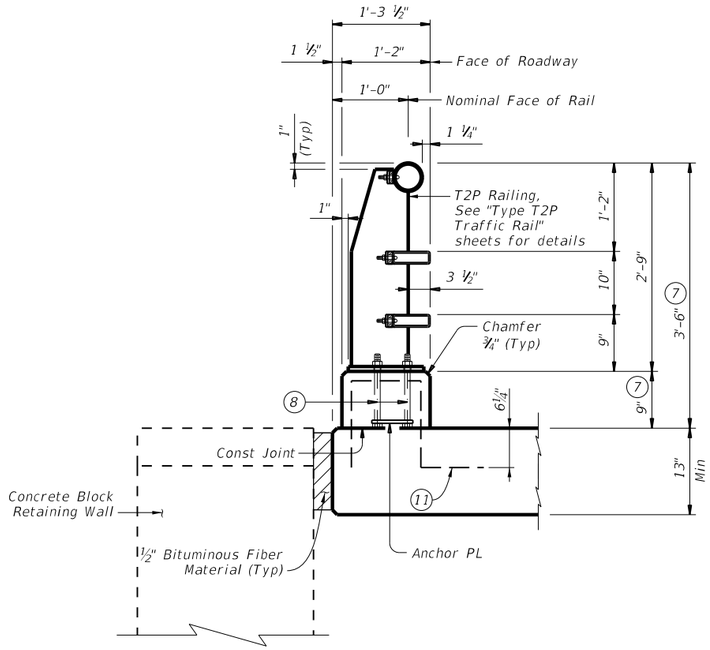
(7) Increase 2" for structures with overlay.

(8) ℄ ⅞" Dia Anchor Bolts. See "Anchor Bolt Assembly Details" in Type T2P standard sheets.

(9) S (#4) spaced longitudinally along grade beam at 9" Max. (Spaced 2" longitudinally from outside edge of moment slab.)

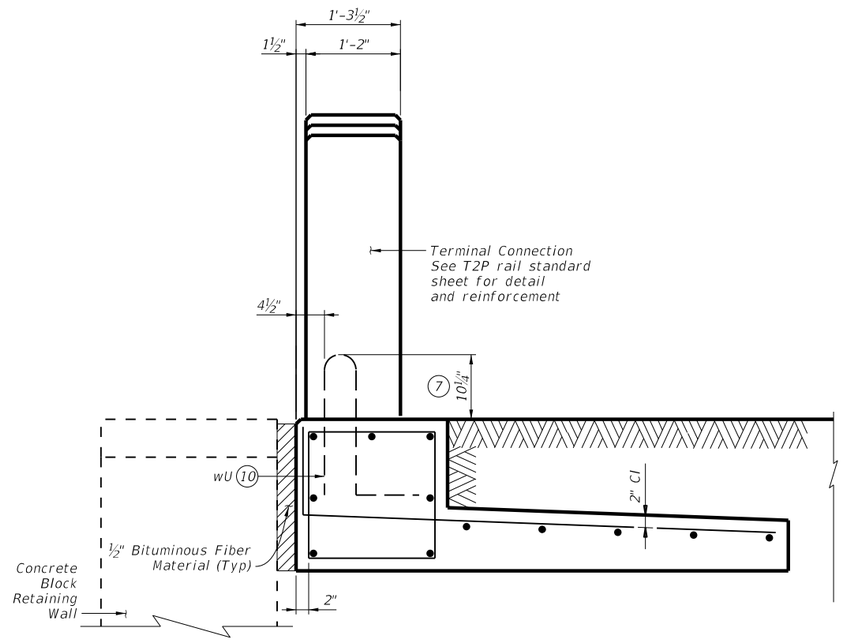
(10) Bars wU spaced longitudinally at 8" max.

(11) Bars V spaced longitudinally at 6" max with same edge distances as T2P standard sheets.



POST AT APPROACH SLAB

Reinforcing steel not shown for clarity.



TYPICAL SECTION AT TERMINAL CONNECTION

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.

MATERIAL NOTES:

Provide Class "C" concrete (f'c=3,600 psi).
Chamfer all exposed corners ¾" unless shown otherwise.
Provide Grade 60 reinforcing steel.
All reinforcement are to be uncoated. See "Traffic Rail T2P" standard sheets for details.
Provide bar laps, where required, as follows: Galvanized ~ #4 = 1'-11"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 8th Edition (2017).
See Type T2P rail standard for approved speed restrictions, notes and details not shown.
For vehicle safety, the top of the new curb must be flush with the finished grade.
Payment for rail anchorage curb and moment slab will be by CY of Class "C". Approximate moment slab concrete = 0.3 CY/LF and reinforcement = 32.9 LB/FT
See Bridge Layout for the lengths of moment slab and railing.

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

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5/20/21

SHEET 2 OF 2

Texas Department of Transportation | Bridge Division

TRAFFIC RAIL TYPE T2P MOUNTING DETAILS OFF BRIDGE

TYPE T2P (MOD)

FILE: PR0016_BRG_8154mi02.dgn	DN: LMO	CK: LXG	DW: JEB	CK: LMO
©TxDOT MARCH 2021	CONT	SECT	JOB	HIGHWAY
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04-21: To accommodate railing attachment beyond bridge.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		79

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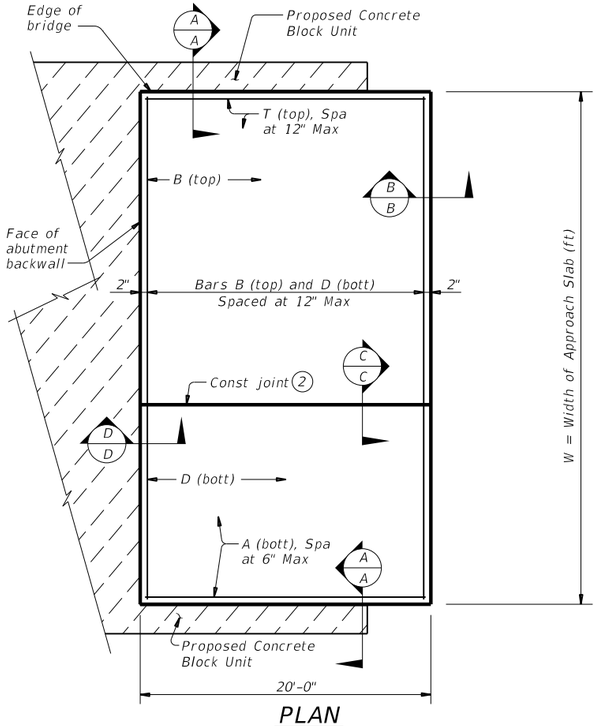
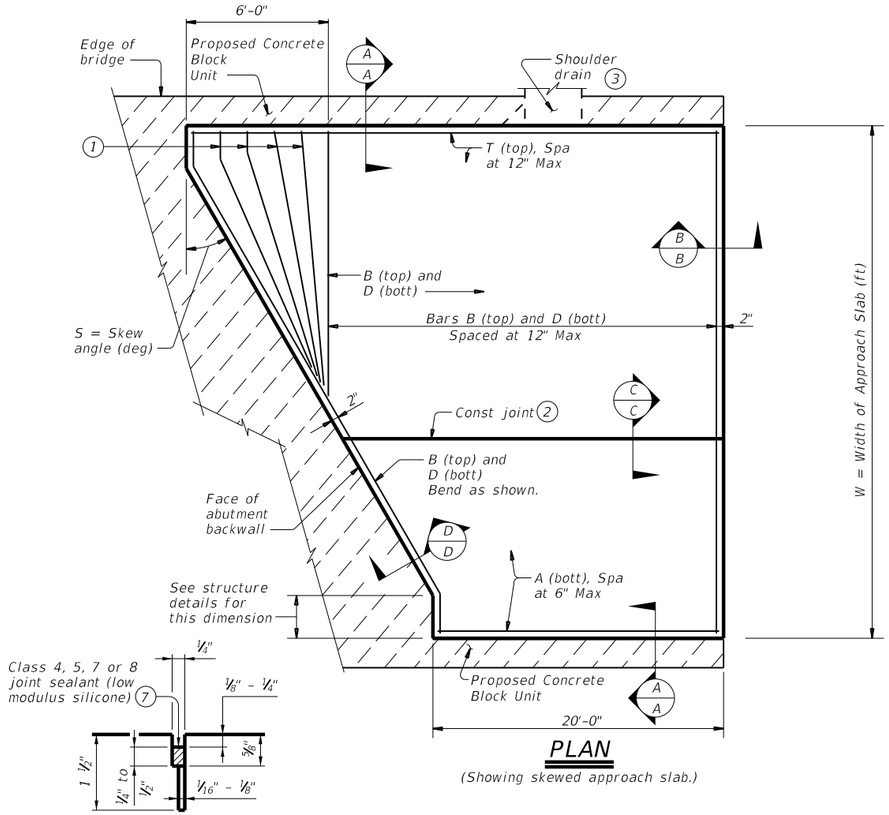


PLAN

(Showing non-skewed approach slab.)



PLAN

(Showing skewed approach slab.)

BAR TABLE

BAR	SIZE
A	#8
B	#5
D	#5
T	#5

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab

Volume of Appr Slab Conc (CY) = $0.802W + 0.02W^2 \tan S$

W = Width of Approach Slab (ft)

S = Skew Angle (deg)

(1) Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.

(2) Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.

(3) See details elsewhere in plans for shoulder drain location and details.

(4) For Contractor's information only. Quantities shown are for one approach slab.

(5) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

(6) See details elsewhere in plans for required cross-slope.

(7) Place in accordance with Item 438.

(8) Provide backer rod that is 25% larger than joint opening and compatible with the sealant.

(9) If bridge rail is present at the Proposed Concrete Block Unit, place ½" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

GENERAL NOTES:

Construct approach slab in accordance with Item 422.

Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.

Provide Grade 60 reinforcing steel.

Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 ½" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 ½" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)

Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310. "Joint Sealants and Fillers."

Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.

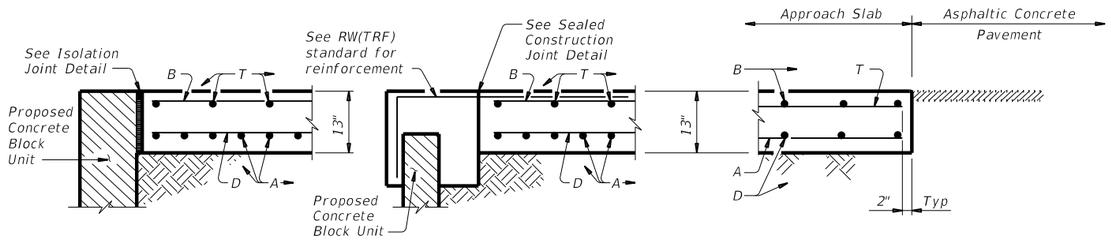
Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.

Cure for 4 days using water or membrane curing per Item 422.

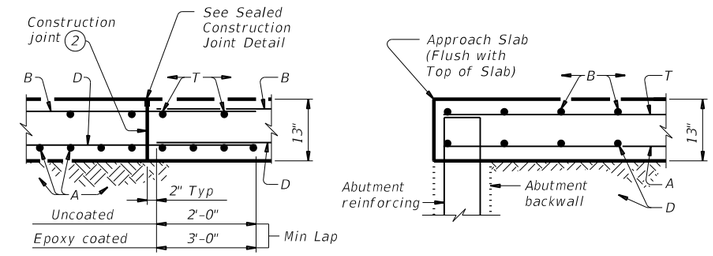
All details shown herein are subsidiary to bridge approach slab.

Cover dimensions are clear dimensions, unless noted otherwise.

LONGITUDINAL SAW CUT JOINT DETAIL



SHOWING CONCRET BLOCK WALL

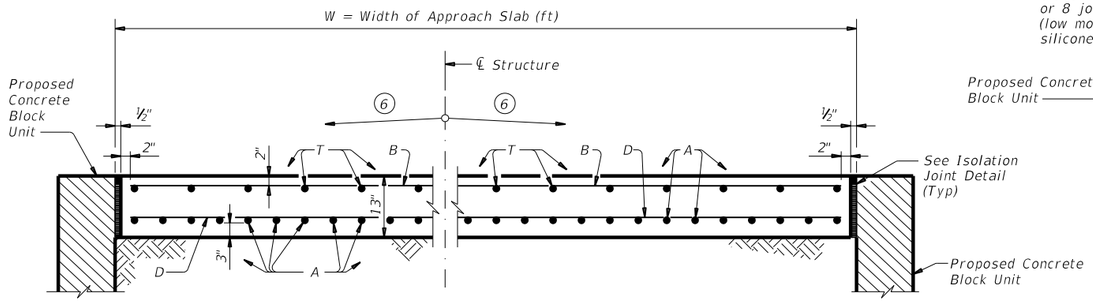


SECTION A-A

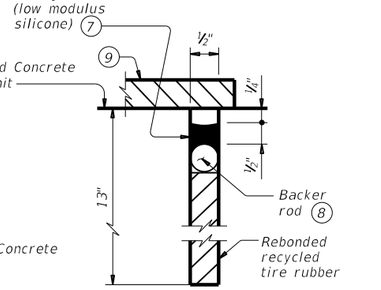
SECTION B-B

SECTION C-C (5)

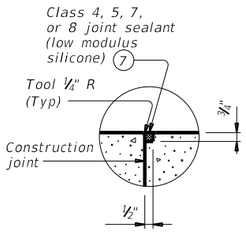
SECTION D-D



TYPICAL TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

BRIDGE APPROACH SLAB

ASPHALTIC CONCRETE PAVEMENT

BAS-A

FILE: basaste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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02-20: Removed stress relieving pad.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		80

DATE: 05/19/2021 03:08 PM
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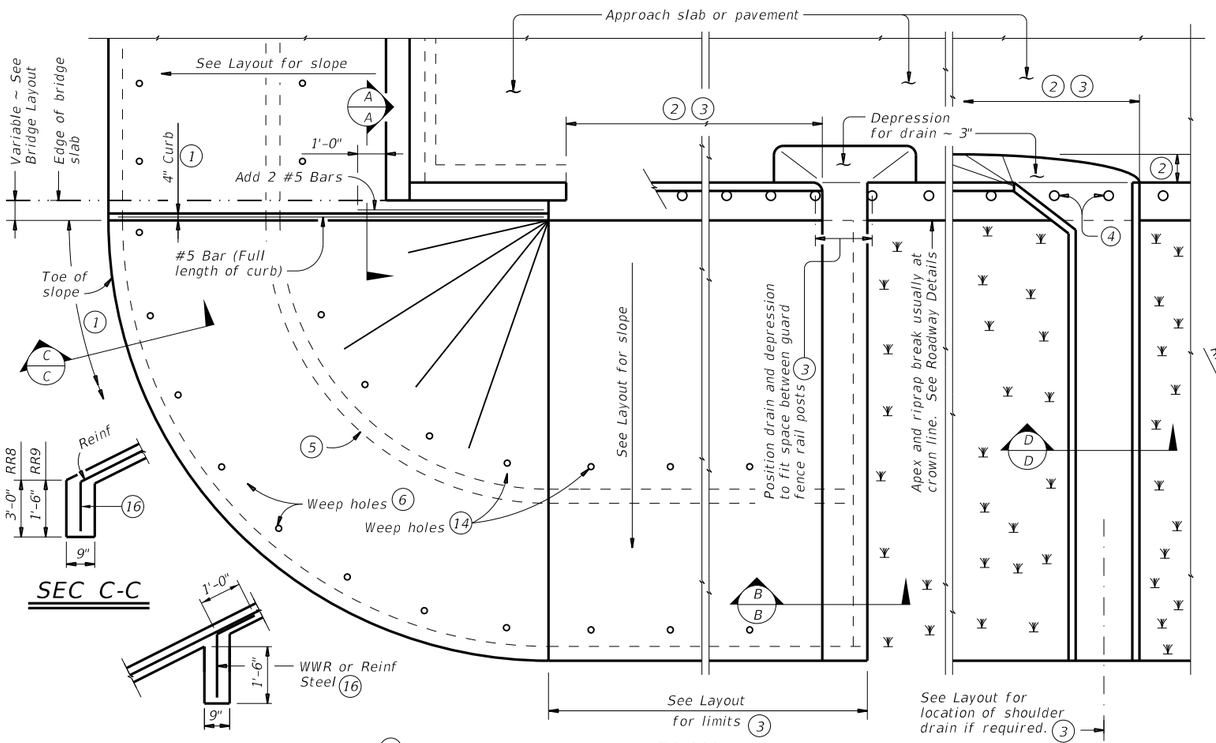
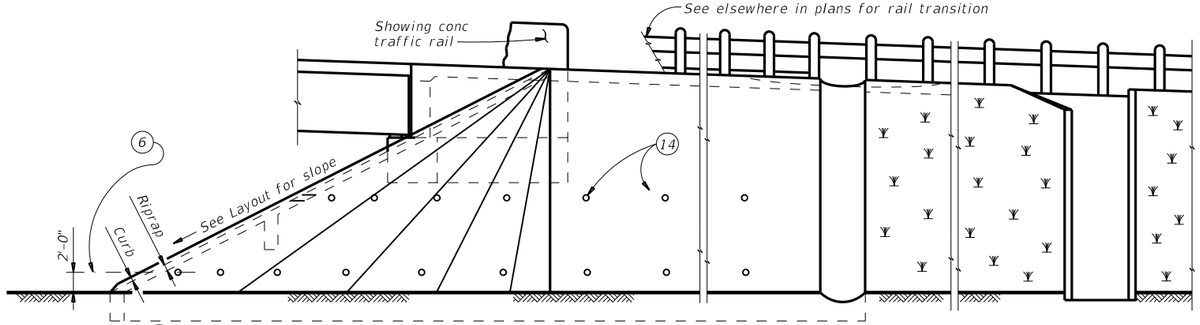


PLAN

SEC C-C

INTERMEDIATE TOEWALL (5)



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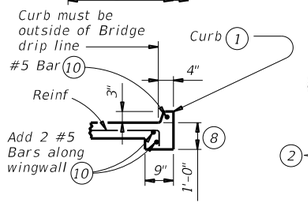
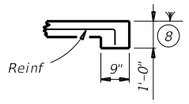
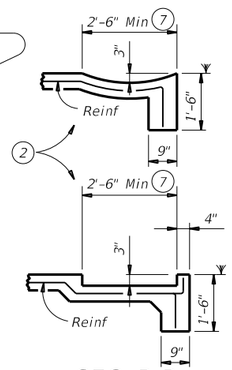


SEC A-A



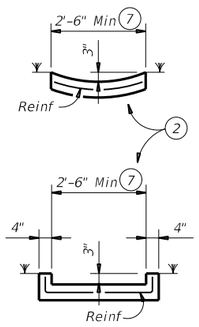
SEC B-B

(No drain)



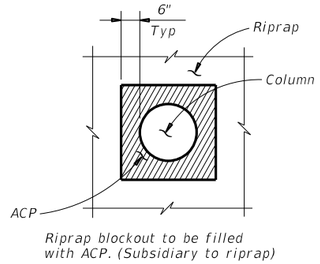
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

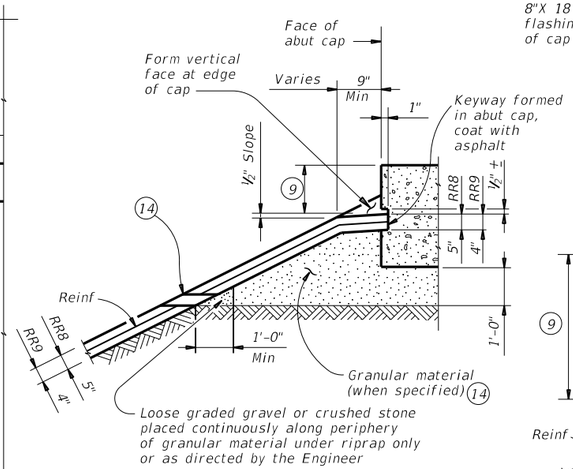
(Shoulder drain)



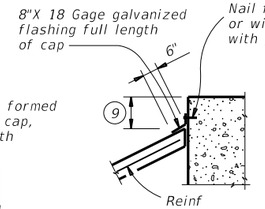
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

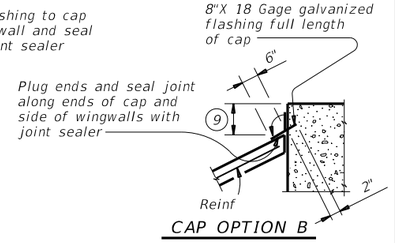
(As directed by the Engineer)



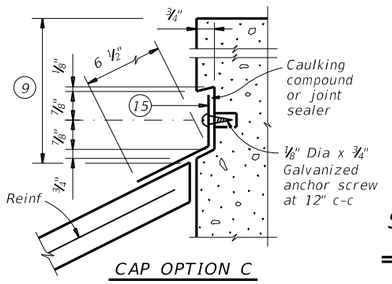
SHOWING KEYWAY OPTION



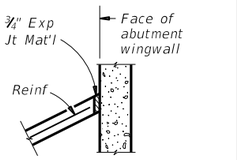
CAP OPTION A



CAP OPTION B

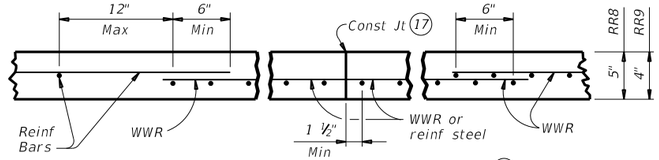


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

(1) When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.

(2) Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.

(3) Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.

(4) See details elsewhere in plans for installation of guard fence posts through concrete riprap.

(5) Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.

(6) Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.

(7) Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.

(8) Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.

(9) Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

(10) #5 bars shown are required even when synthetic fiber reinforcing option is selected.

(11) Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.

(12) Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.

(13) Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.

(14) If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.

(15) 8" x 18 Gage Galv Sheet Metal

(16) Provide WWR or #3 bars, with 1'-0" extension into slope.

(17) WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PR 16
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	TYL	SMITH		81

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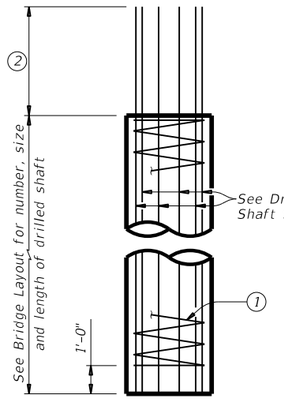
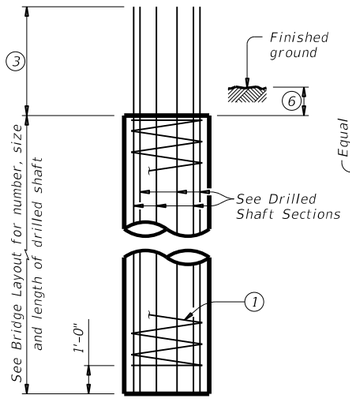
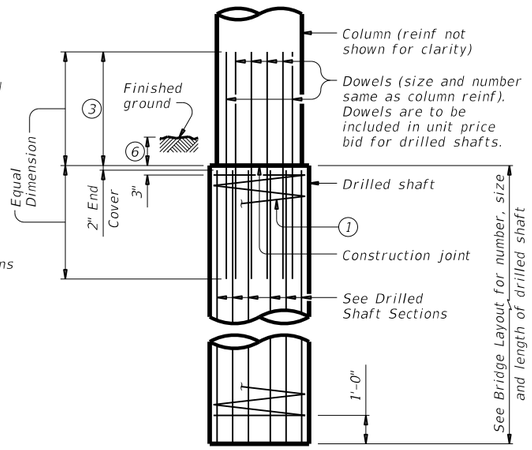


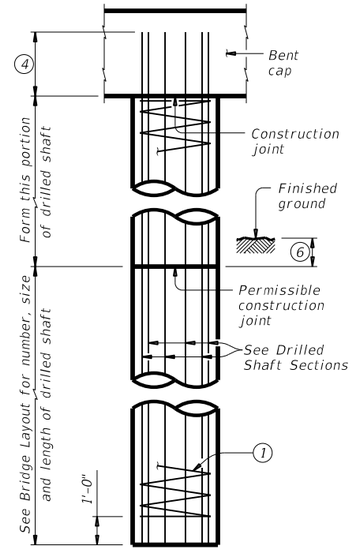
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



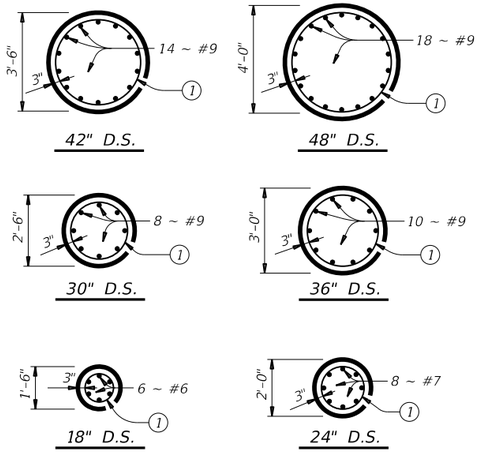
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

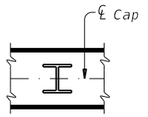


DRILLED SHAFT SECTIONS

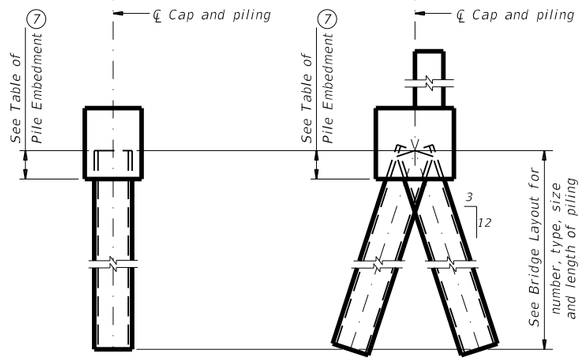
DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

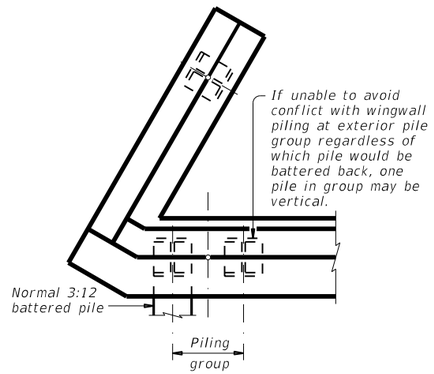
See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.



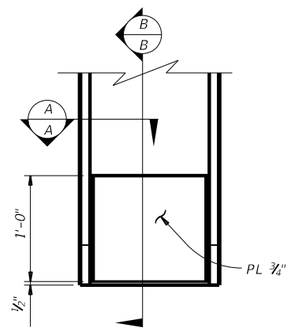
ORIENTATION OF STEEL H-PILING



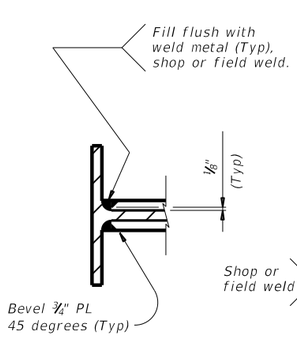
PILING DETAILS
(Concrete or steel H)



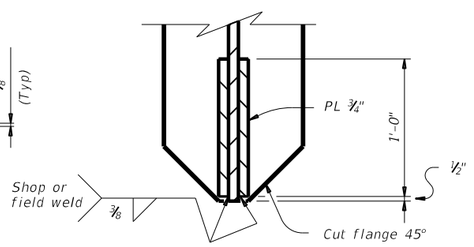
DETAIL "A"
(Showing plan view of a 30° skewed abutment)



ELEVATION



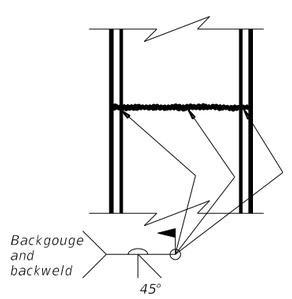
SECTION A-A



SECTION B-B

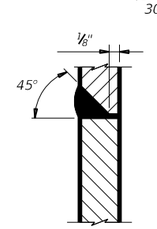
STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.



STEEL H-PILE SPLICE DETAIL

Use when required.



SECTION THRU FLANGE OR WEB

(1) #3 spiral at 6" pitch (one and a half flat turns top and bottom).

(2) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"

(3) Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(4) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"

(5) Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		82

DATE: 05/19/2021 03:08 PM
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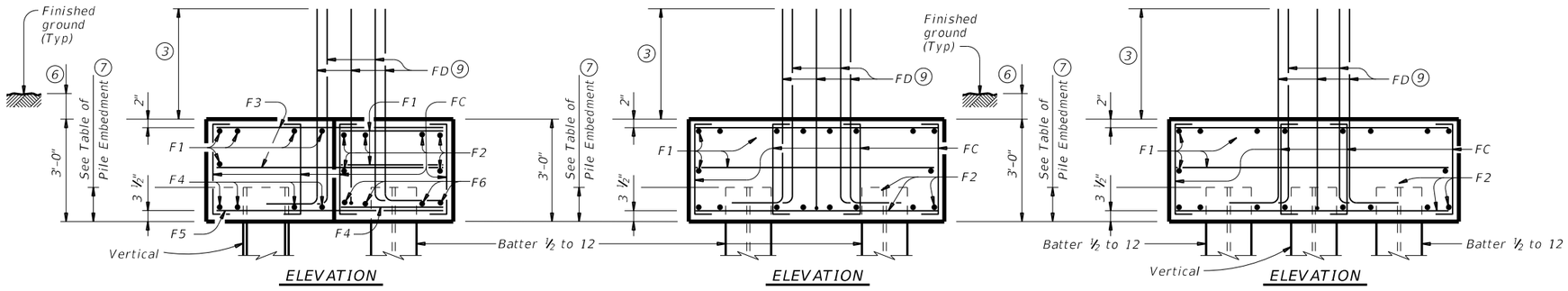
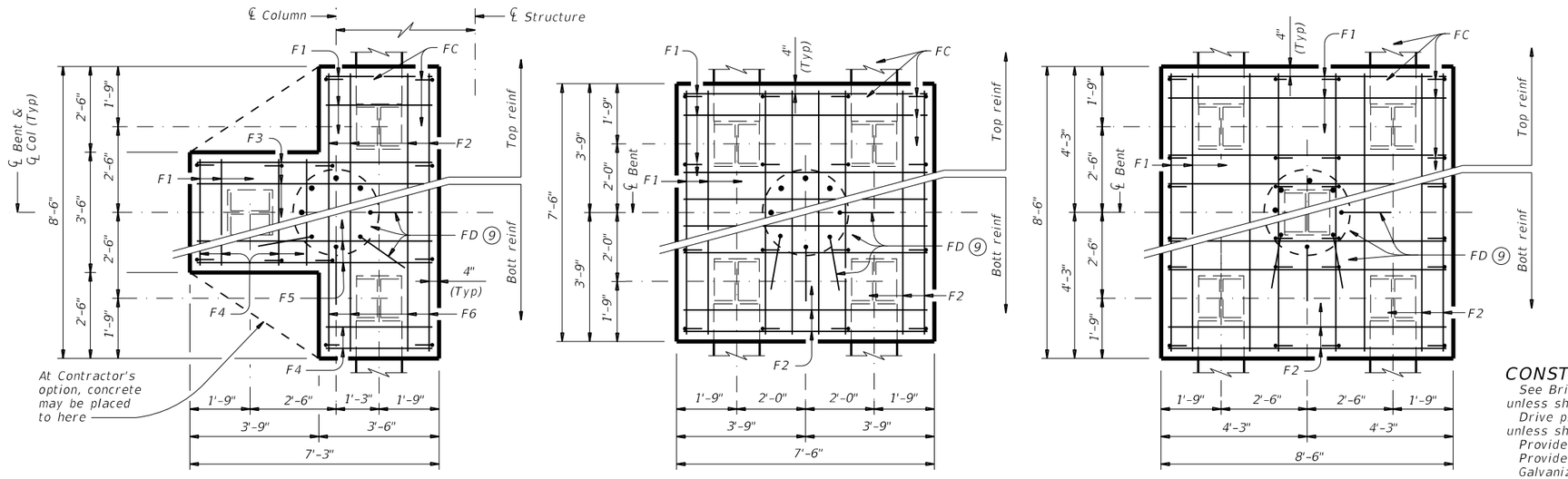




THREE PILE FOOTING (8)

For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.

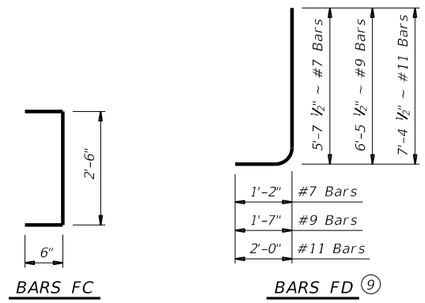


TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	623
Class "C" Concrete			CY	4.8

ONE 4 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	7'- 2"	96
F2	16	#8	7'- 2"	306
FC	16	#4	3'- 6"	37
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	659
Class "C" Concrete			CY	6.3

ONE 5 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	8'- 2"	109
F2	16	#9	8'- 2"	444
FC	24	#4	3'- 6"	56
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	829
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:

See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.

Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.

Provide Class C Concrete (f'c = 3,600 psi), unless shown otherwise.

Provide Grade 60 reinforcing steel.

Galvanize reinforcing if shown elsewhere in the plans.

Provide bar laps for drilled shaft reinforcing, where required, as follows:

Uncoated or galvanized (#6) ~ 2'-6"
Uncoated or galvanized (#7) ~ 2'-11"
Uncoated or galvanized (#9) ~ 3'-9"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

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

DESIGNER NOTES:

Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.

Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.

Maximum allowable pile loads for the footings shown are:

72 Tons/Pile with 24" Dia Columns
80 Tons/Pile with 30" Dia Columns
100 Tons/Pile with 36" Dia Columns
120 Tons/Pile with 42" Dia Columns

(3) Min lap with column reinforcing:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

(8) See Bridge Layout for type, size and length of piling.

(9) Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.

(10) Adjust FD quantity, size and weight as needed to match column reinforcing.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

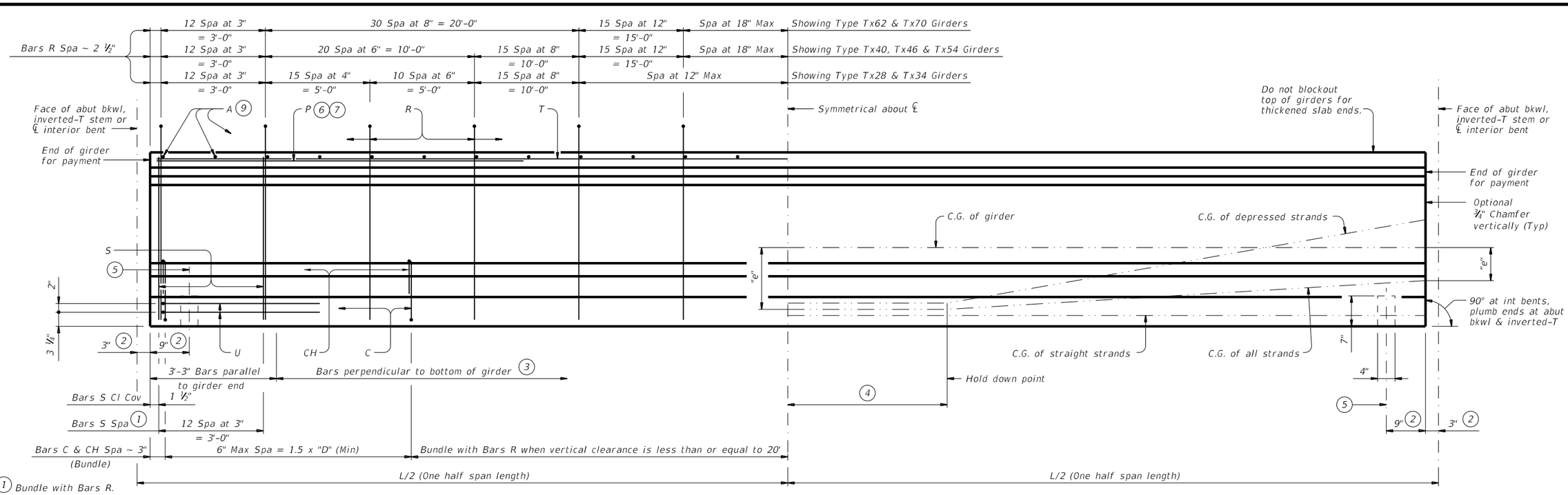
Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PR 16
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		83

DATE: 05/19/2021 03:08 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\10 - TYL\Design Projects\060601007\4 - Design\BridgeVPR16 State Park Bridge\8154m101.dgn



(1) Bundle with Bars R.

(2) Measured along ℄ Girder at interior bents; perpendicular to abutment bkwl or inverted-T stem.

(3) The average of the top and bottom spacing of Bars R cannot exceed the required spacing.

(4) L/20, but not less than 5'-0" (-0,+2').

(5) ℄ 4" x 1 ½" Vertical Slotted Hole at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details. Anchorage holes may be tapered (4 ¾" x 1 ⅜") at base. If holes are formed with sheet metal, forms may be left in place.

GIRDER ELEVATION

(6) Bars P (#6 x 15'-0") required in Tx62 and Tx70 girders. At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(7) Bars P (#6 x 15'-0") are only required in Tx28, Tx34, Tx40, Tx46, and Tx54 girders when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(8) 1 ⅜" Clear Cover to Bars S.

(9) Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".

(10) Based on 155 pcf total weight of concrete and reinforcing steel.

(11) Smooth trowel finish on the slab overhang side of exterior girder.

