FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	F 2022(466)		1
STATE	STATE DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

STATE OF TEXAS
TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL PROJECT NUMBER
F 2022(466)
CSJ 0016-16-028

NET LENGTH OF PROJECT = 11,981.22 FEET = 2.269 MILES
- ROADWAY LENGTH = 11,981.22 FT = 2.269 MI
- BRIDGE LENGTH = 0.00 FT = 0.000 MI

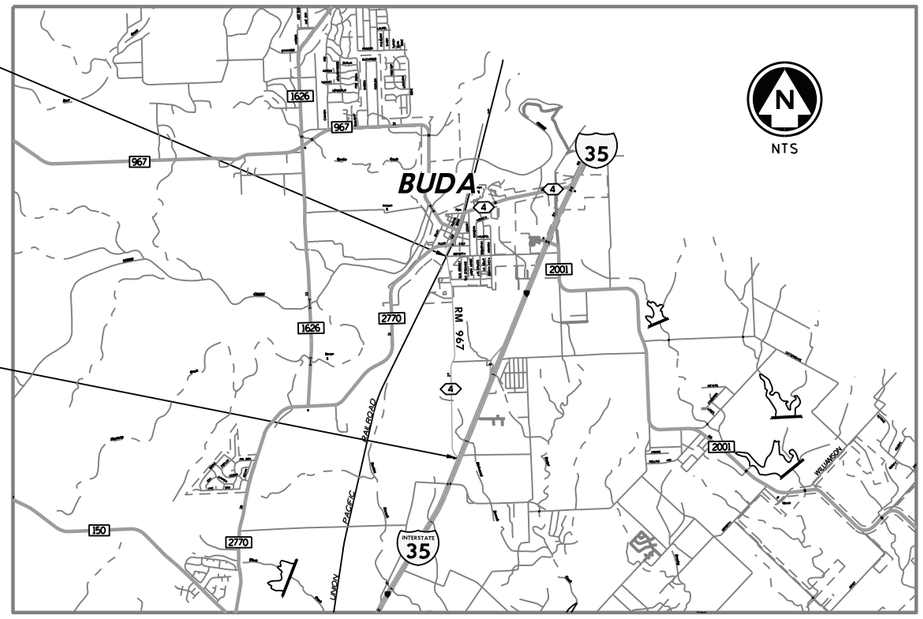
HAYS COUNTY
RM 967

LIMITS: FROM: GOFORTH RD TO: IH 35 SOUTHBOUND FRONTAGE ROAD

FOR THE CONSTRUCTION OF REHABILITATION OF EXISTING ROAD CONSISTING OF REHABILITATE EXISTING ROADWAY, WIDEN SHOULDERS, AND ADD LEFT TURN LANES AT VARIOUS LOCATIONS.

BEGIN PROJECT
CSJ: 0016-16-028
STA 111+10.99
RM 530+0.652
MP 12.012

END PROJECT
CSJ: 0016-16-028
STA 244+79.93
RM 532+0.8
MP 14.236



EXCEPTIONS: STA 140+80.32 TO STA 154+68.04 = -1387.72 FT.
EQUATIONS: NONE
RAILROAD CROSSINGS: UPPR (STA 109+18.97 TO STA 110+76.03)

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

Texas Department of Transportation ®

CSJ: 0016-16-028 (RM 967)
TYPE OF WORK: REHABILITATE ROADWAY
HWY FUNCTION CLASS: URBAN MAJOR COLLECTOR
EMAX = 6%
DESIGN SPEED: 40 MPH
ADT: 5,851 VPD (2021)
8,308 VPD (2041)

FINAL PLANS

DATE OF LETTING: _____
DATE WORK BEGAN: _____
DATE WORK COMPLETED AND ACCEPTED: _____
FINAL CONTRACT COST: $_____
CONTRACTOR: _____
LIST OF APPROVED CHANGE ORDERS:

THIS IS TO CERTIFY THAT THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS, CONTRACT AND LISTED FIELD CHANGES.

AREA ENGINEER _____ DATE _____

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER
Erin N. Gonzales
1/17/2023

BGE, Inc.
1701 Directors Blvd., Suite 1000, Austin, TX 78744
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

SUBMITTED FOR LETTING: 1/17/2023
Erin N. Gonzales
TRANSPORTATION ENGINEER

RECOMMENDED FOR LETTING: 2/1/2023
DocuSigned by: Susana Ceballos P.E.
DISTRICT DESIGN ENGINEER

RECOMMENDED FOR LETTING: 2/1/2023
DocuSigned by:
AREA ENGINEER

APPROVED FOR LETTING: 2/2/2023
DocuSigned by:
DIRECTOR OF TRANSPORTATION, PLANNING & DEVELOPMENT

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6 - 9	EXISTING AND PROPOSED TYPICAL SECTIONS
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11, 11A - 11C	ESTIMATE AND QUANTITY SHEETS
12	SUMMARY OF TCP QUANTITIES
13	SUMMARY OF ROADWAY QUANTITIES
14	SUMMARY OF DRAINAGE QUANTITIES
15	MAILBOX TURNOUT SUMMARY
16	SUMMARY OF EARTHWORK QUANTITIES
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78	SUMMARY OF DRIVEWAYS
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THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Erin N. Gonzales, P.E. — 1/18/2023

ERIN N GONZALES — DATE

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER

Erin N. Gonzales

1/18/2023

Texas Department of Transportation

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Tel: 512-879-0400 • www.bgeinc.com
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RM 967

INDEX OF SHEETS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			2
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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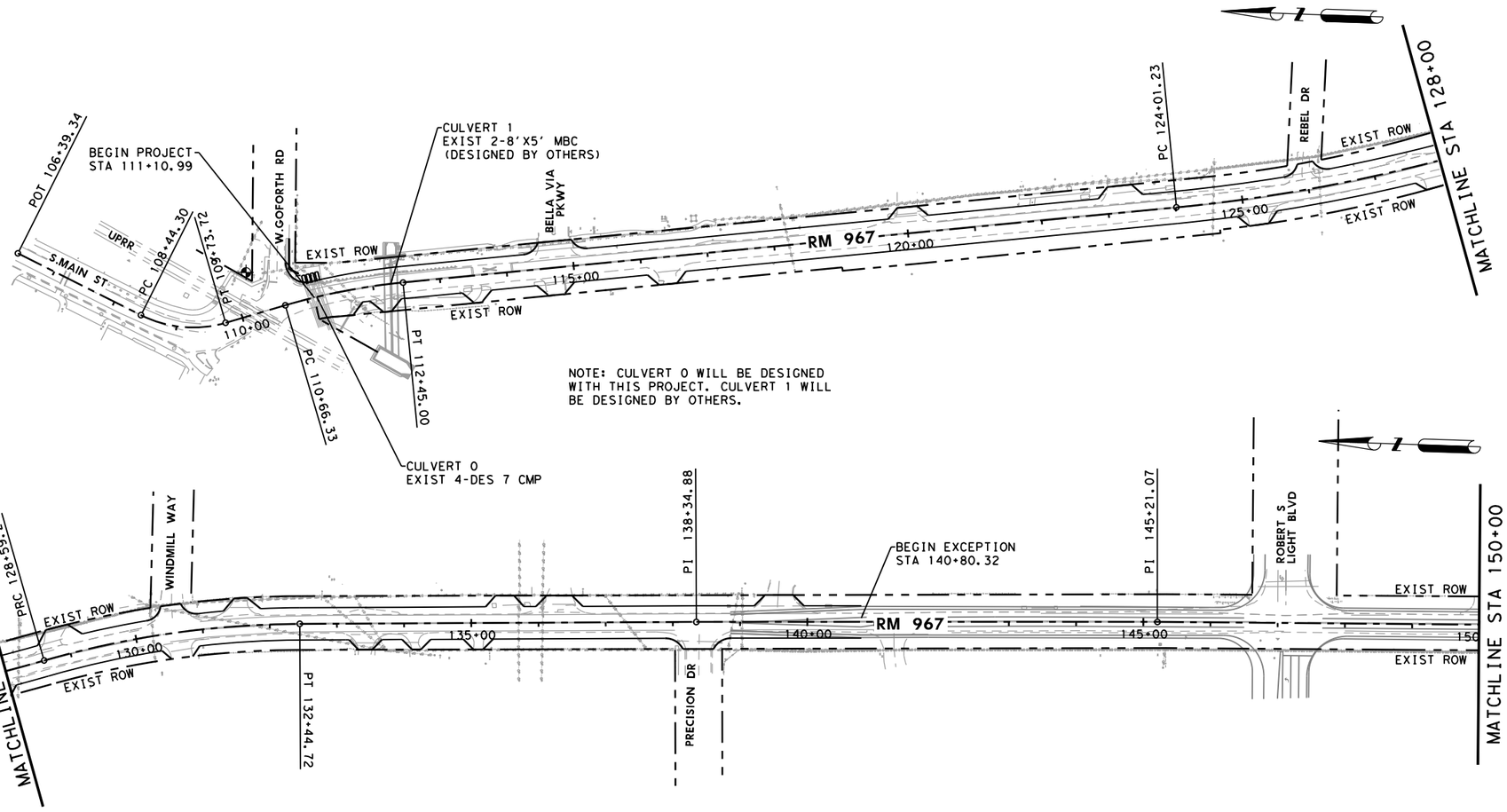

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

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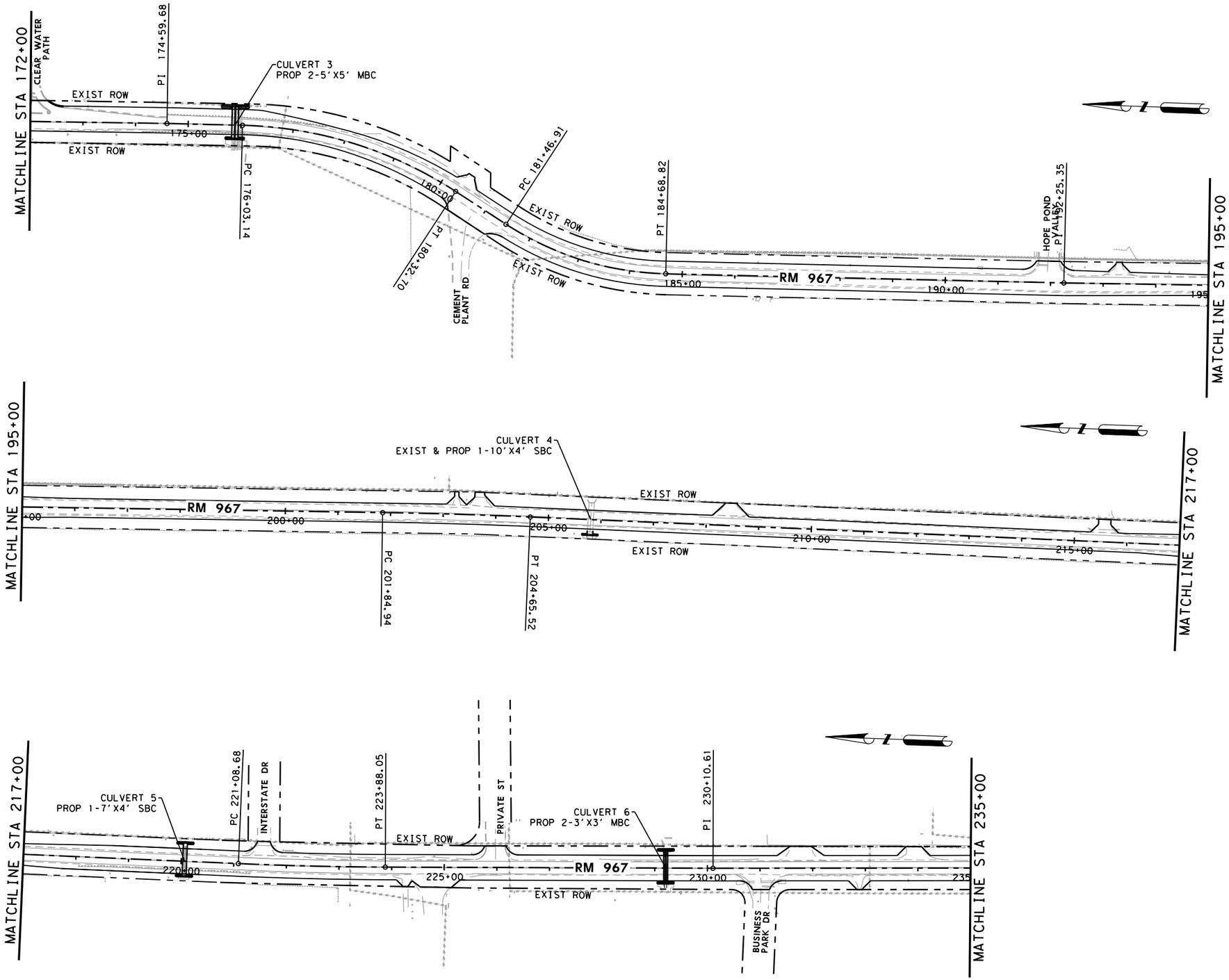
PROJECT LAYOUT

BEGIN TO STA 172+00

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			3
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967



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STATE OF TEXAS
ELENA RAMON
141765
LICENSED PROFESSIONAL ENGINEER

Elena Ramon

12/2/2022

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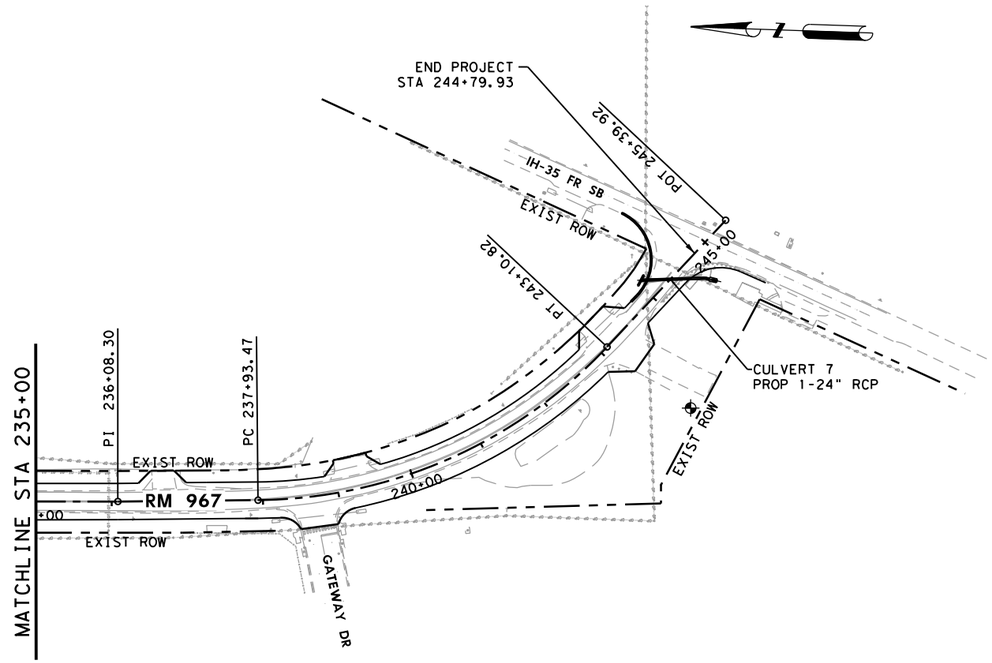
PROJECT LAYOUT

STA 172+00 TO 235+00

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			4
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967



0' 50' 100' 200'
SCALE: 1"=200'

LEGEND:

SURVEY CONTROL POINT

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

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PROJECT LAYOUT

STA 235+00 TO END

SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			5
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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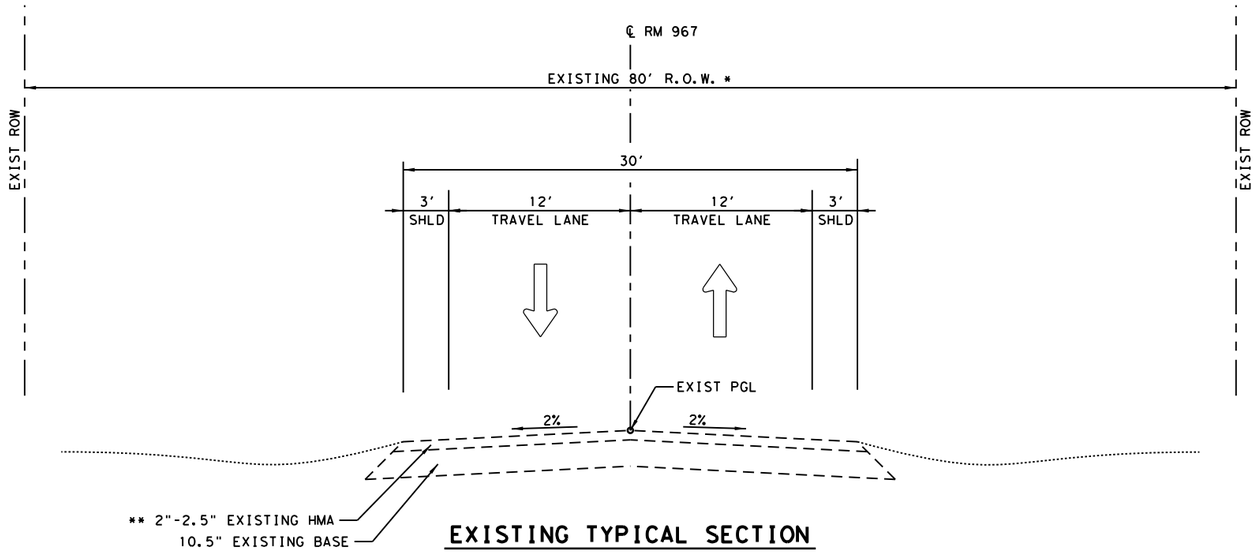

EXISTING TYPICAL SECTION

FROM STA 111+10.99 TO STA 244+79.93

HORZ 0' 5' 10'
VERT 0' 2.5' 5'

* 85' R.O.W. FROM STA 118+97.66 TO STA 124+61.69
** 5"-10" HMA EXISTS IN SOME AREAS

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EXISTING TYPICAL SECTION

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			6
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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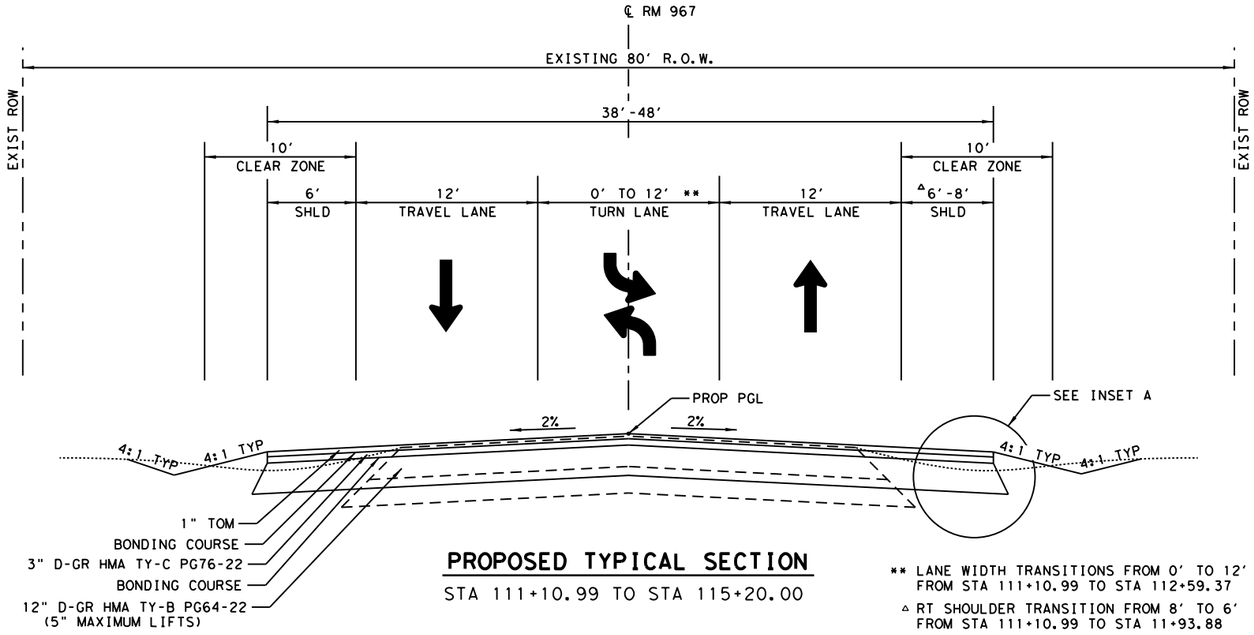
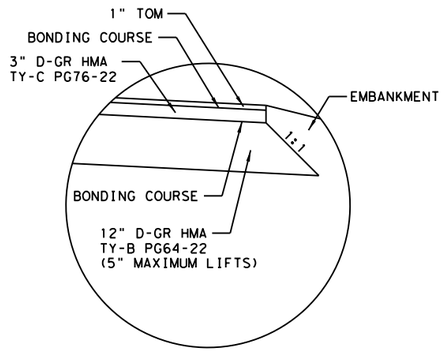


PROPOSED TYPICAL SECTION

STA 111+10.99 TO STA 115+20.00

** LANE WIDTH TRANSITIONS FROM 0' TO 12' FROM STA 111+10.99 TO STA 112+59.37

△ RT SHOULDER TRANSITION FROM 8' TO 6' FROM STA 111+10.99 TO STA 11+93.88



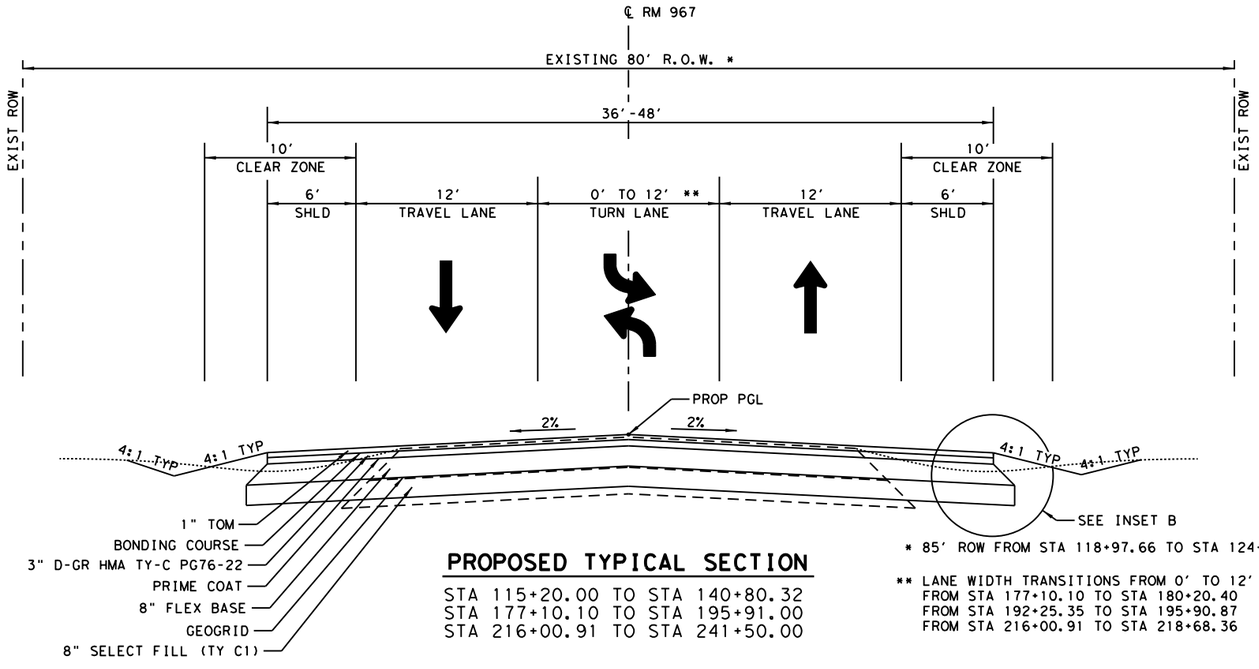
INSET A

N.T.S.

RATES OF APPLICATION:
TOM ASPHALT @ 7 LBS/SY/IN
TOM AGGR @ 106 LNS/SY/IN
D-GR HMA TY-C @ 110 LBS/SY/IN
D-GR HMA TY-B @ 110 LBS/SY/IN
BONDING COURSE @ 0.08 GAL/SY
PRIME COAT=
RC-250 @ 0.32 GAL/SY
TY D GR5 @ 1 CY/150 SY

LIMITS OF EXCEPTION:
STA 140+80.32 TO STA 154+68.04

HORZ 0' 5' 10'
VERT 0' 2.5' 5'

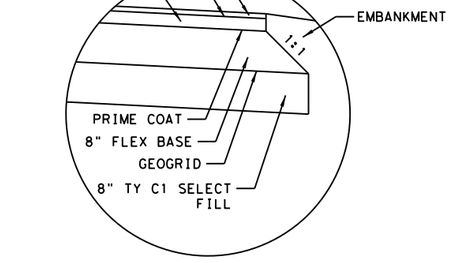


PROPOSED TYPICAL SECTION

STA 115+20.00 TO STA 140+80.32
STA 177+10.10 TO STA 195+91.00
STA 216+00.91 TO STA 241+50.00

* 85' ROW FROM STA 118+97.66 TO STA 124+61.69

** LANE WIDTH TRANSITIONS FROM 0' TO 12' FROM STA 177+10.10 TO STA 180+20.40 FROM STA 192+25.35 TO STA 195+90.87 FROM STA 216+00.91 TO STA 218+68.36



INSET B

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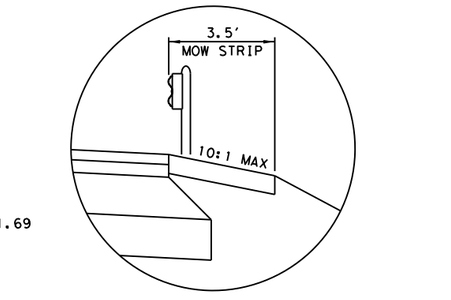

MBGF DETAIL

N.T.S.

MBGF TO BE PLACED AS SHOWN ON ROADWAY PLAN & PROFILE SHEETS.
REFER TO GF(31)-19 AND GF(31)MS-19 STANDARDS FOR DETAILS.

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

Texas Department of Transportation

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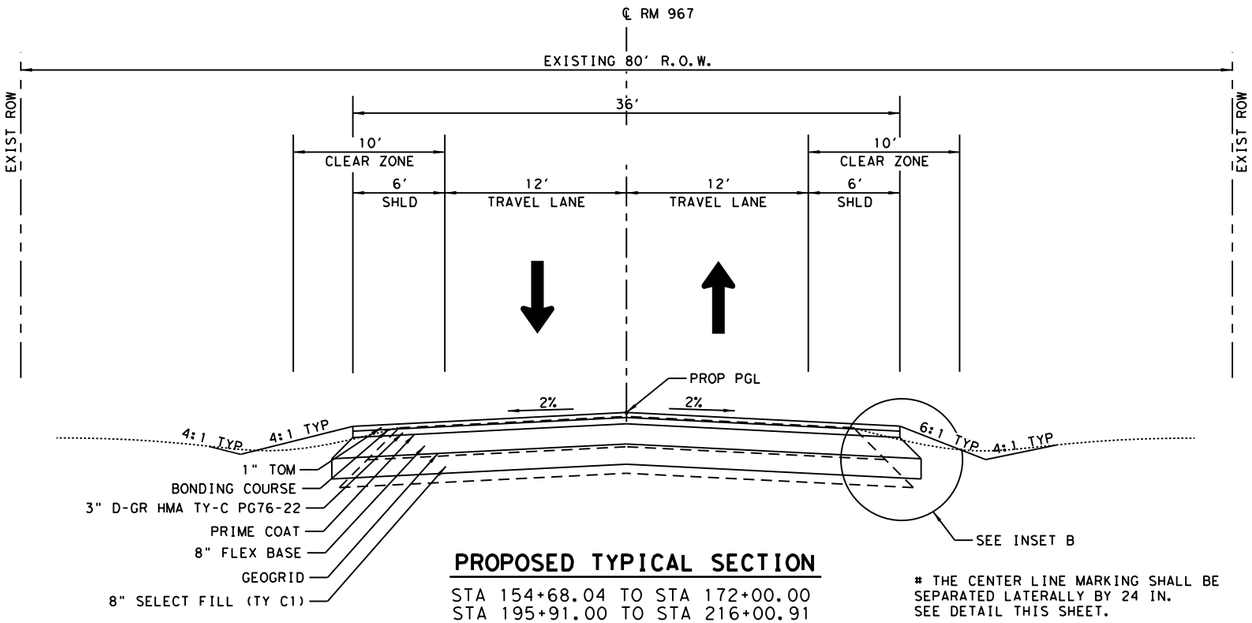
TBPE Registration No. F-1046

RM 967

PROPOSED TYPICAL SECTIONS

SHEET 1 OF 3

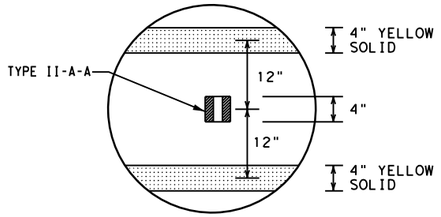
FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			7
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967



PROPOSED TYPICAL SECTION

STA 154+68.04 TO STA 172+00.00
STA 195+91.00 TO STA 216+00.91

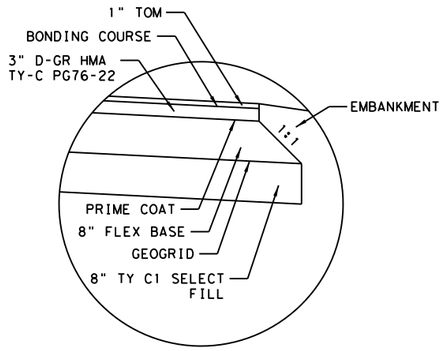
THE CENTER LINE MARKING SHALL BE SEPARATED LATERALLY BY 24 IN. SEE DETAIL THIS SHEET.



CENTER LINE MARKING WIDTH DETAIL

STA 154+68.04 TO STA 177+10.23
STA 195+90.84 TO STA 216+01.11

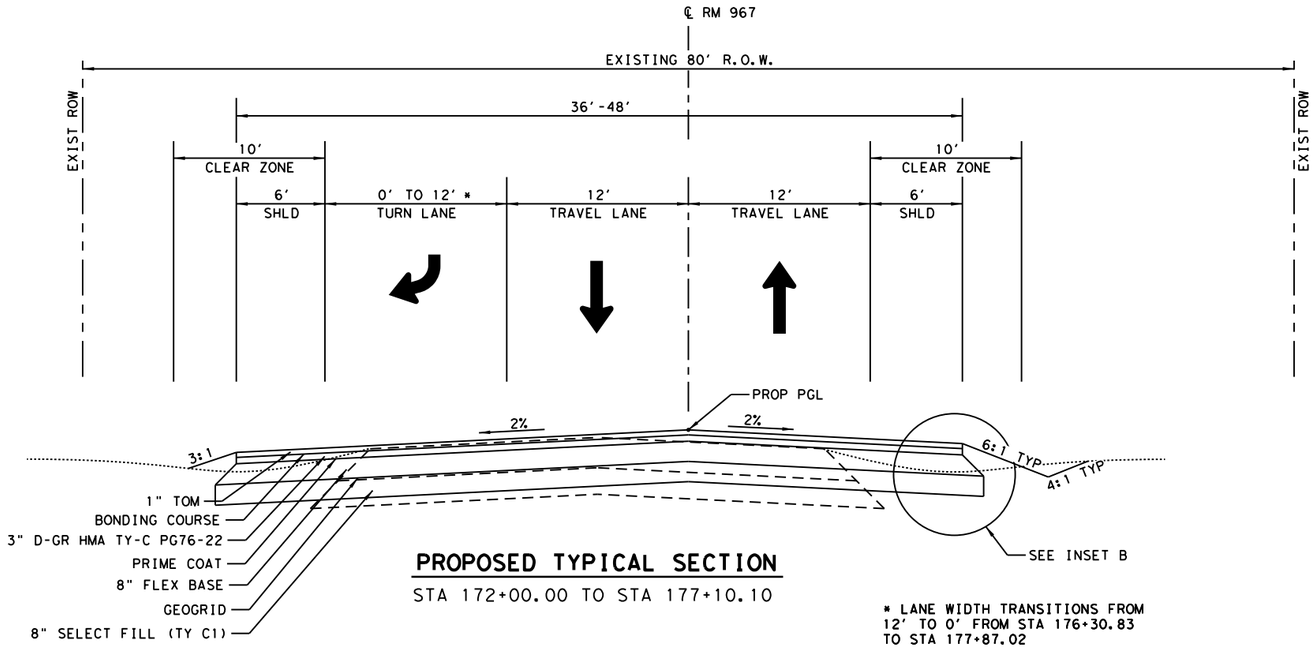
RATES OF APPLICATION:
TOM ASPHALT @ 7 LBS/SY/IN
TOM AGGR @ 106 LNS/SY/IN
D-GR HMA TY-C @ 110 LBS/SY/IN
D-GR HMA TY-B @ 110 LBS/SY/IN
BONDING COURSE @ 0.08 GAL/SY
PRIME COAT=
RC-250 @ 0.32 GAL/SY
TY D GR5 @ 1 CY/150 SY



INSET B

N. T. S.

HORZ 0' 5' 10'
VERT 0' 2.5' 5'

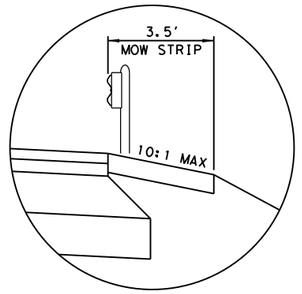


PROPOSED TYPICAL SECTION

STA 172+00.00 TO STA 177+10.10

* LANE WIDTH TRANSITIONS FROM 12' TO 0' FROM STA 176+30.83 TO STA 177+87.02

THE CENTER LINE MARKING SHALL BE SEPARATED LATERALLY BY 24 IN. SEE DETAIL THIS SHEET.



MBGF DETAIL

N. T. S.

MBGF TO BE PLACED AS SHOWN ON ROADWAY PLAN & PROFILE SHEETS. REFER TO GF(31)-19 AND GF(31)MS-19 STANDARDS FOR DETAILS.

STATE OF TEXAS
ELENA RAMON
141765
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12/2/2022

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PROPOSED TYPICAL SECTIONS

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			8
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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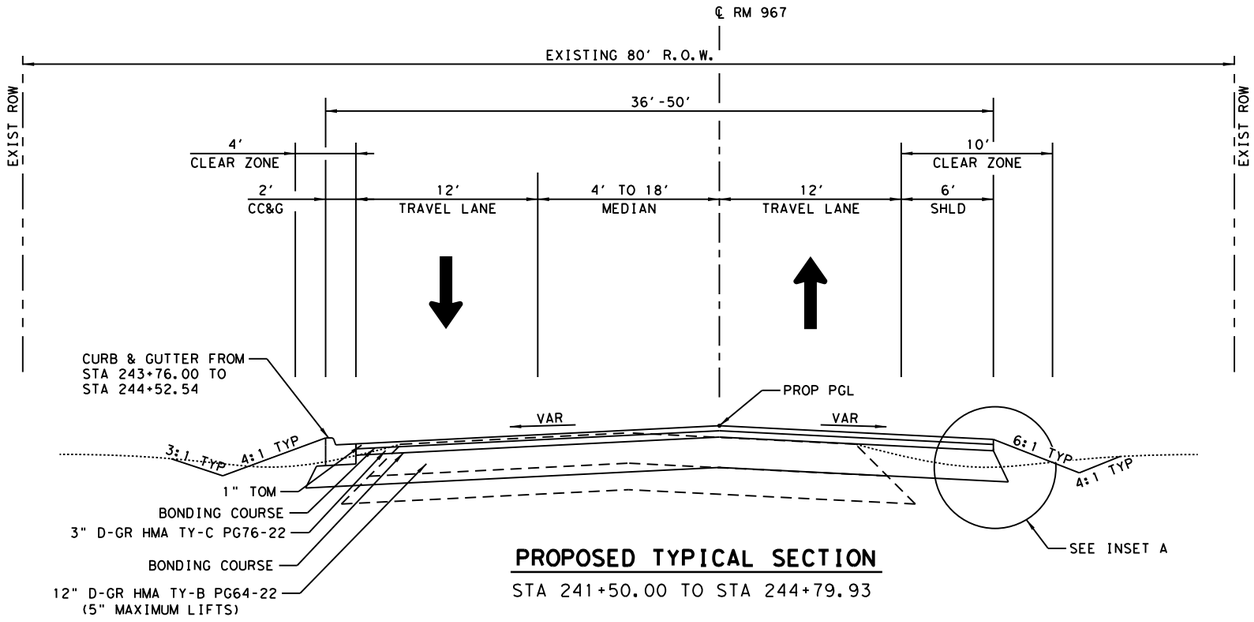
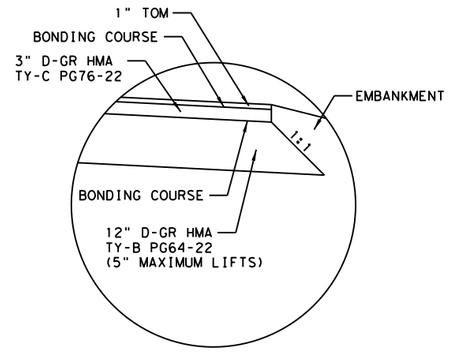


PROPOSED TYPICAL SECTION

STA 241+50.00 TO STA 244+79.93



INSET A

N.T.S.

RATES OF APPLICATION:
TOM ASPHALT @ 7 LBS/SY/IN
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D-GR HMA TY-C @ 110 LBS/SY/IN
D-GR HMA TY-B @ 110 LBS/SY/IN
BONDING COURSE @ 0.08 GAL/SY
PRIME COAT=
RC-250 @ 0.32 GAL/SY
TY D GR5 @ 1 CY/150 SY

HORZ 0' 5' 10'
VERT 0' 2.5' 5'

STATE OF TEXAS
ELENA RAMON
141765
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12/2/2022

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PROPOSED TYPICAL SECTIONS

SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			9
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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PENTABLE: $PENTBL$
PLOTDRIVER: pdf.plt cfg
$STATUS$

GENERAL NOTES: Version: December 14, 2022

Item	Description	**Rate
**204	**Sprinkling**	
	(Dust)	30 GAL/CY
	(Item 132)	30 GAL/CY
	(Item 247)	30 GAL/CY
**210	**Rolling (Flat Wheel)**	
	(Item 247)	1 HR/200 TON
	(Item 316)	1 HR/6000 SY
**210	**Rolling (Tamping and Heavy Tamping)**	1 HR/200 CY
**210	**Rolling (Lt Pneumatic Tire)**	
	(Item 132)	1 HR/500 CY
	(Item 247)	1 HR/200 TON
	(Item 316 - Seal Coat)	1 HR/6000 SY
	(Item 316 - Two Course)	1 HR/3000 SY
247	**Flexible Base (CMP IN PLC)**	132 LB/CF
310	**Prime Coat**	0.20 GAL/SY
3076	**Dense-Graded Hot-Mix Asphalt**	110 LB/SY/IN
3081	**Thin Overlay Mixtures (TOM) - Surface**	
	Asphalt	7.0 LB/SY/IN
	Aggregate (SAC B)	116.0LB/SY/IN
3084	**Bonding Course**	0.09 GAL/SY

** For Informational Purposes Only

The following standard detail sheet or sheets have been modified:

Modified Standards
SCC-7(MOD)

GENERAL
Contractor questions on this project are to be addressed to the following individual(s):
South Austin Mark.Baumann@txdot.gov
South Austin Shane.Swimm@txdot.gov

Questions and requests for documents will be accepted via the Letting Pre-Bid Q&A web page. All questions and any corresponding responses that are generated will be posted through the same 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

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.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved.

County: Hays
Highway: RM 967

Sheet: 10
Control: 0016-16-028

If work is performed at Contractor's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

The roadbed will be free of organic material prior to placing any section of the pavement structure.
Contact the supervisor for the passenger facility at Capital Metro and request the relocation of Capital Metro signs. Contact the supervisor at (512) 385-0190.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Provide a smooth, clean sawcut along the existing asphalt or concrete pavement structure, as directed. Consider subsidiary to the pertinent Items.

Construct all manholes/valves to final pavement elevations prior to the placement of final surface. If the manholes/valves are going to be exposed to traffic, place temporary asphalt around the manhole/valve to provide a 50:1 taper. The asphalt taper is subsidiary to the ACP work.

Supply litter barrels in enough numbers at locations as directed to control litter within the project. Consider subsidiary to pertinent Items.

Use a self-contained vacuum broom to sweep the roadway and keep it free of sediment as directed. The contractor will be responsible for any sweeping above and beyond the normal maintenance required to keep fugitive sediment off the roadway as directed by the Engineer.

Damage to existing pipes and SET's due to Contractor operations will be repaired at Contractor's expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The Contractor will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

Coordinate and obtain approval for all bridgework over existing roadways.

ITEM 5 – CONTROL OF THE WORK
Place construction or silt fence 2 ft. inside TxDOT ROW along the Railroad ROW. If work is to be performed inside the Railroad ROW, then the Contractor will coordinate with the Railroad for a Railroad Flagger. This work is subsidiary.

Obtain and maintain compliance with additional training requested by UPRR "Property Access Training".

Place construction stakes at intervals of no more than 100 ft. This work is subsidiary.

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

Thermoplastic Pipe Alternate Proposals
When a reinforced concrete or corrugated metal pipe is included in the plans, a thermoplastic polypropylene pipe alternate may be submitted in a 2 phase process. 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. Phase 1 submit an official request to TxDOT PM with a summary of proposed locations, max depth of placement for each location, and sizes. TxDOT goal is to review and respond within 10 days. Phase 1 approval does not guarantee Phase 2 approval. Phase 2 submit the following documents with all documents signed and sealed by a licensed Engineer in the state of Texas. 1-Provide a redline or revised set of drainage plans reflecting the revised locations. 2-Provide certification that use of the alternate pipe will not negatively impact the system hydraulic performance, increase headwater elevations, increase outlet velocities, and maintain pipe velocity between 3 to about 12 feet per second. 3-Provide certification that the use of the alternate pipe and proposed bedding are adequate for the proposed application, depth, etc. 4-Provide a completed thermoplastic pipe installation drawing using the following https://ftp.txdot.gov/pub/txdot/brg/thermoplastic-pipe-installation-drawing.pdf https://ftp.txdot.gov/pub/txdot/brg/thermoplastic-pipe-installation-drawing.dgn.

If use of thermoplastic pipe is approved as an alternate, furnish, install, and inspect the thermoplastic pipe in accordance with SS4216 or latest thermoplastic pipe special specification at time of letting. Minimum values, such as cover depth, required by the specification, installation drawing, etc. will not be waived. Use granular backfill unless flowable fill or CSB is required by the alternate design. Backfill locations shown in the bid plans using flowable fill or CSB must use the backfill per the bid plans.

Electronic Shop Drawing Submittals.
Submit electronic shop drawing submittals according to the current Guide to Electronic Shop Drawing Submittal https://www.txdot.gov/business/resources/specifications/shop-drawings.html (TxDOT.gov Business > Resources - General > Shop Drawings). Pre-approved producers can be found online at TxDOT.gov > Business > Resources - Material Producer List. Use the following contact list for all submittals that are not required to be sent to Bridge Division and to copy the Engineer for all submittals to the Bridge Division.

Submittal Contact List
South Austin Mark.Baumann@txdot.gov AUS_SA-ShopReview@txdot.gov

ITEM 6 - CONTROL OF MATERIALS
Give a minimum of 1 business day notice for materials, which require inspection at the Plant.

For Federally Funded Contracts, comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, by submitting a notarized original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product. Refer to the Buy America Material Classification Sheet, located at the following link, for clarification on material categorization. https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html

ITEM 7 – LEGAL RELATIONS AND RESPONSIBILITIES
Roadway closures during key dates and/or special events are prohibited. See notes for Item 502 for the key dates and/or special events.

Refer to the Environmental Permits, Issues and Commitments (EPIC) plan sheets for additional requirements and permits.

When any abandoned well is encountered, cease construction operations in this area and notify the Engineer who will coordinate the proper plugging procedures. A water well driller licensed in the State of Texas must be used to plug a well.

Perform maintenance of vehicles or equipment at designated maintenance sites. Keep a spill kit on-site during fueling and maintenance. This work is subsidiary.

Maintain positive drainage for permanent and temporary work for the duration of the project. Be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work is subsidiary.

Suspend all activities near any significant recharge features, such as sinkholes, caves, or any other subterranean openings that are discovered during construction or core sampling. Do not proceed until the designated Geologist or TCEQ representative is present to evaluate and approve remedial action.

Locate aboveground storage tanks kept on-site for construction purposes in a contained area as to not allow any exposure to soils. The containment will be sized to capture 150% of the total capacity of the storage tanks.

PSL in Edwards Aquifer Recharge and Contributing Zone.
Obtain written approval from the Engineer for all on or off right of way PSLs not specifically addressed in the plans. Provide a signed sketch of the location 30 business days prior to use of the PSL. Include a list of materials, equipment and portable facilities that will be stored at the

PSL. TxDOT will coordinate with the necessary agencies. Approval of the PSL is not guaranteed. Un approved PSL is not a compensable impact.

Work within a USACE Jurisdictional Area.
Do not initiate activities within a U.S. Army Corps of Engineers (USACE) jurisdictional area that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Obtain written approval from the Engineer for activities not specifically addressed in the plans. Provide a signed sketch and description of the location 60 business days prior to begin work at the location. Complete and return any forms provided by TxDOT. Approval of the work is not guaranteed. Un approved work is not a compensable impact.

Work over or near Bodies of Water (lakes, rivers, ponds, creeks, dry waterways, etc.).
Keep on site a universal spill kit adequate for the body of water and the work being performed. Debris is not allowed to fall into the ordinary high-water level (OHWL). Debris that falls into the OHWL must be removed at the end of each work day. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event. Install and maintain traffic control devices to maintain a navigable corridor for water traffic, except during bridge demo and beam placement. This work is subsidiary.

Migratory Birds and Bats.
Migratory birds and bats may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between September 16 and February 28. Prevent migratory birds from re-nesting between March 1 and September 15. Prevention shall include all areas within 25 ft. of proposed work. All methods used for the removal of old nesting areas and the prevention of re-nesting must be submitted to TxDOT 30 business days prior to begin work. This work is subsidiary.

If active nests are encountered on-site during construction, all construction activity within 25 ft. of the nest must stop. Contact the Engineer to determine how to proceed.

Tree and Brush Trimming and Removal.
Work will be conducted September 16 thru February 28. Work conducted outside this timeframe will require a bird survey. Submit a survey request to TxDOT 30 business days prior to begin work.

No extension of time or compensation will be granted for a delay or suspension due to the above bird, bat and tree/brush requirements.

Law Enforcement Personnel.
Submit charge summary and invoices using the Department forms.

Patrol vehicles must be clearly marked to correspond with the officer's agency and equipped with appropriate lights to identify them as law enforcement. For patrol vehicles not owned by a

law enforcement agency, markings will be retroreflective and legible from 100 ft. from both sides and the rear of the vehicle. Lights will be high intensity and visible from all angles.

No payment will be made for law enforcement personnel needed for moving equipment or payment for drive time to/from the event site. A minimum number of hours is not guaranteed. Payment is for work performed. If the Contractor has a field office, provide an office location for a supervisory officer when event requires a supervising officer. This work is subsidiary.

A maximum combined rate of $70 per hour for the law enforcement personnel and the patrol vehicle will be allowed. Any scheduling fee is subsidiary per Standard Specification 502.4.2.

Cancel law enforcement personnel when the event is canceled. Cancellation, minimums or "show up" fees will not be paid when cancellation is made 12 hours prior to beginning of the event. Failure to cancel within 12 hours will not be cause for payment for cancellation, minimums, or "show up" time. Payment of actual "show up" time to the event site due to cancellation will be on a case by case basis at a maximum of 2 hours per officer.

Alterations to the cancellation and maximum rate must be approved by the Engineer or pre-determined by official policy of the officers governing authority.

Back Up Alarm.
For hours 9 P to 5 A, utilize a non-intrusive, self-adjusting noise level reverse signal alarm. This is not applicable to hotmix or seal coat operations. This is subsidiary.

ITEM 8 – PROSECUTION AND PROGRESS
Electronic versions of schedules will be saved in Primavera P6 format.

Special Provision 008-003 has been included to amend Standard Article 8.1 to extend the begin work date due to contractor convenience.

ITEM 100 - PREPARING RIGHT OF WAY
Prep ROW must not begin until accessible trees designated for preservation have been protected, items listed in the EPIC have been addressed, and SW3P controls installed in accessible areas.

Backfill material will be Type B Embankment using ordinary compaction.

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

Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas within 30 ft. of edge of pavement under construction. Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. Trim to provide a minimum of 14 ft. vertical clearance under all trees. This work is subsidiary.

ITEM 110 – EXCAVATION
The Engineer will define unsuitable material.

Removal of existing pavement is included in the excavation item.

ITEM 132 – ALL EMBANKMENT
The Engineer will define unsuitable material. Material which the Contractor might deem to be unsuitable due to moisture content will not be considered unsuitable material.

Prior to begin embankment of existing area, correct or replace unstable material to a depth of 6 in. below existing grade. Embankment areas will be inspected prior to beginning work.

Rock or broken concrete produced by the project is allowed in earth embankments. The size of the rock or broken concrete will not exceed the layer thickness requirements in Section 132.3.4., "Compaction Methods." The material will not be placed vertically within 5 ft. of the finished subgrade elevation.

Embankment placed vertically within 5 ft. of the finished subgrade elevation or within the edges of the subgrade and treated with lime, cement, or other calcium based additives must have a sulfate content less than 3000 ppm. Allow 5 business days for testing. Treatment of sulfate material 3000 ppm to 7000 ppm requires 7 days of mellowing and continuous water curing, in accordance TxDOT guidelines for Treatment of Sulfate-Rich Soils and Bases in Pavement Structures (9/2005). Material over 7000 ppm is not allowed.

ITEM 132 – EMBANKMENT TY C
The Department must approve all Type C embankment material before use on the project. Do not furnish shale clays. Furnish embankment with sulfate content less than 3000 ppm if treated with calcium-based chemicals or within 5 ft. of the finished subgrade elevation. Existing material from within the project limits that meets the Type C Substitute requirements may be substituted for Type C but is not allowed to be substituted for C1, C2, or density-controlled material. Offsite material may be used to blend with onsite material to achieve the Type C requirements. The Type C substitute may also be existing material in accordance with 132 for rock embankment. The Type C substitute material may only be placed vertically beyond 5 ft. below the finished subgrade elevation or 5 ft. beyond the edge of the subgrade.

Type C				
Percent Retained		LL Max	PI Max	PI Min
3"	#4			
0	MIN 45	55	20	6
Type C Substitute				
Percent Retained			PI Max	
3"	#4			
Max 10	10-90		25	

TY C1 and C2

Description	Percent Retained					LL Max	PI Max	PI Min
	3"	1 3/4"	3/8"	#4	#40			
Embankment (Ordinary) (TY C1)	0	0-10	-	45-75	60-85	45	20	6
Embankment (Ordinary) (TY C2)	-	-	0	30-75	50-85	55	25	8

Reclaimed roadway base and hotmix may be used as substitute for Type C1 Embankment. The reclaimed material must all pass the 1.75" sieve.

ITEM 168 – VEGETATIVE WATERING
Water all areas of project to be seeded or sodded.

Maintain the seedbed in a condition favorable for the growth of grass. Watering can be postponed immediately after a rainfall on the site of ½ inch or greater, but will be resumed before the soil dries out. Continue watering until final acceptance.

Vegetative watering rates and quantities are based on ¼ inch of watering per week over a 3-month watering cycle. The actual rates used and paid for will be as directed and will be based on prevailing weather conditions to maintain the seedbed.

Obtain water at a source that is metered (furnish a current certification of the meter being used) or furnish the manufacturer's specifications showing the tank capacity for each truck used. Notify the Engineer, each day that watering takes place, before watering, so that meter readings or truck counts can be verified.

ITEM 169 – SOIL RETENTION BLANKETS
Type A blankets containing straw fibers are not allowed. Type B and D blankets shall be a spray type blanket.

ITEM 204 – SPRINKLING
Apply water for dust control as directed. When dust control is not being maintained, cease operations until dust control is maintained.

ITEM 216 - PROOF ROLLING
Correct and perform "Proof Rolling" retest at the Contractor's expense, to the satisfaction of the Engineer, when initial "Proof Rolling" yields a failing result.

ITEM 247 - FLEXIBLE BASE
The layer thickness will be 4 in. to 6 in. unless shown on the plans. Placing in a single layer is allowed when total thickness of base is 8 in. or less. When placed in multiple layers, compact the bottom and middle layers to at least 95% and 98% of the maximum dry density, respectively. When placed in a single layer or the final layer, compact to at least 100%.

Correction of subgrade soft spots is subsidiary.

Complete per plans the subgrade, ditches, slopes, and drainage structures prior to the placement of base.

Do not use a vibratory roller to compact base placed directly on top of a drainage structure.

Grade 4 will have the same material requirements as Grade 5 except minimum compressive strength at lateral pressure 3 psi will be **70** psi and at lateral pressure 15 psi will be 150 psi. Grade 4 does not have a minimum compressive strength at lateral pressure 0 psi.

Flex base may use ordinary compaction. Proof rolling of the base is required and subsidiary.

ITEM 300s – SURFACE COURSES AND PAVEMENTS
If an under seal is not provided, furnish a tack coat. Apply tack coat at 0.08 GAL/SY (residual). Apply non-tracking tack coat using manufacturer recommended rates.

ITEM 302 – AGGREGATES FOR SURFACE TREATMENTS
Previously tested aggregates delivered to the project, which are found to contain excessive quantities of dust (more than 0.5 percent passing the no. 40 sieve) during pre-coating, stockpiling or hauling operations, will be rejected. Use test method Tex-200-F, Part II, for testing.

Table 3 Los Angeles Abrasion, % Max, is lowered from 35 to 30 and is applicable to all aggregates.

When TY E is allowed, furnish coarse fractionated recycled asphalt pavement (CF-RAP). CF-RAP aggregate stockpiles must be approved on a stockpile-by-stockpile basis, unless approved by the Engineer. Do not exceed stockpiles greater than 2000 tons. CF-RAP will meet the below gradation requirement (after ignition burn off of asphalt) or finer than Grade 4. CF-RAP will meet deleterious material and decantation requirements in accordance with Table 3.

CF-RAP Requirements

Percent Retained				
5/8”	**1/2"**	**3/8"**	**#4**	**#8**
0	10-25	60-80	85-100	90-100

ITEM 310 – PRIME COAT
Apply blotter material to all driveways and intersections. This work is subsidiary.

When Multi Option is allowed, provide MC 30, EC 30 or AE-P. MC 30 is not allowed in Travis County.

Rolling to ensure penetration is required.

ITEMS 3076 THRU 3082 - HOT-MIX ASPHALT PAVEMENT
Core holes may be filled with an Asphaltic patching material meeting the requirements of DMS-9203 or with SCM meeting requirements of DMS-9202.

Install transverse butt joints with 50 ft. H: 1 in. V transition from the new ACP to the existing surface. Install a butt joint with 24 in. H: 1 in. V transition from the new ACP to a driveway, pullout or intersection. Saw cut the existing pavement at the butt joints. This work is subsidiary.

Use a device to create a maximum 3H:1V notched wedge joint on all longitudinal joints of 2 in. or greater. This work is subsidiary.

Prior to milling, core the existing pavement to verify thickness. This work is subsidiary.

Ensure placement sequence to avoid excess distance of longitudinal joint lap back not to exceed one day’s production rates.

Submit any proposed adjustments or changes to a JMF before production of the new JMF.

Tack every layer. Do not dilute tack coat. Apply it evenly through a distributor spray bar.

Provide a minimum transition of 10’ for intersections, 10’ for commercial driveways, and 6’ for residential driveways unless otherwise shown on the plans.

Irregularities will require the replacement of a full lane width using an asphalt paver. Replace the entire sublot if the irregularities are greater than 40% of the sublot area.

Lime or an approved anti-stripping agent must be used when crushed gravel is utilized to meet a SAC “A” requirement.

When using RAP or RAS, include the management methods of processing, stockpiling, and testing the material in the QCP submitted for the project. If RAP and RAS are used in the same mix, the QCP must document that both of these materials have dedicated feeder bins for each recycled material. Blending of RAP and RAS in one feeder bin or in a stockpile is not permitted.

Asphalt content and binder properties of RAP and RAS stockpiles must be documented when recycled asphalt content greater than 20% is utilized.

No RAS is allowed in surface courses.

Department approved warm-mix additives is required for all surface mix application when RAP is used. Dosage rates will be approved during JMF approval.

The Hamburg Wheel Test will have a minimum rut depth of 3mm except for SMA with HPG or PG 76.

ITEMS 3076 - DENSE-GRADED HOT-MIX ASPHALT
Use the SGC for design and production testing of all mixtures. Design all Type D mixtures as a surface mix, maximum 15% RAP and no RAS. Contractor may not use a substitute PG binder for 76-22. When using substitute binders, mold specimens for mix design and production at the temperature required for the substitute binder used to produce the HMA.

The Hamburg Wheel minimum number of passes for PG 64 or lower is reduced to 7,000. The Engineer may accept Hamburg Wheel test results for production and placement if no more than 1 of the 5 most recent tests is below the specified number of passes and the failing test is no more than 2,000 passes below the specified number of passes.

ITEMS 3081 - THIN OVERLAY MIXTURES (TOM)
For SAC A, blending SAC B aggregate with an RSSM greater than the SAC A rating or 10, whichever is greater, is prohibited.

When using a Thermal Imaging System follow the Weather Condition requirements for When Not Using a Thermal Imaging System.

Produce mixture with a Department approved WMA additive or process to facilitate compaction when the haul distance is greater than 40 miles or when the air temperature is 70°F and falling. WMA processes such as water or foaming processes are not allowed under these circumstances.

ITEM 400 - EXCAVATION AND BACKFILL FOR STRUCTURES
Saw-cut the pavement at the edge of the excavation. This work is subsidiary.

ITEM 432 - RIPRAP
Mow strip riprap will be 4 in. and all other riprap will be 5 in. unless otherwise shown on the plans. Mow strip for cable barrier may be placed monolithically with the barrier foundations if using concrete in accordance with Item 543. Fiber reinforcement is not allowed except in mow strip for cable barrier if foundation and mow strip are placed monolithically. GFRP is allowed reinforcement for all applications.

Saw-cut existing riprap then epoxy 12 in. long No. 3 or No. 4 bars 6 in. deep at a maximum spacing of 18 in. in each direction to tie new riprap to existing riprap. This work is subsidiary. Provide Type A Grade 3 or 5 flexible base for cement stabilized riprap. Compressive strengths for flexible base are waived.

SGT approach taper, paid for using mow strip item, will be installed using concrete, flexible base coated with SS-1 at a rate of 0.12 GAL/SY, or HMA Type B/C/D. Placement will be ordinary compaction and does not require placement using an asphalt paver.

ITEM 462 - CONCRETE BOX CULVERTS AND DRAINS
Use precast concrete boxes at Culverts 3, 5, & 6

ITEM 465 – JUNCTION BOXES, MANHOLES, AND INLETS
For inlets not placed in roadway, construct cast-in-place reinforced concrete apron as shown in the standards. This work is subsidiary.

ITEM 466 - HEADWALLS AND WINGWALLS
Remove all loose formwork and materials from the waterway at the end of each work week or prior to a rain event. Debris that falls into the waterway must be removed at the end of each

work day. Upon completion of the structure, stencil the National Bridge Inventory (NBI) number (structure number) using black paint and 4 in. tall numbers at 4 locations designated by TxDOT. This work is subsidiary.

ITEM 467 - SAFETY END TREATMENT
Field adjust pipe end to maintain the necessary slope. Field cutting of pipe end is allowed. Coat all metal field cuts or exposed reinforcement with asphalt paint.

ITEM 479 – ADJUSTING MANHOLES AND INLETS
Use style SL, per standard PSL, for capping inlets and manholes unless otherwise shown on the plans. The cap may be cast in place. The cap must be level and overhang 6 in. beyond the outside edge of the structure. Dowel or attachment of the cap to the existing structure is not required.

ITEM 496 - REMOVING STRUCTURES
Submit a demolition plan to the Engineer. Have the plan signed and sealed by a licensed professional engineer when the structure will continue to accommodate traffic after removal has begun and the removal impacts any part of the structure below the deck or riding surface. If applicable, the plan must detail requirements for meeting the U.S. Army Corps of Engineers' Section 404 Permit. The demolition plan must detail handling of roadway and waterway traffic. Waterway traffic must be maintained at all times unless a closure is approved by the Engineer.

No debris is allowed to fall into a body of water. Debris that falls into the water must be removed at the end of each work day. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

Table 1

Roadway	Limits	Allowable Closure Time
IH 35	All (1 lane closed)	9 P to 5 A
IH 35	All (2 lanes closed, see allowable work below)	9 P to 5 A
IH 35	All (2 lanes closed, all work)	11 P to 5 A
SH 45	US 183 to SH130	8 P to 5 A
LP 1	William Cannon to Parmer Lane	8 P to 5 A
US 183	SH 29 to FM 1327	8 P to 5 A
SH 71	SH 130 to IH 35	8 P to 5 A
SH 71	SH 304 to Tahitian Drive	8 P to 5 A
SH 71	US 290 W to RM 3238	8 P to 5 A
US 290 W	IH 35 to Nutty Brown Rd	8 P to 5 A
US 290 E	IH 35 to SH 95	8 P to 5 A
FM 734	FM 1431 to US 290 E	8 P to 5 A
US 79	IH 35 to Bus 79 in Taylor	8 P to 5 A
RM 1431	Lohmans Ford Rd to IH 35	8 P to 5 A
SH 29	LP 332 western terminus to SH 130	8 P to 5 A
SH 80	Charles Austin to River Road	8 P to 5 A
RM 2222	All	8 P to 5 A
RM 620	All	8 P to 5 A

RM 2244	All	8 P to 5 A
SPUR 69	All	8 P to 5 A
LP 360	All	8 P to 5 A
LP 343	All	8 P to 5 A
LP 275	All	8 P to 5 A
FM 1325	All	8 P to 5 A
All	Within 200' of a signalized intersection	9 P to 5 A
All	All (Full Closure, see allowable work below)	11 P to 4 A

Table 3 (Mobile Operations)

Roadway	Allowable Sun Night thru Fri Noon	Allowable Sat thru Sun Morn
Within Austin City Limits	10 A to 2 P and 7 P to 6 A	7 P to 10 A
Outside Austin City Limits	9 A to 3 P and 7 P to 7 A	6 P to 11 A
IH 35 main lanes	10 P to 5 A	9 P to 9 A
AADT over 50,000	8 P to 6 A	8 P to 10 A

For roadways without defined allowable closure times, nighttime lane closures will be allowed from 8 P to 6 A. Unless stated, daytime or Friday night lane closures will not be allowed and one lane in each direction will remain open at all times for all roadways.

No closures will be allowed on the weekends, working day prior, and working day after the National Holidays defined in the Standard Specifications, Good Friday, and Easter weekend. Closures the Sunday of the Super Bowl will not be allowed from 1 P to 11 P. No closures will be allowed on Friday and the weekends for projects within 20 miles of Formula 1 at COTA, ACL Fest, SXSW, ROT Rally, UT home football games (includes games not on a Friday or weekend), sales tax holiday, Dell Match Play (includes Thursday), Rodeo Austin, or other special events that could be impacted by the construction. All lanes will be open by noon of the day before these special events.

To account for directional traffic volumes, begin and end times of closures may be shifted equally by the Engineer. The closure duration will remain. Added compensation is not allowed.

Submit an emailed request for a lane closure (LCN) to TxDOT. The email will be submitted in the format provided. Receive concurrence prior to implementation. Submit a cancellation of lane closures a minimum of 18 hours prior to implementation. Blanket requests for extended periods are not allowed. Max duration of a request is 2 weeks prior to requiring resubmittal.

Provide 2 hour notice prior to implementation and immediately upon removal of the closure.

For roadways listed in Table 1: Submit the request 96 hours prior to implementation.

For roadways not listed in Table 1: Submit the request a minimum of 48 hours prior to the closure and by the following deadline immediately prior to the closure: 11A on Tuesday or 11A on Friday. For all roadways: Submit request for traffic detours and full roadway closures 168 hours prior to implementation. Submit request for nighttime work 96 hours to implementation date.

Cancellations of accepted closures (not applicable to full closures or detours) due to weather will not require resubmission in accordance with the above restrictions if the work is completed during the next allowable closure time.

Closures that conflict with adjacent contractor will be prioritized according to critical path work per latest schedule. Conflicting critical path or non-critical work will be approved for first LCN submitted. Denial of a closure due to prioritization or other reasons will not be reason for time suspension, delay, overhead, etc.

Meet with the Engineer prior to lane closures to ensure that sufficient equipment, materials, devices, and workers will be used. Take immediate action to modify current and future traffic control, if at any time the queue becomes greater than 20 minutes.

Consider inclement weather prior to implementing the lane closures. Do not set up traffic control when the pavement is wet.

Cover, relocate or remove existing signs that conflict with traffic control. Install all permanent signs, delineation, and object markers required for the operation of the roadway before opening to traffic. Use of temporary mounts is allowed or may be required until the permanent mounts are installed or not impacted by construction. Maintain the temporary mounts. This work is subsidiary.
Meet with the Engineer prior to lane closures to ensure that sufficient equipment, materials, devices, and workers will be used. Take immediate action to modify traffic control, if at any time the queue becomes greater than 20 minutes. Have a contingency plan of how modification will occur. Consider inclement weather prior to implementing the lane closures. Do not set up traffic control when the pavement is wet.

Place a 28-inch cone, meeting requirements of BC (10), on top of foundations that have protruding studs. This work is subsidiary.

Vertical panels used on roadways with speed limit 55mph or greater must be round in shape or have a self-righting mechanism. The "flat" or "oblong" shaped vertical panels are not allowed.

A series of sequential flashing warning lights, per BC(7), must be installed in a merging taper for long term stationary TCP. This includes all TCP setups, such as those shown on the plans or TCP setups per the standards.

Edge condition treatment types must be in accordance with the TxDOT standard. Installation and removal of a safety slope is subsidiary.

To determine a speed limit or an advisory speed limit, submit a request to TxDOT 60 business days prior to manufacture of the sign.

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 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENV CONTROLS
If SW3P plan sheets are not provided, place the control measures as directed.

Install, maintain, remove control measures in areas of the right of way utilized by the Contractor that are outside the limits of disturbance required for construction. Permanently stabilize the area. This work is subsidiary.

Erosion control measures must be initiated immediately in areas where construction activities have ceased and will not resume for a period exceeding 14 calendar days. Vertical track all exposed soil, stockpiles, and slopes. Re-track after each rain event or every 14 days, whichever occurs first. Sheep foot roller is allowed for vertical tracking. This work is subsidiary.

Unless a specific pay item is provided in the plans, the installation of the 6:1 or flatter for RFD side slopes in the safety zone will be subsidiary to pertinent bid items.

ITEM 530 – INTERSECTIONS, DRIVEWAYS, AND TURNOUTS
Notify property owners at least 48 hr. before beginning work on their driveway. Provide a list of each notification and contact before each closure. Only close driveways for reconstruction if duration and alternate access are approved. Install and maintain material across a work zone as temporary access. This work is subsidiary.

For ACP or SURF TREAT, the pavement structure will match the adjacent roadway unless detailed on the plans. HMA, including surface, may use a maximum allowable quantity of 40% RAP and 5% RAS for private driveways, public driveways for 2-lane roadways or smaller, and turnouts. Blending of 2 or more sources is allowed.

For CONC, the pavement structure will be 6 in. thick and have 3 in. flexible base bedding unless detailed on the plans.

ITEMS 540, 542, & 544 - METAL BEAM GUARD FENCE AND GUARDRAIL END TREATMENTS
Furnish round timber posts for guard fence. Steel posts for low fill culvert applications is subsidiary including use of low fill culvert application due to other concrete structures such as inlets. Long span application at inlets may be used as an alternate to low fill culvert. Unless otherwise specified on the plans, use of low fill culvert or long span at inlets will be subsidiary to pertinent items. Stake the locations for approval before installation. Adjust the limits of the fence to meet field conditions. Install delineators before opening the road to traffic.

Retain all materials. Existing materials that are structurally sound and dent free may be reused. All reused material will be from this project and in compliance with current standards.

Structurally sound rust spots with the largest dimension of 4 in. may be cleaned and repaired in accordance with Section 540.3.5. Punch or field drill holes in the metal rail element to accommodate post spacing. Additional holes for splice or connections are not allowed. Space the field holes in accordance with the latest standard but no closer than the minimum spacing shown on the current standard.

Remove, replace, and install mow strip block out material. Construct new block outs and backfill unused block outs with class B concrete. This work is subsidiary.

Repair of mow strip damage, not caused by contractor negligence, and installation of new mow strip will be paid with appropriate bid items. Backfill and shoulder up of area around fence and mow strip will be paid using embankment item.

ITEMS 600s & 6000s – ITS, LIGHTING, SIGNING, MARKINGS, AND SIGNALS
Meet the requirements of the NEC, Texas MUTCD, TxDOT standards, and TxDOT Standard Specifications. Notify the Engineer if existing elements to remain do not meet code or specification.

Contractor shall provide all service, equipment and material required to provide a functional item and interface with existing equipment and software.

For signal shop contact Charles Vaughn Jr (Charles.Vaughn@txdot.gov) and Douglas Turner (Douglas.L.Turner@txdot.gov).

ITEM 644 – SMALL ROADSIDE SIGN ASSEMBLIES
Triangular slip base that use set screws to secure the post will require 1 of the set screws to penetrate the post by drilling a hole in the post at the location of the screw. All set screws shall be treated with anti-seize compound.

ITEM 662 - WORK ZONE PAVEMENT MARKINGS
Notify the Engineer at least 24 hours in advance of work for this item.

Maintain removable and short-term markings daily. Remove within 48 hours after permanent striping has been completed.

Item 668 is not allowed for use as Item 662.

Roadways with existing profile pavement markings or rumble strips must supplement work zone solid lines with traffic buttons spaced at 12 in. Traffic buttons used to supplement the work zone markings will be paid by the each in addition to the work zone item.

DMS-8200 "Traffic Paint" may be used as nonremovable markings.

ITEM 666 - RETROREFLECTORIZED PAVEMENT MARKINGS
Notify the Engineer at least 24 hr. before beginning work.

ITEM 3084 – BONDING COURSE
The minimum application rates are listed in Table BC. Miscellaneous Tack is allowed for use with dense-graded Type B HMA. If a tack bid item is not provided, use bonding course item.

The target shear bond strengths are listed in Table BCS. The informational test cores shall be taken once a shift for first 5 lots of placement or a change to placement method of bonding course, bonding material, or hot mix material. The remaining informational test cores shall be taken once every 3 lots for surface mix. Informational tests are not required for non-surface mix beyond the first 5 lots unless there is a change to placement method of bonding course, bonding material, or hot mix material. Results from these informational tests will not be used for specification compliance.

Table BC

Material	Minimum Application Rate (gal. per square yard)
TRAIL – Emulsified Asphalt	0.06
TRAIL – Hot Asphalt	0.12
Spray Applied Underseal Membrane	0.10

Table BCS (For Informational Tests)

Material	Target Shear Bond Strength (Tex-249-F psi)
SMA – Stone-Matrix Asphalt	60.0
PFC – Permeable Friction Course	N/A
All Other Materials	40.0

ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN
Provide 3 PCMS. Provide a replacement within 12 hours. PCMS will be available for traffic control, event notices, roadway conditions, service announcements, etc.

Place PCMS 10 calendar days prior to begin work stating “Road Work Begin Soon, Contact 832-7000 For Info”.

Place PCMS at time of LCN request. Place the PCMS at the expected end of queue caused by the closure. When the closure is active, revise the message to reflect the actual condition during the closure, such as “RIGHT LN CLOSED XXX FT”.

ITEM 6185 – TRUCK MOUNTED ATTENUATOR AND TRAILER ATTENUATOR
The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

The contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMA/TA required for the work. TMA/TAs paid by the day is full compensation for all worksite locations during an entire day.

TMA/TAs used to protect damaged attenuators will be paid by the day using the force account item for the repair.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0016-16-028 **DISTRICT** Austin **COUNTY** Hays
HIGHWAY RM 967

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0016-16-028**			
		PROJECT ID		**A00006646**			
		COUNTY		**Hays**			
		HIGHWAY		**RM 967**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	119.810		119.810	
	104-6015	REMOVING CONC (SIDEWALKS)	SY	84.000		84.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	1,174.000		1,174.000	
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF	140.000		140.000	
	105-6022	REMOVING STAB BASE AND ASPH PAV (13")	SY	42,801.000		42,801.000	
	110-6001	EXCAVATION (ROADWAY)	CY	16,469.000		16,469.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	4,683.000		4,683.000	
	132-6047	EMBANKMENT (FINAL)(ORD COMP)(TY C1)	CY	12,441.000		12,441.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	42,050.000		42,050.000	
	164-6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	42,050.000		42,050.000	
	164-6071	BROADCAST SEED (TEMP)(WARM OR COOL)	SY	21,027.000		21,027.000	
	168-6001	VEGETATIVE WATERING	MG	707.800		707.800	
	169-6006	SOIL RETENTION BLANKETS (CL 2) (TY F)	SY	42,050.000		42,050.000	
	204-6003	SPRINKLING (DUST CONTROL)	MG	400.000		400.000	
	247-6366	FL BS (CMP IN PLC)(TY A GR 5)(FNAL POS)	CY	12,256.000		12,256.000	
	310-6001	PRIME COAT (MULTI OPTION)	GAL	17,383.000		17,383.000	
	400-6005	CEM STABIL BKFL	CY	396.000		396.000	
	400-6008	CUT & RESTORE ASPH PAVING	SY	246.000		246.000	
	402-6001	TRENCH EXCAVATION PROTECTION	LF	223.000		223.000	
	403-6001	TEMPORARY SPL SHORING	SF	952.000		952.000	
	420-6029	CL C CONC (CAP)	CY	3.000		3.000	
	432-6002	RIPRAP (CONC)(5 IN)	CY	486.000		486.000	
	432-6031	RIPRAP (STONE PROTECTION)(12 IN)	CY	76.000		76.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	130.000		130.000	
	460-6002	CMP (GAL STL 18 IN)	LF	61.000		61.000	
	460-6003	CMP (GAL STL 24 IN)	LF	22.000		22.000	
	460-6024	CMP AR (GAL STL DES 7)	LF	32.000		32.000	
	462-6002	CONC BOX CULV (3 FT X 3 FT)	LF	128.000		128.000	
	462-6009	CONC BOX CULV (5 FT X 5 FT)	LF	124.000		124.000	
	462-6015	CONC BOX CULV (7 FT X 4 FT)	LF	64.000		64.000	
	462-6020	CONC BOX CULV (8 FT X 5 FT)	LF	126.000		126.000	
	462-6164	CONC BOX CULV (7 FT X 2 FT)(EXTEND)	LF	24.000		24.000	
	462-6165	CONC BOX CULVERT (10 FT X 4 FT)(EXTEND)	LF	8.000		8.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF	1,593.000		1,593.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	1,222.000		1,222.000	
	464-6032	RC PIPE (ARCH)(CL III)(DES 3)	LF	68.000		68.000	
	465-6560	INL(CMP)(PAZD-CZ)(FG)(4FTX4FT-4FTX4FT)	EA	1.000		1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0016-16-028 **DISTRICT** Austin **COUNTY** Hays
HIGHWAY RM 967

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0016-16-028**			
		PROJECT ID		**A00006646**			
		COUNTY		**Hays**			
		HIGHWAY		**RM 967**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	466-6130	HEADWALL (CH - PW - S) (DIA= 24 IN)	EA	1.000		1.000	
	466-6171	WINGWALL (PW - 1) (HW=10 FT)	EA	1.000		1.000	
	466-6180	WINGWALL (PW - 1) (HW=5 FT)	EA	1.000		1.000	
	466-6181	WINGWALL (PW - 1) (HW=6 FT)	EA	5.000		5.000	
	467-6243	SET (TY I)(S= 7 FT)(HW= 3 FT)(6:1) (P)	EA	2.000		2.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA	45.000		45.000	
	467-6390	SET (TY II) (24 IN) (RCP) (4: 1) (C)	EA	1.000		1.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	31.000		31.000	
	467-6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	2.000		2.000	
	496-6040	REMOV STR (RET WALL)	LF	7.000		7.000	
	496-6042	REMOV STR (SMALL)	EA	37.000		37.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	12.000		12.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	136.000		136.000	
	506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	50.000		50.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	186.000		186.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	78.000		78.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	78.000		78.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	4,556.000		4,556.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	4,556.000		4,556.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	353.000		353.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	353.000		353.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF	217.000		217.000	
	530-6002	INTERSECTIONS (ACP)	SY	1,137.000		1,137.000	
	530-6004	DRIVEWAYS (CONC)	SY	1,193.000		1,193.000	
	530-6005	DRIVEWAYS (ACP)	SY	2,225.000		2,225.000	
	530-6008	TURNOUTS (ACP)	SY	65.000		65.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	1,362.500		1,362.500	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1.000		1.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	900.000		900.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	13.000		13.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	9.000		9.000	
	560-6004	MAILBOX INSTALL-S (TWG-POST) TY 2	EA	9.000		9.000	
	560-6005	MAILBOX INSTALL-D (TWG-POST) TY 2	EA	2.000		2.000	
	560-6006	MAILBOX INSTALL-M (TWG-POST) TY 2	EA	4.000		4.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1.000		1.000	
	644-6002	IN SM RD SN SUP&AM TY10BWG(1)SA(P-BM)	EA	3.000		3.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0016-16-028 **DISTRICT** Austin **COUNTY** Hays
HIGHWAY RM 967

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0016-16-028**			
		PROJECT ID		**A00006646**			
		COUNTY		**Hays**			
		HIGHWAY		**RM 967**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1.000		1.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	1.000		1.000	
	644-6056	IN SM RD SN SUP&AM TYTWT(1)UA(P)	EA	25.000		25.000	
	644-6057	IN SM RD SN SUP&AM TYTWT(1)UA(T)	EA	1.000		1.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	33.000		33.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	17,073.000		17,073.000	
	662-6012	WK ZN PAV MRK NON-REMOV (W)8"(SLD)	LF	1,635.000		1,635.000	
	662-6016	WK ZN PAV MRK NON-REMOV (W)24"(SLD)	LF	18.000		18.000	
	662-6017	WK ZN PAV MRK NON-REMOV (W)(ARROW)	EA	16.000		16.000	
	662-6023	WK ZN PAV MRK NON-REMOV (W)(RR XING)	EA	1.000		1.000	
	662-6029	WK ZN PAV MRK NON-REMOV(W)(WORD)	EA	12.000		12.000	
	662-6032	WK ZN PAV MRK NON-REMOV (Y)4"(BRK)	LF	438.000		438.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	21,198.000		21,198.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	456.000		456.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	3,708.000		3,708.000	
	666-6018	REFL PAV MRK TY I (W)6"(DOT)(100MIL)	LF	52.000		52.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1,880.000		1,880.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	30.000		30.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	24.000		24.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	14.000		14.000	
	666-6093	REFL PAV MRK TY I (W)(RR XING)(100MIL)	EA	1.000		1.000	
	666-6174	REFL PAV MRK TY II (W) 6" (SLD)	LF	22,917.000		22,917.000	
	666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	1,880.000		1,880.000	
	666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	30.000		30.000	
	666-6184	REFL PAV MRK TY II (W) (ARROW)	EA	24.000		24.000	
	666-6192	REFL PAV MRK TY II (W) (WORD)	EA	14.000		14.000	
	666-6196	REFL PAV MRK TY II (W) (RR XING)	EA	1.000		1.000	
	666-6208	REFL PAV MRK TY II (Y) 6" (BRK)	LF	1,703.000		1,703.000	
	666-6210	REFL PAV MRK TY II (Y) 6" (SLD)	LF	27,348.000		27,348.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	3,378.000		3,378.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	1,703.000		1,703.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	27,348.000		27,348.000	
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	19,539.000		19,539.000	
	672-6007	REFL PAV MRKR TY I-C	EA	112.000		112.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	752.000		752.000	
	3076-6003	D-GR HMA TY-B PG64-22 (EXEMPT)	TON	2,700.000		2,700.000	
	3076-6031	D-GR HMA TY-C PG76-22	TON	9,622.000		9,622.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0016-16-028 **DISTRICT** Austin **COUNTY** Hays
HIGHWAY RM 967

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0016-16-028**			
		PROJECT ID		**A00006646**			
		COUNTY		**Hays**			
		HIGHWAY		**RM 967**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	3081-6008	TOM-C PG76-22 SAC-B	TON	3,572.000		3,572.000	
	3084-6001	BONDING COURSE	GAL	4,984.000		4,984.000	
	5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	55,990.000		55,990.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	3.000		3.000	
	6185-6002	TMA (STATIONARY)	DAY	15.000		15.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	10.000		10.000	
	7251-6001	Subsurface Util Locate (Outside Rdbed)	EA	10.000		10.000	
	7251-6002	Subsurface Util Locate (Within Rdbed)	EA	5.000		5.000	
	18	RAILROAD FLAGGING: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	204 6003	662 6004	662 6012	662 6016	662 6017	662 6023	662 6029	662 6032	662 6034	662 6109	662 6111	6001 6002	6185 6002	6185 6005
	SPRINKLING (DUST CONTROL)	WK ZN PAV MRK NON-REMOV (W)4" (SLD)	WK ZN PAV MRK NON-REMOV (W)8" (SLD)	WK ZN PAV MRK NON-REMOV (W)24" (SLD)	WK ZN PAV MRK NON-REMOV (W) (ARROW)	WK ZN PAV MRK NON-REMOV (W) (RR XING)	WK ZN PAV MRK NON-REMOV (W) (WORD)	WK ZN PAV MRK NON-REMOV (Y)4" (BRK)	WK ZN PAV MRK NON-REMOV (Y)4" (SLD)	WK ZN PAV MRK SHT TERM (TAB)TY W	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	MG	LF	LF	LF	EA	EA	EA	LF	LF	EA	EA	EA	DAY	DAY
(PHASE 1)	290													
STA 154+68 - 244+79 (PHASE 2) (AFTER PHASE 2 SURFACE)		17073	1635	18	16		12	438	21198	208	1186			
(PHASE 3)	110													
STA 111+11 - 141+80 (PHASE 4) (AFTER PHASE 4 SURFACE)						1				20	668			
STA 111+11 - 141+80 (PHASE 5) (AFTER PHASE 5 FINAL SURFACE)										20	668			
STA 154+68 - 244+79 (PHASE 5) (AFTER PHASE 5 FINAL SURFACE)										208	1186			
PROJECT TOTALS	**400**	**17073**	**1635**	**18**	**16**	**1**	**12**	**438**	**21198**	**456**	**3708**	**3**	**15**	**10**

NOTE: ITEM 204 SPRINKLING (DUST CONTROL) TO BE USED
DURING CONSTRUCTION OF 8" SELECT FILL, 8" FLEX BASE,
DAILY TRAFFIC AND/OR AS DIRECTED BY THE CONSTRUCTION OBSERVER.

Texas Department of Transportation

BGE, Inc.
1701 Directors Blvd., Suite 1000, Austin, TX 78744
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

RM 967

SUMMARY OF TCP QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			12
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

SUMMARY OF ROADWAY ITEMS

LOCATION	100 6002 PREPARING ROW	100 6003 PREPARING ROW (TREE) (5" TO 12" DIA) *	104 6015 REMOVING CONC (SIDEWALKS)	104 6017 REMOVING CONC (DRIVEWAYS)	104 6022 REMOVING CONC (CURB AND GUTTER)	105 6022 REMOVING STAB BASE AND ASPH PAV (13")	110 6001 EXCAVATION (ROADWAY)	132 6003 EMBANKMENT (FINAL) (ORD COMP) (TY B)	132 6047 EMBANKMENT (FINAL) (ORD COMP) (TY C1)	247 6366 FL BS (CMP IN PLC) (TY A GR 5) (FNAL POS)	310 6001 PRIME COAT (MULTI OPTION)	432 6002 RIPRAP (CONC) (5 IN)	432 6045 RIPRAP (MOW STRIP) (4 IN)	460 6003 CMP (GAL STL 24 IN)	462 6164 CONC BOX CULV (7 FT X 2 FT) (EXTEND)	464 6003 RC PIPE (CL III) (18 IN)	464 6005 RC PIPE (CL III) (24 IN)	464 6032 RC PIPE (ARCH) (CL III) (DES 3)
	STA	EA	SY	SY	LF	SY	CY	CY	CY	CY	GAL	CY	CY	LF	LF	LF	LF	LF
PP 1	5.89	2	14	73		2261	716	293	219	216	307	144	17	22	24	61	171	
PP 2	11		70	322		3648	1303	410	1339	1321	1877	246				119	498	
PP 3	11			74		3945	1526	364	1339	1321	1876					437	374	
PP 4	1.8					767	364	51	220	217	308					95		
PP 5	6.32			454		2103	614	113	579	569	804		19					
PP 6	11					3780	1223	429	1016	998	1411					128		
PP 7	11				140	4257	1470	778	1284	1266	1797		47			122		
PP 8	11					4007	1611	540	1329	1311	1862					75		
PP 9	11					3900	1230	189	1031	1013	1433					92		
PP 10	11					3865	1215	267	1014	996	1408					48		
PP 11	11					3802	2051	415	1306	1287	1828		19			54		
PP 12	11					3629	2536	438	1340	1322	1877		17			244		
PP 13	6.8			251		2837	612	396	425	419	595		11			118	85	68
PROJECT TOTALS	119.81	2	84	1174	140	42801	16469	4683	12441	12256	17383	390	130	22	24	1593	1128	68

SUMMARY OF ROADWAY ITEMS (CONT.)

LOCATION	465 6560 INL (CMP) (PAZD -CZ) (FG) (4FTX 4FT-4FTX4FT)	467 6243 SET (TY I) (S= 7 FT) (HW= 3 FT) (6:1) (P)	467 6363 SET (TY II) (18 IN) (RCP) (6: 1) (P)	467 6395 SET (TY II) (24 IN) (RCP) (6: 1) (P)	467 6545 SET (TY II) (DES 3) (RCP) (6: 1) (P)	496 6042 REMOV STR (SMALL)	529 6008 CONC CURB & GUTTER (TY II)	530 6002 INTERSECTION S (ACP)	530 6004 DRIVEWAYS (CONC)	530 6005 DRIVEWAYS (ACP)	540 6001 MTL W-BEAM GD FEN (TIM POST)	540 6016 DOWNSTREAM ANCHOR TERMINAL SECTION	542 6001 REMOVE METAL BEAM GUARD FENCE	544 6001 GUARDRAIL END TREATMENT (INSTALL)	544 6003 GUARDRAIL END TREATMENT (REMOVE)	3076 6003 D-GR HMA TY-B PG64-22 (EXEMPT)	3076 6031 D-GR HMA TY-C PG76-22	3081 6008 TOM-C PG 76-22 SAC-B
	EA	EA	EA	EA	EA	EA	LF	SY	SY	SY	LF	EA	LF	EA	EA	TON	TON	TON
PP 1		2	2	5		4		109	73	307	250	1	200	1	1	1446	512	191
PP 2			4	12		5		63	250	61							968	361
PP 3			12	12		10		193	107	472							967	361
PP 4			2			1				104							159	59
PP 5						1			502	98	150			2			415	155
PP 6	1		4			3		116		198							728	271
PP 7			2			1	30	156		56	587.5		400	4	4		927	346
PP 8			1			1		114		49							960	357
PP 9			2			1				131							739	276
PP 10			2							214							726	255
PP 11			2			1		183		147	150		225	2	2		942	351
PP 12			8			1		84		217	150			2			968	361
PP 13			4	2	2	3	187	119	261	171	75		75	2	2	1254	611	228
PROJECT TOTALS	1	2	45	31	2	32	217	1137	1193	2225	1362.5	1	900	13	9	2700	9622	3572

SUMMARY OF ROADWAY ITEMS (CONT.)

LOCATION	3084 6001 BONDING COURSE	5001 6002 GEOGRID BASE REINFORCEMENT (TY II)	7251 6001 SUBSURFACE UTIL LOCATE (OUTSIDE RDBED)	7251 6002 SUBSURFACE UTIL LOCATE (WITHIN RDBED)
	GAL	SY	EA	EA
PP 1	420	987		
PP 2	469	6028		
PP 3	469	6026		
PP 4	77	988		
PP 5	201	2607		
PP 6	353	4572		
PP 7	449	5780		
PP 8	466	5982		
PP 9	358	4641		
PP 10	352	4563		
PP 11	457	5875		
PP 12	469	6030		
PP 13	444	1911		
PROJECT			10	5
PROJECT TOTALS	4984	55990	10	5

* FOR CONTRACTOR'S INFORMATION ONLY.
SUBSIDIARY TO ITEM 100-6002 PREPARING ROW.

Texas Department of Transportation

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RM 967

SUMMARY OF ROADWAY QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			13
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

SUMMARY OF DRAINAGE ITEMS

LOCATION	400 6005	400 6008	402 6001	403 6001	420 6029	432 6002	432 6031	460 6002	460 6024	462 6002	462 6009	462 6015	462 6020	462 6165	464 6005
	CEM STABIL BKFL	CUT & RESTORE ASPH PAVING	TRENCH EXCAVATION PROTECTION	TEMPORARY SPL SHORING	CL C CONC (CAP)	RIPRAP (CONC) (5 IN)	RIPRAP (STONE PROTECTION) (12 IN)	CMP (GAL STL 18 IN)	CMP AR (GAL STL DES 7)	CONC BOX CULV (3 FT X 3 FT)	CONC BOX CULV (5 FT X 5 FT)	CONC BOX CULV (7 FT X 4 FT)	CONC BOX CULV (8 FT X 5 FT)	CONC BOX CULVERT (10 FT X 4 FT) (EXTEND)	RC PIPE (CL III) (24 IN)
	CY	SY	LF	SF	CY	CY	CY	LF	LF	LF	LF	LF	LF	LF	LF
CULVERT 0	7								32						
CULVERT 1	97	92	63		3								126		
CULVERT 2															
CULVERT 3	107	65	58	520		10					124				
CULVERT 4	5					7								8	
CULVERT 5	52	34	52	144		25	15					64			
CULVERT 6	100	31	50	288		8	21			128					
CULVERT 7	14	24				45	40								94
CULVERT 0 DRAINAGE DETAIL	14					1		61							
PROJECT TOTALS	396	246	223	952	3	96	76	61	32	128	124	64	126	8	94

SUMMARY OF DRAINAGE ITEMS (CONT.)

LOCATION	466 6130	466 6171	466 6180	466 6181	467 6390	496 6040	496 6042
	HEADWALL (CH - PW - S) (DIA= 24 IN)	WINGWALL (PW - 1) (HW=10 FT)	WINGWALL (PW - 1) (HW=5 FT)	WINGWALL (PW - 1) (HW=6 FT)	SET (TY II) (24 IN) (RCP) (4: 1) (C)	REMOV STR (RET WALL)	REMOV STR (SMALL)
	EA	EA	EA	EA	EA	LF	EA
CULVERT 0							
CULVERT 1							
CULVERT 2							
CULVERT 3		1		1			1
CULVERT 4			1				
CULVERT 5				2			1
CULVERT 6				2		7	1
CULVERT 7	1				1		1
CULVERT 0 DRAINAGE DETAIL							1
PROJECT TOTALS	1	1	1	5	1	7	5

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SUMMARY OF DRAINAGE QUANTITIES

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			14
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
PLOTDRIVER: pdf.pltcfg
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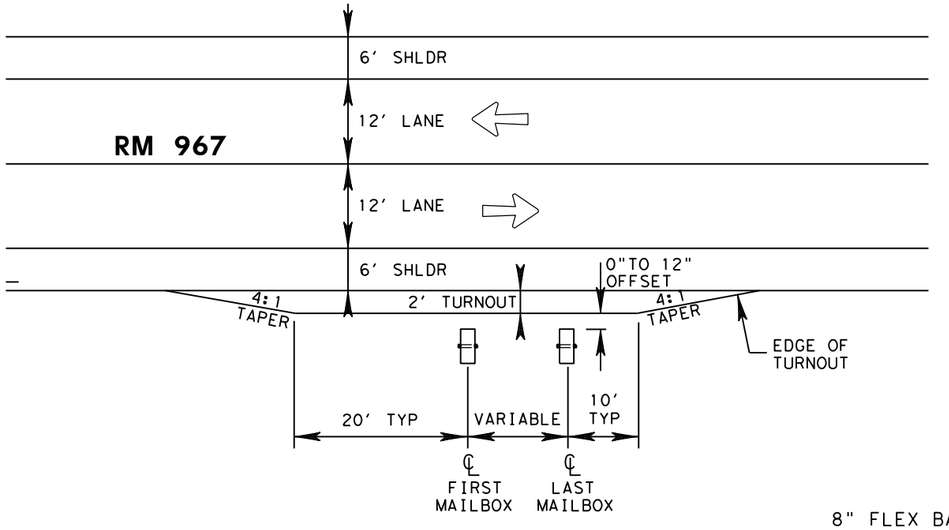
DATE:1/17/2023 7:48:00 AM USER:RM 967
PENTABLE: $PENTBL$

MAILBOX TURNOUT NUMBER	START-END STATION		530 6008 TURNOUTS (ACP)	560 6004 MAILBOX INSTALL-S (TWG-POST) TY 2	560 6005 MAILBOX INSTALL-D (TWG-POST) TY 2	560 6006 MAILBOX INSTALL-M (TWG-POST) TY 2
			SY	EA	EA	EA
1	116+96 - 117+32	LT	6	1		
2	119+49 - 119+73	LT	4	1		
3	123+49 - 123+86	LT	7	1		
4	127+35 - 127+71	LT	6	1		
5	133+27 - 133+63	LT	6		1	
6	135+71 - 135+94	LT	3	1		
7	139+90 - 140+17	LT	4	1		
8	156+05 - 156+35	LT	5			1
9	165+14 - 165+50	LT	6	1		
10	221+83 - 222+42	LT	12	1	1	3
11	224+67 - 225+03	LT	6	1		
PROJECT TOTALS			65	9	2	4

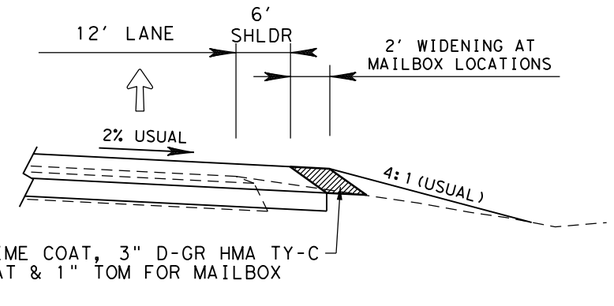


MAILBOX TURNOUT PLAN

(SEE MB-14(2) FOR ADDITIONAL DETAILS)

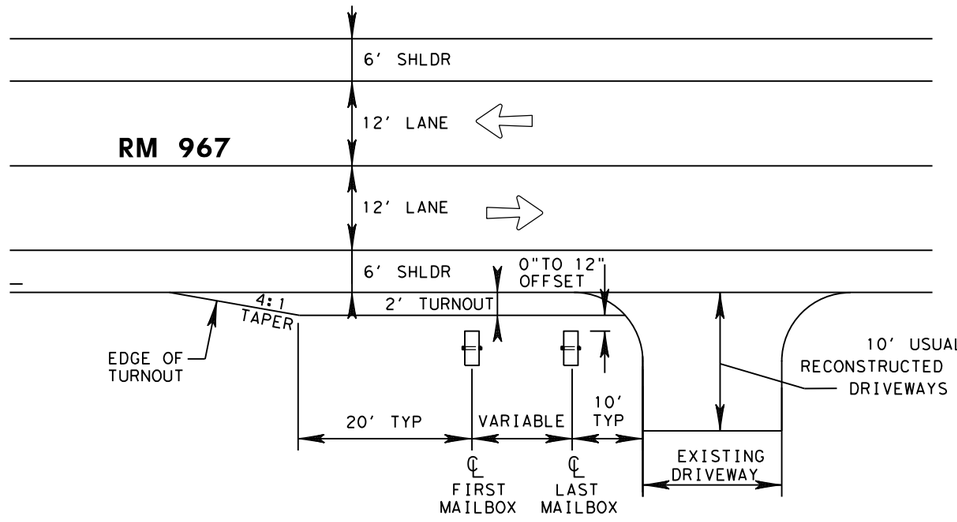
MAILBOX AND TURNOUTS NOTES:

1. ALL LOCATIONS ARE APPROXIMATE AND SHALL BE FIELD ADJUSTED TO MEET EXISTING CONDITION.
2. DIMENSIONS FOR EACH TURNOUT ARE TYPICAL AND MAY VARY DURING ACTUAL CONSTRUCTION TO MEET FIELD CONDITIONS.
3. THE TYPES & RATES OF MATERIALS SHALL CONFORM TO THE ROADWAY ITEMS.
4. TURNOUT LOCATIONS ADJACENT TO DRIVEWAYS SHALL BE CONNECTED TO DRIVEWAYS.
5. SEE MB-14(2) & MB(1-4)-21 STANDARD SHEETS FOR MORE INFORMATION.



MAILBOX TURNOUT TYPICAL SECTION

(SEE MB-14(2) FOR ADDITIONAL DETAILS)



MAILBOX TURNOUT PLAN (ADJACENT TO DRIVEWAYS)

(SEE MB-14(2) FOR ADDITIONAL DETAILS)

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

Texas Department of Transportation

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RM 967

MAILBOX TURNOUT SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			15
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
PLOTDRIVER: pdf.pltcfg
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DATE:12/2/2022 11:55:40 AM USER:RM 967
PENTABLE: $PENTBLS$

SUMMARY OF EARTHWORK
RM 967

ITEM	110	132
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)
STATION	CY	CY
111+50.00	0	0
112+00.00	108	72
112+50.00	122	60
113+00.00	127	51
113+50.00	135	42
114+00.00	140	29
114+50.00	151	10
115+00.00	148	4
115+50.00	141	9
116+00.00	156	8
116+50.00	153	4
117+00.00	151	4
117+50.00	152	6
118+00.00	146	6
118+50.00	142	6
119+00.00	136	7
119+50.00	137	7
120+00.00	126	5
120+50.00	123	4
121+00.00	136	3
121+50.00	134	4
122+00.00	129	5
122+50.00	127	8
123+00.00	122	7
123+50.00	110	8
124+00.00	115	17
124+50.00	115	35
125+00.00	104	33
125+50.00	89	25
126+00.00	79	40
126+50.00	81	47
127+00.00	85	49
127+50.00	104	52
128+00.00	128	36
128+50.00	150	21
129+00.00	148	21
129+50.00	137	23
130+00.00	136	24
130+50.00	139	17
131+00.00	132	21
131+50.00	122	23
132+00.00	127	19
132+50.00	122	24
133+00.00	122	25
133+50.00	144	19
134+00.00	157	13
134+50.00	154	14
135+00.00	153	12
135+50.00	148	8
136+00.00	148	5
136+50.00	147	6
137+00.00	141	8
137+50.00	142	15
138+00.00	143	21
138+50.00	139	25
139+00.00	141	19
139+50.00	144	9
140+00.00	141	6
140+50.00	137	9
140+80.32	78	8
TOTAL	7744	1118

SUMMARY OF EARTHWORK
RM 967

ITEM	110	132
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)
STATION	CY	CY
154+68.04	0	0
155+00.00	71	1
155+50.00	112	3
156+00.00	124	3
156+50.00	127	3
157+00.00	116	3
157+50.00	112	3
158+00.00	107	3
158+50.00	106	12
159+00.00	113	24
159+50.00	124	25
160+00.00	131	21
160+50.00	130	12
161+00.00	122	14
161+50.00	117	27
162+00.00	117	26
162+50.00	115	24
163+00.00	110	23
163+50.00	111	22
164+00.00	115	20
164+50.00	109	12
165+00.00	102	13
165+50.00	102	13
166+00.00	106	10
166+50.00	104	27
167+00.00	99	27
167+50.00	103	18
168+00.00	112	21
168+50.00	118	20
169+00.00	121	16
169+50.00	126	16
170+00.00	133	15
170+50.00	134	13
171+00.00	119	13
171+50.00	99	19
172+00.00	94	20
172+50.00	114	9
173+00.00	152	3
173+50.00	188	5
174+00.00	198	10
174+50.00	195	13
175+00.00	176	23
175+50.00	142	42
176+00.00	113	214
176+50.00	92	226
177+00.00	86	59
177+50.00	91	30
178+00.00	105	15
178+50.00	127	8
179+00.00	151	4
179+50.00	162	8
180+00.00	167	14
180+50.00	168	13
181+00.00	156	14
181+50.00	148	17
182+00.00	143	21
182+50.00	133	30
183+00.00	131	33
183+50.00	138	29
184+00.00	138	24
TOTAL	7375	1406

SUMMARY OF EARTHWORK
RM 967

ITEM	110	132
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)
STATION	CY	CY
184+50.00	129	22
185+00.00	118	21
185+50.00	114	22
186+00.00	117	25
186+50.00	116	26
187+00.00	117	30
187+50.00	122	31
188+00.00	130	26
188+50.00	140	21
189+00.00	144	22
189+50.00	145	24
190+00.00	153	26
190+50.00	153	33
191+00.00	148	26
191+50.00	141	16
192+00.00	134	18
192+50.00	131	19
193+00.00	131	17
193+50.00	132	15
194+00.00	136	14
194+50.00	136	15
195+00.00	131	16
195+50.00	127	14
196+00.00	125	8
196+50.00	129	3
197+00.00	137	2
197+50.00	136	3
198+00.00	126	5
198+50.00	121	7
199+00.00	120	10
199+50.00	122	10
200+00.00	124	8
200+50.00	121	9
201+00.00	118	15
201+50.00	120	16
202+00.00	126	9
202+50.00	131	6
203+00.00	133	6
203+50.00	122	7
204+00.00	114	9
204+50.00	119	11
205+00.00	113	10
205+50.00	112	25
206+00.00	120	34
206+50.00	119	19
207+00.00	113	10
207+50.00	111	6
208+00.00	109	5
208+50.00	110	8
209+00.00	115	11
209+50.00	115	15
210+00.00	108	17
210+50.00	103	23
211+00.00	102	20
211+50.00	100	14
212+00.00	100	12
212+50.00	105	10
213+00.00	113	8
213+50.00	118	6
214+00.00	123	3
TOTAL	7398	899

SUMMARY OF EARTHWORK
RM 967

ITEM	110	132
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)
STATION	CY	CY
214+50.00	126	2
215+00.00	128	3
215+50.00	123	3
216+00.00	125	3
216+50.00	135	5
217+00.00	133	9
217+50.00	136	10
218+00.00	149	7
218+50.00	166	13
219+00.00	189	22
219+50.00	187	24
220+00.00	168	50
220+50.00	154	57
221+00.00	138	32
221+50.00	135	21
222+00.00	149	12
222+50.00	161	8
223+00.00	157	11
223+50.00	151	20
224+00.00	157	21
224+50.00	158	17
225+00.00	159	19
225+50.00	191	24
226+00.00	223	21
226+50.00	228	12
227+00.00	216	12
227+50.00	198	12
228+00.00	179	14
228+50.00	169	14
229+00.00	152	20
229+50.00	139	27
230+00.00	147	25
230+50.00	139	22
231+00.00	145	22
231+50.00	148	23
232+00.00	146	23
232+50.00	173	22
233+00.00	180	21
233+50.00	193	19
234+00.00	217	12
234+50.00	211	11
235+00.00	199	23
235+50.00	186	25
236+00.00	172	20
236+50.00	153	14
237+00.00	132	16
237+50.00	125	15
238+00.00	127	26
238+50.00	141	31
239+00.00	167	13
239+50.00	156	42
240+00.00	121	72
240+50.00	115	55
241+00.00	119	45
241+50.00	107	39
242+00.00	102	27
242+50.00	112	18
243+00.00	118	9
243+50.00	127	2
TOTAL	9157	1217

SUMMARY OF EARTHWORK
RM 967

ITEM	110	132
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)
STATION	CY	CY
244+00.00	121	15
244+50.00	130	28
TOTAL	251	43
PROJECT TOTAL	31925	4683

Texas Department of Transportation

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TBPE Registration No. F-1046

RM 967

SUMMARY OF EARTHWORK QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			16
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	666 6018	666 6036	666 6048	666 6054	666 6078	666 6093	666 6174	666 6178	666 6182	666 6184	666 6192	666 6196	666 6208	666 6210	666 6309	666 6318	666 6321	666 6343	672 6007	672 6009
	REFL PAV MRK TY I (W)6"(DOT) (100MIL)	REFL PAV MRK TY I (W)8"(SLD) (100MIL)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	REFL PAV MRK TY I (W)(ARROW) (100MIL)	REFL PAV MRK TY I (W)(WORD)(100MIL)	REFL PAV MRK TY I (W)(RR XING)(100MIL)	REFL PAV MRK TY II (W) 6" (SLD)	REFL PAV MRK TY II (W) 8" (SLD)	REFL PAV MRK TY II (W) 24" (SLD)	REFL PAV MRK TY II (W) (ARROW)	REFL PAV MRK TY II (W) (WORD)	REFL PAV MRK TY II (W) (RR XING)	REFL PAV MRK TY II (Y) 6" (BRK)	REFL PAV MRK TY II (Y) 6" (SLD)	RE PM W/RET REQ TY I (W)6"(SLD) (100MIL)	RE PM W/RET REQ TY I (Y)6"(BRK) (100MIL)	RE PM W/RET REQ TY I (Y)6"(SLD) (100MIL)	REF PROF PAV MRK TY I (W)6"(SLD) (100MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
	LF	LF	LF	EA	EA	EA	LF	LF	LF	LF	EA	EA	LF	LF	LF	LF	LF	LF	EA	EA
SPMD SHEET 1			12	2		1	3378		12	2		1	773	3699	3378	773	3699		16	108
SPMD SHEET 2		193		6	2		2462	193		6	2		492	2451		492	2451	2462	10	54
SPMD SHEET 3							3426							3392			3392	3426		43
SPMD SHEET 4	52	976		6	6		4090	976		6	6			5654			5654	4090	51	198
SPMD SHEET 5							4397							4782			4782	4397		89
SPMD SHEET 6		505		8	4		4246	505		8	4		438	5832		438	5832	4246	25	199
SPMD SHEET 7		206	18	2	2		918	206	18	2	2			1538			1538	918	10	61
PROJECT TOTALS	52	1880	30	24	14	1	22917	1880	30	24	14	1	1703	27348	3378	1703	27348	19539	112	752

SUMMARY OF SIGNING ITEMS

LOCATION	644 6001	644 6002	644 6004	644 6007	644 6056	644 6057	644 6076
	IN SM RD SN SUP&AM TY10BWG(1)SA (P)	IN SM RD SN SUP&AM TY10BWG(1) SA(P-BM)	IN SM RD SN SUP&AM TY10BWG(1) SA(T)	IN SM RD SN SUP&AM TY10BWG(1) SA(U)	IN SM RD SN SUP&AM TYTWT(1)UA (P)	IN SM RD SN SUP&AM TYTWT(1)UA (T)	REMOVE SM RD SN SUP&AM
	EA	EA	EA	EA	EA	EA	EA
SPMD SHEET 1			1		7	1	10
SPMD SHEET 2		1			3		4
SPMD SHEET 3		1			2		2
SPMD SHEET 4					7		8
SPMD SHEET 5					1		1
SPMD SHEET 6	1	1			3		5
SPMD SHEET 7				1	2		3
PROJECT TOTALS	1	3	1	1	25	1	33

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RM 967
SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			17
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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"	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) TYPE N	TYPE S
1	1	R12-3	NO TRUCKS	24 X 36	X		TWT	1	UA	P			
	2	W11-2	PEDESTRIAN CROSSING	30 X 30	X		TWT	1	UA	P			
	3	D14-4T	ADOPT A HIGHWAY NEXT 3 MILES	48 X 24	X		TWT	1	UA	T			
	4	W11-2	PEDESTRIAN CROSSING	30 X 30	X		TWT	1	UA	P			
	5	R2-1	SPEED LIMIT 45	30 X 36	X		TWT	1	UA	P			
	6	W10-1	RR XING	36" DIA	X		TWT	1	UA	P			
	7	R2-1	SPEED LIMIT 35	30 X 36	X		TWT	1	UA	P			
	8	D3-4T	REBEL DR	30 X 8	X		TWT	1	UA	P			
		R1-1	STOP	36 X 36	X								
	9	R5-4AT	NO ENGINE BRAKE	36 X 48	X		10 BWG	1	SA	T			
2	1	R2-1	SPEED LIMIT 45	30 X 36	X		TWT	1	UA	P			
	2	R2-1	SPEED LIMIT 55	30 X 36	X		TWT	1	UA	P			
	3	D3-4T	PRECISION DR	36 X 8	X		TWT	1	UA	P			
		R1-1	STOP	36 X 36	X								
	4	D3-4T	WINDMILL WAY	42 X 8	X		10 BWG	1	SA	P	BM		
		R1-1	STOP	36 X 36	X								
3	1	D3-4T	CLEAR WATER PATH	42 X 8	X		10 BWG	1	SA	P	BM		
		D3-4T	LOOP 4	30 X 8	X								
		R1-1	STOP	36 X 36	X								
	2	W2-2R	INTERSECTION AHEAD	30 X 30	X		TWT	1	UA	P			
	3	W1-4R	CURVE	30 X 30	X		TWT	1	UA	P			
		W13-1P	40 MPH	18 X 18	X								
4	1	R3-5R	RIGHT TURN ONLY	30 X 36	X		TWT	1	UA	P			
	2	R3-2	NO LEFT TURN	36 X 36	X		TWT	1	UA	P			
	3	W11-10R	TRUCK	30 X 30	X		TWT	1	UA	P			
	4	R1-1	STOP	36 X 36	X		TWT	1	UA	P			
	5	W11-10R	TRUCK	30 X 30	X		TWT	1	UA	P			
	6	W2-2L	INTERSECTION AHEAD	30 X 30	X		TWT	1	UA	P			
	7	R1-1	STOP	36 X 36	X		TWT	1	UA	P			
5	1	W1-4R	CURVE	30 X 30	X		TWT	1	UA	P			
		W13-1P	45 MPH	18 X 18	X								

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

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

http://www.txdot.gov/

NOTE:

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

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 1 OF 2

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		18

18

DATE: 12/2/2022 11:55:41 AM
FILE: G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\00-GEN\SMALL SIGNS\sums16.dgn

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
6	1	D3-4T	INTERSTATE DR	36 X 8	X		TWT	1	UA	P			
		R1-1	STOP	36 X 36	X								
	2	D3-4T	BUSINESS PARK DR	42 X 8	X		10 BWG	1	SA	P	BM		
		R1-1	STOP	36 X 36	X								
	3	W1-2L	CURVE	30 X 30	X		TWT	1	UA	P			
	4	W3-1	STOP AHEAD	30 X 30	X		TWT	1	UA	P			
	5	M2-1B	JCT	21 X 15	X		10 BWG	1	SA	P			
		M1-1	INTERSTATE 35	36 X 36	X								
7	1	R2-1	SPEED LIMIT 55	30 X 36	X		TWT	1	UA	P			
	2	D14-4T-2	ADOPT A HIGHWAY NEXT 3 MILES	48 X 48	X		10 BWG	1	SA	U			
			LITTER CONTROL										
	3	R1-1	STOP	36 X 36	X		TWT	1	UA	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"

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2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 2 OF 2

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		19

DATE: 12/2/2022 11:55:42 AM
FILE: G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\00-GEN\SMALL SIGNS\SUMMARY16.dgn

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	160 6003	164 6033	164 6071	168 6001	169 6006	506 6002	506 6004	506 6011	506 6020	506 6024	506 6038	506 6039	506 6041	506 6043
	FURNISHING AND PLACING TOPSOIL (4")	DRILL SEEDING (PERM) (RURAL) (SANDY)	BROADCAST SEED (TEMP) (WARM OR COOL)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 2) (TY F)	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (INSTALL) (TY 4)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	SY	MG	SY	LF	LF	LF	SY	SY	LF	LF	LF	LF
SHEET 1 OF 7	3317	3317	1659	55.9	3317						48	48		
SHEET 2 OF 7	3538	3538	1769	59.5	3538									
SHEET 3 OF 7	8939	8939	4470	150.5	8939						884	884	63	63
SHEET 4 OF 7	7186	7186	3593	120.9	7186	52		52			1263	1263	62	62
SHEET 5 OF 7	10356	10356	5178	174.3	10356	20		20			742	742	72	72
SHEET 6 OF 7	6143	6143	3072	103.4	6143	64		64			1519	1519	120	120
SHEET 7 OF 7	2571	2571	1286	43.3	2571						100	100	36	36
PROJECT							50	50	78	78				
PROJECT TOTALS	42050	42050	21027	707.8	42050	136	50	186	78	78	4556	4556	353	353

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RM 967

SUMMARY OF SW3P QUANTITIES

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			20
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
PLOTDRIVER: pdf.pltcfg
FILE:G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\00-GEN\RM967_SUMM_SW3P_01.dgn
DATE:1/17/2023 7:48:01 AM USER:RM 967
PENTABLE: $PENTBL$

TRAFFIC CONTROL GENERAL NOTES

1. THE CONTRACTOR MAY SUBMIT AN ALTERNATE TRAFFIC CONTROL PLAN, SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER IN TEXAS, FOR APPROVAL.

2. VERIFY THE LOCATION AND SPACING OF SIGNS, BARRICADES, AND CHANNELIZING DEVICES PRIOR TO THEIR PLACEMENT ALONG VERTICAL CURVES, HORIZONTAL CURVES, AND OTHER GEOMETRIC CONSTRAINTS TO ENSURE VISIBILITY TO ALL MOTORISTS.

3. COVER, RELOCATE OR REMOVE EXISTING SIGNS THAT CONFLICT WITH THE TRAFFIC CONTROL PLAN AND UNCOVER DURING NON-WORKING HOURS OR AS DIRECTED BY THE ENGINEER. PARTIAL COVERAGE OF THE SIGN OR COVERAGE BY MATERIAL THAT WILL NOT COVER THE ENTIRE SIGN ALL THE TIME IS NOT PERMITTED. INSTALL ALL PERMANENT SIGNS, DELINEATION, AND OBJECT MARKERS REQUIRED FOR THE OPERATION OF THE ROADWAY BEFORE OPENING TO TRAFFIC. USE OF TEMPORARY MOUNTS IS ALLOWED OR MAY BE REQUIRED UNTIL THE PERMANENT MOUNTS ARE INSTALLED OR NOT IMPACTED BY CONSTRUCTION. MAINTAIN THE TEMPORARY MOUNTS. THIS WORK IS SUBSIDIARY.

4. THE CONTRACTOR IS TO ENSURE THAT ALL TRAFFIC CONTROL DEVICES AND WORK ZONE PAVEMENT MARKINGS ARE KEPT IN A HIGHLY VISIBLE CONDITION (CLEAN, UPRIGHT AND AT PROPER LOCATION).

5. CONDUCT CONSTRUCTION OPERATIONS SO AS TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC AND TO PERMIT THE CONTINUOUS MOVEMENT OF TRAFFIC IN ALL ALLOWABLE DIRECTIONS AT ALL TIMES OR AS PERMITTED BY THE SEQUENCE OF CONSTRUCTION. PROVIDE FOR SAFE AND CONVENIENT ACCESS TO ABUTTING PROPERTY, DRIVEWAYS AND SIDE STREET CROSSINGS.

6. PLACE ALL STOCKPILED MATERIAL, WASTE MATERIAL, SIGNS, BARRICADES, CHANNELIZING DEVICES AND WORK VEHICLES NOT IN USE, AT A MINIMUM OF 20 FEET FROM THE OUTER EDGE OF THE NEAREST TRAVEL LANE, (UNLESS PROTECTED BY A BARRIER).

7. MAINTAIN ALL EXISTING DRAINAGE CONDITIONS DURING ALL CONSTRUCTION PHASES UNTIL THE PERMANENT DRAINAGE FACILITIES ARE CONSTRUCTED AND READY TO USE. HANDLE EXCAVATED AND STOCKPILED MATERIAL IN SUCH A WAY THAT IT WILL NOT BLOCK DRAINAGE.

8. REGULATE ALL CONSTRUCTION TRAFFIC SO AS TO CAUSE A MINIMAL INCONVENIENCE TO THE TRAVELING PUBLIC. AT THE TIMES WHEN IT IS NECESSARY FOR TRUCKS TO STOP, UNLOAD OR CROSS ROADWAYS UNDER TRAFFIC, PROVIDE WARNING SIGNS AND FLAGGERS AS NEEDED TO ADEQUATELY PROTECT THE TRAVELING PUBLIC.

9. REMOVE FROM THE WORK AREA ALL LOOSE MATERIALS AND DEBRIS RESULTING FROM CONSTRUCTION OPERATIONS AT THE END OF EACH WORK DAY.

10. IMPLEMENT ALL REQUIRED EROSION CONTROL MEASURES AS SHOWN IN THE PLANS DURING THE VARIOUS STAGES OF CONSTRUCTION.

11. MOVING AN EXISTING SIGN TO A TEMPORARY LOCATION IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

12. ADDITIONAL SIGNS, BARRICADES AND CHANNELIZING DEVICES MAY BE REQUIRED TO MAINTAIN TRAFFIC DURING CONSTRUCTION, AS SHOWN ON TCP STANDARDS. ADDITIONAL SIGNS, BARRICADES, ETC. (IF ANY), WILL BE SUBSIDIARY TO ITEMS 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING".

13. USE OPPOSING TRAFFIC LANE DIVIDERS AND PLASTIC DRUMS TO CHANNELIZE TRAFFIC WHEN EXISTING PAVEMENT MARKINGS HAVE BEEN OBLITERATED.

14. SHADOW VEHICLE WITH TMA IS REQUIRED AS SHOWN IN THE TCP SHEETS AND FOR SETUP / REMOVAL OF TRAFFIC CONTROL DEVICES.

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

Texas Department of Transportation

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RM 967

TRAFFIC CONTROL PLAN GENERAL NOTES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			21
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

TRAFFIC CONTROL PLAN NARRATIVE

GENERAL:
FOLLOW THE CONSTRUCTION SEQUENCING UNLESS OTHERWISE APPROVED.

THE CONTRACTOR MAY PROPOSE MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE CONSTRUCTION OBSERVER. ANY RECOMMENDATION RESULTING IN MAJOR MODIFICATIONS TO THE SEQUENCE OF WORK BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS PAY ITEMS, IMPACT TO TRAFFIC, AND EFFECT TO OVERALL PROJECT TIME, COST, ETC. DO NOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED SEQUENCE OF WORK WITHOUT WRITTEN APPROVAL FROM THE CONSTRUCTION OBSERVER.

IT IS THE CONTRACTOR'S RESPONSIBILTY TO DETERMINE EXACT LOCATION OF UTILITIES PRIOR TO STARTING CONSTRUCTION.

CONTRACTOR WILL MAINTAIN ACCESS TO DRIVEWAYS AND SIDE STREETS AT ALL TIMES UNLESS APPROVED BY THE CONSTRUCTION OBSERVER OR SHOWN OTHERWISE IN THE PLANS.

SIDE STREETS AND DRIVEWAYS CAN BE CONSTRUCTED UTILIZING DAILY/TEMPORARY ONE WAY TRAFFIC CONTROL AND BE OPENED TO FULL WIDTH AT THE END OF THE WORKDAY MAINTAINING ACCESS AT ALL TIMES UNLESS APPROVED BY THE CONSTRUCTION OBSERVER.

CONTRACTOR WILL BE RESPONSIBLE FOR MAINTENANCE OF SELECT FILL AND FLEX BASE EXPOSED TO TRAFFIC.

CONTRACTOR WILL MAINTAIN DRAINAGE THROUGHOUT THE PROJECT.

INSTALL APPROPRIATE ADVANCE WARNING SIGNS AND TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH ADVANCE WARNING LAYOUT, TXDOT STANDARDS BC(1)-21 THRU BC(12)-21, WZ(RS)-16, WZ(STPM)-13, WZ(UL)-13, TCP (2-1)-18, TCP (2-2)-18 AND TCP (2-8)-18, PRIOR TO COMMENCING WORK.

LIMIT THE MAXIMUM LENGTH OF ANY INDIVIDUAL WORK AREA TO 0.6 MILE, UNLESS OTHERWISE APPROVED.

CONTRACTOR SHALL NOT WORK IN AREAS WITH UTILITY CONFLICTS UNTIL THE UTILITIES HAVE CLEARED.

PHASE 1 - STEP 1
CULVERT CONSTRUCTION - CULVERTS 3, 5, 6, & 7:

1. INSTALL TEMPORARY EROSION CONTROL DEVICES FOR CONSTRUCTION ACTIVITIES AS SHOWN ON SW3P LAYOUTS FOR ENTIRE PROJECT.

2. INSTALL PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) AT THE BEGINNING AND END OF PROJECT TO ADVISE TRAFFIC OF CONSTRUCTION.
   MESSAGE FOR PCMS AS FOLLOWS OR AS DIRECTED BY ENGINEER:

   (PHASE 1 STEP 1 - CULVERT CONSTRUCTION)
   " ONE LANE ROADWAY AHEAD. BE PREPARED TO STOP."

   (PHASE 1, 2, 3, & 4 - ROADWAY CONSTRUCTION)(WORKING HOURS)
   " ONE LANE ROADWAY AHEAD. BE PREPARED TO STOP."

   (PHASE 1 & 3 - ROADWAY CONSTRUCTION)(NON WORKING HOURS)
   " USE CAUTION UNSURFACED ROADWAY AHEAD "

3. PHASE 1 - STEP 1 CULVERT CONSTRUCTION TO BE DONE PRIOR TO BEGINNING ANY ROADWAY CONSTRUCTION.
   SET-UP TCP (2-2b)-18 W/ FLAGGERS 24 HOURS A DAY FOR ONE-LANE TWO WAY TRAFFIC CONTROL FOR CULVERT 3. CONSTRUCT PROPOSED CULVERT 24 HOURS A DAY UNTIL COMPLETED UNDER EXISTING ROADWAY WITH TEMPORARY 3:1 FRONT SLOPES. RESTORE EXISTING ROADWAY AFTER COMPLETION OF PROPOSED CULVERT ACCORDANCE WITH THE CUT AND RESTORE DETAIL ON MISCELLANEOUS DRAINAGE DETAIL PLAN SHEET. PROPOSED CULVERT END TREATMENTS TO BE COMPLETED DURING PHASE 1, STEPS 2B, 2C, 2D & 2F AFTER ALL CULVERTS HAVE BEEN CONSTRUCTED UNDER EXISTING ROADWAY DURING PHASE 1. AFTER COMPLETION OF CULVERT 3 PROCEED TO CULVERT 5 AND CONSTRUCT 24 HOURS A DAY WITH TCP (2-2b)-18 W/ FLAGGERS. REPEAT TASK 3 FOR CULVERTS 6 & 7. SEE TRAFFIC CONTROL PLAN CULVERTS PHASE 1 TYPICAL SECTIONS FOR ADDITIONAL NOTES AND INFORMATION.

4. AFTER COMPLETION OF CULVERTS 3, 5, 6, & 7 UNDER EXISTING ROADWAY WITH 3:1 TEMPORARY FRONT SLOPES, PROCEED TO PHASE 1 STEP 2A.

PHASE 1 - STEP 2A
ROADWAY CONSTRUCTION - STA 154+68.04 TO STA 171+00.00:

1. REFER TO ITEM 8 (STANDARD WORKWEEK) FOR HOURS OF OPERATION DURING PHASE 1 ROADWAY CONSTRUCTION.
   DURING ROADWAY CONSTRUCTION, USE STANDARD TCP (2-2)-18 WITH FLAGGERS FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE FOR TWO-WAY TRAFFIC.

2. REMOVE EXISTING MATERIALS FROM STA 154+68.04 TO STA 171+00.00 IN ACCORDANCE WITH PROPOSED ROADWAY PROFILE AND ROADWAY SECTIONS. REMOVAL OF EXISTING PAVEMENT IS INCLUDED IN ITEM 105. THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED FULL WIDTH THRU 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. THE NEXT DAY CONTINUE WITH NEXT SECTION OF 8" SELECT FILL AND CONSTRUCT GEOGRID AND 8" FLEX BASE ON THE 8" SELECT FILL PLACED THE PREVIOUS DAY. LONGITUDINAL CONSTRUCTION JOINTS WILL NOT BE ALLOWED AT ANY TIME OVERNIGHT. CONSTRUCT SIDE STREETS, DRIVEWAYS AND PARALLEL DRAINAGE STRUCTURES IN CONJUNCTION WITH ROADWAY CONSTRUCTION. SIDE STREETS & DRIVEWAYS TO BE CONSTRUCTED IN HALF WIDTHS TO ALLOW ACCESS AT ALL TIMES. OPPOSING TRAFFIC LANE DIVIDERS TO BE PLACED AT CENTERLINE AT THE END OF EACH DAY FOR TWO-WAY TRAFFIC. DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED WITH FLEX BASE TO A 3:1 MAXIMUM SLOPE.

   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP SELECT FILL OR BASE GRADE TO EXISTING GRADE USING SELECT FILL / FLEX BASE OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

3. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 1 - STEP 2A, PROCEED TO PHASE 1 - STEP 2B CONSTRUCTION.

PHASE 1 - STEP 2B
ROADWAY CONSTRUCTION - STA 175+00.00 TO STA 202+00.00:

1. REFER TO ITEM 8 (STANDARD WORKWEEK) FOR HOURS OF OPERATION DURING PHASE 1 ROADWAY CONSTRUCTION.
   AFTER PHASE 1 STEP 2A HAS BEEN COMPLETED, BEGIN CONSTRUCTION OF PROPOSED CULVERT 3 END TREATMENTS USING STANDARD BC (10)-21 - "CULVERT WIDENING WORK WITHIN THE PROJECT LIMITS."
   DURING ROADWAY CONSTRUCTION, USE STANDARD TCP (2-2)-18 WITH FLAGGERS FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE FOR TWO-WAY TRAFFIC.

2. REMOVE EXISTING MATERIALS FROM STA 175+00.00 TO STA 202+00.00 IN ACCORDANCE WITH PROPOSED ROADWAY PROFILE AND ROADWAY SECTIONS. REMOVAL OF EXISTING PAVEMENT IS INCLUDED IN ITEM 105. THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED FULL WIDTH THRU 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. THE NEXT DAY CONTINUE WITH NEXT SECTION OF 8" SELECT FILL AND CONSTRUCT GEOGRID AND 8" FLEX BASE ON THE 8" SELECT FILL PLACED THE PREVIOUS DAY. LONGITUDINAL CONSTRUCTION JOINTS WILL NOT BE ALLOWED AT ANY TIME OVERNIGHT. CONSTRUCT SIDE STREETS, DRIVEWAYS AND PARALLEL DRAINAGE STRUCTURES IN CONJUNCTION WITH ROADWAY CONSTRUCTION. SIDE STREETS & DRIVEWAYS TO BE CONSTRUCTED IN HALF WIDTHS TO ALLOW ACCESS AT ALL TIMES. OPPOSING TRAFFIC LANE DIVIDERS TO BE PLACED AT CENTERLINE AT THE END OF EACH DAY FOR TWO-WAY TRAFFIC. DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED WITH FLEX BASE TO A 3:1 MAXIMUM SLOPE.

   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP SELECT FILL OR BASE GRADE TO EXISTING GRADE USING SELECT FILL / FLEX BASE OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

3. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 1 - STEP 2B, PROCEED TO PHASE 1 - STEP 2C CONSTRUCTION.

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

1/17/2023

Texas Department of Transportation

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Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

RM 967

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			22
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

PHASE 1 - STEP 2C
ROADWAY CONSTRUCTION - STA 226+50.00 TO STA 241+50.00:

1. REFER TO ITEM 8 (STANDARD WORKWEEK) FOR HOURS OF OPERATION DURING PHASE 1 ROADWAY CONSTRUCTION. AFTER PHASE 1 STEP 2B HAS BEEN COMPLETED, BEGIN CONSTRUCTION OF PROPOSED CULVERT 6 END TREATMENTS USING STANDARD BC (10)-21 - "CULVERT WIDENING WORK WITHIN THE PROJECT LIMITS." DURING ROADWAY CONSTRUCTION, USE STANDARD TCP (2-2)-18 WITH FLAGGERS FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE FOR TWO-WAY TRAFFIC.

2. REMOVE EXISTING MATERIALS FROM STA 226+50.00 TO STA 241+50.00 IN ACCORDANCE WITH PROPOSED ROADWAY PROFILE AND ROADWAY SECTIONS. REMOVAL OF EXISTING PAVEMENT IS INCLUDED IN ITEM 105. THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED FULL WIDTH THRU 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. THE NEXT DAY CONTINUE WITH NEXT SECTION OF 8" SELECT FILL AND CONSTRUCT GEOGRID AND 8" FLEX BASE ON THE 8" SELECT FILL PLACED THE PREVIOUS DAY. LONGITUDINAL CONSTRUCTION JOINTS WILL NOT BE ALLOWED AT ANY TIME OVERNIGHT. CONSTRUCT SIDE STREETS, DRIVEWAYS AND PARALLEL DRAINAGE STRUCTURES IN CONJUNCTION WITH ROADWAY CONSTRUCTION. SIDE STREETS & DRIVEWAYS TO BE CONSTRUCTED IN HALF WIDTHS TO ALLOW ACCESS AT ALL TIMES. OPPOSING TRAFFIC LANE DIVIDERS TO BE PLACED AT CENTERLINE AT THE END OF EACH DAY FOR TWO-WAY TRAFFIC. DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED WITH FLEX BASE TO A 3:1 MAXIMUM SLOPE.

   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP SELECT FILL OR BASE GRADE TO EXISTING GRADE USING SELECT FILL / FLEX BASE OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

3. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 1 - STEP 2C, PROCEED TO PHASE 1 - STEP 2D CONSTRUCTION.

