FED. RD. DIV. NO.	FEDERAL AID-PROJECT NO.		HIGHWAY NO.
6	BR 2B24(147)		SH 30
STATE	DISTRICT	COUNTY	
TEXAS	BRY	GRIMES	
CONTROL	SECTION	JOB	SHEET NO.
0212	04	039	1

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

SEE SHEET 2 FOR INDEX OF SHEETS
SEE SHEET 3 FOR PROJECT LOCATION MAP

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

DESIGN SPEED: 60 MPH
FUNCTIONAL CLASSIFICATION: RURAL MINOR ARTERIAL

PROJECT NO: BR 2B24(147)

SH 30 AT GIBBONS CREEK
GRIMES COUNTY

TOTAL LENGTH OF PROJECT = 5,689.00 FT = 1.077 MI

FOR THE CONSTRUCTION OF REPLACING EXISTING BRIDGE
CONSISTING OF GRADING, STRUCTURES, AND BASE

LOCATION NO.	HIGHWAY	CONTROL NO.	NBI NO.	LIMITS	ADT	STATION		REFERENCE MARKERS		RDWY LENGTH (FT)	BRIDGE LENGTH (FT)	TOTAL LENGTH (FT)
						FROM	TO	BEGIN	END			
1	SH 30	0212-04-039	17-094-0-0212-04-217	AT GIBBONS CREEK	ADT 2015: 4240 ADT 2035: 8370	229+51.00	286+40.00	RM: 640+0.348 MP: 7.388 DFO: 17.071	RM: 640+1.425 MP: 8.465 DFO: 18.148	5139.00	550.00	5689.00
										TOTAL=5689.00 FT 1.077 MI		

NO EXCEPTIONS
NO EQUATIONS
NO RAILROAD CROSSINGS

Texas Department of Transportation

SUBMITTED FOR LETTING
DocuSigned by: 5/3/2024
01EBC5C65E334CE...
BRIDGE ENGINEER

RECOMMENDED FOR LETTING
DocuSigned by: 5/3/2024
DAA3B0824EE3419...
DIRECTOR OF TRANSPORTATION
PLANNING & DEVELOPMENT

APPROVED FOR LETTING
DocuSigned by: 5/3/2024
60E5537715D24FA...
DISTRICT ENGINEER

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND SPECIFICATION ITEMS LISTED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 23, 2023)

PLOT DRIVER: $PLTDRV$
USER: $USER$ DATE: $DATE$ TIME: $TIME$
FILE: $FILE$
PENTABLE: $PENTBL$
SCALE: $SCALESHORT$

PLOT DRIVER: $PLTDRVS$ USER: $USER$ FILE: $FILES$ DATE: $DATE$ TIME: $TIME$ SCALE: $SCALESHORT$ PENTABLE: $PENTBLS$

STATE OF TEXAS
BRADLEY N. PEIKERT
96552
LICENSED
PROFESSIONAL ENGINEER

Brad N. Peikert, P.E.
5/13/2024
35F195DA3848487...

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

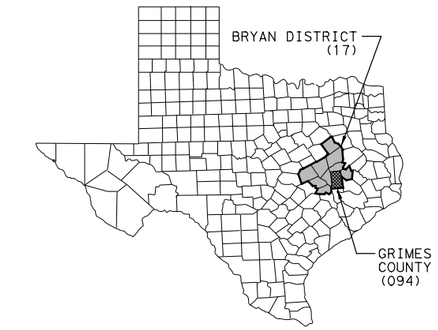
NO.	DATE	REVISION	APPROVED

Texas Department of Transportation

INDEX OF SHEETS

SHEET 1 OF 1

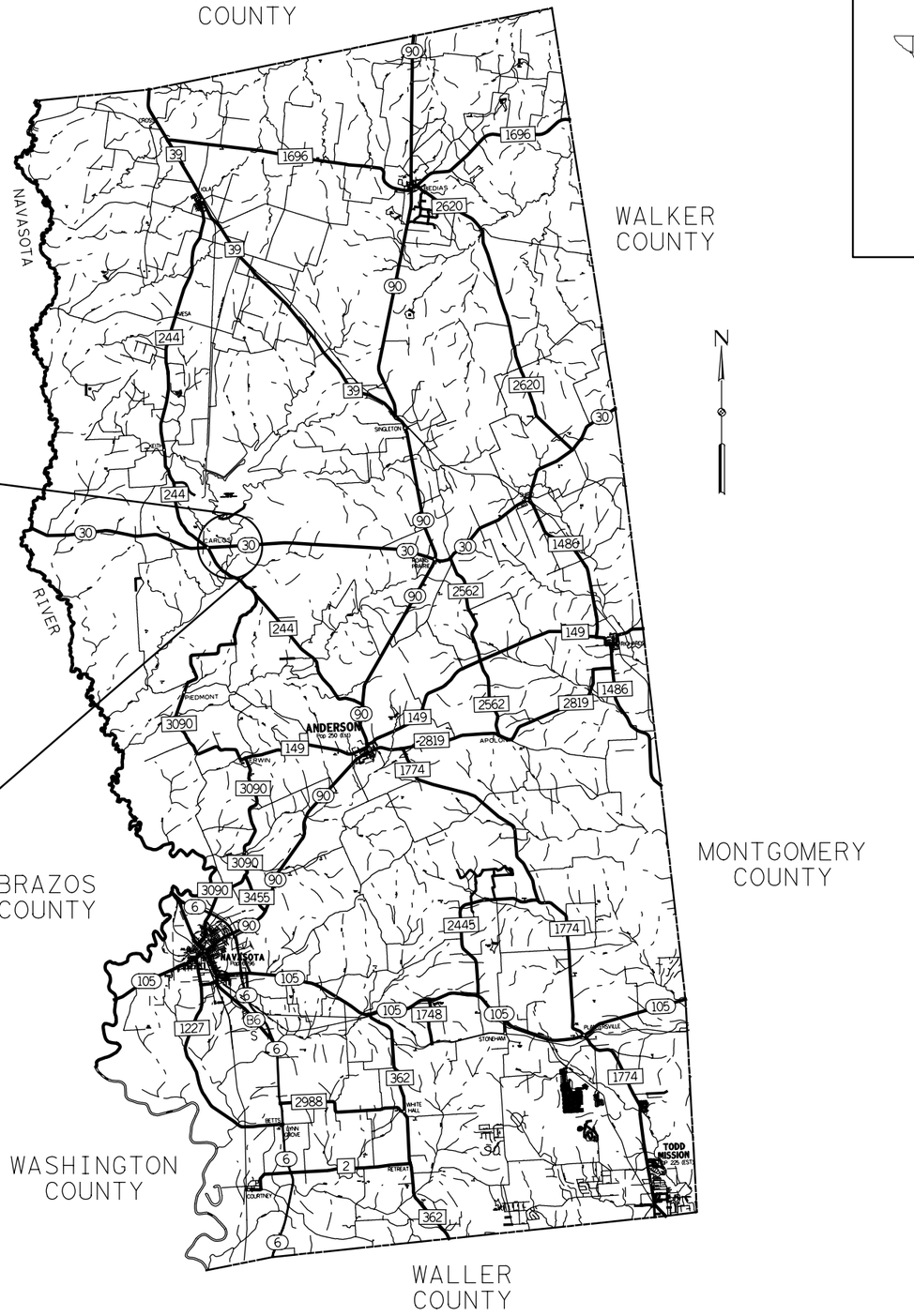
FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	2
CONTROL	SECTION	JOB	
0212	04	039	



KEY TO COUNTIES

BEGIN PROJECT
BEGIN CSJ: 0212-04-039
STA 229+51
RM 640+0.348
MP 7.388

END PROJECT
END CSJ: 0212-04-039
STA 286+40
RM 640+1.425
MP 8.465



NOTES:

1. REFERENCE MARKERS AND MILE POINTS SHOWN ON THIS SHEET AND THE TITLE SHEET ARE FOR REFERENCE PURPOSES ONLY. THE PROJECT LIMIT STATIONS SHOWN REPRESENT THE PROJECT CONSTRUCTION LENGTH. THE PROJECT QUANTITIES ARE BASED ON STATIONS, NOT THE MILE POINTS OR REFERENCE MARKERS.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

08/17/2018

Jacob E. Walker, PE

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

PROJECT LOCATION MAP
(GRIMES COUNTY)

NOT TO SCALE — SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	3
CONTROL	SECTION	JOB	
0212	04	039	

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USER: KBERGER DATE: 8/17/2018
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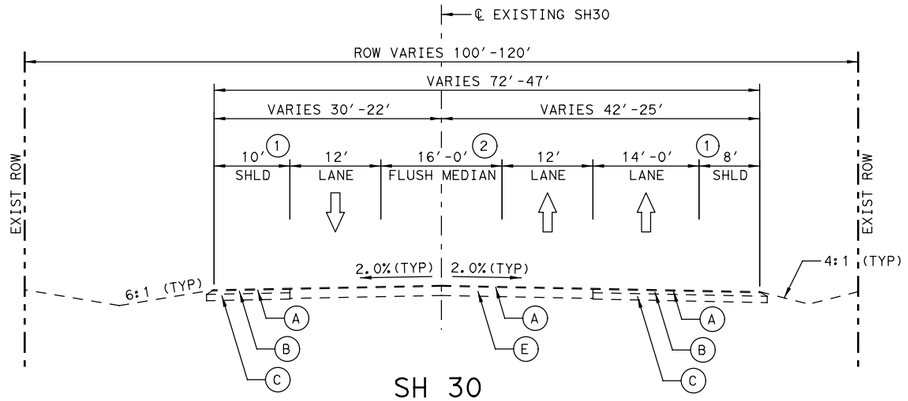
TIME: 10:32:17 AM SCALE: 1:26400

EXISTING PAVEMENT LEGEND	
(A) 1.5" HMAC	(D) 1.5" PFC
(B) 5.5" HMAC	(E) 8" BASE
(C) 10" SUBGRADE	(F) 8" SUBGRADE

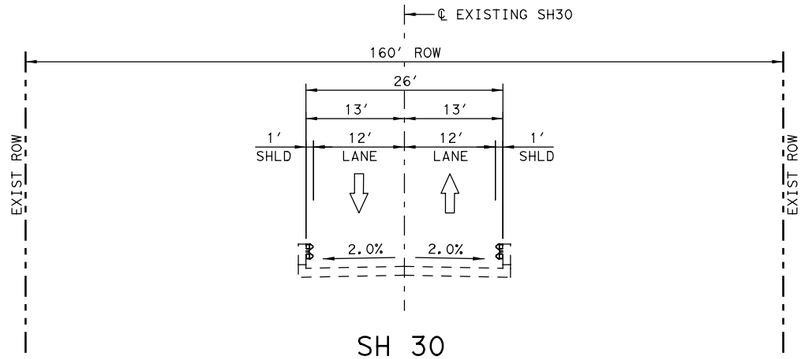


SH 30
EXISTING TYPICAL SECTION

BEGIN PROJECT TO STA 251+00

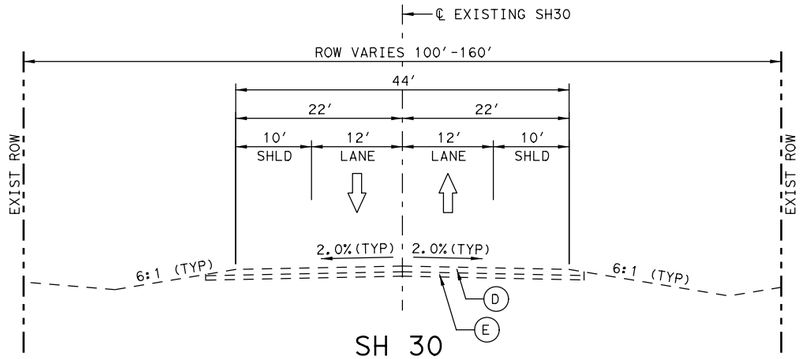
(1) 10' SHLD VARIES 10' TO 14' FROM STA 249+50 TO STA 251+00
8' SHLD VARIES 8' TO 14' FROM STA 249+50 TO STA 251+00

(2) MEDIAN VARIES 16' TO 0' FROM STA 241+90 TO STA 247+50



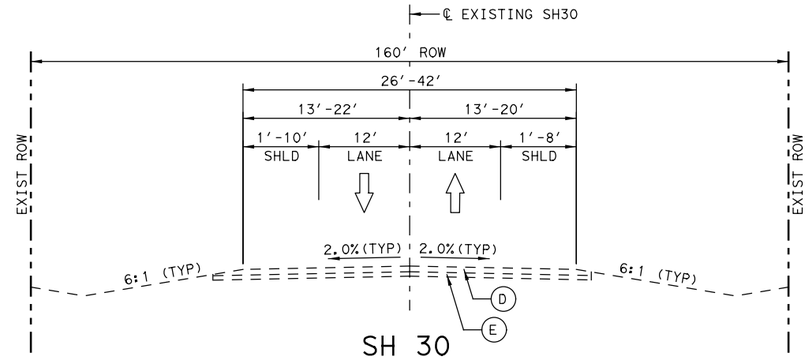
SH 30
EXISTING TYPICAL SECTION

STA 265+39 TO STA 270+37



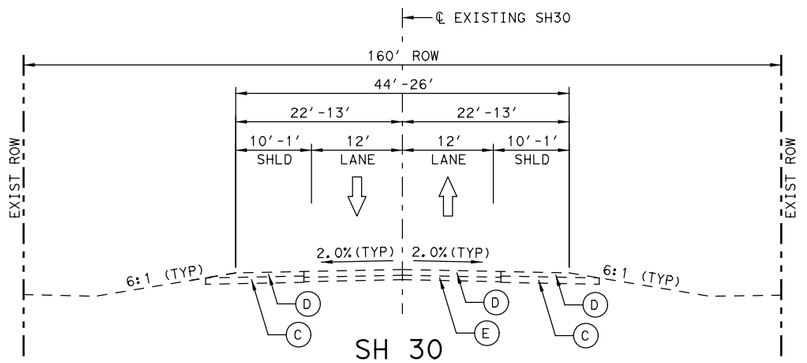
SH 30
EXISTING TYPICAL SECTION

STA 251+00 TO STA 262+11



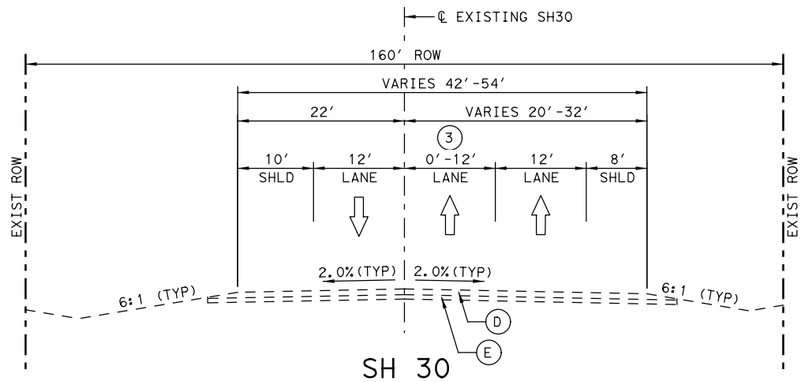
SH 30
EXISTING TYPICAL SECTION

STA 270+37 TO STA 273+50



SH 30
EXISTING TYPICAL SECTION

STA 262+11 TO STA 265+39



SH 30
EXISTING TYPICAL SECTION

STA 273+50 TO END PROJECT

(3) LANE VARIES 0' TO 12' FROM STA 273+50 TO STA 277+50

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

08/17/2018

Jacob E. Walker, PE

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

EXISTING TYPICAL SECTIONS

NOT TO SCALE

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	4
CONTROL	SECTION	JOB	
0212	04	039	

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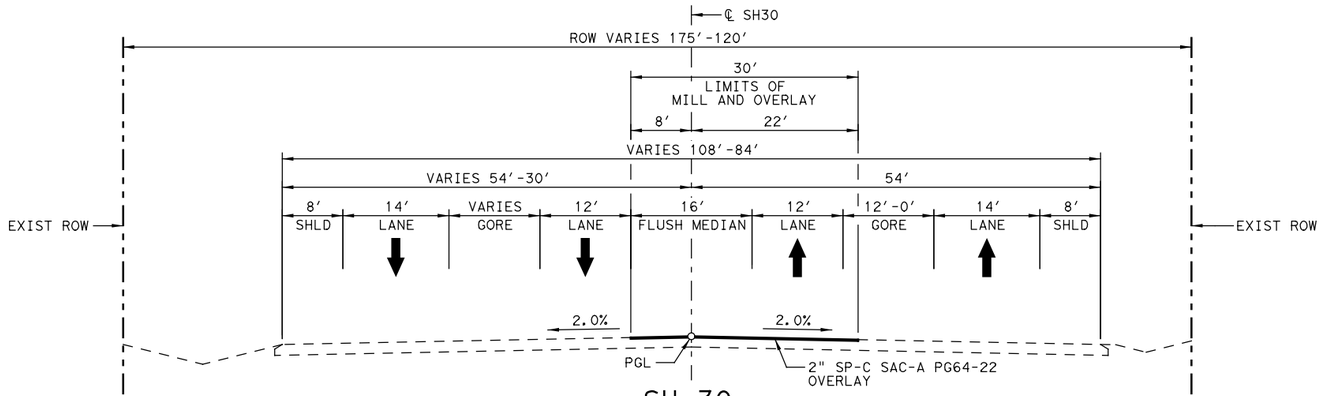
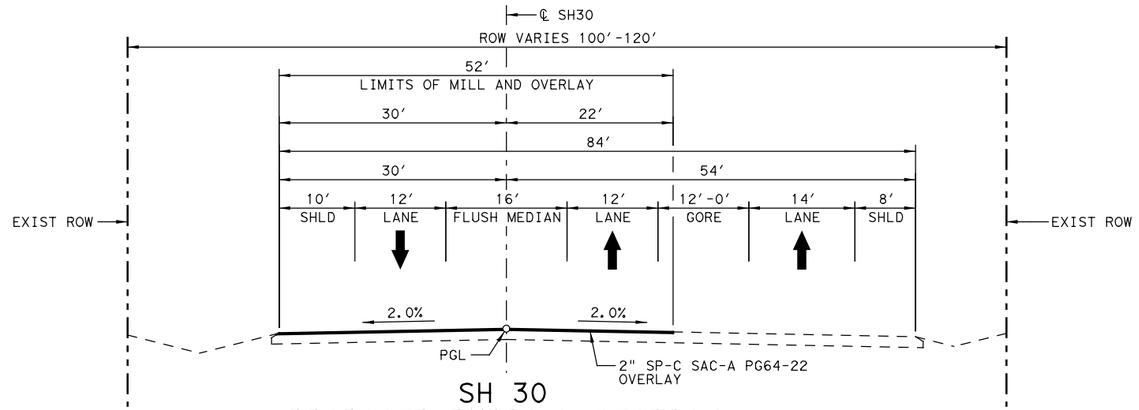


SH 30
PROPOSED TYPICAL SECTION

STA 229+51 TO STA 235+28



SH 30
PROPOSED TYPICAL SECTION

STA 235+28 TO STA 241+90

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
08/17/2018
Jacob E. Walker, PE

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

PROPOSED TYPICAL SECTIONS

NOT TO SCALE SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	5
CONTROL	SECTION	JOB	
0212	04	039	

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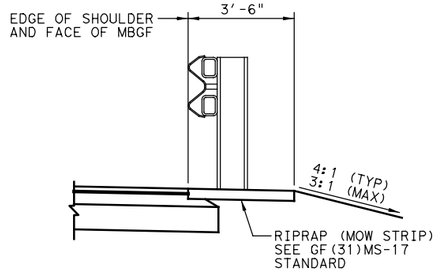
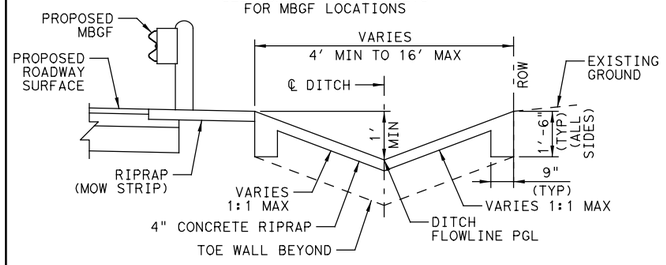


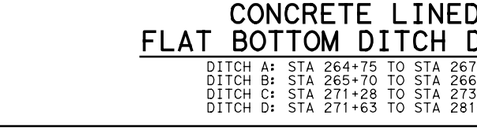
MBGF DETAIL

SEE ROADWAY PLAN SHEETS FOR MBGF LOCATIONS



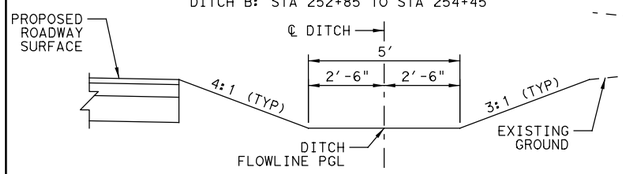
CONCRETE LINED V-DITCH DETAIL

DITCH B: STA 241+57 TO STA 252+85



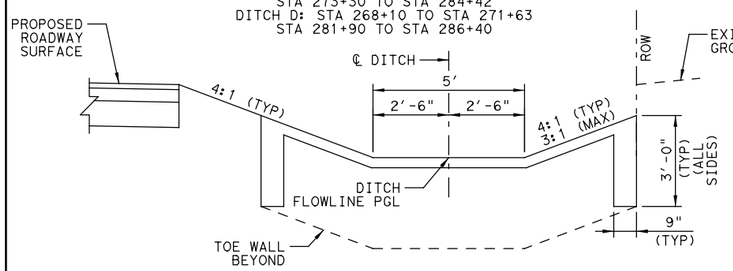
TYPICAL V-DITCH DETAIL

DITCH B: STA 252+85 TO STA 254+45



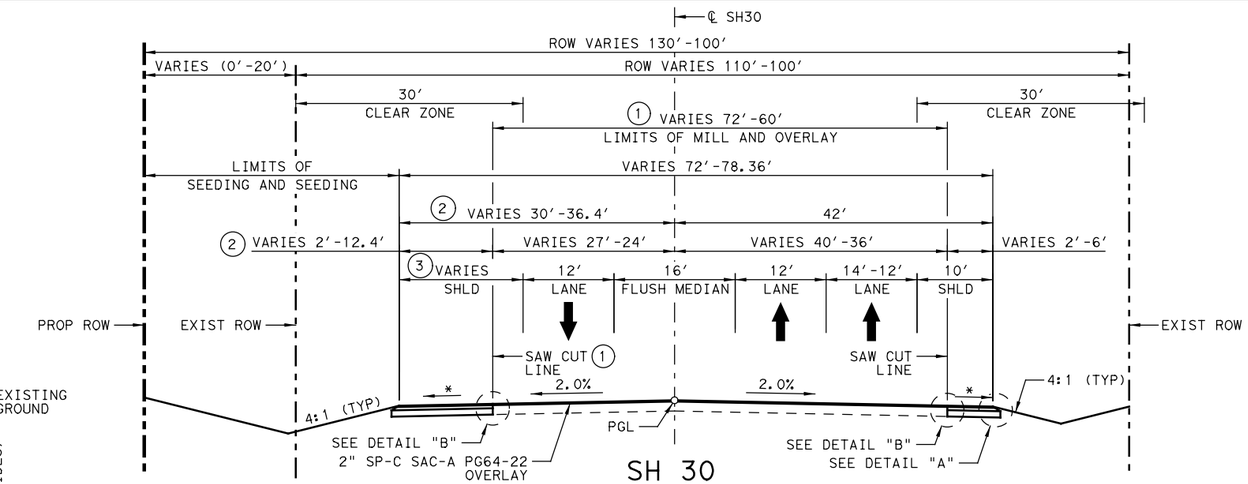
TYPICAL FLAT BOTTOM DITCH DETAIL

DITCH A: STA 242+20 TO STA 242+15 (TRANSITION 0'-5')
STA 242+15 TO STA 264+75
STA 267+52 TO STA 268+40
DITCH B: STA 254+45 TO STA 254+70 (TRANSITION 0'-5')
STA 254+70 TO STA 265+70
STA 266+70 TO STA 267+55
DITCH C: STA 268+65 TO STA 271+28
STA 273+30 TO STA 284+42
DITCH D: STA 268+10 TO STA 271+63
STA 281+90 TO STA 286+40



CONCRETE LINED FLAT BOTTOM DITCH DETAIL

DITCH A: STA 264+75 TO STA 267+52
DITCH B: STA 265+70 TO STA 266+70
DITCH C: STA 271+28 TO STA 273+30
DITCH D: STA 271+63 TO STA 281+90



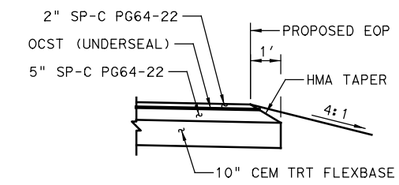
SH 30 PROPOSED TYPICAL SECTION

STA 241+90 TO STA 245+09

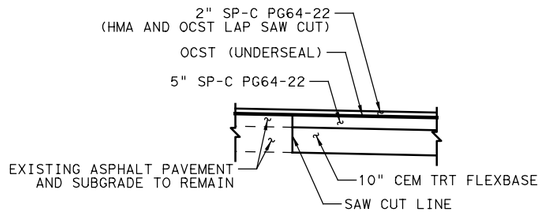
(1) SAW CUT LINE BEGINS AT STA 242+60

(2) PAVEMENT TAPER BEGINS AT STA 242+60 (3) SHLD VARIES BEGIN PROJECT TO STA 245+09 (10' TO 16.36')

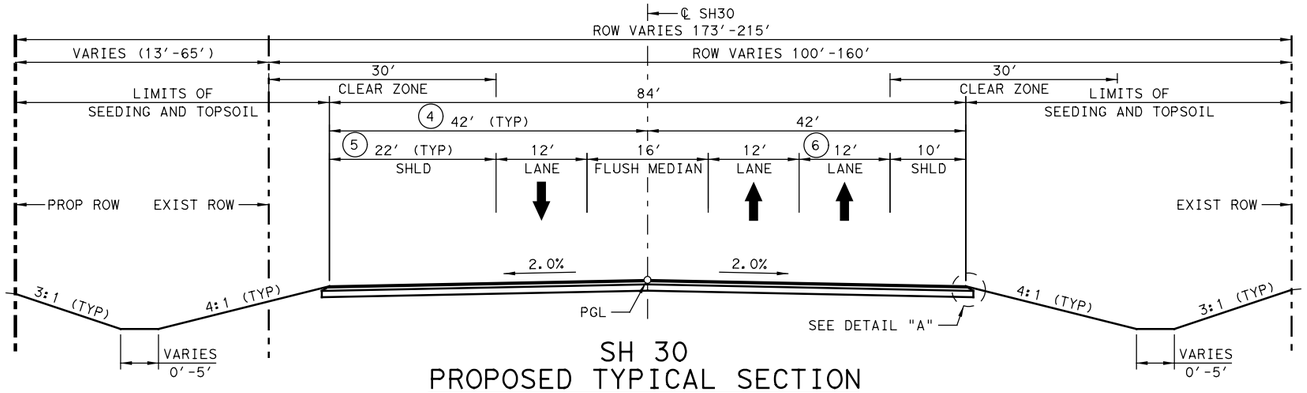
* PROPOSED WIDENING SHALL MATCH EXISTING ADJACENT CROSS SLOPE.



DETAIL "A"



DETAIL "B"



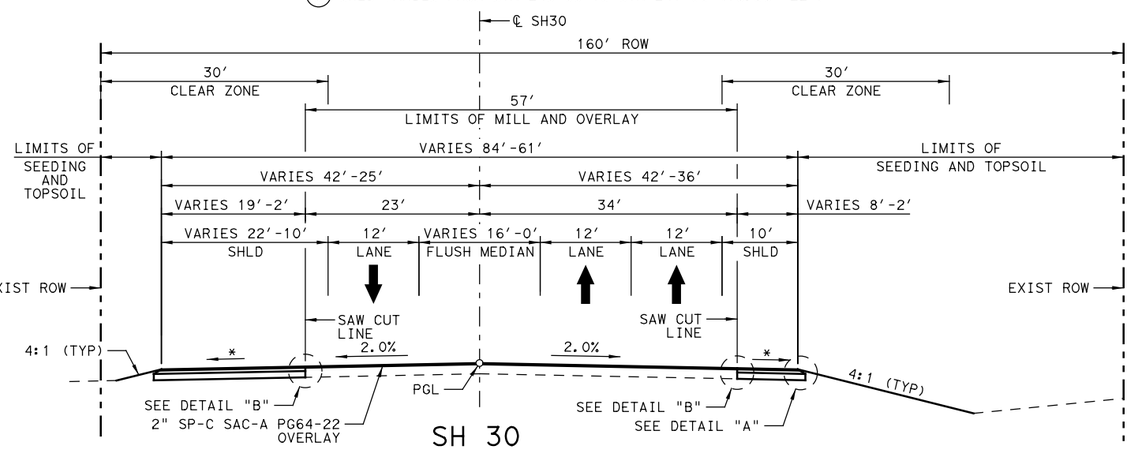
SH 30 PROPOSED TYPICAL SECTION

STA 245+09 TO STA 266+56
STA 266+56 TO STA 272+06 (BRIDGE SECTION)
STA 272+06 TO STA 281+60

(4) PAVEMENT TAPER ENDS AT STA 247+00

(5) SHLD VARIES FROM STA 245+09 TO STA 247+00 (16.36'-22')

(6) 12' LANE AT STA 247+00



SH 30 PROPOSED TYPICAL SECTION

STA 281+60 TO END PROJECT

* PROPOSED WIDENING SHALL MATCH EXISTING ADJACENT CROSS SLOPE.

NOTES:

1. SEE "TEMPORARY SW3P PLAN" SHEETS FOR ACTUAL LIMITS AND PAYMENT FOR SEEDING AND TOPSOIL.
2. SAW CUTTING WILL NOT BE PAID FOR SEPARATELY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
3. SEE "PLAN AND PROFILE" SHEETS FOR ACTUAL DITCH FLOWLINE PGL ELEVATIONS.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
08/17/2018

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

PROPOSED TYPICAL SECTIONS

NOT TO SCALE SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	6
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: KBERGER DATE: 8/17/2018
FILE: SH30TYP03.dgn
PENTABLE: I0069736.tbl
TIME: 10:32:26 AM SCALE: 1:20

BASIS OF ESTIMATE					
ITEM	**DESCRIPTION**	**COURSE**	**RATE**	**AMOUNT**	**QUANTITY**
168	Vegetative Watering		0.010 MG/SY	41,100 SY	411 MG
275	Cement (10")(4%)	Subgrade	0.0165 TON/SY	30,897 SY	510 TON
316	Asphalt (RC-250)		0.25 GAL/SY	40,787 SY	10,197 GAL
316	Aggregate (TY-B GR 5 or TY-L GR-5)		1 CY/135 SY	40,787 SY	303 CY
3077	SP MIXES SP-C PG64-22	2"	220 LB/SY	40,644 SY	4,471 TON
3077	SP MIXES SP-C PG64-22	5"	550 LB/SY	30,562 SY	8,405 TON

BASIS OF ESTIMATE * for contractor's information only					
ITEM	**DESCRIPTION**	**COURSE**	**RATE**	**AMOUNT**	**QUANTITY**
166*	FERTILIZER **		60 LB/AC	8.5 AC	0.26 TON
530*	SP MIXES SP-C PG64-22	2" Driveway	220 SY	159 SY	18 TON
530*	Asphalt (RC 250)	Prime Driveway	0.25 GAL/SY	172 SY	43 GAL
530*	Aggregate (TY-B GR 5 or TY-L GR-5)	Prime Driveway	1 CY/135 SY	172 SY	2 CY
530*	FL BS (CMP IN PLC) (TY D GR 4)	8" Driveway	N/A	280 SY	280 SY

Note: Rates are for estimating purposes only. Actual Rates will be determined in the field.
** Tonnage represents Nitrogen content only.

GENERAL:

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

James Robbins, P.E., A.E., James.Robbins@txdot.gov
Joseph Greive, P.E., A.A.E., Joseph.Greive@txdot.gov

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

Project Number: BR 2B24(147) **Sheet:** 7
Highway: SH 30 **Control:** 0212-04-039
County: Grimes

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

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

For non-bridge items, send eligible shop plan submittals with PDF attachments directly to the reviewing office. Submit bridge, retaining wall, and structural item shop drawings following the directions described at
https://www.txdot.gov/business/resources/highway/bridge/shop-drawing-submittal-cycle.html

ITEM 5 "CONTROL OF THE WORK"

Prior to letting, earthwork construction cross-section data is available at the Area Engineer's office in ***Bryan*** for inspection by prospective bidders.

Earthwork files will be provided by email or by using TxDOT's FTP Service. These cross-sections are for non-construction purposes only, and it is the responsibility of the prospective bidder to validate the data for this project.

After letting, the Engineer will provide final earthwork construction cross-section data necessary for the contractor to establish and control the work.

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/business/resources/highway/bridge/bridge-publications.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.

After award of the contract, when requested, TxDOT will provide CADD files to the selected Contractor. The recipient acknowledges that the electronic files may not contain all the information and may differ from the Bid Documents or Contract Documents for the construction of the Project. Electronic files are provided for information only and the TxDOT Bryan District shall not be responsible for differences between Electronic Files, the Bid Documents, and Contract Documents. The CADD files provided are a graphical representation of the project; the

CADD data may not be 100% accurate and should not be used for dimensional control, shop drawings, or any other similar purpose. Any electronic files provided are strictly for the use of the Recipient in regard to the Project named above and shall not be used for any other purpose or provided by the Recipient to any other entity.

ITEM 6 "CONTROL OF MATERIALS"

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

Refer to the Buy America Material Classification Sheet for clarification on material categorization. The Buy America Material Classification Sheet is located at the below link. https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

ITEM 7 "LEGAL RELATIONS AND RESPONSIBILITIES"

State contract mowers will mow the right of way during the growing season. The Contractor will be notified by the Engineer one week in advance of the anticipated time when mowers will be in the limits of the project. Clean the right of way to such a condition that allows the mowing contractors to safely mow.

In accordance with Item 7.2.5, Contractor equipment equipped with blue warning lights shall be wired so that operation of blue lights is independent of any other lights.

This project is on a secondary hurricane evacuation route. Furnish at the pre-construction meeting a written plan outlining procedures to suspend work, secure the job site and safely handle traffic through and across the project in the event of a hurricane evacuation.

During the hurricane season (June 1 through November 30), do not close any travel lanes except when the Contractor can demonstrate that he can provide labor, equipment, material, work plan, and quality of work to satisfactorily return all lanes to an open, all-weather travel surface within three days of receiving written or verbal notice but no later than 3 days prior to hurricane landfall. Construction of temporary lanes to an all-weather surface will be paid in accordance with Article 9.7, "Payment for Extra Work and Force Account Method".

Project Number: BR 2B24(147) **Sheet:** 7A
Highway: SH 30 **Control:** 0212-04-039
County: Grimes

In addition to lane closures, cease work 3 days or as directed by the Engineer prior to hurricane landfall on or near the roadway that adversely impacts the flow of traffic and reduces the capacity of the highway during an evacuation. Prohibit the Contractor's, sub-contractors' or material suppliers' vehicles from entering or exiting the stream of traffic including material hauling and delivery, and mobilization or demobilization of equipment. When directed, this prohibition will include a reasonable time period for the evacuees to return to their point of origin.

In the event of the declaration of a hurricane watch, warning, other severe weather warning or national or state emergency that requires the roadways in the vicinity be used as evacuation routes, cease all work that requires the Contractor's, sub-contractors' or material suppliers' vehicles to enter the stream of traffic on these primary or secondary evacuation routes. This work includes material hauling and delivery, and mobilization or demobilization of equipment.

The following roadways are recognized hurricane evacuation routes in the Bryan District:

Primary Evacuation Routes: IH 45, US 77 (S of US 79), US 84 (E of IH 45), US 79, US 287, US 290, SH 6.

Secondary Evacuation Routes: US 190 (E of IH 45), SH 7, SH 21, SH 30 (SH 6 to IH 45), SH 36, SH 105 (E of SH 6).

Other routes may be designated.

Roadway closures during the following key dates and/or special events are prohibited:

- Day before and day of Texas A&M home football games
- Texas A&M graduation
- Texas A&M Family Weekend

The Engineer may decide to restrict construction operations or lane closures on these key dates and/or special events.

ITEM 8 "PROSECUTION AND PROGRESS"

At the end of each work day, remove all grade differentials transverse to centerline. See TREATMENT FOR VARIOUS EDGE CONDITIONS sheet for details.

At the end of each work day, provide 100 foot minimum grade tapers longitudinal to the centerline to transition differences in the profile grade line or roadway grade.

The following standard detail sheet(s) has(have) been modified: BAS-A.

By noon of each Wednesday, provide the Engineer a written outline of the daily work schedule for the following week. Include in the outline the times and places for proposed traffic control changes, lane and shoulder closures, and moving operations or other operations that affect traffic on the roadway. Unless otherwise authorized by the Engineer, prosecute the work on this project as narrated in the TCP Sequence of Work.

Prosecute the work on this project in accordance with the following sequence of work:

1) Set advance signing and barricades; install Phase 1 SWP3 devices; mill the existing median pavement, eastbound pavement, and westbound pavement and place final 2" of hot mix the same day milling occurs. Place temporary traffic barrier and temporary work zone pavement markings and signage. Shift traffic to the existing eastbound half of the roadway utilizing the existing shoulder as a travel lane. Place temporary special shoring on the east and west sides of Gibbons Creek. Sawcut and widen existing westbound pavement, full depth reconstruct the left half of the proposed roadway to 2" below final grade, and construct the left half of the proposed bridge over Gibbons Creek. Stabilize disturbed soils (temporary and/or permanent).

2) Set advance signing and barricades; install Phase 2 SWP3 devices; furnish and install temporary traffic barrier across the proposed Gibbons Creek bridge. Move temporary traffic barrier and attenuators from Phase 1 and reset the barrier on the proposed pavement starting at the East end of the project. This work will have to be done at night and on the weekend under one-way traffic control to minimize traffic impact.

3) Shift traffic to the previously constructed half of the roadway; sawcut and widen existing eastbound pavement, full depth reconstruct the right half of the proposed roadway to 2" below final grade, and construct the remaining half of the proposed bridge over Gibbons Creek. Stabilize disturbed soils (temporary and/or permanent).

4) Place permanent signs and remaining 2" of hot mix (where required); stabilize disturbed soil (permanent). Place permanent pavement markings, markers, delineators, and milled rumble strips.

5) Final cleanup.

Some of these operations may be performed simultaneously.

Prepare Progress Schedule Bar Chart.

Work is allowed to be performed during the nighttime, unless not approved by the Engineer.

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Work that interferes with traffic is required to be performed during off-peak hours, 7 pm until 6 am, unless approved by the Engineer.

Equipment and material may be pre-staged at approved locations. When staging equipment and materials, they shall be marked/protected by type 3 barricades or appropriate TCP standards (includes overnight).

The 90-day convenience delayed start allowed after authorization under SP008-056 is for Contractor time for material acquisition.

ITEM 100 "PREPARING RIGHT OF WAY"

Limits of the Prep ROW to be confirmed in the field by the Engineer.

During burn bans obtain written approval from the respective County Commissioners Court prior to burning brush.

Prevent ashes from burned vegetation to be transported into any stream.

If burning is not allowed, all trees and brush will be disposed of by shredding, logging or other methods approved by the Engineer. Create a windrow, stockpile, or topdress biomass on disturbed areas along the project at locations approved by necessary permits and the Engineer.

ITEM 132 "EMBANKMENT"

Provide Embankment material for areas within the limits of the Pavement Structure that meet one of the following requirements:

- Sources outside the ROW provide material with a plasticity index between 10 and 25 and with less than 30% silt.
- Sources within the ROW provide material with a plasticity index between 10 and 25 and with less than 30% silt.

Provide Embankment material for areas outside the limits of the Pavement Structure with a plasticity index between 10 and 35.

ITEM 160 "TOPSOIL"

All slopes requiring topsoil will be tracked immediately upon final grading to prevent erosion per standard sheet EC(1)-16. Tracking slopes to prevent erosion will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 166 "FERTILIZER"

Fertilize all areas of project that are being seeded or sodded.

ITEM 168 "VEGETATIVE WATERING"

Vegetative watering is required for all areas of the project that are being seeded or sodded.

ITEM 247 "FLEXIBLE BASE"

Place flexible base in equal lifts of 4 to 8 in. in depth unless otherwise authorized by the Engineer in writing.

ITEM 275 "CEMENT TREATMENT (ROAD MIXED)"

Microcracking is required for this item.

ITEM 301 "ASPHALT ANTISTRIPPING AGENT"

When the Contractor adds lime as an anti-stripping agent (or an equivalent anti-stripping agent) the lime or equivalent shall be added to the asphaltic concrete in the methods specified in this item unless otherwise approved by the Engineer. If an alternate method is proposed, the Engineer's approval will be based on test method Tex-242-F performed on the asphaltic concrete produced through the plant.

ITEM 316 "SEAL COAT"

When placing surface treatment on base material, prepare surface by sweeping or other approved methods. Before applying bituminous material, lightly sprinkle the surface with water. When

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directed, sweep the surface after sprinkling with water. Do not apply bituminous material when water is puddling on the surface.

Sweep excess aggregate no sooner than 2 hours after rolling or as directed.

Vehicles used to haul aggregate from the stockpile to the chip spreader will not be overloaded. Any damage to the roadway caused by the vehicles will be repaired by the Contractor at his expense and subsequent loads will be reduced so as not to cause further damage.

Transverse variance rates shall be used as directed. The nozzles outside the wheel paths will output up to 20% more asphalt by volume than the nozzles over the wheel paths.

The Contractor may be required to furnish and set string line to insure straight and uniform alignment as directed by the Engineer. The Contractor may use other methods subject to approval of the Engineer.

Surface treat the metal beam guard fence widening areas after placing the MBGF to ensure that the entire widened areas are properly sealed.

If electing to place the MBGF after placing the surface treatment, reseal the widened areas to the satisfaction of the Engineer.

Air and surface temperature for asphalt material application will be in accordance with the specification and the manufacturer's recommendation. However, the engineer may limit the use of an asphalt material due to the time of year/weather conditions.

Schedule the work so that a seal coat is placed no more than two weeks after milling has been performed on any pavement surface, unless otherwise approved by the Engineer. The Engineer may require the seal coat to be placed sooner than two weeks in cases when base materials are exposed or when the pavement structure is showing signs of distress.

ITEM 320 "EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT"

Unless otherwise approved by the Engineer, provide a Material Transfer Device with remixing capabilities as specified in Item 320.2.3.3 Placement and Compaction Equipment for all asphaltic concrete pavement.

ITEM 354 "PLANING AND TEXTURING PAVEMENT"

Take ownership of reclaimed asphalt material.

Schedule the work so that a seal coat or HMA placement is placed no more than two weeks after milling has been performed on any pavement surface, unless otherwise approved by the Engineer. The Engineer may require the seal coat to be placed sooner than two weeks in cases when base materials are exposed or when the pavement structure is showing signs of distress.

Existing raised pavement markers in the proposed work area are to be removed prior to planing operations. This work will be considered subsidiary.

Construct a fine milling pattern by adjusting the speed of the drum and the machine, as approved by the Engineer.

ITEM 416 "DRILLED SHAFT FOUNDATIONS"

Stake foundation locations and have them approved by the Engineer before installation.

Do not place concrete without an Inspector present. Failure to inform the Engineer and provide adequate time to arrive on the job site may result in removing and replacing the foundation at the Contractor's expense.

ITEM 420 "CONCRETE SUBSTRUCTURES"

Mass placements are defined as placements with a least dimension greater than or equal to 5 ft., or designated on the plans.

ITEM 421 "HYDRAULIC CEMENT CONCRETE"

Optimized Aggregate Gradation is required for this project.

ITEM 432 "RIPRAP"

The fifty foot (50') approach taper to the MBGF end treatment will be concrete Mow Strip unless otherwise shown in the plans or otherwise directed by the Engineer.

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ITEM 464 "REINFORCED CONCRETE PIPE"

Seal joints using cold applied plastic asphalt sewer compound or cold applied preformed plastic gaskets. When cohesionless material is used for backfill, wrap the joints prior to backfilling with sand proof tape following the manufacturer's recommendations or with an equivalent material and method.

ITEM 467 "SAFETY END TREATMENTS"

All Type II SET's shall have riprap aprons as shown on the plans. Riprap aprons are considered subsidiary to Type II SET's.

ITEM 496 "REMOVING STRUCTURES"

Notify the Engineer of the exact date of bridge removal at least thirty (30) working days prior to the removal of the existing structure to allow for compliance with the Texas Department of State Health Services requirements for structural demolition. Bridge removal will not be allowed to take place until this notice is given.

The structure(s) to be removed have surface coatings which may contain hazardous materials. Provide for the safety and health of employees and abide by all OSHA Standards and Regulations.

Paint chips from the existing bridge were analyzed and found to exhibit a low to moderate probability of containing lead. Tests suggest that waste generated by the complete removal of this paint system will be classified as hazardous. The Department will provide for a separate contractor to remove paint prior to dismantling of the steel. The Contractor will coordinate with the Department the timing of the structure removal in order to allow the Department sufficient time to schedule work with the separate contractor. The Contractor will clearly indicate the locations on site that will require paint removal in accordance with Item 6.

ITEM 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING"

One way traffic control operations are required when placing centerline profile markings on all two-lane roadways, unless otherwise approved by the Engineer. Work area is limited to a maximum of 2 miles for this work.

During one-way operations, station flaggers at all county roads and any other locations, such as private businesses, that may have traffic entering the work area.

Removal of ground mounted temporary signs and supports as specified on standard sheet BC(5), shall include the immediate backfilling of support holes with Type B embankment material and the compaction of the backfill material. The signs must also be removed within two weeks once construction ends.

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

ITEM 504 "FIELD OFFICE AND LABORATORY"

Furnish a Type D Structure (Asphalt Mix Control Laboratory).

ITEM 506 "TEMPORARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS"

Prior to starting construction, review the SWP3 with the Engineer to confirm the type and placement of the devices. Device locations may be added, deleted, or modified by the Engineer.

ITEM 512 "PORTABLE TRAFFIC BARRIER"

Do not pin PTB on bridge decks. For work zone safety, PTB shall not deflect more than 2'. Alternate anchoring methods may be required to meet these criteria. Refer to standard sheets.

ITEM 540 "METAL BEAM GUARD FENCE"

When the roadway is converted from two-way operation to one-way operation for TCP operations, the appropriate Metal Beam Guard Fence shall be relapped in the direction of travel. This will not be paid for directly but will be considered subsidiary to this Item

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Furnish and install only one type of timber post.

ITEM 560 "MAILBOX ASSEMBLIES"

Notify the postmaster prior to installation for approval of type and temporary and permanent locations.

Retain and re-use newspaper holders removed or relocated during construction for placement on new mailbox assemblies in accordance with mailbox standard sheets.

ITEM 585 "RIDE QUALITY FOR PAVEMENT SURFACES"

Pay adjustment schedule 3 will be used to evaluate ride quality of the travel lanes in accordance with Item 585, "Ride Quality for Pavement Surfaces."

ITEM 636 "SIGNS"

Salvage and deliver all aluminum sign faces to the local TxDOT maintenance office.

ITEM 644 "SMALL ROADSIDE SIGN ASSEMBLIES"

Prior to taking elevations to determine lengths for fabrication of sign posts, obtain verification of all proposed locations.

Salvage and deliver all aluminum sign faces to the local TxDOT maintenance office.

ITEM 662 "WORK ZONE PAVEMENT MARKINGS"

Paint and beads may be used for non-removable work zone pavement markings.

All striping limits must be approved by the Engineer before striping operations may begin.

ITEM 666 "REFLECTORIZED PAVEMENT MARKINGS"

Unless authorized by the Engineer, the Contractor will not place the pavement markings on the resurfaced roadway until it has cured for 3 days.

All striping limits must be approved by the Engineer before striping operations may begin.

Use an acrylic sealer on concrete pavement.

ITEM 672 "RAISED PAVEMENT MARKERS"

Use flexible bituminous adhesive for applications on all pavement types.

ITEM 678 "PAVEMENT SURFACE PREPARATION FOR MARKINGS"

It is not anticipated that pavement surface preparation for markings will be needed. If the Engineer determines that it is needed, payment for work will be determined in accordance with Article 9.7 "Payment for Extra Work and Force Account Method".

ITEM 3077 "SUPERPAVE MIXTURES"

Hydrated lime, commercial lime slurry or an equivalent anti-stripping agent may be used. If hydrated lime or commercial lime slurry is used up to 1.0 percent may be added. If an equivalent anti-stripping agent is used, add according to manufacturer's recommendations. Provide hydrated lime or commercial lime slurry in accordance with DMS-6350, "Lime and Lime Slurry". Add hydrated lime, commercial lime slurry, or an equivalent anti-stripping agent in accordance with Section 301.4.2.

Apply tack coat through a distributor spray bar in accordance with Section 316.3.1. Distributor. If residual from emulsion tack is not tacky, then the Engineer can require the use of PG binder.

RAS is not permitted.

ITEM 6001 "PORTABLE CHANGEABLE MESSAGE SIGN"

Furnish, install, and operate up to 3 Portable Changeable Message Signs (PCMS) for this project. The signs can be used both on the project and within a ten (10) mile radius of the project. Locations, messages, and durations of use will be specified by the Engineer. The primary uses

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will be to inform the public of special events, lane and road closures, and changes in traffic control. Signs will be paid for only when used as directed by the Engineer.

ITEM 6185 "TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA)"

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan (TCP) for this project,

provide one (1) shadow vehicle(s) with TMA for TCP(2-1)-18 as detailed on General Note 4 of this standard sheet.

provide one (1) shadow vehicle(s) with TMA for TCP(2-2)-18 as detailed on General Note 6 of this standard sheet.

provide one (1) or (2) shadow vehicle(s) with TMA for TCP(2-3)-23 as detailed on General Notes 7 and 8 of this standard sheet.

provide one (1) or (2) shadow vehicle(s) with TMA for TCP(2-4)-18 as detailed on General Notes 5 and 6 of this standard sheet.

provide two (2) (shadow and trail) vehicle(s) with TMA for TCP(3-1)-13 as detailed on General Note 3 of this standard sheet.

provide two (2) (shadow and trail) vehicle(s) with TMA for TCP(3-3)-14 as detailed on General Note 3 of this standard sheet.

provide one (1) shadow vehicle(s) with TMA for TCP(S-1)-08A as detailed on General Note 4 of this standard sheet.

provide one (1) shadow vehicle(s) with TMA for TCP(S-2)-08A as detailed on General Note 11 of this standard sheet.

Therefore, twelve (12) total shadow vehicles with TMA will be required for this type of work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

Two hundred and thirty-nine (239) TMA days are provided in the project estimate for stationary operations.

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Thirty (30) TMA days are provided in the project estimate for mobile operations.

TMA's shall meet the requirements of the Compliant Work Zone Traffic Control Device List.
http://ftp.txdot.gov/pub/txdot-info/cmd/mpl/cwztcd.pdf

Signs and arrow boards required on truck-mounted attenuators and pilot vehicles are subsidiary to Item 6185.

Submit to the Engineer at or before the pre-construction meeting a letter certifying all TMA devices used on the project meet NCHRP 350 or AASHTO Manual for assessing Safety Hardware (MASH) requirements.

Estimate & Quantity Sheet

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HIGHWAY SH 30

							TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0212-04-039**			
			PROJECT ID		**A00082248**			
			COUNTY		**Grimes**			
			HIGHWAY		**SH 30**			
ALT	**BID CODE**	**DESCRIPTION**			EST.	FINAL		
	100-6002	PREPARING ROW		STA	45.000		45.000	
	104-6009	REMOVING CONC (RIPRAP)		SY	905.000		905.000	
	105-6044	REMOVING STAB BASE AND ASPH PAV (10")		SY	166.000		166.000	
	105-6108	RMV STAB BASE & ASPH PV (17")		SY	931.000		931.000	
	106-6001	OBLITERATING ABANDONED ROAD		STA	32.000		32.000	
	110-6001	EXCAVATION (ROADWAY)		CY	12,449.000		12,449.000	
	110-6002	EXCAVATION (CHANNEL)		CY	6,474.000		6,474.000	
	132-6006	EMBANKMENT (FINAL)(DENS CONT)(TY C)		CY	28,255.000		28,255.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")		SY	41,100.000		41,100.000	
	164-6021	CELL FBR MLCH SEED(PERM)(RURAL)(SANDY)		SY	41,100.000		41,100.000	
	164-6029	CELL FBR MLCH SEED(TEMP)(WARM)		SY	20,550.000		20,550.000	
	164-6031	CELL FBR MLCH SEED(TEMP)(COOL)		SY	20,550.000		20,550.000	
	168-6001	VEGETATIVE WATERING		MG	411.000		411.000	
	247-6345	FL BS (CMP IN PLC)(TY D GR 4)(10")		SY	30,897.000		30,897.000	
	275-6001	CEMENT		TON	510.000		510.000	
	275-6031	CEMENT TREAT (NEW BASE) (10")		SY	30,897.000		30,897.000	
	316-6029	ASPH (RC-250)		GAL	10,240.000		10,240.000	
	316-6403	AGGR (TY-B GR-5 OR TY-L GR-5)		CY	303.000		303.000	
	354-6045	PLANE ASPH CONC PAV (2")		SY	10,484.000		10,484.000	
	400-6005	CEM STABIL BKFL		CY	456.000		456.000	
	403-6001	TEMPORARY SPL SHORING		SF	3,150.000		3,150.000	
	416-6002	DRILL SHAFT (24 IN)		LF	3,804.000		3,804.000	
	420-6013	CL C CONC (ABUT)		CY	52.800		52.800	
	420-6029	CL C CONC (CAP)		CY	212.000		212.000	
	420-6037	CL C CONC (COLUMN)		CY	88.400		88.400	
	422-6007	REINF CONC SLAB (SLAB BEAM)		SF	47,300.000		47,300.000	
	422-6015	APPROACH SLAB		CY	200.400		200.400	
	425-6011	PRESTR CONC SLAB BEAM (4SB15)		LF	8,711.760		8,711.760	
	425-6012	PRESTR CONC SLAB BEAM (5SB15)		LF	2,177.920		2,177.920	
	432-6001	RIPRAP (CONC)(4 IN)		CY	958.000		958.000	
	432-6035	RIPRAP (STONE PROTECTION)(24 IN)		CY	9,857.000		9,857.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)		CY	83.000		83.000	
	450-6006	RAIL (TY T223)		LF	1,128.000		1,128.000	
	454-6004	ARMOR JOINT (SEALED)		LF	426.000		426.000	
	464-6003	RC PIPE (CL III)(18 IN)		LF	86.000		86.000	
	464-6030	RC PIPE (ARCH)(CL III)(DES 1)		LF	32.000		32.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)		EA	4.000		4.000	

Estimate & Quantity Sheet

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HIGHWAY SH 30

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0212-04-039**			
		PROJECT ID		**A00082248**			
		COUNTY		**Grimes**			
		HIGHWAY		**SH 30**			
ALT	**BID CODE**	**DESCRIPTION**		EST.	FINAL		
	467-6519	SET (TY II) (DES 1) (RCP) (6: 1) (P)	EA	2.000		2.000	
	496-6004	REMOV STR (SET)	EA	4.000		4.000	
	496-6007	REMOV STR (PIPE)	LF	48.000		48.000	
	496-6011	REMOV STR (BRIDGE 500 - 999 FT LENGTH)	EA	1.000		1.000	
	496-6043	REMOV STR (SMALL FENCE)	LF	2,571.000		2,571.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	27.000		27.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	603.000		603.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	603.000		603.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	222.000		222.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	222.000		222.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	9,938.000		9,938.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	9,938.000		9,938.000	
	512-6005	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	LF	3,870.000		3,870.000	
	512-6029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF	2,760.000		2,760.000	
	512-6053	PORT CTB (REMOVE)(F-SHAPE)(TY 1)	LF	3,870.000		3,870.000	
	530-6005	DRIVEWAYS (ACP)	SY	145.000		145.000	
	533-6001	RUMBLE STRIPS (SHOULDER)	LF	17,532.000		17,532.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	1,300.000		1,300.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	3.000		3.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	3.000		3.000	
	540-6018	MTL BM GD FEN TRANS (NON - SYM)	EA	1.000		1.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	1,000.000		1,000.000	
	542-6005	RM MTL BM GD FEN TRANS (T101)	EA	4.000		4.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	5.000		5.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	4.000		4.000	
	544-6006	GDRAIL END TRT(INST)(WOOD POST)(TY III)	EA	2.000		2.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	3.000		3.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	6.000		6.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	6.000		6.000	
	550-6006	GATE (REMOVE)	EA	3.000		3.000	
	560-6004	MAILBOX INSTALL-S (TWG-POST) TY 2	EA	1.000		1.000	
	560-6005	MAILBOX INSTALL-D (TWG-POST) TY 2	EA	1.000		1.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	6.000		6.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2.000		2.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	2.000		2.000	
	644-6070	RELOCATE SM RD SN SUP&AM TY S80	EA	1.000		1.000	

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CONTROLLING PROJECT ID 0212-04-039 **DISTRICT** Bryan **COUNTY** Grimes
HIGHWAY SH 30

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0212-04-039**			
		PROJECT ID		**A00082248**			
		COUNTY		**Grimes**			
		HIGHWAY		**SH 30**			
ALT	**BID CODE**	**DESCRIPTION**		EST.	FINAL		
	644-6076	REMOVE SM RD SN SUP&AM	EA	8.000		8.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA	12.000		12.000	
	658-6015	INSTL DEL ASSM (D-SW)SZ (BRF)GF1	EA	19.000		19.000	
	658-6046	INSTL OM ASSM (OM-2X)(WC)GND	EA	6.000		6.000	
	662-6008	WK ZN PAV MRK NON-REMOV (W)6"(SLD)	LF	11,053.000		11,053.000	
	662-6010	WK ZN PAV MRK NON-REMOV (W)8"(DOT)	LF	39.000		39.000	
	662-6037	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	LF	15,300.000		15,300.000	
	662-6059	WK ZN PAV MRK REMOV (TRAF BTN) TY Y	LF	1,225.000		1,225.000	
	662-6067	WK ZN PAV MRK REMOV (W)6"(SLD)	LF	4,745.000		4,745.000	
	662-6069	WK ZN PAV MRK REMOV (W)8"(DOT)	LF	57.000		57.000	
	662-6071	WK ZN PAV MRK REMOV (W)8"(SLD)	LF	1,629.000		1,629.000	
	662-6098	WK ZN PAV MRK REMOV (Y)6"(SLD)	LF	10,806.000		10,806.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	464.000		464.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	1,164.000		1,164.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1,210.000		1,210.000	
	666-6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	160.000		160.000	
	666-6174	REFL PAV MRK TY II (W) 6" (SLD)	LF	1,226.000		1,226.000	
	666-6210	REFL PAV MRK TY II (Y) 6" (SLD)	LF	2,452.000		2,452.000	
	666-6225	PAVEMENT SEALER 6"	LF	3,838.000		3,838.000	
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1,180.000		1,180.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	10,250.000		10,250.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	23,281.000		23,281.000	
	672-6007	REFL PAV MRKR TY I-C	EA	58.000		58.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	60.000		60.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	8,606.000		8,606.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	310.000		310.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	3,838.000		3,838.000	
	678-6033	PAV SURF PREP FOR MRK (RPM)	EA	68.000		68.000	
	3077-6011	SP MIXES SP-C PG64-22	TON	12,878.000		12,878.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	3.000		3.000	
	6185-6002	TMA (STATIONARY)	DAY	239.000		239.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	30.000		30.000	
	18	EROSION CONTROL MAINTENANCE	LS	1.000		1.000	
		SAFETY CONTINGENCY	LS	1.000		1.000	

SUMMARY OF TRAFFIC CONTROL QUANTITIES

LOCATION	403 6001	512 6005	512 6029	512 6053	545 6003	545 6005	545 6019	662 6008	662 6037	662 6059
	TEMPORARY SPL SHORING	PORT CTB (FUR & INST) (F-SHAPE) (TY 1)	PORT CTB (MOVE) (F-SHAPE) (TY 1)	PORT CTB (REMOVE) (F-SHAPE) (TY 1)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (REMOVE)	CRASH CUSH ATTEN (INSTL) (S) (N) (TL3)	WK ZN PAV MRK NON-REMOV (W) 6" (SLD)	WK ZN PAV MRK NON-REMOV (Y) 6" (SLD)	WK ZN PAV MRK REMOV (TRAF BTN) TY Y
	SF	LF	LF	LF	EA	EA	EA	LF	LF	LF
TRAFFIC CONTROL PLAN PHASE 1										
BEGIN TO STA 251+00	-	160	-	-	-	-	1	1,073	1,184	-
STA 251+00 TO STA 273+00	-	1,119	-	-	-	-	4	652	4,400	-
STA 273+00 TO END	-	1,481	-	-	-	-	1	2,291	2,680	-
TEMPORARY SPECIAL SHORING LAYOUT SHEET 1	1,314	-	-	-	-	-	-	-	-	-
TEMPORARY SPECIAL SHORING LAYOUT SHEET 2	1,836	-	-	-	-	-	-	-	-	-
TRAFFIC CONTROL PLAN PHASE 2										
BEGIN TO STA 251+00	-	-	160	-	2	-	-	1,181	1,180	-
STA 251+00 TO STA 273+00	-	950	1,250	-	-	-	-	3,176	3,176	1,225
STA 273+00 TO END	-	160	1,350	3,870	1	6	-	2,680	2,680	-
PROJECT TOTALS	**3,150**	**3,870**	**2,760**	**3,870**	**3**	**6**	**6**	**11,053**	**15,300**	**1,225**

LOCATION	662 6067	662 6069	662 6071	662 6095	662 6109	662 6111	677 6001	677 6003	6001 6002	6185 6005
	WK ZN PAV MRK REMOV (W) 6"(SLD)	WK ZN PAV MRK REMOV (W) 8" (DOT)	WK ZN PAV MRK REMOV (W) 8" (SLD)	WK ZN PAV MRK REMOV (Y) 4" (SLD)	WK ZN PAV MRK SHT TERM (TAB) TY W	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (8")	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (MOBILE OPERATION)
	LF	LF	LF	LF	EA	EA	LF	LF	EA	DAY
TRAFFIC CONTROL PLAN PHASE 1										
BEGIN TO STA 251+00	1,419	-	395	6,214	-	-	2,757	50	3	2
STA 251+00 TO STA 273+00	-	-	-	-	-	-	1,753	-	-	-
STA 273+00 TO END	248	-	-	496	-	-	4,071	-	-	-
TEMPORARY SPECIAL SHORING LAYOUT SHEET 1	-	-	-	-	-	-	-	-	-	-
TEMPORARY SPECIAL SHORING LAYOUT SHEET 2	-	-	-	-	-	-	-	-	-	-
TRAFFIC CONTROL PLAN PHASE 2										
BEGIN TO STA 251+00	2,513	57	1,234	3,600	-	-	25	260	-	-
STA 251+00 TO STA 273+00	-	-	-	-	-	-	-	-	-	-
STA 273+00 TO END	565	-	-	496	464	1,164	-	-	-	12
PROJECT TOTALS	**4,745**	**57**	**1,629**	**10,806**	**464**	**1,164**	**8,606**	**310**	**3**	**14**

SUMMARY OF REMOVAL QUANTITIES

LOCATION	100 6002	104 6009	105 6044	105 6108	106 6001	354 6045	496 6004	496 6007	496 6043	542 6001	542 6005	544 6003	550 6006
	PREPARING ROW	REMOVING CONC (RIPRAP)	REMOVING STAB BASE AND ASPH PAV (10")	RMV STAB BASE & ASPH PV (17")	OBLITERATING ABANDONED ROAD	PLANE ASPH CONC PAV (2")	REMOV STR (SET)	REMOV STR (PIPE)	REMOV STR (SMALL FENCE)	REMOVE METAL BEAM GUARD FENCE	RM MTL BM GD FEN TRANS (T101)	GUARDRAIL END TREATMENT (REMOVE)	GATE (REMOVE)
	STA	SY	SY	SY	STA	SY	EA	LF	LF	LF	EA	EA	EA
REMOVAL PLAN													
BEGIN TO STA 240+00	-	-	-	-	-	4,651	-	-	-	-	-	-	-
STA 240+00 TO STA 262+00	20	-	166	375	17	3,113	4	48	1,975	-	-	-	2
STA 262+00 TO STA 284+00	22	905	-	208	15	1,440	-	-	596	1,000	4	4	1
STA 284+00 TO END	3	-	-	348	-	1,280	-	-	-	-	-	-	-
PROJECT TOTALS	**45**	**905**	**166**	**931**	**32**	**10,484**	**4**	**48**	**2,571**	**1,000**	**4**	**4**	**3**

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

SUMMARY OF QUANTITIES

SHEET 1 OF 3

FED. RD. DIV. NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	9
CONTROL	SECTION	JOB	
0212	04	039	

SUMMARY OF ROADWAY QUANTITIES

LOCATION	247 6248 (1)(2)	247 6345	275 6001 (1)	275 6031	316 6029 (1)	316 6403 (1)	3077 6011 (1)	432 6001	432 6045	464 6003
	FL BS (CMP IN PL) (TY D GR 4) (8")	FL BS (CMP IN PLC) (TY D GR 4) (10")	CEMENT	CEMENT TREAT (NEW BASE) (10")	ASPH (RC-250)	AGGR (TY-B GR-5 OR TY-L GR-5)	SUPERPAVE MIXTURES SP-C PG64-22	RIPRAP (CONC) (4 IN)	RIPRAP (MOW STRIP) (4 IN)	RC PIPE (CL III) (18 IN)
	SY	SY	SY	SY	SY	SY	SY	CY	CY	LF
ROADWAY PLAN AND PROFILE										
BEGIN TO STA 240+00	-	-	-	-	4,666	4,666	4,658	-	-	-
STA 240+00 TO STA 251+00	-	6,257	6,257	6,257	9,240	9,240	15,381	147	40	-
STA 251+00 TO STA 262+00	-	10,511	10,511	10,511	10,337	10,337	20,722	44	8	-
STA 262+00 TO STA 273+00	-	4,658	4,658	4,658	4,571	4,571	9,159	338	26	-
STA 273+00 TO STA 284+00	-	8,918	8,918	8,918	10,178	10,178	18,964	429	9	-
STA 284+00 TO END	-	553	553	553	1,795	1,795	2,322	-	-	-
DRIVEWAY NO. 1	63	-	-	-	44	44	42	-	-	-
DRIVEWAY NO. 2	89	-	-	-	55	55	50	-	-	32
DRIVEWAY NO. 3	128	-	-	-	73	73	67	-	-	54
PROJECT TOTALS	**280**	**30,897**	**30,897**	**30,897**	**40,959**	**40,959**	**71,365**	**958**	**83**	**86**

(1) FOR CONTRACTOR'S INFORMATION ONLY. SEE BASIS OF ESTIMATE FOR PAY QUANTITY.

(2) SUBSIDIARY TO ITEM 530.

LOCATION	464 6030	467 6363	467 6519	530 6005	540 6001	540 6006	540 6016	540 6018	544 6001	560 6004	560 6005
	RC PIPE (ARCH) (CL III) (DES 1)	SET (TY II) (18 IN) (RCP) (6: 1) (P)	SET (TY II) (DES 1) (RCP) (6: 1) (P)	DRIVEWAYS (ACP)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	DOWNSTREAM ANCHOR TERMINAL SECTION	MTL BM GD FEN TRANS (NON - SYM)	GUARDRAIL END TREATMENT (INSTALL)	MAILBOX INSTALL-S (TWG-POST) TY 2	MAILBOX INSTALL-D (TWG-POST) TY 2
	LF	EA	EA	SY	LF	EA	EA	EA	EA	EA	EA
ROADWAY PLAN AND PROFILE											
BEGIN TO STA 240+00	-	-	-	-	-	-	-	-	-	-	-
STA 240+00 TO STA 251+00	-	-	-	-	789	-	1	-	2	1	-
STA 251+00 TO STA 262+00	-	-	-	-	174	-	1	-	-	-	1
STA 262+00 TO STA 273+00	-	-	-	-	338	3	1	1	2	-	-
STA 273+00 TO STA 284+00	-	-	-	-	-	-	-	-	1	-	-
STA 284+00 TO END	-	-	-	-	-	-	-	-	-	-	-
DRIVEWAY NO. 1	32	-	2	39	-	-	-	-	-	-	-
DRIVEWAY NO. 2	-	2	-	46	-	-	-	-	-	-	-
DRIVEWAY NO. 3	-	2	-	60	-	-	-	-	-	-	-
PROJECT TOTALS	**32**	**4**	**2**	**145**	**1,300**	**3**	**3**	**1**	**5**	**1**	**1**

SUMMARY OF BRIDGE QUANTITIES

LOCATION	400 6005	416 6002	420 6013	420 6029	420 6037	422 6007	422 6015	425 6011	425 6012	432 6035	450 6006	454 6004	496 6011
	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	CL C CONC (CAP)	CL C CONC (COLUMN)	REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM (4SB15)	PRESTR CONC SLAB BEAM (5SB15)	RIPRAP (STONE PROTECTION) (24 IN)	RAIL (TY T223)	ARMOR JOINT (SEALED)	REMOV STR (BRIDGE 500 - 999 FT LENGTH)
	CY	LF	CY	CY	CY	SF	CY	LF	LF	CY	LF	LF	EA
GIBBONS CREEK BRIDGE	456	3,804	52.8	212.0	88.4	47,300	200.4	8,711.76	2,177.92	9,857	1,128.0	426	1
PROJECT TOTALS	**456**	**3,804**	**52.8**	**212.0**	**88.4**	**47,300**	**200.4**	**8,711.76**	**2,177.92**	**9,857**	**1,128.0**	**426**	**1**

SUMMARY OF EARTHWORK QUANTITIES

STATION	110 6001 EXCAVATION (ROADWAY)	110 6002 EXCAVATION (CHANNEL)	132 6006 EMBANKMENT (FINAL) (DENS CONT) (TY C)
	CY	CY	CY
241+90.10	0	0	0
242+00.00	10	0	0
242+50.00	50	0	3
243+00.00	68	0	3
243+50.00	105	0	2
244+00.00	101	0	1
244+50.00	93	0	5
245+00.00	84	0	12
245+50.00	136	0	11
246+00.00	177	0	14
246+50.00	168	0	28
247+00.00	172	0	42
247+50.00	186	0	43
248+00.00	195	0	43
248+50.00	225	0	44
249+00.00	229	0	60
249+50.00	199	0	94
250+00.00	168	0	131
250+50.00	108	0	181
251+00.00	68	0	211
251+50.00	70	0	205
252+00.00	66	0	193
252+50.00	85	0	184
253+00.00	118	0	167
253+50.00	99	0	172
254+00.00	63	0	223
254+50.00	62	0	276
255+00.00	82	0	302
255+50.00	96	0	282
256+00.00	127	0	223
256+50.00	170	0	165
257+00.00	167	0	137
257+50.00	132	0	154
258+00.00	125	0	178
258+50.00	152	0	188
259+00.00	182	0	202
259+50.00	205	0	229
260+00.00	229	0	266
260+50.00	246	0	310
261+00.00	260	0	354
261+50.00	266	0	410
262+00.00	251	0	450
262+50.00	231	0	467
263+00.00	225	0	499
263+50.00	245	0	539
264+00.00	258	0	581
264+50.00	239	0	634

STATION	110 6001 EXCAVATION (ROADWAY)	110 6002 EXCAVATION (CHANNEL)	132 6006 EMBANKMENT (FINAL) (DENS CONT) (TY C)
	CY	CY	CY
265+00.00	229	0	714
265+50.00	236	0	977
266+00.00	261	0	1,541
266+44.48	271	0	1,695
266+67.52	0	37	221
267+00.00	0	423	734
267+50.00	0	596	130
268+00.00	0	449	77
268+50.00	0	319	49
269+00.00	0	136	478
269+50.00	0	160	876
270+00.00	0	38	1,672
270+50.00	0	586	1,102
271+00.00	0	1,260	529
271+50.00	0	1,356	251
271+94.48	0	0	0
272+17.53	0	1,114	428
272+50.00	104	0	589
273+00.00	162	0	842
273+50.00	162	0	701
274+00.00	166	0	591
274+50.00	186	0	545
275+00.00	191	0	457
275+50.00	221	0	361
276+00.00	263	0	305
276+50.00	258	0	274
277+00.00	253	0	262
277+50.00	244	0	265
278+00.00	231	0	266
278+50.00	228	0	253
279+00.00	229	0	231
279+50.00	221	0	212
280+00.00	212	0	200
280+50.00	209	0	191
281+00.00	206	0	181
281+50.00	206	0	173
282+00.00	129	0	168
282+50.00	58	0	159
283+00.00	52	0	151
283+50.00	42	0	134
284+00.00	42	0	111
284+50.00	46	0	84
285+00.00	43	0	59
285+50.00	38	0	44
286+00.00	36	0	26
286+39.90	22	0	28
PROJECT TOTALS	**12,449**	**6,474**	**28,255**

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

SUMMARY OF QUANTITIES

SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	10
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: KBERGER DATE: 8/17/2018
FILE: SH30SUM02.dgn
PENTABLE: I0069736.tbl
TIME: 10:32:55 AM SCALE:1:1

SUMMARY OF SIGNING QUANTITIES

LOCATION	644 6001	644 6004	644 6068	644 6070	644 6076	658 6013	658 6015	658 6046
	IN SM RD SN SUP&AM TY10BWG(1) SA(P)	IN SM RD SN SUP&AM TY10BWG(1) SA(T)	RELOCATE SM RD SN SUP&AM TY 10BWG	RELOCATE SM RD SN SUP&AM TY S80	REMOVE SM RD SN SUP&AM	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	INSTL DEL ASSM (D-SW)SZ (BRF)GF1	INSTL OM ASSM (OM-2X)(WC) GND
	EA	EA	EA	EA	EA	EA	EA	EA
SIGNING AND PAVEMENT MARKING LAYOUT								
BEGIN TO STA 251+00	-	-	2	1	-	-	11	4
STA 251+00 TO STA 273+00	5	2	-	-	6	12	7	2
STA 273+00 TO END	1	-	-	-	2	-	1	-
PROJECT TOTALS	**6**	**2**	**2**	**1**	**8**	**12**	**19**	**6**

SUMMARY OF PAVEMENT MARKING QUANTITIES

LOCATION	533 6001	666 6036	666 6225	666 6306	666 6309	666 6321	672 6007	672 6009	678 6001	678 6033
	RUMBLE STRIPS (SHOULDER)	REFL PAV MRK TY I (W)8"(SLD) (100MIL)	PAVEMENT SEALER 6"	RE PM W/RET REQ TY I (W)6"(BRK) (100MIL)	RE PM W/RET REQ TY I (W)6"(SLD) (100MIL)	RE PM W/RET REQ TY I (Y)6"(SLD) (100MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A	PAV SURF PREP FOR MRK (4")	PAV SURF PREP FOR MRK (RPM)
	LF	LF	LF	LF	LF	LF	EA	EA	LF	EA
SIGNING AND PAVEMENT MARKING LAYOUT										
BEGIN TO STA 251+00	6,780	1,210	-	230	2,920	8,621	11	-	-	-
STA 251+00 TO STA 273+00	6,352	-	3,838	550	4,402	8,804	28	60	3,838	68
STA 273+00 TO END	4,400	-	-	400	2,928	5,856	19	-	-	-
PROJECT TOTALS	**17,532**	**1,210**	**3,838**	**1,180**	**10,250**	**23,281**	**58**	**60**	**3,838**	**68**

SUMMARY OF ENVIRONMENTAL QUANTITIES (1)

LOCATION	160 6003	164 6021	164 6029	164 6031	168 6001	506 6002	506 6011	506 6020	506 6024	506 6038	506 6039
	FURNISHING AND PLACING TOPSOIL (4")	CELL FBR MLCH SEED (PERM)(RURAL) (SANDY)	CELL FBR MLCH SEED (TEMP)(WARM)	CELL FBR MLCH SEED (TEMP)(COOL)	VEGETATIVE WATERING	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	SY	SY	SY	SY	SY	LF	LF	SY	SY	LF	LF
TEMPORARY SW3P PLAN PHASE 1											
BEGIN TO STA 262+00	10,382	10,382	5,191	5,191	10,382	187	187	111	111	2,009	2,009
STA 262+00 TO STA 284+00	11,986	11,986	5,993	5,993	11,986	150	150	-	-	2,827	2,827
STA 284+00 TO END	1,610	1,610	805	805	1,610	15	15	-	-	300	300
TEMPORARY SW3P PLAN PHASE 2											
BEGIN TO STA 262+00	5,474	5,474	2,737	2,737	5,474	107	107	111	111	2,060	2,060
STA 262+00 TO STA 284+00	10,098	10,098	5,049	5,049	10,098	123	123	-	-	2,442	2,442
STA 284+00 TO END	1,550	1,550	775	775	1,550	21	21	-	-	300	300
PROJECT TOTALS	**41,100**	**41,100**	**20,550**	**20,550**	**41,100**	**603**	**603**	**222**	**222**	**9,938**	**9,938**

(1) FOR CONTRACTOR'S INFORMATION ONLY. SEE BASIS OF ESTIMATE FOR PAY QUANTITY.

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: KBERGER DATE: 8/17/2018
FILE: SH30SUM03.dgn
PENTABLE: 1006936.tbl
TIME: 2:26:50 PM SCALE: 1:1

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

SUMMARY OF QUANTITIES

SHEET 3 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	11
CONTROL	SECTION	JOB	
0212	04	039	

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: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
131	1	R2-1	SPEED LIMIT 60	30x36	X		10 BWG	1	SA	P		
	2	R2-1	SPEED LIMIT 70	30x36	X		10 BWG	1	SA	P		
	3	R4-3	SLOWER TRAFFIC KEEP RIGHT	24x30	X		10 BWG	1	SA	P		
	4	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36x36	X		10 BWG	1	SA	P		
	5	W3-5	REDUCED SPEED LIMIT AHEAD (60 MPH)	36x36	X		10 BWG	1	SA	P		
	6	I-3	GIBBONS CREEK	36x18	X		10 BWG	1	SA	T		
	7	I-3	GIBBONS CREEK	36x18	X		10 BWG	1	SA	T		
132	1	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36x36	X		10 BWG	1	SA	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).

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

08/17/2018

Jacob E. Walker, PE

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH30
4-16	DIST	COUNTY		SHEET NO.
8-16	BRY	GRIMES		12

18

DATE: 8/17/2018 10:32:59 AM
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GENERAL

1. TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A SAFE AND COMFORTABLE PASSAGE FOR VEHICULAR TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC, AS SHOWN IN THE PLANS OR AS DIRECTED OR APPROVED BY THE ENGINEER.

2. THE CONTRACTOR MAY PROPOSE OR RECOMMEND MODIFICATIONS TO THE SEQUENCE OF CONSTRUCTION FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATIONS BY THE CONTRACTOR WILL INCLUDE ANY CHANGES TO THE VARIOUS BID ITEMS, IMPACT TO TRAFFIC, AND EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. IF THIS PROPOSAL IS IMPLEMENTED, THE CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING DETAILED PLAN SHEETS TO BE SEALED BY A LICENSED PROFESSIONAL ENGINEER FOR INCLUSION WITH THE CHANGE ORDER. THE CONTRACTOR CANNOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE OR SEQUENCE UNTIL WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE FOR SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR WILL IMMEDIATELY CHANGE THEIR OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.

3. ENSURE ADEQUATE DRAINAGE DURING ALL PHASES OF CONSTRUCTION. TEMPORARY DRAINAGE IS THE RESPONSIBILITY OF THE CONTRACTOR.

4. DO NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD AND WILL ENDANGER TRAFFIC. NO EQUIPMENT WILL BE LEFT WITHIN 30 FOOT OF THE TRAVEL WAY AFTER WORKING HOURS UNLESS LOCATED BEHIND TRAFFIC BARRIER.

5. THE CONTRACTOR WILL NOTIFY TO THE ENGINEER OF IMPENDING OR UPCOMING LANE CLOSURES 10 BUSINESS DAYS IN ADVANCE FOR ALL TEMPORARY CLOSURES OR DETOURS. SEE "GENERAL NOTES" FOR NOTIFICATION REQUIREMENTS.

6. ACCESS TO ADJOINING PROPERTY SHOULD TO THE GREATEST EXTENT POSSIBLE BE MAINTAINED AT ALL TIMES AT THE SOLE EXPENSE OF THE CONTRACTOR. CONTACT PROPERTY OWNER AT LEAST 5 DAYS IN ADVANCE OF DRIVEWAY CONSTRUCTION. IF THE PROPERTY OWNER HAS MORE THAN ONE DRIVEWAY, CONSTRUCTION WILL ONLY BE PERMITTED ON ONE DRIVEWAY AT A TIME. DRIVEWAY GRADES DURING CONSTRUCTION SHOULD NOT EXCEED 12%. ADJUST CONSTRUCTION ACTIVITIES ACCORDINGLY TO NOT EXCEED MAXIMUM GRADE LIMITS. PROVIDE ADEQUATE TEMPORARY SURFACING FOR TRANSITIONS BETWEEN PAVEMENT ELEVATIONS FOR ALL DRIVEWAYS.

7. REMOVAL AND DISPOSAL OF EXISTING ABANDONED UTILITIES (EITHER PREVIOUSLY ABANDONED OR ABANDONED DURING THIS PROJECT) REQUIRED TO SUPPORT THIS PROJECT'S CONSTRUCTION WILL BE PERFORMED UNDER ITEM 100.

8. COVER PERMANENT SIGNS IF NOT USED. PAYMENT WILL BE CONSIDERED SUBSIDIARY TO ITEM 502.

9. SEE TxDOT BARRICADE AND CONSTRUCTION STANDARDS AND THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) FOR SIGN SPACING AND LOCATION REQUIREMENTS.

10. SEE TxDOT TRAFFIC CONTROL PLAN STANDARDS AND THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) FOR CHANNELIZING DEVICE SPACING REQUIREMENTS.

11. WORK ZONE PAVEMENT MARKINGS WILL BE RAISED PAVEMENT MARKERS WITHIN THE LIMITS OF THE NEW BRIDGE, INCLUDING APPROACH SLABS.

12. WHEN OPERATIONS HAVE CEASED FOR THE DAY, PLACE A 4H:1V OR FLATTER SAFETY WEDGE INTO THE PROPOSED CONSTRUCTION AND COMPACT SO THAT IT IS CAPABLE OF SUPPORTING VEHICLES FOR ANY ROADWAY EDGE OF 2 INCHES OR GREATER ADJACENT TO A ROADWAY UNDER TRAFFIC. THE SAFETY WEDGE MATERIAL USED SHALL BE DURABLE CRUSHED STONE TYPE OF FLEXIBLE BASE OR OTHER MATERIALS APPROVED BY THE ENGINEER. WHEN WORK IS RESUMED ON THIS EXCAVATED AREA, THIS SAFETY WEDGE MATERIAL WILL BE INCORPORATED INTO THE ROAD WORK OR DISPOSED OF AS APPROVED. MATERIALS AND LABOR FOR THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

13. SURFACE TREATMENTS AND OVERLAYS WILL BE PERFORMED IN THE DIRECTION OF TRAFFIC.

14. PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), PER TMUTCD, WILL BE PLACED 5 CALENDAR DAYS IN ADVANCE OF PLACING, MOVING, AND REMOVING TRAFFIC CONTROL DEVICES. THE ENGINEER WILL APPROVE THE LOCATION OF PCMS PRIOR TO PLACEMENT AND/OR RELOCATION. THE ENGINEER WILL APPROVE THE WORDING OF PCMS.

15. PREPARING ROW AND REMOVAL OF EXISTING ITEMS ARE TO BE DONE ONLY IN THE AREAS WHERE WORK IS OCCURRING AS PER THE PHASES NOTED AS FOLLOWS.

DRIVEWAY NO. 3 NOTES

1. DUE TO LIMITED SIGHT DISTANCE FOR DRIVEWAY NO. 3, THE CONTRACTOR WILL INFORM THE PROPERTY OWNER AT LEAST 5 DAYS IN ADVANCE OF PHASE 1 CONSTRUCTION, THAT THE PROPERTY OWNER WILL ONLY BE PROVIDED RIGHT-OUT TURNING MOVEMENTS. LEFT-OUT TURNING MOVEMENTS WILL NOT BE PROVIDED DURING THE PHASE 1 CONSTRUCTION. THE CONTRACTOR WILL INFORM THE PROPERTY OWNER, VIA DOOR HANGER, OF ACCESSIBLE ROUTES FOR EASTWARD TRAVEL UTILIZING EXISTING FACILITIES. (ONE ACCESSIBLE ROUTE IS WESTBOUND SH 30 TO F.M. 244 AND F.M. 244 FOLLOWING EXISTING SIGNAGE FOR EASTBOUND SH 30). THIS WILL BE IN PLACE DURING THE PHASE 1 CONSTRUCTION ONLY.

TRAFFIC CONTROL NARRATIVE

THIS PROJECT WILL BE CONSTRUCTED IN (2) PHASES.

PRIOR TO PHASE 1

1. PLACE ADVANCE WARNING SIGNS AS SHOWN ON THE TxDOT BARRICADE AND CONSTRUCTION STANDARDS.

2. PLACE PHASE 1 STORM WATER POLLUTION PREVENTION PLAN DEVICES PRIOR TO BEGINNING PHASE 1 CONSTRUCTION IN ACCORDANCE WITH THE "TEMPORARY SW3P PLAN" SHEETS.

3. MILL THE EXISTING MEDIAN PAVEMENT FROM STATION 229+51 TO STATION 241+90 TO THE DEPTH AND LOCATIONS SPECIFIED ON THE REMOVAL PLANS AND PLACE FINAL 2" OF ASPHALT PAVEMENT TO THE FINISHED GRADE. MAINTAIN EXISTING EASTBOUND AND WESTBOUND TRAFFIC. ASPHALT PAVEMENT WILL BE PLACED THE SAME DAY MILLING OCCURS.

4. SHIFT EASTBOUND TRAFFIC TO THE PREVIOUSLY MILLED AND OVERLAYED MEDIAN UTILIZING TxDOT TCP(2-3)-18 STANDARD. MILL THE REMAINING EXISTING EASTBOUND PAVEMENT FROM STATION 229+51 TO STATION 241+90 TO THE DEPTH AND LOCATIONS SPECIFIED ON THE REMOVAL PLANS AND PLACE FINAL 2" OF ASPHALT PAVEMENT TO THE FINISHED GRADE. ASPHALT PAVEMENT WILL BE PLACED THE SAME DAY MILLING OCCURS.

5. SHIFT WESTBOUND TRAFFIC TO THE PREVIOUSLY MILLED AND OVERLAYED MEDIAN UTILIZING TxDOT TCP(2-3)-18 STANDARD. MILL THE EXISTING WESTBOUND PAVEMENT FROM STATION 235+28 TO STATION 241+90 TO THE DEPTH AND LOCATIONS SPECIFIED ON THE REMOVAL PLANS AND PLACE FINAL 2" OF ASPHALT PAVEMENT TO THE FINISHED GRADE. ASPHALT PAVEMENT WILL BE PLACED THE SAME DAY MILLING OCCURS.

6. PLACE TEMPORARY WORKZONE PAVEMENT MARKINGS AND SIGNAGE IN ACCORDANCE WITH THE PHASE 1 TRAFFIC CONTROL PLANS.

7. FURNISH AND INSTALL PCTB PROVIDING A 1 FOOT MINIMUM OFFSET FROM THE TOE OF RAIL TO EITHER THE WORK ZONE STRIPE OR THE EXISTING STRIPE IN THE AREAS SHOWN ON THE TRAFFIC CONTROL PLANS.

PHASE 1

THE INTENT OF PHASE 1 IS TO SAW CUT AND WIDEN THE WESTBOUND EXISTING PAVEMENT FROM STATION 242+60 TO STATION 245+09 AND STATION 281+60 TO STATION 286+40 AND FULL DEPTH RECONSTRUCT THE LEFT HALF OF THE PROPOSED ROADWAY TO 2" BELOW FINAL GRADE AND BRIDGE FROM STATION 245+09 TO STATION 281+60. PLACE A 4H:1V OR FLATTER ASPHALT SAFETY WEDGE AT EACH BRIDGE APPROACH SLAB TO PROVIDE A SMOOTH TRANSITION. MATERIALS AND LABOR FOR THE ASPHALT SAFETY WEDGE WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR WILL SHIFT ALL EXISTING TRAFFIC ONTO THE EXISTING EASTBOUND HALF OF THE ROADWAY UTILIZING THE EXISTING SHOULDER AS A TRAVEL LANE AND MAINTAINING A MINIMUM SHOULDER WIDTH OF 1'. ACCESS TO EXISTING DRIVEWAYS WILL BE MAINTAINED AND OPEN DURING THIS PHASE AND WILL BE ACHIEVED BY BEGINNING AND ENDING THE PCTB AT THE LOCATIONS SHOWN ON THE TRAFFIC CONTROL PLANS. BARRELS WILL BE UTILIZED IN THE AREAS NOT PROTECTED BY PCTB. THESE AREAS WILL REQUIRE A 4H:1V OR FLATTER SAFETY WEDGE AFTER EACH WORK DAY IS COMPLETE. TEMPORARY SPECIAL SHORING WILL BE USED DURING THIS PHASE TO CONSTRUCT THE EMBANKMENT ON THE WEST SIDE OF THE PROPOSED GIBBONS CREEK BRIDGE AND USED TO EXCAVATE THE EXISTING EMBANKMENT ON THE EAST SIDE OF THE PROPOSED GIBBONS CREEK BRIDGE.

PRIOR TO PHASE 2

1. PLACE ADVANCE WARNING SIGNS AS SHOWN ON THE TxDOT BARRICADE AND CONSTRUCTION STANDARDS.

2. PLACE PHASE 2 STORM WATER POLLUTION PREVENTION PLAN DEVICES PRIOR TO BEGINNING PHASE 2 CONSTRUCTION IN ACCORDANCE WITH THE "SW3P LAYOUT" SHEETS.

3. PLACE TEMPORARY WORKZONE PAVEMENT MARKINGS AND SIGNAGE IN ACCORDANCE WITH THE PHASE 2 TRAFFIC CONTROL PLANS. RAISED PAVEMENT MARKERS WILL BE UTILIZED WITHIN THE CONCRETE LIMITS OF THE CONSTRUCTED BRIDGE.

4. FURNISH AND INSTALL PCTB ACROSS THE PROPOSED GIBBONS CREEK BRIDGE. MOVE PCTB FROM PHASE 1 AND RESET PCTB STARTING AT THE EAST END OF THE PROJECT PROVIDING A 1 FOOT MINIMUM OFFSET FROM THE TOE OF RAIL TO THE WORK ZONE STRIPE OR RAISED PAVEMENT MARKER IN THE AREAS SHOWN ON THE TRAFFIC CONTROL PLANS UNDER ONE-WAY TRAFFIC CONTROL. UTILIZE TXDOT TCP(2-2)-18 WITH FLAGGERS DURING OFF-PEAK WEEKEND NIGHTTIME WORKING HOURS TO MOVE AND RESET THE PCTB. IF THE ENTIRE LENGTH OF PHASE 1 PCTB AND ATTENUATORS CAN NOT BE MOVED AND RESET IN ONE NIGHT, MOVE PHASE 1 ATTENUATOR AT STATION 287+81 AND RESET THE ATTENUATOR AT STATION 273+11. ONCE ATTENUATOR IS RESET AND ROADWAY IS CLEAR OF ALL OBSTRUCTIONS AND CONSTRUCTION VEHICLES, OPEN ROADWAY BACK TO TWO WAY TRAFFIC DURING NON WORKING HOURS. ALL PHASE 2 PCTB MUST BE MOVED AND RESET PRIOR TO BEGINNING PHASE 2 CONSTRUCTION AND SHIFTING TRAFFIC.

PHASE 2

THE INTENT OF PHASE 2 IS TO SAW CUT AND WIDEN THE EASTBOUND EXISTING PAVEMENT FROM STATION 242+60 TO STATION 245+09 AND STATION 281+60 TO STATION 286+40 AND FULL DEPTH RECONSTRUCT THE RIGHT HALF OF THE PROPOSED ROADWAY TO 2" BELOW FINAL GRADE AND BRIDGE FROM STATION 245+09 TO STATION 281+60. PLACE A 4H:1V OR FLATTER ASPHALT SAFETY WEDGE AT EACH BRIDGE APPROACH SLAB TO PROVIDE A SMOOTH TRANSITION. MATERIALS AND LABOR FOR THE ASPHALT SAFETY WEDGE WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR WILL SHIFT ALL EXISTING TRAFFIC ONTO THE PREVIOUSLY CONSTRUCTED PROPOSED HALF OF THE ROADWAY. ACCESS TO EXISTING DRIVEWAYS WILL BE MAINTAINED AND OPEN DURING THIS PHASE AND WILL BE ACHIEVED BY BEGINNING AND ENDING THE PCTB AT THE LOCATIONS SHOWN ON THE TRAFFIC CONTROL PLANS. BARRELS WILL BE UTILIZED IN THE AREAS NOT PROTECTED BY PCTB. THESE AREAS WILL REQUIRE A 4H:1V OR FLATTER SAFETY WEDGE AFTER EACH WORK DAY IS COMPLETE.

ONCE ALL OF THE CONSTRUCTION IS COMPLETE, MILL THE EXISTING PAVEMENT FROM STATION 241+90 TO STATION 245+09 AND STATION 281+60 TO STATION 286+40 TO THE DEPTH SPECIFIED ON THE REMOVAL PLANS. PLACE FINAL 2" OF ASPHALT PAVEMENT TO THE FINISHED GRADE UTILIZING APPLICABLE TxDOT TRAFFIC CONTROL PLAN STANDARDS. PLACE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS IN THE LOCATIONS WHERE PROPOSED FINAL STRIPING WILL BE LAID. MARKER TABS WILL MATCH THE COLOR OF THE FINAL STRIPE.

ONCE FINAL ASPHALT PAVEMENT IS COMPLETE, PLACE THE FINAL PROPOSED SIGNING, PAVEMENT MARKINGS, AND RUMBLE STRIPS UTILIZING TxDOT TRAFFIC CONTROL PLAN MOBILE OPERATIONS STANDARD IN ACCORDANCE WITH THE SIGNING AND PAVEMENT MARKING LAYOUT. REMOVE ANY TEMPORARY STORM WATER POLLUTION PREVENTION DEVICES AND PLACE FINAL PERMANENT SEEDING.

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Texas Department of Transportation

TRAFFIC CONTROL PLAN NARRATIVE

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	13
CONTROL	SECTION	JOB	
0212	04	039	

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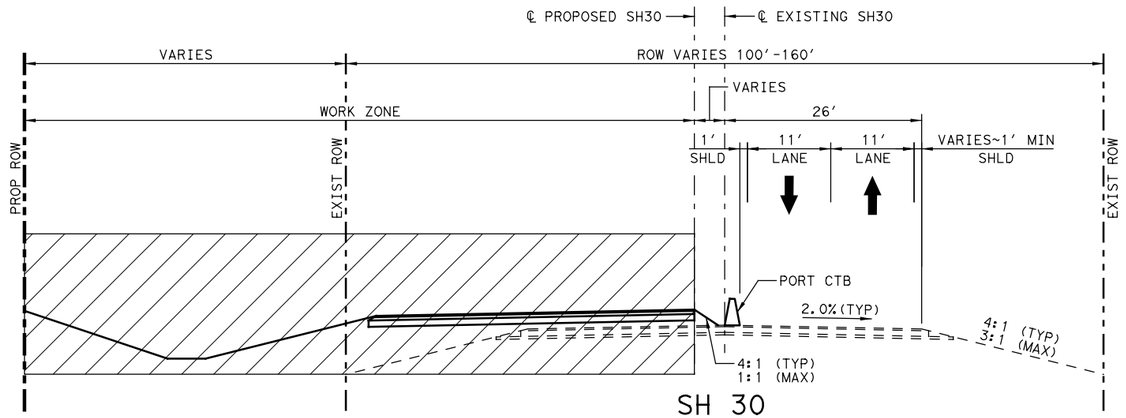
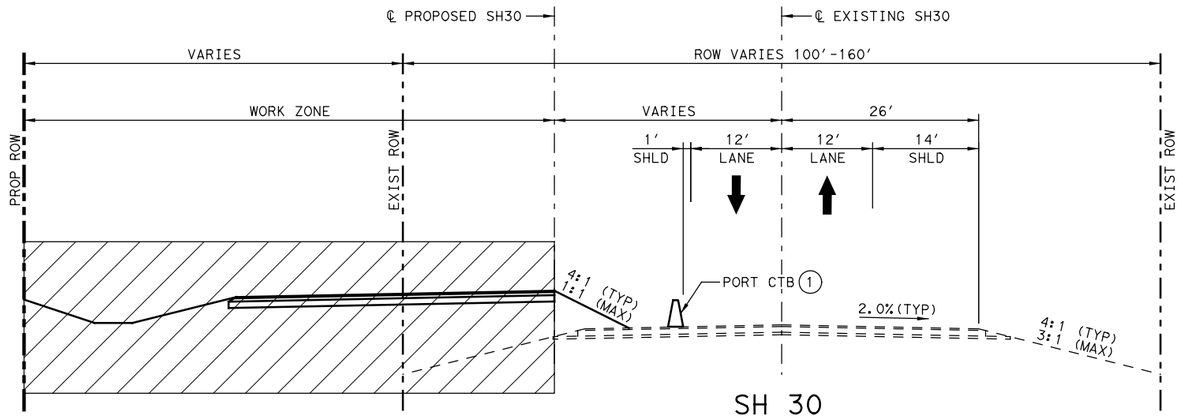


SH 30
PHASE 1 TYPICAL SECTION

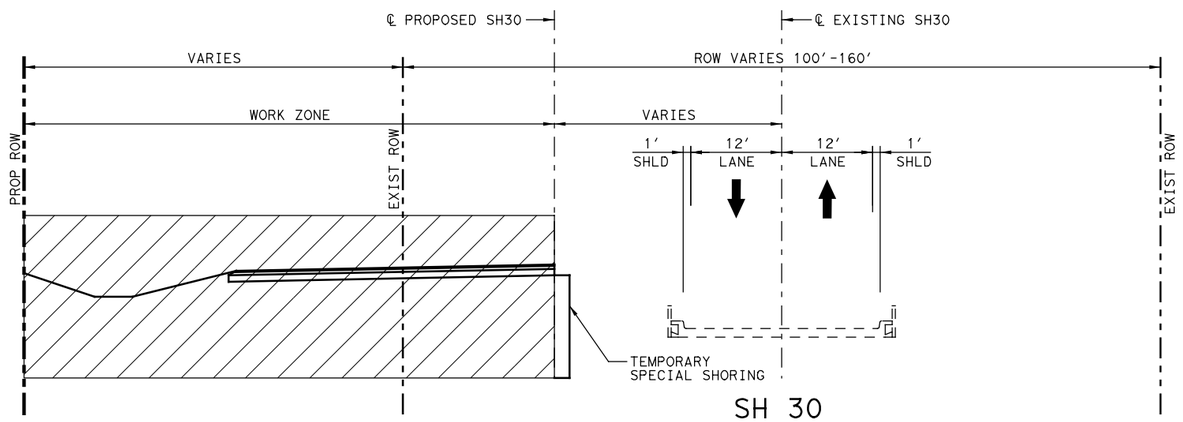
BEGIN TO STA 253+43
STA 272+38 TO END



SH 30
PHASE 1 TYPICAL SECTION

STA 253+43 TO STA 265+00

(1) PORT CTB ENDS AT STA 262+30.
EXISTING MBGF WILL REMAIN IN PLACE
DURING THIS PHASE.



SH 30
PHASE 1 TYPICAL SECTION

STA 265+00 TO STA 266+57.25

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TRAFFIC CONTROL PLAN
TYPICAL SECTIONS
PHASE 1

NOT TO SCALE — SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	14
CONTROL	SECTION	JOB	
0212	04	039	

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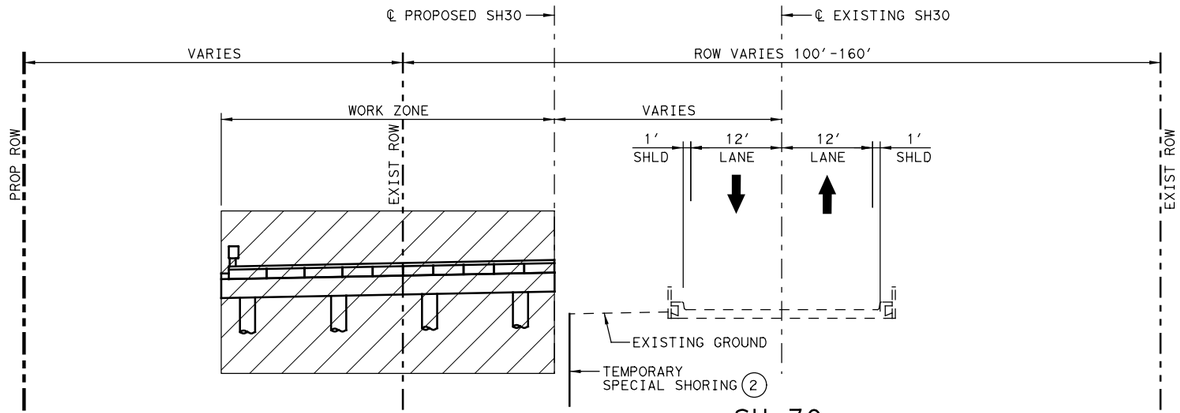
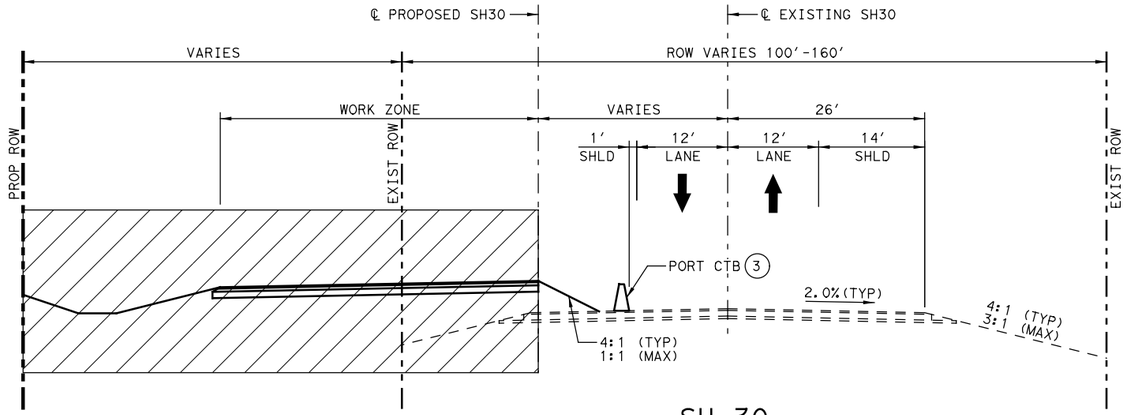


SH 30
PHASE 1 TYPICAL SECTION

STA 266+57.25 TO STA 272+06

(2) TEMPORARY SPECIAL SHORING BEGINS AT STA 270+19.



SH 30
PHASE 1 TYPICAL SECTION

STA 272+06 TO STA 272+38

(3) 87.5′ OF EXISTING MBGF WILL REMAIN IN PLACE DURING THIS PHASE AND TERMINATE BEHIND THE ATTENUATOR. PORT CTB BEGINS AT STA 271+61.

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TRAFFIC CONTROL PLAN TYPICAL SECTIONS
PHASE 1

NOT TO SCALE — SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	15
CONTROL	SECTION	JOB	
0212	04	039	

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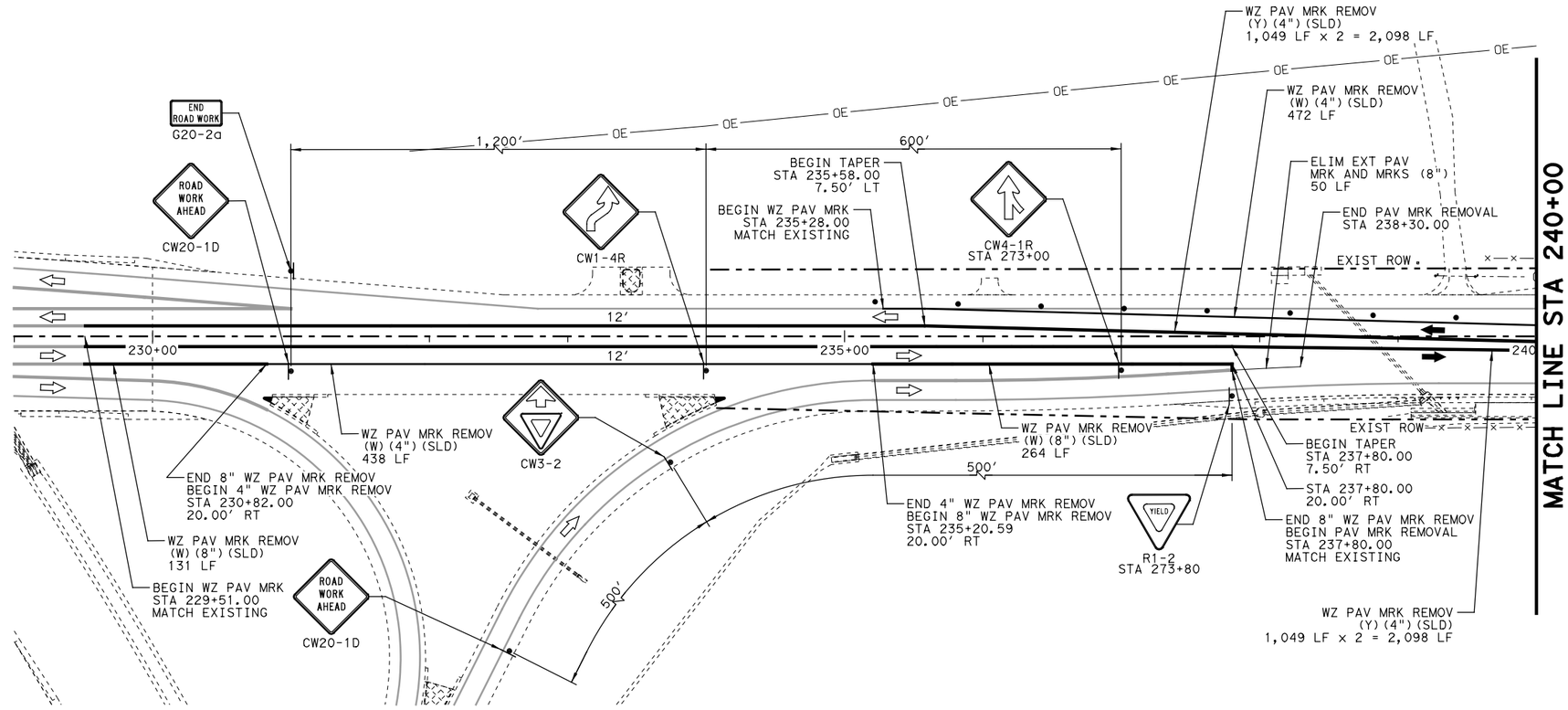

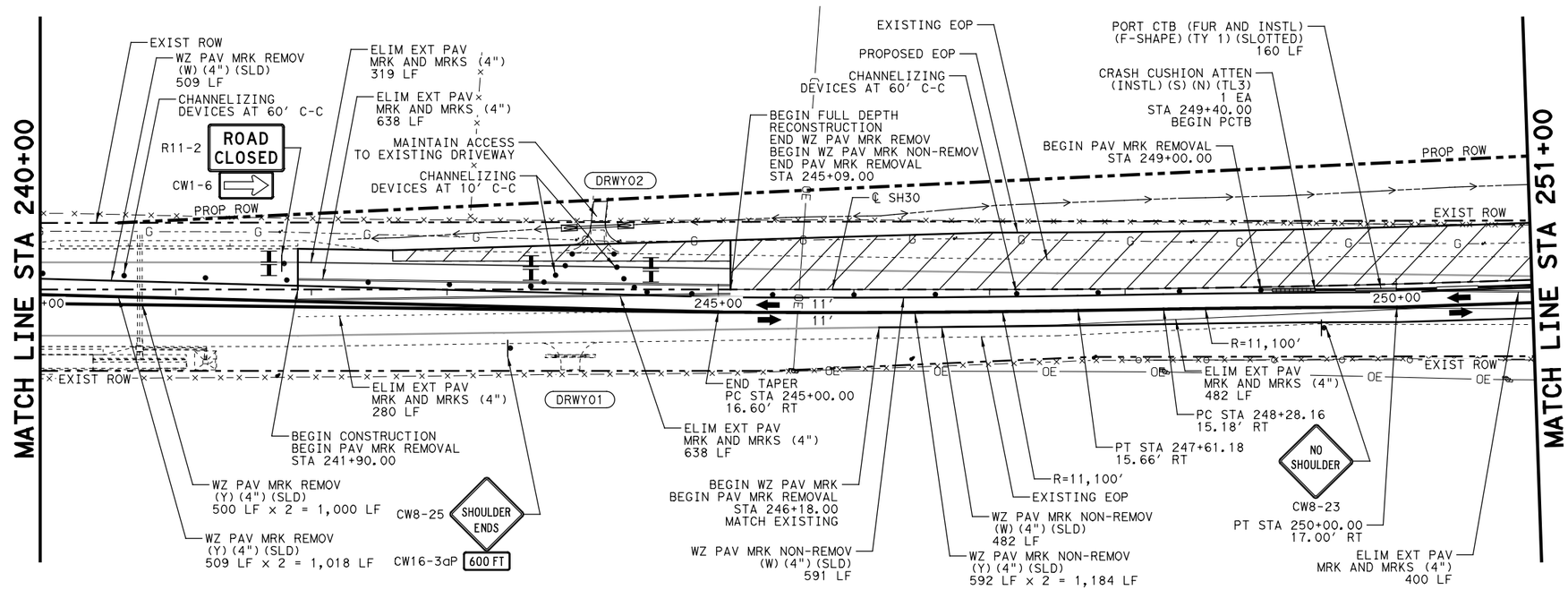

LEGEND

- CONSTRUCTION AREA (THIS PHASE)
- EXISTING PAVEMENT MARKINGS
- TCP PAVEMENT MARKINGS (THIS PHASE)
- PORTABLE CONCRETE BARRIER (FUR AND INSTL THIS PHASE)
- PORTABLE CONCRETE BARRIER (MOVE FROM PREVIOUS PHASE)
- TEMPORARY SPECIAL SHORING
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- ATTENUATOR (NARROW) (INSTL THIS PHASE)
- ATTENUATOR (NARROW) (MOVE AND RESET FROM PREVIOUS PHASE)
- CHANNELIZATION DEVICES
- TYPE III BARRICADE
- PROPOSED TEMPORARY SIGN
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR HORIZONTAL ALIGNMENT INFORMATION.
2. STANDARD OFFSET FROM THE NOMINAL FACE OF THE BARRIER TO THE EDGE OF STRIPE IS 1 FOOT UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET

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TRAFFIC CONTROL PLAN
PHASE 1
BEGIN TO STA 251+00

SCALE: 1"=100′ SHEET 1 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	16
CONTROL	SECTION	JOB	
0212	04	039	

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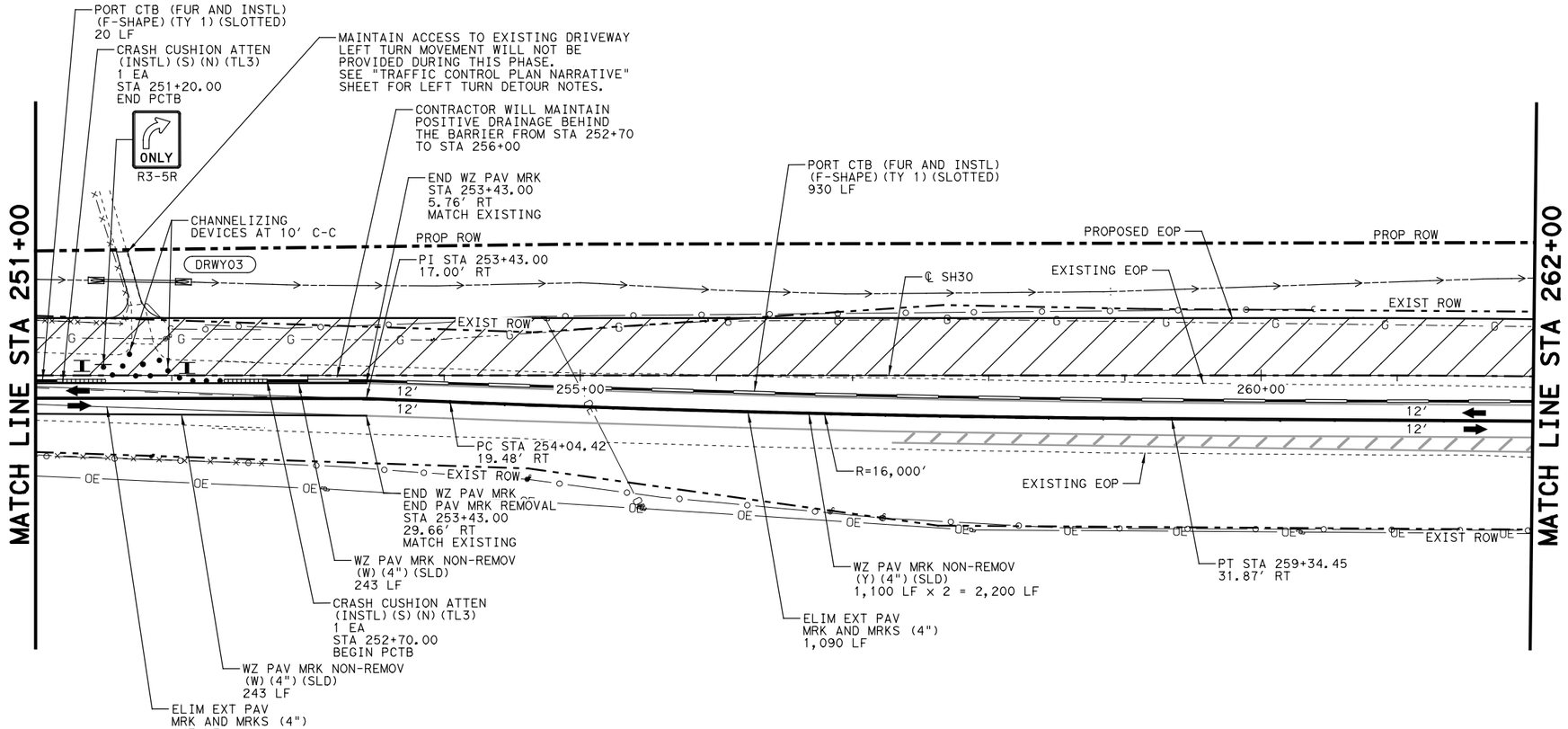

NOTES:

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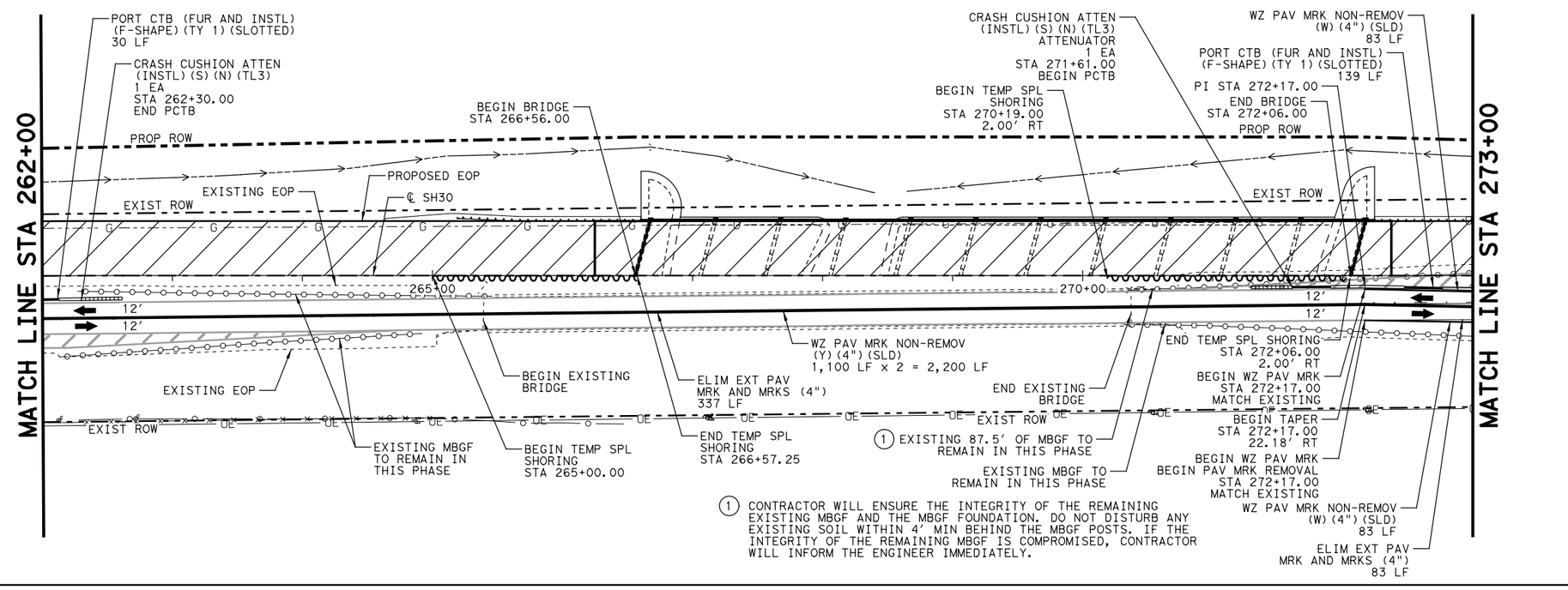

(1) CONTRACTOR WILL ENSURE THE INTEGRITY OF THE REMAINING EXISTING MBGF AND THE MBGF FOUNDATION. DO NOT DISTURB ANY EXISTING SOIL WITHIN 4' MIN BEHIND THE MBGF POSTS. IF THE INTEGRITY OF THE REMAINING MBGF IS COMPROMISED, CONTRACTOR WILL INFORM THE ENGINEER IMMEDIATELY.