GIRDER DIMENSIONS AND SECTION PROPERTIES

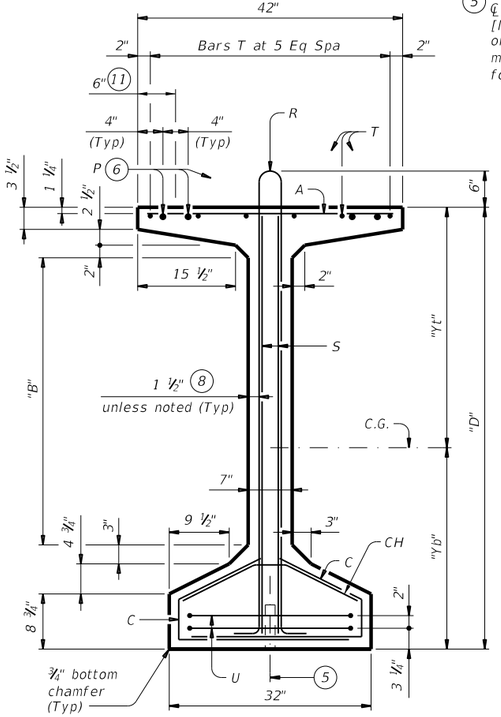
Girder Type	"D" (in.)	"B" (in.)	"Yt" (in.)	"Yb" (in.)	Area (in.²)	"Ix" (in.⁴)	"Iy" (in.⁴)	Weight (10) (plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	630
Tx34	34	12	18.49	15.51	627	88,355	40,731	675
Tx40	40	18	21.90	18.10	669	134,990	40,902	720
Tx46	46	22	25.90	20.10	761	198,089	46,478	819
Tx54	54	30	30.49	23.51	817	299,740	46,707	880
Tx62	62	37 ½"	33.72	28.28	910	463,072	57,351	980
Tx70	70	45 ½"	38.09	31.91	966	628,747	57,579	1,040

GENERAL NOTES:

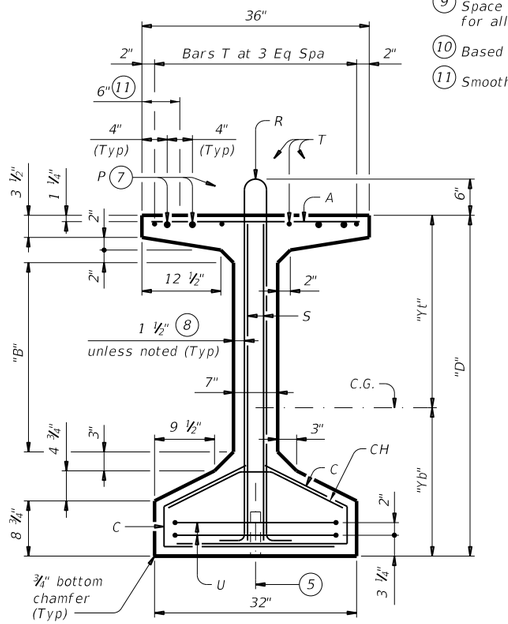
Designed according to AASHTO LRFD Bridge Design Specifications.
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A1064) may be substituted for Bars A, C, R or T unless otherwise noted.
It is permissible for bars or strands to come in contact with materials used in forming anchor holes.

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

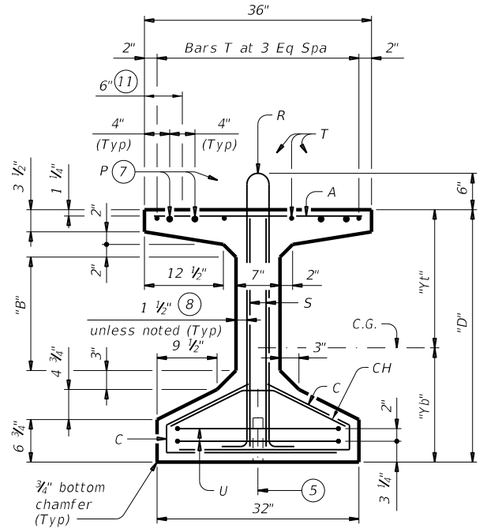
HL93 LOADING



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40

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PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: igdstds1-19.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
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REVISIONS	0606	01	007	PR 16
10-19: Added Bars C and CH full length for VC<= 20'	DIST	COUNTY		SHEET NO.
	TYL	SMITH		84

DATE: 05/19/2021 03:08 PM
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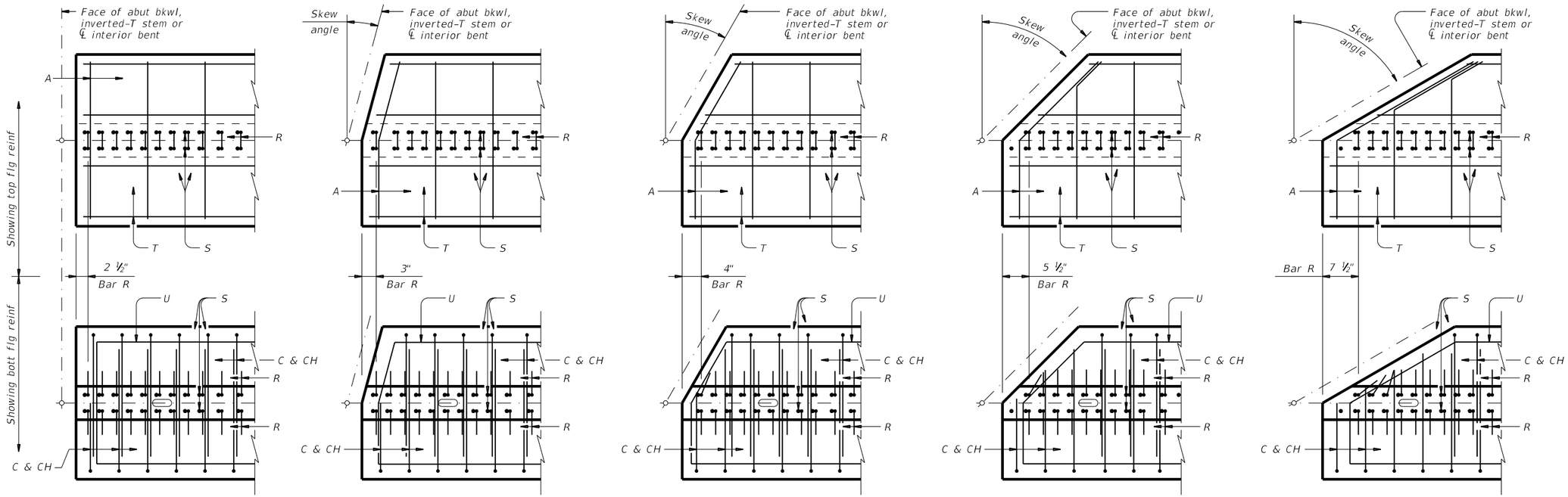
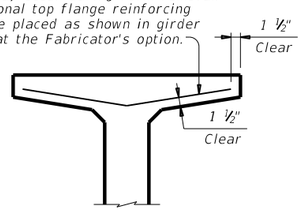
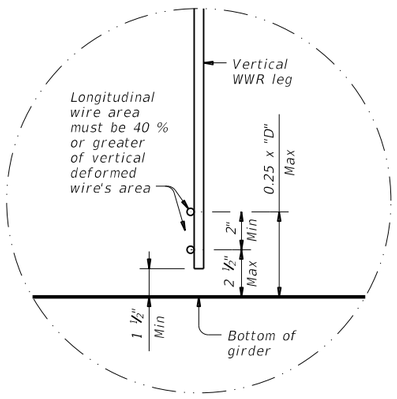


PLAN OF GIRDER ENDS (12)

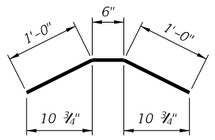
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



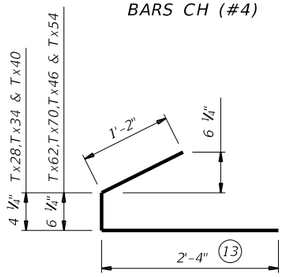
OPTIONAL TOP FLANGE REINFORCING DETAIL



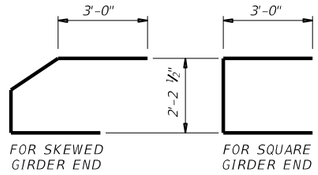
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



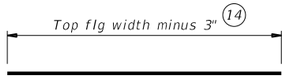
BARS CH (#4)



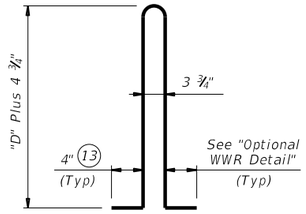
BARS C (#4)



BARS U (#5)

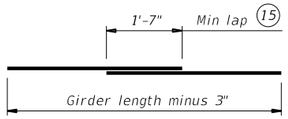


BARS A (#3)



BARS R (#4) (16)

BARS S (#6)



BARS T (#4)

(12) Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.

(13) Bars may be cut or bent at skewed end as required.

(14) Increase as necessary for bars at skewed end.

(15) No portion of bar less than 10 ft.

(16) For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

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REVISIONS	0606	01	007	PR 16
10-19: Added Bars C and CH full length for VC<= 20'	DIST	COUNTY		SHEET NO.
	TYL	SMITH		85

DATE: 05/19/2021 03:08 PM
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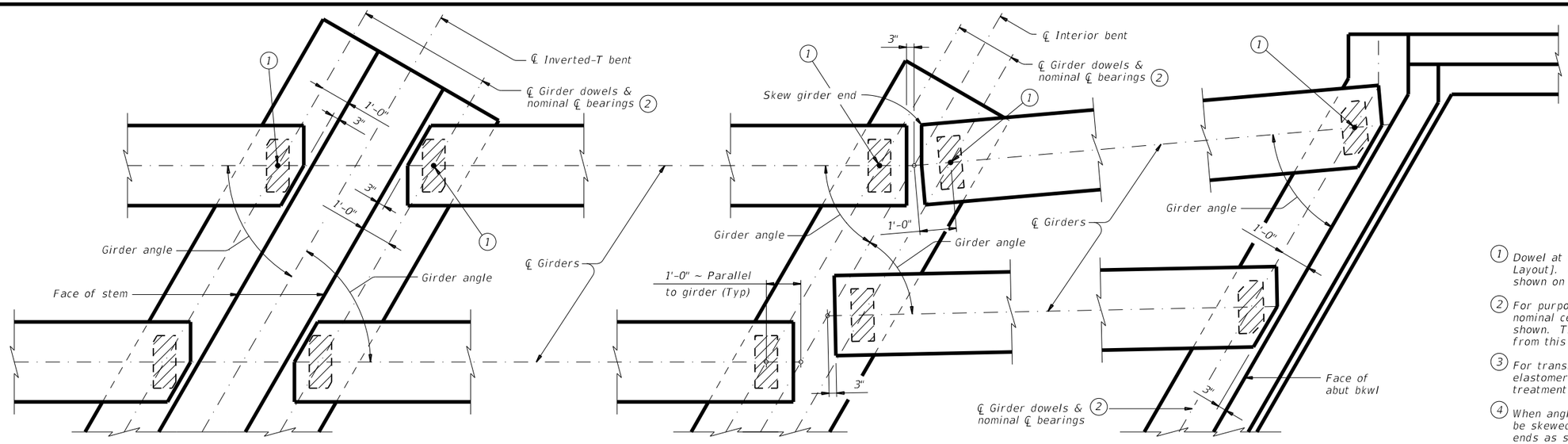


AT INVERTED-T BENT W/SKEW

AT CONVENTIONAL INTERIOR BENT W/SKEW

AT ABUTMENT W/SKEW (3)

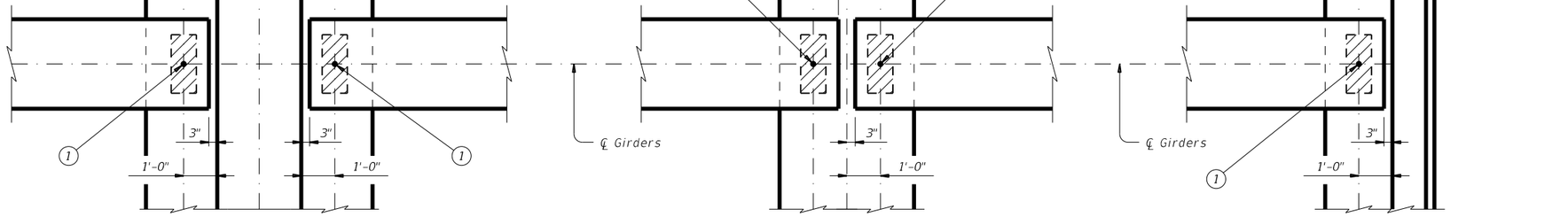
(1) Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

(3) For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.

(4) When angle exceeds 0°, one or both girders ends must be skewed to maintain the clearance between girder ends as shown in view.

(5) See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.

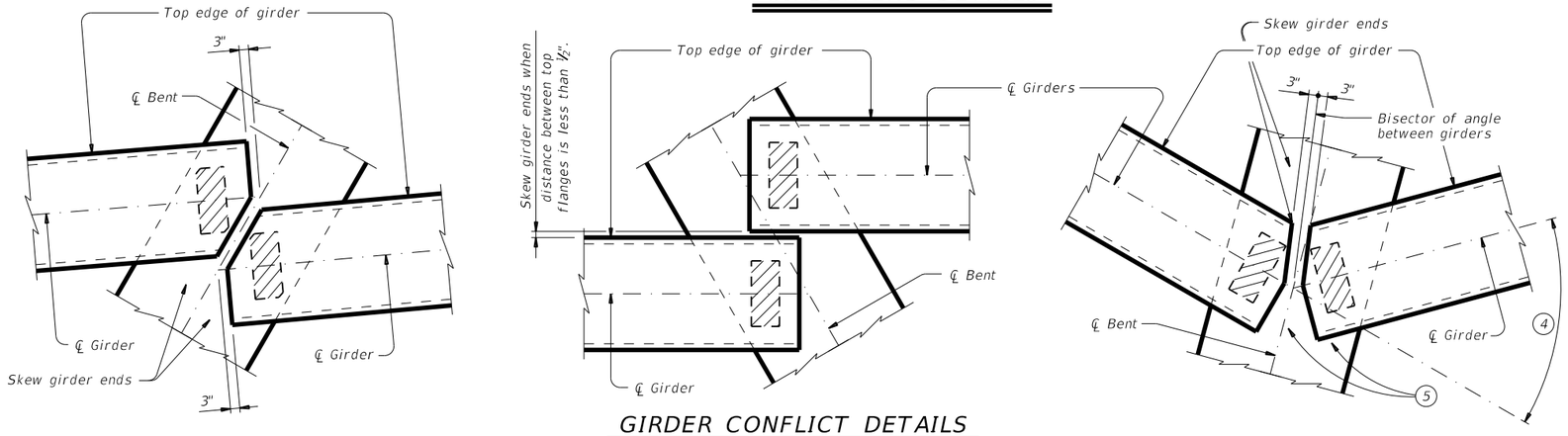


AT INVERTED-T BENT

AT CONVENTIONAL INTERIOR BENT

AT ABUTMENT (3)

GIRDER END DETAILS



GIRDER CONFLICT DETAILS

GENERAL NOTES:
These details accommodate skew angles up to 60°.
Shop drawings for approval are required.
A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.
Cost of furnishing and installing elastomeric bearings, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".

HL93 LOADING SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

IGEB

FILE: igebsts1-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
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REVISIONS	0606	01	007	PR 16
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	TYL	SMITH		86

DATE: 05/19/2021 03:08 PM
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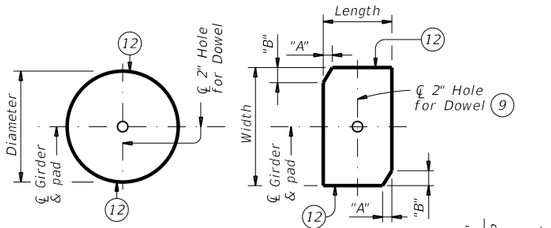
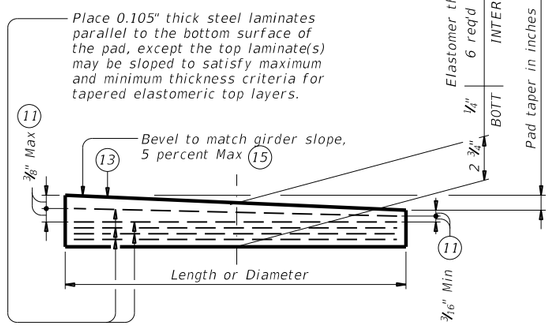


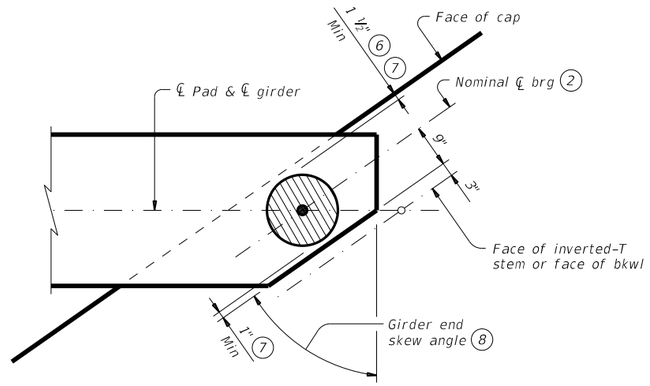
PLANS (10)



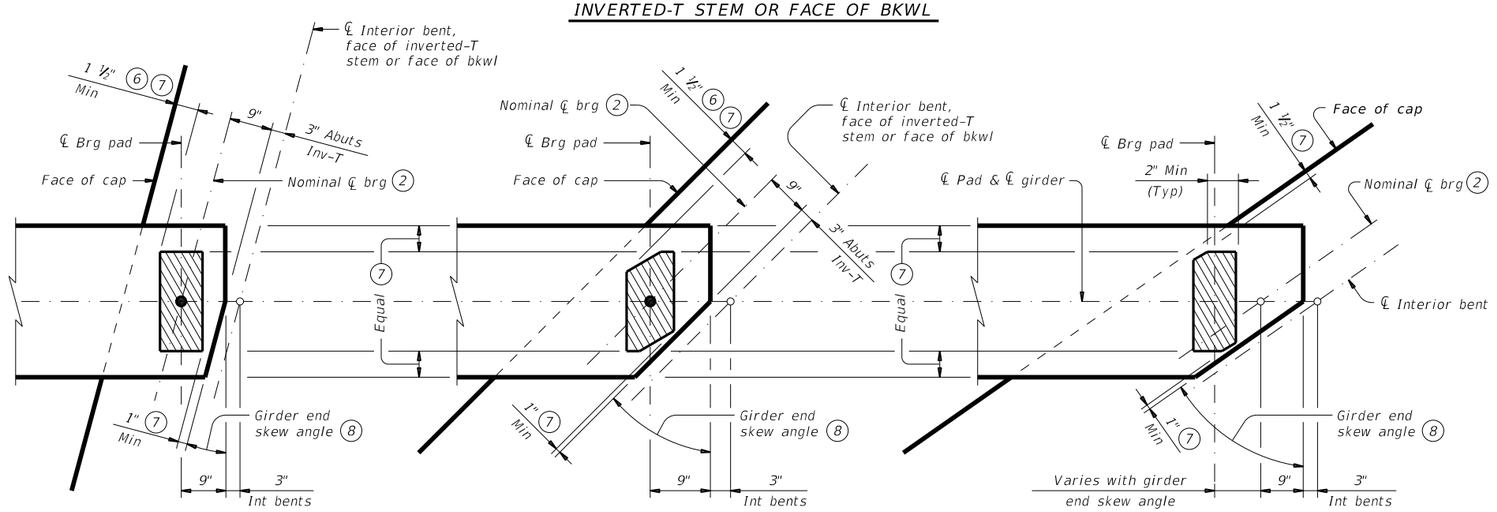
ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)



ROUND BEARINGS FOR SKEWED GIRDER ENDS AT FACE OF INVERTED-T STEM OR FACE OF BKWL



SKEWED GIRDER ENDS AT INT BENTS, FACE OF INVERTED-T STEM OR FACE OF BKWL

SKEWED GIRDER ENDS AT CONVENTIONAL INTERIOR BENTS (16)

(NO GIRDER DOWELS)

BEARING PAD PLACEMENT DIAGRAMS

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)

Girder Type	Abutments: Face of Bkwl to Face of Cap	Int Bents: Overall Cap Width	Inv-T Bents: Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 ½"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 ½"

TABLE OF BEARING PAD DIMENSIONS

Bent Type	Girder Type	Bearing Type (13)	Girder End Skew Angle Range	Pad Size Lgth x Wdth	Pad Clip Dimensions "A"	Pad Clip Dimensions "B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-3-"N"	30°+ thru 45°	9" x 21"	4 ½"	4 ½"
		G-4-"N"	45°+ thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21°+ thru 30°	9" x 21"	1 ½"	2 ½"
		G-7-"N"	30°+ thru 45°	10" x 21"	4 ½"	4 ½"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 ¼"	4 ¼"
CONVENTIONAL INTERIOR BENTS	Tx28,Tx34, Tx40,Tx46 & Tx54	---	---	---	---	---
		---	---	---	---	---
		G-1-"N"	0° thru 60°	8" x 21"	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 60°	9" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) (16)	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
		G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 ½"
	Tx62 & Tx70	G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-5-"N"	18°+ thru 30°	9" x 21"	---	---
		G-11-"N"	30°+ thru 45°	9" x 21"	1 ½"	1 ½"
		G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 ¾"

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

(6) 3" for inverted-T.

(7) Place centerline pad as near nominal centerline bearing as possible between limits shown.

(8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.

(9) Provide 2" dia hole only at locations required. See Substructure details for location.

(10) See Table of Bearing Pad Dimensions for dimensions.

(11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(12) Locate Permanent Mark here.

(13) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in ⅛" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for ⅛" taper)
N=2, (for ¼" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan girder slope by more than $\left(\frac{0.0625"}{\text{Length or Dia}}\right)$ IN/IN.

(14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.

(15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.

(16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

HL93 LOADING SHEET 2 OF 3

Texas Department of Transportation — Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

IGEB

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	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		87

DATE: 05/19/2021 03:08 PM
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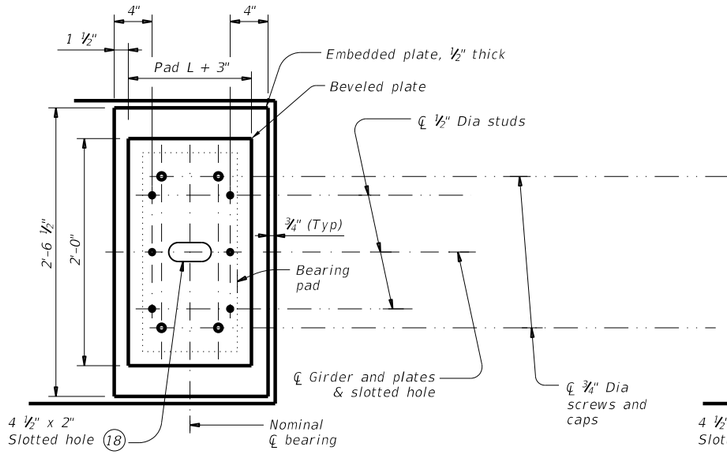
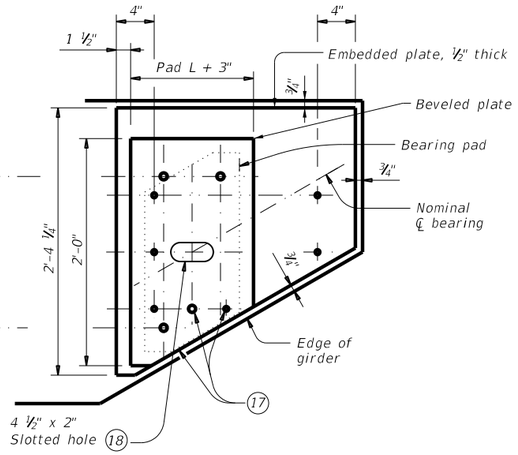
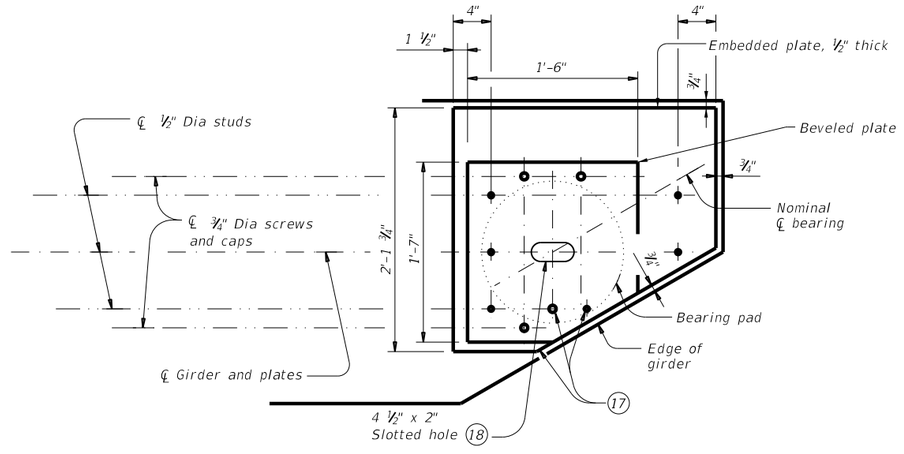


NORMAL GIRDER END
RECTANGULAR BEARING PAD

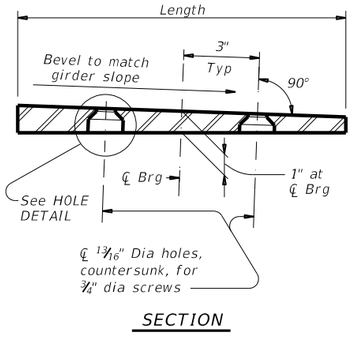


SKEWED GIRDER END
CLIPPED RECTANGULAR BEARING PAD

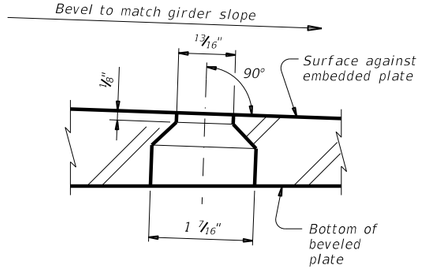


SKEWED GIRDER END
15" DIA BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS



SECTION



HOLE DETAIL

(17) Cut beveled and embedded plates to match girder end skew. Adjust location of screw and stud as shown when necessary.

(18) Slotted hole is required at doweled girder end locations.

SOLE PLATE NOTES:

Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when the girder slope exceeds 5 percent or if otherwise required in the plans. Provide for all girders in the span.

On the shop drawings, dimension sole plates to the nearest 1/16" based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1/16"+/-, except variation from a plane parallel to the theoretical top surface can not exceed 1/16" total. Bearing surface tolerances listed in Item 424 apply to embedded and beveled plates.

Steel plate must conform to ASTM A36, A572 Gr 50, or A709 Gr 36 or Gr 50. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

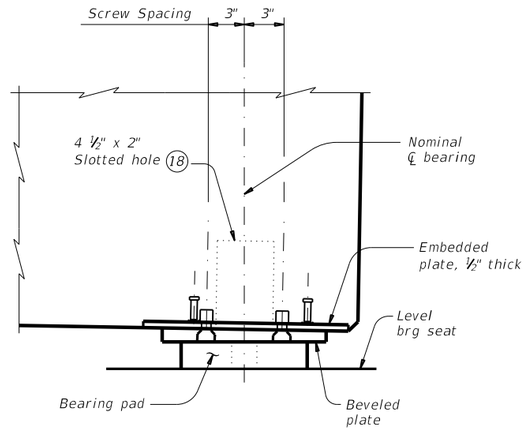
When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

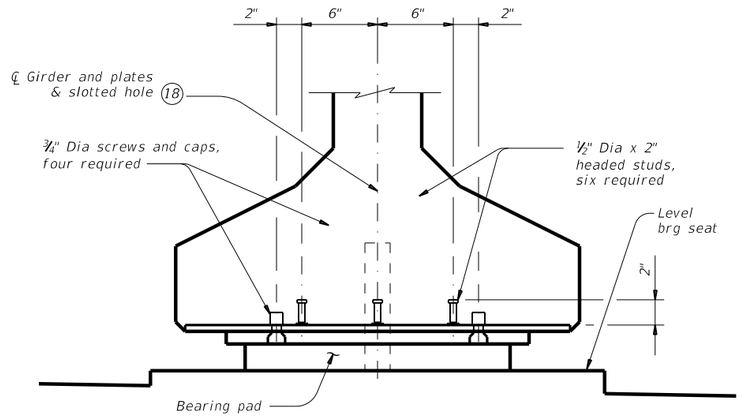
¾" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a ¾" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than ½" deep or deeper than 1".

Install beveled sole plates prior to shipping girders. Installed screw heads must not protrude below the bottom of the beveled plate.

BEVELED PLATE DETAILS



SIDE ELEVATION



END ELEVATION
Showing normal girder end.

GIRDER DETAILS

HL93 LOADING SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

IGEB

FILE: igebsts1-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
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REVISIONS	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		88

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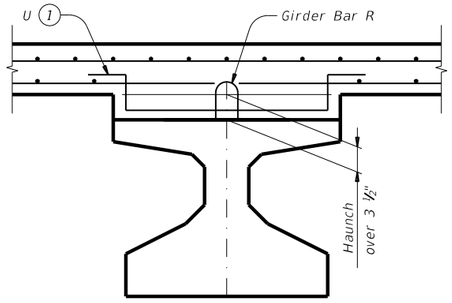
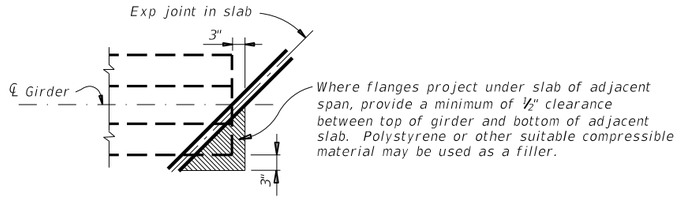
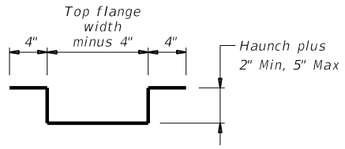


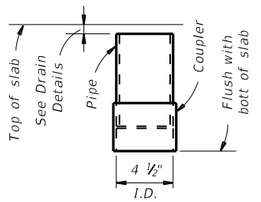
HAUNCH REINFORCING DETAIL



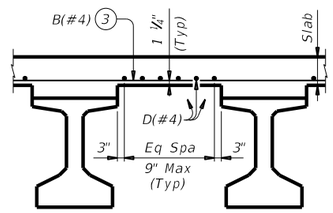
TREATMENT AT GIRDER END FOR SKEWED SPANS



BARS U (#4)

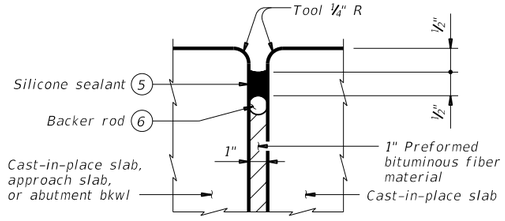


C-I-P DRAIN DETAIL (2)

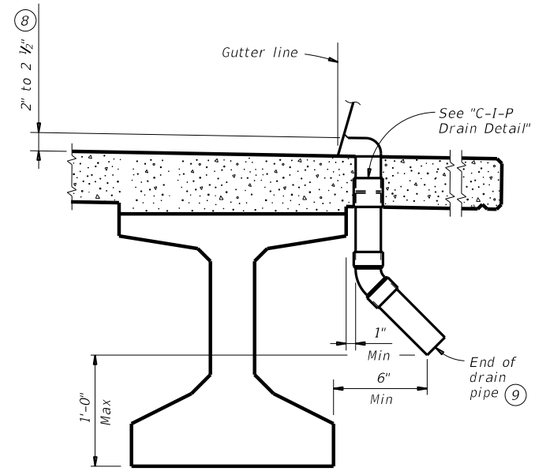


TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP (4)

Top reinforcing steel not shown for clarity.



TYPE A JOINT DETAIL (7)



DRAIN DETAIL (10)

(1) Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 ½".

(2) Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.

(3) Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#4) at centerline outside girder.

(4) Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

(5) Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.

(6) 1 ¼" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(7) The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints.

(8) Drain entrance formed in rail or sidewalk.

(9) Water may not be discharged onto girders.

(10) All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railways, or within 10'-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Payment for Type A joint will be as per Item 454, "Bridge Expansion Joints."

All other items (reinforcing steel, drains, etc.) shown on this sheet are subsidiary to other bid items.

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

DECK FORMWORK NOTES:

Overhang bracket hangers are limited to a safe working load of 3,600 lbs, applied to and along the axis of a coil rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

HL93 LOADING

Texas Department of Transportation

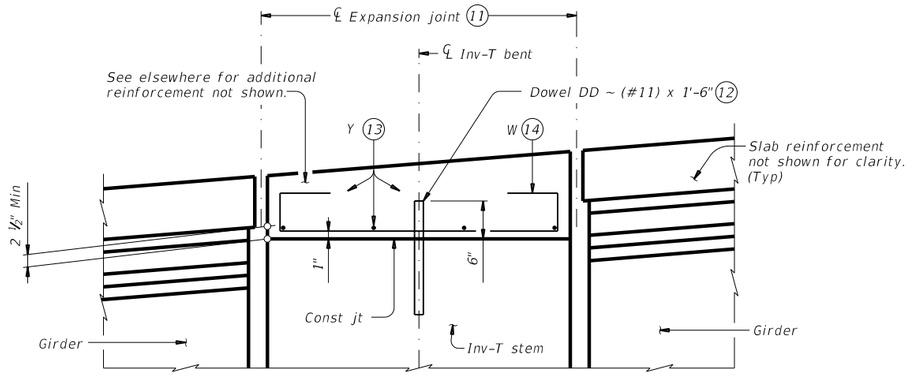
Bridge Division Standard

MISCELLANEOUS SLAB DETAILS

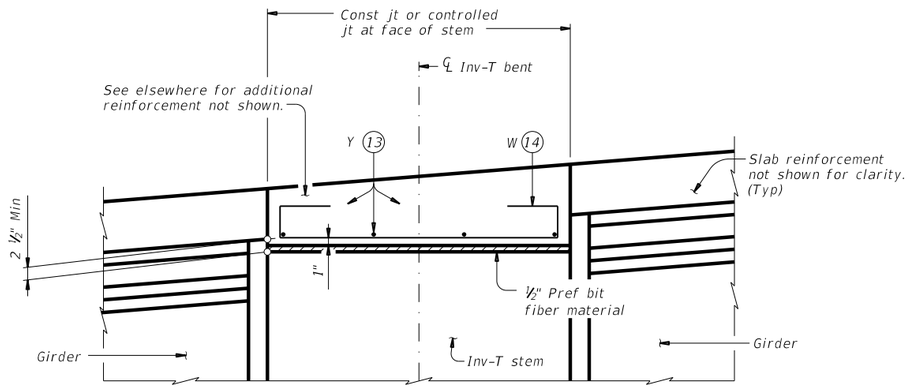
PRESTR CONCRETE I-GIRDERS

IGMS

FILE: igmssts1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PR 16
10-19: Modified Note 7. Type A now a pay item.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		89

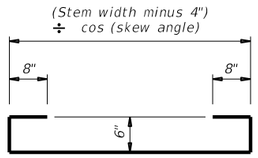


SHOWING EXPANSION JOINTS

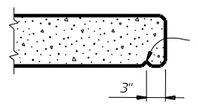


SHOWING CONST JTS OR CONTROLLED JTS

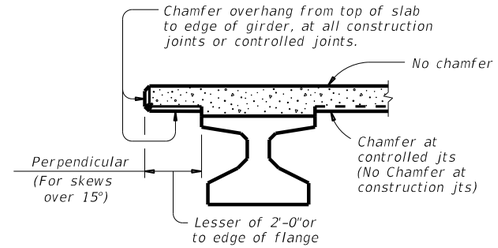
REINFORCEMENT OVER INV-T BENTS



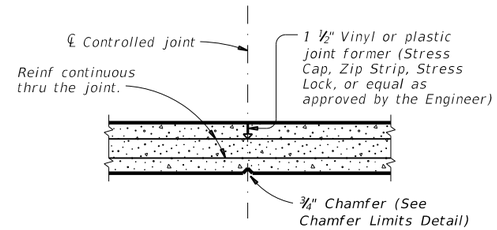
BARS W (#4)



DRIP BEAD DETAIL



CHAMFER LIMITS DETAIL (15)



CONTROLLED JOINT DETAIL

(Saw-cutting is not allowed)

(11) See Layout for joint type.

(12) Dowels DD (#11) spaced at 5 Ft Max. See Inv-T bents for quantity and location.

(13) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.

(14) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.