PHASE 1 - STEP 2D
ROADWAY CONSTRUCTION - STA 241+50.00 TO STA 244+79.93:

1. REFER TO ITEM 8 (STANDARD WORKWEEK) FOR HOURS OF OPERATION DURING PHASE 1 ROADWAY CONSTRUCTION. AFTER PHASE 1 STEP 2C HAS BEEN COMPLETED, BEGIN CONSTRUCTION OF PROPOSED CULVERT 7 END TREATMENTS USING STANDARD BC (10)-21 - "CULVERT WIDENING WORK WITHIN THE PROJECT LIMITS."

2. DURING ROADWAY CONSTRUCTION, USE STANDARD TCP (2-2)-18 WITH FLAGGERS FOR DAILY LANE CLOSURES ON RM 967 AND TRAFFIC CONTROL PLAN FOR IH 35 FRONTAGE ROAD LANE CLOSURE WHEN CONSTRUCTING RM 967 AND IH 35 FRONTAGE ROAD INTERSECTION. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE FOR TWO-WAY TRAFFIC.

3. REMOVE EXISTING MATERIALS FROM STA 241+50.00 TO STA 244+79.93 IN ACCORDANCE WITH PROPOSED ROADWAY PROFILE AND ROADWAY SECTIONS. REMOVAL OF EXISTING PAVEMENT IS INCLUDED IN ITEM 105. THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED FULL WIDTH THRU 4" HMA TY B AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. LONGITUDINAL CONSTRUCTION JOINTS WILL NOT BE ALLOWED AT ANY TIME OVERNIGHT. OPPOSING TRAFFIC LANE DIVIDERS TO BE PLACED AT CENTERLINE AT THE END OF EACH DAY FOR TWO-WAY TRAFFIC. DURING NON WORKING ALL DROP-OFFS ARE TO BE BACKFILLED WITH HMA TO A 3:1 MAXIMUM SLOPE.

   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP HMA TO EXISTING GRADE USING HMA OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

4. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 1 - STEP 2D, PROCEED TO PHASE 1 - STEP 2E CONSTRUCTION.

PHASE 1 - STEP 2E
ROADWAY CONSTRUCTION - STA 171+00.00 TO STA 175+00.00:

1. REFER TO ITEM 8 (STANDARD WORKWEEK) FOR HOURS OF OPERATION DURING PHASE 1 ROADWAY CONSTRUCTION. DURING ROADWAY CONSTRUCTION, USE STANDARD TCP (2-2)-18 WITH FLAGGERS FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE FOR TWO-WAY TRAFFIC.

2. REMOVE EXISTING MATERIALS FROM STA 171+00.00 TO STA 175+00.00 IN ACCORDANCE WITH PROPOSED ROADWAY PROFILE AND ROADWAY SECTIONS. REMOVAL OF EXISTING PAVEMENT IS INCLUDED IN THE ITEM 105. THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED FULL WIDTH THRU 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. THE NEXT DAY CONTINUE WITH NEXT SECTION OF 8" SELECT FILL AND CONSTRUCT GEOGRID AND 8" FLEX BASE ON THE 8" SELECT FILL PLACED THE PREVIOUS DAY. LONGITUDINAL CONSTRUCTION JOINTS WILL NOT BE ALLOWED AT ANY TIME OVERNIGHT. CONSTRUCT SIDE STREETS, DRIVEWAYS AND PARALLEL DRAINAGE STRUCTURES IN CONJUNCTION WITH ROADWAY CONSTRUCTION. SIDE STREETS & DRIVEWAYS TO BE CONSTRUCTED IN HALF WIDTHS TO ALLOW ACCESS AT ALL TIMES. OPPOSING TRAFFIC LANE DIVIDERS TO BE PLACED AT CENTERLINE AT THE END OF EACH DAY FOR TWO-WAY TRAFFIC. DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED WITH FLEX BASE TO A 3:1 MAXIMUM SLOPE.

   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP SELECT FILL OR BASE GRADE TO EXISTING GRADE USING SELECT FILL / FLEX BASE OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

3. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 1 - STEP 2E, PROCEED TO PHASE 1 - STEP 2F CONSTRUCTION.

PHASE 1 - STEP 2F
ROADWAY CONSTRUCTION - STA 202+00.00 TO STA 226+50.00:

1. REFER TO ITEM 8 (STANDARD WORKWEEK) FOR HOURS OF OPERATION DURING PHASE 1 ROADWAY CONSTRUCTION. AFTER PHASE 1 STEP 2E HAS BEEN COMPLETED, BEGIN CONSTRUCTION OF PROPOSED CULVERTS 4 & 5 END TREATMENTS USING STANDARD BC (10)-21 - "CULVERT WIDENING WORK WITHIN THE PROJECT LIMITS."

2. DURING ROADWAY CONSTRUCTION, USE STANDARD TCP (2-2)-18 WITH FLAGGERS FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE FOR TWO-WAY TRAFFIC.

3. REMOVE EXISTING MATERIALS FROM STA 202+00.00 TO STA 226+50.00 IN ACCORDANCE WITH PROPOSED ROADWAY PROFILE AND ROADWAY SECTIONS. REMOVAL OF EXISTING PAVEMENT IS INCLUDED IN ITEM 105. THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED FULL WIDTH THRU 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. THE NEXT DAY CONTINUE WITH NEXT SECTION OF 8" SELECT FILL AND CONSTRUCT GEOGRID AND 8" FLEX BASE ON THE 8" SELECT FILL PLACED THE PREVIOUS DAY. LONGITUDINAL CONSTRUCTION JOINTS WILL NOT BE ALLOWED AT ANY TIME OVERNIGHT. CONSTRUCT SIDE STREETS, DRIVEWAYS AND PARALLEL DRAINAGE STRUCTURES IN CONJUNCTION WITH ROADWAY CONSTRUCTION. SIDE STREETS & DRIVEWAYS TO BE CONSTRUCTED IN HALF WIDTHS TO ALLOW ACCESS AT ALL TIMES. OPPOSING TRAFFIC LANE DIVIDERS TO BE PLACED AT CENTERLINE AT THE END OF EACH DAY FOR TWO-WAY TRAFFIC. DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED WITH FLEX BASE TO A 3:1 MAXIMUM SLOPE.

   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP SELECT FILL OR BASE GRADE TO EXISTING GRADE USING SELECT FILL / FLEX BASE OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

4. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 1 - STEP 2F, PROCEED TO PHASE 2 CONSTRUCTION.

PHASE 2 CONSTRUCTION - STA 154+68.04 TO STA 244+79.93:

1. REFER TO ITEM 8 (STANDARD WORKWEEK) FOR HOURS OF OPERATION DURING PHASE 2 CONSTRUCTION. AFTER COMPLETION OF FLEX BASE AND 12" HMA TY B IN PHASE 1, SET-UP TRAFFIC CONTROL USING TCP (2-2)-18 STANDARD WITH FLAGGERS FOR DAILY LANE CLOSURES AND IH 35 FRONTAGE ROAD LANE CLOSURE WHEN CONSTRUCTING RM 967 AND IH 35 FRONTAGE ROAD INTERSECTION. CONSTRUCT RC 250 W/ GR 5 AGGR ON THE FLEX BASE AND BONDING COURSE ON 12" HMA TY B. THEN CONSTRUCT 3" HMA TY C. PLACE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS AT THE END OF EACH WORK DAY. FINAL 1" TOM SURFACE TO BE CONSTRUCTED IN PHASE 5.

   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP HMA GRADE TO EXISTING GRADE USING HMA OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

2. AFTER COMPLETION OF 3" HMA TY C, CONSTRUCT WORK ZONE PAVEMENT MARKINGS TO FINAL LANE CONFIGURATION AND OPEN ALL LANES TO TRAFFIC.

3. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 2, PROCEED TO PHASE 3 CONSTRUCTION.

PHASE 3 CULVERT CONSTRUCTION - CULVERT 1:

1. PHASE 3 CULVERT CONSTRUCTION TO BE DONE PRIOR TO BEGINNING ANY ROADWAY CONSTRUCTION. SET-UP TCP (2-2b)-18 W/ FLAGGERS 24 HOURS A DAY FOR ONE-LANE TWO WAY TRAFFIC CONTROL FOR CULVERT 1. CONSTRUCT PROPOSED CULVERT 24 HOURS A DAY UNTIL COMPLETED UNDER EXISTING ROADWAY WITH TEMPORARY 3:1 FRONT SLOPES. RESTORE EXISTING ROADWAY AFTER COMPLETION OF PROPOSED CULVERT 1. CULVERT 1 TO BE PLUGGED OR CAPPED. THIS WORK & MATERIALS WILL BE PAID FOR UNDER ITEM 420. SEE TRAFFIC CONTROL PLAN CULVERTS PHASES 1 & 3 TYPICAL SECTION FOR ADDITIONAL NOTES AND INFORMATION.

2. AFTER COMPLETION OF CULVERT 1 UNDER EXISTING ROADWAY WITH 3:1 TEMPORARY FRONT SLOPES, PROCEED TO PHASE 3 ROADWAY CONSTRUCTION.

STATE OF TEXAS
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1/17/2023

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RM 967

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			23
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

PHASE 3 ROADWAY CONSTRUCTION - STA 111+10.99 TO STA 140+80.32:

1. REFER TO ITEM 8 (STANDARD WORKWEEK) FOR HOURS OF OPERATION DURING PHASE 3 ROADWAY CONSTRUCTION. AFTER PHASE 3 TASKS 1 & 2 HAVE BEEN COMPLETED, BEGIN CONSTRUCTION OF PROPOSED CULVERT EXTENSIONS USING STANDARD BC (10)-21 - "CULVERT WIDENING WORK WITHIN THE PROJECT LIMITS." ALL REMAINING CULVERT WORK INCLUDING CULVERT O MAY BE CONSTRUCTED IN CONJUNCTION WITH ROADWAY CONSTRUCTION. EXISTING MBGF AT CULVERT O TO REMAIN IN PLACE UNTIL COMPLETION OF CULVERT O EXTENSION AND INSTALLATION OF PROPOSED MBGF.

2. FOR PHASE 3 ROADWAY CONSTRUCTION, USE STANDARD TCP (2-2)-18 WITH FLAGGERS FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE FOR TWO-WAY TRAFFIC. FLAGGER STATION TO BE MOVED SOUTH OF RAILROAD RIGHT OF WAY AFTER ROADWAY CONSTRUCTION HAS BEEN COMPLETED FROM STA 111+10.99 TO STA 115+20.00. FLAGGER STATION, TCP SIGNS, ETC. TO BE POSITIONED OUTSIDE OF RAILROAD RIGHT OF WAY AT ALL TIMES.

3. REMOVE EXISTING MATERIALS FROM STA 111+10.99 TO STA 115+20.00 IN ACCORDANCE WITH PROPOSED ROADWAY PROFILE AND ROADWAY SECTIONS. REMOVAL OF EXISTING PAVEMENT IS INCLUDED ITEM 105. THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED FULL WIDTH THRU 4" HMA TY B AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. AFTER COMPLETION OF 12" HMA TY B FROM STA 111+10.99 TO STA 115+20.00, PROCEED TO TASK 4. LONGITUDINAL CONSTRUCTION JOINTS WILL NOT BE ALLOWED AT ANY TIME OVERNIGHT.

4. CONSTRUCT SELECT FILL, GEOGRID AND FLEX BASE ROADWAY FROM STA 115+20.00 TO 140+80.32. REMOVE EXISTING MATERIALS IN ACCORDANCE WITH PROPOSED ROADWAY PROFILE AND ROADWAY SECTIONS. REMOVAL OF EXISTING PAVEMENT IS INCLUDED IN ITEM 105. THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED FULL WIDTH THRU 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. THE NEXT DAY CONTINUE WITH NEXT SECTION OF 8" SELECT FILL AND CONSTRUCT GEOGRID AND 8" FLEX BASE ON THE 8" SELECT FILL PLACED THE PREVIOUS DAY. LONGITUDINAL CONSTRUCTION JOINTS WILL NOT BE ALLOWED AT ANY TIME OVERNIGHT. CONSTRUCT SIDE STREETS, DRIVEWAYS AND PARALLEL DRAINAGE STRUCTURES IN CONJUNCTION WITH ROADWAY CONSTRUCTION. SIDE STREETS & DRIVEWAYS TO BE CONSTRUCTED IN HALF WIDTHS TO ALLOW ACCESS AT ALL TIMES.

   OPPOSING TRAFFIC LANE DIVIDERS TO BE PLACED AT CENTERLINE AT THE END OF EACH DAY FOR TWO-WAY TRAFFIC. DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED WITH FLEX BASE TO A 3:1 MAXIMUM SLOPE.

   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP SELECT FILL OR BASE GRADE TO EXISTING GRADE USING SELECT FILL / FLEX BASE OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

5. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 3, PROCEED TO PHASE 4 CONSTRUCTION.

PHASE 4 CONSTRUCTION - STA 111+10.99 TO STA 140+80.32:

1. REFER TO ITEM 8 (STANDARD WORKWEEK) FOR HOURS OF OPERATION DURING PHASE 4 CONSTRUCTION. AFTER COMPLETION OF 12" HMA TY B AND FLEX BASE IN PHASE 3, SET-UP TRAFFIC CONTROL USING TCP (2-2)-18 STANDARD WITH FLAGGERS FOR DAILY LANE CLOSURES.
   CONSTRUCT RC 250 W/ GR 5 AGGR ON FLEX BASE AND BONDING COURSE ON 12" HMA TY B.
   THEN CONSTRUCT 3" HMA TY C.
   PLACE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS AT THE END OF EACH WORK DAY.

   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP HMA GRADE TO EXISTING GRADE USING HMA OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

2. AFTER COMPLETION OF 3" HMA TY C, PROCEED TO PHASE 5 CONSTRUCTION.

PHASE 5 CONSTRUCTION - STA 111+10.99 TO STA 244+79.93:

1. AFTER COMPLETION OF 3" HMA TY C IN PHASE 4, SET-UP TRAFFIC CONTROL USING TCP (2-2)-18 STANDARD WITH FLAGGERS FOR DAILY LANE CLOSURES. CONSTRUCT BONDING COURSE AND FINAL 1" TOM SURFACE. PLACE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS AT THE END OF EACH WORK DAY.

   AFTER COMPLETION OF FINAL 1" TOM SURFACE, PLACE ALL PERMANENT SIGNING AND PAVEMENT MARKINGS AND OPEN ALL LANES TO TRAFFIC.

STATE OF TEXAS
ELENA RAMON
141765
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PROFESSIONAL ENGINEER

1/17/2023

Texas Department of Transportation

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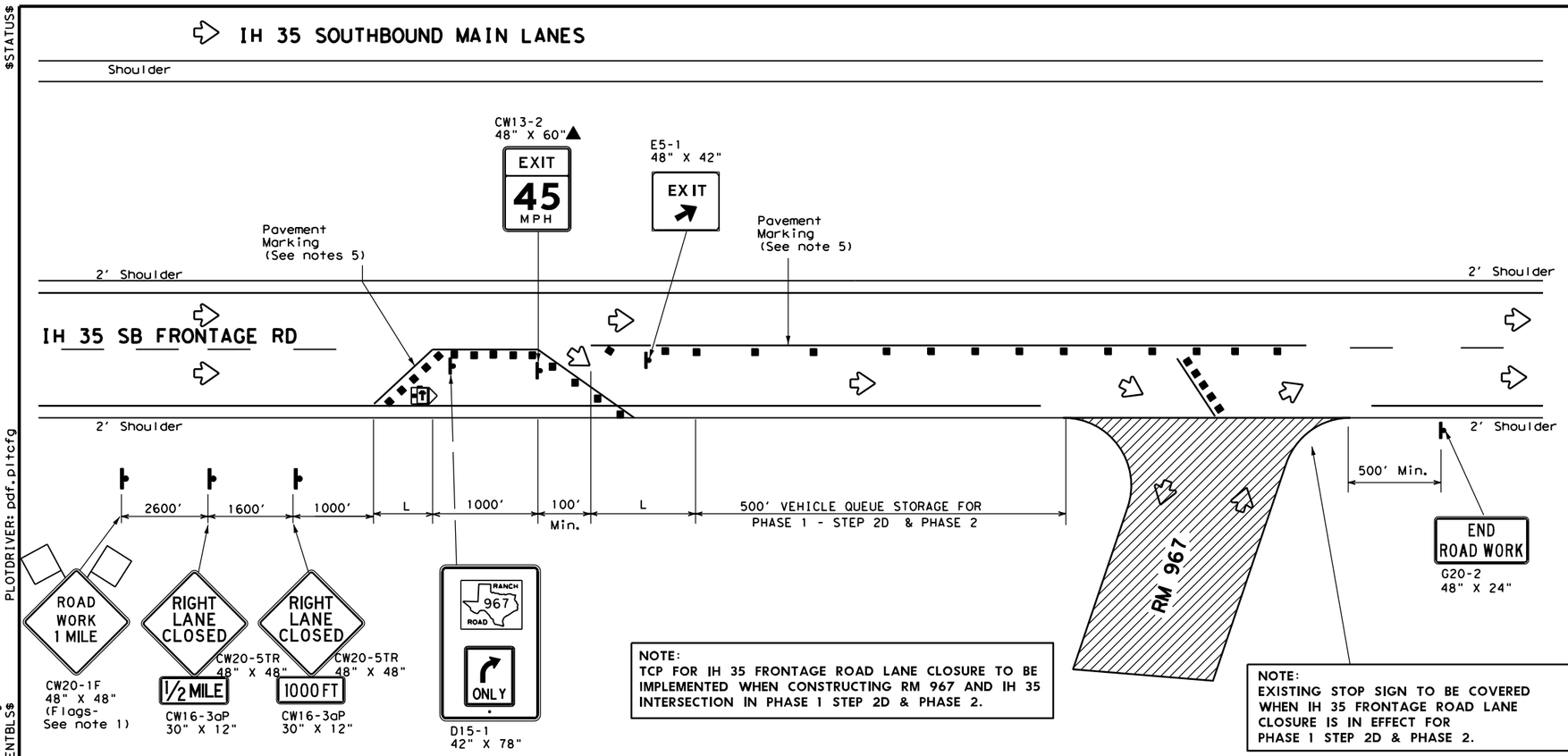
TBPE Registration No. F-1046

RM 967

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			24
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967



IH 35 FRONTAGE ROAD RIGHT LANE CLOSURE NEAR RM 967

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. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing,oscillating or strobe lights. 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.
7. 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.

STATE OF TEXAS
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12/2/2022

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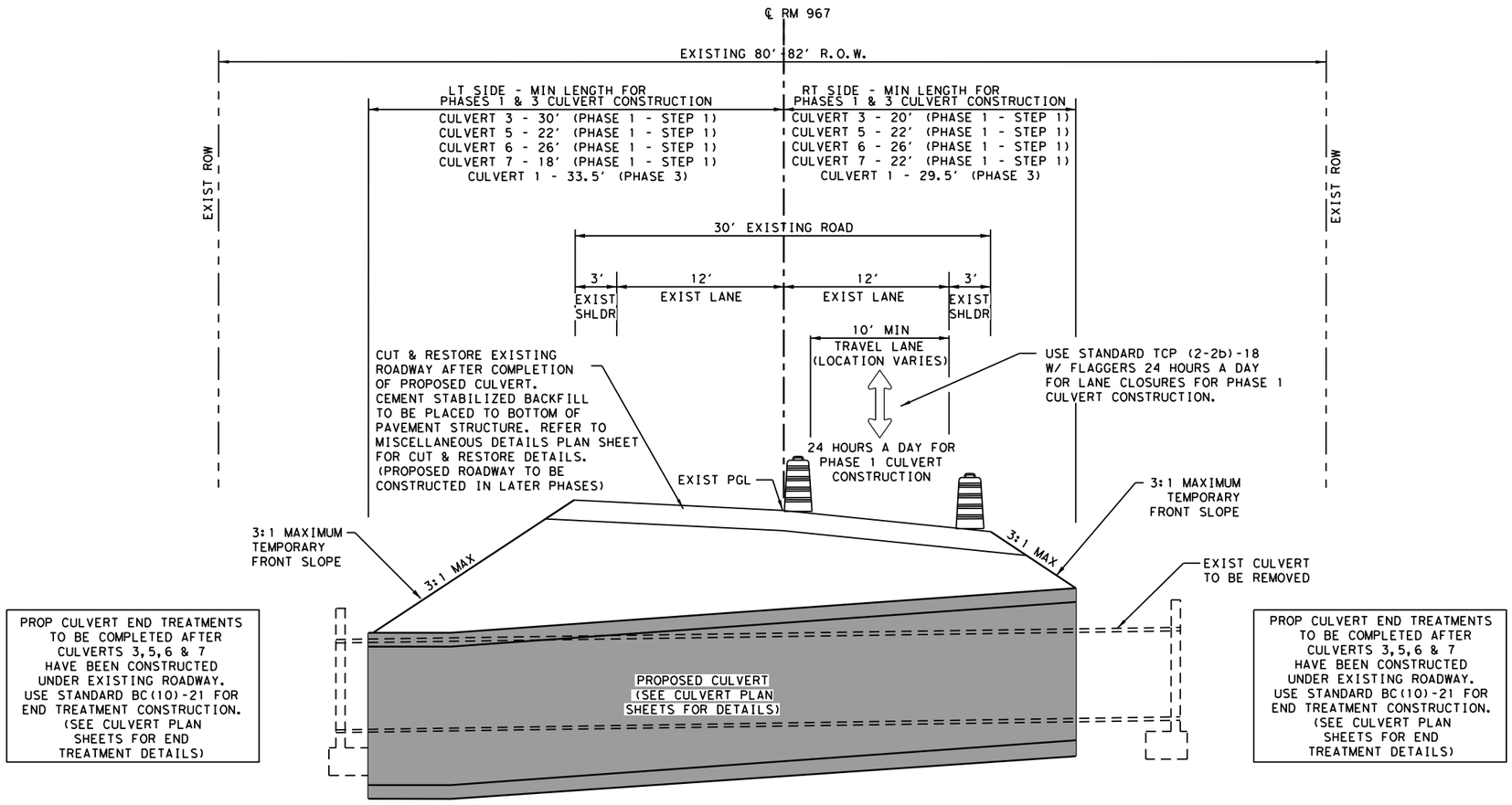
RM 967
TRAFFIC CONTROL PLAN
IH 35 FR RD
LANE CLOSURE

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			25
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16		RM 967

$STATUS$
PLOTDRIVER: pdf.pltcfg
FILE:G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\02-TCP\RM967_FR_Closure.dgn
DATE:12/2/2022 11:55:46 AM USER:RM 967
PENTABLE: $PENTBL$$



PROP CULVERT END TREATMENTS TO BE COMPLETED AFTER CULVERTS 3,5,6 & 7 HAVE BEEN CONSTRUCTED UNDER EXISTING ROADWAY. USE STANDARD BC(10)-21 FOR END TREATMENT CONSTRUCTION. (SEE CULVERT PLAN SHEETS FOR END TREATMENT DETAILS)

PROP CULVERT END TREATMENTS TO BE COMPLETED AFTER CULVERTS 3,5,6 & 7 HAVE BEEN CONSTRUCTED UNDER EXISTING ROADWAY. USE STANDARD BC(10)-21 FOR END TREATMENT CONSTRUCTION. (SEE CULVERT PLAN SHEETS FOR END TREATMENT DETAILS)

CULVERT 1 ENDS TO BE PLUGGED OR CAPPED AND END TREATMENTS COMPLETED IN A LATER PROJECT. PLUGS OR CAPS TO BE CONSTRUCTED WITH MINIMUM THICKNESS OF 6" UNREINFORCED CONCRETE. PRECAST CONCRETE PLUGS OR CAPS MAY BE USED. ALL MATERIALS & WORK TO CONSTRUCT OR INSTALL PLUGS OR CAPS WILL BE PAID FOR UNDER TO ITEM 420.

REMOVE EXISTING CULVERT AND CONSTRUCT PROPOSED CULVERT 24 HOURS A DAY UNTIL COMPLETE UNDER EXISTING ROADWAY WITH TEMPORARY 3:1 FRONT SLOPES. PRECAST BOXES TO BE USED FOR CONSTRUCTION OF PROPOSED CULVERTS. MAINTAIN DRAINAGE DURING PHASED CONSTRUCTION. ALL WORK & MATERIALS REQUIRED FOR TEMPORARY DRAINAGE ARE SUBSIDIARY TO CULVERT ITEMS.

CULVERT 1 ENDS TO BE PLUGGED OR CAPPED AND END TREATMENTS COMPLETED IN A LATER PROJECT. PLUGS OR CAPS TO BE CONSTRUCTED WITH MINIMUM THICKNESS OF 6" UNREINFORCED CONCRETE. PRECAST CONCRETE PLUGS OR CAPS MAY BE USED. ALL MATERIALS & WORK TO CONSTRUCT OR INSTALL PLUGS OR CAPS WILL BE PAID FOR UNDER TO ITEM 420.

CONTRACTOR TO COORDINATE WITH TXDOT PRIOR TO CAPPING CULVERT 1 ENDS. TXDOT TO COORDINATE WITH THE ADJACENT CITY OF BUDA PROJECT THAT WILL ULTIMATELY CONNECT THE CULVERT OUTSIDE OF THE TXDOT ROW. ANY CHANGE TO THE CULVERT END WILL BE DIRECTED WITH A CHANGE ORDER.

PHASE 1 - STEP 1 & PHASE 3 CULVERT CONSTRUCTION
(PRIOR TO BEGINNING ANY ROADWAY CONSTRUCTION)

CULVERT 3 (STA 175+89)-(PHASE 1 - STEP 1)
CULVERT 5 (STA 220+06)-(PHASE 1 - STEP 1)
CULVERT 6 (STA 229+20)-(PHASE 1 - STEP 1)
CULVERT 7 (STA 244+25)-(PHASE 1 - STEP 1)
CULVERT 1 (STA 112+26)-(PHASE 3)

NOTES:
THE UTILIZATION OF TCP(2-2b)-18 WHILE WORK IS BEING PERFORMED AT CROSS CULVERT LOCATIONS SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING". ANY ADDITIONAL MEASURES DESIRED BY THE CONTRACTOR AND AS APPROVED BY THE ENGINEER, WILL BE AT THE CONTRACTOR'S ENTIRE EXPENSE.

CONTRACTOR TO PROVIDE LIGHTS TO ILLUMINATE THE FLAGGERS AND WORK AREA DURING NIGHTTIME OPERATIONS. CLASS 3 GARMENTS SHALL BE REQUIRED FOR ALL WORKERS AND FLAGGERS DURING NIGHTTIME WORK. FLAGGERS WILL BE REQUIRED AT SIDE STREETS AND DRIVEWAYS UNLESS OTHERWISE DIRECTED.

IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE 24 HOURS A DAY CONSTRUCTION IS CEASED, THE CONTRACTOR MAY TEMPORARILY STEEL PLATE CROSS CULVERT TRENCH TO OPEN TO TRAFFIC. IF PLATES ARE UTILIZED TO OPEN TRAFFIC LANES, THE PAVEMENT SHALL BE NOTCHED TO MAKE PLATES FLUSH WITH PAVEMENT AND PLATES SHALL BE SECURED IN PLACE. NO VOIDS SHALL BE PERMITTED BELOW STEEL PLATES FOR TRANSVERSE WIDTHS EXCEEDING 5'. IF CONTRACTOR CHOOSES TO USE PLATES WITH GREATER VOIDS, THE CONTRACTOR SHALL PROVIDE A ENGINEERED PLAN FOR REVIEW & APPROVED BY THE ENGINEER.

LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- ONE-LANE TWO-WAY TRAFFIC
- CONSTRUCTION THIS PHASE
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON APPROVED TEMPORARY MOUNTS, WHERE NEEDED FOR TCP.

0' 5' 10'
SCALE 1" = 10' H
1" = 5' V

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER
1/17/2023

Texas Department of Transportation

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RM 967
TRAFFIC CONTROL PLAN CULVERTS - PHASES 1&3 TYPICAL SECTIONS

SHEET 1 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			26
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
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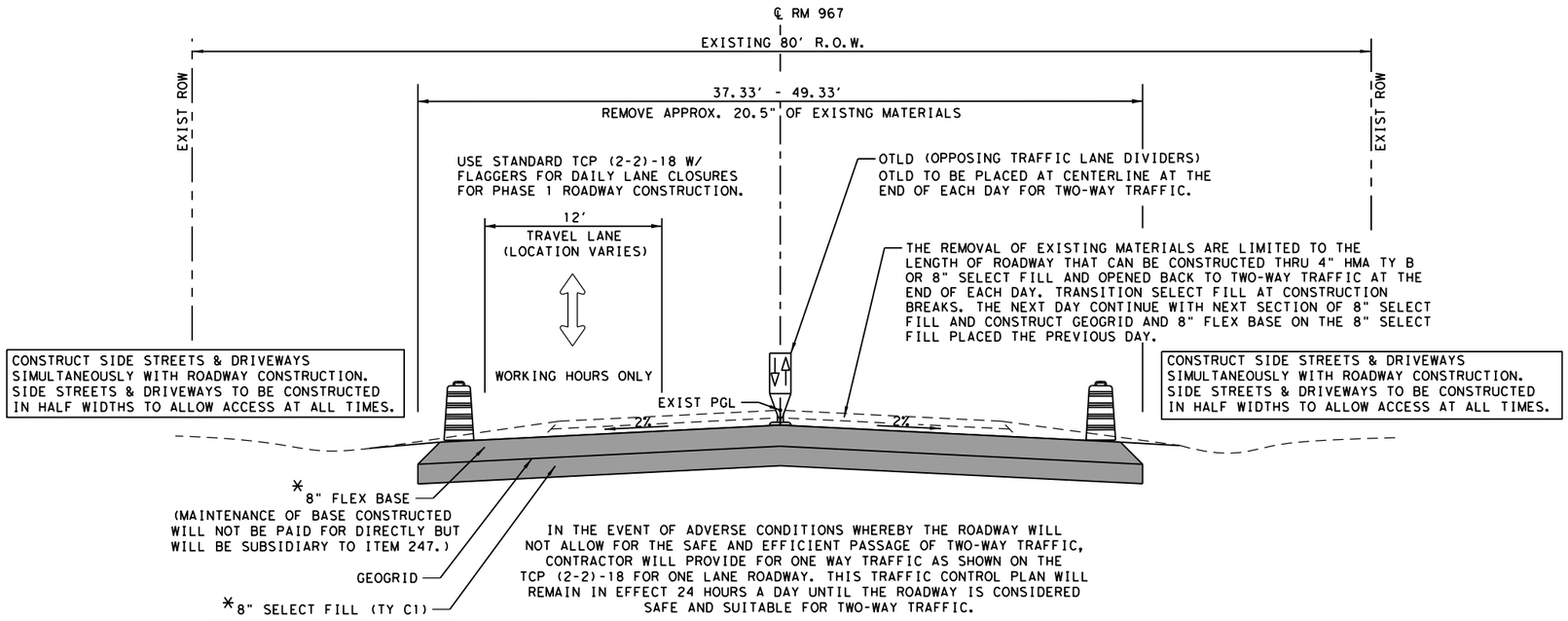
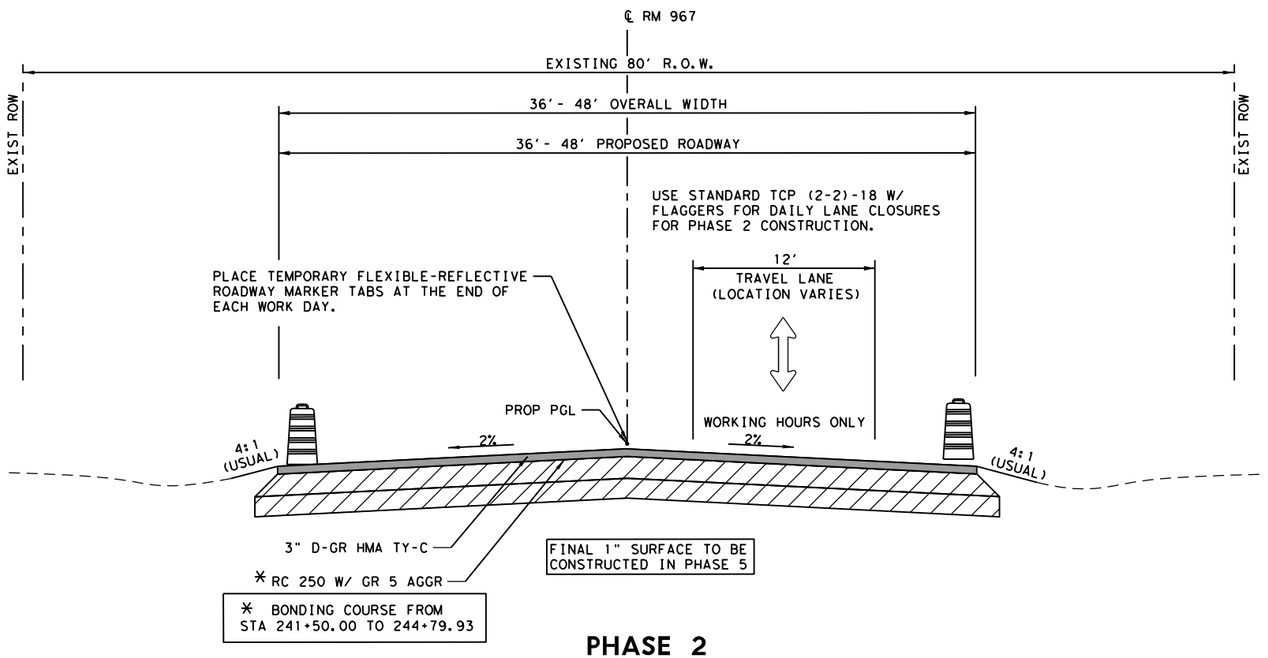
PENTABLE: $PENTBLS$



PHASE 1 - STEPS 2A - 2F

STA 154+68.04 TO 241+50.00 (8" FLEX BASE, GEOGRID & 8" SELECT FILL)
STA 241+50.00 TO 244+79.93 (12" HMA TY B)

NOTE: DUST FROM RM 967 DAILY TRAFFIC & CONSTRUCTION ACTIVITIES SHALL BE CONTROLLED WITH ITEM 204 SPRINKLING (DUST CONTROL)



PHASE 2

STA 154+68.04 TO 244+79.93

LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- ONE-LANE TWO-WAY TRAFFIC
- CONSTRUCTION THIS PHASE
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON APPROVED TEMPORARY MOUNTS, WHERE NEEDED FOR TCP.

0' 5' 10'
SCALE 1" = 10' H
1" = 5' V

STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

12/2/2022

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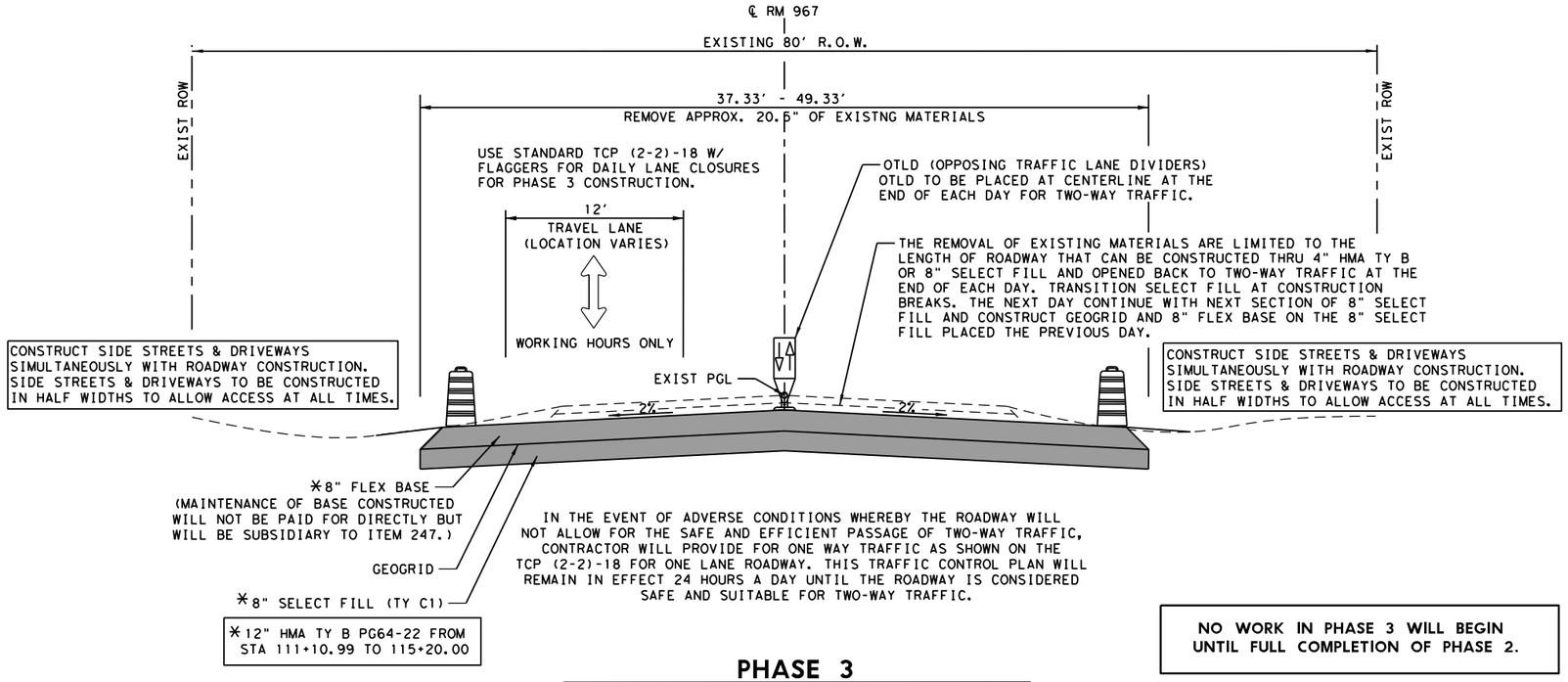
RM 967
TRAFFIC CONTROL PLAN PHASES 1 & 2 TYPICAL SECTIONS

SHEET 2 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			27
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

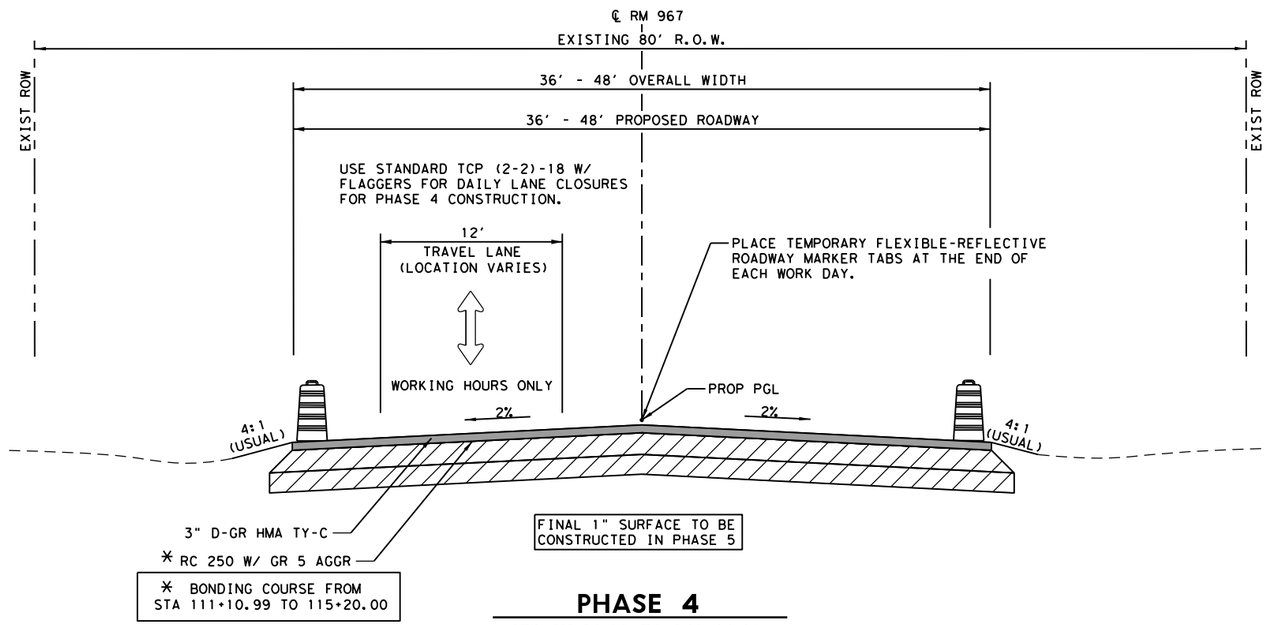


NO WORK IN PHASE 3 WILL BEGIN UNTIL FULL COMPLETION OF PHASE 2.

PHASE 3

STA 111+10.99 TO 115+20.00 (12" HMA TY B)
STA 115+20.00 TO 140+80.32 (8" FLEX BASE, GEOGRID & 8" SELECT FILL)

NOTE: DUST FROM RM 967 DAILY TRAFFIC & CONSTRUCTION ACTIVITIES SHALL BE CONTROLLED WITH ITEM 204 SPRINKLING (DUST CONTROL)



PHASE 4

STA 111+10.99 TO 140+80.32

LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- ONE-LANE TWO-WAY TRAFFIC
- CONSTRUCTION THIS PHASE
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON APPROVED TEMPORARY MOUNTS, WHERE NEEDED FOR TCP.

0' 5' 10'
SCALE 1" = 10' H
1" = 5' V

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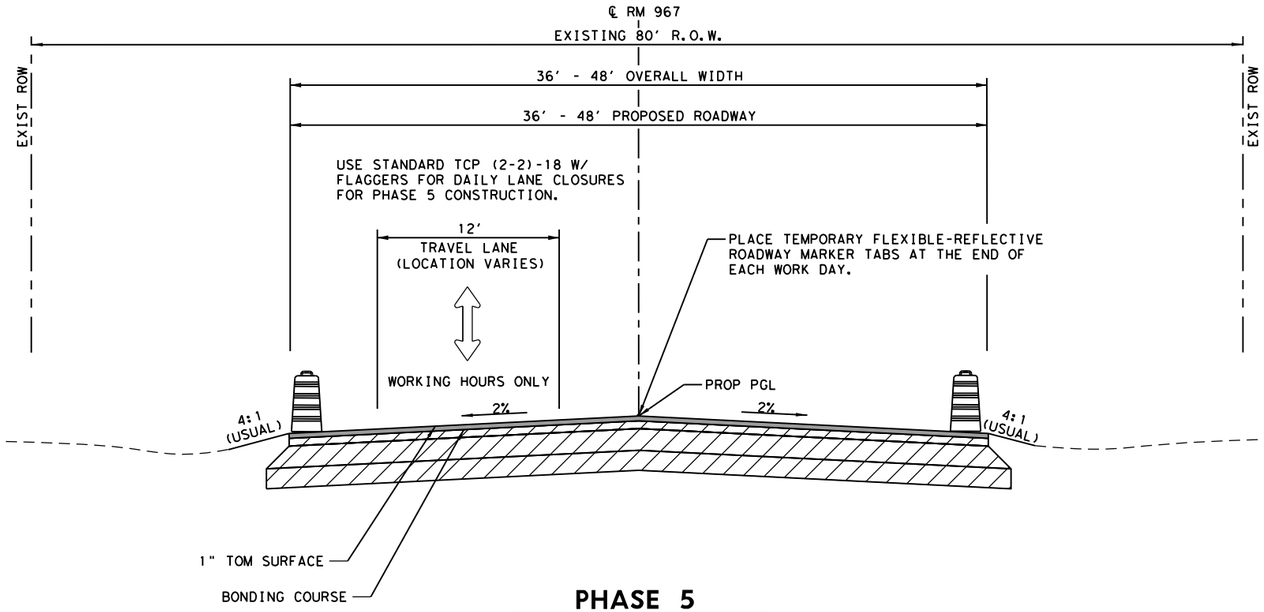
RM 967
TRAFFIC CONTROL PLAN PHASES-3 & 4 TYPICAL SECTIONS

SHEET 3 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			28
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967



PHASE 5

FINAL SURFACE
STA 111+10.99 TO 140+80.32
STA 154+68.04 TO 244+79.93

LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- ONE-LANE TWO-WAY TRAFFIC
- CONSTRUCTION THIS PHASE
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON APPROVED TEMPORARY MOUNTS, WHERE NEEDED FOR TCP.

0' 5' 10'
SCALE 1" = 10' H
1" = 5' V

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RM 967
TRAFFIC CONTROL PLAN
FINAL SURFACE-PHASE 5
TYPICAL SECTIONS

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			29
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
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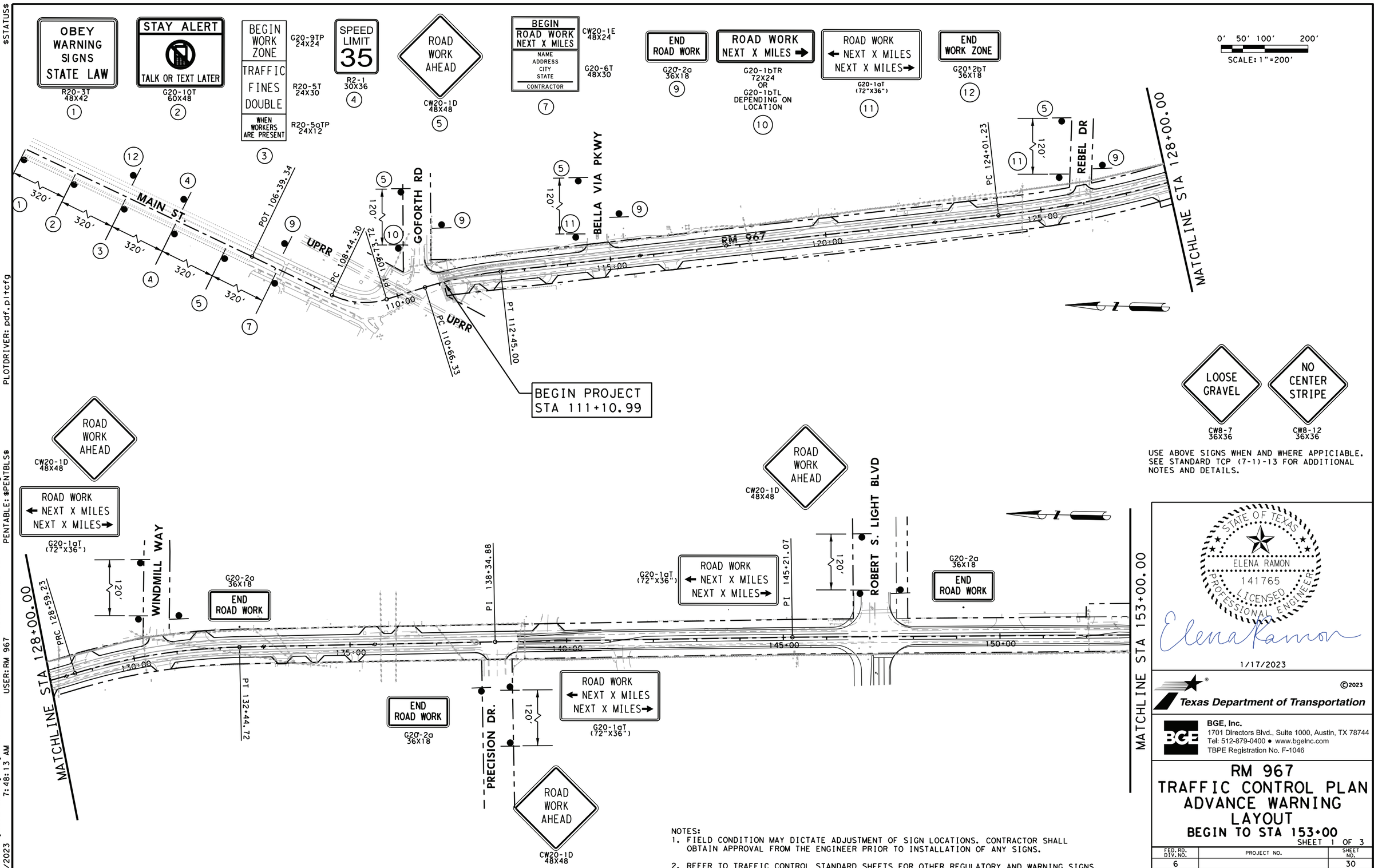

NOTES:
1. FIELD CONDITION MAY DICTATE ADJUSTMENT OF SIGN LOCATIONS. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO INSTALLATION OF ANY SIGNS.
2. REFER TO TRAFFIC CONTROL STANDARD SHEETS FOR OTHER REGULATORY AND WARNING SIGNS.
3. ADHERE AT ALL TIMES TO TxDOT STANDARDS BC(1)-21 THROUGH BC(12)-21, & TMUTCD FOR SIGN DETAILS, DIMENSIONS AND PLACEMENT.

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1/17/2023

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RM 967
TRAFFIC CONTROL PLAN ADVANCE WARNING LAYOUT
BEGIN TO STA 153+00

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			30
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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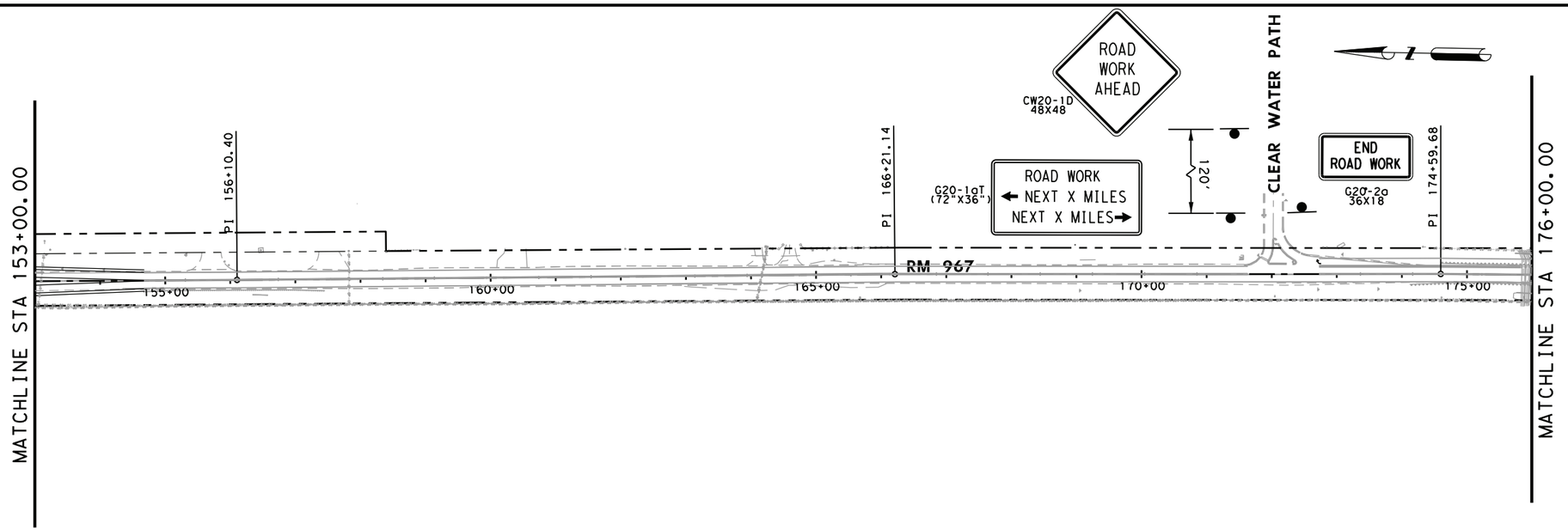

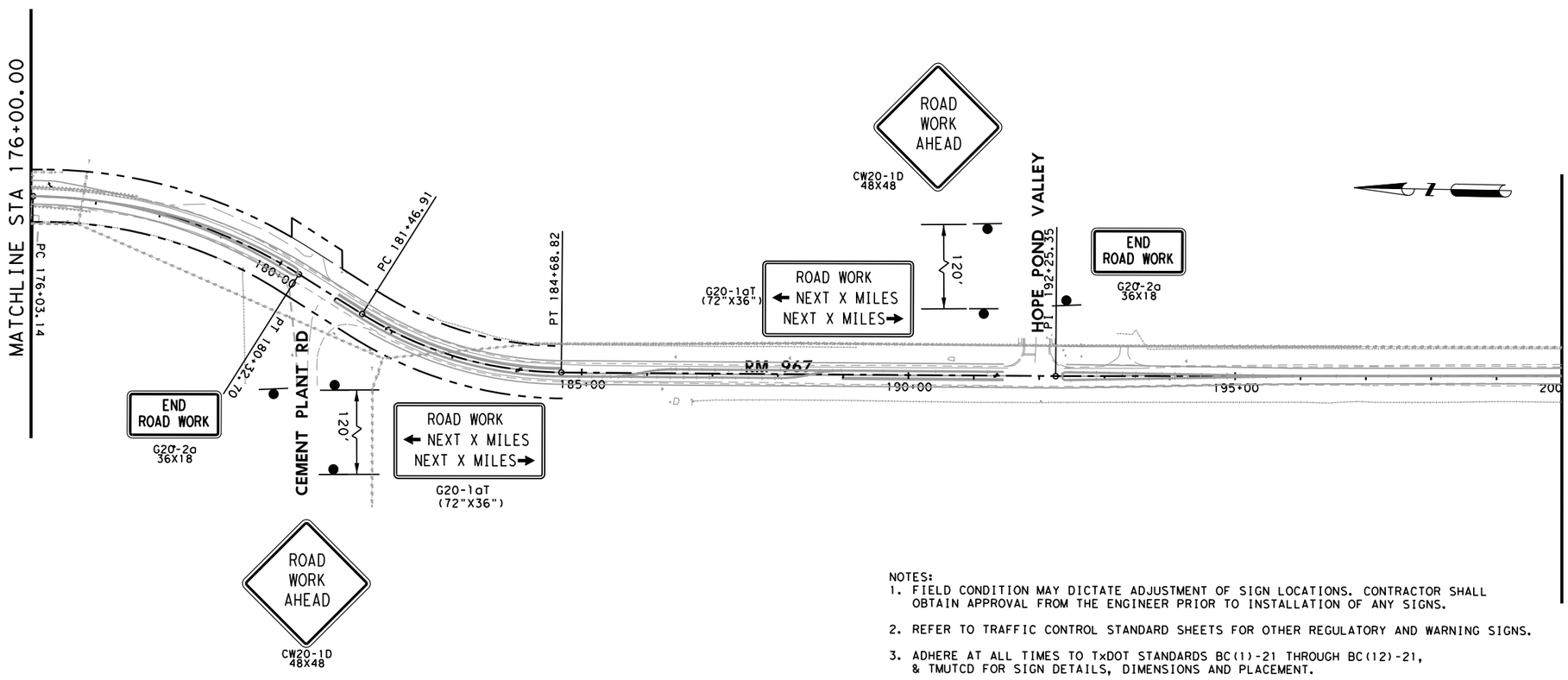

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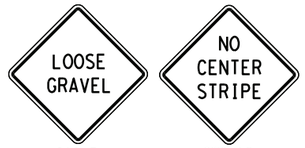
SCALE: 1"=200'



USE ABOVE SIGNS WHEN AND WHERE APPICIABLE. SEE STANDARD TCP (7-1)-13 FOR ADDITIONAL NOTES AND DETAILS.

NOTES:
1. FIELD CONDITION MAY DICTATE ADJUSTMENT OF SIGN LOCATIONS. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO INSTALLATION OF ANY SIGNS.
2. REFER TO TRAFFIC CONTROL STANDARD SHEETS FOR OTHER REGULATORY AND WARNING SIGNS.
3. ADHERE AT ALL TIMES TO TxDOT STANDARDS BC(1)-21 THROUGH BC(12)-21, & TMUTCD FOR SIGN DETAILS, DIMENSIONS AND PLACEMENT.

1/17/2023

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RM 967
TRAFFIC CONTROL PLAN ADVANCE WARNING LAYOUT
STA 153+00 TO STA 200+00

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			31
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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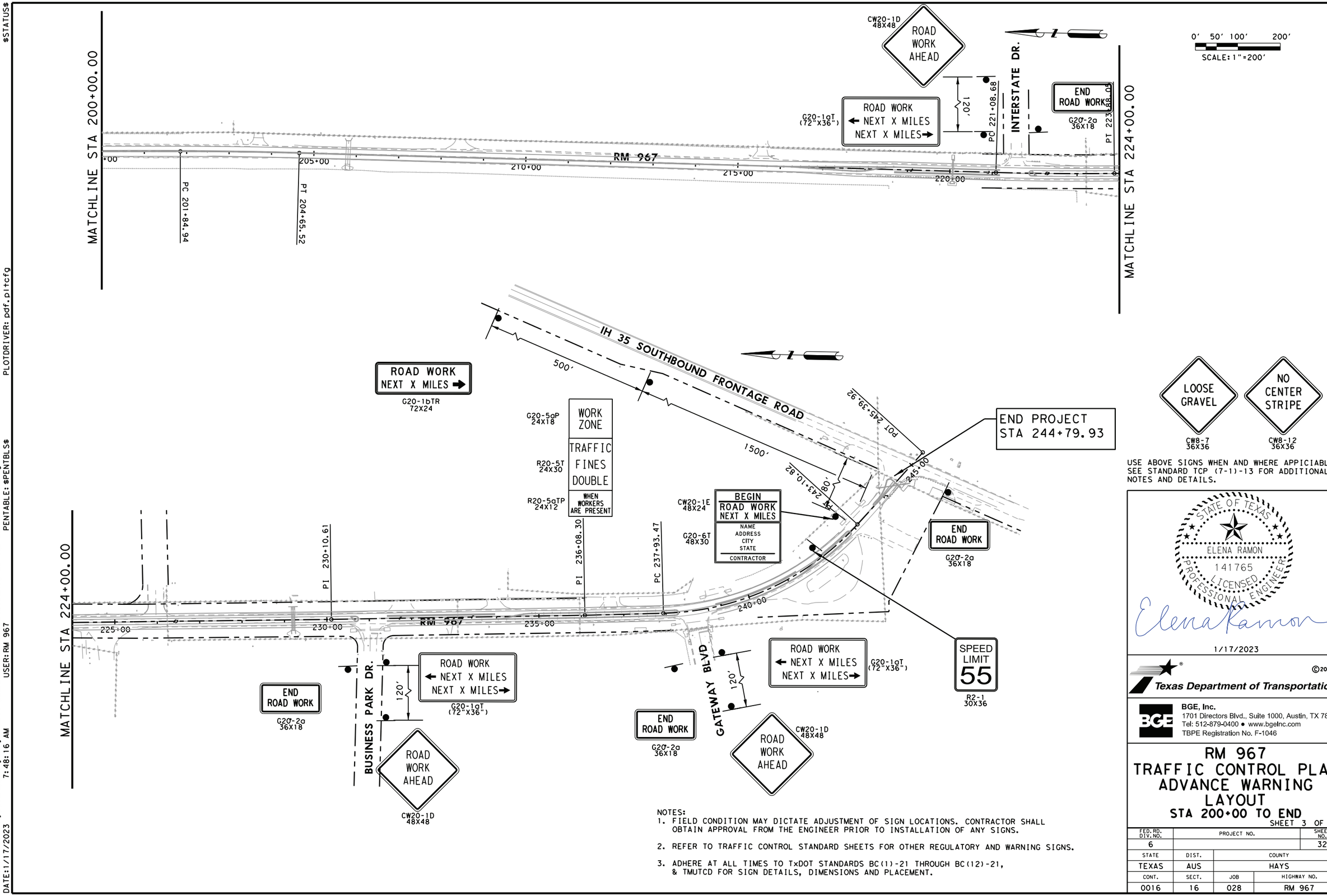

USE ABOVE SIGNS WHEN AND WHERE APPICIABLE. SEE STANDARD TCP (7-1)-13 FOR ADDITIONAL NOTES AND DETAILS.

NOTES:
1. FIELD CONDITION MAY DICTATE ADJUSTMENT OF SIGN LOCATIONS. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO INSTALLATION OF ANY SIGNS.
2. REFER TO TRAFFIC CONTROL STANDARD SHEETS FOR OTHER REGULATORY AND WARNING SIGNS.
3. ADHERE AT ALL TIMES TO TxDOT STANDARDS BC(1)-21 THROUGH BC(12)-21, & TMUTCD FOR SIGN DETAILS, DIMENSIONS AND PLACEMENT.

STATE OF TEXAS
ELENA RAMON
141765
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Elena Ramon
1/17/2023

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RM 967
TRAFFIC CONTROL PLAN
ADVANCE WARNING LAYOUT
STA 200+00 TO END

SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			32
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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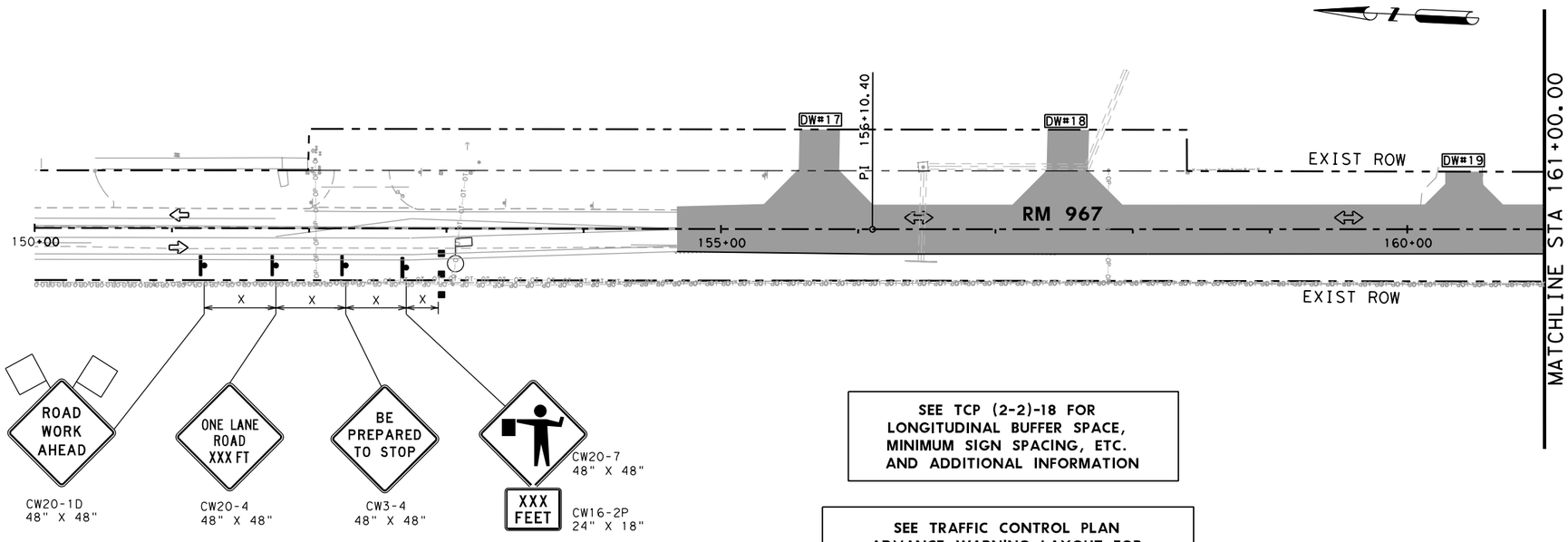
PENTABLE: $PENTBL$
PLOTDRIVER: pdf.plt cfg
$STATUS$

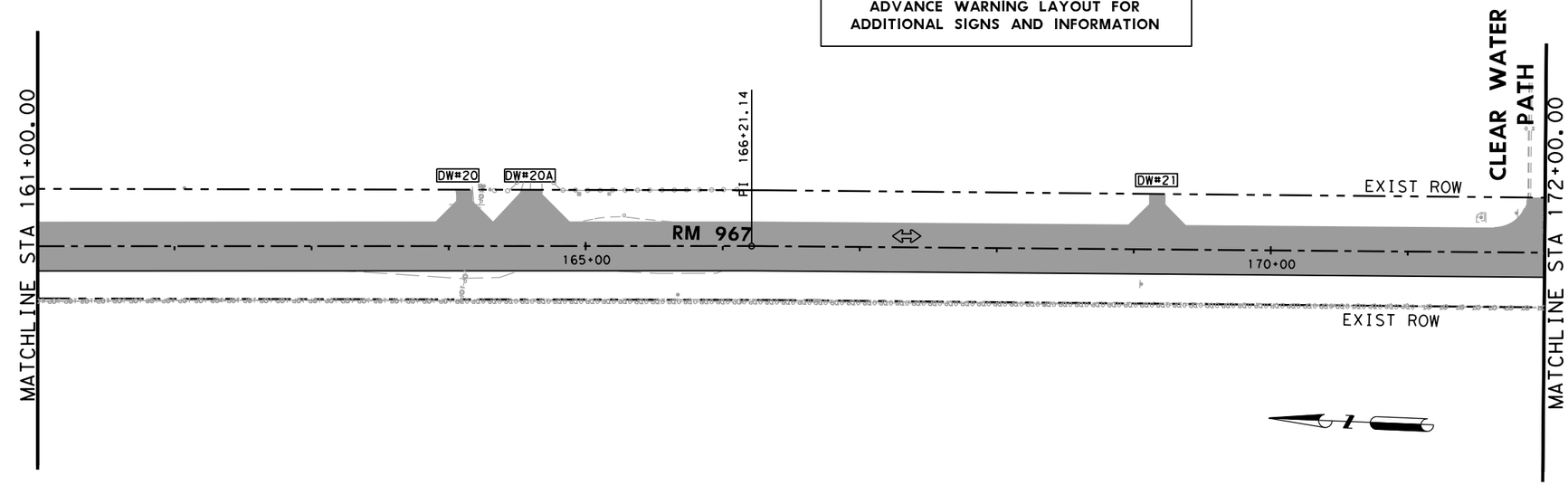
LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- ONE-LANE TWO-WAY TRAFFIC
- CONSTRUCTION THIS PHASE



SEE TCP (2-2)-18 FOR LONGITUDINAL BUFFER SPACE, MINIMUM SIGN SPACING, ETC. AND ADDITIONAL INFORMATION

SEE TRAFFIC CONTROL PLAN ADVANCE WARNING LAYOUT FOR ADDITIONAL SIGNS AND INFORMATION



THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED THRU 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. TRANSITION SELECT FILL OR FLEX BASE AT CONSTRUCTION BREAKS.

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON APPROVED TEMPORARY MOUNTS, WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100' H

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12/2/2022

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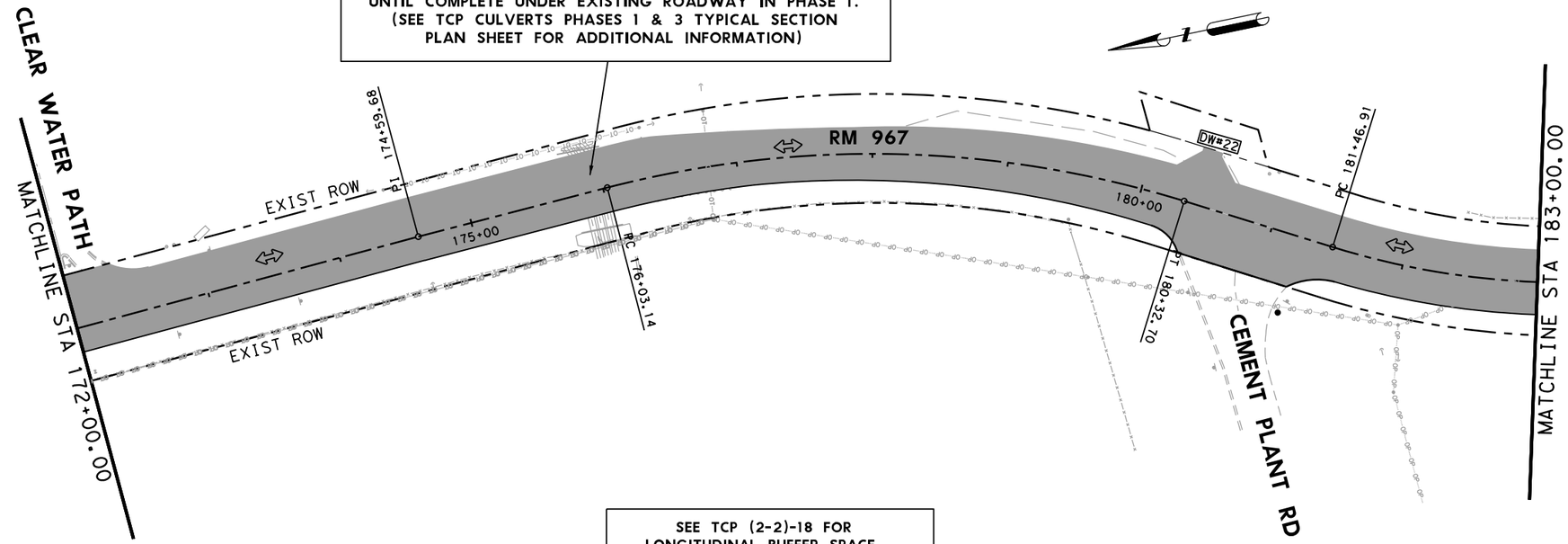
RM 967

TRAFFIC CONTROL PLAN LAYOUT PHASES 1 & 2
STA 154+68.04 TO STA 172+00

SHEET 1 OF 5

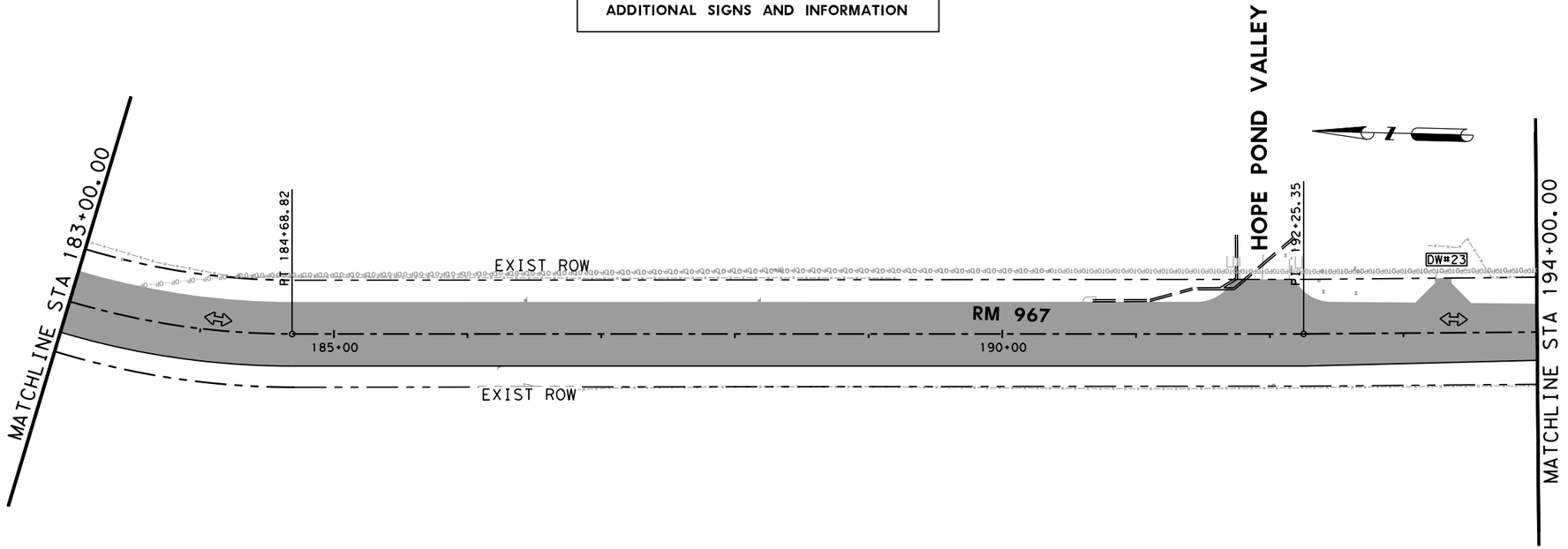
FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			33
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

PRIOR TO BEGINNING ANY ROADWAY CONSTRUCTION, CONSTRUCT PROPOSED CULVERT 3 - 24 HOURS A DAY UNTIL COMPLETE UNDER EXISTING ROADWAY IN PHASE 1. (SEE TCP CULVERTS PHASES 1 & 3 TYPICAL SECTION PLAN SHEET FOR ADDITIONAL INFORMATION)



SEE TCP (2-2)-18 FOR LONGITUDINAL BUFFER SPACE, MINIMUM SIGN SPACING, ETC. AND ADDITIONAL INFORMATION

SEE TRAFFIC CONTROL PLAN ADVANCE WARNING LAYOUT FOR ADDITIONAL SIGNS AND INFORMATION



LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- ONE-LANE TWO-WAY TRAFFIC
- CONSTRUCTION THIS PHASE

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
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3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
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0 50 100
SCALE: 1"=100' H

THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED THRU 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. TRANSITION SELECT FILL OR FLEX BASE AT CONSTRUCTION BREAKS.

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

Texas Department of Transportation

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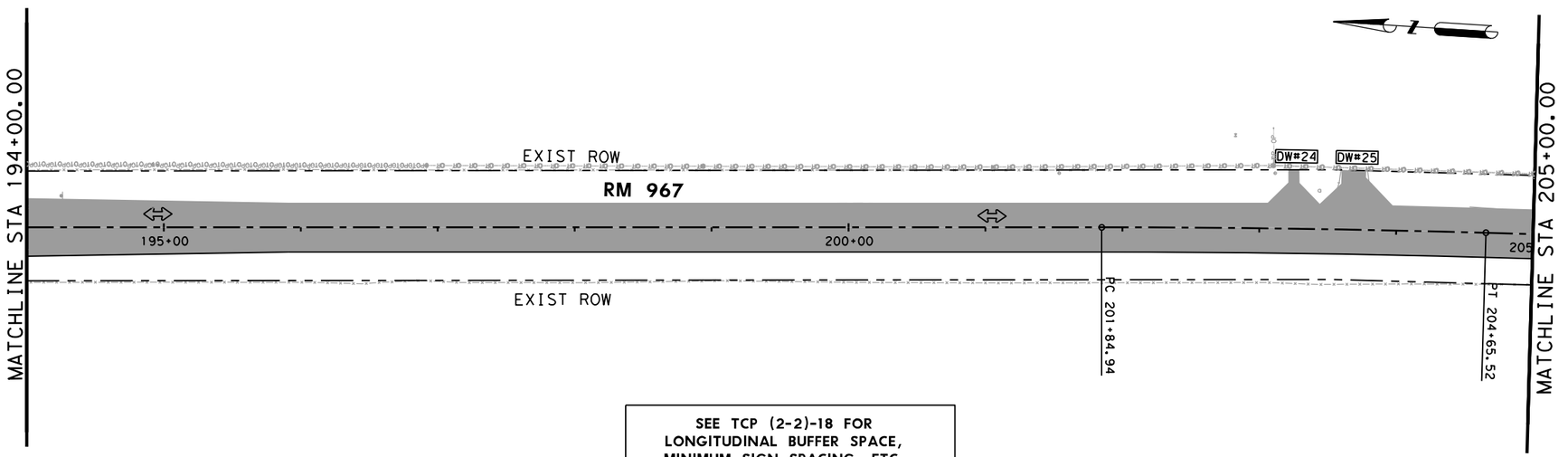
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

RM 967

TRAFFIC CONTROL PLAN LAYOUT PHASES 1 & 2 STA 172+00 TO STA 194+00

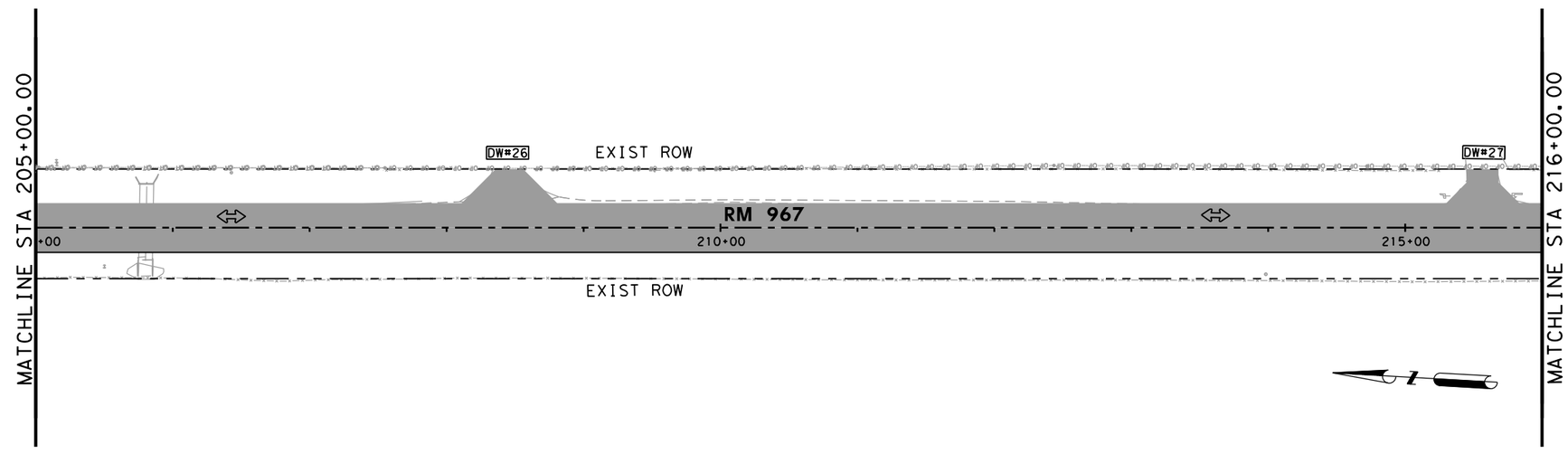
SHEET 2 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			34
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967



SEE TCP (2-2)-18 FOR LONGITUDINAL BUFFER SPACE, MINIMUM SIGN SPACING, ETC. AND ADDITIONAL INFORMATION

SEE TRAFFIC CONTROL PLAN ADVANCE WARNING LAYOUT FOR ADDITIONAL SIGNS AND INFORMATION



LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- ONE-LANE TWO-WAY TRAFFIC
- CONSTRUCTION THIS PHASE

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON APPROVED TEMPORARY MOUNTS, WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100' H

THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED THRU 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. TRANSITION SELECT FILL OR FLEX BASE AT CONSTRUCTION BREAKS.

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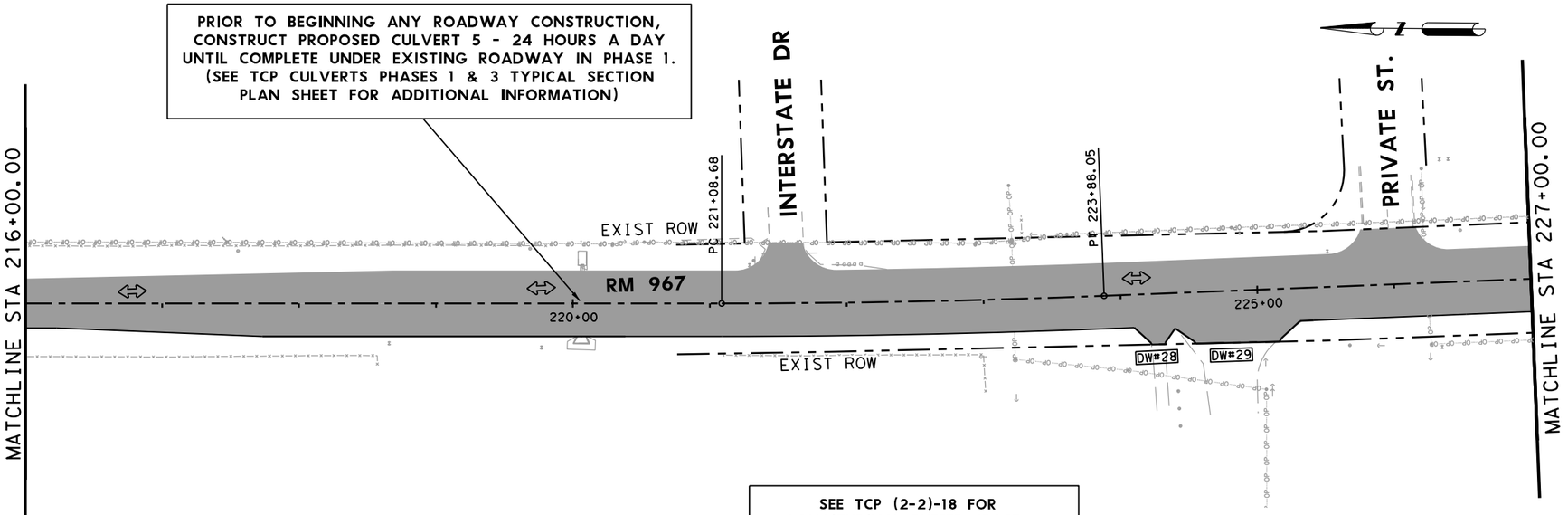
RM 967

TRAFFIC CONTROL PLAN LAYOUT PHASES 1 & 2 STA 194+00 TO STA 216+00

SHEET 3 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			35
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

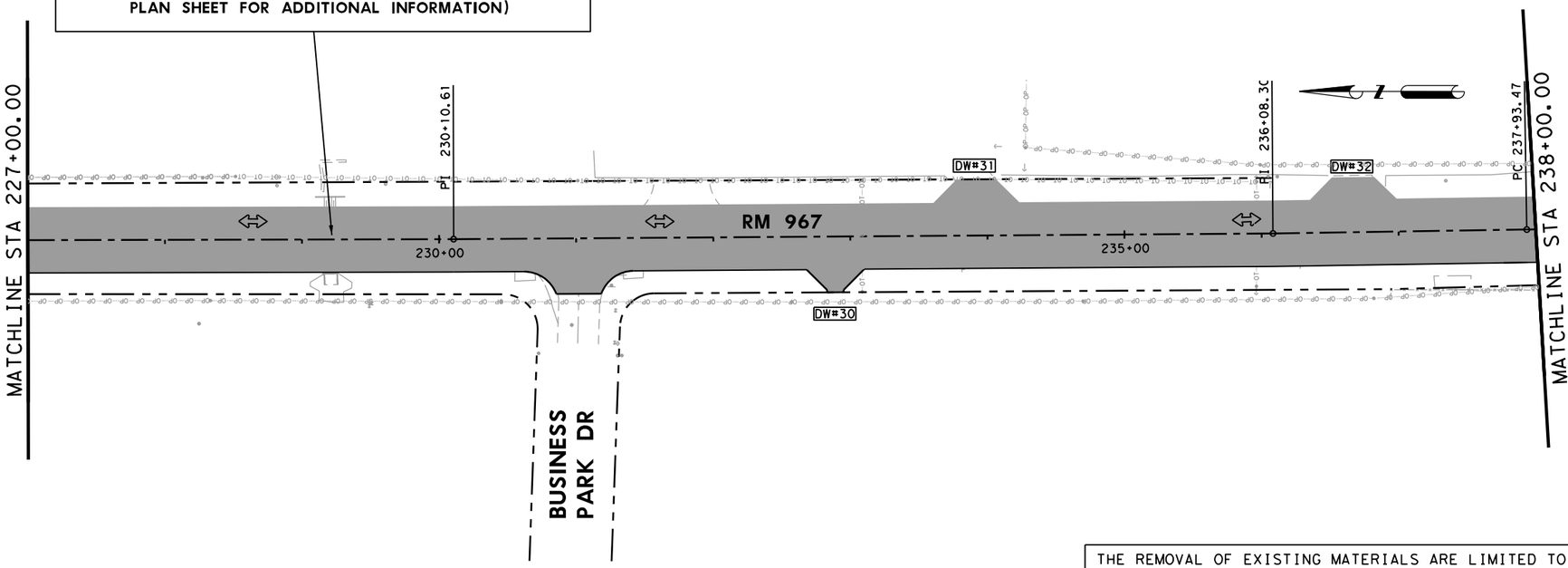
PRIOR TO BEGINNING ANY ROADWAY CONSTRUCTION, CONSTRUCT PROPOSED CULVERT 5 - 24 HOURS A DAY UNTIL COMPLETE UNDER EXISTING ROADWAY IN PHASE 1. (SEE TCP CULVERTS PHASES 1 & 3 TYPICAL SECTION PLAN SHEET FOR ADDITIONAL INFORMATION)



SEE TCP (2-2)-18 FOR LONGITUDINAL BUFFER SPACE, MINIMUM SIGN SPACING, ETC. AND ADDITIONAL INFORMATION

SEE TRAFFIC CONTROL PLAN ADVANCE WARNING LAYOUT FOR ADDITIONAL SIGNS AND INFORMATION

PRIOR TO BEGINNING ANY ROADWAY CONSTRUCTION, CONSTRUCT PROPOSED CULVERT 6 - 24 HOURS A DAY UNTIL COMPLETE UNDER EXISTING ROADWAY IN PHASE 1. (SEE TCP CULVERTS PHASES 1 & 3 TYPICAL SECTION PLAN SHEET FOR ADDITIONAL INFORMATION)



THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED THRU 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. TRANSITION SELECT FILL OR FLEX BASE AT CONSTRUCTION BREAKS.

LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- ONE-LANE TWO-WAY TRAFFIC
- CONSTRUCTION THIS PHASE

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON APPROVED TEMPORARY MOUNTS, WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100' H

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

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RM 967

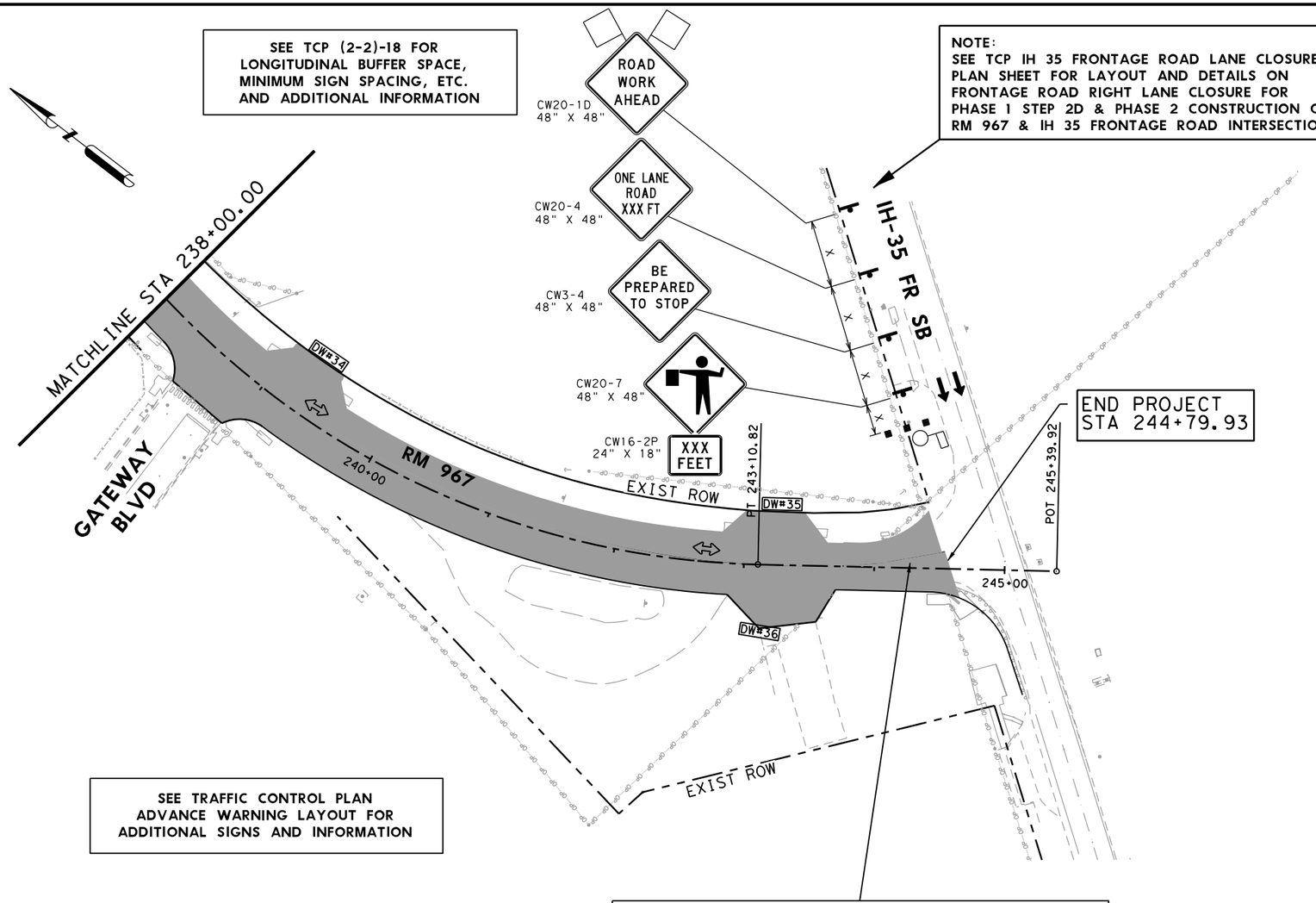
TRAFFIC CONTROL PLAN LAYOUT PHASES 1 & 2
STA 216+00 TO STA 238+00

SHEET 4 OF 5

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			36
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

SEE TCP (2-2)-18 FOR LONGITUDINAL BUFFER SPACE, MINIMUM SIGN SPACING, ETC. AND ADDITIONAL INFORMATION

NOTE:
SEE TCP IH 35 FRONTAGE ROAD LANE CLOSURE PLAN SHEET FOR LAYOUT AND DETAILS ON FRONTAGE ROAD RIGHT LANE CLOSURE FOR PHASE 1 STEP 2D & PHASE 2 CONSTRUCTION OF RM 967 & IH 35 FRONTAGE ROAD INTERSECTION.



SEE TRAFFIC CONTROL PLAN ADVANCE WARNING LAYOUT FOR ADDITIONAL SIGNS AND INFORMATION

PRIOR TO BEGINNING ANY ROADWAY CONSTRUCTION, CONSTRUCT PROPOSED CULVERT 7 - 24 HOURS A DAY UNTIL COMPLETE UNDER EXISTING ROADWAY IN PHASE 1. (SEE TCP CULVERTS PHASES 1 & 3 TYPICAL SECTION PLAN SHEET FOR ADDITIONAL INFORMATION)

LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- ONE-LANE TWO-WAY TRAFFIC
- CONSTRUCTION THIS PHASE

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON APPROVED TEMPORARY MOUNTS, WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100' H

THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED THRU 4" HMA TY B OR 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. TRANSITION SELECT FILL OR FLEX BASE AT CONSTRUCTION BREAKS.

STATE OF TEXAS
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12/2/2022

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RM 967

TRAFFIC CONTROL PLAN LAYOUT PHASES 1 & 2 STA 238+00 TO END

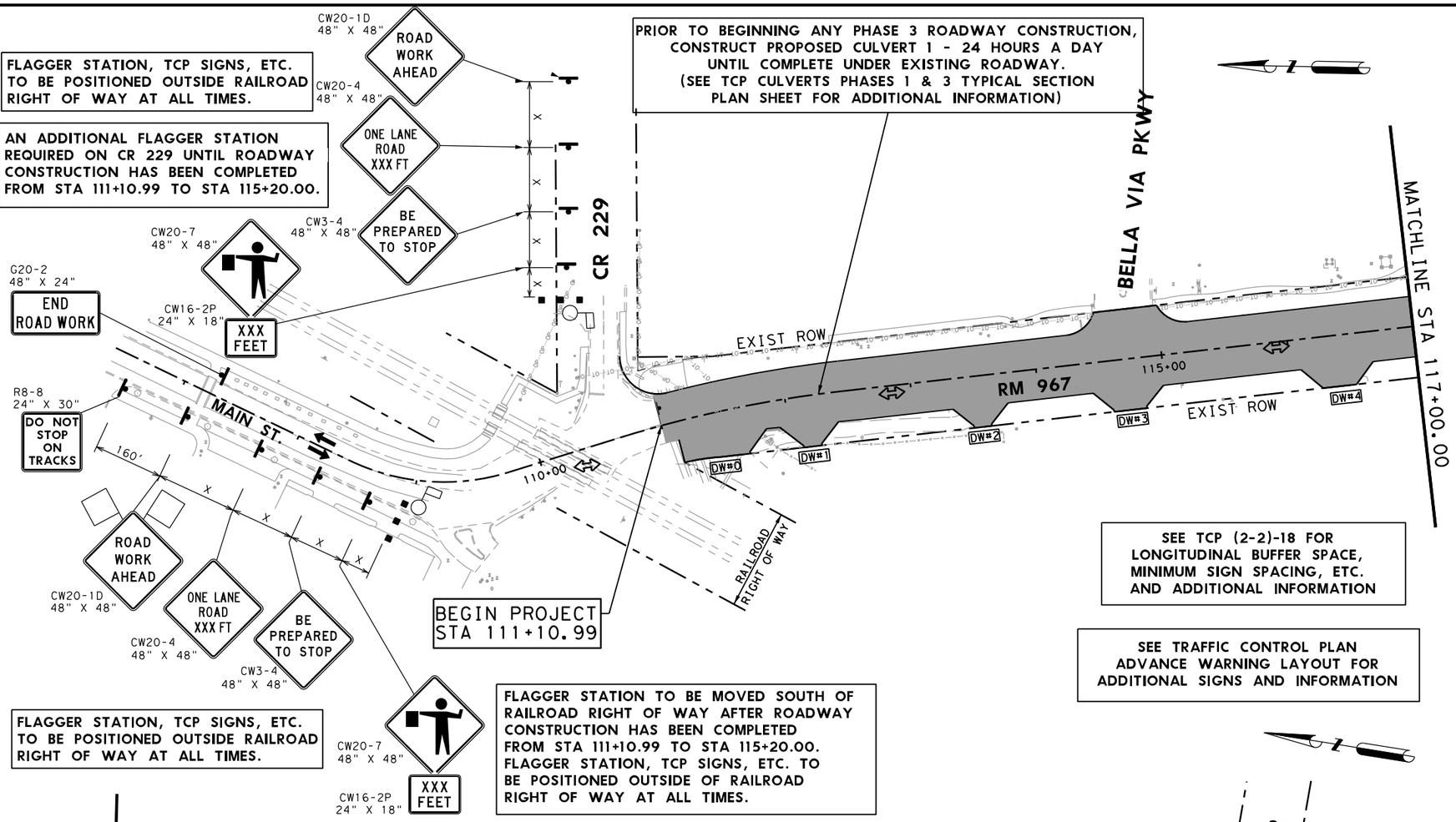
SHEET 5 OF 5

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			37
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

FLAGGER STATION, TCP SIGNS, ETC. TO BE POSITIONED OUTSIDE RAILROAD RIGHT OF WAY AT ALL TIMES.

AN ADDITIONAL FLAGGER STATION REQUIRED ON CR 229 UNTIL ROADWAY CONSTRUCTION HAS BEEN COMPLETED FROM STA 111+10.99 TO STA 115+20.00.

PRIOR TO BEGINNING ANY PHASE 3 ROADWAY CONSTRUCTION, CONSTRUCT PROPOSED CULVERT 1 - 24 HOURS A DAY UNTIL COMPLETE UNDER EXISTING ROADWAY. (SEE TCP CULVERTS PHASES 1 & 3 TYPICAL SECTION PLAN SHEET FOR ADDITIONAL INFORMATION)



SEE TCP (2-2)-18 FOR LONGITUDINAL BUFFER SPACE, MINIMUM SIGN SPACING, ETC. AND ADDITIONAL INFORMATION

SEE TRAFFIC CONTROL PLAN ADVANCE WARNING LAYOUT FOR ADDITIONAL SIGNS AND INFORMATION

FLAGGER STATION, TCP SIGNS, ETC. TO BE POSITIONED OUTSIDE RAILROAD RIGHT OF WAY AT ALL TIMES.

FLAGGER STATION TO BE MOVED SOUTH OF RAILROAD RIGHT OF WAY AFTER ROADWAY CONSTRUCTION HAS BEEN COMPLETED FROM STA 111+10.99 TO STA 115+20.00. FLAGGER STATION, TCP SIGNS, ETC. TO BE POSITIONED OUTSIDE OF RAILROAD RIGHT OF WAY AT ALL TIMES.

LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- ONE-LANE TWO-WAY TRAFFIC
- CONSTRUCTION THIS PHASE

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON APPROVED TEMPORARY MOUNTS, WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100' H

THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED THRU 4" HMA TY B OR 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. TRANSITION SELECT FILL OR FLEX BASE AT CONSTRUCTION BREAKS.

STATE OF TEXAS
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12/2/2022

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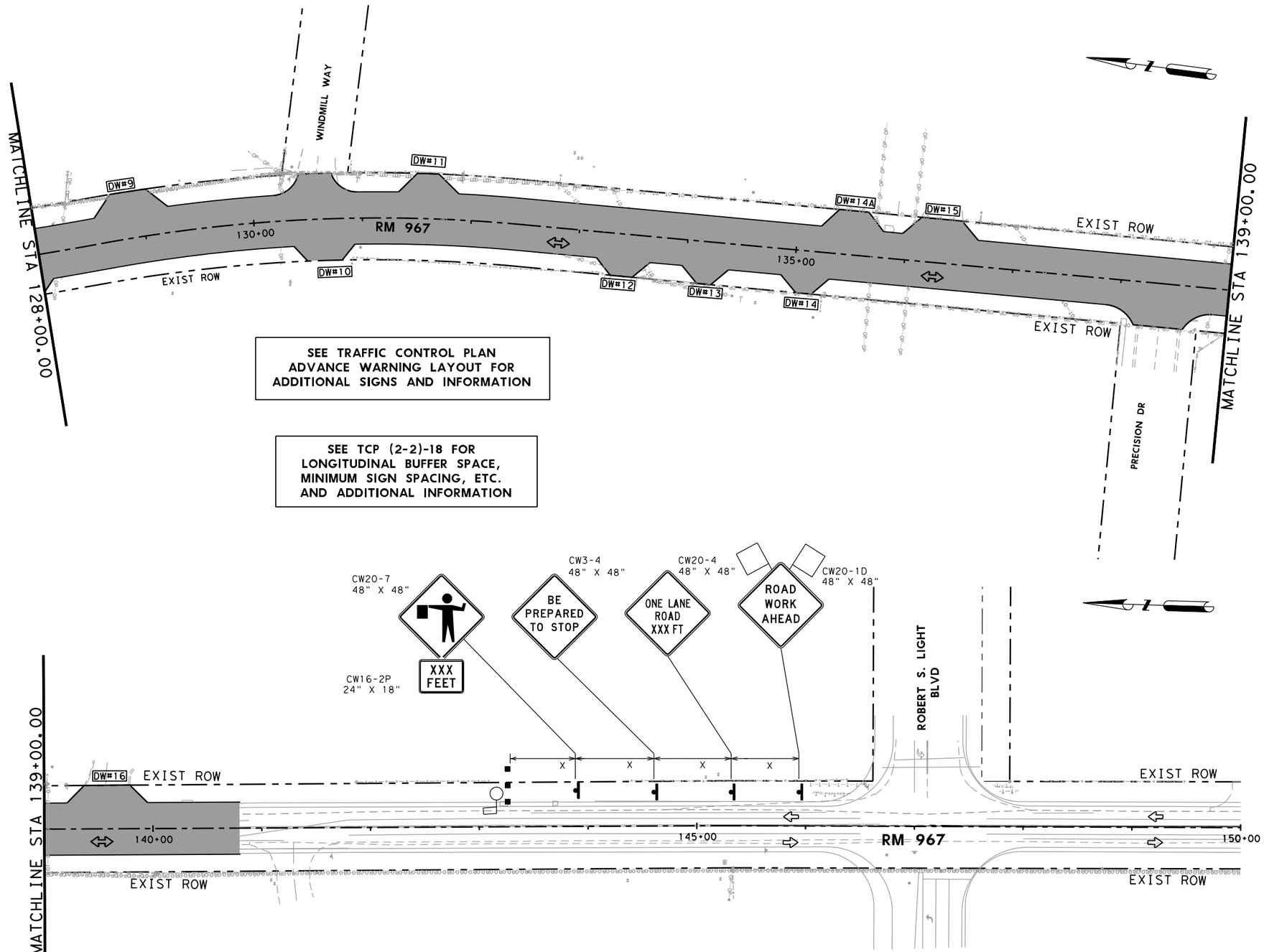
RM 967

TRAFFIC CONTROL PLAN LAYOUT PHASES 3 & 4 BEGIN TO STA 128+00

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			38
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967



SEE TRAFFIC CONTROL PLAN ADVANCE WARNING LAYOUT FOR ADDITIONAL SIGNS AND INFORMATION

SEE TCP (2-2)-18 FOR LONGITUDINAL BUFFER SPACE, MINIMUM SIGN SPACING, ETC. AND ADDITIONAL INFORMATION

LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- ONE-LANE TWO-WAY TRAFFIC
- CONSTRUCTION THIS PHASE

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
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0 50 100
SCALE: 1"=100' H

THE REMOVAL OF EXISTING MATERIALS ARE LIMITED TO THE LENGTH OF ROADWAY THAT CAN BE CONSTRUCTED THRU 8" SELECT FILL AND OPENED BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. TRANSITION SELECT FILL OR FLEX BASE AT CONSTRUCTION BREAKS.

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RM 967

TRAFFIC CONTROL PLAN LAYOUT PHASES 3 & 4
128+00 TO STA 140+80.32

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			39
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

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	0016	16	028	RM 967
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	AUS	HAYS		40
5-10 5-21				

DATE: 12/2/2022 11:56:01 AM
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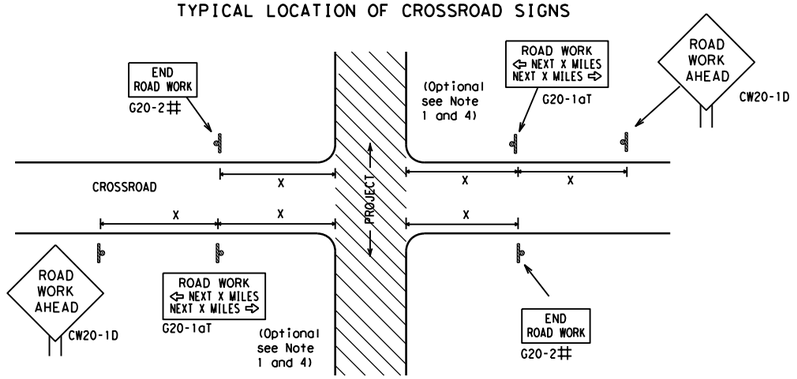
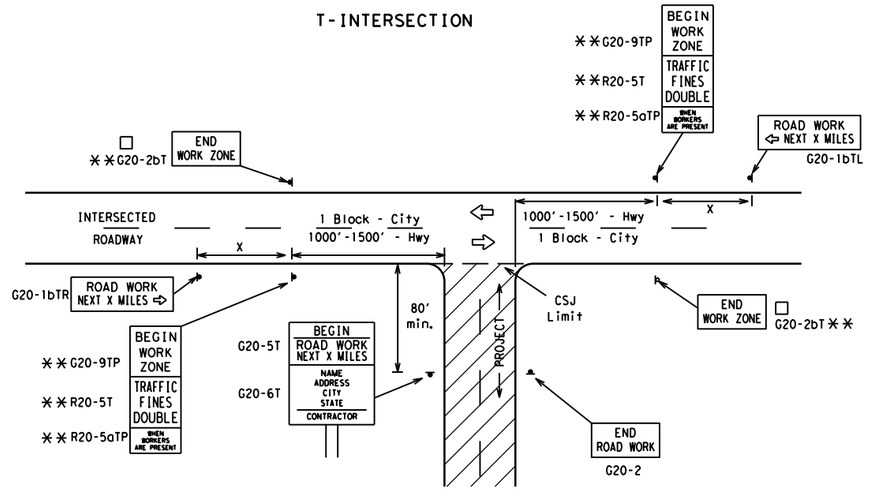
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

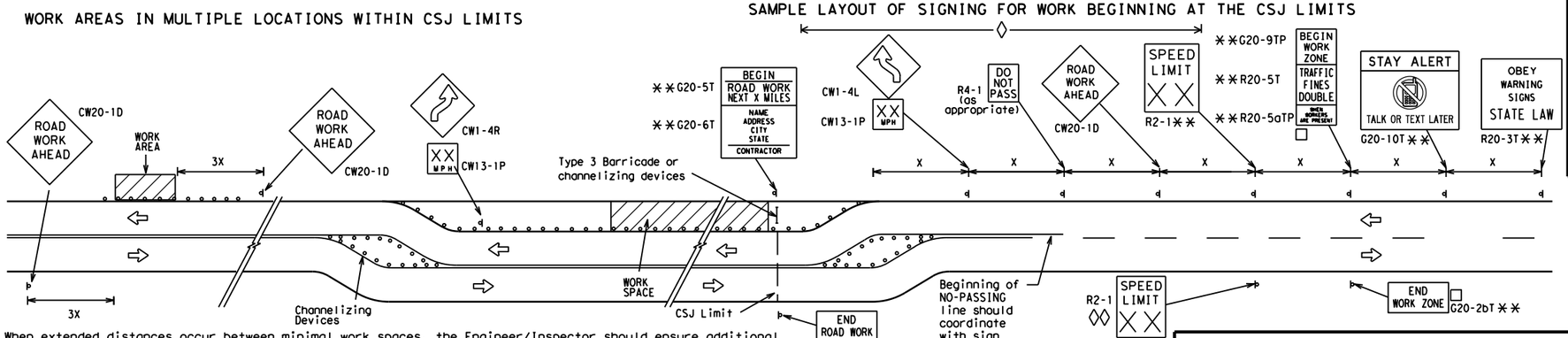
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

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.

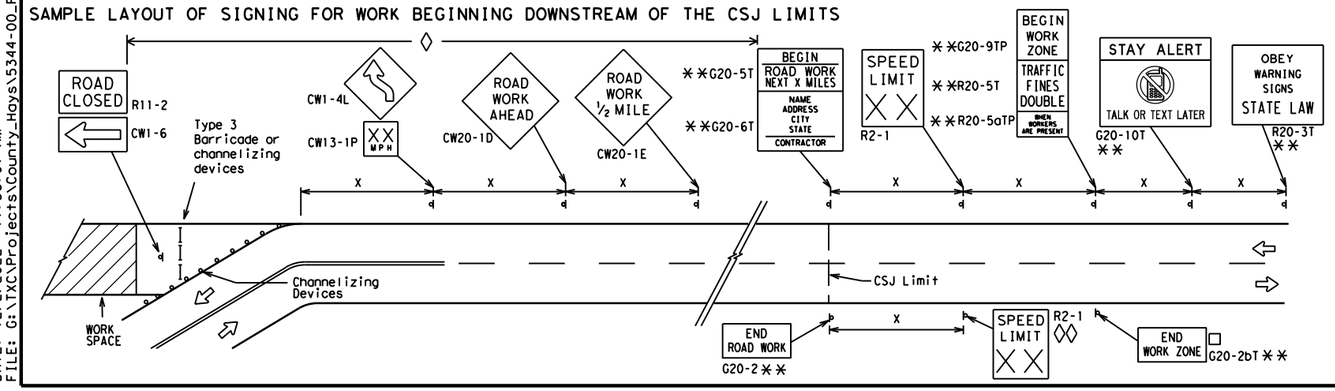
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

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

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

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

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

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

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

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	0016	16	028	RM 967
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUS	HAYS		41

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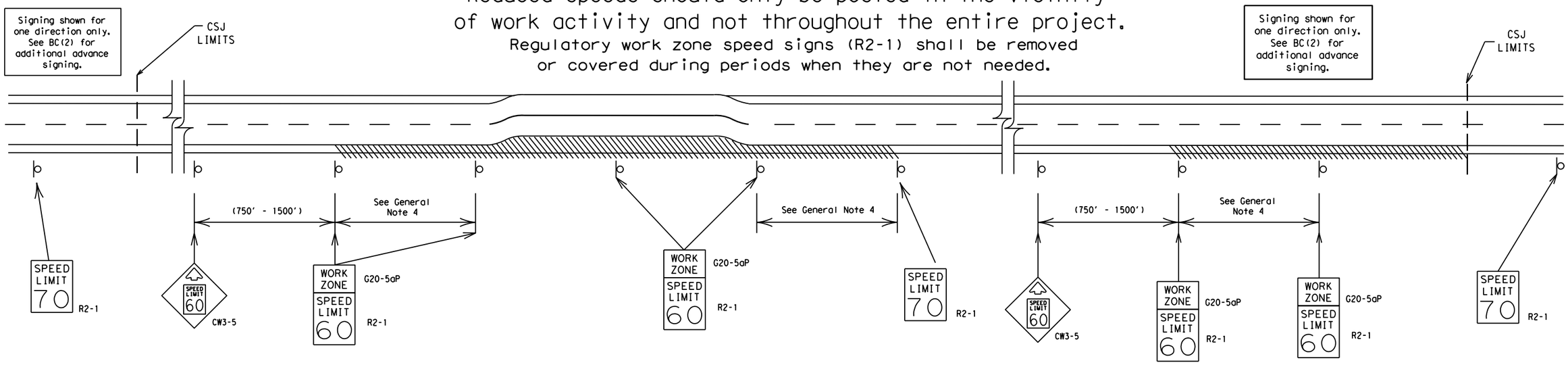
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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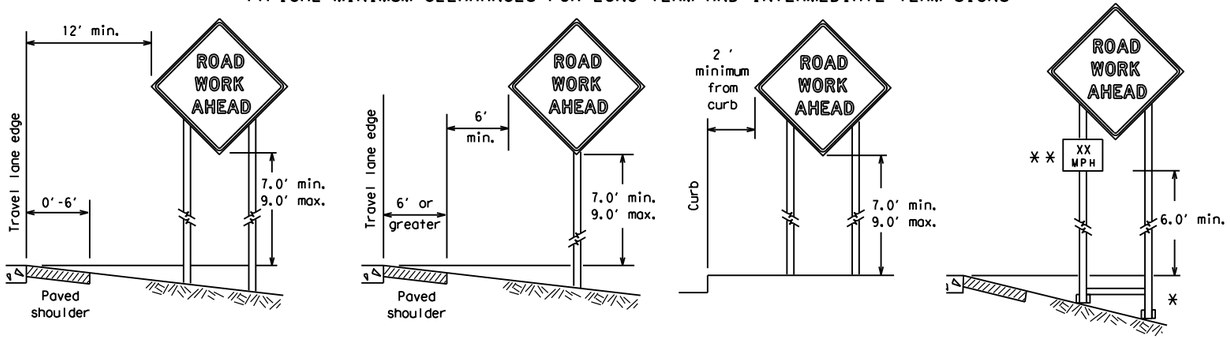
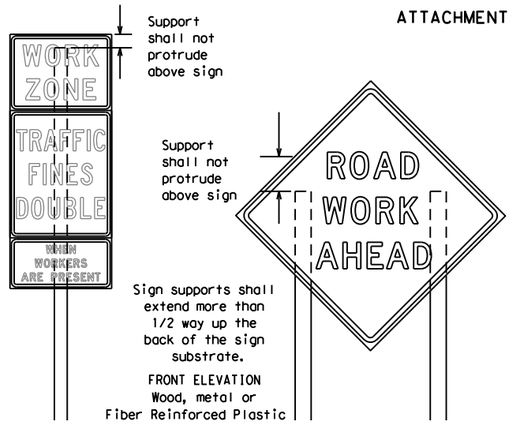
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

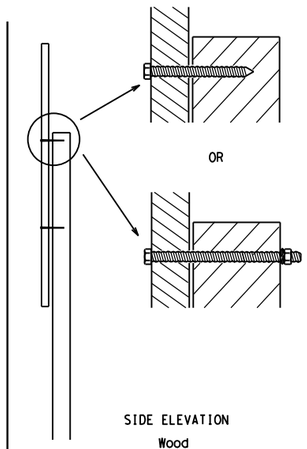


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





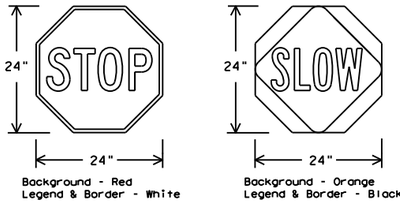
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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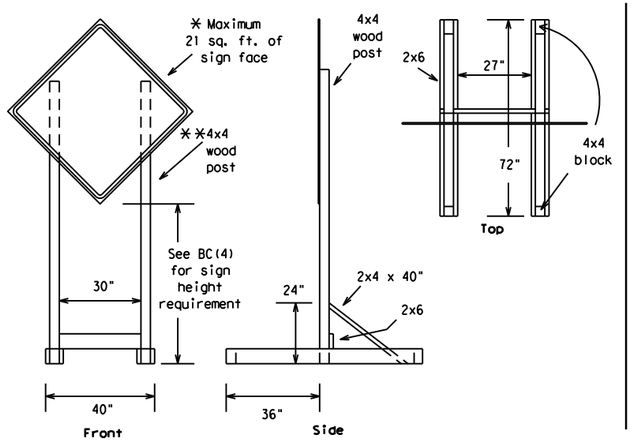
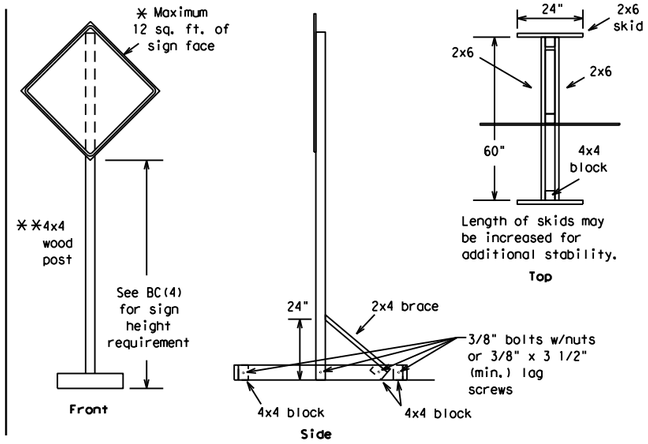
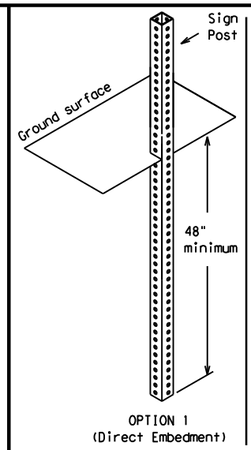
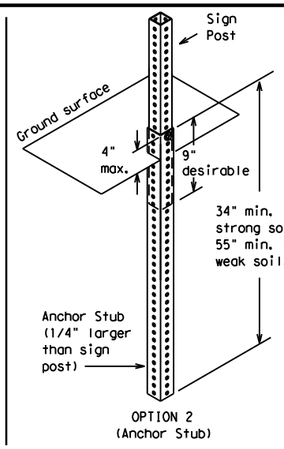


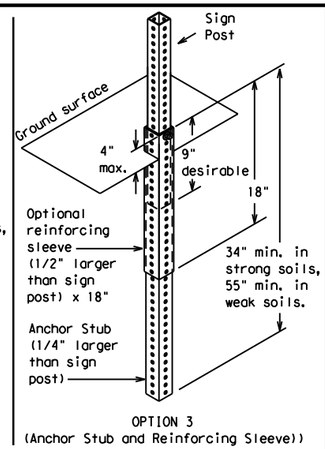


SKID MOUNTED WOOD SIGN SUPPORTS

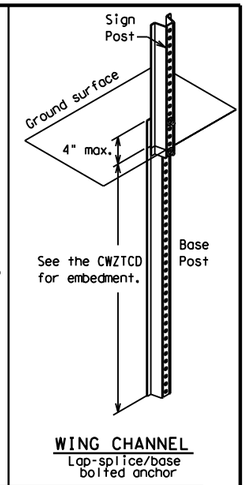
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







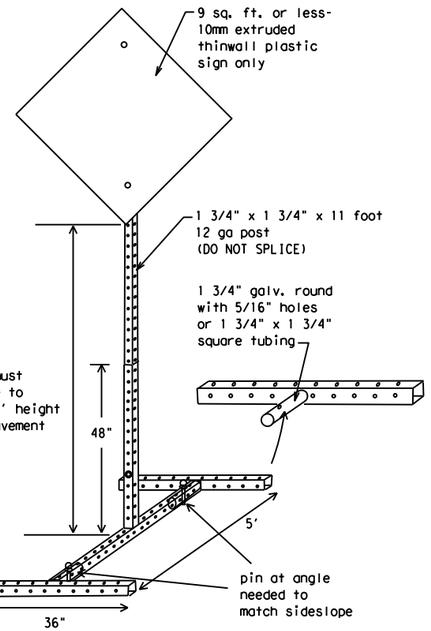
PERFORATED SQUARE METAL TUBING

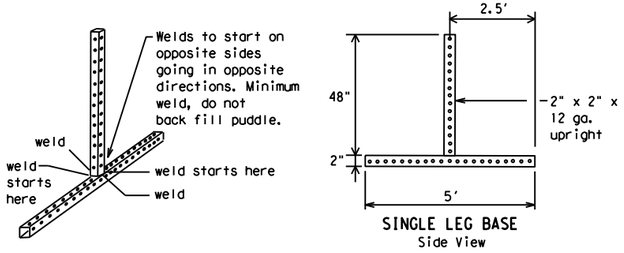


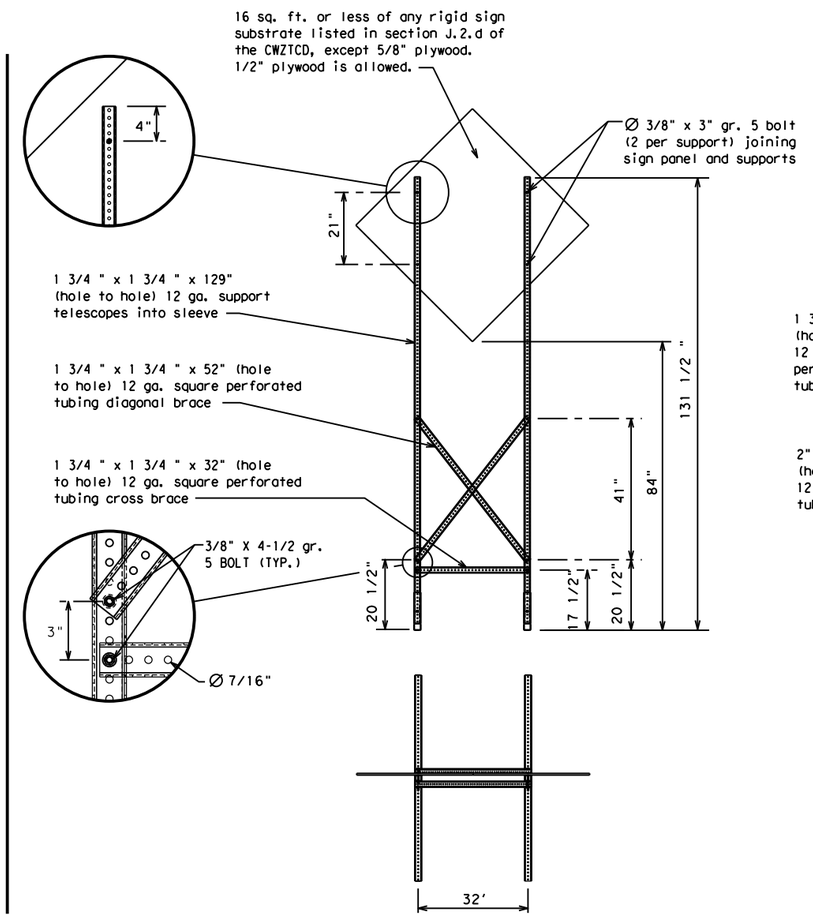
WING CHANNEL
Lap-splice/base bolted anchor

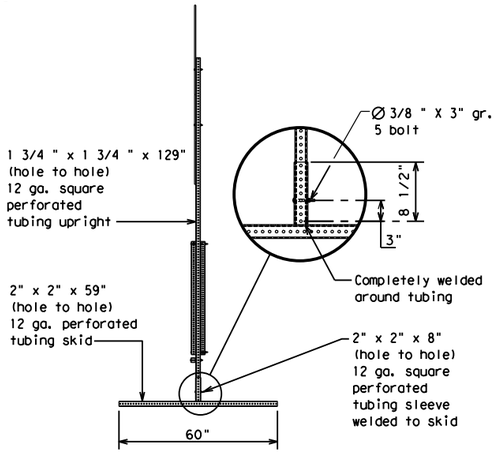
GROUND MOUNTED SIGN SUPPORTS

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.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* 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		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

* 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)

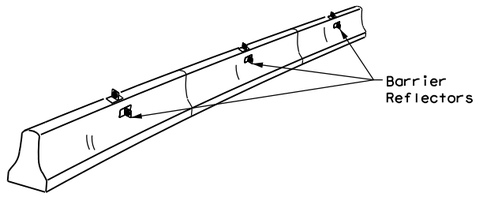
BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUS	HAYS		45

100

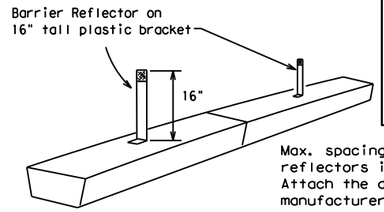
DATE: 12/2/2022 11:56:03 AM
FILE: G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\02-TCP\Srdsbc-21.dgn

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.



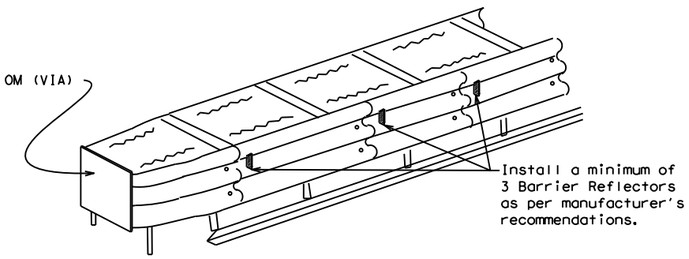
CONCRETE TRAFFIC BARRIER (CTB)

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)



DELINEATION OF END TREATMENTS

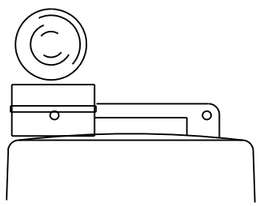
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

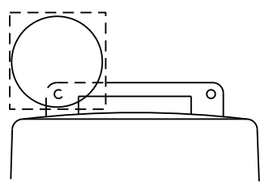
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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

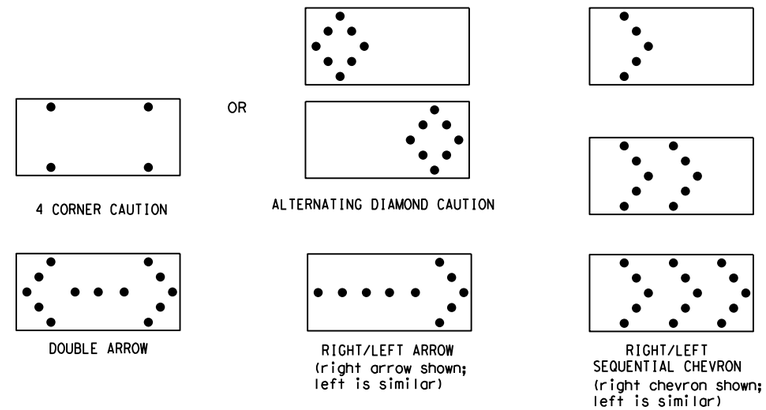
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

Texas Department of Transportation

Traffic Safety Division Standard

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	0016	16	028	RM 967
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUS	HAYS		46

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

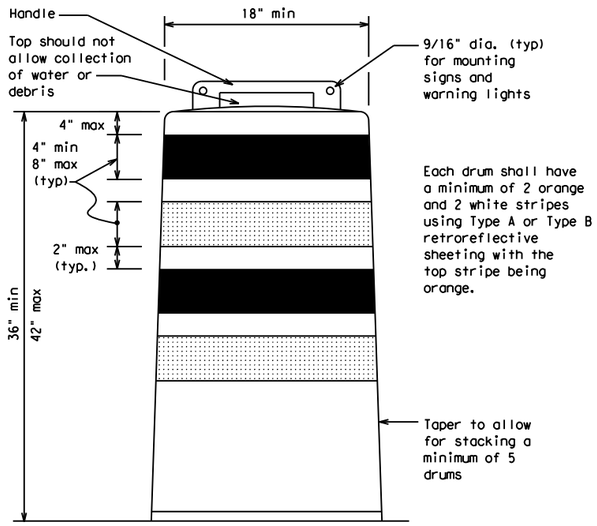
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

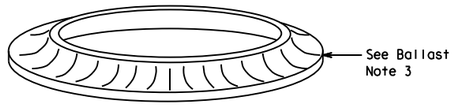
RETROREFLECTIVE SHEETING

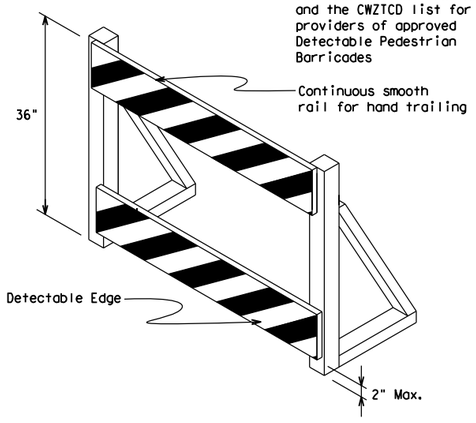
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

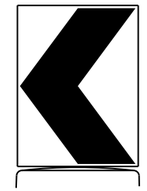




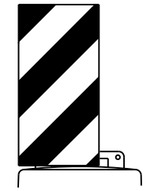


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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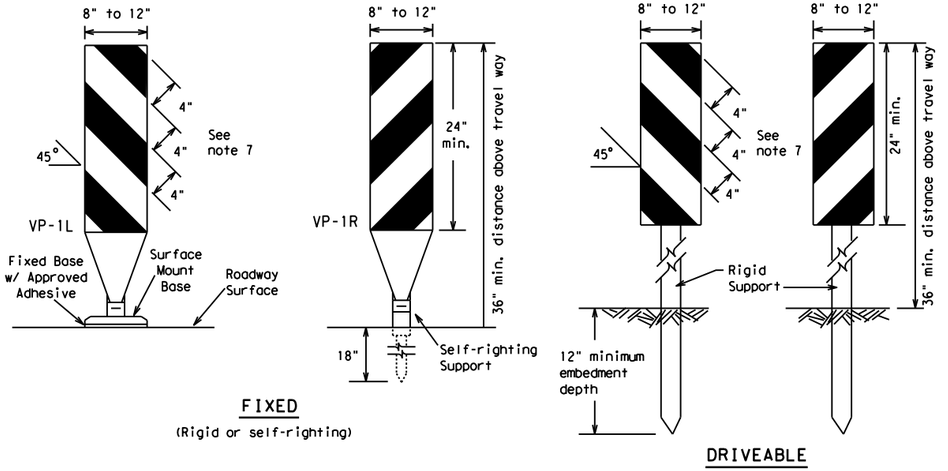
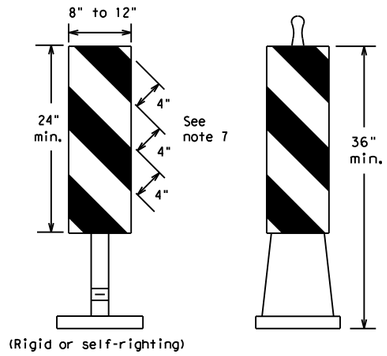


FIXED

(Rigid or self-righting)

DRIVEABLE

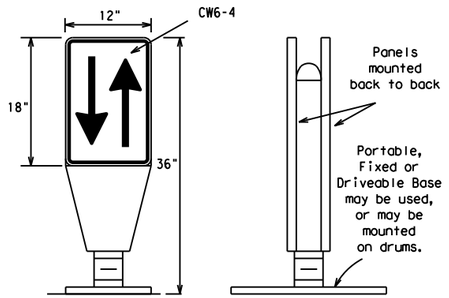


(Rigid or self-righting)

PORTABLE

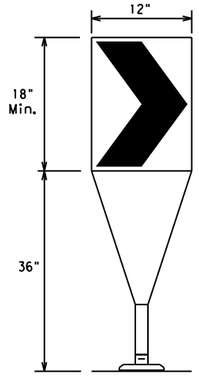
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



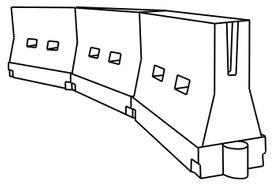
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

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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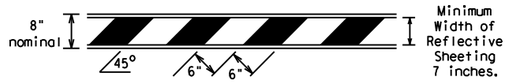
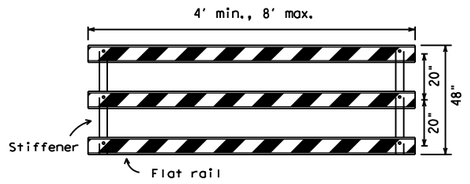
TYPE 3 BARRICADES

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.