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TRAFFIC CONTROL PLAN PHASE 1
STA 251+00 TO STA 273+00

SCALE: 1"=100' SHEET 2 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	17
CONTROL	SECTION	JOB	
0212	04	039	

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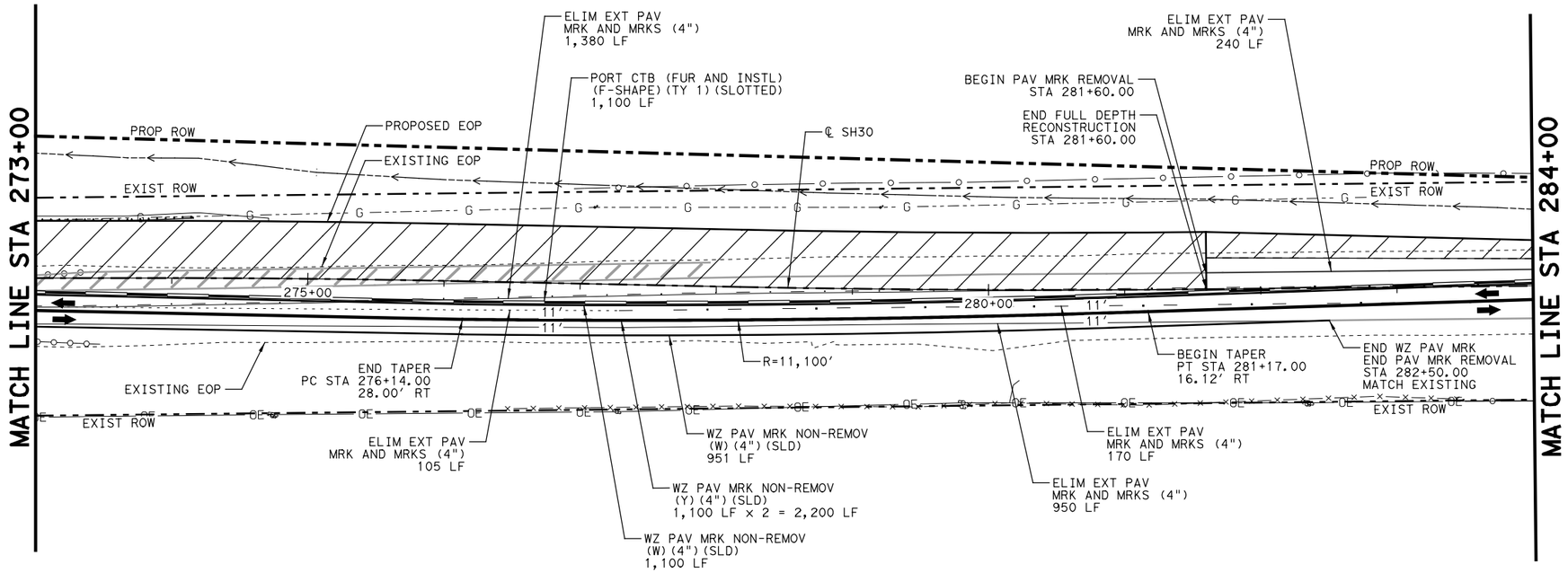

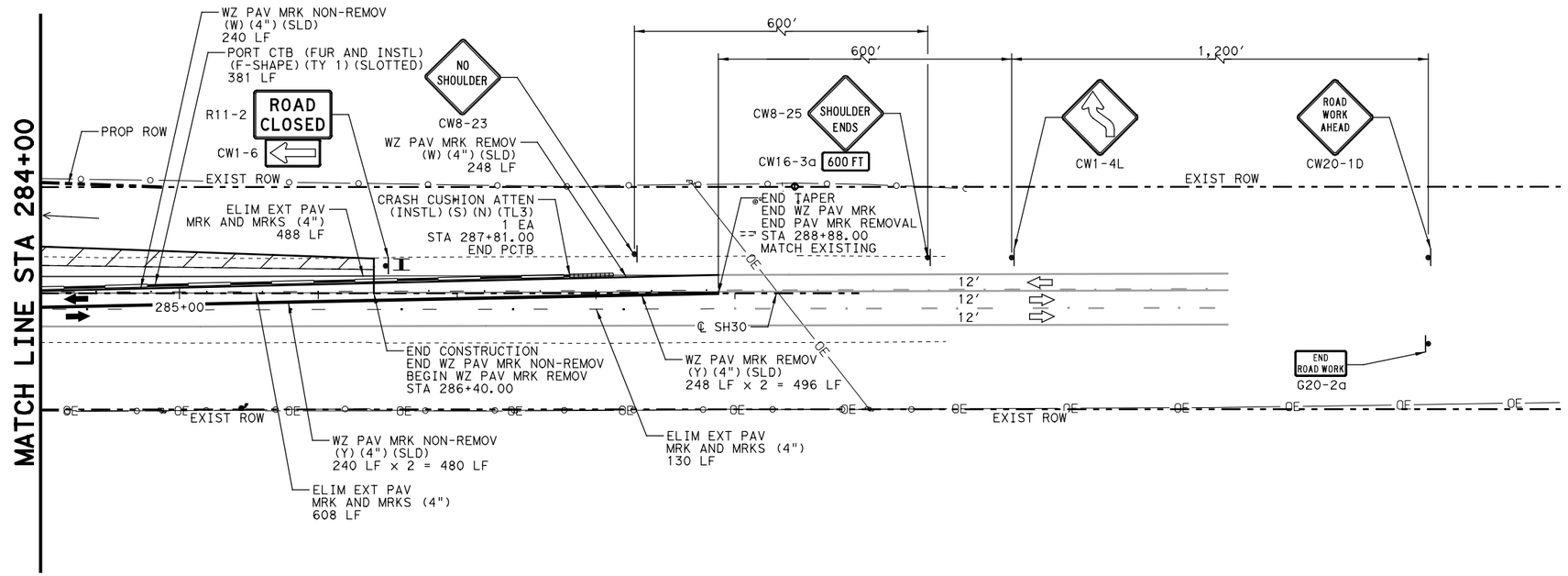

N

LEGEND

- CONSTRUCTION AREA (THIS PHASE)
- EXISTING PAVEMENT MARKINGS
- TCP PAVEMENT MARKINGS (THIS PHASE)
- PORTABLE CONCRETE BARRIER (FUR AND INSTL THIS PHASE)
- PORTABLE CONCRETE BARRIER (MOVE FROM PREVIOUS PHASE)
- TEMPORARY SPECIAL SHORING
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- ATTENUATOR (NARROW) (INSTL THIS PHASE)
- ATTENUATOR (NARROW) (MOVE AND RESET FROM PREVIOUS PHASE)
- CHANNELIZATION DEVICES
- TYPE III BARRICADE
- PROPOSED TEMPORARY SIGN
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR HORIZONTAL ALIGNMENT INFORMATION.
2. STANDARD OFFSET FROM THE NOMINAL FACE OF THE BARRIER TO THE EDGE OF STRIPE IS 1 FOOT UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET

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TRAFFIC CONTROL PLAN PHASE 1
STA 273+00 TO END

SCALE: 1"=100′ SHEET 3 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	18
CONTROL	SECTION	JOB	
0212	04	039	

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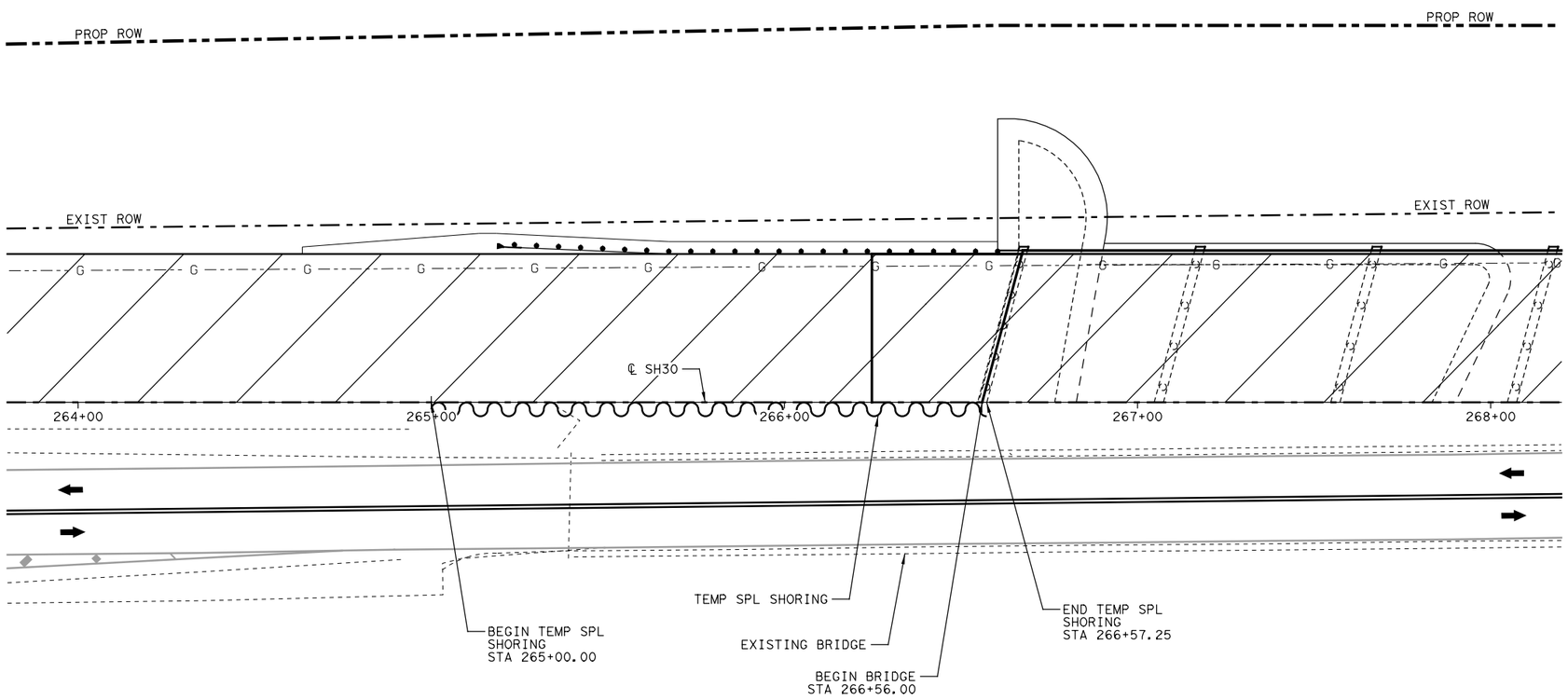
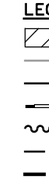
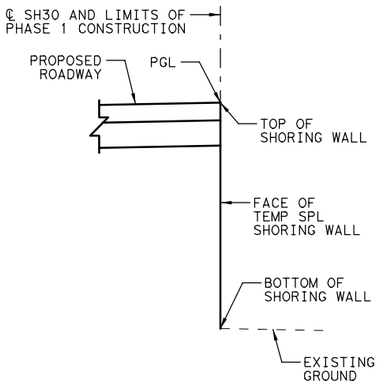


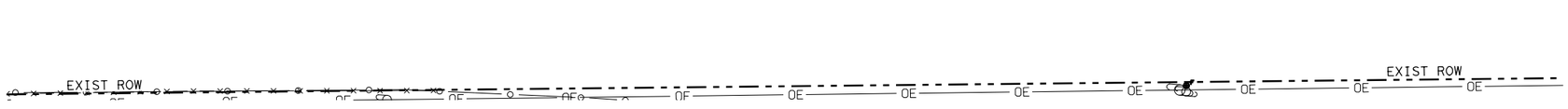


LEGEND

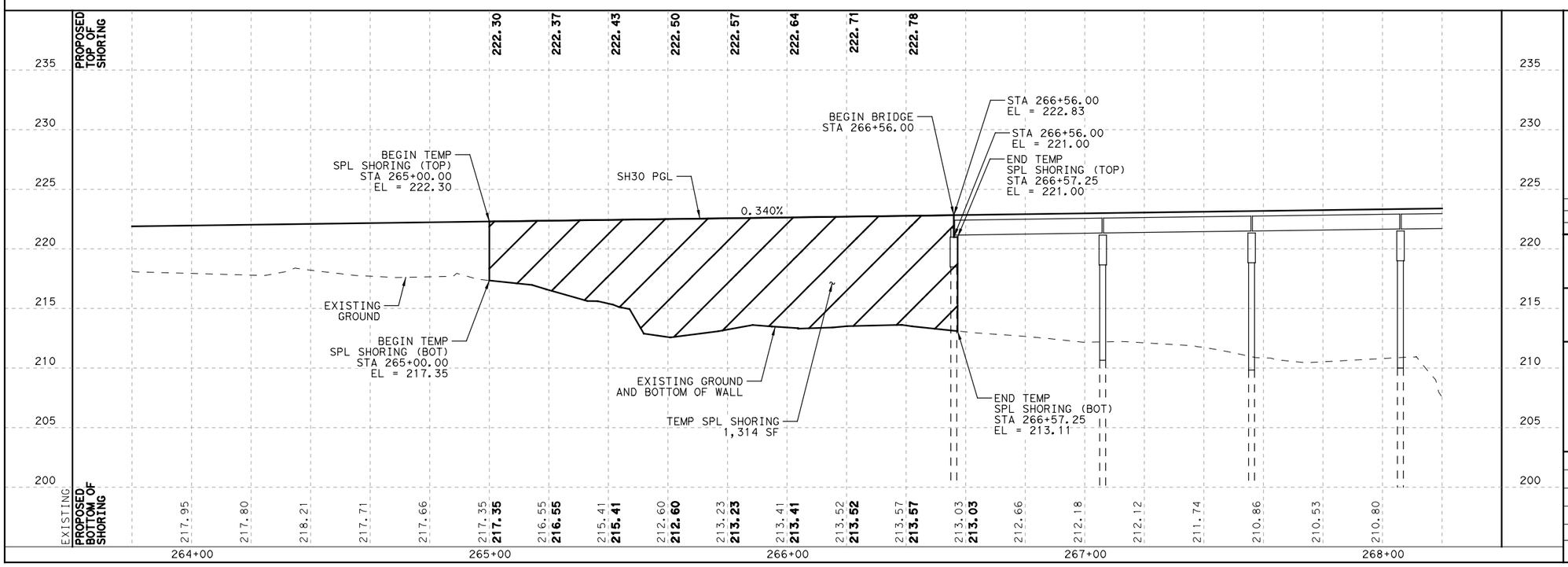
- CONSTRUCTION AREA (THIS PHASE)
- EXISTING PAVEMENT MARKINGS
- TCP PAVEMENT MARKINGS (THIS PHASE)
- PORTABLE CONCRETE BARRIER
- TEMPORARY SPECIAL SHORING
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- ATTENUATOR (NARROW)
- PROPOSED TRAFFIC FLOW



TEMPORARY SPECIAL SHORING TYPICAL SECTION



H: 0 20 40 60 80
V: 0 5 10 15 20
SCALE IN FEET



STATE OF TEXAS
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122057
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PROFESSIONAL ENGINEER

08/17/2018

Jacob E. Walker, PE

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Texas Department of Transportation

TEMPORARY SPECIAL SHORING LAYOUT

SCALE: 1"=40'-H
1"=4'-V

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	19
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
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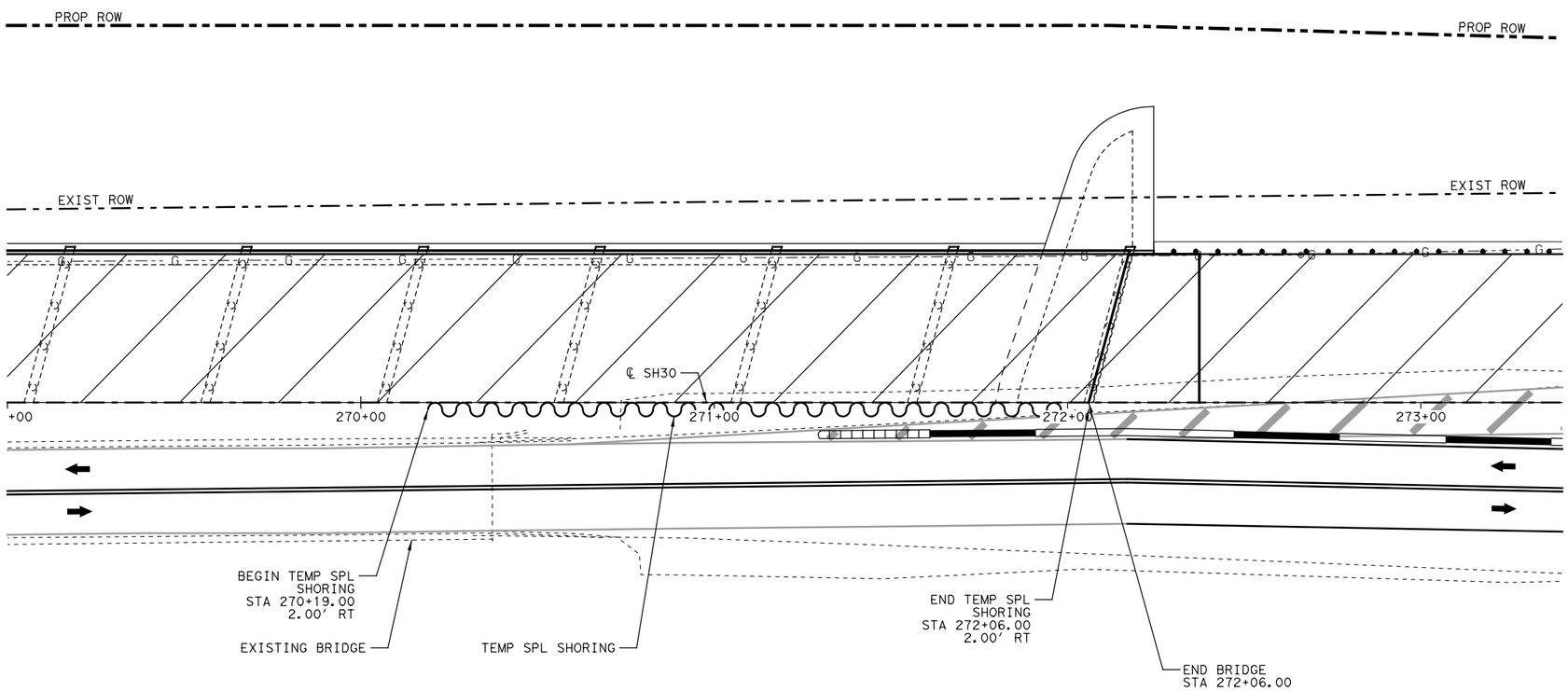
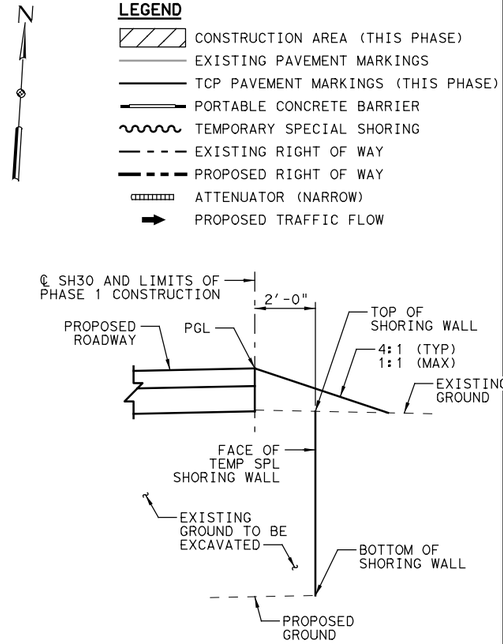
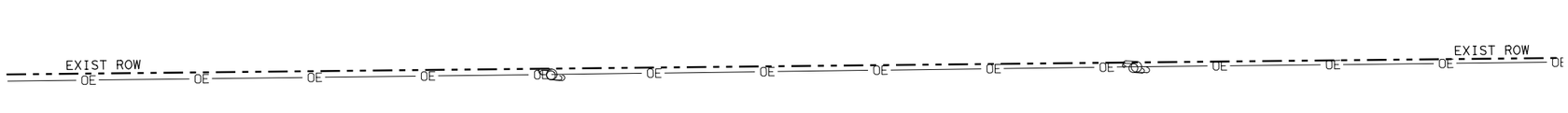
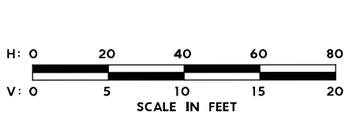
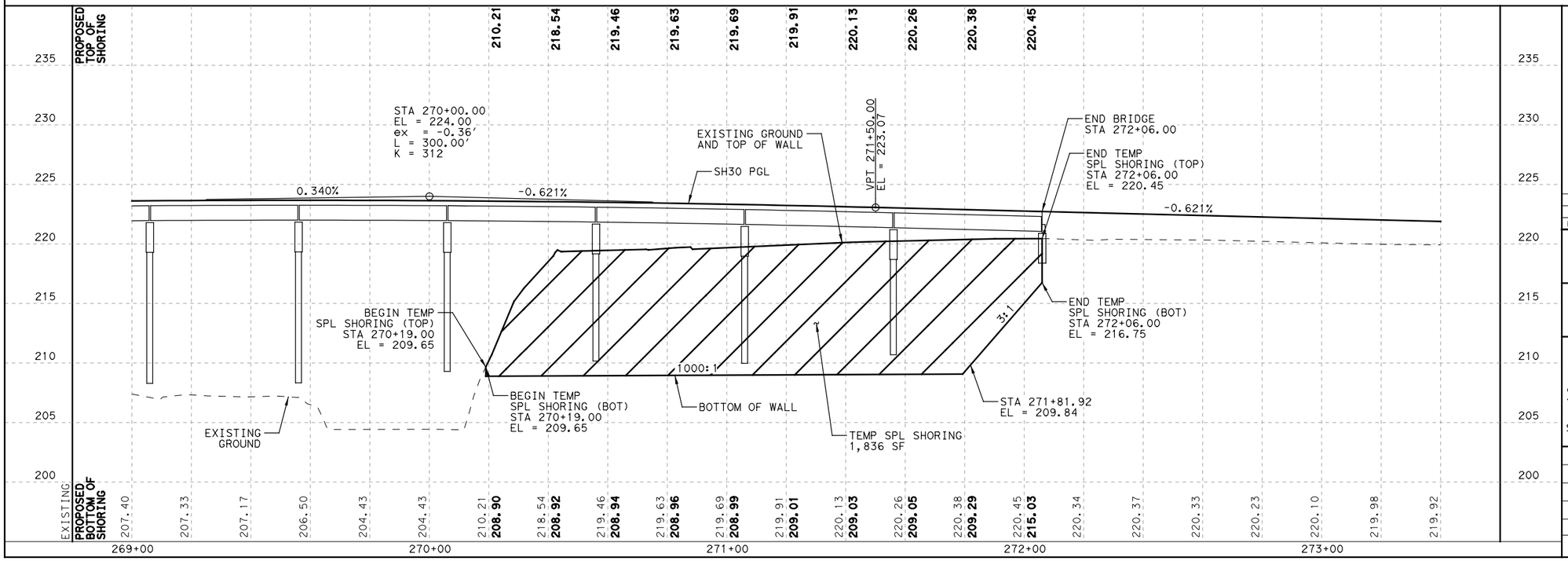




TEMPORARY SPECIAL SHORING TYPICAL SECTION







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USER: KBERGER DATE: 8/17/2018
FILE: SH30SHOR02.dgn
PENTABLE: I0069736.tbl
TIME: 3:35:33 PM SCALE: 1:40

STATE OF TEXAS
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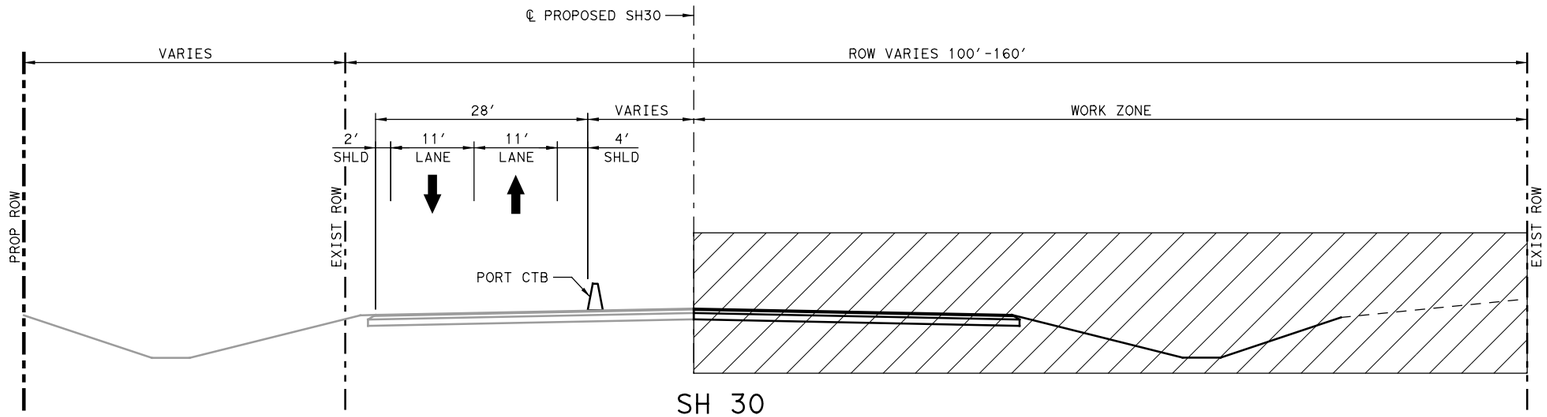
TEMPORARY SPECIAL SHORING LAYOUT

SCALE: 1"=40'-H
1"=4'-V

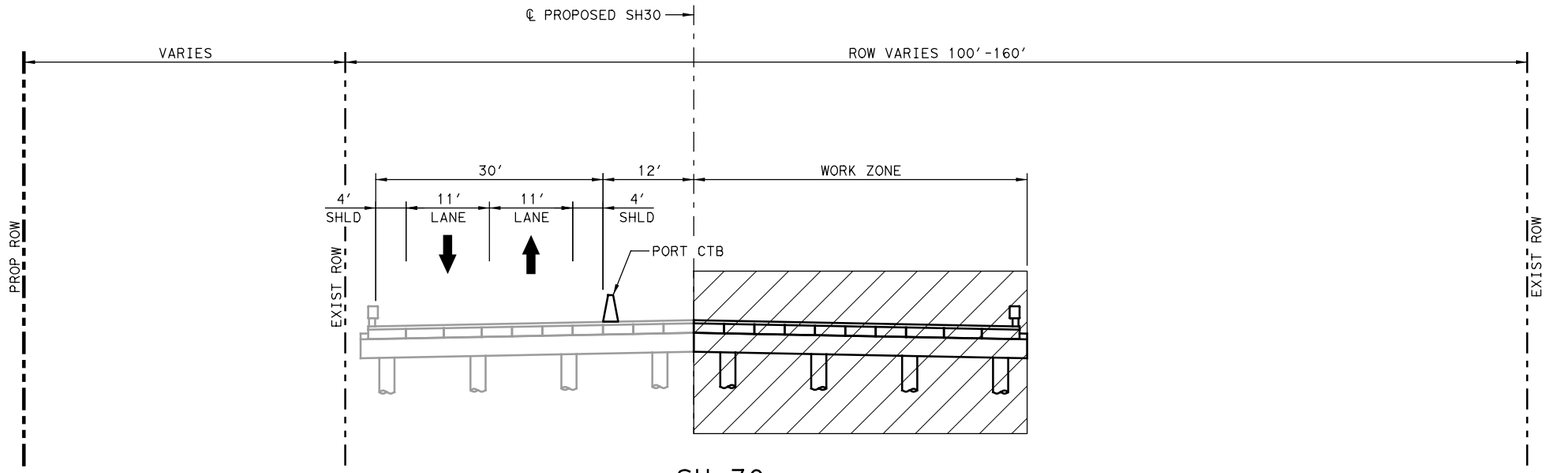
SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	20
CONTROL	SECTION	JOB	
0212	04	039	



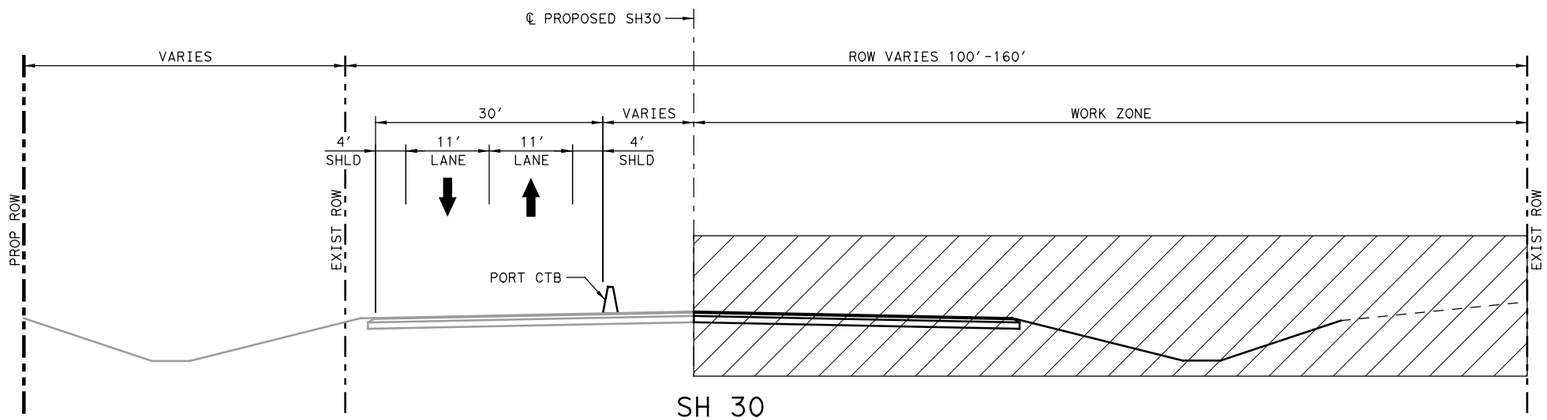
SH 30
PHASE 2 TYPICAL SECTION

BEGIN TO STA 266+56



SH 30
PHASE 2 TYPICAL SECTION

STA 266+56 TO STA 272+06



SH 30
PHASE 2 TYPICAL SECTION

STA 272+06 TO END

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TRAFFIC CONTROL PLAN TYPICAL SECTIONS
PHASE 2

NOT TO SCALE — SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	21
CONTROL	SECTION	JOB	
0212	04	039	

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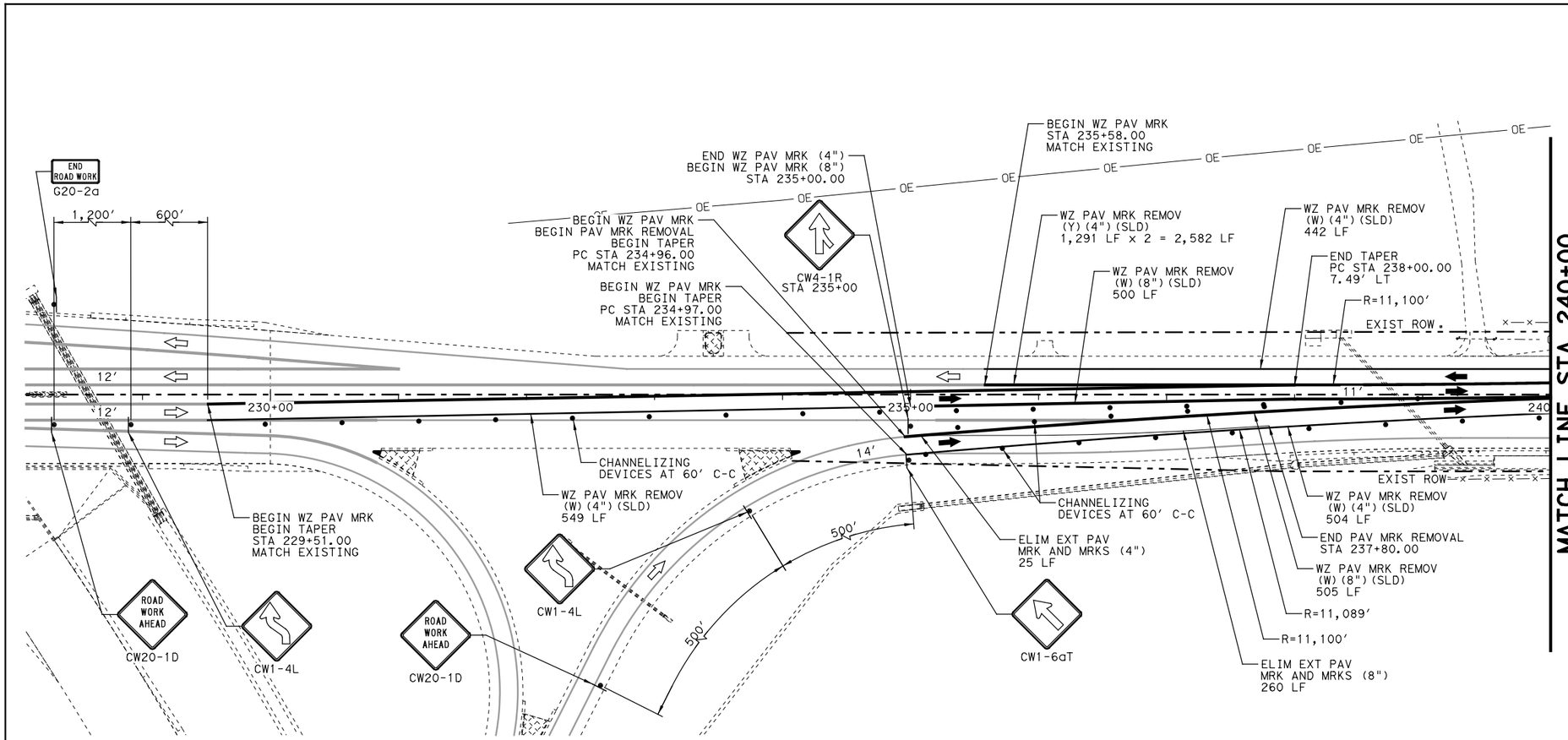

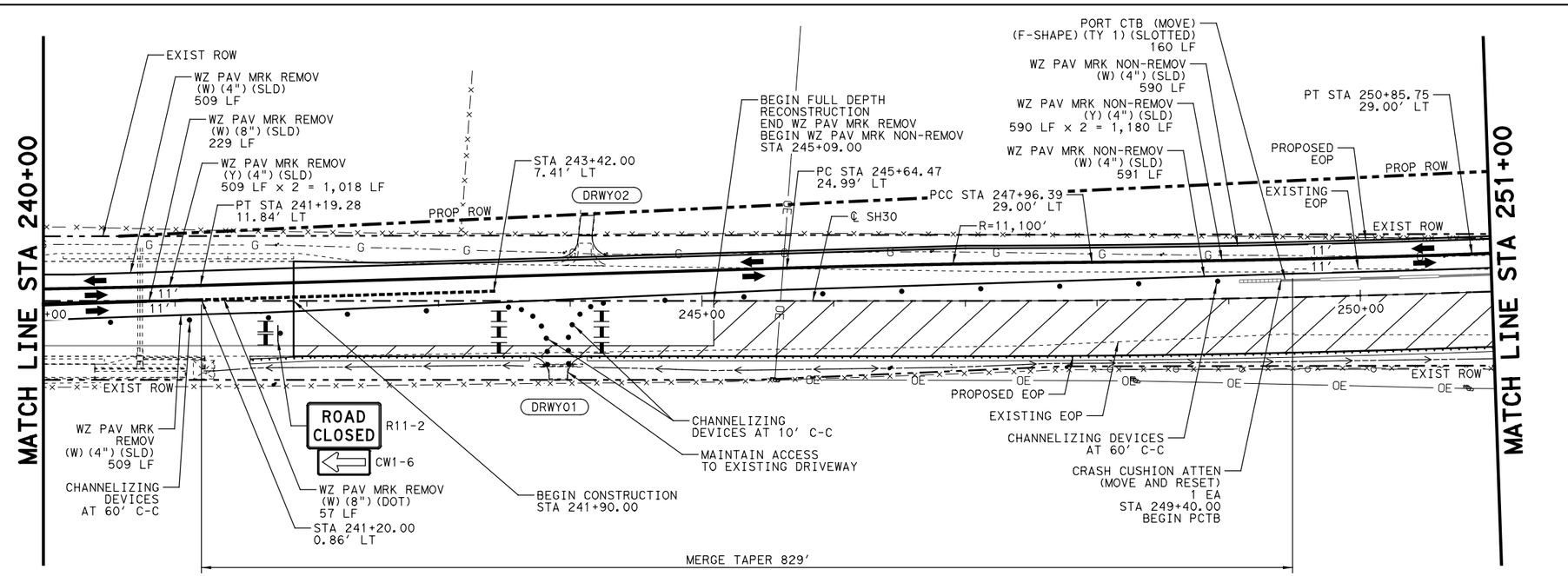

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TRAFFIC CONTROL PLAN PHASE 2
BEGIN TO STA 251+00

SCALE: 1"=100′ SHEET 1 OF 3

FED. RD. DIV. NO.	FEDERAL PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	SH30

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	22

CONTROL	SECTION	JOB
0212	04	039

PLOT DRIVER: TXDOT_PDF_BW.pltcfg TIME: 10:33:57 AM SCALE: 1:100
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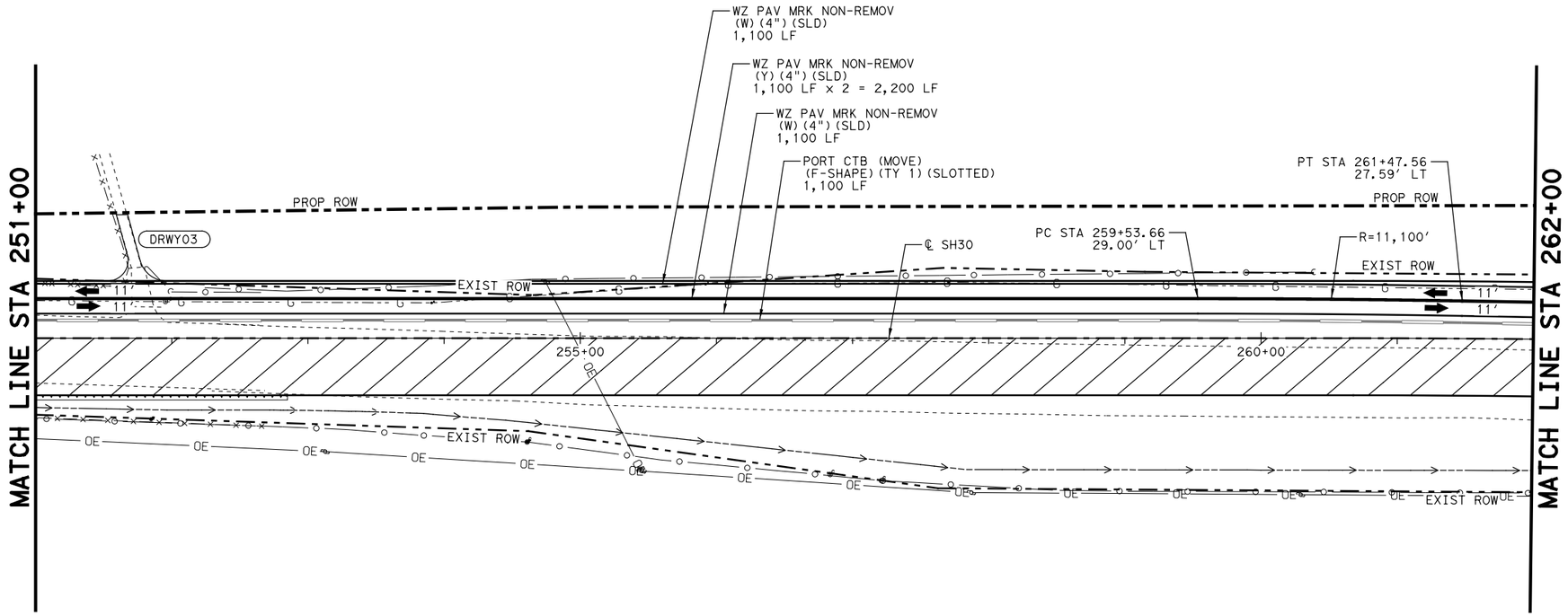

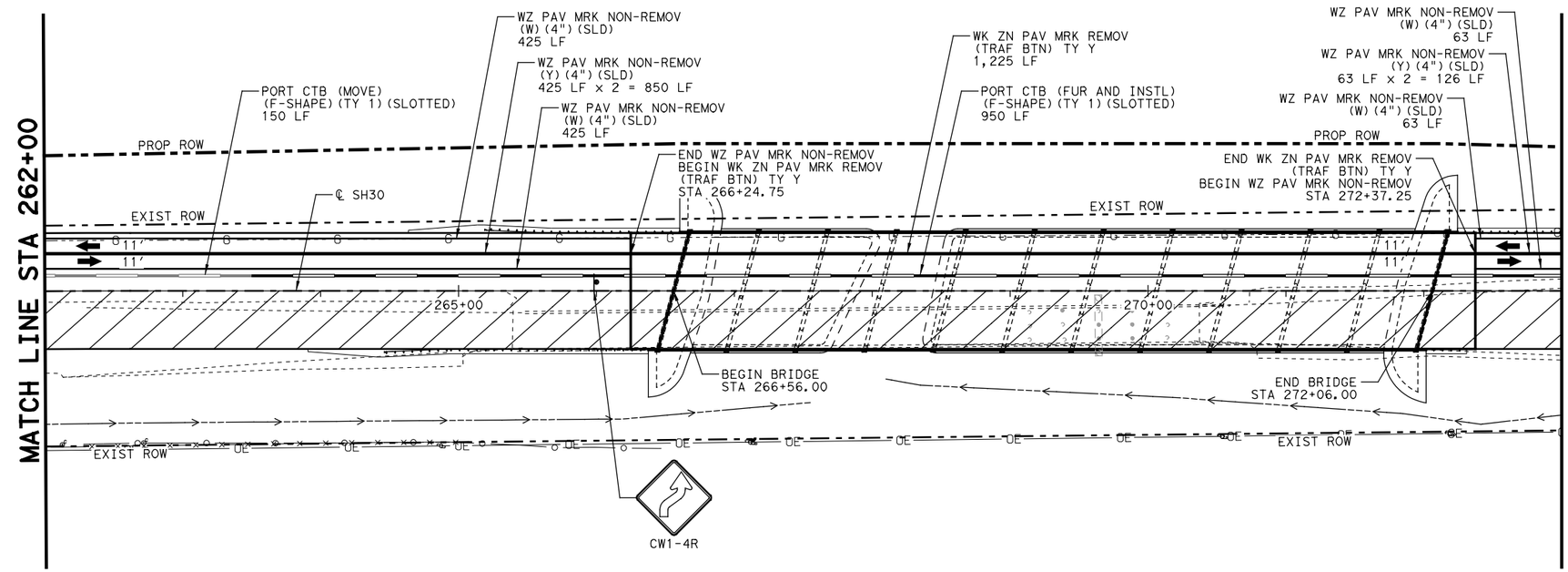

LEGEND

- CONSTRUCTION AREA (THIS PHASE)
- EXISTING PAVEMENT MARKINGS
- TCP PAVEMENT MARKINGS (THIS PHASE)
- PORTABLE CONCRETE BARRIER (FUR AND INSTL THIS PHASE)
- PORTABLE CONCRETE BARRIER (MOVE FROM PREVIOUS PHASE)
- TEMPORARY SPECIAL SHORING
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- ATTENUATOR (NARROW) (INSTL THIS PHASE)
- ATTENUATOR (NARROW) (MOVE AND RESET FROM PREVIOUS PHASE)
- CHANNELIZATION DEVICES
- TYPE III BARRICADE
- PROPOSED TEMPORARY SIGN
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR HORIZONTAL ALIGNMENT INFORMATION.
2. STANDARD OFFSET FROM THE NOMINAL FACE OF THE BARRIER TO THE EDGE OF STRIPE IS 1 FOOT UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
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LICENSED
PROFESSIONAL ENGINEER
08/17/2018

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TRAFFIC CONTROL PLAN PHASE 2
STA 251+00 TO STA 273+00

SCALE: 1"=100' SHEET 2 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	23
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
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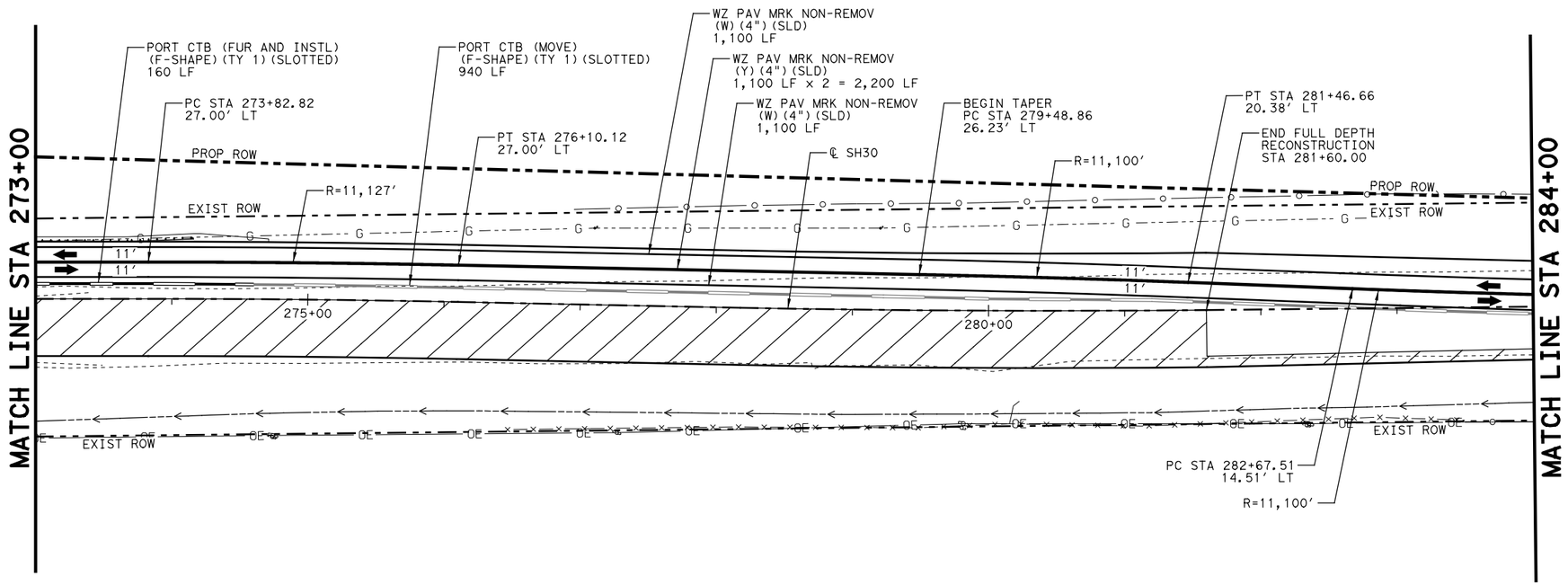
FILE: SH30TCP202.dgn



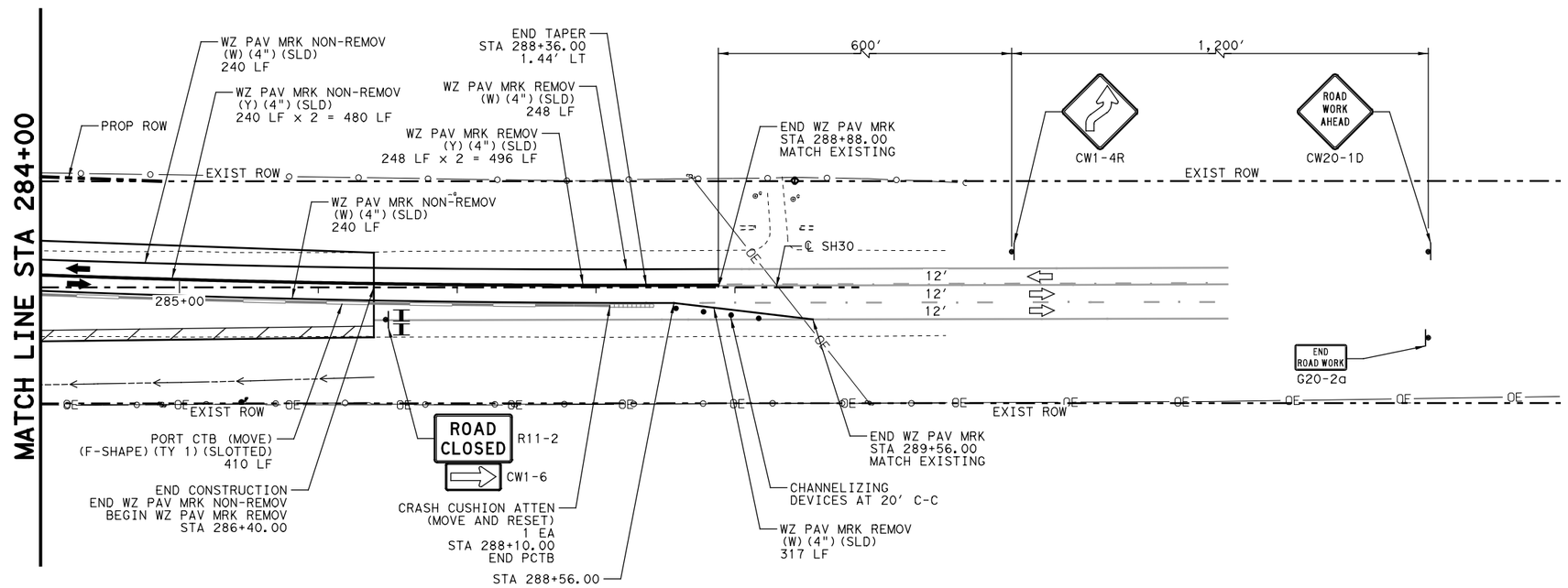
LEGEND

- CONSTRUCTION AREA (THIS PHASE)
- EXISTING PAVEMENT MARKINGS
- TCP PAVEMENT MARKINGS (THIS PHASE)
- PORTABLE CONCRETE BARRIER (FUR AND INSTL THIS PHASE)
- PORTABLE CONCRETE BARRIER (MOVE FROM PREVIOUS PHASE)
- TEMPORARY SPECIAL SHORING
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- ATTENUATOR (NARROW) (INSTL THIS PHASE)
- ATTENUATOR (NARROW) (MOVE AND RESET FROM PREVIOUS PHASE)
- CHANNELIZATION DEVICES
- TYPE III BARRICADE
- PROPOSED TEMPORARY SIGN
- PROPOSED TRAFFIC FLOW
- EXISTING TRAFFIC FLOW

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR HORIZONTAL ALIGNMENT INFORMATION.
2. STANDARD OFFSET FROM THE NOMINAL FACE OF THE BARRIER TO THE EDGE OF STRIPE IS 1 FOOT UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET



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08/17/2018

NO.	DATE	REVISION	APPROVED

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TRAFFIC CONTROL PLAN PHASE 2
STA 273+00 TO END

SCALE: 1"=100' SHEET 3 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	24
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
USER: KBERGER DATE: 8/17/2018 TIME: 10:34:11 AM SCALE: 1:100
FILE: SH30TCP203.dgn

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LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC.#	N	W	N	W	N	W
1	PHASE 1	16	SH 30	249+40	3	UNI	N/A	N/A	CONCRETE SAFETY BARRIER	24"	32"	40′	X								X	
2	PHASE 1	17	SH 30	251+20	3	UNI	N/A	N/A	CONCRETE SAFETY BARRIER	24"	32"	40′	X	X							X	
3	PHASE 1	17	SH 30	252+70	3	UNI	N/A	N/A	CONCRETE SAFETY BARRIER	24"	32"	40′	X	X							X	
4	PHASE 1	17	SH 30	262+30	3	UNI	N/A	N/A	CONCRETE SAFETY BARRIER	24"	32"	40′	X	X							X	
5	PHASE 1	17	SH 30	271+61	3	UNI	N/A	N/A	CONCRETE SAFETY BARRIER	24"	32"	40′	X	X							X	
6	PHASE 1	18	SH 30	287+81	3	UNI	N/A	N/A	CONCRETE SAFETY BARRIER	24"	32"	40′	X								X	
7	PHASE 1	13	SH 30	273+11	3	UNI	N/A	N/A	CONCRETE SAFETY BARRIER	24"	32"	40′			X	6					X	
8	PHASE 2	22	SH 30	249+40	3	UNI	N/A	N/A	CONCRETE SAFETY BARRIER	24"	32"	40′		X	X	1					X	
9	PHASE 2	24	SH 30	288+10	3	UNI	N/A	N/A	CONCRETE SAFETY BARRIER	24"	32"	40′		X	X	7					X	
												TOTALS	6	6	3							

LEGEND:
L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
W=WIDE

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwylse.htm

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CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH30
	DIST	COUNTY		
	BRY	GRIMES		
	FEDERAL AID PROJECT			SHEET NO.
	SEE TITLE SHEET			25

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

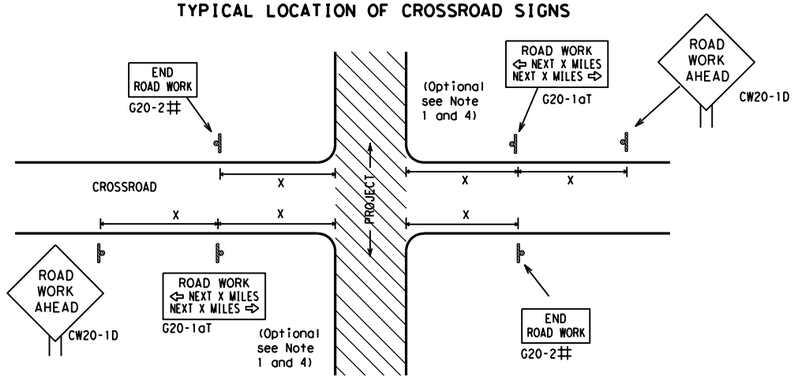
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	BRY	GRIMES		26
5-10 5-21				

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

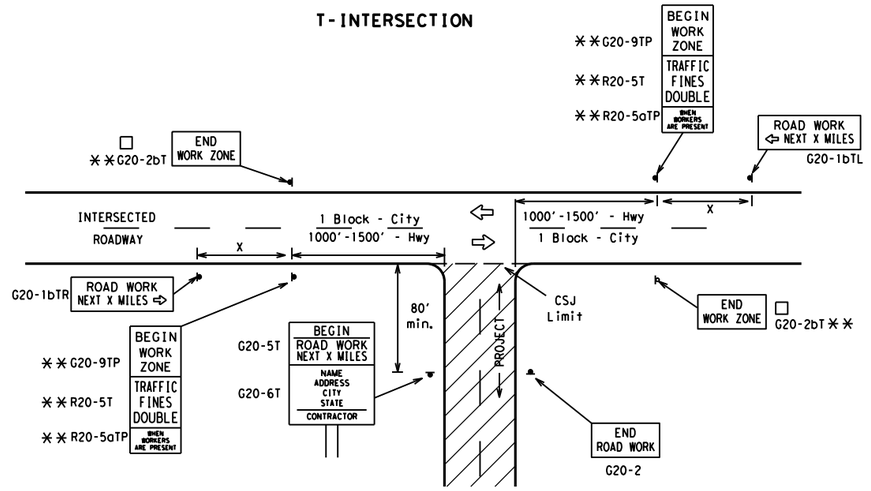
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

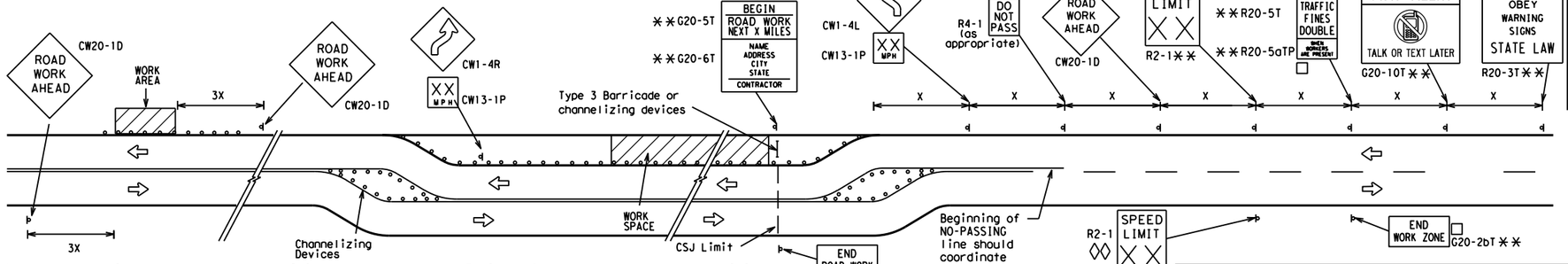
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

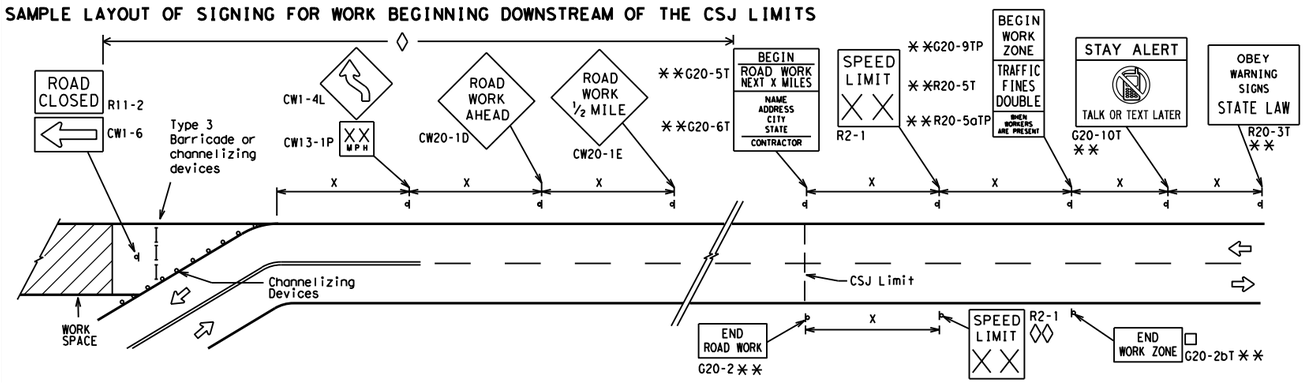
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRY	GRIMES		27

DATE: $DATE$ $TIME$
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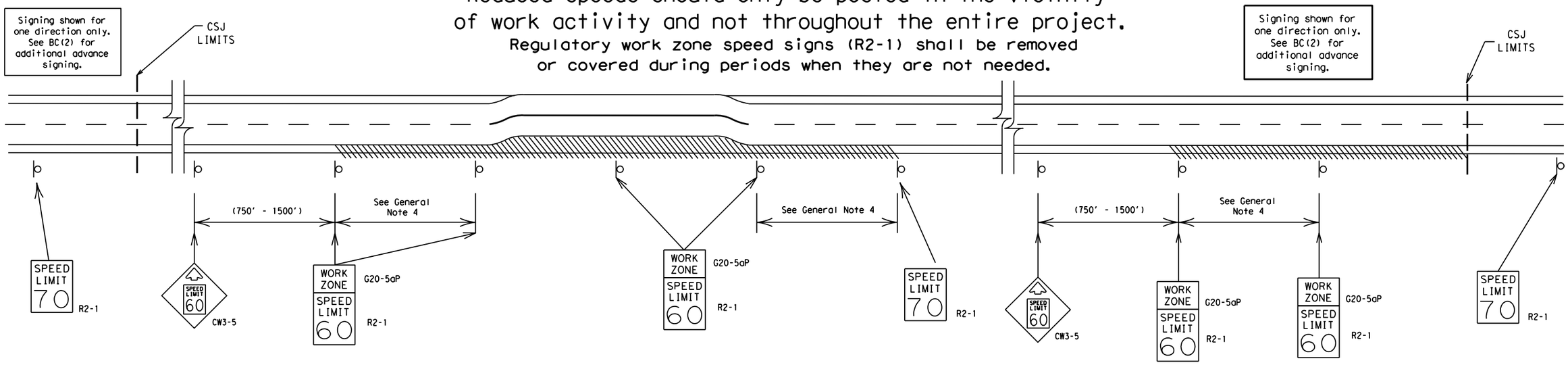
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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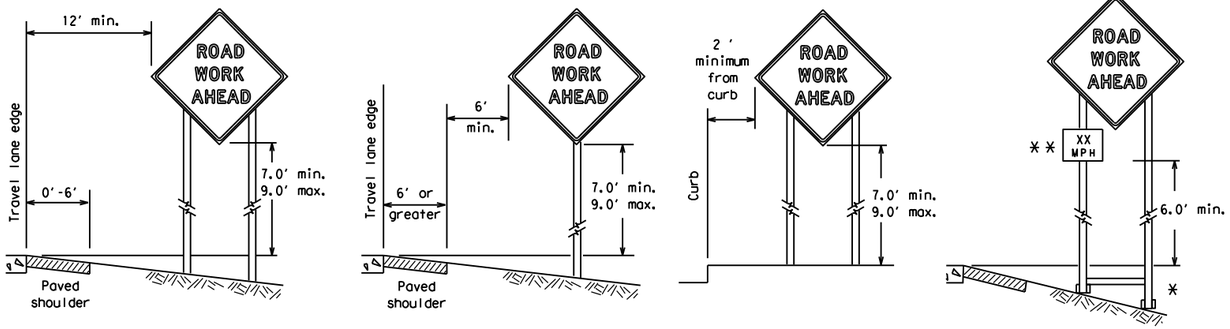
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRY	GRIMES		28

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

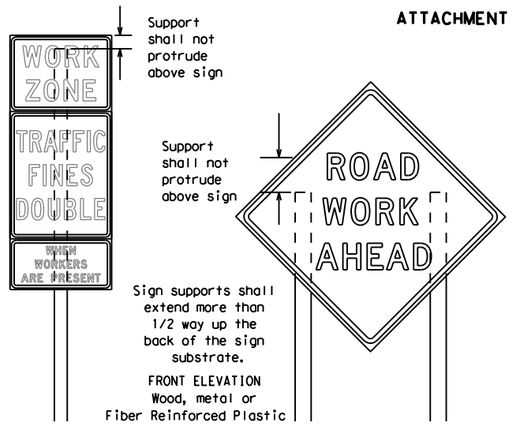
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

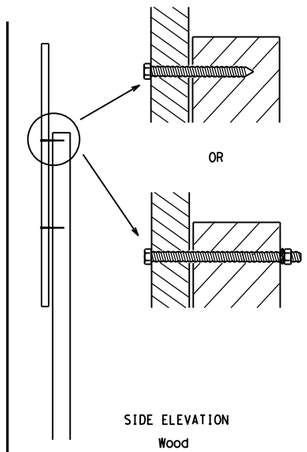


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





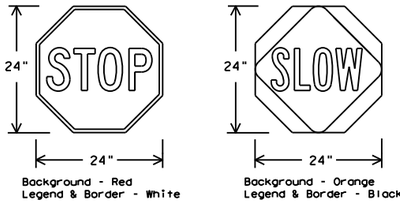
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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7-13 5-21	BRY	GRIMES		29

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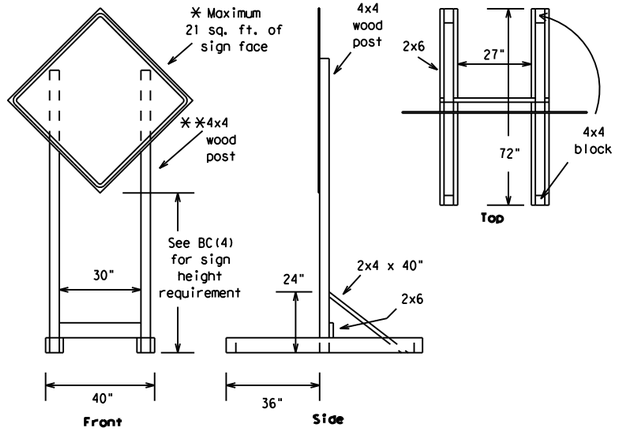
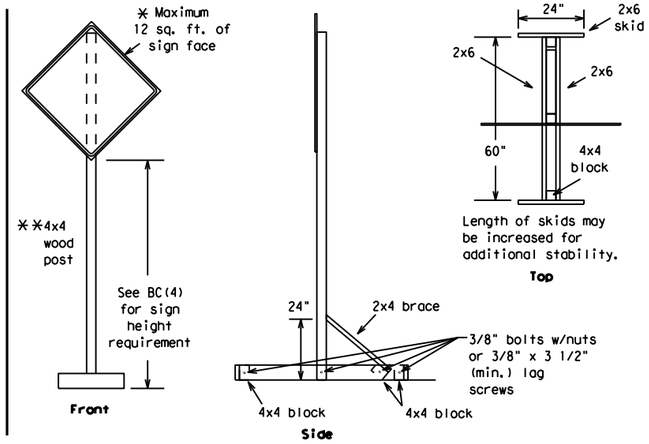
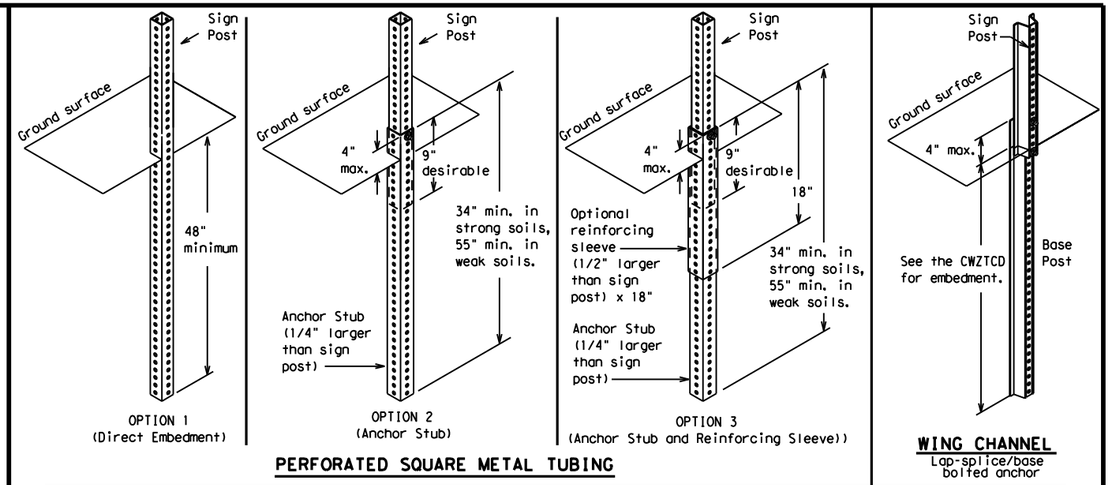




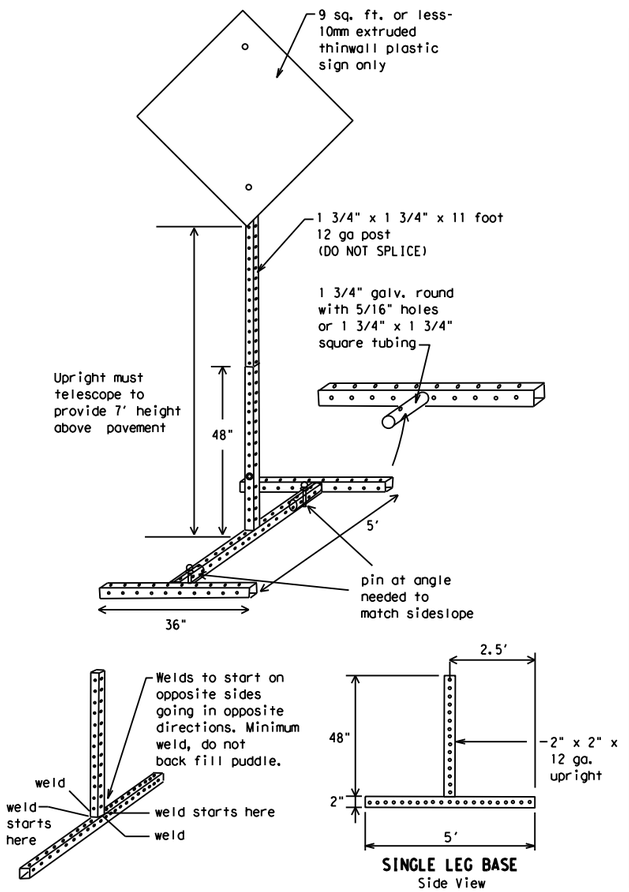
SKID MOUNTED WOOD SIGN SUPPORTS

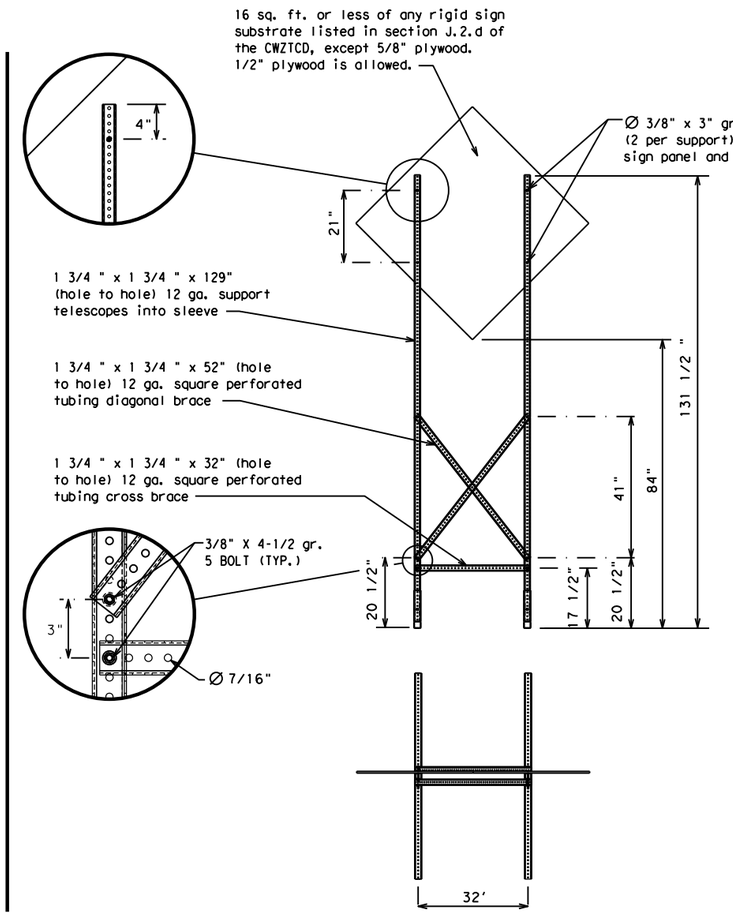
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

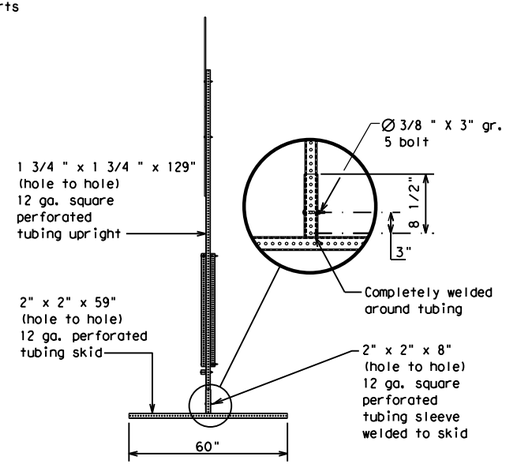


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

SHEET 5 OF 12

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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7-13 5-21	BRY	GRIMES		30

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

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 Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

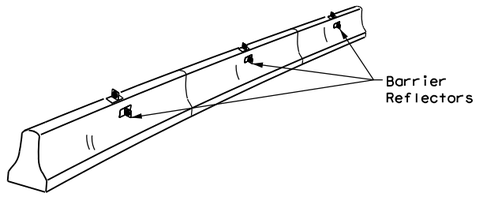
BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0212	04	039	SH 30
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		BRY	GRIMES		31

100

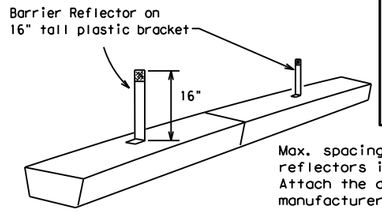
DATE: $DATE$ $TIME$
FILE: $FILE$

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



CONCRETE TRAFFIC BARRIER (CTB)

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

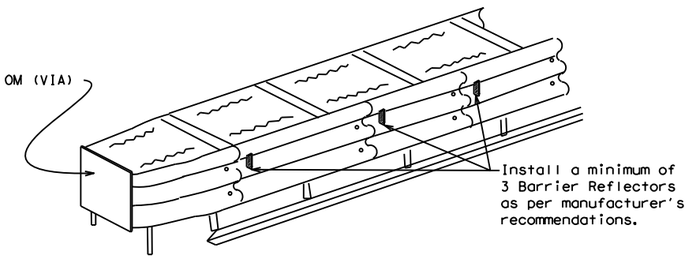


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

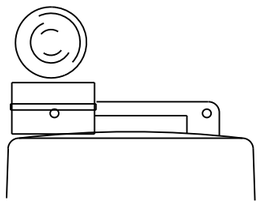


DELINEATION OF END TREATMENTS

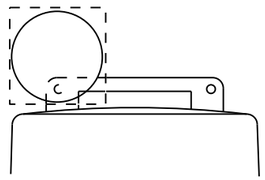
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

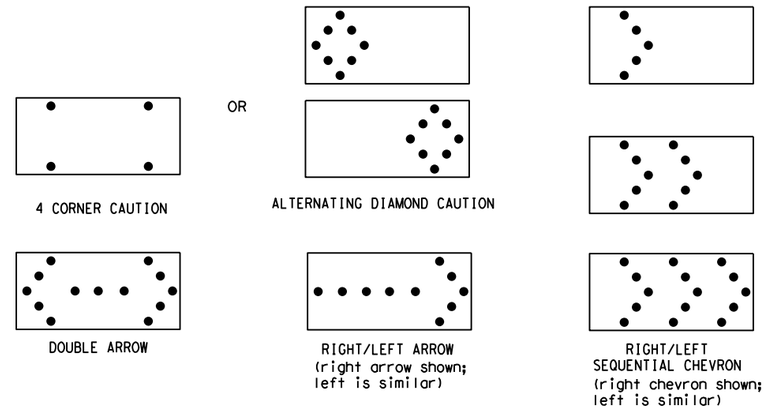
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRY	GRIMES		32

101

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

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

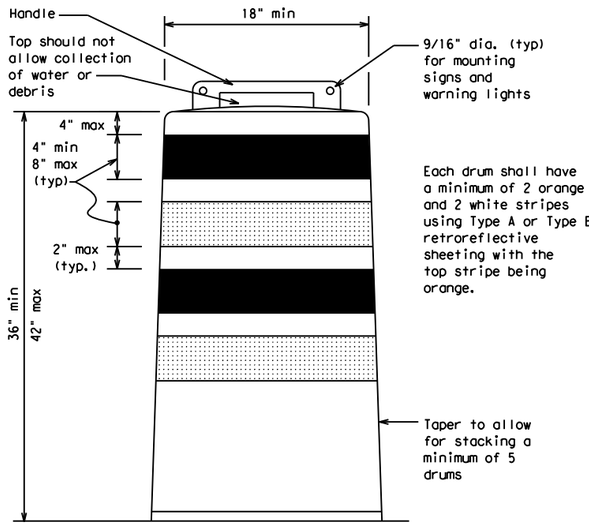
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

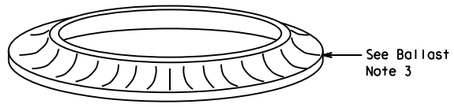
RETROREFLECTIVE SHEETING

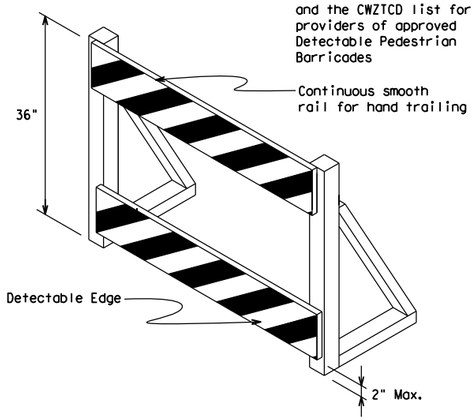
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

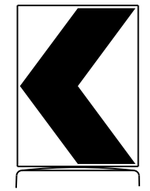




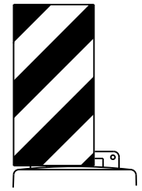


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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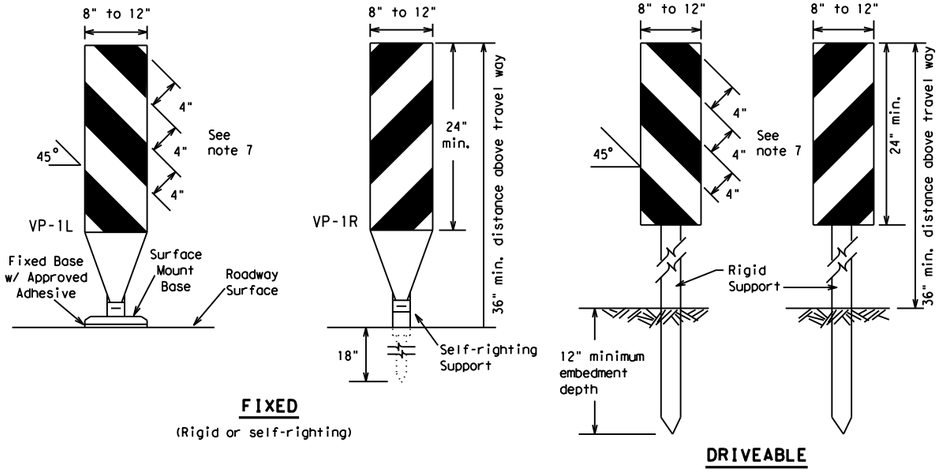
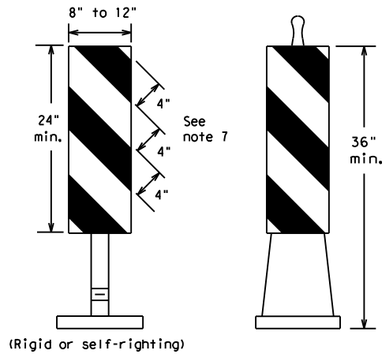


FIXED
(Rigid or self-righting)

DRIVEABLE

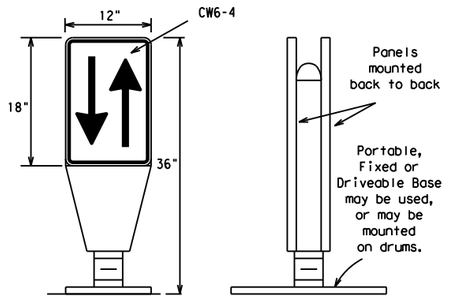


(Rigid or self-righting)

PORTABLE

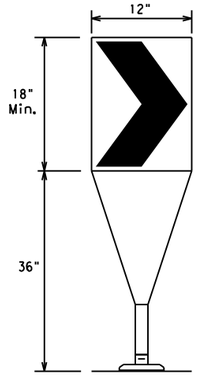
VERTICAL PANELS (VPs)

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



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)



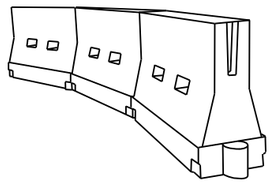
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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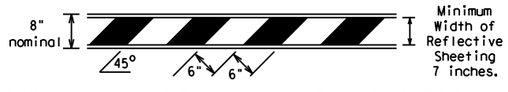
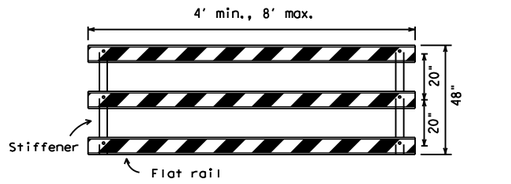
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



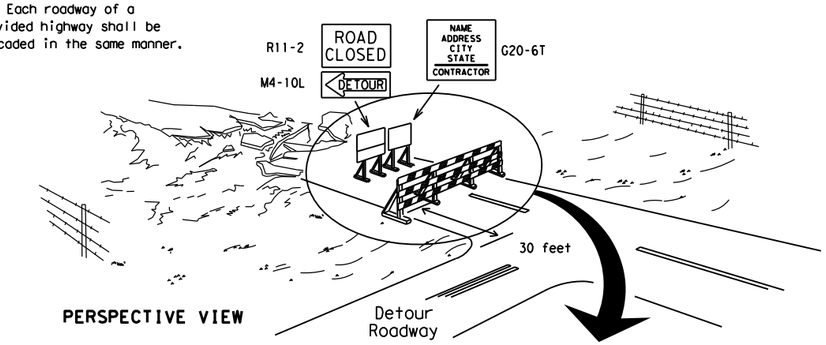
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

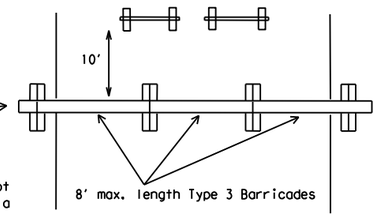
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

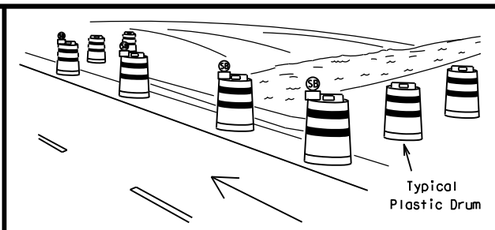
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

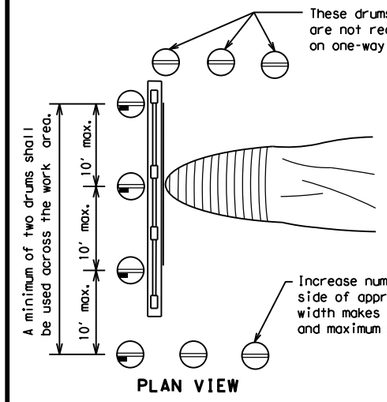
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

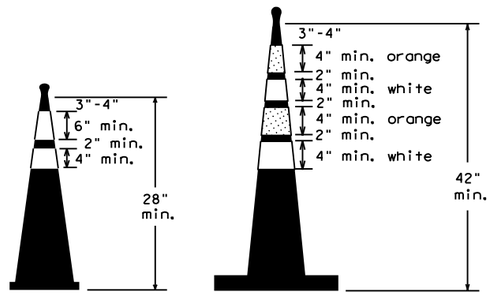
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



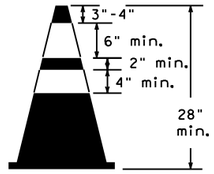
PLAN VIEW

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

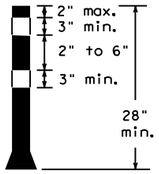
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

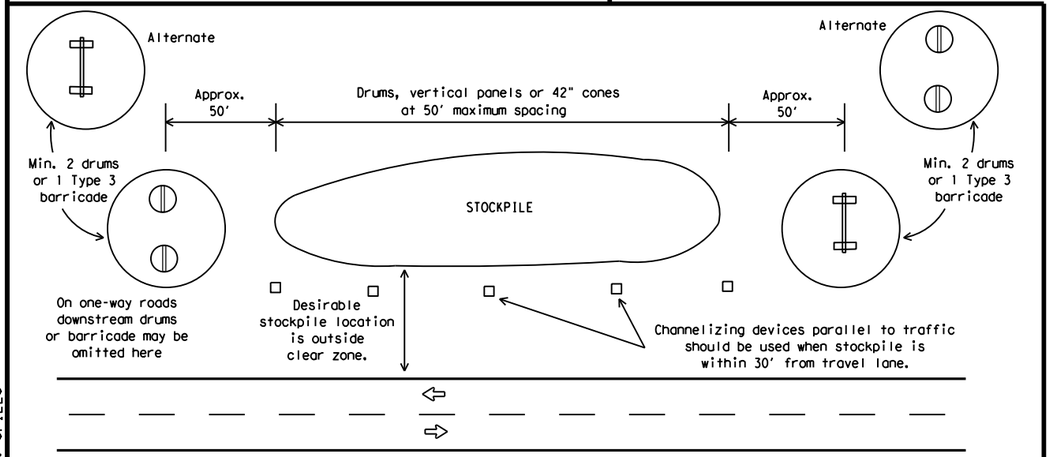


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

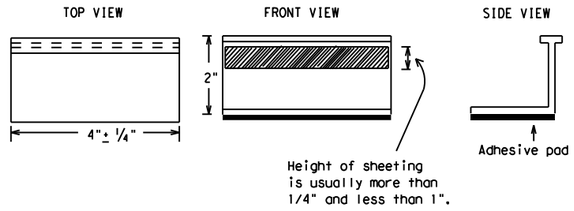
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

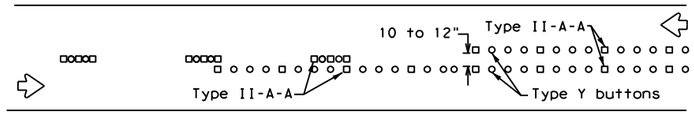
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	BRY	GRIMES		36
11-02 8-14				

105

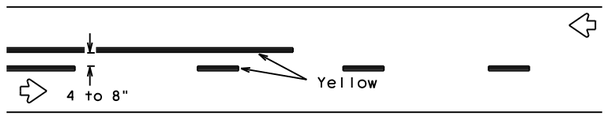
DATE: $DATE$ $TIME$
FILE: $FILE$

PAVEMENT MARKING PATTERNS

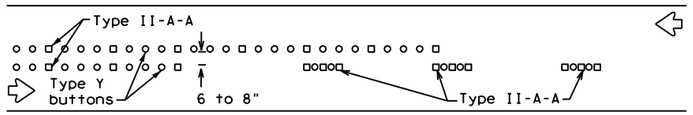
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



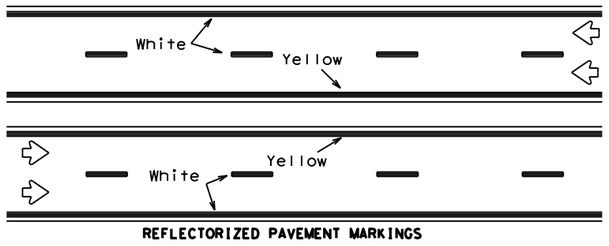
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



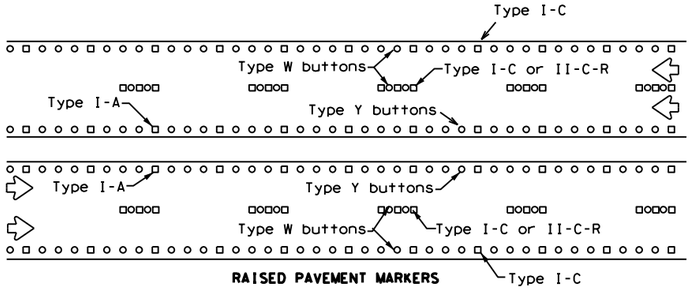
RAISED PAVEMENT MARKERS - PATTERN B

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

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



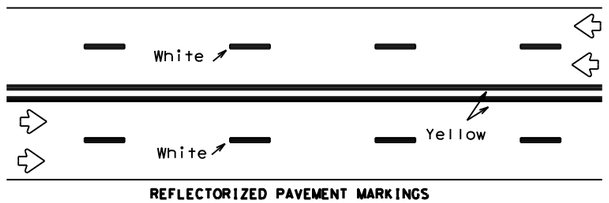
REFLECTORIZED PAVEMENT MARKINGS



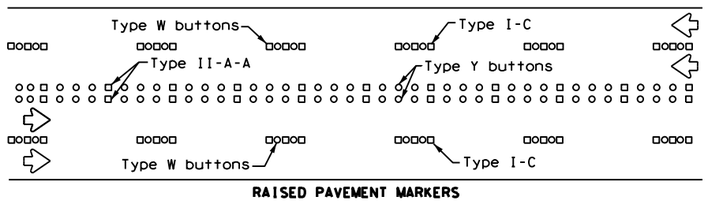
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



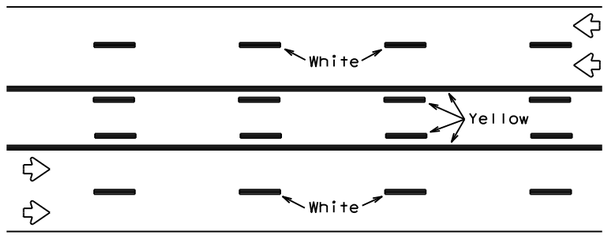
REFLECTORIZED PAVEMENT MARKINGS



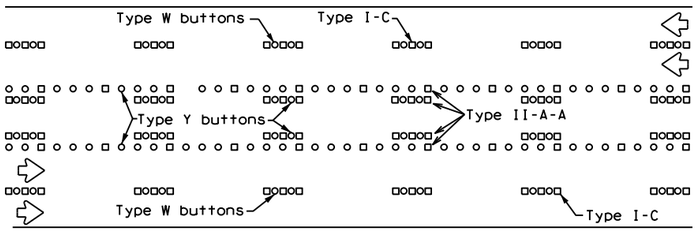
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

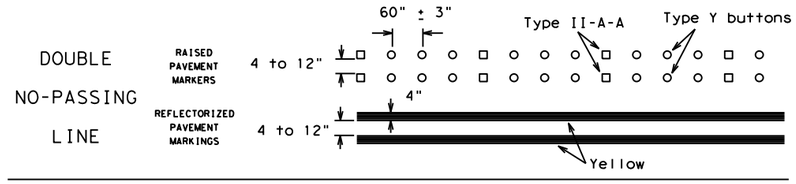
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

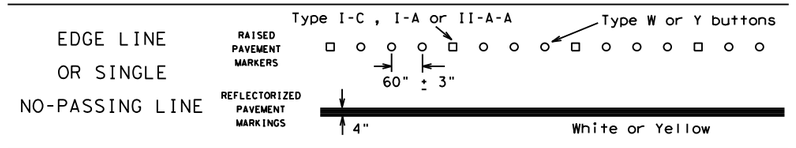
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

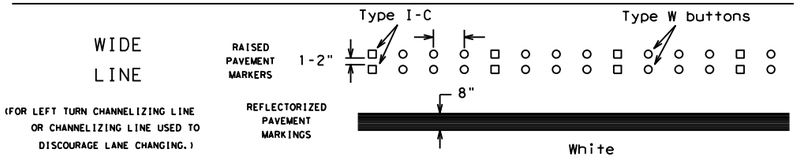


EDGE LINE OR SINGLE NO-PASSING LINE



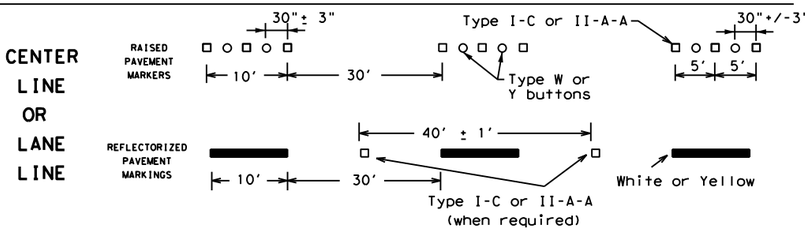
WIDE LINE

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

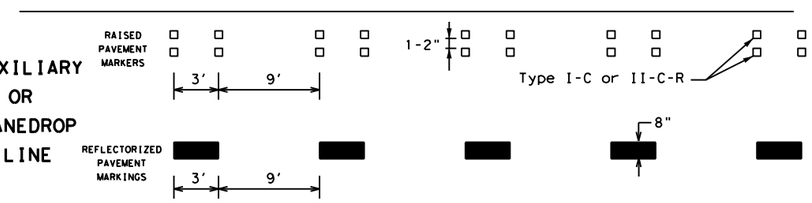


BROKEN LINES

CENTER LINE OR LANE LINE

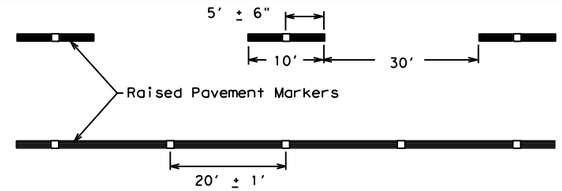


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

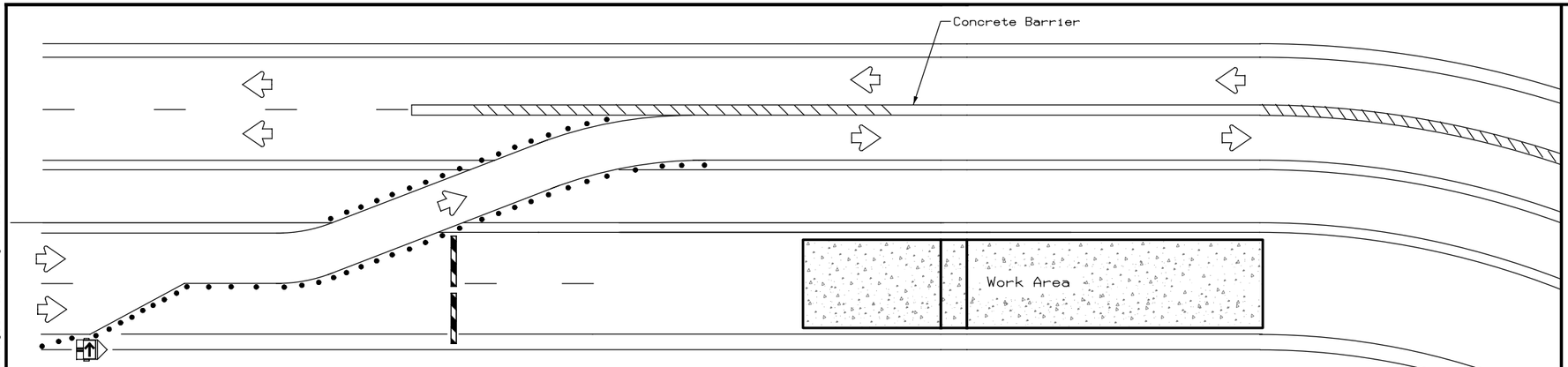
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		37

106

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



NOTES:

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

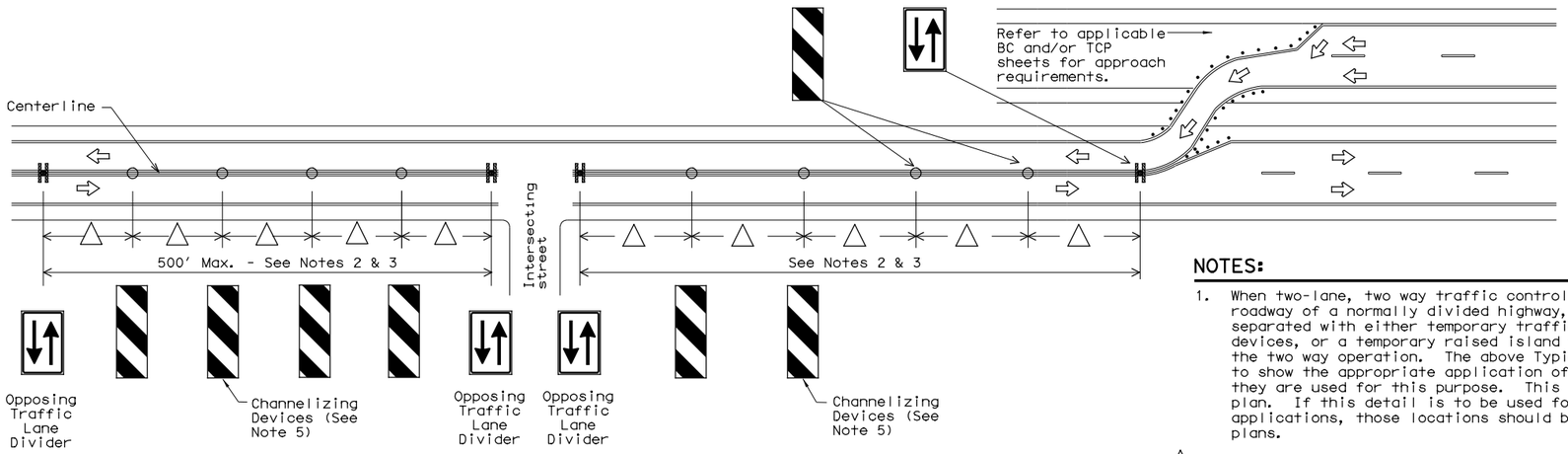
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

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

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

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

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



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

NOTES:

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 2-17 3-03 7-13	0212	04	039	SH30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		38

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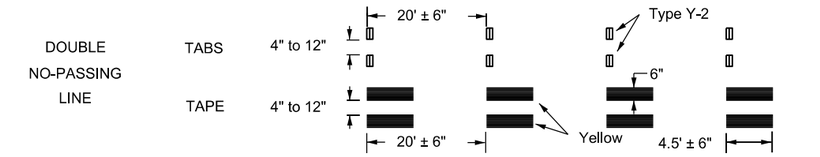
DATE: 8/17/2018 10:34:31 AM
FILE: c:\pwworking\central01\d0668969\wztd-17.dgn

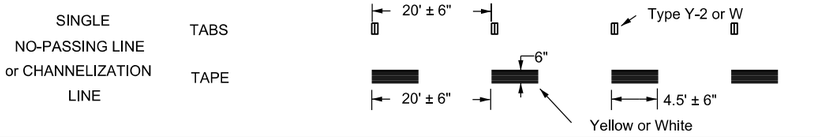
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

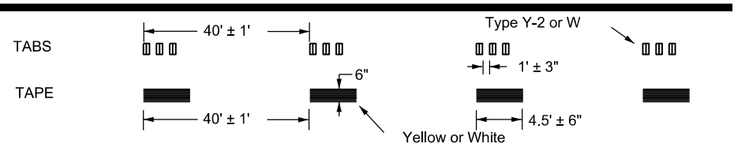


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



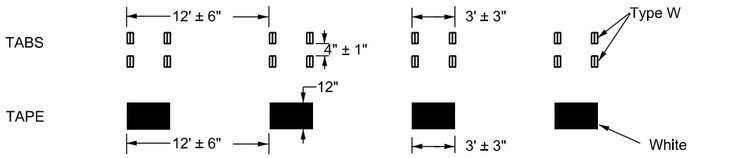
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

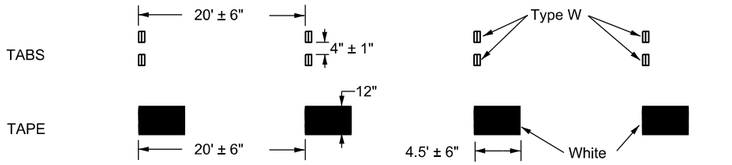


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



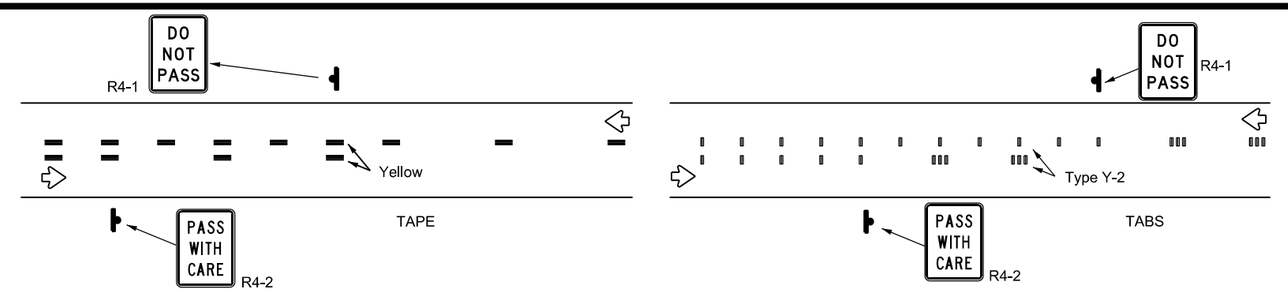
NOTES:

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

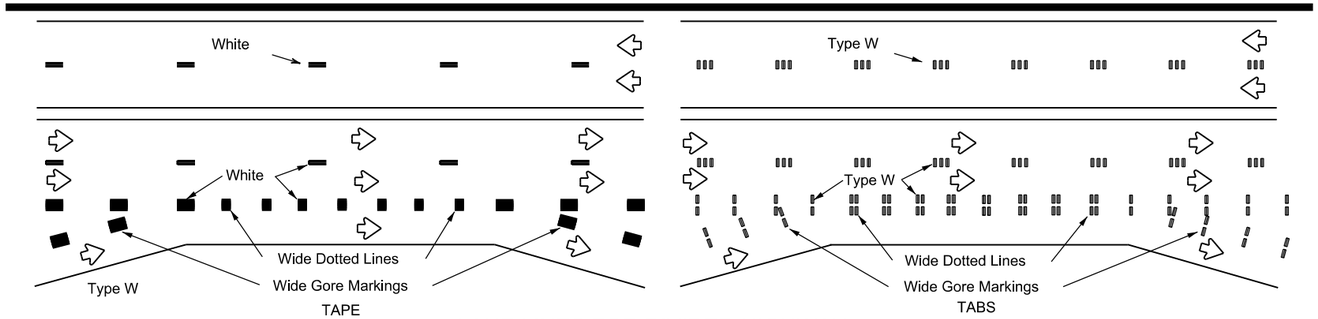
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

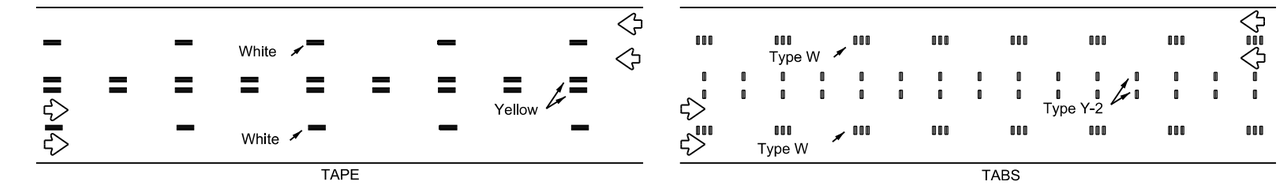
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



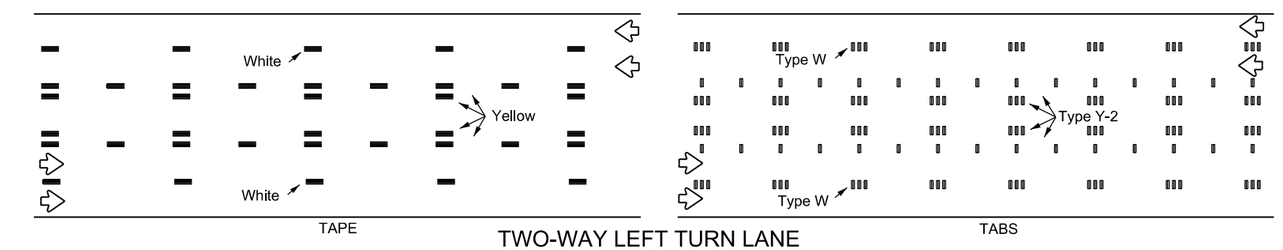
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



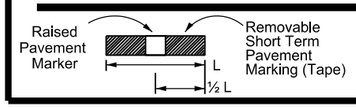
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:

http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

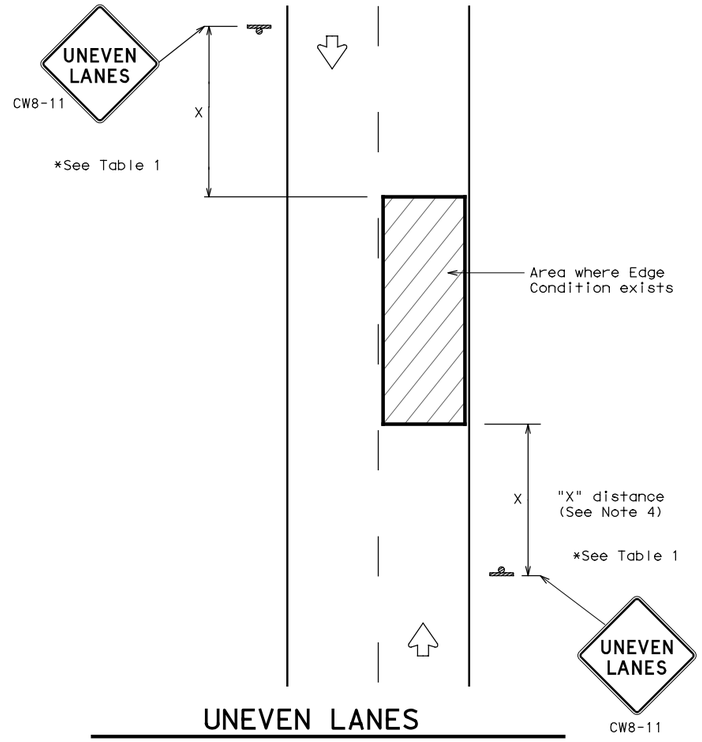
Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

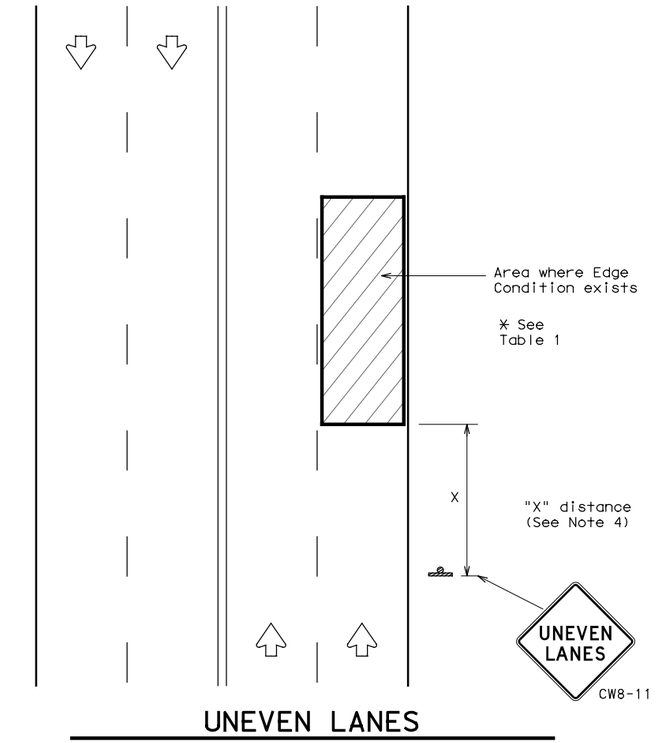
WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
4-92 7-13 1-97 2-23 3-03	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		39

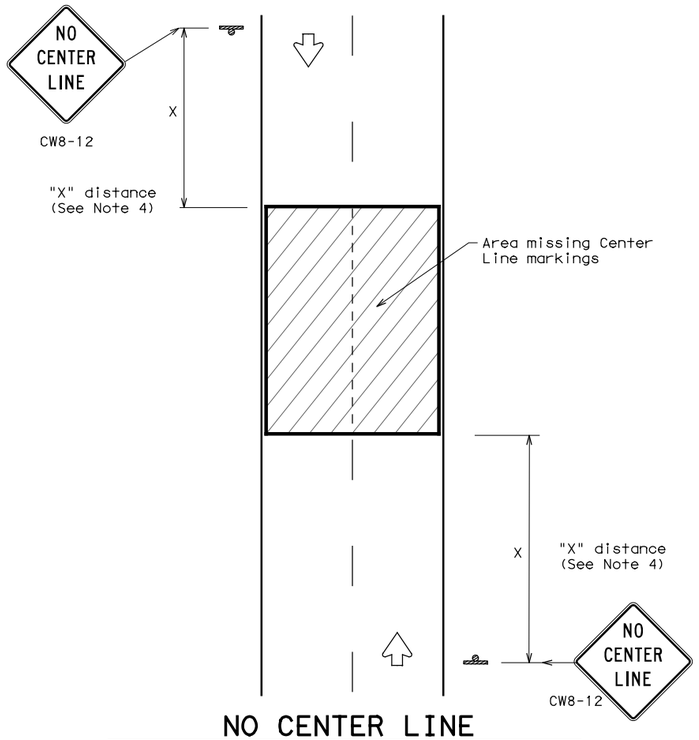
DATE:
FILE:



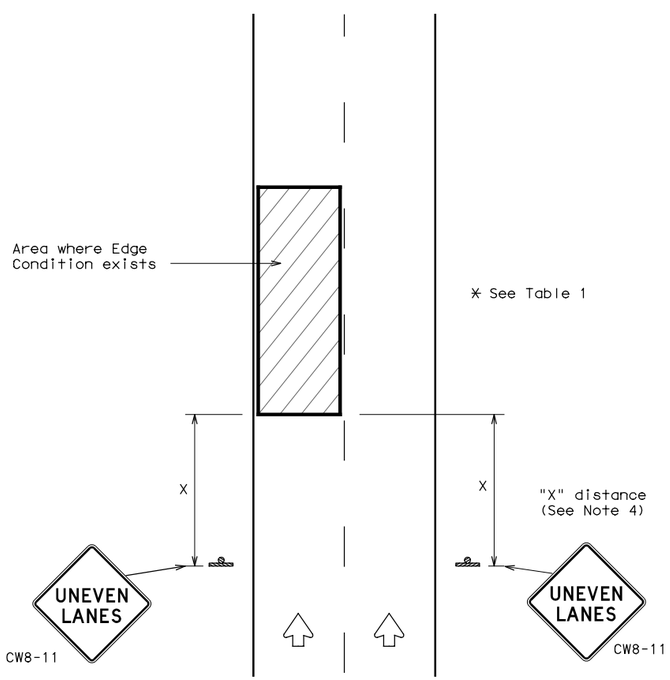
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

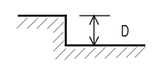
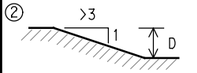
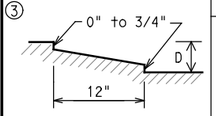
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH30
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	BRY	GRIMES		40

112

DATE: 8/17/2018 10:34:35 AM
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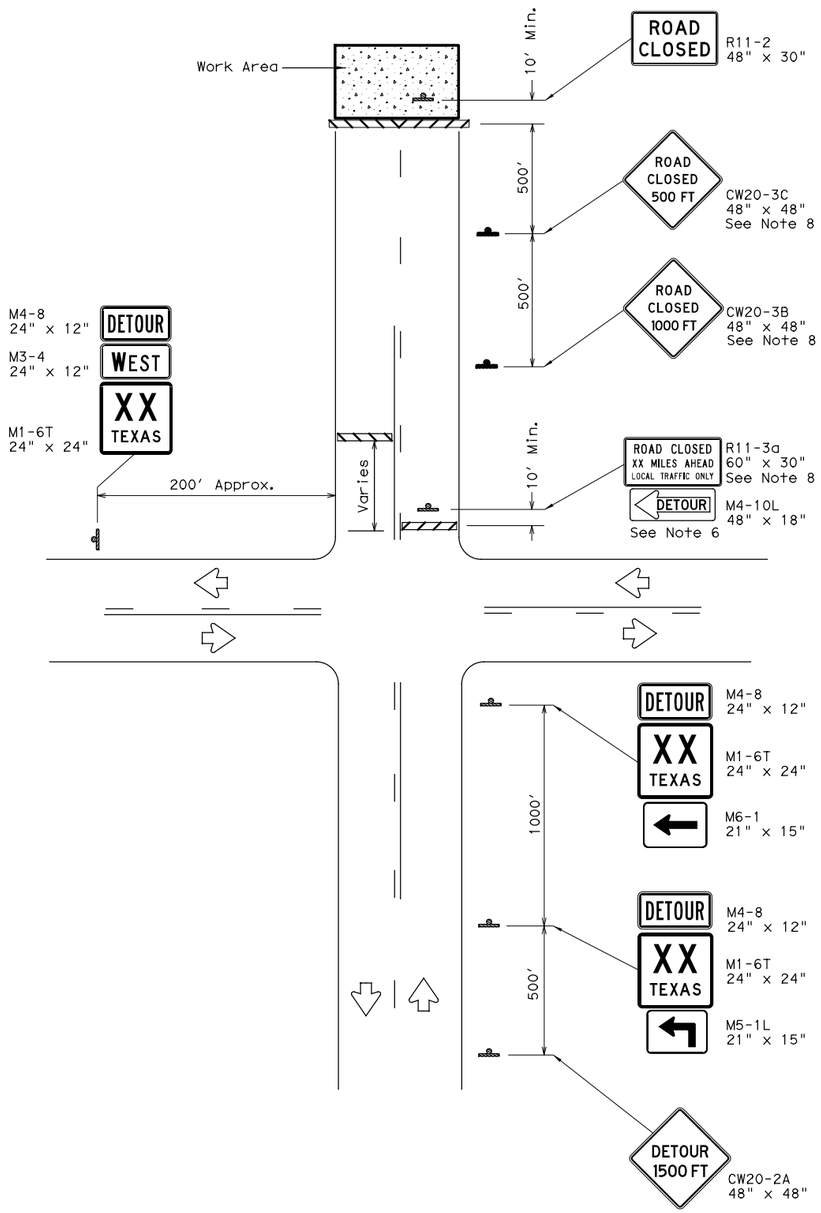
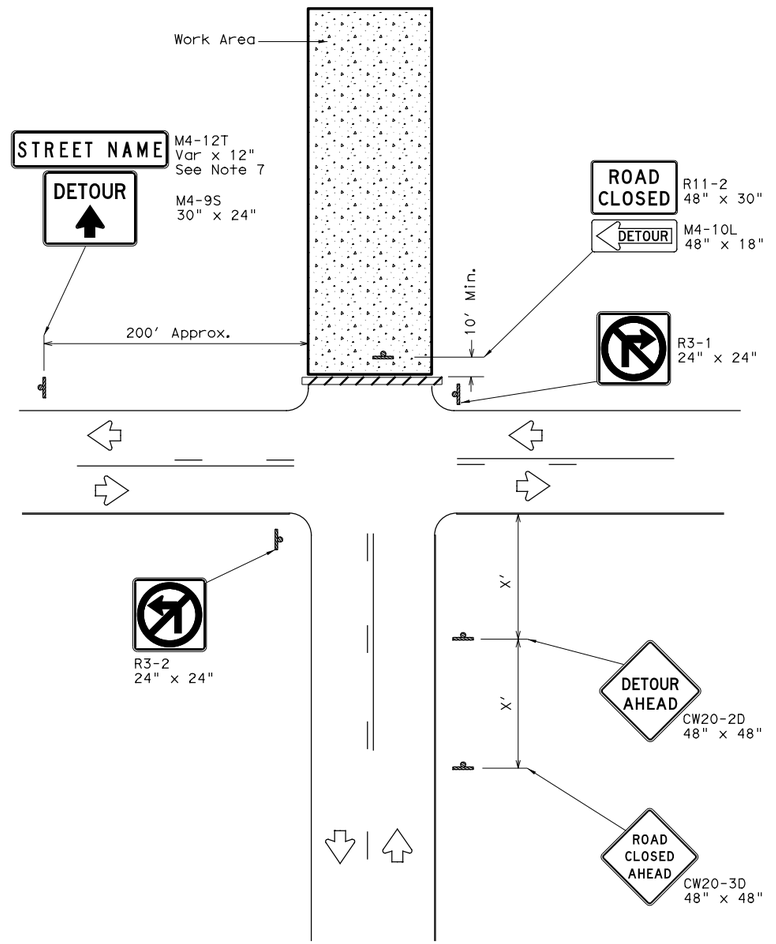


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH30
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	BRY	GRIMES		41

DATE: 8/17/2018 10:34:37 AM
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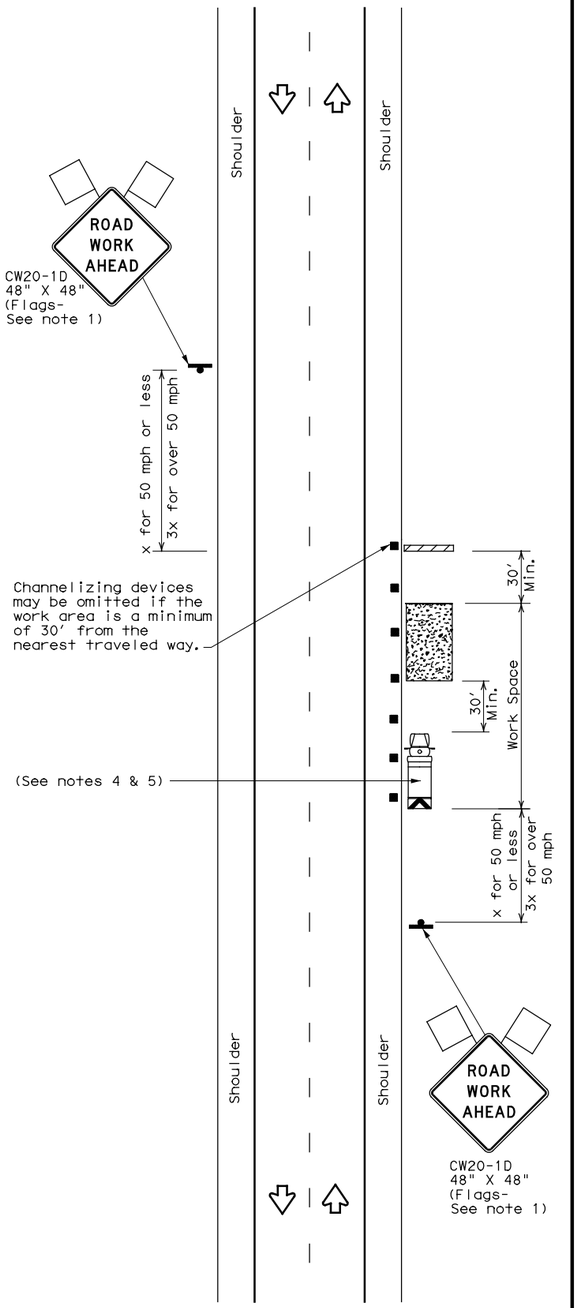
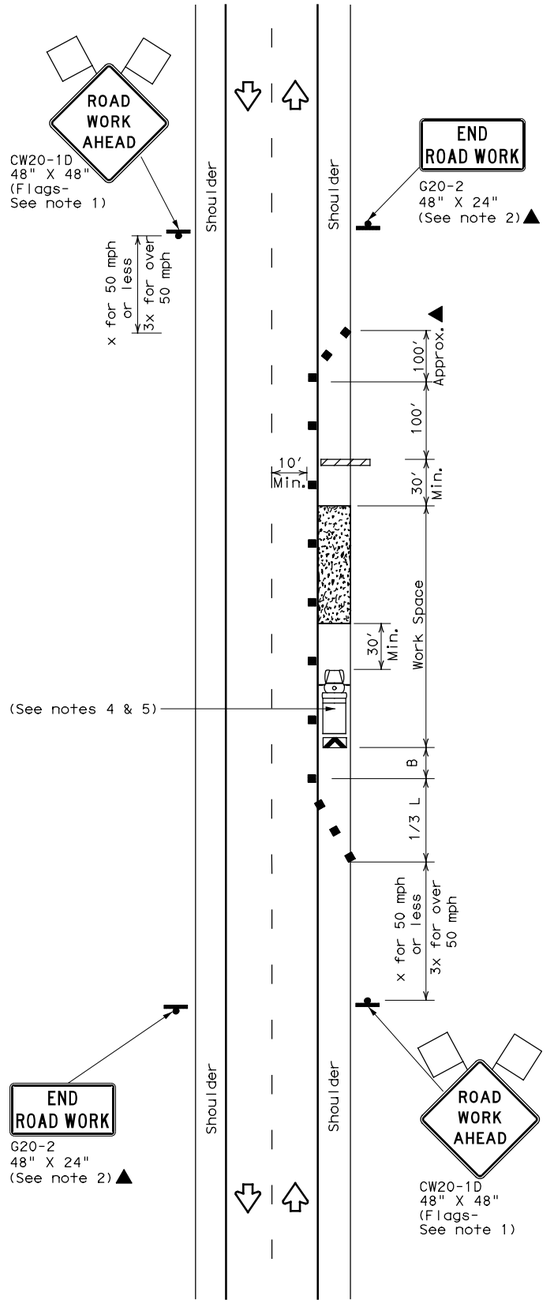


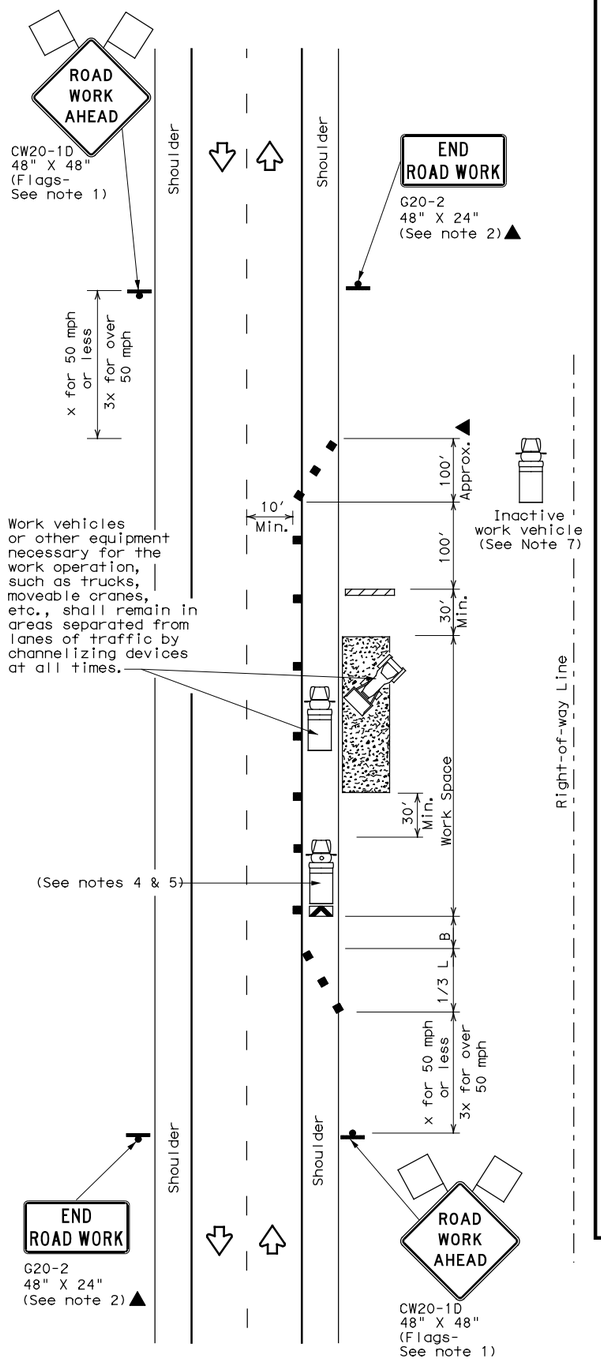
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH30
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	BRY	GRIMES		42
1-97 2-18				

161

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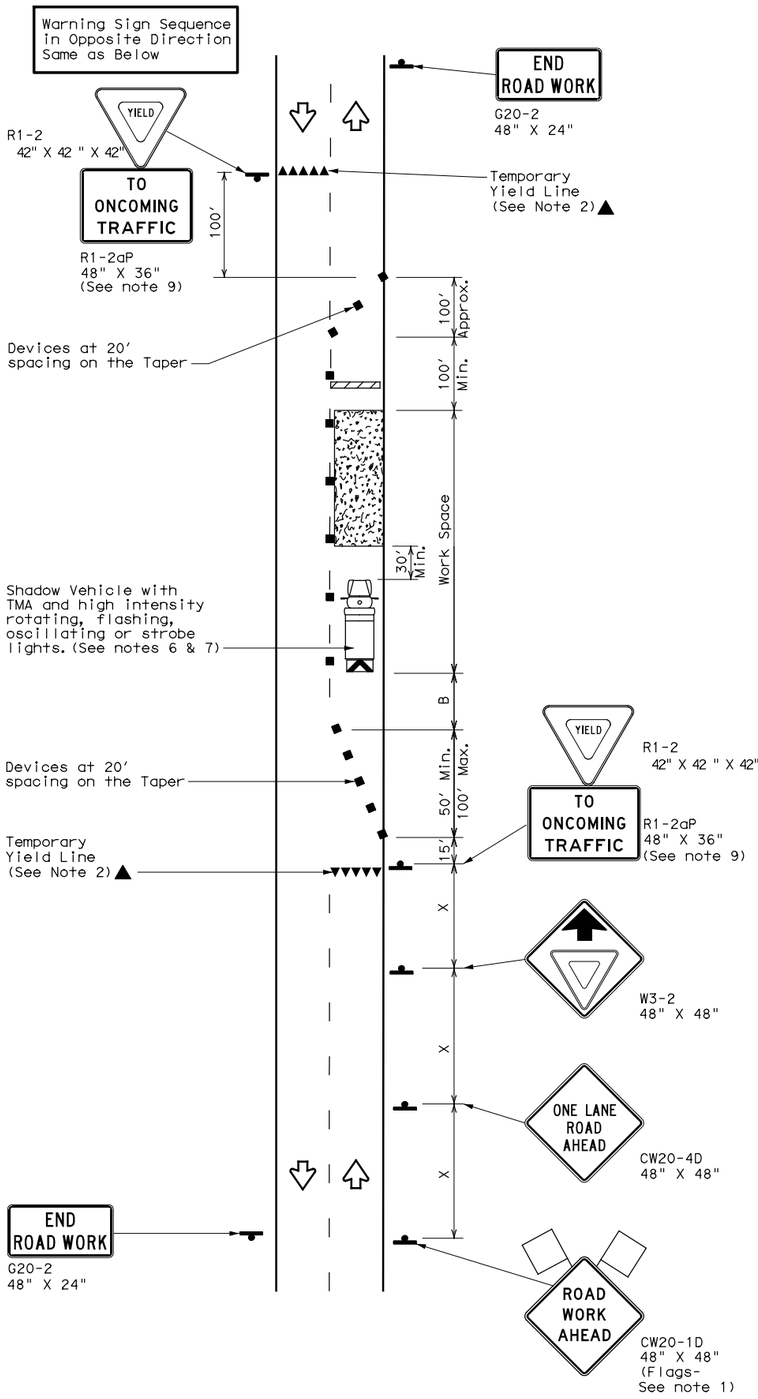
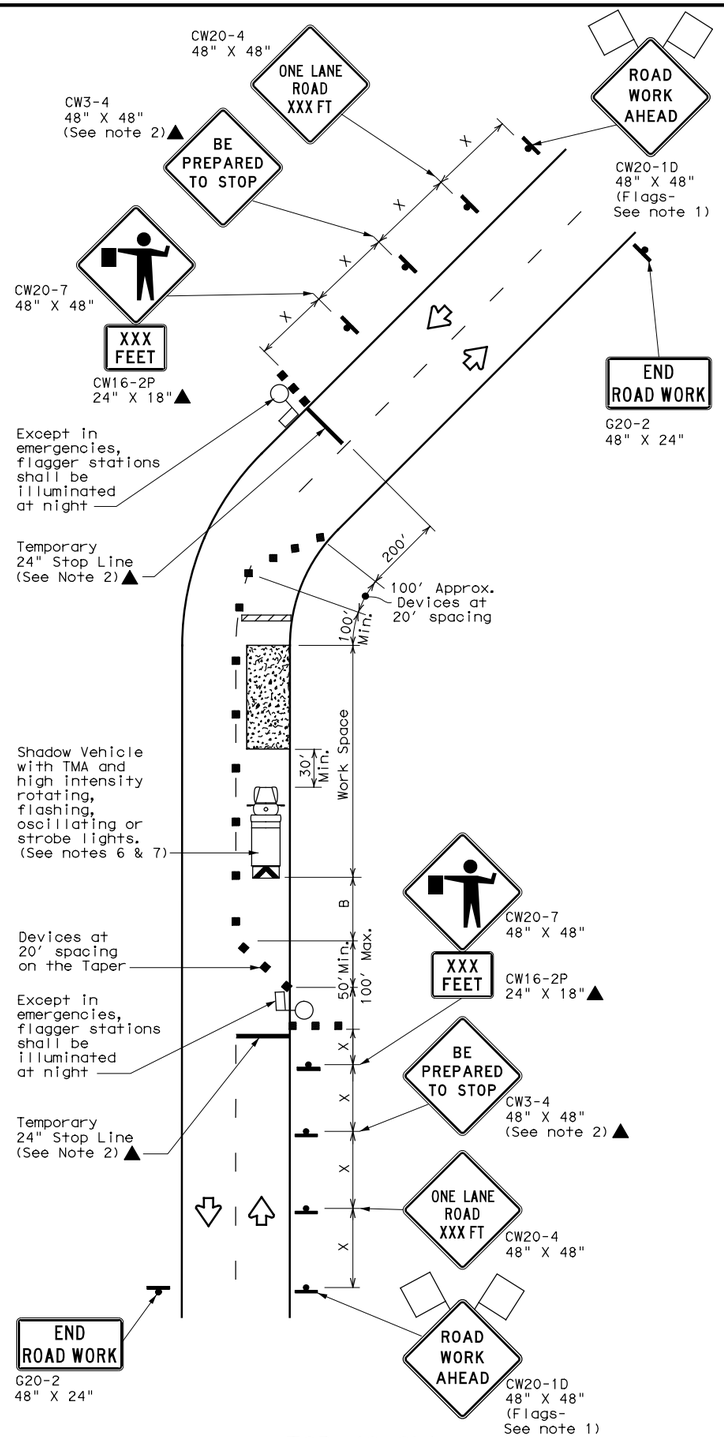


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	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 CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. 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.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

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

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP (2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0212	04	039	SH30
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	BRY	GRIMES		43

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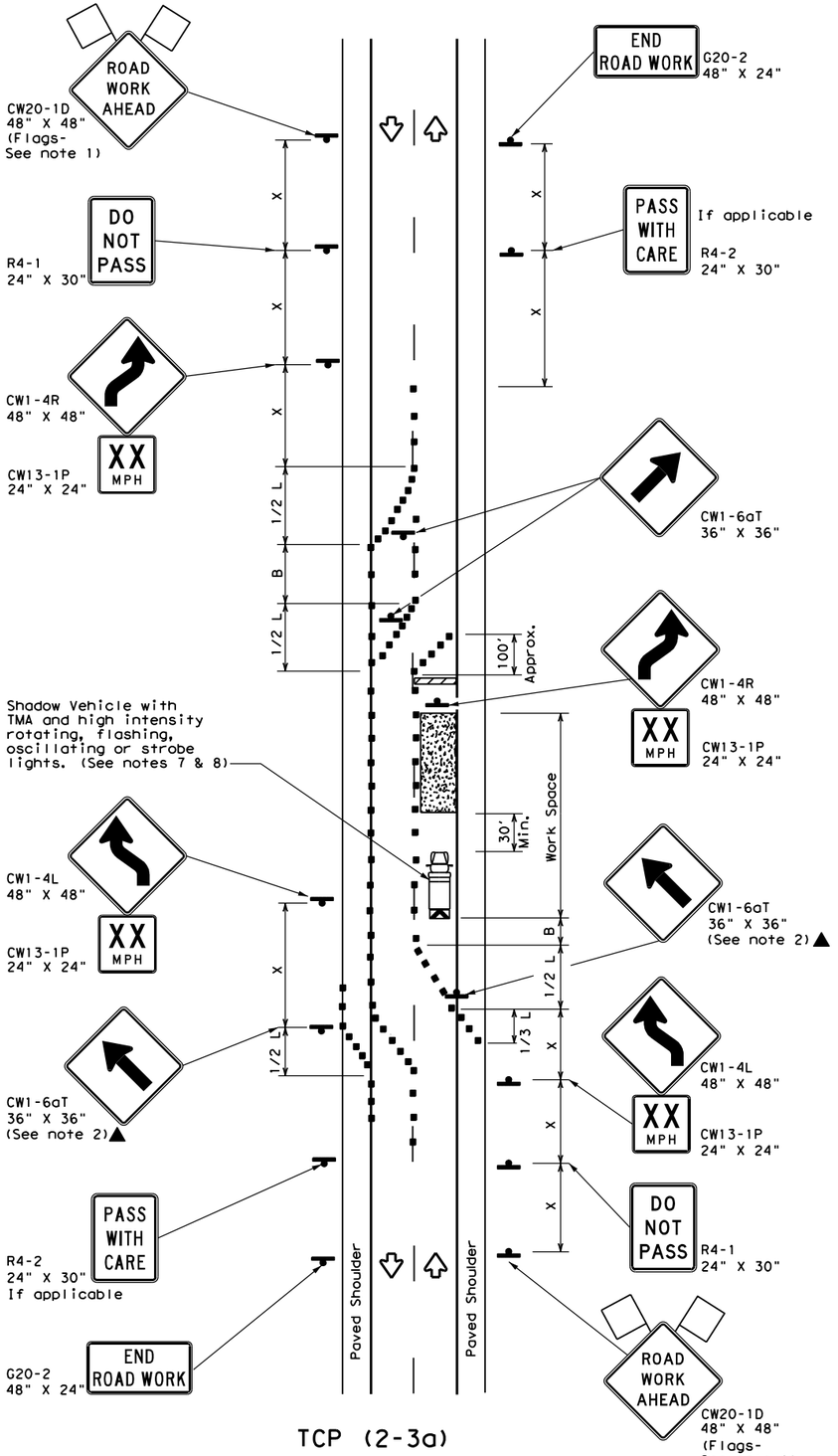
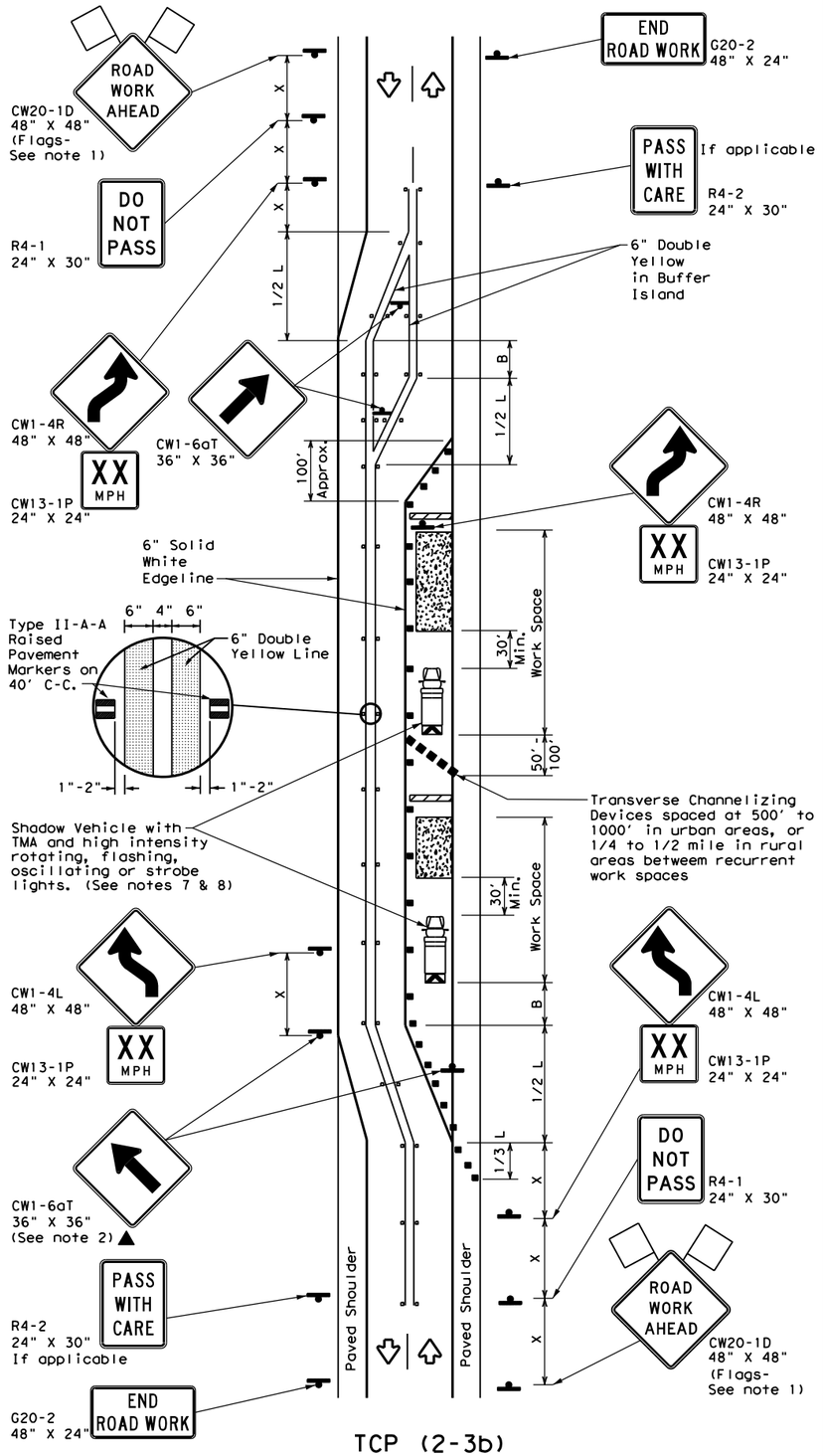
DATE:
FILE:



TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	• • • •	Raised Pavement Markers Ty II-AA
	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
				TCP(2-3b)ONLY
			✓	✓

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. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

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

Texas Department of Transportation — *Traffic Safety Division Standard*

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-23

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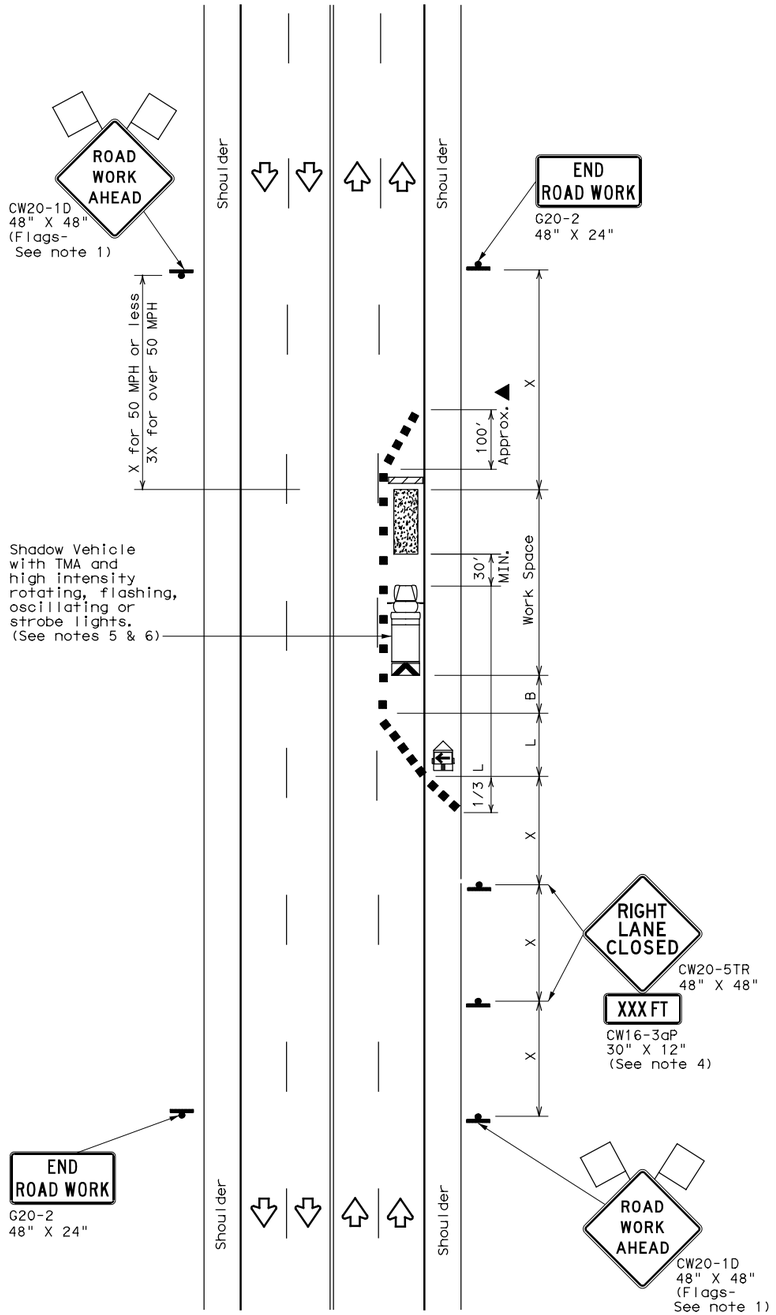
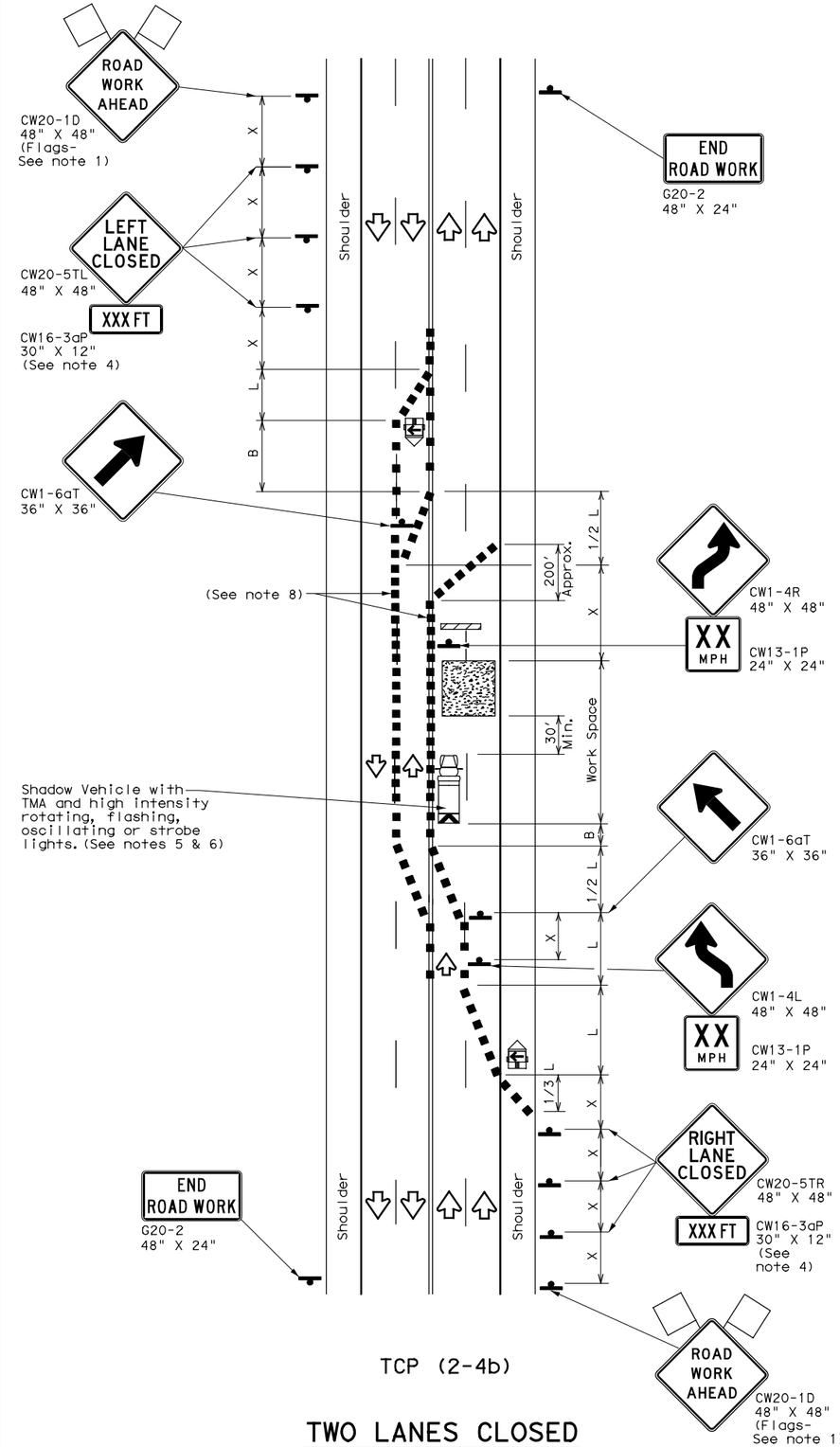
© TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-85 4-98 2-18	0212	04	039	SH 30
8-95 3-03 4-23	DIST	COUNTY		SHEET NO.
1-97 2-12	BRY	GRIMES		44

163



TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0212	04	039	SH30
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	BRY	GRIMES		45

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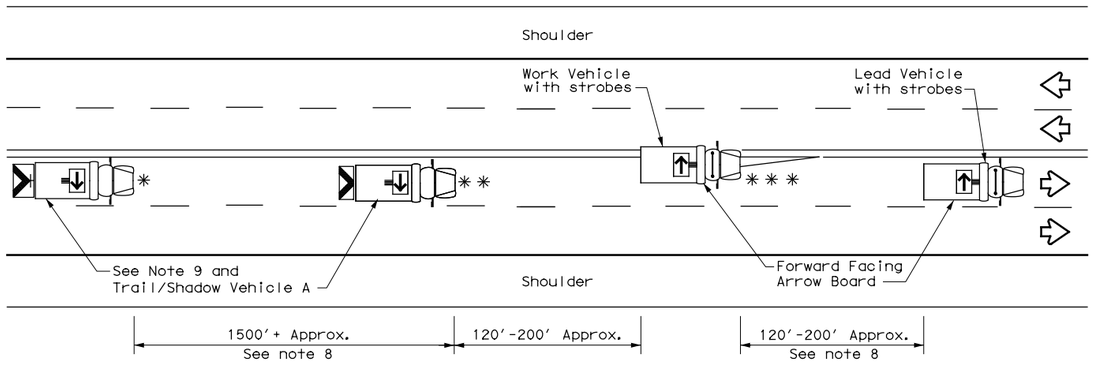
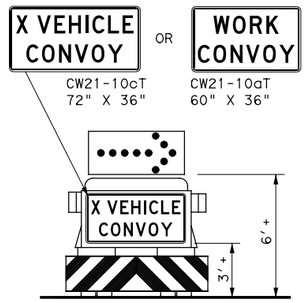


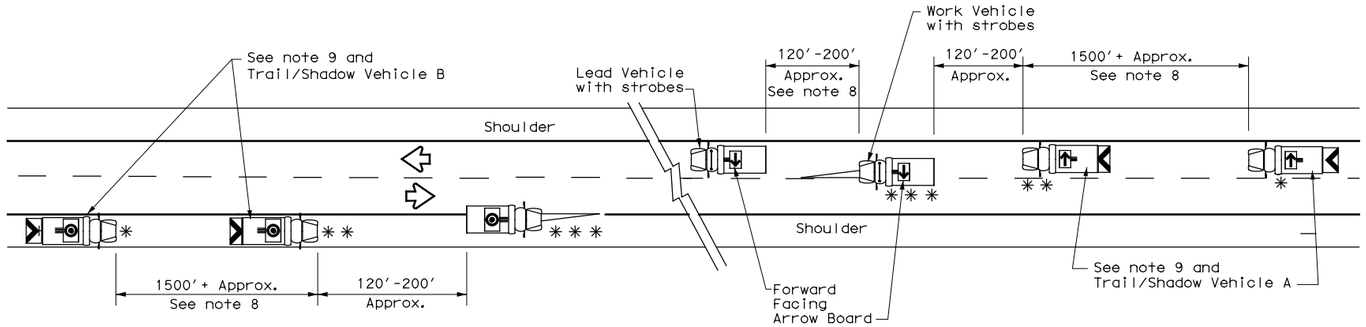
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

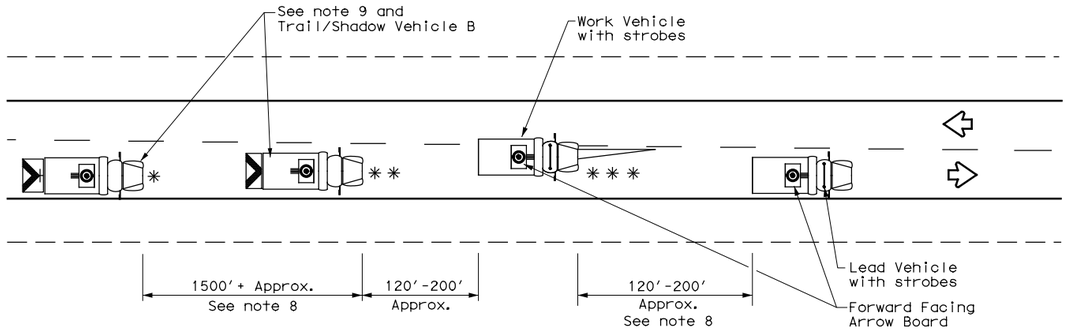


WORK ON SHOULDER

WORK ON TRAVEL LANE

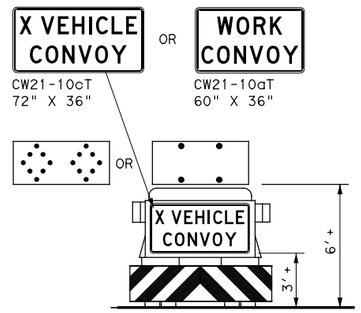
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

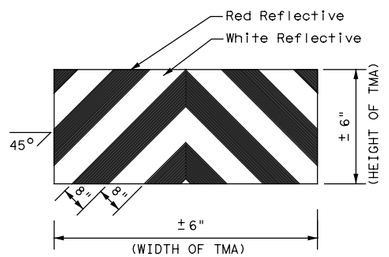
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP (3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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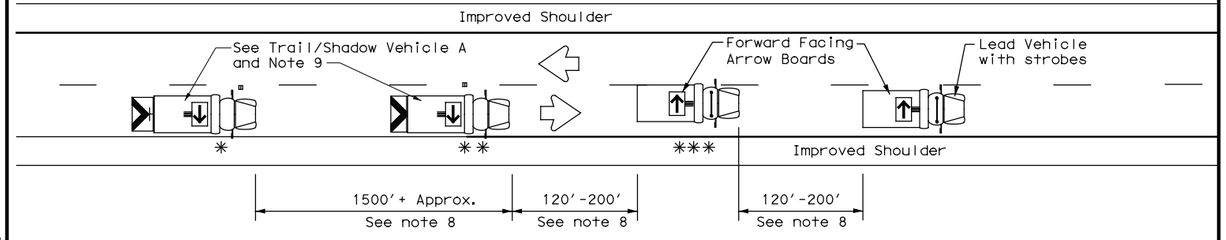
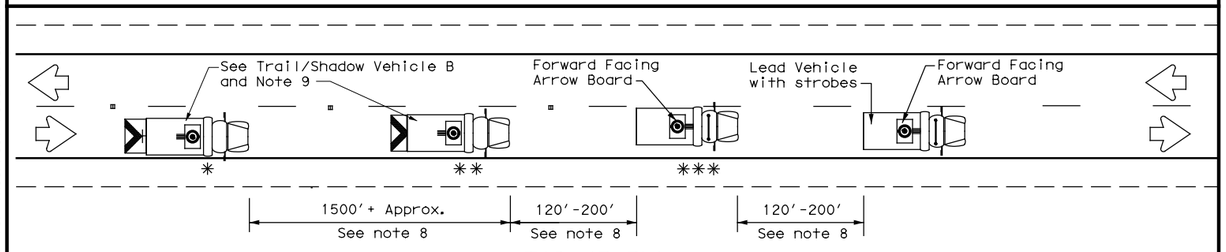
8-95 7-13	BRY	GRIMES		46
1-97				



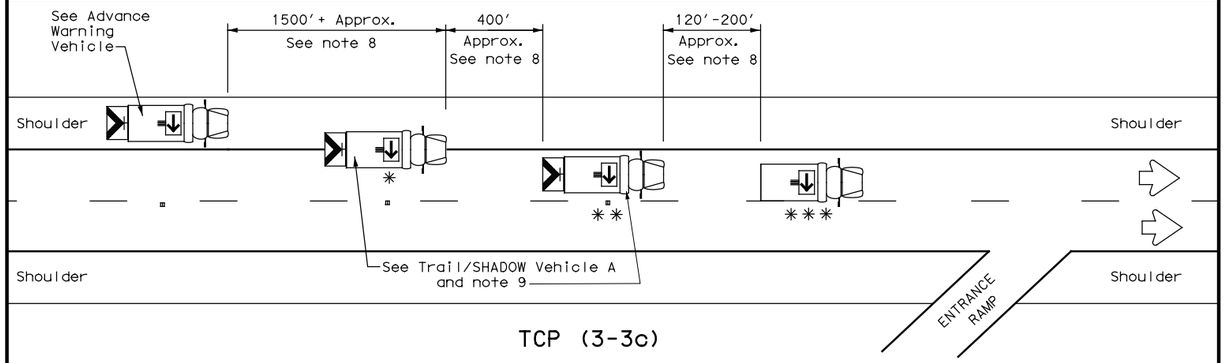
TCP (3-3a)

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



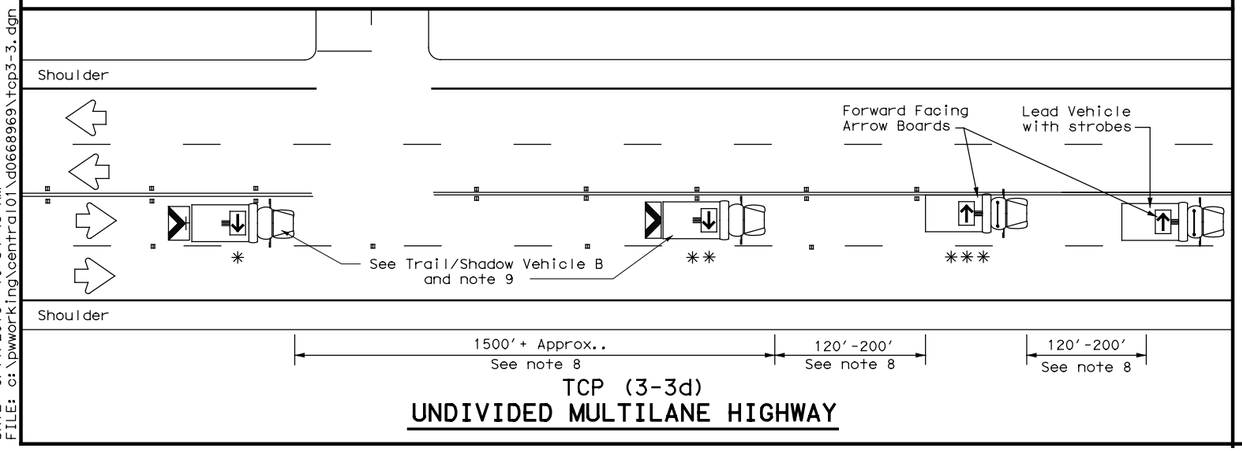
TCP (3-3b)

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



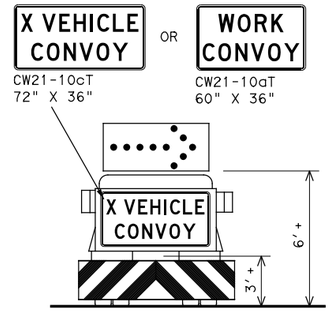
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



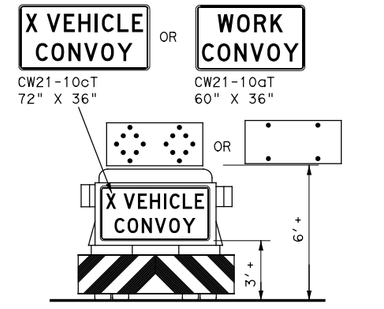
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



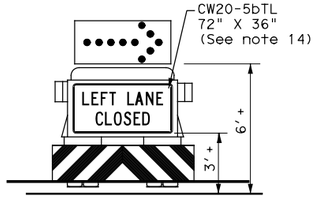
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

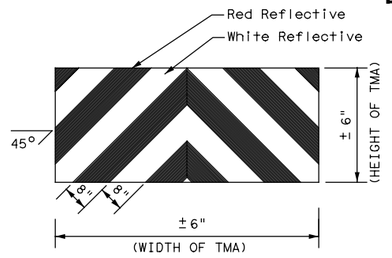


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	BRY	GRIMES		47
1-97 7-14				

177

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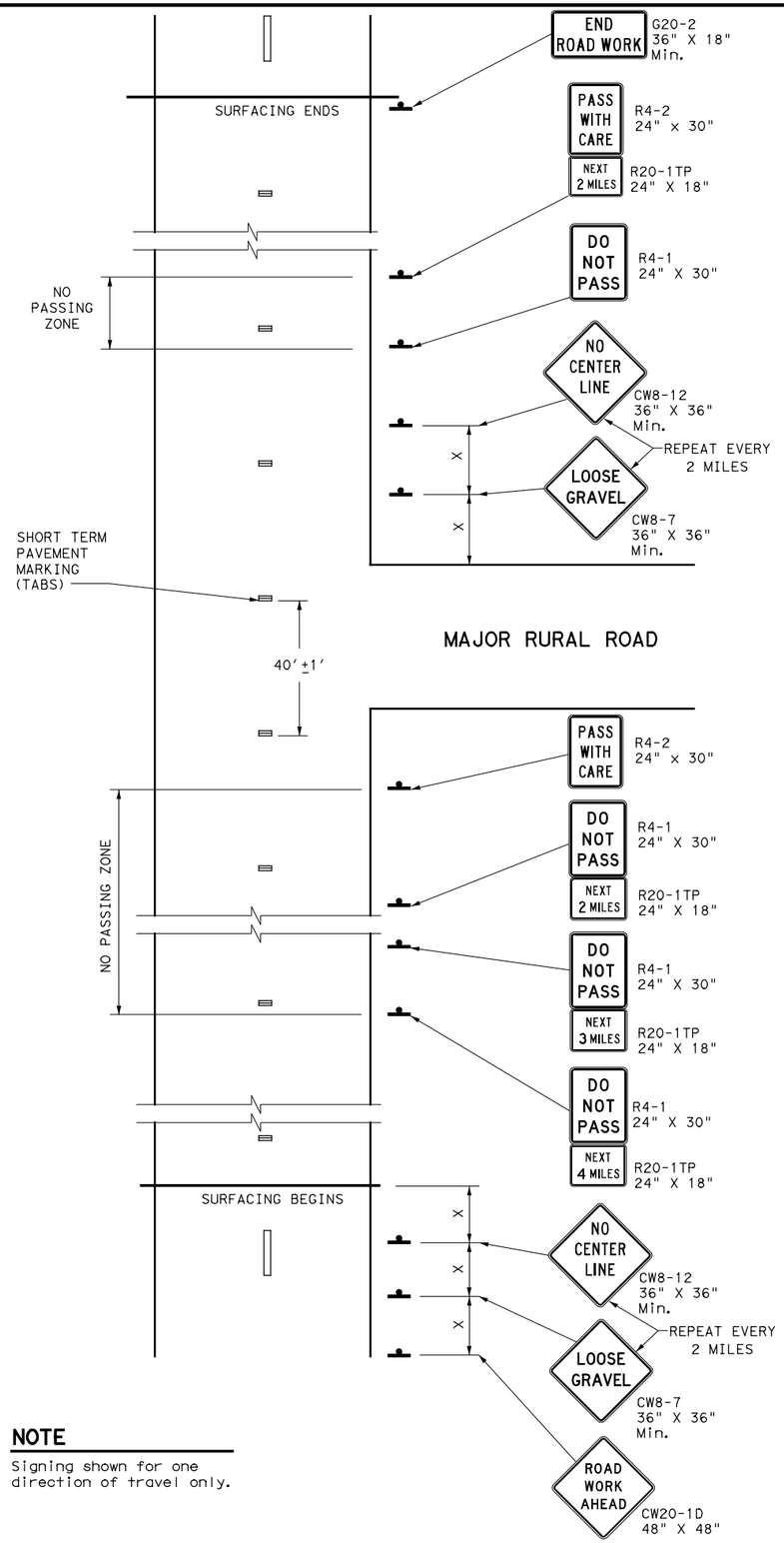
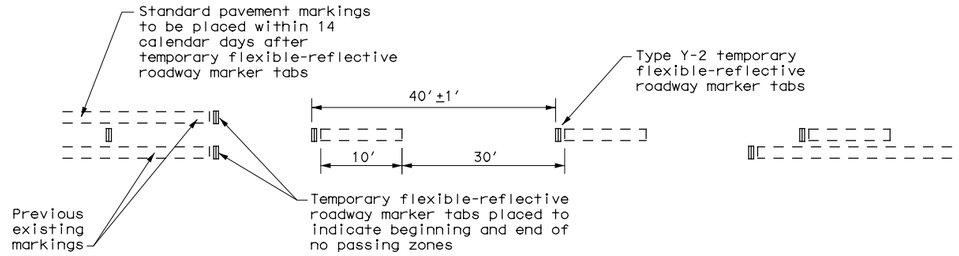


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement
no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120′
35	160′
40	240′
45	320′
50	400′
55	500′
60	600′
65	700′
70	800′
75	900′

* Conventional Roads Only

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

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

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©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
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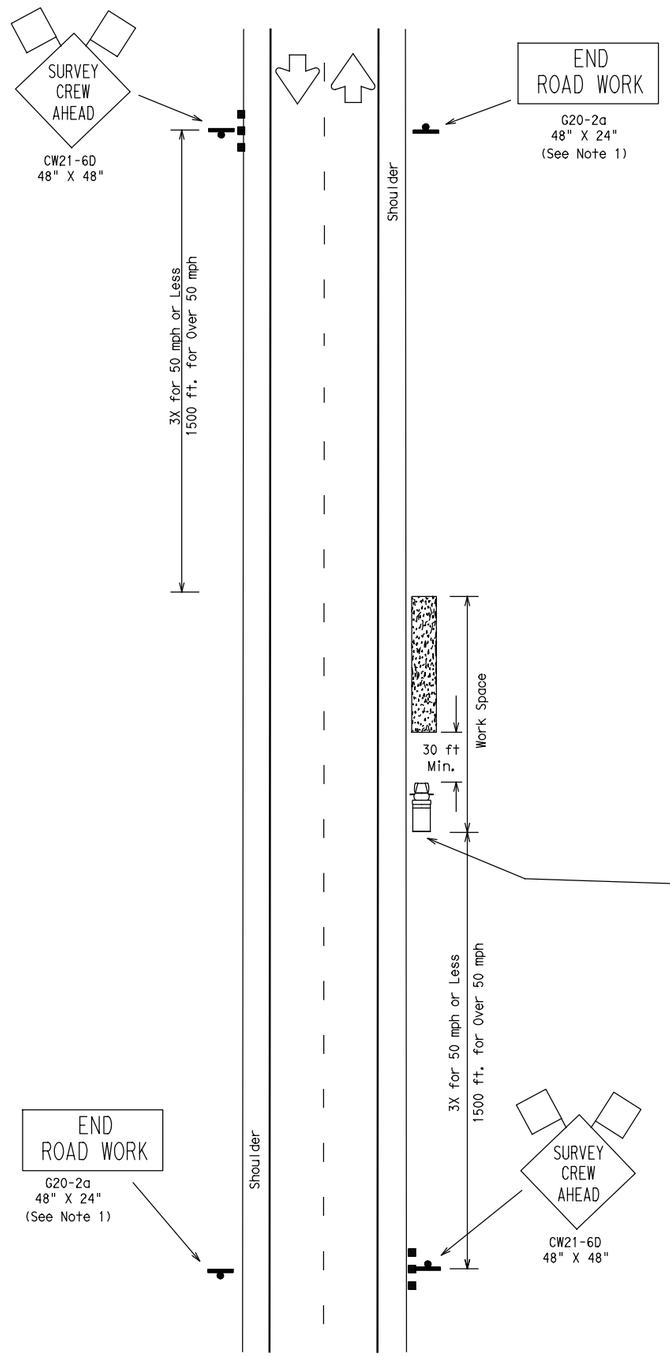
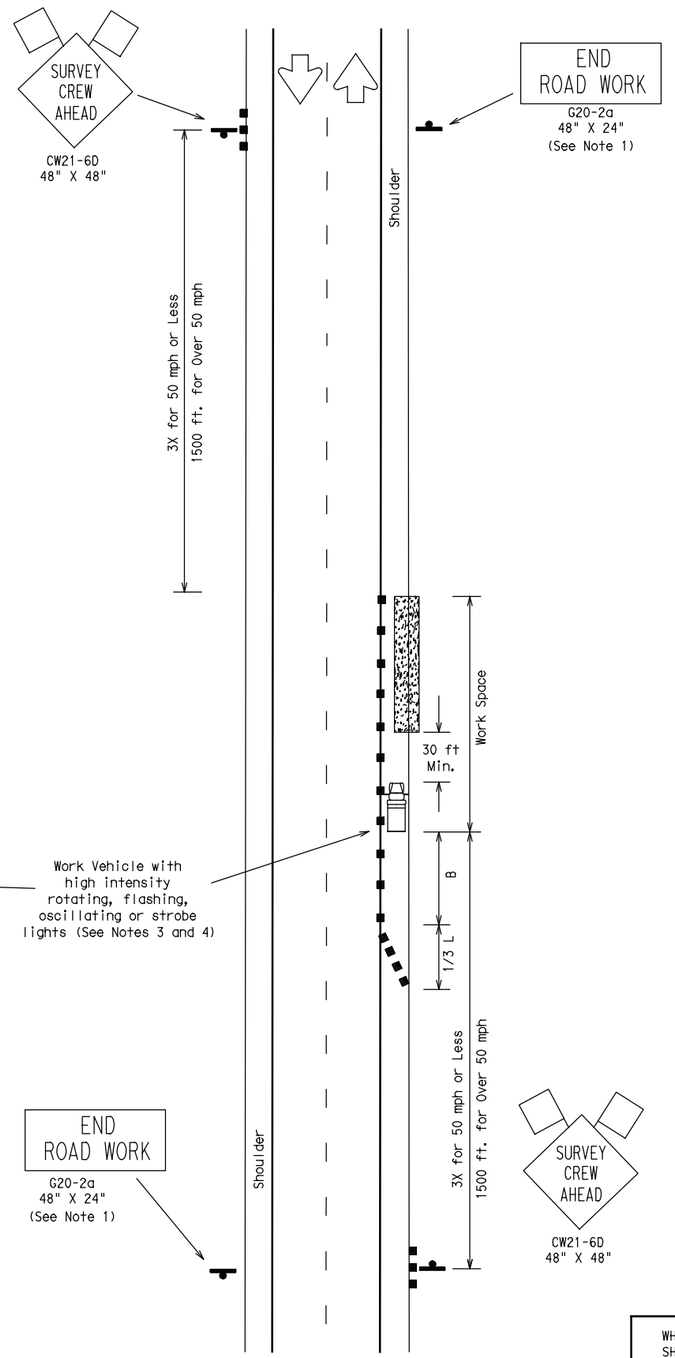


TCP (S-1a)
WORK OFF SHOULDER
OR PAVED SURFACE



TCP (S-1b)
WORK ON SHOULDER

LEGEND

Type III Barricade ■ ■ Channelizing Devices Flag
Heavy Work Vehicle Truck Mounted Attenuator (TMA)
Trailer Mounted Flashing Arrow Panel (M) Portable Changeable Message Sign (PCMS)
Flagger Sign Post

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10′ Offset	11′ Offset	12′ Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150′	165′	180′	30′	60′-75′	120′	90′
35		205′	225′	245′	35′	70′-90′	160′	120′
40		265′	295′	320′	40′	80′-100′	240′	155′
45	L=WS	450′	495′	540′	45′	90′-110′	320′	195′
50		500′	550′	600′	50′	100′-125′	400′	240′
55		550′	605′	660′	55′	110′-140′	500′	295′
60		600′	660′	720′	60′	120′-150′	600′	350′
65		650′	715′	780′	65′	130′-165′	700′	410′
70		700′	770′	840′	70′	140′-175′	800′	475′
75		750′	825′	900′	75′	150′-185′	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
	✓	✓		

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
2. Channelizing devices on the shoulder taper and tangent section may be omitted for short duration (less than 1 hour) work.
3. If line-of-sight requirements for surveying operations will preclude the placement of the Work Vehicle to protect workers, the channelizing devices mentioned in Note 2 are required.
1. 4. A Shadow Vehicle with a Truck Mounted Attenuator and flashing warning lights/arrow panel in caution mode may be used in lieu of the Work Vehicle to protect the work space.
5. The CW20-1D "ROAD WORK AHEAD" sign may be substituted for the CW21-6D "SURVEY CREW AHEAD" sign.
6. This plan may also be used for shoulder work or off shoulder work for multilane undivided roadways.
7. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

TCP(S-1a)

8. Cones may be placed at edge of pavement adjacent to the work space to enhance safety.

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision
1 Corrected misspelling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-1)-08A

REVISIONS
8-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

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0212	04	039	SH30

DIST	COUNTY	SHEET NO.
BRY	GRIMES	49

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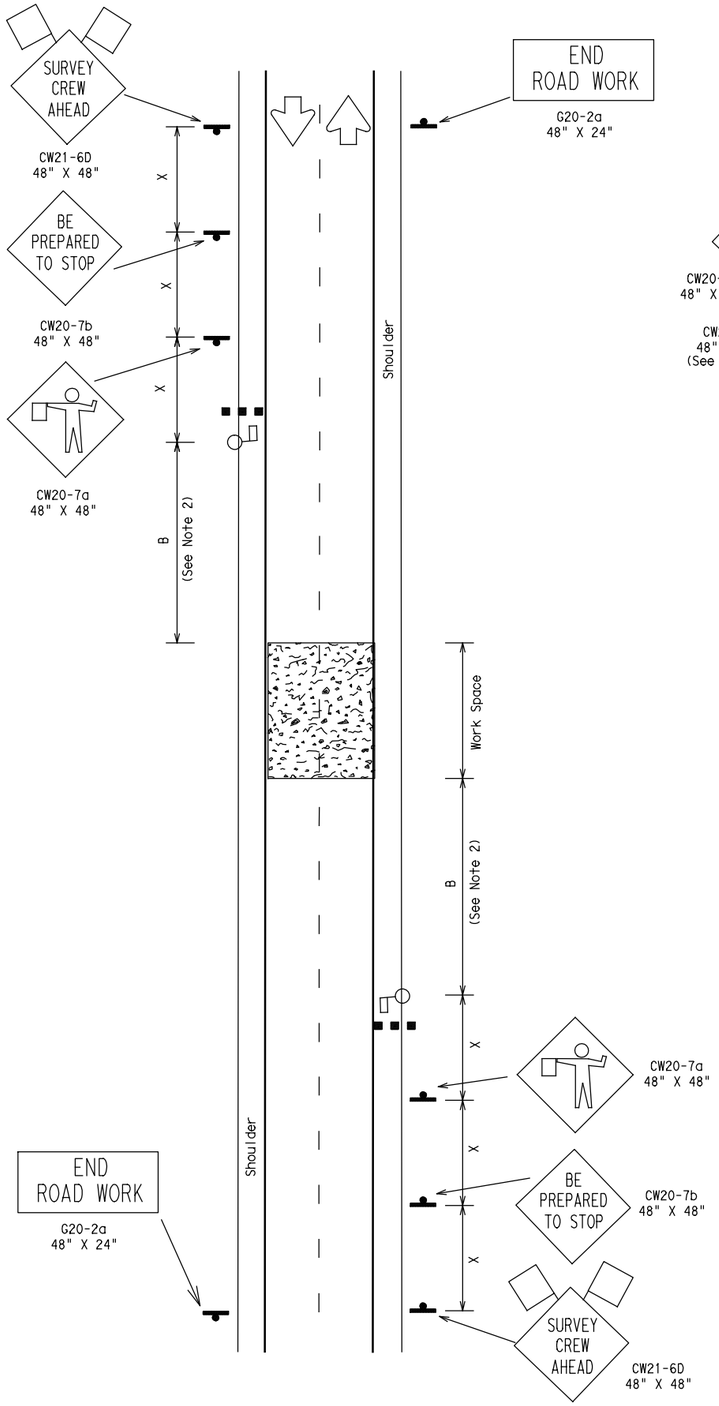
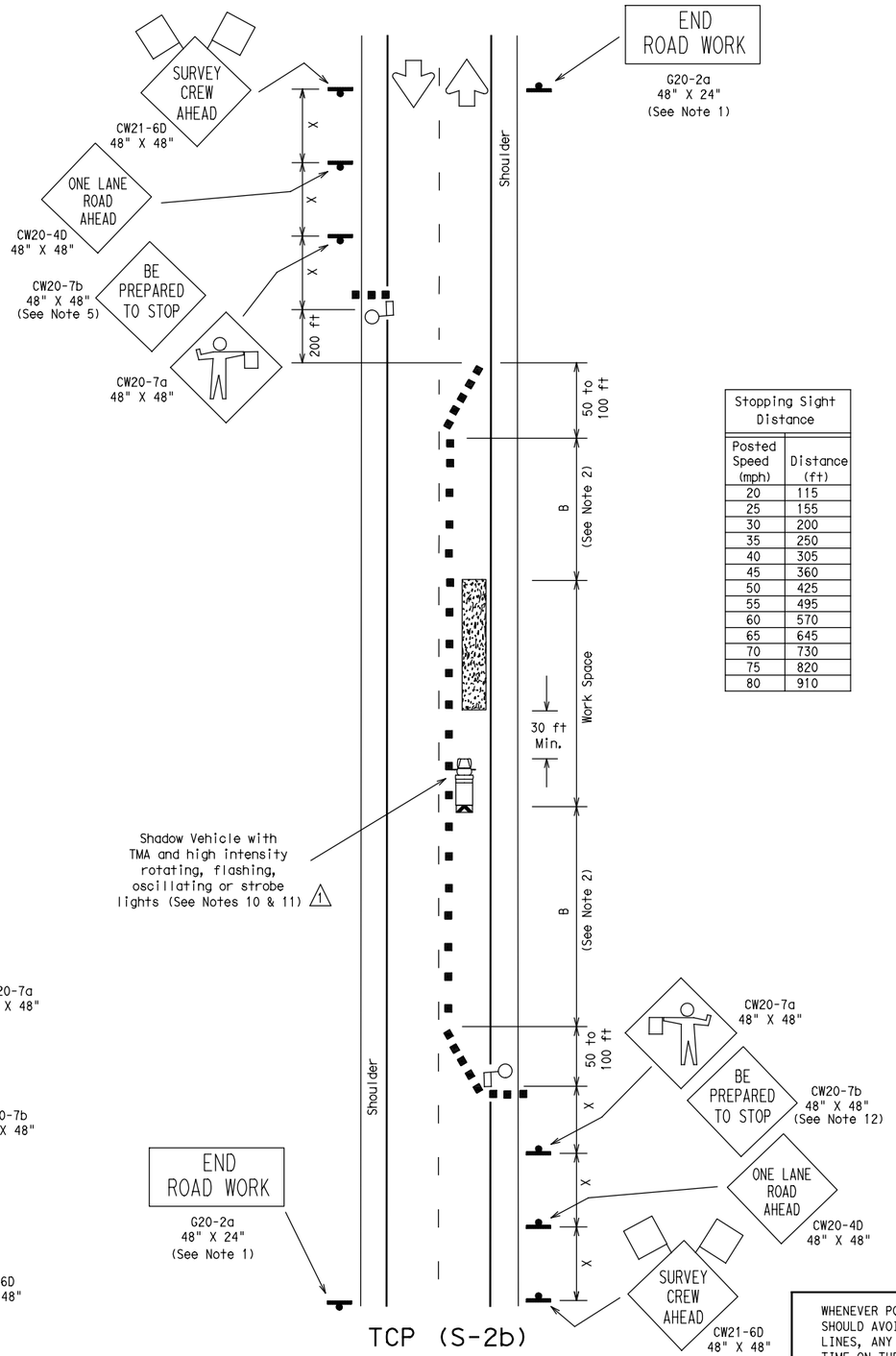


TCP (S-2a)
ROAD CLOSED FOR LESS THAN 20 MINUTES -
OFF PEAK TRAFFIC HOURS
WITH OR WITHOUT SHOULDERS



TCP (S-2b)
WORK IN ROADWAY
OFF PEAK TRAFFIC HOURS
WITH OR WITHOUT SHOULDERS

Stopping Sight Distance	
Posted Speed (mph)	Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

LEGEND

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

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10′ Offset	11′ Offset	12′ Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150′	165′	180′	30′	60′-75′	120′	90′
35		205′	225′	245′	35′	70′-90′	160′	120′
40		265′	295′	320′	40′	80′-100′	240′	155′
45	L=WS	450′	495′	540′	45′	90′-110′	320′	195′
50		500′	550′	600′	50′	100′-125′	400′	240′
55		550′	605′	660′	55′	110′-140′	500′	295′
60		600′	660′	720′	60′	120′-150′	600′	350′
65		650′	715′	780′	65′	130′-165′	700′	410′
70		700′	770′	840′	70′	140′-175′	800′	475′
75		750′	825′	900′	75′	150′-185′	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
	✓	✓		

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:
1. The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
2. Adequate Stopping Sight Distance (see Stopping Sight Distance table) should be maintained from approaching traffic to the flagger or a queue of stopped vehicles. The Buffer Space "B" should be extended around curves or other obstacles, when necessary, to have adequate Stopping Sight Distance to the flagger station.
3. Flaggers should use two-way radios or other means of communication while flagging.
4. The length of the work space should be based on the ability of the flaggers to communicate.
5. CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" signs.
6. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

TCP(S-2a)

7. Road closures shall be less than 20 minutes. Closures less than 5 minutes are desirable.
8. Sign spacing should be increased if traffic repeatedly queues past the CW20-7b "BE PREPARED TO STOP" sign.
9. The surveying instrument should not be located on the paved surface.

TCP (S-2B)

10. For short duration work the Shadow Vehicle with a TMA may be replaced by another Work Vehicle with high intensity rotating, flashing or strobe lights.
11. Shadow Vehicles with a TMA are desirable when workers or equipment are in the work space. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Shadow Vehicle.
12. The CW20-7b "BE PREPARED TO STOP" sign is optional. When used, it should be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign.

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision
1 Corrected referrence to notes.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-2)-08A

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
8-08

CONT	SECT	JOB	HIGHWAY
0212	04	039	SH30
DIST	COUNTY		SHEET NO.
BRY	GRIMES		50

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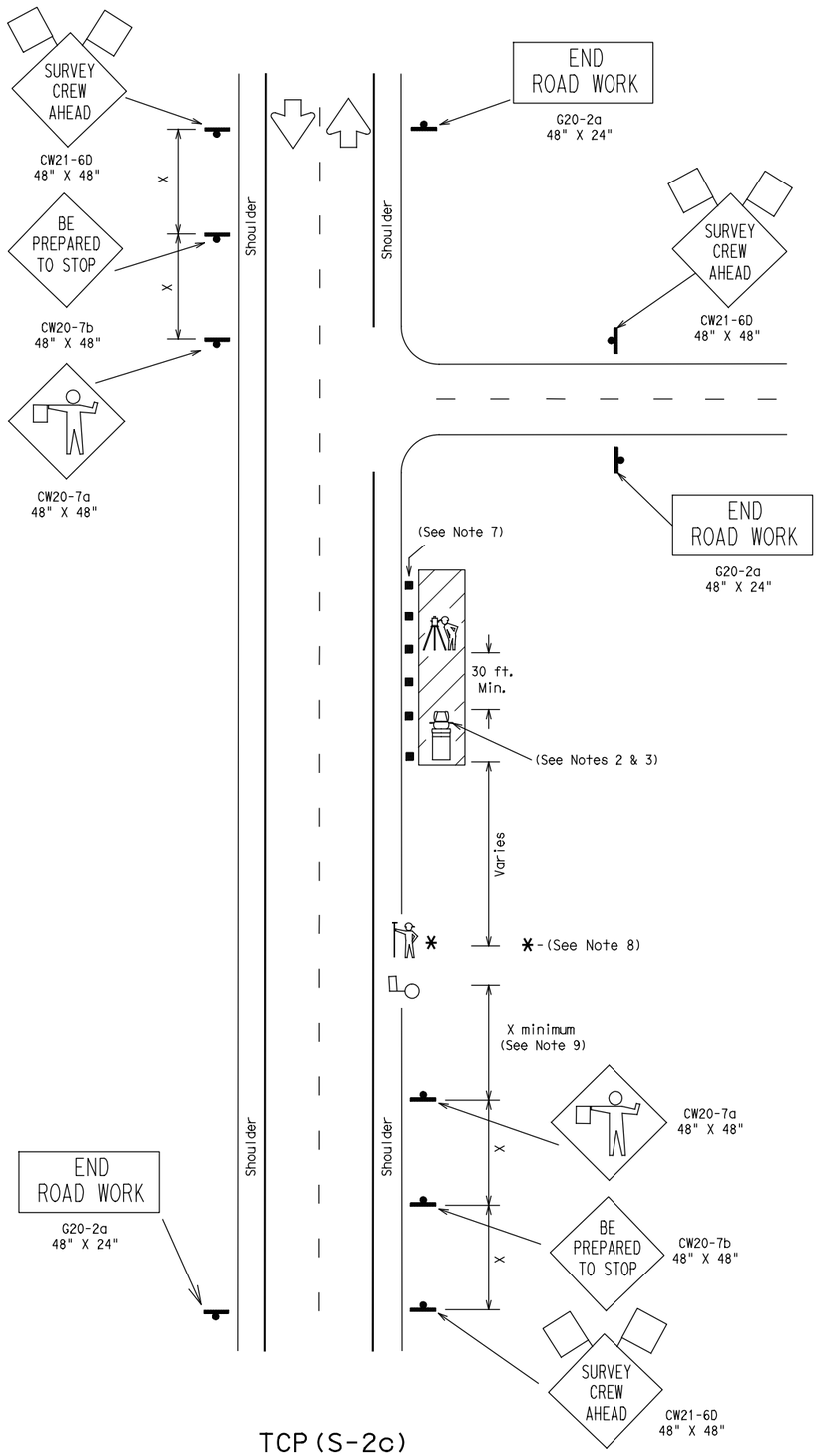

TCP(S-2c)

Stopping Sight Distance	
Posted Speed (mph)	Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

LEGEND

Type III Barricade ■ ■ Channelizing Devices Flag

Work Vehicle Truck Mounted Attenuator (TMA)

Flagger Sign Post Survey Rodman Instrument Person

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10′ Offset	11′ Offset	12′ Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150′	165′	180′	30′	60′-75′	120′	90′
35		205′	225′	245′	35′	70′-90′	160′	120′
40		265′	295′	320′	40′	80′-100′	240′	155′
45	L=WS	450′	495′	540′	45′	90′-110′	320′	195′
50		500′	550′	600′	50′	100′-125′	400′	240′
55		550′	605′	660′	55′	110′-140′	500′	295′
60		600′	660′	720′	60′	120′-150′	600′	350′
65		650′	715′	780′	65′	130′-165′	700′	410′
70		700′	770′	840′	70′	140′-175′	800′	475′
75		750′	825′	900′	75′	150′-185′	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
	✓	✓		

DEFINITIONS:

MOBILE - work that moves continously or intermittently (stopping up to approximately 15 minutes).

SHORT DURATION - work that occupies a location up to 1 hour.

SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
2. Work Vehicle with high intensity rotating, flashing, oscillating or strobe lights should be used to protect work space.
3. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Heavy Work Vehicle.
4. CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" SIGNS.
5. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads may be omitted when approved by the Engineer.
6. The Surveying Instrument shall not be located on the paved surface.
7. Cones at edge of pavement adjacent to instrument person may be omitted when approved by the Engineer.
8. Rodman may only enter roadway when accompanied by flagger and as traffic allows.
9. The distance between the advance warning signs and the work should not exceed a two mile maximum.
10. Flaggers and Survey Crew should use two-way radios or other means of communication.
11. Survey Crew and Flaggers shall wear high-visibility apparel meeting the ANSI 107-2007 standard performance for Class 2 or Class 3 risk exposure.
12. Additional traffic control devices may be required to address local site conditions.
13. Stopping Sight Distance shall be maintained from approaching traffic to the flagger. See "Stopping Sight Distance" table.

SURVEY PARTIES SHOULD AVOID ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

This TCP is to cover two lane rural type roadways as determined by the Engineer. All other type roadways will be covered by other established Survey TCP'S.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-2c)-10

REVISIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0212	04	039	SH30

DIST	COUNTY	SHEET NO.
BRY	GRIMES	51

212A

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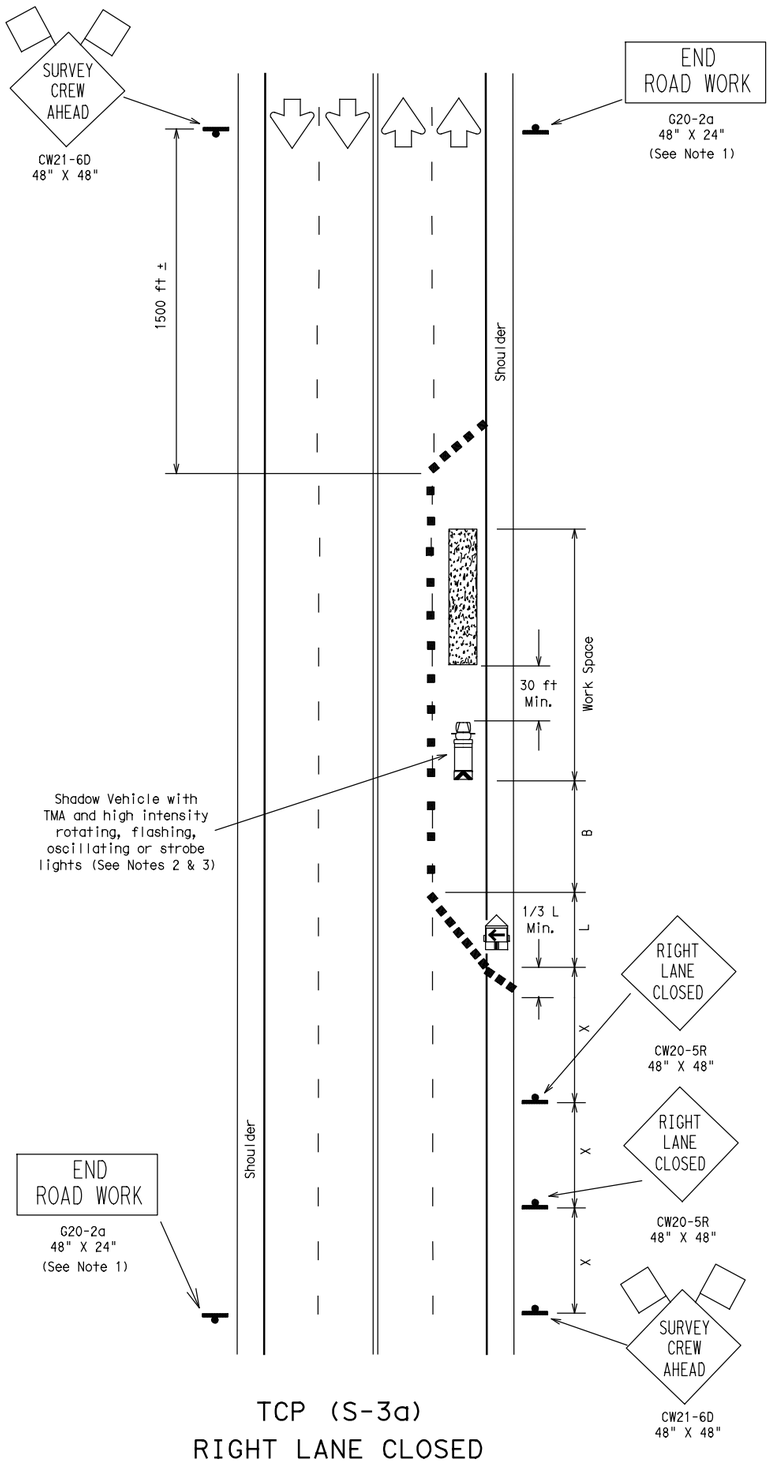
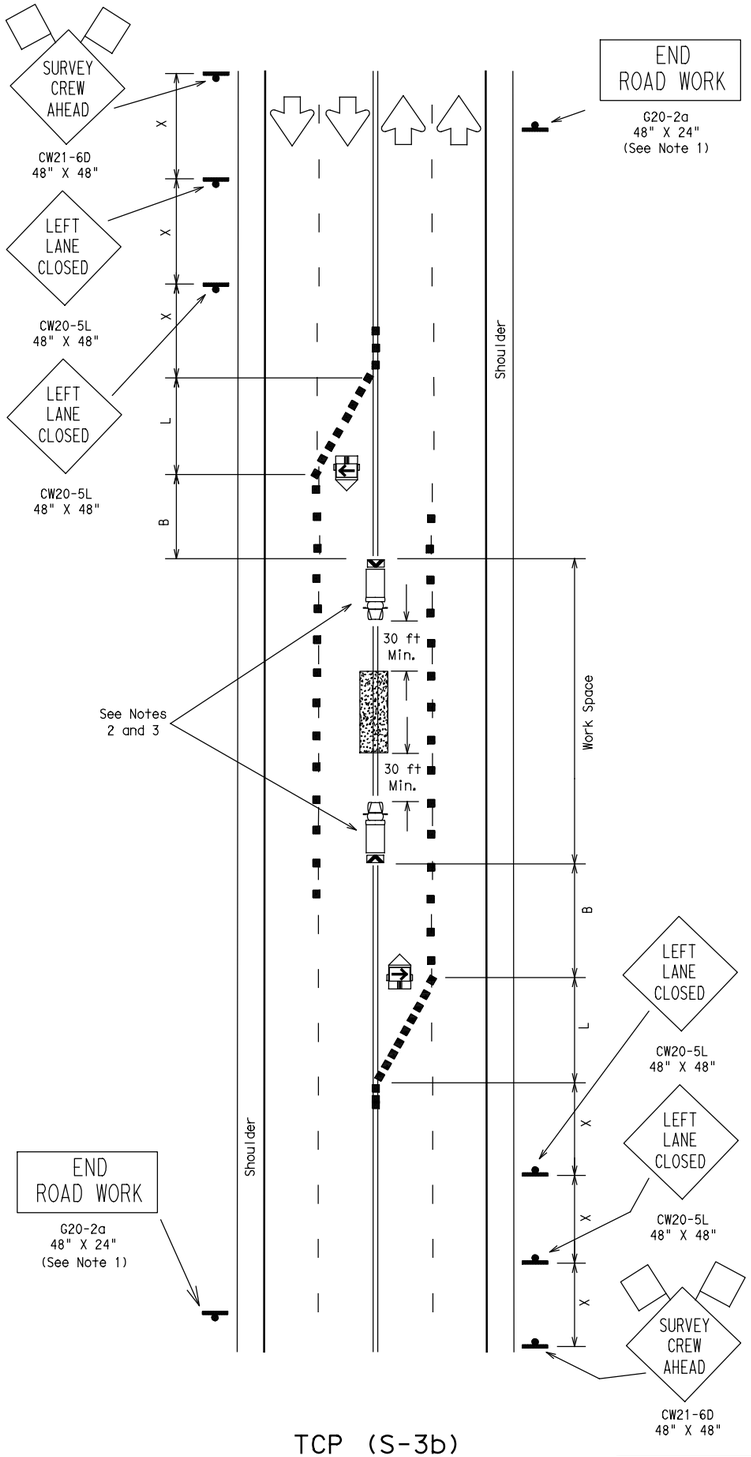


TCP (S-3a)
RIGHT LANE CLOSED
WITH OR WITHOUT SHOULDERS



TCP (S-3b)
WORK ON CENTERLINE

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

LEGEND

Type III Barricade ■ ■ Channelizing Devices Flag
Heavy Work Vehicle Truck Mounted Attenuator (TMA)
Trailer Mounted Flashing Arrow Panel (M) Portable Changeable Message Sign (PCMS)
Flagger Sign Post

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10′ Offset	11′ Offset	12′ Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150′	165′	180′	30′	60′-75′	120′	90′
35		205′	225′	245′	35′	70′-90′	160′	120′
40		265′	295′	320′	40′	80′-100′	240′	155′
45	L=WS	450′	495′	540′	45′	90′-110′	320′	195′
50		500′	550′	600′	50′	100′-125′	400′	240′
55		550′	605′	660′	55′	110′-140′	500′	295′
60		600′	660′	720′	60′	120′-150′	600′	350′
65		650′	715′	780′	65′	130′-165′	700′	410′
70		700′	770′	840′	70′	140′-175′	800′	475′
75		750′	825′	900′	75′	150′-185′	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
	✓	✓		

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:
1. The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
2. For short duration work the Shadow Vehicle with TMA may be replaced by another Work Vehicle with high intensity rotating, flashing or strobe lights.
3. Shadow Vehicles with a TMA are desirable when workers or equipment are in the work space. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Shadow Vehicle.
4. CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" signs.
5. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

TCP(S-3a)
6. If shoulders are not present, the 1/3L shoulder taper is to be omitted and four channelizing devices shall be placed in front of the arrow panel, perpendicular to traffic.

TCP(S-3b)
7. One CW20-5L "LEFT LANE CLOSED" sign in each direction may be omitted when the posted speed is less than 45mph and volume is less then 2000 ADT.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-3)-08

REVISIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0212	04	039	SH30

DIST	COUNTY	SHEET NO.
BRY	GRIMES	52

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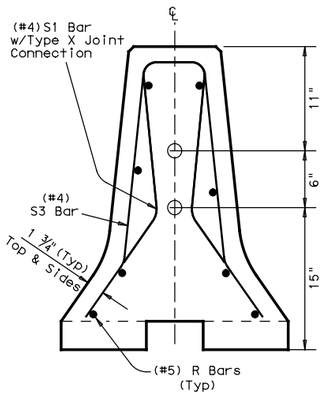
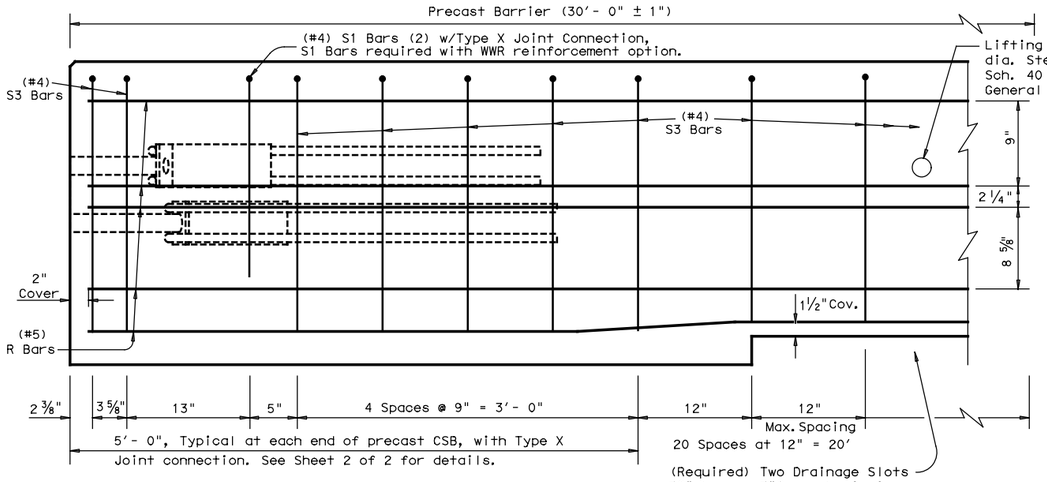


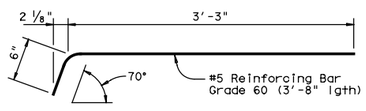
End View Precast Barrier

See sheet 2 of 3 for Joint connection Type X



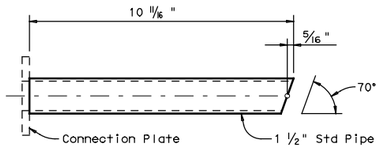
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)

Showing reinforcement for Joint Type X



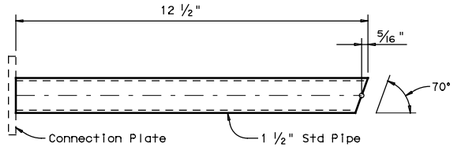
DEFORMED BAR ANCHOR DETAILS

Two (2) Bars required per assembly.
Eight (8) required per Joint.



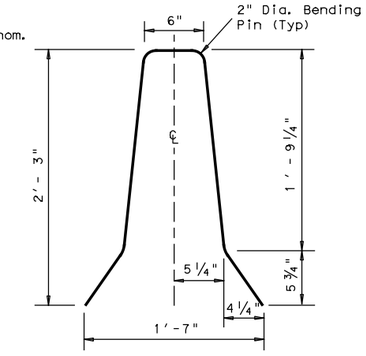
UPPER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Upper Assembly.
Two (2) required per Joint.



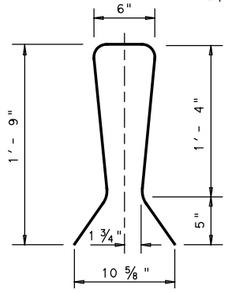
LOWER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Lower Assembly.
Two (2) required per Joint.



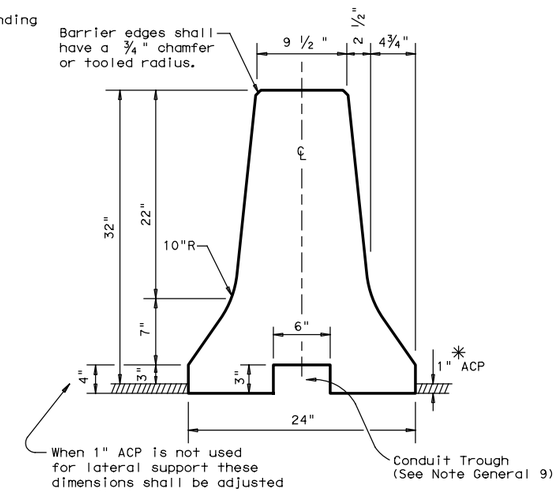
S3 Bar

#4 Bar



S1 Bar

#4 Bar (2)
(Joint Type X)

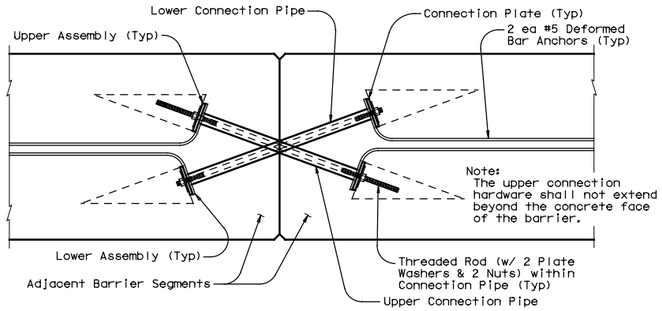


Concrete Safety Barrier

✳ When 1" ACP is "not" used as lateral support for permanent barrier placement. A permissible method of attaining the equivalent lateral support may be used, See CSB(6) sheet.

GENERAL NOTES

1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾" chamfer or tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. All steel assemblies for joint shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items involved.
9. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.



TYPE X JOINT INSTALLATION DETAIL

Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.

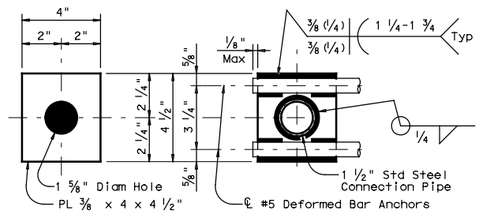
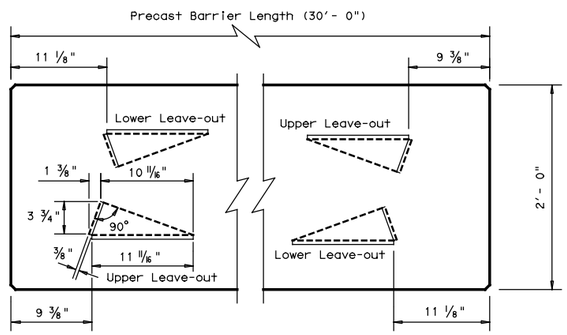


PLATE DIMENSIONS

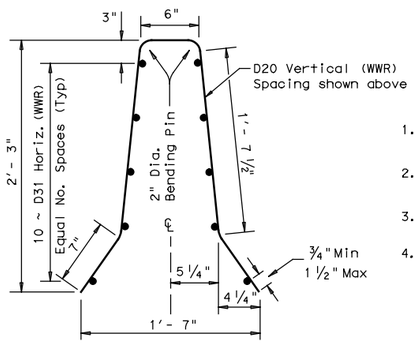
WELDING DETAILS

CONNECTION PLATE DETAILS

One (1) Plate required per assembly.
Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.



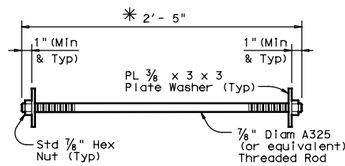
BARRIER PLAN AT END JOINTS



Welded Wire Reinforcement (WWR) Option for Bars R and S3

(WWR) General Notes

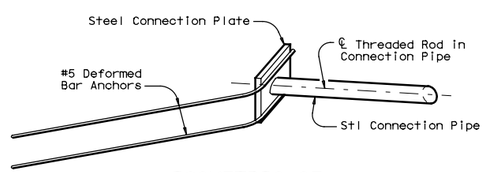
1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".



CONNECTION BOLT OR THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts)
(w/ Two (2) PL 3/8 x 3 x 3 Plate Washers & Two (2) Std Hex Nuts)
required per Joint.

✳ The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

Four (4) [2 Upper & 2 Lower] Assemblies required per Joint.

Weight of one Precast 30 ft. (CSB) segment = Approx. 6.5 Tons or 440 lbs per ft.

SHEET 1 OF 2

Texas Department of Transportation

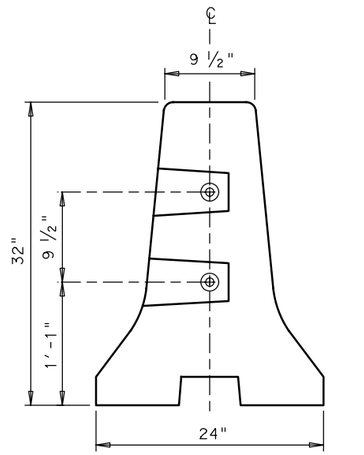
Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER (TYPE 1)

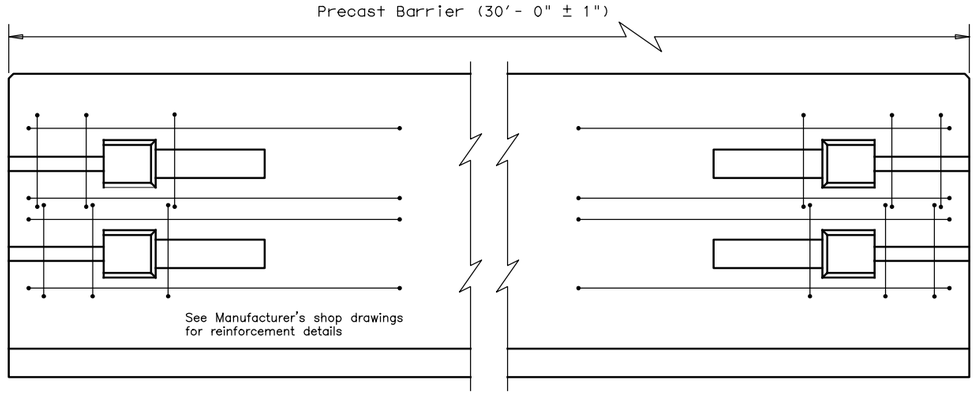
CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		53



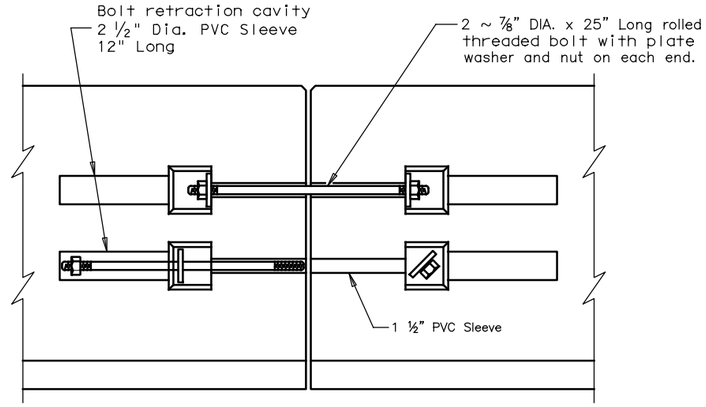
END VIEW (CSB) QUICK-BOLT

QUICK-BOLT POCKET LOCATIONS



ELEVATION (CSB) QUICK-BOLT

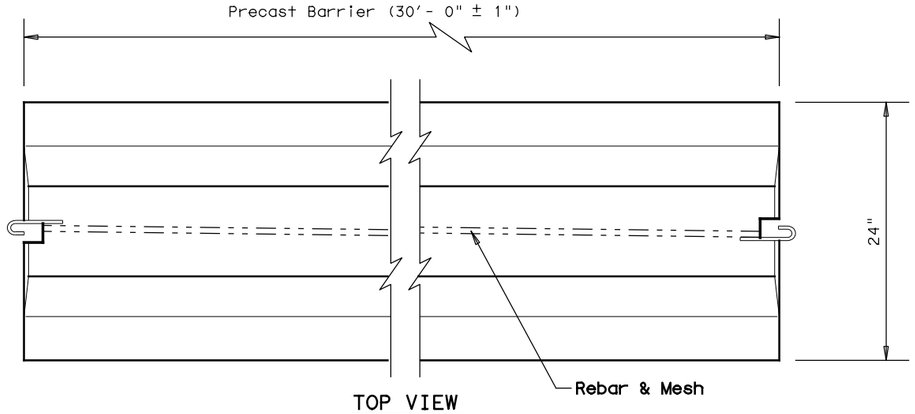
See Manufacturer's shop drawing for additional details



ELEVATION VIEW SHOWING JOINT CONNECTION

"QUICK-BOLT"

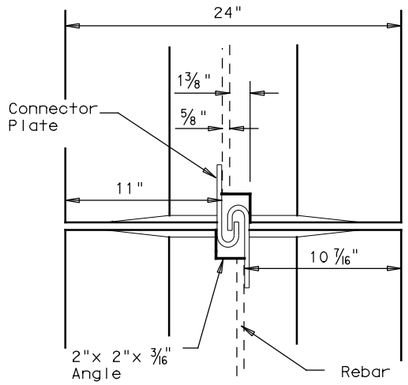
Joint Connection (Type Q)



TOP VIEW

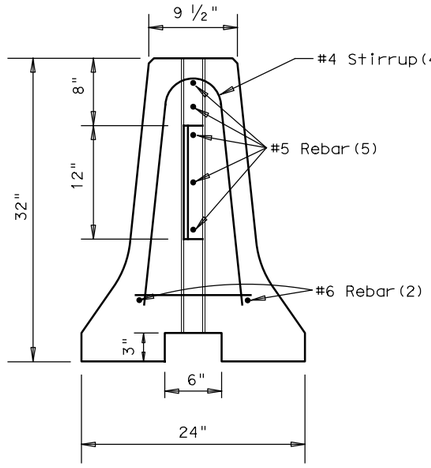
PRECAST (CSB) WITH J-J HOOKS

See Manufacturer's shop drawing for additional details



VIEW FROM ABOVE

J-J HOOK CONNECTION



END VIEW

J-J HOOK CONNECTION

Joint Connection (Type J)

Proprietary Joint Connections (CSB)

Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexar Concrete, (210)497-3773

If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.

Texas Department of Transportation

Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER
(TYPE 1)

CSB(1)-10

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©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		54

DATE: 8/17/2018 10:35:02 AM
FILE: c:\pwworking\central01\d0668969\csb110.dgn

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

3360G 5/8"x1¼" H.G.R. Bolt and 3340G Nuts
9852A 6"x3" Strut
984G side Pl 10 Ga both sides
9915A Spacer Channel w/hole for Cable ass'y. facing Post (2)
31G 12 Ga
Begin M.B.G.F. Length of need
19261G ½" Plate both sides
130A 10 Ga Slotted w/steel plate at Post (4)
19259G Washers (typ)
Rail is lapped such that over-sections face away from the nose (typ)
Note: Transition requirement, When a single sided transition section is required, see the MBGF transition standards for the proper installation.
End payment for Metal Thrie-Beam Guard Fence (LF)
*Change splice lap direction for uni-directional application
*Traffic
Median Barrier
Bracket A ℄ 9606A
Thrie-Beam (Nested-2 each side) rail (12 gauge)
End payment for CAT(EA), begin payment for Metal Thrie-Beam Guard Fence(LF)
983G Nose Plate 10 Ga
3275G ⅜" Rod & 4252G 4-Nuts w/2 4258G Wash
3395G Splice Bolts (typ)
9921G Tube
3000G
701A
9G
21G
"W" beam to Thrie-Beam transition rail (12 gauge) 974G
Traffic
Spacer Bracket Attachment Options:
(1) 2-⅝"x 15" post bolts 3550G through the barrier with rectangular washers 3320G
(2) 8 Expansion bolts 4406G to attach 2 brackets to the barrier (No bracket attachment to thrie-beam is required).
⅝"x 2" H.G.R. Splice Bolts 3400G & Nuts 3340G
PLAN VIEW
31'-3" Front Section
12' 6" End Section
18'- 9" Transition Section
6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 3'- 1½" 3'- 1½" 3'- 1½" 3'- 1½" 3'- 1½"
782G ⅝" Plate
19271G Pipe Sleeve
3380G ⅝"x 1½" Large Hex Hd Bolt & 3340G Nuts
3360G ⅝"x 1¼" H.G.R. splice Bolts and 3340G Nuts
3177B 18"x18" (2)Object markers
Pipe 705G Sleeve
2'-3"
5" Ground Line
3910G 2-1" Hex Nuts & 3900G 1-1" Washer each end of 3000G
705G Pipe Sleve (inserted into Post)
740G 6'x8" Tube (typ) at all Wood Posts
766G ¼" Plate (typ) at all Wood Posts
3320G (typ)
Rail ℄
See Thrie-Beam Terminal Connection Detail 980G
Option (1) above 2-15" thru Bolts 3550G with rectangular washers 3320G
⅝"x Ⓑ H.G.R. Bolts & Nuts(Typ.) (See table below)
3910G Double Nut at each end for locking
3012G ¾" Cable Assembly
9852A 6"x3" Strut
3320G Washer PL 1¾" x 3/16" x 3" Lg
ELEVATION VIEW
Note: There are no Rail to Post attachments for Posts (3), (5), & (6)

3100B Wood Block
9916A Sleeve
705G Pipe inserted in Post
782G ⅝" Plate
9852A Strut
766G Soil Plate
3650G ⅝"x 25" H.G.R. Post Bolt & 3340G Nut w/2 3320G Washers (cut off excess & peen thds)
3497G ⅝"x 9½" Large Hex Hd Bolt & 3340G Nut w/ 3300G Washer
3075B Wood Post (notched)
3478G ⅝"x 7½" Hex Hd Bolt and 3340G Nut
740G 6"x8"x4'-6" Tube
SECTION A-A (1)

3650G ⅝"x 25" H.G.R. Post Bolt & 3340G Nut w/2 3320G Washers
3101B Wood Block
Toe nail
3360G ⅝"x 1¼" H.G.R. Bolt and 3340G Nut (typ)
9852A Strut
705G Pipe inserted in Post
3074B Wood Post
766G Soil Plate
SECTION B-B (2)

3101B Wood Block
3 - 6 Minimum (typ)
4640G ⅝"x 24" Hex Hd Bolt & 3340G Nut w/2 3300G Wash
3497G ⅝"x 9½" Hex Hd Bolt and 3340G Nut
3074B Wood Post
3478G ⅝"x 7½" Hex Hd Bolt and 3340G Nut
740G 6"x8"x4'-6" Tube
⅛" x 2½" slotted holes for ⅝" bolts (typical)
SECTION C-C (3)&(5)

4470G ⅝"x 8" Hex Hd Bolt & 3340G Nut for 19261G Plates, Post 4 only
3101B Wood Block
9921G 6"x8" Tube located 4" down from top of Wood Post
3395G Splice Bolt & 3340G Nut w/2 19259G Wash (typ)
For Post (4) only
¾"
3263G ⅜"x 2" Lag Screws & 4257G Wash
3074B Wood Post
766G Soil Plate
SECTION E-E (4)&(6)

Note: 3395G Splice Bolts are used to allow telescoping action
⅝" Dia.
⅝"-11 Threads
1" Unthreaded
1¾"
3395G SPLICE BOLT

3275G ⅜" Rod w/4 4252G Nuts and 2 4258G Lock Washers
Lockwashers
⅜" Hex Nut
SECTION D-D

Steel Plate on Slotted 10 Ga Rail at Post (4)
DETAIL 1

21G W-Beam Guardrail
8" 8" 8"
Toe nail
9G W-Beam GR
14"
3101B
4062B
3650G
3340G
3320G
1'- 9"
3'- 8"
POSTS (7) (8)

Ⓐ 8" Ⓐ
Nested Thrie-Beam both sides at Posts (10) (11) & (12) only
22"
2'- 7"
3'- 4"
SECTION F-F Post (9) (10) (11) & (12)

9½"
3" 3½" 3"
⅛" x 2½" slotted holes for ⅝" bolts (typical)
1¼"
2¾"
4"
7⅜"
7⅝"
3⅜"
9606A
5"
¾"
1¼"
BRACKET "A" DETAILS
AT C.T.B. (1" ACP Key-in)
¼" steel plate or section of rectangular tubing with flanges welded on to the satisfaction of the Engineer

Post	Ⓐ Block Width	Product Code	Ⓑ Post Bolt Length	Product Code
9	6 ½"	3409B	24"	3640G
10	5 ½"	3408B	22"	3620G
11	4 ½"	3407B	20"	3600G
12	3 ½"	3406B	18"	3580G

** Modifications (as approved by the Engineer) in bracket design will be required for other barrier configurations.

Post to be refitted in field as approved by the Engineer
Varies with curb type (approx 6 ½" for Type II Curb & Gutter)
4"max
28"
6¼"
21"
3'- 6"
Post Length
4'- 6" Tube
Width of plate reduced in the field at curb locations as approved by the Engineer
TYPICAL CURB PLACEMENT

SHEET 1 OF 2

Texas Department of Transportation
Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION CRASH CUSHION (CONCRETE BARRIER)

CATCB(1)-17

FILE: catcb17.dgn	DN: TxDOT	CK: KM	DW: BD	CK: VP
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REVISIONS REVISED 03,2016 VP REVISED 03,2017 KM	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		55

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

CATCB FRONT SECTION (POSTS 1 THRU 6)

BILL OF MATERIAL

Mfr Code #	QTY	DESCRIPTION
983G	1	Nose Plate (10 Ga)
984G	2	Side Plate (10 Ga)
31G	2	"W" Beam 12 Ga x 13'-6 1/2"
130A	2	"W" Beam 10 Ga x 13'-6 1/2"
9852A	1	Channel Strut x 6'-6"
740G	6	Steel Foundation Tube
766G	6	Soil Plate 18"x 24"
3075B	1	Wood Post 5 1/2" x 7 1/2" (Notched) (Post 1)
3074B	5	Wood Post 5 1/2" x 7 1/2"(Post 2-6)
3100B	2	Wood Block 5 1/2" x 7 1/2"(Post 1)
3101B	10	Wood Block 5 1/2" x 7 1/2"(Post 2-6)
9916A	1	Sleeve (Post 1)
9915A	1	Spacer Channel (Post 2)
9921G	2	Steel Tube (Posts 4 & 6)
19271G	1	Pipe Sleeve (Post 1)
705G	1	Pipe Sleeve (Post 2)
19261G	2	Post Plate (Post 4)
782G	1	Bearing Plate (Post 1)
3012G	1	Cable Assembly(Posts 1 to 2)
3275G	2	3/8" Restraint Rod(Post 3 & 5)
19259G	32	Plate Washer (Posts 4 & 6)

HARDWARE

3263G	4	3/8" x 2" Lg Lag Screw
4252G	8	3/8" Hex Nut
4258G	4	3/8" Lock Washer
4257G	4	3/8" Flat Washer
3320G	4	Rectangular Washer
3395G	32	5/8" x 1 3/4" H.H. Splice Bolt
3650G	2	5/8" x 25" Lg H.G.R. Bolt
4640G	8	5/8" x 24" Lg H.H. Bolt
3478G	13	5/8" x 7 1/2" Lg H.H. Bolt
3380G	8	5/8" x 1 1/2" Lg H.H. Bolt
3360G	16	5/8" x 1 1/4" Lg H.G.R. Bolt
3340G	85	5/8" H.G.R. Nut
3300G	8	5/8" Flat Washer
3497G	6	5/8" x 9 1/2" Lg H.H. Bolt
3910G	4	1" Hex Nut
3900G	2	1" Flat Washer

CATCB GUARDRAIL TERMINAL END SECTION (POSTS 7 & 8)

BILL OF MATERIAL

Mfr Code #	QTY	DESCRIPTION
4064B	2	Wood Post 5 1/2" x 7 1/2" x 6'
3101B	4	Wood Block 5 1/2" x 7 1/2"
21G	1	"W" Beam Guard Rail (12 Ga)
9G	1	"W" Beam Guard Rail (12 Ga)
701A	1	Bracket
782G	1	Bearing Plate
705G	1	Pipe Sleve
3000G	1	Cable Assembly
3320G	2	Rectangular Washer

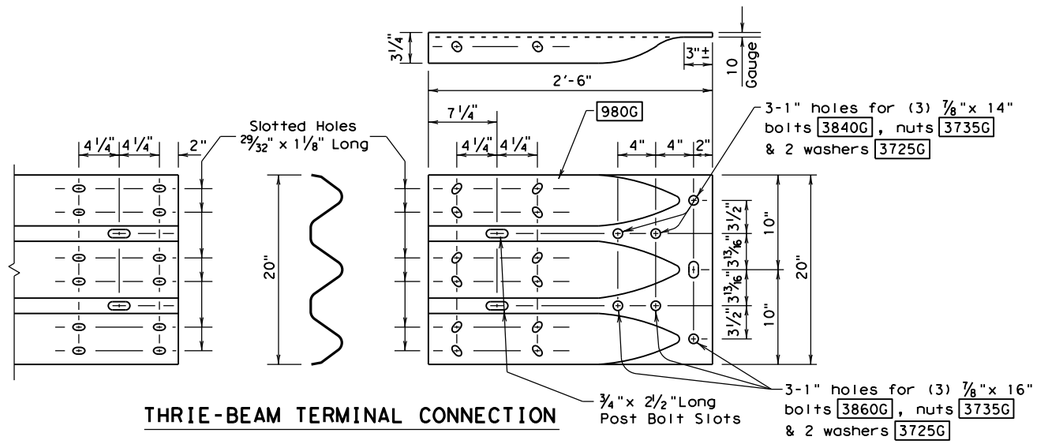
HARDWARE		
3360G	24	5/8" x 1 1/4" H.G.R. Splice Bolt
3400G	4	5/8" x 25" H.G.R. Post Bolt
3380G	8	5/8" x 1 1/2" Hex Hd Bolt
3340G	28	5/8" H.G.R. Nut
3300G	8	5/8" Washer
3910G	4	1" Hex Nut
3900G	2	1" Washer

CATCB TRANSITION SECTION (POST 9 THRU END SHOE)

BILL OF MATERIAL

	Mfr Code #	QTY	DESCRIPTION
	211G	4	Thrie beam 12'-6"(12 Ga)
	974G	2	Trans panel 6'-3"(12 Ga)
	980G	2	Special Thrie beam end shoe
	3078B	3	Wood Post 6"x 8"x 6', (Posts11&12)
	3320G	20	Rectangular Washer
	3340G	62	5/8" H.G.R. Nut
	3400G	52	5/8" x 2" Splice Bolt
	3406B	2	22 1/2" Block 6"x 3 1/2" (Post 12)
	3407B	2	22 1/2" Block 6"x 4 1/2" (Post 11)
	3408B	2	22 1/2" Block 6"x 5 1/2" (Post 10)
	3409B	2	22 1/2" Block 6"x 6 1/2" (Post 9)
	3412B	1	Wood Post 6"x 8"x 6', (Posts 9)
*	3560G	2	5/8" x 16" Bolt
*	4406G	8	5/8" x 3 3/4" Expansion Bolts w/Nuts
	3580G	2	5/8" x 18"Post Bolt (Post 12)
	3600G	2	5/8" x 20"Post Bolt (Post 11)
	3620G	2	5/8" x 22"Post Bolt (Post 10)
	3640G	2	5/8" x 24"Post Bolt (Post 9)
	3725G	12	7/8" Washer (End Shoe Bolts)
	3735G	6	7/8" Hex Nuts (End Shoe Bolts)
	3840G	3	7/8" x 14" Hex Bolt (End Shoe)
	3860G	3	7/8" x 16" Hex Bolt (End Shoe)
	9606A	2	Spacer Bracket
	Delineation		
	3177B	2	Object Marker 18"x 18" (Cut to fit)
	Optional Hardware for Single Slope Barrier-42"		
	3640G	2	5/8" x 24" Bolt
	4896G	6	7/8" x 24" Hex Bolt (End Shoe)

* Expansion or through bolts may be used with optional bracket installation.



THRIE-BEAM TERMINAL CONNECTION

GENERAL NOTES

1. For specific information regarding installation and technical guidance of the system, contact: Trinity Highway at 1(888)323-6374. 70 W. Madison St. Suite 2350. Chicago, IL 60602
2. Crown will be widened to accommodate the CAT system. The crown should extend at least 3 feet beyond the inside face of rail. The ground line at posts should be an extension of the roadway surface crown.
3. All bolts, nuts, washers, cable assemblies, cable anchors, post tubes, backup plates, and soil plates shall be galvanized.
4. The exposed end segment of an "End Section" should be evaluated as a potential obstacle in the determination of the need of MBGF for the opposing direction of traffic.
5. For placement at curb sections, the height from gutter pan to post bolt will be 21", and the front section shall be flared (See Detail 2).
6. The wood blockouts shall be "toe nailed" to the rectangular wood posts to prevent them from turning when the wood shrinks.
7. Either 6"- 8" or 5 1/2"x 7 1/2" wood blocks may be used at posts 1 thru 8 as supplied by the manufacturer.
8. If a "single sided" transition section is required for the attachment to a rigid concrete rail, see the MBGF transition standards for the proper installation.
9. Object markers shall be installed on the front of the terminal as detailed on the D&OM(VIA).

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Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION CRASH CUSHION (CONCRETE BARRIER)

CATCB(1)-17

FILE: catcb17.dgn	DN: TxDOT	CK: KM	DW: BD	CK: VP
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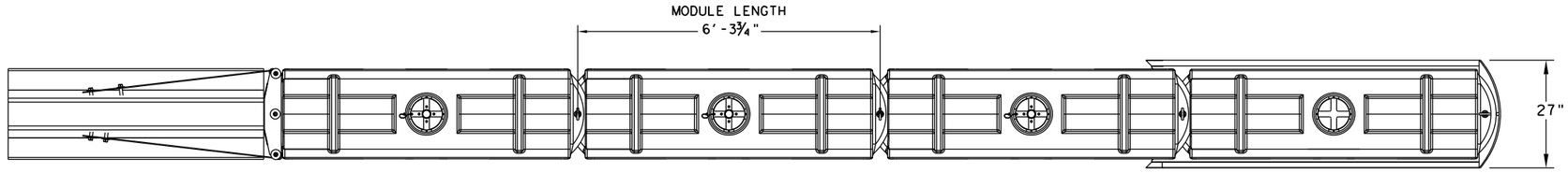
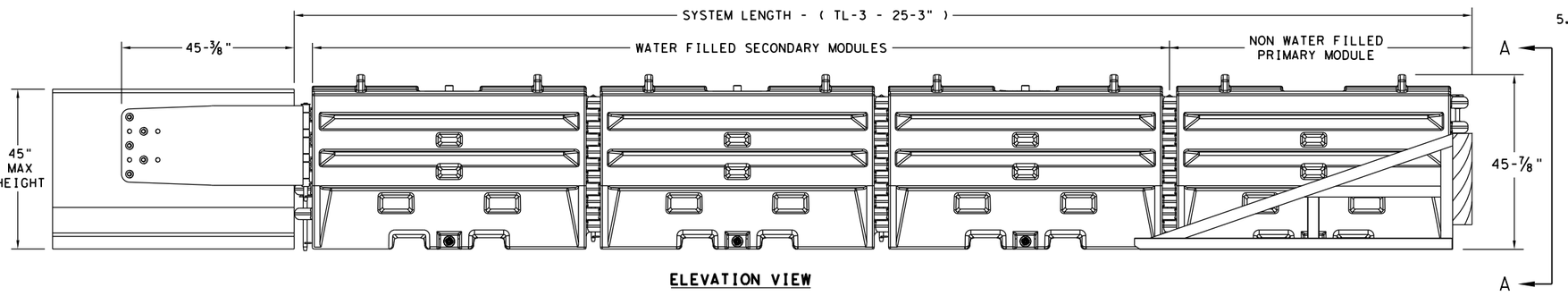
REVISIONS REVISED 03,2016 VP REVISED 03,2017 KM	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		55A



PLAN VIEW



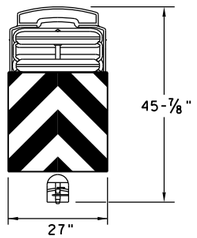
ELEVATION VIEW

GENERAL NOTES

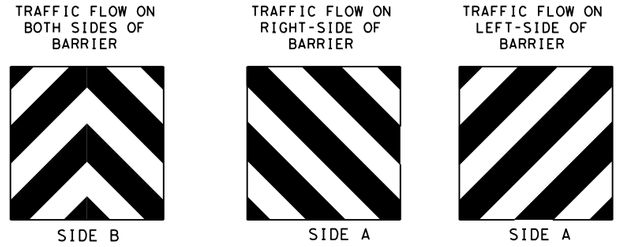
1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
3. MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES) (14%).
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
5. THE SLED SYSTEM CAN BE ATTACHED TO:

- CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
- STEEL BARRIER
- PLASTIC BARRIER
- CONCRETE BRIDGE ABUTMENTS
- W-BEAM GUARD RAIL
- THRIE BEAM GUARD RAIL

TEST LEVEL	NUMBER OF SECONDARY MODULES	SYSTEM LENGTH
TL-3	3	25' 3"

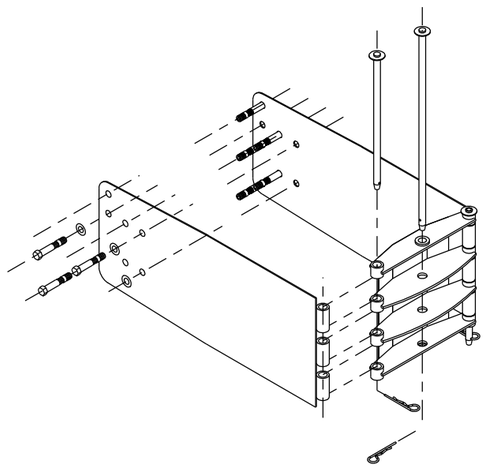


SECTION A-A



NOSE SHEETING PANEL DELINEATION

NOTE:
SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

NOTE:
SEE MANUFACTURER'S INSTALLATION MANUAL FOR FURTHER DETAILS.

TRANSITION OPTIONS
SLED TRANSITION TO CONCRETE TRAFFIC BARRIER (TEMPORARY OR PERMANENT)
SLED TRANSITION TO STEEL TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO PLASTIC TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO W-BEAM OR THRIE BEAM GUARD RAIL (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO CONCRETE BRIDGE ABUTMENT

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

BILL OF MATERIAL

PART NUMBER	DESCRIPTION	QTY: TL-3
45131	TRANSITION FRAME, GALVANIZED	1
45150	TRANSITION PANEL, GALVANIZED	2
45147-CP	TRANSITION SHORT DROP PIN W/ KEEPER PIN, GALVANIZED	2
45148-CP	TRANSITION LONG DROP PIN W/ KEEPER PIN, GALVANIZED	1
45050	ANCHOR BOLTS	9
12060	WASHER, 3/4" ID X 2" OD	9
45044-Y	SLED YELLOW WATER FILLED MODULE	3
45044-YH	SLED YELLOW "NO FILL" MODULE	1
45044-S	CIS (CONTAINMENT IMPACT SLED), GALVANIZED	1
45043-CP	T-PIN W/ KEEPER PIN	4
18009-B-I	FILL CAP W/ "DRIVE BY" FLOAT INDICATOR	3
45033-RC-B	DRAIN PLUG	3
45032-DPT	DRAIN PLUG REMOVAL TOOL	1

Texas Department of Transportation — Design Division Standard

SLED
CRASH CUSHION
TL-3 MASH COMPLIANT
(TEMPORARY, WORK ZONE)
SLED-19

FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
©TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		56

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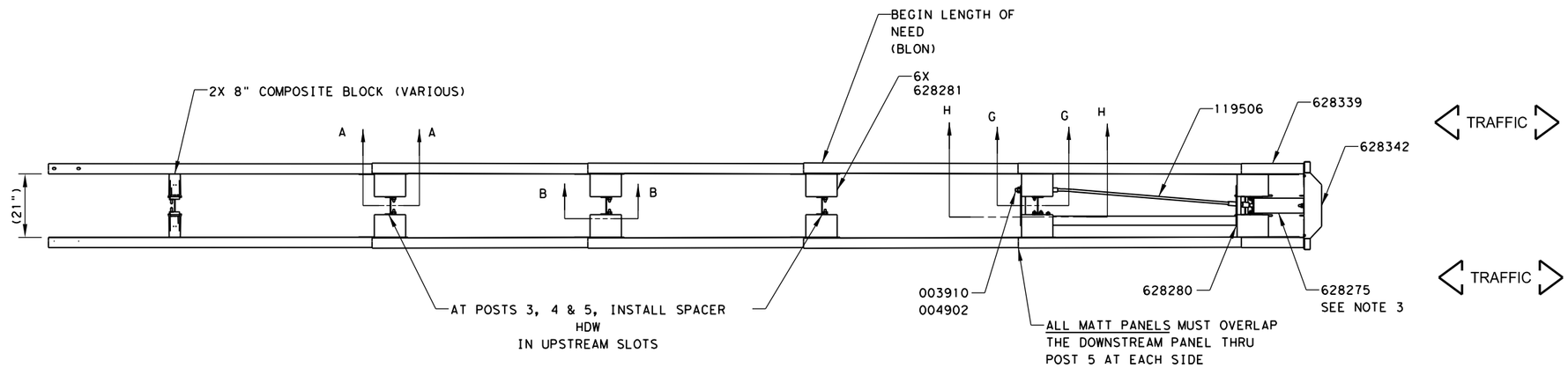
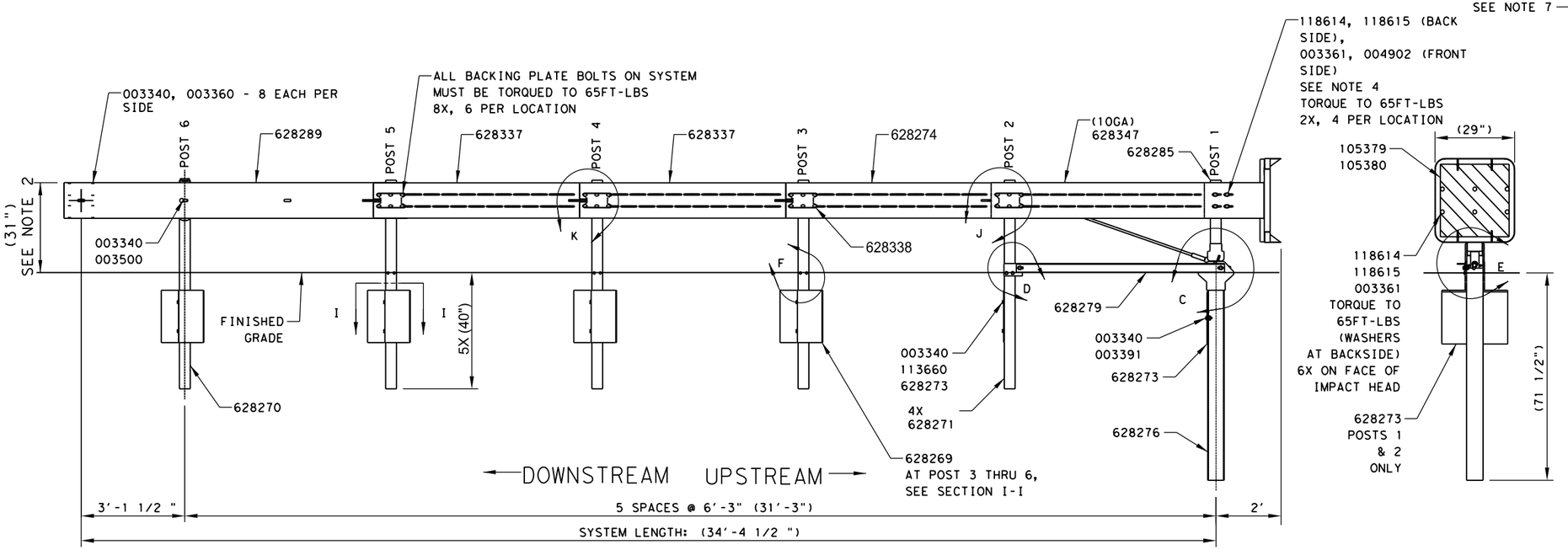




PARTS LIST		
PART NO.	DESCRIPTION	QTY.
628276	MATT CR POST #1 BOTTOM	1
628271	6'0POST/W6X8.5/7/S PL/SYT	4
628285	MATT CR POST #1 TOP	1
628280	MATT DOUBLE SPACER	2
628281	MATT SINGLE SPACER	6
628279	MATT ANGLE GROUND STRUT	1
003340	5/8" GR HEX NUT	36
033909	CRP-CBL BRKT FOR CRP PST	1
119506	CBL 3/4X7'5"/DBL SWG	1
003910	1" HEX NUT A563	2
628289	MATT 12G TRANS,W FIN-4	2
628337	MATT 12G INT,W FIN-3	4
628274	MATT 12G,W/O FIN-2	2
628342	MATT IMPACT HEAD	1
628275	MATT HEAD TUBE	1
628339	MATT 10G HEAD RAIL	2
628338	MATT BACKING PLATE	8
SEE NOTE 7 → 118614	BOLT,RAIL,5/8X2,A325/G5,G	62
118615	WASHER,FLAT,5/8,THICK,G	62
003361	5/8" HVY HEX NUT A563 DH	66
003360	5/8"X1.25" GR BOLT	16
003391	5/8"X1.75" HEX BOLT A325	6
004211	5/16"X1.75 HXBTA307 1-1/8	2
003240	WASHER,FLAT,5/16 W,TY A,G	2
003245	5/16" HEX NUT A563	2
628348	MATT STRUT ADAPTER PLATE	1
628347	MATT 10G FRONT,W/O FIN-1	2
004902	1" ROUND WASHER F436	10
004372	WASHER,FLAT,5/8,HRD,TY1,G	8
003403	5/8"X2" HEX BOLT A307	6
628270	6'0 POST/W6X8.5/7/S PL	1
003500	5/8"X10" GR BOLT A307	2
113660	BOLT,HX,5/8X3 1/2,G5,G	10
628273	1/4"X18"X24" SOIL PL/4 H	2
628269	1/4"X15"X17" SOIL PL/MULT	4
118009	WASHER,FLAT,1/2X1 3/8,G	8
115939	NUT,HX,1/2,A563,G	4
113457	BOLT,HX,1/2X1 1/2,G2,G	4
VARIOUS	8" NOM DEPTH COMPOSITE BLOCKS	2
SEE TABLE	DELINEATION	REF

TABLE	
PART NO.	DESCRIPTION
105379	REF 25X25 BLK/YEL MEDIAN
105380	REFL 25X25 BLK/YEL GORE

NOTES:
1. PROPER SITE GRADING MUST BE ACCOMPLISHED BEFORE ASSEMBLY AND IN ACCORDANCE WITH STATE/SPECIFYING AGENCY GUIDELINES AND/OR THE AASHTO ROADSIDE DESIGN GUIDE.
2. GUARDRAIL INSTALLATION HEIGHT TO BE 31" ABOVE FINISHED GRADE, +1", -0".
3. PRIOR TO TIGHTENING HARDWARE PUSH IMPACT HEAD UNTIL P/N 628275 TOUCHES UPPER PORTION OF POST 1.
4. ENSURE 004902 IS APPROXIMATELY CENTERED WITH P/N 118614 PRIOR TO TIGHTENING
5. THE INTEGRATED FINS IN THE PROVIDED MATT™ GUARDRAIL PANELS ARE ALWAYS POSITIONED UPSTREAM.
6. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL PANELS WITHIN THE MATT™ BE CURVED OR RADIUSED.
7. ALL 62 LOCATIONS OF 118614 MUST BE TORQUED TO 65FT-LBS. (+/- 3 FT-LBS.)
8. ALL FASTENERS NOT REQUIRED TO BE TORQUED SHALL BE TIGHTENED TO A SNUG POSITION WITH A MINIMUM OF 2 BOLT THREADS PROTRUDING BEYOND THE NUT.
9. SEE MATT PRODUCT MANUAL FOR SOIL PLATE, STRUT AND ANCHOR CABLE ORIENTATION/LOCATION AS WELL AS SPECIFIC LAPPING GUIDANCE.

SACRIFICIAL

SHEET 1 OF 2

Texas Department of Transportation

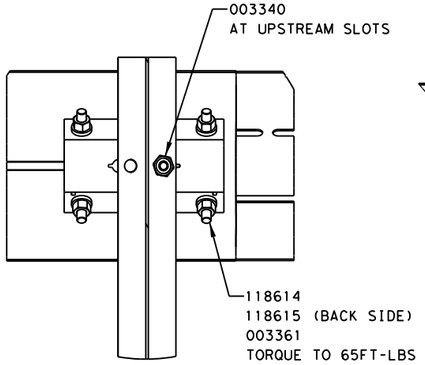
DESCRIPTION

Design Division Standard

MATT (MEDIAN ATTENUATING TREND TERMINAL) (MASH TL-3)

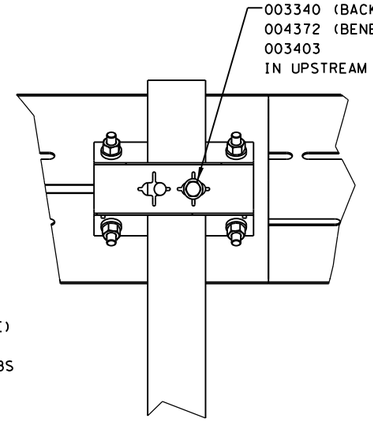
MATT(1)-23

FILE: Matt23.dgn	DN: TxDOT	CK:KM	DW: CES	CK:
©TxDOT:2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		56A



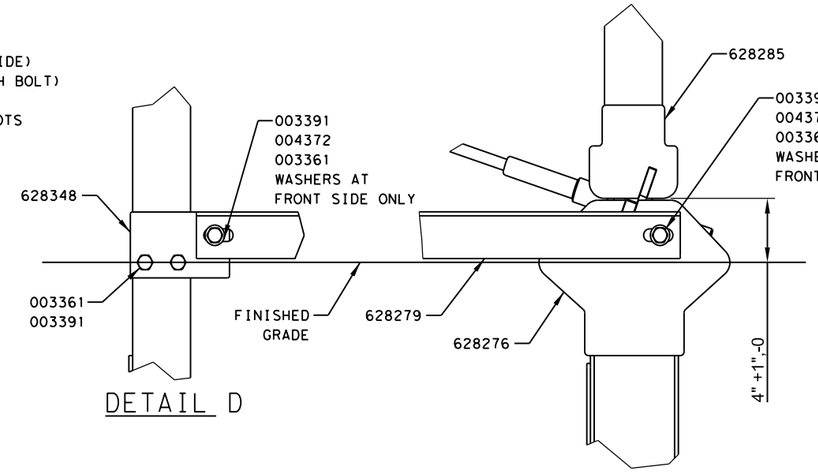
SECTION A-A

TYP AT SINGLE SPACERS ON POSTS 3,4,5
USE UPSTREAM SLOTS ONLY



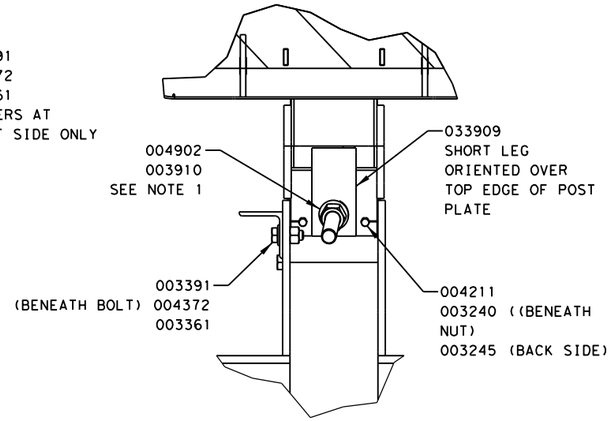
SECTION B-B

TYP AT SINGLE SPACERS ON POSTS 3,4,5
USE UPSTREAM SLOTS ONLY

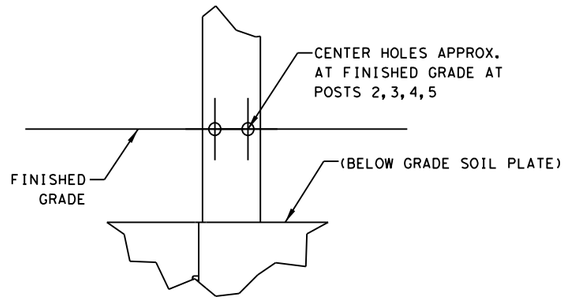


DETAIL D

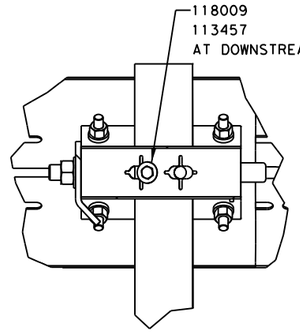
DETAIL C



DETAIL E

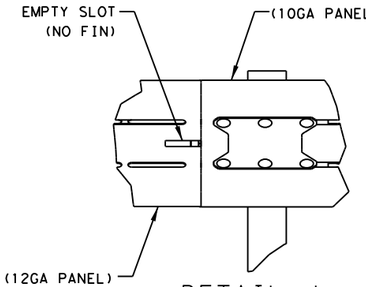


DETAIL F



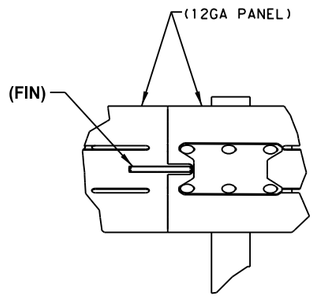
SECTION H-H

TYP AT DOUBLE SPACER ON POSTS 1 & 2



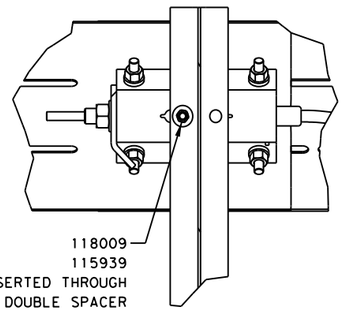
DETAIL J

POST 2 ONLY



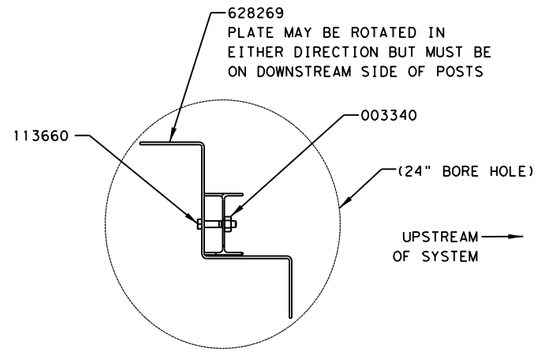
DETAIL K

TYP AT POSTS 3, 4, 5



SECTION G-G

TYP AT DOUBLE SPACER ON POSTS 1 & 2



SECTION I-I

TYP POSTS 3 THRU 6

NOTES:

1. TIGHTEN CABLE UNTIL TAUT. CABLE IS CONSIDERED TAUT WHEN IT DOES NOT DEFLECT MORE THAN 1" WHEN PRESSURE IS APPLIED BY HAND IN AN UP AND DOWN DIRECTION. RESTRAIN THE CABLE WITH PIPE WRENCH OR LOCKING PLIERS WHILE TIGHTENING NUT WITH A WRENCH TO PREVENT CABLE FROM TWISTING.
2. GUARDRAIL INSTALLATION HEIGHT TO BE 31" ABOVE FINISHED GRADE, +1", -0".
3. REFER TO MATT™ ASSEMBLY MANUAL FOR ADDITIONAL DETAILS.
4. ONLY ATTACH THE MATT™ DIRECTLY TO OTHER STRONG POST DOUBLE SIDED W-BEAM GUARDRAIL SYSTEMS, SEE MANUAL FOR DETAILS.

DATE:
FILE:

SACRIFICIAL

Texas Department of Transportation

Design Division Standard

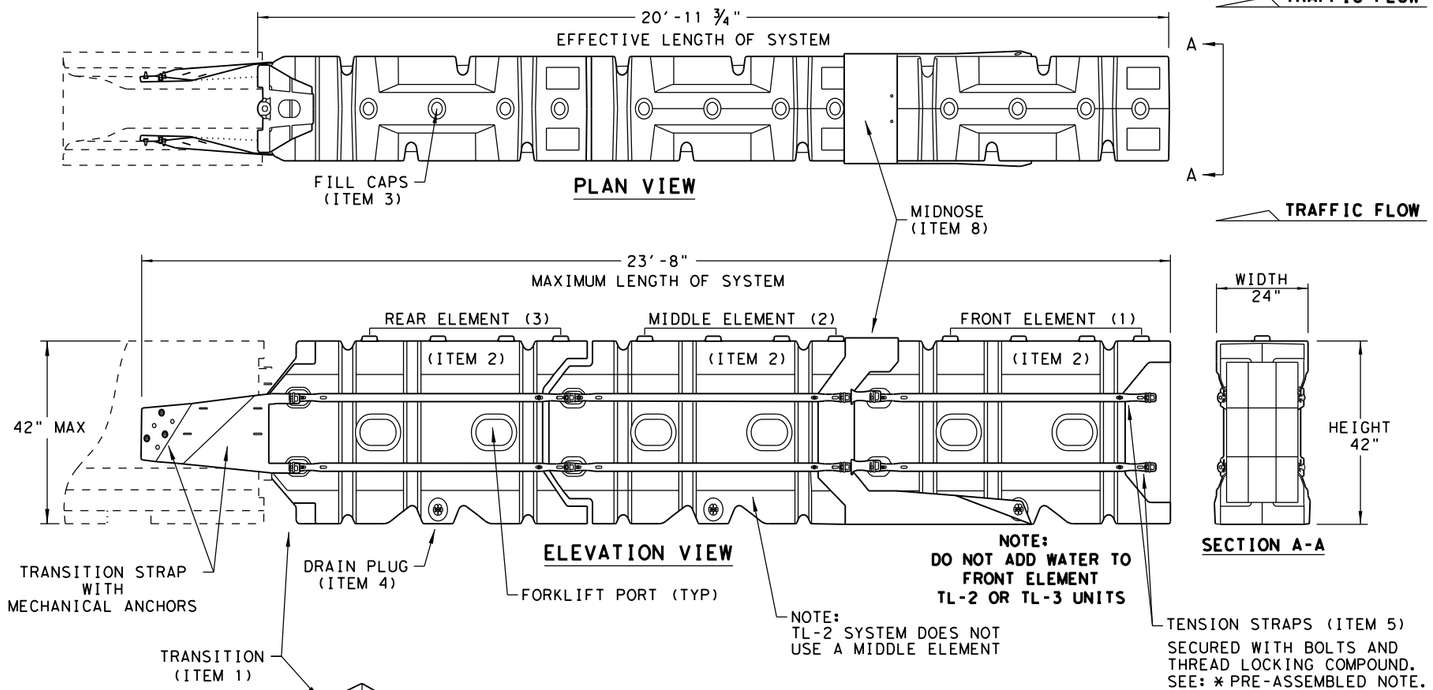
MATT
(MEDIAN ATTENUATING TREND TERMINAL)
(MASH TL-3)

MATT(1)-23

FILE: Matt23.dgn	DN: TxDOT	CK: KM	DW: CES	CK:
© TxDOT: 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		56B

DATE:
FILE:

SYSTEM SHOWN - ABSORB-M TL-3



THE ABSORB-M IS A NON-REDIRECTIVE, GATING, CRASH CUSHION DESIGNED TO MEET THE LATEST TL-3 & TL-2 MASH REQUIREMENTS.

THE SYSTEM IS DESIGNED TO ACCOMMODATE A VARIETY OF F-SHAPE AND SINGLE SLOPE CONCRETE BARRIERS. CONTACT THE MANUFACTURER FOR GUIDANCE REGARDING OTHER ALLOWABLE SHAPES.

TEST LEVEL	NUMBER OF ELEMENTS	EFFECTIVE LENGTH	MAXIMUM LENGTH
TL-2	2	14'- 7 3/4"	17'- 4"
TL-3	3	20'- 11 3/4"	23'- 8"

NOTE:
CROSS SLOPES OF UP TO 8% (OR 1:12 SLOPE) CAN BE ACCOMMODATED WITH STANDARD HARDWARE SHOWN WITHIN THE INSTRUCTIONS MANUAL. FOR SLOPES WITH EXCESS OF 8% (OR 1:12) CONTACT, LINDSAY TRANSPORTATION SOLUTIONS.

GENERAL NOTES

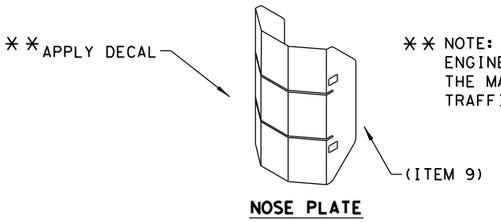
1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M IS A WATER FILLED NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO A FOUNDATION AND CAN BE INSTALLED ON TOP OF CONCRETE, ASPHALT, OR ANY SURFACE CAPABLE OF BEARING THE WEIGHT OF THE SYSTEM.
4. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
5. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
6. THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.
7. THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.
8. DO NOT ADD WATER TO FRONT ELEMENT (TL-2 OR TL-3 UNIT).

BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION-(GALV)	1	1
* 2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
* 3	BSI-4004598	FILL CAPS	8	12
* 4	BSI-4004599	DRAIN PLUGS	2	3
* 5	BSI-1809053-00	TENSION STRAP-(GALV)	8	12
* 6	BSI-2001998	C-SCR FH 3/8-16 X 1 1/2 GR5 PLT	8	12
* 7	BSI-2001999	C-SCR FH 3/8-16 X 1 GR5 PLT	8	12
8	BSI-1809035-00	MIDNOSE-(GALV)	1	1
9	BSI-1808014-00	NOSE PLATE	1	1
10	BSI-1809037-00	TRANSITION STRAP (LEFT-HAND)-(GALV)	1	1
11	BSI-1809038-00	TRANSITION STRAP (RIGHT-HAND)-(GALV)	1	1
12	BSI-1808005-00	PIN ASSEMBLY	8	10
13	BSI-2002001	ANC MECH 5/8-11X5 (GALV)	6	6
14	ABSORB-M	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE

TRAFFIC FLOW LEFT-SIDE BARRIER | TRAFFIC FLOW BOTH-SIDE BARRIER | TRAFFIC FLOW RIGHT-SIDE BARRIER



NOSE PLATE

** NOTE: (PROVIDED BY OTHERS)
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALs ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

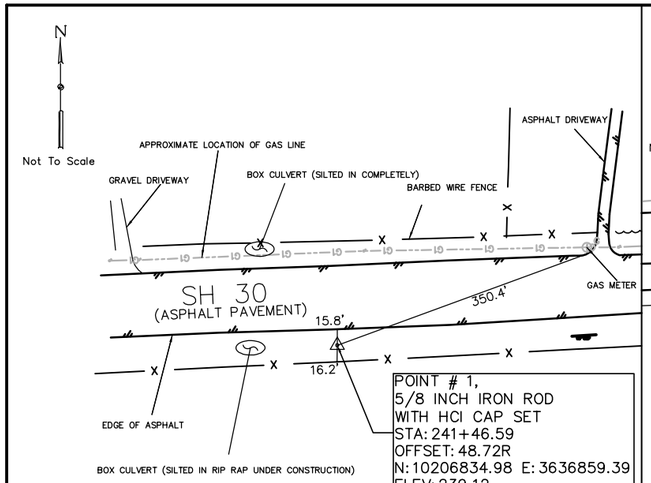
NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE ABSORB-M, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

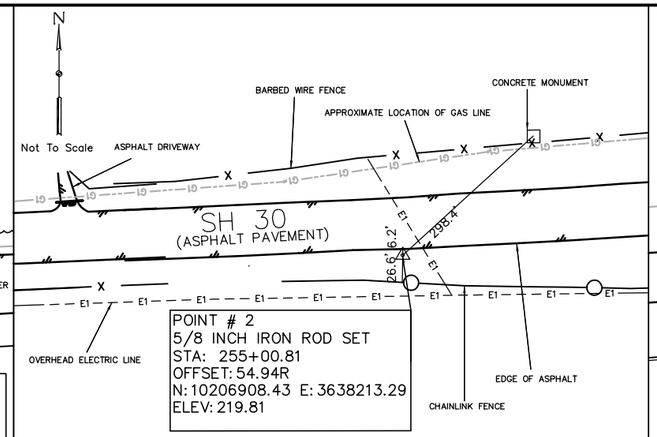
Texas Department of Transportation — Design Division Standard

LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

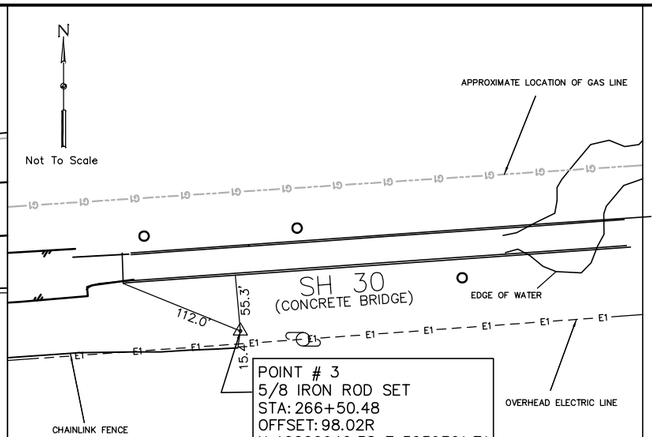
FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		56C



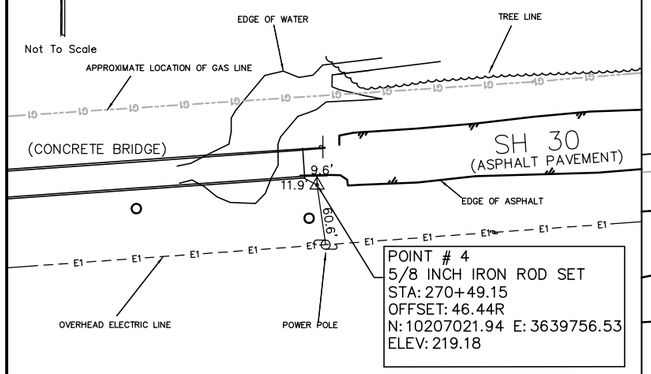
LOCATION:
CP 1 IS IN THE SOUTH SIDE OF SH 30 15.8' SOUTH OF THE EDGE OF SH 30 AND 16.16' NORTH OF A FENCE, 350.4' WEST OF THE PT OF AN ASPHALT DRIVE ON THE NORTH SIDE OF SH 30, AND 2393' WEST OF THE WEST SIDE OF THE BRIDGE DECK.



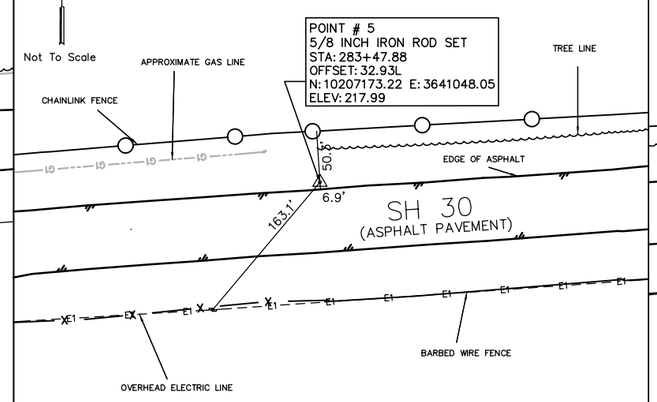
LOCATION:
CP 2 IS IN THE SOUTH SIDE OF SH 30 26.6' NORTH OF A FENCE, 6.2' SOUTH OF THE EDGE OF ASPHALT OF SH 30, AND 298.4' SOUTH WEST OF A CONCRETE MONUMENT FOUND ON THE NORTH RIGHT OF WAY.



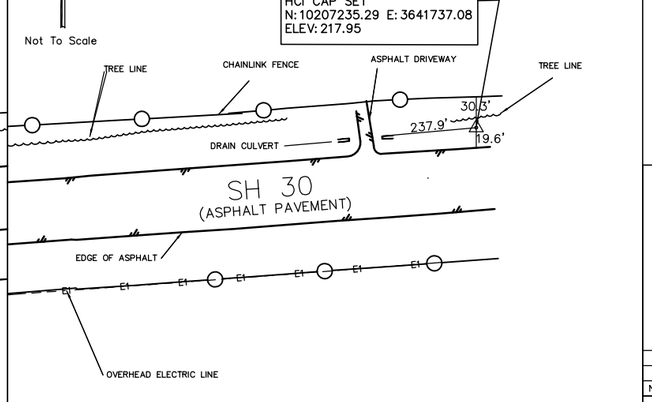
LOCATION:
CP 3 IS 55.3 SOUTH OF THE BRIDGE DECK WITHIN THE CHANNEL 16.4' NORTH OF A FENCE, 112' EAST OF THE WESTERN EDGE OF BRIDGE DECK AND 387' WEST OF THE EASTERN BRIDGE DECK.



LOCATION:
CP 4 IS IN THE SOUTH SIDE OF SH 30 9.6' SOUTH OF EDGE OF ASPHALT OF SH 30, 60.6' NORTH OF A UTILITY POLE AND 11.9' EAST OF THE EASTERN END OF THE BRIDGE DECK.



LOCATION:
CP 5 IS IN THE NORTH SIDE OF THE ROAD 50.3' SOUTH OF THE FENCE, 6.9' NORTH OF THE EDGE OF ASPHALT OF SH 30 AND 16.1' NORTH EAST OF A POWER POLE LOCATED NEAR THE SOUTHERN RIGHT OF WAY.



LOCATION:
CP 6 IS IN THE NORTH SIDE OF SH 30 30.3' SOUTH OF THE FENCE LINE 19.6' NORTH OF THE EDGE OF ASPHALT OF SH 30 AND 237.9' EAST FROM THE NORTH WESTERN POINT OF A CULVERT HEADWALL.

NOTES:

1. ALL BEARINGS AND COORDINATES SHOWN HERON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJUSTMENT) EPOCH 2010.00.

2. ALL ELEVATIONS SHOWN HERON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (2001 ADJUSTMENT) GEOID 12A.

3. COORDINATES AND DISTANCES ARE US SURVEY FEET, DISPLAYED IN THE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT SURFACE ADJUSTMENT FACTOR OF 1.00012.

4. HORIZONTAL AND VERTICAL CONTROL VALUES FOR THE SECONDARY CONTROL POINTS ARE BASED ON RTK OBSERVATIONS UTILIZING TXDOT VRS.