(15) See Span details for type of joint and joint locations.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

MISCELLANEOUS SLAB DETAILS

PRESTR CONCRETE I-GIRDERS

IGMS

FILE: igmssts1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PR 16
10-19: Modified Note 7, Type A now a pay item.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		90

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STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					LOAD RATING			
				PRESTRESSING STRANDS															STRENGTH I		SERVICE III	
	SPAN NO.	GIRDER NO.	GIRDER TYPE	NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)	NO.	TO END (in)	RELEASE STRGTH (1) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (2) Moment	LIVE LOAD DISTRIBUTION FACTOR (2) Shear	Inv	Opr	Inv
Type Tx28 Girders 30' Roadway 8.5" Slab	40	ALL	Tx28		12	0.6	270	10.48	10.48			4.700	5.300	1.156	-1.635	1606	0.810	1.020	1.58	2.04	1.90
	45	ALL	Tx28		14	0.6	270	10.48	9.34	2	10.5	4.000	5.000	1.463	-1.996	1675	0.780	1.020	1.54	2.00	1.67
	50	ALL	Tx28		16	0.6	270	10.23	9.23	4	8.5	4.000	5.600	1.796	-2.409	1947	0.760	1.030	1.47	1.91	1.41
	55	ALL	Tx28		18	0.6	270	10.04	7.81	4	14.5	4.000	6.100	2.177	-2.861	2267	0.740	1.030	1.39	1.80	1.17
	60	ALL	Tx28		22	0.6	270	9.75	6.48	4	22.5	4.400	6.700	2.569	-3.322	2588	0.720	1.040	1.40	1.94	1.16
	65	ALL	Tx28		26	0.6	270	9.56	6.48	4	24.5	5.200	7.000	3.002	-3.815	2918	0.700	1.040	1.37	1.84	1.14
	70	ALL	Tx28		30	0.6	270	9.28	6.48	6	20.5	6.000	7.500	3.468	-4.351	3282	0.690	1.040	1.20	1.70	1.05
Type Tx34 Girders 30' Roadway 8.5" Slab	40	ALL	Tx34		12	0.6	270	13.01	13.01			4.000	5.000	0.910	-1.255	1907	0.840	1.000	1.86	2.41	2.49
	45	ALL	Tx34		14	0.6	270	13.01	12.15	2	8.5	4.000	5.000	1.147	-1.528	2120	0.810	1.000	1.85	2.40	2.25
	50	ALL	Tx34		14	0.6	270	13.01	12.44	2	6.5	4.000	5.000	1.418	-1.852	2072	0.790	1.010	1.49	1.93	1.67
	55	ALL	Tx34		16	0.6	270	12.76	11.76	4	8.5	4.000	5.000	1.699	-2.175	2326	0.760	1.010	1.47	1.90	1.48
	60	ALL	Tx34		16	0.6	270	12.76	11.76	4	8.5	4.000	5.200	2.022	-2.549	2687	0.750	1.010	1.18	1.56	1.07
	65	ALL	Tx34		20	0.6	270	12.41	9.61	4	18.5	4.000	5.700	2.350	-2.917	3027	0.730	1.020	1.37	1.77	1.11
	70	ALL	Tx34		24	0.6	270	12.18	7.84	4	30.5	4.300	6.100	2.723	-3.335	3412	0.720	1.020	1.47	1.91	1.10
	75	ALL	Tx34		28	0.6	270	12.01	8.58	4	28.5	5.200	6.400	3.093	-3.736	3765	0.700	1.030	1.52	2.03	1.13
	80	ALL	Tx34		32	0.6	270	11.64	7.14	6	30.5	5.500	6.700	3.515	-4.194	4172	0.690	1.030	1.26	1.75	1.06
Type Tx40 Girders 30' Roadway 8.5" Slab	40	ALL	Tx40		12	0.6	270	15.60	15.60			4.000	5.000	0.750	-1.015	1968	0.870	0.980	2.13	2.76	3.03
	45	ALL	Tx40		12	0.6	270	15.60	15.60			4.500	5.000	0.943	-1.235	2328	0.840	0.990	2.12	2.75	2.90
	50	ALL	Tx40		14	0.6	270	15.60	15.60			4.500	5.000	1.161	-1.488	2554	0.810	0.990	1.74	2.26	2.17
	55	ALL	Tx40		16	0.6	270	15.35	14.35	4	8.5	4.000	5.000	1.392	-1.755	2685	0.790	1.000	1.70	2.20	1.94
	60	ALL	Tx40		16	0.6	270	15.35	14.35	4	8.5	4.000	5.000	1.652	-2.046	2756	0.770	1.000	1.42	1.85	1.50
	65	ALL	Tx40		18	0.6	270	15.16	13.82	4	10.5	4.000	5.000	1.918	-2.340	3106	0.750	1.000	1.42	1.84	1.35
	70	ALL	Tx40		20	0.6	270	15.00	13.40	4	12.5	4.000	5.000	2.220	-2.674	3501	0.740	1.010	1.07	1.54	1.00
	75	ALL	Tx40		22	0.6	270	14.87	11.24	4	24.5	4.000	5.400	2.540	-3.011	3879	0.720	1.010	1.36	1.77	1.05
	80	ALL	Tx40		26	0.6	270	14.68	9.76	4	36.5	4.400	5.700	2.861	-3.360	4285	0.710	1.010	1.27	1.93	1.09
	85	ALL	Tx40		30	0.6	270	14.40	8.80	6	34.5	4.800	5.900	3.223	-3.744	4717	0.700	1.010	1.33	2.03	1.07
	90	ALL	Tx40		34	0.6	270	14.07	8.78	6	36.5	5.400	6.100	3.577	-4.121	5143	0.690	1.020	1.38	2.09	1.07
	95	ALL	Tx40	*	38	0.6	270	13.71	7.81	8	36.5	5.700	7.300	3.978	-4.537	5599	0.680	1.020	1.40	1.73	1.02
Type Tx46 Girders 30' Roadway 8.5" Slab	40	ALL	Tx46		12	0.6	270	17.60	17.60			4.000	5.000	0.661	-0.811	2050	0.900	0.970	2.36	3.06	3.61
	45	ALL	Tx46		12	0.6	270	17.60	17.60			4.000	5.000	0.830	-0.987	2428	0.870	0.970	1.96	2.54	2.89
	50	ALL	Tx46		14	0.6	270	17.60	17.60			4.500	5.000	1.014	-1.185	2866	0.840	0.980	1.95	2.52	2.65
	55	ALL	Tx46		14	0.6	270	17.60	17.60			4.000	5.000	1.223	-1.406	3025	0.820	0.980	1.61	2.08	2.08
	60	ALL	Tx46		16	0.6	270	17.35	16.35	4	8.5	4.000	5.000	1.450	-1.639	3218	0.800	0.980	1.60	2.07	1.89
	65	ALL	Tx46		16	0.6	270	17.35	16.35	4	8.5	4.000	5.000	1.695	-1.886	3263	0.780	0.990	1.35	1.75	1.48
	70	ALL	Tx46		18	0.6	270	17.16	15.83	4	10.5	4.000	5.000	1.946	-2.144	3669	0.770	0.990	1.35	1.75	1.34
	75	ALL	Tx46		18	0.6	270	17.16	15.83	4	10.5	4.000	5.000	2.225	-2.416	4069	0.750	0.990	1.11	1.49	1.02
	80	ALL	Tx46		22	0.6	270	16.88	15.06	4	14.5	4.000	5.000	2.524	-2.712	4512	0.740	0.990	1.25	1.72	1.07
	85	ALL	Tx46		26	0.6	270	16.68	12.07	4	34.5	4.000	5.300	2.821	-3.007	4954	0.730	1.000	1.37	1.91	1.10
	90	ALL	Tx46		30	0.6	270	16.40	9.20	6	42.5	4.100	5.400	3.150	-3.316	5383	0.710	1.000	1.46	2.06	1.10
	95	ALL	Tx46		34	0.6	270	16.07	9.72	6	42.5	4.700	5.600	3.488	-3.642	5854	0.700	1.000	1.54	2.16	1.11
	100	ALL	Tx46		38	0.6	270	15.81	10.13	6	42.5	5.300	6.200	3.856	-3.991	6348	0.690	1.000	1.35	2.07	1.02
	105	ALL	Tx46		42	0.6	270	15.60	10.46	6	42.5	5.900	6.800	4.231	-4.360	6895	0.690	1.010	1.40	1.82	1.03

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER
*	2.5(14),4.5(14),6.5(8),8.5(2)

(1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

(2) Portion of full HL93.

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Load rated using Load and Resistance Factor Rating according to AASTHO Manual for Bridge Evaluation.

Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.

Prestress losses for the designed girders have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel bars.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

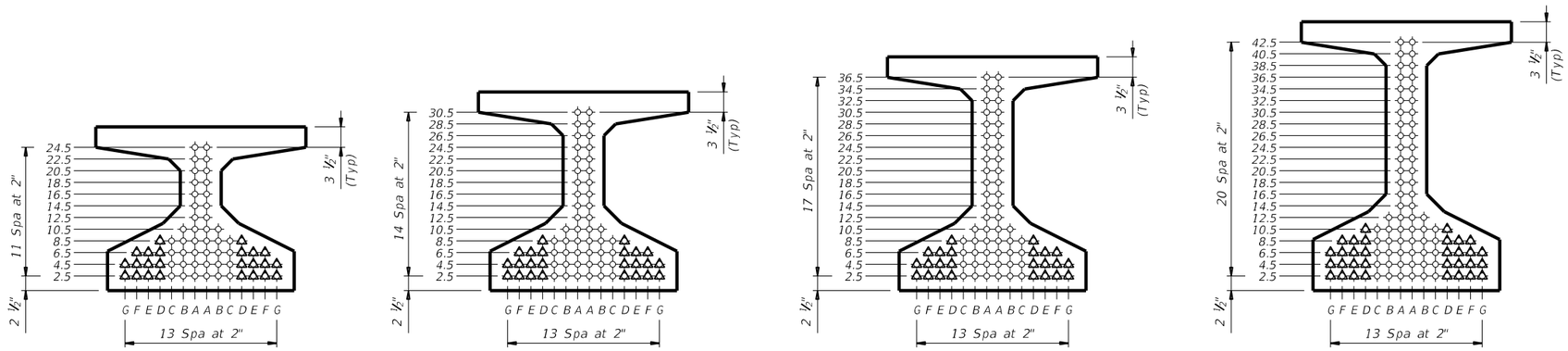
Strand debonding must comply with Item 424.4.2.2.2.4. Full-length debonded strands are only permitted in positions marked △. Double wrap full-length debonded strands in outer most position of each row.

When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

DEPRESSED STRAND DESIGNS:

Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.



HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER STANDARD DESIGNS

30' ROADWAY

IGSD-30

FILE: ig03stds-21.dgn	DN: EFC	CK: AJF	DW: EFC	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Redesigned girders. 1-21: Added load rating.	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		91

STRUCTURE	DESIGNED GIRDERS								DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					LOAD RATING			
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS					NO.	TO END	RELEASE STRGTH (1) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (2)		STRENGTH I		SERVICE III
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)							Moment	Shear	Inv	Opr	Inv
Type Tx54 Girders 30' Roadway 8.5" Slab	40	ALL	Tx54		10	0.6	270	21.01	21.01			4.000	5.000	0.548	-0.660	2115	0.930	0.960	2.18	2.83	3.72
	45	ALL	Tx54		12	0.6	270	21.01	21.01			4.000	5.000	0.686	-0.803	2508	0.900	0.960	2.25	2.92	3.52
	50	ALL	Tx54		14	0.6	270	21.01	21.01			4.000	5.000	0.837	-0.964	2962	0.870	0.960	2.24	2.90	3.25
	55	ALL	Tx54		14	0.6	270	21.01	21.01			4.000	5.000	1.009	-1.142	3457	0.850	0.970	1.86	2.42	2.61
	60	ALL	Tx54		16	0.6	270	20.76	20.26	4	6.5	4.000	5.000	1.194	-1.332	3922	0.830	0.970	1.86	2.41	2.42
	65	ALL	Tx54		16	0.6	270	20.76	20.26	4	6.5	4.000	5.000	1.394	-1.532	3871	0.810	0.970	1.59	2.06	1.96
	70	ALL	Tx54		18	0.6	270	20.56	19.23	4	10.5	4.000	5.000	1.608	-1.742	4099	0.790	0.980	1.60	2.08	1.83
	75	ALL	Tx54		18	0.6	270	20.56	19.67	4	8.5	4.000	5.000	1.840	-1.971	4227	0.780	0.980	1.37	1.77	1.45
	80	ALL	Tx54		18	0.6	270	20.56	19.67	4	8.5	4.500	5.500	2.068	-2.191	4639	0.760	0.980	1.39	1.81	1.36
	85	ALL	Tx54		20	0.6	270	20.41	18.81	4	12.5	4.000	5.000	2.327	-2.442	5111	0.750	0.980	1.20	1.55	1.05
	90	ALL	Tx54		24	0.6	270	20.17	17.84	4	18.5	4.000	5.000	2.582	-2.689	5579	0.740	0.990	1.39	1.80	1.13
	95	ALL	Tx54		28	0.6	270	20.01	14.29	4	44.5	4.000	5.000	2.868	-2.961	6079	0.730	0.990	1.37	1.78	1.01
	100	ALL	Tx54		32	0.6	270	19.63	11.38	6	50.5	4.100	5.000	3.169	-3.245	6594	0.720	0.990	1.43	1.94	1.01
	105	ALL	Tx54		34	0.6	270	19.48	12.77	6	44.5	4.600	5.300	3.471	-3.530	7110	0.710	0.990	1.51	2.07	1.03
	110	ALL	Tx54		38	0.6	270	19.22	12.27	6	50.5	5.000	5.700	3.799	-3.835	7652	0.700	0.990	1.60	2.18	1.08
	115	ALL	Tx54		42	0.6	270	19.01	12.72	6	50.5	5.600	6.400	4.126	-4.139	8193	0.690	0.990	1.45	1.94	1.02
	120	ALL	Tx54		46	0.6	270	18.66	11.36	8	50.5	5.800	6.800	4.481	-4.466	8761	0.680	1.000	1.35	1.78	1.05
Type Tx62 Girders 30' Roadway 8.5" Slab	60	ALL	Tx62		14	0.6	270	25.78	25.78			4.000	5.000	0.939	-1.113	4110	0.850	0.960	1.78	2.31	2.57
	65	ALL	Tx62		16	0.6	270	25.53	25.53			4.000	5.000	1.094	-1.280	4602	0.830	0.960	1.81	2.35	2.43
	70	ALL	Tx62		16	0.6	270	25.53	25.53			4.000	5.000	1.263	-1.462	4556	0.820	0.970	1.54	2.00	1.98
	75	ALL	Tx62		18	0.6	270	25.33	25.33			4.000	5.000	1.440	-1.646	4837	0.800	0.970	1.57	2.04	1.88
	80	ALL	Tx62		18	0.6	270	25.33	25.33			4.000	5.000	1.631	-1.847	4871	0.790	0.970	1.35	1.76	1.52
	85	ALL	Tx62		20	0.6	270	25.18	24.38	4	8.5	4.000	5.000	1.823	-2.043	5322	0.770	0.970	1.39	1.80	1.49
	90	ALL	Tx62		20	0.6	270	25.18	24.38	4	8.5	4.000	5.000	2.028	-2.256	5822	0.760	0.970	1.21	1.56	1.15
	95	ALL	Tx62		22	0.6	270	25.05	23.96	4	10.5	4.000	5.000	2.251	-2.484	6347	0.750	0.980	1.22	1.58	1.06
	100	ALL	Tx62		26	0.6	270	24.85	22.39	4	20.5	4.000	5.000	2.484	-2.721	6888	0.740	0.980	1.23	1.59	1.00
	105	ALL	Tx62		28	0.6	270	24.78	20.21	4	36.5	4.000	5.000	2.708	-2.950	7415	0.730	0.980	1.40	1.82	1.04
	110	ALL	Tx62		32	0.6	270	24.40	15.40	6	54.5	4.000	5.000	2.951	-3.195	7968	0.720	0.980	1.67	2.17	1.19
	115	ALL	Tx62		36	0.6	270	24.11	15.78	6	56.5	4.500	5.200	3.214	-3.458	8551	0.710	0.980	1.63	2.11	1.10
	120	ALL	Tx62		38	0.6	270	23.99	17.67	6	46.5	5.000	5.900	3.489	-3.730	9148	0.700	0.980	1.55	2.08	1.02
	125	ALL	Tx62		42	0.6	270	23.78	16.35	6	58.5	5.300	6.200	3.765	-4.014	9805	0.700	0.990	1.55	2.08	1.06
	130	ALL	Tx62		46	0.6	270	23.43	14.73	8	58.5	5.500	6.400	4.044	-4.291	10411	0.690	0.990	1.34	1.82	1.02
	135	ALL	Tx62	**	50	0.6	270	23.06	13.86	10	56.5	5.800	6.800	4.349	-4.589	11052	0.680	0.990	1.54	2.12	1.08

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER
**	2.5(14),4.5(14),6.5(14),8.5(6),10.5(2)

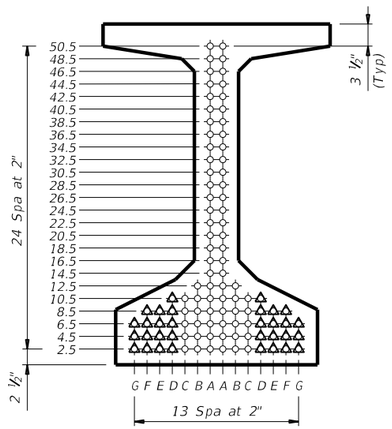
(1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

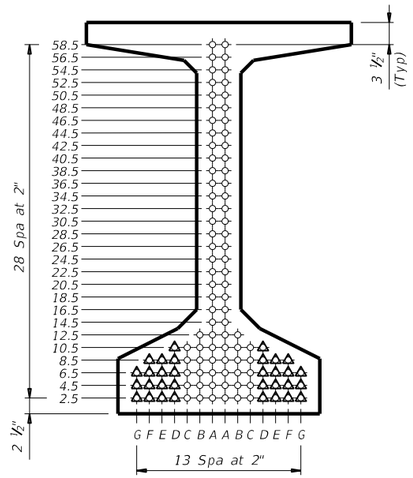
Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

(2) Portion of full HL93.



TYPE Tx54



TYPE Tx62

HL93 LOADING

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER STANDARD DESIGNS

30' ROADWAY

IGSD-30

FILE: ig03stds-21.dgn	DN: EFC	CK: AJF	DW: EFC	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Redesigned girders. 1-21: Added load rating.	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		92

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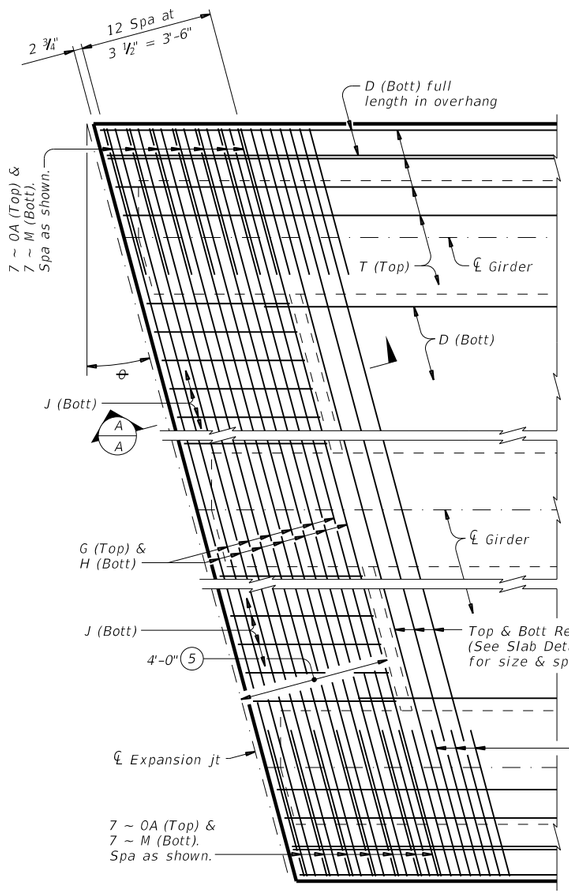
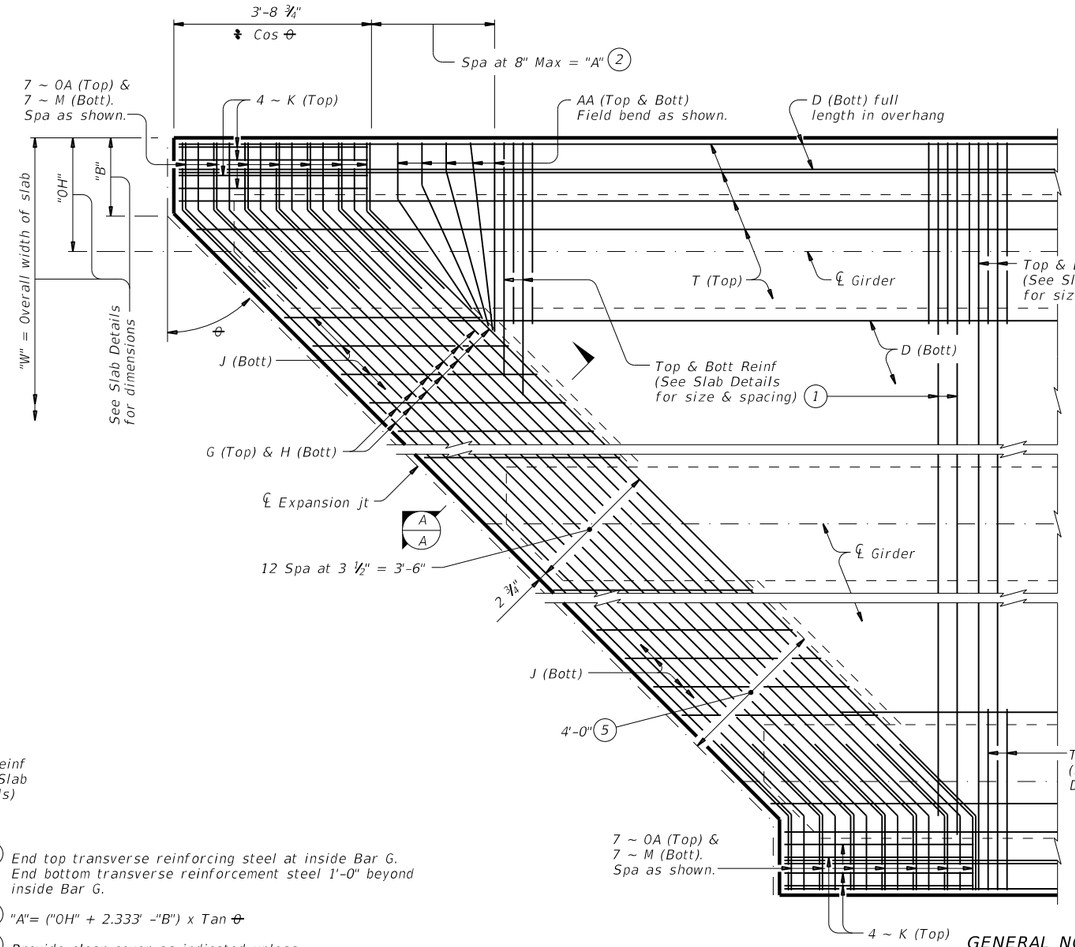


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

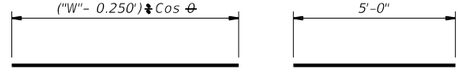
(1) End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.

(2) "A"= ("0H" + 2.333' -"B") x Tan θ

(3) Provide clear cover as indicated unless otherwise shown on Span Details.

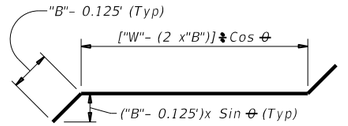
(4) Only required on slabs with breakbacks.

(5) Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.

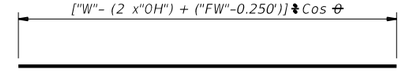


BARS G (#4) (For slabs without breakbacks)

BARS K (#4) (4)



BARS G (#4) (For slabs with breakbacks)

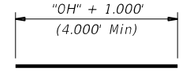


"FW" = girder's top flange width (ft)

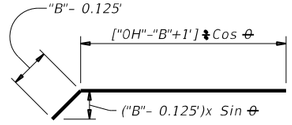
BARS H (#4)

BARS AA (#5) (4)

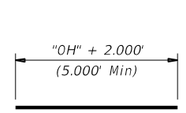
BARS J (#4)



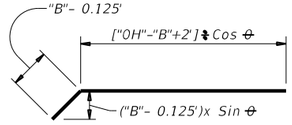
BARS M (#4) (For slabs without breakbacks)



BARS M (#4) (For slabs with breakbacks)



BARS OA (#5) (For slabs without breakbacks)



BARS OA (#5) (For slabs with breakbacks)

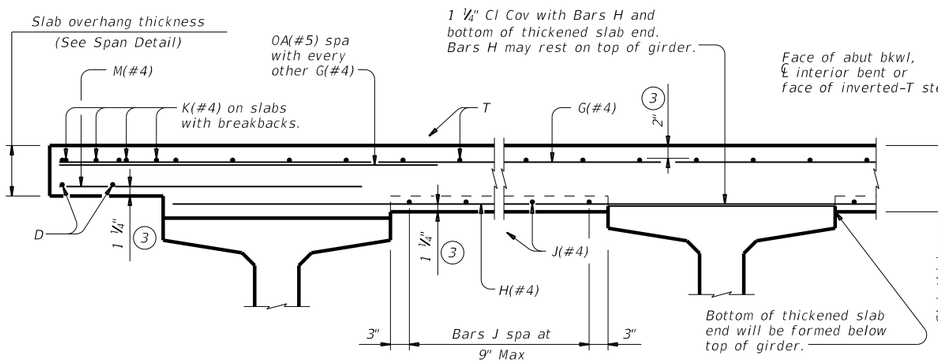
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
These details are restricted to Prestressed Concrete I-Girder Spans.
These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used).
When Option 2 from PCP standard is used, provide Bars AA, G, K and 0A in the slab.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and 0A must be epoxy coated.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

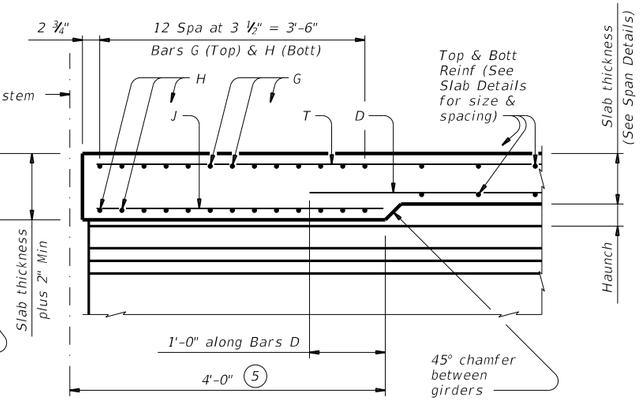
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



2" AND MORE OF HAUNCH — LESS THAN 2" OF HAUNCH

TYPICAL TRANSVERSE SECTION

(Showing Prestressed Conc I-Girders at ℄ Brg)



SECTION A-A

(Showing with 2" and more of haunch)

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

THICKENED SLAB END DETAILS

PRESTRESSED CONCRETE I-GIRDER SPANS

IGTS

FILE: igtssts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		93

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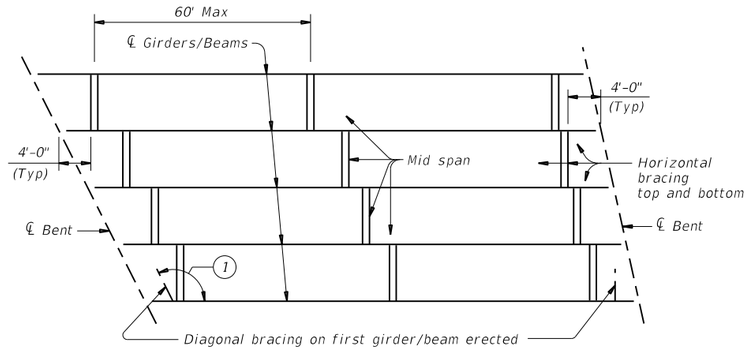
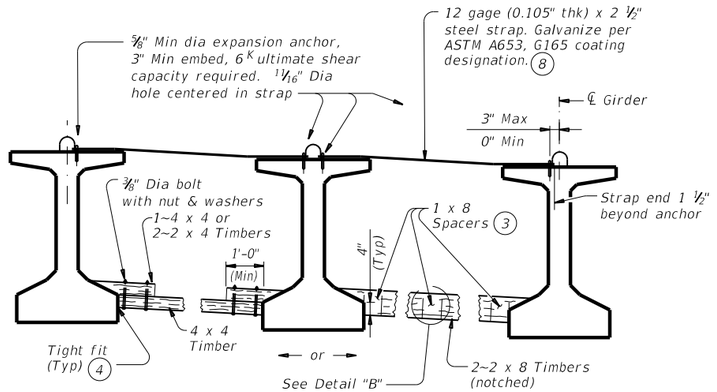
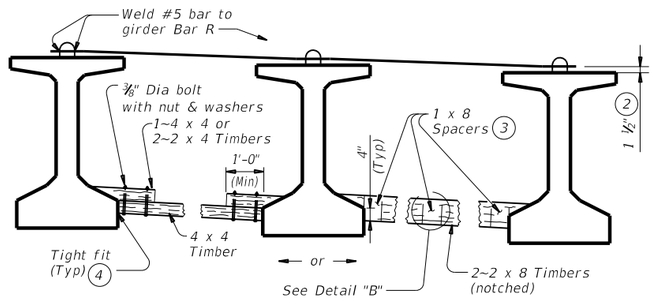


ERECTION BRACING



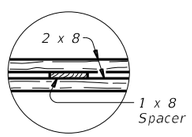
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)



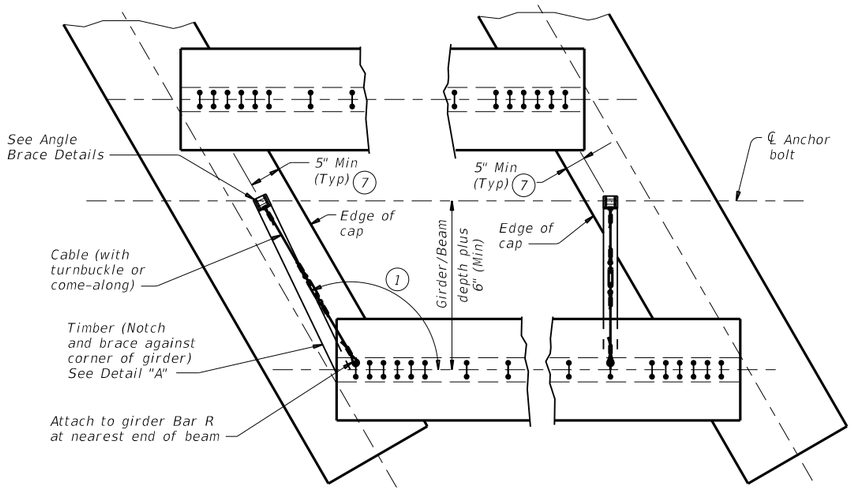
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS (5)

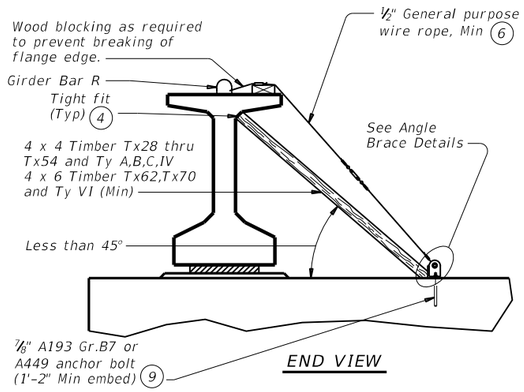


PLAN

DETAIL "B"



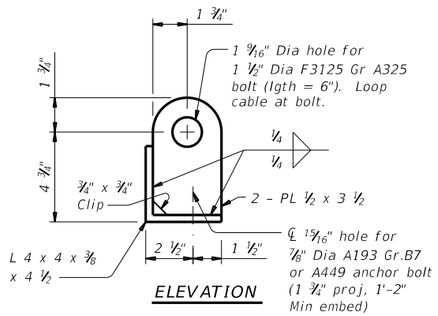
PLAN



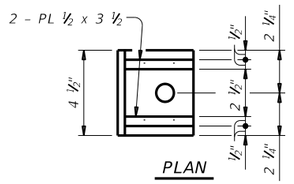
END VIEW

DIAGONAL BRACING DETAILS (5)

(To be used on both ends of the first girder/beam erected in the span in each phase.)



ELEVATION



PLAN

ANGLE BRACE DETAILS

HAULING & ERECTION:

The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral stiffening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

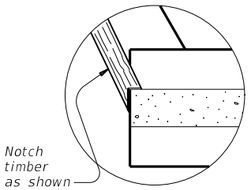
ERECTION BRACING:

Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425.

Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:

Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after first, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



DETAIL "A"

(1) If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(6) All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing aginst the dead end.

(7) It is acceptable to tie anchor bolts to cap reinforcement.

(8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.

(9) Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS

PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

FILE: mebcsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	TYL	SMITH		94

DATE: 05/19/2021 03:08 PM
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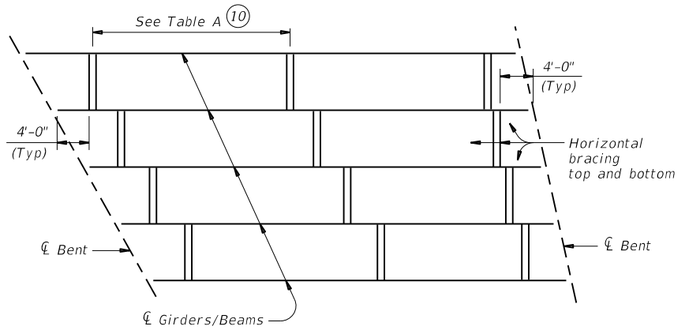


SLAB PLACEMENT BRACING

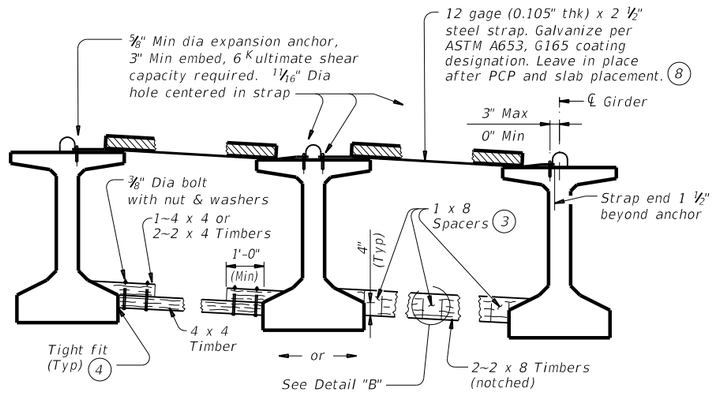
TABLE A

OPTION 1-RIGID BRACING (STEEL STRAP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	¼ points
Tx34	¼ points	¼ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	⅛ points	⅛ points
B	⅛ points	⅛ points
C	⅛ points	⅛ points
IV	¼ points	⅛ points
VI	¼ points	⅛ points

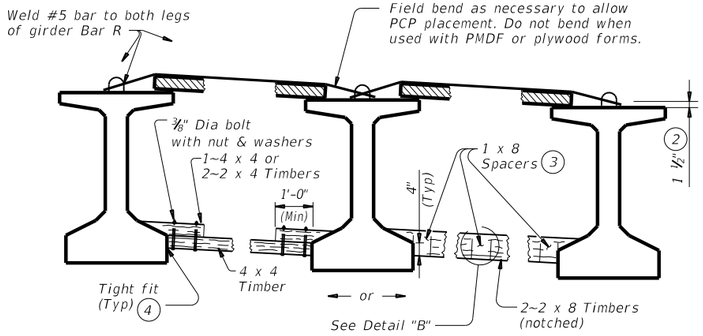
OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	⅛ points
Tx34	¼ points	⅛ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	2.0 ft	1.5 ft
B	3.0 ft	2.0 ft
C	4.5 ft	2.0 ft
IV	¼ points	4.0 ft
VI	¼ points	4.0 ft



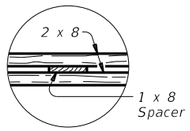
FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)



PLAN

DETAIL "B"

HORIZONTAL BRACING DETAILS (5)

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.

(10) Bracing spacing (¼ and ⅛ points) measured between first and last typical brace location.

(11) Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425.

Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

GENERAL NOTES:

Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection.

Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection.

Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure.

Removal of bracing for short periods of time to align girders and beams is permissible.

All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown.

Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS
PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
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	TYL	SMITH		95

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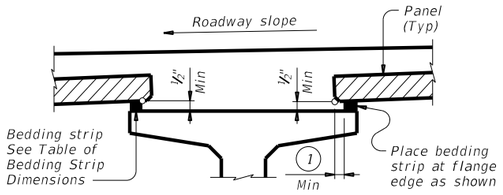
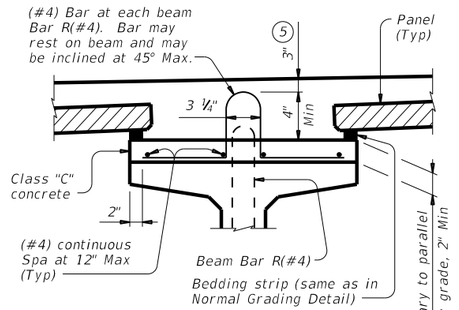


NORMAL GRADING DETAIL (3)

Showing prestressed concrete I-girders.
(Other beam types similar)



SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing prestressed concrete I-girders.
(Other beam types similar)

TABLE OF BEDDING STRIP DIMENSIONS		
WIDTH	HEIGHT (4)	
	Min	Max
1" (Min)	½"	2"
1 ¼"	½"	2 ½"
1 ½"	½"	3"
1 ¾"	½"	3 ½"
2"	½"	4"
2 ¼"	½"	4 ½" (2)
2 ½"	½"	5" (2)
2 ¾"	½"	5 ½" (2)
3" (Max)	½"	6" (2)

(1) 2" Min for I-giders, 1 ½" Min for all other beam types.

(2) Allowed for I-girders, not allowed on other beam types.

(3) To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in ¼" increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is ¼". Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 6" high for I-Girders, 4" high for all other beam types, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge Division for approval.

(4) Height must not exceed twice the width.

(5) Provide clear cover as indicated unless otherwise shown on Span Details.

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(7) Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3 ½" with I-girders, and 3" for all other beam types. Epoxy coating for Bars UP is not required.

(8) Do not locate construction joints on top of a panel.

(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

CONSTRUCTION NOTES:

Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges.

Placing panels to minimize joint openings is recommended.

If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction.

Bars U, shown on PCP-FAB, may be bent over or cut off if necessary.

Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete material under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 ½" under the panels as the slab concrete is placed.

To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least ½". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required.

For clear span between U-beams less than or equal to 18", see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement.

If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated.

Provide bar Laps, where required, as follows:

Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees.

Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use.