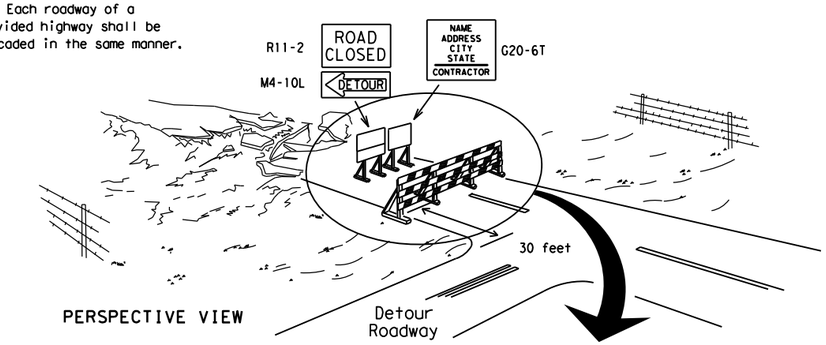
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

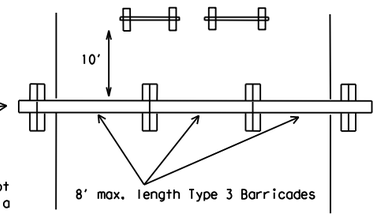
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

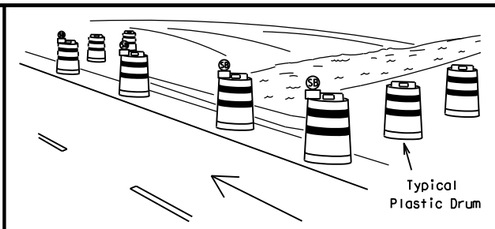
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

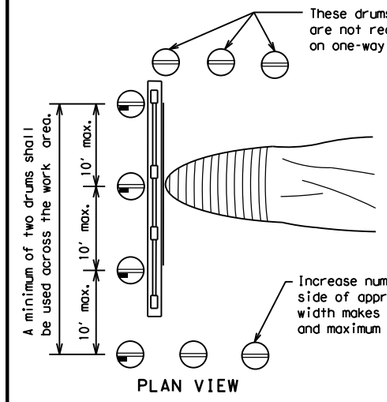
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

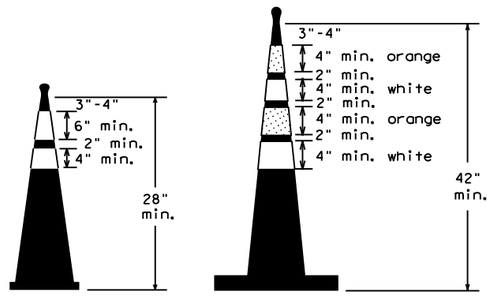
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



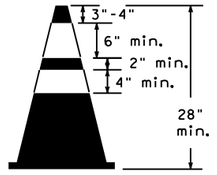
PLAN VIEW

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

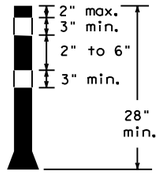
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

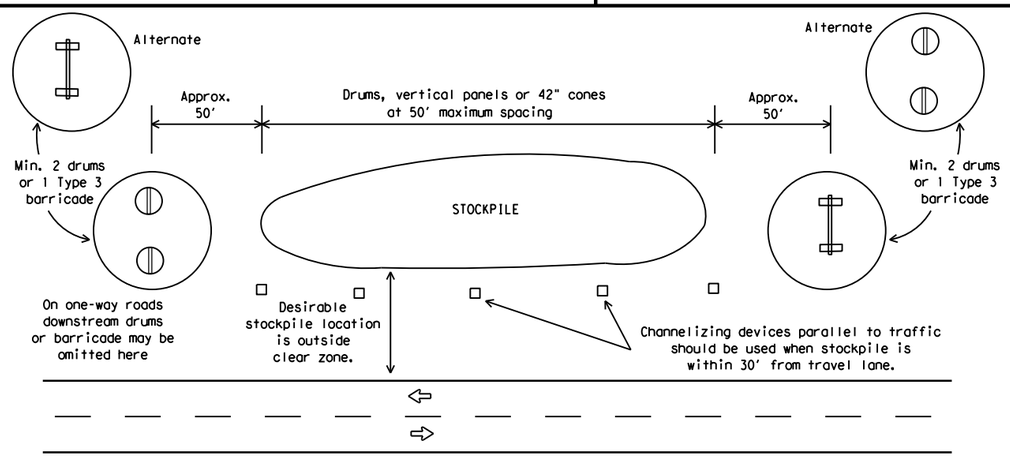


Tubular Marker

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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Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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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.

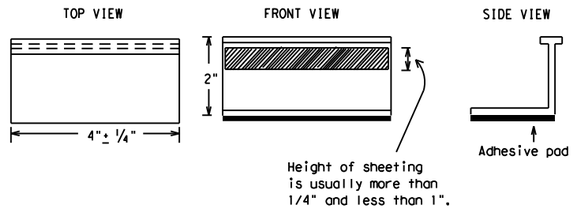
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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).

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BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		50

DATE: 12/2/2022 11:56:05 AM
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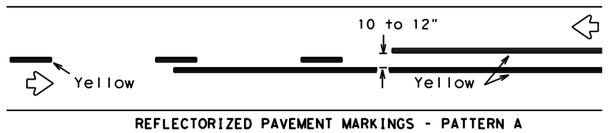
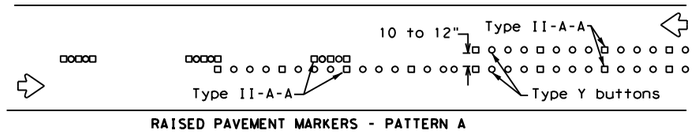
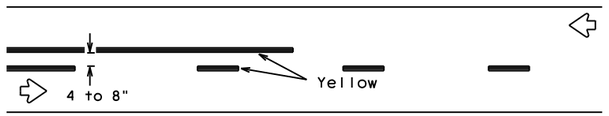
PAVEMENT MARKING PATTERNS



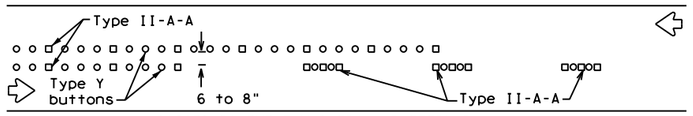
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



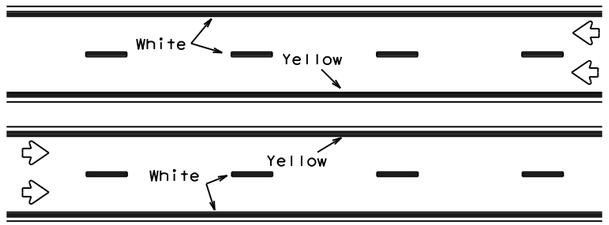
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



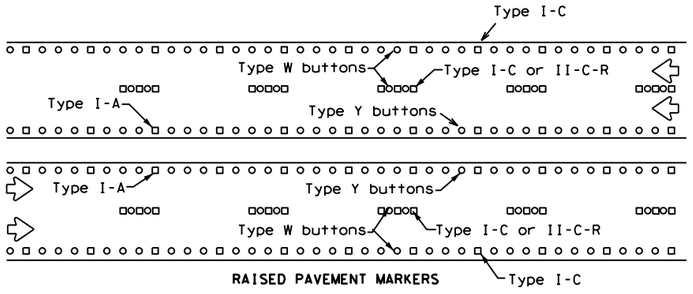
RAISED PAVEMENT MARKERS - PATTERN B

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

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



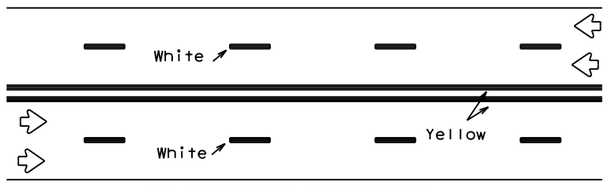
REFLECTORIZED PAVEMENT MARKINGS



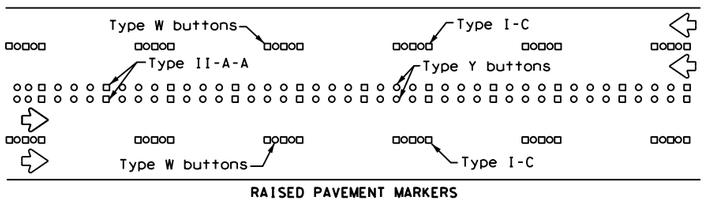
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



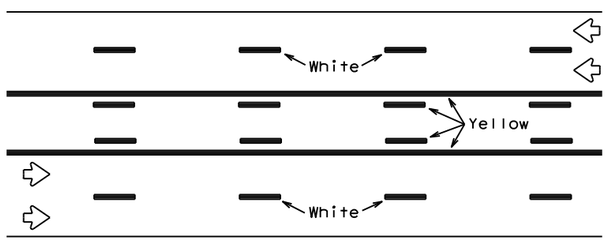
REFLECTORIZED PAVEMENT MARKINGS



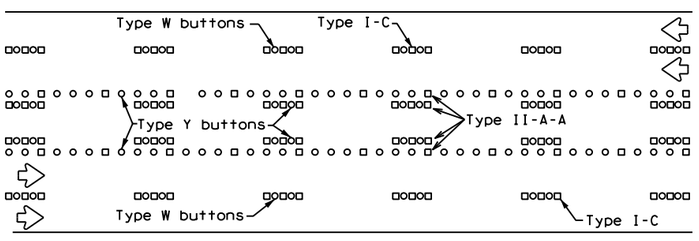
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

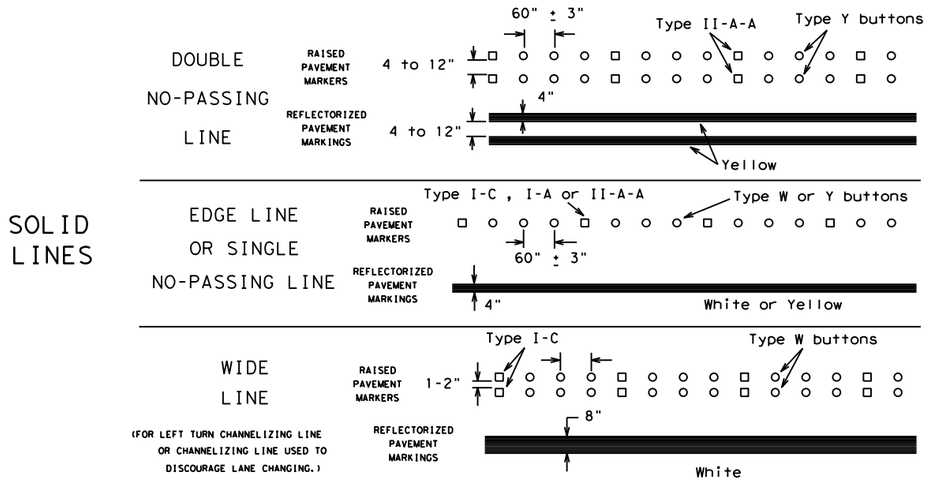


RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

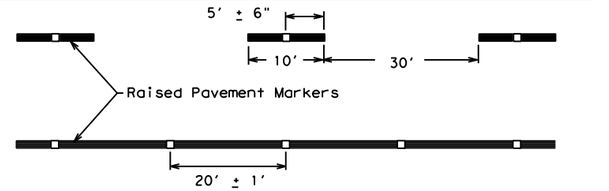
TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



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	0016	16	028	RM 967
1-97 9-07 5-21	DIST	COUNTY		SHEET NO.
2-98 7-13	AUS	HAYS		51
11-02 8-14				

DATE: 12/2/2022 11:56:06 AM
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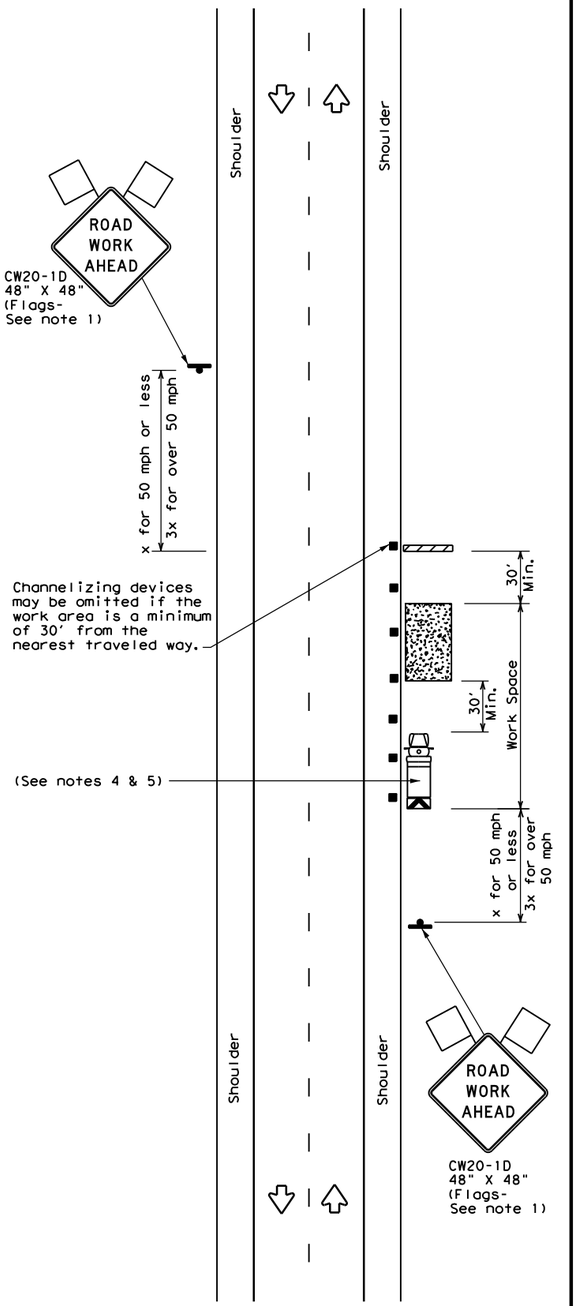
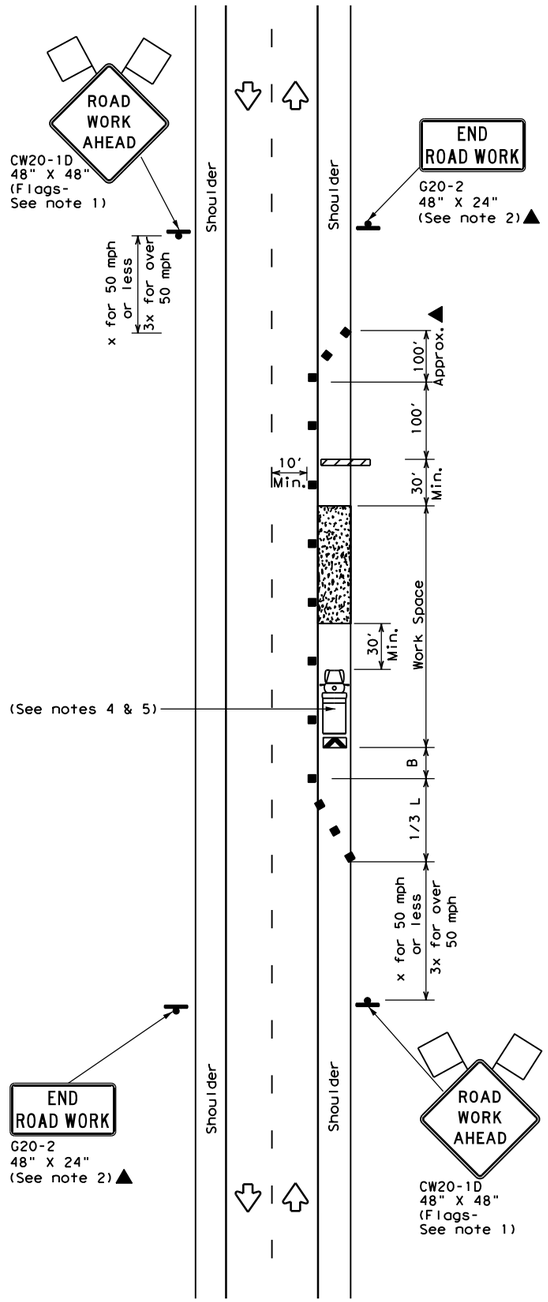


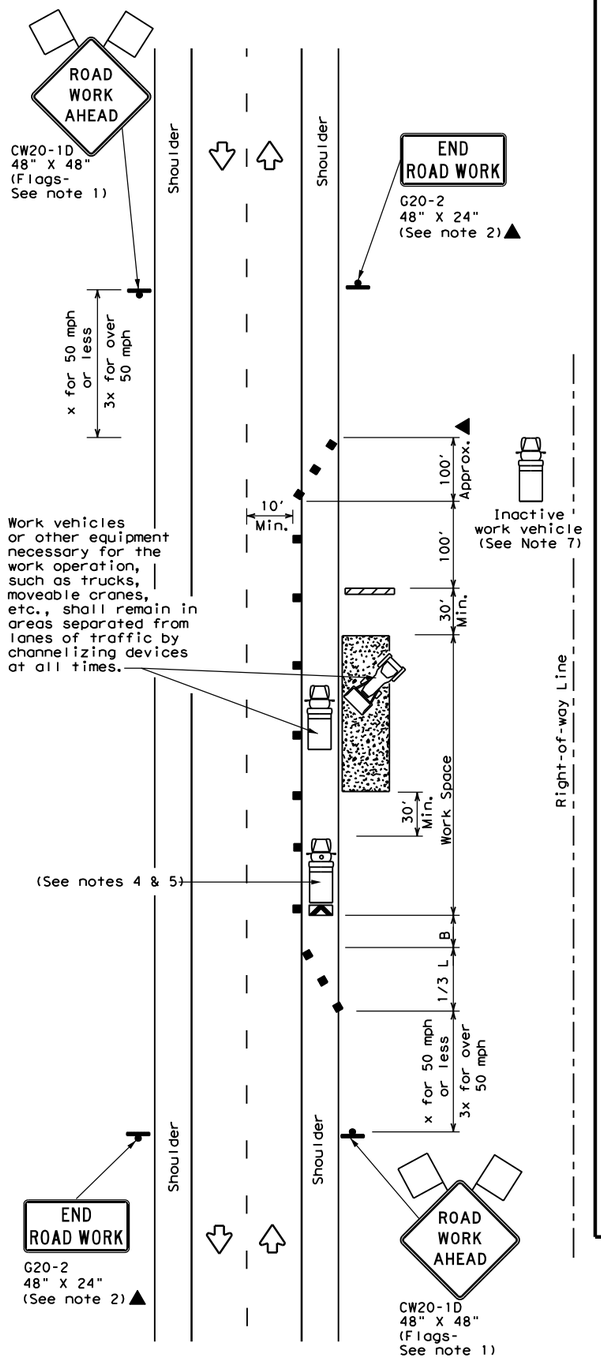
TCP (2-1a)

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

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	AUS	HAYS		52
1-97 2-18				

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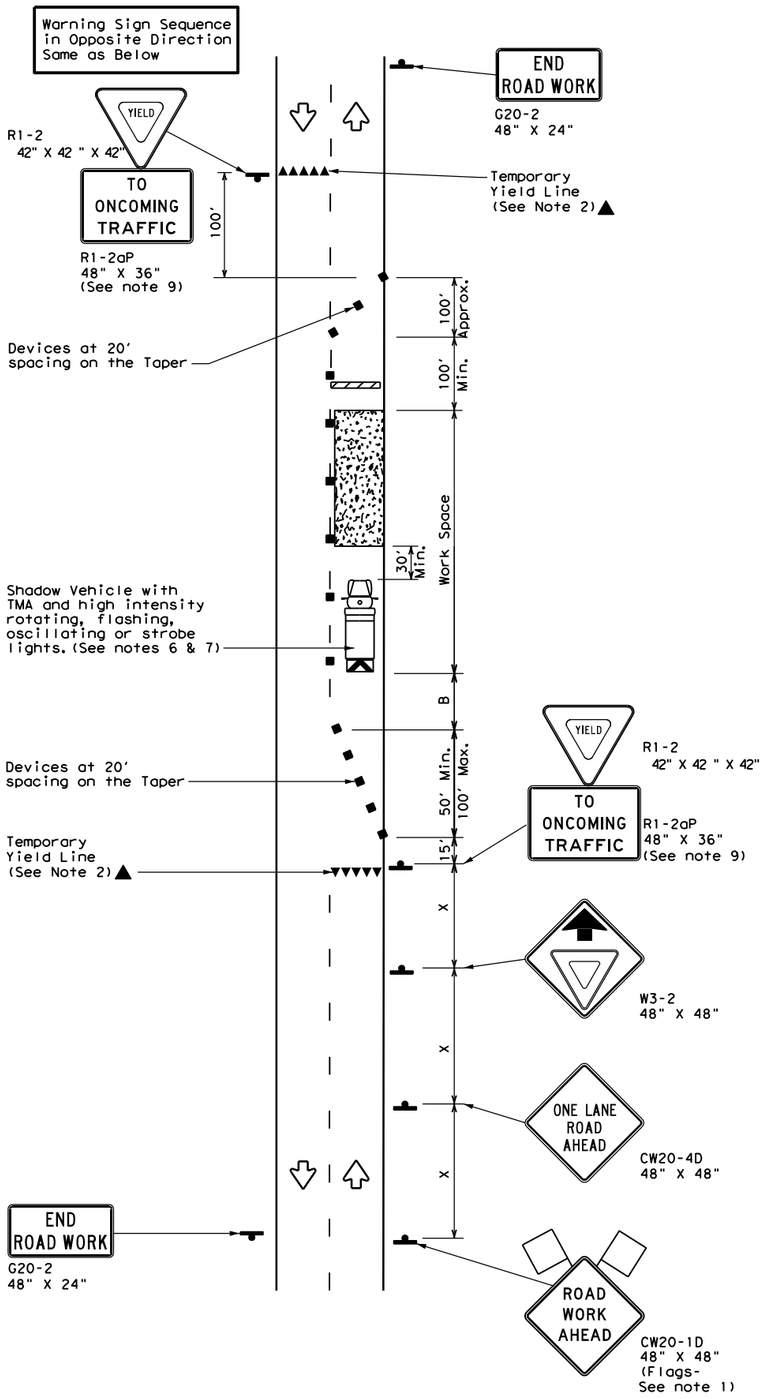
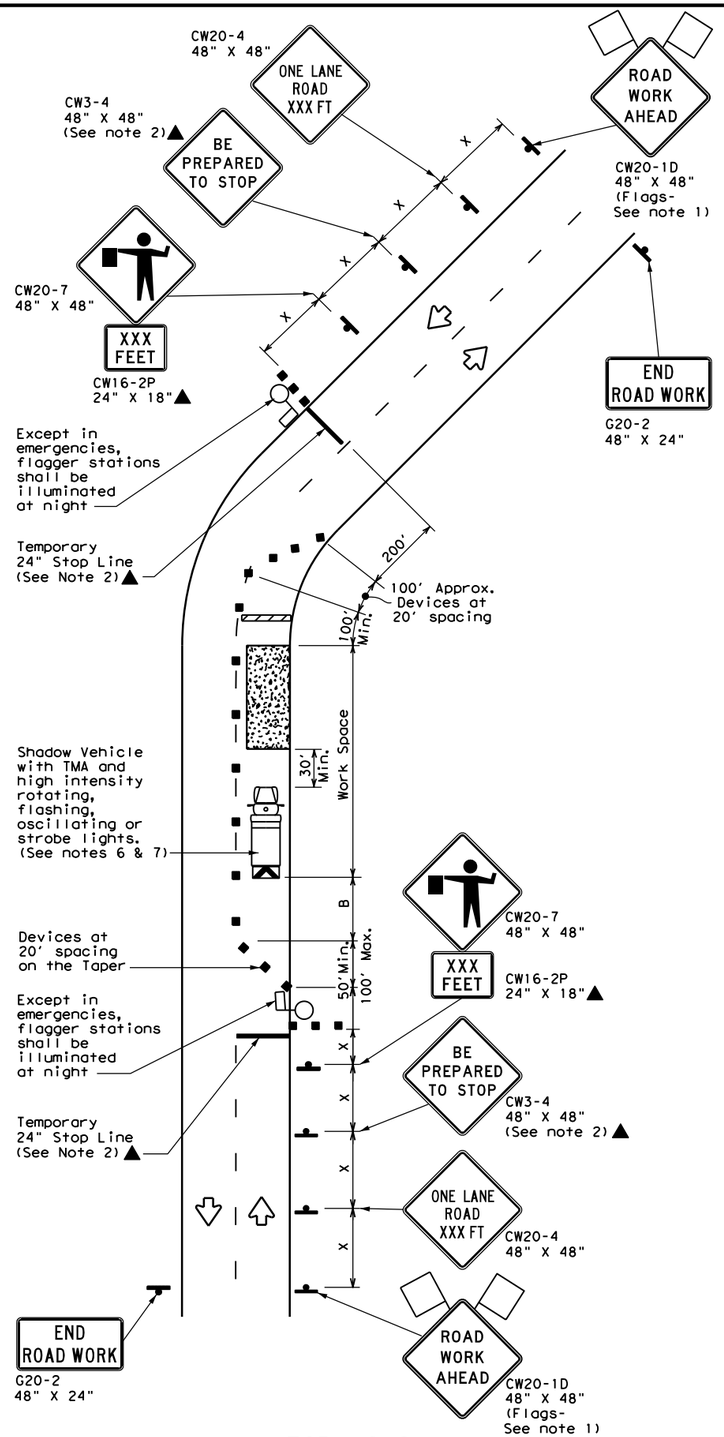


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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

LEGEND			
	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	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 1-97 2-12 4-98 2-18	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		53

DATE: 12/2/2022 11:56:07 AM
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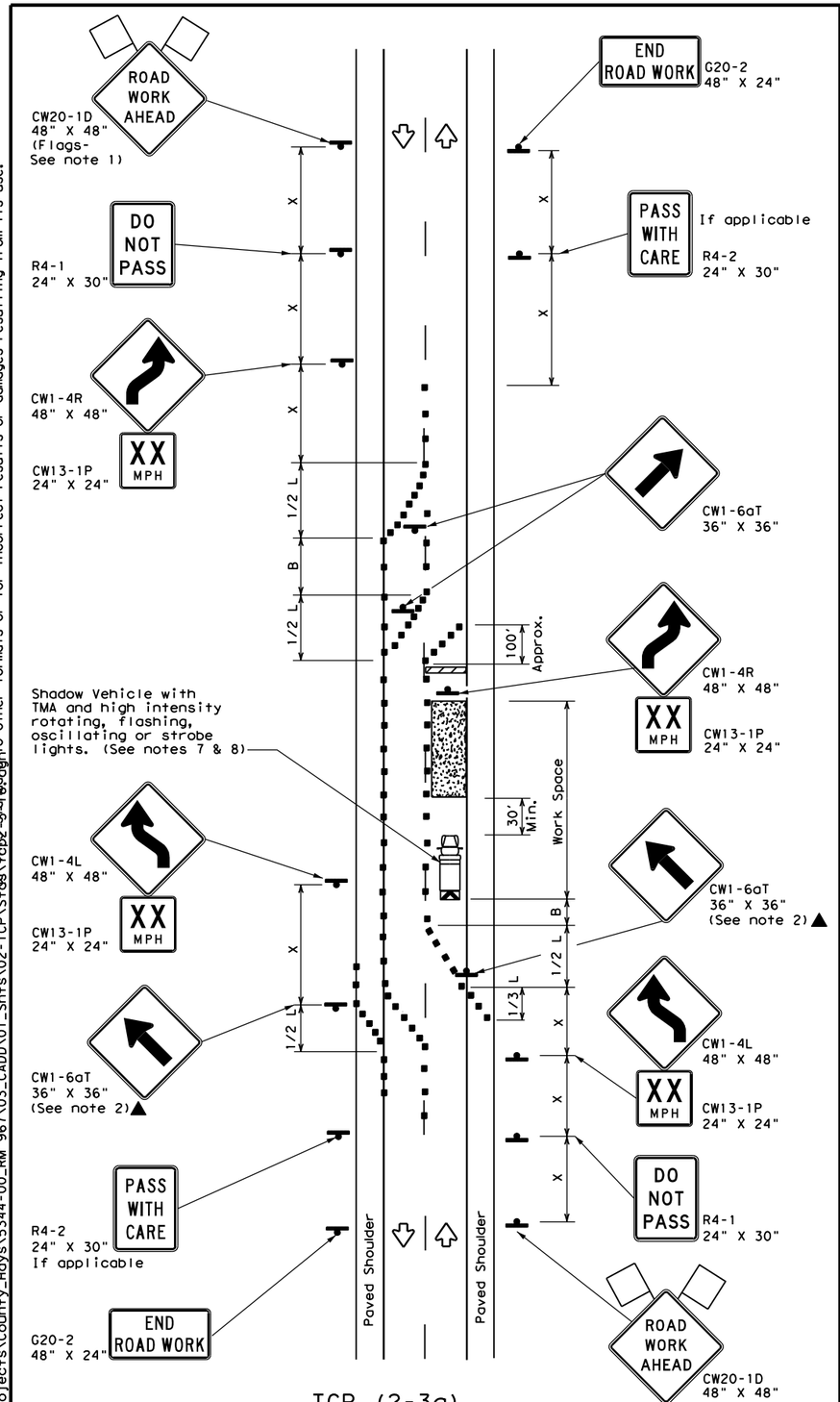
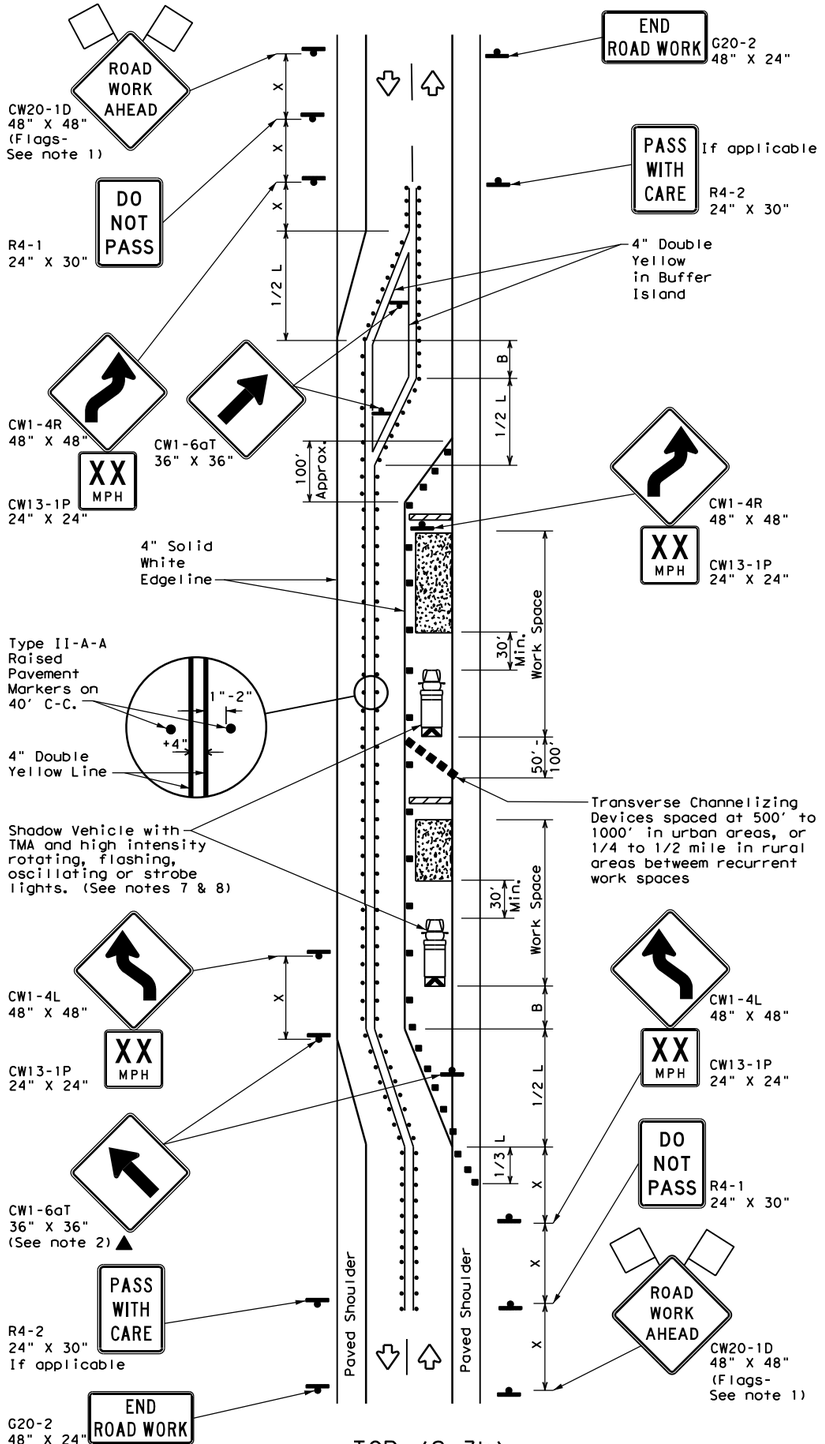


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

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 Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	AUS	HAYS		54
4-98 2-18				

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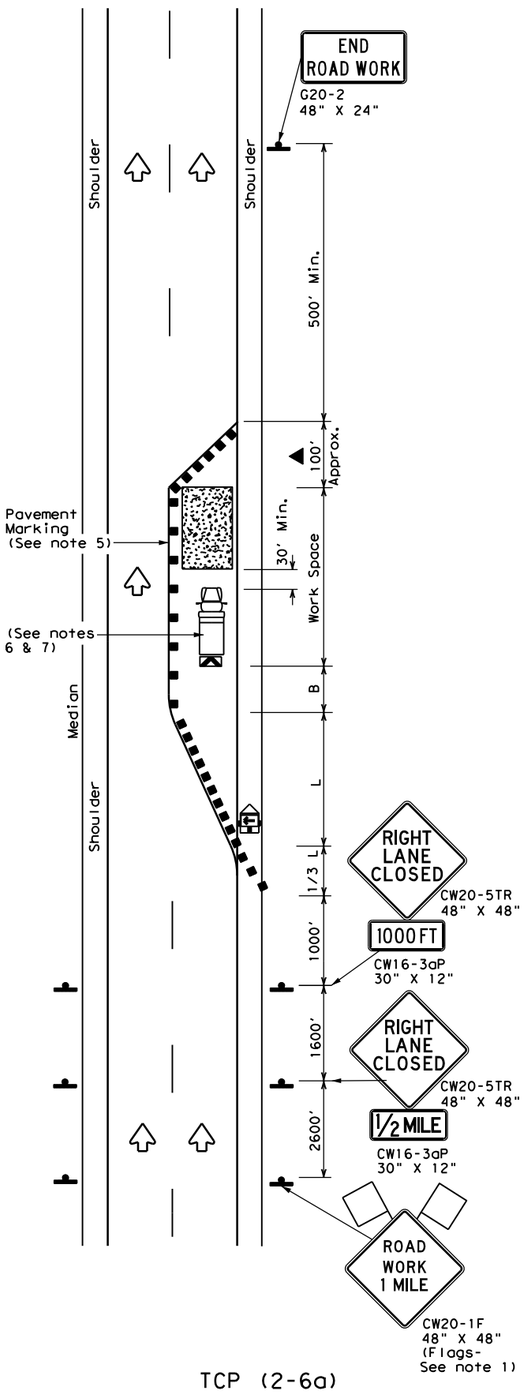
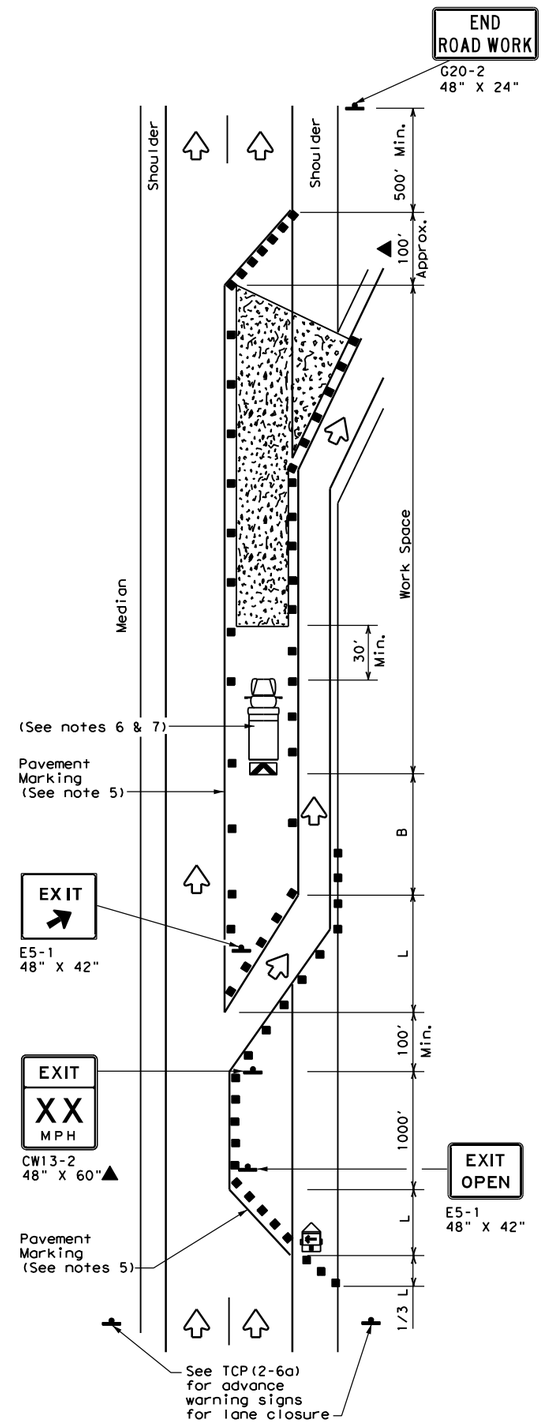


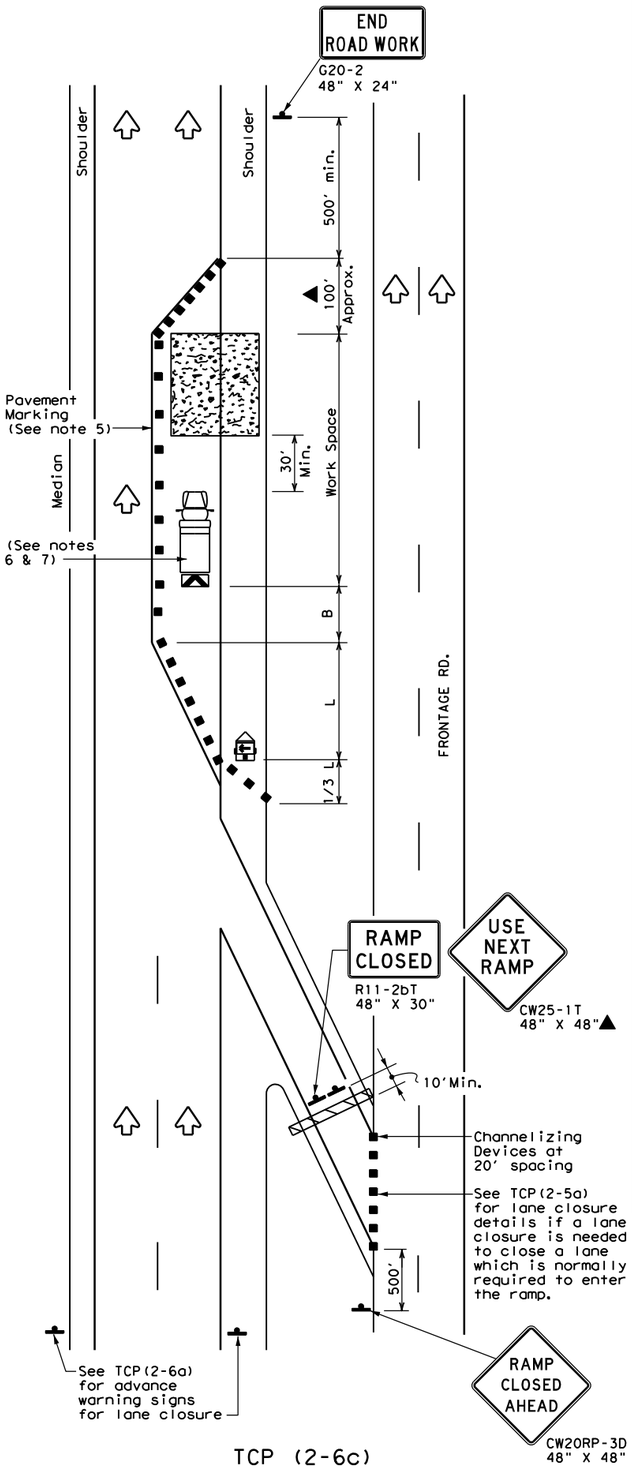
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing,oscillating or strobe lights. 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.
7. 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.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0016	16	028	RM 967
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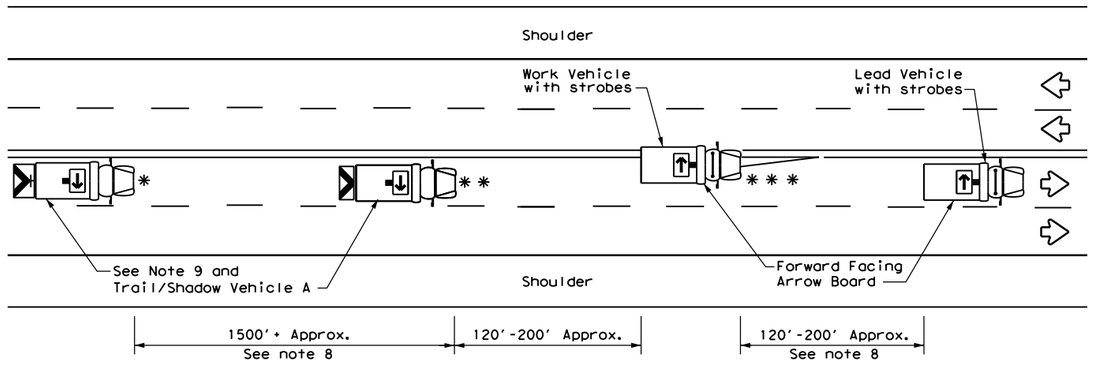
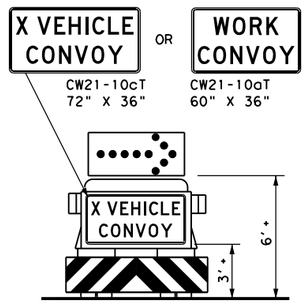


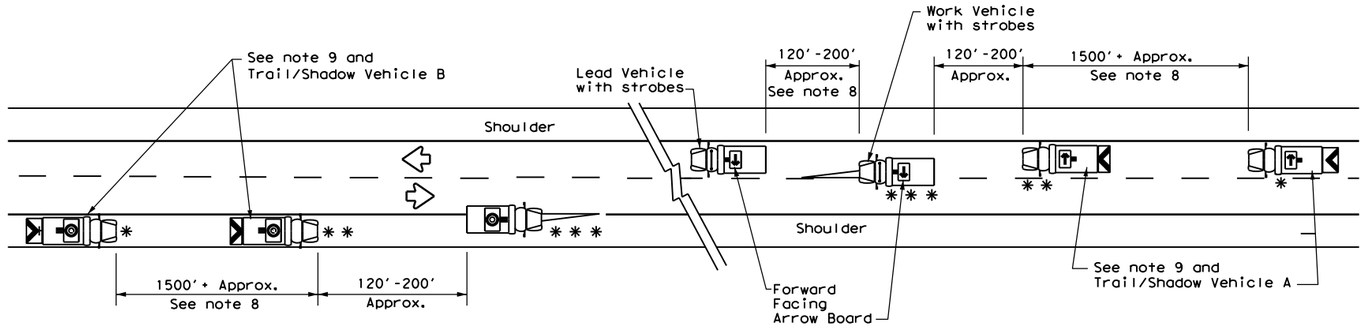
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

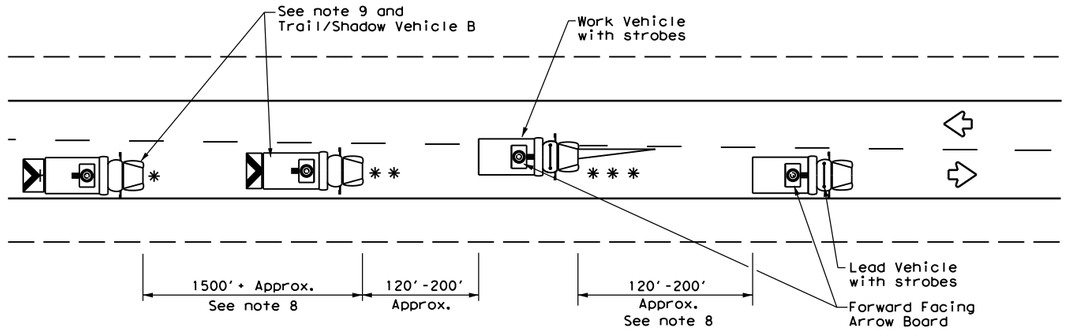
with RIGHT Directional display Flashing Arrow Board



WORK ON SHOULDER — WORK ON TRAVEL LANE

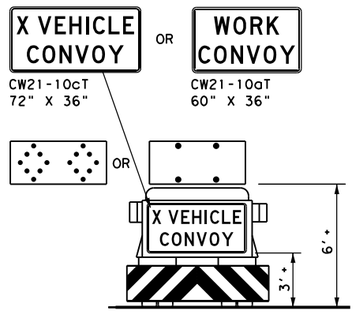
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

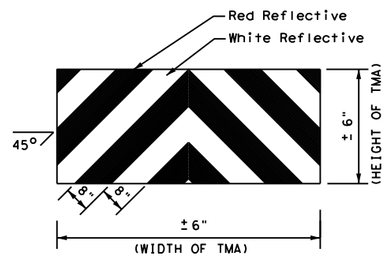
with Flashing Arrow Board in CAUTION display

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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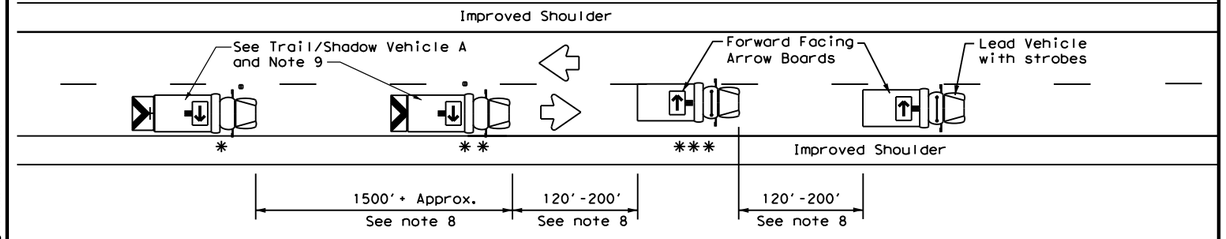
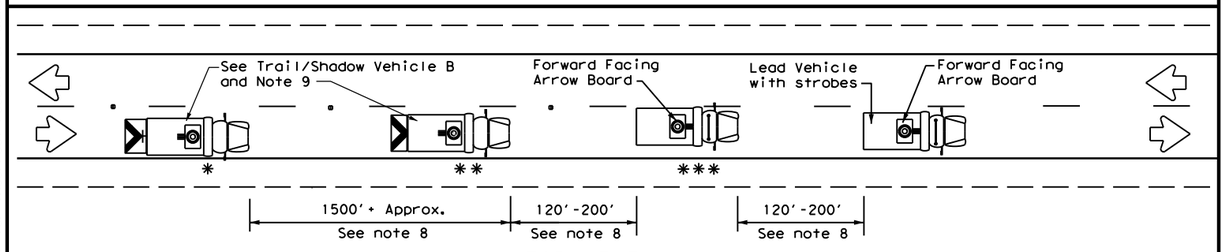


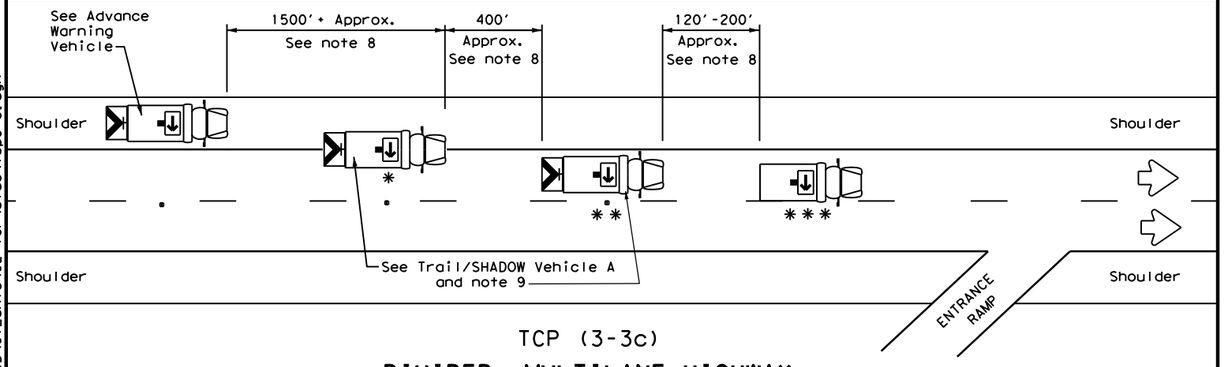
TCP (3-3a)

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



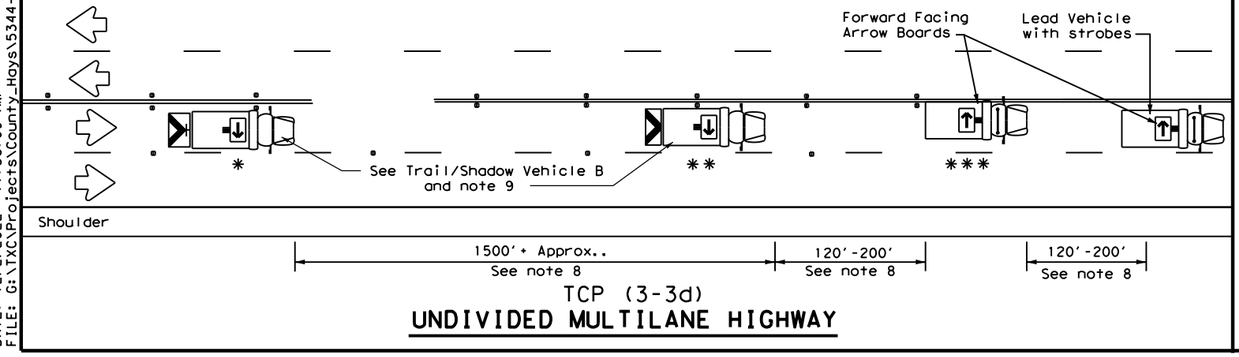
TCP (3-3b)

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



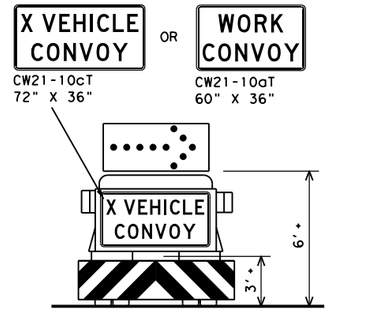
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



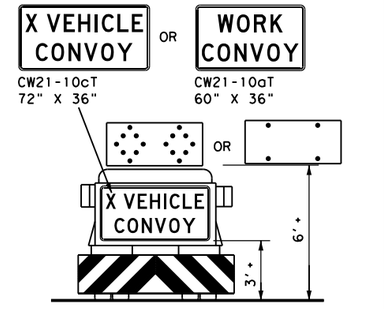
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



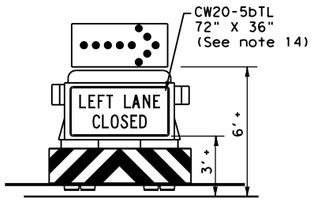
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

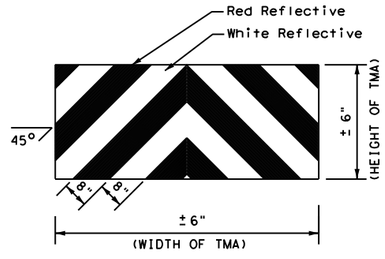


TRAIL/SHADOW VEHICLE B

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

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©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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8-95 7-13	AUS	HAYS		57
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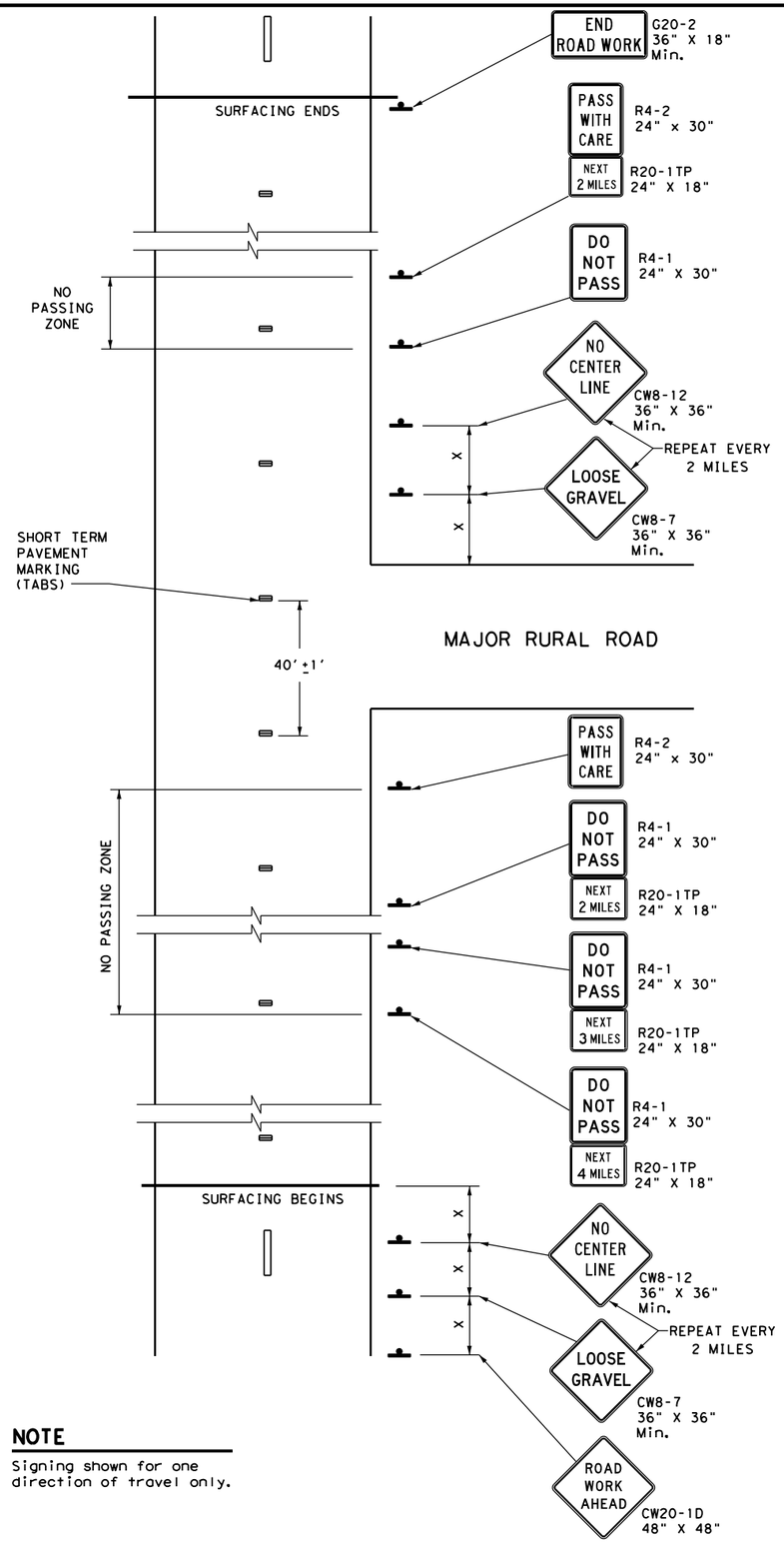
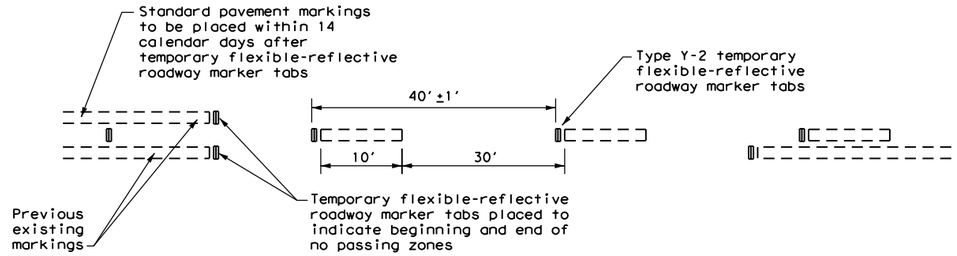


NOTE

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

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
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1-97 7-13	AUS	HAYS		58

210

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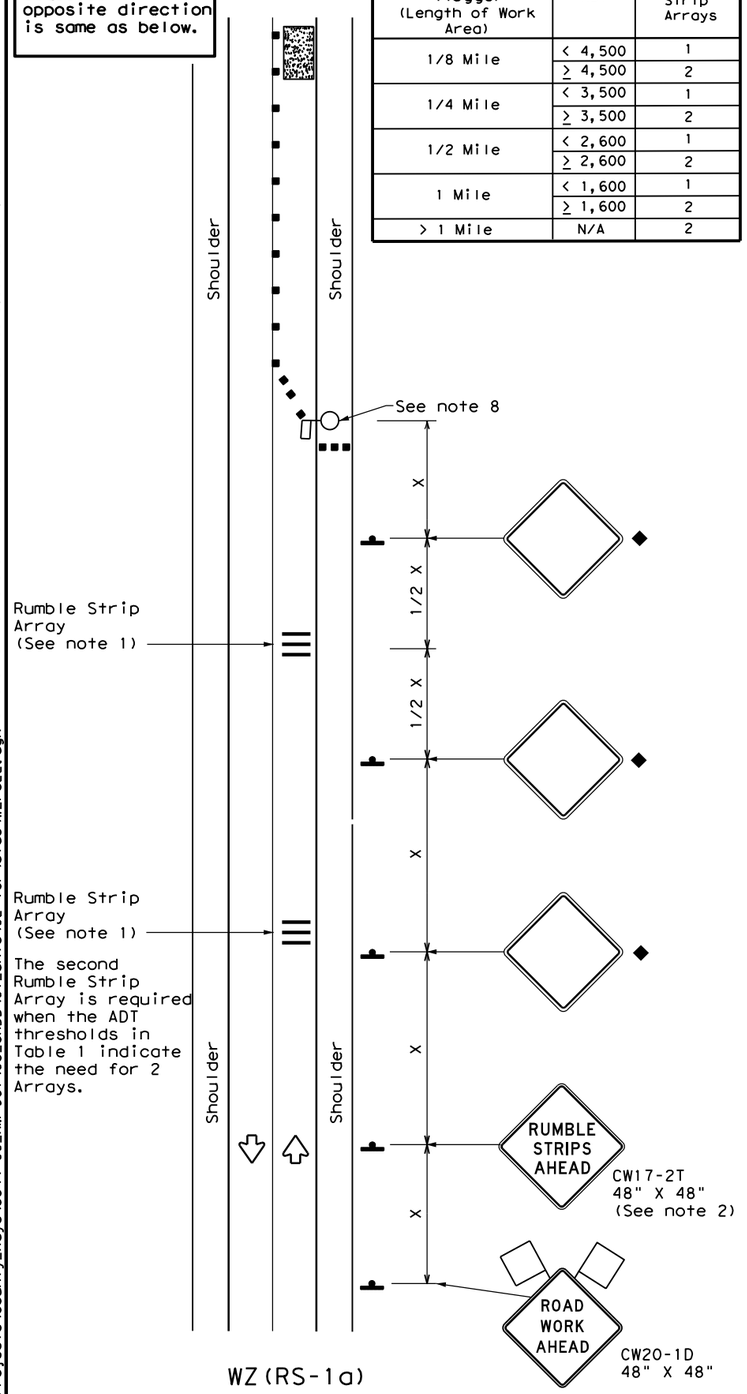
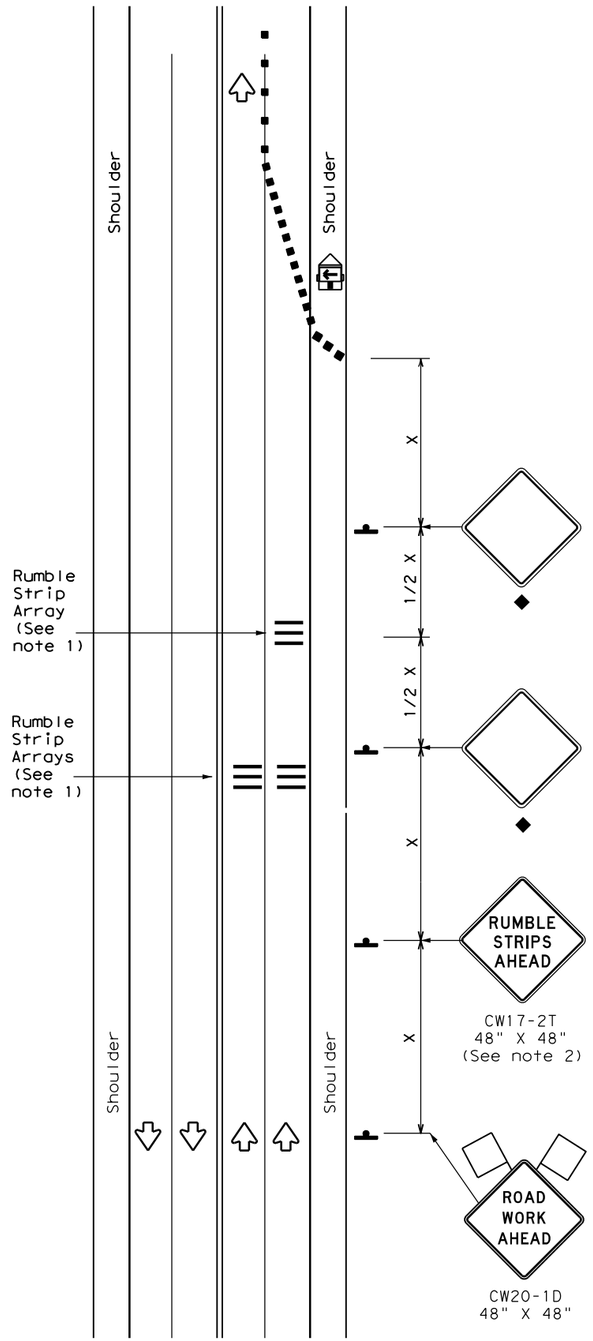
Warning sign and rumble strip sequence in opposite direction is same as below.

TABLE 1		
Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Remove Temporary Rumble Strips before removing the advanced warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
9. Replace defective Temporary Rumble Strips as directed by the Engineer.
10. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel	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
	✓	✓		

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

TABLE 2	
Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	* 35' +

Texas Department of Transportation

Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

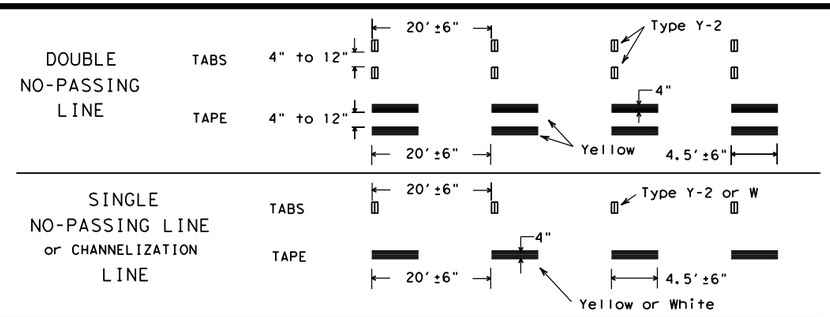
WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		59

117

DATE: 12/2/2022 11:56:11 AM
FILE: G:\TXC\Projects\County_Hays\5344-00-RM 967\03_CADD\01_Snts\02-TCP\Standards\wzstpm-13.dgn

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



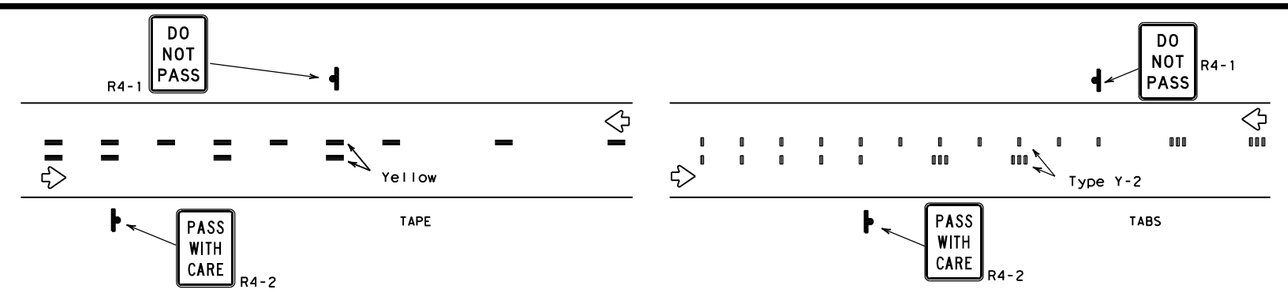
NOTES:

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

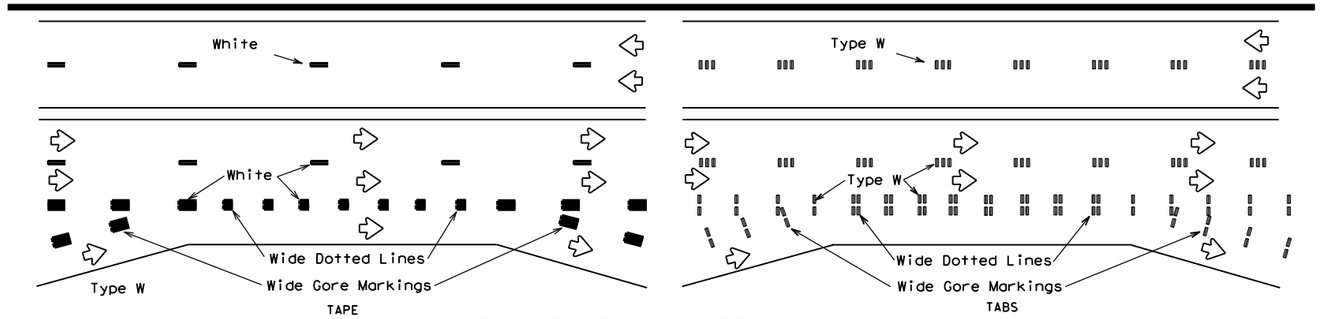
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

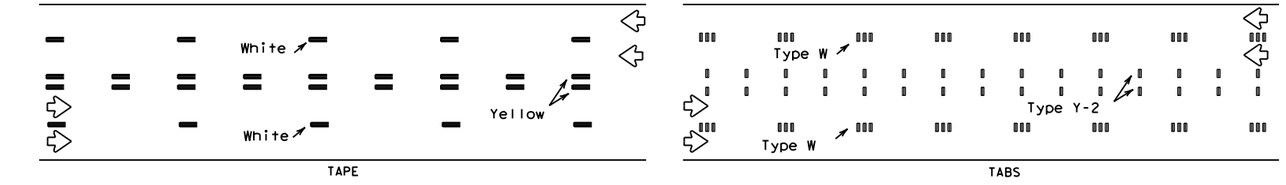
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



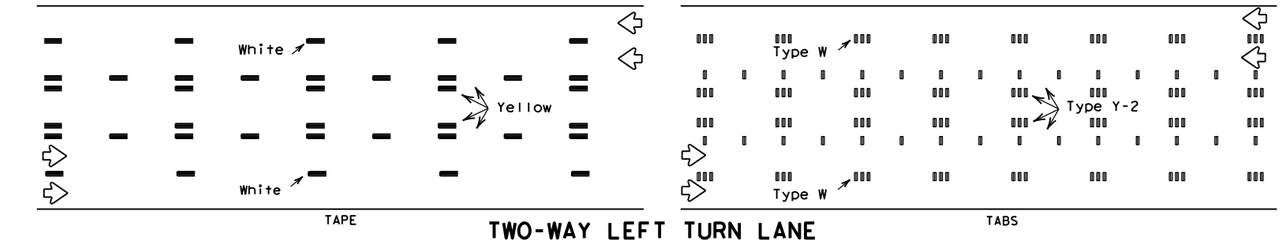
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



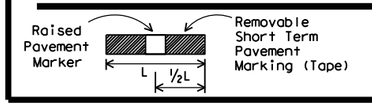
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0016	16	028	RM 967
1-97		DIST	COUNTY		SHEET NO.
3-03		AUS	HAYS		60
7-13					

111

DATE: 12/2/2022 11:56:12 AM
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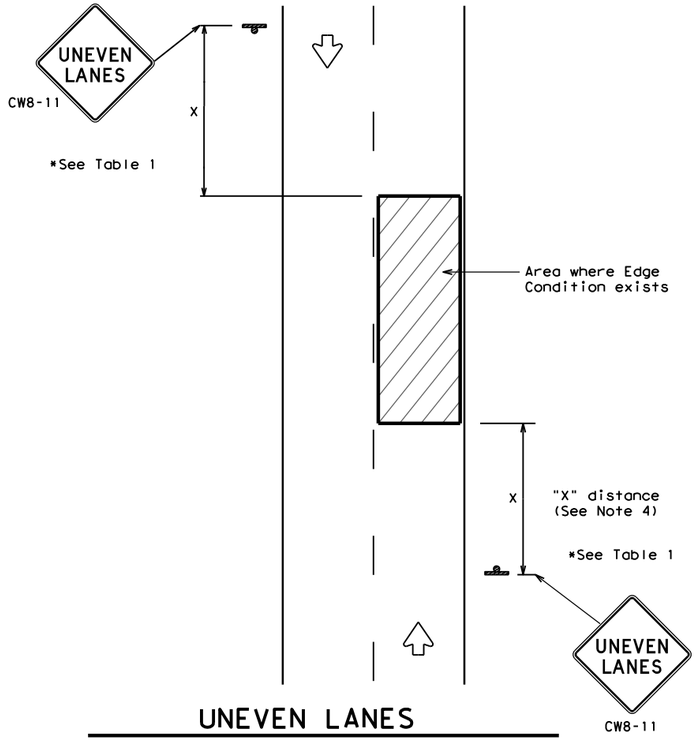
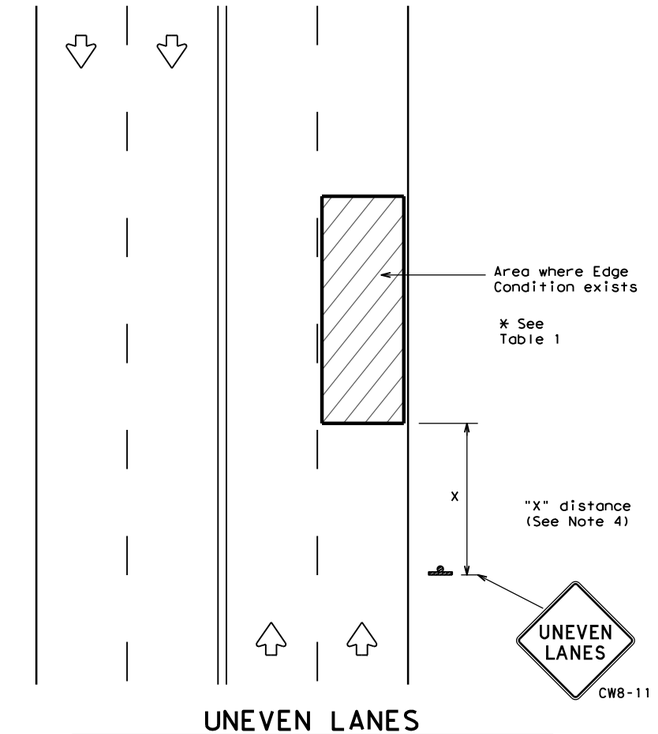
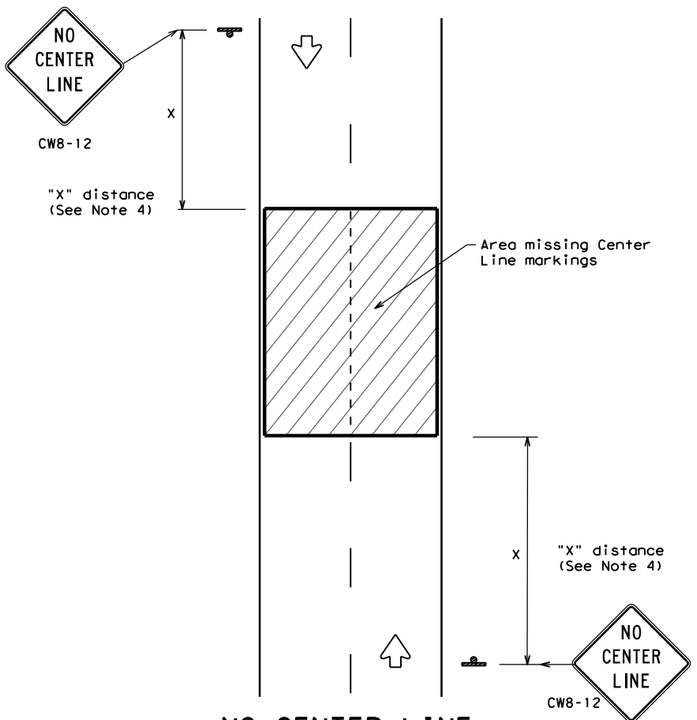


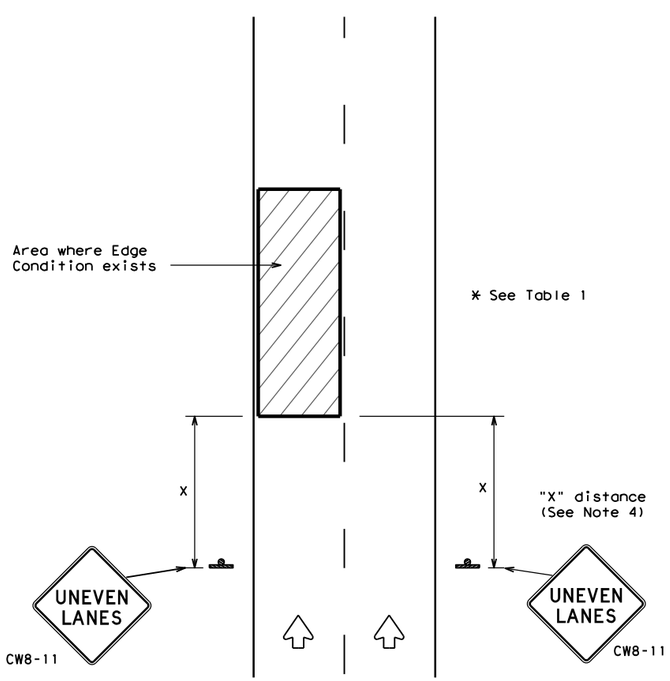
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

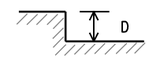
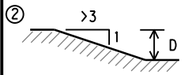
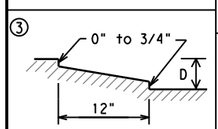
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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	0016	16	028	RM 967
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	AUS	HAYS		61

RM 967 HORIZONTAL ALIGNMENT DATA

* 1 DESCRIBE CHAIN RM967

Chain RM967 contains:
E001 CUR RM9671 CUR RM9672 CUR RM9673 CUR RM9674 E002 E003 E004 E005 E006 CUR - RM9675 CUR RM9676 E007 CUR RM9677 CUR RM9678 E008 E009 CUR RM9679 E010

Beginning chain RM967 description

Point E001 X 2,334,033.07 Y 13,942,559.50 Sta 106+39.34

Course from E001 to PC RM9671 S 24° 40′ 24.33" W Dist 204.96

Curve Data					
Curve RM9671					
P.I. Station	109+12.23	X	2,333,919.16	Y	13,942,311.53
Delta =	42° 59′ 05.68" (LT)				
Degree =	33° 12′ 56.25"				
Tangent =	67.92				
Length =	129.41				
Radius =	172.50				
External =	12.89				
Long Chord =	126.40				
Mid. Ord. =	11.99				
P.C. Station	108+44.30	X	2,333,947.51	Y	13,942,373.25
P.T. Station	109+73.72	X	2,333,940.50	Y	13,942,247.04
C.C.		X	2,334,104.26	Y	13,942,301.24
Back = S	24° 40′ 24.33" W				
Ahead = S	18° 18′ 41.35" E				
Chord Bear = S	3° 10′ 51.49" W				

Course from PT RM9671 to PC RM9672 S 18° 18′ 41.35" E Dist 92.61

Curve Data					
Curve RM9672					
P.I. Station	111+55.93	X	2,333,997.75	Y	13,942,074.06
Delta =	10° 46′ 33.09" (RT)				
Degree =	6° 01′ 52.08"				
Tangent =	89.60				
Length =	178.67				
Radius =	950.00				
External =	4.22				
Long Chord =	178.41				
Mid. Ord. =	4.20				
P.C. Station	110+66.33	X	2,333,969.60	Y	13,942,159.12
P.T. Station	112+45.00	X	2,334,009.50	Y	13,941,985.23
C.C.		X	2,333,067.70	Y	13,941,860.65
Back = S	18° 18′ 41.35" E				
Ahead = S	7° 32′ 08.26" E				
Chord Bear = S	12° 55′ 24.80" E				

Course from PT RM9672 to PC RM9673 S 7° 32′ 08.26" E Dist 1,156.23

Curve Data					
Curve RM9673					
P.I. Station	126+30.88	X	2,334,191.24	Y	13,940,611.33
Delta =	10° 29′ 47.63" (LT)				
Degree =	2° 17′ 30.59"				
Tangent =	229.64				
Length =	458.00				
Radius =	2,500.00				
External =	10.52				
Long Chord =	457.36				
Mid. Ord. =	10.48				
P.C. Station	124+01.23	X	2,334,161.13	Y	13,940,838.99
P.T. Station	128+59.23	X	2,334,262.33	Y	13,940,392.96
C.C.		X	2,336,639.54	Y	13,941,166.84
Back = S	7° 32′ 08.26" E				
Ahead = S	18° 01′ 55.88" E				
Chord Bear = S	12° 47′ 02.07" E				

Curve Data					
Curve RM9674					
P.I. Station	130+53.20	X	2,334,322.37	Y	13,940,208.52
Delta =	15° 46′ 34.34" (RT)				
Degree =	4° 05′ 33.20"				
Tangent =	193.97				
Length =	385.49				
Radius =	1,400.00				
External =	13.37				
Long Chord =	384.27				
Mid. Ord. =	13.25				
P.C. Station	128+59.23	X	2,334,262.33	Y	13,940,392.96
P.T. Station	132+44.72	X	2,334,330.01	Y	13,940,014.70
C.C.		X	2,332,931.09	Y	13,939,959.59
Back = S	18° 01′ 55.88" E				
Ahead = S	2° 15′ 21.55" E				
Chord Bear = S	10° 08′ 38.72" E				

Course from PT RM9674 to E002 S 2° 15′ 21.55" E Dist 590.16

Point E002 X 2,334,353.24 Y 13,939,424.99 Sta 138+34.88

Course from E002 to E003 S 1° 58′ 59.49" E Dist 686.18

Point E003 X 2,334,376.99 Y 13,938,739.22 Sta 145+21.07

Course from E003 to E004 S 1° 29′ 14.04" E Dist 1,089.33

Point E004 X 2,334,405.26 Y 13,937,650.26 Sta 156+10.40

Course from E004 to E005 S 1° 35′ 54.67" E Dist 1,010.74

Point E005 X 2,334,433.46 Y 13,936,639.91 Sta 166+21.14

Course from E005 to E006 S 1° 06′ 41.02" E Dist 838.54

Point E006 X 2,334,449.72 Y 13,935,801.53 Sta 174+59.68

Course from E006 to PC RM9675 S 0° 37′ 10.75" E Dist 143.47

Curve Data					
Curve RM9675					
P.I. Station	178+23.59	X	2,334,453.66	Y	13,935,437.63
Delta =	31° 45′ 24.40" (RT)				
Degree =	7° 23′ 34.81"				
Tangent =	220.45				
Length =	429.55				
Radius =	775.00				
External =	30.74				
Long Chord =	424.07				
Mid. Ord. =	29.57				
P.C. Station	176+03.14	X	2,334,451.27	Y	13,935,658.07
P.T. Station	180+32.70	X	2,334,339.66	Y	13,935,248.95
C.C.		X	2,333,676.32	Y	13,935,649.69
Back = S	0° 37′ 10.75" E				
Ahead = S	31° 08′ 13.65" W				
Chord Bear = S	15° 15′ 31.45" W				

Course from PT RM9675 to PC RM9676 S 31° 08′ 13.65" W Dist 114.21

Curve Data					
Curve RM9676					
P.I. Station	183+12.13	X	2,334,195.18	Y	13,935,009.77
Delta =	31° 47′ 59.14" (LT)				
Degree =	9° 52′ 42.90"				
Tangent =	165.22				
Length =	321.91				
Radius =	580.00				
External =	23.07				
Long Chord =	317.79				
Mid. Ord. =	22.19				
P.C. Station	181+46.91	X	2,334,280.61	Y	13,935,151.19
P.T. Station	184+68.82	X	2,334,197.09	Y	13,934,844.57
C.C.		X	2,334,777.05	Y	13,934,851.28
Back = S	31° 08′ 13.65" W				
Ahead = S	0° 39′ 45.49" E				
Chord Bear = S	15° 14′ 14.08" W				

Course from PT RM9676 to E007 S 0° 39′ 45.49" E Dist 756.54

Point E007 X 2,334,205.84 Y 13,934,088.08 Sta 192+25.35

Course from E007 to PC RM9677 S 1° 06′ 09.00" E Dist 959.58

Curve Data					
Curve RM9677					
P.I. Station	203+25.24	X	2,334,227.00	Y	13,932,988.40
Delta =	1° 36′ 27.54" (RT)				
Degree =	0° 34′ 22.65"				
Tangent =	140.30				
Length =	280.59				
Radius =	10,000.00				
External =	0.98				
Long Chord =	280.58				
Mid. Ord. =	0.98				
P.C. Station	201+84.94	X	2,334,224.30	Y	13,933,128.68
P.T. Station	204+65.52	X	2,334,225.76	Y	13,932,848.10
C.C.		X	2,324,226.15	Y	13,932,936.27
Back = S	1° 06′ 09.00" E				
Ahead = S	0° 30′ 18.54" W				
Chord Bear = S	0° 17′ 55.23" E				

Course from PT RM9677 to PC RM9678 S 0° 30′ 18.54" W Dist 1,643.15

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

Texas Department of Transportation

BGE, Inc.
1701 Directors Blvd., Suite 1000, Austin, TX 78744
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

RM 967

HORIZONTAL ALIGNMENT DATA

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			62
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
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DATE:12/2/2022 11:56:12 AM
USER:RM 967
PENTABLE: $PENTBLS$

RM 967 HORIZONTAL ALIGNMENT DATA (CONT'D)

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Curve RM9678
P.I.  Station            222+48.38  X      2,334,210.04  Y      13,931,065.31
Delta        =       2° 16′ 31.05" (LT)
Degree       =       0° 48′ 51.98"
Tangent      =              139.70
Length       =              279.37
Radius       =            7,035.00
External     =                1.39
Long Chord   =              279.35
Mid. Ord.    =                1.39
P.C.  Station            221+08.68  X      2,334,211.27  Y      13,931,205.01
P.T.  Station            223+88.05  X      2,334,214.36  Y      13,930,925.68
C.C.                                X      2,341,246.00  Y      13,931,142.99
Back         = S   0° 30′ 18.54" W
Ahead        = S   1° 46′ 12.51" E
Chord Bear   = S   0° 37′ 56.99" E

Course from PT RM9678 to E008 S 1° 46′ 12.51" E Dist 622.57

Point E008             X     2,334,233.59 Y    13,930,303.41 Sta     230+10.61

Course from E008 to E009 S 2° 02′ 42.83" E Dist 597.69

Point E009             X     2,334,254.92 Y    13,929,706.10 Sta     236+08.30

Course from E009 to PC RM9679 S 2° 32′ 15.41" E Dist 185.17

                                        Curve Data
                                       *----------*
Curve RM9679
P.I.  Station            240+67.21  X      2,334,275.24  Y      13,929,247.64
Delta        =      46° 18′ 55.47" (LT)
Degree       =       8° 57′ 08.88"
Tangent      =              273.75
Length       =              517.35
Radius       =              640.00
External     =               56.09
Long Chord   =              503.38
Mid. Ord.    =               51.57
P.C.  Station            237+93.47  X      2,334,263.12  Y      13,929,521.12
P.T.  Station            243+10.82  X      2,334,481.37  Y      13,929,067.52
C.C.                                X      2,334,902.49  Y      13,929,549.45
Back         = S   2° 32′ 15.41" E
Ahead        = S  48° 51′ 10.88" E
Chord Bear   = S  25° 41′ 43.15" E