Brian C. Wright
6/04/2018

NO.	DATE	REVISION	APPROVED

HAYDEN CONSULTANTS, INC.
5646 MILTON STREET SUITE 515 DALLAS, TX 75206
Ph. 214.750.9889 www.HaydenConsultants.com
Fx. 214.750.9329 Firm Registration No. 00640

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

2018 Texas Department of Transportation ®

SH 30
CONTROL POINTS

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	57
CONTROL	SECTION	JOB	
0212	04	039	

ALIGNMENT: SH30

		STATION	NORTHING	EASTING
Element: Linear				
POB	( )	199+99.62	10206704.573	3632714.192
PC	( )	247+00.31	10206907.565	3637410.497
Tangent Direction:		N 87°31'30.00" E		
Tangent Length:		4700.69		
Element: Circular				
PC	( )	247+00.31	10206907.565	3637410.497
PI	( )	248+93.05	10206915.888	3637603.053
CC	( )		10217997.210	3636931.160
PT	( )	250+85.75	10206930.891	3637795.205
Radius:		11100.00		
Delta:		1°59'22.29" Left		
Degree of Curvature(Arc):		0°30'58.24"		
Length:		385.43		
Tangent:		192.74		
Chord:		385.41		
Middle Ordinate:		1.67		
External:		1.67		
Tangent Direction:		N 87°31'30.00" E		
Radial Direction:		S 2°28'30.00" E		
Chord Direction:		N 86°31'48.85" E		
Radial Direction:		S 4°27'52.29" E		
Tangent Direction:		N 85°32'07.71" E		
Element: Linear				
PT	( )	250+85.75	10206930.891	3637795.205
PC	( )	260+67.78	10207007.334	3638774.263
Tangent Direction:		N 85°32'07.71" E		
Tangent Length:		982.04		
Element: Circular				
PC	( )	260+67.78	10207007.334	3638774.263
PI	( )	261+64.84	10207014.890	3638871.025
CC	( )		10195941.015	3639638.307
PT	( )	262+61.89	10207020.751	3638967.904
Radius:		11100.00		
Delta:		1°00'06.99" Right		
Degree of Curvature(Arc):		0°30'58.24"		
Length:		194.11		
Tangent:		97.06		
Chord:		194.11		
Middle Ordinate:		0.42		
External:		0.42		
Tangent Direction:		N 85°32'07.71" E		
Radial Direction:		S 4°27'52.29" E		
Chord Direction:		N 86°02'11.20" E		
Radial Direction:		S 3°27'45.30" E		
Tangent Direction:		N 86°32'14.70" E		

ALIGNMENT: SH30 CONTINUED

		STATION	NORTHING	EASTING
Element: Linear				
PT	( )	262+61.89	10207020.751	3638967.904
PC	( )	273+82.82	10207088.452	3640086.782
Tangent Direction:		N 86°32'14.70" E		
Tangent Length:		1120.92		
Element: Circular				
PC	( )	273+82.82	10207088.452	3640086.782
PI	( )	274+96.47	10207095.316	3640200.232
CC	( )		10196008.715	3640757.186
PT	( )	276+10.12	10207099.856	3640313.799
Radius:		11100.00		
Delta:		1°10'23.91" Right		
Degree of Curvature(Arc):		0°30'58.24"		
Length:		227.31		
Tangent:		113.66		
Chord:		227.30		
Middle Ordinate:		0.58		
External:		0.58		
Tangent Direction:		N 86°32'14.70" E		
Radial Direction:		S 3°27'45.30" E		
Chord Direction:		N 87°07'26.65" E		
Radial Direction:		S 2°17'21.39" E		
Tangent Direction:		N 87°42'38.61" E		
Element: Linear				
PT	( )	276+10.12	10207099.856	3640313.799
PC	( )	278+17.89	10207108.155	3640521.397
Tangent Direction:		N 87°42'38.61" E		
Tangent Length:		207.76		
Element: Circular				
PC	( )	278+17.89	10207108.155	3640521.397
PI	( )	279+88.97	10207114.989	3640692.346
CC	( )		10218199.296	3640078.010
PT	( )	281+60.03	10207127.088	3640863.002
Radius:		11100.00		
Delta:		1°45'57.84" Left		
Degree of Curvature(Arc):		0°30'58.24"		
Length:		342.14		
Tangent:		171.08		
Chord:		342.13		
Middle Ordinate:		1.32		
External:		1.32		
Tangent Direction:		N 87°42'38.61" E		
Radial Direction:		S 2°17'21.39" E		
Chord Direction:		N 86°49'39.69" E		
Radial Direction:		S 4°03'19.23" E		
Tangent Direction:		N 85°56'40.77" E		
Element: Linear				
PT	( )	281+60.03	10207127.088	3640863.002
POE	( )	289+88.88	10207185.705	3641689.777
Tangent Direction:		N 85°56'40.77" E		
Tangent Length:		828.85		

ALIGNMENT: DRWY01

		STATION	NORTHING	EASTING
Element: Linear				
POB	( )	10+00.00	10206894.208	3637101.491
POE	( )	11+00.00	10206794.302	3637105.809
Tangent Direction:		S 2°28'30.00" E		
Tangent Length:		100.00		

ALIGNMENT: DRWY02

		STATION	NORTHING	EASTING
Element: Linear				
POB	( )	10+00.00	10206895.072	3637121.474
PI	( )	10+45.41	10206940.435	3637119.513
Tangent Direction:		N 2°28'30.00" W		
Tangent Length:		45.41		
Element: Linear				
PI	( )	10+45.41	10206940.435	3637119.513
POE	( )	11+00.00	10206994.903	3637123.231
Tangent Direction:		N 3°54'16.93" E		
Tangent Length:		54.59		

ALIGNMENT: DRWY03

		STATION	NORTHING	EASTING
Element: Linear				
POB	( )	10+00.00	10206938.859	3637897.263
POE	( )	11+00.00	10207033.050	3637863.675
Tangent Direction:		N 19°37'34.19" W		
Tangent Length:		100.00		

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

08/17/2018

Jacob E. Walker, PE

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

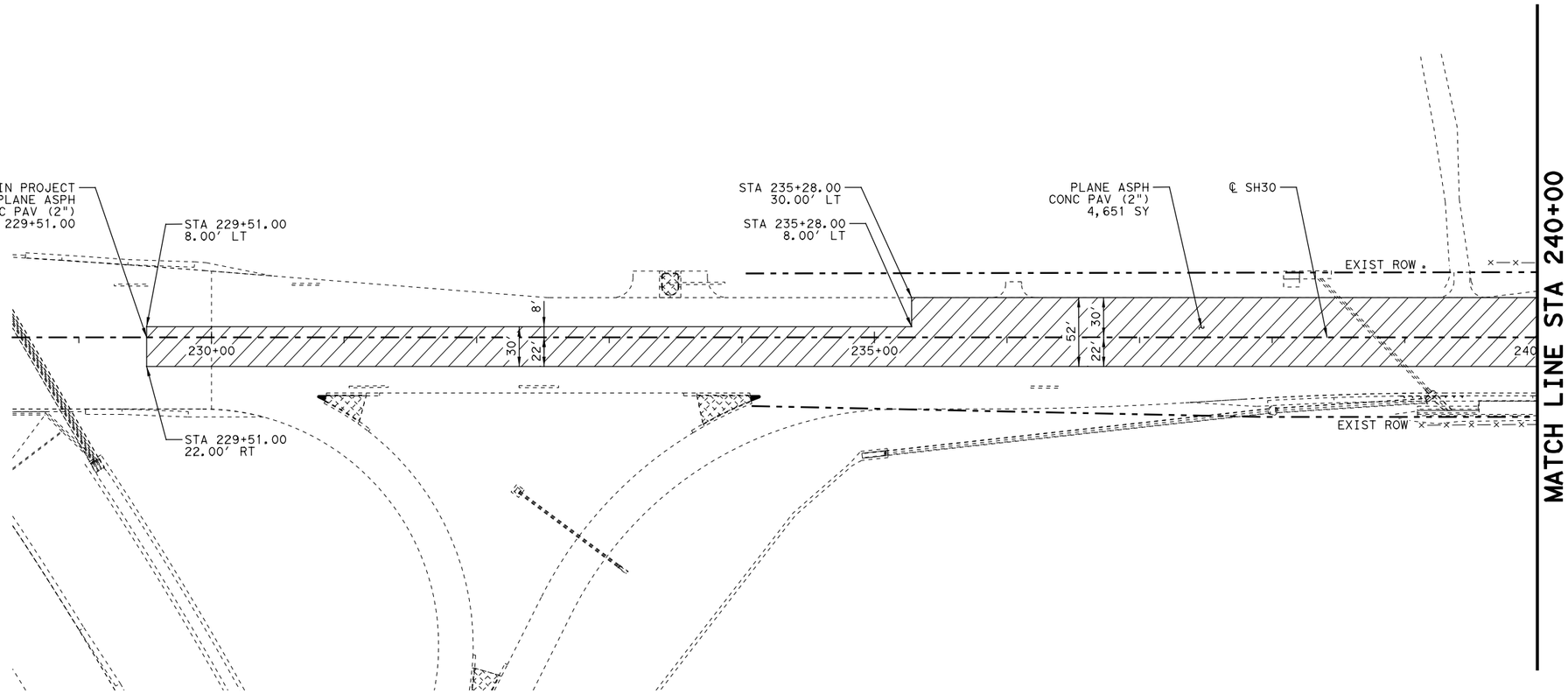
Texas Department of Transportation

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	58
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: KBERGER DATE: 8/17/2018
FILE: SH30ALNOI.dgn
TIME: 10:35:08 AM
PENTABLE: I0069736.tbl
SCALE: 1:1



N

LEGEND

- OBLITERATE EXISTING ROADWAY
- REMOVE STAB BASE AND ASPH PAV
- PLANE ASPH CONC PAV
- REMOVE CONCRETE RIPRAP
- REMOVE EXISTING FENCE
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY

NOTES:

1. ANY ITEMS REQUIRING REMOVAL THAT ARE NOT DIRECTLY CALLED OUT SHALL BE CONSIDERED SUBSIDIARY TO PREP ROW.
2. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR HORIZONTAL ALIGNMENT INFORMATION.
3. SAW CUTTING WILL NOT BE PAID FOR SEPARATELY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
4. GRAVEL DRIVEWAY REMOVAL WILL NOT BE PAID FOR SEPARATELY BUT WILL BE CONSIDERED SUBSIDIARY TO PREP ROW.
5. THE UTILITY INFORMATION SHOWN IS PROVIDED BY OTHERS. THIS INFORMATION WAS OBTAINED SOLELY FOR THE USE OF THE ENGINEERING DESIGN OF THE PROJECT. THE ACCURACY AND SUFFICIENCY OF THE INFORMATION SHOWN IS NOT GUARANTEED. THE CONTRACTOR SHALL FIELD VERIFY UTILITY LIMITS AND LOCATIONS PRIOR TO CONSTRUCTION.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
08/17/2018
Jacob E. Walker, PE

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

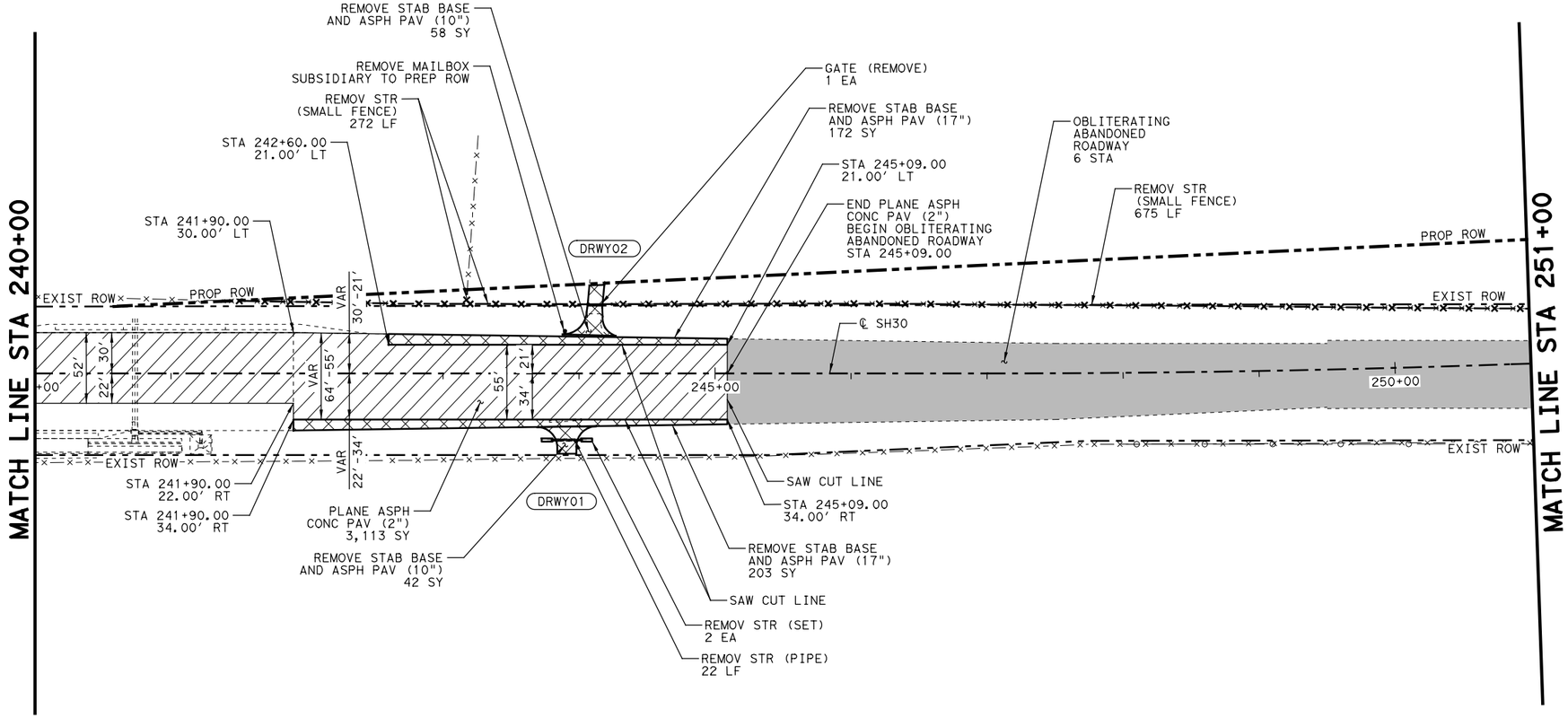
REMOVAL PLAN

BEGIN TO STA 240+00

SCALE: 1"=100' SHEET 1 OF 4

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	59
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: KBERGER DATE: 8/17/2018
FILE: SH30RMV01.dgn
TIME: 10:35:11 AM SCALE: 1:100
PENTABLE: 10069736.tbl



LEGEND

- OBLITERATE EXISTING ROADWAY
- REMOVE STAB BASE AND ASPH PAV
- PLANE ASPH CONC PAV
- REMOVE CONCRETE RIPRAP
- REMOVE EXISTING FENCE
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY

NOTES:

1. ANY ITEMS REQUIRING REMOVAL THAT ARE NOT DIRECTLY CALLED OUT SHALL BE CONSIDERED SUBSIDIARY TO PREP ROW.
2. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR HORIZONTAL ALIGNMENT INFORMATION.
3. SAW CUTTING WILL NOT BE PAID FOR SEPARATELY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
4. GRAVEL DRIVEWAY REMOVAL WILL NOT BE PAID FOR SEPARATELY BUT WILL BE CONSIDERED SUBSIDIARY TO PREP ROW.
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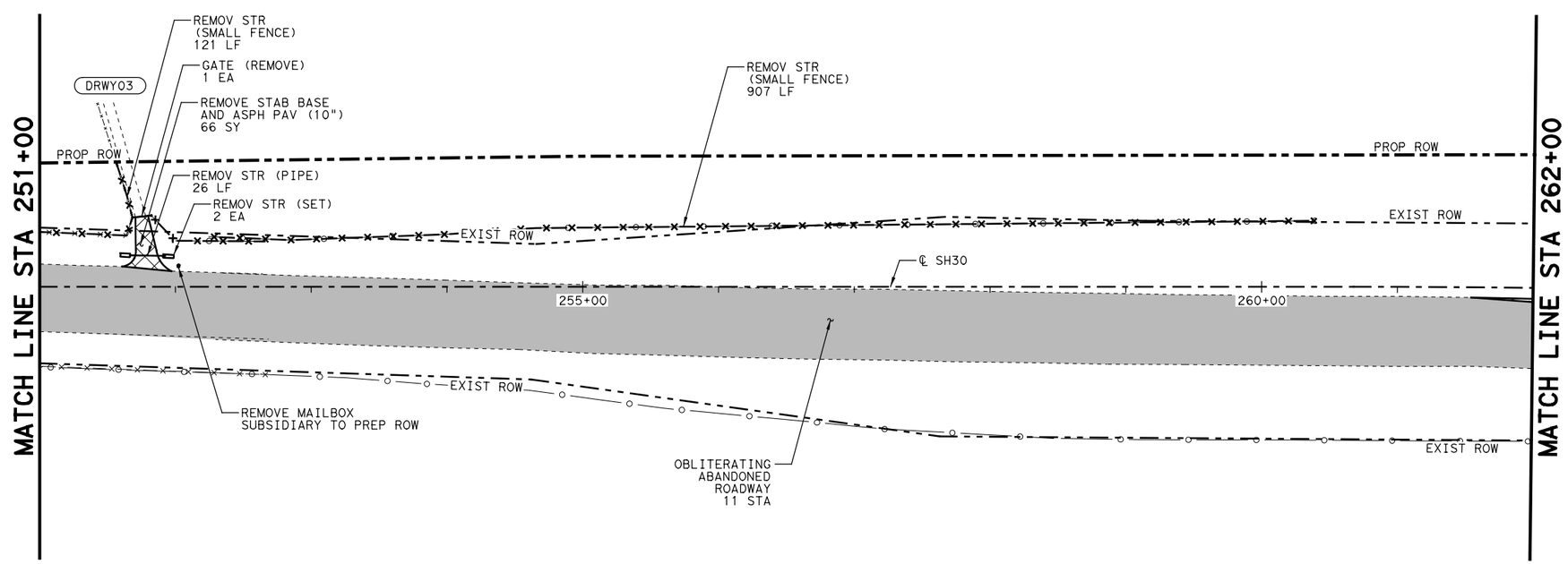
0 50 100 150 200
SCALE IN FEET



STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED PROFESSIONAL ENGINEER
08/17/2018
Jacob E. Walker, PE

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

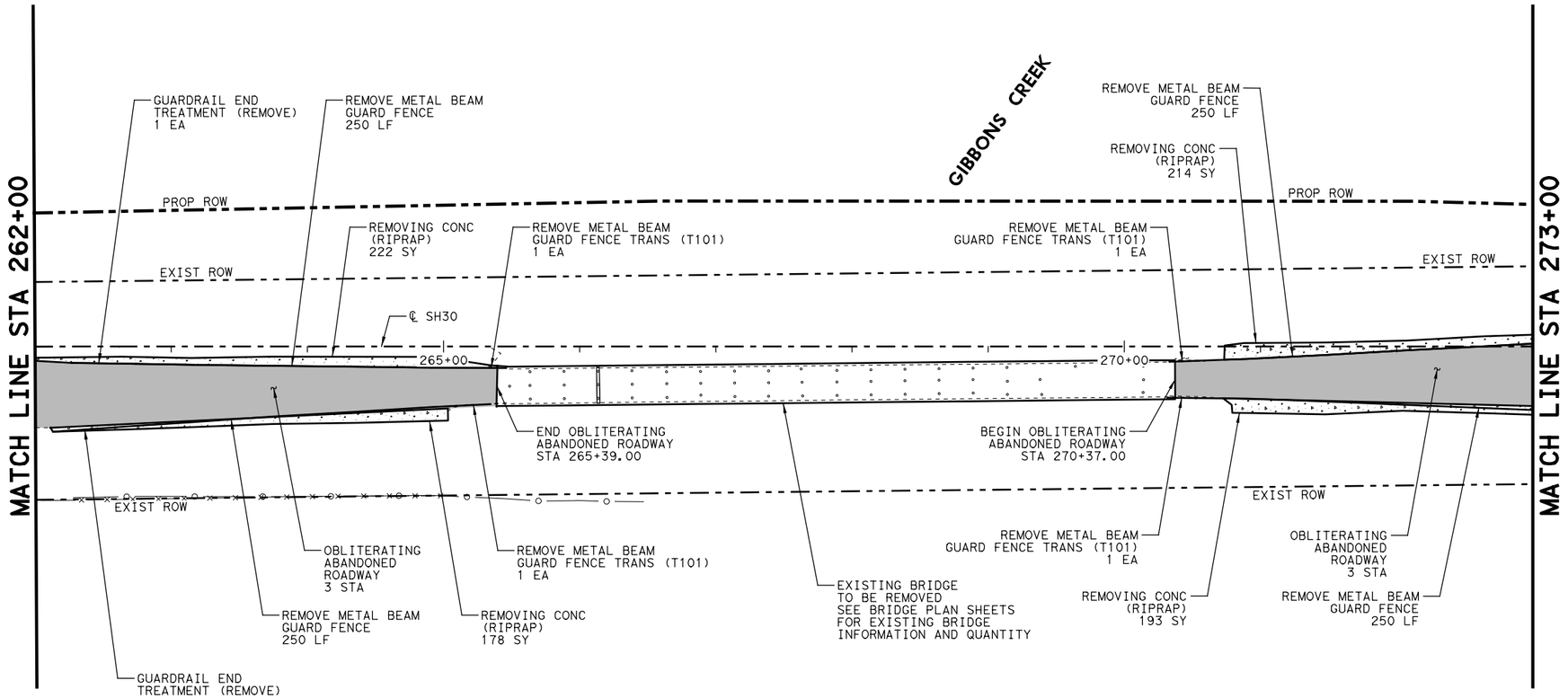
REMOVAL PLAN

STA 240+00 TO STA 262+00

SCALE: 1"=100' SHEET 2 OF 4

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	60
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
USER: KBERGER TIME: 10:35:14 AM SCALE: 1:100
DATE: 8/17/2018
FILE: SH30RMV02.dgn



LEGEND

- OBLITERATE EXISTING ROADWAY
- REMOVE STAB BASE AND ASPH PAV
- PLANE ASPH CONC PAV
- REMOVE CONCRETE RIPRAP
- REMOVE EXISTING FENCE
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY

NOTES:

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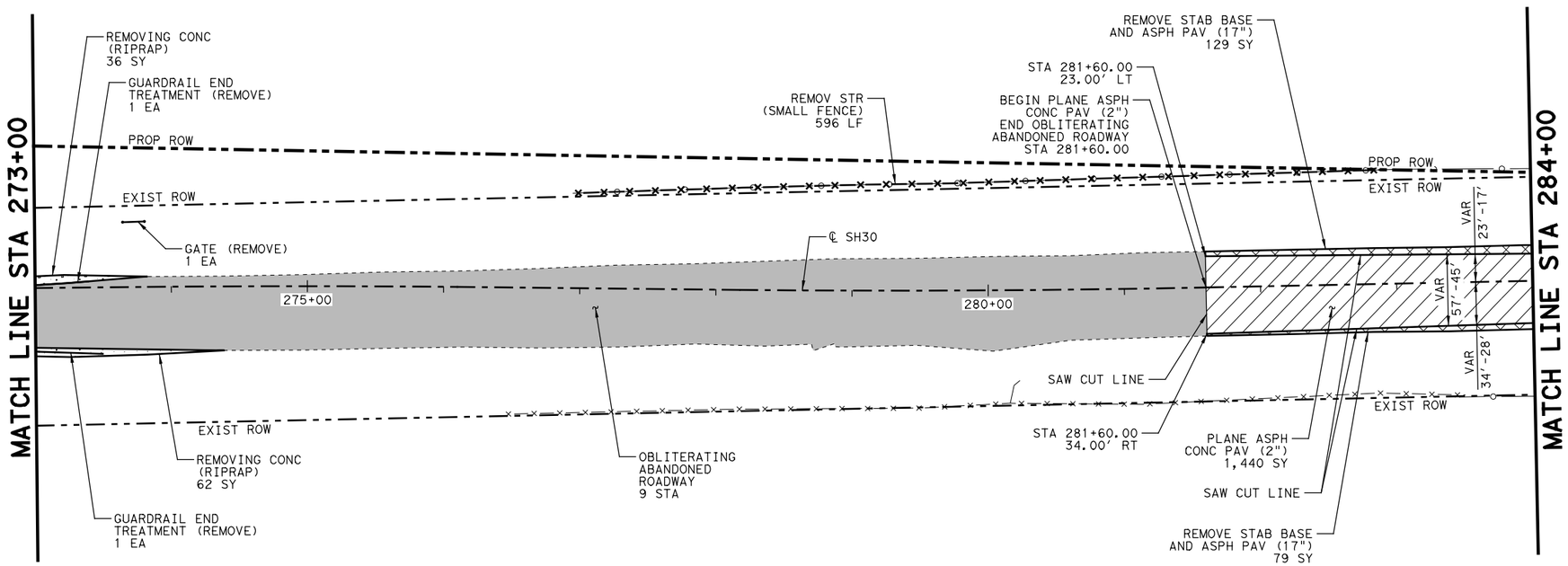
0 50 100 150 200
SCALE IN FEET



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Texas Department of Transportation

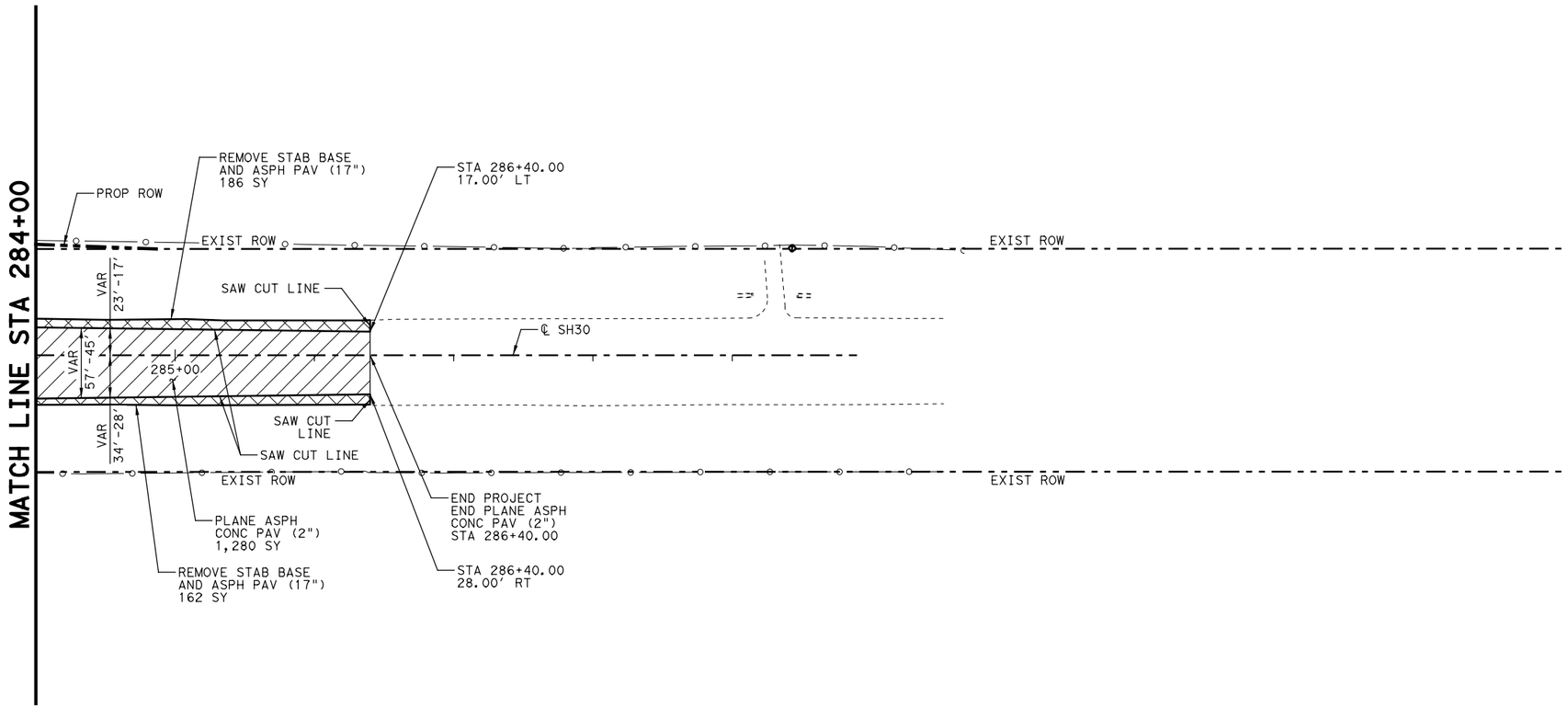
REMOVAL PLAN

STA 262+00 TO STA 284+00

SCALE: 1"=100' SHEET 3 OF 4

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	61
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
USER: KBERGER DATE: 8/17/2018 TIME: 10:35:17 AM SCALE: 1:100
FILE: SH30RMV03.dgn



N

LEGEND

- OBLITERATE EXISTING ROADWAY
- REMOVE STAB BASE AND ASPH PAV
- PLANE ASPH CONC PAV
- REMOVE CONCRETE RIPRAP
- REMOVE EXISTING FENCE
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY

NOTES:

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0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
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08/17/2018
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NO.	DATE	REVISION	APPROVED

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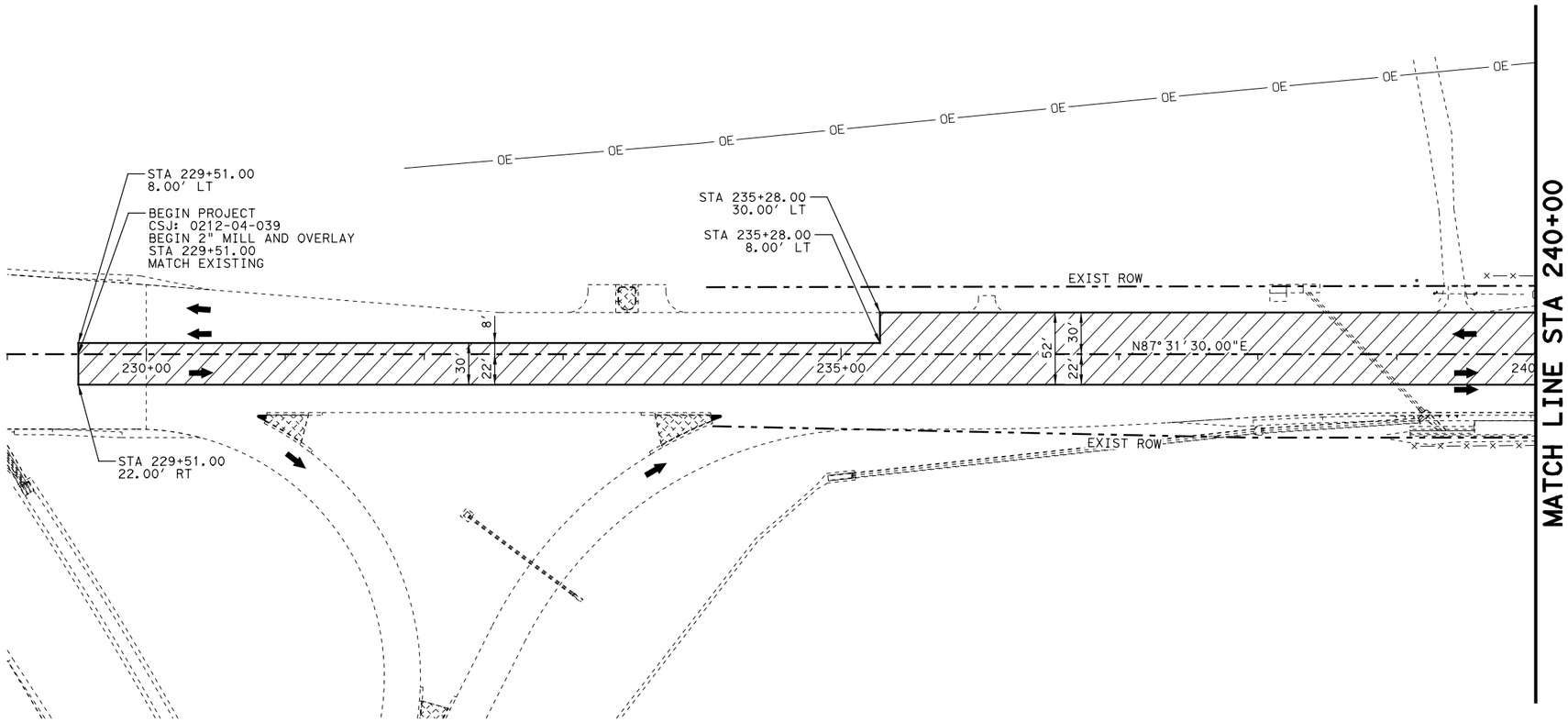
REMOVAL PLAN

STA 284+00 TO END

SCALE: 1"=100' SHEET 4 OF 4

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	62
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: KBERGER DATE: 8/17/2018
FILE: SH30RMV04.dgn
TIME: 10:35:19 AM SCALE: 1:100
PENTABLE: 1006936.tbl



LEGEND

- PROPOSED WIDENING
- LIMITS OF MILL AND OVERLAY
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- TRAFFIC FLOW

NOTES:

1. ALL STATION AND OFFSETS ARE FROM "CL SH30" UNLESS OTHERWISE NOTED. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR HORIZONTAL ALIGNMENT INFORMATION.
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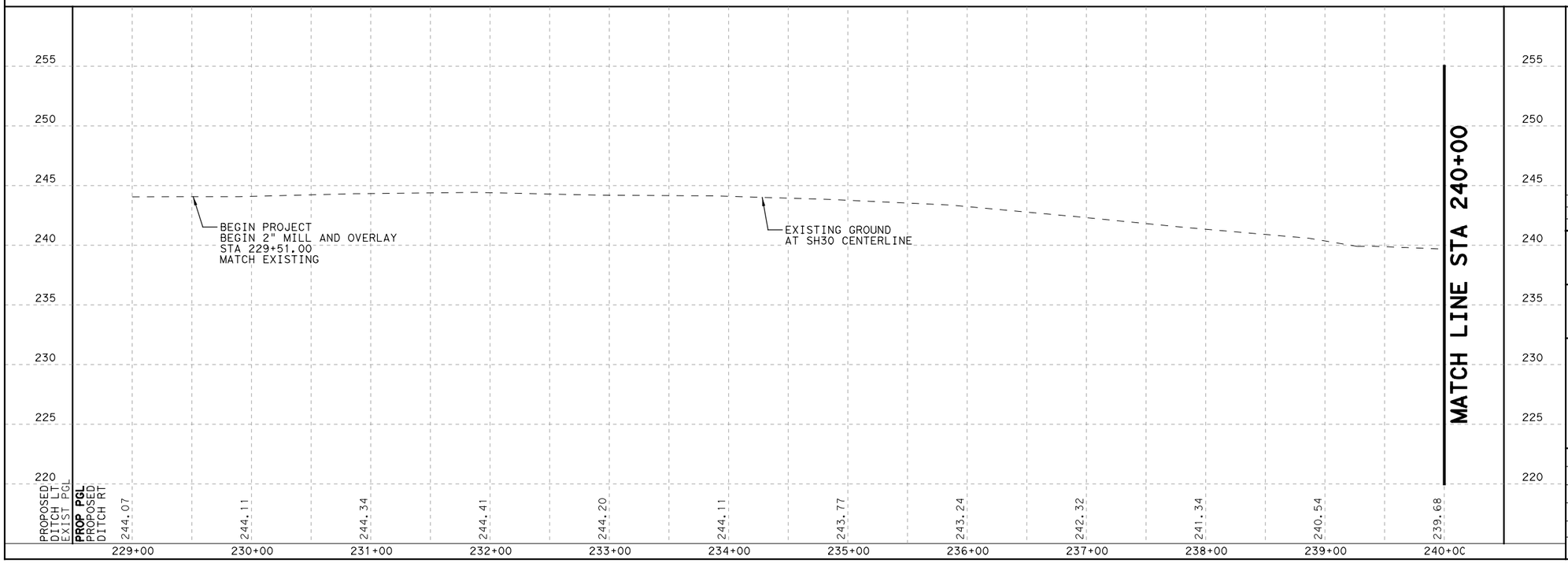
7. SEE "PROPOSED TYPICAL SECTIONS" SHEETS FOR DITCH TYPICAL SECTIONS AND LIMITS.

H: 0 50 100 150 200
V: 0 5 10 15 20
SCALE IN FEET



STATE OF TEXAS
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PLAN AND PROFILE

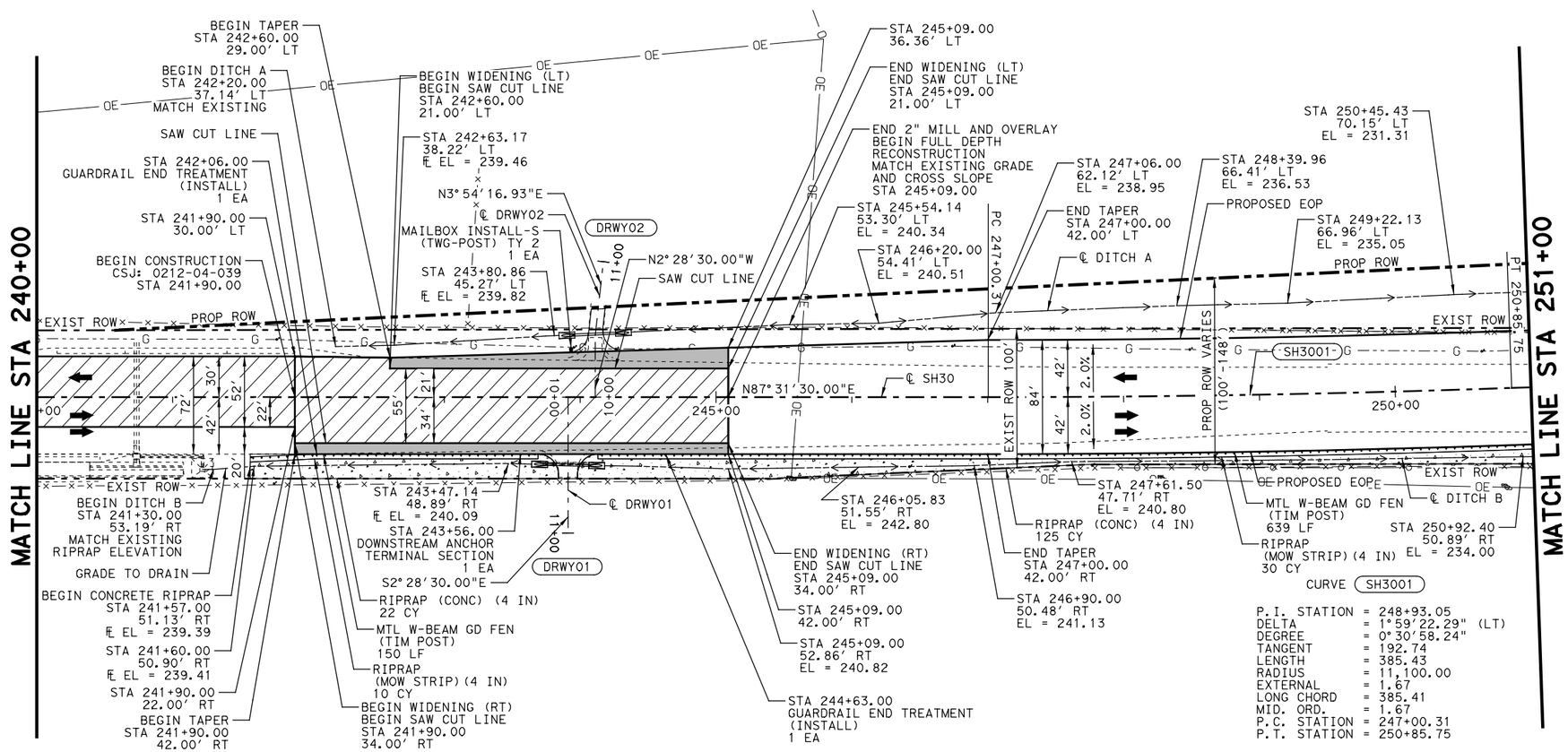
BEGIN TO STA 240+00

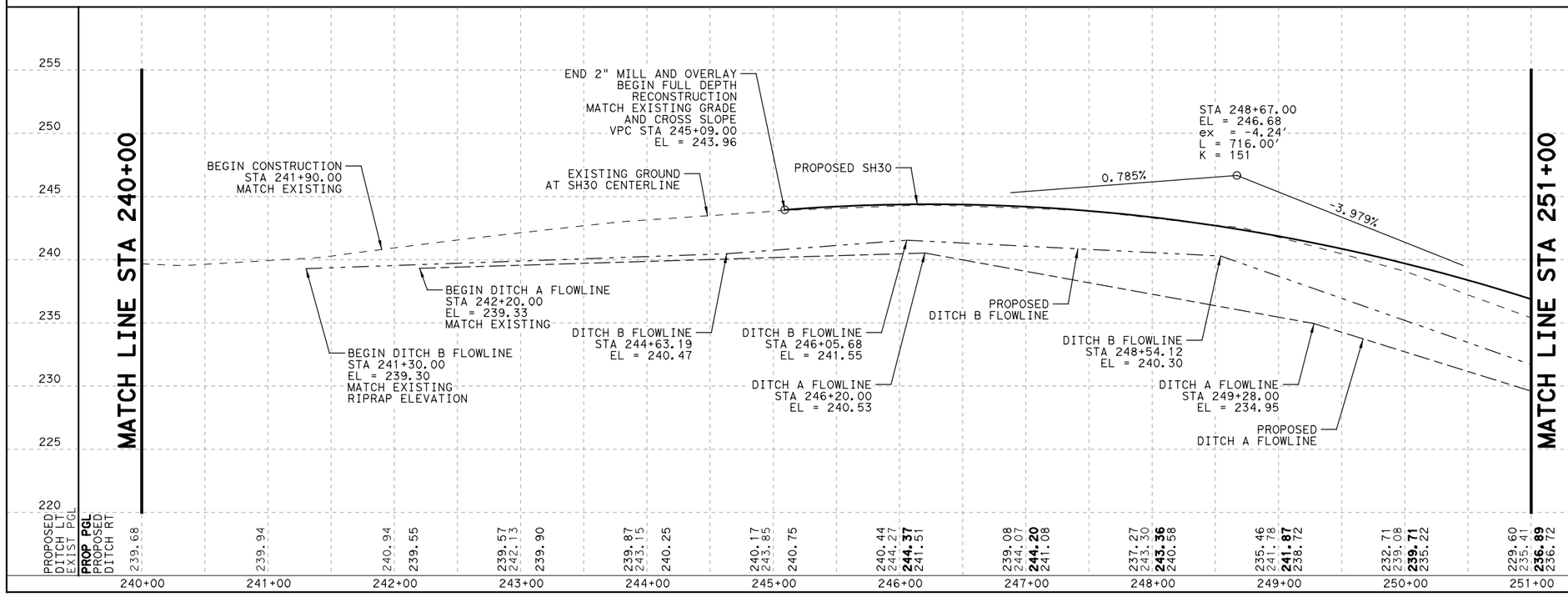
SCALE: 1"=100'-H
1"=10'-V

SHEET 1 OF 6

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	63
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
USER: KBERGER DATE: 8/17/2018 TIME: 10:35:22 AM SCALE: 1:100
FILE: SH30RDPP01.dgn





JACOB E. WALKER
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08/17/2018
Jacob E. Walker, PE

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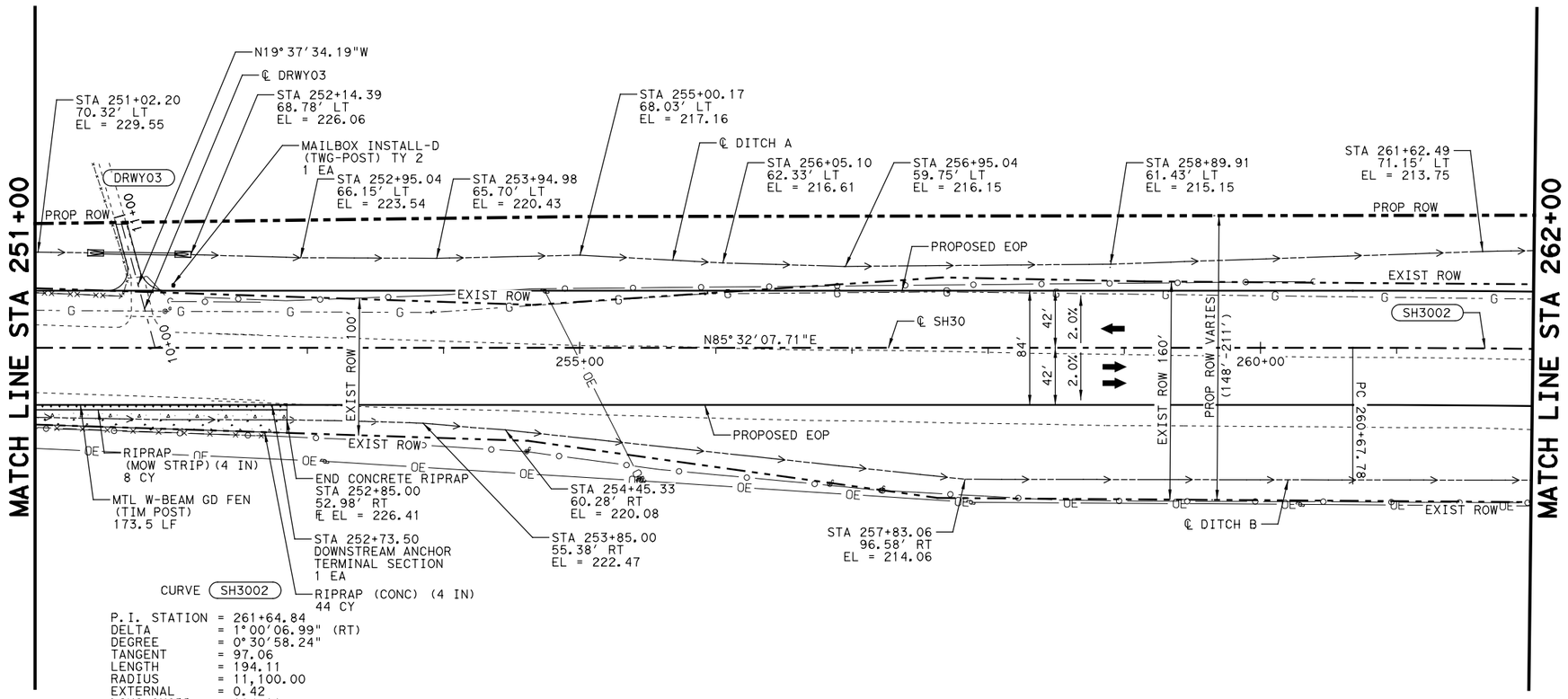
PLAN AND PROFILE

STA 240+00 TO STA 251+00

SCALE: 1"=100'-H
1"=10'-V
SHEET 2 OF 6

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	64
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
USER: KBERGER DATE: 8/17/2018 TIME: 10:35:25 AM SCALE: 1:100
FILE: SH30RDPP02.dgn



LEGEND

- PROPOSED WIDENING
- LIMITS OF MILL AND OVERLAY
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- TRAFFIC FLOW

NOTES:

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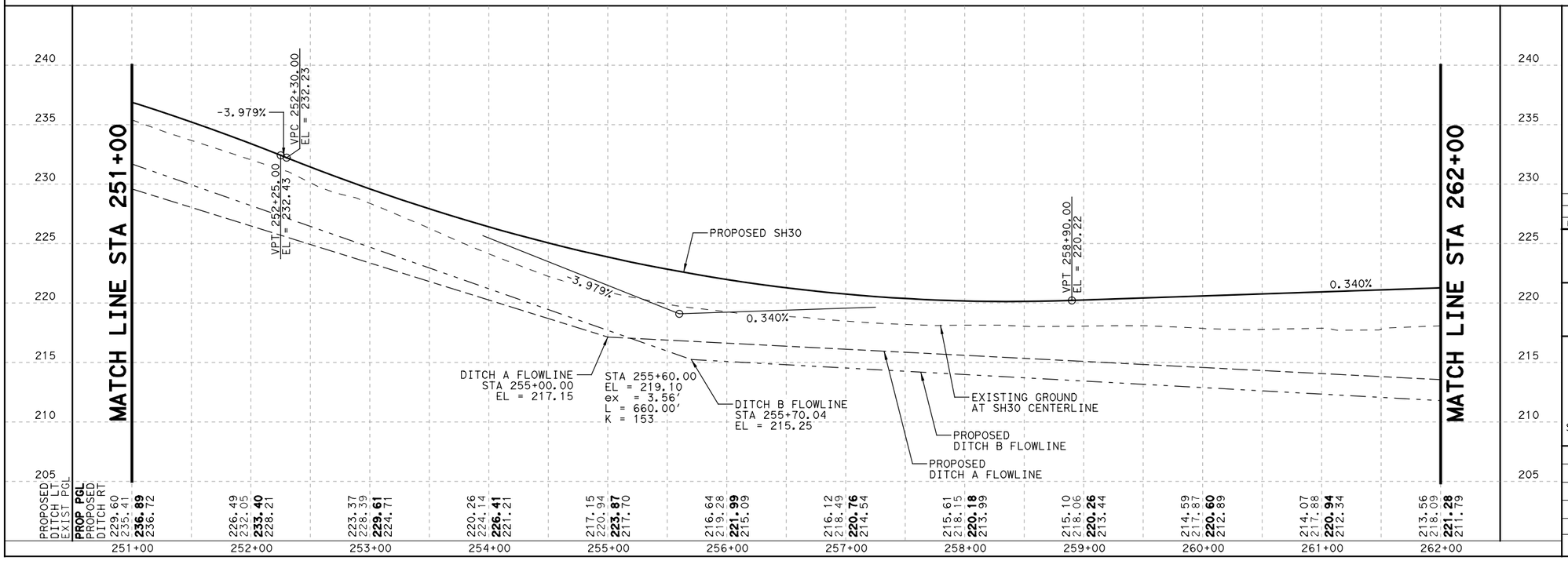
H: 0 50 100 150 200
V: 0 5 10 15 20
SCALE IN FEET



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USER: KBERGER DATE: 8/17/2018 TIME: 10:35:28 AM SCALE: 1:100
FILE: SH30RDPP03.dgn

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
08/17/2018
Jacob E. Walker, PE

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
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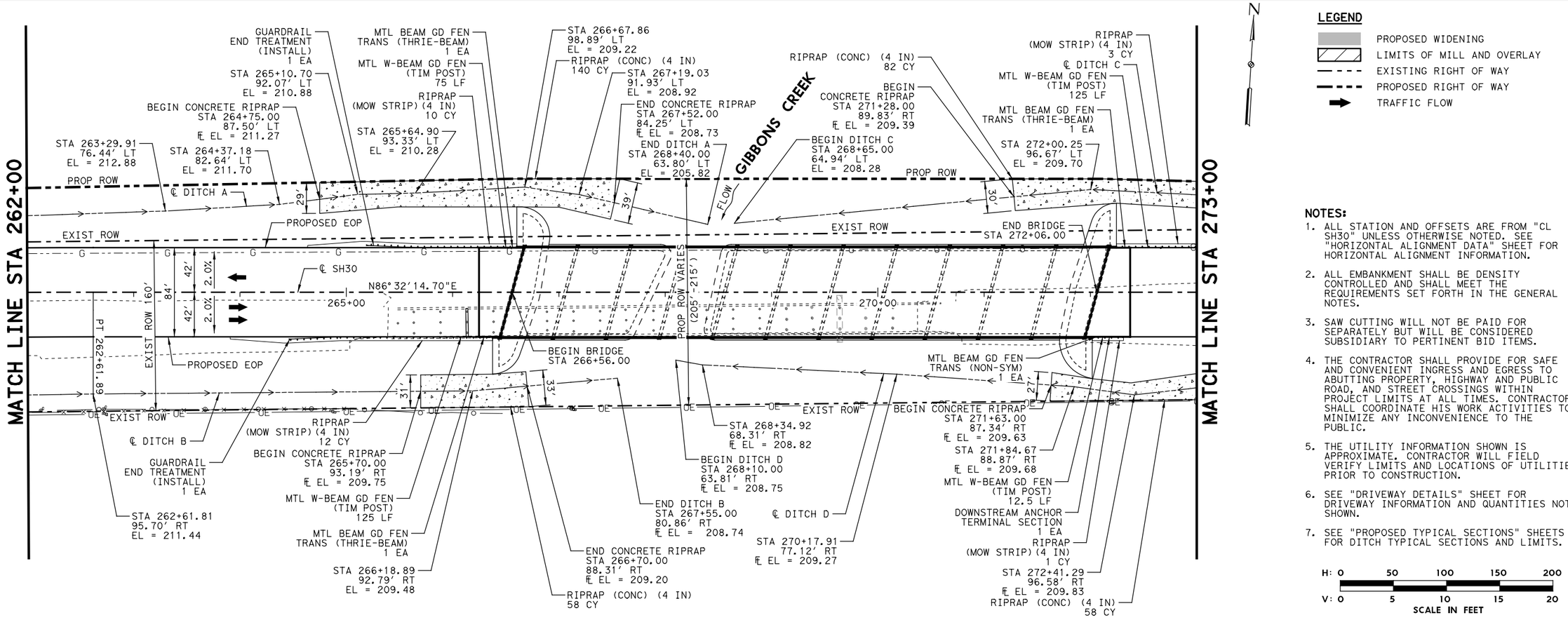
PLAN AND PROFILE

STA 251+00 TO STA 262+00

SCALE: 1"=100'-H
1"=10'-V

SHEET 3 OF 6

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	65
CONTROL	SECTION	JOB	
0212	04	039	



N

LEGEND

- PROPOSED WIDENING
- LIMITS OF MILL AND OVERLAY
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- TRAFFIC FLOW

NOTES:

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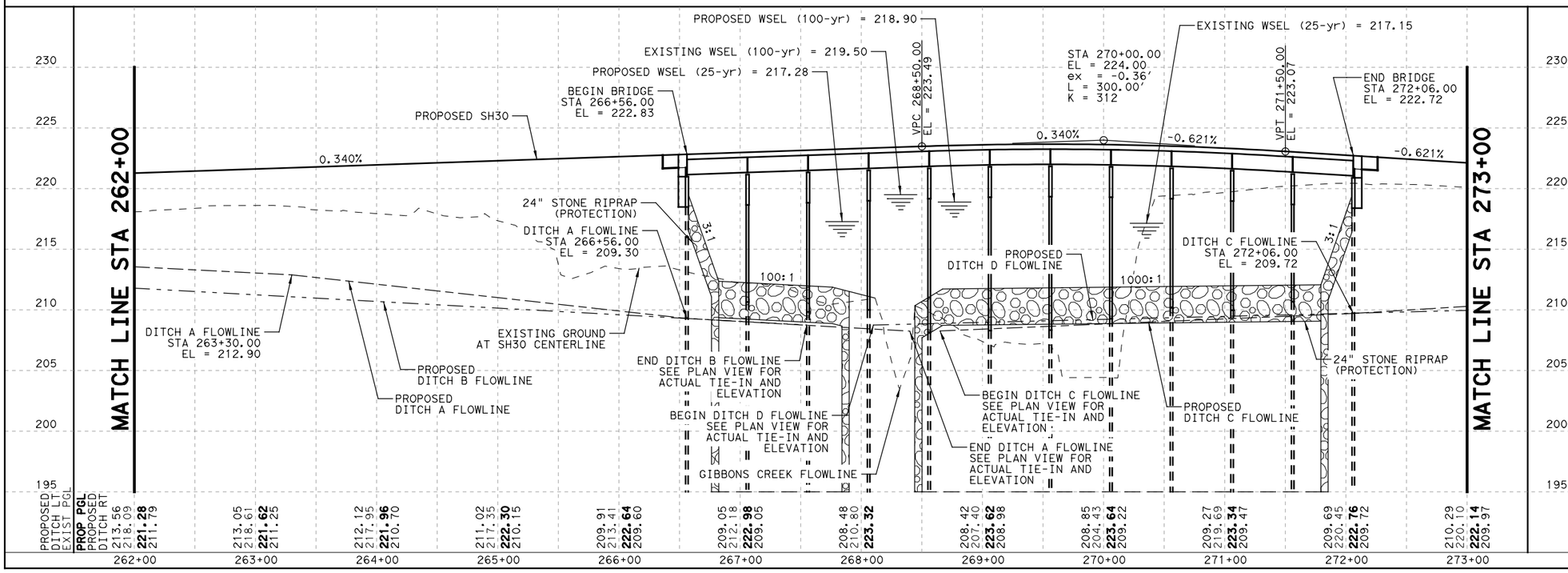
H: 0 50 100 150 200
V: 0 5 10 15 20
SCALE IN FEET



STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED PROFESSIONAL ENGINEER
08/17/2018

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PLAN AND PROFILE

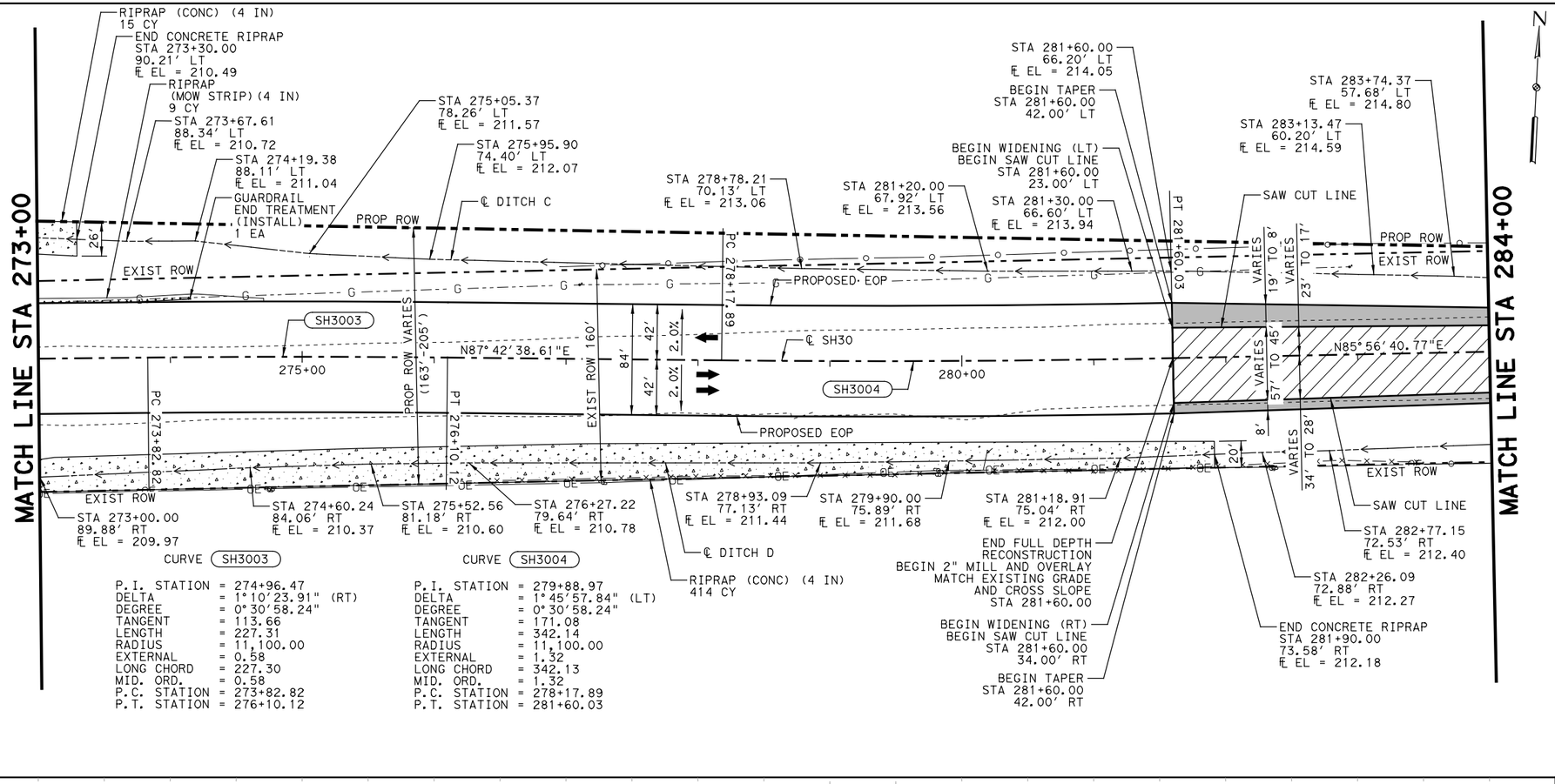
STA 262+00 TO STA 273+00

SCALE: 1"=100'-H
1"=10'-V

SHEET 4 OF 6

FED. RD. DIV. NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	66
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
USER: KBERGER DATE: 8/17/2018 TIME: 4:03:49 PM SCALE: 1:100
FILE: SH30RDPP04.dgn



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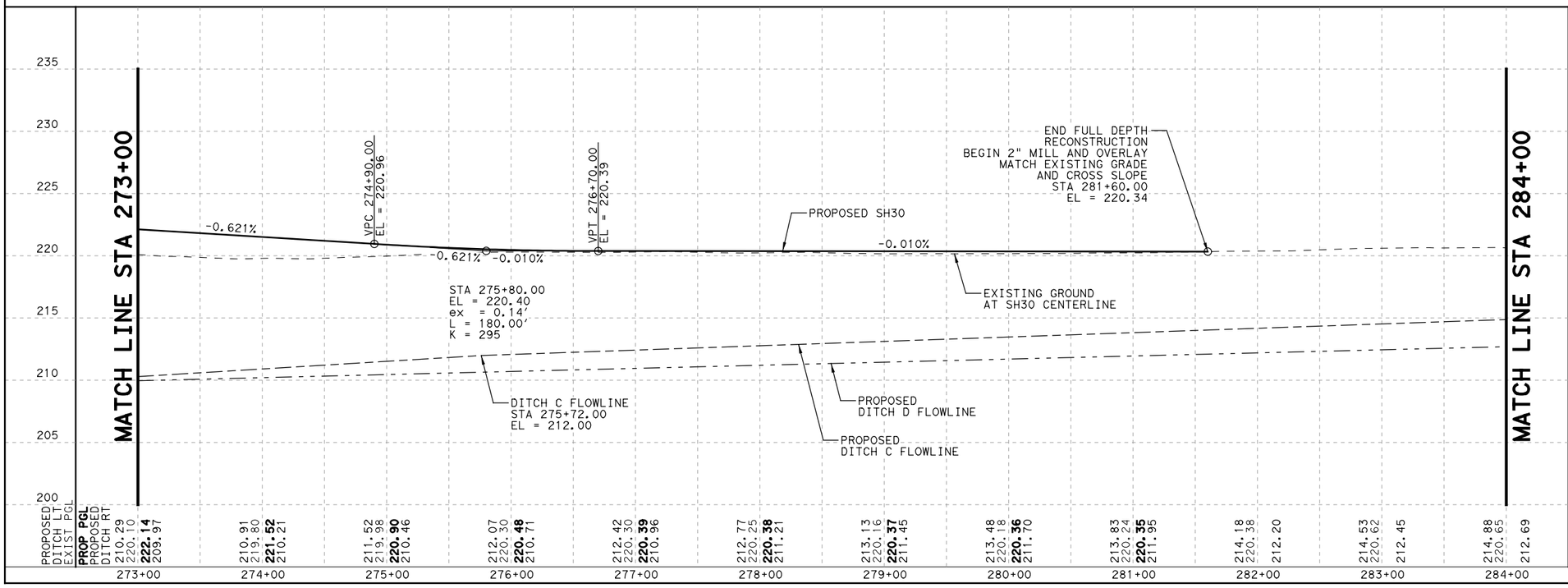
H: 0 50 100 150 200
V: 0 5 10 15 20
SCALE IN FEET



STATE OF TEXAS
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Texas Department of Transportation

PLAN AND PROFILE

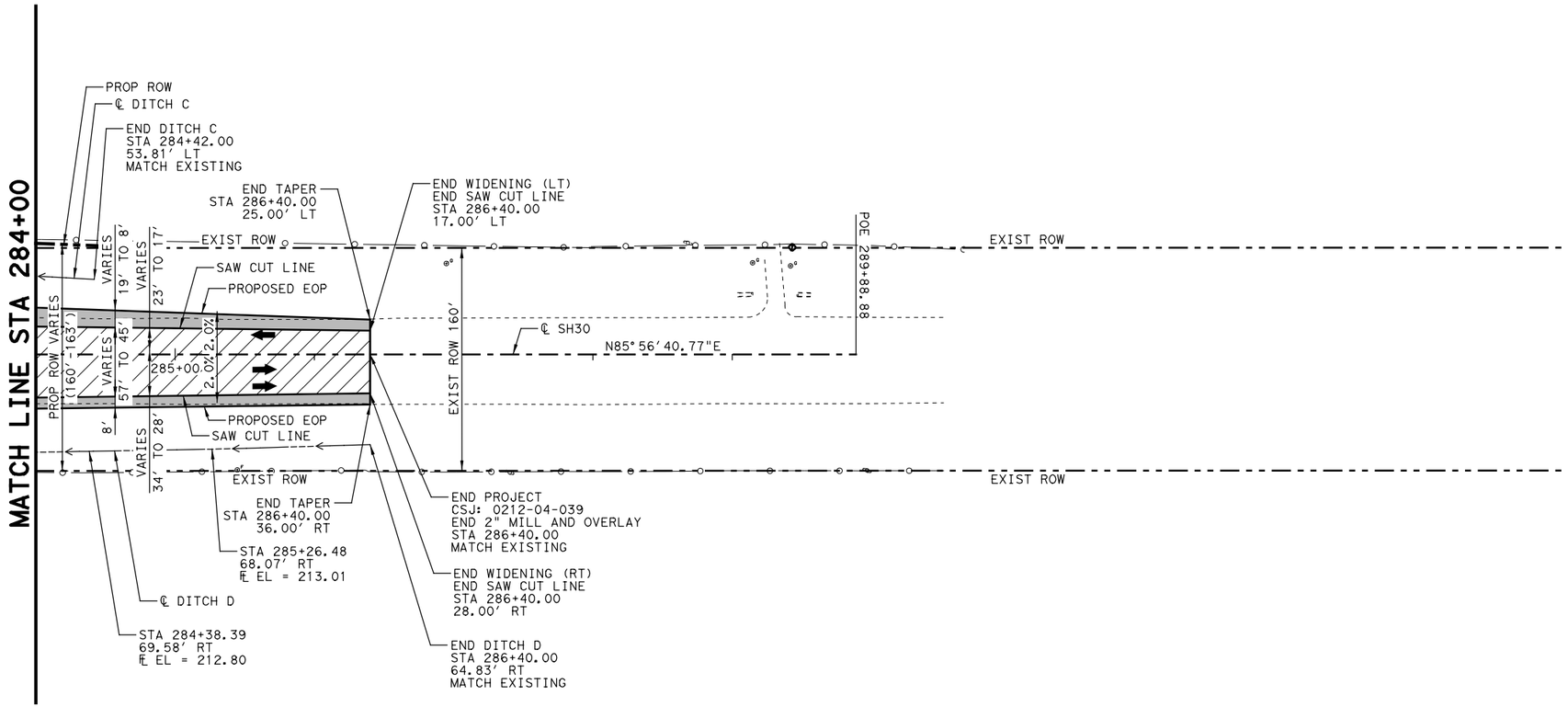
STA 273+00 TO STA 284+00

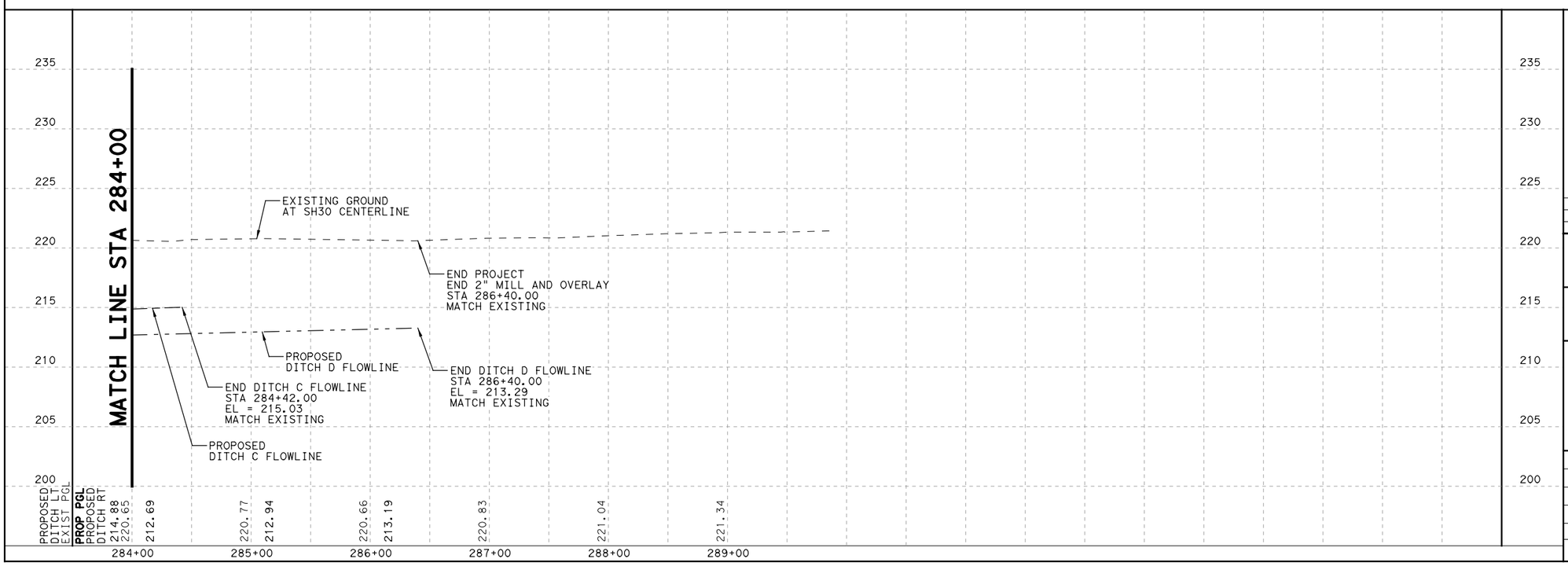
SCALE: 1"=100'-H
1"=10'-V

SHEET 5 OF 6

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	67
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
USER: KBERGER DATE: 8/17/2018 TIME: 10:35:43 AM SCALE: H00
FILE: SH30RDPP05.dgn





LEGEND

- PROPOSED WIDENING
- LIMITS OF MILL AND OVERLAY
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- TRAFFIC FLOW

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H: 0 50 100 150 200
V: 0 5 10 15 20
SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
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08/17/2018
Jacob E. Walker, PE

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PLAN AND PROFILE

STA 284+00 TO END

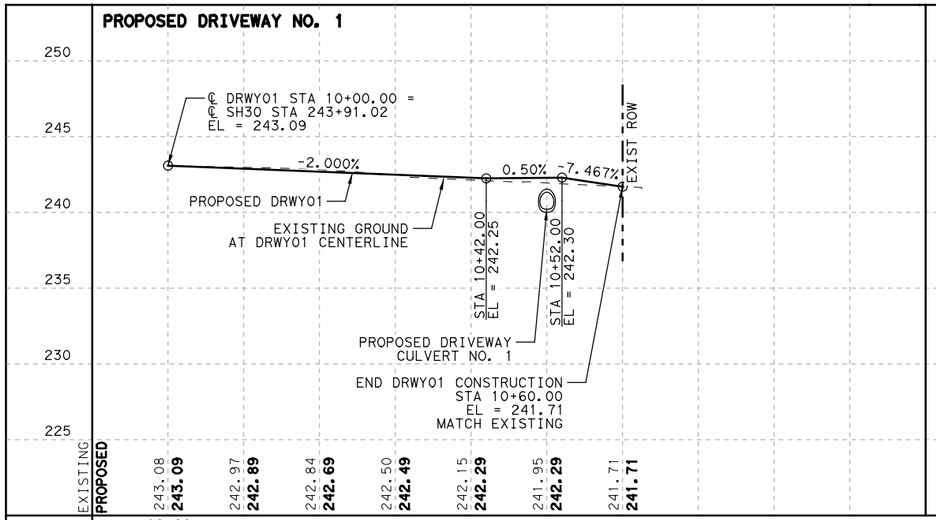
SCALE: 1"=100'-H
1"=10'-V

SHEET 6 OF 6

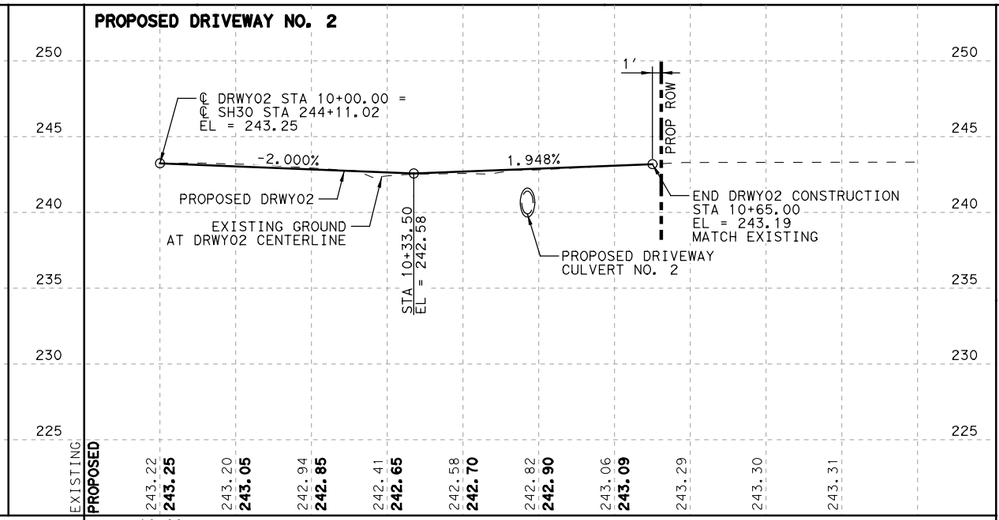
FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	68
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: KBERGER
FILE: SH30RDPP06.dgn
DATE: 8/17/2018
TIME: 10:35:50 AM
PENTABLE: I0069736.tbl
SCALE: 1=100

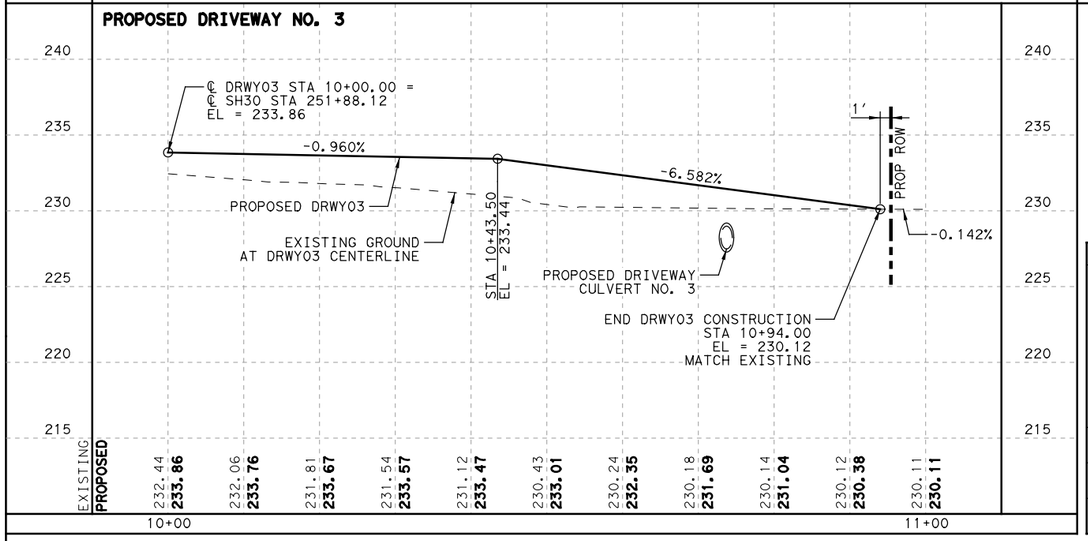
PROPOSED DRIVEWAY NO. 1



PROPOSED DRIVEWAY NO. 2



PROPOSED DRIVEWAY NO. 3



DRIVEWAY SUMMARY

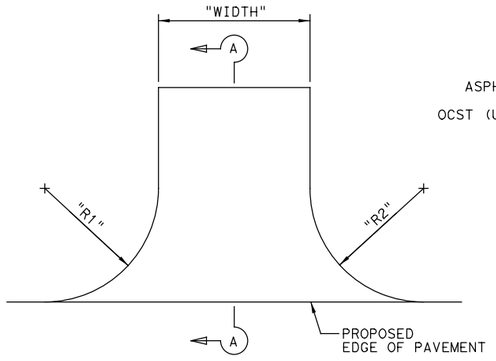
DRIVEWAY NUMBER	SH 30 STATION	LT OR RT	FOR CONTRACTOR'S INFORMATION ONLY "WIDTH"	"LENGTH"	RADIUS "R1"	RADIUS "R2"	530 6005 DRIVEWAYS (ACP)
			(FT)	(FT)	(FT)	(FT)	(SY)
DRWY01	243+91.02	RT	14	18	15	15	39
DRWY02	244+11.02	LT	10	31.5	15	15	46
DRWY03	251+88.12	LT	8	50.5	15	20	60

DRIVEWAY CULVERT SUMMARY

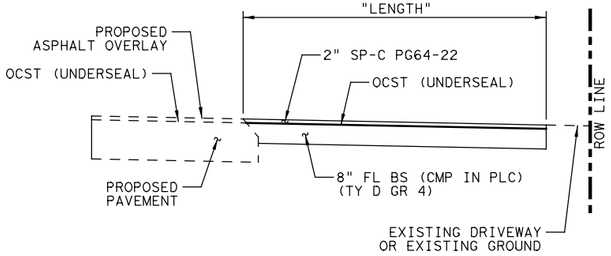
DRIVEWAY NUMBER	SET REFERENCE POINT: DRIVEWAY STATION	SET REFERENCE POINT: OFFSET	SET REFERENCE POINT: UPSTREAM ELEVATION	SET REFERENCE POINT: DOWNSTREAM ELEVATION	PIPE SLOPE	464 6003 RC PIPE (CL III) (18 IN)	464 6030 RC PIPE (ARCH) (CL III) (DES 1)	467 6363 SET (TY II) (18 IN) (RCP) (6:1) (P)	467 6519 SET (TY II) (DES 1) (RCP) (6:1) (P)
	(STA)	(FT)	(FT)	(FT)	(%)	(LF)	(LF)	(EA)	(EA)
DRWY01	10+49.35	26.74' RT	240.31	240.12	0.35	-	32	-	2
	10+50.56	27.00' LT							
DRWY02	10+45.30	26.63' LT	239.99	239.83	0.30	32	-	2	-
	10+50.51	26.18' RT							
DRWY03	10+80.27	29.50' LT	228.41	226.06	3.10	54	-	2	-
	10+59.33	43.30' RT							

NOTES:

1. EARTHWORK REQUIRED TO OBTAIN GRADE WILL BE CONSIDERED SUBSIDIARY TO ITEM 530.



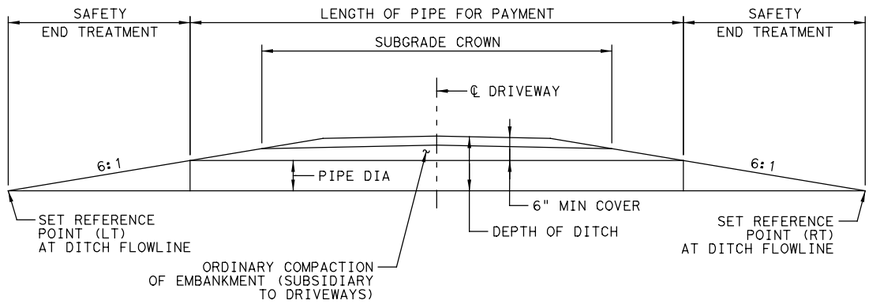
PLAN



SECTION A-A

PROPOSED DRIVEWAY DETAIL

NOT TO SCALE



DRIVEWAY CULVERT TYPICAL SECTION

NOT TO SCALE

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
08/17/2018

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

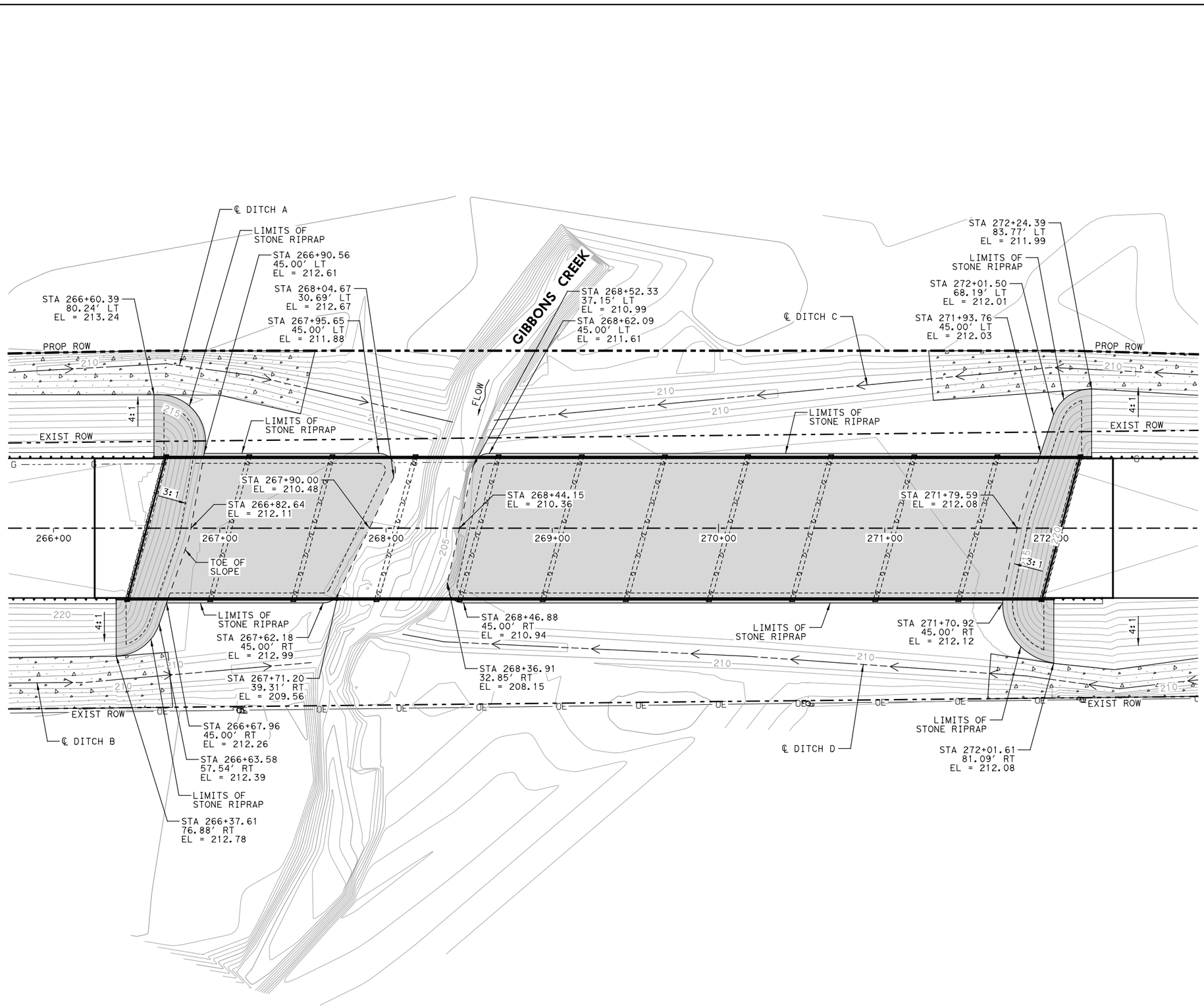
DRIVEWAY DETAILS

SCALE: 1"=20'-H
1"=2'-V

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	69
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: KBERGER DATE: 8/17/2018
FILE: SH30DWY01.dgn
PENTABLE: I0069736.tbl
TIME: 10:35:53 AM SCALE: 1:20



N

LEGEND

- PROPOSED RIPRAP LIMITS
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY

0 30 60 90 120

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

08/17/2018

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

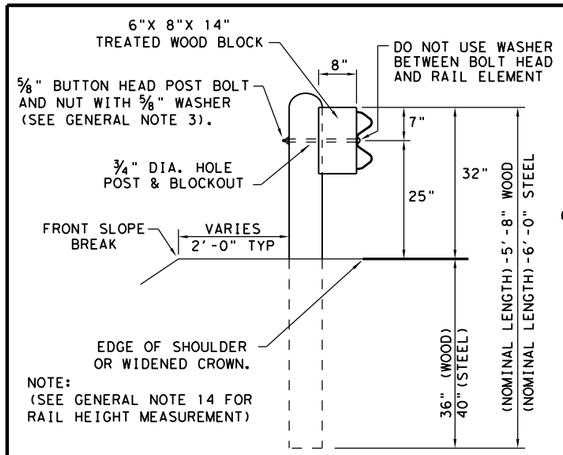
Texas Department of Transportation

BRIDGE GRADING PLAN

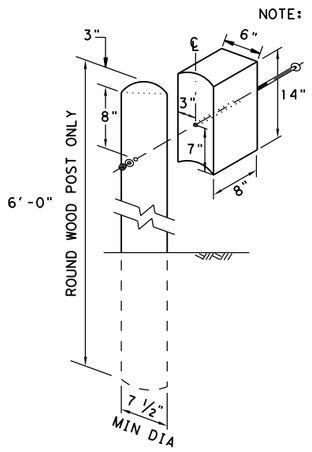
SCALE: 1"=60' SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	70
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
USER: KBERGER DATE: 8/17/2018 TIME: 4:26:22 PM SCALE: 1:60
FILE: SH30GRDOI.dgn

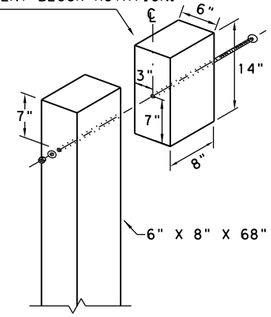


TYPICAL POST PLACEMENT

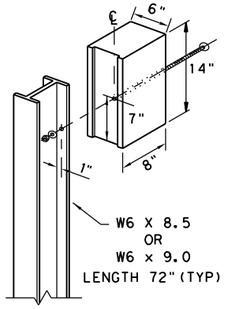


WOOD BLOCK TO ROUND WOOD POST

NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.

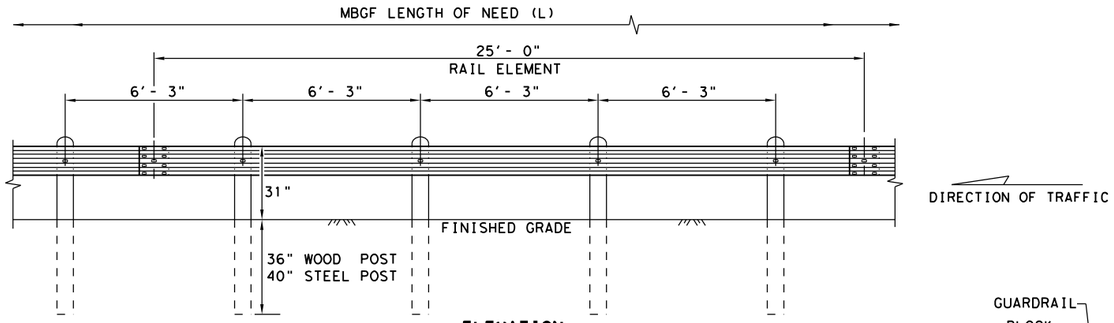


WOOD BLOCK TO RECTANGULAR WOOD POST



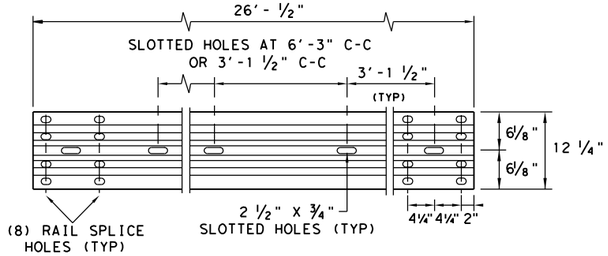
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



ELEVATION
MID-SPAN RAIL SPLICE

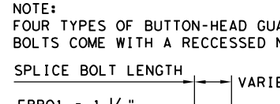
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

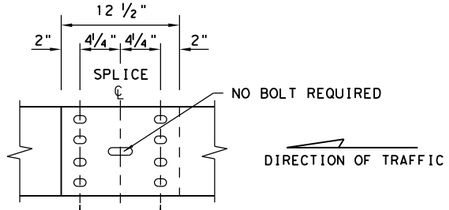
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.



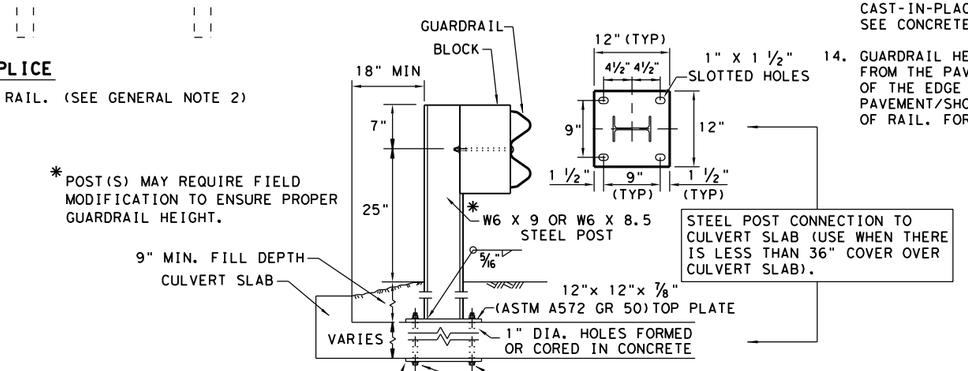
BUTTON HEAD BOLT

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.



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" 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 ¼" 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 ½" 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 ⅝" 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

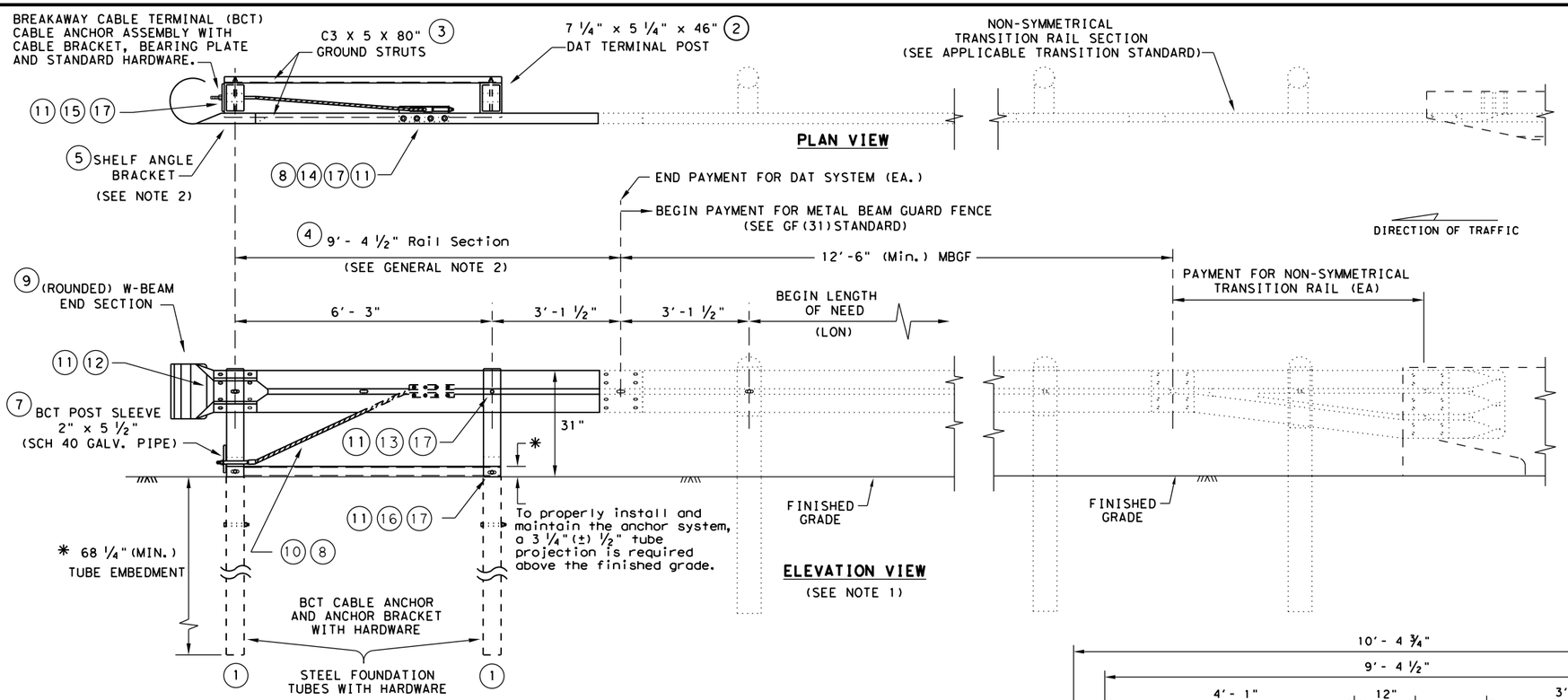
Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		71

DATE: $DATE$
FILE: $FILE$

DATE: $DATE$
FILE: $FILE$



DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

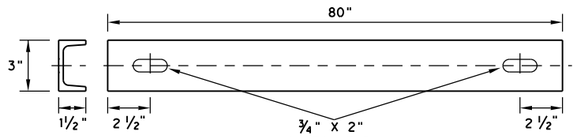
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

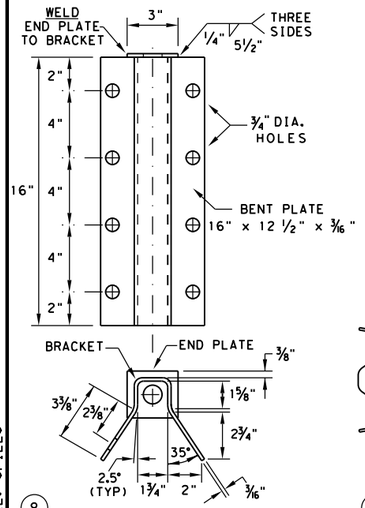
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 1/4" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	5/8" X 2" HEX HEAD BOLT	8
(15)	5/8" X 8" HEX HEAD BOLT	4
(16)	5/8" X 10" HEX HEAD BOLT	2
(17)	5/8" FLAT WASHER	18

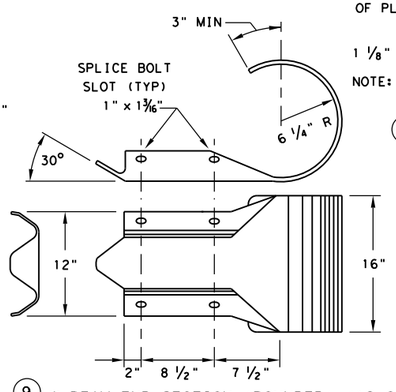
(4) TERMINAL RAIL ELEMENT FOR DAT



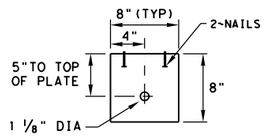
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

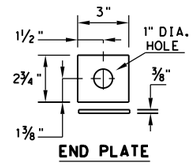


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

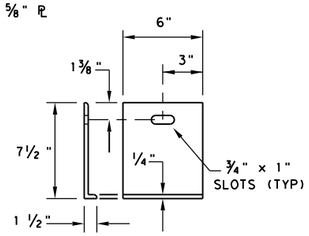


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

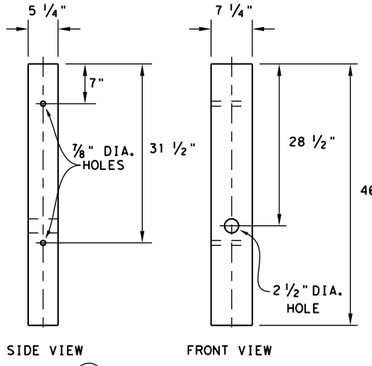
(6) BEARING PLATE
8"x 8"x 5/8" PL



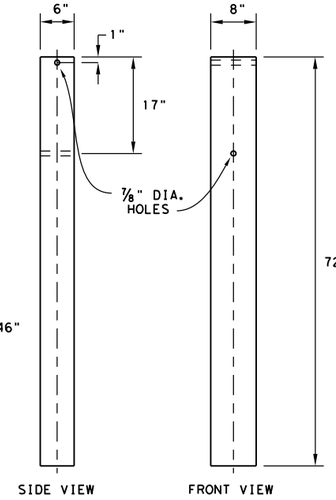
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation

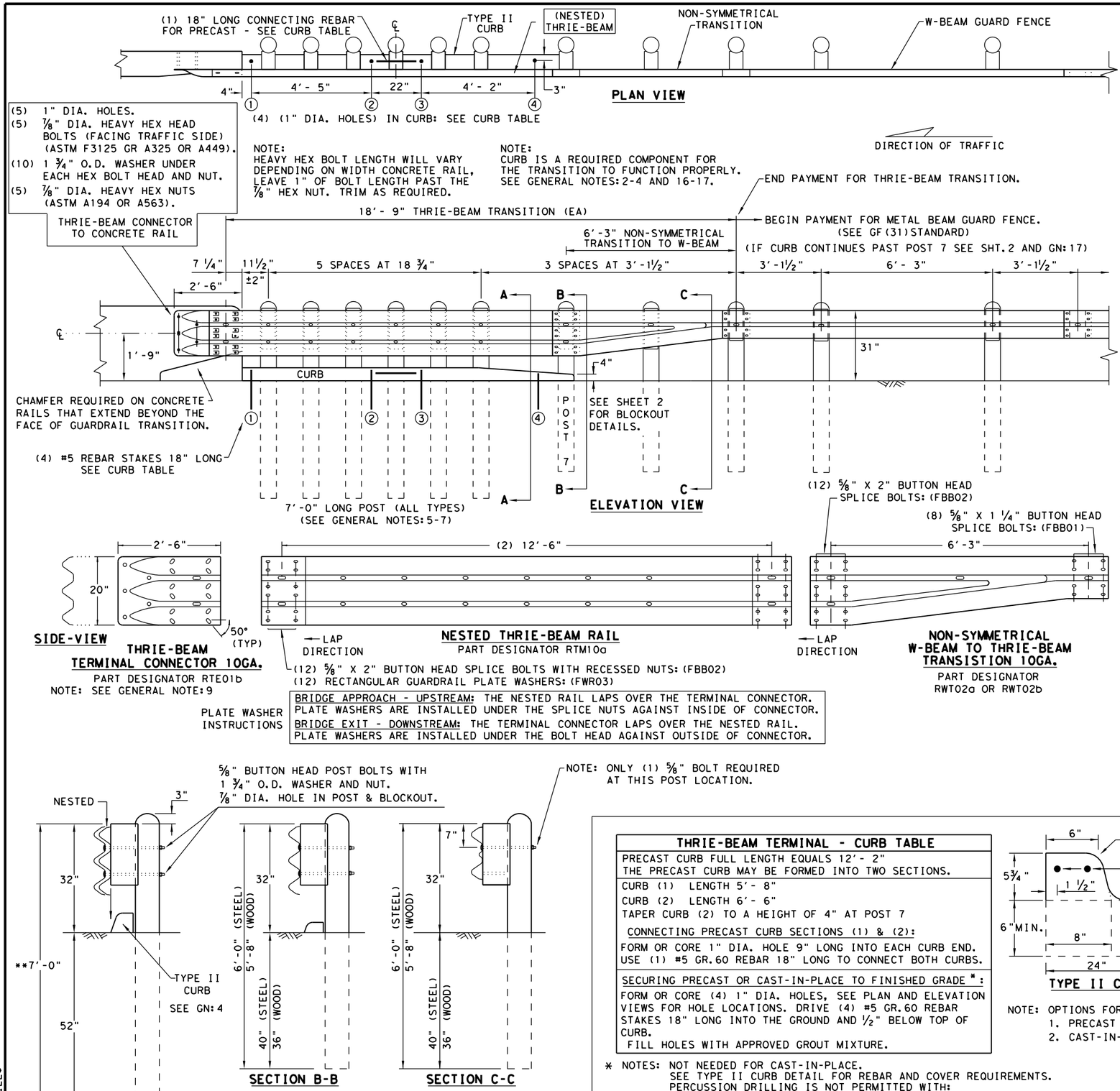
Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT

GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		72

DATE: $DATE$
FILE: $FILE$



GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- ¾" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST ⅝" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. 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 REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. 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. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED)(TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED)(STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

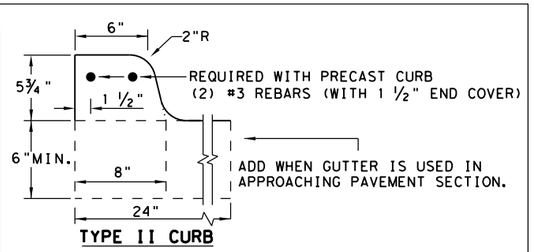
THRIE-BEAM TERMINAL - CURB TABLE

PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7

CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END. USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.

SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND ½" BELOW TOP OF CURB.
FILL HOLES WITH APPROVED GROUT MIXTURE.



TYPE II CURB

NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

* NOTES: NOT NEEDED FOR CAST-IN-PLACE.
SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS.
PERCUSSION DRILLING IS NOT PERMITTED WITH:
TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

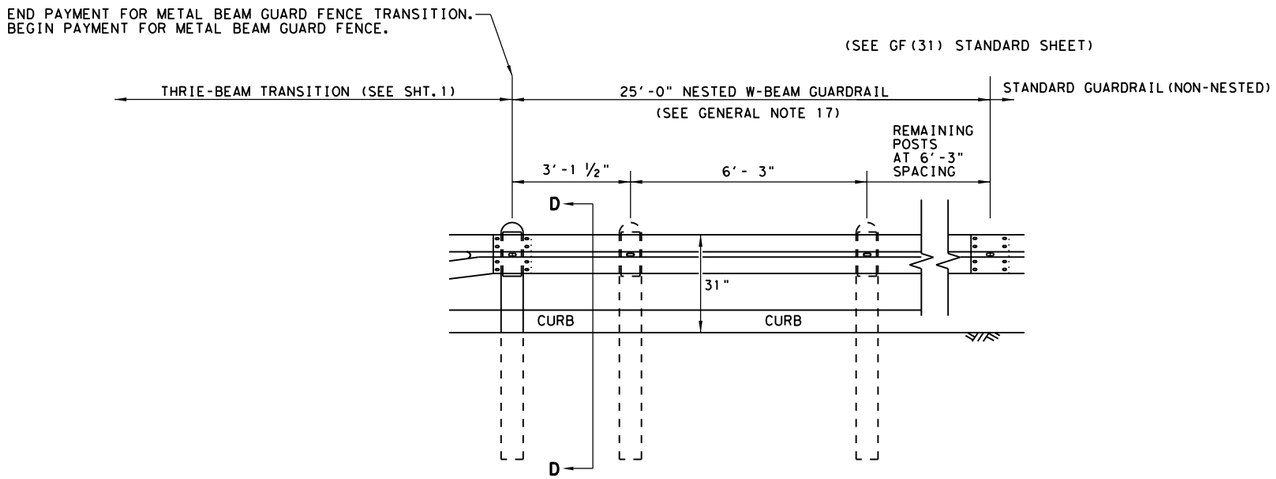
Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

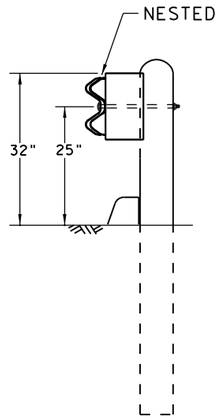
GF(31)TR TL3-20

FILE: gf31trtl320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		73

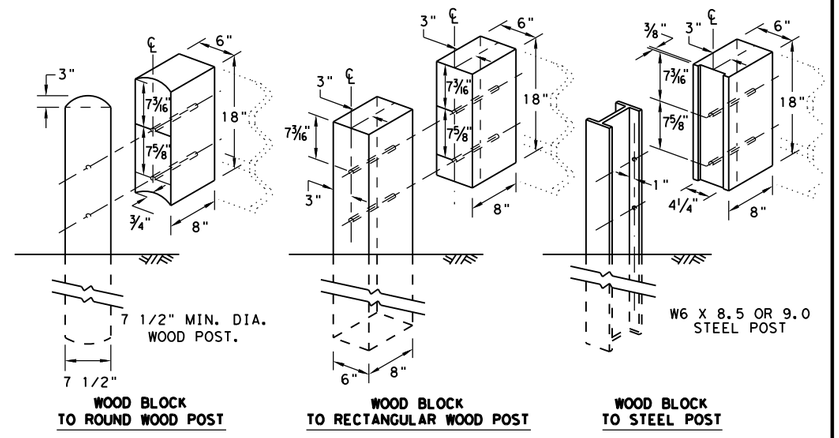
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

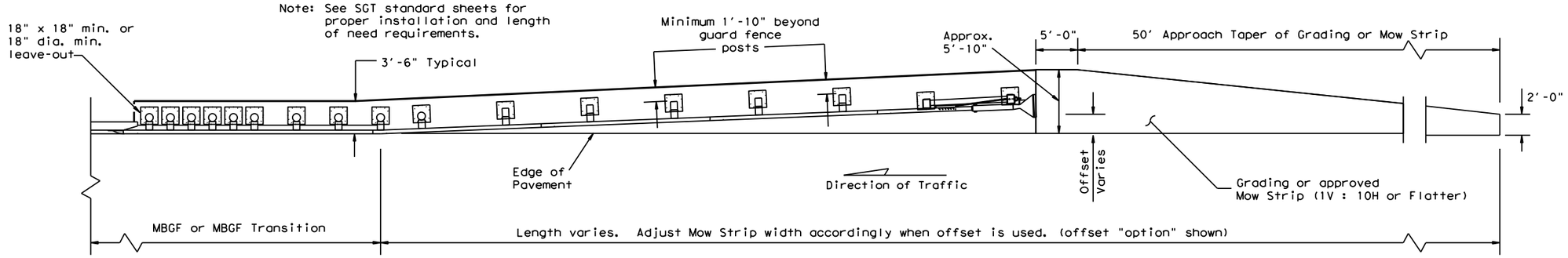
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

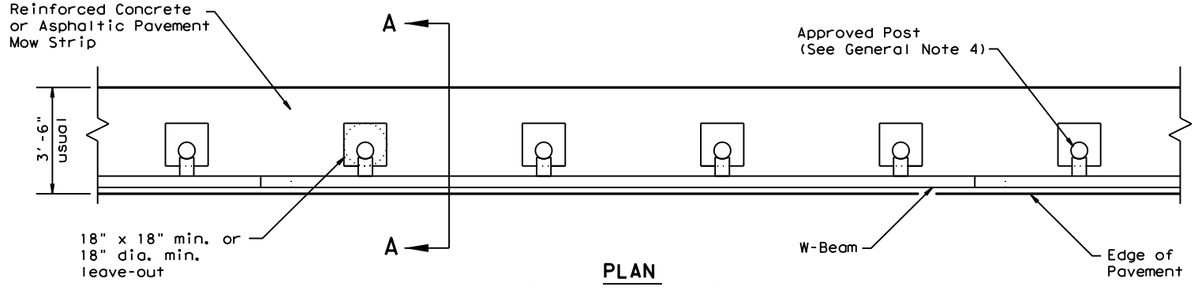
FILE: gf31trtl320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		74

DATE: $DATE$
FILE: $FILE$

DATE: $DATE$
FILE: $FILE$

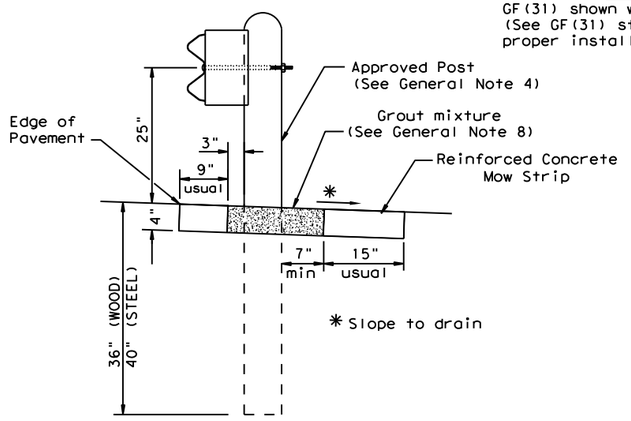


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



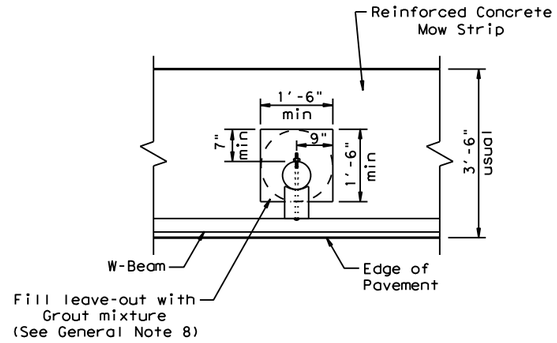
PLAN

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



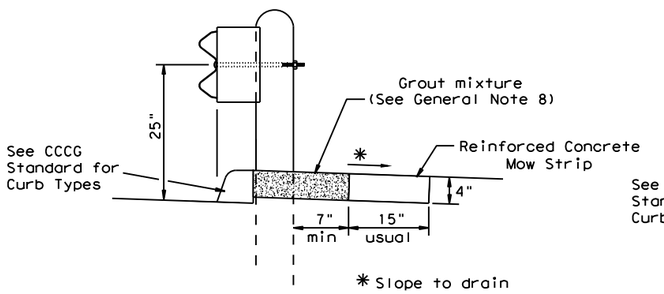
SECTION A-A

Typical



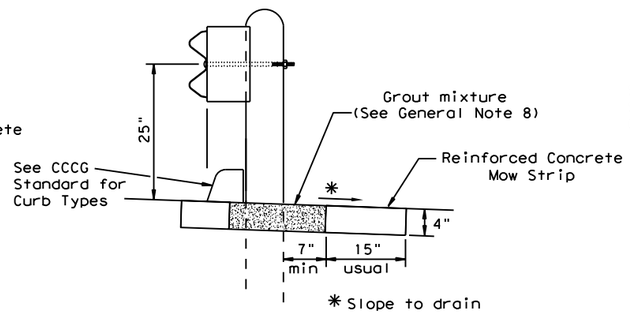
MOW STRIP DETAIL

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



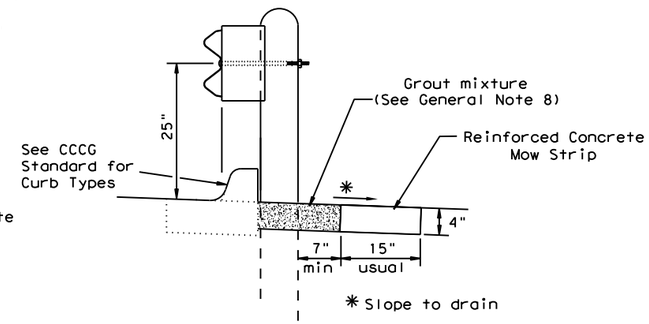
CURB OPTION (1)

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.

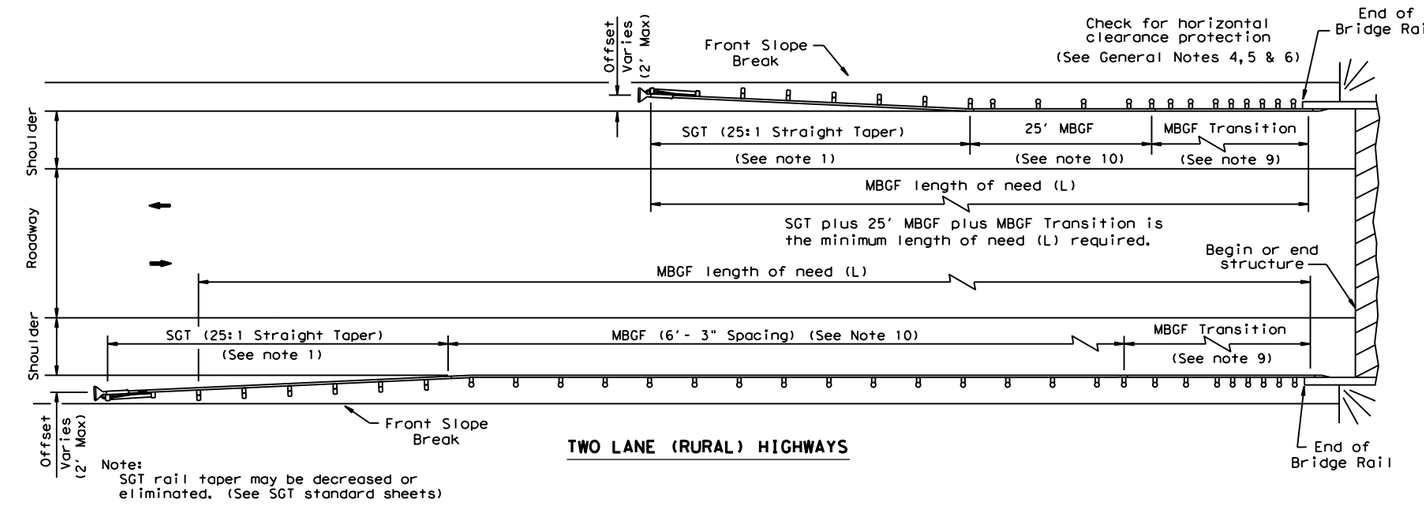
Texas Department of Transportation

Design Division Standard

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

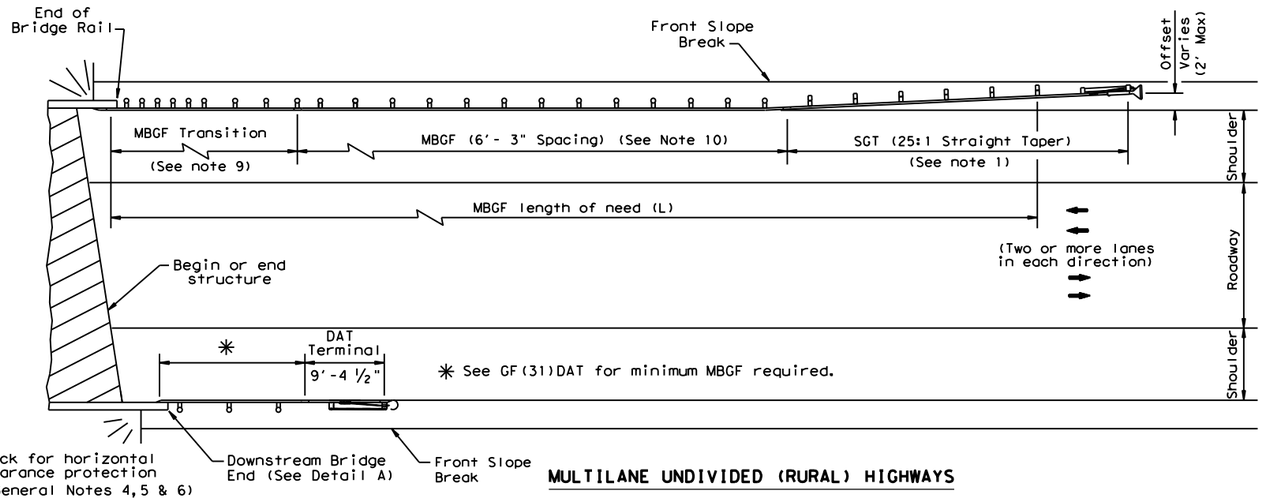
GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG		
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0212	04	039		SH 30	
	DIST	COUNTY			SHEET NO.	
	BRY	GRIMES			75	

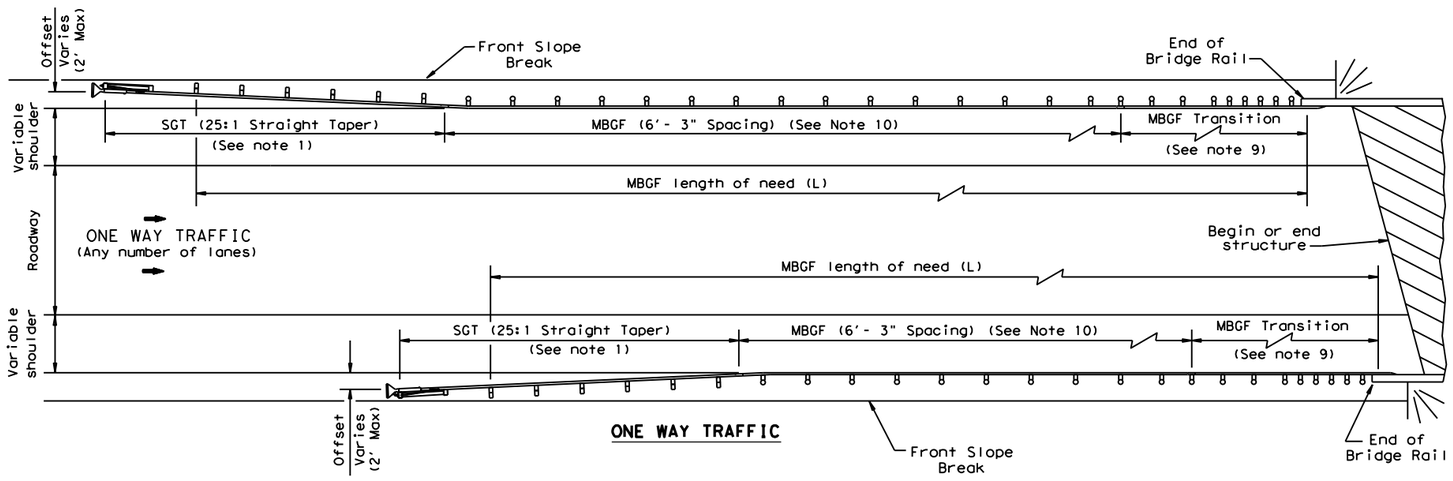


TWO LANE (RURAL) HIGHWAYS

Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)



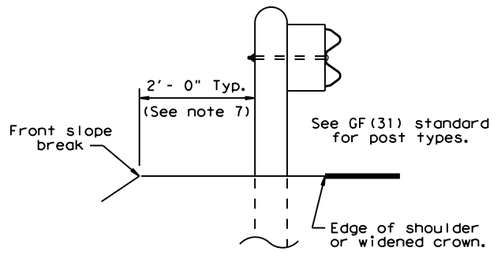
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF

Note:
All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED APRIL 2014 SEE (MEMO 0414)	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		76

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

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

PLAN VIEW

TRAFFIC FLOW

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

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

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

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

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

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

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

ANCHOR PLATE WASHER ½" THICK PN: 15206G

1" ROUND WASHER F463 PN: 4902G

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

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

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR.DH PN: 3245G

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"

FINISHED GRADE

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

SECTION VIEW B-B

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

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"

FINISHED GRADE

POST(2)

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	0212	04	039		SH 30		
	DIST	COUNTY			SHEET NO.		
	BRY	GRIMES			77		

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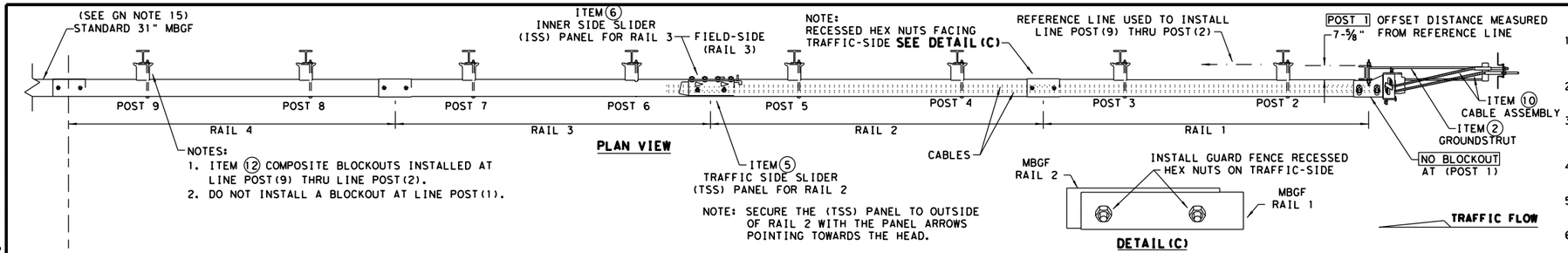
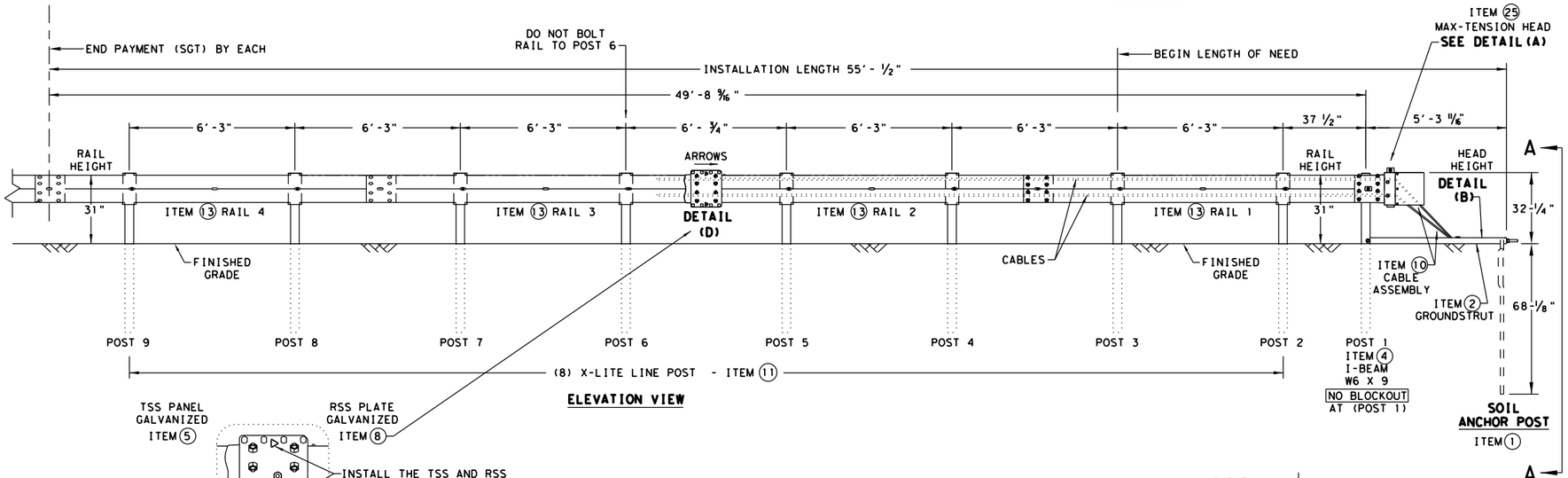
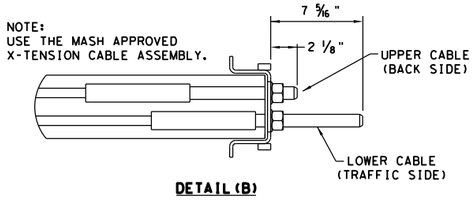
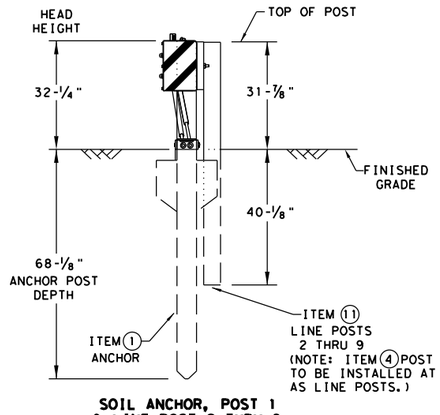
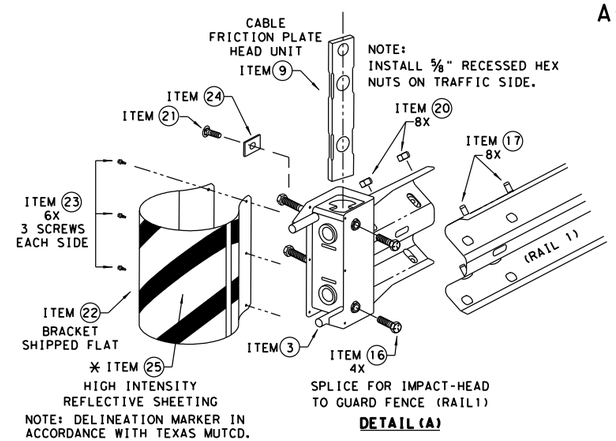










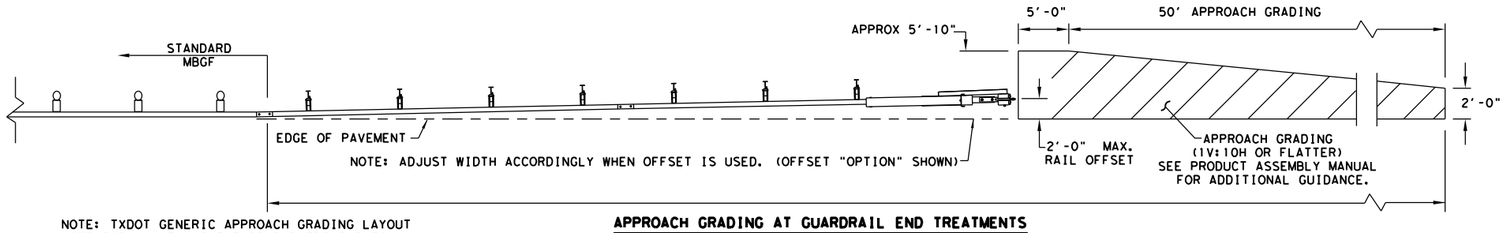
GENERAL NOTES

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	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" 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



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.

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
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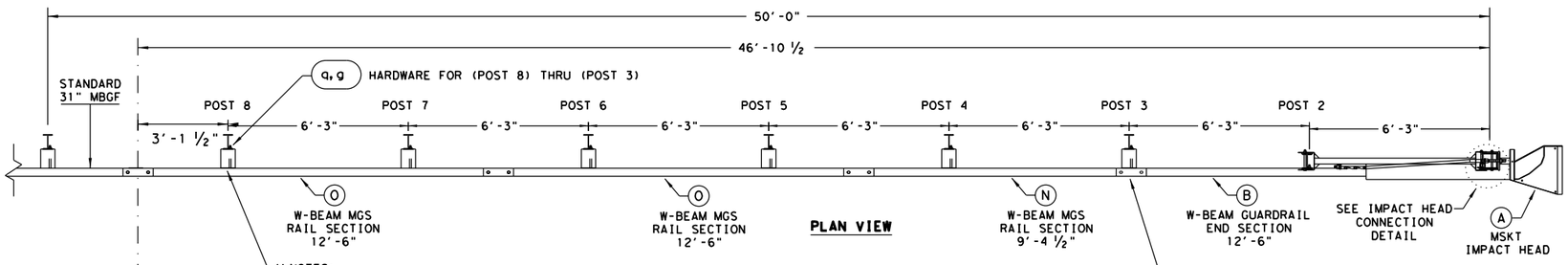
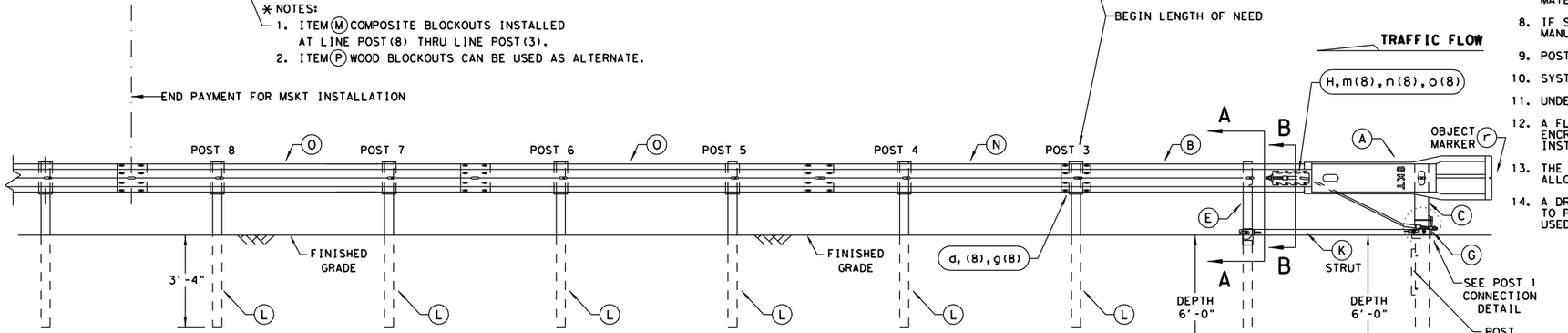
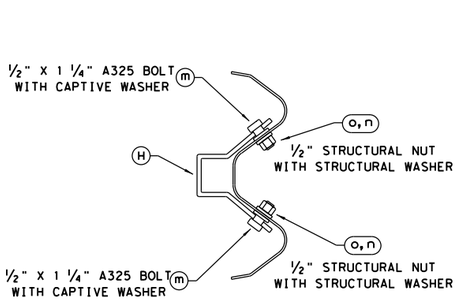


PLAN VIEW

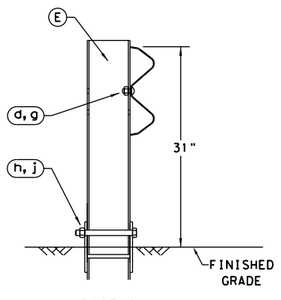


ELEVATION VIEW

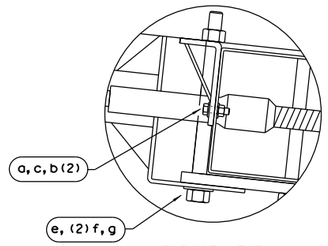
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



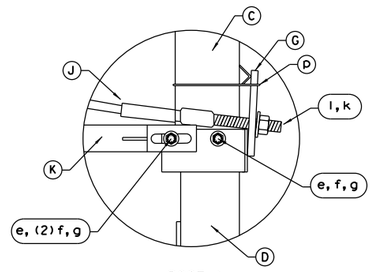
SECTION B-B
ANCHOR BRACKET



POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL

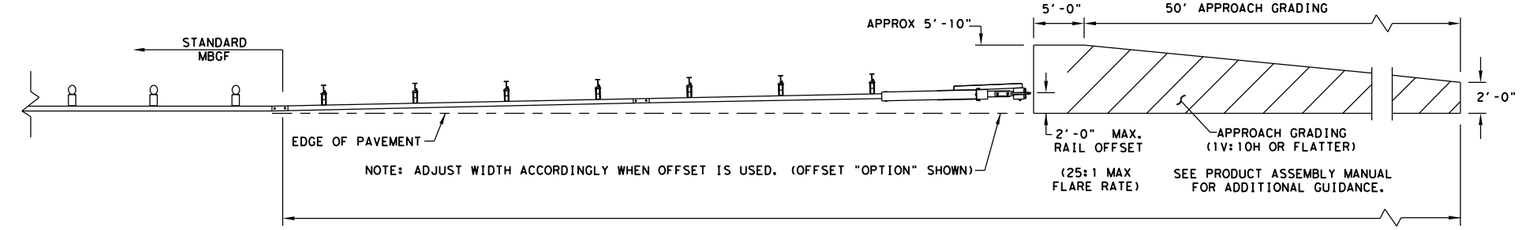
GENERAL NOTES

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 1/8" 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 1/2")	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	5/16" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/16" WASHER	W0516
c	2	5/16" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" 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



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.