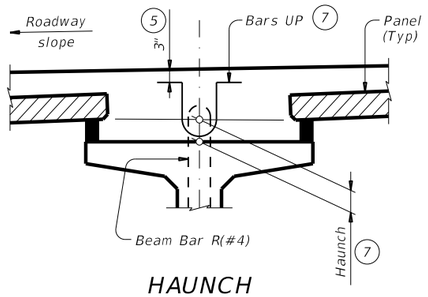
These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable standard drawings.

When panel support (bedding strips) deviates from what is shown herein, provide details signed and sealed by a professional Engineer.

Any additional reinforcement or concrete required on this standard is considered subsidiary to the bid Item "Reinforced Concrete Slab".

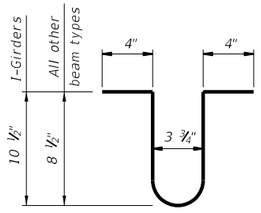
Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

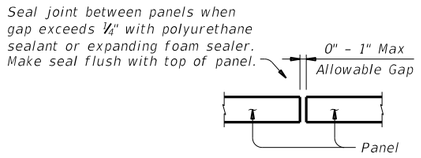


HAUNCH REINFORCING DETAIL

Showing prestressed concrete I-girders.
(Other beam types similar)

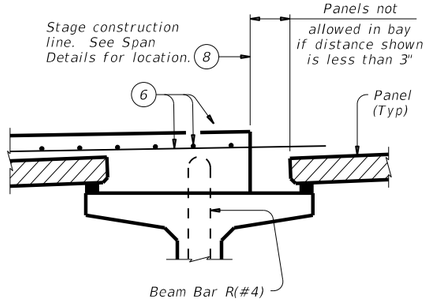


BARS UP (#4) (7)

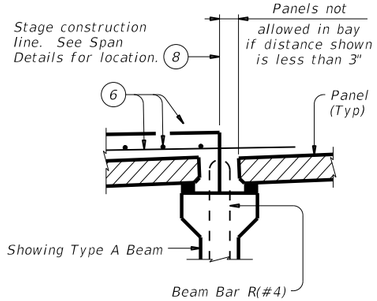


PANEL JOINTS

(Panel reinforcing not shown for clarity.
The gap cannot be considered as a panel fabrication tolerance. Adjust panel placement to minimize joint openings.)



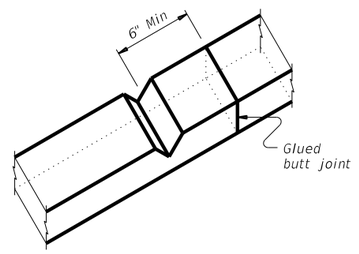
PRESTR CONC I-GIRDERS



PRESTR CONC I-BEAMS

STAGE CONSTRUCTION LIMITATIONS

(Other beam types similar)



BEDDING STRIP DETAIL (9)

HL93 LOADING SHEET 1 OF 4

Texas Department of Transportation | Bridge Division Standard

PRESTRESSED CONCRETE PANELS DECK DETAILS

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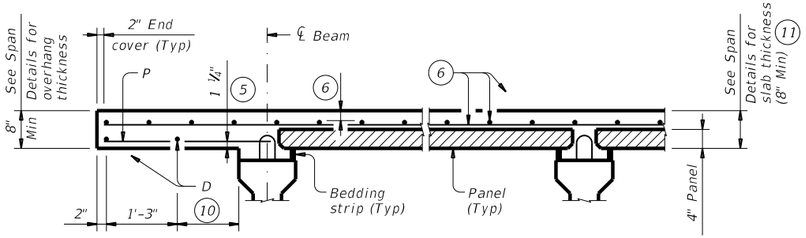
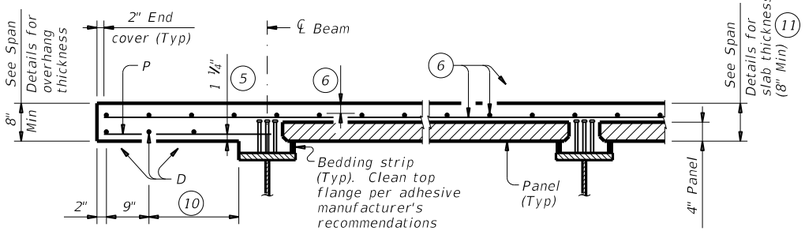
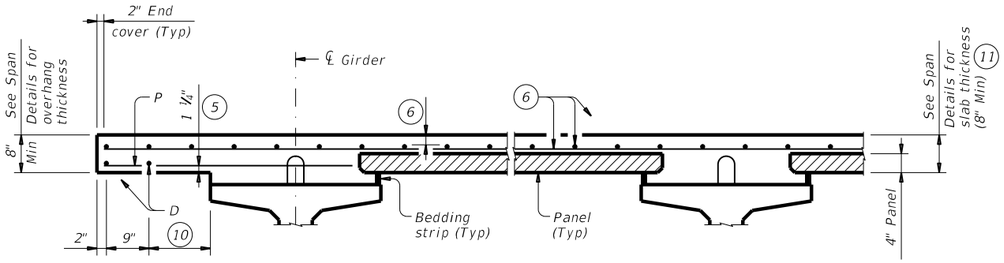


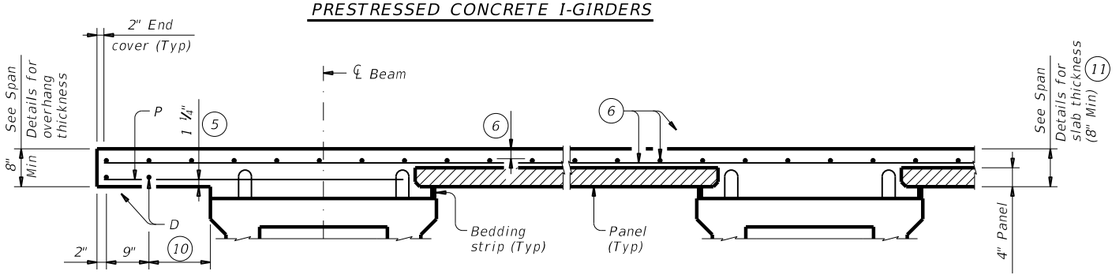
PRESTRESSED CONCRETE I-BEAMS



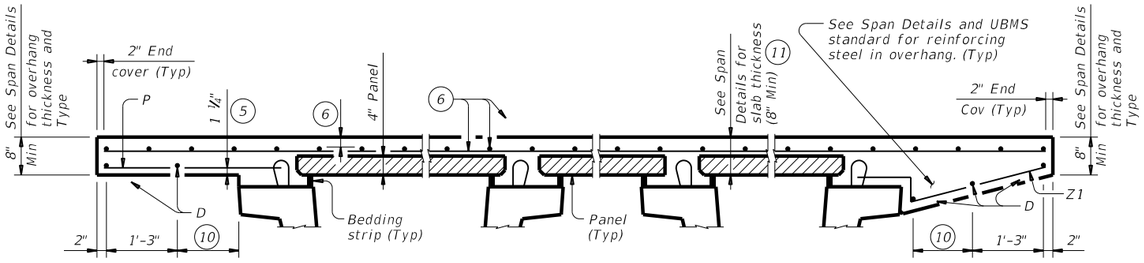
STEEL BEAMS



PRESTRESSED CONCRETE I-GIRDERS



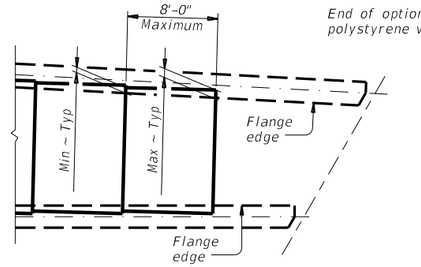
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

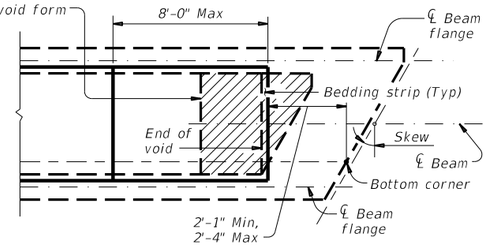
SLOPED OVERHANG WITH PRESTR CONC U-BEAMS

TYPICAL PART TRANSVERSE SECTIONS

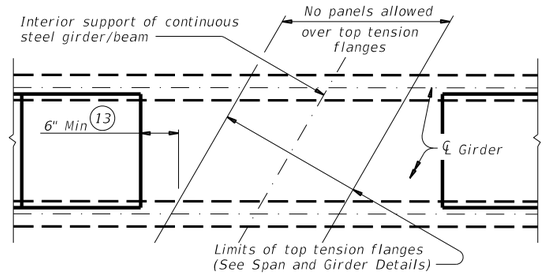


AT FLARED BEAMS OR GIRDERS

See PCP-FAB standard for Min and Max dimensions based on bemm/girder type.



OVER CONC U-BEAMS



AT INT SUPPORTS OF CONTINUOUS STEEL GIRDERS

PART PLANS OF PANEL PLACEMENT

(5) Provide clear cover as indicated unless otherwise shown on Span Details.

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

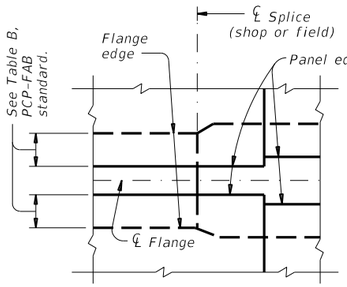
(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8" o.c..

(10) Equally space additional bar if more than 1'-3" Max.

(11) The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for prestressed concrete U-beams and steel beams). Bearing seat elevations or finished grade may be adjusted.

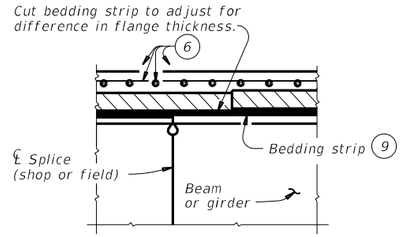
(12) Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inverted-Tee stems only.

(13) Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.



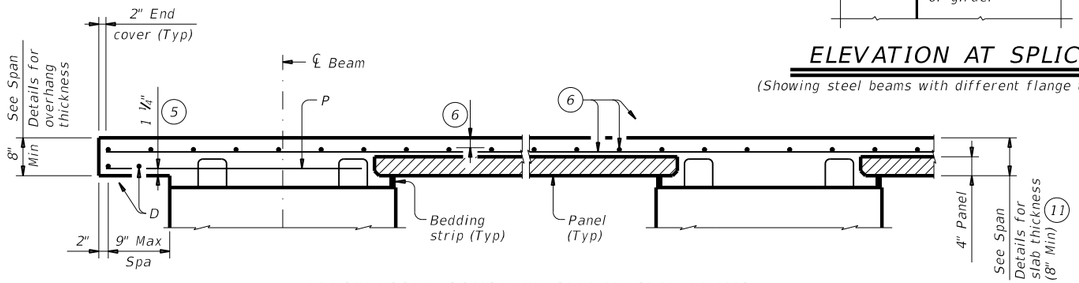
PLAN AT SPLICE

(Showing steel beams with flange width transition)



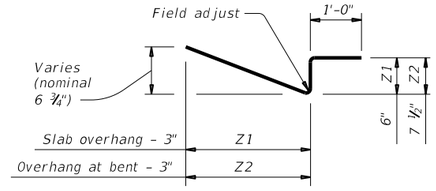
ELEVATION AT SPLICE

(Showing steel beams with different flange thickness)



PRESTRESSED CONCRETE SPREAD SLAB BEAMS

Bars P over exterior beams are still required when no overhang is used. In this case, only one Bar D, 2" from slab edge, is required.



BARS Z (#4) (12)

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Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

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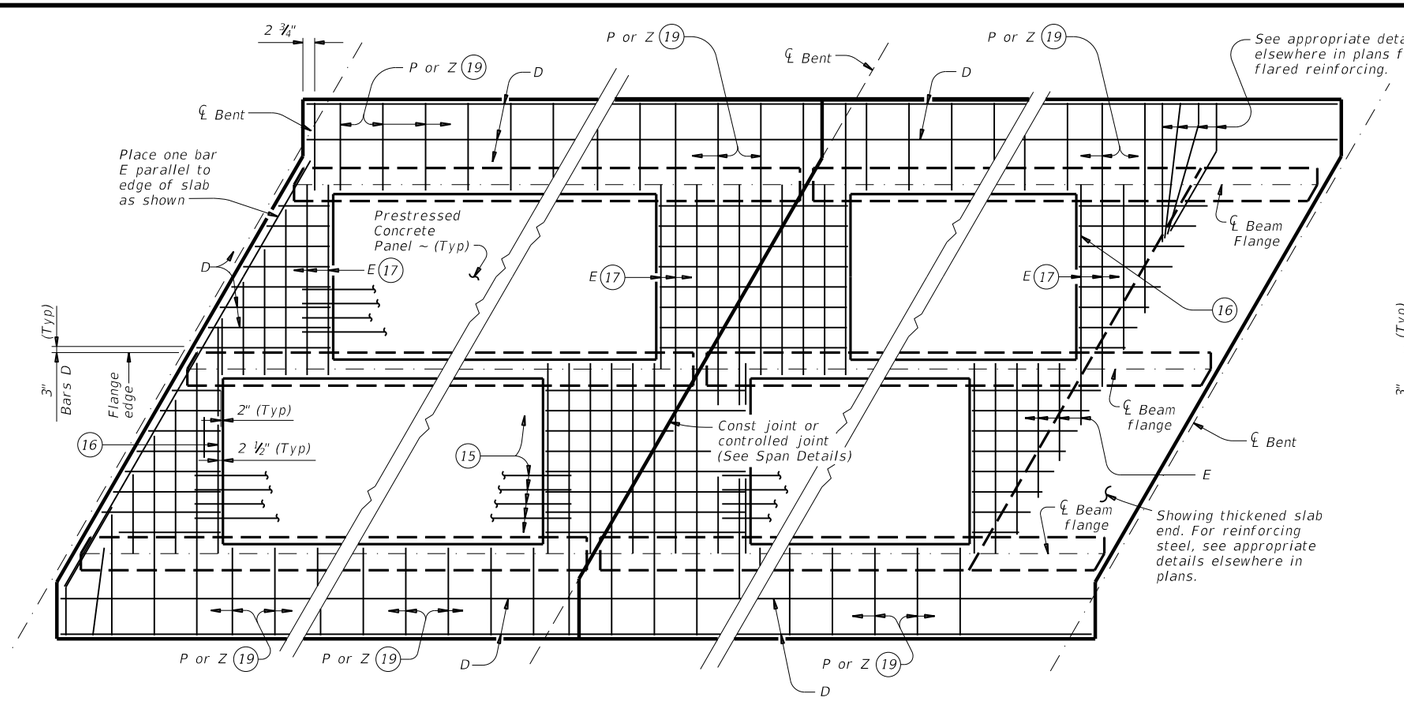
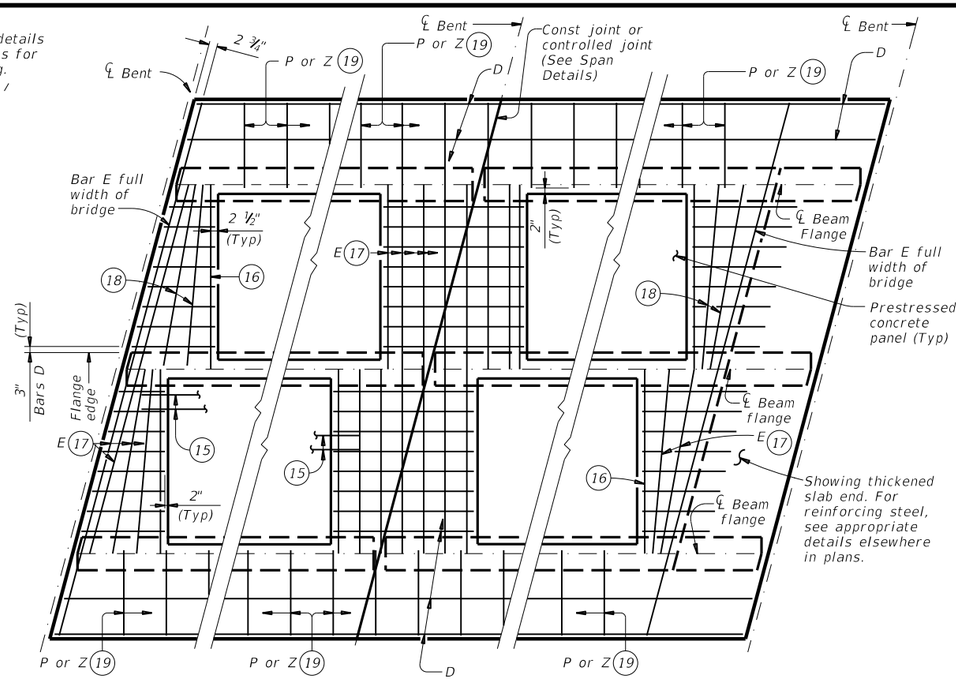


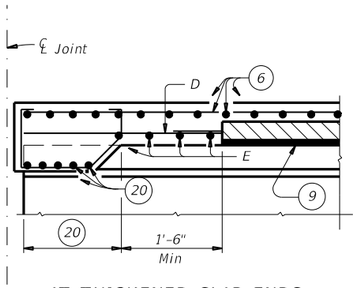
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

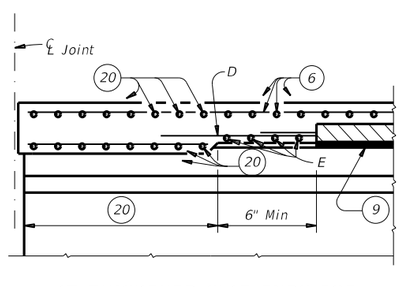


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

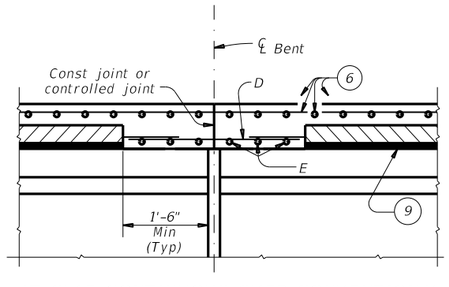
OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



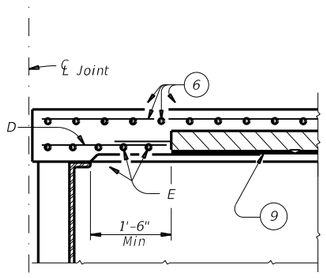
AT THICKENED SLAB ENDS FOR PRESTR CONC U-BMS



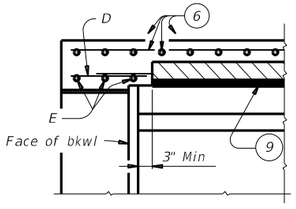
AT THICKENED SLAB ENDS FOR PRESTR CONC I-BMS AND STEEL BMS



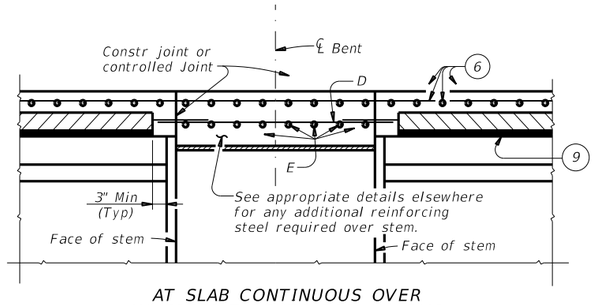
AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BMS



AT CONVENTIONAL END DIAPHRAGMS FOR STEEL BMS



AT SLAB OVER ABUTMENT BACKWALL FOR ALL BMS



AT SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BMS

OPTION 1 ~ ELEVATIONS AT BEAM ENDS

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c.

(14) Max Spacing as listed unless otherwise shown.

(15) At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.

(16) Maintain one Bar E(#4) parallel to panel ends (Typ).

(17) Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.

(18) Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.

(19) Where possible, Bars E(#4) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.

(20) See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

TABLE OF REINFORCING STEEL (14)

BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18

HL93 LOADING SHEET 3 OF 4

Texas Department of Transportation | Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

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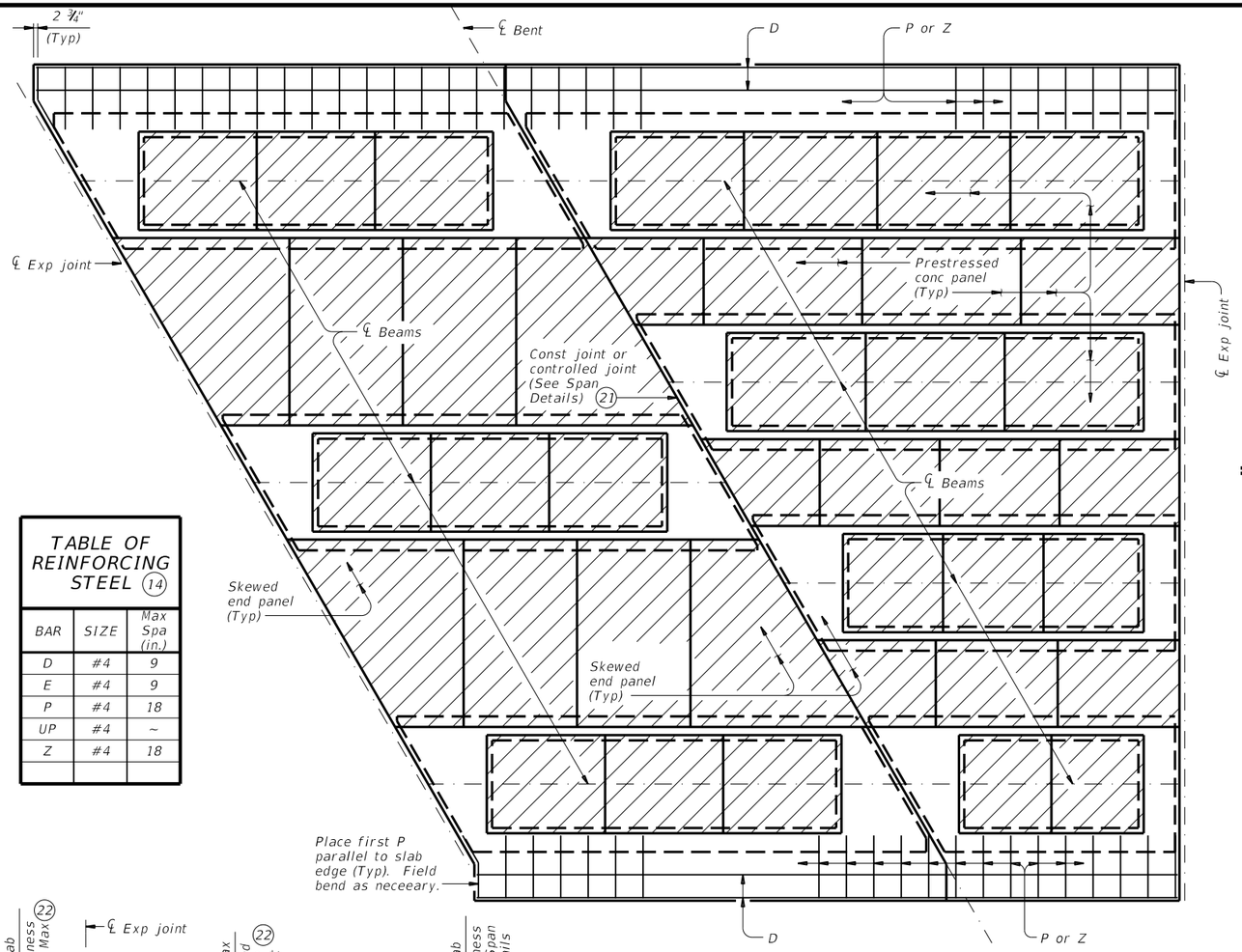
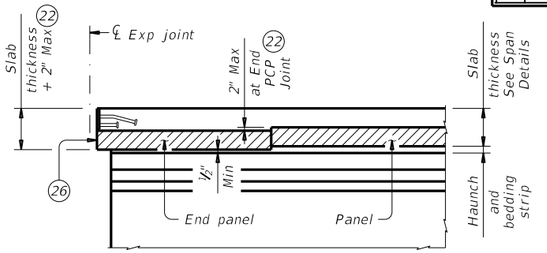


OPTION 2 ~ PLAN OF SLAB

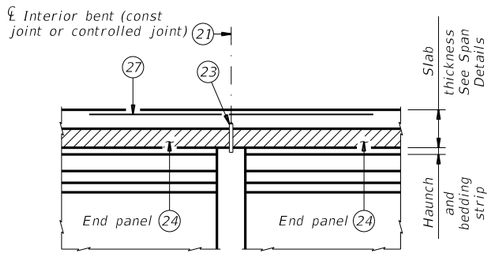
(Showing U-Beams; other beams similar)

TABLE OF REINFORCING STEEL (14)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



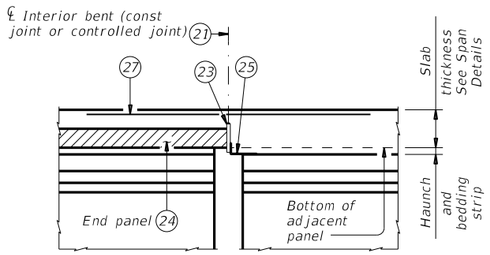
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)

For SEJ-A, SEJ-S(0), AJ, and Type A expansion joints only.



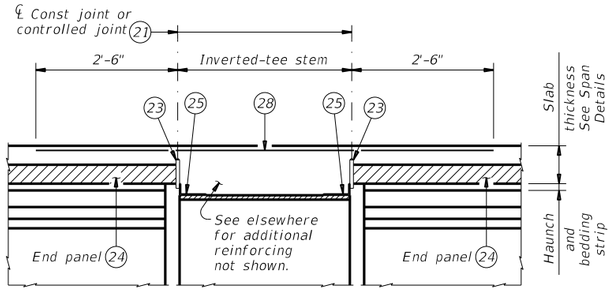
CONVENTIONAL INTERIOR BENT

Panel against panel between beams/girders.



CONVENTIONAL INTERIOR BENT

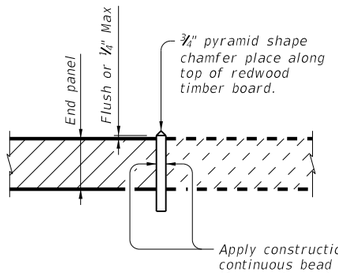
Panel against beam/girder end in adacent span.



INVERTED-T BENT

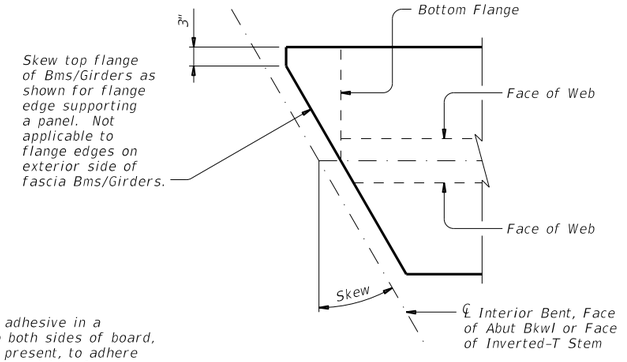
Panels against inverted-tee stem

OPTION 2 ~ ELEVATIONS AT BEAM ENDS (6)



ELEVATION EXAMPLE OF END PANEL AND TIMBER BOARD (23)

See "Option 2 ~ Elevation At Beam Ends".



OPTION 2 ~ SHOWING MODIFICATION TO BEAM/GIRDER TOP FLANGE FOR SKEWS OVER 5°

Showing I-Bm/I-Girder, U-Bms and Steel Bms similar.

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(14) Max Spacing as listed unless otherwise shown.

(21) 1 ½" Vinyl or plastic joint former at controlled joints (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)

(22) End panel may be set up to 2" lower to accommodate expansion joint hardware, provided bedding strip is not less than ½" thick.

(23) ¾" thick redwood timber board, leave in place. Redwood timber board placed flush with top of panel or within ¼" Max above panel. Place ¾" pyramid shape chamfer along top of timber board. See "Elevation Example of End Panel and Timber Board". Place straight, within ¼" of centerline of bent or face of inverted-tee, across bridge width and end board at exterior flange edge of fascia beams/girders. Do not extend into overhang.

(24) Place panel within ½" of ¾" thick board.

(25) Permanent galvanized steel sheet form. Removable formwork is acceptable.

(26) Place end panel within ½" of expansion joint opening. End panel cannot encroach on required expansion joint opening.

(27) Place additional (#4) bar 5'-0" in length between every slab bars T. Center (#4) bar on Joint.

(28) Place additional (#4) bar continuous 2'-6" beyond each side of Inverted-T Stem between every slab bars T.

SPECIAL OPTION 2 CONSTRUCTION NOTES:

When Option 2 is chosen bottom mat of thickened end slab reinforcing is not required. Use the same top mat as shown on the Thickened Slab End Details sheet.

Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 ½".

Do not extend the longitudinal panel reinforcement into the cast-in-place slab.

Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.

Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.

Bending of anchor studs of expansion joints shown on standards AJ, SEJ-A and SEJ-S(0) is permissible if necessary to clear top of end panels. The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.

Bedding strips under skewed end panels must conform to the requirements of Item 422 except their minimum compressive strength must be 60 psi.

Provide Bars AA, G, K and 0A from standard IGTS in the slab.

HL93 LOADING SHEET 4 OF 4

Texas Department of Transportation — Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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	TYL	SMITH		99

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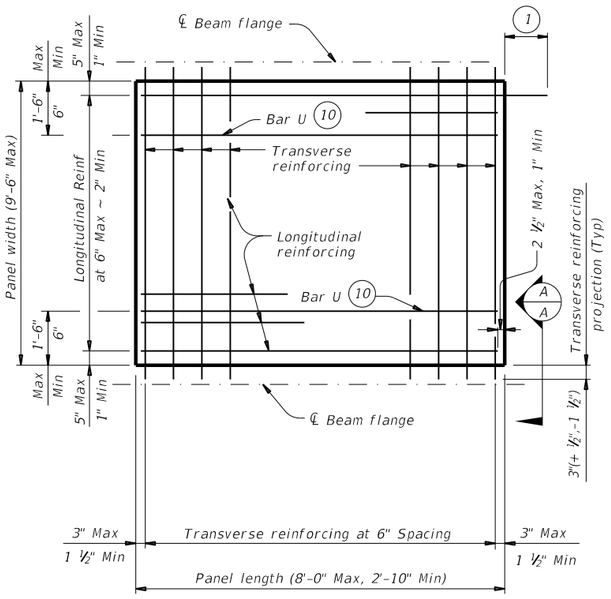
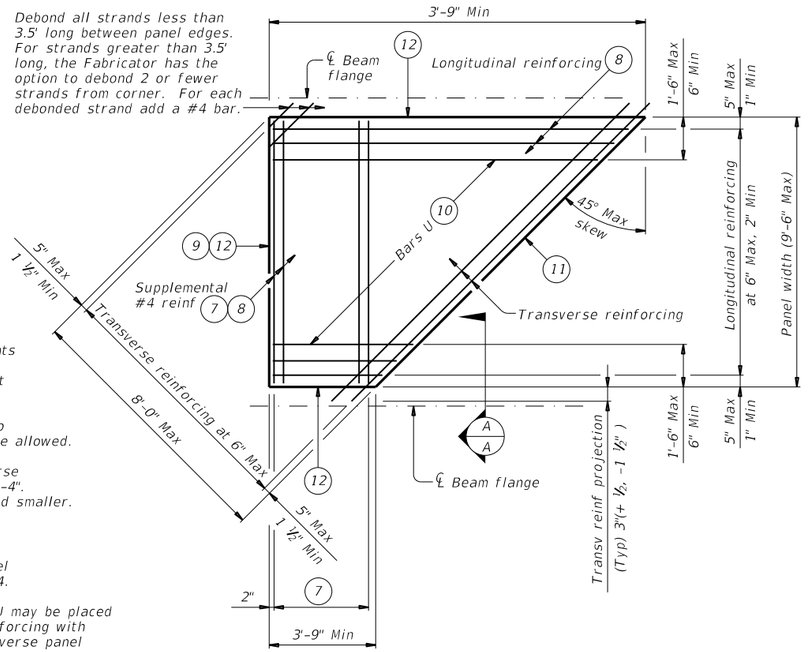


TYPICAL NON-SKEWED PANEL PLAN



TYPICAL SKEWED END PANEL PLAN

(Only to be used with details shown elsewhere in the plans.)

1. At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2",-0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.
2. Four loops required per panel.
3. Four loops required per panel. ⅜" or ½" strands may be used.
4. Normal dimensions must be used on spans with parallel beams. Maximum and Minimum dimensions apply only to spans with flared beams.
5. See Normal Grading Detail on PCP standard for lap requirements and bedding strip dimensions. Some laps shown in tables cannot utilize all bedding strip widths.
6. One Splice allowed per panel. No more than two sheets of WWR are allowed.
7. Provide (#4) bars under transverse reinforcing, 10 Spaces at 4" = 3'-4". Omit for 5 degree (1:12) skew and smaller.
8. End Cover 2 ½" Max, 1" Min.
9. Recess strands on indicated panel edge in accordance with Item 424.
10. At the fabricator's option, Bars U may be placed parallel to transverse panel reinforcing with horizontal legs in plane of transverse panel reinforcing.
11. Use length of indicated panel edge as panel width for purpose of determining type of transverse reinforcing.
12. Timber form work permissible this edge.

Debond all strands less than 3.5' long between panel edges. For strands greater than 3.5' long, the Fabricator has the option to debond 2 or fewer strands from corner. For each debonded strand add a #4 bar.

TABLE A (4) (5)			
Beam Type	Normal (In.)	Min (In.)	Max (In.)
A	3	2 ½	3 ½
B	3	2 ½	3 ½
C	4	3	4 ½
IV	6	4	7 ½
VI	6 ½	4 ½"	8 ½
U40 – 54	5 ½	5 ½	7
Tx28-70	6	5	7 ½
XB20 – 40	4	3	4 ½
XSB12 – 15	4	3	4 ½

TABLE B (4) (5)			
Top Flange Width	Normal (In.)	Min (In.)	Max (In.)
11" to 12"	2 ¾	2 ½	2 ¾
Over 12" to 15"	3 ¼	3	3 ¼
Over 15" to 18"	4	3	4 ¾
Over 18"	5	3 ½	6 ¼

GENERAL NOTES:

Provide Class H concrete for panels. Release strength f'ci=3,500 psi. Minimum 28 day strength f'c=5,000 psi.

Provide ¾" chamfer along bottom edge of panel on beam side.

Do not use epoxy-coated reinforcing steel bar or strand in panels.

Remove laitance from top panel surface.

Finish top of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).

Shop drawings for the fabrication of panels will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.

TRANSVERSE PANEL REINFORCEMENT:

For panel widths over 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.

For panel widths over 3'-6" up to and including 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, (#4) Grade 60 reinforcing bars may be used in lieu of prestressed strands.

For panel widths up to 3'-6", use (#4) Grade 60 reinforcing bars (prestressed strands alone are not allowed).

Place transverse panel reinforcement at panel centroid and space at 6" Max.

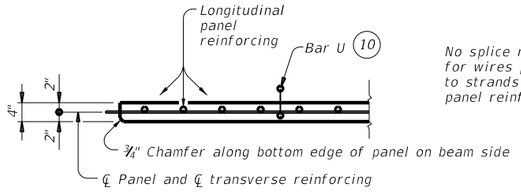
LONGITUDINAL PANEL REINFORCEMENT:

Any of the following options may be used for longitudinal panel reinforcement:

1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
2. ⅜" Dia prestressing strands at 4 ½" Max Spacing (unstressed). No splices allowed.
3. ½" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.

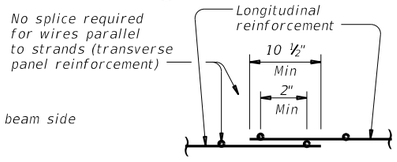
No combination of longitudinal reinforcement options in a panel is allowed.

Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental (#4) reinforcement.

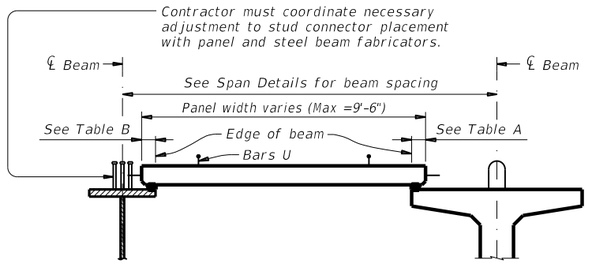


SECTION A-A

(Not showing supplemental #4 bars for skewed end panels.)