Course from PT RM9679 to E010 S 48° 51′ 10.88" E Dist 229.11

Point E010             X     2,334,653.90 Y    13,928,916.77 Sta     245+39.92

================================================================================
Ending chain RM967 description
```

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

Elena Ramon

12/2/2022

Texas Department of Transportation

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RM 967

HORIZONTAL ALIGNMENT DATA

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			63
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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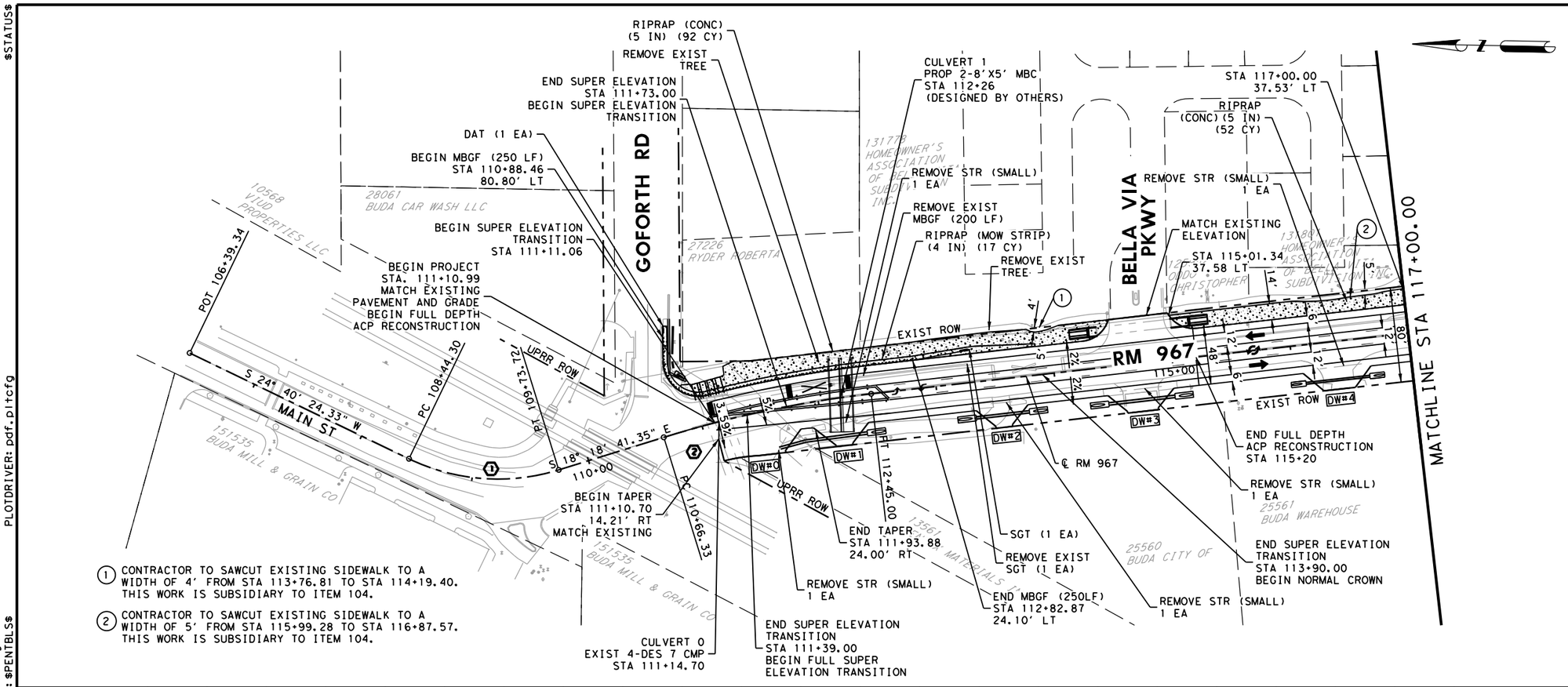

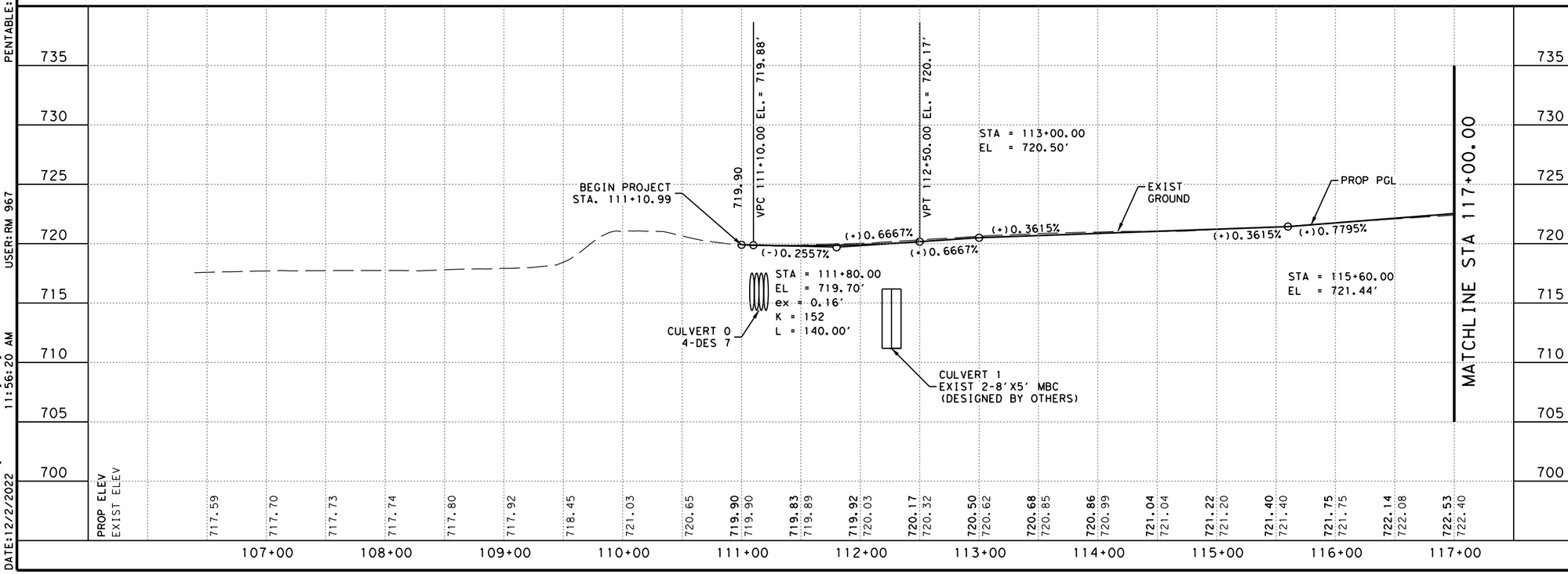

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RM 967

ROADWAY PLAN AND PROFILE BEGIN TO STA 117+00

SHEET 1 OF 13

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			64
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
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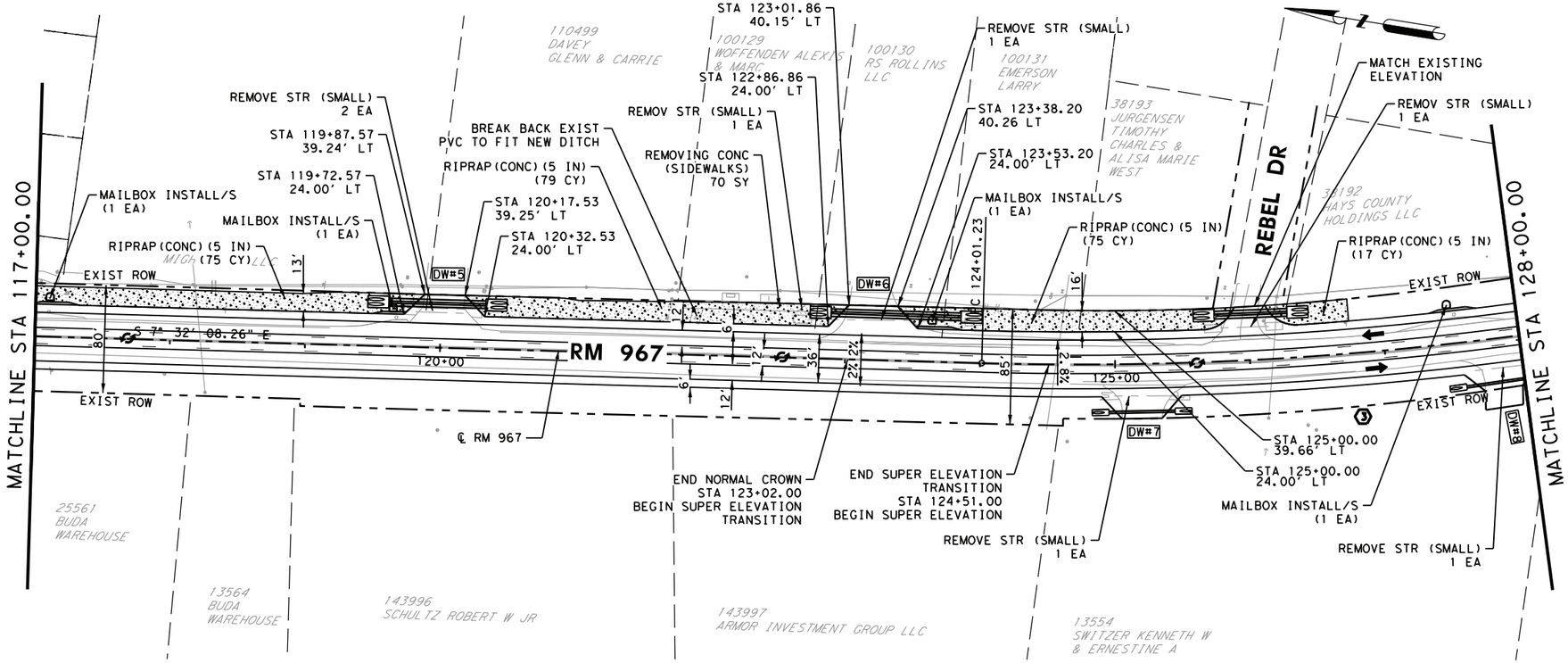
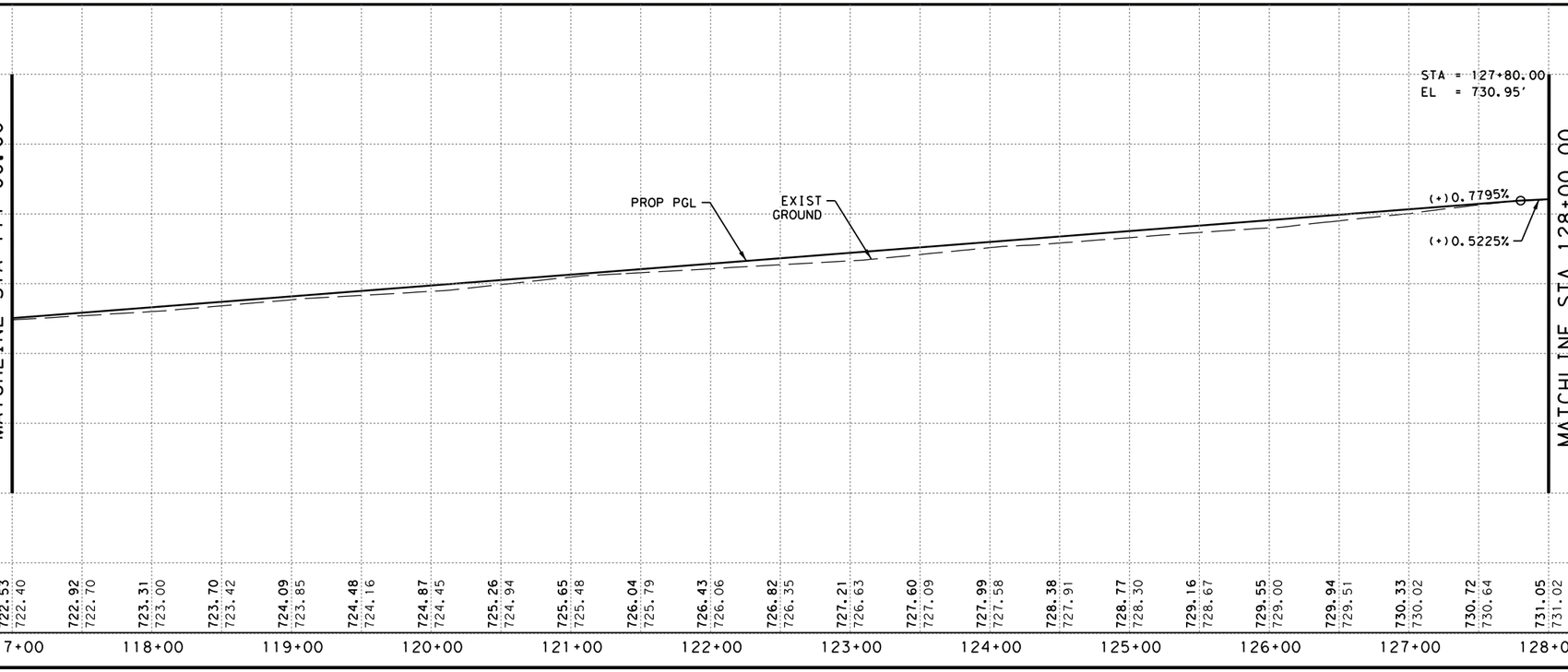


LEGEND:

- EXISTING ROW
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELECOMM
- EXISTING FENCE
- DW# DRIVEWAY NUMBER
- TRAFFIC ARROWS
- PROPOSED MAILBOX
- CURVE NUMBER

NOTES:

1. CALL THE TEXAS STATEWIDE ONE CALL LOCATOR NUMBER 1-800-344-8377, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD UTILITIES.
3. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR CURVE DATA.



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ROADWAY PLAN AND PROFILE STA 117+00 TO STA 128+00

SHEET 2 OF 13

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			65
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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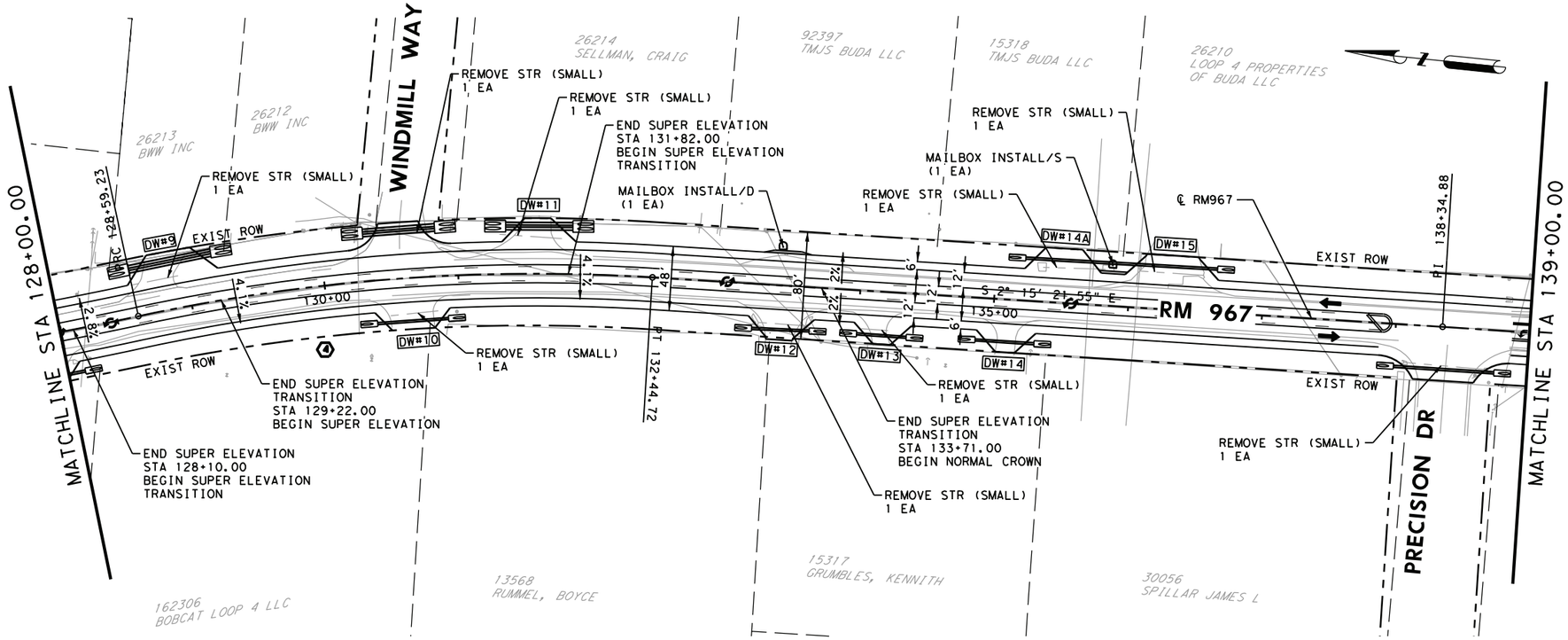

LEGEND:

- EXISTING ROW
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELECOMM
- EXISTING FENCE
- DW# DRIVEWAY NUMBER
- TRAFFIC ARROWS
- PROPOSED MAILBOX
- CURVE NUMBER

NOTES:

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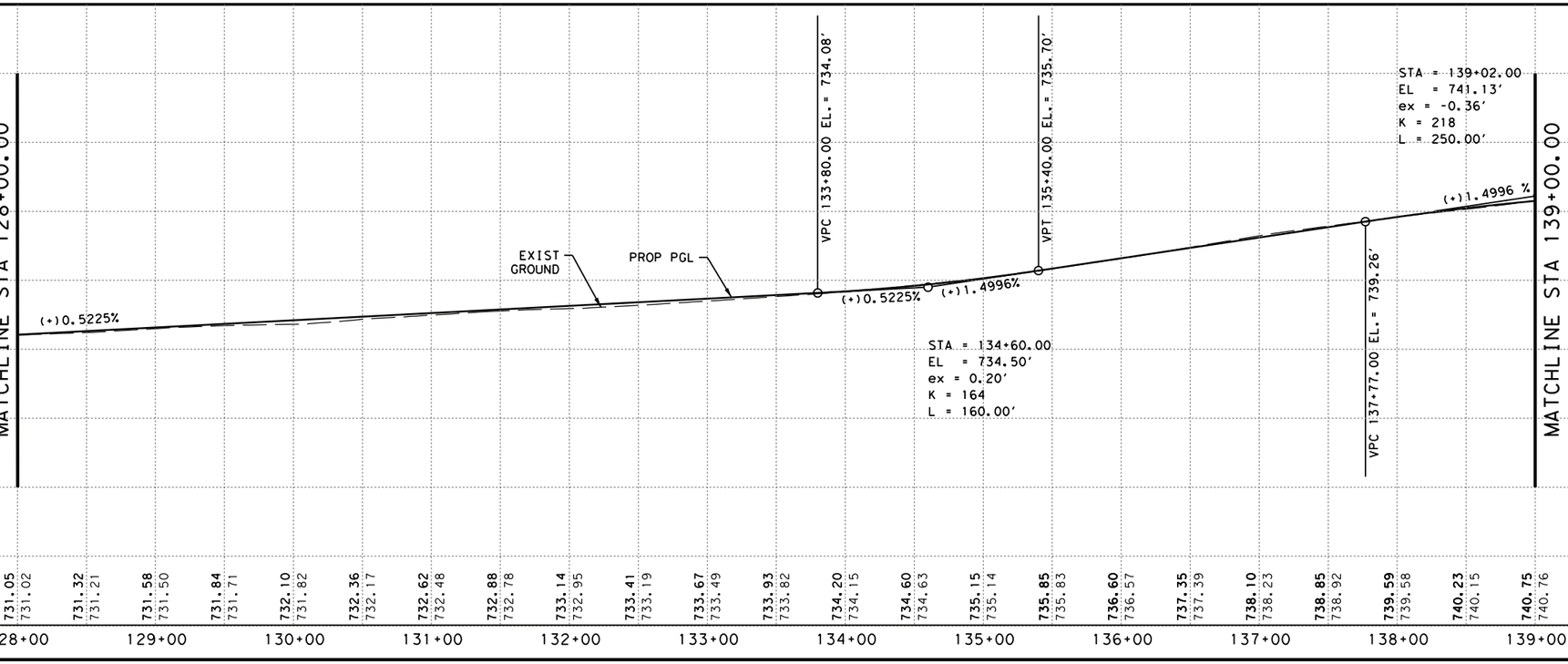
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD UTILITIES.
3. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR CURVE DATA.
4. CONTRACTOR TO VERIFY LOCATION AND DEPTH OF 8" FM WASTEWATER LINE PRIOR TO CONSTRUCTION. EXCAVATE WITH CAUTION.

0' 25' 50' 100'



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RM 967

ROADWAY PLAN AND PROFILE STA 128+00 TO STA 139+00

SHEET 3 OF 13

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			66
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
PLOTDRIVER: pdf.pltcfg
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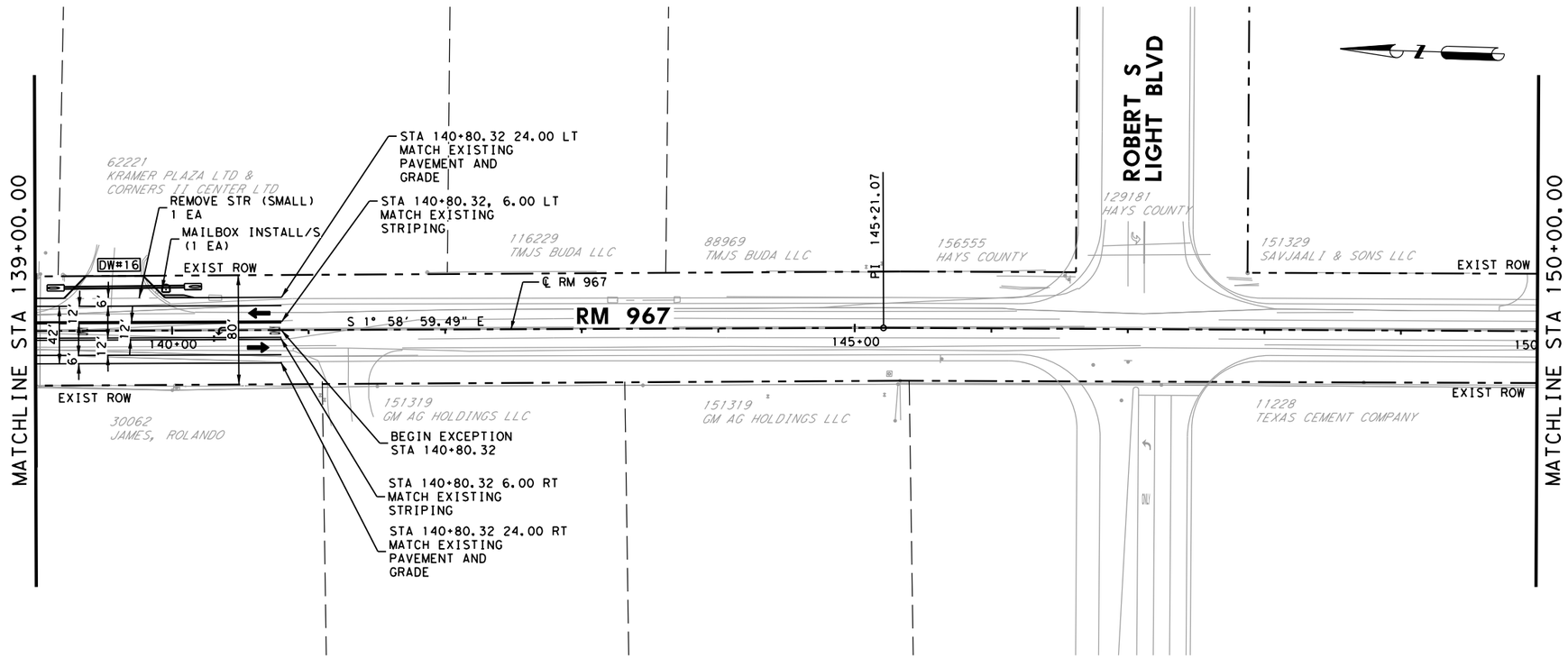

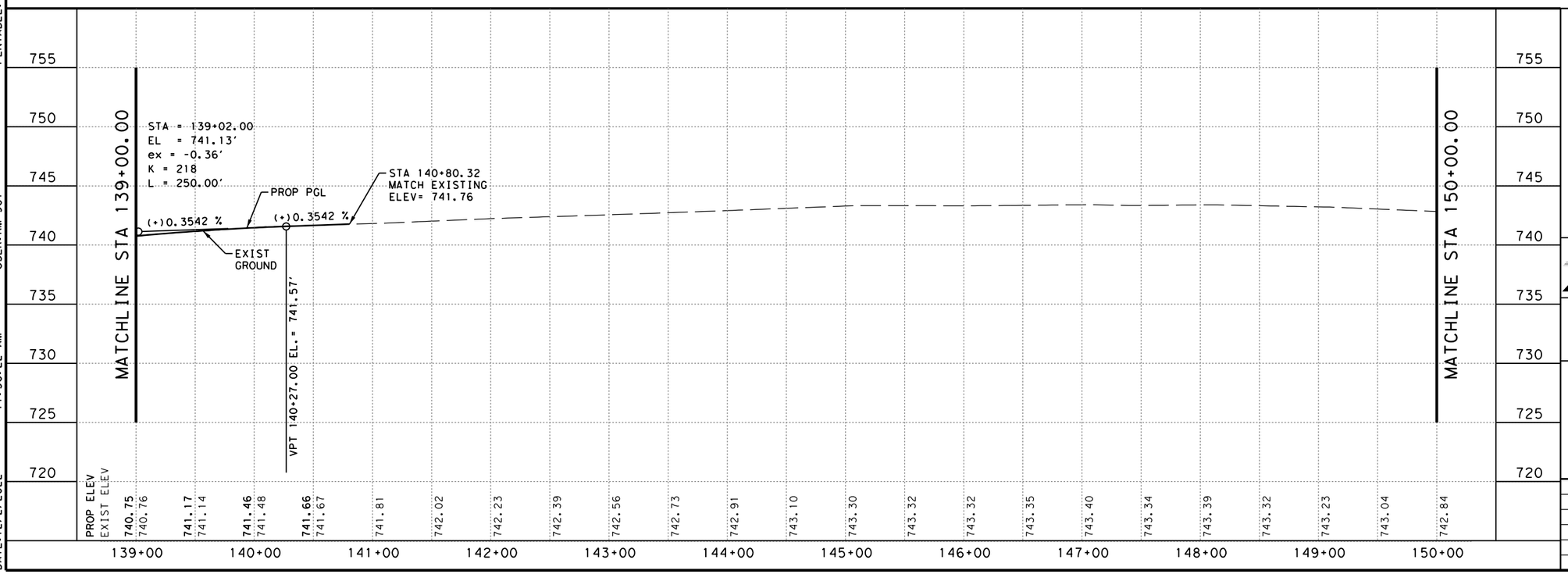

LEGEND:

- EXISTING ROW
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELECOMM
- EXISTING FENCE
- DW# — DRIVEWAY NUMBER
- TRAFFIC ARROWS
- PROPOSED MAILBOX
- (#) — CURVE NUMBER

NOTES:

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4. CONTRACTOR TO VERIFY LOCATION AND DEPTH OF 8" FM WASTEWATER LINE PRIOR TO CONSTRUCTION. EXCAVATE WITH CAUTION.

0' 25' 50' 100'

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RM 967

ROADWAY PLAN AND PROFILE STA 139+00 TO STA 150+00

SHEET 4 OF 13

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			67
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
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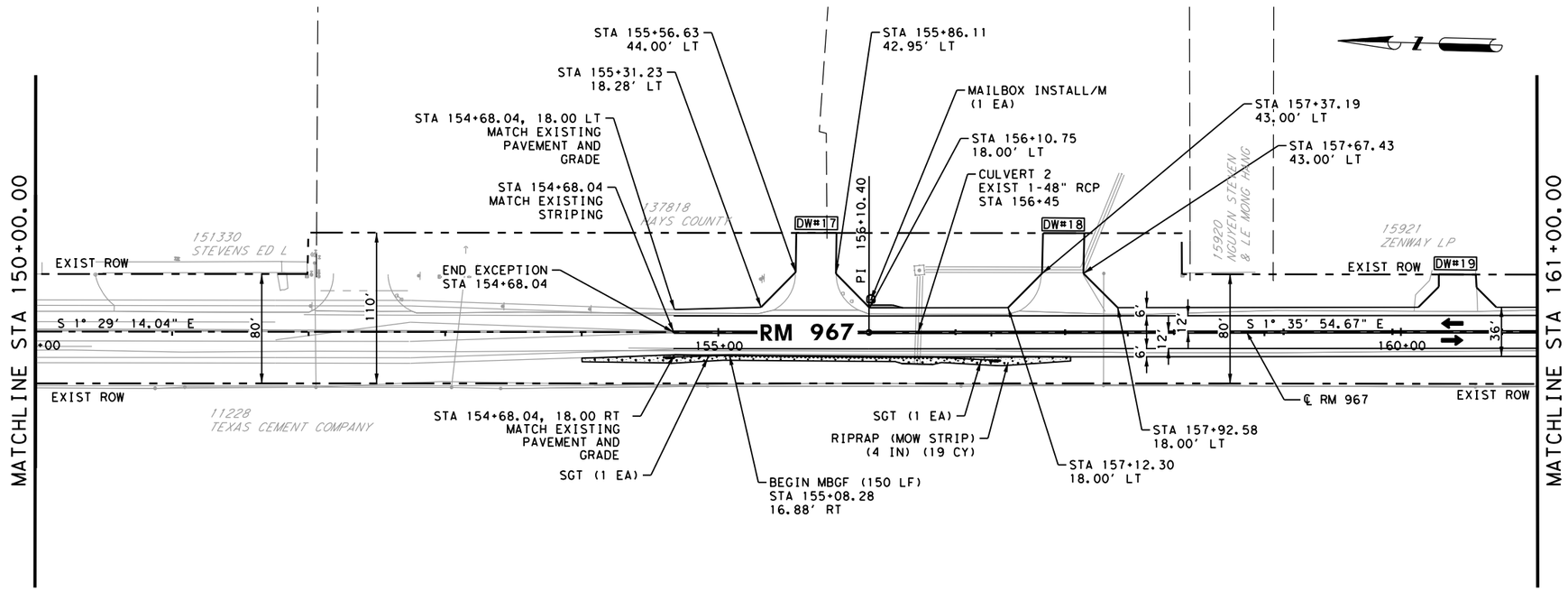

LEGEND:

- EXISTING ROW
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELECOMM
- EXISTING FENCE
- DW# — DRIVEWAY NUMBER
- TRAFFIC ARROWS
- PROPOSED MAILBOX
- (#) — CURVE NUMBER

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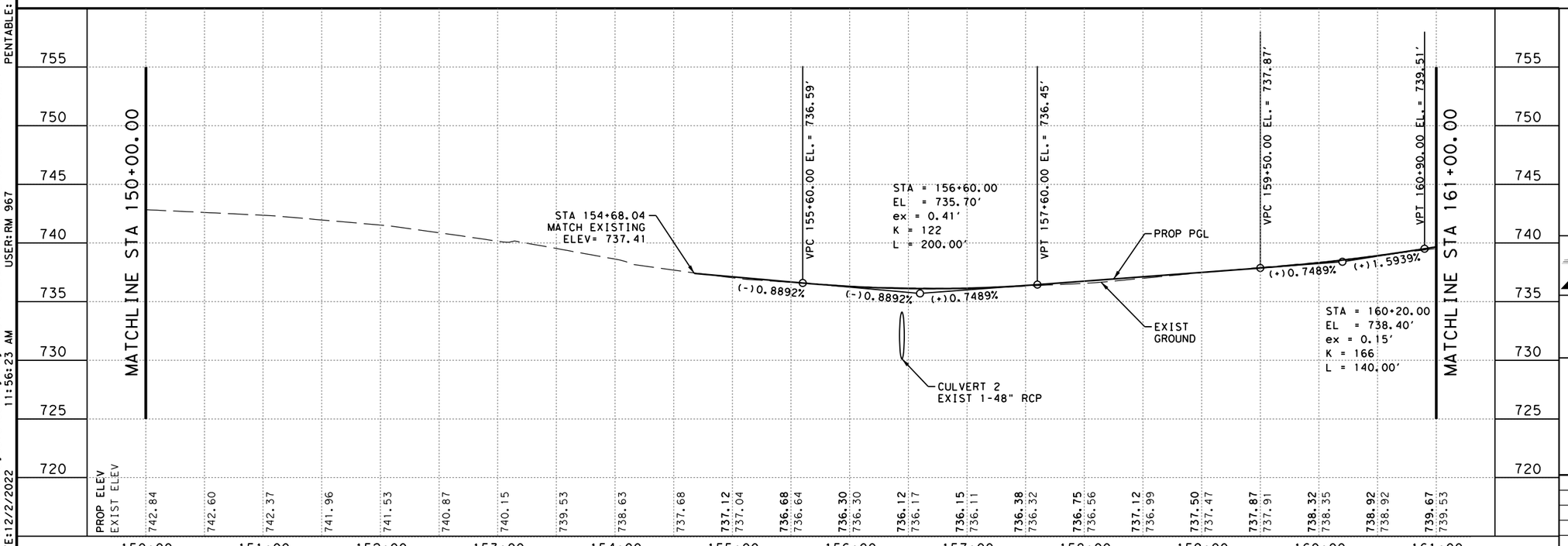
0' 25' 50' 100'



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RM 967

ROADWAY PLAN AND PROFILE
STA 150+00 TO STA 161+00

SHEET 5 OF 13

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			68
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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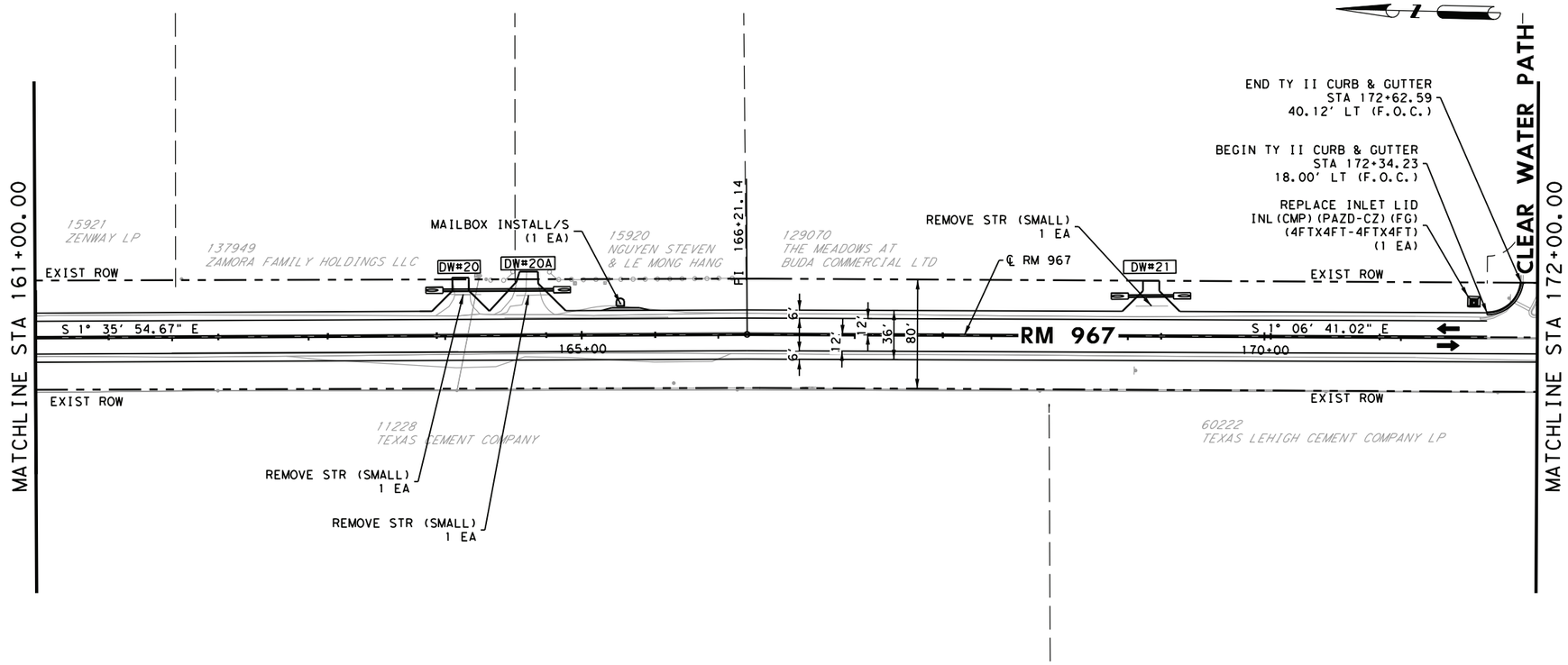

LEGEND:

- EXISTING ROW
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELECOMM
- EXISTING FENCE
- DRIVEWAY NUMBER
- TRAFFIC ARROWS
- PROPOSED MAILBOX
- CURVE NUMBER

NOTES:

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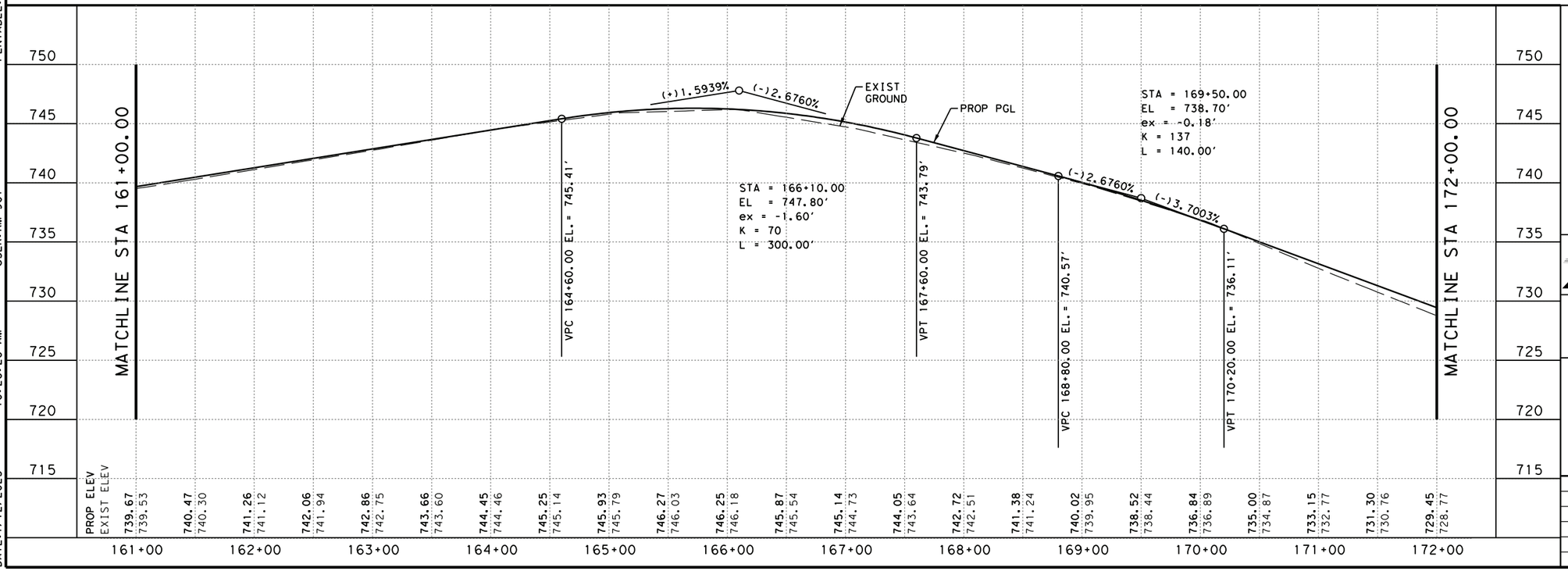
3. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR CURVE DATA.

0' 25' 50' 100'



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STATE OF TEXAS

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RM 967

ROADWAY PLAN AND PROFILE STA 161+00 TO STA 172+00

SHEET 6 OF 13

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			69
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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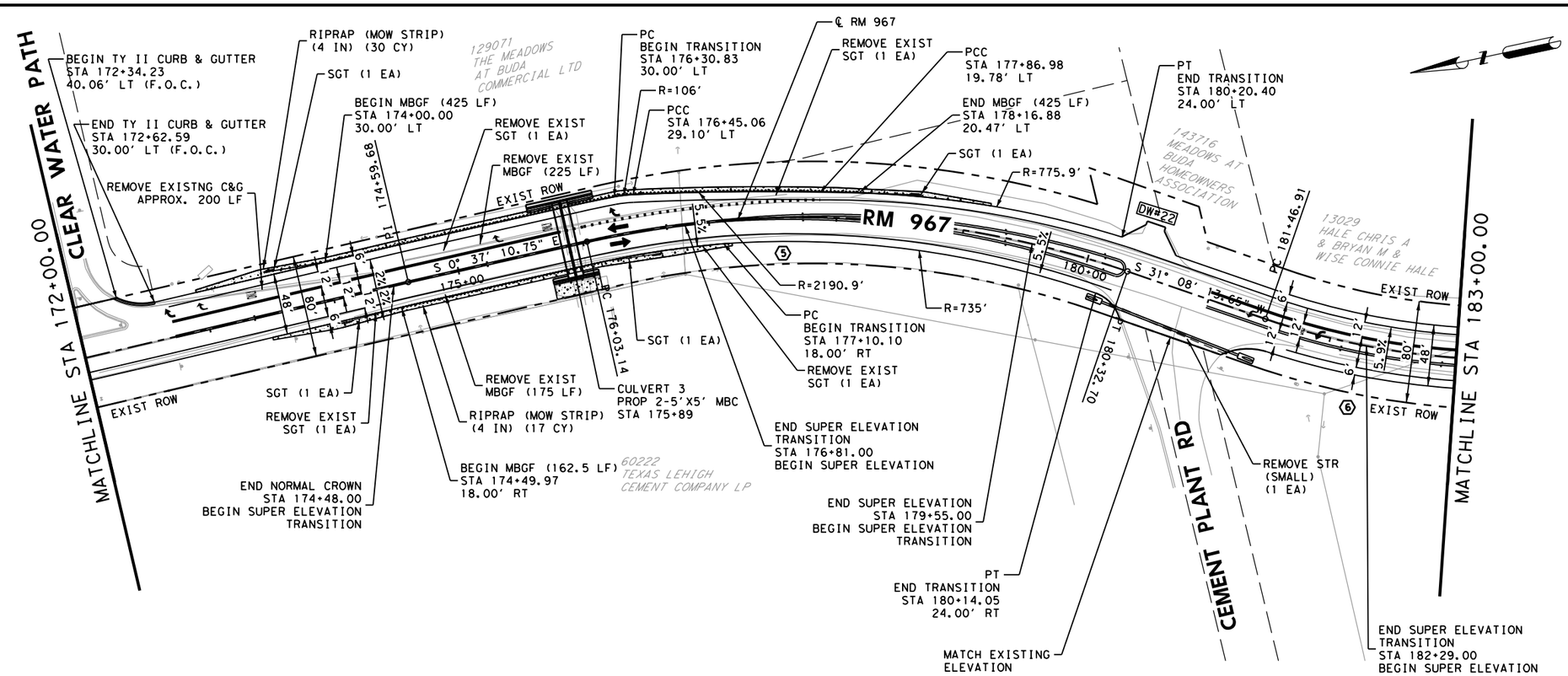

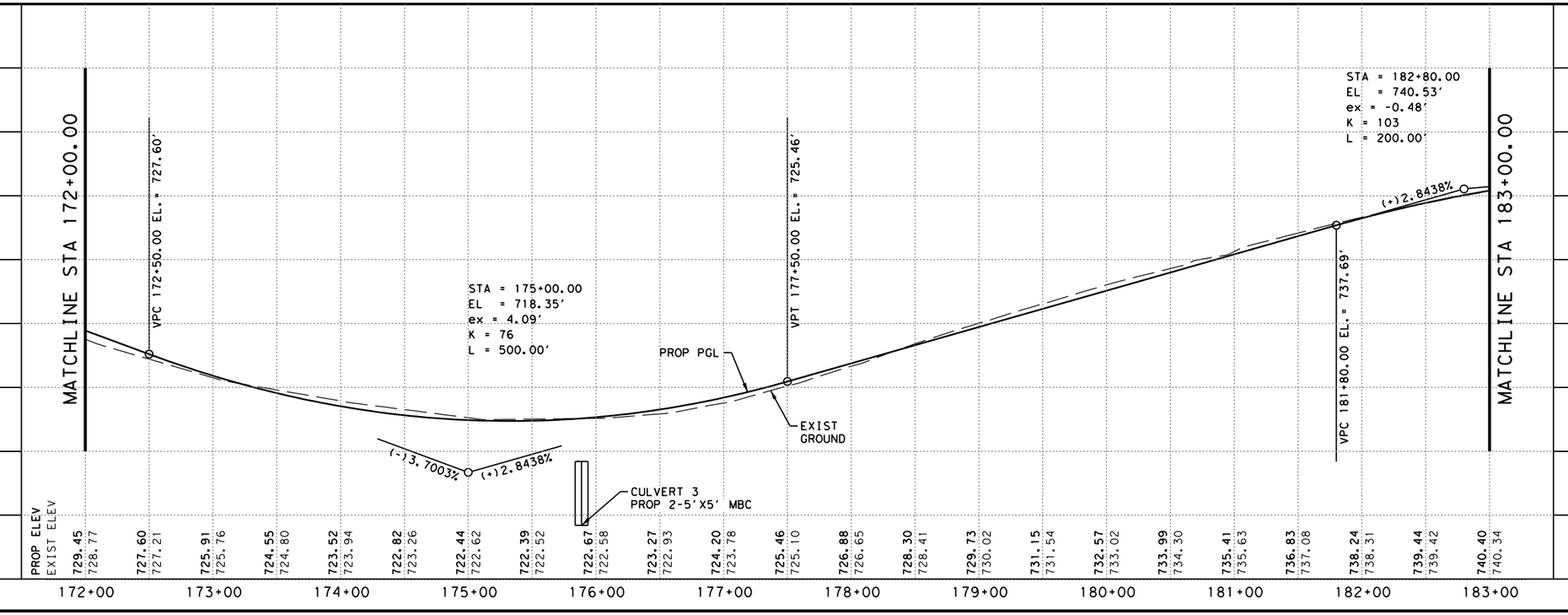

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RM 967

ROADWAY PLAN AND PROFILE
STA 172+00 TO STA 183+00

SHEET 7 OF 13

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			70
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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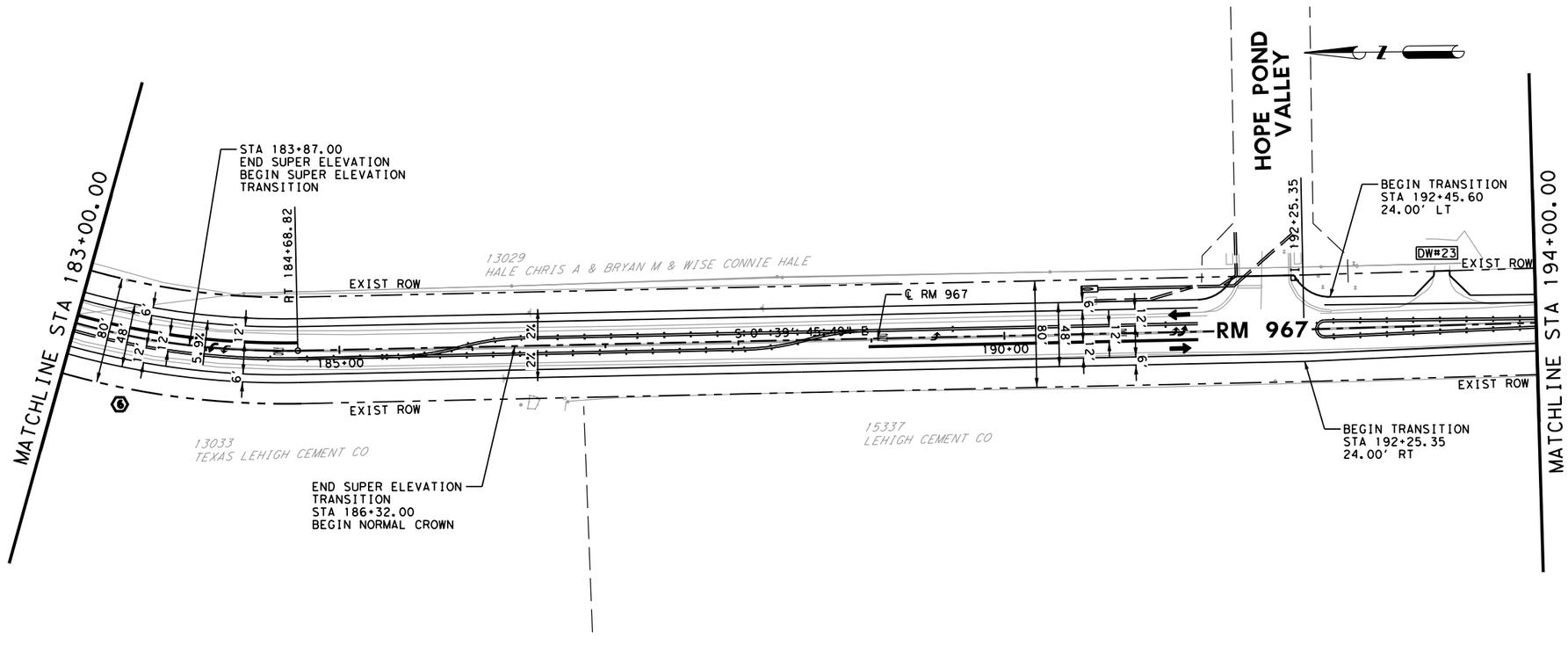

LEGEND:

- EXISTING ROW
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELECOMM
- EXISTING FENCE
- DW# — DRIVEWAY NUMBER
- TRAFFIC ARROWS
- PROPOSED MAILBOX
- # — CURVE NUMBER

NOTES:

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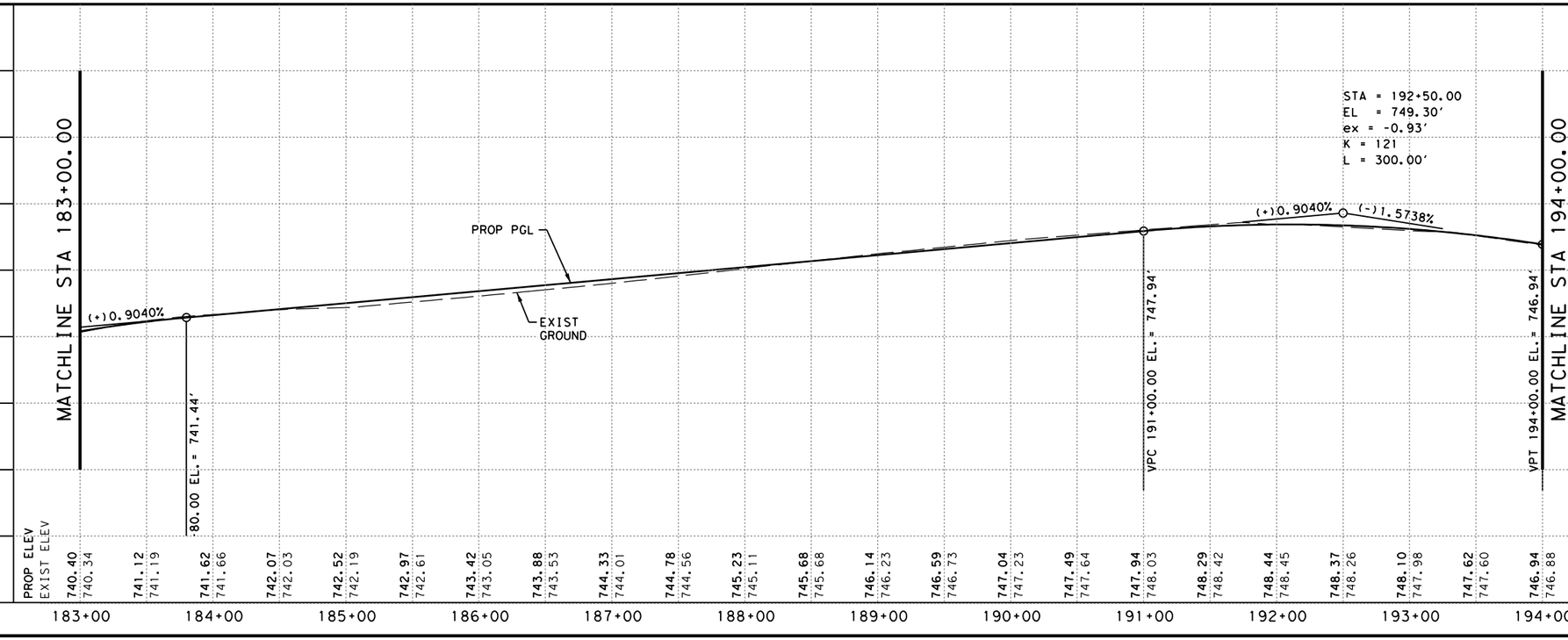
3. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR CURVE DATA.

0' 25' 50' 100'



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RM 967

ROADWAY PLAN AND PROFILE
STA 183+00 TO STA 194+00

SHEET 8 OF 13

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			71
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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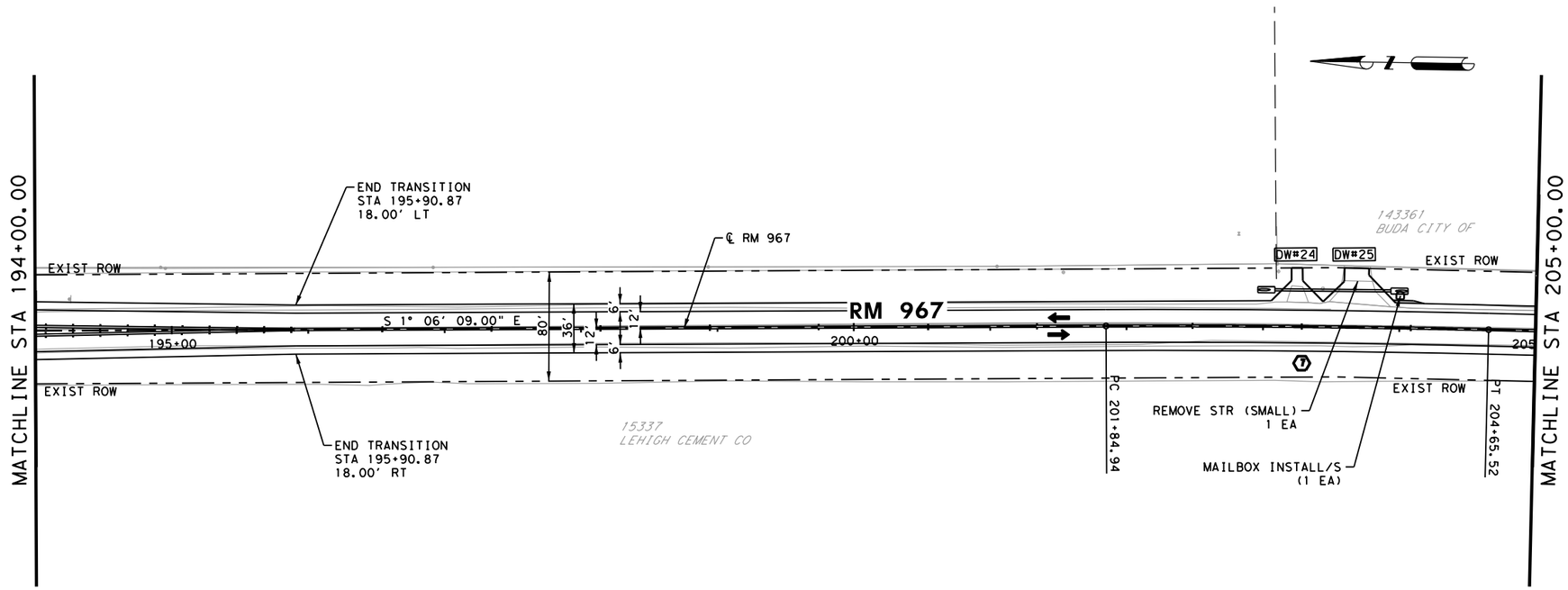

LEGEND:

- EXISTING ROW
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELECOMM
- EXISTING FENCE
- DW# — DRIVEWAY NUMBER
- TRAFFIC ARROWS
- PROPOSED MAILBOX
- (#) — CURVE NUMBER

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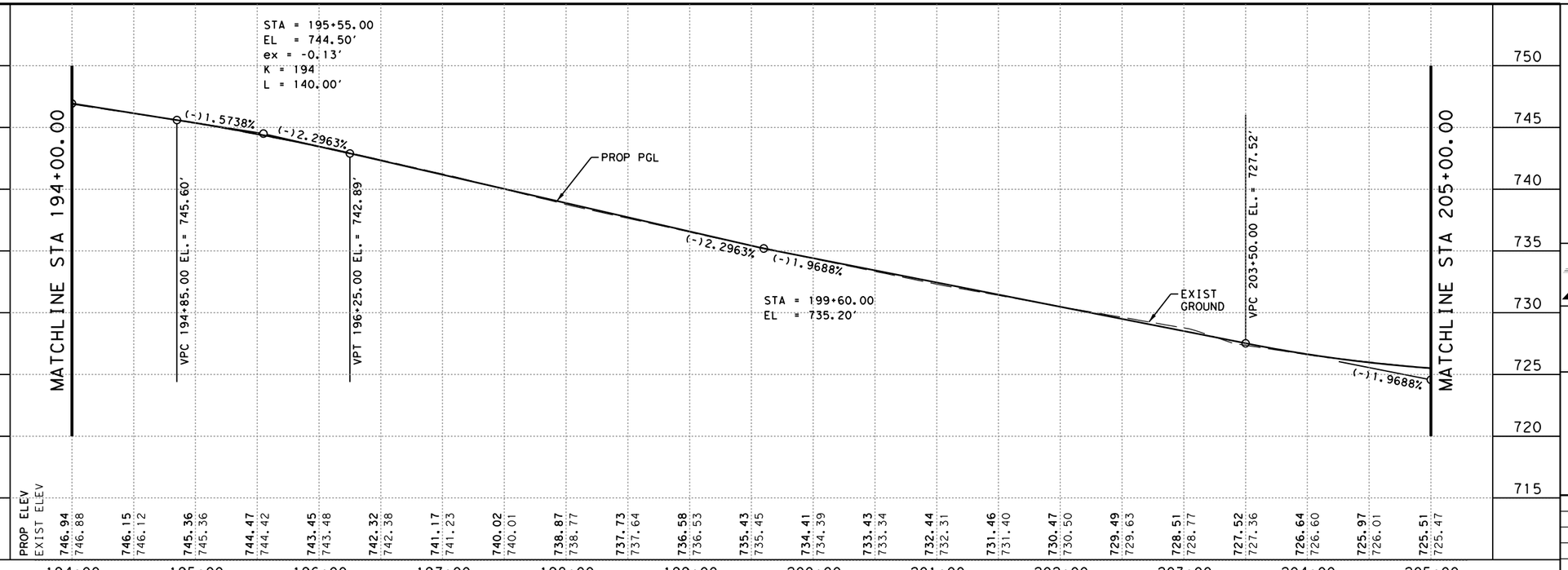
0' 25' 50' 100'



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ROADWAY PLAN AND PROFILE
STA 194+00 TO STA 205+00

SHEET 9 OF 13

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			72
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
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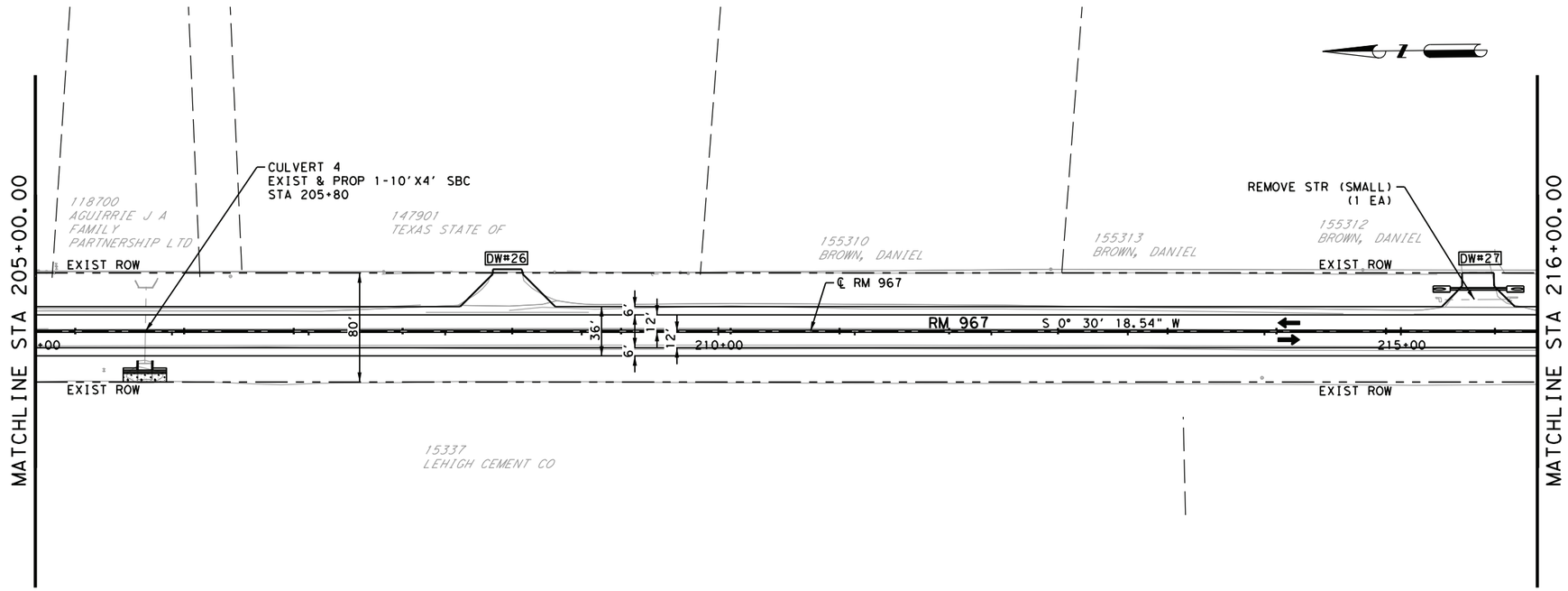

LEGEND:

- EXISTING ROW
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELECOMM
- EXISTING FENCE
- DW# — DRIVEWAY NUMBER
- TRAFFIC ARROWS
- PROPOSED MAILBOX
- (#) — CURVE NUMBER

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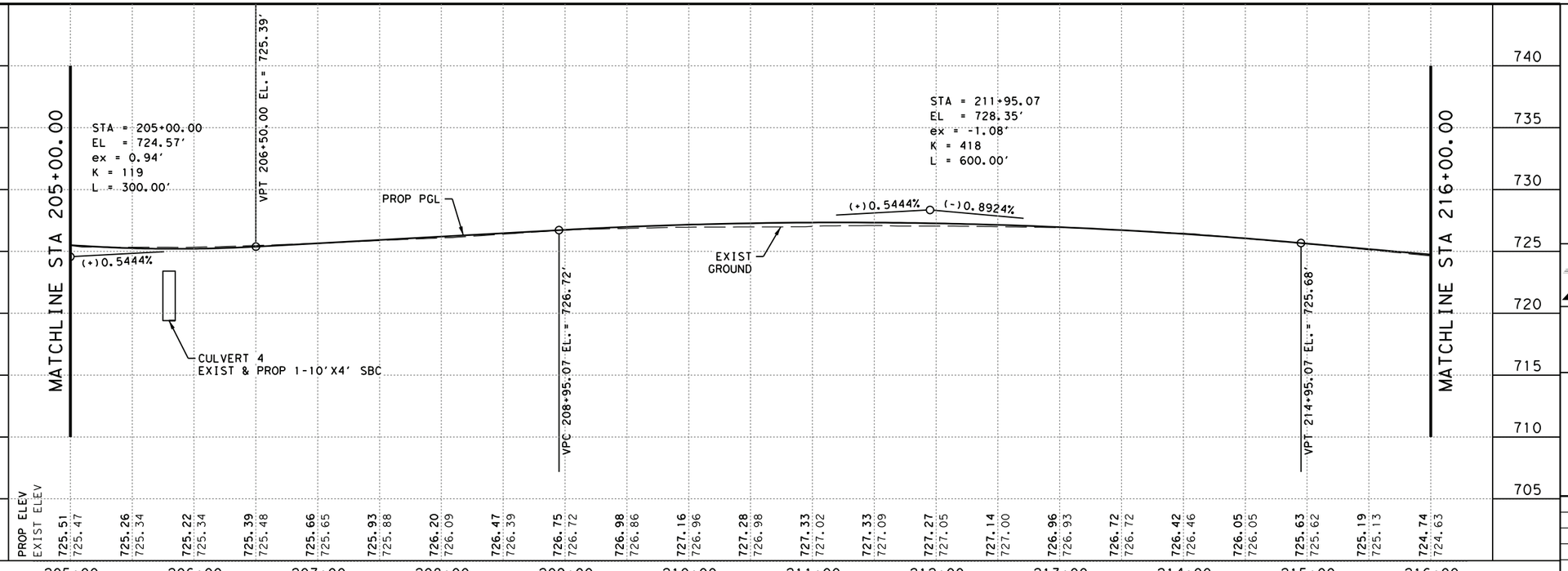

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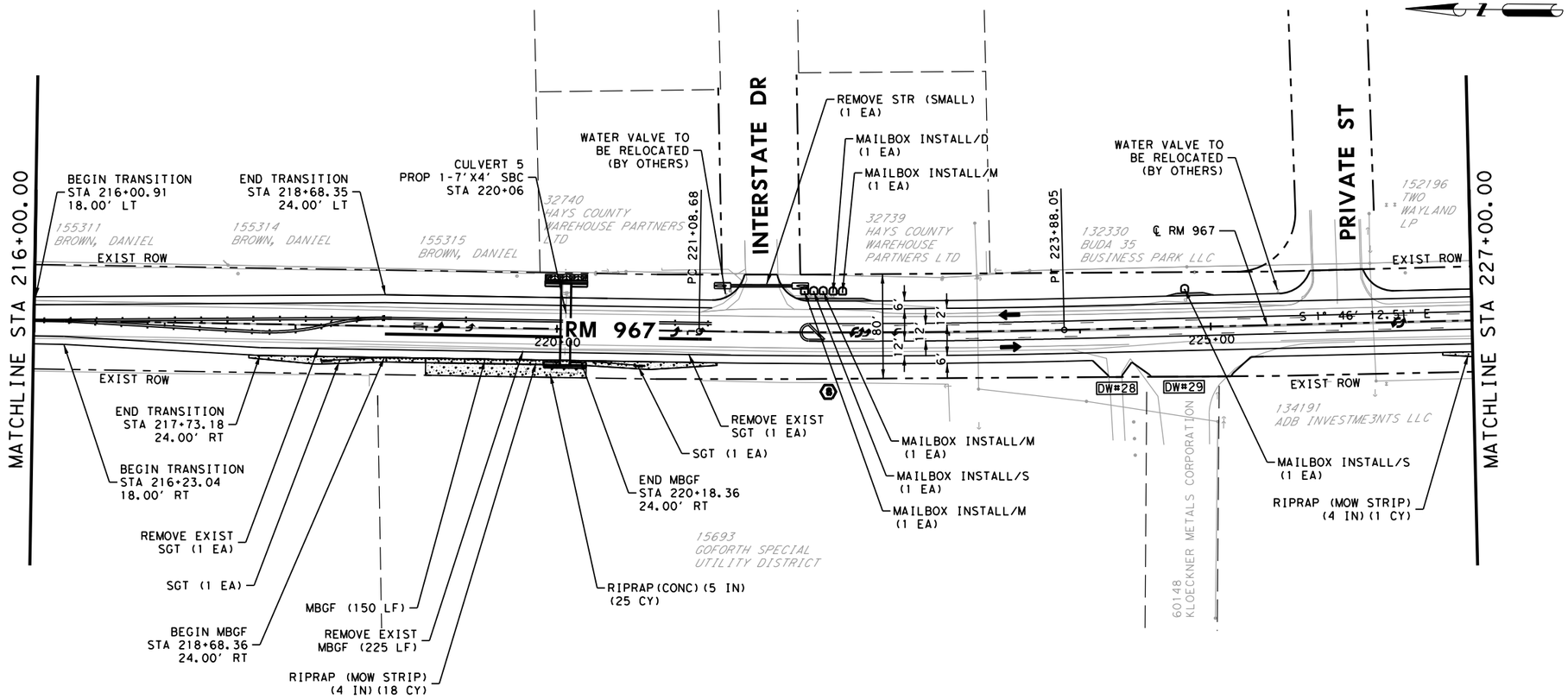
RM 967

ROADWAY PLAN AND PROFILE STA 205+00 TO STA 216+00

SHEET 10 OF 13

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			73
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967



LEGEND:

- EXISTING ROW
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELECOMM
- EXISTING FENCE
- DW# — DRIVEWAY NUMBER
- TRAFFIC ARROWS
- PROPOSED MAILBOX
- (#) — CURVE NUMBER

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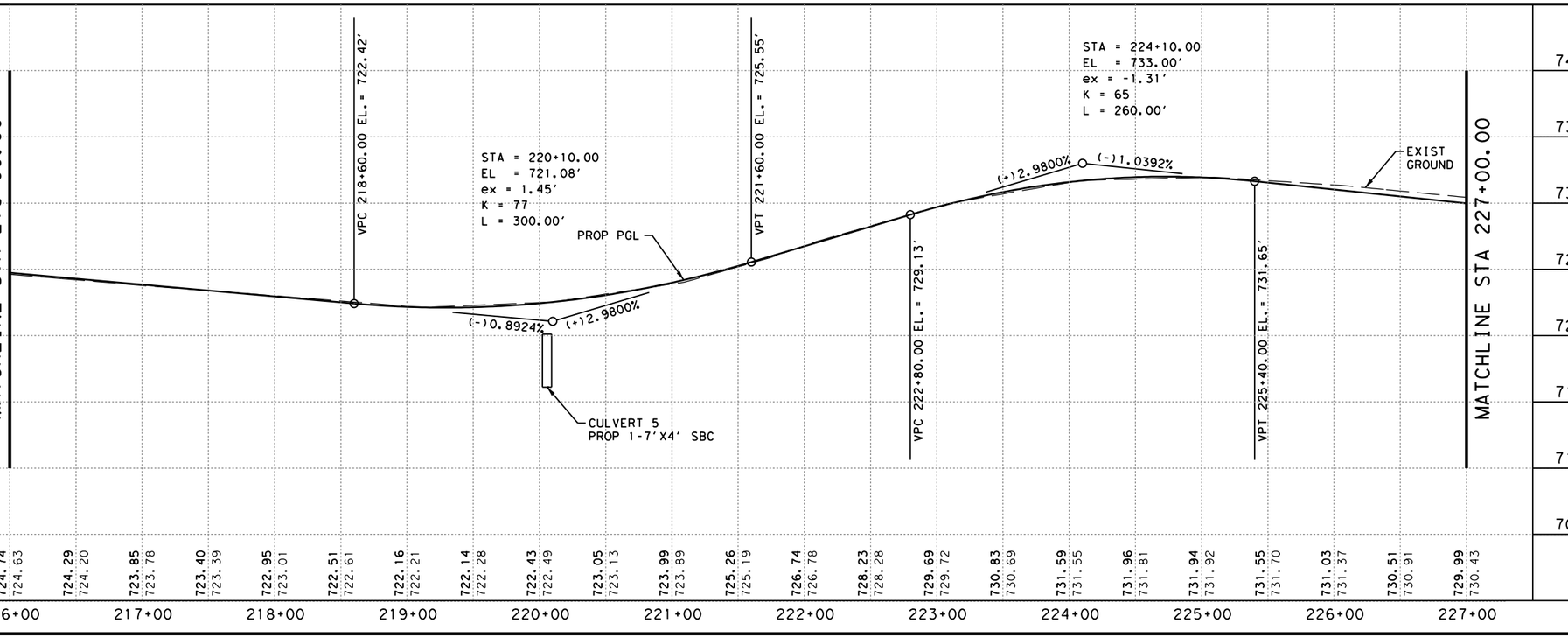
0' 25' 50' 100'



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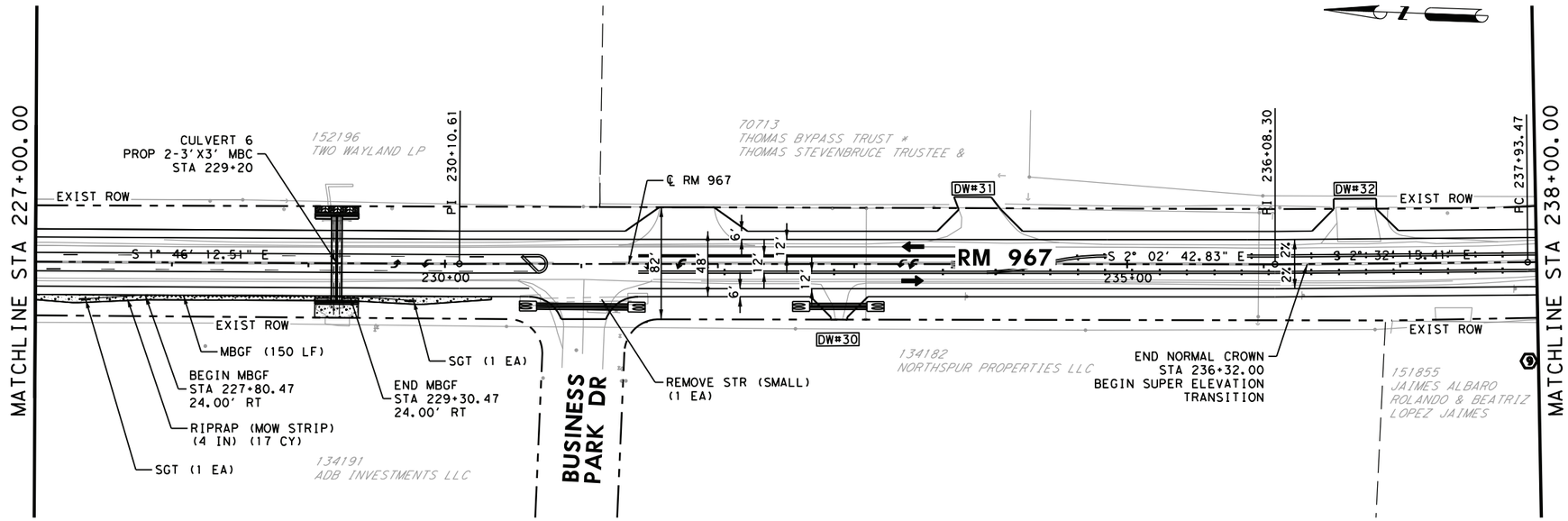
Tel: 512-879-0400 • www.bgeInc.com
TBPE Registration No. F-1046

RM 967

ROADWAY PLAN AND PROFILE
STA 216+00 TO STA 227+00

SHEET 11 OF 13

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			74
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967



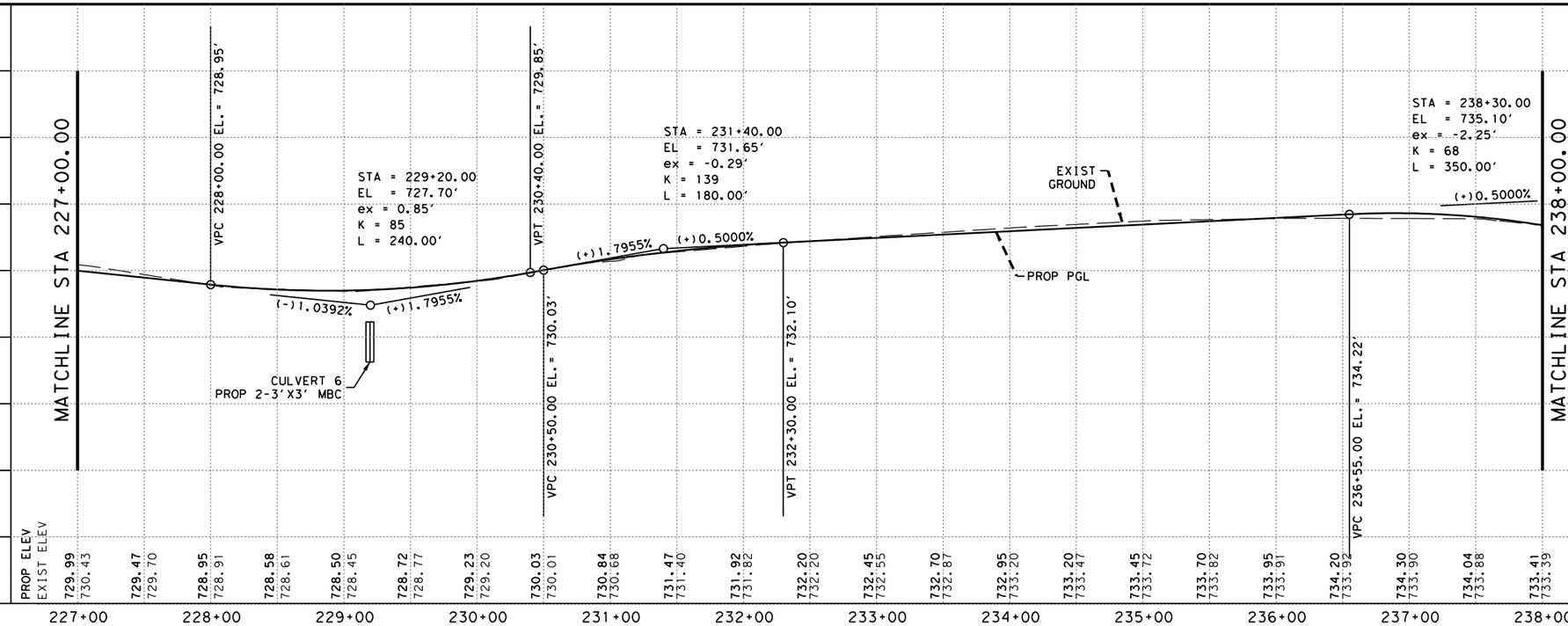
LEGEND:

- EXISTING ROW
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELECOMM
- EXISTING FENCE
- DW# — DRIVEWAY NUMBER
- TRAFFIC ARROWS
- PROPOSED MAILBOX
- CURVE NUMBER

NOTES:

1. CALL THE TEXAS STATEWIDE ONE CALL LOCATOR NUMBER 1-800-344-8377, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD UTILITIES.
3. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR CURVE DATA.

0' 25' 50' 100'



STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

Elena Ramon

1/12/2023

Texas Department of Transportation

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RM 967

ROADWAY PLAN AND PROFILE
STA 227+00 TO STA 238+00

SHEET 12 OF 13

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			75
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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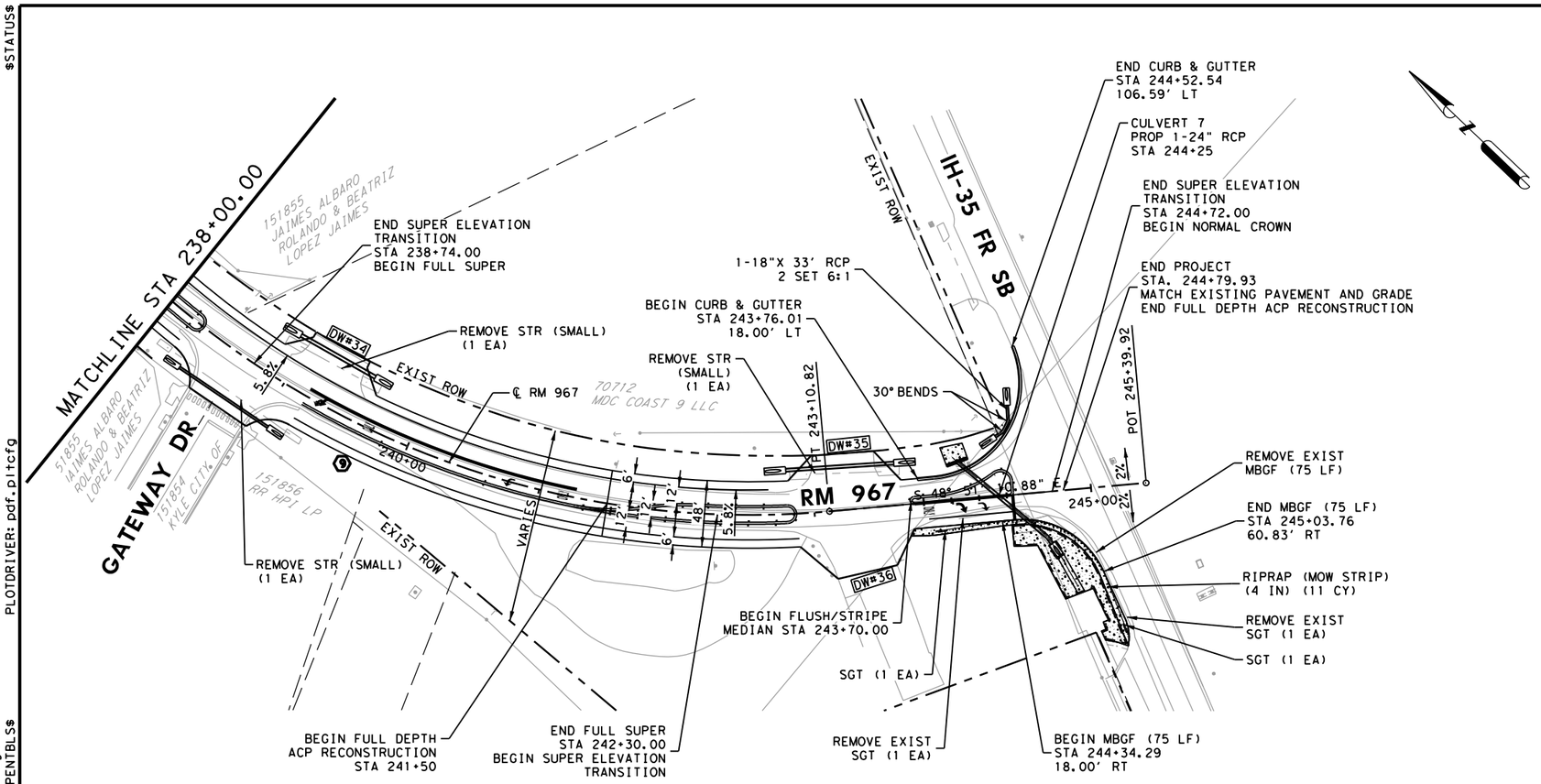
PENTABLE: $PENTBL$
$STATUS$



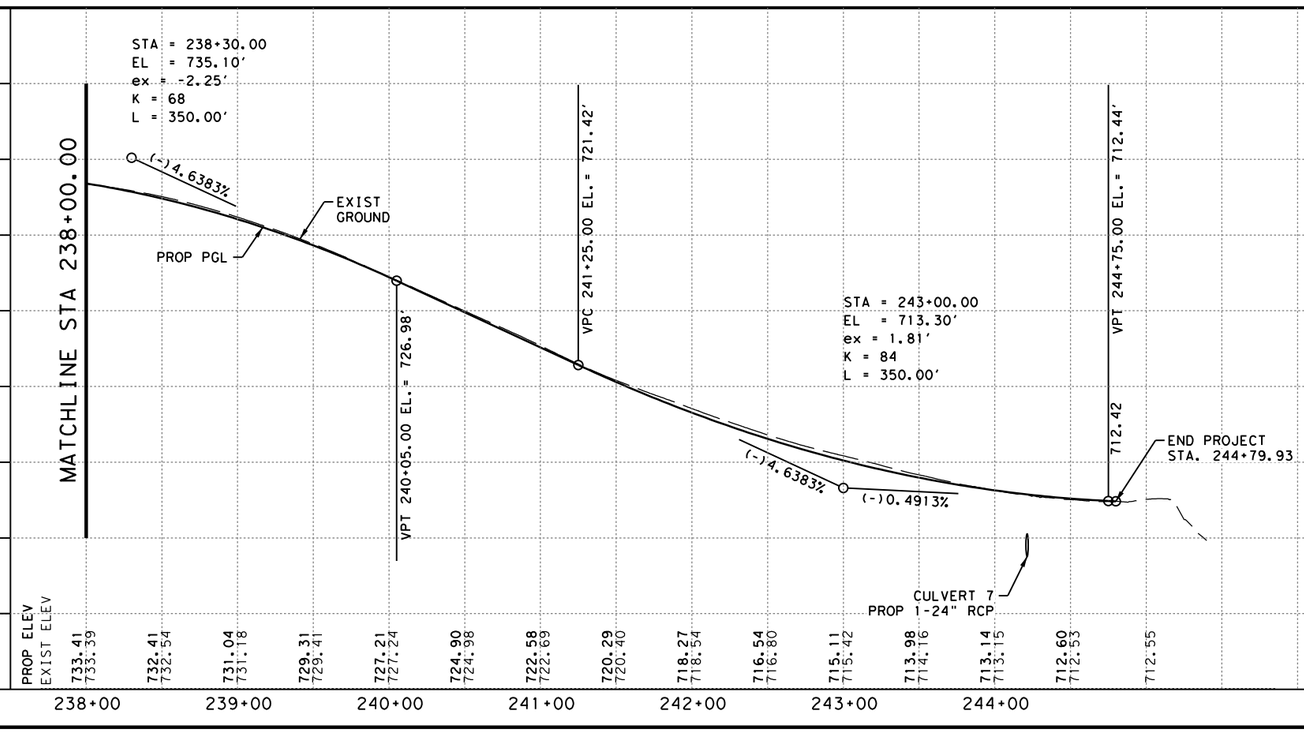
LEGEND:

- EXISTING ROW
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELECOMM
- EXISTING FENCE
- DW# — DRIVEWAY NUMBER
- TRAFFIC ARROWS
- PROPOSED MAILBOX
- # — CURVE NUMBER

NOTES:

1. CALL THE TEXAS STATEWIDE ONE CALL LOCATOR NUMBER 1-800-344-8377, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD UTILITIES.
3. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR CURVE DATA.

0' 25' 50' 100'



STATE OF TEXAS
ELENA RAMON
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12/2/2022

Texas Department of Transportation

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RM 967

ROADWAY PLAN AND PROFILE
STA 238+00 TO END

SHEET 13 OF 13

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		76

STATE	DIST.	COUNTY
TEXAS	AUS	HAYS

CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
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DATE:12/2/2022 11:56:29 AM USER:RM 967
PENTABLE: $PENTBLS$

SUMMARY OF INTERSECTIONS

INTERSECTION NAME	P&P SHEET NUMBER	CENTERLINE STATION		R1 (FT)	R2 (FT)	WIDTH FT	AREA SY	LENGTH FT	EXIST PIPE	PROPOSED PIPE	S.E.T. SIDE SLOPE	CULVERT GRADE (%)	UPSTREAM FLOWLINE STATION	UPSTREAM FLOWLINE OFFSET (FT)	UPSTREAM FLOWLINE ELEV (FT)	DOWNSTREAM FLOWLINE STATION	DOWNSTREAM FLOWLINE OFFSET (FT)	DOWNSTREAM FLOWLINE ELEV (FT)
BELLA VIA PKWY	PP 01	114+75.00	LT	25	25	50	109	16	1 - 7'X2' CBC	EXT 1-7'X2' CBC 8' LT & 16' RT	6:1	0.93	115+18.23	30.65	718.45	114+31.40	30.70	717.64
REBEL DR	PP 02	126+01.55	LT	25	25	23	63	15	1 - 18" RCP	2 - 24" X 61' RCP	6:1	0.77	126+33.00	31.79	726.25	125+71.16	32.62	725.78
WINDMILL WAY	PP 03	130+57.67	LT	25	25	30	85	18	1 - 18" RCP	2 - 24" X 61' RCP	6:1	0.70	130+87.60	34.69	729.98	130+28.02	34.40	729.55
PRECISION DR	PP 03	138+38.22	RT	30	30	45	108	16	1 - 18" RCP	1 - 18" X 82' RCP	6:1	1.10	138+78.76	31.64	737.40	137+96.61	31.62	736.50
CLEAR WATER PATH	PP 06	172+11.19	LT	25	45	48	116	20	AREA INLET	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CEMENT PLANT RD	PP 07	180+93.76	RT	30	50	87	156	14	1-18" RCP	1-18" X 122' RCP	6:1	3.80	181+39.60	34.03	734.75	180+17.04	29.98	730.12
HOPE POND VALLEY	PP 08	191+95.69	LT	30	30	46	114	17	1 - 18" RCP	REMOVE 76' LT, EXT 75' LT	6:1	N/A	N/A	N/A	N/A	190+67.47	33.77	744.30
INTERSTATE DR	PP 11	221+55.77	LT	25	25	25	82	20	1 - 18" CMP	1 - 18" X 54' RCP	6:1	2.31	221+83.28	35.51	723.00	221+28.96	35.08	721.75
PRIVATE ST	PP 11	225+97.13	LT	25	25	41	101	17	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUSINESS PARK DR	PP 12	231+01.54	RT	25	25	33	84	17	2 - 18" RCP	2 - 18" X 74' RCP	6:1	1.01	231+37.66	31.84	728.60	230+63.67	30.85	727.85
GATEWAY DR	PP 13	238+72.58	RT	30	30	52	119	16	1 - 18" RCP	1 - 18" X 84' RCP	6:1	3.89	238+29.83	33.94	730.33	239+09.20	33.62	727.06
RM 967 / I-35 FRONTAGE	PP 13	244+43.30	LT	-	-	-	-	-	NONE	1 - 18" X 33' RCP	6:1	2.12	244+45.25	68.22	710.50	244+31.64	41.28	709.80

NOTE:

1. STATION AND OFFSET ARE TAKEN FROM THE SOFFIT OF THE S.E.T.
2. OFFSET FOR DOUBLE BARREL CULVERTS IS TAKEN FROM BARREL CLOSEST TO PAVEMENT.
3. USE SETP-PD STANDARD FOR ALL RCP & CMP PIPES.
   USE SCC-7(MOD), SCC-MD, SETB-PD, & BCS FOR BELLA VIA PKWY.

STATE OF TEXAS
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12/2/2022

Texas Department of Transportation

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RM 967

SUMMARY OF INTERSECTIONS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			77
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

SUMMARY OF DRIVEWAYS

DRIVEWAY NUMBER	P&P SHEET NUMBER	CENTERLINE STATION		EXISTING SURFACE	PROPOSED SURFACE	F (FT)	WIDTH	AREA	LENGTHS			GRADES			DRIVEWAY TYPE	ELEV AT PROP EOP	ELEV AT TIE IN
							FT	SY	(L1) FT	(L2) FT	(L3) FT	(G1) %	(G2) %	(G3) %			
DW# 00	PP 01	111+50.00	RT	GRAVEL	ASPHALT	15	53	128	8.84	-	-	0.51	-	-	COMMERCIAL	718.84	718.89
DW# 01	PP 01	112+18.89	RT	GRAVEL	ASPHALT	15	14	51	9.67	-	-	-0.50	-	-	RESIDENTIAL	719.15	719.10
DW# 02	PP 01	113+52.35	RT	GRAVEL	ASPHALT	15	14	51	6.31	1.39	-	0.00	-6.00	-	RESIDENTIAL	720.09	720.00
DW# 03	PP 01	114+71.37	RT	CONCRETE	CONCRETE	15	26	73	2.50	5.16	-	1.90	0.00	-	COMMERCIAL	720.65	720.69
DW# 04	PP 01	116+37.10	RT	ASPHALT	ASPHALT	15	28	77	3.50	7.07	6.22	-2.00	-6.00	-10.00	COMMERCIAL	721.57	720.45
DW# 05	PP 02	120+04.42	LT	CONCRETE	CONCRETE	15	34	76	2.50	6.24	-	1.90	8.00	-	COMMERCIAL	724.42	724.97
DW# 06	PP 02	123+18.85	LT	CONCRETE	CONCRETE	15	34	92	10.70	5.50	-	-2.00	-8.00	-	COMMERCIAL	726.85	726.20
DW# 07	PP 02	125+19.85	RT	CONCRETE	CONCRETE	15	30	81	2.50	12.69	-	-1.10	-10.00	-	COMMERCIAL	729.62	728.32
DW# 08	PP 02	127+82.76	RT	ASPHALT	ASPHALT	14/12	26	61	2.50	2.50	22.25	-1.10	-10.00	-12.00	COMMERCIAL	731.64	728.72
DW# 09	PP 03	128+87.32	LT	CONCRETE	CONCRETE	18	32	107	2.00	16.19	-	-1.50	-8.00	-	COMMERCIAL	731.98	730.65
DW# 10	PP 03	130+60.96	RT	GRAVEL	ASPHALT	12	32	69	9.92	-	-	-1.00	-	-	COMMERCIAL	731.44	731.34
DW# 11	PP 03	131+59.67	LT	GRAVEL	ASPHALT	17/19	20	73	2.00	14.43	-	-1.50	-6.00	-	COMMERCIAL	733.92	733.02
DW# 12	PP 03	133+41.79	RT	GRAVEL	ASPHALT	14/15	21	58	2.00	14.61	-	-6.25	-12.00	-	COMMERCIAL	733.33	731.45
DW# 13	PP 03	134+18.52	RT	GRAVEL	ASPHALT	15	14	47	2.50	6.12	6.20	-5.90	-8.00	-12.00	RESIDENTIAL	733.85	732.47
DW# 14	PP 03	135+10.86	RT	GRAVEL	ASPHALT	15	14	50	1.50	13.43	-	-5.90	-10.00	-	RESIDENTIAL	734.81	733.38
DW# 14 A	PP 03	135+49.01	LT	GRAVEL	ASPHALT	15	27	78	6.47	-	-	2.00	-	-	COMMERCIAL	735.37	735.50
DW# 15	PP 03	136+30.91	LT	GRAVEL	ASPHALT	15	40	98	3.93	-	-	-2.00	-	-	COMMERCIAL	736.59	736.51
DW# 16	PP 04	139+61.93	LT	ASPHALT	ASPHALT	15	40	104	3.90	-	-	1.90	-	-	COMMERCIAL	740.80	740.87
DW# 17	PP 05	155+72.25	LT	CONCRETE	CONCRETE	25	30	249	2.50	19.15	-	1.90	8.00	-	COMMERCIAL	736.12	737.70
DW# 18	PP 05	157+51.60	LT	CONCRETE	CONCRETE	25	30	253	2.50	3.43	-	1.90	3.00	-	COMMERCIAL	736.03	736.18
DW# 19	PP 05	160+41.36	LT	GRAVEL	ASPHALT	15	27	98	1.30	-	-	-5.90	-	-	RESIDENTIAL	738.41	738.33
DW# 20	PP 06	164+13.43	LT	ASPHALT	ASPHALT	15	12	56	2.00	22.50	-	-5.90	-17.21	-	RESIDENTIAL	744.31	740.32
DW# 20 A	PP 06	164+61.19	LT	ASPHALT	ASPHALT	20	15	87	2.50	26.21	-	-5.90	-15.76	-	COMMERCIAL	745.07	740.79
DW# 21	PP 06	169+18.41	LT	GRAVEL	ASPHALT	15	15	55	2.00	19.24	-	-5.90	-8.57	-	RESIDENTIAL	739.68	737.92
DW# 22	PP 07	180+41.72	LT	ASPHALT	ASPHALT	15	12	56	2.00	10.00	19.59	-2.00	-6.00	-8.00	RESIDENTIAL	734.21	732.00
DW# 23	PP 08	193+30.08	LT	ASPHALT	ASPHALT	15	10	49	4.24	-	-	1.50	-	-	RESIDENTIAL	747.39	747.45
DW# 24	PP 09	203+25.04	LT	ASPHALT	ASPHALT	15	18	46	5.00	16.40	-	1.90	-1.34	-	RESIDENTIAL	727.64	727.51
DW# 25	PP 09	203+67.71	LT	GRAVEL	ASPHALT	15/20	22	84	16.71	-	-	1.50	-	-	COMMERCIAL	726.81	727.06
DW# 26	PP 10	208+46.09	LT	GRAVEL	ASPHALT	24	16	124	1.00	10.00	16.46	-5.90	-8.00	-11.13	COMMERCIAL	726.11	723.42
DW# 27	PP 10	215+60.36	LT	GRAVEL	ASPHALT	15	23	90	2.00	5.43	-	-5.50	-8.00	-	RESIDENTIAL	724.69	724.15
DW# 28	PP 11	224+26.33	RT	GRAVEL	ASPHALT	12	10	29	2.00	2.00	8.98	1.90	7.00	8.55	RESIDENTIAL	731.35	732.30
DW# 29	PP 11	224+76.33	RT	GRAVEL	ASPHALT	12/14	60	118	2.00	2.00	9.26	1.90	7.00	8.00	COMMERCIAL	731.52	732.44
DW# 30	PP 12	232+87.71	RT	ASPHALT	ASPHALT	15	12	47	1.00	1.50	14.18	1.90	5.80	11.00	RESIDENTIAL	731.91	733.58
DW# 31	PP 12	233+91.92	LT	GRAVEL	ASPHALT	16	31	86	2.00	23.11	-	-5.90	-12.00	-	COMMERCIAL	732.43	729.54
DW# 32	PP 12	236+67.30	LT	GRAVEL	ASPHALT	16	31	84	2.00	21.12	-	-6.45	-12.00	-	COMMERCIAL	733.67	731.01
DW# 34	PP 13	239+26.41	LT	CONCRETE	CONCRETE	15	49	124	15.01	8.50	9.82	-2.00	-8.00	-	RESIDENTIAL	728.94	728.00
DW# 35	PP 13	243+27.52	LT	CONCRETE	CONCRETE	18	58	137	2.00	6.53	-	0.50	3.00	-	COMMERCIAL	713.81	713.99
DW# 36	PP 13	243+27.52	RT	ASPHALT	ASPHALT	25	48	171	2.00	10.11	-	-1.25	-6.00	-	COMMERCIAL	715.27	714.64

STATE OF TEXAS
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12/2/2022

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RM 967

SUMMARY OF DRIVEWAYS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		78

STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

SUMMARY OF DRIVEWAY STRUCTURES

DRIVEWAY NUMBER	P&P SHEET NUMBER	CENTERLINE STATION		EXIST PIPE	PROPOSED PIPE	S.E.T. SIDE SLOPE	CULVERT GRADE (%)	UPSTREAM FLOWLINE			DOWNSTREAM FLOWLINE		
								STATION	OFFSET (FT)	ELEV (FT)	STATION	OFFSET (FT)	ELEV (FT)
DW# 00	PP 01	111+50.00	RT	1-24" CMP	REMOVE 11' LT EXTEND @ 45° 22' LT & CONNECT TO DW#01 PIPE	6:1	3.27	111+83.94	31.48	716.65	111+34.80	59.82	715.08
DW# 01	PP 01	112+18.89	RT	1-24" CMP	1-24" X 56' RCP TO BE CONNECTED W/ DW#00	6:1	0.63	112+41.59	32.35	717.00	111+83.94	31.48	716.65
DW# 02	PP 01	113+52.35	RT	1-24" CMP	1-24" X 52' RCP	6:1	0.45	113+76.16	30.02	717.57	113+27.16	30.13	717.35
DW# 03	PP 01	114+71.37	RT	1-24" CMP	1-24" X 63' RCP	6:1	0.84	115+02.43	30.93	718.53	114+39.43	31.04	718.00
DW# 04	PP 01	116+37.10	RT	1 - 18" CMP	1 - 18" X 61' RCP	6:1	1.30	116+67.35	32.50	719.60	116+06.35	32.45	718.81
DW# 05	PP 02	120+04.42	LT	2 - 24" CMP	2 - 24" X 78' RCP	6:1	0.82	120+36.78	30.98	722.95	119+57.78	31.02	722.30
DW# 06	PP 02	123+18.85	LT	1 - 18" CMP	2-24" X 110' RCP	6:1	0.87	123+88.68	32.06	724.75	122+85.27	32.50	723.85
DW# 07	PP 02	125+19.85	RT	1 - 18" CMP	1 - 18" X 56' RCP	6:1	0.64	125+46.86	35.70	726.45	124+91.77	35.61	726.10
DW# 08	PP 02	127+82.76	RT	1 - 18" CMP	1 - 18" X 63' RCP	6:1	0.97	128+16.01	32.01	728.80	127+53.95	33.17	728.20
DW# 09	PP 03	128+87.32	LT	1 - 18" CMP	2 - 24" X 69' RCP	6:1	0.99	129+23.66	34.84	728.55	128+55.90	33.76	727.88
DW# 10	PP 03	130+60.96	RT	1 - 18" CMP	1 - 18" X 60' RCP	6:1	0.41	130+94.83	31.74	729.55	130+33.42	31.99	729.30
DW# 11	PP 03	131+59.67	LT	1 - 18" RCP	2 - 24" X 57' RCP	6:1	0.70	131+88.26	33.80	730.64	131+32.27	33.95	730.25
DW# 12	PP 03	133+41.79	RT	1 - 18" CMP	1 - 18" X 50' RCP	6:1	0.64	133+67.33	32.34	730.60	133+17.34	33.39	730.28
DW# 13	PP 03	134+18.52	RT	1 - 18" CMP	1 - 18" X 44' RCP	6:1	2.27	134+39.71	32.80	731.75	133+95.71	32.49	730.75
DW# 14	PP 03	135+10.86	RT	1 - 18" CMP	1 - 18" x 51' RCP	6:1	0.80	135+35.12	31.57	732.35	134+84.13	31.42	731.94
DW# 14 A	PP 03	135+49.01	LT	1 - 18" CMP	1 - 18" X 150' RCP	6:1	0.85	N/A	N/A	N/A	135+18.20	31.70	733.42
DW# 15	PP 03	136+30.91	LT	1 - 18" CMP	COMBINED WITH DW 14A	6:1	N/A	136+68.36	32.43	734.70	N/A	N/A	N/A
DW# 16	PP 04	139+61.93	LT	1 - 18" CMP	1 - 18" X 95' RCP	6:1	0.84	140+12.67	32.15	739.25	139+17.60	31.53	738.45
DW# 17	PP 05	155+72.25	LT	1 - 18" CMP	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DW# 18	PP 05	157+51.60	LT	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DW# 19	PP 05	160+41.36	LT	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DW# 20	PP 06	164+13.43	LT	1 - 15" CMP	1 - 18" X 88' RCP	6:1	N/A	N/A	N/A	N/A	163+94.99	33.36	739.30
DW# 20 A	PP 06	164+61.19	LT	1 - 12" CMP	COMBINED WITH DW 20	6:1	1.76	164+82.99	33.36	740.85	N/A	N/A	N/A
DW# 21	PP 06	169+18.41	LT	1 - 18" RCP	1 - 18" X 40' RCP	6:1	3.12	168+96.76	29.13	736.90	169+36.79	29.43	735.65
DW# 22	PP 07	180+41.72	LT	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DW# 23	PP 08	193+30.08	LT	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DW# 24	PP 09	203+25.04	LT	NONE	COMBINED WITH DW 25	6:1	1.95	203+96.88	26.96	726.42	N/A	N/A	N/A
DW# 25	PP 09	203+67.71	LT	1 - 18" RCP	1 - 18" X 92' RCP	6:1	N/A	N/A	N/A	N/A	203+05.12	26.77	724.63
DW# 26	PP 10	208+46.09	LT	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DW# 27	PP 10	215+60.36	LT	1 - 18" RCP	1 - 18" X 48' RCP	6:1	0.50	215+32.60	31.00	721.65	215+80.96	31.00	721.41
DW# 28	PP 11	224+26.33	RT	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DW# 29	PP 11	224+76.33	RT	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DW# 30	PP 12	232+87.71	RT	NONE	2 - 18" X 48' RCP	6:1	0.71	233+12.83	29.75	730.49	232+63.83	29.75	730.15
DW# 31	PP 12	233+91.92	LT	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DW# 32	PP 12	236+67.30	LT	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DW# 33	PP 12	237+36.52	RT	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DW# 34	PP 13	239+26.41	LT	1 - DES 3 CMP	1 -DES 3 X 68' RCP	6:1	1.79	238+88.24	35.50	726.40	239+60.73	35.36	725.10
DW# 35	PP 13	243+27.52	LT	1 - 24" CMP	1 - 24" X 85' RCP	6:1	3.33	242+76.82	31.63	713.37	243+63.49	30.48	710.48
DW# 36	PP 13	243+27.52	RT	NONE	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTE:

1. STATION AND OFFSET ARE TAKEN FROM THE SOFFIT OF THE S.E.T.
2. OFFSET FOR DOUBLE BARREL CULVERTS IS TAKEN FROM BARREL CLOSEST TO PAVEMENT.
3. USE SETP-PD STANDARD FOR ALL RCP & CMP PIPES.
   USE SETP-PD-A STANDARD FOR DW# 34.

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

Texas Department of Transportation

BGE, Inc.
1701 Directors Blvd., Suite 1000, Austin, TX 78744
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

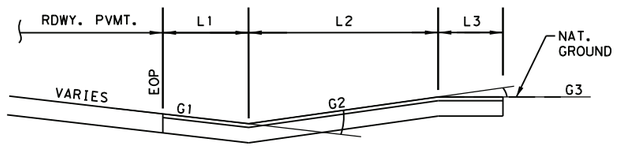
RM 967

SUMMARY OF DRIVEWAY STRUCTURES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			79
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

G = DRIVEWAY GRADE (%)
L = HORIZONTAL LENGTH TO THE GRADE BREAK

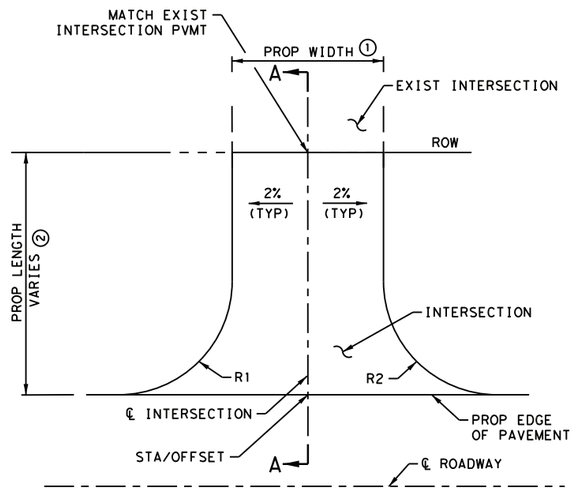


DRIVEWAYS

NTS

SEE DWMB-22(AUS) FOR ADDITIONAL DETAILS

SEE SUMMARY OF DRIVEWAYS FOR ADDITIONAL DIMENSIONS AND QUANTITIES

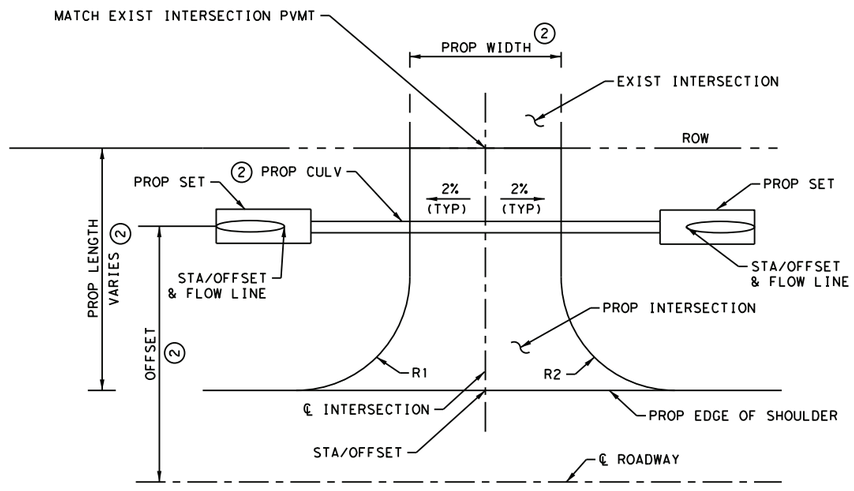


INTERSECTIONS

NTS

① SEE SUMMARY OF DRIVEWAYS AND SUMMARY OF INTERSECTIONS FOR ADDITIONAL DETAILS, DIMENSIONS AND QUANTITIES

② LIMITS OF PAY VARY FOR INTERSECTION AS SHOWN ON PLAN SHEETS AND ON SUMMARY OF DRIVEWAYS, SUMMARY OF DRIVEWAY CULVERTS OR SUMMARY OF INTERSECTIONS



INTERSECTIONS

NTS

STATE OF TEXAS
ELENA RAMON
141765
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PROFESSIONAL ENGINEER

1/17/2023

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TBPE Registration No. F-1046

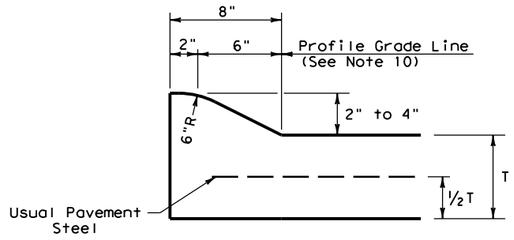
RM 967

MISCELLANEOUS DETAILS

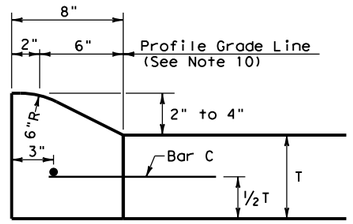
SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			80
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

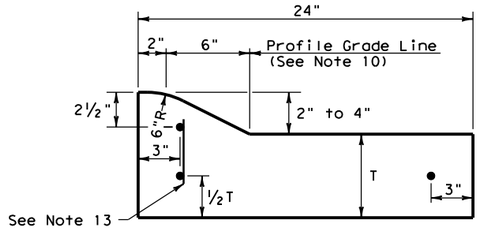
DATE: 12/2/2022
FILE: G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\03-RDWY\Stds\cccg22.dgn



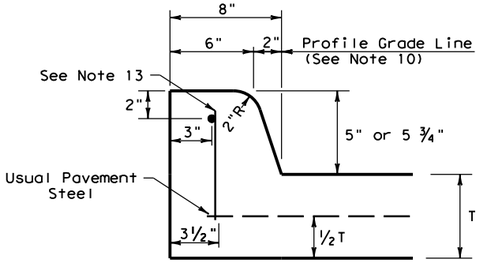
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



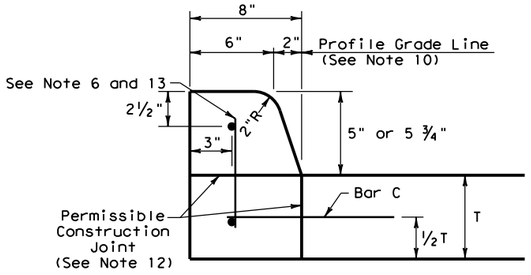
TYPE I CURB
2" - 4" HEIGHT



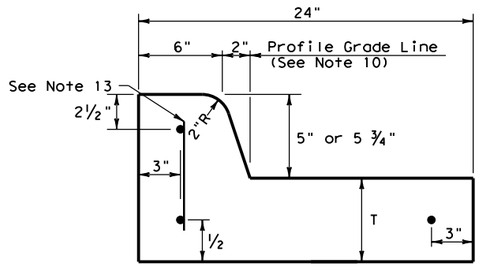
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



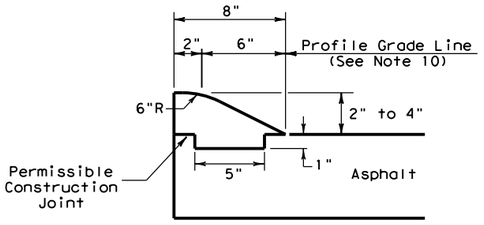
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



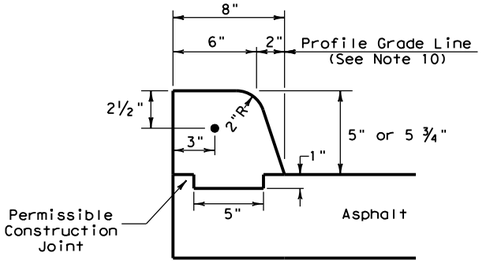
TYPE II CURB
5" - 5 ¾" HEIGHT



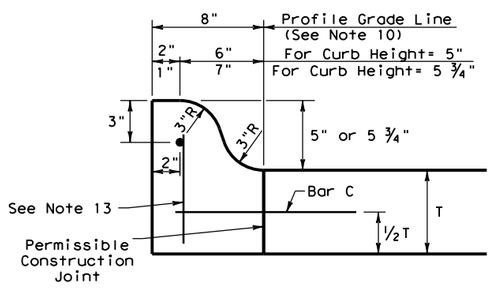
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



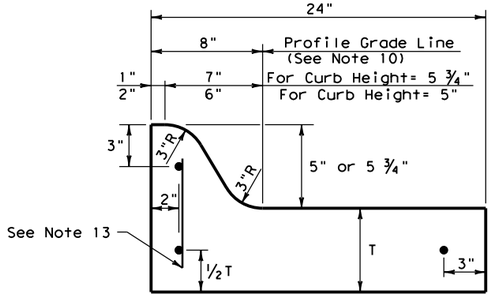
TYPE III CURB (KEYED)
2" - 4" HEIGHT



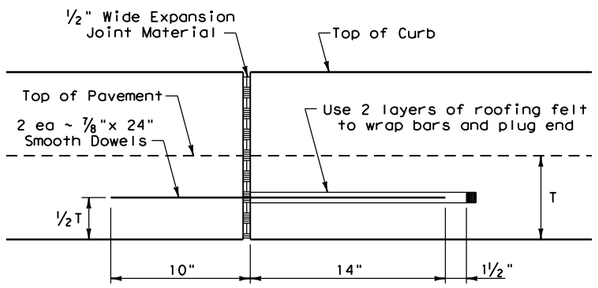
TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

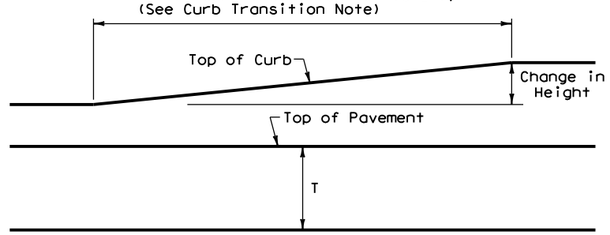


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

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

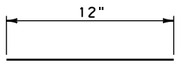


CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

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

BAR B



BAR C

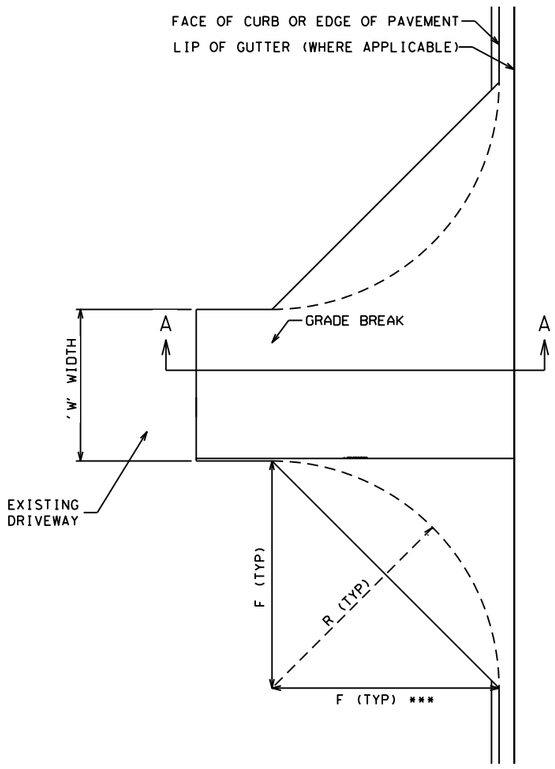
Texas Department of Transportation

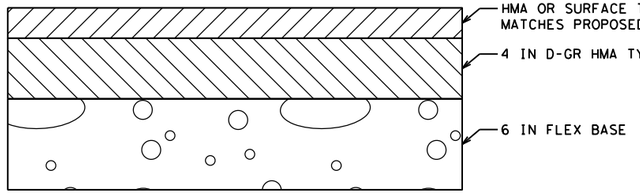
Design Division Standard

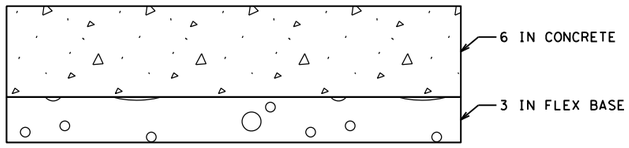
CONCRETE CURB AND CURB AND GUTTER

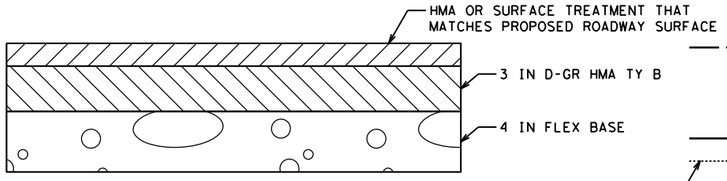
CCCG-22

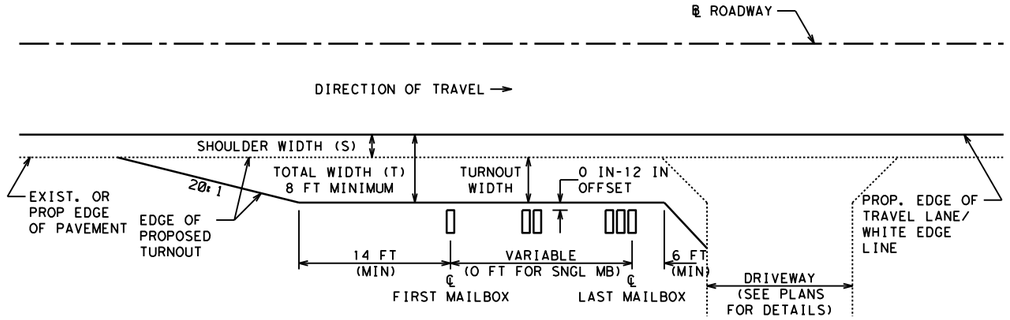
FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		81

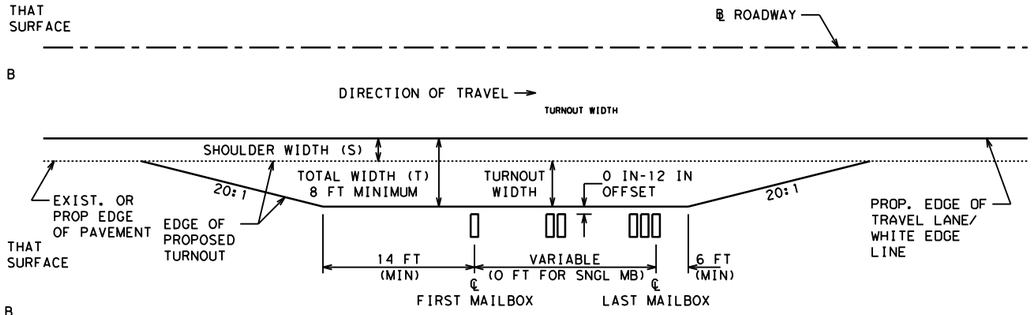










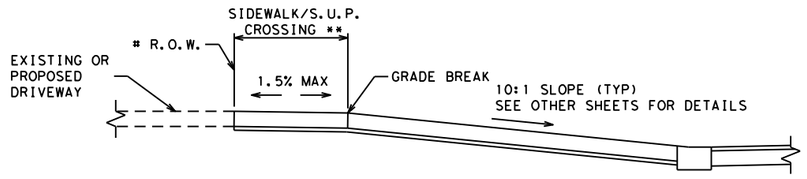


FLARE OR RADIUS	FARM/RANCH	RESIDENTIAL	COMMERCIAL
"F" OR "R" (FT)	25	25	25

THESE ARE STANDARD DIMENSIONS UNLESS OTHERWISE SHOWN ELSEWHERE ON THE PLANS.

FLARES ARE TYPICALLY USED FOR SUBURBAN/URBAN (CURBED) ROADWAYS. RADII ARE TYPICALLY USED FOR RURAL OR UNCURBED ROADWAYS.

*** THIS 'F' DIMENSION MAY BE REDUCED TO KEEP WORK WITHIN THE ROW.



ACTUAL TIE-IN SHOWN ELSEWHERE IN PLANS OR AS DIRECTED

ENSURE GRADE BREAK DOES NOT EXCEED 8% UNLESS OTHERWISE DIRECTED. PROVIDE ABSOLUTE MINIMUM SIDEWALK CROSSING WIDTH OF 4' FOR DRIVEWAYS WIDTH OF 20' OR LESS

** LOCATE SIDEWALK CROSSING TO ALIGN WITH ADJACENT SIDEWALK; SIDEWALK/S.U.P. WIDTH AND LOCATION SHOWN ELSEWHERE ON THE PLANS.

PROVIDE EXPANSION 20 FT C-C FOR WIDTH OR LENGTH OVER 25 FT. EXPANSION JOINT PER AUS STANDARD FOR SIDEWALK (MCPSWMD).

REINFORCEMENT WILL BE IN ACCORDANCE WITH ITEM 432.3.1 USING NO. 3 OR NO. 4 BARS.

FIBER REINFORCEMENT IS NOT ALLOWED. CLASS A CONCRETE IS ALLOWED TO USE COARSE AGGREGATE GRADES 1-8.

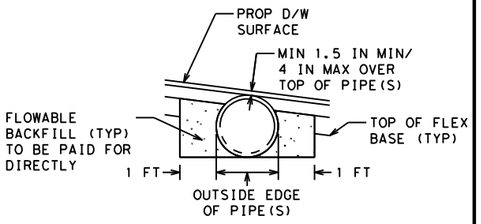
IN LIEU OF PFC OR TOM, SURFACE MUST BE 1.5" D-GR HMA TY D. IF SURFACE IS A MULTIPLE COURSE SURFACE TREATEMENT, ALL COURSES MUST BE PLACED ON DRIVEWAY. SURFACE HMA IS PG 76-22. NON SURFACE HMA IS PG 64-22 AND MAY BE BLADE LAID.

FURNISH BASE MEETING THE REQUIREMENTS FOR ANY TYPE OR GRADE IN ACCORDANCE WITH ITEM 247. BASE COMPRESSIVE STRENGTHS ARE WAIVED.

THE BASE UNDER THE CONCRETE MAY BE REPLACED WITH CONCRETE AT A RATIO OF 3 INCHES OF BASE EQUALS 2 INCHES OF CONCRETE.

FAST TRACK DRIVEWAYS MUST BE CLOSED, CONSTRUCTED, AND REOPENED WITHIN 24 HOURS.

IF ROOTS ARE ENCOUNTERED VERIFY WITH THE ENGINEER PRIOR TO ACCOMMODATING OR REMOVING 2 IN. DIAMETER OR LARGER ROOTS. ROOT REMOVAL MUST BE IN ACCORDANCE WITH ITEM 752.4.2. ROOTS MAY REMAIN IN THE BASE. FOR IMPROVEMENTS WITHIN 6 IN. OF A ROOT, THE CONCRETE THICKNESS MAY BE REDUCED BY 1 IN. AND THE BASE INCREASED BY 1 IN. TO MINIMIZE IMPACTS TO THE ROOTS. ADJUST BASE AND SURFACE PROFILE TO PROVIDE A 1 IN. BASE CUSHION AROUND THE ROOTS. THE SURFACE PROFILE MAY BE ADJUSTED TO THE EXTENT ALLOWED BY ADA. THIS WORK IS SUBSIDIARY.



ONLY ONE PIPE SHOWN
SEE ELSEWHERE ON THE PLANS FOR SPECIFIC DRIVEWAY DETAILS

Texas Department of Transportation | Austin District Standard

DRIVEWAYS AND MAILBOX TURNOUTS

NOT TO SCALE

DWMB-22 (AUS)

©TxDOT8YEAR8

REVISIONS
01/16: SHEET CREATED
04/19: APPROVED
11/20: TABLE REVISED, GN ADDED, PLAN & PROFILE MODIFIED
01/22: ADDED TURNOUT INFO

CONT	SECT	JOB	HIGHWAY
0016	16	028	RM 967
DIST	COUNTY		SHEET NO.
AUS	HAYS		82

DATE: 12/2/2022 11:56:34 AM
FILE: G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\03-ROWY\Stds\dwmb-22.dgn

DATE: 12/2/2022
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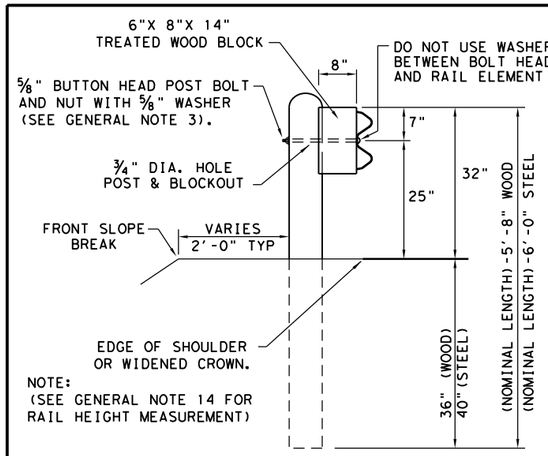
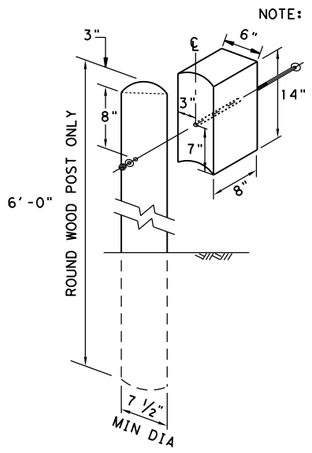
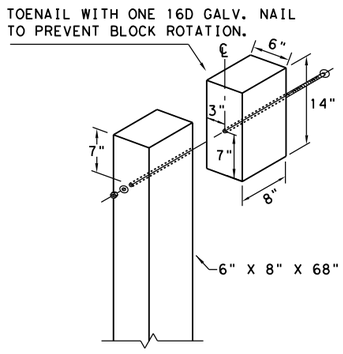


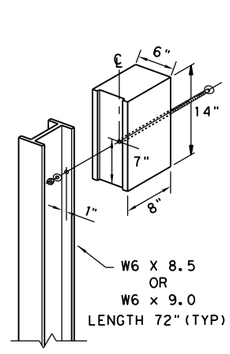
TYPICAL POST PLACEMENT



WOOD BLOCK TO
ROUND WOOD POST

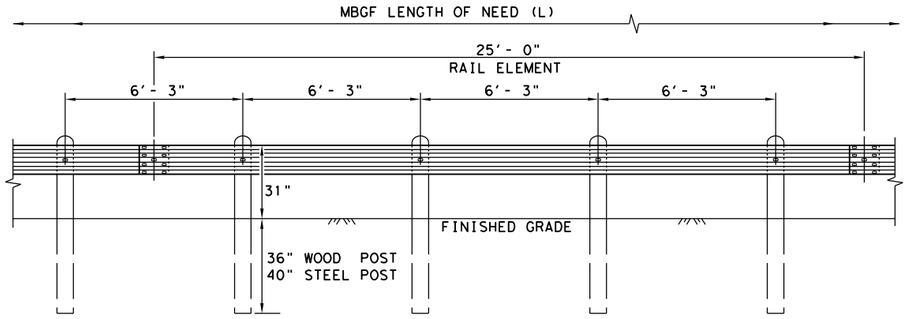


WOOD BLOCK TO
RECTANGULAR WOOD POST



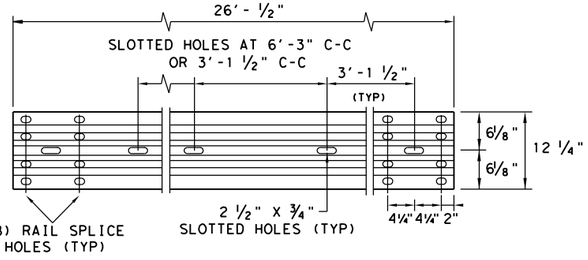
ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

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



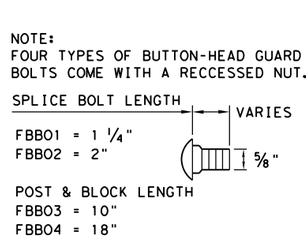
ELEVATION
MID-SPAN RAIL SPLICE

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



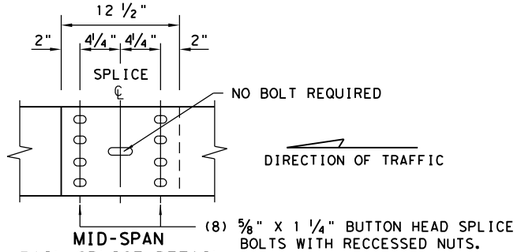
ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

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



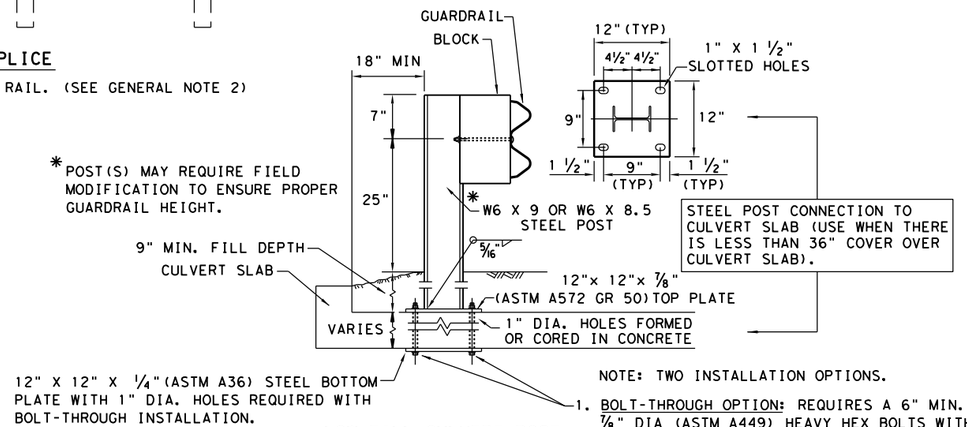
BUTTON HEAD BOLT

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



MID-SPAN
RAIL SPLICE DETAIL

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



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

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

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. 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.

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	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		83

DATE: 12/2/2022
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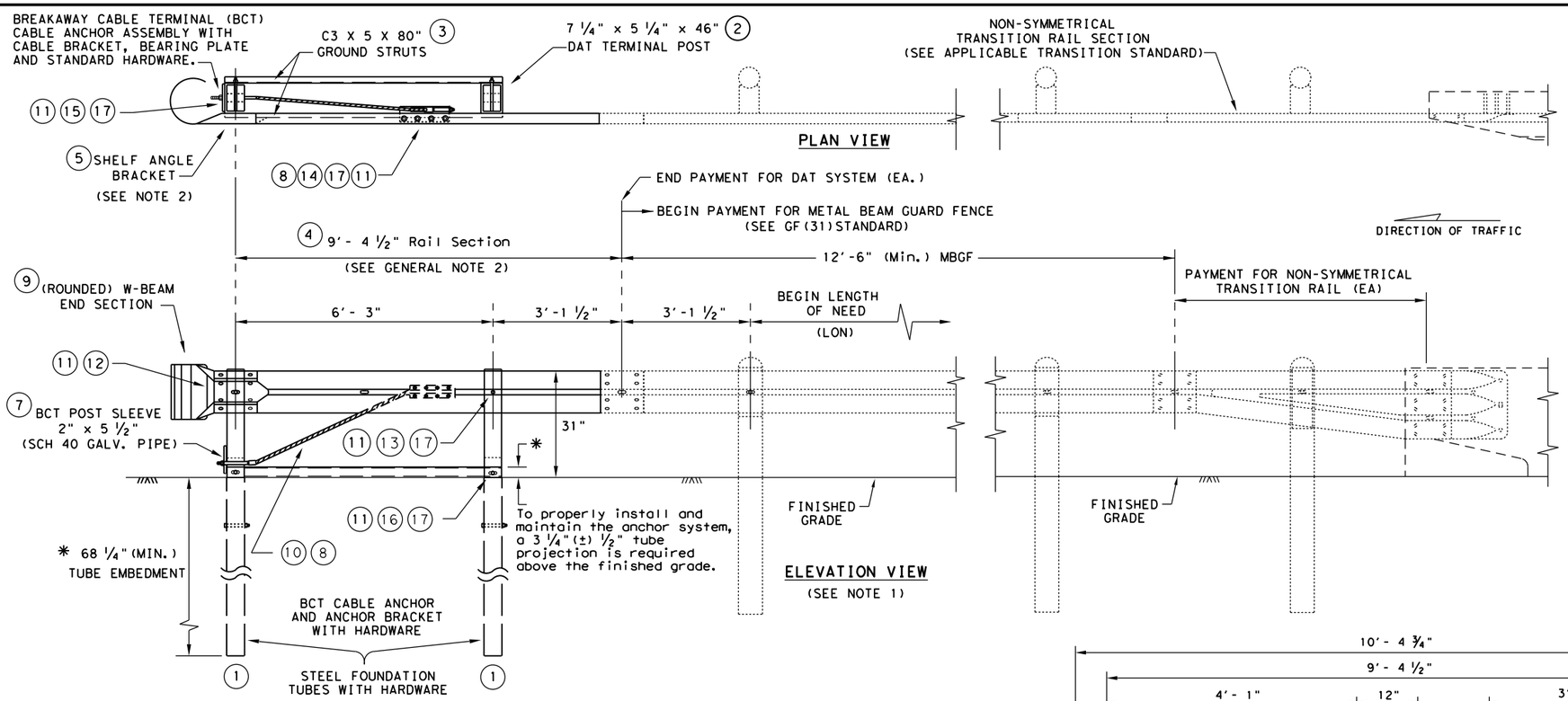


DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

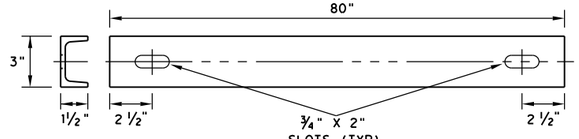
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 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

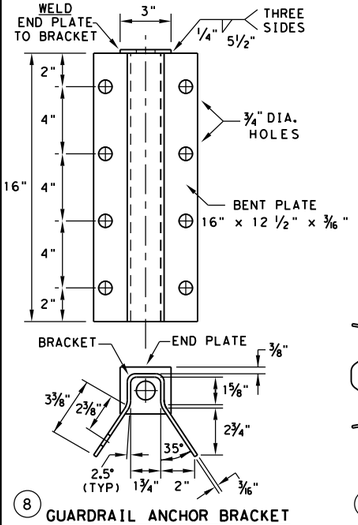
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(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

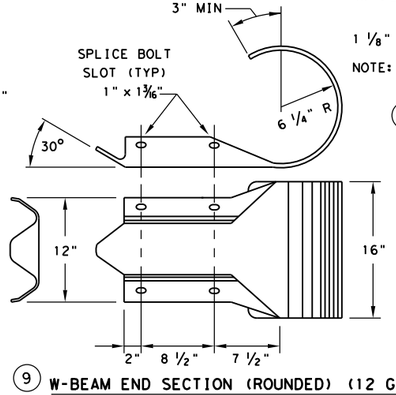
(4) TERMINAL RAIL ELEMENT FOR DAT



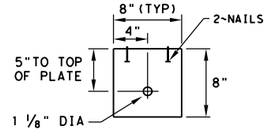
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



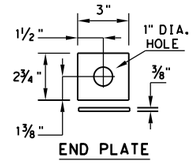
(8) GUARDRAIL ANCHOR BRACKET



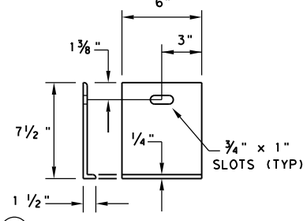
(9) W-BEAM END SECTION (ROUNDED) (12 GA.)



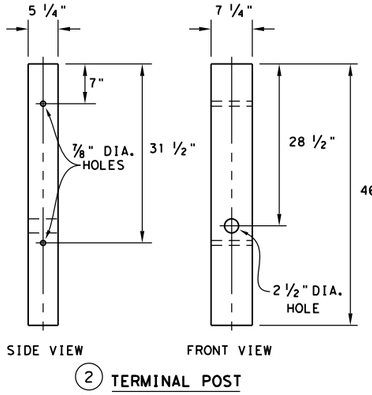
NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION
(6) BEARING PLATE
8"x 8"x 5/8" ℄



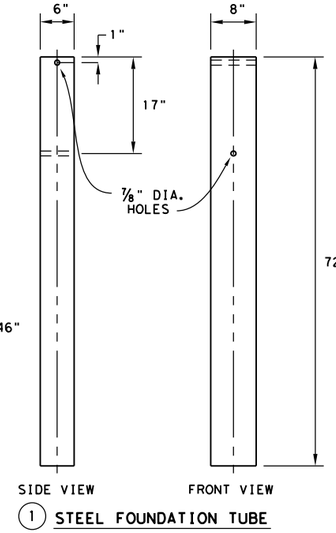
END PLATE



(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	0016	16	028	RM 967	
	DIST	COUNTY		SHEET NO.	
	AUS	HAYS		84	

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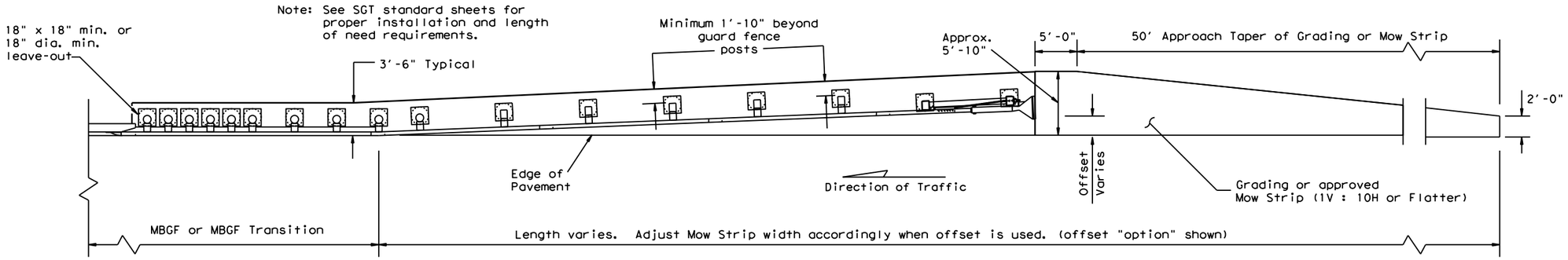
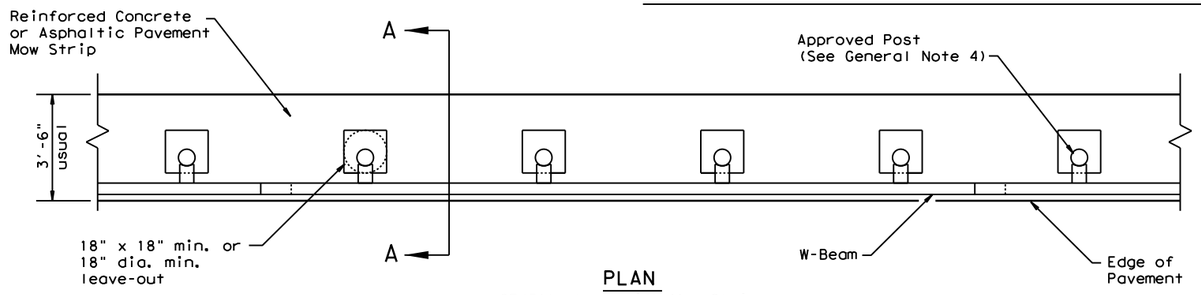
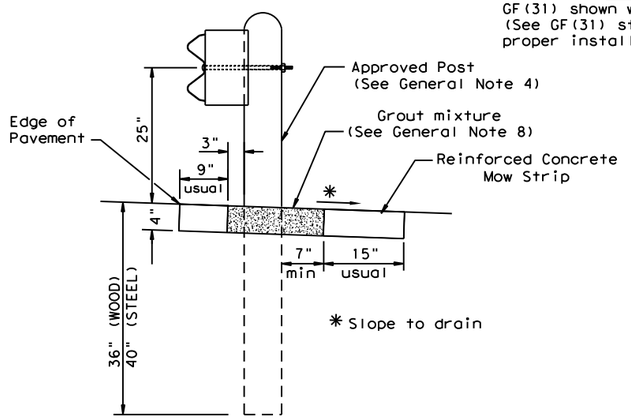


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



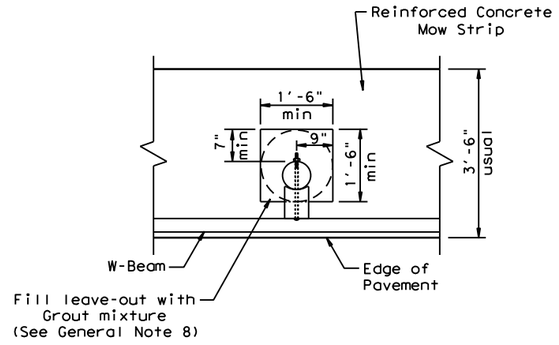
PLAN

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.

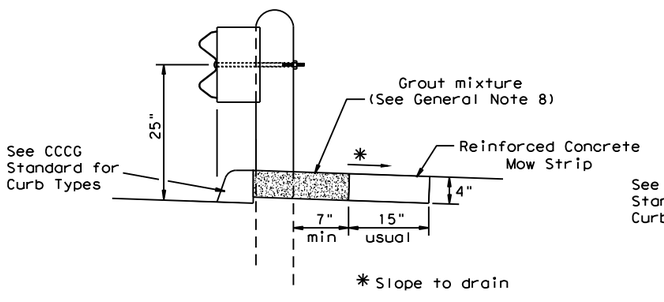
Note: Site Condition(s)

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.

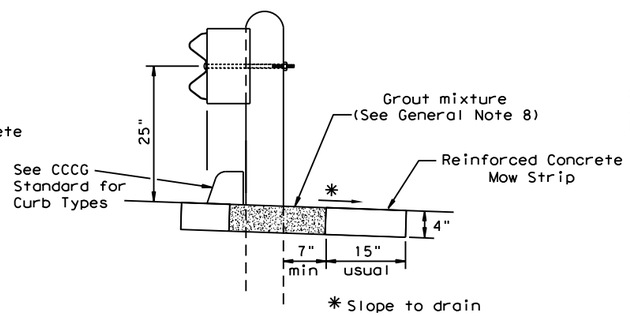
GENERAL NOTES

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.



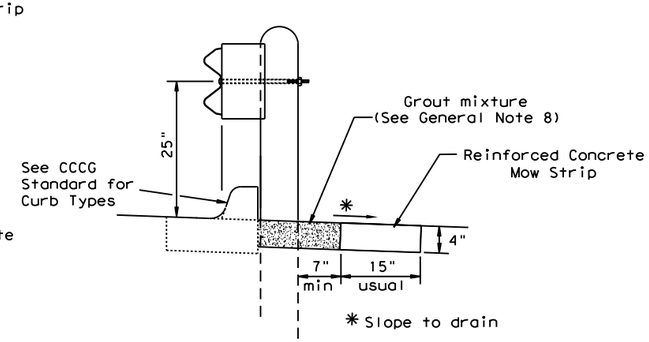
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

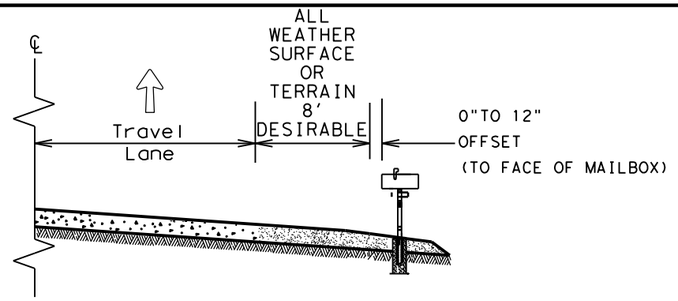
Texas Department of Transportation

Design Division Standard

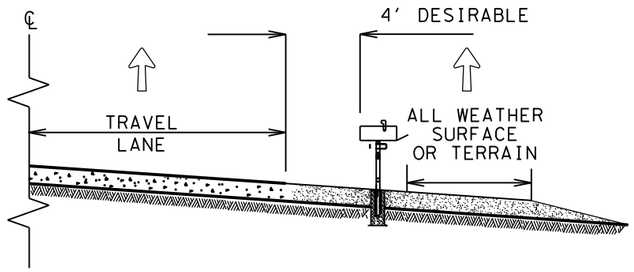
METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

GF(31)MS-19

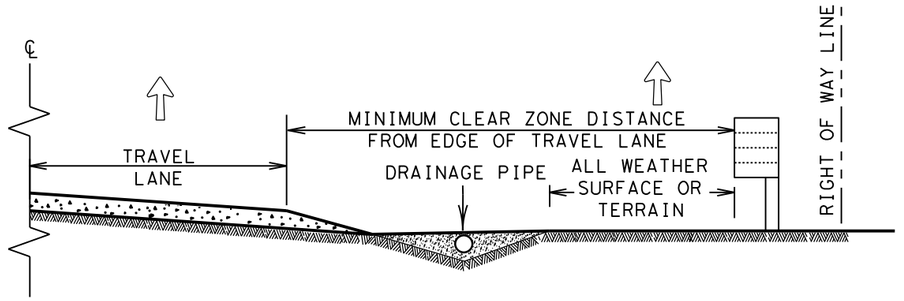
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		85



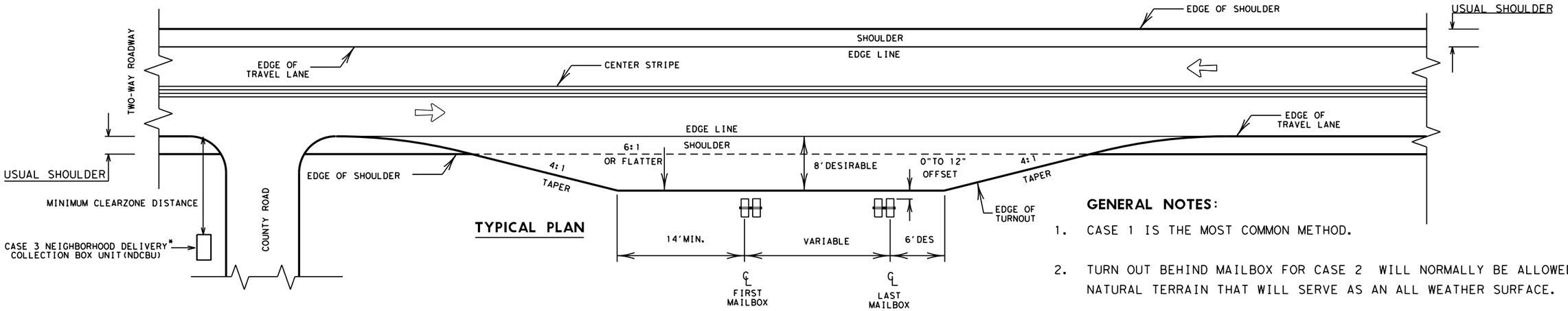
CASE 1. OFF TRAVEL WAY DELIVERY



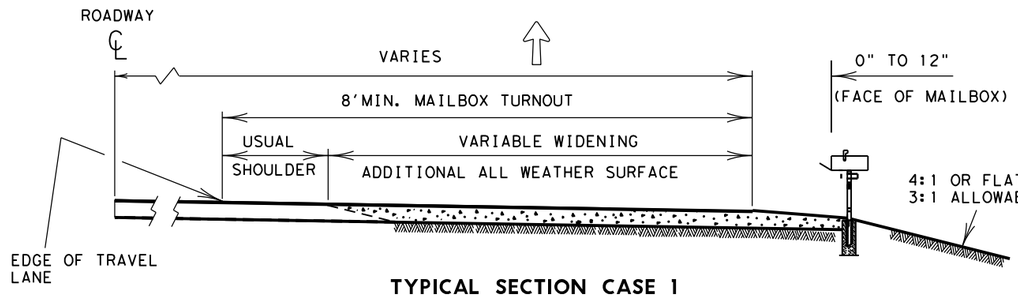
CASE 2. BACK SIDE DELIVERY



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

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	0016	16	028		RM 967	
	DIST	COUNTY			SHEET NO.	
	AUS	HAYS			86	

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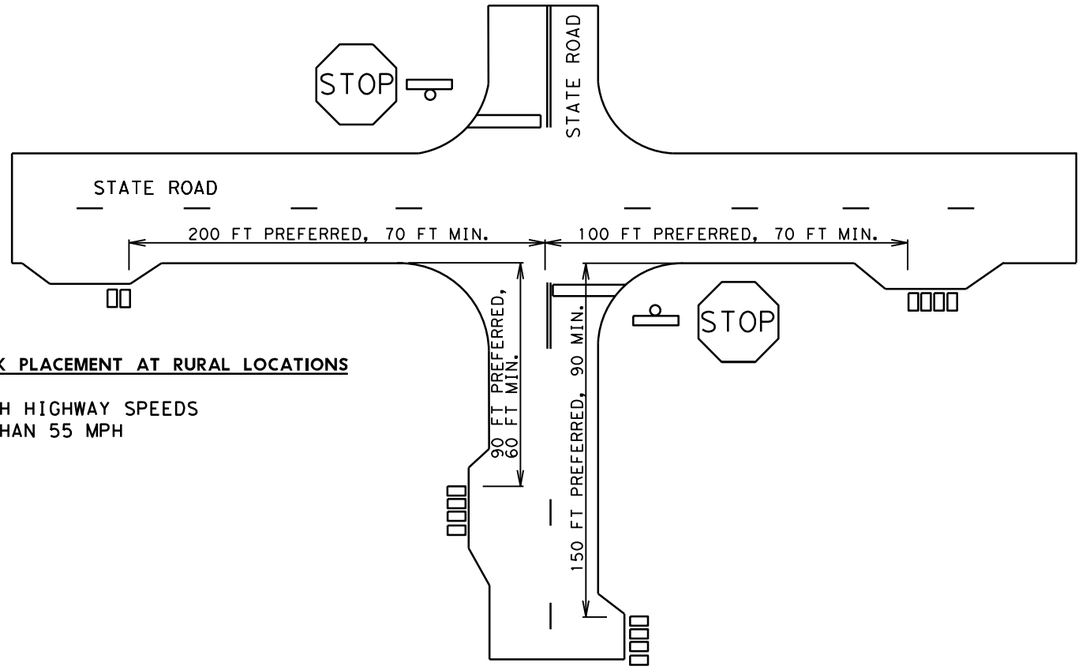
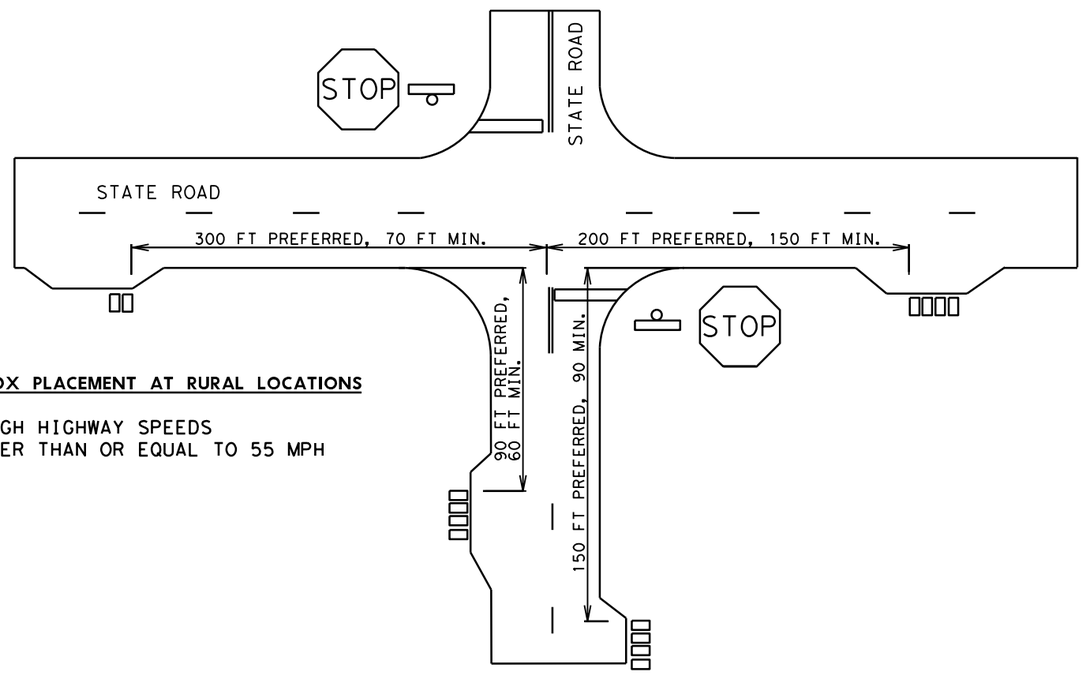


MAILBOX PLACEMENT AT RURAL LOCATIONS

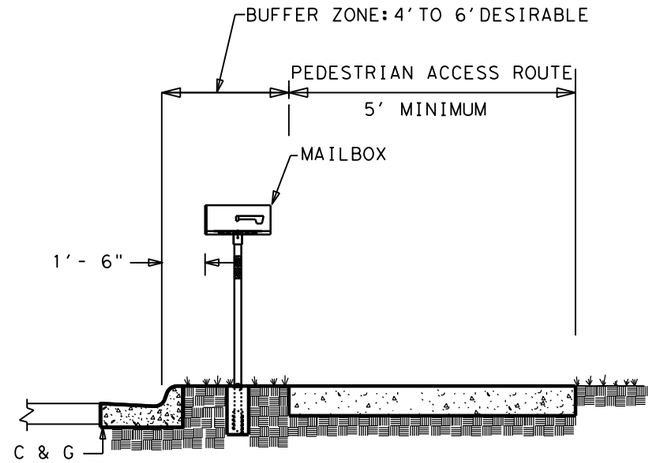
THROUGH HIGHWAY SPEEDS
LESS THAN 55 MPH



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:
© TxDOT OCTOBER 2022	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0016	16	028		RM 967	
12/2012 5/2014	DIST	COUNTY			SHEET NO.	
	AUS	HAYS			87	

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DATE:
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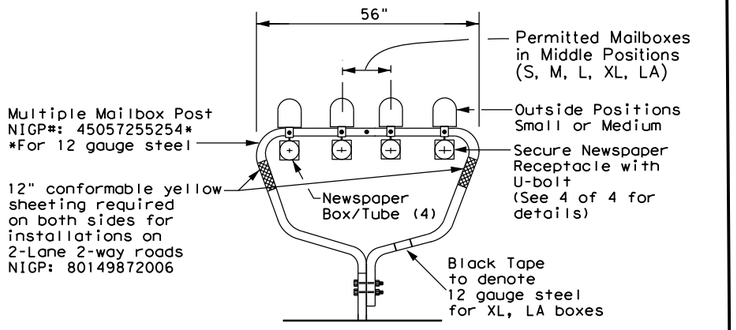

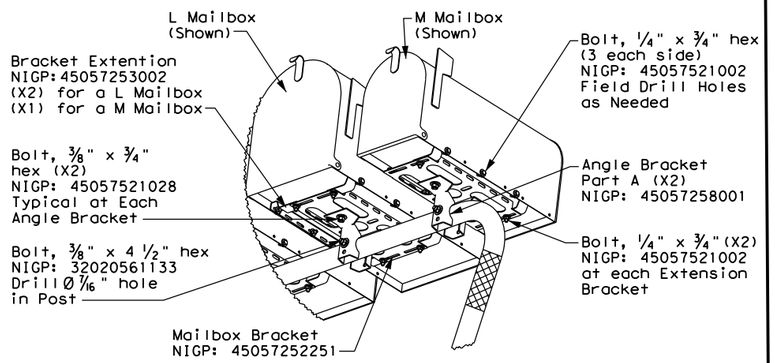

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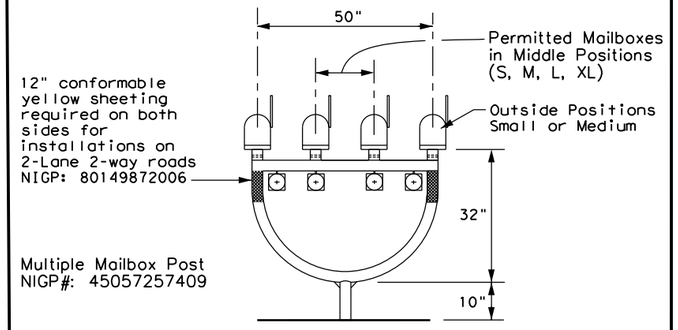
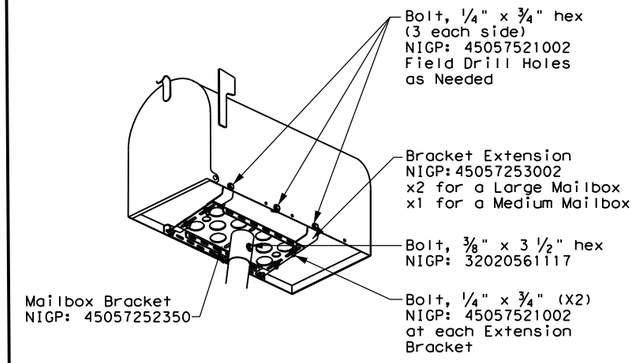




MAILBOX SIZES

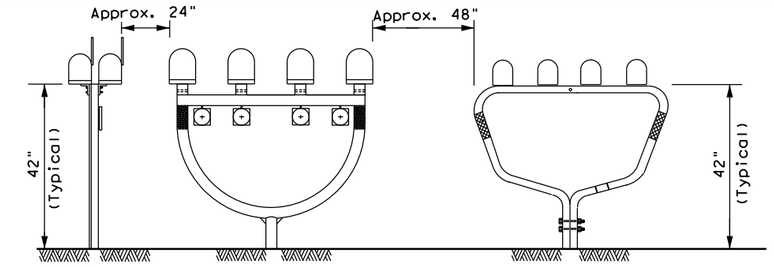
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

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

GENERAL NOTES:

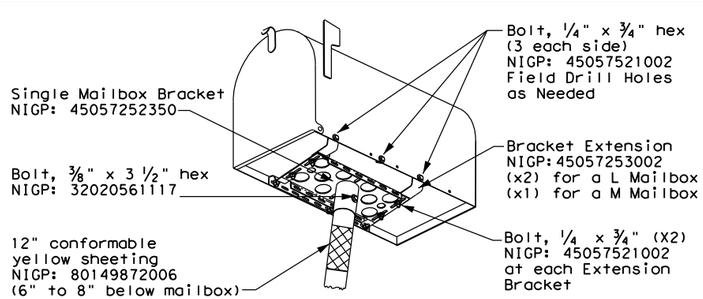
1. Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
2. Mailboxes shall be made of light weight sheet metal or light weight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

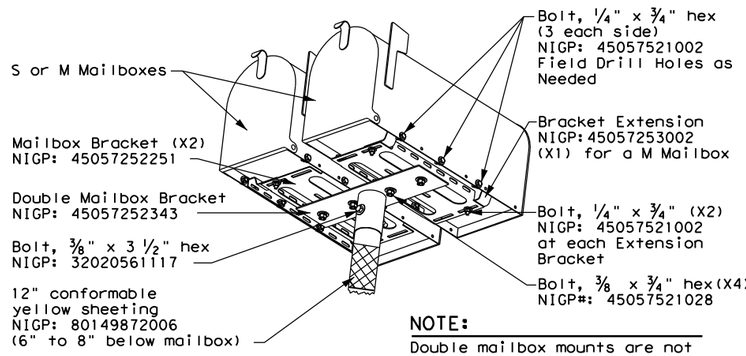
TYPICAL INSTALLATION MEASUREMENTS



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

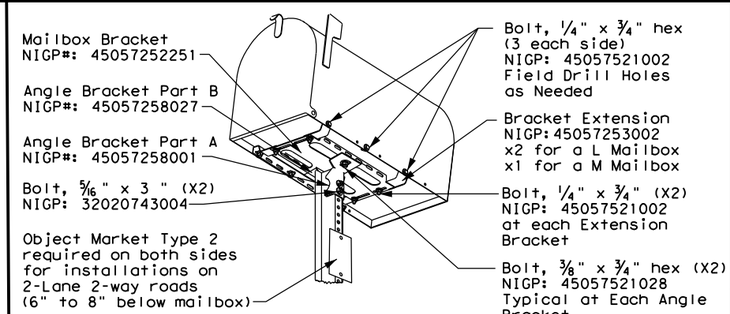
TYPE 2 and 4 - SINGLE/DOUBLE

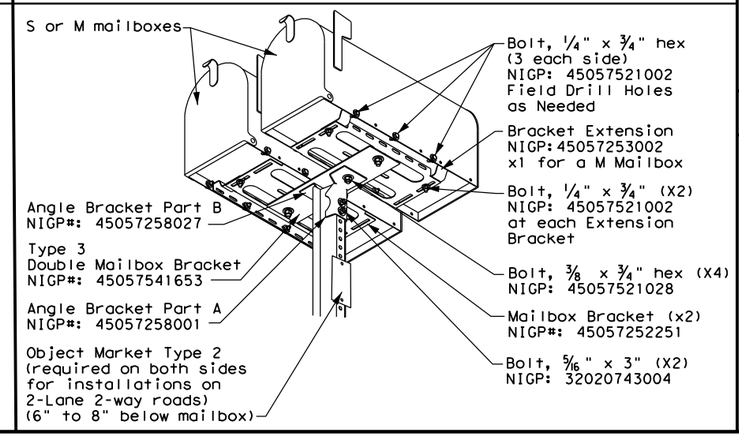




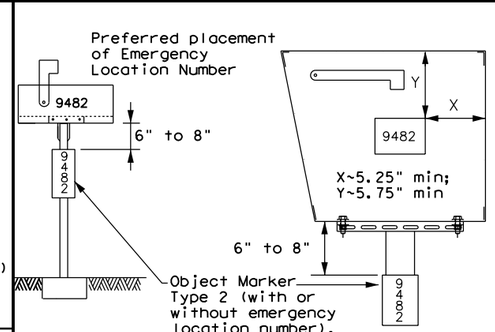
NOTE:
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

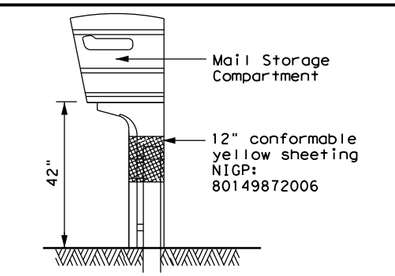


NOTES:

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
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		89

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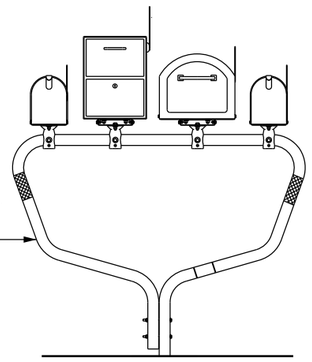
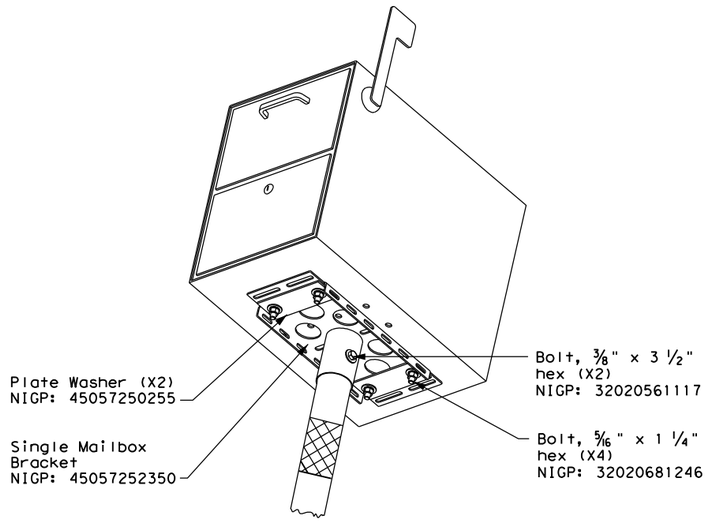
DATE:
FILE:

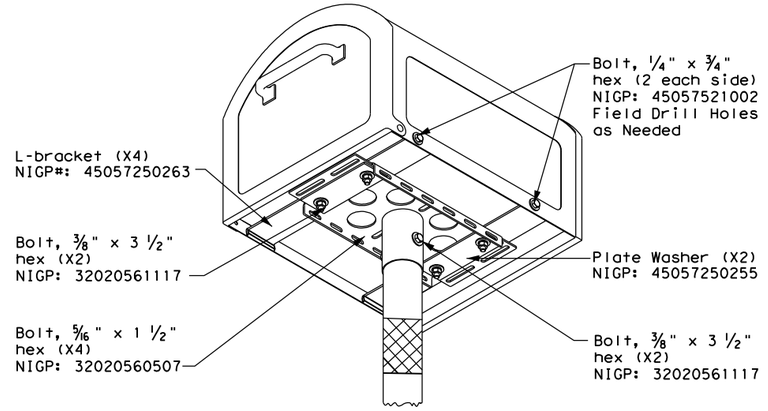
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

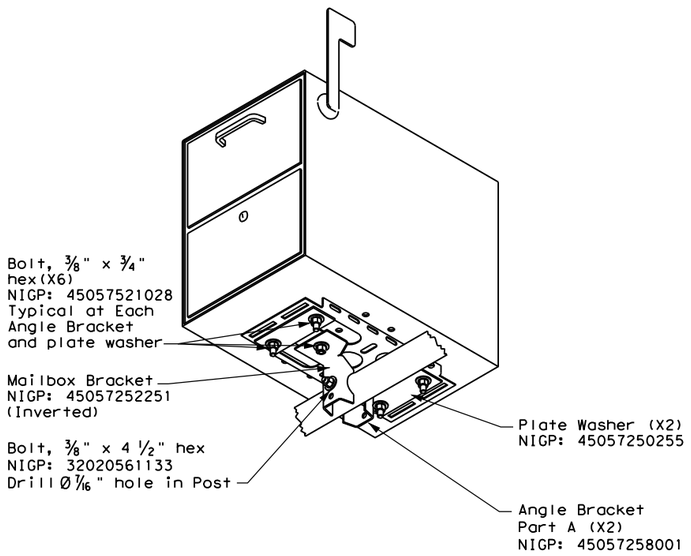


TYPE 2/4 - SINGLE XL MAILBOX

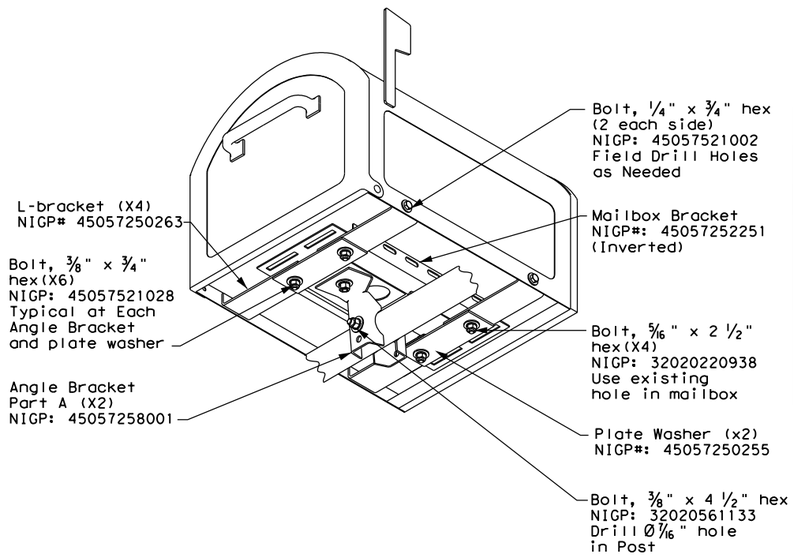


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

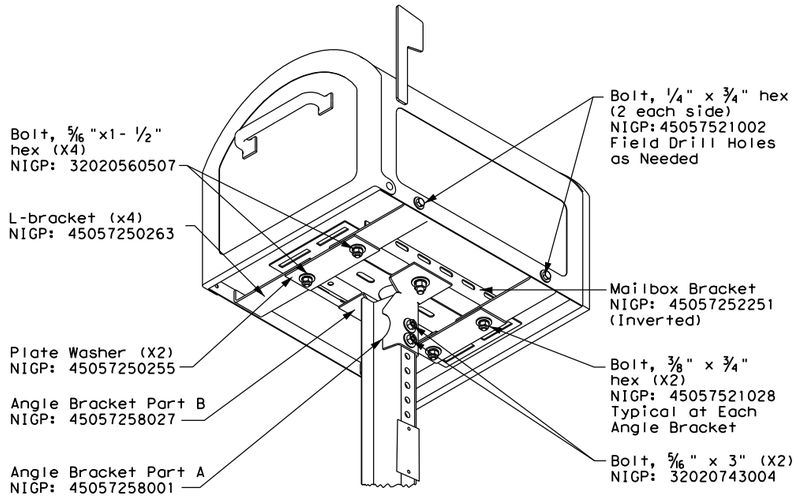
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation

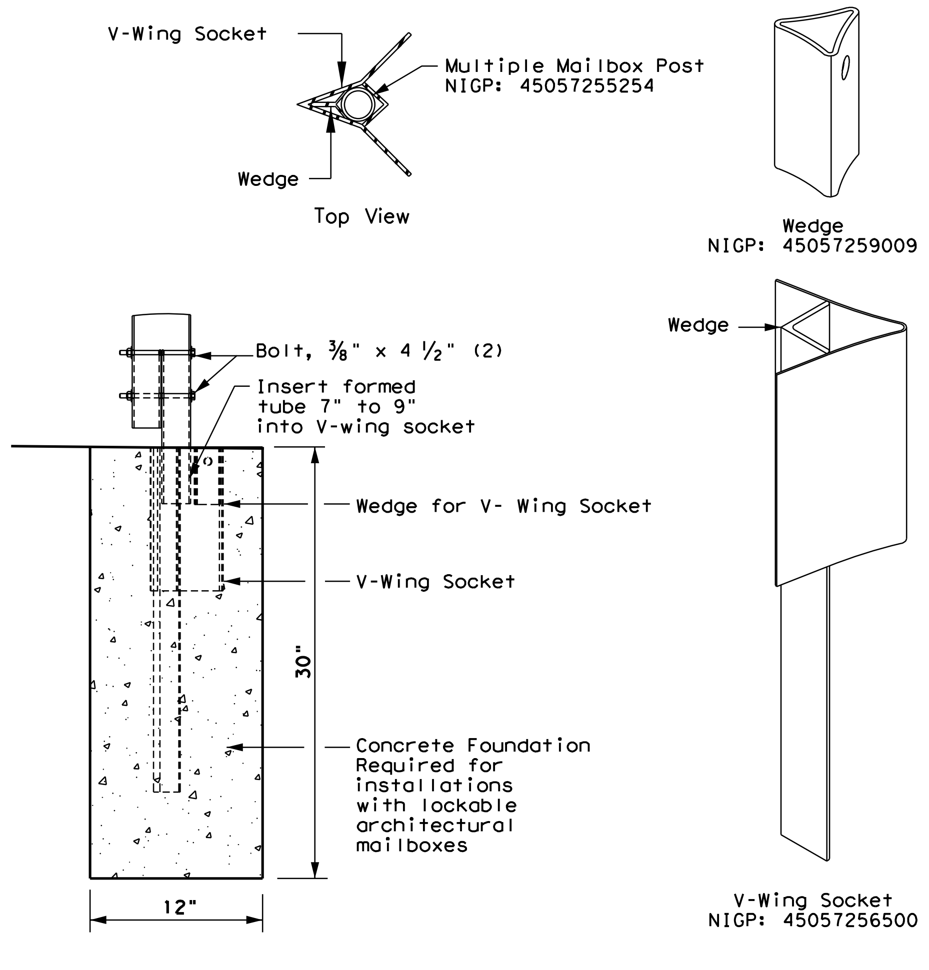
Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

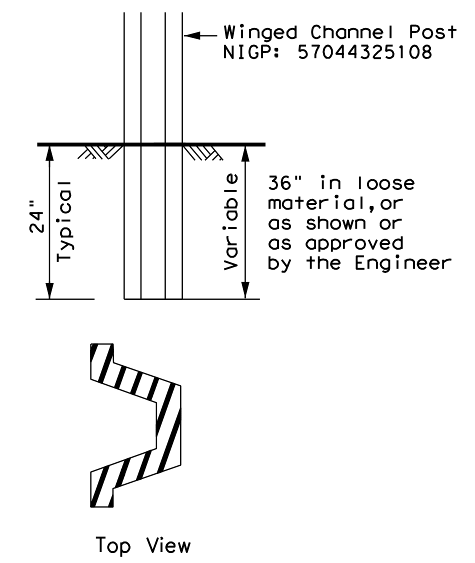
MB(2)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		90

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



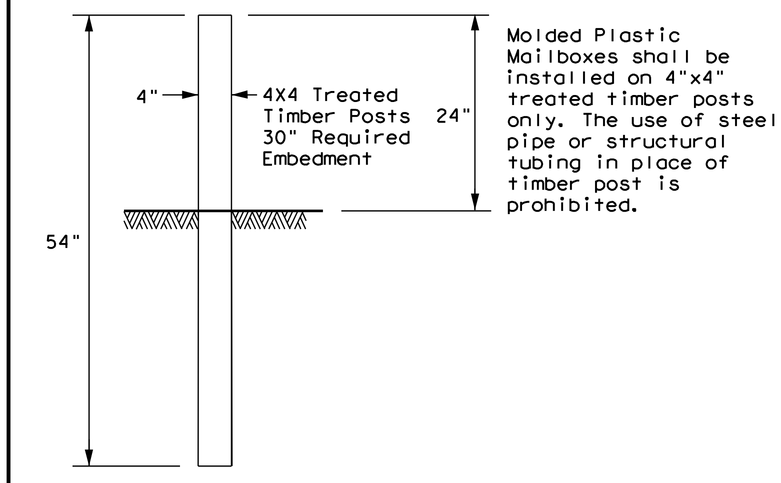
TYPE 3 - SUPPORT/FOUNDATION



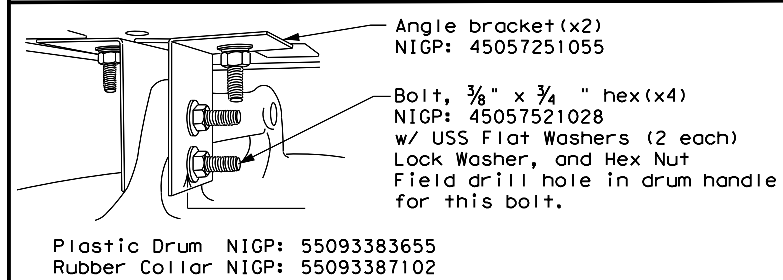
NOTES:

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



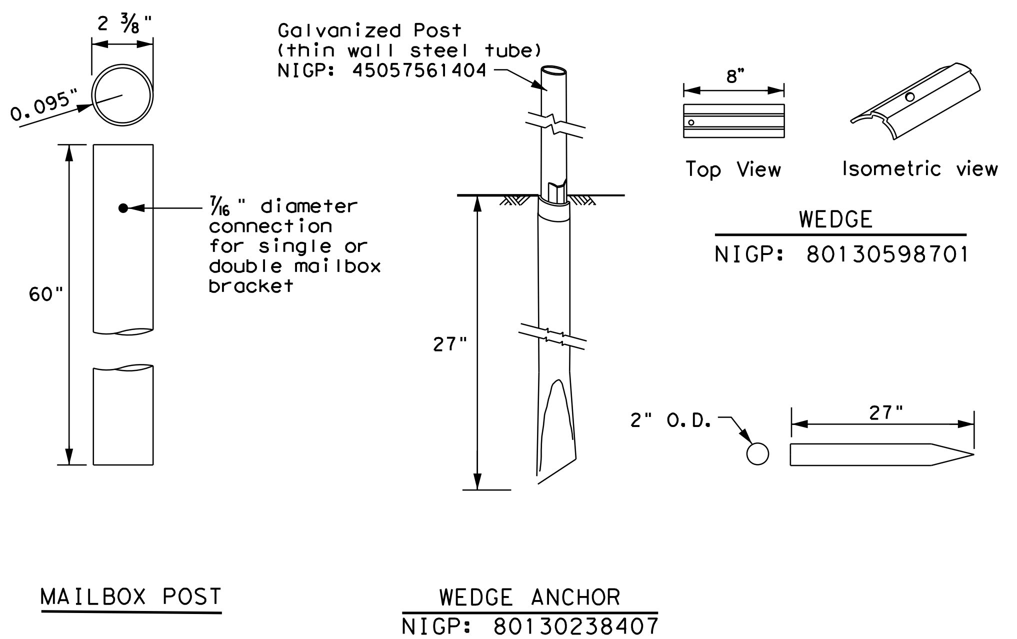
NOTES:

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.

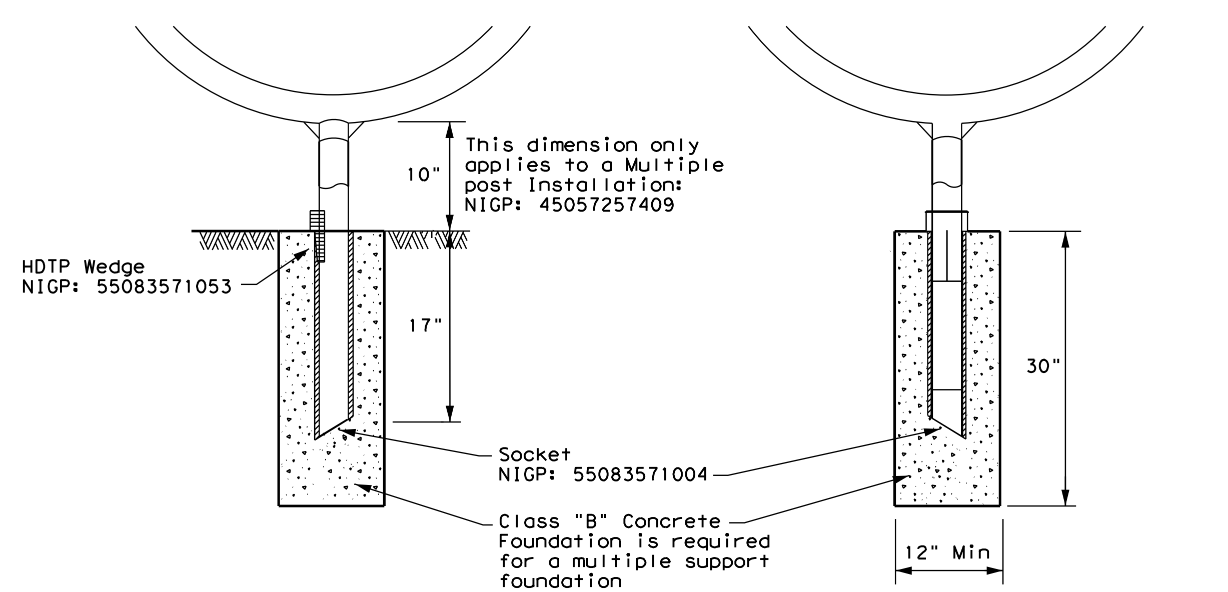
GENERAL NOTES:

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



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



Texas Department of Transportation — Maintenance Division Standard

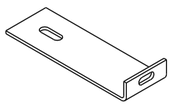
MAILBOX SUPPORT AND FOUNDATION

MB(3)-21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015	0016	16	028	RM 967
6/2005 1/2011	DIST		COUNTY	SHEET NO.
11/2006 7/2014	AUS		HAYS	91

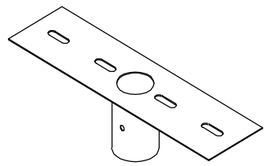
DATE: 12/21/2022 12:18:11 PM

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



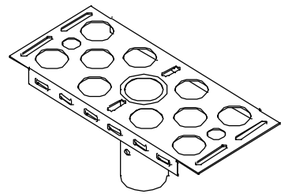
NIGP: 45057250263

L-Bracket x4 for
XL sized mailboxes



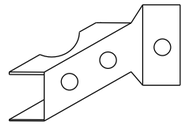
NIGP: 45057252343

Double Mailbox Bracket
For Type 2 and Type 4
double mount



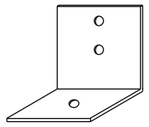
NIGP: 45057252350

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



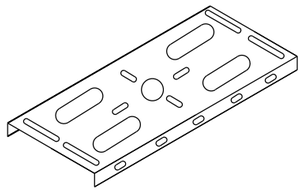
NIGP: 45057258001

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



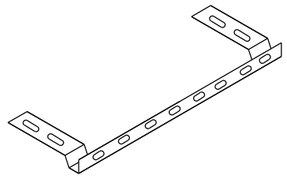
NIGP: 45057251055

Type 6 Angle Bracket
(2 per mailbox)



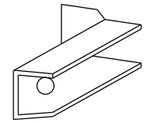
NIGP: 45057252251

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



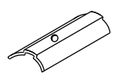
NIGP: 45057253002

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

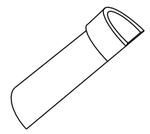
Wedge for Type 2

NIGP: 45057250255

Plate Washer for Architecural
and XL Mailboxes

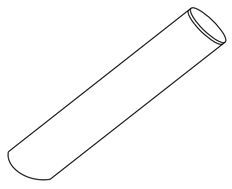
NIGP: 45057541653

Type 3 double mailbox bracket



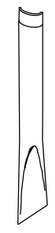
NIGP: 55083571053

Type 4 Mailbox Wedge



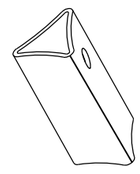
NIGP: 55083571004

Type 4 Mailbox Socket



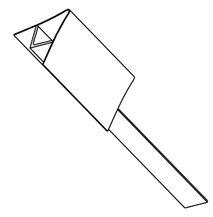
NIGP: 80130238407

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

DATE: 12/21/2022 12:18:11 PM
FILE: G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\03-ROWY\SHTS-MB-21.dgn

SHEET 4 OF 4

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	0016	16	028	RM 967
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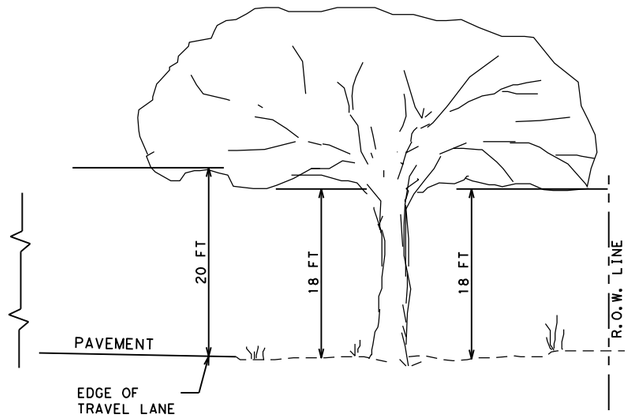
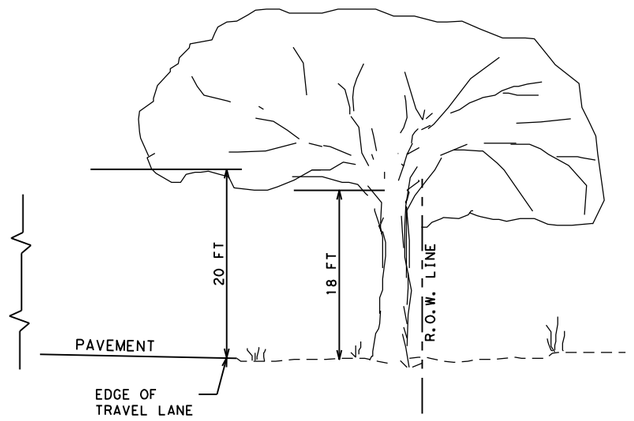
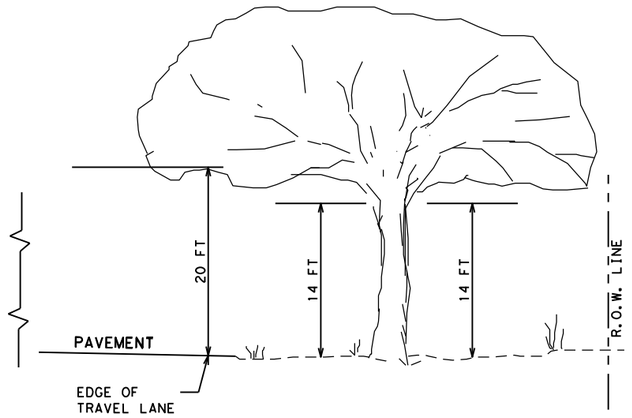
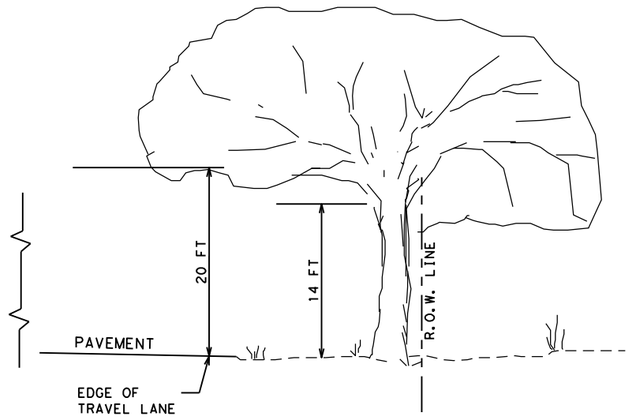




NON-OAK SPECIES
TREE PRUNING LIMITS



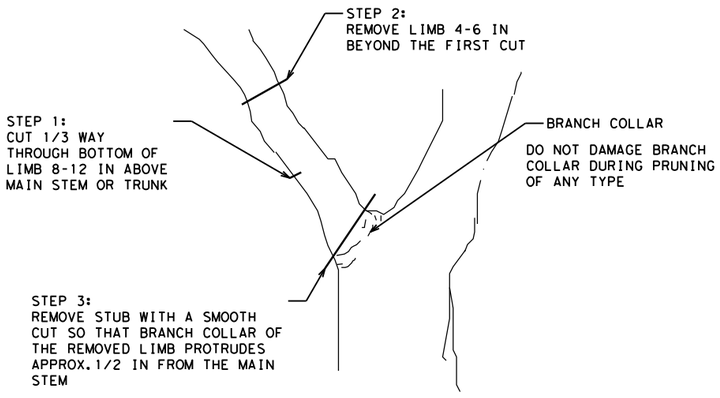


OAK SPECIES
TREE PRUNING LIMITS

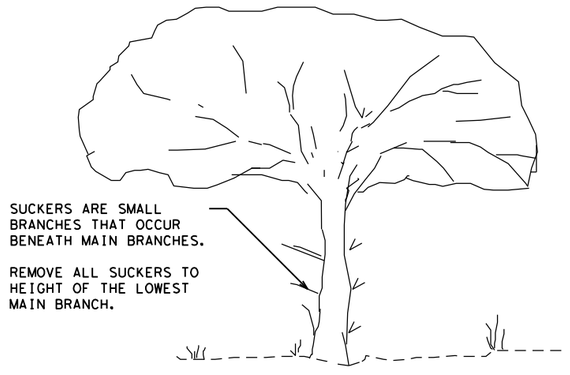
GENERAL NOTES

PAYMENT FOR THIS WORK IS SUBSIDIARY TO PREP R.O.W.

1. REMOVE ALL DEAD TREES, DEAD BRUSH, AND DEAD MULTI-TRUNKED TREES WITHIN THE R.O.W.. TREES, SHRUBS, OR MULTI-TRUNKED TREES THAT DIE DURING CONSTRUCTION SHALL BE REMOVED PRIOR TO COMPLETION OF THE PROJECT.
2. USE WORK METHODS IN ACCORDANCE WITH ANSI A300 STANDARDS AND ITEM 752.
3. FLAILING EQUIPMENT IS NOT ALLOWED ON OAK TREES.
4. REPAIR DAMAGE TO PRIVATE FENCES AND/OR PRIVATE PROPERTY.
5. PERFORM TREE PRUNING ONLY WITHIN THE R.O.W.. NO CUTS SHALL BE MADE OUTSIDE THE R.O.W..
6. PERFORM TREE PRUNING PER DETAIL FOR ENTIRE R.O.W. AREA WITHIN PROJECT LIMITS. THE ENGINEER MAY DEFINE AREAS TO RESTRICT TREE PRUNING.
7. REVIEW EPIC SHEETS FOR AREAS TO BE AVOIDED DUE TO ENVIRONMENTAL REASONS OR ADDITIONAL NOTES THAT PERTAIN TO TREE PRUNING.
8. MIGRATORY BIRDS AND BATS MAY BE NESTING WITHIN THE PROJECT LIMITS. PERFORM TREE TRIMMING OUTSIDE THE NESTING SEASON DATES LISTED IN THE GENERAL NOTES.
9. NO TRIMMING OF THE VEGETATION THAT CONTAINS AN ACTIVE NEST FOR MIGRATORY BIRDS IS ALLOWED.
10. THE TRIMMING OR CUTTING OF RED OAK AND LIVE OAK SPECIES FOR PURPOSES OTHER THAN PROTECTING PUBLIC SAFETY IS ONLY PERMITTED BETWEEN JULY 1ST AND JANUARY 31ST AND PROHIBITED BETWEEN FEBRUARY 1ST AND JUNE 30TH
11. ALL PRUNING CUTS MUST BE TREATED IMMEDIATELY WITH COMMERCIAL PRUNING PAINT TO SEAL THE EXPOSED SURFACE FROM CONTAMINATION. USE OF AEROSOL CAN IS THE PREFERRED METHOD OF APPLICATION FOR SEALING CUTS. ANY WOUNDS, WHETHER MADE BY TRIMMING, CONSTRUCTION OR ACCIDENT, SHALL BE TREATED IMMEDIATELY WITH COMMERCIAL PRUNING PAINT TO SEAL THE SURFACE FROM CONTAMINATION. THE TXDOT INSPECTOR MAY CONDUCT UNANNOUNCED INSPECTIONS TO ENSURE COMPLIANCE.
12. IF MORE THAN 25% OF THE TREE CANOPY WILL BE REMOVED CONTACT THE TXDOT ABORIST OR INSPECTOR FOR APPROVAL PRIOR TO PROCEEDING.



PROPER TREE PRUNING
FOR LIMBS 2" IN DIA. AND GREATER



SUCKER REMOVAL DETAIL

Texas Department of Transportation | Austin District Standard

PREP R.O.W. PRUNING DETAIL

PRWPD-20 (AUS)

©TxDOT8YEAR8	CONT	SECT	JOB	HIGHWAY
	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		93

DATE: 12/2/2022 11:56:39 AM
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DATE: 12/2/2022
FILE: G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\03-RDWY\Stds\sgt10s3116.dgn

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

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

LINE AT THE BACK OF POST #2 THRU #8

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

ANCHOR PADDLE PN: 15204A

ANGLE STRUT PN: 15202G

16"

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

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

BEGIN LENGTH OF NEED

PLAN VIEW

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

TRAFFIC FLOW

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

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼" 3'-1 ½" 6'-3" 6'-3"

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

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

OUTSIDE SLOTS CUTOUT (2)1½" X 6'-9 ⅝"

SoftStop FACE SEE GN(3) & NOTE:B

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

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

SoftStop ANCHOR RAIL (12GA) PN: 15215G

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

B B A A

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

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

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

POST 40" DEPTH (TYP 1-8)

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

SEE DETAIL 3

13/16" DIA. YIELDING HOLES

13/16" DIA. YIELDING HOLES

6'-1⅜"

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

ANCHOR PLATE WASHER ½" THICK PN: 15206G

1" ROUND WASHER F463 PN: 4902G

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

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR.DH PN: 3245G

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

W-BEAM FLATTENED (4 PLIES)

ANGLE STRUT PN: 15202G

SEE NOTE: A

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

(4) ¾" FLAT WASHER (TYP) PN: 3701G

(2) ¾" HEX NUT (TYP) PN: 3704G

(2) ANCHOR POST ANGLE PN: 15201G

6'-1 ⅜" POST DEPTH

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

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 ⅞")
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	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		94

DATE: 12/2/2022
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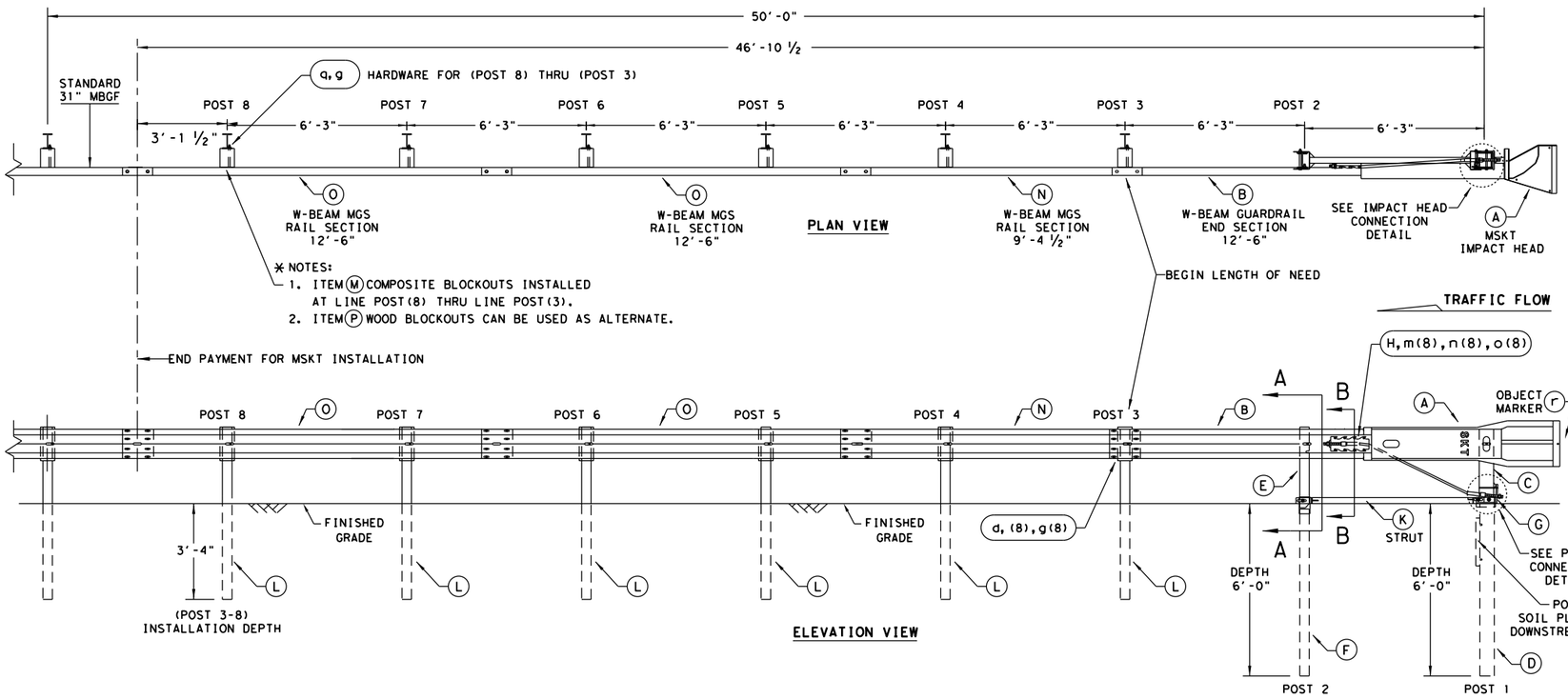


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

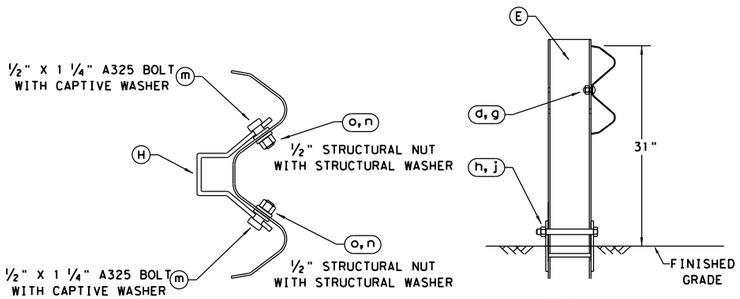
GENERAL NOTES

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

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

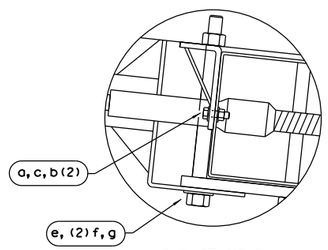
SEE NOTES: *

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



SECTION B-B
ANCHOR BRACKET

POST 2
SECTION A-A



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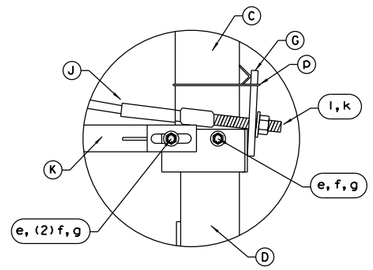
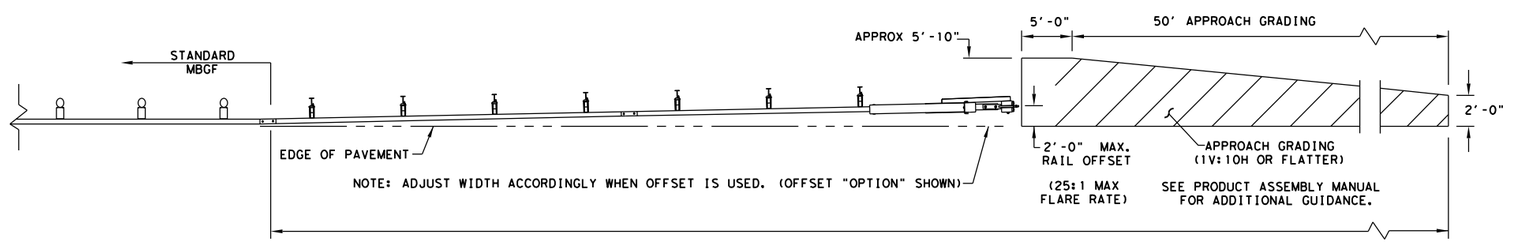
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

TRAFFIC FLOW

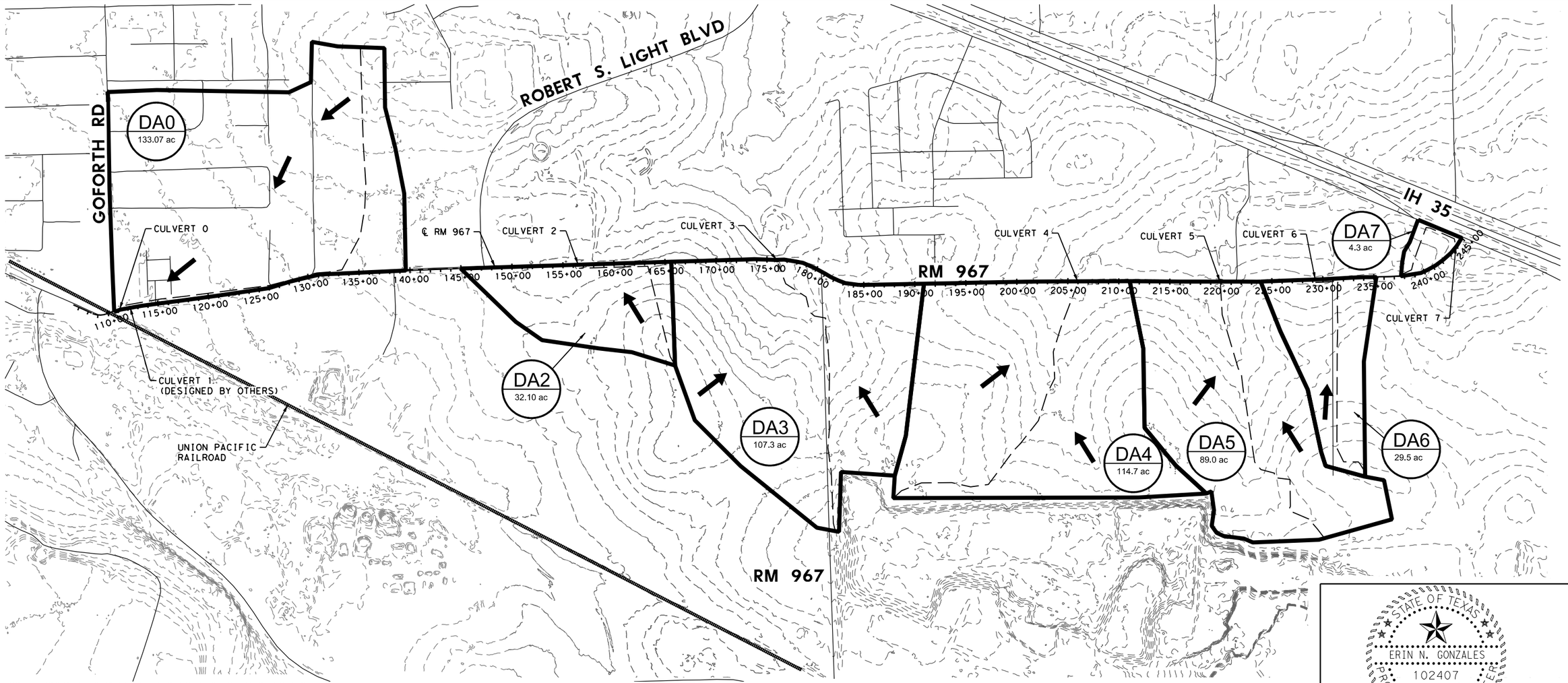
NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

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

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0016	16	028	RM 967	
	DIST	COUNTY		SHEET NO.	
	AUS	HAYS		95	



NOTE: CULVERT 0 WILL BE DESIGNED WITH THIS PROJECT.
CULVERT 1 WILL BE DESIGNED BY OTHERS.

RATIONAL METHOD SUMMARY																		
DRAINAGE AREA	AREA (AC)	C	INTENSITIES (IN/HR)						FLOW TRAVEL TIMES (MIN)			T. O. C. (MIN)	DESIGN FLOW (CFS)					
			I2	I5	I10	I25	I50	I100	SHEET	SHALLOW	CHANNEL		Q2	Q5	Q10	Q25	Q50	Q100
DRAINAGE AREA 0	133.07	0.41	2.55	3.26	3.85	4.70	5.35	6.06	15	21	7	43	140.83	179.60	212.40	259.04	295.14	334.07
DRAINAGE AREA 2	32.10	0.38	3.08	3.93	4.64	5.65	6.42	7.25	14	13	2	29	38.08	48.49	57.27	69.73	79.29	89.58
DRAINAGE AREA 3	107.32	0.34	3.42	4.35	5.15	6.27	7.14	8.07	15	1	9	25	126.10	160.67	189.95	231.40	263.64	297.71
DRAINAGE AREA 4	114.67	0.34	2.90	3.69	4.36	5.31	6.04	6.82	16	10	7	33	111.76	142.35	168.12	204.73	232.82	263.14
DRAINAGE AREA 5	89.04	0.40	3.08	3.93	4.64	5.65	6.42	7.25	10	15	5	29	110.97	141.32	166.89	203.20	231.08	261.04
DRAINAGE AREA 6	29.48	0.41	4.08	5.21	6.17	7.52	8.59	9.69	15	1	1	17	49.82	63.52	75.22	91.72	104.79	118.26
DRAINAGE AREA 7	4.27	0.56	3.92	4.99	5.91	7.21	8.23	9.29	15	3	1	19	9.31	11.87	14.05	17.12	19.55	22.07

NOTE:
1) NOAA ATLAS 14 RAINFALL DATA WAS UTILIZED IN THESE CALCULATIONS.
2) THE C-VALUES WERE GENERATED USING THE RURAL AND MIXED USE WATERSHED METHOD DESCRIBED IN TXDOT'S HYDRAULIC DESIGN MANUAL.

N

DA# / XX.X ac — CULVERT DRAINAGE AREA / DRAINAGE AREA (ACRES)

FLOW DIRECTION

CONTOUR

DRAINAGE AREA BOUNDARY

CHANNEL ℄

ROAD ℄

0 500 1000

SCALE: 1"=1000'

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER

Erin N. Gonzales

12/2/2022

Texas Department of Transportation

BGE, Inc.
1701 Directors Blvd., Suite 1000, Austin, TX 78744
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TBPE Registration No. F-1046