DATE: $DATE$
FILE: $FILE$

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	0212	04	039	SH 30		
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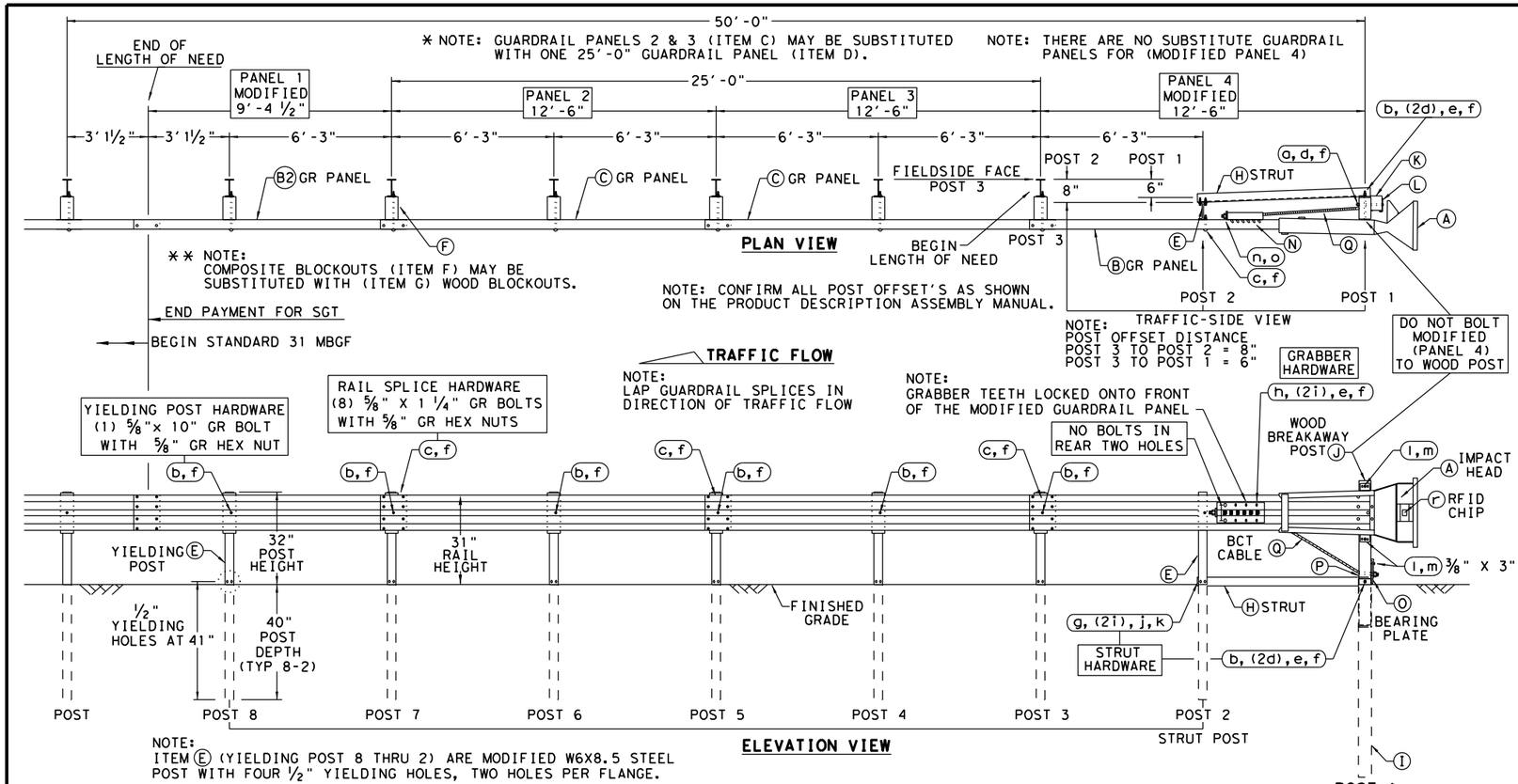
	BRY	GRIMES		79		

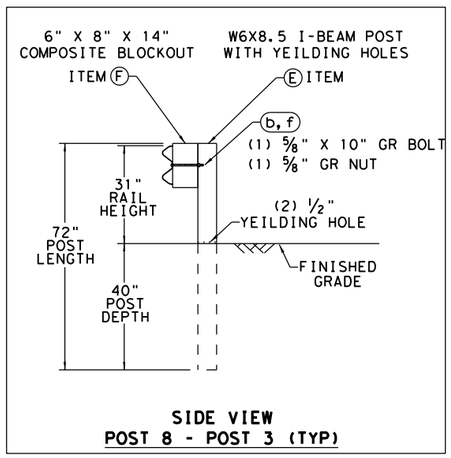


GENERAL NOTES

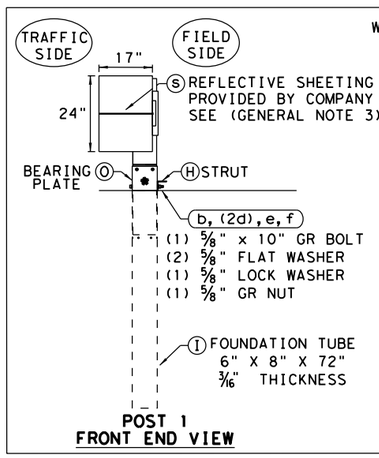
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
9. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D *	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G **	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
		SMALL HARDWARE	
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

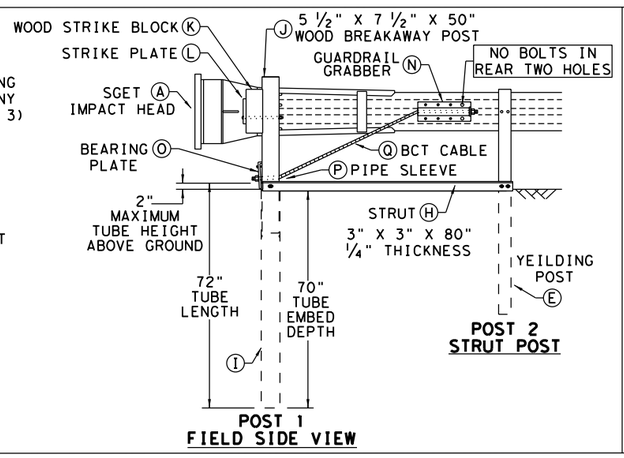
* ALTERNATIVE ITEMS
** NOTE: SEE PLAN VIEW



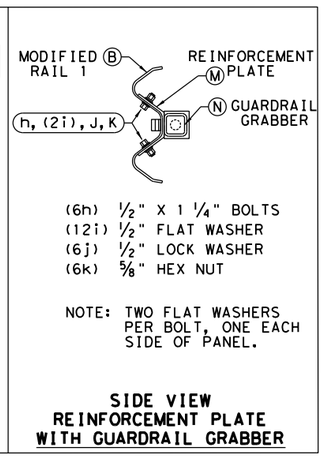
SIDE VIEW
POST 8 - POST 3 (TYP)



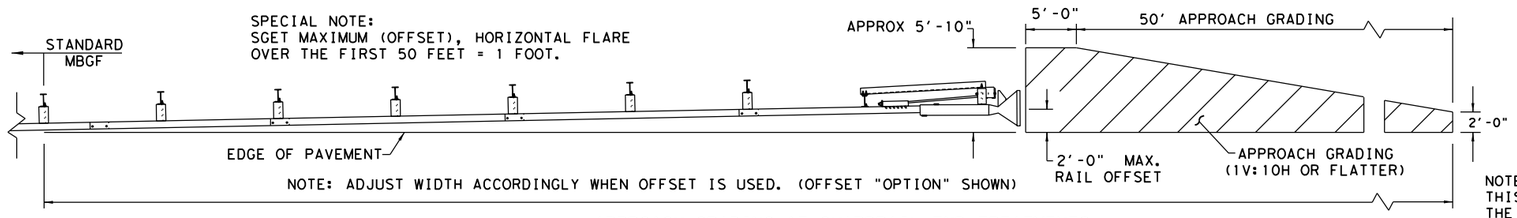
POST 1
FRONT END VIEW



POST 1
FIELD SIDE VIEW



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

Texas Department of Transportation
Design Division Standard

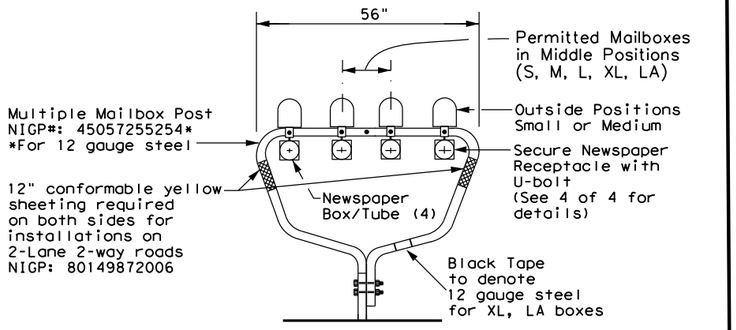
SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

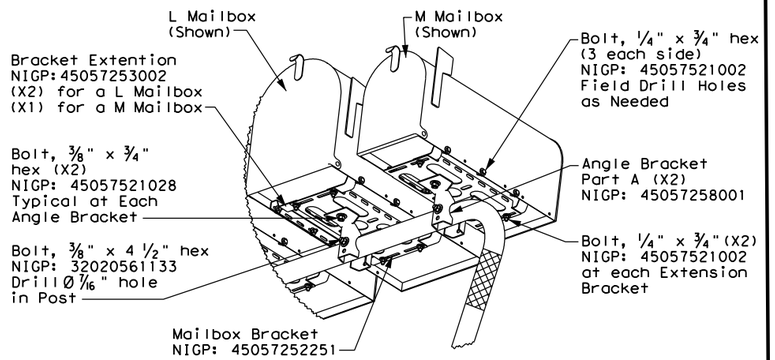
FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP	
©TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0212	04	039	SH 30	
	DIST	COUNTY		SHEET NO.	
	BRY	GRIMES		79A	

DATE: $DATE$
FILE: $FILE$

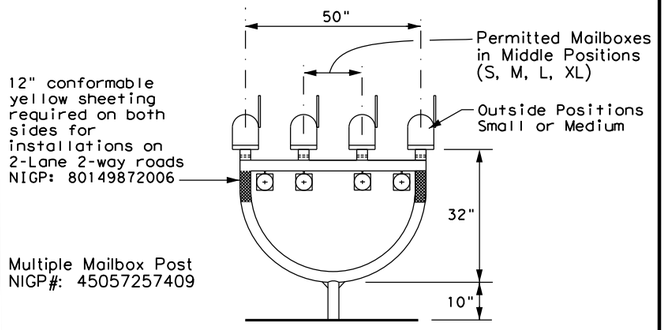
DATE:
FILE:

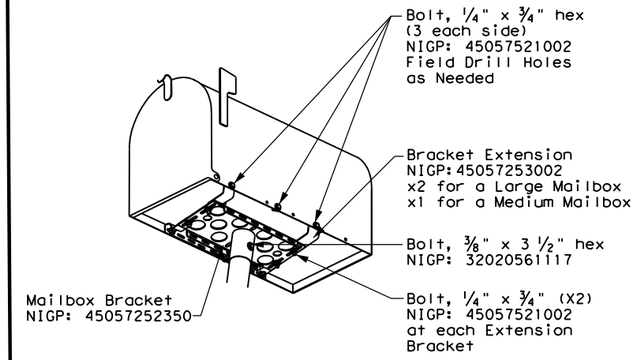
TYPE 1 - MULTIPLE





TYPE 4 - MULTIPLE





MAILBOX SIZES

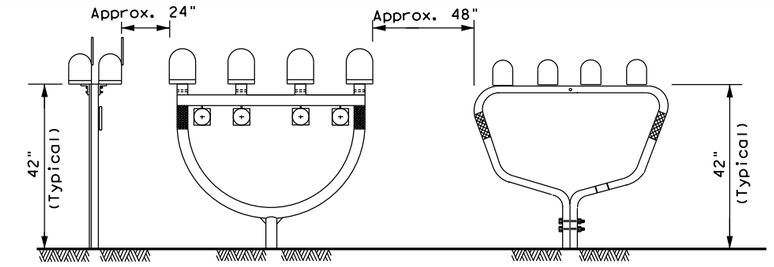
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

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

GENERAL NOTES:

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

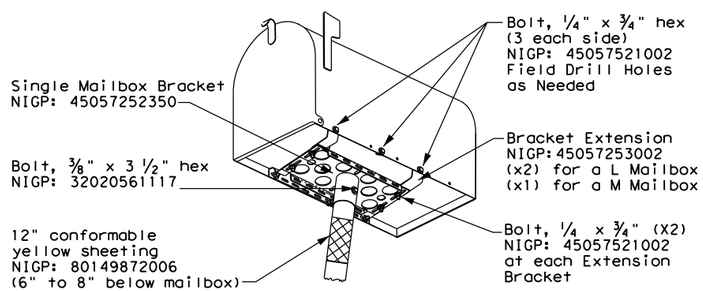
TYPICAL INSTALLATION MEASUREMENTS

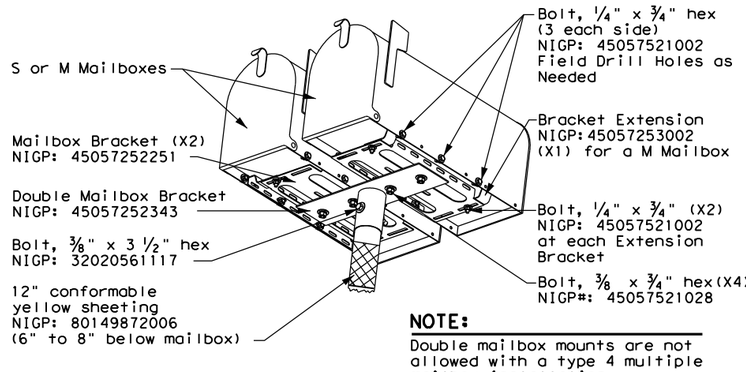


NOTE:

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

TYPE 2 and 4 - SINGLE/DOUBLE

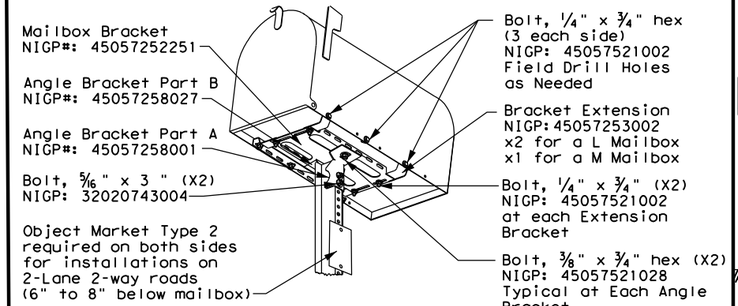


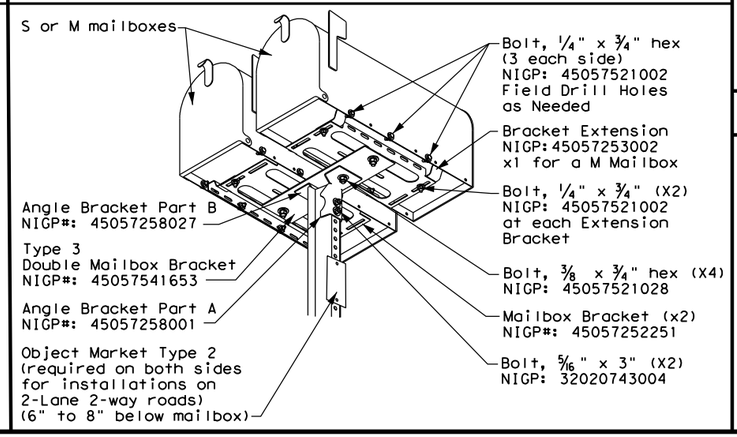


NOTE:

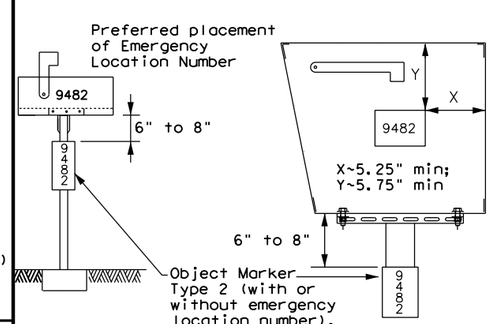
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

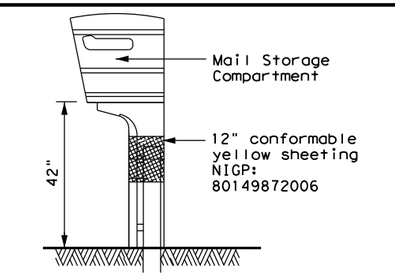


NOTES:

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

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation

Maintenance Division Standard

MAILBOX MOUNTING AND ASSEMBLY

MB(1)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
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	BRY			80

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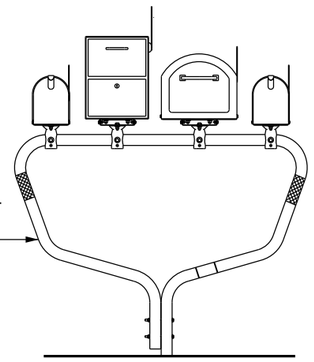
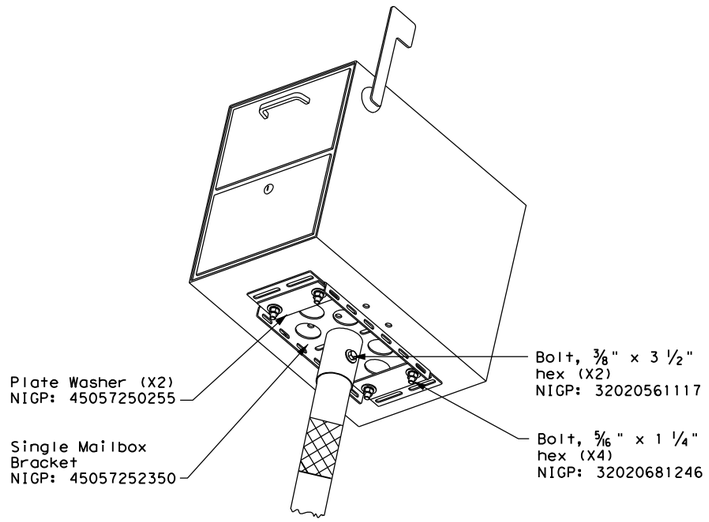
DATE:
FILE:

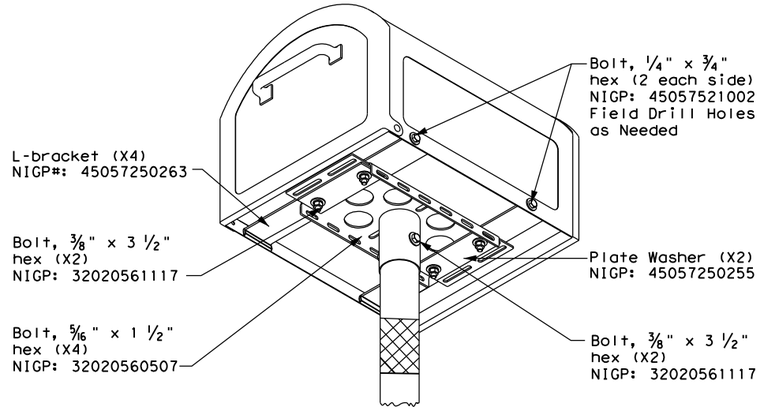
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

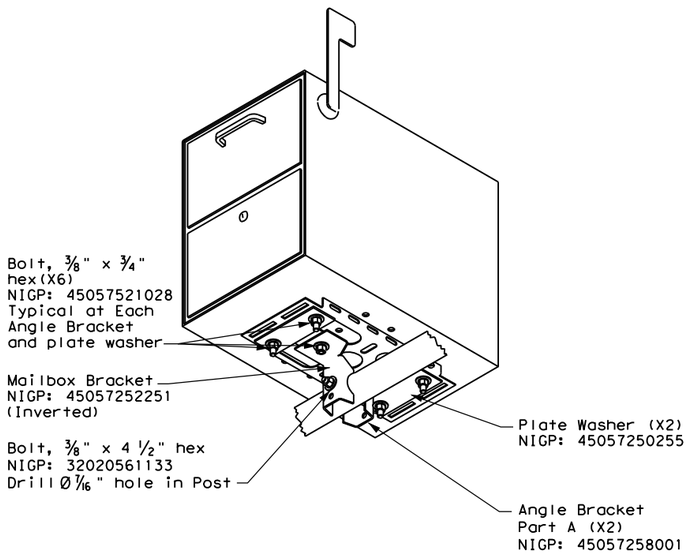


TYPE 2/4 - SINGLE XL MAILBOX

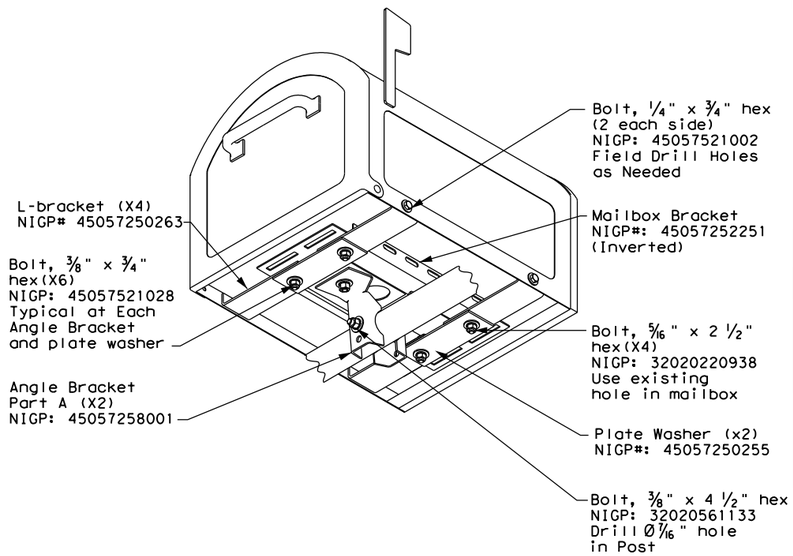


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

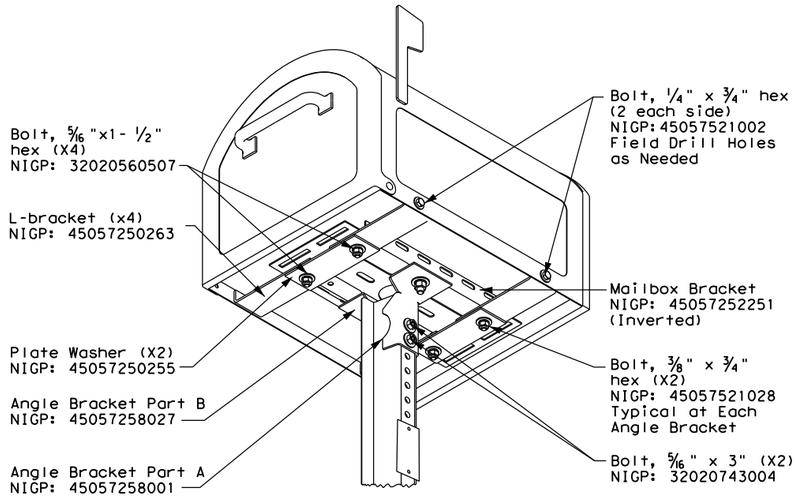
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation

Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

MB(2)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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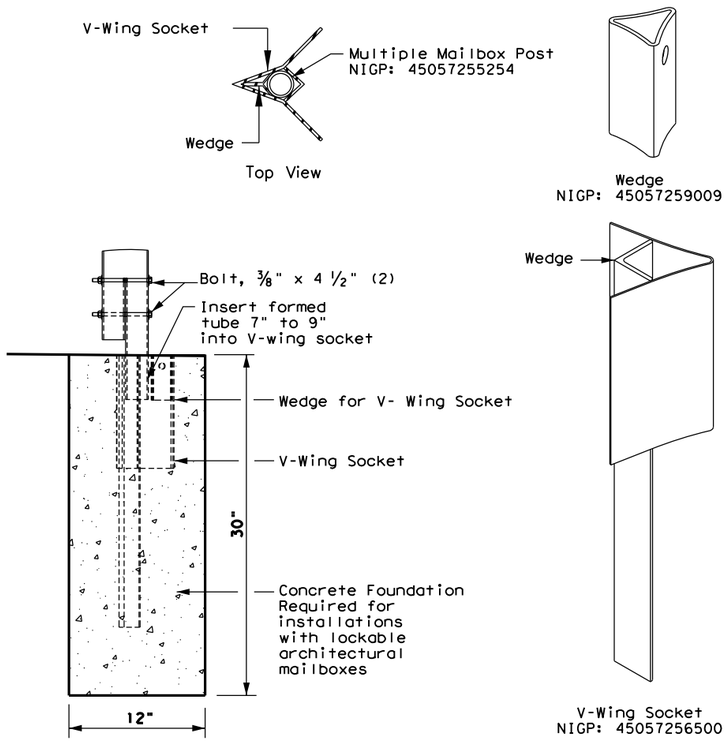
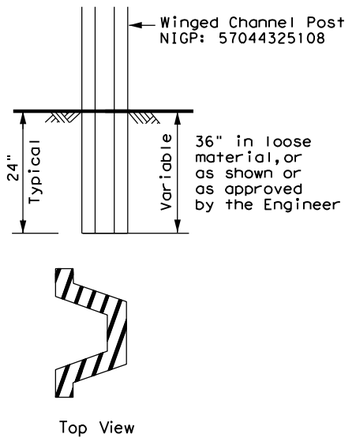
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		81

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

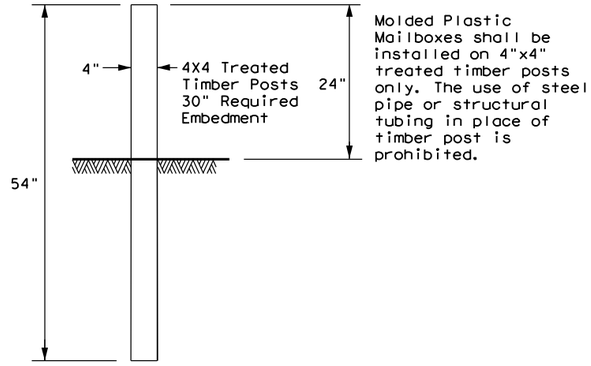


TYPE 3 - SUPPORT/FOUNDATION

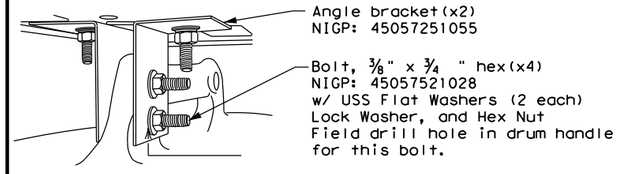


NOTES:
1. Attach Object Marker (OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT

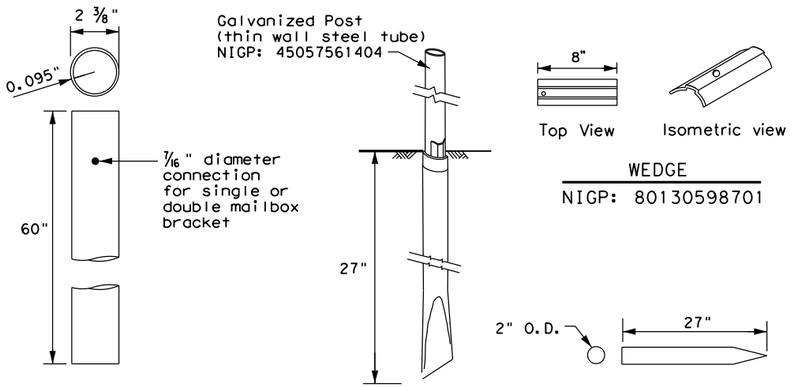


Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

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

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

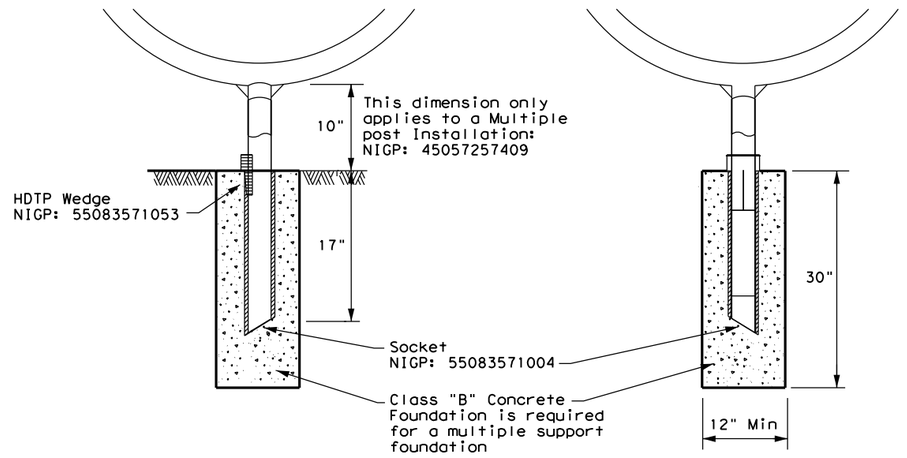
TYPE 2 - SUPPORT/FOUNDATION
Thin Wall Steel Tube w/Wedge Anchor System



MAILBOX POST

WEDGE ANCHOR
NIGP: 80130238407

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



SHEET 3 OF 4

Texas Department of Transportation | Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

MB(3)-21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:
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	BRY	GRIMES		82

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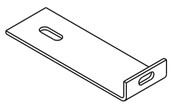
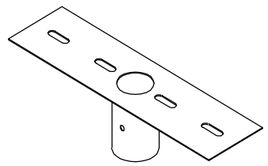
DATE:
FILE:

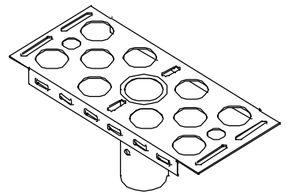
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: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



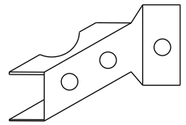
NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes



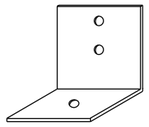
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount



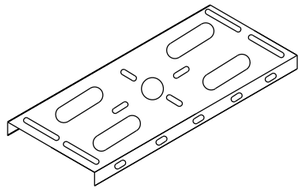
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



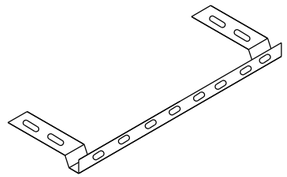
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



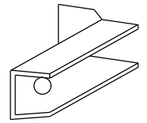
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



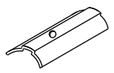
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



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



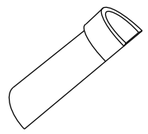
NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double



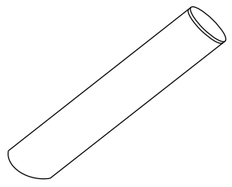
NIGP: 80130598701
Wedge for Type 2

NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes

NIGP: 45057541653
Type 3 double mailbox bracket

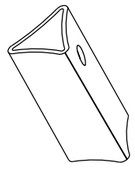


NIGP: 55083571053
Type 4 Mailbox Wedge

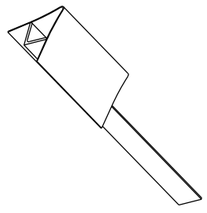


NIGP: 55083571004
Type 4 Mailbox Socket

NIGP: 80130238407
Type 2 Wedge Anchor



NIGP: 45057259009
Wedge for Type 1 V-wing Socket



NIGP: 45057256500
V-wing Socket for
Type 1 Foundation

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

NOTES:

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

BID CODES FOR CONTRACTS

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

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

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

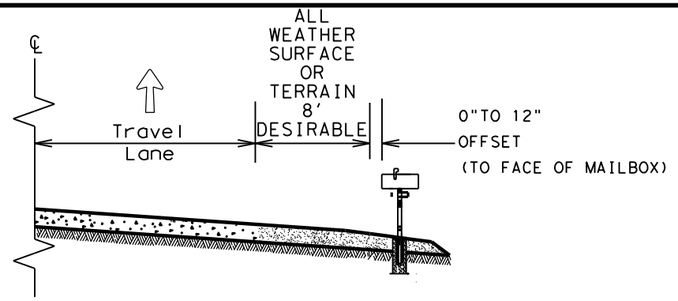
Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post

Texas Department of Transportation — Maintenance Division Standard

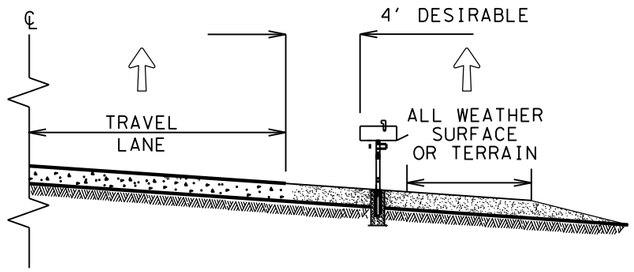
NIGP PARTS LIST AND COMPATIBILITY

MB(4)-21

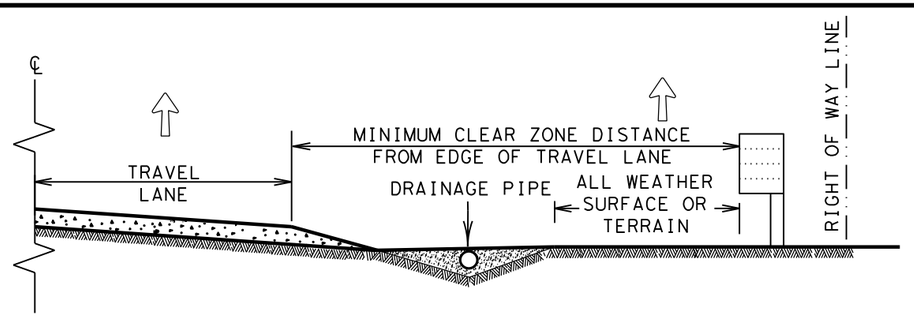
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		83



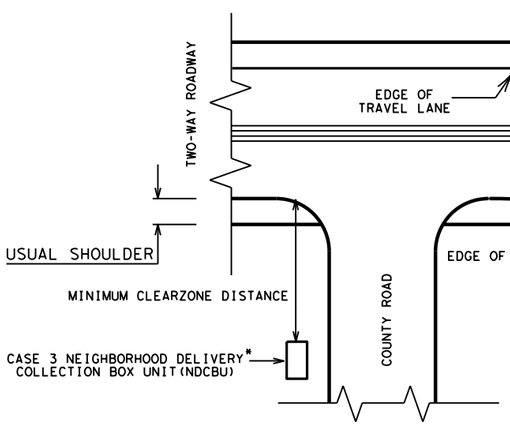
CASE 1. OFF TRAVEL WAY DELIVERY

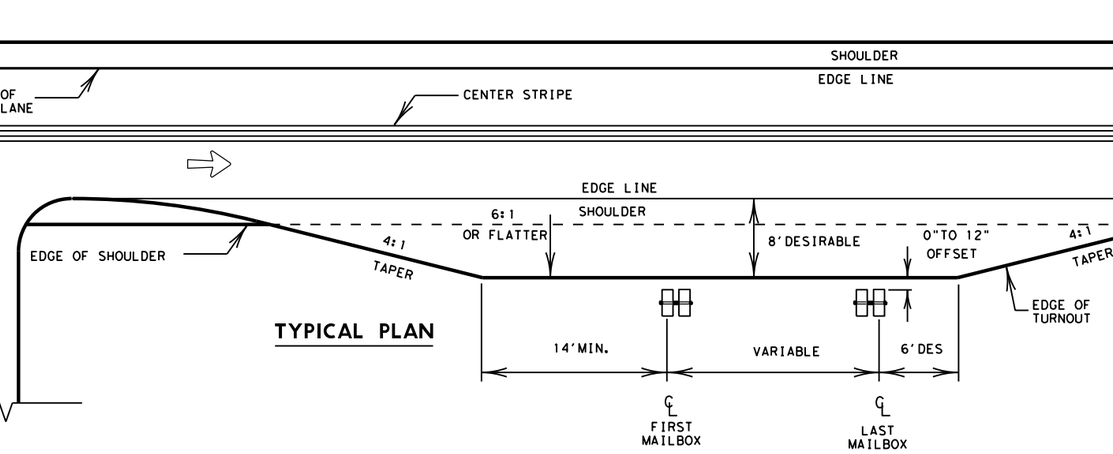


CASE 2. BACK SIDE DELIVERY

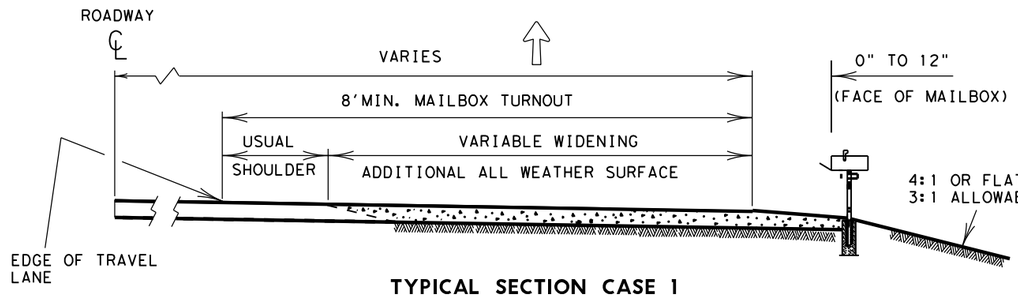


CASE 3. DELIVERY NEAR RIGHT OF WAY LINE





TYPICAL PLAN



TYPICAL SECTION CASE 1

GENERAL NOTES:

1. CASE 1 IS THE MOST COMMON METHOD.
2. TURN OUT BEHIND MAILBOX FOR CASE 2 WILL NORMALLY BE ALLOWED FOR NATURAL TERRAIN THAT WILL SERVE AS AN ALL WEATHER SURFACE.
3. ALL WEATHER DRIVEWAYS FOR CASE 3 MAILBOXES LOCATED AT THE RIGHT OF WAY LINE SHOULD NORMALLY BE PLACED IN CONJUNCTION WITH COUNTY ROADS OR OTHER CONNECTING COMMUNITY ROADS OR STREETS. WHEN 3 OR MORE MULTI-RACKS ARE ANTICIPATED, THE USE OF AN NDCBU IS RECOMMENDED. ONLY RURAL PATRONS LOCATED ON STATE MAINTAINED HIGHWAYS MAY HAVE A MAILBOX OR NDCBU SLOT ON TXDOT RIGHT OF WAY.

*NDCBU MAY BE INSTALLED ON COUNTY ROAD ROW WITH APPROVAL OF COUNTY.

MAIL DELIVERY VEHICLE TRAVEL DIRECTION

DATE:
FILE:

Texas Department of Transportation | Maintenance Division Standard

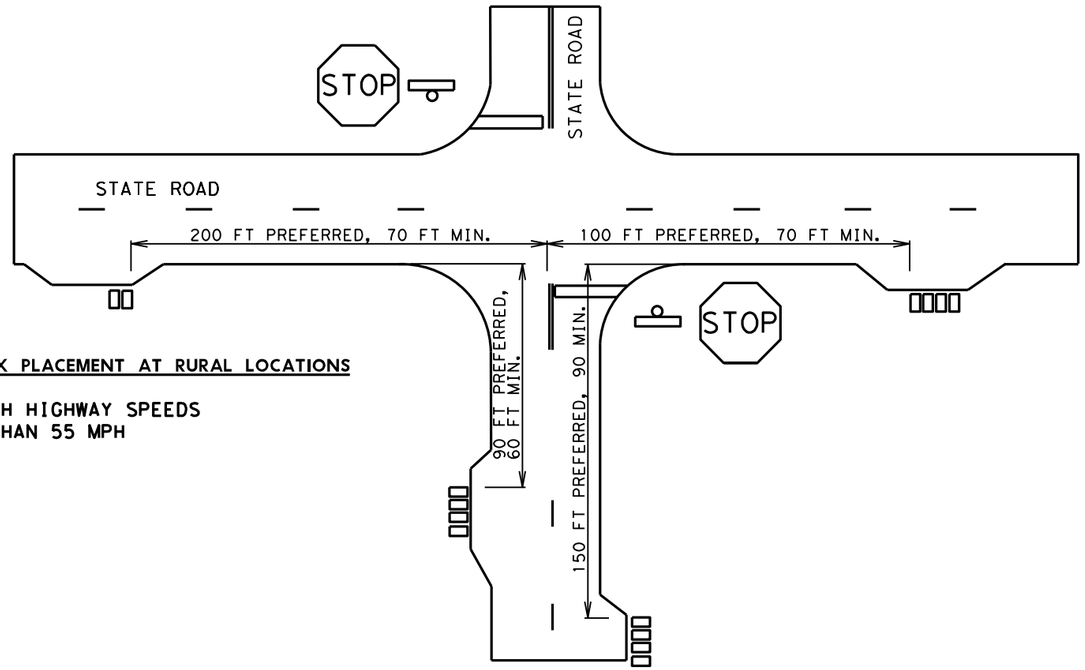
Guideline

MAILBOX SIDE ROAD PLACEMENT AND TURNOUTS

MBP(1)-22

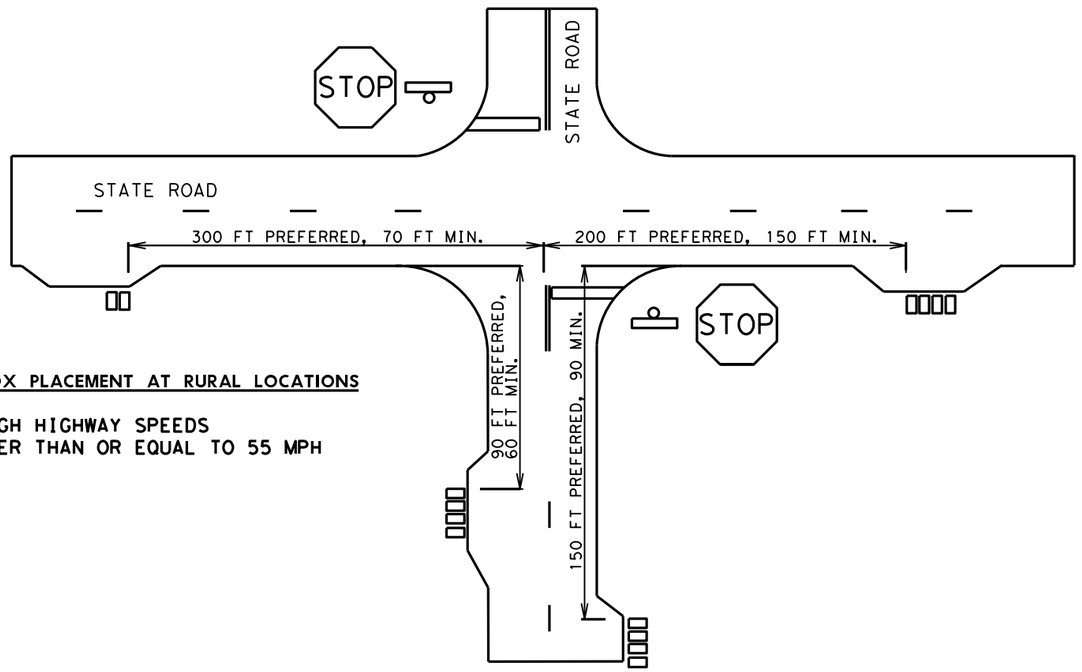
FILE: MBP-22.DGN	DN: VS	CK:	DW: VS	CK:
© TxDOT OCTOBER 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 12/2012 5/2014	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		84

DATE:
FILE:



MAILBOX PLACEMENT AT RURAL LOCATIONS

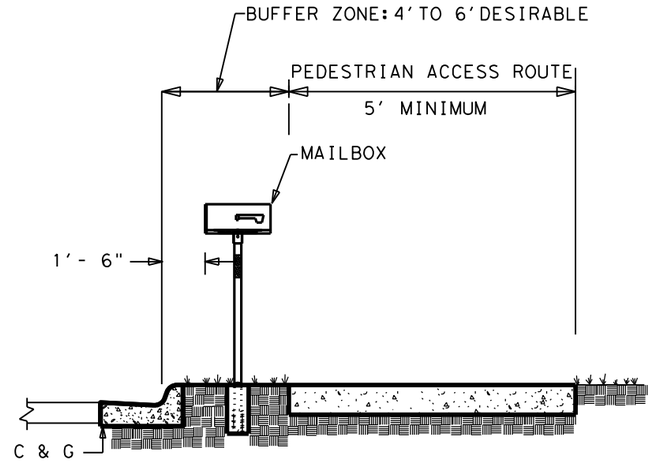
THROUGH HIGHWAY SPEEDS
LESS THAN 55 MPH



MAILBOX PLACEMENT AT RURAL LOCATIONS

THROUGH HIGHWAY SPEEDS
GREATER THAN OR EQUAL TO 55 MPH

CURB AND GUTTER MAILBOX INSTALLATION



NOTES:
1. A NON-TRAVERSABLE SURFACE MUST BE INSTALLED NEAR THE MAILBOX (NATURAL VEGETATION OR OTHER) IN THE BUFFER ZONE. ALTERNATIVELY, A BASE WITH A MINIMUM HEIGHT OF 2.5 INCHES MAY BE INSTALLED SO THAT THE EDGE OF THE MAILBOX DOES NOT EXTEND OUT MORE THAN 4 INCHES HORIZONTALLY BEYOND THE BASE.

2. THE SIDEWALK WIDTH MAY BE REDUCED TO 4 FOOT FOR SHORT DISTANCES AROUND THE MAILBOX IF NEEDED.

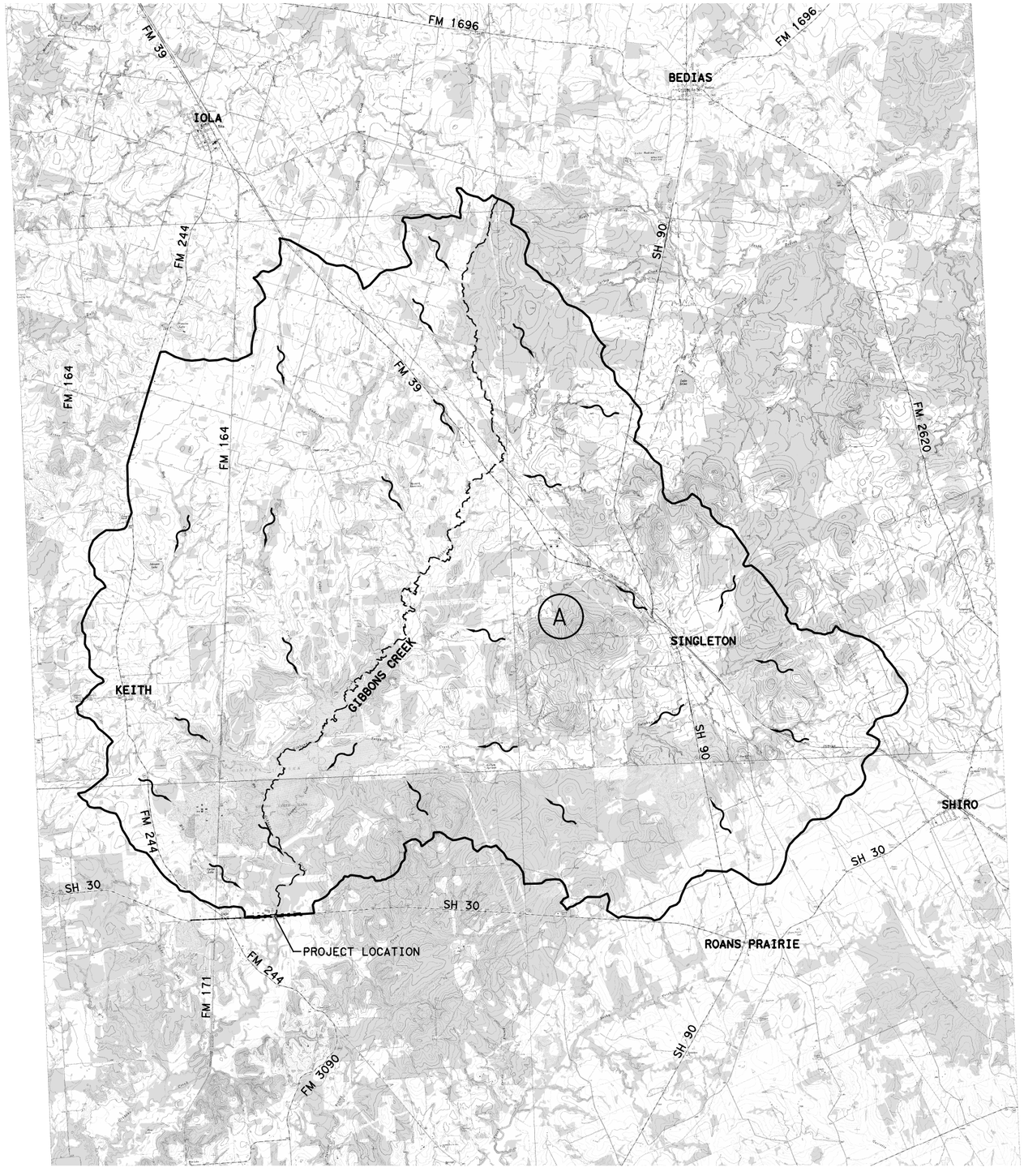
3. MAINTAIN A MINIMUM OF 5 FEET BETWEEN OBSTRUCTIONS IN THE PEDESTRIAN ACCESS ROUTE.

Texas Department of Transportation | Maintenance Division Standard

MAILBOX PLACEMENT CURBS & INTERSECTIONS

MBP(2)-22

FILE: MBP-22.DGN	DN: VS		CK:	DW: VS		CK:
	CONT	SECT	JOB		HIGHWAY	
REVISIONS 12/2012 5/2014	0212	04	039		SH 30	
	DIST	COUNTY			SHEET NO.	
	BRY	GRIMES			85	



0 2500 5000

SCALE: 1" = 5000'

LEGEND

(A)	AREA I.D.
~	DIRECTION OF FLOW
———	DRAINAGE AREA BOUNDARY

NOTES:

1. THE OMEGA EM REGRESSION METHOD WAS USED TO ESTIMATE THE PEAK FLOWS USED FOR HYDRAULIC ANALYSIS. TXDOT HYDRAULIC MANUAL, JULY 2016, CHAPTER 4 SECTION 10.
2. THE RUNOFF RESULTS FROM THE OMEGA REGRESSION ANALYSIS WERE USED AS THE DESIGN FLOWS FOR THE BRIDGE DESIGN.
3. THE BRIDGE IS LOCATED WITHIN FLOOD ZONE A, FEMA MAP 48185C0250C.
4. CONTOURS ARE SHOWN AT 10' INTERVALS.

STATE OF TEXAS
ERIK A. NELSEN
91924
LICENSED PROFESSIONAL ENGINEER
8/14/2018

NO.	DATE	REVISION	APPROVED

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

DRAINAGE AREA MAP

SHEET 1 OF 4

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	86
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: $PLTDRVS$ PENTABLE: $PENTBLS$
USER: $USER$ DATE: 8/14/2018 TIME: 2:18:34 PM SCALE: $SCALESHORT$
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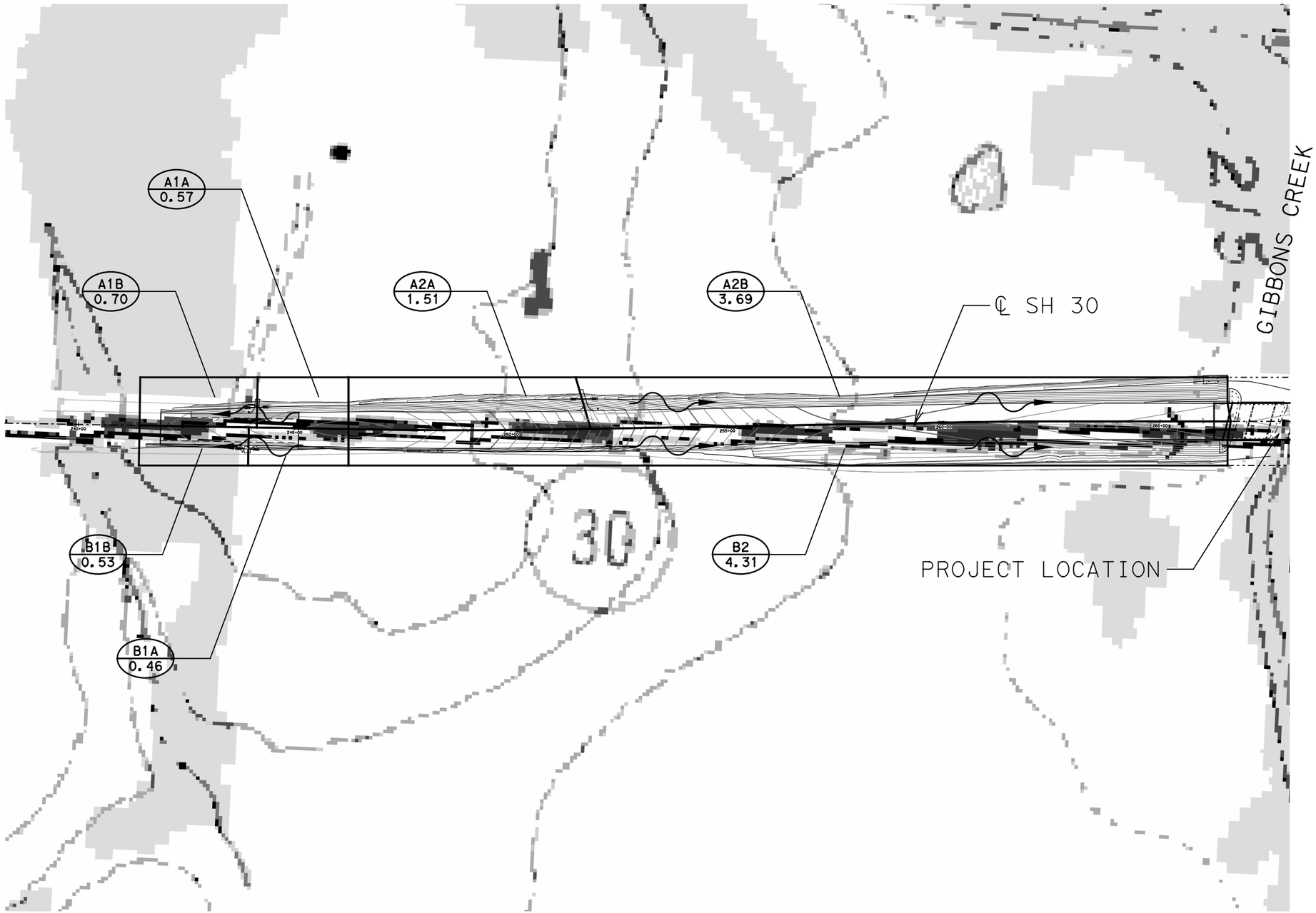

0 125 250
SCALE: 1" = 250'

LEGEND

X / XX.XX	AREA I.D.
	DIRECTION OF FLOW
	DRAINAGE AREA BOUNDARY

NOTES:

1. THE RATIONAL METHOD WAS USED TO ESTIMATE THE PEAK FLOWS USED FOR HYDRAULIC ANALYSIS. TXDOT HYDRAULIC MANUAL, JULY 2016, CHAPTER 4 SECTION 12.
2. THE RUNOFF RESULTS FROM THE RATIONAL METHOD ANALYSIS WERE USED AS THE DESIGN FLOWS FOR THE DITCH DESIGN.
3. THE BRIDGE IS LOCATED WITHIN FLOOD ZONE A, FEMA MAP 48185C0250C.
4. CONTOURS ARE SHOWN AT 1' INTERVALS.

STATE OF TEXAS
ERIK A. NELSON
91924
LICENSED PROFESSIONAL ENGINEER
8/15/2018

NO.	DATE	REVISION	APPROVED

RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

INTERIOR DRAINAGE AREA MAP

SHEET 2 OF 4

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	87
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: $PLTDRV$$
USER: $USER$$ DATE: 8/15/2018 TIME: 3:34:30 PM SCALE: $SCALESHORT$$
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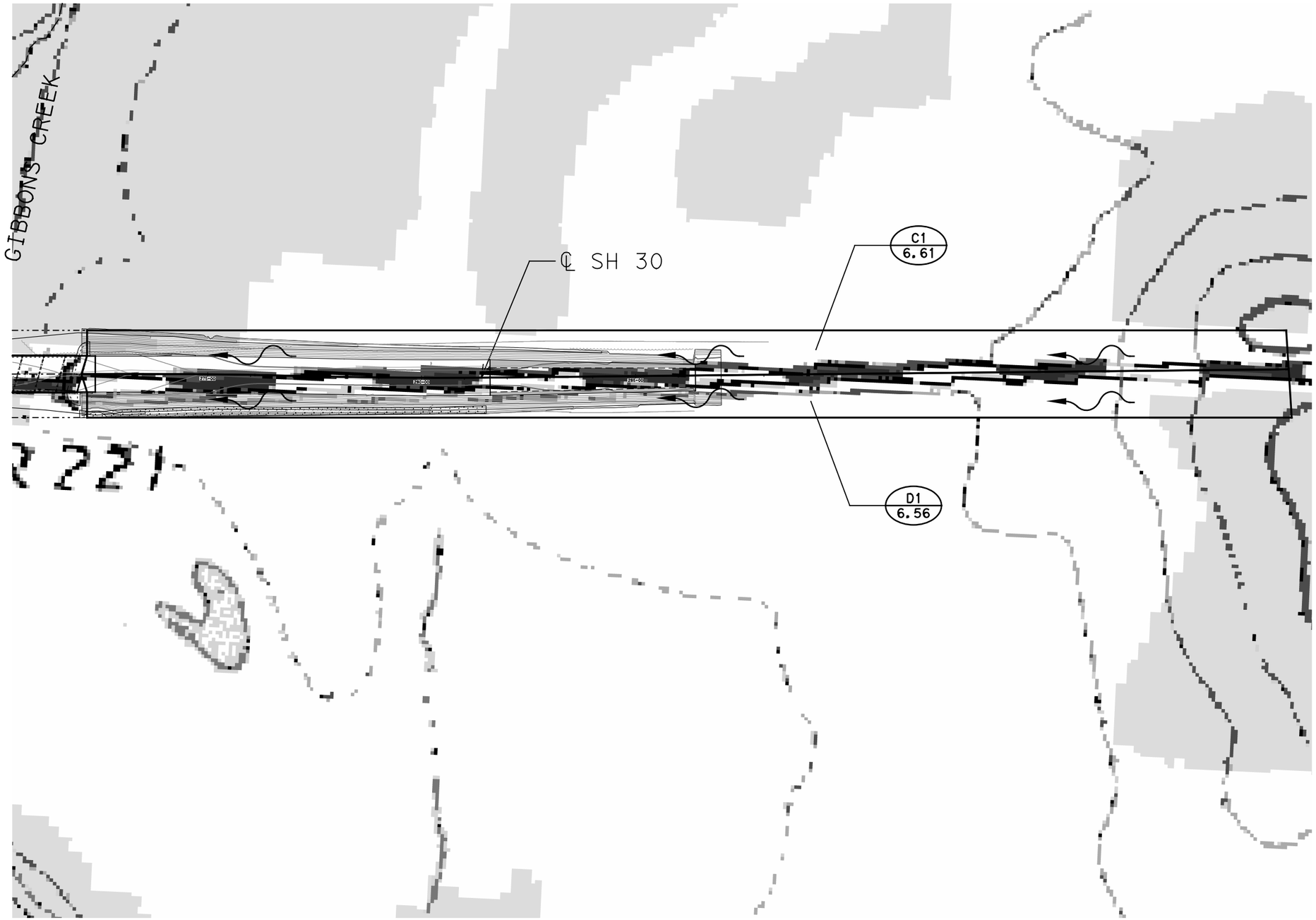

0 125 250

SCALE: 1" = 250'

LEGEND

X / XX.XX — AREA I.D.

DIRECTION OF FLOW

DRAINAGE AREA BOUNDARY

NOTES:

1. THE RATIONAL METHOD WAS USED TO ESTIMATE THE PEAK FLOWS USED FOR HYDRAULIC ANALYSIS. TXDOT HYDRAULIC MANUAL, JULY 2016, CHAPTER 4 SECTION 12.
2. THE RUNOFF RESULTS FROM THE RATIONAL METHOD ANALYSIS WERE USED AS THE DESIGN FLOWS FOR THE DITCH DESIGN.
3. THE BRIDGE IS LOCATED WITHIN FLOOD ZONE A, FEMA MAP 48185C0250C.
4. CONTOURS ARE SHOWN AT 1' INTERVALS.

STATE OF TEXAS
ERIK A. NELSEN
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LICENSED PROFESSIONAL ENGINEER
8/15/2018

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Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

INTERIOR DRAINAGE AREA MAP

SHEET 3 OF 4

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	
CONTROL	SECTION	JOB	87A
0212	04	039	

PLOT DRIVER: $PLTDRV$$
USER: $USER$ DATE: 8/15/2018 TIME: 3:46:03 PM SCALE:$SCALESHORT$
FILE: SH30_DRG_DT03.dgn PENTABLE: $PENTBL$$

ESTIMATION OF ANNUAL PEAK-STREAMFLOW FREQUENCY FOR UNDEVELOPED WATERSHEDS IN TEXAS (CFS)

DRAINAGE AREA PROPERTIES					Q2						Q5						Q10						Q25 (DESIGN)						Q50						Q100					
DRAINAGE AREA ID	DRAINAGE AREA	MEAN ANNUAL PRECIPITATION	MAIN CHANNEL SLOPE	OmegaEM PARAMETER	REGRESSION COEFFICIENTS					PRESS -MIN POWER	REGRESSION COEFFICIENTS					PRESS -MIN POWER	REGRESSION COEFFICIENTS					PRESS -MIN POWER	REGRESSION COEFFICIENTS					PRESS -MIN POWER	REGRESSION COEFFICIENTS					PRESS -MIN POWER	REGRESSION COEFFICIENTS					PRESS -MIN POWER
	A	P	S	SEE FIG. 2	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	e	f
	(MI2)	(IN)	(FT/FT)		50.98	-50.30	1.398	0.270	0.776	-0.0058	16.62	-15.32	1.308	0.372	0.885	-0.0215	13.62	-11.97	1.203	0.403	0.918	-0.0289	11.79	-9.819	1.140	0.446	0.945	-0.0374	11.17	-8.997	1.105	0.476	0.961	-0.0424	10.82	-8.448	1.071	0.507	0.969	-0.0467
A	90.8	44	0.0025	0.013	**3,830**						**8,100**						**11,300**						**16,600**						**21,300**						**26,900**					

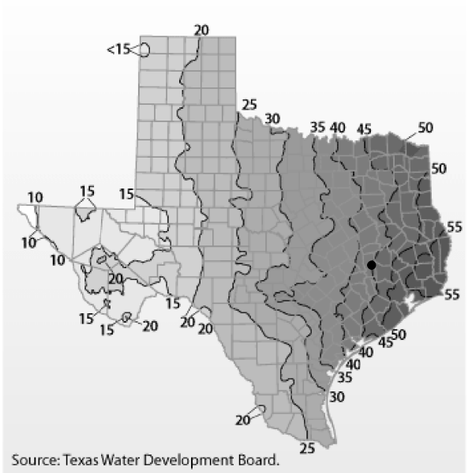
Regression equation

$$Q_2 = P^{1.398} S^{0.270} \times 10^{[0.776\,\Omega + 50.98 - 50.30 A^{-0.0058}]}$$
$$Q_5 = P^{1.308} S^{0.372} \times 10^{[0.885\,\Omega + 16.62 - 15.32 A^{-0.0215}]}$$
$$Q_{10} = P^{1.203} S^{0.403} \times 10^{[0.918\,\Omega + 13.62 - 11.97 A^{-0.0289}]}$$
$$Q_{25} = P^{1.140} S^{0.446} \times 10^{[0.945\,\Omega + 11.79 - 9.819 A^{-0.0374}]}$$
$$Q_{50} = P^{1.105} S^{0.476} \times 10^{[0.961\,\Omega + 11.17 - 8.997 A^{-0.0424}]}$$
$$Q_{100} = P^{1.071} S^{0.507} \times 10^{[0.969\,\Omega + 10.82 - 8.448 A^{-0.0467}]}$$
$$Q_{200} = P^{1.034} S^{0.531} \times 10^{[0.975\,\Omega + 10.61 - 8.058 A^{-0.0504}]}$$
$$Q_{250} = P^{1.021} S^{0.541} \times 10^{[0.977\,\Omega + 10.56 - 7.943 A^{-0.0516}]}$$
$$Q_{500} = P^{0.988} S^{0.569} \times 10^{[0.976\,\Omega + 10.40 - 7.605 A^{-0.0554}]}$$

$$Q_{100} = P^{c} S^{d} \times 10^{[e\,\Omega + a + bA^{f}]}$$

Q= PEAK FLOW (CFS)
P= MEAN ANNUAL PRECIPITATION (IN)
S= DIMENSIONLESS MAIN CHANNEL SLOPE
A= DRAINAGE AREA (SQ. MI)
Ω= OmegaEM PARAMETER (SEE FIG. 2)
f= ITERATIVE POWER (BY PRESS-MINIMIZATION)
a, b, c, d, e= REGRESSION FREQ COEFFICIENTS

MEAN ANNUAL PRECIPITATION (P) MAP OF TEXAS



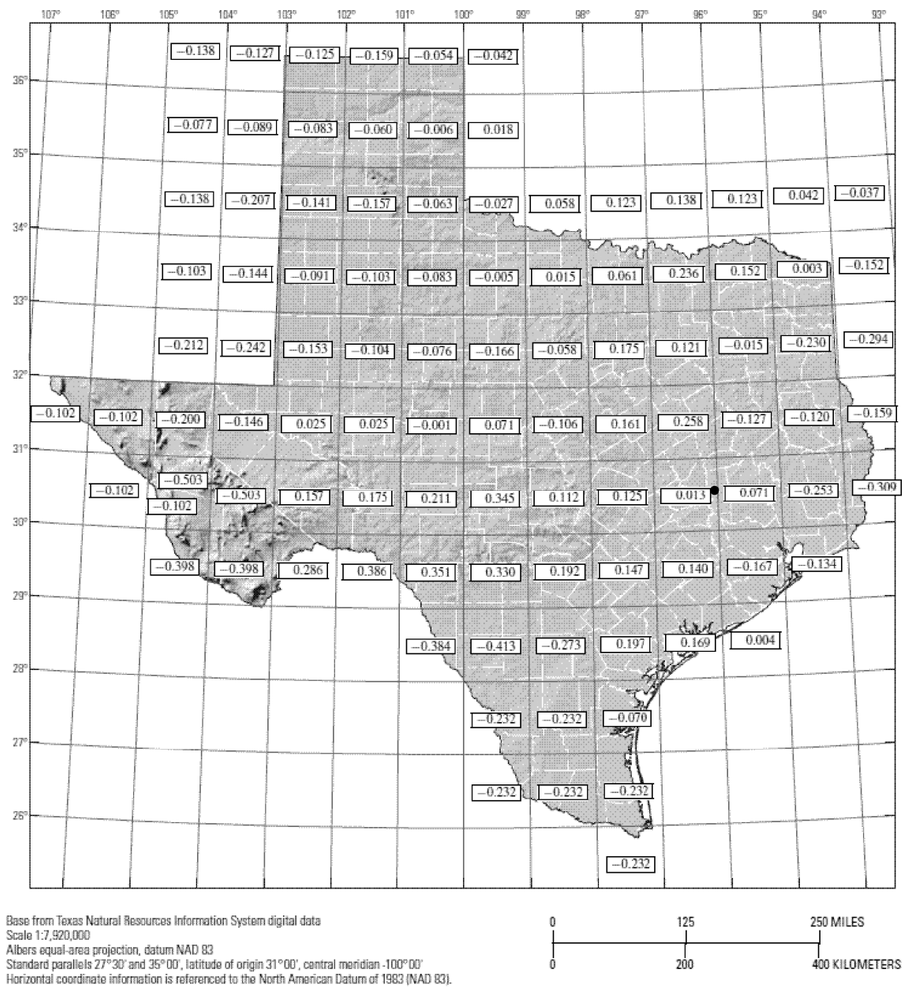


Figure 2. Hill-shade relief in Texas with superimposed values of OmegaEM parameter that represents a generalized terrain and climate index for regionalization of peak-streamflow frequency.

NOTES:

1. THE OMEGA EM REGRESSION METHOD WAS USED TO ESTIMATE THE PEAK FLOWS USED FOR HYDRAULIC ANALYSIS. TXDOT HYDRAULIC MANUAL, JULY 2016, CHAPTER 4 SECTION 10.
2. THE RUNOFF RESULTS FROM THE OMEGA REGRESSION ANALYSIS WERE USED AS THE DESIGN FLOWS FOR THE BRIDGE DESIGN.
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4. CONTOURS ARE SHOWN AT 10' INTERVALS.

STATE OF TEXAS
ERIK A. NELSEN
91924
LICENSED PROFESSIONAL ENGINEER
8/15/2018

NO.	DATE	REVISION	APPROVED

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HDR
Firm Registration No. F-754
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Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

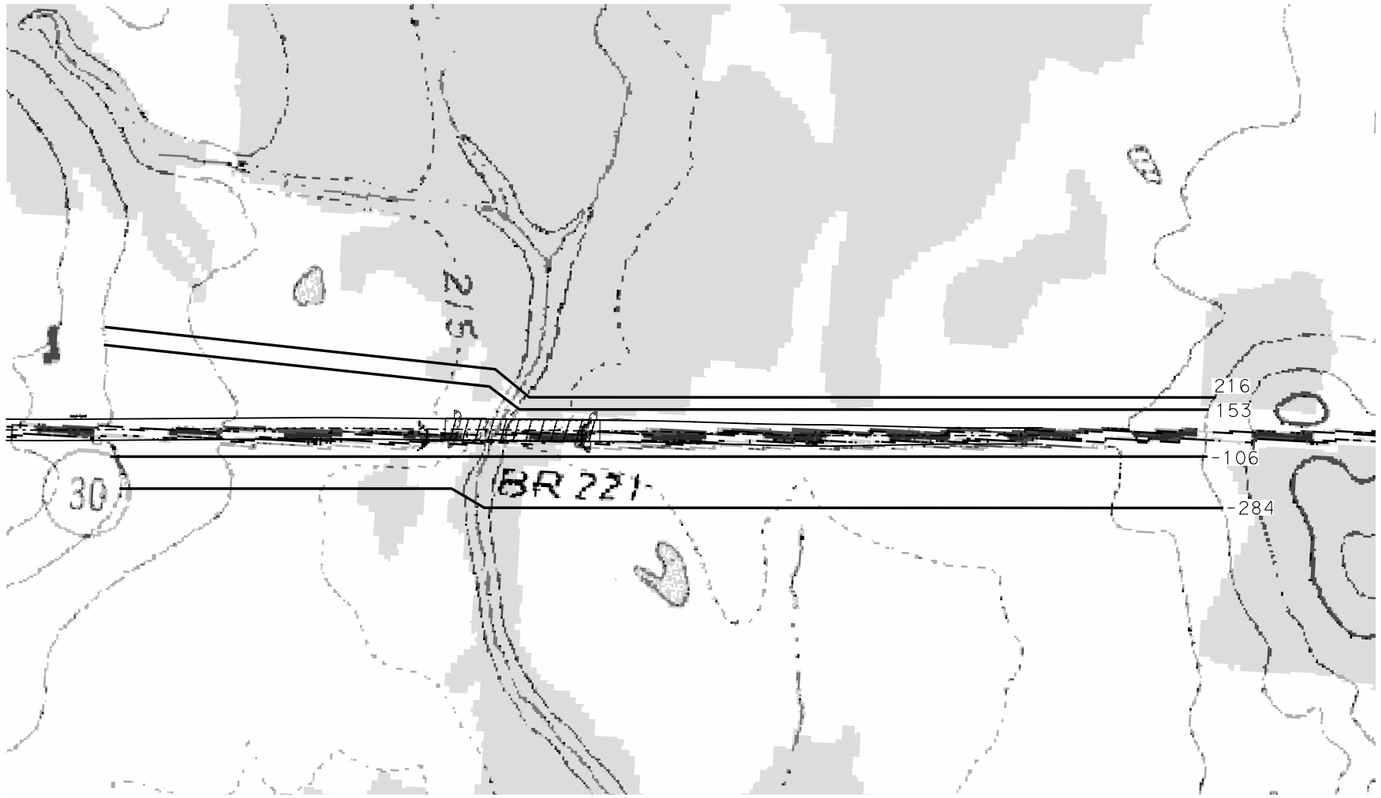
HYDROLOGIC DATA

AREAS > 200 AC

SHEET 4 OF 4

FED. RD. DIV. NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	88
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: $PLTDRV$ USER: $USER$ DATE: 8/15/2018 TIME: 2:49:52 PM PENTABLE: $PENTBLS$ SCALE: $SCALESHORT$
FILE: SH30_DRG_DT04.dgn



HEC-RAS CROSS-SECTION LAYOUT

Plan: PROP	Gibbons Creek	Gibbons Creek RS: 0	Profile: 4% AEP	
E.G. US. (ft)	218.50	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	218.36	E.G. Elev (ft)	218.21	217.55
Q Total (cfs)	16600	W.S. Elev (ft)	217.28	216.67
Q Bridge (cfs)	16600	Crit W.S. (ft)	215.80	215.15
Q Weir (cfs)		Max Chl Dpth (ft)	13.44	13.56
Weir Sta Lft (ft)		Vel Total (ft/s)	5.45	5.83
Weir Sta Rgt (ft)		Flow Area (sq ft)	3044.96	2846.86
Weir Submerg		Froude # Chl	0.67	0.58
Weir Max Depth (ft)		Specif Force (cu ft)	13305.54	12609.90
Min El Weir Flow (ft)	222.27	Hydr Depth (ft)	5.92	5.59
Min El Prs (ft)	221.84	W.P. Total (ft)	638.55	626.89
Delta EG (ft)	1.59	Conv. Total (cfs)	193613	192627
Delta WS (ft)	1.63	Top Width (ft)	513.96	509.46
BR Open Area (sq ft)	5235.96	Frctn Loss (ft)	0.64	0.30
BR Open Vel (ft/s)	5.83	C & E Loss (ft)	0.03	0.35
Coef of Q		Shear Total (lb/sq ft)	2.19	2.11
Br Sel Method	Energy only	Power Total (lb/ft s)	11.93	12.28

Plan: PROP	Gibbons Creek	Gibbons Creek RS: 0	Profile: 1% AEP	
E.G. US. (ft)	220.71	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	220.47	E.G. Elev (ft)	220.29	219.40
Q Total (cfs)	26900	W.S. Elev (ft)	218.90	217.98
Q Bridge (cfs)	26900	Crit W.S. (ft)	217.23	216.57
Q Weir (cfs)		Max Chl Dpth (ft)	15.06	14.87
Weir Sta Lft (ft)		Vel Total (ft/s)	6.93	7.65
Weir Sta Rgt (ft)		Flow Area (sq ft)	3881.32	3515.20
Weir Submerg		Froude # Chl	0.43	0.71
Weir Max Depth (ft)		Specif Force (cu ft)	22410.08	20613.33
Min El Weir Flow (ft)	222.27	Hydr Depth (ft)	7.45	6.80
Min El Prs (ft)	221.84	W.P. Total (ft)	681.29	660.65
Delta EG (ft)	2.25	Conv. Total (cfs)	272098	256515
Delta WS (ft)	2.33	Top Width (ft)	520.80	516.72
BR Open Area (sq ft)	5235.96	Frctn Loss (ft)	0.89	0.39
BR Open Vel (ft/s)	7.65	C & E Loss (ft)	0.01	0.56
Coef of Q		Shear Total (lb/sq ft)	3.48	3.65
Br Sel Method	Energy only	Power Total (lb/ft s)	24.09	27.95

HEC-RAS BRIDGE OUTPUT

NOTES:

NORMAL DEPTH FLOW WAS USED AS DOWNSTREAM BOUNDARY CONDITION. MANNINGS N VALUES WERE ESTABLISHED VERTICALLY ALONG THE CROSS SECTION AS NECESSARY TO MATCH OBSERVED DOWNSTREAM WATER SURFACE ELEVATIONS.

HEC-RAS River: Gibbons Creek Reach: Gibbons Creek

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Gibbons Creek	216	4% AEP	EXIST	16600	204.50	218.02		218.13	0.000422	2.98	10604.56	2610.55	0.17
Gibbons Creek	216	4% AEP	PROP	16600	204.50	218.47		218.53	0.000238	1.93	11853.46	2908.35	0.13
Gibbons Creek	216	1% AEP	EXIST	26900	204.50	220.43		220.56	0.000391	3.35	18701.94	3889.77	0.17
Gibbons Creek	216	1% AEP	PROP	26900	204.50	220.68		220.75	0.000224	2.23	19679.88	3904.20	0.13
Gibbons Creek	153	4% AEP	EXIST	16600	204.00	218.04	212.72	218.10	0.000278	2.15	13854.91	3216.04	0.14
Gibbons Creek	153	4% AEP	PROP	16600	204.00	218.36	212.76	218.50	0.000506	3.07	5733.65	3256.50	0.19
Gibbons Creek	153	1% AEP	EXIST	26900	204.00	220.46	213.67	220.52	0.000235	2.37	22027.95	3543.12	0.13
Gibbons Creek	153	1% AEP	PROP	26900	204.00	220.47	213.80	220.71	0.000625	3.96	7219.33	3544.61	0.22
Gibbons Creek	0 BR U	4% AEP	EXIST	16600	203.84	217.15	213.46	217.81	0.009310	10.15	3813.57	454.37	0.31
Gibbons Creek	0 BR U	4% AEP	PROP	16600	203.84	217.28	215.80	218.21	0.007351	12.71	3044.96	513.96	0.67
Gibbons Creek	0 BR U	1% AEP	EXIST	26900	203.84	219.50	215.25	220.22	0.018775	11.79	6783.91	1977.73	0.30
Gibbons Creek	0 BR U	1% AEP	PROP	26900	203.84	218.90	217.23	220.29	0.009774	16.04	3881.32	520.80	0.43
Gibbons Creek	0 BR D	4% AEP	EXIST	16600	203.11	216.62	213.65	217.46	0.009999	10.59	3480.62	473.50	0.35
Gibbons Creek	0 BR D	4% AEP	PROP	16600	203.11	216.67	215.15	217.55	0.007426	9.85	2846.86	509.46	0.58
Gibbons Creek	0 BR D	1% AEP	EXIST	26900	203.11	217.75	215.55	219.38	0.019349	14.93	4041.13	727.49	0.47
Gibbons Creek	0 BR D	1% AEP	PROP	26900	203.11	217.98	216.57	219.40	0.010997	12.79	3515.20	516.72	0.71
Gibbons Creek	-106	4% AEP	EXIST	16600	203.00	216.78		216.90	0.000911	2.83	7321.35	3049.37	0.23
Gibbons Creek	-106	4% AEP	PROP	16600	203.00	216.72	212.91	216.91	0.001078	3.44	4827.95	2991.35	0.25
Gibbons Creek	-106	1% AEP	EXIST	26900	203.00	218.28		218.42	0.000825	3.23	12385.82	3542.78	0.23
Gibbons Creek	-106	1% AEP	PROP	26900	203.00	218.15	214.21	218.45	0.001338	4.45	6044.19	3516.13	0.29
Gibbons Creek	-284	4% AEP	EXIST	16600	202.50	216.19	213.92	216.57	0.002503	5.36	5477.27	2115.23	0.39
Gibbons Creek	-284	4% AEP	PROP	16600	202.50	216.19	213.97	216.57	0.002502	5.36	5477.63	2115.30	0.39
Gibbons Creek	-284	1% AEP	EXIST	26900	202.50	217.63	215.38	218.09	0.002501	6.21	8962.29	2679.94	0.40
Gibbons Creek	-284	1% AEP	PROP	26900	202.50	217.63	215.38	218.09	0.002501	6.21	8962.29	2679.94	0.40

HEC-RAS OUTPUT

H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR DAVID LILLY ON 8/15/18 .

STATE OF TEXAS
ERIK A. NELSEN
91924
LICENSED PROFESSIONAL ENGINEER
8/15/2018

NO.	DATE	REVISION	APPROVED

RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation
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HYDRAULIC DATA SHEET

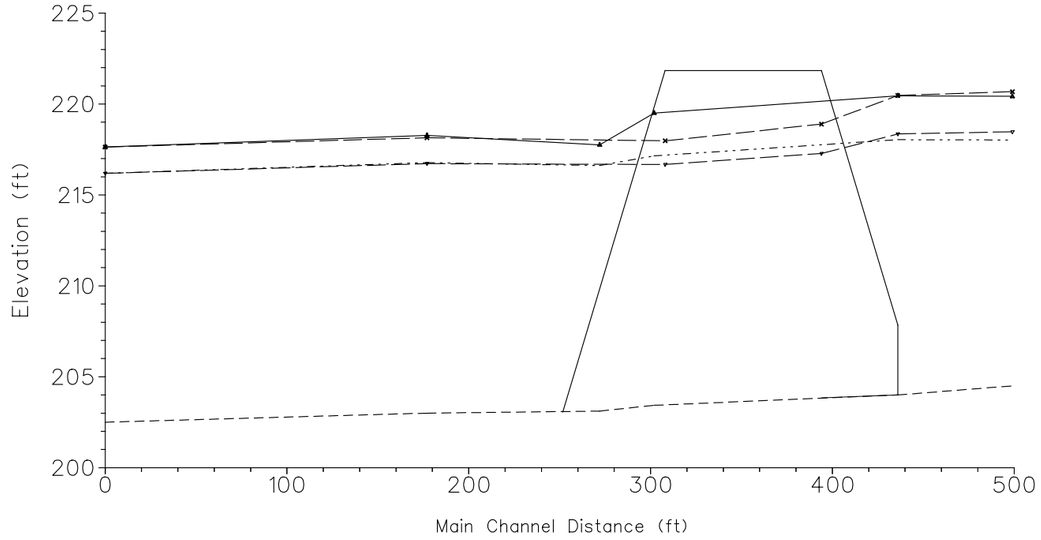
BRIDGE CROSSING

SHEET 1 OF 2

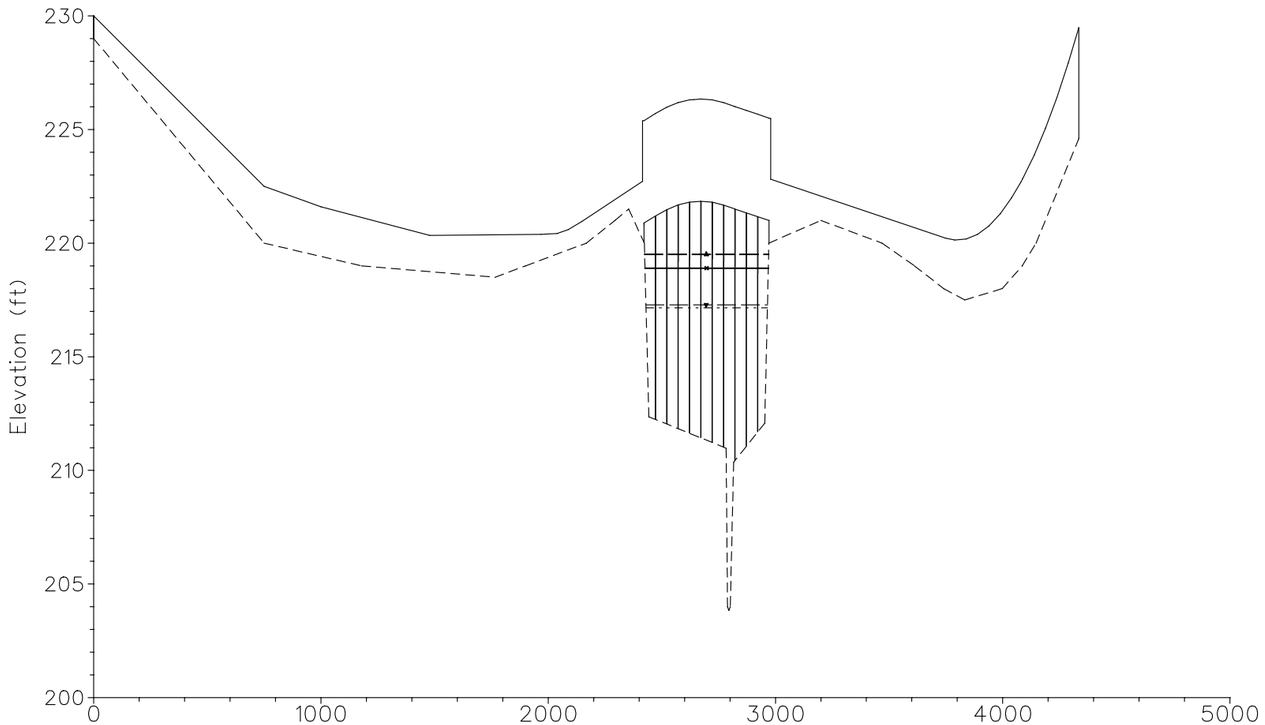
FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	89
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: $PLTDRVS$ PENTABLE: $PENTBLS$
USER: $USER$ DATE: 8/15/2018 TIME: 9:45:29 AM SCALE: $SCALESHORT$
FILE: SH30_DRG_HDS_01.dgn

SH 30 at Gibbons Creek Plan: 1) Exist 8/14/2018 2) Prop 8/14/2018



HEC-RAS PROFILE OUTPUT



HEC-RAS CROSS-SECTION OUTPUT

Legend

- WS 1% AEP - PROP
- WS 1% AEP - EXIST
- WS 4% AEP - PROP
- WS 4% AEP - EXIST
- Ground

STATE OF TEXAS
ERIK A. NELSEN
91924
LICENSED PROFESSIONAL ENGINEER
8/15/2018

NO.	DATE	REVISION	APPROVED

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

HYDRAULIC DATA SHEET

BRIDGE CROSSING

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	90
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: $PLTDRVS$ PENTABLE: $PENTBLS$
USER: $USER$ DATE: 8/15/2018 TIME: 3:27:55 PM SCALE: $SCALESHORT$
FILE: SH30_DRG_HDS_02.dgn

RUNOFF SUMMARY FOR DRAINAGE AREAS SMALLER THAN 200 ACRES USING THE RATIONAL METHOD

DRAINAGE AREA		SUBAREAS (AC)						COMPOSITE	TOTAL	TOTAL	INTENSITY	DISCHARGE	INTENSITY	DISCHARGE	INTENSITY	DISCHARGE	COMMENTS
NO.	ACRES	SUBAREA 1			SUBAREA 2			C VALUE	CA	Tc	I(10)	Q(10)	I(25)	Q(25)	I(100)	Q(100)	(COMBINED DRAINAGE AREAS, ETC.)
		AREA (AC)	C	LAND USE	AREA (AC)	C	LAND USE			(MIN)	(IN/HR)	(CFS)	(IN/HR)	(CFS)	(IN/HR)	(CFS)	
B2	4.32	1.98	0.90	IMP	2.34	0.70	SG	0.79	3.42	10.00	8.89	30.4	8.20	70.1	8.89	30.4	DITCH B
C1	6.61	2.28	0.90	IMP	4.33	0.70	SG	0.77	5.08	10.00	8.89	45.2	8.03	56.3	8.89	45.2	DITCH C
D1	6.56	2.42	0.90	IMP	4.14	0.70	SG	0.77	5.08	10.00	8.89	45.1	9.31	5.4	8.89	45.1	DITCH D
A1A	0.57	0.18	0.90	IMP	0.39	0.70	SG	0.76	0.43	10.00	8.89	3.87	8.84	108	8.89	3.87	DITCH A
A1B	0.71	0.16	0.90	IMP	0.55	0.70	SG	0.75	0.53	10.00	8.89	4.68	9.31	6.76	8.89	4.68	DITCH A
A2A	1.51	0.53	0.90	IMP	0.98	0.70	SG	0.77	1.17	10.00	8.89	10.4	7.77	83.8	8.89	10.4	DITCH A
A2B	3.69	1.43	0.90	IMP	2.26	0.70	SG	0.78	2.87	10.00	8.89	25.5	9.31	13.4	8.89	25.5	DITCH A
B1A	0.46	0.22	0.90	IMP	0.24	0.70	SG	0.80	0.37	10.00	8.89	3.25	9.31	7.78	8.89	3.25	DITCH B
B1B	0.53	0.20	0.90	IMP	0.33	0.70	SG	0.78	0.41	10.00	8.89	3.62	8.41	111	8.89	3.62	DITCH B
B1D	0.05	0.05	0.90	IMP				0.91	0.04	10.00	8.89	0.37	9.31	77.6	8.89	0.37	DITCH B
B2A	4.32	1.98	0.90	IMP	2.34	0.70	SG	0.79	3.42	10.00	8.89	30.4	9.31	6.5	8.89	30.4	DITCH B

Inlets

Inlet	Inlet	Inlet Location				Top/Inlet	Roadway Gutter Data			Grate					Tc	10% AEP	Intercept	Ponded Width				Ponded Depth	
I.D.	Type	Cntrl Chain	Inlet Station	Offset (ft)	LT/RT	Elev (ft)	Long (%)	Trans (%)	n	L (ft)	W (ft)	Type	P (ft)	A (sf)	(min)	Inlet Q (cfs)	Capacity (cfs)	Allowed (ft)	Actual (ft)	LT (Sag) (ft)	RT (Sag) (ft)	Allowed (ft)	Actual (ft)
B1D	(TY PSL)(FG)(3X3L)(3X3G)(EOAG) Grate Inlet In Sag	SH30_NEW	241+22.00	53.19	RT	238.30	n/a	2.00	0.012	3.00	3.00	Reticuline	12.67	5.50	10.00	3	14.78	18.00	14.33	2.86	5.67	1.00	0.29

Conveyance

DITCH I.D.	Node I.D.		Invert Elev		Soffit Elev		Link Type	No. of Barrels	Span (ft)	Rise/ Dia (ft)	Link Mtrl	Shape	Hyd Length (ft)	Slope (%)	Manning's "n"	H.G.L.		E.G.L.		Unif Depth (ft)	Unif Vel (ft/s)	Crit Depth (ft)	Crit Vel (ft/s)	Crit Slope (%)	Frictn Slope (%)
	STA	OFF	US (ft)	DS (ft)	US (ft)	DS (ft)										US Elev (ft)	DS Elev (ft)	US Elev (ft)	DS Elev (ft)						
C	273+30	-90.3	215.03	211.03	218.03	214.03	Ditch	n/a	5	3	n/a	n/a	1110.12	0.36	0.043	216.90	212.11	216.98	212.48	1.80	2.21	1.06	4.89	3.07	0.35
C	271+28	-90.0	211.03	209.39	214.03	212.39	Ditch	n/a	5	3	n/a	n/a	202.00	0.81	0.012	212.11	210.17	212.48	211.05	0.77	7.58	1.06	4.89	0.24	0.81
C	268+65	-65.1	209.39	208.25	212.39	211.25	Ditch	n/a	5	3	n/a	n/a	264.18	0.43	0.043	211.10	209.31	211.19	209.68	1.71	2.40	1.06	4.89	3.07	0.44
D	281+90	73.4	213.29	211.94	216.29	214.94	Ditch	n/a	5	3	n/a	n/a	450.07	0.30	0.043	215.48	213.19	215.56	213.61	2.13	2.23	1.23	5.20	2.95	0.30
D	271+63	88.8	211.94	208.85	214.94	211.85	Ditch	n/a	5	3	n/a	n/a	1028.60	0.30	0.012	213.19	210.00	213.61	210.51	1.15	5.73	1.23	5.20	0.23	0.30
D	268+10	65.6	208.85	208.75	211.85	211.75	Ditch	n/a	5	3	n/a	n/a	353.76	0.03	0.043	211.42	209.98	211.46	210.40	3.00	1.28	1.23	5.20	2.95	0.07
A	244+38	-47.6	240.53	239.98	243.53	242.98	Ditch	n/a	5	3	n/a	n/a	182.53	0.30	0.240	241.80	240.88	241.80	241.10	1.31	0.31	0.25	2.64	141.52	0.30
A	243+84	-45.2	239.96	239.80	241.46	241.30	Pipe	1		1.5	Concrete	Circular	53.25	0.30	0.012	240.88	240.55	241.10	240.32	0.86	3.70	0.75	4.36	0.46	0.30
A	242+15	-36.8	239.80	239.29	242.80	242.29	Ditch	n/a	5	3	n/a	n/a	169.61	0.30	0.012	240.18	239.82	240.32	239.99	0.36	3.03	0.35	3.08	0.32	0.31
A	241+90	-37.0	239.29	239.22	242.29	242.22	Ditch	n/a	2.5	3	n/a	n/a	25.00	0.30	0.012	239.82	239.70	239.99	239.87	0.49	3.31	0.48	3.33	0.31	0.30
A	251+38	-69.6	242.80	233.47	245.80	236.47	Ditch	n/a	5	3	n/a	n/a	515.61	1.81	0.043	243.47	234.95	243.58	235.63	0.56	2.65	0.46	3.44	3.84	1.82
A	252+00	-68.8	233.47	230.37	234.97	231.87	Pipe	1		1.5	Concrete	Circular	75.80	4.09	0.012	234.95	231.10	235.63	233.37	0.71	12.69	1.24	6.64	0.82	4.09
A	264+75	-85.1	218.72	213.74	221.72	216.74	Ditch	n/a	5	3	n/a	n/a	976.97	0.51	0.043	220.21	214.67	221.77	215.01	1.48	2.39	0.93	4.64	3.17	0.51
A	267+08	-92.3	213.74	212.55	216.74	215.55	Ditch	n/a	5	3	n/a	n/a	233.35	0.51	0.012	214.67	213.32	215.01	213.89	0.77	6.02	0.93	4.64	0.25	0.51
A	267+52	-84.0	212.55	211.92	215.55	214.92	Ditch	n/a	5	3	n/a	n/a	44.78	1.41	0.043	213.71	212.87	213.90	213.21	1.15	3.46	0.93	4.64	3.17	1.41
A	268+40	-63.4	211.92	205.72	214.92	208.72	Ditch	n/a	5	3	n/a	n/a	90.38	6.86	0.043	212.87	206.48	213.21	207.07	0.76	6.11	0.93	4.64	3.17	6.86
B	244+18	50.6	242.80	240.47	245.80	243.47	Ditch	n/a	0	3	n/a	n/a	142.03	1.64	0.012	243.58	240.93	243.73	241.45	0.46	5.79	0.62	3.16	0.33	1.64
B	243+64	49.4	240.31	240.12	241.81	241.62	Pipe	1		1.5	Concrete	Circular	53.71	0.35	0.012	241.25	240.98	241.51	241.19	0.87	4.03	0.79	4.51	0.47	0.35
B	241+57	51.1	240.12	239.39	243.12	242.39	Ditch	n/a	0	3	n/a	n/a	207.31	0.35	0.012	240.98	240.20	241.19	240.45	0.81	3.95	0.84	3.67	0.30	0.36
B	241+22	53.2	239.39	238.30	242.39	241.30	Ditch	n/a	0	3	n/a	n/a	35.06	3.12	0.012	240.24	238.87	240.45	239.87	0.54	8.88	0.84	3.67	0.30	3.12
B	254+45	62.2	242.80	222.32	245.80	225.32	Ditch	n/a	0	3	n/a	n/a	680.68	3.01	0.012	244.50	223.18	244.84	225.37	0.86	11.86	1.36	4.68	0.25	3.00
B	254+70	64.7	222.32	216.02	225.32	219.02	Ditch	n/a	5	3	n/a	n/a	160.26	3.93	0.012	223.38	216.43	223.69	218.54	0.41	11.67	0.85	4.47	0.25	3.93
B	265+70	93.1	216.02	215.81	219.02	218.81	Ditch	n/a	0	3	n/a	n/a	25.12	0.84	0.012	217.48	216.98	217.82	217.61	1.08	7.39	1.36	4.68	0.25	0.85
B	266+70	88.3	215.81	209.77	218.81	212.77	Ditch	n/a	0	3	n/a	n/a	1098.89	0.55	0.012	217.20	210.95	217.54	211.56	1.18	6.26	1.36	4.68	0.25	0.55
B	267+55	80.7	209.77	209.22	212.77	212.22	Ditch	n/a	0	3	n/a	n/a	100.12	0.55	0.012	211.15	210.40	211.49	211.00	1.18	6.26	1.36	4.68	0.25	0.55
A	255+00	-67.9	209.22	208.75	212.22	211.75	Ditch	n/a	0	3	n/a	n/a	85.34	0.55	0.012	210.60	209.94	210.94	210.53	1.18	6.26	1.36	4.68	0.25	0.55

Conveyance (cont.)

Actual Depth (ft)	Actual Vel (ft/s)	Total Q (cfs)	Link Capacity (cfs)	Junctn Loss (ft)
1.08	4.78	45.2	139.03	0.08
0.78	7.54	45.2	748.13	0.02
1.06	4.89	45.2	151.94	0.01
1.15	5.73	59.4	454.77	0.02
1.23	5.20	59.4	62.57	0.00
0.90	0.53	3.87	22.74	0.00
0.75	4.36	3.87	6.70	0.08
0.53	1.88	6.77	454.77	0.02
0.48	3.33	6.77	362.05	0.04
1.48	0.69	10.4	311.73	0.11
0.73	12.07	10.4	24.76	0.24
0.94	4.62	35.9	165.47	0.01
0.77	6.01	35.9	592.95	0.00
0.95	4.51	35.9	275.14	0.01
0.76	6.11	35.9	606.88	0.02
0.46	5.79	4.28	637.37	0.16
0.85	4.11	4.28	7.24	0.08
0.81	3.95	9.03	294.45	0.02
0.57	8.02	9.03	879.13	0.01
0.86	11.86	30.4	863.31	0.34
0.41	11.62	30.4	1645.99	0.20
1.17	6.35	30.4	456.15	0.10
1.18	6.26	30.4	369.11	0.02
1.18	6.19	30.4	369.11	0.02
1.19	6.16	30.4	369.11	0.02

STATE OF TEXAS
ERIK A. NELSEN
91924
LICENSED PROFESSIONAL ENGINEER
8/15/2018

NO.	DATE	REVISION	APPROVED

RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

HYDRAULIC DATA SHEET

PROPOSED DITCHES

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	91
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: $PLTDRVS$
USER: $USER$ DATE: 8/15/2018 TIME: 5:23:48 PM SCALE: $SCALESHORT$
FILE: SH30_DRG_HDS_03.dgn PENTABLE: $PENTBLS$

Hydraulic Design Data 25-YR
Contraction Scour

	Left	Channel	Right
Input Data			
Average Depth (ft):	2.16	7.38	2.05
Approach Velocity (ft/s):	0.32	1.93	0.31
Br Average Depth (ft):	5.49	11.12	5.75
BR Opening Flow (cfs):	8877	3916	3807
BR Top WD (ft):	338.75	33	142.21
Grain Size D50 (mm):	0.08	0.08	0.08
Approach Flow (cfs):	871.45	15374.32	354.23
Approach Top WD (ft):	1267.34	1080	561.01
K1 Coefficient:	0.69	0.69	0.69
Results			
Scour Depth Ys (ft):	14.79	14.25	14.9
Critical Velocity (ft/s):	0.82	1	0.81
Equation:	Clear	Live	Clear

Pier Scour

All piers have the same scour depth

Input Data	
Pier Shape:	Group of Cylinders
Pier Width (ft):	2
Grain Size D50 (mm):	0.08
Depth Upstream (ft):	8.42
Velocity Upstream (ft/s):	3.07
K1 Nose Shape:	1
Pier Angle:	0
Pier Length (ft):	16
K2 Angle Coef:	1
K3 Bed Cond Coef:	1.1
Grain Size D90 (mm):	0.18
K4 Armouring Coef:	1
Results	
Scour Depth Ys (ft):	3.53
Froude #:	0.19
Equation:	CSU equation

Combined Scour Depths

Pier Scour + Contraction Scour (ft):

Left Bank:	18.32
Right Bank:	18.44

Hydraulic Design Data 100-YR
Contraction Scour

	Left	Channel	Right
Input Data			
Average Depth (ft):	3.35	9.59	3.2
Approach Velocity (ft/s):	0.41	2.23	0.4
Br Average Depth (ft):	7.04	12.74	7.24
BR Opening Flow (cfs):	14257	6456	6187
BR Top WD (ft):	342.56	33	145.24
Grain Size D50 (mm):	0.08	0.08	0.08
Approach Flow (cfs):	2689.09	23068.25	1142.66
Approach Top WD (ft):	1935.34	1080	888.86
K1 Coefficient:	0.69	0.69	0.69
Results			
Scour Depth Ys (ft):	39.17	23	40.26
Critical Velocity (ft/s):			
Equation:	Live	Live	Live

Pier Scour

All piers have the same scour depth

Input Data	
Pier Shape:	Group of Cylinders
Pier Width (ft):	2
Grain Size D50 (mm):	0.08
Depth Upstream (ft):	10.53
Velocity Upstream (ft/s):	3.96
K1 Nose Shape:	1
Pier Angle:	0
Pier Length (ft):	16
K2 Angle Coef:	1
K3 Bed Cond Coef:	1.1
Grain Size D90 (mm):	0.18
K4 Armouring Coef:	1
Results	
Scour Depth Ys (ft):	4.06
Froude #:	0.22
Equation:	CSU equation

Combined Scour Depths

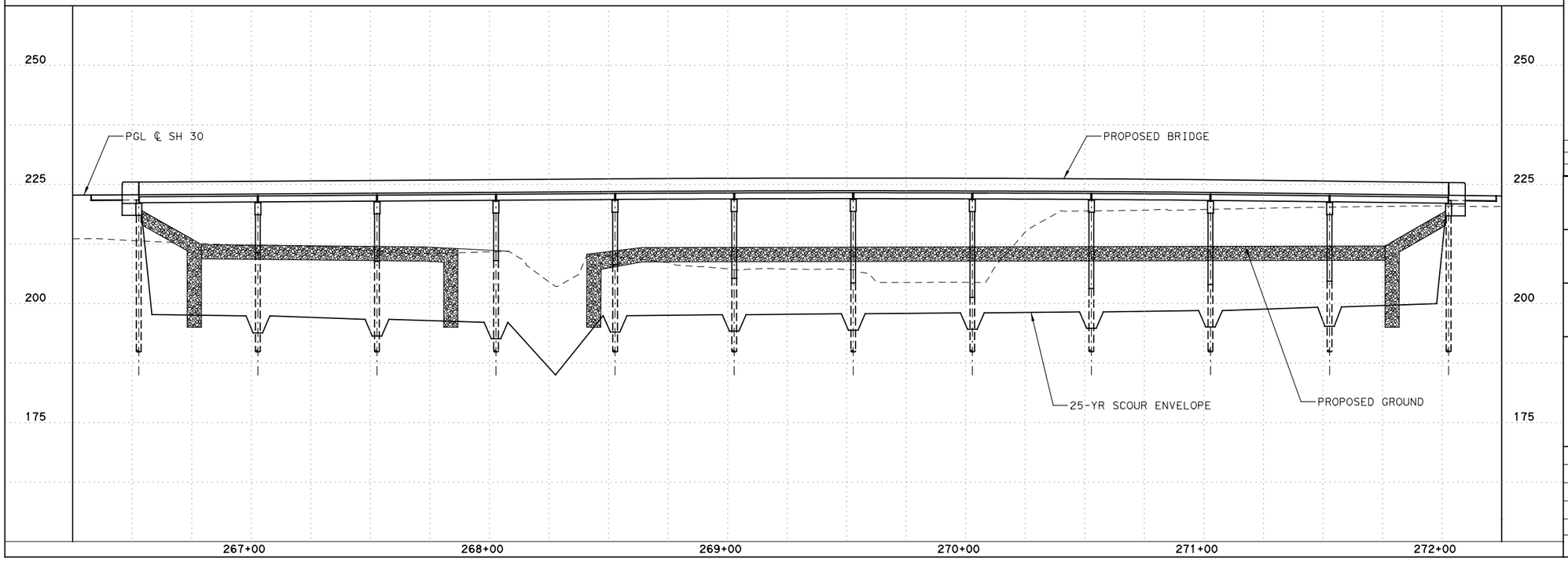
Pier Scour + Contraction Scour (ft):

Left Bank:	43.24
Right Bank:	44.32

H: 0 25 50
V: 0 12.5 25

NOTES:

1. SCOUR COMPUTATIONS PERFORMED ACCORDING TO FHWA HEC-18 PROCEDURES.
2. ABUTMENT SCOUR WAS NOT CONSIDERED BECAUSE ABUTMENTS ARE PROTECTED WITH RIPRAP.



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USER: $USER$ DATE: 8/15/2018 TIME: 3:20:03 PM SCALE: $SCALESHORT$
FILE: SH30_DRG_SCOUR_01.dgn
PENTABLE: $PENTBLS$

STATE OF TEXAS
ERIK A. NELSEN
91924
LICENSED PROFESSIONAL ENGINEER
8/15/2018

NO.	DATE	REVISION	APPROVED

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

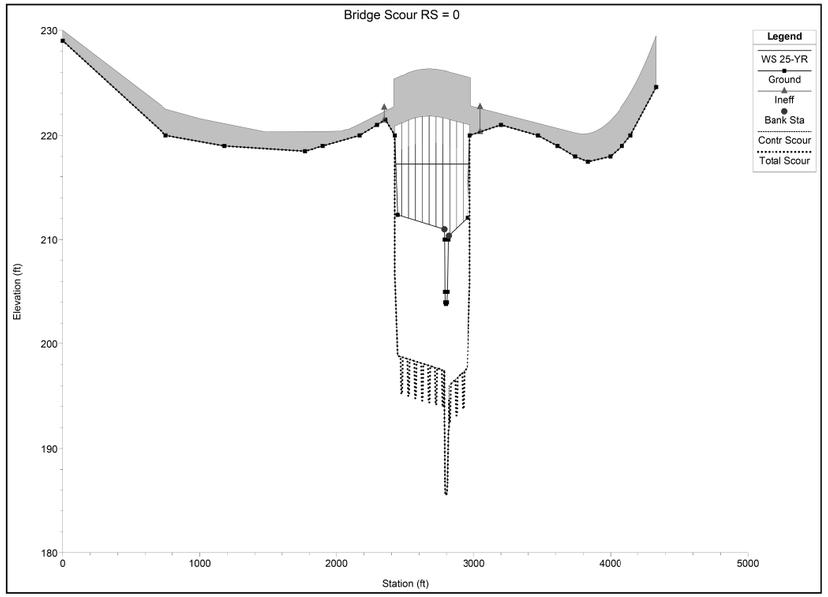
HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

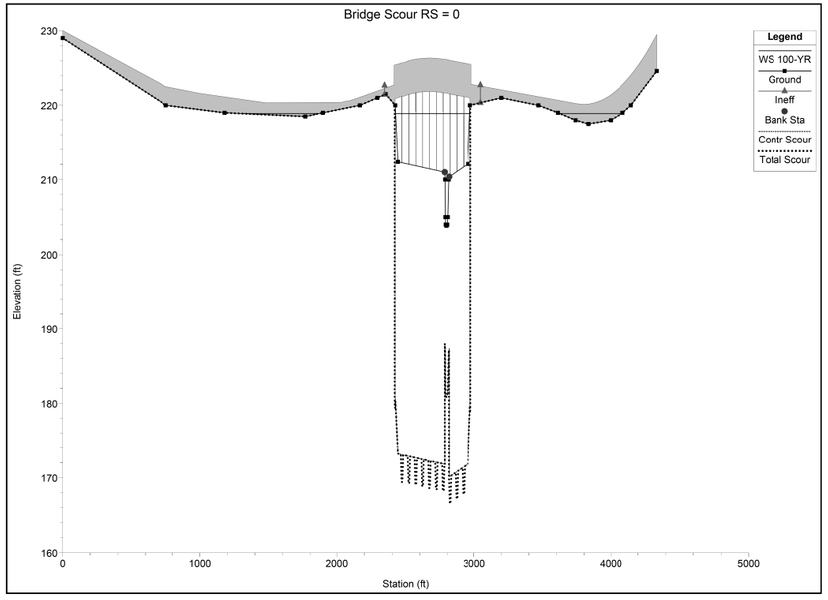
SCOUR COMPUTATIONS

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	92
CONTROL	SECTION	JOB	
0212	04	039	



25-YR SCOUR ENVELOPE



100-YR SCOUR ENVELOPE

NOTES:

1. SCOUR COMPUTATIONS PERFORMED ACCORDING TO FHWA HEC-18 PROCEDURES.
2. ABUTMENT SCOUR WAS NOT CONSIDERED BECAUSE ABUTMENTS ARE PROTECTED WITH RIPRAP.

N.T.S.

STATE OF TEXAS
ERIK A. NELSEN
91924
LICENSED
PROFESSIONAL ENGINEER
8/15/2018

NO.	DATE	REVISION	APPROVED

RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

SCOUR COMPUTATIONS

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	92A
CONTROL	SECTION	JOB	
0212	04	039	

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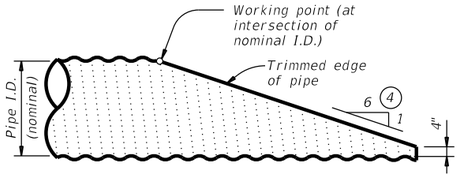
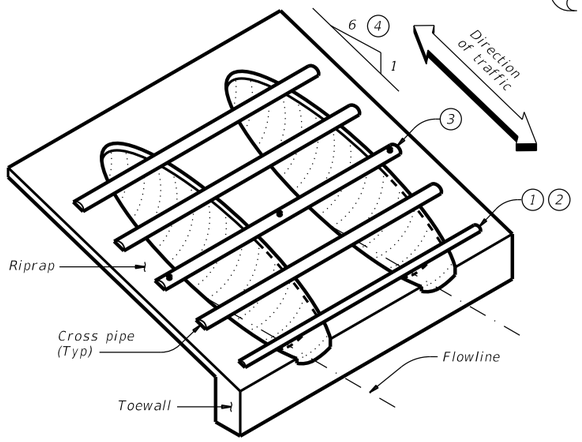
SCALE: $SCALESHORT$



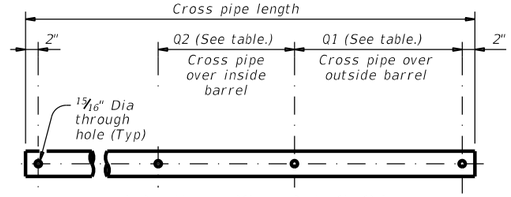
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

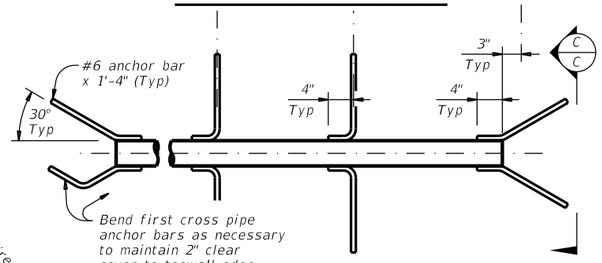
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



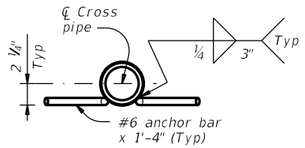
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

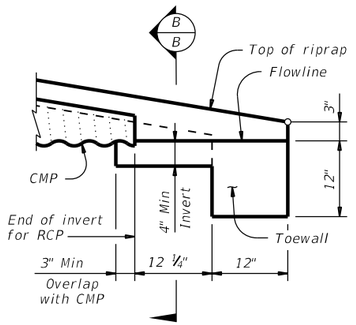


PIPE WITH ANCHOR BARS



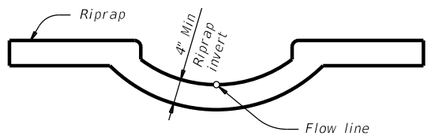
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

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



SECTION B-B

(Cross pipes not shown for clarity.)

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

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

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

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

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

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

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

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

MATERIAL NOTES:

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

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

Provide ASTM A307 bolts and nuts.

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

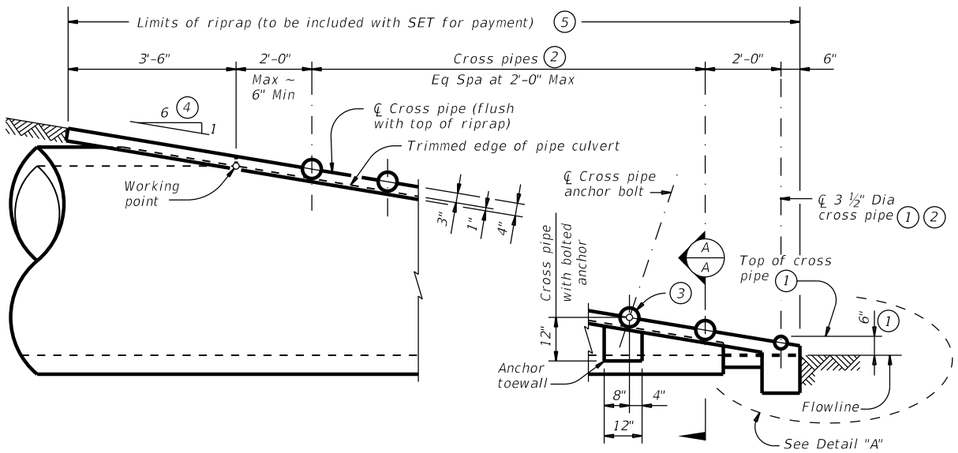
GENERAL NOTES:

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

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

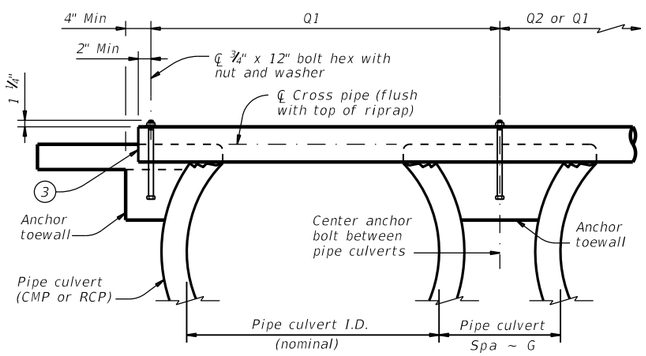
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap."

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



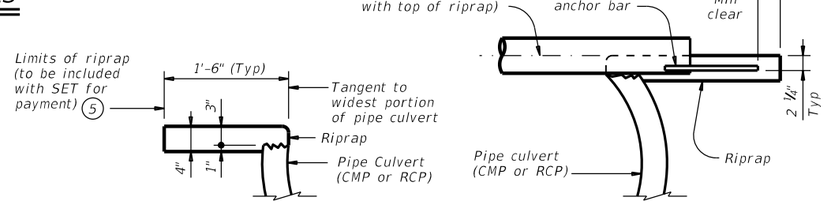
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

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



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A



SHOWING CROSS PIPE WITH ANCHOR BAR

SHOWING TYPICAL PIPE CULVERT AND RIPRAP

Texas Department of Transportation

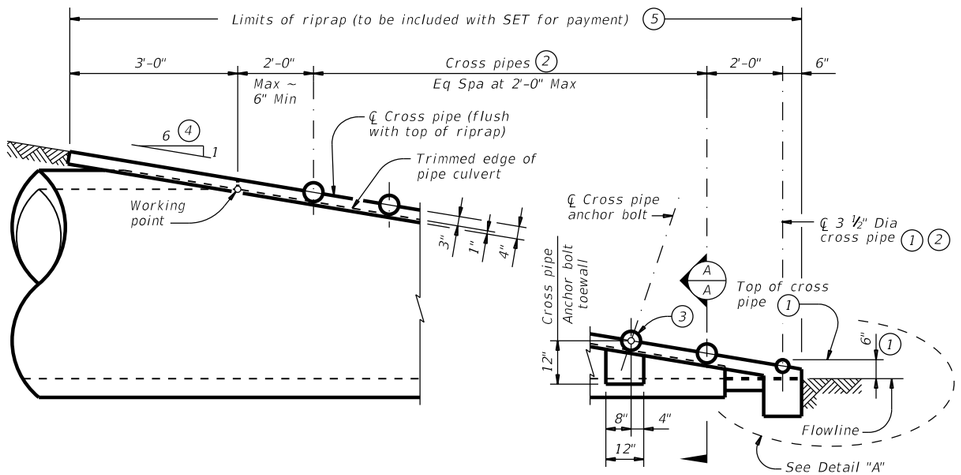
Bridge Division Standard

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

SETP-PD

FILE:	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		93

DATE:
FILE:



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

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

CROSS PIPE LENGTHS AND REQUIRED PIPE SIZES (2)

Corrugated Metal Pipe (CMP) Culverts

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

Reinforced Concrete Pipe (RCP) Culverts

Design	Conc Riprap (CY) (6)	Pipe Culvert Span	Pipe Culvert Rise	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
1	0.6	22"	13 ½"	1' – 0"	N/A	3' – 1"	2' – 10"	3 or more pipe culverts	3" Std (3.500" O.D.)
2	0.7	26"	15 ½"	1' – 2"	N/A	3' – 6"	3' – 4"		
3	0.9	28 ½"	18"	1' – 5"	N/A	3' – 10"	3' – 9 ½"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
4	1.0	36 ¼"	22 ½"	1' – 8"	4' – 5"	4' – 7"	4' – 8 ¼"	All pipe culverts	4" Std (4.500" O.D.)
5	1.2	43 ¾"	26 ⅝"	1' – 11"	5' – 1"	5' – 4"	5' – 6 ¾"		
6	1.4	51 ½"	31 5/16"	2' – 2"	5' – 8"	6' – 1"	6' – 5 ¼"	All pipe culverts	5" Std (5.563" O.D.)
7	1.6	58 ½"	36"	2' – 5"	6' – 4"	6' – 10"	7' – 3 ½"		
8	1.8	65"	40"	2' – 10"	6' – 10"	7' – 7"	8' – 3"		
9	1.9	73"	45"	3' – 2"	7' – 6"	8' – 5"	9' – 3"		

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

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

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

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

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

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

MATERIAL NOTES:

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

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

Provide ASTM A307 bolts and nuts.

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

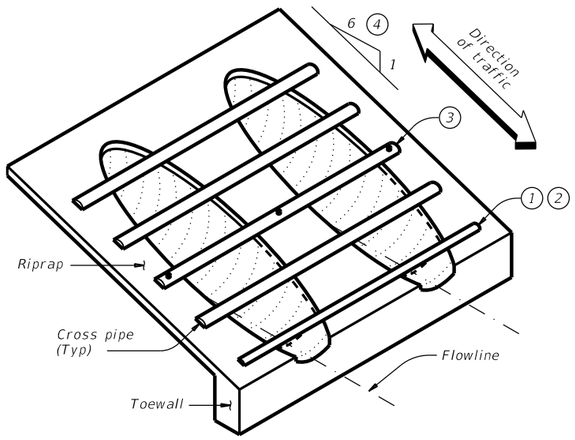
GENERAL NOTES:

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

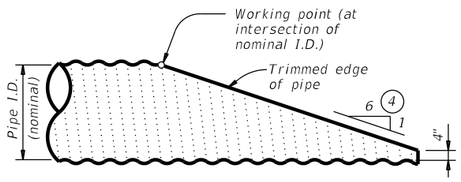
Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Pipe Runners.

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

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



ISOMETRIC VIEW OF TYPICAL INSTALLATION



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

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

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

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

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

SETP-PD-A

FILE:	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
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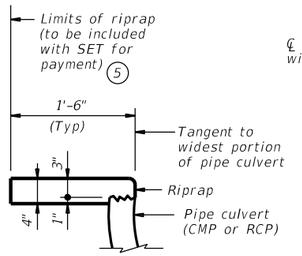
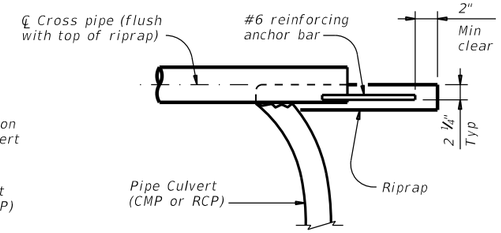
	BRY	GRIMES		94

DATE:
FILE:

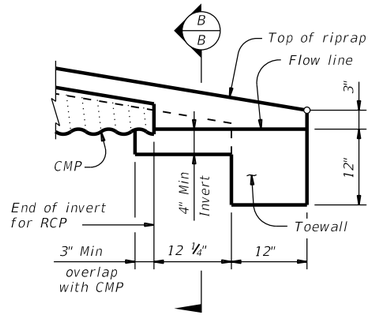
DATE:
FILE:



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

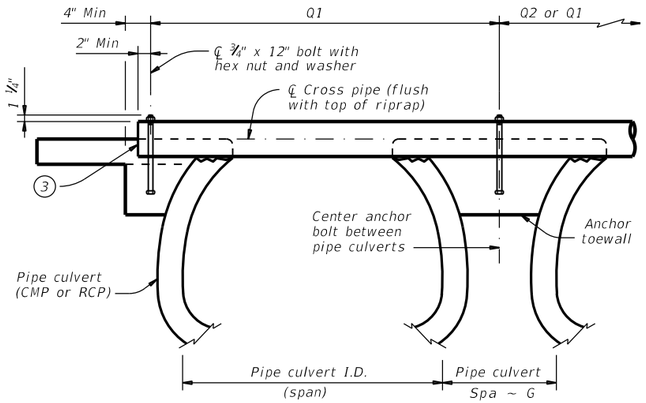


SHOWING CROSS PIPE WITH ANCHOR BAR



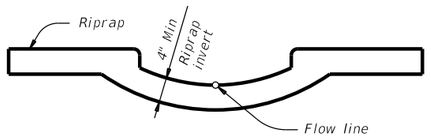
DETAIL "A"

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



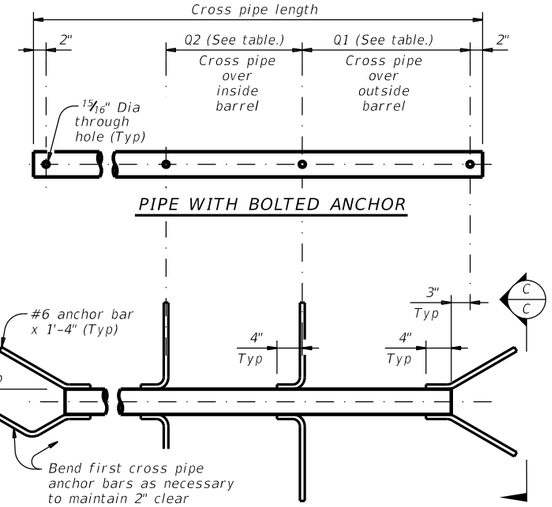
SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

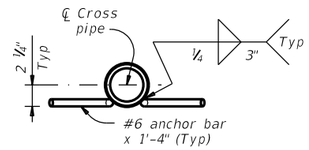


SECTION B-B

(Cross pipes not shown for clarity.)



PIPE WITH ANCHOR BARS



SECTION C-C

CROSS PIPE DETAILS

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

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

SETP-PD-A

FILE:	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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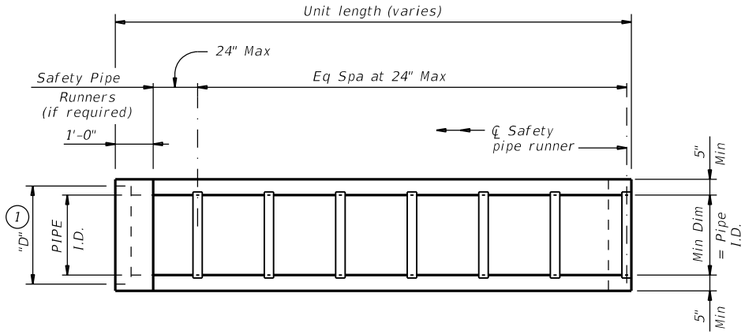
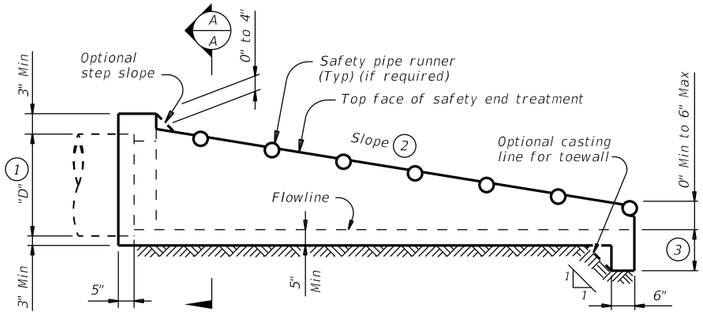
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		95



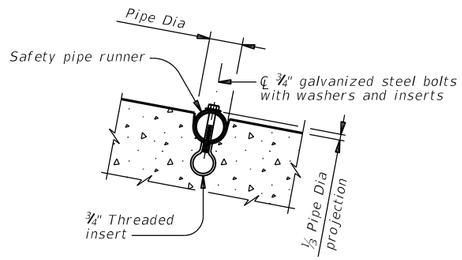
PLAN

(Showing bell end connection.)



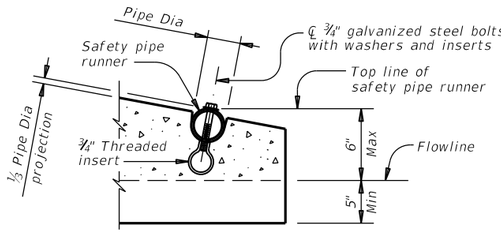
LONGITUDINAL ELEVATION

(Showing bell end connection.)

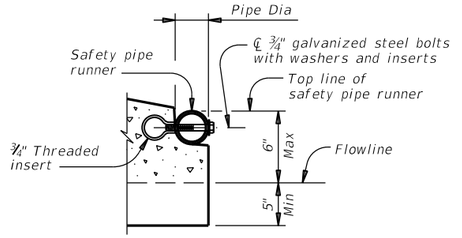


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



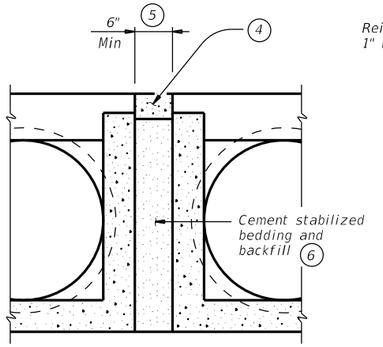
OPTION A



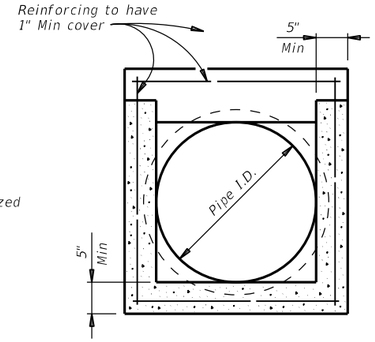
OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

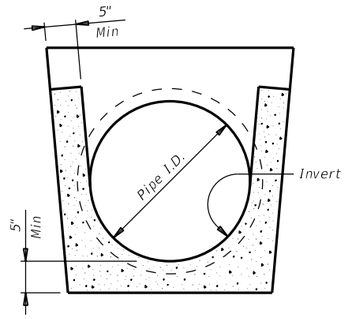
(If required)



MULTIPLE PIPE INSTALLATION

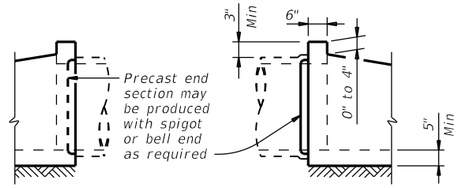


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment.)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (7)	"D" (1)	Slope	Min Length	Pipe Runners Required		Required Pipe Runner Size		
						Single Pipe	Multiple Pipe	Nominal Dia.	O.D.	I.D.
12"	2"	1.15"	17.00"	6:1	4' – 9"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
15"	2 ¼"	1.30"	20.50"	6:1	6' – 5"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
18"	2 ½"	1.60"	24.00"	6:1	8' – 0"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
24"	3"	1.95"	31.00"	6:1	11' – 3"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
30"	3 ½"	2.65"	38.50"	6:1	14' – 8"	No	Yes	4" STD	4.500"	4.026"
36"	4"	2.75"	45.50"	6:1	17' – 11"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	2.7"	52.50"	6:1	21' – 2"	Yes	Yes	4" STD	4.500"	4.026"

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment."