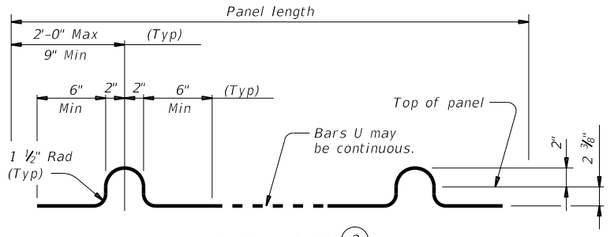
WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL (6)



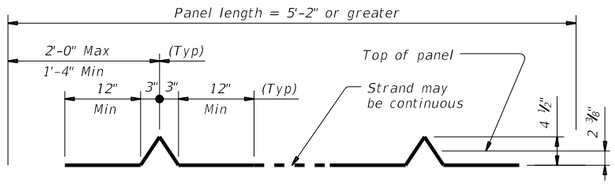
STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS

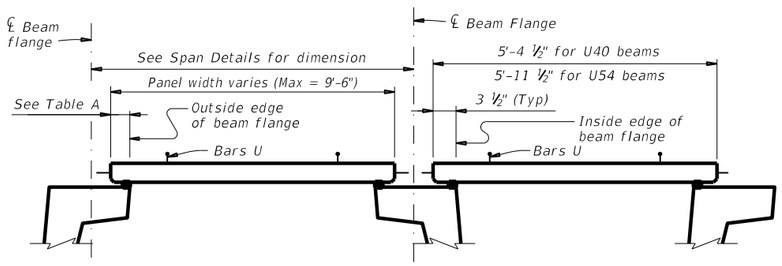
Typ unless noted otherwise



BARS U (#3) (2)



OPTIONAL STRAND FOR BARS U (3)



PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE PANEL FABRICATION DETAILS

PCP-FAB

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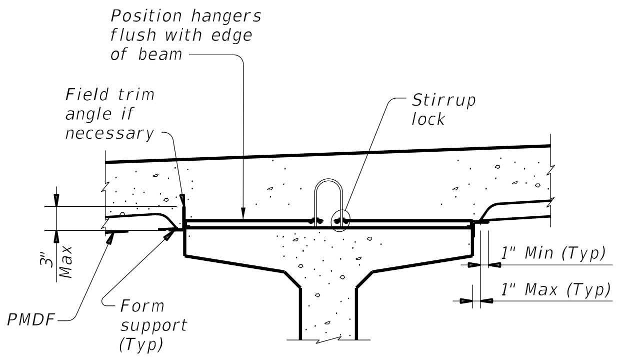
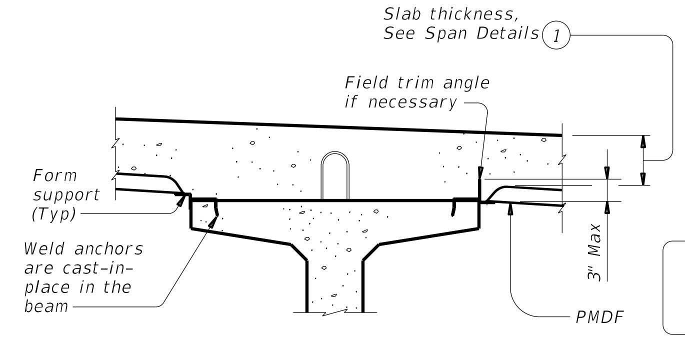
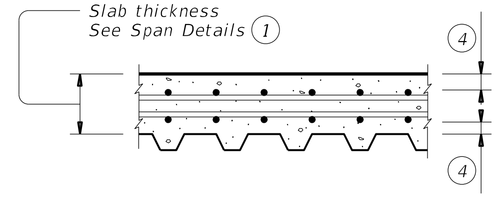


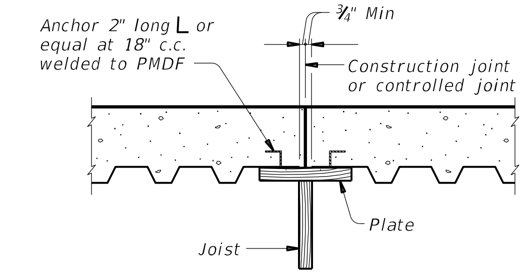
PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS



PRESTR CONC I-BEAMS AND I-GIRDERS WITH WELD ANCHORS

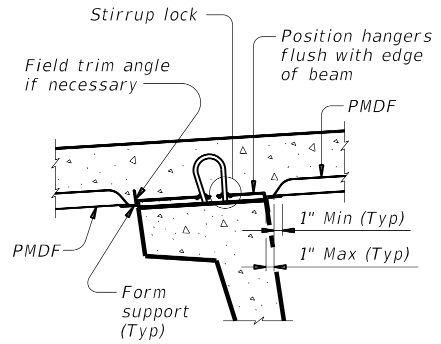


TYP LONGITUDINAL SLAB SECTION

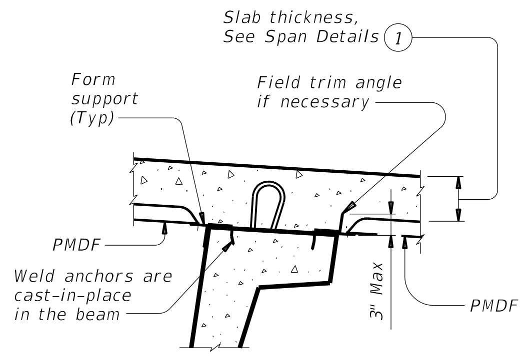


Note: In spans where PMD forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

SECTION THRU CONSTRUCTION JOINT

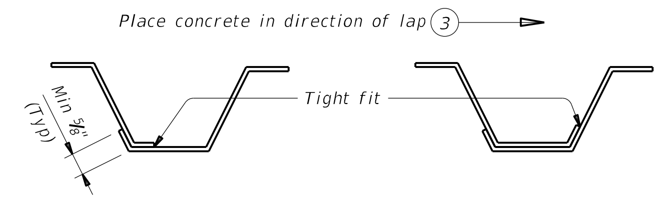


U-BEAMS WITH STIRRUP LOCKS

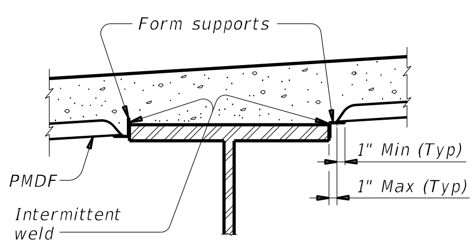


U-BEAMS WITH WELD ANCHORS

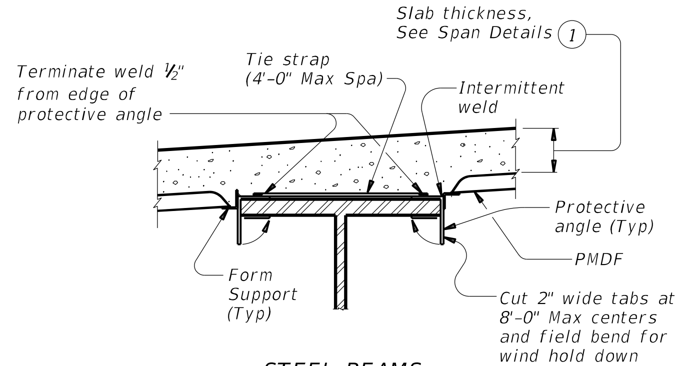
FOR PRESTR CONC U-BEAM AND STEEL GIRDER BRIDGES:
Unless shown elsewhere in the plans, size, spacing, and orientation of bottom mat of slab reinforcement must match the top mat of reinforcing shown on the span details except all bottom mat bars are to be #5. Bottom mat reinforcement and additional concrete is subsidiary to Item 422 "Concrete Superstructures."
FOR PRESTR CONC TX-GIRDER BRIDGES:
See Miscellaneous Slab Details, Prestr Concrete I-Girders (IGMS) standard sheet for bottom mat reinforcing.



SIDE LAP DETAILS



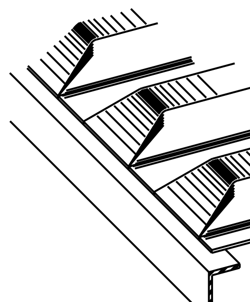
STEEL BEAMS AT COMPRESSION FLANGES



STEEL BEAMS AT TENSION FLANGES 2

TYPICAL TRANSVERSE SECTIONS

1. Slab thickness minus 5/8" if corrugations match reinforcing bars.
2. Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down resistance for PMDF in tension flange zones will be considered. At least one layer of sheet metal must be provided between the flange and the weld joint.
3. The direction of concrete placement will be such that the upper layer of the form overlap is loaded first.
4. See Span details for cover requirements.



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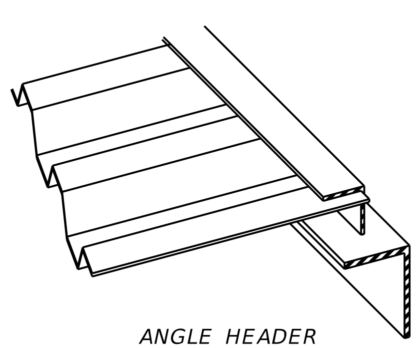

ANGLE HEADER

NOTE: This type is to be used for skewed ends only.

TYPES OF END CLOSURES

GENERAL NOTES:
Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to ASTM A653, structural steel (SS), with coating designation G165. Steel must have a minimum yield strength of 33 ksi. Minimum thickness of PMDF is 20 gage and that of support angles and protective angles is 12 gage.
Submit two copies of forming plans for PMDF to the Engineer. These plans must show all essential details of proposed form sheets, closures, fasteners, supports, connectors, special conditions and size and location of welds. These plans must clearly show areas of tension flanges for steel beams and provisions for protecting the tension flanges from welding notch effects by inclusion of separating sheet metal or other positive method. These plans must be designed, signed, and sealed by a licensed professional engineer. Department approval of these plans is not required, but the Department reserves the right to require modifications to the plans.
The Contractor is responsible for the adequacy of these plans.
The details and notes shown on this standard are to be used as a guide in preparation of the forming plans.
All material, labor, tools and incidentals necessary to form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructures".

DESIGN NOTES:
As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi.
Maximum deflection under the weight of forms, reinforcement and concrete or 120 psf, whichever is greater, shall not exceed the following:

1/180 of the form design span, but not more than 0.50", for design spans of 10' or less.

1/240 of the form design span, but not more than 0.75", for design spans greater than 10'.

The form design span must not be less than the clear distance between beam flanges, measured parallel to the form flutes, minus 2".

CONSTRUCTION NOTES:
Form sheets must not be permitted to rest directly on the top of beam flanges. Form sheets must be securely fastened to form supports and must have a minimum bearing length of one inch at each end. Form supports must be placed in direct contact with beam flanges.
All attachments must be made by permissible welds, screws, bolts, clips or other means shown on the forming plans. All sheet metal assembly screws must be installed with torque-limiting devices to prevent stripping. Only welds or bolts must be used to support vertical loads.
Welding and welds must be in accordance with the provisions of Item 448, "Structural Field Welding", pertaining to fillet welds. All welds must be made by a qualified welder in accordance with Item 448.
All permanently exposed form metal, where the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing". Minor heat discoloration in areas of welds need not be touched up.
Flutes must line up uniformly across the entire width of the structure where main reinforcing steel is located in the flute.
Construction joints will not be permitted unless shown on the plans. The location of and forming details for any construction joint used must be shown on the forming plans. Forms below a construction joint must be removed after curing of the slab.
A sequence for uniform vibration of concrete must be approved by the Engineer prior to concrete placement. Attention must be given to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb in the flutes and at headers and/or construction joints.

SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

PERMANENT METAL DECK FORMS

PMDF

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY	
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02-20: Modified box note by adding steel beams/girders and subsidiary.	DIST	COUNTY		SHEET NO.	
	TYL	SMITH		101	

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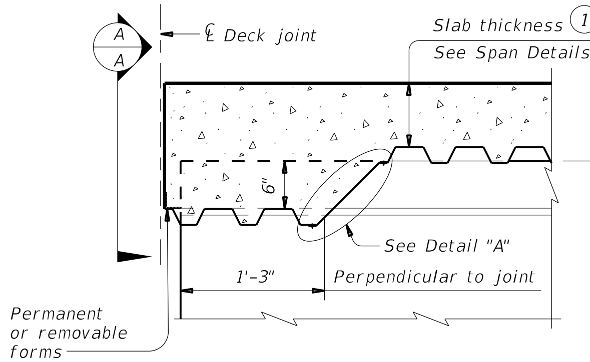
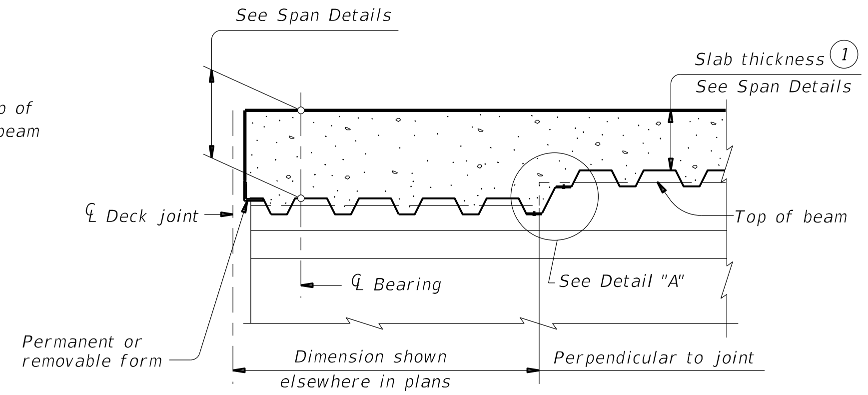
DETAILS AT ENDS OF BEAMS

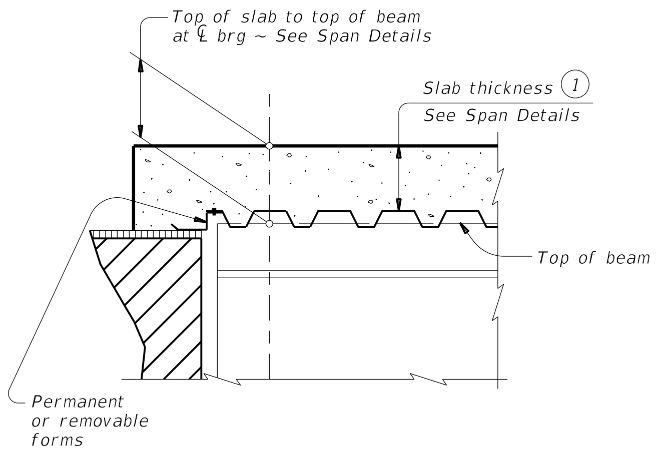


AT THICKENED SLAB END FOR U-BEAMS

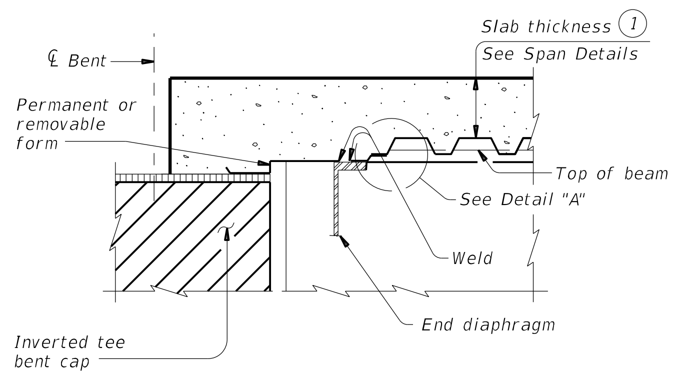


AT THICKENED SLAB END FOR PRESTRESSED I-BEAMS, I-GIRDERS AND STEEL BEAMS

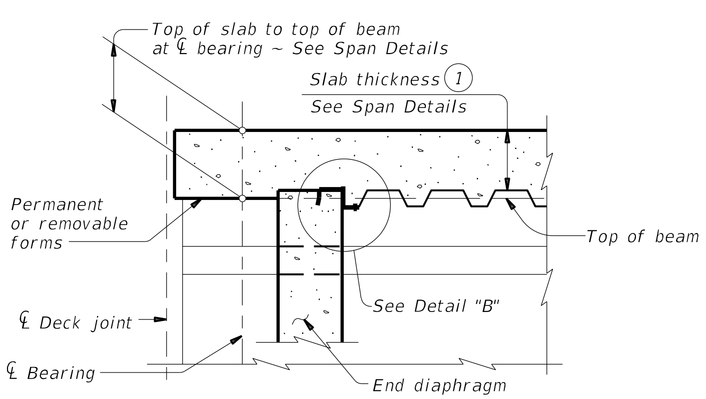
Showing I-beam block-out. No block-out for I-girders or steel beams.



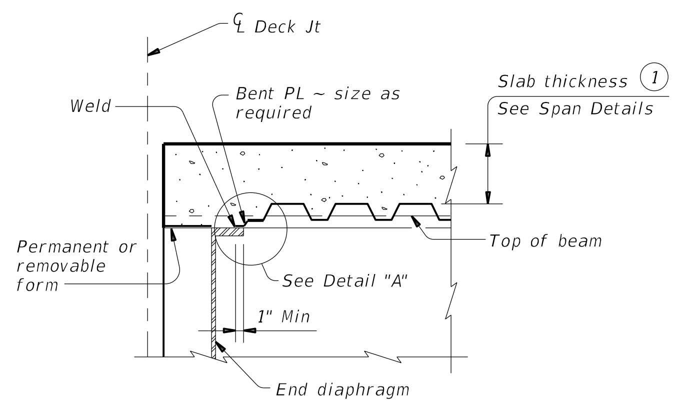
AT SLAB OVER ABUT BKWL OR INV TEE STEM FOR CONC BEAMS WITHOUT THICKENED SLAB END



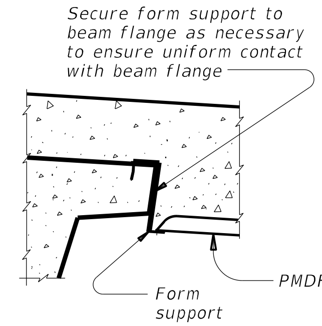
AT SLAB OVER INV TEE STEM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



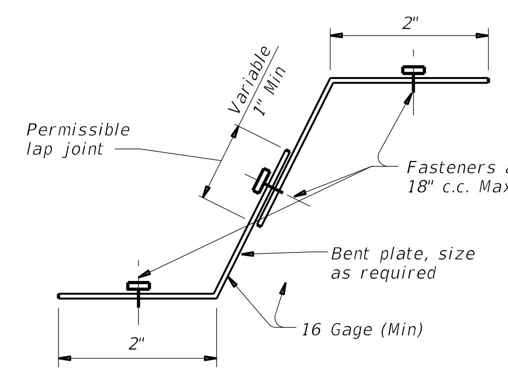
AT CONC END DIAPHRAGM FOR PRESTRESSED I-BEAMS AND STEEL BEAMS



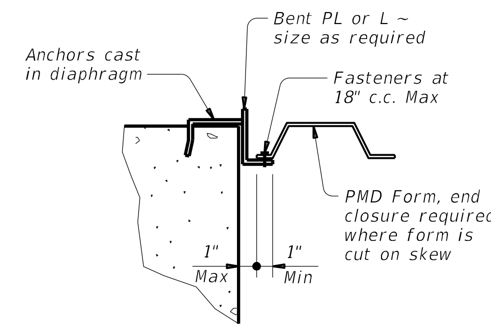
AT END DIAPHRAGM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



SECTION A-A



DETAIL "A"



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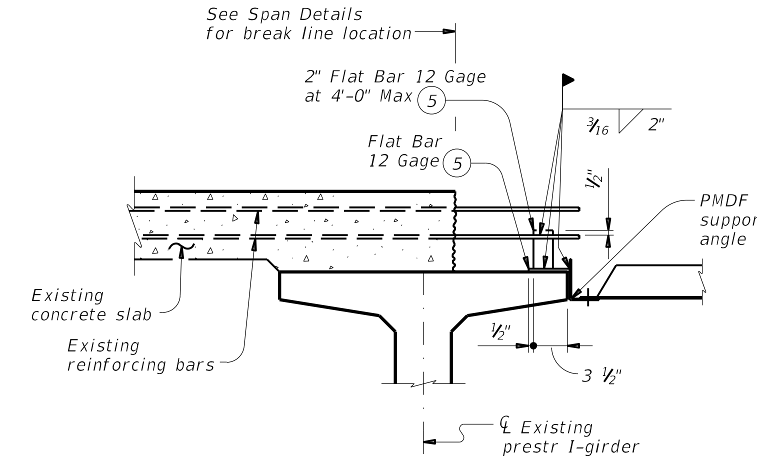
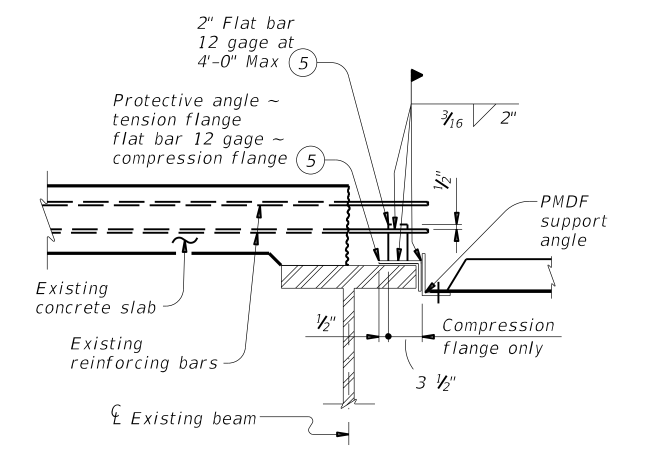


SHOWING PRESTRESSED CONCRETE I-BEAMS, I-GIRDERS AND U-BEAMS



SHOWING STEEL BEAMS

WIDENING DETAILS

(1) Slab thickness minus 1/8" if corrugations match reinforcing bars

(5) Minimum yield stress of 12 gage bars shall be 40 ksi

Texas Department of Transportation | Bridge Division Standard

PERMANENT METAL DECK FORMS

PMDF

FILE: pmdfste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PR 16
02-20: Modified box note by adding steel beams/girders and subsidiary.	DIST		COUNTY	SHEET NO.
	TYL		SMITH	102

DATE: 05/19/2021 03:08 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT3\Documents\10 - TYL\Design Projects\0606010007

DATE: 05/20/2021 04:32 PM
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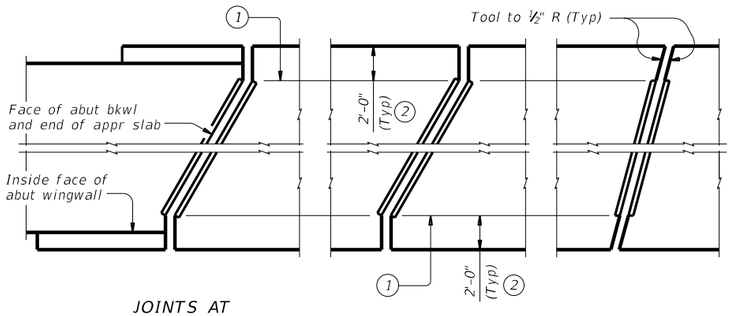
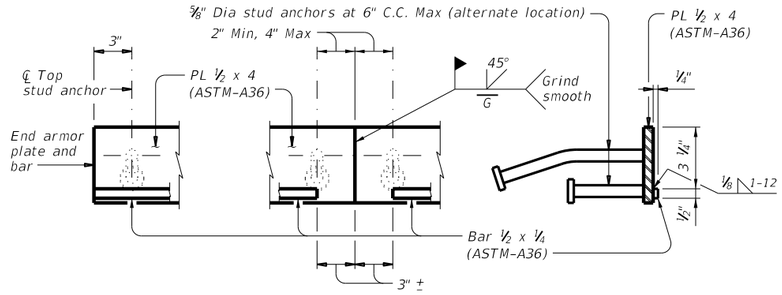


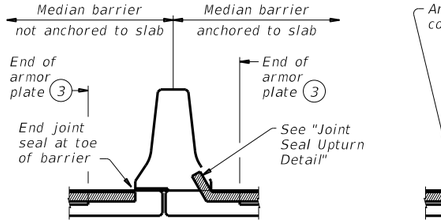
JOINTS AT ABUTMENTS | SKEWS OVER 15° | SKEWS THRU 15°

PLANS OF ARMOR PLATES

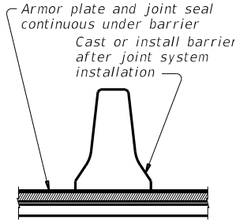


END VIEW | FIELD SPLICE (Studs are not shown for clarity.) | SECTION

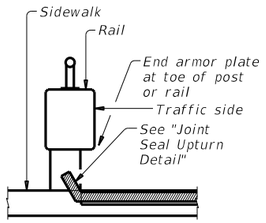
ELEVATION OF ARMOR PLATE



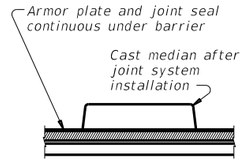
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



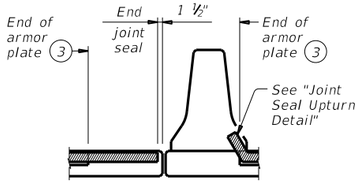
AT MEDIAN BARRIER



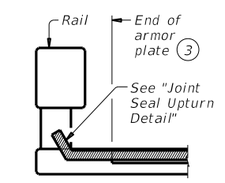
AT SIDEWALK BEHIND BRIDGE RAIL



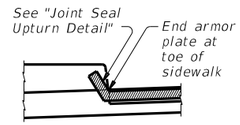
AT RAISED MEDIAN



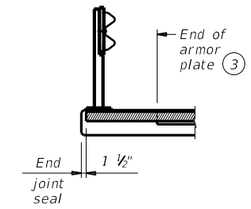
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

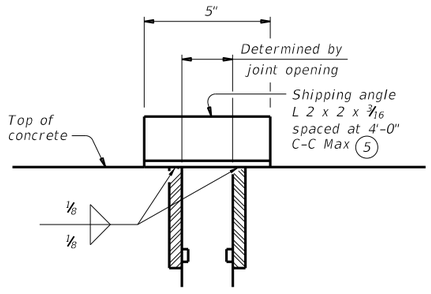


AT SIDEWALK



AT STEEL POST BRIDGE RAIL

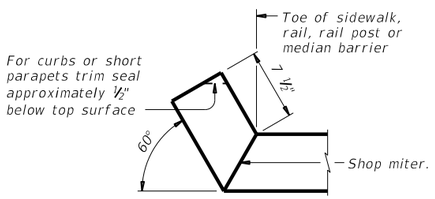
TYPICAL SECTIONS OF ARMOR PLATES AND SEALS (4)



SHOWING ARMOR PLATE (Studs not shown for clarity)

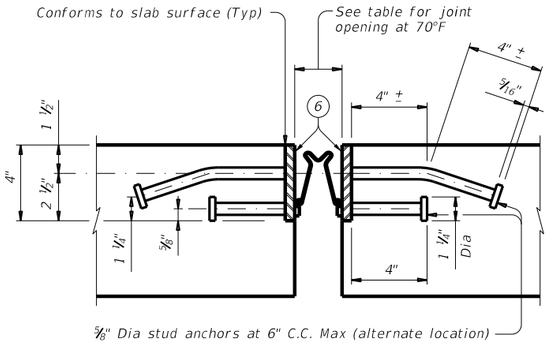
SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.



JOINT SEAL UPTURN DETAIL

Upturn seal only. Terminate armor plates as shown in "Plans of Armor Plates" and "Typical Sections of Armor Plates & Seals."



JOINT SECTION

Showing R J Watson strip seal. Other strip seals are similar.

1. At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
2. Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
3. See "Plans of Armor Plates".
4. Other conditions affecting the joint profile should be noted elsewhere.
5. Align shipping angle perpendicular to joint.
6. Coat with Manufacturer's supplied epoxy primer above bar before installing sealant.
7. Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.
8. These openings are also the recommended minimum installation openings.

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION (7)	STRIP SEAL 4" JOINT	
		Seal Type	Joint Opening (8)
D.S. Brown	As shown	V-400	2 ¼"
R.J. Watson	As shown	SF-400	2 ½"
SSI	As shown	SSS-400	2 ½"
Watson Bowman Acme	As shown	SPS-400	2"

REDUCED LONGITUDINAL MOVEMENT RANGE

SKEW (deg)	JOINT SIZE 4"
0	4.0"
15	4.0"
30	3.5"
45	2.8"

DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.

For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for sealed expansion joint.

Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section with System II or IV primer in accordance with Item 446, "Feild Cleaning and Painting Steel." Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Item 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of sealed expansion joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure the sealed expansion joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for sealed expansion joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

Splice and install seal in accordance with the Manufacturer's directions and with the adhesive provided by the Manufacturer.

Splice in joint seal may be performed in the field.

GENERAL NOTES:

Provide sealed expansion joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-B is 6 ½".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SEALED EXPANSION JOINT TYPE B WITHOUT OVERLAY

SEJ-B

FILE: sejbste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		103

DATE: 05/20/2021 04:32 PM
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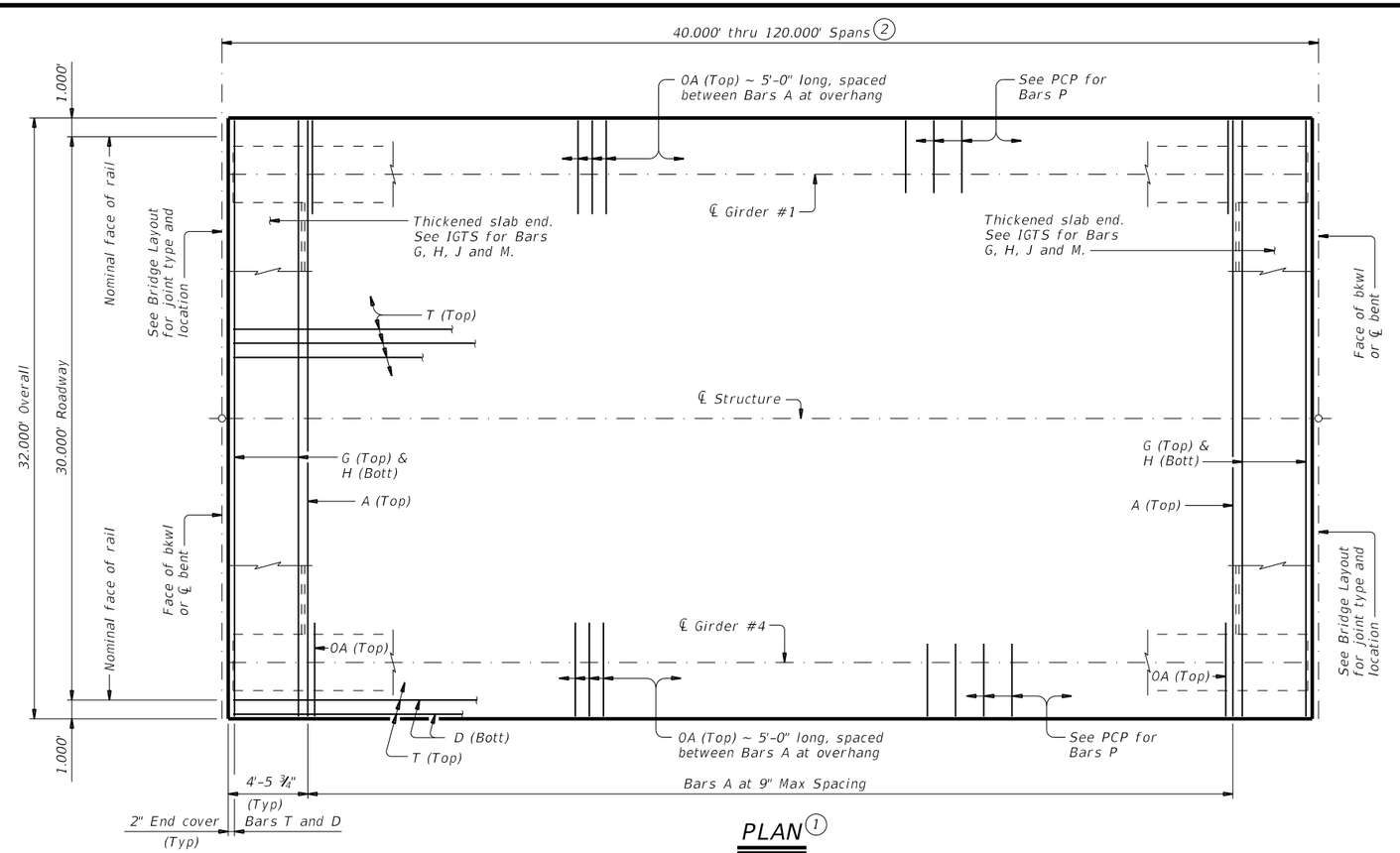
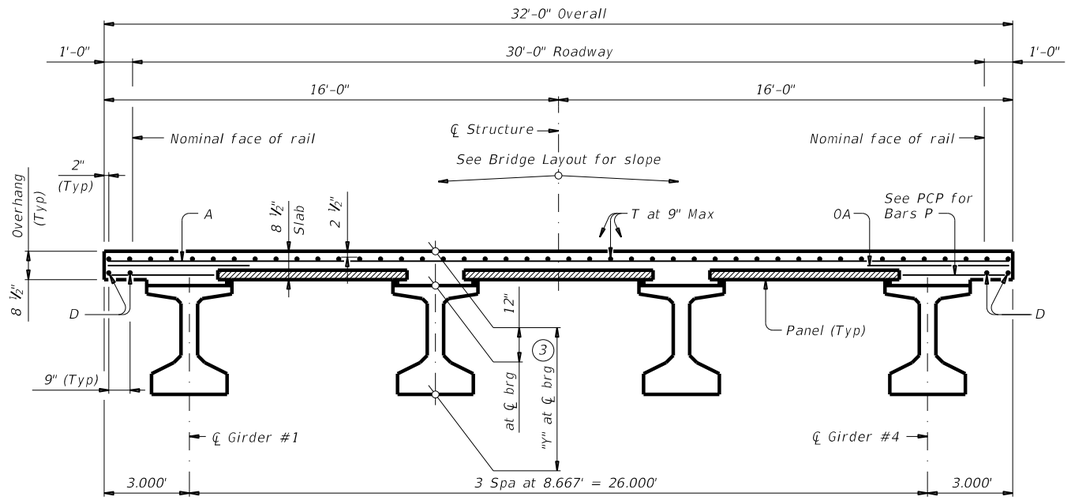


PLAN (1)



TYPICAL TRANSVERSE SECTION
(Showing girder type Tx46)

BAR TABLE	
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
0A	#5
P	#4
T	#4

TABLE OF SECTION DEPTHS	
GIRDER TYPE	"Y" AT ℄ BRG (3)
	Ft/In
Tx28	3'-4"
Tx34	3'-10"
Tx40	4'-4"
Tx46	4'-10"
Tx54	5'-6"

(1) If multi-span units (with slab continuous over interior bents) are indicated on the Bridge Layout, see standard IGCS for adjustment to slab reinforcement and quantities.

(2) Span lengths for prestressed concrete I-Girder type:
Type Tx28 for spans lengths 40.000' thru 70.000'.
Type Tx34 for spans lengths 40.000' thru 80.000'.
Type Tx40 for spans lengths 40.000' thru 95.000'.
Type Tx46 for spans lengths 40.000' thru 105.000'.
Type Tx54 for spans lengths 40.000' thru 120.000'.

(3) "Y" value shown is based on theoretical girder camber, dead load deflection from an 8 ½" concrete slab, a constant roadway grade, and using precast panels (PCP). The Contractor will adjust this value as necessary for any roadway vertical curve and/or if the precast overhang panel (PCP(0)) option is used.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER SPANS (TYPE Tx28 THRU Tx54)

30' ROADWAY

SIG-30

FILE: sig09sts-19.dgn	DN: JMH	CK: NRN	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Increased "X" and "Y" Values	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		104

TABLE OF DEAD LOAD DEFLECTIONS

TYPE Tx28 GIRDERS

SPAN LENGTH	"A"	"B"
Ft	Ft	Ft
40	0.010	0.014
45	0.016	0.022
50	0.025	0.035
55	0.037	0.052
60	0.053	0.074
65	0.073	0.103
70	0.100	0.140

TYPE Tx34 GIRDERS

SPAN LENGTH	"A"	"B"
Ft	Ft	Ft
40	0.006	0.008
45	0.009	0.013
50	0.015	0.021
55	0.022	0.031
60	0.031	0.044
65	0.044	0.062
70	0.060	0.084
75	0.079	0.111
80	0.103	0.145

TYPE Tx40 GIRDERS

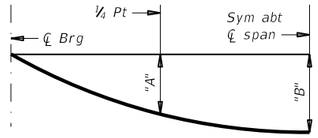
SPAN LENGTH	"A"	"B"
Ft	Ft	Ft
40	0.004	0.005
45	0.006	0.009
50	0.010	0.014
55	0.014	0.020
60	0.021	0.029
65	0.028	0.040
70	0.039	0.055
75	0.052	0.073
80	0.068	0.095
85	0.086	0.121
90	0.109	0.153
95	0.136	0.191

TYPE Tx46 GIRDERS

SPAN LENGTH	"A"	"B"
Ft	Ft	Ft
40	0.003	0.004
45	0.004	0.006
50	0.006	0.009
55	0.010	0.014
60	0.014	0.020
65	0.019	0.027
70	0.026	0.037
75	0.036	0.050
80	0.046	0.065
85	0.059	0.083
90	0.075	0.105
95	0.093	0.130
100	0.115	0.161
105	0.140	0.196

TYPE Tx54 GIRDERS

SPAN LENGTH	"A"	"B"
Ft	Ft	Ft
40	0.001	0.002
45	0.003	0.004
50	0.004	0.006
55	0.006	0.009
60	0.009	0.013
65	0.013	0.018
70	0.018	0.025
75	0.024	0.033
80	0.031	0.043
85	0.039	0.055
90	0.049	0.069
95	0.061	0.086
100	0.076	0.106
105	0.093	0.130
110	0.112	0.157
115	0.134	0.188
120	0.159	0.223



DEAD LOAD DEFLECTION DIAGRAM

Calculated deflections shown are due to the concrete slab on interior girders only (Ec = 5000 ksi). Adjust values as required for exterior girders and if optional slab forming is used. These values may require field verification.

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB	Prestressed Concrete Girders			TOTAL REINF STEEL (5)
		ABUT TO INT BT (4)	INT BT TO INT BT (4)	ABUT TO ABUT (4)	
Ft	SF	LF	LF	LF	Lb
40	1,280	158.00	158.00	158.00	2,944
45	1,440	178.00	178.00	178.00	3,312
50	1,600	198.00	198.00	198.00	3,680
55	1,760	218.00	218.00	218.00	4,048
60	1,920	238.00	238.00	238.00	4,416
65	2,080	258.00	258.00	258.00	4,784
70	2,240	278.00	278.00	278.00	5,152
75	2,400	298.00	298.00	298.00	5,520
80	2,560	318.00	318.00	318.00	5,888
85	2,720	338.00	338.00	338.00	6,256
90	2,880	358.00	358.00	358.00	6,624
95	3,040	378.00	378.00	378.00	6,992
100	3,200	398.00	398.00	398.00	7,360
105	3,360	418.00	418.00	418.00	7,728
110	3,520	438.00	438.00	438.00	8,096
115	3,680	458.00	458.00	458.00	8,464
120	3,840	478.00	478.00	478.00	8,832

(4) Fabricator will adjust lengths for girder slopes as required.