RM 967

DRAINAGE AREA MAP

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			96
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
PLOTDRIVER: pdf.pltcfg
FILE:G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\06-DRNG\RM967_DRN_DA_01.dgn
DATE:12/2/2022 11:56:51 AM USER:RM 967
PENTABLE: $PENTBL$

EXISTING

SITE DATA - EX CULV 111+14

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 714.47 FT
OUTLET STATION: 72.60 FT
OUTLET ELEVATION: 714.21 FT
NUMBER OF BARRELS: 4

CULVERT DATA SUMMARY - EX CULV 111+14

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 4.00 FT
BARREL MATERIAL: CORRUGATED STEEL
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0240
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: THIN EDGE PROJECTING
INLET DEPRESSION: NONE

PROPOSED

SITE DATA - PROP CULV 111+14

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 714.49 FT
OUTLET STATION: 78.00 FT
OUTLET ELEVATION: 714.21 FT
NUMBER OF BARRELS: 4

CULVERT DATA SUMMARY - PROP CULV 111+14

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 4.00 FT
BARREL MATERIAL: CORRUGATED STEEL
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0240
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: THIN EDGE PROJECTING
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 111+14

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 719.86 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 30.00 FT

ROADWAY DATA FOR CROSSING: PROP CULV 111+14

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 719.83 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 39.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 111+14

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
212.40	212.40	718.27	3.503	3.796	3-M2T	4.000	2.187	2.564	2.564	6.242	5.238
224.57	224.57	718.4	3.640	3.930	3-M2T	4.000	2.250	2.623	2.623	6.427	5.312
236.73	236.73	718.54	3.778	4.065	3-M2T	4.000	2.312	2.681	2.681	6.610	5.383
248.90	248.90	718.67	3.918	4.201	3-M2T	4.000	2.376	2.737	2.737	6.792	5.452
259.04	259.04	718.78	4.037	4.314	3-M2T	4.000	2.425	2.782	2.782	6.941	5.506
273.24	273.24	718.94	4.206	4.474	3-M2T	4.000	2.493	2.844	2.844	7.149	5.581
285.40	285.40	719.08	4.355	4.614	3-M2T	4.000	2.549	2.895	2.895	7.326	5.642
297.57	297.57	719.23	4.507	4.757	3-M2T	4.000	2.604	2.945	2.945	7.502	5.702
309.74	309.74	719.37	4.663	4.905	3-M2T	4.000	2.662	2.993	2.993	7.677	5.760
321.90	321.90	719.53	4.823	5.058	3-M2T	4.000	2.715	3.041	3.041	7.852	5.816
334.07	334.07	719.69	4.988	5.221	3-M2T	4.000	2.767	3.087	3.087	8.025	5.870

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 111+14

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	212.40	212.40	718.29	3.503	3.802	3-M2T	4.000	2.187	2.564	2.564	6.242	5.238
	224.57	224.57	718.43	3.640	3.938	3-M2T	4.000	2.250	2.623	2.623	6.427	5.312
	236.73	236.73	718.56	3.778	4.074	3-M2T	4.000	2.312	2.681	2.681	6.610	5.383
	248.90	248.90	718.70	3.918	4.210	3-M2T	4.000	2.376	2.737	2.737	6.792	5.452
**	259.04	259.04	718.81	4.037	4.325	3-M2T	4.000	2.425	2.782	2.782	6.941	5.506
	273.24	273.24	718.98	4.206	4.487	3-M2T	4.000	2.493	2.844	2.844	7.149	5.581
	285.40	285.40	719.12	4.355	4.629	3-M2T	4.000	2.549	2.895	2.895	7.326	5.642
	297.57	297.57	719.26	4.507	4.774	3-M2T	4.000	2.604	2.945	2.945	7.502	5.702
	309.74	309.74	719.41	4.663	4.925	3-M2T	4.000	2.662	2.993	2.993	7.677	5.760
	321.90	321.90	719.57	4.823	5.083	3-M2T	4.000	2.715	3.041	3.041	7.852	5.816
***	334.07	334.07	719.74	4.988	5.252	3-M2T	4.000	2.767	3.087	3.087	8.025	5.870

* MINIMUM FLOW IS 10-YEAR EVENT.
** DESIGN FLOW IS 25-YEAR EVENT.
*** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - EX CULV 111+14

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 3.00 FT
SIDE SLOPE (H:V): 5.00 (_:1)
CHANNEL SLOPE: 0.0162
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 714.21 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 111+14)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
212.40	716.77	2.56	5.24	2.59	0.78
224.57	716.83	2.62	5.31	2.65	0.78
236.73	716.89	2.68	5.38	2.71	0.78
248.90	716.95	2.74	5.45	2.77	0.78
259.04	716.99	2.78	5.51	2.81	0.79
273.24	717.05	2.84	5.58	2.87	0.79
285.40	717.10	2.89	5.64	2.93	0.79
297.57	717.15	2.94	5.70	2.98	0.79
309.74	717.20	2.99	5.76	3.03	0.79
321.90	717.25	3.04	5.82	3.07	0.80
334.07	717.30	3.09	5.87	3.12	0.80

TAILWATER CHANNEL DATA - PROP CULV 111+14

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 3.00 FT
SIDE SLOPE (H:V): 5.00 (_:1)
CHANNEL SLOPE: 0.0162
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 714.21 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 111+14)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
212.40	716.77	2.56	5.24	2.59	0.78
224.57	716.83	2.62	5.31	2.65	0.78
236.73	716.89	2.68	5.38	2.71	0.78
248.90	716.95	2.74	5.45	2.77	0.78
259.04	716.99	2.78	5.51	2.81	0.79
273.24	717.05	2.84	5.58	2.87	0.79
285.40	717.10	2.89	5.64	2.93	0.79
297.57	717.15	2.94	5.70	2.98	0.79
309.74	717.20	2.99	5.76	3.03	0.79
321.90	717.25	3.04	5.82	3.07	0.80
334.07	717.30	3.09	5.87	3.12	0.80

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

NOTE: THE ALLOWABLE HEADWATER ELEVATION IS 719.83' AND IS LOCATED AT STA 111+50.00.

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED PROFESSIONAL ENGINEER

Erin N. Gonzales

12/2/2022

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RM 967

HYDRAULIC DATA CULVERT 0

SHEET 1 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			97
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

EXISTING

SITE DATA - EX CULV 175+89

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 715.16 FT
OUTLET STATION: 52.28 FT
OUTLET ELEVATION: 714.58 FT
NUMBER OF BARRELS: 3

CULVERT DATA SUMMARY - EX CULV 175+89

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 4.00 FT
BARREL MATERIAL: CORRUGATED STEEL
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0240
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE WITH HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 175+89

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 722.65 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 30.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 175+89

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
189.95	189.95	719.01	3.587	3.848	2-M2C	2.639	2.397	2.397	1.676	8.053	4.407
200.73	200.73	719.14	3.727	3.980	2-M2C	2.749	2.466	2.466	1.733	8.228	4.496
211.50	211.50	719.27	3.869	4.112	7-M2C	2.858	2.534	2.534	1.788	8.401	4.581
222.28	222.28	719.4	4.012	4.245	7-M2C	2.980	2.599	2.599	1.842	8.573	4.662
231.40	231.40	719.52	4.136	4.358	7-M2C	3.093	2.657	2.657	1.887	8.704	4.730
243.83	243.83	719.67	4.308	4.514	7-M2C	3.246	2.729	2.729	1.947	8.901	4.819
254.61	254.61	719.81	4.460	4.651	7-M2C	3.452	2.789	2.789	1.998	9.071	4.893
265.38	265.38	719.95	4.617	4.791	7-M2C	4.000	2.848	2.848	2.049	9.243	4.966
276.16	276.16	720.09	4.778	4.934	7-M2C	4.000	2.905	2.905	2.098	9.416	5.035
286.93	286.93	720.24	4.943	5.082	7-M2C	4.000	2.961	2.961	2.147	9.590	5.104
297.71	297.71	720.4	5.114	5.237	7-M2C	4.000	3.015	3.015	2.195	9.766	5.170

TAILWATER CHANNEL DATA - EX CULV 175+89

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 24.00 FT
SIDE SLOPE (H:V): 1.02 (_:1)
CHANNEL SLOPE: 0.0104
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 714.58 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 175+89)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
189.95	716.26	1.68	4.41	1.09	0.62
200.73	716.31	1.73	4.50	1.12	0.62
211.50	716.37	1.79	4.58	1.16	0.62
222.28	716.42	1.84	4.66	1.20	0.63
231.40	716.47	1.89	4.73	1.22	0.63
243.83	716.53	1.95	4.82	1.26	0.63
254.61	716.58	2.00	4.89	1.30	0.63
265.38	716.63	2.05	4.97	1.33	0.64
276.16	716.68	2.10	5.04	1.36	0.64
286.93	716.73	2.15	5.10	1.39	0.64
297.71	716.77	2.19	5.17	1.42	0.64

PROPOSED

SITE DATA - PROP CULV 175+89

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 714.40 FT
BREAK STATION: 50.00 FT
BREAK ELEVATION: 712.65 FT
OUTLET STATION: 62.00 FT
OUTLET ELEVATION: 712.65 FT
NUMBER OF BARRELS: 2

CULVERT DATA SUMMARY - PROP CULV 175+89

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 5.00 FT
BARREL RISE: 5.00 FT
UPPER SECTION MATERIAL: CONCRETE
LOWER SECTION MATERIAL:
EMBEDMENT: 0.00 IN
UPPER SECTION MANNING'S N: 0.0120
LOWER SECTION MANNING'S N: 0.0120
CULVERT TYPE: SINGLE BROKEN-BACK
INLET CONFIGURATION: SQUARE EDGE (90°/$\frac{90°}{34}$) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: PROP CULV 175+89

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 722.37 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 48.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 175+89

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	189.95	189.95	718.12	3.722	2.461	1-JS1T	0.000	1.498	3.840	1.870	4.947	4.638
	200.73	200.73	718.26	3.861	2.566	1-JS1T	0.000	1.498	3.902	1.932	5.144	4.728
	211.50	211.50	718.40	3.998	2.674	1-JS1T	0.000	1.498	3.964	1.994	5.336	4.815
	222.28	222.28	718.53	4.134	2.782	1-JS1T	0.000	1.498	4.024	2.054	5.524	4.898
**	231.40	231.40	718.65	4.248	2.874	1-JS1T	0.000	1.498	4.074	2.104	5.680	4.967
	243.83	243.83	718.80	4.401	3.002	1-JS1T	0.000	1.498	4.140	2.170	5.889	5.057
	254.61	254.61	718.93	4.534	3.114	1-JS1T	0.000	1.498	4.197	2.227	6.066	5.133
	265.38	265.38	719.07	4.666	3.227	1-JS1T	0.000	1.498	4.253	2.283	6.240	5.206
	276.16	276.16	719.20	4.798	3.342	1-S2N	0.000	1.498	1.835	2.338	15.048	5.277
	286.93	286.93	719.33	4.930	3.458	1-S2N	0.000	1.498	1.891	2.392	15.172	5.346
***	297.71	297.71	719.46	5.062	3.576	5-S2N	0.000	1.498	1.947	2.445	15.293	5.413

* MINIMUM FLOW IS 10-YEAR EVENT.
** DESIGN FLOW IS 25-YEAR EVENT.
*** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - PROP CULV 175+89

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 20.00 FT
SIDE SLOPE (H:V): 1.02 (_:1)
CHANNEL SLOPE: 0.0104
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 714.62 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 175+89)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
189.95	716.49	1.87	4.64	1.21	0.62
200.73	716.55	1.93	4.73	1.25	0.63
211.50	716.61	1.99	4.81	1.29	0.63
222.28	716.67	2.05	4.90	1.33	0.63
231.40	716.72	2.10	4.97	1.37	0.63
243.83	716.79	2.17	5.06	1.41	0.63
254.61	716.85	2.23	5.13	1.45	0.64
265.38	716.90	2.28	5.21	1.48	0.64
276.16	716.96	2.34	5.28	1.52	0.64
286.93	717.01	2.39	5.35	1.55	0.64
297.71	717.06	2.44	5.41	1.59	0.64

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

NOTE: THE ALLOWABLE HEADWATER ELEVATION IS 722.37' AND IS LOCATED AT STA 175+30.00.

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER

Erin N. Gonzales

12/2/2022

Texas Department of Transportation

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RM 967

HYDRAULIC DATA CULVERT 3

SHEET 2 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			98
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

EXISTING

SITE DATA - EX CULV 205+80

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 718.80 FT
OUTLET STATION: 56.30 FT
OUTLET ELEVATION: 718.65 FT
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY - EX CULV 205+80

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 10.00 FT
BARREL RISE: 4.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

PROPOSED

SITE DATA - PROP CULV 205+80

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 718.82 FT
OUTLET STATION: 62.14 FT
OUTLET ELEVATION: 718.65 FT
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY - PROP CULV 205+80

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 10.00 FT
BARREL RISE: 4.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 205+80

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 725.39 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 30.00 FT

ROADWAY DATA FOR CROSSING: PROP CULV 205+80

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 725.21 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 36.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 205+80

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
168.12	168.12	722.28	3.485	1.728	1-S2N	2.044	2.063	2.044	1.878	8.226	6.413
177.62	177.62	722.42	3.616	2.494	1-S2N	2.123	2.140	2.123	1.935	8.366	6.519
187.12	187.12	722.55	3.746	2.625	1-S2N	2.201	2.215	2.201	1.991	8.501	6.621
196.63	196.63	722.68	3.876	2.758	1-S2N	2.276	2.290	2.276	2.046	8.640	6.719
204.73	204.73	722.79	3.987	1.941	1-S2N	2.339	2.352	2.339	2.091	8.752	6.799
215.63	215.63	722.94	4.136	3.028	5-S2N	2.425	2.435	2.430	2.151	8.873	6.904
225.13	225.13	723.07	4.268	3.166	5-S2N	2.499	2.506	2.504	2.202	8.992	6.992
234.63	234.63	723.2	4.400	3.306	5-S2N	2.573	2.576	2.573	2.252	9.121	7.076
244.14	244.14	723.33	4.533	3.447	5-S2N	2.644	2.645	2.644	2.300	9.235	7.159
253.64	253.64	723.55	4.669	4.750	7-M2C	2.714	2.713	2.713	2.348	9.347	7.238
263.14	263.14	723.67	4.806	4.866	7-M2C	2.785	2.781	2.781	2.395	9.463	7.315

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 205+80

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	168.12	168.12	722.30	3.484	1.708	1-S2N	2.025	2.063	2.025	1.878	8.300	6.413
	177.62	177.62	722.44	3.615	2.478	1-S2N	2.104	2.140	2.104	1.935	8.443	6.519
	187.12	187.12	722.57	3.746	2.610	1-S2N	2.182	2.215	2.185	1.991	8.564	6.621
	196.63	196.63	722.70	3.876	2.743	1-S2N	2.255	2.290	2.261	2.046	8.697	6.719
**	204.73	204.73	722.81	3.987	2.858	1-S2N	2.318	2.352	2.318	2.091	8.832	6.799
	215.63	215.63	722.96	4.136	3.015	5-S2N	2.403	2.435	2.408	2.151	8.953	6.904
	225.13	225.13	723.09	4.267	3.153	5-S2N	2.476	2.506	2.476	2.202	9.092	6.992
	234.63	234.63	723.22	4.400	3.294	5-S2N	2.549	2.576	2.553	2.252	9.191	7.076
	244.14	244.14	723.35	4.533	3.436	5-S2N	2.620	2.645	2.625	2.300	9.300	7.159
	253.64	253.64	723.49	4.669	3.581	5-S2N	2.690	2.713	2.695	2.348	9.411	7.238
***	263.14	263.14	723.63	4.806	3.727	5-S2N	2.760	2.781	2.760	2.395	9.535	7.315

* MINIMUM FLOW IS 10-YEAR EVENT.
** DESIGN FLOW IS 25-YEAR EVENT.
*** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - EX CULV 205+80

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 10.11 FT
SIDE SLOPE (H:V): 2.05 (_:1)
CHANNEL SLOPE: 0.0240
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 718.65 FT

TAILWATER CHANNEL DATA - PROP CULV 205+80

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 10.11 FT
SIDE SLOPE (H:V): 2.05 (_:1)
CHANNEL SLOPE: 0.0240
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 718.65 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 205+80)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
168.12	720.53	1.88	6.41	2.81	0.93
177.62	720.59	1.94	6.52	2.90	0.93
187.12	720.64	1.99	6.62	2.98	0.94
196.63	720.70	2.05	6.72	3.06	0.94
204.73	720.74	2.09	6.80	3.13	0.94
215.63	720.80	2.15	6.90	3.22	0.95
225.13	720.85	2.20	6.99	3.30	0.95
234.63	720.90	2.25	7.08	3.37	0.95
244.14	720.95	2.30	7.16	3.44	0.95
253.64	721.00	2.35	7.24	3.52	0.96
263.14	721.04	2.39	7.32	3.59	0.96

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 205+80)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
168.12	720.53	1.88	6.41	2.81	0.93
177.62	720.59	1.94	6.52	2.90	0.93
187.12	720.64	1.99	6.62	2.98	0.94
196.63	720.70	2.05	6.72	3.06	0.94
204.73	720.74	2.09	6.80	3.13	0.94
215.63	720.80	2.15	6.90	3.22	0.95
225.13	720.85	2.20	6.99	3.30	0.95
234.63	720.90	2.25	7.08	3.37	0.95
244.14	720.95	2.30	7.16	3.44	0.95
253.64	721.00	2.35	7.24	3.52	0.96
263.14	721.04	2.39	7.32	3.59	0.96

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

NOTE: THE ALLOWABLE HEADWATER ELEVATION IS 725.21' AND IS LOCATED AT STA 208+80.00.

STATE OF TEXAS
ERIN N. GONZALES
102407
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PROFESSIONAL ENGINEER

Erin N. Gonzales

12/2/2022

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RM 967

HYDRAULIC DATA CULVERT 4

SHEET 3 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			99
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

EXISTING

SITE DATA - EX CULV 220+06

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 715.94 FT
OUTLET STATION: 51.82 FT
OUTLET ELEVATION: 715.84 FT
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY - EX CULV 220+06

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 3.00 FT
BARREL RISE: 3.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

PROPOSED

SITE DATA - PROP CULV 220+06

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 715.68 FT
BREAK STATION: 48.00 FT
BREAK ELEVATION: 715.26 FT
OUTLET STATION: 64.00 FT
OUTLET ELEVATION: 715.26 FT
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY - PROP CULV 220+06

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 7.00 FT
BARREL RISE: 4.00 FT
UPPER SECTION MATERIAL: CONCRETE
LOWER SECTION MATERIAL:
EMBEDMENT: 0.00 IN
UPPER SECTION MANNING'S N: 0.0120
LOWER SECTION MANNING'S N: 0.0120
CULVERT TYPE: SINGLE BROKEN-BACK
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 220+06

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 723.00 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 30.00 FT

ROADWAY DATA FOR CROSSING: PROP CULV 220+06

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 722.10 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 48.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 220+06

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
166.89	100.97	723.36	7.423	6.452	6-FFC	3.000	3.000	3.000	1.875	11.219	5.450
176.30	101.28	723.4	7.455	6.474	6-FFC	3.000	3.000	3.000	1.925	11.254	5.529
185.72	101.58	723.43	7.486	6.495	6-FFC	3.000	3.000	3.000	1.973	11.286	5.606
195.13	101.87	723.46	7.515	6.516	6-FFC	3.000	3.000	3.000	2.020	11.318	5.680
203.20	102.11	723.48	7.541	6.533	6-FFC	3.000	3.000	3.000	2.059	11.346	5.740
213.97	102.42	723.51	7.573	6.555	6-FFC	3.000	3.000	3.000	2.109	11.380	5.819
223.38	102.69	723.54	7.601	6.574	6-FFC	3.000	3.000	3.000	2.152	11.410	5.885
232.80	102.95	723.57	7.628	6.593	6-FFC	3.000	3.000	3.000	2.194	11.439	5.949
242.21	103.20	723.59	7.655	6.611	6-FFC	3.000	3.000	3.000	2.235	11.467	6.011
251.63	103.45	723.62	7.680	6.629	6-FFC	3.000	3.000	3.000	2.275	11.494	6.072
261.04	103.69	723.65	7.706	6.646	6-FFC	3.000	3.000	3.000	2.314	11.521	6.130

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 220+06

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	166.89	166.89	720.12	4.445	2.363	5-S2N	0.000	0.000	2.231	1.875	10.689	5.450
	176.30	176.30	720.32	4.636	2.518	5-S2N	0.000	0.000	2.319	1.925	10.863	5.529
	185.72	185.72	720.51	4.830	2.677	5-S2N	0.000	0.000	2.407	1.973	11.021	5.606
	195.13	195.13	720.71	5.029	2.840	5-S2N	0.000	0.000	2.494	2.020	11.176	5.680
**	203.20	203.20	720.88	5.204	2.984	5-S2N	0.000	1.172	2.567	2.059	11.306	5.740
	213.97	213.97	721.12	5.444	3.181	5-S2N	0.000	0.000	2.664	2.109	11.476	5.819
	223.38	223.38	721.34	5.661	3.358	5-S2N	0.000	0.000	2.746	2.152	11.621	5.885
	232.80	232.80	721.57	5.885	3.540	5-S2N	0.000	0.000	2.829	2.194	11.754	5.949
	242.21	242.21	721.80	6.117	3.727	5-S2N	0.000	0.000	2.912	2.235	11.883	6.011
	251.63	251.63	722.04	6.357	3.918	5-S2N	0.000	0.000	2.993	2.275	12.010	6.072
***	261.04	256.68	722.17	6.489	4.041	5-S2N	0.000	0.000	3.036	2.314	12.077	6.130

* MINIMUM FLOW IS 10-YEAR EVENT.
** DESIGN FLOW IS 25-YEAR EVENT.
*** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - EX CULV 220+06

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 7.50 FT
SIDE SLOPE (H:V): 4.71 (_:1)
CHANNEL SLOPE: 0.0214
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 715.84 FT

TAILWATER CHANNEL DATA - PROP CULV 220+06

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 7.50 FT
SIDE SLOPE (H:V): 4.71 (_:1)
CHANNEL SLOPE: 0.0214
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 715.26 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 220+06)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
166.89	717.72	1.88	5.45	2.50	0.87
176.30	717.76	1.92	5.53	2.57	0.87
185.72	717.81	1.97	5.61	2.63	0.88
195.13	717.86	2.02	5.68	2.70	0.88
203.20	717.90	2.06	5.74	2.75	0.88
213.97	717.95	2.11	5.82	2.82	0.88
223.38	717.99	2.15	5.89	2.87	0.89
232.80	718.03	2.19	5.95	2.93	0.89
242.21	718.08	2.24	6.01	2.98	0.89
251.63	718.11	2.27	6.07	3.04	0.89
261.04	718.15	2.31	6.13	3.09	0.90

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 220+06)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
166.89	717.14	1.88	5.45	2.50	0.87
176.30	717.18	1.92	5.53	2.57	0.87
185.72	717.23	1.97	5.61	2.63	0.88
195.13	717.28	2.02	5.68	2.70	0.88
203.20	717.32	2.06	5.74	2.75	0.88
213.97	717.37	2.11	5.82	2.82	0.88
223.38	717.41	2.15	5.89	2.87	0.89
232.80	717.45	2.19	5.95	2.93	0.89
242.21	717.50	2.24	6.01	2.98	0.89
251.63	717.53	2.27	6.07	3.04	0.89
261.04	717.57	2.31	6.13	3.09	0.90

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

NOTE: THE ALLOWABLE HEADWATER ELEVATION IS 722.10' AND IS LOCATED AT STA 219+30.00.

STATE OF TEXAS
ERIN N. GONZALES
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12/2/2022

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RM 967

HYDRAULIC DATA CULVERT 5

SHEET 4 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			100
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

EXISTING

SITE DATA - EX CULV 229+20

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 724.45 FT
OUTLET STATION: 56.72 FT
OUTLET ELEVATION: 720.79 FT
NUMBER OF BARRELS: 2

CULVERT DATA SUMMARY - EX CULV 229+20

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 3.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE WITH HEADWALL
INLET DEPRESSION: NONE

PROPOSED

SITE DATA - PROP CULV 229+20

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 721.95 FT
BREAK STATION: 52.00 FT
BREAK ELEVATION: 720.85 FT
OUTLET STATION: 64.00 FT
OUTLET ELEVATION: 720.85 FT
NUMBER OF BARRELS: 2

CULVERT DATA SUMMARY - PROP CULV 229+20

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 3.00 FT
BARREL RISE: 3.00 FT
UPPER SECTION MATERIAL: CONCRETE
LOWER SECTION MATERIAL:
EMBEDMENT: 0.00 IN
UPPER SECTION MANNING'S N: 0.0120
LOWER SECTION MANNING'S N: 0.0120
CULVERT TYPE: SINGLE BROKEN-BACK
INLET CONFIGURATION: SQUARE EDGE (90°/90°) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 229+20

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 728.70 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 30.00 FT

ROADWAY DATA FOR CROSSING: PROP CULV 229+20

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 728.49 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 48.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 229+20

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
75.22	75.22	727.51	3.056	0.0*	5-S2N	0.913	1.990	1.081	1.256	16.391	6.238
79.52	79.52	727.64	3.190	0.0*	5-S2N	0.940	2.051	1.119	1.294	16.567	6.343
83.83	83.83	727.78	3.329	0.0*	5-S2N	0.967	2.106	1.154	1.332	16.709	6.443
88.13	88.13	727.92	3.474	0.0*	5-S2N	0.993	2.160	1.192	1.369	16.818	6.539
91.72	91.72	728.05	3.599	0.0*	5-S2N	1.015	2.203	1.222	1.399	16.939	6.616
96.74	96.74	728.23	3.781	0.315	5-S2N	1.047	2.262	1.261	1.440	17.132	6.720
101.04	101.04	728.39	3.945	0.461	5-S2N	1.073	2.310	1.297	1.474	17.244	6.807
105.35	105.35	728.57	4.116	0.612	5-S2N	1.098	2.356	1.332	1.508	17.376	6.890
109.65	108.95	728.71	4.264	0.741	5-S2N	1.117	2.394	1.359	1.541	17.495	6.970
113.96	109.91	728.76	4.305	0.777	5-S2N	1.122	2.403	1.367	1.573	17.528	7.049
118.26	110.63	728.79	4.336	0.803	5-S2N	1.126	2.411	1.372	1.604	17.553	7.125

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 229+20

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	75.22	75.22	724.80	2.848	0.649	1-S2N	0.000	0.000	1.200	1.256	10.443	6.238
	79.52	79.52	724.91	2.961	0.746	1-S2N	0.000	0.000	1.250	1.294	10.602	6.343
	83.83	83.83	725.03	3.075	0.845	5-S2N	0.000	0.000	1.299	1.332	10.754	6.443
	88.13	88.13	725.14	3.189	0.946	5-S2N	0.000	0.000	1.351	1.369	10.875	6.539
**	91.72	91.72	725.24	3.286	1.032	5-S2N	0.000	0.889	1.392	1.399	10.981	6.616
	96.74	96.74	725.37	3.422	1.156	5-S2N	0.000	0.000	1.448	1.440	11.136	6.720
	101.04	101.04	725.49	3.541	1.264	5-S2N	0.000	0.000	1.496	1.474	11.259	6.807
	105.35	105.35	725.61	3.662	1.375	5-S2N	0.000	0.000	1.545	1.508	11.363	6.890
	109.65	109.65	725.74	3.785	1.489	5-S2N	0.000	0.000	1.593	1.541	11.472	6.970
	113.96	113.96	725.86	3.911	1.605	5-S2N	0.000	0.000	1.640	1.573	11.583	7.049
***	118.26	118.26	725.99	4.041	1.723	5-S2N	0.000	0.000	1.685	1.604	11.695	7.125

* MINIMUM FLOW IS 10-YEAR EVENT.
** DESIGN FLOW IS 25-YEAR EVENT.
*** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - EX CULV 229+20

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 6.93 FT
SIDE SLOPE (H:V): 2.13 (_:1)
CHANNEL SLOPE: 0.0388
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 720.79 FT

TAILWATER CHANNEL DATA - PROP CULV 229+20

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 6.93 FT
SIDE SLOPE (H:V): 2.13 (_:1)
CHANNEL SLOPE: 0.0388
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 720.85 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 229+20)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
75.22	722.05	1.26	6.24	3.04	1.11
79.52	722.08	1.29	6.34	3.13	1.11
83.83	722.12	1.33	6.44	3.23	1.12
88.13	722.16	1.37	6.54	3.31	1.12
91.72	722.19	1.40	6.62	3.39	1.12
96.74	722.23	1.44	6.72	3.49	1.13
101.04	722.26	1.47	6.81	3.57	1.13
105.35	722.30	1.51	6.89	3.65	1.13
109.65	722.33	1.54	6.97	3.73	1.14
113.96	722.36	1.57	7.05	3.81	1.14
118.26	722.39	1.60	7.12	3.88	1.14

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 229+20)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
75.22	722.11	1.26	6.24	3.04	1.11
79.52	722.14	1.29	6.34	3.13	1.11
83.83	722.18	1.33	6.44	3.23	1.12
88.13	722.22	1.37	6.54	3.31	1.12
91.72	722.25	1.40	6.62	3.39	1.12
96.74	722.29	1.44	6.72	3.49	1.13
101.04	722.32	1.47	6.81	3.57	1.13
105.35	722.36	1.51	6.89	3.65	1.13
109.65	722.39	1.54	6.97	3.73	1.14
113.96	722.42	1.57	7.05	3.81	1.14
118.26	722.45	1.60	7.12	3.88	1.14

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

NOTE: THE ALLOWABLE HEADWATER ELEVATION IS 728.49' AND IS LOCATED AT STA 228+90.00.

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER

Erin N. Gonzales

12/2/2022

Texas Department of Transportation

BGE, Inc.
1701 Directors Blvd., Suite 1000, Austin, TX 78744
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

RM 967

HYDRAULIC DATA CULVERT 6

SHEET 5 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			101
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

EXISTING

SITE DATA - EX CULV 244+25

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 708.79 FT
OUTLET STATION: 78.24 FT
OUTLET ELEVATION: 707.06 FT
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY - EX CULV 244+25

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 1.50 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: GROOVED END PROJECTING
INLET DEPRESSION: NONE

PROPOSED

SITE DATA - PROP CULV 244+25

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 709.04 FT
OUTLET STATION: 93.47 FT
OUTLET ELEVATION: 707.02 FT
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY - PROP CULV 244+25

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 2.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE WITH HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 244+25

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 712.48 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 33.00 FT

ROADWAY DATA FOR CROSSING: PROP CULV 244+25

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 712.42 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 45.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 244+25

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
14.05	14.05	711.81	3.023	2.075	5-S2N	1.044	1.382	1.073	1.253	10.394	5.773
14.85	14.85	712.05	3.263	2.364	5-S2N	1.088	1.404	1.119	1.279	10.486	5.854
15.65	15.65	712.31	3.516	2.665	5-S2N	1.142	1.421	1.169	1.305	10.620	5.931
16.46	16.20	712.49	3.696	2.881	5-S2N	1.179	1.432	1.204	1.330	10.670	6.006
17.12	16.24	712.5	3.709	2.892	5-S2N	1.181	1.424	1.207	1.349	10.672	6.066
18.06	16.28	712.51	3.722	2.907	5-S2N	1.184	1.424	1.209	1.377	10.674	6.147
18.86	16.31	712.52	3.731	2.922	5-S2N	1.185	1.434	1.211	1.399	10.675	6.214
19.66	16.33	712.53	3.739	2.927	5-S2N	1.187	1.426	1.213	1.421	10.677	6.279
20.47	16.35	712.54	3.747	2.916	5-S2N	1.189	1.434	1.214	1.443	10.678	6.342
21.27	16.38	712.54	3.754	2.946	5-S2N	1.190	1.435	1.216	1.464	10.679	6.404
22.07	16.40	712.55	3.761	2.974	5-S2N	1.192	1.426	1.217	1.484	10.682	6.463

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 244+25

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	14.05	14.05	711.17	2.126	0.098	5-S2N	0.864	1.347	0.896	1.253	10.302	5.773
	14.85	14.85	711.26	2.220	0.227	5-S2N	0.893	1.385	0.930	1.279	10.383	5.854
	15.65	15.65	711.36	2.317	0.359	5-S2N	0.920	1.422	0.960	1.305	10.493	5.931
	16.46	16.46	711.46	2.418	0.496	5-S2N	0.947	1.457	0.989	1.330	10.624	6.006
**	17.12	17.12	711.55	2.505	0.615	5-S2N	0.968	1.490	1.011	1.349	10.750	6.066
	18.06	18.06	711.67	2.634	1.019	5-S2N	0.999	1.529	1.042	1.377	10.913	6.147
	18.86	18.86	711.79	2.749	1.151	5-S2N	1.025	1.561	1.069	1.399	11.043	6.214
	19.66	19.66	711.91	2.870	1.287	5-S2N	1.052	1.592	1.096	1.421	11.162	6.279
	20.47	20.47	712.04	2.996	1.427	5-S2N	1.078	1.621	1.123	1.443	11.269	6.342
	21.27	21.27	712.17	3.128	1.572	5-S2N	1.104	1.649	1.151	1.464	11.376	6.404
***	22.07	22.07	712.30	3.265	1.722	5-S2N	1.130	1.676	1.179	1.484	11.465	6.463

* MINIMUM FLOW IS 10-YEAR EVENT.
** DESIGN FLOW IS 25-YEAR EVENT.
*** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - EX CULV 244+25

TAILWATER CHANNEL OPTION: TRIANGULAR CHANNEL
SIDE SLOPE (H:V): 1.55 (_:1)
CHANNEL SLOPE: 0.0719
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 707.06 FT

TAILWATER CHANNEL DATA - PROP CULV 244+25

TAILWATER CHANNEL OPTION: TRIANGULAR CHANNEL
SIDE SLOPE (H:V): 1.55 (_:1)
CHANNEL SLOPE: 0.0719
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 707.02 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 244+25)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
14.05	708.31	1.25	5.77	5.62	1.29
14.85	708.34	1.28	5.85	5.74	1.29
15.65	708.36	1.30	5.93	5.85	1.29
16.46	708.39	1.33	6.01	5.97	1.30
17.12	708.41	1.35	6.07	6.05	1.30
18.06	708.44	1.38	6.15	6.18	1.31
18.86	708.46	1.40	6.21	6.28	1.31
19.66	708.48	1.42	6.28	6.38	1.31
20.47	708.50	1.44	6.34	6.47	1.32
21.27	708.52	1.46	6.40	6.57	1.32
22.07	708.54	1.48	6.46	6.66	1.32

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 244+25)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
14.05	708.27	1.25	5.77	5.62	1.29
14.85	708.30	1.28	5.85	5.74	1.29
15.65	708.32	1.30	5.93	5.85	1.29
16.46	708.35	1.33	6.01	5.97	1.30
17.12	708.37	1.35	6.07	6.05	1.30
18.06	708.40	1.38	6.15	6.18	1.31
18.86	708.42	1.40	6.21	6.28	1.31
19.66	708.44	1.42	6.28	6.38	1.31
20.47	708.46	1.44	6.34	6.47	1.32
21.27	708.48	1.46	6.40	6.57	1.32
22.07	708.50	1.48	6.46	6.66	1.32

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

NOTE: THE ALLOWABLE HEADWATER ELEVATION IS 712.42' AND IS LOCATED AT STA 244+70.00.

STATE OF TEXAS
ERIN N. GONZALES
102407
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PROFESSIONAL ENGINEER

Erin N. Gonzales

12/2/2022

Texas Department of Transportation

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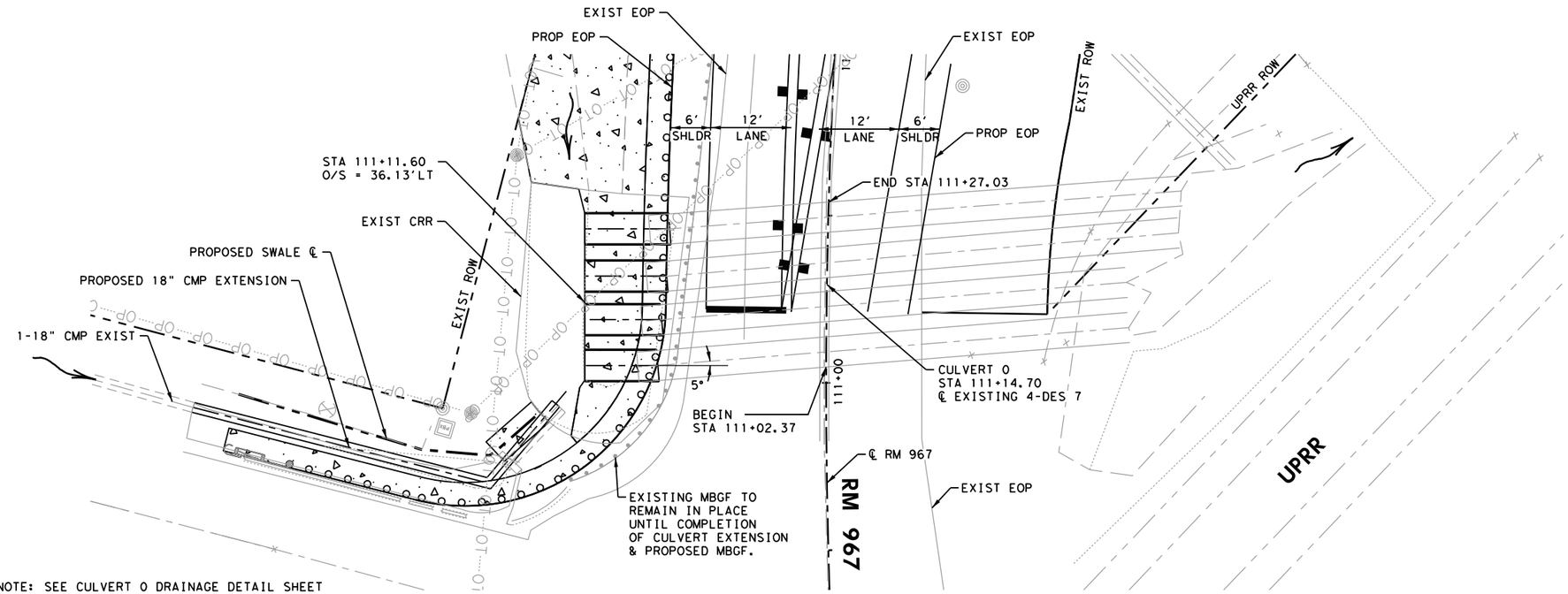
RM 967

HYDRAULIC DATA CULVERT 7

SHEET 6 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			102
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

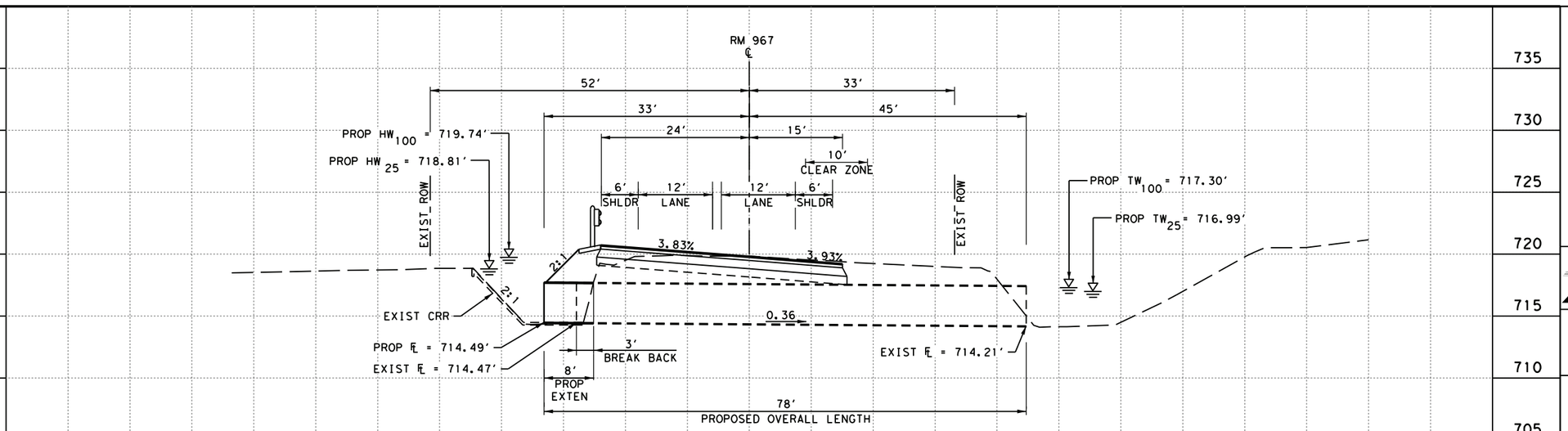


NOTE: SEE CULVERT 0 DRAINAGE DETAIL SHEET FOR 18" CMP EXTENSION AND PROPOSED SWALE.

LEGEND:

- FLOW DIRECTION
- TEMPORARY SPECIAL SHORING
- CUT & RESTORE

HORZ 0' 10' 20'
VERT 0' 5' 10'



CULVERT 0
STA 111+14

EXISTING 4-DES 7 X 79 LF CMP
BREAK BACK 3' LT
EXTEND 4-DES 7 X 8' LT

STATE OF TEXAS
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1/17/2023

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TBPE Registration No. F-1046

RM 967

CULVERT 0
STA 111+14

SHEET 1 OF 8

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			103
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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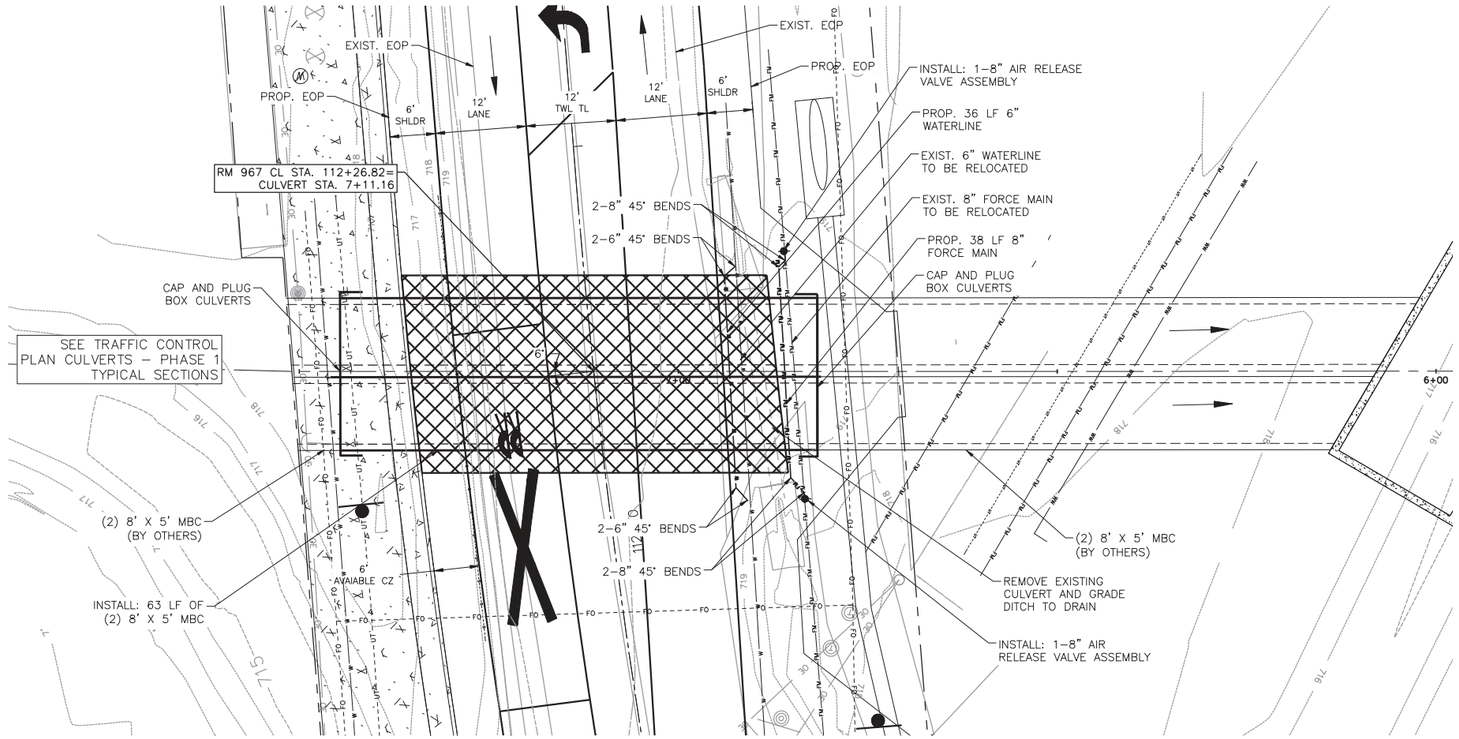


FLOW DIRECTION

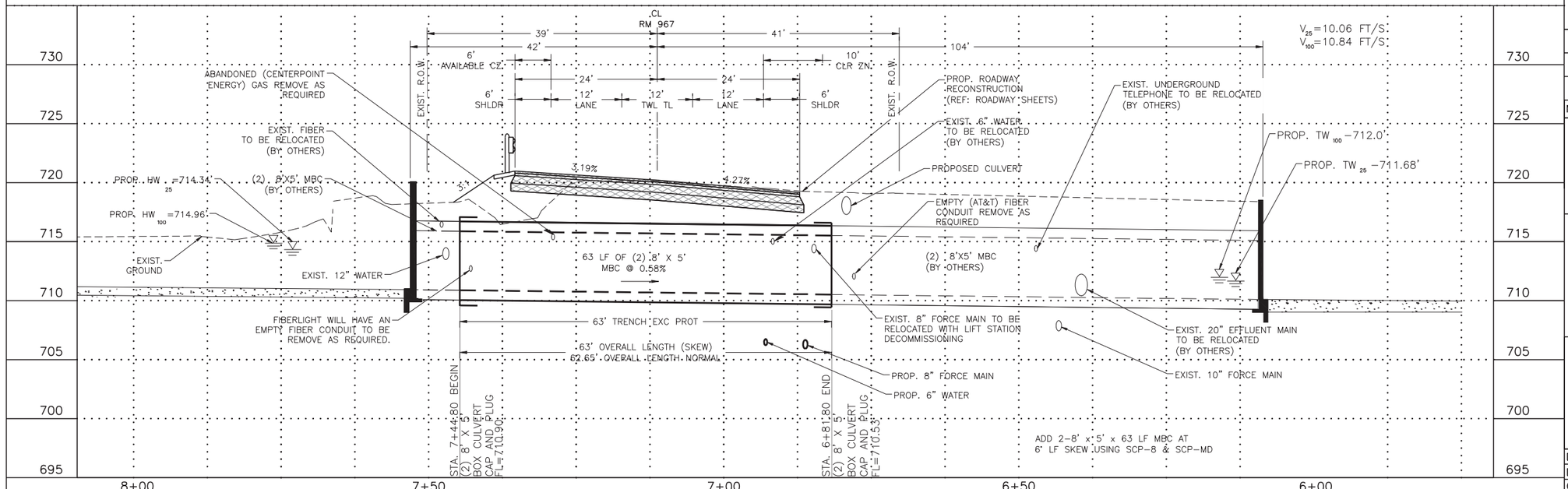
CUT AND RESTORE

N

HORZ 0 10' 20'

VERT 0 5' 10'

NOTE:
THE PROPOSED CULVERT WILL BE CAPPED AND THE H&H REVIEW WILL BE CONDUCTED UNDER THE PROJECT CSJ # 0016-16-031.



STATE OF TEXAS
J. BLAINE LAECHELIN
103616
LICENSED PROFESSIONAL ENGINEER
12-8-2021

NO.	DATE	REVISION	APPROVED

HAYS COUNTY
712 S. STAGECOACH TRAIL
SAN, MARCOS, TEXAS 78666
Tel: 512-393-7779

FREESE and NICHOLS
10431 Morado Circle, Suite 300
Austin, Texas 78759
Phone - (512) 617-3100
Fax - (512) 617-3101
Web - www.freese.com

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

RM 967
CULVERT 1
STA. 112+26.82

DESIGNED BY:	JBL	
DRAWN BY:	N. ORTIZ	104
CHECKED BY:	JBL	
APPROVED BY:	JBL	

ACAD Rel: 24.0s (LMS Tech)
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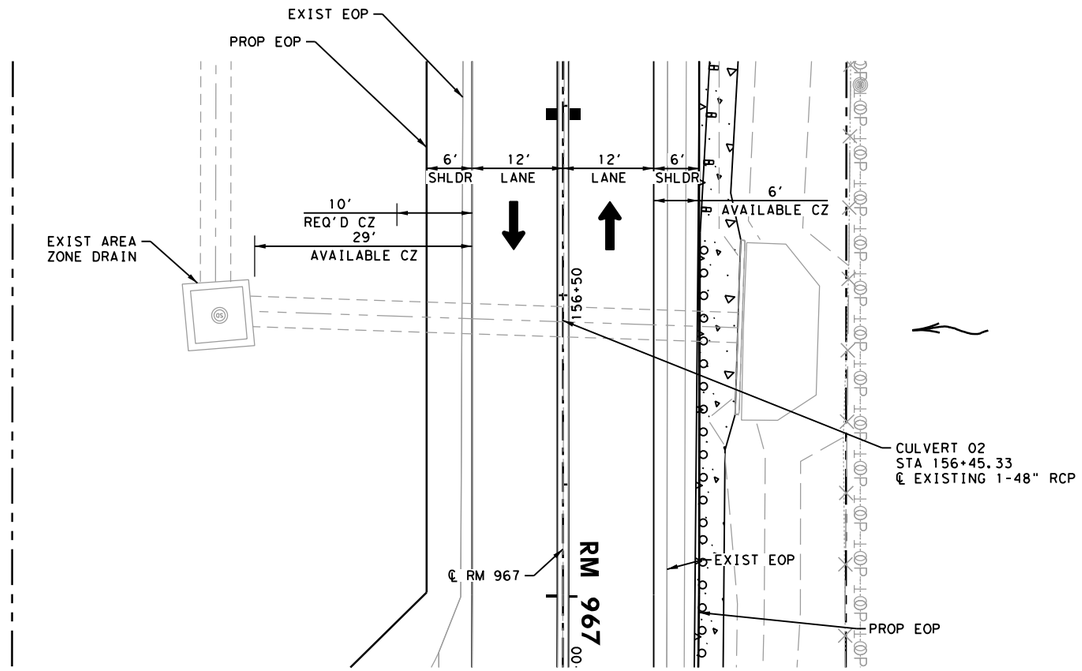
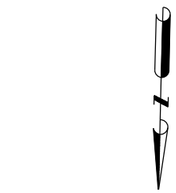




LEGEND:

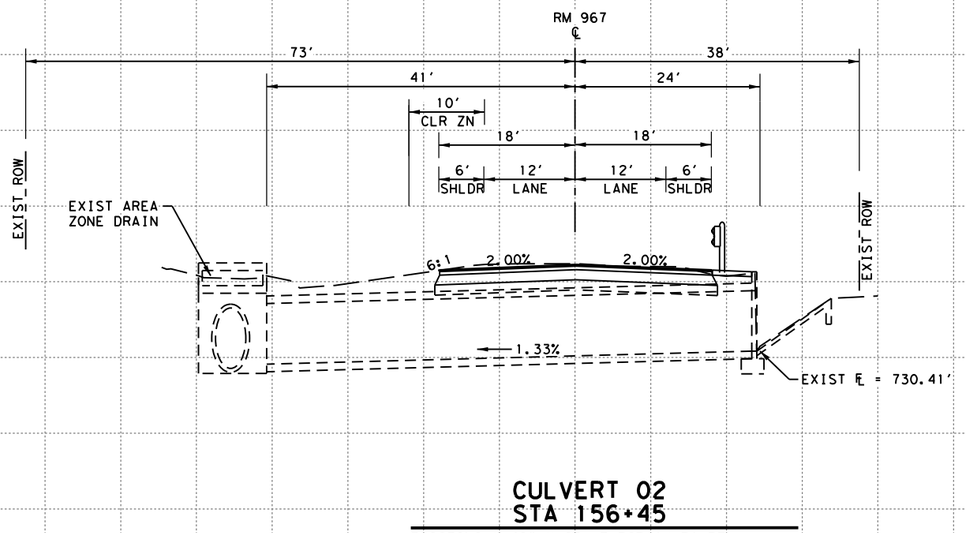
FLOW DIRECTION

TEMPORARY SPECIAL SHORING

CUT & RESTORE

HORZ 0' 10' 20'

VERT 0' 5' 10'



CULVERT 02
STA 156+45

EXISTING 1-48" X 65 LF RCP W/ PW RT

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

Texas Department of Transportation

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TBPE Registration No. F-1046

RM 967

CULVERT 2
STA 156+45

SHEET 3 OF 8

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		105

STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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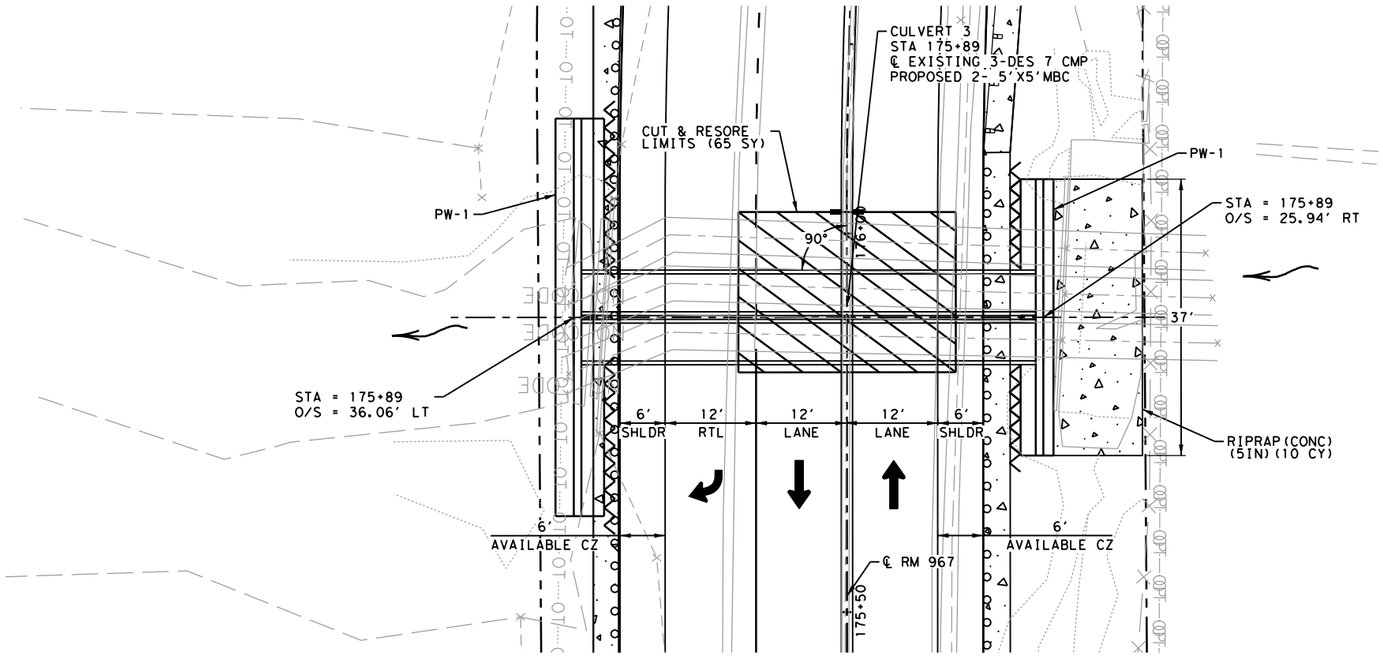
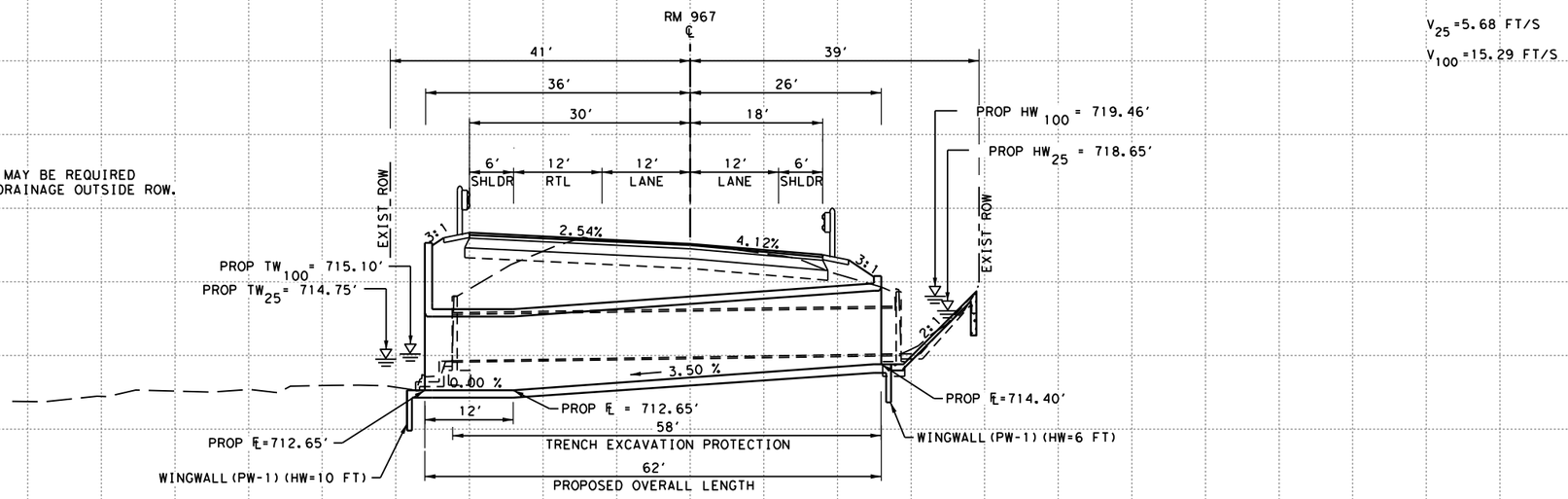


LEGEND:

- FLOW DIRECTION
- TEMPORARY SPECIAL SHORING
- CUT & RESTORE

HORZ 0' 10' 20'
VERT 0' 5' 10'



NOTE:
ADDITIONAL GRADING MAY BE REQUIRED
TO ENSURE POSTIVE DRAINAGE OUTSIDE ROW.

CULVERT 3
STA 175+89

EXISTING 3-DES 7 X 86 LF CMP
REMOVE EXISTING
ADD 2-5' X 5' X 62 LF MBC
ADD PW-1 LT & RT
USING SCP-5, SCP-MD, PW, ECD & BCS

STATE OF TEXAS
ERIN N. GONZALES
102407
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12/2/2022

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RM 967

CULVERT 3
STA 175+89

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			106
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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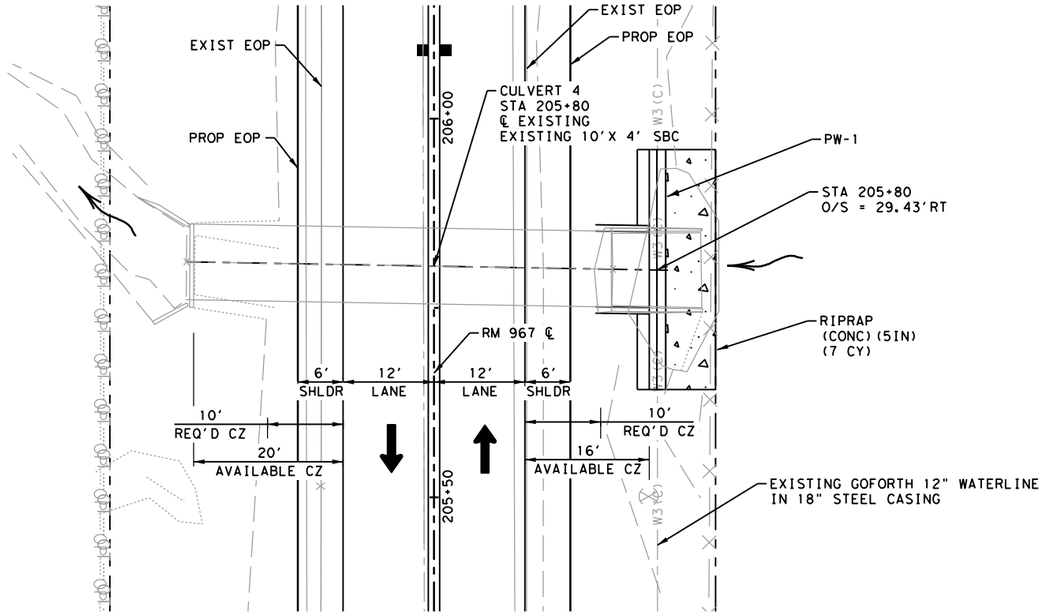
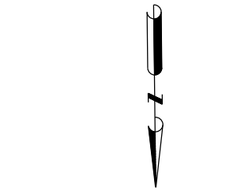
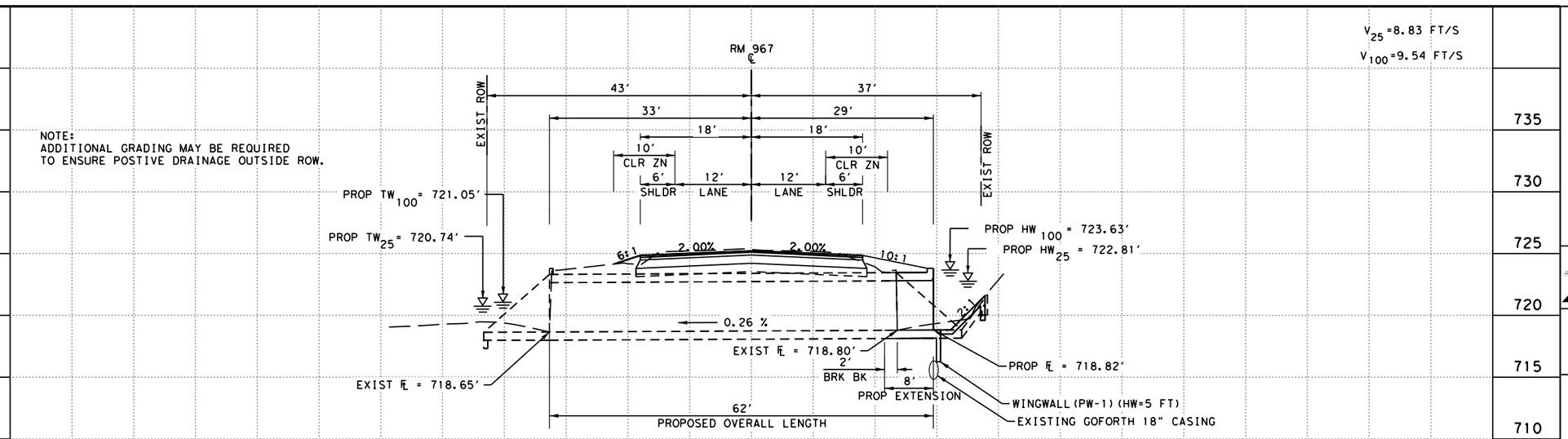




HORZ 0' 10' 20'
VERT 0' 5' 10'



CULVERT 4
STA 205+80

EXISTING 1-10' X 4' X 56 LF SBC
REMOVE SET RT & BREAK BACK 2' RT
EXTEND 10' X 4' SBC 8' RT
ADD PW-1 RT
USING SCC-10, SCC-MD, PW & BCS

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

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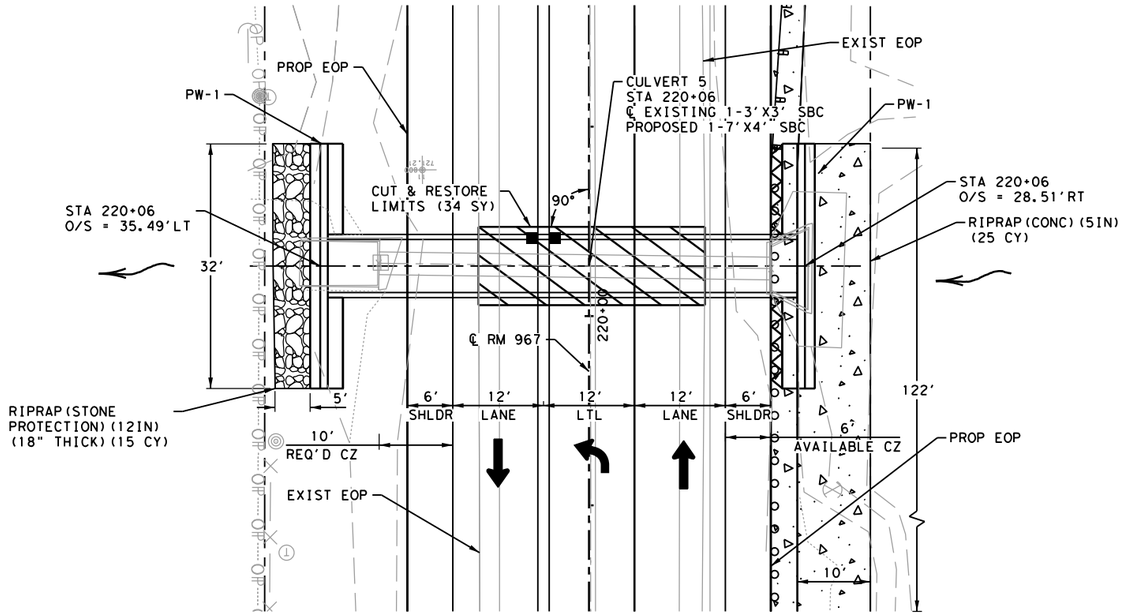
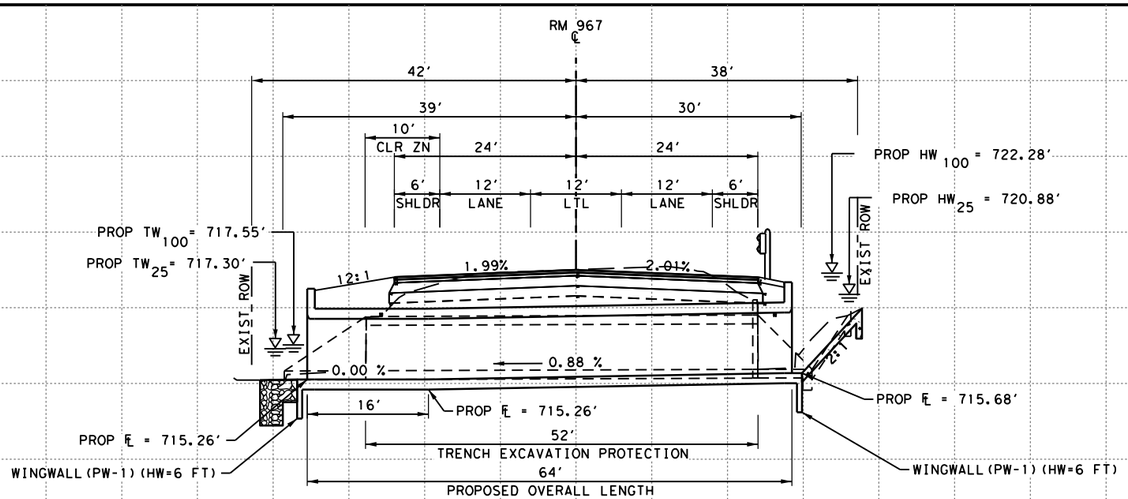
TBPE Registration No. F-1046

RM 967

CULVERT 4
STA 205+80

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			107
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967





CULVERT 5
STA 220+06

EXISTING 1-3' X 3' X 53 LF SBC
REMOVE EXISTING
ADD 1-7'X4' X 64 LF SBC
ADD PW-1 LT & RT
USING SCP-7, SCP-MD, ECD, PW & BCS

LEGEND:

FLOW DIRECTION

TEMPORARY SPECIAL SHORING

CUT & RESTORE

HORZ 0' 10' 20'
VERT 0' 5' 10'

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

Texas Department of Transportation

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TBPE Registration No. F-1046

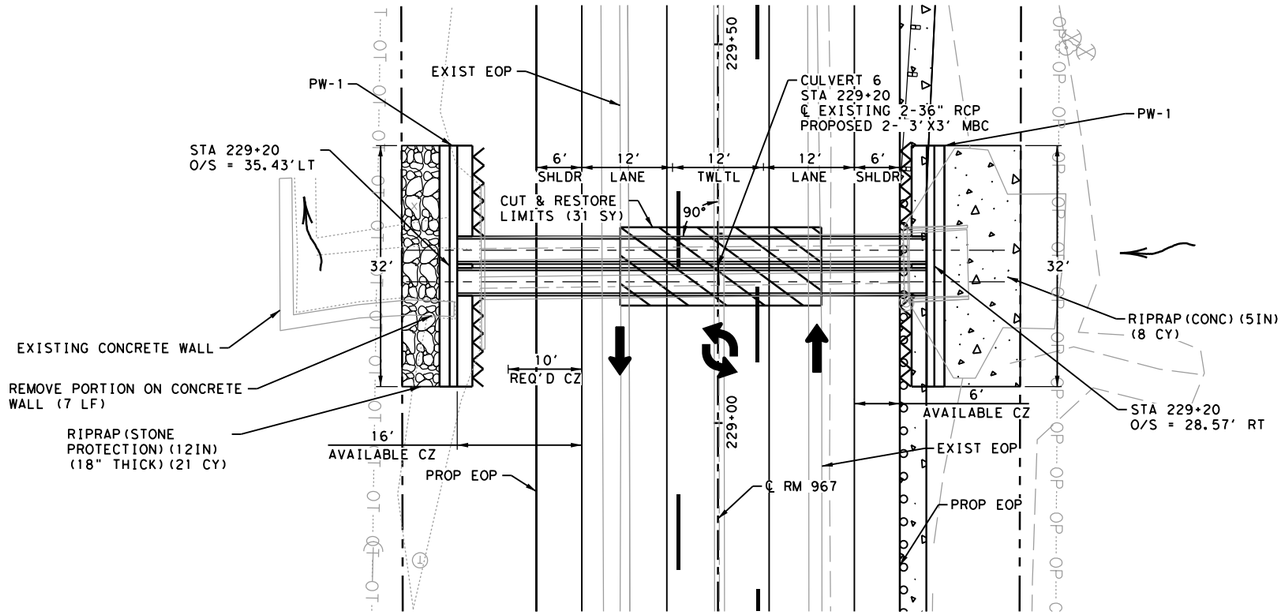
RM 967

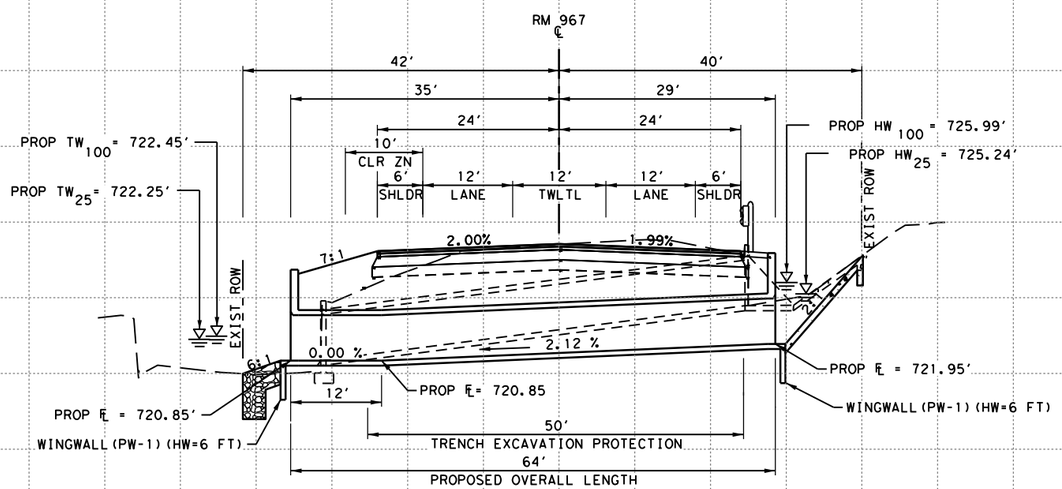
CULVERT 5
STA 220+06

SHEET 6 OF 8

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		108

STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967





CULVERT 6
STA 229+20

EXISTING 2-36" X 56 LF RCP W/PW LT & SET RT
REMOVE EXISTING
ADD 2- 3'X3' X 64 LF MBC
ADD PW-1 LT & RT
USING SCP-3, SCP-MD, ECD, PW, & BCS

LEGEND:

FLOW DIRECTION

TEMPORARY SPECIAL SHORING

CUT & RESTORE

HORZ 0' 10' 20'
VERT 0' 5' 10'

ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

12/2/2022

Texas Department of Transportation

BGE, Inc.
1701 Directors Blvd., Suite 1000, Austin, TX 78744
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RM 967

CULVERT 6
STA 229+20

SHEET 7 OF 8

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		109

STATE	DIST.	COUNTY
TEXAS	AUS	HAYS

CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
PLOTDRIVER: pdf.plt cfg
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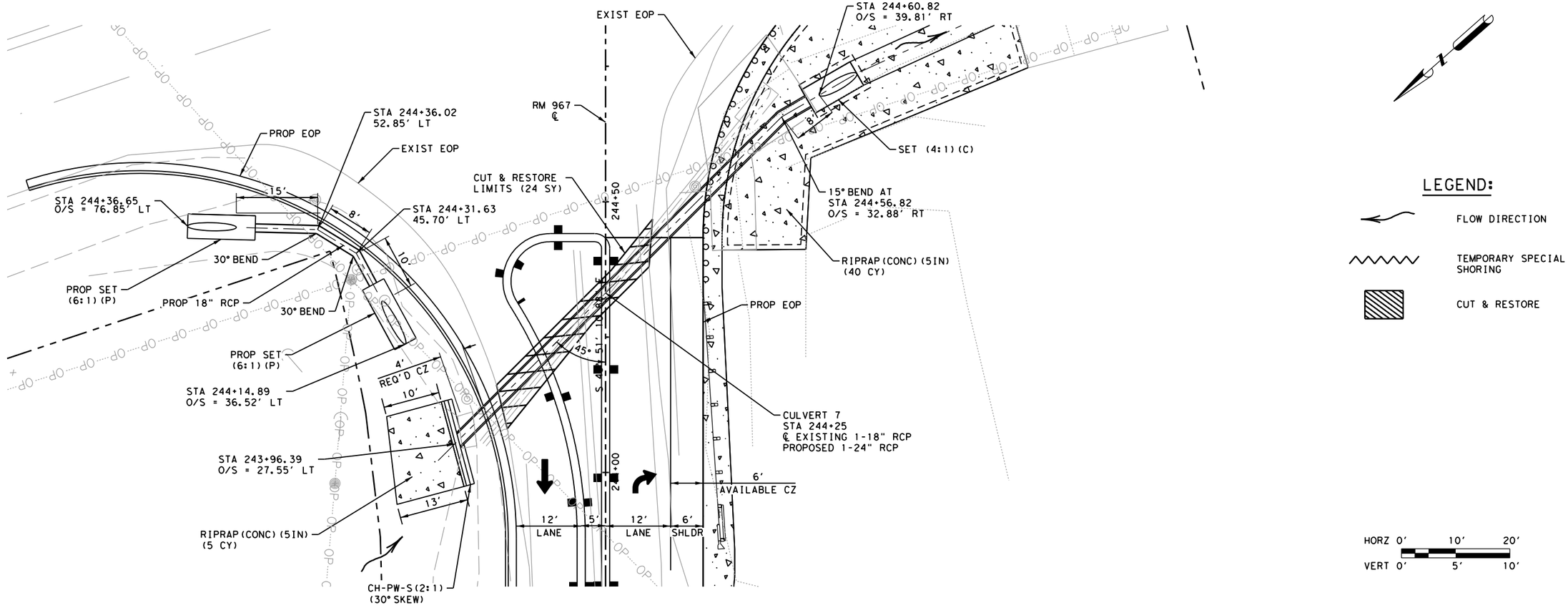

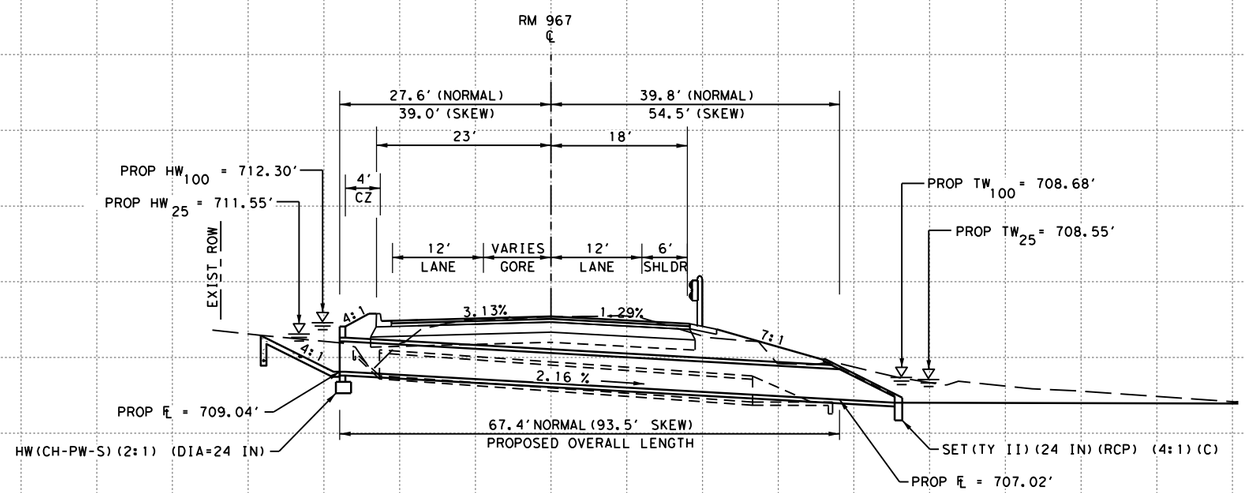

CULVERT 7
STA 244+25

EXISTING 1-18" X 78 LF (51°RF SKEW) RCP W/SET RT
PROPOSED 1-24" X 91.7 LF (45°RF SKEW) RCP
ADD HEADWALL (CH-PW-S) (DIA= 24 IN) LT & SET (TY II) (24 IN) (RCP) (4:1) (C) RT
USING CH-PW-S & SETP-CD

ERIN N. GONZALES
102407
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

12/2/2022

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CULVERT 7
STA 244+25

SHEET 8 OF 8

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			110
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
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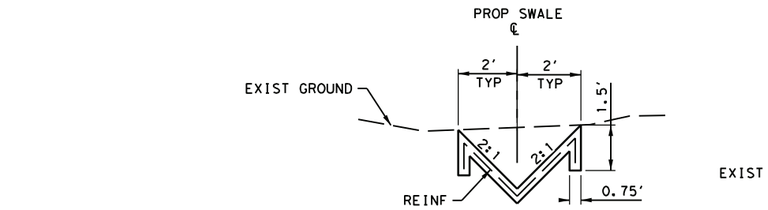
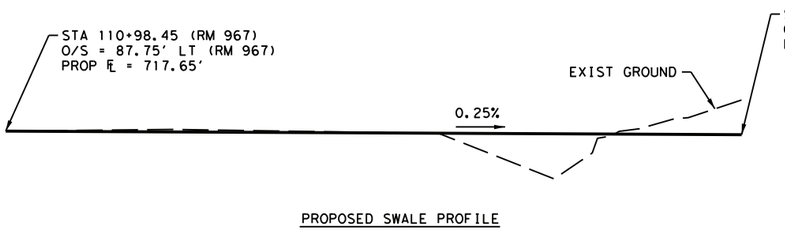
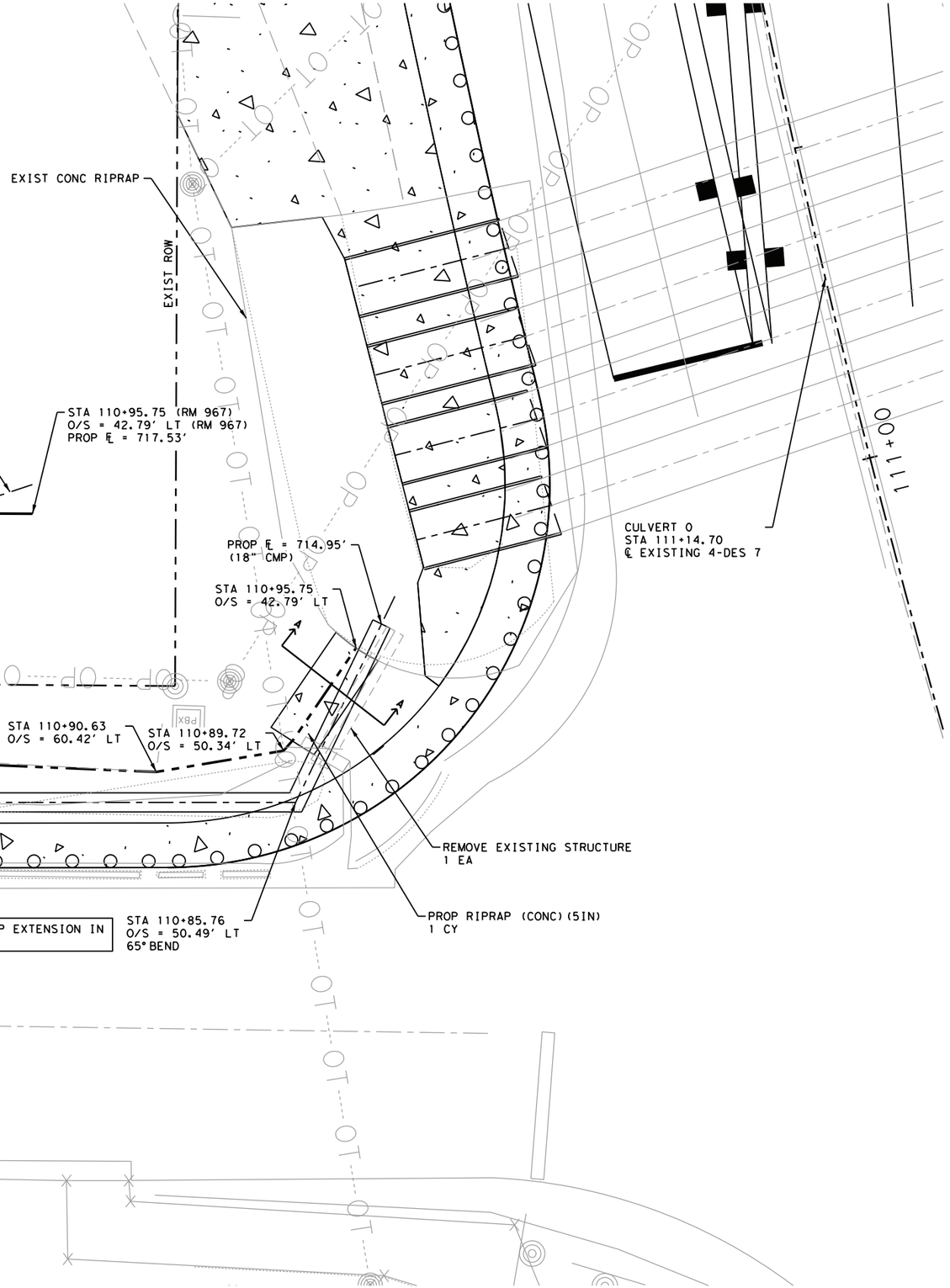


SECTION A-A TYPICAL
N.T.S.

5" RIPRAP (CONC)(CL B)
W/ #3 BARS CCEW OR
6X6X6 ga WIRE MESH



PROPOSED SWALE PROFILE



LEGEND:

- FLOW DIRECTION
- TEMPORARY SPECIAL SHORING
- CUT & RESTORE

HORZ 0' 5' 10'

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER

1/17/2023

Texas Department of Transportation

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RM 967

CULVERT 0 DRAINAGE DETAIL

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			111
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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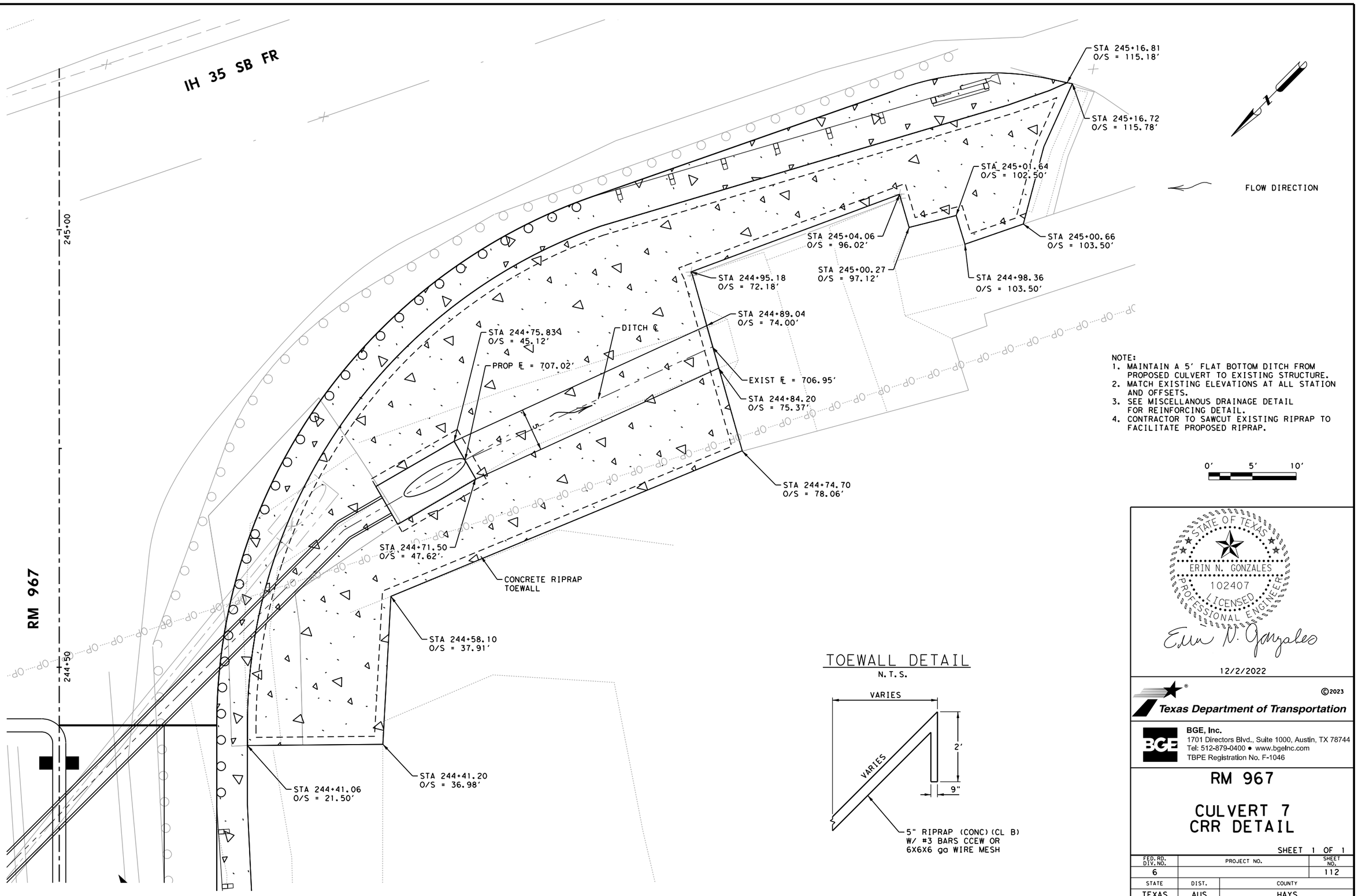
$STATUS$



NOTE:
1. MAINTAIN A 5' FLAT BOTTOM DITCH FROM PROPOSED CULVERT TO EXISTING STRUCTURE.
2. MATCH EXISTING ELEVATIONS AT ALL STATION AND OFFSETS.
3. SEE MISCELLANOUS DRAINAGE DETAIL FOR REINFORCING DETAIL.
4. CONTRACTOR TO SAWCUT EXISTING RIPRAP TO FACILITATE PROPOSED RIPRAP.

0' 5' 10'

TOEWALL DETAIL

N. T. S.

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

Texas Department of Transportation

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TBPE Registration No. F-1046

RM 967

CULVERT 7 CRR DETAIL

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			112
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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DATE:12/2/2022 11:57:04 AM USER:RM 967 PENTABLE: $PENTBLS$
PLOTDRIVER: pdf.pltcfg
$STATUS$

RIGHT DITCH

STA	Elevation (ft)	N Value	Ditch Slope (%)	Ditch Flow (cfs)	Flow Depth (ft)	Velocity (ft/sec)	Distance Below EOP
0112+00	716.79	0.04	0.42	8.80	1.32	1.26	0.70
0112+50	717.00	0.04	0.40	8.71	1.16	1.62	1.06
0113+00	717.20	0.04	0.48	8.54	1.18	1.76	1.34
0114+00	717.68	0.04	0.70	8.36	1.09	2.02	1.61
0114+50	718.03	0.04	1.00	8.10	1.00	2.29	1.54
0115+00	718.53	0.04	0.40	7.92	1.18	1.61	1.03
0115+50	718.73	0.04	0.16	7.74	1.39	1.14	0.80
0116+00	718.81	0.04	1.03	7.57	0.97	2.27	1.49
0117+00	719.84	0.04	1.40	7.39	0.91	2.54	1.30
0117+50	720.54	0.04	1.02	7.22	0.88	2.32	1.02
0118+00	721.05	0.04	0.52	7.04	0.95	1.95	0.83
0118+50	721.31	0.04	0.46	6.86	1.02	1.63	0.89
0119+00	721.54	0.04	1.05	6.78	0.88	2.17	1.19
0119+50	722.07	0.04	1.17	6.69	0.87	2.20	1.06
0120+00	722.65	0.04	0.96	6.51	0.87	2.16	0.87
0120+50	723.13	0.04	0.90	6.42	0.89	2.04	0.76
0121+00	723.58	0.04	0.82	6.34	0.90	1.94	0.69
0121+50	723.99	0.04	0.80	6.25	0.90	1.93	0.67
0122+00	724.39	0.04	0.68	6.07	0.91	1.85	0.65
0122+50	724.73	0.04	0.68	5.98	0.91	1.78	0.70
0123+00	725.07	0.04	0.46	5.81	0.97	1.53	0.69
0123+50	725.30	0.04	0.46	5.72	0.97	1.52	1.22
0124+00	725.53	0.04	0.68	5.54	0.92	1.64	1.82
0124+50	725.87	0.04	0.97	5.37	0.85	1.87	2.32
0125+50	726.84	0.04	0.36	5.10	0.91	1.75	2.11
0126+00	727.02	0.04	0.78	5.02	0.93	1.64	2.27
0126+50	727.41	0.04	0.90	4.93	0.40	1.64	2.80
0127+00	727.86	0.04	1.32	4.84	0.79	2.23	2.34
0127+50	728.52	0.04	0.42	4.75	0.84	1.90	2.06
0128+50	728.94	0.04	0.12	4.58	1.04	1.21	1.42
0129+00	728.88	0.04	0.30	4.40	1.07	1.09	0.97
0129+50	729.03	0.04	0.38	4.22	0.96	1.30	0.86
0130+00	729.22	0.04	0.56	4.05	0.89	1.45	1.01
0130+50	729.50	0.04	0.16	3.87	0.92	1.30	0.96
0131+00	729.58	0.04	0.26	3.70	0.96	1.13	1.10
0131+50	729.71	0.04	0.36	3.52	0.92	1.20	1.27
0132+00	729.89	0.04	0.70	3.34	0.81	1.45	1.51
0132+50	730.24	0.04	0.08	3.26	0.85	1.28	1.51
0133+00	730.28	0.04	0.78	3.17	0.74	1.65	1.98
0134+00	731.06	0.04	1.56	3.08	0.64	2.12	2.02
0134+50	731.84	0.04	1.61	2.99	0.60	2.07	1.68
0135+00	732.64	0.04	1.79	2.90	0.58	2.14	1.45
0135+50	733.54	0.04	1.96	2.82	0.56	2.20	1.27
0136+00	734.52	0.04	1.40	2.73	0.57	2.06	1.03
0136+50	735.22	0.04	1.68	2.64	0.58	1.98	1.07
0137+00	736.06	0.04	0.48	2.46	0.70	1.25	0.86
0137+50	736.30	0.04	1.12	2.38	0.63	1.50	1.44
0138+00	736.86	0.04	1.14	2.29	0.58	1.70	1.67
0139+00	738.00	0.04	1.74	2.11	0.52	1.96	1.77
0139+50	738.87	0.04	0.96	2.02	0.54	1.76	1.29
0140+00	739.35	0.04	0.44	1.94	0.60	1.36	1.07
0140+50	739.57	0.04	0.26	1.85	0.67	1.04	0.97
0155+00	735.76	0.04	0.78	3.78	0.42	1.32	0.58
0155+50	735.37	0.04	4.78	4.26	0.34	2.25	0.72
0156+00	732.98	0.04	1.33	4.70	0.66	3.04	2.53
0157+00	734.31	0.04	1.08	13.78	1.05	2.48	0.42
0157+50	734.85	0.04	0.80	13.37	0.94	2.29	0.23
0158+00	735.25	0.04	1.08	12.95	0.91	2.22	0.22
0158+50	735.79	0.04	0.62	12.54	0.91	2.12	0.06
0159+00	736.10	0.04	0.80	11.99	0.96	2.14	0.08
0159+50	736.50	0.04	1.00	11.58	0.93	2.22	0.08
0160+00	737.00	0.04	1.52	10.61	0.83	2.46	0.09
0160+50	737.76	0.04	1.06	9.92	0.81	2.44	-0.01

STA	Elevation (ft)	N Value	Ditch Slope (%)	Ditch Flow (cfs)	Flow Depth (ft)	Velocity (ft/sec)	Distance Below EOP
0161+00	738.29	0.04	1.36	9.09	0.80	2.34	0.22
0161+50	738.97	0.04	1.48	8.27	0.77	2.32	0.37
0162+00	739.71	0.04	1.74	7.03	0.71	2.34	0.49
0162+50	740.58	0.04	1.82	5.79	0.65	2.31	0.47
0163+00	741.49	0.04	1.68	4.82	0.61	2.16	0.40
0163+50	742.33	0.04	1.58	3.72	0.50	1.87	0.47
0164+00	743.12	0.04	1.46	2.62	0.49	1.79	0.48
0164+50	743.85	0.04	1.18	1.38	0.40	1.44	0.64
0165+00	744.44	0.04	0.00	0.01	0.05	0.30	1.08
0165+50	744.44	0.04	0.28	0.60	0.44	0.51	1.03
0166+00	744.30	0.04	1.30	1.80	0.49	1.27	1.09
0166+50	743.65	0.04	1.54	2.89	0.52	1.79	1.34
0167+00	742.88	0.04	2.74	3.85	0.51	2.45	1.39
0167+50	741.51	0.04	3.02	4.33	0.57	2.69	1.59
0168+00	740.00	0.04	2.12	4.93	0.61	2.66	1.75
0168+50	738.94	0.04	1.92	5.53	0.62	2.40	1.46
0169+00	737.98	0.04	3.56	6.02	0.57	3.03	1.13
0169+50	736.20	0.04	3.84	6.38	0.58	3.12	1.43
0170+00	734.28	0.04	4.04	6.86	0.59	3.25	1.62
0170+50	732.26	0.04	4.08	7.22	0.64	3.47	1.74
0171+00	730.22	0.04	3.22	7.70	0.75	3.40	1.82
0171+50	728.61	0.04	2.96	8.18	0.77	3.40	1.56
0172+00	727.13	0.04	2.10	9.02	0.77	3.07	1.19
0172+50	726.08	0.04	3.16	9.38	0.72	3.02	0.44
0173+00	724.50	0.04	3.00	9.74	0.76	3.34	0.29
0173+50	723.00	0.04	1.40	10.23	0.77	2.89	0.43
0174+00	722.30	0.04	2.60	10.71	0.85	2.94	0.01
0174+50	721.00	0.04	1.22	11.31	0.88	2.93	0.57
0175+00	720.39	0.04	6.10	11.67	0.71	4.56	0.84
0175+50	717.34	0.04	2.67	12.03	0.73	4.77	3.68
0176+50	720.01	0.04	3.36	11.16	0.67	3.84	1.68
0177+00	721.69	0.04	2.02	11.05	0.71	2.89	0.81