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures." Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment." When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(7) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment."

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" – D12 x D12 or 5"x5" – D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor the next larger size of safety end treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

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

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

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

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464, "Reinforced Concrete Pipe." Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

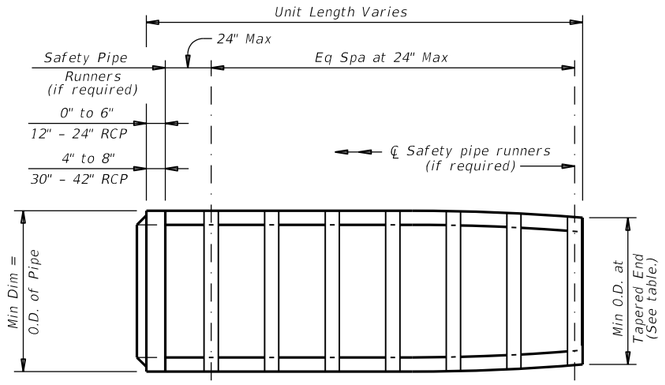
TYPE II ~ PARALLEL DRAINAGE

PSET-SP

FILE:	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: Added 42" TP	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		96

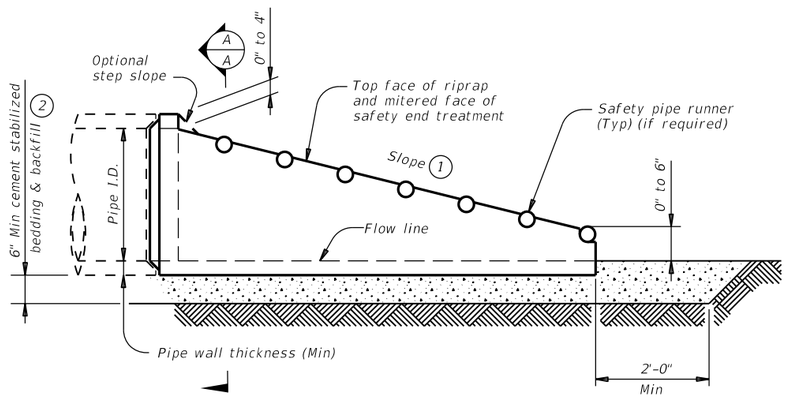
DATE:
FILE:

DATE:
FILE:



PLAN VIEW – 12" THRU 24"

(Showing spigot end connection.)



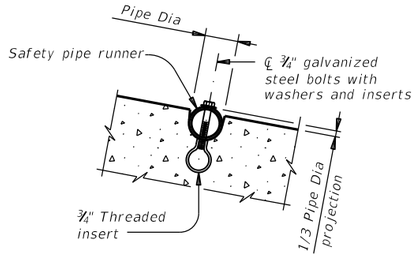
LONGITUDINAL ELEVATION - 12" THRU 24"

(Showing spigot end connection.)

1. Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.
2. Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures." Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment." When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.
3. Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment."
4. Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.
5. Safety pipe runners are required for multiple pipe culverts with more than two pipes.

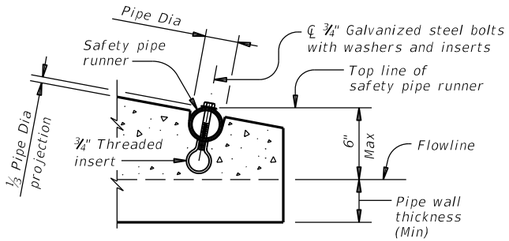
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. per ft. of Pipe)	Max Slope	Min Length of Unit	Pipe Runner Requirements		Required Pipe Runner Sizes		
							Single Pipe	Multiple Pipe	Nominal Dia	O.D.	I.D.
12"	2"	16"	16"	0.07 Circ.	6:1	4'–0"	No	(5)	3" STD	3.500"	3.068"
15"	2 ¼"	19 ½"	19"	0.07 Circ.	6:1	5'–8"	No	(5)	3" STD	3.500"	3.068"
18"	2 ½"	23"	21 ½"	0.07 Circ.	6:1	7'–3"	No	(5)	3" STD	3.500"	3.068"
24"	3"	30"	27"	0.07 Circ.	6:1	10'–6"	No	(5)	3" STD	3.500"	3.068"
30"	3 ½"	37"	31"	0.18 Circ.	6:1	12'–1"	No	Yes	4" STD	4.500"	4.026"
36"	4"	44"	36"	0.19 Ellip.	6:1	15'–4"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	51"	41 ½"	0.23 Ellip.	6:1	18'–7"	Yes	Yes	4" STD	4.500"	4.026"

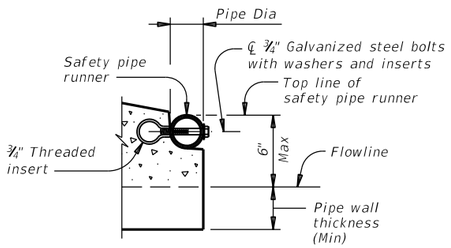


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



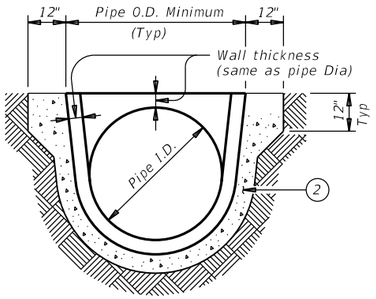
OPTION A



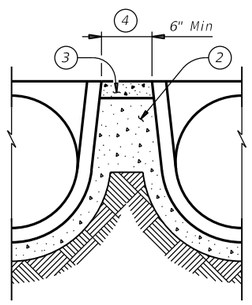
OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



SECTION A-A



MULTIPLE PIPE INSTALLATION

MATERIAL NOTES:

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

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

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

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment."

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C–76, Class III, Wall B for circular pipe.

Provide precast concrete end sections with a spigot or bell end for compatibility with upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre–formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading and installation.

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

Texas Department of Transportation

Bridge Division Standard

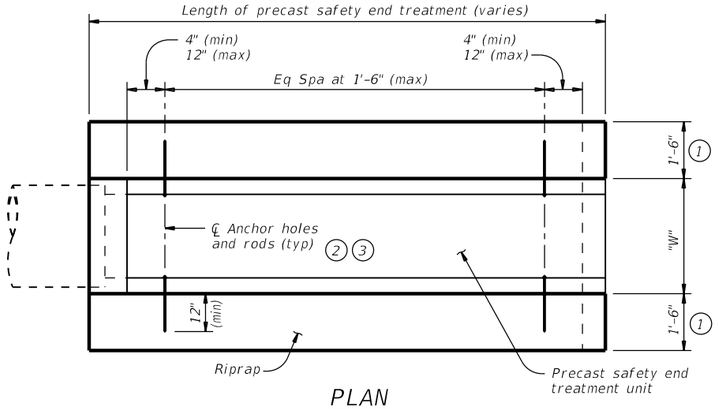
PRECAST SAFETY END TREATMENT

TYPE II ~ PARALLEL DRAINAGE

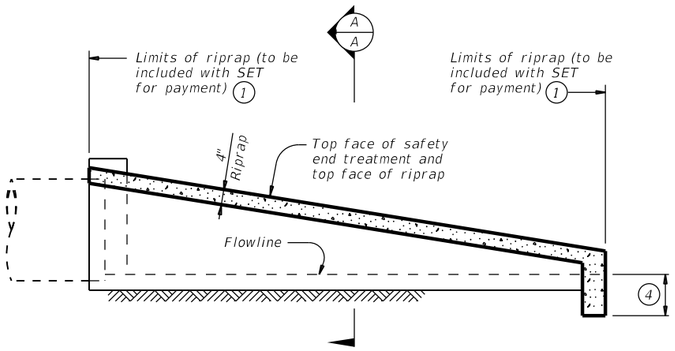
PSET-RP

FILE:	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		97

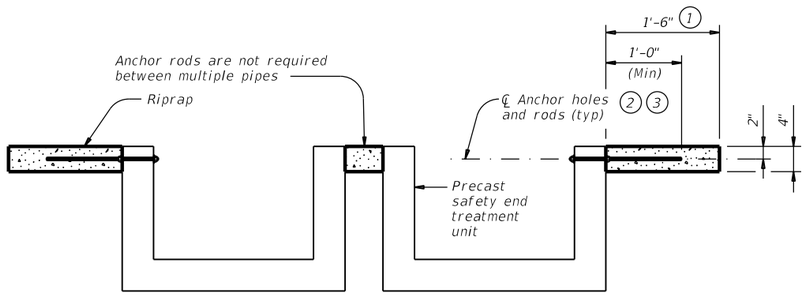
DATE:
FILE:



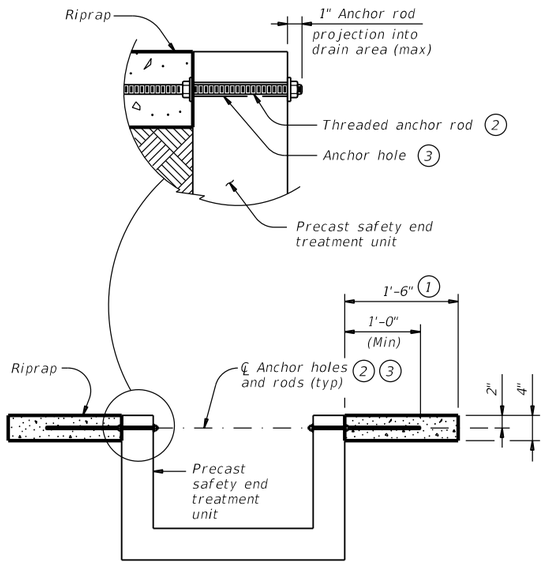
PLAN



LONGITUDINAL ELEVATION



MULTIPLE PIPE INSTALLATION



SINGLE PIPE INSTALLATION

SECTION A-A

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) 5

Nominal Culvert (Pipe) I.D.	PSET-SC and PSET-SP Standards				PSET-RC and PSET-RP Standards			
	Unit Width "W"	Side Slope			Unit Width "W"	Side Slope		
		3:1	4:1	6:1		3:1	4:1	6:1
12"	23.0"	0.1	0.2	0.2	16.0"	0.1	0.1	0.2
15"	26.5"	0.2	0.2	0.3	19.5"	0.1	0.2	0.2
18"	30.0"	0.2	0.2	0.3	23.0"	0.2	0.2	0.3
24"	37.0"	0.3	0.3	0.5	30.0"	0.2	0.3	0.4
30"	44.5"	0.3	0.4	0.6	37.0"	0.3	0.3	0.5
36"	51.5"	0.4	0.5	0.7	44.0"	0.3	0.4	0.6
42"	58.5"	0.5	0.6	0.8	51.0"	0.4	0.5	0.7

(1) Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap." When riprap is cast integrally with the precast safety end treatment, this dimension is 1'-0" minimum.

(2) 1#2" Dia ASTM A307 Gr A threaded anchor rod with 2 nuts and 2 washers. Galvanize all components in accordance with Item 445, "Galvanizing." Repair galvanizing that is damaged during transport or construction in accordance with the specifications.

(3) 3#4" through holes in walls of safety end treatment for riprap anchor rods may be drilled with rotary (coring or masonry) type drilling equipment or may be formed. Do not use percussive (star) type drilling equipment. If holes are drilled, patch spalls in the inside face of the wall exceeding 1#2" from the holes.

(4) Provide riprap toe wall when dimension is shown elsewhere in the plans or when field conditions require a toe wall.

(5) Quantities shown are for one end of one reinforced concrete pipe culvert. For multiple pipe culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only. Quantities are based on the minimum unit lengths shown on the Precast Saftey End Treatment (SET) standard sheets.

MATERIAL NOTES:

Provide Class "B" riprap in accordance with Item 432, "Riprap."
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. The anchor rods shown are always required.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment."

Refer to PSET-SC or PSET-SP standard sheets for details of square safety end treatments not shown. Refer to PSET-RC or PSET-RP standard sheets for details of round safety end treatments not shown.

For precast units with integrally cast riprap, substitute reinforcing steel in the amount on 0.26 in./ft. minimum for the threaded anchor rods shown. When requested, submit sealed engineering drawings for approval prior to construction. Shop drawings will not be required. Note that a proprietary precast unit with integral riprap is available from L&R Precast Concrete Works, Inc. (956) 583-6293 or www.lrprecast.com.

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

These riprap details are only applicable when notes that require placement of riprap with precast safety end treatments are shown elsewhere in the plans.

Precast units with integrally cast riprap are permitted unless noted otherwise on the plans.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT
TYPE II
RIPRAP DETAILS

PSET-RR

FILE:	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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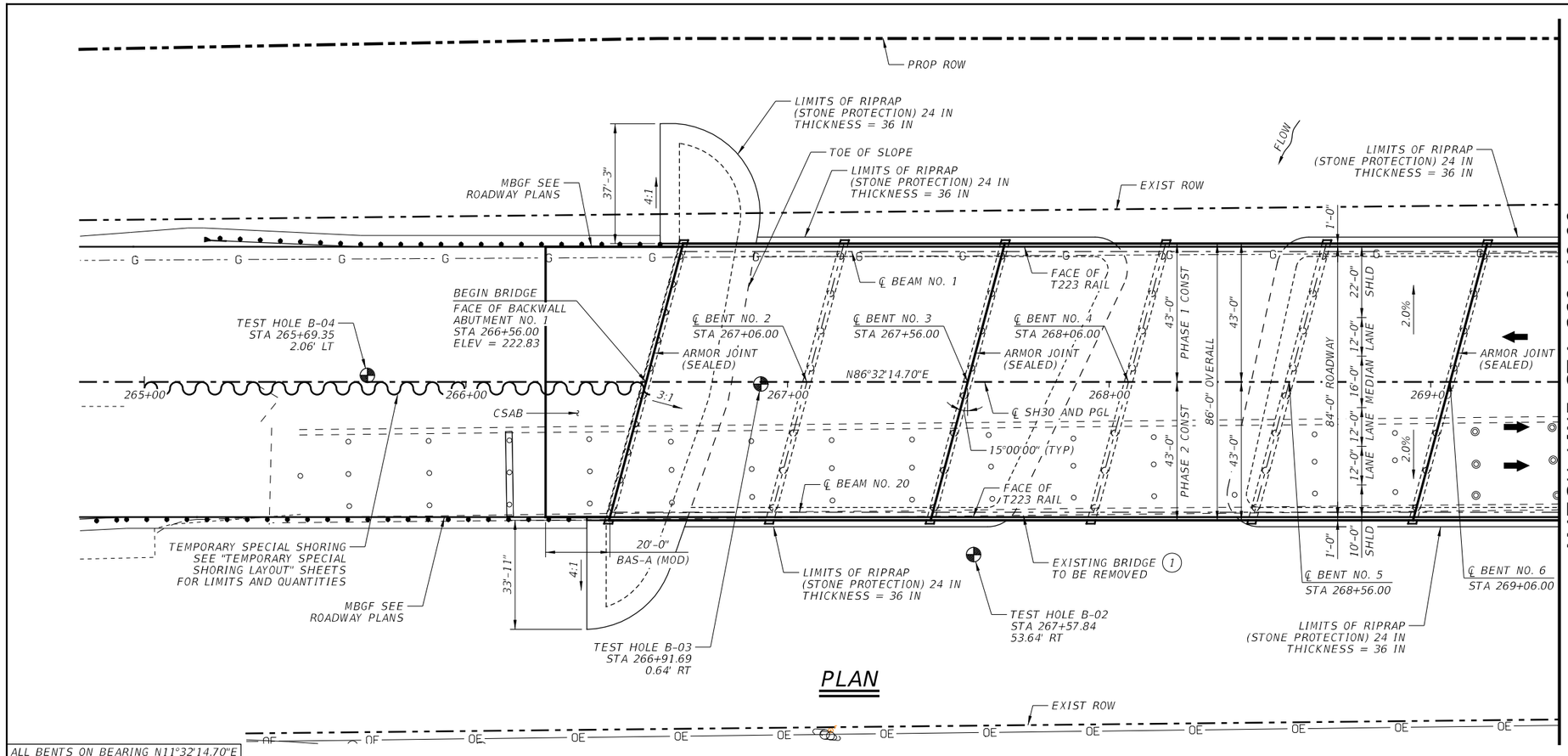
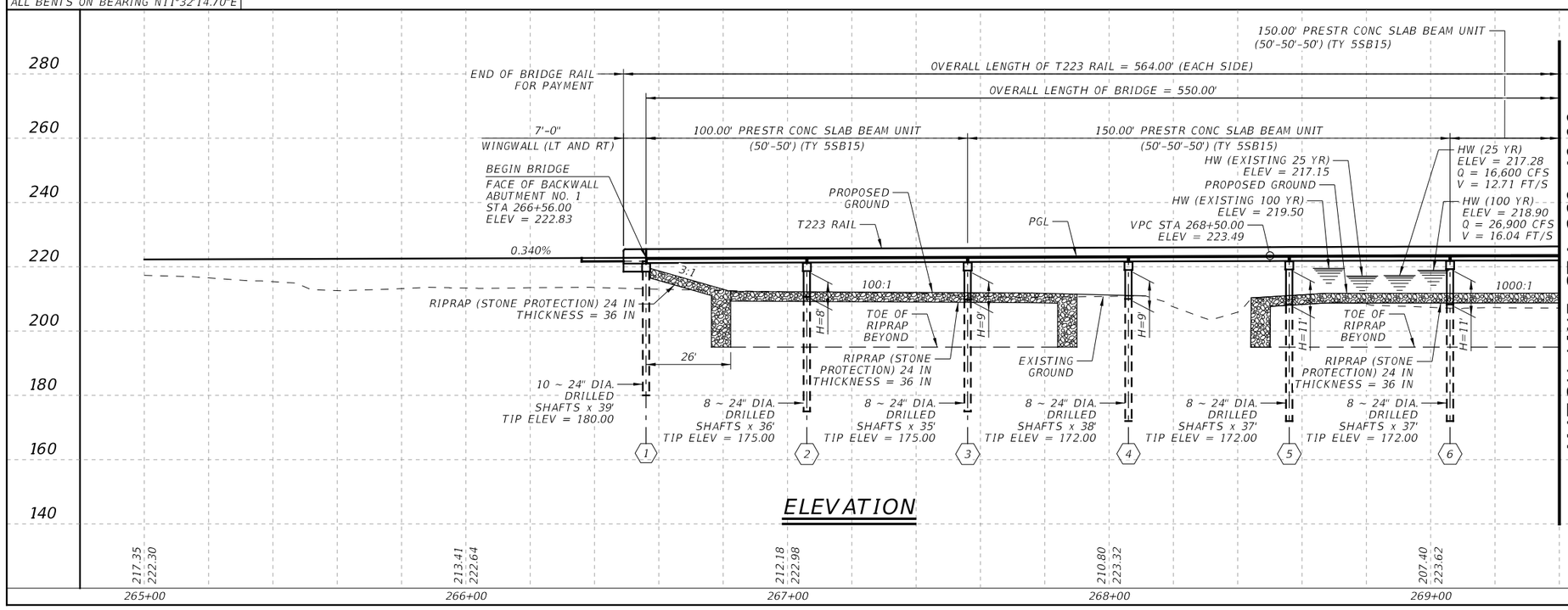
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		98





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ADT (2015):	4,240
ADT (2035):	8,370
FUNCT CLASS:	RURAL MINOR ARTERIAL
EXISTING NBI:	17-194-0-0212-04-007
PROPOSED NBI:	17-194-0-0212-04-217

N

08/17/2018

08/17/2018

STATE OF TEXAS
RYAN L. EAVES
129462
LICENSED PROFESSIONAL ENGINEER

Ryan L Eaves

FOUNDATION DESIGN

08/17/2018

STATE OF TEXAS
NICHOLAS NEMEC
102288
LICENSED PROFESSIONAL ENGINEER

Nicholas Nemec

BRIDGE DESIGN

(1) EXISTING BRIDGE IS A 500' CONTINUOUS SLAB BEAM UNIT WITH 18" CURBS AND TYPE II RAILING.

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATION, 7TH EDITION (2014).
2. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF UTILITIES PRIOR TO ORDERING MATERIALS OR DRILLING FOUNDATIONS.
3. THE H VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. CONTRACTOR SHALL VERIFY ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.
4. THE CONTRACTOR'S ATTENTION IS DRAWN TO THE WATER BEARING SAND MATERIAL SHOWN IN THE BORING LOGS. THE USE OF CASING AND/OR DRILLING SLURRY MAY BE NECESSARY TO INSTALL THE DRILLED SHAFT TO THE REQUIRED PENETRATION DEPTH.

0 20 40 60 80
SCALE IN FEET

HL93 LOADING

STATE OF TEXAS
DAVID P. HOHMANN
60983
REGISTERED PROFESSIONAL ENGINEER

08/17/2018

David P Hohmann

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

BRIDGE LAYOUT

SH 30 AT GIBBONS CREEK

SHEET 1 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	99
CONTROL	SECTION	JOB	
0212	04	039	

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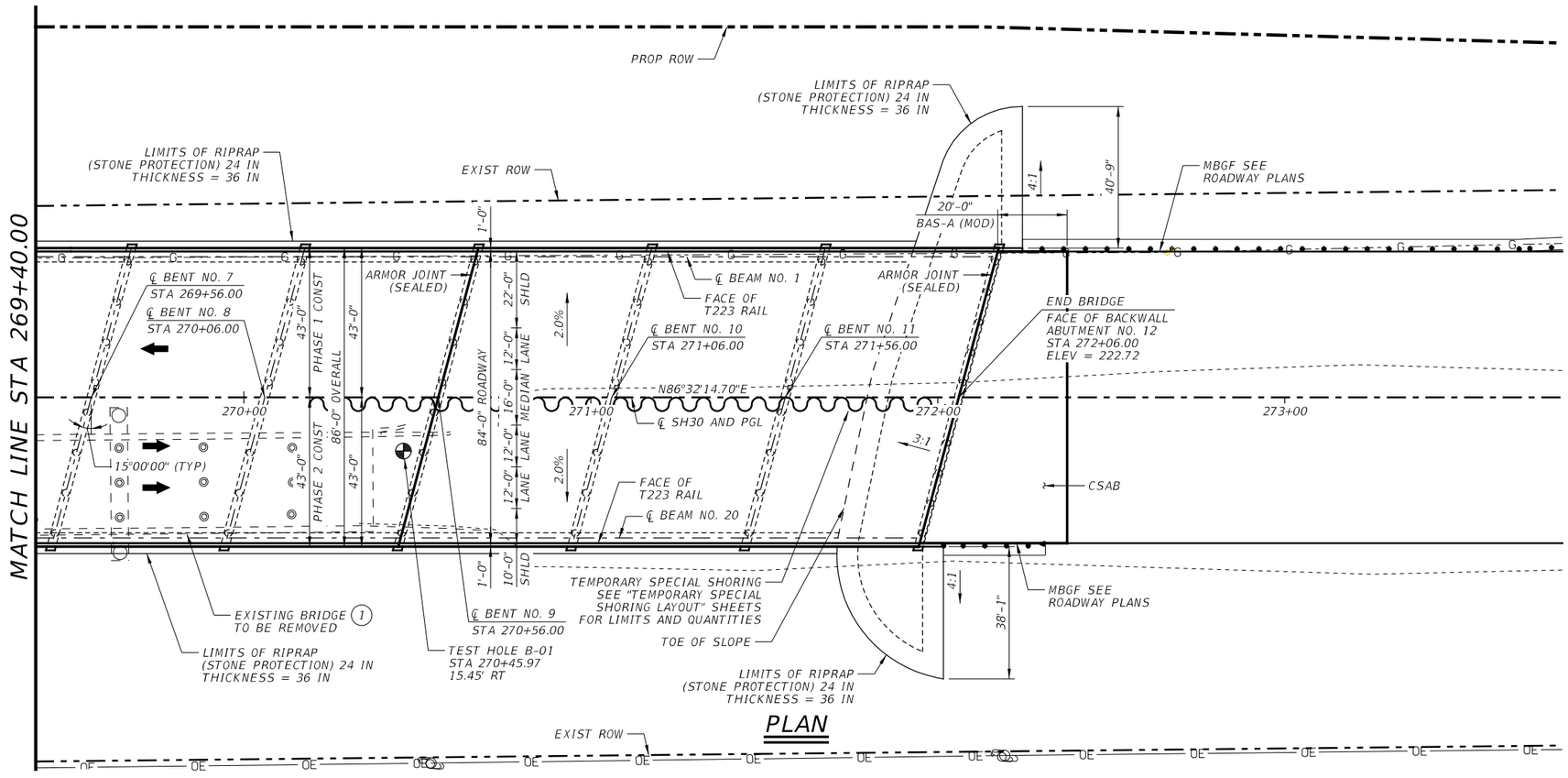
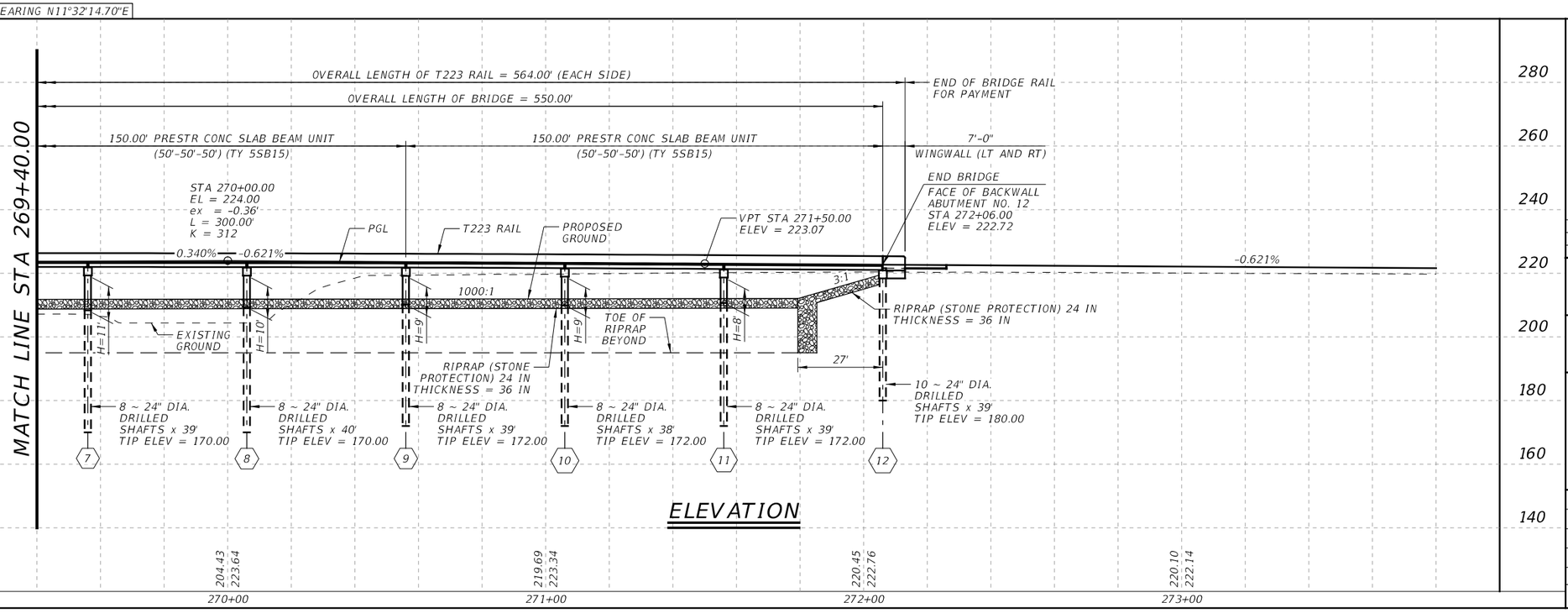
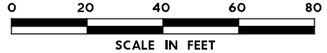


ALL BENTS ON BEARING N11°32'14.70"E



ELEVATION



HL93 LOADING

08/17/2018

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LICENSED PROFESSIONAL ENGINEER

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FOUNDATION DESIGN

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4. THE CONTRACTOR'S ATTENTION IS DRAWN TO THE WATER BEARING SAND MATERIAL SHOWN IN THE BORING LOGS. THE USE OF CASING AND/OR DRILLING SLURRY MAY BE NECESSARY TO INSTALL THE DRILLED SHAFT TO THE REQUIRED PENETRATION DEPTH

STATE OF TEXAS
DAVID P. HOHMANN
60983
REGISTERED PROFESSIONAL ENGINEER

08/17/2018

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

BRIDGE LAYOUT

SH 30 AT GIBBONS CREEK

SHEET 2 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	100
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
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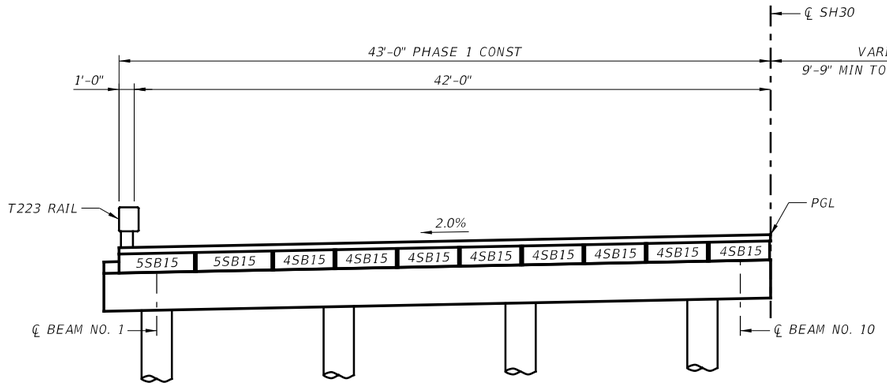
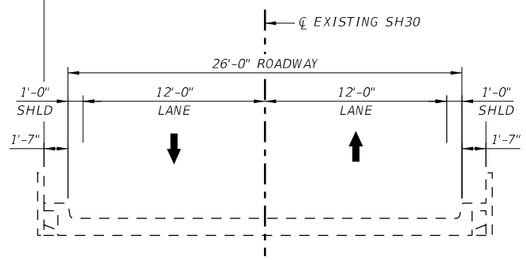
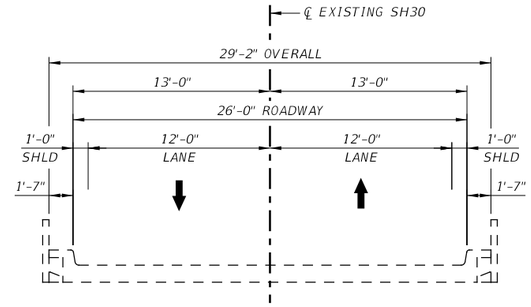
DATE: 8/17/2018
FILE: SH30BL02.dgn

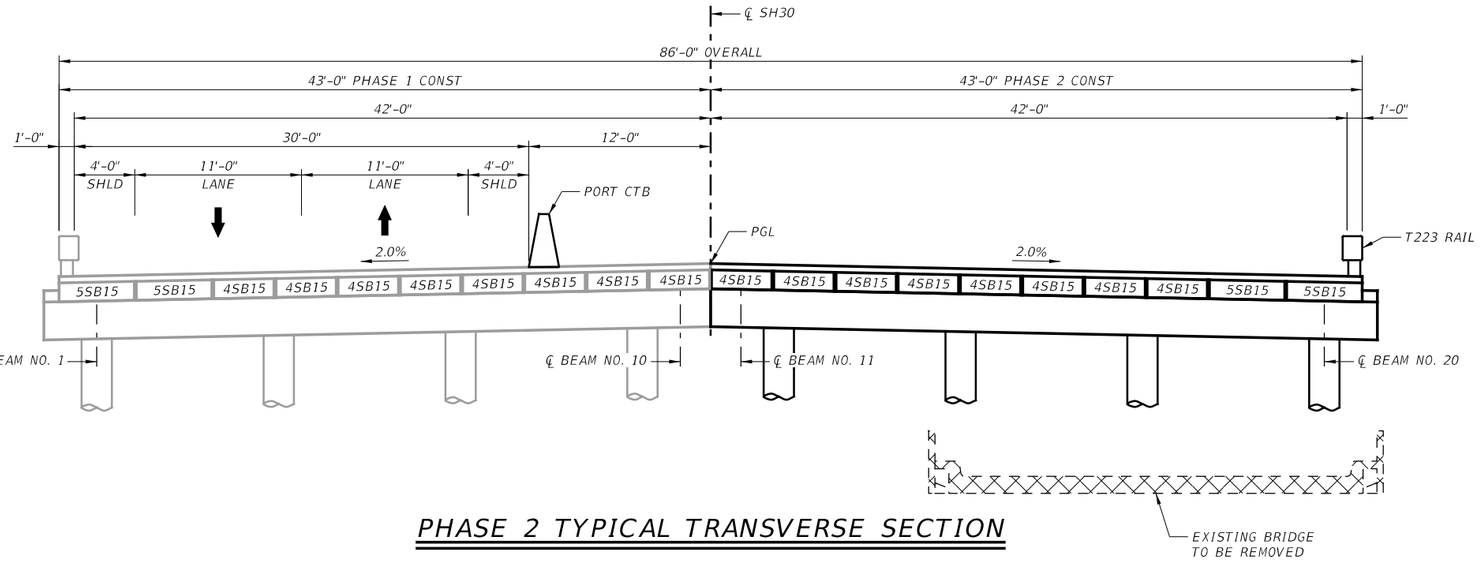




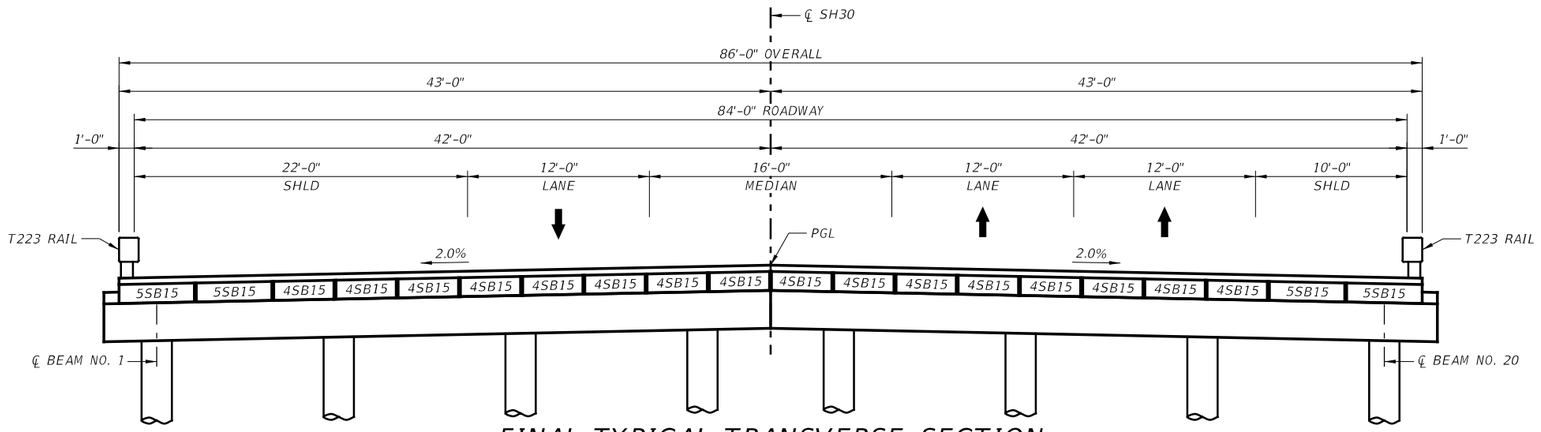
PHASE 1 TYPICAL TRANSVERSE SECTION



EXISTING TYPICAL TRANSVERSE SECTION



PHASE 2 TYPICAL TRANSVERSE SECTION



FINAL TYPICAL TRANSVERSE SECTION

0 5 10 15 20
SCALE IN FEET

HL93 LOADING

STATE OF TEXAS
DAVID P. HOHMANN
60983
REGISTERED PROFESSIONAL ENGINEER
08/17/2018

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

BRIDGE LAYOUT

SH 30 AT GIBBONS CREEK

SHEET 3 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	101
CONTROL	SECTION	JOB	
0212	04	039	

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USER: KBERGER DATE: 8/17/2018
FILE: SH30BL03.dgn
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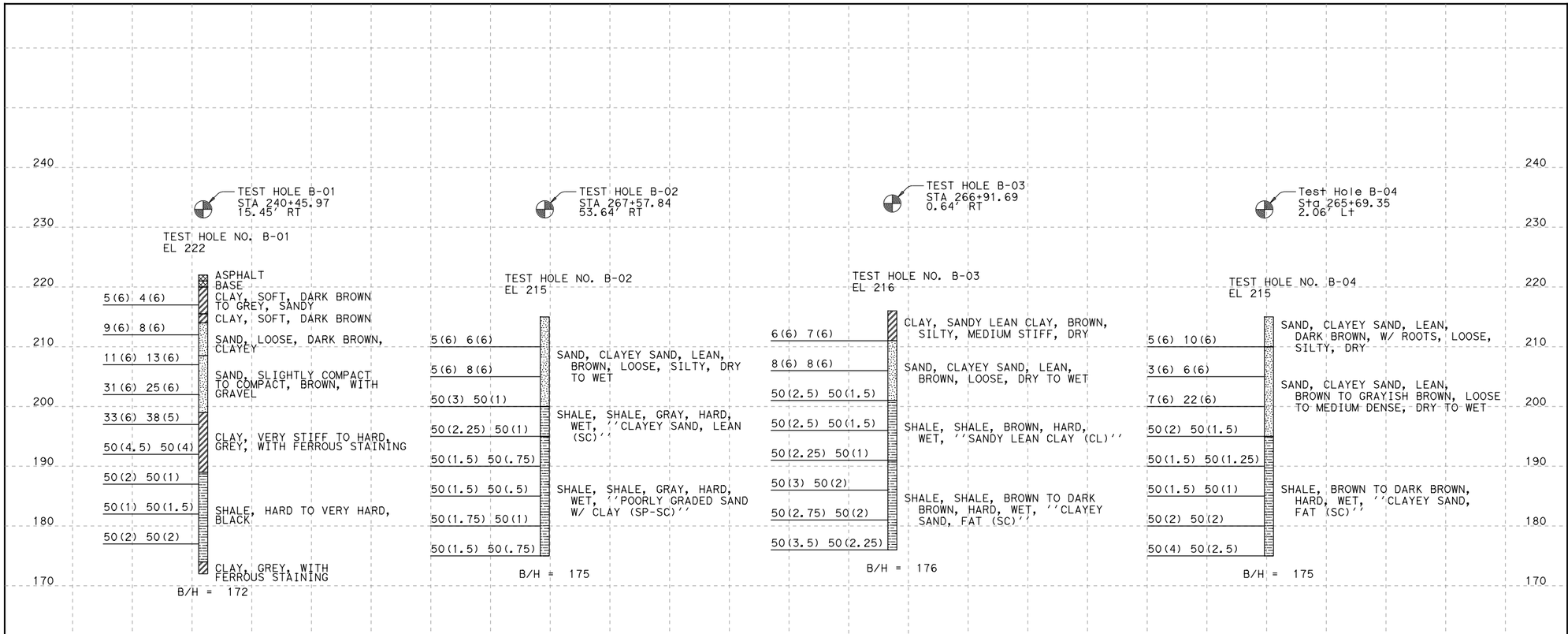


NOTES:

1. BORING LOGS CONDUCTED BY L&G ENGINEERING ARE SHOWN HERE FOR INFORMATIONAL PURPOSES ONLY. SEE L&G ENGINEERING GEOTECHNICAL MEMO FOR **WA#3:** BRYAN DISTRICT ON-SYSTEM BRIDGE REPLACEMENT - SH 30 AT GIBBONS CREEK SUBMITTAL OF GEOTECHNICAL FIELD STUDY, SIGNED BY DAVID A. SAENZ, P.E., C.F.M, DATED AUGUST 31, 2017 FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
DAVID P. HOHMANN
60983
REGISTERED
PROFESSIONAL ENGINEER

08/17/2018

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

BORE LOGS

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	102
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: KBERGER DATE: 8/17/2018 TIME: 10:36:47 AM SCALE: 1:20
FILE: SH30BORE01.dgn PENTABLE: 1006936.tbl

SUMMARY OF ESTIMATED QUANTITIES

BID CODES / BRIDGE ELEMENT — BID ITEM DESCRIPTION	0400 6005 CEM STABIL BKFL	0416 6002 DRILL SHAFT (24 IN)	0420 6013 CL C CONC (ABUT)	0420 6029 CL C CONC (CAP)	0420 6037 CL C CONC (COLUMN)	0422 6007 REINF CONC SLAB (SLAB BEAM)	0422 6015 APPROACH SLAB	0425 6011 PRESTR CONC SLAB BEAM (4SB15)	0425 6012 PRESTR CONC SLAB BEAM (5SB15)	0432 6035 RIPRAP (STONE PROTECTION) (24 IN)	0450 6006 RAIL (TY T223)	0454 6004 ARMOR JOINT (SEALED)	0496 6011 REMOV STR (BRIDGE 500 – 999 FT LENGTH)
	CY	LF	CY	CY	CY	SF	CY	LF	LF	CY	LF	LF	EA
PHASE I													
2 - ABUTMENTS	228	390	26.4				100.2				14.0		
10 - INTERIOR BENTS		1512		106.0	44.2								
1 - 100.00' PRESTRESSED CONC. SLAB BEAM UNIT						4300		791.93	197.98		100.0	87	
3 - 150.00' PRESTRESSED CONC. SLAB BEAM UNIT						19350		3563.95	890.98		450.0	131	
PHASE I SUBTOTAL:	228	1902	26.4	106.0	44.2	23650	100.2	4355.88	1088.96		564.0	218	
PHASE II													
2 - ABUTMENTS	228	390	26.4				100.2				14.0		
10 - INTERIOR BENTS		1512		106.0	44.2								
1 - 100.00' PRESTRESSED CONC. SLAB BEAM UNIT						4300		791.93	197.98		100.0	83	
3 - 150.00' PRESTRESSED CONC. SLAB BEAM UNIT						19350		3563.95	890.98		450.0	125	
PHASE II SUBTOTAL:	228	1902	26.4	106.0	44.2	23650	100.2	4355.88	1088.96		564.0	208	
OVERALL TOTALS:	456	3804	52.8	212.0	88.4	47300	200.4	8711.76	2177.92	9857	1128.0	426	1

DATE:
FILE:

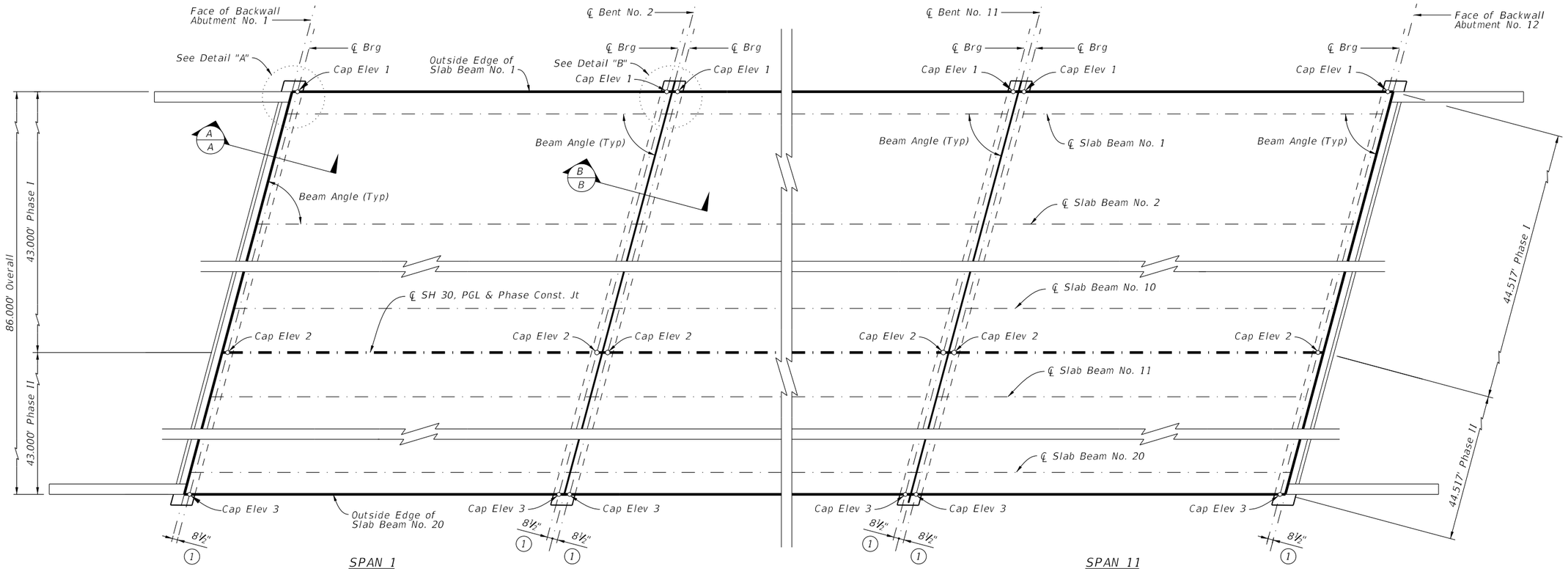
Texas Department of Transportation

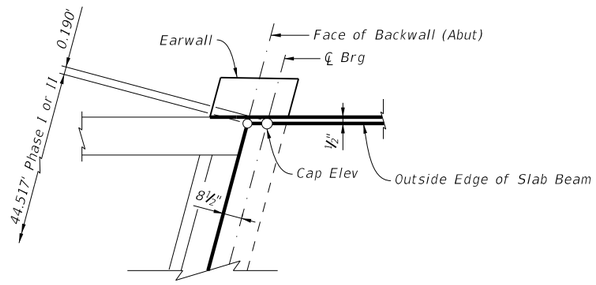
Bridge Division

ESTIMATED QUANTITIES

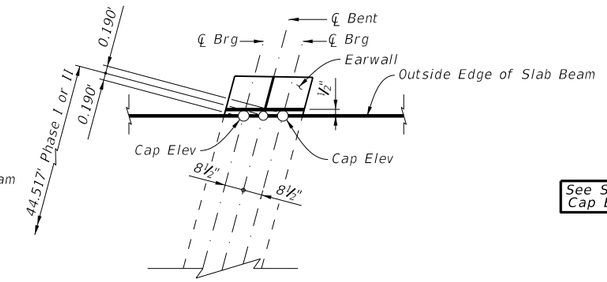
GIBBONS CREEK BRIDGE

FILE: 8049eq01.dgn	DN: LXG	CK: VEM	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		103



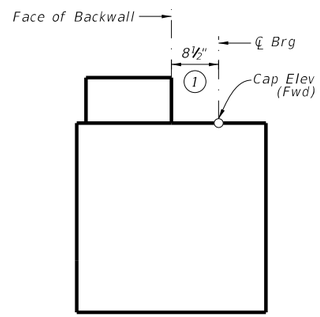


DETAIL A

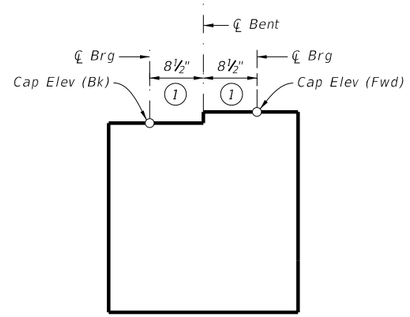


DETAIL B

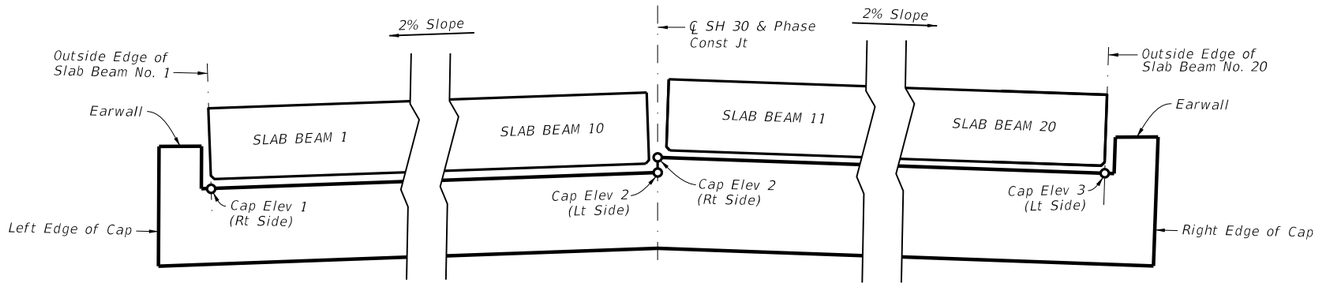
See Sheet 4 of 4 for Cap Elevation values



SECTION A-A



SECTION B-B



COMMON TRANSVERSE SECTIONS AT CAP ELEVATIONS

Texas Department of Transportation — Bridge Division

CAP ELEVATION AND FRAMING PLAN DETAILS

(SPANS 1-11)

GIBBONS CREEK BRIDGE

FILE: SH0030 BRG 8049pb03.dgn	DN: LXG	CK: VEM	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		104

DATE: 07/30/2018
FILE:

BENT REPORT

ABUT NO. 1 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 1	BEAM 1	0.0000	75	0	0.00
	BEAM 2	5.2950	75	0	0.00
	BEAM 3	4.7774	75	0	0.00
	BEAM 4	4.2489	75	0	0.00
	BEAM 5	4.2490	75	0	0.00
	BEAM 6	4.2489	75	0	0.00
	BEAM 7	4.2490	75	0	0.00
	BEAM 8	4.2490	75	0	0.00
	BEAM 9	4.2489	75	0	0.00
	BEAM 10	4.2491	75	0	0.00
	BEAM 11	4.2488	75	0	0.00
	BEAM 12	4.2491	75	0	0.00
	BEAM 13	4.2489	75	0	0.00
	BEAM 14	4.2490	75	0	0.00
	BEAM 15	4.2490	75	0	0.00
	BEAM 16	4.2489	75	0	0.00
	BEAM 17	4.2490	75	0	0.00
	BEAM 18	4.2489	75	0	0.00
	BEAM 19	4.7774	75	0	0.00
	BEAM 20	5.2950	75	0	0.00
	TOTAL	83.8789			

BENT NO. 2 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 1	BEAM 1	0.0000	75	0	0.00
	BEAM 2	5.2950	75	0	0.00
	BEAM 3	4.7774	75	0	0.00
	BEAM 4	4.2489	75	0	0.00
	BEAM 5	4.2490	75	0	0.00
	BEAM 6	4.2489	75	0	0.00
	BEAM 7	4.2490	75	0	0.00
	BEAM 8	4.2490	75	0	0.00
	BEAM 9	4.2489	75	0	0.00
	BEAM 10	4.2491	75	0	0.00
	BEAM 11	4.2488	75	0	0.00
	BEAM 12	4.2491	75	0	0.00
	BEAM 13	4.2489	75	0	0.00
	BEAM 14	4.2490	75	0	0.00
	BEAM 15	4.2490	75	0	0.00
	BEAM 16	4.2489	75	0	0.00
	BEAM 17	4.2490	75	0	0.00
	BEAM 18	4.2489	75	0	0.00
	BEAM 19	4.7774	75	0	0.00
	BEAM 20	5.2950	75	0	0.00
	TOTAL	83.8789			

BENT NO. 3 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 2	BEAM 1	0.0000	75	0	0.00
	BEAM 2	5.2950	75	0	0.00
	BEAM 3	4.7774	75	0	0.00
	BEAM 4	4.2489	75	0	0.00
	BEAM 5	4.2490	75	0	0.00
	BEAM 6	4.2489	75	0	0.00
	BEAM 7	4.2490	75	0	0.00
	BEAM 8	4.2490	75	0	0.00
	BEAM 9	4.2489	75	0	0.00
	BEAM 10	4.2491	75	0	0.00
	BEAM 11	4.2488	75	0	0.00
	BEAM 12	4.2491	75	0	0.00
	BEAM 13	4.2489	75	0	0.00
	BEAM 14	4.2490	75	0	0.00
	BEAM 15	4.2490	75	0	0.00
	BEAM 16	4.2489	75	0	0.00
	BEAM 17	4.2490	75	0	0.00
	BEAM 18	4.2489	75	0	0.00
	BEAM 19	4.7774	75	0	0.00
	BEAM 20	5.2950	75	0	0.00
	TOTAL	83.8789			

BENT NO. 4 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 3	BEAM 1	0.0000	75	0	0.00
	BEAM 2	5.2950	75	0	0.00
	BEAM 3	4.7774	75	0	0.00
	BEAM 4	4.2489	75	0	0.00
	BEAM 5	4.2490	75	0	0.00
	BEAM 6	4.2489	75	0	0.00
	BEAM 7	4.2490	75	0	0.00
	BEAM 8	4.2490	75	0	0.00
	BEAM 9	4.2489	75	0	0.00
	BEAM 10	4.2491	75	0	0.00
	BEAM 11	4.2488	75	0	0.00
	BEAM 12	4.2491	75	0	0.00
	BEAM 13	4.2489	75	0	0.00
	BEAM 14	4.2490	75	0	0.00
	BEAM 15	4.2490	75	0	0.00
	BEAM 16	4.2489	75	0	0.00
	BEAM 17	4.2490	75	0	0.00
	BEAM 18	4.2489	75	0	0.00
	BEAM 19	4.7774	75	0	0.00
	BEAM 20	5.2950	75	0	0.00
	TOTAL	83.8789			

BENT NO. 5 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 4	BEAM 1	0.0000	75	0	0.00
	BEAM 2	5.2950	75	0	0.00
	BEAM 3	4.7774	75	0	0.00
	BEAM 4	4.2489	75	0	0.00
	BEAM 5	4.2490	75	0	0.00
	BEAM 6	4.2489	75	0	0.00
	BEAM 7	4.2490	75	0	0.00
	BEAM 8	4.2490	75	0	0.00
	BEAM 9	4.2489	75	0	0.00
	BEAM 10	4.2491	75	0	0.00
	BEAM 11	4.2488	75	0	0.00
	BEAM 12	4.2491	75	0	0.00
	BEAM 13	4.2489	75	0	0.00
	BEAM 14	4.2490	75	0	0.00
	BEAM 15	4.2490	75	0	0.00
	BEAM 16	4.2489	75	0	0.00
	BEAM 17	4.2490	75	0	0.00
	BEAM 18	4.2489	75	0	0.00
	BEAM 19	4.7774	75	0	0.00
	BEAM 20	5.2950	75	0	0.00
	TOTAL	83.8789			

BENT NO. 6 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 5	BEAM 1	0.0000	75	0	0.00
	BEAM 2	5.2950	75	0	0.00
	BEAM 3	4.7774	75	0	0.00
	BEAM 4	4.2489	75	0	0.00
	BEAM 5	4.2490	75	0	0.00
	BEAM 6	4.2489	75	0	0.00
	BEAM 7	4.2490	75	0	0.00
	BEAM 8	4.2490	75	0	0.00
	BEAM 9	4.2489	75	0	0.00
	BEAM 10	4.2491	75	0	0.00
	BEAM 11	4.2488	75	0	0.00
	BEAM 12	4.2491	75	0	0.00
	BEAM 13	4.2489	75	0	0.00
	BEAM 14	4.2490	75	0	0.00
	BEAM 15	4.2490	75	0	0.00
	BEAM 16	4.2489	75	0	0.00
	BEAM 17	4.2490	75	0	0.00
	BEAM 18	4.2489	75	0	0.00
	BEAM 19	4.7774	75	0	0.00
	BEAM 20	5.2950	75	0	0.00
	TOTAL	83.8789			

BENT NO. 7 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 6	BEAM 1	0.0000	75	0	0.00
	BEAM 2	5.2950	75	0	0.00
	BEAM 3	4.7774	75	0	0.00
	BEAM 4	4.2489	75	0	0.00
	BEAM 5	4.2490	75	0	0.00
	BEAM 6	4.2489	75	0	0.00
	BEAM 7	4.2490	75	0	0.00
	BEAM 8	4.2490	75	0	0.00
	BEAM 9	4.2489	75	0	0.00
	BEAM 10	4.2491	75	0	0.00
	BEAM 11	4.2488	75	0	0.00
	BEAM 12	4.2491	75	0	0.00
	BEAM 13	4.2489	75	0	0.00
	BEAM 14	4.2490	75	0	0.00
	BEAM 15	4.2490	75	0	0.00
	BEAM 16	4.2489	75	0	0.00
	BEAM 17	4.2490	75	0	0.00
	BEAM 18	4.2489	75	0	0.00
	BEAM 19	4.7774	75	0	0.00
	BEAM 20	5.2950	75	0	0.00
	TOTAL	83.8789			

BENT NO. 7 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 7	BEAM 1	0.0000	75	0	0.00
	BEAM 2	5.2950	75	0	0.00
	BEAM 3	4.7774	75	0	0.00
	BEAM 4	4.2489	75	0	0.00
	BEAM 5	4.2490	75	0	0.00
	BEAM 6	4.2489	75	0	0.00
	BEAM 7	4.2490	75	0	0.00
	BEAM 8	4.2490	75	0	0.00
	BEAM 9	4.2489	75	0	0.00
	BEAM 10	4.2491	75	0	0.00
	BEAM 11	4.2488	75	0	0.00
	BEAM 12	4.2491	75	0	0.00
	BEAM 13	4.2489	75	0	0.00
	BEAM 14	4.2490	75	0	0.00
	BEAM 15	4.2490	75	0	0.00
	BEAM 16	4.2489	75	0	0.00
	BEAM 17	4.2490	75	0	0.00
	BEAM 18	4.2489	75	0	0.00
	BEAM 19	4.7774	75	0	0.00
	BEAM 20	5.2950	75	0	0.00
	TOTAL	83.8789			

BENT NO. 8 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 7	BEAM 1	0.0000	75	0	0.00
	BEAM 2	5.2950	75	0	0.00
	BEAM 3	4.7774	75	0	0.00
	BEAM 4	4.2489	75	0	0.00
	BEAM 5	4.2490	75	0	0.00
	BEAM 6	4.2489	75	0	0.00
	BEAM 7	4.2490	75	0	0.00
	BEAM 8	4.2490	75	0	0.00
	BEAM 9	4.2489	75	0	0.00
	BEAM 10	4.2491	75	0	0.00
	BEAM 11	4.2488	75	0	0.00
	BEAM 12	4.2491	75	0	0.00
	BEAM 13	4.2489	75	0	0.00
	BEAM 14	4.2490	75	0	0.00
	BEAM 15	4.2490	75	0	0.00
	BEAM 16	4.2489	75	0	0.00
	BEAM 17	4.2490	75	0	0.00
	BEAM 18	4.2489	75	0	0.00
	BEAM 19	4.7774	75	0	0.00
	BEAM 20	5.2950	75	0	0.00
	TOTAL	83.8789			

BENT NO. 8 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 8	BEAM 1	0.0000	75	0	0.00
	BEAM 2	5.2950	75	0	0.00
	BEAM 3	4.7774	75	0	0.00
	BEAM 4	4.2489	75	0	0.00
	BEAM 5	4.2490	75	0	0.00
	BEAM 6	4.2489	75	0	0.00
	BEAM 7	4.2490	75	0	0.00
	BEAM 8	4.2490	75	0	0.00
	BEAM 9	4.2489	75	0	0.00
	BEAM 10	4.2491	75	0	0.00
	BEAM 11	4.2488	75	0	0.00
	BEAM 12	4.2491	75	0	0.00
	BEAM 13	4.2489	75	0	0.00
	BEAM 14	4.2490	75	0	0.00
	BEAM 15	4.2490	75	0	0.00
	BEAM 16	4.2489	75	0	0.00
	BEAM 17	4.2490	75	0	0.00
	BEAM 18	4.2489	75	0	0.00
	BEAM 19	4.7774	75	0	0.00
	BEAM 20	5.2950	75	0	0.00
	TOTAL	83.8789			

DATE: 07/30/2018
FILE:

Texas Department of Transportation — Bridge Division

CAP ELEVATION AND FRAMING PLAN DETAILS

(SPANS 1-11)

GIBBONS CREEK BRIDGE

FILE: SH0030 BRG 8049pb03.dgn	DN: LXG	CK: VEM	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		105

BENT REPORT

BENT NO. 9 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

			BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 8	BEAM	1	0.0000	75	0	0.00
	BEAM	2	5.2950	75	0	0.00
	BEAM	3	4.7774	75	0	0.00
	BEAM	4	4.2489	75	0	0.00
	BEAM	5	4.2490	75	0	0.00
	BEAM	6	4.2489	75	0	0.00
	BEAM	7	4.2490	75	0	0.00
	BEAM	8	4.2490	75	0	0.00
	BEAM	9	4.2489	75	0	0.00
	BEAM	10	4.2491	75	0	0.00
	BEAM	11	4.2488	75	0	0.00
	BEAM	12	4.2491	75	0	0.00
	BEAM	13	4.2489	75	0	0.00
	BEAM	14	4.2490	75	0	0.00
	BEAM	15	4.2490	75	0	0.00
	BEAM	16	4.2489	75	0	0.00
	BEAM	17	4.2490	75	0	0.00
	BEAM	18	4.2489	75	0	0.00
	BEAM	19	4.7774	75	0	0.00
	BEAM	20	5.2950	75	0	0.00
	TOTAL		83.8789			

BENT NO. 9 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

			BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 9	BEAM	1	0.0000	75	0	0.00
	BEAM	2	5.2950	75	0	0.00
	BEAM	3	4.7774	75	0	0.00
	BEAM	4	4.2489	75	0	0.00
	BEAM	5	4.2490	75	0	0.00
	BEAM	6	4.2489	75	0	0.00
	BEAM	7	4.2490	75	0	0.00
	BEAM	8	4.2490	75	0	0.00
	BEAM	9	4.2489	75	0	0.00
	BEAM	10	4.2491	75	0	0.00
	BEAM	11	4.2488	75	0	0.00
	BEAM	12	4.2491	75	0	0.00
	BEAM	13	4.2489	75	0	0.00
	BEAM	14	4.2490	75	0	0.00
	BEAM	15	4.2490	75	0	0.00
	BEAM	16	4.2489	75	0	0.00
	BEAM	17	4.2490	75	0	0.00
	BEAM	18	4.2489	75	0	0.00
	BEAM	19	4.7774	75	0	0.00
	BEAM	20	5.2950	75	0	0.00
	TOTAL		83.8789			

BENT NO. 10 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

			BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 9	BEAM	1	0.0000	75	0	0.00
	BEAM	2	5.2950	75	0	0.00
	BEAM	3	4.7774	75	0	0.00
	BEAM	4	4.2489	75	0	0.00
	BEAM	5	4.2490	75	0	0.00
	BEAM	6	4.2489	75	0	0.00
	BEAM	7	4.2490	75	0	0.00
	BEAM	8	4.2490	75	0	0.00
	BEAM	9	4.2489	75	0	0.00
	BEAM	10	4.2491	75	0	0.00
	BEAM	11	4.2488	75	0	0.00
	BEAM	12	4.2491	75	0	0.00
	BEAM	13	4.2489	75	0	0.00
	BEAM	14	4.2490	75	0	0.00
	BEAM	15	4.2490	75	0	0.00
	BEAM	16	4.2489	75	0	0.00
	BEAM	17	4.2490	75	0	0.00
	BEAM	18	4.2489	75	0	0.00
	BEAM	19	4.7774	75	0	0.00
	BEAM	20	5.2950	75	0	0.00
	TOTAL		83.8789			

BENT NO. 10 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

			BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 10	BEAM	1	0.0000	75	0	0.00
	BEAM	2	5.2950	75	0	0.00
	BEAM	3	4.7774	75	0	0.00
	BEAM	4	4.2489	75	0	0.00
	BEAM	5	4.2490	75	0	0.00
	BEAM	6	4.2489	75	0	0.00
	BEAM	7	4.2490	75	0	0.00
	BEAM	8	4.2490	75	0	0.00
	BEAM	9	4.2489	75	0	0.00
	BEAM	10	4.2491	75	0	0.00
	BEAM	11	4.2488	75	0	0.00
	BEAM	12	4.2491	75	0	0.00
	BEAM	13	4.2489	75	0	0.00
	BEAM	14	4.2490	75	0	0.00
	BEAM	15	4.2490	75	0	0.00
	BEAM	16	4.2489	75	0	0.00
	BEAM	17	4.2490	75	0	0.00
	BEAM	18	4.2489	75	0	0.00
	BEAM	19	4.7774	75	0	0.00
	BEAM	20	5.2950	75	0	0.00
	TOTAL		83.8789			

BENT NO. 11 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

			BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 10	BEAM	1	0.0000	75	0	0.00
	BEAM	2	5.2950	75	0	0.00
	BEAM	3	4.7774	75	0	0.00
	BEAM	4	4.2489	75	0	0.00
	BEAM	5	4.2490	75	0	0.00
	BEAM	6	4.2489	75	0	0.00
	BEAM	7	4.2490	75	0	0.00
	BEAM	8	4.2490	75	0	0.00
	BEAM	9	4.2489	75	0	0.00
	BEAM	10	4.2491	75	0	0.00
	BEAM	11	4.2488	75	0	0.00
	BEAM	12	4.2491	75	0	0.00
	BEAM	13	4.2489	75	0	0.00
	BEAM	14	4.2490	75	0	0.00
	BEAM	15	4.2490	75	0	0.00
	BEAM	16	4.2489	75	0	0.00
	BEAM	17	4.2490	75	0	0.00
	BEAM	18	4.2489	75	0	0.00
	BEAM	19	4.7774	75	0	0.00
	BEAM	20	5.2950	75	0	0.00
	TOTAL		83.8789			

BENT NO. 11 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

			BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 11	BEAM	1	0.0000	75	0	0.00
	BEAM	2	5.2950	75	0	0.00
	BEAM	3	4.7774	75	0	0.00
	BEAM	4	4.2489	75	0	0.00
	BEAM	5	4.2490	75	0	0.00
	BEAM	6	4.2489	75	0	0.00
	BEAM	7	4.2490	75	0	0.00
	BEAM	8	4.2490	75	0	0.00
	BEAM	9	4.2489	75	0	0.00
	BEAM	10	4.2491	75	0	0.00
	BEAM	11	4.2488	75	0	0.00
	BEAM	12	4.2491	75	0	0.00
	BEAM	13	4.2489	75	0	0.00
	BEAM	14	4.2490	75	0	0.00
	BEAM	15	4.2490	75	0	0.00
	BEAM	16	4.2489	75	0	0.00
	BEAM	17	4.2490	75	0	0.00
	BEAM	18	4.2489	75	0	0.00
	BEAM	19	4.7774	75	0	0.00
	BEAM	20	5.2950	75	0	0.00
	TOTAL		83.8789			

ABUT NO. 12 (N 11 32 14.70 E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 41.9395 L

			BEAM SPAC. (CL BENT)	BEAM ANGLE D	M	S
SPAN 11	BEAM	1	0.0000	75	0	0.00
	BEAM	2	5.2950	75	0	0.00
	BEAM	3	4.7774	75	0	0.00
	BEAM	4	4.2489	75	0	0.00
	BEAM	5	4.2490	75	0	0.00
	BEAM	6	4.2489	75	0	0.00
	BEAM	7	4.2490	75	0	0.00
	BEAM	8	4.2490	75	0	0.00
	BEAM	9	4.2489	75	0	0.00
	BEAM	10	4.2491	75	0	0.00
	BEAM	11	4.2488	75	0	0.00
	BEAM	12	4.2491	75	0	0.00
	BEAM	13	4.2489	75	0	0.00
	BEAM	14	4.2490	75	0	0.00
	BEAM	15	4.2490	75	0	0.00
	BEAM	16	4.2489	75	0	0.00
	BEAM	17	4.2490	75	0	0.00
	BEAM	18	4.2489	75	0	0.00
	BEAM	19	4.7774	75	0	0.00
	BEAM	20	5.2950	75	0	0.00
	TOTAL		83.8789			

(2) Beam lengths shown are bottom beam flange lengths with adjustments made for beam slope.

BEAM REPORT

BEAM REPORT, SPAN 1

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BEAM BOT. BM. FLG. (2)	SLOPE
BEAM 1	50.0000	48.5334	49.4915	0.00340
BEAM 2	50.0000	48.5334	49.4915	0.00340
BEAM 3	50.0000	48.5334	49.4915	0.00340
BEAM 4	50.0000	48.5334	49.4915	0.00340
BEAM 5	50.0000	48.5334	49.4915	0.00340
BEAM 6	50.0000	48.5334	49.4915	0.00340
BEAM 7	50.0000	48.5334	49.4915	0.00340
BEAM 8	50.0000	48.5334	49.4915	0.00340
BEAM 9	50.0000	48.5334	49.4915	0.00340
BEAM 10	50.0000	48.5334	49.4915	0.00340
BEAM 11	50.0000	48.5334	49.4915	0.00340
BEAM 12	50.0000	48.5334	49.4915	0.00340
BEAM 13	50.0000	48.5334	49.4915	0.00340
BEAM 14	50.0000	48.5334	49.4915	0.00340
BEAM 15	50.0000	48.5334	49.4915	0.00340
BEAM 16	50.0000	48.5334	49.4915	0.00340
BEAM 17	50.0000	48.5334	49.4915	0.00340
BEAM 18	50.0000	48.5334	49.4915	0.00340

BEAM REPORT, SPAN 2

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BEAM BOT. BM. FLG. (2)	SLOPE
BEAM 1	50.0000	48.5334	49.5003	0.00340
BEAM 2	50.0000	48.5334	49.5003	0.00340
BEAM 3	50.0000	48.5334	49.5003	0.00340
BEAM 4	50.0000	48.5334	49.5003	0.00340
BEAM 5	50.0000	48.5334	49.5003	0.00340
BEAM 6	50.0000	48.5334	49.5003	0.00340
BEAM 7	50.0000	48.5334	49.5003	0.00340
BEAM 8	50.0000	48.5334	49.5003	0.00340
BEAM 9	50.0000	48.5334	49.5003	0.00340
BEAM 10	50.0000	48.5334	49.5003	0.00340
BEAM 11	50.0000	48.5334	49.5003	0.00340
BEAM 12	50.0000	48.5334	49.5003	0.00340
BEAM 13	50.0000	48.5334	49.5003	0.00340
BEAM 14	50.0000	48.5334	49.5003	0.00340
BEAM 15	50.0000	48.5334	49.5003	0.00340
BEAM 16	50.0000	48.5334	49.5003	0.00340
BEAM 17	50.0000	48.5334	49.5003	0.00340
BEAM 18	50.0000	48.5334	49.5003	0.00340

BEAM REPORT, SPAN 3

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BEAM BOT. BM. FLG. (2)	SLOPE
BEAM 1	50.0000	48.5334	49.5003	0.00340
BEAM 2	50.0000	48.5334	49.5003	0.00340
BEAM 3	50.0000	48.5334	49.5003	0.00340
BEAM 4	50.0000	48.5334	49.5003	0.00340
BEAM 5	50.0000	48.5334	49.5003	0.00340
BEAM 6	50.0000	48.5334	49.5003	0.00340
BEAM 7	50.0000	48.5334	49.5003	0.00340
BEAM 8	50.0000	48.5334	49.5003	0.00340
BEAM 9	50.0000	48.5334	49.5003	0.00340
BEAM 10	50.0000	48.5334	49.5003	0.00340
BEAM 11	50.0000	48.5334	49.5003	0.00340
BEAM 12	50.0000	48.5334	49.5003	0.00340
BEAM 13	50.0000	48.5334	49.5003	0.00340
BEAM 14	50.0000	48.5334	49.5003	0.00340
BEAM 15	50.0000	48.5334	49.5003	0.00340
BEAM 16	50.0000	48.5334	49.5003	0.00340
BEAM 17	50.0000	48.5334	49.5003	0.00340
BEAM 18	50.0000	48.5334	49.5003	0.00340

DATE: 07/30/2018
FILE:

Texas Department of Transportation | Bridge Division

CAP ELEVATION AND FRAMING PLAN DETAILS

(SPANS 1-11)

GIBBONS CREEK BRIDGE

FILE: SH0030 BRG 8049pb03.dgn	DN: LXG	CK: VEM	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		106

BEAM REPORT

BEAM REPORT, SPAN 4

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG. (2)	BEAM SLOPE
BEAM 1	50.0000	48.5334	49.5003	0.00331
BEAM 2	50.0000	48.5334	49.5003	0.00333
BEAM 3	50.0000	48.5334	49.5003	0.00334
BEAM 4	50.0000	48.5334	49.5003	0.00335
BEAM 5	50.0000	48.5334	49.5003	0.00336
BEAM 6	50.0000	48.5334	49.5003	0.00337
BEAM 7	50.0000	48.5334	49.5003	0.00337
BEAM 8	50.0000	48.5334	49.5003	0.00338
BEAM 9	50.0000	48.5334	49.5003	0.00339
BEAM 10	50.0000	48.5334	49.5003	0.00339
BEAM 11	50.0000	48.5334	49.5003	0.00339
BEAM 12	50.0000	48.5334	49.5003	0.00340
BEAM 13	50.0000	48.5334	49.5003	0.00340
BEAM 14	50.0000	48.5334	49.5003	0.00340
BEAM 15	50.0000	48.5334	49.5003	0.00340
BEAM 16	50.0000	48.5334	49.5003	0.00340
BEAM 17	50.0000	48.5334	49.5003	0.00340
BEAM 18	50.0000	48.5334	49.5003	0.00340

BEAM REPORT, SPAN 5

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG. (2)	BEAM SLOPE
BEAM 1	50.0000	48.5334	49.5001	0.00206
BEAM 2	50.0000	48.5334	49.5001	0.00210
BEAM 3	50.0000	48.5334	49.5001	0.00214
BEAM 4	50.0000	48.5334	49.5001	0.00218
BEAM 5	50.0000	48.5334	49.5001	0.00221
BEAM 6	50.0000	48.5334	49.5001	0.00225
BEAM 7	50.0000	48.5334	49.5001	0.00229
BEAM 8	50.0000	48.5334	49.5001	0.00232
BEAM 9	50.0000	48.5334	49.5001	0.00236
BEAM 10	50.0000	48.5334	49.5001	0.00239
BEAM 11	50.0000	48.5334	49.5001	0.00243
BEAM 12	50.0000	48.5334	49.5002	0.00246
BEAM 13	50.0000	48.5334	49.5002	0.00250
BEAM 14	50.0000	48.5334	49.5002	0.00253
BEAM 15	50.0000	48.5334	49.5002	0.00257
BEAM 16	50.0000	48.5334	49.5002	0.00260
BEAM 17	50.0000	48.5334	49.5002	0.00264
BEAM 18	50.0000	48.5334	49.5002	0.00267

BEAM REPORT, SPAN 6

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG. (2)	BEAM SLOPE
BEAM 1	50.0000	48.5334	49.5000	0.00046
BEAM 2	50.0000	48.5334	49.5000	0.00050
BEAM 3	50.0000	48.5334	49.5000	0.00054
BEAM 4	50.0000	48.5334	49.5000	0.00058
BEAM 5	50.0000	48.5334	49.5000	0.00061
BEAM 6	50.0000	48.5334	49.5000	0.00065
BEAM 7	50.0000	48.5334	49.5000	0.00069
BEAM 8	50.0000	48.5334	49.5000	0.00072
BEAM 9	50.0000	48.5334	49.5000	0.00076
BEAM 10	50.0000	48.5334	49.5000	0.00079
BEAM 11	50.0000	48.5334	49.5000	0.00083
BEAM 12	50.0000	48.5334	49.5000	0.00086
BEAM 13	50.0000	48.5334	49.5000	0.00090
BEAM 14	50.0000	48.5334	49.5000	0.00093
BEAM 15	50.0000	48.5334	49.5000	0.00097
BEAM 16	50.0000	48.5334	49.5000	0.00100
BEAM 17	50.0000	48.5334	49.5000	0.00104
BEAM 18	50.0000	48.5334	49.5000	0.00107

BEAM REPORT, SPAN 7

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG. (2)	BEAM SLOPE
BEAM 1	50.0000	48.5334	49.5000	-0.00114
BEAM 2	50.0000	48.5334	49.5000	-0.00110
BEAM 3	50.0000	48.5334	49.5000	-0.00106
BEAM 4	50.0000	48.5334	49.5000	-0.00102
BEAM 5	50.0000	48.5334	49.5000	-0.00099
BEAM 6	50.0000	48.5334	49.5000	-0.00095
BEAM 7	50.0000	48.5334	49.5000	-0.00092
BEAM 8	50.0000	48.5334	49.5000	-0.00088
BEAM 9	50.0000	48.5334	49.5000	-0.00084
BEAM 10	50.0000	48.5334	49.5000	-0.00081
BEAM 11	50.0000	48.5334	49.5000	-0.00077
BEAM 12	50.0000	48.5334	49.5000	-0.00074
BEAM 13	50.0000	48.5334	49.5000	-0.00070
BEAM 14	50.0000	48.5334	49.5000	-0.00067
BEAM 15	50.0000	48.5334	49.5000	-0.00063
BEAM 16	50.0000	48.5334	49.5000	-0.00060
BEAM 17	50.0000	48.5334	49.5000	-0.00056
BEAM 18	50.0000	48.5334	49.5000	-0.00053

BEAM REPORT, SPAN 8

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG. (2)	BEAM SLOPE
BEAM 1	50.0000	48.5334	49.5002	-0.00274
BEAM 2	50.0000	48.5334	49.5002	-0.00270
BEAM 3	50.0000	48.5334	49.5002	-0.00266
BEAM 4	50.0000	48.5334	49.5002	-0.00262
BEAM 5	50.0000	48.5334	49.5002	-0.00259
BEAM 6	50.0000	48.5334	49.5002	-0.00255
BEAM 7	50.0000	48.5334	49.5002	-0.00252
BEAM 8	50.0000	48.5334	49.5002	-0.00248
BEAM 9	50.0000	48.5334	49.5001	-0.00245
BEAM 10	50.0000	48.5334	49.5001	-0.00241
BEAM 11	50.0000	48.5334	49.5001	-0.00237
BEAM 12	50.0000	48.5334	49.5001	-0.00234
BEAM 13	50.0000	48.5334	49.5001	-0.00230
BEAM 14	50.0000	48.5334	49.5001	-0.00227
BEAM 15	50.0000	48.5334	49.5001	-0.00223
BEAM 16	50.0000	48.5334	49.5001	-0.00220
BEAM 17	50.0000	48.5334	49.5001	-0.00216
BEAM 18	50.0000	48.5334	49.5001	-0.00213

BEAM REPORT, SPAN 9

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG. (2)	BEAM SLOPE
BEAM 1	50.0000	48.5334	49.5005	-0.00434
BEAM 2	50.0000	48.5334	49.5005	-0.00430
BEAM 3	50.0000	48.5334	49.5004	-0.00426
BEAM 4	50.0000	48.5334	49.5004	-0.00422
BEAM 5	50.0000	48.5334	49.5004	-0.00419
BEAM 6	50.0000	48.5334	49.5004	-0.00415
BEAM 7	50.0000	48.5334	49.5004	-0.00412
BEAM 8	50.0000	48.5334	49.5004	-0.00408
BEAM 9	50.0000	48.5334	49.5004	-0.00405
BEAM 10	50.0000	48.5334	49.5004	-0.00401
BEAM 11	50.0000	48.5334	49.5004	-0.00397
BEAM 12	50.0000	48.5334	49.5004	-0.00394
BEAM 13	50.0000	48.5334	49.5004	-0.00390
BEAM 14	50.0000	48.5334	49.5004	-0.00387
BEAM 15	50.0000	48.5334	49.5004	-0.00383
BEAM 16	50.0000	48.5334	49.5004	-0.00380
BEAM 17	50.0000	48.5334	49.5004	-0.00376
BEAM 18	50.0000	48.5334	49.5003	-0.00373

BEAM REPORT, SPAN 10

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG. (2)	BEAM SLOPE
BEAM 1	50.0000	48.5334	49.5008	-0.00586
BEAM 2	50.0000	48.5334	49.5008	-0.00582
BEAM 3	50.0000	48.5334	49.5008	-0.00580
BEAM 4	50.0000	48.5334	49.5008	-0.00577
BEAM 5	50.0000	48.5334	49.5008	-0.00575
BEAM 6	50.0000	48.5334	49.5008	-0.00572
BEAM 7	50.0000	48.5334	49.5008	-0.00569
BEAM 8	50.0000	48.5334	49.5008	-0.00566
BEAM 9	50.0000	48.5334	49.5008	-0.00563
BEAM 10	50.0000	48.5334	49.5008	-0.00560
BEAM 11	50.0000	48.5334	49.5008	-0.00557
BEAM 12	50.0000	48.5334	49.5008	-0.00554
BEAM 13	50.0000	48.5334	49.5008	-0.00550
BEAM 14	50.0000	48.5334	49.5007	-0.00547
BEAM 15	50.0000	48.5334	49.5007	-0.00543
BEAM 16	50.0000	48.5334	49.5007	-0.00540
BEAM 17	50.0000	48.5334	49.5007	-0.00536
BEAM 18	50.0000	48.5334	49.5007	-0.00533

BEAM REPORT, SPAN 11

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG. (2)	BEAM SLOPE
BEAM 1	50.0000	48.5334	49.4921	-0.00620
BEAM 2	50.0000	48.5334	49.4921	-0.00620
BEAM 3	50.0000	48.5334	49.4921	-0.00620
BEAM 4	50.0000	48.5334	49.4921	-0.00620
BEAM 5	50.0000	48.5334	49.4921	-0.00621
BEAM 6	50.0000	48.5334	49.4921	-0.00621
BEAM 7	50.0000	48.5334	49.4921	-0.00621
BEAM 8	50.0000	48.5334	49.4921	-0.00621
BEAM 9	50.0000	48.5334	49.4921	-0.00621
BEAM 10	50.0000	48.5334	49.4921	-0.00621
BEAM 11	50.0000	48.5334	49.4921	-0.00621
BEAM 12	50.0000	48.5334	49.4921	-0.00621
BEAM 13	50.0000	48.5334	49.4921	-0.00621
BEAM 14	50.0000	48.5334	49.4921	-0.00621
BEAM 15	50.0000	48.5334	49.4921	-0.00621
BEAM 16	50.0000	48.5334	49.4921	-0.00621
BEAM 17	50.0000	48.5334	49.4921	-0.00620
BEAM 18	50.0000	48.5334	49.4921	-0.00620

CAP ELEVATIONS

	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 1 (FWD)	219.991	220.812	220.812	219.913
	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 2 (BK)	220.156	220.977	220.977	220.078
(FWD)	220.161	220.982	220.982	220.083
	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 3 (BK)	220.326	221.147	221.147	220.248
(FWD)	220.331	221.152	221.152	220.253
	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 4 (BK)	220.496	221.317	221.317	220.418
(FWD)	220.499	221.322	221.322	220.423
	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 5 (BK)	220.662	221.485	221.487	220.588
(FWD)	220.678	221.512	221.503	220.614
	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 6 (BK)	220.786	221.620	221.629	220.739
(FWD)	220.779	221.631	221.622	220.751
	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 7 (BK)	220.809	221.662	221.671	220.799
(FWD)	220.799	221.671	221.662	220.809
	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 8 (BK)	220.752	221.623	221.632	220.779
(FWD)	220.740	221.630	221.621	220.786
	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 9 (BK)	220.615	221.505	221.514	220.679
(FWD)	220.601	221.509	221.500	220.684
	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 10 (BK)	220.398	221.306	221.315	220.499
(FWD)	220.384	221.308	221.300	220.502
	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 11 (BK)	220.106	221.030	221.037	220.239
(FWD)	220.076	221.007	221.007	220.219
	Cap Elev 1 (RT.SIDE)	Cap Elev 2 (LT.SIDE)	Cap Elev 3 (RT.SIDE)	Cap Elev 3 (LT.SIDE)
BENT 12 (BK)	219.775	220.706	220.706	219.918

(2) Beam lengths shown are bottom beam flange lengths with adjustments made for beam slope.

DATE: 07/30/2018
FILE:

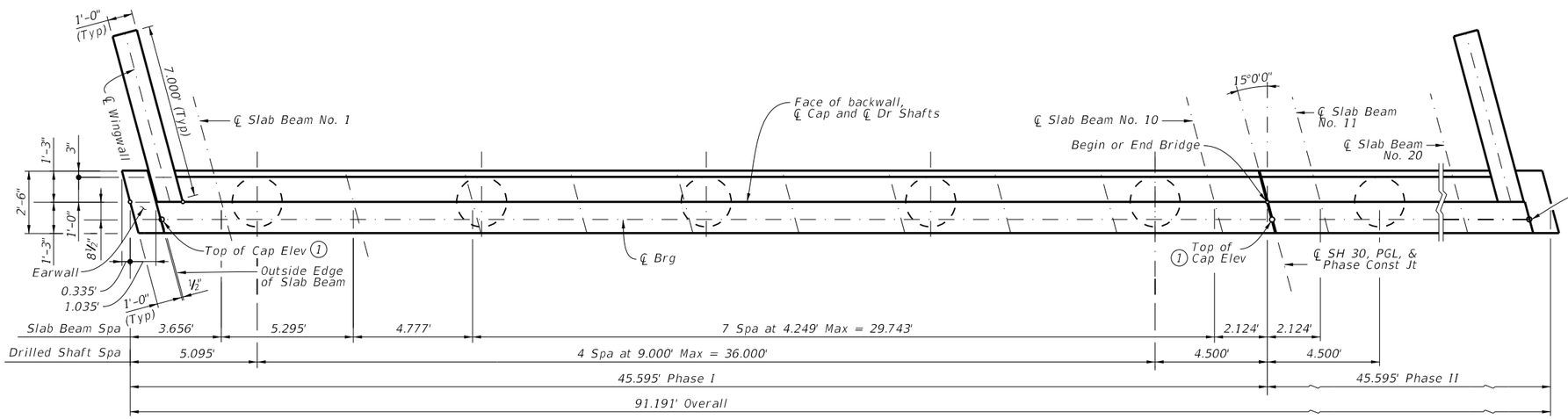
Texas Department of Transportation — Bridge Division

CAP ELEVATION AND FRAMING PLAN DETAILS

(SPANS 1-11)

GIBBONS CREEK BRIDGE

FILE: SH0030 BRG 8049pb03.dgn	DN: LXG	CK: VEM	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		107

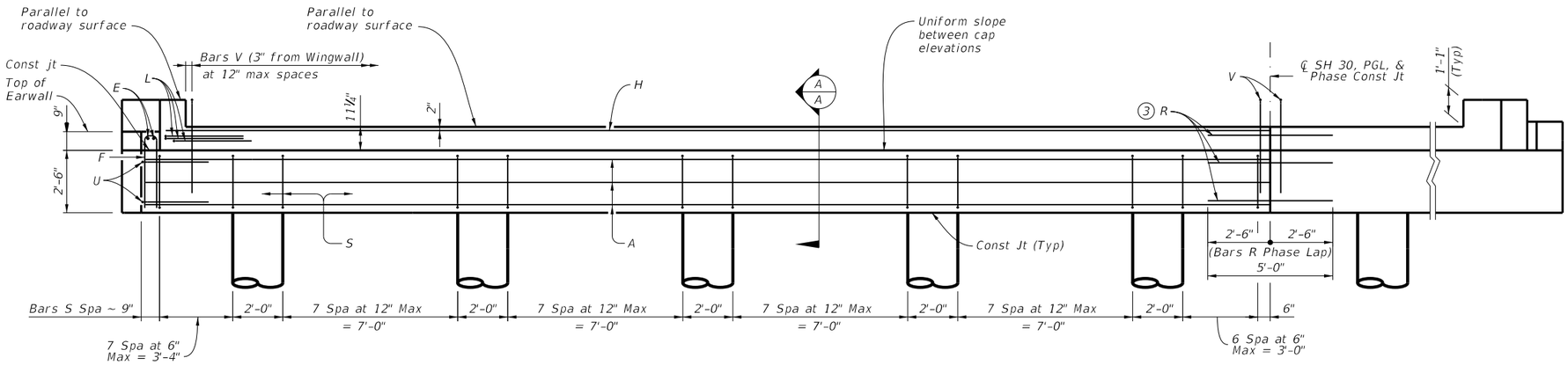


PLAN

(Abutment No. 12 Shown)

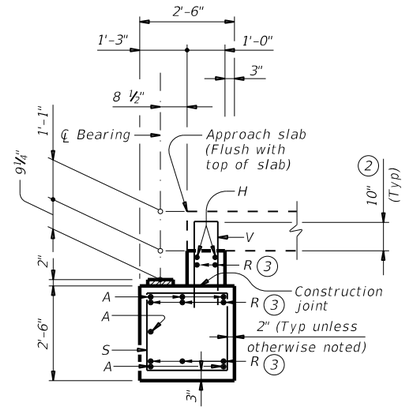
1. See "Cap Elevation and Framing Plan Details" sheet for Top of Cap Elevations.
2. Increase as required to maintain 3" from finished grade.
3. Extend Bars R 2'-6" into Phase II construction. Lap Bars R with Phase I & Phase II Bars A and H.

Details provided for Phase I, Phase II mirrored about ℄ SH 30



ELEVATION

(Abutment No. 12 Shown)



SECTION A-A

Note: At Contractor's option, backwall may be cast with approach slab.

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

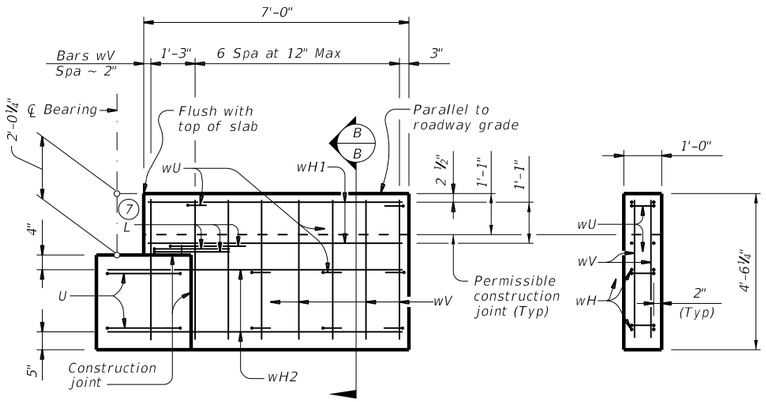
Bridge Division

ABUTMENT NO. 1 OR NO. 12

GIBBONS CREEK BRIDGE

FILE: SH0030 BRG 8049ab01.dgn	DN: LXG	CK: VEM	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		108

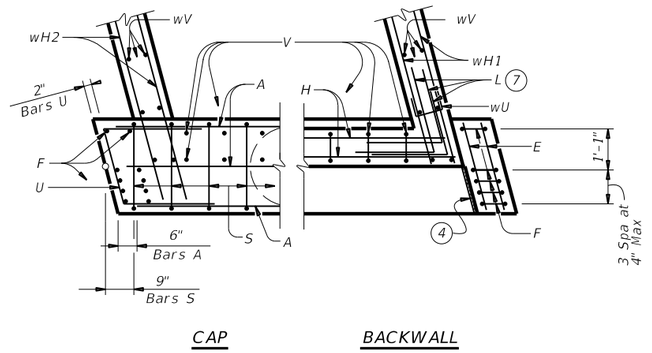
DATE: 07/30/2018
FILE:



WINGWALL ELEVATION

(Earwall not shown for clarity.)

SECTION B-B



CAP BACKWALL

CORNER DETAILS

	Bar	No.	Size	Length	Weight
	A	6	#11	44'-11"	1,432
	E	2	#4	2'-3"	3
	F	5	#4	6'-4"	21
	H	2	#5	44'-2"	92
7	L	3	#6	4'-0"	18
6	R	8	#6	5'-0"	60
	S	47	#4	9'-4"	293
	U	2	#6	7'-2"	22
	V	44	#5	8'-0"	367
	wH1	4	#6	6'-8"	40
	wH2	4	#6	7'-11"	48
	wU	8	#4	1'-8"	9
	wV	16	#5	4'-2"	70
	Reinforcing Steel			Lb	2,475
	Class "C" Concrete (Abut)			CY	13.2

TABLE OF ESTIMATED QUANTITIES - PHASE I OR II (5)

(4) ½" Preformed Bituminous Fiber material between slab beam and earwall. Bond to beam with an approved adhesive. Inside face of earwall to be cast with vertical side of beam. Do not cast earwalls until beams are erected in their final position.

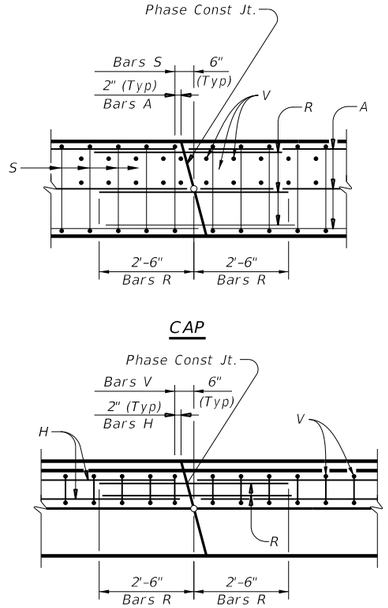
(5) Quantities shown are for one phase of one abutment only.

(6) Quantity included in Phase 1 only.

(7) Use Bars L1 on obtuse corners. Use Bars L2 on acute corners. See Bridge Layout for Details.

BARS V BARS F BARS S BARS U

BARS L1 (7) BARS L2 (7) BARS wU



BACKWALL

PHASED CONSTRUCTION JOINT DETAILS

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 7th Edition (2014), with Interims.
See "Cap Elevation and Framing Plan Details" sheet for Top of Cap Elevations.
See Common Foundation Details (FD) standard sheet for all foundation details and notes.
See Stone Riprap (SRR) standard sheet for riprap attachment details.
See applicable rail details for rail anchorage in wingwalls.

Calculated Foundation Load = 55 Tons/Dr Shaft

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

MATERIAL NOTES:

Provide Class C concrete (f'c =3600 psi)
Provide Grade 60 reinforcing steel.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation — Bridge Division

ABUTMENT NO. 1 OR NO. 12

GIBBONS CREEK BRIDGE

FILE: SH0030 BRG 8049ab01.dgn	DN: LXG	CK: VEN	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT	SECT	JOB	HIGHWAY
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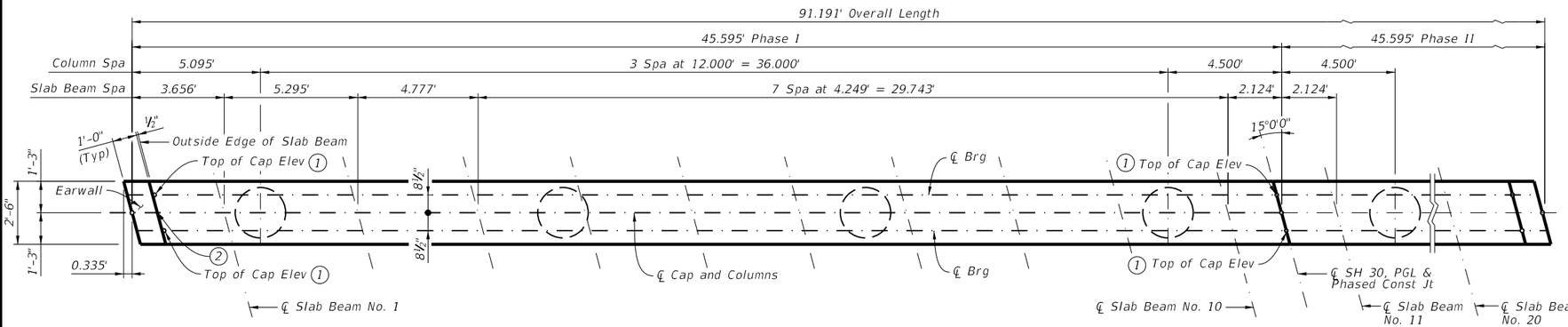
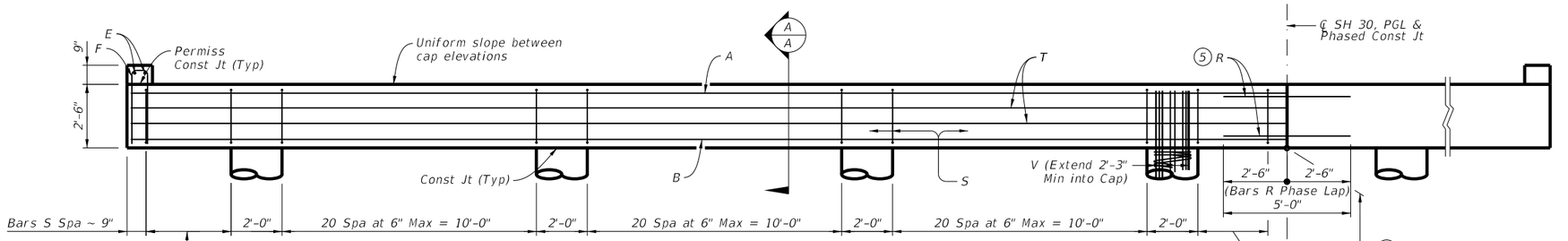
	BRY	GRIMES		109

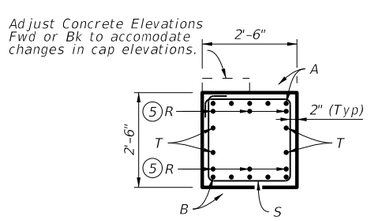
DATE: 07/30/2018
FILE:



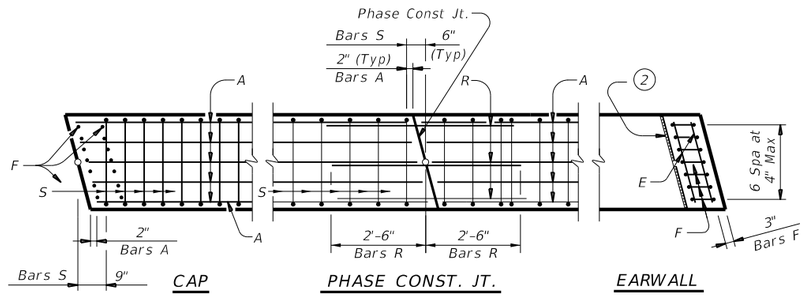
PLAN



ELEVATION

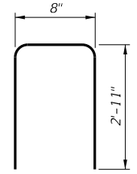


SECTION A-A

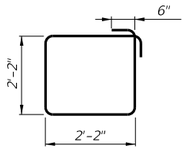


CAP — PHASE CONST. JT. — EARWALL

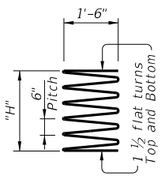
CAP END DETAIL



BAR F



BAR S



BAR Z

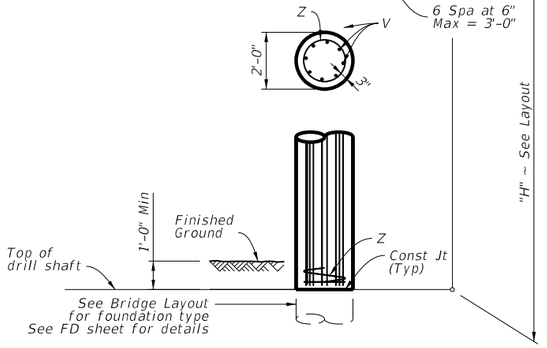


TABLE OF ESTIMATED QUANTITIES - PHASE I OR II (3)

Bar	No.	Size	Length	Weight
A	5	#11	45'-3"	1,202
B	5	#11	45'-3"	1,202
E	2	#4	2'-3"	3
F	7	#4	6'-6"	30
(6) R	6	#6	5'-0"	45
S	78	#5	9'-8"	786
T	4	#5	45'-3"	189
Reinforcing Steel			Lb	3,457
Class "C" Concrete (Cap)			CY	10.6

TABLE OF COLUMN QUANTITIES - (3)(4) PHASE I OR II

Bent	"H"	Bars V 32 ~ #7		Bars Z 4 ~ #3		Reinf Steel	Class "C" Conc (Col)
No.	Height	Length	Weight	Length	Weight	Lb	CY
2	8'	10'-3"	670	90'-2"	136	806	3.7
3	9'	11'-3"	736	99'-8"	150	886	4.2
4	9'	11'-3"	736	99'-8"	150	886	4.2
5	11'	13'-3"	867	118'-8"	178	1045	5.1
6	11'	13'-3"	867	118'-8"	178	1045	5.1
7	11'	13'-3"	867	118'-8"	178	1045	5.1
8	10'	12'-3"	801	109'-2"	164	965	4.7
9	9'	11'-3"	736	99'-8"	150	886	4.2
10	9'	11'-3"	736	99'-8"	150	886	4.2
11	8'	10'-3"	670	90'-2"	136	806	3.7

(3) Quantities shown are for one Bent only.

(4) For each linear foot of variation in "H" value, make the following adjustments per column.

Bars V length by 1'-0"
Bars Z length by 9'-6"
Reinforcing steel total by 79 lbs
Cl "C" Conc (Column) total by 0.47 CY

(5) Extend Bars R 2'-6" into Phase II construction. Lap Bars R with Phase I & Phase II Bars A and B.

(6) Quantity included in Phase I only.

(1) See "Cap Elevations and Framing Plan Details" sheet for top of cap elevations.

(2) ½" Preformed Bituminous Fiber material between slab beam and earwall. Bond to beam with an approved adhesive. Inside face of earwall to be cast with vertical side of beam. Do not cast earwalls until beams are erected in their final position.

Details provided for Phase I. Phase II mirrored about ℄ SH 30.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 7th Edition (2014), with Interims.

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

See Common Foundation Details (FD) Standard Sheet for all foundation details and notes
Calculated Foundation Loads = 110 tons/Dr Sh

MATERIAL NOTES

Provide Class C concrete (f'c = 3600 psi)
Provide Grade 60 reinforcing steel.

HL93 LOADING

Texas Department of Transportation — Bridge Division

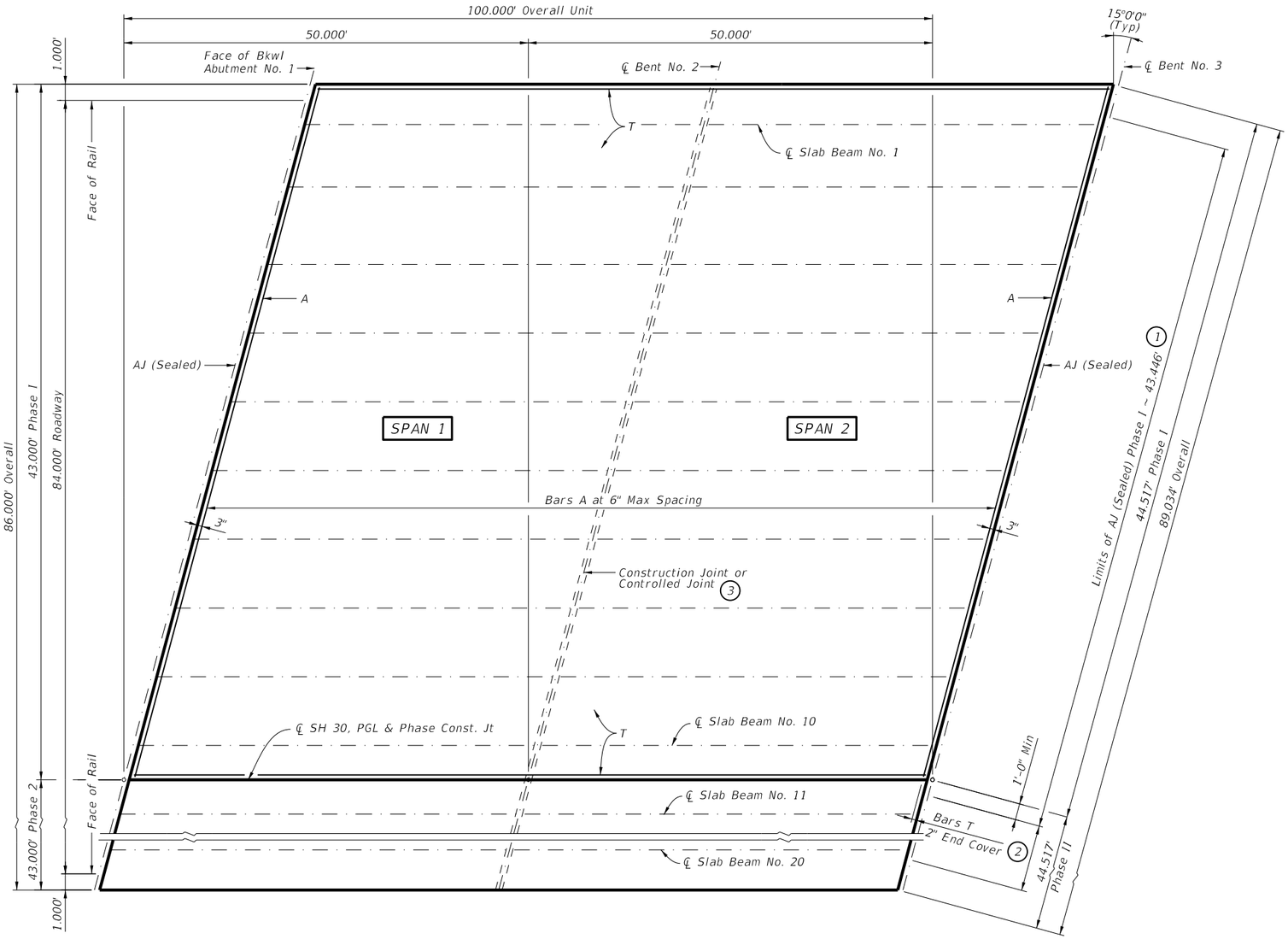
INTERIOR BENTS NO. 2 - NO. 11

GIBBONS CREEK BRIDGE

FILE: SH0030 BRG 8049ib01.dgn	DN: LXG	CK: VEM	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT.	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		110

DATE:
FILE:

07/30/2018



1. Extend AJ (Sealed) (Phase I) 1'-0" Min beyond Phase Construction Joint.
2. Limits of AJ (Sealed) Phase II – 41.446'
3. See Continuous Slab Detail.

PLAN

HL93 LOADING

Texas Department of Transportation

Bridge Division

100.00' PRESTR CONCRETE SLAB BEAM UNIT

(SPANS 1 & 2)

GIBBONS CREEK BRIDGE

FILE: SH0030 BRG 8049pb01.dgn	DN: LXG	CK: VEM	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		111

DATE: 07/30/2018
FILE:

BAR TABLE	
BAR	SIZE
A	#5
T	#4

(4) Contractor option to flush deck with outside edge of slab beam for Phase I.

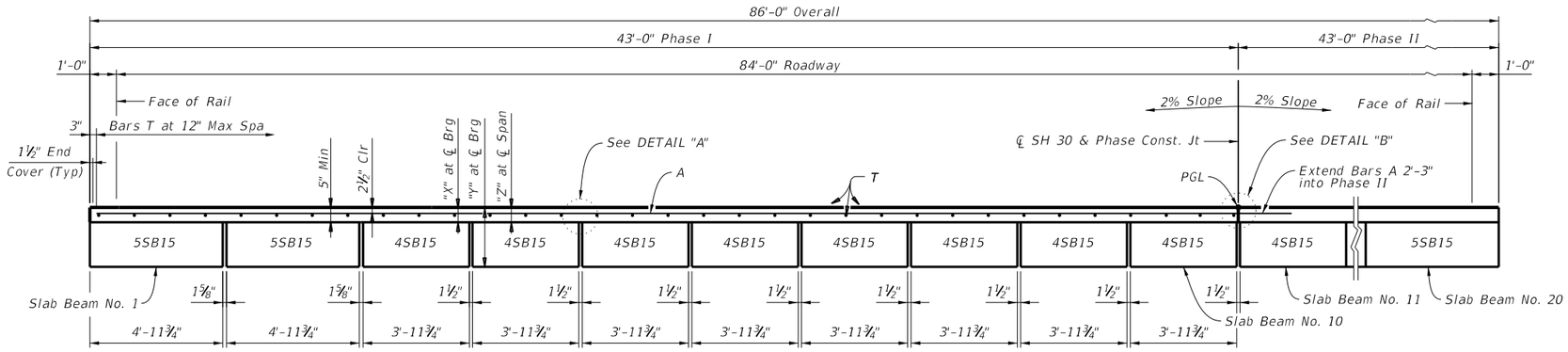
(5) Lengths shown are bottom beam flange lengths with adjustments made for beam slope. See FRAMING PLAN for beam lengths.

(6) Reinforcing steel weight is calculated using an approximate factor of 2.8 lbs per sq ft

(7) Theoretical Dimension

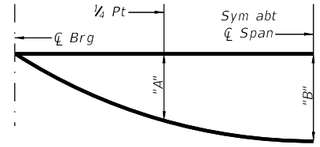
TABLE OF ESTIMATED QUANTITIES - PHASE I OR II

Span No.	Reinf Conc Slab	Prestr Conc Girders (5)		Total Reinf Steel (6)
		4SB15	5SB15	
	SF	LF	LF	Lb
1	2150	395.93	98.98	6020
2	2150	396.00	99.00	6020
Total	4300	791.93	197.98	12040



TYPICAL TRANSVERSE SECTION

Dimensions/spacing are symmetrical about ℄ SH 30 (Phase Const. Jt)



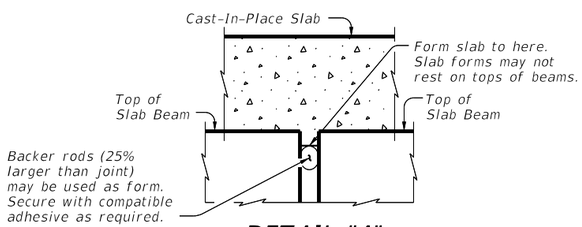
DEAD LOAD DEFLECTION DIAGRAM

NOTE: Deflections shown are due to concrete slab only. (E_c = 5000 ksi) Calculated deflections shown are theoretical and actual deflections may be less. Deflections shall be adjusted based on field observations

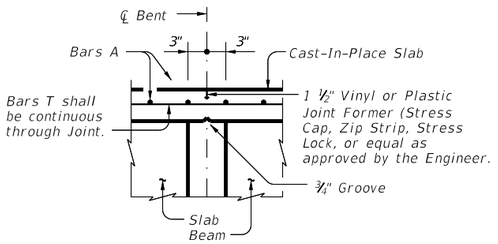
Span No.	Girder No.	"A"	"B"
		Ft	Ft
1	All	0.029'	0.040'
2	All	0.029'	0.040'

TABLE OF SECTION DEPTHS (7)

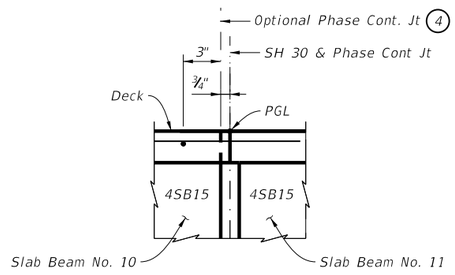
Span No.	Girder No.	"X" at ℄ Brg.	"Y" at ℄ Brg.	"Z" at ℄ Span
1	1-2, 19-20	7 ¼"	1' - 10 ¼"	5 ⅜"
	3-18	7 ¼"	1' - 10 ¼"	5 ½"
2	1-2, 19-20	7 ¼"	1' - 10 ¼"	5 ⅜"
	3-18	7 ¼"	1' - 10 ¼"	5 ½"



DETAIL "A"



CONTINUOUS SLAB DETAIL



DETAIL "B"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 7th Edition (2014), with Interims.
See applicable rail standard and PSBRA standard for rail anchorage in slab.

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

MATERIAL NOTES:

Provide Class S Concrete (f'c = 4000 psi).
Provide Grade 60 reinforcing steel.

Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
#5 = 2'-0"

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A or T unless noted otherwise. Provide the same laps as required for reinforcing bars.

HL93 LOADING

SHEET 2 OF 2

Texas Department of Transportation — Bridge Division

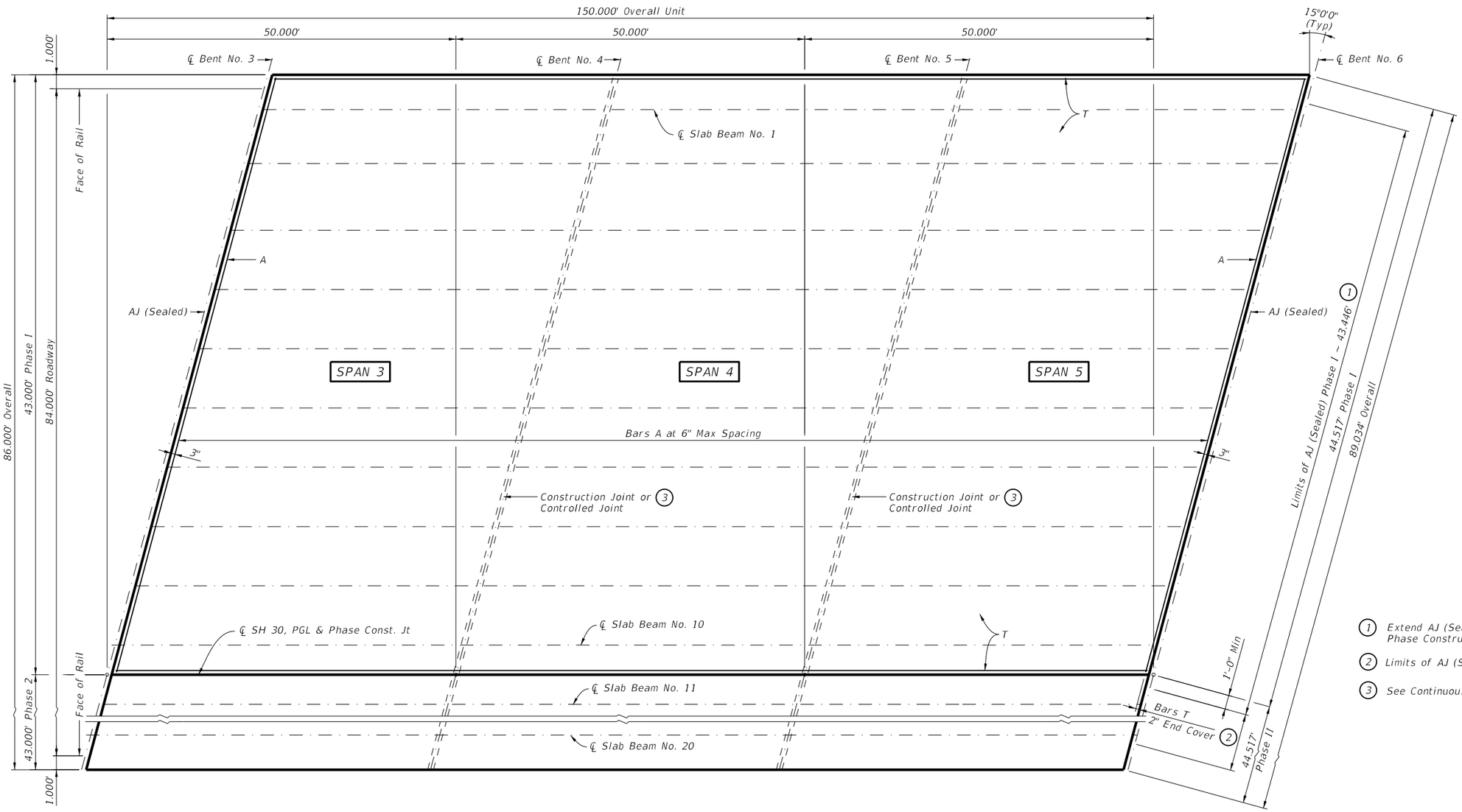
100.00' PRESTR CONCRETE SLAB BEAM UNIT

(SPANS 1 & 2)

GIBBONS CREEK BRIDGE

FILE: SH0030 BRG 8049pb01.dgn	DN: LXG	CK: VEM	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		112

DATE: 07/30/2018
FILE:



1. Extend AJ (Sealed) (Phase I) 1'-0" Min beyond Phase Construction Joint.
2. Limits of AJ (Sealed) Phase II – 41.446'
3. See Continuous Slab Detail.

PLAN

(Showing Spans 3-5, other Spans similar)

HL93 LOADING

Texas Department of Transportation | Bridge Division

150.00' PRESTR CONCRETE SLAB BEAM UNIT

(SPANS 3-5, 6-8, & 9-11)

GIBBONS CREEK BRIDGE

FILE: SH0030 BRG 8049pb02.dgn	DN: LXG	CK: VEM	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		113

DATE: 07/30/2018
FILE:

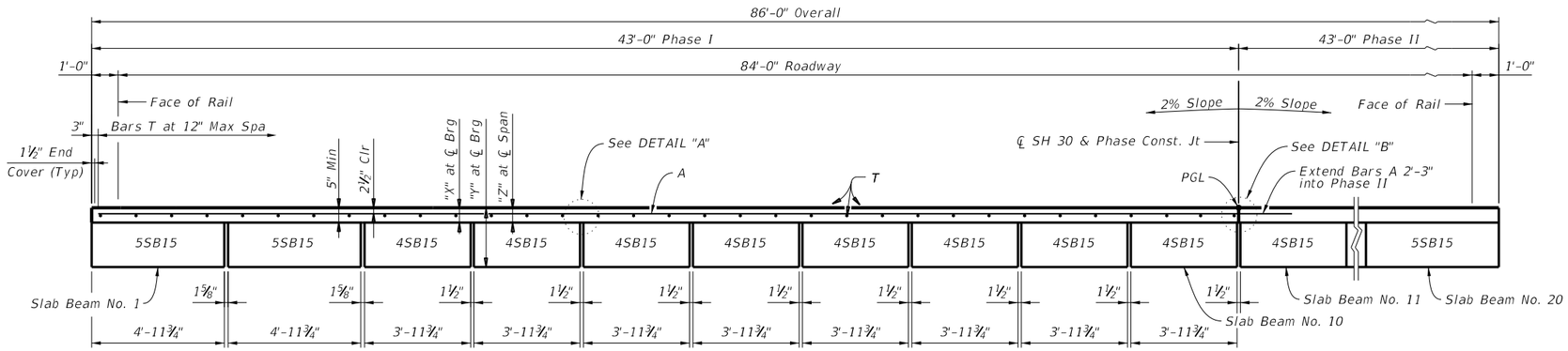
BAR TABLE	
BAR	SIZE
A	#5
T	#4

(4) Contractor option to flush deck with outside edge of slab beam for Phase I.

(5) Lengths shown are bottom beam flange lengths with adjustments made for beam slope. See FRAMING PLAN for beam lengths.

(6) Reinforcing steel weight is calculated using an approximate factor of 2.8 lbs per sq ft

(7) Theoretical Dimension

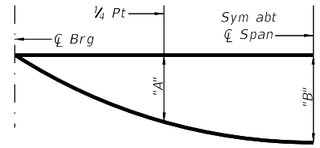


TYPICAL TRANSVERSE SECTION

Dimensions/spacing are symmetrical about ℄ SH 30 (Phase Const. Jt)

TABLE OF ESTIMATED QUANTITIES - PHASE I OR II

	Span No.	Reinf Conc Slab	Prestr Conc Girders (5)		Total Reinf Steel (6)
			4SB15	5SB15	
		SF	LF	LF	Lb
Unit	3	2150	396.00	99.00	6020
	4	2150	396.00	99.00	6020
	5	2150	396.00	99.00	6020
Unit	6	2150	396.00	99.00	6020
	7	2150	396.00	99.00	6020
	8	2150	396.00	99.00	6020
Unit	9	2150	396.00	99.00	6020
	10	2150	396.01	99.00	6020
	11	2150	395.94	98.98	6020
	Total	19350	3563.95	890.98	54180



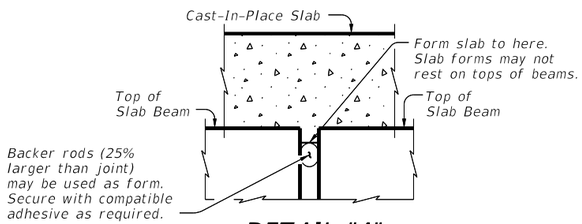
DEAD LOAD DEFLECTION DIAGRAM

NOTE: Deflections shown are due to concrete slab only. (E_c = 5000 ksi) Calculated deflections shown are theoretical and actual deflections may be less. Deflections shall be adjusted based on field observations

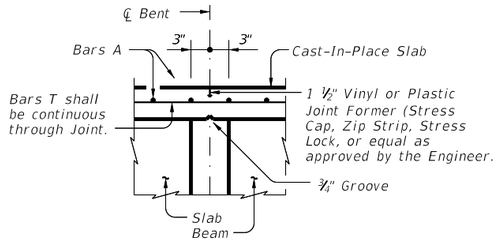
Span No.	Girder No.	"A"	"B"
		Ft	Ft
All	All	0.029'	0.040'

TABLE OF SECTION DEPTHS

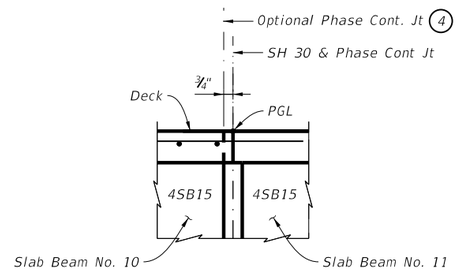
	Span No.	Girder No.	"X" at ℄ Brg.	"Y" at ℄ Brg.	"Z" at (7) ℄ Span
Unit	3	1-2, 19-20	7 ¼"	1' - 10 ¼"	5 ⅜"
		3-18	7 ¼"	1' - 10 ¼"	5 ⅛"
	4	1-2, 19-20	7 ¼"	1' - 10 ¼"	5 ⅜"
		3-18	7 ¼"	1' - 10 ¼"	5 ⅛"
	5	1-2, 19-20	7"	1' - 10"	5 ¼"
		3-18	7"	1' - 10"	5"
Unit	6	1-2, 19-20	7"	1' - 10"	5 ¼"
		3-18	7"	1' - 10"	5"
	7	1-2, 19-20	7"	1' - 10"	5 ¼"
		3-18	7"	1' - 10"	5"
	8	1-2, 19-20	7"	1' - 10"	5 ¼"
		3-18	7"	1' - 10"	5"
Unit	9	1-2, 19-20	7"	1' - 10"	5 ¼"
		3-18	7"	1' - 10"	5"
	10	1-2, 19-20	7"	1' - 10"	5 ¼"
		3-18	7"	1' - 10"	5"
	11	1-2, 19-20	7 ¼"	1' - 10 ¼"	5 ⅜"
		3-18	7 ¼"	1' - 10 ¼"	5 ⅛"



DETAIL "A"



CONTINUOUS SLAB DETAIL



DETAIL "B"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 7th Edition (2014), with Interims. See applicable rail standard and PSBRA standard for rail anchorage in slab.

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

MATERIAL NOTES:

Provide Class S Concrete (f'c = 4000 psi). Provide Grade 60 reinforcing steel.

Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
#5 = 2'-0"

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A or T unless noted otherwise. Provide the same laps as required for reinforcing bars.

HL93 LOADING

Texas Department of Transportation — Bridge Division

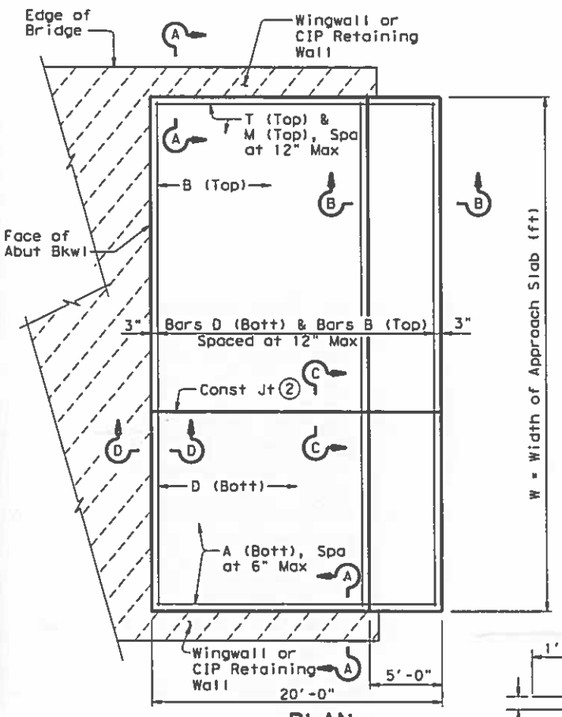
150.00' PRESTR CONCRETE SLAB BEAM UNIT

(SPANS 3-5, 6-8, & 9-11)

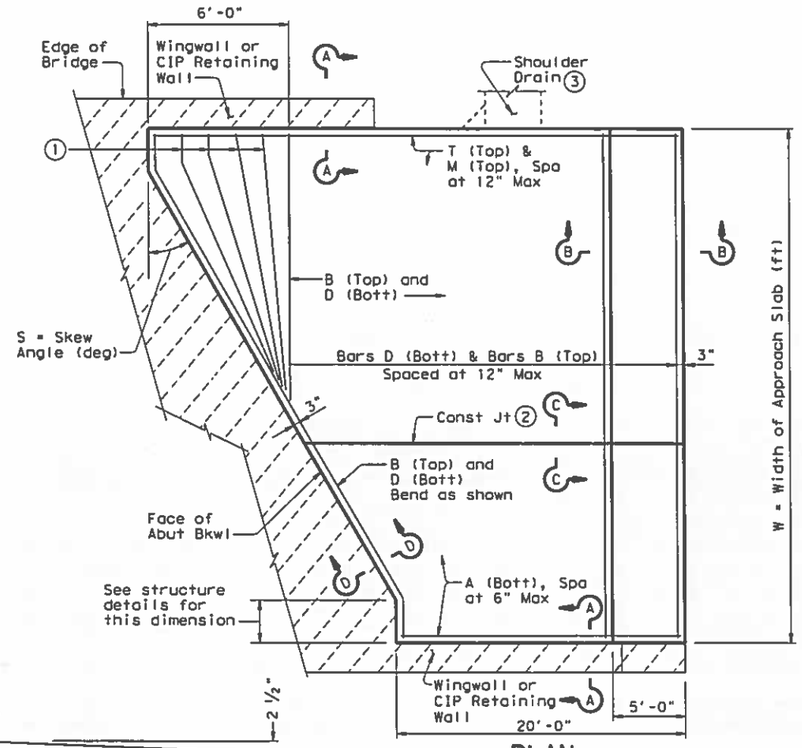
GIBBONS CREEK BRIDGE

FILE: SH0030 BRG 8049pb02.dgn	DN: LXG	CK: VEM	DW: ESE	CK: LXG
©TxDOT JUNE, 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		114

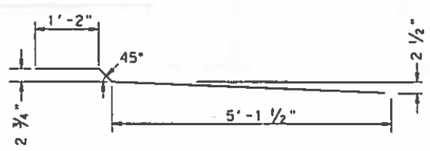
DATE: 07/30/2018
FILE:



PLAN
(Showing Non-Skewed Approach Slab)



PLAN
(Showing Skewed Approach Slab)



BARS M (#5)

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

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab

Area of Appr Slab = $20W + 0.5W^2 \tan S$ (SF)

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.

(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) Backer rod shall be 25% larger than joint opening and shall be compatible with the sealant.