(5) Reinforcing steel weight is calculated using an approximate factor of 2.3 lbs/SF.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Multi-span units, with slab continuous over interior bents, may be formed with the details shown on this sheet and standard IGCS.

See IGTS standard for Thickened Slab End details and quantity adjustments.

See PCP and PCP-FAB for panel details not shown.

See PCP(O) and PCP(O)-FAB for precast overhang panel details if this option is used.

See IGMS standard for miscellaneous details.

See applicable rail details for rail anchorage in slab.

See PMDF standard for details and quantity adjustments if this option is used.

This standard does not support the use of transition bents.

Cover dimensions are clear dimensions, unless noted otherwise.

MATERIAL NOTES:

Provide Class S concrete (f'c = 4,000 psi).

Provide Class S (HPC) concrete if shown elsewhere in the plans.

Provide Grade 60 reinforcing steel.

Provide bar laps, where required, as follows:

Uncoated ~ #4 = 1'-7"

Epoxy coated ~ #4 = 2'-5"

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A, D, DA, P or T unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER SPANS (TYPE Tx28 THRU Tx54)

30' ROADWAY

SIG-30

FILE: sig09sts-19.dgn	DN: JMH	CK: NRN	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Increased "X" and "Y" Values	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		105

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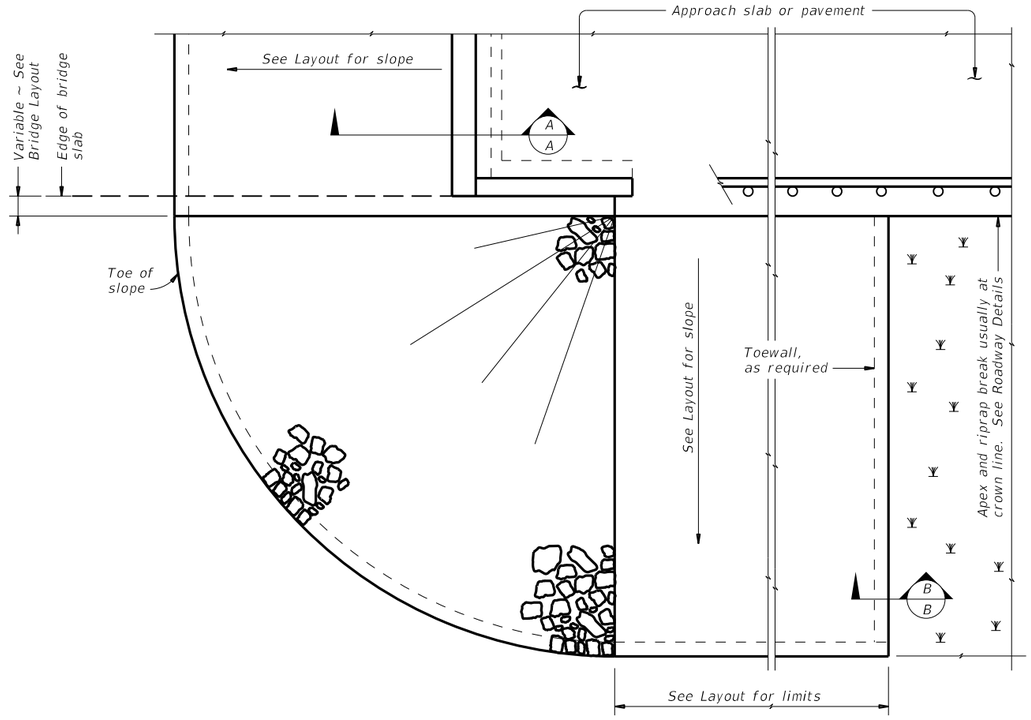
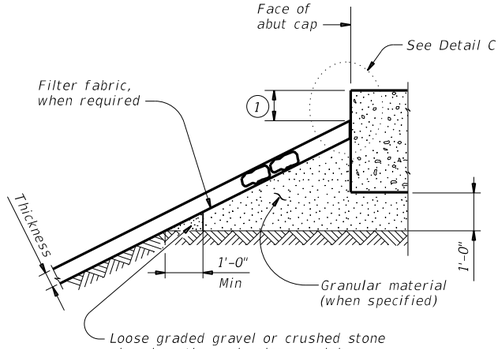
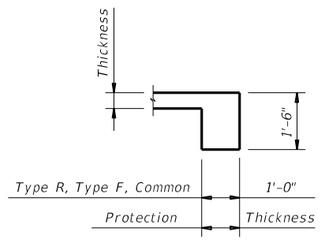


PLAN

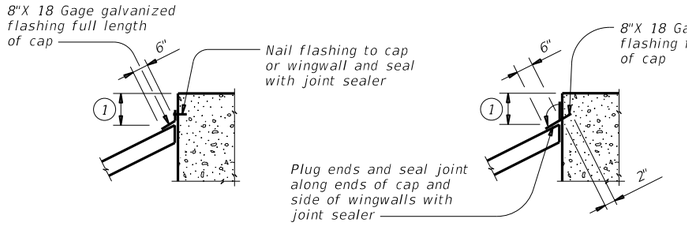


SECTION A-A AT CAP



SECTION B-B

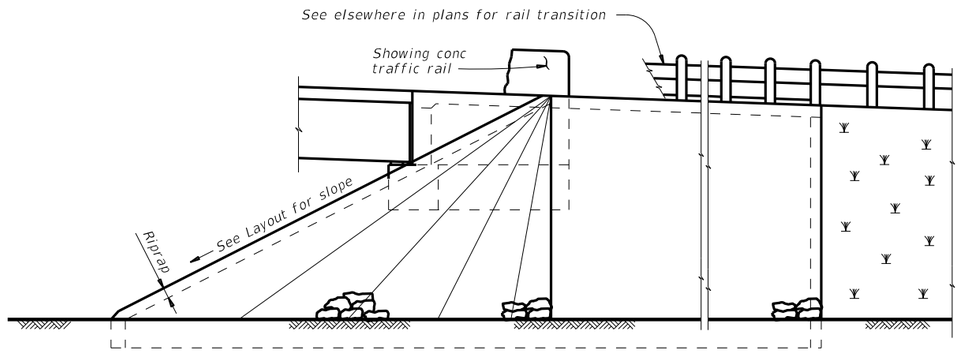
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C



ELEVATION

(1) Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES			
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REVISIONS	0606	01	007	PARK ROAD			
	DIST	COUNTY		SHEET NO.			
	TYL	SMITH		105A			

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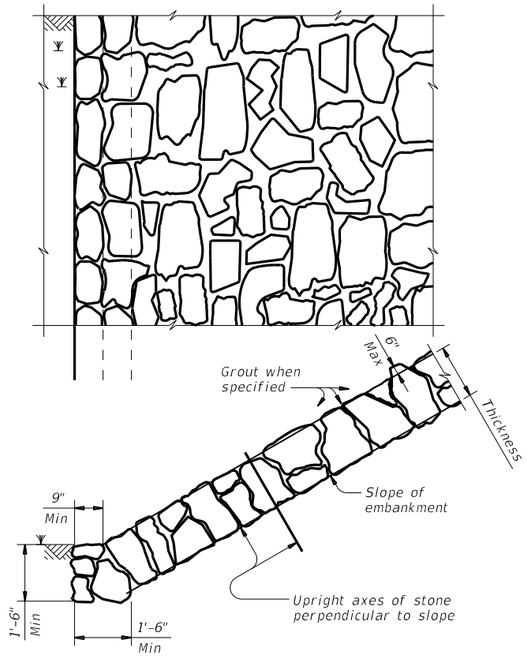


FIGURE 1 ~ TYPE R STONE RIPRAP
dry or grouted

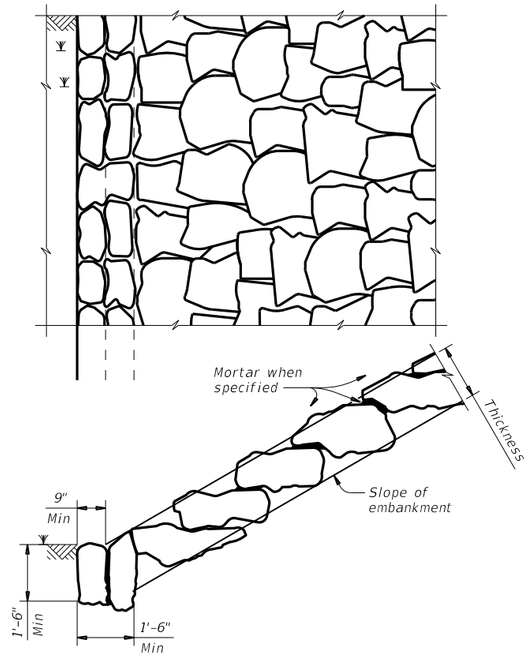


FIGURE 2 ~ TYPE F STONE RIPRAP
dry or mortared

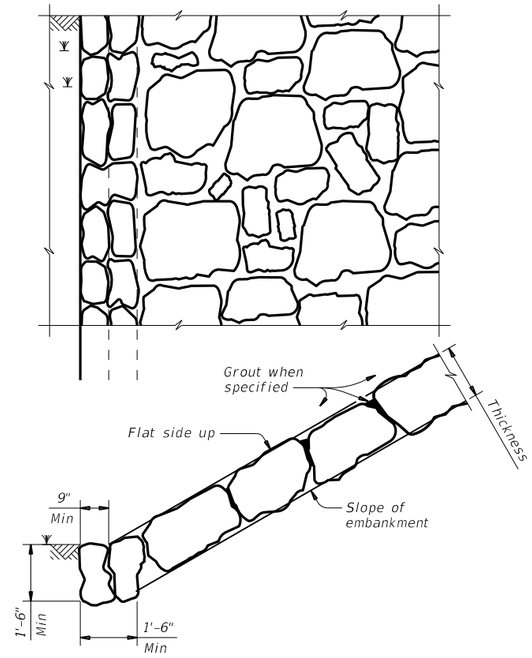


FIGURE 3 ~ TYPE F STONE RIPRAP
grouted

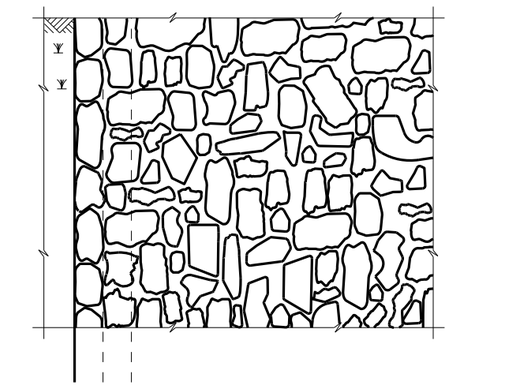


FIGURE 4 ~ COMMON STONE RIPRAP
dry or grouted

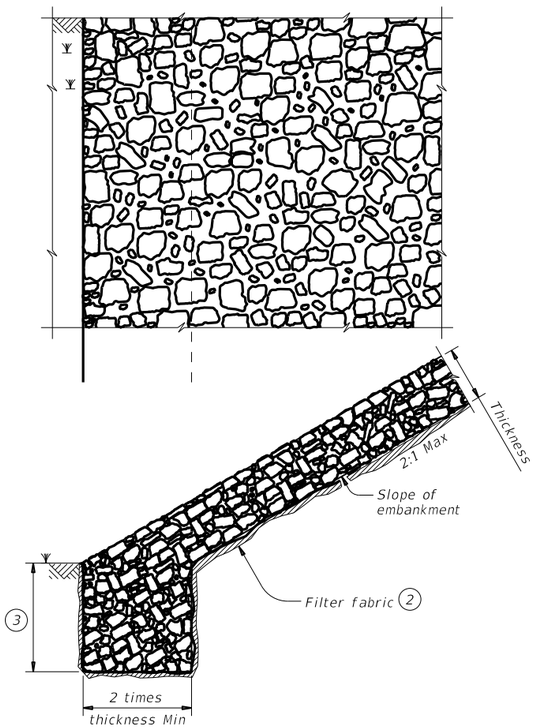


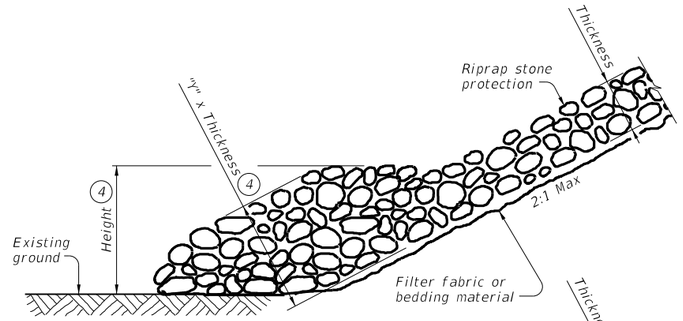
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

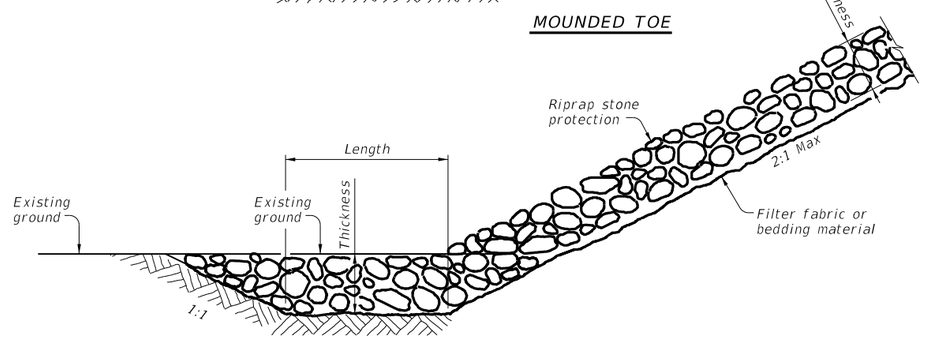
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(4) "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

(5) List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES			
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	DIST	COUNTY		SHEET NO.			
	TYL	SMITH		105B			

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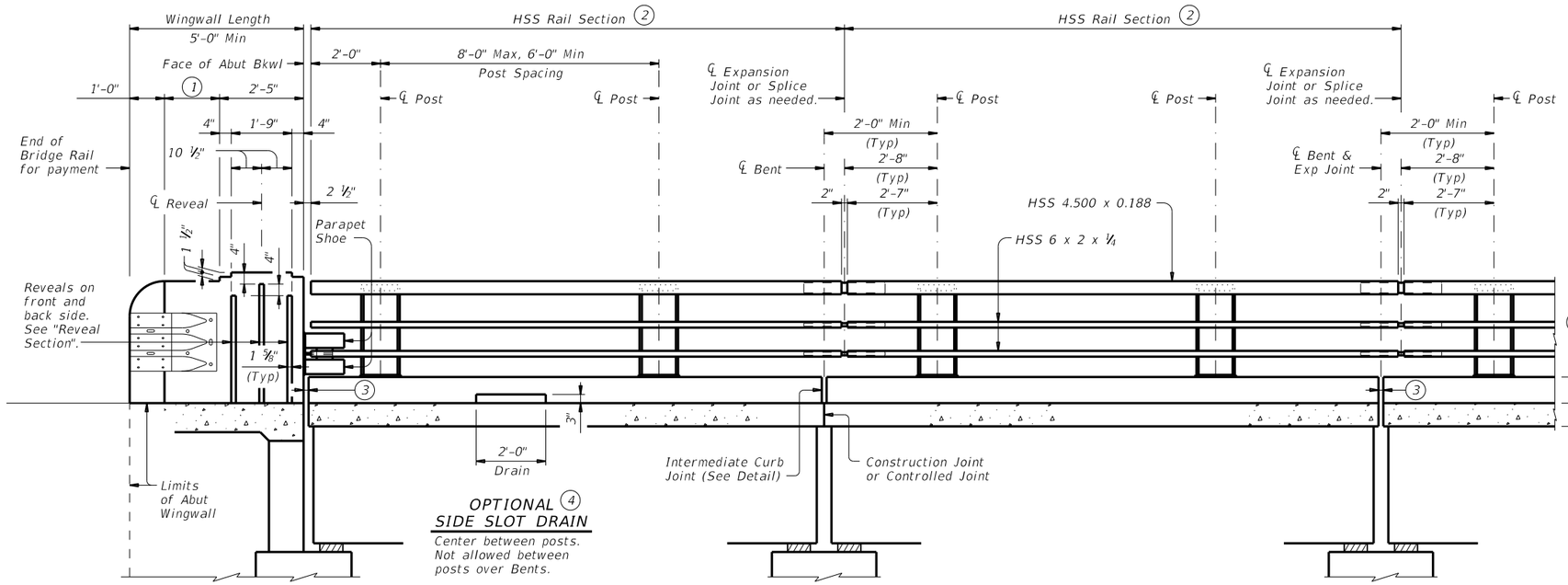


AT ABUTMENTS

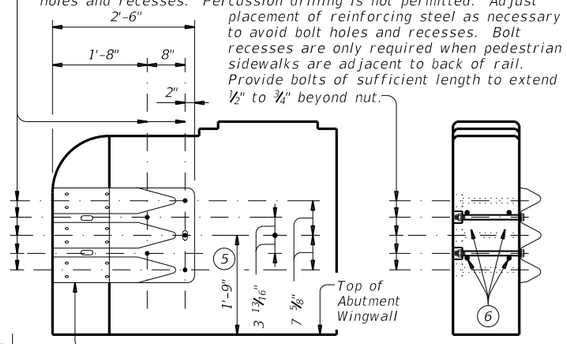
AT BENTS WITHOUT SLAB EXP JOINTS

AT BENTS WITH SLAB EXP JOINTS

OPTIONAL (4) SIDE SLOT DRAIN

Center between posts. Not allowed between posts over Bents.

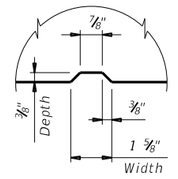
ROADWAY ELEVATION OF RAIL



ELEVATION SECTION

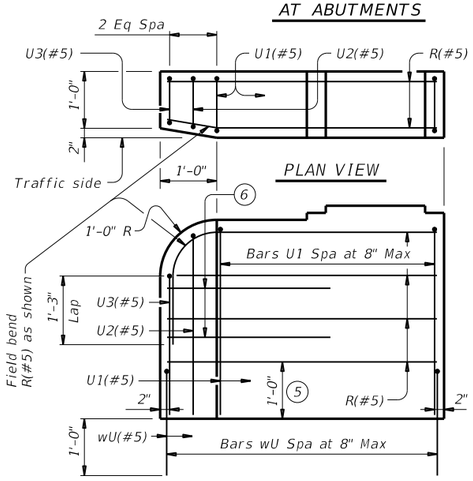
TERMINAL CONNECTION DETAILS

Reveals not shown for clarity.

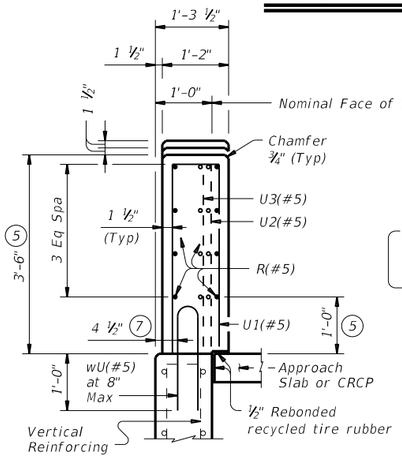


REVEAL SECTION

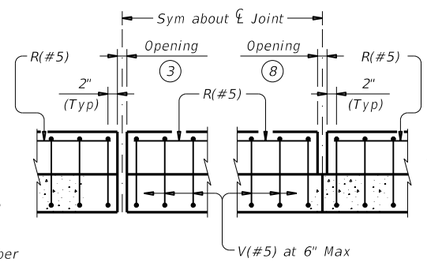
(Showing reveal dimensions)



AT ABUTMENT WINGWALLS OR CIP RETAINING WALLS

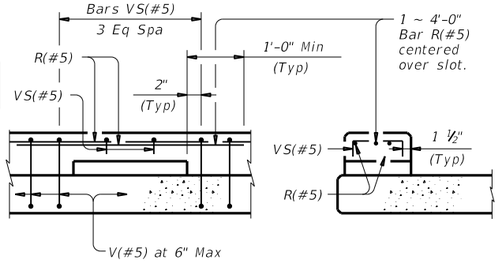


SECTION AT ABUTMENT WINGWALLS OR CIP RETAINING WALLS



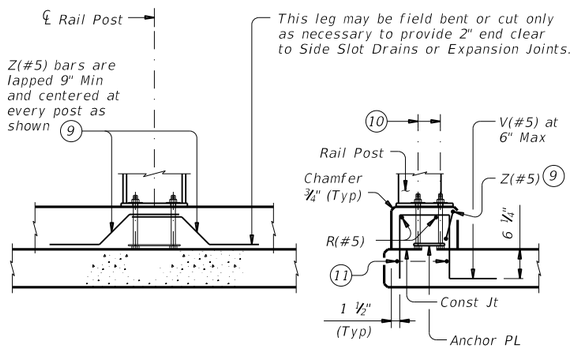
AT BENTS WITH SLAB EXPANSION JOINTS

AT BENTS WITHOUT SLAB EXPANSION JOINTS



AT OPTIONAL DRAIN

SECTION AT OPTIONAL DRAIN

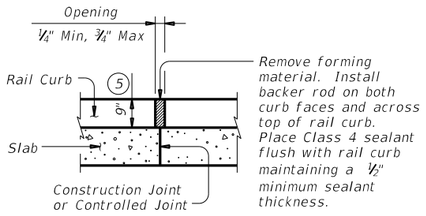


AT POST

Bars V and R omitted for clarity.

SECTION AT POST

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



INTERMEDIATE CURB JOINT DETAIL

Provide at all interior bents without slab expansion joints.

(1) Wingwall length minus 3'-5" (Variable) 1'-7" Min.

(2) HSS rail sections must have at least two posts but not more than four.

(3) Same as slab joint opening. (5" Max Expansion Joint)

(4) Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway and a sidewalk, side slot drains are not permitted.

(5) Increase 2" for structures with overlay.

(6) Place 4 additional Bars R(#5) 3'-8" in length inside Bars U(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.

(7) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(8) ¼" Min, ¾" Max.

(9) Adjust Bars Z(#5) as necessary to avoid Bars V(#5).

(10) ℄ ⅞" Dia Anchor Bolts. See "Anchor Bolt Assembly Details".

(11) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

HL93 LOADING

SHEET 1 OF 4

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T2P

FILE:	r1std035-19.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
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		TYL	SMITH		106

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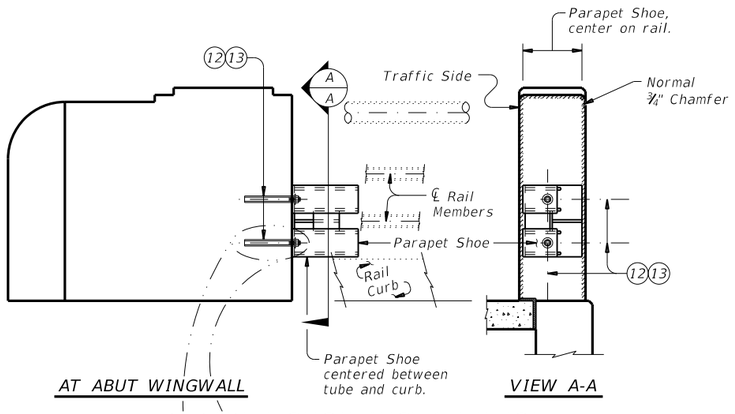
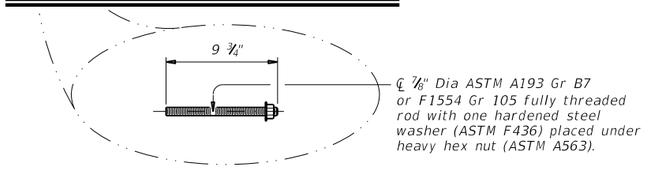
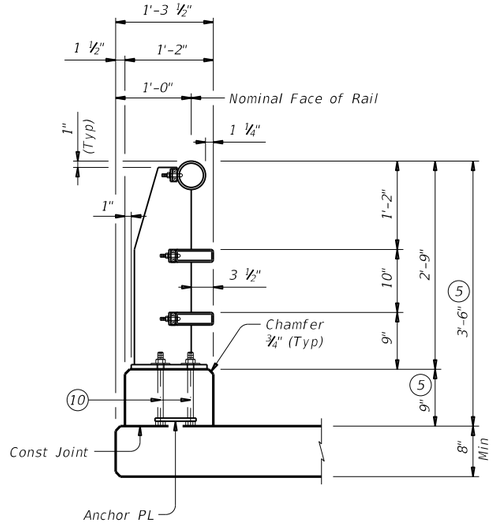


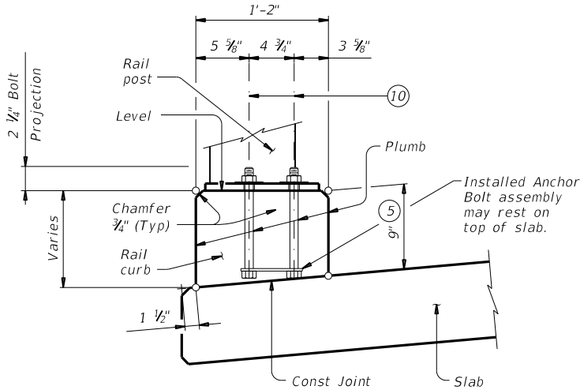
PARAPET SHOE INSTALLATION





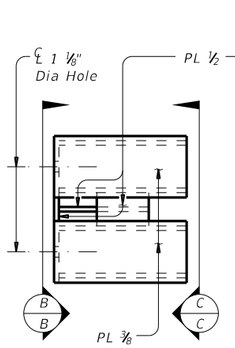
SECTION THRU BRIDGE RAIL AT POST

Reinforcing steel not shown for clarity.



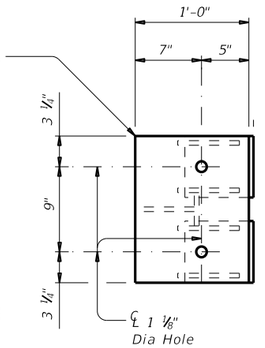
RAIL CURB FORMING DETAIL

Reinforcing steel not shown for clarity.

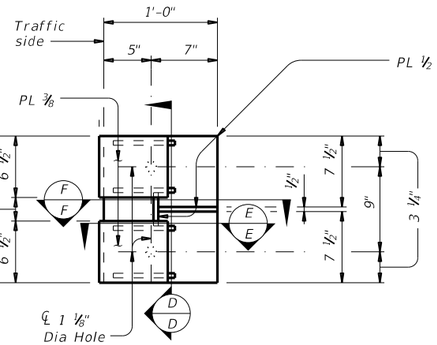


PARAPET SHOE

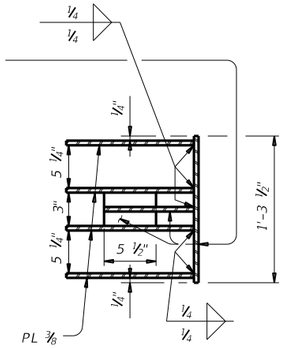
(Parapet Shoe weight = 78 lb each, for contractor's information only).



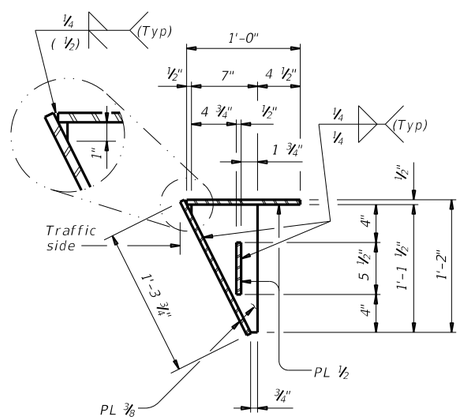
VIEW B-B



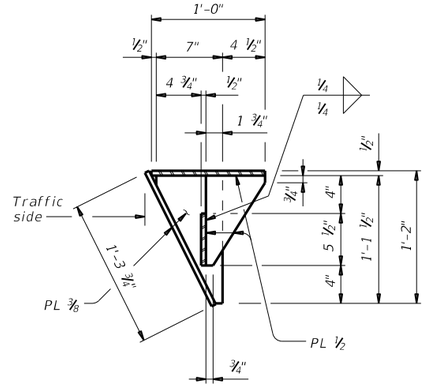
VIEW C-C



SECTION D-D



SECTION E-E



SECTION F-F

(5) Increase 2" for structures with overlay.

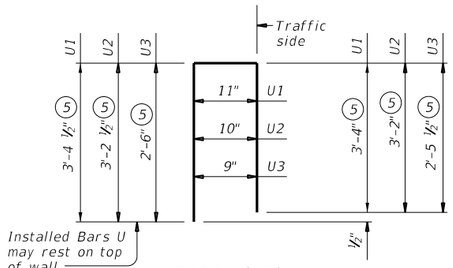
(10) ℄ ⅞" Dia Anchor Bolts. See "Anchor Bolt Assembly Details".

(12) Anchor bolts must be ⅞" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with heavy hex nuts and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

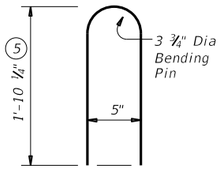
(13) Install Parapet Shoe after rail has been placed. To ease installation, temporarily brace parapet shoe until the anchorage system achieves manufacturer's recommended curing time. Anchorage system must be assembled with one hardened steel washer (ASTM F436) and one heavy hex nut (ASTM A563) each. Remove temporary bracing after anchorage systems has been firmly tightened.

(14) Length shown for 6 ¼" Min bar embedment with no overlay. Adjust as required.

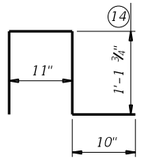
(15) Increase 2 ¾" for structures with overlay.



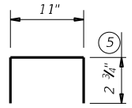
BARS U(#5)



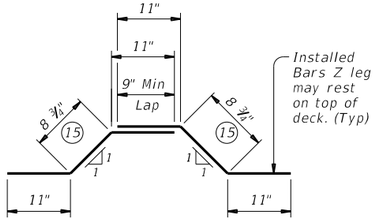
BARS wU(#5)



BARS V(#5)



BARS VS(#5)



BARS Z(#5)

HL93 LOADING SHEET 2 OF 4

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T2P

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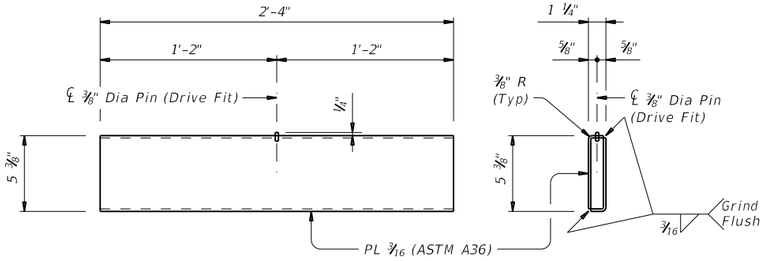
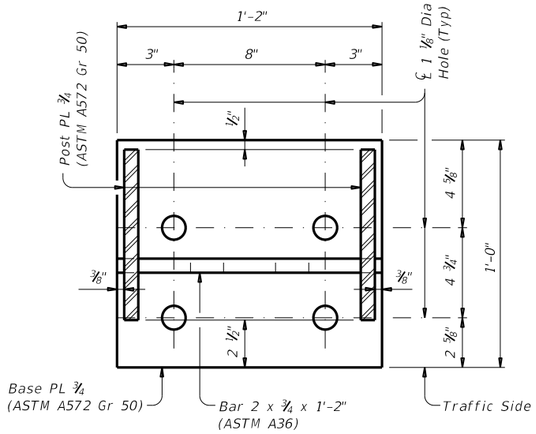
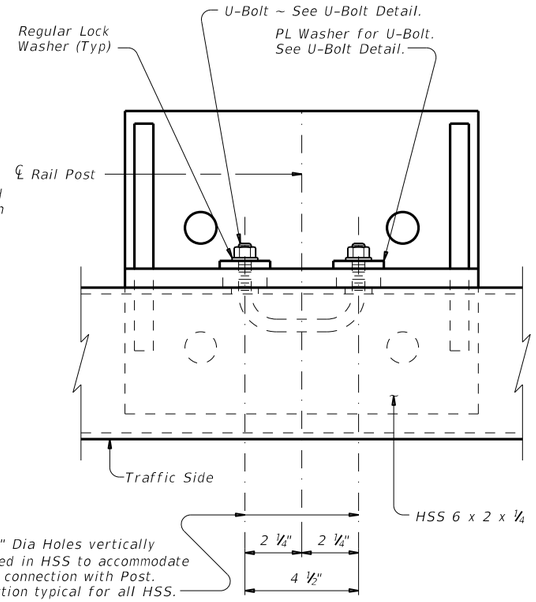


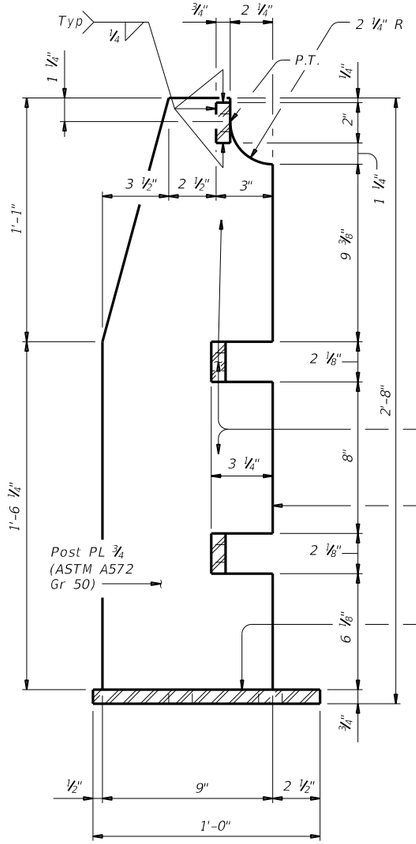
RECTANGULAR SLEEVE MEMBER



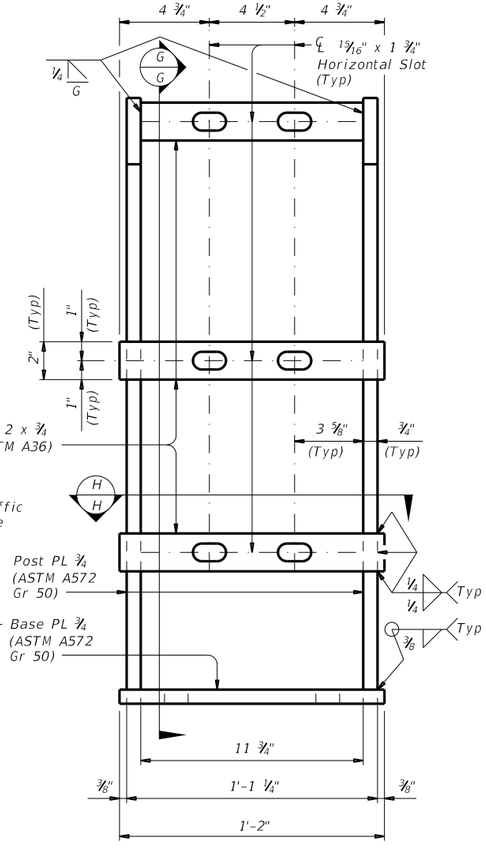


TOP VIEW OF RAIL POST

(Showing connection for rail post and HSS 6 x 2 x ¼. HSS 4.5 x 0.188 not shown for clarity. HSS 4.5 x 0.188 connection similar.)