0177+50	722.70	0.04	2.10	10.94	0.87	3.14	0.87
0178+00	723.75	0.04	3.80	10.71	0.91	3.68	1.16
0178+50	725.65	0.04	3.58	10.49	0.87	3.98	0.67
0179+00	727.44	0.04	3.28	10.16	0.87	3.78	0.25
0179+50	729.08	0.04	2.08	9.93	0.90	3.48	-0.06
0180+00	730.12	0.04	3.17	9.71	0.79	3.34	0.81
0181+50	734.88	0.04	3.54	9.49	0.85	3.75	1.91
0182+00	736.65	0.04	2.72	9.26	0.85	3.63	1.86
0182+50	738.01	0.04	1.92	9.04	0.89	3.22	1.96
0183+00	738.97	0.04	1.84	8.82	0.92	2.94	1.93
0183+50	739.89	0.04	1.60	8.48	0.92	2.84	1.73
0184+00	740.69	0.04	1.30	8.15	0.89	2.56	1.35
0184+50	741.34	0.04	0.88	7.81	0.93	2.28	0.72
0185+00	741.78	0.04	0.34	7.37	1.13	1.45	0.15
0185+50	741.95	0.04	0.48	6.92	1.06	1.53	0.12
0186+00	742.19	0.04	0.71	6.47	0.97	1.73	0.03
0187+00	742.90	0.04	1.12	6.03	0.83	2.15	0.12
0187+50	743.46	0.04	0.40	5.47	0.74	1.66	0.10
0188+00	743.66	0.04	0.54	5.13	0.79	1.36	0.30
0188+50	743.93	0.04	0.58	4.80	0.75	1.43	0.52
0189+00	744.22	0.04	0.58	4.24	0.71	1.40	0.73
0189+50	744.51	0.04	0.52	3.79	0.80	1.47	0.80
0190+00	744.77	0.04	0.52	3.12	0.75	1.37	1.04
0190+50	745.03	0.04	0.52	2.46	0.69	1.29	1.29
0191+00	745.29	0.04	0.52	1.67	0.60	1.17	1.57
0191+50	745.55	0.04	0.46	0.89	0.48	0.98	1.78
0192+00	745.78	0.04	0.44	0.01	0.09	0.32	2.09
0192+50	745.56	0.04	0.38	0.89	0.49	0.92	1.84
0193+00	745.37	0.04	1.00	1.77	0.54	1.52	1.73
0193+50	744.87	0.04	1.12	2.66	0.62	1.72	1.69
0194+00	744.31	0.04	1.58	3.55	0.66	2.02	1.54

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER

Erin N. Gonzales

12/2/2022

Texas Department of Transportation

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Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

RM 967
DITCH CAPACITY ANALYSIS
RIGHT DITCH

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			113
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

FILE:G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\06-DRNG\RM967_DitchCapacityTables_01.dgn
DATE:12/2/2022 11:57:05 AM USER:RM 967
PLOTDRIVER: pdf.pltcfg PENTABLE: $PENTBL$
$STATUS$

RIGHT DITCH (CONT.)

STA	Elevation (ft)	N Value	Ditch Slope (%)	Ditch Flow (cfs)	Flow Depth (ft)	Velocity (ft/sec)	Distance Below EOP
0194+50	743.52	0.04	2.22	4.44	0.67	2.43	1.55
0195+00	742.41	0.04	1.34	5.42	0.78	2.24	1.78
0195+50	741.74	0.04	1.24	6.11	0.82	2.28	1.54
0196+00	741.12	0.04	1.96	6.41	0.80	2.50	1.17
0196+50	740.14	0.04	3.00	6.70	0.75	2.98	1.07
0197+00	738.64	0.04	2.02	7.10	0.79	2.80	1.38
0197+50	737.63	0.04	1.80	7.49	0.82	2.78	1.21
0198+00	736.73	0.04	3.04	7.89	0.80	3.08	0.98
0198+50	735.21	0.04	3.22	8.28	0.78	3.43	1.38
0199+00	733.60	0.04	1.58	8.68	0.90	2.69	1.72
0199+50	732.81	0.04	1.84	9.07	0.90	2.80	1.37
0200+00	731.89	0.04	2.02	9.47	0.89	2.96	1.27
0200+50	730.88	0.04	1.65	9.86	0.92	2.93	1.27
				.			
0206+00	721.78	0.04	3.78	5.00	0.56	2.61	2.52
0206+50	723.67	0.04	1.00	4.50	0.56	2.42	0.80
0207+00	724.17	0.04	1.04	4.00	0.62	1.71	0.51
0207+50	724.69	0.04	0.32	3.50	0.64	1.42	0.25
0208+00	724.53	0.04	0.08	3.00	0.76	0.86	0.57
0208+50	724.57	0.04	0.40	2.50	0.69	0.88	0.87
0209+00	724.77	0.04	0.64	2.00	0.55	1.12	1.06
0209+50	725.09	0.04	0.86	1.50	0.46	1.19	0.95
0210+00	725.52	0.04	0.12	1.25	0.46	0.97	0.54
0210+50	725.46	0.04	0.36	1.00	0.49	0.70	0.59
0211+00	725.28	0.04	0.24	0.50	0.36	0.64	0.92
0211+50	725.40	0.04	0.38	0.05	0.15	0.37	1.02
				.			
0212+00	725.59	0.04	0.04	0.08	0.20	0.36	0.80
0212+50	725.57	0.04	0.12	0.75	0.54	0.43	0.50
0213+00	725.51	0.04	0.06	1.33	0.65	0.52	0.40
0213+50	725.48	0.04	0.02	1.83	0.85	0.42	0.06
0214+00	725.47	0.04	0.90	2.41	0.50	1.07	0.12
0214+50	725.02	0.04	1.12	2.83	0.45	1.50	0.20
0215+00	724.46	0.04	1.10	3.32	0.57	1.69	0.24
0215+50	723.91	0.04	1.12	3.82	0.60	1.75	0.27
0216+00	723.35	0.04	1.38	4.16	0.61	1.86	0.38
0216+50	722.66	0.04	1.44	4.65	0.62	2.01	0.60
0217+00	721.94	0.04	0.30	4.99	0.75	1.78	0.71
0217+50	721.79	0.04	0.06	5.40	1.04	1.00	0.09
0218+00	721.76	0.04	0.70	5.82	0.82	1.45	-0.11
0218+50	721.41	0.04	2.32	6.40	0.62	2.47	0.00

STA	Elevation (ft)	N Value	Ditch Slope (%)	Ditch Flow (cfs)	Flow Depth (ft)	Velocity (ft/sec)	Distance Below EOP
0219+00	720.25	0.04	6.32	6.98	0.77	3.94	0.66
0219+50	717.09	0.04	0.20	7.65	0.54	3.72	4.02
0220+00	716.99	0.04	6.62	8.31	1.19	4.22	3.42
0220+50	720.30	0.04	2.72	5.50	0.65	3.70	1.62
0221+00	721.66	0.04	3.20	4.95	0.68	3.04	1.17
0221+50	723.26	0.04	3.74	4.13	0.59	2.99	0.93
0222+00	725.13	0.04	3.36	3.30	0.49	2.71	0.64
0222+50	726.81	0.04	3.16	2.48	0.45	2.45	0.49
0223+00	728.39	0.04	2.02	1.65	0.40	2.03	0.42
0223+50	729.40	0.04	1.80	0.83	0.36	1.60	0.59
0224+00	730.30	0.04	0.03	0.28	0.25	0.88	0.56
				.			
0225+50	730.25	0.04	2.08	0.07	0.15	0.67	0.67
0226+00	729.21	0.04	1.00	0.30	0.27	1.18	1.07
0226+50	728.71	0.04	0.04	0.63	0.43	0.94	0.89
0227+00	728.69	0.04	0.68	1.22	0.60	0.97	0.22
0227+50	728.35	0.04	1.32	1.73	0.60	1.61	0.04
0228+00	727.69	0.04	1.20	2.40	0.65	1.90	0.13
0228+50	727.09	0.04	0.74	3.03	0.74	1.83	0.27
0229+00	726.72	0.04	0.56	3.69	0.68	1.59	0.62
0229+50	727.00	0.04	0.72	11.54	0.94	1.99	0.30
0230+00	727.36	0.04	1.08	10.39	1.12	2.34	0.27
0230+50	727.90	0.04	1.15	9.23	1.03	2.46	0.62
0231+50	729.05	0.04	1.24	8.08	0.97	2.44	0.97
0232+00	729.67	0.04	0.86	6.92	0.94	2.24	0.82
0232+50	730.10	0.04	0.67	5.77	0.93	1.90	0.68
0233+50	730.77	0.04	1.06	4.62	0.84	1.88	0.60
0234+00	731.30	0.04	1.00	3.46	0.73	1.87	0.42
0234+50	731.80	0.04	0.60	2.89	0.67	1.58	0.23
0235+00	732.10	0.04	0.80	1.96	0.60	1.36	0.24
0235+50	732.50	0.04	0.80	1.15	0.44	1.19	0.25
0236+00	732.90	0.04	0.92	0.01	0.07	0.37	0.47
0236+50	733.36	0.04	0.90	0.19	0.20	0.77	0.42
0237+00	732.91	0.04	1.89	2.58	0.50	1.72	1.08
0238+00	731.02	0.04	2.94	4.52	0.68	2.75	2.64
0239+50	726.61	0.04	3.82	5.81	0.67	3.23	3.42
0241+00	720.88	0.04	-2.99	6.46	0.58	3.16	2.51

STATE OF TEXAS
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12/2/2022

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TBPE Registration No. F-1046

RM 967 DITCH CAPACITY ANALYSIS RIGHT DITCH (CONT.)

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			114
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

FILE:G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\06-DRNG\RM967_DitchCapacityTables_02.dgn $STATUS$
DATE:12/2/2022 11:57:06 AM USER:RM 967 PLOTDRIVER: pdf.pltcfg
$$$$ PENTABLE: $PENTBLS$

LEFT DITCH

STA	Elevation (ft)	N Value	Ditch Slope (%)	Ditch Flow (cfs)	Flow Depth (ft)	Velocity (ft/sec)	Distance Below EOP
0111+00	716.27	0.013	2.44	46.15	1.23	12.25	3.21
0111+50	715.05	0.013	2.26	45.92	1.07	12.07	4.91
0112+00	716.18	0.013	1.06	45.69	0.37	7.23	4.36
0112+50	716.71	0.013	0.78	45.46	1.60	8.80	2.46
0113+00	717.10	0.013	0.10	45.23	2.43	3.82	1.19
0113+50	717.15	0.013	0.58	45.00	1.40	5.44	1.67
0114+00	717.44	0.013	1.00	44.77	1.17	7.45	0.27
0115+50	718.94	0.013	0.96	44.30	1.12	8.06	0.87
0116+00	719.42	0.013	0.22	44.21	1.02	6.55	0.83
0116+50	719.53	0.013	1.26	43.98	1.07	7.19	1.06
0117+00	720.16	0.013	1.94	43.84	0.70	10.03	1.19
0117+50	721.13	0.013	0.12	43.61	0.81	7.87	0.50
0118+00	721.07	0.013	0.66	43.38	1.12	5.60	0.65
0118+50	721.40	0.013	0.38	43.15	1.04	6.22	0.78
0119+00	721.59	0.013	1.42	42.78	0.82	8.96	1.20
0119+50	722.30	0.013	0.65	42.46	0.60	7.41	1.09
0120+50	722.95	0.013	0.60	42.00	0.69	6.24	1.14
0121+00	723.25	0.013	0.82	41.54	0.92	7.27	1.00
0121+50	723.66	0.013	0.28	41.07	1.01	6.26	0.89
0122+00	723.80	0.013	0.10	40.61	1.39	4.25	0.76
0122+50	723.85	0.013	0.60	40.15	0.99	5.41	1.50
0124+00	724.75	0.013	0.12	39.69	1.02	5.51	1.61
0124+50	724.81	0.013	0.74	39.46	1.49	5.93	1.41
0125+00	725.18	0.013	1.20	39.23	1.22	8.69	1.70
0125+50	725.78	0.04	0.47	38.77	1.51	3.31	1.20
0126+50	726.25	0.04	2.26	38.54	1.45	4.01	1.57
0127+00	727.38	0.04	0.54	38.30	1.92	2.60	0.35
0127+50	727.65	0.04	0.14	37.84	2.08	2.18	0.31
0128+00	727.72	0.04	0.34	37.38	2.33	1.96	0.33
0128+50	727.89	0.04	1.30	37.15	1.38	3.06	1.97
0129+00	728.54	0.04	0.04	36.92	3.45	1.03	0.24
0129+50	728.56	0.04	0.58	36.46	2.20	2.15	2.06
0130+00	728.85	0.04	1.54	36.00	1.74	3.39	2.49
0131+00	730.39	0.04	0.24	31.38	2.18	1.88	1.04
0132+00	730.63	0.04	1.58	27.69	1.11	3.64	2.25
0132+50	731.42	0.04	0.58	24.46	1.60	2.39	0.84
0133+00	731.71	0.04	0.64	22.61	1.52	2.43	0.51
0133+50	732.03	0.04	0.56	20.31	1.28	2.24	0.30
0134+00	732.31	0.04	1.02	18.46	0.91	2.67	0.50
0134+50	732.82	0.04	1.16	16.61	0.83	2.72	0.47
0135+00	733.40	0.04	1.01	14.31	0.87	2.52	0.40
0136+00	734.32	0.04	1.10	10.15	1.02	2.44	0.78
0137+00	735.42	0.04	1.38	7.85	0.89	2.49	1.31
0137+50	736.11	0.04	0.84	6.00	0.88	1.93	1.38
0138+00	736.53	0.04	1.22	5.54	0.84	2.24	1.74
0138+50	737.14	0.04	0.97	4.15	0.79	1.91	1.83
0139+00	738.42	0.04	0.54	4.15	0.83	1.49	1.04
0140+50	739.08	0.04	0.82	0.69	0.41	1.15	1.72
0141+00	739.49	0.04	0.30	0.46	0.41	0.69	1.41
				.			
0155+00	735.32	0.04	0.04	3.17	0.95	0.49	0.49
				.			
0161+50	735.55	0.04	1.52	1.79	0.37	1.68	4.19
0162+00	736.31	0.04	1.82	1.34	0.40	1.69	4.20
0162+50	737.22	0.04	1.83	0.78	0.28	1.47	4.21
0163+50	739.05	0.04	1.80	0.56	0.29	1.35	3.95
0164+00	739.95	0.04	0.62	0.22	0.27	0.76	3.87
0167+00	741.82	0.04	2.88	0.28	0.20	1.35	2.76
0167+50	740.38	0.04	2.36	0.37	0.23	1.40	3.08
0168+00	739.20	0.04	2.20	0.56	0.27	1.47	2.88
0168+50	738.10	0.04	2.66	0.74	0.30	1.62	2.62
0169+50	735.44	0.04	2.48	0.93	0.35	1.84	2.37
0170+00	734.20	0.04	3.40	1.11	0.37	2.03	1.92
0170+50	732.50	0.04	3.72	1.35	0.38	2.29	1.75
0171+00	730.64	0.04	4.22	1.59	0.39	2.54	1.73
0171+50	728.53	0.04	0.44	1.85	0.35	2.03	2.02
				.			
0181+00	732.75	0.04	1.74	1.27	0.39	1.64	2.14
0181+50	733.62	0.04	2.16	1.12	0.37	1.65	2.22
0182+00	734.70	0.04	1.24	0.98	0.39	1.60	2.02
0182+50	735.32	0.04	2.00	0.84	0.37	1.51	2.34
0183+00	736.32	0.04	1.36	0.70	0.36	1.35	2.30

STA	Elevation (ft)	N Value	Ditch Slope (%)	Ditch Flow (cfs)	Flow Depth (ft)	Velocity (ft/sec)	Distance Below EOP
0183+50	737.00	0.04	1.44	0.44	0.30	1.22	2.41
0184+00	737.72	0.04	1.12	0.13	0.19	0.86	2.34
				.			
0188+50	742.75	0.04	1.10	1.29	0.43	1.39	2.02
0189+00	743.30	0.04	0.38	1.10	0.54	0.94	1.82
0189+50	743.49	0.04	0.42	0.90	0.52	0.94	2.10
0190+00	743.70	0.04	1.20	0.71	0.42	1.15	2.44
0190+50	744.30	0.04	2.00	0.52	0.33	1.37	2.38
0191+00	745.30	0.04	1.40	0.32	0.27	1.13	1.89
0191+50	746.00	0.04	0.84	0.13	0.20	0.82	1.61
0192+50	746.84	0.04	0.84	0.03	0.05	0.31	1.00
				.			
0193+50	746.00	0.04	3.00	0.43	0.26	1.29	0.90
0194+00	744.50	0.04	2.00	1.28	0.40	1.98	1.61
0194+50	743.50	0.04	2.20	1.71	0.46	1.99	1.78
0195+00	742.40	0.04	2.39	2.13	0.49	2.21	2.08
0195+50	741.20	0.04	2.01	2.56	0.53	2.24	2.36
0196+00	740.20	0.04	2.40	2.99	0.56	2.33	2.34
0196+50	739.00	0.04	2.60	3.41	0.58	2.53	2.38
0197+00	737.70	0.04	2.00	3.84	0.63	2.39	2.48
0197+50	736.70	0.04	2.34	4.27	0.65	2.53	2.31
0198+00	735.53	0.04	2.30	4.01	0.62	2.56	2.36
0198+50	734.38	0.04	2.22	4.27	0.64	2.57	2.35
0199+00	733.27	0.04	1.92	4.52	0.68	2.45	2.27
0199+50	732.31	0.04	1.62	4.78	0.70	2.41	2.07
0200+00	731.50	0.04	2.00	5.03	0.71	2.47	1.84
0200+50	730.50	0.04	1.80	5.29	0.72	2.54	1.85
0201+00	729.60	0.04	1.40	5.54	0.78	2.29	1.70
0201+50	728.90	0.04	1.40	5.72	0.78	2.31	1.42
0202+00	728.20	0.04	1.36	5.97	0.80	2.32	1.12
0202+50	727.52	0.04	2.18	6.48	0.79	2.60	0.82
0203+00	726.43	0.04	2.52	6.82	0.75	3.01	0.95
0203+50	725.17	0.04	1.10	7.34	0.82	2.71	1.16
0204+00	724.62	0.04	2.74	7.68	0.79	2.73	0.87
0204+50	723.25	0.04	0.16	8.10	0.89	2.56	1.47
0205+00	723.17	0.04	0.24	8.53	1.09	1.20	0.89
				.			
0209+00	724.13	0.04	0.20	0.02	0.11	0.25	2.14
0209+50	724.03	0.04	0.20	0.17	0.28	0.44	2.19
0210+00	723.93	0.04	0.20	0.35	0.36	0.53	2.23
0210+50	723.83	0.04	0.20	0.48	0.41	0.57	2.30
0211+00	723.73	0.04	0.20	0.64	0.46	0.61	2.37
0211+50	723.63	0.04	0.20	0.75	0.48	0.64	2.46
0212+00	723.53	0.04	0.20	0.85	0.51	0.66	2.55
0212+50	723.43	0.04	0.20	0.97	0.53	0.68	2.65
0213+00	723.33	0.04	0.20	1.10	0.56	0.70	2.67
0213+50	723.23	0.04	0.20	1.29	0.59	0.73	2.57
0214+00	723.13	0.04	0.20	1.45	0.62	0.75	2.34
0214+50	723.03	0.04	2.06	1.56	0.46	1.47	2.17
0215+00	722.00	0.04	0.70	1.68	0.52	1.74	2.71
0216+00	721.30	0.04	0.10	1.79	0.68	1.11	2.36
0216+50	721.25	0.04	0.10	1.93	0.90	0.68	1.76
				.			
0220+50	720.29	0.04	2.86	1.13	0.36	1.43	1.92
0221+00	721.72	0.04	1.88	0.90	0.36	1.17	1.43
0222+00	723.60	0.04	3.80	0.68	0.32	1.80	2.34
0222+50	725.50	0.04	3.16	0.45	0.25	1.72	2.00
0223+00	727.08	0.04	0.23	0.06	0.13	0.78	2.00
0237+50	730.44	0.04	1.92	0.00	0.05	0.34	2.62
0238+00	729.48	0.04	3.16	0.30	0.25	1.43	2.56
0238+50	727.90	0.04	2.76	0.61	0.31	1.80	2.90
0239+00	726.52	0.04	2.84	0.91	0.36	1.95	2.77
0239+50	725.10	0.04	3.04	1.22	0.40	2.14	2.42
0240+00	723.58	0.04	4.16	1.52	0.42	2.44	1.82
0240+50	721.50	0.04	4.34	1.83	0.44	2.71	1.56
0241+00	719.33	0.04	4.16	2.13	0.46	2.82	1.39
0241+50	717.25	0.04	3.78	2.44	0.49	2.84	1.16
0242+00	715.36	0.04	3.24	2.74	0.53	2.79	0.99
0242+50	713.74	0.04	2.51	3.05	0.57	2.66	0.92
0243+50	711.23	0.04	3.34	3.35	0.59	2.74	1.42
0244+00	709.56	0.04	1.92	3.62	0.62	2.69	2.41
0244+50	710.52	0.04	-2.91	3.81	0.67	2.42	0.82

STATE OF TEXAS
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12/2/2022

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TBPE Registration No. F-1046

RM 967 DITCH CAPACITY ANALYSIS LEFT DITCH

SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		115

STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

DRIVEWAY/INTERSECTION CULVERT FLOW ANALYSIS

DW # / INTERSECTION	STATION	LT/RT	SIZE	AREA	SLOPE	Q	n	Q(MAX)	
DW# 00	111+50.00	RT	2.00	3.14	0.0327	8.8	0.020	26.66	
DW# 01	112+18.89	RT	2.00	3.14	0.0063	8.71	0.012	19.51	
DW# 02	113+52.35	RT	2.00	3.14	0.0045	8.54	0.012	16.49	
DW# 03	114+71.37	RT	2.00	3.14	0.0084	8.36	0.012	22.52	
BELLA VIA PKWY	114+75.00	LT	7' X 2'	14.00	0.0096	44.3	0.012	200.03	
DW# 04	116+37.10	RT	1.50	1.77	0.0130	7.57	0.012	13.01	
DW# 05	120+04.42	LT	2.00	3.14	0.0082	41.00	0.012	44.51	*
DW# 06	123+18.85	LT	2.00	3.14	0.0087	39.69	0.012	45.84	*
DW# 07	125+19.85	RT	1.50	1.77	0.0064	5.1	0.012	9.10	
REBEL DR	126+01.55	LT	2.00	3.14	0.0077	38.54	0.012	43.13	*
DW# 08	127+82.76	RT	1.50	1.77	0.0097	4.58	0.012	11.22	
DW# 09	128+87.32	LT	2.00	3.14	0.0099	36.92	0.012	48.90	*
WINDMILL WAY	130+57.67	LT	2.00	3.14	0.0070	31.38	0.012	41.12	*
DW# 10	130+60.96	RT	1.50	1.77	0.0041	3.87	0.012	7.28	
DW# 11	131+59.67	LT	2.00	3.14	0.0070	27.69	0.012	41.12	*
DW# 12	133+41.79	RT	1.50	1.77	0.0064	3.17	0.012	9.13	
DW# 13	134+18.52	RT	1.50	1.77	0.0227	3.08	0.012	17.19	
DW# 14	135+10.86	RT	1.50	1.77	0.0080	2.9	0.012	10.21	
DW# 14A	135+49.01	LT	1.50	1.77	0.0085	10.15	0.012	10.52	
DW# 15	136+30.91	LT	1.50	COMBINED WITH DW 14A					
PRECISION DR	138+38.22	RT	1.50	1.77	0.0110	2.11	0.012	11.97	
DW# 16	139+61.93	LT	1.50	1.77	0.0084	4.15	0.012	10.46	
DW# 17	155+72.25	LT	EXISTING PIPE TO REMAIN						
DW# 18	157+51.60	LT	N/A	N/A	N/A	N/A	N/A	N/A	
DW# 19	160+41.36	LT	N/A	N/A	N/A	N/A	N/A	N/A	
DW# 20	164+13.43	LT	1.50	COMBINED WITH DW 20A					
DW# 20A	164+61.19	LT	1.50	1.77	0.0176	0.22	0.012	15.14	
DW# 21	169+18.41	LT	1.50	1.77	0.0312	0.93	0.012	20.16	
CLEAR WATER PATH	172+11.19	LT	AREA INLET						
DW# 22	180+41.72	LT	N/A	N/A	N/A	N/A	N/A	N/A	
CEMENT PLANT RD	180+93.76	RT	1.50	1.77	0.0380	9.49	0.012	22.24	
HOPE POND VALLEY	191+95.69	LT	1.50	DISCHARGES INTO THE DITCH FROM DEVELOPMENT					
DW# 23	193+30.08	LT	N/A	N/A	N/A	N/A	N/A	N/A	
DW# 24	203+25.04	LT	1.50	1.77	0.0195	6.82	0.012	15.93	
DW# 25	203+67.71	LT	1.50	COMBINED WITH DW 24					
DW# 26	208+46.09	LT	N/A	N/A	N/A	N/A	N/A	N/A	
DW# 27	215+60.36	LT	1.50	1.77	0.005	1.68	0.012	8.07	
INTERSTATE DR	221+55.77	LT	1.50	1.77	0.0231	0.68	0.012	17.34	
DW# 28	224+26.33	RT	N/A	N/A	N/A	N/A	N/A	N/A	
DW# 29	224+76.33	RT	N/A	N/A	N/A	N/A	N/A	N/A	
PRIVATE ST	225+97.13	LT	N/A	N/A	N/A	N/A	N/A	N/A	
BUSINESS PARK DR	231+01.54	RT	1.50	1.77	0.0101	8.08	0.012	22.94	*
DW# 30	232+87.71	RT	1.50	1.77	0.0071	4.62	0.012	9.61	
DW# 31	233+91.92	LT	N/A	N/A	N/A	N/A	N/A	N/A	
DW# 32	236+67.30	LT	N/A	N/A	N/A	N/A	N/A	N/A	
GATEWAY DR	238+72.58	RT	1.50	1.77	0.0389	4.52	0.012	22.51	
DW# 34	239+26.41	LT	2.00	3.14	0.0179	1.22	0.012	32.88	
DW# 35	243+27.52	LT	2.00	3.14	0.0330	3.35	0.012	44.64	
DW# 36	243+27.52	RT	N/A	N/A	N/A	N/A	N/A	N/A	

* QMAX INCLUDES BOTH PIPES

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12/2/2022

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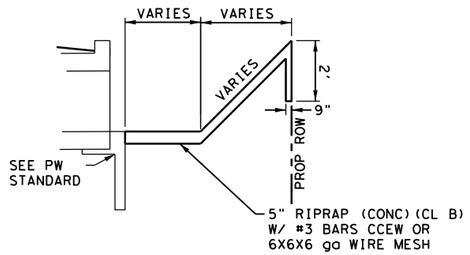
TBPE Registration No. F-1046

RM 967

FLOW ANALYSIS DRIVEWAY CULVERTS

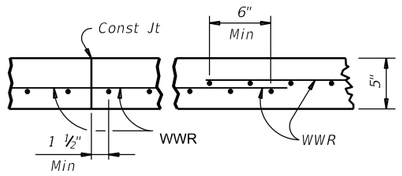
SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			116
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967



CULVERT RIPRAP DETAIL

N. T. S.



DITCH CRR REINFORCEMENT DETAILS (1)

N. T. S.

See General Notes for optional synthetic fiber reinforcement.

(1) Provide Welded Wire Reinforcement (WWR) as 6x6-D3xD3. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.

GENERAL NOTES:

Provide Class "B" concrete with a minimum compressive strength of 2,000 psi unless noted elsewhere in plans.

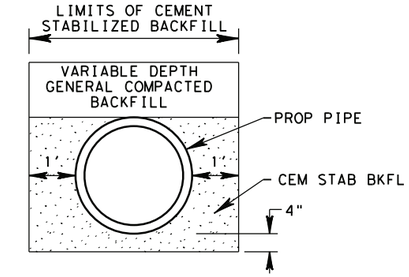
Provide Grade 60 deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

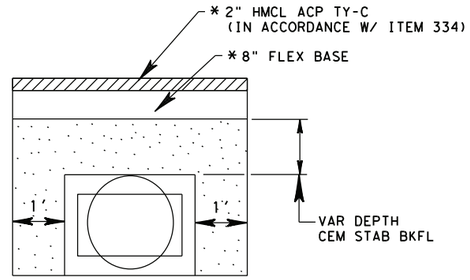
FOR CONTRACTOR'S INFORMATION ONLY:

6x6-D3xD3 = 0.408 Lbs/SF



CEMENT STABILIZED BACKFILL DETAIL

SECTION VIEW (N. T. S.)

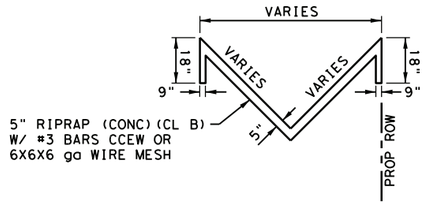


CUT & RESTORE DETAIL

HMCL SURFACE

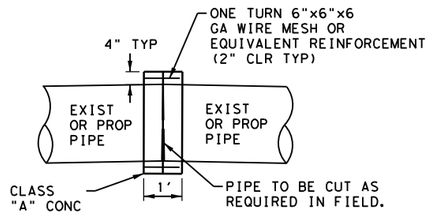
SECTION VIEW (N. T. S.)

* SUBSIDIARY TO ITEM 400 CUT & RESTORE



DITCH RIPRAP DETAIL

N. T. S.



PIPE COLLAR DETAIL

N. T. S.

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1/17/2023

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TBPE Registration No. F-1046

RM 967

MISCELLANEOUS DRAINAGE DETAIL

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			117
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

FILE:G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\06-DRNG\RM967_DRNG_MISC_DTL.dgn
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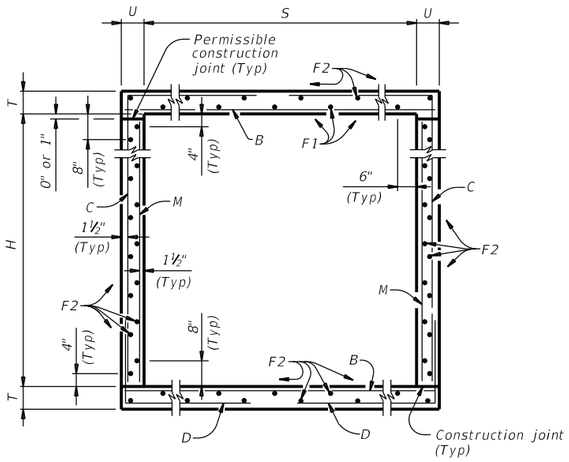
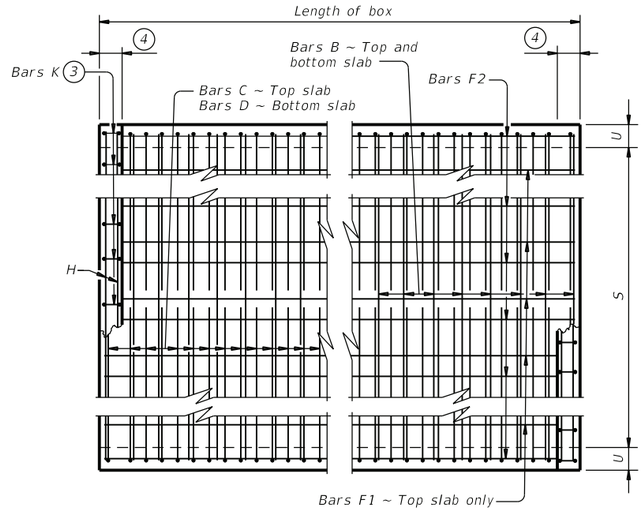
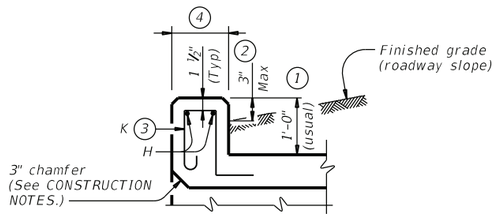


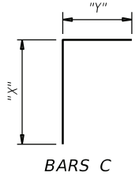
TYPICAL SECTION



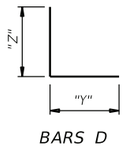
PLAN OF REINF STEEL



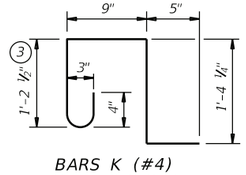
SECTION THRU CURB



BARS C



BARS D



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

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

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

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12/21/2022

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-7(MOD)

FILE: scc07ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
⚠ ADDED 7'X2' BOX	AUS	HAYS		118

SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																										QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
7' – 0"	3' – 0"	8"	7"	16'	108	#6	9"	7' – 11"	1,284	162	#5	6"	7' – 11"	1,338	3' – 6"	4' – 5"	162	#5	6"	7' – 1"	1,197	4' – 5"	2' – 8"	108	9"	3' – 0"	216	5	39' – 9"	133	31	39' – 9"	823	7' – 11"	21	18	50	0.533	124.8	0.6	71	21.9	5,062
7' – 0"	3' – 0"	9"	7"	20'	108	#6	9"	7' – 11"	1,284	162	#5	6"	8' – 0"	1,352	3' – 7"	4' – 5"	162	#5	6"	7' – 2"	1,211	4' – 5"	2' – 9"	108	9"	3' – 0"	216	5	39' – 9"	133	31	39' – 9"	823	7' – 11"	21	18	50	0.583	125.5	0.6	71	23.9	5,090
7' – 0"	3' – 0"	10"	8"	23'	108	#6	9"	8' – 1"	1,311	162	#5	6"	8' – 2"	1,380	3' – 8"	4' – 6"	162	#5	6"	7' – 4"	1,239	4' – 6"	2' – 10"	82	12"	3' – 0"	164	5	39' – 9"	133	31	39' – 9"	823	8' – 1"	22	20	56	0.663	126.3	0.6	78	27.1	5,128
7' – 0"	3' – 0"	11"	8"	30'	108	#6	9"	8' – 1"	1,311	162	#5	6"	8' – 3"	1,394	3' – 9"	4' – 6"	162	#5	6"	7' – 5"	1,253	4' – 6"	2' – 11"	82	12"	3' – 0"	164	5	39' – 9"	133	31	39' – 9"	823	8' – 1"	22	20	56	0.714	127.0	0.6	78	29.2	5,156
7' – 0"	4' – 0"	8"	7"	16'	108	#6	9"	7' – 11"	1,284	162	#5	6"	8' – 11"	1,507	4' – 6"	4' – 5"	162	#5	6"	7' – 1"	1,197	4' – 5"	2' – 8"	108	9"	4' – 0"	289	5	39' – 9"	133	31	39' – 9"	823	7' – 11"	21	18	50	0.576	130.8	0.6	71	23.6	5,304
7' – 0"	4' – 0"	9"	7"	20'	108	#6	9"	7' – 11"	1,284	162	#5	6"	9' – 0"	1,521	4' – 7"	4' – 5"	162	#5	6"	7' – 2"	1,211	4' – 5"	2' – 9"	108	9"	4' – 0"	289	5	39' – 9"	133	31	39' – 9"	823	7' – 11"	21	18	50	0.627	131.5	0.6	71	25.7	5,332
7' – 0"	4' – 0"	10"	8"	23'	108	#6	9"	8' – 1"	1,311	162	#5	6"	9' – 2"	1,549	4' – 8"	4' – 6"	162	#5	6"	7' – 4"	1,239	4' – 6"	2' – 10"	82	12"	4' – 0"	219	5	39' – 9"	133	31	39' – 9"	823	8' – 1"	22	20	56	0.712	131.9	0.6	78	29.1	5,352
7' – 0"	4' – 0"	11"	8"	30'	162	#6	6"	8' – 1"	1,967	162	#5	6"	9' – 3"	1,563	4' – 9"	4' – 6"	162	#5	6"	7' – 5"	1,253	4' – 6"	2' – 11"	82	12"	4' – 0"	219	5	39' – 9"	133	31	39' – 9"	823	8' – 1"	22	20	56	0.763	149.0	0.6	78	31.1	6,036
7' – 0"	5' – 0"	8"	7"	16'	108	#6	9"	7' – 11"	1,284	162	#5	6"	9' – 11"	1,676	5' – 6"	4' – 5"	162	#5	6"	7' – 1"	1,197	4' – 5"	2' – 8"	108	9"	5' – 0"	361	5	39' – 9"	133	35	39' – 9"	929	7' – 11"	21	18	50	0.619	139.5	0.6	71	25.4	5,651
7' – 0"	5' – 0"	9"	7"	20'	108	#6	9"	7' – 11"	1,284	162	#5	6"	10' – 0"	1,690	5' – 7"	4' – 5"	162	#5	6"	7' – 2"	1,211	4' – 5"	2' – 9"	108	9"	5' – 0"	361	5	39' – 9"	133	35	39' – 9"	929	7' – 11"	21	18	50	0.670	140.2	0.6	71	27.4	5,679
7' – 0"	5' – 0"	10"	8"	23'	108	#6	9"	8' – 1"	1,311	162	#5	6"	10' – 2"	1,718	5' – 8"	4' – 6"	162	#5	6"	7' – 4"	1,239	4' – 6"	2' – 10"	82	12"	5' – 0"	274	5	39' – 9"	133	35	39' – 9"	929	8' – 1"	22	20	56	0.761	140.1	0.6	78	31.1	5,682
7' – 0"	5' – 0"	11"	8"	30'	162	#6	6"	8' – 1"	1,967	162	#5	6"	10' – 3"	1,732	5' – 9"	4' – 6"	162	#5	6"	7' – 5"	1,253	4' – 6"	2' – 11"	82	12"	5' – 0"	274	5	39' – 9"	133	35	39' – 9"	929	8' – 1"	22	20	56	0.813	157.2	0.6	78	33.1	6,366
7' – 0"	6' – 0"	8"	7"	16'	108	#6	9"	7' – 11"	1,284	162	#5	6"	10' – 11"	1,845	6' – 6"	4' – 5"	162	#5	6"	7' – 1"	1,197	4' – 5"	2' – 8"	108	9"	6' – 0"	433	5	39' – 9"	133	39	39' – 9"	1,036	7' – 11"	21	18	50	0.663	148.2	0.6	71	27.1	5,999
7' – 0"	6' – 0"	9"	7"	20'	108	#6	9"	7' – 11"	1,284	162	#5	6"	11' – 0"	1,859	6' – 7"	4' – 5"	162	#5	6"	7' – 2"	1,211	4' – 5"	2' – 9"	108	9"	6' – 0"	433	5	39' – 9"	133	39	39' – 9"	1,036	7' – 11"	21	18	50	0.713	148.9	0.6	71	29.1	6,027
7' – 0"	6' – 0"	10"	8"	23'	108	#6	9"	8' – 1"	1,311	162	#5	6"	11' – 2"	1,887	6' – 8"	4' – 6"	162	#5	6"	7' – 4"	1,239	4' – 6"	2' – 10"	82	12"	6' – 0"	329	5	39' – 9"	133	39	39' – 9"	1,036	8' – 1"	22	20	56	0.811	148.4	0.6	78	33.1	6,013
7' – 0"	6' – 0"	11"	8"	30'	162	#6	6"	8' – 1"	1,967	162	#5	6"	11' – 3"	1,901	6' – 9"	4' – 6"	162	#5	6"	7' – 5"	1,253	4' – 6"	2' – 11"	82	12"	6' – 0"	329	5	39' – 9"	133	39	39' – 9"	1,036	8' – 1"	22	20	56	0.862	165.5	0.6	78	35.1	6,697
7' – 0"	7' – 0"	8"	7"	16'	108	#6	9"	7' – 11"	1,284	162	#5	6"	11' – 11"	2,014	7' – 6"	4' – 5"	162	#5	6"	7' – 1"	1,197	4' – 5"	2' – 8"	108	9"	7' – 0"	505	5	39' – 9"	133	39	39' – 9"	1,036	7' – 11"	21	18	50	0.706	154.2	0.6	71	28.8	6,240
7' – 0"	7' – 0"	9"	7"	20'	108	#6	9"	7' – 11"	1,284	162	#5	6"	12' – 0"	2,028	7' – 7"	4' – 5"	162	#5	6"	7' – 2"	1,211	4' – 5"	2' – 9"	108	9"	7' – 0"	505	5	39' – 9"	133	39	39' – 9"	1,036	7' – 11"	21	18	50	0.756	154.9	0.6	71	30.8	6,268
7' – 0"	7' – 0"	10"	8"	23'	108	#6	9"	8' – 1"	1,311	162	#5	6"	12' – 2"	2,056	7' – 8"	4' – 6"	162	#5	6"	7' – 4"	1,239	4' – 6"	2' – 10"	108	9"	7' – 0"	505	5	39' – 9"	133	39	39' – 9"	1,036	8' – 1"	22	20	56	0.860	157.0	0.6	78	35.0	6,358
7' – 0"	7' – 0"	11"	8"	30'	162	#6	6"	8' – 1"	1,967	162	#5	6"	12' – 3"	2,070	7' – 9"	4' – 6"	162	#5	6"	7' – 5"	1,253	4' – 6"	2' – 11"	108	9"	7' – 0"	505	5	39' – 9"	133	39	39' – 9"	1,036	8' – 1"	22	20	56	0.912	174.1	0.6	78	37.1	7,042
⚠ 7'– 0"	2'– 0"	8"	7"	16'	108	#6	9"	7'–11"	1,284	162	#5	6"	7'– 0"	1,183	2' – 7"	4' – 5"	162	#5	6"	7' – 1"	1,197	4' – 5"	2' – 8"	108	9"	2'– 0"	144	5	39'–9"	133	31	39' – 9"	823	7' – 11"	21	18	50	0.489	120.9	0.6	71	20.16	4,907

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

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STATE OF TEXAS

12/2/2022

HL93 LOADING

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-7(MOD)

FILE: scc07ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
⚠ ADDED 7'X2' BOX	AUS	HAYS		119

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DATE: 12/2/2022 11:57:11 AM
FILE: G:\TxC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\06-DRNG\Srds\scc07ste-21.dgn

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw Height of Wingwall (1) (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
CULVERT 03: STA 175+89 (Lt)	2 ~ 5'x 5'	4'	SCP-5	PW-1	0°	2:1	6"	6"	4.500'	10.000'	N/A	N/A	20.000'	12.500'	N/A	0.0	2.1	26.1	400
CULVERT 03: STA 175+89 (Rt)	2 ~ 5'x 5'	3'	SCP-5	PW-1	0°	2:1	6"	6"	0.500'	6.000'	N/A	N/A	12.000'	12.500'	N/A	0.0	0.2	9.7	144
CULVERT 04: STA 205+80 (Rt)	1 ~10'x 4'	2'	SCC-10	PW-1	0°	2:1	8"	7"	0.250'	4.917'	N/A	N/A	9.833'	11.167'	N/A	0.0	0.1	7.1	97
CULVERT 05: STA 220+06 (Both)	1 ~ 7'x 4'	2'	SCP-7	PW-1	0°	2:1	8"	8"	1.333'	6.000'	N/A	N/A	12.000'	8.333'	N/A	0.0	0.8	18.8	288
CULVERT 06: STA 229+20 (Both)	2 ~ 3'x 3'	4'	SCP-3	PW-1	0°	2:1	4"	4"	2.667'	6.000'	N/A	N/A	12.000'	7.833'	N/A	0.0	1.6	18.8	288
BELLA VIA PKWY (Both)	1 ~ 7'x 2'	1'	Non-Stndrd	SETB-PD	0°	6:1	8"	7"	0.250'	2.667'	N/A	N/A	14.500'	N/A	8.167'	0.0	0.2	7.2	N/A

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

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

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

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

C = Curb height

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

Hw = Height of wingwall

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

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

Lw = Length of longest wingwall.

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

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

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

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

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

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

DATE: 12/2/2022 11:57:12 AM
FILE: G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\06-DRNG\Stds\bcsstde1-20.dgn

STATE OF TEXAS
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Erin N. Gonzales
12/2/2022

Texas Department of Transportation

Bridge Division Standard

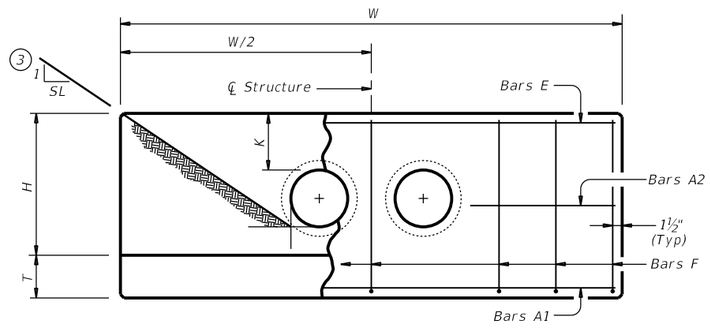
BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

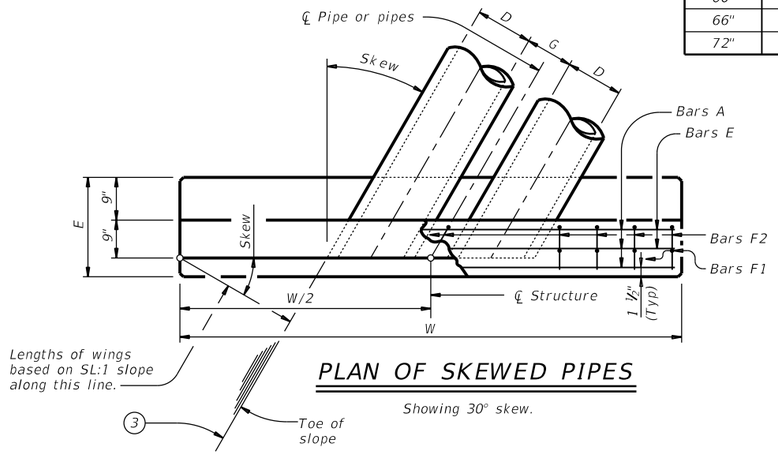
FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		120

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

Slope	Dia of Pipe (D)	15° Skew						30° Skew						45° Skew					
		Values for One Pipe			Values To Be Added for Each Addt'l Pipe			Values for One Pipe			Values To Be Added for Each Addt'l Pipe			Values for One Pipe			Values To Be Added for Each Addt'l Pipe		
		W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)
2:1	12"	9' – 4"	124	1.1	1' – 9 3/4"	15	0.2	10' – 5"	130	1.2	2' – 0"	16	0.2	12' – 9"	159	1.5	2' – 5 3/4"	17	0.3
	15"	10' – 7"	136	1.3	2' – 3"	17	0.2	11' – 10"	159	1.5	2' – 6"	18	0.2	14' – 6"	191	1.8	3' – 0 3/4"	20	0.3
	18"	11' – 11"	165	1.5	2' – 9"	19	0.3	13' – 3"	174	1.7	3' – 1"	29	0.3	16' – 3"	207	2.1	3' – 9 1/4"	33	0.4
	21"	13' – 2"	203	1.9	3' – 2 1/4"	31	0.4	14' – 9"	233	2.1	3' – 6 3/4"	33	0.4	18' – 0"	276	2.6	4' – 4 1/4"	36	0.5
	24"	14' – 6"	240	2.1	3' – 8 1/4"	34	0.4	16' – 2"	251	2.4	4' – 1 3/4"	36	0.5	19' – 10"	318	2.9	5' – 0 3/4"	39	0.6
	27"	15' – 9"	258	2.5	4' – 0 3/4"	38	0.5	17' – 7"	292	2.8	4' – 6 1/4"	39	0.6	21' – 7"	342	3.4	5' – 6 1/4"	44	0.7
	30"	17' – 1"	297	2.8	4' – 5 3/4"	40	0.6	19' – 1"	311	3.1	5' – 0"	42	0.6	23' – 4"	388	3.8	6' – 1 3/4"	47	0.8
	33"	18' – 5"	320	3.3	4' – 9 3/4"	43	0.6	20' – 6"	358	3.6	5' – 4 3/4"	46	0.7	25' – 1"	439	4.4	6' – 7 1/4"	51	0.9
	36"	19' – 8"	401	4.0	5' – 3"	47	0.9	21' – 11"	422	4.5	5' – 10 3/4"	50	0.9	26' – 10"	517	5.5	7' – 2 1/4"	55	1.2
	42"	22' – 3"	476	5.0	6' – 0 3/4"	53	1.1	24' – 10"	528	5.6	6' – 8 3/4"	56	1.2	30' – 5"	634	6.9	8' – 3"	76	1.4
	48"	25' – 11"	577	6.6	6' – 9 3/4"	60	1.3	28' – 10"	637	7.3	7' – 7 1/4"	79	1.5	35' – 4"	791	9.0	9' – 3 3/4"	88	1.8
	54"	28' – 6"	711	7.8	7' – 9"	83	1.6	31' – 9"	781	8.7	8' – 8"	81	1.8	38' – 11"	958	10.7	10' – 7 1/4"	97	2.2
	60"	31' – 1"	805	9.2	8' – 6 1/4"	91	1.9	34' – 8"	881	10.2	9' – 6 1/4"	97	2.1	42' – 5"	1,113	12.5	11' – 8"	124	2.6
	66"	33' – 8"	907	10.6	9' – 0 3/4"	98	2.1	37' – 6"	1,028	11.8	10' – 1 1/4"	102	2.4	46' – 0"	1,235	14.5	12' – 4 1/4"	132	2.9
	72"	36' – 3"	1,071	12.1	9' – 8"	105	2.4	40' – 5"	1,207	13.5	10' – 9 1/4"	110	2.6	49' – 6"	1,446	16.6	13' – 2 1/4"	141	3.2
3:1	12"	13' – 6"	178	1.6	1' – 9 3/4"	15	0.2	15' – 0"	189	1.8	2' – 0"	15	0.2	18' – 5"	237	2.2	2' – 5 3/4"	17	0.2
	15"	15' – 3"	212	1.9	2' – 3"	17	0.2	17' – 0"	223	2.1	2' – 6"	17	0.3	20' – 10"	276	2.6	3' – 0 3/4"	20	0.3
	18"	17' – 1"	231	2.3	2' – 9"	19	0.3	19' – 1"	259	2.5	3' – 1"	29	0.3	23' – 4"	318	3.1	3' – 9 1/4"	32	0.4
	21"	18' – 11"	306	2.7	3' – 2 1/4"	31	0.4	21' – 1"	339	3.0	3' – 6 3/4"	33	0.4	25' – 10"	413	3.7	4' – 4 1/4"	36	0.5
	24"	20' – 8"	345	3.1	3' – 8 3/4"	35	0.4	23' – 1"	384	3.5	4' – 1 3/4"	36	0.5	28' – 3"	462	4.2	5' – 0 3/4"	40	0.6
	27"	22' – 6"	376	3.7	4' – 0 3/4"	38	0.5	25' – 1"	438	4.1	4' – 6 1/4"	39	0.6	30' – 9"	522	5.0	5' – 6 1/4"	44	0.7
	30"	24' – 4"	422	4.1	4' – 5 3/4"	40	0.6	27' – 2"	466	4.6	5' – 0"	42	0.6	33' – 3"	578	5.6	6' – 1 3/4"	47	0.8
	33"	26' – 2"	476	4.8	4' – 10"	43	0.6	29' – 2"	522	5.3	5' – 4 3/4"	46	0.7	35' – 9"	644	6.5	6' – 7 1/4"	51	0.9
	36"	27' – 11"	590	5.9	5' – 3"	47	0.8	31' – 2"	645	6.6	5' – 10 3/4"	50	0.9	38' – 2"	787	8.0	7' – 2 1/4"	56	1.2
	42"	31' – 7"	684	7.3	6' – 0 1/4"	53	1.1	35' – 3"	776	8.2	6' – 8 3/4"	56	1.2	43' – 2"	933	10.0	8' – 3"	79	1.4
	48"	36' – 9"	880	9.6	6' – 9 3/4"	61	1.3	41' – 0"	953	10.7	7' – 7 1/4"	81	1.5	50' – 2"	1,166	13.1	9' – 3 3/4"	88	1.8
	54"	40' – 5"	1,065	11.4	7' – 9"	85	1.6	45' – 0"	1,185	12.7	8' – 8"	89	1.8	55' – 2"	1,435	15.5	10' – 7 1/4"	97	2.2
	60"	44' – 0"	1,224	13.3	8' – 6 1/4"	93	1.9	49' – 1"	1,356	14.8	9' – 6 1/4"	96	2.1	60' – 1"	1,635	18.2	11' – 8"	124	2.6
	66"	47' – 7"	1,357	15.4	9' – 1"	98	2.1	53' – 1"	1,497	17.2	10' – 1 1/4"	103	2.3	65' – 1"	1,892	21.1	12' – 4 1/4"	130	2.9
	72"	51' – 3"	1,624	17.7	9' – 8"	105	2.3	57' – 2"	1,787	19.7	10' – 9 1/4"	109	2.6	70' – 0"	2,218	24.1	13' – 2 1/4"	139	3.2
4:1	12"	17' – 7"	232	2.1	1' – 9 3/4"	15	0.2	19' – 8"	259	2.4	2' – 0"	16	0.2	24' – 0"	314	2.9	2' – 5 3/4"	18	0.2
	15"	19' – 11"	272	2.5	2' – 3"	17	0.2	22' – 3"	301	2.8	2' – 6"	18	0.3	27' – 3"	361	3.5	3' – 0 3/4"	21	0.3
	18"	22' – 3"	313	3.0	2' – 9"	19	0.3	24' – 10"	344	3.3	3' – 1"	29	0.3	30' – 5"	427	4.0	3' – 9 1/4"	32	0.4
	21"	24' – 7"	407	3.6	3' – 2 1/4"	31	0.4	27' – 5"	446	4.0	3' – 6 3/4"	33	0.4	33' – 7"	549	4.9	4' – 4 1/4"	36	0.5
	24"	26' – 11"	455	4.1	3' – 8 3/4"	35	0.4	30' – 0"	499	4.5	4' – 1 3/4"	36	0.5	36' – 9"	609	5.6	5' – 0 3/4"	40	0.6
	27"	29' – 3"	514	4.8	4' – 0 3/4"	38	0.5	32' – 7"	562	5.4	4' – 6 1/4"	40	0.6	39' – 11"	703	6.6	5' – 6 1/4"	43	0.7
	30"	31' – 7"	568	5.4	4' – 5 3/4"	40	0.6	35' – 3"	620	6.0	5' – 0"	42	0.6	43' – 2"	768	7.4	6' – 1 3/4"	49	0.8
	33"	33' – 11"	634	6.2	4' – 10"	43	0.7	37' – 10"	710	7.0	5' – 4 3/4"	46	0.7	46' – 4"	848	8.5	6' – 7 1/4"	52	0.9
	36"	36' – 3"	776	7.7	5' – 3"	48	0.9	40' – 5"	868	8.6	5' – 10 3/4"	49	0.9	49' – 6"	1,058	10.6	7' – 2 1/4"	56	1.1
	42"	40' – 11"	921	9.6	6' – 0 1/4"	53	1.0	45' – 7"	1,022	10.7	6' – 8 3/4"	57	1.2	55' – 10"	1,262	13.1	8' – 3"	78	1.4
	48"	47' – 7"	1,152	12.6	6' – 10"	61	1.3	53' – 1"	1,268	14.0	7' – 7 1/4"	80	1.5	65' – 1"	1,587	17.2	9' – 3 3/4"	86	1.8
	54"	52' – 3"	1,416	14.9	7' – 9 1/4"	86	1.6	58' – 4"	1,589	16.6	8' – 8"	89	1.8	71' – 5"	1,924	20.4	10' – 7 1/4"	95	2.2
	60"	56' – 11"	1,606	17.5	8' – 6 3/4"	92	1.9	63' – 6"	1,806	19.5	9' – 6 1/4"	95	2.1	77' – 9"	2,192	23.9	11' – 8"	122	2.6
	66"	61' – 7"	1,819	20.2	9' – 0 3/4"	97	2.1	68' – 8"	2,019	22.5	10' – 1 1/4"	101	2.4	84' – 2"	2,472	27.6	12' – 4 1/4"	131	2.9
	72"	66' – 3"	2,150	23.2	9' – 8"	104	2.4	73' – 11"	2,379	25.9	10' – 9 1/4"	108	2.6	90' – 6"	2,937	31.7	13' – 2 1/4"	138	3.2
6:1	12"	25' – 11"	342	3.1	1' – 9 3/4"	15	0.2	28' – 10"	374	3.5	2' – 0"	16	0.2	35' – 4"	456	4.3	2' – 5 3/4"	17	0.2
	15"	29' – 3"	390	3.7	2' – 3"	17	0.2	32' – 7"	442	4.2	2' – 6"	18	0.2	39' – 11"	549	5.1	3' – 0 3/4"	20	0.3
	18"	32' – 7"	459	4.4	2' – 9"	20	0.3	36' – 4"	515	4.9	3' – 1"	29	0.3	44' – 7"	629	6.0	3' – 9 1/4"	33	0.4
	21"	36' – 0"	608	5.3	3' – 2 1/4"	31	0.4	40' – 2"	660	5.9	3' – 6 3/4"	33	0.4	49' – 2"	823	7.2	4' – 4 1/4"	38	0.5
	24"	39' – 4"	672	6.0	3' – 8 3/4"	35	0.4	43' – 11"	748	6.7	4' – 1 3/4"	36	0.5	53' – 9"	920	8.2	5' – 0 3/4"	42	0.6
	27"	42' – 8"	770	7.1	4' – 0 3/4"	38	0.5	47' – 8"	852	8.0	4' – 6 1/4"	41	0.5	58' – 4"	1,039	9.7	5' – 6 1/4"	45	0.7
	30"	46' – 1"	839	8.0	4' – 5 3/4"	40	0.6	51' – 5"	949	8.9	5' – 0"	44	0.6	62' – 11"	1,162	10.9	6' – 1 3/4"	48	0.8
	33"	49' – 5"	947	9.2	4' – 10"	45	0.7	55' – 2"	1,040	10.3	5' – 4 3/4"	48	0.7	67' – 6"	1,292	12.6	6' – 7 1/4"	50	0.9
	36"	52' – 10"	1,151	11.4	5' – 3"	49	0.8	58' – 11"	1,287	12.7	5' – 10 3/4"	51	1.0	72' – 1"	1,583	15.6	7' – 2 1/4"	55	1.1
	42"	59' – 6"	1,365	14.2	6' – 0 1/4"	55	1.0	66' – 5"	1,530	15.8	6' – 8 3/4"	57	1.2	81' – 4"	1,875	19.4	8' – 3"	76	1.4
	48"	69' – 4"	1,737	18.5	6' – 10"	59	1.3	77' – 4"	1,942	20.7	7' – 7 1/4"	79	1.5	94' – 9"	2,368	25.3	9' – 3 3/4"	86	1.8
	54"	76' – 1"	2,138	22.0	7' – 9 1/4"	83	1.6	84' – 10"	2,378	24.6	8' – 8"	87	1.8	103' – 11"	2,912	30.1	10' – 7 1/4"	95	2.2
	60"	82' – 10"	2,426	25.8	8' – 6 3/4"	90	1.9	92' – 5"	2,681	28.8	9' – 6 1/4"	94	2.1	113' – 2"	3,294	35.3	11' – 8"	122	2.6
	66"	89' – 7"	2,730	29.9	9' – 0 3/4"	96	2.1	99' – 11"	3,038	33.3	10' – 1 1/4"	101	2.4	122' – 4"	3,697	40.8	12' – 4 1/4"	130	2.9
	72"	96' – 3"	3,218	34.2	9' – 8"	102	2.4	107' – 5"	3,580	38.2	10' – 9 1/4"	108	2.6	131' – 6"	4,372	46.8	13' – 2 1/4"	139	3.2

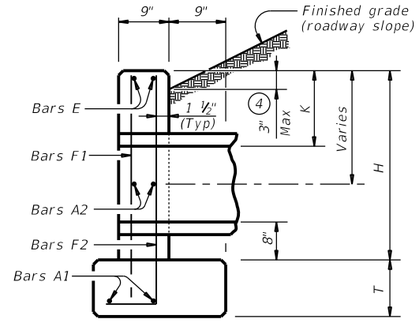


ELEVATION



PLAN OF SKEWED PIPES

Showing 30° skew.



SECTION AT CENTER OF PIPE

(1) Total quantites include one 3'–1" lap for bars over 60' in length.

(2) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(3) Indicated slope is perpendicular to centerline pipe or pipes.

(4) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) Dimensions shown are usual and maximum.

(6) Quantities shown are for one structure end only (one headwall).

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0' – 9"	1' – 0"	2' – 8"	0' – 9"	1' – 9"
15"	0' – 11"	1' – 0"	2' – 11"	0' – 9"	1' – 9"
18"	1' – 2"	1' – 0"	3' – 2"	0' – 9"	1' – 9"
21"	1' – 4"	1' – 0"	3' – 5"	0' – 9"	2' – 0"
24"	1' – 7"	1' – 0"	3' – 8"	0' – 9"	2' – 0"
27"	1' – 8"	1' – 0"	3' – 11"	0' – 9"	2' – 3"
30"	1' – 10"	1' – 0"	4' – 2"	0' – 9"	2' – 3"
33"	1' – 11"	1' – 0"	4' – 5"	0' – 9"	2' – 6"
36"	2' – 1"	1' – 0"	4' – 8"	1' – 0"	2' – 6"
42"	2' – 4"	1' – 0"	5' – 2"	1' – 0"	2' – 9"
48"	2' – 7"	1' – 3"	5' – 11"	1' – 0"	3' – 0"
54"	3' – 0"	1' – 3"	6' – 5"	1' – 0"	3' – 3"
60"	3' – 3"	1' – 3"	6' – 11"	1' – 0"	3' – 6"
66"	3' – 3"	1' – 3"	7' – 5"	1' – 0"	3' – 9"
72"	3' – 4"	1' – 3"	7' – 11"	1' – 0"	4' – 0"

TABLE OF (6) REINFORCING STEEL

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' – 6"	~
E	#5	~	2
F	#5	1' – 0"	~

BARS F2

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

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

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

Texas Department of Transportation | Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR SKEWED PIPE CULVERTS

CH-PW-S

FILE: chpwsste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		121

DATE: 12/2/2022 11:57:13 AM
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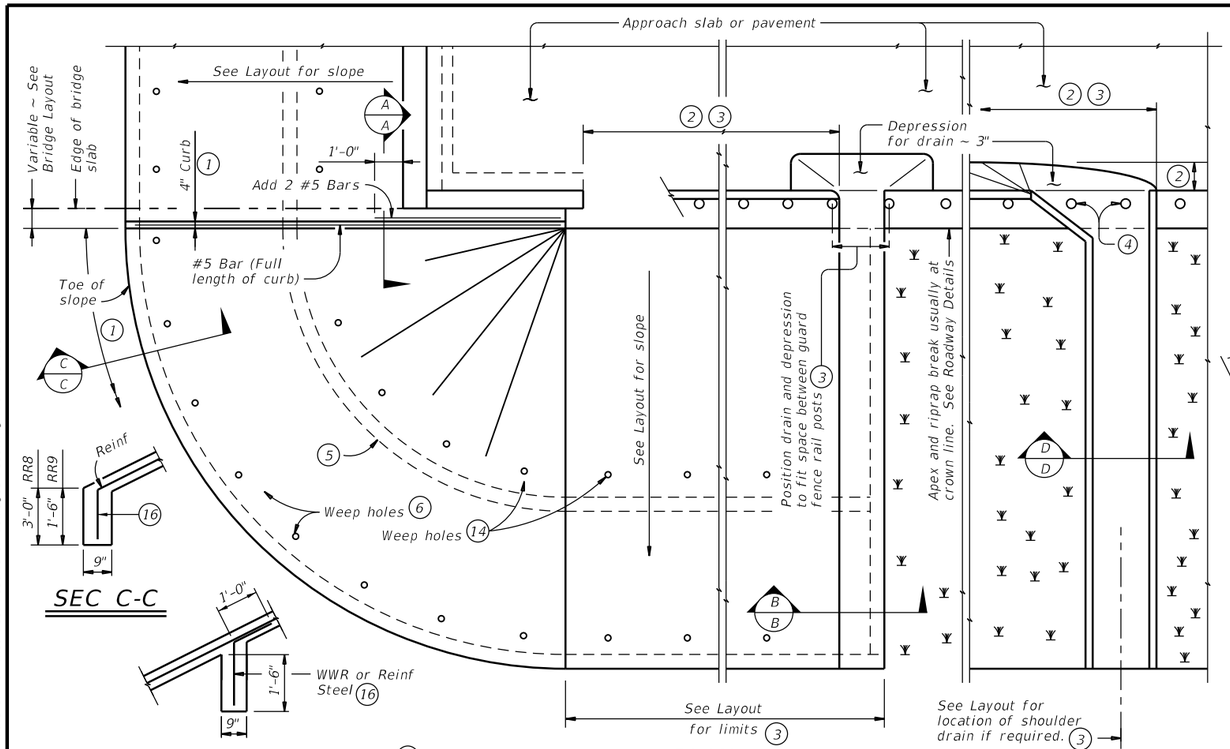
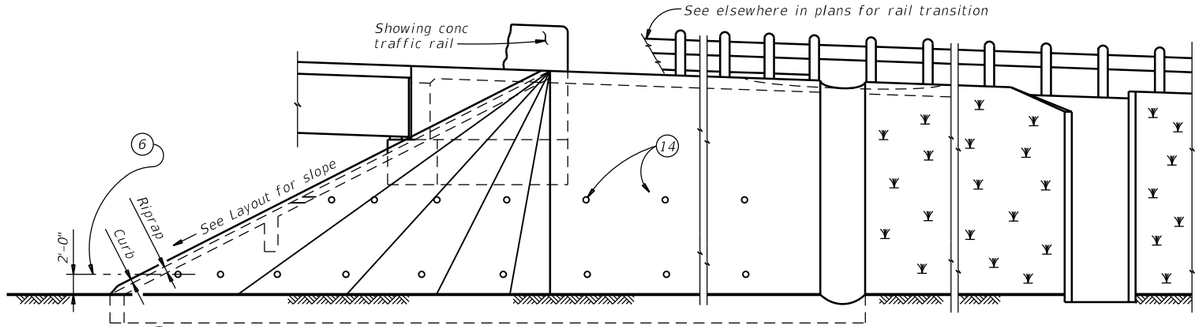


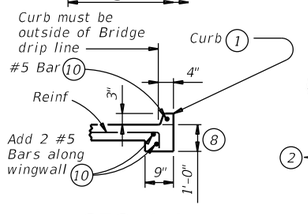
PLAN

SEC C-C

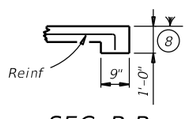
INTERMEDIATE TOEWALL (5)



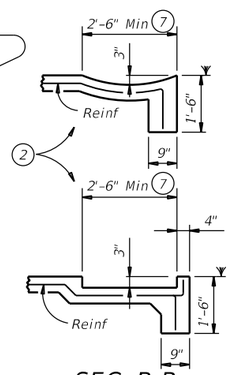
ELEVATION



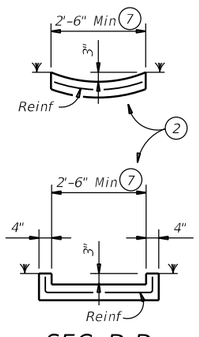
SEC A-A



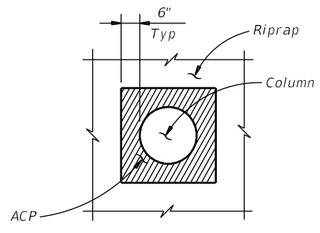
SEC B-B
(No drain)



SEC B-B
(Shoulder drain integral with riprap)

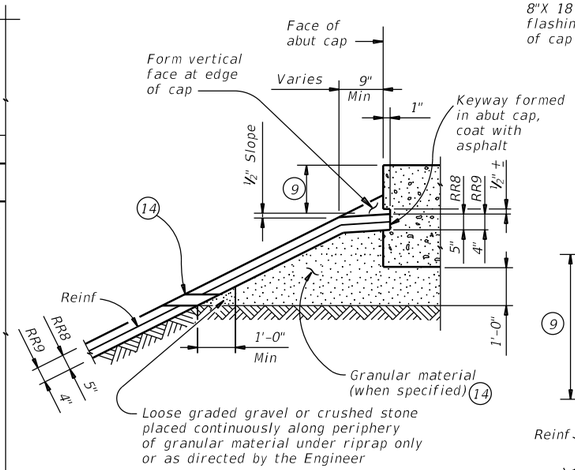


SEC D-D
(Shoulder drain)

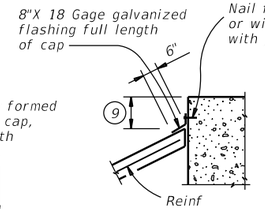


Riprap blockout to be filled with ACP. (Subsidiary to riprap)

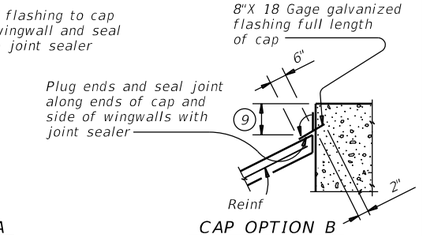
RIPRAP DETAIL AT COLUMNS
(As directed by the Engineer)



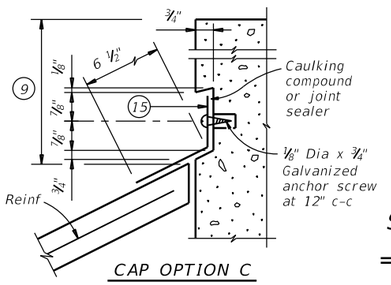
SHOWING KEYWAY OPTION



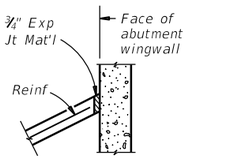
CAP OPTION A



CAP OPTION B

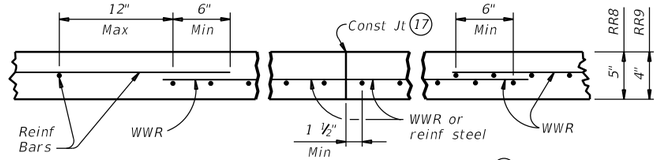


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

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©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	AUS	HAYS		122

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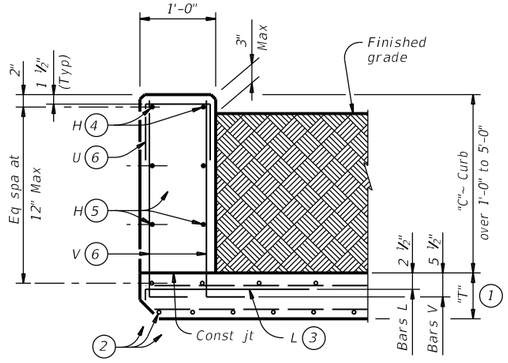
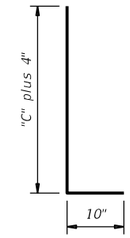
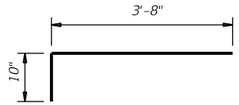


TYPICAL SECTION

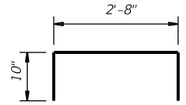
Used for curbs over 1'–0" to 5'–0"



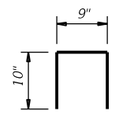
BARS V (#5) (6)
Spaced at 12" Max



BARS L (#5) (3)
Spaced at 12" Max



OPTIONAL BARS L (#5) (3) (7)
Spaced at 12" Max



BARS U (#4) (6)
Spaced at 12" Max

(1) "T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.

(2) Adjust normal culvert slab bars as necessary to clear obstructions.

(3) Place bars L as shown. Tilt hook as necessary to maintain cover.

(4) Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.

(5) Additional bars H(#4) as required to maintain 12" Max spacing.

(6) Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.

(7) Optional bars L are to be used only for precast box culverts with 3'–0" closure pour.

(8) Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (8)

Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'–0"	0.037	10.4
1'–6"	0.056	14.5
2'–0"	0.074	15.6
2'–6"	0.093	18.0
3'–0"	0.111	19.0
3'–6"	0.130	21.3
4'–0"	0.148	22.4
4'–6"	0.167	24.8
5'–0"	0.185	25.9

CONSTRUCTION NOTES:

Adjust reinforcing steel as necessary to provide 1 ¼" cover.

For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Provide Class "C" concrete (f'_c = 3,600 psi) minimum for curbs.

Provide bar laps, where required, as follows:

- Uncoated or galvanized ~ #4 = 1'–8" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.

This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.

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

Texas Department of Transportation

Bridge Division Standard

EXTENDED CURB DETAILS

FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

ECD

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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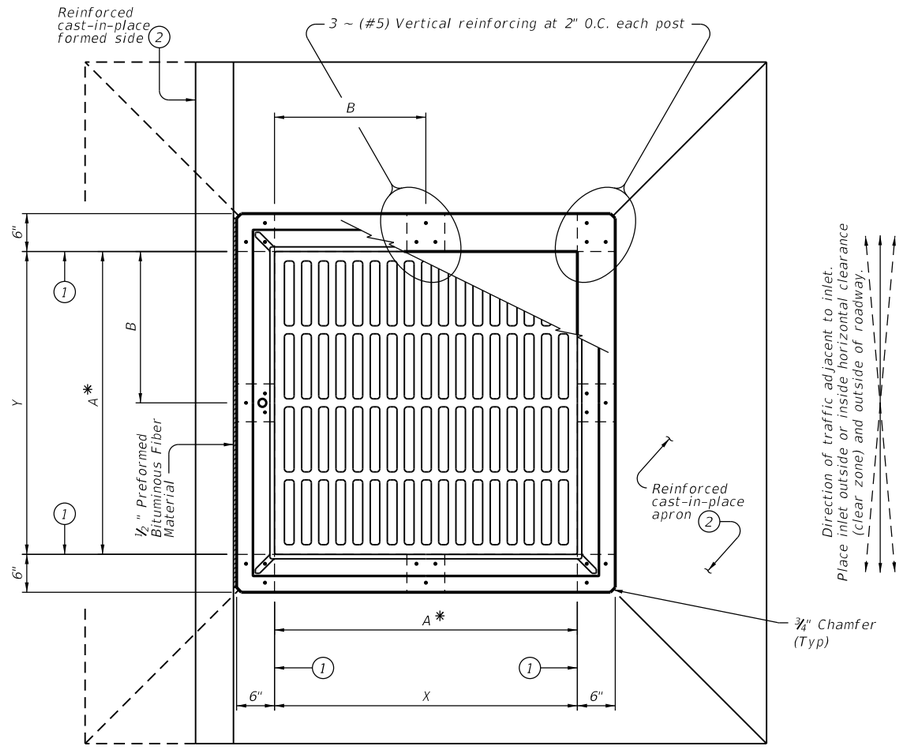
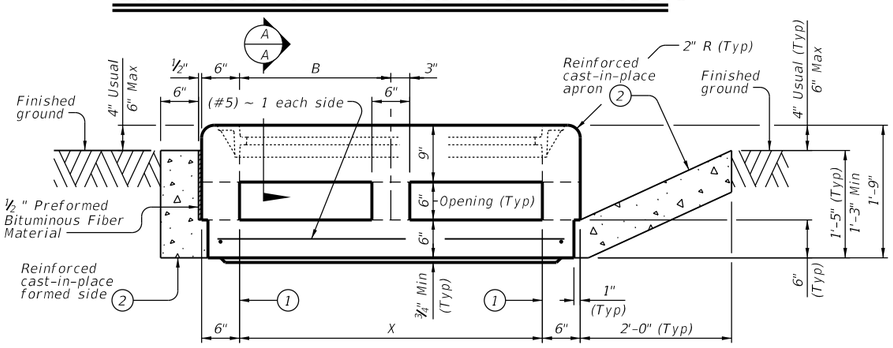
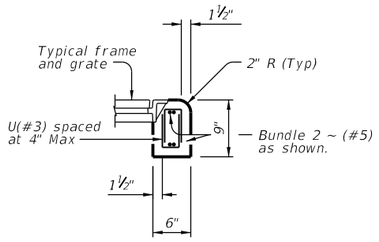


PLAN VIEW ~ STYLE 'FG' (3)

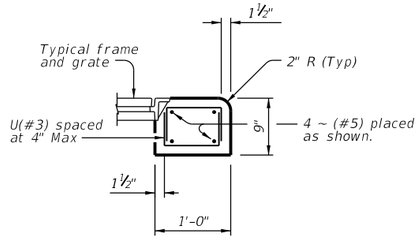
ELEVATION VIEW WITHOUT FORMED SIDE (4)



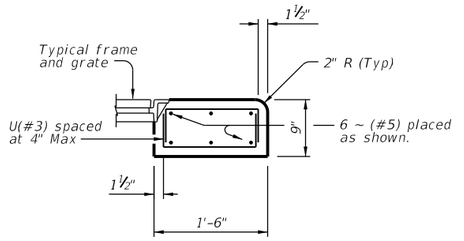
ELEVATION VIEW WITH FORMED SIDE (4)



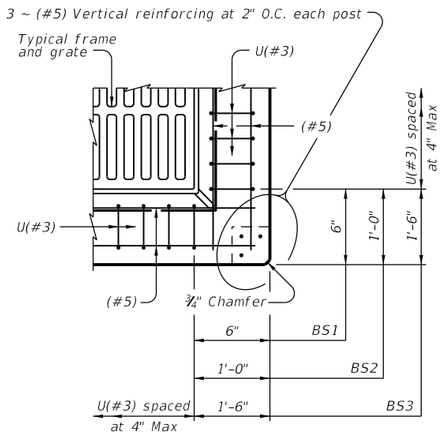
SECTION A-A ~ BS1



SECTION A-A ~ BS2

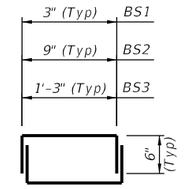


SECTION A-A ~ BS3



TYPICAL CORNER REINFORCING PLAN DETAIL

Showing BS2 other beam sections similar.



BARS U (#3)

Showing one complete bar.

Style	Size (X x Y)	A x A *	B x B	Beam Section
FG	3'x3'	3'x3'	1.5'x1.5'	BS1
FG	4'x4'	3'x3'	2'x2'	BS2
FG	4'x4'	4'x4'	2'x2'	BS1
FG	5'x5'	3'x3'	2.5'x2.5'	BS3
FG	5'x5'	4'x4'	2.5'x2.5'	BS2

* Nominal frame/grate size.

(1) Matches inside face of wall of precast base or riser below inlet.

(2) Construct cast-in-place reinforced concrete with or without formed side. Place formed side/sides as directed elsewhere in the plans. Formed sides may only be used on sides parallel to traffic. Use Class "C" concrete. Apron and formed side reinforcing not shown for clarity. Apron and formed side are subsidiary to PAZD-CZ. Apron is 2'-0" width around precast zone drain, unless an optional formed side is used. For apron and formed side, provide (#4) reinforcing at 12" 0.C.

(3) Top slab reinforcing not shown for clarity.

(4) Top slab reinforcing and post reinforcing not shown for clarity.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide clear cover of ¾" to reinforcing from bottom of slab and 2" to reinforcing from top of slab for structural reinforcement.
4. Provide 1 ½" end cover on (#5) reinforcing.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
6. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast Area Zone Drain within Clear Zone (PAZD-CZ) is for use in ditches and medians outside and inside of the horizontal clearance (clear zone). PAZD-CZ is never placed in the roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

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

PRECAST AREA ZONE DRAIN WITHIN CLEAR ZONE

PAZD-CZ

FILE: prestd15-20.dgn	DN: SDC	CK: TAR	DW: JTR	CK: SDC
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		124

DATE: 12/2/2022 11:57:16 AM
FILE: G:\TxDC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\06-DRNG\Shts\pwstde01-20.dgn

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

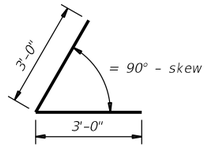
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1		Bars J2					
					Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

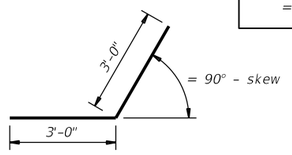
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

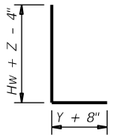
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



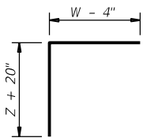
BARS D1



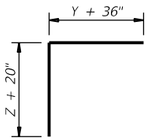
BARS D2



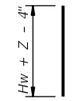
BARS J1



BARS J2



BARS J3



BARS V

WING DIMENSION FORMULAS:
(All values are in feet.)

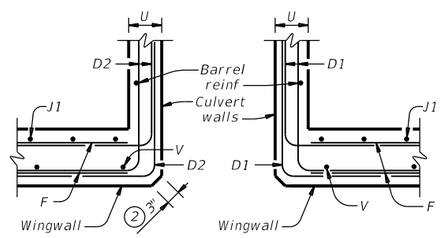
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw < 4'

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

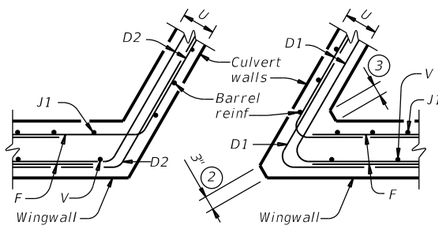
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw < 4'

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

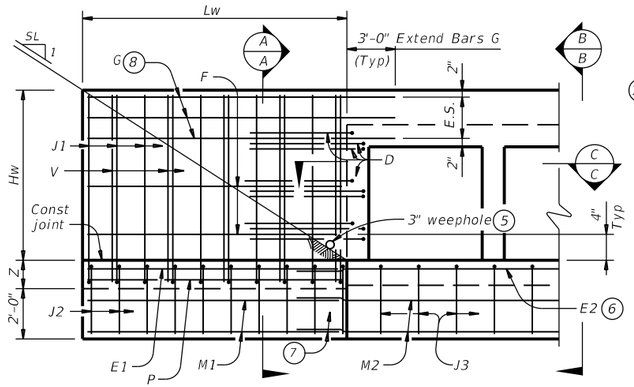
See applicable box culvert standard sheet for S, H, T, and U values.



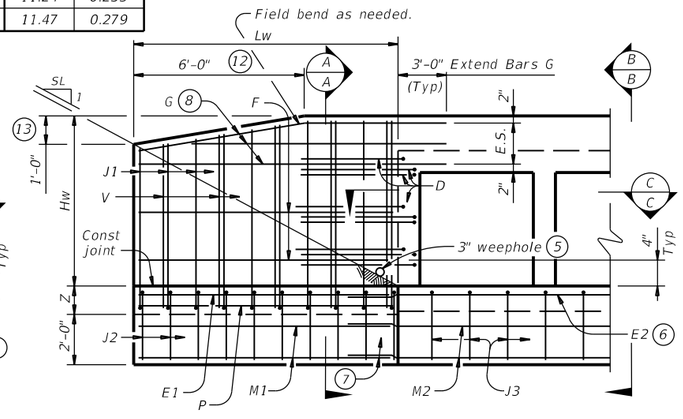
SECTION C-C - PW-1



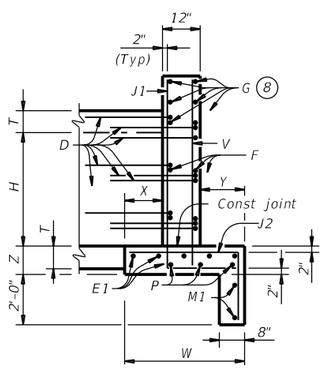
SECTION C-C - PW-2



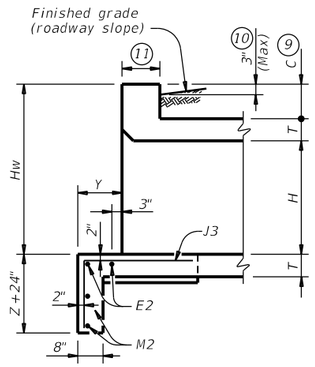
PARTIAL ELEVATION - PW-1



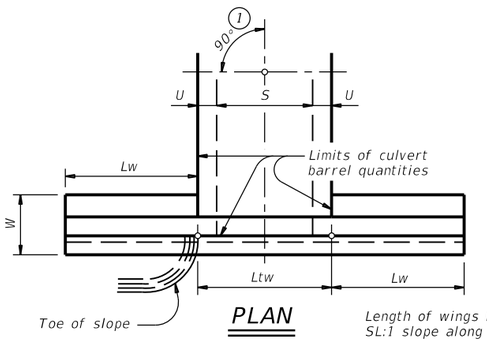
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)

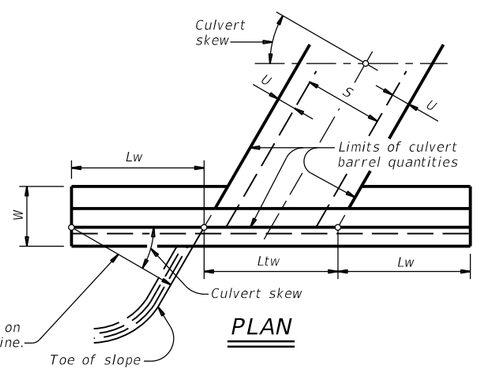


SECTION B-B
(Showing wing reinforcement.)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elswhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

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

Texas Department of Transportation
Bridge Division Standard

CONCRETE WINGWALLS WITH PARALLEL WINGS FOR BOX CULVERTS TYPES PW-1 AND PW-2

PW

FILE: pwstde01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
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REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		125

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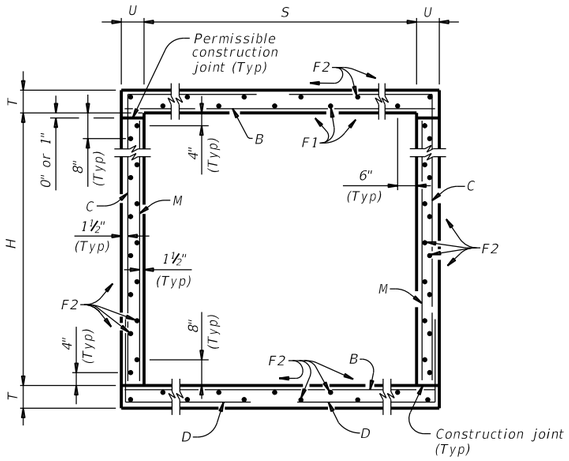
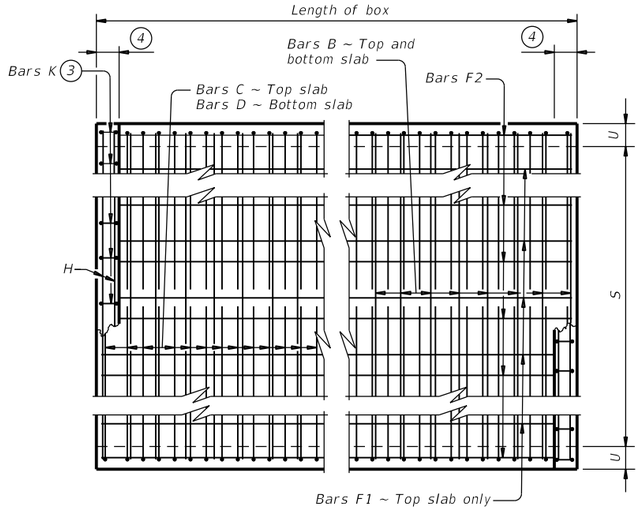
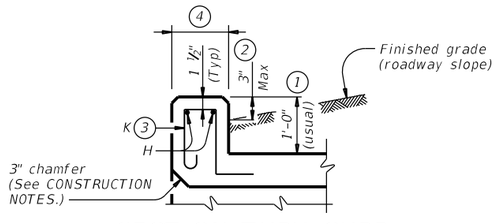


TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

MATERIAL NOTES:

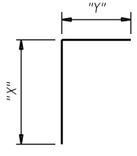
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min
- Uncoated or galvanized ~ #7 = 3'-3" Min

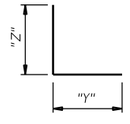
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

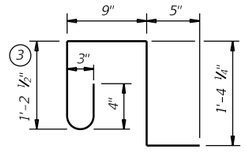
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