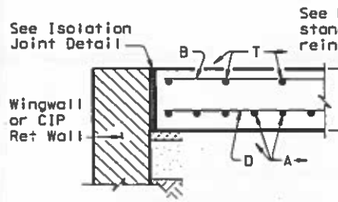
(9) Place ½" Preformed Bituminous Fiber Material between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

(10) Material requirements for the subbase will be shown elsewhere in the plans. *Modified*

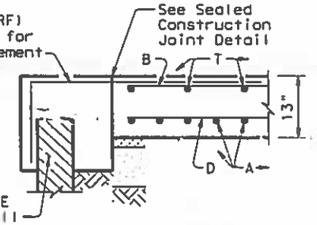
(11) See details elsewhere in plans for adjacent pavement section and additional HMA overlay placement on the bridge and bridge approach slabs.

(12) Minimum dimensions for Pavement Transition Section unless otherwise shown elsewhere in plans. Limits can be adjusted to match existing field condition as directed by the Engineer.

(13) Unless it is shown in plans, use Superpave Type C, SAC "B" with PG 64-22, in accordance with Item 341. Material type and requirements can be modified to match existing field condition as directed by the Engineer.

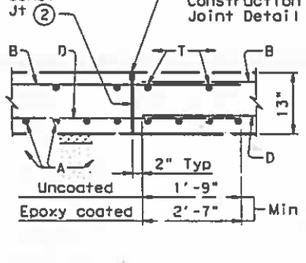


SHOWING WINGWALL OR CIP RETAINING WALL

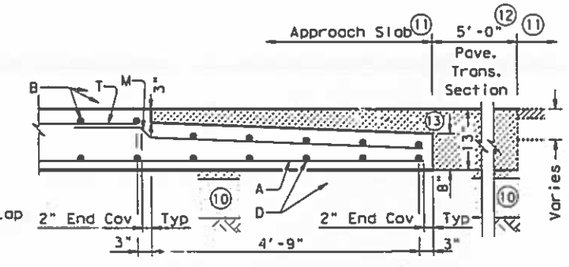


SHOWING MSE WALL

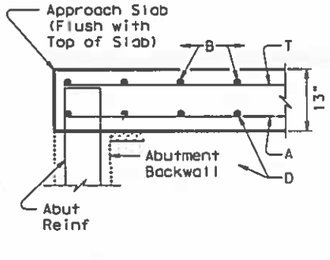
SECTION A-A



SECTION C-C (5)



SECTION B-B



SECTION D-D

GENERAL NOTES:

Construct approach slab in accordance with Item 422.

Concrete shall be Class "S".

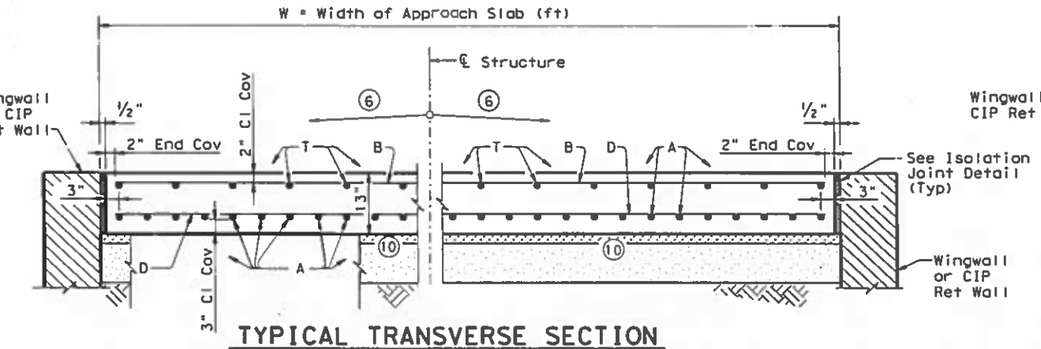
All reinforcing steel shall be Grade 60.

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

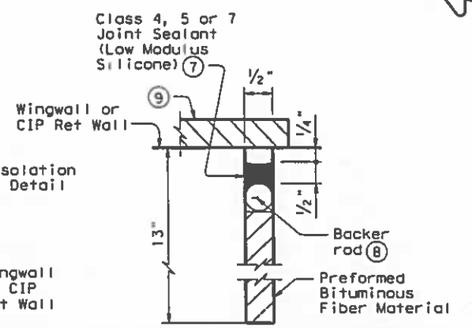
Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.

Cure for 4 days using water or membrane curing per Item 422.

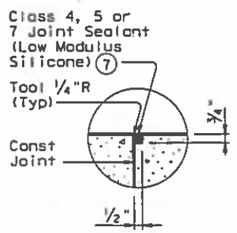
Sealant, backer rod and preformed bituminous fiber material is subsidiary to approach slab concrete.



TYPICAL TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

Modified

4/17/09 Added Pavement Transition Section. Added subbase requirement notes.

PRINT DATE	REVISION DATE
7/27/2018	3/09/2010

STATE OF TEXAS — CARLOS NEVEU JR. — 97344 — LICENSED PROFESSIONAL ENGINEER

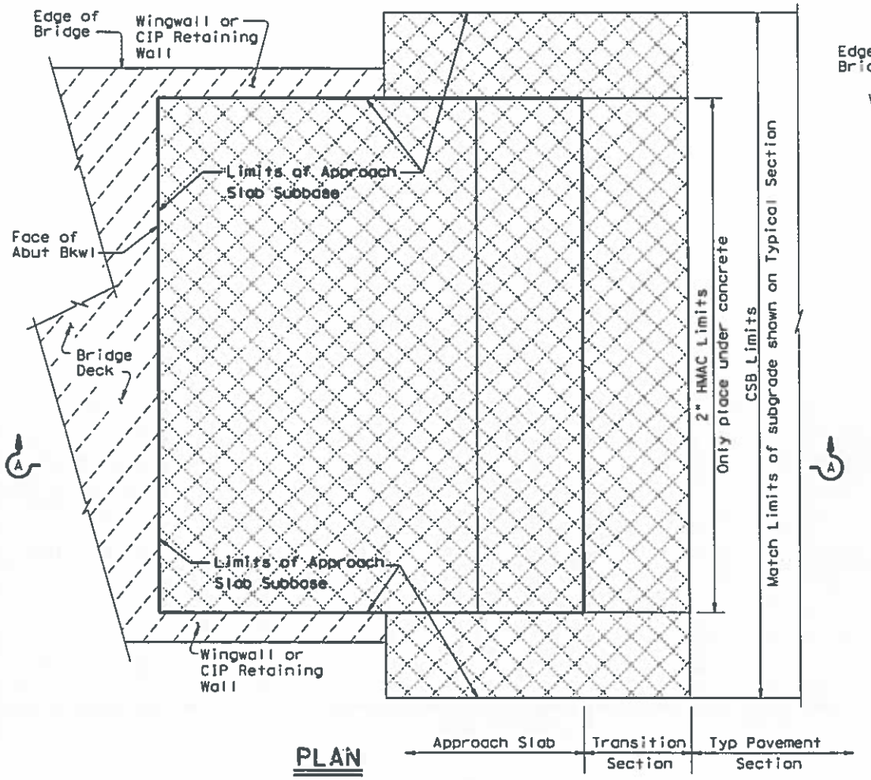
7/30/18

Texas Department of Transportation ©YR
Bryan District

BRIDGE APPROACH SLAB
ASPHALTIC PAVEMENT
BAS-A (MOD)

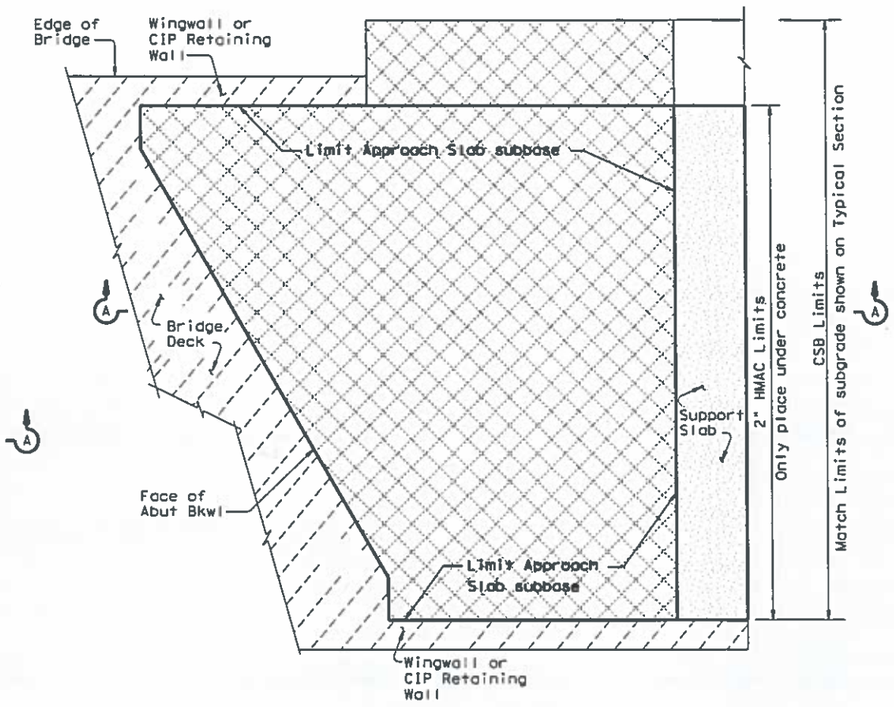
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		SH 30
STATE	DISTRICT	COUNTY
TEXAS	BRY	GRIMES
CONTROL	SECTION	JOB / SHEET NO.
0212	04	039 / 115

REV DATE: 2-12-2015
CSJ: XXXX-XX-XXX
FILENAME: pw:\\txdot.projectwiseonline.com:TXDOT4\Documents\17 - BRY\Design Projects\0212040391\4 - Design\Plan Set\7. Bridge\SH0030_BRG_B049m01.dgn



PLAN

(Showing Non-Skewed Approach with Transition to Flexible Pavement)



PLAN

(Showing Skewed Approach Slab with Support Slab)

General Notes:

Minimum Subbase for Approach Slab shall 2" HMAC with 8" Cement Stabilized Backfill.

Provide Superpave Type C, PG64-22 in accordance with Item 340. Payment for Superpave is subsidiary to Item 422.

Provide Cement Stabilized Backfill in accordance with Item 400, "Excavation and Backfill for Structures", to the limits shown.

Design Cement Stabilized Backfill in accordance with Tex-120-E, with a minimum unconfined compressive strength of 175 psi. Use either Fine Aggregate meeting the requirements of Item 421, "Hydraulic Cement Concrete" or Type E Grade 4 flexible base meeting the following requirements:

Type E material is crushed stone produced and graded from oversize quarried aggregate that originates from a single, naturally occurring source. Do not use multiple sources.
Master gradation, (Tex-110-E)

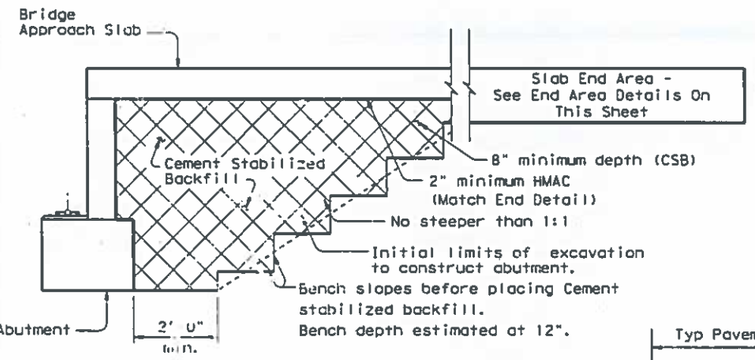
Sieve size	% Retained
1 ¾"	0-10
No. 4	45-70
No. 40	50-85

Liquid limit, (Tex-104-E) 40 % max.
Plasticity index, (Tex-106-E) 12 max.
(Determine plastic index in accordance with Tex-107-E when liquid limit is unattainable as defined in Tex-104-E.)

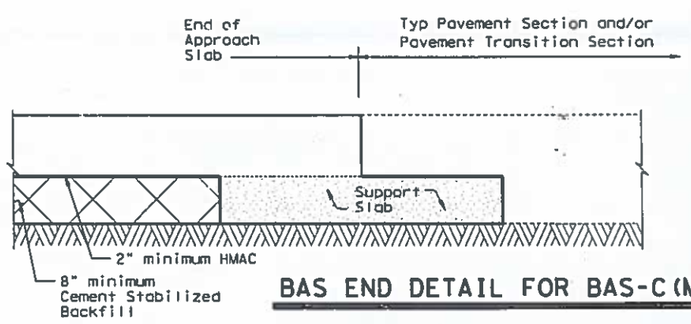
Place Cement Stabilized Backfill in uniform layers at 8 in. deep, by loose measurement. Compact each layer to meet the density requirements of the roadbed, retaining wall, embankment material, or as shown on the plans.

Plan views and BAS end details are drawn for general information. See Bridge Layout, BAS Standards, and typical sections for additional details.

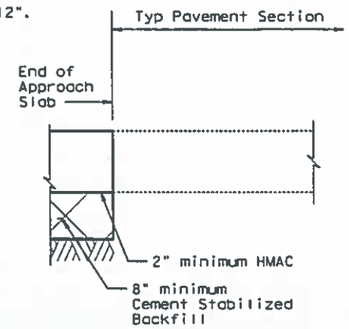
Do not place materials shown on this detail in locations that conflict with structural parts of a retaining wall, such as MSE Wall straps.



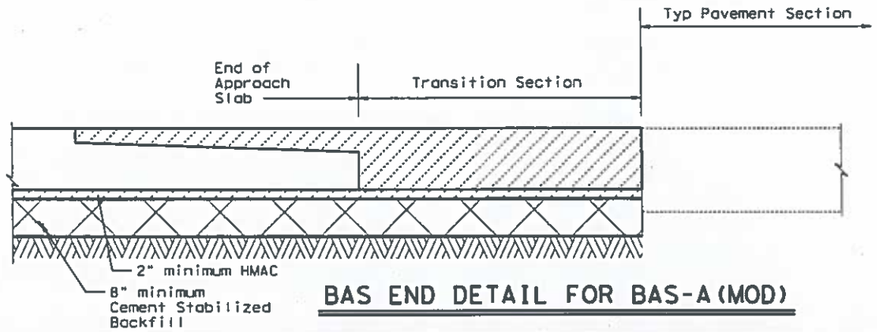
SECTION A-A



BAS END DETAIL FOR BAS-C(MOD) AND BAS(MOD)



BAS END DETAIL FOR BAS-A



BAS END DETAIL FOR BAS-A(MOD)

STATE OF TEXAS
CARLOS NEVEU JR.
97344
LICENSED PROFESSIONAL ENGINEER

7/30/18

PRINT DATE	REVISION DATE
7/27/2018	3/09/2010

Texas Department of Transportation ©YR
Bryan District

BRIDGE APPROACH SLAB
PAVEMENT SUBBASE AND ABUTMENT BACKFILL
PSAB

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		SH 30

STATE	DISTRICT	COUNTY	
TEXAS	BRY	GRIMES	
CONTROL	SECTION	JOB	SHEET NO.
0212	04	039	116

REV DATE: 2-12-2015
CSJ: XXXX-XX-XXX
FILENAME: pw:\\txdot.projectwiseonline.com:TXDOT4\Documents\17 - BRY\Design Projects\0212040391\4 - Design\Plan Set\7. Bridge\SH0030_BRG_8049m01.dgn

DESIGNED BEAMS (STRAIGHT STRANDS)

STRUCTURE	SPAN NO.	BEAM NO.	BEAM TYPE	PRESTRESSING STRANDS: NON-STD STRAND PATTERN	PRESTRESSING STRANDS: TOTAL NO.	PRESTRESSING STRANDS: SIZE (in)	PRESTRESSING STRANDS: STRGTH fpu (ksi)	PRESTRESSING STRANDS: "e" ℄ (in)	PRESTRESSING STRANDS: "e" END (in)	PRESTRESSING STRANDS: TOT NO. DEB	DEBONDED STRANDS PER ROW: DIST FROM BOTTOM (in)	DEBONDED STRANDS PER ROW: NO. OF STRANDS: TOTAL	DEBONDED STRANDS PER ROW: NO. OF STRANDS: DE-BONDED	DEBONDED STRANDS PER ROW: NUMBER OF STRANDS DEBONDED TO (ft from end): 3	6	9	12	15	CONCRETE: RELEASE STRGTH ① f'ci (ksi)	CONCRETE: MINIMUM 28 DAY COMP STRGTH f'c (ksi)
Gibbons Creek Bridge	All	1-2 19-20	5SB15		24	0.6	270	5.00	5.00	8	2.5	24	8	4	4	0	0	0	4.000	5.000
	All	3-18	4SB15		20	0.6	270	5.00	5.00	6	2.5	20	6	2	4	0	0	0	4.000	5.000

OPTIONAL DESIGN

STRUCTURE	SPAN NO.	BEAM NO.	BEAM TYPE	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
Gibbons Creek Bridge	All	1-2 19-20	5SB15	2.713	-3.155	1259	0.432	0.432
	All	3-18	4SB15	2.769	-3.257	1058	0.369	0.369

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF BEAM

① Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

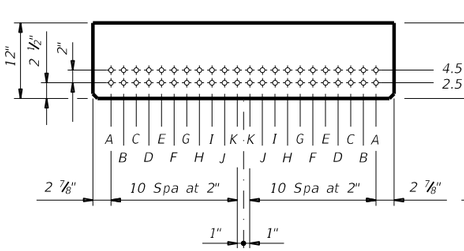
② Portion of full HL93.

DESIGN NOTES:

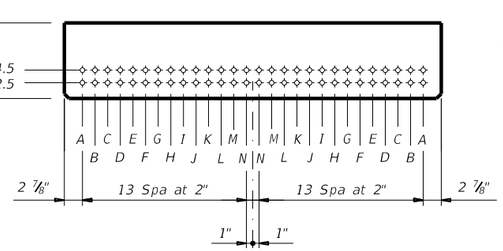
Designed according to AASHTO LRFD Bridge Design Specifications.
Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

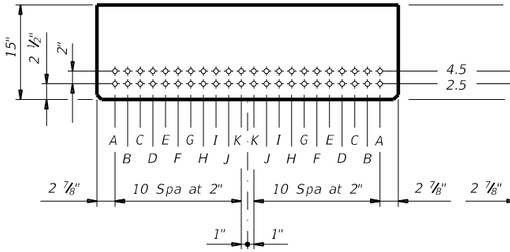
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
Use low relaxation strands, each pretensioned to 75 percent of fpu.
Full-length debonded strands are not permitted in positions "A" and "B".
Strand debonding must comply with Item 424.4.2.2.2.4.
When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.
Locate strands for the designed beam 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". Place strands within a row as follows:
1) Locate a strand in each "A" position.
2) Place strand symmetrically about vertical centerline of beam.
3) Space strands as equally as possible across the entire width.
Do not debond strands in position "A". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.



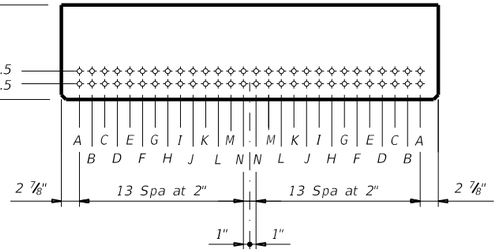
TxDOT 4SB12 SLAB BEAM



TxDOT 5SB12 SLAB BEAM



TxDOT 4SB15 SLAB BEAM



TxDOT 5SB15 SLAB BEAM

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAMS (NON-STANDARD SPANS)

PSBND

FILE: psbsts05-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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07/30/2018

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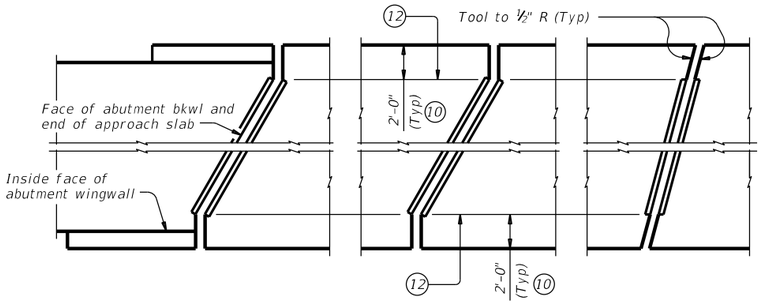
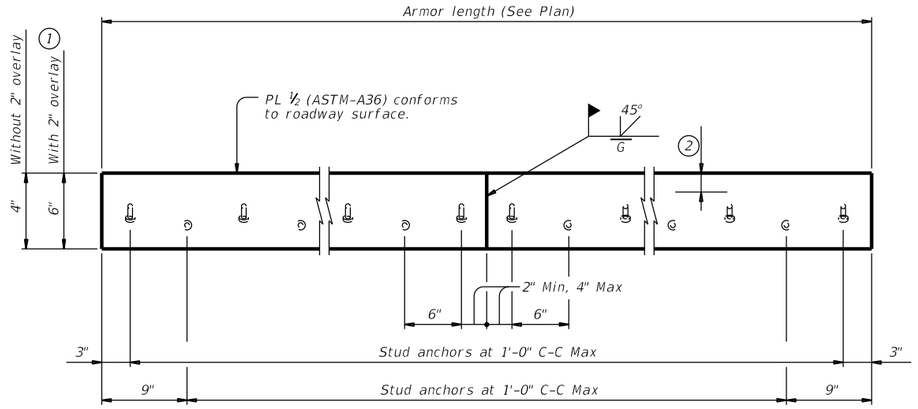


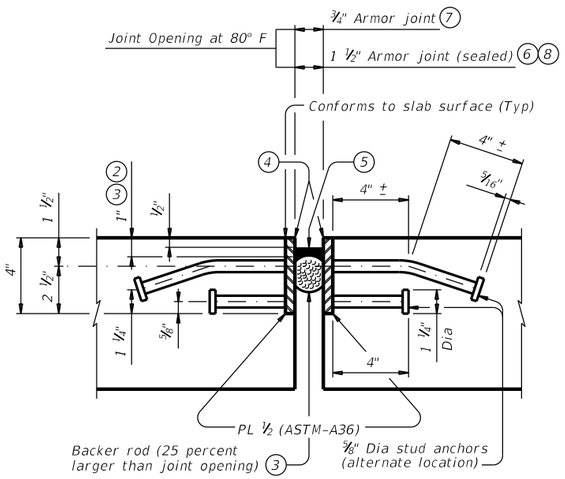
JOINTS AT ABUTMENTS | SKEWS OVER 15° | SKEWS THRU 15°

PLANS OF ARMOR PLATES

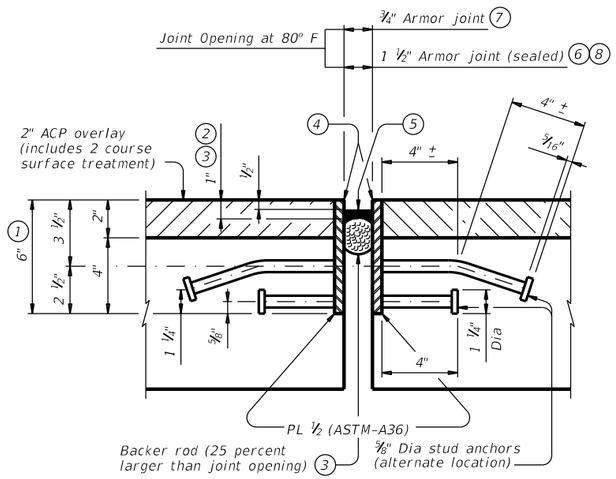


ELEVATION OF BASIC ARMOR PLATE

1. Adjust 6" plate height for overlay thicknesses other than the 2" shown. Adjust weight by 1.70 plf for each ½" variation in thickness.
2. Do not paint top 1 ½" of plate if using sealed armor joint.
3. Set top of backer rod 1" below top of armor plate. 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.
4. Blast clean entire contact area between sealant and plate (SSPC-SP10) before installing sealant. Light brush blast and thoroughly clean all dust and debris from concrete surfaces in contact with joint sealant before application of silicone seal.
5. Use Class 7 joint sealant that conforms to DMS-6310.
6. Place sealant while ambient temperature is between 55°F and 80°F and is rising.
7. Armor joint does not include joint sealant or backer rod.
8. Armor joint (sealed) includes Class 7 joint sealant and backer rod.
9. Form vertical leg of seal as per the Manufacturer's recommendations. Use Class 4 joint sealant if Class 7 cannot be installed correctly. Install according to Manufacturer's recommendations.
10. Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
11. See "Plans of Armor Plates".
12. At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
13. Align shipping angle perpendicular to joint.



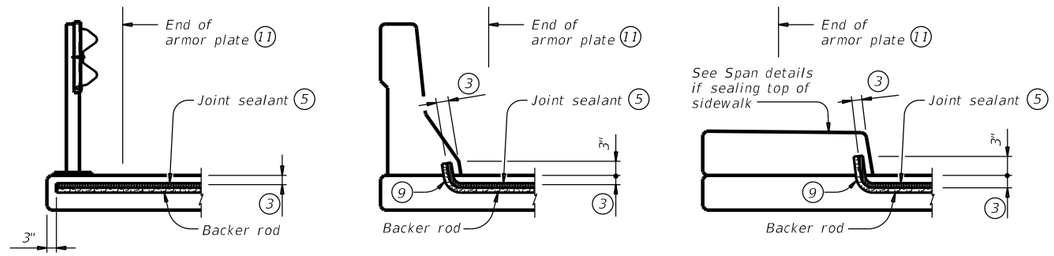
SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION



SHOWN WITH 2" OVERLAY AT JOINT LOCATION 1

ARMOR JOINT SECTIONS

Showing Armor Joint (Sealed)



AT STEEL POST BRIDGE RAIL | AT CONCRETE BRIDGE RAIL | AT SIDEWALK

JOINT SEALANT TERMINATION DETAILS

Armor joint (sealed) only. Armor plate is not shown for clarity.

FABRICATION NOTES:

Match mark corresponding plate sections and secure together for shipment with shipping angle. Do not use erection bolts.

Ship armor joints in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for stage 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.

Use groove welds for all shop and field butt splices. Grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section, except as stated in Note 2, with System II or IV primer in accordance with Item 446 "Field Cleaning and Painting Steel." Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Items 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of armor joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure armor joints in position and place to 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 Armor Joint.

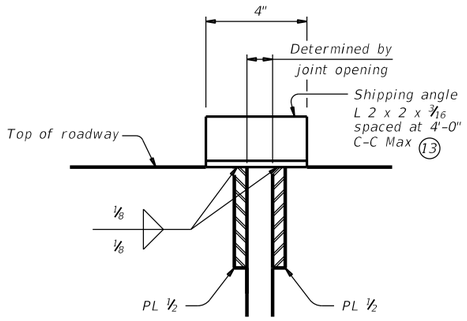
Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

GENERAL NOTES:

Provide armor joints at locations shown on the plans. Provide the seal when "Armor Joint (Sealed)" is noted on the plans.

These joint details accommodate a joint movement range of 1 ⅜" (¾" opening movement and ⅜" closure movement).

Payment for armor joint, with or without seal, is based on length of armor plate.



SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION

With overlay similar

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

WEIGHTS FOR ONE ARMOR JOINT (2 PLATES)	
WITHOUT OVERLAY	16.10 plf
WITH 2" OVERLAY 1	22.90 plf

Texas Department of Transportation

Bridge Division Standard

ARMOR JOINT DETAILS

AJ

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	BRY	GRIMES		118

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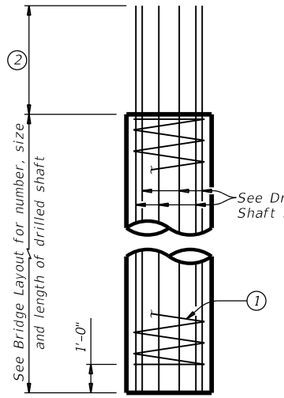
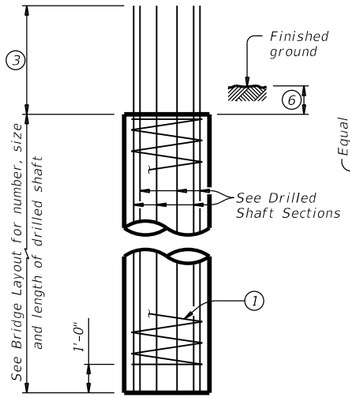
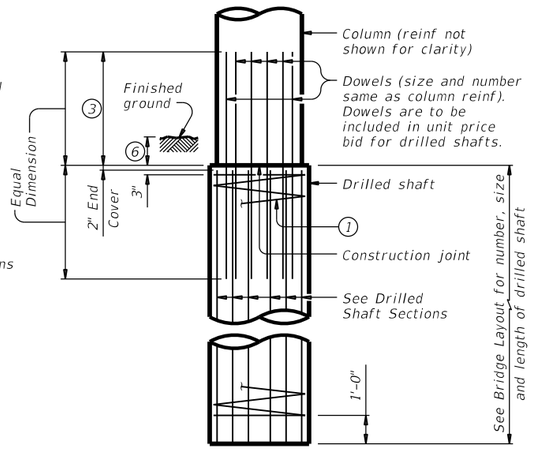


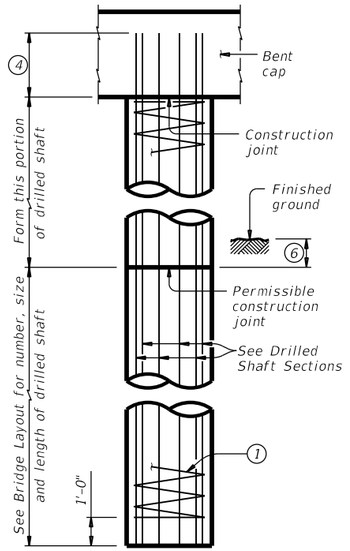
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



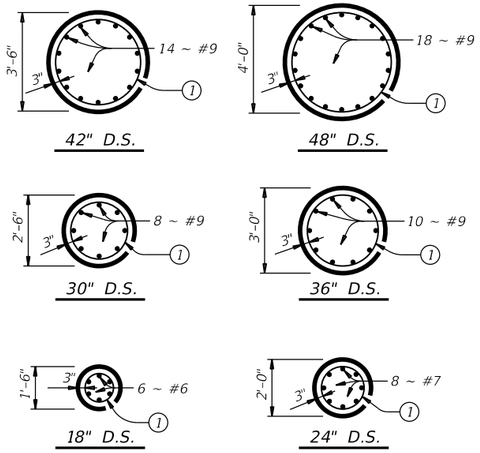
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

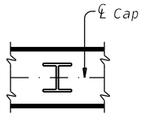


DRILLED SHAFT SECTIONS

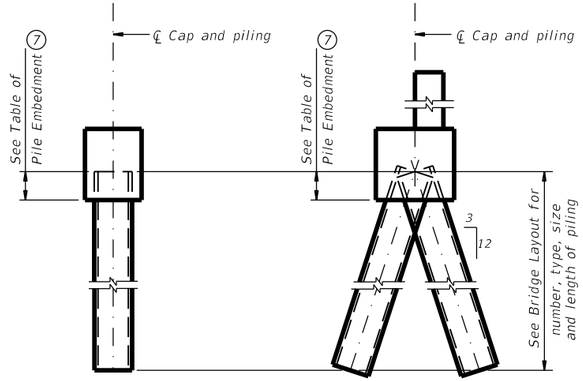
DRILLED SHAFT DETAILS

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.



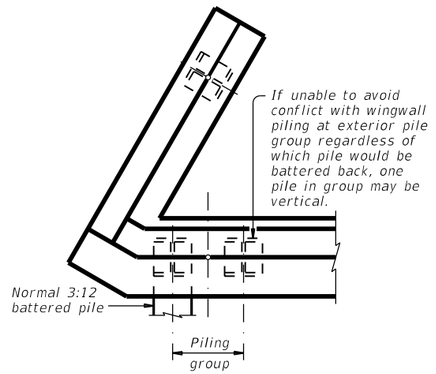
ORIENTATION OF STEEL H-PILING



VERTICAL PILE BATTERED PILE

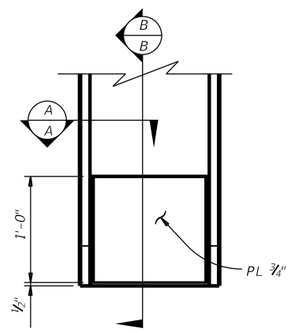
PILING DETAILS

(Concrete or steel H)



DETAIL "A"

(Showing plan view of a 30° skewed abutment)



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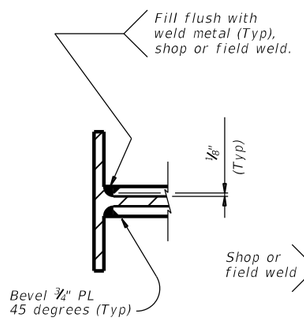
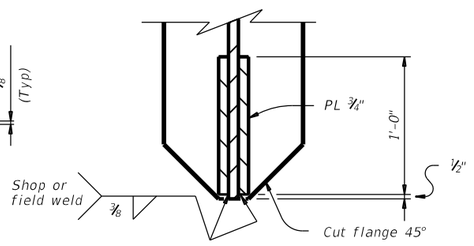


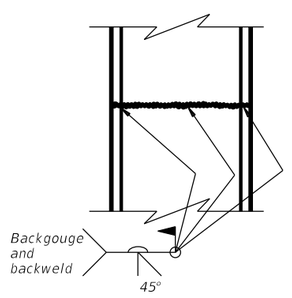
SECTION A-A

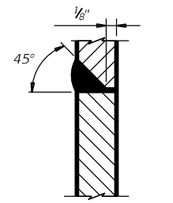


SECTION B-B

STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.





SECTION THRU FLANGE OR WEB

STEEL H-PILE SPLICE DETAIL

Use when required.

(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.

SHEET 1 OF 2

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Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

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01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
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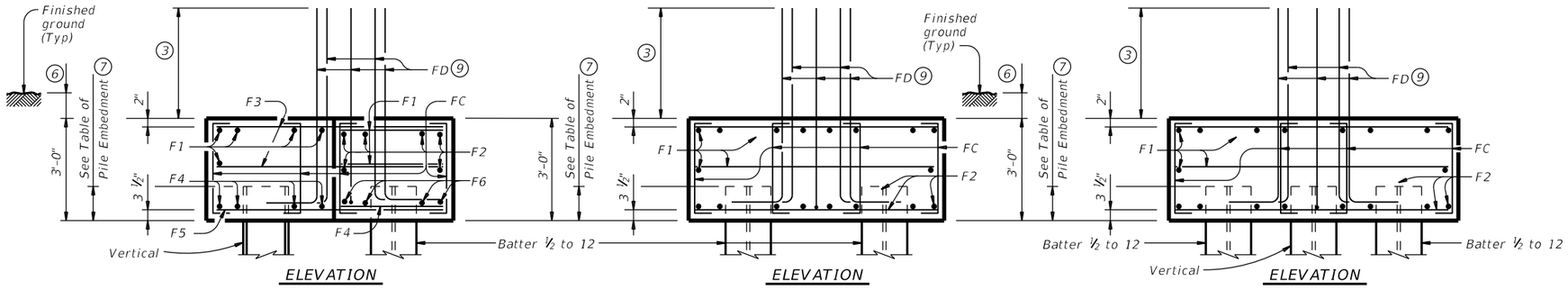
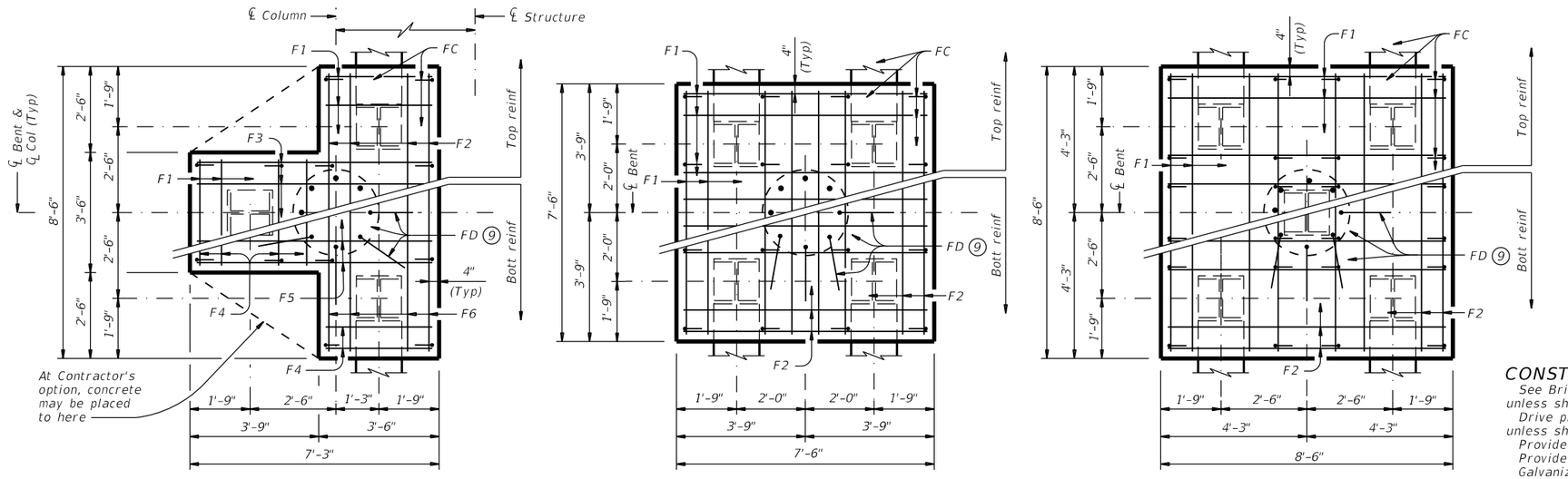




THREE PILE FOOTING (8)

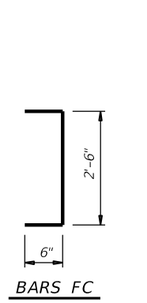
For 36" Dia and smaller columns.

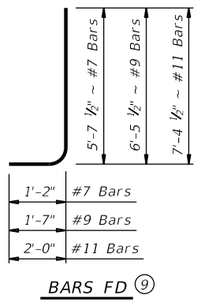
FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.





(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.

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

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Bridge Division Standard

COMMON FOUNDATION DETAILS

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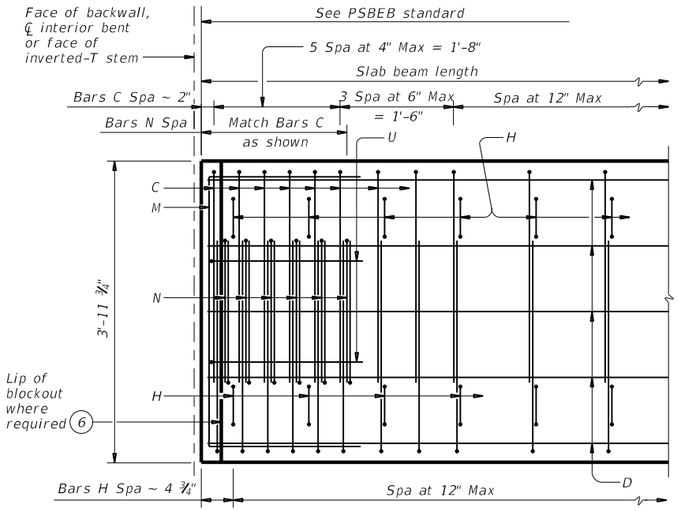
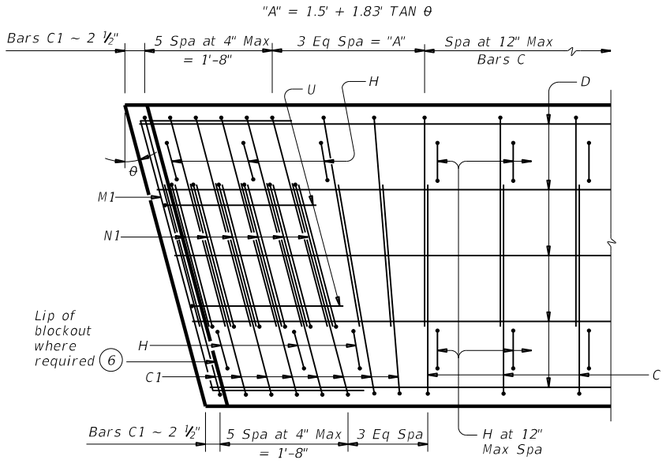
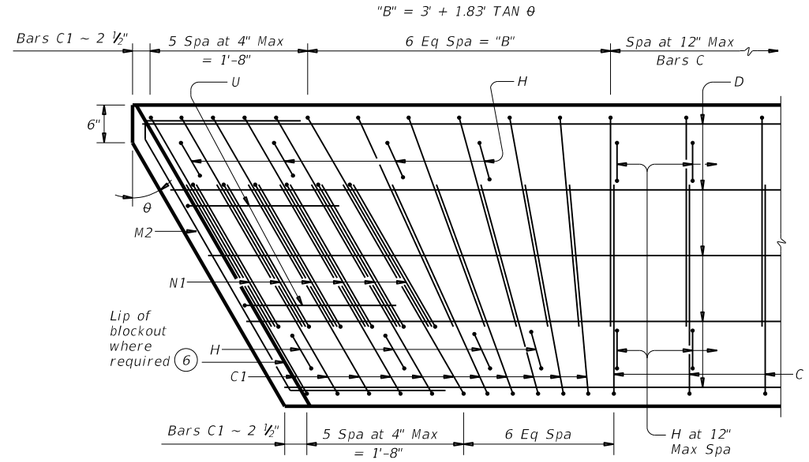


PART PLAN



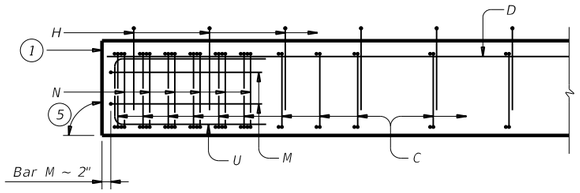
PART SKEW PLAN

(Showing θ over 0° to 15° Skew)



PART SKEW PLAN

(Showing θ over 15° to 30° Skew)



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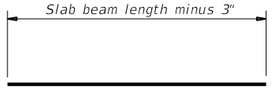

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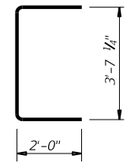

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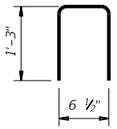

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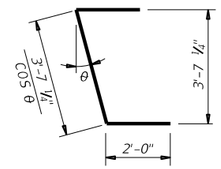

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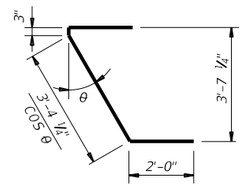

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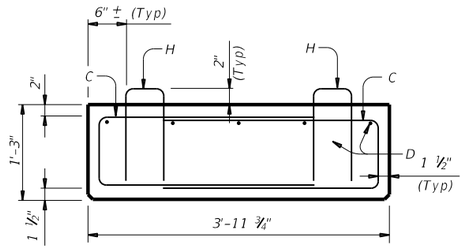
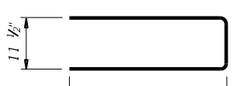


SECTION



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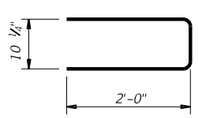

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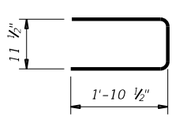

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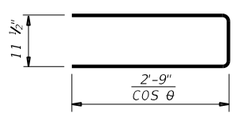
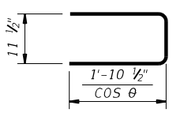


BARS C1(#4)



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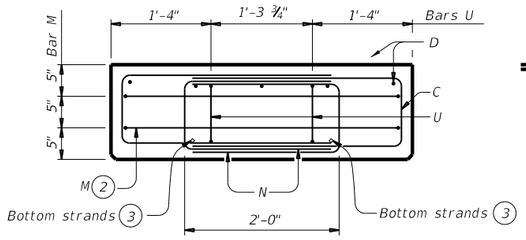
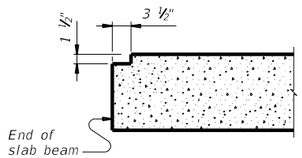


END MAT REINFORCING

Bars H not shown for clarity.



ELEVATION OF BLOCKOUT (6)

BEAM PROPERTIES		
Area	in^2	716.2
Y top	in	7.50
Y bott	in	7.50
I	in^4	13,429
Weight (4)	lb/ft	746

(1) See End Mat Reinforcing detail.

(2) Adjust bars M vertically to avoid strands.

(3) See sheet PSBND or PSBSD for strand locations.

(4) Assumes 150 pcf weight density of concrete.

(5) 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.

(6) Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.

Provide Grade 60 reinforcing steel.

An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.

These details can be used for any skew angle up to a maximum of 30 degrees.

Chamfer all exposed corners ¾" or round to a ¾" radius.

Details are drawn showing right forward skew. See Bridge Layout for actual direction.

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

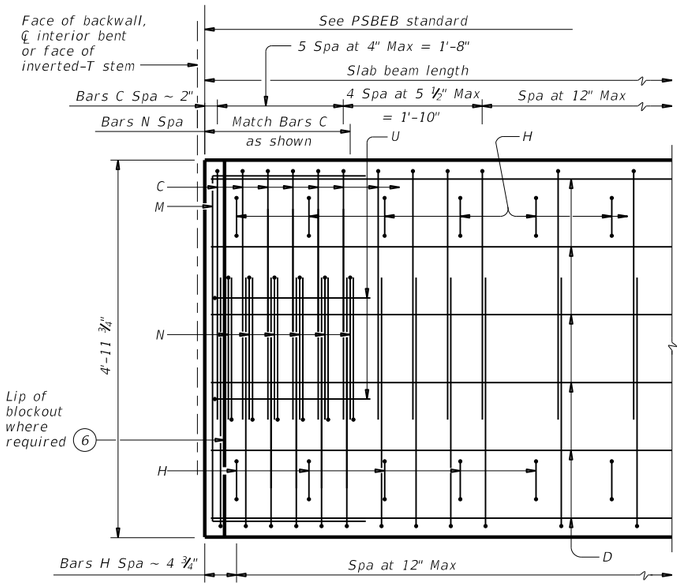
PRESTRESSED CONCRETE SLAB BEAM DETAILS

(TYPE 4SB15)

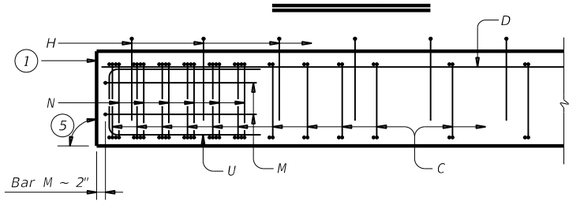
PSB-4SB15

FILE: psbsts02-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		121

DATE: 05/30/2018 08:50 PM
FILE: DOCUMENT NAME



PART PLAN



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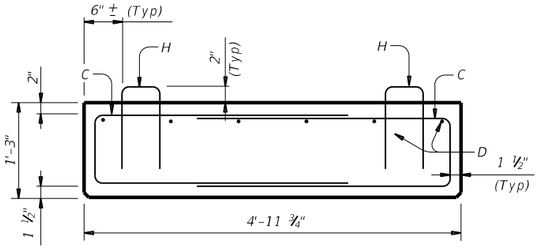
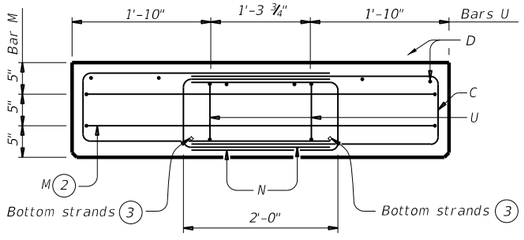
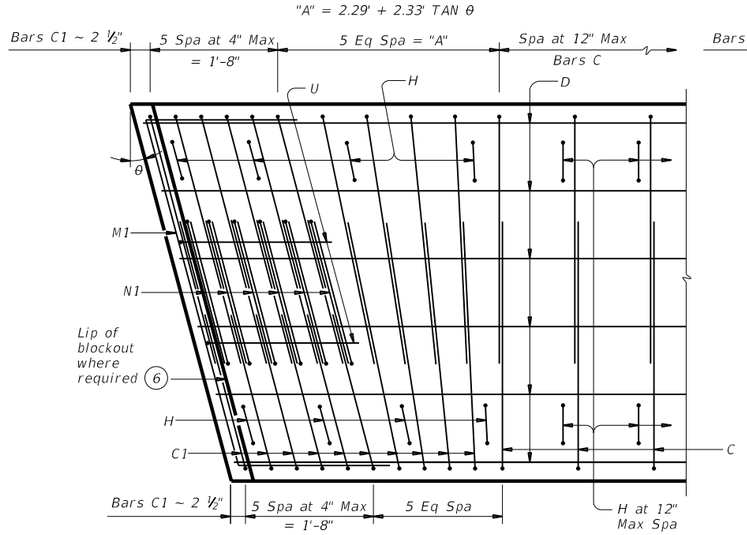


SECTION



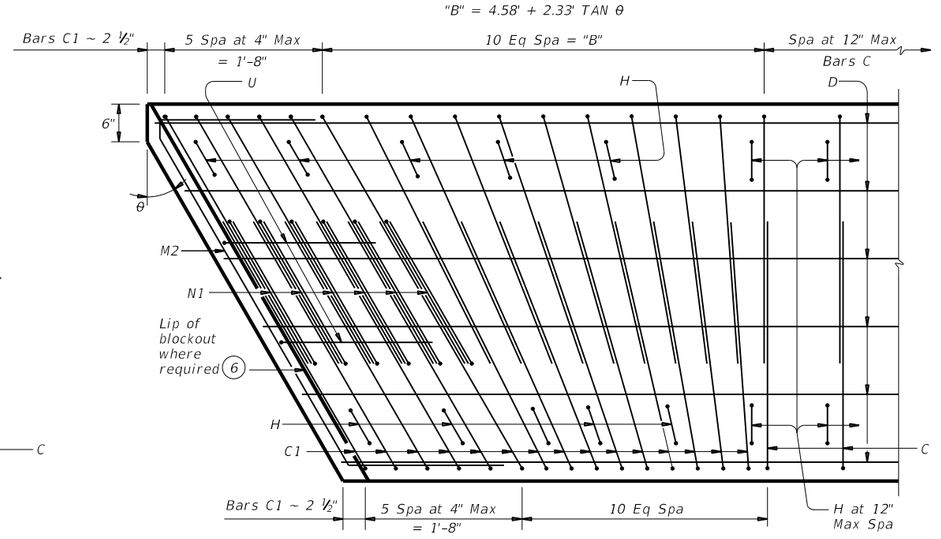
END MAT REINFORCING

Bars H not shown for clarity.



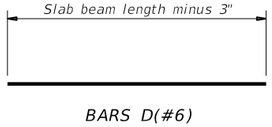
PART SKEW PLAN

(Showing θ over 0° to 15° skew)



PART SKEW PLAN

(Showing θ over 15° to 30° skew)



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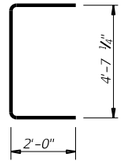

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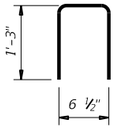

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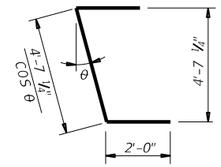

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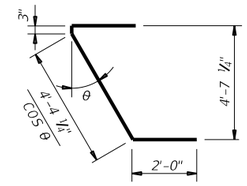

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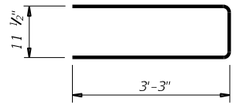
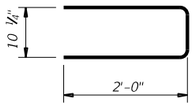
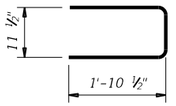


BARS C(#4)



BARS U(#5)



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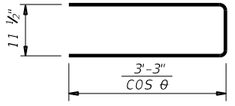

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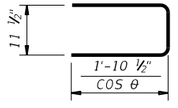

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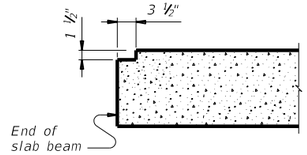


ELEVATION OF BLOCKOUT (6)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.

Provide Grade 60 reinforcing steel.

An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.

These details can be used for any skew angle up to a maximum of 30 degrees.

Chamfer all exposed corners ¾" or round to a ¾" radius.

Details are drawn showing right forward skew. See Bridge Layout for actual direction.

Cover dimensions are clear dimensions, unless noted otherwise.

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

BEAM PROPERTIES		
Area	in^2	896.2
Y top	in	7.50
Y bott	in	7.50
I	in^4	16,805
Weight (4)	lb/ft	934

(1) See End Mat Reinforcing detail.

(2) Adjust bars M vertically to avoid strands.

(3) See sheet PSBND or PSBSD for strand locations.

(4) Assumes 150 pcf weight density of concrete.

(5) 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.

(6) Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

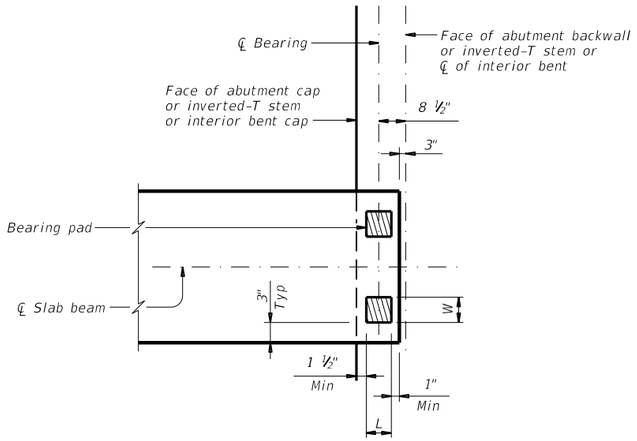
PRESTRESSED CONCRETE SLAB BEAM DETAILS

(TYPE 5SB15)

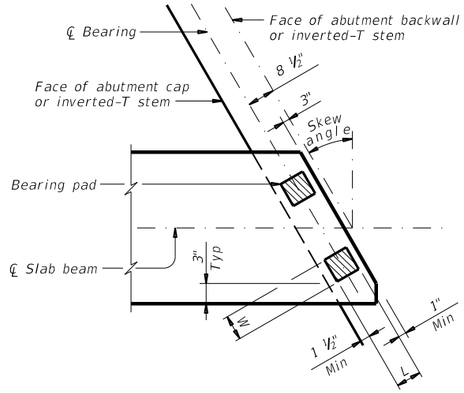
PSB-5SB15

FILE: psbsts04-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		122

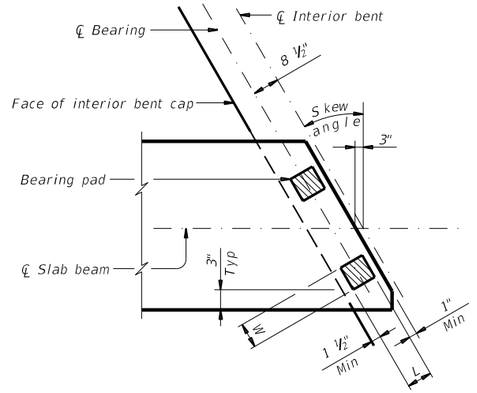
DATE: 05/30/2018 08:50 PM
FILE: DOCUMENT NAME



TWO-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



TWO-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



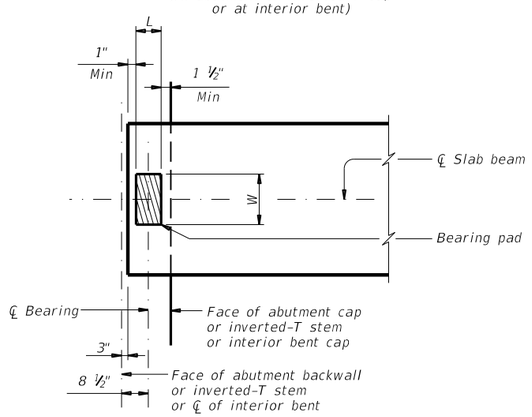
TWO-PAD DETAIL SKEW PLAN
(At interior bent)

TABLE OF BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)

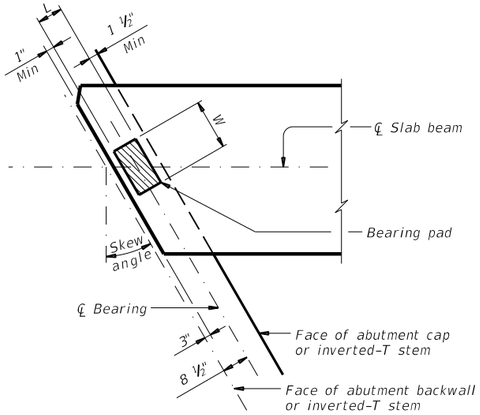
One-Pad (Ty SB1-"N") (2)			Two-Pad (Ty SB2-"N") (2)		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

Pad sizes shown are applicable for the following conditions:

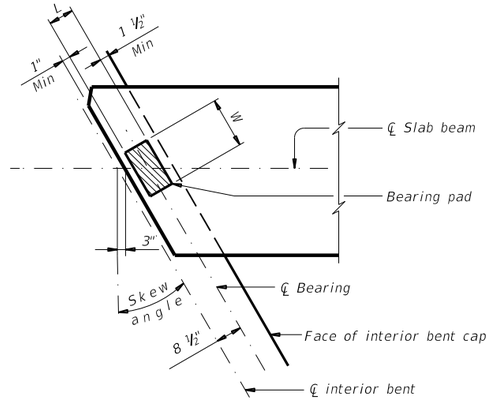
(1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
(2) Skews less than or equal to 30°.



ONE-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



ONE-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



ONE-PAD DETAIL SKEW PLAN
(At interior bent)

ELASTOMERIC BEARING PAD PLACEMENT AND BEAM END DIAGRAMS

Place one bearing pad at forward station beam end.
Place two bearing pads at back station beam end.

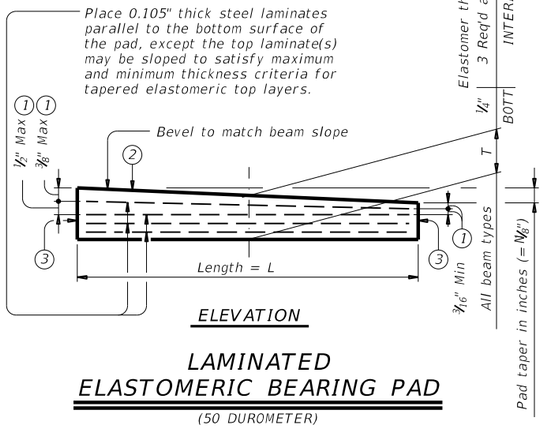
GENERAL NOTES:

These details accommodate skew angles up to 30°.

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 must be included in unit price bid for "Prestressed Concrete Slab Beams".



ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)

(1) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(2) 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 beam slope by more than $\left(\frac{0.0625"}{Length}\right)$ IN/IN.

(3) Locate permanent mark here.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND BEAM END DETAILS

PRESTR CONCRETE SLAB BEAM

PSBEB

FILE: psbste06-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
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	BRY	GRIMES		123

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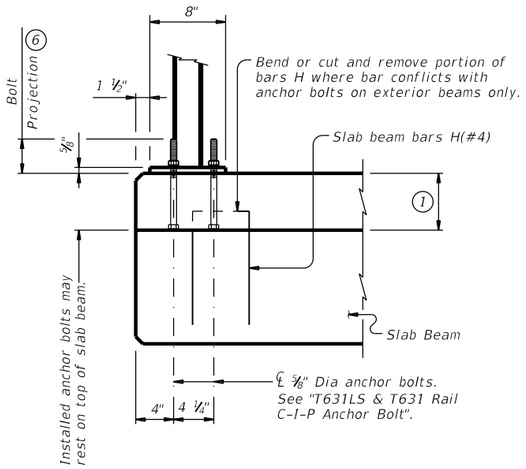
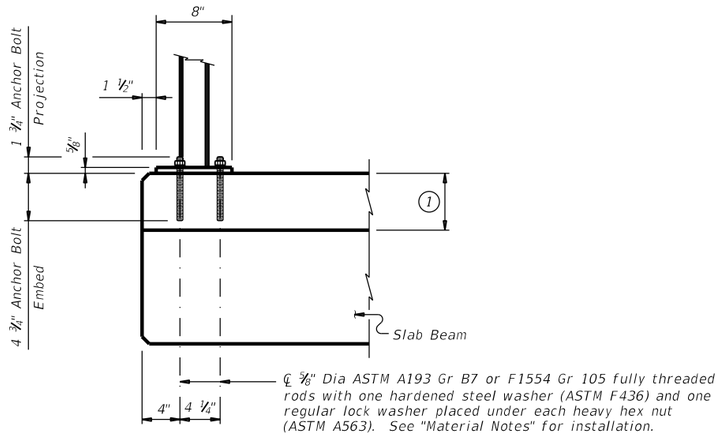
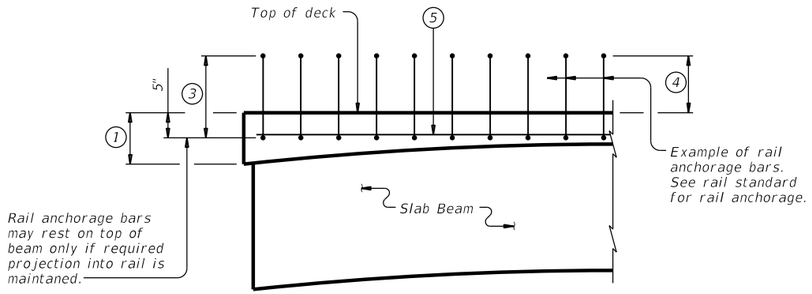


CAST-IN-PLACE ANCHORAGE OPTION

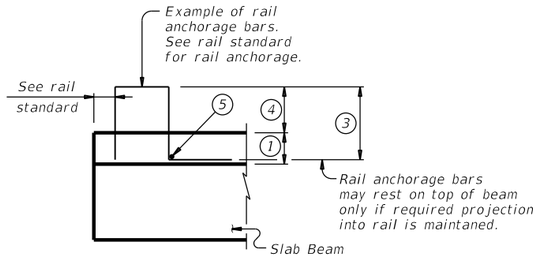


ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT ②⑦



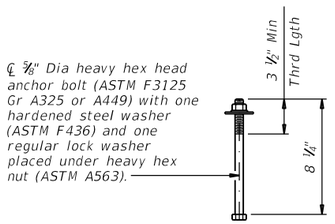
PART SPAN ELEVATION



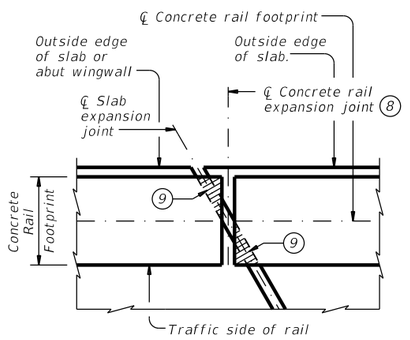
SECTION

TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)



T631LS & T631 RAIL C-I-P ANCHOR BOLT



PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

1. Cast-in-place slab thickness varies due to beam camber (5" minimum).
2. Replace cast-in-place anchor bolts shown on T631LS and T631 Rail standard with an adhesive anchor system or cast-in-place anchor bolts shown on this sheet.
3. Bar length shown on rail standard, minus 1 ¼". Adjust bar length for a raised sidewalk.
4. See rail standard for projection from finished grade or top of sidewalk.
5. Place additional (#5) longitudinal bar.
6. Excess bolt length has been provided to accommodate a variable slab thickness due to beam camber. If slab thickness on span details exceed 7", bolt length must be increased accordingly. After posts have been set and bolts tightened, bolt projection above nuts of more than ½" must be cut off and painted with two coats of zinc-rich paint conforming to the Item 445 "Galvanizing".
7. Distance from end of top outside edge of slab to center of first bolt group can not be less than 9", except: 15° Skew: 1'-0" (acute corner only)
   30° Skew: 1'-3" (acute corner only)
8. Location of rail expansion joint must be at the intersection of ℄ slab expansion joint, ℄ rail footprint and perpendicular to slab outside edge.
9. Cross-hatched area must have ½" preformed bituminous fiber material under concrete rail, as shown.

CONSTRUCTION NOTES:

Rail anchorage bars may be field bent as required to clear rail reinforcing or provide minimum cover shown on standard rail detail sheets.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components of steel rail system.

Provide Grade 60 reinforcing steel.

Cast-in-place anchorage system for T631LS and T631 Rail must be ⅝" Dia heavy hex head anchor bolts (ASTM F3125 Gr 325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed anchor bolts 4 ½" minimum.

Adhesive anchors for T631LS and T631 Rail must be ⅞" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 ¾". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

Epoxy coat or galvanize reinforcing steel shown on this standard if rail reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

This standard is for use with structures with a 5" minimum cast-in-place concrete slab.

This standard may require modification for interior rails. This standard does not apply to median barriers.

This standard does not provide details for Type T221P, T224, T80HT, T80SS, C412, PR11, PR22 and PR3 rails on slab beam bridges.

See rail standards for approved speed restrictions, notes and details not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation

Bridge Division Standard

RAIL ANCHORAGE DETAILS

PRESTR CONCRETE SLAB BEAMS

PSBRA

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
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03-18: Updated adhesive anchor notes.	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		124

DATE:
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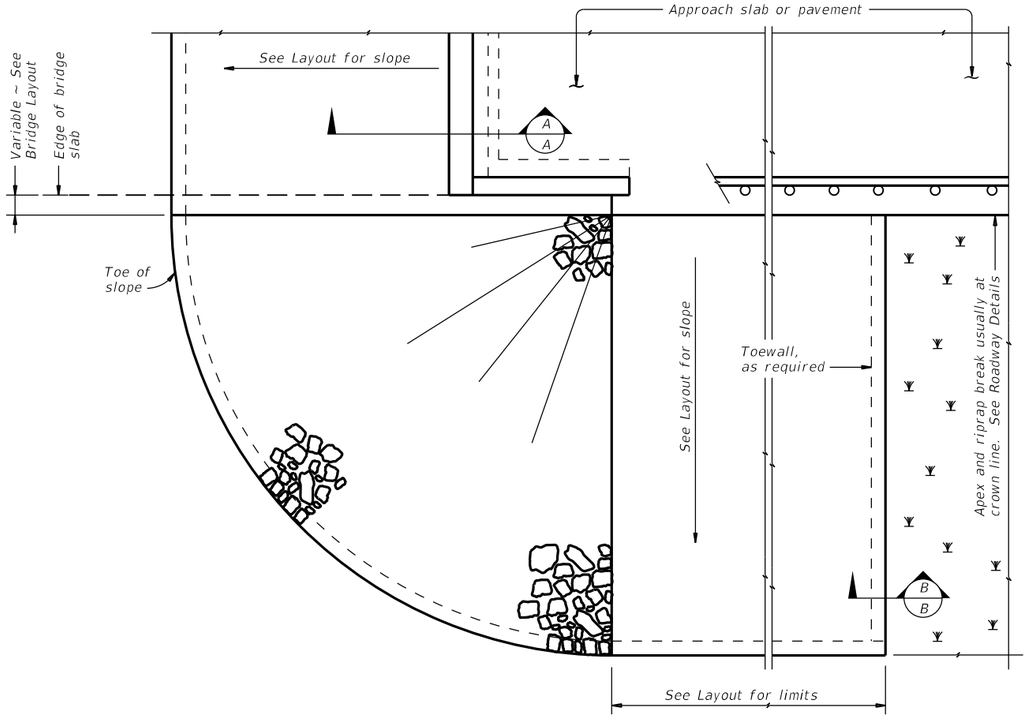
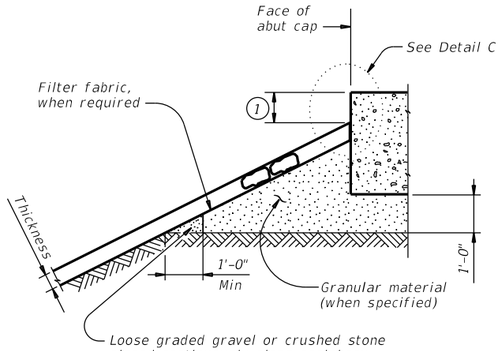
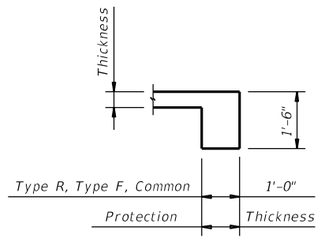


PLAN

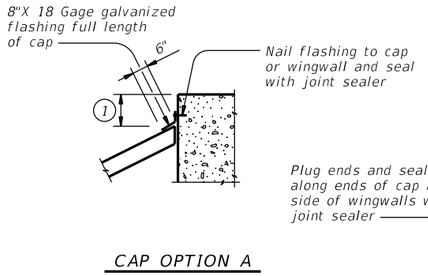


SECTION A-A AT CAP



SECTION B-B

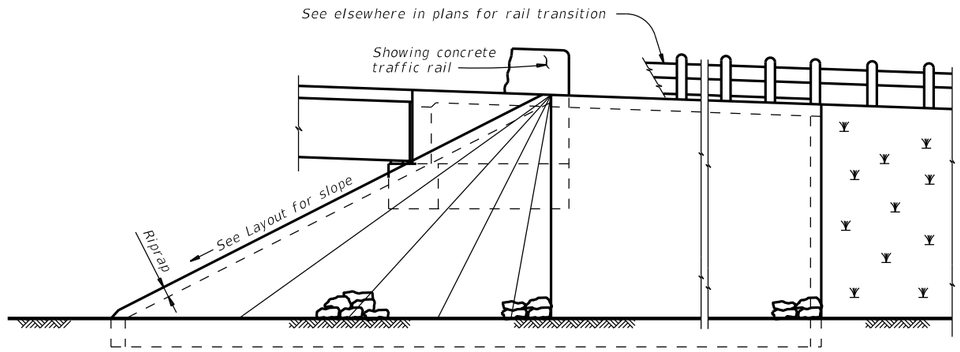
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C



ELEVATION

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.

(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.

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE:	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		125

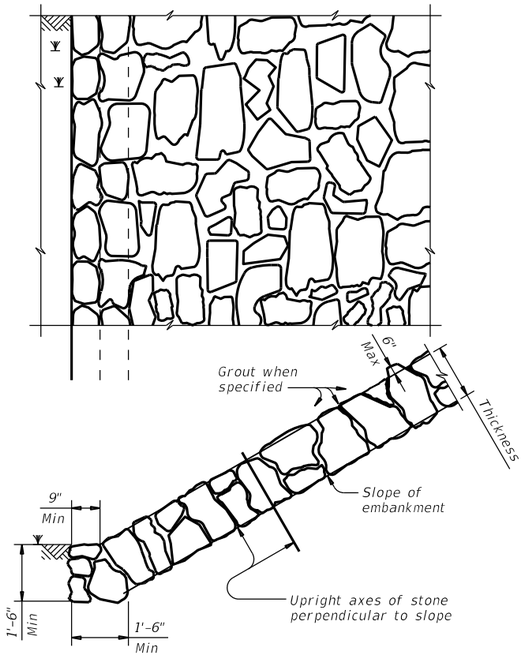


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

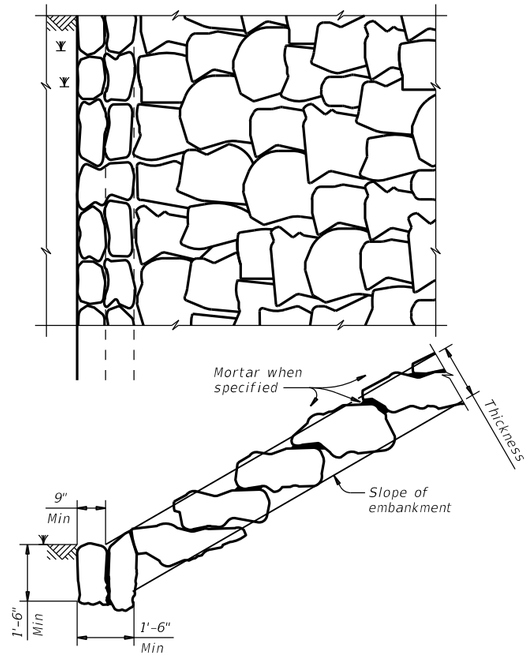


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

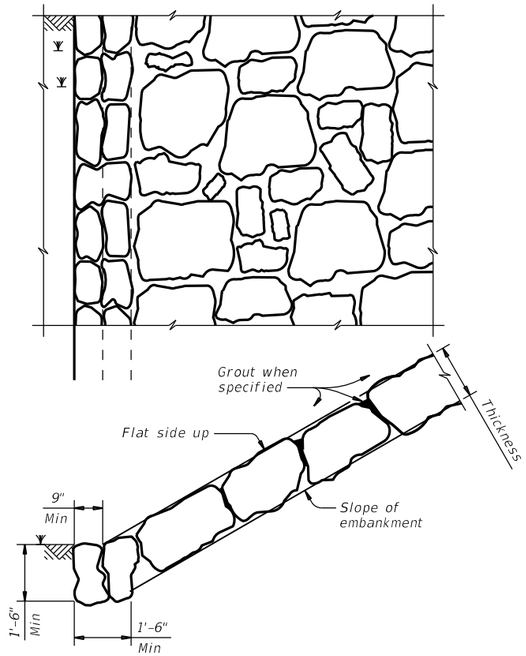


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

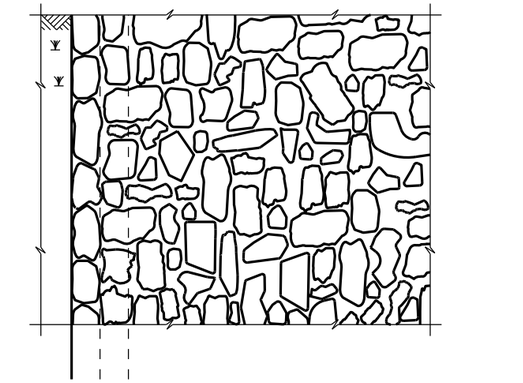


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

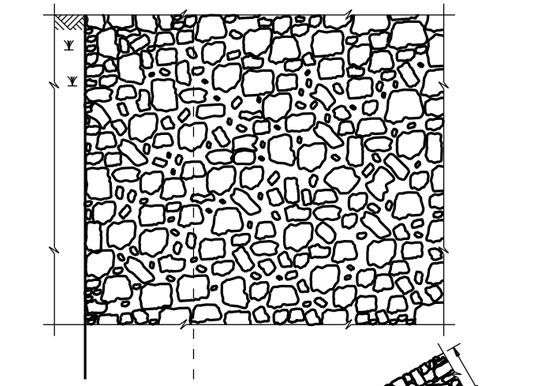


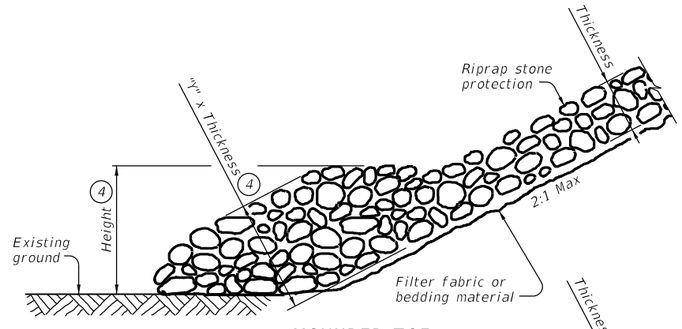
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

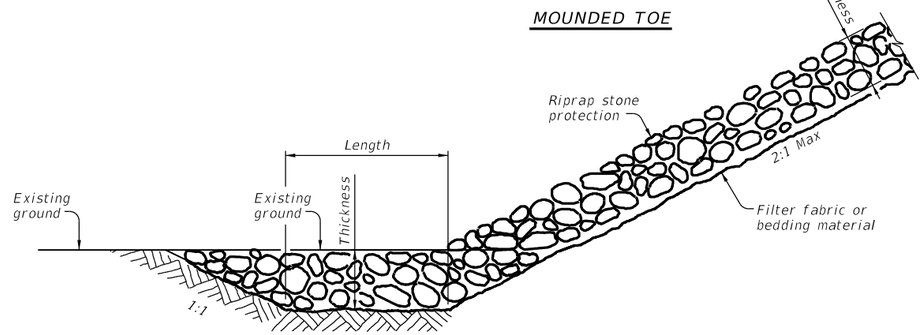
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(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)

SHEET 2 OF 2

Texas Department of Transportation

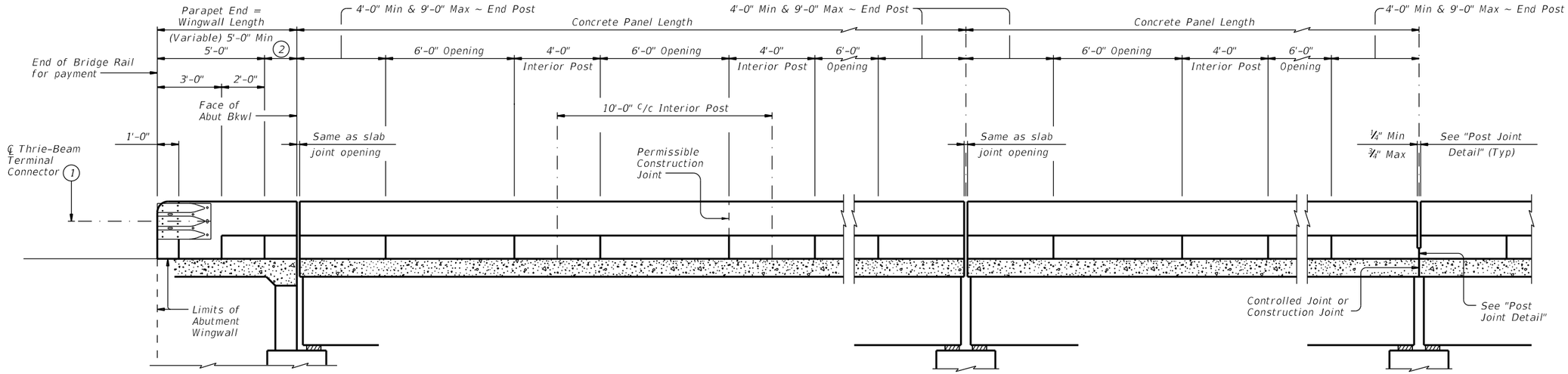
Bridge Division Standard

STONE RIPRAP

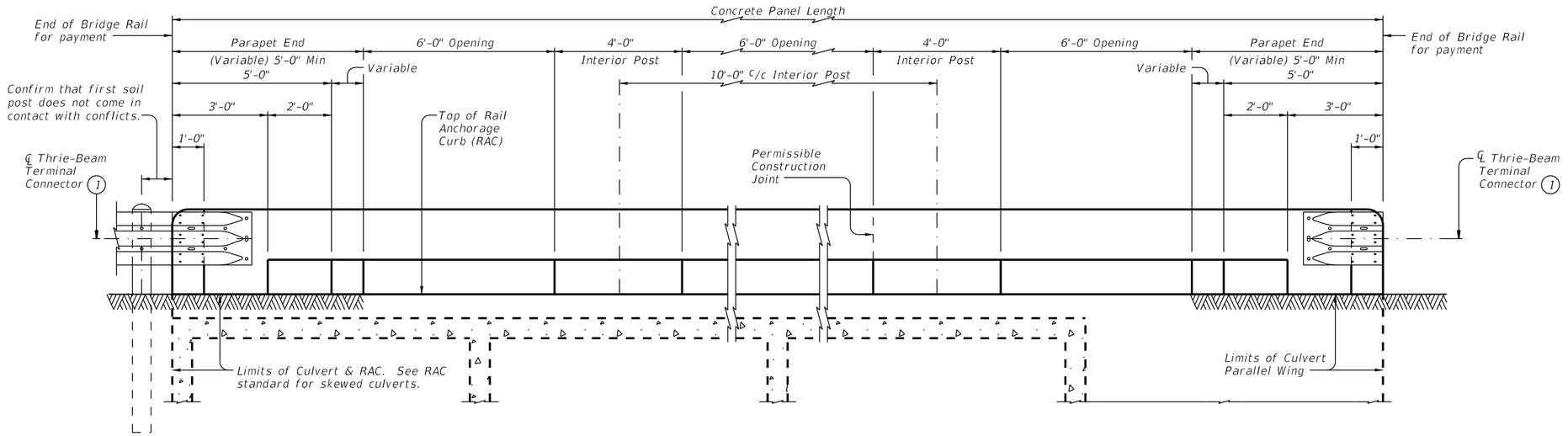
SRR

FILE:	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		126

DATE:
FILE:



ROADWAY ELEVATION OF RAIL ON BRIDGE



ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown. Vertical joints in concrete rail are not required, unless shown elsewhere.

(1) *Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.*

(2) *Wingwall Length minus 5'-0" (Varies)*

Texas Department of Transportation

Bridge Division Standard

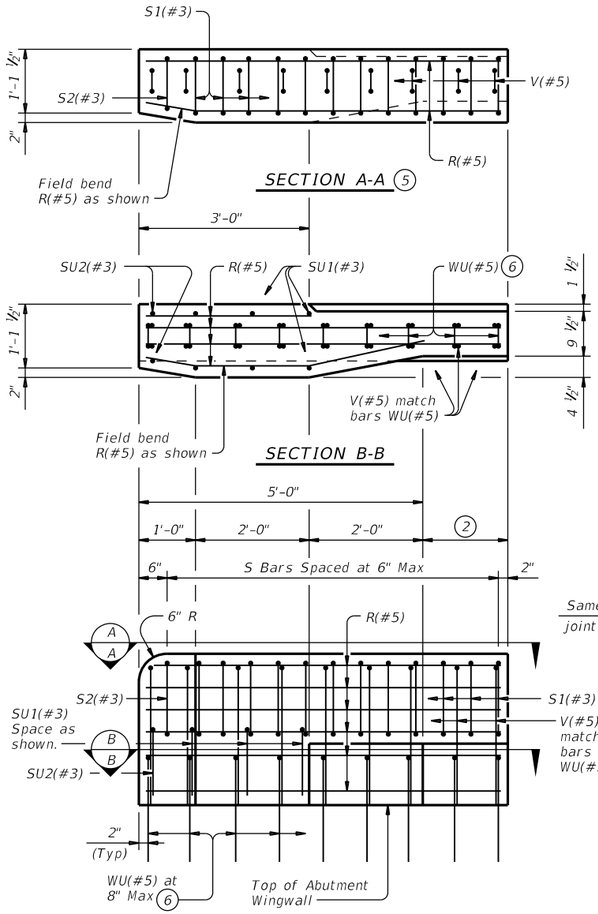
TRAFFIC RAIL

TYPE T223

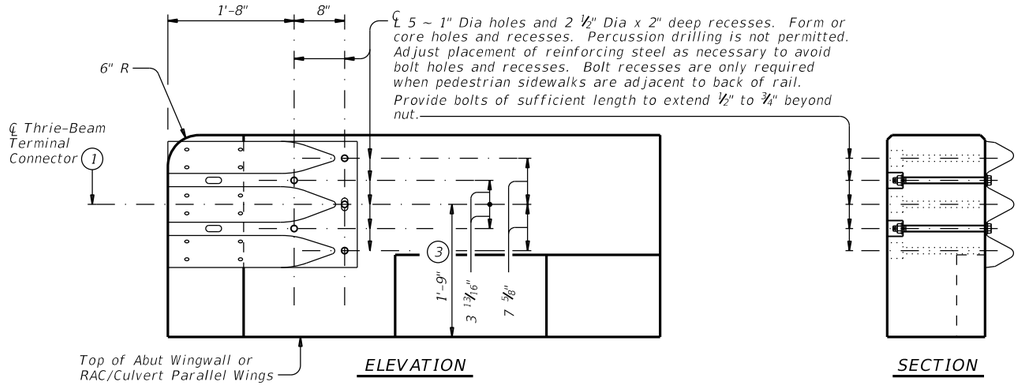
FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		127

DATE:
FILE:

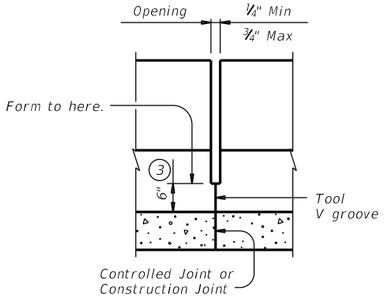
DATE:
FILE:



PARAPET END AT ABUT WINGWALL (6)

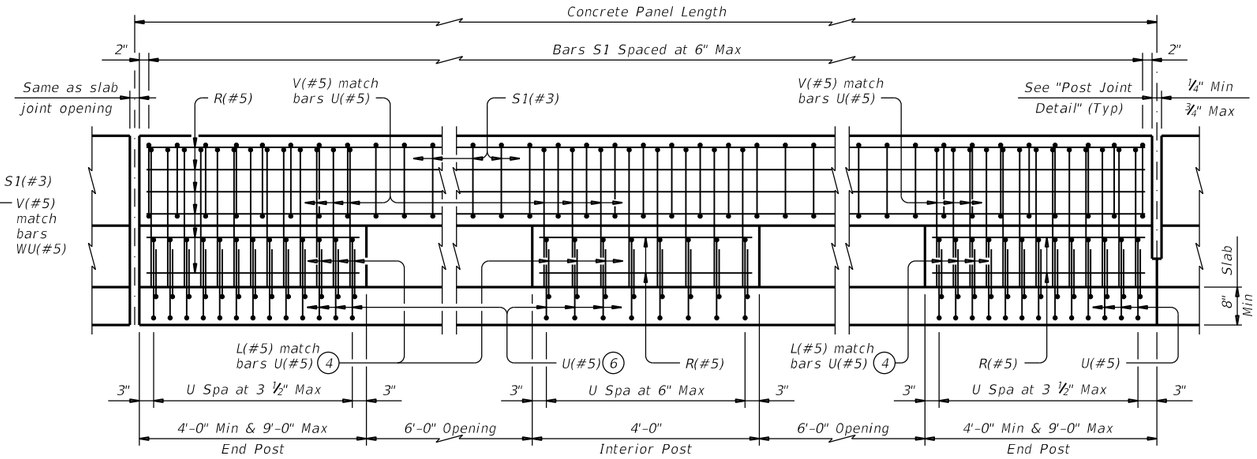


TERMINAL CONNECTION DETAILS



POST JOINT DETAIL

Provide at all interior bents without slab expansion joints.



AT SLAB EXPANSION JOINTS

AT 4' INTERIOR POST

AT BENTS WITHOUT SLAB EXPANSION JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing rail on slab. Rail on box culvert similar.

(1) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.

(2) Wingwall Length minus 5'-0" (Varies)

(3) Increase 2" for structures with overlay.

(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(5) Bars SU1(#3), SU2(#3) and WU(#5) not shown for clarity.

(6) Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

Texas Department of Transportation

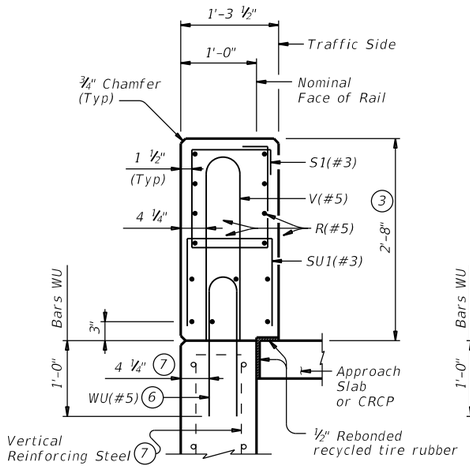
Bridge Division Standard

TRAFFIC RAIL

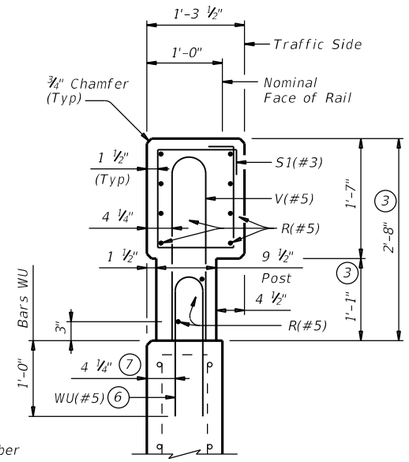
TYPE T223

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	029	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		128

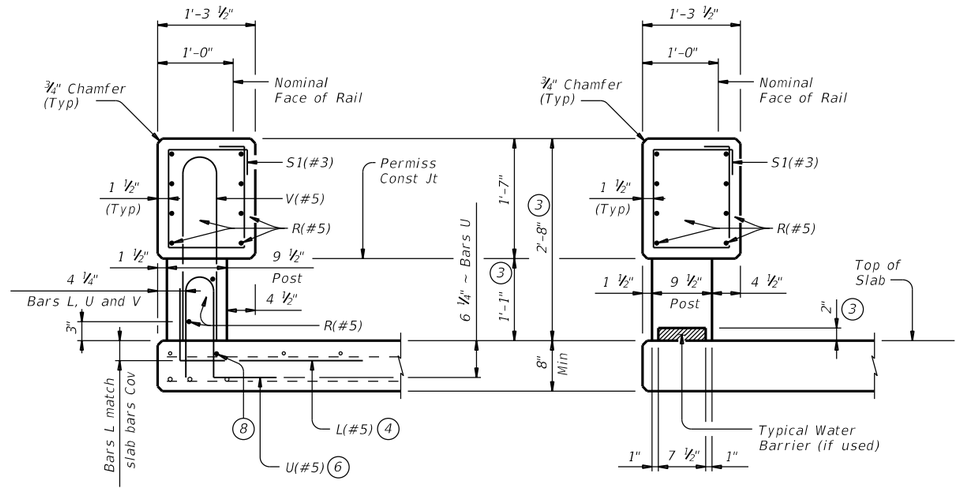
DATE:
FILE:



SECTION C-C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

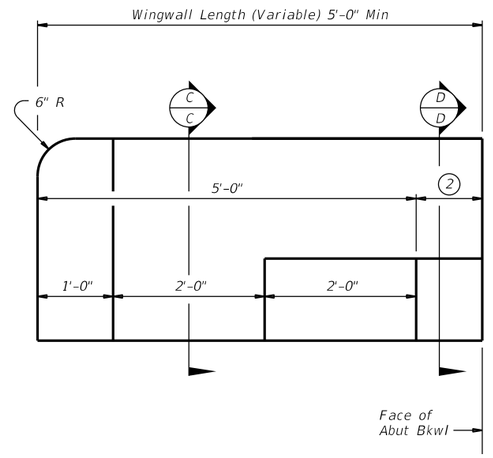


AT POST
ON BRIDGE SLAB

AT OPENING
ON BRIDGE SLAB

SECTIONS THRU RAIL

Sections on box culverts similar.



ELEVATION AT ABUTMENT WINGWALL

Box culvert parallel wings or rail anchorage curb similar.

(2) Wingwall Length minus 5'-0" (Varies)

(3) Increase 2" for structures with overlay.

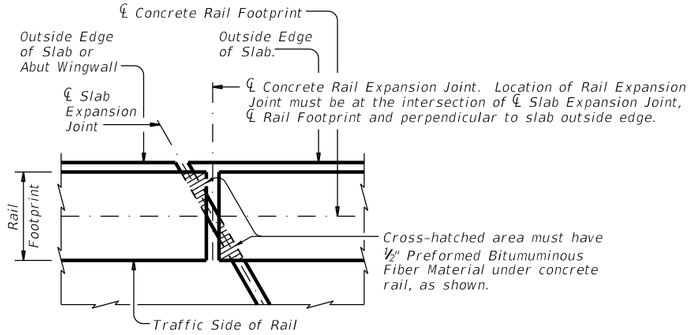
(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(6) Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

(7) When vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall, move the horizontal wingwall/retaining wall reinforcing to the inside of Bars WU where bars conflict.

(8) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(9) At the Contractor's option, Bars V may be replaced by extending Bars U to 2'-5 ¼" above the roadway surface without overlay.



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

CONSTRUCTION NOTES:

Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.

Provide water barriers at openings draining onto undercrossing roadways and sidewalks. They may be cast-in-place or precast in convenient lengths and bonded to the bridge deck with an approved epoxy cement.

Chamfer all exposed corners.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Deformed Welded Wire Reinforcing (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U, V, and WU unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-0"
Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been evaluated by full-scale crash test to meet MASH TL-3 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.

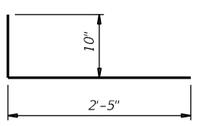
Do not use this railing on bridges with expansion joints providing more than 5" movement.

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

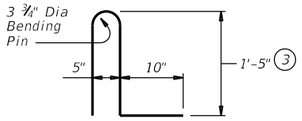
Shop drawings are not required for this rail.

Average weight of railing with no overlay is 358 plf.

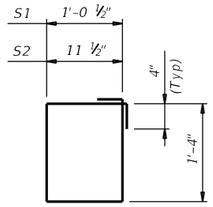
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



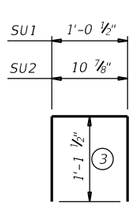
BARS L (#5)



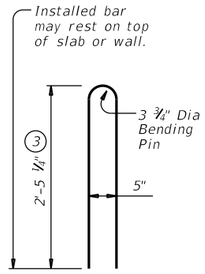
BARS U (#5) (9)



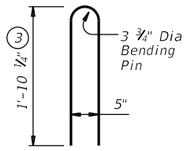
BARS S (#3)



BARS SU (#3)



BARS V (#5) (9)



BARS WU (#5)

SHEET 3 OF 3

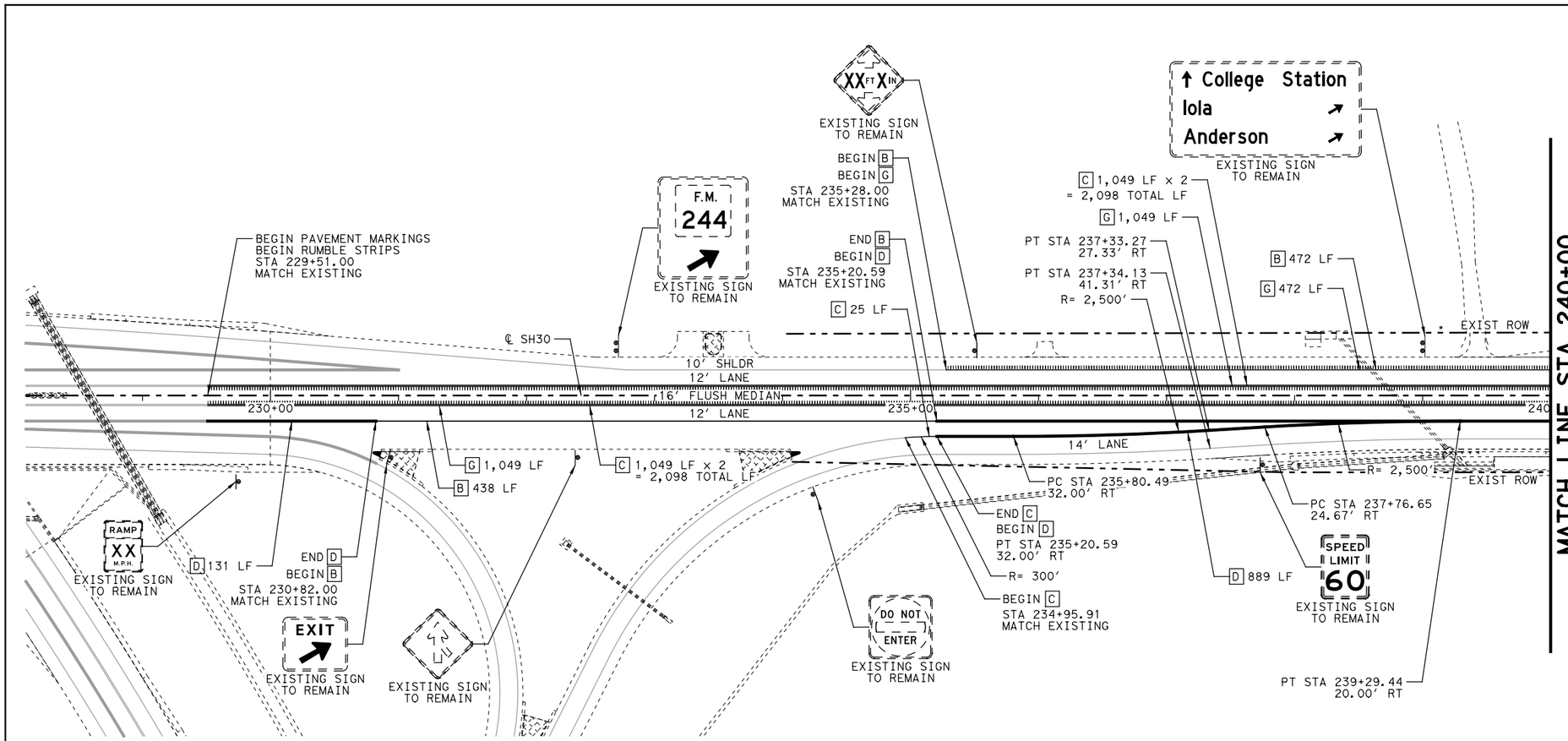
Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T223

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		129



LEGEND

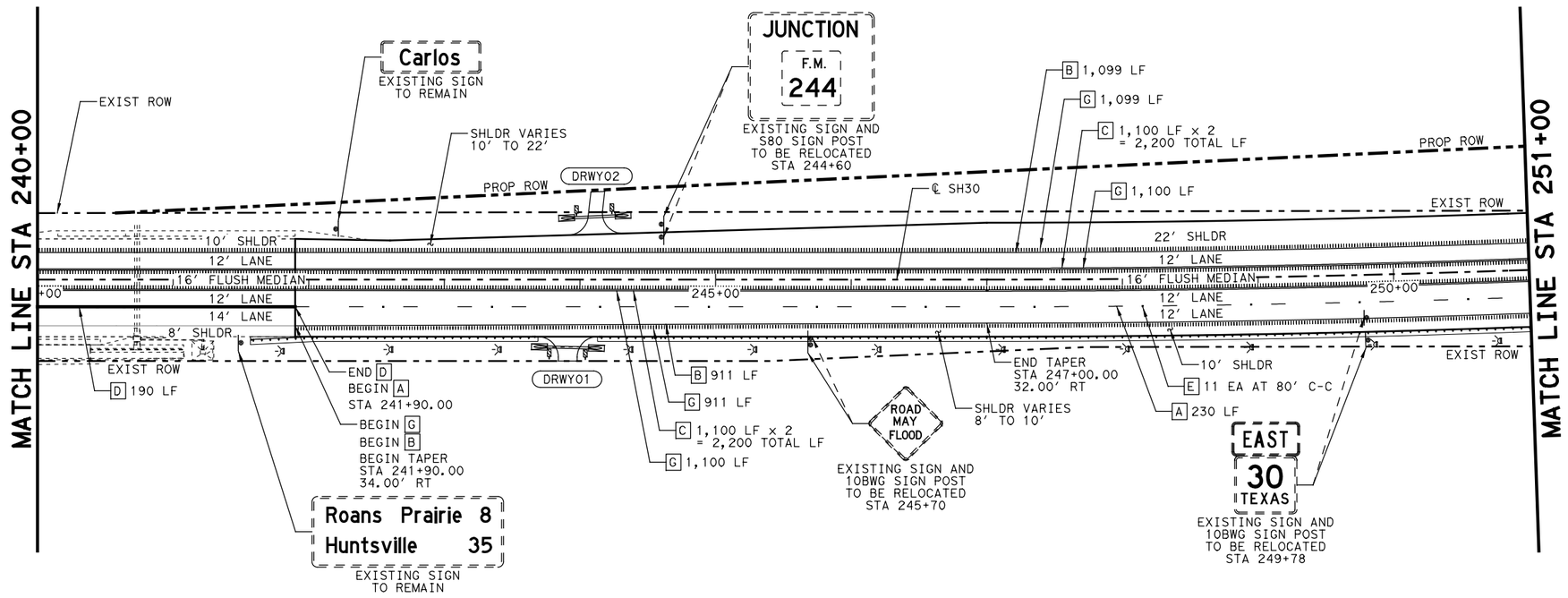
A	RE PM W/ RET REQ TY I (W) 4" (BRK)
B	RE PM W/ RET REQ TY I (W) 4" (SLD)
C	RE PM W/ RET REQ TY I (Y) 4" (SLD)
D	REFL PAV MRK TY I (W) 8" (SLD)
E	REFL PAV MRKR TY I-C
F	REFL PAV MRKR TY II-A-A
G	RUMBLE STRIPS (SHOULDER) (OPTION 4)
H	PAV SURF PREP FOR MRK (4")
I	PAV SURF PREP FOR MRK (RPM)
J	PAVEMENT SEALER 4"
	INSTL DEL ASSM (D-SW) SZ (BRF) GF1
	INSTL DEL ASSM (D-SW) SZ (BRF) CTB
	OBJECT MARKER
	PROPOSED SIGN POST
	EXISTING SIGN POST
	EXISTING SIGN POST TO BE REMOVED
	EXISTING SIGN TO BE REMOVED
	EXISTING SIGN TO REMAIN
	PROPOSED SIGN

NOTES:

1. ALL STATION AND OFFSETS ARE FROM "CL SH30" UNLESS OTHERWISE NOTED. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR HORIZONTAL ALIGNMENT INFORMATION.
2. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. ALL PAVEMENT MARKINGS ARE TY I (100MIL) UNLESS OTHERWISE SPECIFIED.

0 50 100 150 200

SCALE IN FEET



STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
08/17/2018

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

SIGNING AND PAVEMENT MARKING LAYOUT
BEGIN TO STA 251+00

SCALE: 1"=100′ SHEET 1 OF 3

FED. RD. DIV. NO.	FEDERAL PROJECT NO.	HIGHWAY NO.
6	SEE TITLE SHEET	SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	130
CONTROL	SECTION	JOB	
0212	04	039	

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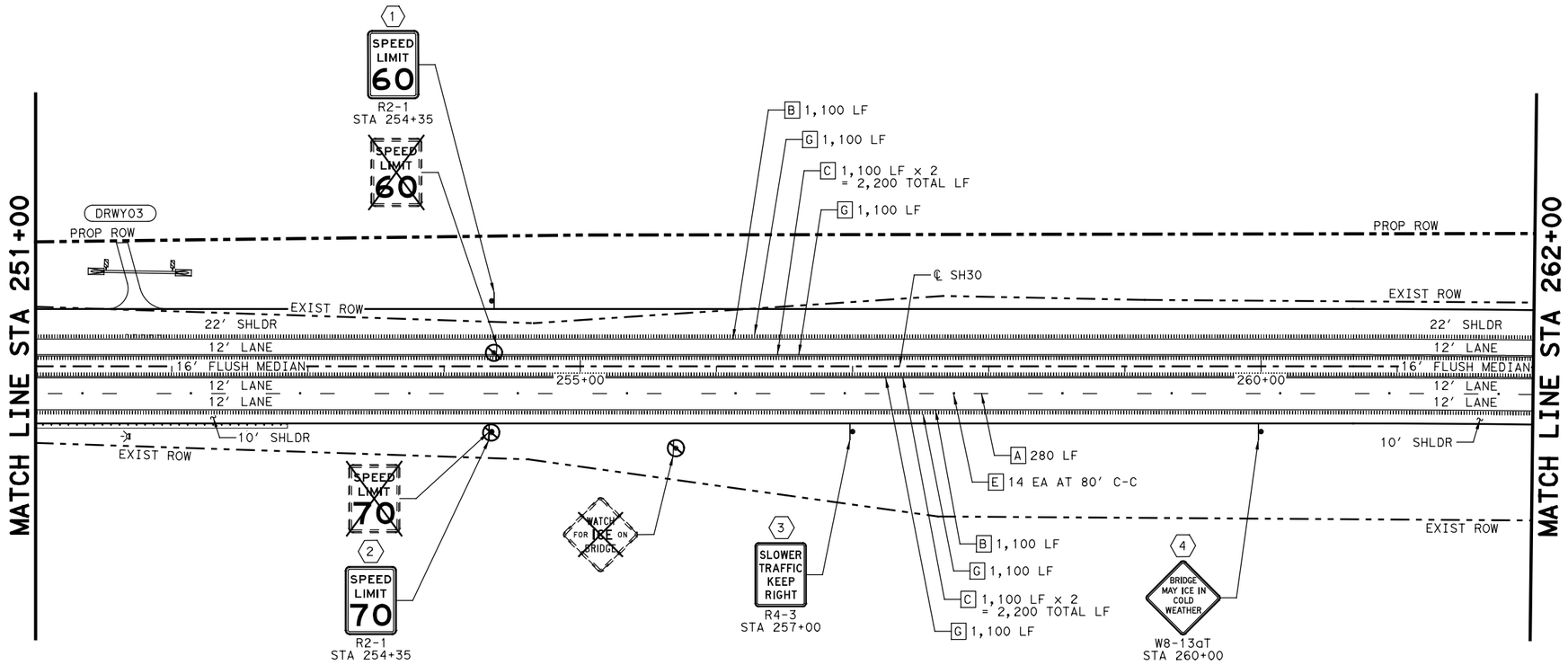

LEGEND

A	RE PM W/ RET REQ TY I (W) 4" (BRK)
B	RE PM W/ RET REQ TY I (W) 4" (SLD)
C	RE PM W/ RET REQ TY I (Y) 4" (SLD)
D	REFL PAV MRK TY I (W) 8" (SLD)
E	REFL PAV MRKR TY I-C
F	REFL PAV MRKR TY II-A-A
G	RUMBLE STRIPS (SHOULDER) (OPTION 4)
H	PAV SURF PREP FOR MRK (4")
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J	PAVEMENT SEALER 4"
	INSTL DEL ASSM (D-SW) SZ (BRF) GF1
	INSTL DEL ASSM (D-SW) SZ (BRF) CTB
	OBJECT MARKER
	PROPOSED SIGN POST
	EXISTING SIGN POST
	EXISTING SIGN POST TO BE REMOVED
	EXISTING SIGN TO BE REMOVED
	EXISTING SIGN TO REMAIN
	PROPOSED SIGN

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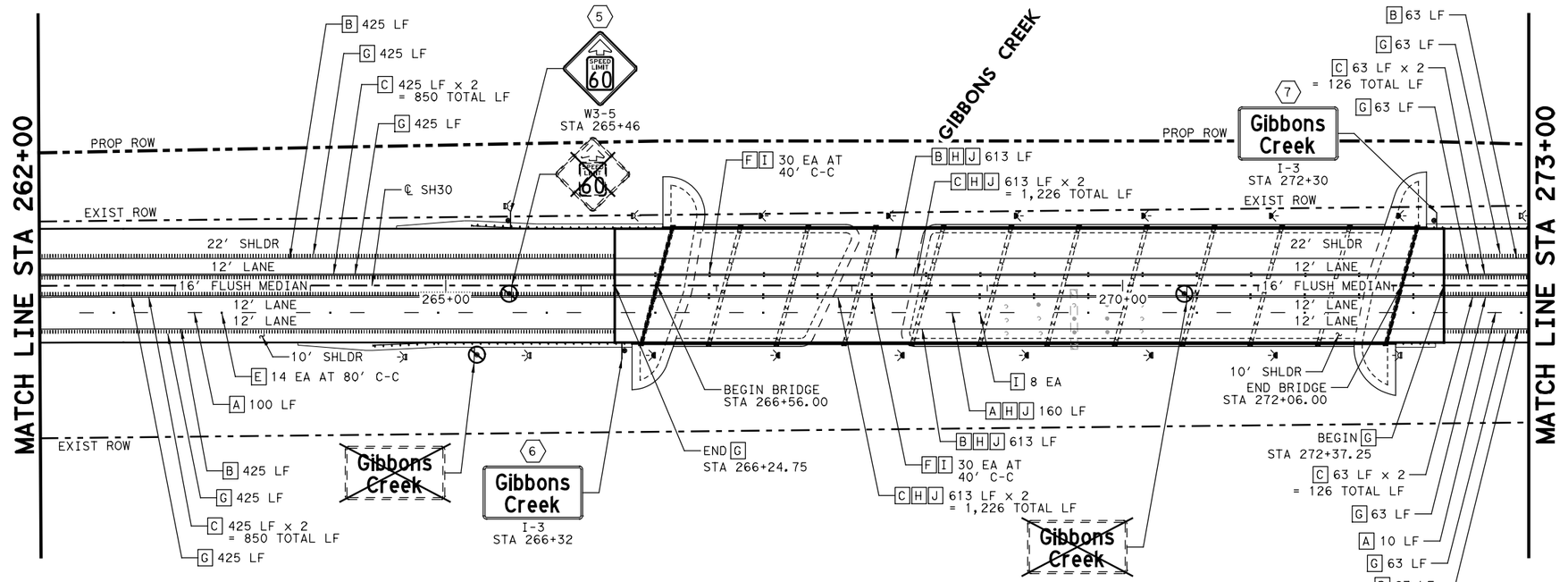
0 50 100 150 200

SCALE IN FEET



NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

SIGNING AND PAVEMENT MARKING LAYOUT
STA 251+00 TO STA 273+00

SCALE: 1"=100' SHEET 2 OF 3

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TEXAS	BRY	GRIMES	131
CONTROL	SECTION	JOB	
0212	04	039	

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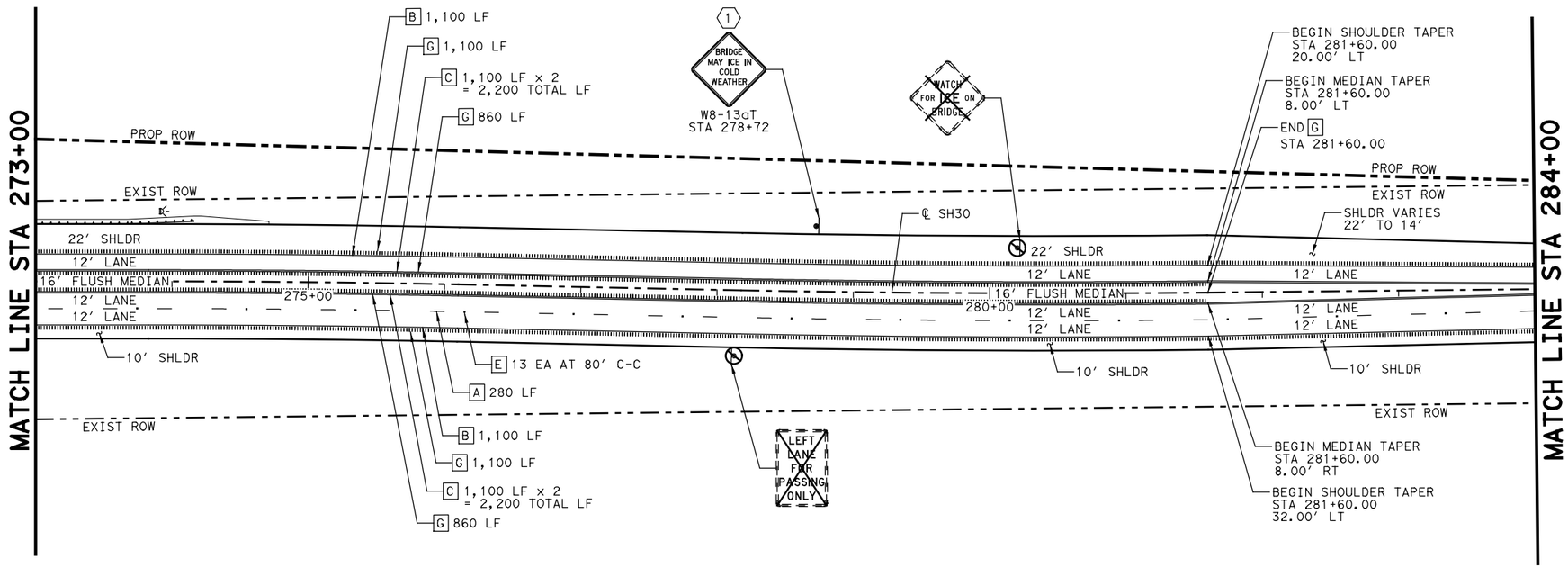

LEGEND

A	RE PM W/ RET REQ TY I (W) 4" (BRK)
B	RE PM W/ RET REQ TY I (W) 4" (SLD)
C	RE PM W/ RET REQ TY I (Y) 4" (SLD)
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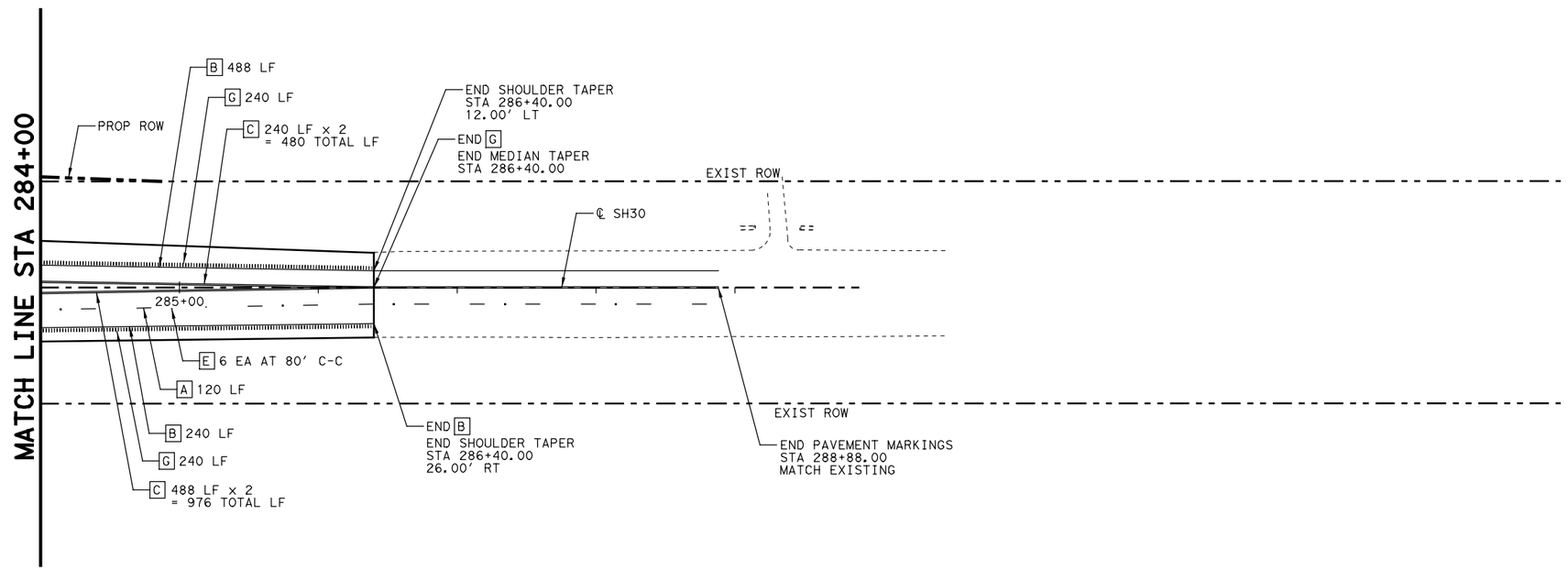
	OBJECT MARKER
	PROPOSED SIGN POST
	EXISTING SIGN POST
	EXISTING SIGN POST TO BE REMOVED
	EXISTING SIGN TO BE REMOVED
	EXISTING SIGN TO REMAIN
	PROPOSED SIGN

NOTES:

1. ALL STATION AND OFFSETS ARE FROM "CL SH30" UNLESS OTHERWISE NOTED. SEE "HORIZONTAL ALIGNMENT DATA" SHEET FOR HORIZONTAL ALIGNMENT INFORMATION.
2. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. ALL PAVEMENT MARKINGS ARE TY I (100MIL) UNLESS OTHERWISE SPECIFIED.

0 50 100 150 200

SCALE IN FEET



STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
08/17/2018
Jacob E. Walker, PE

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

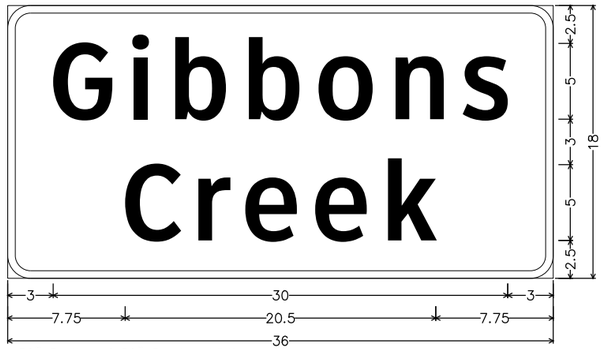
Texas Department of Transportation

SIGNING AND PAVEMENT MARKING LAYOUT
STA 273+00 TO END

SCALE: 1"=100' SHEET 3 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	132
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: I0069736.tbl
USER: KBERGER DATE: 8/17/2018 TIME: 10:37:03 AM SCALE: 1:100
FILE: SH30SS03.dgn



1.50" Radius, 0.50" Border, White on Green;
[Gibbons] ClearviewHwy-3-W
[Creek] ClearviewHwy-3-W

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: KBERGER DATE: 8/17/2018
FILE: SH30SGNOTL01.dgn
PENTABLE: I0069736.tbl
TIME: 10:37:05 AM SCALE: NTS

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

08/17/2018

Jacob E. Walker, PE

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

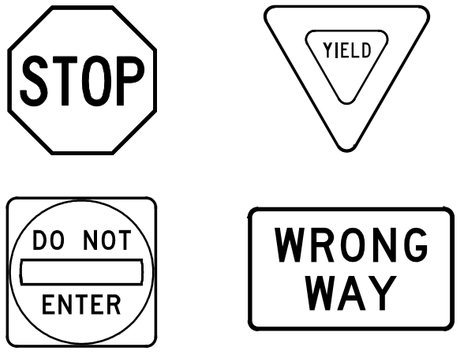
Texas Department of Transportation

SIGN DETAILS

NOT TO SCALE SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	133
CONTROL	SECTION	JOB	
0212	04	039	

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

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.