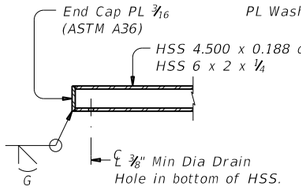


SECTION G-G

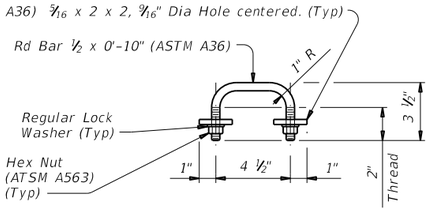


POST DETAIL

(Showing Traffic Side of Post)

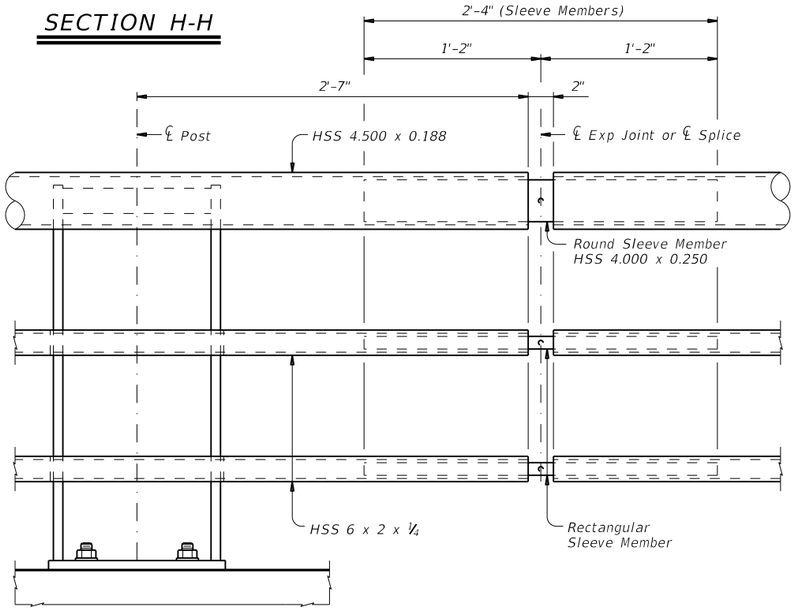


END CAP DETAIL

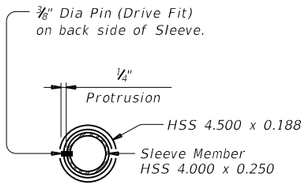


U-BOLT DETAIL

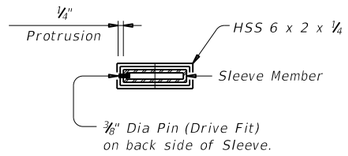
(Showing U-Bolt for rail post and HSS)



EXPANSION JOINT OR SPLICE



ROUND SLEEVE MEMBER



RECTANGULAR SLEEVE MEMBER

SECTIONS THRU SLEEVE MEMBERS

(Sections shown at ℄ Exp Jt or ℄ Splice)

HL93 LOADING SHEET 3 OF 4

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T2P

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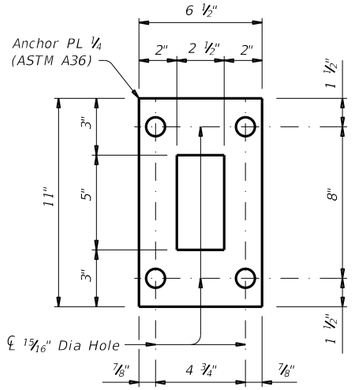
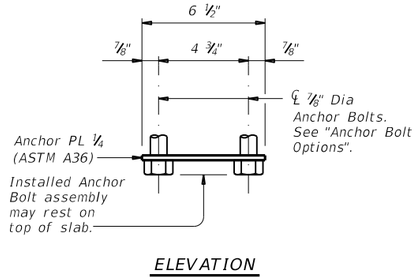
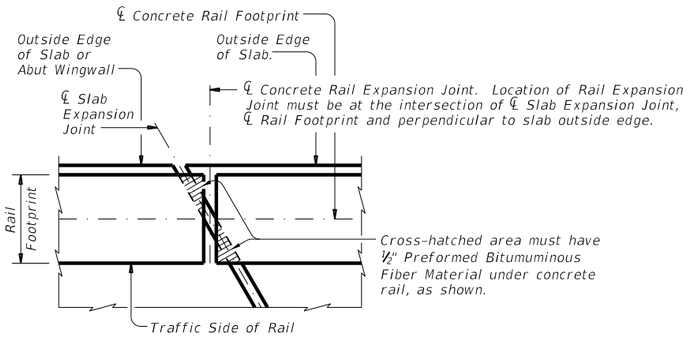


PLAN OF ANCHOR PLATE



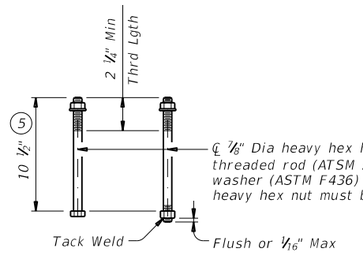
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.



ANCHOR BOLT OPTIONS

(Showing Anchor Bolts for Base Plate)

(5) Increase 2" for structures with overlay.

CONSTRUCTION NOTES:

The face of tubular sections and rail curb must be plumb unless otherwise approved by the Engineer. Steel posts must be square to the top of curb. Use epoxy mortar under post base plates if gaps larger than 1⁄16" exist.

Bend tubes to required radius for curved rails. Shop drawings for approval are required for curved rails.

One shop splice per rail member section is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

Cap all ends of HSS at parapet.

Round or chamfer exposed edges of rail members and rail posts to approximately 1⁄16" by grinding.

Chamfer all exposed concrete corners.

MATERIAL NOTES:

Provide ASTM A1085 or A500 Gr B for all HSS.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over gavanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Provide ⅞" Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.

Provide ½" Dia round bar U-bolts (ASTM A36) with plate washers (ASTM A36) and regular lock washers placed under hex nuts that conform to ASTM A563 requirements. See "U-Bolt Detail".

Provide Class "S" concrete. When Class "S" concrete for slab is HPC, include a minimum of 3 gallons of calcium nitrite inorganic corrosion inhibitor per cubic yard of Class "S" concrete.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-0"
Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

This railing cannot be used on bridges with expansion joints providing more than 5" movement or on cast-in-place retaining walls, unless otherwise noted.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting, to the Engineer for approval.

Average weight of railing with no overlay: 192 plf total
131 plf (Conc)
61 plf (Steel).

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T2P

FILE: rlstd035-19.dgn	DN: JMH	CK: TAR	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PR 16
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		109

SPM LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (C) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)(12")(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
- (K) REFL PAV MRKR TY I-C
- (L) REFL PAV MRKR TY II-A-A
- (M) REFL PAV MRKR TY II-C-R
- (#) PROPOSED SMALL SIGN NUMBER
- PROPOSED SIGN
- EXISTING SIGN

END ELIMINATE PAVEMENT MARKINGS

BEGIN PR STA 10+00.00

(1) STOP R1-1 36x36

(2) ONE WAY R6-11 36x12

(3) STOP R1-1 36x36

(4) YIELD R1-2 36x36

(5) SPEED LIMIT 25 R2-1 30x36

(6) ONE WAY R6-11 36x12

(7) PARALLEL PARKING R7-11T DBL 12x18

(8) DO NOT ENTER R5-1 36x36

(9) PARALLEL PARKING R7-11T DBL 12x18

(10) RESERVED PARKING R7-8T 12x18

(11) RESERVED PARKING R7-8T 12x18, VAN ACCESSIBLE R7-8P 12x6

(12) RESERVED PARKING R7-8T 12x18

(13) WATCH FOR ICE ON BRIDGE W8-13T 36x36

(14) ONE WAY R6-11 36x12

(15) RESERVED PARKING R7-8T 12x18

(16) RESERVED PARKING R7-8T 12x18, VAN ACCESSIBLE R7-8P 12x6

BEGIN PROJECT
PW STA 10+11.62

BEGIN ELIMINATE PAVEMENT MARKINGS

END WHITE PAV MRKRS
BEGIN YELLOW PAV MRKRS

END PROJECT
PW STA 17+48.00
PR STA 17+06.06
MATCH EXIST STRIPE

LIMITS OF CONSTRUCTION

PW

PR 16

PARK ROAD 16

UTURN

0 25 50

SCALE: 1" = 50' H

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

06/17/2021

PARK ROAD 16
SIGNING & PAVEMENT MARKING LAYOUT

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		110

DATE: 6/17/2021 7:59:59 AM
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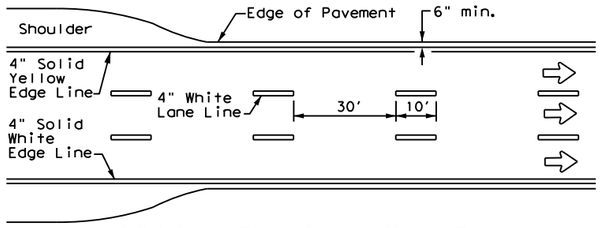
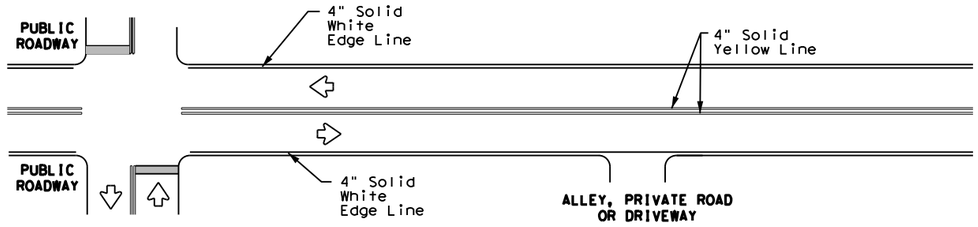
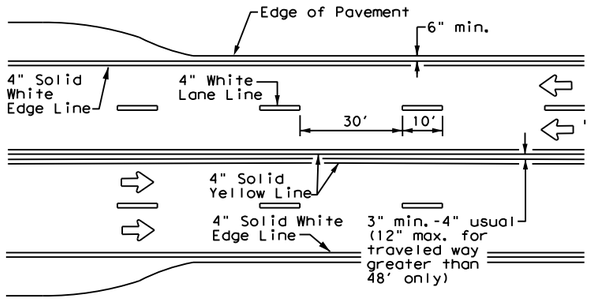


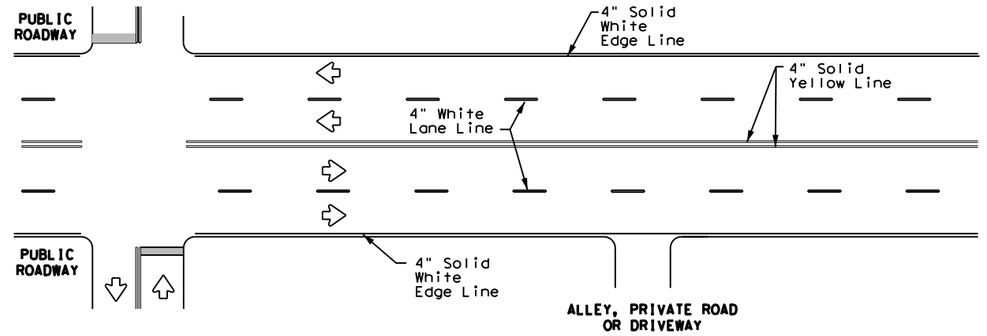
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



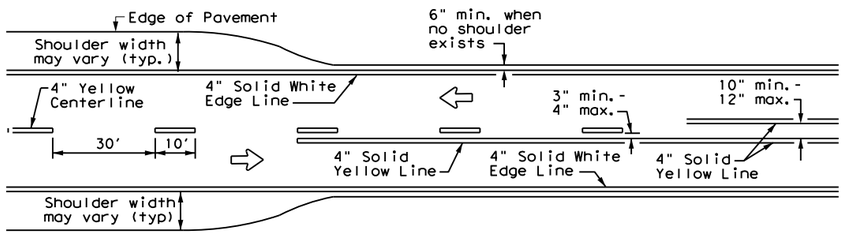
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



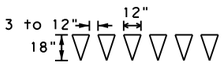
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



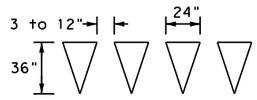
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

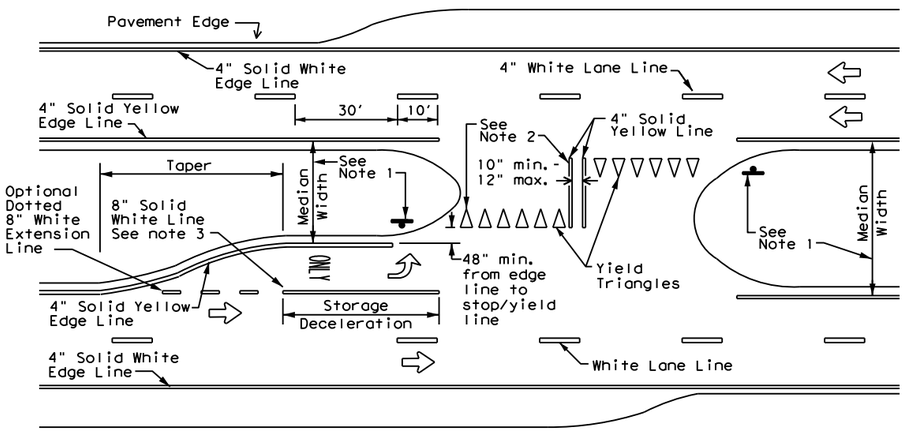


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



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 are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles 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.

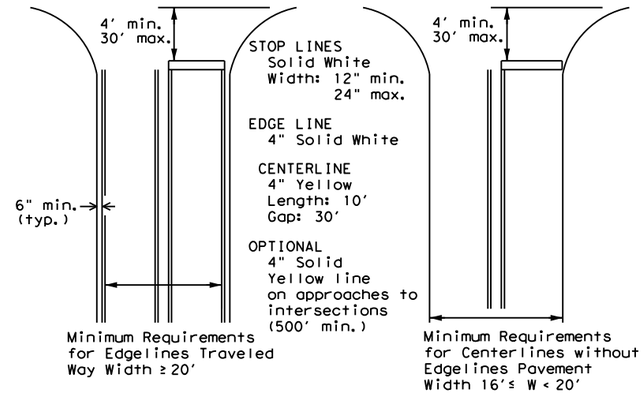
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines 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 inside of edgeline to the inside of edgeline 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.



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0606	01	007	PARK ROAD
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	TYL	SMITH		111

22A

DATE: 5/21/2021 8:04:29 AM
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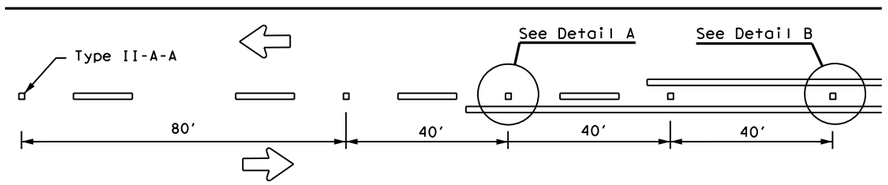
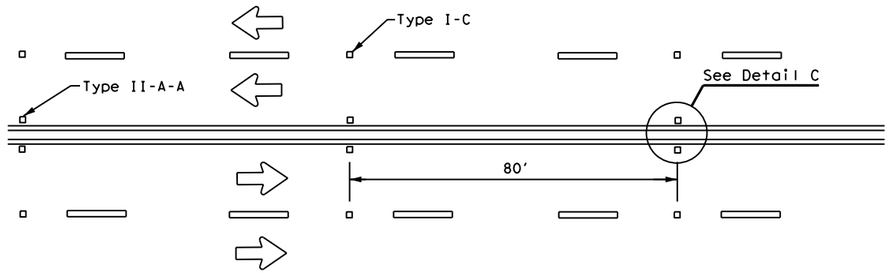
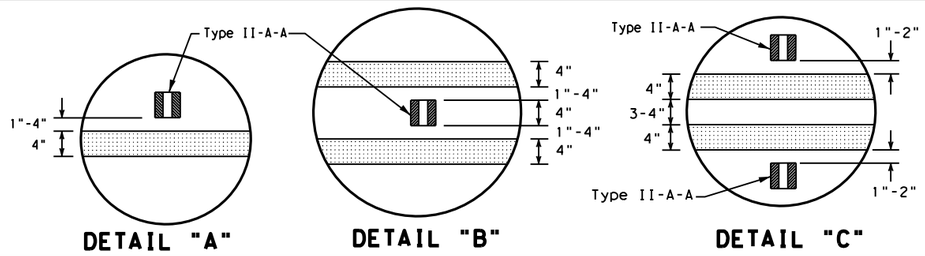
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



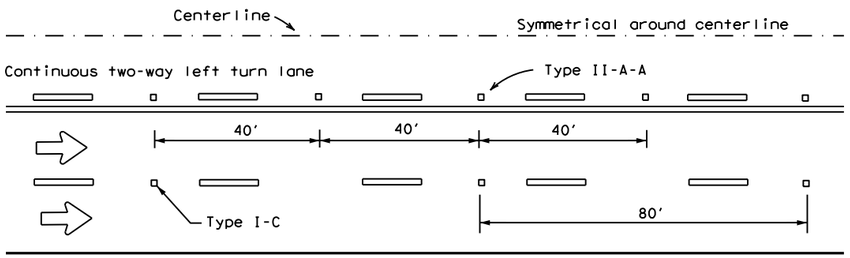
CENTERLINE FOR ALL TWO LANE ROADWAYS



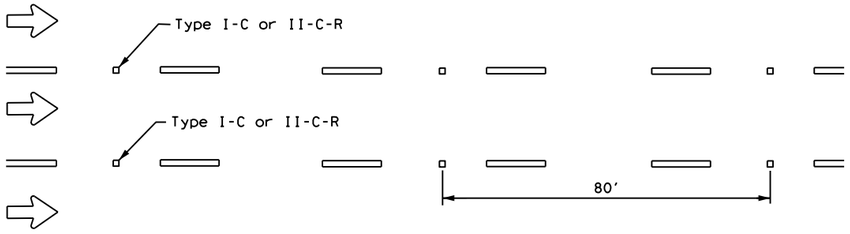
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**

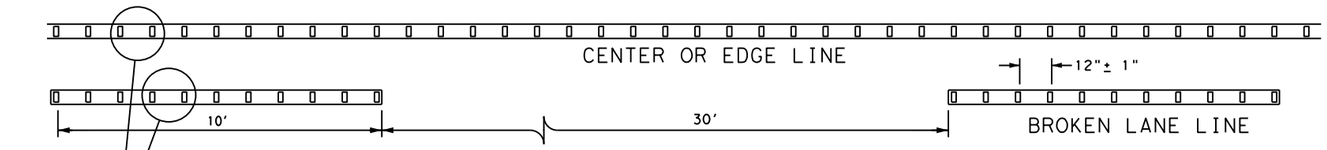


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



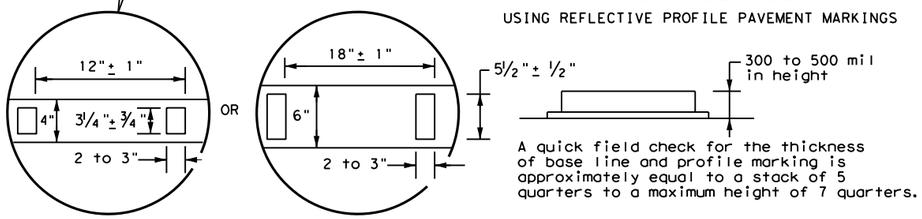
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

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.

NOTE

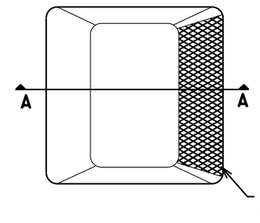
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

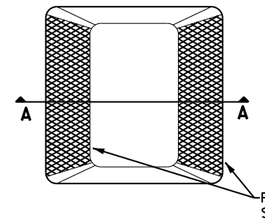
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

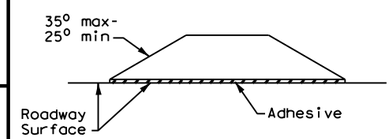
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10 5-00 2-12 8-00 6-20	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		112

22B

DATE: 5/21/2021 8:04:37 AM
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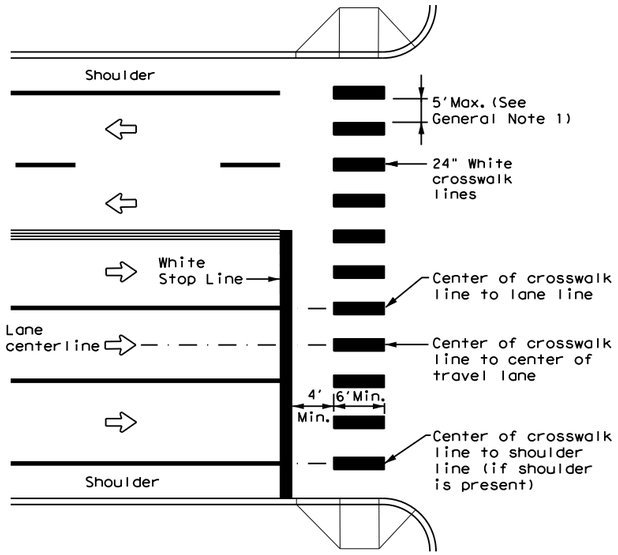


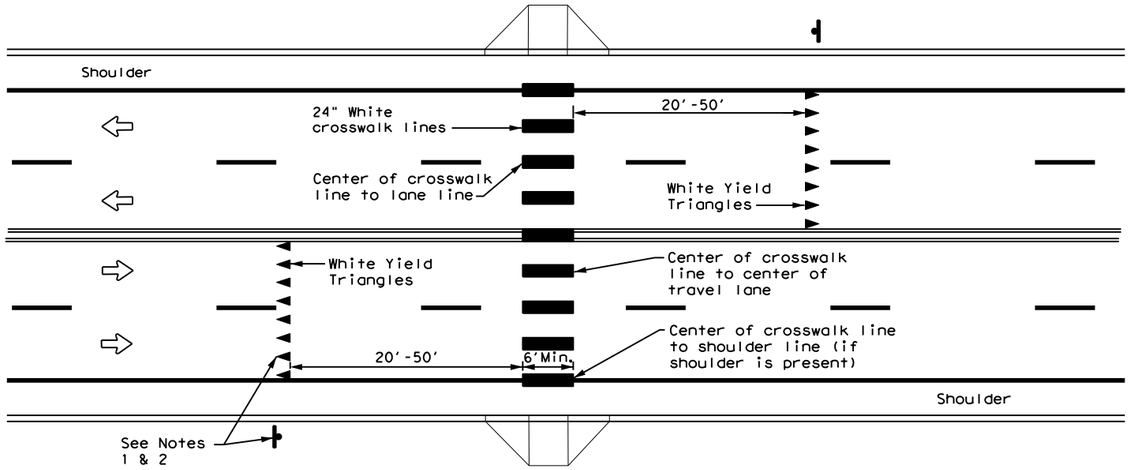
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar/Yield Triangles and Crosswalk shall be approved by the Engineer in the field.

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.



UNSIGNALIZED MID BLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES

1. Use yield triangles with "Yield Here to Pedestrians" signs at unsignalized mid block crosswalks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Crosswalk width = 9' for approach speeds of 30 mph or less
Crosswalk width = 12' for approach speeds of 35 mph or more

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

05/25/2021

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-20 (MOD)

FILE: pm4-20.dgn	DN:	CK:	DW:	CK:
© TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		113

22D

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

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

Number of Posts (1 or 2)

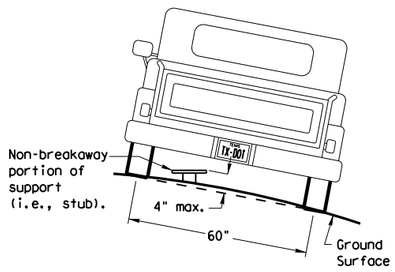
Anchor Type

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

Sign Mounting Designation

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

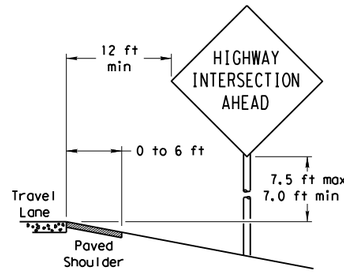
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

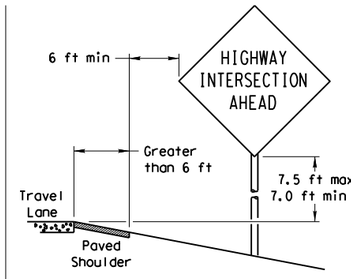
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

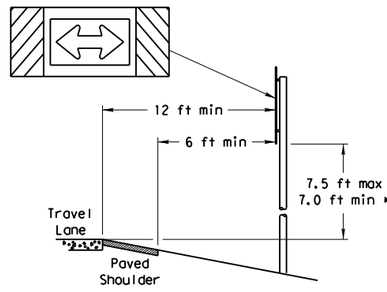
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



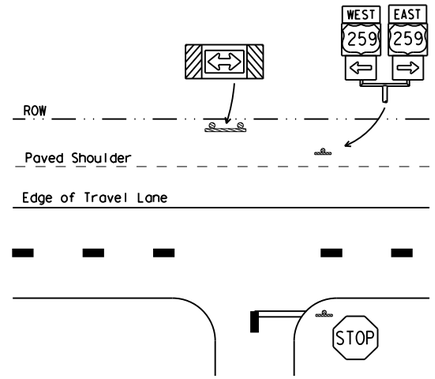
GREATER THAN 6 FT. WIDE

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.

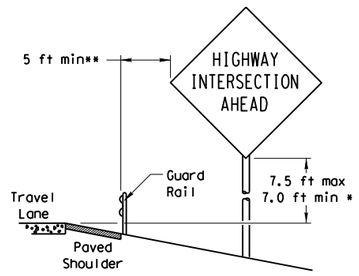
T-INTERSECTION



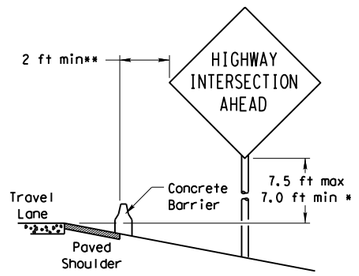
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



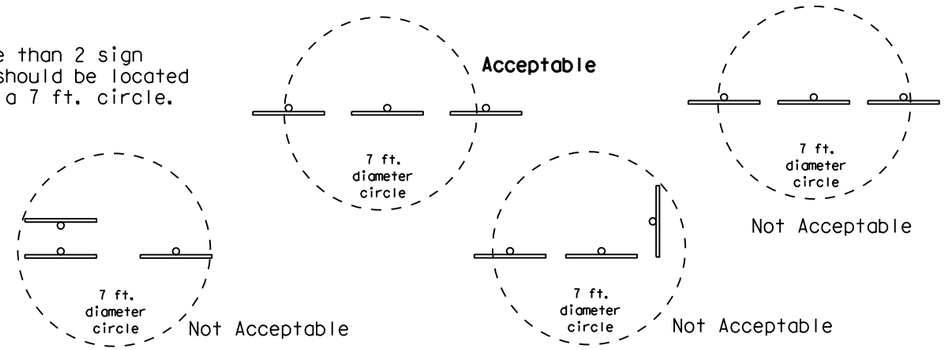
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

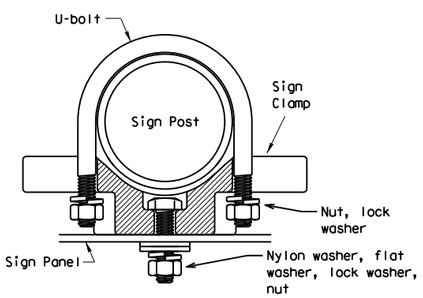
****Sign clearance based on distance required for proper guard rail or concrete barrier performance.**

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



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

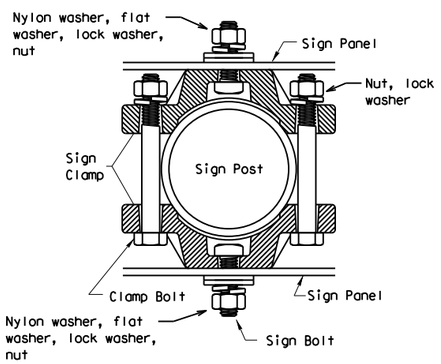


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

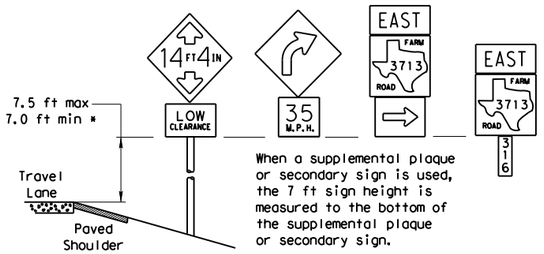
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



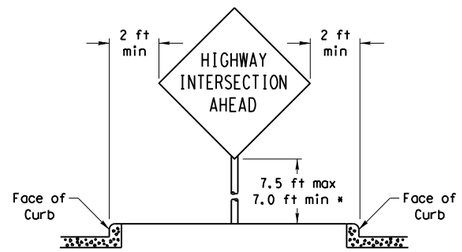
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



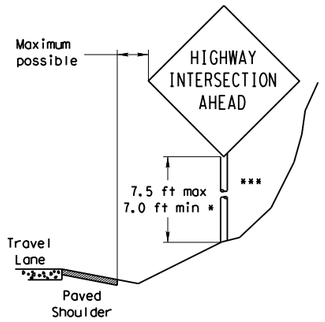
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		114

26A

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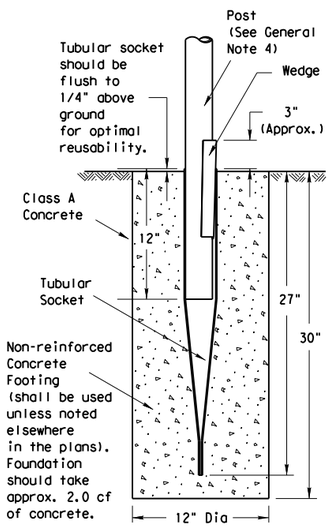
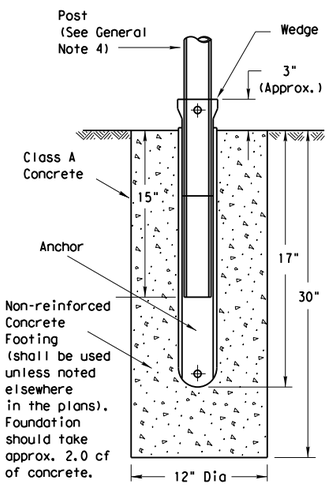
Wedge Anchor Steel System



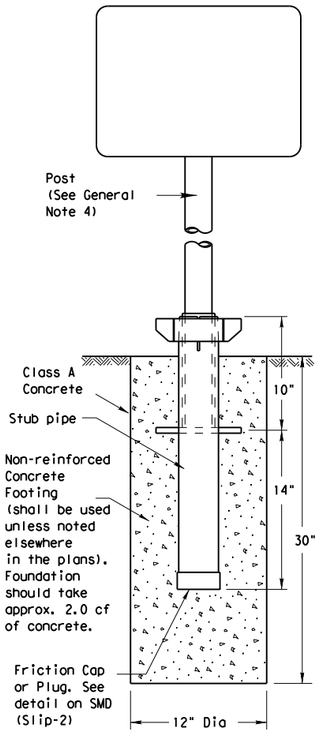
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

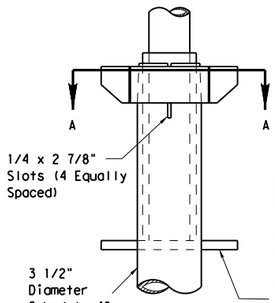


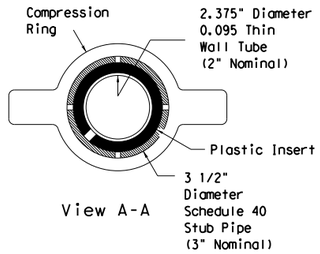
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



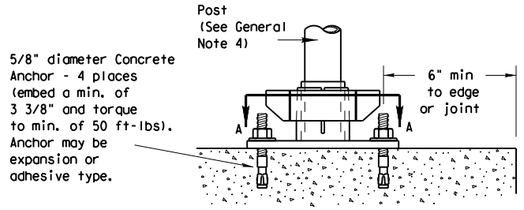
SM RD SGN ASSM TY TWT(X)UA(P)



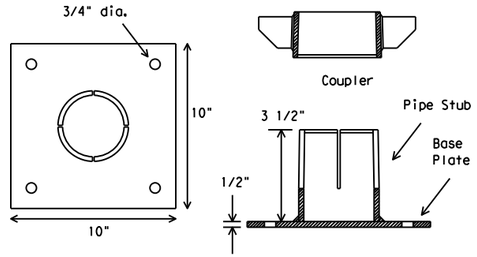


View A-A

Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

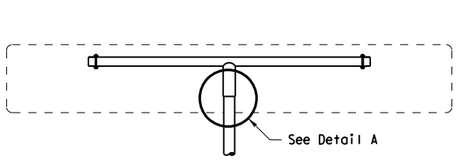


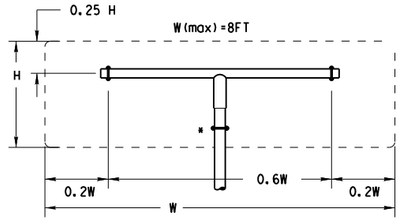
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. 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.



SM RD SGN ASSM TY TWT(X)UB(P)

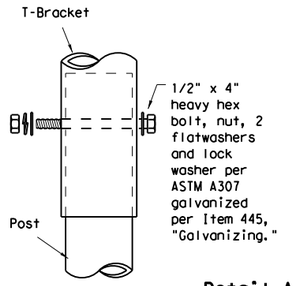
Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)

(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

The devices shall be installed per manufacturer's recommendations.
Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   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
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
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. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		115

26E

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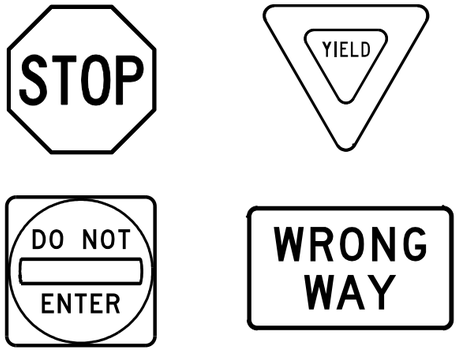
REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(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

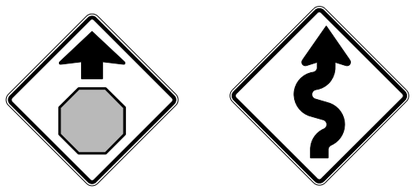
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(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/

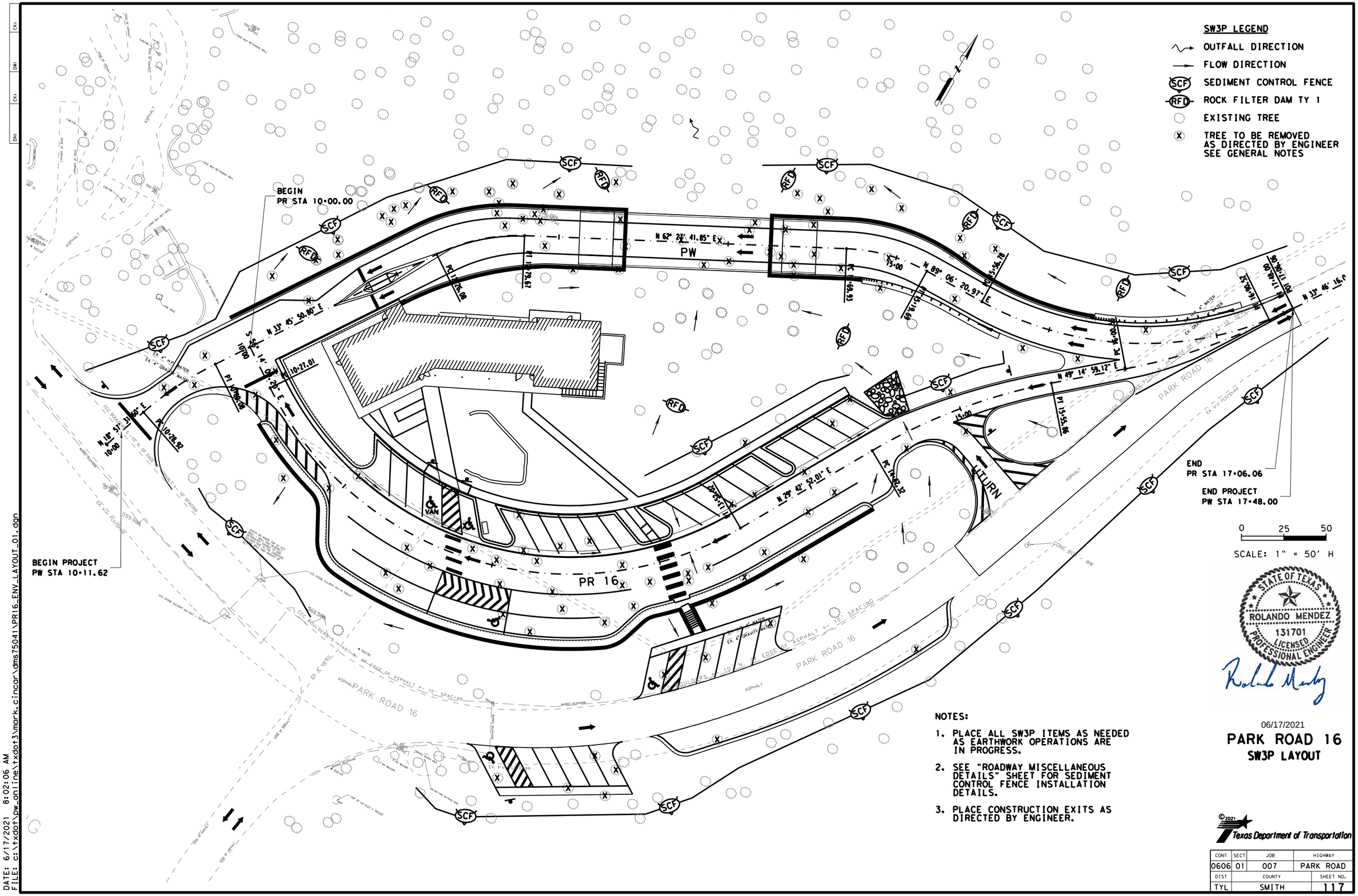
Texas Department of Transportation

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	0606	01	007	PARK ROAD
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	TYL	SMITH		116



NOTES:

1. PLACE ALL SW3P ITEMS AS NEEDED AS EARTHWORK OPERATIONS ARE IN PROGRESS.
2. SEE "ROADWAY MISCELLANEOUS DETAILS" SHEET FOR SEDIMENT CONTROL FENCE INSTALLATION DETAILS.
3. PLACE CONSTRUCTION EXITS AS DIRECTED BY ENGINEER.

STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

06/17/2021

PARK ROAD 16
SW3P LAYOUT

CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		117

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Contractor must comply with SW3P as stated in the plans.

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. Various unnamed tributaries of Hitts Creek.

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.

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. Contractor to adhere to specs listed above in IV.

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. Adhere to Migratory Bird language listed below.

2.

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. No action necessary above those requireed by the 2014 Texas Standard for Specification Construction & Maintenance of Highways, Streets and Bridges.
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.

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	0606	01	007	PARK ROAD	
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.	
05-07-14 ADDED NOTE SECTION IV.	TYL	SMITH		118	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.					