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

HL93 LOADING SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-10

FILE: scc10ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
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REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		126

SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																												QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
10' – 0"	4' – 0"	8"	7"	7'	162	#6	6"	10' – 11"	2,656	162	#6	6"	10' – 5"	2,535	4' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	108	9"	4' – 0"	289	7	39' – 9"	186	37	39' – 9"	982	10' – 11"	29	24	67	0.724	220.5	0.8	96	29.8	8,914
10' – 0"	4' – 0"	9"	7"	10'	162	#6	6"	10' – 11"	2,656	162	#6	6"	10' – 6"	2,555	4' – 8"	5' – 10"	162	#6	6"	9' – 0"	2,190	5' – 10"	3' – 2"	108	9"	4' – 0"	289	7	39' – 9"	186	37	39' – 9"	982	10' – 11"	29	24	67	0.793	221.5	0.8	96	32.5	8,954
10' – 0"	4' – 0"	10"	8"	13'	162	#6	6"	11' – 1"	2,697	162	#6	6"	10' – 8"	2,595	4' – 9"	5' – 11"	162	#6	6"	9' – 2"	2,230	5' – 11"	3' – 3"	82	12"	4' – 0"	219	7	39' – 9"	186	37	39' – 9"	982	11' – 1"	30	26	72	0.897	222.7	0.8	102	36.7	9,011
10' – 0"	4' – 0"	11"	8"	16'	162	#6	6"	11' – 1"	2,697	162	#6	6"	10' – 9"	2,616	4' – 10"	5' – 11"	162	#6	6"	9' – 3"	2,251	5' – 11"	3' – 4"	82	12"	4' – 0"	219	7	39' – 9"	186	37	39' – 9"	982	11' – 1"	30	26	72	0.967	223.8	0.8	102	39.5	9,053
10' – 0"	4' – 0"	12"	9"	20'	162	#6	6"	11' – 3"	2,737	162	#6	6"	11' – 11"	2,900	5' – 11"	5' – 12"	162	#6	6"	9' – 5"	2,291	5' – 12"	3' – 5"	108	9"	4' – 0"	289	7	39' – 9"	186	37	39' – 9"	982	11' – 3"	30	26	72	1.074	234.6	0.8	102	43.8	9,487
10' – 0"	4' – 0"	13"	10"	23'	162	#6	6"	11' – 5"	2,778	162	#6	6"	11' – 0"	2,677	5' – 0"	6' – 0"	162	#6	6"	9' – 6"	2,312	6' – 0"	3' – 6"	108	9"	4' – 0"	289	7	39' – 9"	186	37	39' – 9"	982	11' – 5"	31	26	72	1.183	230.6	0.9	103	48.2	9,327
10' – 0"	4' – 0"	14"	11"	26'	162	#6	6"	11' – 7"	2,819	162	#6	6"	11' – 2"	2,717	5' – 1"	6' – 1"	162	#6	6"	9' – 8"	2,352	6' – 1"	3' – 7"	108	9"	4' – 0"	289	7	39' – 9"	186	37	39' – 9"	982	11' – 7"	31	26	72	1.294	233.6	0.9	103	52.6	9,448
10' – 0"	4' – 0"	15"	12"	30'	162	#6	6"	11' – 9"	2,859	162	#6	6"	11' – 4"	2,758	5' – 2"	6' – 2"	162	#6	6"	9' – 10"	2,393	6' – 2"	3' – 8"	108	9"	4' – 0"	289	7	39' – 9"	186	37	39' – 9"	982	11' – 9"	31	26	72	1.407	236.7	0.9	103	57.2	9,570
10' – 0"	5' – 0"	8"	7"	7'	162	#6	6"	10' – 11"	2,656	162	#6	6"	11' – 5"	2,778	5' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	108	9"	5' – 0"	361	7	39' – 9"	186	41	39' – 9"	1,089	10' – 11"	29	24	67	0.767	231.0	0.8	96	31.5	9,336
10' – 0"	5' – 0"	9"	7"	10'	162	#6	6"	10' – 11"	2,656	162	#6	6"	11' – 6"	2,798	5' – 8"	5' – 10"	162	#6	6"	9' – 0"	2,190	5' – 10"	3' – 2"	108	9"	5' – 0"	361	7	39' – 9"	186	41	39' – 9"	1,089	10' – 11"	29	24	67	0.836	232.0	0.8	96	34.3	9,376
10' – 0"	5' – 0"	10"	8"	13'	162	#6	6"	11' – 1"	2,697	162	#6	6"	11' – 8"	2,839	5' – 9"	5' – 11"	162	#6	6"	9' – 2"	2,230	5' – 11"	3' – 3"	82	12"	5' – 0"	274	7	39' – 9"	186	41	39' – 9"	1,089	11' – 1"	30	26	72	0.947	232.9	0.8	102	38.7	9,417
10' – 0"	5' – 0"	11"	8"	16'	162	#6	6"	11' – 1"	2,697	162	#6	6"	11' – 9"	2,859	5' – 10"	5' – 11"	162	#6	6"	9' – 3"	2,251	5' – 11"	3' – 4"	82	12"	5' – 0"	274	7	39' – 9"	186	41	39' – 9"	1,089	11' – 1"	30	26	72	1.016	233.9	0.8	102	41.5	9,458
10' – 0"	5' – 0"	12"	9"	20'	162	#6	6"	11' – 3"	2,737	162	#6	6"	12' – 11"	3,143	6' – 11"	5' – 12"	162	#6	6"	9' – 5"	2,291	5' – 12"	3' – 5"	108	9"	5' – 0"	361	7	39' – 9"	186	41	39' – 9"	1,089	11' – 3"	30	26	72	1.130	245.2	0.8	102	46.0	9,909
10' – 0"	5' – 0"	13"	10"	23'	162	#6	6"	11' – 5"	2,778	162	#6	6"	12' – 0"	2,920	6' – 0"	6' – 0"	162	#6	6"	9' – 6"	2,312	6' – 0"	3' – 6"	108	9"	5' – 0"	361	7	39' – 9"	186	41	39' – 9"	1,089	11' – 5"	31	26	72	1.245	241.2	0.9	103	50.7	9,749
10' – 0"	5' – 0"	14"	11"	26'	162	#6	6"	11' – 7"	2,819	162	#6	6"	12' – 2"	2,960	6' – 1"	6' – 1"	162	#6	6"	9' – 8"	2,352	6' – 1"	3' – 7"	108	9"	5' – 0"	361	7	39' – 9"	186	41	39' – 9"	1,089	11' – 7"	31	26	72	1.362	244.2	0.9	103	55.4	9,870
10' – 0"	5' – 0"	15"	12"	30'	162	#7	6"	11' – 9"	3,891	162	#6	6"	12' – 4"	3,001	6' – 2"	6' – 2"	162	#6	6"	9' – 10"	2,393	6' – 2"	3' – 8"	108	9"	5' – 0"	361	7	39' – 9"	186	41	39' – 9"	1,089	11' – 9"	31	26	72	1.481	273.0	0.9	103	60.1	11,024
10' – 0"	6' – 0"	8"	7"	7'	162	#6	6"	10' – 11"	2,656	162	#6	6"	12' – 5"	3,021	6' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	108	9"	6' – 0"	433	7	39' – 9"	186	45	39' – 9"	1,195	10' – 11"	29	24	67	0.811	241.5	0.8	96	33.3	9,757
10' – 0"	6' – 0"	8"	7"	10'	162	#6	6"	10' – 11"	2,656	162	#6	6"	12' – 5"	3,021	6' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	108	9"	6' – 0"	433	7	39' – 9"	186	45	39' – 9"	1,195	10' – 11"	29	24	67	0.811	241.5	0.8	96	33.3	9,757
10' – 0"	6' – 0"	9"	8"	13'	162	#6	6"	11' – 1"	2,697	162	#6	6"	12' – 7"	3,062	6' – 8"	5' – 11"	162	#6	6"	9' – 1"	2,210	5' – 11"	3' – 2"	82	12"	6' – 0"	329	7	39' – 9"	186	45	39' – 9"	1,195	11' – 1"	30	26	72	0.926	242.0	0.8	102	37.9	9,781
10' – 0"	6' – 0"	10"	8"	16'	162	#6	6"	11' – 1"	2,697	162	#6	6"	12' – 8"	3,082	6' – 9"	5' – 11"	162	#6	6"	9' – 2"	2,230	5' – 11"	3' – 3"	82	12"	6' – 0"	329	7	39' – 9"	186	45	39' – 9"	1,195	11' – 1"	30	26	72	0.996	243.0	0.8	102	40.7	9,821
10' – 0"	6' – 0"	12"	9"	20'	162	#6	6"	11' – 3"	2,737	162	#6	6"	13' – 11"	3,386	7' – 11"	5' – 12"	162	#6	6"	9' – 5"	2,291	5' – 12"	3' – 5"	108	9"	6' – 0"	433	7	39' – 9"	186	45	39' – 9"	1,195	11' – 3"	30	26	72	1.185	255.7	0.8	102	48.2	10,330
10' – 0"	6' – 0"	13"	10"	23'	162	#6	6"	11' – 5"	2,778	162	#6	6"	13' – 0"	3,163	7' – 0"	6' – 0"	162	#6	6"	9' – 6"	2,312	6' – 0"	3' – 6"	108	9"	6' – 0"	433	7	39' – 9"	186	45	39' – 9"	1,195	11' – 5"	31	26	72	1.307	251.7	0.9	103	53.1	10,170
10' – 0"	6' – 0"	14"	11"	26'	162	#6	6"	11' – 7"	2,819	162	#6	6"	13' – 2"	3,204	7' – 1"	6' – 1"	162	#6	6"	9' – 8"	2,352	6' – 1"	3' – 7"	108	9"	6' – 0"	433	7	39' – 9"	186	45	39' – 9"	1,195	11' – 7"	31	26	72	1.430	254.7	0.9	103	58.1	10,292
10' – 0"	6' – 0"	15"	12"	30'	162	#7	6"	11' – 9"	3,891	162	#6	6"	13' – 4"	3,244	7' – 2"	6' – 2"	162	#6	6"	9' – 10"	2,393	6' – 2"	3' – 8"	108	9"	6' – 0"	433	7	39' – 9"	186	45	39' – 9"	1,195	11' – 9"	31	26	72	1.556	283.6	0.9	103	63.1	11,445
10' – 0"	7' – 0"	8"	7"	7'	162	#6	6"	10' – 11"	2,656	162	#6	6"	13' – 5"	3,265	7' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	108	9"	7' – 0"	505	7	39' – 9"	186	45	39' – 9"	1,195	10' – 11"	29	24	67	0.854	249.4	0.8	96	35.0	10,073
10' – 0"	7' – 0"	8"	7"	10'	162	#6	6"	10' – 11"	2,656	162	#6	6"	13' – 5"	3,265	7' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	108	9"	7' – 0"	505	7	39' – 9"	186	45	39' – 9"	1,195	10' – 11"	29	24	67	0.854	249.4	0.8	96	35.0	10,073
10' – 0"	7' – 0"	9"	8"	13'	162	#6	6"	11' – 1"	2,697	162	#6	6"	13' – 7"	3,305	7' – 8"	5' – 11"	162	#6	6"	9' – 1"	2,210	5' – 11"	3' – 2"	82	12"	7' – 0"	383	7	39' – 9"	186	45	39' – 9"	1,195	11' – 1"	30	26	72	0.975	249.4	0.8	102	39.8	10,078
10' – 0"	7' – 0"	10"	8"	16'	162	#6	6"	11' – 1"	2,697	162	#6	6"	13' – 8"	3,325	7' – 9"	5' – 11"	162	#6	6"	9' – 2"	2,230	5' – 11"	3' – 3"	82	12"	7' – 0"	383	7	39' – 9"	186	45	39' – 9"	1,195	11' – 1"	30	26	72	1.045	250.4	0.8	102	42.6	10,118
10' – 0"	7' – 0"	12"	9"	20'	162	#6	6"	11' – 3"	2,737	162	#6	6"	14' – 11"	3,630	8' – 11"	5' – 12"	162	#6	6"	9' – 5"	2,291	5' – 12"	3' – 5"	108	9"	7' – 0"	505	7	39' – 9"	186	45	39' – 9"	1,195	11' – 3"	30	26	72	1.241	263.6	0.8	102	50.5	10,646
10' – 0"	7' – 0"	13"	10"	23'	162	#6	6"	11' – 5"	2,778	162	#6	6"	14' – 0"	3,407	8' – 0"	6' – 0"	162	#6	6"	9' – 6"	2,312	6' – 0"	3' – 6"	108	9"	7' – 0"	505	7	39' – 9"	186	45	39' – 9"	1,195	11' – 5"	31	26	72	1.368	259.6	0.9	103	55.6	10,486
10' – 0"	7' – 0"	14"	11"	26'	162	#6	6"	11' – 7"	2,819	162	#6	6"	14' – 2"	3,447	8' – 1"	6' – 1"	162	#6	6"	9' – 8"	2,352	6' – 1"	3' – 7"	108	9"	7' – 0"	505	7	39' – 9"	186	45	39' – 9"	1,195	11' – 7"	31	26	72	1.498	262.6	0.9	103	60.8	10,607
10' – 0"	7' – 0"	15"	12"	30'	162	#7	6"	11' – 9"	3,891	162	#6	6"	14' – 4"	3,488	8' – 2"	6' – 2"	162	#6	6"	9' – 10"	2,393	6' – 2"	3' – 8"	108	9"	7' – 0"	505	7	39' – 9"	186	45	39' – 9"	1,195	11' – 9"	31	26	72	1.630	291.5	0.9	103	66.1	11,761
10' – 0"	8' – 0"	8"	7"	7'	162	#6	6"	10' – 11"	2,656	162	#6	6"	14' – 5"	3,508	8' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	108	9"	8' – 0"	577	7	39' – 9"	186	49	39' – 9"	1,301	10' – 11"	29	24	67	0.897	260.0	0.8	96	36.7	10,494
10' – 0"	8' – 0"	8"	7"	10'	162	#6	6"	10' – 11"	2,656	162	#6	6"	14' – 5"	3,508	8' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	108	9"	8' – 0"	577	7	39' – 9"	186	49	39' – 9"	1,301	10' – 11"	29	24	67	0.897	260.0	0.8	96	36.7	10,494
10' – 0"	8' – 0"	9"	8"	13'	162	#6	6"	11' – 1"	2,697	162	#6	6"	14' – 7"	3,548	8' – 8"	5' – 11"	162	#6	6"	9' – 1"	2,210	5' – 11"	3' – 2"	82	12"	8' – 0"	438	7	39' – 9"	186	49	39' – 9"	1,301	11' – 1"	30	26	72	1.025	259.5	0.8	102	41.8	10,482
10' – 0"	8' – 0"	10"	8"	16'	162	#6	6"	11' – 1"	2,697	162	#6	6"	14' – 8"	3,569	8' – 9"	5' – 11"	162	#6	6"	9' – 2"	2,230	5' – 11"	3' – 3"	82	12"	8' – 0"	438	7	39' – 9"	186	49	39' – 9"	1,301	11' – 1"	30	26	72	1.095	260.5	0.8	102	44.6	10,523
10' – 0"	8' – 0"	12"	9"	20'	162	#6	6"	11' – 3"	2,737	162	#6	6"	15' – 11"	3,873	9' – 11"	5' – 12"	162	#6	6"	9' – 5"	2,291	5' – 12"	3' – 5"	108	9"	8' – 0"	577	7	39' – 9"	186	49	39' – 9"	1,301	11' – 3"	30	26	72	1.296	274.1	0.8	102	52.7	11,067
10' – 0"	8' – 0"	13"	10"	23'	162	#6	6"	11' – 5"	2,778	162	#6	6"	15' – 0"	3,650	9' – 0"	6' – 0"	162	#6	6"	9' – 6"	2,312	6' – 0"	3' – 6"	108	9"	8' – 0"	577	7	39' – 9"	186	49	39' – 9"	1,301	11' – 5"	31	26	72	1.430	270.1	0.9	103	58.1	10,907
10' – 0"	8' – 0"	14"	11"	26'	162	#6	6"	11' – 7"	2,819	162	#6	6"	15' – 2"	3,690	9' – 1"	6' – 1"	162	#6	6"	9' – 8"	2,352	6' – 1"	3' – 7"	108	9"	8' – 0"	577	7	39' – 9"	186	49	39' – 9"	1,301	11' – 7"	31	26	72	1.566	273.1	0.9	103	63.5	11,028
10' – 0"	8' – 0"	15"	12"	30'	162	#7	6"	11' – 9"	3,891	162	#6	6"	15' – 4"	3,731	9' – 2"	6' – 2"	162	#6	6"	9' – 10"	2,393	6' – 2"	3' – 8"	108	9"	8' – 0"	577	7	39' – 9"	186	49	39' – 9"	1,301	11' – 9"	31	26	72	1.704	302.0	0.9	103	69.0	12,182

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE

0' TO 30' FILL

SCC-10

FILE: scc10ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		127

DATE: 12/2/2022 11:57:18 AM
FILE: G:\TxC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\06-DRNG\Sheets\scc10ste-20.dgn

SECTION DIMENSIONS				(5) FILL HEIGHT	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																												QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
10' – 0"	9' – 0"	8"	7"	7'	162	#6	6"	10' – 11"	2,656	162	#6	6"	15' – 5"	3,751	9' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	108	9"	9' – 0"	649	7	39' – 9"	186	53	39' – 9"	1,407	10' – 11"	29	24	67	0.940	270.5	0.8	96	38.4	10,915
10' – 0"	9' – 0"	8"	7"	10'	162	#6	6"	10' – 11"	2,656	162	#6	6"	15' – 5"	3,751	9' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	108	9"	9' – 0"	649	7	39' – 9"	186	53	39' – 9"	1,407	10' – 11"	29	24	67	0.940	270.5	0.8	96	38.4	10,915
10' – 0"	9' – 0"	9"	8"	13'	162	#6	6"	11' – 1"	2,697	162	#6	6"	15' – 7"	3,792	9' – 8"	5' – 11"	162	#6	6"	9' – 1"	2,210	5' – 11"	3' – 2"	108	9"	9' – 0"	649	7	39' – 9"	186	53	39' – 9"	1,407	11' – 1"	30	26	72	1.074	273.5	0.8	102	43.8	11,043
10' – 0"	9' – 0"	10"	8"	16'	162	#6	6"	11' – 1"	2,697	162	#6	6"	15' – 8"	3,812	9' – 9"	5' – 11"	162	#6	6"	9' – 2"	2,230	5' – 11"	3' – 3"	162	6"	9' – 0"	974	7	39' – 9"	186	53	39' – 9"	1,407	11' – 1"	30	26	72	1.144	282.7	0.8	102	46.6	11,408
10' – 0"	9' – 0"	12"	9"	20'	162	#6	6"	11' – 3"	2,737	162	#6	6"	16' – 11"	4,116	10' – 11"	5' – 12"	162	#6	6"	9' – 5"	2,291	5' – 12"	3' – 5"	162	6"	9' – 0"	974	7	39' – 9"	186	53	39' – 9"	1,407	11' – 3"	30	26	72	1.352	292.8	0.8	102	54.9	11,813
10' – 0"	9' – 0"	13"	10"	23'	162	#6	6"	11' – 5"	2,778	162	#6	6"	16' – 0"	3,893	10' – 0"	6' – 0"	162	#6	6"	9' – 6"	2,312	6' – 0"	3' – 6"	162	6"	9' – 0"	974	7	39' – 9"	186	53	39' – 9"	1,407	11' – 5"	31	26	72	1.492	288.8	0.9	103	60.5	11,653
10' – 0"	9' – 0"	14"	11"	26'	162	#6	6"	11' – 7"	2,819	162	#6	6"	16' – 2"	3,934	10' – 1"	6' – 1"	162	#6	6"	9' – 8"	2,352	6' – 1"	3' – 7"	162	6"	9' – 0"	974	7	39' – 9"	186	53	39' – 9"	1,407	11' – 7"	31	26	72	1.634	291.8	0.9	103	66.2	11,775
10' – 0"	9' – 0"	15"	12"	30'	162	#7	6"	11' – 9"	3,891	162	#6	6"	16' – 4"	3,974	10' – 2"	6' – 2"	162	#6	6"	9' – 10"	2,393	6' – 2"	3' – 8"	162	6"	9' – 0"	974	7	39' – 9"	186	53	39' – 9"	1,407	11' – 9"	31	26	72	1.778	320.6	0.9	103	72.0	12,928
10' – 0"	10' – 0"	8"	7"	7'	162	#6	6"	10' – 11"	2,656	162	#6	6"	16' – 5"	3,995	10' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	162	6"	10' – 0"	1,082	7	39' – 9"	186	53	39' – 9"	1,407	10' – 11"	29	24	67	0.984	287.4	0.8	96	40.2	11,592
10' – 0"	10' – 0"	8"	7"	10'	162	#6	6"	10' – 11"	2,656	162	#6	6"	16' – 5"	3,995	10' – 7"	5' – 10"	162	#6	6"	8' – 11"	2,170	5' – 10"	3' – 1"	162	6"	10' – 0"	1,082	7	39' – 9"	186	53	39' – 9"	1,407	10' – 11"	29	24	67	0.984	287.4	0.8	96	40.2	11,592
10' – 0"	10' – 0"	9"	8"	13'	162	#6	6"	11' – 1"	2,697	162	#6	6"	16' – 7"	4,035	10' – 8"	5' – 11"	162	#6	6"	9' – 1"	2,210	5' – 11"	3' – 2"	162	6"	10' – 0"	1,082	7	39' – 9"	186	53	39' – 9"	1,407	11' – 1"	30	26	72	1.123	290.4	0.8	102	45.8	11,719
10' – 0"	10' – 0"	10"	8"	16'	162	#6	6"	11' – 1"	2,697	162	#6	6"	16' – 8"	4,055	10' – 9"	5' – 11"	162	#6	6"	9' – 2"	2,230	5' – 11"	3' – 3"	162	6"	10' – 0"	1,082	7	39' – 9"	186	53	39' – 9"	1,407	11' – 1"	30	26	72	1.193	291.4	0.8	102	48.6	11,759
10' – 0"	10' – 0"	12"	9"	20'	162	#6	6"	11' – 3"	2,737	162	#6	6"	17' – 11"	4,360	11' – 11"	5' – 12"	162	#6	6"	9' – 5"	2,291	5' – 12"	3' – 5"	162	6"	10' – 0"	1,082	7	39' – 9"	186	53	39' – 9"	1,407	11' – 3"	30	26	72	1.407	301.6	0.8	102	57.1	12,165
10' – 0"	10' – 0"	13"	10"	23'	162	#6	6"	11' – 5"	2,778	162	#6	6"	17' – 0"	4,137	11' – 0"	6' – 0"	162	#6	6"	9' – 6"	2,312	6' – 0"	3' – 6"	162	6"	10' – 0"	1,082	7	39' – 9"	186	53	39' – 9"	1,407	11' – 5"	31	26	72	1.553	297.6	0.9	103	63.0	12,005
10' – 0"	10' – 0"	14"	11"	26'	162	#6	6"	11' – 7"	2,819	162	#6	6"	17' – 2"	4,177	11' – 1"	6' – 1"	162	#6	6"	9' – 8"	2,352	6' – 1"	3' – 7"	162	6"	10' – 0"	1,082	7	39' – 9"	186	53	39' – 9"	1,407	11' – 7"	31	26	72	1.702	300.6	0.9	103	69.0	12,126
10' – 0"	10' – 0"	15"	12"	30'	162	#7	6"	11' – 9"	3,891	162	#6	6"	17' – 4"	4,218	11' – 2"	6' – 2"	162	#6	6"	9' – 10"	2,393	6' – 2"	3' – 8"	162	6"	10' – 0"	1,082	7	39' – 9"	186	53	39' – 9"	1,407	11' – 9"	31	26	72	1.852	329.4	0.9	103	75.0	13,280

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-10

FILE: scc10ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	AUS	HAYS		128

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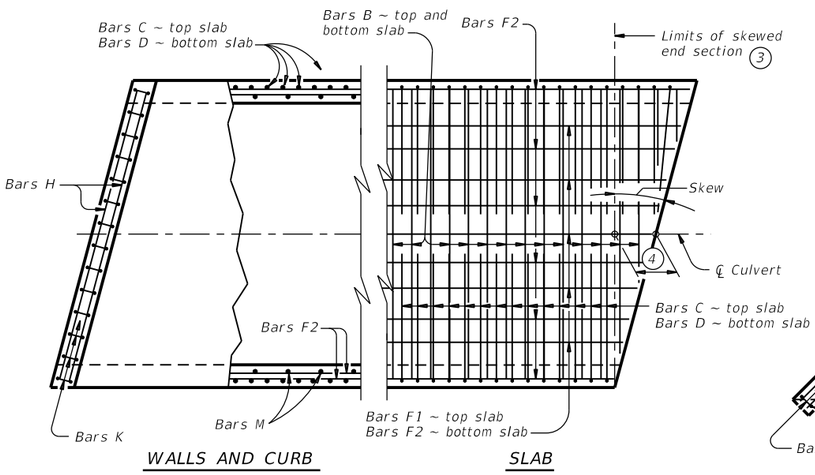
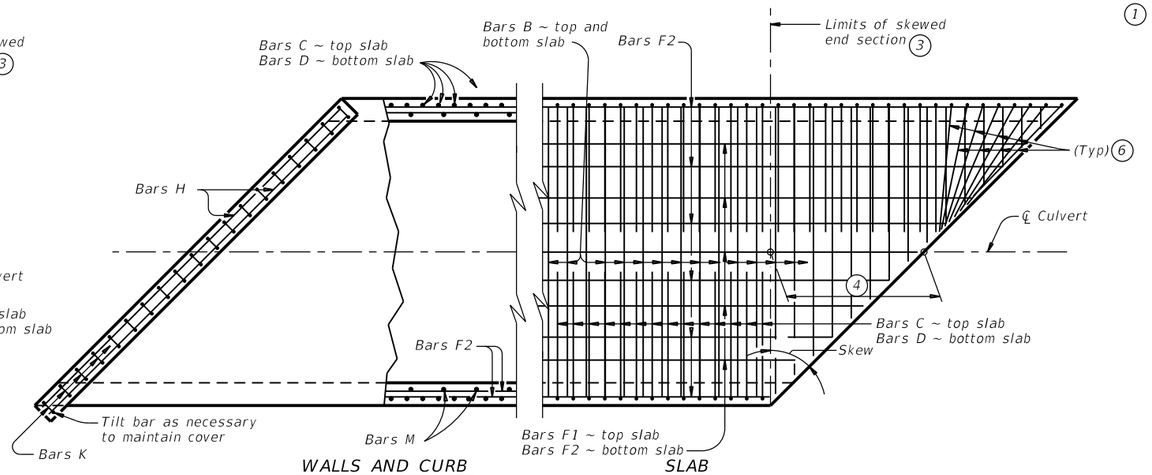
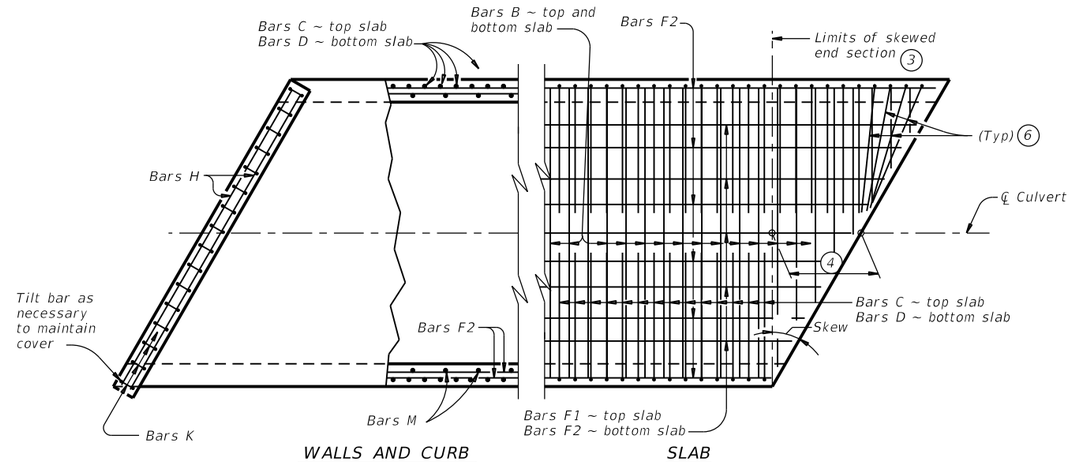


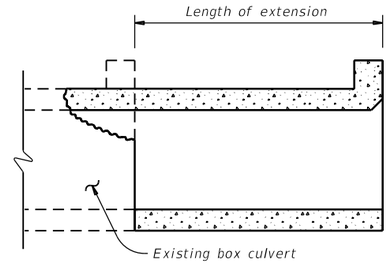
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° (7)



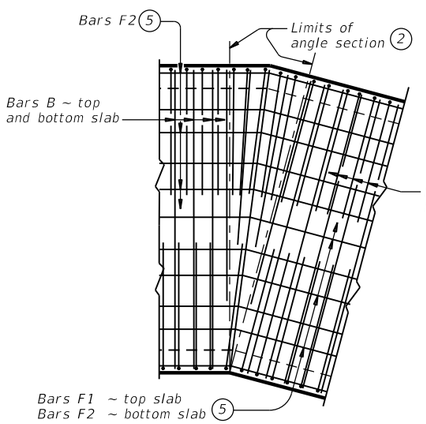
PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



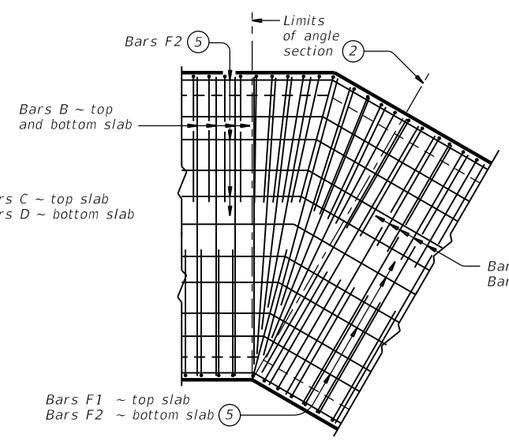
PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



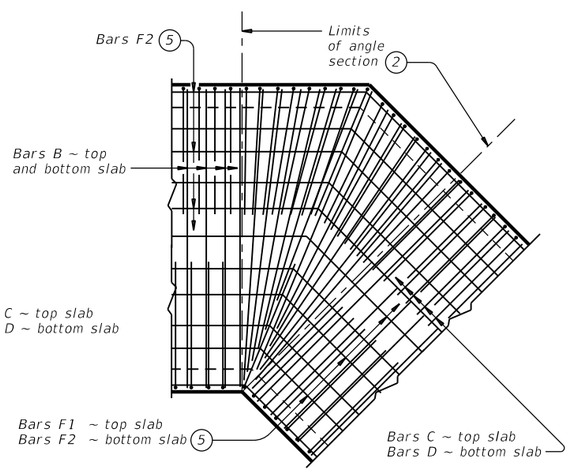
LENGTHENING DETAIL (1)



PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

(1) For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars in the extension.

For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, C, D , E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.

(2) When the spacing between Bars B becomes less than half of the normal spacing, cut bars to avoid conflict.

(3) The length of Bars B vary in the skewed end sections.

(4) [One half of overall width] x [tangent of the skew angle]

(5) Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.

(6) When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.

(7) At the Contractor's option, for skews of 15° or less, place Bars B, C, and D parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B shown on the Single Box Culverts Cast-In-Place (SCC) standards sheets to accommodate the skew.

CONSTRUCTION NOTES:

Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions:
provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for details of straight sections of culvert.
For skewed sections and angle sections, refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for slab and wall dimensions, bar spacing, and any other details not shown.
For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the culvert Single Box Culverts Cast-In-Place (SCC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

SCC-MD

FILE: sccmdste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	AUS	HAYS		129

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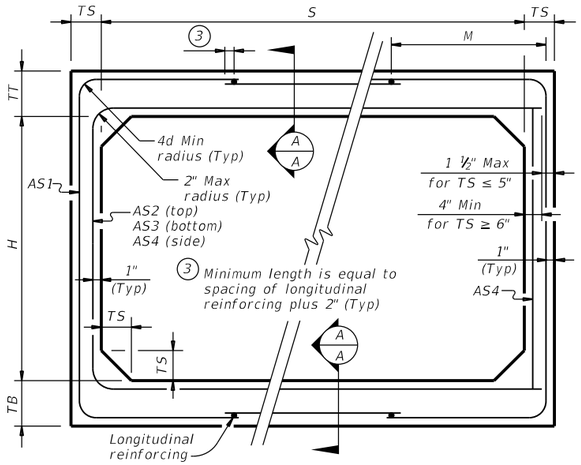
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
3	2	7	6	4	< 2	–	0.17	0.25	0.16	0.10	0.17	0.17	0.14	3.3
3	2	4	4	4	2 < 3	31	0.13	0.19	0.18	0.10	–	–	–	2.4
3	2	4	4	4	3 – 5	31	0.10	0.11	0.12	0.10	–	–	–	2.4
3	2	4	4	4	10	31	0.10	0.10	0.10	0.10	–	–	–	2.4
3	2	4	4	4	15	31	0.10	0.13	0.13	0.10	–	–	–	2.4
3	2	4	4	4	20	31	0.11	0.17	0.17	0.10	–	–	–	2.4
3	2	4	4	4	25	31	0.14	0.21	0.21	0.10	–	–	–	2.4
3	2	4	4	4	30	31	0.17	0.25	0.25	0.10	–	–	–	2.4
3	2	4	4	4	35	31	0.20	0.29	0.30	0.10	–	–	–	2.4
3	3	7	6	4	< 2	–	0.17	0.27	0.17	0.10	0.17	0.17	0.14	3.7
3	3	4	4	4	2 < 3	31	0.10	0.22	0.21	0.10	–	–	–	2.8
3	3	4	4	4	3 – 5	31	0.10	0.14	0.14	0.10	–	–	–	2.8
3	3	4	4	4	10	31	0.10	0.11	0.11	0.10	–	–	–	2.8
3	3	4	4	4	15	31	0.10	0.14	0.15	0.10	–	–	–	2.8
3	3	4	4	4	20	31	0.10	0.18	0.19	0.10	–	–	–	2.8
3	3	4	4	4	25	31	0.10	0.23	0.23	0.10	–	–	–	2.8
3	3	4	4	4	30	31	0.12	0.27	0.28	0.10	–	–	–	2.8
3	3	4	4	4	35	31	0.14	0.32	0.32	0.10	–	–	–	2.8

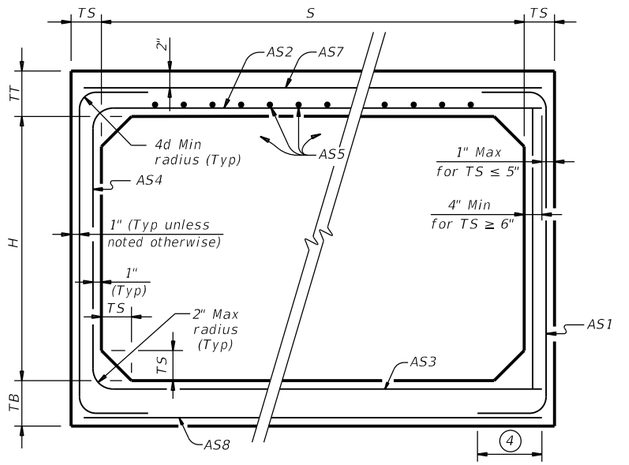
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

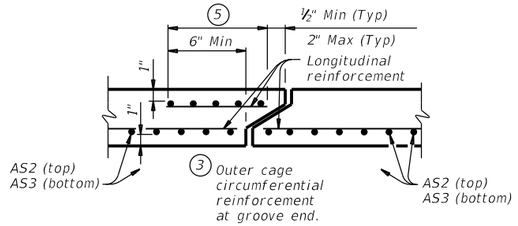
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

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



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

3'-0" SPAN

SCP-3

FILE: scp03sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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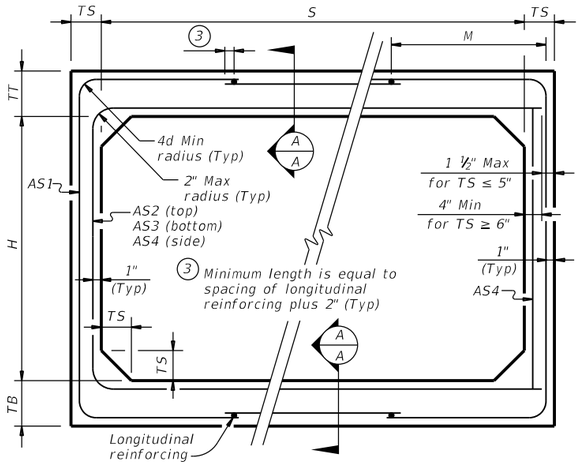
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
5	2	8	7	6	< 2	–	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	–	–	–	5.1
5	2	6	6	6	3 – 5	44	0.16	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	–	–	–	5.1
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	–	–	–	5.1
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	–	–	–	5.1
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	–	–	–	5.1
5	3	8	7	6	< 2	–	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	–	–	–	5.7
5	3	6	6	6	3 – 5	36	0.14	0.17	0.16	0.14	–	–	–	5.7
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	–	–	–	5.7
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	–	–	–	5.7
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	–	–	–	5.7
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	–	–	–	5.7
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	–	–	–	5.7
5	4	8	7	6	< 2	–	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	–	–	–	6.3
5	4	6	6	6	3 – 5	45	0.14	0.19	0.18	0.14	–	–	–	6.3
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	–	–	–	6.3
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	–	–	–	6.3
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	–	–	–	6.3
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	–	–	–	6.3
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	–	–	–	6.3
5	5	8	7	6	< 2	–	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	–	–	–	6.9
5	5	6	6	6	3 – 5	45	0.14	0.21	0.20	0.14	–	–	–	6.9
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	–	–	–	6.9
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	–	–	–	6.9
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	–	–	–	6.9
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	–	–	–	6.9
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	–	–	–	6.9

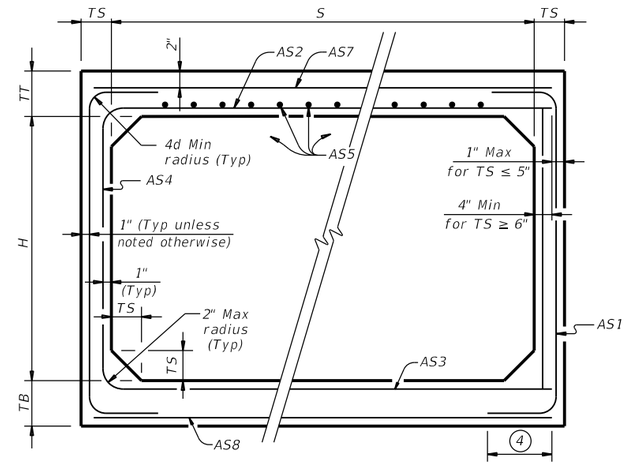
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

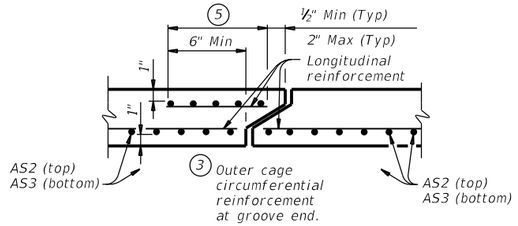
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

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



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

5'-0" SPAN

SCP-5

FILE: scp05sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	AUS	HAYS		131

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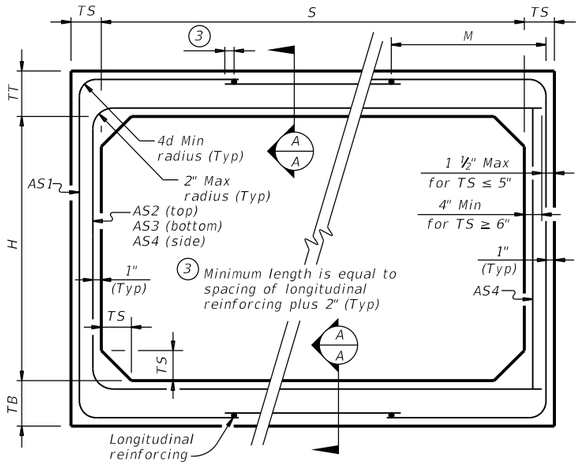
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
7	3	8	8	8	< 2	–	0.23	0.31	0.22	0.19	0.19	0.19	0.19	9.6
7	3	8	8	8	2 < 3	47	0.27	0.25	0.24	0.19	–	–	–	9.6
7	3	8	8	8	3 – 5	43	0.19	0.19	0.19	0.19	–	–	–	9.6
7	3	8	8	8	10	43	0.21	0.20	0.21	0.19	–	–	–	9.6
7	3	8	8	8	15	43	0.28	0.26	0.27	0.19	–	–	–	9.6
7	3	8	8	8	20	43	0.36	0.34	0.35	0.19	–	–	–	9.6
7	3	8	8	8	25	43	0.45	0.42	0.43	0.19	–	–	–	9.6
7	3	8	8	8	30	43	0.54	0.50	0.51	0.19	–	–	–	9.6
7	4	8	8	8	< 2	–	0.21	0.34	0.25	0.19	0.19	0.19	0.19	10.4
7	4	8	8	8	2 < 3	43	0.23	0.28	0.28	0.19	–	–	–	10.4
7	4	8	8	8	3 – 5	43	0.19	0.22	0.19	0.19	–	–	–	10.4
7	4	8	8	8	10	43	0.19	0.23	0.23	0.19	–	–	–	10.4
7	4	8	8	8	15	41	0.24	0.30	0.30	0.19	–	–	–	10.4
7	4	8	8	8	20	41	0.31	0.38	0.39	0.19	–	–	–	10.4
7	4	8	8	8	25	41	0.38	0.47	0.48	0.19	–	–	–	10.4
7	4	8	8	8	30	41	0.46	0.57	0.57	0.19	–	–	–	10.4
7	5	8	8	8	< 2	–	0.19	0.36	0.27	0.19	0.19	0.19	0.19	11.2
7	5	8	8	8	2 < 3	47	0.21	0.31	0.31	0.19	–	–	–	11.2
7	5	8	8	8	3 – 5	43	0.19	0.24	0.21	0.19	–	–	–	11.2
7	5	8	8	8	10	43	0.19	0.25	0.26	0.19	–	–	–	11.2
7	5	8	8	8	15	41	0.21	0.32	0.33	0.19	–	–	–	11.2
7	5	8	8	8	20	41	0.27	0.41	0.42	0.19	–	–	–	11.2
7	5	8	8	8	25	41	0.33	0.51	0.52	0.19	–	–	–	11.2
7	5	8	8	8	30	41	0.40	0.61	0.62	0.19	–	–	–	11.2
7	6	8	8	8	< 2	–	0.19	0.38	0.30	0.19	0.19	0.19	0.19	12.0
7	6	8	8	8	2 < 3	59	0.19	0.33	0.34	0.19	–	–	–	12.0
7	6	8	8	8	3 – 5	47	0.19	0.25	0.23	0.19	–	–	–	12.0
7	6	8	8	8	10	43	0.19	0.26	0.27	0.19	–	–	–	12.0
7	6	8	8	8	15	41	0.19	0.34	0.35	0.19	–	–	–	12.0
7	6	8	8	8	20	41	0.24	0.43	0.45	0.19	–	–	–	12.0
7	6	8	8	8	25	41	0.29	0.53	0.55	0.19	–	–	–	12.0
7	6	8	8	8	30	41	0.35	0.64	0.65	0.19	–	–	–	12.0
7	7	8	8	8	< 2	–	0.19	0.40	0.33	0.19	0.19	0.19	0.19	12.8
7	7	8	8	8	2 < 3	59	0.19	0.36	0.37	0.19	–	–	–	12.8
7	7	8	8	8	3 – 5	59	0.19	0.27	0.25	0.19	–	–	–	12.8
7	7	8	8	8	10	47	0.19	0.27	0.29	0.19	–	–	–	12.8
7	7	8	8	8	15	43	0.19	0.35	0.37	0.19	–	–	–	12.8
7	7	8	8	8	20	43	0.22	0.44	0.46	0.19	–	–	–	12.8
7	7	8	8	8	25	43	0.27	0.54	0.57	0.19	–	–	–	12.8
7	7	8	8	8	30	41	0.32	0.65	0.67	0.19	–	–	–	12.8

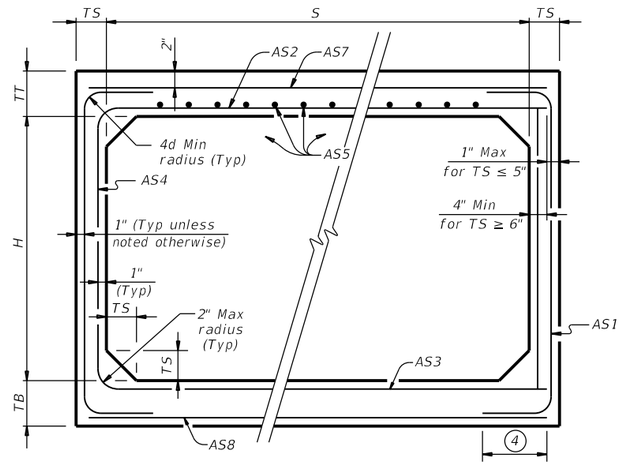
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

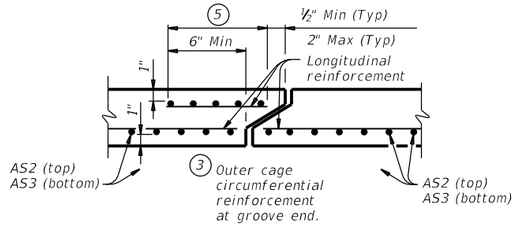
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

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



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

7'-0" SPAN

SCP-7

FILE: scp07sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	AUS	HAYS		132

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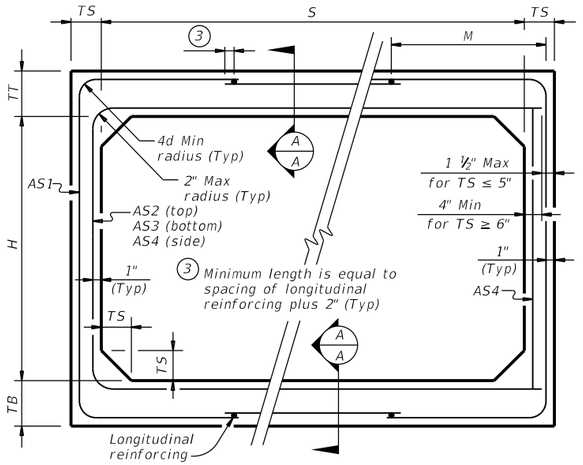
BOX DATA

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

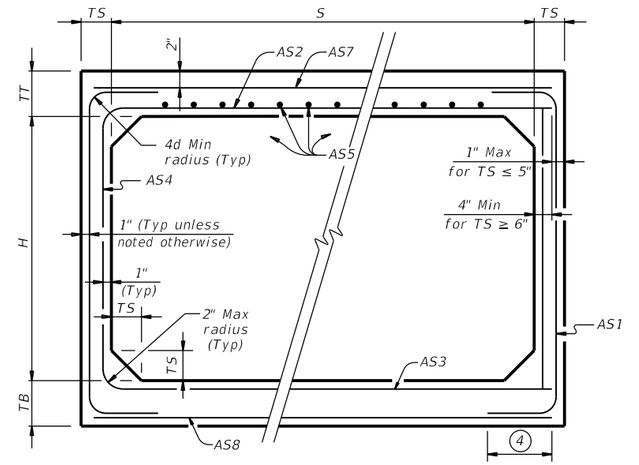
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

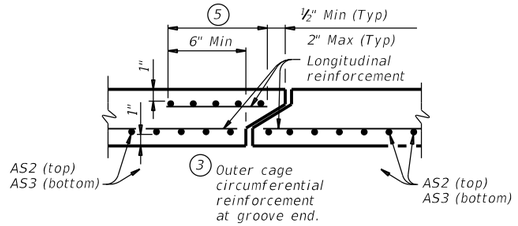
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

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



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

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HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

8'-0" SPAN

SCP-8

FILE: scp08sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		133

DATE: 12/2/2022 11:57:23 AM
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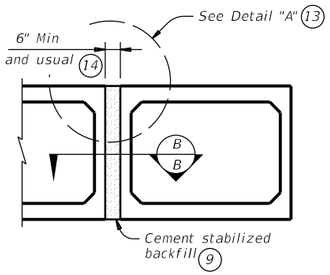
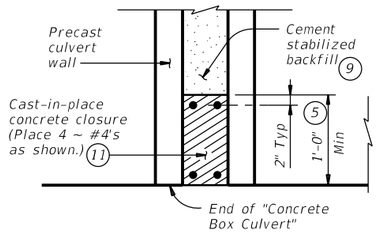
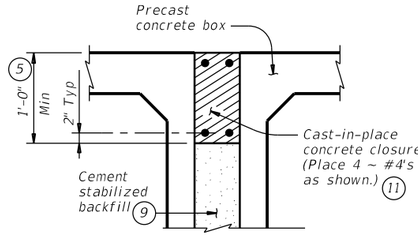


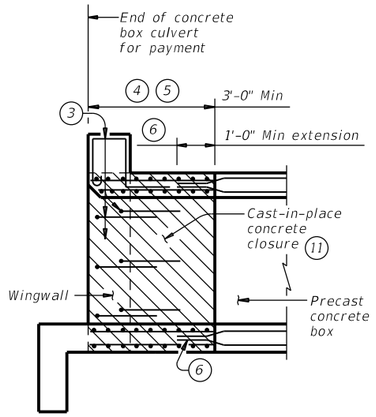
MULTIPLE UNIT PLACEMENT



SECTION B-B

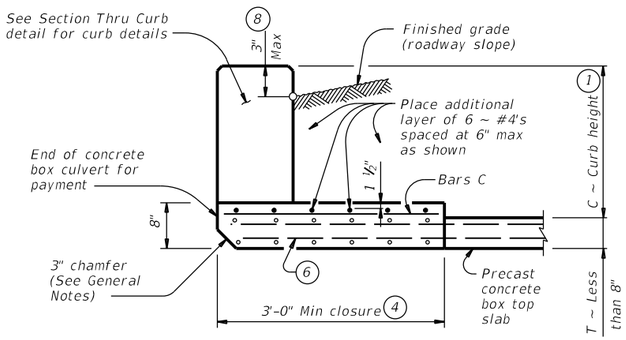


DETAIL "A" (13)

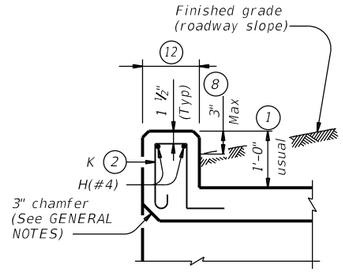


WINGWALL CONNECTION

(Also applies to safety end treatment.)

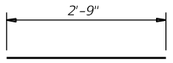


SECTION THRU TOP SLABS LESS THAN 8"

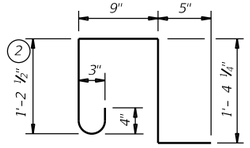


SECTION THRU CURB

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



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



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

1) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2) For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

3) Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.

4) Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.

5) For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.

6) Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).

7) Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.

8) For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

9) Cement stabilized backfill between boxes is considered part of the box culvert for payment.

10) All curb concrete and reinforcing is considered part of the box culvert for payment.

11) Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.

12) 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.

13) For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".

14) This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

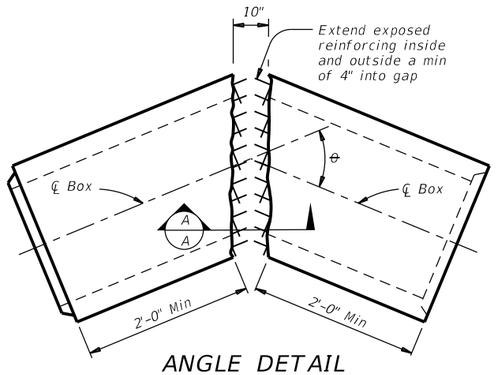
MATERIAL NOTES:

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

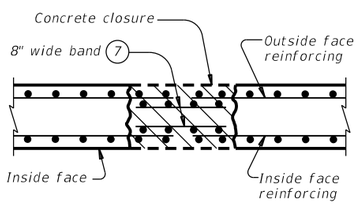
GENERAL NOTES:

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

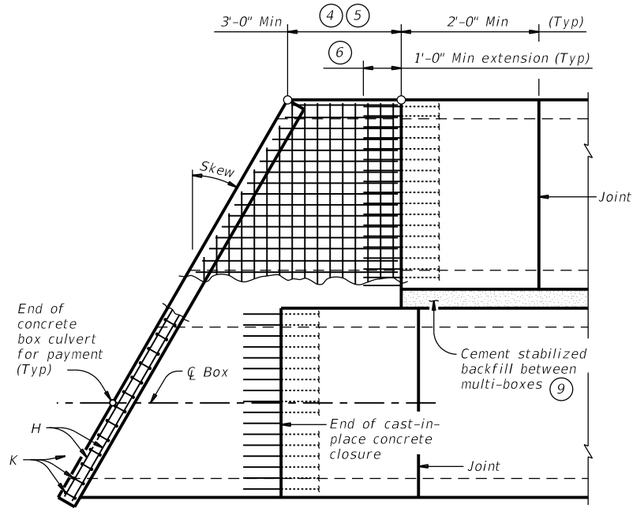
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bars dimensions are out-to-out of bars.



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement.)

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

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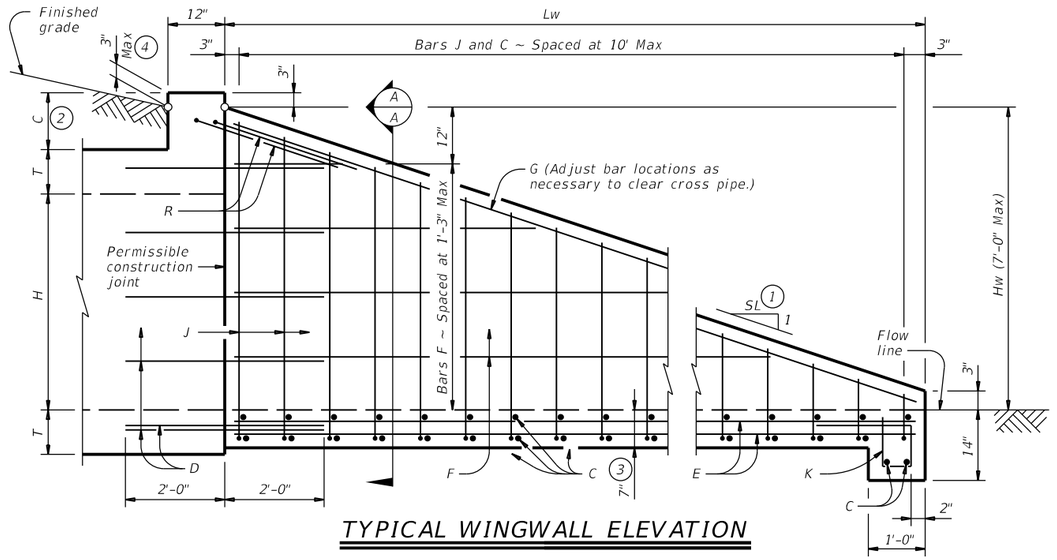
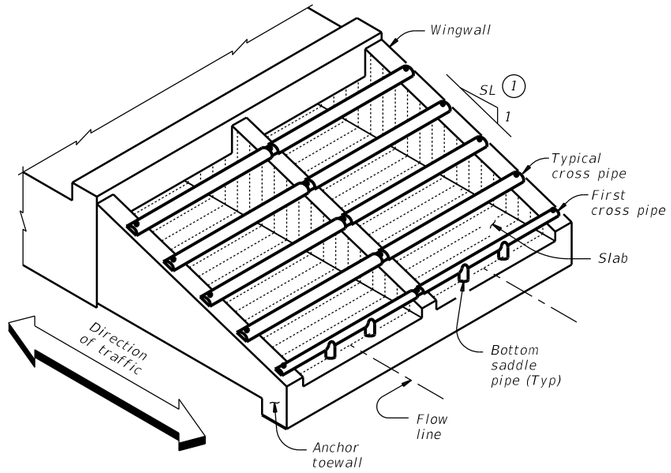


TYPICAL WINGWALL ELEVATION

(Cross pipes not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing bolted anchor option.)

WING DIMENSION CALCULATIONS:

$Hw = H + T + C - 0.250'$

$Lw = (Hw - 0.333')\ (SL)$

For cast-in-place culverts:

$Atw = (N)\ (S) + (N + 1)\ (U)$

For precast culverts:

$Atw = (N)\ (2U + S) + (N - 1)\ (0.500')$

Total Wingwall Area (SF)
$= (0.5)\ (Hw + 0.333')\ (Lw)\ (N - 1)$

Total Concrete Volume (CY)
$= [(\text{Wingwall Area})\ (0.583') +$
$(Lw)\ (Atw)\ (0.583') +$
$(Atw)\ (1.167')\ (1.167' - 0.583')] \div (27)$

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length (feet)
$= (Lw)\ (K1) = (1.917')$

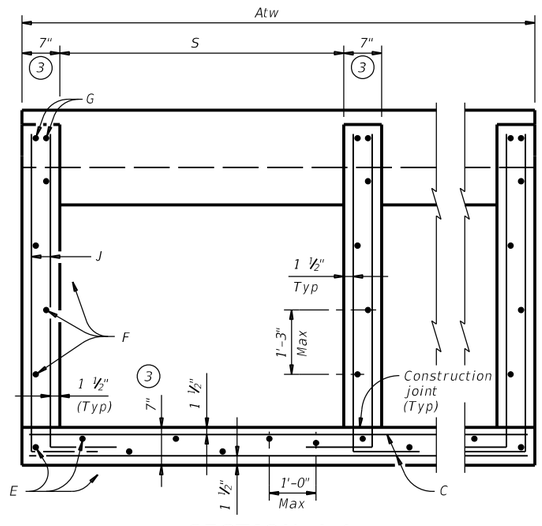
Total Reinforcing (Lb)
$= (1.55)\ (Lw)\ (Atw) +$
$(4.43)\ (Atw) +$
$(K2)\ (Hw)\ (N + 1)\ (\sqrt{Lw})$

C = Height of curb above top of top slab (feet)
Hw = Height of wingwall (feet)
K = Constant value for use in formulas

Slope SL:1	K1	K2
3:1	~ 1.054 ~	7.45
4:1	~ 1.031 ~	8.49
6:1	~ 1.014 ~	10.30

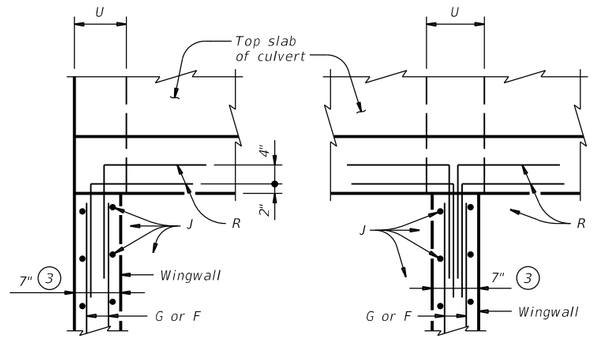
Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)

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



SECTION A-A

(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)

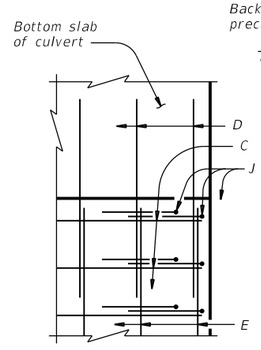


AT TOP OF EXTERIOR WINGWALL

(Cast-in-place culvert)

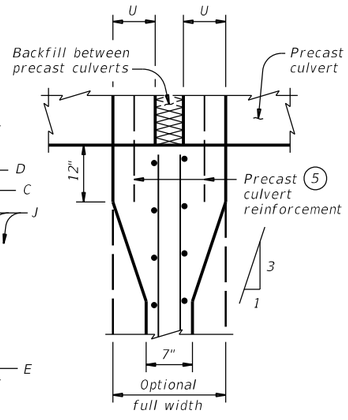
AT TOP OF INTERIOR WINGWALL

(Cast-in-place culvert)



AT OUTSIDE OF BOTTOM SLAB

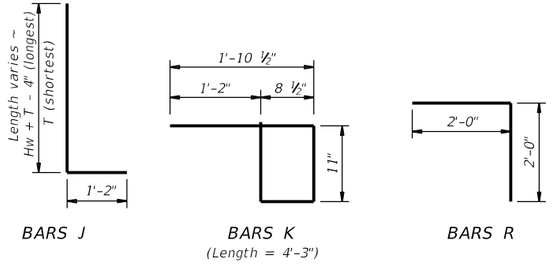
(Cast-in-place culvert)



AT INTERIOR WINGWALL

(Precast culvert)

PLAN VIEWS OF CORNER DETAILS



MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Adjust reinforcing as necessary to provide a minimum clear cover of 1½".
Provide Class "C" concrete ($f'c$ = 3,600 psi).
Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
Provide ASTM A307 bolts.
Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.
Repair galvanizing damaged during transport or construction in accordance with Item 445, "Galvanizing."

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.
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.
The quantities for concrete, reinforcing steel, and cross pipes resulting from the formulas given herein are for Contractor's information only.
See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

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

TABLE OF REINFORCING BAR SIZES AND SPACING

Bar	Size	Spacing
C	#4	10" Max
D	#4	Match F and E
E	#4	1'- 0" Max
F	#4	1'- 3" Max
G	#6	As shown
J	#4	10" Max
K	#4	1'- 0" Max
R	#4	As shown

(1) Provide 6:1 or flatter slope.

(2) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to Extended Curb Details the Extended Curb Details (ECD) standard sheet.

(3) Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" Minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.

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

(5) For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.

Texas Department of Transportation
Bridge Division Standard

SAFETY END TREATMENT

FOR BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ PARALLEL DRAINAGE

SETB-PD

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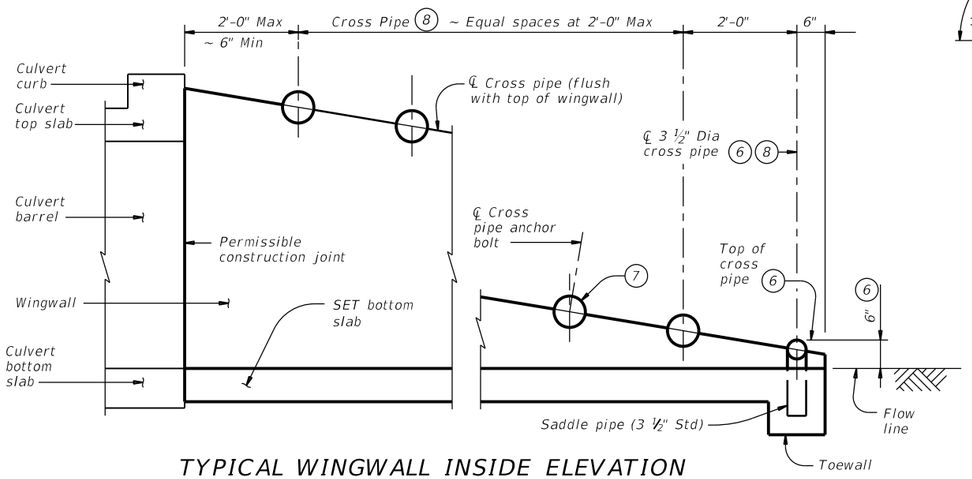
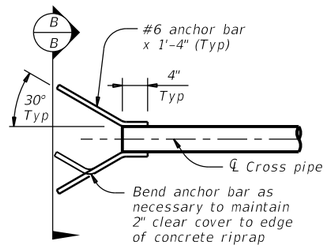
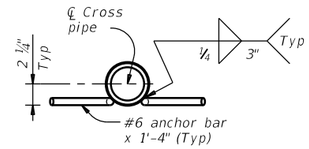


TYPICAL WINGWALL INSIDE ELEVATION

(Showing installation of cross pipes.)

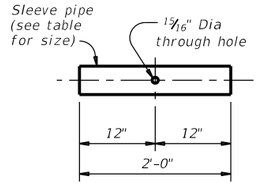


PART PLAN



SECTION B-B

OPTIONAL ANCHOR BAR DETAILS



SLEEVE PIPE DETAILS (9)

REQUIRED PIPE SIZES (8)		
Culvert Span Sizes	Cross Pipe Size	Sleeve Pipe Size (9)
First Pipe	3 ½" STD	2 ½" STD
30" to 42"	4" STD	3" STD
48" to 72"	5" STD	4" STD
78" to 120"	6" STD	5" STD

STANDARD PIPE SIZES		
Pipe Size	Pipe O.D.	Pipe I.D.
2 ½" STD	2.875"	2.469"
3" STD	3.500"	3.068"
3 ½" STD	4.000"	3.548"
4" STD	4.500"	4.026"
5" STD	5.563"	5.047"
6" STD	6.625"	6.065"

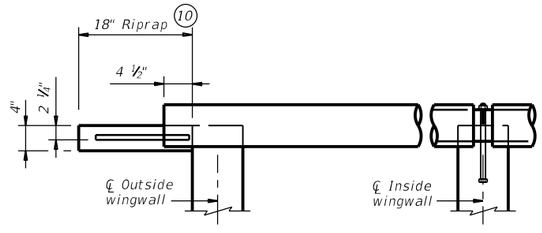
(6) The proper installation of the first cross pipe is critical for vechicle saftey. Place the top of the first cross pipe at no more than 6" above the flow line.

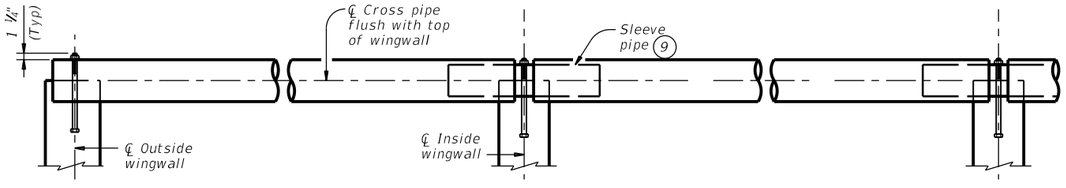
(7) Always install the third cross pipe from the bottom of the culvert using a bolted connection. Take care to ensure that concrete does not flow into this cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(8) Provide cross pipes and sleeve pipes (if required) as shown in the Required Pipe Sizes table. Provide 3 1#2" saddle pipes for the 3 1#2" first cross pipe.

(9) At Contractor's option, make the cross pipe continuous across the inside wingwalls. If this option is selected, omit the sleeve pipe and make a 15#16" diameter throughhole in the cross pipe to accept the anchor bolt at the centerline of each interior wingwall.

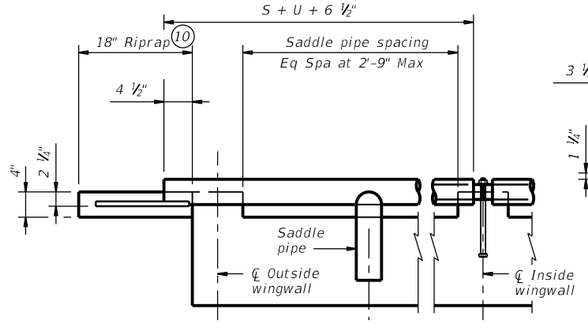
(10) Provide riprap when using the Optional Anchor Bar details. Riprap is included in the bid price for Safety End Treatment. Provide riprap in accordance with Item 432, "Riprap".

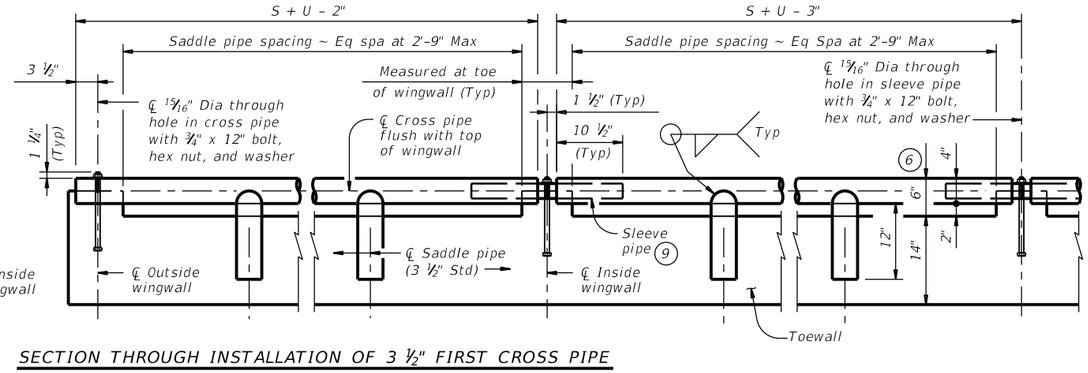




SECTION THROUGH INSTALLATION OF TYPICAL FULL CROSS PIPE

(Anchor details and dimensions are similar to those shown below in Section Through Installation of 3 ½" First Cross Pipe detail.)





SECTION THROUGH INSTALLATION OF 3 ½" FIRST CROSS PIPE

OUTSIDE CULVERT BARREL WITH OPTIONAL ANCHOR BARS & RIPRAP

OUTSIDE CULVERT BARREL WITH BOLTED ANCHOR

INSIDE CULVERT BARREL

CROSS PIPE INSTALLATION DETAILS

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ PARALLEL DRAINAGE

SETB-PD

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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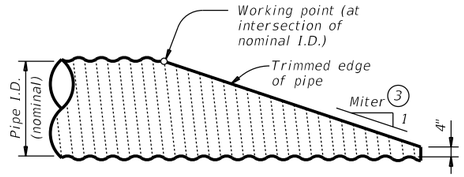
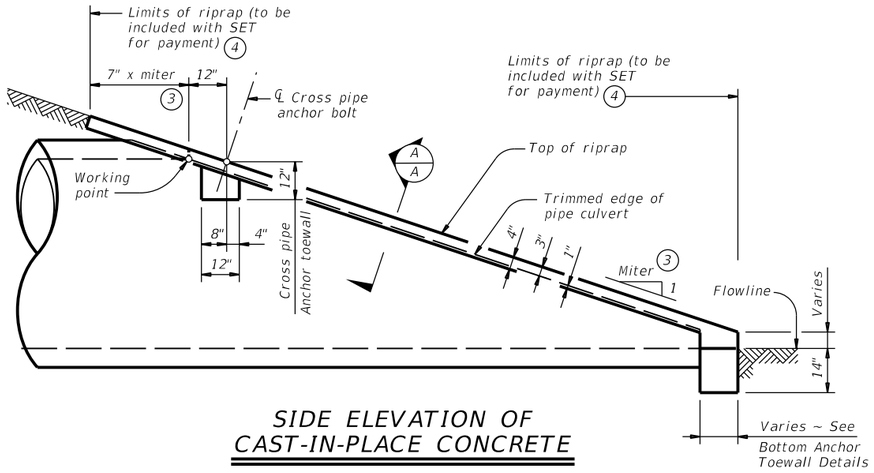


NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

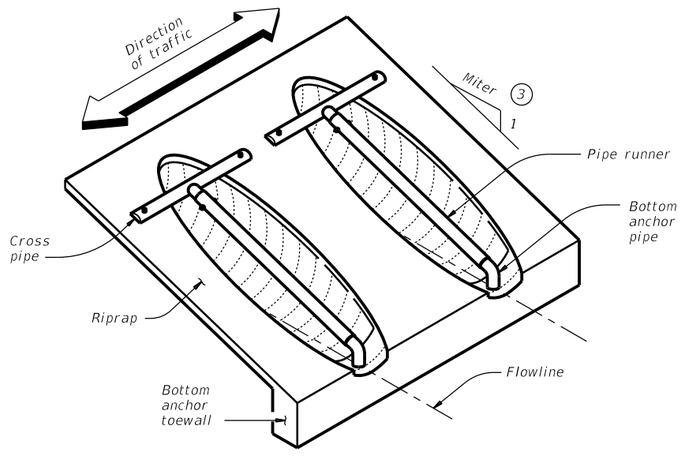
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

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



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)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1)(2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' – 7"	3' – 5"	N/A	N/A	N/A	5' – 10"	N/A	N/A	N/A	8' – 1"	N/A	N/A	N/A	12' – 9"
27"	1' – 8"	3' – 8"	N/A	N/A	5' – 5"	6' – 11"	N/A	N/A	7' – 7"	9' – 7"	N/A	N/A	11' – 11"	14' – 11"
30"	1' – 10"	3' – 11"	N/A	N/A	6' – 4"	8' – 0"	N/A	N/A	8' – 9"	11' – 0"	N/A	N/A	13' – 8"	17' – 0"
33"	1' – 11"	4' – 2"	6' – 2"	6' – 5"	7' – 3"	9' – 1"	8' – 6"	8' – 10"	10' – 0"	12' – 5"	13' – 3"	13' – 9"	15' – 5"	19' – 2"
36"	2' – 1"	4' – 5"	6' – 11"	7' – 3"	8' – 2"	10' – 2"	9' – 6"	9' – 11"	11' – 2"	13' – 10"	14' – 9"	15' – 3"	17' – 2"	21' – 3"
42"	2' – 4"	4' – 11"	8' – 6"	8' – 10"	9' – 11"	12' – 4"	11' – 7"	12' – 0"	13' – 6"	16' – 8"	17' – 9"	18' – 5"	20' – 8"	25' – 7"
48"	2' – 7"	5' – 5"	10' – 1"	10' – 5"	11' – 9"	N/A	13' – 7"	14' – 2"	15' – 10"	N/A	20' – 9"	21' – 6"	24' – 2"	N/A
54"	3' – 0"	5' – 11"	11' – 8"	12' – 1"	N/A	N/A	15' – 8"	16' – 3"	N/A	N/A	23' – 10"	24' – 8"	N/A	N/A
60"	3' – 3"	6' – 5"	13' – 3"	N/A	N/A	N/A	17' – 9"	N/A	N/A	N/A	26' – 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' – 0"
4" STD	4.500"	4.026"	19' – 8"
5" STD	5.563"	5.047"	34' – 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

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

(5) 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.

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	AUS	HAYS		137

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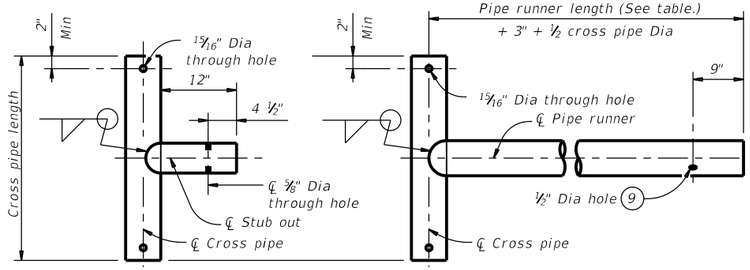
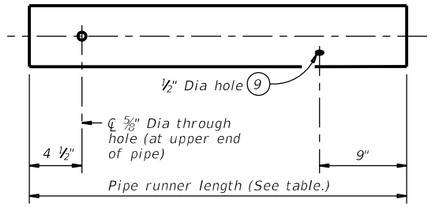


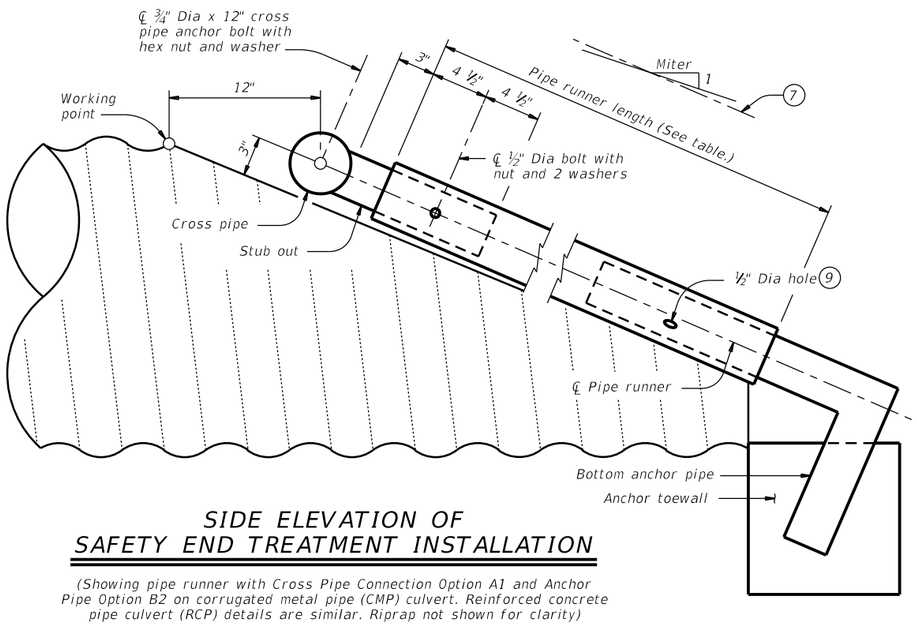
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



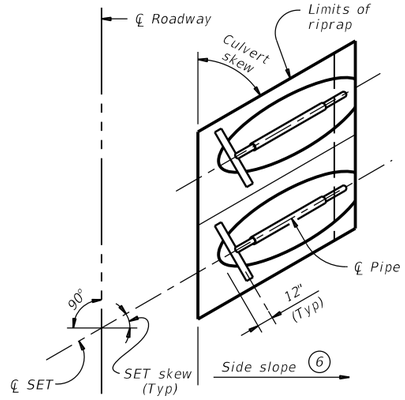
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

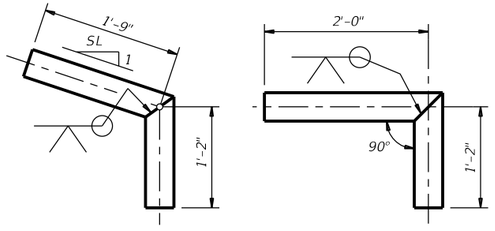


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

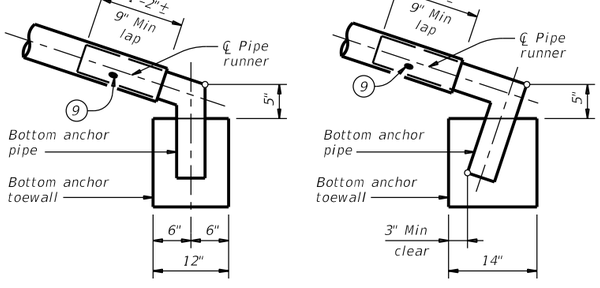


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

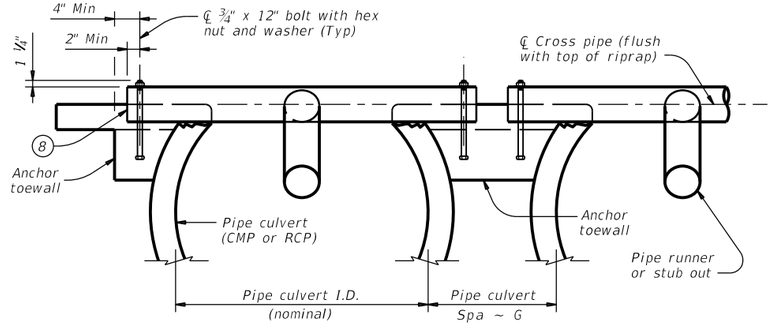
BOTTOM ANCHOR PIPE DETAILS (10)



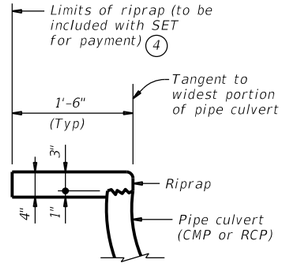
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

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

(6) Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1/2" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

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, cross pipes, and anchor pipes conforming to 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 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-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.

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

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

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

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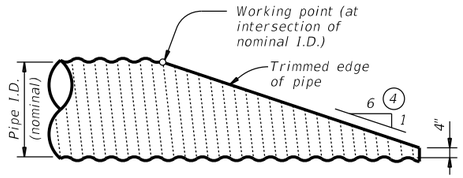
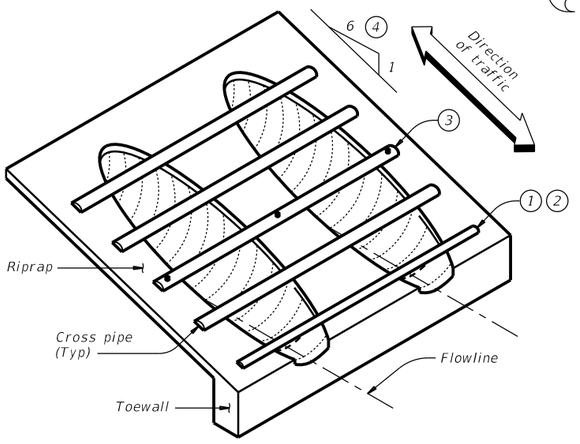


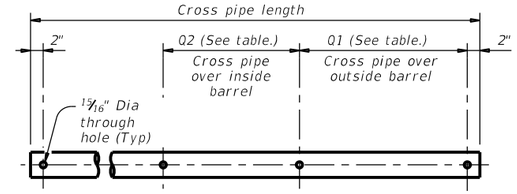
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

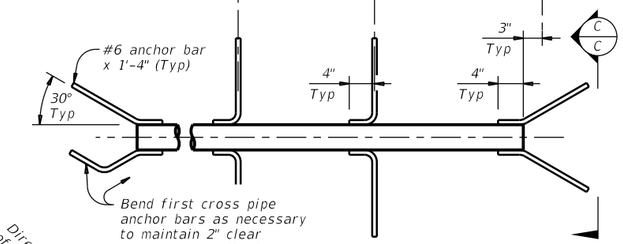
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



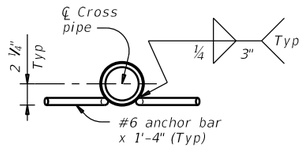
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

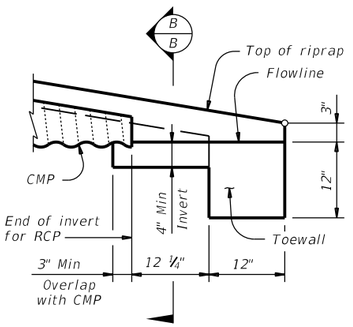


PIPE WITH ANCHOR BARS



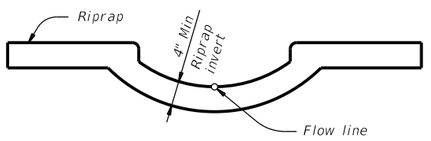
SECTION C-C

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.

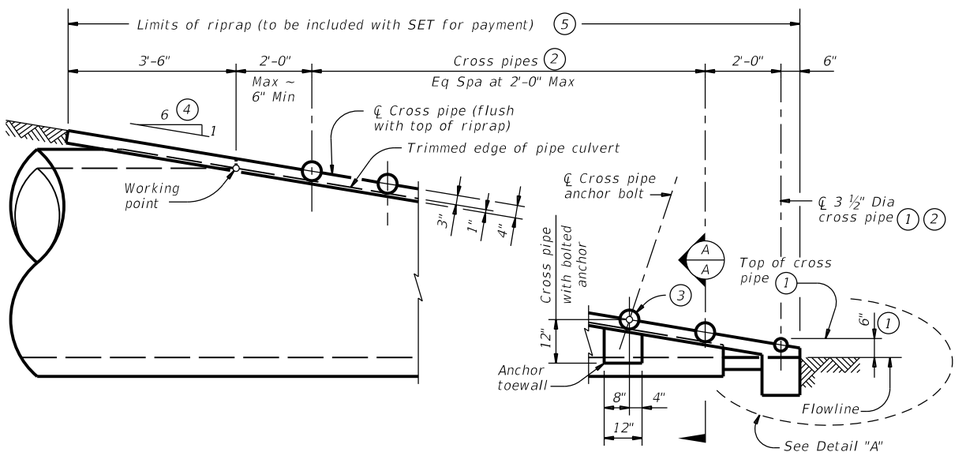
GENERAL NOTES:

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.

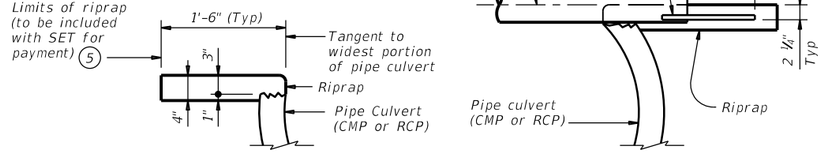
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

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



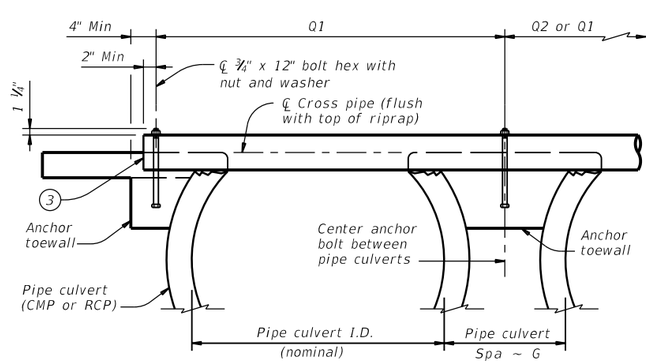
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

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



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

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

SETP-PD

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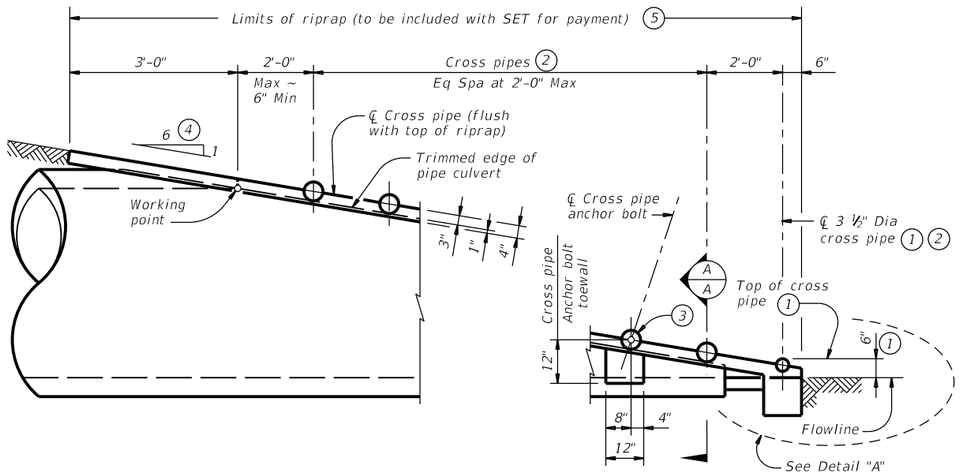


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(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 5/8"	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.

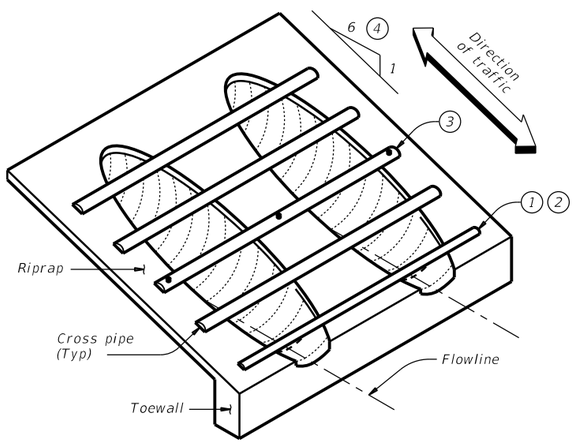
GENERAL NOTES:

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.

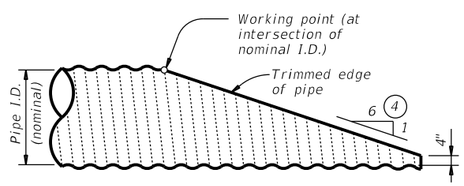
Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Pipe Runners.

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 cipe (RCP) culvert are similar.)

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

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

SETP-PD-A

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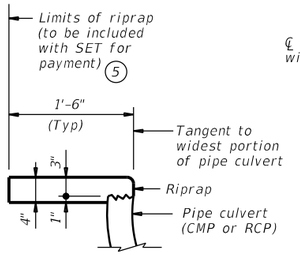
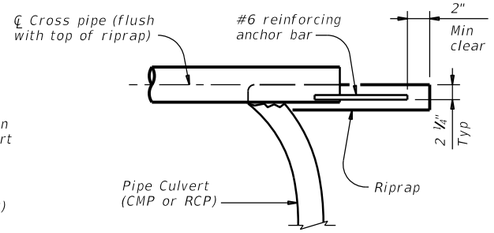
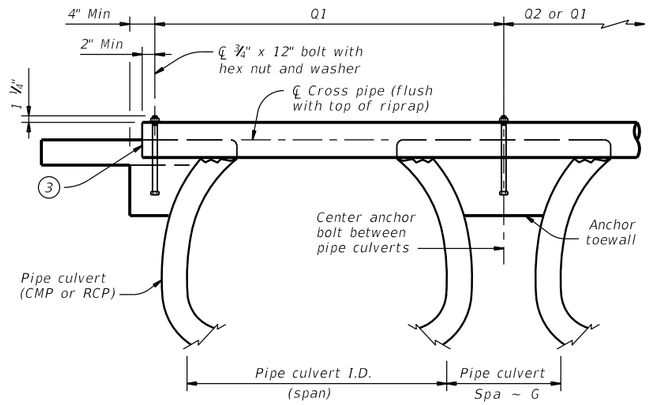


SHOWING TYPICAL PIPE CULVERT AND RIPRAP

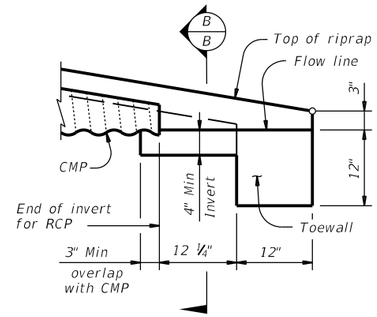


SHOWING CROSS PIPE WITH ANCHOR BAR



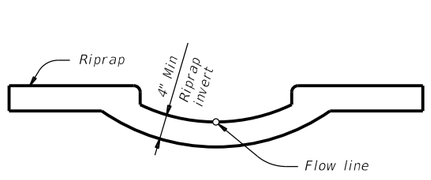
SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A



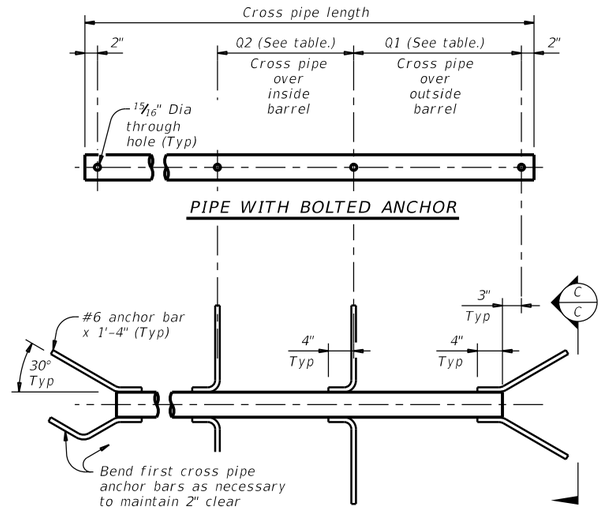
DETAIL "A"

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

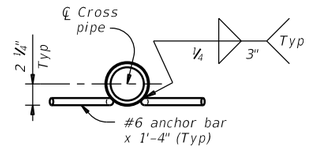


SECTION B-B

(Cross pipes not shown for clarity.)



PIPE WITH ANCHOR BARS



SECTION C-C

CROSS PIPE DETAILS

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

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

SETP-PD-A

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		141

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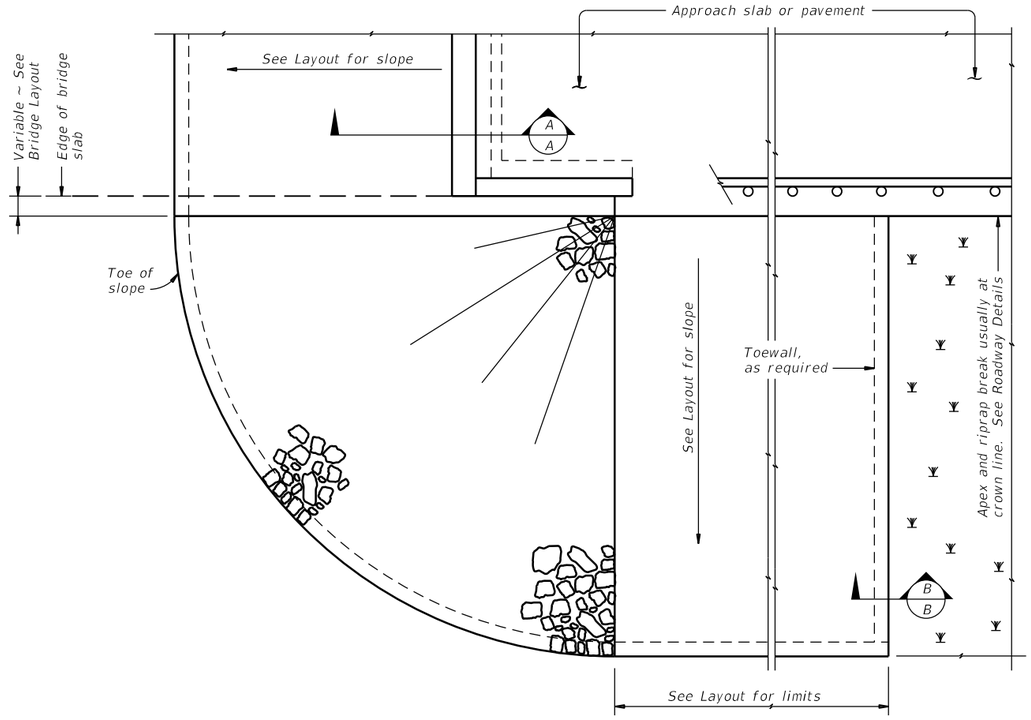
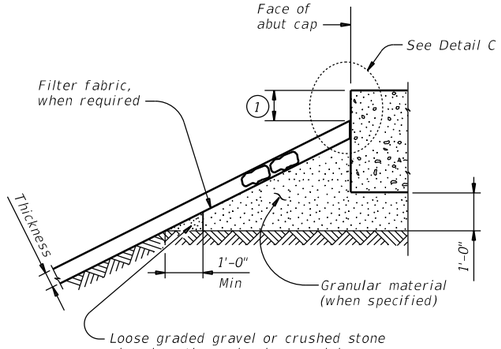
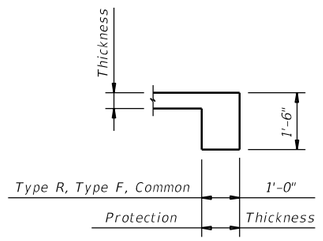


PLAN

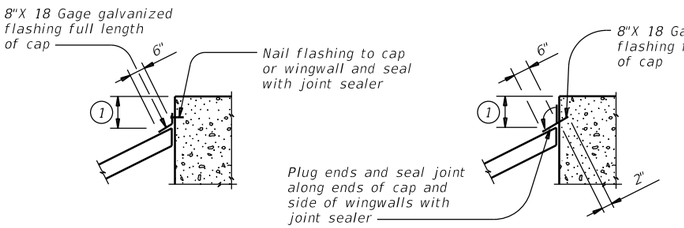


SECTION A-A AT CAP



SECTION B-B

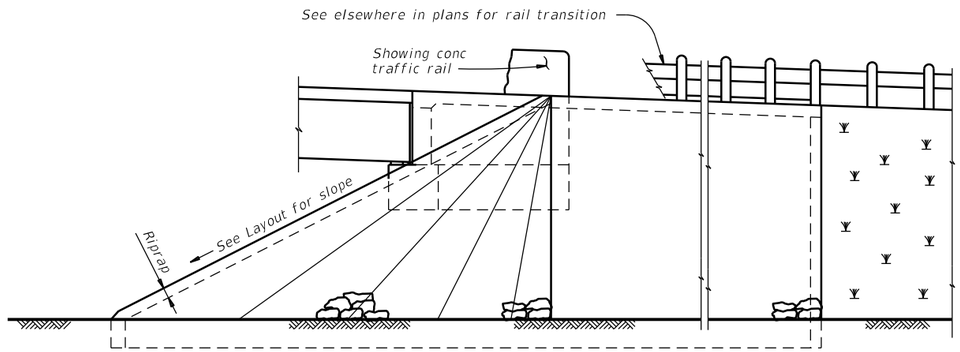
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C



ELEVATION

(1) Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

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Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES			
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY			
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	DIST	COUNTY		SHEET NO.			
	AUS	HAYS		142			

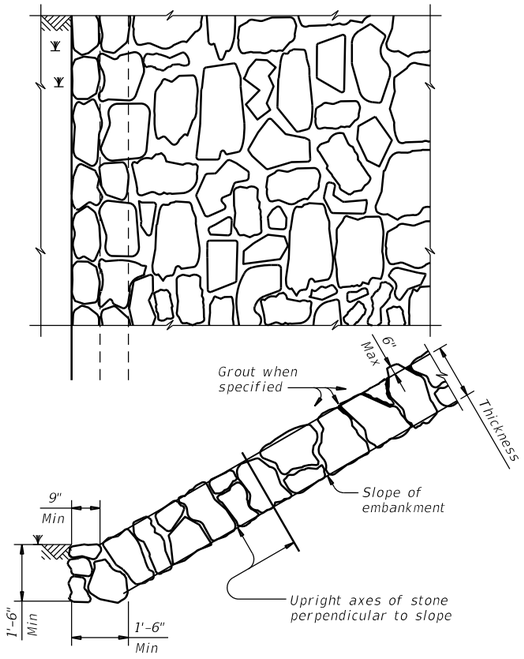


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

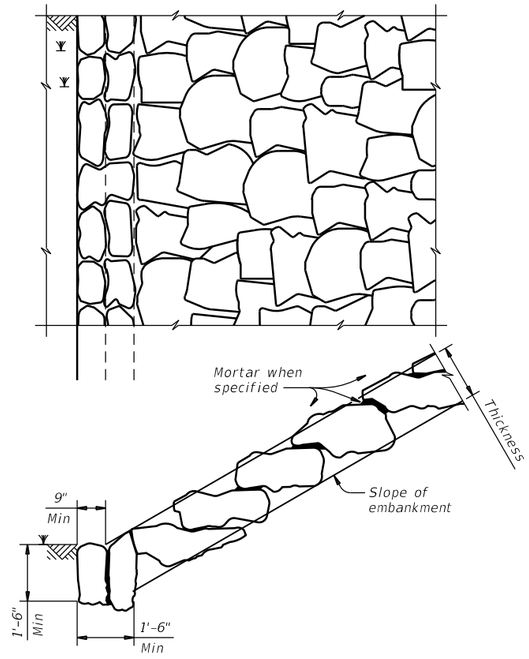


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

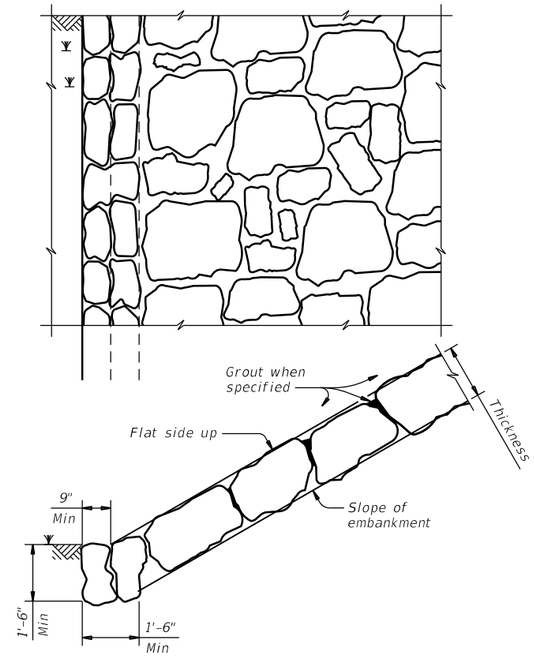


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

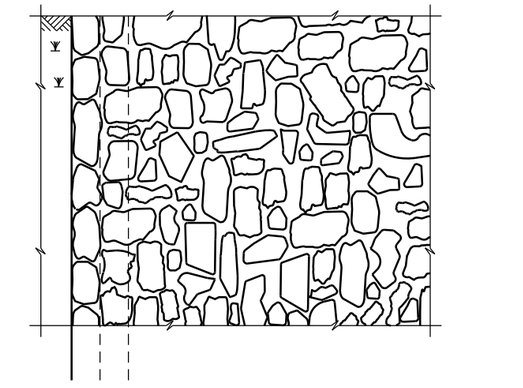


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

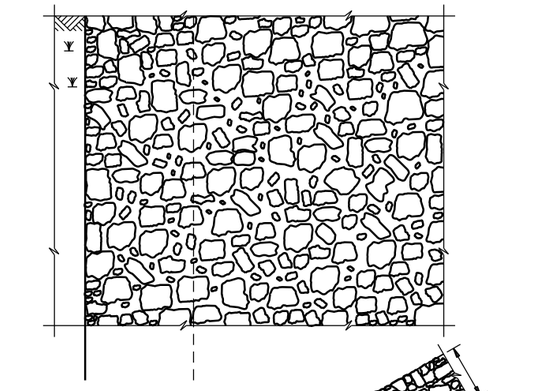


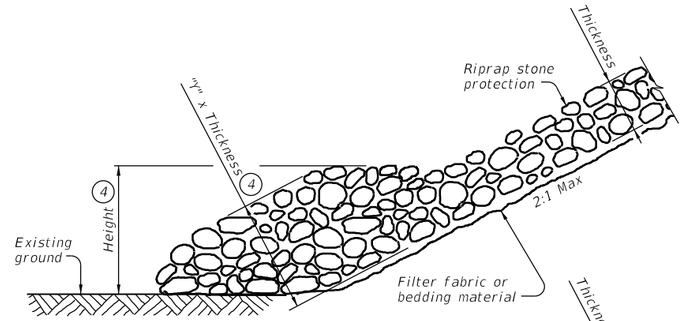
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

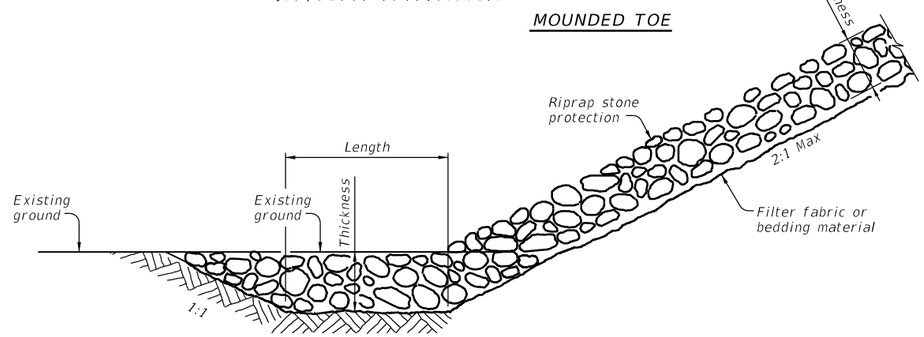
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(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

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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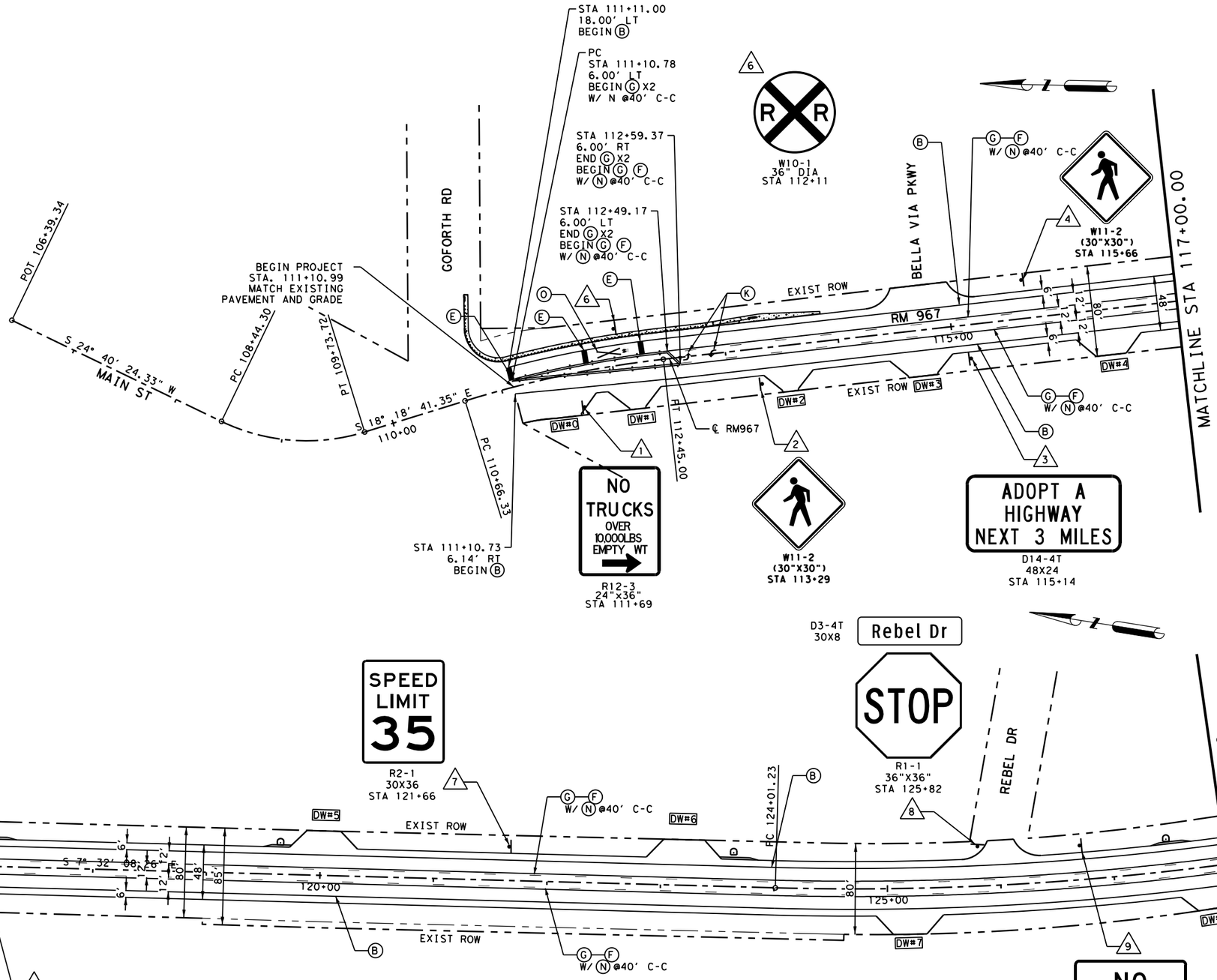

LEGEND

- (A) 6 IN WHT BRK
- (B) 6 IN WHT SLD
- (C) 8 IN WHT SLD
- (D) 12 IN WHT SLD
- (E) 24 IN WHT SLD
- (F) 6 IN YEL BRK
- (G) 6 IN YEL SLD
- (H) 24 IN YEL SLD
- (I) 6 IN WHT DOT
- (J) WORD "ONLY" WHT
- (K) ARROW WHT
- (M) RPM TYPE I-C
- (N) RPM TYPE II-A-A
- (O) RAILROAD X-ING WHT

(#) REMOVE EXIST AND INSTALL SIGN

0 50 100
SCALE: 1"=100' H

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12/2/2022

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BEGIN TO STA 128+00

SHEET 1 OF 7

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TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
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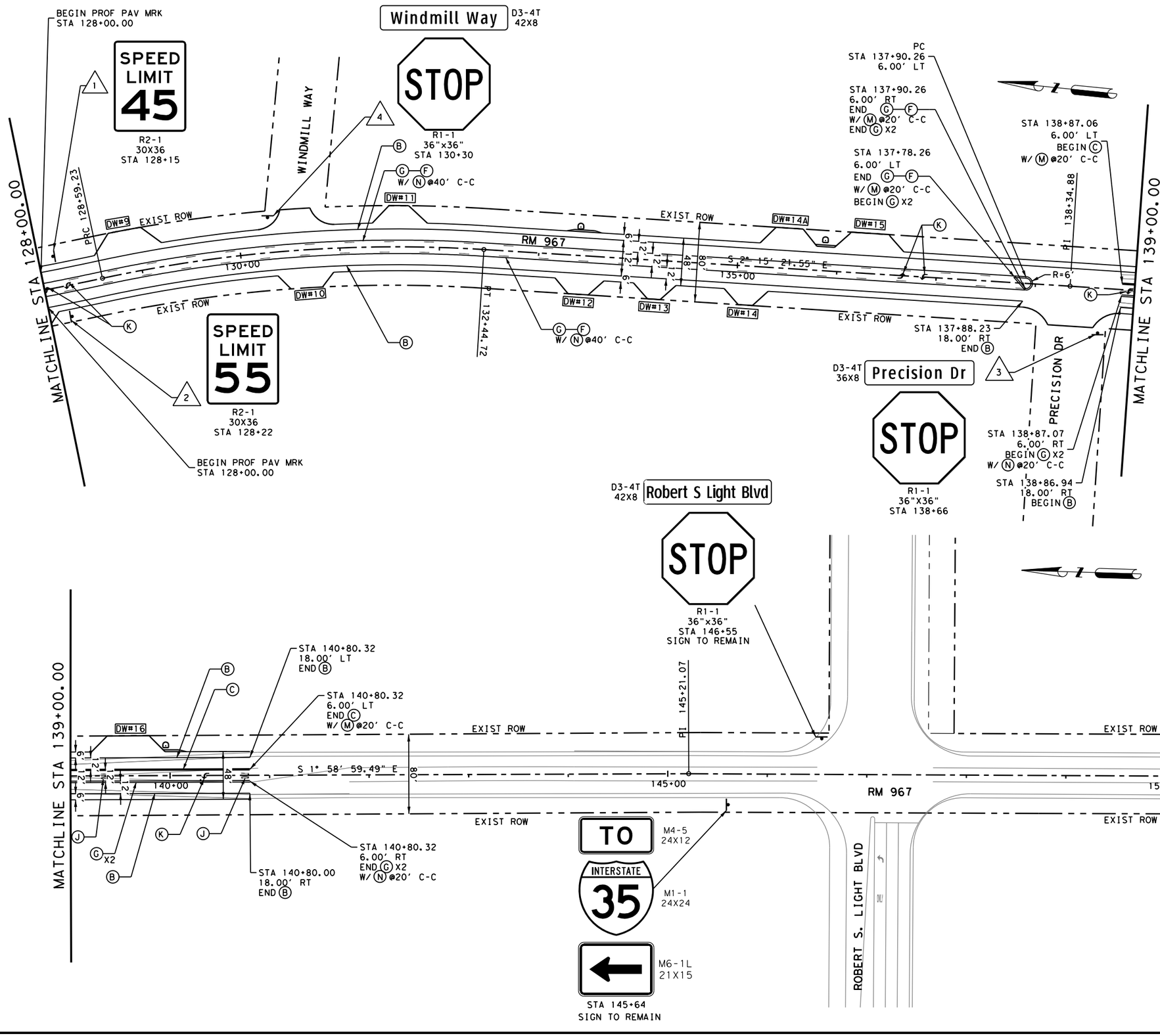

LEGEND

- (A) 6 IN WHT BRK
- (B) 6 IN WHT SLD
- (C) 8 IN WHT SLD
- (D) 12 IN WHT SLD
- (E) 24 IN WHT SLD
- (F) 6 IN YEL BRK
- (G) 6 IN YEL SLD
- (H) 24 IN YEL SLD
- (I) 6 IN WHT DOT
- (J) WORD "ONLY" WHT
- (K) ARROW WHT
- (M) RPM TYPE I-C
- (N) RPM TYPE II-A-A
- (O) RAILROAD X-ING WHT

△# REMOVE EXIST AND INSTALL SIGN

0 50 100
SCALE: 1"=100' H

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128+00 TO STA 150+00

SHEET 2 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
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CONT.	SECT.	JOB	HIGHWAY NO.
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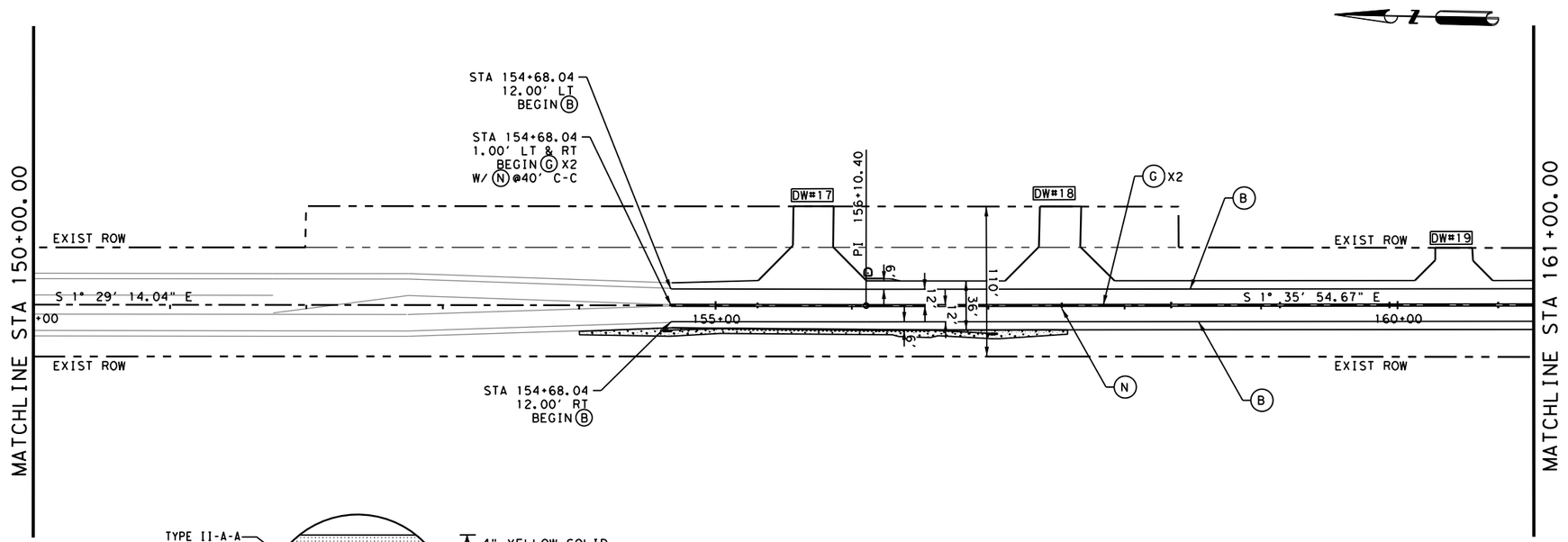

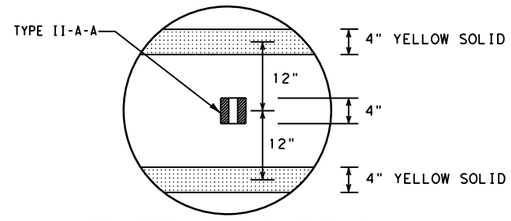

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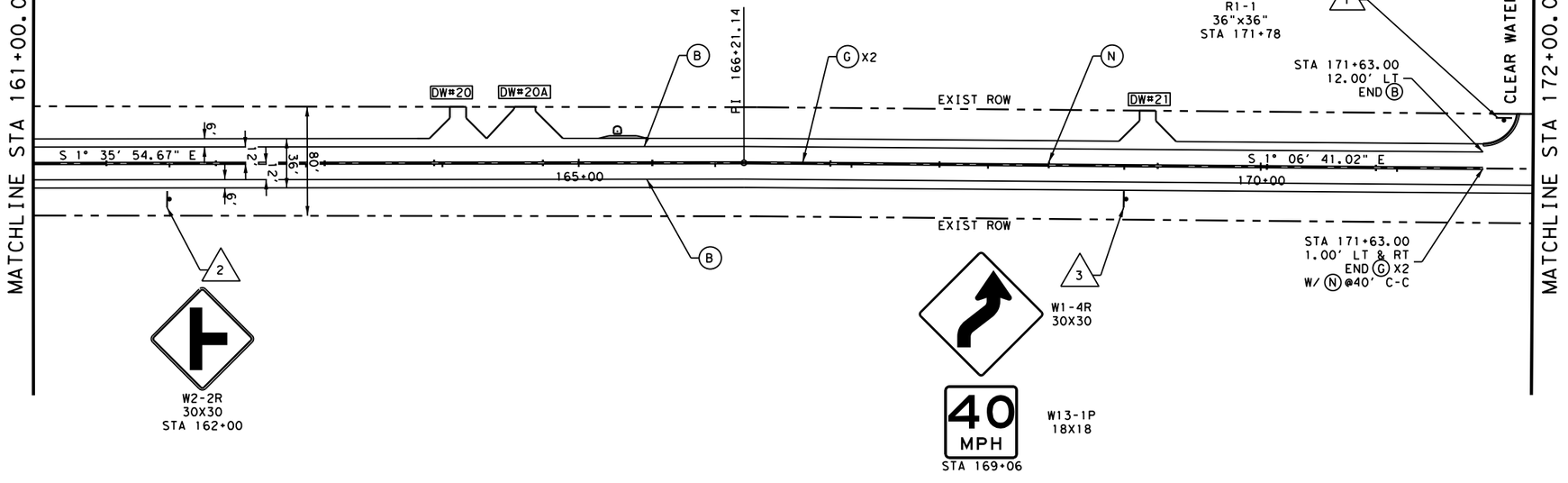
(STA 154+68.04 TO 177+10.23)



LEGEND

- (A) 6 IN WHT BRK
- (B) 6 IN WHT SLD
- (C) 8 IN WHT SLD
- (D) 12 IN WHT SLD
- (E) 24 IN WHT SLD
- (F) 6 IN YEL BRK
- (G) 6 IN YEL SLD
- (H) 24 IN YEL SLD
- (I) 6 IN WHT DOT
- (J) WORD "ONLY" WHT
- (K) ARROW WHT
- (M) RPM TYPE I-C
- (N) RPM TYPE II-A-A
- (O) RAILROAD X-ING WHT

△# REMOVE EXIST AND INSTALL SIGN

0 50 100
SCALE: 1"=100' H

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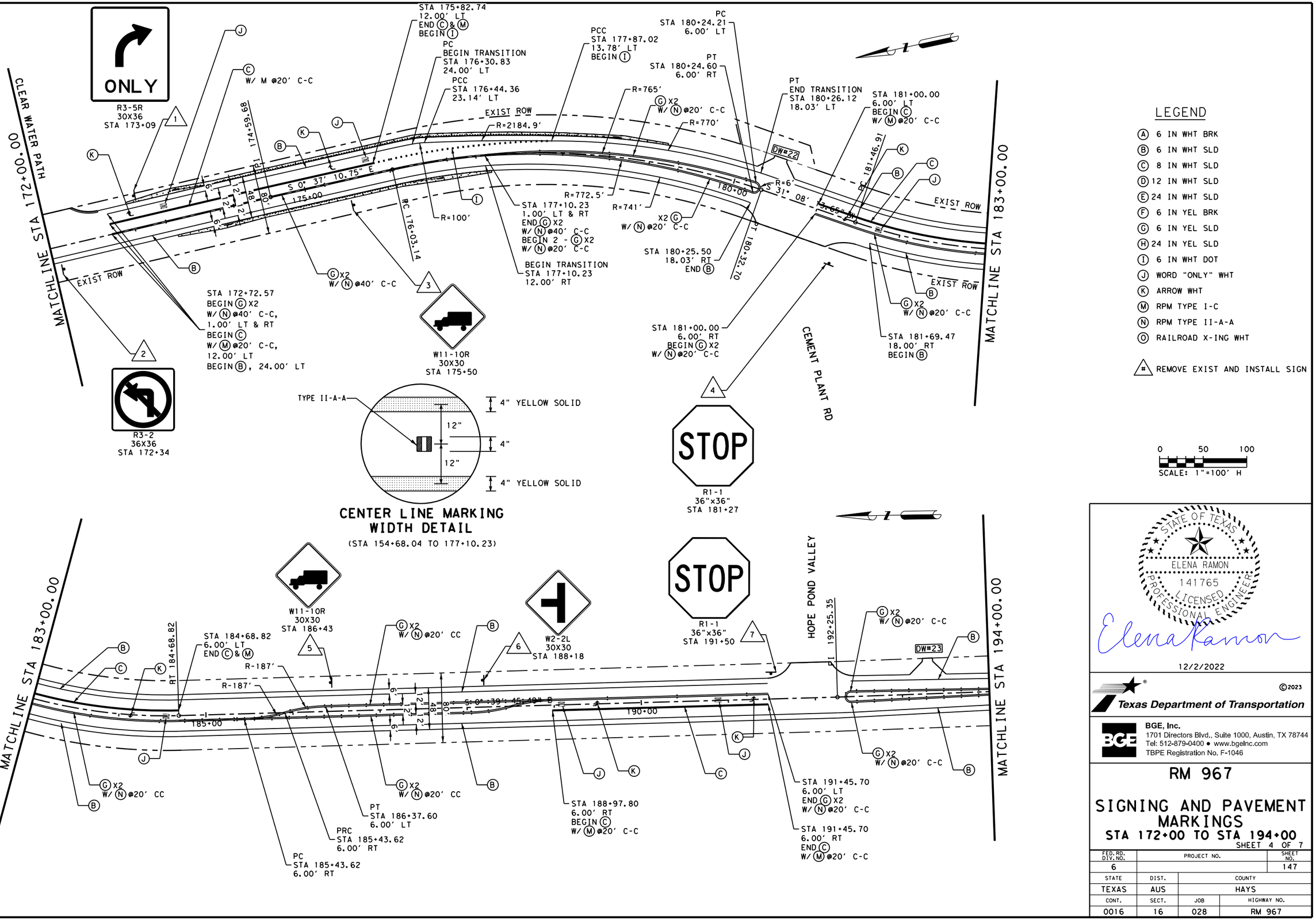

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FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
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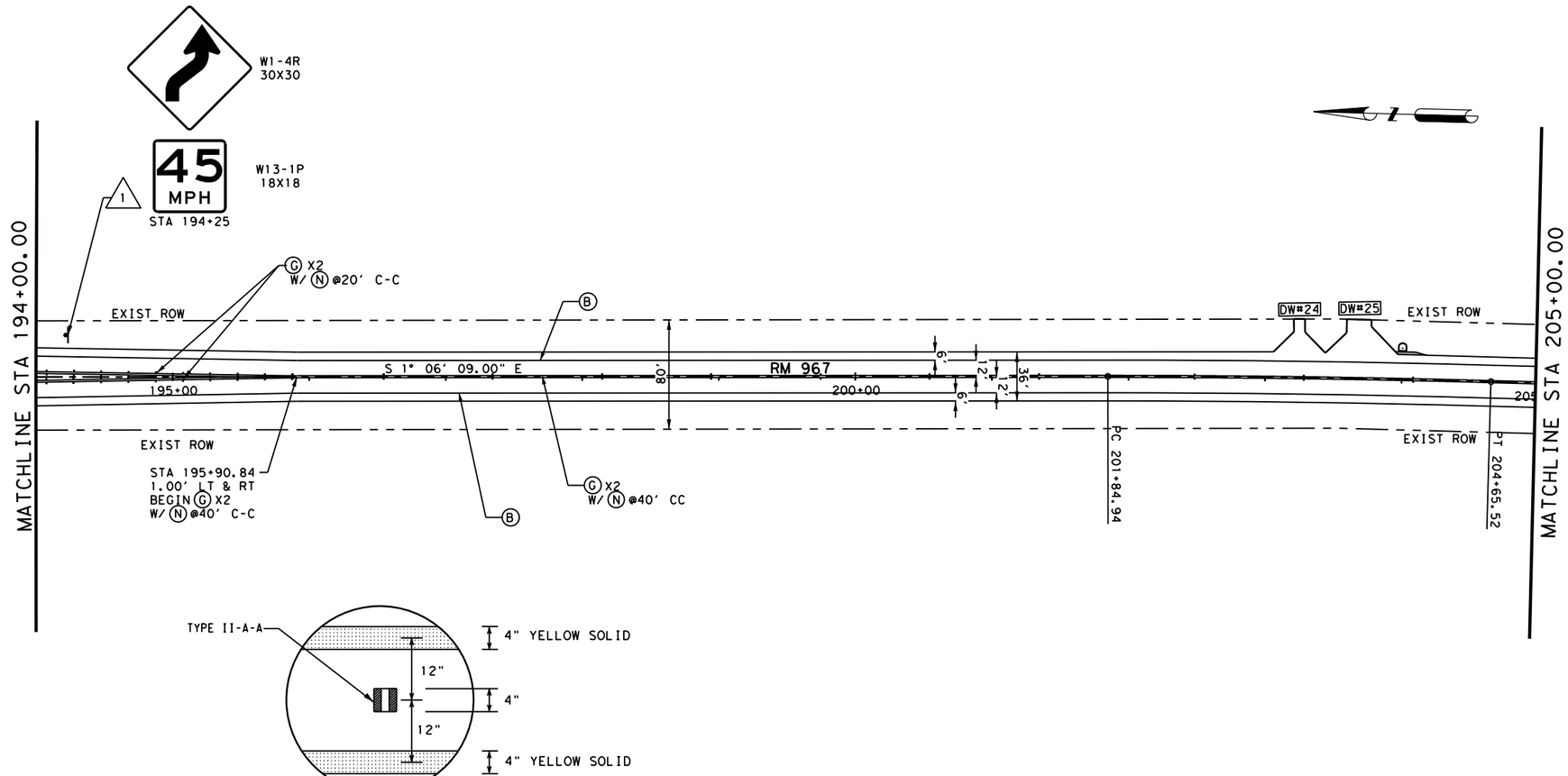

LEGEND

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- (B) 6 IN WHT SLD
- (C) 8 IN WHT SLD
- (D) 12 IN WHT SLD
- (E) 24 IN WHT SLD
- (F) 6 IN YEL BRK
- (G) 6 IN YEL SLD
- (H) 24 IN YEL SLD
- (I) 6 IN WHT DOT
- (J) WORD "ONLY" WHT
- (K) ARROW WHT
- (M) RPM TYPE I-C
- (N) RPM TYPE II-A-A
- (O) RAILROAD X-ING WHT

(#) REMOVE EXIST AND INSTALL SIGN

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SCALE: 1"=100' H

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SHEET 5 OF 7

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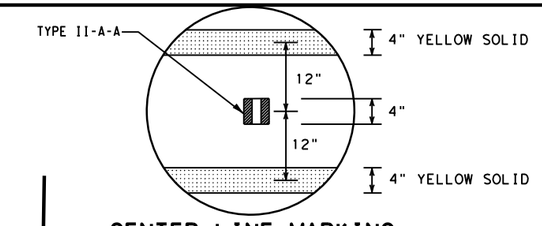

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(STA 195+90.84 TO 216+01.11)

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- (E) 24 IN WHT SLD
- (F) 6 IN YEL BRK
- (G) 6 IN YEL SLD
- (H) 24 IN YEL SLD
- (I) 6 IN WHT DOT
- (J) WORD "ONLY" WHT
- (K) ARROW WHT
- (M) RPM TYPE I-C
- (N) RPM TYPE II-A-A
- (O) RAILROAD X-ING WHT

△# REMOVE EXIST AND INSTALL SIGN

0 50 100

SCALE: 1"=100' H

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STA 216+00 TO STA 238+00

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CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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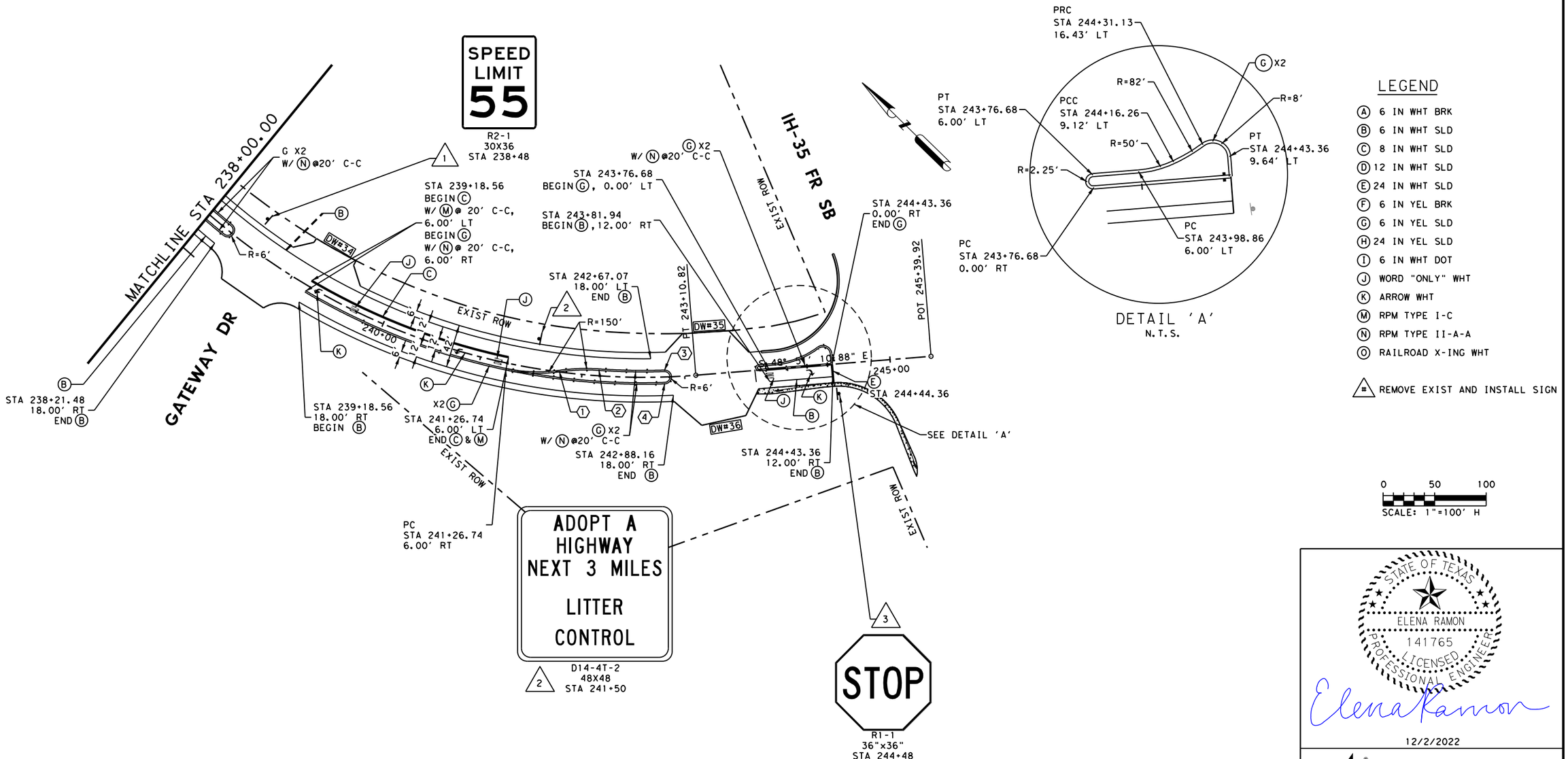

LEGEND

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- (B) 6 IN WHT SLD
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- (E) 24 IN WHT SLD
- (F) 6 IN YEL BRK
- (G) 6 IN YEL SLD
- (H) 24 IN YEL SLD
- (I) 6 IN WHT DOT
- (J) WORD "ONLY" WHT
- (K) ARROW WHT
- (M) RPM TYPE I-C
- (N) RPM TYPE II-A-A
- (O) RAILROAD X-ING WHT

△# REMOVE EXIST AND INSTALL SIGN

SCALE: 1"=100' H
0 50 100

1. PRC STA 241+77.78, 0.87' LT
2. PT STA 242+16.20, 6.00' LT
3. PC STA 242+80.37, 6.00' LT
4. PT STA 242+80.37, 6.00' RT

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SIGNING AND PAVEMENT MARKINGS
STA 238+00 TO END

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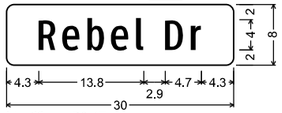
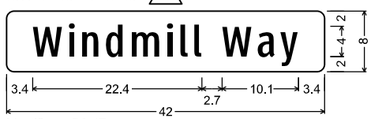
$STATUS$

SHT 1 OF 7 SIGN 8



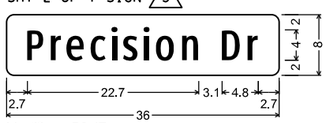
Identifier : D3-4T;
1.0" Radius, No border, Green on Green;
[Rebel Dr] White ClearviewHwy-2-W;

SHT 2 OF 7 SIGN 4



Identifier : D3-4T;
1.0" Radius, No border, Green on Green;
[Windmill Way] White ClearviewHwy-2-W;

SHT 2 OF 7 SIGN 3