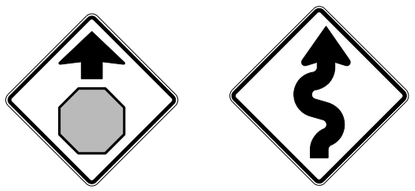
ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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/

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

Texas Department of Transportation

Traffic Operations Division Standard

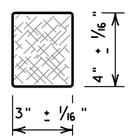
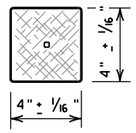
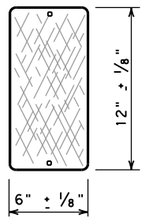
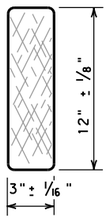
TYPICAL SIGN REQUIREMENTS

TSR(4)-13

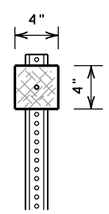
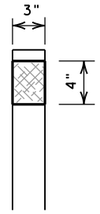
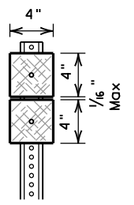
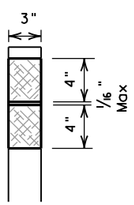
FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH30
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	BRY	GRIMES		134

4

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

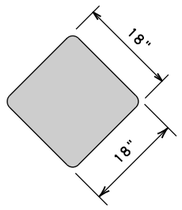
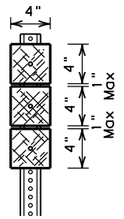
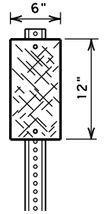
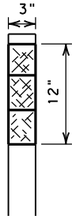
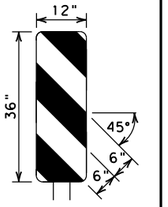
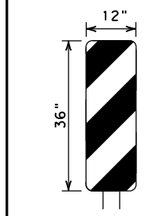
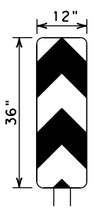
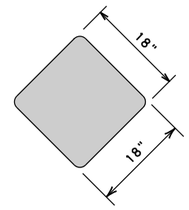
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

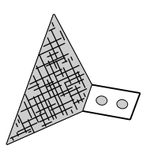
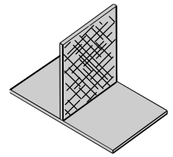
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

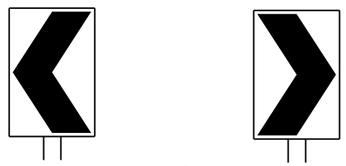
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



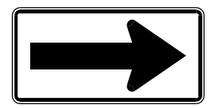
W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	BRY	GRIMES		135

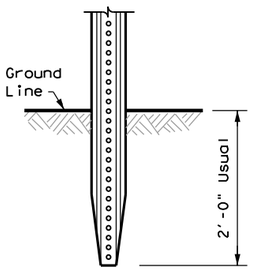
20A

DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

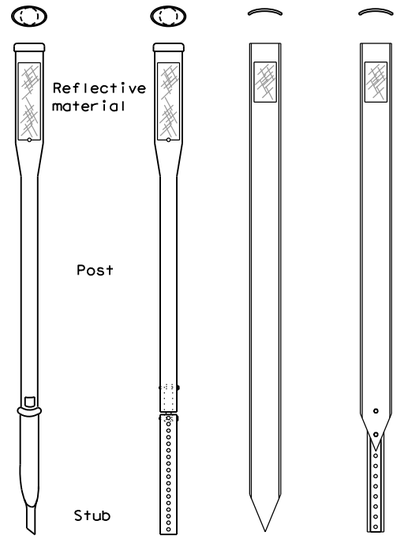


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

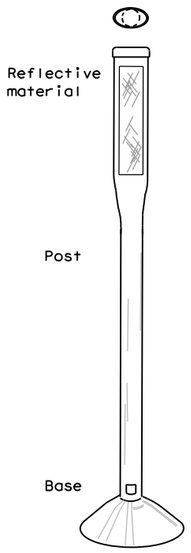
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



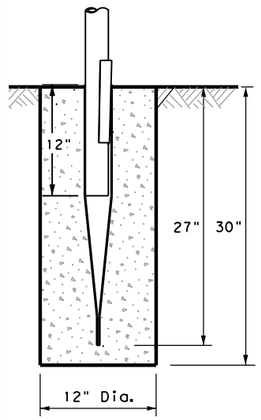
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

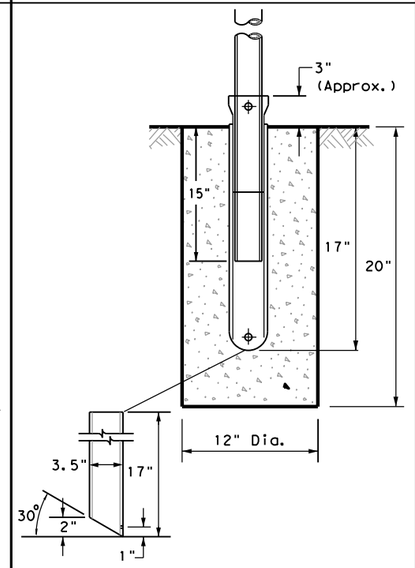
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

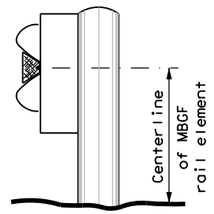
NOTE

1. Install per manufacturer's recommendations.

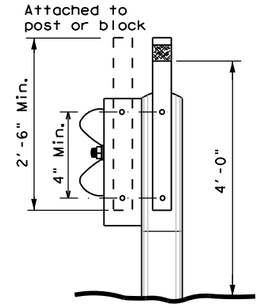
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

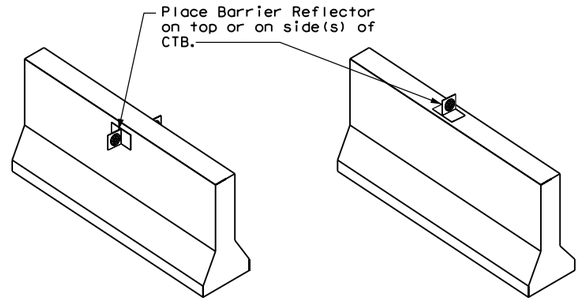
GF1



GF2



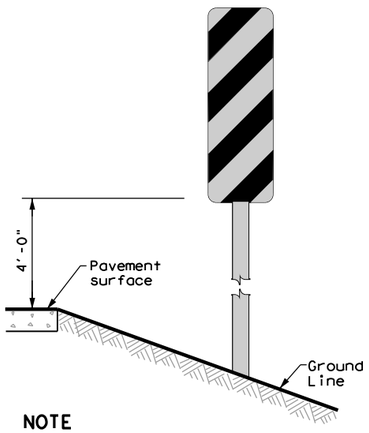
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

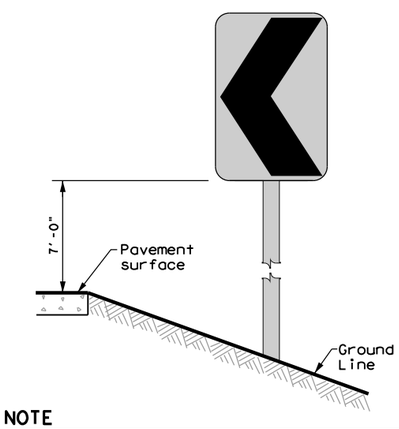
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

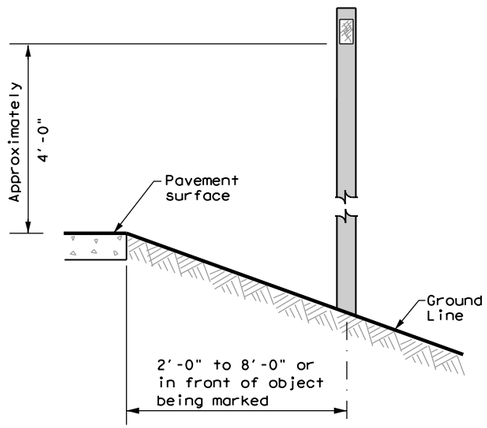
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
10-09 3-15	DIST	COUNTY		SHEET NO.
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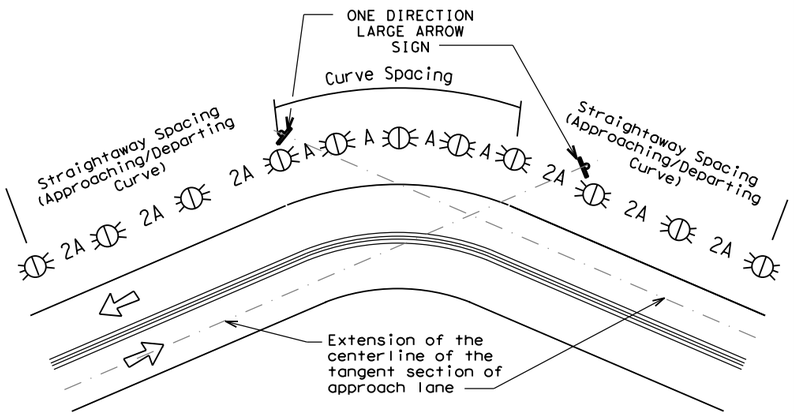
20B

DATE:
FILE:

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

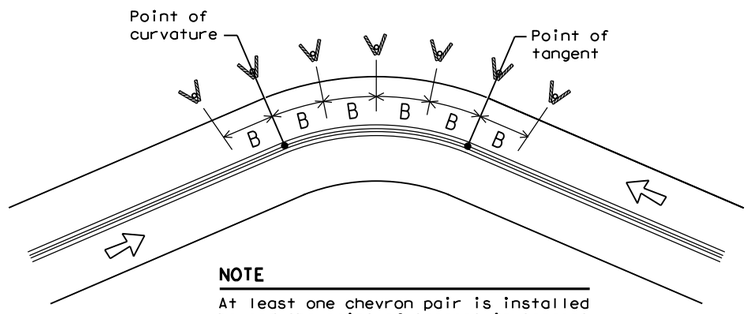
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	—
2	2865	160	320	—
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

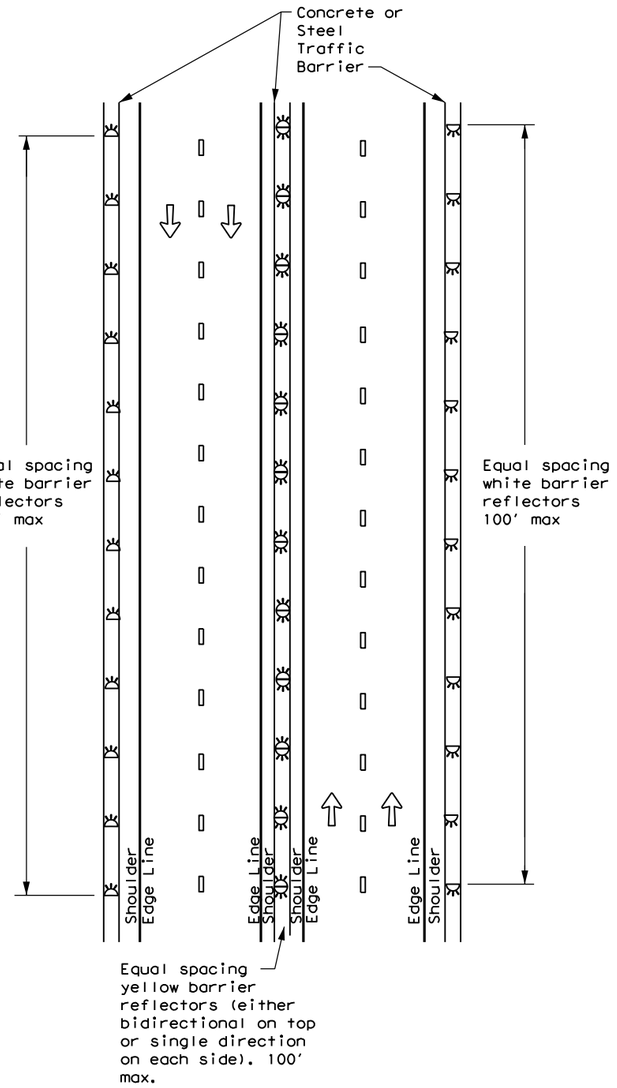
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	BRY	GRIMES		138

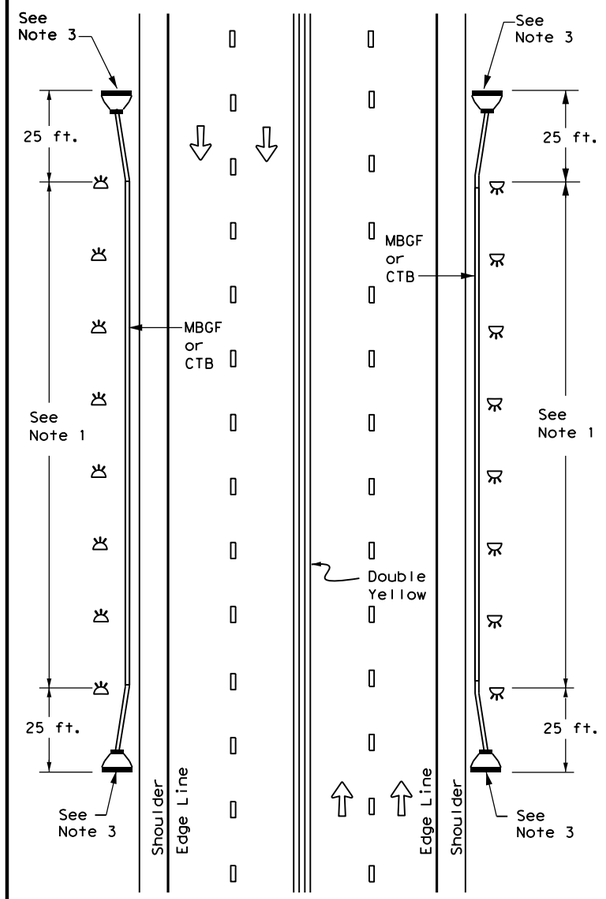
DATE:
FILE:

20C

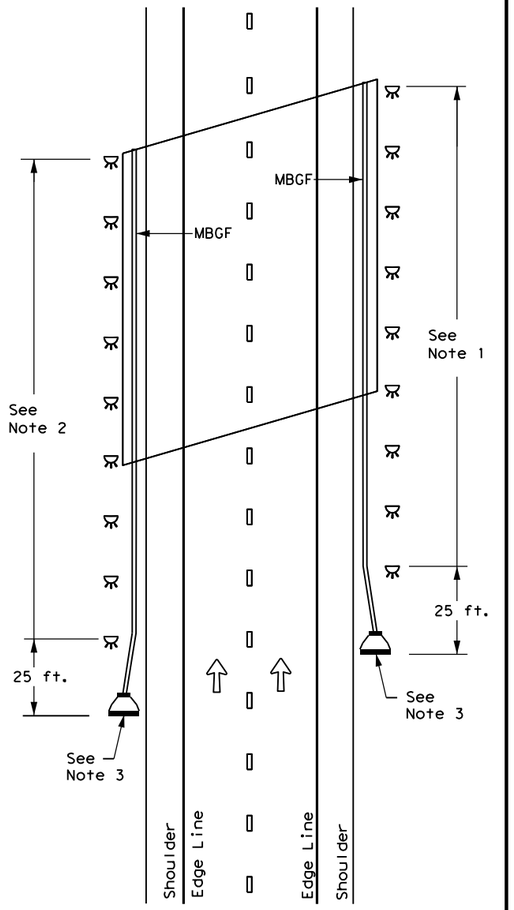
CONTINUOUS CONCRETE OR STEEL BARRIER



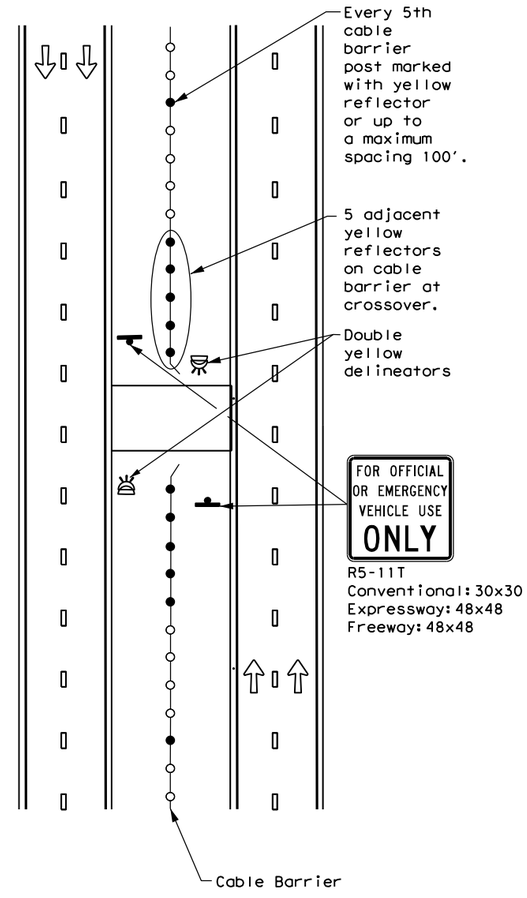
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 7-20	0202	034	039	SH 30
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	BRY	GRIMES		138

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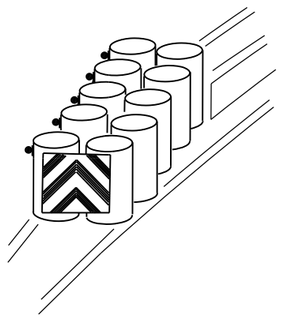
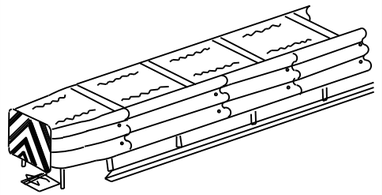
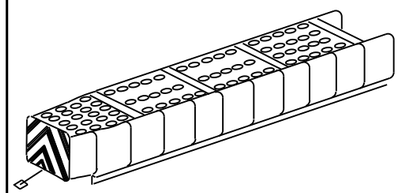
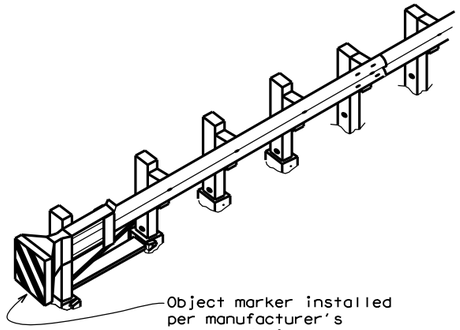
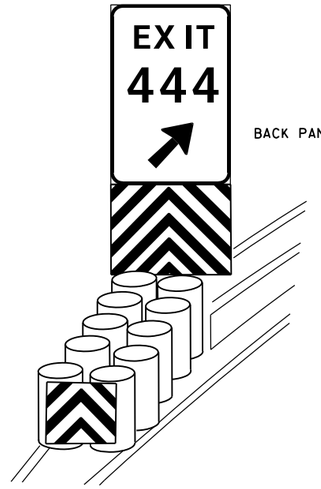
DATE: DATE$IME $TIME$
FILE: DOCUMENT NAME

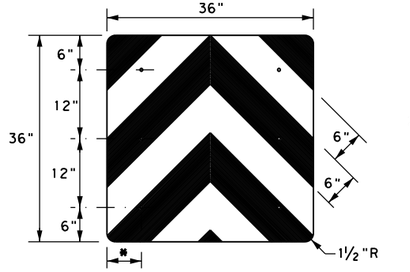


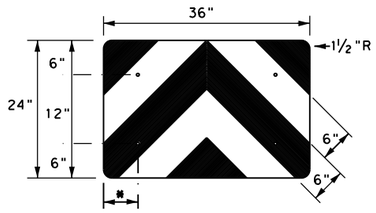




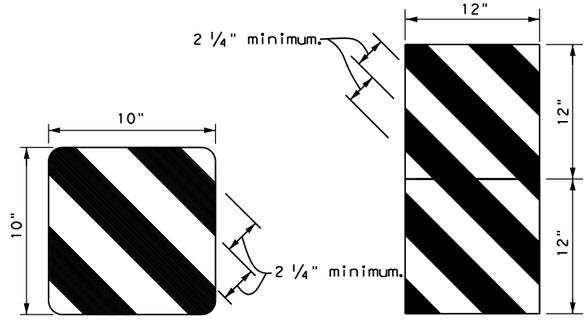




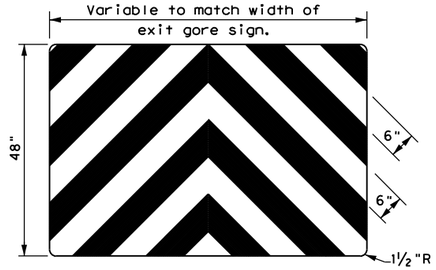


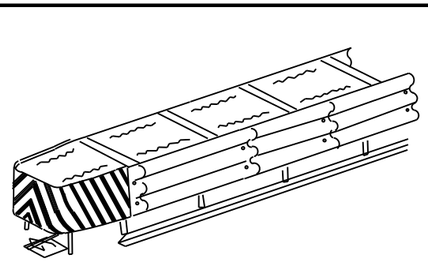


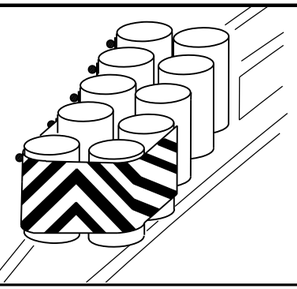
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

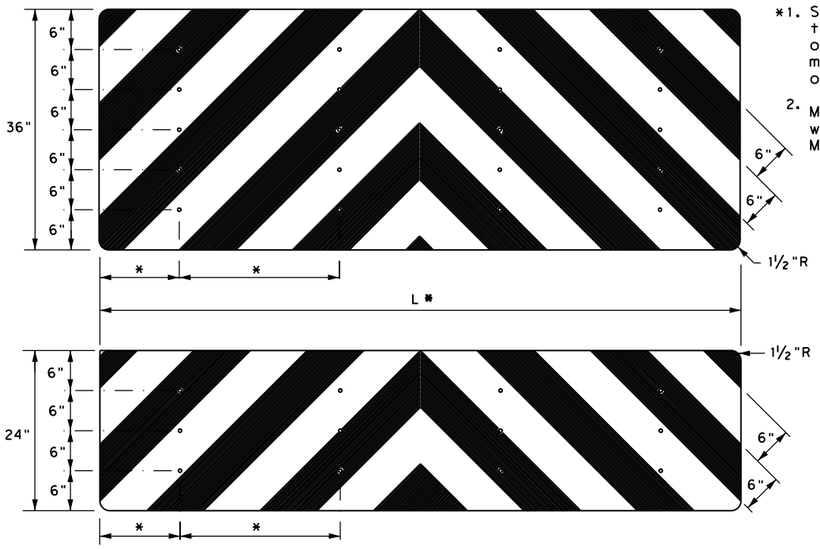


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
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4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	BRY	GRIMES		139
4-98 7-20				

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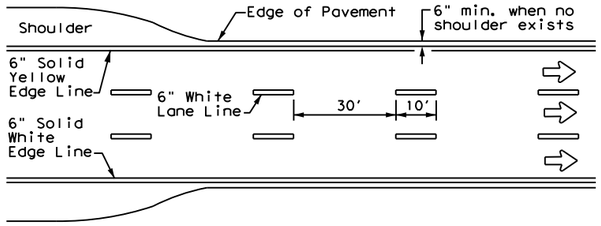
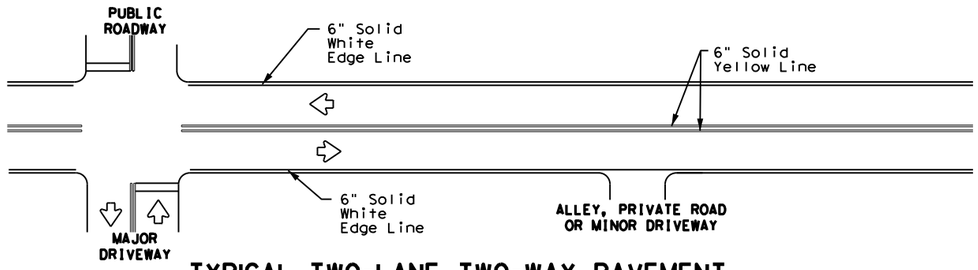
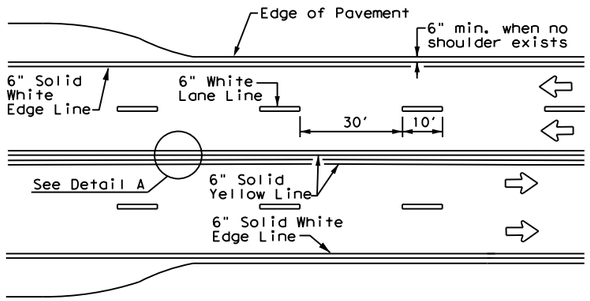
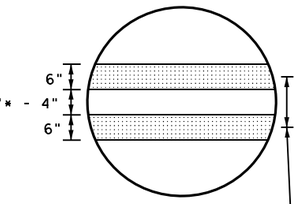


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

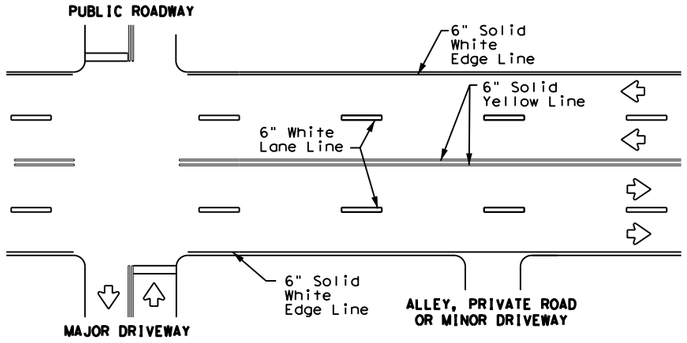




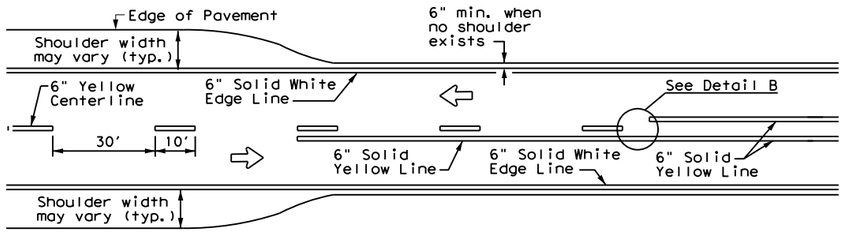
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

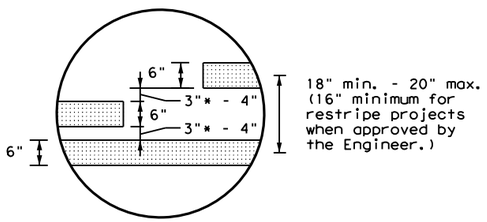
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

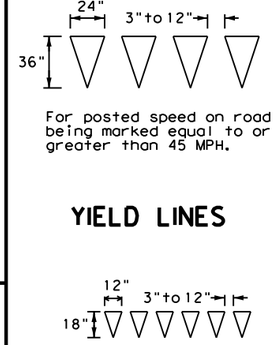


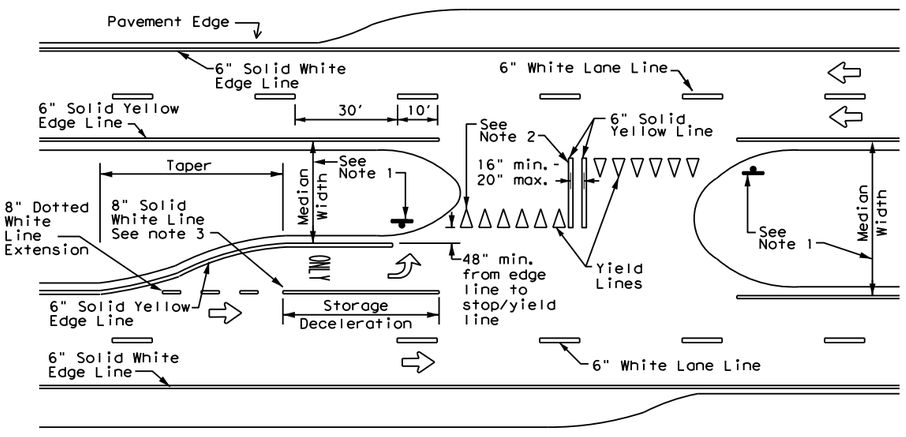
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.





FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

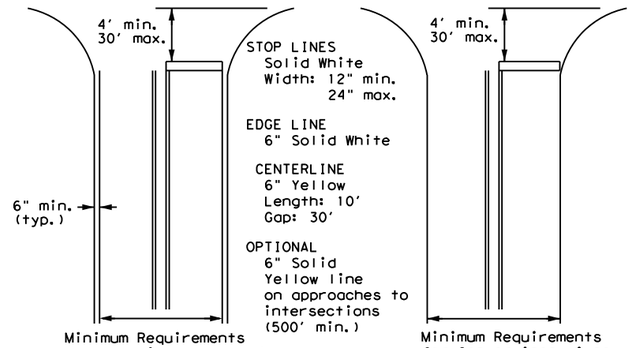
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20	0212	04	039	SH 30
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	BRY	GRIMES		140

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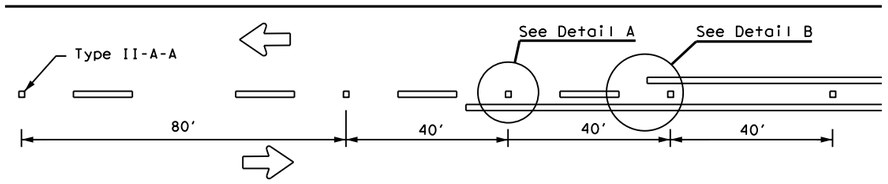
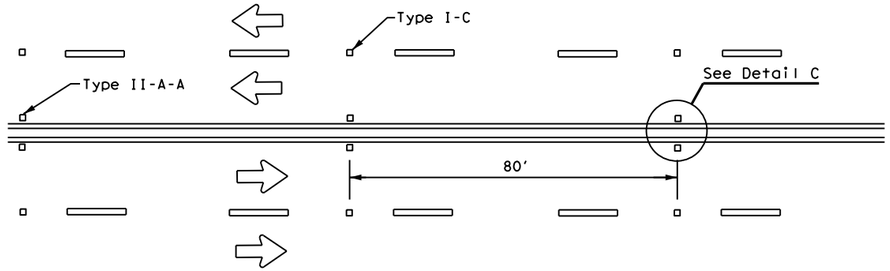
DATE: $DATE$ $TIME$
FILE: $FILE$

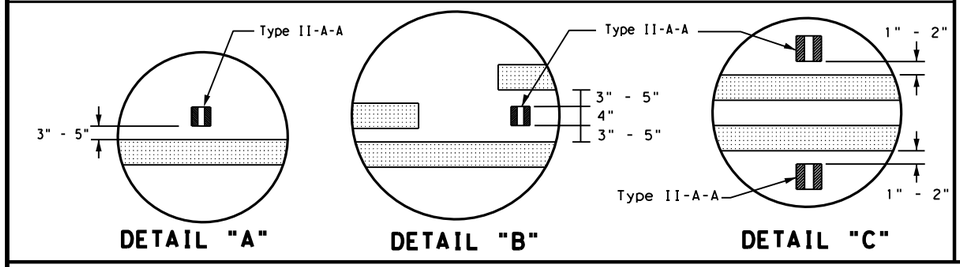
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



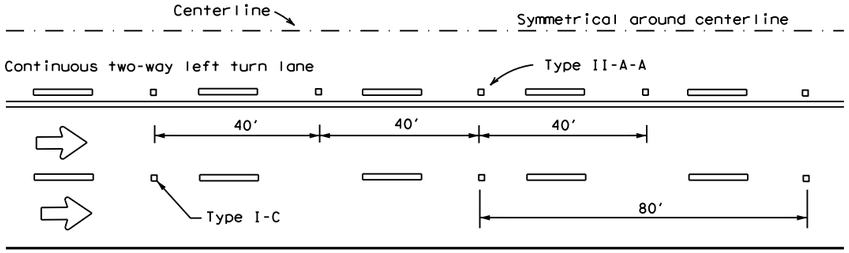
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



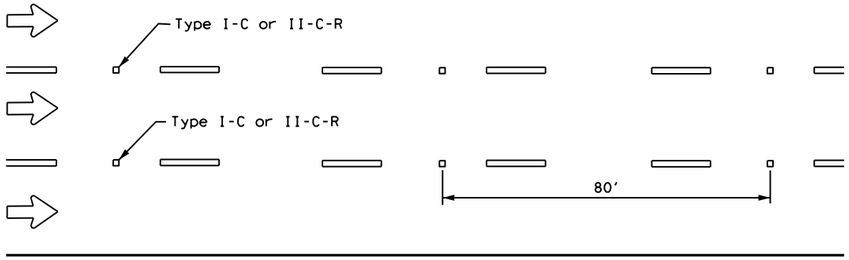
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



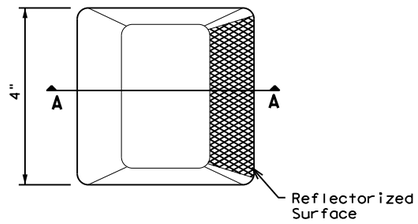
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

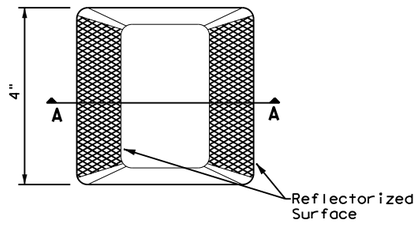
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

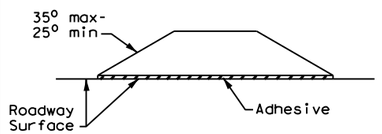
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

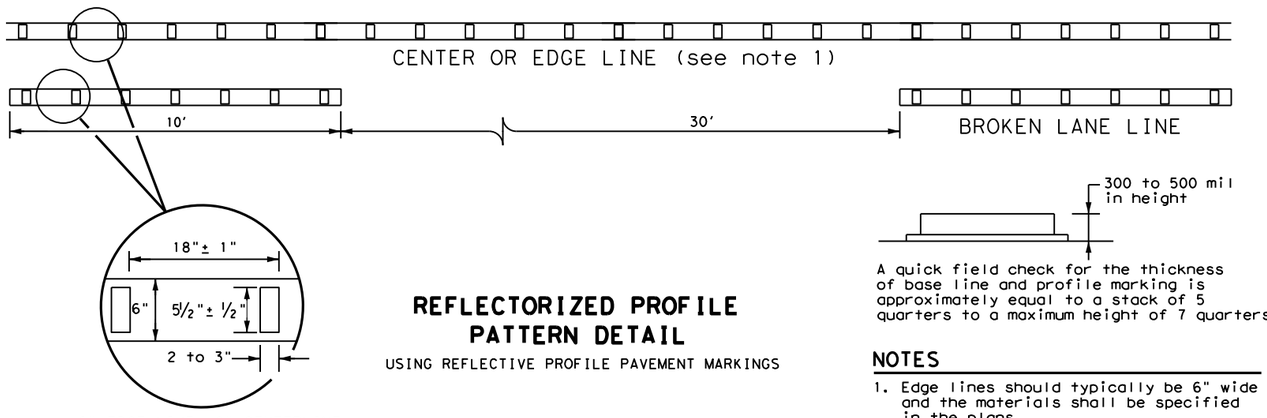


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements, the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians, and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

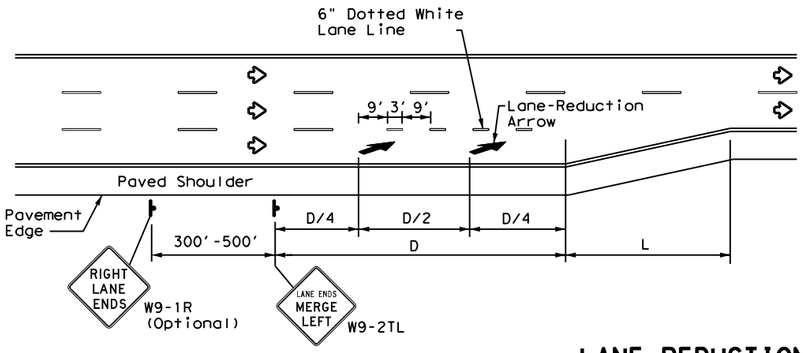
Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		141

22B

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

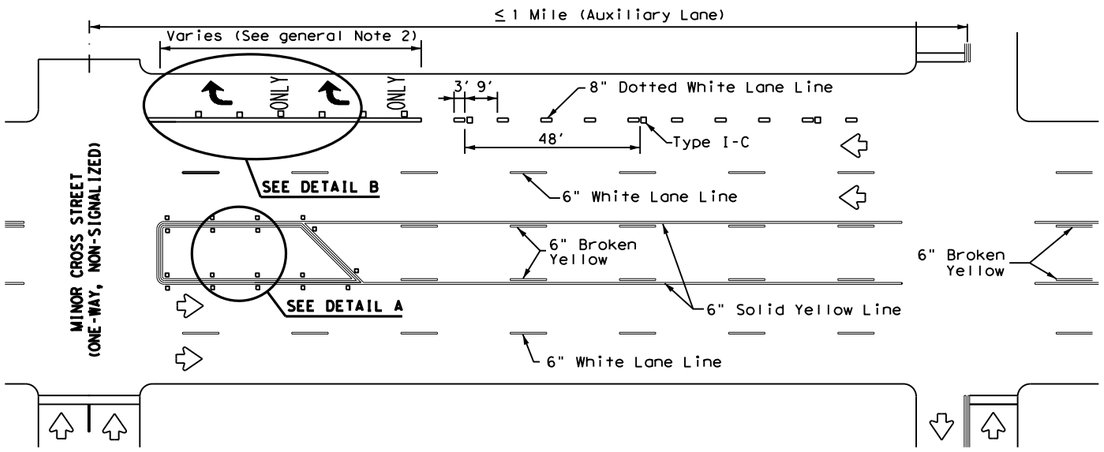


LANE REDUCTION

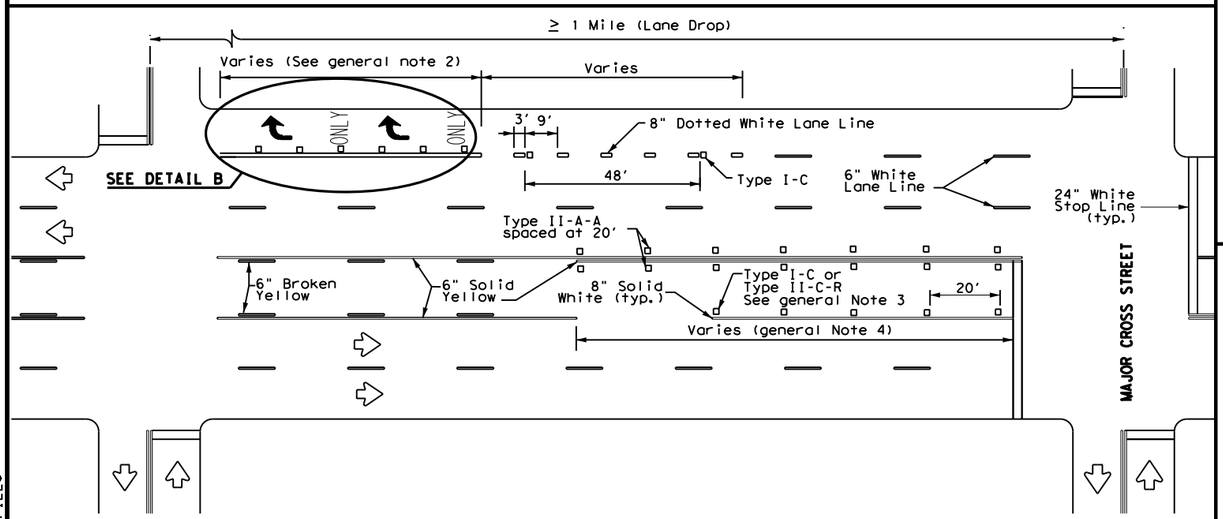
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

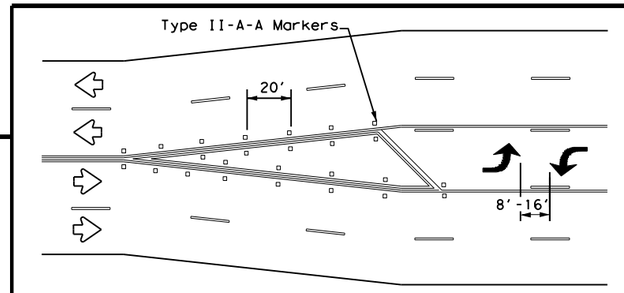
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

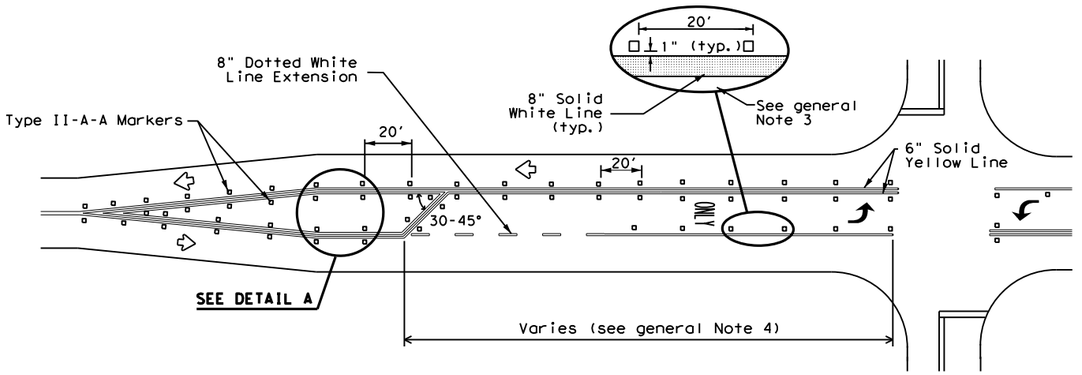
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

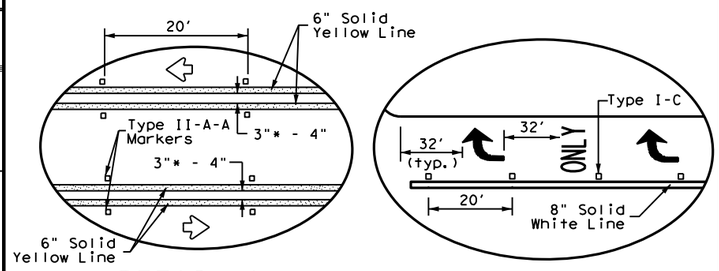
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	0212	04	039	SH 30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		142

22C

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

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)

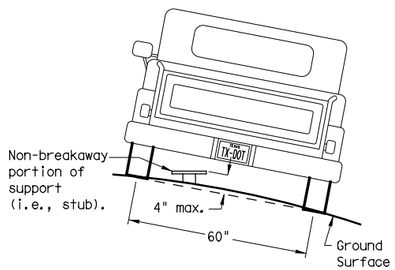
Anchor Type

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))

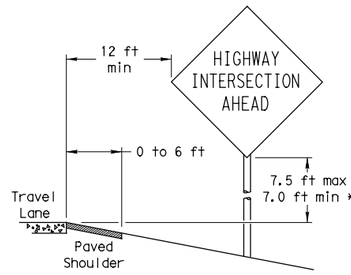
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

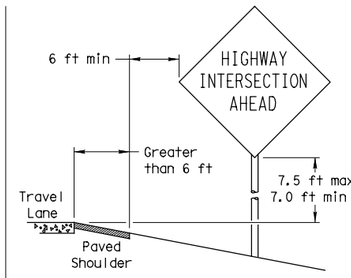
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

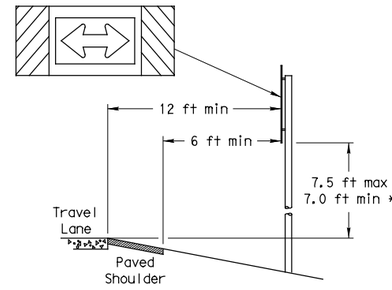
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



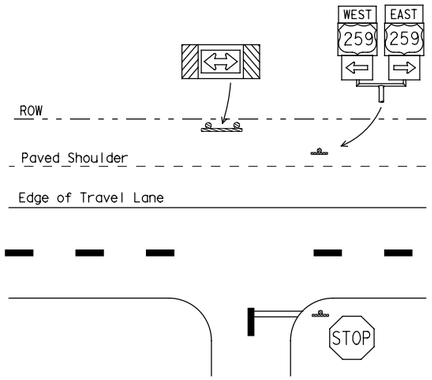
GREATER THAN 6 FT. WIDE

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.

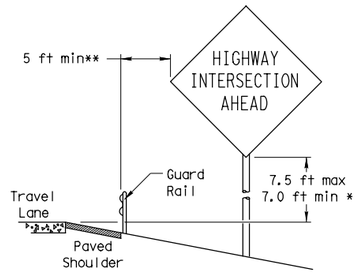
T-INTERSECTION



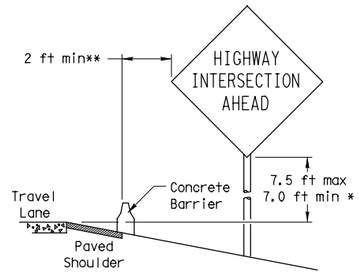
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



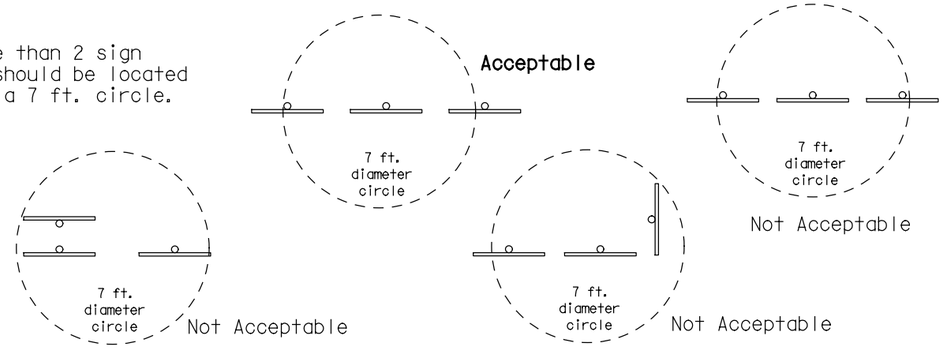
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

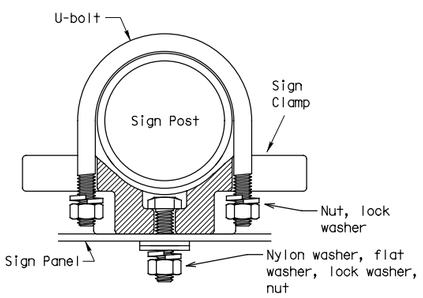
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

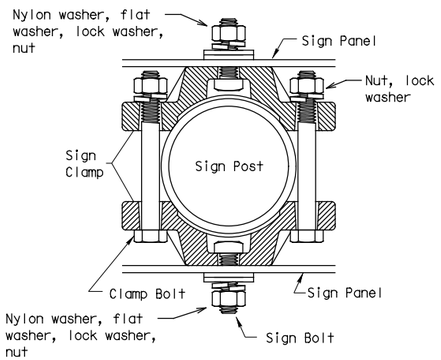


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

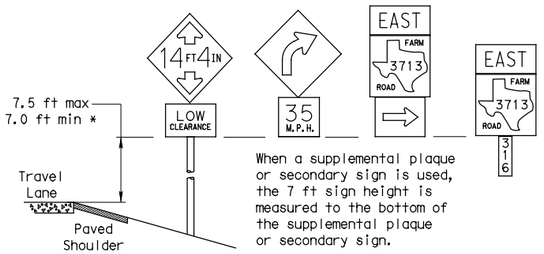
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs

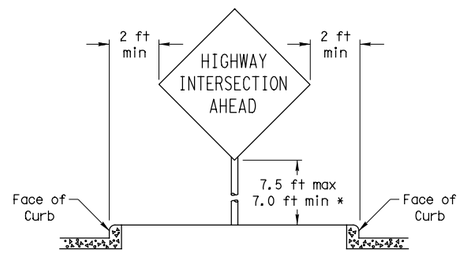


Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

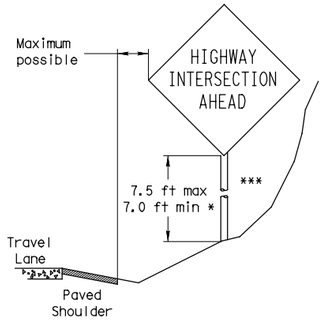


CURB & GUTTER OR RAISED ISLAND



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

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0212	04	039	SH30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		143

26A

DATE: 8/17/2018 10:37:24 AM
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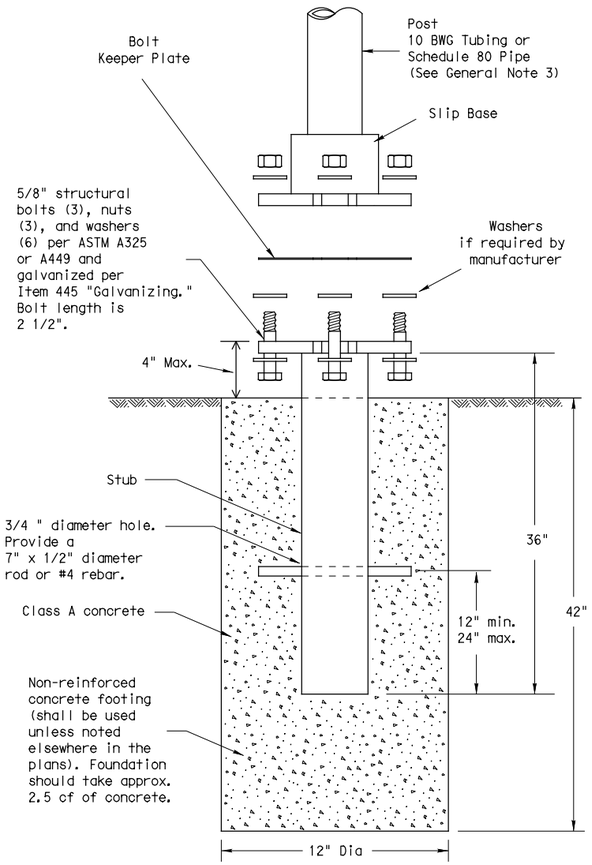
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

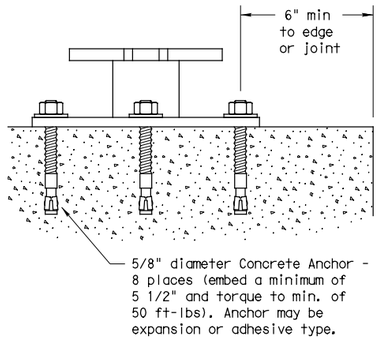
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

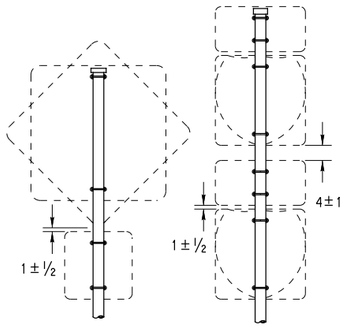
REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0212	04	039	SH30

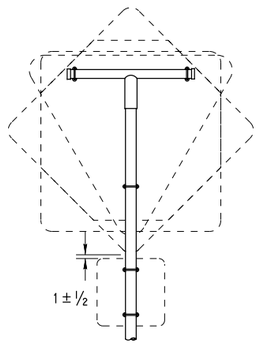
DIST	COUNTY	SHEET NO.
BRY	GRIMES	144

26B

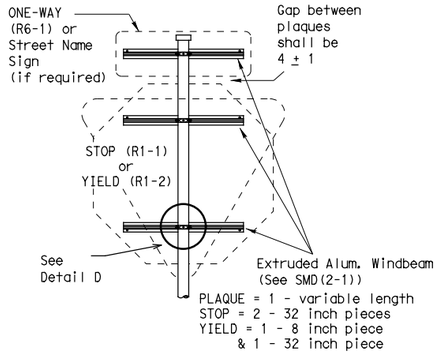
DATE: 8/17/2018 10:37:26 AM
FILE: c:\pwworking\central01\d0669807\smds1.dgn



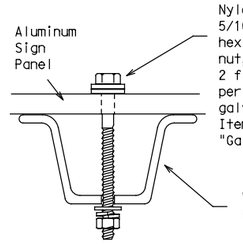
SM RD SGN ASSM TY XXXXX(1)XX(P)



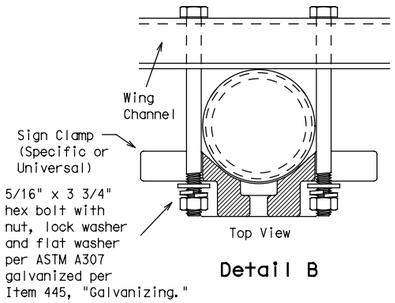
SM RD SGN ASSM TY XXXXX(1)XX(T)



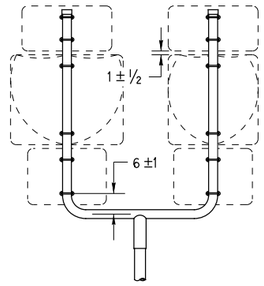
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



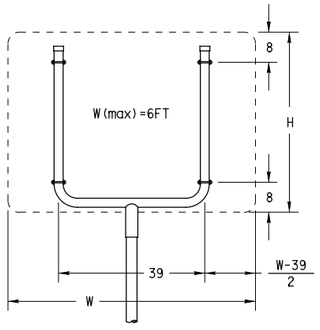
Detail A



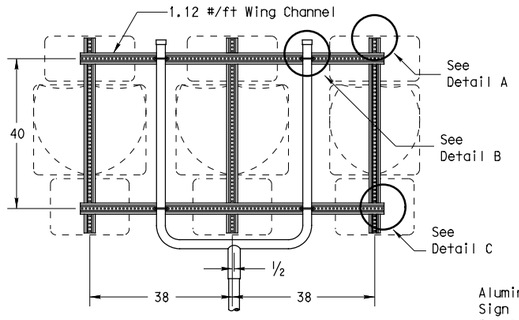
Detail B



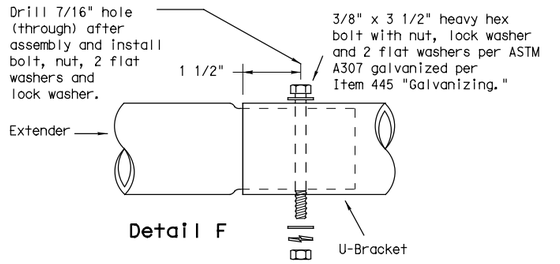
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

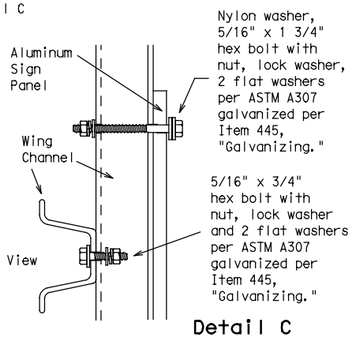


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

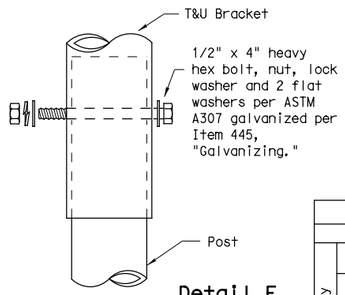


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



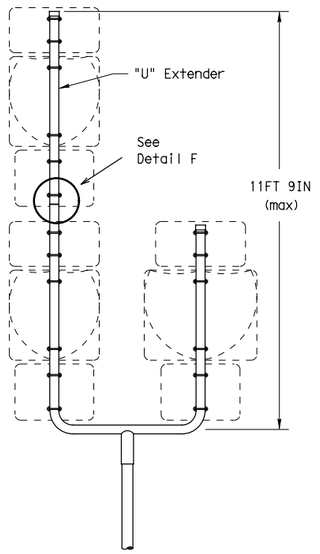
Detail E

GENERAL NOTES:

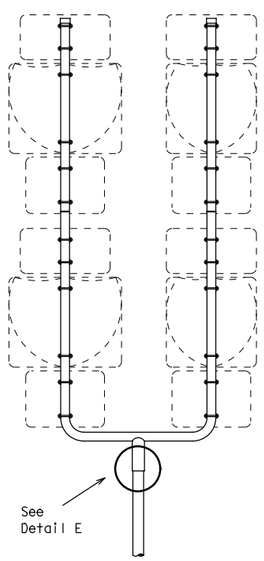
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

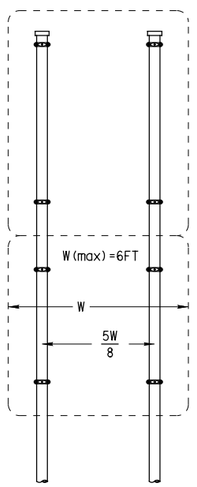
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

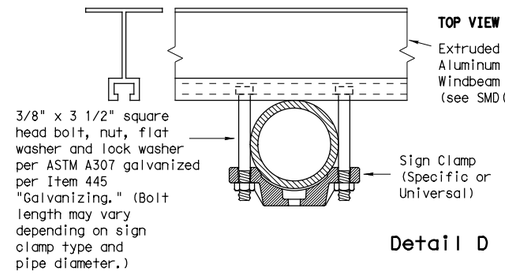


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

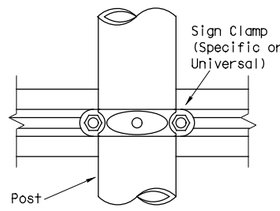


SM RD SGN ASSYM TY XXXXX(2)XX(P)

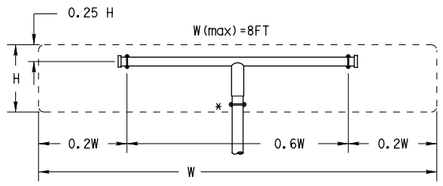
SIDE VIEW



Detail D



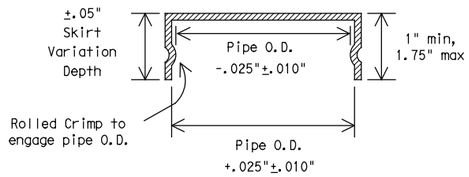
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0212	04	039	SH30

DIST	COUNTY	SHEET NO.
BRY	GRIMES	145

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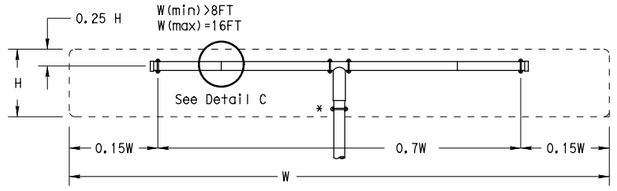
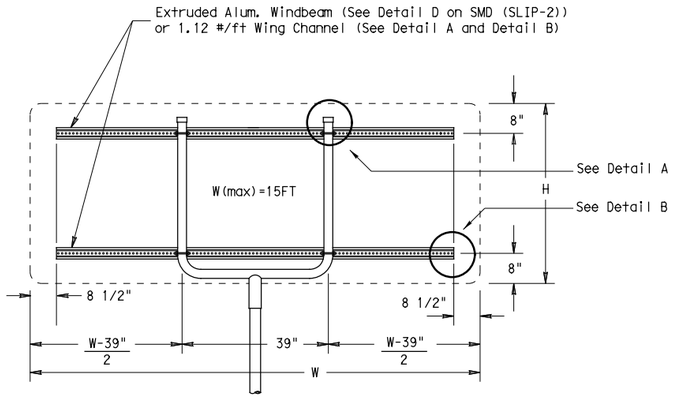
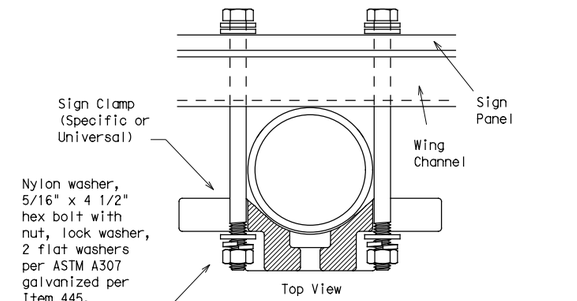


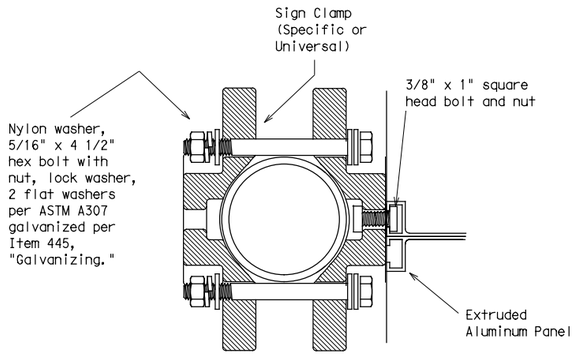
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



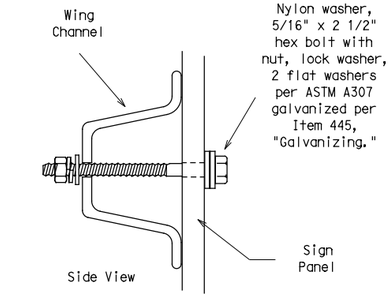
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



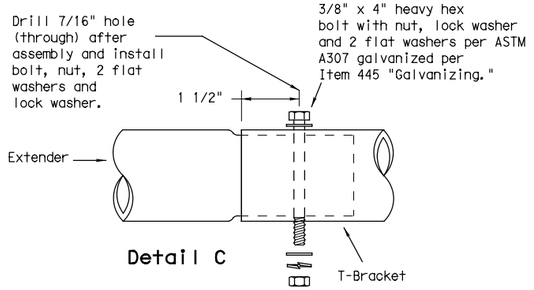
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

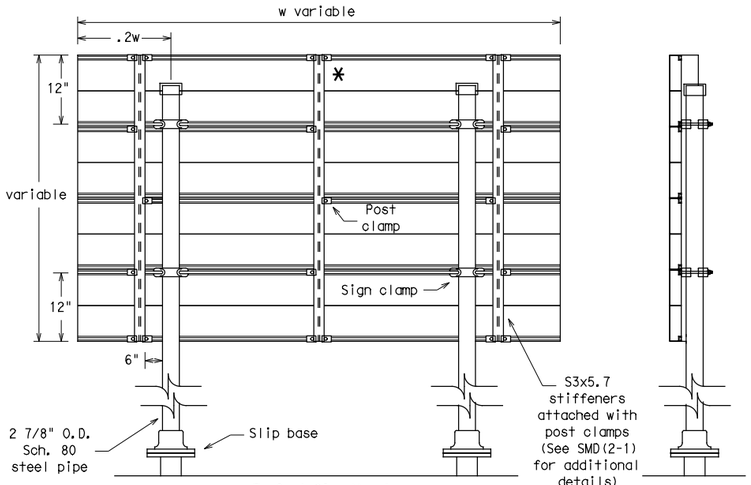


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

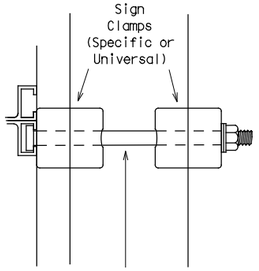


Typical Sign Mount

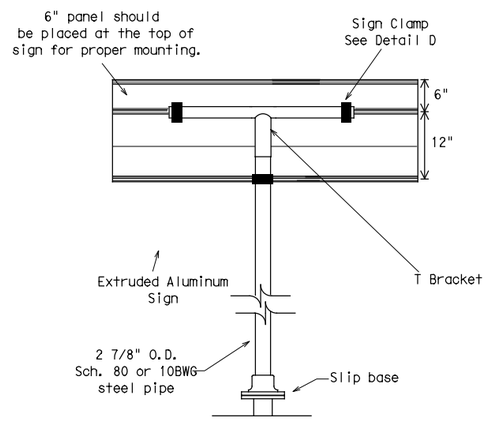
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

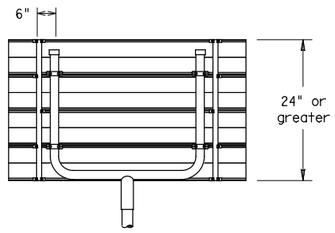
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0212	04	039	SH30

DIST	COUNTY	SHEET NO.
BRY	GRIMES	146

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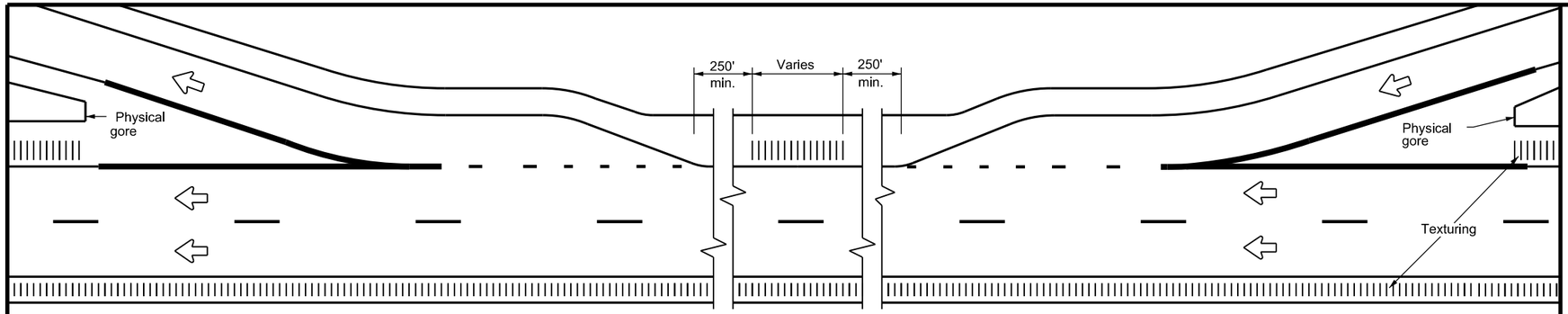
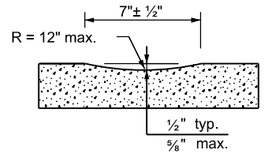
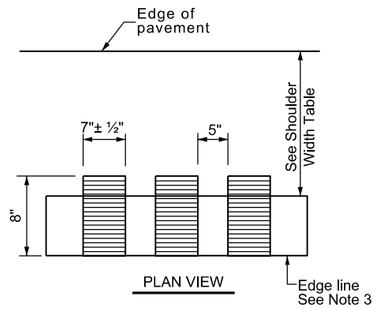


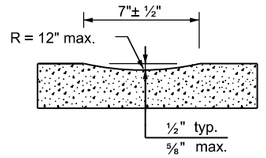
TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPS



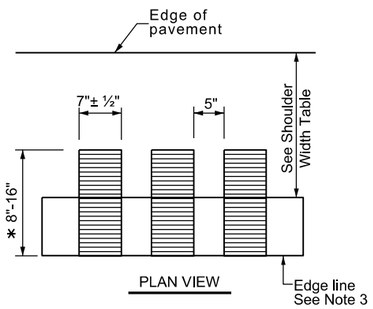
PROFILE VIEW
OPTION 1



CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

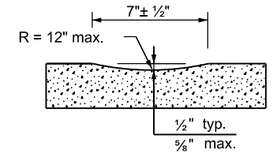


PROFILE VIEW
OPTION 2

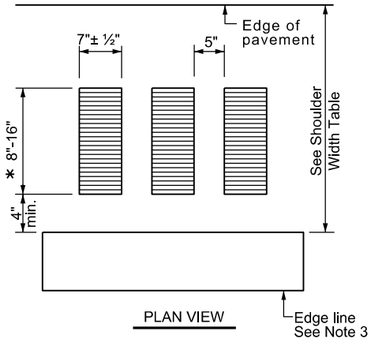


* This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

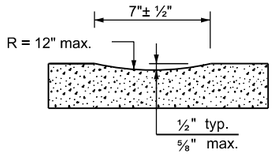


PROFILE VIEW
OPTION 3

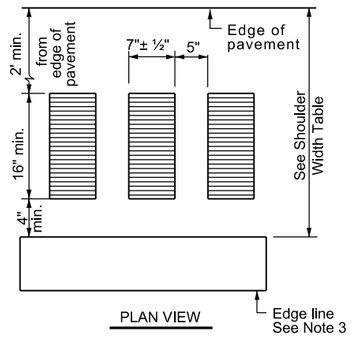


* This distance may vary based on width of shoulder

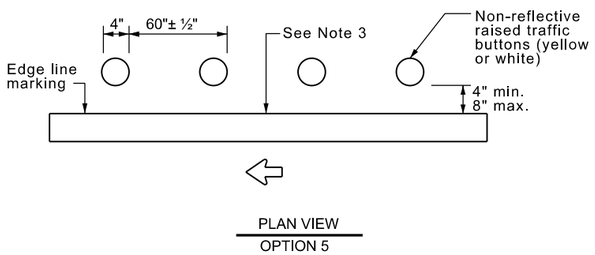
CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PROFILE VIEW
OPTION 4

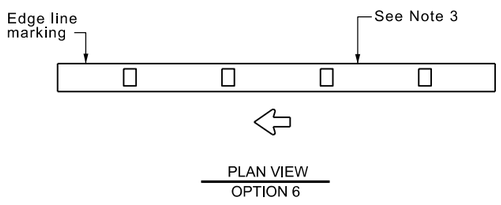


CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW
OPTION 5

RAISED EDGE LINE
(Rumble Strips)



PLAN VIEW
OPTION 6

PROFILE EDGE LINE MARKINGS
(Rumble Strips)

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use standard sheets PM(2) and FPM(1) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the Shoulder Width Table below for determining what options may be used for edge line rumble strips.
5. Breaks in edge line rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections, or driveways with high usage of large trucks when installed on conventional highways.
6. Rumble strips shall not be placed across exit or entrance ramps, acceleration or deceleration lanes, crossovers, gore areas, or intersections with other roadways.
7. Consideration should be given to noise levels when edge line rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

9. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
10. Pavement markings can be applied over milled shoulder rumble strips to create an edge line rumble stripe.

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edge line when used as a rumble strip. The color of the button should match the color of the adjacent edge line marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. The minimum distance between the edge line and the buttons should be used if the shoulder is less than 8 feet in width.
15. Raised profile thermoplastic markings used as edge lines may substitute for buttons.

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5, or 6	Option 1, 2, 3, 5, or 6	Option 2, 4, 5, or 6

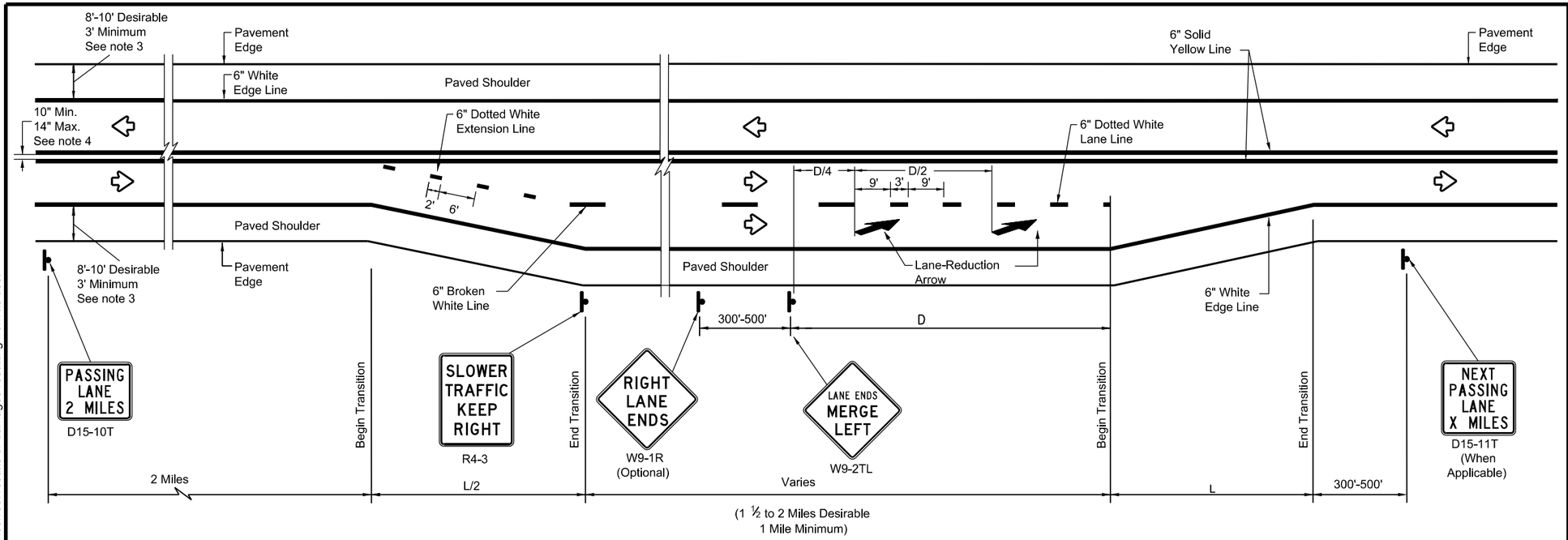
Texas Department of Transportation

Traffic Safety Division Standard

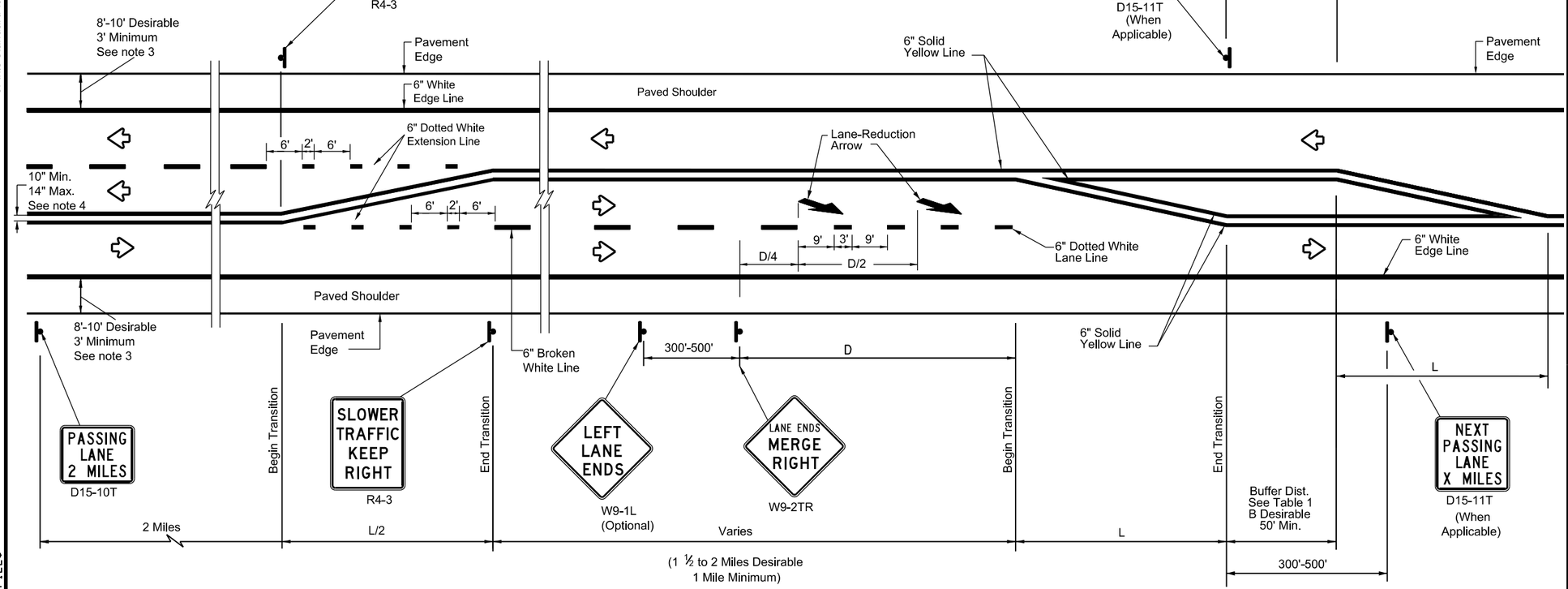
EDGE LINE RUMBLE STRIPS ON FREEWAYS AND DIVIDED HIGHWAYS
RS(1)-23

FILE: rs(1)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
4-06 1-23	DIST	COUNTY		SHEET NO.
2-10	BRY	GRIMES		147
10-13				

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



SEPARATED



ALTERNATING

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

LEGEND

	Sign
	Traffic Flow

TYPICAL TAPER LENGTH (L)

Formula *	L = WS

* Transition length should be rounded up to nearest 5 foot increment.

L=Length of Transition (FT)
W=Width of Offset (FT)
S=Posted Speed (MPH)

EXAMPLE

A 12 foot lane is added on a 70 mph roadway.
The length of the transition should be:

L=12x70=840 ft

TABLE 1
ADVANCE WARNING SIGN DISTANCE (D) AND BUFFER DISTANCE (B)

Posted Speed	D (FT)	B (FT)
40	670	305
45	775	360
50	885	425
55	990	495
60	1100	570
65	1200	645
70	1250	730
75	1350	820

GENERAL NOTES

1. For minimum and desirable design details, see the Roadway Design Manual, Chapter 4, Section 6, Super 2 Highways.
2. For Raised Pavement Markers (RPM) details, see Pavement Markings Standard sheet, PM(2) - Centerline for All Two Lane Two-Way Roadways. Note that RPMs are not recommended on the 6" dotted white extension lines.
3. For rumble strip options available for the designed shoulder width, see Rumble Strip Standard sheet RS(2).
4. For pavement marking details, see Pavement Marking Standard sheet PM(1).

Texas Department of Transportation

Traffic Safety Division Standard

TEXAS SUPER 2 PASSING LANES

TS2(PL-1)-23

FILE: ts2-1-23.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH 30
5-10 3-18	DIST	COUNTY		SHEET NO.
2-12 2-23	BRY	GRIMES		148
3-12				

25

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

For all projects with soil disturbing activity and for projects that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

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

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0212-04-039

1.2 PROJECT LIMITS:
From: At Gibbons Creek

To:

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 30.5947° ,(Long) -96.0664°

END: (Lat) 30.5949° ,(Long) -96.0618°

1.4 TOTAL PROJECT AREA (Acres): 18.3 Ac

1.5 TOTAL AREA TO BE DISTURBED (Acres): 14.2 Ac

1.6 NATURE OF CONSTRUCTION ACTIVITY:
For the construction of replacing existing bridge consisting of grading, structures, and base.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
3% Elmina loamy fine sand, 1-5% slopes	Clayey, somewhat poorly drained, high runoff, erosion class 1
12% Hatliff fine sandy loam, freq. flooded	Coarse-loamy, moderately well drained, high runoff, erosion class 1
5% Lufkin-Rader complex, 0-2% slopes	Fine grained, moderately well drained, very high runoff, erosion cl. 1
68% Nahatche clay loam, freq. flooded	Fine-loamy, moderately well drained, high runoff, erosion class 1
1% Shiro loamy fine sand, 1-5% slopes	Fine grained, well drained, high runoff, erosion class 1
11% Shiro loamy fine sand, 5-8% slopes	Fine grained, well drained, high runoff, erosion class 1

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

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

Type	Sheet #s

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

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

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

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

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

Tributaries	Classified Waterbody
Gibbons Creek	*Gibbons Creek (1209I); Impaired for bacteria, depressed dissolved oxygen in water
Navasota River	*Navasota River(1209); Impaired for bacteria

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

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

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

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

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

MS4 Entity

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BR 2B24(147)		149
STATE	STATE DIST.	COUNTY	
TEXAS	BRY	GRIMES	
CONT.	SECT.	JOB	HIGHWAY NO.
0212	04	039	SH 30

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

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

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

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

T / P

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

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

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

2.5 POLLUTION PREVENTION MEASURES:

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

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

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

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

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

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BR 2B24(147)		149A
STATE	STATE DIST.	COUNTY	
TEXAS	BRY	GRIMES	
CONT.	SECT.	JOB	HIGHWAY NO.
0212	04	039	SH 30

During the planning phase of project development the following environmental permits, issues and commitments have been developed during coordination with resource agencies, local governmental entities and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities. As additional environmental clearances may be required.

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.

☒ Required Action ☐ No Action Required

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

Refer to 2014 TxDOT Standard Specification Items:
7.7.2 Texas Pollutant Discharge Elimination System (TPDES) Permits and Storm Water Pollution Prevention PLans (SWP3)
506 Temporary Erosion, Sedimentation and Environmental Controls
734 Litter Removal
735 Debris Removal
738 Cleaning and Sweeping Highways

II. WORK IN OR NEAR STREAMS, WATER BODIES 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 locations of waters of the US.

1. Gibbons Creek, STA. 268+30

Information regarding the USACE Nationwide Permit Program can be found at:
http://www.swf.usace.army.mil/Missions/Regulatory/Permitting/GeneralPermits.aspx

Refer to 2014 TxDOT Standard Specification Items:
7.7.3 Work in Waters of the United States
7.7.6 Project Specific Locations
496 Removing Structures
506 Temporary Erosion, Sedimentation and Environmental Controls
506.4.3.4 Restricted Activities and Required Precautions

III. CULTURAL RESOURCES

Refer to 2014 TxDOT Standard Specification Item 7.7.1 Cultural Resources, in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) immediately cease work in the vicinity and contact the Engineer.

☐ Required Action ☒ No Action Required

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.

☐ Required Action ☒ No Action Required

Refer to 2014 TxDOT Standard Specification Items:
160 Topsoil
161 Compost
162 Sodding for Erosion Control
164 Seeding for Erosion Control
166 Fertilizer
168 Vegetative Watering
169 Soil Retention Blankets
170 Irrigation System
180 Wildflower Seeding
192 Landscape Planting
193 Landscape Establishment
506 Temporary Erosion, Sedimentation, and Environmental Controls
730 Roadside Mowing
751 Landscape Maintenance
752 Tree and Brush Removal

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

☒ Required Action ☐ No Action Required

Action No.

1. Do not kill snakes or other animals!
2. Do not destroy nests on structures within the project limits.

   Temporarily prevent the building of nests on any structures that require work within the project limits during the construction timeframe.

   This can be accomplished by application of bird repellant gel, netting, or removal by hand every 3-4 days.

   The nesting/breeding season for migratory birds is March 1 - September 1.

Under the Migratory Bird Treaty Act (MBTA), it is unlawful by any means or manner, to pursue, hunt, take, capture, [or] kill any migratory birds except as permitted by regulation (16 U.S.C. 703-704). Neither the statute nor its implementing regulations (Title 50, Code of Federal Regulations, Parts 10, 13, 21) exempt unintentional take of migratory birds. The unauthorized take (e.g. killing, capturing, or collecting) of migratory birds is a strict liability criminal offense that does not require knowledge or specific intent on the part of the offender. Even when engaged in an otherwise lawful activity for which the intent is not the killing of migratory birds, a violation may be committed.

3. If caves or sinkholes are discovered, cease work in the immediate area to verify the presence or absence of wildlife.
4. BMPs for T and E species will be discussed at the preconstruction meeting.

The Bryan District Environmental Section can be contacted at (979) 778-9766 to assist with the removal of wildlife that will not leave on their own with gentle persuasion.

Refer to 2014 TxDOT Standard Specification Item:
7.7.6 Project Specific Locations

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropiate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

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

Contact the Engineer if any of the follwing are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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 notifiy 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 discoverd on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ Required Action ☐ No Action Required

Action No.

1. The Clean Water Act, in part, requires that any spill of oil that could enter a waterway, as defined by the Act, and that violates applicable water quality standards or causes a film or sheen on water require reporting to the TCEQ and local authorities.
   Contact the Bryan District Enviromental Section at 979-778-9766.

   If potentially hazardous material and/or contaminated media (i.e. soil, groudwater, surface water, sediment, building materials) are unexpectedly encountered during construction, immediately cease work in the vicinity and contact the Engineer.

   Refer to 2014 TxDOT Standard Specification Items:
   6.10 Hazardous Materials
   7.12 Responsibility for Hazardous Materials

VII. OTHER ENVIRONMENTAL ISSUES

☐ Required Action ☒ No Action Required

Refer to 2014 TxDOT Standard Specification Items:
7.7.6 Project Specific Locations
751 Landscape Maintenance

Contacts:

Mr. John D. Moravec
Environmental Coordinator
Texas Department of Transportation
Bryan District
2591 N. Earl Rudder Freeway
Bryan, TX 77803
Phone: (979) 778-9766
Fax: (979) 778-9702
e-mail: John.Moravec@txdot.gov

PRINT DATE	REVISION DATE
05/03/2024	02/12/2015

Texas Department of Transportation
Bryan District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	—	SH 30

STATE	DISTRICT	COUNTY	
TEXAS	BRY	GRIMES	
CONTROL	SECTION	JOB	SHEET NO.
0212	04	039	150

REV DATE: 2-12-2015
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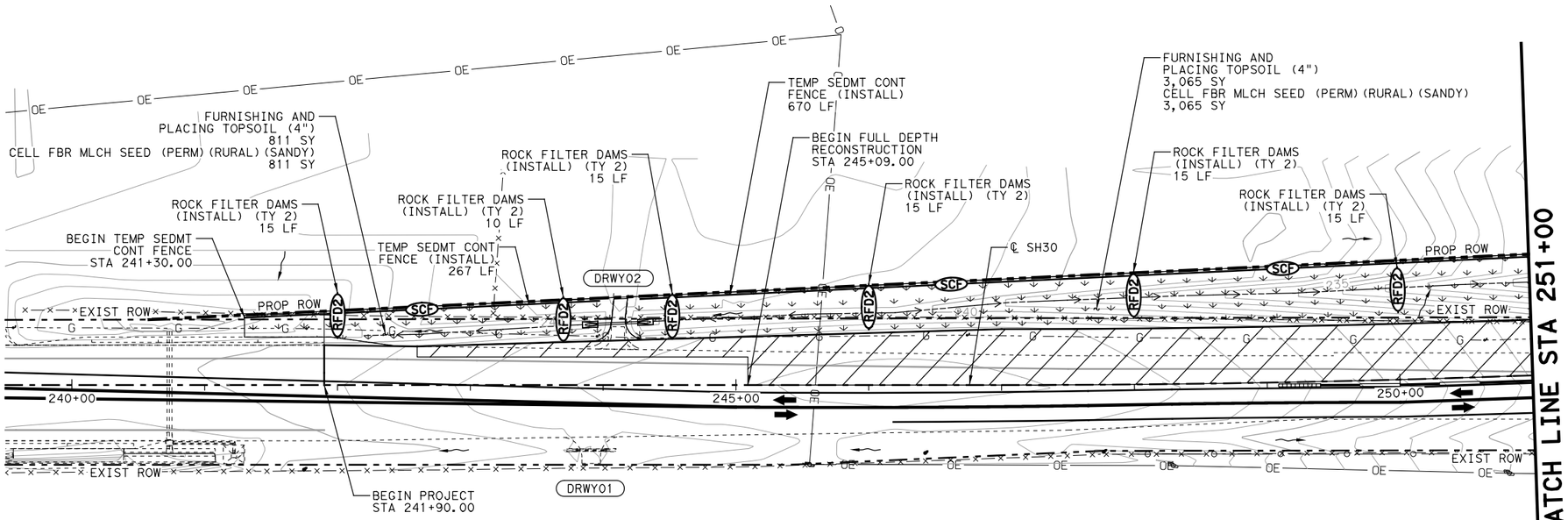


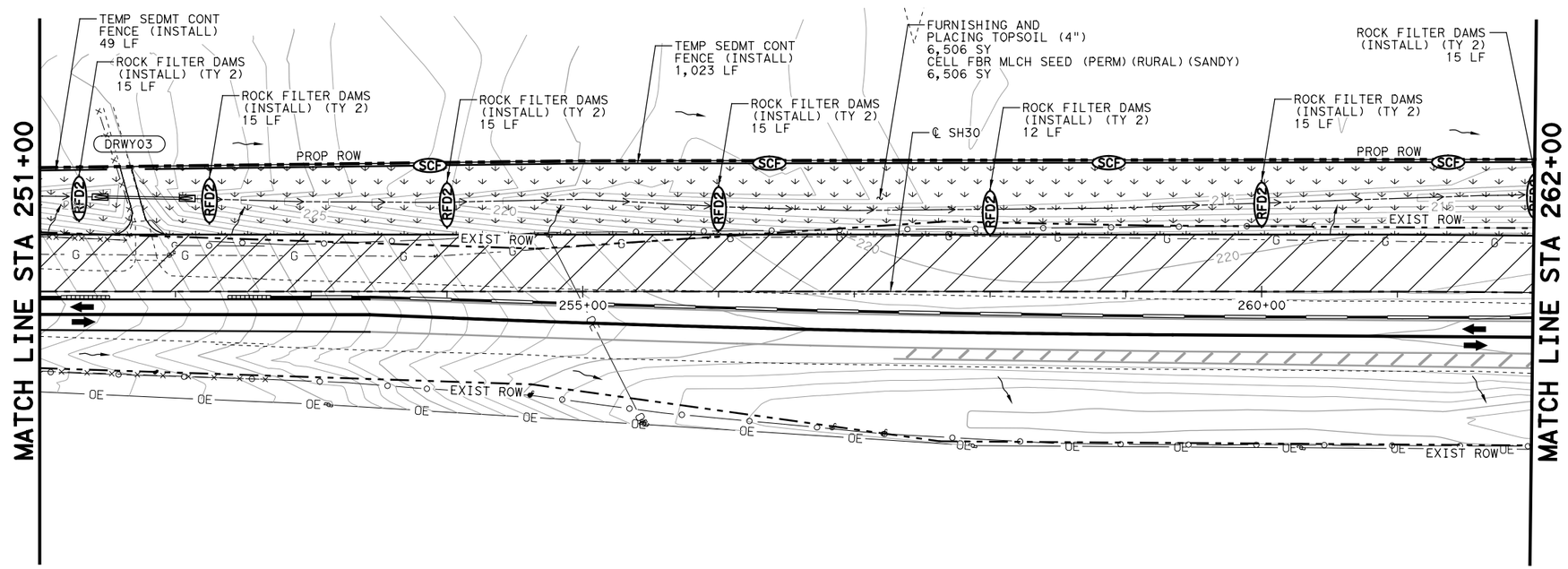
LEGEND

- LIMITS OF TOPSOIL AND SEEDING
- WORK AREA (THIS PHASE)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE (THIS PHASE)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE (PREVIOUS PHASE)
- RFD2 — ROCK FILTER DAM (THIS PHASE)
- RFD2 — ROCK FILTER DAM (PREVIOUS PHASE)
- FLOW ARROW

NOTES:

1. CONSTRUCTION EXIT/ENTRANCE LOCATIONS ARE TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
2. FIELD VERIFY LOCATIONS OF BMPs SHOWN AND ALTER LOCATIONS AS NEEDED TO ACHIEVE INTENDED PURPOSE AS APPROVED.
3. MAINTAIN SW3P CONTROL MEASURES THROUGHOUT CONSTRUCTION.
4. APPLY VEGATATIVE WATERING AS NEEDED TO SUPPLEMENT NATURAL PERIOD. DROUGHT OR OTHER ENVIRONMENTAL CONDITIONS, AS DETERMINED, MAY REQUIRE THE APPLICATIONS OF SUPPLEMENTAL IRRIGATION TO BE BETWEEN THE HOURS OF 6PM AND 8AM.
5. SW3P MEASURES ARE NOT TO SCALE.

0 50 100 150 200
SCALE IN FEET



STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

08/17/2018

Jacob E. Walker, PE

NO.	DATE	REVISION	APPROVED

HDR
Firm Registration No. F-754
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
512.685.2900

Texas Department of Transportation

TEMPORARY SW3P PLAN PHASE 1
BEGIN TO STA 262+00

SCALE: 1"=100' SHEET 1 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	151
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
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FILE: SH30SW3P101.dgn
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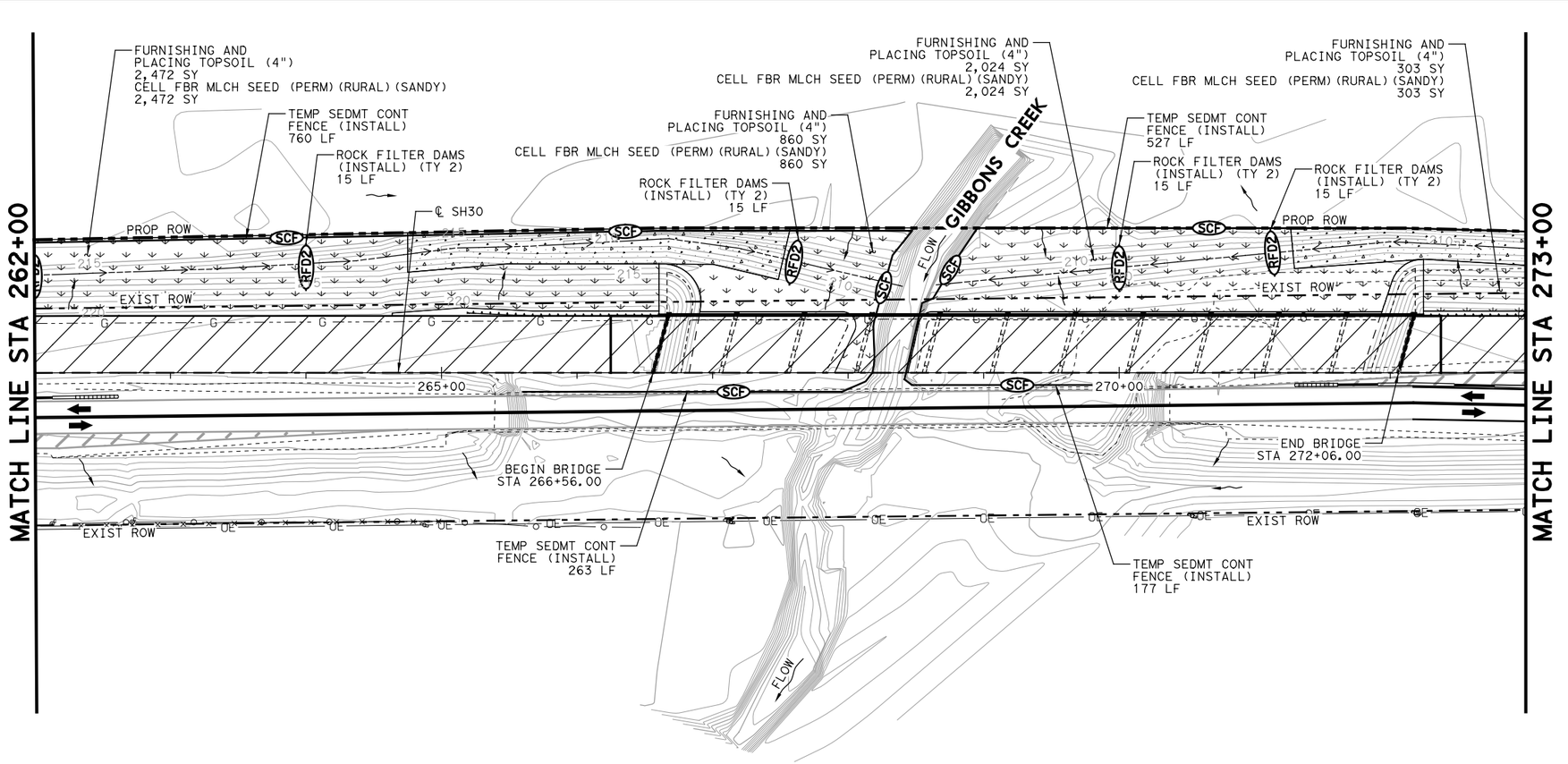

LEGEND

- LIMITS OF TOPSOIL AND SEEDING
- WORK AREA (THIS PHASE)
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- SCF — TEMPORARY SEDIMENT CONTROL FENCE (PREVIOUS PHASE)
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- RFD2 — ROCK FILTER DAM (PREVIOUS PHASE)
- FLOW ARROW

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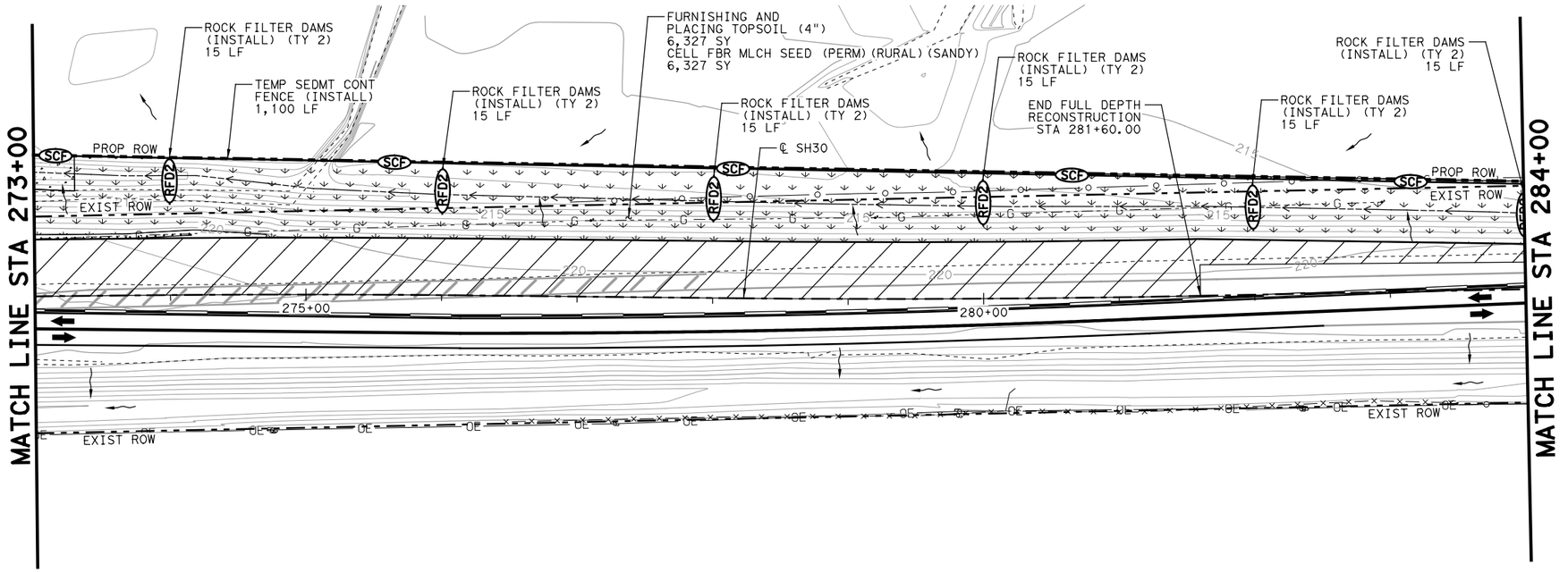
5. SW3P MEASURES ARE NOT TO SCALE.



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PENTABLE: I0069736.tbl
TIME: 10:37:44 AM
DATE: 8/17/2018
SCALE: 1:100

STATE OF TEXAS
JACOB E. WALKER
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08/17/2018

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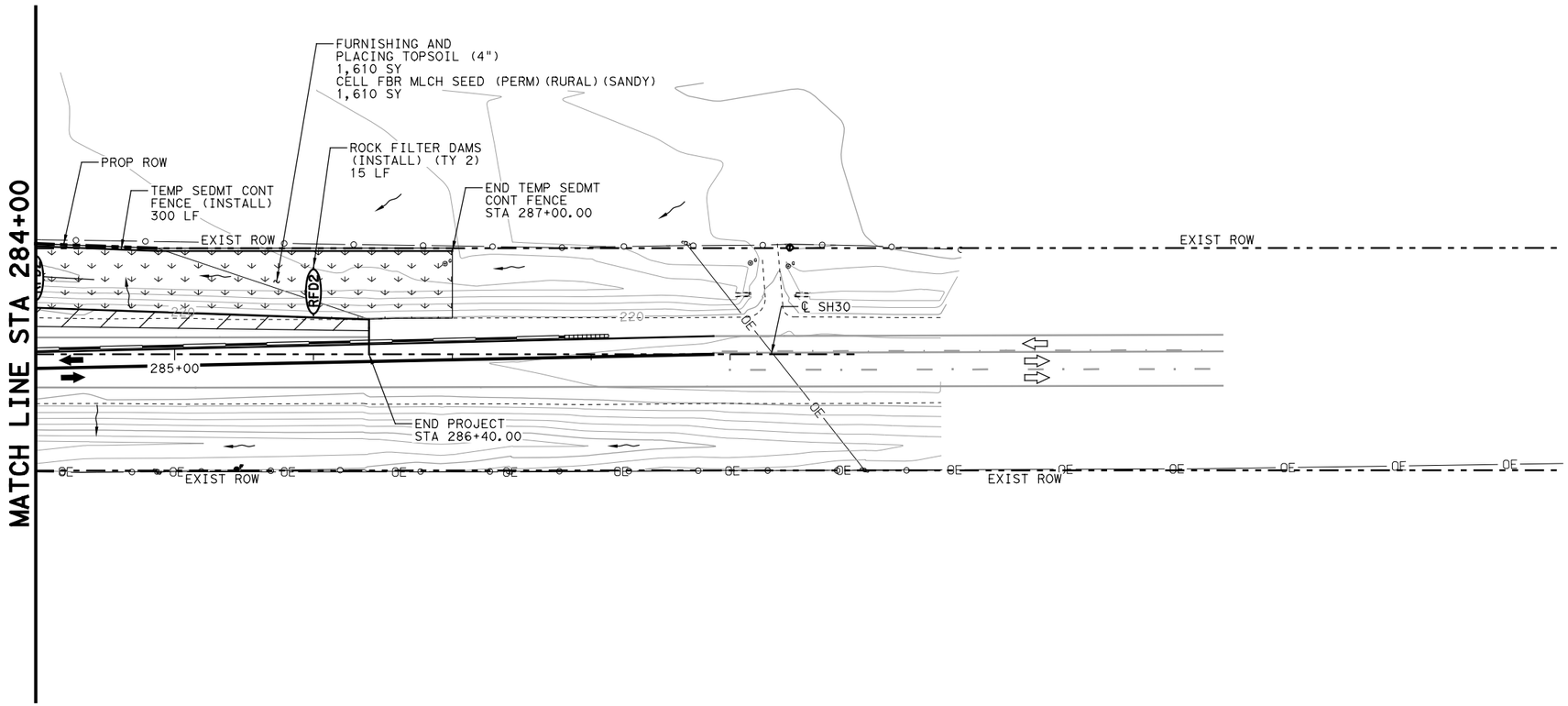
Texas Department of Transportation

TEMPORARY SW3P PLAN PHASE 1
STA 262+00 TO STA 284+00

SCALE: 1"=100' SHEET 2 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	152
CONTROL	SECTION	JOB	
0212	04	039	



N

LEGEND

- LIMITS OF TOPSOIL AND SEEDING
- WORK AREA (THIS PHASE)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE (THIS PHASE)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE (PREVIOUS PHASE)
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- RFD2 — ROCK FILTER DAM (PREVIOUS PHASE)
- FLOW ARROW

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5. SW3P MEASURES ARE NOT TO SCALE.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
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PROFESSIONAL ENGINEER
08/17/2018

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Texas Department of Transportation

TEMPORARY SW3P PLAN PHASE 1
STA 284+00 TO END

SCALE: 1"=100' SHEET 3 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	153
CONTROL	SECTION	JOB	
0212	04	039	

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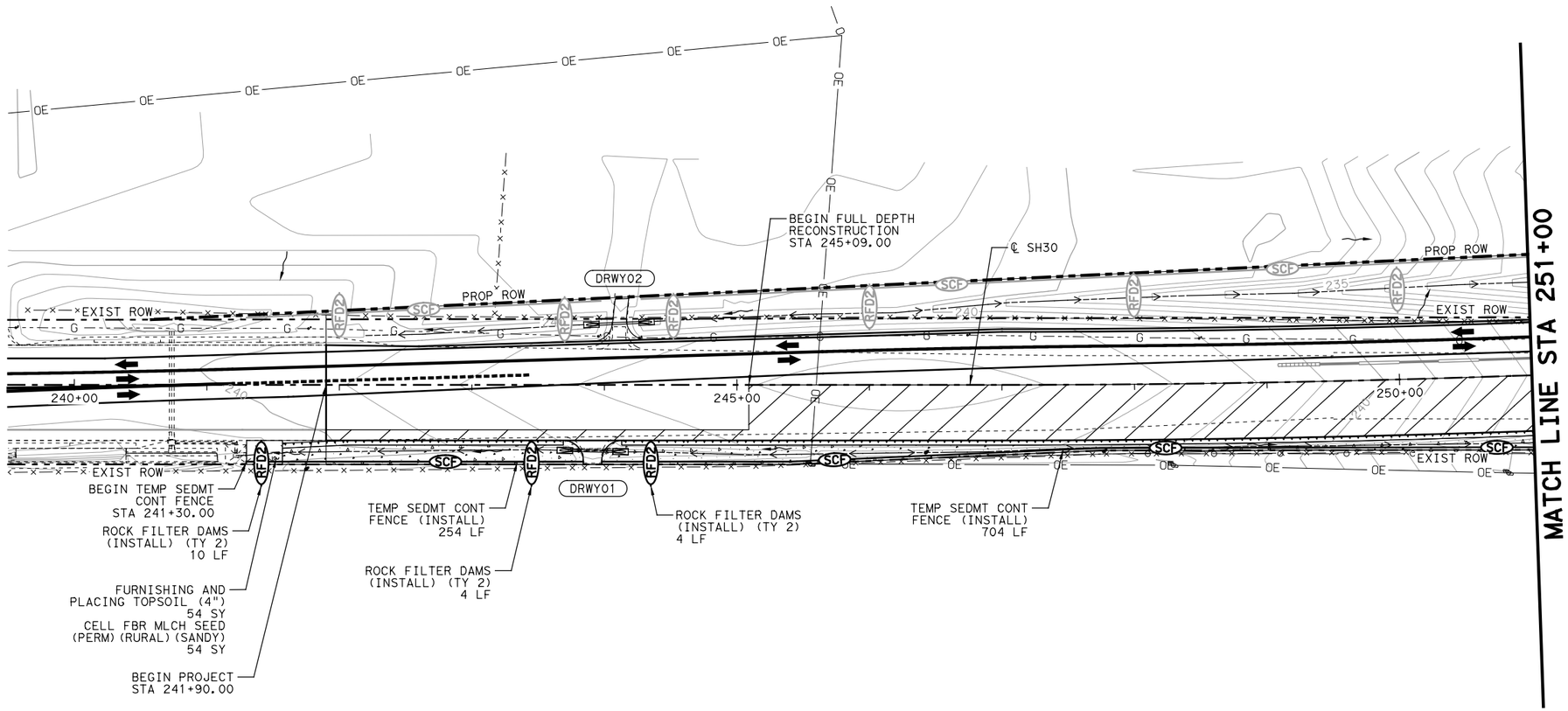

LEGEND

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- SCF — TEMPORARY SEDIMENT CONTROL FENCE (THIS PHASE)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE (PREVIOUS PHASE)
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- FLOW ARROW

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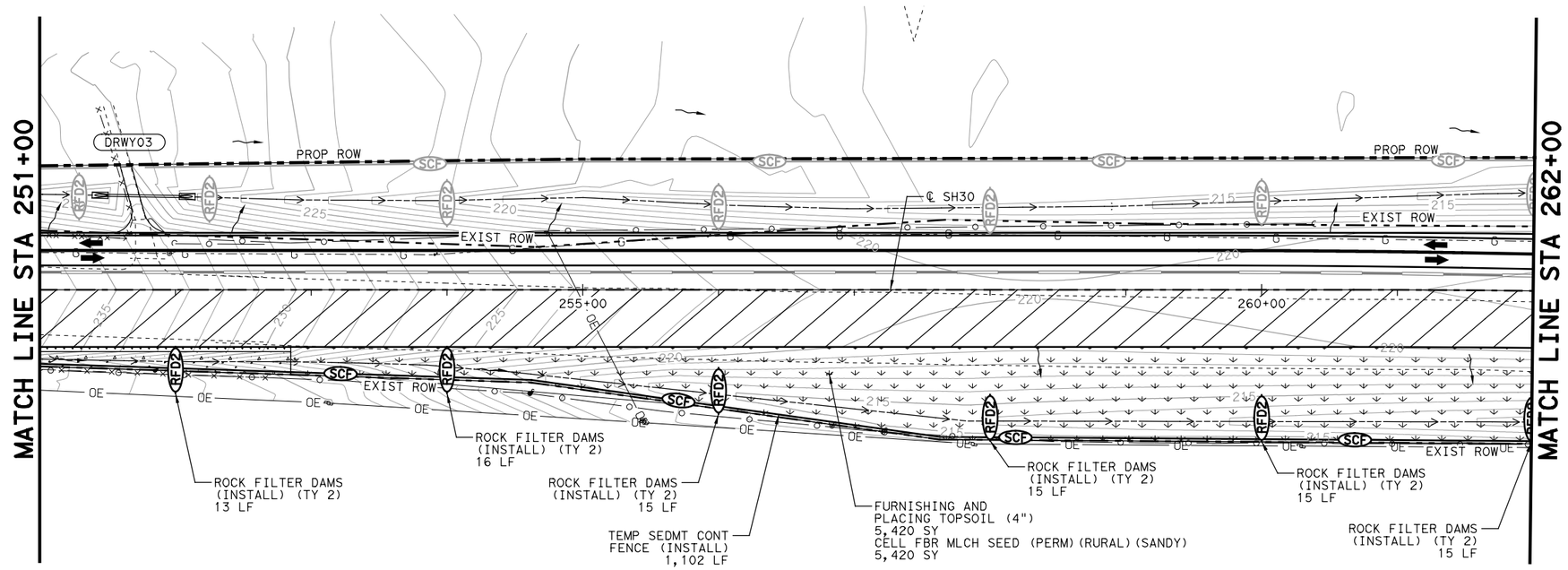
0 50 100 150 200
SCALE IN FEET



STATE OF TEXAS
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122057
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08/17/2018
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Texas Department of Transportation

TEMPORARY SW3P PLAN PHASE 2
BEGIN TO STA 262+00

SCALE: 1"=100' SHEET 1 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	154
CONTROL	SECTION	JOB	
0212	04	039	

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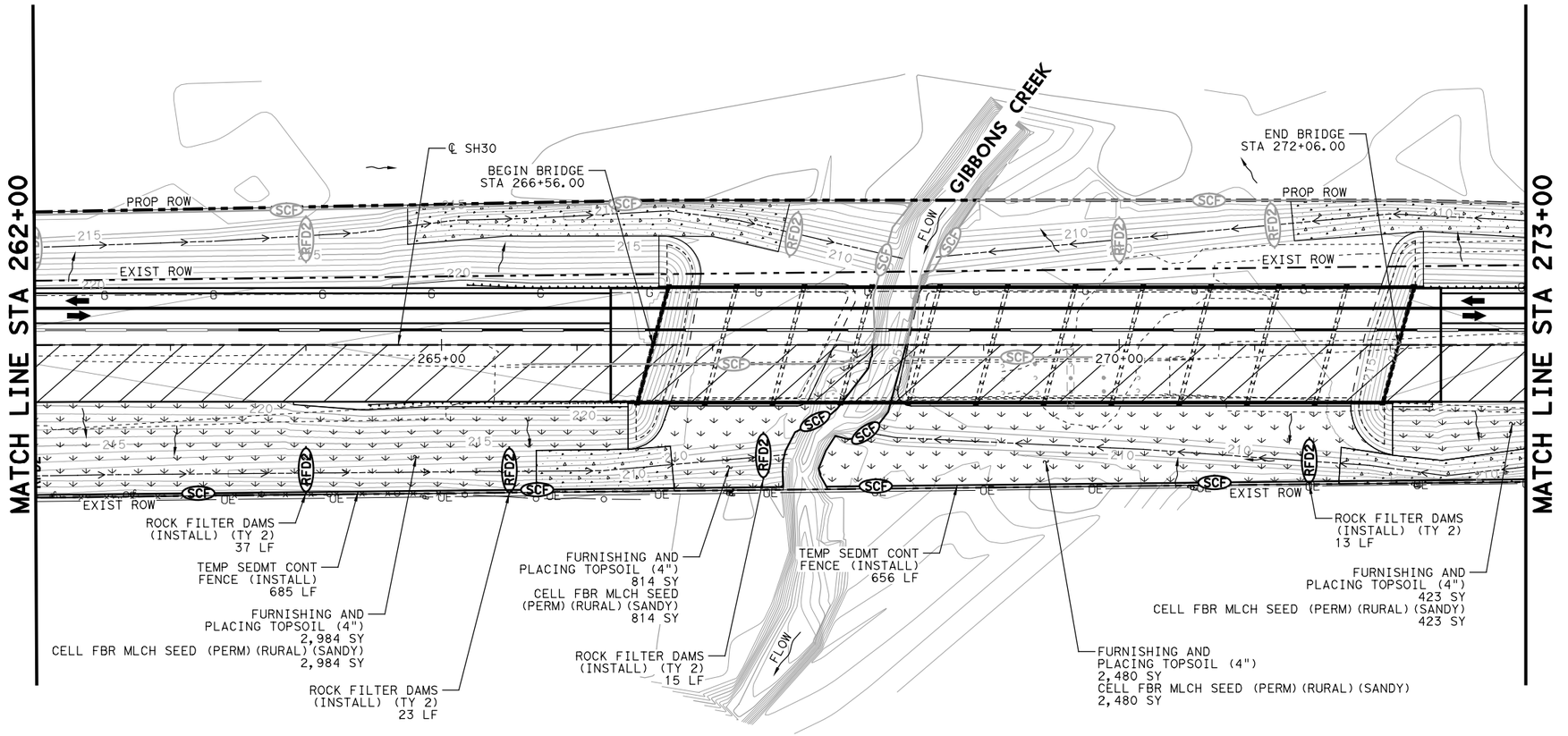

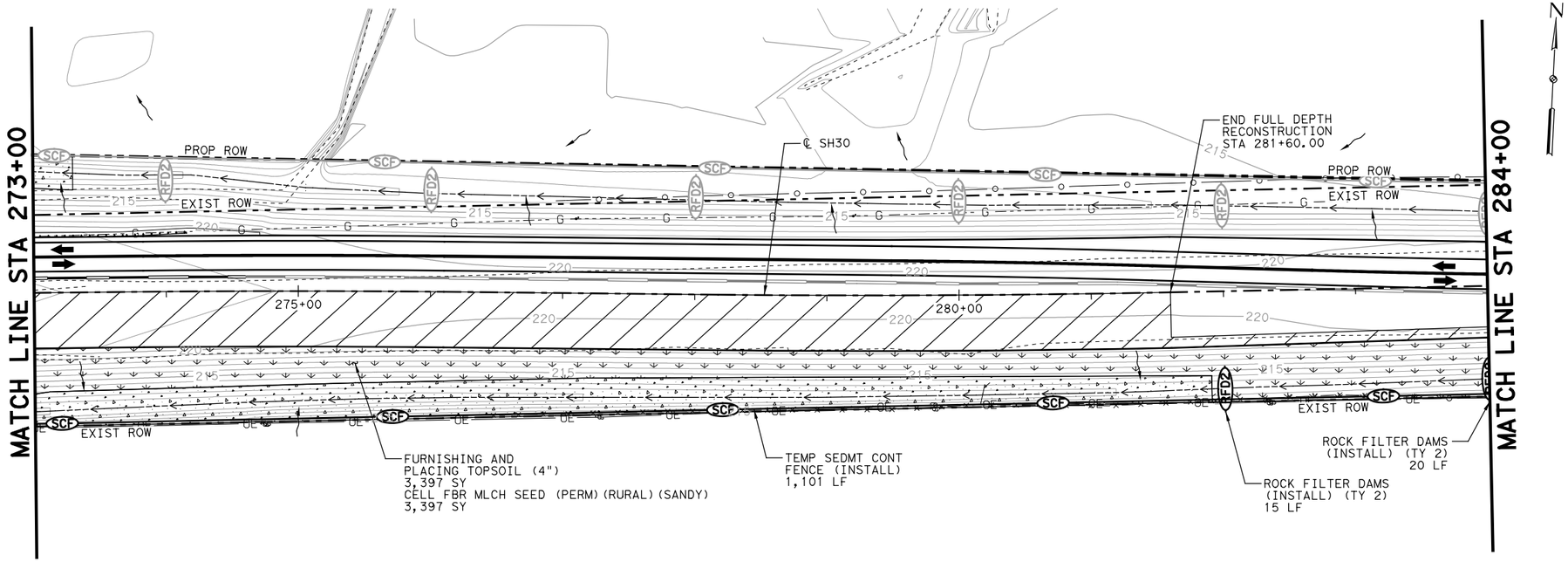

LEGEND

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- WORK AREA (THIS PHASE)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE (THIS PHASE)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE (PREVIOUS PHASE)
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- RFD2 — ROCK FILTER DAM (PREVIOUS PHASE)
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0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
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Texas Department of Transportation

TEMPORARY SW3P PLAN PHASE 2
STA 262+00 TO STA 284+00

SCALE: 1"=100' SHEET 2 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	155
CONTROL	SECTION	JOB	
0212	04	039	

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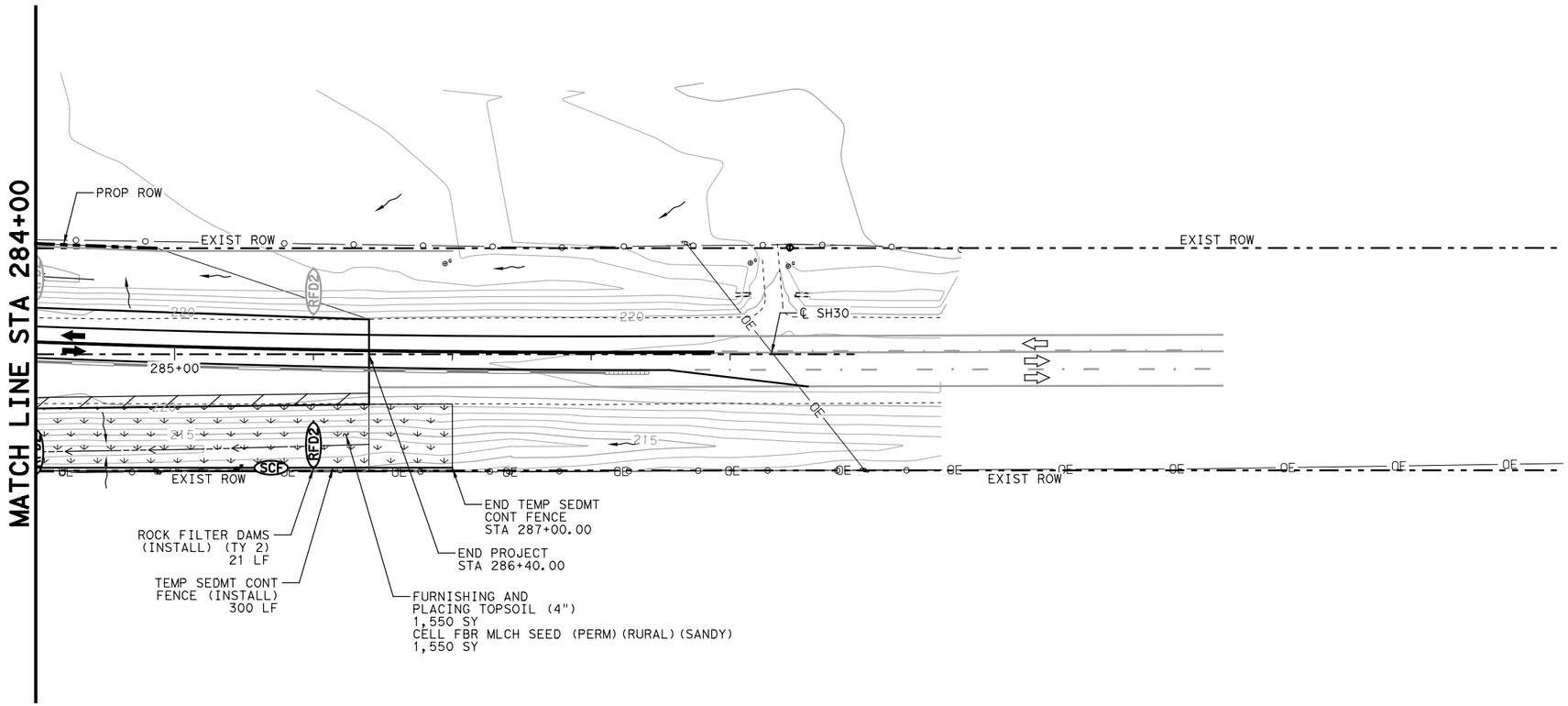

N

LEGEND

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- SCF — TEMPORARY SEDIMENT CONTROL FENCE (PREVIOUS PHASE)
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- FLOW ARROW

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0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
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08/17/2018
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NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
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Texas Department of Transportation

TEMPORARY SW3P PLAN PHASE 2
STA 284+00 TO END

SCALE: 1"=100' SHEET 3 OF 3

FED.RD. DIV.NO.	FEDERAL PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	BRY	GRIMES	156
CONTROL	SECTION	JOB	
0212	04	039	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
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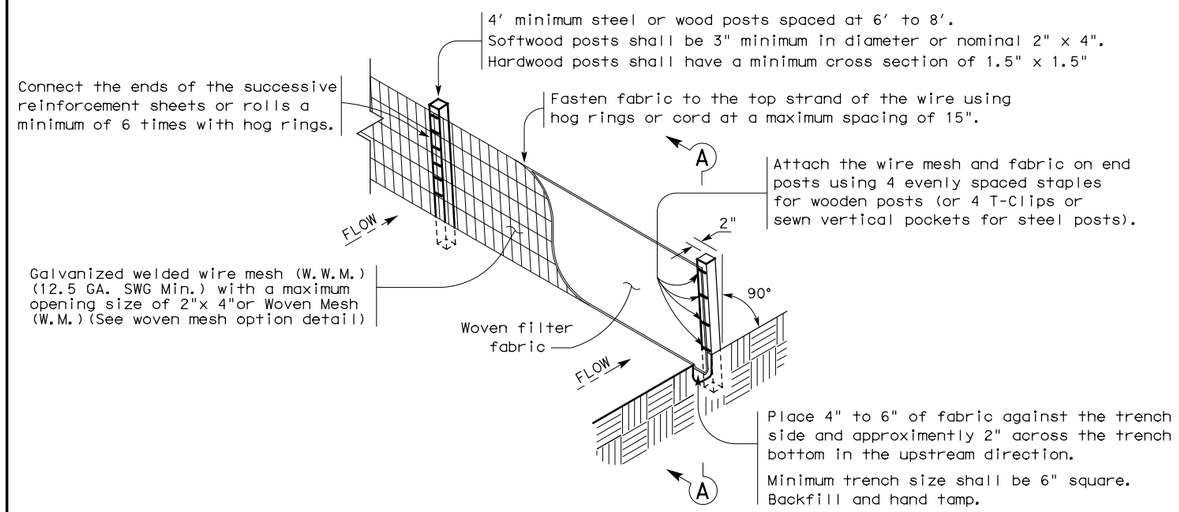
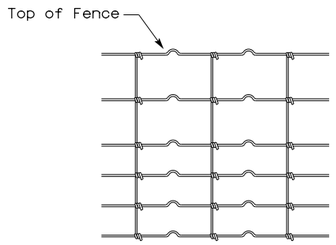
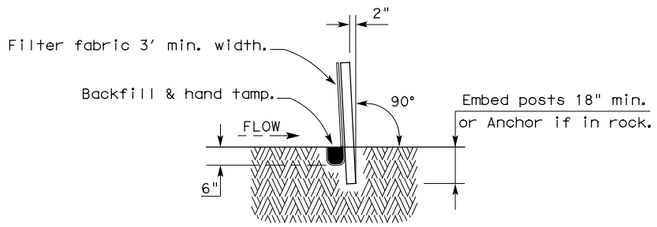


TEMPORARY SEDIMENT CONTROL FENCE

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.

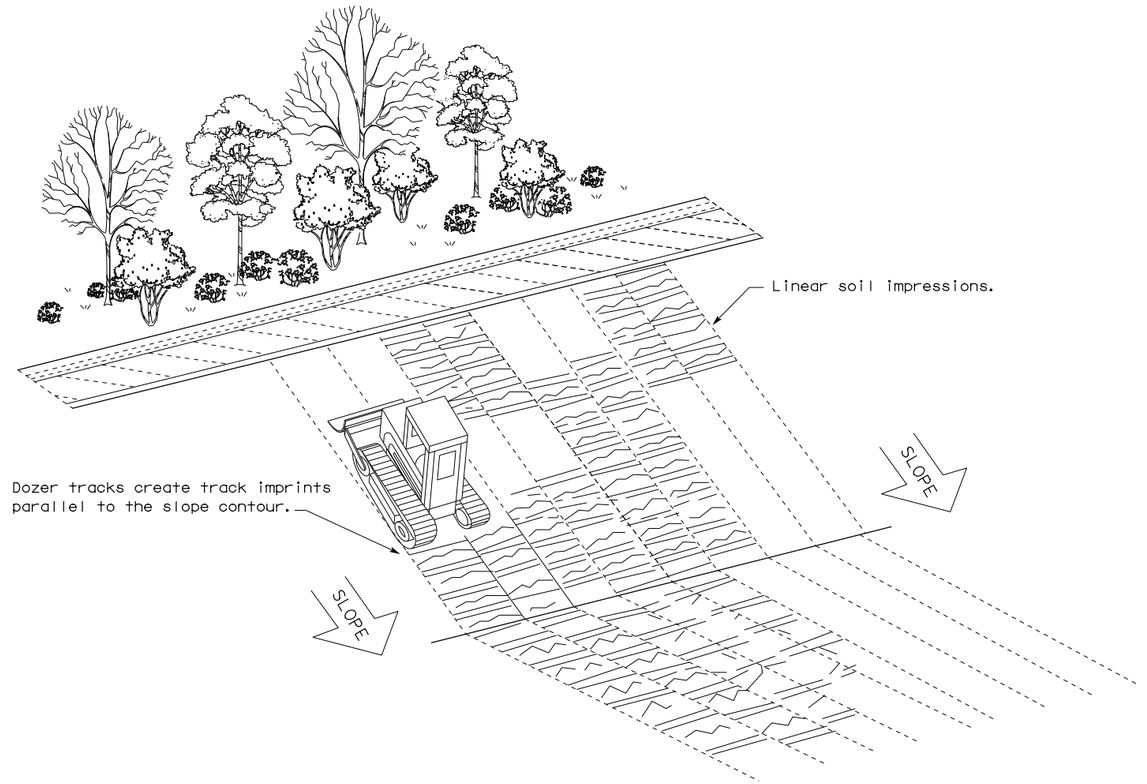
LEGEND

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	0212	04	039	SH30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		157

8/17/2018
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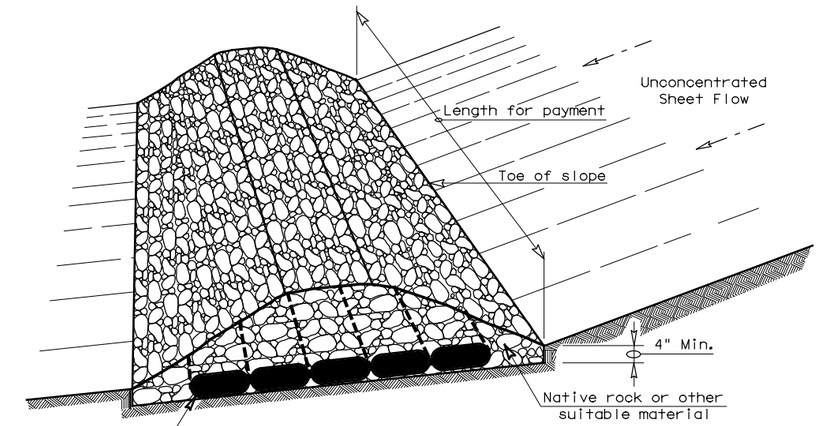
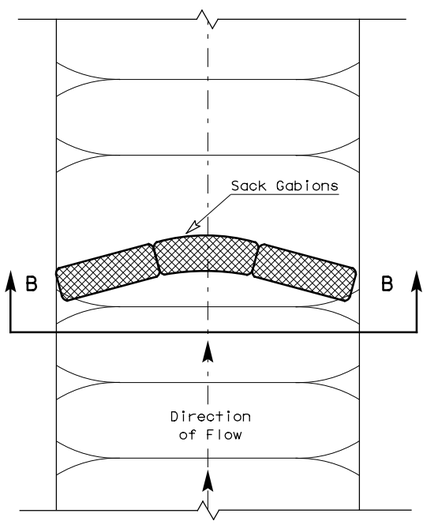
DATE: 8/17/2018
FILE: c:\pwworking\central01\d0669808\ec216.dgn

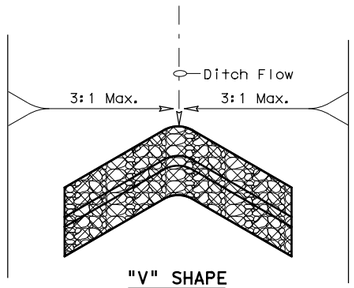


FILTER DAM AT TOE OF SLOPE

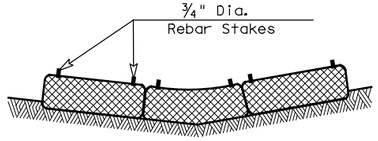
RFD1



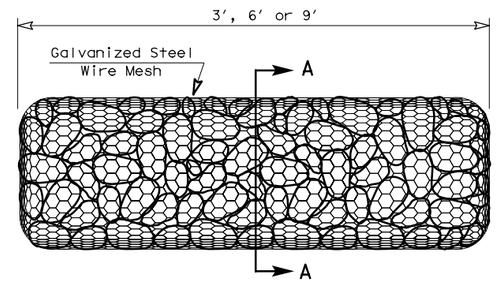
PLAN VIEW



"V" SHAPE
PLAN VIEW

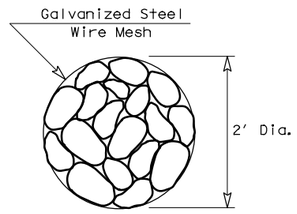


SECTION B-B

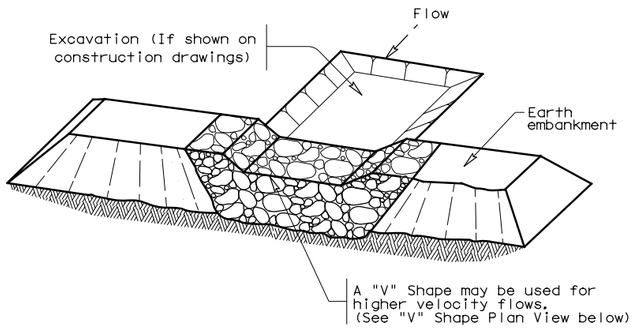


TYPE 4 (SACK GABIONS)

RFD4

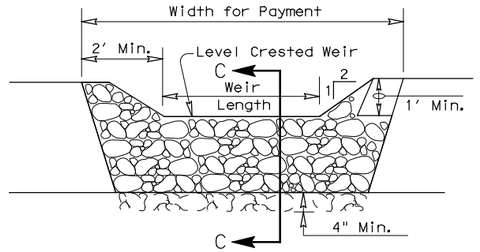


SECTION A-A

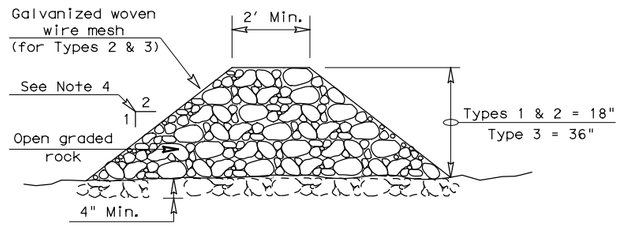


FILTER DAM AT SEDIMENT TRAP

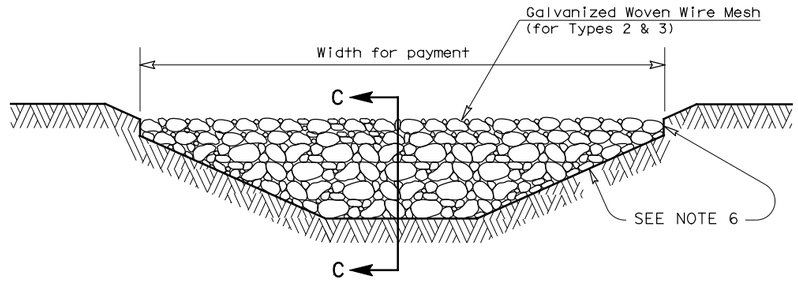
RFD1 — OR — RFD2



PROFILE



SECTION C-C



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	0212	04	039	SH30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		158

DATE: 8/17/2018
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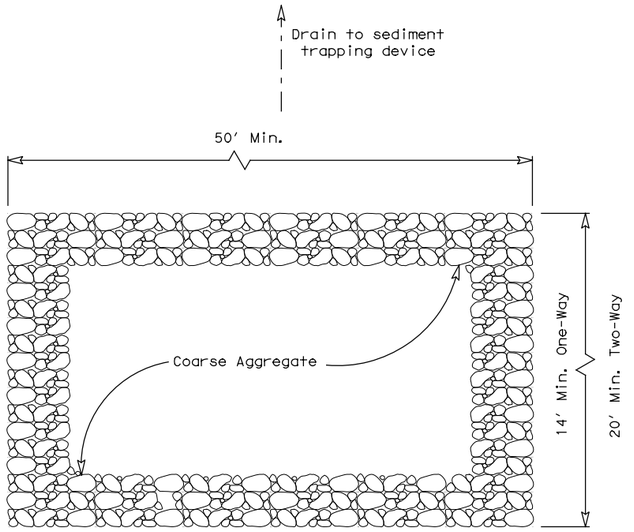
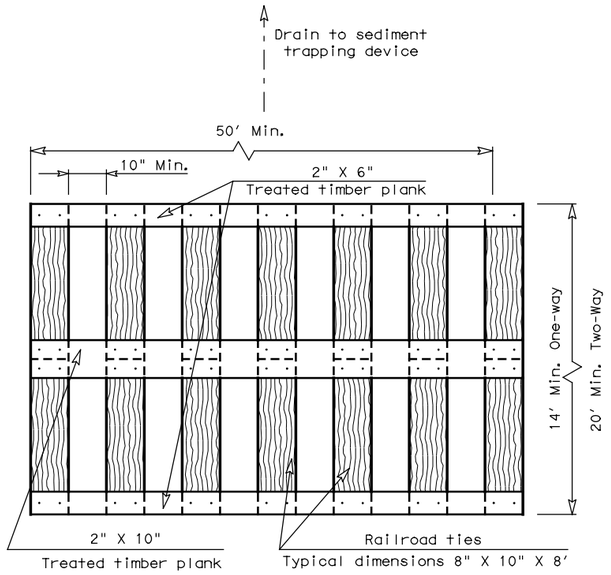
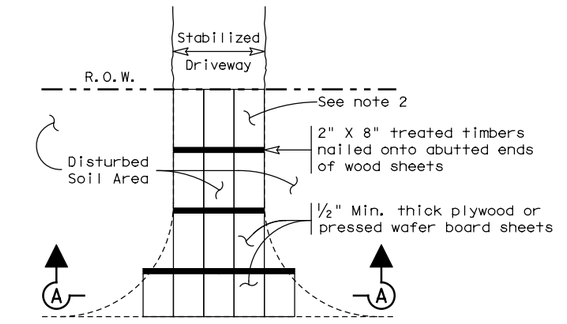


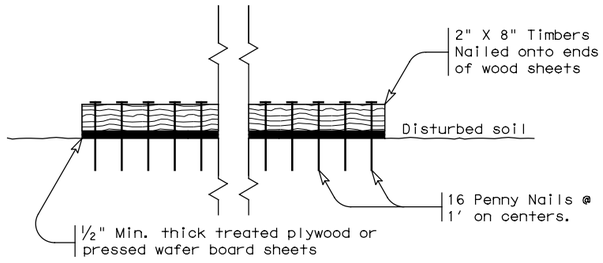
PLAN VIEW



PLAN VIEW



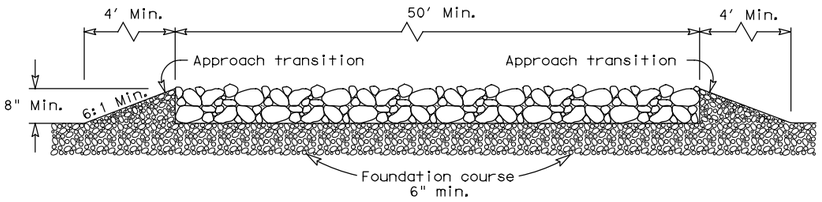
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM



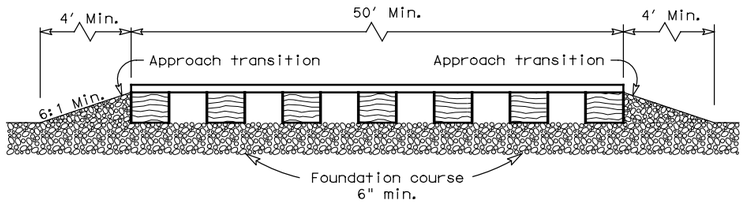
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

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



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50′.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

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

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0212	04	039	SH30
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		159