FILE: c:\txdot\pw*online\txdot3\mark.cincar\dms75041\PR16*ENV*SW3P.dgn
DATE: 5/21/2021 8:05:54 AM

A. GENERAL SITE DATA

1. PROJECT LIMITS:
NEW HQ BUILDING LOCATION INSIDE THE TYLER STATE PARK
PROJECT LENGTH = 1,687.19 FT. = 0.32 MILES
PROJECT LOCATION:
BEGIN PROJECT : R.M. 282+00.540
END PROJECT : R.M. 282+00.682
PROJECT COORDINATES:
BEG LATITUDE: +32.5168710 BEG LONGITUDE: -95.4751122
END LATITUDE: +32.5156423 END LONGITUDE: -95.4096755

2. PROJECT SITE MAPS:
* PROJECT LOCATION MAP: **TITLE SHEET**
* DRAINAGE PATTERNS: **PROJECT LAYOUT**
* SLOPES ANTICIPATED AFTER MAJOR GRADINGS OR AREAS OF SOIL DISTURBANCE: **4:1 AT CROSS DRAINAGE AND 6:1 AT INT.**
* LOCATION OF EROSION AND SEDIMENT CONTROLS: **PROJECT LAYOUT**
* SURFACE WATERS AND DISCHARGE LOCATIONS: **PROJECT LAYOUT**
* PROJECT SPECIFIC LOCATIONS: TO BE SPECIFIED BY THE PROJECT FIELD OFFICE DURING CONSTRUCTION AND LOCATED IN THE PROJECT SW3P FILE. REFERENCE ITEM #10 BELOW

3. PROJECT DESCRIPTION: **CONSTRUCTION OF 2 LANE RURAL ROADWAY & PARKING LOT**

4. MAJOR SOIL DISTURBING ACTIVITIES: **CURB AND GUTTER**
NEW BRIDGE.
IN ADDITION, CONCRETE RIPRAP WILL BE PLACED AT MBGF LOCATIONS AND THERE IS A POTENTIAL FOR GRADING AT THESE LOCATIONS TOO.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
ACCORDING TO DATA FROM THE WEB SOIL SURVEY, THE PROJECT SOILS ARE PRIMARILY LOAMY CLAY. THE PROJECT SITE IS WELL VEGITATED

6. TOTAL PROJECT AREA: **2.83 ACRES**

7. TOTAL AREA TO BE DISTURBED: **2.83 ACRES**

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: **0.400**
AFTER CONSTRUCTION: **0.400**

9. NAME OF RECEIVING WATERS: (SEGMENT NUMBER OF RECEIVING WATERS)
PR 16 & PW ROADWAYS DRAIN NORTHWEST INTO HITTS CREEK. THIS FLOWS INTO SALINE CREEK WHICH DISCHARGES INTO THE SABINE RIVER AT SEGMENT 0506.

10. PROJECT SW3P FILE: FOR PROJECTS DISTURBING ONE ACRE OR MORE, TXDOT WILL MAINTAIN AN SW3P FILE WITH ALL PERTINENT ENVIRONMENTAL DOCUMENTS, CORRESPONDENCE, ETC. AT THE PROJECT FIELD OFFICE. IF NO FIELD OFFICE IS AVAILABLE THEN THE SW3P FILE SHALL BE KEPT IN THE INSPECTOR'S TRUCK.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES:

- [X] TEMPORARY SEEDING
- [X] PERMANENT PLANTING, SODDING, OR SEEDING
- [X] MULCHING
- [ ] SOIL RETENTION BLANKET
- [X] BUFFER ZONES
- [X] PRESERVATION OF NATURAL RESOURCES

OTHER: **N/A**

2. STRUCTURAL PRACTICES:

- [X] SILT FENCES
- [X] ROCK FILTER DAMS
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [ ] PIPE SLOPE DRAINS
- [X] PAVED FLUMES
- [ ] ROCK BEDDING AT CONSTRUCTION EXIT
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS
- [ ] SEDIMENT BASINS
- [X] STORM INLET SEDIMENT TRAP
- [X] STONE OUTLET STRUCTURES
- [X] CURBS AND GUTTERS
- [ ] STORM SEWERS
- [ ] VELOCITY CONTROL DEVICES

OTHER: **N/A**

3. STORM WATER MANAGEMENT:

STORM WATER DRAINAGE WILL BE PROVIDED BY **EXISTING DITCHES**

THIS SYSTEM WILL CARRY THE DRAINAGE WITHIN THE RIGHT-OF-WAY TO

EXISTING OUTFALL CHANNELS

4. STORM WATER MANAGEMENT ACTIVITIES: (SEQUENCE OF CONSTRUCTION)

1. **BEGIN INSTALLING SW3P CONTROLS IN AREA OF WORK**
2. **CONSTRUCT BRIDGE OR MBGF**
3. **PLACE EMBANKMENT, TOPSOIL, AND SEED**
4. **PLACE RIPRAP**
5. **ESTABLISH VEGITATION**
6. **REMOVE SW3P CONTROLS**

5. NON-STORM WATER DISCHARGES:
FILTER NON-STORM WATER DISCHARGES, OR HOLD RETENTION BASINS, BEFORE BEING ALLOWED TO MIX WITH STORM WATER. THESE DISCHARGES CONSIST OF NON-POLLUTED GROUND WATER, SPRING WATER, FOUNDATION AND/OR FOOTING DRAIN WATER; AND WATER USED FOR DUST CONTROL, PAVEMENT WASHING AND VEHICLE WASHWATER CONTAINING NO DETERGENTS.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:
MAINTENANCE WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

2. INSPECTION:
INSPECTION WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

3. WASTE MATERIALS:
ALL WASTE MATERIALS WILL BE COLLECTED, STORED AND DISPOSED OF IN A LIDDED DUMPSTER IN A LEGAL AND PROPER MANNER. NO CONSTRUCTION WASTE MATERIAL WILL BE BURIED ON SITE.

4. HAZARDOUS WASTE (INCLUDING SPILL REPORTING):
AT A MINIMUM, ANY PRODUCTS IN THE FOLLOWING CATEGORIES ARE CONSIDERED TO BE HAZARDOUS. PAINTS, ACIDS FOR CLEANING MASONRY SURFACES, CLEANING SOLVENTS, ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SOIL STABILIZATION, OR CONCRETE CURING COMPOUNDS AND ADDITIVES. IN THE EVENT OF A SPILL WHICH MAY BE HAZARDOUS, THE SPILL COORDINATOR MUST BE CONTACTED IMMEDIATELY.

5. SANITARY WASTE:
ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

OFFSITE VEHICLE TRACKING:

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

OTHER: **N/A**

REMARKS: DISPOSAL AREAS, STOCKPILES AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL SEDIMENT FROM ENTERING RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WATERBODY OR STREAMBED.

CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED TO MINIMIZE THE RUNOFF OF POLLUTANTS.

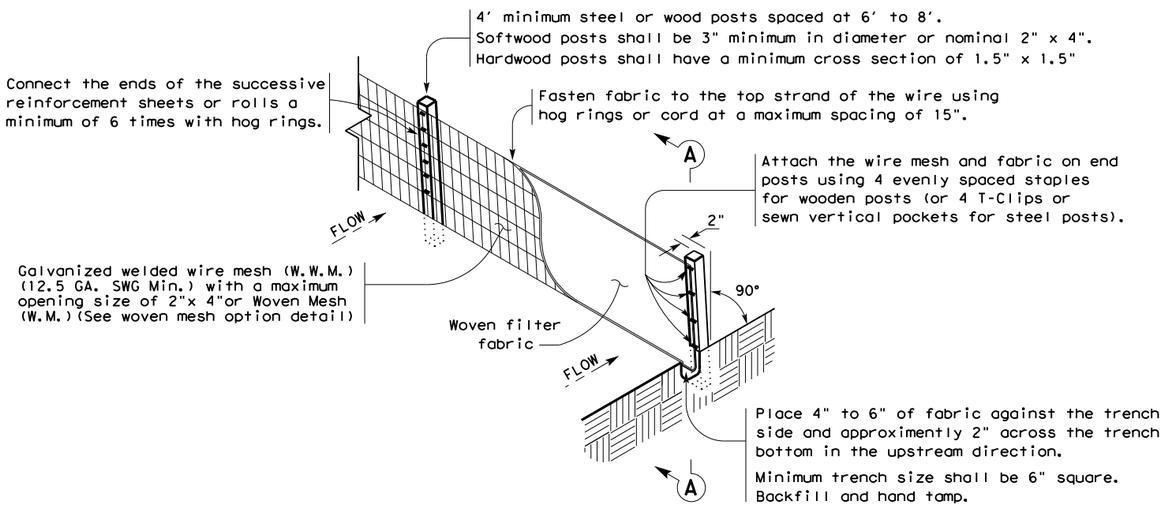
STATE OF TEXAS
ROLANDO MENDEZ
131701
LICENSED
PROFESSIONAL ENGINEER

05/25/2021

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

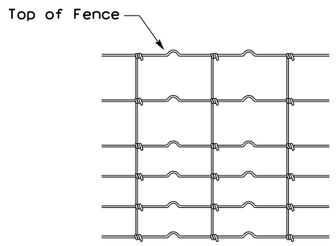
Texas Department of Transportation

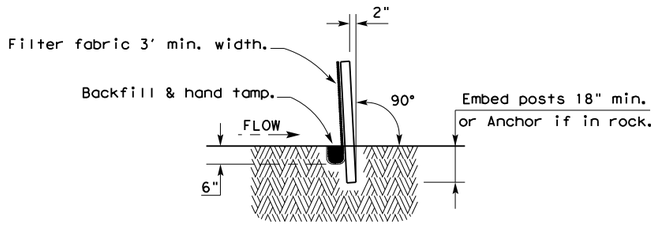
CONT	SECT	JOB	HIGHWAY
0606	01	007	PARK ROAD
DIST	COUNTY		SHEET NO.
TYL	SMITH		119



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.

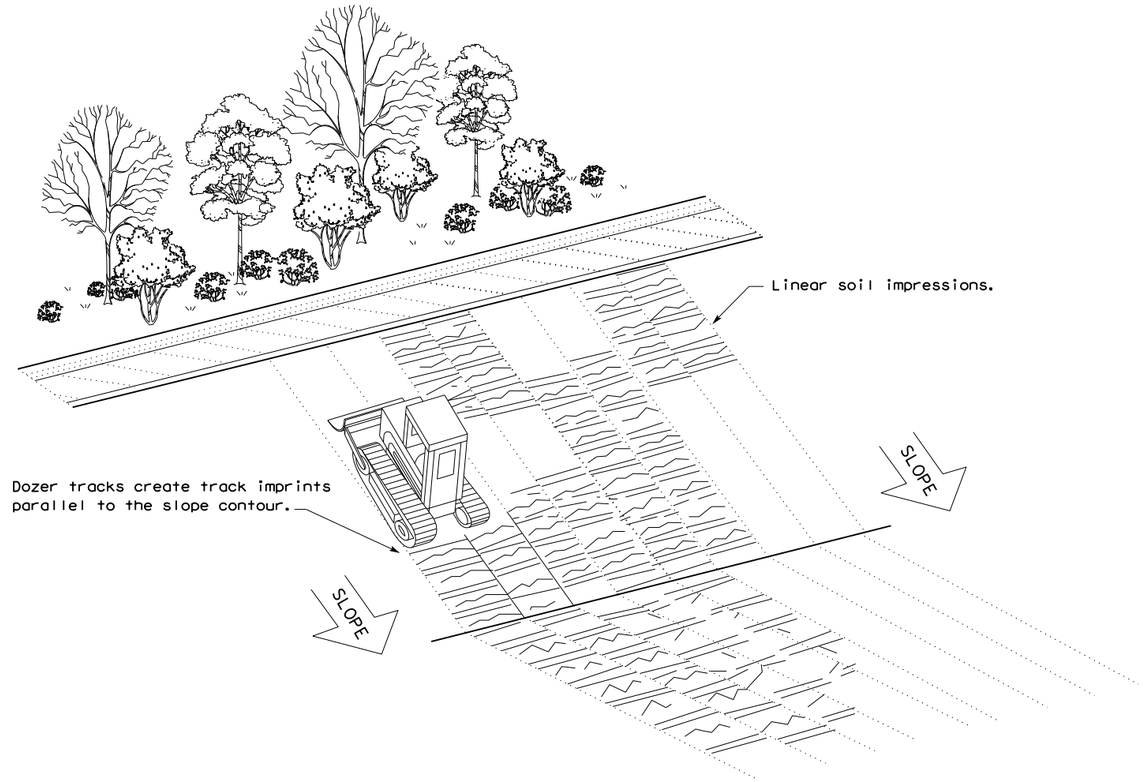
LEGEND

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	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		120

DATE: 5/21/2021
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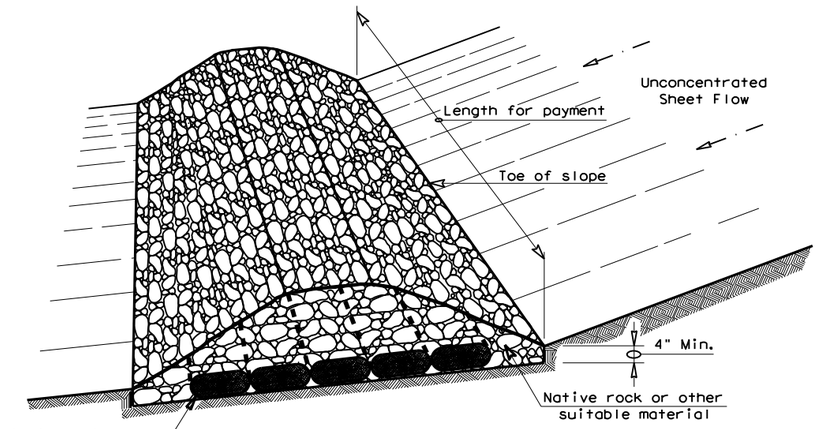
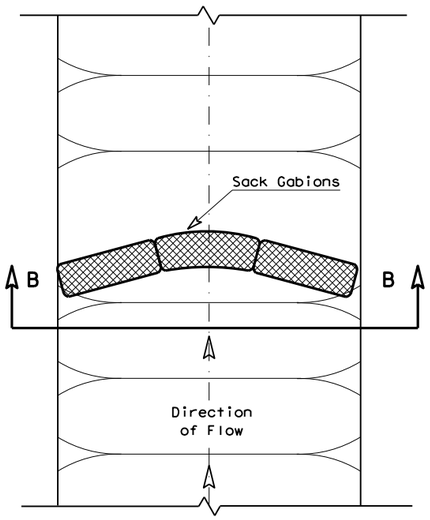
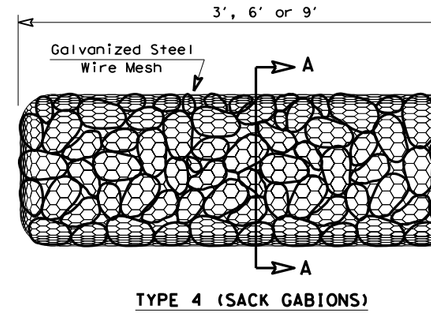


FILTER DAM AT TOE OF SLOPE

RFD1

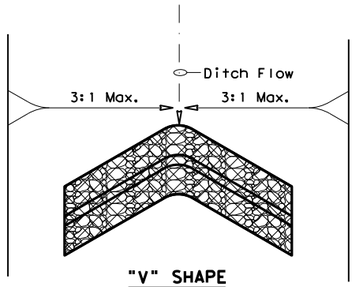


PLAN VIEW

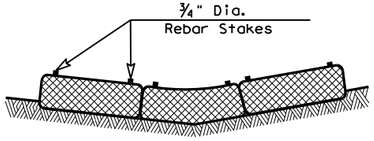


TYPE 4 (SACK GABIONS)

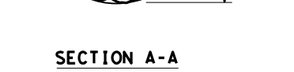
RFD4



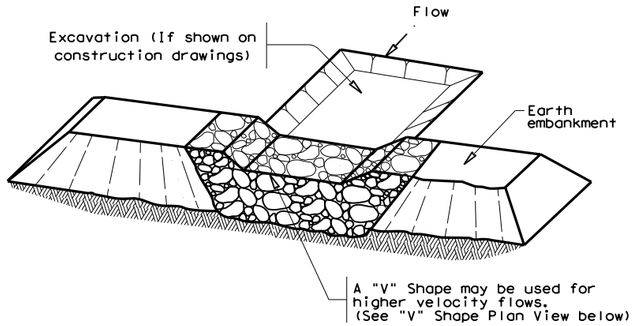
"V" SHAPE
PLAN VIEW



SECTION B-B

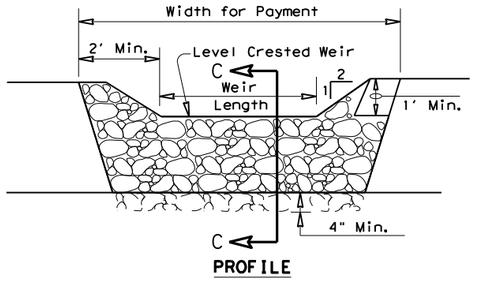


SECTION A-A

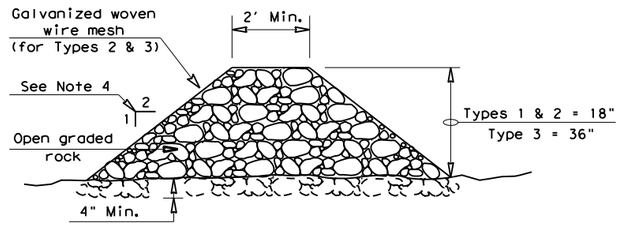


FILTER DAM AT SEDIMENT TRAP

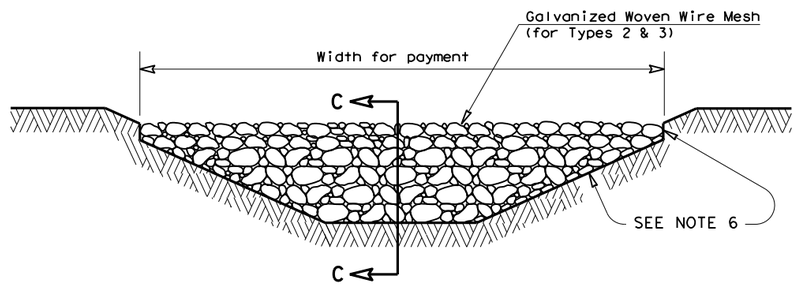
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

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.

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	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		121

DATE: 5/21/2021
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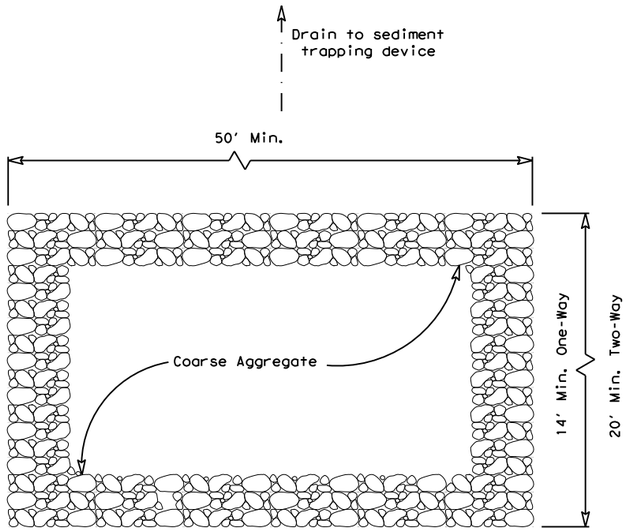
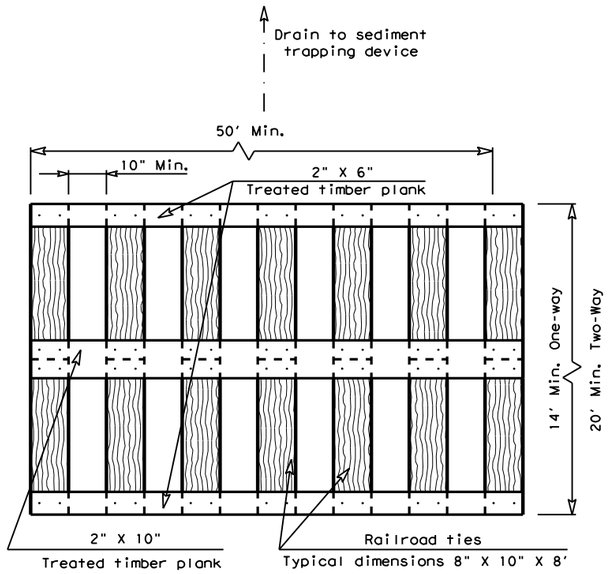


PLAN VIEW



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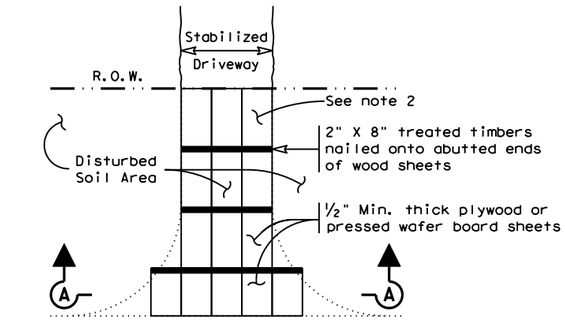
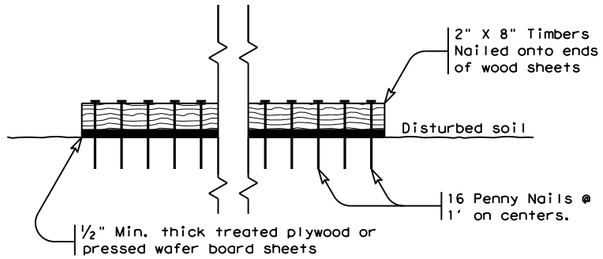


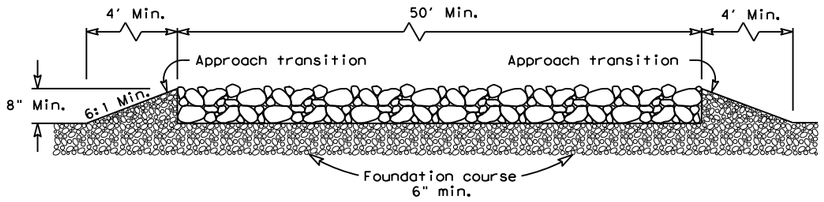
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

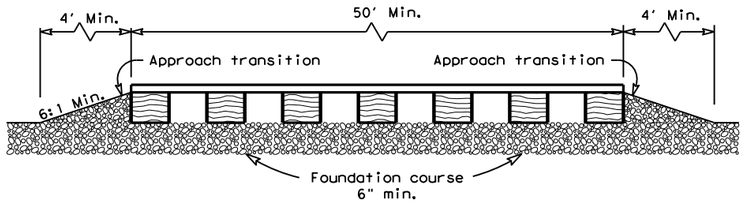
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER 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.

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

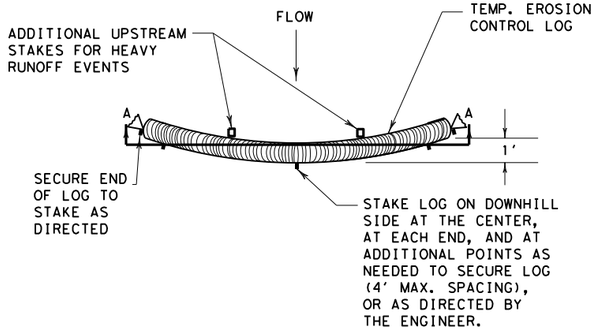
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

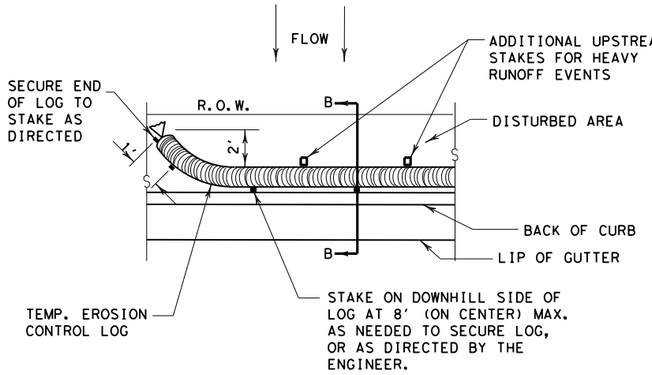
EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		122

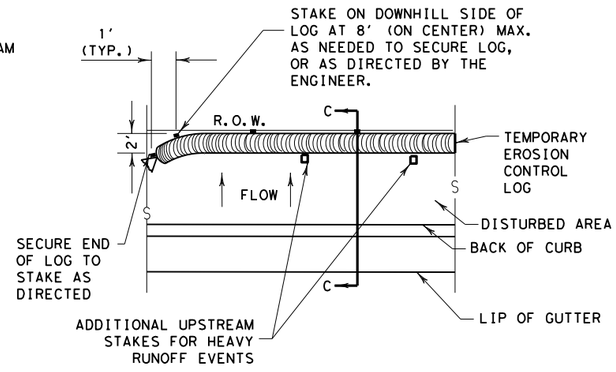
DATE: 5/21/2021
FILE: c:\txdot\pw_online\txdot3\mark.cincar\d0373213\EC(9)-16.dgn



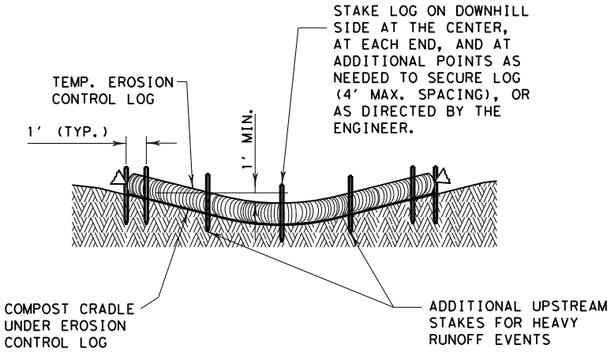
PLAN VIEW



PLAN VIEW



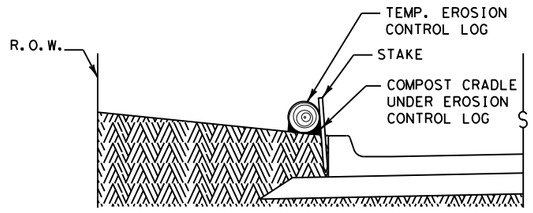
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

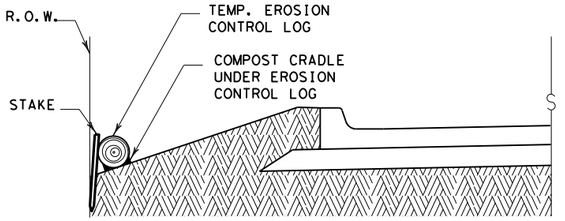
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

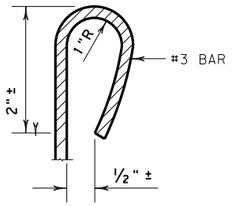
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



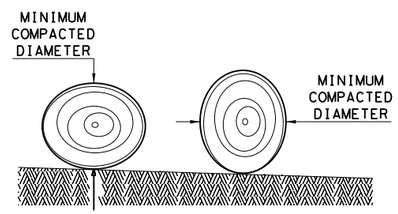
REBAR STAKE DETAIL

LEGEND

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

GENERAL NOTES:

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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

Control logs should be placed in the following locations:

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

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

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

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		0606	01	007		PARK ROAD	
		DIST		COUNTY			SHEET NO.
		TYL		SMITH			123

DATE: 5/21/2021
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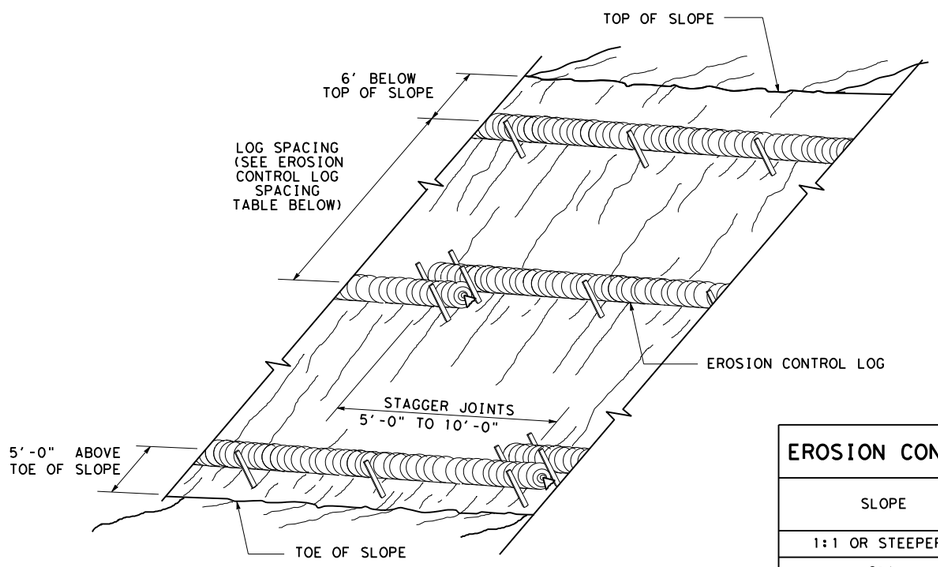
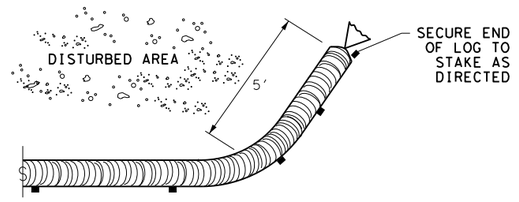


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

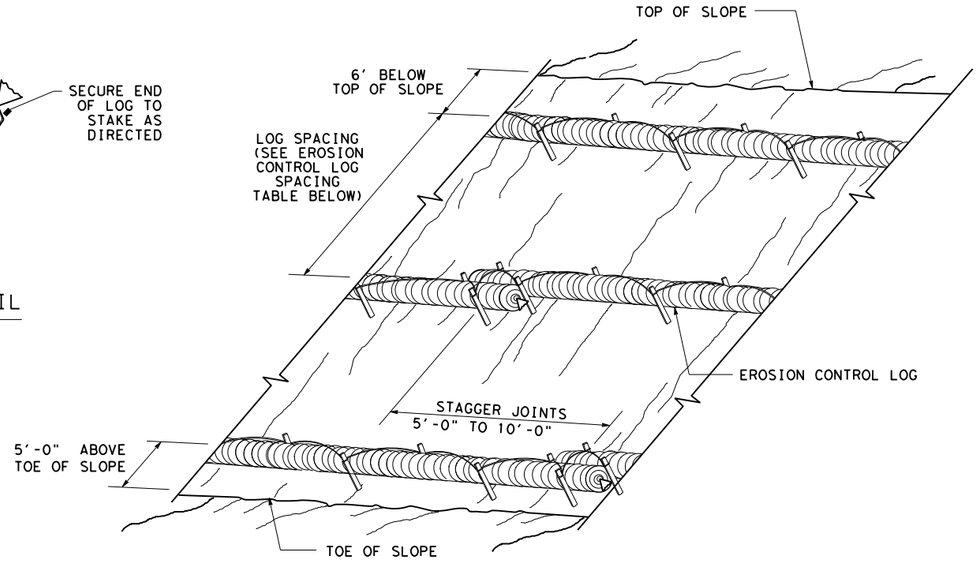
CL-SST



END SECTION RAP DETAIL

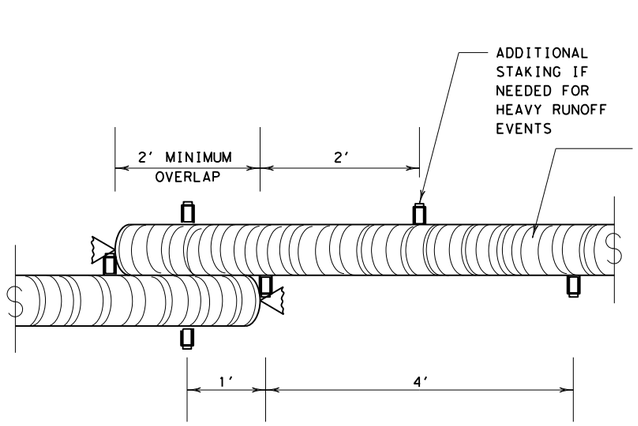
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

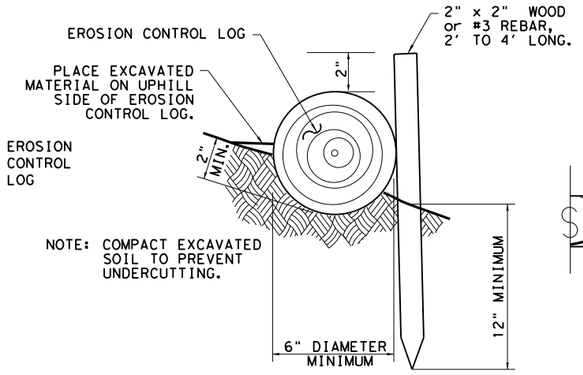
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

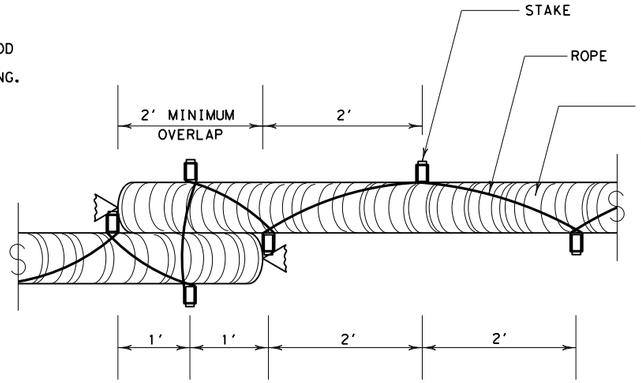


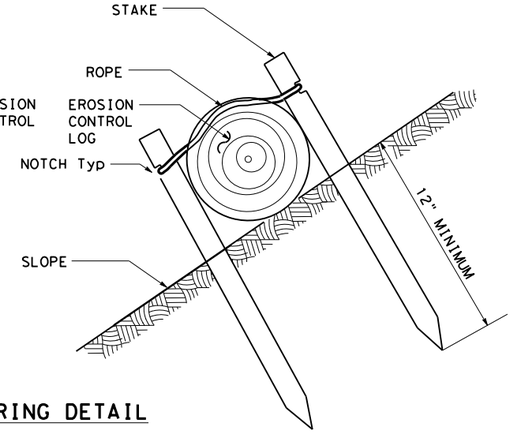


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

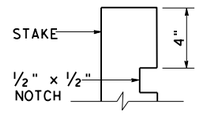
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation | Design Division Standard

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

FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0606	01	007		PARK ROAD	
	DIST	COUNTY			SHEET NO.	
	TYL	SMITH			124	

DATE: 5/21/2021
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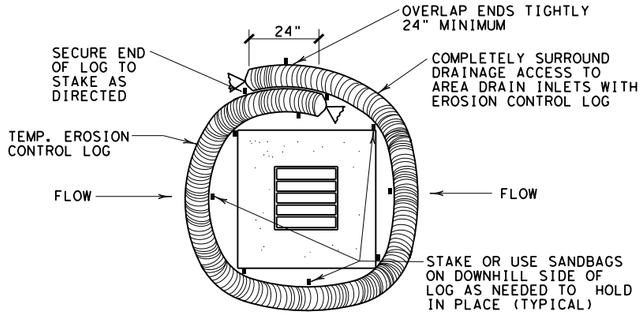
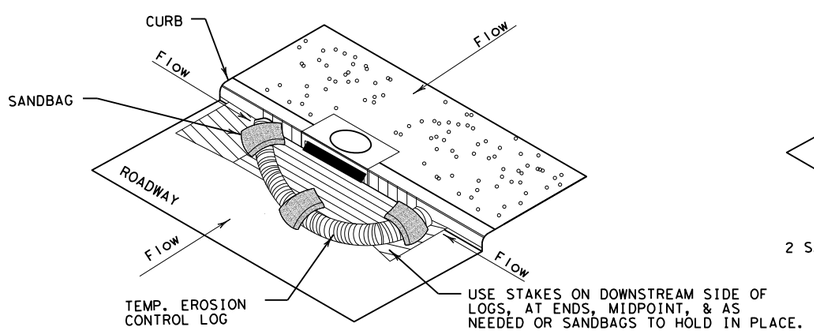


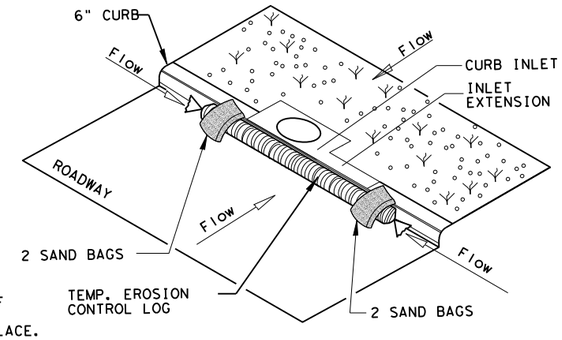
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

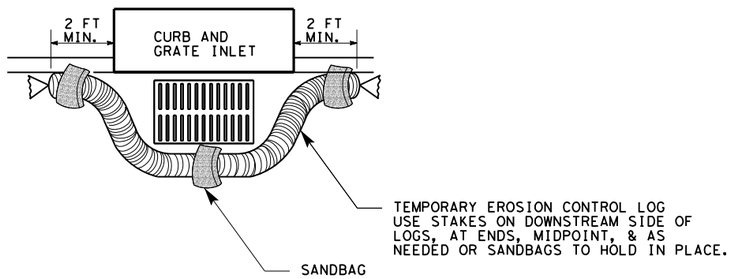
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

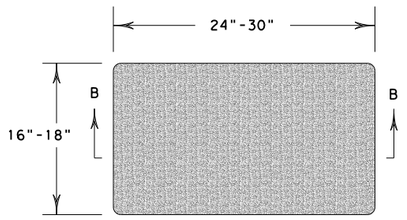
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0606	01	007	PARK ROAD
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		125