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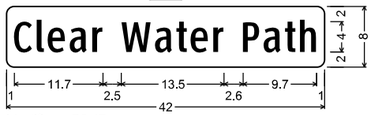
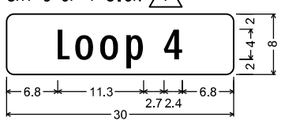
1.0" Radius, No border, Green on Green;
[Precision Dr] White ClearviewHwy-2-W;

SHT 3 OF 7 SIGN 1



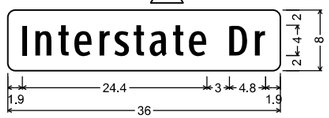
Identifier : D3-4T;
1.0" Radius, No border, Green on Green;
[Clear Water Path] White ClearviewHwy-2-W 66% spacing;

SHT 3 OF 7 SIGN 1



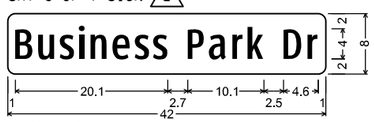
Identifier : D3-4T;
1.0" Radius, No border, Green on Green;
[Loop 4] White ClearviewHwy-2-W;

SHT 6 OF 7 SIGN 1



Identifier : D3-4T;
1.0" Radius, No border, Green on Green;
[Interstate Dr] White ClearviewHwy-2-W;

SHT 6 OF 7 SIGN 2



Identifier : D3-4T;
1.0" Radius, No border, Green on Green;
[Business Park Dr] White ClearviewHwy-2-W 77% spacing;

SHT 7 OF 7 SIGN 2

Identifier : D14-4T-2_48x48;
3.0" Radius, 1.0" Border, White on Blue;
[ADOPT A] C; [HIGHWAY] C; [NEXT 3 MILES] C;
3.0" Radius, 1.0" Border, White on Blue;
[LITTER] C; [CONTROL] C;

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

12/2/2022

Texas Department of Transportation

BGE, Inc.
1701 Directors Blvd., Suite 1000, Austin, TX 78744
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

RM 967

SIGN DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			151
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

$STATUS$
PLOTDRIVER: pdf.pltcfg
FILE:G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\08-SPMD\SIGN_DTL_01.dgn
DATE:12/2/2022 11:57:36 AM USER:RM 967 PENTABLE: $PENTBLS$

DATE: 12/2/2022 11:57:37 AM
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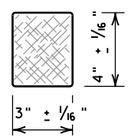
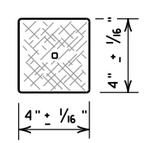
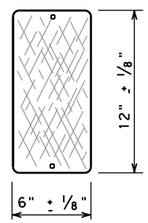
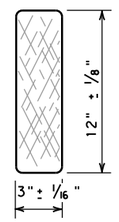
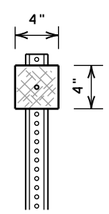
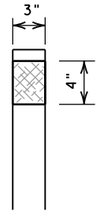
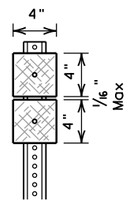
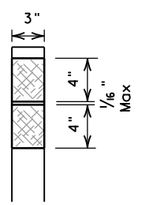
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

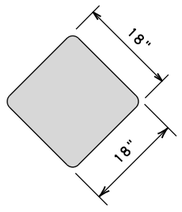
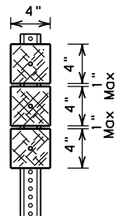
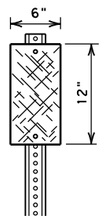
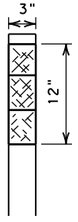
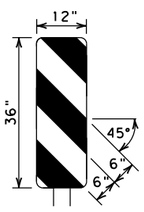
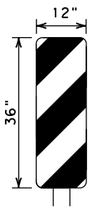
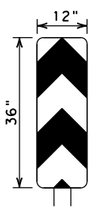
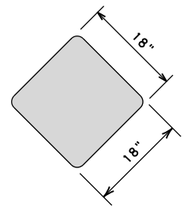
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

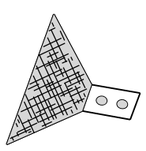
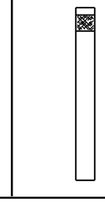
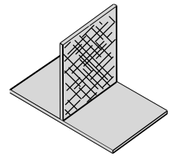
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

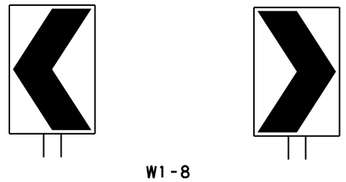
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

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

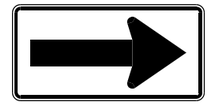


SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

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



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

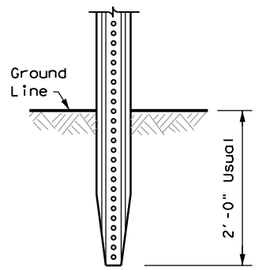
FILE: dam1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AUS	HAYS		152

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

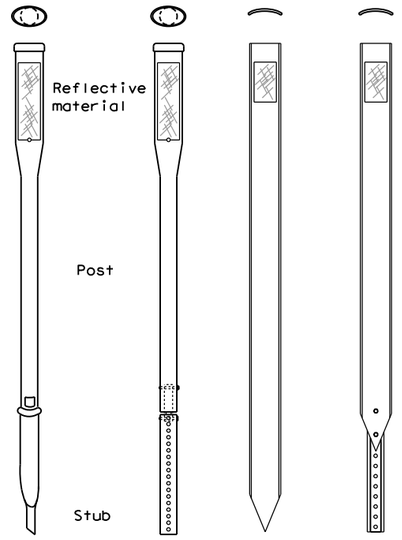


NOTES

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.

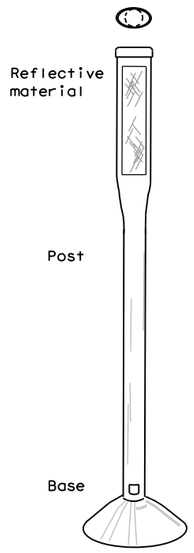
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



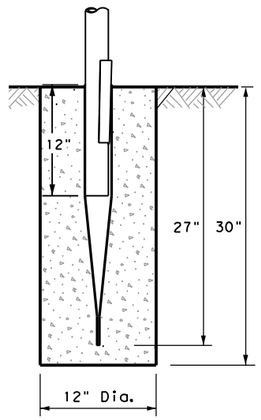
SURFACE MOUNT

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.

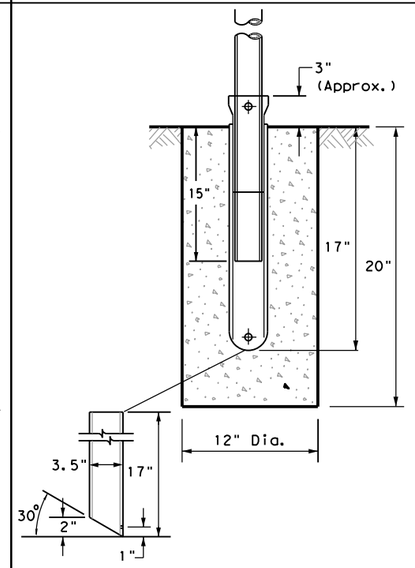
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

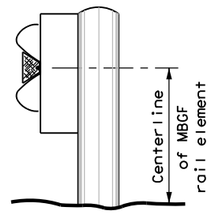
NOTE

1. Install per manufacturer's recommendations.

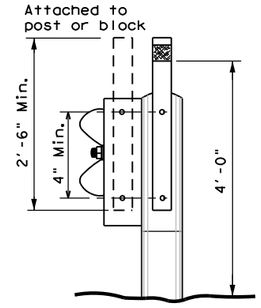
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

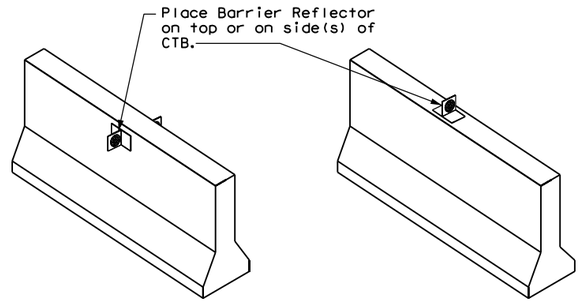
GF1



GF2



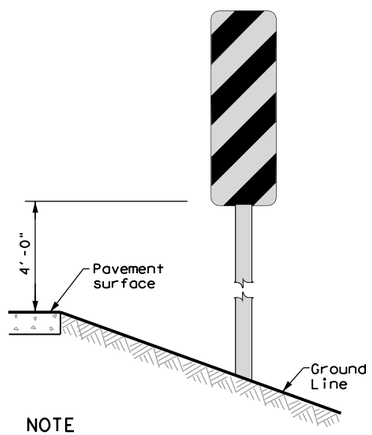
CONCRETE TRAFFIC BARRIER (CTB)



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.

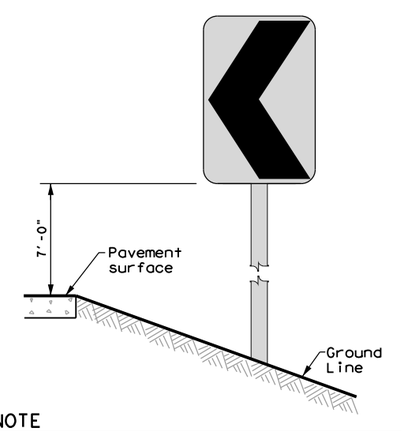
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

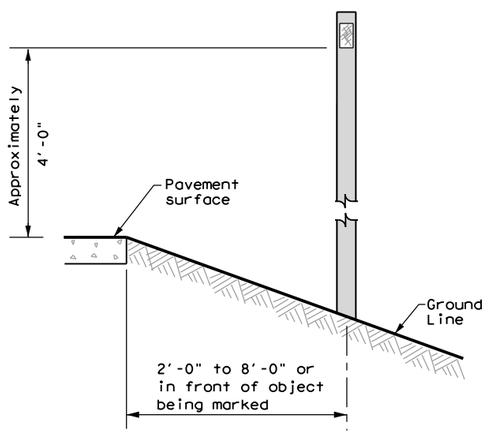
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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	0016	16	028	RM 967
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AUS	HAYS		153

20B

DATE: 12/2/2022 11:57:37 AM
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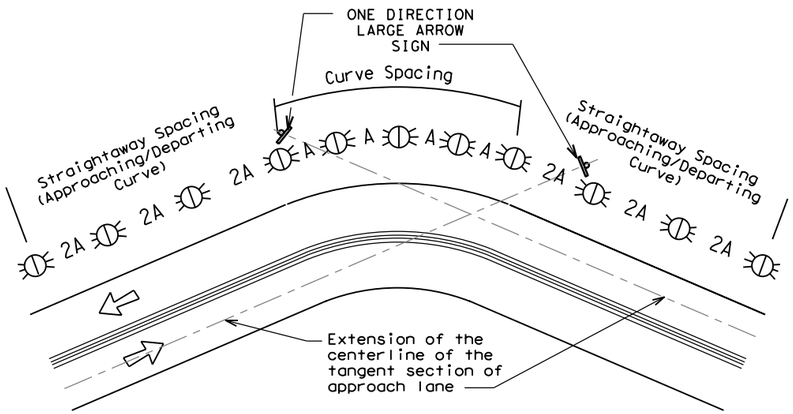
MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

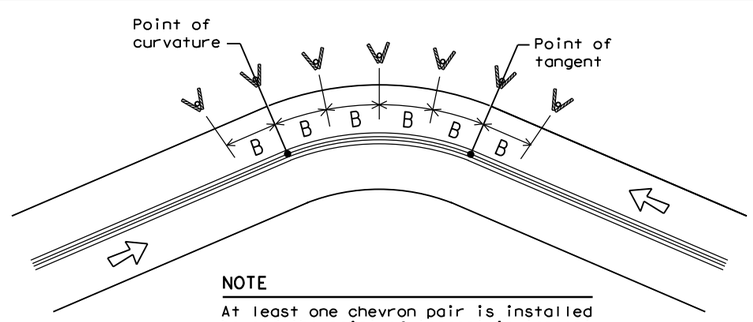
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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	0016	16	028	RM 967
3-15 8-15 8-15 7-20	DIST	COUNTY		SHEET NO.
	AUS	HAYS		154

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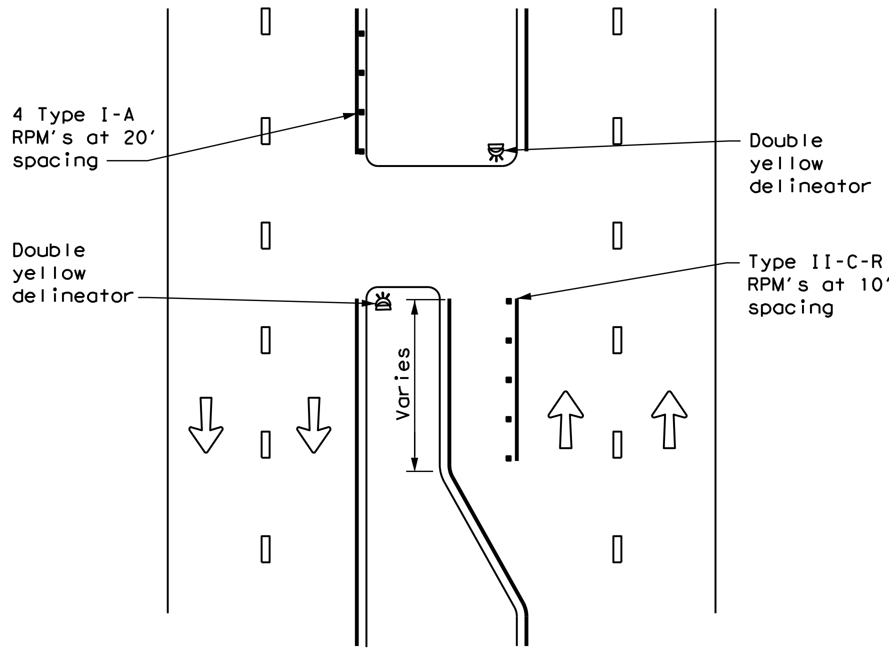
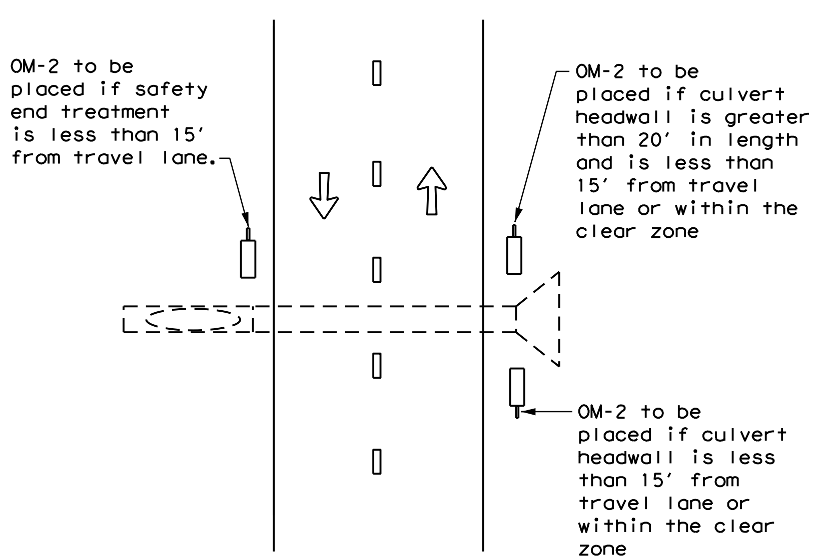
CROSSOVERS



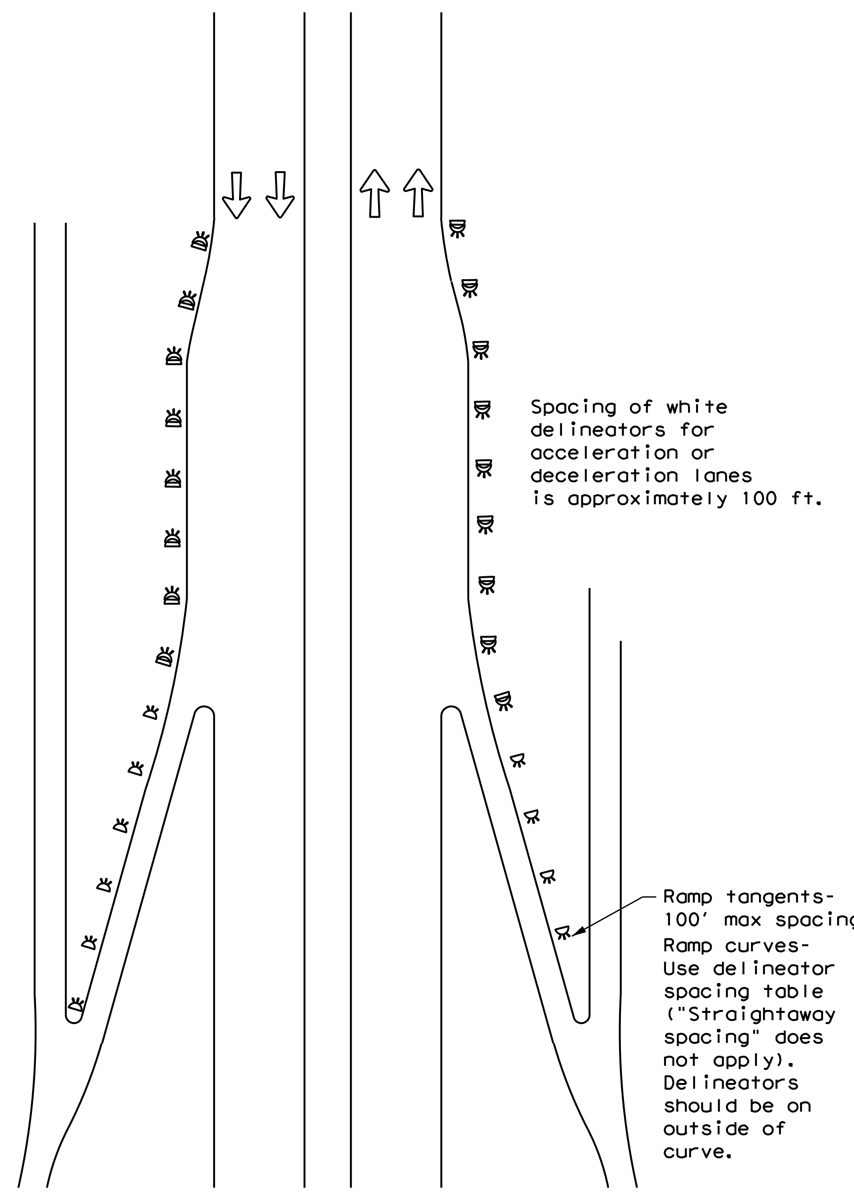
DETAIL 1

FOR CULVERTS WITHOUT MBGF



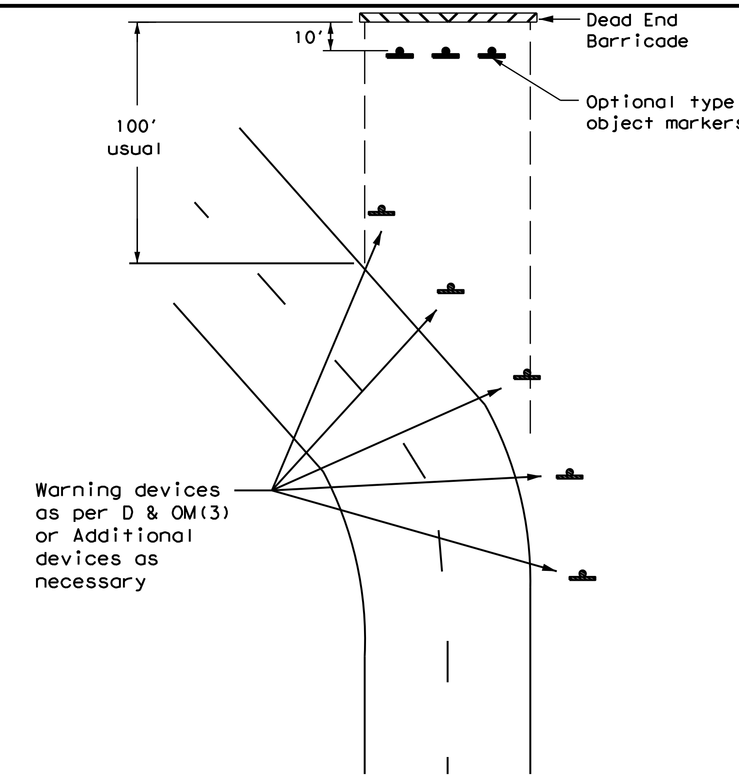
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



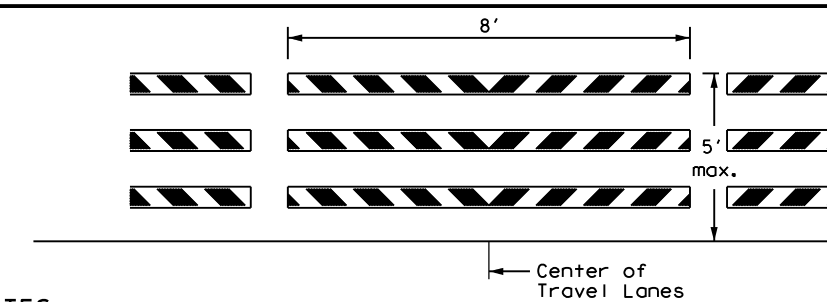
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND

Symbol	Description
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT		
August 2004	CONT	SECT	JOB	HIGHWAY		
REVISIONS 3-15 7-20	0016	16	028	RM 967		
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20D

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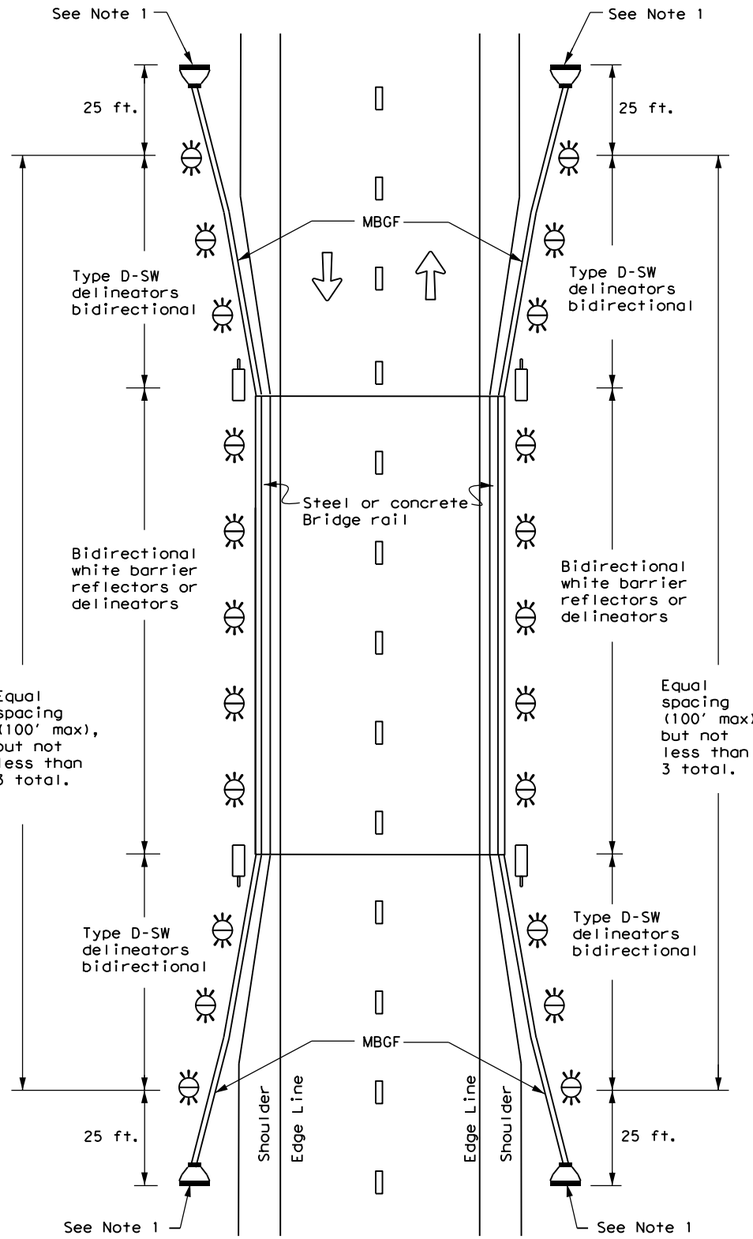
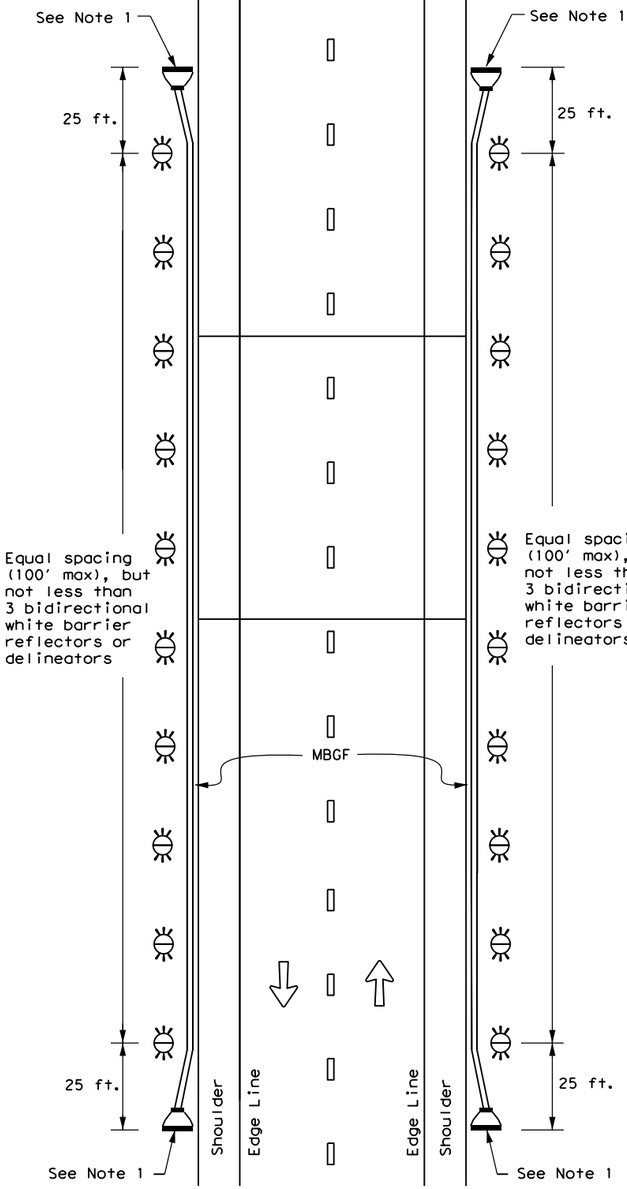
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. 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.

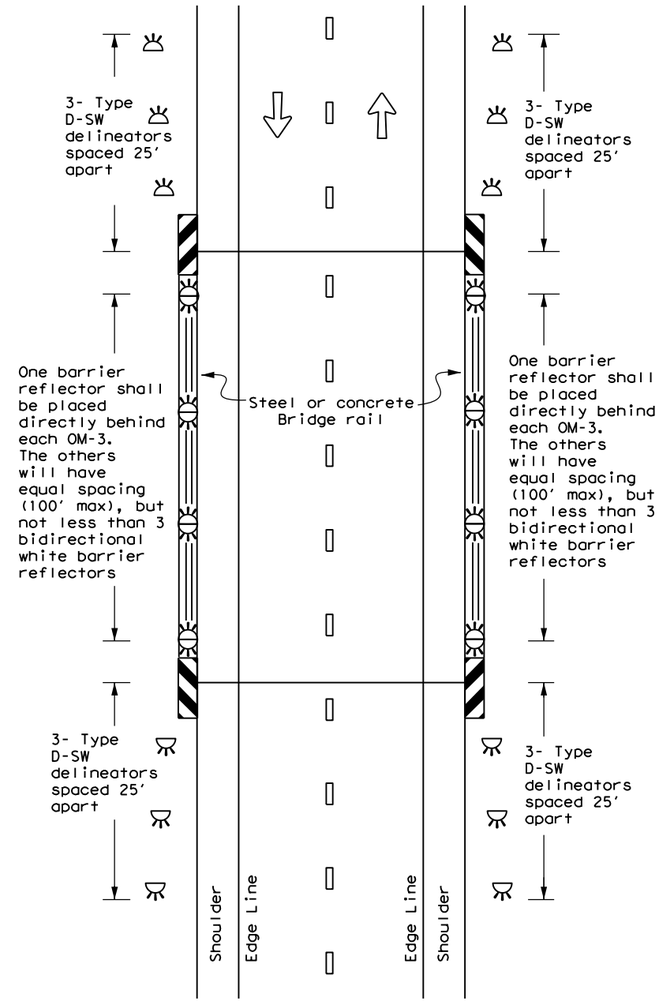
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. 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.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



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(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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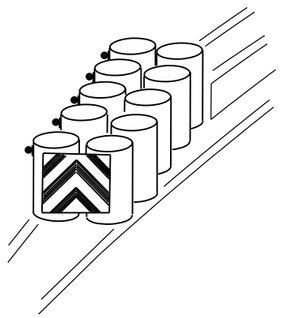
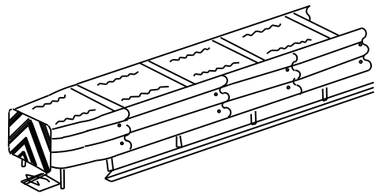
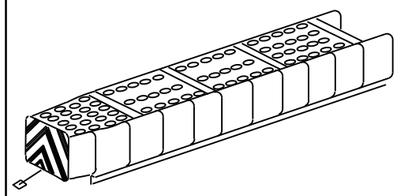
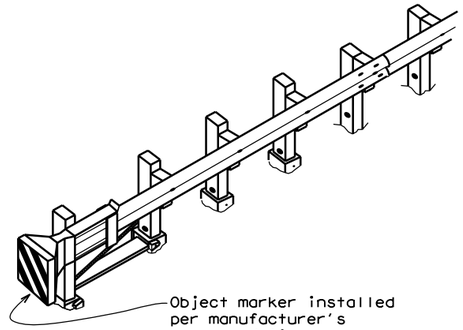
7-20	DIST	COUNTY		SHEET NO.
	AUS	HAYS		156

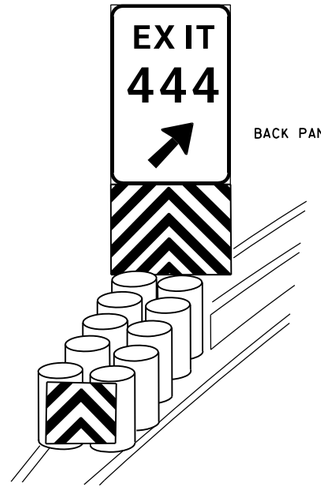
20E

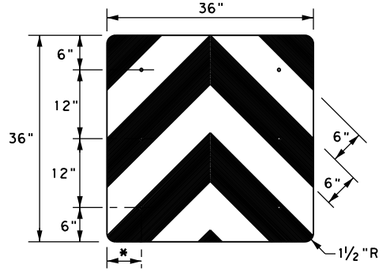


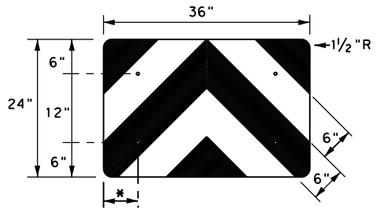




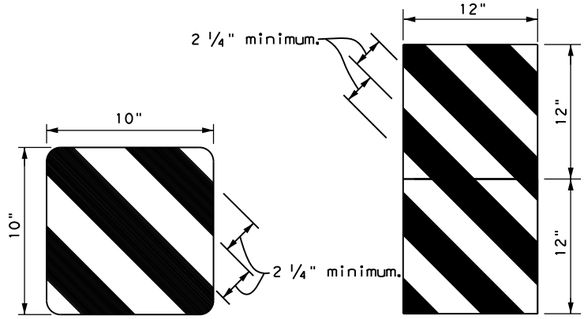




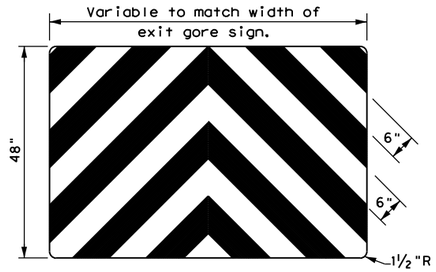


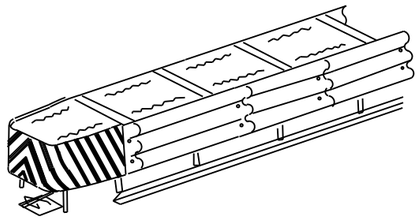


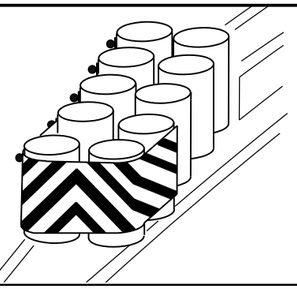
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

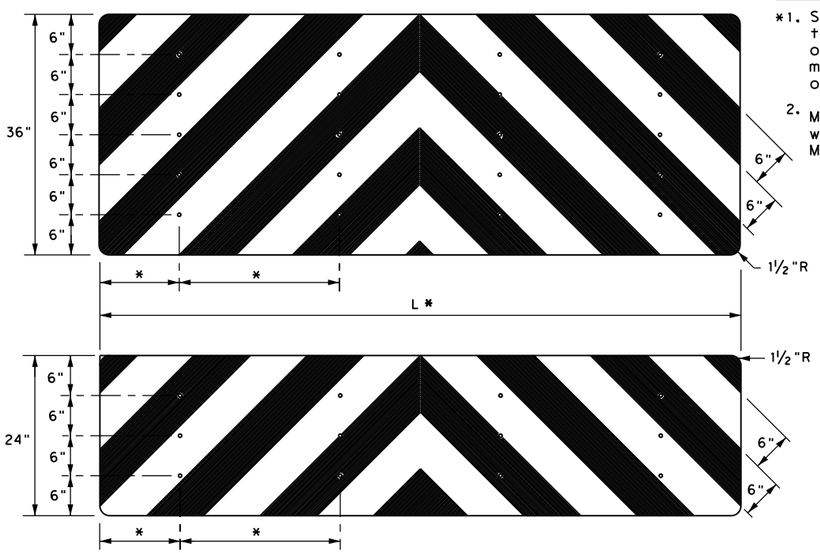


OBJECT MARKERS SMALLER THAN 3 FT^2









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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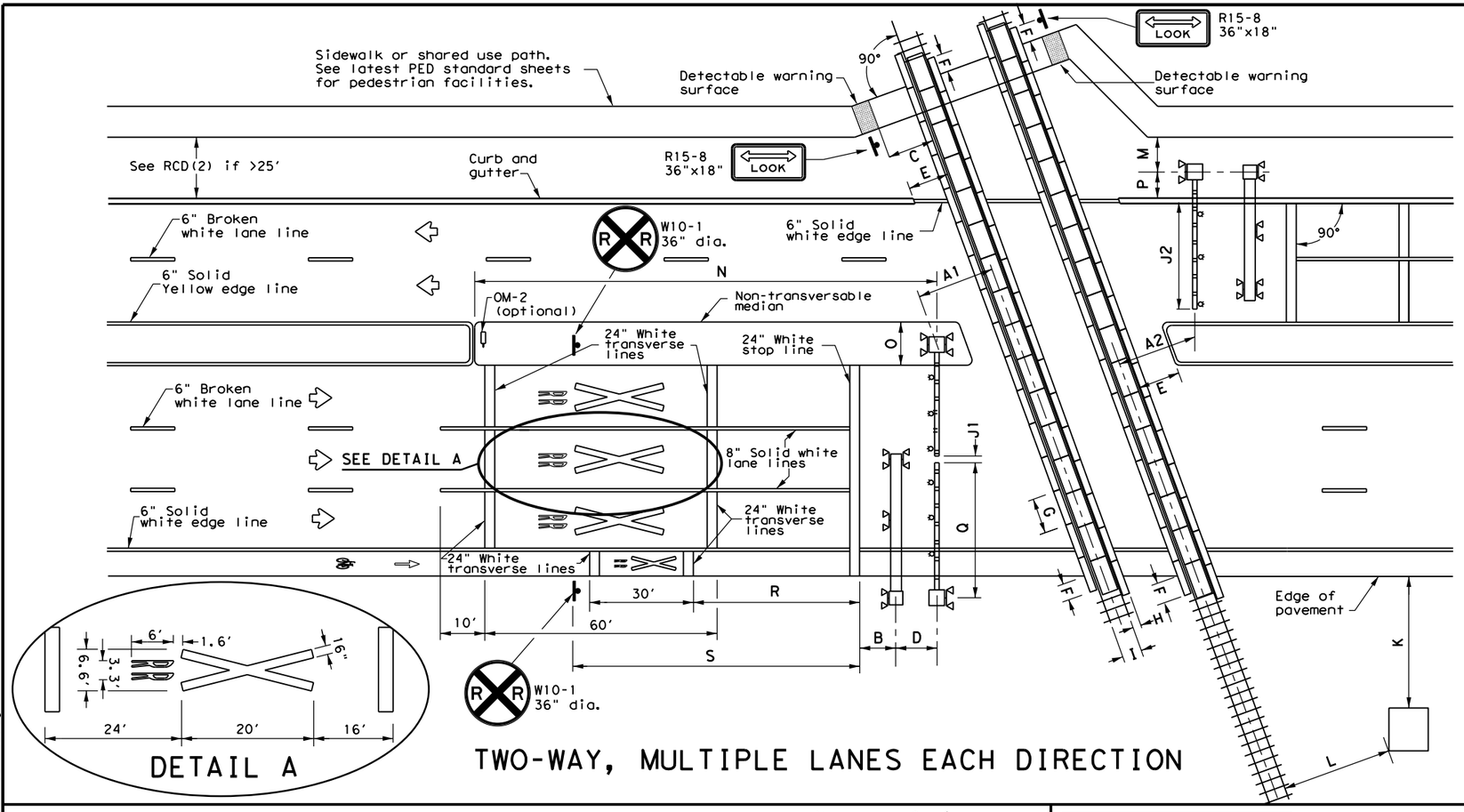


DETAIL A

TWO-WAY, MULTIPLE LANES EACH DIRECTION

NOTES

A1: Center of RR mast to center of rail: 12' minimum, 15' typical.

A2: Tip of gate to center of rail: 12' minimum, 15' typical.

B: Center of mast (cantilever, gate, or mast flasher) of nearest active traffic control device to stop line: 8' (NOTE: Stop line may be moved as needed, but should be at least 8' back from gates, if present).

C: Near edge of detectable warning surface to nearest rail: 12' minimum.

D: Center of gate mast to center of cantilever mast: 6' typical. NOTE: Cantilever may be located in front or behind gates.

E: Edge of median or curb to nearest rail: 10' typical. NOTE: Design median edge to be parallel with rail.

F: Edge of planking panel from edge of pavement or sidewalk: 3' minimum. NOTE: Field panels need not be in line with gauge panels.

G: Length of panels along rail: 8' typical.

H: Width of field panel: 2' typical (check with railroad company).

I: Distance between rails: 4'- 8'1/2".

J1: Tip of gate to tip of gate: 2' maximum.

J2: 90% of traveled roadway to be covered by gate.

K: Nearest edge of RR cabinet from edge of pavement: 30' typical. NOTE: Cabinet not required to be parallel to edge of pavement.

L: Nearest edge of RR cabinet from nearest rail: 25' typical.

M: Center of RR mast to edge of sidewalk: 6' minimum.

N: Center of gate mast to leading edge of non-traversable median: 100' minimum to qualify as a Quiet Zone SSM. NOTE: 60'will suffice if there is a street intersection within the 100' and all street intersections within 60' are closed.

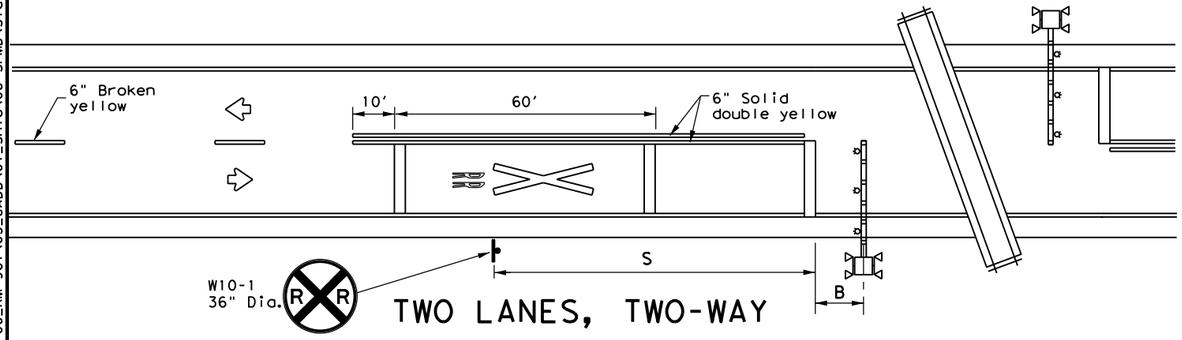
O: Width of median for RR gate assembly: 8'-6" minimum, 10' typical when using median gates. NOTE: Center of gate mast minimum 4'-3" from face of curb.

P: Center of RR mast to face of curb: 5'-3" minimum. Center of RR mast to edge of pavement (with shoulder): 7' minimum. Center of RR mast to edge of pavement (no shoulder): 9'-3" minimum. NOTE: Final location determined by the railroad company.

Q: Gate length: 28' or less typical, but railroad company may allow up to 32' under special circumstances.

R: Stop line to first RR Crossing transverse line (bike lane): 50' typical.

S: Stop line to GRADE CROSSING ADVANCE WARNING (W10-1) sign and adjacent RR Crossing pavement markings. See Table 1. See RCD(2) for other signs.



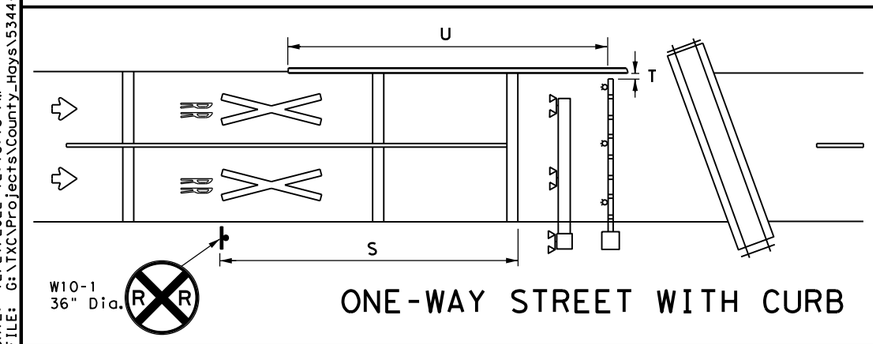
TWO LANES, TWO-WAY

TABLE 1	
Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

LEGEND	
	Sign
	Object Marker
	Traffic Flow
	Cantilever
	Gate Assembly
	Mast Flasher Pair

GENERAL NOTES

1. Medians and curbs must be non-traversable to qualify as a Quiet Zone Supplementary Safety Measure (SSM). Non-traversable curbs in Quiet Zones are 6" tall minimum and used on roadways where speed does not exceed 40 mph.
2. Raised pavement markers may be used to supplement striping. See PM(2) and PM(3) standard sheets.
3. Medians preferred whenever possible to prevent vehicles from driving around gates.
4. Longitudinal edge striping may be continued thru crossing as needed. Illumination may also be considered for nighttime visibility.
5. See SMD standard sheets for sign mounting details.
6. See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.

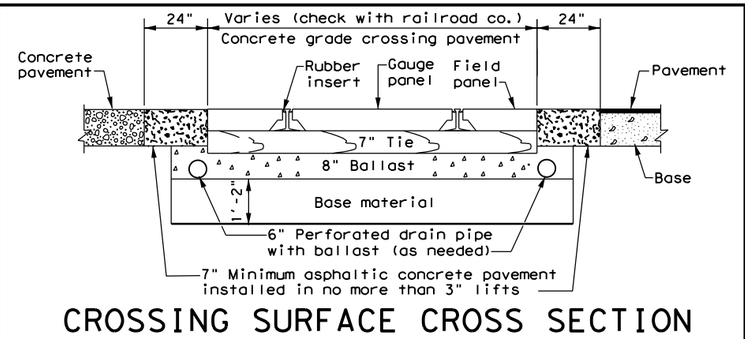


ONE-WAY STREET WITH CURB

NOTES

T: Tip of gate to edge of curb: 1' maximum for Quiet Zone SSM, 90% of traveled way covered by gates for all other locations.

U: Non-traversable curb length from gate: 100' minimum for a Quiet Zone SSM, 10' minimum for all other locations.



CROSSING SURFACE CROSS SECTION

Texas Department of Transportation

Traffic Safety Division Standard

RAILROAD CROSSING DETAILS SIGNING, STRIPING, AND DEVICE PLACEMENT RCD(1)-22

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©TxDOT November 2022	CONT	SECT	JOB	HIGHWAY
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11-22	AUS	HAYS		158

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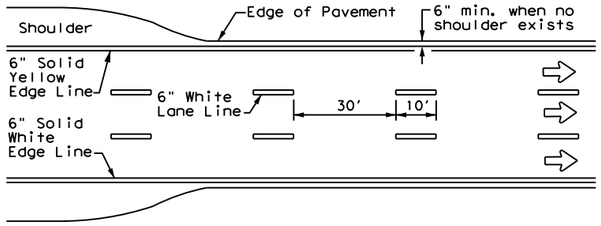
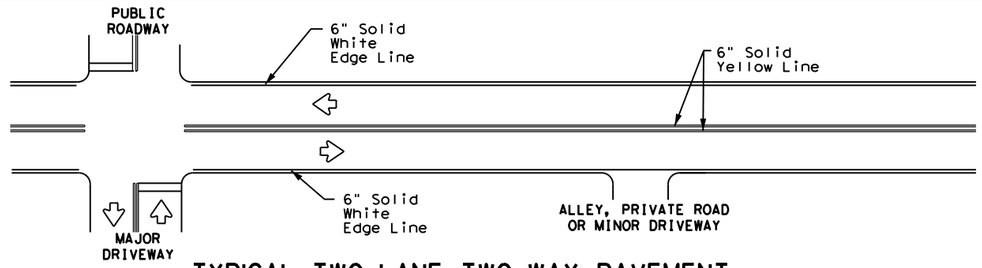
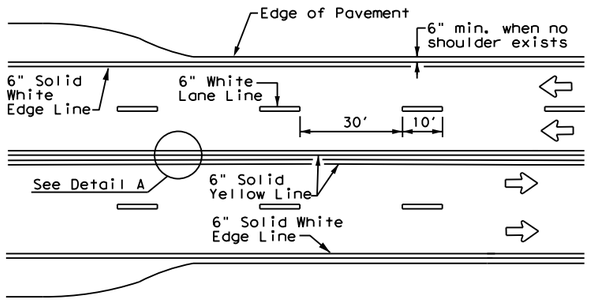
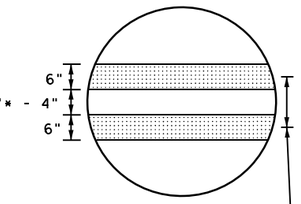


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS





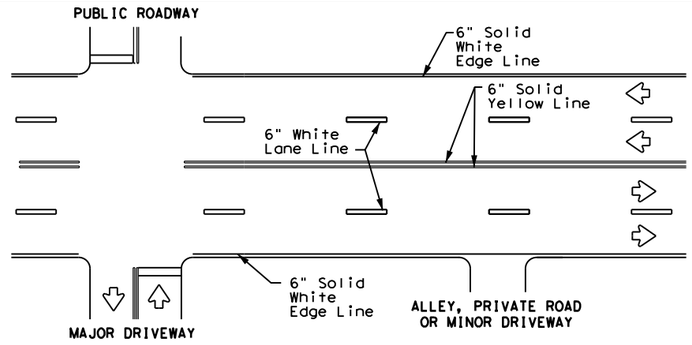
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

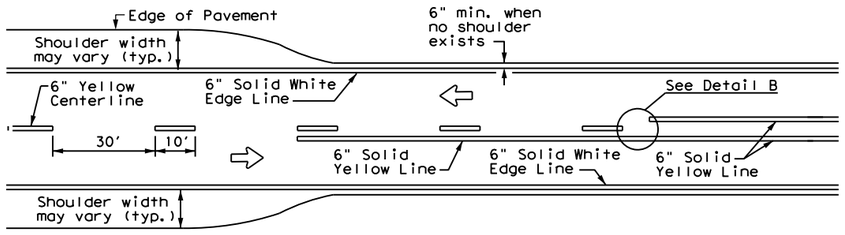
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

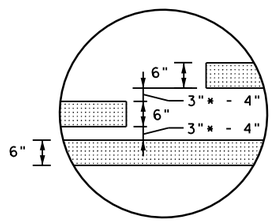
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



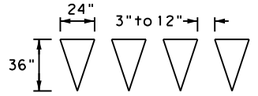
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



18" min. - 20" max.
(16" minimum for restripe projects when approved by the Engineer.)

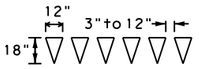
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

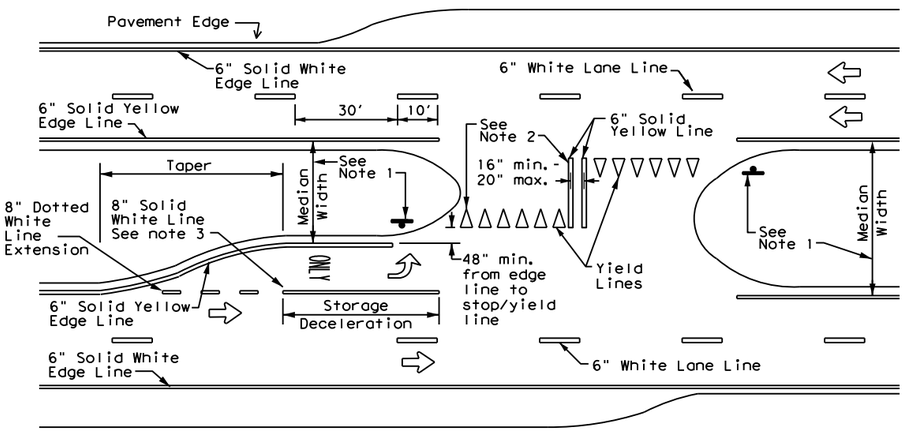


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

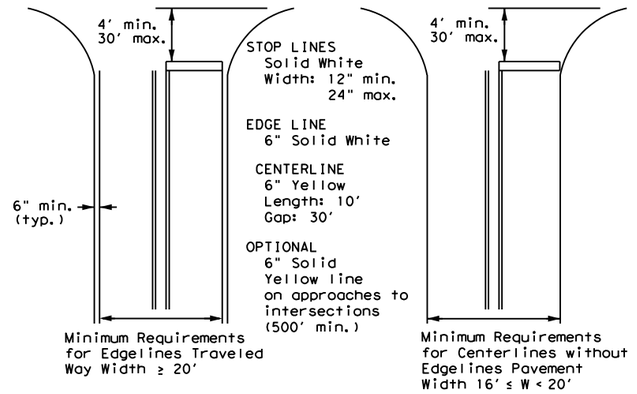
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

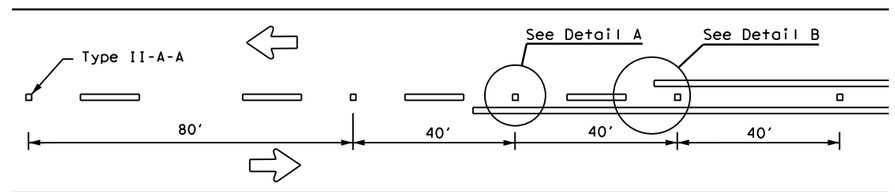
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20	0016	16	028	RM 967
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	AUS	HAYS		159

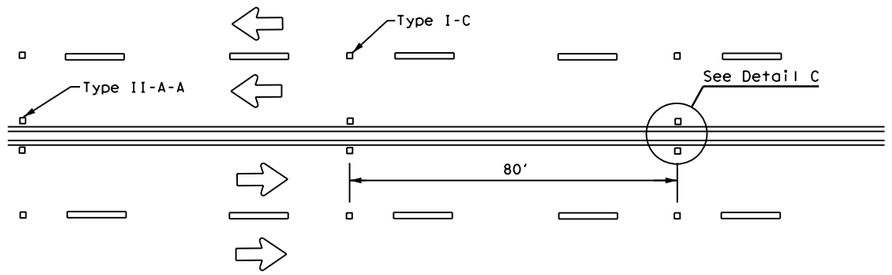
22A

DATE: 12/21/2022 12:18:14 PM
FILE: G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\01_Shts\08-SPMD\SPMD22-01.dgn

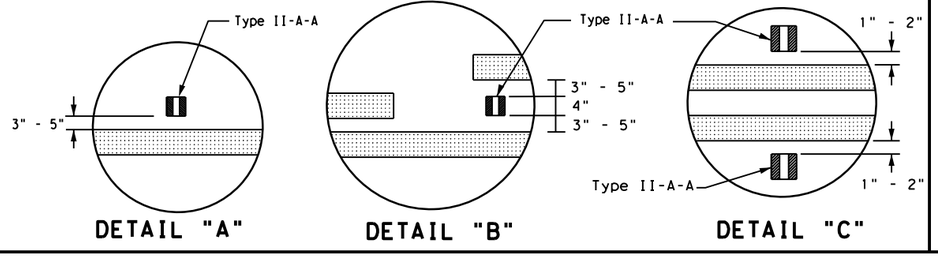
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

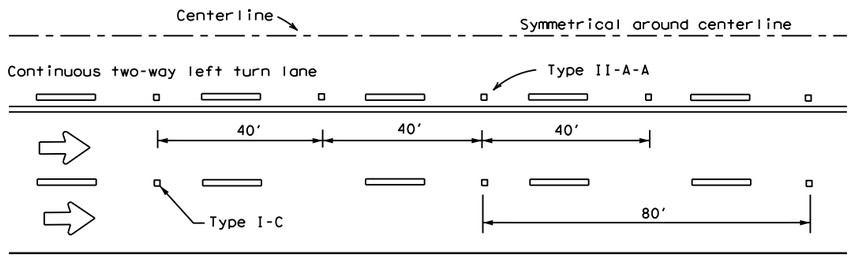


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

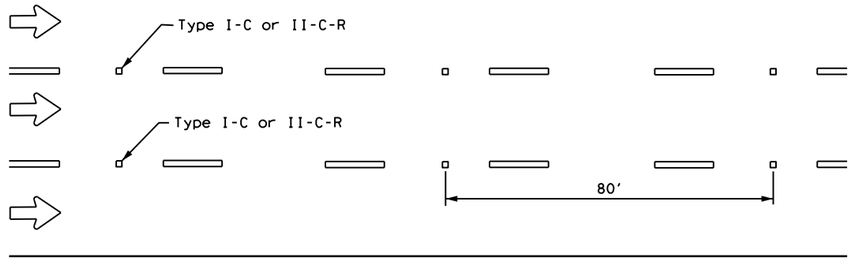


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



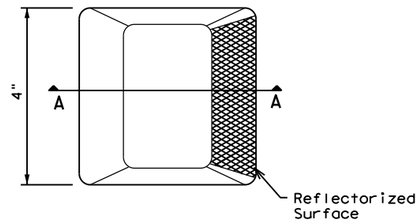
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

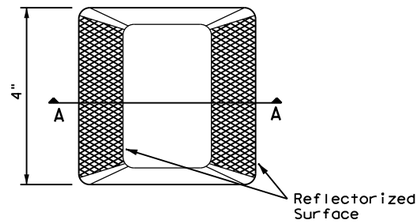
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

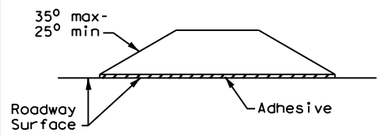
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

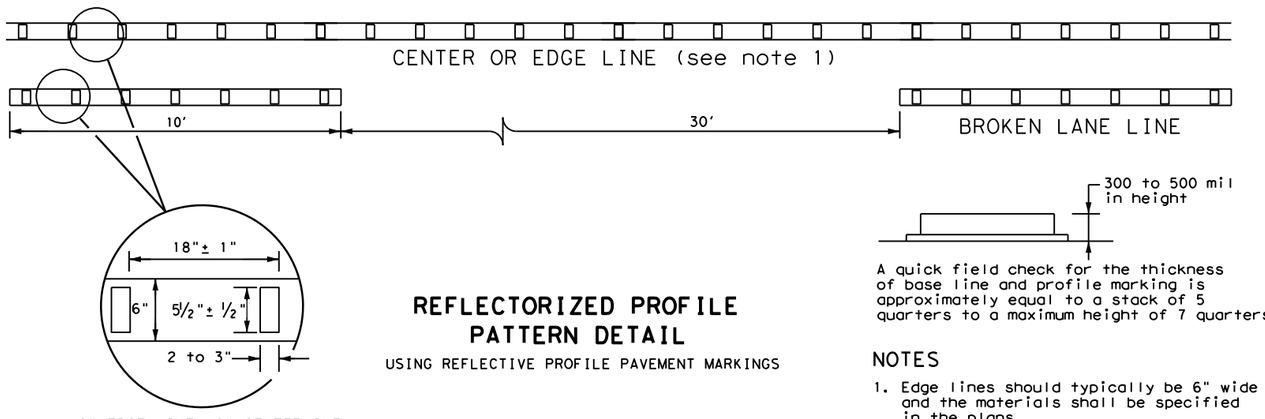


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
4-77 8-00 6-20	DIST	COUNTY		SHEET NO.
4-92 2-10 12-22	AUS	HAYS		160
5-00 2-12				

22B

DATE: 12/21/2022 12:18:15 PM
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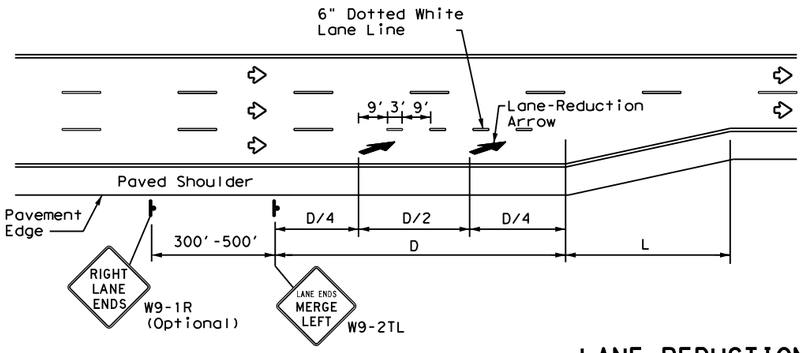


LANE REDUCTION

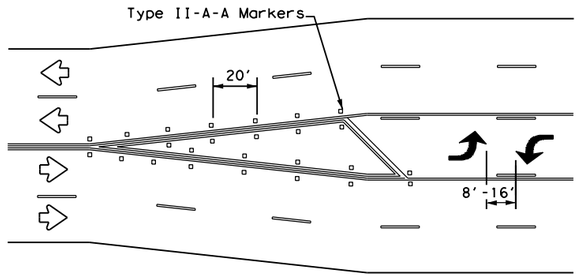
NOTES

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	

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.

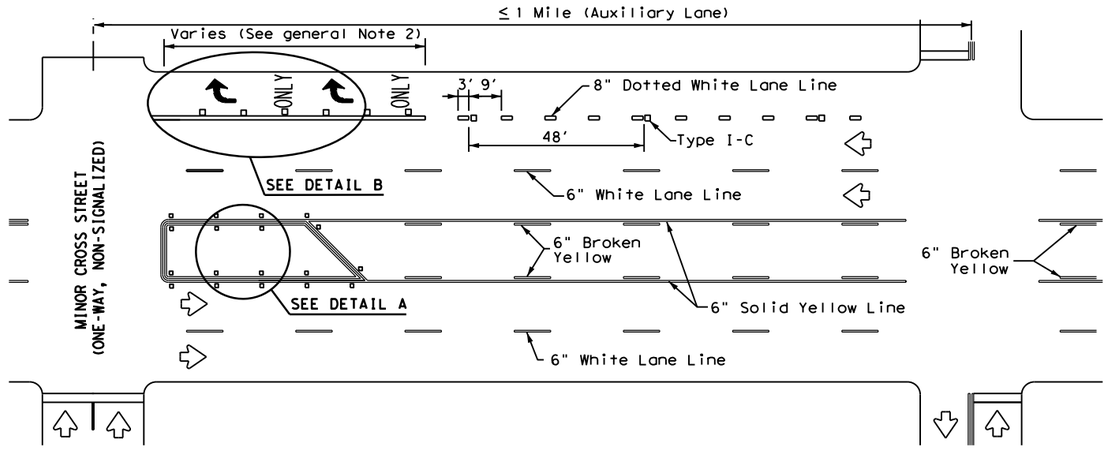


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

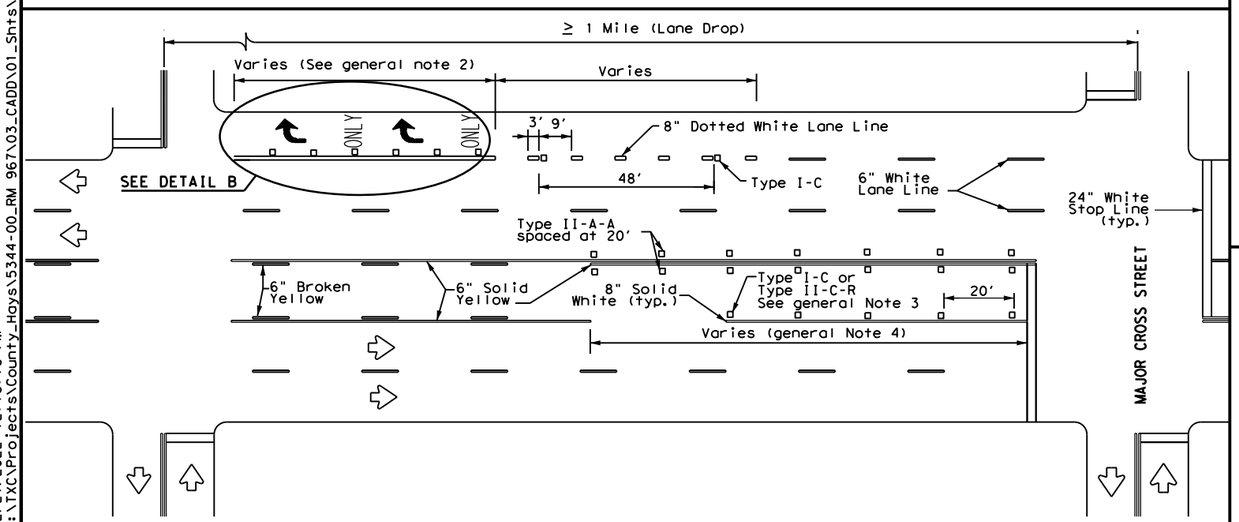
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

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

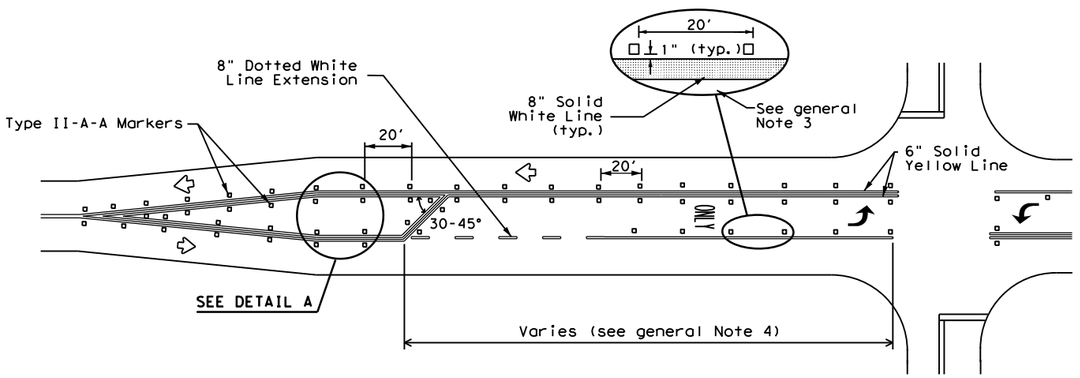
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



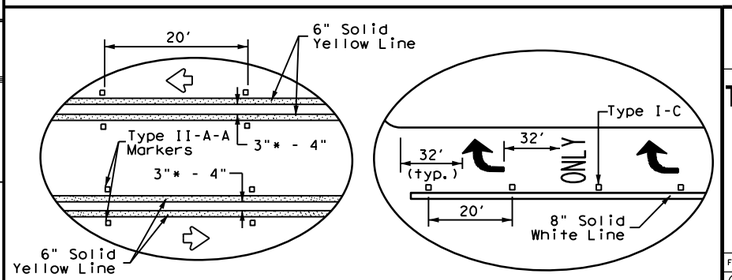
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



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

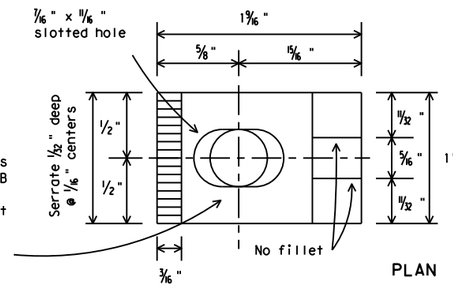
PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20	0016	16	028	RM 967
5-00 2-10 12-22	DIST	COUNTY		SHEET NO.
8-00 2-12	AUS	HAYS		161

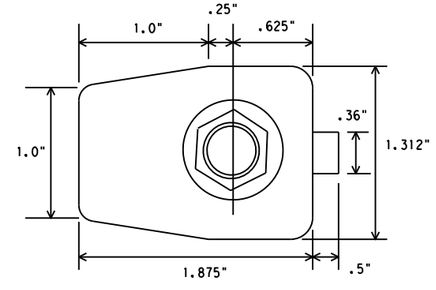
22C

DATE: 12/2/2022 11:57:43 AM
FILE: G:\TXC\Projects\County*Hoys\5344-00*RM 967\03*CADD\01*Shts\08-SPMD\Stds\smd21-08.dgn

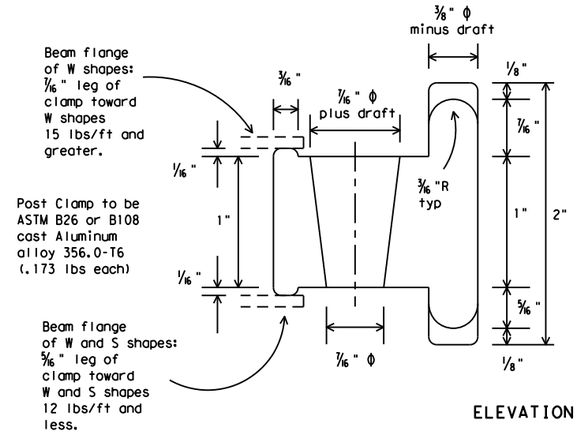
NOTE: centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.



PLAN

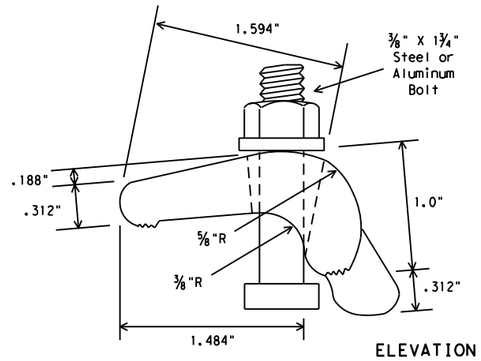


PLAN



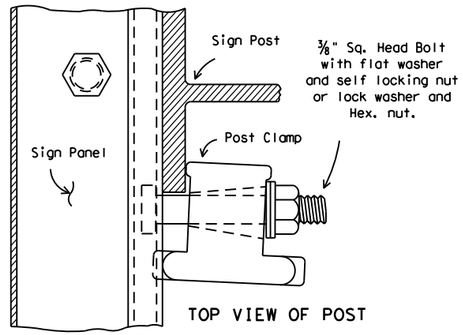
ELEVATION

POST CLAMP DETAIL

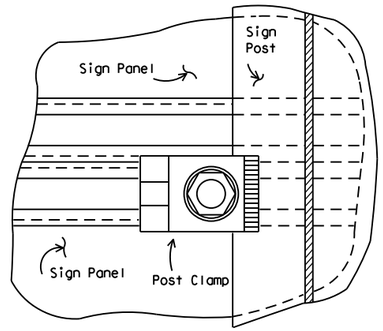


ELEVATION

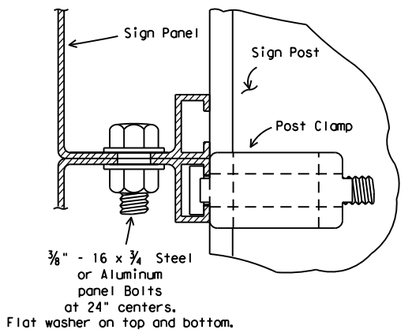
ALTERNATE POST CLAMP DETAIL



TOP VIEW OF POST



TOP VIEW OF CLAMP



SIDE VIEW OF PANELS

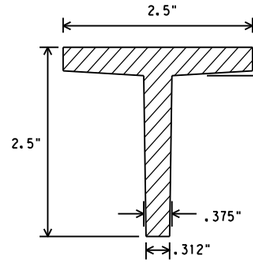
CONNECTION DETAILS

DEPARTMENTAL MATERIAL SPECIFICATIONS

SIGN HARDWARE DMS-7120

GENERAL NOTES:

1. Design conforms with AASHTO Specifications for the design and construction of structural supports for highway signs.
2. Materials and fabrication shall conform to the requirements of the Department material specifications.
3. Structural steel shall be "low-alloy steel" for non-bridge structures per Item 442, "Metal For Structures."
4. For fiberglass substrate connection details, see manufacturer's recommendations.

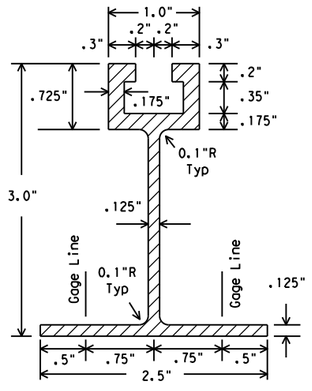


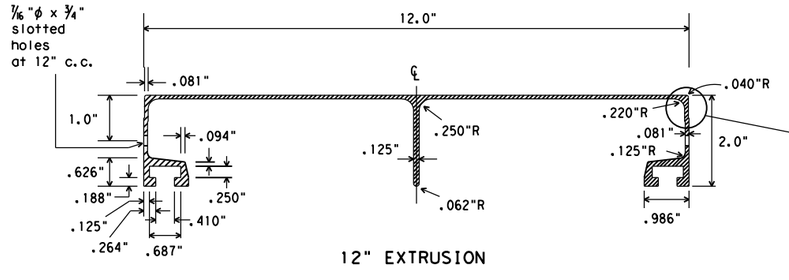
1.912 lbs/ft

ALUMINUM T SECTION OR APPROVED ALTERNATIVE

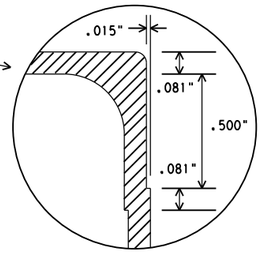
WINDBEAM CROSS SECTION

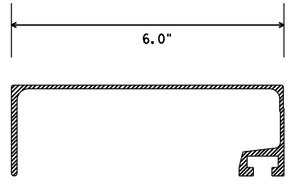
Windbeam to be extruded aluminum (1.175 lbs/ft) or approved alternative



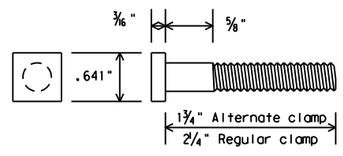


12" EXTRUSION





6" EXTRUSION



POST CLAMP BOLT DETAIL

ALUMINUM SIGN PANEL EXTRUSION DETAILS

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- EXTRUDED ALUMINUM SIGN PANELS & HARDWARE

SMD(2-1)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		162

27A

DATE: 12/2/2022 11:57:43 AM
FILE: G:\TXC\Projects\County\Hays\5344-00\RM 967\03\CADD\01\Shts\08-SPMD\Srds\smdgen.dgn

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)

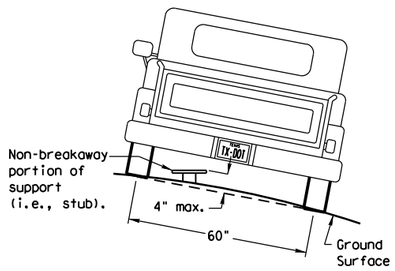
Anchor Type

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) to (SLIP-3))

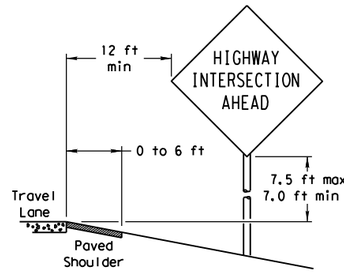
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

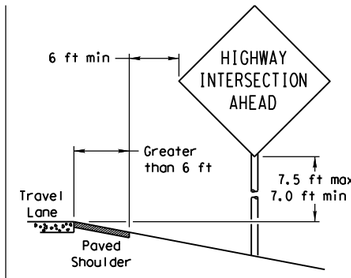
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

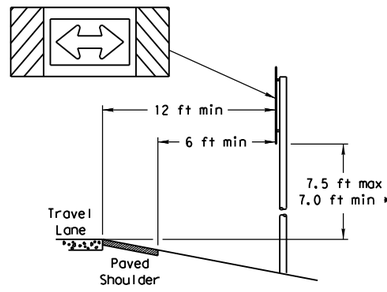
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



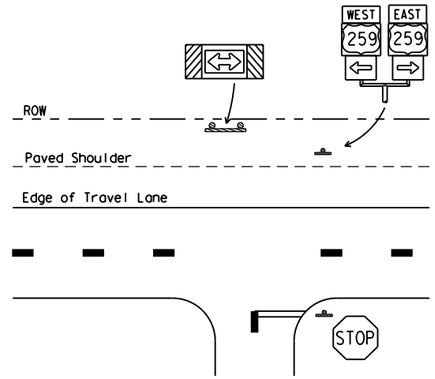
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

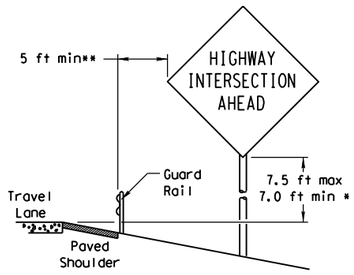
T-INTERSECTION



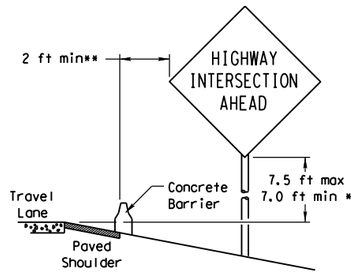
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



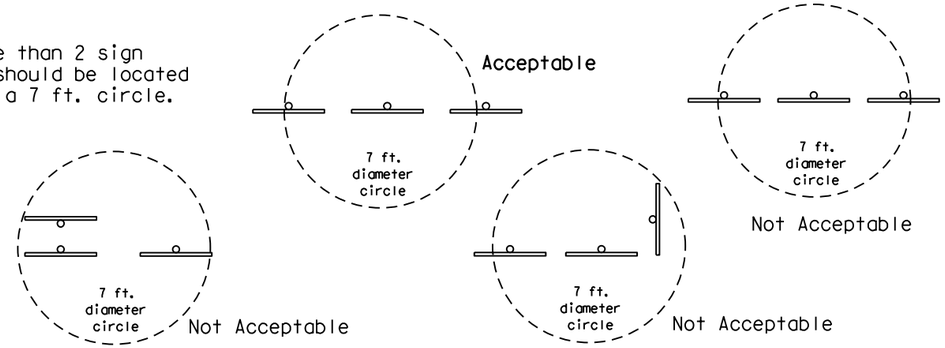
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

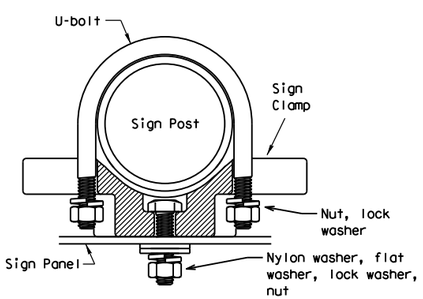
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

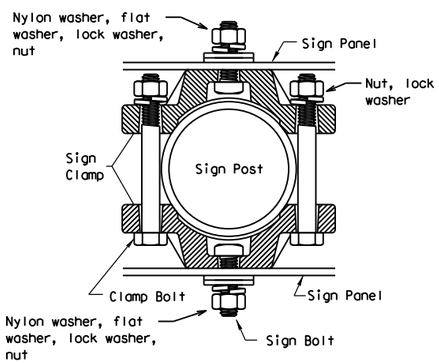


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

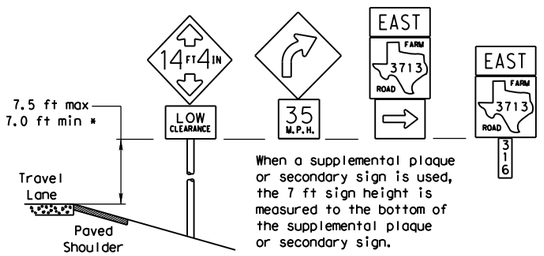
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



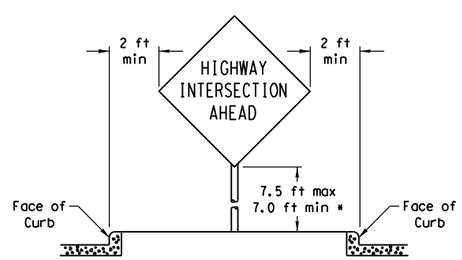
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



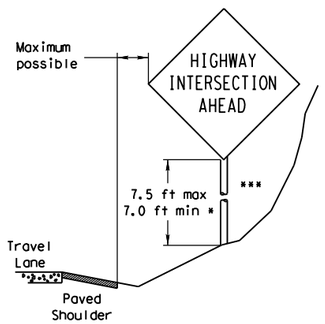
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		163

DATE: 12/2/2022 11:57:44 AM
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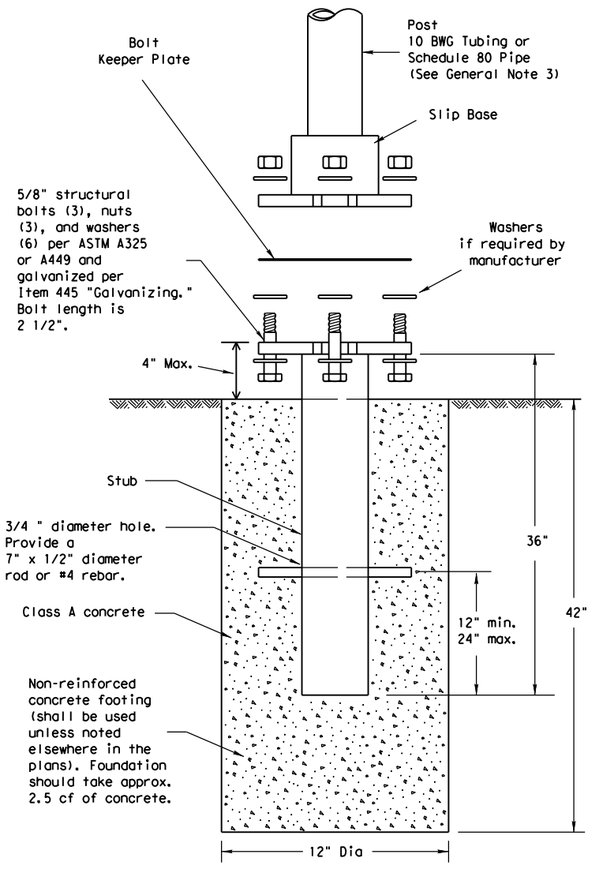
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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.

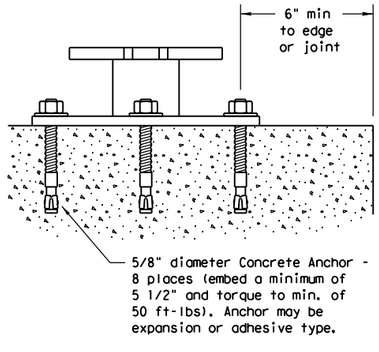
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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

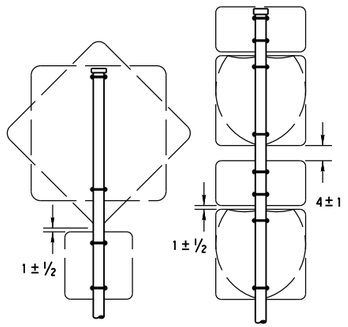
SMD(SLIP-1)-08

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

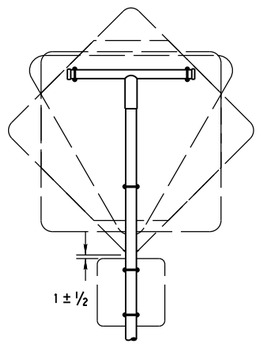
REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0016	16	028	RM 967

DIST	COUNTY	SHEET NO.
AUS	HAYS	164



SM RD SGN ASSM TY XXXXX(1)XX(P)



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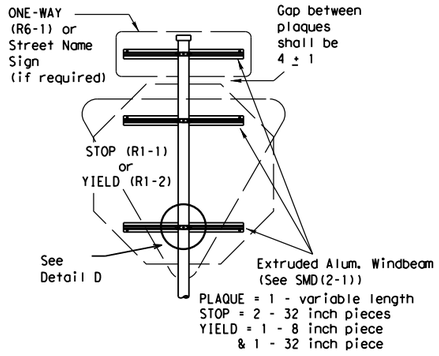
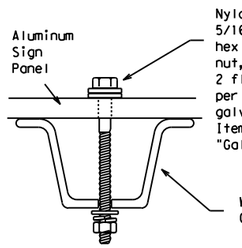
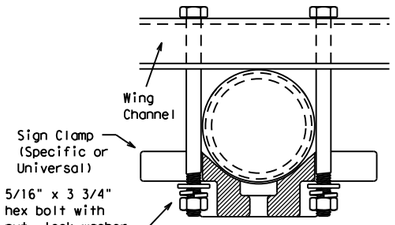


SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



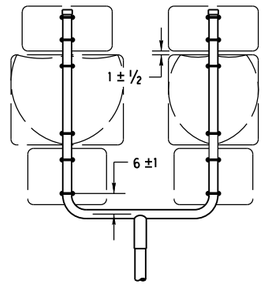
Top View

Detail A

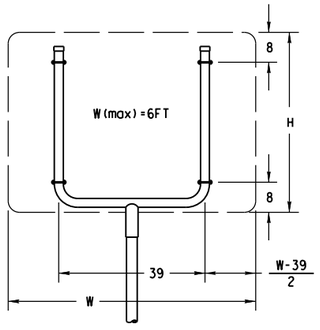


Top View

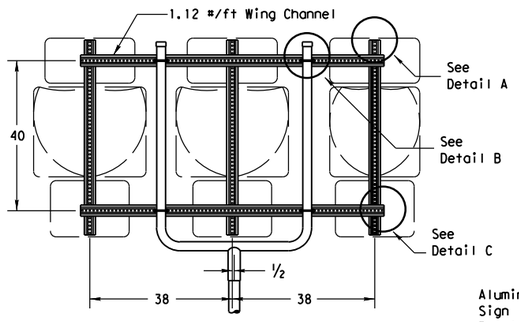
Detail B



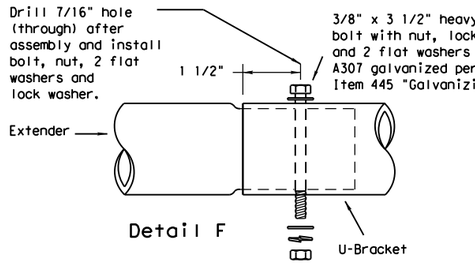
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

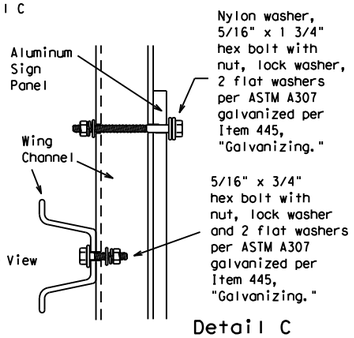


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)



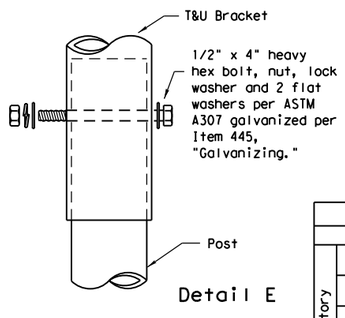
Detail F

Splices shall only be allowed behind the sign substrate.

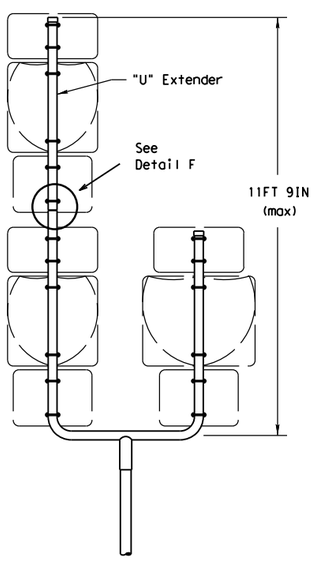


SIDE VIEW

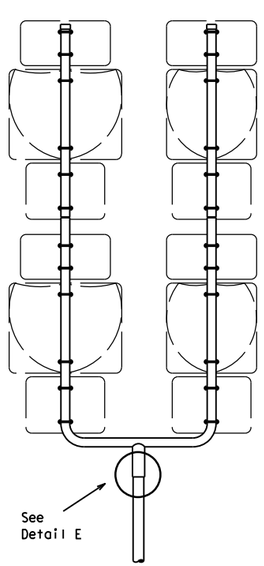
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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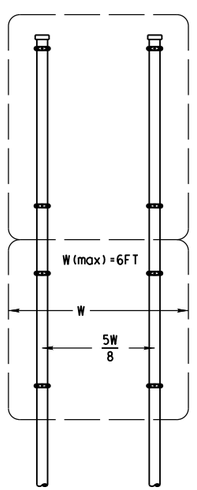
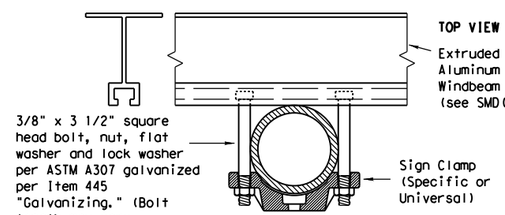
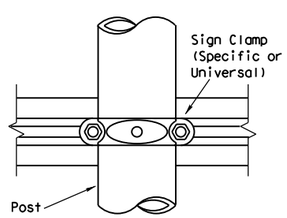
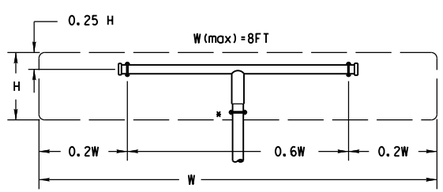


SM RD SGN ASSYM TY XXXXX(2)XX(P)



Detail D

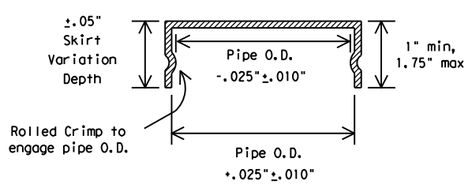




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

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.

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.

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-2)-08

REVISIONS	TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0016	16	028	RM 967
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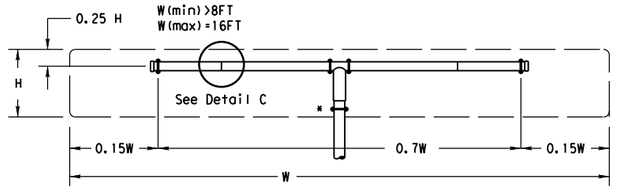
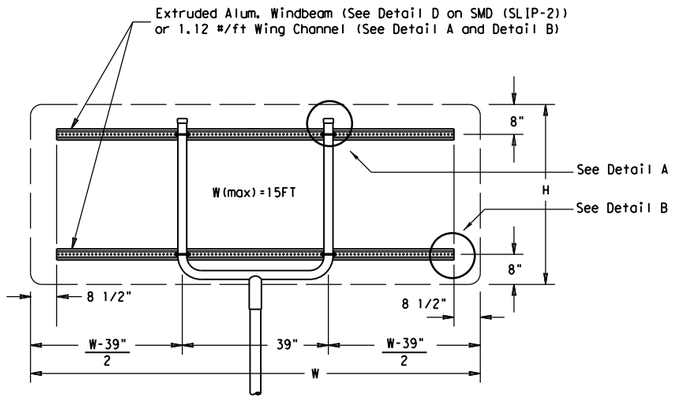
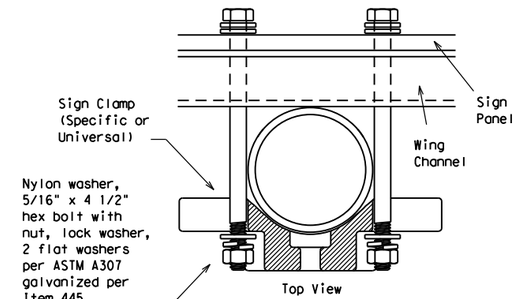


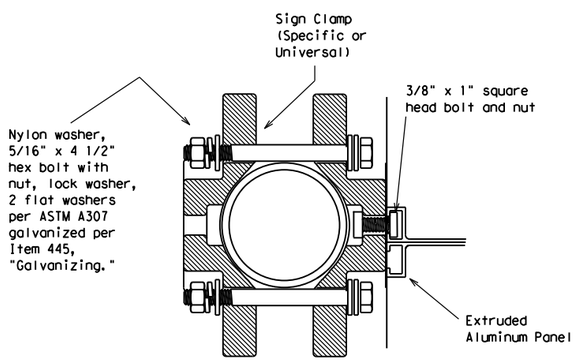
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



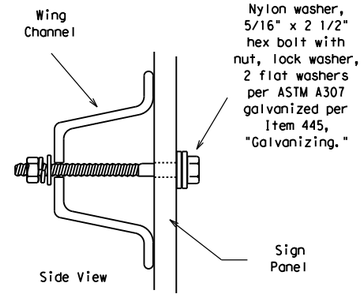
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



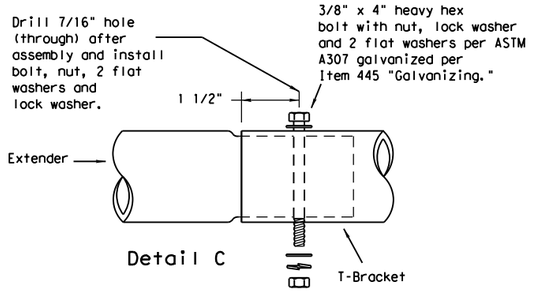
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

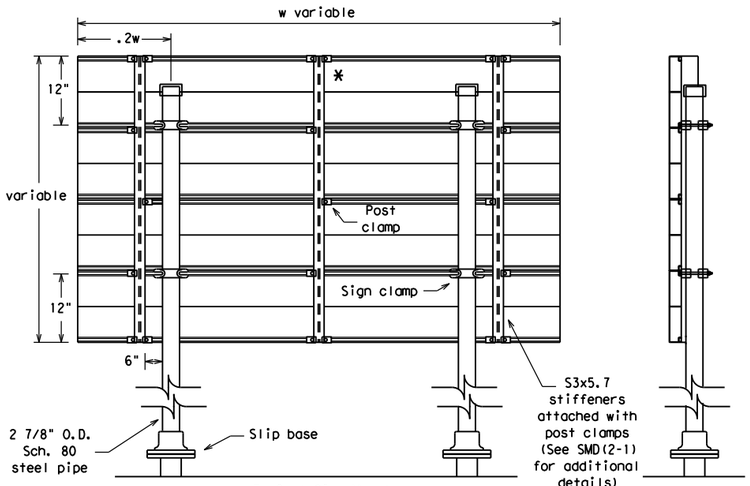


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

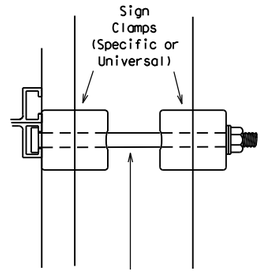


Typical Sign Mount

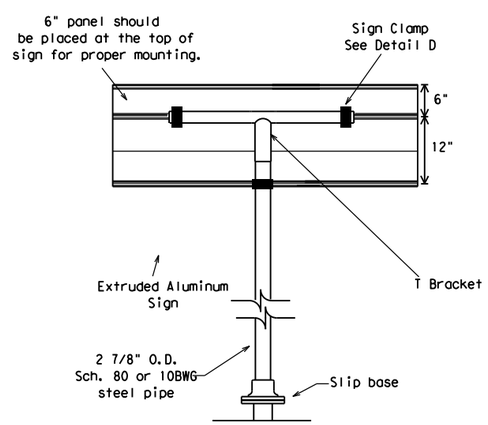
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

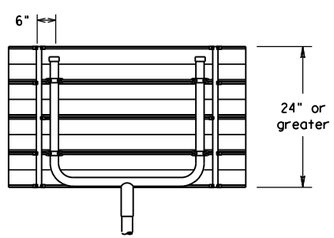
See Detail E
for clamp installation



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
0016	16	028	RM 967

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AUS	HAYS	166

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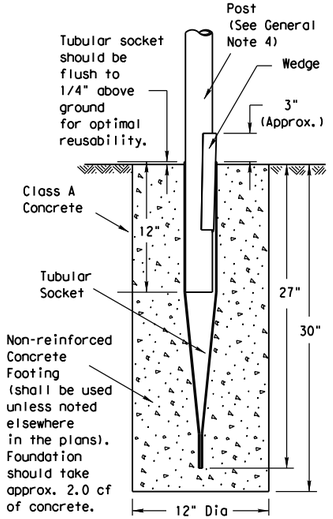
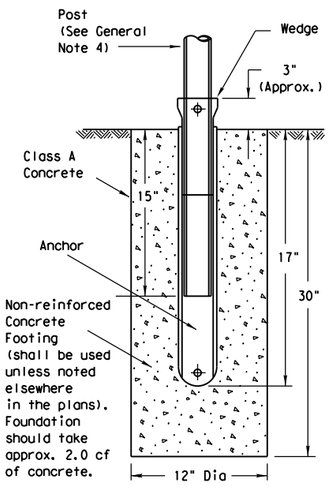
Wedge Anchor Steel System



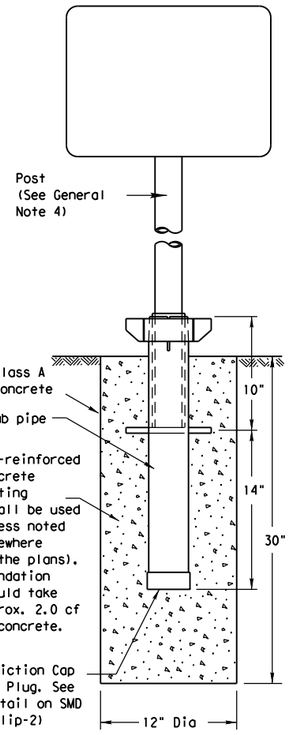
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

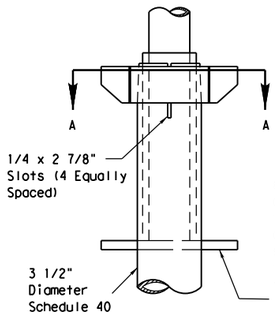


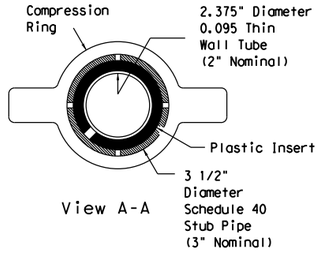
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



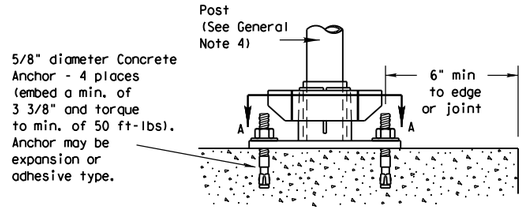
SM RD SGN ASSM TY TWT(X)UA(P)



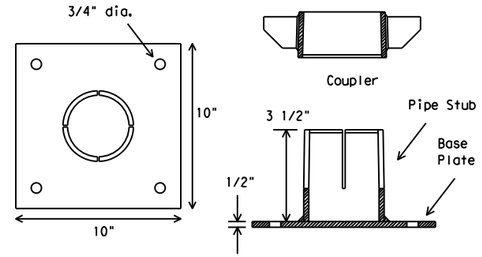


View A-A

Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

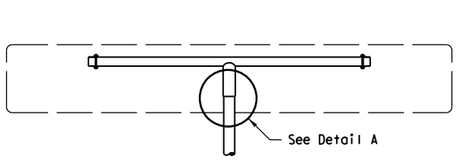


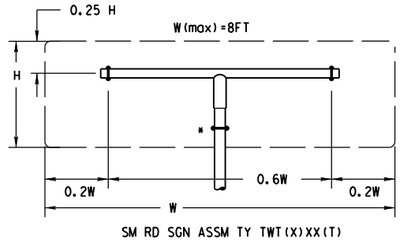
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.



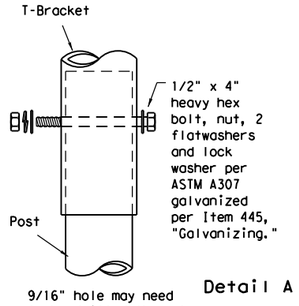
SM RD SGN ASSM TY TWT(X)UB(P)

Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)
(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

The devices shall be installed per manufacturer's recommendations.
Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

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

9-08 REVISIONS

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DIST	COUNTY		SHEET NO.
AUS	HAYS		167

26E

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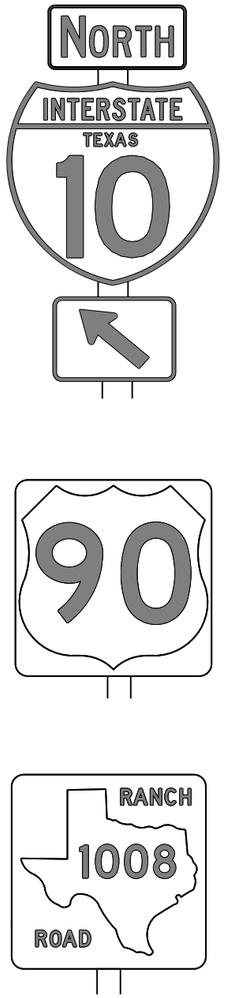
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

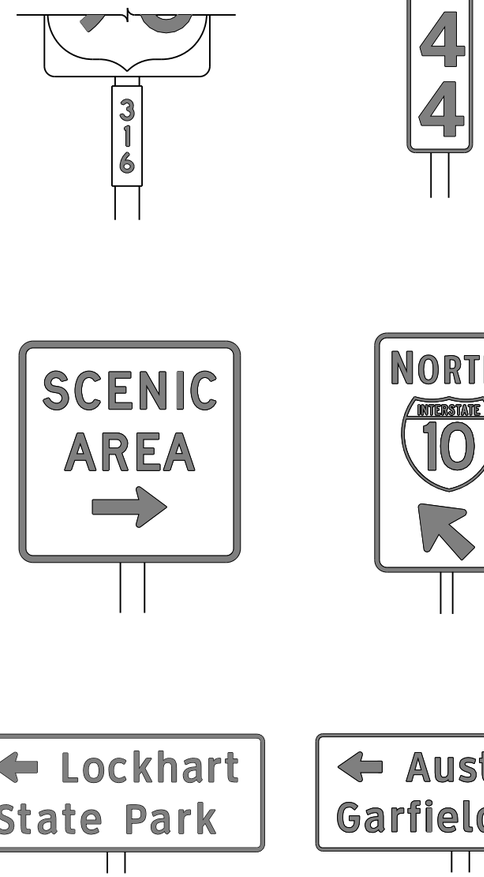
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	AUS	HAYS		168

DATE: 12/2/2022 11:57:46 AM
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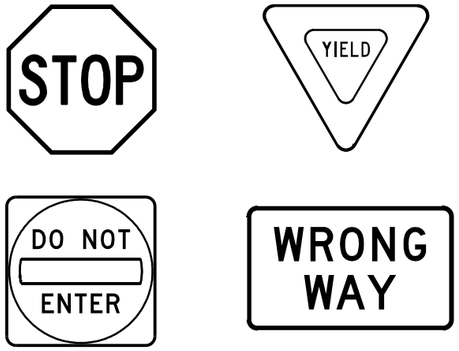
REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

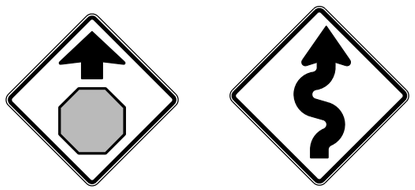
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

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

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn		CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0016	16	028	RM 967
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	AUS	HAYS		169

4

SITE DESCRIPTION

PROJECT LIMITS: *From South Main Street (near UPRR crossing) to IH 35 Southbound Frontage Road*

PROJECT DESCRIPTION: *Rehabilitation of existing roadway consisting of Base, ACP and Pavement Markings.*

MAJOR SOIL DISTURBING ACTIVITIES: *Major soil disturbing activities may include but are not limited to: Excavation and Embankment for roadway and structures, final grading of front slope and placement of topsoil.*

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

TOTAL PROJECT AREA: *XX.XX Acres*

TOTAL AREA TO BE DISTURBED: *XX.XX Acres*

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: *Vegetation is uniformally established grass covering approximately 75% of the surface area.*

NAME OF RECEIVING WATERS: *TCEQ Segment 1427: Onion Creek*
TCEQ Impaired Segment 1810: Plum Creek

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

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

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

STRUCTURAL PRACTICES:

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

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OTHER:

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

The order of activities will be as follows:

1. *Install structural practices as indicated above in ditches at structure locations.*
2. *Existing topsoil will be bladed and windrowed.*
3. *Construction activities begin.*
4. *Windrowed topsoil will be bladed back onto completed front slope. Then seed all disturbed areas.*
5. *Remove all temporary controls and reseed any areas disturbed by their removal.*

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

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

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

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

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

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

OTHER EROSION AND SEDIMENT CONTROLS:

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

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

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

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

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

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

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

OFFSITE VEHICLE TRACKING:

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

OTHER:

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

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

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

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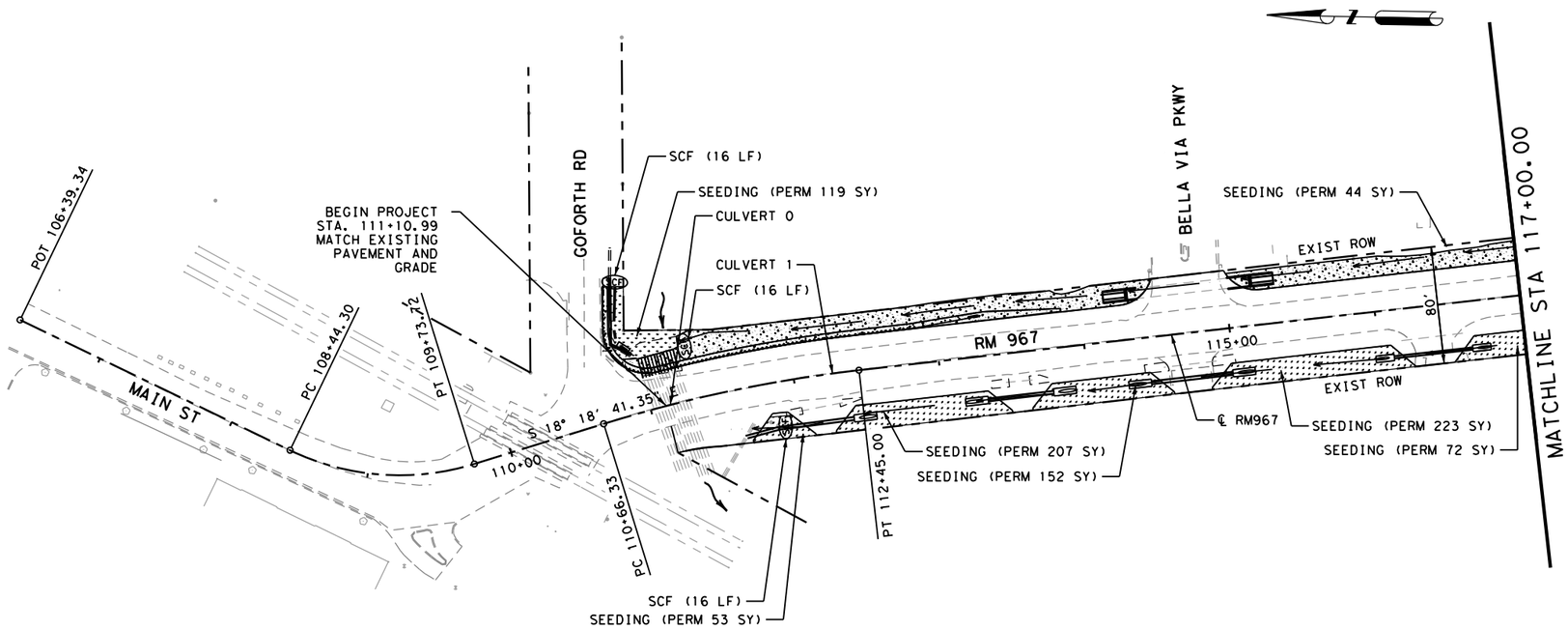
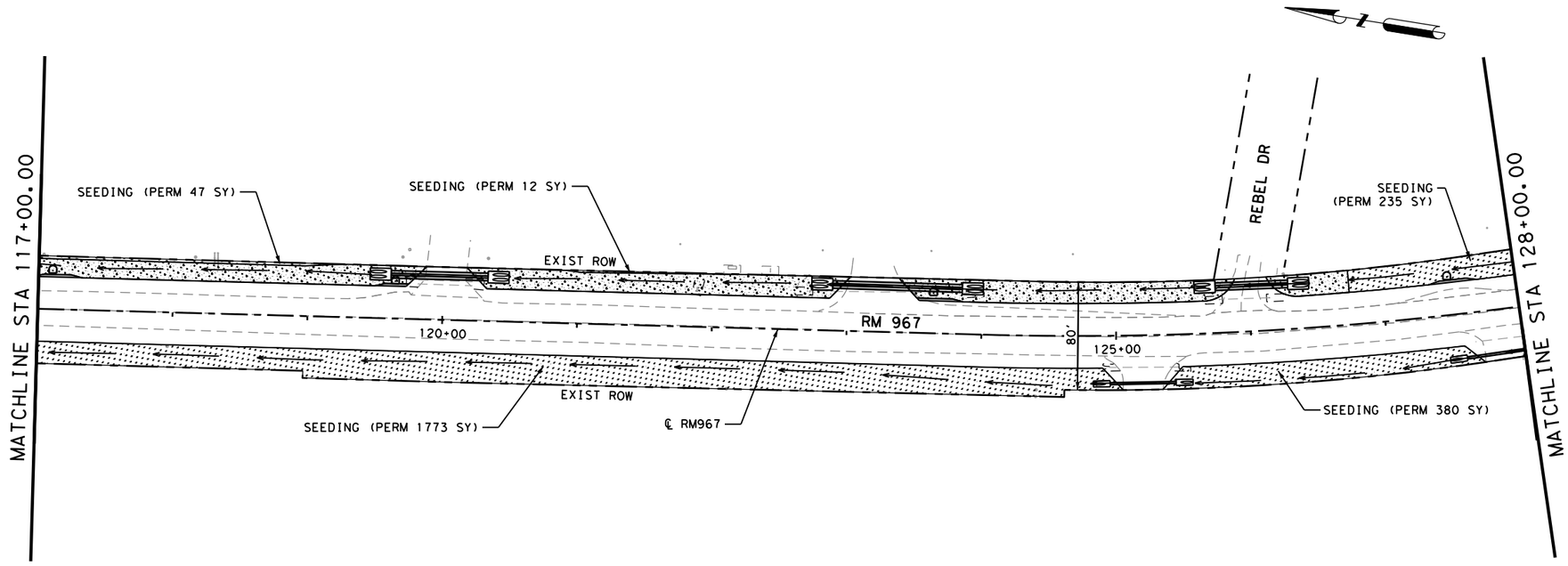
Rev: 04/16/13

RM 967
STORM WATER POLLUTION PREVENTION PLAN (SW3P)

 Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			RM 967
STATE	DISTRICT	COUNTY	
TEXAS	AUS	HAYS	
CONTROL	SECTION	JOB	SHEET NO.
0016	16	028	170





LEGEND:

- SCF — SEDIMENT CONTROL FENCE
- CL-D — EROSION CONTROL LOG DAM
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- RFD2 — ROCK FILTER DAM
- DITCH FLOW DIRECTION
- FLOW ARROWS
- SEEDING
- RIPRAP

0' 25' 50' 100'

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141765
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PROFESSIONAL ENGINEER

Elena Ramon

12/2/2022

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RM 967

SW3P LAYOUT

BEGIN TO STA 128+00

SHEET 1 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			171
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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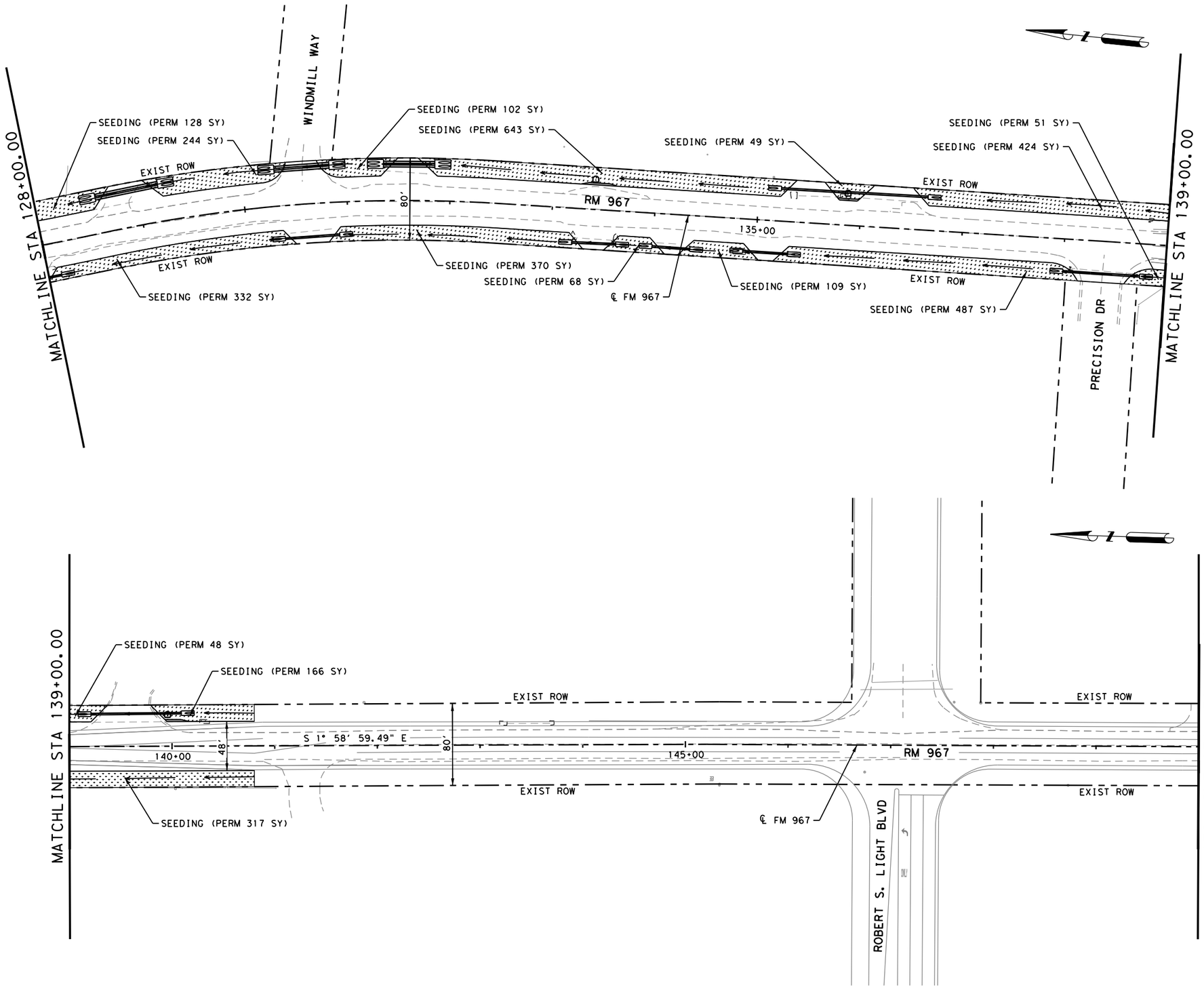

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RM 967

SW3P LAYOUT

STA 128+00 TO STA 150+00

SHEET 2 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			172
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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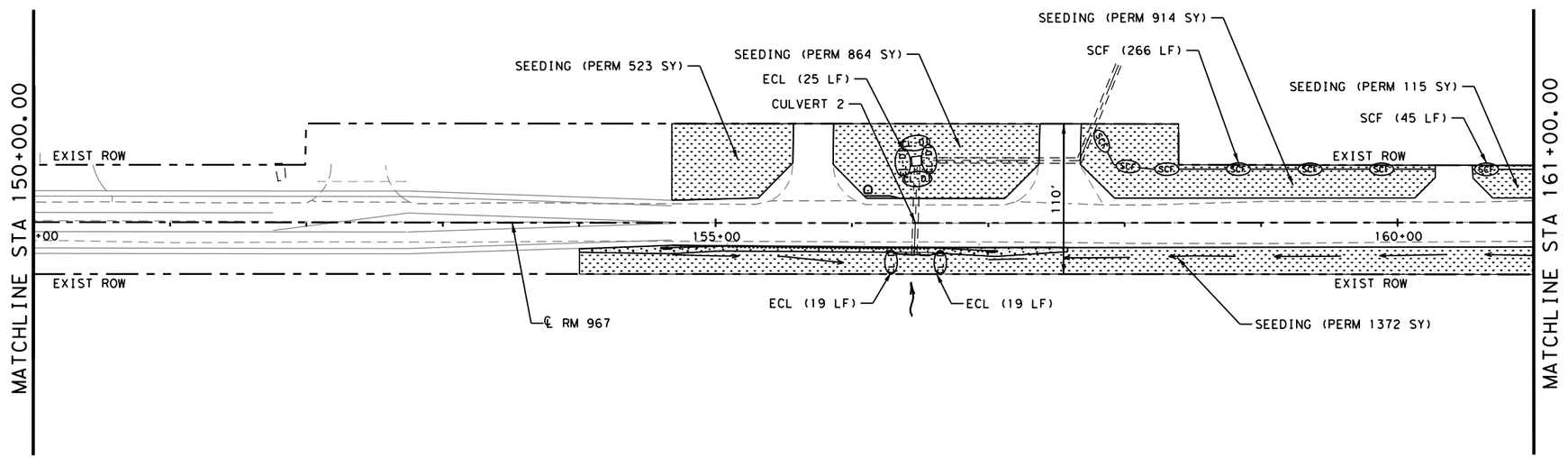

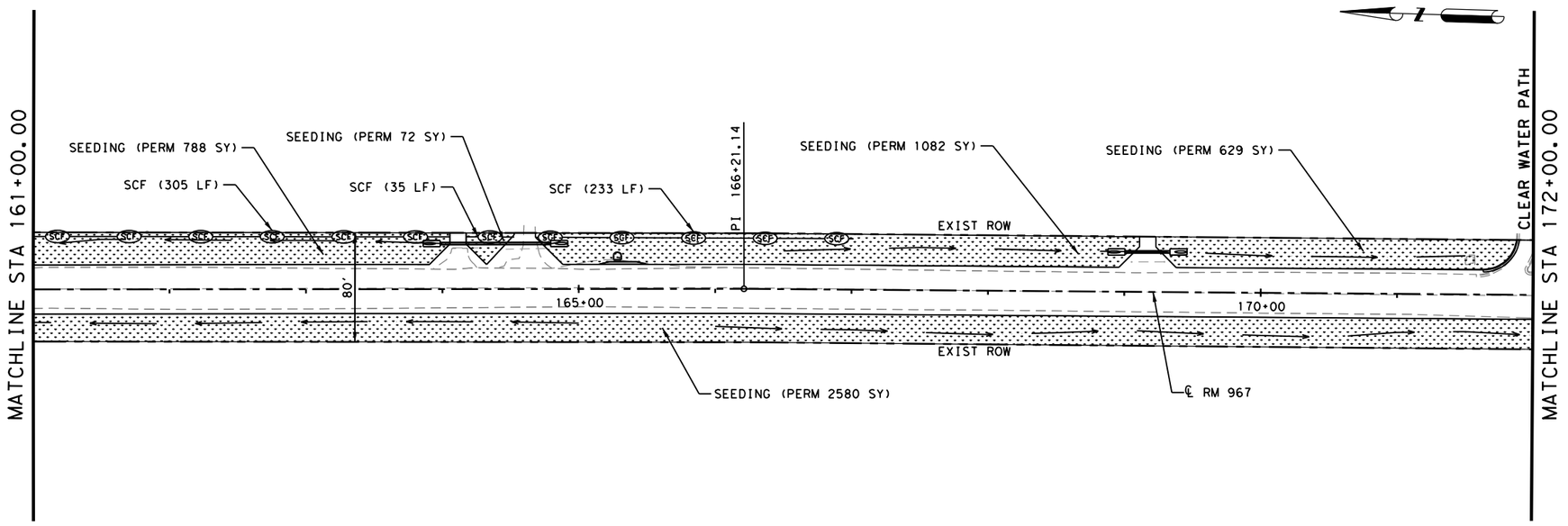

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RM 967

SW3P LAYOUT

STA 150+00 TO STA 172+00

SHEET 3 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			173
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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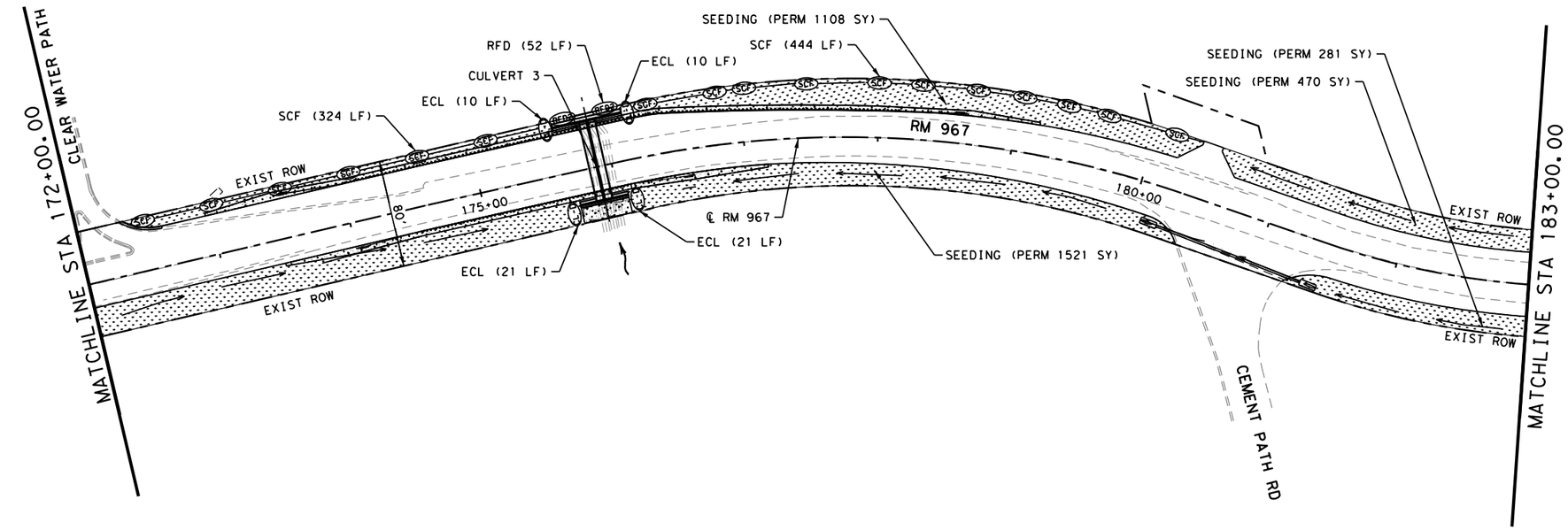

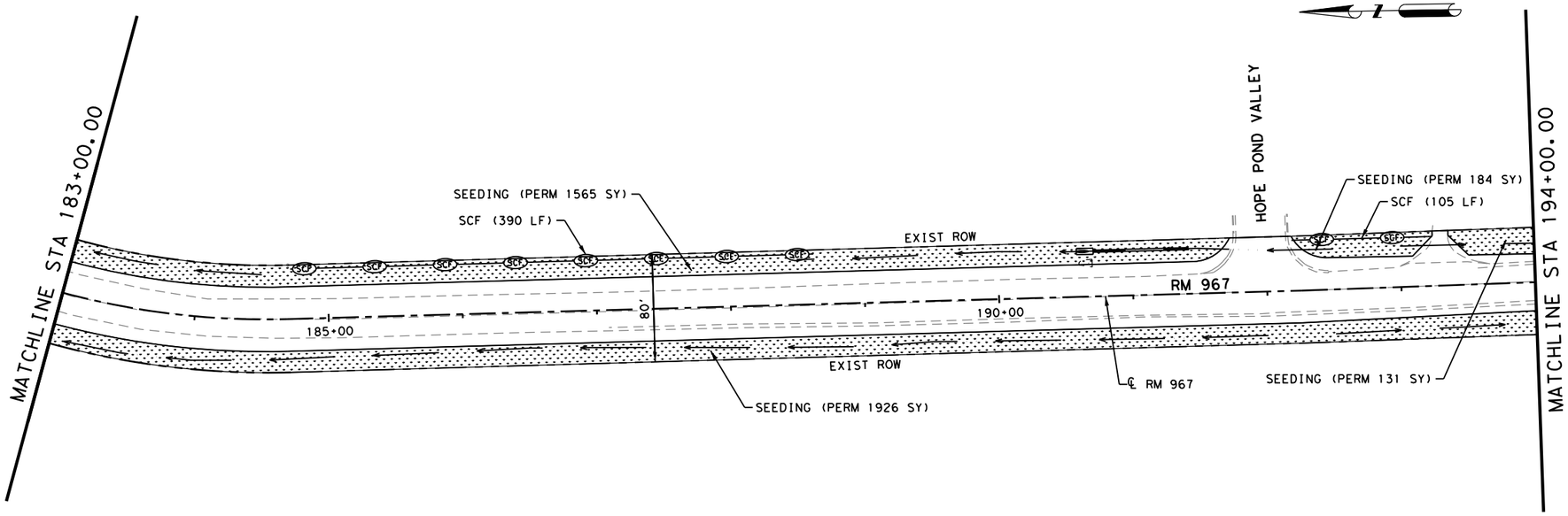

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RM 967

SW3P LAYOUT

STA 172+00 TO STA 194+00

SHEET 4 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			174
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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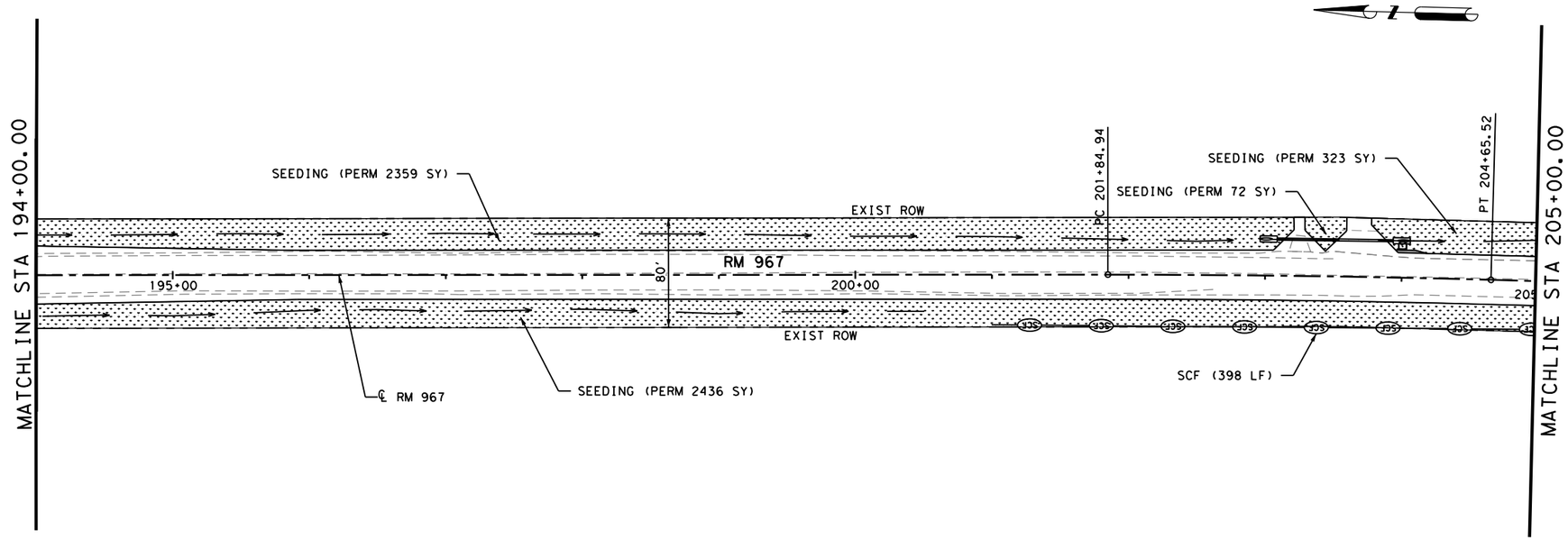

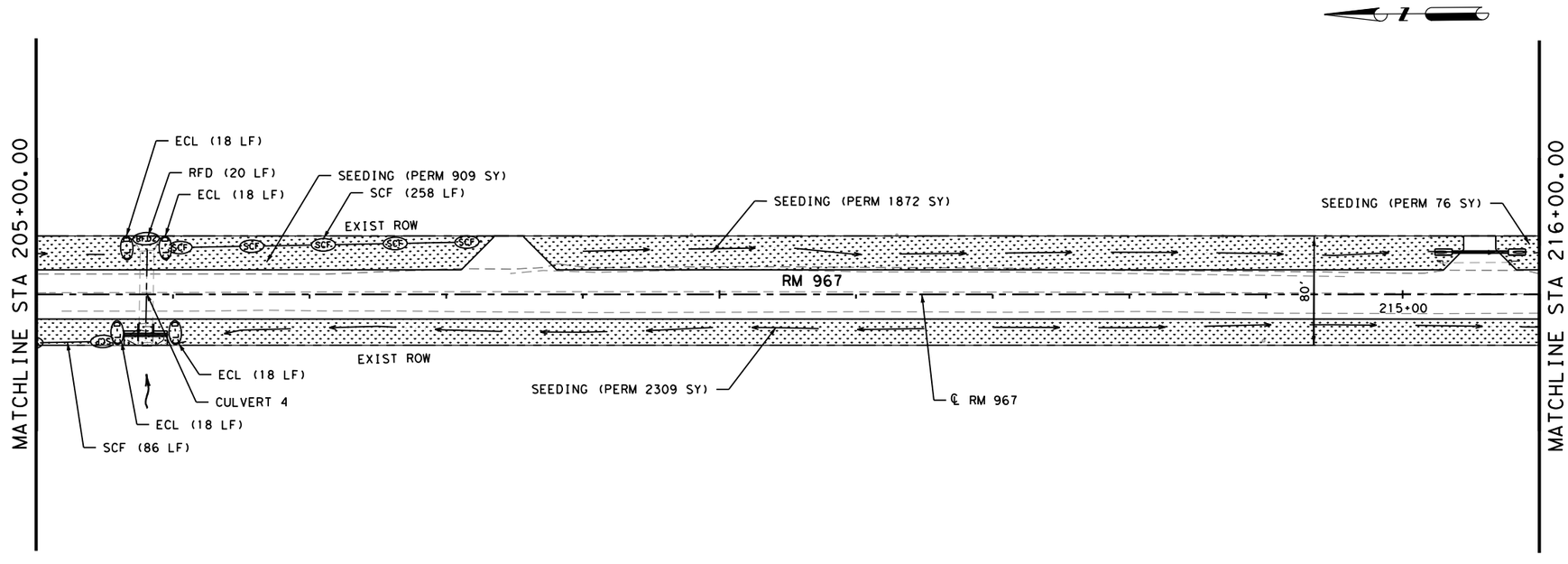

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RM 967

SW3P LAYOUT

STA 194+00 TO STA 216+00

SHEET 5 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			175
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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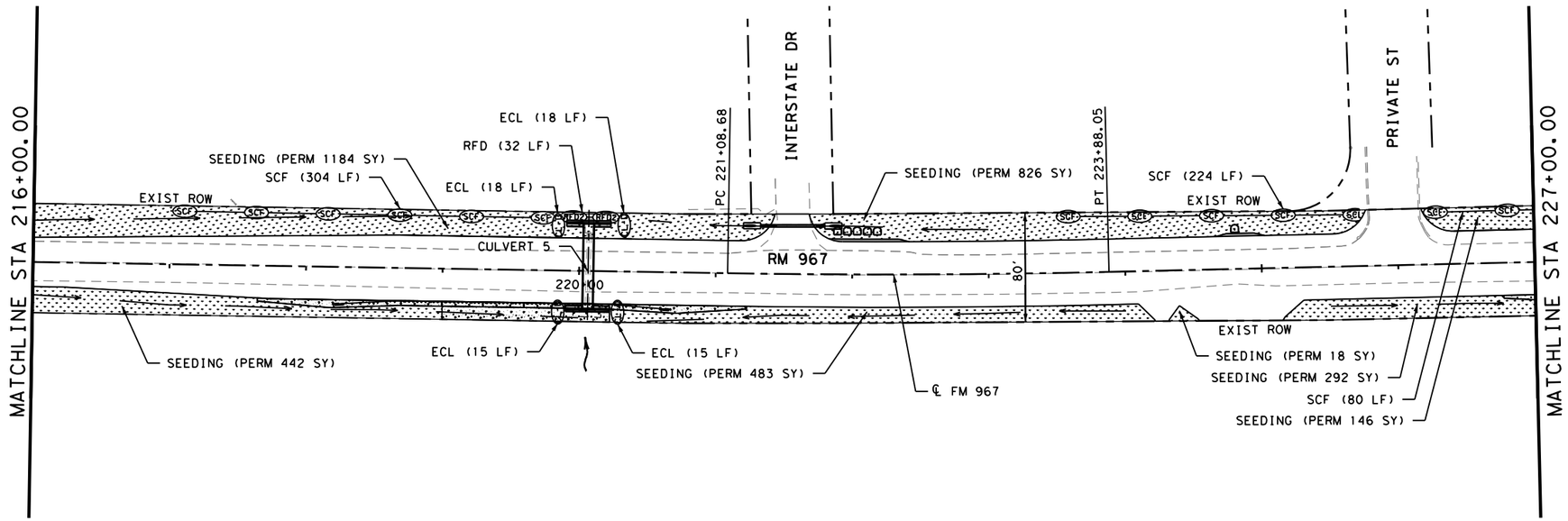

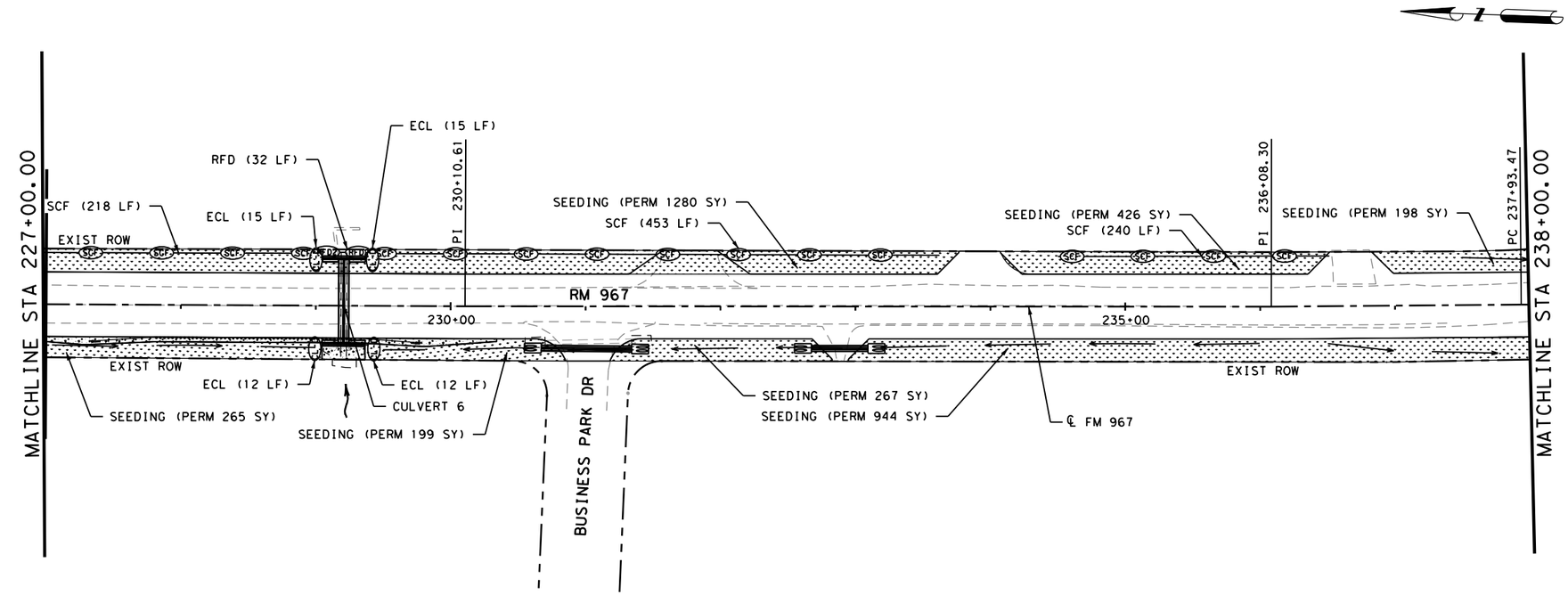

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RM 967

SW3P LAYOUT

STA 216+00 TO STA 238+00

SHEET 6 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			176
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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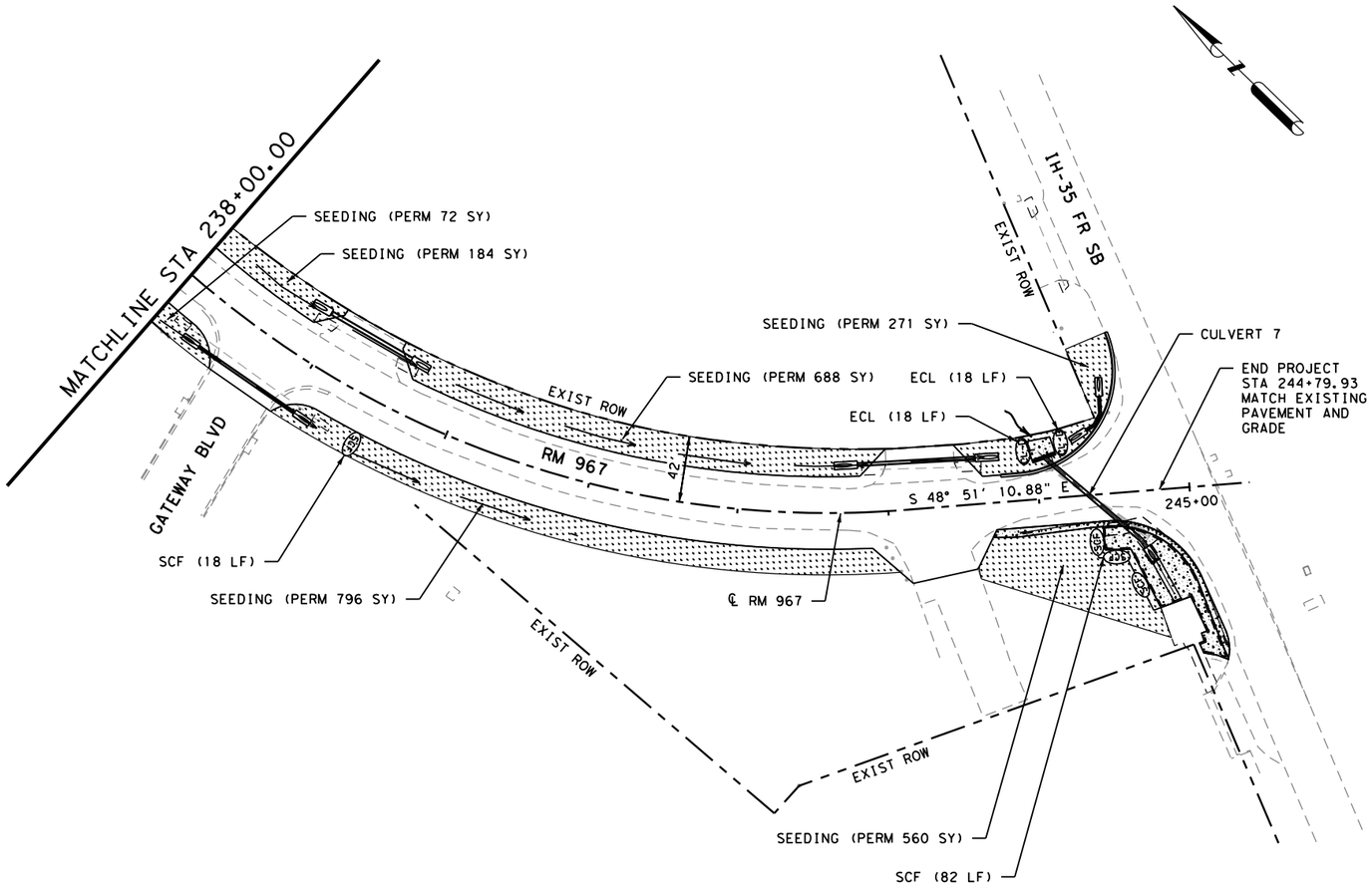

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12/2/2022

Texas Department of Transportation

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TBPE Registration No. F-1046

RM 967

SW3P LAYOUT

STA 238+00 TO END

SHEET 7 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			177
STATE	DIST.	COUNTY	
TEXAS	AUS	HAYS	
CONT.	SECT.	JOB	HIGHWAY NO.
0016	16	028	RM 967

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. City of Buda

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☐ No Permit Required
☒ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1. Unnamed Tributary to Andrews Branch
2. Richmond Branch
3. Unnamed Tributary to Richmond Branch
4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.
4.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1. Minimize the amount proposed for clearing and removal of native vegetation will be avoided.
2. The use of any non-native plant species in re-vegetation will be discouraged.

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

☐ No Action Required ☒ Required Action

Action No.

1. Migratory Bird Treaty Act: Between October 1 and February 15, the contractor would remove all migratory bird nests from any structure that would be affected by the proposed project, and complete any bridge work/demolition and/or vegetation clearing. In addition, the contractor would be prepared to prevent migratory birds from building nests by utilizing nest prevention methods, such as bird-deterrent netting and bird-repellent sprays and/or gels, between February 15 and October 1. In the event that migratory birds are encountered on-site during project construction, adverse impacts on protected birds, active nests, eggs, and/or young would be avoided.
2. The contractor will be advised of potential occurrence of state threatened and endangered species or species of greatest conservation need (SGCN) and TPWD approved BMPs will be implemented during the project. See EPIC Sheet 2 of 2.

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

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:

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

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		178

DATE:
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v. FEDERAL LISTED, PROPOSED THREATENDED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS. (CONT.)

CSJ: 0016-16-028 RM 967
TPWD Approved BMPs

Strecker's chorus frog (Pseudacris streckeri)
Woodhouse's toad (Anaxyrus woodhousii)

Amphibian & Aquatic Reptile BMPs
1. Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.
2. Minimize impacts to wetland, temporary and permanent open water features, including depressions, and riverine habitats.
3. Maintain hydrologic regime and connections between wetlands and other aquatic features.
4. Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species.
5. Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydromulching and/or hydroseeding are not feasible due to site conditions, using erosion control blankets or mats that contain no netting, or only contain loosely woven natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable.
6. Project specific locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features.
7. When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and overwinter sites (e.g., brush and debris piles, crayfish burrows where feasible.
8. Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter, which may be refugia for terrestrial amphibians, where feasible.
9. When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of terrestrial or aquatic wildlife through the water feature. Where feasible, biotechnical streambank stabilization methods using live native vegetation, or a combination of vegetative and structural materials should be used.

Mountain plover (Charadrius montanus)
Western burrowing owl (Athene cunicularia hypugaea)
Lark bunting (Calamospiza melanocorys)
Chestnut-collared longspur (Calcarius ornatus)

Bird BMPs:
In addition to complying with the Migratory Bird Treaty Act (MBTA) perform the following BMPs:
1. Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed.
2. Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season;
3. Avoid the removal of unoccupied, inactive nests, as practicable;
4. Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair;
5. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

eastern spotted skunk (Spilogale putorius)
long-tailed weasel (Mustela frenata)
western hog-nosed skunk (Conepatus leuconotus)

Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered, and to avoid unnecessary impacts to dens or nests.

eastern box turtle (Terrapene carolina)
western box turtle (Terrapene ornata)
slender glass lizard (Ophisaurus attenuates)
plateau spot-tailed earless lizard (Holbrookia lacerate)
western hognose snake (Heterodon nasicus)
common garter snake (Thamnophis sirtalis)
Texas garter snake (Thamnophis sirtalis annectens)

Terrestrial Reptile BMPs:
1. Apply hydromulching and/or hydroseeding in areas for solid stabilization and/or revegetation of disturbed areas where feasible. If hydromulching and/or hydroseeding are not feasible due to site conditions, utilize erosion control blankets or mats that contain no netting or contain loosely woven, natural fiber netting is preferred. Plastic netting should be avoided to the extent possible.
2.. For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling.
3. Inform contractors that if reptiles are found on project site allow species to safely leave the project area.
4. Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter where feasible.
5. Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.
For all Protected Species and SGCN potentially occurring in the project area:
1. Allow the wildlife to leave the site safely.
2. Report all observations to TxDOT.

Texas Department of Transportation | Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
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REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0016	16	028	RM 967
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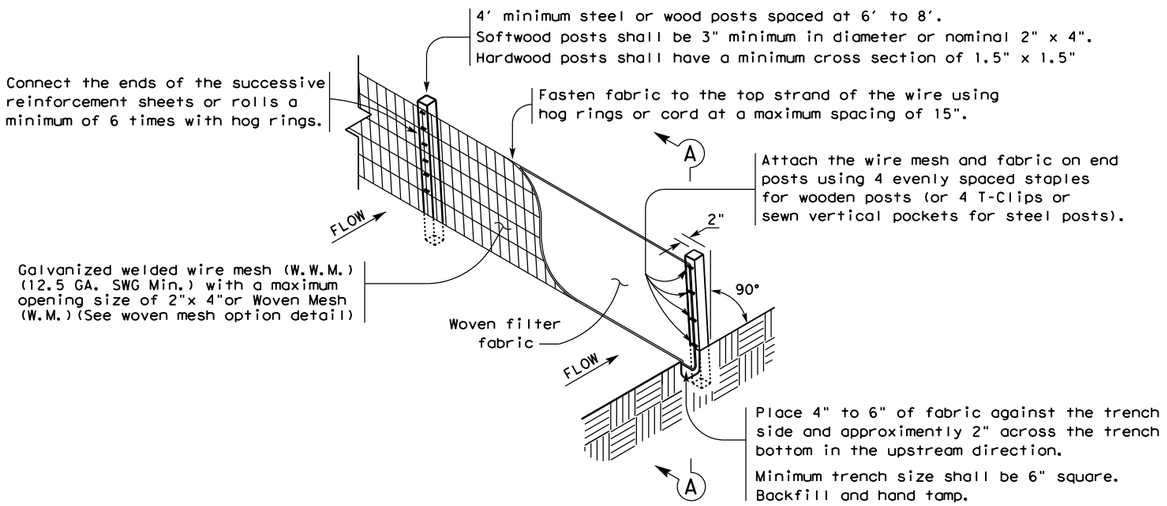
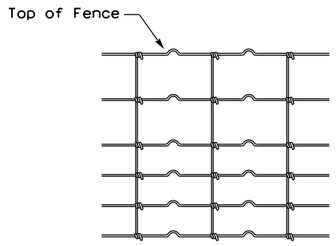
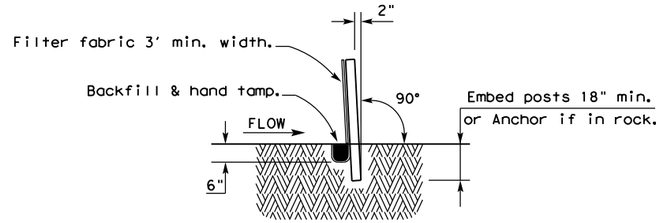


TEMPORARY SEDIMENT CONTROL FENCE

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.

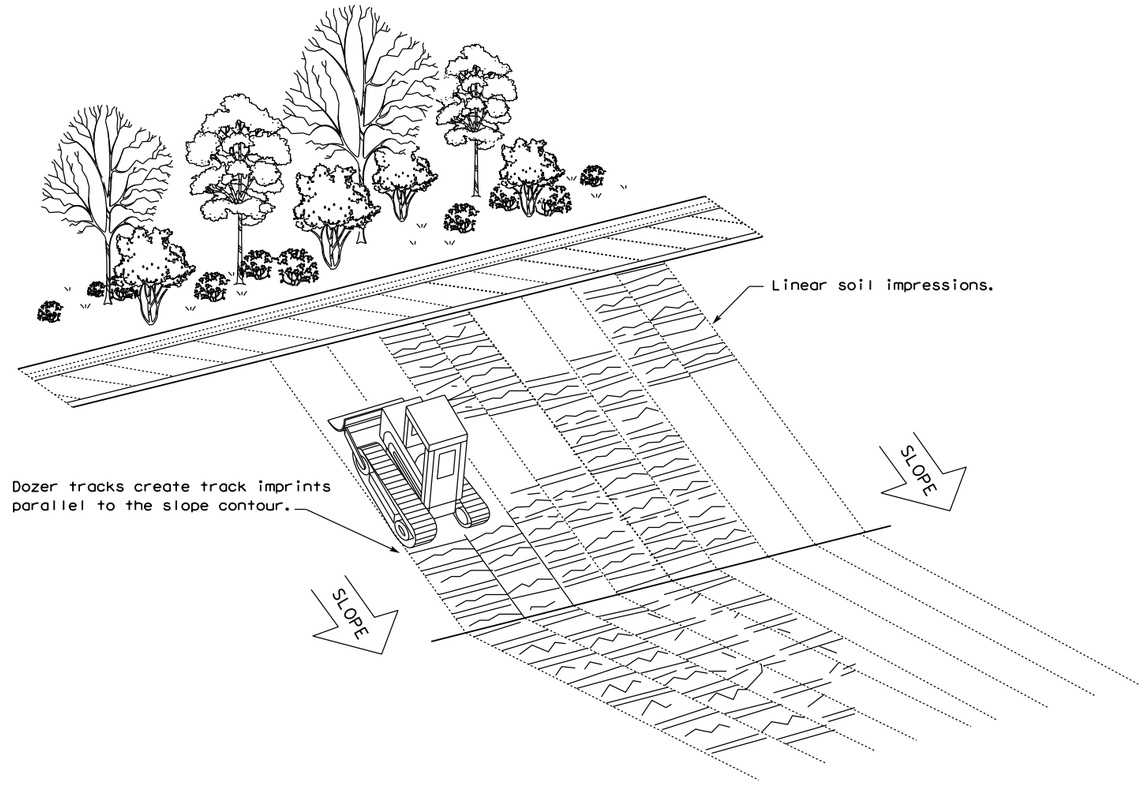
LEGEND

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

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	DIST	COUNTY					SHEET NO.
	AUS	HAYS					180

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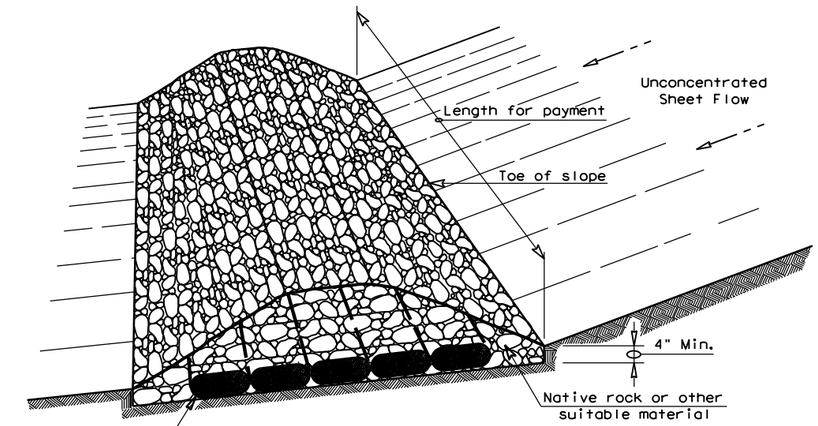
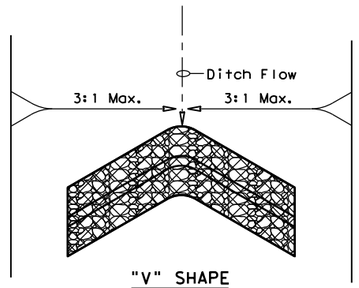
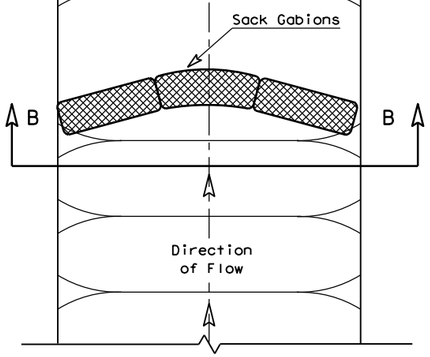


FILTER DAM AT TOE OF SLOPE

RFD1



"V" SHAPE
PLAN VIEW



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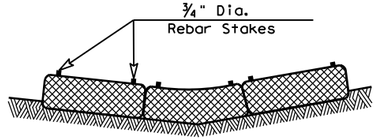
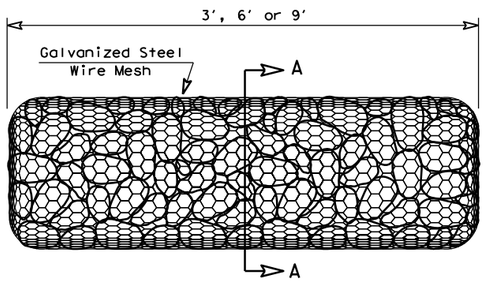
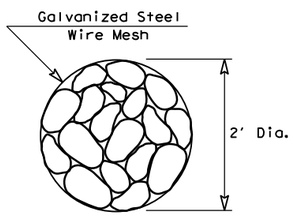


SECTION B-B

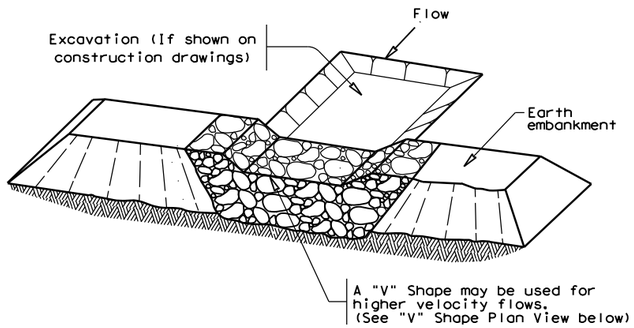


TYPE 4 (SACK GABIONS)

RFD4

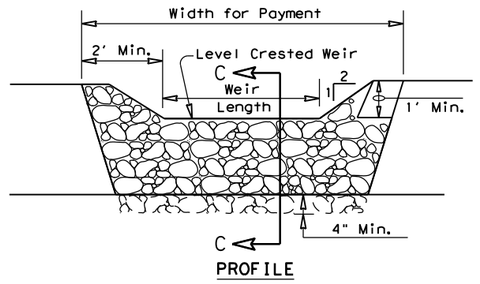


SECTION A-A

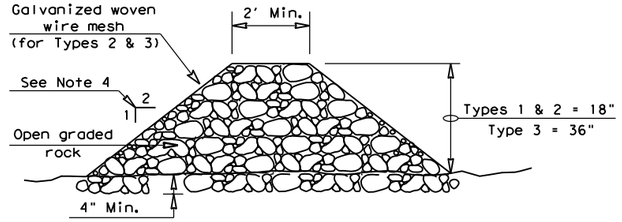


FILTER DAM AT SEDIMENT TRAP

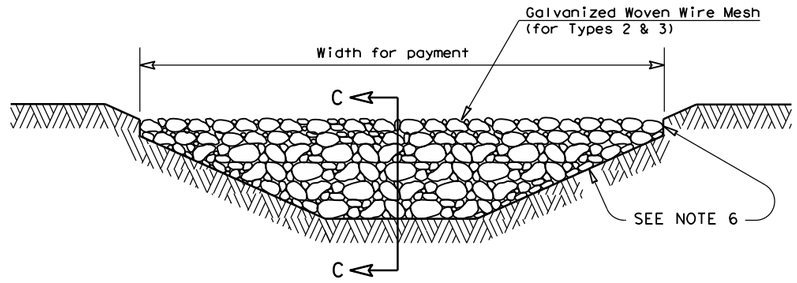
RFD1 OR RFD2



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	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		181

DATE: 12/2/2022
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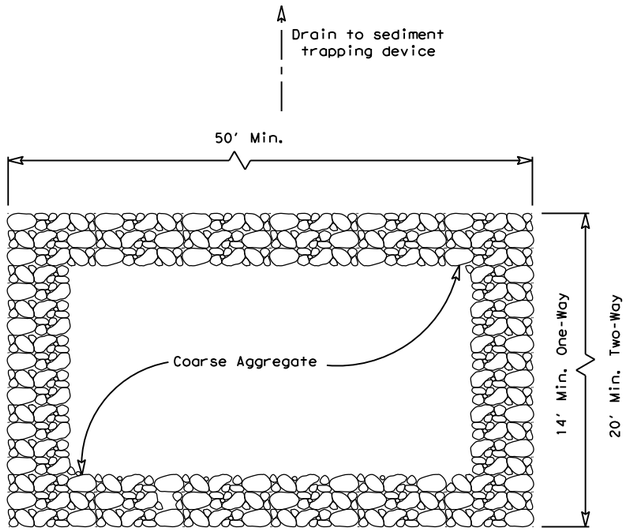
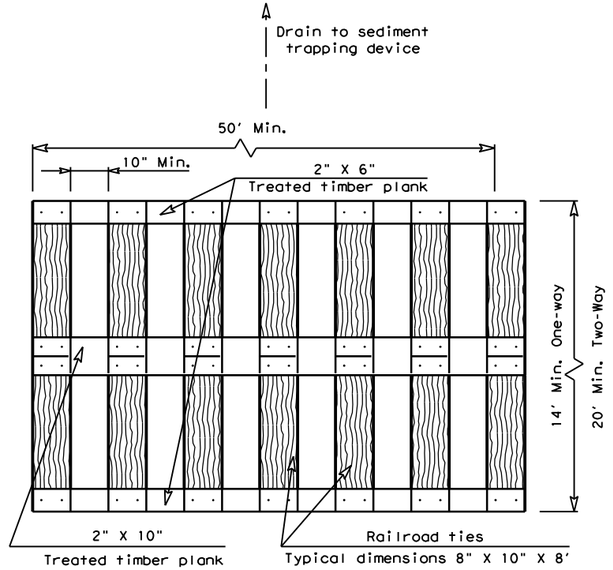
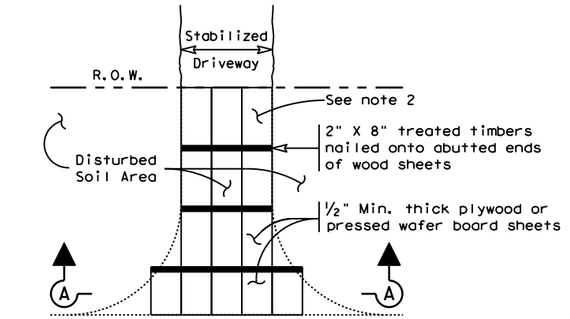


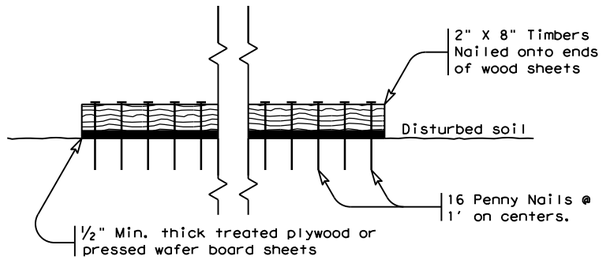
PLAN VIEW



PLAN VIEW



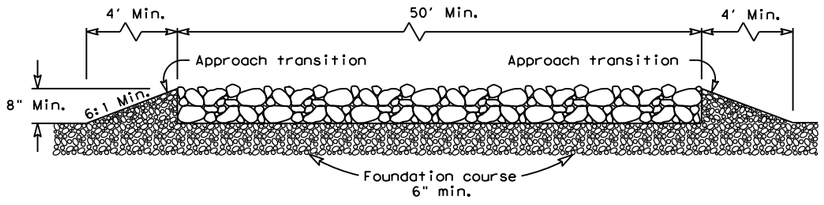
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

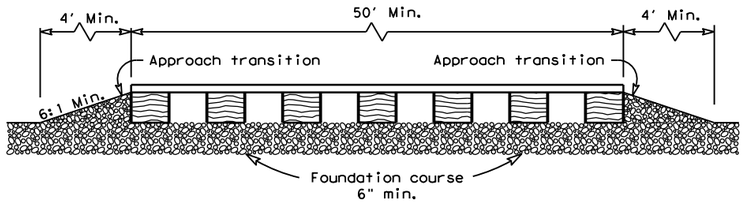
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

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

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

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

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		182

DATE: 12/2/2022
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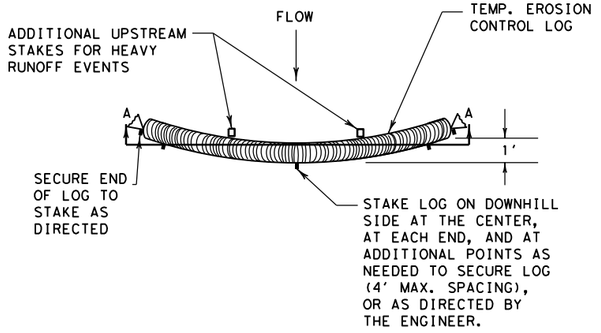
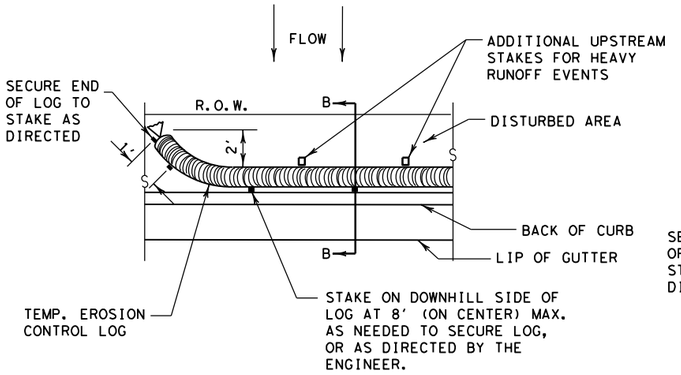
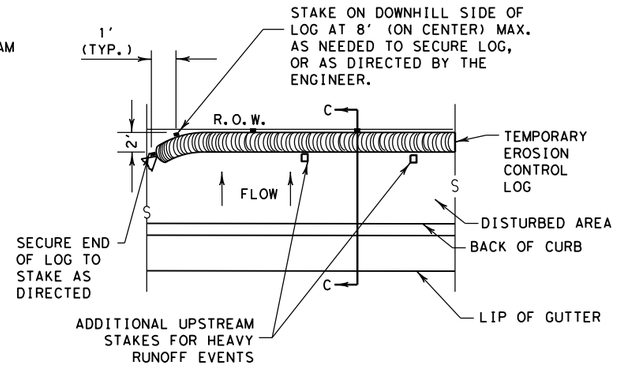


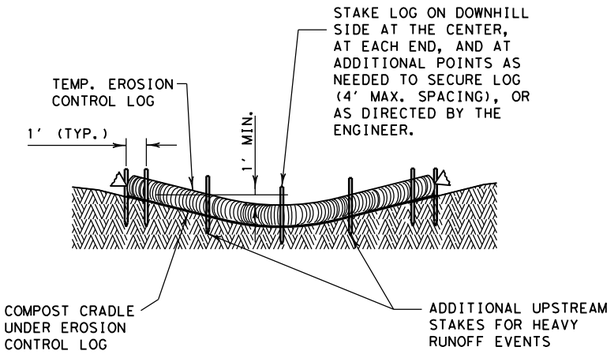
PLAN VIEW



PLAN VIEW



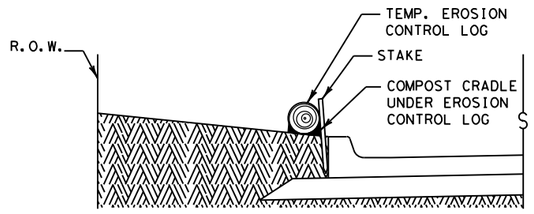
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

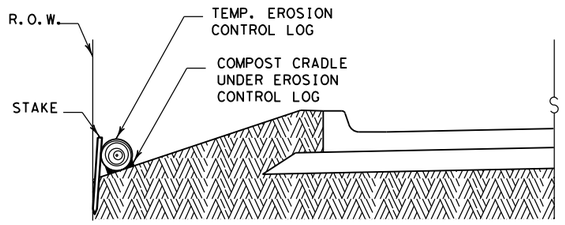
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

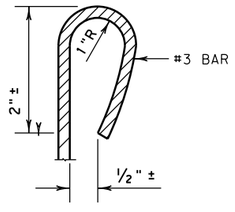
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

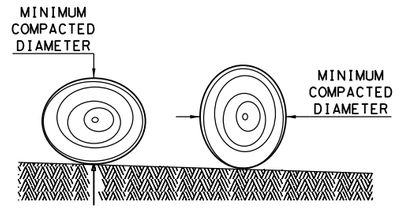
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

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

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

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0016	16	028		RM 967		
	DIST	COUNTY				SHEET NO.	
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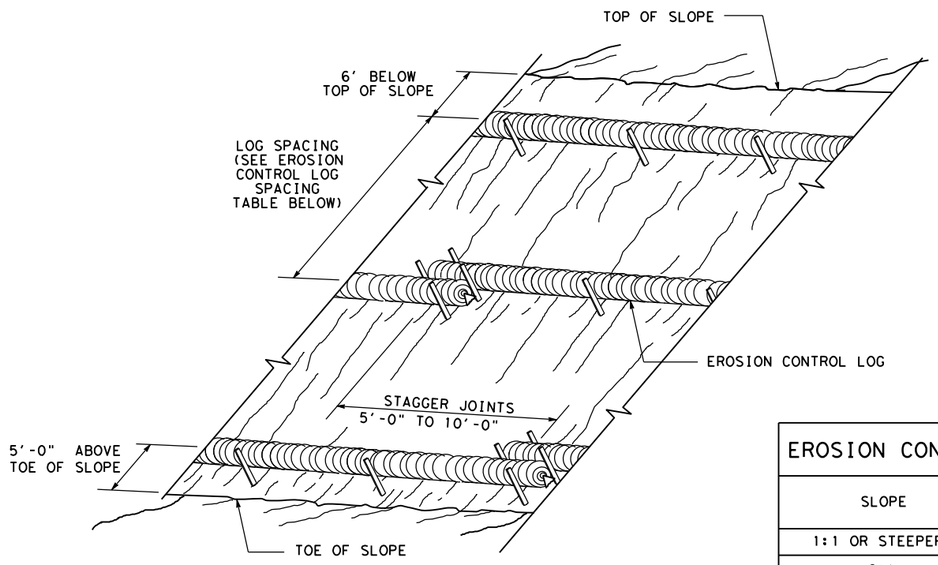
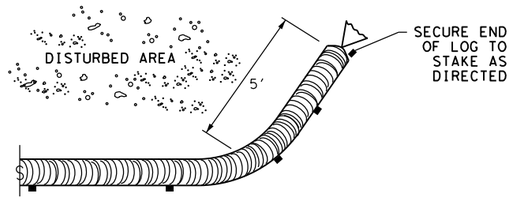


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

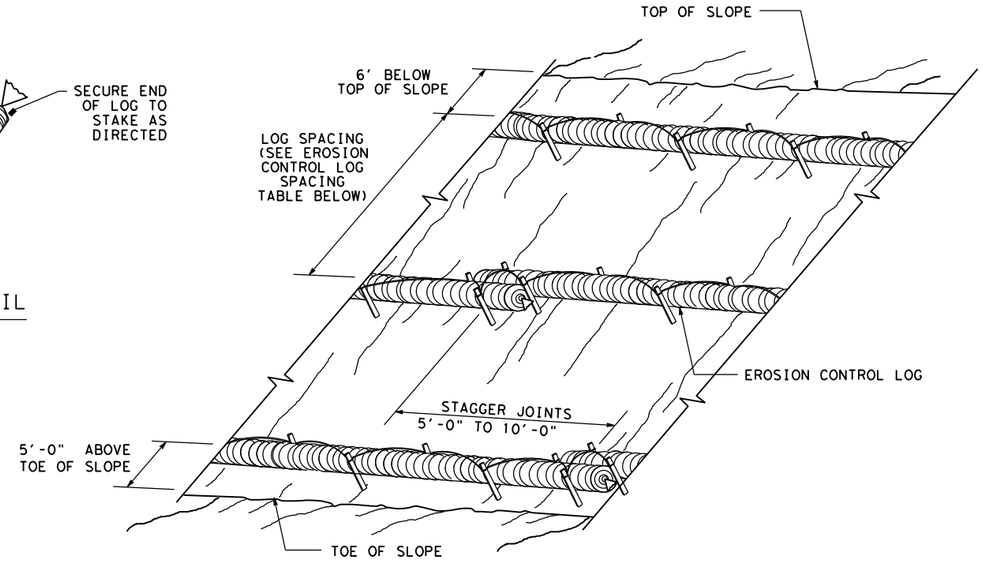
CL-SST



END SECTION RAP DETAIL

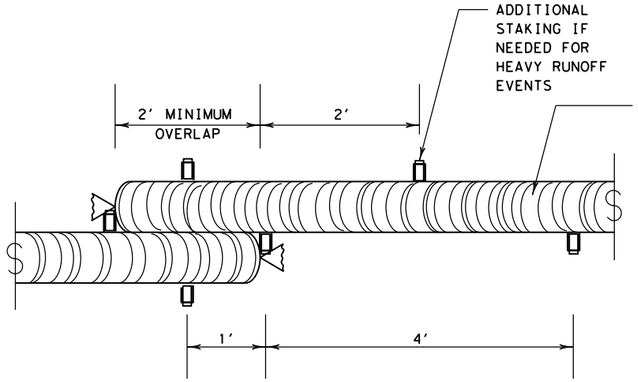
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

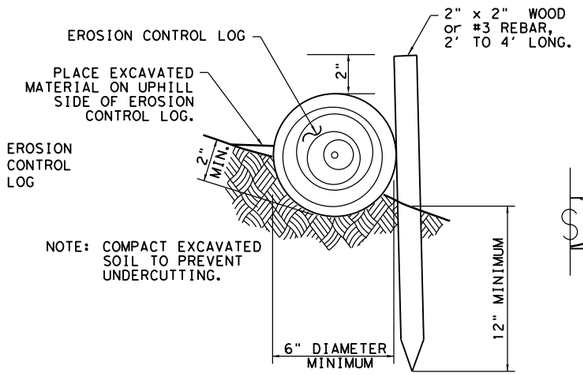
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

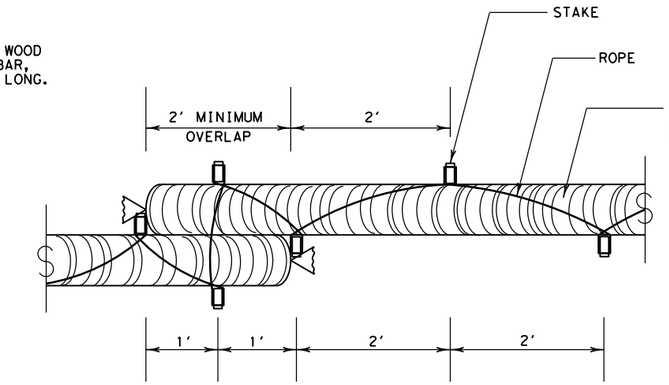


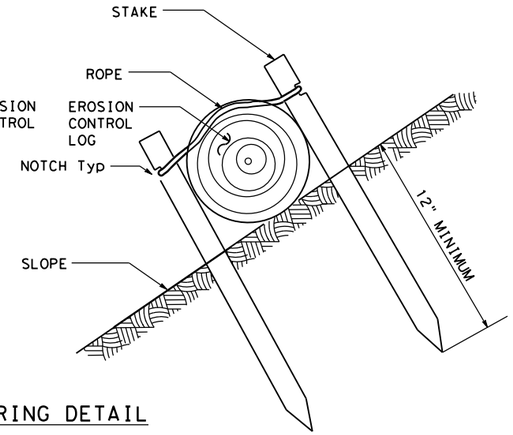


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

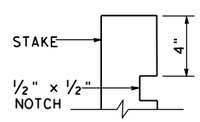
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0016	16	028		RM 967	
	DIST	COUNTY			SHEET NO.	
	AUS	HAYS			184	

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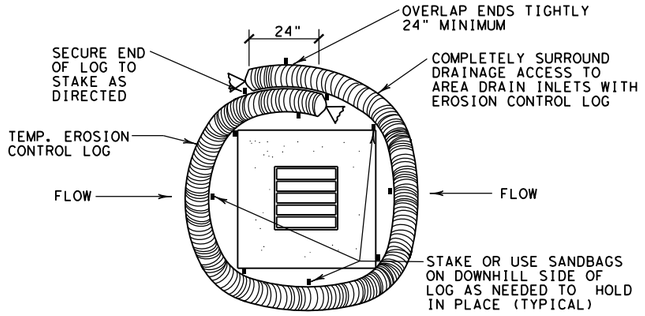
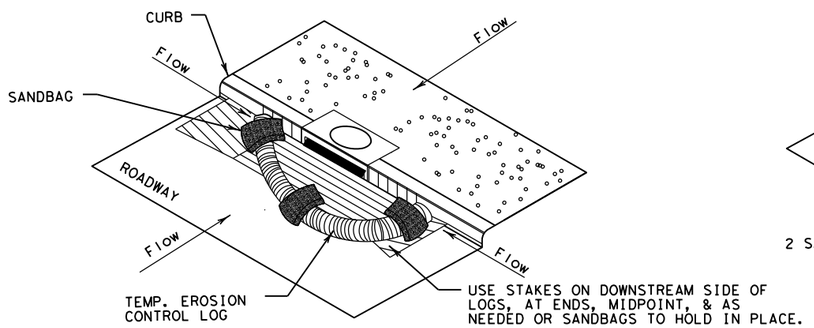


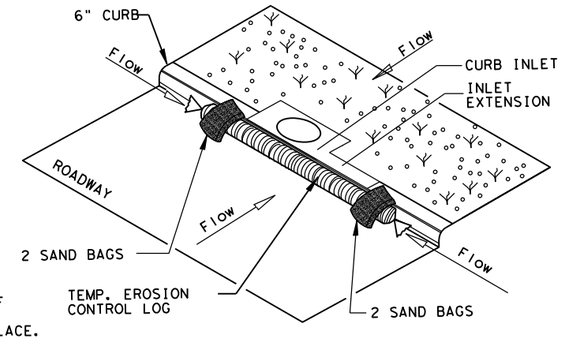
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

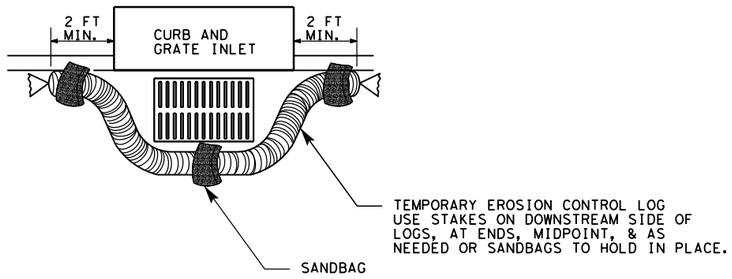
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

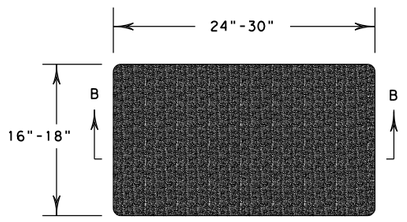
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		185

DATE: 12/21/2022 12:18:17 PM
FILE: G:\TXC\Projects\County_Hays\5344-00_RM 967\03_CADD\05_Exhibits\Exhibit PAGES OF WORK.dgn

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 447-646D
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: UPRR
Operating RR Company at Track: UPRR, BNSF, ATK
RR MP: 194.5
RR Subdivision: AUSTIN SUB
City: BUDA
County: HAYS
CSJ at this Crossing: 0016-16-028
Highway/Roadway name crossing the railroad: RM 967
# of regularly scheduled trains per day at this crossing: 21
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: <1%

Scope of Work at this Crossing to Be Performed by State Contractor:
ONE-LANE TWO-WAY TRAFFIC CONTROL OPERATIONS WILL BE IMPLETED THROUGH UPRR ROW. NO TCP SIGNS OR TCP CHANNELIZERS WITHIN RAILROAD ROW. RR FLAGGING TO BE PROVIDED FOR ENTIRE DURATION OF TCP THROUGH UPRR ROW. NO PROPOSED CONSTRUCTION WITHIN RAILROAD ROW.

Scope of Work at this Crossing to Be Performed by Railroad Company:
NONE

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

NONE

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 10

On this project, night or weekend flagging is:

☐ Expected
☒ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices
☒ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30 day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

☒ UPRR - UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
- UP.request@nrssinc.net
Call Center 877-984-6777

☐ BNSF - BNSF.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging

☐ KCS - KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
- Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS _____

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☒ Not Required

☐ Required: Contact Information for Construction Inspection:

_____
_____
_____

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

☐ Required
☒ Not Required

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Railroad reference number shall be provided by TxDOT CST or DO.

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several Railroad Companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000 combined single limit

Railroad Protective Liability		
☐	Not Required	
☒	Non - Bridge Projects	$2,000,000 / $6,000,000
☐	Bridge Projects	$5,000,000 / $10,000,000
☐	Other	

VI. CONTRACTOR'S RIGHT OF ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

☐ Not Required

☐ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)

☒ Required: UPRR Maintenance Consent Letter. TxDOT CST to assist.

☐ Required: Contractor to obtain (see Item 5, Article 8.4)
With the following railroad companies: _____

To view previously approved ROE Agreement templates agreed upon between the State and Railroad, see:

http://www.txdot.gov/inside-txdot/division/rail/samples.html

Approved ROE Agreement templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed ROE agreement between the Contractor and the Railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☐ Not Required
☒ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call: UNION PACIFIC RAILROAD
Railroad Emergency Line: 888-877-7267
Location: DOT 447646D
RR Milepost: 195.500
Subdivision: AUSTIN

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 9/2021	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		186

PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.

B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.

C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.

D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.

E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.

G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.

B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.

B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.

D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."

B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR)and 14'-0" (KCS) horizontal from centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

A. Maintain minimum track clearances during construction as specified in Section 3.07.

B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		187

3.09 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
   1. Pre-construction meetings.
   2. Pile driving/drilling of caissons or drilled shafts.
   3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
   4. Erection of precast concrete or steel bridge superstructure.
   5. Placement of waterproofing (prior to placing ballast on bridge deck).
   6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.

D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

   UPRR 1-800-336-9193
   7:00 AM to 9:00 PM CST Monday-Friday except holidays,
   staffed 24 hrs/day for emergencies
   48 hrs notice required

   BNSF 1-800-533-2891
   24 hour number
   5 working days notice required

   KCS 1-800-344-8377
   Texas One Call, a 24 hour number
   48 hrs notice required, excluding weekends and holidays

   If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of $\frac{1}{4}$ inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.16 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

Texas Department of Transportation — Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

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	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0016	16	028	RM 967
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		188